



# Using the Terminal

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*Using the Terminal*

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# About This Book

This book describes how to use the Terminal, the command-line interface for Caché. It contains the following chapters:

- [Introduction to the Terminal](#)
- [Using the Terminal Interactively](#)
- [Controlling the Appearance and Behavior of the Terminal](#)
- [Using Terminal Scripts](#)
- [Script Command Reference](#)
- [Using the Terminal in Batch Mode](#)
- [Advanced Topics](#)

For a detailed outline, see the [table of contents](#).

For general information, see the *[InterSystems Documentation Guide](#)*.





# 1

## Introduction to the Terminal

The Terminal is a simple command-line interface for entering Caché commands and displaying current values. It is useful during learning, development, and debugging.

This chapter discusses the following topics:

- [User account that owns the Terminal process](#)
- [How to start the Terminal](#)
- [Background information about the Terminal](#)
- [An introduction to what you use the Terminal for](#)
- [An introduction to the ZWELCOME routine](#)
- [Information about the startup namespace that the Terminal uses](#)
- [Information about the Terminal prompt and the prompt versions you might see](#)
- [How to interrupt the Terminal](#)
- [How to exit the Terminal](#)

**Note:** If the Terminal displays a dialog box with the message **Spy Mode On**, this means that you have accidentally pressed **Alt+Shift+S**. To exit this mode, press **Alt+Shift+S** again. This mode is not for general use and is not documented.

Also, if the Terminal appears to be unresponsive, you may have pressed **Ctrl+S**, which pauses the automatic scrolling. If so, press **Ctrl+Q** to resume.

### 1.1 User Account That Owns the Terminal Process

In Caché versions 2015.2 and later, the Caché process is owned by the user that is logged in to Windows and is running the Terminal program (cterm.exe).

In Caché versions 2015.1 and earlier:

- Beginning with Windows Vista, and including Windows Vista, Windows Server 2008, and Windows 7, the Caché process that serves the Terminal connection is owned by the user account in which the Caché control service runs.
- Before Windows Vista, the Caché process is owned by the user that is logged in to Windows and is running the Terminal program (cterm.exe).

In all cases, all environment variables and shared drive letter designations are those defined by the user that is running the Terminal.

## 1.2 Starting the Terminal

You can use the Terminal interactively or in batch mode.

To use the Terminal interactively, do one of the following:

- To work with the Terminal using a local database, select the InterSystems Launcher and then select **Terminal**.
- To work with the Terminal using a database on a remote server, select the InterSystems Launcher and then select **Remote System Access > Terminal**. Then select a server name.

Or select the InterSystems Launcher, select **Remote System Access > Telnet**. Then log on to the Caché system with your username and password.

For more information and additional options, see the chapter “[Connecting to Remote Servers](#)” in the *Caché System Administration Guide*.

In either case, you then see the Terminal window. The prompt displayed in this window indicates the namespace in which you are currently working. For example:

```
USER>
```

In batch mode, you invoke the Terminal from the operating system command line, passing to it the name of a script file to run. This mode is not available for all operating systems.

## 1.3 Background

The Terminal was designed to work with Caché applications. It uses two methods to communicate with Caché: local and network. The title bar indicates the communication mode currently in use.

- Local communication is used when the Terminal communicates with the Caché server with which it was installed. In this case, the title bar displays **Cache TRM:pid(instance name)** where:
  - *pid* is the process ID of the Caché process with which the Terminal is communicating.
  - *instance name* is the Caché instance in which the process is running.
- Network communication uses the TELNET protocol over TCP/IP to communicate with either a Windows Caché server or with a UNIX® host. In this case, the title bar displays **(server NT — Caché Telnet)** where *server* is the host name of the remote server.

The communications stack for Caché is Winsock. Winsock is a network programming interface for Microsoft Windows which is based on the socket paradigm popularized in the Berkeley Software Distribution (BSD). The host entry can be either from the local file, an IP address, or, if the Winsock implementation has access to a name server, a general host name. The host name may be followed by an optional #nnn to specify a nonstandard port number.

Errors reported from this communications mode are the names of the Winsock error codes. For example, WSAECONNREFUSED means the connection was refused.

## 1.4 General Use

In the Terminal, you can enter ObjectScript commands of all kinds. For example:

```
d ^myroutine

set dirname = "c:\test"

set obj=##class(Test.MyClass).%New()
write obj.Prop1
```

**Note:** The Terminal implicitly issues the `Use 0` command after each line you enter. This means that if you issue a [Use](#) command to direct output to some other device, that command is essentially ignored.

Also, large input buffers may defer the action of keys that attempt to stop the input flow such as **Ctrl-C** or **Ctrl-S**. This is also dependent on processor and connection speed. A special effort was made to respond to keystrokes before host input.

You can also run [Terminal scripts](#), which are files with the extension `.scr` existing in your file system. The Terminal provides a small set of commands you can use in these scripts, including a command that sends a `Caché` command to the Terminal, as if you had typed it manually.

## 1.5 The ZWELCOME Routine

When the Terminal begins execution, the code checks for the existence of a routine called **ZWELCOME** in the `%SYS` namespace. If such a routine is found, it is invoked immediately prior to the terminal login sequence, if any. The name of the routine implies its intended use, as a custom identification and welcome message to users.

**Note:** The installation of **ZWELCOME** into the `%SYS` namespace requires an individual with administrator privileges and write access to the `CACHESYS` database.

**CAUTION:** The **ZWELCOME** routine executes in the `%SYS` namespace with an empty `$USERNAME` and with `$ROLES` set to `%ALL`. Take care to ensure that the failure modes of **ZWELCOME** are benign. Also, this routine should not modify the `$ROLES` variable.

Here is a simple example:

```
ZWELCOME() PUBLIC ;
; Example
Write !

Set ME = ##class(%SYS.ProcessQuery).%OpenId($JOB)

Write "Now: ", $ZDATETIME($HOROLOG, 3, 1), !
Write "Pid/JobNo: ", ME.Pid, "/", ME.JobNumber, !
Write "Priority: ", ME.Priority, !

Quit
```

## 1.6 The Startup Namespace

When you first start the Terminal, it opens in a particular namespace. This option is controlled by the **Startup Namespace** option of the user definition. See the chapter “[Users](#)” in the *Caché Security Administration Guide*.

The command prompt displays the current namespace, such as:

```
USER>
```

### 1.6.1 Changing Namespaces

To change to a new namespace, use the **ZNSPACE** command (which has a short form of **ZN**

```
USER>ZN "SAMPLES"  
SAMPLES>
```

The argument for the **ZNSPACE** command is a single string that is the name of the namespace to change to. If you enter an invalid namespace name, **ZNSPACE** throws a `<NAMESPACE>` error. See the [ZNSPACE](#) reference page in the *Caché ObjectScript Reference* for more information.

## 1.7 The Terminal Prompt

As noted previously, the Terminal prompt indicates the namespace in which you are currently working. The prompt may display additional information, to indicate the transaction level or the program stack level.

