



Installation & Configuration Guide

Windows 95/NT

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How to Use This Book

Chapter Introduction

This guide is written for dL4 Windows 95/NT users. It describes dL4 for Windows installation and configuration. It is assumed that the user is familiar with Windows operating systems. If you are using Windows for the first time, you may want a comprehensive overview of the Windows operating system. See your Microsoft documentation for details on Windows operating system.

The terms and conventions used in this guide are described below.

General Conventions:

- pfilter** *{-c character-set}* Values that you must supply are shown in italic type for clarity and to distinguish them from other elements of the syntax. In this example, *character-set* must be replaced by an actual character set name.
- pfilter** *{-c character-set}* The right and left brace characters (*{ optional items}*) indicate an item that is optional
- WINDOW (ON | OFF)** Selection of one of a group of items is shown within parenthesis separated by |. Choose only one; in this example, the legal syntax is **WINDOW ON** or **WINDOW OFF**. The parenthesis is not part of the syntactical form.
- Choose** Carry out a menu command or a command button in a dialog box by clicking it with the mouse or pressing the appropriate keys.
- Choose the OK button** Click the OK button with the mouse or press the **ENTER** key on the keyboard to carry out the action of the dialog box or close the message window.

Mouse Conventions

This guide assumes that you have not swapped the left and right mouse buttons in the Windows Control Panel. All mouse actions for dL4 are with the left mouse button. Therefore any mention of a mouse button is referring to the left mouse button.

The following terms are used in this guide to describe actions you take with the mouse:

- Point** Move the mouse until the tip of the mouse pointer rests on the screen object you want to point to.
- Click** Point to the item you want to select and then press and release the mouse button without moving the mouse.
- Double-click** Point to the item you want to select and then press and release the mouse button twice in rapid succession without moving the mouse.
- Drag** Press and hold down the mouse button while you move the mouse. When you have moved the mouse pointer to the position you want, release the mouse button.

Keyboard Conventions

The following conventions are used to define the keys and key combinations:

- Key names appear in capital letters and are referred to by their names only, without the word "key". For example, press **ALT** means press the key labeled "Alt".
- A plus sign (+) between key names means you hold down the keys in the order that they are listed and press the last key. For example, **CTRL+D** means hold down the **CTRL** and the **D** keys together.
- A comma (,) between key names means you press and release each key in turn. For example, "press **ALT,P**" means press **ALT** and release it then press **P** and release it.

Installing dL4 Runtime

Chapter Introduction

The dL4 runtime kit consists of scopew, runw, and various supporting utilities and libraries. This chapter provides all of the information you need to install dL4 runtime on your hard disk from the installation diskettes or from a downloaded installation file.

Minimum System Requirements

dL4 Requires:

- A 386-based processor or better with a minimum of 8 megabytes of ram.
- dL4 for Windows requires Windows 95 or Windows NT version 3.51 or later and will not run on Windows 3.11 or earlier.
- 3 megabytes of free disk space for installation or 1.5 megabytes of installed disk space.
- A mouse or other pointing device is recommended.

Licensing

dL4 can only be installed and used with a valid license. Read your dL4 license for terms and conditions in using dL4.

Copying dL4 Disks

Before you install dL4 on your hard disk, DCI recommends making a copy of the setup disks as a backup.

Installing dL4 from diskettes

To install dL4 for Windows, perform the following steps:

1. If Windows is not running, reboot your system and start Windows.
2. Remove any previous dL4 for Windows release.
3. Insert the dL4 Setup disk in the appropriate floppy disk drive.
4. Run the program SETUP.EXE on the diskette ("A:SETUP.EXE") and follow the displayed instructions. See your Microsoft Windows operating system documentation for instructions on how to run programs.
5. If you have not registered your license and SSN, run the Passport **SSNMaint** utility. dL4 cannot be used until Passport is installed and your license registered.
6. If you intend to use loadsave.exe, add the installation directory to your **PATH** environment variable. This typically requires editing the AUTOEXEC.BAT file or modifying the environment section of the **CONTROL** panel. See your Windows operating system documentation for instructions on how to modify the **PATH** variable.

The program group created by the installation process includes a scopew icon to run dL4 using the command line interface and a README icon to display the README file. The README file describes recent changes in dL4 and contains a list of the installed files.

