

**Update Package 1 to the
DOMAIN System
Command Reference**

**Order No. 009496
Revision 00**

Apollo Computer Inc.
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Chelmsford, MA 01824

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Updating Instructions

The information in this package supersedes the contents of the *DOMAIN System Command Reference*, Revision 04. To update your manual, remove the old pages and insert the new pages as listed below. Insert this instruction sheet behind the title page as a record of the changes.

<u>Remove</u>	<u>Insert</u>
Title/Notice	Title/Notice
Preface	Preface
	2-14.1
	2-50.1
4-39/4-40	4-39/4-39.1 through 4-40
4-171/4-172 through 4-174	4-171/4-172 through 4-174
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	4-263.1/4-263.2
4-277/4-278	4-277/4-278
4-315/4-316	4-315/4-316 through 4-316.1
4-319/4-320 through 4-330	4-319/4-320 through 4-330
Index-1 through Index-9	Index-1 through Index-8
Reader's Response/ Business Reply	Reader's Response/ Business Reply

**DOMAIN System
Command Reference**

**Order No. 002547
Revision 04**

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Preface

This document updates the SR9.5 version of the *DOMAIN System Command Reference* for software features included in the SR9.6 release. The *DOMAIN System Command Reference* is the third volume in the three-volume introduction to the DOMAIN computing system. The first volume, *Getting Started With Your DOMAIN System* (Order Number 002348), provides a tutorial approach to getting started on your node. The second volume, *DOMAIN System User's Guide* (Order Number 005488), constitutes a handbook that takes you beyond the introductory stage into practical applications of Display Manager (DM) and Shell operations. This third document provides complete reference information on all of the DM and Shell commands that are available to you. We assume that you are familiar with the material in the first two books before you attempt to use this reference manual. Fundamental concepts like file structure and usage are taken for granted here. We tell you *how* to use the commands; not *why* you might want to use them.

For information on creating, protecting, and maintaining the network environment, see *Administering Your DOMAIN System* (Order number 001746). For information on creating, protecting, and maintaining the DOMAIN/BRIDGE internet environment, see *Administering Your DOMAIN/BRIDGE Internet* (Order number 005694).

Problems, Questions, and Suggestions

We appreciate comments from the people who use our system. In order to make it easy for you to communicate with us, we provide the User Change Request (UCR) system for software-related comments, and the Reader's Response form for documentation comments. By using these formal channels you make it easy for us to respond to your comments.

You can get more information about how to submit a UCR by consulting the description of the Shell command CRUCR (CREATE_USER_CHANGE_REQUEST). You can also get more information by typing:

```
$ HELP CRUCR <RETURN>
```

For your comments on documentation, a Reader's Response form is located at the back of this Guide.

Documentation Conventions

Unless otherwise noted in the text, this manual uses the following symbolic conventions.

UPPERCASE	Uppercase words or characters in formats and command descriptions represent commands or keywords that you must use literally.
lowercase	Lowercase words or characters in formats and command descriptions represent values that you must supply.
[]	Square brackets enclose optional items in formats and command descriptions. In sample Pascal statements, square brackets assume their Pascal meanings.
{ }	Braces enclose a list from which you must choose an item in formats and command descriptions. In sample Pascal statements, braces assume their Pascal meanings.
	A vertical bar separates items in a list of choices.
< >	Angle brackets enclose the name of a key on the keyboard.
CTRL/Z	The notation CTRL/ followed by the name of a key indicates a control character sequence. You should hold down the <CTRL> key while typing the character.
...	Horizontal ellipsis points indicate that the preceding item may be repeated one or more times.
	Vertical ellipsis points mean that irrelevant parts of a figure or example have been omitted.

Summary of Technical Changes

The Display Manager

The following new features are available in the SR9.6 DM.

New Commands and Features

- CDM (CHANGE_DISPLAY_MANAGER_MODE): Change the display manager mode.
- LCM (LOAD_COLOR_MAP): Load a color map.

The Shell

The following new features are available in the SR9.6 shell.

New Commands and Features

- SCRCH (SHOW_SCREEN_CHARACTERISTICS): Show screen characteristics.
- SH8 (INVOKE_8-BIT_SHELL): Invoke 8-bit shell.

Changes to Existing Commands

- CPSCR: New -APPEND and -GPR[_BITMAP] options.
- LCNET: New -C option.
- RTSTAT: New -DESC[RIPTION] option.
- VCTL: New -SUSP, -EOL, -[NO]RAW, -[NO]ENABLE_SIGS options.
- VSIZE: New -STD option.
- VT100: Support for PASTE and F8 keys.
- WBAK: New -PDTU option.

NOTE: A vertical bar in the margin indicates a substantive technical change from Revision 04 of the *DOMAIN System Command Reference*.

CDM (CHANGE_DISPLAY_MANAGER_MODE) -- Change the display manager mode.

FORMAT

CDM [-P 1 | 8]

The CDM command changes the display mode of the hardware which affects the colors used by the Display Manager. A user normally uses this command in preparation for running a direct color application, which requires a 24-plane workstation. In this case it is necessary to restrict the Display Manager to only using 2 colors.

At login, the default is CDM (with no options), which instructs the hardware to use the highest number of planes (normally 8) when drawing colors. This is an indirect color mode where the DM uses several colors for window banners, window background, and text.

Note that this command causes a visual change in the colors on the screen of a 24-plane workstation only. It has no effect on any other display hardware and the DM will give an error message, "wrong display hardware", if this command is issued on any device other than a 24-plane workstation.

The CDM command differs from the MONO command in that the MONO command does not affect the 24-plane hardware in any way. The MONO command simply instructs the DM to use black and white for all its drawing operations, thus freeing up color slots in the color map.

OPTIONS

The only option that the CDM command takes is a -P option that allows the user to specify the number of planes that the Display Manager should use to get color. For example, a "CDM -P 1" causes all DM output to be displayed in only 2 colors, through the use of one plane. This is necessary to "free up" all 24 planes so that some application can run in direct color mode. When the user is finished running a direct color application, the DM can be restored to its original state by issuing the "CDM -P 8" command. The DM's original state is such that it uses 4 colors for window background, 4 more colors for window banner background, white for banner text, and black for text in DM windows.

