XEROX

Xerox 4890 HighLight Color
Laser Printing System
Product Reference

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1. LPS fundamentals

The Xerox 4890 HighLight Color Laser Printing System (LPS) brings highlight color capability to the world of electronic printing. Through advanced imaging technology known as tri-level xerography, this printer has the capacity for production printing. It also prints at 300 dots per inch (dpi) with black plus one color and tints and shades of that color in a single pass.

Electronic printing

Electronic printing is the integrated production of documents, using digitally stored text files and graphic images, computerized composition techniques, and electronic printing systems such as the 4890 LPS.

This concept applies to a variety of printing applications including books, lengthy reports, forms, listings, invoices, statements, and other business communications.

Advantages

Electronic printing has several important advantages over traditional printing methods:

- The use of preprinted forms can be eliminated. Forms are created electronically, using a wide range of design elements such as lines, boxes, color, graphic images, and a variety of fonts. Forms are automatically merged with variable data.

- Unlike traditional printing processes, color can accent data, such as the customer balance shown on a statement or invoice, price figures on a price list, or items that need to be reordered on an inventory report.

- Electronic printing allows you to create documents and forms in less time, with more control over the result (including the ability to make last-minute changes).

- Because of reduced setup time, electronic printing makes smaller print jobs more economical, including the ability to add color easily even when only a few copies are required. Electronic printing also increases the economy of printing a few copies of large documents.

- Electronic printing is a single integrated process. While traditional printing often requires multiple steps (more when color is involved), the 4890 LPS manages multiple steps automatically, while still giving you complete control over the process.

The goal of electronic printing is to increase efficiency in the document creation process.

Highlight color

The 4890 is a HighLight Color Laser Printing System. Highlight color is the use of one primary color and black in their pure forms (solid color or solid black) or mixed to create tones, which are a mixture of color with black or white.

While there are several primary colors available such as red, green and blue, only one color at a time can be installed in the printer. Black is installed permanently in the printer and may not be removed.

In highlight color printing, colors are simulated; that is, there is no physical mixing of different color pigments to achieve the desired color. Color is created by printing very small dots of black dry ink and highlight color dry ink very close to each other to produce the illusion of a color. When the human eye views a patch of color printed in this manner, it perceives a color different than either black or the highlight primary color.

Uses for highlight color in your documents

Highlight color is a design element, similar to others you are already using in your reports and documents. Like fonts, lines, boxes, and other graphic tools, highlight color can emphasize the message and improve the readability of the printed page, or visually support the organization of the document.

Some examples of these uses are:

- In forms, use color to separate required versus optional entry boxes.

- In statements or invoices, use color to highlight the most important information, such as a balance due.

- In longer documents, use color in organizational elements, such as lines, or edge markers to make information easier to find.

- In graphics, use color to emphasize items like bar charts, or specific parts.

These are only a few ways to use highlight color to improve the quality of your printed communications.

How highlight color is created

Highlight color is created by printing a matrix of pixels in combinations of black, the highlight color, and white (not printing anything and assuming you are using white paper). The arrangement and the relative density of these pixels produces an illusion of color.

In figure 1-1, the illustration on the left shows a conceptual view of a greatly enlarged pixel matrix, and on the right a box with the printed result on the 4890. This matrix represents one quarter black, one quarter highlight primary color, and one half white.

Figure 1-1. **Conceptual picture of the pixel matrix used in the creation of highlight color**
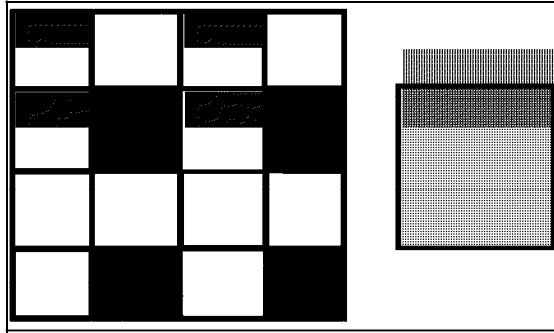
The illustration in figure 1-2 gives the same representation of a different pixel matrix that results in a different color, as shown in the box right of the illustration.

Figure 1-2. **Conceptual picture of the pixel matrix used in the creation of highlight color**
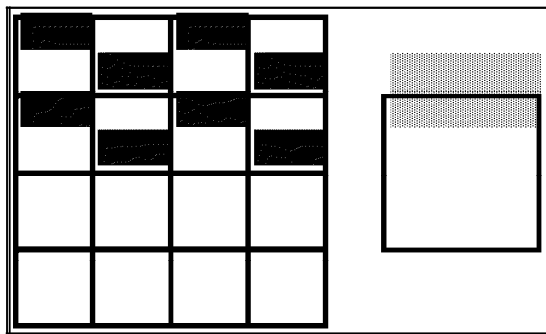
Specifying 4890 colors

When creating documents and reports, 4890 colors are specified by commands indicating the name of a color. In some host-resident software, a number is often used to designate a color.

Each color has been defined as an ink, a term used to refer to a 4890 color.

Inks (colors) are defined in an ink catalog file (identified by the .ICT extension on the file). Your 4890 comes with an ink catalog containing a large set of 4890 inks.

Ink referencing

Once the inks are defined, they may be referenced by name in certain Page Description Language (PDL), and Form Description Language (FDL) statements. (Refer to the *4890 HighLight Color*

LPS PDL Reference and the *Forms Creation Reference* for more information.)

Color support for the 4890 LPS is provided through host-resident software, such as CompuSet and other third-party document composition systems. These software packages also reference inks from ink catalog files. Consult the appropriate reference manual for the software you are using for information on how color is specified.

The 4890 supports the color capabilities of Interpress, the Xerox Page Description Language. Once a document is converted to Interpress, it is sent to the printer using Xerox Network System (XNS) protocols.

With an optional front end processor installed, the 4890 prints documents from software that supports PostScript output, making full use of the application software color capability.

Color substitution

Output from hosts, PCs, or workstations may contain color information in the form of an industry-standard color model. This software includes programs that output Interpress, PostScript, and HP-PCL masters. In these models, the full spectrum of colors is specified through combinations of three or four parameters.

Because the 4890 produces tones of a single highlight primary color, the colors specified must be mapped into a color (ink) defined in the currently available ink catalog file. The translation process attempts to match the colors as closely as possible.

This mapping occurs automatically as a function of the 4890 operating system software (OSS), in the front end processor, or in some host software packages, depending on the particular application.

Color-related software considerations

HighLight color documents for printing on the 4890 are produced by color applications or by adding color with printer utilities. The methods available for adding color to documents depend upon the data stream produced by the application software used to create the document.

Adding color to line printer and LCDS data streams

When variable data is sent to the printer using Laser Conditioned Data Set (LCDS) or line printer data streams, highlight color is implemented through specification in PDL and metacode commands. These commands are included within the data stream by the document creation software.

Adding color during document creation

Many document creation applications support highlight color printing directly. Documentation for these software packages includes instructions for adding color to documents.

Custom software applications may be modified to support highlight color by coding in routines that can add enhanced DJDEs and metacodes to the data stream.

Adding color after document creation

If the platform in use supports applications producing line printer or LCDS data streams, it is possible to produce highlight color documents even in the absence of a color document creation package. Black-only line printer or LCDS data streams produced during document creation may be modified to print in highlight color.

If an application does not support color, color may be added to a document by modifying the job source library (JSL) for the application. Copy modification entries (CMEs) are used to apply static color to the variable data in a document. If the application uses a font index byte to change fonts, that byte can also be used as an ink index to change text color when the font is changed.

Adding color to Interpress and PostScript data streams

With application packages producing Interpress and PostScript data streams, color is added to black-only documents at the printer using the ink substitution command. By substituting the highlight primary color for black, you can change a black-only page or report to a color page or report. The color report uses only the pure primary color plus tints of that color.

If both black and color dry ink are required in an Interpress or PostScript document, the color data stream must be generated on the host or workstation. These documents must be created using a color application package.

Translating from a full color palette to highlight color

Full color software applications are based on a parametric color model such as Red-Green-Blue (RGB), rather than on a highlight color model. These full color models produce a larger range of colors than are available on the 4890. Therefore, a translation or mapping must be made between the colors used in the application and the colors available on the printer.

In the case of Interpress documents, the mapping is done on the printer by the Interpress decomposer. The decomposer uses a 4890 resident software task called ICS ink catalog search (ICS) that finds the ink that most closely approximates each color referenced in the Interpress document.

Application colors are mapped to the highlight color ink closest in value; dark colors are mapped to shades and dark tones of the highlight primary, while light colors are mapped to tints or light tones. The highlight hue is preserved; for example, if the printer is loaded with blue dry ink, the mapping is to the blue palette. In this instance, reds are mapped to grays, not to blues.

In the case of PostScript documents, the mapping of full color to highlight color is provided by the PostScript interpreter in the Entire FIBRE 400/600 front end. The output of the Entire FIBRE is

.IMG files containing color information specific to the 4890 environment.

Facsimile palettes

A facsimile palette is a document or file containing samples of the colors available on the printer and allows a document creator to select a color within the application software with a known printed appearance.

Software versions of facsimile palettes are available for popular, full-color application packages that support palette import. You can import the facsimile palette into the application; once imported, the palette is accessible on the screen. You may now create a highlight color version of a document that looks much the same on the screen as it will look when printed.

The method for importing a facsimile palette depends upon its associated application. Some facsimile palettes are in the form of code that can be loaded through an application utility. Others are in the form of electronic documents. Application-specific instructions for importing a facsimile palette are supplied with the facsimile palette software. The importation process is simple, uses the application's own utilities, and only takes a few minutes to perform.

The method of accessing the on-screen facsimile palette depends upon the method for accessing colors within that particular color application. If the application uses color menus, the facsimile palettes may add highlight color menus to the full color menus available. If the application displays available colors in a box on the screen, then the highlight colors are displayed in the same fashion. Once imported and available on screen, facsimile palettes are easy to use for anyone familiar with the application software.

All facsimile palettes are application-specific and come with instructions for their installation and use. The palettes are packaged by platform, such as IBM PC, Macintosh, and Xerox GlobalView. Facsimile palettes available for color applications may be ordered from Xerox Documentation and Software Services. When ordering use the following kit numbers:

- IBM PC - 720S30460
- Macintosh - 720S30470
- Xerox GlobalView - 300K09840.

Refer to the card in the back of this book for ordering information.

Adding color to forms

Forms for printing on the 4890 can be created using the forms description language (FDL) software on the printer or by using similar software applications on a host or workstation. Forms created on monochrome 4000 family printers may be converted to fully saturated color for printing on the 4890 using the File Conversion Utility (FCU).

Using FDL on the printer

Color forms are created directly on the 4890 using the system editor and the FDL compiler. In this case, ink references

embedded within the code create color lines, boxes, and text. The FDL used on the 4890 LPS is an enhanced version of the FDL used to create black-only documents on the Xerox 4050/4090/4650 monochrome black printers. The 4890 allows the specification of inks by the names defined in the system-resident ink catalogs.

Lines and text used within forms created by FDL may use only the pure forms of black and the highlight primary. However, box fill (the space within the boundaries of a defined box) may use any highlight color tint, shade, or tone that is defined in one of the system ink catalogs.

Using FDL equivalents

If you prefer not to use FDL on the printer, there are host and workstation-resident applications that produce equivalent results in highlight color. Some of these packages include the following:

- Elixir, used on a PC
- Lytrod, used on a PC
- Intran, used on a Sun workstation
- Xerox Forms Generator (XFG), used on an IBM mainframe.

Each of these packages produces forms that can be stored and used on either the 4850 or 4890.

Using FCU

If the file to be printed is a black-only file from a monochrome 4000 family Xerox printer, it may be printed on the 4890 using black ink without modifying the .FRM, .LGO, or .IMG files. If, however, you want to print the file in color, it must be converted to a highlight color file. The file conversion utility (FCU) allows black-only .FRM, .LGO, and .IMG files to be converted to fully saturated color. If you recompile the form, the .LGO file must be in the color format.

If the original source file is unavailable, then the .FRM, .LGO, or .IMG file may be converted to highlight color format by FCU, which is resident on the 4890. Files converted through FCU retain the same file name and extension, so care should be taken to separate these from the original black-only versions. Converted files are no longer printable on any printer other than the 4850 and 4890 LPS.

FCU allows an ink reference to be specified that allows the file to print using only one of the available primary inks. For instance, a file converted from black to red prints using only red ink.

If FCU is used to convert a 4000 family monochrome printer version of a .FRM or .LGO file to a black-only highlight color version, then the new file can still be printed in color using ink substitution. A black-only 4050/4090/4650 monochrome printer version of .FRM and .LGO cannot be printed in color through the use of ink substitution without first being converted to a HighLight LPS version by FCU. .IMG files may be converted but it is not necessary to convert them first to print in color.

Fonts

A font is a collection of character sets that has a unique type style, size, and orientation. Both fixed and proportionally-spaced fonts are available for use on an LPS. Each font character occupies an area called a character cell. All character cells in a fixed font are the same width. Character cells in a proportional font vary in width as illustrated in figure 1-3.

Figure 1-3.   **Character spacing**
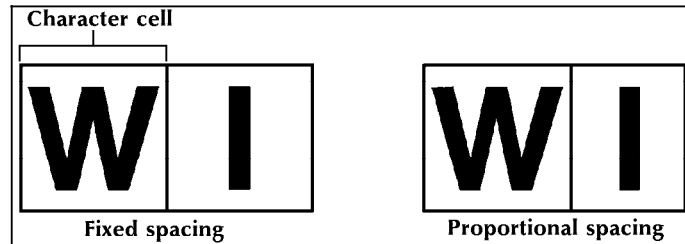
Because the length of a line printed with a proportional font is relatively unpredictable, fixed fonts are used for variable data on a report to avoid overprinting of forms by variable data.

Proportional fonts are normally used for forms data, such as titles and headings. A business letter is an example of the use of proportional fonts for variable data. An example of the difference in line length is illustrated in figure 1-4.

Figure 1-4.   **Character spacing examples**
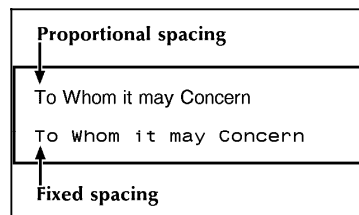
Fonts are available in various families, sizes, and appearances. Refer to the *Xerox 4850/4890 HighLight Color and 4135 LPS Font User Guide* for more information on fonts and for samples of the font families, sizes, and faces available for use with your 4890 LPS.

In addition to typeface, style, and size, a font can be defined by its orientation:

*   Landscape
*   Portrait
*   Inverse landscape
*   Inverse portrait.

Acquiring and loading fonts

The 4890 LPS has a set of standard fonts and a variety of variable fonts available in Data Center and Interpress character collections. For information on acquiring optional fonts, refer to the ordering information in the back of this book.

Loading fonts for PostScript applications

The 4890 LPS supports the use of PostScript applications through a front end processor. This front end processor converts the PostScript data stream into Xerox .IMG files. Since .IMG files are raster images, they can be printed without calling out any printer font files.

While it is not necessary to load printer fonts to print PostScript jobs, it is necessary to load each PostScript font called for in the document onto the front end. This allows the front end to map each PostScript character correctly as it builds the .IMG files for printing.

Font metrics

Font metrics contain information on the dimensions of each character in a printer font. Whenever a new printer font is installed on the 4890, it is important to load the metrics for that font onto the host or workstation. Then, every time that font is called for in a document, the host or workstation application is able to access the metrics and format the document using the metric information.

The .FNT files on each font tape contain the metric information, along with other information about the font. From the host, the system programmer runs a utility to extract the metrics from the .FNT file and store them on the host. A name is assigned to the font, and when you call out the assigned font in your documents, the metrics file is accessed.

The exact method for extracting the metrics depends upon the application software in use. Instructions for metric extraction should be included with your application software. Further information can be found in the *Xerox 4850/4890 HighLight Color and 4135 LPS Font User Guide*, or may be obtained from Xerox Font Services. Refer to the card in this back of the book for ordering information.

LPS production process overview

The 4890 works effectively in many different environments handling input from a wide variety of sources.

Whether you are using the 4890 in an offline capacity, over an Ethernet network, connected directly to a host computer, or remotely over phone lines, input data for printing is sent to the printer in one of two forms:

- **Unformatted data**. In this instance, unformatted data (data from a computer file in database format) is selected, formatted, and combined with form data (boxes, lines,

headings, or totals) and graphics files to produce a printed report.

— The raw data can be sent to the 4890 LPS offline from magnetic tape, online from a channel-attached host, or through an Ethernet network.

— The forms description commands used to select records and format the printed output can be entered directly from the 4890 keyboard and display, or from a host- or PC-based forms definition software package.

- **Preformatted data**. Preformatted data is sent to the printer from a host-based document composition software package, such as CompuSet, XPPI, XDGI, or PC-based software through the front end processor. These systems are often used for electronic publishing and can produce very sophisticated printed documents. Data from these sources comes in a ready-to-print format.

Ink referencing

Regardless of whether you are sending formatted or unformatted data to the 4890, you must specify colors by their ink name, or by number in some host-based applications. The ink catalog is a logical collection of inks, each with a unique name. These names can then be referenced by PDL and FDL commands for unformatted data, and by page description interpreters for preformatted data.

Unformatted data

If you are using the 4890 LPS to create reports or other documents from unformatted data, several elements are required to complete the job:

- **Variable data**. Variable data is the part of the report that changes from page to page. For example, variable data might be the part numbers, descriptions, prices, and costs.

  The variable data can be input from the magnetic tape system in the offline mode, from a host through a channel interface, through an Ethernet network interface, or from a remote host over phone lines.

- **Form data**. Form description language (FDL) is a set of keyword commands used to generate an electronic form. You create a source file of FDL commands describing the characteristics of your form. The form can contain a variety of fonts, logos, and graphics. It is merged with variable data during printing. The file is compiled and stored as an electronic form file on the printer. You can select any stored form for printing.

- **Control data**. Control data is optional, and it allows the operator to control the output of selected reports, or selected copies of a multiple copy report, for cover-to-cover print processing on any job. For example, you may wish to specify that an inventory report has a blue card stock cover, 49 pages of the report, and a blue card stock back cover. You may also decide that four copies without cost information are needed for distribution to clients. The three command sets described below provide control of output:

— **JDE**. Job descriptor entry commands provides you with control over the mechanics of a particular print job. JDE commands specify the feed and output trays, simplex or duplex printing, stapling, and collating.

— **DJDE**. Dynamic job descriptor entry commands enable you to modify the printing environment dynamically. These commands are inserted into the input data stream to modify the command characteristics of the existing JDE currently in use. DJDEs can take effect on a report-to-report, page-to-page, and record-to-record basis.

— **CME**. A Copy Modification Entry command allows you to replace certain parts of a report with predefined static data on selected copies or to specify font and ink changes within the variable data.

Formatted data

Page-description and report data from host-resident software is sent to the printer in a form that it understands and no additional formatting commands are required.

Many host-resident software packages communicate with the printer in a standardized page description language called Interpress, developed by Xerox for Ethernet network-based printers.

The 4890 LPS also supports two similar page description languages: PostScript and the Hewlett-Packard Print Control Language (HP-PCL) with the optional front end processor. Many popular software applications use these languages for communicating with printing devices.

The features available depend on the capabilities of the software package you are using.

Color mapping

Some page composition software applications give you the ability to specify colors based on a red-green-blue (RGB) model (or other standard model, like cyan-magenta-yellow-black [CMYK] or hue saturation brightness [HSB]), providing a much larger range of colors than the printer is capable of reproducing. In these cases, and when full color Interpress or PostScript masters are sent to the printer, colors are automatically mapped into tones of the highlight primary.

For Interpress, the controller attempts to make the closest possible match between the color specified using the full-color model and an ink in the currently available ink catalog. For PostScript, the front end performs this function.

4890 HighLight Color LPS major features

The 4890 is designed to fulfill the potential of efficiency promised by electronic printing.

Speed   The high output rate of the 4890, and other Xerox high-speed laser printing systems makes it possible to bypass the separate duplication process required in traditional printing. With an

output capability of up to 92 pages per minute, the system can generate multiple copies of reports and other documents as originals from the printer. The 4890 can even print color on your documents without diminishing throughput performance.

Automated operation

By giving operators and programmers the capability to program the print job, repetitive jobs are handled easily and consistently, and the printer can print documents at the maximum capacity.

Highlight color

Unlike traditional printing, the 4890 can add highlight color to your documents and reports in a single pass. Highlight color makes documents look more professional, and gives you an additional tool for enhancing readability, and for supporting the message and organization of the documents.

Cover-to-cover document processing

The programming capability combined with a variety of hardware configurations makes it possible to produce documents with cover-to-cover control. For example, cover pages of a report can be printed on heavier paper stock, and the output can be collated or stapled. The separate handling and finishing process of traditional printing is eliminated in electronic printing.

Copy processing

Electronic printing with the 4890 LPS allows you to customize individual copies of a multiple-copy report. For example, you can eliminate sensitive information from a specified number of copies.

4890 feature reference

The major features of the 4890 are as follows:

- Xerox laser printing output up to 92 ppm

- 1024 KB words of task memory

- Disk drive controller with one 400 MB fixed disk drive

- Optional graphic video generator (GVG) with 32 Mb of graphic memory

- Queue management facility.

LPS connection options

Xerox offers a variety of optional interfaces for online and offline operations to allow the 4890 to work effectively in diverse environments. These options are as follows:

- Online interface for all IBM systems supporting the channel-attached 3211 and 4245 protocols

- Offline interface for any 9-track (1600/6250 bpi), 1/2-inch, and 1/4-inch cartridge tape conforming to one of the formats listed in the "LPS connections" chapter.

- OEM interface for SNA/SDLC and bisynchronous (BSC) communications

- DEC interface for VAX/VMS Digital Data Communications Message Protocol (DDCMP) environments

- Ethernet interface for XNS network-connected devices

- Front end processor option provides connectivity with local area networks (LANs) to Ethernet. The front end processor enables input from:

— PC-based LANs such as Novell Net and the IBM Token Ring for personal computers running MS-DOS and OS/2

— Apple Macintosh computers on the AppleTalk network

— Unix workstations on a TCP/IP network (these may include Sun, HP/Apollo, NeXT, IBM, and AT&T)

— Personal computers (PC and Macintosh) in a standalone configuration.

The front end processor option provides data format conversion from PostScript to Interpress and from the Hewlett Packard Print Control Language (HP-PCL) to Interpress. Therefore, the 4890 processes input from either of these increasingly popular page description languages.

System controller

The features of the system controller are listed below:

- Multinational keyboard and display

- Drive controller with 400 MB fixed disk

- 18 MHz processor speed

- Up to three additional drives (optional, 400 MB each)

- 5.25-inch diskette drive

- 1/4-inch cartridge tape drive (optional)

- 1024K words of control memory

- 64 Mb of font memory, expandable to 128 Mb

- 300 spi graphic video generator (GVG), with 32 megabit graphic image memory, expandable to 256 megabits (optional). The GVG option provides the capability to print bitmapped graphic images, and to print pages sent in Interpress and PostScript.

- Raster image processor (RIP) option

- Built-in transceiver for direct connect to Ethernet.

Optional peripheral cabinet

- 9-track open reel tape drive

- 1/2-inch (18-track) 3480-compatible cartridge tape system.

Printer

The printer features are as follows:

- Xerographic engine

- Raster output scanner (ROS) features simultaneous exposure of both the black and the color images for near perfect registration

- Rated speed of up to 92 pages per minute (ppm)

- Printed output of 300 by 300 dots per inch (dpi)

- Image size up to 8.62 by 14 inches/219.8 by 355.6 mm

- One permanent developer housing for black dry ink

- Increased fusing quality

- One customer changeable unit (CCU) for changing the color developer housing that contains the color dry ink

- Prints on front and back side (duplex) of paper under software control

- Printer control console with graphic display of printer assists the operator in clearing jams, and provides information on consumable items (paper, dry ink, and waste)

- Full color graphic display showing print mode and currently installed highlight color developer housing

- LED display showing feeder and stacker tray configurations

- Attention light to alert operator of printer conditions that require attention.

- Stop, continue, and print sample buttons

- Sample print tray holds 100 sheets of 20-pound or 80 gsm bond paper

- Stacker options:

  — Dual stacker: Two 750-sheet, 20 pound or 80 gsm bond, output paper trays with offsetting capability.

  — Stitcher/stacker: One 2000-sheet (unstitched), 20 pound or 80 gsm bond, output paper tray with both set stitching (stapling of up to 50 sheets per set) and offsetting capabilities.

- Feeder options:

  — Dual feeders (standard):

Tray 1 (Main)	=	1000-sheet, 20 pound or 80 gsm capacity tray
Tray 2 (Auxiliary)	=	500-sheet, 20 pound or 80 gsm capacity tray

  — Optional high-capacity feeder (HCF) adds the following trays:

Tray 3	=	1000-sheet, 20 pound or 80 gsm capacity tray
Tray 4	=	1000-sheet, 20 pound or 80 gsm capacity tray

  Greater feed capacity allows the operator to change and refill paper without interrupting a job, and it allows more jobs to be printed without refilling paper supplies.

Paper handling

Options for the 4890 provide enhanced finishing capability, including increased output capacity, collating of multiple copies, and even stapling. Other output options are available for transferring paper to specialized paper handling devices.

The following are the types of paper or media acceptable for use on the printer:

- 20-pound bond to 110 pound/80 gsm to 200 gsm index, cut-sheet paper, colored, and paper already printed, drilled or perforated

- Variable paper sizes of 8.0 by 10 inches/203.2 by 254 mm to 8.5 by 14 inches/216 x 356 mm, including 8.27 by 11.69 inches/215.9 by 355.6 mm/A4

- Transparencies, label stock, and other specialized application materials

- Software-controlled paper stock management with two or four feeder trays.

Forms

The following describes the features relating to the use of forms on the printer:

- Electronically created and stored at LPS or host

- Changeable on a page-to-page basis

- Forms may be created using highlight color

- Functionally compatible with Xerox 4050, 4090, 4650, 4850, and 9790/8790 forms, logos, and signatures

- Form merged with variable data at print time

- Multiple forms per page only with Interpress, raster image processor (RIP), and GVG options

- Preprinted forms.

