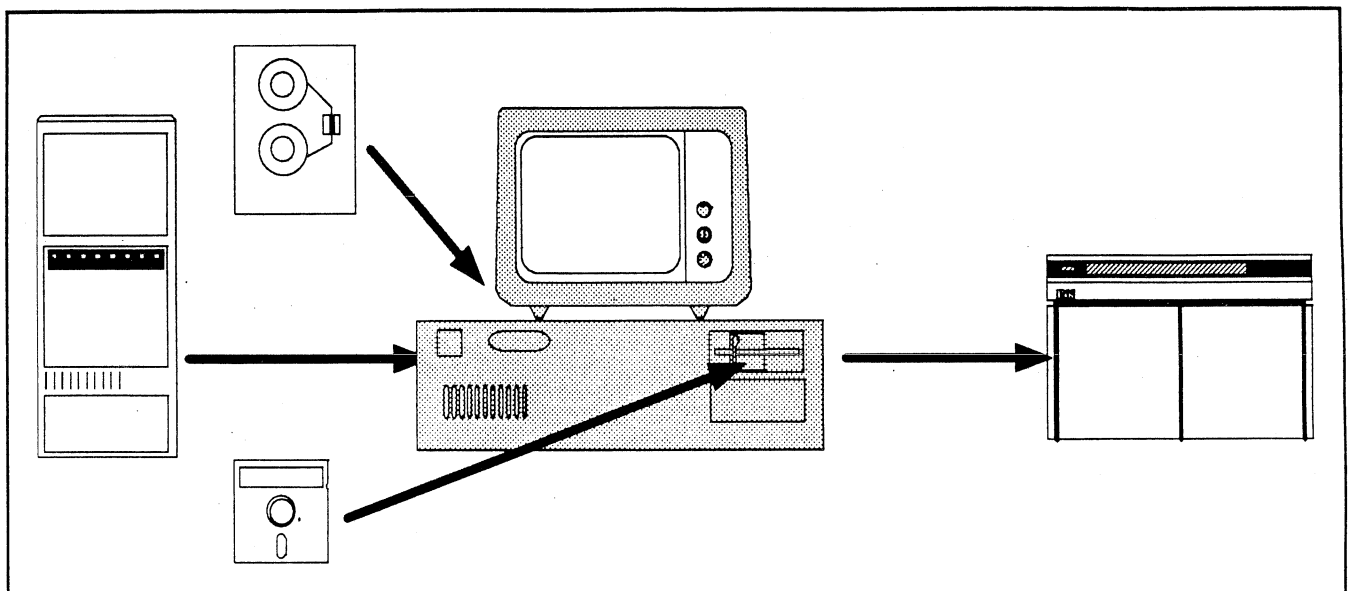


# Reference Manual: IRIS Series 3000 Front End Processor (FEP)

Document Revision 2.1, February 13, 1990



**IRIS** IRIS Graphics, Inc.  
Six Crosby Drive  
Bedford, Massachusetts 01730

**Reference Manual: IRIS Series 3000 Front End Processor**  
**IRIS Part Number 01703-201**

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**FEP Serial Number:** \_\_\_\_\_

(Serial number is on the rear of the base of the FEP.)

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**FREQUENCY INTERFERENCE STATEMENT**

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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# CONTENTS

<b>Part 1</b>	<b>Using the IRIS 3000 FEP Reference Manual</b> . . . . .	<b>1</b>
	Applicability of this Document for FEP Software . . . . .	1
	Procedures for Software-only Sites and Software Upgrades . . . . .	1
	About the FEP Reference Manual . . . . .	2
	Read the Operator's Manual First . . . . .	2
	Familiarity with DOS . . . . .	2
	Organization of the Manual . . . . .	2
	Performance Warranty and Liability . . . . .	3
	If You Need Assistance . . . . .	4
<b>Part 2</b>	<b>Introduction to the FEP</b> . . . . .	<b>5</b>
	FEP Hardware and Software . . . . .	5
	FEP Hardware Supplied by IRIS Graphics . . . . .	5
	Using Hardware and Software from Other Vendors with the FEP . . . . .	6
	Files Supplied and Directory Structure . . . . .	6
	Printer Firmware Revision Level . . . . .	7
	Features of FEP Software — an Overview . . . . .	7
	FEP Features Not Available at the Printer . . . . .	8
	Typical Use of the FEP in Production . . . . .	8
	Your Next Step — the Tutorial or ??? . . . . .	10
<b>Part 3</b>	<b>Quick Start Tutorial — Printing a Sample File</b> . . . . .	<b>11</b>
	The Step-by-Step Quick-Start Procedure . . . . .	11
	Preparing the Printer . . . . .	11
	Run FEP Software . . . . .	12
	Specify an Offset (Optional) . . . . .	12
	Selecting the File . . . . .	12
	Adding a Title and Subtitle (Optional) . . . . .	13
	Pausing or Aborting a Print Run . . . . .	13
	Completing the Print Run . . . . .	13
	What To Do Next . . . . .	14
<b>Part 4</b>	<b>Using FEP Software in Daily Production</b> . . . . .	<b>15</b>
	Overview of FEP Production Functions . . . . .	15
	Getting Started — Preparing To Print Images . . . . .	16
	Loading FEP Software . . . . .	17
	Running FEP Software . . . . .	17
	The FEP Interface . . . . .	17
	Behavior of Keys . . . . .	18

Confirming and Abandoning Selections or Data Changes	18
Loading Image Files to IRIS Format	18
Copying Files to the FEP Disk	19
Loading and Piping Are Affected by Environment Variables	20
Loading Wavefront and Alias Files to the FEP Disk	22
Loading CT2T Files to the FEP Disk	23
Loading CT Handshake and DDES Files to the FEP Disk	24
On-Line Scitex Handshake Systems	25
Printing IRIS-format and Truevision Files	26
Basic Printing Procedures	27
"Piping" Image Files to the Printer	28
Image Scaling Features	28
Applications and Limitations of Scaling	28
"Pick" and "Average" Scaling Algorithms	30
Scaling Choices	30
Test Patterns and Color Proofing Bars	31
Controlling Printing Parameters with the FEP	31
Selecting Printer Configurations	31
Editing Configurations — the Edit Menu	32
Editing List Files	32
Deleting Files	33
Activating Configurations — the Setup Menu	33
Controlling the Color Characteristics of Images — the Basics	34
Applying FEP Color Control Features	34
<b>Part 5</b>	
<b>FEP Menu and Command Reference</b>	<b>36</b>
Opening Menu	36
I/O and Files Menu	37
Printing Files on the FEP Disk	38
Pausing or Aborting Print Runs	38
Deleting Configuration and Parameter Files — the Files Menu	39
The Edit Menu	39
Editing List Files	40
Editing Printer Configurations	41
Activating Configurations, CLTs, and Hue Tables	42
<b>Part 6</b>	
<b>Advanced Applications — Controlling Color Values</b>	<b>43</b>
Density, Contrast, and Color Lookup Tables	43
Color Lookup Tables for Non-Standard Applications	44
"Smoothing" — a Technical Explanation	45
Hue Tables — "Mixing" IRIS Primary Colorants	45
"Tinting" Papers Electronically	46
Gamma Correction for RGB-Biased Data	46
Converting RGB to CMYK Data	46
RGB to CMY Complements	47



	Creating a Color Lookup Table on the FEP . . . . .	47
	Editing a CLT . . . . .	48
	Saving CLT Changes . . . . .	49
	A General Matching Technique . . . . .	49
	Summary of Matching Procedures . . . . .	50
	Limitations of Matching . . . . .	50
	Sample FEP Color Values . . . . .	50
	Step-by-Step Procedures for Matching . . . . .	51
	Step 1 — Create a Step-Wedge Pattern . . . . .	51
	Step 2 — “Tint” the IRIS Stock To Match the Original . . . . .	52
	Non-Standard Data Value Ranges . . . . .	53
	Step 3 — Match the Density of the Original . . . . .	54
	Step 4 — Match the Hues of the Original . . . . .	54
	Step 5 — Adjust the Density Again . . . . .	54
	Step 6 — Match the Contrast of the Original . . . . .	55
	Step 7 — Use the Color Lookup Table To Accommodate Complex Contrast Characteristics . . . . .	55
	Step 8 — Save the Values for Future Use . . . . .	56
<b>Part 7</b>	<b>Customizing the FEP Environment . . . . .</b>	<b>57</b>
	Purpose of the CUSTOM Program . . . . .	57
	Know Your Values Before You Start . . . . .	57
	Running the CUSTOM Program . . . . .	57
	The CUSTOM User Interface and HELP Function . . . . .	58
	The “Customize” Menu . . . . .	58
	Selecting CUSTOM Environment Options . . . . .	59
	Selecting a Program Title . . . . .	59
	Paper Size . . . . .	59
	Image Data Input Type and Tape Specifications . . . . .	60
	Specifying Printing Values . . . . .	60
	Directory Selection . . . . .	60
	Shell . . . . .	63
	FEP Software Version . . . . .	63
	Exiting from the CUSTOM Program . . . . .	63
<b>Appendix A</b>	<b>FEP Diagnostic Error Messages . . . . .</b>	<b>64</b>
<b>Appendix B</b>	<b>Sample Files . . . . .</b>	<b>68</b>
	“IRIS” Hue Table . . . . .	68
	“IRIS” Configuration . . . . .	68
	The “IRIS” Color Lookup Table . . . . .	69
<b>Appendix C</b>	<b>Image File Formats . . . . .</b>	<b>70</b>
	Requirements for Raster Image Data in All Formats . . . . .	70
	Summary of Available Image File Formats . . . . .	71
	Type “A” — CT2T Raster Image Data . . . . .	71
	Additional Information about CT2T Format . . . . .	72

	Type "B" — CT Handshake Raster Image Data . . . . .	72
	Type "C" — DDES Raster Image Files . . . . .	73
	Type "D" — Truevision (TARGA/VISTA) Raster Image Files . . . . .	74
	Type "E" — Wavefront Images . . . . .	74
	Type "H" — IRIS Image File Format . . . . .	75
	Submitting Large Image Files on Diskette or Tape . . . . .	76
	Writing Large Files to Floppy Disks with the SPLIT Utility . . . . .	76
	Using the COMBINE Utility To Restore Files . . . . .	77
	Writing Large Files to Floppy Disks with BACKUP . . . . .	77
	Instructions for Using TAR Utilities . . . . .	78
	Physical Tape Formats for 1/2" Magnetic Tape . . . . .	78
<b>Appendix D</b>	<b>Installing or Upgrading FEP Software . . . . .</b>	<b>79</b>
	Prerequisites for Installing FEP Software . . . . .	79
	Installing FEP Software and Test Patterns . . . . .	80
	Running the INSTALL Program . . . . .	80
	Copy the Test Patterns . . . . .	80
	Run the CUSTOM Program . . . . .	81
	Effects of the INSTALL Program . . . . .	81
<b>Appendix E</b>	<b>Installing and Configuring FEP Interface Boards . . . . .</b>	<b>83</b>
	General Hardware Installation Guidelines . . . . .	83
	Jumper and Switch Settings . . . . .	84
	"IKON Board" (IRIS part number 01157-001) . . . . .	84
	"Adaptec Board" (IRIS part number 01611-002) . . . . .	85
	The Adaptec Board as a Hard Disk Controller . . . . .	85
	The Adaptec Board as an External SCSI Device Controller . . . . .	86
	"GPIB Board" (IRIS part number 00697-001) . . . . .	87
	FEP Configuration for Interface Boards . . . . .	88
	Interface Board Slot Placement . . . . .	88
	What To Do If You Have Problems . . . . .	89
	Common Problems . . . . .	90
	Who To Call for IRIS-Related Problems . . . . .	90
	Return Shipping Procedures . . . . .	90
	Support Policy for IRIS FEP Boards . . . . .	90
<b>Appendix F</b>	<b>New Features and Changes for Release 4.70 . . . . .</b>	<b>92</b>
	New or Improved Features for FEP Rev. 4.70 . . . . .	92
	Scaling Features and Performance . . . . .	92
	Wavefront and Alias Image File Support . . . . .	93
	Color Control Enhancements . . . . .	93
	Interface Board Revisions . . . . .	93
	Enhanced Tape File Support . . . . .	94
	Scitex System Features . . . . .	94
	Test Image Files . . . . .	94
	Miscellaneous . . . . .	94
<b>Index</b>	. . . . .	<b>96</b>

## FIGURES, TABLES, and PROCEDURES

Figure 2-1	Production Workflow with an On-Line Host System . . . . .	9
Figure 3-1	The Opening Menu of the FEP . . . . .	12
Figure 4-1	The FEP Batch File Creates an Environment for the FEP Application . . . . .	16
Figure 4-2	FEP Workflow — IRIS or Truevision File Input . . . . .	19
Figure 4-3	FEP Workflow — Alias or Wavefront File Input . . . . .	20
Figure 4-4	FEP Workflow — PostScript File Input . . . . .	21
Figure 6-1	Using Density and Contrast Setting . . . . .	48
Figure 6-2	Using Color Lookup Tables . . . . .	48
Figure 6-3	Step-Wedge Pattern for Running Matching Samples . . . . .	52
Figure 7-1	The FEP Customization Program . . . . .	58
Figure 7-2	Using a Customized FEP Batch Environment file . . . . .	59
Figure E-1	Settings for the IKON Model 10092 ATbus Hardcopy Interface . . . . .	84
Figure E-2	Settings for the Adaptec Board Used as a SCSI Hard Disk Controller . . . . .	85
Figure E-3	Settings for Adaptec Board Used as an External SCSI Device Controller . . . . .	87
Figure E-4	Settings for the CEC PC<>488 Interface Board . . . . .	88
Figure E-5	Interface Board Placement — FEP Model D316 . . . . .	88
Figure E-6	Interface Board Placement — FEP Model D325 . . . . .	89
Figure E-7	Interface Board Placement — FEP Model D325P . . . . .	89
Procedure 4-1	Scaling an Image . . . . .	29
Procedure 6-1	Changing and Activating Density Values . . . . .	44
Table 4-1	Summary of Raster Image File Processing Options . . . . .	22
Table 7-1	FEP Environment Variables . . . . .	61
Table E-1	Summary of Interface Board Settings . . . . .	91

# Using the IRIS Series 3000 FEP Reference Manual

This manual describes the installation and routine operation of the IRIS Series 3000 Front End Processor (FEP). The descriptions and procedures in this document cover installation and upgrade of FEP software, modification of FEP software configuration for your specific applications, loading images from several sources to the FEP or directly to the printer, and printing images resident on the FEP hard disk drive.

Additional information not available in this manual at the time of publication may be available in the file README on the FEP disk in the directory C:\IRIS.

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## Conventions Used in this Manual

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In the production of this manual we have used the following conventions:

- Emphasis is indicated by **bold type**, not by italicization.
- File names are presented in SMALL CAPITALS.
- Keytop names are surrounded by angle brackets: <Enter>
- Characters that appear on the FEP screen are shown in a typewriter-style face: **I/O and Files**.

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## Comments on this Manual

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Although we have made every effort to make this reference manual as accurate and complete as possible, there will inevitably be some errors and omissions. When you find such problems, please bring them to our attention so that we may correct them. In addition, we welcome suggestions for improving the information presented in this manual.

A documentation comment form is found on the following page. Please send your corrections and comments to:

Customer Documentation Department  
IRIS Graphics, Inc.  
Six Crosby Drive  
Bedford, Massachusetts 01730



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# 1

## Using the IRIS 3000 FEP Reference Manual

This manual describes the installation and routine operation of the IRIS Series 3000 Front End Processor (FEP). The descriptions and procedures in this document cover installation and upgrade of FEP software, modification of FEP software configuration for your specific applications, loading images from several sources to the FEP or directly to the printer, and printing images resident on the FEP hard disk drive.

Applicable FEP software revisions are 4.7 (February, 1990).

Additional information not available in this manual at the time of publication may be available in the file README on the FEP disk in the directory C:\IRIS.

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### Applicability of this Document for FEP Software

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Except as noted, the descriptions of FEP software in this document are applicable both for FEPs purchased as a complete hardware/software package and for FEP software purchased separately. If you have purchased a new FEP as a hardware/software package, IRIS Graphics will install all files and software and will interface your FEP to your IRIS printer and your host system (if any); you do not need to use the installation procedures.

---

### Procedures for Software-only Sites and Software Upgrades

---

If you are upgrading FEP software or installing IRIS FEP for the first time on an appropriate Intel-based (80286 or 80386) personal computer, you should read Appendix D ("How To Install or Upgrade FEP Software"). Be sure that your operating system level and hardware meet the requirements described in that section. In some cases, you may have to change the jumper or switch settings on FEP interface boards. (See Appendix E, "Installing and Configuring FEP Interface Boards.")

There are significant enhancements for FEP rev. 4.7 software. If you are currently using an earlier release of FEP software, you should also read Appendix F ("New Features and Changes for Release 4.70").

If you are upgrading from a previous revision of FEP software, your current Color Lookup Tables and Hue Tables will yield **different results** because of revised methods of calculating color values.

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## About the FEP Reference Manual

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This *Reference Manual* has three major purposes: (1) to describe how to use FEP input, processing and printing functions; (2) to explain how to modify the Color Lookup Tables and other parameters stored on the FEP that govern color values in order to achieve desired output characteristics on the printer; and (3) to explain how to upgrade FEP software and interface boards or reload FEP software.

### Read the Operator's Manual First

Printer operators should first familiarize themselves with the Operator's Manual for their IRIS Series 3000 printer. The Operator's Manual describes printing features in detail. If you have an FEP, you will print image files at the FEP instead of using the printer control panel. The FEP also provides printer functions not described in the *Operator's Manual*. Those differences are explained in Part 2 of this manual.

All adjustments and maintenance functions are still performed at the printer from the control panel. Printer diagnostic error messages appear on the control panel, **not** on the FEP screen.

### Familiarity with DOS

This manual assumes that you are familiar with basic DOS functions, including changing directories, creating and deleting files, and running programs under DOS with batch files.

### Organization of the Manual

The body of this *Reference Manual* is divided into seven sections:

- This part, Part 1, describes the scope and purpose of the manual.
- Part 2 is an overview of the uses and features of the FEP, including an explanation of the basic differences between operation of the printer from the FEP and from the printer control panel. Everyone should read this section first.
- Part 3 is a step-by-step procedure for printing a sample file. If your preferred learning style is to learn by doing, you may want to start with this section.
- Part 4 explains in detail how to use FEP software for loading files to disk, printing, and scaling images.
- Part 5 consists of a menu-by-menu description of the individual FEP commands.

- Part 6 describes techniques for using FEP features to control the color characteristics of images. This section also includes IRIS's recommended procedure for using FEP features to "match" the colors of images from other sources.
- Part 7 describes how to use the CUSTOM program to set up "customized environments" — batch files that load the FEP software with different settings for alternate sources of image files. Customization is not needed if you accept files from only one source.

Six appendixes are also included in this manual:

- Appendix A, "FEP Error Messages"
- Appendix B, "Sample Files"
- Appendix C, "File Formats Supported by the FEP"
- Appendix D, "Installing or Upgrade FEP Software." (Note: If you have received a new FEP, the software is installed by IRIS Graphics and is ready to run.)
- Appendix E, "Installing and Configuring FEP Interface Boards," for FEP users who are adding boards not purchased from IRIS Graphics.
- Appendix F, "New Features and Changes for Release 4.7"

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## Performance Warranty and Liability

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IRIS Graphics guarantees that the IRIS FEP and FEP software has the functionality described in this document and — within the first 90 days or for the duration of extended service contracts covering the FEP — will replace any software damaged during shipment from IRIS to the customer site and will either repair or replace defective FEP hardware.

FEP software purchased for use on computers **not** supplied by IRIS Graphics may or may not perform correctly. IRIS Graphics does not warrant the performance of FEP software when it is used on computers other than those expressly supported by IRIS graphics for this application.

Extended service agreements are available from IRIS Graphics by contacting the IRIS Customer Support Department or your IRIS sales representative.

IRIS Graphics is not responsible under any circumstances for costs incurred by the customer in the process of using IRIS products for its own purposes or for the delivery of products and services to others.



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**If You Need Assistance . . .**

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If you have questions about FEP hardware and software or if you need assistance with installation and use of the FEP, please call

Customer Support Department  
IRIS Graphics, Inc.  
Six Crosby Drive  
Bedford, Massachusetts 01730  
(617) 275-8777



# 2

## Introduction to the FEP

The IRIS FEP consists of software and hardware for accepting image data from one or more sources, controlling the color characteristics of images, scaling images, and transmitting images to an IRIS Series 3000 Color Ink Jet Printer. FEP software runs on Intel-based (80286 and 80386) personal computers under the MS-DOS operating system, including FEP hardware supplied and supported by IRIS Graphics.

FEP software supports printing of raster images in a variety of commonly used formats. With optional third-part software and high-performance hardware, the FEP also converts files in PostScript format to raster images that can be printed on an IRIS printer.

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### FEP Hardware and Software

---

You may purchase an FEP system that includes both hardware and FEP software or the FEP software alone. IRIS Graphics does **not** warrant that FEP software will work consistently or accurately execute the functions described in this document on personal computers that have not been tested and approved for use with IRIS FEP software.

#### FEP Hardware Supplied by IRIS Graphics

FEP hardware supplied by IRIS includes:

- personal computers based on the Intel 80386SX and 80386 microprocessors;
- an interface to an IRIS Series 3000 printer;
- one 5¼" floppy disk drive for loading software and image files;
- depending on the FEP model, additional computer hardware for increased performance and support of PostScript image conversion;
- optional interfaces that accept image data from external systems, including on-line host systems and tape drives.

The FEP hardware is supplied with Microsoft's MS-DOS 4.01 operating system. IRIS FEP hardware has been tested for compatibility with

all applications supplied by IRIS Graphics and is suitable in performance for FEP software applications.

A complete FEP system includes on-site installation of all hardware and software, a test file and test patterns on disk, training in its use at IRIS Graphics, and telephone and field service support according to the terms and conditions of the sales contract.

### Using Hardware and Software from Other Vendors with the FEP

If you add non-IRIS interface boards and software, make sure that installing them does not create conflicts with FEP software and hardware. Consult Appendix E, "Installing and Configuring FEP Interface Boards," if you need to add IRIS-supported FEP interface boards that were not originally supplied by IRIS Graphics when the FEP was installed.

Note that the FEP disk is partitioned with the intention that all image files will be kept on drive D. This larger partition has a larger allocation unit, usually 16384 bytes, in order to make it a more efficient storage medium for large image files.

Standard FEP disk partitioning allots 10 Mbytes to drive C for software (FEP and other applications). The IRIS FEP can run most other MS-DOS software. In some cases, you may need to change the disk partitioning to increase the space available for other software and data files in drive C.

You should not modify any files associated with FEP software — especially data in the FEP batch configuration files generated by the FEP CUSTOM program — unless you are explicitly instructed to do so by IRIS Graphics Technical Service. Always make a backup copy of the CONFIG.SYS file if you are loading other software whose installation program automatically modifies that file.

### Files Supplied and Directory Structure

You control all program activities through the interface supplied by the FEP software. Operators do not use DOS for printing or other standard FEP production functions. The following files are in the directory \IRIS on drive C:

- FEP.BAT (or another batch file) — The batch file created with the CUSTOM program and used to load FEP software.
- FEP470.EXE — The FEP program itself
- CUSTOM.EXE — The program used to generate new FEP batch files
- INSTALL.HLP — The help file for the CUSTOM program
- RELEASE.DOC — Notes on the accompanying release of FEP software
- README — Describes the INSTALL and CUSTOM programs

The following directories are created on drive C:

- \CNF with the configuration file IRIS
- \CLT with the Color Lookup Table IRIS
- \HUE with the Hue Table file IRIS
- \LST for Image List files

The directory \IMG is created on drive D for Image Files. If you have purchased FEP hardware, this directory will contain the sample image file ADPLEX and two test pattern files: VERTSCAL.IRS (a vertical test pattern) and HORZSCAL.IRS (a horizontal test pattern).

For a more complete description of these directories and files, see Appendix D, "Installing or Upgrading FEP Software."

The following directories and files are created during use of FEP software:

- The directory C:\ACTIVE is created when you first run FEP software.
- The file C:\ACTIVE\ACT\_FILE, which saves the identity of the last active Configuration, Color Lookup, and Hue Table files, is created or updated when you exit from FEP software.
- The file C:\ACTIVE\CLT.DOC, is a readable version of the Color Lookup Table values that are sent to the printer. The CLT.DOC file is created or updated whenever you print an image file.

#### Printer Firmware Revision Level

If you are upgrading from FEP software rev. 4.3 to rev. 4.70, your IRIS Series 3000 printer must have the following firmware (U.S. models): Model 3024 — IRS011590 A24011590; Model 3047 — IRIS011590 A47011590. The appropriate ROM chips will be included in your upgrade kit.

---

### Features of FEP Software — an Overview

---

IRIS FEP software was developed by IRIS Graphics to read and store image data from external sources and to control all printing functions for IRIS Series 3000 printers. FEP software provides all the printing controls that are available at the IRIS Series 3000 printer control panel, including selecting files to print, setting printing parameters, and starting the print run (but not including pausing a print run, which must be executed at the printer).

In addition, the FEP allows printer operators to store, recall, and modify sets of printing parameters, including multiple sets of Color Lookup Tables and Hue Tables.



