cadence®

Plotter Configuration User Guide

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Overview

This manual is for system administrators who set up the Cadence® software and the plotters—those who perform the administrative tasks and provide the primary support of the Cadence software. Administrators do not need to read this entire guide, only those chapters pertaining to their specific plotters.

This manual accompanies the Cadence software and the Versatec Hardcopy (plotting) product.

Setting up a plotter requires three distinct tasks.

- Attaching the hardware to the plot server

  Physically connecting the plotter to the workstation with the appropriate boards, cables, and device drivers and printing the plotter's self test.

  Refer to your plotter hardware and the system hardware documentation.

- Configuring the workstation's spooling system for the plotter

  Defining the plotter for the workstation's spooling system and setting up the print spooler. You set up a plotter the same way you set up a printer.

  Appendix B, "Configuring Spooling Systems," provides a general overview of configuring spooling systems. Refer to your operating system documentation for complete information.

- Setting up the Cadence software

  This guide concentrates on how to configure the Cadence software for the plotter.

This overview discusses the following topics:

Overview of Cadence Plotting Services

This section describes the general methods for setting up plotters. Each supported group of plotters has a separate chapter.

Setting up a plotter requires three distinct tasks:

- Installing the hardware
- Configuring the workstation's spooling system for the plotter
- Setting up Cadence Plotting Services (CPS) software

The product notes for plotting list specific plotters that Cadence supports.

Plotting Data Type	Comments
Adobe PostScript Level 1 (monochrome) and Level 2 (color)	Plots PostScript and encapsulated PostScript files. See Chapter 2, "Setting Up PostScript Plotters."
CalComp format	Used by electrostatic and pen plotters. Cadence software produces Format 907 Plotter Controller Interface (PCI) data. See Chapter 3, "Setting Up CalComp Plotters."
HP-GL and HP-GL/2	Plots HP-GL and HP-GL/2 files. See Chapter 4, "Setting Up Hewlett-Packard Plotters."
Cadence Standard Raster Driver, Raptor	Used by Versatec, CalComp electrostatic plotters, and HP DesignJet and DeskJet printers. See Chapter 5, "Cadence Standard Raster Driver."

New Features

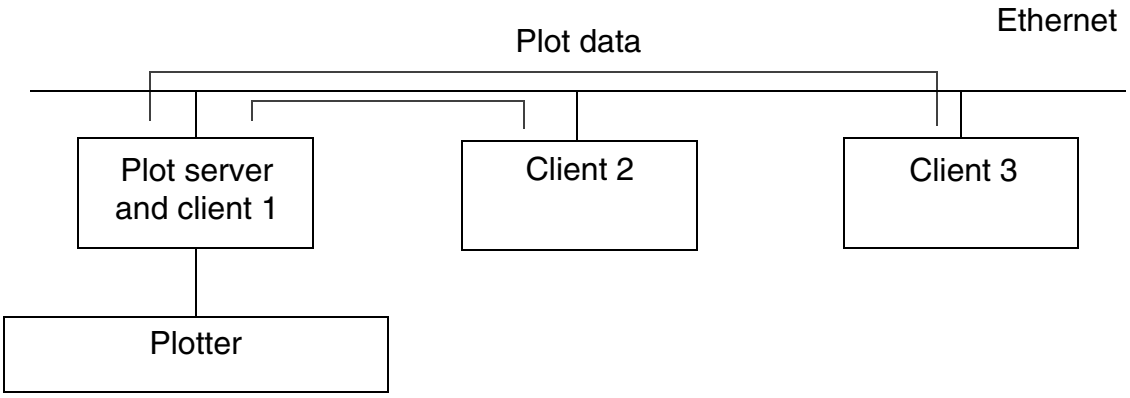
As of version 5.0.33, you can plot using a Windows plot server. See Chapter 6, "Setting Up a Windows Plot Server."

Plotting Configurations on the Network

The plot server is the workstation to which the plotter is attached. The client workstation runs the design job using a Cadence application and a Cadence plotting product. A workstation with a plotter can be both a plot server and a client.

In the network configuration shown below, the plot server is also a client. Client 1 plots locally; clients 2 and 3 plot remotely. The dotted line represents the data sent to the plot server.

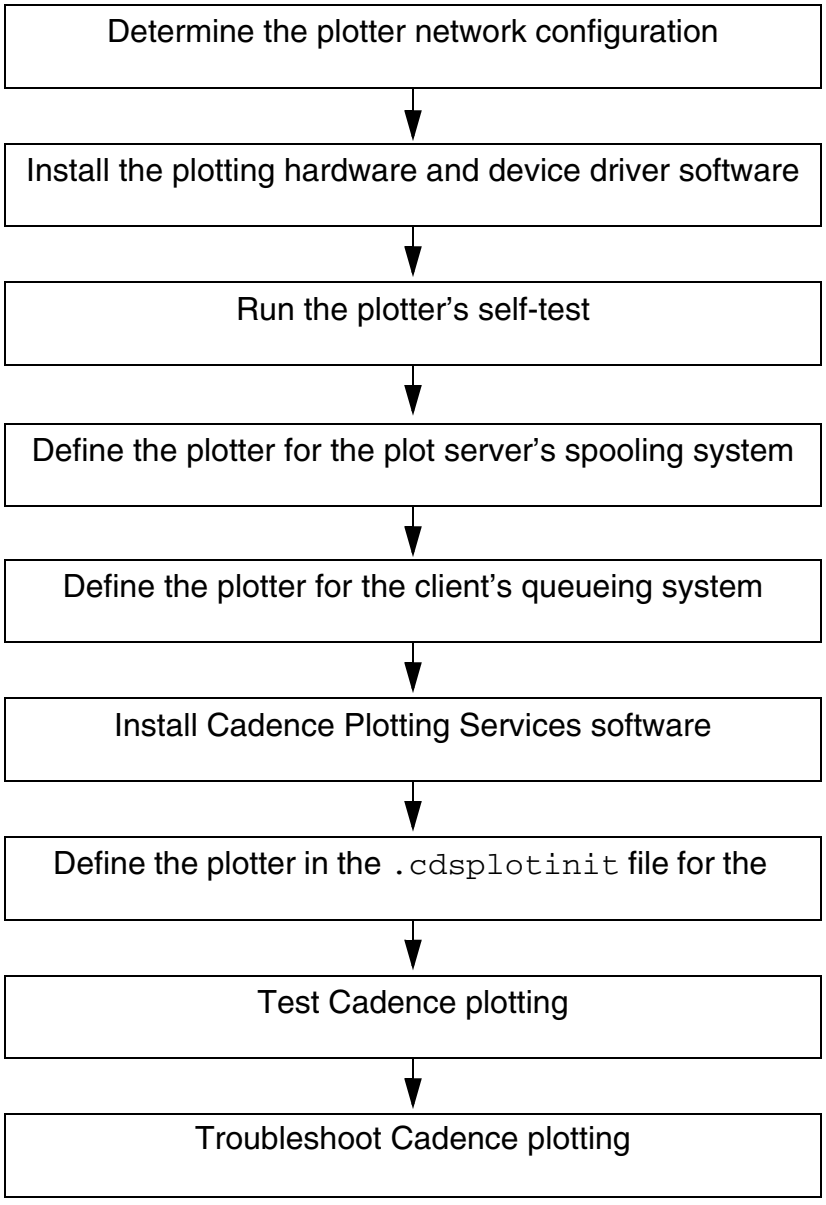
Sample Network Configuration



Depending on the plotter, the plot server and the client might need different plotting products (and Versatec licenses). When your company ordered the Cadence Plotting Services software, it specified if the Cadence software licenses will float on the network or be attached to specific workstations (node-locked).

Summary of the Plotting Installation

You set up plotting by following these general steps.



Quick Start Guide to Setting Up a Plotter

You set up a plotter the same way you set up a printer. Each operating system is somewhat different. Setting up a plotter requires several distinct tasks:

- Attaching the plotter to the plot server

  See your plotter documentation for information on how to connect the plotter to the plot server.

- Configuring the workstation's spooling system for the plotter

  See the your operating system documentation for complete information about its spooling system. You can configure the spooling system for your plotter after you

  - Identify the workstation to be the plot server
  - Identify the workstations from which users will plot

- Setting up the Cadence Plotting Services software

  See the CalComp, HP, PostScript, Cadence standard raster driver, or Windows plot server chapter in this guide for more information about setting up the Cadence Plotting Services software for your plotter.

If you are familiar with setting up printers or plotters on your operating system or you are already plotting with your plotter, you might be able to follow the directions in this section. See the chapters on the specific plotters for more detail.

Setting Up the Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports.

To set up the plot server,

1. Log in as `root`.
2. Create the queue and queue device.

OS	How to Create the Queue and Queue Device
AIX	Use `smit`.
HP-UX	Use `sam`.

OS	How to Create the Queue and Queue Device
Solaris	Use `admintool`.
SunOS	Add the plotter to `/etc/printcap`; create the queue device.

The chapters for specific plotters have more information. CalComp and Versatec plotters use a print filter that must be installed in the queue. See their chapters for more information.

3. Start the printer queue.
4. (Optional) Test the queuing command.

   You can test the queueing command from the configuration utility. See "Setting Up the Cadence Software" on page 13 for more details.

Setting Up the Clients

To plot remotely, you must set up the client workstations in one of two ways. The clients can NFS-mount the plot server and then plot, or you can set up the clients by following the steps below.

1. Log in as `root`.
2. Create the queue and queue device

OS	How to Create the Queue and Queue Device
AIX	Use `smit`.
HP-UX	Use `sam`.
Solaris	Use `admintool`.
SunOS	Add the plotter to `/etc/printcap`; create the queue device.

3. Start the printer queue.
4. For CalComp and Versatec plotters, set up the temporary directory.

   See their chapters for more information.
5. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.

6. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility. See "Setting Up the Cadence Software" on page 13 for more details.

Setting Up the Cadence Software

You must define the plotters in a Cadence plotter configuration file. If the X Window System or OpenWindows is running, you can save time by using the interactive plotconfig utility to define the plotters. If the X Window System or OpenWindows is not running, follow the procedures in the "Configuring the Plotter without the Utility" section of your plotter's chapter.

To use the utility,

1. Verify that *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin` are in your search path.

   If your workstation is set up correctly, typing `cds_root` returns *your_install_dir.* If `cds_root` does not return the path, check your search path or see your system administrator.

   your_install_dir is the directory in which the Cadence products are installed, such as `/cds`.

2. Start the plotter configuration utility by doing one of the following:

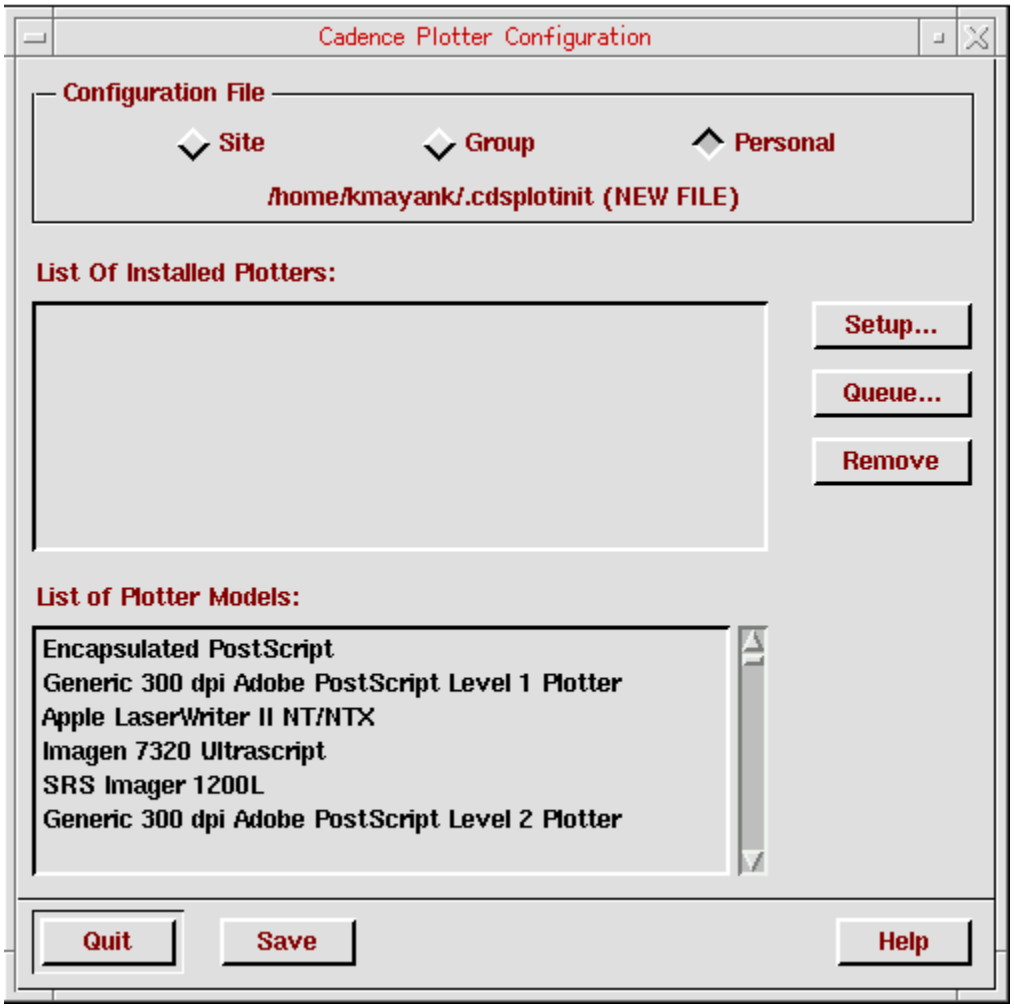
   - At the UNIX prompt on a color terminal, type

     ```
     plotconfig
     ```

   - At the UNIX prompt on a monochrome terminal, type

     ```
     plotconfig -bw
     ```

The Cadence Plotter Configuration form appears.



For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

Note: If the `F1` or `Help` key does not display information about a field, check your window manager file, such as Motif's `~/.mwmrc` file. By default, the X Window System binds help to the `F1` or `Help` key. Your file probably binds the `F1` or `Help` key to something besides help.

3. Select the plotter configuration file to modify.

   You might want to consider several plotter configuration files:

   - A site (system-wide) *`your_install_dir`*`/tools/plot/.cdsplotinit` containing all of your plotters

- A group (group-specific) `.cdsplotinit` file in the current working directory
- A personal (user-specific) `.cdsplotinit` file in your home directory

The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

- *`your_install_dir`*`/tools/plot/.cdsplotinit`
- Current working directory (`./.cdsplotinit`)
- The `.cdsplotinit` file in the home directory entry in the password database for the user

The software appends the plotters to a list of available plotters and overwrites plotter definitions with the same plotter name. The last plotter defined is the definition the software uses.

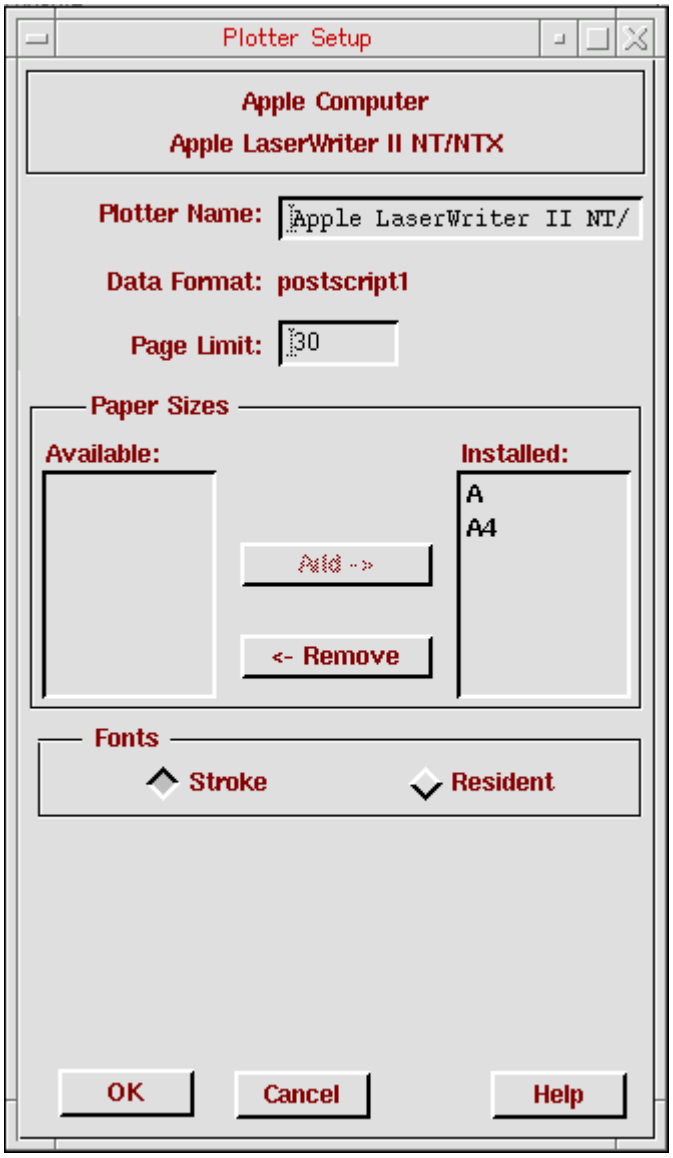
4. In the *List of Plotter Models* list box, double-click the plotter model you want to put in the file.

   The plotter model is added to the *List of Installed Plotters* list box. If you add several plotters of the same model, each plotter is numbered sequentially. For example,

   ```
   Apple LaserWriter II NT/NTX
   Apple LaserWriter II NT/NTX(1)
   Apple LaserWriter II NT/NTX(2)
   ```

5. In the *List of Installed Plotters* list box, click the plotter model.
6. Click *Setup*.

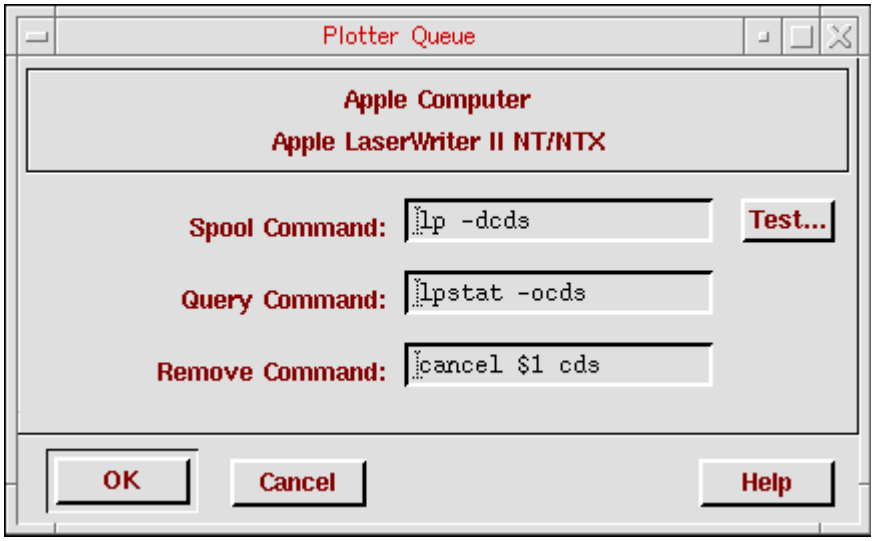
A Plotter Setup form similar to the following appears.



For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

7. Fill in the form.
8. Click *OK*.
9. In the Cadence Plotter Configuration form, click *Queue*.

A Plotter Queue form similar to the following appears.



For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

10. Fill in the form.
11. Click *Test* to test the queue command.
12. Click *OK*.
13. Repeat these steps to set up any other plotter configuration file.
14. In the Cadence Plotter Configuration form, click *Quit*.

    If *Quit* is grayed out, close all windows from the plotconfig utility.

Testing the Configuration File

You test the `.cdsplotinit` file by plotting a design from a Cadence application.

1. Start the Cadence application.
2. Print a design to test the `.cdsplotinit` file.

   Follow the plotting procedure in your Cadence application's user guide. If the plot does not come out, see Chapter 7, "Troubleshooting."

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Setting Up PostScript Plotters

This chapter discusses the following topics:

Configuring the Spooling System

The Cadence Plotting Services software can create a PostScript file and send it to the plotter (regular PostScript), or it can create a disk file (encapsulated PostScript) that you can import into other software, such as FrameMaker.

Cadence recommends at least 4 megabytes of RAM for black-and-white PostScript plotting and at least 16 megabytes of RAM for color PostScript plotting.

You set up a plotter the same way you set up a printer. Each operating system is somewhat different.

Before configuring the spooling system for your plotter,

- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Attach and install the plotter
- Run the plotter's self-test successfully

If users will be plotting from the plot server (local plotting), you only set up the plot server. If users will be plotting from other workstations (plotting remotely), you must set up the plot server and the clients.

Setting Up the Plot Server

Setting Up the SunOS Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the SunOS plot server,

1. Log in as `root` on the plot server.
2. Copy your existing `/etc/printcap` file.

   ```
   cp /etc/printcap /etc/printcap.old
   ```

3. Create the queue device (`printcap` entry).

   Edit the `/etc/printcap` file on the workstation. For example, for an Apple LaserWriter connected to a serial port on this workstation, add a description similar to the following:

```
# Local APPLE LaserWriter
lw|Apple LaserWriter:\
    :lp=/dev/ttya:\
    :sd=/usr/spool/lw:\
    :lf=/usr/adm/lpd-errs:\
    :br#9600:\
    :mx#0:\
    :sh:\
```

For a Tektronix Phaser III, the entry is similar to

```
# Local Tektronix Color Plotter
tek|Tektronix Phaser III PXi:\
    :br#19200:\
    :lf=/usr/adm/lpd-errs:\
    :lp=/dev/ttya:\
    :mx#0:\
    :rw:\
    :sd=/usr/spool/tekd:\
    :sh:\
```

You can set XON/XOFF handshaking with the `ms` or `fc`, `fs`, `xc`, and `xs` flags in `/etc/printcap`. See the `printcap` man page for complete information. Your plotter documentation might specify the appropriate entry for your operating system.

4. Create the queue (spool directory).

   Type commands similar to

   ```
   cd /usr/spool
   mkdir plotter_name
   chown daemon.daemon plotter_name
   chmod 755 plotter_name
   ```

   `plotter_name` is the name specified for the spooling system. For example, if you specified `/usr/spool/lw` as the spool directory in the `/etc/printcap` entry above, create the `lw` spool directory by typing

   ```
   cd /usr/spool
   mkdir lw
   chown daemon.daemon lw
   chmod 755 lw
   ```

5. Start the printer queue.

   ```
   lpc start plotter_name
   lpc enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   ps -aux | grep lpd
   ```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpd
   ```

8. Verify the plotter status.

   ```
   lpc status plotter_name
   ```

If the queue is empty, usually the system returns

```
No daemon present
```

9. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 31.

If you are plotting remotely, go on to "Setting Up the Clients" on page 25.

Setting Up the Solaris Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the Solaris plot server,

1. Log in as root on the plot server.
2. Use admintool to create the queue and queue device.
3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 31.

If you are plotting remotely, go on to "Setting Up the Clients" on page 25.

Setting Up the HP-UX Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the HP-UX plot server,

1. Log in as root on the plot server.
2. Use sam to create the queue and queue device.
3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. (Optional) Test the queuing command.

   You can test the queueing command from the configuration utility.

a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

b. Select the .cdsplotinit file to test.

c. Select the plotter to test.

d. Click *Queue*.

e. Click *Test*.

f. Click *OK* when done.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 31.

If you are plotting remotely, go on to "Setting Up the Clients" on page 25.

Setting Up the AIX Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the AIX plot server,

1. Log in as root on the plot server.
2. Use smit to create the queue and queue device.

   The smit utility modifies /etc/qconfig. In the following /etc/qconfig entry, the print queue name is lp0, and the queue device is dlp0.

   ```
   lp0:
       up = TRUE
       device = dlp0
       discipline = fcfs
   dlp0:
       backend = /usr/lpd/piobe
       file = FALSE
       access = write
       feed = never
       header = never
   ```

   The device named in the first portion must be the device defined in the second portion of the entry.
3. Start the printer queue.

   ```
   enable plotter_name
   ```
4. Verify the printer daemon.

   ```
   ps -edaf | grep qdaemon
   ```

5. If the daemon is not running, start it.

   ```
   /etc/qdaemon
   ```

6. Verify the plotter status.

   ```
   enq -q -P plotter_name
   ```

7. If an AIX plot server will be receiving plot jobs from a SunOS system, start `lpd` on the plot server.

   ```
   startsrc -s lpd
   ```

8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.

   b. Select the `.cdsplotinit` file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 31.

If you are plotting remotely, go on to "Setting Up the Clients" on page 25.

Setting Up the Clients

Setting Up the SunOS Clients

To plot remotely, you must set up the client workstation.

To set up the SunOS client,

1. Log in as `root` on the client.
2. Copy your existing `/etc/printcap` file.

   ```
   cp /etc/printcap /etc/printcap.old
   ```

3. Create the queue device (`printcap` entry).

Edit the `/etc/printcap` file on the workstation. For example, for an Apple LaserWriter connected to the `host2` remote workstation, add a description similar to the following:

```
# APPLE LaserWriter remotely connected (to host2)
lw|Apple LaserWriter:\
    :lp=:\
    :rp=lw:\
    :rm=host2:\
    :sd=/usr/spool/lw:\
    :mx#0:\
```

For a Tektronix Phaser III color plotter connected to `host3`, the entry is similar to

```
# REMOTE Tektronix Color Plotter
tek|Tektronix Phaser III PXi:\
    :lp=:\
    :rp=tek:\
    :rm=host3:\
    :sd=/usr/spool/tekd:\
    :mx#0:\
    :lf=/usr/adm/lpd-errs:
```

See the `printcap` man page for complete information. Your plotter documentation might specify the appropriate entry for your operating system.

4. Create the queue (spool directory).

   Type commands similar to

   ```
   cd /usr/spool
   mkdir plotter_name
   chown daemon.daemon plotter_name
   chmod 755 plotter_name
   ```

   plotter_name is the name specified for the spooling system. For example, if you specified `/usr/spool/lw` as the spool directory in the `/etc/printcap` entry above, create the `lw` spool directory by typing

   ```
   cd /usr/spool
   mkdir lw
   chown daemon.daemon lw
   chmod 755 lw
   ```

   For more information, see "SunOS Spooling Systems" on page 198.

5. Start the printer queue.

   ```
   lpc start plotter_name
   lpc enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   ps -aux | grep lpd
   ```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpd
   ```

8. Verify the plotter status.

```
lpc status plotter_name
```

If the queue is empty, usually the system returns

```
No daemon present
```

9. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
10. (Optional) Test the queuing command.

    You can test the queuing command from the configuration utility.

    a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.
    b. Select the .cdsplotinit file to test.
    c. Select the plotter to test.
    d. Click *Queue*.
    e. Click *Test*.
    f. Click *OK* when done.
11. Repeat these steps on each client.

    If you want to test the setup before you repeat these steps on each client, you must set up the Cadence software.

Proceed to "Setting Up Cadence Plotting Services Software" on page 31.

Setting Up the Solaris Clients

To plot remotely, you must set up the client workstation.

To set up the Solaris client,

1. Log in as root on the client.
2. Use admintool to create the queue and queue device.
3. Start the printer queue.

```
accept plotter_name
enable plotter_name
```

4. Verify the printer daemon.

```
/usr/bin/lpstat -r
```

5. If the daemon is not running, start it.

```
usr/lib/lpsched
```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.

8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

9. Repeat these steps on each client.

   If you want to test the setup before you repeat these steps on each client, you must set up the Cadence software.

See "Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 31.

Setting Up the HP-UX Clients

To plot remotely, you must set up the client workstation.

To set up the HP-UX client,

1. Log in as root on the client.

2. Use sam to create the queue and queue device.

3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.

8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

9. Repeat these steps on each client.

   If you want to test the setup before you repeat these steps on each client, you must set up the Cadence software.

See "Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 31.

Setting Up the AIX Clients

To plot remotely, you must set up the client workstation.

To set up the AIX client,

1. Log in as root on the client.

2. Use smit to create the queue and queue device.

   smit modifies /etc/qconfig. In the following /etc/qconfig entry, the print queue name is lw and queue device is rmlw.

   ```
   lw:
       up = TRUE
   ```

```
    device = rmlw
    host = plot_server
    discipline = fcfs
    s_statfilter = /usr/lpd/aixshort
    l_statfilter = /usr/lpd/aixlong
    rq = lw
rmlw:
    backend = /usr/lpd/rembak
```

The device named in the first portion must be the device defined in the second portion of the entry.

3. Start the printer queue.

   ```
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   ps -edaf | grep qdaemon
   ```

5. If the daemon is not running, start it.

   ```
   /etc/qdaemon
   ```

6. Verify the plotter status.

   ```
   enq -q -P plotter_name
   ```

7. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.

8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

9. Repeat these steps on each client.

   If you want to test the setup before you repeat these steps on each client, you must set up the Cadence software.

See Chapter 7, “Troubleshooting,” if necessary.

Proceed to “Setting Up Cadence Plotting Services Software” on page 31.

Setting Up Cadence Plotting Services Software

You must define the plotters for the Cadence Plotting Services software in a plotting configuration file, `.cdsplotinit`. You might want to consider several `.cdsplotinit` files:

- A system *your_install_dir*`/tools/plot/.cdsplotinit` file containing all of your plotters
- A group-specific `.cdsplotinit` file in the current working directory
- A user-specific `.cdsplotinit` file in the user's home directory

The software loads the system file first, the current working directory's file second, and then the `.cdsplotinit` file in the user's home directory. As the software reads the files, plotter definitions are appended to the current list. The software overwrites plotter definitions with the same plotter name, letting users override system settings.

This section describes the `.cdsplotinit` file for PostScript plotters; these plotters use the features listed in "Summary of Features" on page 182.

Configuring the Plotter with the Utility

To create or modify the `.cdsplotinit` configuration file, use the plotconfig utility to define the plotters if the X Window System or OpenWindows is running. If neither of these windowing systems is running, follow the procedures in "Configuring the Plotter without the Utility" on page 33.

To use the utility,

1. Verify that *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin` are in your search path.

   your_install_dir is the directory in which the Cadence products are installed, such as `/cds`. If your workstation is set up correctly, typing `cds_root` returns *your_install_dir.* If `cds_root` does not return the path, check your search path or see your system administrator.

2. At the UNIX prompt, start the plotconfig utility by typing

   ```
   plotconfig
   ```

   The Cadence Plotter Configuration form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

Note: If the `F1` or `Help` key does not display information about a field, check your window manager file, such as Motif's `~/.mwmrc` file. By default, the X Window System binds help to the `F1` or `Help` key. Your file probably binds the `F1` or `Help` key to something besides help.

3. Select the plotter configuration file to modify.

   The Cadence® applications read the `.cdsplotinit` files in this sequence when the applications start:

   - *your_install_dir*`/tools/plot/.cdsplotinit`
   - Current working directory (`./.cdsplotinit`)
   - The `.cdsplotinit` file in the home directory entry in the password database for the user

   The software appends the plotters to a list of available plotters and overwrites plotter definitions with the same plotter name. The last plotter defined is the definition the software uses.

4. In the *List of Plotter Models* list box, double-click the plotter model you want to put in the file.

   The plotter model is added to the *List of Installed Plotters* list box. Many PostScript plotters can use the Apple LaserWriter or generic PostScript entries. If you add several plotters of the same model, each plotter is numbered sequentially. For example,

   ```
   Apple LaserWriter II NT/NTX
   Apple LaserWriter II NT/NTX(1)
   Apple LaserWriter II NT/NTX(2)
   Encapsulated PostScript
   ```

   To plot black instead of shades of gray on a PostScript Level 2 plotter, see "Configuring the Plotter without the Utility" on page 33. A plotter can have several entries in the file.

   Note: LaserJet III, LaserJet IIIM, LaserJet IV, and LaserJet IVM plotters use the LaserJet III entry.

5. In the *List of Installed Plotters* list box, click the plotter model.

6. Click *Setup.*

   The Plotter Setup form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

7. Fill in the form.

8. Click *OK*.
9. In the Cadence Plotter Configuration form, click *Queue*.

   The Plotter Queue form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.
10. Fill in the form.
11. Click *Test* to test the queue command.
12. Click *OK*.
13. Repeat these steps to set up any other plotter configuration file.
14. In the Cadence Plotter Configuration form, click *Quit*.

    If *Quit* is grayed out, close all windows from the plotconfig utility.

Configuring the Plotter without the Utility

To create or modify the `.cdsplotinit` configuration file without the utility,

1. Create a `.cdsplotinit` file in your home directory.

   You can use an editor, such as `vi`.

   ```
   vi .cdsplotinit
   ```

   You must specify your site-specific information.

   The *your_install_dir*`/tools/plot/etc/cdsplotinit` file lists the supported plotter models. The header of this file lists the CPS version with which the file is associated. The *your_install_dir*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.
2. Copy the entry for your plotter model from *your_install_dir*`/tools/plot/etc/cdsplotinit` to your `.cdsplotinit` file.

   Many PostScript plotters can use the Apple LaserWriter or generic PostScript entries. A plotter can have more than one entry (for example, for different paper sizes or output) in the file. Depending on the Adobe PostScript version and output needed, select the entry with the correct plotter model (*plotter_model*`: \` or *menu_name*`|`*plotter_model*`: \`).

Adobe PostScript Version	Plotter	Output	Type
Level 1	Black-and-white	Black and white	`postscript1`
Level 2	Black-and-white	Black and white	`postscript1`
Level 2	Black-and-white	Shades of gray	`postscript2`
Level 2	Color	Color	`postscript2`
Level 1 or 2	Black-and-white or color	Encapsulated PostScript (for importing into word processors)	`epsf`

See "Customizing Colors, Lines, and Stipple Patterns" on page 38.

For example, if you are setting up an Apple LaserWriter with Adobe PostScript Level 1, copy the entry from the file.

```
Apple LaserWriter II NT/NTX:\
    :manufacturer=Apple Computer:\
    :type=postscript1:\
    :maximumPages#30:\
    :resolution#300:\
    :paperSize="A" 2400 3150 75 75:\
    :paperSize="A4" 2332 3360 60 60:
```

Note: Be sure to remove the backslash from the last line.

A sample `.cdsplotinit` file is in "The Configuration File" on page 185.

If you are setting up for encapsulated PostScript, the entry in the `.cdsplotinit` file is correct except for the name and the optional queuing commands.

```
Encapsulated Postscript:\
    :manufacturer=Adobe:\
    :type=epsf:\
    :maximumPages#1:\
    :resolution#300:\
```

If your plotter is not in *`your_install_dir`*`/tools/plot/etc/cdsplotinit`, you might still be able to use it if you modify an existing entry from the same manufacturer.

3. Add the name of the plotter as the Cadence software should display it.

   Add the name and a vertical bar (|) to the beginning of the plotter model line, leaving no spaces on the line. If you do not specify a name, the Cadence applications cannot recognize this plotter.

For example, if you want the software to list the plotter as `LW1`, add `LW1` to the first line, to the left of the vertical bar (`|`).

```
LW1|Apple LaserWriter II NT/NTX:\
    :manufacturer=Apple Computer:\
    :type=postscript1:\
    :maximumPages#30:\
    :resolution#300:\
    :paperSize="A" 2400 3150 75 75:\
    :paperSize="A4" 2332 3360 60 60
```

Follow these guidelines when naming your plotter:

- Do not use these characters in the plotter name:

  colon (`:`) equal sign (`=`) double quotes (`"`)
  backslash (`\`) vertical bar (`|`)

- Do not leave any spaces at the beginning or the end of the name.

  Note: Leading and trailing spaces in *`menu_name`* and *`plotter_model`* are significant and become part of the names.

- Do not change *`plotter_model`* (`Apple LaserWriter II NT/NTX` in the example). You can only use plotter models recognized by Cadence Plotting Services software.

4. Add the spooling information for the plotter (optional for encapsulated PostScript).

Use the spooling commands for your operating system. The table lists the spooling entries for a plotter (identified as `lw`).