### 1.7.1 The Transaction Level

If you are within a transaction, a prefix is appended to the prompt to indicate the transaction level. The prefix is of the form `TLn:`, where *n* is the transaction level. For example, if you are in the User namespace and you enter the ObjectScript command **TSTART**, the prompt changes as follows:

```
USER>tstart  
TL1:USER>
```

If you exit the Terminal, that rolls back the transaction.

### 1.7.2 The Program Stack Level

If an error occurs, a suffix is added to the prompt to indicate the program stack level. For example:

```
USER 5d3>
```

Enter the **Quit** command to exit the debug prompt. Or debug the error; see the chapter “[Command-line Routine Debugging](#)” in the book *Using Caché ObjectScript*.

## 1.7.3 The TSQL Shell

To access the TSQL shell, type `DO $SYSTEM.SQL.TSQLShell()` and press **Enter**. The prompt is then displayed with the string `(:TSQL)`, as follows:

```
USER>DO $SYSTEM.SQL.TSQLShell()
Current settings :-
No current settings
Compiler is NEW
USER:TSQL>
```

To exit the TSQL shell, enter the `^` command.

For information on the TSQL shell, see the [Caché Transact-SQL \(TSQL\) Migration Guide](#).

## 1.7.4 The MV Shell

To access the MV shell, type `MV` and press **Enter**. The prompt is then displayed with a colon `(:)` at the end rather than a right angle bracket `(>)`, as follows:

```
USER>MV
USER:
```

If the MV shell has not yet been initialized, you may see messages before this prompt.

To exit the MV shell, enter the **Quit** command.

For information on the MV shell, see the chapter “[Starting MultiValue](#)” in the book *Using the MultiValue Features of Caché*.

**Note:** Do not open another MV shell from within an MV shell.

## 1.7.5 Operating-System Shells

In the Terminal, you can also open various operating-system shells. To do so, type `!` and press **Enter**. The Terminal then opens your default operating-system shell, and the prompt shows the working directory. For example:

```
USER>!
c:\intersystems\cache\mgr\user\>
```

**Note:** On Macintosh, you cannot open the C-shell this way; you receive a permission denied error. You can, however, use other shells (Bash, Bourne, or Korn).

To exit the shell, use the `quit` or `exit` command as appropriate for the shell.

# 1.8 Interrupting Execution in the Terminal

To interrupt the Terminal and stop any foreground execution, use one of the following key combinations:

- **Ctrl+C** — Use this if the **Windows edit accelerators** option is not enabled.
- **Ctrl+Shift+C** — Use this if the **Windows edit accelerators** option is enabled.

For information on **Windows edit accelerators** option, see the section “[User Settings](#),” in the chapter “[Controlling the Appearance and Behavior of the Terminal](#).”

## 1.9 Exiting the Terminal

To exit the Terminal, do either of the following:

- Select **File > Exit**.
- Press **Alt+F4**.

This causes this copy of the Terminal to exit, closing any open files and stopping any foreground execution.

If this Terminal was connected to a server at startup, it exits on its own when the communications channel is closed.

If you accessed this Terminal via **Cache Telnet** in the InterSystems Launcher, then it does not exit automatically when the communications channel is closed; instead it remains active so you that can connect again via the **Connect** menu.

# 2

## Using the Terminal Interactively

This chapter describes the basics of how you work with the Terminal in interactive mode. It covers the following topics:

- [How to enter commands](#)
- [How to scroll the display](#)
- [How to pause and resume the Terminal scrolling](#)
- [How to repeat previous commands](#)
- [How to copy and paste text](#)
- [How to print](#)
- [How to clear the Terminal screen](#)
- [How to log the Terminal session](#)

### 2.1 Entering Commands

To enter a command in the Terminal, simply type an ObjectScript command and its arguments. Or, if you are using a shell, type a command applicable to that shell.

Note that for ObjectScript, you do not need to enter a space before the command (in contrast to when you define routines and methods).

Also note that if you start a line in the Terminal by pressing **Tab**, the rest of that line is entered into the routine buffer and is not executed. This behavior was defined long ago and was a useful way of creating routines. (Also see the [ZINSERT](#) command, which serves the same purpose.) Because customers no longer define routines this way, this documentation does not discuss this feature further.

### 2.2 Scrolling

Whenever active text arrives, the Terminal scrolls the window to the newly arrived text. Use the scroll bar on the right to scroll up or down.

You can also use the keyboard to scroll within the Terminal as follows:

**Table 2–1: Using the Keyboard to Scroll the Terminal Display**

Key Combination	Effect
<b>Ctrl+Home</b>	Scroll to the top of the buffer.
<b>Ctrl+End</b>	Scroll down to the cursor.
<b>Ctrl+Page Up</b>	Scroll up by one page.
<b>Ctrl+Page Dn</b>	Scroll down by one page.
<b>Ctrl+Line Up</b>	Scroll up by one line.
<b>Ctrl+Line Dn</b>	Scroll down by one line.

## 2.3 Pausing and Resuming the Terminal Scrolling

To pause the scrolling in Terminal, press **Ctrl+S**. While scrolling is paused, the Terminal accepts commands and processes them, but it does not write the commands or any output to the screen (and thus appears to be unresponsive).

To resume, press **Ctrl+Q**.

## 2.4 Repeating Previous Commands

To repeat a previous command, press the up arrow key repeatedly until the desired command is displayed. To enter the command, press **Enter** as usual.

## 2.5 Copying and Pasting Text

You can copy and paste text in the Terminal. To do this, you can use the context menu (right-click menu), the **Edit** menu, or various keyboard shortcuts. The following options are available:

- **Copy** copies the selected text to the clipboard.
- **Paste** pastes the contents of the clipboard, line by line, to the current position of the cursor (which is the end of the Terminal scrollbar buffer). The text becomes visible in the Terminal window unless echoing has been disabled.
- **Copy + Paste** copies the selected text to the clipboard and then pastes it, line by line, to the current location of the cursor.

### 2.5.1 Keyboard Shortcuts

You can use the following keyboard shortcuts:

**Table 2–2: Shortcuts for Copy and Paste**

Action	Basic Shortcut	Windows Shortcut
Copy	<b>Ctrl+Ins</b>	<b>Ctrl+C</b>
Paste	<b>Shift+Ins</b>	<b>Ctrl+V</b>



Action	Basic Shortcut	Windows Shortcut
Copy and paste		<b>Ctrl+Shift+V</b>

The shortcuts listed in the “Basic Shortcut” column are always enabled.

The shortcuts listed in the “Windows Shortcut” column are enabled only if you set the **Windows edit accelerators** option to Yes; for information on this setting, see the section “[User Settings](#),” in the chapter “[Controlling the Appearance and Behavior of the Terminal](#).”