## FEP Features Not Available at the Printer

Because FEP software uses a stand-alone personal computer with its own storage and processing capabilities, it enables IRIS to provide the following **added** functions. These functions are not available at the printer's control panel and are not described in the *Operator's Manual*:

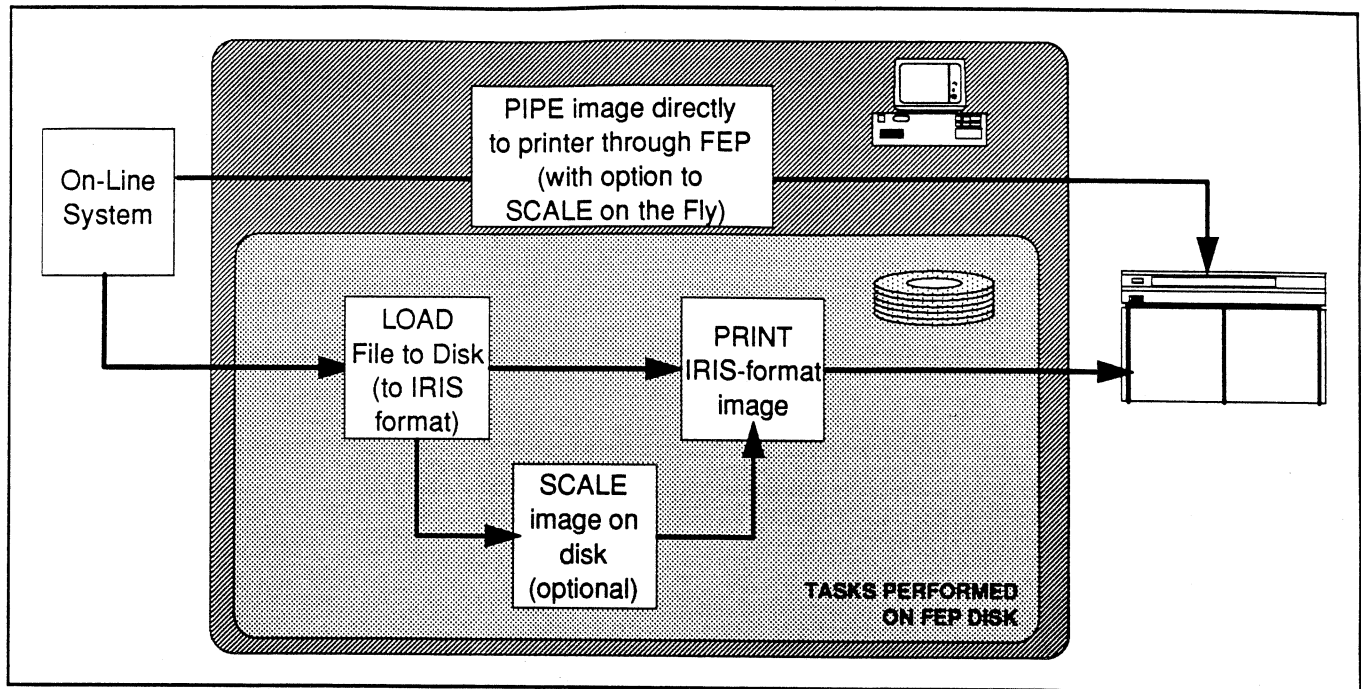
1. Accept image data from on-line image-processing systems and store those files on the FEP's disk for later transmission to the printer.
2. Copy TARGA®, VISTA®, Wavefront®, and Alias® files stored on floppy disk or tape (with tape input options) to the FEP disk for later transmission to the printer.
3. Build lists of images to be printed in a single print run.
4. Specify precise placement of multiple images anywhere on the printing medium, with or without "tic marks."
5. Store and modify multiple sets of printing parameters, including resolution, drum speed, type of data, pixel replication, and other parameters.
6. Store and modify hue control and paper "tinting" values to allow closer matching of the printer images with images produced by other means.
7. Store and edit multiple Color Lookup Tables (CLTs) for precise adjustment of image contrast characteristics.
8. Specify and change Gamma Correction values to compensate for the contrast characteristics of images created on computerized illustration and design systems — usually RGB data.
9. With Scaling features, resize images for specific requirements.
10. Create customized FEP batch files that allow you to use the FEP with a variety of data sources.

## Typical Use of the FEP in Production

The production requirements of IRIS customers vary significantly, but many will use the editing features to develop one or more "house standard" Color Lookup Tables, Hue Tables, and Gamma Correction values. At printing time, most operators will simply select the appropriate standard. Such standard settings may reflect the requirements of different image sources or customer preferences.

When printing an image, the operator only needs to:

- Mount the paper on the printer and place it on-line.
- At the FEP, change the selection of Color Lookup Table and Gamma Correction value, if needed.
- If the file must first be placed on the FEP disk, the operator will copy the file to disk from an external source or LOAD the file to disk in order to convert it to an IRIS-format image file for printing.



**Figure 2-1: Production Workflow with an On-Line Host System.** In a production environment with an on-line host system or 1/2-inch tape drive, the FEP provides four major file-management functions: (1) Loading files to disk, (2) Piping files directly to the printer, (3) Scaling files on disk, and (4) Printing files already stored on the FEP disk in IRIS format. Other FEP configurations and workflows are shown in Part 4.

- Select an image to print. The PIPE command transmits a file directly from a host system (or a file in a non-IRIS format on the FEP disk) to the printer without storing it on disk. The PRINT command sends an IRIS-format or Truevision-format file from the FEP disk to the printer.
- Optionally, the operator adds a “title” and “subtitle” to the image so that information about the image stays with the print.
- The operator starts the print run at the FEP. The FEP tracks the progress of printing on the screen and will display messages about error conditions if they occur. When the run is finished, the printer drum stops spinning and the print head returns to its home position. The FEP is ready for the next task.

Your daily production flow may also include Scaling of images and printing of multiple files in a single run with the Image List function. Regardless of your routines, the FEP interface is easy to use from the start and makes it possible for people with limited training to print high-quality color images in predictable ways.

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## Your Next Step — the Tutorial or ???

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If you like to dive in and “feel” your way around a new system, you may want to start with the Quick Start Tutorial in Part 3. If you have purchased a complete FEP system from IRIS Graphics, your disk contains the sample image file ADPLEX. Part 3 takes you through the process of printing this file step by step.

If you want to do more in-depth reading about the software before you begin, try reading Parts 4 and 5 first, then print a sample file. You won't need to read Part 6 (“Advanced Production Techniques and Color Matching”) until you want to learn about controlling color values of images. You may only rarely need to refer to Part 7 and the Appendixes.

# 3

## Quick Start Tutorial — Printing a Sample File

This part of the manual is for those who like to use a program as quickly as possible. It includes detailed instructions for printing a sample file stored on the FEP disk. These procedures assume that the FEP has been installed and set up properly and that an appropriate FEP Environment file (usually FEP.BAT) has been created for your system. The image file ADPLEX must be in the \IMG directory on drive D.

In the Quick Start procedure, described in detail below, you will take the following steps:

1. Mount a sheet of paper on the printer drum and place the printer on line.
2. Turn on the FEP and run the FEP software.
3. Specify a horizontal image offset (to make room for an image Title and Subtitle), select a sample file to print, type in the Title and Subtitle, and send the image to the printer.
4. Remove the finished print from the printer drum.

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### The Step-by-Step Quick-Start Procedure

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Before you begin this procedure, review the sections in the *Operator's Reference Manual* that describe how to mount the paper and place the printer on line.

#### Preparing the Printer

Mount a sheet of paper 15" × 15" or larger on the drum (large enough to accommodate the ADPLEX file). Make sure that the paper fits snugly on the drum — without wrinkles and bubbles — and that the edges are secure on the double-sided tape. Be sure the upper left-hand corner of the sheet is placed at the alignment marks on the drum.

Check the ink bottles. There must be at least a small amount of ink visible in the bottles. Replace empty bottles with full bottles if necessary. Then close the printer cover and press the Print Switch. The control panel will display:



SYSTEM ON LINE

00:00:00

Where "00:00:00" is the time of day.

### Run FEP Software

Turn the FEP on and run the standard FEP environment by typing **FEP** (or the name of your batch file) and pressing <Enter> at the DOS prompt. The FEP interface should appear on the screen. (See Figure 3-1.) The items **I/O and Files** and **Load** will be highlighted.

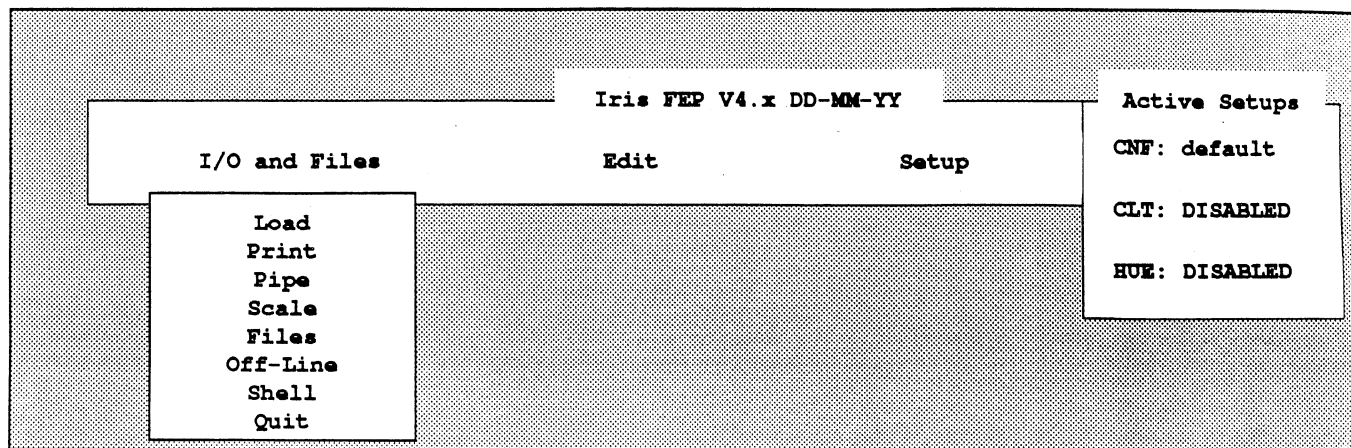


Figure 3-1: The Opening Menu of the FEP. "I/O and Files" and "Load" will be highlighted when you first run the program.

### Specify an Offset (Optional)

To specify an Offset for the Image — in order to make room for the Title and Subtitle — use the Right Arrow key to move the light bar to the Edit menu. **Configuration** is already highlighted because it is the first entry in the list of printing parameters. Select Configuration by pressing <Enter>. Move the light bar down to **default** with the Down Arrow key and press <Enter>. Move the light bar down to **Offsets** and press <Enter>.

Don't change the pixel offset. Move the light bar down to the **Rasters** field and type in an offset of 120 units (rasters) — about 1/2". Then press <Esc> twice. If you need to change the active Configuration file, move the cursor down to the Update Setup? field. If this field displays NO, change it to YES by using the Left or Right Arrow key. Press <Enter> to select the update, then any key **except** <Esc> to confirm the selection.

### Selecting the File

Use the Left Arrow key to highlight the I/O and Files menu. Use the Down Arrow key to move the highlight to **Print**, then press <Enter>. A window will open with a list of files. Move the highlight to **adplex** and press <Enter>. If you select the wrong file, you can restart the procedure by pressing <Esc>.

### Adding a Title and Subtitle (Optional)

For this Quick Start procedure, you may add a Title and Subtitle to the image. These two lines will be printed at the top of the picture. Titles and Subtitles are not required; these steps are included to familiarize you with a feature of the FEP that most customers use frequently.

When you select the ADPLEX file, the FEP opens a print window and superimposes another window that displays two fields. Type your name on the first line, then use the Down Arrow key (not <Enter>) to move to the Subtitle line. Type **Quick Start Test Run** on the Subtitle line.

Press <Enter> when you have completed Title and Subtitle lines. A message at the bottom of the screen tells you, **Hit <Enter> to start printing, <ESC> to return to I/O and Files menu.**

Press <Enter> to start the print run. The system displays the image dimensions in a window on the screen. A third line displays the raster currently being printed. A message in the lower left corner of the screen indicates that printing is in process.

After the FEP starts the print run, the printer control panel will display:

```
PRINTING                1234
                        00:00:00
```

Where "1234" is the current raster (vertical line around the drum) being printed and "00:00:00" is the **elapsed time** since the beginning of the print run.

During a print run, the printer may display error messages on the control panel. Such error conditions and their remedies are described in the *Operator's Manual*.

### Pausing or Aborting a Print Run

You can **abandon** a print run at any time by pressing the <Esc> key on the FEP. The FEP will display a message that the printer has been taken off line.

You can **pause** printing just by opening the printer's cover. Closing the cover restarts printing. If you do not close the cover within two minutes, the print run will be abandoned. You can also abandon the print run explicitly by raising the cover and pressing either button on the printer control panel. (Note: **Pause Image** in the active Configuration file must be enabled — set to Yes. If this command is set to No, opening the cover will abandon the print run.)

### Completing the Print Run

When the print run is complete, the FEP print window will display the message **Transmission Complete**. The message **Hit any key to continue** will appear at the bottom of the screen.

At the printer, wait until the printer control panel displays the following message, which indicates that the printer has received all the image data:

PRINT DONE

00:00:00

Wait until the print head returns to its home position. Then open the printer cover. **Wait until the drum stops spinning. Do not attempt to stop the drum manually.** Remove the print. The print will be dry to the touch. (Prints on acetate may still be damp.)

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## What To Do Next

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Depending on your style of learning, you may want to go next either to Part 4, which provides instructions on how to use the FEP for several typical tasks, or to Part 5, which is a reference section that explains all the FEP menus and command options. After you become familiar with the FEP and the capabilities of your IRIS Series 3000 printer, you may want to test the color matching techniques described in Part 6 or create new environments for your FEP with the Customize program described in Part 7.

# 4

## Using FEP Software in Daily Production

Part 4 describes the FEP interface and explains how to use the FEP for common production functions, including input, printing, and image scaling. Detailed explanations of all individual commands can be found in Part 5.

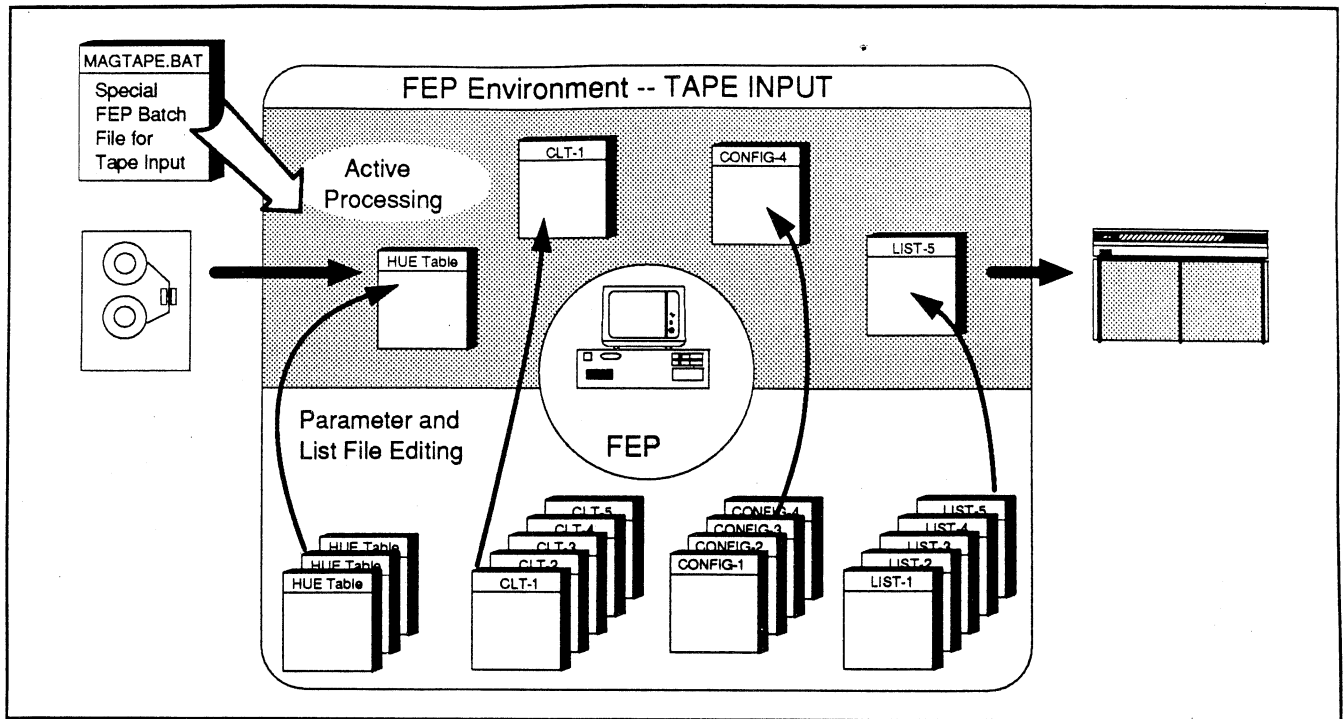
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### Overview of FEP Production Functions

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The FEP software provides the following primary production capabilities:

- **Loading image files from [external] sources to the FEP disk.** The Load command stores a raster image file on disk in IRIS format for Scaling, repeated printing, or inclusion in an Image List for printing with other files. The FEP Load command is used with all supported non-IRIS file types except Truevision files. Loading a file converts the file to IRIS format in the process of copying it to disk. The input file may reside on tape or on some other on-line system, or it may already be on the FEP disk, as is often the case with Alias and Wavefront files. If the file is already on the FEP disk, the Load command performs the format conversion and creates a new IRIS file in the image directory (usually D:\IMG).
- **Piping Image Files to the printer.** The Pipe command converts supported non-IRIS raster image format files on the fly to IRIS format as it transmits them to the printer. Piping is useful when image files are very large or when you have no need to store them on disk for Scaling or inclusion in an Image List file.
- **Printing IRIS and Truevision image files.** The Print command sends files in IRIS or Truevision file format from the FEP disk to the IRIS Series 3000 printer.



**Figure 4-1: The FEP Batch File Creates an Environment for the FEP Application.** When you start the FEP program with the batch file FEP.BAT, you use the parameter files and image files in the directories defined for that environment, and you identify a specific source of image data (for example, an on-line interface).

- **Scaling images.** Images can be Scaled on the fly as they are Loaded to the FEP disk or Piped to the printer. You can use the Scale command to Scale an IRIS or Truevision image that is already resident on the FEP disk.
- **Editing FEP parameter files.** The FEP editing features allow you to pre-set such printing parameters as overall density, drum speed, mirror imaging, etc., and store them as “printing configurations.” By modifying Color Lookup Tables and Hue Tables, you can achieve very precise control over the color characteristics of images from a wide variety of sources. FEP editing features also let you build Image List files for printing multiple images in a single print run.

If you have purchased PostScript file conversion and printing software or other software developed by vendors other than IRIS for use with the IRIS Series 3000 FEP and printers, refer to the documentation provided by those vendors for operation of their software.

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## Getting Started — Preparing To Print Images

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The FEP provides all the printing functions that are available at the printer control panel (described in the *Operator's Manual*), including selecting files to print, setting printing parameters, and starting the print run (but not including pausing a print run, which must be executed at the printer).

### Loading FEP Software

If you have purchased a complete FEP hardware/software system from IRIS Graphics, your FEP will be set up for you and should be ready to print files. If you are installing FEP software on a PC-compatible computer not provided by IRIS — or upgrading to a new release of FEP software — you must first install the FEP software according to the directions in Appendix D and create a batch file to start the program with the CUSTOM program (Part 7).

### Running FEP Software

To start the FEP software, turn the computer on or exit from the current application to DOS and type the name of an FEP batch file — usually **fep** — and press <Enter>. If the program fails to load properly or does not perform as expected, reboot the computer and try again. (The FEP software installation modifies the CONFIG.SYS and AUTOEXEC.BAT files. If other applications have modified the system variables needed by FEP software, rebooting the computer and running the FEP batch file will reset all the variables used by the FEP application.)

The “environment” created by the batch file also identifies directories for program files — Configuration (printing parameter) files, Color Lookup Tables, Hue Tables, and Image List files — and for the images to be printed. If you use image data from more than one source, you may have several batch program files. See Part 7 for an explanation of how the batch files affect the FEP's environment.

You can escape temporarily to the computer operating system with the Shell command in the I/O and Files menu. Type **exit**<Enter> at the DOS prompt to return to the FEP software. To quit permanently from the FEP software, use the FEP Quit command. If you quit, you will have to type the name of an FEP batch file and press <Enter> to restart FEP software.

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## The FEP Interface

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The FEP interface consists of a family of pull-down menus from which you will make selections and dialogue boxes for editing values. When you select a command in a menu, the FEP might present an additional menu of commands or a window containing lists of files (for example, image files) or a dialogue box with labelled fields. The FEP software

will verify your responses and ask you to re-enter data if you make an error, or it may supply a default value for you, depending on the particular data item.

### Behavior of Keys

Keys are used in the following way to control FEP activities:

- Use the cursor (arrow) keys to move from one menu choice to another or to move from one field to another within a window containing data in multiple fields.
- In many cases, pressing the down arrow key at the last entry in a pop-up window (dialogue box) will open the next pop-up window in sequence. (You don't have to explicitly close that window and open the next window on the same level.)
- In some cases, the left and right arrow (cursor) keys will be used to increment/decrement or change values in fields.
- Press <Enter> to select and open a highlighted menu or to confirm an entry.
- Use the <Esc> key to cancel a window. At the top level, pressing <Esc> with a pull-down menu open hides all three pull-down menus. To reactivate pull-down menus, just press <Enter> at the current selection.
- The <Del> key is used to delete files in the Files functions and to delete index entries in the Color Lookup Tables.
- The <Ins>, <Del> (or <Delete>), <Home>, and <End> keys have special uses when editing image list files.

See the description of individual menu entries in Part 5 for special behaviors of keys that deviate from these general rules.

### Confirming and Abandoning Selections or Data Changes

Most actions — including printing an image file or an image list — are confirmed simply by pressing <Enter> after making a selection. Pressing <Esc> after opening a window and making a change will close the window and will save those values in memory, but not on disk. When you press <Esc> and are asked to enter a filename in a "Save As" window, pressing <Esc> cancels your editing changes.

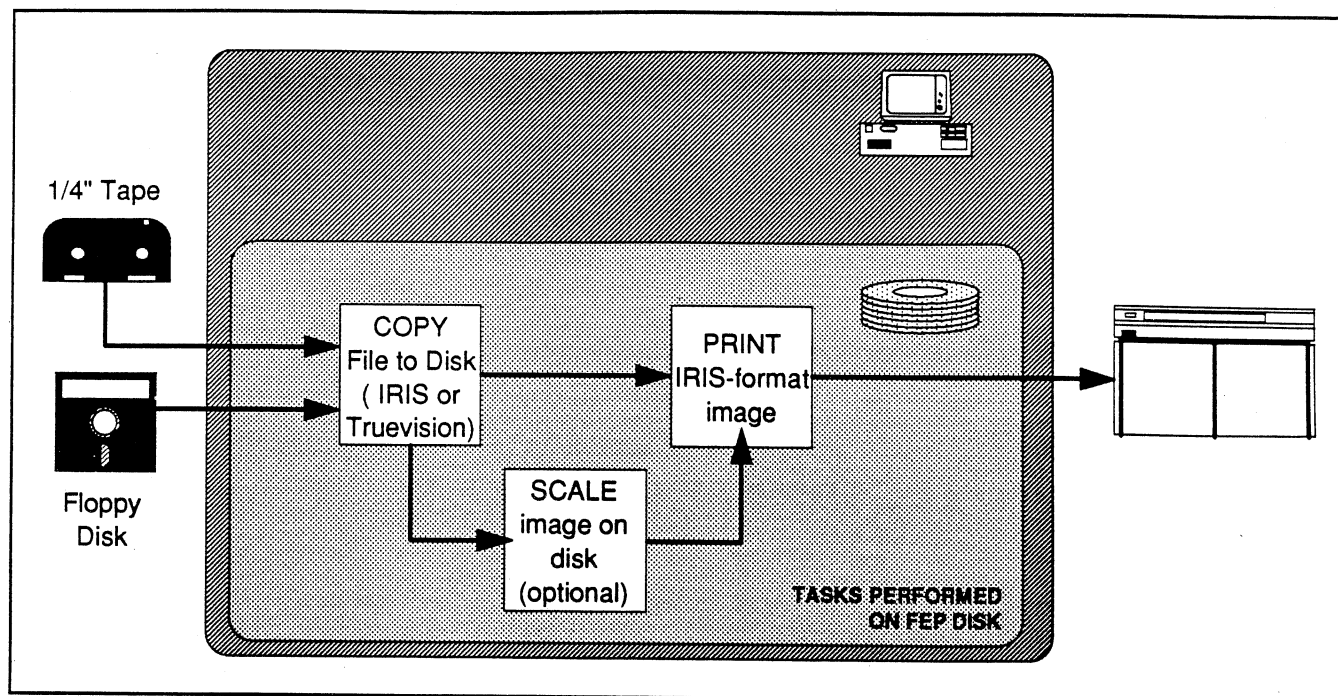
If you change the file name and press <Enter>, your editing changes will be saved as a new file. If you have made changes to a file, you will have to confirm that you want to overwrite the original file.

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### Loading Image Files to IRIS Format

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You can use the FEP Load command to transfer image data onto the FEP hard disk from Alias, Wavefront, CT2T, DDES, and CT Handshake source files. The process of Loading a file to the FEP disk



**Figure 4-2: FEP Workflow — IRIS or Truevision File Input.** Both IRIS and Truevision files are treated as “native” input formats. Truevision files can be copied to the FEP disk from 1/4" tape or multiple floppies by using appropriate DOS-compatible file transfer utilities. Tape input is an FEP option.

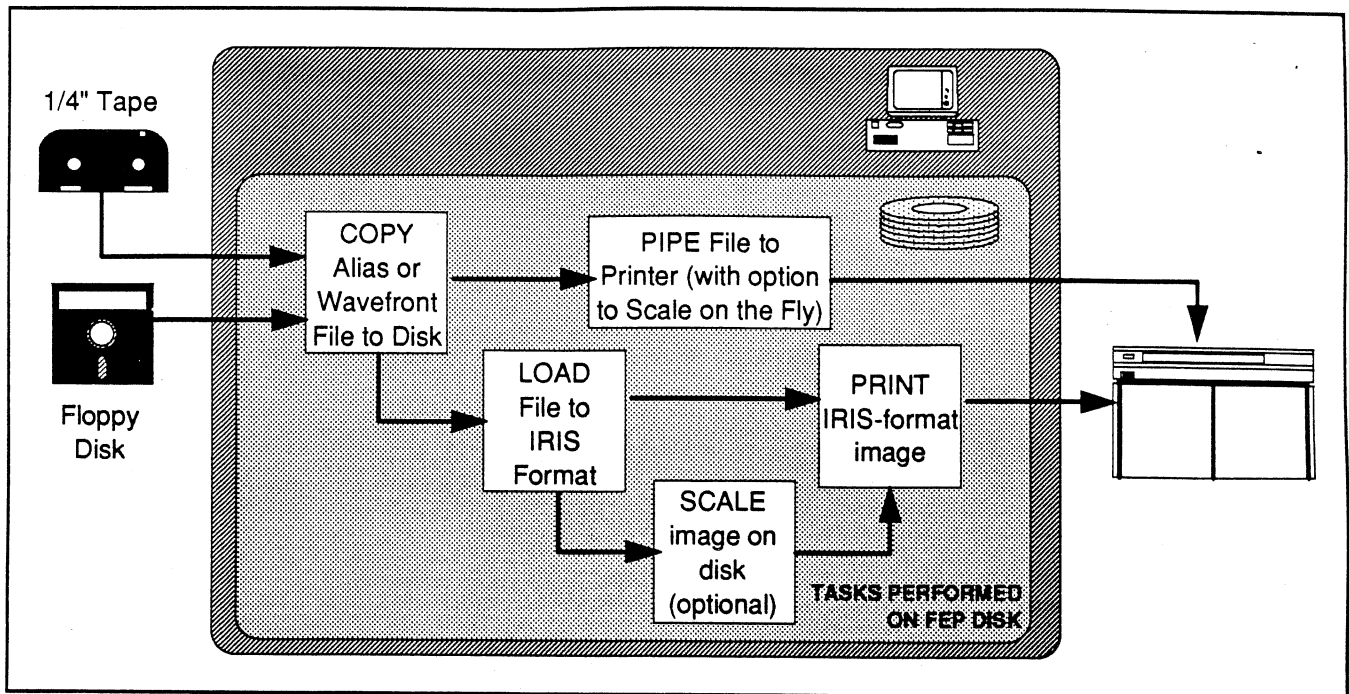
converts it to IRIS file format. The Load process also offers you the option of adding a Title and Subtitle and Scaling (with the exception of CT2T files) during the conversion process.