Operating System	Spool	Query	Remove
AIX	`enq -P lw:\`	`enq -q -P lw:\`	`enq -x $4 -P lw:\`
HP-UX	`lp -dlw:\`	`lpstat -olw:\`	`cancel $1 lw:\`
Solaris	`lp -dlw:\`	`lpstat -olw:\`	`cancel $1 lw:\`
SunOS	`lpr -Plw:\`	`lpq -Plw:\`	`lprm -Plw $3:\`

5. Edit the paper sizes the plotter uses.

Comment or delete the paper sizes the plotter will not use. For example, if the plotter only uses A-size paper, the lines might be

```
:paperSize="A" 2400 3150 75 75:\
#:paperSize="A4" 2332 3360 60 60:\
```

The `75 75` above indicate the offset. PostScript plotters use the lower left corner of the paper as the 0,0 origin, even though they cannot draw to the edge of the paper. You must specify an offset width and height for the plottable area. If you do not specify offsets, they are 0 0.

Occasionally, you can calculate the offset for a PostScript plotter that is not in the `.cdsplotinit` file by using the information about the printable area from your plotter's manual. For example, the manual for a Tektronix Phaser III Pxi lists this information:

Paper Size	Print Area	Side Margins	Bottom Margin
A-size, 8.5" x 11"	8.08" x 10.52"	0.21"	0.28"

To find the correct offset,

a. Multiply the print area and the margins by the plotter's resolution (for example, 300 DPI):

8.08 x 300 = 2424
10.52 x 300 = 3156
0.21 x 300 = 63
0.28 x 300 = 84

b. Round print area results down; round margin results up.

```
2420 3155 66 84
```

These will be your values for `:paperSize`.

Note: Because there is no standard method that plotters use to select paper trays, the Cadence Plotting Services software cannot specify paper trays. If you select B-size paper, you must make sure the plotter selects B-size paper. This means you must select the paper tray using the plotter vendor's method or go to the plotter and put B-size paper in.

6. (Optional) To use the printer's resident fonts instead of the stroked fonts displayed on the screen, type

```
:residentFonts:\
```

7. Remove the backslash from the last line of the plotter definition.

8. Verify each line of the plotter entry.

The complete entry for a 300-dpi PostScript Level 1 plotter identified as `lw` in the `/etc/printcap` file and as `LW1` on the application's menu, and using A-size paper in the SunOS environment might be

```
LW1|Apple LaserWriter II NT/NTX:\
    :spool=lpr -Plw:\
    :query=lpq -Plw:\
    :remove=lprm -Plw $3:\
    :manufacturer=Apple Computer:\
    :type=postscript1:\
    :maximumPages#30:\
    :resolution#300:\
    :residentFonts:\
    :paperSize="A" 2420 3155 66 84:
```

Remove the spaces that occur

- Between *menu_name* and *plotter_model*
- Before the ending colon
- At the end of each line

Note: You do not specify colors for a PostScript plotter because the plotter uses the colors defined in the application.

9. Save and exit the file.
10. (Optional) Relocate the file.

    The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

    - *your_install_dir*`/tools/plot/.cdsplotinit`
    - Current working directory (`./.cdsplotinit`)
    - The `.cdsplotinit` file in the home directory entry in the password database for the user

    The software overwrites plotter definitions with the same plotter name; the last plotter defined is the definition the plotter uses.

Testing the Configuration File

You can test the queuing command from the plotconfig utility. You test the `.cdsplotinit` file by plotting a design from a Cadence application.

1. Start the Cadence application.
2. Print a design to test the `.cdsplotinit` file.

   Follow the plotting procedure in your Cadence application's user guide. If the plot does not come out, see "Troubleshooting PostScript Plotting" on page 39 and Chapter 7, "Troubleshooting."

Customizing Colors, Lines, and Stipple Patterns

PostScript Level 2 plotters use RGB values to define colors for lines, stipple patterns, and solid colors. Depending on your Cadence application, you can customize the plotter's lines, colors, and stipple patterns if you can change the way they are displayed on the screen. Changing the display changes the design plotted by your PostScript plotter. Follow the plotting procedure in your Cadence application's user guide.

Note: PostScript plotters plot white as black.

Using Black-and-White PostScript Level 2 Plotters

When you send a color design to a PostScript Level 2 black-and-white plotter, the design plots in shades of gray. To plot in black and white, use a PostScript Level 1 entry in the `.cdsplotinit` file.

If you can adjust the colors or RGB values from the application, you can change shades of gray by adjusting the RGB values. The RGB values should be equal, as shown in the sample shades in the table below.

Color/Shade	Red	Green	Blue
Black	0	0	0
Very dark	100	100	100
Very light	800	800	800
White	1000	1000	1000

You cannot distinguish differences of 10% or less. To make it easier to distinguish different lines, you can use a dashed line instead of a solid line.

Troubleshooting PostScript Plotting

This section lists a problem specific to PostScript plotters. If these hints do not solve your plotting problem, check

- Troubleshooting Flow Chart on page 169
- Step-by-Step Troubleshooting on page 176
- Plotting Problems on page 159
- Error Messages on page 163
- Appendix B, “Configuring Spooling Systems”

PostScript plotter receives data but doesn’t plot

Cadence Plotting Services software prepends the *your_install_dir*/tools/plot/etc/ps.prologue file to PostScript intermediate files. Internally, the command executed at queue time is

```
cat your_install_dir/tools/plot/etc/ps.prologue plot_file | lpr -Plw
```

Check the data file to make sure the file contains two sections: *your_install_dir*/tools/plot/etc/ps.prologue and data, such as the lines below.

```
%!
%% PS-Adobe-1.0 # ps.prologue section
% Start of Cadence ps.prologue -- Version 4.2.2
% Adobe Postscript Level 2 Color Version.
%*********************% Graphics initialization routine.
%…
%end of Cadence ps.prologue
%…
gis # Data section
%…
gfs
```

Check that encapsulated PostScript files have three sections: preview, eps.prologue, and data. Several *your_install_dir*/tools/plot/etc/eps.prologue lines are shown below.

```
%!
%!PS-Adobe-2.0 EPSF-1.2
%%BoundingBox:0 0 300 300
%% Begin Preview
%…
%% End Preview
% The bitmap image that Design Framework II creates
% should precede this file.# eps.prologue section
%…
%end of Cadence eps.prologue
%…
```

```
gis # Data section
%…
```

What's New in PostScript Support

To address the recent problems with PostScript that have surfaced since the addition of the code in the `ps.prologue` file that called the PS `setpagedevice` operator, support for including device-specific code from PostScript printer description (PPD) files has been added to the plot library.

The only difference is the addition of two new `cdsplotinit` capabilities:

- `PPDFile`, a string capability that sets the path to the PPD file

  For example,

  ```
  :PPDFile = /whereEver/somePrinter.ppd:\
  ```

- `PPD`, a quoted-string capability that specifies which key is requested from the PPD file

  For example,

  ```
  :PPD="(Ap)*PageSize Letter":\
  ```

  This capability may appear more than once if multiple keys are desired.

Brief Description of PPD Files

To facilitate the selection of which keys are appropriate for a given printer in a given environment, a brief description of PPD files follows.

The PostScript Printer Description File Format Specification, Version 4.1, dated April 9, 1993 states:

> "PostScript printer description files (also known as PPD files) are human-readable, machine parsable text files that provide a uniform approach to using the diverse special features of devices that contain PostScript interpreters."

A PPD file consists of a number of entries that describe the printer or list available options and capabilities and how to invoke them. Each entry starts with a main keyword. The first character in a main keyword is an asterisk (`*`), which must be in the first column.

```
*NickName
*Product
*ModelName
*PSVersion
*PageSize
```

Some main keywords require an option keyword if there are several choices for a particular feature. For example, the `*PageSize` main keyword requires an option keyword because there are likely to be many different media sizes supported by a given printer. Some examples for `*PageSize` from the PPD file for a LaserJet III with a PS cartridge are as follows:

```
*PageSize Letter
*PageSize Legal
*PageSize Executive
*PageSize A4
```

The syntax for an entry with no option keyword would look like

```
*MainKeyword: "value"
```

and an entry with an option keyword would be

```
*MainKeyword OptionKeyword: "value"
```

Sample entries from the PPD file above are as follows:

```
*NickName: "HP LaserJet III PostScript Cartridge v52.2"
*PageSize Letter: "statusdict /lettertray get exec"
```

The case of keywords is significant. PageSize is different from Pagesize.

The value for `*PageSize Letter` looks like a fragment of PS code. This is how `plotServ` uses PPD files to perform common operations, like selecting media sizes, that often require device-specific code fragments. The printer's `cdsplotinit` entry would contain a PPD capability containing the main-keyword–option-keyword pair of the desired media size. The PPD file referenced with the `PPDFile` capability would be opened and searched for the given main-keyword–option-keyword pair. If found, the corresponding value would be extracted and placed in the PS file. For example, if

```
:PPDFile=/share/PPD/HPIII522.PPD:\
:PPD="*PageSize Letter":\
```

were present in the `cdsplotinit` entry for a printer, the PPD file `/share/PPD/HPIII522.PPD` would be opened and searched for the `*PageSize Letter` main-keyword–option-keyword pair. If found, its value, which is a PS code fragment to select letter-size paper, would be extracted and placed in the PS file.

If you want to restrict a PPD key to a `cdsplotinit` page size, as you would want to do with an entry to set the page size, you can precede the main keyword with a comma-separated list of paper sizes enclosed in parentheses, such as

```
:PPD="(Ap)*PageSize Letter":\
```

In a `cdsplotinit` entry, the example above would cause the `*PageSize Letter` main-keyword–option-keyword pair to be used only for the paper size `Ap`:

```
:paperSize "Ap" 2450 3200 50 50:\
```

As a more complete example, the following `cdsplotinit` plotter configuration for a QMS 3225 can be used to print to both A and B-sized media with automatic input tray selection:

```
QMS3225|QMS 3225 print system: \
:manufacturer=QMS:\
:type=postscript2: \
:maximumPages#30:\
:resolution#300:\
:PPDFile=qms3225c.ppd:\
:PPD="(A)*PageSize Letter":\
:PPD="(B)*PageSize Tabloid":\
:PPD=*Resolution 300dpi":\
:paperSize="B" 3200 5000 50 50:\
:paperSize="A" 2450 3200 50 50:
```

The following example for a Tektronix Phaser III Pxi further illustrates the capabilities and functionality that have been added by the addition of PPD support. This `cdsplotinit` entry can be used to switch the Phaser III into draft (monochrome) and premium output (quality) modes:

```
PhaserIIIpxi_r|Tektronix Phaser III PXi, resident fonts on: \
:spool=lpr -Ptek: \
:query=lpq -Ptek: \
:remove=lprm -Ptek $3: \
:manufacturer=Tektronix: \
:type=postscript2: \
:maximumPages#30: \
:resolution#300: \
:residentFonts: \
:PPDFile=/u1/tkphzr31.ppd: \
:PPD="*BlackSubstitution True": \
:PPD="(Ad)*OutputMode Draft": \
:PPD="(Ap)*OutputMode Premium": \
:PPD="(Ad,Ap)*PageSize Letter": \
:paperSize="Ad" 2435 3165 55 80: \
:paperSize="Ap" 2435 3165 55 80: \
:paperSize="A landscape" 2415 3185 80 55: \
:paperSize="A4 portrait" 2350 3375 55 80: \
:paperSize="A4 landscape" 2345 3395 80 55: \
:paperSize="Legal" 2419 4051 55 80: \
:paperSize="B portrait" 3180 4965 55 80: \
:paperSize="A3 portrait" 3390 4825 55 85:
```

To use draft mode, the `Ad` paper size would be selected. To use premium, the `Ap` paper size would be selected.

Note: PPD files are text files and are not OS specific. You can use any text editor to view options specified in a PPD file.

List of Main Keywords

Here is a non-exhaustive list of main keywords in the PPD files (the asterisk is omitted).

Main Keyword	Use
`PageSize`	Establishes input slot (tray) and framebuffer
`PageRegion`	Sets imageable area (framebuffer). Intended for use with manual feed.
`MediaType`	Selects media by characteristics other than size. Option keywords are product-dependent strings that describe the media. `LetterHead` and `Transparency` are examples. **Note:** This keyword usually requires that the device be previously set up to access a certain type of media. You will have to tell it what media types are loaded and where they are loaded, such as transparencies are in tray 1.
`MediaColor`	Selects media by color. **Note:** This keyword usually requires that the device be previously set up to access a certain type of media. You will have to tell it what media types are loaded and where they are loaded, such as transparencies are in tray 1.
`MediaWeight`	Selects media by weight. **Note:** This keyword usually requires that the device be previously set up to access a certain type of media. You will have to tell it what media types are loaded and where they are loaded, such as transparencies are in tray 1.
`InputSlot`	Selects media by specifying its tray.
`OutputBin`	Selects output path.
`TraySwitch`	Toggles automatic tray switching on or off.
`ManualFeed`	Toggles manual feed on or off.
`OutputMode`	Sets the output mode. The valid values for the option keyword are strings that describe the level of output quality.
`MirrorPrint`	Toggles mirror print on or off.
`NegativePrint`	Toggles negative print on or off.
`Resolution`	Sets resolution.
`Smoothing`	Allows control over the smoothing, which is also called bit smoothing or anti-aliasing, of edges of text and graphics.

Main Keyword	Use
`BitsPerPixel`	Selects gray scale level or color depths.

3

Setting Up CalComp Plotters

This chapter discusses the following topics:

Configuring the Spooling System

Your Cadence Plotting Services software can plot on CalComp electrostatic plotters that accept Format 907 Plotter Controller Interface (PCI) data through serial ports and parallel Centronics ports.

You set up a plotter the same way you set up a printer. Each spooling system is somewhat different.

Before configuring the spooling system for your plotter,

- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Attach the plotter to the plot server using a Centronics parallel interface or an RS-232-C interface

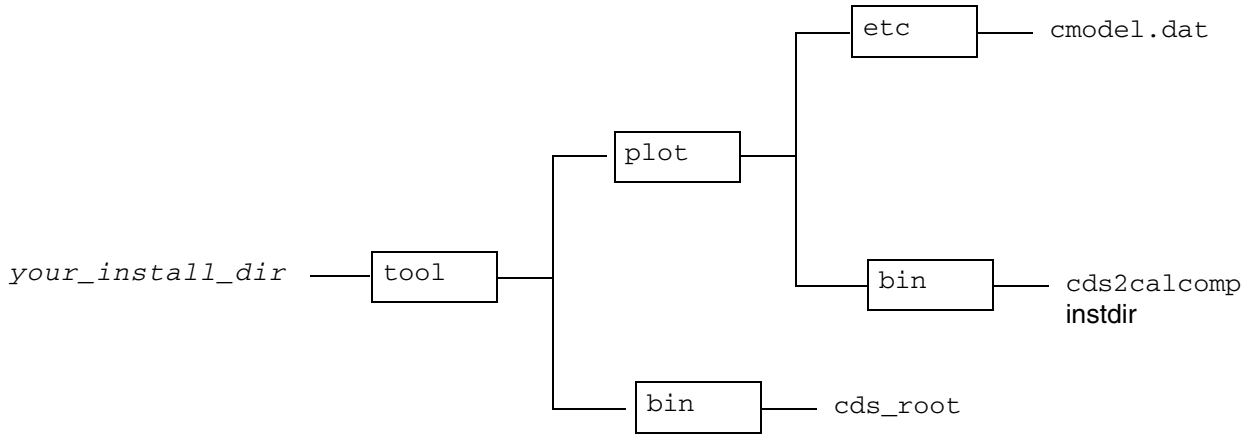
If the plot server will only be generating the 907 PCI data from the CPIF (it will not be generating the CPIF), make the necessary software available.

If the software is not on the plot server, do one of the following:

- Copy the minimal Cadence hierarchy to the plot server.

  The hierarchy can be on any accessible file server. The files must be correctly installed and set up for plotting to work.

Figure 3-1 Minimal CalComp Hierarchy



- Mount the software from the file server on which it is located.

If users will be plotting from the plot server (local plotting), you only set up the plot server. If users will be plotting from other workstations (plotting remotely), you must set up the plot server and the clients.

Setting Up the Plot Server

Setting Up the SunOS Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This section describes hardware handshaking for serial plotters. Your plotter or operating system documentation might have more information.

To set up the SunOS plot server,

1. Log in as `root` on the plot server.
2. Verify that your file system has enough disk space for a temporary directory.

   The software copies the CPIF data to a temporary directory so the temporary directory might need a large amount of disk space. A large design might require more than 200 megabytes.

   If the plot server will also be a client, the plotting temporary directory also stores the temporary 907 PCI files. The default location is `/usr/tmp`.

   If your system does not have enough space, do one of the following:

   - Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file

     See "Setting Up Cadence Plotting Services Software" on page 63.

   - Link `/usr/tmp` to another file system

   You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, preferably, at least 200 megabytes of disk space.
3. Copy your existing `/etc/printcap` file.

   ```
   cp /etc/printcap /etc/printcap.old
   ```
4. Create the queue device (`printcap` entry).

   If you are connecting a CalComp plotter directly to a plot server, edit the `/etc/printcap` file on the plot server. For example, for a CalComp plotter connected to this workstation, add a description similar to the following:

```
cc|Local CalComp plotting:\
    :lp=/dev/ttya:\
    :sh:mx#0:\
    :sd=/usr/spool/cc:\
    :lf=/usr/adm/lpd-errs:\
    :br#38400:ms=crtscts:\
    :if=your_install_dir/tools/plot/bin/cds2calcomp:
```

This entry sets the plotter device to `/dev/ttya`, suppresses job headers and form feeds, sets an unlimited print file size, and sets the spool directory to `/usr/spool/cc`. It tells `lpd` to send error output to the standard error file `/usr/adm/lpd-errs`. The last line specifies the filter name.

The plotter uses the `if` filter because the input data is text. The filter is started once per job.

The spooling system runs `cds2calcomp` to convert the CPIF data to CalComp format. The `.cdsplotinit` file controls all `cds2calcomp` options.

See the `printcap` man page for complete information. Your plotter documentation might specify the appropriate entry for your operating system.

5. Create the queue (spool directory).

   Type commands similar to

   ```
   cd /usr/spool
   mkdir plotter_name
   chown daemon.daemon plotter_name
   chmod 755 plotter_name
   ```

   plotter_name is the name specified for the spooling system. For example, if you specified `/usr/spool/cc` as the spool directory in the `/etc/printcap` entry above, create the `cc` spool directory by typing

   ```
   cd /usr/spool
   mkdir cc
   chown daemon.daemon cc
   chmod 755 cc
   ```

6. Start the printer queue.

   ```
   lpc start plotter_name
   lpc enable plotter_name
   ```

7. Verify the printer daemon.

   ```
   ps -aux | grep lpd
   ```

8. If the daemon is not running, start it.

   ```
   /usr/lib/lpd
   ```

9. Verify the plotter status.

   ```
   lpc status plotter_name
   ```

If the queue is empty, usually the system returns

```
No daemon present
```

10. (Optional) Test the queuing command.

    You can test the queuing command from the configuration utility.

    a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

    b. Select the .cdsplotinit file to test.

    c. Select the plotter to test.

    d. Click *Queue*.

    e. Click *Test*.

    f. Click *OK* when done.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 63.

If you are plotting remotely, go on to "Setting Up the Clients" on page 57.

Setting Up the Solaris Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This section describes hardware handshaking for serial plotters. Your plotter or operating system documentation might have more information.

To set up the Solaris plot server,

1. Log in as root on the plot server.
2. Verify that your file system has enough disk space for a temporary directory.

   The software copies the CPIF data to a temporary directory so the temporary directory might need a large amount of disk space. A large design might require more than 200 megabytes.

   If the plot server will also be a client, the plotting temporary directory also stores the temporary 907 PCI files. The default location is /usr/tmp.

   If your system does not have enough space, do one of the following:

- Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file.

  See "Setting Up Cadence Plotting Services Software" on page 63.

- Link `/usr/tmp` to another file system

You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, preferably, at least 200 megabytes of disk space.

3. Use `lpadmin` to create the queue and queue device.

```
lpadmin -pplotter_name -v/dev/device -iyour_install_dir/tools/plot/etc/
cclpfilter
```

Replace *`plotter_name`* with the name of the plotter, *`device`* with the name of the device (such as `tty00` or `parallel_plot`), and *`your_install_dir`* with the directory in which the Cadence software is installed.

4. Create the `cclpfilter` script.

Use *`your_install_dir`*`/tools/plot/samples/calcomp/cclpfilter` as a guide.

Replace *`device`* with the name of the queue device and *`your_install_dir`* with the directory in which the Cadence software is installed.

```
#!/bin/sh
# Cadence Design Systems 1995
# Use this lp interface for cds2calcomp and System V
# Build log file information
log=/usr/spool/lp/log
#
# Echo arguments to log file
echo "\n\n$*" >>${log}
echo "start:`date`" >>${log}
exec 2 >>${log}

reqid=$1
user=$2
title=$3
copies=$4
options=$5

shift;shift;shift;shift;shift
files=$*
#
# Set RS-232C serial options if port is serial.
# Comment out otherwise.
#
if [ -t 1 ]
then
# Change baud_rate to the appropriate number used by plotter
    stty baud_rate -opost -onlcr -ocrnl -parenb cs8 crts \
        -istrip -clocal tabs ctsxon<&1 2>/dev/null
fi
for file in ${files}
```

```
do
# Change your_install_dir to Cadence software installation directory
your_install_dir/tools/plot/bin/cds2calcomp -inputfile ${file} -h `hostname`
-n ${user}

    done
    echo "done:  `date`">>${log}
    exit 0
```

5. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

8. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

9. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 63.

If you are plotting remotely, go on to "Setting Up the Clients" on page 57.

Setting Up the HP-UX Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This section describes hardware handshaking for serial plotters. Your plotter or operating system documentation might have more information.

To set up the HP-UX plot server,

1. Log in as `root` on the plot server.
2. Verify that your file system has enough disk space for a temporary directory.

   The software copies the CPIF data to a temporary directory so the temporary directory might need a large amount of disk space. A large design might require more than 200 megabytes.

   If the plot server will also be a client, the plotting temporary directory also stores the temporary 907 PCI files. The default location is `/usr/tmp`.

   If your system does not have enough space, do one of the following:

   - Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file.

     See "Setting Up Cadence Plotting Services Software" on page 63.

   - Link `/usr/tmp` to another file system

   You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, preferably, at least 200 megabytes of disk space.

3. Use `lpadmin` to create the queue and queue device.

   ```
   lpadmin -pplotter_name -v/dev/device -iyour_install_dir/tools/plot/etc/
   cclpfilter
   ```

   Replace *`plotter_name`* with the name of the plotter, *`device`* with the name of the device (such as `tty00` or `parallel_plot`), and *`your_install_dir`* with the directory in which the Cadence software is installed.

4. Create the `cclpfilter` script.

   Use *`your_install_dir`*`/tools/plot/samples/calcomp/cclpfilter` as a guide.

   Replace *`device`* with the name of the queue device and *`your_install_dir`* with the directory in which the Cadence software is installed.

   ```
   #!/bin/sh
   # Cadence Design Systems 1995
   # Use this lp interface for cds2calcomp and System V
   # Build log file information
   ```

```
log=/usr/spool/lp/log
#
# Echo arguments to log file
echo "\n\n$*" >>${log}
echo "start:`date`" >>${log}
exec 2 >>${log}

reqid=$1
user=$2
title=$3
copies=$4
options=$5

shift;shift;shift;shift;shift
files=$*
#
# Set RS-232C serial options if port is serial.
# Comment out otherwise.
#
if [ -t 1 ]
then
# Change baud_rate to the appropriate number used by plotter
    stty baud_rate -opost -onlcr -ocrnl -parenb cs8 crts \
        -istrip -clocal tabs ctsxon<&1 2>/dev/null
fi
for file in ${files}
do
# Change your_install_dir to Cadence software installation directory
your_install_dir/tools/plot/bin/cds2calcomp -inputfile ${file} -h `hostname`
-n ${user}
done
echo "done:  `date`">>${log}
exit 0
```

5. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

8. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

9. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

d. Click *Queue*.

e. Click *Test*.

f. Click *OK* when done.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 63.

If you are plotting remotely, go on to "Setting Up the Clients" on page 57.

Setting Up the AIX Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This section describes hardware handshaking for serial plotters. Your plotter or operating system documentation might have more information.

To set up the AIX plot server,

1. Log in as `root` on the plot server.
2. Verify that your file system has enough disk space for a temporary directory.

   The software copies the CPIF data to a temporary directory so the temporary directory might need a large amount of disk space. A large design might require more than 200 megabytes.

   If the plot server will also be a client, the plotting temporary directory also stores the temporary 907 PCI files. The default location is `/usr/tmp`.

   If your system does not have enough space, do one of the following:

   - Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file

     See "Setting Up Cadence Plotting Services Software" on page 63.

   - Link `/usr/tmp` to another file system

   You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, preferably, at least 200 megabytes of disk space.

3. Use `smit` to create the queue and queue device.

   `smit` modifies `/etc/qconfig`.

4. Choose *Devices – Printer/Plotter – Manage Local Printer Subsystem – Local Printer Queues – Add a Local Queue*.

5. Fill out the form.

```
Name of queue to add                    cc5835
# Give the queue a meaningful name
Activate the queue                      yes
Will this become the default queue?     no
Queue discipline                        first come first served
Accounting file pathname
Name of device to add                   cc5835D
# Give the queue a meaningful name
Backend output file pathname

# device file for printer, such as /dev/tty0
Access mode                             both read and write
Backend program pathname                /usr/lpd/piobe
# Create the script as described below
# and enter its pathname
Number of form feeds prior
to printing                             0
Print header pages                      never
Print trailer pages                     never
Align page between files                no
```

6. Look at the entry in `/etc/qconfig`.

   It might be similar to

```
cc5835:
    device = cc5835D
    up = TRUE
cc5835D:
    backend = your_install_dir/tools/plot/etc/ccfilter
    access = both
```

   The device named in the first portion must be the device defined in the second portion of the entry.

7. Force the system to see the changes in `/etc/qconfig`.

```
enq -d
```

8. Create the `ccfilter` script.

   Use *your_install_dir*`/tools/plot/samples/calcomp/ccfilter` as a guide. Replace *your_install_dir* with the directory in which the Cadence software is installed.

```
#!/bin/sh
# ccfilter: AIX calcomp backend
# Set RS-232-C serial options if port is serial. Comment out
# otherwise.
# Uncomment the following lines if the device is a serial port
# and set the baud rate (replace 38400) as needed. This sets up
# request to send/clear to send hardware handshaking.
#
    stty disp posix<&1
    stty add rts<&1 2>/dev/null
    stty  38400
host=‘uname -n‘
#
for file in $*
do
    your_install_dir/tools/plot/bin/cds2calcomp -inputfile $file \
        -h $host -n $user
done
exit 0
```

9. Start the printer queue.

   ```
   enable plotter_name
   ```

10. Verify the printer daemon.

    ```
    ps -edaf | grep qdaemon
    ```

11. If the daemon is not running, start it.

    ```
    /etc/qdaemon
    ```

12. Verify the plotter status.

    ```
    enq -q -P plotter_name
    ```

13. If an AIX plot server will be receiving plot jobs from a SunOS system, you must start `lpd` on the plot server.

    ```
    startsrc -s lpd
    ```

14. (Optional) Test the queuing command.

    You can test the queuing command from the configuration utility.

    a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.

    b. Select the `.cdsplotinit` file to test.

    c. Select the plotter to test.

    d. Click *Queue*.

    e. Click *Test*.

    f. Click *OK* when done.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 63.

If you are plotting remotely, go on to "Setting Up the Clients" on page 57.

Setting Up the Clients

Setting Up the SunOS Clients

You must set up the client workstations in one of two ways. The client can NFS-mount the plot server and then plot, or you can set up the client by following the steps below.

To set up the SunOS client,

1. Log in as `root` on the client.
2. Copy your existing `/etc/printcap` file.

   ```
   cp /etc/printcap /etc/printcap.old
   ```

3. Create the queue device (`printcap` entry).

   Edit the `/etc/printcap` file on the client workstation. For example, add a CalComp entry `cc` to the `/etc/printcap`.

   ```
   cc|Remote CalComp plotting:\
       :lp=:sf:mx#0:\
       :sd=/usr/spool/cc:\
       :lf=/usr/adm/lpd-errs:\
       :rp=cc:rm=plot_server:
   ```

   The `rp` entry is the name of the plotter on the plot server, in this case `cc`. The `rm` entry is the name of the plot server.

   See the `printcap` man page for complete information. Your plotter documentation might specify the appropriate entry for your operating system.

4. Create the queue (spool directory).

   Type commands similar to

   ```
   cd /usr/spool
   mkdir plotter_name
   chown daemon.daemon plotter_name
   chmod 755 plotter_name
   ```

plotter_name is the name specified for the spooling system. For example, for a plotter known as cc, at a UNIX prompt, type

```
cd /usr/spool
mkdir cc
chown daemon.daemon cc
chmod 755 cc
```

5. Set up the temporary directory.

   The plotting temporary directory stores the CPIF data. The default location is /usr/tmp, and it is usually not large enough to store the CPIF data.

   You can set up the temporary directory in one of the following ways:

   - Specify a different directory in the tmpdir field in the .cdsplotinit file
   - Link /usr/tmp to another file system

   You can set up the temporary directory in any location on the network. The directory must have rwxrwxrwx (777) permissions and, depending on the designs plotted, at least 200 megabytes of disk space.

6. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.

   For more information, see Appendix B, “SunOS Spooling Systems.”

7. Start the printer queue.

   ```
   lpc start plotter_name
   lpc enable plotter_name
   ```

8. Verify the printer daemon.

   ```
   ps -aux | grep lpd
   ```

9. If the daemon is not running, start it.

   ```
   /usr/lib/lpd
   ```

10. Verify the plotter status.

    ```
    lpc status plotter_name
    ```

    If the queue is empty, usually the system returns

    ```
    No daemon present
    ```

11. (Optional) Test the queuing command.

    You can test the queuing command from the configuration utility.

    a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

    b. Select the .cdsplotinit file to test.

c. Select the plotter to test.

d. Click *Queue*.

e. Click *Test*.

f. Click *OK* when done.

12. Repeat these steps on each client.

If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

Proceed to "Setting Up Cadence Plotting Services Software" on page 63.

Setting Up the Solaris Clients

You must set up the client workstations in one of two ways. The client can NFS-mount the plot server and then plot, or you can set up the client by following the steps below.

To set up the Solaris client,

1. Log in as `root` on the client.
2. Use `admintool` to create the queue and queue device.
3. Set up the temporary directory.

   The plotting temporary directory stores the CPIF data. The default location is `/usr/tmp`, and it is usually not large enough to store the CPIF data.

   You can set up the temporary directory in one of the following ways:

   - Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file
   - Link `/usr/tmp` to another file system

   You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, depending on the designs plotted, at least 200 megabytes of disk space.
4. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
5. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```
6. Verify the printer daemon.

```
/usr/bin/lpstat -r
```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

8. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

9. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

10. Repeat these steps on each client.

    If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 63.

Setting Up the HP-UX Clients

You must set up the client workstations in one of two ways. The client can NFS-mount the plot server and then plot, or you can set up the client by following the steps below.

To set up the HP-UX client,

1. Log in as root on the client.
2. Use sam to create the queue and queue device.
3. Set up the temporary directory.

   The plotting temporary directory stores the CPIF data. The default location is /usr/tmp, and it is usually not large enough to store the CPIF data.

You can set up the temporary directory in one of the following ways:

- Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file
- Link `/usr/tmp` to another file system

You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, depending on the designs plotted, at least 200 megabytes of disk space.

4. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
5. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

8. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

9. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.
   b. Select the `.cdsplotinit` file to test.
   c. Select the plotter to test.
   d. Click *Queue*.
   e. Click *Test*.
   f. Click *OK* when done.

10. Repeat these steps on each client.

    If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 63.

Setting Up the AIX Clients

You must set up the client workstations in one of two ways. The client can NFS-mount the plot server and then plot, or you can set up the client by following the steps below.

To set up the AIX client,

1. Log in as `root` on the client.
2. Use `smit` to create the queue and queue device.

   The smit utility modifies `/etc/qconfig`. In the following `/etc/qconfig` entry, the print queue name is `cc`, and the queue device is `rcc`.

   ```
   cc:
       device = rcc
       host = plot_server
       rq = cc5835
   rcc:
       backend = /usr/lpd/rembak
   ```

   The device named in the first portion must be the device defined in the second portion of the entry.
3. Set up the temporary directory.

   The plotting temporary directory stores the CPIF data. The default location is `/usr/tmp`, and it is usually not large enough to store the CPIF data.

   You can set up the temporary directory in one of the following ways:

   - Specify a different directory in the `tmpdir` field in the `.cdsplotinit` file
   - Link `/usr/tmp` to another file system

   You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx (777)` permissions and, depending on the designs plotted, at least 200 megabytes of disk space.
4. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
5. Start the printer queue.

   ```
   enable plotter_name
   ```
6. Verify the printer daemon.

   ```
   ps -edaf | grep qdaemon
   ```

7. If the daemon is not running, start it.

   ```
   /etc/qdaemon
   ```

8. Verify the plotter status.

   ```
   enq -q -P plotter_name
   ```

9. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

   b. Select the .cdsplotinit file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

10. Repeat these steps on each client.

    If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

See "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 63.

Setting Up Cadence Plotting Services Software

You must define the plotters for the Cadence Plotting Services software in the plotting configuration file, .cdsplotinit.

You might want to consider several .cdsplotinit files:

- A system *your_install_dir*/tools/plot/.cdsplotinit file containing all of your plotters
- A group-specific .cdsplotinit file in the current working directory
- A user-specific .cdsplotinit file in the user's home directory

The software loads the system file first, the current working directory's file second, and then the `.cdsplotinit` file in the user's home directory. As the software reads the files, plotter definitions are appended to the current list. The software overwrites plotter definitions with the same plotter name, letting users override system settings.

This section describes the `.cdsplotinit` file for CalComp plotters. CalComp plotters use the features listed in "Summary of Features" on page 182.

CalComp plotters can use an optional postprocessing UNIX shell script, possibly to transfer the plotter-ready PCI data (*`plot_file`*) to the plotter. The `cds2calcomp` script executes this script (*`script_name`*) with any arguments that the script requires as *`script_name plot_file`*.

For example, you can write a script similar to the one below to move the plot to the remote plot server (*`plot_server`*).

```
#!/bin/sh
/usr/ucb/rcp $1 plot_server:/usr/tmp
rm -f $1
exit 0
```

A script similar to the one below moves the plot to the remote plot server (*`plot_server`*) and plots it on *`plotter_name`*.

```
#!/bin/sh
/bin/cat $1 | rsh plot_server lpr -Pplotter_name
rm -f $1
exit 0
```

The `moveplot` script might be similar to

```
#!/bin/sh
#moveplot
/bin/mv $1 $2
exit 0
```

After you create your script, you specify the script (*`script_name`*) on the following line in the `.cdsplotinit` file:

```
:script=script_name:\
```

You can specify where to put the file, `moveplot` above, with the script command by adding an asterisk (`*`) to the command:

```
:script=moveplot * *.save:\
```

The system executes the command as

```
moveplot /usr/tmp/cccxxxx /usr/tmp/cccxxxx.save
```

`cccxxxx` is the 907 PCI data file.

Configuring the Plotter with the Utility

To create or modify the `.cdsplotinit` configuration file, use the plotconfig utility to define the plotters if the X Window System or OpenWindows is running. If neither of these windowing systems is running, follow the procedures in "Configuring the Plotter without the Utility" on page 67.

To use the utility,

1. Verify that *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin` are in your search path.

   your_install_dir is the directory in which the Cadence products are installed, such as `/cds`. If your workstation is set up correctly, typing `cds_root` returns *your_install_dir.* If `cds_root` does not return the path, check your search path or see your system administrator.

