

# Changing Programs

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  - Changing an Instruction
  - Inserting an Instruction
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  - Using Search and Replace
  - Editing Programs During Run Mode
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## Two Ways to Edit a Program

### Editing Modes

To edit a program you may select either '**PROGRAM**' or '**RUN-TIME EDIT**' mode. The Program Mode is most commonly used for editing programs. The Run-Time Edit mode is helpful for very minor program changes or adjustments. The Handheld programmer will *not* allow changing from Program Mode, to Run Modes, if no program exists or program is missing the END command. This section begins with explaining the Program Mode and later discusses how to use the Run-Time Edit mode.

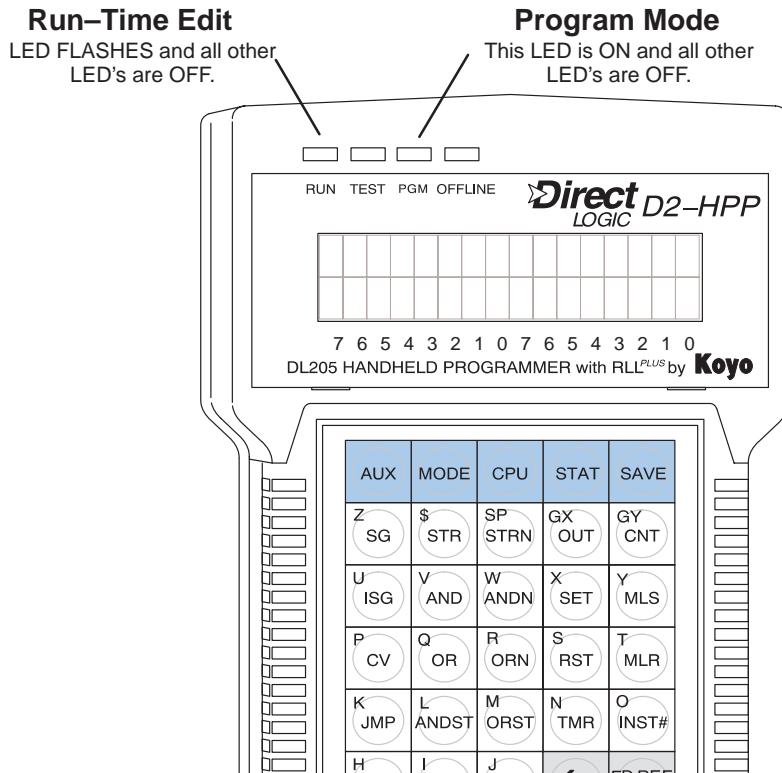
### Program Mode

In the Program Mode, you can insert, edit, change, and delete mnemonic instructions. To enter a new network, you must carefully place the new instructions at the END or between the existing networks (after an OUT). During the Program edit mode the DL105 and DL205 CPU does not execute the application program, preventing unexpected machine control while editing the PLC program.

### Run-Time Edit Mode (DL205 Only)

The DL240 CPU will allow you to edit programs during Run-Time Edits mode. While in the Run-Time Edits mode, most of the Handheld programmer functions operate the same as Program mode. For example, you can use the same techniques to search for a specific instruction, search for a specific address, etc. However, you cannot use Search and Replace during Run Mode. More details Run-Time Edit mode are discussed later in this chapter.

The figure below, shows the LED indicator status for the Program and Run-Time Edit modes.



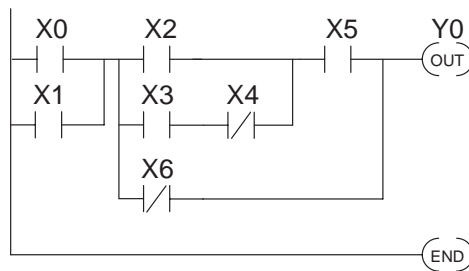
# Displaying a Program

The Handheld programmer display screen allows viewing your program in the mnemonic instruction format. You may scroll through the individual instructions which are programmed using the **NEXT / PREV** keys. Depending on which mode you have selected, the display will maintain different screen formats. You may view the instruction address by pressing the left arrow key (←). The different display modes and characteristics are discussed in Chapters 1 and 6.

