13 Configuring Display PostScript

This chapter describes the DPS (Display PostScript) X server module. The following topics are covered in this chapter:

DPS is available on HMX and Explora 700 terminals only.

DPS Overview

The DPS X server module allows PostScript applications to display their output on NCD terminals. Such local servicing of DPS requests speeds application processing and reduces host and network loading.

NCD’s DPS extension is based on Adobe’s Display PostScript Level 2 software, supports true WYSIWYG two-dimensional graphics, and provides access to all Type 1 Scaled Font Libraries.

The Display PostScript imaging model is device-independent, allowing graphics to look the same on any supported platform. An application that uses Display PostScript works and appears the same on all supported platforms without modification of the application.

Display PostScript performs the following functions:

- ❏ Allows applications to scale, rotate, and render text, graphics, and scanned images at any angle
- ❏ Scales fonts to any point size

- ❏ Automatically adjusts the colors appearing in color graphics and scanned images on monochrome or grayscale monitors or on monitors with limited color selections
- ❏ Renders graphics that use Bézier curves
- ❏ Allows users to import and display Encapsulated PostScript (EPS) files in applications that support this format
- ❏ Automatically adjusts output to the current screen resolution so that an application looks the same on any screen
- ❏ Allows easy porting of application programs to other DPS environments

NCDware includes the following components for DPS:

- ❏ DPS X server modules—For information on managing X server modules, see Chapter 4, Booting—X Server Loading and the *NCDware System Administrator's Guide for UNIX Systems*.
- ❏ DPS support files—For information on support files, see "Using DPS Support Files" on page 13-3.
- ❏ Adobe font files—For information on DPS fonts, see "Configuring DPS Font Access by X Clients" on page 13-11.

DPS Requirements

The requirements for using DPS on an NCD terminal are:

- ❏ Using DPS requires a valid license. To add a DPS *node* license to a terminal's configuration, use the **unit-license-key** parameter (Setup ⇒ Change Setup Parameters ⇒ Licenses ⇒ License Key). If the terminal has more than one node license, include one instance of this parameter for each license key. This parameter is saved in NVRAM.

  After adding the DPS license, reboot the terminal so that the X server can read the PostScript resource file.

  If you are using site licensing or floating licenses, see the *NCDware System Administrator's Guide for UNIX Systems* for instructions.
- ❏ Additional terminal memory may be required. For information on the amount of terminal memory required to use DPS, see the *Release Notes*.

- ❏ You must use NFS (Network File Service) as the file transfer protocol for DPS. See Chapter 5, Configuring Network Services, for information about setting up file services.

Using DPS Support Files

The following DPS support files are included with NCDware and reside by default in **/usr/lib/X11/ncd/dps:**

- ❏ **PSres.upr**—the PostScript resource file
- ❏ **VM_3_2.SNF**—the virtual memory file
- ❏ **CIE-dict19c.dat**—the color-rendering file
- ❏ **InitProc.dat**—the context initialization file

The following sections describe these files in more detail.

The PostScript Resource File

This section describes the PostScript resource file, **PSres.upr**, which is essential for DPS operation, and the NCD utility for creating a new resource file or updating a resource file. When working with this file, keep the following in mind:

- ❏ If you change the default locations of the DPS support files or DPS font files, you must modify the contents of the PostScript resource file to reflect the changes. You may also need to add new file service table entries; for information on the terminal's file service table, see Chapter 5, Configuring Network Services.
- ❏ If you use other PostScript resource files, make sure they follow the ***.upr** naming convention.

For more information about PostScript resource files, refer to *Programming the Display PostScript System with X* from Adobe Systems Incorporated.