2. Start the plotter configuration utility by doing one of the following:

   - At the UNIX prompt on a color terminal, type

     ```
     plotconfig
     ```

   - At the UNIX prompt on a monochrome terminal, type

     ```
     plotconfig -bw
     ```

   The Cadence Plotter Configuration form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

   Note: If the `F1` or `Help` key does not display information about a field, check your window manager file, such as Motif's `~/.mwmrc` file. By default, the X Window System binds help to the `F1` or `Help` key. Your file probably binds the `F1` or `Help` key to something besides help.

3. Select the plotter configuration file to modify.

   The Cadence® applications read the `.cdsplotinit` files sequentially in this order when the applications start:

   - *your_install_dir*`/tools/plot/.cdsplotinit`
   - Current working directory (`./.cdsplotinit`)
   - The `.cdsplotinit` file in the home directory entry in the password database for the user

The software appends the plotters to a list of available plotters and overwrites plotter definitions with the same plotter name. The last plotter defined is the definition the software uses.

4. In the *List of Plotter Models* list box, double-click the plotter model you want to put in the file.

   The plotter model is added to the *List of Installed Plotters* list box. If you add several plotters of the same model, each plotter is numbered sequentially. For example,

   ```
   5835
   5835(1)
   5835(2)
   ```

5. In the *List of Installed Plotters* list box, click the plotter model.
6. Click *Setup*.

   The Plotter Setup form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

7. Fill in the form.
8. Click *OK*.
9. In the Cadence Plotter Configuration form, click *Queue*.

   The Plotter Queue form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

10. Fill in the form.
11. Click *Test* to test the queue command.
12. Click *OK*.
13. (Optional) Add the name of the postprocessing script to the `.cdsplotinit` file.

    Follow the steps in "Configuring the Plotter without the Utility" on page 67.

14. Repeat these steps to set up any other plotter configuration file.
15. In the Cadence Plotter Configuration form, click *Quit*.

    If *Quit* is grayed out, close all windows related to the plotconfig utility.

Configuring the Plotter without the Utility

To create or modify the `.cdsplotinit` configuration file without the utility,

1. Create a `.cdsplotinit` file in your home directory.

   You can use an editor, such as `vi`.

   ```
   vi ~/.cdsplotinit
   ```

   You must specify your site-specific information.

   The *`your_install_dir`*`/tools/plot/etc/cdsplotinit` file lists the supported plotter models. The header of this file lists the CPS version with which the file is associated. The *`your_install_dir`*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.

2. Copy the entry for your plotter model from *`your_install_dir`*`/tools/plot/etc/cdsplotinit` to your `.cdsplotinit` file.

   For example, if you are setting up a CalComp 400-dpi black-and-white plotter using rolls of paper, the entry might be similar to

   ```
   5725:\
       :manufacturer=Calcomp:\
       :type=intBWC:\
       :maximumPages#10:\
       :resolution#400:\
       :compress:\
       :residentFonts:\
       :instdir=/usr/cds:\
       :tmpdir=/usr/tmp:\
       :paperSize="25 inches wide" 0 9408:
   ```

   The entry for a 400-dpi color plotter might be

   ```
   5835:\
       :manufacturer=Calcomp:\
       :type=intCLRC:\
       :maximumPages#10:\
       :resolution#400:\
       :compress:\
       :residentFonts:\
       :instdir=/usr/cds:\
       :tmpdir=/usr/tmp:\
       :white#8:black#1:red#6:yellow#4:green#7:cyan#2:blue#5:magenta#3:\
       :paperSize="35 inches wide" 0 13696:
   ```

   If your plotter is not in *`your_install_dir`*`/tools/plot/etc/cdsplotinit`, you might still be able to use it if you modify an existing entry from the same manufacturer.

3. Add the name of the plotter as the Cadence software should display it.

Add the name and a vertical bar (|) to the beginning of the plotter model line, leaving no spaces on the line. If you do not specify a menu name, the list of plotters does not recognize this plotter.

Follow these guidelines when naming your plotter:

- Do not use these characters in the plotter name:

  colon (:) equal sign (=) double quotes (")
  backslash (\) vertical bar (|)

- Do not leave any spaces at the beginning or the end of the name.

  Note: Leading and trailing spaces in *menu_name* and *plotter_model* are significant and become part of the names.

- Do not change *plotter_model* (5835 in the example below). You can only use plotter models recognized by Cadence Plotting Services software.

For example, if you want the software to display the plotter as CalComp 5835 Color, add the name to the first line, followed by a vertical bar (|), leaving no spaces.

```
CalComp 5835 Color|5835:\
```

For the Concept board designer, because it allows no spaces in the name, type

```
CalComp_5835_Color|5835:\
```

In this example, the Cadence software will display

```
CalComp 5835 Color
```

or

```
CalComp_5835_Color
```

4. Add the spooling information for the plotter.

   Use the spooling commands for your operating system. The table lists the spooling entries for a plotter (identified as cc).

Operating System	Spool	Query	Remove
AIX	`enq -P cc:\`	`enq -q -P cc:\`	`enq -x $4 -P cc:\`
HP-UX	`lp -dcc:\`	`lpstat -occ:\`	`cancel $1 cc:\`
Solaris	`lp -dcc:\`	`lpstat -occ:\`	`cancel $1 cc:\`
SunOS	`lpr -Pcc:\`	`lpq -Pcc:\`	`lprm -Pcc $3:\`

5. Edit `instdir`.

   Type the full path to the Cadence installation directory on the plot server.

   `:instdir=`*`your_install_dir`*`:\`

   Use the *`your_install_dir`*, such as `/usr/cds`. Do not use *`your_install_dir`*`/tools/plot`.

   The path must be local to the plot server. If it is on another workstation, that directory must be mounted on the plot server.

   If `instdir` points to a directory that does not exist, CPS uses the directory returned by the `cds_root` command in your search path.

6. Edit the name of the temporary directory (`tmpdir`).

   `:tmpdir=/usr/tmp:\`

   This directory stores the temporary data files. The default is `/usr/tmp`.

7. (Optional) Edit the name of the script (`script`).

   Specify the full path to prevent the software from looking for the file in *`your_install_dir`*`/tools/plot/bin`.

   `:script=path/`*`script_name`*`:\`

   You can write a script to move the PCI data to any location on the network or to run other script files.

   Note: If `script` is specified, there is no standard output. The CalComp data is put in a `/usr/tmp/cpltxxxx` file, and the script is started. If `script` cannot be located, no plot is produced.

8. (Optional) To send uncompressed data to the plotter, remove the `compress` line.

   `:compress:\`

9. (Optional) To use the printer's resident fonts instead of the stroked fonts displayed on the screen, type

   `:residentFonts:\`

10. (Optional) Edit the colors.

    The plotter maps solid colors (for filling shapes) directly from RGB values but uses the index method, as on a pen plotter, for line and stipple pattern colors. The following line maps RGB colors to eight index colors. Usually, you do not change the line.

    `:white#8:black#1:red#6:yellow#4:green#7:cyan#2:blue#5:magenta#3:\`

    The software maps the colors to the closest color. For example, light green, forest green, and army green map to `green`.

11. Remove the backslash from the last line.

12. Verify each line of the plotter entry.

The complete entry for a 400-dpi CalComp 5835 plotter identified as `cc` in the `/etc/printcap` file and as `CalComp 5835 Color` on the application's menu, and using a 36-inch paper roll in the SunOS environment might be

```
CalComp 5835 Color|5835:\
    :manufacturer=Calcomp:\
    :spool=lpr -Pcc:\
    :query=lpq -Pcc:\
    :remove=lprm -Pcc $3:\
    :type=intCLRC:\
    :maximumPages#10:\
    :resolution#400:\
    :compress:\
    :residentFonts:\
    :instdir=/usr/cds:\
    :tmpdir=/usr/tmp:\
    :paperSize="35 inches wide" 0 13696:
```

Remove spaces that occur

- Between *`menu_name`* and *`plotter_model`*
- Before the ending colon
- At the end of each line

13. Save and exit the file.

14. (Optional) Relocate the file.

The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

- *`your_install_dir`*`/tools/plot/.cdsplotinit`
- Current working directory (`./.cdsplotinit`)
- The `.cdsplotinit` file in the home directory entry in the password database for the user

The software overwrites plotter definitions with the same plotter name; the last plotter defined is the definition the plotter uses.

Testing the Configuration File

You can test the queuing command from the plotconfig utility. You test the `.cdsplotinit` file by plotting a design from a Cadence application.

1. Start the Cadence application.
2. Print a design to test the `.cdsplotinit` file.

   Follow the plotting procedure in your Cadence application's user guide. If the plot does not come out, see "Troubleshooting CalComp Plotting" on page 78 and Chapter 7, "Troubleshooting."

Customizing Colors, Lines, and Stipple Patterns

On all supported color plotters, Cadence Plotting Services software selects colors by either matching or mapping colors to red-green-blue (RGB) color values.

Summary of Color Plotting Differences

Color Plotter	RGB-Matched Color	Mapped Colors
PostScript Level 2	Lines, stipples, solids	None
Versatec	Lines, stipples, solids	None
CalComp	Solids	Lines, stipples
HP-GL/2 ink jet	Lines, stipples, solids	None
Pen plotters	None	Lines, stipples, solids

The software tries to match RGB color values when you match the paint colors. To match an RGB value, plotters use patterns of primary color dots. The color matching works correctly only in solid-filled shapes, like the inside of a rectangle. A plotting area can be too small to accommodate these patterns (as in lines or small shapes) so the color cannot match the RGB values. Because stipple-filled shapes already contain patterns, Cadence Plotting Services software limits stipple patterns on some plotters to the eight primary colors because otherwise the RGB color patterns are overridden with unpredictable results.

The software maps RGB color values to the eight keyword colors identified by index values in the `.cdsplotinit` entry instead of producing patterns of color dots. The plotter uses the appropriate color index.

CalComp Colors

Number	Color
1	Black

CalComp Colors

Number	Color
2	Cyan
3	Magenta
4	Yellow
5	Blue
6	Red
7	Green
8	White

For example, light green, forest green, and army green map to `green`.

Note: CalComp plotters plot white as black.

The Cadence application doing the plotting determines the line or stipple pattern. Depending on your Cadence application, you might be able to customize the plotter's lines, colors, and stipple patterns. Follow the plotting procedure in your Cadence application's user guide.

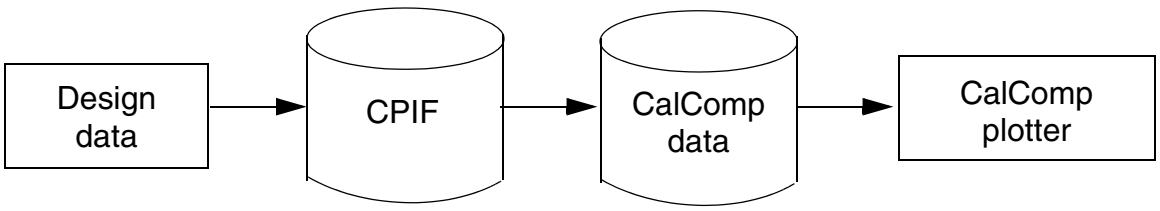
Important

If you want the plot to look like the image on the workstation, do not change the line and stipple patterns in the Cadence software.

More about CalComp Plotting

The Cadence Plotting Services software creates Cadence Plotting Intermediate Format (CPIF) and converts it to CalComp PCI data format before sending the data to the plotter.

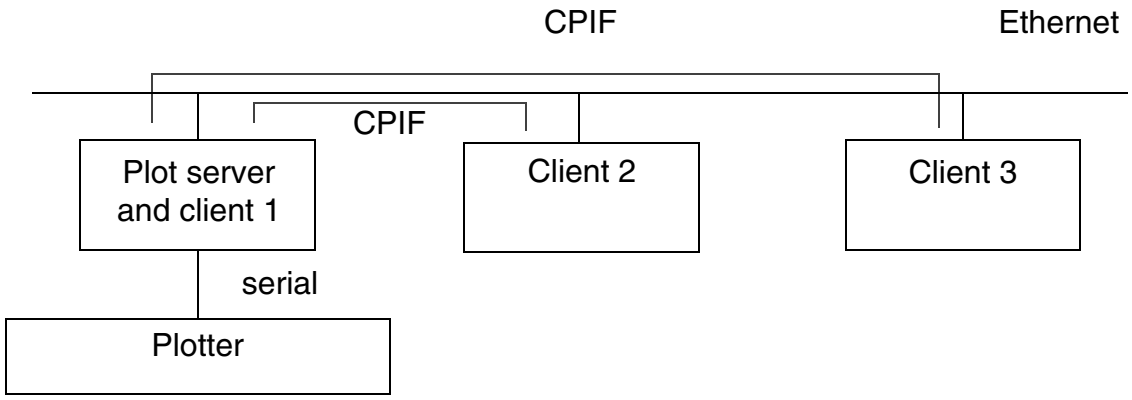
Flow of Plot Data



Plotter Configurations on the Network

You can plot locally or remotely. In the following figure, client 1 plots locally; clients 2 and 3 plot remotely. The dotted line represents the CPIF data sent to the plot server.

Local and Remote Plotting



The plot server requires

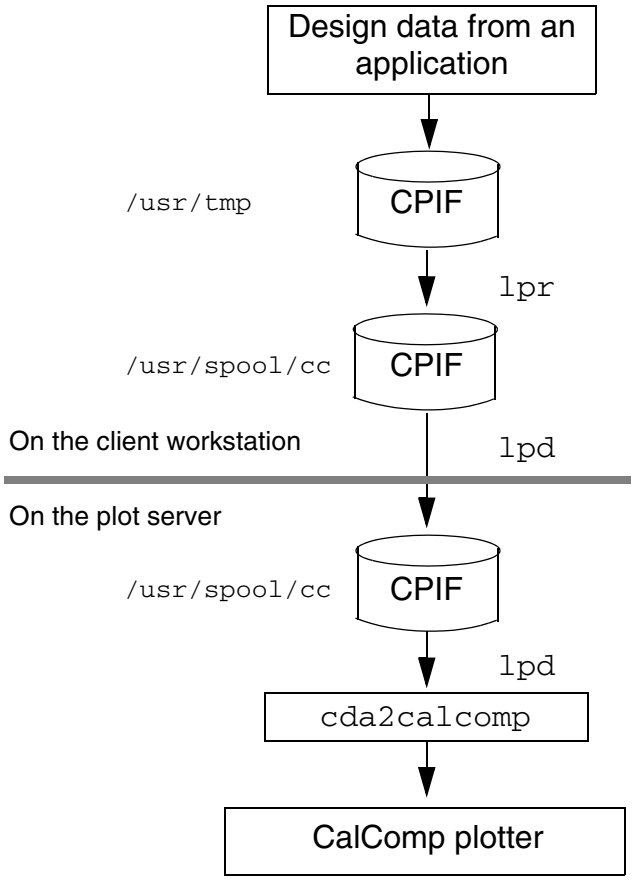
- A Cadence-supported hardware platform
- Access to Figure 3-1 on page 46.

Each client must be a Cadence-supported hardware platform.

How the Plot Server and the Plot Client Interact

The following figure illustrates how you plot in SunOS. The events are similar in HP-UX and AIX, but the daemons and filenames are different.

What Happens When You Send a Design to the Plotter

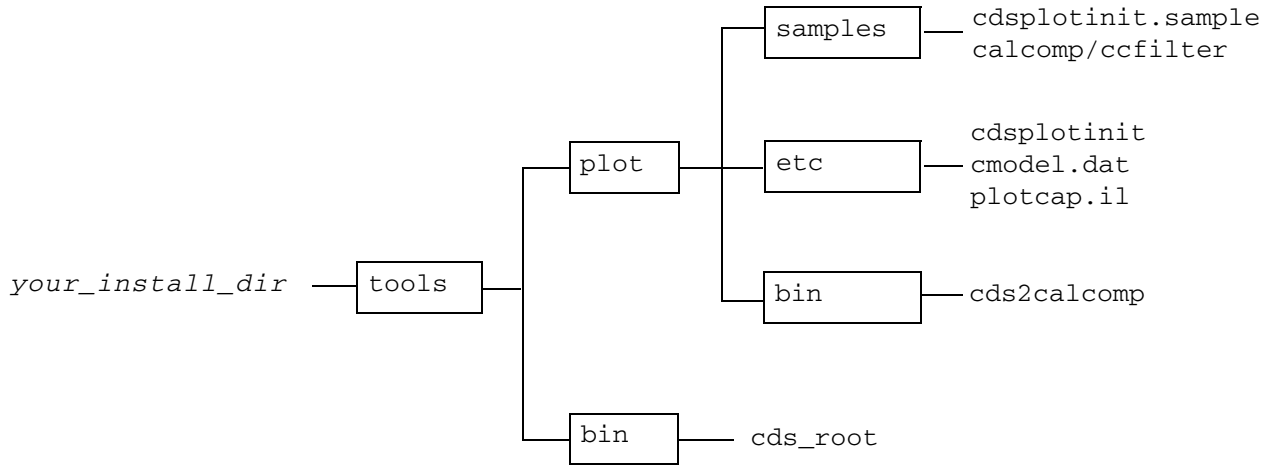


In SunOS, the software executes in this sequence when you plot from a client workstation.

1. You fill out the plotting forms on a client and submit the plot job.
2. The Cadence Plotting Services software generates a `plaxxxxx` CPIF file in a temporary directory. It deletes this file after queuing the data to the spool area.
3. The UNIX spooling command, such as `lpr`, queues the CPIF data to a spool directory, such as `/usr/spool/cc`.
4. For remote plotting, the `lpd` printer daemon moves the CPIF data from the client's spool directory to the plot server's spool directory, `/usr/spool/cc`.
5. On the plot server, the printer daemon starts `cds2calcomp` and converts the CPIF data to CalComp 907 PCI format data.
6. The `lpd` daemon deletes the spooling data after the plot completes.

The Cadence Plotting Services software that generates the PCI data uses several binary executables, driver configuration files, plotter data and pattern files, and other system files. Executables are in *your_install_dir*/tools/plot/bin.

CalComp Plotting Hierarchy



Cadence Plotting Services software uses the following files.

Cadence Plotting Files

File	Description
your_install_dir/tools/plot/etc/cmodel.dat	Plotter model file
your_install_dir/tools/plot/bin/cds2calcomp	Cadence program that converts CPIF data to CalComp format
your_install_dir/tools/bin/cds_root	Cadence program that identifies the installation path of the Cadence software

cds2calcomp

The printer daemon executes cds2calcomp, which

- Reads the header of the CPIF data to find the location of the Cadence Plotting Services software, the temporary directory, and the CalComp plotter model

- Converts the CPIF data to CalComp format plot data
- Outputs the plot data to the CalComp plotter or generates a CalComp format data file on the disk
- Starts the postprocessing script, if one is specified
- Depending on the application, creates a plotting log file and mails it to the user

Note: The `cds2calcomp` software recognizes compressed and uncompressed format. You do not need to specify it.

You can use these `cds2calcomp` options.

`-help` Lists the `cds2calcomp` options.

`-inputfile` *`file_name`*

Name of the CPIF data file. It can be compressed binary CPIF, ASCII CPIF, or 4.2 ASCII CPIF.

`-normalinfo` Sends program information output on standard error. Running `cds2calcomp` as a standalone program requires this option.

`-headerfile` *`file_name`*

Name of file to override the CPIF header. The default CPIF data is a compressed binary file so you must uncompress it to see the header. Because the CPIF data is too large to edit using `vi`, create a header file to override the original header.

A sample header file follows.

```
5                #Number of lines in header
SendMail         #Send mail to user
5835             #Plotter model from .cdsplotinit file
                 # (empty line)
/usr/cds         #instdir from .cdsplotinit file
/usr/tmp         #tmpdir from .cdsplotinit file
```

If you specified a script, the script path is in the header.

```
6                #Number of lines in header
SendMail         #Send mail to user
5835             #Plotter model from .cdsplotinit file
                 # (empty line)
/usr/cds         #instdir from .cdsplotinit file
/usr/tmp         #tmpdir from .cdsplotinit file
script_name      #Script path from .cdsplotinit file
```

`-uncompress > output_file`

	Uncompresses CPIF format, making the data useful for debugging when redirected to *output_file*.
-version	Returns the version of the cds2calcomp you are using.

cmodel.dat

The beginning of the cmodel.dat file describes plotter characteristics you can specify for your plotter:

- Software level
- Units of measurement, such as inches or centimeters
- Plotter stepsize
- Plotter width, such as 24 or 36 inches
- Existence of a paper cutter
- Plotter port communications
- Use of checksums
- Start and stop characters

Running cds2calcomp as a Standalone Program

You can run cds2calcomp as a standalone program several ways, but you must use the -normalinfo option.

- To create a CalComp format data file on the disk from a CPIF file (CPIF), type the following command at a UNIX prompt:

  ```
  your_install_dir/tools/plot/bin/cds2calcomp -inputfile input_file
  -normalinfo > output_file
  ```

- To output a CPIF file (CPIF) directly to the plotter, type the following command at a UNIX prompt:

  ```
  your_install_dir/tools/plot/bin/cds2calcomp -inputfile CPIF -normalinfo >
  /dev/ttya
  ```

Note: The cds2calcomp software recognizes compressed and uncompressed format. You do not need to specify it.

Troubleshooting CalComp Plotting

This section lists several problems specific to CalComp plotters. If these hints do not solve your plotting problem, check

- Troubleshooting Flow Chart
- Step-by-Step Troubleshooting
- Plotting Problems
- Error Messages
- Configuring Spooling Systems
- What Happens When You Send a Design to the Plotter

No CPIF file is generated

The Cadence Plotting Services software generates a `plaxxxxx` CPIF in the temporary directory and deletes this file after queuing the data to the spool area.

- Verify the `tmpdir` in the `.cdsplotinit` file.
- Verify that the temporary directory has `777` access permission.
- Verify that the temporary directory is large enough.

Plotter uses the wrong installation path

Verify the `installdir` entry in the `.cdsplotinit` file. It must point to the Cadence installation path, *`your_install_dir`*, on the plot server. If it points to a directory that does not exist, CPS uses the directory returned by the `cds_root` command in your search path.

Clients do not have enough disk space in /usr/spool

If a client does not have a plotter connected directly, it might run out of disk space because the disk partition containing the plot spool directories in `/usr/spool` often has minimal disk space.

You can use a different spooling command in the `.cdsplotinit` file to transfer the plot data directly to the plot server. For example, if

```
:spool=lpr -Pcc:\
```

is in your `.cdsplotinit` file for a CalComp plotter, modify it to read

```
:spool=rsh plot_server lpr -Pcc:\
```

Design Framework II pipes plot data to the `rsh` command, which transfers the data over the network to the `lpd` on the host *`plot_server`*. The `lpd` on *`plot_server`* writes the plot data into the spool directory on *`plot_server`*. Your plot server must have sufficient space in its spool directory to accept large plot files.

Plotter uses the wrong temporary directory

Verify the `tmpdir` in the `.cdsplotinit` file.

When using the Centronics port on an HP, the design does not plot

Your CalComp plotter might require an alternative hardware handshake protocol.

1. Create an alternative special device file that uses the alternative protocol.

   ```
   mknod /dev/device c 11 0x206005
   ```

   Replace *`device`* with the name of the new device, such as `plot_parallel5`.
2. Set up the plot server again using the new device.

When using the Centronics port on an HP, error messages print on the plotter or on the screen.

Your CalComp plotter might require an alternative hardware handshake protocol.

1. Create an alternative special device file that uses the alternative protocol.

   ```
   mknod /dev/device c 11 0x206005
   ```

   Replace *`device`* with the name of the new device, such as `plot_parallel5`.
2. Set up the plot server again using the new device.

4

Setting Up Hewlett-Packard Plotters

This chapter discusses the following topics:

Configuring the Spooling System

Your Cadence Plotting Services software can plot on Hewlett-Packard plotters using HP-GL or HP-GL/2. You set up a plotter the same way you set up a printer. Each operating system is somewhat different.

Before configuring the spooling system for your plotter,

- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Attach and install the plotter
- Run the plotter's self-test successfully

If users will be plotting from the plot server (local plotting), you set up only the plot server. If users will be plotting from other workstations (plotting remotely), you must set up the plot server and the clients.

Setting Up the Plot Server

Setting Up the SunOS Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the SunOS plot server,

1. Log in as `root` on the plot server.
2. Copy your existing `/etc/printcap` file.

   ```
   cp /etc/printcap /etc/printcap.old
   ```

3. Create the queue device (`printcap` entry).

   Edit the `/etc/printcap` file on the workstation. For example, for a Hewlett-Packard 7596 pen plotter connected to a serial port on this workstation, add a description similar to the following to the `/etc/printcap` file:

   ```
   # Hewlett-Packard 7596 pen plotter locally connected
   hp|Hewlett-Packard 7596 plotter:\
       :br#9600:\
       :lf=/usr/adm/lpd-errs:\
       :lp=/dev/ttyb:\
       :ms=ixon,ixany,cs8,-parity:\
       :mx#0:\
   ```

```
    :sd=/usr/spool/hpd:\
    :sf:\
    :sh:
```

You can set XON/XOFF handshaking with the `ms` or `fc`, `fs`, `xc`, and `xs` flags in the `/etc/printcap` file. See the `printcap` man page for complete information. Your plotter documentation might specify the appropriate entry for your operating system.

4. Create the queue (spool directory).

   Type commands similar to

   ```
   cd /usr/spool
   mkdir plotter_name
   chown daemon.daemon plotter_name
   chmod 755 plotter_name
   ```

   `plotter_name` is the name specified for the spooling system.

   For example, if you specified `/usr/spool/hpd` as the spool directory in the `/etc/printcap` entry above, create the `hpd` spool directory by typing

   ```
   cd /usr/spool
   mkdir hpd
   chown daemon.daemon hpd
   chmod 755 hpd
   ```

5. Start the printer queue.

   ```
   lpc start plotter_name
   lpc enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   ps -aux | grep lpd
   ```

   If the daemon is not running, start it.

   ```
   /usr/lib/lpd
   ```

7. Verify the plotter status.

   ```
   lpc status plotter_name
   ```

   If the queue is empty, usually the system returns

   ```
   No daemon present
   ```

8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *`your_install_dir`*`/tools/plot/bin/plotconfig` utility.

   b. Select the `.cdsplotinit` file to test.

   c. Select the plotter to test.

d. Click *Queue*.

e. Click *Test*.

f. Click *OK* when done.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 92.

If you are plotting remotely, go on to "Setting Up the Clients" on page 87.

Setting Up the Solaris Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the Solaris plot server,

1. Log in as `root` on the plot server.
2. Use `admintool` to create the queue and queue device.
3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.

   b. Select the `.cdsplotinit` file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

f. Click *OK* when done.

See Chapter 7, "Troubleshooting," if necessary.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 92.

If you are plotting remotely, go on to "Setting Up the Clients" on page 87.

Setting Up the HP-UX Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the HP-UX plot server,

1. Log in as `root` on the plot server.
2. Use `sam` to create the queue and queue device.
3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.

   b. Select the `.cdsplotinit` file to test.

   c. Select the plotter to test.

   d. Click *Queue*.

   e. Click *Test*.

   f. Click *OK* when done.

See Chapter 7, “Troubleshooting,” if necessary.

If you are plotting locally, go on to “Setting Up Cadence Plotting Services Software” on page 92.

If you are plotting remotely, go on to “Setting Up the Clients” on page 87.

Setting Up the AIX Plot Server

Use the parallel port for plotting if your plot server and your plotter have parallel ports. This guide describes the XON/XOFF protocol for serial plotters.

To set up the AIX plot server,

1. Log in as `root` on the plot server.
2. Use `smit` to create the queue and queue device.

   `smit` modifies `/etc/qconfig`. In the following `/etc/qconfig` entry, the print queue name is `hp`, and the queue device is `hp1`.

   ```
   hp:
       device = hp1
       up = TRUE
       discipline = fcfs
   hp1:
       backend = /usr/lpd/piobe
       access = both
   ```

   The device named in the first portion must be the device defined in the second portion of the entry.
3. Start the printer queue.

   ```
   enable plotter_name
   ```
4. Verify the printer daemon.

   ```
   ps -edaf | grep qdaemon
   ```
5. If the daemon is not running, start it.

   ```
   /etc/qdaemon
   ```
6. Verify the plotter status.

   ```
   enq -q -P plotter_name
   ```
7. If an AIX plot server will be receiving plot jobs from a SunOS system, you must start `lpd` on the plot server.

   ```
   startsrc -s lpd
   ```
8. (Optional) Test the queuing command.

You can test the queuing command from the configuration utility.

a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

b. Select the .cdsplotinit file to test.

c. Select the plotter to test.

d. Click *Queue*.

e. Click *Test*.

f. Click *OK* when done.

See Chapter 7, "Troubleshooting," if necessary.

If you are plotting locally, go on to "Setting Up Cadence Plotting Services Software" on page 92.

If you are plotting remotely, go on to "Setting Up the Clients" on page 87.

Setting Up the Clients

Setting Up the SunOS Clients

To set up the SunOS client,

1. Log in as root on the client.
2. Copy your existing /etc/printcap file:

   ```
   cp /etc/printcap /etc/printcap.old
   ```

3. Create the queue device (printcap entry).

   Edit the /etc/printcap file on the workstation. For example, for a Hewlett-Packard 7596 pen plotter connected to host2 remotely, add a description similar to

   ```
   # Hewlett-Packard 7596 pen plotter remotely connected
   hp|Hewlett-Packard 7596 plotter:\
       :lp=:\
       :rp=hp:\
       :rm=host2:\
       :sd=/usr/spool/hpd:\
       :mx#0:\
       :lf=/usr/adm/lpd-errs:
   ```

   See the printcap man page for complete information. Your plotter documentation might specify the appropriate entry for your operating system.

4. Create the queue (spool directory).

   Type commands similar to

   ```
   cd /usr/spool
   mkdir plotter_name
   chown daemon.daemon plotter_name
   chmod 755 plotter_name
   ```

   plotter_name is the name specified for the spooling system.

   For example, if you specified `/usr/spool/hpd` as the spool directory in the `/etc/printcap` entry above, create the `hpd` spool directory by typing

   ```
   cd /usr/spool
   mkdir hpd
   chown daemon.daemon hpd
   chmod 755 hpd
   ```

5. Start the printer queue.

   ```
   lpc start plotter_name
   lpc enable plotter_name
   ```

6. Verify the printer daemon.

   ```
   ps -aux | grep lpd
   ```

7. If the daemon is not running, start it.

   ```
   /usr/lib/lpd
   ```

8. Verify the plotter status.

   ```
   lpc status plotter_name
   ```

   If the queue is empty, usually the system returns

   ```
   No daemon present
   ```

9. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.

10. (Optional) Test the queuing command.

    You can test the queuing command from the configuration utility.

    a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.

    b. Select the `.cdsplotinit` file to test.

    c. Select the plotter to test.

    d. Click *Queue*.

    e. Click *Test*.

    f. Click *OK* when done.

11. Repeat these steps on each client.

    If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

Proceed to "Setting Up Cadence Plotting Services Software" on page 92.

Setting Up the Solaris Clients

To set up the Solaris client,

1. Log in as `root` on the client.
2. Use `admintool` to create the queue and queue device.
3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.
   b. Select the `.cdsplotinit` file to test.
   c. Select the plotter to test.
   d. Click *Queue*.
   e. Click *Test*.
   f. Click *OK* when done.

9. Repeat these steps on each client.

If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

See Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 92.

Setting Up the HP-UX Clients

To set up the HP-UX client,

1. Log in as `root` on the client.
2. Use `sam` to create the queue and queue device.
3. Start the printer queue.

   ```
   accept plotter_name
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   /usr/bin/lpstat -r
   ```

5. If the daemon is not running, start it.

   ```
   /usr/lib/lpsched
   ```

6. Verify the plotter status.

   ```
   lpstat -oplotter_name
   ```

7. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

   a. Start the *your_install_dir*`/tools/plot/bin/plotconfig` utility.
   b. Select the `.cdsplotinit` file to test.
   c. Select the plotter to test.
   d. Click *Queue*.
   e. Click *Test*.
   f. Click *OK*. when done.

9. Repeat these steps on each client.

If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

See Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 92.

Setting Up the AIX Clients

To set up the AIX client,

1. Log in as `root` on the client.
2. Use `smit` to create the queue and queue device.

   `smit` modifies `/etc/qconfig`. In the following `/etc/qconfig entry`, `hp` is the print queue, `host2` is the remote plot server, and `rmhp1` is the queue device. The device named in the first portion must be the device defined in the second portion of the entry.

   ```
   hp:
       device = rmhp1
       host = host2
       up = TRUE
       discipline = fcfs
       s_statfilter = /usr/lpd/aixshort
       l_statfilter = /usr/lpd/aixlong
       rq = hp
   rmhp1:
       backend = /usr/lpd/rembak
   ```

3. Start the printer queue.

   ```
   enable plotter_name
   ```

4. Verify the printer daemon.

   ```
   ps -edaf | grep qdaemon
   ```

5. If the daemon is not running, start it.

   ```
   /etc/qdaemon
   ```

6. Verify the plotter status.

   ```
   enq -q -P plotter_name
   ```

7. If the Cadence Plotting Services software is not on the client, mount the software from the file server on which it is located.
8. (Optional) Test the queuing command.

   You can test the queuing command from the configuration utility.

a. Start the *your_install_dir*/tools/plot/bin/plotconfig utility.

b. Select the .cdsplotinit file to test.

c. Select the plotter to test.

d. Click *Queue*.

e. Click *Test*.

f. Click *OK* when done.

9. Repeat these steps on each client.

If you want to test the setup before you repeat these steps on each client, you must set up the Cadence Plotting Services software.

See Chapter 7, "Troubleshooting," if necessary.

Proceed to "Setting Up Cadence Plotting Services Software" on page 92.

Setting Up Cadence Plotting Services Software

You must define the plotters for the Cadence Plotting Services software in the plotting configuration file, .cdsplotinit.

You might want to consider several .cdsplotinit files:

- A system *your_install_dir*/tools/plot/.cdsplotinit file containing all of your plotters
- A group-specific .cdsplotinit file in the current working directory
- A user-specific .cdsplotinit file in the user's home directory

The software loads the system file first, the current working directory's file second, and then the .cdsplotinit file in the user's home directory. As the software reads the files, plotter definitions are appended to the current list. The software overwrites plotter definitions with the same plotter name, letting users override system settings.

This section describes the .cdsplotinit file for Hewlett-Packard plotters using HP-GL or HP-GL/2. HP plotters use the features listed in the table in "Summary of Features" on page 182.

Configuring the Plotter with the Utility

To create or modify the `.cdsplotinit` configuration file, use the plotconfig utility to define the plotters if the X Window System or OpenWindows is running. If neither of these windowing systems is running, follow the procedures in "Configuring the Plotter without the Utility" on page 95.

To use the utility,

1. Verify that *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin` are in your search path.

   your_install_dir is the directory in which the Cadence products are installed, such as `/cds`. If your workstation is set up correctly, typing `cds_root` returns *your_install_dir.* If `cds_root` does not return the path, check your search path or see your system administrator.

2. Start the plotter configuration utility by doing one of the following:

   - At the UNIX prompt on a color terminal, type

     ```
     plotconfig
     ```

   - At the UNIX prompt on a monochrome terminal, type

     ```
     plotconfig -bw
     ```

   The Cadence Plotter Configuration form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

   Note: If the `F1` or `Help` key does not display information about a field, check your window manager file, such as Motif's `~/.mwmrc` file. By default, the X Window System binds help to the `F1` or `Help` key. Your file probably binds the `F1` or `Help` key to something besides help.

3. Select the plotter configuration file to modify.

   The Cadence® applications read the `.cdsplotinit` files sequentially in this order when the applications start:

   - *your_install_dir*`/tools/plot/.cdsplotinit`
   - Current working directory (`./.cdsplotinit`)
   - The `.cdsplotinit` file in the home directory entry in the password database for the user

The software appends the plotters to a list of available plotters and overwrites plotter definitions with the same plotter name. The last plotter defined is the definition the software uses.

