MicroVMS Workstation Guide to Printing Graphics

Order Number: AA-HQ85A-TN

This manual provides information about the two printing options included in the MicroVMS workstation software, Print Screen and HCUIS.

Operating System and Version: MicroVMS Version 4.4

Software Version: MicroVMS Workstation Version 3.0

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Preface

This manual describes the two printing options included in the MicroVMS workstation software, Print Screen and HCUIS.

Print Screen is part of the Workstation Options menu. It prints a specified portion of a display. Print Screen requires a printer that accepts sixel format.

HCUIS (Hardcopy UIS) comes with your workstation software, but it is not automatically installed when you install the workstation software. HCUIS enables users and applications to translate UIS pictures to the formats needed for printing on a variety of hardcopy devices. It also makes it easy for applications to create UIS files.

Intended Audience

Part I of this manual is intended for workstation users who want to print pictures. Part II is intended for programmers who want to incorporate HCUIS into applications.

Structure of This Document

This guide is divided into two parts:

- Part I — User Information

  This section contains an overview of Print Screen and HCUIS, installation instructions for HCUIS, and information on how to set up hardcopy devices and how to use Print Screen and the RENDER command.

  - Chapter 1 — Overview and Installation

    This chapter briefly describes Print Screen and HCUIS and gives installation instructions for HCUIS.

  - Chapter 2 — Device Setup

    This chapter describes how to set up hardcopy devices.

- — Chapter 3 — The Print Screen Function

  This chapter describes how to use the Print Screen function from the Workstation Options menu.

- — Chapter 4 — The RENDER Command

  This chapter describes the RENDER command, which is part of HCUIS.

- • Part II — Programmer Information

  This section contains information for programmers who want to incorporate HCUIS into applications.

- — Chapter 5 — Programming Interface

  This chapter gives a general description of how HCUIS routines are used and how picture fidelity varies varies across devices.

- — Chapter 6 — HCUIS$ Routines

  This chapter is a reference section for HCUIS$ routines.

Associated Documents

The following MicroVMS workstation manuals are related to this guide:

- • *MicroVMS Workstation User's Guide*
- • *MicroVMS Workstation Graphics Programming Guide*

Conventions Used in This Document

The following conventions are used in this manual:

Convention	Meaning
RETURN Key	All commands end with a carriage return.
CTRL/x	The word CTRL followed by a slash and a letter means that you press the letter while holding down the CTRL key. For example, CTRL/B means press B while pressing CTRL.
Key Symbols	In examples, keys and key sequences appear as symbols, such as PF2 and CTRL/Z .
Square brackets ([ ])	Optional parameters are enclosed in square brackets
Vertical Ellipsis	A vertical ellipsis indicates that part of an example is not included.
Lists	When a format item is followed by a comma and an ellipsis (,...), you can enter a single item or a number of the items separated by commas.

Part I User Information

Chapter 1

Overview and Installation

This chapter gives an overview of the Print Screen function, which is part of the Workstation Options menu, and Hardcopy UIS (HCUIS), which is an optional part of the workstation software kit. It also gives instructions for installing HCUIS.

1.1 Print Screen

Print Screen is an option on the Workstation Options menu, which is provided as a built-in part of the workstation software. Print Screen allows you to choose a rectangular portion of the display screen and print it. (See Chapter 3 for information on how to use Print Screen.)

Print Screen sends the bitmap screen display directly to the printer. For this reason, the printer must accept sixel format. Printers that can be used with Print Screen include DIGITAL's LA50 and LA210 dot matrix printers and LN03 and LN03 PLUS laser printers. (See Chapter 2 for information on setting up these printers.)

1.2 HCUIS

Hardcopy UIS (HCUIS) comes with your workstation software kit, but it is not automatically installed when you install the workstation software. HCUIS enables users and applications to translate UIS pictures to the formats needed to print them on a variety of hardcopy devices. HCUIS also makes it easy for applications to create UIS files.

Using the RENDER command, you can translate the picture in a UIS file to a format specific to the hardcopy device you are using. This allows you to use the full graphics capabilities of your workstation hardcopy devices. If, for example, a printer uses PostScript,^(TM) text in the translated file will be printed using PostScript fonts. Similarly, if a sixel printer has a higher resolution than the screen, the translated

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picture can be printed at the higher resolution. (See Chapter 4 for information on the RENDER command.)

To generate UIS files, you need applications that support their creation. Refer questions about whether a particular application can create UIS files to the applications vendor. Note that the workstation software kit contains an unsupported picture-drawing application that supports UIS files. Refer to the cover letter for details.

You can develop applications that support UIS files by using the HCUIS$ routines supplied with HCUIS. (See Chapters 5 and 6 for information on the HCUIS$ routines.)

Hardcopy devices that can be used with HCUIS include DIGITAL's LA50, LA100, and LA210 dot matrix printers; DIGITAL's LN03 and LN03 PLUS laser printers; DIGITAL's LCP01 color printer; Apple Computer's LaserWriter ™ laser printer; DIGITAL's LVP16 6-pen plotter; Hewlett-Packard's HP 7475 ™ 6-pen plotter, HP 7550™ HP 7580™ , HP 7585™ 8-pen plotters, and HP 7510™ film recorder; and Lasergraphics' MPS–2000 ™ film recorder. (See Chapter 2 for information about setting up these devices.)

These devices have very different characteristics. See the section "Creating Device-Independent Pictures" in Chapter 5 for information about the differences in how a picture looks when it is drawn on different devices.

1.2.1 HCUIS Software Installation

The HCUIS software is included in the workstation software kit, but you install it separately, as described here.

Before you can install the HCUIS software, the workstation software must be installed. See the *MicroVMS Workstation User's Guide* for information on installing the workstation software.

Follow these instructions to install the HCUIS software and to print the HCUIS release notes:

NOTE: HCUIS needs 2400 blocks for installation. It needs 1200 blocks to run.

1. Make sure that the workstation software is installed.

2. Locate the HCUIS diskettes or tape.

   The diskettes are labeled "HCUIS030 1/2" and "HCUIS030 2/2".

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™ MPS–2000 is a trademark of Lasergraphics, Inc.

The tape is labeled "HCUIS030".

3. Log in to the SYSTEM account.

4. Invoke the VMSINSTAL procedure.

   - If you are installing from diskettes, type:

     `$ @SYS$UPDATE:VMSINSTAL HCUIS030 $FLOPPY1 OPTIONS N`

   - If you are installing from a tape, type:

     `$ @SYS$UPDATE:VMSINSTAL HCUIS030 $TAPE1 OPTIONS N`

5. Reply to the VMSINSTAL prompts.

   In response to the question "Do you want to continue even though DECnet and other processes are running?" answer Y and press RETURN .

   In response to the question "Are you satisfied with the backup of your system disk [YES]?" press RETURN . Installing HCUIS does not destroy any information on your system disk.