If no options are specified, CDM defaults to highest number of planes, causing the the display to be reset to its original state where existing indirect color applications work as before.

Default options are indicated by "(D)."

-P 1 This causes the Display Manager to put the hardware in a state where the DM draws in only 1 plane, causing the DM's output to appear in 2 colors.

-P 8 (D) This instructs the DM to use all 8 planes for drawing. The hardware mode is changed to allow the DM to use 8 planes. The DM's output appears in many colors. This option is currently equivalent to giving the CDM command with no options.

LCM (LOAD _COLOR _MAP) -- Load a color map.

FORMAT

LCM [-p pathname]

LCM loads a color map from a file which specifies a set of color map entries. Each entry establishes an association between an index and a color value. When the DM is initially loaded, it sets the node's color map from the file in `/sys/dm/color_map`.

If no pathname is given, LCM loads the color map from `/sys/dm/color_map`. In this case, all 16 colors (that is, color entries for color slots 0-15) are reloaded. If you specify a pathname, then LCM reads the given file and tries to load the colors associated with the indexes.

NOTE: IF there are direct mode graphics programs running that have changed the color values for color slots 0-15, then the execution of this command will change the colors in these windows as well as resetting the DM's colors.

OPTIONS

-Ppathname Specify file which contains the color values for red, green, and blue. The format of this file should be identical to the DM's color map file, `/sys/dm/color_map`. For more information about the format of this file, please refer to the manual "Programmer's Guide to DOMAIN Graphics Primitives".

EXAMPLES

1. Load the DM's color map found in the file `/sys/dm/color_map`.

Command: `lcm`

2. Load the color map specified in the file `my_colormap`.

Command: `lcm -p my_colormap`

CPSOCR (COPY_SCREEN) -- Copy the current display to a file.

FORMAT

CPSOCR *pathname* [-INV] [-APPEND] [-GPR[_BITMAP]]

CPSOCR copies the current screen image (without clearing it) to the file you specify. Use the PRF (PRINT_FILE) command to print the file.

Use the Display Manager command CPO to copy the screen without creating a new process window or changing the current transcript pad. CPO invokes the CPSOCR command from the Display Manager without creating a pad or window. Thus, press <CMD> then type:

CPO /COM/CPSOCR *pathname*

You may copy small portions of a black and white screen (such as a single window) with the DM command XI.

By default, black and white screens are copied into a GMF file. Color screens are copied into a GPR bitmap.

ARGUMENTS

pathname (required)	Specify file to which the screen is copied.
-------------------------------	---

OPTIONS

-INV	Invert image. Use this option to store the image in reverse video. Black screen pixels become white and white screen pixels become black. This switch cannot be used with the -gpr_ <i>bitmap</i> switch or on color nodes.
-APPEND	Appends a black and white screen image to an existing GMF file. This switch cannot be used with the -gpr_ <i>bitmap</i> switch or on color nodes.
-GPR[_BITMAP]	Use this option to copy a black and white screen into a gpr bitmap file rather than a gmf file. This option has no meaning for color nodes since color screens are already copied into gpr bitmaps.

EXAMPLES

1. `$ cpsocr //us/looky_there -inv` Invert and copy the current screen image to the specified file. Since the command line is echoed in the Shell's process transcript pad prior to execution, this command will appear in the resulting image.

CPSCR (COPY_SCREEN)

2. <CMD>

Command: `cpo /com/cpscr //us/looky_there -inv`

Same result as in example 1,
but the CPSCR line will not
appear in the plotted output.

CPT (COPY_TREE)

CPT (COPY_TREE) -- Copy a directory tree.

FORMAT

CPT source_pathname target_pathname ... [options]

CPT is a multipurpose tool for copying, merging, and replacing files, directories, and links. To copy files only, use CPF (COPY_FILE).

ARGUMENTS

Multiple source/target pairs and wildcarding are permitted.

source_pathname
(required)

Specify the file, link, or directory tree to be copied. CPT does not change the contents or link references of the source, so errors that occur will leave the source unaffected.

target_pathname
(required)

Specify the file or directory tree to be created, replaced, or merged. The target pathname may be derived from the source pathname. The target can NOT be a link. In addition, the target can NOT be a logical volume entry directory, or the network root unless the -MD option is specified.

OPTIONS

Default options are indicated by "(D)."

-AF date

Copy only objects whose dtms (date-times) are after the given date and time: [[[yy]yy/]mm/dd][.][hh:mm[:ss]] | TODAY . The date defaults to today, and the time to midnight, if either are omitted from 'date'.

-BE date

Copy only objects whose dtms are before the given date and time: [[[yy]yy/]mm/dd][.][hh:mm[:ss]] | TODAY . The date defaults to today, and the time to midnight if either are omitted from 'date'.

-C

(D)

Create source at target. If the file or directory already exists, an error will occur and processing will continue to the next source/target pair. Not valid if -MS, -MD, or -R is specified.

If the source is a file, CPT copies it to the target. If the source is a directory, CPT copies the directory to the target. It then copies every file cataloged in the directory (and all subdirectories) until it reaches the end of the tree.

Each link name in the source tree is created as a link name in the target, but the object that the link references is not copied. If 'source_pathname' is itself a link, however, the link is resolved and the object to which it points is copied to the target.

library when generating a listing of global definitions and references with the -L option.

-REPL pathname

Replace, in the library, any modules found in the file specified by pathname. This option has an effect equivalent to first deleting all the modules found in pathname from the library, and then adding all the modules in pathname back into the library. The advantage gained by using -REPL is that you do not need to know the names of the modules in 'pathname'. Also, if you attempt to add a module to a library without using the -REPL option, and a module of that name *does* already exist, an error message is issued. If a module found in pathname *does not* already exist in the library, a warning message is issued.

-SYS

List global variables which are defined in the system library when generating a listing of global definitions and references with the -L option.

- (hyphen alone)

Request librarian prompting for further arguments.

This command uses the command line parser, and so also accepts the standard command options listed in the description of the command line parser in Chapter 3.

EXAMPLES

Refer to the *DOMAIN Binder and Librarian Reference* for detailed examples of LBR.