Sections in the PostScript Resource File

The PostScript resource file contains the following sections:

- ❏ DPSVM—This section identifies the VM (Virtual Memory) file. The VM file must be loaded for DPS to work correctly. For example:

```
DSPVM
local=VM_3_2_.snf
master=VM_3_2_.snf
```

- ColorRendering—This section identifies the file containing color-rendering information. The identified file aids the DPS extension in rendering colors in a device-independent manner. For example:

```
ColorRendering
DefaultCIE=CIE-dict19c.dat
ColorCIE=CIE-dict19c.dat
```

- ContextInit—This section identifies the context initialization file used when a context is created. For example:

```
ContextInit
InitProc=InitProc.dat
```

- FontAFM—This section identifies the locations of the Adobe Font Metric (AFM) files. Some applications that use the PostScript language need these files for proper operation. The section lists each font name and font location. For example:

```
FontAFM
AvantGarde-BoldObl=fonts/AFM/AGWO____.afm
AvantGarde-Book=fonts/AFM/AGW_____.afm
AvantGarde-Demi=fonts/AFM/AGD_____.afm
AvantGarde-DemiOblique=fonts/AFM/AGDO____.afm
```

- FontFamily—This section identifies the supported font families and additional typefaces. For example:

```
FontFamily
Courier=Bold Oblique,Courier-BoldOblique,Bold,CourierBold,Medium,Courier,
Oblique,Courier-Oblique
.
```

- FontOutline—This section identifies the locations of the available outline font files. It lists each outline font name and the font location. For example:

```
FontOutline
AvantGarde-Book=fonts/AGW_____.pfa
AvantGarde-BookOblique=fonts/AGWO____.pfa
AvantGarde-Demi=fonts/AGD_____.pfa
AvantGarde-DemiOblique=fonts/AGDO____.pfa
```

- FontPrebuilt—This section identifies the locations of the available hand-tuned, bitmap fonts. It lists each font name and the font location. For example:

```
FontPrebuilt
Courier-BoldOblique=prebuilts/COBO____.bepf
Courier-Bold=prebuilts/COB_____.bepf
Courier=prebuilts/COM_____.bepf
Courier-Oblique=prebuilts/COO_____.bepf
```

Creating or Updating the PostScript Resource File

The ***makepsres*** utility allows you to make a new PostScript resource file or update an existing file. The following example shows how to use this utility to update the **PSres.upr** file so that DPS servers can access more fonts:

1. Change to the directory to which you will be adding fonts.

   Note NCD recommends that you use a directory under **/usr/lib/X11/ncd**. Otherwise, the DPS module may not be able to locate the PostScript resource file. If you must place the fonts in another location, make sure that each terminal can access the new fonts through its file service table.

2. Add the desired fonts to the directory.
3. While in the directory, invoke ***makepsres***:

   ```
   > /usr/lib/X11/makepsres
   ```

   In response, ***makepsres*** creates a new PostScript resource file in the current directory. If the current directory contains an existing PostScript resource file, ***makepsres*** merges the contents of the existing file with the information from the new fonts and produces a new **PSres.upr** file.
4. Add the DPSVM section to the resulting **PSres.upr** file if that section does not already exist.

   If you invoke ***makepsres*** in a directory that does not contain an existing **PSres.upr** file, you must include information identifying the location of the VM file. To do this, add DPSVM to the beginning of the **PSres.upr** file where it lists all sections of the file. For example:

   ```
   PS-Resources-1.0
   DPSVM
   FontAFM
   FontFamily
   FontOutline
   ```

Add the DPSVM section to the file; for example:

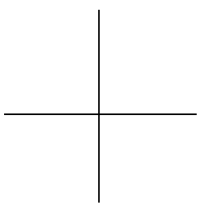
```
DPSVM
local=VM_3_2_beta2.snf
master=VM_3_2_beta2.snf
```

When you finish modifying this file, it should resemble the following example:

```
PS-Resources-1.0DPSVM
ColorRendering
ContextInit
FontAFM
FontFamily
FontOutline
FontPrebuilt
.
DPSVM
local=VM_3_2_beta2.snf
master=VM_3_2_beta2.snf
.
ColorRendering
%DefaultCIE=CIE-dict19c
ColorCIE=CIE-dict19c.dat
.
.
.
```

If necessary, modify the **dps-resource-path** parameter on all terminals using DPS so the DPS module can locate the resource files. For information on setting this parameter, see “Configuring the DPS Resource Path” on page 13-10.