The Pipe command also applies to raster image files in these formats, but Piping a file to the printer converts it to IRIS format on the fly; the file is not stored on the FEP disk. The file types that you can Load and Pipe are controlled by the FEP “environment” currently in effect — the settings created by the FEP batch file you used to load the FEP software. (FEP batch environment files are created with the CUSTOM program. See Part 7.)

The Load command is **not** used with IRIS-format and Truevision (TARGA) files. These file types can be copied to the FEP disk with DOS-compatible utilities. You can then use the Print command to send them to the IRIS printer.

Files stored on 9-track magnetic tape or the disk drive of a host system to which the FEP is interfaced do **not** have to be stored first on the FEP hard disk. (This would be inadvisable in many cases because of the storage requirements of large color image files.) Instead, by using the FEP software’s **Pipe** command, such files can be transmitted directly from the host system or magnetic tape drive through the FEP and to the printer.





**Figure 4-3: FEP Workflow — Alias or Wavefront File Input.** Files in Alias and Wavefront formats must be transferred to the FEP disk for Loading to the IRIS format or Piping directly to the printer. Scaling can be performed on the fly — during Loading or Piping or after the file is Loaded to the disk.

### Copying Files to the FEP Disk

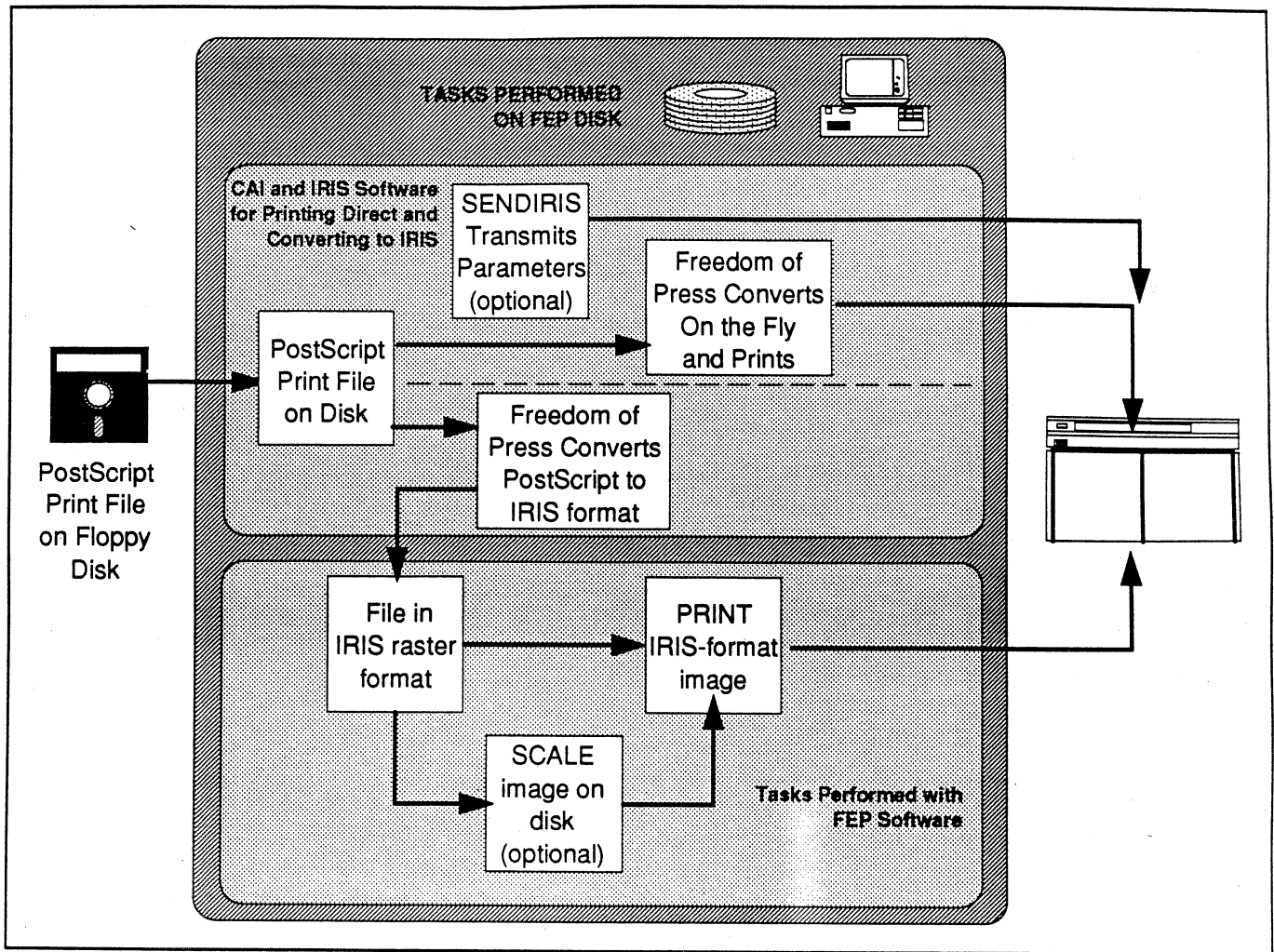
Some file types — including Alias and Wavefront images — must be copied to the FEP disk before they can be converted into IRIS file format with the Load command or printed with the Pipe command. Don't confuse the Load command with DOS utility programs and commands for copying files from another storage medium to the IRIS FEP disk. If a file on a DOS diskette — for example, a PostScript file — is on a single floppy disk, you can use the DOS COPY command to transfer it to the FEP disk. You will need the RESTORE or COMBINE programs to copy multi-floppy files to the FEP disk. The optional IRIS PC TAR utility and 1/4" tape drive allow you to copy large image files from 1/4" magnetic tape to the FEP disk. See the Appendix C for more information on transferring files to the FEP disk.

Remember to copy all non-IRIS files into the directory specified for that file type by the active FEP environment — usually a directory on drive D.

### Loading and Piping Are Affected by Environment Variables

Loading and Piping are affected in the following ways (See Part 7 for more details about environment variables):

- If the value for **FEP** is set to **WAVEFRONT** or **ALIAS**, a list of files of those types on disk will be presented.
- If the value for **FEP** is set to **OLDIF** or **PUSH**, you will initiate transmission of image data to the FEP at the Scitex system.



**Figure 4-4: FEP Workflow — PostScript File Input.** The FEP can process PostScript files if you purchase the CAI Freedom of Press PostScript interpreter software. Files can be converted first to IRIS format or transmitted directly from the Freedom of Press application. FEP model D325P or equivalent is required.

- If the value for **FEP** is set to **PULL**, you will initiate transmission of image data to the FEP at the FEP itself (Scitex background mode).
- If the value for **FEP** is set to **TAPE** and the **TAPEFORMAT** entry is set to **CT2T**, you will be prompted to enter the number of files to skip on the tape and then initiate transmission of image data to the FEP at the FEP.
- If the value for **FEP** is set to **TAPE** and the **TAPEFORMAT** entry is set to **CTHS** or **DDES00**, you can display a directory of file header information on the tape and select one or more files from the list presented.

**Table 4-1. Summary of Raster Image File Processing Options.**

The processing options for different types of raster image source files are set by the environment variables "FEP" and "TAPEFORMAT." See the text for a detailed description of the procedures used for each type.

Source Raster File		Transfer to FEP Disk First?*	Load File to Disk or Pipe to Printer?	Scale on the Fly During Load or Pipe?	Print from Source File Format?	Comments
File Type	FEP Env. Var. Settings					
IRIS	(any)	Yes			Yes	File must be resident on FEP disk to Print
Truevision	(any)	Yes			Yes	File must be resident on FEP disk to Print
CT2T (tape)	TAPE/CT2T		Yes			CT2T header lacks resolution information need for Scale by Resolution
DDES00 (tape)	TAPE/DDES00		Yes	Yes		Scale by Resolution available during Load or Pipe
CT Handshake (tape)	TAPE/CTHS		Yes	Yes		Scale by Resolution available during Load or Pipe
Alias	ALIAS	Yes	Yes	Yes		Load and Pipe performed after transferring source file to FEP disk.
Wavefront	WAVEFRONT	Yes	Yes	Yes		Load and Pipe performed after transferring source file to FEP disk.
CT (Scitex via Handshake on-line interface)	OLDIF PUSH PULL		Yes	Yes		

\*Requires appropriate file transfer utility: COMBINE or RESTORE for files that span diskette volumes; IRIS's PC TAR program for retrieving files on 1/4" magnetic tape. (See Appendix C.

### Loading Wavefront and Alias Files to the FEP Disk

To Load a Wavefront or Alias file to the FEP disk and store it in IRIS image file format, first run an FEP batch environment file that specifies one of those file formats as the input file type. Then take the steps listed below. You can abandon the process of Loading at any time during the conversion by pressing <Esc>.

1. Transfer the file to the D:\WAV (for Wavefront files) or D:\ALIAS directory of the FEP disk with an appropriate utility. See Appendix C, "Image File Formats," for instructions on using BACKUP/RESTORE, SPLIT/COMBINE, and PC TAR.
2. Select the **Load** command from the I/O and Files menu. The files in the input directory will be listed. Move the light bar to the file you want to Load and press <Enter>. The FEP will display a box labelled Output File Name. Type in a file name, following MS-DOS file-naming conventions. Suffixes to indicate file type are optional; FEP software processes file types according to the

directories in which they are found — not according to file-name suffix. Do **not** precede the file name with a path.

3. Enter a Title and a Subtitle for the image, if you want the image to be labelled when it is printed. Respond “Yes” to **Update Header?** if you want to record (or update) the Title and Subtitle information in the image file header. Be sure to include an offset value to accommodate the space required for titles and subtitles when printing the image.
4. After you specify a Title and Scaling — if any — pressing <Enter> opens a Load Window that displays the input file name, the output file name, the image width (in pixels — as measured around the drum) and the image height (number of image rasters — as measured along the length of the drum). If you have specified Scaling, the window also displays information about the number of output pixels and raster and the scaling method.

After the conversion process is finished, the message **Transmission Complete** is displayed at the bottom of the screen.

### Loading CT2T Files to the FEP Disk

To Load a CT2T file on 9-track 1/2” magnetic tape to the FEP disk and store it in IRIS image file format, run an FEP environment that specifies CT2T as the input file tape format. Then take the steps listed below. You can abandon the process of Loading at any time during the conversion by pressing <Esc>.

1. Mount a CT2T tape on the tape drive and place the drive on line.
2. Select the **Load** command from the I/O and Files menu. A dialogue box labelled **Output File Name** opens. Type in the name that you want to store the file under and press <Enter>.
3. Another dialogue box opens, which presents fields for Scaling, selection of file on tape by number, Title, and Subtitle. Leave the field labelled **Enable Scaling** set to No. CT2T files cannot be Scaled during Loading (there is insufficient information about the image dimensions in the image file header). You may Scale the image after you have Loaded it to disk.
4. Enter a Title and a Subtitle for the image, if you want the image to be labelled when it is printed. Respond “Yes” to **Update Header?** if you want to record (or update) the Title and Subtitle information in the image file header. Be sure to include an offset value to accommodate the space required for titles and subtitles when printing the image.
5. After you specify a Title and Subtitle — if any — pressing <Enter> opens a Load Window that displays information about the progress of Loading.

After the conversion process is finished, the message **Transmission Complete** is displayed at the bottom of the screen.

### Loading CT Handshake and DDES Files to the FEP Disk

To Load a CT Handshake or DDES file from 9-track 1/2" magnetic tape to the FEP disk and store it in IRIS image file format, first run an appropriate FEP batch file. The FEP variable should be set to **TAPE**. The TAPEFORMAT variable should be set to **CTHS** or **DDES**. Then take the steps listed below. You can abandon the process of Loading at any time during the conversion by pressing <Esc>.

1. Mount a CT Handshake or DDES tape on the tape drive and place the drive on line.
2. Select the **Load** command from the I/O and Files menu. A window containing the entries **Directory**, **One Image**, and **Multiple Images** will open. If you already know the number of the file on tape, you can enter the number. Select **Directory** to build a list of files on tape. The tape drive will read through the tape and display file header information for each image file it finds. After the tape directory listing is complete, select either **One Image** or **Multiple Images**. You will then be able to select image files to print by moving the highlight bar to an entry and pressing <Enter>. (**Note:** When selecting files from a CT Handshake tape, you can select only the files that are of the "CT" [continuous tone] type.)
3. Another dialogue box allows you to select **Scaling** during Loading. The Scaling options during Loading and Piping of CTHS and DDES files include the **Scale by Header** option at the beginning of the list. If you choose this option, the FEP software will use the input file header information about resolution and Scale the file to the current active resolution. The remaining Scaling options are the same as those for Scaling explicitly with the **Scale** command. Those options are described later in this Part of the manual.
4. After you select a Scaling method, another dialogue box — labelled **Output File Name** — is displayed. The name of the source tape file is entered by default. You can change the name to any string that conforms to DOS file-naming conventions. Do **not** include a path. Confirm the Output File Name by pressing <Enter>.
5. Enter a Title and a Subtitle for the image, if you want the image to be labelled when it is printed. Respond "Yes" to **Update Header?** if you want to record (or update) the Title and Subtitle information in the image file header. Be sure to include an offset value to accommodate the space required for titles and subtitles when printing the image.

6. After you specify a Title and Scaling — if any — pressing <Enter> opens a Load Window that displays the input file name, the output file name, the image width (in pixels — as measured around the drum) and the image height (number of image rasters — as measured along the length of the drum). If you have specified Scaling, the window also displays information about the number of output pixels and raster and the scaling method.

After the conversion process is finished, the message **Transmission Complete** is displayed at the bottom of the screen. If you selected **Multiple Images**, the directory of tape files remains displayed on the screen. You can select another file to Load or press <Esc> to cancel the procedure.

### On-Line Scitex Handshake Systems

To Load a CT file via the Handshake on-line protocol from a Scitex Whisper (Intel-based) or Response (HP-based) system, first run an appropriate FEP batch file. The FEP variable should be set to **PULL**. The SCITEX variable should be set either to **INTEL** or **HP**. Be sure you know the name of the image file on the host system. If the system is Intel-based, you must also know the Job and Page of the image. Then take the steps listed below. You can abandon the process of Loading at any time during the conversion by pressing <Esc>.

1. Select the **Load** command from the I/O and Files menu. The response of the FEP software depends on the SCITEX variable.
  - a. If the host system is Intel-based, a window opens to ask for the Job and Page of the source image file on the host system. After you press <Enter>, another box asks for the Output File Name. (All of these entries must be 11 characters or less.) This is the name of the image file to load from the host system. It will also serve as the name of the IRIS-format file stored in the image directory specified in the active FEP environment (usually D:\IMG).
  - b. If the host system is HP-based, a window opens to ask for the Output File Name. The name must be 11 characters or less. This is the name of the image file to load from the host system. It will also serve as the name of the IRIS-format file stored in the image directory specified in the active FEP environment (usually D:\IMG).
2. Another dialogue box allows you to select **Scaling** during Loading. The Scaling options during Loading and Piping of CTHS and DDES files include the **Scale by Header** option at the beginning of the list. If you choose this option, the FEP software will use the input file header information about resolution and Scale the file to the current active resolution. The remaining Scaling options are the same as those for Scaling

explicitly with the **Scale** command. Those options are described later in this Part of the manual.

4. After you select a Scaling method, another dialogue box — labelled **Output File Name** — is displayed. The name of the source tape file is entered by default. You can change the name to any string that conforms to DOS file-naming conventions. Do **not** include a path. Confirm the Output File Name by pressing <Enter>.
5. Enter a Title and a Subtitle for the image, if you want the image to be labelled when it is printed. Respond “Yes” to **Update Header?** if you want to record (or update) the Title and Subtitle information in the image file header. Be sure to include an offset value to accommodate the space required for titles and subtitles when printing the image.
6. After you specify a Title and Scaling — if any — pressing <Enter> opens a Load Window that displays the input file name, the output file name, the image width (in pixels — as measured around the drum) and the image height (number of image rasters — as measured along the length of the drum). If you have specified Scaling, the window also displays information about the number of output pixels and raster and the scaling method.
7. A status window labelled **Handshake** opens up that overlaps the Load window to indicate the status of the handshake interface. Any errors that occur will be displayed here.

After the conversion process is finished, the message **Transmission Complete** is displayed at the bottom of the screen. If you selected **Multiple Images**, the directory of tape files remains displayed on the screen. You can select another file to Load or press <Esc> to cancel the procedure.

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## Printing IRIS-format and Truevision Files

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Files that are in IRIS or Truevision format in the image file directory specified by the active FEP environment can be Printed. The Load and Pipe commands are not used with files of these two types. IRIS-format files may be created by software applications on the FEP, by external systems, or by Loading files in other formats supported by IRIS to the FEP disk.

The file to be Printed must be on the FEP disk. With the exception of Truevision files, files in other formats must first be converted to IRIS format before Printing them — with the Load command or conversions supplied by other vendors (for example, PostScript-to-

IRIS software converters) — or Piped to the printer without storing them as an IRIS-format file on disk. **Piping** of files is described below.

The **Print** command opens a Print dialogue box for selection of an image or an image list file (multiple image files), then a dialogue box for specifying a Title and Subtitle to be printed with the image. Confirming these selections by pressing <Enter> opens a window on the FEP to allow you to monitor the progress of printing. You must press <Enter> one more time to start printing.

## Basic Printing Procedures

The FEP Print command transmits a file in IRIS or Truevision format to the IRIS Series 3000 printer. The Configuration parameters and color-control files (Color Lookup Tables and Hue Tables) used during printing will be those listed under **Active Setups** on the FEP menu. Printing parameters selected at the FEP will override parameters set at the printer control panel.

The Print command gives you the option of printing a single file or multiple files — the files and positioning information in an Image List file. All the files must reside on the disk in IRIS or Truevision format in the directory identified by the active FEP environment for image files.

Basic procedures for printing image files already stored on the FEP disk in IRIS or Truevision format are as follows:

1. Mount the paper on the drum, check the ink levels, and close the printer cover.
2. Place the printer on-line to the FEP by pressing the print switch. The printer control panel will display SYSTEM ON LINE on the first line. The time of day will appear on the second line.
3. At the FEP, choose an image file or an image list with the Print function from the I/O and Files menu. After the Print Window appears, press <Enter> to start the print run. The printer control panel will display PRINTING on the first line and the elapsed time since the beginning of the run on the second line. The FEP Print Window will display the size of the image and the number of the raster currently being printed.
4. If printer diagnostic error messages occur during printing, they will appear only at the printer control panel. Refer to the *Operator's Manual* for an explanation of those error messages.
5. To **pause** during a print run, go to the printer and raise the hood. A countdown of two minutes will begin at the printer control panel. If you close the hood within two minutes, the print run will resume. No changes are necessary at the FEP. (Note: If the FEP's Pause Image function has been disabled (set to No), the operator may not pause the printer while it is operating. Opening the printer cover will cause the print run to be abandoned.)



6. To **abandon** a print run, press the <Esc> key on the FEP. The FEP will display a message that the printer has been taken off line.

### “Piping” Image Files to the Printer

To print files **without storing them on the FEP disk drive**, use the **FEP Pipe** command. This is the preferred method for printing large image files, because such files occupy so much space on disk. Piping is used for printing raster image files in formats other than IRIS or Truevision. The source files may be stored on a host system (CT Handshake on-line), on a magnetic tape drive (CT, CT Handshake Tape, DDES), or on the FEP disk (Alias, Wavefront). The FEP environment variables for FEP input source and tape format specify the type and location of such files.

To Pipe a file to the printer, start the FEP software with a batch file that specifies the source system or drive (and correct tape format, if applicable) for the image data. When you select the Pipe command, the procedures closely parallel the procedures you use when you Load images. There are differences among file types. (See above.) Dialogue boxes allow you to enter an image title and subtitle. Scaling on the fly is presented as an option, except for CT2T files. If your FEP environment specifies the Scitex Handshake **PULL** option, you will also need to enter a filename.

When you Pipe a file to the printer, the image is not stored on the FEP disk. If you want to make several copies of an image, it may be best to store the image on the disk first (with the Load features) and then Print from disk.

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## Image Scaling Features

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Image scaling features are standard for FEP rev. 4.70 software. Scaling is specified either (1) during Loading or Piping of files or (2) as a separate process for IRIS-format and Truevision files resident on the FEP disk.

See Procedure 4-1, “Scaling an Image,” for a step-by-step explanation of how to use the Scaling command to convert an image already resident on disk.

### Applications and Limitations of Scaling

The Scaling feature is designed to increase the range of image data resolutions that can be printed on the IRIS Series 3000 printers, which offers printing resolutions of 200, 240, and 300 dpi or 8, 10, and 12 ppm (pixels per millimeter). Because the horizontal and vertical resolutions can be scaled independently, this feature can also be used to change the aspect ratio of images.

**PROCEDURE 4-1: Scaling an Image\***

Step	Action	FEP Response on Screen
1	Select the Scale command from the I/O and Files menu.	A pop-up window displays a list of all files in the active image directory. (The active image directory may be different for different FEP batch configuration files.)
2	Move the highlight bar to the image name and press <Enter>.	The Scale Window opens and a dialogue box allows you to enter a Title and Subtitle for the image.
3	[Optional] Enter a Title and Subtitle.** (Use the down arrow to move to the Subtitle line.) Change the <b>Update Header?</b> to <b>YES</b> if you want to want to record the Title and Subtitle information in the image file header. Press <Enter> to confirm.	A dialogue box opens for an Output File Name.
4	Type in a file name of up to eight characters (plus extension, if applicable), then press <Enter>.	The dialogue box closes, and a list of <b>Input</b> resolution options appears. (The <b>output</b> resolution is determined by the Resolution values for the active configuration.)
5	Move the highlight to one of the choices and press <Enter>.	For all choices except Scale By Factors*, a dialogue box opens that asks you to select the method of pixel replication.
6	Select <b>Pick</b> for higher speed of conversion or <b>Average</b> for best results in image quality (see text for explanation). Press <Enter> to confirm the selection.	The dialogue box closes and the Scale Window opens. The window displays the input and output file names, the input resolutions selected, and the method of replication selected — Pick or Average.
7	Press <Enter> to confirm the choices and begin Scaling. Press <Esc> to cancel the process and return to the I/O and Files menu. Pressing <Esc> at any time during Scaling also cancels the process.	The FEP begins the conversion process, displaying information about the input and output data and the progress of the conversion.

\*This procedure describes how to use one of the standard input resolutions. If you want to Scale by Factors because the resolution of the source file is not among those listed by the program, you can Scale from any resolution; and you can specify different scale factors for raster and pixel dimensions.

\*\*Be sure to enter an Offset value if you specify a Title and Subtitle.

The horizontal and vertical resolutions to which you can Scale raster image files are determined by the printer configuration currently in effect. All users have the six choices for vertical resolution listed above. The printer's units of horizontal resolution are preset to English (200, 240, and 300 dpi) or Metric (8, 10, and 12 ppm) at the factory. The FEP environment variable RES must always be set to the same value as the printer. (If you are not sure, check the availability of horizontal resolution choices at the printer control panel.)

A typical application of Scaling might include converting a 390 dpi image to 300 dpi in order to retain the original size of the image. (This is not one of the standard Scaling choices for input file resolution, so you would need to select Scale by Factors.) The Scaling function is **not**, however, appropriate for enlarging a very small image to a large size — for example, enlarging a 512 × 512 pixel Truevision image to 24" × 24". If you use scaling factors of greater than 2:1 or 1:2, you can expect to see undesirable results in the Scaled image.

### “Pick” and “Average” Scaling Algorithms

When you specify Scaling, you may select either **Pick** or **Average** as the scaling algorithm. “Pick” selects the closest input pixel to the output pixel location to use for the output pixel values.

“Average” uses the location-weighted average of the adjacent two input pixels to produce the output pixel values. The Average algorithm usually produces an image that is superior to that produced by the Pick algorithm, but the additional calculations performed will reduce the overall Printing or Loading performance.

### Scaling Choices

The resolution of the image produced by Scaling — the **target image** — is always determined by the resolution currently in effect at the FEP. The FEP provides the following **input resolution options**:

1. Scale by Factors
2. 300 dpi
3. 240 dpi
4. 200 dpi
5. 12 ppm
6. 10 ppm
7. 8 ppm
8. 75 dpi
9. 72 dpi
10. 1:1.2016 TARGA
11. 1:1.0673 TARGA

An additional choice, **Scale by Header**, is available for Loading and Piping of CT Handshake and DDES raster images. This choice is presented only when the environment variable “FEP” is set to **TAPE** and the variable “TAPEFORMAT” is set to **CTHS** or **DDES**. Images stored on tape in these formats contain header information about the image’s resolution. Scale by Header uses that information as the input resolution.

**Scale by Factors** allows you to specify scaling in percentage values independently for the raster and pixel directions. The range is 1 to 1000%.

The next six selections allow you to identify files already stored in a “legal” resolution for the IRIS Series 3000 printer and to convert those files to different printer resolutions.

**75 and 72 dpi** are common CRT display resolutions. These Scaling options are useful to print image data approximately as large as it appears on a screen.

The last two selections specify the pixel aspect ratios for the Truevision display products. The aspect ratio for such images is not square. (The EAGLE.TGA file looks good when converted by 1:1.0673 TARGA.)

### Test Patterns and Color Proofing Bars

A test pattern option — listed as **Test Image** — has been added to the configuration file. This command prints a test patch after the image. The values it uses are fixed. The Test Image pattern allows you to monitor the consistency of printer performance. Use the Edit menu to enable or disable the test pattern for the current image.

“Color Proofing Bars” are provided with FEP software on diskettes that accompany the installation diskette. This test patch is different from the one mentioned above. The Color Proofing Bars are raster image files in two orientations — **HORZSCAL.IRS** and **VERTSCAL.IRS**. These files can be printed alone or in an image list to appear with an image. The Color Proofing Bars use the active color control values and can serve as proofing guides like “Brunner Strips.” If you are installing FEP software, see Appendix D for instructions on loading the Color Proofing Bars files.

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## Controlling Printing Parameters with the FEP

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If you print images from a variety of sources, you can take advantage of the editing features of FEP software to edit and store sets of printing parameters and activate them with just a few keystrokes at the FEP. The FEP also gives you the ability to create and modify Color Lookup Tables and Hue Tables that provide precise control of the color characteristics of images.

This section of Part 4 explains the basics of FEP editing and color control features. For more detailed information about the effects of changing table values, see Part 6 — “Advanced Applications”

### Selecting Printer Configurations

The printer’s operations are controlled by a configuration file sent by the FEP prior to printing images. The printing parameters specified in the configuration file can be edited with the commands in the FEP Configuration menu.

Selecting Configuration from the Edit menu presents the list of configuration files currently stored on disk. After you select a file, a list

of configuration parameter categories is presented. The first entry (Data Type) is highlighted. Pressing <Enter> opens a dialogue window with one or more labelled fields and accompanying values.