LCNET (LIST_CONNECTED_NETWORKS)

LCNET (LIST_CONNECTED_NETWORKS) -- Display internet routing information.

FORMAT

LCNET [options]

LCNET displays the list of known networks, their distances from the current node, the router used as the first hop towards that network, and other information.

The distances (hops) towards remote networks are measured in intervening routers. The distances are all for one-way traffic; if a network is three hops away from yours, your requests pass through three routers to get to that network. The responses also pass through three routers on the way back.

The -CONN option shows you the full internet topology, i.e. the list of networks and how the routers connect them together.

OPTIONS

Default options are indicated by "(D)."

-LOCAL (D) Display the 'First Hop' and 'Hops' information for each network in the internet. The first hop is the node ID of a router on your network. It is the first router used in sending packets from your network to the target network. Other routers are also used if the target network is more than one hop away from your own.

-FULL Display information showing how up-to-date the routing table is (the 'Age' and 'Expiration' columns) in addition to the 'First hop' and 'Hops' information shown by the -LOCAL option. -FULL also lists inaccessible networks.

-CONN Show which routers are connected to each network, and which other networks those routers touch. This option displays the 'Touching' information.

-HW Display the type of hardware used for each of the networks (ring or IIC).

The -CONN and -HW options may take several seconds to execute if you have a large internet.

-N node-spec Print another node's view of the internet. The outputs produced by -LOCAL and -FULL vary from node to node; -N affects these outputs. The -N option does not affect the output produced by the -CONN or -HW options, since the hardware and connectivity do not depend on a node's position in the internet.

-C The -C option suppresses the title over each output column. It also fills every line of the "Network" column produced by the -CONN option, and every line of the "Hardware" column produced by the -HW option. These format changes make it easier to use LCNET's output as another program's input.

EXAMPLES

In this example, the node is directly connected to network COFFEE. Networks 5A1AD and ED1F1CE were connected in the past, but are not now accessible (perhaps because the routers are down).

The expiration date and time for the 'local' network is meaningless.

```
$ lcnet -full
      First
Network  Hop    Hops  Age  Expiration date/time
=====  =====
      B020  4B6F    1  NEW  1985/06/16 14:33:21
      B00B00 4B6F    2  NEW  1985/06/16 14:33:21
      5A1AD  4B6F   gone  NEW  1985/06/16 14:33:21
      COFFEE    0  local  NEW  1985/06/09 10:27:46
      ED1F1CE 4B6F   gone  NEW  1985/06/16 14:33:21
      DODO    BAD1    1  NEW  1985/06/16 14:33:39
```

The 'Touching' information describes your internet completely. This example includes several kinds of information: - Network DEFACED has one router, node 2A3B. That router connects DEFACED to EFFACED. - Network FACEOFF contains two routers, 31DC and 1371. Those routers connect FACEOFF to COCOA and COFFEE, respectively.

```
$ lcnet -conn
      Touching      Touching
Network  Router      Network
=====  =====
      FOOD          5COB        DECAF
              36CF        COFFEE
      5A1AD         459B        COFFEE
              45BE        ED1F1CE
      B002E         3FOA        COFFEE
      COCOA         BAD1        BOOB1E
              56B0        EFFACED
              31DC        FACEOFF
      DECAF         5COB        FOOD
      BOOB1E        BAD1        COCOA
      COFFEE        36CF        FOOD
              459B        5A1AD
              3FOA        B002E
              1371        FACEOFF
      DEFACED       2A3B        EFFACED
      ED1F1CE       45BE        5A1AD
      EFFACED       56B0        COCOA
              2A3B        DEFACED
      FACEOFF       31DC        COCOA
              1371        COFFEE
```

```
$ lcnet -conn -c
      FOOD          5COB        DECAF
      FOOD          36CF        COFFEE
      5A1AD         459B        COFFEE
      5A1AD         45BE        ED1F1CE
      B002E         3FOA        COFFEE
      COCOA         BAD1        BOOB1E
      COCOA         56B0        EFFACED
```

LCNET (LIST _CONNECTED _NETWORKS)

COCOA	31DC	FACEOFF
DECAF	5COB	FOOD
BOOB1E	BAD1	COCOA
COFFEE	36CF	FOOD
COFFEE	459B	5A1AD
COFFEE	3FOA	B002E
COFFEE	1371	FACEOFF
DEFACED	2A3B	EFFACED
ED1F1CE	45BE	5A1AD
EFFACED	56B0	COCOA
EFFACED	2A3B	DEFACED
FACEOFF	31DC	COCOA
FACEOFF	1371	COFFEE

LCNODE (LIST_CONNECTED_NODES)

LCNODE (LIST_CONNECTED_NODES) -- List nodes connected to the network.

FORMAT

LCNODE [options]

LCNODE lists the nodes currently connected to the network. The list contains the ID of every node connected, the time at which the node was started, the current time, and the name of each node's entry directory.

This command reports only the nodes that respond within a preset time limit. Should a node be connected, but temporarily unable to respond within the specified time, it will not appear in the produced list.

OPTIONS

-M[E] Request information about your node only. This option displays the node ID.

-B[R]IEF Request brief output. LCNODE lists only the entry directory name for each connected node. Note that the entry directory of a diskless node is the entry directory of its paging partner.

-ID When used with **-BRIEF**, display the node ID in addition to the entry directory.

-C[O]UNT Request node count only. LCNODE lists only the number of nodes responding to its query.

-MAX[NO]DES n Set a limit on the number of nodes you want to see, even if more could have responded.

-FROM node_spec Starts the node list at some node other than your own. This is especially useful in an internet environment, for looking at networks other than your own. See the section on node specifications in Chapter 3 for more information.

-NAME When you specify the **-BRIEF** option, LCNODE normally prints the entry directory for each node. If you specify **-NAME** with **-BRIEF**, LCNODE prints the node-name catalogued with the naming server. Only diskless nodes are printed differently. A diskless node's entry directory is its partner's node name; a diskless node's node-name is uniquely its own.

Unless the **-FROM** option specifies your own node, the list will only include an unbroken sequence of nodes running AEGIS SR9.0 or later. The rest of the node list is lost, starting with the first running a pre-SR9.0 AEGIS.

