

Auxiliary Functions

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Introduction

What are Auxiliary Functions?

Many CPU setup tasks involve the use of Auxiliary (AUX) Functions. The AUX Functions perform many different operations, ranging from clearing ladder memory, displaying the scan time, copying programs to EEPROM in the handheld programmer, etc. They are divided into categories that affect different system parameters. You can access the AUX Functions from **DirectSOFT™** or from the DL205 Handheld Programmer. The manuals for those products provide step-by-step procedures for accessing the AUX Functions. Some of these AUX Functions are designed specifically for the Handheld Programmer setup, so they will not be needed (or available) with the **DirectSOFT** package. Even though this Appendix provides many examples of how the AUX functions operate, you should supplement this information with the documentation for your choice of programming device. Note, the Handheld Programmer may have additional AUX functions that are not supported with the DL350 CPU.

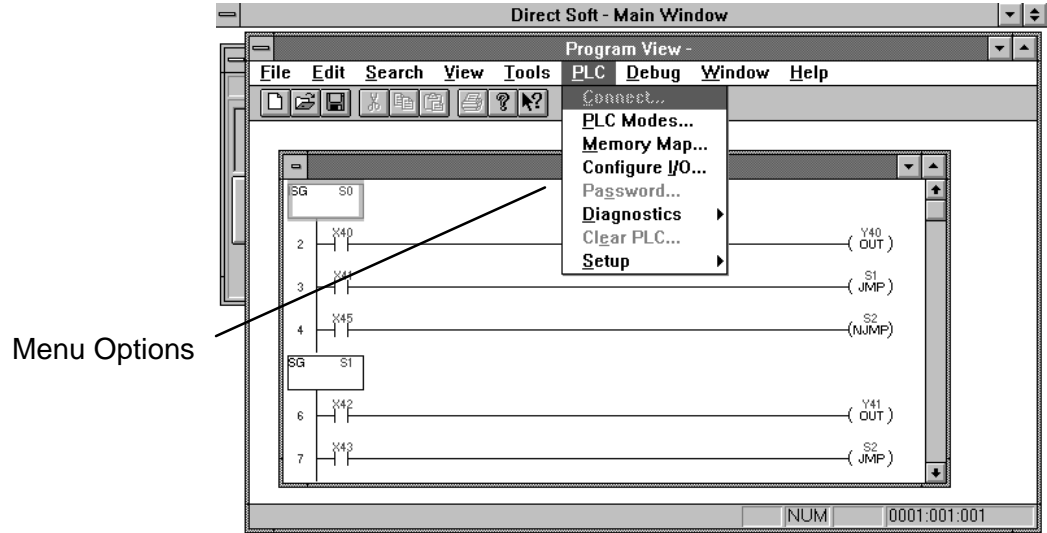
AUX Function and Description	350	HPP
AUX 2* — RLL Operations		
21 Check Program	✓	–
22 Change Reference	✓	–
23 Clear Ladder Range	✓	–
24 Clear All Ladders	✓	–
AUX 3* — V-Memory Operations		
31 Clear V Memory	✓	–
AUX 4* — I/O Configuration		
41 Show I/O Configuration	✓	–
42 I/O Diagnostics	×	–
44 Power-up I/O Configuration Check	×	–
45 Select Configuration	×	–
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	×	–
59 Bit Override	×	–
5B Counter Interface Config.	×	–
5C Display Error History	✓	–

AUX Function and Description	350	HPP
AUX 6* — Handheld Programmer Configuration		
61 Show Revision Numbers	✓	✓
62 Beeper On / Off	×	✓
65 Run Self Diagnostics	×	✓
AUX 7* — EEPROM Operations		
71 Copy CPU memory to HPP EEPROM	×	✓
72 Write HPP EEPROM to CPU	×	✓
73 Compare CPU to HPP EEPROM	×	✓
74 Blank Check (HPP EEPROM)	×	✓
75 Erase HPP EEPROM	×	✓
76 Show EEPROM Type (CPU and HPP)	×	✓
AUX 8* — Password Operations		
81 Modify Password	✓	–
82 Unlock CPU	✓	–
83 Lock CPU	✓	–

- ✓ supported
- × not supported
- not applicable

Accessing AUX Functions via DirectSOFT

DirectSOFT™ provides various menu options during both online and offline programming. Some of the AUX functions are only available during online programming, some only during offline programming, and some during both online and offline programming. The following diagram shows an example of the PLC operations menu available within DirectSOFT.



