IBM Infoprint Manager for AIX Version 3.2

Configuring the Halftone Management System (5/26/2000)

Configuring the Halftone Management System Table of Contents

Halftone Management System Overview

The Halftone Management System gives you the ability to calibrate halftones for each screen frequency on all your Intelligent Printer Data Stream (IPDS) printers. The result is consistent grayscale for each appearance selection.

With the Halftone Management System, you can run multiple IBM Infoprint 4000 printers and calibrate each system. For two-engine duplex print systems, the Halftone Management System also allows you to calibrate each print engine separately, so that whatever document you print , the various levels of gray (grayscale) used to print the document will look the same on both engines. Note that his applies to input file types of TIFF, GIF, or JPEG; for both PostScript and Portable Document Format (PDF) files, a single calibration applies to both engines.

From the smallest network printer to the largest production printer, you can either use the halftone provided with Infoprint Manager or create your own. You can calibrate for different paper types to account for differences between supplies. Infoprint Manager will save and manage these calibrations, allowing you to select them on a job-by-job basis.

The Halftone Management System consists of two parts:

1. A daemon process (**runcalibd**) that runs on all Infoprint AIX servers.

2. A client process (**runcalib**) that can be run from any Infoprint AIX server.

You can calibrate printers on any Infoprint AIX server by using the client from another Infoprint AIX server. For example, if you have installed Infoprint servers A, B and C, you can calibrate printers on A using the client on either A, B or C. The daemon must be running on server A.

You invoke the Halftone Management System through the **Printer Calibration** icon (the page embossed with a lower-case i that is the fourth icon from the right) on the toolbar of the Infoprint Manager desktop (note that the **Printer Calibration** icon is available through the Infoprint Basic Configuration only; to use the Halftone Management System in an Infoprint Advanced configuration, you must use the command described in Starting the Halftone Management System below):
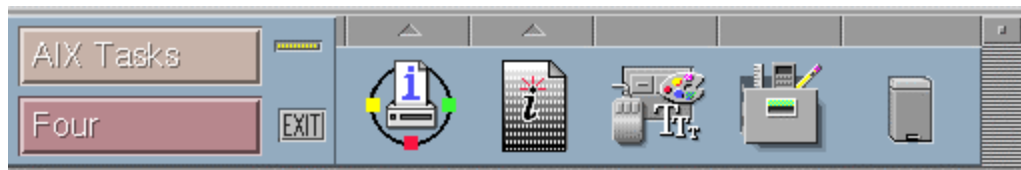
This topic describes the following two procedures that you should ensure have been completed before attempting to use the Halftone Management System.

1. [Starting the Halftone Management System](#)

2. [Calibrating a Densitometer](#)

Starting the Halftone Management System

If you find the Halftone Management System icon in the tool bar on your Infoprint Manager desktop and it starts, you do not need to perform this procedure and should go to [Calibrating a Densitometer](#). If you do not see the Halftone Management System icon on your Infoprint Manager desktop or it does not start, you can use the following procedure to start the Halftone Management System:

1. From your Infoprint AIX server's command line, ensure that your Infoprint AIX server is running by specifying:

   ```
   ps -ef | grep server
   ```

   where *server* is the name of your Infoprint AIX server. You should see a response that shows the server running. Note that the following response example has been split across two lines for clarity:

ID	Process #	Time
root	26078	1 0Mar 20 - 11:24:36

   Process and Server Name

   ```
   ksh /usr/lpp/pd/ipcal/bin/runcalibd
   ```

   Note that the server must be running before you start the Halftone Management System client.

2. If the Calibration daemon (**runcalibd**) is not running, start it by specifying:

   ```
   /usr/lpp/pd/ipcal/bin/runcalibd&
   ```

3. From the toolbar that displays that the bottom of the Basic Infoprint Administrator's GUI (displayed below), double-click on the **Printer Calibration** icon (fourth icon from the right).

This icon starts the Halftone Management System client.

If your system uses the Infoprint Advanced Configuration, you must do the following from the command line:

1. Select a directory to start it from and always start from that directory. This is because a file will be created in that directory that contains information about the servers defined: `cd /calibration-client`

   Note that starting from a different directory will mean you have to redefine the servers to which you want to connect. Multiple Halftone Management System clients can be started on the same AIX server, but they must be started from different directories. Because the clients would try to share the **calibgui.db** file, you cannot start two clients from the same directory.