4. In the *List of Plotter Models* list box, double-click the plotter model you want to put in the file.

   The plotter model is added to the *List of Installed Plotters* list box. If you add several plotters of the same model, each plotter is numbered sequentially. For example,

   ```
   Hewlett-Packard 7550A
   Hewlett-Packard 7550A(1)
   Hewlett-Packard 7550A(2)
   ```

5. In the *List of Installed Plotters* list box, click the plotter model.

6. Click *Setup*.

   The Plotter Setup form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

7. Fill in the form.

8. Click *OK*.

9. In the Cadence Plotter Configuration form, click *Queue.*

   The Plotter Queue form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

10. Fill in the form.

11. Click *Test* to test the queue command.

    Occasionally, a few errors occur on several older HP plotters:

    - On the HP 7440A and the 7475A plotters, an error light flashes after the design plots.
    - On the 7586B plotter, the test sets error #8. The plotter continues functioning properly, except for these errors.

    To clear the errors, turn the plotter off and on again.

12. Click *OK*.

13. Repeat these steps to set up any other plotter configuration file.
14. In the Cadence Plotter Configuration form, click *Quit*.

    If *Quit* is grayed out, close all windows related to the plotconfig utility.

Configuring the Plotter without the Utility

To create or modify the `.cdsplotinit` configuration file without the utility,

1. Create a `.cdsplotinit` file in your home directory.

   You can use an editor, such as `vi`.

   ```
   vi ~/.cdsplotinit
   ```

   You must specify your site-specific information.

   The *your_install_dir*`/tools/plot/etc/cdsplotinit` file lists the supported plotter models. The header of this file lists the CPS version with which the file is associated. The *your_install_dir*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.

2. Copy the entry for your plotter model from *your_install_dir*`/tools/plot/etc/cdsplotinit` to your `.cdsplotinit` file.

   For example, if you are setting up a Hewlett-Packard 7596, copy the entry from the `.cdsplotinit` file.

   ```
   Hewlett-Packard 7596A:\
       :manufacturer=Hewlett-Packard:\
       :type=hp7596:\
       :maximumPages#6:\
       :resolution#1016:\
       :white#8:black#1:red#6:yellow#4:green#7:cyan#2:blue#5:magenta#3:\
       :paperSize="A" 8696 5196:\
       :paperSize="B" 13832 8696:\
       :paperSize="C" 19872 13832:\
       :paperSize="D" 31104 19872:\
       :paperSize="E" 41264 32064:\
       :paperSize="A4" 9400 4960:\
       :paperSize="A3" 13360 9400:\
       :paperSize="A2" 21280 13360:\
       :paperSize="A1" 30200 21280:\
       :paperSize="A0" 44120 31160:
   ```

   If your plotter is not in *your_install_dir*`/tools/plot/etc/cdsplotinit`, you might still be able to use it if you modify an existing entry from the same manufacturer.

3. Add the name of the plotter as the Cadence software should display it.

Add the name and a vertical bar (|) to the beginning of the plotter model line, leaving no spaces on the line. If you do not specify a menu name, the list of plotters does not recognize this plotter.

Follow these guidelines when naming your plotter:

- Do not use these characters in the plotter name:

  colon (:) equal sign (=) double quotes (")
  backslash (\) vertical bar (|)

- Do not leave any spaces at the beginning or the end of the name.

  Note: Leading and trailing spaces in *menu_name* and *plotter_model* are significant and become part of the names.

- Do not change *plotter_model* (Hewlett-Packard 7596A in the example below). You can only use plotter models recognized by Cadence Plotting Services software.

For example, if you want the software to list the plotter as HP1, the line is

```
# Hewlett-Packard HP-GL plotters.
HP1|Hewlett-Packard 7596A:\
```

4. Add the spooling information for the plotter.

Use the spooling commands for your operating system. The table lists the spooling entries for a plotter (identified as hp).

Operating System	Spool	Query	Remove
AIX	`enq -P hp:\`	`enq -q -P hp:\`	`enq -x $4 -P hp:\`
HP-UX	`lp -dhp:\`	`lpstat -ohp:\`	`cancel $1 hp:\`
Solaris	`lp -dhp:\`	`lpstat -ohp:\`	`cancel $1 hp:\`
SunOS	`lpr -Php:\`	`lpq -Php:\`	`lprm -Php $3:\`

5. Edit the colors.

An InkJet plotter using HP-GL/2 plots colors by mapping them directly from RGB values.

A pen plotter maps colors to the pens in its pen carousel. The Cadence Plotting Services software supports eight colors for lines and stipple patterns. A pen plotter selects colors by the index (pen) number. The index number is the location of the pen in the carousel.

The following line lets you map RGB colors to eight colors (keywords), which are then mapped to a color in the plotter's pen carousel.

```
:white#x:black#x:red#x:yellow#x:green#x:cyan#x:blue#x:magenta#x:\
```

x represents the pen number. The software maps the colors to the closest color. For example, light green, forest green, and army green map to `green`.

The pen must be in the correct location in the carousel. For example, if the plotter's green is pen 7, you use

```
:green#7:
```

The software then sends a color index of 7 to the plotter when it maps RGB colors to `green`. If the plotter has a blue pen in location 7, but has `:green#7:` in the `.cdsplotinit` entry, the software maps an RGB color of green to `7`, causing the plotter to draw blue lines.

You can define eight colors and pen locations for an eight-pen plotter with

```
:white#8:black#1:red#6:yellow#4:green#7:cyan#2:blue#5:magenta#3:\
```

If the plotter cannot identify a color, it uses pen 1.

See "Customizing Colors, Lines, and Stipple Patterns" on page 99 for more information.

6. (Optional) If your applications use wide solid lines to outline shapes, edit the pen descriptions.

   For HP-GL pen plotters, define the width of the pen and the speed with which the pen plots.

   ```
   :pen=#,(0,0,0),width,velocity:\
   ```

   width is the width of the solid line (in resolution units) used to outline shapes. *velocity* is the speed (in seconds, such as 1.0 or 2.3 seconds per inch) with which to plot the line. Usually, the quality of the line improves if the pen moves more slowly. However, papers on which inks bleed may benefit from faster lines.

   ```
   :pen=1,(0,0,0),12,1.0:\
   :pen=2,(0,0,0),14,1.0:\
   :pen=3,(0,0,0),14,1.0:\
   :pen=4,(0,0,0),14,1.0:\
   :pen=5,(0,0,0),10,3.0:\
   :pen=6,(0,0,0),10,3.0:\
   :pen=7,(0,0,0),10,3.0:\
   :pen=8,(0,0,0),14,1.0:\
   ```

   Note: For 7470A, 7475A, and 7098A plotters, all pens must have the same velocity.

7. (Optional) To use the printer's resident fonts instead of the stroked fonts displayed on the screen, type.

   ```
   :residentFonts:\
   ```

8. Edit the paper sizes.

   Comment or delete the paper sizes the plotter will not use. For example, if the plotter uses only E-size paper, the lines might be

   ```
   # :paperSize="A" 8696 5196:\
   # :paperSize="B" 13832 8696:\
   # :paperSize="C" 19872 13832:\
   # :paperSize="D" 31104 19872:\
   :paperSize="E" 41264 32064:\
   ```

9. Remove the backslash from the last line.

10. Verify each line of the plotter entry.

    The complete entry for a 1016-dpi Hewlett-Packard 7596 plotter identified as `hp` in the `/etc/printcap` file and as `HP1` on the application's menu, and using E-size paper in the SunOS environment might be

    ```
    HP1|Hewlett-Packard 7596A:\
        :spool=lpr -Php:\
        :query=lpq -Php:\
        :remove=lprm -Php $3:\
        :manufacturer=Hewlett-Packard:\
        :type=hp7596:\
        :maximumPages#6:\
        :resolution#1016:\
        :white#8:black#1:red#6:yellow#4:green#7:cyan#2:blue#5:magenta#3:\
        :paperSize="E" 41264 32064:
    ```

    Remove spaces that occur

    - Between *`menu_name`* and *`plotter_model`*
    - Before the ending colon
    - At the end of each line

11. Save and exit the file.

12. (Optional) Relocate the file.

    The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

    - *`your_install_dir`*`/tools/plot/.cdsplotinit`
    - Current working directory (`./.cdsplotinit`)
    - The `.cdsplotinit` file in the home directory entry in the password database for the user

    The software overwrites plotter definitions with the same plotter name; the last plotter defined is the definition the plotter uses.

Testing the Configuration File

You can test the queuing command from the plotconfig utility. You test the `.cdsplotinit` file by plotting a design from a Cadence application.

1. Start the Cadence application.
2. Print a design to test the `.cdsplotinit` file.

   Follow the plotting procedure in your Cadence application's user guide. If the plot does not come out, see "Troubleshooting HP Plotting" on page 100 and Chapter 7, "Troubleshooting."

Customizing Colors, Lines, and Stipple Patterns

On all supported color plotters, Cadence Plotting Services software selects colors by either matching or mapping colors to red-green-blue (RGB) color values.

Summary of Color Plotting Differences

Color Plotter	RGB-Matched Color	Mapped Colors
PostScript Level 2	Lines, stipples, solids	None
Versatec	Lines, stipples, solids	None
CalComp	Solids	Lines, stipples
Pen plotters	None	Lines, stipples, solids

The software tries to match RGB color values when you match the paint colors. To match an RGB value, plotters use patterns of primary color dots. The color matching works correctly only in solid-filled shapes, like the inside of a rectangle. A plotting area can be too small to accommodate these patterns (as in lines or small shapes) so the color cannot match the RGB values. Because stipple-filled shapes already contain patterns, Cadence Plotting Services software limits stipple patterns on some plotters to the eight primary colors because otherwise the RGB color patterns are overridden with unpredictable results.

The software maps RGB color values to the eight keyword colors identified by index values in the `.cdsplotinit` entry instead of producing patterns of color dots. The plotter uses the appropriate color index. For example, light green, forest green, and army green map to `green`.

An HP pen plotter has fixed line styles and stipple patterns. Even though you might be able to change the line styles or stipple patterns from within Cadence Plotting Services software, those changes might affect only the display.

Note: Depending on your application, you might be able to specify a cross-hatch pattern. See your application documentation for information.

Troubleshooting HP Plotting

For problems specific to Versatec plotters, check

- Troubleshooting Flow Chart on page 169
- Step-by-Step Troubleshooting on page 176
- Plotting Problems on page 159
- Error Messages on page 163
- Appendix B, “Configuring Spooling Systems”

5

Cadence Standard Raster Driver

This chapter discusses the following topics:

Setting up raster plotters to plot in raster mode is somewhat different from setting them up to plot in vector mode (for example, HP-GL/2 for HP inkjets or 907/PCI for CalComp plotters). Cadence® applications that use Cadence Plotting Services software plot to raster plotters in raster mode by first creating a Cadence Plot Intermediate Format (CPIF) file. This file is used as input to the Cadence rasterizer, Raptor. Raptor creates an intermediate raster file, called Cadence Plot Intermediate Raster (CPIR). Various filters are available to convert CPIR to plotter vendor's formats. The rasterization and raster format conversion is usually automated by configuring the OS print spooling system.

Installing the Hardware Interface

Versatec plotters use a high-speed parallel interface from Versatec, commonly called VPI (Versatec Parallel Interface) or green sheet. Cadence Plotting Services software supports the interfaces listed below.

Cadence-Supported VPI Hardware Interfaces

Hardware	Bus Type	Type of Host	Examples
Xerox 117A[1]	VME	Sun-4 Server	Sun-4/260 Sun-4/370 Sun-4/390 Sun-4/490
Xerox 116	SBus	Sun SPARCstation	SPARCstation 1, 1+, IPC, IPX, SPARCstation 2
IKON 10104	SBus	Sun SPARCstation	SPARCstation 1, 1+, IPC, IPX, SPARCstation 2
Xerox 130	SCSI	HP 700	HP 9000/700, HP 9000/720
Xerox 130	SCSI	IBM RISC System/6000	IBM RS/6000

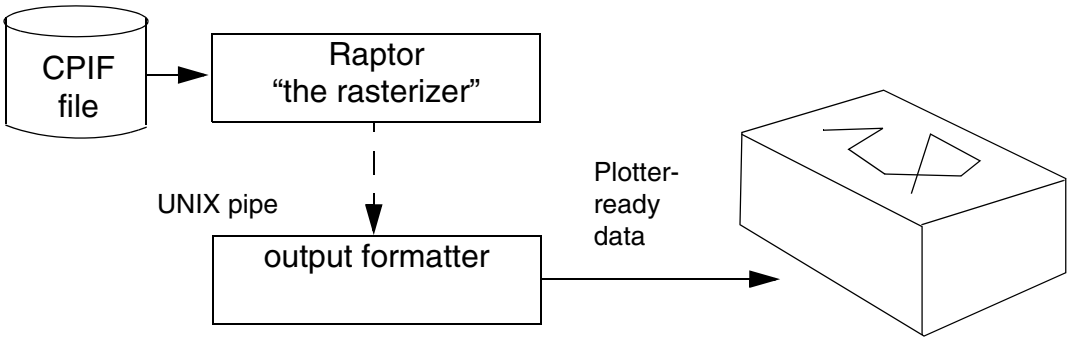
1. The 117A is supported for SunOS 4.1.3 only because there is no Solaris device driver.

CalComp and HP plotters use a standard Centronics parallel port, which is a standard feature for most workstations.

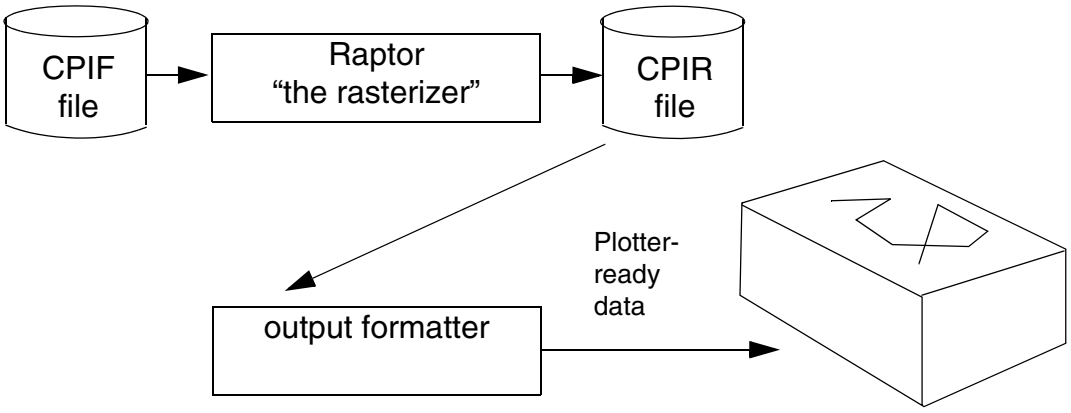
Raptor

The Cadence standard raster driver is called Raptor. This program accepts CPIF vector data and converts it to CPIR data. A number of filters or formatters are available to convert CPIR data to specific plotter vendor's formats. The following diagrams illustrate the fundamental operation of Raptor.

The first diagram illustrates rasterization and output format conversion without storing the CPIR data in a temp file. This is done by having Raptor use a UNIX “pipe” to send the CPIR data directly to the filter.



In some cases it is desirable to perform rasterization and format conversion on different machines. This diagram shows this operation.



CPIR Output Formatters

Filter Name	Output Format	Color Separated (CMY)
`CCRFout`	CCRF, CCRF-IL	yes
`VDSout`	Blocked raster; 1D, 2D, and optimized compacted raster	yes
`VPIout`	Versatec straight raster	yes
`RTLout`	HP RTL raster data	yes
`XWDout`	X11 window dump	no

CPIR Output Formatters

Filter Name	Output Format	Color Separated (CMY)
`PCLout`	HP PCL raster data	yes
`ENRTLout`	Encad specific dialect of RTL	yes
`escP2out`	Epson escape format	yes

A brief review of color models and the two most popular plotting technologies will help in understanding when and how to use two of the most important options available to the rasterizer (`-a`, `-p`).

The most common color model is the RGB color model. In this model, colors are defined by stating relatively how much red, green, and blue the color contains. Some examples are shown below.

Color Name	R	G	B
black	0	0	0
white	255	255	255
lime green	50	205	50
red	255	0	0
green	0	255	0
blue	0	0	255
cyan	0	255	255
magenta	255	0	255
yellow	255	255	0

The RGB color model is commonly called an “additive” color model because various amounts of red, green, and blue (additive primaries) are added to black to form the color. Most computer displays use an RGB model.

Another common color model is the CMY color model. The CMY color model describes a color by subtracting various amounts of cyan, magenta, and yellow (subtractive primaries) from white. Because of this, CMY is called a “subtractive” color model. This is similar to how most color plotters work. The examples given for RGB are repeated here in CMY form.

Color Name	C	M	Y
black	255	255	255
white	0	0	0
lime green	205	50	205
red	0	255	255
green	255	0	255
blue	255	255	0
cyan	255	0	0
magenta	0	255	0
yellow	0	0	255

Note: The equations to convert are: C=255-R, Y=255-B, and M=255-G.

By default, Raptor creates CMY data. This is because its primary purpose is to drive color plotters and printers. It is possible to use Raptor to create RGB data. The `-a` option (disable color separation) is used to create RGB data. Currently, this option is primarily intended for use with the XWDout filter:

```
raptor -a -v -f XWD -o coolChip.xwd coolChip.cpif
```

or

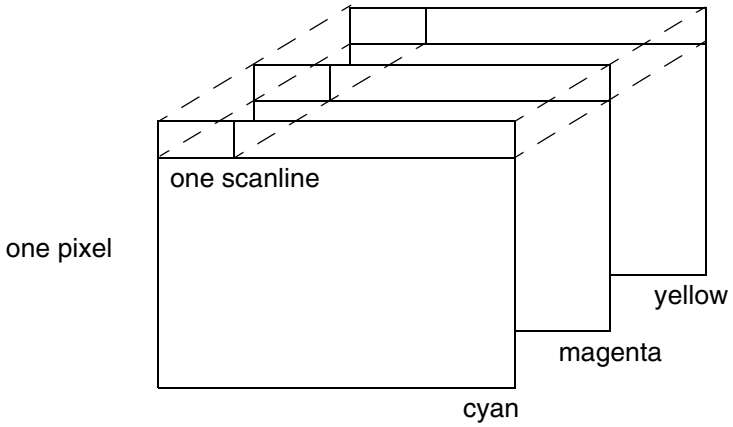
```
raptor -a -v coolChip.cpif|XWDout>coolChip.xwd
```

or

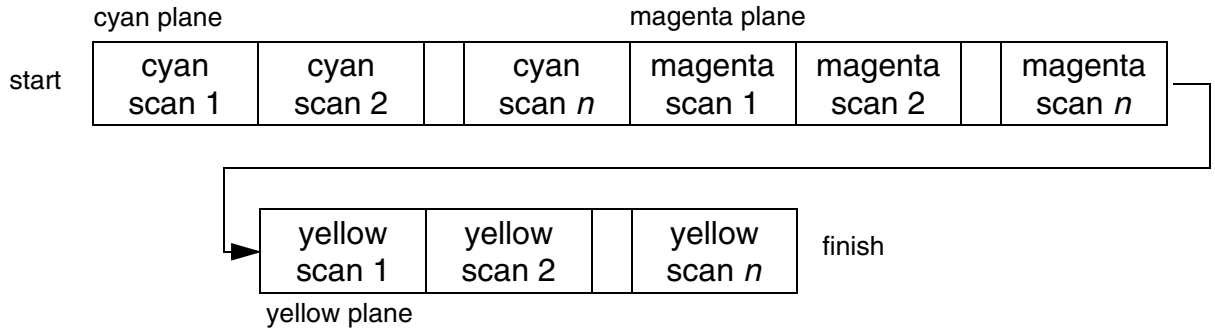
```
cds2XWD -v -o coolChip.xwd coolChip.cpif
```

There are two ways to organize the resulting data stream containing the plot data; by plane and by row. To illustrate, imagine the plot is represented by a plane or array of bits where each

bit represents a dot on the media. There will be three of these planes, one each for cyan, magenta, and yellow overlaid one over another as shown in the illustration.

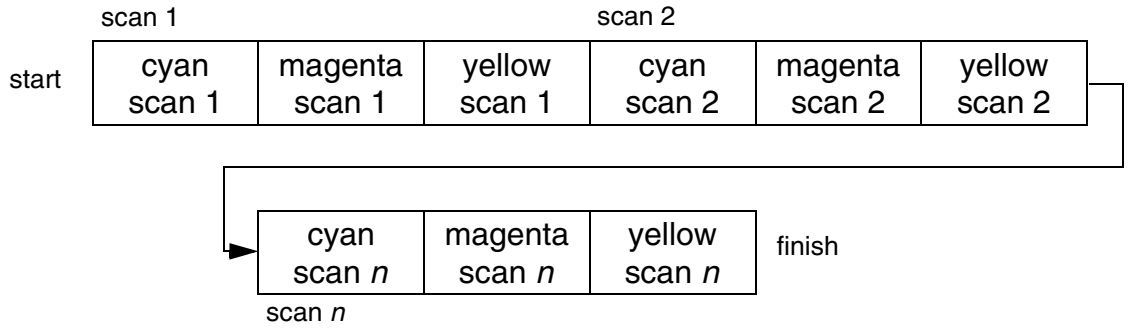


Each pixel is made up of one bit from each plane. The final color of a pixel on the media will depend on the combination of the cyan, magenta, and yellow dots that are on at that location. If the data stream is organized by plane, called plane major pixel encoding, then an entire plane is stored before moving to the next plane. The following illustration shows a file containing a plot stored with a plane major pixel encoding.



On the other hand, if the data stream is organized by row, called row major pixel encoding, then all the data for all the pixels in an entire row (or scanline) are stored before moving on to

the next row. The following illustration shows a file containing a plot stored with a row major pixel encoding.



The order in which the data is organized for plane major pixel encoding is the same as how an electrostatic plotter wants to receive it. Most electrostatic plotters plot color plots in four passes, one each for black, cyan, magenta, and yellow.

Similarly, the order in which the data is organized for row major pixel encoding is the same as how an inkjet plotter wants to receive it. Most inkjet plotters plot color plots in small strips that are about a quarter inch tall. All of the colors are plotted at the same time.

By default, Raptor creates CPIR data with a plane major pixel encoding. If the `-p` option (enable row major pixel encoding) is given, the resulting CPIR data will be organized with a row major pixel encoding.

Summarizing, row major pixel encoded data is required for inkjet plotters. So `-p` should always be used when plotting to inkjet plotters. As it turns out, row major pixel encoding rasterizes faster than plane major pixel encoding. For this reason, either pixel encoding can be used for electrostatic plotters. When using a row major pixel encoding for an electrostatic plotter, the `-a` option should be given to the output filter to let the filter know row major data is coming and it will have to unpack the pixels into individual planes. See the discussion of the `-a` option for the filters.

Row major pixel encoding usually rasterizes faster than plane major pixel encoding for any given plot. This speed improvement is not free. The row major pixel encoding mode (`-p`) uses three times the system memory as the plane major pixel encoding. This is because it allocates all three bitmaps (planes) at once whereas plane major pixel encoding allocates one bitmap and then reuses it to rasterize all the cyan, then the magenta, and finally the yellow.

Raptor executes the following sequence of events:

- Configures itself based on the options provided and the header in the CPIF file
- Converts the CPIF data to CPIR data

- Pipes CPIR data through the output driver to create plotter-ready raster data.

You can use the following Raptor options.

`-a` Disables color separation. This is used to create RGB data.

`-A { r | g | b }`

Specifies the background color for RGB (see the `-a` option).

`-b` *i* Sets bytes per scan. This is defaulted to the paper height as specified in the plotter's `.cdsplotinit` entry. *i* is a positive integer.

`-c` *comp* Specifies the raster compression algorithm used by the output filter. The compression can be specified by either name (for example, `1D`) or by a numerical algorithm ID (for example, `2`).

Valid Values:

- For CCRF—`f8`, `f16`, `f32`
- For VDS—`BR`, `1D`, `2D`, `opt`
- For RTL—`urow`, `rle`, `tiff`, `seed`, `ublock`, `adaptive`
- For escP2—`none`, `rle`, `tiff`

The compression algorithm ID basically works by assigning a numerical index, usually starting at 1, to each compression algorithm for each output formatter. For example, specifying `raptor -c 2` is the same as specifying `raptor -c f16`. The use of the compression algorithm ID allows specification of the compression algorithm for future drivers.

`-d` *i* Sets the size of the dither matrix. The larger the number, the better the color match. With larger numbers, smaller objects are more likely to have problems.
Valid Values: `2` through `8`

`-e` Enables dot expansion. This sets a flag in the CPIR header that tells the output filter to enable the dot expansion feature in the plotter vendor's format, if supported (Versatec and CalComp only).

`-f` *output* Specifies the output formatter to be used. *output* is the path to a command. If it is not an absolute path (for example, does not begin with a leading slash), the search path (`PATH`) will be used to locate the command. There are built-in shortcuts for `CCRF`, `VDS`, `VPI`, `RTL`, `XWD`, `PCL`, `ENRTL`, and `escP2`.

Output	Command
CCRF	CCRFout
VDS	VDSout
VPI	VPIout
RTL	RTLout
XWD	XWDout
PCL	PCLout
ENRTL	ENRTLout
escP2	escP2out

By default, the output of Raptor is CPIR data. If an output formatter is specified, the output will be the result of piping CPIR data through the specified filter. As an example, `-f compress` creates a compressed CPIR file. The UNIX `compress` command will be executed as the output formatter. Using `-f CCRF` creates a CCRF file.

`-g` *i*
Sets the memory limit in bytes. This caps the amount of memory that will be allocated for the pixmap. The default is zero or no limit. Setting this option forces the plot data to be rasterized in smaller chunks or "bands." The output filters will merge the bands back together.
Valid Values: any positive integer

Note: Memory use should be limited to less than or equal to the memory installed in the rasterization host computer.

`-h`
Lists the Raptor options.

`-i`
Enables inverse video.

`-j`
Enables overlay.

`-k` *int*
Enlarges the stipple dot.
Valid Values: `1` through `6`

`-l`
Disables conditioning pass. Registration tracks are plotted with the first pass (electrostatic only).

`-m` *m*
Sets the color mode.
Valid Values: `mono`, `color`, `gray`

`-n`
Disables black. Black is formed using cyan, magenta, and yellow. This option is primarily intended for 3-pass thermal plotters.

`-o` *p*
Specifies the output file path. Default is standard output.
Valid Values: any UNIX path

`-p`
Enables row major pixel encoding. It causes all colors to be rasterized at the same time. When used with an electrostatic plotter, the `-a` option must be passed to the formatter (see the `-z` option).

`-q` *m*
Specifies the quality of the plot. For electrostatic plotters, this is a speed in inches per second.
Valid Values: any floating-point number

`-r` *i*
Sets the desired output resolution. The default is stated in the CPIF file and comes from the plotter's `.cdsplotinit` entry.
Valid Values: any positive integer

`-s` *f*
Scales the plot data up or down. If the plot data is scaled larger than the plotter's paper size, the data will be clipped off and not plotted. The default is 1.0.
Valid Values: any positive floating-point number

`-u`
Uncompresses a compressed CPIF file to standard output (stdout).

`-v`
Enables verbose status messages to be output on standard error.

`-w`
Enables buffered mode. This option will cause an electrostatic plotter to begin plotting a pass only after it has received the entire pass, if supported.

`-x` *mode*
Specifies black-and-white handling.
Valid Values: `btow` (plot anything black as white); `wtob` (plot anything white as black); `revbw` (reverse black and white)

`-z` *opt*
Passes *opt* to the output program. For example, if `compress` is being used to create a compressed CPIR file (`-f compress`), `-v` can be passed to `compress` to get compression statistics as follows:

```
-z v
```

An example of an option with an argument is

```
-z "b 9"
```

where `b` is the option letter and `9` is its argument.

Further illustrating:

```
raptor ... -f compress -z v -z "b 9" ...
```

is effectively identical to:

```
raptor ... | compress -v -b 9 ...
```

Running Raptor as a Standalone Program

You can run Raptor as a standalone program in different ways.

- To create a Versatec format raster file on the disk from a CPIF file (`CPIF`), type the following command at a UNIX prompt. This command uses the VDSout filter.

  your_install_dir`/tools/plot/bin/raptor -f VDS -v -o VDS.out CPIF`

  This command is equivalent to

  your_install_dir`/tools/plot/bin/raptor -v CPIF | VSDout > VSD.out`

- To create Versatec straight raster data, type the following command on the plotter host. This command uses the VPIout filter.

  your_install_dir`/tools/plot/bin/raptor -f VPI -v CPIF > /dev/`*device*

  This command is equivalent to

  your_install_dir`/tools/plot/bin/raptor -v CPIF | VPIout > /dev/`*device*

  Note: Versatec straight raster data must be sent directly to the plotter through a VPI interface. It cannot be stored in a file. Use VDS to store a Versatec plot in a disk file.

Raster Driver Files

Raster plotting uses the files listed below.

Raster Plotting Files in your_install_dir/tools/plot/bin

File	Description
`raptor`	Cadence standard raster driver. Rasterizes CPIF files and creates CPIR output.
`VDSout`	Raster output converter for creating Versatec VDS formats (Blocked Raster Data).
`VPIout`	Raster output converter for creating Versatec straight raster data and sending it directly to the VPI port. Standard output must be a VPI device.
`CCRFout`	Driver that converts CPIR data to CCRF or CCRF-IL data.
`RTLout`	Output formatter that converts CPIR data to RTL data.
`XWDout`	Output formatter that converts CPIR data to X windows window dump format.
`ENRTLout`	Output formatter that converts CPIR data to Encad dialect of RTL.

Raster Plotting Files in your_install_dir/tools/plot/bin

File	Description
`PCLout`	Output formatter that converts CPIR data to HP PCL format.
`escP2out`	Output formatter that converts CPIR data to Epson escape P 2 printer control language format (primarily for the Stylus inkjet line).

Raster Plotting Files in your_install_dir/tools/plot/samples

File	Description
`cdsSYSV.sh`	Sample System V (Solaris, HP-UX) interface script for queuing Versatec plots.
`cdsBSD.sh`	Sample BSD (SunOS) filter script for queuing Versatec plots.
`VPIfilter.sh`	Sample BSD filter script to send plotter-ready data straight to a device.
`VPIinterface.sh`	Sample System V script to send plotter-ready data straight to a device.

VDSout

VDSout is a formatter that takes color-separated (CMY) CPIR, in either pixel encoding, as input (stdin) and produces Versatec Data Standards (VDS) raster data to stdout. The following VDS raster compression techniques are supported:

Compression	Description
`BR`	blocked raster (uncompressed)
`1D`	one-dimensional compacted raster
`2D`	two-dimensional compacted raster
`opt`	optimized (best of 1D and 2D on a scan-by-scan basis)

VDSout recognizes the following options:

`-a`	Inverts pixel encoding. This is used to plot a row major pixel encoded plot to an electrostatic plotter.
`-b`	Disables pass buffering. This should be used when plotting an already created CPIR file.
`-c` *`comp`*	Sets the VDS compression technique. Valid Values: `BR`, `1D`, `2D`, `opt`
`-e`	Enables dot expansion. This sends the Raster Data Translate (RDT) escape sequence to the plotter.
`-h`	Lists syntax and available options.
`-l`	Disables conditioning pass. This sets the merge ticks option in the plotter.
`-m` *`toner`*	Allows selection of the toner that a monochrome plot is plotted with. Valid Values: `black`, `cyan`, `magenta`, `yellow`, `none` Use `none` when plotting to a plotter that does not understand the pass preamble escape sequence (for example, the v80).
`-q` *`speed`*	Sets the plot speed in inches per second. Slower speeds result in higher plot quality.
`-r` *`resolution`*	Sets the plotter resolution. This is used to calculate the tick length.

`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.
`-v`	Enables verbose mode.
`-w`	Enables plotter pass buffering. If supported, this will cause the plotter to delay plotting a pass until it has received all of the data for the pass. This is used to help prevent the plotter from pausing during a pass.

VPIout

VPIout is a formatter that takes color-separated (CMY) CPIR, in either pixel encoding, as input (stdin) and produces straight raster for a VPI (Versatec Parallel Interface) device to stdout.

VPIout recognizes the following options:

`-a`	Inverts pixel encoding. This is used to plot a row major pixel encoded plot to an electrostatic plotter.
`-b`	Disables pass buffering. This should be used when plotting an already created CPIR file.
`-e`	Enables dot expansion. This sends the Raster Data Translate (RDT) escape sequence to the plotter.
`-h`	Lists syntax and available options.
`-l`	Disables conditioning pass. This sets the merge ticks option in the plotter.
`-m` *`toner`*	Allows selection of the toner that a monochrome plot is plotted with. Valid Values: `black`, `cyan`, `magenta`, `yellow`, `none` Use `none` when plotting to a plotter that does not understand the pass preamble escape sequence (for example, the v80).
`-q` *`speed`*	Sets the plot speed in inches per second. Slower speeds result in higher plot quality.
`-r` *`resolution`*	Sets the plotter resolution. This is used to calculate the tick length.
`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.
`-v`	Enables verbose mode.
`-w`	Enables plotter pass buffering. If supported, this will cause the plotter to delay plotting a pass until it has received all of the data for the pass. This is used to help prevent the plotter from pausing during a pass.

CCRFout

CCRFout is a formatter that takes color-separated (CMY) CPIR, in either pixel encoding, as input (stdin) and produces CCRF raster data to stdout. If the input CPIR file has plane major pixel encoding, the output will be normal CCRF for electrostatic plotters. If the input file has row major pixel encoding and the `-a` flag is given, the output will also be normal CCRF. If the input file has row major pixel encoding and the `-a` flag is not given, the output will be CCRF-IL for inkjets. This is summarized below.

Pixel Encoding	-a given	Output Type	Plotter Type
plane	n	CCRF	electrostatic
plane	y	illegal	N/A
row	n	CCRF-IL	inkjet
row	y	CCRF	electrostatic

Note: The TechJet 5336 GT seems capable of plotting normal CCRF. This is not recommended.

CCRFout recognizes the following options:

`-a`	Inverts pixel encoding. This is used to plot a row major pixel encoded plot to an electrostatic plotter.
`-b`	Disables pass buffering. This should be used when plotting an already created CPIR file.
`-c` *`comp`*	Sets the CCRF field length. Valid Values: `f8`, `f16`, `f32`
`-e`	Enables dot expansion. This sets the dot expansion flag in the CCRF header.
`-h`	Lists syntax and available options.
`-l`	Disables conditioning pass. This sets the disable conditioning flag in the CCRF header.
`-m` *`toner`*	Allows selection of the toner that a monochrome plot is plotted with. Valid Values: `black`, `cyan`, `magenta`, `yellow`

`-q` *`speed`*	Sets the plot speed in inches per second. Slower speeds result in higher plot quality.
`-r` *`resolution`*	Sets the plotter resolution. This is used to calculate the tick length.
`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.
`-v`	Enables verbose mode.
`-w`	Enables plotter pass buffering. If supported, this will cause the plotter to delay plotting a pass until it has received all of the data for the pass. This is used to help prevent the plotter from pausing during a pass.

RTLout

RTLout is a formatter that takes color-separated (CMY) CPIR in row major pixel encoding as input (stdin) and produces HP RTL, HP PCL, or Encad EN-RTL raster data to stdout. The following raster compression schemes are supported:

Compression	Description
`urow`	uncompressed, row
`rle`	run length encoded
`tiff`	Tagged Image File Format, pack bits
`seed`	delta row compression
`ublock`	uncompressed, block
`adaptive`	future enhancement

Note: Due to the similarities between RTL, PCL, and EN-RTL, PCLout and ENRTLout are links to RTLout:

```
ln RTLout PCLout
ln RTLout ENRTLout
```

RTLout recognizes the following options:

`-c` *`comp`*	Sets the compression technique. Valid Values: `urow`, `rle`, `tiff`, `seed`, `ublock`, `adaptive`
`-d` *`block_size`*	Sets the block size for ublock compression algorithm.
`-f` *`dialect`*	Sets the variant of RTL that is created. Valid Values: `rtl`, `pcl`, `enrtl`
`-h`	Lists syntax and available options.
`-q` *`quality`*	Sets the quality. Valid Values: `0` to `100` inclusive. For RTL, 0 to `33` set draft mode, `34` to `67` set final, and `68` to `100` set enhanced.
`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.