5. Reboot the affected terminals so they can read the new **PSres.upr** file.



The Virtual Memory File

The virtual memory file, **VM_3_2.SNF**, provides information about the VM (Virtual Memory) space that Display PostScript needs for operation. The DPS extension uses two types of virtual memory:

- Shared VM holds system fonts and other resources shared by all contexts.
- Private VM holds fonts specific to each context.

The Color-Rendering File

The color-rendering file, **CIE-dict19c.dat**, contains a PostScript rendering dictionary that allows the DPS extension to provide device-independent color. This file is loaded for each DPS context. The information in the file allows all requests for color to be honored. The output generated by DPS depends on the output device:

- On monochrome monitors, the output consists of dithered, halftone patterns of black and white pixels.
- On grayscale monitors, the output consists of halftone patterns using gray levels.
- On color monitors, the output consists of the requested color or a dithered pattern of RGB pixels that approximates the color.

The Context Initialization File

The context initialization file, **InitProc.dat**, executes arbitrary PostScript code when a context is created. You can use the file to set various user parameters or to initialize local virtual memory.

Adobe Fonts for DPS

NCDware includes the following fonts for use with the DPS extension:

- Adobe outline fonts
- Font metrics in AFM (Adobe Font Metric) format
- Adobe fonts in hand-tuned, bitmap format

Table 13-1 lists the fonts included in the distribution in both outline and AFM formats.

Table 13-1 Adobe Outline Fonts for Display PostScript

Font Family	Additional Typefaces		
Helvetica	Bold	Oblique	Bold Oblique
Helvetica Condensed	Bold	Oblique	Bold Oblique
Times Roman	Bold	Italic	Bold Italic
Courier	Bold	Oblique	Bold Oblique
New Century SchoolBook	Bold	Italic	Bold Italic
Avant Garde Gothic	Demi	Oblique	Demi Oblique
Bookman	Demi	Italic	Demi Italic
Palatino	Bold	Italic	Bold Italic
Zapf Chancery			
Zapf Dingbats			
Symbol			

Table 13-2 lists the fonts included in the distribution in prebuilt bitmap format.

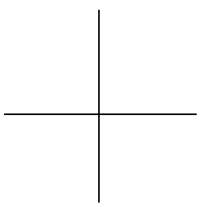
Table 13-2 Bitmap Fonts for Display PostScript

Font Family	Additional Typefaces		
Helvetica	Bold	Oblique	Bold Oblique
Times Roman	Bold	Italic	Bold Italic
Courier	Bold	Oblique	Bold Oblique
New Century SchoolBook	Bold	Italic	Bold Italic
Palatino	Bold	Italic	Bold Italic
Symbol			

Table 13-3 lists the default font locations.

Table 13-3 Default Locations of Adobe Fonts

Font	Path
Type 1 outline fonts	**/usr/lib/X11/ncd/dps/fonts/*.pfa**
AFM font files	**/usr/lib/X11/ncd/dps/fonts/AFM/*.afm**
Prebuilt fonts	**/usr/lib/X11/ncd/dps/prebuilts/*.bepf**



Configuring the DPS Resource Path

The **dps-resource-path** remote configuration parameter specifies the location of the DPS resource files (Setup ⇒ Change Setup Parameters ⇒ Display PostScript ⇒ DPS / X Resource Path). By default, the files reside in **/usr/lib/X11/ncd/dps**.