## 2.5.2 Notes about Copying and Pasting

- As noted above, if you set the **Windows edit accelerators** option to Yes, **Ctrl+C** copies the selected text to the Windows clipboard. To interrupt the Terminal, you must instead press **Ctrl+Shift+C**.
- If the host has a mouse request outstanding and you wish to do a local cut and paste, press **Ctrl** while selecting the region; that mouse action is not reported to the host.
- If the copied text includes a line boundary, it is saved on the clipboard as a carriage return and a line feed. If you do not want to paste line feeds, see “[User Settings](#).”
- The Terminal can often paste data faster than a host can accept it. See “[User Settings](#)” for settings to control the speed of pasting. Also, line feeds can be discarded during a paste command.

## 2.6 Printing

To print from the Terminal, use the following options of the **File** menu:

- To select a printer and set it up for use with the Terminal, select **File > Printer Setup**.
- To print the contents of the Terminal screen, select **File > Print**.
- To print the log file (or any other ASCII file), select **File > Print Log**. This option lets you select the file to print, and it does no special processing except to try to be reasonable in processing form feed characters. During printing, mouse and keyboard input is locked out of the main window and a cancel dialog box appears. Printing is done in draft mode.

## 2.7 Clearing the Screen

The **Edit** menu provides two different options to clear the screen:

- To reset the screen, select **Edit > Reset**. This option resets the margins, scroll region and other processing on the current page, and causes the Terminal to repaint the window.
- To reinitialize the screen, select **Edit > Erase** or press **Ctrl+Del**. This option reinitializes the Terminal window, erases all session data, and resets the scrollbar region to zero.

## 2.8 Logging the Terminal Session

To start logging the Terminal session:

1. Select **File > Logging** or select **Alt+L**.

Caché displays a dialog box to prompt you for the location and name of the log file. The default directory is the Caché system manager's directory. The default filename is CACHETRM.LOG.

The total length of the path and file name cannot exceed 126 characters.

2. Optionally specify a different directory and filename.
3. Select **OK**.

If the log file exists, the Terminal asks if you want to overwrite it and presents three choices:

- **Yes** overwrites the file with the new log data
- **No** appends any new log data to the file
- **Cancel** leaves the file as is (no logging is done)

Later, to stop logging, select **File > Logging** or select **Alt+L**. Caché displays a dialog box to indicate that the log file is closed; select **OK**.

The log file contains only the output from a connection (independent of the current wrap mode).

You can also perform logging from a Terminal script, as described [later in this book](#). Note that if you have started logging by using **File > Logging**, you cannot start a script that also performs logging. If you attempt to do so, the behavior is indeterminate.

Also see the section “[Learning Mode](#)” in the chapter “[Advanced Topics](#).”

# 3

## Controlling the Appearance and Behavior of the Terminal

This chapter describes different ways to control the appearance and behavior of the Terminal in interactive mode. It covers the following topics:

- [How to specify the font](#)
- [How to specify the colors](#)
- [How to specify the window size](#)
- [How to define custom key combinations](#)
- [How to specify user settings](#)
- [How to specify the network encoding](#)
- [How to specify the physical character setting of the display](#)

**Tip:** In addition to the options listed here, you can use the configuration option **TerminalPrompt**, which controls the Terminal prompt. This option is available in the Management Portal. To find it, select **System Administration > Configuration > Additional Settings > Startup**. For example, the Terminal prompt can include the configuration name of your system.

### 3.1 Specifying the Font

To specify the font size to use, select **Edit > Font**. This displays a dialog box where you can select a typeface, size, and style appropriate to your monitor and resolution.

**Note:** If you choose a font size that would expand the window beyond the borders of your screen, the Terminal automatically resizes both screen and font to the largest size available.

Also, whenever you switch to a different size screen, the Terminal attempts to use the preselected font for that size.

## 3.2 Specifying the Colors

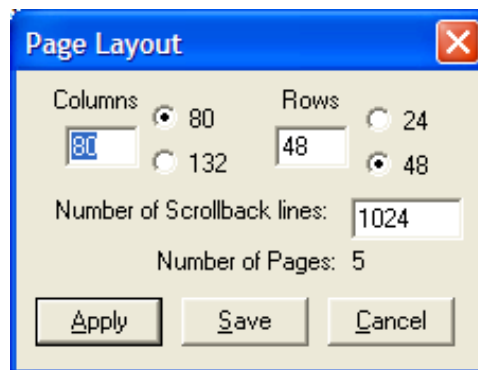
To specify the colors to use, select **Edit > Color**. This displays a dialog box where you can select the default foreground and background colors for the Terminal. Then select one of the following:

- **Apply** changes only the current Terminal.
- **Save** does not change the current instance but saves the color information for new instances of the Terminal.

You can adjust the colors from the expected ANSI-named colors to any colors that the display board can deliver. These colors are saved along with the foreground and background choices. To select the default colors, select **Default** and then choose the colors.

## 3.3 Specifying the Window Size

To specify the Terminal window size, select **Edit > Window Size**. This displays a dialog box where you specify the window size:



The maximum number of columns is 132 and the maximum number of rows is 64. As you make changes, the dialog box updates the number of scrollback lines and the number of pages available. Then select one of the following:

- **Apply** changes only the current Terminal.
- **Save** does not change the current instance but saves the window size information for new instances of the Terminal.

**Note:** When you change the window size, the Terminal erases all current data in both the current display page and all back pages. Further, if there is a font selected for that size, the Terminal selects it.

## 3.4 Defining Custom Key Combinations

To define custom key combinations, select **Edit > User Keys**. This displays a dialog box where you can associate a Caché command with any of the following key combinations: **Alt+Shift+F1** through **Alt+Shift+F10**.

Selecting **Ok+Save** updates the current instance and saves the key sequences for future instances of the Terminal.

To include a non-printable characters in the command, use the decimal equivalent (*nnn*) of the character. You may also use one of <CR>, <F10>, <F7>, <DO>, <TAB>, <LF>, <ESC>, <CSI>, <NL> (= <CR><LF>).

You can also use <P1>, <P2>, and other command line parameters.

**Note:** There are known problems with the User Keys facility. For up-to-date information, please contact the [InterSystems Worldwide Response Center \(WRC\)](#).

## 3.5 Specifying Other User Settings

To specify user settings, select **Edit > User Settings**. This displays a dialog box where you can specify both the current setup and initial values of various parameters used by the Terminal. The settings are as follows:

**Table 3–1: User Settings**

Setting	Description
Wrap	Automatic wrapping at right hand column
<- Key sends ^H	Set to have <X> key send Ctrl+H rather than Delete
Application Keypad	Enable Application Mode keypad
Force Numeric Pad	Force standard PC keypad
Disable Special ID	Do not send special Terminal ID
Disable Mouse Reports	Do not sent mouse reports
Enable Fast Paint	Enable fast paint mode
Paste Keeps Linefeed	Set to send line feeds from clipboard (along with carriage return)
Pass XOFF Through	Let remote host handle XOFF/XON.
Windows edit accelerators	Specifies whether the Terminal enables the common Windows edit shortcuts ( <b>Ctrl+C</b> , <b>Ctrl+V</b> , <b>Ctrl+Shift+V</b> ), in addition to the basic Terminal edit shortcuts ( <b>Ctrl+Insert</b> and <b>Shift+Insert</b> ). If these Windows shortcuts are not enabled, the characters are passed in the data stream to the Caché server process.
Paste burst size (in bytes)	The number of characters to paste in one transmission
Paste pause time (in msec)	The number of milliseconds between successive transmissions of pasted material longer than the burst size

Some systems cannot accept data as fast as the Terminal can send it. Thus, the **Paste burst size** determines how much to send at once and the **Paste pause time** determines the pause time between transmissions. If either setting is less than 1, the entire clipboard is sent at once.

