

DV-1000 Setup Parameters

In This Chapter. . . .

- Overview
 - Parameter Definitions
 - Entering Setup Parameters
 - Using the LDA Instruction for Pointer Setup Parameters
 - Powerup Default Operational Mode
 - Chapter Summary
-

Overview

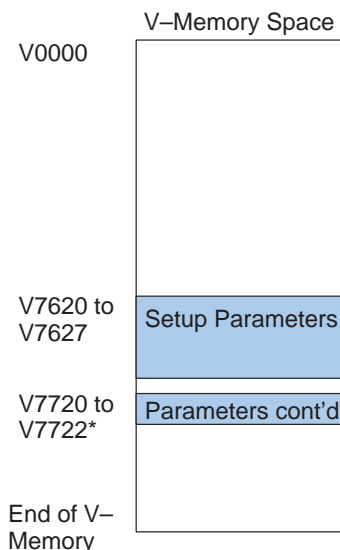
Purpose of Setup Parameters

Some of the operational modes of the DV-1000 have user-selectable features which require some user programming before those modes may be used. In the Display and Keypad Basics exercise of Chapter 1 we saw some "Setup Error" messages occur. These were normal because there were no setup parameters entered for the mode requested by our keypad entry. The goal of this chapter is to define the setup parameter requirements for all DV-1000 modes, and then show how easy it is to program these parameters.

All setup parameters reside in the CPU's V-memory space, not in the DV-1000. This is the most fundamental concept in understanding setup parameters. The DV-1000 has no user memory of its own. Instead, a block of V-memory locations is reserved in the CPU specifically for these setup parameters.

Location of Setup Parameters

At powerup, the DV-1000 reads the setup parameters from the CPU's V-memory. Refer to the image of V-memory to the right. The memory map starts at the top at V0000, and its width is one data word. Setup parameters occupy V-memory locations from V7620 to V7627 on all CPUs, and from V7720 to V7722 on all CPUs except DL130 and DL230 CPUs, which use locations V7640 to V7642. Although they are technically separated into two blocks, this manual simplifies the discussion by combining these into one block. All subsequent drawings of this memory map show DV-1000 setup parameters as one data block.

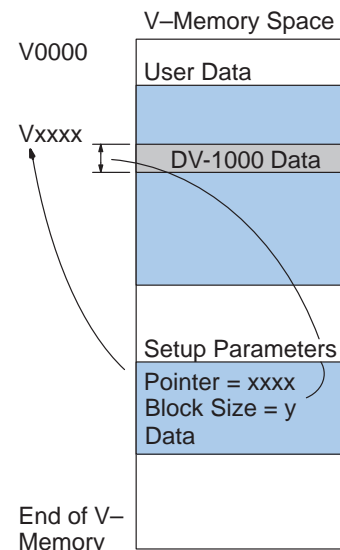


*DL130 and DL230 CPUs use locations V7640 to V7642 instead of V7720 to V7722.

