

**Xerox 4050/4090/4450/4650
Laser Printing Systems
Product Reference**

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This *Xerox 4050/4090/4450/4650 LPS Product Reference* is an overview of the 4050/4090/4450/4650 Laser Printing Systems (LPS) for those who want to gain a broad knowledge of the advantages, features, and options available with the printer. It covers the following information:

- Description of the *4050/4090/4450/4650 LPS* reference set
- Basic concepts of electronic printing
- LPS features and options
- Production process
- System components: hardware and software
- Network connectivity
- Software and hardware comparison to other LPS.

Refer to the *Xerox 4450 Mid-Range Printer Product Reference* for information specific to the 4450 mid-range printer.

4050/4090/4450/4650 reference set

The following is a brief description of the contents of each of the manuals provided in your LPS reference set.

| Document title | What it contains . . . |
|--|--|
| <i>Xerox 4050/4090/4450/4650 LPS Master Index</i> | Incorporates indexes for all documentation: Installation Planning, Operator Guide, System Administration Guide, PDL Reference, Command Reference, Forms Creation Guide, Message Guide, and Product Reference. |
| <i>Xerox 4050/4090/4450/4650 LPS Forms Creation Guide</i> | Presents the syntax and a brief description of all commands that can be used in coding an electronic form, such as: <ul style="list-style-type: none">• Forms Description Language commands• Step-by-step procedures for coding FSL files• Troubleshooting and imaging considerations• Examples and sample output illustrating FDL commands. |
| <i>Xerox 4050/4090/4450/4650 LPS Forms Creation Quick Reference Card</i> | Lists and briefly explains the FDL commands. |
| <i>Xerox 4050/4090/4450/4650 LPS Installation Planning</i> | Details tasks that must be performed in preparation for the installation of the printer. Communicates Xerox and customer responsibilities, fonts, supplies, options, site selection/preparation, and available training/documentation. <ul style="list-style-type: none">• Site preparation instructions and checklist• Installation day procedures• Supplies list and ordering information• Available documentation and training• Site planning template. |

| Document title | What it contains . . . |
|--|--|
| <i>Xerox 4050/4090/4450/4650 LPS Message Guide</i> | Lists all alphanumerically coded messages that may appear on the screen during printer operation and provides a brief explanation and recommended action for each message. This guide covers the following information: <ul style="list-style-type: none"> • All coded messages • Non-coded messages pertaining to the summary sheets • Instructions for calling for Xerox support services • Problem solving, such as printer jams, system recovery, and diagnostics. |
| <i>Xerox 4050/4090/4450/4650 LPS Operator Guide</i> | Step-by-step instructions for basic operator tasks, such as: <ul style="list-style-type: none"> • Hardware cleaning and maintenance • Printing and monitoring jobs • Loading paper and unloading output • Meter reading and reporting. A list of all operator commands and information. A list of available supplies and instructions for ordering them. |
| <i>Xerox 4050/4090/4450/4650 LPS Operator Command Summary</i> | Lists and briefly explains the commands used by the operator. |
| <i>Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Quick Reference Card</i> | Lists and briefly explains the PDL/DJDE commands. |
| <i>Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Reference</i> | Presents the syntax and a brief description of all commands that can be used in coding a print job, such as: <ul style="list-style-type: none"> • Print job preparation commands • Input and output processing commands • Dynamic Job Descriptor Entries (DJDEs) • Step-by-step procedures for coding JSL and FSL files • Examples and sample output illustrating commands. |
| <i>Xerox 4050/4090/4450/4650 LPS Product Reference</i> | Introduces the printer, printer terminology, production process of the printer and the features/options that are unique to these printers (product differences.) <ul style="list-style-type: none"> • Description of reference set • Supported system configurations, with diagrams • System components: hardware and software • Software and hardware comparison to other LPS. |
| <i>Xerox 4050/4090/4450/4650 LPS System Administration Guide</i> | Presents tasks and procedures that control system configuration and user services that are performed by a system administrator, such as: <ul style="list-style-type: none"> • System generation procedures • Backing up and restoring files • Securing files and commands • Administering the Data Capture Utility log • Managing system disk space Lists all system administrator commands and information. |
| <i>Xerox 4050/4090/4450/4650 LPS System Administration Quick Reference Card</i> | Lists and briefly explains the commands used by the system administrator. |

Related publications

You can find additional information related to the 4050/4090/4450/4650 LPS in the following publications.

| Publication | Number |
|---|---------------|
| <i>Xerox 4050/4090/4450/4650 LPS Master Index</i> | 720P93070 |
| <i>Xerox 4050/4090/4450/4650 LPS Bypass Transport Instructions, V3.5/3.8</i> | 720P22320 |
| <i>Xerox 4050/4090/4450/4650 LPS Bypass Transport Operator Training Guide Flipcharts Supplement</i> | 720P22340 |
| <i>Xerox 4050/4090/4450/4650 LPS Bypass Transport Operator Training Guide Supplement</i> | 720P22330 |
| <i>Xerox 4050/4090/4450/4650 LPS Command Reference</i> | 720P23260 |
| <i>Xerox 4050/4090/4450/4650 LPS Forms Creation Guide</i> | 720P93060 |
| <i>Xerox 4050/4090/4450/4650 LPS Forms Creation Quick Reference Card</i> | 720P93100 |
| <i>Xerox 4050/4090/4450/4650 LPS Installation Planning</i> | 720P92990 |
| <i>Xerox 4050/4090/4450/4650 LPS Message Guide</i> | 720P93020 |
| <i>Xerox 4050/4090/4450/4650 LPS Operator Guide</i> | 720P93000 |
| <i>Xerox 4050/4090/4450/4650 LPS Operator Instructor Training Flipcharts</i> | 720P22080 |
| <i>Xerox 4050/4090/4450/4650 LPS Operator Instructor Training Guide</i> | 720P22070 |
| <i>Xerox 4050/4090/4450/4650 LPS Operator Command Summary</i> | 720P93050 |
| <i>Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Quick Reference Card</i> | 720P93090 |
| <i>Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Reference</i> | 720P93030 |
| <i>Xerox 4050/4090/4450/4650 LPS System Administration Guide</i> | 720P93040 |
| <i>Xerox 4050/4090/4450/4650 LPS System Administration Quick Reference Card</i> | 720P93080 |
| <i>Xerox Standard Font Library Font User Guide</i> | 600P86174 |
| <i>Xerox Tape Formats Manual</i> | 600P86175 |
| <i>Helpful Facts About Paper</i> | 610P50497 |

1.

LPS overview

The Xerox 4050/4090/4450/4650 Laser Printing System (LPS) are versatile, high-performance printing systems which process and print data from a variety of sources. They allow host mainframe computers and devices connected to a network, such as workstations and graphic scanners, to produce publications and other documents, incorporating graphics, forms, logos, signatures, and a variety of fonts.