Installing dL4 from an installation file

To install dL4 for Windows, perform the following steps:

1. If Windows is not running, reboot your system and start Windows.
2. Remove any previous dL4 for Windows release.
3. The installation file is a self-extracting setup program. Run the installation file and follow the displayed instructions. See your Windows operating system documentation for instructions on how to run programs.
4. If you haven't registered your license and SSN, run the Passport **SSNMaint** utility. dL4 cannot be used until Passport is installed and your license registered.
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The program group created by the installation process includes a scopew icon to run dL4 using the command line interface and a README icon to display the README file. The README file describes recent changes in dL4 and contains a list of the installed files.

Removing dL4

If the dL4 program group has an uninstall icon, double-click the icon to uninstall dL4. Otherwise, see your Windows operating system documentation for instructions on how to uninstall an application.

Working With dL4 Configuration Options

Chapter Introduction

When dL4 is first installed, it uses a default configuration. This default configuration can be modified in the following areas:

Runtime parameters - **PORT** numbers, **SPC()** values, and driver resources

Display window - window size, font, font size, and default colors

Keyboard handling - keyboard translation and edit key assignments

This chapter also describes printer configuration, how to create desktop icons for dL4 programs, and setup locale information.

Configuring Runtime Parameters

Runtime parameters control various aspects of the dL4 interpreter as well as dL4 file and device drivers.

The dL4 parameters listed below can be controlled by registry entries placed under one of these keys:

HKEY_CURRENT_USER\Software\DynamicConcepts\dL4\Environment

HKEY_LOCAL_MACHINE\Software\DynamicConcepts\dL4\Environment

The parameters can also be set using environment variables of the same name. It is unnecessary to configure any parameter whose default value is adequate for your usage.

Table of Runtime Parameters

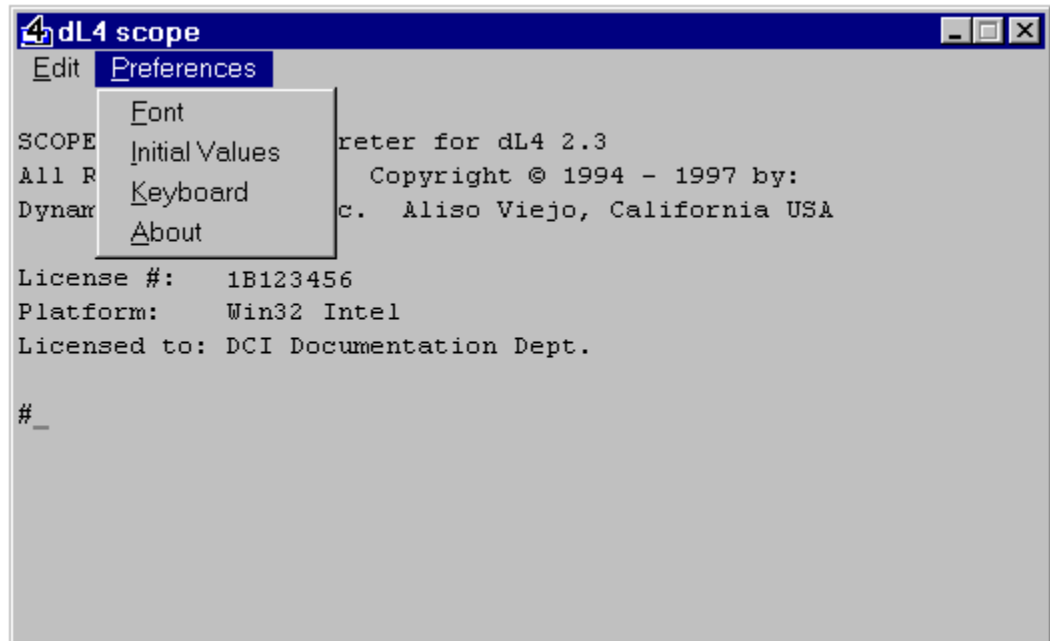
Parameter	Type	Meaning
ISAMFILES	REG_DWORD	Maximum number of concurrently open indexed file directories
LIBSTRING	REG_SZ	Space separated list of directories to search when linking, CALLing, or CHAINing. This value is displayed by the STATUS UNIT command and returned by the Msc\$(6) function.
MAXPORT	REG_DWORD	Maximum port number
MSC7	REG_DWORD	Value returned by Msc(7)
PORT	REG_DWORD	Port Number
SPC5	REG_DWORD	Value returned by Spc(5)
SPC7	REG_DWORD	Value returned by Spc(7)

"HKEY_CURRENT_USER" values override "HKEY_LOCAL_MACHINE" values and environment values override all registry settings. To set parameter values in the registry, use the Windows REGEDIT or REGEDT32 utilities to create, if necessary, any or all of the keys "DynamicConcepts", "dL4", and "Environment". The parameters can then be added as values within the "Environment" key. Note that all of the parameters except **LIBSTRING** must be created with the type REG_DWORD. When defined by environment variables, all parameters use string values. See your Microsoft documentation for a description of how to modify registry values or set environment variables.