6. Load the first volume.

   - If you are installing from a diskette, you are prompted as follows:

     ```
     Please mount the first volume of the set on $FLOPPY1:
     Are you ready?
     ```

     Load the diskette labeled "HCUIS030 1/2" into drive 1. Type Y and press RETURN . The installation proceeds from this point.

   - If you are installing from a tape, you are prompted as follows:

     ```
     Please mount the first volume of the set on $TAPE1:
     Are you ready?
     ```

     Load the tape cartridge labeled "HCUIS030" into the tape drive. Type Y and press RETURN . The installation proceeds from this point.

7. Terminate VMSINSTAL.

   When the HCUIS software is installed, VMSINSTAL asks for your name and a comment for the software history log. The VMSINSTAL procedure then exits.

8. Remove the diskette or tape from its drive.

The following files are copied to your system during installation of HCUIS:

```
SYS$SYSTEM:RENDER.EXE
SYS$SHARE:HCUISSHR.EXE
SYS$SHARE:TRN$UIS_HPGL.EXE
SYS$SHARE:TRN$UIS_PS.EXE
SYS$SHARE:TRN$UIS_SIXEL.EXE
SYS$SHARE:TRN$UIS_REGIS.EXE
```

SYS$MANAGER:HCUISDEVICES.COM
SYS$MANAGER:HCUISSETUP.COM
SYS$LIBRARY:HCUISDEF.*
SYS$MESSAGE:HCUISMSG.EXE
SYS$EXAMPLES:HCUIS.UIS

1.2.2 HCUIS Translators

Each of the four translators supplied with HCUIS supports a different device class. In theory, the devices in a given class are compatible. In practice, there are often minor differences among them. So, while HCUIS officially supports only the devices described in this manual, other devices may be compatible with them.

The following table lists the translators and the devices they support.

Translator	Supported Devices
Sixel	LA50 printer
	LA100 printer
	LA210 printer
	LN03 printer
	LN03 PLUS printer
PostScript	LaserWriter printer
ReGIS	LCP01 color printer
HPGL	LVP16 plotter
	HP 7475 plotter
	HP 7550 plotter
	HP 7580 plotter
	HP 7585 plotter
	HP 7510 film recorder
	MPS–2000 film recorder

1.3 Where to Go from Here

To use the PRINT command, Print Screen, or HCUIS, your hardcopy devices must be set up properly. Refer to Chapter 2, Device Setup, for more information.

Chapter 2

Device Setup

This chapter explains how to connect hardcopy devices to your workstation.

2.1   Print Screen

The hardcopy devices listed in this section can be used with Print Screen.

- LA50
- LA100
- LA210
- LN03
- LN03 PLUS

Unless you use the Printer Setup menu to choose an alternate destination, Print Screen uses the printer attached to CSA0.

2.2   Device Setup Command Procedure

The startup command file provided with the workstation software, STARTVWS.COM, calls another command file, HCUISDEVICES.COM. This second command file can be modified to set up the hardcopy devices on your system and initialize print queues. Each line has an exclamation mark (!) at the beginning, making the command line a comment rather than a command. Simply delete the exclamation mark and fill in the placeholders for the lines that apply to your workstation.

Hardcopy devices that have been set up by HCUISDEVICES.COM can be used with the PRINT command, HCUIS, or Print Screen, except as noted previously.

NOTE: Before you can use print queues, the MicroVMS Secure User Environment option must be installed.

This is what the command file looks like:

```
$! HCUISDEVICES.COM - template for initializing hardcopy devices on your system.
$!
$! Remove (!) in the START/QUEUE if you want to setup any print queues
$! via HCUISSETUP.
$! If you uncomment-out the START here, do NOT uncomment-out the START/QUEUE
$! in SYSTARTUP.COM.
$!
$!❶START/QUEUE/MANAGER/BUFFER_COUNT=10/EXTEND_QUANTITY=25
$
$! Remove (!) from each HCUISSETUP line that applies to your system, AND:
$! 1) Replace csa0: with port the device is on if necessary -- eg. TTA1:
$! 2a) Delete qname & /whatever if you do NOT want to setup a print queue
$!     OR
$! 2b) Replace them with whatever queue name and qualifiers you wish to use.
$!  (If you need no qualifiers, just delete /whatever).
$! 3) Change parameter 2, the device's speed, if desired.
$! You may have multiple lines that refer to the same type of device.
$! You may NOT have multiple lines that refer to the same port.
$!
$!❷@sys$manager:hcuissetup ❸la50 ❹4800 ❺csa0: ❻qname ❼/whatever
$!@sys$manager:hcuissetup la100 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup la210 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup ln03 19200 csa0: qname /whatever
$!@sys$manager:hcuissetup ln03plus 19200 csa0: qname /whatever
$!@sys$manager:hcuissetup lvp16 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup hp7475 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup hp7550 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup hp7580 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup hp7585 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup hp7510 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup mps2000 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup laserwriter 9600 csa0: qname /whatever
$!@sys$manager:hcuissetup lcp01 9600 csa0: qname /whatever
```

The explanation for the parts of each line is as follows:

❶   Delete the comment character from this line if you want to set up any print queues. If you delete this comment character, do **not** delete comments from the lines in SYSTARTUP.COM that are for setting up the queue manager. See the *MicroVMS User's Manual* for information about SYSTARTUP.COM.

❷   This calls the setup procedure for a device. Normally, you would never delete or modify HCUISSETUP.COM.

   If you delete the comment character, do **not** delete comments from the lines in SYSTARTUP.COM that are for the same port. See the *MicroVMS User's Manual* for information about SYSTARTUP.COM.

❸ This is the device type. If you have more than one of a particular device type, repeat the whole line for each device, making the necessary changes.

❹ This is the device speed. It can be changed, if desired. Set the speed to match the setting on the device itself. Refer to the operator manual for your hardcopy device for information.

Note that for the port CSA0 this value is ignored. Instead, set the baud rate dial on the back of your MicroVAX to match the device setting.

On the MicroVAX I, 1200 baud is the fastest speed you can set for an LA50 attached to the port CSA0.

❺ This is the port to which the device is connected. If the device is not connected to CSA0, change "csa0:" to the correct name.

The workstation comes standard with only one printer port, named CSA0. See the Option Installation section of the *VAXstation Owner's Manual* for information on acquiring additional ports.

❻ The "qname" placeholder allows you to set up a print queue for your hardcopy device. Print queues allow you to use the PRINT command.

If you want to set up a print queue, replace "qname" with the name you want for the queue. The name for the default print queue is SYS$PRINT.

If you do not want to set up a print queue, delete "qname /whatever".

❼ The "/whatever" placeholder allows you to modify the print queue you have set up. If you want to change the default characteristics of the queue, replace the "/whatever" with the necessary qualifiers.

If you are setting up a print queue with the default characteristics, delete " /whatever", but still give the queue a name.

If you are not setting up a print queue, delete "/whatever".

See the *MicroVMS User's Manual* for information about print queues.

2.3 Physical Setup Information

This section gives the workstation-specific information you need to physically set up the supported hardcopy devices. See the operator's manual that came with your hardcopy device for general setup information.