Use the left and right arrow keys to cycle through the values available for each parameter. Use the up and down arrow keys to move from one field to the next. If you press the Down Arrow key at the last field in a dialogue box, the next dialogue box will pop open automatically. Or you can press <Esc> and move the highlighting up or down the list to a specific category, then press <Enter>.

Many of the printing parameters can also be specified at the printer control panel — Data Type, Repeat Image, Step Image, Multi-Strike, Color Sep, Color Balance, Drum Speed, Resolution, Replication, Offsets, Mirror Image, Pause Image, and Auto Phase. Printing parameters transmitted from the FEP with the image file always **override** parameters selected at the printer control panel. See Part 5 of this Manual and read the *Operator's Manual* for more information about these parameters.

### Editing Configurations — the Edit Menu

The Edit menu allows you to create and modify four different types of files: Configuration files, Color Lookup Tables, Hue Tables, and Image List files. Selecting one of the four types brings up a list of files of that type only — that is, all the files (regardless of extension) that are stored in the directory reserved for that type of file. (The directories for each type are specified by Environment Variables in the FEP batch files.)

To **create a new file**, select an existing file and change the values or add entries as needed. (Or, for Hue Tables and List files, select the entry **New File**.) When you complete your edits, press <Esc> twice to end your editing session. If this is the first file of that type, the FEP will prompt you to provide a file name in the dialogue box. If you have edited a file, the original name of the file will be presented. Press <Enter> to save the file under the same name. (The original will not be saved as a backup.) To copy and change a file, open the file, make the changes you want, and save it under a new name. The original file will not be changed.

To **abandon your changes** and close the window, press <Esc> when the FEP asks for a file name or for confirmation that the file will be saved over the original.

Press <Esc> to **end the editing session**, then save the configuration file under its original name or under a new name. If you save it under a new name, the original file will be unchanged.

### Editing List Files

An Image List file is a list of the names of IRIS-format raster image files. List files are used to send multiple images to the printer as a single run. Each file name is accompanied by information about the

dimensions of the file (in rasters and pixels) and offsets to place the images at any position on the sheet.

When you are creating or changing a List file, if you know the names of the image files that you want to insert into the list, type them in. Press the <Ins> key to insert a new image entry. If the file does not exist in the image directory, an error message will indicate that the file was not found.

If you don't know the names of the image files, move the cursor to the Image Name field, type a question mark (?), and press <Enter>. The FEP will present a list of available image files. You can insert the image name by highlighting an entry in the list and pressing <Enter>.

Editing features include:

- Use the <Ins> key to insert the name of a file immediately after the current file name.
- Press <Home><Ins> to make the new entry the first image listed.
- Press <Del> to delete an entry.

Note that the size data cannot be edited. It is generated automatically and is there for your reference in establishing horizontal and vertical offsets of images. To delete a file, highlight the name of the file and press <Del>. Deleting a List file does not delete images; it deletes the list of image names.

## Deleting Files

The **Files** command in the I/O and Files menu allows you to display the names of files — both parameter files and image files — and delete them from the FEP disk.

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## Activating Configurations — the Setup Menu

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To activate your changed values, you must use the Setup menu to select a printer configuration (CNF) file, Color Lookup Table (CLT), or Hue Table (HUE). A configuration file must always be active. The CLT and HUE entries are set to **DISABLED** if they are not in use. The values for these three selections are always displayed in the Active Setups window in the upper right-hand corner of the FEP screen. Always check these selections before you print.

If a file is listed as active, any changes you make to the active file will be in effect. You need to update the setup only when you are changing active files — or activating one for the first time.

When you quit FEP software, the last active setups are saved in the file C:\NRIS\ACT\_FILE. When you run FEP software again, those files will be activated.

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## Controlling the Color Characteristics of Images — the Basics

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IRIS Series 3000 printers can generate color images with an extremely wide “color gamut” — a range of color characteristics that often exceeds the capabilities of other color imaging technologies. By using the extensive controls provided by FEP software, the IRIS customer can often closely match the color characteristics of images produced with other technologies.

**The term “match” is used with important qualifications.** An exact color match between images is possible only if they are created with identical data values, printed with identical imaging technologies, printed with colorants that have the same spectral reflectivity characteristics, and examined under light sources with identical spectral characteristics. All other “matches” are dependent on mixing colorants to create perceived matches under defined light sources by a single observer. And a match may not be possible even under these circumstances.

Nevertheless, IRIS FEP software is highly versatile, allowing users to build and select ready-made tables that convert digital image data values into droplet count per pixel with easy-to-use editing features, including

- Selecting density values (per color)
- Selecting contrast values (per color) — for simple exponential adjustment of density over a range of values from light to dark
- Constructing Color Lookup Tables (CLTs) that perform data conversions in complex patterns that cannot be expressed as simple exponential relationships
- Matching the primary colorants of other technologies electronically via “Hue Tables”
- “Tinting” a paper electronically to match the color characteristics of another substrate — providing an overall “cast” to the image
- Performing user-specifiable “Gamma correction” on data whose contrast characteristics are biased for RGB displays

The operator does **not** need to use these features during daily production. Such values should be created and maintained by people familiar with the application’s requirements. Operators only need to select and activate Configurations, Color Lookup Tables, and Hue Tables — and only if the requirements change from job to job.

### Applying FEP Color Control Features

Part 6 of this manual describes how to use the Editing features of FEP software to change CLT and Hue Table values to “match” color images of a specific type. The range of potential applications of IRIS Series

3000 color imaging systems and the range of personal preferences make it impossible to recommend effective settings for all applications.

However, Part 6 provides techniques for using FEP features and sets of values that should provide excellent results for the application described. You should be able to apply the same strategies to your own applications.



# 5

## FEP Menu and Command Reference

Part 5 lists all FEP commands and their functions, grouped according to the menus in which they are found. Descriptions of Environment Variables and how to use the Customize program to set them are in Part 7. Descriptions of advanced applications of FEP color control features can be found in Part 6.

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### Opening Menu

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The opening menu appears when you first run the FEP software by executing one of the FEP batch files and whenever you return to the FEP software after escaping temporarily to the operating system with the Shell command. (See Figure 3-1.) Use the left and right cursor keys to highlight one of the three functions. Press <Enter> to open or “pull down” the menu under that function. After you have opened a menu, moving the left/right cursor keys automatically pulls down the other menus. Pressing the <Esc> key when one of the three main menus is pulled down closes the menu window and temporarily disables automatic pull-down of menus.

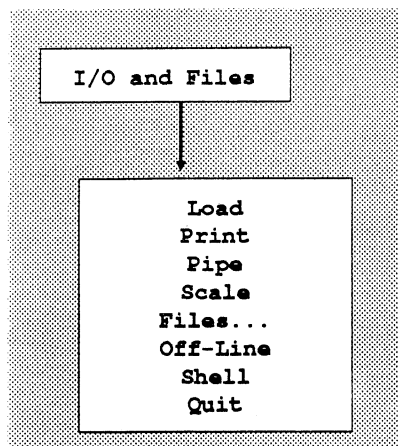
The three entries in the Active Setups window in the upper right hand corner are the current settings for printing. Those choices are changed with the Setup menu.

**I/O and Files** — Allows you to load files from a host system, print files (or lists of files), manage FEP-related files, Scale files, and escape from the FEP application to the operating system.

**Edit** — Allows you to change printing parameters and color values, create new sets of values for specific applications, and build and modify lists of image files.

**Setup** — Allows you to select and activate the parameter files used for printer configuration, Color Lookup Tables, and Hue Tables. The values you select will be displayed in the Active Setups window (upper right-hand corner of the screen) at all times. **Edited files are not activated until the Active Setups entry has been updated with one of the updating functions (see below).**

## I/O and Files Menu



The I/O and Files menu allows you to Load images from a host system, print images (or lists of images), Scale images, manage FEP-related files, and escape from the FEP application to the operating system.

**Load** — Loads image data from supported host systems, magnetic tape drives, or hard-disk directories (Alias and Wavefront files) to the FEP disk, converting them from their native format to IRIS image file format and storing them in the IMG directory. The options for identifying input files may vary according to the file source defined in the active FEP environment. Do not precede the file name with a path. Follow MS-DOS file naming conventions. The new file will be stored in the image directory specified in the active FEP environment — usually the directory \IMG on drive D. (Directory selection is controlled by Environment Variable IMG). Enter a Title and a Subtitle for the image, if you want the image to be labelled when it is printed. (Be sure to include an offset value to accommodate the space required for titles and subtitles when printing the image.) Scaling during Loading is presented as an option (see Part 4). See Parts 4 and 7 for more information on how Environment Variables affect Loading procedures.

**Print** — Printing functions for files in IRIS or Truevision format. Opens Print dialogue box for selection of an image or an image list file (multiple image files), then a dialogue box for specifying a Title and Subtitle to be printed with the image. Confirming these selections by pressing <Enter> opens a window on the FEP to allow you to monitor the progress of printing. You must press <Enter> one more time to start printing.

**Pipe** — Transmit a file directly from a supported host system, tape drive, or disk directory (Alias or Wavefront files) to the printer — without storing the image on the FEP disk. Opens Pipe dialogue box, allows entry of title and subtitle (and selection of tape file by number, if a tape interface is in use). Scaling during Piping is presented as an option. If your FEP is configured for the Handshake **PULL** option, you will also need to enter a file name.

**Scale** — Scale an image in IRIS or Truevision format resident on the FEP disk from its original resolution to the current output resolution. Several predefined input resolution choices are available, or you may specify explicit scaling factors for vertical and horizontal resolution independently. Scaling features and procedures are described in greater detail in Part 4 of the manual.

**Files** — FEP file listing/deleting function. Opens the Files submenu (see below), which lists files by type.

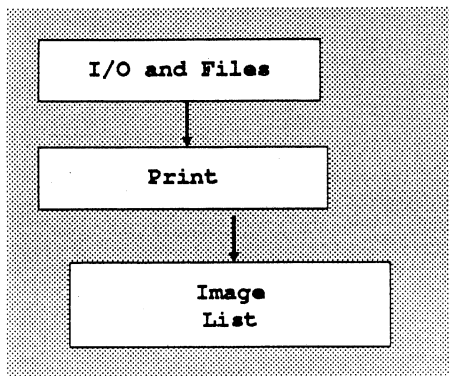
**Off-Line** — Takes printer off-line (unable to accept data from FEP). A confirmation message will appear at the bottom of the screen. Sometimes used to insure that a user with a remote printer will not inadver-

tently run two or more images on the same piece of paper. To place printer back on-line, press the print switch on the printer.

**Shell** — Exit temporarily to DOS (computer operating system). Used to execute DOS commands or run another shell. A confirmation message will appear at the bottom of the screen. Type **exit** at the DOS prompt to return to FEP software.

**Quit** — Exit permanently from FEP application to MS-DOS. If you Quit, you will then have to execute one of the FEP batch files to restart the FEP software.

### Printing Files on the FEP Disk



The Print menu allows you to select one image or an image list file that lists up to 15 image files. Files must be in IRIS or Truevision format. Before you print files, always check the Active Setups files in the upper right-hand corner of the screen to be sure that the values and parameters you want are in effect. The printer must be on-line.

**Image** — Print a single image resident on the FEP disk in the directory assigned by the Environment Variable IMG. Selecting this option opens a window that lists all image files in this directory. Select the **...More...** option if you want to see file names that could not fit in the window. File names are up to eight characters long, with an optional one- to three-character extension (often used to indicate file type).

**List** — Print all the images in an Image List created with the Edit Image List function. This option presents all the Image List files stored in the directory assigned by the LST Environment Variable, as specified in the active FEP environment.

To change the printing parameters before printing, use the Edit menu functions and be sure that those values are in effect in the Active Setups window. Use the Setup functions to change active values or select **YES** as the response to **Update Setups?** after you have finished editing configuration parameters.

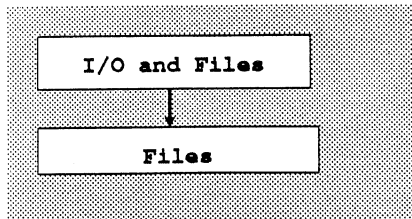
Printing parameters selected at the FEP will override parameters set at the printer control panel.

### Pausing or Aborting Print Runs

You can **abandon** (abort) a print run at any time by pressing the <Esc> key on the FEP. The FEP will display a message that the user has aborted the print run.

If the Pause Image command is set to YES, you can temporarily suspend a print run by raising the printer cover. You must close the cover within two minutes; if you don't, the run will be aborted. If the Pause Image command is set to NO, opening the printer cover will abort the print run.

## Deleting Configuration and Parameter Files — the Files Menu



The Files menu allows you to display and delete files from the FEP disk. The following file types are available for deletion:

**Image** — Image data files, listed by file name (directory specified by the IMG Environment Variable)

**Image List** — Image list files, listed by file name (directory specified by the LST Environment Variable). Only the list is deleted — not the image files.

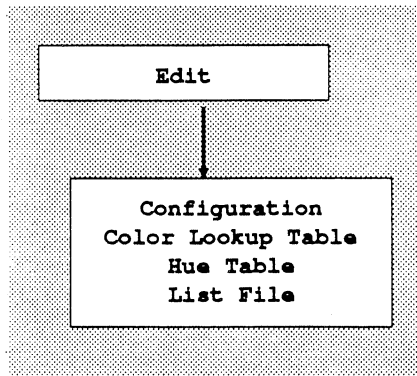
**CNF** — Configuration files (directory specified by the CNF Environment Variable) (See also the Edit menu explanations.)

**CLT** — Color Lookup Table files (directory specified by the CLT Environment Variable) (See Part 4 of this manual for a more detailed explanation of editing and applying Color Lookup Table files.)

**Hue Table** — Hue correction tables (directory specified by the HUE Environment Variable)

If directories of Wavefront or Alias files are available on disk, they will be presented as a type of file to select. Selecting one of these types displays all files of that type, but only those files. Use <Del> to delete a file. The FEP software will ask you for confirmation. Press <Enter> to confirm.

## The Edit Menu



The Edit menu allows you to create and modify four different types of files. Selecting one of the four types of files brings up a list of files of that type only — that is, all the files (regardless of extension) that are stored in the directory reserved for that type of file. (The directories for each type are specified by Environment Variables in the FEP batch files.)

To create a new file, select an existing file and change the values or add entries as needed. (Or, for Hue Tables and List files, select the entry New File.) When you complete your edits, press <Esc> to end your editing session. If this is the first file in that category, the FEP will prompt you to provide a file name in the dialogue box. If you have edited a file, the original name of the file will be presented. Press <Enter> to save the file under the same name. (The original will not be saved as a backup.) To copy and change a file, open the file, make the changes you want, and save it under a new name. The original file will not be changed.

To abandon your changes and close the window, press <Esc> when the FEP asks for a file name . . . or for confirmation that the file will saved over the original.

**Configuration** — Modify configuration files currently stored on FEP disk. (See below, “Configuration” menu.)

**Color Lookup Table** — Modify Color Lookup Tables. (See Parts 4 and 6.)

**HUE Table** — Modify Hue Tables, including “paper tinting” values. Modify color values to provide electronic “mixing” of inks. Used to match the hue properties of printing inks. (See Part 6 for additional information on Hue Tables and Tinting.)

**List File** — Modify image list files — add, remove files; specify pixel (vertical) and raster (horizontal) offsets of images. You can add or change up to 15 files.

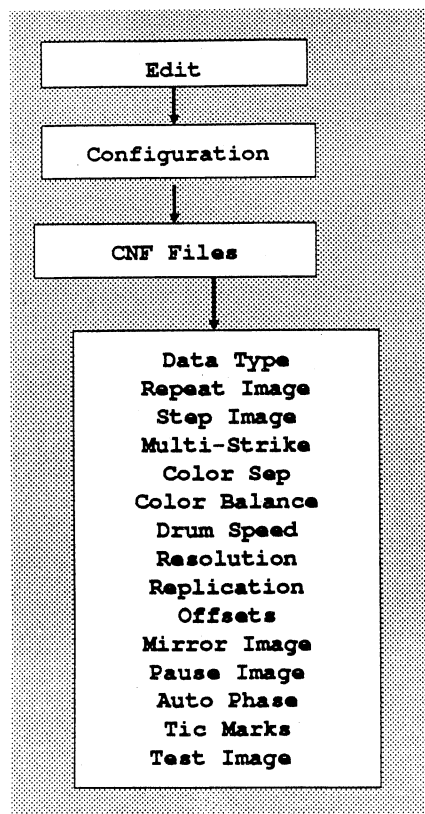
## Editing List Files

When you are creating or changing a List file, if you know the names of the image files that you want to insert into the list, type them in. The image size data for each file will be entered automatically. If you don't know the names of the image files, move the cursor to the Image Name field, type a question mark (?), and press <Enter>. The FEP will present a list of available image files. You can insert the image name by highlighting an entry in the list and pressing <Enter>. Additional editing features include:

- Use the <Ins> key to insert the name of a file immediately after the current file name.
- Press <Home><Ins> to make the new entry the first image listed.
- Press <Del> to delete an entry.

Note that the size data cannot be edited. It is generated automatically and is there for your reference in establishing pixel/raster (x/y) offsets of images.

## Editing Printer Configurations



The printer's operations are controlled by a configuration record sent by the FEP prior to printing images. The parameters in the configuration record can be edited with the commands in the Configuration menu.

Selecting Configuration presents the list of configuration files currently stored on disk. After you select a file, a list of configuration parameter categories is presented. The first entry (Data Type) is highlighted. Pressing <Enter> opens a dialogue window with one or more labelled fields and accompanying values.

Use the left and right arrow keys to cycle through the values available for each parameter. Use the up and down arrow keys to move from one field to the next. If you press the Down Arrow key at the last field in a dialogue box, the next dialogue box will pop open automatically. Or you can press <Esc> and move the highlighting up or down the list to a specific category, then press <Enter>.

Most of the following parameters are described in greater detail in the *Operator's Manual*.

**Data Type** — Number and order of colors per pixel in the data.

**Repeat Image** — Enable/disable repetition of image around drum and margin between images.

**Step Image** — Enable/disable step function (repetition of image along axis of drum, with margins).

**Multi-Strike** — Print each raster up to four times (when very high density is needed)

**Color Sep** — Print color separations from multicolor data, matching an incoming data color to an output color (jet)

**Color Balance** — Set density (values 0–100) and contrast (values 100–250). An active Color Lookup Table will override the contrast settings.

**Drum Speed** — Set from 100 to 250 inches per second (ips) in increments of 10 ips.

**Resolution** — Select vertical resolution (200, 240, 300 dpi; 8, 10, 12 ppm — available on all printers) and horizontal resolutions (200, 240, 300 dpi [if English] or 8, 10, 12 ppm [if metric]).

**Replication** — Select vertical and horizontal replication factors.

**Offsets** — Vertical (pixel) and horizontal (raster) image offsets

**Mirror Image** — Enable/disable inverse printing of raster data.

**Pause Image** — Enable/disable pausing of print run at printer.

**Auto Phase** — Enable/disable printing of Autophase pattern.

**Tic Marks** — Enable/disable printing of “tic marks” for positioning images. (Not available from printer control panel.) Color choices are available (C, M, Y, or K — or a combination of these choices).

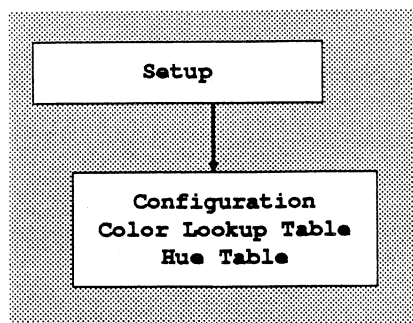
**Test Image** — Enable/disable printing of a Test Pattern with your image file.

Press <Esc> to end the editing session, then save the configuration file under its original name or under a new name. If you save it under a new name, the original file will be unchanged.

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## Activating Configurations, CLTs, and Hue Tables

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Select the active printer configuration (CNF) file, Color Lookup Table (CLT), and hue table (HUE). Always check these selections before you print. The values for these three selections are always displayed in the Active Setups window in the upper right-hand corner of the screen.

**Configuration** — Select a configuration file to install as the active CNF file. Pressing <Enter> when this selection is highlighted presents a window containing list of CNF files. The currently active CNF file is highlighted. To change the active file, move the highlighting to a different file and press <Enter>.

**Color Lookup Table** — Select DISABLED to allow the printer to construct its own Color Lookup Table based on the density and contrast values — and other parameters — specified in the configuration file. Or select a CLT file that will be downloaded to the printer before the image data is transmitted. If DISABLED is the only entry listed, you have no Color Lookup Tables. Creating or copying a Color Lookup Table (with the Edit menu functions) will add a selectable entry to this list. (Refer to Part 6 for a more detailed explanation of Color Lookup Tables.)

**Hue Table** — Select DISABLED to deactivate hue adjustment or select a hue table to activate. If DISABLED is the only entry listed, you have no hue tables. Creating or copying a Hue Table (with the Edit functions) will add a selectable entry to this list.

# 6

## Advanced Applications — Controlling Color Values

One of the problems of color proofing systems is matching the color characteristics of images produced by different technologies. The FEP helps you produce close matches to images of many types by allowing you to “adjust” the hue of the IRIS Series 3000 printing inks electronically, compensate for the tint of substrates, and create customized mappings of image data values to printer droplet count per pixel. This part of the manual introduces the FEP tools and steps you through a recommended procedure for using these tools to match a specific sample — an IRIS test pattern.

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### Density, Contrast, and Color Lookup Tables

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**Density** values for each color can be selected at the printer or downloaded by the FEP. The density value creates a linear mapping of data values to droplet count — a consistent percentage across the range of data values. Density requirements will vary with user requirements. If you are using the IRIS Series 3000 printer for the first time, you may want to start with the Density and Contrast settings in the IRIS Configuration file provided with FEP software. See the step-by-step Procedure for adjusting Density in this part of the manual.

**Contrast** describes the degree of difference between the lightest and darkest values in a color. When you use FEP software to download Density and Contrast settings to the printer, the printer uses those values to construct an internal Color Lookup Table that maps an exponential relationship between data values and droplet count across the range of data values.

If a Color Lookup Table is active — that is, if there is an entry for a Color Lookup Table specified in the Active Setups status area of the FEP interface — the printer will use the values in the FEP Color Lookup Table. The Density and Contrast settings will be ignored.



**PROCEDURE 6-1: Changing and Activating Density Values**

Step	Action	FEP Response on Screen
1	Move the light bar to the Edit menu and press <Enter>.	The Edit menu selections are displayed.
2	Select Configuration by pressing <Enter>.	A dialogue box with a list of configurations is displayed to the right of the Edit menu.
3	Select the name of an appropriate configuration by moving the arrow keys and pressing <Enter>.	The dialogue box closes, and a list of categories appears.
4	Move the cursor down to Color Balance and press <Enter>.	A dialogue box opens, displaying four sets of density and contrast values.
5	Use the up and down arrow keys to move the cursor from one field to the next. Use the left/right arrow keys to decrease/increase Density values. Or type in values explicitly. Then press <Esc>.	The Color Balance dialogue box closes.
6	Press <Esc> again.	A dialogue box opens, displaying the name of the current configuration.
7	Type in the name of a new configuration and press <Enter> to create the new file. (The original configuration is saved unchanged.) Or just press <Enter> to indicate that the changes you have made should update the current configuration. Then move the cursor down to Update Setup. Use the left or right arrow key to change the value to <b>YES</b> , then press <Enter>.	The dialogue box closes, and the CNF entry under Active Setup changes to the name of the configuration that you have chosen or created.
8	Use the Print or Pipe functions under I/O and Files ... to print an image with the current values.	—

**Color Lookup Tables for Non-Standard Applications**

In some cases, the desired relationship between data values and droplet count does not form a consistently exponential curve across the range of data values. For such applications, the FEP user can create Color Lookup Tables (CLTs) that describe complex relationships between data values and droplet counts.

The “512” type of CLT allows the printer to adjust values to account for the crystal frequency currently in effect and to perform

standard IRIS “matrix averaging.” This type of CLT — specified in the environment for your FEP — is the type of CLT used under almost all circumstances. Use of the 4096 type of CLT requires knowledge of the crystal stimulation frequency value currently in effect at the printer.

CLT features also allow users to specify ranges of data values that are a subset of the expected 0–255 data values.

### “Smoothing” — a Technical Explanation

The “Smooth Curve?” option of the CLT gives you two choices for constructing a Color Lookup Table. When you specify values in a CLT, you use only 5 to 20 sampling points. The rest of the values are calculated by the FEP by interpreting the values you entered as points on a curve. The “smoothing” option has been added to FEP software to compensate for anomalies in the data values you enter. This is the method you should use in most cases. However, if you want to retain the effects of such anomalies, you should disable smoothing.

**In technical terms**, the previous releases of FEP software used a cubic spline interpolation technique. The coefficients were derived from what is known as a “natural spline,” where the second derivatives at the endpoints are set to 0. The other conditions imposed on the spline are continuous 0th, 1st, and 2nd derivatives at all intermediate points. These conditions form a tridiagonal system of equations that is solved with gaussian elimination to find the spline coefficients. The implication here is that any change in the shape of the curve will have a global impact on the resulting spline interpolant, most noticeably bumps and wiggles.

The new approach (smoothing) uses a uniform parametric cubic B-spline interpolant. This technique tends to minimize the effect of “bad” data points (for examples, from anomalies in sampling) and produces a “smoother” curve. We have implemented two techniques. The first **forces** the interpolant through the data points in the lookup table. Essentially, we have a matrix equation to find the control points for a B-spline curve that passes through a given data set. The resulting set of control points define a spline that interpolates the data set.

The smoothing option bypasses this matrix operation and assumes the data points are the control points of the spline. One property of B-spline curves is that they are “variation diminishing,” reducing the bumps and wiggles inherent in the data. The resulting curve does not pass through the data points. Instead the curve lies within the “convex hull” of the control points. For a good discussion of B-splines refer the Foley and Van Dam book on computer graphics.

### Hue Tables — “Mixing” IRIS Primary Colorants

IRIS “Hue Tables” allow users to modify color values to provide electronic “mixing” of inks. This feature of FEP software is often used to match the hue properties of primary printing inks.

When hue correction is active — that is, if there is an entry for a Hue Table specified in the Active Setups status area of the FEP interface — the FEP will adjust all data values for all colors in an image as it transmits the data to the printer. The effects of the Density and Contrast settings or CLT are effectively incorporated into the data itself. Substantial computation is required for this process, and printing may be slowed down significantly in some cases. If you use the FEP hue correction features frequently, you may need or want a high-performance model of the FEP (model D325 or equivalent).

### “Tinting” Papers Electronically

IRIS FEP “tinting” features allow users to emulate the color characteristics of a different substrate electronically. By measuring the color properties of the original substrate and adding specific amounts of cyan, magenta, yellow, and (infrequently) black, users can directly account for differences in substrate color.

Tinting is specified in the last line of the Hue Table. Each number value for tinting represents the percent of that color you want to tint the substrate with. You must activate the Hue Table in order to implement Tinting. See Step 2 of the step-by-step procedure below.