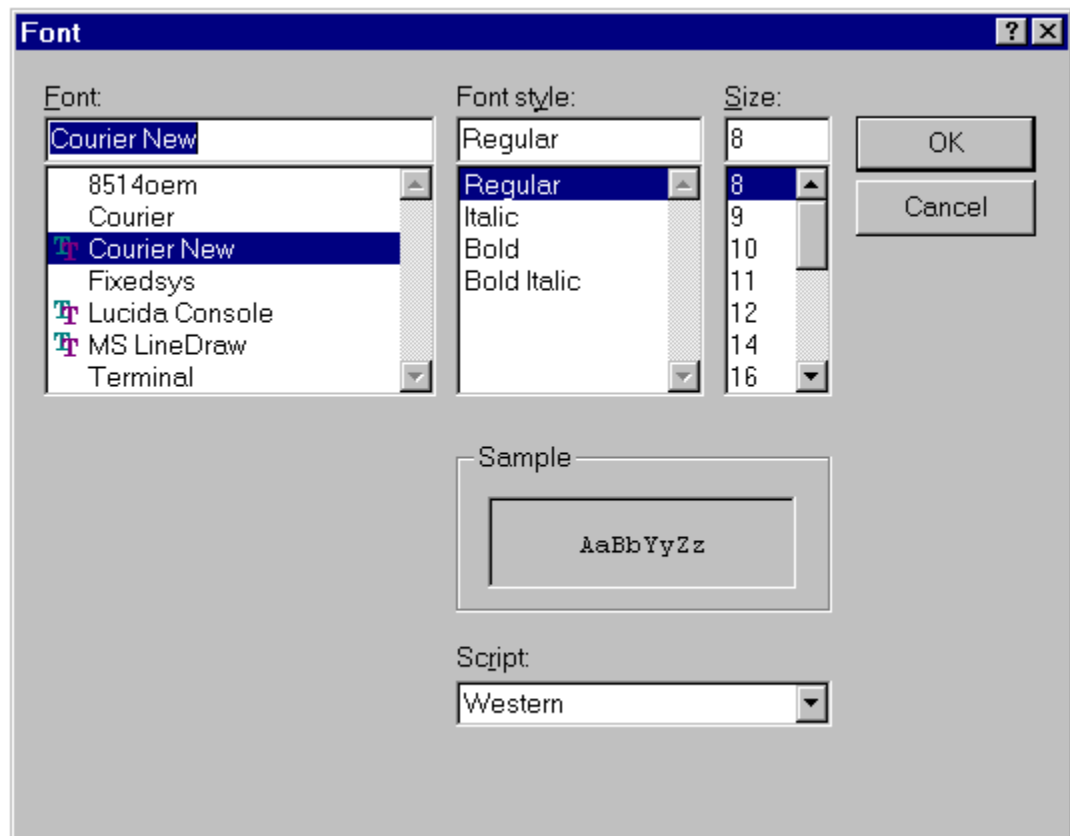
- ISAMFILES** Maximum number of opened Indexed file directories. For each indexed file opened, one entry is required for each Directory (index) plus 1 for the data file. The default value of 40 supports 10 indexed files open with an average of (3) directories (indices) each. If this value is too small, the error "Internal error in driver" or "Driver resource exhausted" is returned.
- LIBSTRING** Defines a set of paths to search for program filenames when linking, **CALL**ing, or **CHAIN**ing a program. This value is displayed by the **STATUS UNIT** command and returned by the Msc\$(6) function. If this parameter is not defined, only the current working directory and the directory of the parent program are searched. The **LIBSTRING** value can be set at runtime by the **LIB** statement, but that value will only be used by the program that executed the **LIB** statement. **LIBSTRING** should be constructed to minimize number of searches required to locate programs.
- MAXPORT** Defines the maximum port number. The default value of **MAXPORT** is 255. The value of **MAXPORT** is used for automatic port number assignment by the **SPAWN** statement and during sign on to assign the **PORT** number of a dL4 session when **PORT** is undefined. Since dL4 assigns port numbers in a decreasing order from **MAXPORT**, it may be used to set unique port numbers on different systems connected via a network.
- MSC7** Defines the numeric value to be returned by the **MSC(7)** function. If **MSC7** is not defined, then the value 257 is returned.
- PORT** Forces the current session to operate as a specific **PORT** number, i.e. **PORT=23**. The maximum **PORT** number must be a value between 0 and **MAXPORT**.
- SPC5** Defines the numeric value to be returned whenever the **SPC(5)** function is called. If **SPC5** is not defined as an environment variable the value of 257 is returned.
- SPC7** Defines the numeric value to be returned whenever the **SPC(7)** function is used. If **SPC7** is not defined as an environmental variable, zero (0) is returned.

