2

System Setup

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— Handheld Setup
— CPU Setup
— I/O Configuration

Auxiliary Functions

What are Auxiliary Functions?

Many Handheld tasks involve the use of AUX Functions. The AUX Functions perform many different operations, ranging from simple operating mode changes to copying programs to memory cartridges. These functions are discussed in more detail throughout the manual. They are divided into categories that affect different system parameters. You'll use AUX Functions for the following types of operations.

AUX Function and Description		DL430	DL440
AUX 1* — Operating Mode			
11	Go to Run Mode	❍	❍
12	Go to Test Mode	❍	❍
13	Go to Program Mode	❍	❍
14	Run Time Edit	×	❍
AUX 2* — RLL Operations			
21	Check Program	❍	❍
22	Change Reference	×	❍
23	Clear Ladder Range	❍	❍
24	Clear Ladders	❍	❍
AUX 3* — V-Memory Operations			
31	Clear V Memory	❍	❍
32	Clear V Range	❍	❍
33	Find V-memory Value	×	❍
AUX 4* — I/O Configuration			
41	Show I/O Configuration	❍	❍
42	I/O Diagnostics	❍	❍
44	Powerup I/O Configuration Check	❍	❍
45	Select Configuration	❍	❍
46	Configure I/O	×	❍
47	Intelligent I/O	❍	❍

AUX Function and Description		DL430	DL440
AUX 5* — CPU Configuration			
51	Modify Program Name	❍	❍
52	Display / Change Calendar	×	❍
53	Display Scan Time	❍	❍
54	Initialize Scratchpad	❍	❍
55	Set Watchdog Timer	❍	❍
56	Set CPU Network Address	❍	❍
57	Set Retentive Ranges	❍	❍
58	Test Operations	❍	❍
5C	Display Error History	×	❍
AUX 6* — Handheld Programmer Configuration			
61	Show Revision Numbers	❍	❍
62	Beeper On / Off	HP	HP
63	Backlight On / Off	HP	HP
64	Select Online / Offline	HP	HP
65	Run Self Diagnostics	HP	HP
AUX 7* — Memory Cartridge Operations			
71	CPU to Memory Cartridge	❍	❍
72	Memory Cartridge to CPU	❍	❍
73	Compare Memory Cart. to CPU	❍	❍
74	Memory Cartridge Blank Check	HP	HP
75	Clear Memory Cartridge	HP	HP
76	Display Memory Cartridge Type	❍	❍
77	Tape to Memory Cartridge	HP	HP
78	Memory Cartridge to Tape	HP	HP
79	Compare Memory Cart. to Tape	HP	HP
AUX 8* — Password Operations			
81	Modify Password	×	❍
82	Unlock CPU	×	❍
83	Lock CPU	×	❍

❍ — supported

× — not supported

HP — Handheld Programmer function

Accessing the AUX Functions

Clear the display

CLR CLR

```
                    
                    
```

Select Auxiliary function

AUX

```
AUX FUNCTION SELECTION
AUX 1* OPERATING MODE
```

Use NXT or PREV to cycle through the menus

NXT

```
AUX FUNCTION SELECTION
AUX 2* RLL OPERATIONS
```

Press ENT to select sub-menus

ENT

```
AUX 2* RLL OPERATIONS
AUX 21 CHECK PROGRAM
```

You can also enter the exact number of the AUX Function to go straight to the sub-menu.

Enter the AUX number directly

AUX 2 1 ENT

```
AUX 2* RLL OPERATIONS
AUX 21 CHECK PROGRAM
```

Handheld Setup

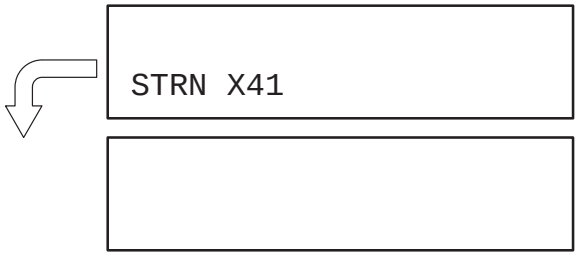
There are a few basic operations that you should be familiar with before you start using the Handheld. The next few pages provide an overview of the most basic Handheld features.