Fonts

The 4890 includes a variety of fonts. To add variety and professionalism to your documents, additional fonts are available. Following is a list of some of the features and options relating to fonts:

- Proportional or fixed character spacing

- Variable character size of 4 to 36 points

- Spacing of 4 to 30 characters per inch (cpi)

- Up to 128 fonts per page from an extensive library of standard and optional fonts

- Resolution of 300 by 300 spots per inch (spi)

- Logo and signature fonts

- Multinational character set

- Loadable from host, diskette, magnetic tape, or cartridge tape

- 64 Mb font memory; expandable to 128 Mb (optional)

- Selectable on a character-to-character basis.

Printed format

- Variable spacing of 3 to 18 lines per inch (lpi)

- Spacing of 4 to 30 characters per inch (cpi)

- Landscape or portrait orientation

- Up to 38K (4 pts., 18 lpi) alphanumeric characters per 8.5 by 14 inch/216 by 356 mm page total density

- 252 (4 pts., 18 lpi) maximum lines per 8.5 by 14 inch/216 by 356 mm portrait page

- 198 (4 pts., 18 lpi) maximum lines per 8.5 by 11 inch/216 by 279 mm portrait page

- Up to 150 lines with 132 characters per line on 8.5 by 11 inch/216 by 279 mm landscape page

- Up to 128 images per page; over 128 images per page and vector graphics capability only with Interpress, RIP, and GVG options

- Multiple logical pages on a physical page

- Simplex and duplex printing.

HighLight color

- Black plus one color plus shades, tints and tones of that color

- Form and variable data may be selectively printed in black or in highlight color using enhanced PDL and FDL commands

- Enhanced PDL and FDL commands are backward compatible with black-only Xerox LPS

- Customer-controllable darkness capability.

Types of output

The following is a list of the types of output the printer produces:

- Interspersed reports
- Stacked reports
- Multiple sets
- Offset reports
- Collated or uncollated reports
- Stitched sets
- Report and job accounting.

DFA/Segment Management

DFA/Segment Management is comprised of four main features.

- Document Feeding and Finishing
- Segment Management
- Increased Graphics
- Operator Commands

Document Feeding and Finishing   The high volume market that the 4800F printers cater to requires the addition of finishing devices for postprocessing activities such as booklet making, shrink wrapping, etc. These finishing devices conform to the Xerox Document Feeding and Finishing Architecture (DFA) Level 1 standard. To support these new devices, the software is modified to interface with the DFA Level

1 standard.   In order to mate Third Party Devices (TPD) to the 4800F printers, a Bypass Transport (or BT) is used.

The BT will perform the following functions:

- Bring the output paper path down to a height consistent with Third Party requirements

- Pass Command signals to the Third Party finishing device.

- Accept Status signals from the Third Party finishing device.

This feature, Document Feeding and Finishing, also involves developing the bridge between Segment Management and DFA. This includes designing and developing the interface between the Input and Output processing subsystems.

Segment Management

There may be some cases where an entire report cannot be handled by the third-party finishing equipment. Therefore, the report must be broken up and delivered in finishing sets, called segments. A "segment" is a set of consecutively delivered sheets whose management as a set or segment has been specified by PDL or DJDE command.

The new EXPORT statement enables specification in PDL of the new Segment Management capabilities, including the following:

- Division of reports into segment
- Generation of separator sheets
- Use of segment numbers on separator sheets
- Use of segment recovery in place of page recovery.

Although the EXPORT command is primarily intended to be used with the bypass transport, it functions with any allowable destination. If the OUTPUT command DESTINATION parameter specifies BIN, segments are offset relative to each other when delivered, and offsetting resulting from other commands is not processed.

Increased Graphics

With the introduction of the Shared Disk Interface (SDI), users wanted to have the capability to print more than 16 graphic images on a page. The following tasks will be modified to support this increased in imaging graphic images per page up to a maximum of 32.

Operator Commands

Several new operator commands were introduced in the V4.0 software, and 4135 V3.6 R1.5. This software release, when installed on the 4800F printers, is able to process or gracefully reject these new operator commands.

Any 4135-unique and 97xx-unique commands will be gracefully rejected when entered on a 4800F printer running V5.0 software with the following message:

0S1726 This system is not configured for this command.

The new operator command for DFA/Segment Management is:

DALIGN, EDGE, OSTK

SCSI System Disk/Floppy Disk

The 4890 program has transitioned from the ESDI based system disk/floppy architecture to a SCSI based architecture.

Color Enhancements

The Color Enhancements project is comprised of three main features and they are:

- Extended CRITERIA
- Extended Palettes
- Shared Disk Enhancements

Extended CRITERIA

The PDL CRITERIA statement defines a test to be performed on variable data in the specified fields to determine whether a true or false value should be returned to the special processing feature that invokes the test criteria.

A new, special processing feature, LMODIFY, will select text in print lines to be modified before printing. The criteria for selecting the text to be modified can be specified by using the existing CRITERIA commands, CONSTANT and CHANGE or by using a new CRITERIA VALUE command. The CRITERIA VALUE command is designed to allow signed magnitude comparisons of numeric character strings.

NOTE: In the BSELECT/BDELETE statements, only the CONSTANT mode criteria can be used. The CHANGE mode criteria or the new VALUE mode criteria are not allowed in these statements.

A new VCODE command has been added to the VOLUME statement to allow for the specification of a character-type table which is to be used when numeric character strings are being evaluated for VALUE mode criteria tests.

Extended Palettes

When the structure of the ink catalog files was first designed, the size was not a major consideration. However, due to space/storage limitations on floppy diskettes (which are used for SYSGENing a system), the size of the ink catalog files to fit on a floppy diskette became an issue, particularly where customers have no alternate method (cartridge or tape drive) to load the software.

Eventually there may be at most 29 highlight color toners available which would cause XEROX1.ICT to grow to 1682 blocks which is more than the amount of data that would fit on a floppy diskette (1326 blocks). Therefore, changes to the Ink Compiler are required in order to support these toners.

The following changes are implemented to yield a compact ink catalog file to meet the floppy disk size requirement.

Shared Disk Enhancements

The primary function of the Shared Disk feature is to provide a high volume, high speed medium for the transmission of textual and graphical data to the printing system. The printer software manages queued jobs made up of LCDS data that have been spooled to the shared disk for printing.

The significant features being provided in this software release are:

- Enhanced crash recovery
- Expanded SDI job queue size to 400
- Enhanced SDI JOBS display
- SDI STORE and CHANGE commands
- Increased number of maximum images per page
- One to four shared disk configuration
- Enhanced Shared-Disk Full handling
- DEC Alliance enhancements

2. Printer hardware components

This chapter describes components of the Xerox 4890 HighLight Color Laser Printing System (LPS) and the hardware options available to increase the printer productivity in your operating environment.
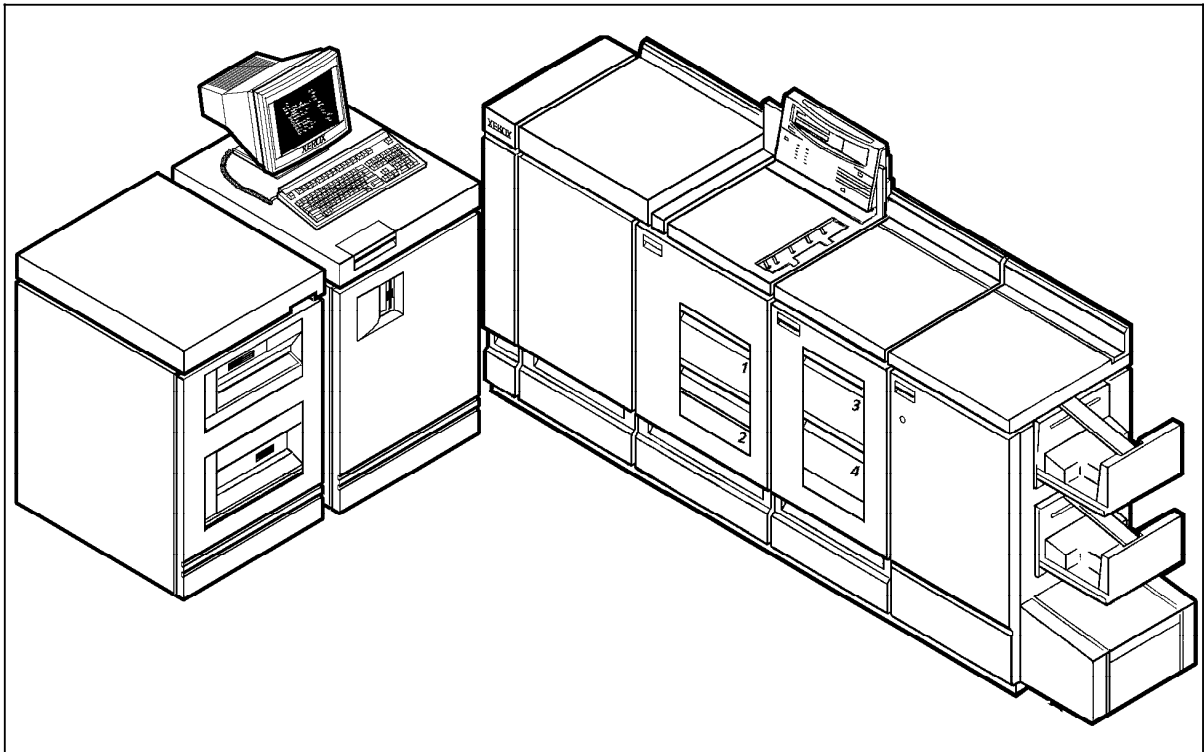
4890 hardware components

Figure 2-1 shows an illustration of the 4890 LPS with the optional peripheral cabinet.

Figure 2-1. **4890 Laser Printing System**

LPS system disk storage and memory

The 4890 controller houses the 400 MB hard disk, a 5.25-inch diskette drive, an optional 1/4-inch cartridge tape drive, bays for three additional hard disk drives of 400 MB each, and a Small Computer System Interface (SCSI) connection for the peripheral cabinet high performance tape drives (9-track open reel and 1/2-inch cartridge).

The system disk stores the operating system software (OSS) as well as the system resources (fonts, forms, logos, and graphics) that are loaded into memory for use during print processing.

Figure 2-2.   **4890 controller**
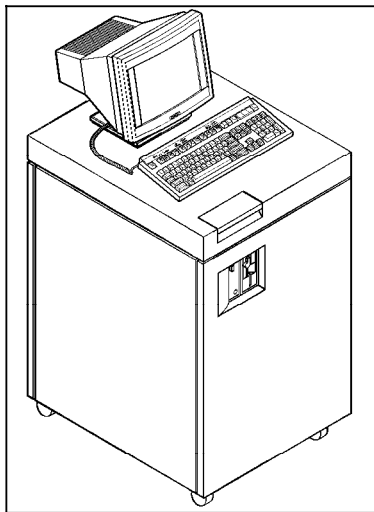
System memory, residing in the controller, is divided into the following categories:

Font memory
Each character in a font is composed of a unique pattern of dots. Font memory stores the data representation of each character. If multiple fonts are needed for a job, more font memory is needed to meet system demands.

Graphic memory
Like font memory, graphic memory stores the data representation of graphic art to be printed.

Character dispatcher/image generator
The CD/IG memory is specialized memory used to construct a page before it is sent to the printer for imaging. The form and text data are merged into a data representation of a printed page.

Task memory
Programs related to the performance of printing tasks (input, output, forms compiler, PDL compiler, Interpress decomposer,...) are stored in task memory.

Cache memory
This high-speed memory improves processor access to task memory.

System control console

The terminal shown sitting on the top of the system controller is the keyboard and display used by the operator to start jobs, display messages and job status, and enter form and job definition commands.

Keyboard and display

The keyboard and display enable interaction with the 4890 LPS to initiate and monitor jobs. The display is 80 character spaces horizontally (columns) and 24 character spaces vertically (lines). The keyboard has 128 displayable characters and 20 function keys.

Figure 2-3. **Keyboard and display**
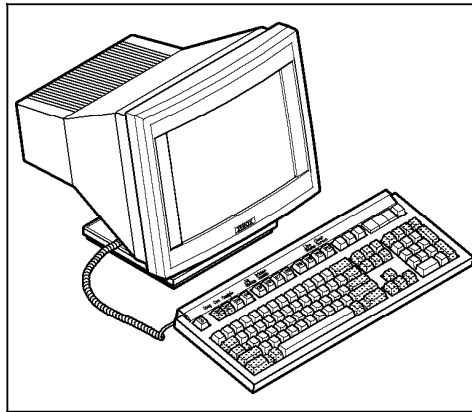
System controller panel

The system controller is powered on or off, booted, and switched between local and remote power using the buttons on this panel.

Figure 2-4 shows the 4890 controller panel. There are three LED indicators. One LED is situated next to the system power button. When lit, this LED conveys that the system power is switched ON. The other two LEDs are the Remote and Local buttons that indicate the operating mode of the controller.

Figure 2-4.   **4890 control panel**
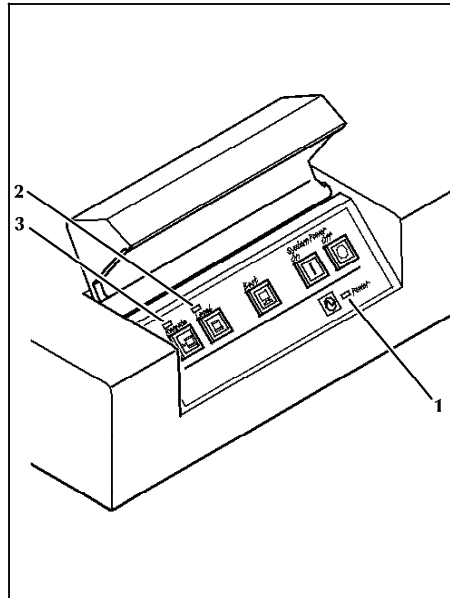
1. **Remote LED**
2. **Local LED**
3. **Power LED**

Floppy disk drive   The floppy disk drive in the controller provides an alternative input for loading operating system software, user files, and fonts, to the system disk. It can also be used for backing up system-disk-resident user files and fonts. A service representative may also use it for diagnostics. It is not an input source for print jobs.

The disk drive uses 5.25-inch double-sided, dual-density disks, and 5.25-inch high density floppy disks. The floppy disk has a total of 1403 available sectors; sector configuration is 78 cylinders, 2 tracks per cylinder, 18 sectors per cylinder, and 512 bytes per sector.

1/4 inch cartridge tape drive   The 1/4 inch cartridge (QIC) tape drive is also mounted within the system controller cabinet. This unit provides an alternative source for loading and backing up user files and loading or unloading fonts to the system disks.

The capacity of the 1/4-inch cartridge tape drive is either 320 MB or 525 MB, depending on the choice of DC6320 or DC6525 tape cartridges. Both tapes are 1/4-inch cartridge ANSI compatible, and they can be used interchangeably without hardware or software reconfiguration.

Printer components

The printer contains the imaging, xerographic, and output subsystems.

Imaging subsystem

The imaging subsystem accepts data two bits at a time (one black, and one highlight) from the system controller where forms and graphics have already been merged for the xerographic process.

Xerographic subsystem

The following steps describe the xerographic process:

1. Imaging data is transferred from the system controller.

2. The photoreceptor belt is charged.

3. The laser beam moves across the surface of the photoreceptor belt producing a latent image based on the incoming video data. The laser beam creates the white image and the highlight color image at the same time, ensuring near perfect registration between the two.

4. Where the photoreceptor is exposed to the laser beam, its surface charge is altered dot-by-dot to one of three levels: fully charged, partially discharged, or discharged. The color dry ink is charged so that it clings to the areas of discharge, while the black dry ink is charged so that it clings to the area of full charge. Areas of partial discharge attract no toner and are imaged as white (plain paper).

5. The photoreceptor belt is then exposed to both dry inks (black and highlight color) in a single pass. The dry inks cling to the appropriate pattern of dots corresponding to the black or the color image.

6. Large, excess toner particles are removed immediately prior to image transfer using a vacuum system known as the "air knife." This technology ensures clean, clear reproduction.

7. A sheet of paper traveling along the paper path is brought into contact with the surface of the photoreceptor belt. Both color and black dry inks are then transferred from the photoreceptor belt onto the paper simultaneously, ensuring near perfect registration.

8. The paper carrying the pattern of dots passes through a fusing subsystem that permanently affixes the dry inks to the paper.

9. The finished page is deposited in the output tray. The photoreceptor belt is then cleaned and prepared for the next page.

Resolution   An LPS imaging system converts a page from a digitized form into a printed image composed of tiny dots. These dots are so small and close together that they appear to form solid areas of black or color. Image clarity is determined largely by the resolution or the number of dots per inch (dpi) printed. The resolution of the 4890 is 300 by 300 dpi.

Output subsystem

The output subsystem provides paper stacking, report collating, optional finishing, and sample print capabilities.

In a standard configuration, the 4890 LPS has two feeder trays and a dual stacker (two trays). For information on other feeder and finishing options, refer to the "Hardware options" section in this chapter.

Figure 2-5. **4890 printer (dual feeder/dual stacker configuration)**
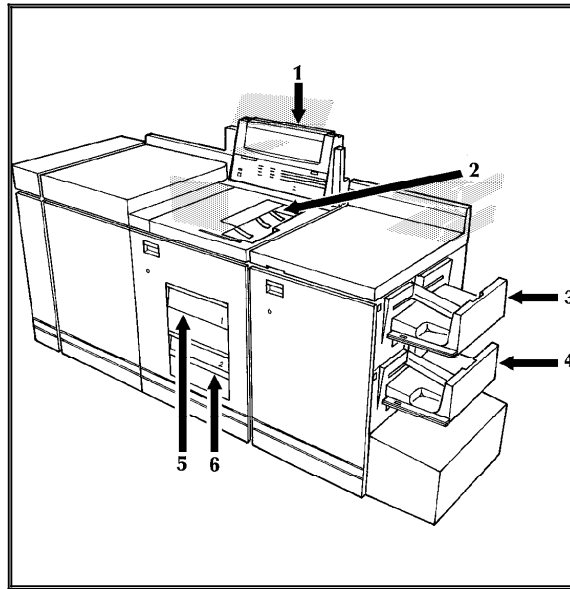
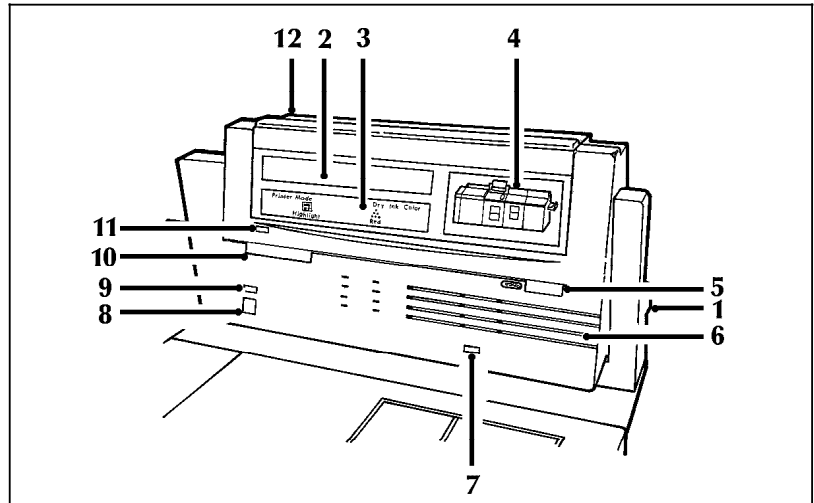| 1. Printer control console	Refer to the "Printer control console" section in this chapter.
2. Sample tray	This output tray is used for sample prints, rejected prints, and transparencies. The capacity of the sample tray is 100 sheets of 20-pound or 80 gsm paper.
3. Stacker tray	The capacity of tray 1 is 750 sheets of 20-pound or 80 gsm paper.
4. Stacker tray	The capacity of tray 2 is 750 sheets of 20-pound or 80 gsm paper.
5. Feeder tray 1	The capacity of tray 1 is 1000 sheets of 20-pound or 80 gsm paper.
6. Feeder tray 2	The capacity of tray 2 is 500 sheets of 20-pound or 80 gsm paper. Except for capacity, this tray is identical to tray 1.

Printer control console

Located on the printer is a control console containing message and graphic displays, information, stop, continue, and sample buttons, a power switch, and indicator lights showing the active feeder tray, and the paper size in use.

Figure 2-6.   **Printer control console**

1. Power switch	The power switch is on the side of the printer control console.
2. Message display	Shows printer status and simple operating and maintenance instructions in a two-line message display.
3. Color information display	Shows the current xerographic mode (monochrome black or highlight). This display also indicates the color developer housing currently installed.
4. Graphic display	Indicates when a specific area of the printer requires attention. Graphics are displayed in support of text messages on the message display. They are intended to clarify location questions, including what doors to open to reach the problem area.
5. Wire percentage indicator	Displays the percentage of stitcher wire remaining on the spool. This display is functional only if your printer has the stitcher/stacker output configuration.
6. Feeder tray indicators	These lights indicate selected feeder trays and the size of paper loaded in each tray.
7. Sample button	The sample button initiates a sample print of the next image waiting in a queue without issuing a command at the system control console. The print is delivered to the sample tray.
8. Continue button	The continue button resumes printing without issuing a command at the system control console.
9. Stop button	The stop button halts printing without issuing a command at the system control console.
10. Print quantity and fault code display	The number of prints completed is shown here. This monitor also displays fault messages. When a fault message displays on the monitor, the corresponding message appears in the message display. For example, a message number `L152` displaying on the monitor is defined on the message display as follows: `stitcher is out of wire or spool not rotating.`
11. Information button	When `i` is displayed on the message display, pressing this button initiates a request for additional information concerning printer operation. Pressing it repeatedly requests more information as long as `i` is displayed.

12. Attention light   Provides a visual warning to alert the operator when the printer has a problem that demands attention. The light has three states (steady yellow, modulating yellow, or off) indicating the severity of the problem. The actual error or problem is described in detail in the message display.

Additional features

Instruction labels   Instruction labels are located throughout the printer to assist you with a variety of tasks.

Audible tones   For certain conditions, audible tones call your attention to the printer. Volume may be adjusted by a service representative.

Accessories

CCU changeout cart   The cart (shown in figure 2-7) is used to remove and install the customer changeable unit (CCU). This CCU consists of the color developer housing and the dry ink bottle. Due to the physical weight of the CCU, the cart is used to remove the CCU from the printer and replace it with another CCU containing a different color dry ink.

Figure 2-7.   **The CCU changeout cart with CCU loaded**
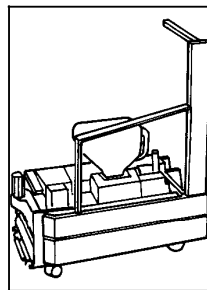
The carts also serve as storage devices for any CCUs not currently in use in your system. For example, if you use both the red and blue dry inks in your operation, one CCU is always out of the machine in storage on the cart while the other is installed.

It is therefore necessary to have a cart for each CCU, where one cart is always empty and available to remove the CCU installed in the system. If your printer prints only one color, the CCU will never be removed and the cart is not necessary. If there is more than one printer in operation at your site, it may not be necessary to have one cart per CCU; however, CCUs are not interchangeable between 4850 and 4890 models. The CCU is labeled to identify its associated printer.

Hardware options

The following options are available to further enhance the productivity of the 4890 LPS in your environment.

4890 peripheral cabinet tape drives

The peripheral cabinet may contain the 9-track open reel tape drive and an 18-track 1/2-inch cartridge tape drive.

Figure 2-8.　　**4890 peripheral cabinet tape drives**
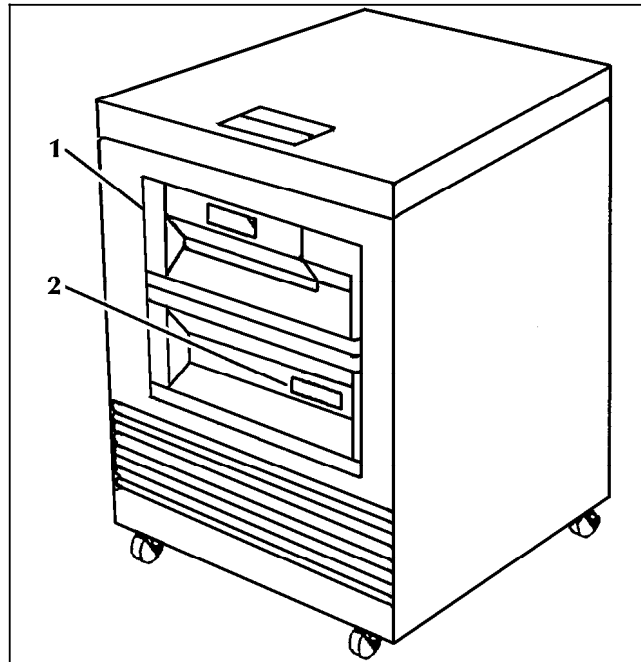
1.　**9-track open reel magnetic tape drive**
2.　**18-track 1/2-inch cartridge tape drive**

Figure 2-9 shows an illustration of the peripheral cabinet next to the 4890 controller.

Figure 2-9.　　**4890 controller and peripheral cabinet**

1.　**Peripheral tape drive cabinet**
2.　**4890 controller**

The SCSI is an 8-bit parallel interface standard used to connect peripheral devices, such as rigid disks, floppy disks, and tape drives, to computer systems.