`-v`	Enables verbose mode.
`-w`	Enables plotter pass buffering. If supported, this will cause the plotter to delay plotting until it has received all of the data for the plot.

PCLout

PCLout is a formatter that takes color-separated (CMY) CPIR in row major pixel encoding as input (stdin) and produces HP RTL, HP PCL, or Encad EN-RTL raster data to stdout. The following raster compression schemes are supported:

Compression	Description
`urow`	uncompressed, row
`rle`	run length encoded
`tiff`	Tagged Image File Format, pack bits
`seed`	delta row compression
`ublock`	uncompressed, block
`adaptive`	future enhancement

Note: Due to the similarities between RTL, PCL, and EN-RTL, PCLout and ENRTLout are links to RTLout:

```
ln RTLout PCLout
ln RTLout ENRTLout
```

PCLout recognizes the following options:

`-c` *`comp`*
: Sets the compression technique.
Valid Values: `urow`, `rle`, `tiff`, `seed`, `ublock`, `adaptive`

`-d` *`block_size`*
: Sets the block size for ublock compression algorithm.

`-f` *`dialect`*
: Sets the variant of RTL that is created.
Valid Values: `rtl`, `pcl`, `enrtl`

`-h`
: Lists syntax and available options.

`-p [ [` *`paper_type`* `] [,`*`paper_size`* `] ]`
: Sets the paper type and paper size for PCL.
Valid Values:

- For *`paper_type`*—`bond`, `plain`, `glossy`
- For *`paper_size`*—`A`, `A4`, `legal`, `B`, `A3`

`-q` *`quality`*	Sets the quality. Valid Values: `0` to `100` inclusive. For PCL, `0` to `33` set EconoFast, `34` to `67` set Normal, and `68` to `100` set Presentation.
`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.
`-v`	Enables verbose mode.
`-w`	Enables plotter pass buffering. If supported, this will cause the plotter to delay plotting until it has received all of the data for the plot.

ENRTLout

ENRTLout is a formatter that takes color-separated (CMY) CPIR in row major pixel encoding as input (stdin) and produces HP RTL, HP PCL, or Encad EN-RTL raster data to stdout. The following raster compression schemes are supported:

Compression	Description
`urow`	uncompressed, row
`rle`	run length encoded
`tiff`	Tagged Image File Format, pack bits
`seed`	delta row compression
`ublock`	uncompressed, block
`adaptive`	future enhancement

Note: Due to the similarities between RTL, PCL, and EN-RTL, PCLout and ENRTLout are links to RTLout:

```
ln RTLout PCLout
ln RTLout ENRTLout
```

ENRTLout recognizes the following options:

`-c` *`comp`*	Sets the compression technique. Valid Values: `urow`, `rle`, `tiff`, `seed`, `ublock`, `adaptive`
`-d` *`block_size`*	Sets the block size for ublock compression algorithm.
`-f` *`dialect`*	Sets the variant of RTL that is created. Valid Values: `rtl`, `pcl`, `enrtl`
`-h`	Lists syntax and available options.
`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.
`-v`	Enables verbose mode.
`-w`	Enables plotter pass buffering. If supported, this will cause the plotter to delay plotting until it has received all of the data for the plot.

`-z remote_printer_control`

Allows Encad EN-RTL specific remote printer control strings to be passed to the printer, in the format

param,*value1*[,*value2*]

Multiple strings may be sent in one argument if separated by a semicolon (;)

Note: To protect the ; from the shell, enclose the entire argument in quotation marks.

Parameter 0 sets the plot resolution for HP-GL/2. This has no effect on raster (EN-RTL) data. Parameter 1 controls carriage (head) movement. The choices are unidirectional and bidirectional each at slow and fast speeds. Currently, only unidirectional slow (that is, quality) and bidirectional fast (that is, draft) are implemented. Enhanced mode (parameter 3) controls how many passes of the head are required to plot a full band. Parameter 4 controls the speed that the head moves across the paper. The value, which is measured in dots per second, should be between 3,000 and 10,000. Dry time (parameter 6) controls how long the plotter will dry a plot before continuing. Parameter 12 sets the emulation mode. When plotting to a NovaJet Pro, this should always be supplied and the value should always be 5 (EN-RTL). Parameter 13 (plot margins) controls the margins on the side of the media. Normal margins are about 1.5 cm. Expanded margins are about 0.5 cm. Plot mode (parameter 25) controls the trade off between plot speed and quality. When the value is set to user defined (0), the first four parameters are used to control plotting in more detail. The amount of memory to use for the I/O buffer can be controlled with parameter 26.

The following parameters are available:

Parameter Desc.	Param.	Value1	Value2
Print direction	1	0: Unidirectional, fast 1: Unidirectional, slow 2: Bidirectional, fast 3: Bidirectional, slow	N/U
White Space	2	0: off 1: on	N/U

Enhanced Mode	3	0: Off (1 pass) 1: 4 pass 2: 3 pass 3: 2 pass	N/U
Head Speed	4	3000<speed<10,000, dots per second	N/U
Dry Time	6	0 to 65,535 seconds	N/U
Emulation Mode	12	5: EN-RTL	N/U
Plot Margins	13	0: Normal 1: Expanded	N/U
Override Host	15	0: Software 1: Printer	N/U
Automatic Cutter	16	0: off 1: on	N/U
Plot Mode	25	0: user defined 1: draft 2: normal 3: quality 4: enhanced 4 pass 5: enhanced 3 pass 6: enhanced 2 pass 7: mono 600 8: draft 3 pass	N/U
I/O memory	26	-1: 16K 0: 128K 1: 512K 2: 1M 3: 2M 4: 4M 5: 6M 6: 8M 7: 10M 8: 12M 9: 16M 10: 20M 11 24M 12 26M 13 28M 14 30M	N/U

Printing Direction	28	0: right to left 1: left to right (best)	N/U

XWDout

XWDout is a formatter that takes non–color-separated (RGB) CPIR as input (stdin) and produces an X Windows window dump format file that can be read by xwud.

XWDout recognizes the following options:

`-h`	Lists syntax and available options.
`-p` *`paper_type`*	Sets the paper type for PCL. Valid Values: `plain`, `bond`, `special`, `glossy`, `transparency`
`-t` *`tmp_dir`*	Sets the directory to be used for temporary files.
`-v`	Enables verbose mode.

escP2out

escP2out is a formatter that takes color-separated (CMY) CPIR data in row major pixel encoding and produces Epson ESC/P 2 printer control language data (primarily for the Stylus line of small-format inkjet printers) to stdout. The following raster compression techniques are supported:

Compression	Description
`none`	uncompressed
`rle`	TIFF, non-binary mode
`tiff`	TIFF, pack bits, binary mode

Note: The `tiff` compression can be used only on the Stylus line. Both `none` and `rle` can be used on any ESC/P 2 printer.

escP2out recognizes the following options:

`-c` *`comp`*
Sets the raster compression algorithm.
Valid Values: `none`, `rle`, `tiff`

`-d` *`band_size`*
Sets the band size for compression modes `none` and `rle`.
Valid Values

- For `none` and `rle`—`1`, `8`, `24`
- For `tiff`—`1`

`-h`
Lists syntax and available options.

`-q` *`quality`*
Sets the print quality. `0` to `34` set bidirectional printing and turn microweave off, `35` to `68` set unidirectional printing, `69` and up set unidirectional printing and enable microweave (multiple passes are required to print each band). Summarizing:

Quality	Result
0	draft
50	standard
100	best

	Note: Do not enable microweave at 180 dpi (that is, *quality* less than 68).
-r *resolution*	Sets the printer resolution. Valid Values: 180, 360, 720 Default is the value specified in the .cdsplotinit entry. **Note:** Printer will NOT print if any other value is used.
-s	Enables small dot. Reduces the size of the dot that is used for printing.
-t *tmp_dir*	Sets the directory to be used for temporary files.
-v	Enables verbose mode.
-y	Enables high-performance monochrome mode for the Stylus 1500 & Stylus Color II.

Configuring the Spooling System

Before configuring the spooling system for your plotter,

- Identify the workstation that the plotter is connected to
- Install your Versatec Parallel Interface (VPI) board or SCSI VPI device on the plot server following the manufacturer's instructions (Versatec only)
- Attach the plotter to the appropriate port
- Run the test provided by the VPI device driver software successfully (Versatec only)

Setting Up the Plot Server

To set up the plot server,

1. Configure the UNIX system print queues.
2. Verify that your file system has enough disk space for a spool directory and a temporary directory for CPIF and raster data.
3. Configure a sufficient amount of swap space (Raptor requires large amounts of memory to produce a plot).

The following sections explain each of these steps.

Configuring the UNIX System Print Queue

Configuring the UNIX System Print Queue for SunOS (BSD Queuing System)

To configure the UNIX system print queue for SunOS,

1. Log in as `root` on the plot server (the machine the plotter is connected to).
2. Copy `cdsBSD.sh` from *`your_install_dir`*`/tools/plot/samples` to *`your_install_dir`*`/tools/plot/bin`.
3. Change the owner of `cdsBSD.sh` to `root`.

   ```
   chown root cdsBSD.sh
   ```
4. Change the permissions for `cdsBSD.sh` as shown below:

   ```
   chmod u=rsx,go=rx cdsBSD.sh
   ```

`cdsBSD.sh` retrieves the filename from the job control file. To allow the script access to the file, the filter script must use SUID permissions and be owned by `root`. See the `lpd(8)` man page for further information.

5. Modify *`your_install_dir`*`/tools/plot/bin/cdsBSD.sh` by replacing *`your_install_dir`* or *`your_install_path`* with the path of the Cadence software.

```
#!/bin/sh
PATH="/bin:/usr/bin:/usr/ucb:your_install_path/tools/plot/bin:"
export PATH
# Locate the name of the data file in the print spool directory.
CONTROL_FILE=‘grep cf lock‘
DATA_FILE=‘grep \^f $CONTROL_FILE | sed -e ’s/^f//’‘
exec raptor -f VPI -p -z a $DATA_FILE
```

6. Modify `etc/printcap` by adding an entry for the plotter as follows:

```
vt|Versatec|Cadence Driven Versatec Plotter:\
:lp=/dev/vp0:\
:sh:sf:mx#0:\
:sd=/usr/spool/vt:\
:lf=/usr/adm/lpd-errs:\
:if=your_install_dir/tools/plot/bin/cdsBSD.sh:
```

   The entry above sets the plotter device to `/dev/vp0`, suppresses job headers (`sh`) and form feeds (`sf`), sets an unlimited print file size (`mx#0`), and sets the spool directory to `/usr/spool/vt`. The last line specifies the filter name.

   The plotter uses the `if` filter because the input data is text. The filter is started once per job.

7. Create the `/usr/spool/vt` directory.

```
mkdir /usr/spool/vt
```

8. Make sure the file `/usr/adm/lpd-errs` exists. If it does not, use the `touch` command to create it.

   Diagnostic output is sent to the file `/usr/adm/lpd-errs`. If you specify the `-v` option to `raptor` in `cdsBSD.sh`, it will produce diagnostic output. If you do not specify the `-v` option, there will be no diagnostic output produced except for error messages.

Note: For more information, see the `printcap` and `lpd` man pages.

It is possible to rasterize the CPIF data in one queue (the rasterization queue) and then transfer the raster data to another queue for plotting. The second queue can reside on the plot server or on another network machine. This requires the modification of the above `cdsBSD.sh` shell script as follows:

```
#!/bin/sh
PATH="/bin:/usr/bin:/usr/ucb:your_install_path/tools/plot/bin"
export PATH
# Locate the name of the data file in the print spool directory
```

```
CONTROL_FILE='grep of lock'
DATA_FILE=`grep \^f $CONTROL_FILE \ sed -e 's/f//'`
OUT_FILE=/usr/tmp/vds$$
raptor -f compress -d 8 -o $OUT_FILE -p $DATA_FILE
lpr -PCPIRQ $OUT_FILE
```

This example uses the `compress` command (`-f compress`) as the output formatter to create a compressed CPIR file. It is then queued to a second queue which is configured to convert the compressed CPIR data to a plotter-ready format. In this example, the second queue is called `CPIRQ`.

Add the following entry to the `/etc/printcap` file for the rasterization queue:

```
vt|Versatec|Cadence Driven Versatec Plotter:\
:lp=/dev/null \
:sh:sf:mx#0 \
:sd=/usr/spool/vt:\
:lf=/usr/adm/lpd-errs:\
:if=your_install_dir/tools/plot/bin/cdsBSD.sh:
```

The output device in the entry above is `/dev/null` instead of `/dev/vp0` because the CPIR file will be queued to a second queue.

The following shows a sample of the plot host printcap which uncompresses the CPIR data and sends it to the plotter:

```
CPIRQ|Versatec CPIR data queue:\
:lp=/dev/vp0:sh:sf:mx#0:sd=/usr/spool/CPIRQ:\
:lf=/usr/adm/lpd-errs:
:if=your_install_dir/tools/plot/bin/VPIfilter.sh
```

To uncompress the data, use `VPIfilter.sh`. The following shows a sample of `VPIfilter.sh` located in *`your_install_dir`*`/tools/plot/samples`:

```
#!/bin/sh
/usr/ucb/zcat | your_install_dir/tools/plot/bin/VPIout -a -b
```

For CalComp or HP, change `VPIout` to `CCRFout` or `RTLout` and `/dev/vp0` to the name of your Centronics port (for example, `/dev/bpp0` on a Sun).

When plotting to an electrostatic plotter, do not forget the `-a` option to the filter (`CCRFout` or `VPIout`) if the data was rasterized with `-p` (row major pixel encoding).

Note: For `CCRFout`, use the `-a` option only if the CPIR file was created with `-p` (row major pixel encoding) and your plotter is a CalComp electrostatic. For `RTLout` or `CCRFout` to a CalComp inkjet, delete the `-b` option.

Configuring the UNIX System Print Queue for HP-UX

To configure the UNIX system print queue for HP-UX,

1. Log in as `root` on the plot server.
2. Copy the interface script, `cdsSYSV.sh`, from *`your_install_dir`*`/tools/plot/samples` to *`your_install_dir`*`/tools/plot/bin`.
3. Change the permissions for `cdsSYSV.sh` as shown below:

   ```
   chmod u=rwx,go=rx your_install_dir/tools/plot/bin/cdsSYSV.sh
   ```

4. Edit *`your_install_dir`*`/tools/plot/bin/cdsSYSV.sh`.

   The following sample shows you how to edit `cdsSYSV.sh` if the directory in which the Cadence software is installed is `cds`.

   ```
   #! /bin/sh
   PATH="/bin:/usr/bin:cds/tools/plot/bin"
   export PATH
   log=/usr/spool/lp/log
   exec 2>>$log
   shift;shift;shift;shift;shift
   DATA_FILE=$1
   exec raptor -f VPI -p -d 8 -z a $DATA_FILE
   ```

5. Use the following `lpadmin` commands (located in `/usr/lib`) to create the queue.

   ```
   lpshut
   lpadmin -pplotter_name -v/dev/device_name -iyour_install_dir/tools/plot/bin/cdsSYSV.sh
   lpsched
   enable plotter_name
   accept plotter_name
   ```

   Replace *`plotter_name`* with the name of the plotter queue and *`your_install_dir`* with the directory in which the Cadence software is installed. For example, if *`your_install_dir`* is `/cds`, *`device_name`* is `vp0`, and *`plotter_name`* is `dt`, type

   ```
   lpadmin -pdt -v/dev/vp0 -i/cds/tools/plot/bin/cdsSYSV.sh
   ```

It is possible to rasterize the CPIF data in one queue and then transfer the raster data to another queue for plotting. This second queue can reside on the plot server or on another network machine. The `lpadmin` command would be changed by setting *`device_name`* to `null`.

This requires the modification of the above `cdsSYSV.sh` shell script as follows:

```
#! /bin/sh
PATH="/bin:/usr/bin:/usr/lib:your_install_path/tools/plot/bin"
export PATH
log=/usr/spool/lp/log
exec 2>>$log
shift;shift;shift;shift;shift
DATA_FILE=$1
OUT_FILE=/usr/tmp/vds$$
```

```
raptor -f compress -o $OUT_FILE -d 8 -p $DATA_FILE
lp -dstandard_raster_queue $OUT_FILE
```

This file is then re-queued to a second queue which is configured to pass compressed CPIR data to the plotter. The following is a sample of the interface script (`VPIinterface.sh`) for the CPIR queue located in *your_install_dir*`/tools/plot/samples`:

```
#! /bin/sh
shift;shift;shift;shift;shift
data_file=$1
zcat $data_file | your_install_dir/tools/plot/bin/VPIout -a -b
```

When plotting to an electrostatic plotter, do not forget the `-a` option to the filter (`CCRFout` or `VPIout`) if the data was rasterized with `-p` (row major pixel encoding).

Note: For `CCRFout`, use the `-a` option only if the CPIR file was created with `-p` (row major pixel encoding) and your plotter is a CalComp electrostatic. For `RTLout` or `CCRFout` to a CalComp inkjet, delete the `-b` option.

Configuring the UNIX System Print Queue for Solaris (System V Queuing System)

To configure the UNIX system print queue for Solaris,

1. Log in as `root` on the plot server.
2. Copy the interface script, `cdsSYSV.sh`, from *your_install_dir*`/tools/plot/samples` to *your_install_dir*`/tools/plot/bin`.
3. Change the permissions for `cdsSYSV.sh` as shown below:

   ```
   chmod u=rwx,go=rx your_install_dir/tools/plot/bin/cdsSYSV.sh
   ```

4. Edit *your_install_dir*`/tools/plot/bin/cdsSYSV.sh`.

   The following sample shows you how to edit `cdsSYSV.sh` if the directory in which the Cadence software is installed is `cds`.

   ```
   #! /bin/sh
   PATH="/bin:/usr/bin:cds/tools/plot/bin"
   export PATH
   log=/usr/spool/lp/log
   exec 2>>$log
   shift;shift;shift;shift;shift
   DATA_FILE=$1
   exec raptor -f VPI -p -d 8 -z a $DATA_FILE
   ```

5. Use the following `lpadmin` commands (located in `/usr/lib`) to create the queue.

   ```
   lpshut
   lpadmin -pplotter_name -v/dev/device_name -iyour_install_dir/tools/plot/
   bin/cdsSYSV.sh
   lpsched
   enable plotter_name
   ```

```
accept plotter_name
```

Replace *plotter_name* with the name of the plotter queue and *your_install_dir* with the directory in which the Cadence software is installed. For example, if *your_install_dir* is /cds, *device_name* is vp0, and *plotter_name* is dt, type

```
lpadmin -pdt -v/dev/vp0 -i/cds/tools/plot/bin/cdsSYSV.sh
```

It is possible to rasterize the CPIF data in one queue and then transfer the raster data to another queue for plotting. This second queue can reside on the plot server or on another network machine. The lpadmin command would be changed by setting *device_name* to null.

This requires the modification of the above cdsSYSV.sh shell script as follows:

```
#! /bin/sh
PATH="/bin:/usr/bin:/usr/lib:your_install_path/tools/plot/bin"
export PATH
log=/usr/spool/lp/log
exec 2>>$log
shift;shift;shift;shift;shift
DATA_FILE=$1
OUT_FILE=/usr/tmp/vds$$
raptor -f compress -o $OUT_FILE -d 8 -p $DATA_FILE
lp -dstandard_raster_queue $OUT_FILE
```

This file is then re-queued to a second queue which is configured to pass compressed CPIR data to the plotter. The following is a sample of the interface script (VPIinterface.sh) for the CPIR queue located in *your_install_dir*/tools/plot/samples:

```
#! /bin/sh
shift;shift;shift;shift;shift
data_file=$1
zcat $data_file | your_install_dir/tools/plot/bin/VPIout -a -b
```

When plotting to an electrostatic plotter, do not forget the -a option to the filter (CCRFout or VPIout) if the data was rasterized with -p (row major pixel encoding).

Note: For CCRFout, use the -a option only if the CPIR file was created with -p (row major pixel encoding) and your plotter is a CalComp electrostatic. For RTLout or CCRFout to a CalComp inkjet, delete the -b option.

Verifying Disk Space

When queuing CPIF data, the software copies the CPIF data to the temporary directory and then recopies it to the spool directory for the print queue. The temporary and spool directories each should be configured with enough space to hold a CPIF file of your plot data. Large IC plots can take over 200 megabytes of disk space.

If your system does not have enough space, you can

- Specify a different directory in the `.cdsplotinit` file

  See "Draft Plotting" on page 136.

- Link `/usr/tmp` to another file system

  You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx` (`ugo=rwx`) permissions.

The software does not verify available disk space before it generates a plot. The workstation might hang if it does not have enough disk space.

If you are using any of the double queue options above, you may also need a large amount of disk space to store the intermediate raster file, especially if it is not compressed. Compute the file size as follows:

1. In the `.cdsplotinit` file, locate the `paperSize` line; for example:

   ```
   :paperSize="R36" 0 13904:
   ```

2. Compute the number of bytes in one scan as follows:

   scan_bytes = (paper_height / 8)

The total byte count for a single plane is equal to the number of bytes in one scan multiplied by the total scan count:

bytes_needed = ((plot_width_in_inches * resolution) * scan_bytes) * number_of_colors

Configuring Sufficient Amount of Swap Space

The plot driver uses a memory array to rasterize the plot data prior to writing this data to disk. The default mode is to allocate one entire color plane (that is, black, cyan, yellow, or magenta) at a time (plane major pixel encoding). The amount of memory required to do this can be large. It can be computed using the above equation and setting *`number_of_colors`* to `1`.

If you are plotting to an electrostatic and your rasterization host has enough physical memory to allocate three planes of memory at the same time, the `-p` option should be used because it is faster. If plotting to an inkjet, the `-p` option must be used.

The Raptor driver has a memory limit option available to put a limit on the amount of memory it is allowed to use. This will segment the plot into smaller bands before putting them all together on disk (see the `-g` option) .

Draft Plotting

If your plotter is a CalComp or a Versatec, it is possible to set up draft plotting. Draft plotting allows rasterization to be done at half resolution. For example, if your plotter is 400 dpi, rasterization can be done at 200 dpi. This will cut memory usage by 75%. It will also result in a similar reduction in rasterization time. Draft plotting takes advantage of the dot expansion feature in the plotter to expand half-resolution plots back up to full size. As an example, to set up draft plotting for a Versatec 8936-2 200-dpi plotter, take the normal resolution `.cdsplotinit` entry:

```
ve8936|8936-2: \
    :spool=lpr -Pvt: \
    :query=lpq -Pvt: \
    :remove=lprm -Pvt $3: \
    :manufacturer=Xerox Engineering Systems: \
    :type=intCLR: \
    :maximumPages#10: \
    :resolution#200: \
    :tmpdir=/tmp: \
    :paperSize="R36" 0 6848:
```

Divide the resolution and paper size by 2. Also give the configuration a unique name and set up new OS queues.

```
ve8936Draft|8936-2: \
    :spool=lpr -PvtDraft: \
    :query=lpq -PvtDraft: \
    :remove=lprm -PvtDraft $3: \
    :manufacturer=Xerox Engineering Systems: \
    :type=intCLR: \
    :maximumPages#10: \
    :resolution#100: \
    :tmpdir=/tmp: \
    :paperSize="R36" 0 3424:
```

The new queue should be identical to the old one except for the following additional options to the Raptor command: `-e -r 200`.

```
raptor -d 8 -f VPI -p -z a -e -r 200 $DATA_FILE
```

Setting Up Cadence Plotting Services Software

You must define the plotters for the Cadence Plotting Services software in the plotting configuration file, `.cdsplotinit`.

You might want to consider several `.cdsplotinit` files:

- A system *`your_install_dir`*`/tools/plot/.cdsplotinit` file containing all of your plotters
- A group-specific `.cdsplotinit` file in the current working directory

- A user-specific `.cdsplotinit` file in the user's home directory

The software loads the system file first, the current working directory's file second, and then the `.cdsplotinit` file in the user's home directory. As the software reads the files, plotter definitions are appended to the current list. The software overwrites plotter definitions with the same plotter name, letting users override system settings.

This section describes the `.cdsplotinit` file entry for any plotter driven by Raptor. The `.cdsplotinit` entry for any plotter that is being driven by Raptor will look similar to a Versatec entry. Specifically, the type will be `intCLR` (or `intBW` for monochrome). And if the plotter uses roll media, the first page size number (the width) should be `0`.

Configuring the Plotter with the Utility

To create or modify the `.cdsplotinit` configuration file, use the plotconfig utility if the X Window System is running. If not, follow the procedures in "Configuring the Plotter without the Utility" on page 139.

To use the utility,

1. Verify that *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin` are in your search path.

   your_install_dir is the directory in which the Cadence products are installed, such as `/cds`. If your workstation is set up correctly, typing `cds_root` returns *your_install_dir.* If `cds_root` does not return the path, check your search path or see your system administrator.

2. Start the plotter configuration utility by doing one of the following:

   - At the UNIX prompt on a color terminal, type

     ```
     plotconfig
     ```

   - At the UNIX prompt on a monochrome terminal, type

     ```
     plotconfig -bw
     ```

   The Cadence Plotter Configuration form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

   Note: If the `F1` or `Help` key does not display information about a field, check your window manager file, such as Motif's `~/.mwmrc` file. By default, Motif binds help to the `F1` or `Help` key. Your file probably binds the `F1` or `Help` key to something besides help.

3. Select the plotter configuration file to modify.

   The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

   - *your_install_dir*`/tools/plot/.cdsplotinit`
   - Current working directory (`./.cdsplotinit`)
   - The `.cdsplotinit` file in the home directory entry in the password database for the user

   The software appends the plotters to the list of available plotters and overwrites plotter definitions with the same plotter name. The last plotter defined is the definition the software uses.

4. In the *List of Plotter Models* list box, double-click the plotter model you want to put in the file.

   The plotter model is added to the *List of Installed Plotters* list box. If you add several plotters of the same model, each plotter is numbered sequentially.

   For example,

   ```
   ce3236
   ce3236(1)
   ce3236(2)
   ```

5. In the *List of Installed Plotters* list box, click the plotter model.

6. Click *Setup*.

   The Plotter Setup form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

7. Fill in the form.

8. Click *OK*.

9. In the Cadence Plotter Configuration form, click *Queue*.

   The Plotter Queue form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

10. Fill in the form.

11. Click *Test* to test the queue command.
12. Click *OK*.
13. (Optional) Create the CPIF data in compressed format by adding the `compress` line:

    ```
    :compress:\
    ```

If this option is specified, Raptor will not accept a memory limit or plane major option. In this case, you must use -p, which specifies row major pixel encoding. This will require much more memory for executing a plot.

14. Repeat these steps to set up any other plotter configuration file.
15. In the Cadence Plotter Configuration form, click *Quit*.

    If *Quit* is grayed out, close all windows related to the plotconfig utility.

Configuring the Plotter without the Utility

To create or modify the `.cdsplotinit` configuration file without the utility,

1. Create a `.cdsplotinit` file in your home directory.

   You can use an editor, such as `vi`.

   ```
   vi ~/.cdsplotinit
   ```

   You must specify your site-specific information.

   The *`your_install_dir`*`/tools/plot/etc/cdsplotinit` file lists the supported plotter models. The header of this file lists the CPS version with which the file is associated. The *`your_install_dir`*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.

2. Copy the entry for your plotter model from *`your_install_dir`*`/tools/plot/etc/cdsplotinit` to your `.cdsplotinit` file.

   For example, if you are setting up a Versatec 400-dpi color plotter using roll media, the entry might be similar to

   ```
   8936-4:\
       :manufacturer=Xerox Engineering Systems:\
       :type=intCLR:\
       :maximumPages#10:\
       :resolution#400:\
       :residentFonts:\
   ```

```
:tmpdir=/usr/tmp:\
:paperSize="36 inches wide" 0 14080:
```

If your plotter is not in *your_install_dir*/tools/plot/etc/cdsplotinit, you might still be able to use it if you modify an existing entry from the same manufacturer.

3. Assign a configuration name to the entry for the plotter.

This is the name the plotter will be known by from Cadence applications.

Add the name and a vertical bar (|) to the beginning of the plotter model line, leaving no spaces on the line. If you do not specify a menu name, the plotter may not show up in the list of plotters in the application.

Follow these guidelines when naming your plotter:

- Do not use these characters in the plotter name:

  colon (:) equal sign (=) double quotes (")
  backslash (\) vertical bar (|)

- Do not leave any spaces at the beginning or the end of the name.

  Note: Leading and trailing spaces in *menu_name* and *plotter_model* are significant and become part of the names.

- Do not change *plotter_model* (8936-4 in the example below). You can only use plotter models recognized by Cadence Plotting Services software.

For example, if you want the software to display the plotter as Versatec 8936-4 Color, add the name to the first line, followed by a vertical bar (|), leaving no spaces.

```
Versatec 8936-4 Color|8936-4:\
```

The Cadence software will display

```
Versatec 8936-4 Color
```

or

```
Versatec_8936-4_Color
```

4. Add the spooling information for the plotter.

Use the spooling commands for your operating system. The table lists the spooling entries for a plotter (identified as vt).

Operating System	Spool	Query	Remove
AIX	`enq -P vt:\`	`enq -q -P vt:\`	`enq -x $4 -P vt:\`
HP-UX	`lp -dvt:\`	`lpstat -ovt:\`	`cancel $1 vt:\`
Solaris	`lp -dvt:\`	`lpstat -ovt:\`	`cancel $1 vt:\`
SunOS	`lpr -Pvt:\`	`lpq -Pvt:\`	`lprm -Pvt $3:\`

5. Edit the name of the temporary directory (`tmpdir`).

   ```
   :tmpdir=/usr/tmp:\
   ```

   This directory stores the temporary files created by Raptor. The default is `/usr/tmp`.

6. (Optional) Create the CPIF data in compressed format by adding the `compress` line:

   ```
   :compress:\
   ```

If this option is specified, Raptor will not accept a memory limit or plane major option. In this case, you must use -p, which specifies row major pixel encoding. This will require much more memory for executing a plot.

7. (Optional) To use the printer's resident fonts instead of the stroked fonts displayed on the screen, type

   ```
   :residentFonts:\
   ```

8. Remove the backslash from the last line of the plotter definition.

9. Verify each line of the plotter entry.

   The complete entry for a 400-dpi Versatec 8936-4 plotter identified as `vt` in the `/etc/printcap` file and as `VT1` on the application's menu, and using a 36-inch paper roll in the SunOS environment might be

   ```
   VT1|8936-4:\
       :spool=lpr -Pvt:\
       :query=lpq -Pvt:\
       :remove=lprm -Pvt $3:\
       :manufacturer=Xerox Engineering Systems:\
       :type=intCLR:\
       :maximumPages#10:\
       :resolution#400:\
       :residentFonts:\
       :tmpdir=/usr/tmp:\
       :paperSize="36 inches wide" 0 14080:
   ```

Remove spaces that occur

- Between *menu_name* and *plotter_model*
- Before the ending colon
- At the end of each line

10. Save and exit the file.
11. (Optional) Relocate the file.

    The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

    - *your_install_dir*`/tools/plot/.cdsplotinit`
    - Current working directory (`./.cdsplotinit`)
    - The `.cdsplotinit` file in the home directory entry in the password database for the user

    The software overwrites plotter definitions with the same plotter name; the last plotter defined is the definition the plotter uses.

Testing the Configuration File

You can test the queuing command from the plotconfig utility. You test the `.cdsplotinit` file by plotting a design from a Cadence application.

1. Start the Cadence application.
2. Print a design to test the `.cdsplotinit` file.

   Follow the plotting procedure in your Cadence application's user guide. If the plot does not come out, see "Troubleshooting Versatec Plotting" on page 143 and Chapter 7, "Troubleshooting."

Customizing Colors, Lines, and Stipple Patterns

The Raptor driver will attempt to match all colors to their RGB values. For example, the color red is selected by choosing the RGB triple of (`255 0 0`). In some Cadence applications where the values range from `0` to `1000`, this triple would be (`1000 0 0`).

Plotters build colors by using a dither pattern. Dithering puts dots of cyan, magenta, yellow, and black in patterns on the paper to produce color. Light colors will contain more white (no

dots) than darker colors. This can affect whether small shapes or single-pixel-wide lines appear on the plot. If a small shape or line falls through the white dots of a dither pattern, it will not appear on the plot. Cadence recommends the use of saturated colors, such as the red above, when attempting to plot this type of shape.

Line patterns are selected depending on the Cadence application that is used. If you are able to select a line's dash pattern, the Raptor driver will convert it to a bit pattern that is 32 bits long. This has the effect of truncating some larger dash patterns.

Line width is also selectable in some Cadence applications. The Raptor driver will plot wide lines. The wider lines allow for better color selection and avoid some of the issues noted above. Wide lines also plot more slowly.

CPIF limits stipple patterns to a 16x16 bit pattern. Stipple patterns can interfere with the shape's fill color. This is due to the same issues mentioned in the color description.

Troubleshooting Versatec Plotting

This section lists several problems specific to Versatec plotters. If these hints do not solve your plotting problem, check

- Troubleshooting Flow Chart on page 169
- Step-by-Step Troubleshooting on page 176
- Plotting Problems on page 159
- Error Messages on page 163
- Appendix B, "Configuring Spooling Systems"

Plot does not print

- Check the plotter's queue on your workstation and the plot server.
- Verify the amount of available disk space in `/usr/tmp` or the specified temporary directory.
- Verify that the plotter and interface board are working correctly.
- Create a CPIF file from a Cadence application.
- If the application creates the CPIF, run Raptor on the plot server to generate Versatec data.

  ```
  raptor -v -o /usr/tmp/file.cpir CPIF_name
  ```

If `file.cpir` was successfully created, output the `it` to the plotter.

```
VPIout < file.cpir > /dev/vp0
```

Clients do not have enough disk space in /usr/spool

If a client does not have a plotter connected directly, it might run out of disk space because the disk partition containing the plot spool directories in `/usr/spool` often has minimal disk space.

You can use a different spooling command in the `.cdsplotinit` file to transfer the plot data directly to the plot server. For example, in your `.cdsplotinit` file for a Versatec plotter, change

```
:spool=lpr -Pvt:\
```

to

```
:spool=rsh plot_server lpr -Pvt:\
```

In this example, Design Framework II pipes the plot data to the `rsh` command, which transfers the data over the network to the `lpd` on the host *`plot_server`*. The `lpd` on *`plot_server`* writes the plot data into the spool directory for the specified queue on the *`plot_server`*. Your plot server must have sufficient space in its spool directory to accept large plot files.

No CPIF file is generated

The Cadence Plotting Services software generates a `plaxxxxx` CPIF in the temporary directory and deletes this file after queuing the data to the spool area.

- Verify the `tmpdir` in the `.cdsplotinit` file.
- Verify that the temporary directory has `rwx` access permission.
- Verify that the temporary directory is large enough.

Plotter uses the wrong temporary directory

Verify the `tmpdir` in the `.cdsplotinit` file.

6

Setting Up a Windows Plot Server

This chapter discusses the following topics:

The Cadence Windows Plot Client

Cadence® applications that use Cadence Plotting Services software to plot to Windows plotters first create a Cadence Plot Intermediate Format (CPIF) file. This file is used as input to the Cadence Windows plot client, cdswpc. cdswpc opens a TCP/IP communications link to the Cadence Windows plot server and transfers the CPIF file to the server to be imaged on the Windows plotter. This is usually automated by configuring the OS print spooling system.

cdswpc accepts CPIF vector data and transmits it to the Cadence Windows plot server.

cdswpc executes the following sequence of events:

- It configures itself based on the options provided and the header in the CPIF file
- It establishes communication with the Cadence Windows plot server
- It transfers the CPIF data to the Cadence Windows plot server

cdswpc recognizes the following options:

`-c` *`color`*	Sets the color mode. Valid Values: `color`, `monochrome`
`-d` *`device_name`*	Sets the device name.
`-H [` *`option`* `]`	Lists the values for *`option`* or lists the values for all the options.
`-h`	Lists syntax and available options.
`-i` *`value`*	Sets the server address (server name/IP address). Must be the same value as set for the Windows server.
`-n` *`value`*	Specifies the number of copies to plot.
`-o` *`orientation`*	Sets the orientation. Valid Values: `portrait`, `landscape`
`-p` *`port_name`*	Sets the printer port name (on the server).