Because the **dps-resource-path** parameter recognizes colons as significant characters, adhere to the following conventions when assigning values to this parameter:

- Use one colon (:) to separate directory specifications in which DPS resource files reside. For example, the assignment:

  ```
  dps-resource-path = /usr/coe/ps:/usr/lib/X11/ncd/dps
  ```

  indicates that the DPS module should look first in **/usr/coe/ps** for a DPS resource file and then in **/usr/lib/X11/ncd/dps**.
- Use two colons (::) to indicate that the DPS extension should look at the system default location for the DPS resource file. For example, the default entry:

  ```
  dps-resource-path = /usr/lib/X11/ncd/dps::
  ```

  indicates that the DPS module should look first in **/usr/lib/X11/ncd/dps** for a DPS resource file and then in the system default location.

If you modify this parameter:

- Make sure the file service table equates the directories specified with this parameter with the mount points on the host system.
- Reboot the terminal so the new values can take effect. The **dps-resource-path** parameter is not saved in NVRAM.

Table 13-4 dps-resource-path Parameter

Possible Values	Results
default	**/usr/lib/X11/ncd/dps::**
/usr/lib/X11/ncd/dps::	When attempting to locate DPS resource files, the X server looks first in **/usr/lib/X11/ncd/dps** and then in the default system location.
***path*[:*path*[:*path*...]]**	The X server looks in the specified directory or directories when loading DPS resource files.

Configuring DPS Font Access by X Clients

To configure your environment so that X clients can access DPS outline fonts, complete the following steps:

Note If you add new outline fonts, you must complete all of the following steps. If you use only the outline fonts included with the NCDware distribution, you need only perform Step 5.

1. Set your current working directory to the directory in which the DPS outline fonts reside; by default, **/usr/lib/X11/ncd/dps/fonts**.
2. Make sure that each outline font file has a **.pfa** (PostScript Font ASCII) extension.
3. Use the ***ncdmkfdir*** (1) utility to add an entry to the **fonts.scale** file for each link or file created in the previous step.

   `% ncdmkfdir` ***currentworkingdir***

   The **fonts.scale** file, which resides in the font directory, has an entry for each font file that pairs the file with its XLFD name, such as:

```
Symbol.pfa -adobe-Symbol-Medium-r-normal-*-0-0-0-0-P-0-adobe-fontspecific
```

   ncdmkfdir works well with Adobe outline fonts. If you use it on fonts from other sources in which the key values may be inaccurate, the resulting **fonts.scale** file may need to be corrected by hand.
4. While still in the font directory, invoke the ***ncdmkfontdir*** utility.

   This utility reads the contents of the **fonts.scale** file and any bitmap font files and then enters them in the **fonts.dir** file.

5. Add the font directory to the terminal's font path:
   — To change the terminal's current font path, use the **pref-font-path** parameter (Setup ⇒ Change User Preferences ⇒ Fonts ⇒ Current Font Path).
   — To change the terminal's default font path, use the **xserver-default-font-path** parameter (Setup ⇒ Change Setup Parameters ⇒ Fonts ⇒ Default Font Path).

   If you change the default font path only, you must reset the terminal before the change takes effect.

X clients can now access the DPS outline fonts.

Freeing the DPS Cache

By default, the DPS module caches the contents of the color-rendering file and the context initialization file when it is invoked for the first instance. It also caches fonts as it uses them. Caching this information speeds processing for subsequent contexts.

To free the font memory in the cache, from the Console, select Utilities ⇒ Free DPS Memory.

Troubleshooting DPS

If the DPS Extension Fails to Start

If the DPS extension fails to start on a licensed terminal, the X server generates an error message and displays it in the Console Messages hide box. If the DPS extension fails to start because no license key has been entered, no error messages appear; the application simply does not access the DPS extension. Check Statistics ⇒ Show Version ⇒ Licensable Features to see if DPS is listed.

File Service Problems

Most DPS failures are caused by file service problems. To see all messages related to file service, enable extended file diagnostics. The parameter is **file-extended-diagnostics** (Setup ⇒ Change Setup Parameters ⇒ File Service ⇒

Extended Diagnostics). After enabling Extended Diagnostics, reboot the terminal and restart the application to see the additional messages.