2. Invoke the client: `/usr/lpp/pd/ipcal/bin/runcalib&`

From the client screen, a pop-up **Halftone Management System** window announces `Starting the Halftone Management System Client`.

To open this window, the client has created a **calibgui.db** file in the directory from which you entered the command.

If you either press the **Printer Calibration** icon or invoke the client from the command line before starting the Halftone Management System daemon, but after defining your Infoprint AIX server, Infoprint Manager provides an Error pop-up dialog with the following message:

`Error in connecting to host` *fully_qualified_server_name* `-- A remote host refused an attempted connect operation.`

To resolve this problem, you must close the Halftone Management System client window and restart the daemon.

Once you have completed these steps, move to the procedure described in [Defining Infoprint Servers to the Halftone Management System Client](#) below.

Calibrating a Densitometer

The reflection densitometer must be calibrated to provide accurate density readings. Prior to using, you must follow the instructions that are provided by the manufacturer to calibrate the densitometer. The densitometer used must comply to the spectral responses defined by ANSI PH2.18 - 1985 and ISO 5/3 - 1984. The densitometer should not have a polarizing filter. The Greytag Macbeth model D19C has a polarizing filter and should not be used. Densitometers which are appropriate to use include the X-Rite Model 504, 508, or 400B.

The densitometer should be used in `Absolute Density` mode for measurements. The following procedure describes how to calibrate the X-RITE 400B (1060) densitometer, using the Reflection Reference Card (part number 400-62). Since the X-RITE 400B is now obsolete, the following information is provided as reference.

The Reflection Reference is the card that is used to calibrate the densitometer. You will use only the circular patches labeled 1 (white reference) and 3 (black reference). The densitometer should be calibrated periodically, or whenever the instrument displays RECAL. You should store the Reflection Reference Card in its envelope.

1. Press the **FUNCTION** and **ENTER** keys in sequence, then release.

   After the version and copyright notices appear, the display will show N cal O Y.

2. Press the **ZERO** key and release.

   After the version and copyright notices appear, the display will show N qcal Y.

3. Press the **FUNCTION** key and release.

   `SET LO` is displayed momentarily, followed by `X.XX`, where `X.XX` should be the white patch ORTHO value from the Reflection Reference card.

4. If `X.XX` matches the white patch ORTHO value for your reflection reference, press the **ENTER** key. If `X.XX` does not match, hold down the **ZERO** key and press either the **FUNCTION** or the **ENTER** key. Decrease (**FUNCTION**) or increase (**ENTER**) the value until the correct number is displayed. When finished, release the keys and press **Enter**.

   `SET HI` is displayed momentarily, followed by `Y.YYH`, where `the Y.YY` part of the value should be the black patch ORTHO value from the Reflection Reference card.

5. If $Y.YY$ matches the black patch ORTHO value for your reflection reference, press the **ENTER** key. If $Y.YY$ does not match, hold down the **ZERO** key and press either the **FUNCTION** or the **ENTER** key. Decrease (**FUNCTION**) or increase (**ENTER**) the value until the correct number is displayed. When finished, release the keys and press **Enter**.

6. When you see READ WHT displayed, center the circle on the base of the densitometer over the white patch (the one labeled "1") on the Reflection Reference. Push the head down and then release it to establish the white patch Optical Density.

    If INVALID displays, repeat the measurement.

7. When you see READ BLK displayed, center the circle on the base of the densitometer over the white patch (the one labeled "3") on the Reflection Reference. Push the head down and then release it to establish the black patch Optical Density.

    If INVALID displays, repeat the measurement.

Verify the calibration by measuring the black, gray, and white patches. If they agree within 0.02 OD to the reflection reference values on the card, density is accurately calibrated. If not, repeat this process until the measurements are accurate.

To find out how you can calibrate and set output appearances, see Calibrating a Printer Using the Halftone Management System.

Calibrating a Printer Using the Halftone Management System

The Halftone Management System allows you to calibrate each of your printers to achieve a consistent tone curve for a set of generic halftone screens. The system also allows you to define additional calibrations for specific paper types. When calibrated the dot gain for a fifty percent dot will be nominally zero percent for **Standard** appearance, fourteen percent for **Highlight Midtown** appearance, and thirty-four percent for **Dark** appearance.