## 3.6 Specifying the Network Encoding

The network encoding of the Terminal controls how characters are translated at the following times:

- When the Terminal translates keyboard input into its display memory, which uses Unicode. Characters received from the keyboard are translated from the single or multibyte character stream using the current Windows input character set. This means that if you change your input language, the Terminal recognizes the change and adapts to it. This enables you to type in mixed languages; the Terminal recognizes it and translates properly into its internal Unicode representation. If you use mixed-language input, select **UTF8** as your network encoding and your Caché **\$ZMODE** I/O translation table.
- When the Terminal communicates with a peer server. Characters transmitted to the server are translated from the internal Unicode representation to a network encoding and characters received from the server are translated from the network encoding to Unicode.

The default network encoding is UTF8, even on 8-bit systems.

To specify the network encoding, select **Edit > Network Encoding**. This displays a dialog box where you can choose the network encoding for the Terminal to use. There are 4 choices: **UTF8**, **Windows**, **ISO**, and **EUC**. Because these encodings are not all relevant to every input locale, only the relevant choices are enabled on the menu.

### 3.6.1 UTF8 Encoding

When you select the UTF8 option, the Terminal translates the internal Unicode characters to UTF8 on output to the server and from UTF8 when received from the server. If you select UTF8, the Caché I/O translation for your principal I/O device must be UTF8. You can determine the I/O translation from **\$ZMODE**. It is the fourth field; fields are delimited by backslashes (\).

### 3.6.2 Windows Encoding

When you select the Windows option, the Terminal uses the current Windows input code page to translate I/O between the Terminal and the server, to and from the internal Unicode character set encoding. When you use the Windows encoding, make sure to set the Caché I/O translation (**\$ZMODE**) to that it expects the character set represented by the active Windows code page.

### 3.6.3 ISO Encoding

When you select the ISO option, the Terminal uses the following ISO 8859-X code pages to translate I/O to and from the peer server. The Terminal selects the appropriate ISO code page based on the current Windows input code page. The following mappings are enabled:

**Table 3–2: ISO Encoding**

Language Region	ISO Standard	Windows Code Page	Network Code Page
Western European	8859-15	1252	28605
Central European	8859-2	1250	28592
Cyrillic	8859-1	1251	28591
Greek	8859-7	1253	28597
Turkish	8859-9	1254	28599
Hebrew	8859-8	1255	28598
Arabic	8859-6	1256	28596
Baltic Rim	8859-4	1257	28594

Language Region	ISO Standard	Windows Code Page	Network Code Page
Korea	iso-2022-kr	949	50225
Japan (JIS)	N/A	932	50220

All other Windows input code pages use the Windows code page if the ISO network encoding is selected.

When using the ISO encoding, you must ensure that the Caché I/O translation shown in **\$ZMODE** is consistent with the character set represented by the active ISO code page used by the Terminal.

### 3.6.4 EUC Encoding

The EUC encoding is relevant to far Eastern languages and is used to communicate with certain UNIX® systems. When you select the EUC option, the Terminal uses the following code pages to translate I/O to and from the server. The Terminal selects the appropriate EUC code page based on the current Windows input code page. The following mappings are enabled:

**Table 3–3: EUC Encoding**

Language Region	ISO Standard	Windows Code Page	Network Code Page
Japanese	N/A	932	51932
Simplified Chinese	N/A	936	51936
Korean	N/A	949	51949

Japanese (JIS) support is provided under the ISO network encoding using the 50220 code page to translate to/from the internal Unicode.

## 3.7 Specifying the Physical Character Setting of the Display

To specify the physical character setting, select **Edit > Display Physical Character Setting** and then select either **Logical** and **Physical**. This option controls the aspect of the characters displayed in the Terminal window. The difference is apparent only when using multibyte character sets.





# 4

## Using Terminal Scripts

This chapter discusses how to create and use script files for the Terminal.

- [How to start execution of a script](#)
- [How to pause execution of a script](#)
- [How to stop execution of a script](#)
- [Contents of a script file](#)
- [A list of the commands that you can use in a script file](#)
- [How to provide arguments to these commands](#)
- [A sample Terminal script file](#)

Also see the next chapter, “[Script Command Reference](#)” and see the section “[Learning Mode](#)” in the chapter “[Advanced Topics](#).”

**Note:** Terminal scripts are useful on occasion, but it is usually much easier to write and use a [routine](#), because each of the routine programming languages provides a much richer set of options.

Environment variables in processes running the local Terminal connection are available as follows:

- Before Windows Vista, the Caché process runs as the user that is logged in to Windows and is running the Terminal program (cterm.exe).  
In these cases, all environment variables and shared drive letter designations are those defined by that user.
- Beginning with Windows Vista, and including Windows Vista, Windows Server 2008, Windows 7, and all anticipated subsequent releases of Windows, the Caché process that serves the Terminal connection runs in the context of the user account in which the Caché control service runs.  
In these cases, the user environment variables and shared drive letter designations are those defined by the user account in which the Caché control service runs.

### 4.1 Starting Script Execution

Script files (with default extension .scr) are normally found in the working directory but could be anywhere.

To run a script, select **File > Script** or press **Alt+S**. A standard Windows file lookup box is presented and the selection of a script is made.

If a script is given as an argument on a command line, it is started immediately if no switch is locking the command mode, or deferred until after a host connection is made if there is a switch.

**Note:** If you edit the communications choices to a single mode, that is equivalent to locking the Terminal to a single choice and thus any script file is invoked after the host connection is made.

## 4.2 Pausing Script Execution

To pause the execution of a script, select **File > Pause** or press **Alt+P**. You are prompted to confirm that you want to pause the current script.

## 4.3 Stopping Script Execution

To stop a script, select **File > Script** or press **Alt+S**. You are prompted to confirm that you want to stop the current script.

## 4.4 Contents of a Script File

Script files are line oriented; there is no line-continuation convention. Each line is separate from any other. Lines beginning with a semicolon are considered comments. You can use blank lines liberally to improve readability. Normally, invalid lines are ignored. Script commands may be preceded by spaces and/or tabs.

The format for a line that contains a script command is as follows. Note that arguments are interpreted as strings or numbers:

```
ScriptCommand: ScriptArguments
```

Here *ScriptCommand* is one of the Terminal script commands and *ScriptArguments* is the argument list for that command (see details for the specific commands). Note that if script command consists of two or more words, the words of the command must be separated from each other by a single space. Also note that there is no space between the command and the colon.