DPS file service messages resemble the following examples:

```
%NETFILE-I-OPENATTEMPT, attempting open for /usr/lib/X11/ncd/dps/fonts/Helvetica

%NETFILE-I-MATCHATTEMPT, attempting NFS open of
/usr/lib/X11/ncd/dps/fonts/Helvetica on 191.42.155.70 for
/usr/lib/X11/ncd/dps/fonts/Helvetica

%NETFILE-I-OPENSUCCESS, open succeeded for /usr/lib/X11/ncd/dps/fonts/Helvetica
```

DPS Applications on Solaris Systems

This section describes how to use AnswerBook, ImageTool, and PageView on an NCD terminal if the applications are running on a Solaris system.

Running AnswerBook

Problems with this application derive from incorrect setting of the ***OPENWINHOME*** environment variable or failing to set the variable at all.

If ***OPENWINHOME*** is set incorrectly, an error message is displayed as shown in the following example:

```
% setenv OPENWINHOME /u/ken
% answerbook
Verifying AnswerBook environment
Could not find the AnswerBook administration utility
"ab_admin" in /u/ken/bin
%
```

If ***OPENWINHOME*** is not set, the following messages are displayed:

```
% answerbook
Verifying AnswerBook environment
The "OPENWINHOME" environment variable is not set.
Are you running OpenWindows?
Check/reset the value of OPENWINHOME, then rerun
"AnswerBook".
%
```

No special fonts are needed for AnswerBook.

Running ImageTool

Problems with this application are caused by unavailable fonts, colormap flash, and incorrect setting of ***OPENWINHOME***.

Font Problems

If the required fonts are not in the terminal's font path or are not in the correct order in the font path, the image appears briefly and the application shuts down. Error messages similar to the following are displayed:

```
% imagetool
X error of failed request: BadValue (integer parameter out of range for operation
  Major opcode of failed request: 94 (X_CreateGlyphCursor)
Minor opcode of failed request: 0
Resource id in failed request: 0xc
Serial number of failed request: 1869
Current serial number in output stream: 1873
.
.
.
%
```

You need the following fonts and font management files, and the font directory must be second in the font path (**xserver-default-font-path**), right after built-ins:

OLCursor46.pcf
fonts.alias
fonts.dir

See Chapter 7, Bitmap Fonts and the Font Server, for more information about fonts.

Colormap Flash

To get the proper colors, make the window with the picture the focus window and press Alt-F12.

OPENWINHOME Variable

If ***OPENWINHOME*** is not set or is set incorrectly:

- When you try to open an image from the ImageTool File ⇒ Open menu, the following error message appears:

  ```
  File format not found. Use Open As option to choose file
  ```

- If you use Open As to choose a file, the following error message appears:

  ```
  Error opening /usr/openwin/share/images/PostScript/file.ps
  ```

To solve this problem, exit from ImageTool and set the ***OPENWINHOME*** variable. Restart the application.

Running PageView

Problems with this application are described in the following subsections. No special fonts are required for PageView, and you need not set the ***OPENWINHOME*** variable.

Displaying the Images

Run PageView from the **/usr/openwin/bin** directory. When prompted by a "goto" request, enter the path to the images; for example, **/usr/openwin/share/images/PostScript**.

Support Files

If the proper support files are not installed, images are not displayed. Make sure the following files are in the NCD PostScript directory; the default directory is **/usr/lib/X11/ncd/dps**:

CIE-dict19c.dat
InitProc.dat
NCDFILE.MAP
PSres.upr
VM_3_2.snf
fonts
prebuilts

If any of the files are not installed, copy them from the NCDware distribution CD-ROM.

Colormap Flash

You can fix colormap flash problems by clicking in another window and then clicking in the PageView main Window. Also, try pressing Alt-F12 when the focus is on the PageView window.