The 4890 controller has a SCSI that connects all the standard and optional peripheral devices available for the 4890. Because the 4890 is an all-SCSI system, you can boot from any device as long as the boot files are on the media for the device.
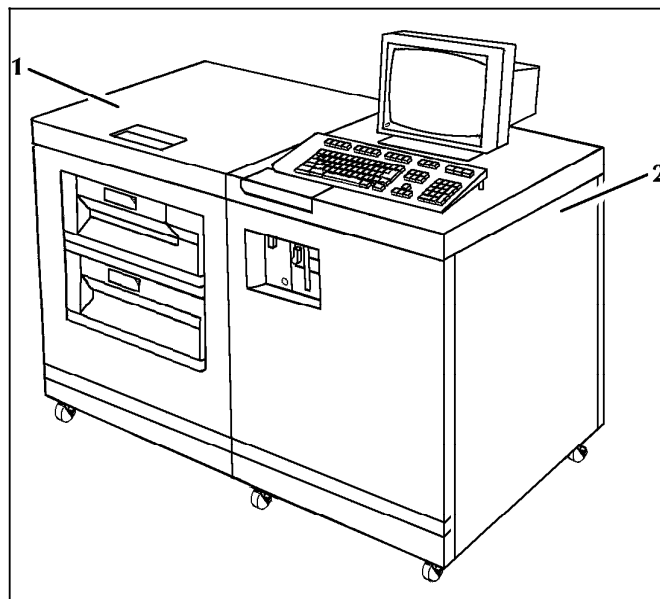
Graphic video generator

The optional graphic video generator (GVG) option with a standard 32-Mb or optional 256-Mb of graphic memory enables the printer to receive digitized graphic data. GVG accepts graphic data encoded according to the Xerox .IMG and .RES standards.

Note: To accept and print graphic data input, the LPS must be equipped with the GVG option.

Font memory expansion

The 4890 has as a standard feature 32-Mb of font memory, which can be expanded to 128 Mb.

High-capacity feeder

The high-capacity feeder (HCF) provides two additional feeder trays. The capacity of each tray is 1000 sheets of 20 pound or 80 gsm paper. Refer to figure 2-10.

Figure 2-10.   **4890 printer (high-capacity feeder configuration)**
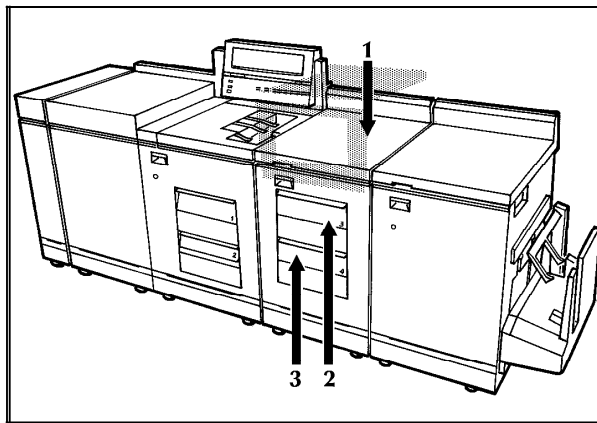
1. **High-capacity feeder**
2. **Feeder tray 3**
3. **Feeder tray 4**

Stitcher/stacker

The stitcher/stacker configuration in figure 2-11 provides an alternative to the dual stacker configuration. It is a one-tray output module with both set stitching (up to 50 sheets) and offsetting capabilities.   The capacity of the stitcher/stacker tray is 2000 sheets (unstitched) of 20 pound or 80 gsm paper.

Figure 2-11.   **4890 printer (stitcher/stacker configuration)**
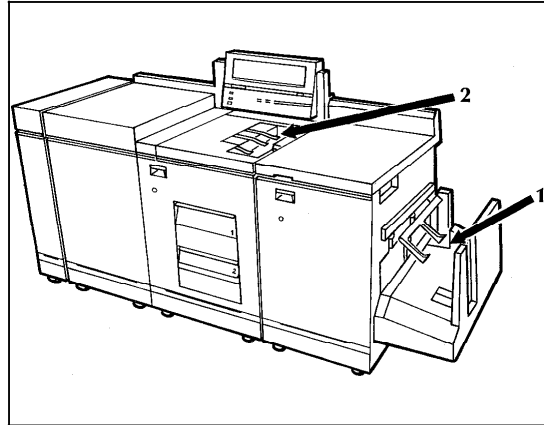
1. **Stitcher/stacker tray**
2. **Sample tray**

3.   Software

This chapter describes the components of the Xerox 4890 HighLight Color Laser Printing System (LPS) operating system software (OSS), as well as some of the options for host software and personal computer (PC) software.

4890 operating system software

The operating system software is an integral part of the laser printing system and is required to operate your printer, regardless of whether you are operating in the online or the offline configuration. The OSS handles many tasks invisible to the operator, including the low-level control of the printer hardware.

The OSS also includes the command languages used to define electronic forms, job processing information, and copy processing information. These tasks are described in the following paragraphs.

LPS editor

The LPS editor is used to enter the commands for the OSS languages: Print Description Language (PDL) and Forms Description Language (FDL). The editor facilitates the editing and manipulation of the source files. From the editor, the source files are stored on the system disk and then compiled in a separate step.

Print Description Language

PDL is used to describe the input, logical processing, and output requirements of a print job. Refer to the *Xerox 4890 HighLight Color LPS PDL Reference* for more information.

Forms Description Language

FDL is a laser printing system resident language for designing electronic forms that can include logos, signatures, highlight color, and shading. Refer to the *Xerox 4890 HighLight Color LPS Forms Creation Reference* for more information.

Host software

This section describes a few of the many host software packages compatible with the 4890 LPS. If you need information on a specific program, please contact your sales representative.

Xerox Forms Generator

The Xerox Forms Generator (XFG) is a host-resident forms design software package (on IBM MVS or VM) that allows forms to be created, changed, and merged with data at the host for printing.

Note: Version 3.0 or higher of XFG is required to support the color capabilities of the 4890 LPS.

CompuSet (Document Sciences Corporation)

CompuSet, developed by Document Sciences Corporation, is a publication production system that enables the complete composition of manuals, price lists, catalogs, and other types of publishing applications.

Tables of contents, indexes, and footnotes can be created with CompuSet by extracting information from the text stream. If desired, graphics, text, and forms may be merged.

Note: CompuSet Version 6.0 is required to support the color capabilities of the 4890 LPS.

Xerox Printer Access Facility

The Xerox Printer Access Facility (XPAF) enhances the capabilities and use of your LPS in an IBM MVS/XA environment. For example, it allows you to change printer destinations without restructuring the data stream. XPAF accepts numerous types of data streams, transforms and conditions them, and then sends them to the selected printer. To users of IBM Advanced Function Printing (AFP), XPAF appears to be an extension of the IBM product.

Note: XPAF Version 2.1 or higher is required to support the color capabilities of the 4890 LPS.

Xerox Print Services

The Xerox Print Services (XPS) 700 is a fully integrated electronic publishing system with a networked workstation base. XPS 700 combines the hardware, software, and interface technologies to link host resources with Xerox laser printing systems. XPS 700 provides numerous production, management, and support functions, which include the following:

- Import document files into the system

- Compose and process files

- Transmit pages or complete documents from DEC systems to Xerox LPS

- Manage and control access to system resources

- Monitor system usage.

Xerox Pen Plotter Interface

The Xerox Pen Plotter Interface (XPPI) software provides an interface to graphics applications that use the CALCOMP pen plotter protocol. Graphics applications such as SAS/GRAPH, CA-

TELL-A-GRAF, or CA-DISSPLA can use this interface to print with highlight color on the 4890.

Xerox DCF and GDDM Interface

XDGI software provides an interface between the IBM Document Composition Facility (DCF 3.2), the Graphical Data Display Manager (GDDM 2.0) products, and the 4890 LPS. Xerox DCF and GDDM Interface (XDGI) also provides a means of adding highlight color commands to these data streams, and can direct output from IBM products directly to the 4890, or to tape for offline printing on the printer.

Third-party host software

There are a number of third party host application software packages also available for use with the 4890.

Application software for IBM mainframe environments

Data stream information for several application software packages that run on an IBM or IBM-compatible mainframe is included in the "Application software data streams and connectivity" appendix. All of these software packages produce documents that print on a 4890. These packages allow the document creator to place color in the document before it is sent to the printer.

Note: The table in Appendix B indicates whether or not the application may be used with a channel (direct) connection or through a Barr/SNA (remote) connection.

Application software for DEC mainframe environments

Application software that runs on a DEC VAX/VMS mainframe and Data stream information is included in the "Application software data streams and connectivity" appendix.

PC-based software

With the optional front-end processor, the 4890 can process print data in the form of PostScript, a page description language similar to Interpress.

This allows your desktop personal computers or local area networks (LANs) comprised of personal computers to connect to the 4890.

Currently there are a wide variety of PC software packages for desktop publishing and graphics. Those packages with the ability to generate Interpress, PostScript, or HP-PCL 5 (Hewlett-Packard Print Control Language) can use the 4890 highlight color features.

Application software for IBM PC workstation environments

Data stream information for several application software packages that run on a PC is included in the "Application software data stream and connectivity" appendix. These software packages can produce color documents for printing on a 4890.

Application software for Macintosh workstation environments

Data stream information for application software packages that run on a Macintosh, is included in the "Application software data stream and connectivity" appendix. These software packages can produce color documents for printing on a 4890.

Application software for Sun workstation environments

Data stream information for an application software that runs on a Sun workstation, is included in the "Application software data stream and connectivity" appendix. These software packages can produce color documents for printing on a 4890.

Interpress

Interpress is a page description language capable of describing any two-dimensional image intended for a raster device, such as a Xerox laser printing system. The function of Interpress is to describe the appearance of data on a page; it is not a page composition language. This functionality includes vector graphics (sometimes referred to as line art), contour fonts, and pixel arrays. Interpress also includes job management features such as paper tray selection, output offsetting, stock selection, copy count, and page selection on a copy basis.

An Interpress master can be created at a host or at a workstation for transport through an Ethernet LAN to the LPS.

Depending on the capabilities of the software, the 4890 can make full use of its highlight color features. Some of these Xerox packages include:

- VP 3.2
- GlobalView Version 1.1 or higher
- GlobalView Pro Illustrator
- Docubuild.

With the Ethernet interface options installed, the 4890 can accept print data in the form of Interpress masters.

The RIP and GVG options are required for printing complex (Interpress Publication Set) documents. These options are not required for simple (Interpress Commercial Set) documents.

# 4.   LPS connections

This chapter discusses a total system and the hardware and software necessary to connect your printer to other devices. The configurations described are representative of a variety of business environments.

System components

Figure 4-1 illustrates the various components included in the Xerox 4890 HighLight Color Laser Printing System (LPS) to define an environment. These components include:

- Printer
- Devices connected to the printer:
  — A mainframe
  — Personal computers or workstations.
- Hardware and software used to connect the system devices.

Figure 4-1.   **System components**
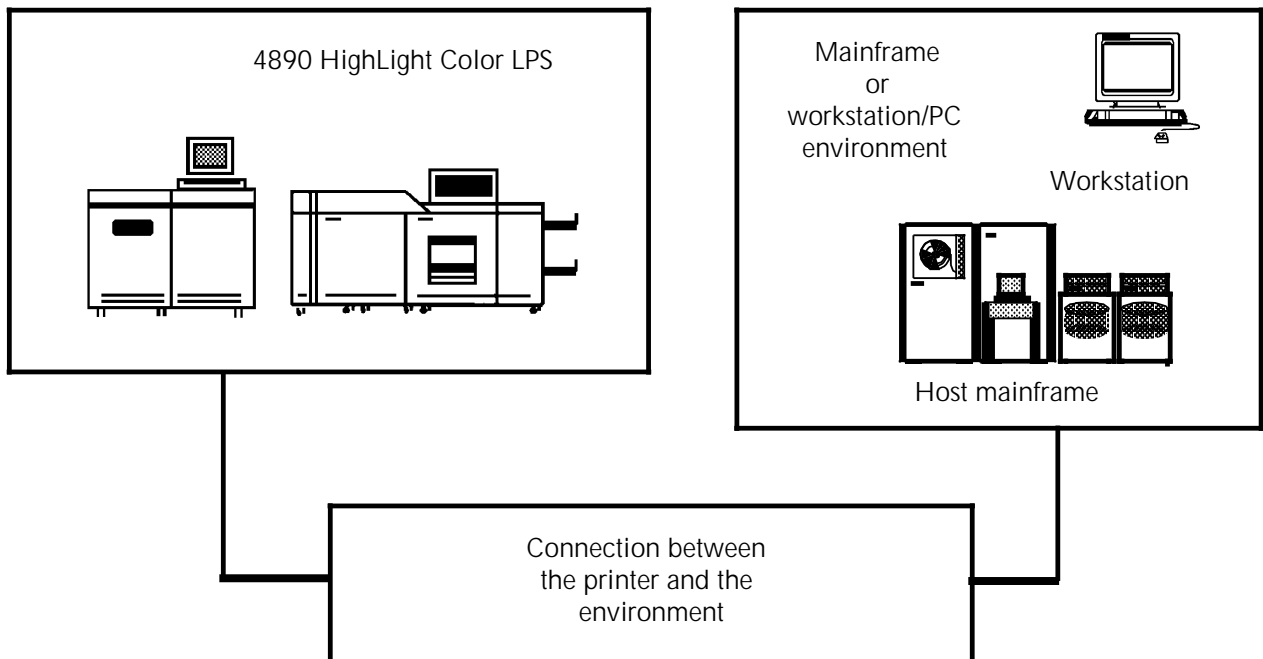
Environment

Figure 4-2 illustrates the general types of environments that can connect to the 4890 LPS:

- Workstations or personal computers (IBM PC or Macintosh)
- Large host mainframes.

While it is possible for a mainframe and several workstations to be connected to one 4890 printer at the same time, this guide covers each environment separately.

Figure 4-2.   **Possible environments of the 4890 system**
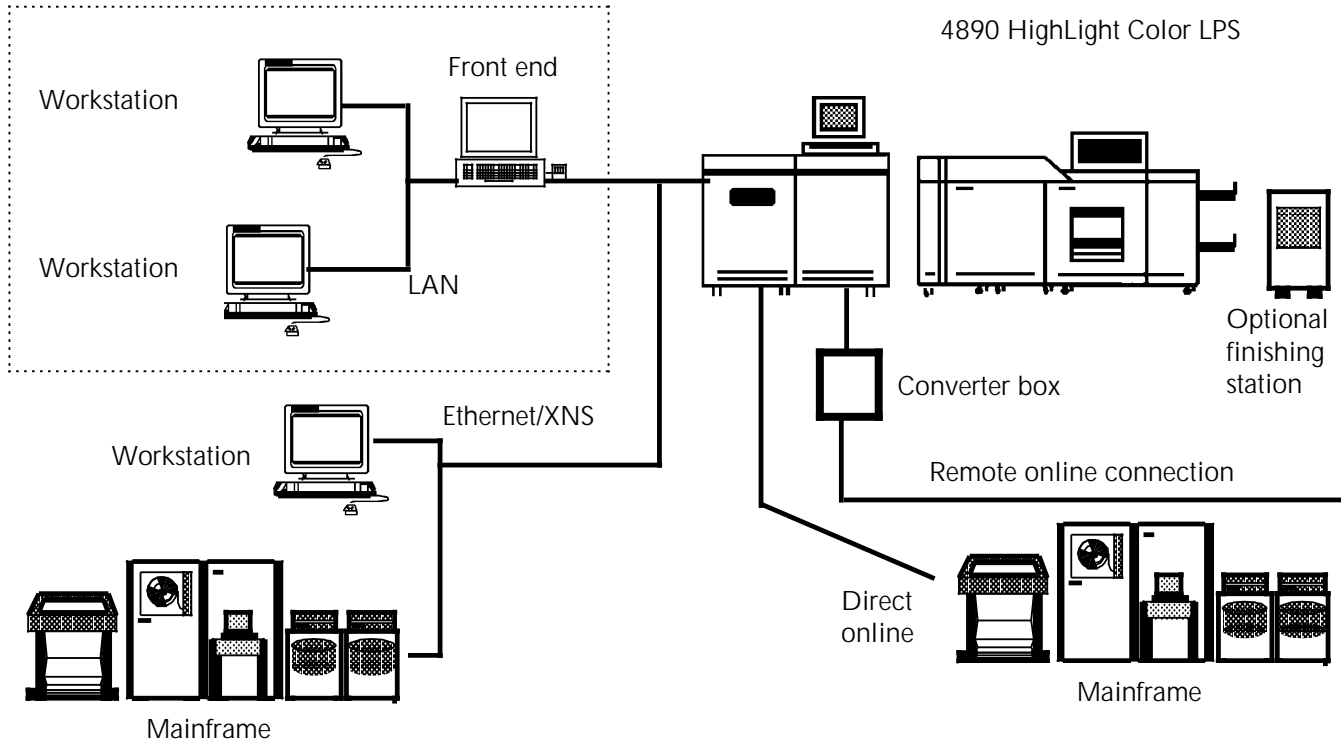
A workstation or mainframe environment includes the hardware, the operating system software, and the application software. The terms "platform" and "application software" are used throughout this guide to describe both mainframe and workstation environments.

Platform   A platform is the combination of the hardware environment and the particular operating system used by that hardware. An example of a platform is a PC using the PC-DOS operating system. The 4890 prints documents prepared in application software residing on a variety of platforms.

Application software Application software packages are used in both mainframe and workstation environments and are necessary to create the documents printed on the 4890. Each software product provides its own means of placing color within a document.

Connecting the printer and the environment

Connectivity Connectivity permits the transport of a document from the application software and the platform it runs on to the printer. Interface hardware and cables are typically required. Modems may be included for remote connections. Additional hardware and software, communication protocol converters, and data stream converters may be required for certain platforms and applications. The "Connectivity overview" section provides an overview of the types of connectivity hardware required for 4890 systems.

Connectivity overview

Connectivity includes hardware and software that translates the output from the application software into a format the printer understands. This translation process may require conversion of electrical signals, communication protocols, and data streams.

A functional connection between an environment and the 4890 LPS may require one or more of the following types of connectivity products:

- Optional interface. A hardware and software solution that enables a platform to be directly connected to a 4890 printer.

- Communication module. A bridge or gateway. A bridge converts communication protocols and connects similar hardware paths. For example, a communication module that converts TCP/IP on Ethernet to XNS on Ethernet is a bridge. A gateway converts communication protocols and connects two different hardware paths. An example of a gateway is a communication module that converts Novell protocol on Token Ring to TCP/IP on Ethernet.

- Front end. Hardware and software that converts data streams not supported by the printer into a format that can be printed.

Primary connectivity concerns

To determine what connectivity hardware you need for your system, consider the following:

- The interface options available for your system
- The communication protocols used by your platform
- The data streams output by your application software.

Interface options

There are three primary interface options for the 4890:

- Network. Printer is one of many network citizens

- Offline. Printer is connected to a magnetic tape drive

- Online. Printer is connected to a host with these online connections:

    — Direct
    — Remote.

There are optional interfaces available that allow the 4890 to have an online connection with a number of different mainframe environments. The types of interface options available are discussed in this chapter.

Communication protocols

Workstation environments and some mainframes are connected to the 4890 LPS by means of a local area network (LAN). The 4890 can be connected directly to an Ethernet LAN using Xerox Network Services (XNS) protocol. Ethernet LANs using a protocol other than XNS require a bridge that can convert the protocol used to XNS. In addition, non-Ethernet LANs require a gateway that converts to Ethernet. Communication module requirements for LAN environments are discussed in greater detail later in this chapter.

Data streams

The following data streams are supported by the 4890 LPS:

- Line printer

- Laser conditioned data set (LCDS) may include Xerox DJDE and metacode commands

- Interpress.

These three data streams are accepted directly by the 4890 without conversion. Any other data stream must be converted before it is accepted by the printer.

Many workstation applications and a few mainframe applications produce PostScript data streams. The 4890 LPS does not support PostScript directly, but it is possible to convert PostScript data for highlight color printing on the 4890 with a front end processor.

Overview of connectivity requirements for mainframes

Specific mainframe systems covered in this guide

This guide focuses on two specific host mainframe types:

- IBM and IBM-compatible hosts
- DEC (VAX) hosts.

These two types of mainframes represent the majority of the mainframes connected to a 4890 LPS.

Note: Connectivity requirements for other mainframes are discussed briefly. For additional information to determine the connectivity hardware and software appropriate to your system, contact the Xerox Connection (U.S. only), or your site representative. Refer to the back of the book for information regarding the Xerox Connection.

Interfaces

Host mainframes are generally connected to the 4890 with an online interface. An online interface can be either a direct cable connection or a remote connection using a modem. A host mainframe and a 4890 printer may also be connected to a local area network (LAN). Or, if desired, data from a host mainframe may be printed on a 4890 through an offline (tape drive) connection.

DEC (VAX) mainframes and IBM-compatible remote connections require optional interface hardware as part of their 4890 connectivity. Non IBM-compatible mainframes require third-party interfaces.

Communications protocols and mainframes

Most mainframe connections do not require communication modules for communication protocol conversion. The remote IBM compatible host configuration requires a special interface as well as a communication module. Non-Ethernet network connections also require a communication module.

Data streams produced by mainframes

Mainframes generally run applications that produce line printer, LCDS, or Interpress data streams. This means that mainframes generally do not require a front end as part of their hardware connection to the 4890. For products that produce IBM AFP data streams, translators are available to convert AFP to LCDS. Applications producing PostScript require a front end processor.

Overview of connectivity requirements for workstations

Specific workstation systems covered in this guide

This guide focuses on three specific workstation types:

- IBM PC or IBM PC-compatible workstations (referred to as PCs in this guide)

- Macintosh workstations

- Sun workstations.

These three types of workstations represent the majority of the workstations connected to a 4890 LPS.

Connectivity requirements for other workstations are discussed only briefly. If your facility uses another type of workstation, you may find the connectivity products you need listed in the "Third party connectivity products" appendix. If you need additional information to determine the connectivity hardware and software appropriate to your system, contact the Xerox Connection, or your site representative. Please refer to the back of this book for information regarding the Xerox Connection.

Interfaces

Workstations are nearly always connected to a 4890 LPS through a local area network (LAN). If the hardware connections include a front end, then the front end can also accept data from a workstation through a 9-track tape.

Communication protocols and workstations

Workstations that use an Ethernet connection with XNS protocol do not require a communication module for communication protocol conversion. All other network communication protocols require conversion. Non-Ethernet networks also require conversion to Ethernet.

Data streams produced by workstations

At present, most workstation applications produce PostScript data streams. Therefore, most workstation environments require a front end as part of their hardware connection to the 4890. Exceptions are the applications for Sun workstations that produce Interpress data streams, and PC applications that produce line printer and LCDS data streams.

Interfaces supported by the printer

The interface option appropriate to your facility depends on the operating environment of your LPS.

You can elect to configure your printer to switch between online and offline modes for added flexibility.
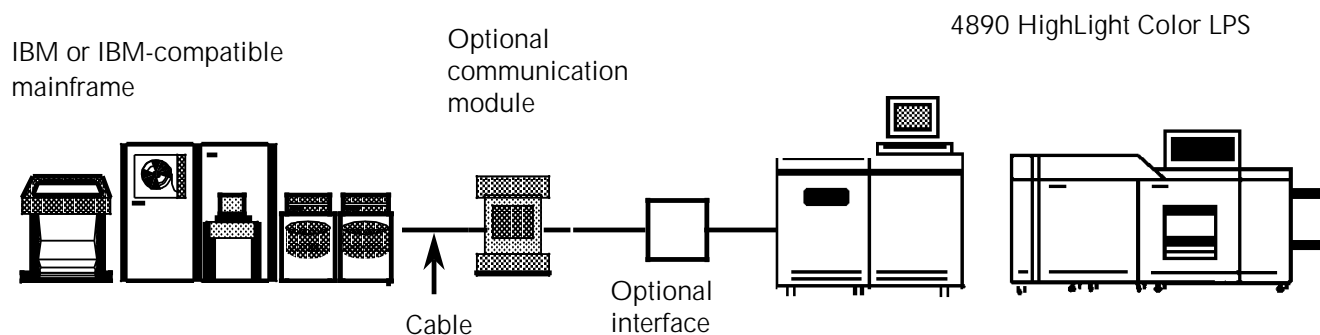
Online interfaces

Online interfaces allow a platform to communicate directly with the 4890 printer. The majority of online connections involve mainframe platforms.

The 4890 LPS supports direct connections to IBM and IBM-compatible host mainframes. Non-IBM compatible mainframes require additional interface hardware and software for online connectivity to the printer, as shown in figure 4-3. Remote IBM connections using System Network Architecture (SNA) or bisynchronous protocol require additional interface hardware and software as well. Online connectivity is also available for PC and PC-compatible workstations.

Figure 4-3.   **Online interface components
(including optional components)**

Online channel interface

The online channel interface receives input directly from a host mainframe through a cable. All IBM and IBM-compatible systems supporting the channel attached 3211 and 4245 protocols are supported.

OEM interface

The Barr/SNA unit and the LPS-resident OEM interface work together to permit ASCII and EBCDIC data transmission to the LPS in SNA/SDLC and bisynchronous (BSC) protocol environments. This allows the 4890 LPS to print jobs from a remote IBM-compatible host computer.

The Barr/SNA is a PC-based communications module that acts as a bridge between the communications protocol sent by the host and the protocol used by the OEM interface.

Refer to the *Xerox 4890 HighLight Color LPS Operator Guide* for more information on SNA/SDLC and bisynchronous communications.

DEC XPMF-VMS interface

The Xerox Print Management Facility (XPMF)-VMS interface enables communication between a DEC VAX/VMS system and the 4890 LPS through cable or modem connections, using the host interface processor (HIP) task. All UNIBUS, VAX-BI, or Q-Bus-based digital processors are supported.