The LPS offers management information systems and data processing environments a high-performance printer with built-in intelligence. This feature eliminates the need for the host computer to store and manage forms, fonts, and other document resources.

A variety of fonts ranging in size from 4 to 24 points, in all four orientations (portrait, inverse portrait, landscape, inverse landscape), and many publishing typefaces are available to meet your printing requirements. You can use special or customized fonts developed by the Xerox Font Center in addition to the standard set of fonts you receive with the LPS.

Table 1-1 lists the feature differences among the 4050, 4090, 4450, and 4650 LPS.

Table 1-1. **LPS features**

| LPS | Feature differences |
|-----------|--|
| 4050/4450 | Prints up to 50 pages a minute with a resolution of 300 dpi |
| 4650 | Prints up to 50 pages per minute, with a resolution of either 300 or 600 dpi |
| 4090 | Prints up to 92 pages a minute with a resolution of 300 dpi and handles four paper stocks simultaneously |

The following features are available with software version 3.8:

- Data Capture Utility provides you with an easy method of capturing and saving all messages and keyboard entries displayed on the terminal.
- Multiple-session utility allows up to eight Xerox Network Service users the ability to submit requests to the print service concurrently.
- Host Interface Processor (HIP) logging utility allows you to have the printer log all or selected XNS filing and printing operations performed by remote clients.
- Filing subset utility allows you to specify a type attribute to each file.

- Compatibility with the 4850 LPS enables you to use your 4050/4090/4450/4650 LPS as a suitable backup for your 4850 HighLight Color LPS. This allows you to use your 4050/4090/4450/4650 LPS to process and print highlight color jobs in black and shades of gray.
- Limited compatibility with the 4135 LPS enables your 4050/4090/4450/4650 to process the data stream from your 4135 LPS. When your 4050/4090/4450/4650 LPS encounters a 4135 unique feature, it ignores the feature and processes the job. A message at your system controller terminal notifies you of the unsupported feature and gives you the opportunity to continue or end the task.
- 4245 emulation using channel connections to an IBM host emulates an IBM line printer.

Electronic printing

Electronic printing is the integrated production of documents on demand, using digitally stored documents and graphic images, computerized composition techniques, and electronic printing systems such as the 4050/4090/4450/4650 LPS.

Electronic printing allows you to use a variety of printing applications and produce complex documents ranging from books and lengthy reports to invoices, statements, forms, and listings.

Advantages

Electronic printing has several important advantages over traditional printing methods:

- Minimizes the use of preprinted forms in listings, statements, invoices, and so on. You can create forms electronically, using a wide range of design elements such as lines, boxes, graphic images, and a variety of fonts. You can then automatically merge the forms with variable data.
- Electronic printing lets you create documents and forms in a shorter time with greater control over the result, including the ability to make last-minute changes.
- By giving operators and programmers the capability to program the print job processing, repetitive jobs are handled easily and consistently, and the output potential of the printer can be maximized.
- The programming capability, combined with a variety of hardware configurations, makes it possible to produce documents with cover-to-cover control. For example, you can print different pages of a report on different paper stocks, and the output can be collated or stapled. Electronic printing eliminates the separate handling and finishing process of traditional printing.

Features

The 4050/4090/4650 LPS has many standard features which allow you to process and print data using a variety of sources. The features for each main component are listed below. Table 1-2 lists the differences among the components of the LPS.

Reference Refer to the "LPS comparison" appendix for a comparison of the 4050/4090/4650 LPS components with other Xerox printers. Refer to the *Xerox 4450 Mid-Range Printer Product Reference* for information on the component features of the 4450 MRP.

Table 1-2. **Component features**

| Component | Features |
|-------------------|---|
| Interface | Several optional interfaces offer a variety of connection options, such as: <ul style="list-style-type: none"> • Online • Offline • OEM • DEC • Ethernet. |
| System controller | <ul style="list-style-type: none"> • Multinational terminal • 4050/4450 LPS: Two standard 50 MB system disks. Optional expansion of up to 200 MB in 50 MB increments is available. • 4090/4650 LPS: Two standard 170 MB system disks. Optional 170 MB, 182 MB, or 380 MB system disks are available for expansion. • 512 KB of control memory • 16 MB of font memory (4050/4450 LPS). 128 MB of font memory (4090/4650 LPS). • 4050/4450 LPS: Graphics Handling Option (GHO) with 8 MB of graphics memory. • 4090/4650 LPS: Graphics Video Generator (GVG) 32 or 256 MB option • Optional Raster Image Processor (RIP) for increased graphics capabilities • 5.25-inch floppy disk drive • Optional 9-track magnetic tape drive with 1600 or 6250 bits per inch (bpi) • Optional 18-track 180 Cartridge Tape System (CTS) with read and write capability for IBM- and ANSI-compatible 0.5 inch tapes in 18-track, IBM 3480 data format. |
| Printer | <p>Functionality:</p> <ul style="list-style-type: none"> • Xerographic engine • Laser raster scanning • Printing speed of up to 50 pages per minute (ppm) for the 4050/4450/4650 LPS, up to 92 ppm for the 4090 LPS, and up to 7,500 lines per minute (lpm). • Output of 300 by 300 spots per inch (spi) for the 4050/4090/4450 LPS or 600 by 600 spi for the 4650. • Light-emitting diode (LED) display showing feeder and stacker tray configurations • Ability to print on only the front (simplex) or both front and back (duplex) of paper • Graphic display of the printer on the control console helps you clear paper jams • Stop, Continue, Print Sample, and Tray Select buttons • Controls paper stock using multiple feeder trays and high-capacity feeder option • Output module options • Sample print tray • Diagnostic jam clearance. <p>Paper handling:</p> <ul style="list-style-type: none"> • Prints index, cut-sheet, colored, preprinted, predrilled, or preperforated paper from 20 pound/75 gsm paper to 110 pound/200 gsm paper • Prints in variable paper sizes from 8 by 10 inches to 8.5 by 14 inches, including 8.27 by 11.69 inches (A4) with an image size up to 8.6 by 11 inches • Prints transparencies, label stock, and other specialized materials |