2.3.1 LA50 Printer

Set switch 1-5 to OFF to get the graphics mode dot ratio of 2 to 1. (See the LA50 installation manual for information on setting the switches.)

On the MicroVAX I, 1200 baud is the fastest speed you can set for an LA50 attached to the port CSA0:.

2.3.2 LN03 Printer

In the front of your LN03 are slots for two cartridges. To print pictures, you need one RAM cartridge. If you print "artwork" as well as business graphics, you need two RAM cartridges. Each RAM cartridge gives the LN03 128 Kbytes more room for storing picture and font data.

A picture's complexity can be too much for an LN03 to handle. However you may be able to rectify the problem as follows:

- If a flashing 1 appears in the error box:
  - use solid fill or some other simple pattern if a halftone or other "busy" pattern was used across the width of the page.
  - specify /DRAFT when you translate the picture.
- If the top half of the picture is printed on one piece of paper and the bottom half on a second piece:
  - Try the remedies described for the flashing 1 error.
  - Add another RAM cartridge.

2.3.3 LN03 PLUS Printer

When you use the /NODRAFT qualifier to the RENDER command, the bitmap for drawing a picture on A-size paper is 1 megabyte. Make sure that the SYSGEN parameters of your VAXstation are set such that the sixel translator can allocate that large an amount of memory.

2.3.4 Apple LaserWriter

To connect the LaserWriter to a VAXstation, you need a male-male cable in series with a standard DIGITAL printer cable.

Set the dial on the back of the LaserWriter to either 9600 or 1200.

2.3.5 LCP01 Color Printer

You need Version 1.2 of the LCP01 loadable software if you want to draw pictures that use filled polygons or bold text.

Turn on the LCP01 before you boot your workstation.

If you set up HCUISDEVICES.COM to initialize an LCP01, its loadable firmware is automatically loaded when you boot the workstation. If, after you boot the workstation, the LCP01 is turned off for any reason, you must reload its firmware. To do this, copy SYS$SYSROOT:[LCP01]LCP01SW.DAT to the LCP01.

2.3.6 LVP16 and HP 7475 Plotters

On an LVP16 or HP 7475 plotter, you may only specify one file at a time to the PRINT command. This is because you must manually remove and insert paper into the plotter.

2.3.6.1 Loading Pens

For best results, load the pens in the order shown in Table 2-1.

Table 2-1   Order of Colors to Load in 6-Pen Plotters

Pen Number	Color
PEN 1	RED
PEN 2	GREEN
PEN 3	BLUE
PEN 4	VIOLET
PEN 5	GOLD
PEN 6	BLACK

2.3.6.2 LVP16 Switches

The Y/D switch on the LVP16 controls cabling. For direct connection (D setting), you need the BCC19 cable for a 25-pin connector and the BCC20 cable for a 9-pin connector.

The S1 and S2 switches control byte size and parity. Set both to OFF (for 8-bit bytes and no parity checking).

2.3.7 HP 7550 Plotter

To connect the HP 7550 plotter, use a standard DIGITAL printer cable. Insert its 25-pin end into the middle receptacle on the plotter labeled COMPUTER/MODEM.

2.3.7.1 Loading Pens

For best results, load the pens in the order shown in Table 2–2.

Table 2–2   Order of Colors to Load in 8-Pen Plotter

Pen Number	Color
PEN 1	RED
PEN 2	GREEN
PEN 3	BLUE
PEN 4	VIOLET
PEN 5	GOLD
PEN 6	BLACK
PEN 7	TURQUOISE
PEN 8	BROWN

2.3.7.2 HP 7550 Front Panel

The settings you need for the VAXstation are as follows:

- Display 5: select STANDARD (lower left corner).

- Display 6, DATA FLOW subdisplay: select REMOTE (upper left) and STANDARD (lower right).

- Display 6, BYPASS subdisplay: select OFF (lower right).

- Display 6, HANDSHAKE subdisplay: select XON/XOFF and DIRECT (lower right).

- Display 7, DUPLEX subdisplay: select FULL (lower right).

- Display 7, PARITY subdisplay: select 8-BITS (lower left) and OFF (lower right).

- Display 7, BAUD subdisplay: select value (lower right) to match desired value.

2.3.8 HP 7580 and HP 7585 Plotters

To connect the HP 7580 or HP 7585 plotter, use a standard DIGITAL printer cable. Insert its 25-pin end into the receptacle on the plotter, labeled COMPUTER/MODEM.

2.3.8.1 Loading Pens

For best results, load the pens in the order shown in Table 2-2.

2.3.8.2 Loading Paper

On the HP 7580 and HP 7585, the long side of the paper should face in the direction indicated in the following table.

Device	Paper Size	Direction
HP 7580	A/A4	Horizontal
	B/A3	Vertical
	C/A2	Vertical
	D/A1	Vertical
	E/A0	Not applicable
HP 7585	A/A4	Horizontal
	B/A3	Vertical
	C/A2	Horizontal
	D/A1	Vertical
	E/A0	Vertical

2.3.8.3 HP 7580 and HP 7585 Switches

To use the HP 7580 or the HP 7585 with your workstation, set the switches on the rear panel of the plotter to the settings described in this section.

Set the top left switch, labeled INTERFACE MODE, to RS-232-C.

Set the five switches to the right of the INTERFACE MODE switch as follows:

- NORMAL

- EMULATE

- STAND ALONE

- NORMAL

- NORMAL

Set the RS-232-C switches as follows:

- OFF

- ODD

- FULL

- HARDWIRE

- NORMAL

2.3.9 HP 7510 Film Recorder

In the first page of the I/O menu on the HP 7510 film recorder, set the following parameters:

- using SERIAL
- DIRECT connection
- STANDALONE configuration
- bypass OFF
- REMOTE mode
- XON/XOFF handshake

In the second page of the I/O menu, set the following parameters:

- Set baud rate to desired value.
- NO parity
- FULL duplex
- 8 data bits
- NO auto-disc

In the Format menu, film orientation should normally be ADAPTIVE.

2.3.10 MPS–2000 Film Recorder

You must have the HPGL option to the MPS–2000 in order to use the MPS–2000 film recorder with your VAXstation.

On the back of the rasterizer unit are three banks of DIP switches. Some of these switches control the connection between the VAXstation and the MPS–2000. Set these switches as follows:

- Switch 5: OFF (calibration mode off)
- Switch 9: OFF (monitor mode off)
- Switch 10: ON (HPGL mode on)
- Switch 11: OFF (do not report errors to host)
- Switch 13: OFF (no DTR to host)
- Switch 14: OFF (no XON/XOFF from host)
- Switch 15: ON (XON/XOFF to host)
- Switch 16: OFF (full duplex)

- Switch 17: OFF (no parity to host)

- Switch 18: OFF (no parity to host)

Very complicated pictures, for example pictures with many large, filled polygons or pictures with large, intricate images, may exceed the internal memory limits of the device. This results in only a partial picture on the film. Memory expansion upgrades are available from Lasergraphics, Inc.