Configuring the Main Display Window

The main display window of dL4 can be configured in many ways. You can change the font, the font (character) size, the number of lines or columns available, the number of lines or columns displayed, and the default foreground and background colors. To change the font or font size, choose the "Preferences" menu as shown below:

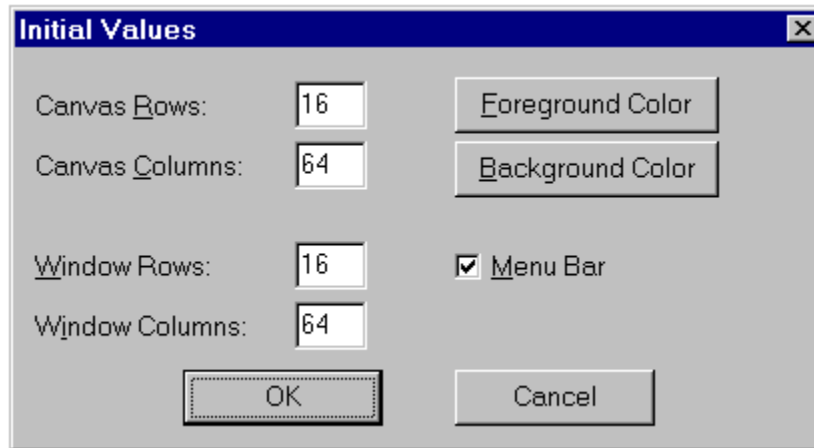


Then choose the "Font" item to display the following font dialog.



You can select a different font or font size by choosing the desired font name and/or size. The "sample" window lets you preview the selected font and font size. The font style can be selected in the dialog, but it will be ignored by dL4 because font style is controlled by the application. After selecting a new font and/or font size, choose the "OK" button to exit the dialog and apply the new font. Choose the "Cancel" button to continue using the existing font. If the "OK" button is chosen, the selected font and font size will be applied to the current main window and to the main window of any new dL4 sessions.

To change the window size or default colors, choose the "Preferences" menu and then choose the "Initial Values" item. The dialog below will be displayed:



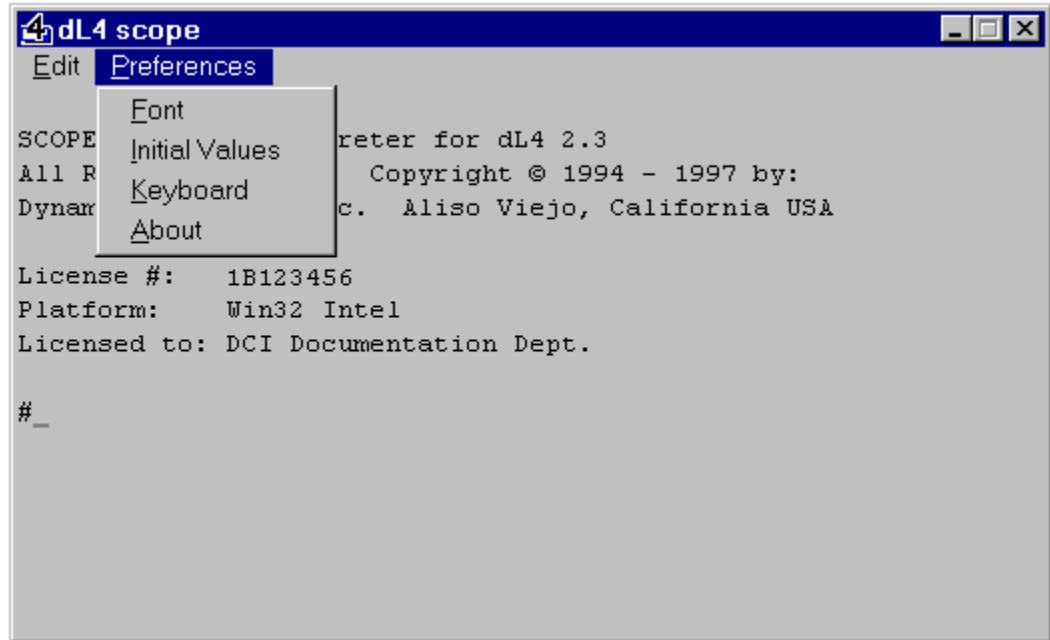
The "canvas" is the virtual display on which all dL4 screen output is drawn. The "window" is that portion of the "canvas" that is actually displayed on the screen. If the "window" is smaller than the "canvas", scroll bars will be displayed so that the user can select which portion of the "canvas" is visible. The "window" cannot be larger than the "canvas". To change the "canvas" or "window" size, simply select the appropriate row or column box and enter the new value. The "Menu Bar" check button controls whether the "Edit" and "Preferences" menus are displayed in a menu bar or as part of the system menu. If you choose the "OK" button, the specified row, column, and menu bar values will be written to the registry and used by all future dL4 sessions. The window of the current session will not be changed.