## Combination Mnemonic Example

ADDRESS	INSTRUCTION	DESCRIPTION
\$00000	STR X0	Starts branch 1 with X0
\$00001	OR X1	Joins X1 in parallel with X0
\$00002	STR X2	Starts branch 2 with X2
\$00003	STR X3	Starts branch 3 with X3
\$00004	ANDN X4	Joins X4 (NOT) with X3
\$00005	ORSTR	Joins branches 2 and 3
\$00006	AND X5	Starts branch 4 with X5
\$00007	ORN X6	Joins X6 (NOT) in parallel with X5
\$00008	ANDSTR	Joins branches 4 and 5 with 1-3
\$00009	OUT Y0	Stores the output and finishes the network
\$00010	END	Ends the program

Equivalent Ladder Logic



D2-HPP Example Display

S	T	A	R	T	O	F	P	R	O	G	R	A	M
S	T	R	X	1									

S	T	A	R	T	O	F	P	R	O	G	R	A	M
\$	0	0	0	0	S	T	R	X	0				

Starting Address

Instruction

Element Type and Reference

**Searching a Program Address**

The Handheld programmer allows you to search and view your mnemonic instruction program. Once again, the display screen may have a different format depending on the mode selected. The figures below are display examples during the Run mode. The bit status of the instruction is indicated in the top right corner the display screen. If the ■ symbol appears the instructions bit status is true or (ON). If the S character appears the bit status is false or (OFF). To search the starting instruction or find a specific instruction address in your program, follow the examples below.

**Searching Start of Program**

**Press these keystrokes**

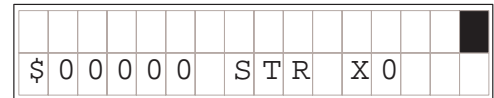
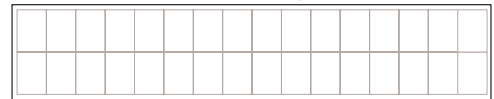
1. Clear complete display screen  

CLR	CLR	CLR
-----	-----	-----
  
2. To search start of program (address \$00000)  

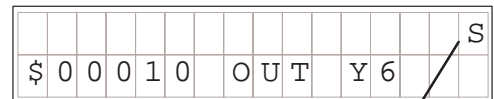
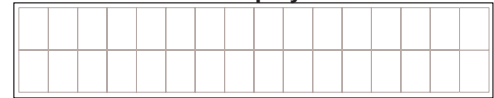
SHFT	\$	STR	NEXT
------	----	-----	------
  
3. To display instruction address  

←
---

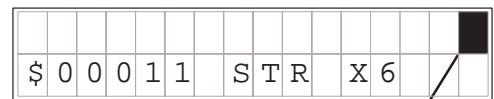
**D2-HPP Display Results**



**D2-HPP Display Results**



"S" indicates OFF  
When in RUN or TEST-RUN mode



Solid fill indicates ON  
When in RUN or TEST-RUN mode

**Searching Specific Address**

1. Clear complete display screen  

CLR	CLR	CLR
-----	-----	-----
  
2. To search specific instruction address (\$00010)  

SHFT	\$	STR	B	1	A	0	NEXT
------	----	-----	---	---	---	---	------
  
3. To display NEXT instruction  

NEXT
------

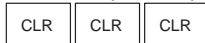
## Finding Instructions

The Handheld programmer may search instruction or reference numbers using the Find function. Use the **FIND** key to search an instruction or specific reference number. To select different instruction types press the **NEXT / PREV** keys during operand entry. After completing the entry press the **FIND** key to begin search. You may search any instruction type used within your PLC program. The following figure demonstrates how to search the instruction STR X1 using the Find function.