If you are not using the 35mm motor drive camera, you may specify only one file at a time to the PRINT command.

Chapter 3

The Print Screen Function

The Print Screen function is part of the Workstation Options menu. Print Screen lets you choose a rectangular portion of a display window and send it to a printer.

To use Print Screen, you must have a sixel printer. See Chapter 2 for information on setting up printers.

3.1 Using Print Screen

If you have a sixel printer connected to the console port on your system, follow these steps to use Print Screen:

1. Make sure the printer is turned on and the paper is properly loaded.

2. Using the pointer, select "Print (portion of) screen" from the Workstation Options menu. The pointer changes shape to resemble an arrow, pointing to the upper left-hand corner of the screen.

3. Move the pointer to a corner of the rectangular area that you want to print.

4. Click and *hold down* the SELECT button. The arrow now points to the lower right-hand corner of the screen.

5. Move the pointer to create a box around the area you want to print.

6. When the box surrounds the area you want to print, release the SELECT button. The printer begins printing, and the pointer again changes shape, so that it resembles an hourglass. The pointer retains the hourglass shape until the printing has completed, then it returns to its arrow shape.

You can cancel the operation before you begin printing. Position the pointer at the starting point and release the SELECT button.

3.2   Selecting an Alternate Printer

As an alternative to printing on the default console device, you can send portions of the screen to a file or a print queue.

Select the Printer Setup option from the Workstation Setup menu. This invokes the Printer Setup menu. The Print Destination item from this menu allows you to choose a printer other than the default.

*   Print Destination

    Console Device (CSA0:)
    Enter new print destination

A checkmark next to the console device indicates that it is the current print destination output device; this is the default. The console device (CSA0) is attached to the rear of the system unit (console port).

If you select "Enter new print destination," a window appears containing the default print destination and an active cursor. You can enter a new destination or simply press RETURN to choose the default.

You can change the destination to any other local or remote device that supports the sixel format, for example, an LA50, LA100, LN03, or LN03 PLUS printer.

The formats for entering a new print destination are as follows:

*   The logical device name in the form [nodename::]devicename:

*   The name of a print queue that has already been set up using the Secure User Environment Option

*   A file in the form [nodename::]devicename:filename

For more information on device and queue name formats, see the *MicroVMS User's Manual*.

If you change the print destination, the new attribute takes effect upon the next print request.

Chapter 4

The RENDER Command

To use the RENDER command, you must have HCUIS installed on your workstation. The RENDER command translates a UIS file into the device-dependent format needed to print it on the specified hardcopy device. If you have set up a print queue, you can use the PRINT command to print translated files.

Unless otherwise specified, the translated file has the file type REN. The translated file will output correctly only to the specified output device type, so you may want to give it a file type that corresponds to its output device. For example, you could name a file that has been translated for an LA210, filename.LA210.

Before translating the input file, RENDER compares the size of the picture with the size of the output page in order to fill the output page as completely as possible without distorting the picture's shape. For example, if page size is 13.2 inches wide by 10.5 inches high and picture size is 12 units wide by 16 units high, RENDER draws the picture sideways. Picture height will be 13.2 inches, and picture width will be 12/16 of 13.2 inches.

4.1   RENDER Command

The format of the RENDER command is as follows.

RENDER input-filespec

PARAMETERS

input-filespec
>   The UIS file to be translated. You can specify more than one file. If you specify two or more files, separate the file names with commas. You can use wildcard characters in the directory, file name, file type, and version number fields. A file specification may contain a node name.

>   If you do not specify a file type for the first input filespec, RENDER uses the default file type UIS.

QUALIFIERS

Qualifier	Default
/DEVICE-TYPE=device-type	/DEVICE_TYPE=UIS
/[NO]DRAFT_QUALITY	/NODRAFT_QUALITY
/OUTPUT=output-filespec	/OUTPUT=[default-directory]input-filename.REN
/PAPER_SIZE=size	See text.

/DEVICE_TYPE=device-type

The /DEVICE_TYPE qualifier causes RENDER to generate output for the specified type of device. DEVICE_TYPE can be any of the following:

UIS
LA50
LA100
LA210
LN03
LN03PLUS
LASERWRITER
LCP01
LVP16
HP7475
HP7550
HP7580
HP7585
HP7510
MPS2000

The device type UIS indicates the VAXstation screen.

If /DEVICE_TYPE is not specified, UIS is assumed.

These devices have very different characeristics. See the section "Creating Device-Independent Pictures" in Chapter 5 for information about the differences in how a picture looks when it is drawn on different devices.

/[NO]DRAFT

If /DRAFT is specified, the translator optimizes drawing speed at the expense of reduced picture quality. If /NODRAFT is specified, the translator optimizes picture quality at the expense of drawing speed. The default is /NODRAFT.

The trade-offs made are a function of the current output device. For example, on the LN03, /DRAFT causes dot density to be 75 x 75 dots/inch; /NODRAFT causes it to be 150 x 150 dots/inch. See Appendix A for more information on the differences in picture quality using /DRAFT or /NODRAFT.

/OUTPUT=output-filespec

The /OUTPUT qualifier gives the file specification of the output file. Wildcards are not allowed in the output file specification.

If a device or directory is omitted, the default is your current default device or directory. If the file name is omitted, the default is the file name of the input file. If the file type is omitted, the default is REN. For example, RENDER MYPIC /DEV=LN03/OUT=SYS$LOGIN: creates SYS$LOGIN:MYPIC.REN.

The translated file outputs correctly only to the specified output device type, so you may want to give it a file type that corresponds to its output device type.

If /OUTPUT's device is a page printer, there is a pause, in addition to translation time, before the paper is output. The pause can range from several seconds to several minutes. The paper is not output until the device has received and interpreted the entire picture.

If /OUTPUT is omitted, the default output filespec is [default-directory]input-name.REN.

If /DEVICE_TYPE=UIS, the output filespec is ignored.

/PAPER_SIZE=size-name

The /PAPER_SIZE qualifier identifies the size of the paper. If the current device is the screen, /PAPER_SIZE is ignored.

The value for size can be A, A4, B, A3, C, A2, D, A1, E, A0, LEGAL, LP, or VT. See Table 4-1 for the paper sizes.

Table 4-1   Paper Sizes

Size Value	Paper Size
Size A	8.5 x 11 inches
Size A4	210 x 297 mm
Size B	11 x 17 inches
Size A3	297 x 420 mm
Size C	17 x 22 inches
Size A2	420 x 594 mm
Size D	22 x 34 inches
Size A1	594 x 841 mm
Size E	34 x 44 inches
Size A0	841 x 1189 mm

Table 4–1 (Cont.)   Paper Sizes

Size Value	Paper Size
Size LEGAL	8.5 x 14 inches
Size LP	13.7 x 11 inches
Size VT	8 x 5 inches

The area available for drawing on a paper size is called the page size. Page size is device dependent; the approximate rule is .25-inch margins for the printers and .75-inch margins for the plotters.