### Gamma Correction for RGB-Biased Data

Many types of images are originated and designed primarily for use on RGB (Red-Green-Blue) monitors. The contrast characteristics of such images are “biased” for RGB displays — they are very different from the contrast characteristics of CMYK image data. Unless the data values are “corrected” for hard-copy (subtractive technology) printing, the printed image will appear very dark except in highlight areas. To correct this bias, users of IRIS FEP software can specify a “Gamma Correction” factor. IRIS has found that a Gamma Correction value of 45 is appropriate for most RGB images.

**For CMYK data** — typical of the hard-copy image-matching techniques described in this part of the manual — **set the Gamma Correction value to 100**. This setting is the equivalent of “no correction.”

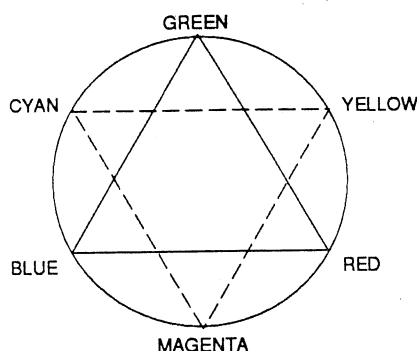
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### Converting RGB to CMYK Data

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RGB (Red-Blue-Green) raster color data can be converted to subtractive color values (CMYK) by having IRIS FEP software invert the data values for each color and assigning that data to its complementary subtractive color. This process **also** adds a black value that equals the minimum CMY value. You can use the Hue Table to perform “under-color removal” — effectively reducing all resulting CMY values by a specified percentage.

## RGB to CMY Complements



The relationships between additive primary colorants and subtractive primaries are often illustrated with the accompanying diagram. Each additive primary has a subtractive primary as its complement. Using these complements, the FEP converts the additive RGB primaries to CMY values according to the following formulas:

$$\begin{aligned} C &= 255 - R \\ M &= 255 - G \\ Y &= 255 - B \\ K &= \min(C, Y, M) \end{aligned}$$

This process results in a true black (K) subtractive primary, but the resulting image may be too dark. To compensate, the CMY values can be reduced using FEP Hue Table or Gamma Correction features, effectively “lightening” the CMY primaries across the full range of data values.

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## Creating a Color Lookup Table on the FEP

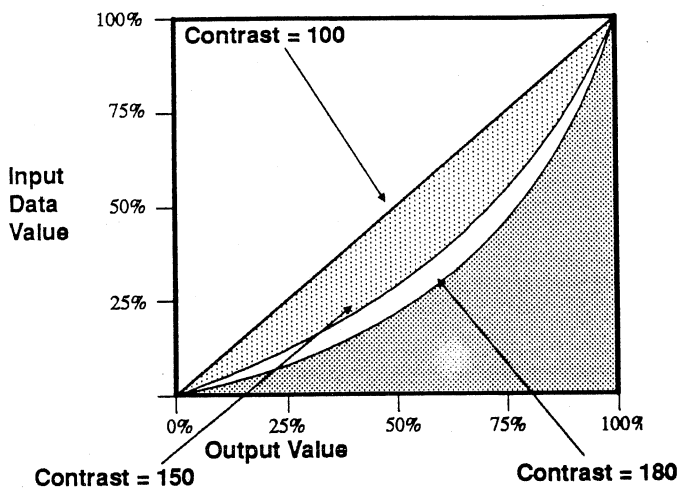
---

To create a CLT, select Color Lookup Table from the Edit menu. A window will open on the selection of CLTs available. The CLT last edited since the FEP software was loaded will be highlighted. The entry Use Contrast appears as the first item in the list. If there are no CLTs, only the entry **Use Contrast** will be presented and highlighted.

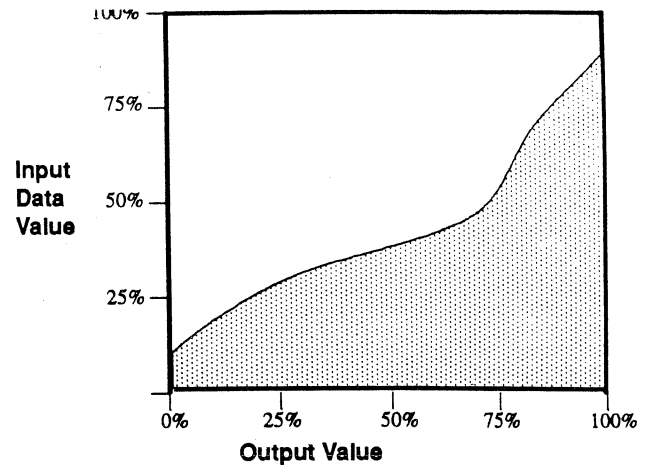
Selecting the name of a CLT displays that CLT for editing. Selecting Use Contrast automatically inserts the output values that would have been generated by the contrast values saved in the **active configuration file**. If you want to observe the effects of the contrast settings on output values in the CLT, open the active configuration file and change the settings for contrast under Color Balance. Then create a new CLT by selecting Use Contrast.

The number of entries in a CLT that you create with Use Contrast is dependent on the setting of the FEP Number of Points environment variable (NPOINTS). That setting can be from 4 to 21. After you create a CLT, you can add or delete entries (index points) to any CLT, but the software prevents you from having fewer than 4 or more than 21 points.

You **save** your changes by pressing <Esc> once and then confirming the current file name, changing the file name to save it as a new file, or supplying a new name. You can **abandon** changes you have made to a CLT by pressing <Esc> again.



**Figure 6-1: Using Density and Contrast Setting.** Using a Contrast value, the printer constructs an exponential relationship between input data values and number of droplets of ink on output.



**Figure 6-2: Using Color Lookup Tables.** If you use a Color Lookup Table, you can accommodate complex relationships between input data and number of droplets of ink.

### Editing a CLT

After you select a CLT file to edit, the editing window appears. The CLT is displayed as five columns of fields: Index and the four primary printing colors. You can move the cursor freely from field to field, and you can edit all fields except the first and last entries in the Index column.

The Index fields indicate the points (displayed as percentage values) at which the samplings are made in the data stream over the range of possible values (0–255)

You can change all but the first and last entries in the Index column — a feature that allows you to make more frequent samplings in critical ranges. However, you are limited to a total of 21 index points, and the first and last must always be 0 and 100 respectively. You can delete indexes with the <Del> key, but you must have a minimum of four sampling points. The software prevents you from deleting additional indexes after you have reached this minimum.

Index entries must be in ascending order. If you attempt to enter index values out of order, you will hear a beep and an error message will appear on the bottom of the screen. You must enter a legal value before you can proceed.

## Saving CLT Changes

After you have completed the changes to the CLT, press <Esc>. The window with the table will be closed and the “Save CLT?” dialog box will be opened. There are five entries:

- **CLT** — The name of the CLT to update. If the field is blank, type in a new name (up to eight characters).
- **0% dot** — The data value that represents no color or the minimum value.
- **100% dot** — The data value that represents full color or the maximum value.
- **Gamma correction** — The Gamma Correction factor is useful with images that originate in CRT-based applications. Use 45 as a starting point for RGB data. For CMYK data, you will use the value 100 in most cases (no correction).
- **Smooth Curve?** — Select **YES** to minimize anomalies in CLT contrast values. Select **NO** to implement CLT contrast that reflects data anomalies more closely. (See discussion of smoothing, above.)
- **Update Setup?** — To activate the changes you have made for the current work session, use the left or right arrow to change the value in this field to YES. If you have created a CLT with a new name and saved it, the new name will appear in the Active Setups window in the upper right-hand corner of the screen. If you do not want to activate the changes you have made, select NO. (This value is “sticky” — it keeps the most recent choice until you change it.) In both cases, pressing <Enter> saves your changes to disk. Pressing <Esc> discards the changes you have made. If you are editing the current active setup, you do not need to explicitly change (update) the setup. Any changes you have made and saved will be used.

If you want to activate a CLT already stored on disk, you must use the Setup menu to install the CLT as the active file.

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## A General Matching Technique

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IRIS color dyes have different color characteristics from those of printing inks and Cromalin proofs, and IRIS printers place ink on printing media in a manner that differs significantly from other imaging methods. However, you can closely approximate the color characteristics of images with the IRIS Series 3000 FEP and Color Ink Jet Printer by electronically adjusting the density, contrast, and hue of the IRIS primary dyes to match the primary colorants of images from other sources.

## Summary of Matching Procedures

The color matching procedure, described in detail on the following pages, consists of the following steps:

1. Run test patches of the primaries — according to the Step-Wedge Pattern described above and in Figure 6-1 — on the system used to produce the original image — in densities from 0% to 100% dot in increments of 10%.
2. Use the FEP paper tinting feature to match the color characteristics of the original printing substrate.
3. Use the IRIS FEP Density features to match the density of each color at 100% dot. If the data source does not use the full range of data values (0–255), first specify a 0% dot and 100% dot value for a CLT and activate the CLT.
4. Use the FEP Hue Table features to “mix” the IRIS primaries to match the hue of the original primaries — again at 100% dot.
5. Adjust the Density again if necessary to compensate for any overall density increases introduced by Hue Correction.
6. Use the FEP Contrast features to match the 0% to 90% sample densities as closely as possible.
7. If you feel that contrast still does not achieve an adequate match, create a Color Lookup Table to apply a non-linear contrast curve to the source data.
8. Save the values for use with other images from this source.

This method is more effective in producing a close approximation of the original image than successive “tweaking” of printing parameters after observations of color images.

**Note:** If the source data is defined for an RGB display monitor, you may need to use a Gamma Correction value to compensate for the image’s contrast characteristics. A Gamma Correction value of 45 is effective for most RGB data. CMYK color data should be processed with a Gamma Correction value of 100 (no correction).

## Limitations of Matching

The printing parameter files arrived at by this process are useful for images printed from the **same input data characteristics, on the same paper, and viewed under the same light source**. If you change **any of these variables**, the match will no longer be as close.

## Sample FEP Color Values

The sample values on disk for the “iris” Configuration, Hue Table and CLT settings provided with the FEP were developed using the techniques described in this part of the manual. These sample values were used to match a Eurostandard Cromalin, using IRIS paper #01640-001 (glossy) under a D5000 light source.

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## Step-by-Step Procedures for Matching

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The paragraphs describe how to match a sample from CMYK data sources. This technique assumes that you are able to run sample patches of all primaries in a range of densities on the system used to generate the images you want to match. Although a colorimeter or spectrophotometer is recommended for best results and ease of matching, it is possible to use this technique effectively by careful observation under a controlled light source.

### Step 1 — Create a Step-Wedge Pattern

IRIS experience in matching the colors of hard-copy images created with other technologies shows that a close match can be obtained quickly by “mixing” IRIS water-based inks electronically to match the hues of the primary colorants used to produce the original image — for example, the press inks used for offset printing. To begin the process of matching, create a “step-wedge pattern” using the same technology that you typically use for matching — for example, a Cromalin proof or a press proof. The same digital source data that you use to create this pattern will be used to generate the image on the IRIS Series 3000 printer.

Requirements for the step-wedge pattern are as follows.

1. The pattern contains step wedge patches with C, M, Y, K, R, G, B and 3K (three-color black) colors.
2. For each color, the patches must range from 0% dot to 100% dot in 10% increments. Percent dot increments less than 10% are also acceptable.
3. The size of each patch should be at least 0.75” (1.875 cm).
4. The digital values (0–255) required to make a 0% dot and 100% dot are also used to determine the image data range.
5. The percent dot digital values for the step wedge pattern should be the same as those typically used in production images.

See Figure 6-3 (not drawn to scale).

Throughout the matching process, be sure that you are using the same paper and the same light source. The light source should be typical of the viewing conditions that will be used when a proof is reviewed for final acceptance. Matches made, for example, under fluorescent light may be not be close when viewed under tungsten or daylight sources.

Run the same pattern on the IRIS Series 3000 printer, using the “default” FEP printing configuration. Change the default configuration Density value to 56 for all colors and Contrast to 100 (no contrast) for all colors. Set drum speed to a minimum of 150 ips. Save the configuration under a name that is meaningful for this matching application,



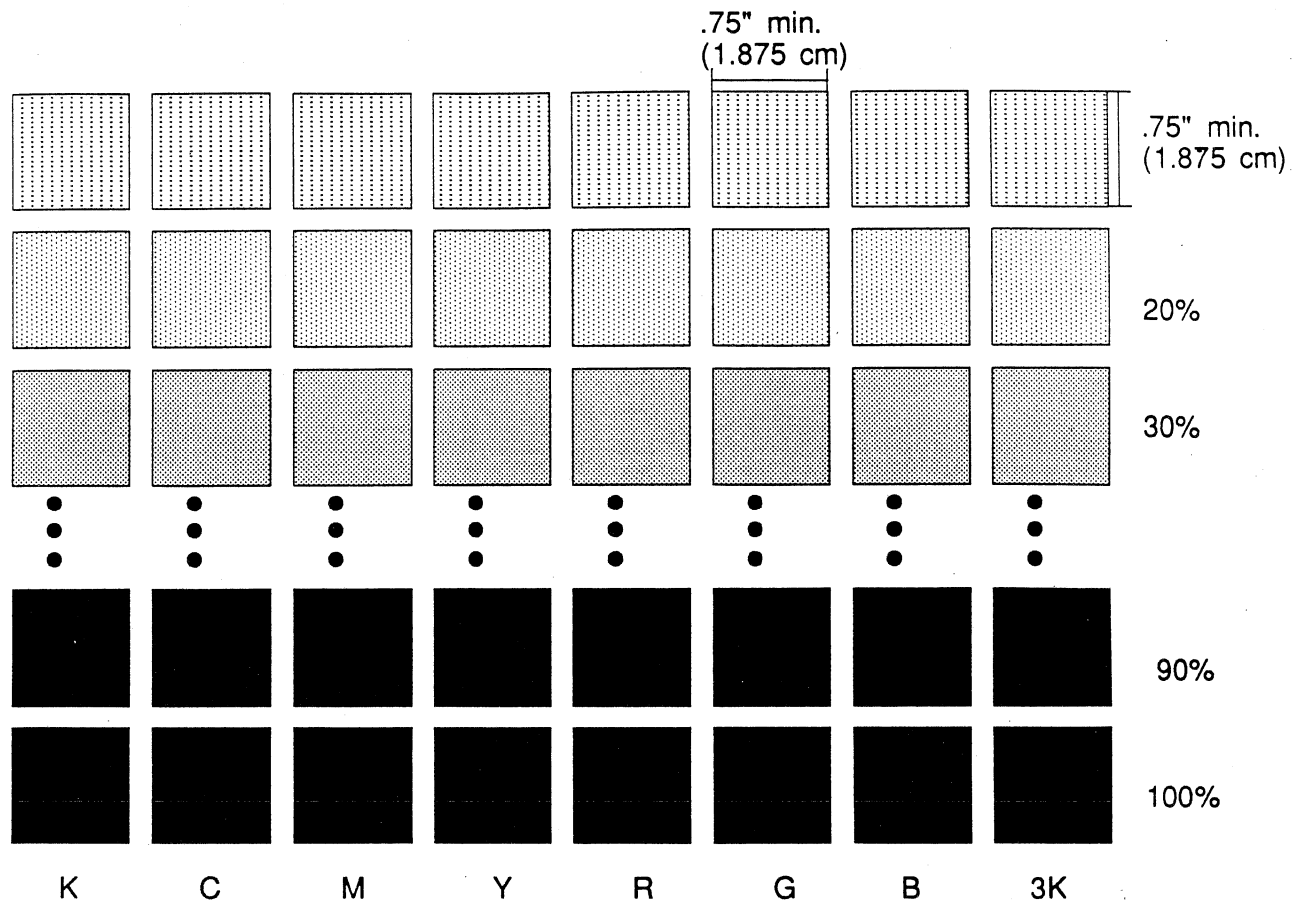


Figure 6-3: Step-Wedge Pattern for Running Matching Samples

and activate this configuration. Hue Tables are not active. Color Lookup Tables are not active, but you will need to specify a 0% dot and 100% dot and activate a CLT if the range of values in the image data does not cover the full range of IRIS data values (0–255). (See below, “Non-Standard Data Value Ranges.”)

### Step 2 — “Tint” the IRIS Stock To Match the Original

Use the IRIS FEP “tinting” feature to provide the same overall cast to the substrate as that of the original. First use a colorimeter or densitometer to measure the color characteristics of the original printing substrate, then adjust the values in the “TINT” row of the Hue Table named “IRIS” to match the original.

- To change tint values, use the FEP **Edit** menu to select **HUE Table**. Select **New Table**.
- The last line of the table is labelled “TINT.” Add values as appropriate to the Cyan, Magenta, and Yellow fields — but not to the Black (K) field. The number is the percent of that color that you want to tint the paper with. Substrates vary widely in their

color characteristics, but the tint values needed to match them are unlikely to exceed five (5). The absolute maximum value permitted is 20. A typical set of tinting values might be C = 1, M = 2, Y = 3, K = 0. Don't change the hue values yet.

- Save the Hue Table under a name that is meaningful for this matching application.
- **Activate the Hue Table.** You are asked after you edit parameter files whether you want to update the active setup. Answer Yes. To activate a setup at any time, use the Setup menu. The name of the new Hue Table will appear after the **HUE:** under **Active Setups**.
- Run an image that contains a measurable patch with no color except that provided by the tinting feature.
- Use the colorimeter or densitometer to compare the tinted area of the IRIS print with the original substrate.

**HINT:** Save paper and mounting time by using the Image Offset features to print smaller test image patterns at various positions on the same large sheet of stock.

### Non-Standard Data Value Ranges

If the source for your image data does not generate image data with 0 = 0% dot and 255 = 100% dot, you will need to use a Color Lookup Table from the start instead of the Density and Contrast settings. The CLT provides a way of specifying the actual data range when you store the table.

If your source system uses such non-standard data value ranges, you will need to use a Color Lookup Table whose values correspond to changes in density. To start the process, select **Configuration** from the **Edit** menu. Select the configuration file you created for this matching procedure, make sure the Contrast values in Color Balance are 100 for all colors, save the Configuration file, and **activate that setup**.

Then create a new CLT by selecting **Color Lookup Table**. Select **Use Contrast**. The values shown in the table will reflect a linear mapping of input data to output data. You don't need to change the values for the first use of the CLT. Save the CLT and specify the data range when you save the file. For example, the 0% dot might be set at 28 and the 100% dot at 228. Values of 25 and 225 respectively are also a frequent requirement.

To make additional changes to Density and Contrast, you can repeat this process or edit the CLT values themselves.

### Step 3 — Match the Density of the Original

Measure the color of the 100% dot sample patches in all four colors. Then use the Density features (under Color Balance) of the FEP to adjust the density of the IRIS samples.

To change density, select Configuration in the Edit menu, then select Color Balance. A dialogue box opens, displaying Density and Contrast settings for all four primaries. Adjust the density values for each and save the configuration by pressing <Esc> after you have changed the values. If necessary, change the response to "Update Setup?" to YES. The name of the configuration must appear after the **CNF:** entry under **Active Setups**.

Run the sample patches again. Repeat the measurements and adjustment of density, keeping the same configuration name and activating the configuration after each change, until the density of the IRIS sample patches at 100% dot is as close as possible to that of original. For the moment, ignore the match between samples at 0% to 90% dot.

### Step 4 — Match the Hues of the Original

After you have matched the density at 100% as closely as possible, use a colorimeter, spectrophotometer, or densitometer to measure the differences in hue at 100% dot. Then use the Hue Table features of the FEP to "mix" the IRIS primaries to match the hue of the originals primaries.

Edit the values in the new Hue Table you created to adjust color. This has the effect of "mixing" the IRIS primaries electronically to match the hues of the original primaries. For example, add a small amount of Cyan to Magenta to make the Magenta more blue. Refer to the settings in the Hue Table called "iris" for a possible starting point. Press <Esc> when you have finished entering the values and activate the Hue Table. When the table is activated, the entry **HUE:** will display the name of the Hue Table.

The total of the values for any color do **not** have to add up to 100%. They can be more or less than 100%. And you can use less than 100% of the corresponding IRIS primary. You can also use negative values.

Repeat this process until the hue values of the 100% dot samples are as close as possible to those of the original. Be sure to activate your changes before you run them. For the moment, continue to ignore the patches for 0% to 90% dot.

### Step 5 — Adjust the Density Again

Adjusting the hue of the primaries tends to make the image darker. Measure the density of the patches again and adjust density again if needed.

### Step 6 — Match the Contrast of the Original

After you have matched the density and hue at 100% as closely as possible, use a colorimeter or spectrophotometer to measure the differences in color of the samples at 0% to 90% dot. Then use the Contrast function to create a density match across the full range of densities represented by the samples.

To change contrast, select Configuration in the Edit menu, then select Color Balance. A dialogue box opens, displaying Density and Contrast settings for all four primaries. A value of 100 means NO contrast is applied. Increasing the values increases the contrast.

Adjust the Contrast values for each primary, save the values, activate the changed configuration, and run the sample patches again. Repeat this process until the contrast of the IRIS sample patches is as close as possible to that of original. Do NOT alter the Density and Hue Table settings.

### Step 7 — Use the Color Lookup Table To Accommodate Complex Contrast Characteristics

The Contrast settings produce a curve that has an exponential effect over the full range of data values. However, the contrast characteristics of the source data may not have such a relationship to IRIS printer contrast characteristics. To accommodate the differences in contrast characteristics, you may need to use a Color Lookup Tables.

If you are already using a CLT in this procedure because your data has a non-standard range of values, continue to use that CLT instead of creating a new one.

To create a new Color Lookup Table (CLT), select the Color Lookup Table function under the Edit menu. Select **Use Contrast** and press <Enter>. The FEP software will construct a CLT based on the contrast values currently in effect (the values in the active configuration), providing you with a good starting point for your CLT values. Edit the values in the table to match the non-linear contrast characteristics of the image data. (See above, "Editing a CLT.")

Give the new Color Lookup Table a meaningful name for this application and change the value of the field labeled "Active Setup?" to YES. The entry **CLT**: under Active Setups will display the name of the new Color Lookup Table. **Note:** When you activate a CLT, the printer uses the CLT values instead of the Density and Contrast values of the configuration file.

Continue to adjust the CLT values until you achieve the closest possible match over the full range of density (percent dot) samples. Note that when you make your second and subsequent sets of changes to the CLT, you will edit the CLT by name. Don't use the Use Contrast feature on subsequent edits. Do not alter the Density and Hue Table values during this process.

**Step 8 — Save the Values for Future Use**

Save the Configuration, Hue Table and Color Lookup Table values you developed for use with images from similar sources. Document and **save** your FEP values, clearly identifying the paper and the light source you used to produce the results.

Using different paper and different light sources **will** affect the closeness of the match.

# 7

## Customizing the FEP Environment

The FEP software can be started with different batch files that create “environments” for specific production requirements, including accepting data from different sources, storing it in special directories, and activating predefined parameters for specific kinds of work. This Part of the manual explains how to use the customization program (CUSTOM.EXE) to create batch customization files and how to select values for your specific requirements.

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### Purpose of the CUSTOM Program

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When you use the FEP customization program, CUSTOM.EXE, you create a batch file that you can use to start the FEP software with specific values for input source and format, location of data files and tables used by the program to control color values, and other variables. The batch file will set the environment variables and run the FEP program. See Table 7-1 for a summary list and explanation of Environment Variables.

Most FEP users will not need more than one or two batch customization files. But the CUSTOM program allows you to create as many different FEP batch customization files as you want, each with a different name. Each batch file can set up changes in input type and FEP directory structure, eliminating the need to specify such changes at run time. To run the FEP software for a specific environment, just type the name of one of the batch FEP customization files and press <Enter>. (You do not need to type the .BAT extension.)

### Know Your Values Before You Start

Before you run the CUSTOM program, be sure that you have the information you need in front of you. You may want to use the “FEP System Information Sheet”. A copy of this form can be found in the README file in the FEP’s C:\IRIS directory.

### Running the CUSTOM Program

You can run the CUSTOM program from any drive or directory if you have followed the installation procedure. (The directory C:\IRIS is

added to your DOS "PATH" specification if you respond Yes to the prompt.)

Before it does anything, the CUSTOM program sets all its default selections to the values specified in its current environment (the values supplied by the last batch file you used to load the FEP software). If no definitions are available, the program uses the default values described in the accompanying table, "FEP Environment Variables."

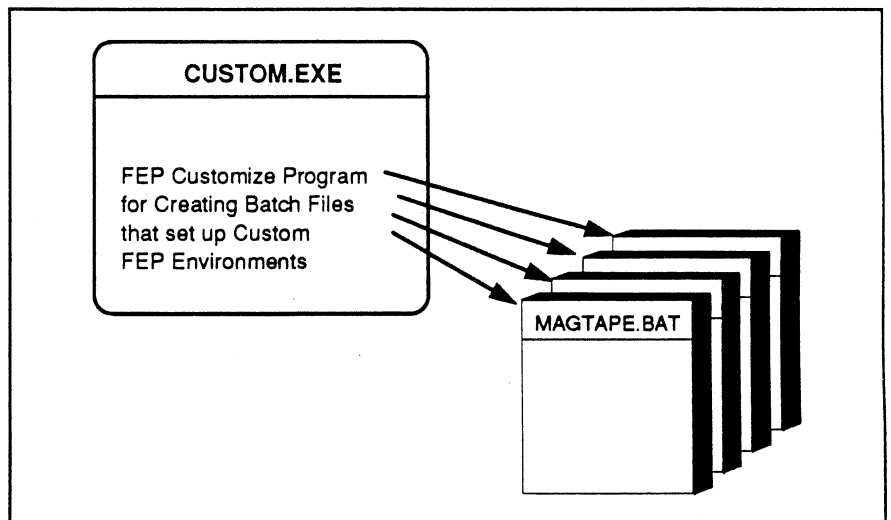
### The CUSTOM User Interface and HELP Function

The CUSTOM program interface is similar to the FEP interface. When you run the CUSTOM program, the active menu bar item is the "Help" function. The help file window appears whenever you run the program. You exit the submenu functions or their pop-up windows by pressing the <Esc> key. To read the entire help file, press <Enter> to see the next part of the file. If you read through the whole file, the last <Enter> will clear the help window from the screen and leave you in the menu bar.