Types of Setup Parameters

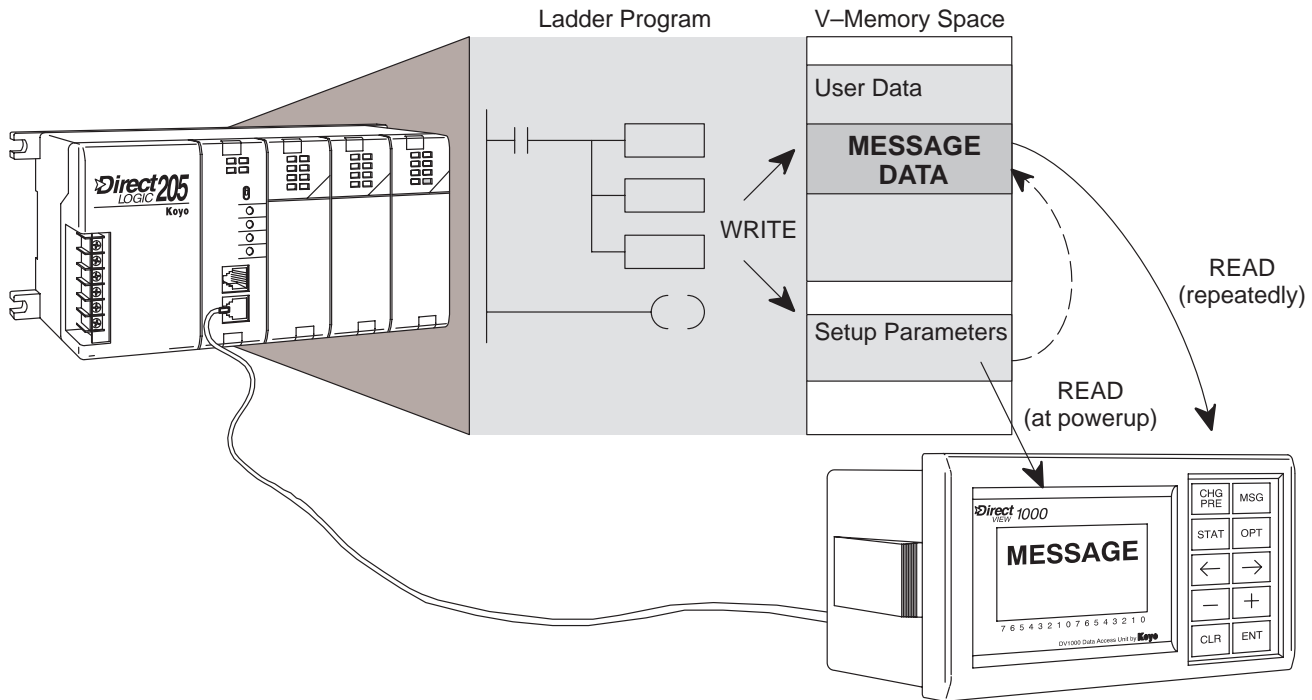
The individual data word contents of setup parameters belong to one of three types of functions:

- **Pointers** – simply point to the starting V-memory address of another data block in the User Data portion of V-memory that contains information useful to the DV-1000.
- **Block sizes** –tells how many V-memory locations (data words) are in the block referenced by the associated pointer.
- **Data** – constants which the DV-1000 reads for configuration purposes.



How the DV-1000 Uses Setup Parameters

As an example, let's look at how the DV-1000 uses setup parameters to display messages. At powerup, the ladder program writes the setup parameters. The DV-1000 uses the pointers and block sizes to find the message data for example, as shown below. During operation, the DV-1000 reads the message data repeatedly, and interprets it to create an output on the display.



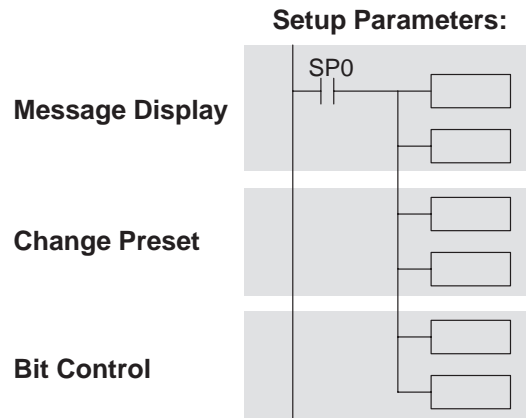
The DV-1000 applies the same basic procedure to all modes which require setup parameters:

- Read the setup parameters at powerup.
- Read or write the associated data for each mode during normal operation.

Setup Parameter Ladder Rung

Most operational modes of the DV-1000 require setup parameters. You'll first need to decide which modes are required in your application. You can even develop and test the ladder program for each mode separately. However, all the setup parameter instructions may be combined into a single rung, as shown to the right.

After the setup parameter rung, the main program begins.



Parameter Definitions

The setup parameters consist of a total of eleven V-memory locations. Together, they contain several pointers, block sizes, and data. The following table shows the setup parameters as one group. Following the description of each parameter, the DV-1000 mode which uses that parameter is listed. The remaining column references other chapters for more information on how to use specific setup parameters. This table applies to all CPUs.