If the /PAPER_SIZE qualifier is omitted or an illegal size is specified, the default for the device is used. Table 4–2 shows the default paper size and the paper sizes allowed for each device.

For some printers, you need only place the desired size paper in the device in order to print that size picture. For other printers, you must change the setting on the printer, as well as changing the paper. See the installation guide for your printer for information on printing on different paper sizes.

Table 4–2   Paper Sizes Allowed on Workstation Output Devices

Device Type	Default Paper Size	Allowed Paper Sizes
LA50	A	A, A4, LEGAL, VT
LA100	LP	LP, A, A4, LEGAL, B, A3, VT
LA210	LP	LP, A, A4, LEGAL, B, A3, VT
LN03	A	A, A4, VT
LN03PLUS	A	A, A4, VT
LASERWRITER	A	A, VT
LCP01	A	A, VT
LVP16	A	A, A4, B, A3
HP7475	A	A, A4, B, A3
HP7550	A	A, A4, B, A3
HP7580	D	A, A4, B, A3, C, A2, D, A1
HP7585	E	A, A4, B, A3, C, A2, D, A1, E, A0
HP7510	A	A, A4, B, A3
MPS2000	A	A

Part II Programmer Information

Chapter 5

Programming Interface

A display list is a list of drawing commands used to create a picture. You can request that UIS maintain a display list by calling UIS$ENABLE_DISPLAY_LIST. You can request that UIS not maintain a display list by calling UIS$DISABLE_DISPLAY_LIST.

If you have told UIS to maintain a display list, you can then ask UIS for an executable copy of it. This form of a display list is called a UIS metafile. (See the *MicroVMS Workstation Graphics Programming Guide* for more information about display lists and metafiles.)

You can ask HCUIS to output a UIS metafile to a file. Such a file is called a UIS file.

5.1 Creating and Displaying a UIS File

The easiest way for an application to create a UIS file is to:

1. If needed, use UIS$ENABLE_DISPLAY_LIST (vd_id).

2. Draw a picture, using UIS.

3. Use HCUIS$WRITE_DISPLAY (vd_id, file_spec) to create the UIS file.

4. If desired, use UIS$DISABLE_DISPLAY_LIST (vd_id).

The easiest way for an application to later redisplay this picture is to:

1. Set vd_id = 0.

2. Use HCUIS$READ_DISPLAY (vd_id, file_spec) to display the picture.

3. Use wd_id = USI$CREATE_WINDOW (vd_id, ...).

If you need more control in creating a UIS file, you can use a variant of UIS$EXTRACT with HCUIS$WRITE_BUFFER. If you need more control in displaying a UIS file, you can use HCUIS$READ_BUFFER with UIS$EXECUTE.

5.2   Creating UIS Metafile Data

As noted, a metafile is the external form of a display list. HCUIS processes UIS
metafile data, which can be created in several ways.

1. An application that always runs with the display list enabled can call
    HCUIS$WRITE_DISPLAY or a variant of UIS$EXTRACT whenever it wants.

2. An application that normally runs with the display list disabled can also create
    UIS metafile data — if the application can draw a picture at the user's request.
    It just has to place calls to UIS$ENABLE_DISPLAY_LIST and UIS$DISABLE_
    DISPLAY_LIST around the user's request.

3. An application that normally uses UISDC can essentially use the second method
    of creating metafile data. It does so by first creating a virtual display whose
    world coordinates are equal to the regular display's device coordinates and then
    using UIS$ routines rather than UISDC$ routines when drawing the picture.

4. An application can manually construct UIS metafile data. See Chapter 15 of the
    MicroVMS Workstation Graphics Programming Guide for information.

If you want to be able to use the RENDER command, HCUIS$READ_DISPLAY, or
HCUIS$READ_BUFFER, you should use HCUIS$WRITE_BUFFER or HCUIS$WRITE_
DISPLAY when storing UIS metafile data in a file.

5.3   Translating UIS Metafile Data

The routines introduced in this section allow you to compose a translated picture
from an arbitrary series of picture fragments. You do this as follows:

```
        HCUIS$BEGIN_TRANSLATOR (tranid, device, ...)
TOP:
        Put UIS metafile data in a buffer
            (eg. call a variant of UIS$EXTRACT)
        HCUIS$TRANSLATE (tranid, buflen, buffer)
        Goto TOP until done
        HCUIS$END_TRANSLATOR (tranid)
```

HCUIS$BEGIN_TRANSLATOR initializes the translator for the specified device.
HCUIS$TRANSLATE processes the specified UIS metafile data. HCUIS$END_
TRANSLATOR finishes the translation process and terminates the translator.

To create the first buffer for HCUIS$TRANSLATE, you should normally use
UIS$EXTRACT_HEADER. Similarly, before the last call to HCUIS$TRANSLATE,
you should normally use UIS$EXTRACT_TRAILER. See the *MicroVMS Workstation
Graphics Programming Guide* for information on UIS routines.

5.4   Compiling and Linking Against HCUIS$ Routines

The symbols used with HCUIS$BEGIN_TRANSLATOR and the definition of each HCUIS entry point are located in SYS$LIBRARY:HCUISDEF.type. There is a separate HCUISDEF file for each supported language, with the file type determined by the language. For example, the PASCAL definitions file is HCUISDEF.PAS. See your language reference manual for information on how to refer to a declarations file in your source program.

The HCUIS$ routines are in a shareable image, HCUISSHR. On a workstation, this is located in the library IMAGELIB.OLB. Thus, to link your files against the HCUIS$ routines, you use the following command line:

$ LINK file-specs

On a system where you have not installed HCUIS, but you have copied HCUISSHR.EXE, you use the following command line to link your files against the HCUIS$ routines:

$ LINK file-specs, option-file.opt/OPTIONS

Option-file.opt must contain HCUISSHR/SHARE and may contain other options as well.

5.5   Creating Device-Independent Pictures

When HCUIS translates a UIS picture to a device-dependent format, the translated picture is similar to the original, but it is not always identical. For example, a color picture looks different when printed on a black and white device. This section describes the general and device-specific ways in which picture fidelity is lost.

Differences in resolution cause pattern sizes to differ slightly across devices. Fill pattern alignment also differs slightly across devices.

On devices that do not have a color map, the background color cannot change dynamically as it can on the screen. For pictures on these devices, the background color is set to the value of color 0 at the time the first drawing operation in the picture is performed.

For proportionately spaced fonts, word length differs across devices, because the width tables of a font are not identical across devices. HCUIS deals with this in two ways. It tries to hide the differences by adjusting interword spacing and by setting average character width, mostly using the widths of the lowercase letters and digits. However, this means that tightly fitted text that is mostly uppercase letters tends to overflow the right margin slightly.