Third-party interfaces

Third-party interface hardware and software is available to provide online connectivity for many non-IBM compatible mainframes and also for PC and PC-compatible workstations. Refer to the "Third-party connectivity products" appendix for a list of some of the third-party interfaces available.
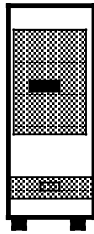
Offline interface

The offline interface magnetic tape drive is an alternative or an addition to online operation. There is an optional IBM 3480-compatible 1/2-inch tape drive and a 9-track open reel (1600/6250 bpi) tape drive. The 9-track tape drive supports EBCDIC, ASCII, or BCD (9-track) tapes that conform to one of the following formats:
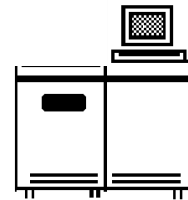
• American National Standards Institute (ANSI)
• IBM (OS/VS370, OS/360, ODS/VS/370, DOS/360/370)
• Burroughs (MCP 2500-4700, 6700)
• Honeywell (OS 200/2000, OS 600/6000 Series)
• Sperry/Univac Series 70 (100-OS standard files)
• DEC (RSX-11)
• CDC (external format)
• NCR (Century-B1)
• Univac (SDF-formatted tapes)
• ICL (2900 VME/B).
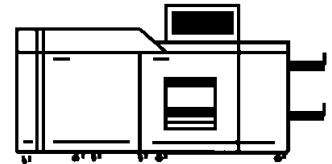
Figure 4-4. **Offline connection**

3480 cartridge tape drive   9-track reel tape drive   4890 HighLight Color LPS
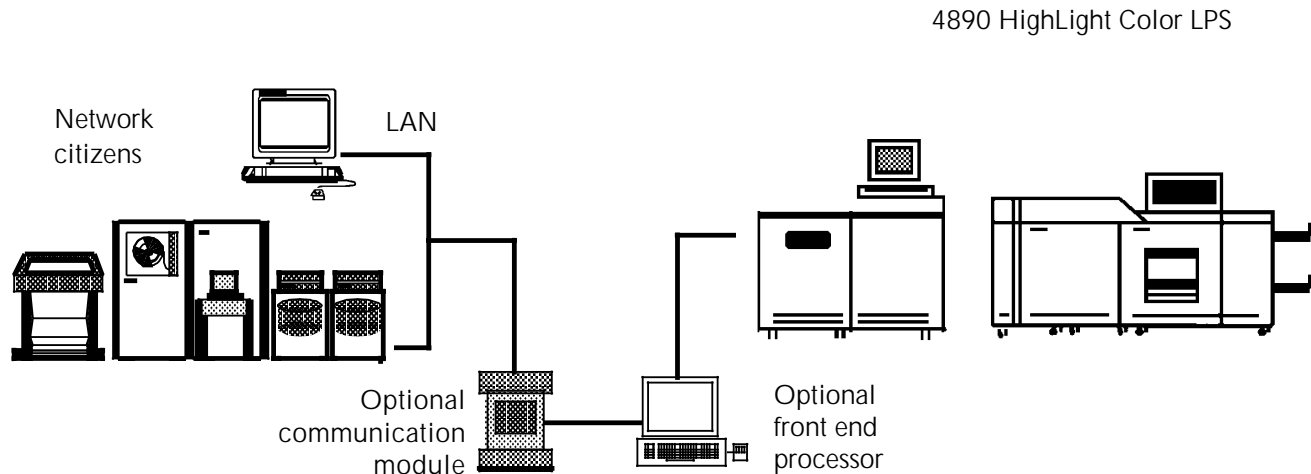

The optional 1/4-inch cartridge tape drive supports Xerox format tape cartridges only.

Network interface

Both workstation and mainframe platforms may be connected to the 4890 through a local area network (LAN).

Figure 4-5. **Network interface components (including optional components)**

4890 HighLight Color LPS

The 4890 supports XNS protocol on an Ethernet LAN. Other types of networks and network communication protocols are supported through the addition of a communication module or front end processor.

Multiple interfaces

It is possible to have more than one type of interface connected to the printer simultaneously. For example, your facility could have both an online and an Ethernet connection to the same printer.

Online jobs use the online (channel) interface and are processed directly by the input task. All other inputs are processed by the host interface processor (HIP) task; the Barr/SNA bisynchronous communication model jobs using the OEM interface, jobs using the Ethernet interface, and XPAF jobs using the online interface are all processed by HIP.

HIP can receive jobs only from one input source at a time. For example, if your facility has both a XPMF-VMS interface and an Ethernet connection to the same printer, HIP can receive input from only one of them at any given time. Switching HIP from one input source to another requires an operator command.

HIP can spool jobs from one of its input sources while input is processing online jobs. To print these spooled jobs, the operator must first take the printer offline and then issue a start command for HIP to begin printing.

For further information on using HIP, refer to the *Xerox 4890 HighLight Color LPS Operator Guide.*

Communication protocols required by the printer

The 4890 LPS supports the following protocols:

- IBM 3211 and 4245 channel protocols

- DDCMP protocol (through the XPMF-VMS interface)

- Xerox 871 protocol (through the OEM interface)

- Xerox Network Services (XNS) protocol on Ethernet (for network connections).

All other protocols require conversion.

Converting protocols for online connectivity

The communication protocols for many non-IBM compatible mainframe platforms can be converted to allow printing on the 4890. This conversion is done through the use of an optional interface. Communication protocols compatible with Dataproducts, Centronics, and many other printers can be converted by third-party interfaces into protocols that the 4890 can accept. Refer to the "Third-party connectivity products appendix for a list of third-party interfaces.
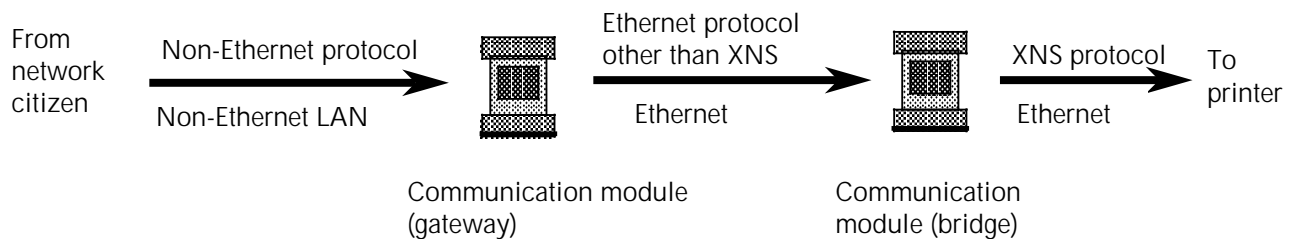
Converting protocols for network connectivity

Communication module   The conversion of network communication protocols requires the use of a communication module. A communication module is a bridge or gateway that enables a path from a network to equipment outside of that network. The path may be from one network to another network, or from the network to a device, such as a mainframe or printer.

Ethernet LANs using protocols other than XNS require a bridge that converts the other protocol to XNS. For example, if an Ethernet LAN uses the TCP/IP communication protocol, a bridge is needed to convert TCP/IP to XNS. The network connections on either side of the bridge are Ethernet, but the communication protocol has been converted.

Non-Ethernet LANs require a gateway that enables a path from them to an Ethernet LAN and that converts their communication protocols to XNS.

Figure 4-6.   **Communication modules**

From network citizen — Non-Ethernet protocol / Non-Ethernet LAN → Communication module (gateway) — Ethernet protocol other than XNS / Ethernet → Communication module (bridge) — XNS protocol / Ethernet → To printer

It is possible for a network connection to the 4890 to use more than one communication module. For example, the Shiva FASTPATH communication module converts AppleTalk protocol on an AppleTalk network to TCP/IP on Ethernet. A second communication module is required to convert TCP/IP to XNS.

Data streams required by the printer

As previously mentioned, the 4890 LPS supports three data streams: line printer, Line Conditioned Data Set (LCDS), and Interpress. All other data streams require conversion.

The type of data stream sent to the 4890 printer depends upon the application software being run on the platforms connected to the printer.

Conversion of PostScript data streams

Front end   A large number of the document creation applications available for 4890 environments (particularly workstation environments) produce PostScript data streams. These must be converted to a format that is acceptable to the printer. Conversion of PostScript data streams is done by a front end processor.

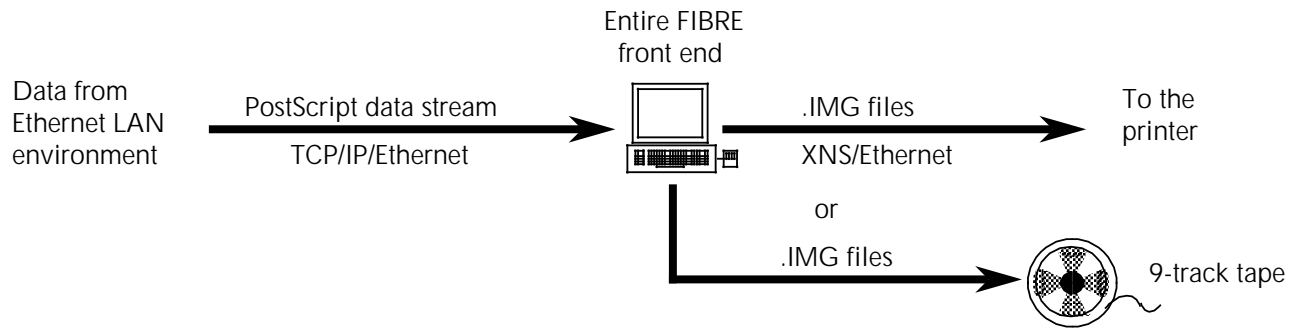### The Entire FIBRE 400/600 front end

The Entire FIBRE front end converts PostScript data streams to Xerox .IMG files. The software for FIBRE runs on a Sun SPARCstation 1+ (FIBRE 400) or SPARCstation 2 (FIBRE 600) workstation, running SUN OS 4.1 (a UNIX-based operating system).

FIBRE 400/600 accepts full color input and converts it to highlight color output for printing on the 4890 LPS. This is done by converting each page of PostScript data to a pair of .IMG files (one for black, one for highlight color). The pair of .IMG files is stored on the printer, then printed with an Interpress print job that overprints the two files.

Figure 4-7. **Entire FIBRE front end**

The Entire FIBRE front end also functions as a bridge for print jobs. FIBRE accepts TCP/IP communication protocol on Ethernet, converts the print job from PostScript to .IMG files, and then sends the converted job out through the XNS network on Ethernet. If the PostScript application is being run on a platform that does not use either Ethernet or the TCP/IP protocol, then an additional gateway is necessary to convert to TCP/IP on Ethernet before the data stream goes to the front end.

Connectivity options for IBM and compatible mainframes

To determine the appropriate connectivity option for your IBM mainframe environment, you need to take into account the interface option you use and the data streams to be output by your application software.

Interface options

IBM and IBM-compatible mainframes can be connected to a 4890 through an online direct interface, a remote interface, or a network.

Online direct interface

The IBM direct interface, also called a channel interface, uses the IBM 3211 or 4245 protocols as shown in figure 4-8.

Figure 4-8.   **IBM online direct (channel)**

4890 HighLight Color
LPS

IBM channel

IBM or IBM-compatible
mainframe with 3211
and 4245 interface
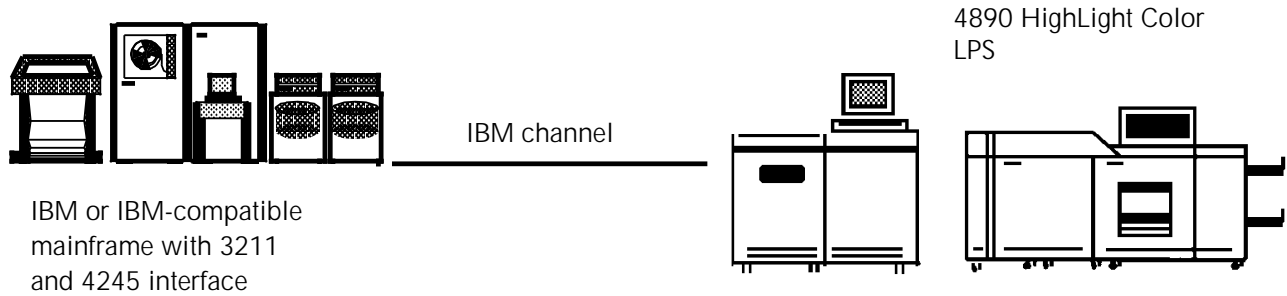
Data streams   Application software used with IBM and IBM-compatible hosts in
an online connection generally produces printer output in line
printer or LCDS (Xerox metacode) data streams. For those
products that produce other data streams, such as AFP,
translators are available that convert the output to LCDS. None
of these formats require further conversion, so a front end
processor is not necessary.

Color specifications   PDL and metacode commands provide highlight color support
for these data streams.

Remote interface

To remotely connect an IBM or IBM compatible mainframe, an
OEM interface and Barr/SNA Bisynchronous Communication
Module are required. In this configuration, the LPS can support
SNA/SDLC or bisynchronous protocol environments.

Data streams   Again, application software for a mainframe in an IBM remote
connection usually outputs line printer or LCDS data streams or
bitmapped .IMG files; these do not require further conversion.
Translators are available to convert AFP to LCDS.

Color specifications   Enhanced PDL or metacode commands.

Figure 4-9.   **IBM remote interface**

4890 HighLight Color
LPS

IBM or compatible
mainframe

Barr/SNA
Communication
Module
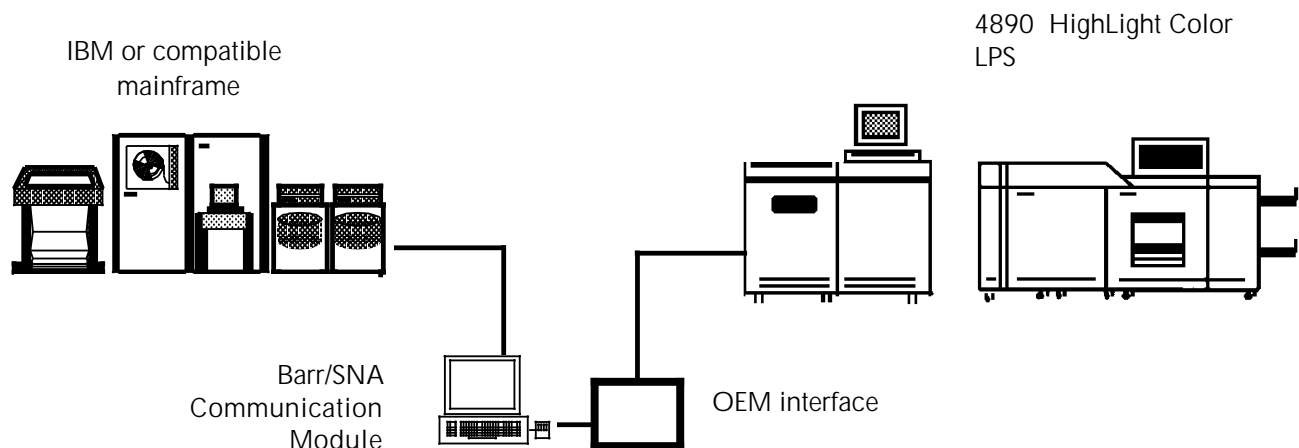
OEM interface

Network interface

An IBM or IBM-compatible mainframe may be connected to a 4890 through a LAN.

Ethernet LAN This configuration requires a front end processor, such as Entire FIBRE 400/600, that converts the Ethernet TCP/IP protocol to an Ethernet XNS protocol.
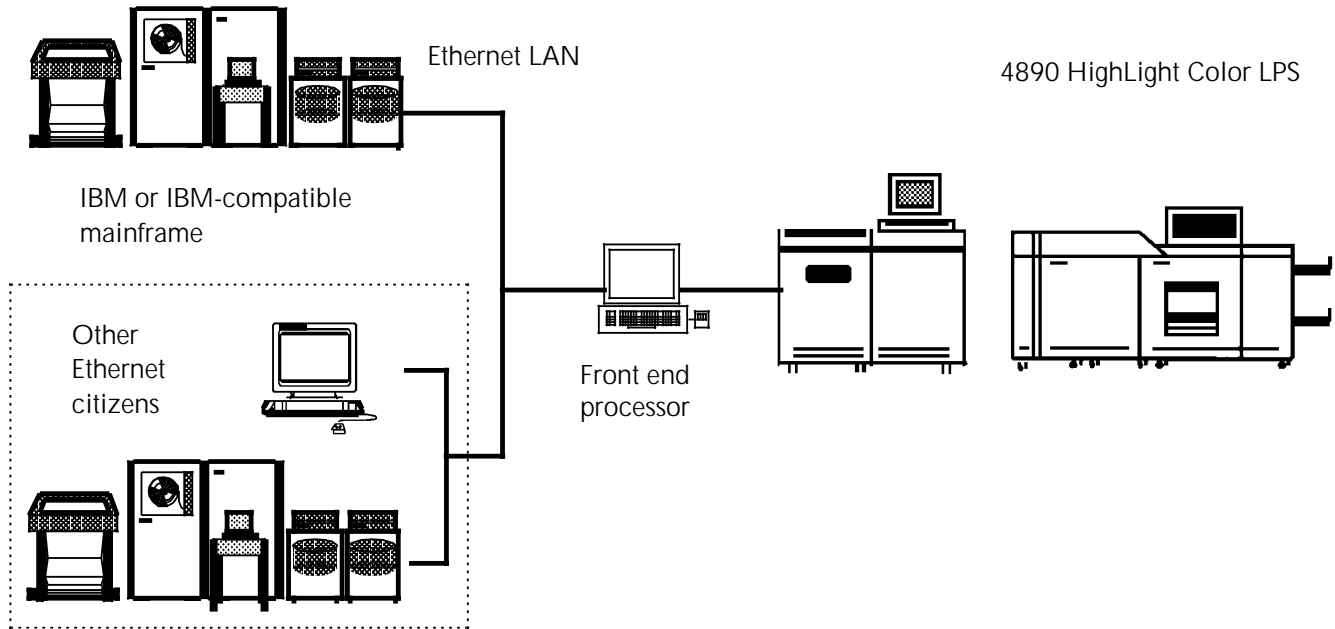
Other LAN If you are using a network interface other than Ethernet, such as Token Ring, you need a third-party gateway to convert your network protocol to Ethernet TCP/IP protocol. You then need a front end processor to convert the TCP/IP protocol into XNS on Ethernet.

Data streams In this configuration, application output is generally in PostScript. PostScript must be converted to a data stream format the printer understands. The front end processor converts PostScript data streams to .IMG files. The front end is also needed to convert TCP/IP to XNS.

Figure 4-10. **IBM and IBM-compatible Ethernet interface**

Ethernet LAN

4890 HighLight Color LPS

IBM or IBM-compatible mainframe

Other Ethernet citizens

Front end processor

Color specification PostScript masters may contain full color specifications, in which case full color to highlight color mapping is required. The front end performs the color mapping automatically when it converts PostScript data to two-color .IMG files. If colors are specified by the document creation application, through the use of a facsimile palette, then the colors print as specified.

If the data stream is line printer or LCDS, then color is implemented through enhanced PDL or metacode commands.

Connectivity options for DEC VAX and MicroVAX mainframes

To determine the appropriate connectivity option for your DEC mainframe environment, consider the interface option you use and the data stream to be output by your software applications.

Interface options

A 4890 LPS connected to either a DEC VAX or MicroVAX system in the VMS environment can be configured for either a communications or network interface. The communications interface may be either local or remote.

Communications interface

A DEC VAX/VMS platform can use the XPMF-VMS option to connect to a 4890 through a DEC communications interface. For a local connection, the Xerox supplied modem eliminator may be used to provide a point-to-point communications link. You can use modems to create a remote connection.

Figure 4-11.   **DEC XPMF-VMS online interface**

4890 HighLight Color LPS

DEC VAX/VMS mainframe
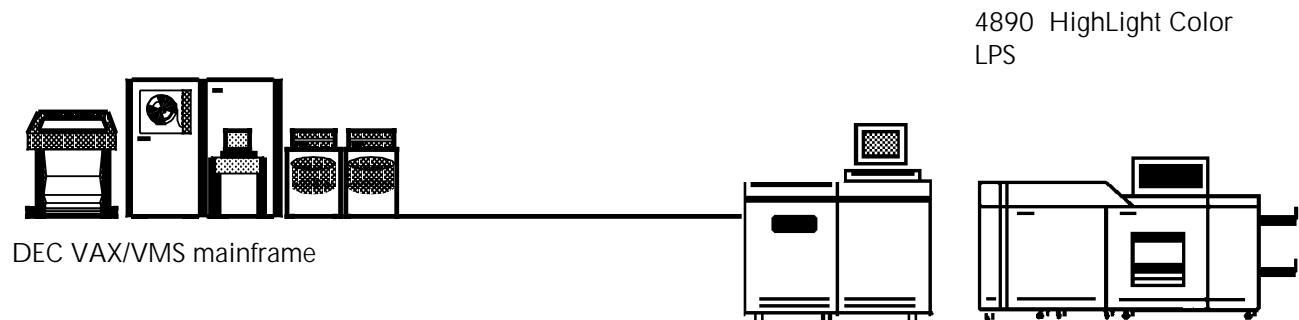
The XPMF software is installed on the host to generate DJDEs from the Digital DCL PRINT command and accommodate the physical linkage using the Digital DDCMP protocol.

Refer to the XPMF-VMS product literature for more details on this interface option.

Data streams   In this configuration, application output is in ASCII text plus DJDE format. No data stream conversion is required. A front end processor is not applicable.

Color specification   Enhanced PDL commands support highlight color. Refer to the *Xerox 4890 HighLight Color LPS PDL Reference* for more information.

Network interface

A DEC VAX/VMS mainframe is connected to a 4890 through an Ethernet LAN. Multiple solutions are present for this environment.

SPUR System 534: The SPUR System 534, available from the Xerox Connection, provides network connection. It should be noted that any VAX system utilizing TCP/IP in the VMS environment requires the Digital TCP/IP Services for OpenVMS (or equivalent), if it is not already present.

Xerox XNS 5.0 for VMS: If the Xerox XNS for 5.0 for the VMS software package is used, no communications protocol conversion is required. If XNS 5.0 is not used, then a bridge that provides connectivity between the VAX Ethernet TCP/IP or DECnet protocol and the selected Xerox interface is required.

Note: XNS 5.0 for VMS is limited to text printing only.

Entire 400/600: The Entire FIBRE 400/600 front end processor serves as a bridge for TCP/IP.

FunAsset TNxxxx: In Rank Xerox, the FunAsset TNxxxx series provides network connectivity through a DECserver 250, or equivalent. The FunAsset interface is also capable of providing a local or remote communications interface.

Data streams

In these configurations, application output can be either Interpress, LCDS (Xerox metacode), or PostScript, depending on the interface option selected.

The Entire FIBRE 400/600 solution converts PostScript data streams to .IMG files.

Color specification

PostScript masters may contain full color specification, in which case full color to highlight color mapping is required. The front end performs the color mapping automatically when it converts PostScript data to .IMG files.

If the data stream is line printer or LCDS, color is implemented through enhanced PDL or metacode commands. Refer to the *Xerox 4890 HighLight Color LPS PDL Reference* for more information.

Figure 4-12.   **DEC network interface**
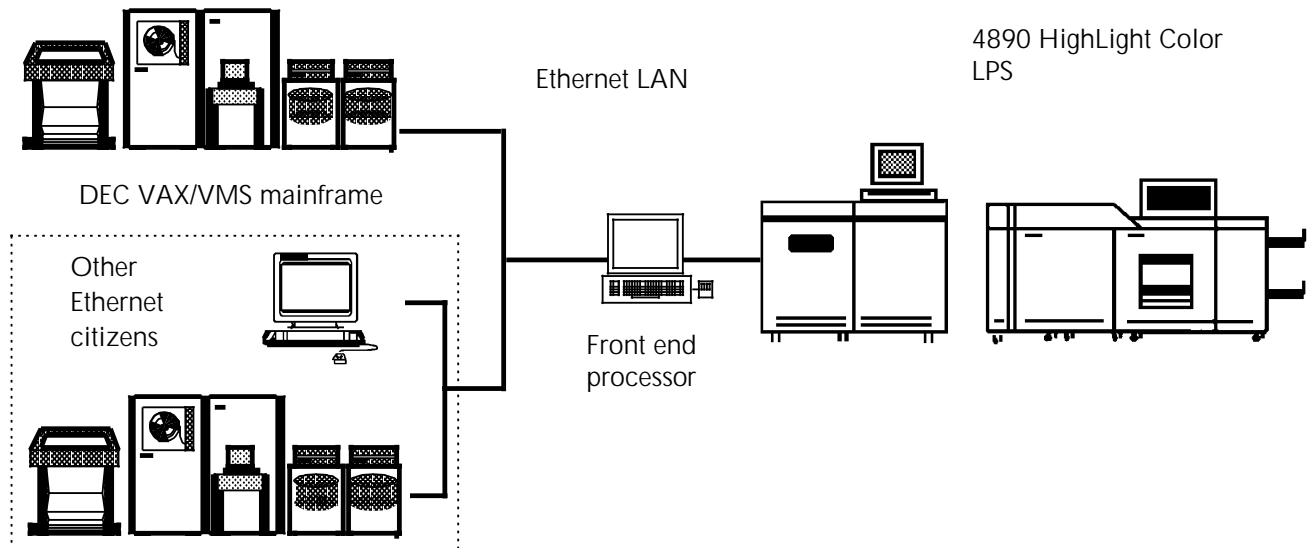
Connectivity options for other mainframes

Non-IBM or DEC mainframes are connected to the 4890 in an online configuration using third-party interface options.

Online interface option

Several non IBM-compatible mainframes may be connected to a 4890 printer through the appropriate third-party interface. Refer to the "Application software data streams and connectivity" appendix for a list of some of these interfaces. More information on third-party interfaces is available from the Xerox Connection or your site representative.

Data streams   For non IBM-compatible mainframes in an online configuration, application output is generally in line printer or LCDS (Xerox metacode) format. No data stream conversion is required, so a front end processor is not necessary.

Color specification   PDL and metacode commands support highlight color.