PLC CPU V-memory Locations	DV-1000 Parameter Description	Operational Mode	See Chapter Number
V7620	Change Preset Values Pointer	CHG PRE	6
V7621	Change Preset Titles Pointer	CHG PRE	6
V7622	Change Preset Block Size	CHG PRE	6
V7623	Numeric Message Pointer	MSG	4
V7624	Text Messages Pointer	MSG	4
V7625	Bit Control Pointer	BIT CNTRL	7
V7626	Powerup Operational Mode	Power-up Default	3
V7627	Change Preset Value Password	CHG PRE	6
V7720*	Titled Timer Preset Value Pointer	CHG PRE	6
V7721*	Titled Counter Preset Value Pointer	CHG PRE	6
V7722*, High byte	Titled Timer Preset Block Size	CHG PRE	6
Low byte	Titled Counter Preset Block Size	CHG PRE	6

*DL130 and DL230 CPUs use different memory locations here: V7640 instead of V7720, V7641 instead of V7721, and V7642 instead of V7722.

The table on the following page gives further details about the setup parameters. Following each parameter description, the next column gives the proper data type for each parameter. In general, pointers are address locations which are in octal. Block sizes are simply the number of V-memory locations, so it's easiest to think of these quantities as BCD numbers. Other data such as the password is also a BCD number. The ranges columns list the acceptable range of addresses for pointers, or simple numeric ranges for block sizes and data. Be sure to find the column for the particular CPU you are using.