### Finding Specific Reference

#### Press these keystrokes

1. Clear complete display screen



2. To find an instruction type and reference



\* Press the NEXT/PREV key after the right arrow key to select different references.

#### HPP Display Results


S	T	R		X	1										

\$	0	0	0	0	2	S	T	R	X	0					
\$	0	0	0	0	3	S	T	R	X	1					

#### To Search Specific Reference

Clear complete display screen

1. 

CLR	CLR	CLR
-----	-----	-----

To find specific reference number

2. 

SHFT	X	F	SHFT	FD REF
	SET	5		FIND


X	5														

\$	0	0	0	0	5	O	R	S	T	R					
\$	0	0	0	0	6	A	N	D	X	5					

If the memory reference or instruction is not found, one of the following error messages 'E604 REF MISSING' or 'E602INST MISSING' are displayed. (If you think the message is incorrect, re-enter your keystrokes and try the operation again.)

# Changing an Instruction

## Preparing Mode for Changes

The Handheld programmer allows you to change the Mnemonic instructions. If possible program changes should be performed in Program Mode. When switch from Run Mode to Program Mode the display screen will display your first instruction programmed. You should consider which mode the Handheld programmer is in, prior to attempting a search function. The Handheld programmer must be in one of the following modes to perform program changes.

- Program Mode
- Run-Time Edit Mode
- Test-Program Mode

The following figures and examples should be performed in the Program Mode. This example demonstrates how to find and change the X5 contact to X10.

### Press these Keystrokes

#### To Find instruction

Clear complete display screen

1.

Enter the reference to search

2.

#### To Change the instruction

Cursor to reference number

3.

Enter new instruction and display next

4.

### HPP Display Results

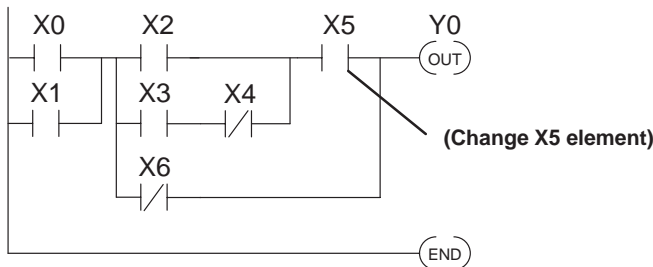
S	E	A	R	C	H	I	N	G												

\$	0	0	0	0	5		O	R	S	T	R									
\$	0	0	0	0	6		A	N	D		X	5								

O	R	S	T	R																
A	N	D		X	1	0														

A	N	D		X	1	0														
O	R	N		X	6															

### Equivalent Ladder Logic



### Mnemonic Example Program

ADDRESS	INSTRUCTION
\$00000	STR X0
\$00001	OR X1
—	—
—	—
<b>\$00006</b>	<b>AND X5</b>
—	—
—	—
\$00010	END

# Inserting an Instruction

You may insert mnemonic instructions by using the **INS** (insert ) key. Pressing the **INS** key places the instruction *after* the instruction that is being displayed. You should first consider the desired location where to insert. The insert function duplicates the instruction displayed, and increments all remaining addresses. You should then enter a the desired instruction and reference. Use the following example to search and insert a new mnemonic instruction.

### Press these Keystrokes

#### To Find insert location

1. Locate NOT X6 contact  

R	→	G	FD REF
AND		5	FIND
2. Press INS key to begin insert operation  

ON
INS
3. Press ENT to confirm (or CLR to exit)  