Figure 4-13.   **Mainframe in an online configuration**

4890 HighLight Color
LPS

Appropriate
third-party
interface or
converter

Non-IBM-compatible mainframe
(excluding DEC)
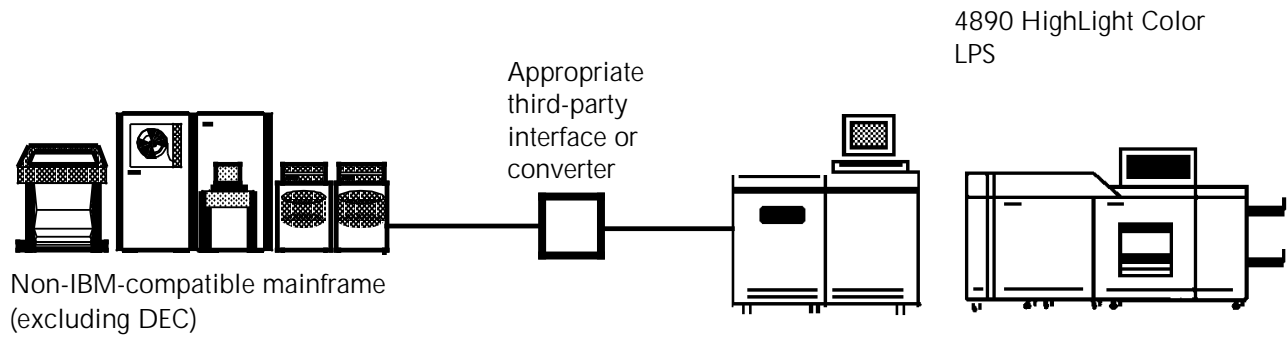
Connectivity options for IBM PC and PC-compatible workstations

To determine the appropriate connectivity option for your IBM
PC or PC-compatible workstation environment, consider the
interface option you use and the data streams to be output by
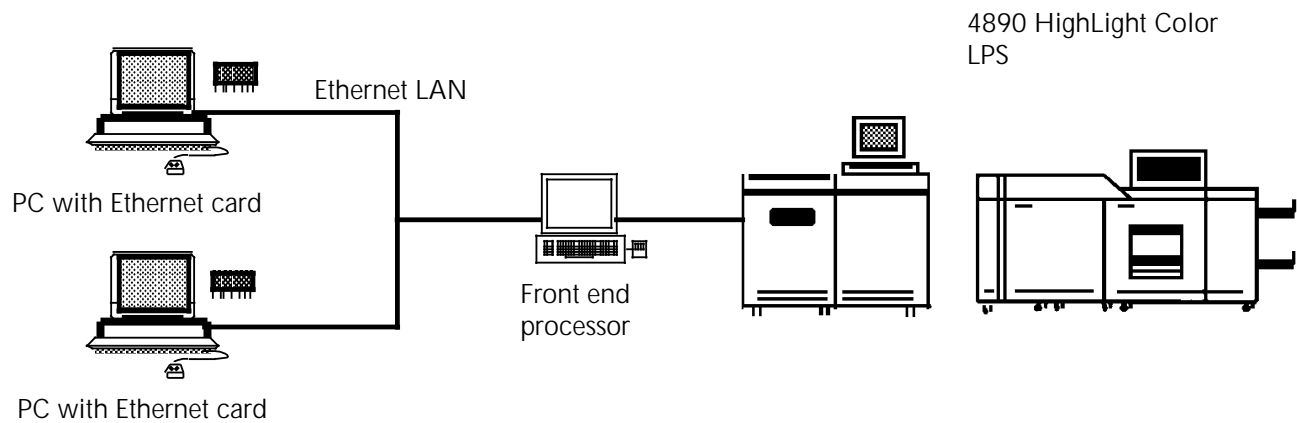your software applications.

Interface options

PCs can be connected to a 4890 with a network connection
(Ethernet or other) or in an online configuration using third-party
interface hardware and software.

Ethernet interface

A PC may be connected to a 4890 LPS through an Ethernet local
area network.

Figure 4-14.   **PC Ethernet interface**

4890 HighLight Color
LPS

Ethernet LAN

PC with Ethernet card

Front end
processor

PC with Ethernet card

Communication protocols   Each PC on the Ethernet LAN requires its own Ethernet card. The Ethernet TCP/IP print jobs are converted to Ethernet XNS print jobs by the Entire FIBRE 400/600 front end.

A combination of Ethernet card and the Xerox XNS PC Plus 2.0 software package allows a PC to produce XNS protocol on Ethernet. This configuration does not require a front end provided it is used with software applications that produce LCDS or Interpress data streams.

Data streams   Most of the application software running on a PC in this configuration produces PostScript data streams. When using PostScript applications, a front end is required to convert the PostScript output.

Color specification   PostScript masters may contain full color specification, in which case full color to highlight color mapping is required. The front end performs the color mapping automatically when it converts PostScript data to .IMG files. If printer colors are specified through the use of a facsimile palette, the printed colors closely match the displayed colors.

Other network interfaces

PCs may be connected to networks other than Ethernet, such as Token Ring.

Communication protocols   Non-Ethernet networks require a communication module that can convert to Ethernet. Generally, this type of communication module converts the original network protocol to TCP/IP protocol on Ethernet. This requires a front end that converts TCP/IP to XNS.

Figure 4-15.   **PC non-Ethernet network interface**

4890 HighLight Color LPS

Non-Ethernet LAN

PC

PC

Communication module

Front end processor
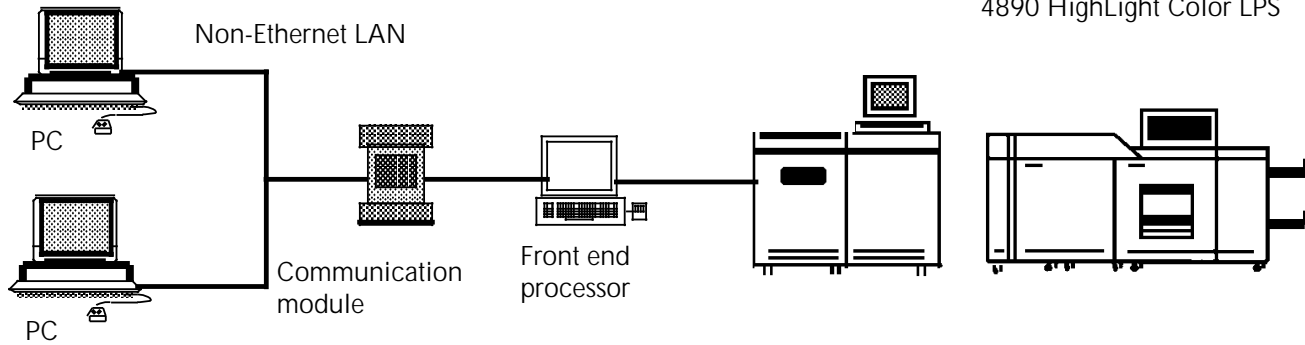
Data streams

Data streams are handled the same as described with the Ethernet interface above.

Color specification

Color specification is handled the same as described with the Ethernet interface above.

PC online interface

There is a third-party interface that allows a PC to be connected directly to a 4890 in an online configuration. Contact the Xerox Connection or your site representative for connectivity and application software information for this configuration.

Connectivity options for Macintosh workstations

To determine the appropriate connectivity option for your Macintosh workstation environment, consider the interface option you use and the data streams to be output by your software applications.

Interface options

Macintosh PCs are generally connected to an AppleTalk network. They may also be configured to connect to Ethernet. The type of LAN you use in your facility depends on the number of Macintosh PCs you want to connect to the 4890. If you want only a few of your Macintosh PCs to be capable of sending documents to the 4890, then an Ethernet connection may be more cost effective. If you have a large number of Macintosh PCs in your facility and you require all of them to be capable of transmitting to the printer, it is less expensive to use AppleTalk and convert to Ethernet through a communication module.

AppleTalk network interface

The standard Macintosh LAN configuration is through AppleTalk, and most networked Macintosh PCs use AppleTalk to communicate with a printer.

Communication protocols   The 4890 does not accept input directly from an AppleTalk network. AppleTalk must first be converted to Ethernet, so a communication module such as Shiva's FASTPATH is necessary. FASTPATH converts AppleTalk communication protocols into TCP/IP protocol on Ethernet. The TCP/IP print jobs can then be converted into XNS print jobs by a front end.

Data streams   Macintosh application software that produces output for printing produces PostScript data streams. The front end converts the PostScript output to Xerox .IMG files that can be read by the printer.

Color specification   PostScript masters may contain full color specifications, in which case full color to highlight color mapping is required. The front end performs the color mapping automatically when it converts PostScript data to .IMG files. If exact printer colors are specified through the use of a facsimile palette, then the colors print exactly as specified.

Figure 4-16.   **Macintosh AppleTalk network interface**
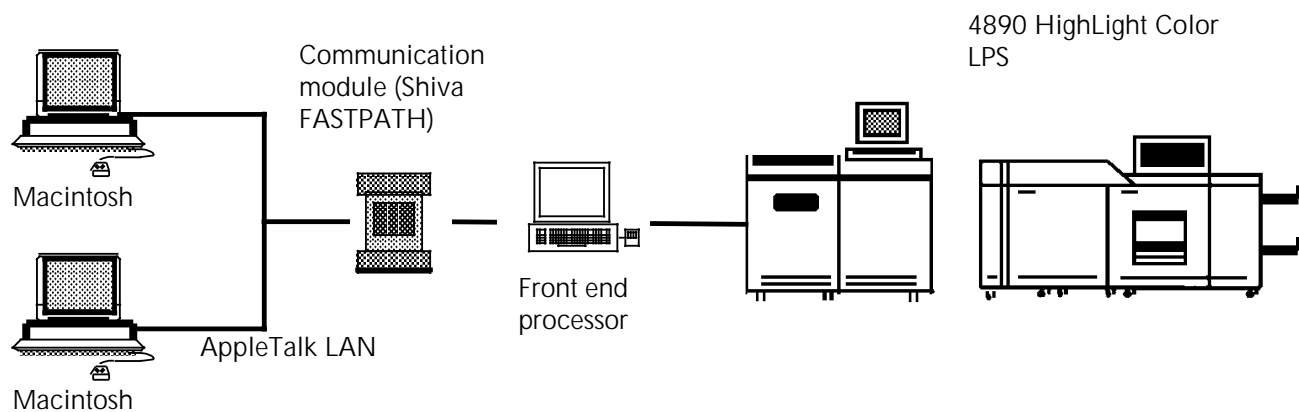
Ethernet interface

It is possible to connect a Macintosh to a 4890 through an Ethernet LAN. Each Macintosh connected to the network must have its own Ethernet card. One or a few Ethernet cards are less expensive than the communication module needed to convert AppleTalk to Ethernet, but if you have several Macintosh PCs that need to communicate directly with the printer it may be more cost effective to use the AppleTalk Plus communication module configuration.

You can use an Ethernet configuration to restrict printer accessibility to a small number of Macintosh PCs at your facility simply by installing Ethernet cards in only those few PCs you wish to have connected to the printer.

Figure 4-17. **Macintosh Ethernet interface**
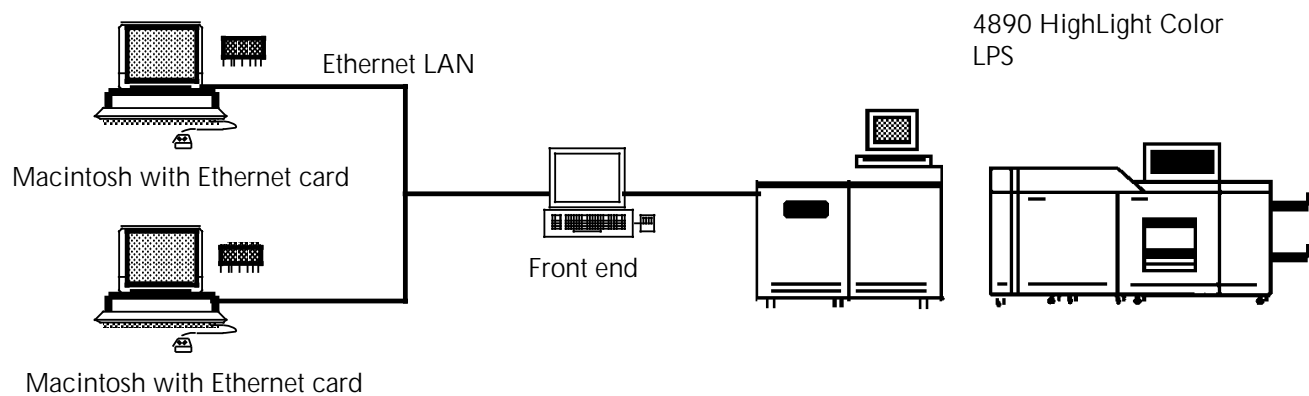
Communication protocols	With the Ethernet card in place, output is in TCP/IP on Ethernet. A front end is then required to connect TCP/IP to XNS.	
Data streams	The front end also converts the PostScript data streams output of Macintosh application software to .IMG files for printing.	
Color specification	PostScript masters may contain full color specification, in which case full color to highlight color mapping is required. The front end performs the color mapping automatically when it converts PostScript data to .IMG files. If exact printer colors are specified through the use of a facsimile palette, then the colors print exactly as specified.	

Connectivity options for Sun workstations

To determine the appropriate connectivity option for your Sun workstation environment, consider the interface option you will use and the data streams to be output by your software applications.

Interface options

The Sun workstation connects to a 4890 through an Ethernet interface. The equipment needed for connectivity depends upon the communication protocol and the data streams used. The workstations communicate to the 4890 LPS through the Xerox Network System (XNS) using XNS protocols.
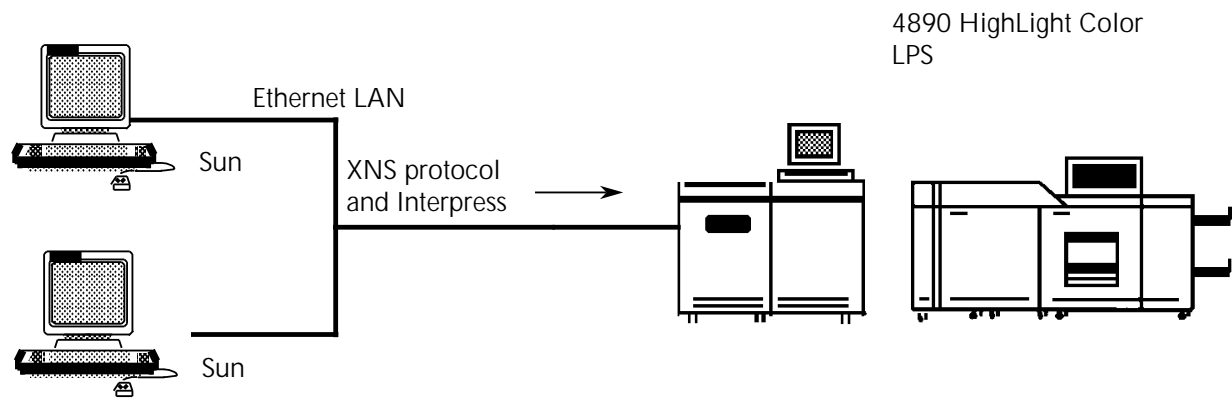
Ethernet with XNS protocol

Communication protocols A Sun workstation can be configured to produce XNS protocol output on Ethernet. This communication protocol is acceptable to the 4890 without conversion.

Figure 4-18. **Sun Ethernet interface involving XNS protocol and Interpress data streams**

Data streams   If the application software you are using on your Sun produces an Interpress data stream, then conversion is not necessary and a front end is not required. However, if you are using an application that produces PostScript data streams, a front end is required to convert the PostScript data into .IMG files.

Color specification   Both Interpress and PostScript masters may contain full color specification, in which case full color to highlight color mapping is required. For Interpress, the 4890 performs the color mapping automatically. For PostScript, the front end performs the color mapping automatically when it converts PostScript data to .IMG files. If printer colors are specified through the use of a facsimile palette, then the colors print exactly as specified.

Ethernet with TCP/IP protocol

Communication protocols   If a Sun workstation is connected to an Ethernet LAN using a TCP/IP protocol, the TCP/IP must be converted on the front end to XNS protocols before the data reaches the printer.

Data streams   A front end is already required in this configuration to connect TCP/IP to XNS. The front end also converts PostScript data streams to .IMG files, which is necessary if the application software being used produces output in PostScript. If the application software produces output in Interpress, the front end connects TCP/IP to XNS and passes the Interpress data streams through without further conversion.

Color specification   Both Interpress and PostScript masters may contain full color specifications, in which case full color to highlight color mapping is required. For Interpress, the 4890 performs the color mapping automatically. For PostScript, the front end performs the color mapping automatically when it converts PostScript data to .IMG files. If printer colors are specified through the use of a facsimile palette, then the colors print exactly as specified.

Figure 4-19. **Sun Ethernet interface involving TCP/IP protocol or PostScript data streams**

Ethernet LAN

Sun

Sun

Front end processor

4890 HighLight Color LPS
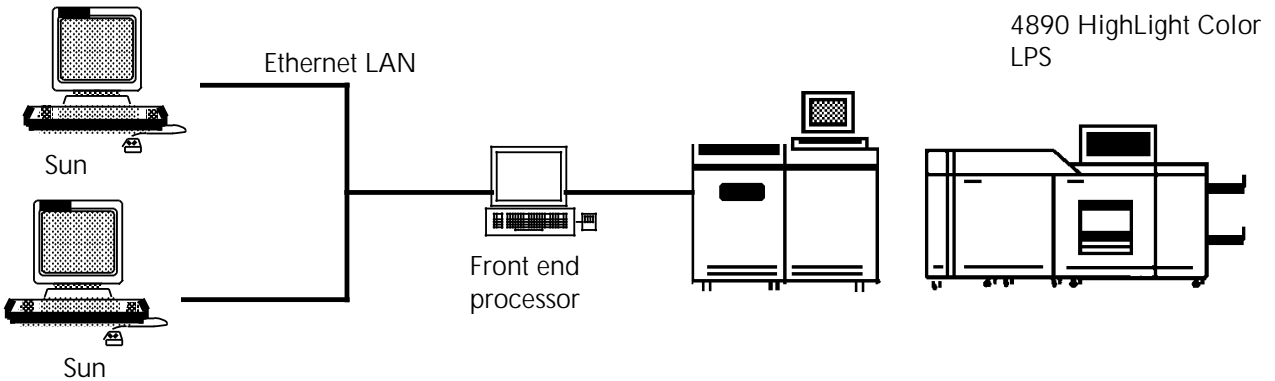
Connectivity options for other workstations

Workstations other than the IBM PC, Macintosh, and Sun may also be connected to the 4890 through a LAN. The connectivity products needed depend upon the type of network used, the communication protocols used on that network, and the data streams generated by the application software in use.

Ethernet interface

Several types of workstations now have Ethernet compatibility. An Ethernet card is required for each compatible workstation you wish to connect to the 4890.

If the workstation uses TCP/IP protocol on Ethernet, a front end is required to connect TCP/IP to XNS. A front end is also necessary if the application software used produces a data stream other than Interpress or LCDS.

Refer to figure 4-14 for an example of an Ethernet LAN interface.

Other network interfaces

If your workstations use a LAN other than Ethernet, a communication module is necessary to convert to Ethernet. This conversion usually produces TCP/IP on Ethernet rather than XNS on Ethernet.

A bridge or front end is required to convert TCP/IP to XNS. The front end is also necessary if the application software used produces a data stream other than Interpress or LCDS.

Refer to figure 4-19 for an example of an interface involving a non-Ethernet LAN.

Offline connectivity for workstations

An offline interface option is available for workstations. These interfaces require a front end processor.

There are several ways of loading data onto the front end using magnetic media:

- An application job is loaded directly onto an Entire front end using a 3.5 inch UNIX disk.

- An optional 3.5 inch DOS disk drive is also available for the front end, allowing input from a DOS-formatted 3.5 inch floppy disk.

- An optional tape drive allows application input from a 9-track reel tape and a 1/2-inch (18-track) cartridge tape.

- An optional 1/4-inch cartridge tape drive allows application input from a 1/4-inch tape.

Figure 4-20.   **Offline connection through front end**
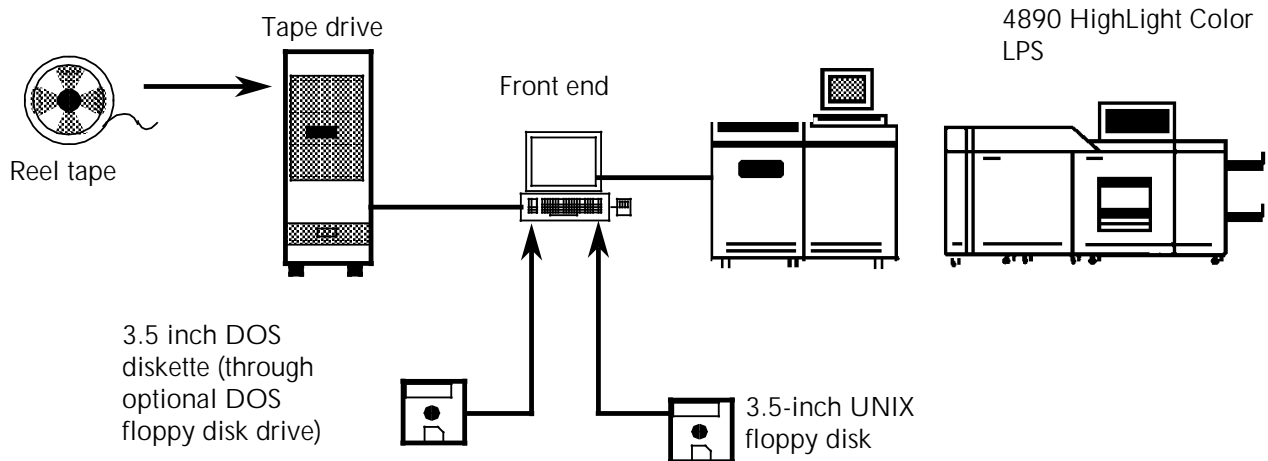
High Speed PostScript Printing (HSPP) solutions (or SDI)

The Xerox High Speed PostScript Printing (HSPP) solutions (also referred to as Shared Disk Interface or SDI) allow workstation and mainframe users on a variety of computer networks to access the Xerox 4890 Laser Printing System.

This option is available with version 4.1 software only.

The HSPP solutions accept document files in a number of different formats (such as PostScript, HP/PCL 4/5, Interpress, ASCII text, CCITT G3, and TIFF) and converts the files to Xerox printer formats. The converted files are printed according to the printing and finishing requirements you select.

For more information on HSPP solutions, contact your sales representative or refer to the *Xerox High Speed PostScript Printing (HSPP) Operations Guide* and other user documentation included with your HSPP system.

5.   User considerations

This chapter outlines some of the features and limitations of the Xerox 4890 HighLight Color Laser Printing System (LPS), and is designed to help you determine the most efficient and effective way to install and use the printer.

Job compatibility

The 4890 LPS has an advanced xerographic mode-switching capability enabling it to serve as an efficient backup printer for a Xerox LPS in the 9790 or 4050 families.

Jobs transferred from 4050 or 9790 family black-only printers to the 4890 LPS run without compatibility problems. The 4890 runs in black mode and prints only in black ink. However, if color jobs are created for the 4890 and transferred to a Xerox LPS device in the 9790 or 4050 families running current releases of the operating system software, errors will occur, and the job will not print.

Image size considerations

The 4890 LPS can feed and print on a variety of paper sizes. The size of the image can also be manipulated, with some limitations.

To fully understand these limitations, the operator should be familiar with three terms:

*   **System page**. Refers to the maximum image area, which is 8.62 by 14.00 inches/209.8 by 355.6 mm. No print elements may originate off the leading edge of the system page (refer to the "Non-imaged elements" section later in this chapter). Figure 5-1 shows the relationship between the system page, the physical page, and the virtual page.

- **Physical page**. Refers to the actual paper size. The 4890 LPS can accommodate a range of paper sizes:

Inches	Millimeters
8.0 x 10.0	203 x 254
8.0 x 10.5	203 x 267
8.0 x 13.0	203 x 330
8.27 x 10.63	210 x 270
8.27 x 11.69/A4	210 x 297
8.27 x 13.0	210 x 330
8.37 x 10.78	213 x 274
8.46 x 10.83	215 x 275
8.46 x 12.4	215 x 315
8.46 x 14.02	215 x 356
8.5 x 10.75	216 x 273
8.5 x 11.0/USLETTER	216 x 279
8.5 x 13.0	216 x 330
8.5 x 14.0/USLEGAL	216 x 356

- **Virtual page**. Refers to the dimensions of the page as specified in the software. The dimensions of the virtual page may be less than or equal to the dimensions of the physical page size, but not larger. Larger values are truncated.

Figure 5-1 shows the relationship of the system page and the virtual page to several physical page sizes.

Figure 5-1. **4890 page frames**
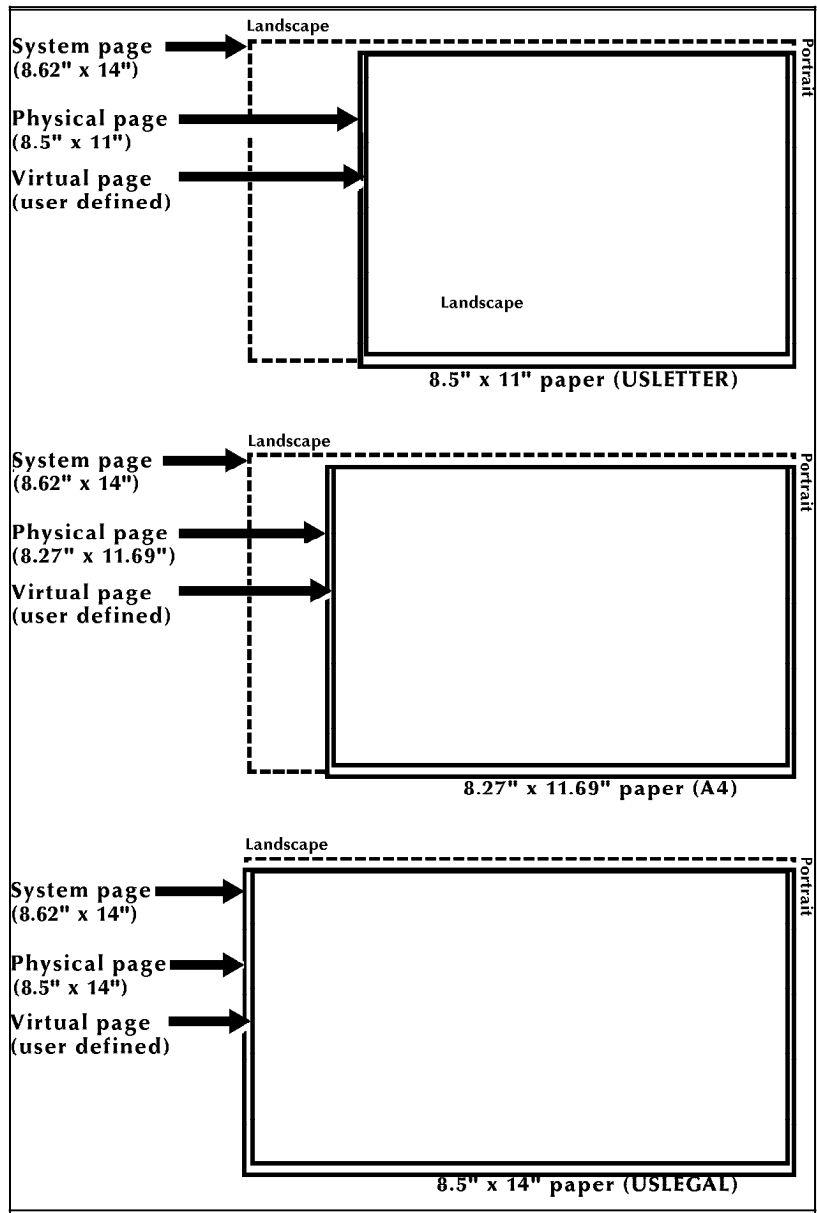
Edgemarking

Edgemarking is the placement of marks along the edge of the page. These marks consist of graphic elements that bleed off the paper, tabs for section reference, or marks that denote changes made in redline drafts.