Table 1-2. **Component features** (continued)

| Component | Features |
|------------------------|---|
| Printer (continued) | <p>Forms:</p> <ul style="list-style-type: none"> • Creates and stores forms electronically on the LPS or host computer • Changes form contents on a page-to-page basis • Allows functional compatibility with the 9790/8790 forms, logos, and signatures • With system software version 3.8, allows limited compatibility with 4135 forms, logos, and signatures • With system software version 3.8, allows you to print precompiled forms from a color printer in black and shades of gray • Merges forms with the necessary variable data when the form prints • Prints multiple forms on each page when you use Interpress, RIP, and GHO/GVG. • Allows you to use preprinted forms. <p>Fonts:</p> <ul style="list-style-type: none"> • Uses proportional or fixed character spacing • Offers variable character sizes from 4 to 24 points. 6 to 36 points for the 4650. • Uses spacing from 4 to 30 characters per inch (cpi) • Allows you to select up to 128 fonts per page from an extensive library of standard and optional fonts. • Allows the use of logo and signature fonts • Offers a multinational character set • Loads fonts from the host computer system, floppy disk, magnetic reel tape, or cartridge tape • 4050/4450 LPS: Contains 16 MB of font memory. 4090/4650 LPS: 128 MB of font memory. • Allows you to select fonts on a character-to-character basis. <p>Print format:</p> <ul style="list-style-type: none"> • Variable spacing from 3 to 18 lines per inch (lpi) • Spacing from 4 to 30 cpi • Landscape or portrait orientation • 38 KB (at 4 points, 18 lpi) of alphanumeric characters for each 8.5 by 14 inches of variable density on a page • 198 lines (at 4 points, 18 lpi) for each 8.5 by 11 inch portrait page. 252 lines (at 4 points, 18 lpi) for each 8.5 by 14 inch portrait page • 150 lines, with 132 characters per line, on each 8.5 by 11 inch landscape page • 16 images per page; over 16 images per page and vector graphics capability are available when you use Interpress, or RIP with GHO/GVG. • Multiple logical pages on a physical page. • Simplex or duplex printing. <p>Compatibility:</p> <ul style="list-style-type: none"> • Allows functional compatibility between 4050, 4090, and 4650 LPS and limited compatibility with the 4135 LPS. • With system software version 3.8, enables you to print jobs with color commands in black and shades of gray <p>Output:</p> <ul style="list-style-type: none"> • Interspersing • Stitching • Stacking • Multiple set printing • Offsetting • Job accounting and reports • Collating or noncollating. |

Options

Options available for your LPS are listed by type in table 1-3.

Table 1-3. **Component options**

| Type | Options |
|--------------------|--|
| Hardware | <ul style="list-style-type: none"> • 9-track magnetic tape drive • 18-track, Xerox 180 CTS • High-capacity feeder • Stitcher/stacker • Bypass transport <p>Refer to the "Hardware components" chapter for more information regarding these hardware options.</p> |
| Memory | <ul style="list-style-type: none"> • Expanded system disk memory • Font memory • Graphics memory • Task memory • Cache memory <p>Refer to the "Hardware components" chapter for more information regarding these memory options.</p> |
| Graphics | <ul style="list-style-type: none"> • Graphics Handling Option (GHO)/ Graphics Video Generator (GVG) • Raster Image Processor (RIP) |
| Software | <ul style="list-style-type: none"> • Electronic Printing Image Construction (EPIC) • Host Forms Description Language (HFDL) • Xerox Job Control Facility (XJCF) • Xerox Printer Access Facility (XPAF) <p>Refer to the "Software components" chapter for more information regarding these software packages.</p> |
| Resident languages | <p>The LPS contains three resident languages: Forms Description Language (FDL), Interpress, Print Description Language (PDL). Refer to the "Resident languages" section in the "Software components" chapter for more information.</p> |

Fonts

A set of standard LPS fonts are provided at installation time. (Font is a publishing term referring to a set of characters with the same type style, type size, and orientation.) For specific font size information, refer to your *Xerox 4050/4090/4450/4650 LPS Installation Planning* guide.

Note: Additional fonts, whether standard or custom designed, may be ordered from the Xerox Font Center or Rank Xerox. You can also order digitized logos and signatures. Refer to your *Xerox 4050/4090/4450/4650 LPS Installation Planning* guide for information on ordering fonts.

Reference Refer to the *Xerox 4050/4090/4450/4650 LPS Forms Creation Guide* and the *Xerox 4050/4090/4450/4650 LPS Installation Planning* guide for more information about fonts.

Data types

One of the available sources creates and transmits data to the 4050/4090/4450/4650 LPS. The system controller receives the incoming data from one of the interfaces for processing. If the input is print data, the system controller sends a stream of data to the printer for imaging. If the input is nonprint data, it stores it on the system disks.

Receiving data

The 4050/4090/4450/4650 LPS can receive data as input from any of the sources shown in table 1-4.

Table 1-4. **Data sources**

| Source | Using . . . |
|---|-------------------------------------|
| Channel-attached host computer system | Online interface |
| Magnetic tape (9- or 18-track) | Offline interface |
| 871-CM using an OEM interface (SNA/SDLC or BSC) | HIP task |
| Remote workstation | Ethernet interface and the HIP task |
| VAX/VMS DDCMP environment | DEC interface and the HIP task |

Additional graphic sources include the 7650 Pro Imager and the 150 Graphic Input Station (GIS) using an Ethernet interface. Graphic handling requires GHO/GVG on the LPS.

Printing data

The 4050/4090/4450/4650 LPS can print the types of data shown in table 1-5.

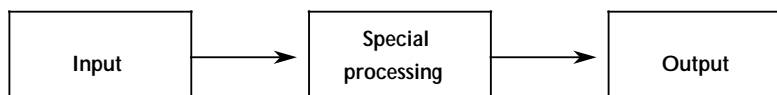
Table 1-5. **Data types**

| Data type | Description |
|--|--|
| Variable data | Variable data changes from page to page. The LPS can merge variable data with a form. |
| Fixed data | <p>Fixed data (FRM file) remains constant from page to page (for example, letterheads and column headings). Forms data usually refers to information found on preprinted forms or overlays.</p> <p>Note: Generating forms at a host requires a host-resident forms design software package such as Host Forms Description Language (HFDL).</p> <p>Any form suitable for computer printout can be described and entered into system storage. Once stored on the system, a form can be activated by referencing the name of the form in the Job Source Library (JSL) file or Job Descriptor Entry (JDE).</p> <p>All Xerox laser printing systems have a line editor utility for the creation and modification of program source files (.FSL and .JSL extension files).</p> <p>Refer to the <i>Xerox 4050/4090/4450/4650 LPS Command Reference</i> for more information on the LPS Editor.</p> |
| Graphic data (usually merged with variable data or fixed data) | <p>Graphic data (.IMG file) refers to digitized images (both line art and continuous tone images) that are merged with variable or forms data. Sources of graphic data include the following:</p> <ul style="list-style-type: none"> • Graphic data generated by EPIC host-resident software • Scanned images from the Xerox 7650 Pro Imager (using XPIW) • Scanned images from the 150 GIS. <p>Note: The GHO/GVG option is required on the LPS to process graphic data.</p> |

Production process overview

The process of producing a job on an LPS can be broken down into three distinct phases: input, special processing, and output. Figure 1-1 shows this process.