ENT
-----
4. Enter NEW instruction and element  

V	→	H	ENT
AND		7	

### D2-HPP Display Results

S	E	A	R	C	H	I	N	G												

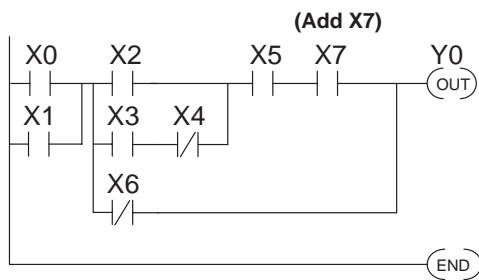
\$	0	0	0	0	6		O	R	S	T	R									
\$	0	0	0	0	7		A	N	D		X	5								

I	N	S	E	R	T		I	N	S	T	?									
\$	0	0	0	0	7		A	N	D		X	5								

\$	0	0	0	0	7		A	N	D		X	5								
\$	0	0	0	0	8		A	N	D		X	5								

A	N	D					X	5												
A	N	D					X	7												

### Equivalent Ladder Logic



### Mnemonic Example Program

\$00000	STR X0
\$00001	OR X1
—	—
\$00006	AND X5
—	<b>AND X7</b>
\$00007	ORN X6
—	—
\$00010	END

Location to search

# Deleting an Instruction

Use the delete feature to remove an instruction from your program. The **DEL** key deletes the instruction that is currently being displayed. Note to make sure you are at the desired location within program prior to the Delete operation. Once you've deleted the instruction, the remaining addresses will automatically decrement. The following example demonstrates using the Delete function.

### Press these Keystrokes

1. Locate X7 contact  

V	AND
---	-----

→
---

H	7
---	---

FD REF	FIND
--------	------
2. To Delete instruction  

OFF	DEL
-----	-----
3. Press ENT to confirm (or CLR to reject)  

ENT
-----

### D2-HPP Display Results

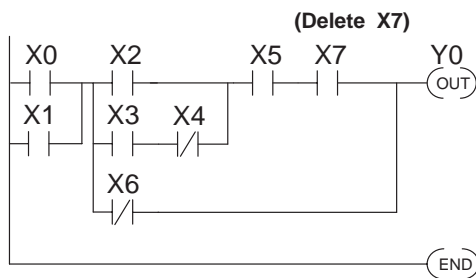
S	E	A	R	C	H	I	N	G												

\$	0	0	0	0	6		A	N	D		X	1	0						
\$	0	0	0	0	7		A	N	D		X	7							

D	E	L	E	T	E		I	N	S	T	?								
\$	0	0	0	0	7		A	N	D		X	7							

\$	0	0	0	0	7		A	N	D		X	7							
\$	0	0	0	0	8		A	N	D		X	7							

### Equivalent Ladder Logic



### Mnemonic Example Program

	\$00000	STR X0
	\$00001	OR X1
	—	—
Location to search	\$00006	AND X5
		<b>AND X7</b>
	\$00007	ORN X6
	—	—
	\$00010	END



# Using Search and Replace

The **AUX 22** function allows you to Search and Replace all occurrences of a specific instruction. The example below demonstrates replacing every instance of X5 with X10.

## Press these Keystrokes

1. Clear complete display screen
  
2. Use AUX 22 to change memory references
  
3. Enter beginning address for the change or press ENT to accept the default
  
4. Enter ending address for the change or press ENT to accept the default
  
5. Enter old memory reference
  
6. Enter new memory reference
  
7. Press ENT to confirm change

- Use CLR key to exit AUX 22 function

## D2-HPP Display Results


AUX	2	*		R	L	L		O	P	E	R	A							
AUX	2	2		C	H	N	G	E		R	E	F							

AUX	2	2		C	H	N	G	E		R	E	F							
l	s	t		\$	0	0	0	0	0										

AUX	2	2		C	H	N	G	E		R	E	F							
E	N	D		\$	1	6													

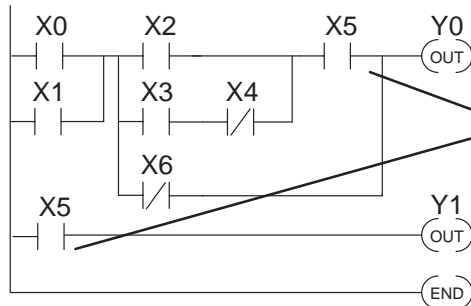
AUX	2	2		C	H	N	G	E		R	E	F							
O	L	D								X	5								