Clearing the Display

Sometimes we all make mistakes, so it's important to know how to clear the display and start from the beginning. The keystrokes needed depend on what you're trying to do, but one of two methods will always work. The following example shows two ways to clear the display.

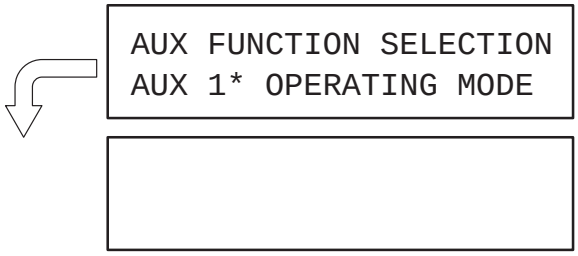
Use the CLR Key

CLR



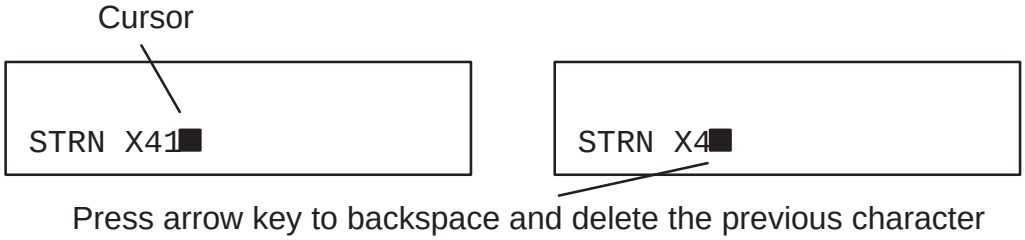
Use the EXIT Key to exit the AUX menus

SHFT EXIT



Using the Cursor

Once you start an operation, a flashing cursor appears. On some displays you can move this cursor left or right with the ← or → keys. If you move the cursor left, it acts just like the backspace key on a keyboard. Some menus also allow you to toggle between two choices by pressing the arrow keys.



Turning Off the Beeper

The Handheld has a beeper that provides confirmation of keystrokes. This can be quite annoying in an office environment. You can use Auxiliary (AUX) Function 62 to turn off the beeper.

Use the AUX menu

AUX

```
AUX FUNCTION SELECTION
AUX 1* OPERATING MODE
```

Enter 62 to select AUX 62

6 2 ↵

```
AUX 6* CFG MIU
AUX 62 BEEPER ON/OFF
```

Press ENT to turn off the beeper

ENT

Turning Off the Backlight

If necessary, you can turn off the display backlight. You can use Auxiliary (AUX) Function 63 to turn off the backlight.

Use the AUX menu

AUX

```
AUX FUNCTION SELECTION
AUX 1* OPERATING MODE
```

Enter 63 to select AUX 63

6 3 ↵

```
AUX 6* CFG MIU
AUX 63 BACKLIGHT ON/OFF
```

Press ENT to turn off the backlight

ENT

CPU Setup

A Few Things to Know

Even if you have years of experience using PLCs with handheld programmers, there are a few things you may need to know before you start entering programs. This section includes some basic things, such as changing the CPU mode, but it also includes some things that you may never have to use. Here's a brief list of the items that are discussed.

- Changing the CPU Modes
- Clearing the program (and other memory areas)
- How to initialize system memory
- Setting the CPU network address
- Setting retentive memory ranges
- Setting the Clock and Calendar

Changing the CPU Modes

There are three modes available with the DL405 CPUs.