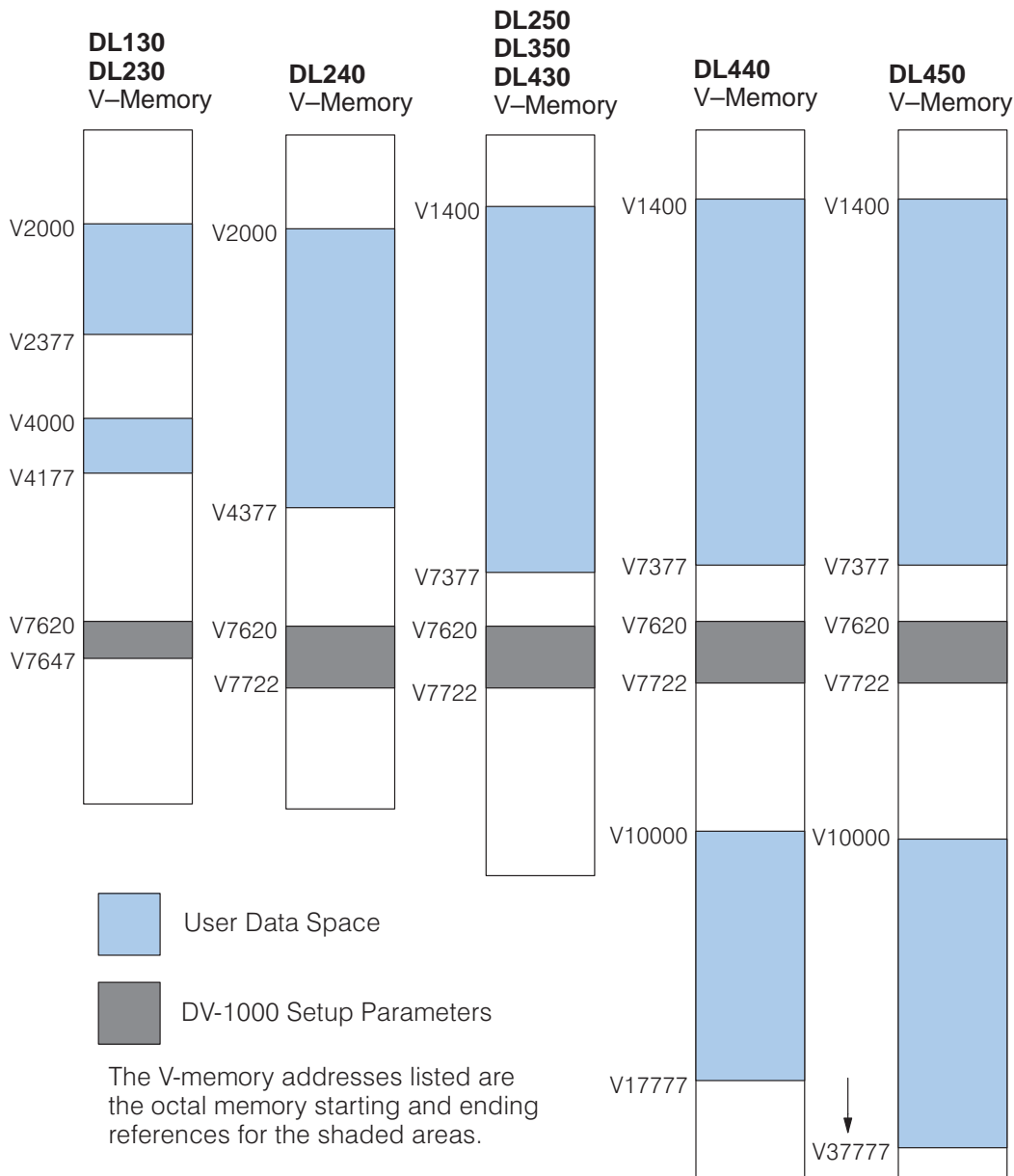
PLC CPU V-memory Locations	DV-1000 Parameter Description	Data Type	DL130 DL230 Ranges	DL240, Ranges	DL250 DL350 DL430 Ranges	DL440 Ranges	DL450 Ranges
V7620	Change Preset Values Pointer	Octal	V2000 to V2377, V4000 to V4177	V2000 to V4377	V1400 to V7377	V1400 to V7377, V10000 - V17777	V1400 to V7377, V10000 - V37777
V7621	Change Preset Titles Pointer	Octal	V2000 to V2377, V4000 to V4177	V2000 to V4377	V1400 to V7377	V1400 to V7377, V10000- V17777	V1400 to V7377, V10000- V37777
V7622	Change Preset Block Size	BCD	1 – 16	1 – 16	1 – 32	1 – 32	1 – 32
V7623	Numeric Message Pointer	Octal	V2000 to V2377, V4000 to V4177	V2000 to V4377	V1400 to V7377	V1400 to V7377, V10000- V17777	V1400 to V7377, V10000- V37777
V7624	Text Message Pointer	Octal	V0000 to V2377, V4000 to V4177	V2000 to V4377	V1400 to V7377	V1400 to V7377, V10000- V17777	V1400 to V7377, V10000- V37777
V7625	Bit Control Pointer	Octal	X, Y, or C V-mem. locations	X, Y, or C V-mem. locations	X, Y, GX, or C V-mem. locations	X, Y, GX, or C V-mem. locations	X, Y, GX, or C V-mem. locations
V7626	Power-up Operational Mode	BCD	0, 1, 2, 12, 3	0, 1, 2, 12, 3	0, 1, 2, 12, 3	0, 1, 2, 12, 3	0, 1, 2, 12, 3
V7627	Change Preset Value Password	BCD	0000 to 9999	0000 to 9999	0000 to 9999	0000 to 9999	0000 to 9999
V7720*	Titled Timer Preset Value Pointer	Octal	–	V2000 to V4377	V1400 to V7377	V1400 to V7377, V10000- V17777	V1400 to V7377, V10000- V37777
V7721*	Titled Counter Preset Value Pointer	Octal	–	V2000 to V4377	V1400 to V7377	V1400 to V7377, V10000- V17777	V1400 to V7377, V10000- V37777
V7722*, High byte	Titled Timer Preset Block Size	BCD	–	1 to 99	1 to 99	1 to 99	1 to 99
V7722*, Low byte	Titled Counter Preset Block Size	BCD	–	1 to 99	1 to 99	1 to 99	1 to 99

*DL130 and DL230 CPUs use memory locations V7640 thru V7642 here.

V-Memory Maps

The following figure summarizes the V-memory map information for the eight CPUs listed in the previous table. These memory graphs show the identical location of the setup parameters for all CPU types. The amount of user data memory space increases with each CPU type from left to right. For each CPU, the setup parameters which are pointers must point to space within the user data space shown.

In order to simplify examples in this manual, we will confine DV-1000 related data to a memory area common to all CPU types. Therefore, the examples will use a block of memory starting at V2000. This allows specific example ladder programs to work for all CPU types. The only exception to this is that DL130 and DL230 CPUs do not have memory locations V7720-V7722 and use V7640-V7642 instead.