Figure 1-1. **Basic processing flow**

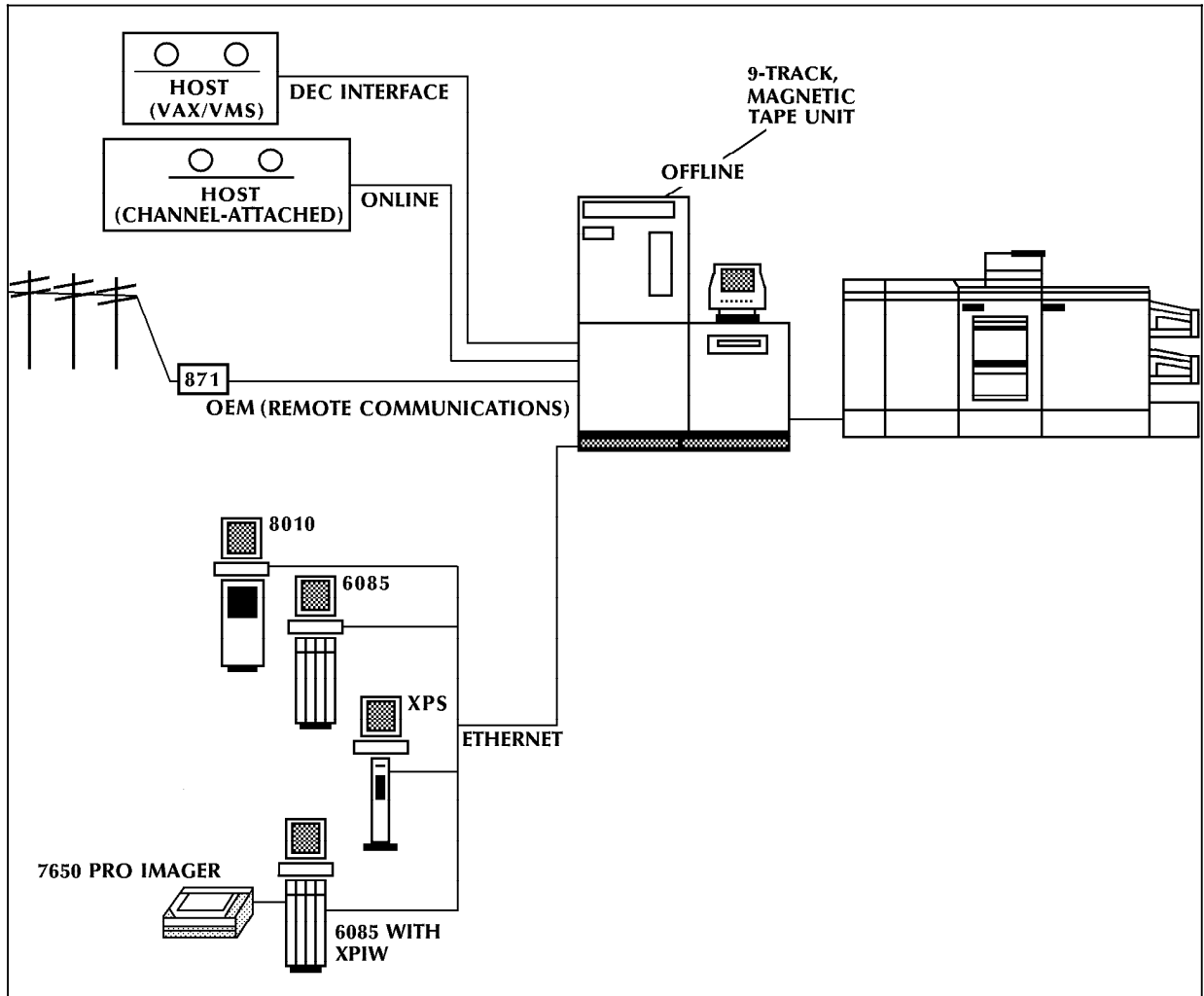


Input sources

The input phase of job production begins with the collecting and input of data using one of several available sources.

As shown in figure 1-2, several data input methods are available.

Figure 1-2. Xerox 4050/4090/4450/4650 input options



The input sources shown in table 1-6 are available for the 4050/4090/4450/4650 LPS.

Table 1-6. **Input sources**

| Input source | What it does . . . |
|-----------------------------------|--|
| Channel-attached host | The online channel interface receives input directly from a host mainframe through a cable and supports all IBM and IBM-compatible systems supporting the channel-attached 3811/3211 and 4245 interfaces. |
| Remote host | The 871-CM and the OEM interface use the Host Interface Processor (HIP) task to permit ASCII and EBCDIC data transmission to the LPS using SNA/SDLC or BSC protocols. This input method allows the 4050/4090/4450/4650 LPS to print jobs from a remote IBM-compatible host computer. By using a telephone modem, the 871-CM eliminates the need for a channel extender unit. |
| VAX/VMS host | The DEC interface enables communication between a DEC VAX/VMS system and a 4050/4090/4450/4650 LPS through cable or modem connections using the HIP task. Refer to the Xerox Print Management Facility—VMS Version manuals, which contain more information on DEC VAX/VMS. |
| Magnetic tape | Magnetic tape input (9- or 18-track) is received by the offline interface. The <i>Xerox Laser Printing Systems Tape Formats Manual</i> describes the tape format and encryption schemes that a Xerox LPS recognizes. |
| Workstations and graphic scanners | Using the HIP task, the ethernet interface receives input from workstations, such as the Xerox 6085, and graphic scanners, such as the 7650 Pro Imager, using Xerox Publishing Illustrator Workstation (XPIW) and the 150 GIS. Ethernet is the Xerox Local Area Network (LAN) that allows data to be transmitted by cable from one device to another on a shared or an unshared, but accessible, network. Note: Graphic handling requires either Graphics Video Generator (GVG) or Graphics Handling Option (GHO) on the 4050/4090/4450/4650 LPS. |

Special processing

Special processing features (outlined in table 1-7) distinguish the 4050/4090/4450/4650 LPS from an impact printer because you can specify that you want the system to perform logical functions (such as printing portions of the data, offsetting certain pages of a report, and repositioning a page logically during the printing process).

Table 1-7. Special processing features

| Feature | What it provides . . . |
|---------|--|
| DJDE | <p>A Dynamic Job Descriptor Entry (DJDE) command allows you to modify the printing environment dynamically. You insert these commands into the input data stream to modify the command characteristics of the existing JDE. DJDEs can take effect on a report-to-report, page-to-page, and record-to-record basis.</p> <p>Refer to the <i>Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Reference</i> for more information.</p> |
| CME | <p>A Copy Modification Entry (CME) command allows you to replace certain parts of a report with predefined static data on selected copies or to specify font changes within the variable data.</p> <p>Refer to the <i>Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Reference</i> for more information.</p> |

LPS output

The final production phase is output. The 4050/4090/4450/4650 LPS provides powerful finishing and disbursement features. You can have a cover-to-cover printing process on any job. This means that an inventory stock report job could have:

- Blue card stock front cover with the title in a 24-point bold font
- 49 pages of equipment inventory, with the last page designed to summarize totals
- 37 pages of equipment description, with pricing information removed, and a shaded grid filling the columns on each page
- A matching blue card stock back cover printed on the reverse side with "END OF REPORT" in a 14-point bold font.