RTSTAT (ROUTING_STATISTICS) -- Display internet router information.

FORMAT

RTSTAT [options]

RTSTAT shows the behavior of an internet router at each of its network ports. RTSTAT is most useful in a DOMAIN/BRIDGE internet. It can, however, provide information about non-routing nodes as well as routing nodes.

For more information on RTSTAT, see *Managing DOMAIN Internets*.

OPTIONS

- DEV** Report device-specific statistics for each port.
- NET [net_id ...]** Report counts of references to each network specified. The reference counts for each network are roughly proportional to the number of packets transmitted towards the network, but may be somewhat higher. -NET with no arguments uses the list of visible networks.
- R [n]** Repeat every 'n' seconds. If 'n' is omitted, repeat every 10 seconds.
- N node_spec ...** Report statistics for each node in the list.

See the section on node specifications in Chapter 3 for more information. If this option is omitted, RTSTAT reports statistics for the local node only.
- DESC[RIBE]** Print a description, several lines long, of each statistic. The description appears only once for each statistic, the first time it is printed with a non-zero value.

EXAMPLES

1. `$ rtstat`

```
-----
1232.3D9      pkts routed:  110024   queue oflo:      0
               misrouted:      0     rt too far:     14

               RING      pkts sent:    73278   pkts rcvd:      72434

               IIC      pkts sent:    67830   pkts rcvd:      61077
```

RTSTAT (ROUTING_STATISTICS)

2. \$ rtstat -net

```
-----  
1232.3D9      pkts routed:  110024  queue oflo:    0  
               misrouted:    0      rt too far:   14  
  
RING         pkts sent:    73278   pkts rcvd:    72434  
             towards net:  1232   ref cnt:     74540  
  
IIC         pkts sent:    67830   pkts rcvd:    61077  
            towards net:  1234   ref cnt:     53532  
            towards net:  1231   ref cnt:     9193  
            towards net:  1233   ref cnt:     5105
```

SCRCH (SHOW_SCREEN_CHARACTERISTICS)

SCRCH (SHOW_SCREEN_CHARACTERISTICS) -- Show screen characteristics.

FORMAT

SCRCH [fieldname...] [options]

SCRCH lists values of screen characteristics on standard output.

ARGUMENTS

fieldname
(optional)

Specify fieldname(s) of the graphic attribute to be described. If omitted, the default is to show values of all currently supported attributes.

The possible fieldnames are **x_visible_size** (visible x dimension screen area in pixels), **y_visible_size** (visible y dimension screen area in pixels), **n_planes** (number of planes available), and **n primaries** (number of primaries for graphics, either 1 for monochrome or 3 for RGB color).

OPTIONS

Default options are indicated by "(D)."

- V** Verbose description of field values.
- X** (D) Specifically give value of x visible screen size.
- Y** (D) Specifically give value of y visible screen size.
- P** (D) Specifically give value of the number of planes.
- PR** (D) Specifically give the number of primaries. The possible values are 1 for monochrome and 3 for RGB color.

EXAMPLES

1.

```
$ scrch
1024 800 4 3
$
```
2.

```
$ scrch -v
x_visible_size - 1024
y_visible_size - 800
n_planes - 4
n primaries - 3
$
```
3.

```
$ scrch -x -y
1024 800
$
```

SCRCH (SHOW_SCREEN_CHARACTERISTICS)

4.

```
$ scrch -y -x  
800 1024  
$
```
5.

```
$ scrch -p -x -v  
n_planes - 4  
x_visible_size - 1024  
$
```
6.

```
$ scrch x_visible_size  
1024  
$
```

SUMMARY OF INTERNAL SHELL COMMANDS

The Shell has four types of commands:

External Commands

These are programs that reside on your disk. They are invoked when you type in their pathname or, if their directories are included in your command search rules, when you type their leafname.

Internal Commands

These are built-in Shell commands (see below). The Shell always looks for these first.

Control Structures

These are programming constructs that allow you to control the flow of control in a Shell script. Note: Since these structures are legal anywhere on the command line, you must enclose them in quotes when using the HELP command (i.e., HELP 'IF').

Expressions

These are delimited by '()' and '()'. Inside of these double parentheses you can set variables, compare values and perform other standard integer, string or boolean operations. The assignment operation (VARIABLE := VALUE) is a special case that does not have to be enclosed in double parentheses.

Any of these commands can have their output redirected or may be invoked in the background using the Shells parsing operators (>, >>, >?, >>? <, <<, <?, <<?, |, &...) See the *DOMAIN System User's Guide* for details.

Internal Commands

Flags VON, VOFF, XON, XOFF, BON, BOFF, EON, EOFF

Variables READC, READ, READLN, EXISTVAR, LVAR, DLVAR, SETVAR, EXPORT

Control Structures

IF, WHILE, SELECT, FOR
EQS, EXISTF, RETURN, EXIT, NEXT, SOURCE, SET, ABTSEV,
NOT

Miscellaneous ARGS, CSR, RDYM, HLPVER, INLIB, UMASK

Expressions

TRUE, FALSE
:=, OR, AND, =, <, >, <=, >=, <>, +, =, *, /, MOD, **, (,), NOT

SH8 (INVOKE_8-BIT_SHELL)

SH8 (INVOKE_8-BIT_SHELL) -- Invoke 8-bit shell.

FORMAT

SH8 [font]

The **sh8** program provides a shell with support for output of 8-bit characters. The standard output stream is extended through the use of a type manager to interpret characters above ASCII 128 as referring to characters in an additional font file. A new shell is then invoked by **sh8** which uses this stream. The value of the SHELL environment variable is used to determine which shell to invoke.

In order for **sh8** to work, there must exist in /sys/dm/fonts two font files, name (ASCII 32 to 126 decimal), name.a (ASCII 160 to 254). The name.b file (ASCII 128 to 159) is optional, as it is used to print out the control characters in the high 128 range (ASCII 128 - 159). If the program has no need to print these characters, the name.b file need not exist.