Entering Setup Parameters

Methods for Entering the Setup Parameters

Three main techniques are available for setting the values of the DV-1000 setup parameters:

Using your RLL/RLL^{PLUS} program – (the recommended approach) Ladder logic initializes any required setup parameters during the first scan (use contact SP0). The DV-1000 reads these at powerup or when a keypad entry requests a mode change. This method has the *advantage* of imbedding the setup parameter values in the main ladder program which relies on them, also enabling you to add comments to the setup parameters.

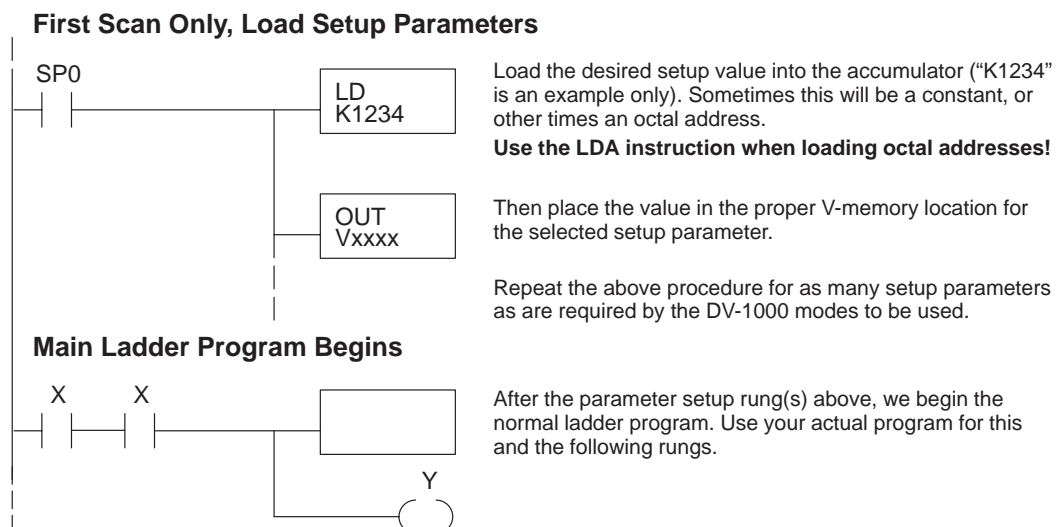
Using the DirectSOFT memory editor or DV-1000 setup utility – You can use the memory editor or DV-1000 setup utility in **DirectSOFT** to enter the proper setup parameter values in specific V-memory locations. Both methods provide tools to allow you to quickly enter values as different data types (BCD/HEX, Octal, Text...). The *disadvantage* to using these methods is the setup parameters are susceptible to change or loss with no indication given to the user. Some scenarios are:

- The battery which supports retentive V-memory locations can become weak or may be removed, causing a loss of setup parameters in the CPU V-memory during a power failure.
- Someone else may inadvertently edit parameter values, overwriting the original settings.
- If someone swaps the CPU for another and copies the ladder program from the old to the new CPU, it is easy to forget about copying the setup parameters as well.

Because of these scenarios and their resulting confusion, we recommend the first method above: initializing the setup parameters in the application ladder program.

Parameter Setup By Ladder Program

To initialize setup parameters, the ladder program must load the desired constants into specific V-memory locations. The DV-1000 reads its setup parameters from V-memory at each powerup, and after a mode change from the keypad. The ladder program needs only to initialize setup parameters on the first scan. Soon after the first scan, the DV-1000 retrieves its setup parameters from V-memory, and uses them thereafter. The following general ladder program shows the recommended ladder program arrangement.