You can have each copy of the inventory report offset, or stitched (stapled) and offset, in the stacker tray for easy identification. The system places a routing sheet on top of each offset stack. This routing sheet contains information such as "Jones and Smith Supplies, Inc." This feature is useful when you want to separate individual copies for binding or distribution to different groups.

With the bypass transport option, you can connect third-party finishing equipment directly to your 4050/4090/4450/4650 LPS. The bypass transport fits into tray 1 of the dual stacker output module configuration. Third-party devices do a variety of finishing tasks such as saddle stitching, binding, folding, stapling, trimming, and stacking.

Reference Refer to the *Xerox 4050/4090/4450/4650 LPS Operator Guide* and the *Xerox 4050/4090/4450/4650 LPS Forms Creation Guide* for more information on imaging and output considerations.

2.

Hardware components

This chapter is an overview of the Xerox 4050/4090/4650 Laser Printing System (LPS) storage and memory, hardware components, additional features, and optional printer components.

Refer to the *Xerox 4450 Mid-Range Printer Product Reference* for information on the hardware components of the 4450 MRP.

LPS system disk storage and memory

The system disks store the operating system software and the system resources, such as fonts, forms, and graphics, you want to load into memory for use during input processing. There are several types of memory used with the LPS.

System disks

The 4050/4450 LPS has two standard 50 MB system disks. Optional expansion of up to 200 MB in 50 MB increments is available.

The 4090/4650 LPS has two standard 170 MB disks. Optional expansion of up to two additional 170, 182, or 380 MB drives is also available.

Font memory

Each character in a font set is composed of a unique pattern of dots. Font memory stores the data representation of each character in an individual memory location. If a job requires multiple fonts, more font memory may be needed.

- The 4050/4450LPS has 8 MB of font memory which is expandable to 16 MB.
- The 4090/4650 LPS has 16 MB of font memory which is expandable to 32 MB.

Graphics

Graphics are handled using the methods shown in table 2-1.

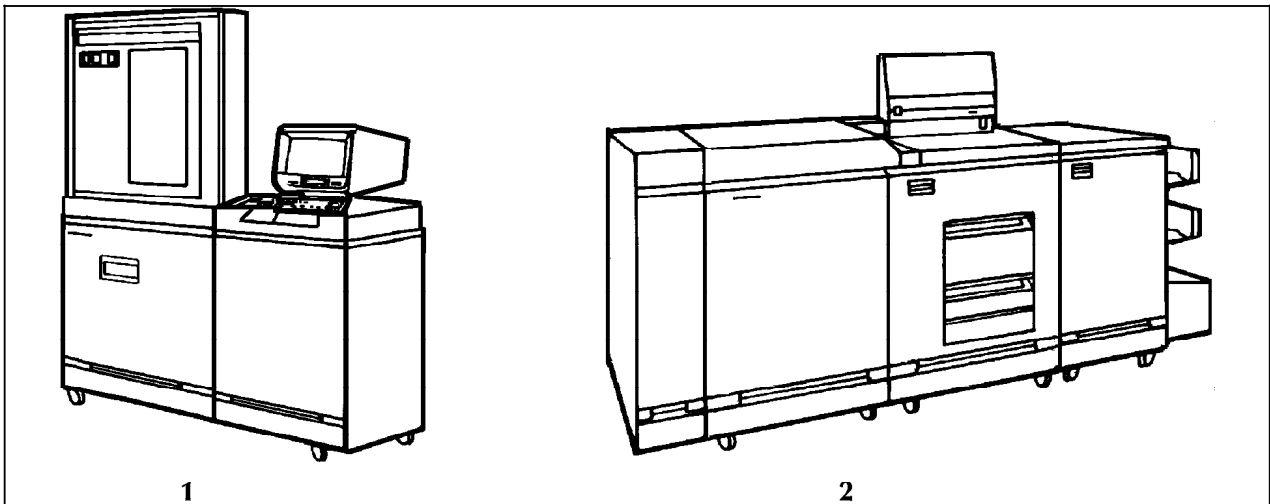
Table 2-1. **Graphics options**

| Method | How it works . . . |
|--|--|
| Graphics Handling Option (4050/4450 LPS) | GHO has 8 MB of graphic memory which allows the 4050/4450 LPS to receive digitized graphic data. |
| Graphics Video Generator (4090/4650 LPS) | GVG has an optional 32 or 256 MB of graphic memory which allows the 4090/4650 LPS to receive digitized graphic data. |
| Raster Image Processor | GHO and GVG accept graphic data encoded according to the Xerox Interpress Standard. Sources of graphic data include the following: <ul style="list-style-type: none"> • Graphic data generated by the Electronic Printing Image Construction (EPIC) host-resident software • Scanned images from the Xerox 7650 Pro Imager using a Xerox Publishing Illustrator Workstation (XPIW) • Scanned images from the 150 Graphic Input Station (GIS). |
| Raster Image Processor | The RIP performs vector to raster conversion in support of the Interpress 3.0 Publication Set. It provides multiple forms capability for any given page and allows you to print text and image files which would otherwise be unprintable or incomplete because of complexity. RIP allows you to use two forms per page and more than 16 graphics on a page for Interpress applications. |

4050/4090/4650 basic components

The LPS consists of two separate units: the system controller and the printer.

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



System controller

The system controller provides the interface capability, data handling, formatting, buffering, and operator control for the LPS. It contains the input subsystem and the control subsystem electronics.

The input subsystem provides interfacing capabilities (online, offline, Ethernet, OEM, and DEC) for a variety of input sources (host, magnetic tape, workstations, and graphic scanners).

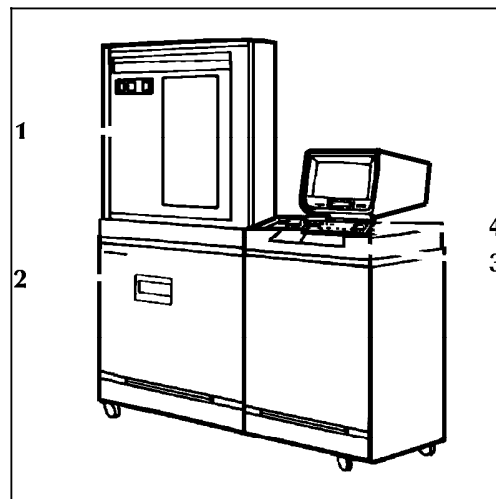
The control subsystem performs all data handling, formatting, buffering, and operational control of the system.

The standard system controller components are the terminal, system controller panel, floppy disk drive, and the system disks.

System controller components

The standard system controller components are the floppy disk drive, the system disks, the system controller panel, and the terminal. Figure 2-2 shows the standard and optional system controller components.