ARGUMENTS

font

(optional)

The **sh8** default font is `courier12`. Thus, if **sh8** is invoked with no arguments, the files `courier12`, `courier12.a`, and (optionally) `courier12.b` must exist in `/sys/dm/fonts`.

Optionally, a font name may be given as the first (and only) argument to **sh8**.

The command `sh8 helvetica16` would use `/sys/dm/fonts/helvetica16` as the low 128 characters, and `/sys/dm/fonts/helvetica16.a` as the high 128 characters.

SHUTSPM

SHUTSPM -- Shut down SPM on a node.

FORMAT

SHUTSPM

When the SPM runs in place of the DM, it waits on the eventcount file 'NODE_DATA/SPMSHUT_EC'. SHUTSPM advances this eventcount, causing the SPM to perform an orderly shutdown of the node.

To shut down the SPM with SHUTSPM, create a remote process (via the CRP command) on the target node and type 'SHUTSPM'.

Normally, only system administrators may shut down the SPM using this command. This is because SPM creates the 'NODE_DATA/SPMSHUT_EC' file with the following ACL (provided the default file ACL for 'NODE_DATA' gives all rights to %.%.%.%):

Subject ID	Access Rights
%.sys_admin.%	pgndwrx
%.%.%.%	---d-r-

This ACL limits SHUTSPM shutdown to accounts with the 'sys_admin' project name, but permits any account to delete the SPMSHUT_EC file whenever SPM is not using it. If, however, the default file ACL for 'NODE_DATA' has been changed, SPM creates the eventcount file using that default ACL. Note that an SID must have at least 'r' and 'w' rights to shutdown SPM.

If the SPMSHUT_EC file already exists when SPM starts up, SPM does not change its ACL.

To prevent SPM from responding to the SHUTSPM command, add the following line to the 'NODE_DATA/STARTUP.SPM' file:

```
NO_SHUTSPM
```

EXAMPLES

```
$ crp -on 1fb -login sys_admin      Create remote process on server node 1fb
                                     and log in with the system administrator
                                     account.

$ shutspm                            Shut down the SPM on server node 1fb.
```

VCTL (VT100_CONTROL) -- Set/display VT100 terminal characteristics.

FORMAT

VCTL [options]

VCTL allows you to set or display information about how the VT100 terminal emulator driver handles input from the keyboard (for example, whether or not it echoes characters, or how it interprets key sequences typed at the keyboard).

This command is valid only if you have the VT100 terminal emulation software package running on your node. In addition, VCTL can only be run in a window where the VT100 emulator is already running.

OPTIONS

If no options are specified, the current VT100 settings are displayed.

- DEFAULT** Set all options to their default values. This allows you to quickly reset values to known states.
- [NO]CVT_IN_NL** Convert a newline (linefeed) to a carriage return on input. The initial setting is -NOCVT_IN_LINE.
- [NO]CVT_IN_CR** Convert a carriage return to a newline on input. The initial setting is -CVT_IN_CR.
- [NO]CVT_OUT_NL** Convert a newline to carriage return, newline on output. The initial setting is -CVT_OUT_NL.
- [NO]CVT_OUT_CR** Convert a carriage return to a newline on output. The initial setting is -NOCVT_OUT_CR.
- [NO]ECHO** Turn the echoing of input characters on or off. The initial setting is ECHO.
- [NO]ECHO_CTL** Turn the echoing of control characters (such as CTRL/Z) on or off. The initial setting is NOECHO_CTL.
- [NO]ECHO_ERASE** If ECHO is on, controls whether characters are visibly erased from the screen when the erase character is typed. The combination of ECHO and NOECHO_ERASE causes the erase character to be echoed until all characters on a line are erased. The initial setting is -ECHO_ERASE.

-[NO]RAW

If RAW is on, a program reading from the keyboard in the VT100 will receive each character as it is typed. If RAW is off, such a program will block until a full line has been typed. A full line is a sequence of characters ending in a newline character. In other words, in non-raw mode, a program blocks until a carriage return or line feed is typed.

-[NO]ECHO_KILL

If ECHO is on, controls whether a line is visibly erased from the screen when the line kill character is typed. The combination of ECHO and NOECHO_KILL causes the kill character to be echoed and a new line to be displayed. The initial setting is -ECHO_KILL.

-EOF char

Set the end-of-file character. The EOF character is initially set to CTRL/Z.

-ERASE char

Set the erase character. This option is valid only when data is being passed to the terminal emulator in "cooked" mode. The 'char' can be any character or one-byte hexadecimal value. Some characters may require quoting in the Shell. The erase character is initially set to BACKSPACE (08 hex).

-INTR char

Set the interrupt character, which sends an interrupt fault to the process group of the terminal emulator. The interrupt character is initially set to CTRL/C.

-KILL char

Set the kill character. This option is valid only when data is being passed to the emulator in "cooked mode". The kill character is initially set to CTRL/X.

-QUIT char

Set the quit character. The quit character is initially set to CTRL/Q.

-SUSP char

Set the suspend character. The suspend character is initially set to hex FF, which is equivalent to its being disabled.

-[NO]ENABLE_SIGS

If ENABLE_SIGS is on then the fault-generating characters (interrupt, quit, suspend) have their special meaning. If ENABLE_SIGS is off then these characters are not treated specially.

EOL char

Set the extra break character. The EOL character is initially set to hex FF, which is equivalent to its being disabled. If it is enabled, the EOL character behaves like <return> in that any program reading from the keyboard will immediately wake up and read whatever has been typed so far, including the EOL character itself.

EXAMPLES

1. \$ vctl Display current settings.
 Erase (character delete) character: "^H" (08 hex)
 Kill (line delete) character: "^U" (15 hex)
 End of file character: "^Z" (1A hex)
 Interrupt character: "^C" (03 hex)
 Quit character: "^Q" (11 hex)
 Extra break character: FF (hex)
 Suspend character: FF (hex)
 Raw: FALSE, Echo: TRUE, Echo_Erase: TRUE
 Echo_Kill: TRUE, Echo_Ctl: FALSE, Cvt_In_CR: TRUE
 Cvt_In_NL: FALSE, Cvt_Out_NL: TRUE, Cvt_Out_CR: FALSE
 Enable_Sigs: TRUE
 \$

2. \$ vctl -quit OFE -cvt_out_cr Set quit character to hex FE,
enable conversion of output
newlines to carriage returns.