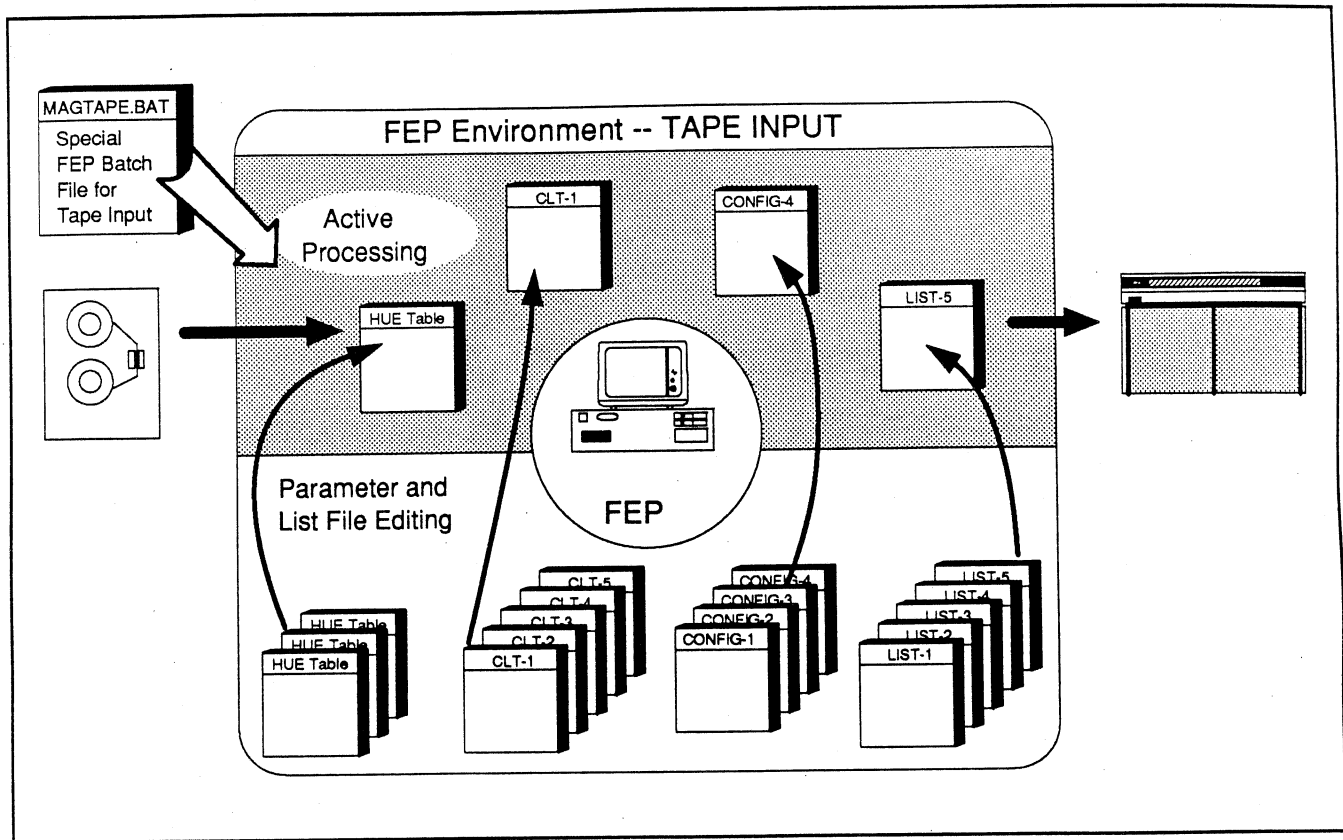
### The "Customize" Menu

Your next step is to move the light bar left to the "Customize" selection with the left arrow key. Pull down its submenu by pressing <Enter>.

There are 10 items in the pull-down menu of the Customize menu: Program Title, Paper Size, Image Source, Scitex Specs, Tape Specs, Color Lookup Table, Resolution, Directories, Shell, and FEP Version. If you press <Enter> at this point, the pop-up windows for each item appear. You enter your selections either by typing in a character string, as for the title and directories, or by selecting from a set of choices using the left and right arrow keys to "roll" through the lists.



**Figure 7-1: The FEP Customization Program.** The program CUSTOM.EXE allows you to generate multiple FEP Batch Environment files.



**Figure 7-2: Using a Customized FEP Batch Environment file.** You can “preprogram” the environment and identify a different input source by creating new batch files with the CUSTOM program and running the new batch file instead of FEP.BAT. The new environment may also specify different directories for parameter files that you can modify with the FEP editing features.

## Selecting CUSTOM Environment Options

The following paragraphs provide a more detailed description of the choices available when you select environment options with the CUSTOM program.

### Selecting a Program Title

The Program Title command lets you specify a string of up to 20 characters that will appear on the top margin of the menu bar of the FEP screen when you run this particular configuration. You should use this field to identify the configuration you are running. For example, you might specify “DDES Tape” as the title string of the configuration that selects “Tape” for the image source, and “DDES00” for the tape format.

### Paper Size

“Paper Size” can be either 3024 paper, or 3047 paper which is A0 size paper or E size paper. This information is used to determine the allowable size of the image to print.



## Image Data Input Type and Tape Specifications

**Image Source** can be 9-track 1/2-inch magnetic tape, online to a Scitex system using either Foreground or Background HandShake protocol, the old Scitex interface protocol, Alias image files, or Wavefront image files. If you select tape, you must complete the selections for Tape Specs. If you select online Scitex Foreground or Background HandShake protocol, you should pay attention to the selections for "Scitex Platform", otherwise you may skip them.

**Tape Specs** has two items to select. **Tape Format** can be the Scitex CT2T, CT Handshake tape, or the non-vendor industry standard DDES UEF00 format. **Tape Drive** is one of eight combinations on buffered/unbuffered, high/low speed, and 1600/6250 bpi. This information is used by the Mode Select issued to the tape controller during initialization before reading each tape, and may or may not have an effect on the operation of the tape drive. (Some controllers may ignore options they have no capability to change.)

**Scitex Platform** can be either HP or INTEL. Scitex Platform (item 4 on the FSIS) will be selected with its current settings displayed. If you would like to change the Scitex Platform, use the left and right arrows keys to select a new platform. Once the platform you want is displayed, type <Enter> to select it. If you do not want to change Scitex Platform, type <Enter> to go to the next item.

## Specifying Printing Values

**Color Lookup Table** has three items to specify. The first is the type of CLT printer record to produce and send to the printer when the Color Lookup Table feature is enabled. The two choices are the 4096 lookup table or the 512 table. IRIS recommends using the 512 selection. If you select "4096" — the 4096 table format you must enter the printer's crystal frequency setting in the second field. See the *Operator's Manual* for instructions on how to display the crystal frequency value on the printer control panel. The **Number of Points** variable allows you to select the number of index points that will be used in a CLT when you create a new CLT from scratch by using the **Use Contrast** feature. The minimum number of points is 4, The maximum is 21. Index points may be added to and deleted from CLTs after they are created — as long as these limits are not exceeded.

**Resolution** can be either **metric** or **English**. Around-the-drum printing resolution is electronically controlled; you always have six choices — 200, 240, or 300 lines/in and 8, 10, or 12 lines/mm. For along-the-drum resolution, selecting "metric" gives you choices of 8, 10, or 12 lines/mm.; "English" gives you choices of 200, 240, or 300 lines/in. Along-the-drum resolutions are fixed, controlled by the diameter of the carriage drive pulley in the printer.

## Directory Selection

The **Directories** entry allows you to specify the drive and directory where the FEP program looks for and stores the files it uses and creates.

Table 7-1: FEP Environment Variables

Variable	Values	Default	Explanation
FEPTITLE	text	"Iris..."	Up to 20 characters that are displayed on the top line of the screen in the menubar border. Use this line for such purposes as identifying the FEP software revision level and date or — if you are creating FEP batch configuration files for several applications — include a brief description of the application. Example: <b>MAG TAPE</b>
PAPERSIZE	3024 ASIZE ESIZE	3024	Size of paper. Set to 3024 for all model 3024 printers. Set to <b>ASIZE</b> (A0 size paper) or <b>ESIZE</b> (E size paper) for printer model 3047 only.
FEP	OLDIF PULL PUSH TAPE WAVEFRONT ALIAS	PULL	The type of input device/protocol the FEP will use when loading ( <b>Load</b> function) and piping ( <b>Pipe</b> function) image files. <b>OLDIF</b> is used with the "old" Scitex online interface. <b>PULL</b> is used with Scitex HandShake background mode. <b>PUSH</b> is used with Scitex HandShake foreground mode. <b>TAPE</b> indicates that image files will be drawn from a SCSI-compatible tape drive (9-track, 1/2-inch tape). <b>WAVEFRONT</b> indicates Wavefront-format images. <b>ALIAS</b> indicates Alias-format image source files. If you select <b>TAPE</b> , you should pay attention to the selections for the <b>TAPEFORMAT</b> and <b>TAPEDRIVE</b> variables; otherwise you may skip them. If you select online Scitex Foreground or Background HandShake protocol, you should pay attention to the selections for <b>SCITEX</b> ; otherwise, skip them.
SCITEX	HP INTEL	HP	(For Scitex Foreground or Background Online only.) Selects Hewlett-Packard or Intel host.
TAPEFORMAT	CT2T DDES00 CTHS	CT2T	<b>CT2T</b> is Scitex CMYK pixel-interleaved data, one raster per block. <b>DDES</b> indicates DDES UEF00 format, four or one color, pixel interleaved. <b>CTHS</b> indicates CT Handshake tape format.
TAPEDRIVE	0...7	4	Used during transmission of SCSI Mode Select command to SCSI tape controller, to specify prestored values for buffered/unbuffered, high-speed/low-speed, and 6250/1600 bpi (density) defaults. 0 = unbuffered, high speed, 6250 bpi 1 = unbuffered, high speed, 1600 bpi 2 = unbuffered, low speed, 6250 bpi 3 = unbuffered, low speed, 1600 bpi 4 = buffered, high speed, 6250 bpi 5 = buffered, high speed, 1600 bpi 6 = buffered, low speed, 6250 bpi 7 = buffered, low speed, 1600 bpi

(continued on next page)

Table 7-1 (cont.): FEP Environment Variables

Variable	Values	Default	Explanation
CLT_TYPE	512 4096	512	The FEP calculates and sends one of these two types of CLT printer records when enabled. If 4096 is selected, the software needs to know the current pixel clock frequency, stated in the FREQUENCY variable.
NPOINTS	4...21	21	Number of index points created in new Color Lookup Table created with Use Contrast feature.
FREQUENCY	1...16	8	IF the value for CLT_TYPE is 4096, set this variable to the same value that appears on the printer control panel in the XTAL FREQUENCY menu. This variable is ignored if the value for CLT_TYPE is 512.
RES	ENGLISH METRIC	METRIC	When set to ENGLISH, horizontal resolutions are displayed as 200, 240, or 300. When set to METRIC, horizontal resolutions are displayed as 8, 10, or 12. The resolution chosen must match the hardware-configured horizontal resolution shown on the printer control panel.
SHELL	path\program	c:\dos\command.com	Used by the Dos function of I/O and Files as the command interpreter.
CNF	drive[path]	c:\cnf	Drive and path specification for storing configuration files
HUE	drive[path]	c:\hue	Drive and path specification for storing hue table files
CLT	drive[path]	c:\clt	Drive and path specification for storing color lookup table files
LST	drive[path]	c:\lst	Drive and path specification for storing image list files
IMG	drive[path]	d:\img	Drive and path specification for storing image files. (Usually drive d:)
WAV	drive[path]	d:\wav	Drive and path specification for storing Wavefront format image files. (Usually drive d:)
ALIAS	drive[path]	d:\alias	Drive and path specification for storing Alias format image files. (Usually drive d:)

When it starts up, the FEP program will create these directories if they do not exist. The FEP hard drive is normally configured as a smaller "C:" partition with the remaining space on the disk given to the "D:" partition. The larger partition has a larger allocation unit, usually 16384 bytes for the 300 Mbyte disk, for example, and it is not efficient to put small data files on this partition because an 80 byte file uses 16384 bytes. The disk is partitioned with the intention that only image files will be kept on drive D.

It is better then, to put small files on the C: partition, where the allocation size is smaller and less space is wasted per file. The FEP program allows you to create and edit four types of small files: (1) printer configuration, (2) Color Lookup Table, (3) ink mixing or hue correction, and (4) image list files. Each of these types is kept in its own directory to make it unnecessary to actually read each file when it is necessary to present the user with a list of files of one type.

If the FEP is used by separate work groups that do not desire to share files, each group may have its own environment, customized to provide separate directories.

## Shell

The **Shell** command specifies that the FEP application provide the user a DOS shell without exiting the FEP program. The default selection is C:\DOS\COMMAND.COM, but you may find other shells or uses for the FEP "Shell" function where you can put this to good use.

## FEP Software Version

FepVersion (item 10 on the FSIS) will be selected with the latest FEP executable selected. If you would like to change the FEP executable, use the left and right arrows keys to select another FEP executable, and type <Enter>. Most user will only have one FEP executable.

## Exiting from the CUSTOM Program

The **Exit** menu entry allows you to leave the CUSTOM program. When you select this option, you are given the choice of saving what you've selected as a batch file.

- **If you don't want to save any changes**, press the <Esc> key.
- If you press <Enter> in response to the exit question, you can specify the name of the batch configuration file to create. **Do not add a file extension to the name.** The Customization program will add the necessary file extension: .BAT. The batch file will be placed in the C:\IRIS directory. If a file exists with the name you specify, you will be asked whether you want to overwrite it or save it under a different name. Pressing <Esc> at this point allows you to retype the batch file name. Pressing <Enter> creates a new file with your current settings.

# A

## FEP Diagnostic Error Messages

Error Message	Probable Cause	Suggested Remedy
<b>Allocating Buffer</b>	FEP software cannot allocate memory buffer.	Remove memory-resident (TSR) programs and retry.
<b>Allocating Tape (ICB) Buffer</b>	Tape drive interface error.	Remove memory-resident (TSR) programs and retry.
<b>Cannot Process Image List</b>	Image List file corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Closing Tape Drive</b>	Tape drive interface error.	Check interface and tape PCB configuration.
<b>Error Opening CLT File</b>	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Error Opening HUE File</b>	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Error Reading CLT File</b>	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Error Reading HUE File</b>	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Error Writing CLT</b>	Could not write CLT to disk.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Error Writing HUE</b>	Could not write HUE file to disk.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
<b>Getting Scitex Parameter Block</b>	Error reading data from host	Check interface cable and connections.
<b>HandShake Protocol Error</b>	Data error in protocol to Scitex system.	Check incoming data, time out parameter on host system.
<b>Image Size Equal to Zero</b>	Image file header specified a size of "0" rasters and/or pixels.	Host error. Check data.

### Diagnostic Error Messages (cont.)

Error Message	Probable Cause	Suggested Remedy
Initializing GPIB Board	GPIB board installed or configured incorrectly or otherwise not functioning correctly	Double check installation, retest; call IRIS Graphics Customer Support if problems persist.
Initializing IKON Board	IKON board installed or configured incorrectly or otherwise not functioning correctly	Double check installation, retest; call IRIS Graphics Customer Support if problems persist.
Insufficient Disk Space for Output File.	Not enough space on disk.	Delete unnecessary files.
Invalid CLT File	File not of correct type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Invalid Configuration File	Configuration file corrupted or unreadable.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Invalid index in image list	Internal error in processing.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Invalid IRIS Image File	File not of correct type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Not a CLT File	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Not a HUE File	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Not a Image List File	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Not Enough Memory - can't allocate.	Insufficient memory to run process.	Make more memory available by removing memory-resident software (TSRs).
Opening Configuration File	File not of correct type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Opening Image List File	File of wrong type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Opening Input File	Could not open file. File does not exist or is not read-accessible.	Make file readable.
Opening Output File	Directory or disk full; too many open files.	Check disk space; delete unnecessary files. Check CONFIG.SYS; should contain line <b>FILES = 20.</b>
Opening Tape Drive	Board or tape unit not configured or terminated properly.	Check cable connections and tape drive configuration.

## Diagnostic Error Messages (cont.)

Error Message	Probable Cause	Suggested Remedy
Printer Offline	Printer has not been placed on-line or cable is not properly connected. IKON switch settings wrong. Bad IKON Board. Bad cable.	Turn printer on-line (press print switch). Check connections to IKON board, cables.
Reading Color Look Up File	File not of correct type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Reading Configuration Parameters	Configuration file corrupted or unreadable.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Reading Data	Error reading data.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Reading Extended Config. Parameters	Configuration file corrupted or unreadable.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Reading File Header Block	File not of correct type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Reading First Block	Tape drive interface error.	Check interface and tape drive configuration.
Reading First GPIB Buffer	Error reading data from host	Check interface cable and connections.
Reading GPIB Buffer	Error reading data from host	Check interface cable and connections.
Reading Image File	Encountered EOF (End of File) before expected. Error in image file data.	Check image file data.
Reading Image Header Block	Could not open or read file, or what was read was inconsistent with what program expected to find.	Check file. Is it a supported image file type?
Reading Image Identification Field	File not of correct type or corrupted.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Reading Tape Drive	Tape drive interface error.	Check interface and tape drive configuration.
SCSI CCB command byte wrong.	SCSI protocol error.	Call IRIS Graphics Customer Support.
SCSI DMA channel configuration wrong.	Adaptec SCSI board configured incorrectly.	Check Adaptec PCB configuration.
SCSI initialization failure.	Adaptec SCSI board configured incorrectly or not functioning properly.	Check Adaptec PCB configuration. Make sure all SCSI devices are powered on.
SCSI INT channel configuration wrong.	Adaptec SCSI board configured incorrectly.	Check Adaptec PCB configuration.
SCSI Linked CCB has wrong status.	SCSI protocol error.	Call IRIS Graphics Customer Support.
SCSI MBO command byte wrong.	SCSI protocol error.	Call IRIS Graphics Customer Support.

### Diagnostic Error Messages (cont.)

Error Message	Probable Cause	Suggested Remedy
SCSI selection time out.	Tried to select a device that did not respond.	Call IRIS Graphics Customer Support. Check SCSI device number of attached device.
SCSI target bus phase sequence error.	SCSI protocol error.	Call IRIS Graphics Customer Support.
SCSI unexpected bus free.	SCSI protocol error.	Call IRIS Graphics Customer Support.
SCSIstart: No Mailboxes available	General SCSI failure	Call IRIS Graphics Customer Support.
Sending ... Color Look Up Table Config Data Off-Line Command	FEP and printer are not in similar states or out of sequence.	Reset printer; avoid using switchbox during data transfer.
Skipping a File	Tape drive interface error.	Check interface and tape drive configuration.
Undefined Error Code	Error condition undefined — software error.	Call IRIS Graphics Customer Support.
Unsupported image file type	Unknown file type or corrupted image file.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Writing Color Look Up File	Could not write CLT file to disk.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Writing Configuration Parameters	Could not write Configuration Parameters to disk.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Writing Extended Config. Parameters	Could not write Configuration Parameters to disk.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Writing Image Header Block	Cannot write file header.	Check file attributes; is this a read-only file?
Writing Image Header Block	Could not write image header block	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Writing Image List Data	Could not write Image List to disk.	Non-recoverable; call IRIS Graphics Customer Support if this error occurs frequently or can be repeated.
Writing to Image File	Cannot write file header or disk full.	Check file attributes; is this a read-only file? Delete unnecessary files.
Writing to Printer	Bad cable connections to printer or faulty IKON board.	Check cable connections; call IRIS Graphics Customer Support if problems persist.



# B

## Sample Files

The following Hue Table, Density and Contrast values, and CLT files were produced using the techniques described in Part 6 as starting point settings under D5000 daylight lighting with IRIS glossy stock, Part number 01640-001. All the files are called "IRIS." The latest revisions of these files are provided with FEP software version 4.70.

### "IRIS" Hue Table

The Hue Table for the "Iris" standard configuration is as follows:

Input Color	% Ink out			
	CYAN	MAGENTA	YELLOW	BLACK
CYAN	100	15	0	0
MAGENTA	2	100	-10	0
YELLOW	0	0	100	0
BLACK	0	0	0	100
TINT	0	0	0	0

### "IRIS" Configuration

The Density and Contrast settings for the "IRIS" standard configuration are as follows:

Cyan Density	32
Contrast	180
Magenta Density	49
Contrast	180
Yellow Density	36
Contrast	180
Black Density	56
Contrast	180

## The "IRIS" Color Lookup Table

The "IRIS" CLT has the following values:

Index	CYAN	MAGENTA	YELLOW	BLACK
0.00	0.00	0.00	0.00	0.00
6.25	3.38	3.13	3.57	2.50
12.50	6.76	6.25	7.14	5.00
18.75	10.14	9.38	10.71	7.50
25.00	13.51	12.50	14.29	10.00
31.25	16.89	15.63	17.86	12.50
37.50	20.27	18.75	21.43	15.00
43.75	23.65	21.88	25.00	17.50
50.00	27.03	25.00	28.57	20.00
56.25	30.41	28.80	32.30	22.50
62.50	33.92	34.18	37.33	25.27
68.75	39.24	41.17	43.91	30.46
75.00	46.83	49.74	52.03	38.56
81.25	56.71	59.92	61.70	49.57
87.50	68.86	71.68	72.92	63.47
93.75	83.29	85.04	85.69	80.29
100.00	100.00	100.00	100.00	100.00

# C

## Image File Formats

FEP software will support several widely-used formats, depending on the hardware and software options purchased with FEP software. File formats include the CT2T and CT Handshake formats used by Scitex Corporation, the ANSI DDES00 UEF00 standard, Truevision ("TARGA" or "VISTA"), Alias, and Wavefront format images. Detailed specifications for test image files in these formats are provided in following sections.

### Requirements for Raster Image Data in All Formats

Regardless of the media and data format chosen, **raster** image data for all sample image files must consist of **raster** data in the following format:

1. Four-color CMYK raster or three-color RGB raster data. Colors may be in any sequence (*e.g.*, YMCK).
2. Data must be pixel-interleaved — eight bits/color/pixel. Each raster line must contain the data for all colors. Files that consist of all cyan data, then all magenta, etc., cannot be processed.
3. Each 8-bit data byte consists of a value in the range 0–255, with 0 = no color. Values may be inverted.
4. Maximum record size for all images is limited by the maximum printable raster length. For the 3024 (max. paper size 24.5" × 24.5") — 28,800 bytes per raster (4 colors). For the 3047, maximum record length depends on the paper size chosen. For size "E" (34" × 44") — 53,040 bytes per raster. For size "A0" (841 cm. × 1189 cm.) — 60,200 bytes per raster. Lower printing resolutions will proportionally decrease the maximum record size.

### Summary of Available Image File Formats

With appropriate software and hardware, the FEP can process image data in the file formats specified on the following computer platforms (some systems may require additional software or hardware to generate the format specified):

Media	Image Type Supported						
	A CT2T	B CT Hand- shake	C DDES	D Truevision (Types 1-2-9-10)	E Wavefront (.rla & .rlb)	G Alias	H IRIS
1/2" Tape	•	•	•				
1/4" Tape				•	•	•	•
Floppy Disk				•	•	•	•

See the following paragraphs for specific data format and media requirements of each type of image data. Note that IRIS printers do not support Scitex and some other "native" image formats.

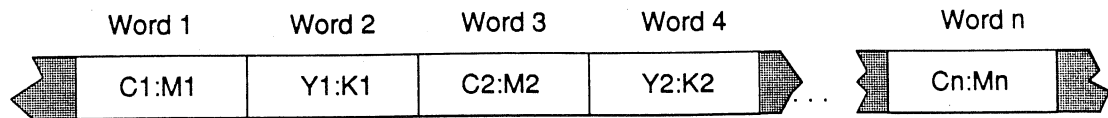
### Type "A" — CT2T Raster Image Data

IRIS supports input of sample image file data in the Scitex "CT2T" (Continuous Tone image To Tape) generic tape format. Note that, for sample input, IRIS does not support the full range of options possible with the Scitex CT2T Utility.

- **Media Format:** 1/2" nine-track, 1600 bpi IBM-compatible phase-encoded or 6250 bpi GCR tape format. The higher density format is preferred because images larger than 8" by 10" may not fit on a single 1600 bpi tape.
- **Tape Characteristics:** Tape must be unlabeled; image file written to tape without a header record; block length equals length of one image raster.
- **Image Data Format:** Four colors (CMYK, any sequence), byte sequential by color; eight bits/pixel/color, pixel interleaved.
- **Resolution:** Files may be written to tape at one of six resolutions: 8 p/pm, 10 p/pm, 12 p/pm, 7.87 p/pm (200 dpi), 9.45 p/pm (240 dpi), or 11.81 p/pm (300 dpi).
- **Other:** Multiple image files can be processed if each file is terminated with an end-of-file mark. Describe each file in writing.

### Additional Information about CT2T Format

For test images, IRIS supports CT2T data for four separations only. Each pixel is described by two words with two separations in each word. If the data is in the order CMYK, the values are stored as in the following graphic:



Note that Byte 0 = Cyan, byte 1 = Magenta, byte 2 = Yellow, and byte 3 = Black (K).

The Scitex CT2T utility is limited to writing rasters no longer than 5000 bytes. The IRIS printer can accept longer rasters. (See above, "Maximum Image Size and Record Length.")

For more detailed information about CT2T, refer to "Scitex Generic Tape Formats for Continuous Tone Image Transfer," an instructional aid available from

Commercial Marketing Group  
Scitex America Corporation  
Eight Oak Park Drive  
Bedford, MA 01730  
(617) 275-5150.

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### Type "B" — CT Handshake Raster Image Data

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IRIS supports input of sample image file data in the Scitex "CT Handshake" tape format — CT file type only. LW files are not supported. If you need to print text (LW file data) in an image, combine the CT and LW files into a single CT file.

- **Media Format:** 1/2" nine-track, 1600 bpi IBM-compatible phase-encoded or 6250 bpi GCR tape format. The higher density format is preferred because images larger than 8" by 10" may not fit on a single 1600 bpi tape.
- **Tape Characteristics and Image Data Format:** Refer to Scitex Corp. specifications for creating CT Handshake files.
- **Resolution:** Files may be written to tape at one of six resolutions: 8 p/pm, 10 p/pm, 12 p/pm, 7.87 p/pm (200 dpi), 9.45 p/pm (240 dpi), or 11.81 p/pm (300 dpi).
- **Other:** Multiple image files can be processed if each file is terminated with an end-of-file mark.

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## Type "C" — DDES Raster Image Files

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DDES is an ANSI non-vendor industry standard for color raster image data. IRIS printers support the DDES UEF00 format. Additional information on the DDES standard can be found in the *Dunn Report on EPPS*, Vol. IV, No. 6, or by ordering ANSI standard IT8.1-1988, *User Exchange Format (UEF00) for the Exchange of Color Picture Data between Electronic Prepress Systems via Magnetic Tape (DDES00)* from:

Secretariat  
National Equipment Printing and Supply Association, Inc.  
1899 Preston White Drive  
Reston, Virginia 22091-4326  
(703) 264-7200

The specifications below adhere to the User Exchange Format (UEF00) and are the minimum requirements for IRIS FEP software to interpret the data stored on the DDES00 tape:

- **Media Format:** 1/2" nine-track, 1600 bpi IBM-compatible phase-encoded or 6250 bpi GCR tape format. The higher density format is preferred because images larger than 8" by 10" may not fit on a single 1600 bpi tape.
- Volume Header Label (VOL1) must be present with bytes 00-03 of VOL1 = "VOL1"
- If File Header Label 2 (HDR2) is present, the block length must be set to 8192 (bytes 05-09 of HDR2 = "08192").
- File type must be of color picture (bytes 24-27 of UHL2 = "0000").
- Number of blocks within a picture file before the first line of picture data must be present in UHL2 (bytes 33-34).
- Format of interleaving must be pixel (bytes 04-05 of UHL3 = "00").
- Number of colors must be four (4) (bytes 06-07 of UHL3 = "04") or single color data type (bytes 06-07 of UHL3 = "01").
- Color sequence must be YMCK, CMYK, C, Y, M or K (bytes 08-11 of UHL3 = "YMCK", "CMYK", "C", "M", "Y", or "K" respectively; bytes 12-23 of UHL3 are left blank).
- Picture orientation must be specified (bytes 64-65 of UHL3).
- If resolution of line is specified, it must be specified in bytes 68-73 of UHL3. If the resolution is not specified, IRIS will calculate the values from other data in the header.