The default foreground and background colors can be changed by choosing the "Foreground Color" or "Background Color" buttons. In either case, a color dialog will be displayed. If you choose the "OK" button within the color dialog, the specified color will be written to the registry and used by all future dL4 sessions. The window of the current session will not be changed.

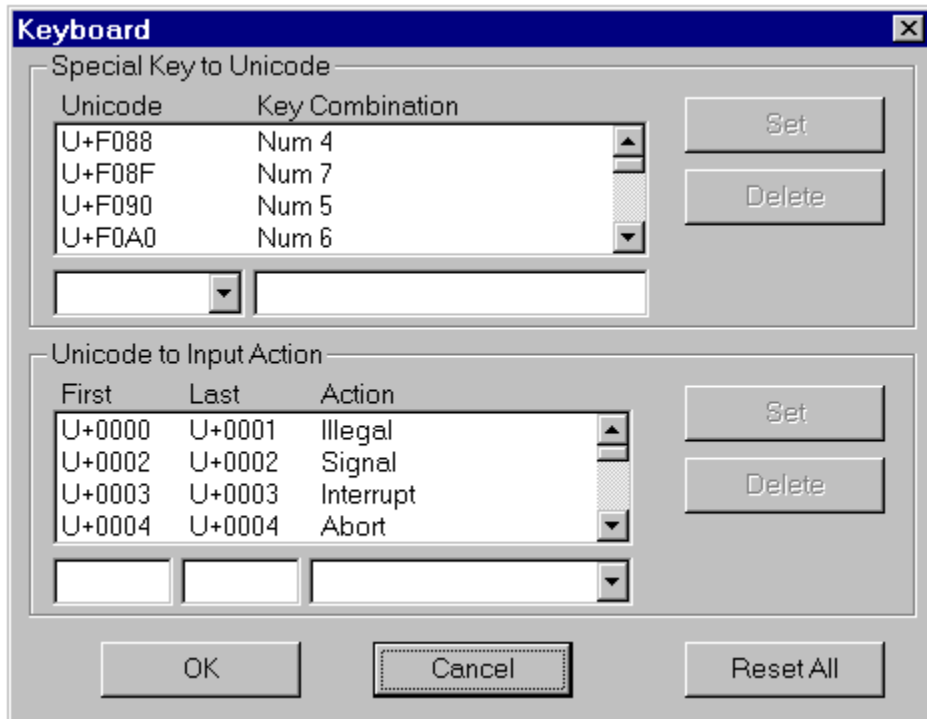
Configuring Keyboard Handling

The processing of keyboard input in dL4 is somewhat complex and the keyboard configuration dialog is similarly complex. When a key (such as "A") or a combination of keys (such as "CTRL+X") is pressed and released, the dL4 Windows TTY driver first translates the key or key combination into a Unicode character. The driver then looks up the "input action" associated with the Unicode character. The "input action" determines whether the character is treated as data to be read by a dL4 program or as an editing key. Because the translation is logically done with two tables, keyboard configuration is performed by changing two tables: the "Special Key to Unicode" table and the "Unicode to Input Action" table. The "Special Key to Unicode" table controls the translation of key combinations to Unicode characters. Standard translations, such as "Key-A" to "a", are not shown in the table, but they can be overridden using the table. The "Unicode to Input Action" table controls translation of Unicode characters to input actions. Any character not specified in the table will be treated as a data character. The "Unicode to Input Action" table specifies input actions for characters typed on the keyboard and for characters entered into typeahead by "long CHAINS" or the INPBUF() intrinsic CALL.