AUX	2	2		C	H	N	G	E		R	E	F							
T	O									X	1	0							

AUX	2	2		C	H	N	G	E		R	E	F							
X	0	0	0	5	-	>		X	0	0	1	0							

R	E	F	E	R	E	N	C	E		C	H	A	N	G	E				
O	L	D		X															

## Equivalent Ladder Logic



Replace with X10

## Mnemonic Example Program

\$00000		STR X0
\$00006		AND X10
\$00010		STR X10

## Editing Programs During Run Mode

The DL205 CPU's allow you to edit programs during Run mode. To modify a program in RUN mode use **MODE** key to select "RUN-TIME EDITS".

The operations you are able to perform in Program mode also apply in the Run-Time mode. For example, you can use the same techniques to search for a specific instruction, search for a specific address, etc. However, you cannot use Search and Replace during Run Mode.

The Run-Time Edits are not "bumpless". Instead, the CPU maintains the outputs in their last state while it accepts the new program information. If an error is found in the new program, then the CPU will turn all the outputs off and change to Program Mode.

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**WARNING:** Only authorized personnel fully familiar with all aspects of the PLC application should make changes to the program. Changes during Run Mode become effective immediately. Make sure you thoroughly consider the impact of any changes to minimize the risk of personal injury or damage to equipment.

Edits during Run Mode are ideally suited to small changes. If the program requires major changes it is strongly recommended you switch the system to program mode and take all necessary precautions just as if you were starting the machine for the first time.

There are some important operation sequence changes during Run Time Edits.

1. If there is a syntax error in the new instruction, the CPU *will not* enter the Run Mode.
  2. If you delete an output coil reference and the output was on at the time, the output will remain on until it is forced off with a programming device.
  3. Input point changes are not acknowledged during Run Time Edits. So, if you're using a high-speed operation and a critical input comes on, the CPU may not see the change.
-

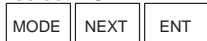
**Selecting Runtime Edits**

The figure below demonstrates how to select the Runtime edit feature. Note the following are some conditions which pertain during Run-Time Edit mode.

- Once you select RUNTIME EDITS the RUN LED starts blinking. This indicates a edit may be performed while in the Run mode.
- If you had displayed an address just before selecting Run-Time Edit mode, you may immediately jump to the same address by pressing the **NEXT** key. This allows you to search for an address or instruction *before* you change the mode.

**Press these Keystrokes**

1. While in the Run Mode select RUNTIME EDIT mode



2. Confirm mode change



3. Confirm mode change



**D2-HPP Display Results**

*	M	O	D	E		C	H	A	N	G	E	*				
G	O	T	O			P	G	M		M	O	D	E			

*	M	O	D	E		C	H	A	N	G	E	*				
R	U	N	T	I	M	E		E	D	I	T	S	?			

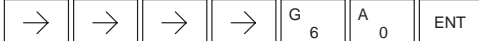
*	M	O	D	E		C	H	A	N	G	E	*				
R	U	N	T	I	M	E		E	D	I	T	S				

**Changing Constant Values During Run Mode**

Changing the value of a constant in an instruction during Run Mode works the same as it does during Program Mode. The following example is not reflected in the short program we have been working with, since it does not contain any instructions with a constant value. This example shows how to modify the preset value of an Up Down Counter.

**Press these Keystrokes**

1. Locate and display the instruction with the constant you want to change
2. Position cursor on constant value and enter new value



**D2-HPP Display Results**

																S
U	D	C		C	T	1	6		K	5	0					

E	N	D														
---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- The change in value is not saved until you press the ENT key.
- After pressing the ENT key, the next instruction programmed will automatically be displayed.