Accessing AUX Functions via the Handheld Programmer

You can also access the AUX functions by using a Handheld Programmer. Plus, remember some of the AUX functions are only available from the Handheld. Sometimes the AUX name or description cannot fit on one display. If you want to see the complete description, press the arrow keys to scroll left and right. Also, depending on the current display, you may have to press CLR more than once.



AUX FUNCTION SELECTION
AUX 2 * RLL OPERATIONS

Use NXT or PREV to cycle through the menus



AUX FUNCTION SELECTION
AUX 3 * V OPERATIONS

Press ENT to select sub-menus



AUX 3 * V OPERATIONS
AUX 31 CLR V MEMORY

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

Enter the AUX number directly



AUX 3 * V OPERATIONS
AUX 31 CLR V MEMORY

AUX 2* — RLL Operations

AUX 21, 22, 23 and 24

There are four AUX functions available that you can use to perform various operations on the control program.

- AUX 21 — Check Program
- AUX 22 — Change Reference
- AUX 23 — Clear Ladder Range
- AUX 24 — Clear Ladders

AUX 21 Check Program

Both the Handheld and *DirectSOFT*™ automatically check for errors during program entry. However, there may be occasions when you want to check a program that has already been in the CPU. There are two types of checks available:

- Syntax
- Duplicate References

The Syntax check will find a wide variety of programming errors, such as missing END statements, incomplete FOR/NEXT loops, etc. If you perform this check and get an error, see Appendix B for a complete listing of programming error codes. Correct the problem and then continue running the Syntax check until the message “NO SYNTAX ERROR” appears.

Use the Duplicate Reference check to verify you have not used the same output coil reference more than once. Note, this AUX function will also find the same outputs even if they have been used with the OROUT instruction, which is perfectly acceptable.

This AUX function is available on the PLC Diagnostics sub-menu from within *DirectSOFT*.

AUX 22 Change Reference

There will be times when you need to change an I/O address reference or control relay reference. AUX 22 allows you to quickly and easily change all occurrences, (within an address range), of a specific instruction. For example, you can replace every instance of X5 with X10.

AUX 23 Clear Ladder Range

There have been many times when you take existing programs and add or remove certain portions to solve new application problems. By using AUX 23 you can select and delete a portion of the program. *DirectSOFT* does not have a menu option for this AUX function, but you can select the appropriate portion of the program and cut it with the editing tools.

AUX 24 Clear Ladders

AUX 24 clears the entire program from CPU memory. Before you enter a new program, you should always clear ladder memory. This AUX function is available on the PLC/Clear PLC sub-menu within *DirectSOFT*.

AUX 3* — V-memory Operations

- AUX 31 — Clear V memory

AUX 31 Clear V Memory

AUX 31 clears all the information from the V-memory locations available for general use. This AUX function is available on the PLC/Clear PLC sub-menu within *DirectSOFT*.

AUX 4* — I/O Configuration

AUX 41 Show I/O Configuration

This AUX function allows you to display the current I/O configuration. With the Handheld Programmer, you can scroll through each base and I/O slot to view the complete configuration. The configuration shows the type of module installed in each slot. *DirectSOFT*™ provides the same information, but it is much easier to view because you can view a complete base on one screen.

AUX 5* — CPU Configuration

AUX 51 – 58

There are several AUX functions available that you can use to setup, view, or change the CPU configuration.