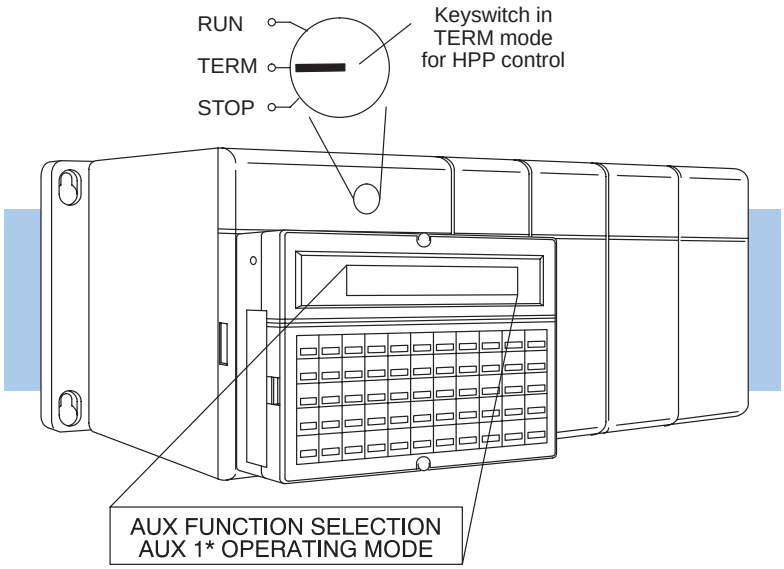
- RUN — executes program and updates I/O modules
- PGM — allows program entry, does not execute program or update I/O modules
- TEST — allows you to run a fixed number of scans and enables other TEST features. (See Chapter 6 for additional information.)

The DL405 User Manual provides additional information concerning the different modes of operation.

AUX 11, 12, and 13 are used to change the CPU operating mode. The CPU must be in PGM mode before you can enter a program. There are two ways to change to PGM mode.

1. Place the CPU keyswitch in the STOP position.
2. Place the CPU keyswitch in the TERM position and use the Handheld to change operating modes (AUX 13).

Here's an example that shows the keystrokes needed to change the CPU to Program mode.



Use the AUX menu

AUX

```
AUX FUNCTION SELECTION
AUX 1* OPERATING MODE
```

Enter 13 to select AUX 13

1 3 ↵

```
AUX 1* OPERATING MODE
AUX 13 GO TO PGM MODE
```

Press ENT to change to PGM mode

ENT ↵

```
PGM MODE?
```

Press ENT to confirm the change

ENT ↵

```
MODE = PGM
```

Clearing an Existing Program

Before you enter a new program, you should always clear ladder memory. You can use AUX Function 24 to clear the complete program.

Use AUX 24

AUX 2 4 ↵

```
AUX 2* RLL OPERATIONS
AUX 24 CLEAR LADDERS
```

Press ENT to clear the ladders

↵

```
CLR ALL LADDERS ?
```

Press ENT to confirm the operation

ENT ↵

```
CLR ALL LADDERS OK
```

You can also use other AUX functions to clear other memory areas.

- AUX 23 — Clear Ladder Range
- AUX 31 — Clear V Memory
- AUX 32 — Clear V Range

Initializing System Memory

The DL405 CPUs maintain system parameters in a memory area often referred to as the “scratchpad”. In some cases, you may make changes to the system setup that will be stored in system memory. For example, if you specify a range of Control Relays (CRs) as retentive, these data values will be stored in scratchpad memory.

NOTE: You may never have to use this feature unless you have made changes that affect system memory. Usually, you’ll only need to initialize the system memory if you are changing programs and the old program required a special system setup. You can usually change from program to program without ever initializing system memory.

AUX 54 resets the system memory to the default values.

Use AUX 54

AUX 5 4 ↵

```
AUX 54 INIT SCRATCH PAD
CLR XPAD?
```

Press ENT to return to the default values

↵

```
OK
```

Setting the CPU Network Address

Since the DL405 CPUs have built-in ***Direct***NET ports (25-pin), you can use the Handheld to set the network address for the port and the port communication parameters. The default settings are:

- Station address 1
- Hex mode
- Odd parity

The ***Direct***NET manual provides additional information about communication settings required for network operation.

NOTE: You will only need to use this procedure if you have the bottom port connected to a network, operator interface or personal computer.

Use AUX 56 to set the network address and communication parameters.