- If resolution of breadth is specified, it must be specified in bytes 74-79 of UHL3. If the resolution is not specified, IRIS will calculate the values from other data in the header.
- If the IRIS software is expected to scale the image to allow reproduction of actual input image size, then the units of resolution should be specified for both length and breadth (bytes 66 and 67 of UHL3 = "M" or "T"). If the units of resolution are not specified in the header, IRIS automatically selects a default value of "I."

IRIS software will "scale" the input data to 8, 10 or 12 p/mm or 200, 240 or 300 dpi. Output resolution will be that of the active configuration. Images can span tape volumes.

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### Type "D" — Truevision (TARGA/VISTA) Raster Image Files

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IRIS software supports images generated by the Truevision product family, including several types of "TARGA and VISTA" files..

- **Media Format 1 — 5 $\frac{1}{4}$ " floppy disks.** Files that exceed one (1) floppy should be stored with the same revision of the MS-DOS "Backup" and "Restore" utilities on the source system and the FEP. You may also use the public domain DOS "Split" and "Combine" utilities. See detailed explanation below.
- **Media Format 2 — 1/4" cartridge tape.** Use the TAR (Tape Archive) utility to write the file to the tape. This utility is standard with UNIX. An MS-DOS version of the TAR utility has been developed by IRIS Graphics and is available. Contact your IRIS sales representative for information about ordering the utility. See below for physical tape format specifications for Truevision and other DOS file formats.
- **Image Data Format:** Truevision file formats supported are data types 1, 2, 9 and 10. RGB data values should range from 0 to 255. RGB data values will be converted to CMYK values by a proprietary algorithm.

---

### Type "E" — Wavefront Images

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You may use the BACKUP/RESTORE, SPLIT/COMBINE, or PC TAR utilities to archive Wavefront test image files. See instructions above for Truevision files.

For additional information about Wavefront .rla and .rib (run length encoded) file formats contact:

Wavefront Technologies, Inc.  
1421 State Street, Suite H  
Santa Barbara, CA 93101

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## Type "H" — IRIS Image File Format

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You may use the BACKUP/RESTORE, SPLIT/COMBINE, or PC TAR utilities to archive test image files in IRIS File Format. See instructions above for Truevision files. When files from other systems are loaded to the hard disk of and IRIS FEP, they are stored in IRIS Image File Format.

IRIS supports Truevision file formats 1, 2, 9, and 10 directly. The following extension to the Truevision format uses Data Type 130: CMYK Pixel Interleave Images, used for storing raster images where each pixel is represented by its cyan, magenta, yellow and black values.

The file format is as follows:

- Field 1** **Number of Characters in Identification Field (1) byte):** This field identifies the number of bytes in Field 6, the Image Identification Field. **IRIS files must have this set to 248.**
- Field 2** **Color Map Type (1) byte):** This field is ignored. Recommend setting to 0.
- Field 3** **Image Type Code (1) byte):** This value must be 130 for IRIS Image Files.
- Field 4** **Color Map Specification (5) bytes)** This field is ignored. Recommend setting to 0.
- Field 5** **Image Specification (10 bytes):**
  - Field 5.1** **X-Origin of Image (2) bytes):** This field is ignored. Recommend setting to 0.
  - Field 5.2** **Y-Origin of Image (2) bytes):** This field is ignored. Recommend setting to 0.
  - Field 5.3** **Width of Image (2) bytes):** Width of image in pixels.
  - Field 5.4** **Height of Image (2) bytes):** Height of image in pixels.
  - Field 5.5** **Image Pixel Size (1) byte):** Number of bits in a stored pixel. **This value must be 32 for IRIS Image Files.**
  - Field 5.6** **Image Descriptor Byte (1) byte):** This field is ignored. Recommend setting to 0.
- Field 6** **Image Identification Field (248 bytes):** Contains an identification field whose length in bytes is specified by Field 1 (must be 248). **This field is used by the IRIS FEP PRINT command. It Should be zero filled.**
- Field 7** **Color Map Data (Variable):** This field must be empty if Field 2 is 0. If Field 2 is 1, this field is interpreted by the rules described with Truevision File Format 1.
- Field 8** **Image Data Field (Variable):** This field specifies (Width)x(Height pixels. Each pixel specifies a CMYK color value. The values for Width and



Height are specified in Fields 5.3 and 5.4 respectively. The CMYK specification for each pixel value is stored in successive bit-fields in a multi-byte entry. Each color bit-field is assumed to be:

Field Bit Length = Field 5.5/4 colors

For IRIS image files each pixel must be stored as four bytes. The field is assumed to be unsigned. The color order of the four byte pixel is cyan, magenta, yellow and black.

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## Large Image Files on Diskette or Tape

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### Writing Large Files to Floppy Disks with the SPLIT Utility

If a Truevision or other image file from a DOS system is larger than one diskette, you may use the MS-DOS public-domain SPLIT utility to write image data to multiple diskettes. You can then use the COMBINE transfer the data to the IRIS FEP's hard drive. This is the preferred method of transferring multi-volume files on floppy diskette at IRIS Graphics. IRIS will send you a copy of these utilities on request. Contact the IRIS Product Support department.

Do **not** use the MS-DOS "Copy" command to transfer multi-volume files.

To copy a large Truevision image with the SPLIT utility from your hard disk to one or more formatted diskettes, follow this procedure:

1. Format several 5 $\frac{1}{4}$ -inch floppy disks (1.2 Mbyte capacity preferred) **in advance**.
2. Change directories to the directory on your hard disk that contains the Truevision image you want to save.
3. If the file SPLIT.EXE is on your hard disk and is in a path identified by the DOS PATH command (or if it is in the same directory as the image file), type **SPLIT filename.ext** and press <Enter>. *filename.ext* represents the image file name and extension — for example, BIRD.TGA. If the SPLIT utility is on diskette, you would type A:SPLIT BIRD.TGA.
4. The program will instruct you to insert the first diskette into drive A:. Do this and then press <Enter>. Label the first diskette — for example, "BIRD.TGA — DISK NUMBER 1." The program will continue to ask you to insert diskettes until the entire file has been saved. The number of diskettes you need will depend on the size of the file and the storage capacity of the diskettes.
5. The SPLIT utility terminates automatically after it has finished backing up the file to the last diskette.
6. Place a write-protect tab on each floppy.

### Using the COMBINE Utility To Restore Files

To put the previously saved image file back on your hard disk, use the COMBINE utility (COMBINE.EXE), described below.

The MS-DOS COMBINE utility program can be used to restore large image files stored with the SPLIT utility. Such images may span several floppy disks. When you restore files to the FEP disk with COMBINE, be sure to adhere to the following procedure:

1. Insert the diskette containing the first part of the image file into drive A.
2. Change the active disk drive to D and move into the directory \IMG — or \WAV or ALIAS, depending on the type of file you are restoring — with the change directory command.
3. Restore the file by typing the command in the following format and pressing <Enter>:

```
[d:\path] combine filename
```

where “[d:\path]” represents the disk and path of the COMBINE utility, and “filename” is the name of the file stored on floppy disk.

4. A series of plus signs indicates that copying is in progress. If the file spans diskettes 1 and 2, when the first part of the file has been copied, a message will ask you to insert the second diskette. Insert the second diskette and press <Enter>. Repeat this step as needed for additional diskettes.
5. Type q<Enter> after the program copies the last part of the file to finish the process.

### Writing Large Files to Floppy Disks with BACKUP

If a Truevision image file is larger than one diskette, you may use the DOS BACKUP and RESTORE utilities — **but only if the originating system and the receiving system at IRIS are using the identical version of these utility programs.**

In order to restore the file to the FEP disk, you must use the same version of BACKUP/RESTORE that was in use on the system that used BACKUP.

Do **not** use the MS-DOS “Copy” command to transfer multi-volume files. We recommend that you use 1.2 Mbyte capacity diskettes instead of 360 Kbyte diskettes because of their higher capacity.

Have several formatted or unformatted 5¼-inch diskettes ready. If BACKUP.COM is resident on your hard disk, you copy an image to a series of floppy disks typing the commands in the following format at the DOS prompt (then press <Enter> to execute):

```
backup d:[path]filename a: [/f]
```

For “d:” substitute the name of the drive where the file is stored. For “[path]” substitute the path along which the file is found. For

“filename,” substitute the name of your image file. Use the “/f” switch to format the diskettes while copying the file. The BACKUP and RESTORE commands are described in DOS documentation.

The RESTORE utility restores files from floppy disks only to the directory whose path is the same as the path from which BACKUP archived the file(s). (The disk specification may be different, but the path specification must be identical.) If you use BACKUP, IRIS prefers that the test image file be archived from a directory named \IMG. Be sure to describe the path of the source file if you use BACKUP.

### Instructions for Using TAR Utilities

If you are using the TAR utility on a UNIX system to write image data to 1/4” magnetic tape, follow the directions in your UNIX documentation.

If you want to archive to 1/4” magnetic tape on a DOS system, you will need the PC TAR utility. Contact your IRIS Sales Representative to order a copy of the IRIS PC TAR utility for DOS systems (IRIS part number 01860-001). Instructions for using the IRIS PC TAR utility will accompany the program. The program is provided on 5 1/4” 1.2 Mb capacity floppy diskette only.

### Physical Tape Formats for 1/4” Magnetic Tape

Available physical tape formats for 1/4” magnetic tape are as follows:

Tape Specification	Qualified Tape	Function
ANSI X3B5/87-165	DC600XTD	Read/Write (QIC-150) Read/Write (QIC-120) Read only (QIC-24)
ANSI X3B5/85-138	3M DC600A	Read/Write (QIC-120) Read only (QIC-24)
ANSI BSR X3.127	3M DC300XLP	Read only (QIC-24)

# D

## Installing or Upgrading FEP Software

This chapter describes the prerequisites for installing and running FEP software revision 4.70, lists the actions performed by the INSTALL program, and provides step-by-step instructions for running the program.

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### Prerequisites for Installing FEP Software

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The IRIS Series 3000 Front End Processor (FEP) is an IBM-PC/AT™-compatible microcomputer. FEP software runs as an application under the Microsoft MS-DOS™ operating system (versions 3.2, 3.3, and 4.01 only).

FEP software sold as upgrades to previous levels of software may require upgrading printer firmware. This upgrade will be provided as a kit and can be performed by customers with telephone assistance from IRIS customer support personnel.

---

**IMPORTANT:** If you have purchased a new FEP with FEP software version 4.70, **the FEP software is already installed and ready to use.** However, we do recommend that you familiarize yourself with the effects of the installation process and with the names of the files that installation creates.

---

**The procedures described in this section for installing FEP software assume that you are familiar with MS-DOS®.**

If you will be making extensive use of FEP Hue Correction features or Scaling, you should be using FEP Model D325 or an equivalent high-performance platform.

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**IMPORTANT:** After you install FEP version 4.70, Color Lookup Tables and Hue Tables used with previous revisions will not produce the same results. Version 4.70 uses a different method of calculating drop-let count values.

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## Installing FEP Software and Test Patterns

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If you have purchased a complete FEP system (hardware and software), IRIS personnel will install the system for you. The FEP will be configured for operation with the input options you have purchased and IRIS default values. Installing or upgrading FEP software is required **only if you are upgrading from previous levels of FEP software to revision 4.70 or if you need to reinstall FEP software revision 4.70 for some reason.**

To properly install this new version of the FEP software, you will need to (1) run the FEP installation program — `INSTALL.EXE`, (2) use the `COMBINE.EXE` utility to copy the IRIS test patterns to the directory `D:\IMG`, and (3) run the Customization program (`CUSTOM.EXE`) to create an FEP batch file that you will use to run FEP software. Before you begin these procedures, make backup copies of the source diskettes.

### Running the INSTALL Program

To run the FEP Installation program, take the following steps:

1. Reboot the computer.
2. Insert the Install/Customize program floppy disk into drive A and change the current drive to drive A.
3. At the prompt **A>**, type **install** and press <Enter>. New directories will be created for program files and data files. The FEP files will be copied to the appropriate directories.
4. When the program asks you if you want your `CONFIG.SYS` file updated, type **Y**.
5. When the program asks you if you want your `AUTOEXEC.BAT` file updated type **Y**.
6. After the program completes these processes and the **C>** prompt is displayed on the screen, remove the Install floppy disk from drive and reboot the system as instructed on the screen. Make sure drive A door is open.

### Copy the Test Patterns

The remaining three diskettes provided with the FEP 4.70 software upgrade contain two test pattern image files — `VERTSCAL.IRS` and `HORZSCAL.IRS` and two copies of the Combine utility program (`COMBINE.EXE`). Transfer the Test Patterns to the directory `D:\IMG` with the following procedure:

1. Insert the diskette labelled "Test Pattern — 1 of 3" into drive A.
2. Change the active disk drive to D and move into the directory `\IMG` with the change directory command.
3. Type the following line and press <Enter>

```
a:combine vertscal.irs
```

4. A series of plus signs indicates that copying is in progress. The first Test Pattern spans diskettes 1 and 2. When the first part of the file has been copied, a message will ask you to insert the second diskette. Insert diskette 2 of 3 and press <Enter>.
5. Type **q**<Enter> after the program copies the second part of the file from diskette 2 of 3. Do not remove the diskette. The second Test Pattern spans diskettes 2 and 3. With diskette 2 still in drive A, type the following and press <Enter>:  

```
a:combine horzscal.irs
```
6. Complete the file transfer with diskette 3 of 3 and type **q**<Enter> to finish the process.

### Run the CUSTOM Program

The Installation program does **not** create an FEP batch environment file. You will need to create a new batch file with the CUSTOM program in order to run the new version of FEP software.

The Customization program file is copied to the hard disk during the Installation procedure. After you install FEP software, you will run the Customization program from drive C, not from the program diskette. See Part 7 of this manual for instructions on running CUSTOM.EXE.

---

### Effects of the INSTALL Program

---

The INSTALL program (INSTALL.EXE) performs the following functions:

1. Makes (tries to make) the CNF directory on C:\, where IRIS Printer Configuration files are placed.
2. Copies A:\IRIS.CNF to C:\CNF\IRIS.
3. Makes (tries to make) the CLT directory on C:\, where Iris Color Lookup Tables are placed.
4. Copies A:\IRIS.CLT to C:\CLT\IRIS.
5. Makes (tries to make) the HUE directory on C:\, where Iris HUE table files are placed.
6. Copies A:\IRIS.HUE to C:\HUE\IRIS.
7. Makes (tries to make) the IRIS directory on C:\, where IRIS executable files and FEP batch files are placed.
8. Copies A:\FEP???.EXE to C:\IRIS. (The version number of the software is represented by "???.")
9. Copies A:\CUSTOM.EXE and its help file A:\INSTALL.HLP to C:\IRIS.

10. Copies A:\README, an information file about installing and customizing FEP software, to C:\NRIS. Most of this information is already available in this manual. You should read this file if the release number of your software is higher than the applicable release number for this manual.
11. Copies A:\RELEASE.DOC, a list of changes for the release, to C:\NRIS. Most of this information is already available in this manual. You should read this file if the release number of your software is higher than the applicable release number for this manual.
12. Copies A:\TMC.EXE (the Future Domain TSR task) to C:\NRIS if you are using Future Domain Tape Controller.
13. Asks users if they want their C:\CONFIG.SYS to be updated. If the user responds YES, the program adds the following lines to the C:\CONFIG.SYS file:

```
FILES=20
BUFFERS=8
SHELL=c:\dos\command.com /e:2048 /p
```

Otherwise, the program tells them to put the above lines into their C:\CONFIG.SYS file.

14. Asks users if they want their C:\AUTOEXEC.BAT to be updated. If the user responds YES, the program adds C:\NRIS to the PATH command in the file. If the user gives a different response, the program tells them to add C:\NRIS to the PATH command.
15. Instructs the user to remove the floppy and reboot the system if C:\AUTOEXEC.BAT or C:\CONFIG.SYS files were changed.

# E

## Installing and Configuring FEP Interface Boards

Most IRIS Front End Processors (FEPs) are delivered with all printed circuit boards installed and properly configured for operation with IRIS Series 3000 Color Ink Jet Printers and host computers. This section addresses the following requirements:

- Installation and configuration of printed circuit boards (PCBs) that were not installed in the FEP as delivered by IRIS Graphics.
- Installation and configuration of PCBs for IRIS FEP printing applications in personal computers purchased from a third party.
- Description of PCB configurations that should help you avoid contention with IRIS applications if you install PCBs not described in this document.

This information assumes that the user is familiar with general procedures for installing boards in personal computers, setting board switches, installing board “jumpers,” and changing memory addresses for newly-installed boards. Consult your computer documentation or your computer support representative if you are unfamiliar with these procedures.

---

### General Hardware Installation Guidelines

---

Specific installation requirements are found in the documentation accompanying each board.

- Disconnect the processing unit and all connected peripherals from their power sources before removing the unit's cover.
- Be sure you have an open slot!
- Work in a static-free area, and ground yourself before handling the board.



- Remove the board from the system to change jumpers. Some switches and jumpers are inaccessible or difficult to access after the board is installed.
- Follow IRIS board-configuration instructions, then install the board.

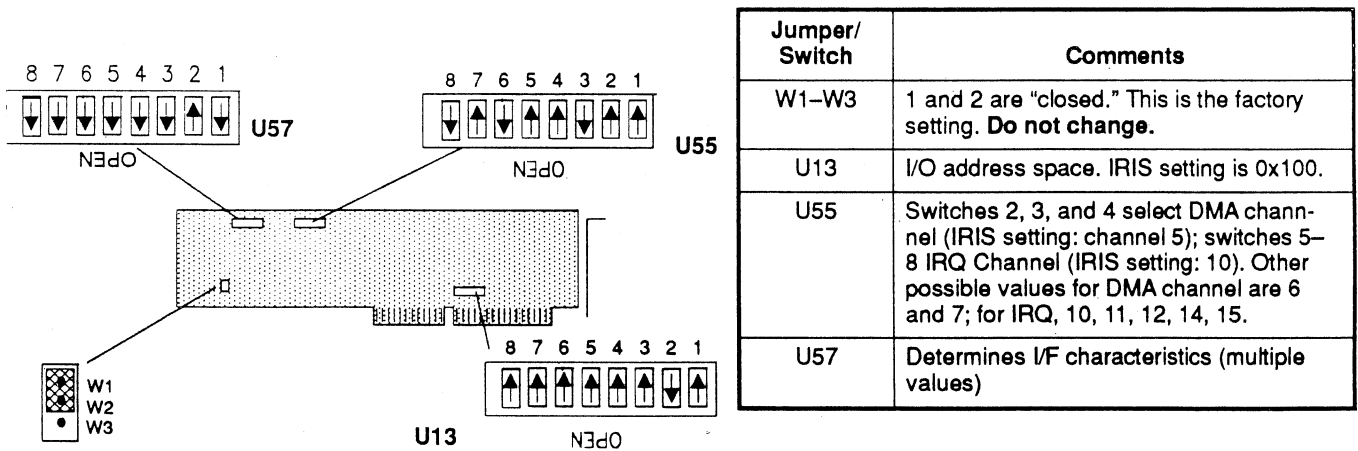
**Jumper and Switch Settings**

The following section specifies configuration parameters for each board. (The notation "0xnnnn" indicates a hexadecimal value.) The settings provided below for each interface board **supersede** any settings and recommendations in the documentation that accompanies each board. Original vendor documentation for all PCBs installed by IRIS Graphics in IRIS-configured FEPs is supplied with the FEP.

**"IKON Board" (IRIS part number 01157-001)**

The IKON Model 10092 Hardcopy Interface (also referred as "the IKON board" in this document) is a high performance DMA interface for hardcopy output devices, including Versatec electrostatic plotters, Imagen laser printers, and other Centronics or Versatec-compatible devices, including IRIS Series 3000 Color Ink Jet Printers.

IKON Corporation  
 2617 Western Avenue  
 Seattle, Washington 98121  
 Phone: (206) 728-6465.



**Figure E-1: Settings for the IKON Model 10092 ATbus Hardcopy Interface**

## “Adaptec Board” (IRIS part number 01611-002)

The “Adaptec Board” — Adaptec Intelligent Host Adapter AHA-1542A — is a multitasking interface between the AT bus and the Small Computer System Interface (SCSI) bus. It is used in the IRIS FEP environment as an internal disk drive controller for 300Mbyte and 600Mbyte SCSI drives and to interface external SCSI devices.

Adaptec, Inc.  
691 South Milpitas Blvd.  
Milpitas, California 95035.

### The Adaptec Board as a Hard Disk Controller

The Adaptec AHA-1542A used as a hard disk controller is placed in slot 1 of the PC motherboard for IRIS FEP models D316, D325, and D325P. (See accompanying illustrations.) The following variations may apply:

1. For FEP model **D316**, the floppy disk drive is connected to the 386SX motherboard — **not** to the Adaptec header for floppy disk drives. For this model, you must **disable jumper J13** on the Adaptec board.
2. For model **D325**, the single floppy disk drive is connected to the Adaptec board header for floppy disk drives. Jumper configura-

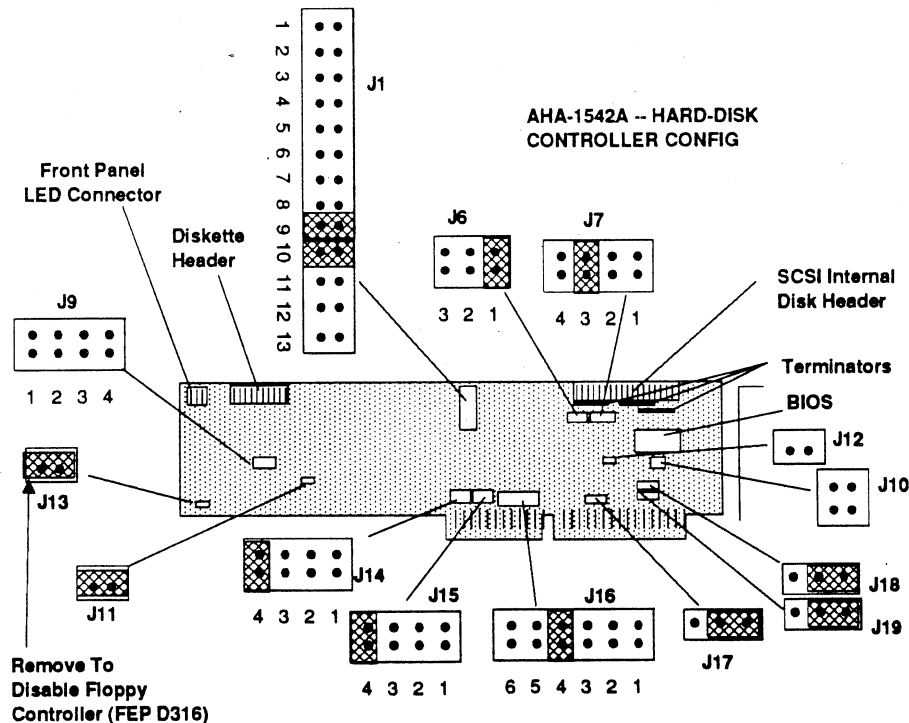


Figure E-2: Settings for the Adaptec Board Used as a SCSI Hard Disk Controller

tions are shown in the accompanying illustration. Remove the Dell floppy controller.

- For model **D325P**, the two floppy disk drives are connected to the Adaptec board header for floppy disk drives by a split cable. Jumper configurations are shown in the accompanying illustration. Remove the Dell floppy controller.

If the Adaptec board is used as an internal disk drive controller, you cannot use the external port. You will need a second Adaptec board to support other SCSI devices, including 1/4" and 1/2" tape drives.

Jumper/ Switch	Comments
J1	Synchronous negotiation disabled; SCSI ID = 7; DMA channel = 7; IRQ channel = 12; DMA transfer speed = 5.0 MB/sec.
J6	AT Port Address = 0x330
J7	AT BIOS Wait State = 2 wait states
J10	BIOS Address = 0xDC000H
J11	BIOS enabled (open = disabled)
J14	DMA request channel = 7
J15	DMA acknowledge channel; = 7
J16	IRQ channel = 12

To enable the floppy controller, the following jumpers have to be set:

Jumper/ Switch	Comments
J12	I/O address for floppy — leave jumper off (0x3F0–3F7)
J13	floppy diskette enable — jumper on (for models D325 and D325P)
J17	IRQ request channel = 6
J18	DMA request channel = 2
J19	DMA acknowledge channel = 2

### The Adaptec Board as an External SCSI Device Controller

You may use the same model of the Adaptec board that is used as a disk controller to support other SCSI devices, including 1/4" and 1/2" tape drives. **A separate Adaptec board is required for external devices.** The Adaptec board used as a tape controller is normally placed in Slot 5. (See accompanying illustrations.) You can use the same board for several external SCSI devices by swapping cables at the external port or by "daisy chaining" SCSI devices.

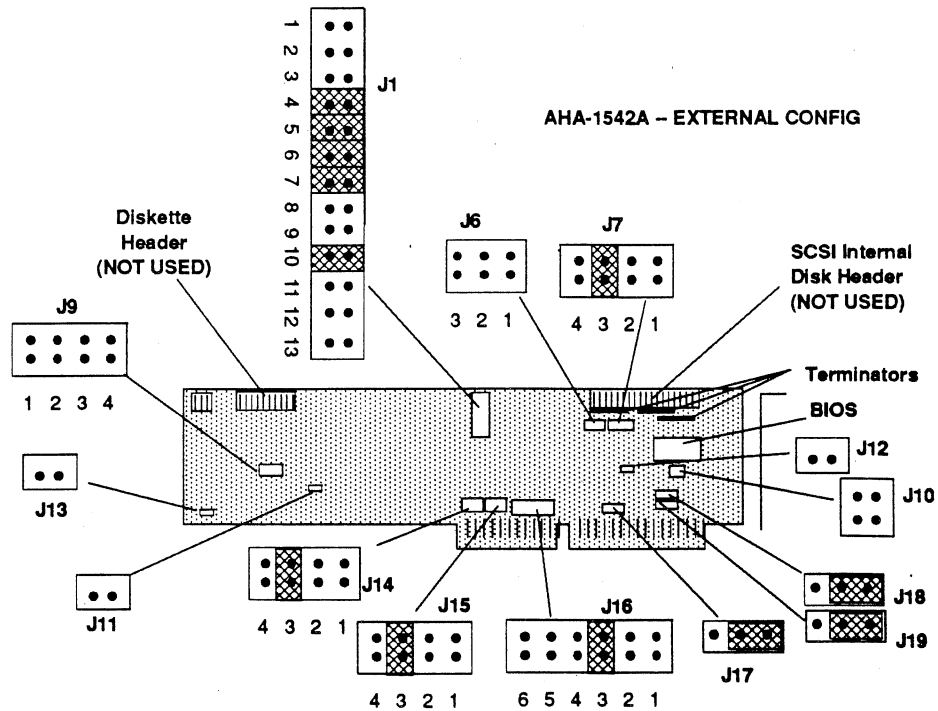


Figure E-3: Settings for Adaptec Board Used as an External SCSI Device Controller

Jumper/ Switch	Comments
J1	Synchronous negotiation disabled; SCSI ID = 0; DMA channel = 6; IRQ channel = 11; DMA transfer speed = 5.0 MB/sec.
J6	AT Port Address = 0x334
J7	AT BIOS Wait State = 2 wait states
J10	BIOS Address = 0xDC000H (Note: BIOS disabled with jumper 11)
J11	BIOS disabled
J14	DMA request channel = 6
J15	DMA acknowledge channel = 6
J16	IRQ channel = 11

“GPIB Board” (IRIS part number 00697-001)

The Capital Equipment PC<math>\leftrightarrow</math>488 Interface Board, Model #01000-00300 (also referred to as the “GPIB board” in this document) provides an interface for the FEP to a complete implementation of the IEEE-488 (1978) General Purpose Interface Bus (GPIB).