- AUX 51 — Modify Program Name
- AUX 52 — Display / Change Calendar
- AUX 53 — Display Scan Time
- AUX 54 — Initialize Scratchpad
- AUX 55 — Set Watchdog Timer
- AUX 56 — Configure Comm Port
- AUX 57 — Set Retentive Ranges
- AUX 5C — Display Error / Message History

AUX 51 Modify Program Name

The DL305 products can use a program name for the CPU program or a program stored on EEPROM in the Handheld Programmer. Note, you cannot have multiple programs stored on the EEPROM. 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. You can also perform this operation from within *DirectSOFT*™ by using the PLC/Setup sub-menu. Once you've entered a program name, you can only clear the name by using AUX 54 to reset the system memory. Make sure you understand the possible ramifications of AUX 54 before you use it!

AUX 52 Display /Change Calendar

The DL350 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).

You can also perform this operation from within *DirectSOFT* by using the PLC/Setup sub-menu.

**AUX 53
Display Scan Time**

AUX 53 displays the current, minimum, and maximum scan times. The minimum and maximum times are the ones that have occurred since the last Program Mode to Run Mode transition. You can also perform this operation from within **DirectSOFT** by using the PLC/Diagnostics sub-menu.

**AUX 54
Initialize
Scratchpad**

The DL350 CPU maintains 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 changes are stored.



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. You can also perform this operation from within **DirectSOFT™** by using the PLC/Setup sub-menu.

**AUX 55
Set Watchdog
Timer**

The DL350 CPU has a “watchdog” timer that is used to monitor the scan time. The default value set from the factory is 200 ms. If the scan time exceeds the watchdog time limit, the CPU automatically leaves RUN mode and enters PGM mode. The Handheld displays the following message E003 S/W TIMEOUT when the scan overrun occurs.

Use AUX 55 to increase or decrease the watchdog timer value. You can also perform this operation from within **DirectSOFT** by using the PLC/Setup sub-menu.

**AUX 56
CPU Network
Address**

Since the DL350 CPU has an additional communication port, 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

You can use this port with either the Handheld Programmer, **DirectSOFT**, or, as a **DirectNET** communication port. The **DirectNET** 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. Otherwise, the default settings will work fine.

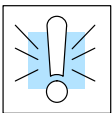
Use AUX 56 to set the network address and communication parameters. You can also perform this operation from within **DirectSOFT** by using the PLC/Setup sub-menu.

AUX 57 Set Retentive Ranges

The DL350 CPU provides 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:

Memory Area	DL350	
	Default Range	Avail. Range
Control Relays	C1000 – C1777	C0 – C1777
V Memory	V1400 – V37777	V0 – V37777
Timers	None by default	T0 – T377
Counters	CT0 – CT177	CT0 – CT177
Stages	None by default	S0 – S1777

Use AUX 57 to change the retentive ranges. You can also perform this operation from within *DirectSOFT*™ by using the PLC/Setup sub-menu.



WARNING: The DL350 CPUs do not come with a battery. The super capacitor will retain the values in the event of a power loss, but only up to 1 week. The retention time may be less in some conditions. If the retentive ranges are important for your application, make sure you obtain the optional battery.

AUX 5C Display Error History

The DL350 CPU will automatically log any system error codes and custom messages created with the FAULT instructions. The CPU logs the error code, date, and time the error occurred. There are two separate tables that store this information.

- Error Code Table – the system logs up to 32 errors in the table. When an error occurs, the errors already on the table are pushed down and the most recent error is loaded into the top slot. If the table is full when an error occurs, the oldest error is pushed out (erased) of the table.
- Message Table – the system logs up to 16 messages in this table. When a message is triggered, the messages already stored in the table are pushed down and the most recent message is loaded into the top slot. If the table is full when an error occurs, the oldest message is pushed out (erased) of the table.

The following diagram shows an example of an error table for messages.

Date	Time	Message
1997-05-26	08:41:51:11	* Conveyor-2 stopped
1997-04-30	17:01:11:56	* Conveyor-1 stopped
1997-04-30	17:01:11:12	* Limit SW1 failed
1997-04-28	03:25:14:31	* Saw Jam Detect

You can use AUX Function 5C to show the error codes or messages. You can also view the errors and messages from within *DirectSOFT*™ by using the PLC/Diagnostics sub-menu.