The maximum image size on the 4890 LPS is 8.62 by 14.00 inches/218.9 by 355.6 mm. The printer only allows imaging off the page on the top and left edges of a landscape page, and left and bottom edges of a portrait page.

Note: Caution should be used when edgemarking. Printing a solid band on the leading edge of the paper may cause fuser jams.

Non-imaged elements

Figure 5-1 shows the relationship of the system page to the physical page for several physical page sizes. Elements, such as text and graphics, may begin at the edge of the physical page on two sides, and off the physical page on the top and on the left side (except 8.5 by 14 inch paper).

However, if any part of a printed element begins off the system page, no part of the element is imaged. Figure 5-2 illustrates this principle.

Figure 5-2.   **Non-imaged elements**
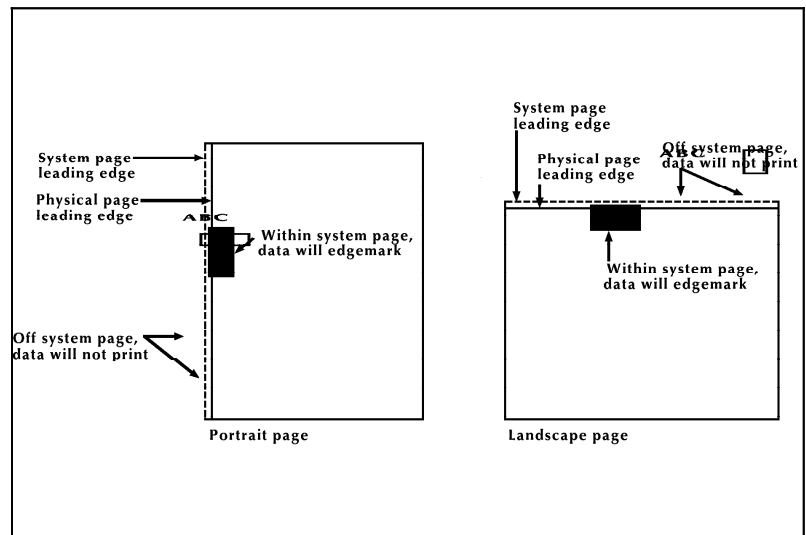
- If a line of variable data begins off the system page, the system prints as much of the line as possible.

- If a ruled line begins off the system page, no part of the ruled line is printed.

- A ruled line near the edge of the system page must be positioned at least one-half the line thickness inside the system page to print. For example, a bold line is eight dots thick and, therefore, it must be positioned at least four dots inside the system page leading edge.

One common cause of print elements accidentally beginning off the system page is the improper use of the PDL OUTPUT SHIFT command. This command is used to shift the entire page contents relative to the boundaries of the system page. When a negative shift value is entered (as is often the case for the back side of duplex pages), and that value exceeds the left margin, the system prints as much of the text as possible. When using a negative value for the SHIFT command, make sure that it is less than the value of the left margin.

Error messages

If any part of a print line originates off the system page, the following message is displayed:

OS6905 DATA ORIGIN OFF PAGE -- CHECK OUTPUT

This message line appears only once during a print job. It indicates that a print line origin problem exists within the form description, or that an excessive SHIFT value has been specified. Refer to the *Xerox 4850/4890 HighLight Color LPS Forms Creation Guide* for more information.

Registration shift and skew

The registration of a printed image can appear shifted or skewed on a page if the sheet of paper is misaligned as it enters the printer. Because of the design of the LPS feeder, the image registration on each page can vary slightly both horizontally and vertically by up to .05 inch. (1.0 mm). The image can also be slanted or skewed slightly by up to .05 inch. (1.0 mm) in opposite directions, for a maximum skew of 0.1 inch. (2.0 mm). (Refer to figures 5-3 and 5-4.)

Note that the following figures are the same specifications merely rotated to show portrait and landscape orientations. The shift and skew variances described here are within allowable specifications, but as this can affect the registration of variable data in preprinted forms and the placement of images close to the edge of the page, it is important to make allowance for this condition.

Figure 5-3.   **Landscape orientation shift and skew (8.5 x 11 inches/216 x 279 mm)**
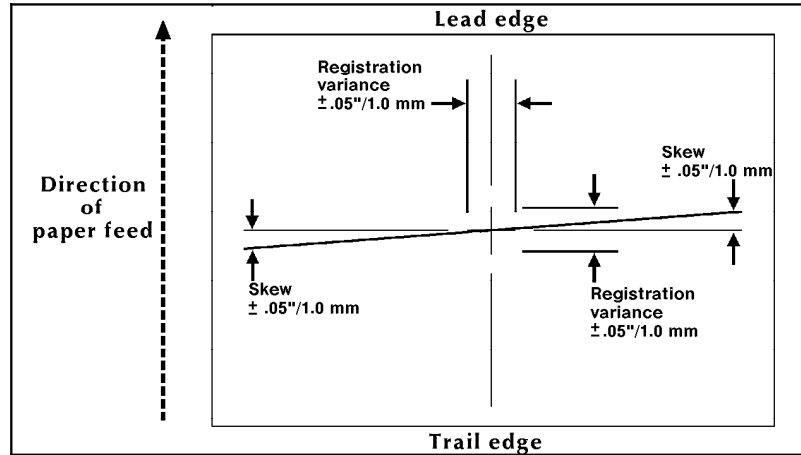
Figure 5-4.   **Portrait orientation shift and skew (8.5 x 11 inches/216 x 279 mm)**
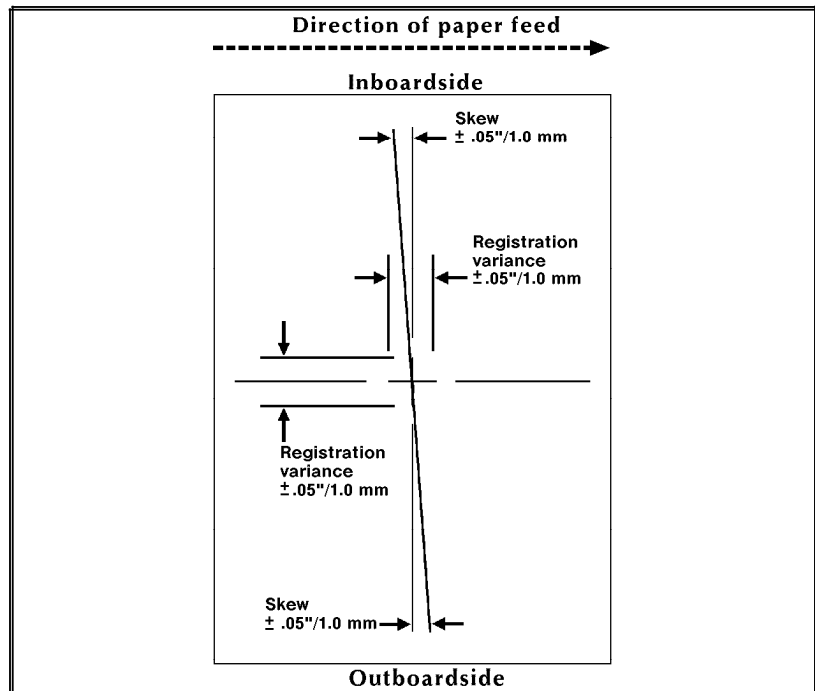
For best results, when designing preprinted forms, allow approximately .1 inch or 2.0 mm space on all sides of any boxes, or above and below any lines onto which variable data is to be printed, as illustrated in figure 5-5.

Figure 5-5. **Maintaining margins in preprinted boxes to allow for LPS registration and skew variations**
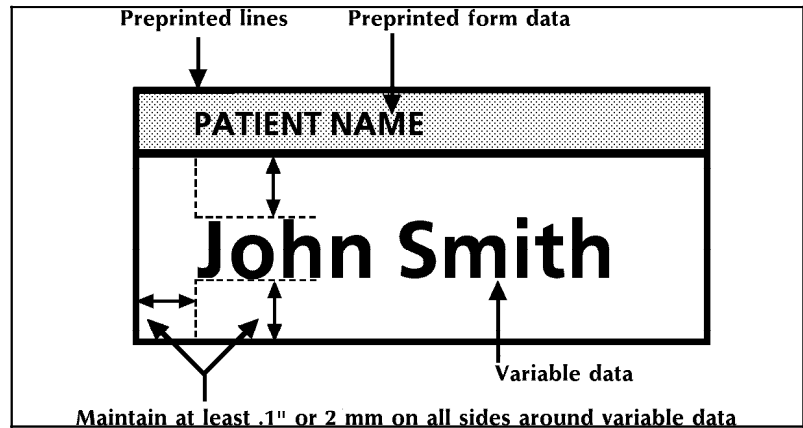
Graphic images

The 4890 LPS can print graphics in Xerox .IMG formats, and graphics created in host software packages, including those that output Interpress, PostScript, or HP-PCL5 through a front end option.

In all instances, the graphic video generator (GVG) option must be installed in your printer. The GVG option may be installed with 32 Mb or 256 Mb of memory.

If your applications require printing large graphics files in the .IMG format, multiple images on a single page, or complex Interpress masters, increased GVG memory can greatly reduce the processing time required to print these documents.

Regardless of the amount of GVG memory installed in your system, printing of graphics has the following limitations on the 4890:

- The largest .IMG that can be printed is 8.5 x 13.65 inches/261 x 347 mm (regardless of paper size).

- The 4890 can print up to a maximum of 128 graphic images on a single page (fewer if the images are very complex).

Fonts

There are two areas of consideration relating to fonts:

- Increasing font memory to improve processing time for applications that require large fonts or a large number of different fonts on a single page

- Using Xerox 4050 family LPS fonts with the 4890 LPS.

Font memory

The 4890 can print up to 128 fonts on a single page.   When processing the page data, the controller stores font information in a special memory cache called font memory. The amount of

memory required to store font data depends on the size of the fonts and the number of different fonts on a single page.

If your applications call for either large fonts, or a variety of fonts on a single page, the increased font memory option can greatly improve the processing time required to print these documents.

Custom fonts, logos and signature font data also consume font memory during processing.

Compatibility with 4050 and 9790 family Xerox LPS fonts

If you are using both 4050 and 9790 family Xerox LPS devices at your site, you may use the A03 set of fonts already in your possession with the 4890. You can also maintain a set of the A03 fonts on your 4890 for printing jobs created for other Xerox printers. Use of fonts other than the A03 set is a violation of the license agreement for those particular fonts.

Because of the advanced imaging technology in the 4890 LPS xerographic system, you can obtain better results by using the fonts designed for the 4890. Several core fonts are provided with the printer and additional font families may be ordered.

Transparencies

The 4890 can print on transparency stock. However, for highlight colors to be rendered correctly, an external fusing process is required after the printing is complete and the transparency is delivered to the sample tray.

Transparencies printed using only black inks do not require external fusing. Consult your site representative for more information about this external fusing process.

For the best results when printing on transparencies, use only those recommended in the supply order form in the *Xerox 4890 HighLight Color LPS Installation Planning Reference.*

Transfer blade

The 4890 uses a transfer blade during the application of dry ink to keep the paper perfectly flat and reduce the occurrence of "deletions" or white spots in imaged areas.

For effective operation of the transfer blade, it is necessary that the paper be of equal length or longer than the transfer blade. The standard transfer blade supports four standard paper lengths: 11, 11.7, 13, and 14 inches/279, 297, 330, and 356 mm.

If you want to run paper stocks of lengths less than 11 inches/279 mm, or of a length intermediate to the four sizes in the standard blade, you can have a custom transfer blade installed that is cut to the exact length of the special paper stock. A customized transfer blade must be cut by a service representative. The customized transfer blade is used only with the specific size paper stock; when other paper sizes are run, the standard transfer blade must be reinstalled in the printer.

If you use paper sizes intermediate to the four standard lengths listed above and the standard transfer blade is installed, the system selects the next shorter blade length. This may result in deletions in the outer margins of the page beyond the region of blade contact. If this occurs, and is objectionable for a given application, a standard paper size should be used.

The use of the transfer blade is enabled and disabled with an operator command. The use of the BLADE ENABLE, BLADE DISABLE command is described in the *Xerox 4850/4890 HighLight Color LPS Command Reference.*

Output performance considerations

The 4890 has a rated speed of 92 impressions per minute (an impression refers to one printed side of a sheet of paper). The actual output performance you experience depends greatly on the processing features invoked in the job and the print density of each page.

Actual output also varies according to the configuration of the 4890, such as the type of connection (offline, online, remote communication, and front end processor).

This section provides information on expected output performance when printing various types of jobs, applications, and hardware configurations. For more detailed information, consult your service representative.

Note: Throughput refers to the print speed once pages start printing. The processing that occurs prior to the actual printing of the pages depends greatly on the complexity of the job.

Interpress
Interpress masters sent to the 4890 must be processed by the Interpress decomposer function of the Operating System Software (OSS). The time required to print an Interpress job depends on the complexity of the image from page to page.

PostScript
PostScript masters sent to the 4890 must first be converted to .IMG files in the front-end processor. The time required to print a PostScript job depends on the complexity of the image from page to page.

Number of inks referenced
This applies to all types of print jobs that utilize highlight color. You can improve throughput in your jobs by not referencing any inks not required by the job, by reducing the number inks required by the job, or by using ink indexing instead of using ink names.

Dynamic job descriptor entries
The use of Dynamic job descriptor entries (DJDEs) adds processing time and slows the output. To maximize performance, restrict the use of DJDEs to the following commands: GRAPHIC, FORMAT, MODIFY, and FORM.

Print density
Full throughput estimates are based on pages with an average print density of approximately seven percent of the page. Pages which are very dense require more time to image and therefore to print.

Print quality adjustment
The 4890 maintains optimal print quality adjustment (PQA) by monitoring the state of the dry inks as they are called for by the print job. If the state of a required dry ink is such that the print quality would be adversely affected, the system shifts into adjusting print quality mode until the dry ink is in the proper

state. During printing this adjustment occurs automatically. In some cases the operator is requested to initiate PQA.

A request for PQA can occur when:

•   **The color developer housing has been changed.** The dry ink must be evenly distributed within the housing, and its electrostatic charge must be properly set.

•   **A color developer housing has been unused for over 16 hours.** If a dry ink remains unused for a long period of time, its electrostatic charge may dissipate. PQA is required to reset the proper charge state.

The operator may initiate a PQA without waiting to be instructed to do so by the system. This allows you to schedule PQA as part of your daily routine. For example, you could schedule PQA to be run at the beginning of the first shift of the day. As a standard procedure, you should run PQA after the color housings have been idle for longer than 16 hours. Routine or regularly run PQAs reduce the number of system-initiated requests for PQA and therefore reduce the number of delays and interruptions to print jobs.

Mode switching

The 4890 has two modes of operation:

•   Black mode, using only the black primary color

•   Highlight color mode, using black plus a highlight primary color.

Pages requiring highlight color must be printed in highlight color mode. Pages requiring black ink only may be printed in either black mode or highlight color mode. Shifts from one mode to the other are handled automatically by the 4890 system controller. It is possible to have a mode switch during a job. For example, if highlight color is required for the first two pages in a several hundred page job, the controller selects highlight color mode, then shifts to black mode for the remaining pages. The point when the controller actually makes the shift to black mode depends upon the xerographic mode persistence (XMP) setting in effect. XMP is a feature that allows you a measure of control over mode switching.

Xerographic mode persistence   The 4890 system controller selects and sets the xerographic mode persistence (XMP) by evaluating the demands of the printing job. It first determines what primary ink colors are needed for a page and, if highlight color is required, it shifts into highlight color mode. The controller then uses the current XMP setting to determine the maximum number of black-only pages to print in highlight mode. If that number of pages is printed without encountering a page requiring highlight color, a shift-to-black mode will occur.You can set XMP to control how long the highlight color mode remains in effect.

The XMP system parameter instructs the controller on what basis the xerographic mode is to be switched back to black mode:

•   Never (always stay in highlight color mode),
•   After a specified number of pages (minimum 50 pages)
•   Report (Output statement of DJDE).

Reasons to use XMP   Use XMP to optimize printer performance in regard to the following factors:

- **Throughput.** The time required to change modes is approximately 15 seconds. Throughput is reduced by frequent mode changing. It is at a maximum when the printer is operating continuously in a single mode.

- **Dry ink consumption.** When printing jobs requiring only black inks in the highlight color mode, some non-imaged color dry ink is consumed. Printing black-only pages in black mode reduces color dry ink consumption.

- **Print consistency.** Both highlight color and black modes render high-quality black printing, but there are minor differences in print appearance between modes. Applications requiring high uniformity of appearance should not switch modes within a report.

The default XMP setting   XMP can be set using the sysgen XMP commands. The XMP parameter set during sysgen becomes the default setting.

Modifying XMP on a job-by-job basis   At times you may want to override the default XMP setting to control mode switching on a report-by-report or copy-by-copy basis. For example, if the default setting would result in a mode switch during a job that requires a uniform appearance, you can override the default setting and keep the mode consistent during that report. This can be done by changing the XMP setting for a particular report using the PDL OUTPUT XMP statement. You can also change the XMP setting for individual copies of a report by using the XMP parameter in a DJDE. For further information refer to the *Xerox 4850/4890 Highlight Color LPS PDL/DJDE Reference.*

Throughput considerations related to highlight color

Highlight color printing introduces a number of new considerations that have an impact on printer productivity. To maintain peak printer throughput, you need to make some decisions concerning the order that color jobs are printed, when to change the printing mode, and when to change the dry ink color.

Queue management

In addition to black, only one dry ink color may be loaded at any given time. Changing to a different color developer housing and running print quality adjustment (PQA) takes a few minutes and a large number of such changes in one day could create a substantial decrease in productivity. The queue management feature helps you minimize the number of color developer housing changes. A report enters a queue according to the attributes within the job. Those attributes may include color and finishing requirements. The scheduling mode processes the reports according to the attributes.

If each job name indicates the color required for printing, it would be possible to use the HIP queue to release only jobs of a certain color, one by one.

Ink substitution

For jobs that require a color substitution, there is an ink substitution feature that allows an operator to substitute another dry ink color in place of the one specified in the job.

The ink substitution feature is useful for processing generic queues, since the jobs in a generic queue may be printed in whatever dry ink color is currently loaded. These queues can be processed without operator intervention by using SUB INK CURRENT FOR COLOR ALWAYS. This substitution must be canceled before enabling a queue requiring a specific color.

Ink mismatch Ink substitution may also be used in the event of an ink mismatch. An ink mismatch occurs when a report requests the use of a primary dry ink color not currently loaded. A mismatch can occur within a report and may be detected after print processing has started. When a mismatch occurs, the operator has three options:

- Substitute the currently loaded dry ink for the dry ink requested by the job

- Load the required dry ink housing and run PQA

- Abort the job.

The decision of whether or not to substitute the currently loaded dry ink in place of the requested dry ink may be based on productivity requirements. For example, you could specify that dry ink be changed to match the job requirement only during off-peak hours, so that during peak demand hours the currently loaded dry ink would always be used despite any ink mismatch.

6. LPS comparison

The Xerox 4890 Laser Printing System (LPS) has many standard and optional features that distinguish it from other Xerox Laser Printing Systems. Although most print jobs are interchangeable with other Xerox printers, this chapter points out the unique qualities of the 4890 running Version 4 software. This will help you to determine if your system is compatible with other Xerox printers at your site.

This chapter contains LPS compatibility and comparison charts as well as a summary of the unique hardware and software features of the 4890 LPS.

Hardware

System disk capacity
One 400 MB fixed disk and may be configured with three additional 400 MB disks.

1/4-inch cartridge tape drive option
The optional 1/4-inch cartridge tape drive provides alternate backup capability (maximum of 320 or 525 MB depending on the choice of tape cartridge) for the disk subsystem.

Customized transfer blade
The transfer blade, used to reduce the occurrence of print deletions on paper that is not perfectly flat, has four standard lengths that can be adjusted automatically to work with standard size paper (11, 11.7, 13, and 14 inch/279, 297, 330, and 356 mm). It is also possible to cut a single custom blade (installed by a service representative) to fit any non-standard size paper.

Customer changeable unit
The customer changeable unit (CCU) includes the color developer housing and the dry ink bottle. The unit is removed using the CCU cart when the operator wishes to change the highlight primary color. The CCU remains on the cart for storage purposes. Therefore, it is necessary to have a cart for each color the operator wishes to print with the 4890, always leaving an extra cart available for changing CCUs.

Attention light
A light is mounted on the printer control console to alert operators when a problem in the printer requires their attention. This might include a paper jam, empty tray, or depleted toner.

Mode and color icons
The printer control console has two displays: one that indicates the mode the LPS is running (either highlight color or black) and one that indicates the color of the dry ink in the color developer housing currently installed.

Tri-level xerography
The raster output scanner (ROS) on the 4890 LPS has the ability to expose both the white and the highlight primary color images in a single pass. It is this advanced technology that makes highlight printing possible. Creating both images at once ensures near perfect registration and unreduced throughput on the printer.

Software

The operating system software (OSS) includes support for the hardware features described above, as well as the following:

- Highlight color, including the ability to utilize tones of the highlight primary color in forms, documents, and graphics.

- The color capabilities of page description languages: PostScript and HP-PCL through a front-end processor.

- Two-color logos and color graphics images. A utility is provided to convert existing monochrome black resource files to any chosen 4890 LPS primary color.

- Enhanced PDL and FDL commands include support for highlight color features, including logos, edgemarking and variable text.

- Ink substitution, which gives the operator the option of substituting another primary in a job if the specified CCU is not available, or of changing the primary used in a print job without recoding the application.

- Xerographic mode switching, which allows the printer to run in black mode (for printing black inks only), or in highlight color mode (for printing black plus one other highlight primary color).

- Print quality adjustment (PQA) is a function of the OSS designed to maintain the electrostatic charge state of the xerographic subsystem to ensure optimum print quality.

LPS compatibility and comparison

Your 4890 running OSS Version 4 may print jobs created on other Xerox Laser Printing Systems running another OSS. Consider the following factors:

- Are fonts required by the job?

- Are font character sets required by the job?

- Are forms required by the job?

- Is the allocated size of the print file on the LPS appropriate for the print job?

- Is the current forms default appropriate for the print job?

- Is the current graphics default appropriate for the print job?

- Is the current font default appropriate for the print job?

- Does the LPS have sufficient memory hardware for the print job?

- Does the Interpress set (Commercial or Publication set) loaded on the LPS support the printing requirements of the print job?

- Does the print job request a finishing device?

- Does the print job require a configured XPAF, HIP, or SDI connection?

The following tables, 6-1 through 6-6, identify what you need to consider when using the 4890 LPS for printing jobs created on other printers with different OSS versions.

Table 6-1.   **Jobs created for 4050/4090 (V3.5)**

Job features from 4050/4090 (V3.5)	Results when run on 4890 (V5)
Programmable bypass transport	Job prints if LPS has a bypass transport and the finishing device required by the job. Otherwise, it does not run. Accounting sheets and error message pages go to the sample tray.
Clusters	Job prints. Operator needs to redefine clusters if trays differ.
Color	Print job waits in a queue until the specified color is available, unless substitute inks is already in effect.
Edgemarking	Job prints.
Fonts	Job prints if the fonts and character sets used are loaded on the LPS or if substitutions for these fonts are defined.
Graphics	Job prints if graphic memory is available, and if graphic files are loaded.
Labels	Job prints using only paper labels.
Page density	Job prints.
Paper sizes	Job prints.
Paper stock	Job prints if it does not use edge-reinforced, 3-hole stock.
Stitch commands	Document is stitched, if stitcher option is implemented.
Transparencies	Job prints. Transparencies must be loaded as a special stock in tray 1 or 2, and delivered to the sample tray.

Table 6-2.   **Jobs created for 4650 (V3.5)**

Job features from 4650 (V3.5)	Results when run on 4890 (V5)
Programmable bypass transport	Job prints if LPS has a bypass transport and the finishing device is required by the job; otherwise, it does not run. Accounting sheets and error message pages go to the sample tray.
Clusters	Job prints. Operator needs to redefine clusters if trays differ.
Edgemarking	Job prints.
Fonts	Job prints if the fonts and character sets are loaded on the LPS or if substitutions for these fonts are defined.
Graphics	Job prints if graphic memory is available, input source is 300 dpi resolution, and graphic files are loaded.
Labels	Job prints using only paper-faced labels.
Page density	Job prints.
Paper sizes	Job prints.
Paper stock	Job prints if it does not use edge-reinforced 3-hole stock.
Stitch commands	Job is stitched if stitcher option is implemented.
Transparencies	Job prints. Transparencies must be loaded as a special stock in tray 1 or 2, and delivered to the sample tray.
600 dpi	Prints in 300 dpi.