`-Q`	Queries devices from the server.
	Example:
	`%cdswpc -Q`
	`HP DeskJet 690C,LPT1:`
	`HP LaserJet 5Si Mopier PS,LPT3:`
	`HP LaserJet 4V/4MV PostScript,LPT2:`
	`HP DesignJet 650C (C2859A),hp650c@plotserver`

`-s value` — Scales the plot up or down.

`-t port` — Sets the TCP port. Must be the same value as set for the Windows server.
Default: `44965` (on the server)

`-v` — Displays the version number of the software.

`-X [ on | off ]` — Expands stipples (`on`) or not.

`-z paper_size` — Sets the paper size.
Valid Values:

- `A4small`, `executive`, `folio`, `last`, `ledger`, `legal`, `letter[ _rotated ]`, `lettersmall`, `note`, `quarto`, `statement`, `tabloid`
- `10X14`, `11X17`, `12X11`
- `An[ _rotated ]` (where *n* can be `3`, `4`, `5`, `6`)
- `B4[ _jis_rotated ]`, `B5[ _jis_rotated ]`, `B6[ _jis_rotated ]`
- `{ C | D | E }sheet`
- `ENV_style` (where *style* can be `9`, `10`, `11`, `12`, `14`, `C5`, `C3`, `C4`, `C6`, `C65`, `B4`, `B5`, `B6`, `DL`, `italy`, `monarch`, `personal`)
- `japanese_postcard_rotated`, `DBL_japanses_postcard[ _rotated ]`, `JENV_style[ _rotated ]` (where *style* can be `chou3`, `chou4`, `kaku2`, `kaku3`, `you4`)
- `PENV_n[ _rotated ]` (where *n* can be `1` through `10`)
- `fanfold_{ US | std_german | lgl_german }`
- `P16K[ _rotated ]`, `P32K[ _rotated ]`, `P32Kbig[ _rotated ]`

To see other options cdswpc supports, type

```
cdswpc -H all
```

Running cdswpc as a Standalone Program

You can run cdswpc as a standalone program by typing

your_install_dir/tools/plot/bin/cdswpc -i *ipaddress* -t *port* -Q

Table 6-1 cdswpc Plotting Files in your_install_dir/tools/plot/samples

File	Description
cdswpcSYSV.sh	Sample System V (Solaris, HP-UX) interface
cdswpcBSD.sh	Sample BSD (SunOS) filter script

Installing the Cadence Windows Plot Server Software

You must be logged in as administrator or have administrator privileges to perform the installation.

To install the Cadence Windows plot server software,

1. Copy *your_install_dir*/tools/plot/etc/cdswps03.01-r*XXX*.exe (where *XXX* is the build release) to your Windows 2000 plot server.

   This is a Windows 2000 executable program and will not run on your UNIX workstation.

2. Run this program by doing the following:

   a. Choose *Start – Run* from the taskbar and do one of the following:

      - Type the full path and filename to cdswps03.01-r*XXX*.exe
      - Click *Browse* and search for cdswps03.01-r*XXX*.exe

   b. Follow the on-screen instructions to complete the installation.

      A new Cadence icon appears in the taskbar.

   c. Double-click the Cadence icon.

      The Configure Settings for Cadence Windows Plot Server form appears.

   d. Click the *Service Control* tab.

      The *Service Status* field displays *Running*. If it does not, click *Start*.

      If the program still is not running, you might have to restart Windows 2000.

Configuring the Spooling System

Before configuring the spooling system for your plotter,

- Identify the workstation that the plotter is connected to
- Install the Windows plotter according to the manufacturer's directions
- Install the Cadence Windows plot server software

Setting Up the Plot Server

To set up the plot server,

1. Configure the UNIX system print queues.
2. Verify that your file system has enough disk space for a spool directory and a temporary directory for CPIF data.

The following sections explain each of these steps.

Configuring the UNIX System Print Queue

Configuring the UNIX System Print Queue for SunOS (BSD Queuing System)

To configure the UNIX system print queue for SunOS,

1. Log in as `root` on the plot server (the machine the plotter is connected to).
2. Copy `cdswpcBSD.sh` from *`your_install_dir`*`/tools/plot/samples` to *`your_install_dir`*`/tools/plot/bin`.
3. Change the owner of `cdswpcBSD.sh` to `root`.

   ```
   chown root cdswpcBSD.sh
   ```
4. Change the permissions for `cdswpcBSD.sh` as shown below:

   ```
   chmod u=rsx,go=rx cdswpcBSD.sh
   ```

   `cdswpcBSD.sh` retrieves the filename from the job control file. To allow the script access to the file, the filter script must use SUID permissions and be owned by `root`. See the `lpd(8)` man page for further information.
5. Modify *`your_install_dir`*`/tools/plot/bin/cdswpcBSD.sh` by replacing *`your_install_dir`* or *`your_install_path`* with the path of the Cadence software.

```
#!/bin/sh
#
# Cadence Design Systems      March 2003
#
# ...
PATH="/bin:/usr/bin:/usr/ucb:your_install_path/tools/plot/bin:"
export PATH
#
# Locate the name of the data file in the print spool directory.
#
CONTROL_FILE='grep cf lock'
DATA_FILE='grep \^f $CONTROL_FILE | sed -e 's/f//''
# Find out ip_address of Windows server by typing 'ipconfig' from the MS-DOS
# prompt on the Windows machine. Give the name of printer (not
# print_queue_name) you want the plot output to go to after the -d option.
exec cdswpc -i ip_address_of_windows_server -t port_number -d
"printer_name" $DATA_FILE
```

6. Modify `etc/printcap` by adding an entry for the plotter as follows:

   ```
   winplt|winplot|Cadence Windows Plot Server Plotter:\
   :lp=/dev/null:\
   :sh:sf:mx#0:\
   :sd=/usr/spool/winplt:\
   :lf=/usr/adm/lpd-errs:\
   :if=your_install_dir/tools/plot/bin/cdswpcBSD.sh:
   ```

   The entry above sets the plotter device to `/dev/null`, suppresses job headers (`sh`) and form feeds (`sf`), sets an unlimited print file size (`mx#0`), and sets the spool directory to `/usr/spool/winplt`. The last line specifies the filter name.

   The plotter uses the `if` filter because the input data is text. The filter is started once per job.

7. Create the `/usr/spool/winplt` directory.

   ```
   mkdir /usr/spool/winplt
   ```

8. Make sure the file `/usr/adm/lpd-errs` exists. If it does not, use the `touch` command to create it.

Diagnostic output is sent to the file `/usr/adm/lpd-errs`. If you specify the `-v` option to `raptor` in `cdswpcBSD.sh`, it will produce diagnostic output. If you do not specify the `-v` option, there will be no diagnostic output produced except for error messages.

Note: For more information, see the `printcap` and `lpd` man pages.

Configuring the UNIX System Print Queue for HP-UX

To configure the UNIX system print queue for HP-UX,

1. Log in as `root` on the plot server.

2. Copy `cdswpcSYSV.sh` from *`your_install_dir`*`/tools/plot/samples` to *`your_install_dir`*`/tools/plot/bin`.
3. Change the permissions for `cdswpcSYSV.sh` as shown below:

   ```
   chmod u=rwx,go=rx your_install_dir/tools/plot/bin/cdswpcSYSV.sh
   ```

4. Edit *`your_install_dir`*`/tools/plot/bin/cdswpcSYSV.sh`.

   The following sample shows you how to edit `cdswpcSYSV.sh` if the directory in which the Cadence software is installed is `cds`.

   ```
   #!/bin/sh
   #
   # Cadence Design Systems      March 2003
   # ...
   PATH="/bin:/usr/bin:/usr/lib:cds/tools/plot/bin"
   export PATH
   log=/usr/spool/lp/logwinplt
   exec 2>>$log
   shift;shift;shift;shift;shift
   DATA_FILE=$1
   exec cdswpc -i ip_address_of_windows_server -t port_number -d
   "printer_name" $DATA_FILE
   ```

5. Use the following `lpadmin` commands (located in `/usr/lib`) to create the queue.

   ```
   lpshut
   lpadmin -pplotter_name -v/dev/null -iyour_install_dir/tools/plot/bin/
   cdswpcSYSV.sh
   lpsched
   enable plotter_name
   accept plotter_name
   ```

   Replace *`plotter_name`* with the name of the plotter queue and *`your_install_dir`* with the directory in which the Cadence software is installed. For example, if *`your_install_dir`* is `/cds` and *`plotter_name`* is `winplt`, type

   ```
   lpadmin -p winplt -v /dev/null -i/cds/tools/plot/bin/cdswpcSYSV.sh
   ```

Configuring the UNIX System Print Queue for Solaris (System V Queuing System)

To configure the UNIX system print queue for Solaris,

1. Log in as `root` on the plot server.
2. Copy `cdswpcSYSV.sh` from *`your_install_dir`*`/tools/plot/samples` to *`your_install_dir`*`/tools/plot/bin`.
3. Change the permissions for `cdswpcSYSV.sh` as shown below:

   ```
   chmod u=rwx,go=rx your_install_dir/tools/plot/bin/cdswpcSYSV.sh
   ```

4. Edit *`your_install_dir`*`/tools/plot/bin/cdswpcSYSV.sh`.

The following sample shows you how to edit `cdswpcSYSV.sh` if the directory in which the Cadence software is installed is `cds`.

```
#!/bin/sh
#
# Cadence Design Systems      March 2003
# ...
PATH="/bin:/usr/bin:/usr/lib:cds/tools/plot/bin"
export PATH
log=/usr/spool/lp/logwinplt
exec 2>>$log
shift;shift;shift;shift;shift
DATA_FILE=$1
exec cdswpc -i ip_address_of_windows_server -t port_number -d
"printer_name" $DATA_FILE
```

5. Use the following `lpadmin` commands (located in `/usr/lib`) to create the queue.

   ```
   lpshut
   lpadmin -pplotter_name -v/dev/null -iyour_install_dir/tools/plot/bin/
   cdswpcSYSV.sh
   lpsched
   enable plotter_name
   accept plotter_name
   ```

   Replace *`plotter_name`* with the name of the plotter queue and *`your_install_dir`* with the directory in which the Cadence software is installed. For example, if *`your_install_dir`* is `/cds` and *`plotter_name`* is `winplt`, type

   ```
   lpadmin -p winplt -v /dev/null -i/cds/tools/plot/bin/cdswpcSYSV.sh
   ```

Verifying Disk Space

When queuing CPIF data, the software copies the CPIF data to the temporary directory and then recopies it to the spool directory for the print queue. The temporary and spool directories each should be configured with enough space to hold a CPIF file of your plot data. Large IC plots can take over 200 megabytes of disk space.

If your system does not have enough space, you can

- Specify a different directory in the `.cdsplotinit` file

  See "Draft Plotting" on page 136.

- Link `/usr/tmp` to another file system

You can set up the temporary directory in any location on the network. The directory must have `rwxrwxrwx` (`ugo=rwx`) permissions.

The software does not verify available disk space before it generates a plot. The workstation might hang if it does not have enough disk space.

Setting Up Cadence Plotting Services Software

You must define the plotters for the Cadence Plotting Services software in the plotting configuration file, `.cdsplotinit`.

You might want to consider several `.cdsplotinit` files:

- A system *your_install_dir*`/tools/plot/.cdsplotinit` file containing all of your plotters
- A group-specific `.cdsplotinit` file in the current working directory
- A user-specific `.cdsplotinit` file in the user's home directory

The software loads the system file first, the current working directory's file second, and then the `.cdsplotinit` file in the user's home directory. As the software reads the files, plotter definitions are appended to the current list. The software overwrites plotter definitions with the same plotter name, letting users override system settings.

This section describes the `.cdsplotinit` file entry for any plotter driven by cdswpc, which will look similar to a Versatec entry. Specifically, the type will be `intCLR` (or `intBW` for monochrome). And if the plotter uses roll media, the first page size number (the width) should be 0.

Configuring the Plotter with the Utility

To create or modify the `.cdsplotinit` configuration file, use the plotconfig utility if the X Window System is running. If not, follow the procedures in "Configuring the Plotter without the Utility" on page 155.

To use the utility,

1. Verify that *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin` are in your search path.

   your_install_dir is the directory in which the Cadence products are installed, such as `/cds`. If your workstation is set up correctly, typing `cds_root` returns *your_install_dir*. If `cds_root` does not return the path, check your search path or see your system administrator.

2. Start the plotter configuration utility by doing one of the following:

   - At the UNIX prompt on a color terminal, type

     ```
     plotconfig
     ```

- At the UNIX prompt on a monochrome terminal, type

  ```
  plotconfig -bw
  ```

3. The Cadence Plotter Configuration form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

   Note: If the `F1` or `Help` key does not display information about a field, check your window manager file, such as Motif's `~/.mwmrc` file. By default, Motif binds help to the `F1` or `Help` key. Your file probably binds the `F1` or `Help` key to something besides help.

4. Select the plotter configuration file to modify.

   The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

   - *your_install_dir*`/tools/plot/.cdsplotinit`
   - Current working directory (`./.cdsplotinit`)
   - The `.cdsplotinit` file in the home directory entry in the password database for the user

   As each file is read, the software appends the plotters to the list of available plotters and overwrites plotter definitions with the same plotter name.

5. In the *List of Plotter Models* list box, double-click the plotter model you want to put in the file.

   The plotter model is added to the *List of Installed Plotters* list box. If you add several plotters of the same model, each plotter is numbered sequentially. For example,

   ```
   ce3236
   ce3236(1)
   ce3236(2)
   ```

6. In the *List of Installed Plotters* list box, click the plotter model.

7. Click *Setup*.

   The Plotter Setup form appears.

   For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

8. Fill in the form.

9. Click *OK*.

10. In the Cadence Plotter Configuration form, click *Queue*.

    The Plotter Queue form appears.

    For information, click the *Help* button. For information about a specific topic (or field), move your cursor over the field and press `F1` or the `Help` key. Press the key again (over the field) to close the help window, or click *Close* in the help window.

11. Fill in the form.

12. Click *Test* to test the queue command.

13. Click *OK*.

14. (Optional) Create the CPIF data in compressed format by adding the `compress` line:

    ```
    :compress:\
    ```

15. Repeat these steps to set up any other plotter configuration file.

16. In the Cadence Plotter Configuration form, click *Quit*.

    If *Quit* is grayed out, close all windows related to the plotconfig utility.

Configuring the Plotter without the Utility

To create or modify the `.cdsplotinit` configuration file without the utility,

1. Create a `.cdsplotinit` file in your home directory.

   You can use an editor, such as `vi`.

   ```
   vi ~/.cdsplotinit
   ```

   You must specify your site-specific information.

   The *`your_install_dir`*`/tools/plot/etc/cdsplotinit` file lists the supported plotter models. The header of this file lists the CPS version with which the file is associated. The *`your_install_dir`*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.

2. Copy the entry for your plotter model from *`your_install_dir`*`/tools/plot/etc/cdsplotinit` to your `.cdsplotinit` file.

   For example, if you are setting up an HP DeskJet 690C color plotter, the entry might be similar to

   ```
   HP DeskJet 690C:\
       :manufacturer=Hewlett Packard:\
       :type=intCLR:\
   ```

```
:maximumPages#10:\
:resolution#300:\
:paperSize="Letter" 2400 3150 75 75:
```

If your plotter is not in *your_install_dir*/tools/plot/etc/cdsplotinit, you might still be able to use it if you modify an existing entry from the same manufacturer.

3. Assign a configuration name to the entry for the plotter.

This is the name the plotter will be known by from Cadence applications.

Add the name and a vertical bar (|) to the beginning of the plotter model line, leaving no spaces on the line. If you do not specify a menu name, the plotter may not show up in the list of plotters in the application.

Follow these guidelines when naming your plotter:

- Do not use these characters in the plotter name:

  colon (:) equal sign (=) double quotes (")
  backslash (\) vertical bar (|)

- Do not leave any spaces at the beginning or the end of the name.

  Note: Leading and trailing spaces in *menu_name* and *plotter_model* are significant and become part of the names.

- Do not change *plotter_model* (HP DeskJet 690C in the example). You can only use plotter models recognized by Cadence Plotting Services software.

For example, if you want the software to display the plotter as HP DeskJet 690C, add the name to the first line, followed by a vertical bar (|), leaving no spaces.

```
HP DeskJet 690C|HP DeskJet 690C:\
```

The Cadence software will display

```
HP DeskJet 690C
```

or

```
HP_DeskJet_690C
```

4. Add the spooling information for the plotter.

Use the spooling commands for your operating system. The table lists the spooling entries for a plotter (identified as winp).

Operating System	Spool	Query	Remove
AIX	`enq -P winp:\`	`enq -q -P winp:\`	`enq -x $4 -P winp:\`
HP-UX	`lp -dwinp:\`	`lpstat -owinp:\`	`cancel $1 winp:\`
Solaris	`lp -dwinp:\`	`lpstat -owinp:\`	`cancel $1 winp:\`
SunOS	`lpr -Pwinp:\`	`lpq -Pwinp:\`	`lprm -Pwinp $3:\`

5. (Optional) Create the CPIF data in compressed format by adding the `compress` line:

   ```
   :compress:\
   ```

6. (Optional) To use the resident fonts instead of the stroked fonts displayed on the screen, type

   ```
   :residentFonts:\
   ```

7. Remove the backslash from the last line of the plotter definition.

8. Verify each line of the plotter entry.

   The complete entry for a 300-dpi HP DeskJet 690C plotter identified as `winp` in the `/etc/printcap` file and as `HP DeskJet 690C` on the application's menu, and using a letter size paper in the SunOS environment might be

   ```
   HP DeskJet 690C|HP DeskJet 690C:\
       :spool=lpr -Pwinp:\
       :query=lpq -Pwinp:\
       :remove=lprm -Pwinp $3:\
       :manufacturer=Hewlett Packard:\
       :type=intCLR:\
       :maximumPages#10:\
       :resolution#300:\
       :paperSize="Letter" 2400 3150 75 75:
   ```

   Remove spaces that occur

   - Between *`menu_name`* and *`plotter_model`*
   - Before the ending colon
   - At the end of each line

9. Save and exit the file.

10. (Optional) Relocate the file.

The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

- *your_install_dir*`/tools/plot/.cdsplotinit`
- Current working directory (`./.cdsplotinit`)
- The `.cdsplotinit` file in the home directory entry in the password database for the user

The software overwrites plotter definitions with the same plotter name; the last plotter defined is the definition the plotter uses.

Testing the Configuration File

You can test the queuing command from the plotconfig utility. You test the `.cdsplotinit` file by plotting a design from a Cadence application.

1. Start the Cadence application.
2. Print a design to test the `.cdsplotinit` file.

Follow the plotting procedure in your Cadence application's user guide. If the plot does not come out, see Chapter 7, "Troubleshooting."

7

Troubleshooting

To troubleshoot a plotting problem, check the following.

- Depending on your Cadence application, check for error messages in
  - Cadence windows
  - Plotter log file
  - Cadence log file
- See "Plotting Problems" on page 159.
- See "Error Messages" on page 163.
- Send the plot to a file instead of a plotter and use the spooling system command, such as `lpr`, to send the file to a plotter.
- Refer to the flowchart for your operating system in Appendix B, "Configuring Spooling Systems," to see how your operating system handles plotting.
- Follow the steps in "Troubleshooting Flow Chart" on page 169 or "Step-by-Step Troubleshooting" on page 176.

Plotting Problems

Look up specific plotting problems here. Look up error messages in "Error Messages" on page 163.

The plotter name is wrong

Verify the queue device for the spooling system.

- For SunOS, check the `/etc/printcap` entry for the plotter.
- For HP-UX, use `sam`.

- For Solaris, use `admintool`.
- For AIX, check the `/etc/qconfig` entry.

The plotter is not recognized by the Cadence application

Check the `.cdsplotinit` file. The Cadence® applications read the `.cdsplotinit` files in this sequence when the applications start:

- *`your_install_dir`*`/tools/plot/.cdsplotinit`
- Current working directory (`./.cdsplotinit`)
- The `.cdsplotinit` file in the home directory entry in the password database for the user

The software overwrites plotter definitions with the same plotter name; the last plotter defined is the definition the plotter uses.

The name of the plotter precedes the vertical bar (`|`) on the first uncommented line. If there is no name preceding the model name, the plotter does not appear on a Cadence menu.

Plotter status indicates no daemon is present

- In SunOS, if a status message indicates no printer daemon is running, verify the entry in the `/etc/printcap` file.
- Start the daemon with the command appropriate for your operating system. For example, for SunOS, type

  ```
  /usr/lib/lpd
  ```

  For HP-UX or Solaris, type

  ```
  /usr/lib/lpsched
  ```

  For AIX, type

  ```
  /etc/qdaemon
  ```

  If the AIX plot server will be receiving plot jobs from a SunOS system, you must start `lpd` on the plot server:

  ```
  startsrc -s lpd
  ```

Cadence Plotting Services software uses the wrong .cdsplotinit file

Because the `.cdsplotinit` file can be in several locations, be sure you modify the correct one. The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:

- *your_install_dir*`/tools/plot/.cdsplotinit`
- Current working directory (`./.cdsplotinit`)
- The `.cdsplotinit` file in the home directory entry in the password database for the user

As the software searches the locations, new plotters are appended to the current list. The software overwrites plotter definitions with the same plotter name.

Colors, stipple patterns, or line styles plotted do not match the image on the screen

- Check your mail and the log file for errors.
- The plotter is not defined correctly in the `.cdsplotinit` file.
- The plot is not defined correctly in the library.

  In Design Framework II, check the plotting output device defined in the library's technology file. Modify the layer colors, stipple patterns, and line styles. Add layers if necessary.
- Your plotter might not be able to plot the colors, lines, and stipple patterns defined in the library.

  Check the "Customizing Lines, Colors, and Stipple Patterns" section of your plotter's chapter for plotter limitations.

Plot does not print

- Depending on your application, check your mail and the log file for errors.
- Verify that the plot does not exceed the maximum number of pages allowed.

  Occasionally, some sites restrict the number of pages to print to save time or paper. If the plot exceeds the maximum number of pages specified in the `.cdsplotinit` file, no plot plots. The plot header page is not counted.

  ```
  :maximumPages#2:\
  ```

  Increase the number of pages allowed.

- Check the plotter's queue on your workstation and the plot server.
- Verify that the printer daemon is running on both the plot server and the client.

  Use the command appropriate for your operating system. For example, for SunOS, type

  ```
  ps -aux | grep lpd
  ```

  For HP-UX or Solaris, type

  ```
  /usr/bin/lpstat -r
  ```

  For AIX, type

  ```
  ps -edaf | grep qdaemon
  ```

  If the daemon is not running, start it with the command appropriate for your operating system.
- Verify the plotter status on both the plot server and the client.

  Use the command appropriate for your operating system. For example, for SunOS, type

  ```
  lpc status plotter_name
  ```

  For HP-UX or Solaris, type

  ```
  lpstat -oplotter_name
  ```

  For AIX, type

  ```
  enq -q -P plotter_name
  ```
- Verify the `/etc/services` entry for `printer` services.

  The `printer` entries in `/etc/services` on the clients must match those on the plot server. The default works, but you might have problems if someone modified the file. The default is

  ```
  printer 515/tcp spooler #Line Printer Spooler
  ```
- Check the hardware connections.
- Run a self-test from the plotter.

Plotter cannot plot large designs

There are no error messages. The plotter can plot small designs.

A plotter requires the `mx#0` option in the `/etc/printcap` file in SunOS because the option permits printing unlimited amounts of data. If `mx#0` exists, check the amount of disk space in the temporary and spool directories. You might need as much as 200 megabytes in the temporary directory or 100 megabytes in the spool directory, depending on the type of plotter.

Application hangs when I click the Queue Status from the application window

The application is running in the background. You can “unhang” it by bringing the application to the foreground with the `fg` command, and you can determine the cause while it is hung.

Use the `ps -ax` command to locate the hung command. The command displays information similar to

```
jo  7584 0.0 0.0 28  0   p3  TW   14:32 0:00
    sh -c csh -c "lpq -Plw >&!  \  /tmp/querya07575 < /dev/null"
jo  7585 0.0 0.0 76  0   p3  TW   14:32 0:00
    -sh -c lpq -Plw >&! \      /tmp/querya07575 < /dev/null(csh)
```

The process that follows these commands (or one close by) is usually the offending command.

If the command does not make sense, use `ps -l` to identify the parent process (PPID) of the command. For example, `ps -l` displays information similar to the following.

```
    F UIDPIDPPIDCP   PRI NI  SZ  RSS WCHANSTATTTTIMECOMMAND
20408000389167996684O5   0   36 0    child IW co0:00 xinit
20008001389168006799S1   064041368   select S co5:00 X :0
20008000389168016799O5   0   28 0    child IW co0:00 sh /mnt2/jo
20008000389181297807O5   0   28 0        TW   p30:00 sh -c csh -c
200080003891813081292O5  0   76 0        TW   p30:00 -sh -c lpq -
200080003891813381300O5  0   20 0         TW   p30:00 more
```

The command might come from an error in your `.cshrc` or `.profile` file.

In the above example, `more` is the process following the hung command. When an application opens a new window, it reads the `.cshrc` or `.profile` file. An incorrect alias definition causes the file to execute a `more` command, which requires standard input. Because Design Framework II is running in the background, it cannot receive standard input.

In this example, necessary quotation marks were missing around an alias ending with `more`.

Error Messages

This section lists alphabetically the error messages from the Cadence plotting products. Numbered error messages are listed alphabetically according to the first word in the message. The messages can appear in a Cadence log file, plotter log file, application window, or in mail messages.

Abnormal end of file

- Usually caused by a corrupted CPIF file. Make sure the CPIF file specified is CPIF format.

Abnormal exit

- Program exited with a bad status.

Aborting program, received signal X

- Program was aborted with a signal X.

Bad fill pattern definition in CPIF data
: Stipple pattern not 16x16, expanding.
: If not 16 bits wide expect incorrect stipple on plot.

- Raptor will clip the fill pattern down to 16x16.

Can't open EPS output file. Check security on temporary directory.

- Access permissions on `/usr/tmp` must be `777`.

Cannot open input file name

- CalComp or Versatec plotting error. The `-inputfile` option of `cds2calcomp` or `cds2versa` was used to start CalComp or Versatec plotting. Verify that the specified file exists.

Cannot open input file ...
cpifParser.cc-1064: Error opening input file, name

- Either could not find the file or did not have permission to open the CPIF input file specified on the command line.

Cannot open output file ...
cpifParser.cc-1099: File open failed (name)

- Could not open the output file specified with the `-o` argument on the command line. Check whether the directory exists or that the permissions are correct.

cat: writer error: Broken pipe

- Verify the spool command and the name of the plotter in the `.cdsplotinit` file.

Computed zero pages to plot

- The plot size selected was too small. Check the plot size specified in the Cadence software.

Could not find temporary plot directory path

- CalComp or Versatec plotting error. The Cadence software cannot find the temporary directory specified in the `.cdsplotinit` file with `tmpdir`.

cpifParser.cc-1149: Fork failed

- When attempting to fork the formatter process, it failed. The formatter is specified with the `-f` command line argument. If a Cadence formatter is used (VPI, VDS, CCRF), make sure that your search path contains the *`your_install_dir`*`/tools/plot/bin` directory to allow location of VPIout, VDSout, and CCRFout. If you are using a different program such as compress, check to make sure it is in your search path.

Expected close polygon command, line X.

- Did not find a polygon close command. This is caused by a corrupted CPIF file.

File filename does not exist or is not accessible.

- Check the spelling of *`filename`*.

Header is bad.

- Usually caused by a corrupted CPIF file. Make sure the CPIF file specified is CPIF format.

Incomplete intermediate file header

- Usually caused by a corrupted CPIF file. Make sure the CPIF file specified is CPIF format.

- lpd[189]: filename: No such file or directory

- System cannot queue the data to the spooling area because the *`path`* directory does not exist. Create a spool directory.

- lpd[234]: unable to get hostname for remote machine plot_server

- The remote workstation name does not match the name in the `/etc/printcap` or `/etc/qconfig` file or the remote workstation is down.

- lpd[456]: vt: can't execv install_dir/tools/plot/bin/cds2versa: No such file or directory

- In SunOS, correct the `cds2versa` path in `/etc/printcap`. In AIX, correct the `cds2versa` path in `/etc/qconfig`.

lpr:Error Piping File

- Verify the name of the plotter in the `.cdsplotinit` file.

lpr:plotter_name unknown

- Verify the name of the plotter in the `.cdsplotinit` file.

No paper sizes are defined.

- Correct the `paperSize` entry for *`plotter_name`* in the `.cdsplotinit` file.

plot il file not found
plotcap il file not found

- The software looked for the wrong file. Verify that `cds_root` returns the correct hierarchy, such as `/usr/cds` if the Cadence Plotting Services software is in `/usr/cds/tools/plot`.

plot mail command failed: user

- The command failed to send mail back to the plot submitter, usually due to a mail or network problem. Contact your system administrator.

plot submission failed

- Plot submission at later time failed. See documentation for help.

  This means the user is either in the `at.deny` table or is not in the `at.allow` table. The `at.allow` table is not required. See your administrator.

Plotter is not able to do multipage plots.

- Your plotter cannot plot plots that use more than one page. Check the `.cdsplotinit` file for the `maximumPages` entry.

Plotter type is not available from the plotcap entry.

- Verify *`plotter_name`* in the `.cdsplotinit` file. It must be listed in *`your_install_dir`*`/tools/plot/etc/plotcap.il`.

plotter type not found in plotcap entry “plotter.”, plotcaptype);

- Verify *`plotter_name`* in the `.cdsplotinit` file. It must be listed in *`your_install_dir`*`/tools/plot/etc/plotcap.il`.

syntax error line # error

- There is a syntax error in the `.cdsplotinit` file.

The maximumPages for plotter_name is zero

- Correct the `maximumPages` entry for *`plotter_name`* in the `.cdsplotinit` file. It must be an integer of one or more.

The resolution for plotter_name is zero

- Specify the `resolution` entry for *`plotter_name`* in the `.cdsplotinit` file. The resolution is in dots per inch, such as `300`.

There is no model specified for *plotter_name*

- Verify *`plotter_model`* for *`plotter_name`* in the `.cdsplotinit` file. You cannot change *`plotter_model`*. You can only use plotter models recognized by Cadence Plotting Services software.

There are no paper sizes defined for *plotter_name*

- Add the `paperSize` entry for *`plotter_name`* in the `.cdsplotinit` file.

There is no paper size selected.

- Select the paper size before plotting a design.

There is no plot to submit.

- You did not specify a design to plot. Follow the plotting procedure in your Cadence application's user guide.

There is no plotter selected.

- Select the plotter before plotting a design.

There is no query command specified for *plotter_name*

- Verify the `query` entry for *`plotter_name`* in the `.cdsplotinit` file.

There is no remove command specified for *plotter_name*

- Verify the `remove` entry for *`plotter_name`* in the `.cdsplotinit` file.

There is no spool command specified for *plotter_name*

- Verify the `spool` entry for *`plotter_name`* in the `.cdsplotinit` file.

There is no type specified for *plotter_name*

- Verify *`plotter_name`* in the `.cdsplotinit` file. It must be listed in *`your_install_dir`*`/tools/plot/etc/plotcap.il` or in Appendix A, "Cadence Plotter Configuration File."

There were no system .cdsplotinit files found.

- There is no default `.cdsplotinit` file. The Cadence applications read the `.cdsplotinit` files in this sequence when the applications start:
  - *`your_install_dir`*`/tools/plot/.cdsplotinit`
  - Current working directory (`./.cdsplotinit`)
  - The `.cdsplotinit` file in the home directory entry in the password database for the user

As the software searches the locations, new plotters are appended to the current list. The software overwrites plotter definitions with the same plotter name.

Warning, syntax error in filename, using default values.

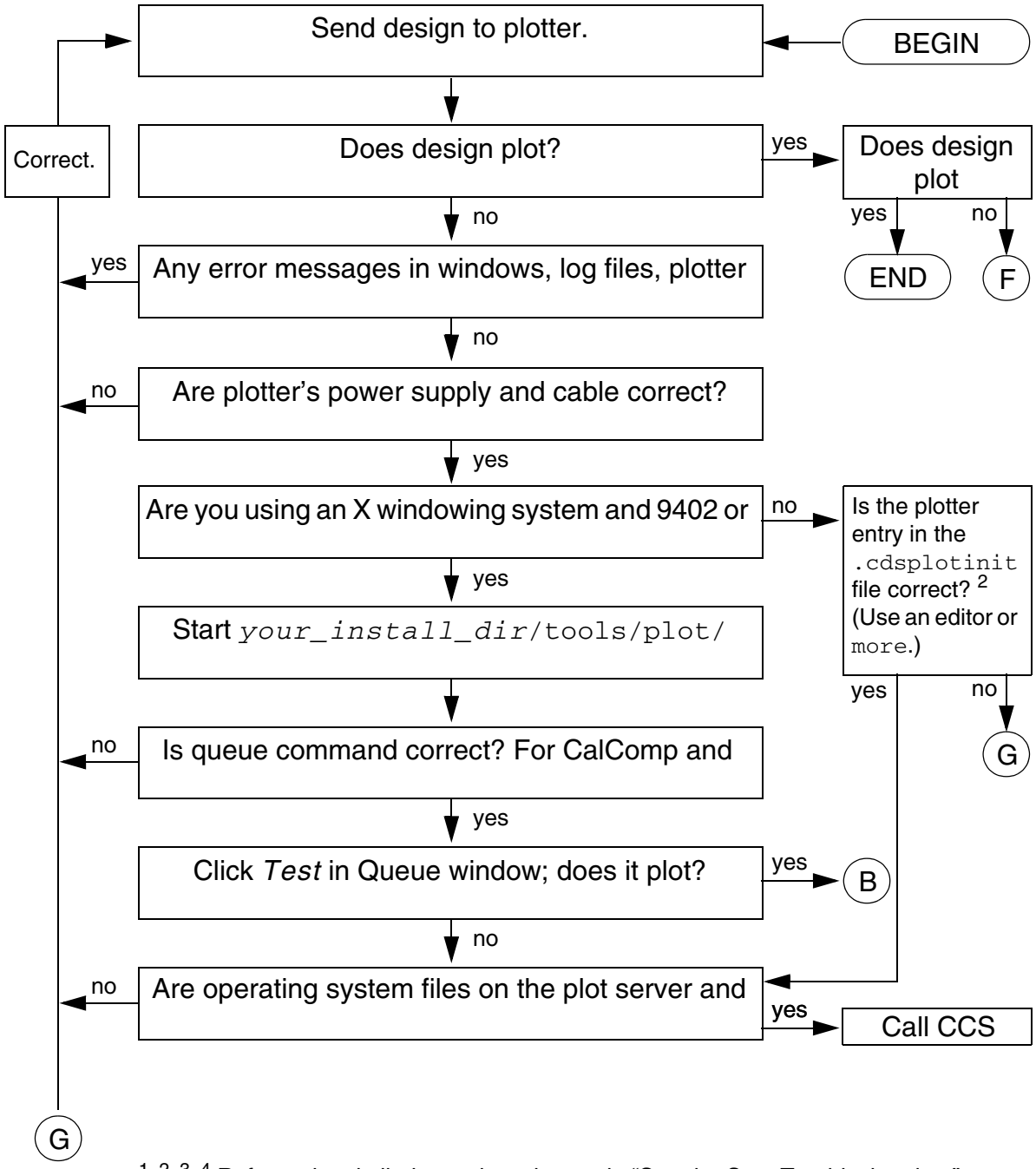
- CalComp plotting error. Syntax error in `cmodel.dat` file.