Figure 2-2. LPS system controller



1. 9-track magnetic tape drive
2. Floppy disk drive
3. System controller panel
4. Terminal and keyboard

Floppy disk drive

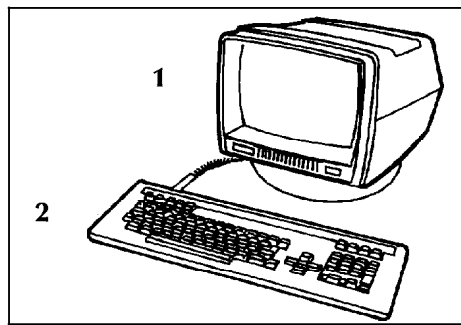
The floppy disk drive provides an alternative input for loading operating system software, user files, and fonts to the system disks. You can also use the floppy disk drive for diagnostics and to back up resident user files and fonts on 5.25-inch, double-sided, high-density floppy disks. You cannot use it as an input source for print jobs.

The floppy disk drive has a total of 1404 available sectors. Sector configuration is 78 cylinders, 2 tracks per cylinder, 18 sectors per cylinder, and 512 bytes per sector.

Terminal

The terminal consists of two components: the keyboard and the display as shown in figure 2-3. The keyboard is your means of communicating with the LPS; the display is the printing system means of communicating with you. The commands you enter at the keyboard control functions (such as loading the operating system, switching between online and offline processing modes, starting jobs, requesting sample prints, and obtaining accounting summaries).

Figure 2-3. **Keyboard and display terminal**

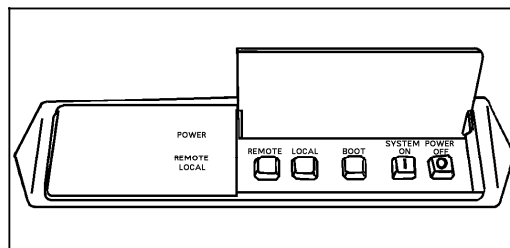


- 1. Display
- 2. Keyboard

System controller panel

The system control panel contains buttons which turn the system on and off, boot the system, and switch between local and remote modes as shown in figure 2-4.

Figure 2-4. **System controller panel**



System disks

System disks store the operating system software, fonts, forms, and general user files for the LPS.

The 4050/4450 LPS has two standard 50 MB system disks. Optional expansion of up to 200 MB in 50 MB increments is available.

The 4090/4650 LPS has two standard 170 MB system disks. Optional expansion using 170 MB, 182 MB, or 380 MB system disks are available.

System controller options

The system controller offers two options which enhance the capabilities of the LPS: the 9-track magnetic tape drive and the 180 18-track cartridge tape drive.

Note: These options are not available on the 4450 mid-range printer.

9-track magnetic tape drive

The optional 9-track magnetic tape drive offers an alternative to online operations. This tape drive supports 9-track, 1600 bits per inch (bpi), phase encoded (pe) magnetic tapes and 6250 bpi, Group Code Recording (GCR) encoded magnetic tapes. Refer to the *Xerox 4050/4090/4450/4650 LPS Operator Guide* for information on using the 9-track magnetic tape drive which is shown in figure 2-5.

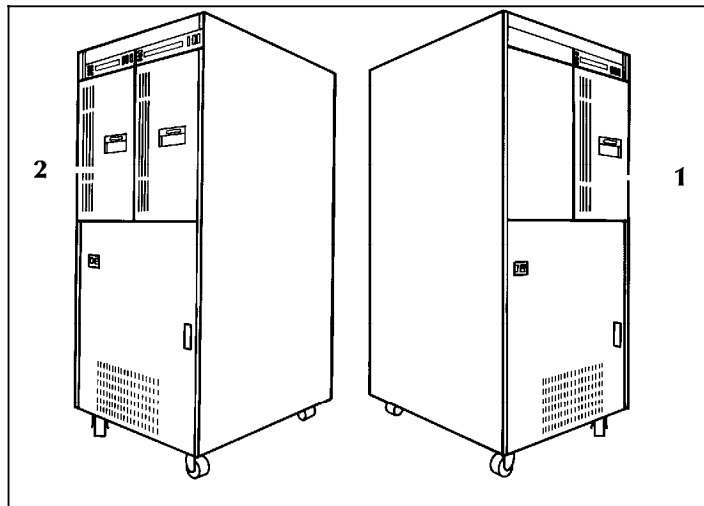
Figure 2-5. **System controller with 9-track magnetic tape drive**

18-track 180 Cartridge Tape System

You can add the detached 18-track, Xerox 180 Cartridge Tape System (CTS) to your system as an alternative to the 9-track magnetic tape drive, or as an additional offline capability for the system. This tape drive supports IBM- and ANSI-compatible, 0.5-inch tape in the 18-track, IBM 3480 data format.

You can use the 180 CTS as a source for loading and backing up your user files and fonts and as an input source for print jobs. This tape drive also offers you additional offline capabilities for sending print and nonprint data to the LPS. The Xerox 180 CTS is available with a single or a dual tape transport as shown in figure 2-6.

Figure 2-6. **180 CTS with transport options**



1. Single transport
2. Dual transport

Printer

The LPS printer is a high-performance printer with built-in intelligence which provides the LPS the output capabilities to produce high-quality publications.

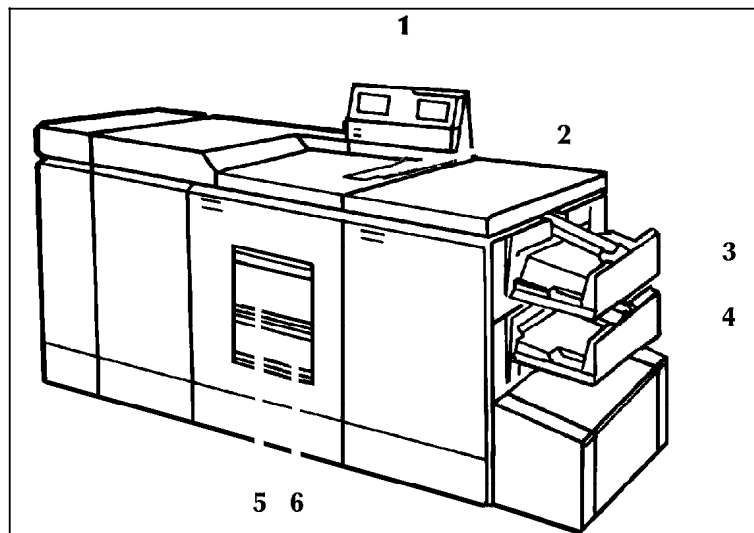
Printer components

The standard LPS printer components are the printer control console, the sample tray, and the feeder trays as shown in figure 2-7. Labels are located throughout the printer to assist you with a variety of tasks such as clearing a paper jam. The printer also has the capability to sound an audible tone to direct your attention to a printer problem. Your service representative can adjust the volume of this tone.