To use this tool to calibrate your printers, perform the following procedures in sequence:

1. Defining Infoprint Servers to the Halftone Management System Client
2. Defining Custom Patch Sets
3. Calibrating a Halftone
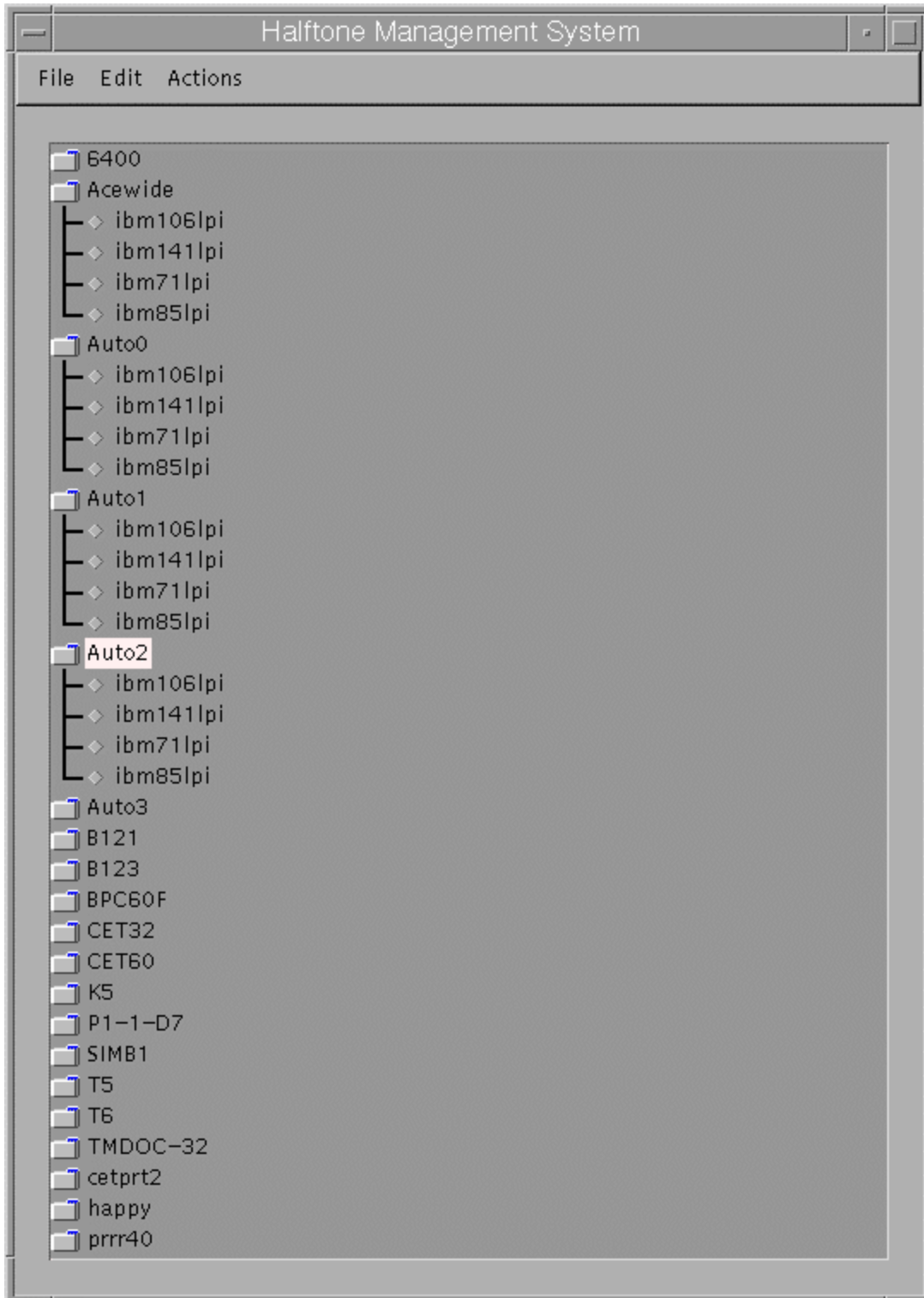4. Measuring Optical Density with a Densitometer

Defining Infoprint Servers to the Halftone Management System Client

The first time you start the Halftone Management System client, you will see an empty window. You must connect to the Infoprint AIX server to see a list of the printers that are available for calibration:

1. From the **Halftone Management System** (or **Main**) window, select the **Edit -> Servers** option.

2. From the **Servers** window, select the **File -> Add Server** option.

3. In the **Server Properties** window, fill in the **Server Name** field with the symbolic server name, and the **Hostname** field with either the explicit name of the server or the server's dotted decimal notation IP address.