Table 6-3.   **Will this 4850 (V3.7) job print on my 4890 (V4)?**

Job features from 4850 (V3.7)	Results when run on 4890 (V5)
Programmable bypass transport	Job prints if LPS has a bypass transport and the finishing device is required by the job; otherwise, it does not run. Accounting sheets and error message pages go to the sample tray.
Clusters	Job prints. Operator needs to redefine clusters if trays differ.
Color	Job waits in a queue until requested color is implemented.
Edgemarking	Job prints.
Fonts	Job prints if the fonts and character sets are loaded on the LPS or if substitutions for these fonts are defined.
Graphics	Job prints if graphic memory is available, input source is 300 dpi resolution, and graphic files are loaded.
Labels	Job prints using only paper-faced labels.
Page density	Job prints.
Paper sizes	Job prints.
Paper stock	Job prints.
Stitch commands	Document is stitched if stitcher option is implemented.
Transparencies	Job prints. Transparencies must be loaded as a special stock in tray 1 or 2, and delivered to the sample tray.

Table 6-4.   **Will this 9790 (V2) print on my 4890 (V5)?**

Job features from 9790 (V2.1)	Results when run on 4890 (V4)
Clusters	Job prints. Operator needs to redefine clusters if trays differ.
Edgemarking	Job prints.
Fonts	Job prints if the fonts and character sets used are loaded on the LPS or if substitutions for these fonts are defined.
Graphics	Job prints if graphic memory is available, and graphic files are loaded.
Labels	Job prints using only paper-faced labels.
Page density	Job prints.
Paper sizes	Job prints with the exception of 7 by 12 inch paper.
Paper stock	Job prints with the exceptions of edge reinforced 3-hole paper and envelops.
Stitch commands	Document stitches if stitcher option is implemented.
Transparencies	Job prints. Transparencies must be loaded as a special stock in tray 1 or 2, and delivered to the sample tray.

Table 6-5   **Will this 8790 (V2) print on my 4890 (V5)?**

Job features from 8790 (V2.1)	Results when run on 4890 (V4)
Clusters	Job prints. Operator needs to redefine clusters if trays differ.
Edgemarking	Job prints.
Fonts	Job prints if the fonts and character sets used are loaded on the LPS or if substitutions for these fonts are defined.
Graphics	Job prints if graphic memory is available, and graphic files are loaded.
Labels	Job prints using only paper-faced labels.
Page density	Job prints.
Paper sizes	Job prints.
Paper stock	Job prints with the exceptions of edge reinforced, 3-hole paper.
Stitch commands	Document is stitched if stitcher option is implemented.
Transparencies	Job prints. Transparencies must be loaded as a special stock in tray 1 or 2, and delivered to the sample tray.

Table 6-6. **Will this 4135 print on my 4890 (V5)?**

Job features from 4135	Results when run on 4890 (V4)
Clusters	Job prints. Operator needs to redefine clusters if trays differ.
Edgemarking	Job does not print. 4890 does not recognize the 4135 logical page setup and command.
Fonts	Job prints if the fonts and character sets used are loaded on the LPS or if substitutions for these fonts are defined.
Graphics	Job prints if graphic memory is available, and graphic files are loaded.
Labels	Job prints using only paper-faced labels.
Page density	Job prints.
Paper sizes	Job prints.
Paper stock	Job prints with the exceptions of edge reinforced 3-hole paper.
Transparencies	Job prints. Transparencies must be loaded as a special stock in tray 1 or 2, and delivered to the sample tray.
Programmable bypass transport	Job prints if the LPS has a bypass transport and the finishing device required by the job. Otherwise, it does not run.
Ordered stock	Unique to the 4135.

Paper sizes and special stocks

If your job requires a particular paper size, make sure your 4890 is capable of handling it. Table 6-7 identifies the paper sizes for several other Xerox laser printing systems.

Table 6-7.   **LPS paper handling capabilities**

Paper Size (Inches)	Laser Printing System				
	4135	4050/4650/4090	4850/4890	9790	8790
8.5 by 11	●	●	●	●	●
8.27 by 10.63		●	●		
8.27 by 11.69/A4	●	●	●	**	**
8.27 by 13		●	●		
8.37 by 10.78		●	●		
5.83 by 8.27/A5	●				
6.93 by 9.84/B5					
7 by 12				*	
8 by 13	●	●	●		
8.5 by 5.5	●				
8.5 by 10.75		●	●		
8.5 x 12.4	●				
8.5 by 13	●	●	●		
8.5 by 14	●	●	●		
8 by 10		●	●		
8 by 10.5	●	●	●		
11 by 17	●				
11.69 by 16.54/A3	●				

*   With variable paper size option.
**   Available as standard on international version.
4890   also accommodates page sizes: 8.46 x 10.83, 8.46 x 12.4, and 8.46 x 14.02 inches.

If your job requires specialty paper, make sure the 4890 LPS is capable of handling it. Table 6-8 identifies the type of specialty paper and stock for several laser printing systems.

Table 6-8. **Speciality paper and stock**

Specialty paper or Stock	Laser Printing System				
	4135	**4050/ 4090/4650**	**4850/ 4890**	**9790**	**8790**
Card stock (up to 110 pound)	●	●	●	●	●
Divider stock (65 pound)	●	●	●	●	●
Index stock (90 pound)	●	●	●	●	●
Image Series Elite (20 pound)	●	●	●	●	●
Edge reinforced 3-hole		●	●	●	●
Carbonless paper	●			●	●
Antique parchment (24 pound)	●	●	●	●	●
Envelopes				*	
Labels (self adhesive)		●	●	●	●
Labels (high speed)	●	●	●	●	●
Perforated	●	$	●	●	●
Predrilled	●	●	●	●	●
Preprinted	●	$	●	●	●
Tinted	●	●	●	●	●
Transparencies	●	●	**	**	●
Zero Solvent Vellum (20 pound)	●	●	●	●	●
Never-Tear paper	●	●	●	●	●

*   With Special Materials Feeder.
**   High-speed paper-backed transparencies only.
$ Caution: Please read all special instructions for 4050, 4650, and 4090 in Operator Guide before using this stock.

Print resolution considerations

Since Xerox Laser Printing Systems have different print resolution capabilities, it is important to know the print resolution functionality of your LPS and of the LPS on which the job was created. Table 6-9 illustrates the print resolution functionalities of the Xerox LPS.

Note: 600-dpi jobs can be created and compiled on an LPS only if 600 dpi fonts are loaded. Also, 300-dpi jobs can be created and compiled on an LPS only if 300-dpi fonts are loaded.

Table 6-9. **Print resolution of print jobs created or printed on LPS**

Print resolution functionality	Laser printing system						
	4135	4050	4650	4090	4850/ 4890	9790	8790
Creates and prints 300-dpi jobs.		●	●	●	●	●	●
Creates 300-dpi jobs but prints 300-dpi jobs in 600-dpi resolution.	●						
Creates and prints 600-dpi jobs.			●				
Creates but does not print 600-dpi jobs.	●	●	●	●	●	●	●
Creates but does not print 300-dpi jobs.	●		●				

JDL compatibility

Job descriptor libraries (JDLs) are a collection of compiled job descriptions set up by the user. Jobs may be compiled on one LPS and run on another. Table 6-10 shows how the 4890 LPS handles JDLs from other laser printing systems.

Table 6-10. **How the 4890 LPS handles JDLs from other LPS**

JDLs from the following laser printing systems	Printed results on the 4890 LPS
4850 LPS (300 dpi, color) (V3.7)	Job prints in color when requested color is implemented.
4050, 4090 LPS (300 dpi) (V3.5)	Job prints as on source LPS.
4650 LPS (300 dpi) (V3.5)	Job prints.
4650 LPS (600 dpi) (V3.5)	Job does not print.

A.   Third-party connectivity products

This appendix contains brief descriptions of third-party connectivity products for the Xerox 4890 HighLight Color Laser Printing System (LPS).

Connectivity products available from The Xerox Connection

The following third-party connectivity products are available from The Xerox Connection (U. S. only). Refer to the card in the back of this book for ordering information.

Currently available

Spur USA and Channel Switch	Online connectivity, various hosts (for hosts compatible with printers from Dataproducts, Centronics, and others)
C.P. Bourg, APE5000RX	Online connectivity to Honeywell
Information Systems Corp. (ISC) Spool/LPM	Online connectivity to Unisys/Burroughs
Georgia State University (GSU) Spin-X and Spin-X HFDL	Online connectivity to Unisys/Sperry
Data/Ware, DW2000 and PowerPrint	Online PC connectivity and print management
Elixir, HP2XRX	Conversion of HP-PCL Level 3 and above to Xerox centralized format
Barr/SNA	Online connectivity to the IBM host environment.

Available soon

Spur Page Printer Controller (PPC)	Network connectivity for high-volume printers
Dataware, PrintAx	High-speed connectivity in the AS400 / System 3X environment
Dataware, MacroChannel	Online PS/2 connectivity and print management
i-data	IBM coax, twin-ax and remote connectivity for decentralized printers.

Connectivity products available from Entire

The following connectivity products are available from Entire, Inc. For information regarding these Entire products, contact the Xerox Connection. Refer to the information at the back of this manual for information.

Entire FIBRE 400/600   PostScript converter, TCP/IP to XNS connectivity

Note: You must order a FIBRE 400/600 in order to purchase the following products through ENTIRE, Inc.

Shiva FASTPATH   AppleTalk to Ethernet gateway.

Shiva Etherport Card   Enables a Macintosh to be connected directly to an Ethernet network.

B. Application software data streams and connectivity

The table in this appendix gives data stream specifications and connectivity recommendations for a large number of application software packages that produce output for printing on the 4890 HighLight Color Laser Printing System (LPS). Newer releases of these application software packages are usually compatible with the 4890.

How to use the table

Refer to the following information when reading the table:

Facsimile palette: Availability of facsimile palette from Xerox.

Data stream/file format: Type of output data stream (including page description languages) or file format produced by the application.

LAN: Connectivity products suggested for LAN environment.

Online: Type of online interface supported.

Tape/floppy disk: Types of magnetic media support.

Facsimile palettes are available from Xerox Documentation and Software Service (XDSS). Refer to the card in the back of this book for ordering information.

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Adobe	• A structured graphics editor (similar to VP Pro Illustrator)		PostScript	NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP	None	None
Illustrator 1.0	Runs on the PC in Windows.	None				
Illustrator 3.2	Runs on the Macintosh. Supports NeXT also.	XDSS,kit # 720S30470		Entire FIBRE 400/600 front end		
PhotoShop 2.5	• An image editor Runs on the Macintosh	from XDSS, kit # 720S30470				

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Aldus PageMaker 4.0 (PC) PageMaker 4.2 (Macintosh) Freehand 3.1	• A desktop publishing package • A structured graphics editor Runs on DOS (in Windows) and OS/2 based PCs and Macintosh computers Runs on Macintosh computers	XDSS, kit # 720S30460 XDSS, kit # 720S30470 from XDSS, kit # 720S30470	PostScript	NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end	None	None
Armour Software Laserpage 3.0	• An AFP-to-meta and AFP-to-.IMG converter • AFP-to-PCL4 & PCL5 • AFP-to-XES, including color XES. Runs under the MVS and VM operating systems on an IBM mainframe.	Packaged with LaserPage	LCDS (Xerox metacode and/Xerox .IMG files)	None	Channel 871-CM: SNA and Bisync coax	Tape
Claris MacDraw Pro 1.1	• A graphics editor Runs on Macintosh computers.	None	PostScript	NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end	None	None
Computer Associates Disspla, Tell-a-graf	Generates business graphics	Packaged with Disspla, Tell-a-Graf	LCDS: Used with XPPI, output is Xerox .IMG	None	Channel 871 CM through XPPI	9-track

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Corel CorelDraw! 3.0	• A structured graphics editor Runs on DOS and OS/2-based PCs.	from XDSS, kit # 720S30470	PostScript	FTP Software, Inc. PC/TCP for DOS v 2.03, Entire FIBRE 400/600 front end	None	None
Datalogics DLPager v4.657 with Xerox Output Module 2.405	• A batch pagination and composition system Runs on DEC/VAX VMS systems.	N/A	LCDS (metacode) PostScript (black and white only)	XNS VMS 5.0 WIN/TCP for VMS 5.4 (version 5.2) Entire FIBRE 400/600 front end	DMR-11	9-track direct to printer 9-track through front end
Deneba Canvas 3.0.5	• A full-features graphics editor. Runs on Macintosh and Windows systems.	N/A	PostScript	FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end	None	None
Document Sciences Corporation Compuset 6.0	• A host publishing system Runs on a variety of platforms. It supports color on IBM MVS and VM, DEC VAX/VMS, UNIX, WANG, IBM DOS/VSE, Prime, Data General MV, and Control Data NOS/VE.	N/A	LCDS (Metacode) PostScript	TCP/IP from the mainframe to an Entire FIBRE 400/600 front end is possible, but not tested	Channel Barr/SNA or 871 CM:SNA	9-track

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Frame Technology FrameMaker 3.1	• A publishing package Runs on Apollo, Macintosh, Sun, NeXT, DEC DECStations, HP Series 9000, IBM RISC System 6000, SCO Open Desktop, and X Terminals	None	PostScript	Sun: Sun TCP/IP telnet and FTP Entire FIBRE 400/600 front end DOS: FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end Macintosh: NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end		Sun: 1/4-inch cartridge through front end DOS: 3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end Macintosh: none

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
IBM GDDM/ICU DCF	• GA business graphics creation package. A publishing package. These products run on a variety of IBM mainframe operating systems	None N/A	AFPDS structured fields for DCF AFP page segments for GDDM Output from these products may be translated to LCDS using Laserpage, DCF/PLUS, XDGI, or XPAF.	None	Channel	None
Image Sciences Commander Products: Print Commander	Allows printing from Microsoft Windows applications to metacode.	N/A	LCDS metacode and variable data from database application	None	Channel via mainframe, Dataware DW2000 card, Barr Print370 card, 871 controller	Tape / floppy disk for fonts
Image Sciences DCF/PLUS 3.2 Documerge 2.1	• An AFP-to-metacode and AFP-to-XES converter • A database publishing application that is heavily used in the Insurance industry Runs on IBM mainframe MVS, VM, DOS operating systems.	N/A	LCDS metacode and variable data from database application	None	Channel or 871 controller	Tape

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Interleaf Interleaf TPS+ 5.0	• A publishing package Runs on a variety of platforms, including SunOS (UNIX), Macintosh, and PC workstations.	None	PostScript	Sun: TCP/IP lpr or telnet and ftp to Entire FIBRE 400/600 front end DOS: FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end Macintosh: NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end	None	Sun: 1/4-inch cartridge through front end DOS: 3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end Macintosh: none

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Island Graphic Write, Draw, Paint 3.0 Write, Draw, Paint 4.0	• A word processing package • A package for editing diagrams and illustrations • A package for editing bitmap images.	None	PostScript	Sun: TCP/IP lpr or telnet and ftp to Entire FIBRE 400/600 front end	None	Sun: 1/4-inch cartridge through front end
Letraset Color Studio 1.5	• A color image editor Runs on the Macintosh	from XDSS, kit # 720S30470	RRES PostScript	None NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end	None None	9-track and 1/4-inch cartridge
Lotus 1-2-3 2.2, 2.3, 3.0, 3.1 Freelance Plus 3.01	• A spreadsheet providing the ability to print 1-2-3 graphics in color. Runs on DOS and OS/2-based PCs. • A business graphics package Runs on DOS and OS/2.	None None	PostScript	FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end		
Lytrod Software Proform Vision, Vision+ 2.0, and ProForm97	• A forms design and compilation package Runs on DOS-based PCs	Packaged with Proform	LCDS (FSL or .FRM)	None	None	TBD: Tape or floppy disk

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Microsoft Word for DOS 5.5 Word for Windows 2.0 Word for Macintosh 5.1 Excel for Macintosh 4.0 PowerPoint for Macintosh 2.0	• A word processor Runs on DOS/Windows-based PCs and Macintosh. Runs on DOS/Windows-based PCs and Macintosh Runs on DOS/Windows-based PCs and Macintosh	N/A	PostScript	DOS: FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end Macintosh: NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end	None	DOS: 3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end Macintosh: none
Quark XPress 3.1	• A desktop publishing package Runs on Macintosh and Windows.	from XDSS, kit # 720S30470	PostScript	NCSA Telnet and FTP, Shiva FastPath bridge to connect AppleTalk and TCP/IP Entire FIBRE 400/600 front end	None	None
SAS Institute SAS/Graph	• A business graphics creation package	Packaged with SAS (limited to the number of XPPI pens)	LCDS (Used with XPPI, output is Xerox .IMG)	None	Channel, Barr/SNA or 871 CM through XPPI	Yes, through XPPI

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Software Publishing Corp. Harvard Graphics 2.3	• A business graphics creator Runs on DOS-based PCs.	None	PostScript	FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end	None	3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end
U-Lead Systems PhotoStyler 1.0	• A color image editor Runs on DOS-based PCs.	None	PostScript	FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end	None	3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end
WordPerfect WordPerfect 5.1 WordPerfect 2.0	• A word processor Runs on DOS, Windows, OS/2-based PCs and Macintosh.	N/A	PostScript	DOS: FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end	None	DOS: 3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Xerox HFDL 3.1 XFG (Xerox Forms Generator) 1.0	• HFDL (Host Forms Development Language) host forms generator package. Runs on IBM mainframe running MVS.	None	LCDS (.FRM)	None	Channel Barr/SNA or 871 CM: SNA	9-track
Xerox Elixir Printing Productivity Series	• A forms, graphics, and fonts editing system Runs on DOS-based PCs.	Available from Xerox	LCDS (FRM, FSL, LGO, IMG (RRES), Metacode)	XNS PC - XFILE to File Service XNS PC - XPRINT	None	9-track 1/4-inch cartridge Floppy drive
Xerox/Intran The Intran Edition 3.2.2f: —Form Builder —Graphics Builder —Resource Manager —Font Builder	• A forms, graphics, and font editing system. Runs on Sun/Unix workstations.	Packaged with Intran	LCDS (FRM, FSL, LGO, IMG (RES), metacode PostScript (BW only)	XNS: xnsprint, xnsftp, imgtool (printer filing subset) Entire FIBRE 400/600 front end	None	9-track
Xerox XDGI 1.1	• XDGI (Xerox DCF and GDDM Interface) translates AFP to metacode. Runs on IBM mainframe running MVS.	Available from Xerox	LCDS (Xerox .IMG; Xerox metacode)	None	Channel Barr/SNA or 871 CM:SNA	9-track
Xerox XPAF 2.2	• XPAF (Xerox Printer Access Facility) is a JES functional subsystem that translates AFP to metacode and UDK. Runs on IBM mainframe running MVS.	Available from Xerox	LCDS (Metacode)	None	Channel	None

Company/ product	Product description	Facsimile palette	Data stream/ file format	Connectivity		
				LAN	Online	Tape/ floppy disk
Xerox XPPI 2.1	• XPPI (Xerox Pen Plotter Interface) translates pen plotter calls to metacode. Runs on IBM mainframe running MVS.	Available from Xerox	LCDS (Xerox .IMG)	None	Channel Barr/SNA or 871 CM:SNA	9-track
Xerox GlobalView	• A general purpose office workstation package. Runs on Xerox 6085 and Sun platforms	Available from Xerox	Interpress	XNS	None	None
Xerox • Ventura Publisher 2.0	• A desktop publishing package Runs on DOS-based PCs, OS/2 PCs, and Macintosh.	From XDSS kit # 300K09850 (PC) kit # 300K09810 (Mac)	PostScript and Interpress	DOS: FTP Software, Inc. PC/TCP for DOS v 2.03 Entire FIBRE 400/600 front end	None	DOS: 3.5-inch floppy disks (720 KB double sided, double density and 1.44 MB high density) through front end

Glossary

4890 palette   A predefined set of colors or inks provided with the 4890 HighLight Color LPS. Different versions are provided with the printer and with host- or PC-based application software.

A3   International paper size measuring 297 mm by 420 mm or 11.69 by 16.54 inches.

A4   International paper size measuring 210 by 297 mm or 8.27 by 11.69 inches.

additive primary color   There are five additive primary colors: red, green, blue, magenta and cyan. When light of these five colors is combined in equal amounts, the result is white light.

American Standard Code for Information Interchange (ASCII)   Standard 7-bit code that represents alphanumeric information Each alphanumeric character and several nonprinting characters are assigned a binary number, covering 128 possible characters It is used for information interchange among data processing systems, data communication systems, and associated equipment.

ANSI   American National Standards Institute.

application software   Host- or LPS-resident software that directs the computer to perform specific tasks or functions. Common business applications include payroll, accounting, and inventory.

argument   Independent variable of a function, such as a parameter.

ascender   Portion of a lowercase alphabetic character that extends above the main body of characters such as b, d, or h. See also *descender*.

asynchronous   Transmission in data communications controlled by start and stop characters; thus, time intervals between transmitted data blocks may be unequal in length.

ASCII   American Standard Code for Information Interchange. Standard 7 or 8--bit code that represents alphanumeric characters and several nonprinting characters by assigning each a binary number covering 128 possible characters. It is a common standard for information interchange among data processing systems, data communication systems, and associated equipment.

B4   International paper size measuring 250 mm by 353 mm or 9.84 by 13.9 inches.

batch processing Process that allows for repetitive operations to be performed sequentially on batched data without much involvement from the computer operator.

background job Low-priority job, usually batched, which is executed automatically as system resources become available.

baud Measurement of data flow between devices in bits per second. Common baud rates are 110, 300, 1200, 2400, 4800, and 9600.

BCD Binary coded decimal.

binary Numbering system with a base of 2. All numbers are represented by combinations of 1 and 0.

binary synchronous communication See *BSC*.

binary synchronous transmission Data transmission where synchronization of characters is controlled by timing signals generated at the sending and receiving stations.

bit Abbreviation for binary digit, the smallest unit of information recognized by a computer.

bitmap Visual representation of graphic images in which a bit defines a picture element (pixel) and a matrix of bits defines an image. For example, if a bit is 1, the corresponding pixel is printed.

bitmapped Display image generated bit by bit for each point or dot. A software-driven scanner is used to create characters and/or graphics.

bits per second See *bps*.

block length Number of characters or bytes contained in a block of data (the block is treated as a unit within the computer). Block length is usually invariable within a system and may be specified in units such as records, words, computer words, or characters.

blocking Process of combining two or more records into a single block of data which can moved, operated upon, stored, and so on, as a single unit by the computer.

BOF Bottom of form.

boot To load the initial instructions of a program into memory. These instructions direct the loading of the operating system and application software.

BOT Beginning of tape.

bpi	Bits per inch.
bps	Bits per second. In serial communication, the instantaneous bit speed a device or channel transmits a character.
BSC	Binary synchronous communications. 1. Data transmission in which synchronization of characters is controlled by timing signals generated at the sending and receiving stations. 2. Communication using binary synchronous line discipline. 3. Uniform procedure using a standardized set of control characters and control character sequences for synchronous transmission of binary-coded data between stations.
buffer	Area of memory in which data is stored during transfer from one device to another. Used for: 1. Accumulating data into blocks before storage or processing. 2. Adjusting differences of speed between devices, or between a device and a communicating facility.
byte	Fixed number of bits (in data processing, usually 8) processed as a single binary value.
cache memory	A fast, small memory used to enhance CPU performance, separate from the main processor memory.
CCID	Character code identifier. Code associated with the universal identifier "Xerox" to indicate the version of the Xerox character code standard used to code Interpress strings.
CCU	Customer Changeable Unit. The color housing that fits inside the printer.
central processing unit	Interprets and executes instructions, performs all operations and calculations, and controls input and output units and auxiliary attachments.
channel	1. In data communications, a path or line that enables two or more devices to communicate (sometimes called a circuit, facility, or link). 2. In computers, a path for communication between the central processing unit (CPU) and input and output units, or between the CPU and peripheral devices.
character cell	Area defined by the outside dimensions of a character plus all horizontal and vertical spacing. In electronic printing, the character cell is defined by a bitmap of dots.
character code identifier	See *CCID.*
character set	Set of all characters defined in a font, including alphabetic, numeric, and special characters such as symbols.
characters per inch	See *cpi.*

clearing house service	Directory of registered users, services, and other resources, allowing relevant information about each item to be retrieved by name.
clocking	A method of synchronizing sending and receiving data communications devices. Clocking allows synchronous transmission at high speeds.
cluster	Group of related feeder trays, usually containing the same size and type of paper (stock). Each cluster has a name, consisting of one to six alphanumeric characters.
CME	Entry modifying the output printing characteristics of a report on a copy-to-copy basis.
CMT	Character mapping table.
CMYK	A printing industry standard color definition model where all colors are defined in terms of values for the four-color process primary colors: cyan, magenta, yellow, and black. Refer to color definition model.
Code	1. A set of symbols representing data or instructions to a computer. 2. To write a program or routine that instructs a computer to perform specified operations.
code conversion	Translation of one type of character or symbol code to another.
color definition model	A standardized format for defining colors using quantifiable values. The most popular such models are RGB, CMYK, and HSB.
color substitution	The 4890 HighLight Color LPS uses an algorithm to translate a color specified in a printing industry standard color definition model to a tone of the Highlight primary color using a 4890 palette.
command language	A language used to instruct an operating system.
communication line	Telecommunication line connecting devices at one location with devices at other locations in order to transmit and receive information.
communication link	Physical means connecting one location to another to transmit and receive information, such as a data link
compiler	Software that translates instructions written in high-level language into machine language for execution by a system.
composite character	Character that has multiple bitmap references combined into one and stored on disk in font memory.

continuous printing   Refers to Interpress job integrity under any of the following conditions: excessive graphics, forms, or font use problems.

continuous tone   A photograph, rendering, or other similar image that is made of blended gray tones or values that flow into each other gradually and without hard edges.

control program   An operating system program that manages job flow, input/output processing, and other overall system functions and resources.