To change the keyboard configuration, first choose the "Preferences" menu as shown below:



Then choose the "Keyboard" item to display the following dialog:



To add a new key combination translation to the "Special Key to Unicode" table, perform the following steps:

1. Choose the box under the "Unicode" column of the table and enter the hexadecimal value to which the key combination will be translated.
2. Choose the box under the "Key Combination" column and type the desired key combination. All of the keys in the key combination must be pressed at the same time.
3. Choose the "Set" button to add the new definition to the table.

To delete a key translation from the "Special Key to Unicode" table, select the table row that defines the key and then choose the "Delete" button. The drop down list in the "Unicode" box is used to set the Unicode value using the value associated with an input action.

One reason to add a new translation to the "Special Key to Unicode" table is to redefine standard Windows keys. For example, **ALT+F4** normally causes a Windows program to exit. In the dL4 environment, it might be desirable to treat **ALT+F4** as an **ESCAPE** character, which interrupts the application. This could be done in the "Special Key to Unicode" table of the keyboard dialog, by entering "1B" (assuming **ESCAPE** is used as the **ESCAPE** input action) in the Unicode box, pressing the **ALT** and **F4** keys while in the "Key Combination" box, choosing the "Set" button, and then choosing the "OK" button. Warning: redefining **ALT** key combinations may confuse the user by interfering with expected Windows behavior.

To add a new input action translation to the "Unicode to Input Action" table, perform these steps:

1. Choose the box under the "First" column and enter the hexadecimal value of the first character in the range of Unicode characters to be associated with the input action.
2. Choose the box under the "Last" column and enter the hexadecimal value of the last character in the range of Unicode characters.
3. Choose the drop down list (the "down" arrow) in the "Action" column and select the desired input action.
4. Choose the "Set" button to add the new definition to the table.

To delete an input action translation from the "Unicode to Input Action" table, choose the table row that defines the translation and then choose the "Delete" button.

Choosing the "Reset All" button will set both tables to default values (see the table below).

After making your changes to the "Special Key to Unicode" or "Unicode to Input Action" tables, choose the "OK" button to exit the dialog and apply the changes. Choose the "Cancel" button to continue using the existing keyboard configuration. If the "OK" button is chosen, the new configuration will be applied to the current main window and to the main window of any new dL4 sessions.

The default associations of keys, Unicode characters, and input actions are shown in the table below for all non-data keys.

Key	Character	Input Action
control-B	STX	Send signal to program
control-C	ETX	Interrupt program
control-D	EOT	Abort program
control-E	ENQ	Toggle echo and enter control-E into input
Backspace	Backspace	Backspace and delete character
Enter	Carriage Return	Enter
control-X	CANCEL	Delete all input
Escape	ESCAPE	Escape program
Left-arrow	'ML'	Move cursor left
Right-arrow	'MR'	Move cursor right
Insert	'IC'	Toggle input insert/replace mode
Delete	'DC'	Delete input character
Home	'MH'	Move cursor to start of input
End	'END'	Move cursor to end of input
Control-Left-arrow	'PREV'	Move cursor to previous word

Control-Right-arrow	'NEXT'	Move cursor to next word
Control-End	'CL'	Delete characters to end of input
F9	'F9'	Swap (if enabled via SWAPF())
BEGIN	'BEGIN'	Enter "BEGIN" mode

Configuring A Printer

A dL4 program accesses printers by opening a pipe to an external program, usually a batch file, and then outputting to that pipe. For example, the statement `'OPEN #2,"$printer1"'` would start up a separate process to run the batch file `printer1.bat` (or program `printer1.exe`, if it exists) and send all output from channel 2 to be filtered by `printer1.bat`. The batch file is responsible for reading dL4 program output from standard input, translating the input characters into the form required by the printer, and then sending the translated characters to the printer.

A printer batch file cannot have the same name as a device such as **CON**, **NUL**, **LPT1** and **PRN**. The extension of the file must be **.BAT**. The filename should not begin with a dollar sign ("**\$**"); the dollar sign is a special character that tells the dL4 open routine that this is a pipe open. The batch file must be in a directory specified in the **PATH** variable.