Troubleshooting Flow Chart

To troubleshoot a plotting problem, use the flow charts on the following pages. In the charts, CCS stands for Cadence Customer Support. For more detailed information, see

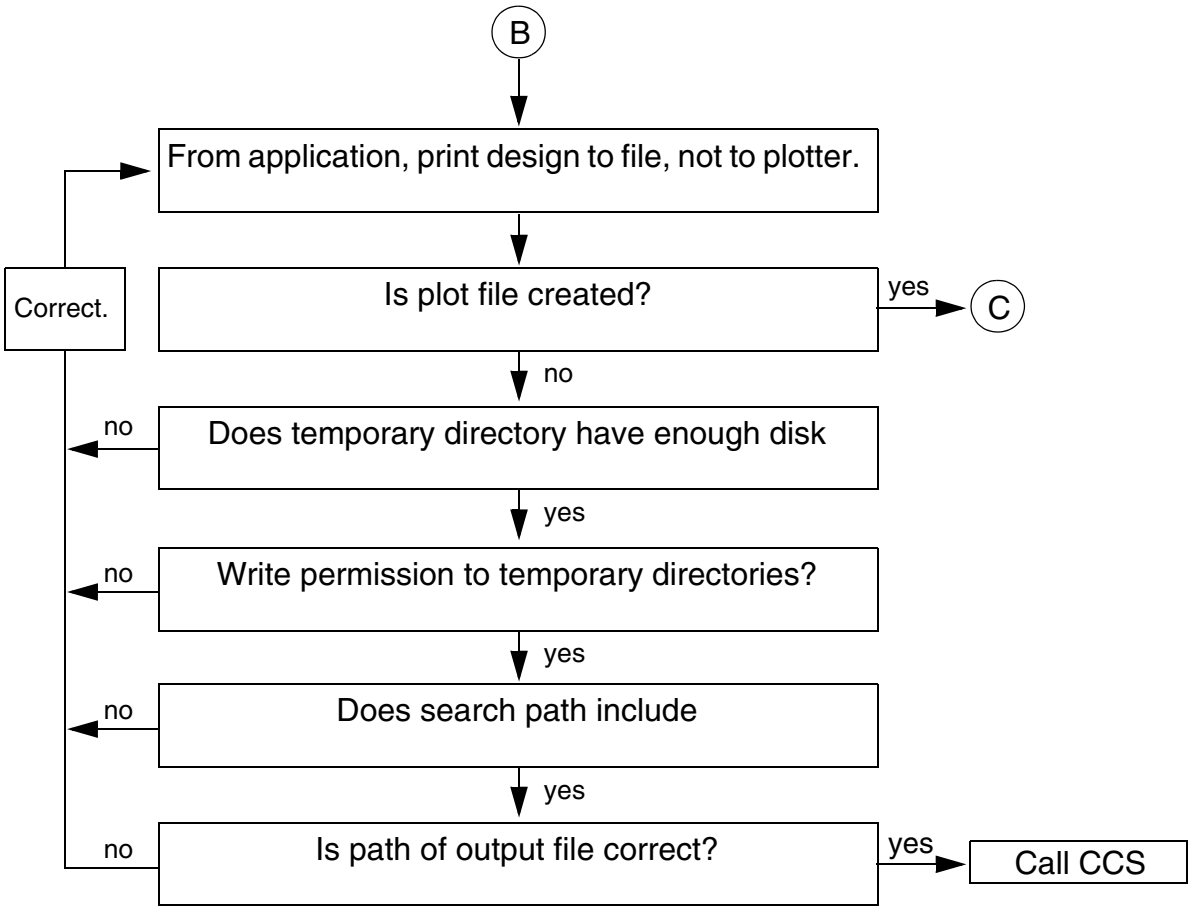
- Step-by-Step Troubleshooting on page 176
- Plotting Problems on page 159
- Error Messages on page 163
- Plotter-specific chapters
- Configuring Spooling Systems on page 197
- Your operating system documentation

Figure 7-1 Check Plotter Setup



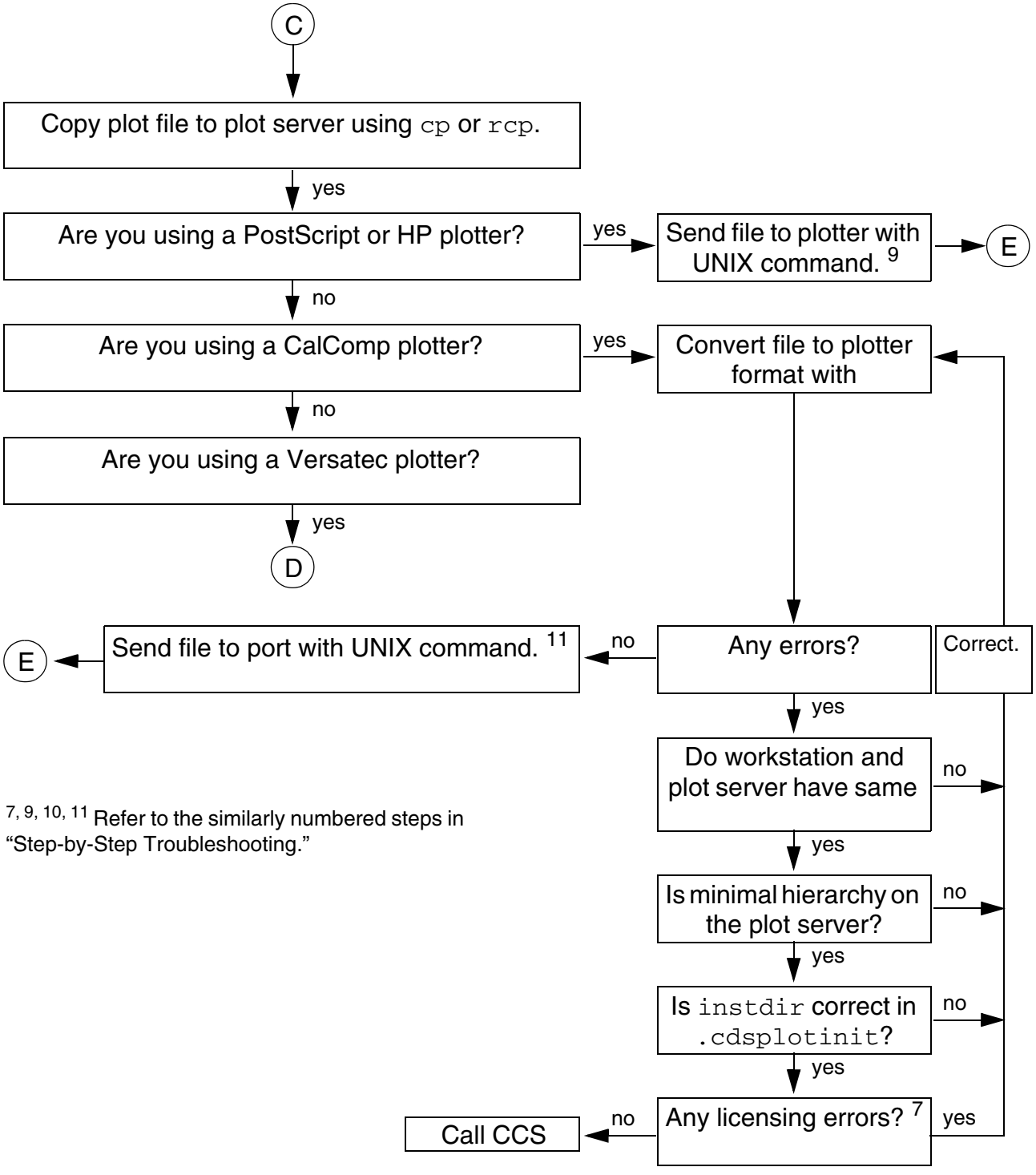
1, 2, 3, 4 Refer to the similarly numbered steps in "Step-by-Step Troubleshooting."

Figure 7-2 Create Plot File



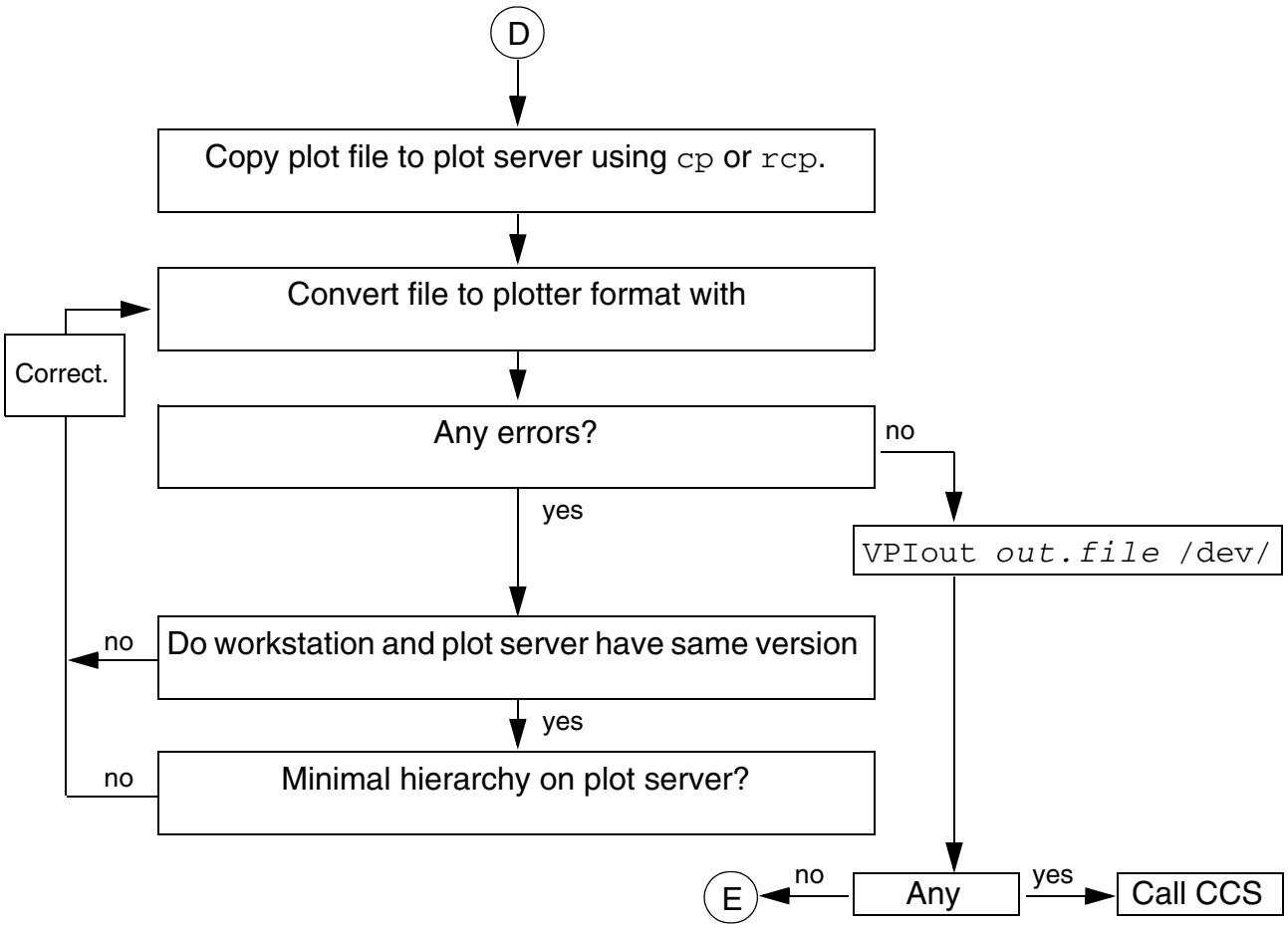
[5, 6] Refer to the similarly numbered steps in “Step-by-Step Troubleshooting.”

Figure 7-3 Send Plot File to Plotter



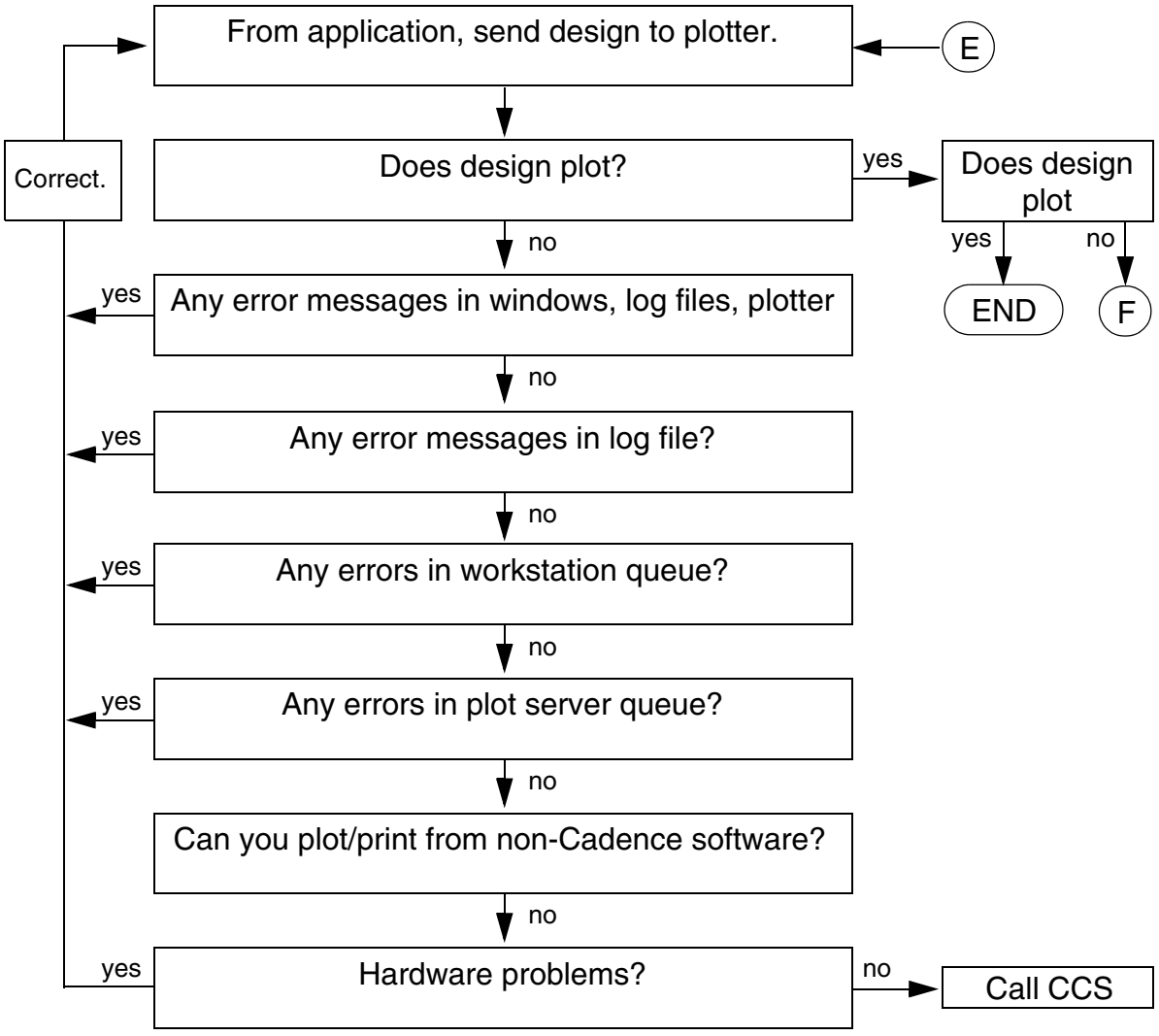
7, 9, 10, 11 Refer to the similarly numbered steps in "Step-by-Step Troubleshooting."

Figure 7-4 Send Plot File to Plotter (Versatec)



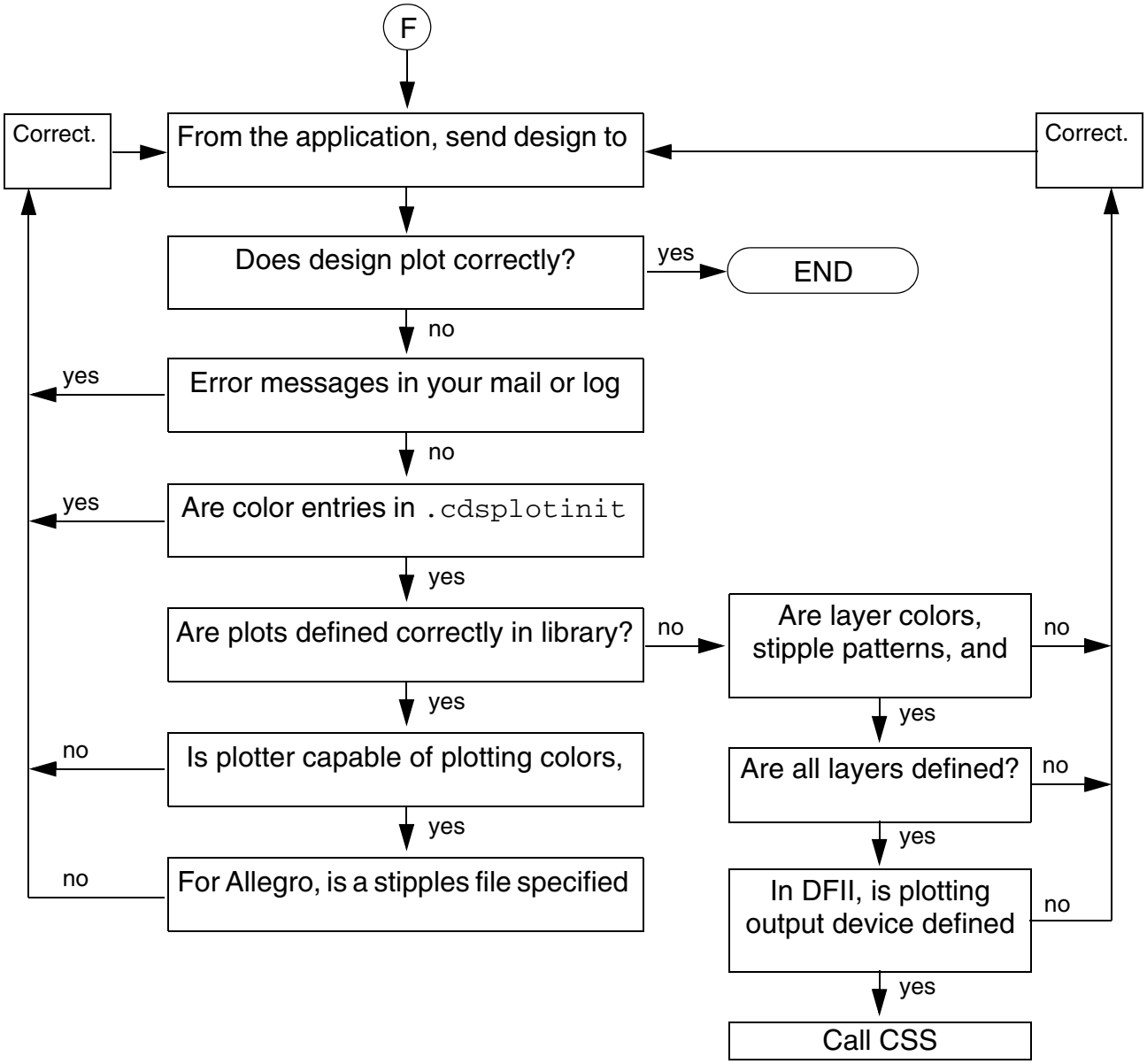
[10] Refer to the similarly numbered steps in “Step-by-Step Troubleshooting.”

Figure 7-5 Send the Design to the Plotter



[1] Refer to the similarly numbered steps in “Step-by-Step Troubleshooting.”

Figure 7-6 If the Plot Is Not Correct



Step-by-Step Troubleshooting

When a Design Does Not Plot

This guide is for Cadence plotting software, release 4.2.2 and later. *your_install_dir* represents the directory in which the Cadence software is installed, such as `/usr/cds`.

Follow these steps until you find and correct the problem.

1. Check for error messages.

   Depending on the Cadence application and operating system, check for errors in Cadence windows, user's mail, plotter and Cadence log files, plotter LED display, and the plotter queues.

2. If you have an X Window System, follow these steps.

   a. Type `plotconfig`.

      If plotconfig cannot be found, use the full path, *your_install_dir*`/tools/plot/bin/plotconfig`.

      The Plotter Configuration form appears.

   b. Select the personal, group, or site file.

      The personal file overrides the group and site files. The plotters must be defined in at least one of these files.

   c. In the *List of Installed Plotters* list box, click the plotter model.

   d. Verify spool commands by clicking *Queue*.

   e. For CalComp, verify that `instdir` is the path returned by `cds_root`.

   f. Test queuing by clicking *Test* in the Plotter Queue form.

      A simple polygon plots if the spool command is correct.

   g. Close the Plotter Queue form and click *Save*.

   h. Resubmit the plot to the plotter.

3. When an X Window System is not available, use `more` or an editor to look at the problem plotter's definition.

   From your workstation, verify each line of the problem plotter's entry in all `.cdsplotinit` files read by the software. Your personal `.cdsplotinit` file (in the

home directory entry in the password database for the user) overrides the group `./.cdsplotinit` and site *your_install_dir*`/tools/plot/.cdsplotinit` files.

The entries follow the same rules as BSD's `/etc/printcap` file. The ellipsis (…) in this sample entry represents more text.

```
vt|8936-4:\
:manufacturer=Xerox Engineering S…:\
:type=intCLR:\
:spool=lpr -Pvt:\
:query=lpq -Pvt:\
:remove=lprm -Pvt $3:\
:maximumPages#10:\
:resolution#400:\
:residentFonts:\
:tmpdir=/usr/tmp:\
:paperSize="36 inches wide" 0 14080:
```

Common problems include

- Backslashes (\) followed by spaces.
- For the Concept® board designer, plotter names with spaces.
- For CalComp and Versatec plotters, an incorrect path to the filter in the `/etc/printcap` entry.
- For CalComp plotters, `instdir` pointing to the wrong directory. The `.cdsplotinit` file on your workstation must point to the plot server's *your_install_dir*.
- Specifying encapsulated PostScript for reasons other than importing a plot into word processing-type document.

4. Check the operating system files on the plot server and on your workstation.

   - For SunOS, and OSF, look at `/etc/printcap`.

     Look for errors such as comment lines within a plotter definition or extra spaces. For CalComp or Versatec plotters, verify the absolute path to `cds2calcomp` or the filter script on the plot server. Check the filter script, `cdsBSD.sh`, located in *your_install_dir*`/tools/plot/bin` to determine the correct path to the `raptor` command.
   - For HP-UX and Solaris, check the interface script, `cdsSYSV.sh`, located in *your_install_dir*`/tools/plot/bin`.
   - For AIX, see your system manuals.

5. From your application, select the plotter name (*plotter_name*).

   For the Concept board designer, type

```
set plotter plotter_name
```

6. Send the plot to a file (*plot_file*).

   For the Concept board designer, create `vw.spool` in your working directory:

   ```
   set spooled_plot
   hardcopy
   ```

7. If no plot file is produced, verify

   - The directory to which you sent *plot_file* is writable
   - Adequate disk space in `/usr/tmp` or the specified temporary directory and in `tmpdir` for CalComp and Versatec plotting
   - You have write permission to these directories
   - Your search path includes *your_install_dir*`/tools/bin` and *your_install_dir*`/tools/plot/bin`

8. Make *plot_file* available to the plot server.

   - Use `cp` or `rcp` to copy *plot_file* to the plot server.
   - From the plot server, use an automount path, such as `/net/`*workstation*`/`*path_to_plot_file*.

9. For HP and PostScript plotters, use the usual UNIX spool command, such as `lpr`, to send the file to a plotter.

10. For CalComp or Versatec plotters, convert *plot_file* (CPIF format) to plotter format.

    - On the plot server, use `cds2calcomp` to convert *plot_file* to CalComp format (*cc_file*) and `raptor` to convert *plot_file* to Versatec raster (*versa_file*).

      Use `cds2calcomp -help` and `raptor -h` to see the arguments each accepts.

    - Correct any errors.

      For `cds2calcomp`, the `instdir` in the `.cdsplotinit` file on your workstation must point to the plot server's *your_install_dir*.

      If the plot server and your workstation use different versions of Cadence software, reinstall the plotting software.

      If the plot server does not have the minimal hierarchy, reinstall the plotting software.

11. For a CalComp plotter, send *cc_file* directly to the port connected to the plotter.

    For a `/dev/ttya` serial plotter, type

```
stty baud ixon ixany cd8 -parity < /dev/ttya
cat cc_file > /dev/ttya
```

For a parallel plotter, type

```
cat cc_file > /dev/plt_parallel
```

12. For Versatec plotters, follow these steps.

Use `raptor` to create standard raster data as follows:

```
raptor -o versa_file -v cpif.file
VPIout < versa_file > /dev/vp0
```

13. From the application, send the design to the plotter.

In the user interface, turn off the option that sends it to a file. For the Concept board designer, type

```
set local plot
hardcopy
```

When the Plot Is Incorrect

On all supported color plotters, Cadence plotting software selects colors by either matching or mapping colors to red-green-blue (RGB) color values as described in the table.

Color Plotter	RGB-Matched Color	Mapped Colors
PostScript Level 2	Lines, stipples, solids	None
Versatec	Lines, stipples, solids	None
CalComp	Solids	Lines, stipples
HP-GL/2 ink jet	Lines, stipples, solids	None
Pen plotters	None	Lines, stipples, solids

Color matching: The software tries to match RGB color values using patterns of primary color dots. Color matching works correctly only in solid-filled areas. A small plotting area, such as lines or small shapes, cannot accommodate the dot patterns so the color cannot match the RGB values. Light colors on this type of shape may disappear or appear as dashes.

Color mapping: The software maps RGB color values to the eight keyword colors (index values in the `.cdsplotinit` file).

For More Help

You can send e-mail to `support@cadence.com` or call Cadence Customer Support at 1-877-CDS-4911 (1-877-237-4911) with the following information:

- The `.cdsplotinit` files
- Appropriate operating system files, such as `/etc/printcap` for BSD or the interface script for HP-UX
- Plotter model
- The plot file
- System ID

  At a UNIX prompt, type

  `your_install_dir``/tools/bin/systemid`

  The system ID is returned.

A

Cadence Plotter Configuration File

You must define the plotters for the Cadence Plotting Services software in a plotting configuration file, `.cdsplotinit`. You might want to consider several `.cdsplotinit` files:

- A system *`your_install_dir`*`/tools/plot/.cdsplotinit` containing all of your plotters
- A group-specific `.cdsplotinit` file in the current working directory
- A user-specific `.cdsplotinit` file in the user's home directory

The software loads the system file first, the current working directory's file second, and then the user's `.cdsplotinit` file (in the home directory entry in the password database for the user). As the software reads the files, plotter definitions are appended to the current list. The software overwrites plotter definitions with the same plotter name.

`your_install_dir``/tools/plot/etc/cdsplotinit` lists the supported plotter models. The header of this file lists the CPS version with which the file is associated. The *`your_install_dir`*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.

This appendix describes the `.cdsplotinit` file in detail. The plotter-specific chapters describe how to modify the file for each plotter.

You can find the following topics in this section:

Summary of Features

The type of plotter determines the features you must specify. All features are not required (Reqd) by all plotters, as indicated in this table.

Note: CC is CalComp, EPS is encapsulated PostScript, HP is Hewlett-Packard, PS is PostScript, and V is Versatec.

Used by					Feature	Description	Reqd
CC	EPS	HP	PS	V			
•	•	•	•	•	*menu_name*	Name of the plotter as it should appear on the list of plotters in the Cadence software, such as `LaserWriter` or `Versatec Color`.	Yes
•	•	•	•	•	*plotter_model*	Name of the plotter model, such as `Apple LaserWriter II NT/NTX`, from the *your_install_dir*`/tools/plot/etc/cdsplotinit` file. Do not change this name.	Yes
•	•	•	•	•	`spool`	Operating system spool command to queue the plot data to the plotter, such as `lpr`.	Yes
•	•	•	•	•	`query`	Operating system spool query command that returns information about the plotter's queue, such as `lpq`.	Yes
•	•	•	•	•	`remove`	Operating system command to remove spooled jobs, such as `lprm`.	Yes

Used by					Feature	Description	Reqd
CC	EPS	HP	PS	V			
•	•	•	•	•	`manufacturer`	Manufacturer of the plotter, such as `Hewlett-Packard` or `CalComp`.	Yes
•	•	•	•	•	`type`	One of the Cadence-supported plotter data formats, such as `intB` or `postscript2`.	Yes
	•				`EPSPreviewType=TIFF`	Plot to EPS plotter with TIFF preview (see `EPSPreviewType` and "Encapsulated PostScript Plotting with TIFF Preview" on page 194 for more information).	No
•	•	•	•	•	`resolution`	Number of addressable units per inch, dots per inch (dpi), such as `200`.	Yes
•	•	•	•	•	`maximumPages`	Maximum number of pages allowed to plot if the plot image does not fit on one page, such as `10`.	Yes
•	•	•	•	•	`paperSize`	Name (such as `A size`), size, and offset of the paper the plotter uses. You can specify more than one `paperSize`.	Yes
•		•		•	`red`, `green`, `blue`, `cyan`, `magenta`, `yellow`, `black`, `white`	Index values for the specified color keywords.	Yes
•				•	`compress`	Compresses CPIF data. The default is compressed input.	No

Used by					Feature	Description	Reqd
CC	EPS	HP	PS	V			
•		•	•	•	`residentFonts`	Uses the plotter's resident fonts instead of the stroked fonts displayed on the screen. The stroked fonts produce larger files and plot more slowly.	No
•				•	`instdir`	Full path to the directory in which `tools/plot` is installed on the plot server. For example, if the path is `/usr/cds/tools/plot`, `instdir` is `/usr/cds`.	Yes
•				•	`tmpdir`	Directory on the plot server to store the temporary files.	Yes
				•	`outtype`	Defines the output format for a Versatec plotter, such as `FM_RASTER`, `RASTER`, `BLOCKED_RASTER`, `RPM_VRF`, or `RPM_VCGL`.	Yes
•				•	`script`	Postprocessing UNIX shell script.	No
		•			`pen`	Defines the width of the pen and the speed with which a pen outlines shapes (HPGL pen plotters only)	No

The Configuration File

The `.cdsplotinit` file contains one or more plotter entries. Each plotter entry pertains to one plotter. Use these guidelines for plotter entries:

- Remove the backslash (`\`) from the last line.
- Do not use spaces
  - Between *`menu_name`* and *`plotter_model`*
  - Before the ending colon
  - At the end of the line
- If the plotter entry continues on the next line, end the line with a backslash.

  The plotter entry terminates when the end of the line has no backslash.
- Place features, such as `spool` or `type`, within colons.

`your_install_dir``/tools/plot/etc/cdsplotinit` lists the supported plotter models, but you must add your site-specific information. The beginning of the *`your_install_dir`*`/tools/plot/samples/cdsplotinit.sample` file lists sample plotters with complete entries; the entries might not be accurate for your site.

You use the following format to define a plotter:

```
menu_name|plotter_model:\
    :spool=spoolCommand:\
    :query=queryCommand:\
    :remove=removeCommand:\
    :manufacturer=manufacturer:\
    :type=dataFormat:\
    :resolution#int:\
    :maximumPages#int:\
    :paperSize="name" x y [(offset_x offset_y)]:\

:red#x:green#x:blue#x:cyan#x:magenta#x:yellow#x:white#x:black#x:\
    :compress:\
    :residentFonts:\
    :instdir=path:\
    :tmpdir=dir:\
    :outtype=format:\
    :script=script:\
    :pen=#, (0,0,0),width, velocity:
```

The type of plotter determines the features you must specify. All plotters do not require all features. See the table in "Summary of Features" on page 182 for the requirements of each plotter.

menu_name

Name to appear on the list of plotters in the Cadence software. Some examples are `LaserWriter`, `Tektronix`, and `Encapsulated PostScript TIFF preview`.

plotter_model

The name of the plotter model, such as `Apple LaserWriter II NT/NTX` or `ce3236`. Do not change *`plotter_model`*. You can only use plotter models recognized by Cadence Plotting Services software.

Add the name and a vertical bar (`|`) to the beginning of the plotter model line, leaving no spaces on the line. Follow these guidelines when naming your plotter.

- Do not use these characters in the plotter name:

  colon (`:`) equal sign (`=`) double quotes (`"`)
  backslash (`\`) vertical bar (`|`)

- Do not leave any spaces at the beginning or the end of the name.

- If you do not specify *`menu_name`*, the list of plotters does not recognize this plotter.

Note: There can be no spaces between *`menu_name`* and *`plotter_model`*.

int

Any integer.

`spool=`*`spoolCommand`* Operating system spool command to queue the plot data to the plotter. Usually, Cadence software pipes output directly to the spool command. For example, in SunOS, the entry for the `lw` plotter is

```
:spool=lpr -Plw:\
```

Internally, the software executes this command:

```
cat CPIF1 CPIF2 CPIF3 | lpr -Plw
```

However, if you do not want `lpr` to copy the files, you can create a symbolic link to the data files in the spool directory by using `lpr -s`. You must pass the data files as arguments, as in

```
:spool=lpr -s -Plw *:\
```

The asterisk (`*`) specifies where to put the names of the plot data files. The command above executes like this:

```
lpr -Plw CPIF1 CPIF2 CPIF3
```

`query=`*`queryCommand`* Operating system spool query command that returns information about the plotter's queue. For example, in SunOS, the following command provides the information for the `lw` plotter.

```
:query=lpq -Plw:\
```

`remove=`*`removeCommand`*

Operating system command to remove spooled jobs. The `remove` command uses a job identifier returned by the query command. For example, in SunOS, `lpq` returns information similar to the following:

```
Rank    Owner    Job    Files        Total Size
1st     user     6      test.ps      2782 bytes
```

In SunOS, the third field gives the job identifier used by the `remove` command (`lprm`), `6` in this example. To indicate that the `remove` command should use the third field in SunOS, type `$3` (the third field), as in the following entry:

```
:remove=lprm -Plw $3:\
```

In HP-UX, `lpstat` returns information similar to the following information for `host2`:

```
lw-1   joe   6   priority 0 from host2 p s1  15527 bytes
```

The first field gives the job identifier used by the remove command (`cancel`), `lw-1` in this example. The `remove` entry is

```
:remove=cancel $1 lw:\
```

`manufacturer=`*`manufacturer`*

Manufacturer of the plotter, such as `Hewlett-Packard` or `CalComp`.

```
:manufacturer=Xerox Engineering Systems:\
```

`type=`*`dataFormat`*

One of the Cadence-supported plotter data formats, as listed in *`your_install_dir`*`/tools/plot/etc/plotcap_5.0.0.il` (the file might contain more than those listed here).

Data Format	Type
Adobe PostScript Level 1	postscript1
Adobe PostScript Level 2	postscript2
Encapsulated PostScript output, no preview	epsf
Encapsulated PostScript output, with preview	epsfi
Encapsulated PostScript color, no preview	epsfC
Encapsulated PostScript color, with preview	epsfiC

	Versatec CPIF black-and-white output	intBW
	CalComp CPIF black-and-white output	intBWC
	Versatec CPIF color output	intCLR
	CalComp CPIF color output	intCLRC
	HP 7475 emulations	hp7475
	Hewlett-Packard pen plotters using HP-GL/2	hpgl2pen
	Hewlett-Packard LaserJet III using HP-GL/2	hpgl2laserJet
	Other Hewlett-Packard plotters using HP-GL/2	hpgl2
	HP 7440 emulations	hp7440
	HP 7440 emulations that support polygon mode	hp7440pm
	HP 7475 emulations	hp7475
	HP 7510 emulations	hp7510
	HP 7550 emulations	hp7550a
	HP 7550 Plus emulations	hp7550a1
	HP 7570 emulations	hp7570
	HP 7580 emulations	hp7580
	HP 7580 emulations that support polygon mode	hp7580pm
	HP 7585 emulations	hp7585
	HP 7586 emulations that use roll paper	hp7586roll
	HP 7586 emulations that use sheet paper	hp7586sheet
	HP 7595 emulations	hp7595
	HP 7596 emulations	hp7596
	Versatec thermal black-and-white output	versTB
	Versatec thermal color output	versTC

`EPSPreviewType=TIFF` Plot to EPS plotter with TIFF preview so that the resulting file can be used in Microsoft Word or other Microsoft Office applications. See “Encapsulated PostScript Plotting with TIFF Preview” on page 194 for more information.

```
:EPSPreviewType=TIFF:\
```

`resolution#`*`int`*	Number of addressable units per inch, dots per inch (dpi). The entry below specifies a resolution of 300 dpi: `:resolution#300:\`
`maximumPages#`*`int`*	Maximum number of pages to plot if the plot image does not fit on one page. Plots can be larger than the plotter paper if each piece of the plot is a separate page. The entry below specifies a maximum number of 10 pages: `:maximumPages#10:\`

`paperSize="`*`name`*`" x y [(`*`offset_x offset_y`*`)]`

Name (`"`*`name`*`"`) of the paper size to appear in the Cadence software, the plottable area (the plotter's x axis and y axis in resolution units) of the paper, and the amount of offset (*`offset_x`* and *`offset_y`*).