The potential quality of text improves as device resolution increases. However, when a device's built-in fonts cannot be used, the actual quality depends on the UIS fonts available in SYS$FONT:. For example, if HCUIS needs text that is 80 x 60 pixels, but the largest font available is 20 x 15 pixels, the text will look very jagged when HCUIS scales it to 80 x 60.

5.5.1 Sixel Output Devices

The LA50, LA100, LA210, LN03, and LN03 PLUS are not color printers. Solid fill is mapped to an appropriate shade of gray. Other objects are mapped to either black or white.

There are limits to line width, line style, and fill pattern size in UIS and the sixel translator. When the dot density of the output device is about the same as the screen resolution, the limits are the same. When the dot density of the output device is higher, maximum line width, length of line style, and maximum fill pattern size are correspondingly smaller.

5.5.1.1 LN03 Printer

The LN03 cannot image "busy" fill patterns, such as halftones. The busy patterns in the UIS$FILL_PATTERNS file are mapped to less busy patterns in the same file. See the *MicroVMS Workstation Graphics Programming Guide* for information about fill patterns.

5.5.2 PostScript Output Devices (Apple LaserWriter)

Colors are represented by an appropriate shade of gray.

When you specify the DEC Multinational Character Set, the available PostScript font families are Courier, Times, and Helvetica. If you use another font family, it is mapped to one of the available ones.

When you specify a character set other than DEC Multinational, HCUIS uses the raster font UIS would have used. A raster font often decreases the quality of the text, because the screen is a low-resolution device.

A filled polygon that crosses an interior section of itself has the interior section filled rather than empty.

Table 5-1 indicates the writing modes on the Apple LaserWriter that HCUIS treats as different writing modes.

Table 5-1   Writing Modes on the Apple LaserWriter

Writing Mode Specified	Translated Writing Mode
Bit-Set	Overlay mode
Bit-Set Negate	Overlay Negate mode
Bit-Clear	Erase mode
Bit-Clear Negate	Transparent mode
XOR	Replace mode
Complement	Overlay mode

5.5.3 ReGIS Output Devices (LCP01 Printer)

The LCP01 color printer can use a maximum of eight colors in a picture. The colors available for UIS files are: black, red, green, blue, yellow, magenta, cyan, and white. Other colors are mapped to one of these.

For the LCP01 printer, HCUIS uses only eight character rotation angles: 0, 45, 90, 135, 180, 225, 270, and 315. The specified text rotation angle is mapped to the nearest available one.

For the DEC Multinational Character Set, HCUIS uses the LCP01's Courier-like font. Other characters are imaged as if they were part of the DEC Multinational Character Set.

5.5.4 HPGL Output Devices

A line's style is mapped to the line style supported by the output device that most closely resembles the specified style.

The plotters and film recorders can only image fill patterns that contain edge-to-edge straight lines. If you use a pattern in UIS$FILL_PATTERNS that is more complicated, it is emulated with a pattern that is as similar as possible and that contains only edge-to-edge straight lines.

User-defined patterns are arbitrarily mapped to one of the patterns in the UIS$FILL_PATTERNS set. See the *MicroVMS Workstation Graphics Programming Guide* for information about fill patterns.

For the DEC Multinational character set, HCUIS uses the appropriate font. The LVP16, HP 7475, and MPS-2000 have a Courier-like font. The HP 7550, HP 7580, HP 7585, and the HP 7510 have a Helvetica-like and a Courier-like font.

Writing Modes

Except for filled polygons, writing mode is mapped to either "Blend" mode or Transparent mode. Blend mode is the same as Overlay mode, except that where two colors overlap they blend rather than the second replacing the first.

Table 5-2 indicates how writing modes for all objects except filled polygons are handled.

Table 5-2   Writing Modes on HPGL Devices

Writing Mode Specified	Translated Writing Mode
Erase	Transparent
Bit-Clear	Transparent
Bit-Clear-Negate	Transparent
Bit-Set	Blend
Bit-Set-Negate	Blend
Complement	Blend
Copy	Blend
Copy-Negate	Blend
Overlay	Blend
Overlay-Negate	Blend
Replace	Blend
Replace-Negate	Blend

Writing Modes for Filled Polygons

Writing modes for filled polygons are treated differently, depending on whether /DRAFT or /NODRAFT is specified on the command line.
For /NODRAFT, when a filled polygon is drawn on top of another filled polygon, the hidden part of the first polygon is erased, if appropriate. But, any lines, text, or images that have been drawn over are not erased.

Table 5-3 describes how writing modes for filled polygons are handled.

Table 5-3   Writing Modes for Filled Polygons on HPGL Devices

Writing Mode Specified	Translated Writing Mode with /DRAFT	Translated Writing Mode with /NODRAFT
Erase	Transparent	Erase
Bit-Clear	Transparent	Erase mode if the fill is mostly on-bits, and Transparent mode otherwise.
Bit-Set	Blend	Blend
Complement	Blend	Overlay
Copy	Blend	Replace
Overlay	Blend	Blend mode if the fill is mostly off-bits, and Replace mode otherwise.
Replace	Blend	Replace
Erase-Negate	Sets the fill pattern to PATT$C_ FOREGROUND and then uses Blend mode	Erase-Negate
Bit-Clear-Negate	Transparent	Erase mode if the fill is mostly off-bits, and Transparent mode otherwise.
Bit-Set-Negate	Blend-Negate	Blend-Negate
Copy-Negate	Blend-Negate	Replace-Negate
Overlay-Negate	Blend-Negate	Blend-Negate mode if the fill is mostly on-bits, and Replace-Negate mode otherwise.
Replace-Negate	Blend-Negate	Replace-Negate

5.5.4.1 LVP16, HP 7475, HP 7550, HP 7580, and HP7585 Plotters

The background color is always white (or the color of the paper). The picture's other colors are mapped to the available pens on the plotter. For best results, load the pens in the order shown in Table 2-1 or Table 2-2.

5.5.4.2 HP 7510 Film Recorder

The color of the color map entries zero (0) and one (1) are sometimes changed by the HPGL translator. Two different situations cause the HPGL translator to change the assignments of colors 0 and 1.

First, if color 0 is white and color 1 is black, the translator reverses them: color 0 is set to black and color 1 is set to white. This is to keep thin black foreground lines, text, etc. from being lost in the glare and light bleed due to a bright background.

Second, the intensity of the background is dimmed, if necessary. For example, if the background is set to bright red, then the translator dims the background to dark red.

On the HP 7510, Blend mode is additive rather than subtractive. On a plotter, the intersection of two colors is darker. On the HP 7510, the intersection is brighter. There are two side effects of this behavior:

1.   The intersection of two bright colors creates a third. For example, blue on red creates magenta.

2.   A dark object drawn on top of a bright object is hard to see.

5.5.4.3 MPS–2000 Film Recorder

The color of the color map entries zero (0) and one (1) are sometimes changed by the HPGL translator. If color 0 is white and color 1 is black, the translator reverses them: color 0 is set to black and color 1 is set to white. This is to keep thin black foreground lines, text, etc. from being lost in the glare and light bleed due to a bright background.