Or, for a command that has no arguments:

```
ScriptCommand
```

You can use labels to define points of control transfer. A label begins with a dollar sign (\$), is not case-sensitive, and can have embedded spaces. A label must appear by itself on a line.

Also see the section “[Learning Mode](#)” in the chapter “[Advanced Topics](#).”

## 4.5 Script Command Summary

The following table gives the list of available script commands:

**Table 4–1: Terminal Script Commands**

Command	Action
<a href="#">break</a>	Transmit a break for those communications devices that support it
<a href="#">call script</a>	Exit the current script and start another
<a href="#">case match</a>	Indicate if the "wait for" string must match in case
<a href="#">closelog</a>	Close a log file
<a href="#">connect</a>	Force a host connection if not connected
<a href="#">debug</a>	Enable/disable debugging for scripts
<a href="#">disconnect</a>	Force a disconnect if connected
<a href="#">display</a>	Send text to the display
<a href="#">echo</a>	Turn on/off echo of incoming characters
<a href="#">execute</a>	Execute a Windows program
<a href="#">exit</a>	Exit the script
<a href="#">goto</a>	Transfer control to another place in the script
<a href="#">if empty</a>	Transfer control if last test string was empty
<a href="#">key_starttime</a>	Simulate key timing start
<a href="#">key_stoptime</a>	Simulate key timing stop
<a href="#">key_timer</a>	Turn key timing on and off
<a href="#">logfile</a>	Start a log file
<a href="#">multiwait for</a>	Wait for any of several strings from the communications device
<a href="#">notify</a>	Display a dialog box and wait for user response
<a href="#">on error</a>	Indicate label to branch to if timer fires
<a href="#">pause</a>	Pause the script
<a href="#">return</a>	Return from a subroutine in the script file
<a href="#">send</a>	Send text to the communications device
<a href="#">subroutine</a>	Call a subroutine in the script file
<a href="#">terminate</a>	Exit the emulator entirely
<a href="#">test</a>	Build a string to be tested
<a href="#">timer</a>	Control the timer for "wait for"
<a href="#">title</a>	Set the window title
<a href="#">wait for</a>	Wait for a particular string from the communications device

For reference information on these commands, see the later section “[Script Command Reference](#).”

## 4.6 Script Command Arguments

All spaces and tabs at the beginning and end of arguments are ignored.

All numeric arguments are integers. A required numeric argument defaults to 0 if not provided. Additionally, OFF is equivalent to 0 and ON is equivalent to 1.

Strings are simply the concatenation of all data on a line after the command (with the exception of the leading and trailing white space). Quotation marks are not needed. Additionally, parameter substitution is accomplished with the use of one of the following:

<P1>, <P2>, ..., <Pn>

This substitutes the *n*-th command line parameter in place of <Pn>.

To ease operation, certain ASCII characters have equivalent shortcut representations as shown in the following table.

**Note:** Any ASCII (extended) character except NUL (000) can be produced via <ddd> where *ddd* is the decimal value of the character.

**Table 4–2: Special Characters**

Character(s)	Interpretation	Transmitted Sequence
<CR>	Carriage return	<13>
<F10>	F10 key	<27>[21-
<F7>	F7 key	<27>[18-
<DO>	Do key	<27>[29-
<TAB>	Tab key	<9>
<LF>	Line feed	<10>
<ESC>	Escape key	<27>
<DCS>	Device control string introducer	<144>
<ST>	Stop device control string	<156>
<EMU>	Start of extended emulator command	<144>i
<NL>	Newline	<CR><LF>
<CSI>	Control string introducer	<155>

## 4.7 A Sample Script

The following is a sample Terminal script:

```
; initialization -- turn match off to make comparisons more lenient
case match: off

; wait for the terminal to initialize and ask for our identification
echo: off
wait for:Username
send: SYS<CR>
wait for:Password
```

```
send: XXX<CR>
title: Terminal Example
echo: on

; log everything in a log
logfile: C:\TermExample.log
; wait a second
pause:10

; display a header to let the user know we are ready
; you need <CR><LF> because "display" does not
; have a prompt to advance to another line
display:<CR><LF>
display:-----<CR><LF>
display:<<< Terminal Example >>><CR><LF>
display:-----<CR><LF>
; wait a second
pause:10

; switch to the USER namespace
send: znospace "USER"<CR>
wait for:USER>

; display some basic information about the system
; Use the debugging routine to do so
send: Do ^%STACK<CR>
wait for: action:

; have it outline our options
send: ?<CR>
wait for: action:

; wait 5 seconds for user to absorb
pause: 50

; ask for the basic process info
send: *s
pause: 50
send: <CR>
wait for: action:

; wait another 10 seconds
pause: 100

; finish the session
send: <CR>

; close the log file
closelog

; finished
terminate
```



# 5

## Script Command Reference

This chapter provides reference information for the Terminal script commands.

**Note:** Terminal scripts are useful on occasion, but it is usually much easier to write and use a [routine](#), because each of the routine programming languages provides a much richer set of options.

### 5.1 break

Sends a break for those communications nodes that support a break. Otherwise, it does nothing. It has no arguments. Usage example:

```
break
```

### 5.2 call script

Starts running a script. If a script is executing when this command is executed, the Terminal terminates that script before starting the new script. Usage example:

```
call script: login fred <p3>
```

This example stops the current script (if one is running) and starts another called login.scr. The first parameter in the sample script (login.scr) is fred. The second parameter is whatever is in the third parameter of the current script file (the one making the call). The default file extension is assumed to be .scr. The current working directory is searched first for an instance of login.scr.

### 5.3 case match

Enables or disables exact case matching in the [wait for](#) command. Usage example:

```
case match: off
```

By disabling exact case matching, you can match strings even if the individual characters differ from one another in case. The default for this switch is *on*.

## 5.4 closelog

Closes the currently open log file, if any. Usage example:

```
logfile: mydirect.log
send: dir *.* /FULL<CR>
wait for: <NL>$
closelog
```

## 5.5 connect

Opens a dialog box to initiate a connection to a remote host. Usage example:

```
connect
```

## 5.6 debug

Enables debug mode, which traps invalid script commands, which the Terminal usually ignores. When you enable the debug mode, the first part of an invalid command appears in a message box requiring operator attention. Usage example:

```
debug: on
```

## 5.7 disconnect

Disconnects from the host. If the Terminal is not connected, the command does nothing. Usage example:

```
disconnect
```

## 5.8 display

Writes data to your screen. It is not sent to the communications device. Usage example:

```
display: <CSI>H<CSI>J<LF>Here are the choices for today:
```

When this example is executed, it moves the cursor to the home position, clears the window, advances by one line, and writes the text `Here are the choices for today:` and leaves the cursor after the end of the text.

## 5.9 echo

Enables or disables displayed output to the window and log file. This is useful if you need to hide output (because it is uninformative to the user, for example). For an example, see [wait for](#).