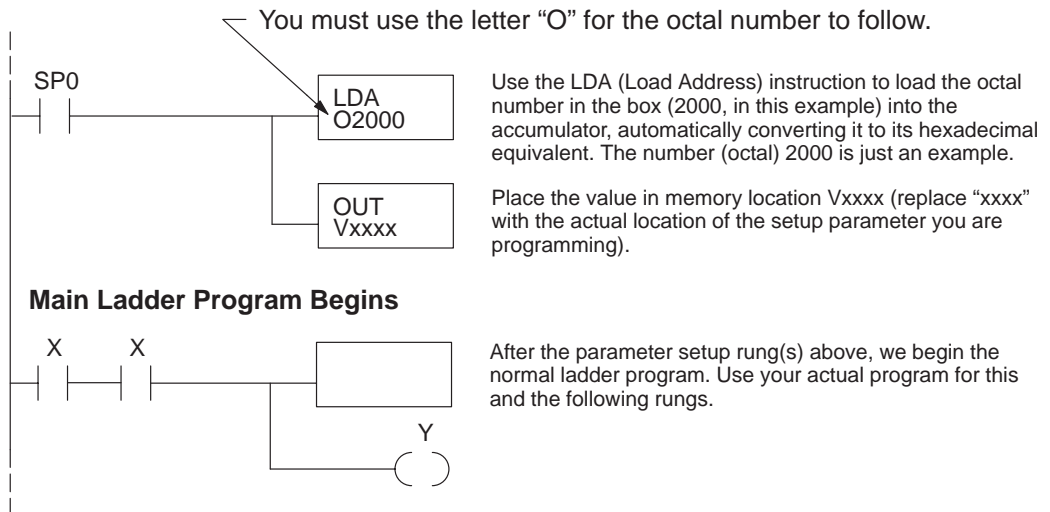


Using the LDA Instruction for Pointer Setup Parameters

The previous section on the Power-up Default parameter demonstrates how to program a *constant* in the setup parameter table and see the results. Most of the remaining parameters are of the address *pointer* type. We will only cover the general case of pointers in this section, so refer to specific chapters on the modes corresponding to any specific pointers type parameters you may be interested in.

It is usually easiest to think of address pointers as octal numbers, just as they are numbered in the I/O map. However, the address pointers must be stored in hex format. The **Load Address (LDA)** box instruction makes the *octal-to-hex conversion automatically*. The following ladder example assumes you want a pointer to V-memory location (octal) V2000.

First Scan Only, Load Address Pointer Setup Parameter



Powerup Default Operational Mode

Powerup Default Setup Parameter

We will begin to use setup parameters with the simplest and most fundamental of them all: the powerup default mode. A single constant in the setup parameter table is all that's required. The keypad and display exercise in Chapter 1 demonstrated that several operational modes are available by using the keypad. In an actual factory installation, it is unlikely that an operator will be present to use the keypad at each system powerup. Therefore, it is important to provide a method to determine beforehand the mode the DV-1000 automatically enters at powerup. It's a good idea to program the powerup default parameter, regardless of which DV-1000 mode(s) you intend to use. The available selections are:

- Enter previous mode (at power-down)
- Enter Change Preset Mode
- Enter Message Display Mode without Bit Control
- Enter Message Display Mode with Bit Control
- Enter Status Display Mode