Capital Equipment Corporation  
 99 South Bedford Street  
 Burlington, Massachusetts 01803  
 Phone: (617) 273-1818

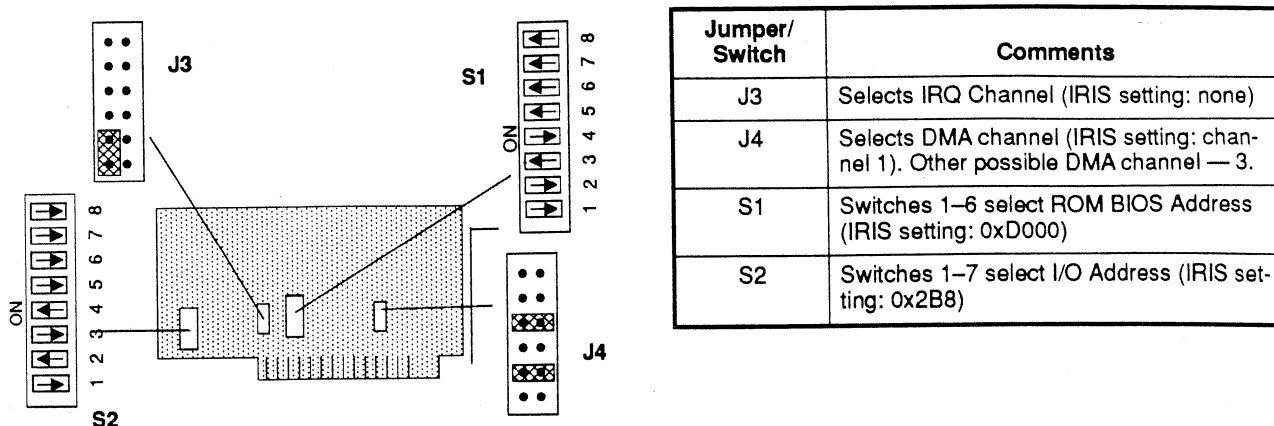


Figure E-4: Settings for the CEC PC<->488 Interface Board

### FEP Configuration for Interface Boards

The table on the last page of this document summarizes the settings required by each interface board. All settings marked as “•” are “hard-coded.” If you change these values on your FEP, IRIS software — and possibly other applications — will not run properly.

#### Interface Board Slot Placement

When the Adaptec board is used as a drive controller, it should be placed in slot 1 (see accompanying illustrations). Otherwise, FEP interface boards can be placed in any slot. However, IRIS recommends that the IKON board and Adaptec boards be separated by an open slot in order to make the cable connectors more easily accessible. The accompanying illustrations are suggestions for placement.

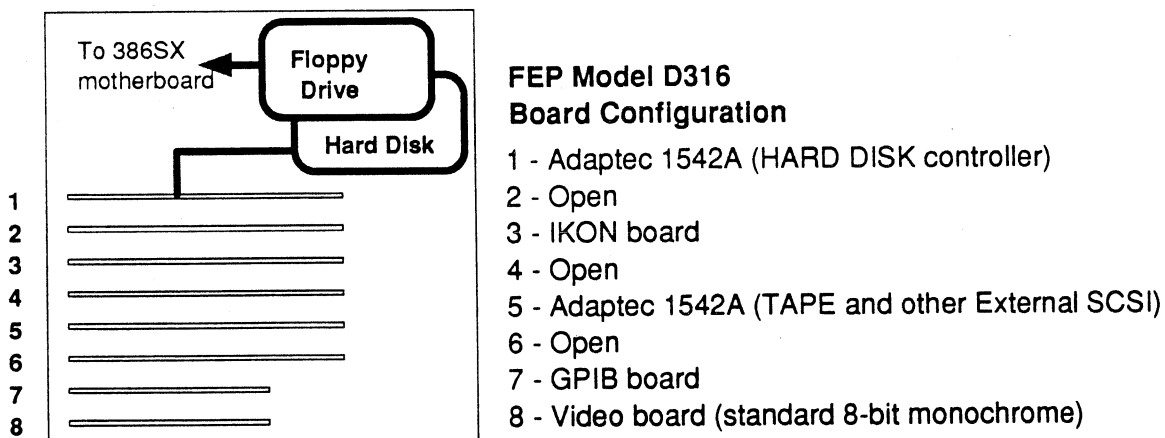


Figure E-5: Interface Board Placement — FEP Model D316

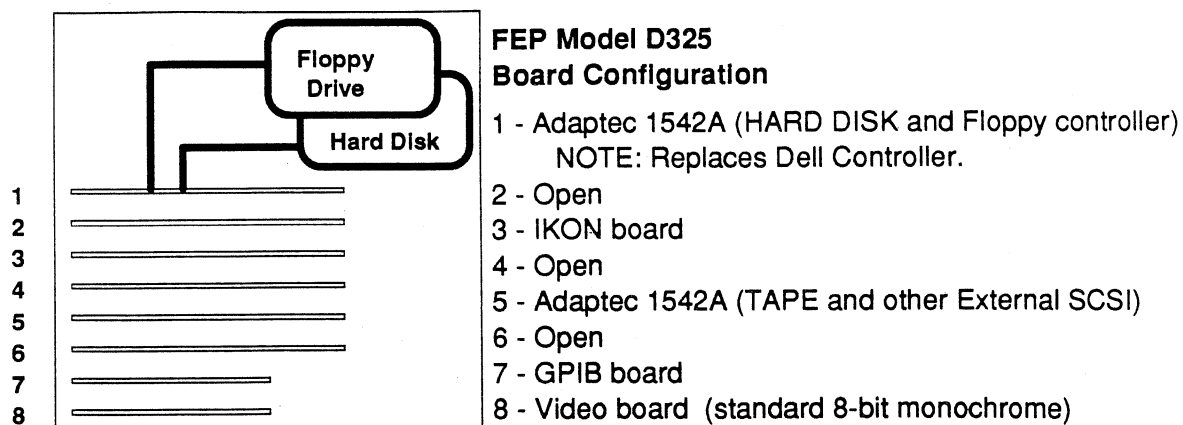


Figure E-6: Interface Board Placement — FEP Model D325

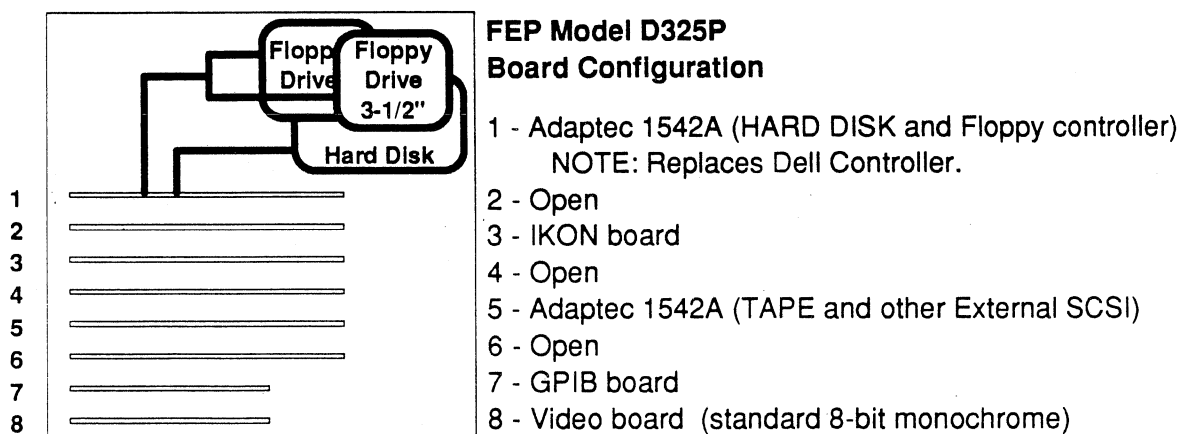


Figure E-7: Interface Board Placement — FEP Model D325P

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## What To Do If You Have Problems

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If you encounter problems installing boards you have purchased, re-check all connections and board settings and check the documentation provided with all boards. If you still cannot resolve the problem, contact the vendor or manufacturer of the board — not IRIS Graphics. If IRIS FEP software and IRIS-supplied hardware fail to perform as they did before you installed a new interface board, you are responsible for solving the problems introduced by your installing the board. IRIS

Graphics is not responsible for boards installed and configured by users.

### Common Problems

Care has been taken in the FEP software to return the PC hardware to a known state upon program exit. In general, be sure that other software does not change the expected state of the hardware, causing malfunction or halting of FEP and other applications.

If FEP software fails to work or halts completely, "freezing" computer and requiring reboot, double check all settings for the boards described in this document and reboot. Check settings for other boards (not installed by IRIS) to be sure that there is no contention with settings for IRIS interface boards. If the problems persist, call IRIS Graphics Customer Support.

### Who To Call for IRIS-Related Problems

If you have isolated an FEP problem and it can be traced to hardware or software supplied by IRIS Graphics, call IRIS Graphics Technical Service at (617) 275-8777.

You will be billed for service calls according to the terms and conditions of your sales contract or extended warranty for FEP hardware and software.

### Return Shipping Procedures

If you need to return a defective interface board for repair or replacement, complete an IRIS Graphics Return Merchandise Authorization form and follow the shipping/packing instructions on that form. Use the packing materials of the replacement board when you ship the defective board to IRIS Graphics.

### Support Policy for IRIS FEP Boards

IRIS Graphics provides full support — according to IRIS terms and conditions of sale and extended warranty agreements — of all FEP components, including FEP interface boards installed by IRIS Graphics, for a period of 90 days or the duration of the extended support contract. Support for IRIS-installed interface boards after that period may be provided by the vendor of the board. (See literature accompanying each board.)

IRIS Graphics does **not** provide support of interface boards added to an IRIS FEP by the user, nor does IRIS provide support of personal computers and other components purchased and assembled by the user for the FEP application.





# F

## New Features and Changes for Release 4.70

The following new features and changes are applicable for FEP software rev. 4.70, available in February, 1990. Comparisons are with FEP software rev. 4.3.

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### New or Improved Features for FEP Rev. 4.70

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The software upgrade from FEP rev. 4.3 software (executable files FEP430.EXE and FEP430S.EXE) to FEP rev. 4.70 software (FEP470.EXE) provides the following new features and improved performance:

#### Scaling Features and Performance

- Resolution conversion of disk image files to disk image files is provided by the I/O and Files menu function "Scale". The Scaling features are now **standard** for FEP software sold directly by IRIS Graphics. Scaling may be performed on disk using this function. The user specifies the input file, the output file name and headings, then selects one of a list of input resolutions which applies to the input image, or selects an option to manually specify in percentage value the scaling factors for the raster and pixel directions in the image.
- Scaling may also be performed on the fly for specific types of images. When you select the LOAD or PIPE functions, a dialogue box will appear if image Scaling is available for the type of image specified in the environment variable FEP.
- Scaling performance has been improved. You may select either "Pick" or "Average" as the scaling algorithm. "Pick" selects the closest input pixel to the output pixel location to use for the output pixel values. "Average" uses the location-weighted average of the adjacent two input pixels to produce the output pixel values. Both picking and averaging methods have been speeded up by effec-

tively reducing the number of machine instructions and memory references required to process each output pixel.

### Wavefront and Alias Image File Support

- This version of the FEP supports Load and Pipe for Wavefront and Alias image files. The Load function converts the image source file in Wavefront or Alias format from the Wavefront or Alias image directory on drive D to an IRIS file that is put into the \IMG image directory on D. This file can then be scaled or printed as an IRIS file. The Pipe function sends the Wavefront or Alias image file to the printer while converting it to IRIS format. Scaling can be performed during either the Load or the Pipe function.

The FEP looks for the environment variable "FEP" to be set to "WAVEFRONT" or "ALIAS" to know that these functions are to take the image source from the respective directories. Wavefront and Alias image files can be extracted from 1/4" tape via the IRIS PC TAR utility — an option for the FEP — into the appropriate image file source directory on drive D.

### Color Control Enhancements

- The methods of calculating the Color Lookup and Hue Tables have been improved. See Part 7 for more information.
- Paper "Tinting" features have been added to the Hue Table.
- NOTE: Previous Color Lookup Tables and Hue Tables will not yield the same results with Rev. 4.70.
- A Smooth feature was added for a smoother color curve. Currently the curve is forced through the set of points given. If the smooth feature is selected, the curve will be smoothed.
- An environment variable has been added to allow the number of points in the Color Lookup Table to be specified. The number of points must be 4 or greater and not more than 21. This number will be used when they create a Color Lookup Table using the "Use Contrast" pick on the Edit menu.

### Interface Board Revisions

- TMC Device Adapter Interface Revised. The routines used to interface to the tape drive using the Future Domain adapter board have been revised to work more efficiently.

- **Adaptec Device Adapter Interface Revised.** The routines used to interface to the tape drive using the Adaptec adapter board have been revised to work more efficiently.
- This software supports Adaptec boards at either address (330 or 334) as opposed to FEP 4.31 which only supported address 330. The disk controller may now be an Adaptec board at address 330. This means that if an Adaptec board is being used for the tape interface it must be at address 334.

### Enhanced Tape File Support

- **Loading and Piping of CT Handshake tape files** are now supported. This allows you to display a directory of all the "CT" format files on the tape. Other formats may occupy the same tape but will not be displayed. You can select to Load or Pipe one image or multiple images from the tape. Different color separations and Scaling are also supported.
- The existing DDES tape file support has been enhanced to allow you to display a directory of the files on the tape, Load or Pipe one image or multiple images has been added and Scaling has been added.
- Support of multi-volume tape files in CT Handshake and DDES00 formats has been added.

### Scitex System Features

- The Scitex Push or Pull interface now supports Scaling and one, two, three, or four color separations.
- The Whisper (Intel platform) interface has been added to the Scitex Push and Pull interface.

### Test Image Files

- Test image files — "Color Proofing Bars" — accompany the installation diskette. These files can be printed alone or in an image list to appear with an image. The Color Proofing Bars use the active color control values and can serve as proofing guides like "Brunner Strips."
- A test pattern option has been added to the configuration file. This prints a test patch after the image. This test patch is different from the one mentioned above. The values it uses are fixed. It is used to monitor the consistency of printer performance. Use the Edit menu to enable or disable the test pattern for the current image.

### Miscellaneous

- Support for the 3047 Printer Added. This version of the FEP supports the larger paper/drum size of the 3047 printer. A new environment variable has been added called "PAPERSIZE". When set to the appropriate value the images can now be stepped across the entire drum. See the "README" file on the release disk for the proper values.
- The time the software delays waiting for the printer has been shortened to coincide with the changes made in the firmware.
- Terminology Change. The wording for the dimensions has been changed to refer to pixels and rasters for more uniformity.
- Automatic Color Complements. If information in the header of foreign file formats indicate that the colors are complemented, the software automatically complements the colors.
- Truncates rasters that are larger than the printer can accept.

# Index

## !

- 0% dot parameter, 49
- 100% dot parameter, 49
- 3047 printer, support for in version 4.70, 95
- 4096 type of Color Lookup Table, 45, 60
- 512 type of Color Lookup Table, 45, 60

## A

- abandoning a print run, 13, 28, 38
- abandoning changed files, 47
- abandoning configuration editing changes, 32
- activating a Setup, 49
- activating parameter files, 33, 42
- Adaptec interface board
  - addresses, 94
  - overview, 85
  - revision of interface for version 4.70, 94
  - used as external SCSI device controller, 86
  - used as hard disk controller, 85
- Alias image files, 22, 93
- Auto Phase parameter, 41
- Average scaling algorithm, 30

## B

- BACKUP utility, 77
- batch customization files
  - and CONFIG.SYS, 6
  - overview, 57

## C

- CLT files
  - See Color Lookup Tables
- Color Balance, 41
- color complements, automatic, 95
- color control features, overview, 34
- Color Lookup Tables

- activating, 42
- creating, 53
- editing, 48
- explanation of, 44
- menu location, 39
- procedures for creating at FEP, 47
- specifying type of in environment variable, 60
- use of, 43, 55

- color matching
  - overview, 43-56
- Color Proofing Bars, 31, 94
- Color Sep (color separations) parameter, 41
- color values, matching, 43-56
- COMBINE utility program, 77
- common problems, 90
- complementary colors, automatic processing of, 95
- complementary primary colors, 47
- configuration files, 39
  - activating, 42
  - creating new, 32
  - editing, 31, 41
- configuration parameters
  - types of, 32
- contrast
  - changing, 55
  - explanation of, 43
  - use of, 43
- Contrast parameter, 41
- creating new files, 39
- CT Handshake files
  - Loading of, 24-25
- CT Handshake raster image data, 72
- CT Handshake tape format
  - support for Load and Pipe, 94
- CT2T files
  - Loading to disk, 23
- CT2T raster image data, 71
- cursor (arrow) keys, behavior of in FEP interface, 18

CUSTOM program  
 description of interface, 58  
 exiting from, 63  
 help function, 58  
 purpose of, 57  
 running, 57  
 saving or abandoning changes to a batch file, 63  
 setting default directories with, 60  
 use of keys, 58  
 user interface and Help function, 58  
 Customize menu, 58  
 customizing the FEP environment with CUSTOM, 57

## D

data ranges, non-standard, 53  
 Data Type parameter, 41  
 DDES files  
 Loading of, 24  
 DDES raster image files, 73  
 DDES tape format, 60, 73  
 support for directory list, Load, and Pipe, 94  
 Del key, use of in FEP interface, 18  
 deleting files, 39  
 density, 43  
 detailed procedure for changing, 44  
 how to change, 54  
 use of, 43, 54  
 Density parameter, 41  
 dialogue boxes, use of in FEP interface, 18  
 directory defaults, setting with CUSTOM, 60  
 disabled configurations, 33  
 disk allocation units, 6  
 disk drive usage, C and D partitions, 63  
 disk partitioning, 6, 63  
 Drum Speed parameter, 41

## E

Edit Image List, 38  
 Edit menu, 32, 36, 39  
 editing changes, confirming and abandoning, 18  
 End key, use of in FEP interface, 18  
 Enter key, use of in FEP interface, 18  
 environment variables, 57-58  
 description of, 59  
 effects on loading and piping, 20  
 tabular summary of, 61  
 error messages  
 comprehensive list, 64  
 escaping to a shell, 17

## F

FEP batch files, 6  
 effects of, 17  
 uses of, 63  
 FEP environment, 17  
 FEP environment variables  
*See* environment variables  
 FEP functions not available at printer, 8  
 FEP hardware, 5  
 FEP interface, 17-18  
 FEP software  
 installation procedure, 80  
 overview of features, 7  
 overview of functionality, 5-10  
 performance of, 6  
 running, 17  
 starting, 17  
 FEP Version environment variable, 63  
 field service, 6, 90  
 file names  
 displaying and deleting, 33, 39  
 use of extensions with, 38  
 files  
 copying to FEP disk, 20  
 creating new, 32, 39  
 deleting, 33  
 tabular summary of types, 22  
 types of, 32, 39  
 Files command, 37  
 Files menu, 39  
 files, directories created by FEP, 6  
 firmware, revision level of required, 7  
 functions not available at printer, 8

## G

gamma correction, 46, 50  
 meaning of values, 49  
 GBIP interface board, 87

## H

hardware and software, overview of, 5  
 Home key, use of in FEP interface, 18  
 Hue correction files  
*See* Hue Tables  
 Hue Tables  
 activating, 42  
 effects of on performance, 46  
 explanation of, 45  
 using, 54

**I**

I/O and Files menu, 36-37  
 IKON interface board, 84  
 Image command, 38  
 image data  
   sources of, by type, 18  
 Image data files, 39  
 image directory, 7  
 image file format requirements, general, 70  
 image file formats  
   summary of, 71  
 image file formats supported by FEP  
   overview, 70-78  
 image files  
   copying to FEP disk, 20  
   location of, 6  
   Piping to printer, 28  
 Image List files, 33, 38-39  
 image offsets, 41  
 image scaling, 28  
 image size data, 40  
 Image Source environment variable, 60  
 index fields in Color Lookup Table, 48  
 index points  
   deleting and inserting, 48  
   maximum and minimum number of, 48  
 Ins key, use of in FEP interface, 18  
 INSTALL program  
   effects of, 81  
   when to use, 79  
 installation policy, 1  
 installing FEP software, 80  
 interface boards  
   general installation guidelines, 83  
   IRIS support policy for, 90  
   placement in slots, 88  
   summary of configuration settings, 88  
 interface boards, installing in FEP, 6, 83-90  
 IRIS-format image files, 15, 26  
 IRIS-format raster image files, 75

**K**

keys  
   use of in editing Configuration files, 32  
   use of in FEP, 36  
   use of when editing List files, 40  
   used in editing List files, 33  
 keys, use of in FEP  
   *See also* descriptions of FEP functions  
 keys, use of in FEP interface, 18

**L**

labelling images, 23, 37  
 large files on diskette, special treatment of, 77  
 large image files, 76  
 liability of IRIS Graphics, 3  
 List command, 38  
 List files  
   editing, 40  
 List files, editing, 32  
 Load command  
   overview, 18  
   reference description, 37  
   use with specific file types, 15  
 Loading image files to disk, 15

**M**

magnetic tape  
   Scitex interface, 60  
   specifying with CUSTOM, 60  
 magnetic tape, physical formats, 78  
 manual  
   purpose of, 2  
   scope of, 1-4  
 matching  
   limitations of, 34, 50  
   overview of technique, 49  
   step-by-step procedure, 51  
 menus, use in FEP interface, 18  
 Mirror Image parameter, 41  
 Multi-Strike parameter, 41  
 multi-volume files on floppy, 77

**N**

non-standard data ranges, 53  
 Number of Points environment variable, 60, 93

**O**

Off-Line command, 38  
 Offsets parameter, 41  
 offsets, specifying, 12  
 on-line printer status, 38  
 opening menu, 36  
 operating system, revision level requirements, 79  
 other software, running on FEP, 6

**P**

Paper Size environment variable, 59  
 parameter files, editing, 16  
 Pause Image command, 13, 38

Pause Image parameter, 41  
 pausing a print run, 13, 17, 27, 38  
 Pick scaling algorithm, 30  
 Pipe command, 15, 19, 28, 37  
 Piping files to the printer, 28  
 pixels, use of terminology, 95  
 PostScript file support, 5, 16  
 preparing the printer, 11  
 preparing to print, 17  
 Print command, 27, 37  
 Print menu, 38  
 printer configuration files, 31  
 printer control panel, 13  
 printer diagnostic error messages, 2  
 printing a single image, 38  
 printing controls of the FEP, 7  
 printing features, 2  
 printing functions, 37  
 printing parameters  
   overview, 31  
   types of, 32  
 printing procedures, basic, 27  
 processing options, tabular summary of, 22  
 production flow  
   typical, 8  
 production functions of FEP  
   overview, 15  
 production procedures, basic, 8  
 Program Title environment variable, 59

## Q

quick-start procedure, 11  
 Quit command, 38

## R

rasters, truncation of, 95  
 rasters, use of terminology, 95  
 Repeat Image parameter, 41  
 Replication parameter, 41  
 Resolution environment variable, 60  
 resolution of printer, preset at factory, 29  
 Resolution parameter, 41  
 RESTORE utility, used with multi-volume files, 77  
 revision level of firmware, 7  
 RGB image data  
   conversion to CMYK data, 46  
   Gamma Correction, 46  
 RGB to CMY complements, 47  
 running FEP software, 17  
 running the CUSTOM program, 57

## S

sample FEP color values, 50  
 Save CLT? dialogue box, 49  
 saving changed files, 47  
 Scale by Factors, 30  
 Scale by Header command, 30  
 Scale command, 16, 28, 37  
   choices, 30  
   new for all version 4.70 software, 92  
   purpose of, 28  
 Scaling  
   applications of, 30  
   detailed procedures for use, 29  
   features, 16, 28  
   Pick and Average algorithms, 30  
   used to approximate screen image size, 31  
 Scaling on the Fly, 92  
 scaling performance, improvement of, 93  
 Scitex  
   magnetic tape interface, 60  
 Scitex interface additions, 94  
 Scitex on-line systems, Loading files from, 25  
 Scitex Platform environment variable, 60  
 selecting a file to print, 12  
 service agreements, 3  
 service assistance, 90  
 service for FEP, 89  
 Setup menu, 33, 36, 42  
 Setups, activating, 49  
 Shell command, 17, 38, 63  
 Shell environment variable, 63  
 shipping procedures, returned boards, 90  
 size data of images, 40  
 Smooth Curve command, 45, 49, 93  
 software  
   installation of, when required, 1, 79  
   operating system revision level requirements, 79  
   other, running on FEP, 6  
   third-party, 6  
   upgrading, 1  
 SPLIT utility, 76  
 Ssmoothing  
   Smooth Curve command, 45  
 Step Image parameter, 41  
 step-by-step matching procedure, 51  
 Step-Wedge Pattern, 51  
 Subtitle for image  
   specifying, 37  
 Subtitles for images, 13, 19, 23-24, 26  
 support from IRIS Graphics, 4  
 support policy, interface boards, 90



**T**

- tape files, multi-volume, 94
- Tape Format
  - specifying with CUSTOM, 60
- Tape Format environment variable, 60
- Tape Specs
  - description of, 60
- Targa raster image files
  - See Truevision
- technical assistance from IRIS Graphics, 4
- telephone support, 6, 90
- Test Image command, 31
- Test Image command, 41
- test pattern
  - new for version 4.70, 94
- test pattern files, 7, 31
- third-party hardware and software, 5
- Tic Marks parameter, 41
- tinting features, 46, 52
  - new for version 4.70, 93
- Title
  - procedure for adding, 13

- Title for image
  - specifying, 37
- Titles for images, 19, 23-24, 26
- TMC device adapter, revision of, 93
- transmitting files directly to the printer, 37
- troubleshooting, 89
- Truevision files, 19, 74
  - Printing of, 26
  - processing of, 15
- tutorial, overview of, 11-14

**U**

- Update Setup?, 49
- Update Setups?, 38
- upgrading to FEP rev. 4.70, 80
- Use Contrast command, 47, 53

**W**

- warranties, 3, 5
- Wavefront image files, 22, 74, 93
- workflow, FEP, 8