VSIZE (VT100_SIZE) -- Set/display VT100 window settings.

FORMAT

VSIZE [options]

The VSIZE command allows you to set the dimensions of the VT100 emulator window pane. This command is only valid from within the VT100 emulator (which is invoked with the VT100 command); attempting to use it directly from the Shell causes an error.

OPTIONS

If no options are specified, VSIZE displays the current window pane settings.

- L n** Specify the height of the window pane in lines. If this option is omitted, the height remains unchanged.
- C n** Specify the width of the window in columns. If this option is omitted, the width remains unchanged.
- STD** Set the height of the window to 24 lines and the width to 80 columns (same as saying -l 24 -c 80).

EXAMPLES

```

$ vt100                      Invoke VT100 emulator.
$ vsize                      Display current settings.
Screen size is 18 lines by 70 columns.
$ vsize -c 60                Change the width.
Old screen size is 18 lines by 70 columns.
New screen size is 18 lines by 60 columns.
$ *** EOF ***                Exit the emulator and return
$                              to the Shell.

```

VT100 -- VT100 terminal emulator.

FORMAT

VT100 [options] [pathname [arg1 arg2 ...]]

The VT100 command creates a window running the VT100 terminal emulator and starts up a Shell within the window. This command is valid only if you have the VT100 terminal emulation software package running on your node.

The VT100 terminal emulation package is intended for use with two types of programs. When used in conjunction with remote communications packages such as DOMAIN TCP/IP or X.25, the VT100 terminal emulator allows you to interact with the remote system as if you were logged into a VT100 connected to that system. Using the VT100 terminal emulator with programs that take advantage of VT100 special features allows you to run these programs on a DOMAIN node without having to tailor them to the DOMAIN environment.

The VT100 terminal emulation package consists of:

- The terminal emulation software, which performs the functions of a VT100 terminal, such as handling VT100-type escape sequences. The terminal emulator redirects the handling of keyboard input and screen output to stream manager operations. The terminal emulator is invoked within a DM window by the VT100 Shell command.
- The terminal emulator driver, which performs keyboard input functions such as erasing or echoing characters. The VCTL Shell command allows you to set and display the VT100 terminal characteristics controlled by the terminal emulator driver.

ARGUMENTS

If any options are specified, they must precede the argument(s).

pathname [arg1 arg2 ...]

(optional)

Specify the name of a command or program for the Shell in the VT100 window to invoke. You must give the full pathname; for example, /com/ld. Arg1, arg2, ... are valid arguments to the selected command (or program): for example, /com/ld //my_node/my_home_dir.

Default if omitted: invoke /com/sh

OPTIONS

If any options are specified, they must precede the argument(s). Once VT100 is running, you may change the window size with the VSIZE (VT100_SIZE) command.

-STD

Set up a VT100 window that is 24 lines by 80 columns (the standard size of a VT100 screen).

-LINES n Set up a VT100 window with the number of lines specified by 'n'. The number of lines cannot be greater than the number of lines in the DM window running the VT100 emulator.

-COLUMNS n Set up a VT100 window with the number of columns specified by 'n'. The number of columns cannot exceed the number of columns of the DM window running the VT100 emulator.

EXAMPLES

1. \$ VT100 Create a window running the VT100 emulator and start a shell running within the window.
2. \$ VT100 /COM/TELNET hostname Open a connection to the remote system specified by 'hostname' and create a window running the VT100 emulator.

VT100 Keyboard Layout

The table below shows how the keys on a DOMAIN low-profile or 880 keyboard map to the keys of a VT100. This presupposes that you are running the VT100 Keyboard Emulation package on your node. Note that the VT100 definitions for the <F2>, <F3>, and <F7> keys supercede the usual EMT definitions for these keys.

<i>DOMAIN key</i>	<i>VT100 keypad</i>
<INS MODE>	<ESC>
<CHAR DEL>	<RUBOUT>
<F2>	<PF1>
<F3>	<PF2>
<F4>	<PF3>
<F5>	<PF4>
SHIFT/<F2>	<7>
SHIFT/<F3>	<8>
SHIFT/<F4>	<9>
SHIFT/<F5>	<->
CTRL/<F2>	<4>
CTRL/<F3>	<5>
CTRL/<F4>	<6>
CTRL/<F5>	<,>
<F6>	<1>
<F7>	<2>
SHIFT/<F6>	<3>
SHIFT/<F7>	<ENTER>
CTRL/<F6>	<0>
CTRL/<F7>	<. >

WBAK (WRITE_BACKUP)

WBAK (WRITE_BACKUP) -- Create a magnetic media backup file.

FORMAT

WBAK *pathname* ... -F *file_no* [*options*] [-]

WBAK writes one or more objects to a magnetic media backup file. These objects may be directory trees, files, or links. For each object, the information saved includes the name, object data, and attributes associated with the object, such as the access control list. This lets you reconstruct files, the directory tree, or any portion of the tree using the RBAK (READ_BACKUP) command.

The WBAK and RBAK commands are intended both for disk backup and for interchanging information between separate DOMAIN installations. Use the RWMT (READ_WRITE_MAGTAPE) command to read and write magnetic media which are used for interchanging information with non-DOMAIN installations.

Tape Structure

WBAK writes the contents of the objects you specify to a single "backup file". Note that a backup file may be an ANSI standard tape file or diskette, and may contain many DOMAIN files, directories, and links. A backup file is a logically (and, if contained on one physical volume, physically) contiguous area of magnetic media surrounded by ANSI "file header" and "end of file" labels. One physical backup volume may contain one or more backup files. A single backup file may, however, span multiple magnetic media volumes.

The collection of backup files on one or more associated physical magnetic media volumes is called a "file set". The first backup file on the first physical magnetic media volume in a file set is numbered "1". Subsequent backup files in this file set are numbered in ascending order from "2".