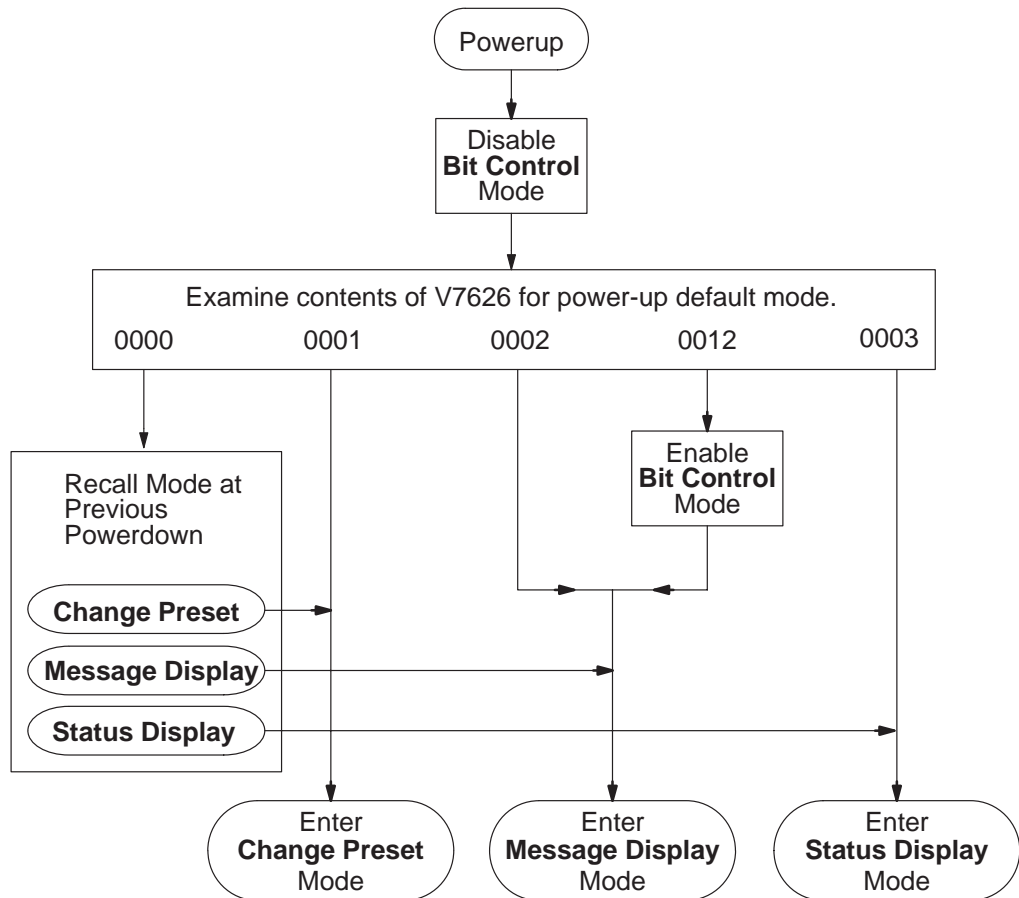
In order to select the proper power-up default mode for your application, you need to know something about how the DV-1000 will be used in the finished machine or factory process. In some situations, a single operator will frequently use the keypad and change DV-1000 modes from one to another. They may expect the DV-1000 to remain in the mode they were last using, even after a power cycle. The first choice on the list above will do this. In other situations, multiple personnel will use the keypad. Or, the application may use the DV-1000's display mainly for monitoring purposes. In these cases you may want to set up the DV-1000 to enter a specific operational mode at every powerup, which the remaining selections in the list will do.

A single parameter selects the powerup default operational mode, stored in BCD format at V7626. The following table lists the default choices and the required setup parameters.

Power-up Default Operational Mode	V7626 BCD Value
Previous Mode: Change Preset, or Message Mode, or Status Mode	0000
Change Preset	0001
Message Mode <i>without</i> Bit Control Mode	0002
Message Mode <i>with</i> Bit Control Mode	0012
Status Mode	0003

NOTE: The power-up default "Previous Mode" (code 0000) will power up any of three modes, but Bit Control is not offered (for safety reasons). So, even if you manually put the DV-1000 in Bit Control Mode before the power cycle, the unit will not power up in Bit Control Mode. This is done for safety reasons, because there is no constant indication that the unit is in Bit Control Mode. If you want the DV-1000 to power up in Bit Control Mode, you must choose "Message Mode *with* Bit Control" by entering "0012" in location V7626.

Powerup Sequence The following flow chart shows the DV-1000's actions on powerup. It begins with Bit Control disabled. Then it reads the setup parameter at V7626 for the power-up default mode.



Select the value to place in V7626 according to the desired default powerup mode:

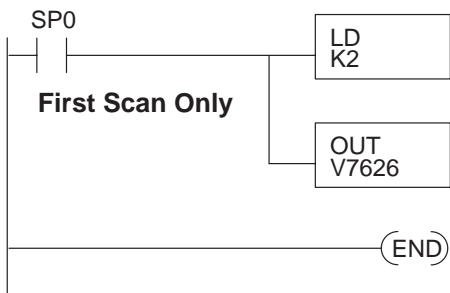
- Previous Mode (at power-down) – Power down in either Change Preset, Message Display, or Status Display modes. The DV-1000 will power up in the previous mode.
- Change Preset Mode – the operator uses the keypad to change data values at selected memory locations shown on the display.
- Message Display Mode – display messages (text and numbers). This can be *with* or *without* Bit Control Mode, because the two modes are independent. Message Display Mode (once entered) utilizes only the display, while Bit Control Mode (once entered) utilizes only the keypad.
- Status Display Mode – to monitor values of V-memory locations selected from the keypad.