The following is a sample printer batch file:

```
rem dL4opts=charset=utf-8,lock=true
set TERMDIR=c:\dl4\printers
c:\dl4\pfilter -c utf-8 -d \\server\printer_name pclprinter.def
```

The first line of this batch file is an options line interpreted by the dL4 pipe driver. This options line specifies that the pipe driver should send all output to batch file in the UTF-8 character set. It also specifies that the printer should be locked so that any subsequent attempt to open the printer will cause an "device is open elsewhere" error until the printer is closed. To use pipe driver options the first line of the batch file must begin with `"rem dL4opts="`. Options use the format `"keyword=value"`. The supported keywords are "charset" and "lock":

charset is used to specify the character set used by pipe I/O. The available character sets and their synonyms are:

```
"US-ASCII" or "ASCII" or "ISO 646"
"ISO 8859-1" or "ANSI" or "ANSI Latin 1"
"IRIS" or "IRIS-ASCII"
"UniBasic" or "UniBasic-ASCII"
"IBM Code Page 437"
"IBM Code Page 850"
"Windows" or "Windows Code Page 1252"
"EBCDIC" or "EBCDIC 037"
"UTF-8"
```

The most flexible character set is UTF-8 which is a multibyte encoding of Unicode, the native character set of dL4. Using UTF-8 allows the pipe driver to pass any character used by a dL4 program to the printer script. UTF-8, however, can only be used with batch files that can accept UTF-8. The default character set is "UniBasic-ASCII" which consists of the ASCII character set and the UniBasic mnemonics.

lock can be used to prevent concurrent opens of a printer script. If the value of "lock" is "true", then only one simultaneous open to the printer will be allowed, The default value of "lock" is "false".

The sample batch file uses the dL4 pfilter utility to translate the piped output into the form required by the printer and send it to a network printer. The pfilter utility is a console program with the following command line syntax:

```
pfilter {-c character-set} {-d devicename} printer-type
```

Where:

character-set specifies the input character set (default is UniBasic ASCII). The supported character sets are the same as those listed above for the "charset=" batch file option.

devicename can be any printer device available to the system. "lpt1:", "com1:", and "\\server\printer" are common printer devices. Network printers must be shared in order to be used by the pipe driver.

printer-type is the path of a printer definition file, which is similar to a Terminal Definition File (TDF). A printer definition file controls the translation of the character's output by dL4 to the characters required by the printer. The printer definition file should be specified by an absolute path (such as "C:\dl4printers\hplj") or be in the directory specified by the **TERMDIR** environment variable. The **TERMDIR** environment variable can be set in the printer batch file as in the example above.

The format of printer definition files is identical to dL4 for UNIX terminal definition files except that only the output sections are required. See the documentation on the Terminal Description Files for more information. A simple printer definition that copies all ANSI Latin 1 characters without translation would appear as follows:

```
[OutputMacros]
Default=%@%c
[OutputUnicodeMapping]
; This mapping is set up for 8-bit output on a printer using
; the ISO 8859-1 (i.e. ANSI Latin 1) character set.
Set0=
0x0000-0x00ff=0x00
```

Setting Up An Icon for a dL4 Program

Creating a desktop icon for a dL4 application makes it possible for a user to invoke a dL4 program by selecting the icon with the mouse, just like other Windows applications. The icon should be set up with "*dL4path*\runw *programname*" or "*dL4path*\scopew *programname*" as the command line where *dL4path* is the dL4 installation directory. Set the working directory of the icon to the directory expected by *programname*. Note that *programname* must be an absolute path ("E:\ProgramDir\ProgramName") or a path relative to the working directory. See your Microsoft documentation for instructions on creating program icons.

Selecting a Locale

When a dL4 program selects native language format, dL4 uses the Windows locale information to perform numeric, currency and date formatting. See your Microsoft documentation for instructions on how to configure Windows locale information.

Moving Configuration Parameters Between Systems

If dL4 runtime parameters are configured via the registry, that configuration can be moved to other systems by exporting the registry key

```
HKEY_CURRENT_USER\Software\DynamicConcepts\dL4\Environment
```

and/or

```
HKEY_LOCAL_MACHINE\Software\DynamicConcepts\dL4\Environment
```

to a file and then importing that file into the registry of the target system. Display window and keyboard handling configuration can be copied by exporting the registry key

```
HKEY_CURRENT_USER\Software\DynamicConcepts\dL4\WndTTY
```

and/or

```
HKEY_LOCAL_MACHINE\Software\DynamicConcepts\dL4\WndTTY
```

Registry keys can be exported and imported with the Windows **REGEDIT** utility. See your Microsoft documentation for instructions on how to use **REGEDIT**.

Installing dL4 Development

Chapter Introduction

The dL4 development kit provides the files necessary to build a customized version of dL4 with user written intrinsic calls and drivers. This chapter provides all of the information you need to install dL4 development on your hard disk from the installation diskettes or from a downloaded installation file.