The printer provides control buttons and displays for basic printer functions and status information. The printer control console contains message and graphic displays which assist you with jam clearance and printer maintenance.

The printer also contains an information button (i) which provides you with access to extended messages. LEDs on the control panel indicate feeder status. The dual stacker configuration contains tray select buttons, located next to each stacker tray, which allow you to divert output to the other stacker tray.

Figure 2-7. **Printer components**



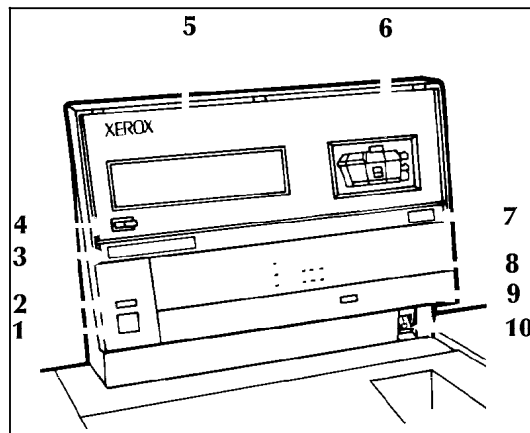
1. Printer control console
2. Sample tray
3. Stacker tray 1
4. Stacker tray 2
5. Feeder tray 2
6. Feeder tray 1

Reference Refer to the *Xerox 4050/4090/4450/4650 LPS Operator Guide* for more information on operating the printer.

Printer control console

A control console located on the printer, shown in figure 2-8, contains message and graphic displays, Information, Stop, Continue, and Sample buttons, an On/Off switch, and indicator lights showing which feeder tray is active and the paper size in use.

Figure 2-8. Printer control console



1. Continue button
2. Stop button
3. Print quantity display
4. Information button
5. Message display
6. Graphic display
7. Wire percentage indicator
8. Feeder tray indicators
9. Sample button
10. On/off switch

Reference Refer to the *Xerox 4050/4090/4450/4650 LPS Operator Guide* for more information on operating the printer control console.

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. The volume may be adjusted by a service representative. |
| Language button | Systems with the language option have a Language button that you use for selecting a different language for the message display; for example, French instead of English. |

Optional printer components

There are four options available with the LPS printer:

- Dual stacker configuration
- High-capacity stitcher/stacker configuration
- High-capacity feeder configuration
- Bypass transport.

Dual stacker configuration

The dual stacker configuration offers two output trays with the ability for automatic tray switching. This allows you to program the system to route output to the inactive output tray when the active output tray is full. This feature allows you to unload a tray without any interruption to the printing process as long as an output tray is ready. If the inactive output tray is not ready when the active output tray reaches its capacity, the system stops printing. You can continue normal processing once an output tray is ready.

You can select either output tray. If both trays are in the ready mode, and neither is selected manually, the system selects tray 1. You can change your tray selection at any time, provided the alternate output tray is in the ready mode.

You can also select one of the output trays as the sample tray, except when you use transparencies.

Reference

Refer to the "SELECT command" section in the *Xerox 4050/4090/4450/4650 LPS Command Reference* for instructions.

You can program the system to offset each output set approximately 0.5 inch from the previous set.

High-capacity stitcher/stacker configuration

The stitcher/stacker tray holds up to 2,000 sheets of unstitched paper. If you want the system to stitch your output, it is collected inside the output module, stitched, and ejected into the output tray. The system can stitch up to 50 sheets in each set.

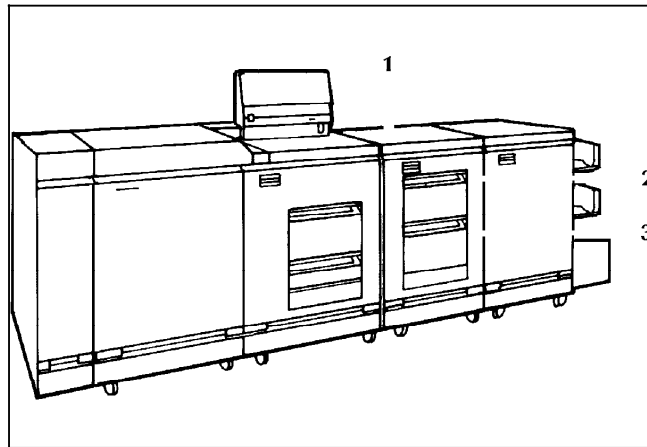
You can program the system to offset each output set approximately 0.5 inch from the previous set.

High-capacity feeder configuration

The high-capacity Feeder (HCF), shown in figure 2-9, is an optional configuration for your LPS. This option allows you to customize your printer to increase its efficiency and use specialized applications. The HCF provides two additional feeder trays and increases the feeder capacity by approximately 2,000 sheets.

Feeder trays 3 and 4 each hold 1,000 sheets of 20 pound/75 gsm paper. They work interchangeably with feeder trays 1 and 2, allowing automatic tray switching and offering increased uninterrupted printing time.

Figure 2-9. LPS with high-capacity feeder



1. High-capacity feeder
2. Feeder tray 3
3. Feeder tray 4

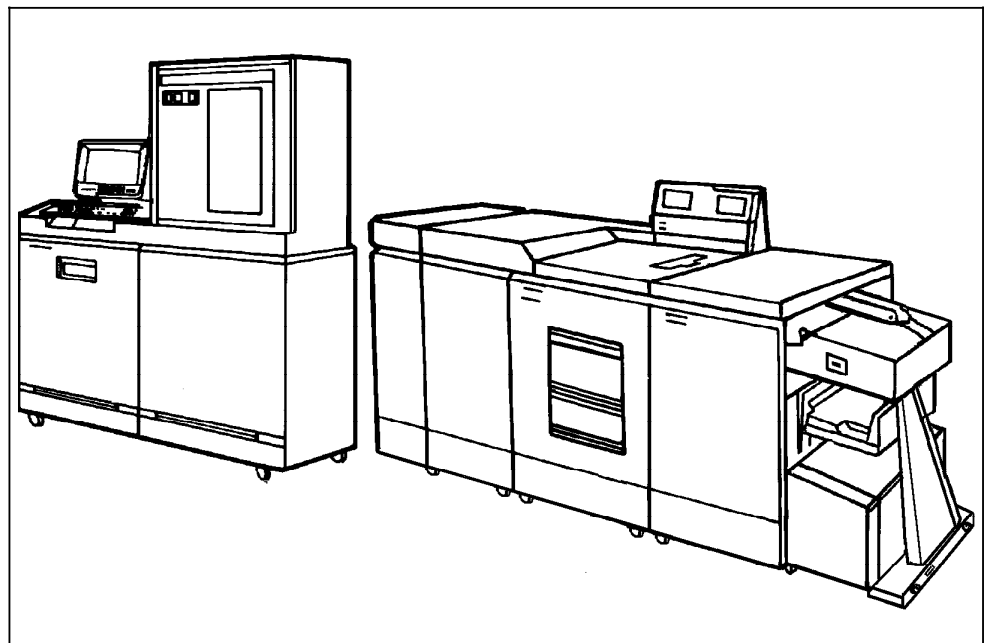
Bypass transport

The LPS bypass transport option, shown in figure 2-10, enables third-party finishing equipment to connect to and interface directly with your LPS.