NOTE: If you use Message Mode *with* Bit Control enabled as the power-up default, we recommend using your ladder program to write a message to the DV-1000 display indicating bit control mode. See the chapter on Bit Control Mode for more details, including an example program.

Powerup Default Example Program

Now we give an example ladder program to enter the Power-up Default Operational Mode you have selected in V7626. The program uses "Message Mode *without* Bit Control", just for example. An END coil on the last rung makes this a complete but simple example program.

Load Setup Parameters

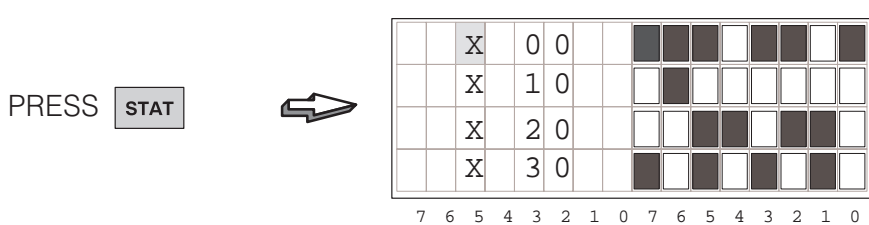


Load the constant K2 into the accumulator, to select Message mode without Bit Control.

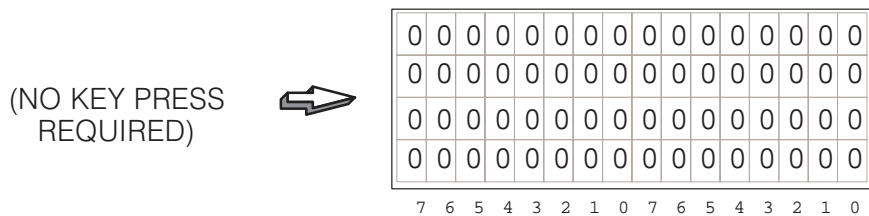
Place the value in memory location V7626, the location of the Power-up Default Operation Mode selection.

After the parameter setup rung(s) above, we begin the normal ladder program. Insert your actual program before the end coil.

To test the program and confirm our understanding of the Powerup Default mode, enter the program above into your CPU. Then put the CPU in run mode, which will place the constant K2 in memory location V7626 on the first scan. Now follow the steps below to test the Powerup Default feature.



The goal is just to have the DV-1000 in some mode other than the powerup default which we have selected in the program above. It is now in Status Display Mode. Now power-cycle the DV-1000 by unplugging it or removing power to the CPU. Then restore power, and do not press any key on the DV-1000 keypad at this point. The display below (or perhaps a setup error message) should appear after 2 or 3 seconds. This confirms the DV-1000 read the constant K2 default selection at V7626 and entered the Message Display Mode which we had chosen.



Chapter Summary

Now we have covered the various types of setup parameters, and their locations in V-memory. The Powerup Default parameter and LDA instruction have been covered in detail. The remainder of the setup parameters are discussed in each chapter on the corresponding modes.

Summary of Key Points

Now we may summarize some of the key points we have learned about setup parameters in this chapter:

- Setup parameters occupy V-memory in the CPU, not DV-1000 memory.
- The DV-1000 only reads the setup parameters at powerup, or when a key on the keypad is pressed.
- It's a good idea to program the powerup default parameter, regardless of which DV-1000 mode(s) you intend to use.
- Parameters belong to one of three types: Pointers, Block Sizes, or Data.
- Enter pointers as octal (address) numbers, while block sizes and data are always BCD numbers.
- You can program setup parameters using your RLL program or by editing V-memory directly. However, it is generally more desirable to use the RLL program.
- You only need to program the setup parameters once in a ladder program. Use the special contact SP0 to activate the setup rung on the first scan only.
- You only need to program setup parameters for the mode(s) you intend to use. The instructions to set up the various modes may be combined into the same rung.
- All ladder examples in this manual use V-memory user data space starting at V2000. In this way, the examples shown will work across the various CPU types.
- It is generally best to chart (plan) your V-memory map before writing the application RLL program. This ensures there will be V-memory space available for the DV-1000's data blocks for the mode(s) used.