For example, the following entry defines the width of the plotting area on A-size paper as 2400 units and the height of the plotting area on the paper as 3150 units:

```
:paperSize="A" 2400 3150:\
```

For plotters supporting roll paper feeders, use `0` to denote an unlimited size in one direction (axis) and use the plottable area in resolution units of the roll for the other direction (axis). For example, if the x axis is the unlimited direction, set x to 0 and determine y with the following formula:

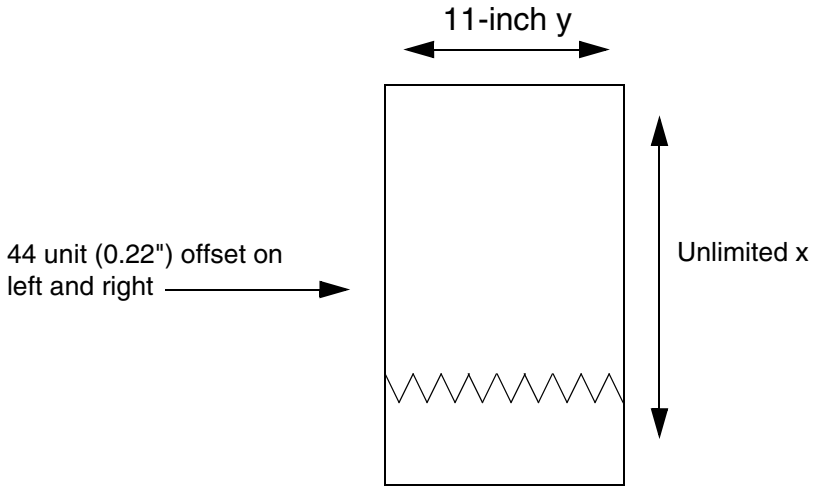
y = total_y_axis - offset_y

`total_y_axis` (or *`total_x_axis`*) is the dpi across the plotter's y axis (or x axis). For example, the y of a 200-dpi Versatec v80 plotter using 11-inch wide paper and offsets of 44 units on both left and right sides is determined as follows:

2200 - 88 = 2112

The plotter's entry is

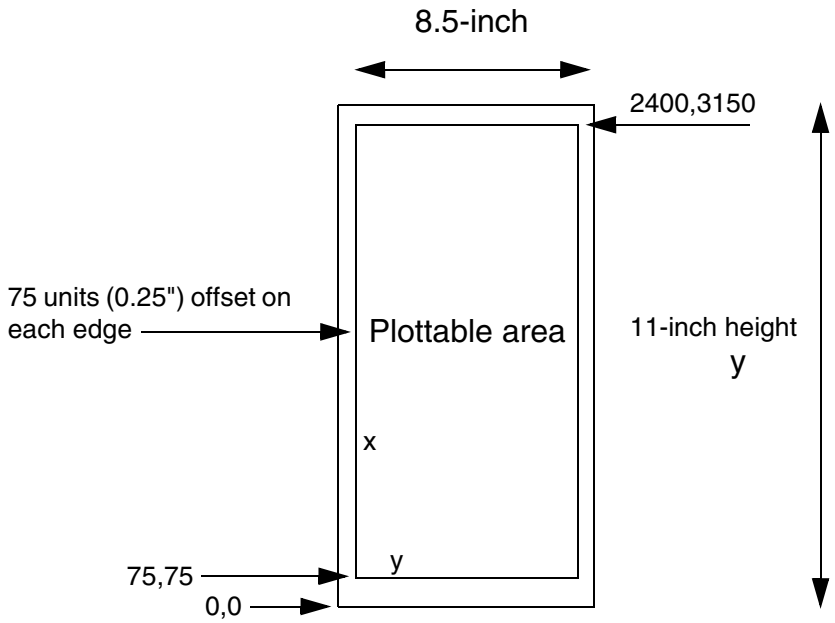
```
:paperSize="11 inches" 0 2112:\
```



PostScript plotters use the lower left corner of the paper as the origin of 0 0, even though they cannot draw to the edge of the paper. For these plotters, you must specify an offset width and height for the plottable area. If you do not specify offsets, they are `0 0`.

The following example specifies an offset of 75 resolution units in the width of 2400 and 75 units in the height of 3150 for a 300-dpi plotter:

```
:paperSize="A" 2400 3150 75 75:\
```



Note: Because there is no standard method that plotters use to select paper trays, the Cadence software cannot specify paper trays. If you select E-size paper, you must make sure the plotter selects E size paper. This means you must select the paper tray using the plotter vendor's method or go to the plotter and put E-size paper in.

`compress` Compresses CPIF data for CalComp and Versatec plotters but is ignored by other plotters.

`residentFonts`	Uses the plotter's resident fonts instead of stroked fonts (only in some applications). Users might be able to change the fonts displayed on the screen, but many plotters have a limited number of fonts.The screen fonts can be converted into fonts residing on the plotter and will print more legibly and efficiently. Stroked fonts produce larger files and plot more slowly.
`instdir=`*`path`*	Full path to the installation directory, *`your_install_dir`* on the plot server (CalComp and Versatec plotters only). If you specify an installation directory that does not exist, CPS uses the directory returned by the `cds_root` command in your search path.
`tmpdir=`*`dir`*	Directory on the plot server to store the temporary files created by Cadence software for CalComp and Versatec plotters.
`outtype=`*`format`*	Defines the output format (`outputFormat`) for a Versatec plotter, such as `FM_RASTER`, `RASTER`, `BLOCKED_RASTER`, `RPM_VRF`, or `RPM_VCGL` (Versatec plotters only).
`script=`*`script`*	Optional postprocessing UNIX shell script for CalComp and Versatec plotters.
`pen=#, (0,0,0),`*`width, velocity`*	Defines the width of the pen and the speed with which a pen outlines shapes (HPGL pen plotters only).

Note: Be sure to remove the backslash from the last line of the plotter definition.

Encapsulated PostScript Plotting with TIFF Preview

By plotting to an Encapsulated PostScript (EPS) plotter with *TIFF preview*, you can use the resulting file in Microsoft Word or other Microsoft Office applications.

For example, you can add the following to your `.cdsplotinit` file:

```
Encapsulated PostScript TIFF preview |Encapsulated PostScript: \
        :manufacturer=Adobe: \
        :type=epsfiC: \
        :EPSPreviewType=TIFF: \
        :resolution#300: \
        :maximumPages#1: \
        :paperSize="5x5 inches" 1500 1500: \
        :paperSize="8x8 inches" 2400 2400: \
        :paperSize="Unlimited" 72000 72000:
```

You can specify any of the following `type` keywords:

`type=epsf`	EPS black and white, without preview
`type=epsfi`	EPS black and white, with preview
`type=epsfC`	EPS with color, no preview
`type=epsfiC`	EPS with color, with preview

To plot from the Virtuoso® Schematic Editor, do the following:

1. Choose *Design – Plot – Submit*.

   The Submit Plot form appears.
2. In the *Plot With* group box, remove the mark from the *header* check box.
3. At the bottom right corner of the form, click *Plot Options*.

   The Plot Options form appears.
4. On the Plot Options form, mark the following check boxes:
   - *Center Plot*
   - *Fit to Pate*
   - *Send Plot Only To File*
5. In the field to the right of the *Send Plot Only To File* check box, type a file name. For example, `test.eps`.

You can insert the plot in a Microsoft Word document by doing the following:

1. Choose *Insert – Picture – From File*.
2. Navigate to and select the file.
3. Click *Insert*.

B

Configuring Spooling Systems

This appendix covers the following topics:

SunOS Spooling Systems

Before configuring SunOS for your plotter,

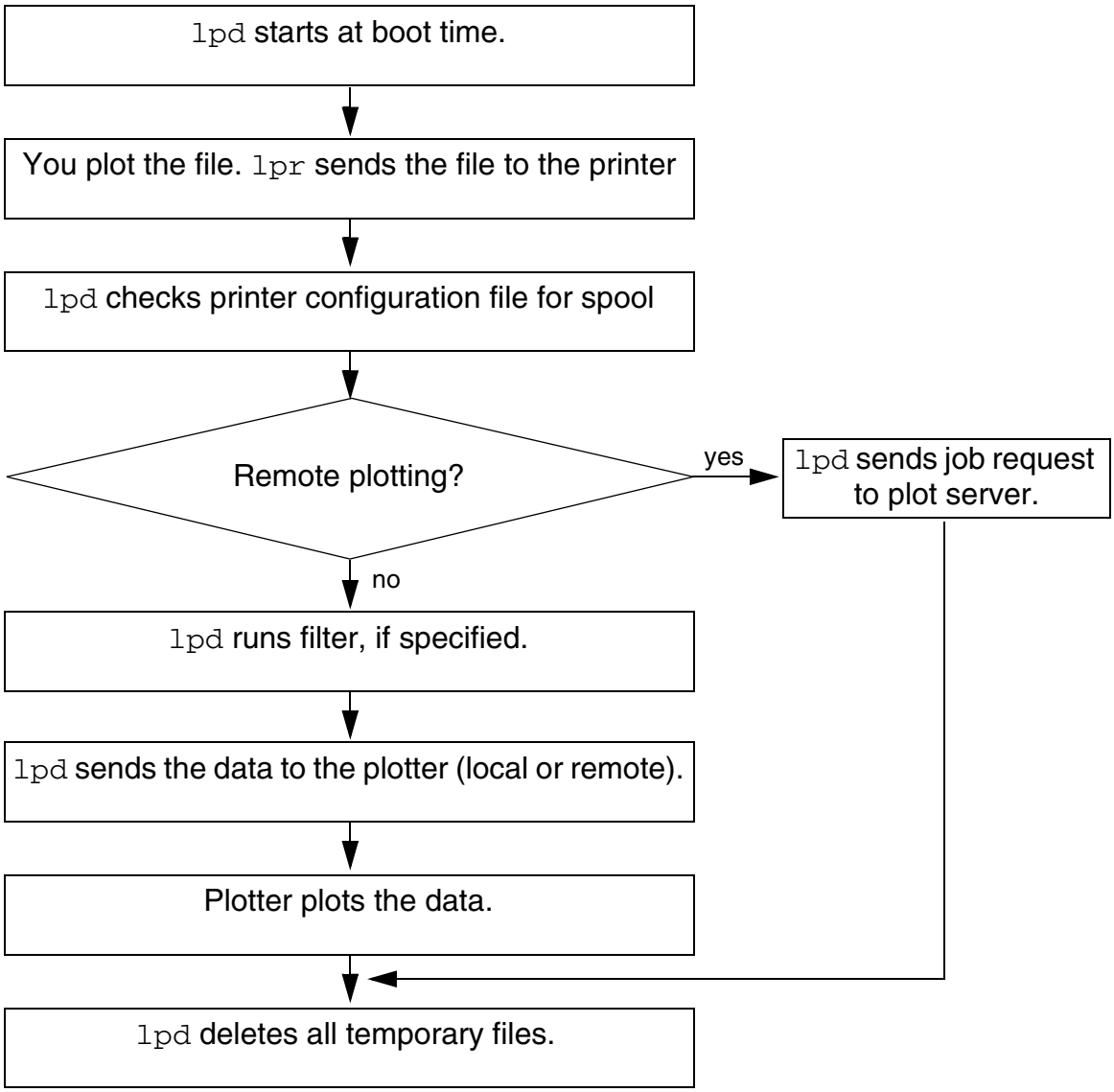
- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Install your interface board or SCSI device driver software (Versatec plotters only) on the plot server
- Attach the plotter to the plot server
- Run the plotter's self-test successfully
- Run the test provided by the device driver software successfully (Versatec plotters only)

You set up a plotter the same way you set up a printer. Each operating system is somewhat different. In SunOS,

- `lpd` printer daemon controls printing and outputs the file
- `lpr` queues the files for printing (copies files to the spool directory)
- `lpc` handles administrative information
- `/etc/printcap` identifies the printers

See your operating system documentation for complete information.

This flowchart shows how SunOS plotting works.



If you are plotting from this workstation (local plotting), you set up only the plot server. If you are plotting from other workstations (remote plotting), you must set up the plot server and the clients.

Each plotter requires an entry in the `/etc/printcap` file on the plot server. Add the plotter to the `/etc/printcap` file using the following syntax guidelines.

- The first field of each entry must be the name by which the plotter is known. Additional names are separated by a vertical bar (|) with no spaces.
- Fields on the same line must be separated by colons.

- Each line except the first line begins with a tab.
- Each line except the first line begins and ends with a colon.
- Each line except the last line ends with a backslash (`\`).
- No line can end with blank spaces.
- Comment lines begin with a pound sign (`#`).

The following table lists some of the fields you can use in the `/etc/printcap` entry. See your operating system documentation and the `printcap` man page for complete information.

/etc/printcap Fields

Field	Description
`name`	Plotter name in the UNIX print system. Multiple names are separated by a vertical bar (`|`).
`lp`	Output device, such as `/dev/vp0`.
`sd`	Spool directory where the printer files remain.
`lf`	Log file name to which printer error messages are sent. This file must exist.
`sh`	Suppresses the printing of the burst page header. Required if the plotter does not have a text controller.
`rp`	Remote plotter name from the plot server's `printcap` file.
`rm`	Remote workstation name; usually it is the plot server name.
`mx`	Maximum file size, 0 is unlimited.
`if`	Name of the filter program.
`br`	Baud rate.
`ms`	Hardware port setup.
`fc`, `fs`, `xc`, `xs`	Hardware port setup.

If a workstation has not been previously set up for printing or plotting, make sure you add the alias `lp` to the first line of one (and only one) `printcap` entry.

If there are two entries with the same printer name, the operating system uses the first entry.

A sample entry for a local LaserWriter plotter might be

```
# Local APPLE LaserWriter
lw|lwc|ps|postscript|PostScript|Apple LaserWriter:\
    :lp=/dev/ttya:\
    :sd=/usr/spoo1/lw:\
    :lf=/usr/adm/lpd-errs:\
    :br#9600:\
    :mx#0:\
    :sh:\
    :ms=ixon,ixany,cs8,-parity:
```

See your operating system documentation for complete information.

HP-UX Spooling System

Before configuring HP-UX for your plotter,

- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Install your interface board or SCSI device driver software (Versatec plotters only) on the plot server
- Attach the plotter to the plot server
- Run the test provided by the device driver software successfully (Versatec plotters only)

You set up a plotter the same way you set up a printer. Each operating system is somewhat different. In HP-UX,

- `/usr/lib/lpsched` printer daemon controls printing and sends spooled files to the plotter
- `lp` queues requests for printing (it does not copy the files)
- `sam` configures plotters for your site
- `/usr/bin/lpstat` displays the status of a plotter
- `/usr/spool/lp/log` is the usual error log for the plotters

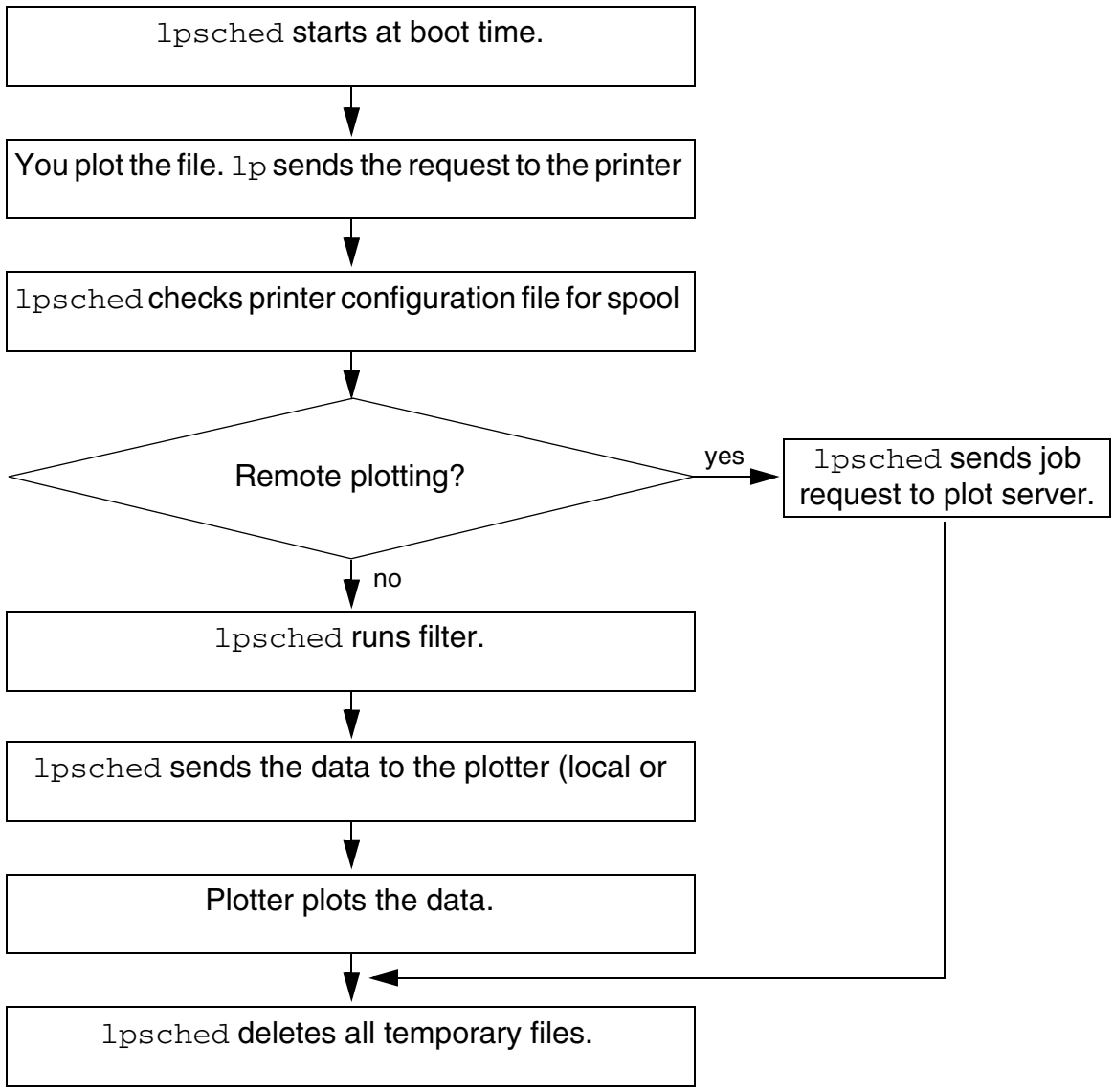
A plotter is a *destination* in HP-UX. You can group several destinations into a *class* so that the plotters share the same queue.

See your operating system documentation for complete information.

Important

Use `sam` to configure the spooling system and describe plotters, classes, and devices. Using `lpadmin` can be complicated and prone to errors and is not recommended.

This flowchart shows how HP-UX plotting works.



Solaris Spooling System

Before configuring Solaris for your plotter,

- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Install your interface board or SCSI device driver software (Versatec plotters only) on the plot server
- Attach the plotter to the plot server
- Run the test provided by the device driver software successfully (Versatec plotters only)

You set up a plotter the same way you set up a printer. Each operating system is somewhat different. In Solaris,

- `/usr/lib/lpsched` printer daemon controls printing and sends spooled files to the plotter
- `lp` queues requests for printing (it does not copy the files)
- `admintool` configures plotters for your site
- `/usr/bin/lpstat` displays the status of a plotter
- `/usr/spool/lp/log` is the usual error log for the plotters

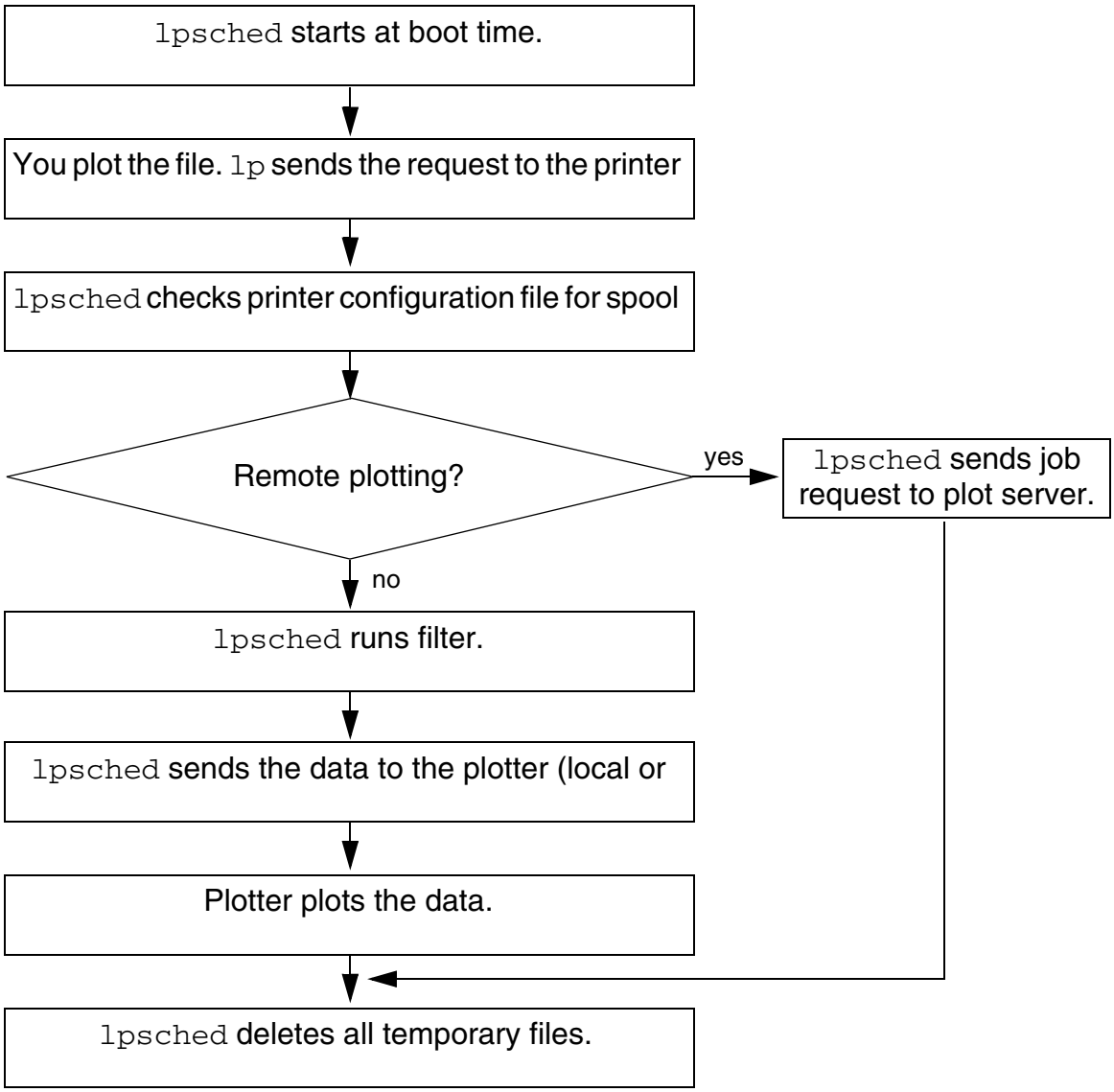
A plotter is a *destination* in Solaris. You can group several destinations into a *class* so that the plotters share the same queue.

See your operating system documentation for complete information.

Important

Use `admintool` to configure the spooling system and describe plotters, classes, and devices. Using `lpadmin` is not recommended.

This flowchart shows how Solaris plotting works.



AIX Spooling System

Before configuring AIX for your plotter,

- Identify the workstation to be the plot server
- Identify the workstations from which users will plot
- Install your interface board or SCSI device driver software

- Attach the plotter to the plot server
- Run the test provided by the device driver software successfully

You set up a plotter the same way you set up a printer. Each operating system is somewhat different. In AIX,

- `smit` configures plotters for your site
- `qdaemon` printer daemon controls printing and copies the file to a spool directory
- `enq` queues files for printing and handles administrative information
- `/etc/qconfig` identifies the printers

AIX supports

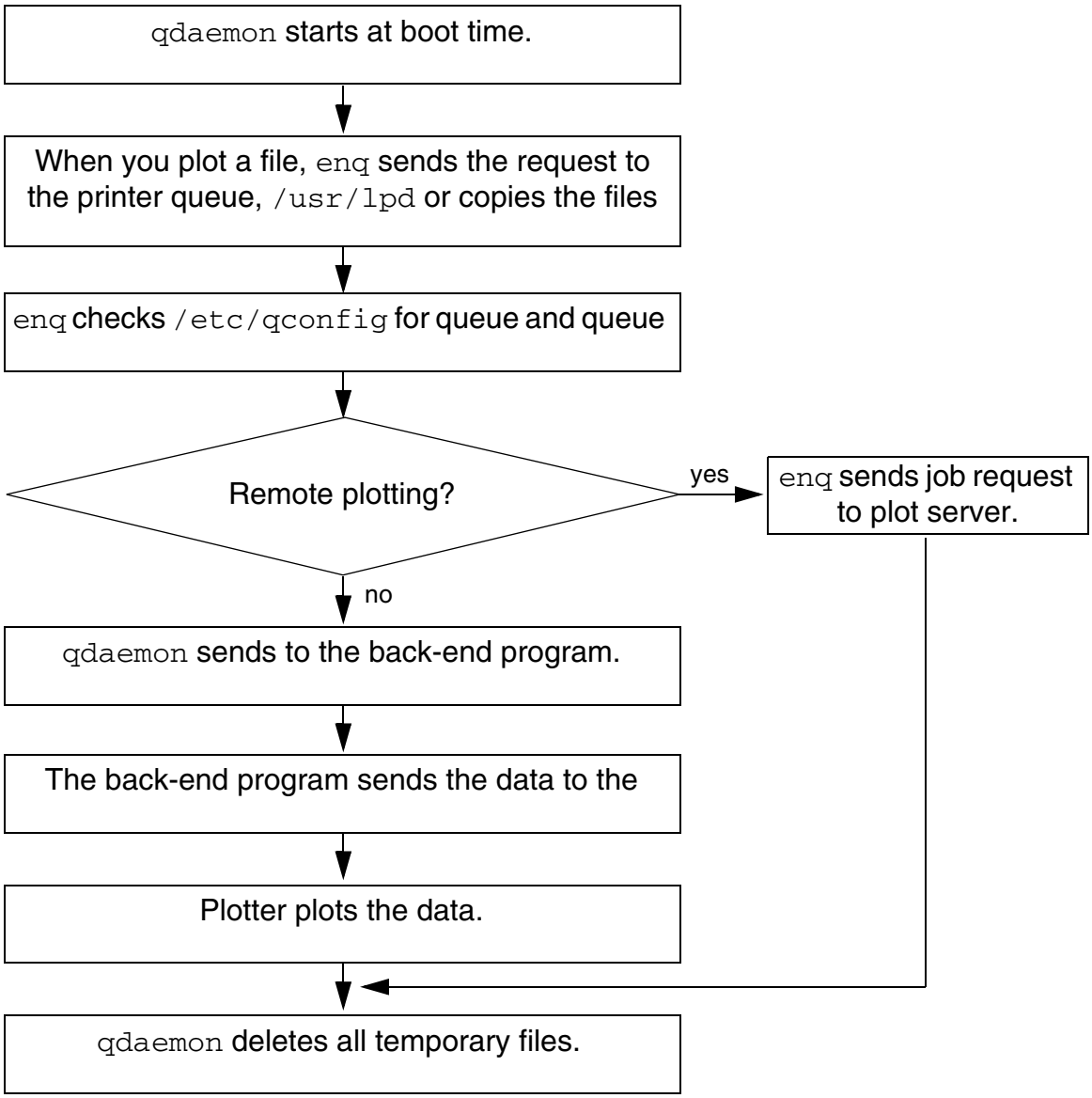
- BSD commands: `lpr`, `lpq`, and `lprm`
- System V commands: `lp`, `cancel`, and `lpstat`

See your operating system documentation for complete information.

Important

Always use either System Management Interface Tool (`smit`) or `install92enq` to configure the spooling system and describe printers, classes, and devices.

This flowchart shows how AIX plotting works.



C

Virtuoso Plotter Form Descriptions

Submit Plot Form

Plot sets how much of the cellview to plot.

Cellview plots the entire cellview.

Viewing Area plots the area shown in your window.

Library Name, **Cell Name**, and **View Name** set the library, cell, and view names of the cellview you want to plot.

Browse lets you select the library, cell, and view names by clicking on them in the browser.

Area to Plot lets you set what area to plot.

Full Size plots the entire cellview, and the cellview bounding box coordinates are displayed.

Select lets you select an area to plot.

Plot With specifies what to include in the output.

Header prints a separate header page listing

Your name
Today's date
The total plot size
The magnification used
Number of pages printed
The library, cell, and view names and the version number of the cellview

Notes lets you type notes that appear as part of the plot header.

Template File specifies the name of the ASCII form template file.

Load updates the Submit Plot form with the settings from the file.

Save saves the current form settings to the file.

Plotter Name, **Paper Size**, **Total Pages**, **Copies**, and **Plot to File** display the setting specified in the Plot Options form. To change any of these fields, click *Plot Options*.

Plot Options opens the Plot Options form, to let you specify the plotter, page size, and plot job settings.

Display Options opens the plotter Display Options form, to let you control the appearance of the objects you plot.

Display Options Form (Plotting)

Array Icons shows only outlines of the instances in arrays, when *Array Border* is set to show only instance outlines.

Axes includes the cellview axes in the plot.

Path Center Line sets how you want paths to appear in the plot.

yes plots the path center line.

no does not plot the path center line.

only plots only the path center line.

Show Name Of when *Display Levels* is set to show only instance outlines, sets whether the instance name (for example, `I1`) or the master cell name appears on each instance.

Array Border sets which instances in the array you want plotted.

Full plots all instances in the array.

Border plots only the instances around the outside edge of the array.

Source plots only the instance in the lower left corner of the array.

Display Levels sets the first (*From*) and last (*To*) levels in the design hierarchy that are plotted in detail. The hierarchy levels are numbered 0 to 32. The current cellview is level 0, instances inside of it are level 1, and so forth.

Grid Controls controls whether you plot the cellview grid and how it appears.

Type sets whether you want no grid, dots, or lines plotted.

None does not plot the grid.

Dots plots a dot for each grid point.

Lines plots a grid of lines.

Minor Spacing and **Major Spacing** control the spacing, in user units (typically microns), between the dots or lines of the grid.

Plot Options Form

Display Type lists all the plotter types defined in your technology file. The default, *display*, plots the same stipple patterns, colors, and line styles used to display the cellview on your monitor screen.

Plotter Name sets the type of plotter as defined in your Cadence® plotter support file. This field includes all plotters from your `.cdsplotinit` file.

Paper Size sets the paper size. This field includes all paper sizes supported by the selected plotter.

Orientation sets what edge of the paper to use as the top.

Portrait plots the cellview as it appears in the window.

Landscape rotates the plot 90 degrees counterclockwise.

Automatic plots whichever way fits best.

Scale scales the plot by the entered factor. Entering a scale updates the *Plot Size* and *Total Plot Size* fields.

Center Plot automatically adjusts the offset, centering the plot on the plotted page. If the plot spans multiple pages, the plot is centered across all pages.

Fit to Page scales the plot to fit on one page. The *Scale* and *Plot Size* fields are updated to reflect the scaled plot.

Plot Size is the width and height of the cellview or viewing area after it is plotted. You can specify what size you want the image to be.

The cyclic field to the right of the *Plot Size* fields specifies the display units for all the fields on the Plot Options form.

Offset specifies the X and Y origin of the cellview or viewing area on the plotted page. If the plot spans more than one page, the offset is from the bottom left corner.

Total Plot Size is the sum of the plot size and the offset. You cannot edit this field.

Image Position assists in setting desired plot options. It is a graphical representation displayed in the form using orientation, scale, fit, plot size, and offset chosen in the plot options form and shown on an outline of the selected paper size.

Total Pages displays the number of pages that will be printed. You cannot edit this field.

Number Of Copies indicates the number of copies that will print.

Local Tmp Directory is the temporary directory used by the *Plot* command.

Queue Plot Data At sets the time and day to run the plot job.

Send Plot Only To File saves the plot to the specified file formatted for your chosen plotter. You can then use the appropriate UNIX commands for your plotter to plot this file.

Mail Log To sends e-mail to the specified address when the plot finishes.

Queue Status Form

Select Plotter lists the available plotters as defined in your `.cdsplotinit` file.

Cancel Selected Plot Jobs removes the selected plot jobs from the plot queue.

Selected Jobs lets you type the number of each print job you want to select.

Job list lists print and plot jobs waiting to be printed. You can select any job by clicking on that job.

D

Glossary

A

absolute path
The path to a file or directory from the root file system.

B

blocked raster
A Versatec data format that can be stored on a disk. A blocked raster file is almost-final raster plot data.

C

Cadence Plotting Services
(CPS) The Cadence plotting software that supports the CalComp, HP, PostScript, and Versatec plotters described in this guide.

Cadence software
Cadence products include plotting and application software.

CCRF
CalComp Compressed Raster Format

CCRF-IL
CCRF for the InkJet plotters.

CCRFout
Driver that converts Standard Raster Data to CCRF or CCRF-IL data.

CCS
Cadence Customer Support.

cds2calcomp

The Cadence plotting program for CalComp plotters that converts CPIF data to CalComp format and output the data to the plotter.

client

A workstation on which you run the Cadence applications.

CPIF

Cadence Plotting Intermediate Format generated by Cadence software, which can generate a compressed or uncompressed CPIF data. Compressed CPIF data is binary data. Uncompressed CPIF data is ASCII data.

D

default

The value used by the software unless you specify otherwise. The default is frequently the initial state.

design

A window with a cellview. A composite of cells and views, usually hierarchical.

dpi

Dots Per Inch, a unit defining how many dots the plotter plots in one inch. A parameter to measure the plotter density. A 300-dpi plotter draws 300 parallel lines in one inch.

E

environment

The hardware and software setup and conditions within which the system operates.

H

home directory

The directory in which you are placed when you log into a computer and to which you have read and write permission.

L

local plotting
You generate design data and send it to the plotter directly attached to your workstation.

P

plotconfig
Graphic utility to configure the plotter.

plot server
The workstation connected to the plotter.

R

raptor
The Cadence plotting program for raster plotters that converts CPIF data to standard raster format.

remote plotting
You generate design data on your workstation and send it to the plotter attached to another workstation.

RPM
Raster Processing Machine (hardware from Versatec) that converts VDS formats to plotter data.

S

search path
The list of directories the software searches for files, libraries, and commands.

stipple pattern
The fill style defined with a bit map.

V

VDS
Versatec Data Standards, including Blocked Raster, 1D Compacted Raster, 2D Compacted Raster, and Optimized Compacted Raster.

VDSout

Device driver that converts standard raster format to Versatec VDS formats.

VPIfilter.sh

Sample BSD filter script to send plotter-ready data straight to a device.

VPIout

Device driver that sends standard raster format to a Versatec VPI device.

W

window

In a windowing environment, a rectangular area on a graphics workstation that emulates a terminal and runs an application separate from the applications in other windows. Usually you can have several windows on your screen at one time.

Y

your_install_dir

Variable representing the directory in which the Cadence software is installed. Replace this with the absolute path to the Cadence software.