Backup Modes

If you are backing up directory trees, WBAK can operate in one of three modes: "full" backup, "incremental" backup, or "dtm relative" backup. In full backup mode, all files, directories, and links are written to the backup file. When doing a full backup, objects in use do not get backed up. In incremental backup mode, all files are saved which were modified since the last full or incremental backup (when the backup history file was updated). In dtm relative mode, all files which were most recently modified either before or after the specified time are written to the tape.

Backup History

WBAK records all times that a directory has been backed up in a file called BACKUP_HISTORY. This file is updated in all directories named on the command line with the 'pathname' argument; it is not updated in directories contained within (subordinate to) those named directories. If no directory is named on the command line, then no BACKUP_HISTORY file is made. The information written to this file includes the date and time of the backup (in Coordinate Universal Time (UTC)), the backup mode, and, if you have specified a dtm relative backup, the date and time to which the backup is relative.

WBAK uses this file in incremental backup mode to determine the date and time of the last full or incremental backup. This file is a standard text file and may be read in the same way as any text file; you should not, however, change it except possibly to delete old entries from the beginning of the file if it becomes too large. The automatic update of the history file can be suppressed by using the `-NHIST` command option.

File Identification on Tape

Associated with a backup file is a "file id" (`-FID` option). This is a 1 through 17 character user-assigned name which can be used in place of the file number to identify the backup file. This name is stored in the file header label and is printed (by default) by RBAK when the contents of a backup file are indexed (listed) or restored.

Full Disk Backup

An entire disk can be backed up by specifying the entry directory name as the pathname (example 2). It takes approximately 25 minutes to perform a full backup on a local 33 megabyte Winchester disk; 50 minutes for a remote disk.

Backup Verification

Use RBAK with the `-INDEX` option to list a single backup file. For an index of all backup files on one physical tape volume, use RWMT with the `-INDEX` option.

When using WBAK, please note the following:

- Directories must allow list access in order to be backed up.
- Files must allow read access in order to be backed up.
- Objects locked for writing by another process cannot be backed up.
- WBAK must be run on the node which is connected to the tape or floppy unit. You may accomplish this either by physically typing the WBAK command on the host node, or by running WBAK in a process on the host node created from your own remote node using the `CRP CREATE_PROCESS` command.
- Only one tape unit can be connected to any node.
- There are no special tape mounting commands. Simply mount the tape on the tape drive and execute WBAK.

ARGUMENTS

pathname
(required)

Specify the name of the object to be written to backup media. This may be a directory, file, or link. If it is a file, then the file is written as specified. If it is a link, then the link is resolved and the resolution object is written to backup media. If it is a

directory, all subordinate files and subdirectories in the tree are written. Note that the pathname specified reflects the way the directory is stored on the backup media, and that the same name must be used when reading files using pathnames in RBAK. Multiple pathnames and wildcarding are permitted. If you omit this argument, WBAK will prompt you for it. You may specify a hyphen (-) as an argument to direct WBAK to standard input for further arguments and options.

OPTIONS

The **-F** option is required, as it specifies where on the backup media the new file is to be written. If you omit it, WBAK will prompt you for it.

Default options are indicated by "(D)."

Tape File Identifiers

-FID file_id Specify a 1-17 character file ID to be written in the file header label for use when writing a file to a labeled volume. If this option is omitted, the file is not named and can only be restored by the file number.

-F [position] Specify the file position for the write operation. Valid values for 'position' are "CUR", "END", or a nonzero integer. A position of "CUR" specifies that the file should be written at the current position on the backup media; the media must have been previously written by WBAK and its position must not have been disturbed.

A position of "END" specifies that the file should be written at the end of the backup media file set. This causes WBAK to append the specified disk file ('pathname' argument) to the very end of the file set.

A position specified by a nonzero integer value causes the file to be written at that absolute position in the backup media volume. If multiple 'pathname' arguments are supplied, the value of 'position' is incremented by one after each file has been written.

The default value for 'position' is 1.

Mode Control

The object specified by the 'pathname' argument must be a directory for either **-FULL** or **-INCR** to have meaning.

-FULL (D) Specify a full backup; save all files in specified trees.

-INCR Specify an incremental backup; save files which were modified since the last backup recorded in the BACKUP_HISTORY file stored in the 'pathname' directory.

-AF dtm Save all files modified after the given date and time; dtm is in the form "yy/mm/dd.hh:mm". The date defaults to today, and the time to midnight if either of those are omitted from dtm.

-BEF dtm Save all files last modified before the given date and time.

Label Control

-WLA (D) Write the backup media volume label if the backup file number is 1.

-NWLA Suppress writing of the backup media volume label.

-OWN id Specify backup media volume owner (1-14 character name). This option is only meaningful when used with the **-WLA** option.

-VID vol_id Specify a 1-6 character volume ID for use when labeling a volume. This option is only meaningful when the backup file number is 1. The default volume ID is ' ' (blank).

-SLA (D) Display the label information written for this backup file on standard output.

-NSLA Suppress output of label information.

Listing Control

You may include the **-L** option, or any combination of **-LD**, **-LF**, AND **-LL**.

-L Write the names of all files, directories, and links saved to standard output.

-LF Write the names of all files saved to standard output.

-LD Write the names of all directories saved to standard output.

-LL Write the names of all links saved to standard output.

Backup Device Control

-DEV d[unit] Specify device type and unit number. 'd' must be either 'M' (for reel-to-reel magnetic tape), 'CT' (for cartridge tape), or 'F' (for floppy), depending on which drive is being used. 'unit' is an integer (0-3). Both are required for reel-to-reel tapes (i.e., **-DEV M2**). A unit number is NOT required for floppy disks and cartridge tapes (i.e., **-DEV F**). If this option is omitted, RBAK assumes device M0.

CAUTION: Floppy disk support for this command is limited. In particular, error detection during reads and writes is poor. DO NOT use this command with floppy disks when the data being placed on the floppy disks are critical and unrecoverable.

-REO Force previous backup media volume to be reopened, and suppress reading of backup media volume label. Use only when backup media has not been repositioned since last WBAK or RBAK.

Special Cartridge Tape Control Options

- RETEN Retension the cartridge tape (unwind to the end, then rewind). This can be helpful if you have encountered cartridge tape reading errors. Retensioning requires about 1.5 minutes to complete.

- NRETEN (D) Do not retension the cartridge tape.