## 5.10 execute

Launches a Windows program with a SHOW attribute for its window. Usage example:

```
execute: notepad.exe myfile.not
```

This example executes the Windows Notepad program and opens the file myfile.not inside that application. Notice that you could do the following:

```
logfile: mydat.lst
echo: off
send: dir *.dat/full
wait for: <NL>$
closelog
echo: on
execute: notepad mydat.lst
```

**Note:** No test is made to see if the program actually starts and no wait is done for its completion.

## 5.11 exit

Exits the script. A script normally exits when it reaches the end of its last line, but you may wish to exit if some event (say a login) does not occur. Usage example:

```
on error: $byebye
timer: 40
wait for: event:
goto: $Got event

$byebye:
notify: Did not find event prompt, exiting script
exit

$Got event:
timer: 0
; more commands
```

## 5.12 goto

Transfers control to another place in the script file. This is useful for managing control flow for looping, and in response to timeout branching. Usage example:

```
on error: $Not There
timer: 30
wait for: abc<CR>
goto: $Got It

$Not There:
;failed to see it, send Ctrl+C
send: <3>
goto: $bad

$Got It:
;turn timer off because we got abc<CR>
timer: 0

;more commands ...
```

## 5.13 if empty

Causes a branch to the given label if the last [test](#) command found an empty string. Usage example:

```
test: <pl>
if empty: $No First Arg
```

The first command determines if the first parameter provided in the command line is missing or empty. The second command branches to the label `$No First Arg` if this is the case.

## 5.14 key\_starttime

Starts the timing of a key sequence. It takes a single numeric argument. If the argument is zero, the statistics are accumulated when you press **Enter**. Otherwise, statistics are accumulated when you press **F10**. Usage example:

```
key_starttime: 0
```

To stop timing, use the [key\\_stoptime](#) command.

## 5.15 key\_stoptime

Stops a timing and accumulates statistics, if timing is currently active. Usage example:

```
key_starttime: 0
wait for: <esc>[14;22H
key_stoptime
```

## 5.16 key\_timer

Starts or stops the data collection of key timing information. Alternatively, you can start or stop the timer with **Alt+Shift+T**. Usage example:

```
key_timer: on
; rest of your script commands
key_timer: off
```

A file (KEYTIMER.LOG) is constructed in the system manager's directory that contains a histogram of key timings. You can use only one such timing sequence because it does not append to the current statistics file but overwrites it.

**Note:** To drive timings exclusively from a script file, you must use `<CR>` and `<F10>` in place of `<13>` and “`<27>`”[21-”, respectively.

## 5.17 logfile

Starts the collection of received data in the log file specified. If there is currently a log file active, it is quietly stopped. Use the **closelog** command to stop the logging. Usage example:

```
logfile: mydirect.log
send: dir *.* /FULL<CR>
wait for: <NL>$
closelog
```

The default directory is the directory in which the script resides. It can be changed by supplying a full pathname.

Log files are normally opened for overwrite; that is, if they already exist, new data replaces what is already there.

## 5.18 multiwait for

Synchronizes the script file with the host. Processing is suspended until the data that arrives from the host matches one of several strings given in the argument. Usage example:

```
multiwait for: =USER>=***ERROR,=DONE
```

This example causes the script file to wait (maybe forever) until any one of three strings of characters arrives. The first non-blank character of the argument (in this instance, the equals sign) is treated as the delimiter that breaks up the argument into substrings. So this command causes the example script to wait until one of the following sequences arrives:

```
USER>
***ERROR,
DONE
```

You can use a timer to break out of this command.

See the [case match](#) command to turn exact case matching on or off.

Because a [case match](#) command may have only a single substring argument, the following two script commands are identical in function:

```
multiwait for: =USER>
wait for: USER>
```

## 5.19 notify

Displays a Windows message box and waits until the user presses **OK**. You can use this for messages to the user who runs the script. Usage example:

```
notify: Ready to send commands...
send: copy *.lst backup:*.lst<CR>
send: delete *.lst;*
```

**Note:** This box is modal and cannot be interrupted except by the user.

## 5.20 on error

Establishes the target label for the implied [goto](#) that is executed if a timer expires (normally while waiting for text to arrive). To be strictly correct, you should use this command before using [timer](#), although in practice the order might not matter.

For examples, see [wait for](#), [exit](#), [goto](#), and [subroutine](#).

Also see the [timer](#) command.

## 5.21 pause

Pauses a running script for a number of tenths of seconds. Usage example:

```
pause: 30
```

This example pauses execution of the script for three seconds. If the argument is 0, that is equivalent to an indefinite pause; to resume from an indefinite pause, use **Alt+P**.

## 5.22 return

Used with the [subroutine](#) command to return to the place in the script from which the subroutine was called. See the [subroutine](#) command for an example.

## 5.23 send

Simulates typed data (such as Caché syntax) that is sent to the currently connected host. Usage example:

```
send: zn "DOCBOOK" <CR>
```

This line changes the namespace to DOCBOOK. The <CR> at the end is necessary because the [send](#) command does not implicitly add a carriage return.

Another usage example is as follows:

```
send: 1<cr>2<cr>A1234<F10><32>
```

This command is equivalent to typing the following, in sequence:

- The character 1
- The carriage-return key
- The character 2
- The carriage-return key
- The string of characters A1234
- The F10 key

- A single space character

Notice that `<32>` is the only way to send a leading or trailing space. Those characters are removed by the command interpreter if typed normally.

**Important:** It is best practice to include the `wait for` command after each `send` command. The `wait for` command provides the ability to synchronize later commands in the script with input from the terminal. The Terminal script mechanism sends commands one-after-the-next without regard to the input returning from Caché except when a `wait for` command is encountered.

If you do not include the `wait for` command after each `send` command, and you are generating a log file, the log file will not include information for the later `send` commands.

## 5.24 subroutine

Useful if repetitive commands are used in a script. It saves both memory and the possible need to invent many different labels. Use this command with a `return` command. Usage example:

```
subroutine: $Send It Again
; some other processing
exit

$Send It Again:
send: <F7>Q
on error: $skip
timer: 30
wait for: [22;5H
timer: 0
return

$skip:
send: <3>
; note on error still set to $skip
timer: 30
wait for: function:
timer: 0
send: <CR>
exit
```

**Note:** The subroutine stack holds 16 addresses. If you try to nest subroutine invocations deeper than that, the script fails.

## 5.25 terminate

Tells the Terminal to exit back to Windows. Any open files are closed, extra windows are removed, and the connections are closed. Usage example:

```
terminate
```

## 5.26 test

Tests if a parameter or window property is non-empty. The command is used in conjunction with the `if empty` command. See the `if empty` command for an example.

## 5.27 timer

Sets a timer to use with the [wait for](#) command. The [timer](#) command performs a Windows SetTimer() command. When the timer fires, the script processor goes to the label specified by [on error](#) (if any). The script exits immediately if no label has been specified by [on error](#).