Use AUX 56

AUX 5 6 ENT ENT

```
AUX 56 CPU N/W ADDRESS
N/W #   01
```

Enter the new station address

0 3 ENT

```
AUX 56 CPU N/W ADDRESS
HEX / ASCII
```

Use the arrow keys to toggle between the settings

← ENT

```
AUX 56 CPU N/W ADDRESS
NONE / ODD
```

Use the arrow keys to toggle between the settings

← ENT

```
AUX 56 CPU N/W ADDRESS
OK
```

Setting Retentive Memory Ranges

The DL405 CPUs provide certain ranges of retentive memory by default. The default ranges are suitable for many applications, but you can change them if your application requires additional retentive ranges or no retentive ranges at all. The default settings are:

- Control Relays — C600 – C737
- V Memory — V2000 – V7377
- Timers — None by default (you can make them retentive though)
- Counters — CT0 – CT177
- Stages — None by default (you can make them retentive though)

Use AUX 57 to change the retentive ranges. You cannot select an individual memory type to change. Instead, you must cycle through the retentive range for each memory type. If you do not want to change the starting or ending address for one of the memory types, just press ***ENT*** to leave the entry as is. If you make a mistake, you can press ***SHFT DEL*** to return the memory type currently displayed to the default settings.

Use AUX 57 to set the ranges

AUX 5 7 ENT ENT

(One of two types of displays will appear.)

```
AUX 57 SET RET RANGES
1st C0600
```

Display with existing range

```
AUX 57 SET RET RANGES
1st C----
```

Display without an existing range

Enter the first retentive CR address

6 3 0 ENT

(Except for V Memory, all ranges must be entered in 8-bit increments.)

```
AUX 57 SET RET RANGES
END C0737
```

Enter the last retentive CR address

6 5 0 ENT

```
AUX 57 SET RET RANGES
1st V02000
```

Enter the first retentive V-Memory address

3 5 0 0 ENT

```
AUX 57 SET RET RANGES
END V07777
```

•
•
•

•
•
•

```
END
```

Setting the Clock and Calendar

The DL440 CPU has a clock and calendar feature. If you are using this, you can use the Handheld and AUX 52 to set the time and date. The following format is used.

- Date — Year, Month, Date, Day of week (0 – 6, Sunday thru Saturday)
- Time — 24 hour format, Hours, Minutes, Seconds

You can use the AUX function to change any component of the date or time. However, the CPU will not automatically correct any discrepancy between the date and the day of the week. For example, if you change the date to the 15th of the month and the 15th is on a Thursday, you will also have to change the day of the week (unless the CPU already shows the date as Thursday).

Use AUX 52 to set the time and date

AUX 5 2 ENT ENT

```
AUX 52 CHG CLOCK / CAL
YMD 94/01/01/6(SAT)
```

Enter the new date

9 4 0 1 0 2 0
ENT

```
AUX 52 CHG CLOCK / CAL
YMD 94/01/02/0(SUN)
```

(You can also use the arrow keys to move the cursor over the exact part you need to change. Or, if you don't need to change the date you can just press ENTER without changing any numbers to leave the date as is and change the time.)

Press Enter to accept the new date and display the time

ENT

```
AUX 52 CHG CLOCK / CAL
TIME 22:08:17
```

Enter the new time

2 3 0 8 1 7 ENT

```
AUX 52 CHG CLOCK / CAL
TIME 23:08:17
```

(You can also use the arrow keys to move the cursor over the exact part you need to change. Or, if you don't need to change the time you can just press ENTER without changing any numbers to leave the time as is.)