AUX 6* — Handheld Programmer Configuration

AUX 61 Show Revision Numbers

As with most industrial control products, there are cases when additional features and enhancements are made. Sometimes these new features only work with certain releases of firmware. By using AUX 61 you can quickly view the CPU and Handheld Programmer firmware revision numbers. This information (for the CPU) is also available from within **DirectSOFT** from the PLC/Diagnostics sub-menu.

AUX 7* — EEPROM Operations

AUX 71 – 76

There are several AUX functions available you can use to move programs between the CPU memory and an optional EEPROM installed in the Handheld Programmer.

- AUX 71 — Read from CPU memory to HPP EEPROM
- AUX 72 — Write HPP EEPROM to CPU
- AUX 73 — Compare CPU to HPP EEPROM
- AUX 74 — Blank Check (HPP EEPROM)
- AUX 75 — Erase HPP EEPROM
- AUX 76 — Show EEPROM Type (CPU and HPP)

AUX 71 CPU to HPP EEPROM

AUX 71 copies information from the CPU memory to an EEPROM installed in the Handheld Programmer.

You can copy different portions of EEPROM (HP) memory to the CPU memory as shown in the previous table. The amount of data you can copy depends on the CPU.

AUX 72 HPP EEPROM to CPU

AUX 72 copies information from an EEPROM installed in the Handheld Programmer to the CPU. You can copy different types of information from CPU memory as shown in the previous table.

AUX 73 Compare HPP EEPROM to CPU

AUX 73 compares the program in the Handheld programmer (EEPROM) with the CPU program. You can compare different types of information as shown previously. There is also an option called “etc.” that allows you to check all of the areas sequentially without re-executing the AUX function every time.

AUX 74 HPP EEPROM Blank Check

AUX 74 allows you to check the EEPROM in the handheld programmer to make sure it is blank. It's a good idea to use this function anytime you start to copy an entire program to an EEPROM in the handheld programmer.

AUX 75 Erase HPP EEPROM

AUX 75 allows you to clear all data in the EEPROM in the handheld programmer. You should use this AUX function before you copy a program from the CPU.

AUX 76 Show EEPROM Type

You can use AUX 76 to quickly determine what size EEPROM is installed in the Handheld Programmer.

AUX 8* — Password Operations

AUX 81 – 83

There are several AUX functions available that you can use to modify or enable the CPU password. You can use these features during on-line communications with the CPU, or, you can also use them with an EEPROM installed in the Handheld Programmer during off-line operation. This will allow you to develop a program in the Handheld Programmer and include password protection.

- AUX 81 — Modify Password
- AUX 82 — Unlock CPU
- AUX 83 — Lock CPU

AUX 81 Modify Password

You can use AUX 81 to provide an extra measure of protection by entering a password that prevents unauthorized machine operations. If you are using the standard level password, it must be an eight-character 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.

The DL350 also features a multi-level password that you select by entering the character "A" and seven numeric characters. This level of protection differs from the standard in that it allows an operator interface device to access and change V-memory data (i.e., presets). However, it also does not allow a ladder program edit.

Once you've entered a password, you can lock the CPU against access. There are two ways to lock the CPU with the Handheld Programmer.

- 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.

You can also enter or modify a password from within **DirectSOFT™** by using the PLC/Password sub-menu. This feature works slightly differently in **DirectSOFT**. Once you've entered a password, the CPU is automatically locked when you exit the software package. It will also be locked if the CPU is power cycled.



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. If you do not remember the password, you have to return the CPU to the factory for password removal.



NOTE: The D3-350 CPU supports multi-level password protection of the ladder program. This allows password protection while not locking the communication port to an operator interface. The multi-level password can be invoked by creating a password with an upper case "A" followed by seven numeric characters (e.g. A1234567).

AUX 82 Unlock CPU

AUX 81 can be used to unlock a CPU that has been password protected. **DirectSOFT** will automatically ask you to enter the password if you attempt to communicate with a CPU that contains a password.

AUX 83 Lock CPU

AUX 83 can be used to lock a CPU that contains a password. Once the CPU is locked, you will have to enter a password to gain access. Remember, this is not necessary with **DirectSOFT** since the CPU is automatically locked whenever you exit the software package.