Chapter 6

HCUIS$ Routines and Condition Values

6.1 HCUIS$ Routines

This chapter contains reference material for the HCUIS$ routines and condition
values. This manual uses the same conventions for documenting routines as are used
in the *MicroVMS Workstation Graphics Programming Guide*. Refer to Chapter 18 of
that manual for information on the format of the routines.

HCUIS$BEGIN_TRANSLATOR

This routine initializes the translator for the specified device type.

Format

*status=***HCUIS$BEGIN_TRANSLATOR**   *tranid, devtyp,*
putroutine,
allocroutine,
freeroutine, [attrlist]

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX
MACRO). Condition values that can be returned by this routine are listed
under Condition Values Returned in R0.

Arguments

tranid
VMS Usage: **identifier**
type: **longword (unsigned)**
access: **write only**
mechanism: **by reference**

The address of a longword. HCUIS$BEGIN_TRANSLATOR sets this
longword to a unique value. This value is used as a parameter in
HCUIS$TRANSLATE and HCUIS$END_TRANSLATOR.

devtyp
VMS Usage: **char-string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to a device type. The defined
strings are LA50, LA100, LA210, LN03, LN03PLUS, LASERWRITER, LCP01,

LVP16, HP7475, HP7550, HP7580, HP7585, HP7510, and MPS2000. The string may contain uppercase or lowercase characters.

putroutine

VMS Usage: **procedure**
type: **procedure entry mask**
access: **read only**
mechanism: **by reference**

The address of the routine that is called when HCUIS$TRANSLATE or HCUIS$END_TRANSLATOR has translated data to output. The translator calls this routine with an argument list of (buflen, buffer). Buflen is the address of a longword that contains the number of bytes in the specified buffer. Buffer is the address of an array that contains the translated bytes. Putroutine should return a condition value to the translator.

allocroutine

VMS Usage: **procedure**
type: **procedure entry mask**
access: **read only**
mechanism: **by reference**

The address of a routine to allocate memory. The translator calls this routine whenever it needs to allocate memory. Allocroutine is called with an argument list of (buflen, bufaddr). Buflen is the address of a longword that contains the number of bytes to allocate. Bufaddr is the address of a longword into which Allocroutine should return the address of the allocated memory. Allocroutine should return a condition value. Note that LIB$GET_VM conforms to this definition.

freeroutine

VMS Usage: **procedure**
type: **procedure entry mask**
access: **read only**
mechanism: **by reference**

The address of a routine to deallocate memory. Freeroutine is called with an argument list of (buflen, bufaddr). Buflen is the address of a longword that contains the number of bytes to free. Bufaddr is the address of a longword that contains the address of the memory Freeroutine should deallocate. Freeroutine should return a condition value. Note that LIB$FREE_VM conforms to this definition.

attrlist

VMS Usage: **item_list_pair**
type: **longword**
access: **read only**
mechanism: **by reference**

The address of a list of longword pairs. Within the first longword, the first word is reserved, and the second contains an attribute code. The second longword contains an attribute value. The list of pairs is terminated by a longword containing HCUIS$C_END_OF_LIST. The defined attributes are:

- HCUIS$C_PAPER: a paper size value (HCUIS$C_PAPER_xxx)

  where

  xxx may be A, A4, B, A3, C, A2, D, A1, E, A0, LEGAL, LP, or VT.

xxx Value	Paper Size
A	8.5 x 11 inches
A4	210 x 297 mm
B	11 x 17 inches
A3	297 x 420 mm
C	17 x 22 inches
A2	420 x 594 mm
D	22 x 34 inches
A1	594 x 841 mm
E	34 x 44 inches
A0	841 x 1189 mm
LEGAL	8.5 x 14 inches
LP	13.7 x 11 inches
VT	8 x 5 inches

  The area actually available for drawing on a given paper size is device dependent. The approximate rule is .25-inch margins for the printers and .75-inch margins for the plotters.

- HCUIS$C_APPEARANCE: flags that control the appearance of the translated picture.

  If HCUIS$M_DRAFT is set, the translator sacrifices picture quality for speed. If it is not set, the translator favors picture quality over speed.

Condition Values Returned in R0

SS$_NORMAL   A normal successful completion

HCUIS$_INTCHKFAIL   Internal consistency check failed

Any condition values returned by RTL or one of the caller-supplied routines

HCUIS$END_TRANSLATOR

This routine finishes the translation process and terminates the translator.

Format

*status=***HCUIS$END_TRANSLATOR** *tranid*

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX MACRO). Condition values that can be returned by this routine are listed under Condition Values Returned in R0.

ARGUMENT

tranid
VMS Usage: **identifier**
type: **longword (unsigned)**
access: **read only**
mechanism: **by reference**

Identifies the translator context to finish. See HCUIS$BEGIN_TRANSLATOR for more information.

Condition Values Returned in R0

SS$_NORMAL	A normal successful completion
HCUIS$_BADTRANID	Unknown translator ID
HCUIS$_INTCHKFAIL	Internal consistency check failed

Any condition values returned by RTL or a condition value from one of the routines identified in HCUIS$BEGIN_TRANSLATOR

HCUIS$READ_BUFFER

This routine opens the specified UIS file, allocates room in memory for it using Allocroutine, reads the contents of the file into memory, and closes the file.

Format

*status=***HCUIS$READ_BUFFER**   *buflen, bufaddr, allocroutine, filespec, [defaultspec]*

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX MACRO). Condition values that can be returned by this routine are listed under Condition Values Returned in R0.

Arguments

buflen
VMS Usage: **longword_unsigned**
type: **longword (unsigned)**
access: **write only**
mechanism: **by reference**

The address of a longword that is set to the number of bytes allocated by Allocroutine.

bufaddr
VMS Usage: **longword_unsigned**
type: **longword (unsigned)**
access: **write only**
mechanism: **by reference**

The address of a longword that is set to the address of the memory allocated by Allocroutine.

HCUIS$READ_BUFFER

allocroutine

VMS Usage: **procedure**
type: **procedure entry mask**
access: **read only**
mechanism: **by reference**

The address of a routine to allocate memory for the UIS metafile data.
Allocroutine is called with an argument list of (buflen, bufaddr). Buflen is
the address of a longword that contains the number of bytes to allocate.
Bufaddr is the address of a longword into which Allocroutine should return
the address of the allocated memory. It should return a condition value.
Note that LIB$GET_VM conforms to this definition.

filespec

VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to the file specification of a UIS
file.

defaultspec

VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to the default components to
use in creating the file specification of the UIS file. If omitted, the defaultspec
.UIS is used.

Condition Values Returned in R0

SS$_NORMAL   A normal successful completion

Any condition values returned by RTL or VAX RMS routines and any condition value
returned from Allocroutine

HCUIS$READ_DISPLAY

This routine opens the specified UIS file; reads it into a buffer using SYS$READ; performs a variant of UIS$EXECUTE; deletes the buffer; and closes the file. To display the picture on the screen, use UIS$CREATE_WINDOW after HCUIS$READ_DISPLAY.