Copy Modification Entry   See *CME.*

copy-sensitive   Job in which multiple copies of a report contain different data, such as paychecks and banking statements.

cpi   Characters per inch. Measure of the size of a fixed-pitch font expressed as the number of characters of the font that can be set in one horizontal inch. See also *pitch.*

CSI   Command status interface.

Data Capture Utility   See *DCU.*

data communications   Transmission and reception of encoded information over telecommunication lines.

data file   Collection of related data records organized in a specific manner so that each record is similarly structured. An example of this would be a payroll file set up with one record for each employee, last name first, indicating the rate of pay and all deductions.

data link   Physical means of connecting one location with another for communication. This might include the communications lines, modems, and controls that transmit information between two or more stations.

DCU   Data capture utility. LPS function that saves and prints all system controller activity and provides tracing and event logging facilities.

DDCMP   Digital Data Communication Message Protocol.

default   Value assigned to a field by the system if no input is received from the operator.

defined ink   The tone (defined in the ink catalog file and reproduced for your reference on the printed samples of 4890 HighLight Color LPS palettes) as it is applied to the page.

descender   Portion of the lowercase alphabetic character that extends below the main body of characters such as g, p, or y. See also *ascender.*

DEC   Digital Equipment Corporation.

device   Any piece of hardware other than the CPU (Central Processing Unit).

digitize   To express or represent data in digital (binary) form so that it can be processed electronically.

DJDE   Dynamic job descriptor entry. Command within an input data stream used to modify the printing environment dynamically.

DMA   Direct memory access.

DMR   Data mode ready. Command parameter that designates a Digital Equipment Corporation host system.

document   1. Data medium and the data recorded on it, usually permanent, which can be read by you or a computer. 2. Collection of information pertaining to a specific subject or related subjects.

dot   Picture element (pixel) imaged by a printer. The number of dots imaged per inch measures printer resolution, for example, 300 dots per mich (dpi). See also *spot.*

dpi   Dots per inch. Indicates the number of dots per inch displayed on a terminal screen or printed to form a character or graphic.

dry ink   Minute particles of resin and carbon black that can accept an electrical charge and create images. Resin and carbon black or color pigment toner are combined with developer to form the dry ink.

DSDD   Double sided double density.

DSSD   Double sided single density.

DSU   Digital signal unit.

duplex   1. Ability of a data communications system to send and receive information simultaneously. 2. In printing, duplex means printing on both sides of the paper.

dynamic Job descriptor entry   See *DJDE.*

EBCDIC   Extended binary coded decimal interchange code. Coded character set consisting of up to 256 8-bit coded characters.

edge marking	Use of graphic objects (usually lines or boxes) that bleed off the edge of the physical page. See also *physical page.*
electronic publishing	The integrated production of documents on demand, using digitally stored documents, computerized composition, and electronic printing systems.
elite	Smallest size standard typewriter type which is 12 characters per horizontal inch.
embedded blanks	Blank spaces within a command line.
EMT	Emulator trap. Language instruction.
enabler	Hardware devices or software packages that come with the printer and allow it to perform as specified.
ENET	Ethernet network.
EOF	End of file.
EOT	End of tape.
escapement	Lateral positioning of characters or font families.
Ethernet	Xerox developed local area network (LAN) that allows transmission of data by cable from one device to another. A modified version of the Ethernet specification has been approved as IEEE standard 802.3.
Extended binary coded decimal interchange code	See *EBCDIC.*
extended metrics	Measurements used in Interpress to alter the size of fonts, allowing more precision with character escapement. Used for rendered characters.
FCB	Forms control buffer. Controls the vertical format of printed output.
FCP	File control parameter.
FCG	Finishing Configuration Utility.
FCU	File Conversion Utility.
FDL	Forms description language. LPS-resident source language used to design electronic forms. See also *FSL* and *form.*

FDR	File directory.
feedback	Portion of an output signal that is returned, directly or indirectly, to be compared to a reference signal to maintain the quality of the output signal.
FFM	Font file management.
firmware	Permanent programs stored in read-only memory (ROM).
fixed font	Font containing characters with fixed spacing.
fixed pitch	Font set with every character cell having the same width. In reference to character sets, this term describes typefaces with all character cells having equal width. Monospaced as opposed to proportional spaced.
fixed spacing	Arrangement of characters on a line so that all characters occupy the same amount of horizontal space.
flag	Small indicator marking the occurrence of an event or the existence of a certain condition while the program is executing.
floating accent	Nonspacing accent characters that can be combined with characters and printed as a composite.
font	Complete set of characters of a particular font family having the same point size, weight, stress, and orientation.
Font Interchange Standard (FIS)	A standard that defines the digital representation of fonts and character metrics for the generation of an entire series of Interpress fonts.
form	1. Compiled .FSL file. 2. Specific arrangement of lines, text, and graphics stored in an electronic version. Forms can be printed without variable data or merged with variable data during the printing process. See also *FDL* and *FSL*.
format	1. Layout of a document, including margins, page length, line spacing, and typeface. 2. In data storage, the way the surface of a disk is organized to store data. 3. To prepare the surface of a disk for acceptance of data.
format line	Line preceding the message text in a formatted message display.
form feed	Keyboard and printer control character that causes the printer to skip to the top of the next page.
forms control buffer	See *FCB.*

forms description language	See *FDL.*
forms source library	See *FSL.*
FPS	Formatting print service.
FSL	Forms source library. Uncompiled collection of user-created files containing FDL commands. See also *FDL* and *form.*
FST	Font specification table.
fuse	To affix dry ink to paper by heat or pressure or a combination of both.
GB	Gigabyte. Unit of approximately one billion bytes.
GCR	Group code recording.
GHO	Graphics handling option.
gigabyte	See *GB.*
group code recording (GCR) mode	Refers to the specific density of data (such as 6250 bpi) as it is recorded on tape, which is measured in bits per inch (bpi).
gsm	Grams per square meter.
GVG	Graphics video generator.
halftone screen	A tool used in offset printing, typesetting, and laser printing to convert a continuous tone (such as photographic) image to dots, which allows the image to be rendered accurately in these printing processes.
hardcopy	Machine output in permanent form, such as printed reports and listings. Output in a permanent form (usually on paper or paper tape) rather than in temporary form, as on a display. Contains readable printed copy of machine (such as computer) output.
hardware	Physical components (mechanical, magnetic, electronic, and so on) of a system, as opposed to programs, procedures, rules, and associated documentation. The hardware is operated by software and firmware.
HCF	High-capacity feeder.
HCSS	High-capacity stitcher/stacker; also referred to as stitcher/stacker.

hexadecimal	Numbering system with a base of 16. The numbers 10 through 15 are represented by A through F.
HFDL	Host forms description language.
hierarchy	Relative priority assigned to arithmetic or logical operations that must be performed.
high-level language	Programming language consisting of words and symbols that are close to normal English and, also readily understandable by the user. High-level source languages are used for most commercial programs.
highlight color	Printing with black plus another color. A range of colors, tints, and shades is printed by varying the percentage of black dots, colored dots, and the white space between the dots.
HIP	Host interface processor.
host	Computer accessed by users that serves as a source of high-speed data processing for workstations with less computer power. Commonly referred to as mainframe.
host interface	Connection between network and host computer.
HSB	A printing industry standard color definition model in which all colors are defined in terms of values for hue, saturation, and brightness. Refer to *color definition model.*
hue	The name that describes a color's general appearance, such as red, green, and blue.
identifier (id)	Character(s) used to identify or name data and possibly to indicate certain properties of that data image area on a physical page that may contain text or graphics.
IFU	Interpress font utility. A utility for managing Interpress fonts.
image area	Area on a physical page that may contain text or graphics.
initialize	1. To prepare a blank diskette so it can accept data. This is usually accomplished when a program is booted. 2. To set all information in a computer system to its starting values.
initial program load	See *IPL.*
ink catalog	File containing inks that is referenced by all software for color information. The ink catalog file has the extension .ICT.

ink referencing	Process by which inks within the ink catalog are referenced in PDL and FDL commands, and by page description language interpreters.
ink substitution	Option of aborting the printing process or continuing with a substitute ink if the referenced ink is not found.
input devices	Keyboards, magnetic media, or any device used to give a system information.
input/output	General term encompassing the flow of data into and out of a system. Also referred to as I/O.
interface	The device that connects two systems to allow them to communicate.
Interpress	Industry-standard page description language developed by Xerox. Interpress documents can be printed on any sufficiently powerful printer equipped with Interpress print software.
Interpress font utility (IFU)	Utility for managing fonts.
Interpress font utility (IFU) program	Program used to convert FIS fonts to LPS fonts.
Interpress master	File written according to the Interpress standard.
IPD	Interpress decomposer.
IPL	Initial program load. For the optional 9-track magnetic tape drive, the internal initialization sequence whereby certain functions are loaded into random access memory (RAM).
IPM	Interpress mapping.
ips	Inches per second.
JCB	Job control block.
JCL	Job control language.
JDE	Job descriptor entry. Collection of job descriptions.
JDL	Job description library. Collection of compiled job descriptions. See also *JSL*.
JID	Job identifier.
job descriptor entry	See *JDE*.

job descriptor library   See *JDL.*

job source library   See *JSL.*

JSL   Job source library. Collection of uncompiled job descriptions. See also *JDE* and *JDL.*

keyword   Required part of a command.

label   Reference to a file saved on tape or disk, a record indicating the file name or date created, or other control information.

LAN   Local area network. LAN is the lower two layers of the network architecture: the physical layer and the data link layer

landscape   Orientation in which text and images are positioned parallel to the long edge of the paper.

laser printing   Technology that uses a laser to transfer character forms to a page by direct or indirect means.

latent image   Static charge present on the photo conductor before contact with dry ink particles.

leading   (pronounced *ledding*) Vertical distance between lines of type (also called line space), measured from a baseline of one line to the baseline of the next.

legal size   Paper size measuring 8.5 by 14 inches or 216 by 356 mm.

letter size   Paper size measuring 8.5 by 11 inches or 216 by 279 mm.

light emitting diode (LED)   Solid substance that glows when a current is passed through it. Often used for indicator lights on disk drives or modems, as well as for displays on other electronic equipment.

LF   Line feed character.

line feed   Control character that (unless set to be interpreted as a line end) causes the printing system to begin printing in the current character position of the next line.

literal   Alphanumeric character beginning with a letter, including an asterisk, period, colon, or slash, and not enclosed in single quotes.

logical page   In Xerox printing systems, a logical page is a formatted page that is smaller than the physical page. A logical page is defined by an origin, thus allowing more than one logical page to be placed on a physical page.

logo Small illustration or design, usually simple, typically used to identify a company.

long-edge feed See *LEF*.

lpi Lines per inch.

LPS Laser printing system.

LUN Logical unit number. A number that identifies a peripheral device to the OSS.

magnetic media Term for all storage devices (disks, tape, and so on) on which data is stored in magnetic form.

map To establish a set of values having a defined correspondence with the quantities or values of another set.

mask Selection of bits from a storage unit by use of an instruction that eliminates the other bits in the unit. In accessing files, a file name mask is used to reference one or more files with similar file-id (identifier) syntax. In Interpress, a mask serves as a template, indicating the shape and position of an object on a page.

master file File serving as a general reference point for a particular application system and providing information to be used by the program. It is usually updated and maintained to reflect the results of current or daily processing operations.

MB Megabyte. Unit of approximately one million bytes.

metacode Method of controlling the image generator. The character dispatcher uses these codes to generate scan line information. This information is sent in the form of character specifications to the image generator, which uses it to compose the bit stream that modulates the laser. Also called native mode.

MHz Megahertz. One million cycles per second. Used to measure electromagnetic waves.

mixed environment Multiple printers or printing systems in the same location.

modem Device that converts digital information into an analog signal suitable for sending over analog telecommunication lines. Also converts an analog signal from telecommunication lines into digital information.

monochrome Printing in one color only.

nesting Subroutine or set of data, such as a comment, contained sequentially within another set of data.

network System of hardware and software that manages communication and sharing of common resources (such as printers) between computers and terminals for multiple users at once.

node Station, terminal or computer operating in a network environment.

object file Source file converted into machine language (binary code).

octal System of representing numbers based on 8.

offline Devices not under the active control of a central processing unit. For example, a computer makes output to a magnetic tape. The tape is then used by an offline printing system to produce printed data. Offline operations are much slower than online operations. Refer to *online.*

offset To place printed output sets in slightly different positions from each other in an output bin for easy separation of collated sets.

offset printing Widely-used method of commercial and corporate printing, in which ink is picked up by a metal or paper plate, passed to an offset drum, then passed to the paper.

online Devices under the direct control of a central processing unit, such as a printing system in interactive communication with a mainframe. Refer to *offline.*

operand That which is acted upon, for example, data, in an operation or process.

operating system Software that controls the low-level tasks in a computer system, such as input or output and memory management. The operating system is always running when the computer is active.

orientation In reference to image area, describes whether the printed lines are parallel to the long edge of the paper (landscape) or the short edge of the paper (portrait).

origin In reference to image area, the upper left corner of a sheet.

output 1. Material produced by a peripheral device of a computer, such as a printout or a magnetic tape. 2. The result of completed operations.

overprint lines Print lines whose carriage control specifies printing with no line spacing after the last printed line.

overprint ratio   Maximum number of variable data and form characters that can be intersected by a single scan line.

page end   Command character (form feed) to terminate the current page.

page orientation   Direction that data is printed on a report. Refer to *landscape page orientation* and *portrait page orientation*.

pagination   Process of separating text into pages.

palette   Predefined set of colors or inks. Different versions are provided with the printer and with some application software packages.

parameter   Part of a command, other than the keyword. See *keyword*.

pass-through job   On systems with XPAF, a job that is sent directly from a host to a Xerox printer through XPAF without undergoing XPAF processing.

parse   To read or interpret a command; to build up a parameter list from information within a command.

PCC   Printer carriage control.

PDE   Page description entry.

PDL   Print description language. Language used to describe printing jobs to a laser printing system. PDL describes the input (type, format, characteristics), performs the processing functions (logical processing), and describes the output (type, format, font selection, accounting options).

PE   Phase encoded.

physical page   Actual page size your printer uses to print a form.

pica   1. Unit of measurement equal to twelve points or approximately 1/6 inch. 2. A 10-pitch typeface having ten characters per inch and 12 points in height. See also *point*.

pitch   Width of a fixed-pitch font expressed in characters per horizontal inch.

pixel   Acronym for picture element. Smallest addressable point of a bitmapped screen that can be independently assigned color and intensity.

point   In Xerox laser printing systems, a unit of measurement equal to 0.0139 inch. Points are always used to express type, size, and leading. There are 12 points to a pica and about 72 points to an inch. See also *pica*.

point size   Height of character set from the top of its ascenders to the bottom of its descenders in units (points). Point size does not always include leading.

portrait   Orientation in which text and images are positioned parallel to the short edge of the paper.

PostScript   Proprietary page definition language, compatible with the Xerox 4890 Highlight Color LPS when a front-end conversion utility is installed.

ppm   Pages per minute.

print quality adjustment   See *PQA.*

primary color   A color that, when combined with one or more other primary colors in a color model system in varying quantities, produces the palette of colors described by that model.

print description language   See *PDL.*

print ratio   The maximum number of variable data and form characters that may be intersected by a single scan line.

printer subsystem controller   See *PSC.*

print file   Portion of the system disk memory (up to 4 MB) reserved for temporary storage of formatted pages for printing. Pages are retained until they are delivered to the output tray.

PQA   The process the 4890 HighLight Color LPS uses to maintain the electrostatic state of the xerographic subsystem to ensure optimal print quality.

printout   Informal expression referring to almost anything printed by a computer peripheral device.

PROM   Programmable read-only memory.

prompt   Message or symbol displayed on a system console requiring the operator to take action.

process color printing   In process color printing, every color in the spectrum is printed by combining various percentages of the four-color process primary colors–cyan, magenta, yellow, and black.

processor   Applies to any system that is capable of receiving and performing operations upon data and supplying the results of those operations.

protocol   Formal set of conventions governing format of data and control of information exchange between two communication devices.

proportional font   Font containing characters that vary in width.

proportional spacing   Text where each alphanumeric character is given a weighted amount of space. Such output has print-like appearance. Proportional spacing allows more space for wide characters and less space for narrow characters.

proportional type   Characters that vary in width.

PSC   Printer subsystem controller. Command and task that download the printer and/or raster image processor (RIP) software if selected.

query   Request for data or other information, entered by an operator while the system is processing.

queue   Managed database of documents waiting to be processed.

RAM   Random access memory.

raster data   Binary data, usually consisting of dots arranged in scan lines, according to the print order.

raster image processor   See *RIP.*

rasterization   The creation of a bitmap image on a page for printing.

read-only memory   See *ROM.*

read/write head   A small electromagnet that reads, writes, and erases data in the form of magnetic dots on the surface of an external storage medium, such as a magnetic disk.

real time   To process transactions as they are entered into a system. User and system interchange allow transactions to be processed and the results returned to the user.

remote access   Access to a central computer by terminals or devices geographically separated from that computer.

RGB   A printing industry standard color definition model where all colors are defined in terms of values for the three additive primary colors: red, green and blue. Refer to *color definition model.*

ROM   Solid-state memory for programs. It cannot be rewritten.

rendered character Character whose bitmap is a combination of other bitmaps positioned relative to each other, such as accented characters and single characters consisting of two or more characters. A rendered character does not require additional disk space or font memory.

report In setting a separation boundary, report refers to a subset of a job. A job may consist of one or more reports.

resolution Number of dots per inch (dpi) or spots per inch (spi). The greater the number of dots, the higher the resolution and the clearer the image. The terms dots, spots, and pixels are synonymous.

RIP Raster image processor. LPS option that supports the Interpress V3.0 Publications Set.

scale To adjust font or image size according to given proportions.

sci START command index.

scroll Manipulation of a display to bring upper or lower portions of a document page into view when available space is insufficient to view the entire document at once.

SCSI Small computer system interface. Common standard for connecting devices to computers.

SDI System diagnostics interface. OSS task used by service personnel to diagnose system problems.

secondary storage Form of storage external to a system, such as magnetic tapes or floppy disks.

security 1. Procedure for limiting access to the system's resources, programs, or files, to authorized personnel. 2. Protecting programs and files from unintentional or undesired modification.

SEF See *short-edge feed.*

sequential 1. In numeric sequence, usually in ascending order. 2. A file structure in which records are written one after another and cannot be randomly accessed.

set Multiple copies of the same report.

SFC Status file converter.

SFS Status file service.

shade   Color resulting from adding black to a pure hue. See also *tint* and *tone.*

short-edge   feed   Movement of paper through the printer in the direction of the paper width (the shorter side of a sheet of paper).

SIF   Sequence insert file.

simplex   printing   Printing on one side of the page.

small   computer   system   interface   See *SCSI.*

SNA   System network architecture. Total description of logical structure, formats, and protocols of operation sequences for transmitting an information unit through the communication system.

special   processing   Commands allowing the user to process special reports such as printing certain records, and printing on special paper

spi   Spots per inch. See *resolution.*

spooling   Process of releasing data from main memory and storing it temporarily until a peripheral device is ready to accept it, for example, storing print data before sending it to a printer.

spot   A picture element imaged by the printer. Synonymous with *dot* and *pixel.*

statement   Detailed instructions in a program step, written according to specific rules called syntax.

static   data   Information usually found on preprinted forms or overlays.

station   1. In data communications, a terminal device connected to a data link. 2. In computer networks, any of the numerous terminal devices that form a network.

stock   User-defined name in the JSL that specifies a certain type of paper for printing a job.

stock   descriptor   A stock reference or a stock name.

stock   name   The name of a cluster as defined by a system command.

stock   reference   An application specific pseudonym for a cluster.

stockset   Collection of stocks to be used on a print job. See also *stock.*

string   Connected sequence of alphanumeric characters treated as one unit of data by a program.

symbiont   Device which shares a common purpose and close association with other devices. This term is used to identify the Xerox print software which resides in the Digital host system as part of the XPMF-VMS communications link.

symbol   Character used in a computer language to specify a particular function.

synchronous   Efficient encoding of data suitable for high-speed, block-oriented data transmission by using equal time elements.

syntax   Rules governing the structure of expressions in a programming language.

syntax error   System response to a mistake in a command's entry.

sysgen   Abbreviated form of system generation.

System   1. In data processing, a collection of computer components and procedures organized to accomplish a set of specific functions. 2. Assembly of components united by some form of regulated interaction to form an organized whole. 3. Operations or procedures used to accomplish a business activity.

System controller   The part of the LPS that provides interfacing capability, data handling, formatting, buffering, and operator control for the system. Also called the system controller.

system disk   Magnetic disk storage medium, usually of large capacity, that is not removable as opposed to floppy disk or disk packs.

system file   Master software program that keeps all components working together.

system generation   Process whereby the system is made ready to operate. Typically involves selecting the operative parameters and activating the relevant software.

System Network Architecture   See *SNA.*

system page   Maximum area in which text and graphics can be imaged on a printing system.

tape density   Expression of the format of a magnetic tape measured in number of bytes that can be stored per inch of tape.

tape drive   Input/output device that controls the movement of magnetic storage tape past the read/write head while data is accessed or stored.

telecommunications   The transfer of data through telephone lines.

teleprocessing   Data transfer through telecommunication lines for processing among various remote terminals and the central processing unit (CPU).

templates   1. Preset document formats, usually furnished along with application software, such as electronic spreadsheets or data base programs. 2. Also applies to keyboard overlays showing function keys for particular software packages.

temporary storage   Main memory locations reserved for intermediate results of processing, control values, or other information that needs to be kept on hand as a program proceeds.

terminal   Interface device connected to a computer or network. A terminal has no processing capability of its own.

throughput   Measure of the number of pages printed during a given unit of time, usually expressed as pages per minute.

tint   Color resulting from adding white to a pure hue. See also *shade* and *tone*.

TOF   Top of form.

toggle   In an LPS system, to switch (alternate) from one tray to another. The system will switch from an active feeder or stacker tray to an inactive one to allow continuous printing when the proper commands are invoked.

token   A coded character representing a word used in programs. For instance STOP is a word and the one-byte token for it in a BASIC dialect is 250.

tone   Primary color in its pure form, or mixed with black or white to create a lighter tint or darker shade of the primary color. See also *shade* and *tone*.

total xerographic convergence (TXC)   For the 4890 HighLight Color LPS, a function of the operating system software (OSS) that monitors the state of the color and black developer housings. If TXC detects a condition that may affect print quality, TXC requests that the operator initiate Print Quality Adjustment (PQA) to adjust the xerographic subsystem. Refer to *print quality adjustment.*

tpi   Tracks per inch.

transaction processing   Method of data processing that updates files and results are generated immediately after data entry.

translation   1. In data communications, the conversion of one code to another on a character-by-character basis. 2. In programming, the function of a language processor that converts a source program from one programming language to another.

transmission speed   In data communications, the rate data is passed through communication lines, usually measured in bits per inch (bpi).

Tri-level xerography   The feature of the 4890 HighLight Color LPS that enables the rasterization of both the black and the color images in a single pass by the creation of a third charge state.

truncated   Cut off before completion, as when data transfer from a host to a printer is cut off before all data has been transmitted.

two-up   Printing two logical pages on one side of a physical page.

TXC   Total xerographic convergence.

type style   Italic, condensed, bold, and other variations of typeface that form a type family.

typeface   Set of fonts having identical design features that give the type a uniform appearance.

UCS   Universal Character Set. Printer feature that permits the use of a variety of character arrays.

UCSB   Universal Character Set Buffer.

UI   User interface.

Universal Character Set   See *UCS.*

utility program   General-purpose program that performs activities, such as initializing a disk or sorting, which are not specific to any application.

validation   Process of testing a system's ability to meet performance objectives by measuring or monitoring its performance in a live environment.

variable data   Changeable information which is merged with a standard document to create specialized or personalized versions of that document. Variable data is not a part of a form design, but varies from page to page.

variable text	Text of changing nature (such as names and addresses) combined with a form letter to make a complete document.
verification	Process of testing a system's ability to meet performance objectives by running programs in a simulated environment.
virtual page	Page area selected by a forms designer for printing.
vpos	Vertical positioning.
WAN	Wide area network.
weight	Perceived blackness of a character affected by varying the width of the stroke. Weight is expressed in general terms as either bold or roman.
wildcard	Character (usually an asterisk *) which can be inserted into a command string to indicate that it may represent one or more characters in that position.
write protection	Data protection feature implemented on magnetic media (for example, floppy disk, 9-track tape) to prevent stored data from being modified, written over, or erased.
x axis	Horizontal axis on a forms grid.
x height	Height of lowercase letters without their ascenders or descenders (height of letter "x").
xdot	Unit of measurement representing a fraction of an inch. May also be referred to as a picture element (pixel) or spot; for example, 1/600 spots per inch (spi).
xerographic engine	Component of a printer that develops an image, transfers it to paper, and fuses it for output as hardcopy.
xerographic mode	Either of two possible printer configurations: 1. Black mode which allows printing with black dry ink only. 2. Highlight mode which enables both highlight color and black printing.
xerographic mode persistence (XMP)	For the 4890 HighLight Color LPS, a value specified during sysgen, in JDL or in DJDE code that specifies on what basis xerographic mode switching (XMS) may take place. Refer to *xerographic mode switching*.
xerographic mode switching (XMS)	A function of the operating system software (OSS) that controls the xerographic mode of the 4890 HighLight Color LPS. The operator or programmer controls XMS through the xerographic mode persistence (XMP) setting. Refer to *xerographic mode*.
XICS	Xerox Integrated Composition System.

XJCF	Xerox Job Control Facility.
XNS	Xerox Network Systems is the network architecture and protocol used with Xerox equipment.
XPAF, XPF	Xerox Printer Access Facility.
XPPI	Xerox Pen Plotter Interface.
XPS (Xerox Print Service)	Xerox Print Service (XPS) Manager is a printer front end to other hosts. XPS Manager server communicates with the printer via a layered communication protocol, based on the XNS protocol suite but enhanced with "online" capability.
XPS (Xerox Publishing System)	Xerox Publishing System.
XPMF-VMS	Xerox Print Management Facility-VMS Version.
y axis	Vertical axis on a forms grid.

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