Press Enter to accept the changes and display the new date and time

ENT

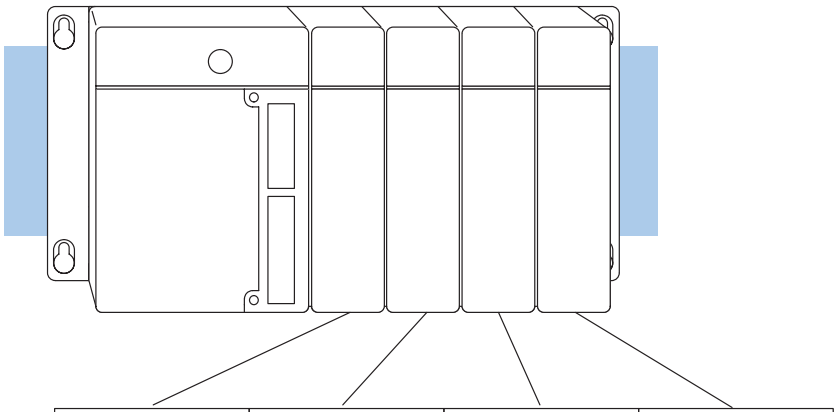
```
     94/01/02 23:08:17
```

I/O Configuration

Automatic Configuration

The DL405 CPUs automatically examine any installed I/O modules (including specialty modules) and establish the correct I/O configuration and addressing on power-up. For most applications, you never have to change or adjust the configuration.

The I/O addresses are assigned using octal numbering, starting at X0 and Y0. The addresses are assigned in groups of 8, 16, or 32, depending on the number of points for the I/O module. The discrete input and output modules can be mixed in any order, but there may be restrictions placed on some specialty modules. See the DL405 User Manual for details. The following diagram shows the I/O numbering scheme for an example system.



Automatically compensates for I/O types

Automatic I/O Configuration Check

The DL405 CPUs can also be set to automatically check the I/O configuration on power-up. By selecting this feature you can quickly detect any changes that may have occurred while the power was disconnected. For example, if someone placed an output module in a slot that previously held an input module, the configuration check would detect the change and a message would appear on the Handheld. Use AUX 44 to enable the configuration check.

Use AUX 44

AUX 4 4 ↵ ↵

```
AUX 44 POWERUP CFG CHK
       (YES/NO)
```

Use the arrow key to select the option

← ↵

```
PWRUP CHK ON
```

If the system detects a change in the I/O configuration at power-up, an error code E252 NEW I/O CONFIGURATION will be generated. You can use AUX 42 to determine the exact base and slot location where the change occurred.

Initial Error Display

```
E252 NEW I/O CFG
```

Press CLR to clear the display

CLR

```
E2** DIAG ERROR AUX 42
```

(The display suggests that you use AUX 42 to determine the error location.)

Use AUX 42

CLR AUX 4 2 ENT ENT

```
AUX 42 I/O BASE0/SLOT1
E252 I/O CONFIG. ERROR
```

WARNING: You should always correct any I/O configuration errors before you place the CPU into RUN mode. Uncorrected errors can cause unpredictable machine operation that can result in a risk of personal injury or damage to equipment.

Even though an error was generated, you may actually want the new I/O configuration to be used. For example, you may have intentionally changed the module to use with a new program. You can use AUX 45 to select the new configuration, or, keep the existing configuration stored in memory.

Use AUX 45

AUX 4 5 ↵ ↵

```
AUX 45 SELECT CFG
       (NEW/MEM)
```

Use the arrow key to select the option

↵ ↵

```
CFG      NEW
```

New configuration selected

```
CFG      MEM
```

Existing configuration selected

WARNING: Make sure the I/O configuration being selected will work properly with the CPU program. You should always correct any I/O configuration errors before you place the CPU into RUN mode. Uncorrected errors can cause unpredictable machine operation that can result in a risk of personal injury or damage to equipment.

Manual Configuration

You will probably never need to use this feature, but the DL440 CPU allows you to manually assign I/O addresses for any or all I/O slots on the local or expansion bases. This feature is useful if you have a standard configuration that you must sometimes change slightly to accommodate special requests. For example, you may require two adjacent input modules to have addresses starting at X10 and X200 respectively.

In automatic configuration, the addresses were assigned on 8-point boundaries. Manual configuration assumes that all modules are at least 16 points, so you can only assign addresses that are a multiple of 20 (octal). For example, X30 and Y50 would not be valid addresses. This does not mean that you can only use 16 or 32 point modules with manual configuration. You can use 8 point modules, but 16 addresses will be assigned and 8 of them are unused.

Use AUX 46 to select Manual I/O Configuration.