Format

*status=*HCUIS$READ_DISPLAY   *vd_id, filespec, [defaultspec]*

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX MACRO). Condition values that can be returned by this routine are listed under Condition Values Returned in R0.

Arguments

vd_id
VMS Usage: **identifier**
type: **longword (unsigned)**
access: **read/write**
mechanism: **by reference**

Option 1:

The address of a longword value that uniquely identifies a virtual display. UIS$CREATE_DISPLAY is used to get a vd_id. You should also use UIS$CREATE_COLOR_MAP to create a virtual color map for the display.

Option 2:

The address of a longword containing 0. This causes HCUIS$READ_DISPLAY to create a virtual display and a virtual color map and replace the 0 with the vd_id of the created display.

filespec

VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to the file specification of a UIS file.

defaultspec

VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to the default components to use in creating the file specification of the UIS file. If omitted, the defaultspec .UIS is used.

Condition Values Returned in R0

SS$_NORMAL   A normal successful completion

Any condition values returned by RTL, VAX RMS, or UIS routines

HCUIS$TRANSLATE

This routine translates the UIS metafile data in the specified buffer to a form suitable for the current output device.

Format

status=**HCUIS$TRANSLATE** *tranid, buflen, buffer*

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX MACRO). Condition values that can be returned by this routine are listed under Condition Values Returned in R0.

Arguments

tranid
VMS Usage: **identifier**
type: **longword (unsigned)**
access: **read only**
mechanism: **by reference**

Identifies the translator context to use when translating the specified buffer. See HCUIS$BEGIN_TRANSLATOR for more information.

buflen
VMS Usage: **longword_unsigned**
type: **longword (unsigned)**
access: **read only**
mechanism: **by reference**

The address of a longword that contains the number of bytes in the specified buffer.

buffer

VMS Usage: **vec_byte_unsigned**
type: **byte (unsigned)**
access: **read only**
mechanism: **by reference**

The address of an array that contains the UIS metafile data.

Condition Values Returned in R0

SS$_NORMAL	A normal successful completion
HCUIS$_BADTRANID	Unknown translator ID
HCUIS$_INTCHKFAIL	Internal consistency check failed

Any condition values returned by RTL, UIS, or one of the routines identified in
HCUIS$BEGIN_TRANSLATOR.

Notes

The buffer passed to HCUIS$TRANSLATE may consist of one or more
drawing commands. You may not put the beginning of a drawing command
at the end of one buffer and the end of the command at the start of the next
buffer.

HCUIS$WRITE_BUFFER

This routine creates the specified UIS file from the specified buffer of UIS metafile data and closes the file.

Format

*status=***HCUIS$WRITE_BUFFER**   *buflen, buffer, filespec, [defaultspec]*

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX MACRO). Condition values that can be returned by this routine are listed under Condition Values Returned in R0.

Arguments

buflen
VMS Usage: **longword_unsigned**
type: **longword (unsigned)**
access: **read only**
mechanism: **by reference**

The address of a longword that contains the number of bytes in the specified buffer.

buffer
VMS Usage: **vec_byte_unsigned**
type: **byte (unsigned)**
access: **read only**
mechanism: **by reference**

The address of an array that contains the UIS metafile data.

filespec
VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to a file specification.

defaultspec
VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to the default components to use in creating the file specification of the UIS file. If omitted, the defaultspec .UIS is used.

Condition Values Returned in R0

SS$_NORMAL   A normal successful completion

Any condition values returned by RTL or VAX RMS routines

Notes

The buffer should start with a UIS metafile header and end with a UIS metafile trailer. Normally, you generate these using UIS$EXTRACT_HEADER and UIS$EXTRACT_TRAILER. See the *MicroVMS Workstation Graphics Programming Guide* for information on UIS routines.

HCUIS$WRITE_DISPLAY

This routine allocates a buffer for the metafile, performs a UIS$EXTRACT for the specified virtual display's root segment, outputs the buffer to the file, deletes the buffer, and closes the file.

Format

status=**HCUIS$WRITE_DISPLAY**   *vd_id, filespec,*
                                    [defaultspec]

Returns

VMS Usage: **cond_value**
type: **longword (unsigned)**
access: **write only**
mechanism: **by value**

Longword condition value returned in the variable *status* or R0 (VAX MACRO). Condition values that can be returned by this routine are listed under Condition Values Returned in R0.

Arguments

vd_id
VMS Usage: **identifier**
type: **longword (unsigned)**
access: **read only**
mechanism: **by reference**

The address of a longword value that uniquely identifies the virtual display to save.

filespec
VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to a file specification.

defaultspec

VMS Usage: **char_string**
type: **character string**
access: **read only**
mechanism: **by descriptor**

The address of a string descriptor that points to the default components to use in creating the file specification of the UIS file. If omitted, the defaultspec .UIS is used.

Condition Values Returned in R0

SS$_NORMAL   A normal successful completion

Any condition values returned by RTL, VAX RMS, or UIS routines

6.2   HCUIS Condition Values

Two HCUIS condition values can be returned by HCUIS$ routines.

6.2.1   HCUIS$_BADTRANID

The condition value HCUIS$_BADTRANID indicates that an unknown translator ID was passed to HCUIS$TRANSLATE or HCUIS$END_TRANSLATOR.

6.2.2   HCUIS$_INTCHKFAIL

The condition value HCUIS$_INTCHKFAIL indicates that an internal consistency check failed. You should gather all known information and submit a Software Performance Report (SPR).

Appendix A

Differences in Picture Quality Using /DRAFT and /NODRAFT

The following table describes the differences in picture quality when you use the /DRAFT qualifier or /NODRAFT qualifier to the RENDER command.

Table A-1   Differences in Picture Quality with /DRAFT and /NODRAFT

Device	Differences
LA50, LA100, and LA210	There are no differences in picture quality.
LN03	The picture is printed at 75 dots/inch using /DRAFT.
	It is printed at 150 dots/inch using /NODRAFT.
LN03 PLUS	The picture is printed at 150 dots/inch using /DRAFT.
	It is printed at 300 dots/inch using /NODRAFT.
LaserWriter	The edge of a filled curve area is less smooth when you use /DRAFT than it is with /NODRAFT.
LCP01	Fill looks more solid when you use /NODRAFT.
HPGL Devices	There is no hidden surface removal when you use /DRAFT.
	For thick lines, polygon fill, bold text and images, the separation between adjacent lines is somewhat greater when you use /DRAFT. Conversely, the fill looks more solid when you use /NODRAFT.

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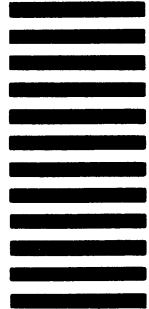
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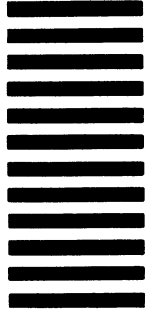
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