   For example, the **Server Name** field value could be `sage.penn.boulder.ibm.com`, while the **Hostname** field value could be either `sage` or `9.99.43.73`.

4. Return to the **Main** window and either use left mouse button to double-click on each printer or highlight the printer and press enter to display its output screens (as displayed on the following page). The Main window displays all printers defined to the Infoprint server to which you are connected, but only the IPDS printers contain screens that can be calibrated.

Halftone Management System

File   Edit   Actions

- 6400
- Acewide
  - ibm106lpi
  - ibm141lpi
  - ibm71lpi
  - ibm85lpi
- Auto0
  - ibm106lpi
  - ibm141lpi
  - ibm71lpi
  - ibm85lpi
- Auto1
  - ibm106lpi
  - ibm141lpi
  - ibm71lpi
  - ibm85lpi
- Auto2
  - ibm106lpi
  - ibm141lpi
  - ibm71lpi
  - ibm85lpi
- Auto3
- B121
- B123
- BPC60F
- CET32
- CET60
- K5
- P1-1-D7
- SIMB1
- T5
- T6
- TMDOC-32
- cetprt2
- happy
- prrr40

Defining Custom Patch Sets

A patch set is a step wedge file that has patches with different shades of gray. One patch set has been defined (`patches11`). It has eleven uniformly-stepped grays.

To define additional patch sets, use the following procedure:

1. From the **Halftone Management System** window, select the **Edit -> Patch Sets** option.

2. From the **Patch Sets** window, click on a patch set (such as patches11) and select the **Edit -> Properties** option.

3. From the **Patch Set** *name* window (where *name* indicates the patch set highlighted in the previous step), use the left mouse button to select the patches that you would like to modify.

   The screen shows 99 squares representing from 1-to-99 percent dot at one percent increments. Squares which are dark will be printed. To change a patch selection, point to the patch desired and click the left mouse button. Each click selects or deselects a patch. 0 percent and 100 percent dot patches are always included in each patch set. The example displayed below will print 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 percent dot patches.

4. Once you have defined the patch set, select the **File -> Save as** option and save your patch set with a unique name.

   Note that the shipped patch set patches11 cannot be modified. However, a user-created patch set can be modified through the **Save** option. In the example on the following page, the **Save** option is grayed-out because no changes have been made to the file.

Patch set patches11

File

Save
Save As
Close

	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	

Calibrating a Halftone

Once you have either selected an existing patch set or created your own customized patch set, you must print it out, use a densitometer to measure the density of each gray patch. Then you must enter the calibration values in the Halftone Calibration Management System to create a calibration curve for the printer.

Note: Ensure that you use the Halftone Management System to both add and delete patch files and Calibration files.

Use the following procedure to accomplish these tasks:

1. If desired, define a custom patch set to print from the Halftone Management System window from the menu bar by selecting **EDIT-->PATCH SETS**, then selecting the patch from the list and **ACTIONS--> SELECT AS CURRENT, FILE-->CLOSE**.

2. From the **Halftone Management System** window, select a printer and a halftone screen supported by that printer.

3. From the **Halftone Management System** window, select the **Actions -> Print Patches** option.

4. If the actual destination you chose has a **logical-destination-assigned** attribute, the patch set will be sent to that logical printer. Otherwise, you will be prompted for a logical printer.

5. From the pop-up window, select **OK**.

6. Once you retrieve your output from the printer, use the densitometer to measure the patches. Because the Halftone Management System is designed to take multiple measurements of each patch and use the average, you could take three measurements of each patch.

7. Select the same actual destination (printer) and screen that you selected before you printed the patch set (in step 2).

   Note that the printed patch set identifies the screen, patch set, and printer, along with a date/time stamp.

8. From the **Halftone Management System** window, select the **Actions -> Calibrate** option.

9. From the **Enter calibration values** window (shown below), set **The number of entries to average** field (it defaults to 3) to the number of measurements you took for each patch.

10. If this is a custom calibration and you want it to replace the default calibration provided by Infoprint Manager, allow it to retain the `default` value in the **Calibration name** field. If you want to retain the original default, but have this custom calibration as a second option, type a name for the calibration in the **Calibration name** field.