Minimum System Requirements

The dL4 development kit requires:

- Installation of Microsoft Visual C++. See the README.TXT file in the development kit to determine which version of Visual C++ is required. Usage of other C compiler packages is not supported. See Microsoft Visual C++ documentation for Visual C++ hardware requirements.
- A 386-based processor or better with a minimum of 8 megabytes of ram.
- Windows 95 or Windows NT version 3.51 or later. dL4 for Windows cannot be used with Windows 3.11 or earlier.
- 6 megabytes of free disk space for installation or 4.5 megabytes of installed disk space.
- A mouse or other pointing device is recommended.

Licensing

dL4 can only be installed and used with a valid license. Read your dL4 license for terms and conditions in using dL4.

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1. If Windows is not running, reboot your system and start Windows.
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4. Run the program SETUP.EXE on the diskette ("A:SETUP.EXE") and follow the displayed instructions. See your Windows operating system documentation for instructions on how to run programs.
5. If you have not registered your license and SSN, run the Passport **SSNMaint** utility. dL4 cannot be used until Passport is installed and your license registered.
6. If you intend to use loadsave.exe, add the installation directory to your **PATH** variable. This typically requires editing the AUTOEXEC.BAT file or modifying the environment section of the CONTROL panel. See your Windows operating system documentation for instructions on how to modify the **PATH** variable.

The program group created by the installation process includes a scopew icon to run dL4 using the command line interface and README icons to display the README files. The README files describe recent changes in dL4 and contain a list of the installed files.

Installing dL4 from a installation file

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1. If Windows is not running, reboot your system and start Windows.
2. Remove any previous dL4 for Windows release.
3. The installation file is a self-extracting installation program. Run the installation file and follow the displayed instructions. See your Windows operating system documentation for instructions on how to run programs.
4. If you haven't registered your license and SSN, run the Passport **SSNMaint** utility. dL4 cannot be used until Passport is installed and your license registered.
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The program group created by the installation process includes a scopew icon to run dL4 using the command line interface and README icons to display the README files. The README files describe recent changes in dL4 and contain a list of the installed files.

Removing dL4

If the dL4 program group has an uninstall icon, double-click the icon to uninstall dL4. Otherwise, see your Windows operating system documentation for instructions on how to uninstall an application.

Working with the dL4 Development Kit

Chapter Introduction

The purpose of this chapter is to briefly introduce the developer to using the dL4 development kit. This chapter does not explain how to write or debug an intrinsic call or a driver.

Compiling/Linking a Customized dL4

The dL4 development kit is used to add user written intrinsic **CALLs**, intrinsic functions, or drivers to dL4. The kit can also be used to recompile the standard drivers in order to change standard options (see the individual driver sources for more information on such options). In dL4 for Windows, most of the runtime system resides in dynamic link libraries (DLLs). All intrinsic CALLs and functions are contained in dl4basic.dll. All drivers are contained in dl4rt.dll. The development kit consists of the object files, sample source files, and nmake control files necessary to build custom versions of dl4basic.dll and dl4rt.dll. It also contains, in the directory dL4Dev\Devel\Release, copies of the standard dL4 front end programs (scopew.exe and runw.exe), utilities (loadsave.exe and pfilter.exe), and support DLLs. The only files produced by the development kit are dl4basic.dll and dl4rt.dll.

To add an intrinsic call or function, you must copy the source files for the new call to the "dL4Dev\Devel\Usercall" directory and add the new call to the files makefile, userproc.c, and userproc.h (these files are in the Usercall directory). Examine the entries for existing calls to determine what changes to make.

To add a driver, you must copy the source files for the new driver to the "dL4Dev\Devel\Driver" directory and add the new driver to the files makefile, driver.c, and drvlib.h (these files are in the Driver directory). Examine the entries for existing drivers to determine what changes to make. To modify a driver, simply edit the source file.

After making the required modifications, the dl4basic.dll and/or dl4rt.dll libraries must be recompiled and relinked. The current procedure to compile and link the libraries is described in the development kit readme file. This readme file is available as an icon in the development kit program group or as a text file in dL4Dev\Devel\readme.txt.

Installing a Customized Version of dL4

To install a customized version of dL4, install a standard version of dL4 and then replace the two files "dl4basic.dll" and "dl4rt.dll" in the dL4 directory with the customized versions produced in dL4Dev\Devel\Release by the development kit. Please note that the Windows operating system will not allow copying of the files if any of them are currently in use. If dL4 or a dL4 utility is executing, an error will occur if you attempt to delete or replace the current dl4basic.dll or dl4rt.dll.