Use AUX 46

AUX 4 6 ENT ENT

```
AUX 46 CFG I/O
    1->AUTO  2->MAN
```

Select Manual Configuration

2 ENT

```
AUX 46 CFG I/O
0/0  X   0  ------
```

base slot type starting address

Use PREV or NXT to scroll to the base and slot you want to change

NXT

```
AUX 46 CFG I/O
0/1 ------ Y  0
```

OR

Press CLR and enter the base and slot number

CLR 0 2 NXT

```
AUX 46 CFG I/O
0/2  X  20  ------
```

Enter the new starting address

X(IN) 1 0 0 ENT

(The display scrolls to the next slot and updates the addresses.)

```
AUX 46 CFG I/O
0/3  X  20  ------
```

Exit the AUX function to save the change

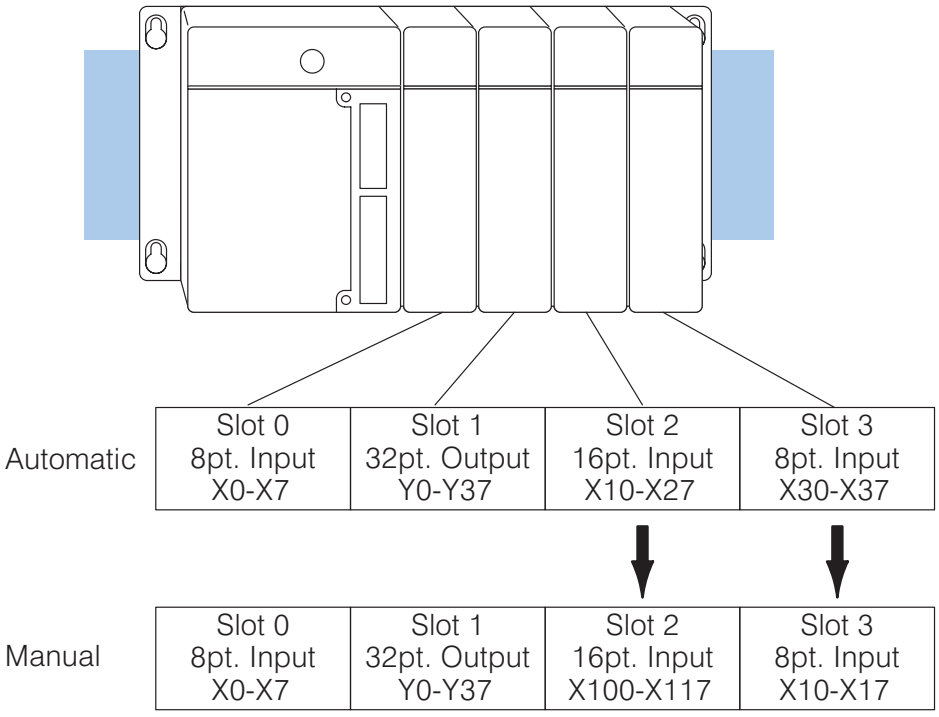
SHFT EXIT

```

```

WARNING: If you manually configure an I/O slot, the I/O addressing for the other modules will change. This is because the DL405 products do not allow you to assign duplicate I/O addresses. You should always correct any I/O configuration errors before you place the CPU into RUN mode. Uncorrected errors can cause unpredictable machine operation that can result in a risk of personal injury or damage to equipment.

The following diagram shows how I/O addresses can be affected after a slot has been manually configured.



Removing a Manual Configuration

Once you have manually configured the addresses for an I/O slot, the system will automatically retain these values even after a power cycle. You can remove any manual configuration changes by simply performing an automatic configuration. AUX 46 executes an automatic configuration, which allows the CPU to examine the installed modules and determine the I/O configuration and addressing.

Use AUX 46

AUX 4 6 ↵ ↵

```
AUX 46 CFG I/O
    1->AUTO  2->MAN
```

Select Automatic Configuration

1 ↵

```
AUX 46 CFG I/O
    OK
```

Now that you understand the basics of the DL405 Handheld Programmer and how to perform many different types of system setup operations, you are ready to enter a program.