Usage example:

```
timer: 100
```

The argument is the number of tenths of a second to wait. The example sets a timer for ten seconds. See the example in the [goto](#) command for another example.

To switch off a timer, use the following:

```
timer: 0
```

For an example of [timer](#) in context, see [wait for](#).

## 5.28 title

Sets the Terminal window title to the specified string. Usage example:

```
title: This is my window
```

You can also set the title remotely via the extended emulator commands.

## 5.29 wait for

Synchronizes the script file with data that arrives from the host. Usage example:

```
wait for: USER>
```

This example causes the script file to wait (maybe forever) until the precise string of characters `USER>` arrives. This particular sequence is the default prompt from the Terminal when in the `USER` namespace. This means that you can use this command to wait until the Terminal is ready for more input.

You can use [timer](#) to break out of a [wait for](#) command. If the text being looked for is never received, or is missed due to timing or case match issues, [timer](#) is the only way to interrupt a [wait for](#) and continue execution of the script. When you use [timer](#), you can specify a label to receive the flow if the timer expires; see [on error](#). If [wait for](#) finds the text it is seeking, it kills the timer and clears any label set by [on error](#). Usage example:

```
echo: off
on error: $Failed Login
timer: 50
wait for: Name:
send: <p1><CR>
wait for: Password:
send: <p2><CR>
wait for: <NL>$
echo: on
Notify: Login is complete
display: <CSI>H<CSI>J
send: <CR>
```

```
    goto $Process
$Failed Login:
    echo: on
    notify: Login failed.
    exit
$Process:
    ;processing begins
```

This example hides the login sequence using a name and password supplied as the first two script parameters, respectively. If the login succeeds, processing begins at the indicated label. If it fails, the script displays a dialog box indicating the failure and then exits when you select **OK**.

The [wait for](#) command may or may not consider the case of the text, depending on whether and how you have used the [case match](#) command.





# 6

## Using the Terminal in Batch Mode

For some operating systems, you can run the Terminal from the command line (for example, the DOS window). This chapter is organized as follows:

- [Escape characters in Windows](#)
- [The Batch Command Line](#)
- [Control arguments](#)
- [Examples of running a script:](#)
  - [Example 1: getting process information \(batch\)](#)
  - [Example 2: getting process information \(interactive\)](#)

### 6.1 Escape Characters in Windows

The various versions of Microsoft Windows interpret the caret character (^) and percent character (%) differently from one another. A specific line of text may also be interpreted differently depending on whether you type it into a “batch” window (DOS prompt) or include it as input in a batch script.

The following table gives the different input sequences required to represent the following line on different operating systems:

```
cterm /console=cn_ap:cache[USER]:^%D
```

**Table 6–1: Operating System Differences**

Operating System	Environment	Rule	Input Sequence
Windows 7	DOS prompt	No escaping needed	cterm /console=cn_ap:cache[USER]:^%D
Windows NT, Windows 2000, Windows XP	DOS prompt	Double caret (^) characters	cterm /console=cn_ap:cache[USER]:^^%D

Operating System	Environment	Rule	Input Sequence
Windows 7, Windows NT, Windows 2000, Windows XP	Batch file	Double caret (^) characters Double percent (%) characters	cterm /console=cn_ap:cache[USER]:^%%D
Windows 9x, Windows ME	DOS prompt or batch file	Double percent (%) characters	cterm /console=cn_ap:cache[USER]:^%%D

For other operating systems, consult the documentation for the relevant operating system.

## 6.2 The Batch Command Line

You can invoke the Terminal from the DOS command line (cmd.exe, to be precise). The general form of the command line is:

```
cterm Arg1 Arg2 ... ArgN ScriptFilePath
```

Where:

**Table 6–2: Invoking the Terminal in Batch Mode**

Item	Meaning
cterm	Invokes the Terminal application. If the Windows environment variable <i>PATH</i> includes the location of the Caché binaries, then use the command name <i>cterm</i> or <i>cterm.exe</i> . Otherwise, you must use a full or partial path. For a default installation of Caché, the binaries are in the directory <i>install-dir\Bin</i> .
Arg1 ... ArgN	Control arguments (described in the next section).
ScriptFilePath	The location of the script file.

## 6.3 Control Arguments

Several arguments modify the starting environment for the Terminal session. Some of these are reserved for internal use and are not described here. The most useful arguments are as follows.

**Note:** If you start the Terminal with either the */console* or the */server* control argument, the **Connect** menu item is not shown.

### 6.3.1 /console=<ConnectionString>

This argument specifies both the type of connection and the additional data needed to make the connection. There are two types: TELNET connections and connections to local console applications.

**Note:** You cannot specify both */console* and */server* arguments.

### 6.3.1.1 /console=cn\_iptcp:<HostAddr>

This specifies the target system with which the Terminal is to interact over a TELNET connection. This is useful for running a script on the local machine. In this case, you specify the local machine IP address and port as *HostAddr*. For example:

```
cterm /console=cn_iptcp:127.0.0.1[23]
```

### 6.3.1.2 /console=cn\_ap:<Instance>[<Namespace>]

You can open a Terminal prompt. For example:

```
cterm /console=cn_ap:cache[USER]
```

This line opens a Terminal session and switches to the given namespace.

In this case, the instance name is *cache*, and the namespace name is *USER*.

The namespace name is optional. If it is not supplied, the default namespace is used.

### 6.3.1.3 /console=cn\_ap:<Instance>[<Namespace>]:<Routine>

You can also execute routines from a batch file. For example, assume that the following appears as a line in a batch (.bat) file for use in Windows 7:

```
cterm /console=cn_ap:cache[USER]:^^%%D
```

This line starts the given instance (if it is not already running), opens a Terminal session, switches to the given namespace, executes the given routine. When the routine ends, the Terminal session is closed.

In this case, the instance name is *cache*, and the namespace name is *USER*. The routine name is *^^%D* (which prints out the current date). Be sure to read “[Escape Characters in Windows](#),” earlier in this chapter.

The namespace name is optional. If it is not supplied, the default namespace is used.

## 6.3.2 /server=<ServerName>

This argument specifies the name of the server to use for a secure connection between this Terminal session and the given server.

```
cterm /server=ServerName
```

For *ServerName*, specify a Caché server. To see the list of available servers, select the InterSystems Launcher and then select **Preferred Server**. The system then displays a list of servers.

Make sure of the following, on platforms other than UNIX:

- On the desired server, the Telnet service (**%Service\_Telnet**) must be enabled. (Note that this service is not enabled by default.)

For information, see “[Services](#)” in the *Caché Security Administration Guide*.

- The server must be running.

On UNIX<sup>®</sup>, the server does not need to be running, but you will log in to a shell, not directly in to Caché.

**Note:** You cannot specify both `/console` and `/server` arguments.

### 6.3.3 /size=RowsxCols

This argument gives the initial size of the Terminal screen, in terms of rows and columns. Each of *Rows* and *Cols* must be an unsigned integer. The *x* that separates them is required as shown. No spaces are permitted in the control argument.