- NO _EOT Suppress the writing of two tape marks at the end of the tape file, which are the standard signal for end of tape. The cartridge can't position between the two tapemarks to be ready for a successive call to WBAK (as it does on magtape), without rewinding the tape and searching forward, so this option speeds up multiple invocations of WBAK. *It SHOULD NOT be used on the LAST invocation of WBAK.* Also, '-F CUR' should be used on all WBAK invocations in a series except the first one.

- SYSBOOT Permit use of a bootable tape that has a special boot program at the beginning. This option causes WBAK to skip over the first file on the tape. This option is only necessary when the first file on the tape is being written ('-F 1').

Miscellaneous Control Options

- NHI Suppress update of the backup history file.

- (hyphen) Read standard input for further arguments or options; input is accepted until WBAK receives an EOF (CTRL/Z by default).

- PDTU Preserves the last date/time-used information on objects. After each object is backed up on tape, the date/time-used information is reset to the value it had before the backup.

This command uses the command line parser, and so also accepts the standard command options listed in the description of the command line parser in Chapter 3.

EXAMPLES

```
1. $ wbak //mask/wby -f 1 -af 81/11/19.12.00 -fid wby -L
```

This command writes the directory //MASK/WBY to tape. The directory is written out to tape file one, and the file ID "wby" is written to the file's label. Disk files from directory WBY are written to the tape only if they have been modified since noon on November 19, 1981. The label and the names of the files written to tape are printed to standard output.

When this command is executed, WBAK writes the following information to standard output:

```
Label:
File number:    1
File section:  1
File ID:       wby
Date written:   1981/11/20 10:47:58 EST
```

Starting write:

```
(file) "//mask/wby/among" written
(file) "//mask/wby/school" written
(file) "//mask/wby/children" written
(file) "//mask/wby/backup_history" written
(dir) "//mask/wby/" written.
```

Write complete.

2. \$ wbak -f 1 -own "john doe" -vid "volbk2" -fid "node 27 backup" //goeey

This command backs up the entire contents of the node whose entry directory name is "goeey". Note that the file ID is specified as "node 27 backup" to make it easy to identify when you want to reload it, and that the command assigns volume and owner IDs.

When this command is executed, WBAK writes the following information to standard output:

```
Label:
  Volume ID:      VOLBK2
  Owner ID:       john doe
  File number:    1
  File section:   1
  File ID:        n 27 backup
  File written:   1983/02/17 18:00:39 EST
```

Starting write:

Write complete.

3. \$ wbak -f 1 -own "john doe" -vid "volbk1" ug/[a-f]?*_example -1

This command uses wildcards to match only those files in the "ug" subdirectory of the current working directory whose names begin with the letters "a" through "f" and end with "_example".

When this command is executed, WBAK writes the following information to standard output:

```
Label:
  Volume ID:      VOLBK1
  Owner ID:       john doe
  File number:    1
  File section:   1
  File ID:        (no ID specified)
  File written:   1983/02/17 17:58:52 EST
```

Starting write:

```
(file) "ug/cm_f_example" written.
(file) "ug/cmt_example" written.
(file) "ug/cpboot_example" written.
(file) "ug/cpf_example" written.
(file) "ug/cpt_example" written.
(file) "ug/fpat_example" written.
(file) "ug/fppmask_example" written.
```

WBAK (WRITE_BACKUP)

(file) "ug/fst_example" written.

Write complete.

DIAGNOSTICS

I/O Errors

When WBAK has an I/O error, it attempts the operation again, for a total of five times. After the fourth retry fails, WBAK prints out an error message describing which type of error occurred. If the error was during an attempt to write to a tape, WBAK skips the tape block which caused the error, and tries to write the same data in the next block. Note that no data is lost, but RBAK will return an I/O error when it tries to read that block. If the write attempt again fails, after five tries, WBAK skips that block and tries the next. This process will continue for a total of twenty consecutive failed blocks, at which time WBAK aborts.

tape rewind error

An I/O error occurred.

tape write-filemark error

An I/O error occurred.

tape space-filemark error

An I/O error occurred.

tape space-record error

An I/O error occurred.

i/o recovery failed

An I/O error occurred and the tape drive could not reposition for another try.

tape i/o error

An I/O error occurred.

Operator Errors

first label on volume is not VOL1 label

Expected a standard label, and did not find one.

label version number in VOL1 label is not "3"

The label format is incorrect.

a HDR1 label is missing where one is required

A file on the tape does not begin with the correct format.

wrong volume, file header is inconsistent with previous trailer

The wrong continuation tape was put on the drive. This is an operator error which can occur when a multi-tape volume is used.

magtape drive is offline

You have not put the drive on line.

tape is write-protected

The write enable ring is not on the tape.

file not found

The tape file specified was not found.

invalid unit number

Tape unit specified is not connected. Presently, only DEV 0 is supported.

pbu is not present.

No tape unit is connected to the node. WBAK can only be run on the node connected to the tape drive.

WD (WORKING_DIRECTORY)

WD (WORKING_DIRECTORY) -- Set or display the current working directory.

FORMAT

WD [pathname]

WD sets the working directory for the current process to the specified directory. The working directory is where the system looks for objects when you don't explicitly specify a directory as a part of a pathname.

ARGUMENTS

pathname
(optional)

Specify new working directory. This may be a derived name, but must point to a directory or link to a directory. Specifying a file will cause an error. WD also accepts the command line parser arguments "-" and "*". If you specify a hyphen (-), WD looks to standard input for the directory name. An asterisk (*) followed by the name of a file directs WD to look inside that file for the new working directory name.

Default if omitted: display current working directory.

EXAMPLES

- ```
$ wd //fred/jtj Set new working directory.
$ wd Display the new setting.
//fred/jtj
$ wd stuff/revised Set working directory with derived name.
$ wd Display the new setting.
//fred/jtj/stuff/revised
```
- ```
$ wd -                  Direct input to standard input for new
//frodo/my_stuff       directory name.
*** EOF ***            Signal end of input with CTRL/Z.
$
```
- ```
$ wd *newdir Direct input to a file named "newdir"
$ that holds the name of the new working
 directory.
```

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