11. To enter your densitometer readings, begin with the **0%** field. Enter your first 0% value and press **Enter**. The statistics of your values will be displayed under the columns **Average**, **Min**, and **Max**.

Enter calibration values

Printer: sage60
Screen: generic106lpi
Patch set : patches11
The number of entries to average:
Calibration name: default

% gray	Entry	Average	Min	Max	# entries	
0%					0	Clear
10%					0	Clear
20%					0	Clear
30%					0	Clear
40%					0	Clear
50%					0	Clear
60%					0	Clear
70%					0	Clear
80%					0	Clear
90%					0	Clear
100%					0	Clear

Do   Cancel

If you specified more than 1 in the number of entries to average field, the cursor will remain in the field for your next reading. Otherwise, it will move on to the next patch field. Continue until all your readings have been entered. The display below shows a sample customized Calibration named `first_run`.

Enter calibration values

Printer: ip2000
Screen: ibm85lpi
Patch set : patches11
The number of readings per patch: 3
Calibration name: first_run

% gray	Entry	Average	Min	Max	# entries	
0%		0.0700	0.07	0.07	3	Clear
10%		0.1967	0.19	0.2	3	Clear
20%		0.3100	0.31	0.31	3	Clear
30%		0.4233	0.42	0.43	3	Clear
40%		0.5367	0.53	0.54	3	Clear
50%		0.6867	0.67	0.7	3	Clear
60%		0.8000	0.79	0.81	3	Clear
70%		0.9600	0.95	0.97	3	Clear
80%		1.0800	1.06	1.09	3	Clear
90%		1.3067	1.3	1.31	3	Clear
100%		1.4400	1.43	1.45	3	Clear

Do   Cancel

12. Once you have filled in your calibration values, press the **Do** button. Your calibration is saved in the **/usr/local/Infoprint/config** directory and ready for use.

Measuring Optical Density with a Densitometer

The following procedure describes how you can measure optical density using the XRITE 400B Densitometer. While you can use other densitometers, this procedure has been verified with this particular make and model. Ensure that the density readings are absolute, not paper reference.

1. Press the **FUNCTION** key until DEN appears. If DEN-R appears, press the **ZERO** key and try again.

2. Center the circle on the base of the densitometer over the area to be measured.

3. Push the head down and release it to measure the Optical Density (OD).

   The density reading will appear as X.XXD.

4. Record the X.XX value as it is displayed.

   Several measurements should be taken at different representative locations on each gray patch and averaged to obtain an accurate OD value. Alternately, you can enter individual measurements into the calibration value screen and have the averaging performed automatically.

Specifying a Halftone for Printing on the Infoprint AIX Server

You can use a particular halftone for printing a grayscale file through either Infoprint Submit interface or the AIX command line .

Note: The Halftone Management System does not need to be running when you print the job.

Printing from Infoprint Submit

You can print using a particular halftone for printing a grayscale file from a job ticket (*name*.jtk file) in Infoprint Submit. Through this interface, you can specify a specific screen and output appearance. Begin by selecting a value in the **Screen Name** field of the **Look** tab. Note that all screen frequencies shipped with the product have the term 'ibm' prepended to their identifier. If you are accessing this interface for the first time, all your previous default calibrations will have 'ibm' attached to the name.

Infoprint Manager allows you to determine output appearance on a job-by-job basis by setting a default screen and output appearance in a default document or job object. For more information about creating default document or default job objects, see Chapter 11, "Creating and Managing Default Job and Document Objects" in the *IBM Infoprint Manager for AIX Administrator's Guide*, (S544-5495).

Printing from the AIX Command Line

You can submit a halftone calibration from the AIX command line by using some variation of the following **pdpr** Command.

Note that this command is spread across three lines to illustrate each component more clearly:

Command	Printer
pdpr	-p sip20-sage

Customized Calibration file
-x halftone=generic106lpi:highlight-midtones.mycal

File to Be Printed
grayscale.ps

Note: When submitting a **pdpr** command from the AIX command line, you specify the **halftone** attribute, rather than setting both frequency and output appearance as you do when using the Infoprint Submit interface. The actual halftone name for this example (generic106lpi:highlight-midtones.mycal) can be found either by using the **Infoprint Manager Administration GUI** to look up the halftone for the actual destination, or enter the following at the command line: pdls -cp -r halftones-supported ActualDestination name.