The allowed ranges for *Rows* and *Cols* are:

- $5 \leq Rows \leq 64$
- $20 \leq Cols \leq 132$

### 6.3.4 /pos=(X,Y)

This argument gives the initial origin of the Terminal screen in the display device window in pixels. Both *X* and *Y* must be unsigned integers. The parentheses around the pair and the comma separator are required. No spaces are permitted in the control argument.

**Note:** It is possible to place a window outside the displayed area by using values for *X* and *Y* that are larger than the size of the display device.

### 6.3.5 /ppos=(Xpct,Ypct)

This argument gives the initial origin of the Terminal screen in the display device window in terms of a percentage of the display area. Both *Xpct* and *Ypct* must be unsigned integers. The parentheses around the pair and the comma separator are required. No spaces are permitted in the control argument.

The allowed ranges for *XPct* and *Ypct* are:

- $0 \leq Xpct \leq 40$
- $0 \leq Ypct \leq 40$

That is, the window origin cannot be placed above and to the left of the device origin. Nor can it be placed more than 40% down or across the display device.

### 6.3.6 /UnbufferedLogging

This argument causes output to be written immediately to the log file when logging is active instead of being buffered. This may be useful if another process is inspecting the output of the log file.

## 6.4 Examples

This section uses the example script shown earlier in this document, and shows two ways to run it.

### 6.4.1 Running a Script in Batch Mode

This example uses the basic debugging routine `^%STACK` to display information about the current user and the Terminal process. If the script commands are stored in `C:\TestScript.scr`, you can run the example by typing into a DOS command window:

```
C:\CacheSys\Bin\cterm.exe /console=cn_ip tcp:127.0.0.1[23] C:\TestScript.scr
```

## 6.4.2 Running a Script Interactively

You can invoke the previous routine in a Terminal session as follows:

```
C:\CacheSys\Bin\cterm.exe /console=cn_ap:cache[USER]:^^%STACK
```

You can manually provide the responses that the script supplied in that example. When you reply to the prompt `Stack Display Action:` by pressing the **Enter** key, the Terminal window closes.



# 7

## Advanced Topics

This chapter discusses the following advanced topics:

- [Disabling the close button](#)
- [The mapping of the extended keyboard](#)
- [Special modes of the Terminal](#)
- [Using the Terminal with DDE](#)

### 7.1 Disabling the Close Button of the Terminal

If you need to disable the close button (X) of the Terminal, add a registry key, as follows:

- On 32-bit Windows machines: `HKEY_LOCAL_MACHINE\SOFTWARE\InterSystems\Terminal\NoExit`  
Notice the space in “Terminal”.
- On 64-bit Windows machines:  
`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\InterSystems\Terminal\NoExit=1`

The NoExit value is of type REG\_SZ in both cases.

### 7.2 Mapping of the Extended Keyboard

The Terminal supports application keyboard mode for the extended keyboard as follows:

**Table 7–1: Key Mappings**

Key	Mapped Value
Num Lock	PF1
Keypad-divide	PF2
Keypad-times	PF3
Keypad-minus	PF4
Keypad-plus	Keypad-comma
Shift+Keypad-plus	Keypad-minus
F1, F2, F3, F4	PF1, PF2, PF3, PF4 (respectively)
Shift+F1 ... Shift+F10	F11 ... F20 (respectively)

The keypad cluster of the extended keyboard is mapped as follows:

**Table 7–2: Keyboard Mappings**

Key	Mapped Value
Insert	Insert Here
Home	Find
Page Up	Prev Screen
Delete	Remove
End	Select
Page Down	Next Screen

The **Pause** key acts as a single XON/XOFF toggle key.

## 7.3 Special Modes

The Terminal provides a couple of special modes, accessible only by keyboard actions.

### 7.3.1 Key Timing Mode

To enter or exit *key timing mode*, press **Alt+Shift+T**.

This mode can help you determine performance of a host system under various load conditions. The output of a timing run is the file KEYTIMER.LOG in the Caché system manager's directory.

### 7.3.2 Learning Mode

In *learning mode*, the Terminal generates a log file that you can quickly convert to a script file, after making only minor edits. When this mode is enabled, the log file is a sequence of script **wait for** and **send** commands. The **wait for** commands show up to 16 characters preceding the sent data.



To enter learning mode:

1. Press **Alt+L** to enable logging. Then specify a log filename and directory, as described in “[Logging the Terminal Session](#),” earlier in this book.
2. Press **Alt+Shift+L**.

To exit learning mode, press **Alt+Shift+L**.

## 7.4 Using the Terminal with DDE

The Terminal supports DDE (Dynamic Data Exchange) links to permit other applications to talk to a remote host. This section assumes that you are familiar with DDE. The topics here are as follows:

- [Layout](#) — Used to obtain status information. Examples are the row and column size, whether there is a connection, and so on.
- [Screen](#) — Used to gather data from the Terminal screen.
- [Message](#) — Used to send data to either the Terminal screen or the host.

**Note:** A Windows task cannot discriminate between multiple instances of the Terminal when it comes to using DDE. Therefore, use DDE only if *one* copy of the Terminal is running.

### 7.4.1 DDE Layout Connections

The Terminal supports DDE requests for what could be considered as static information through the Layout topic.

**Table 7–3: DDE Layout Connections**

Item	Meaning of Returned Value
Column	The number of columns of the window.
Row	The number of rows of the window.
hWnd	The decimal equivalent of the main window handle.
Connected	A null string if there is no connection, otherwise the equivalent of the title string "mode: node"
Read	A 1 if the last received character was a CTRL/A. Its use is detection of the end of screen painting.
Script	A 1 if a script is currently running, otherwise 0.
Title	The title of the window.

### 7.4.2 DDE Screen Connections

The Terminal supports DDE requests for screen data through the Screen topic. Currently, one POKE command is available to select which part of a screen line is desired.

**Table 7–4: DDE Screen Connections**

Item	Meaning of Returned Value
Cursor	The current position of the cursor, in the form row;col.

Item	Meaning of Returned Value
Line	The current line (without a CR LF).
LeftLine	The left part of the current line up to but not including the character under the cursor.
RightLine	The right part of the current line including the character under the cursor.
All	The entire screen, each line is delimited by CR LF.
Piece	The currently selected piece of a screen line (without a CR LF).

**Note:** The item "Piece" can be POKEd with a string of the form "*RnnCmmLpp*" to cause the Piece request to retrieve (at most) *pp* characters on the screen line *nn* beginning with column *mm*. The top left corner of the screen is row 1, column 1.

## 7.4.3 DDE Message Connections

The Terminal supports DDE requests for data communications through the Message topic. These are implemented with DDE POKE commands.

**Table 7-5: DDE Message Connections**

Item	Meaning of returned value
Send	The DDE message value is sent to the host if a connection is active.
Display	The DDE message value is sent to the "screen" as if it were received from the host.