The bypass transport fits into tray 1 of the dual stacker output module configuration. Your LPS and third-party finishing devices connect by aligning a finishing device with the bypass transport exit slot, or by physically and electrically linking a finishing device with the LPS bypass transport output module.

Third-party devices perform a variety of finishing tasks, such as saddle-stitching, binding, folding, stapling, trimming, and stacking.

Figure 2-10. Laser printing system with bypass transport



Subsystems

The LPS contains five subsystems that perform the tasks necessary to meet the requirements of the system. These subsystems are as follows:

- Input
- Control
- Imaging
- Xerographic
- Output.

Input subsystem

The input subsystem receives print and nonprint file input through the offline interface, the OEM interface, the DEC interface, the Ethernet interface, or the online interface.

A selectable system allows a choice between operational modes.

Input is obtained from the sources shown in table 2-2.

Table 2-2. **Interface sources**

| Interface | Source |
|-----------|---|
| Offline | 9-track (1600 or 6250 bpi) magnetic tape using the magnetic tape drive or from 18-track cartridge using the 180 18-track CTS. |
| Ethernet | Workstations (such as the 6085) and graphic scanners (150 GIS or 7650 Pro Imager) in a shared or unshared, but accessible, network. |
| OEM | A remote IBM-compatible host computer system using the 871-Communications Module (CM). This permits ASCII and EBCDIC data transmission to the 4050/4090/4450/4650 LPS. Transmissions can occur in the System Network Architecture and Synchronous Data Link Control (SNA and SDLC) protocol environment and the Binary Synchronous Communications (BSC) protocol environment. |
| DEC | A VAX/VMS system. This permits synchronous data transmission to the 4050/4090/4450/4650 LPS in a DEC Data Communications Message Protocol (DDCMP) environment. |
| Online | A channel-attached host. All IBM systems which support the channel-attached 3811/3211 and 4245 interface are supported. (Non-IBM systems are supported through a variety of third-party connections.) |

Control subsystem

Table 2-3 is a summary of the control subsystem.

Table 2-3. **Control subsystem features**

| The control subsystem performs . . . | It consists of . . . | The system controller main memory directs . . . |
|---|---|--|
| <ul style="list-style-type: none"> • All data handling • Formatting • Buffering • Operational control | <ul style="list-style-type: none"> • System controller • Main memory • Terminal • Two to four system disks • Interface and control electronics | <ul style="list-style-type: none"> • Page formatting • System control • FSL/JSL compilation • System diagnostics |

The interface and control electronics handle controller-to-device communications and control of specific device functions. They provide the necessary interfacing between the input/output (I/O)

circuits and the device circuits. They also accept control orders from the system controller and exercise the indicated functional control over the devices. The control and interface electronics communicate device status to the computer software.

Imaging subsystem

The imaging subsystem accepts a formatted page of data on which forms and graphics are merged for the xerographic process. This subsystem converts a character 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 black areas. Image clarity is determined largely by the resolution or the number of dots per inch (dpi) printed. The resolution of the 4050/4450/4090 LPS is 300 by 300 dpi. The resolution of the 4650 LPS is 300 or 600 dpi.

Xerographic subsystem

The xerographic subsystem incorporates all of the typical functions of the xerographic printer, including paper handling and development of the latent image for the output page. The latent image is subsequently developed by applying dry ink and transferring it to a sheet of paper. The final image is fixed when the paper passes through a fusing station on its way to the output stacker. The photoreceptor belt is cleaned and recharged in preparation for the next cycle of operation.

Alternate feeder trays

When all feeder trays contain the same type of paper, you can print continuously by programming the printer to feed from alternate feeder trays. You can also fill any tray with different colored paper or with a different weight of paper.

Simplex printing

When you print on one side of the paper (simplex), the system obtains an individual sheet of paper from a feeder tray, passes it over a transfer station, through the fuser station where the image is fixed, and routes it to the output subsystem.

Duplex printing

When you print on both sides of the paper (duplex), the front side of the sheet prints before the back side. After the system prints on the front side, the system turns the sheet over and reroutes it through the xerographic subsystem for printing on the back side. When the system completes the process on the back side of the page, the system routes the sheet to the output subsystem.

Output subsystem

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

The LPS offers two output configurations: the dual stacker and the stitcher/stacker. Each configuration has a paper transport mechanism to allow paper handling. Each configuration can also offset an output set approximately 0.5 inch from the previous set.

Samples are delivered to a sample tray. Sample pages can include printouts of information stored in the system, a duplicate copy of the current output page, or a sample of the next page the system will print. This sample print feature allows you to examine job pages. When a sheet is delivered to the sample tray, the system reprints the sample sheet and delivers it to the active stacker tray, thus maintaining the integrity of the output set.

Note: You should always route transparencies to the sample output tray.

The 4050/4450/4650 LPS delivers output at a rate of up to 50 PPM, and the 4090 delivers output at a rate of up to 92 PPM for the first copy of a report, depending on the processing features you use and the density of the page. Subsequent copies of a report do not require input processing time except when you use copy-sensitive processing. The output rate increases for subsequent copies when any of the following occurs:

- All required forms and fonts remain in memory for the duration of the job.
- Entire job runs in either simplex or duplex mode.
- No copy-sensitive processing.
- System can hold the entire print file for the report on disk.
- No hardware errors or system recoveries occur.
- Graphic image size is three-quarters of a megabit or less on a page-to-page basis.

When printing in duplex mode, printing throughput is reduced when form and font memory cannot accommodate all the forms and fonts used.

3.

Software components

This chapter is an overview of the Xerox 4050/4090/4650 Laser Printing Systems (LPS) Operating System Software (OSS), resident languages, interfaces, and the operating system.

Refer to the *Xerox 4450 Mid-Range Printer Product Reference* for information on the 4450 MRP software components.

Operating System Software

The LPS OSS includes the components outlined in table 3-1.

Table 3-1. LPS OSS components

| Component | What it does . . . |
|--|--|
| Executive | Schedules all LPS processing. |
| Operator and subsystem (OCS) | Interfaces between the OSS and the keyboard/display or user interface. |
| Input processor | Decodes and formats input data (offline magnetic tape, Ethernet, DEC interfaces, etc.), then writes it to the system disk for subsequent printing. |
| Output processor | Merges form and graphic data with input source data, producing merged data in a coded format for printing. The output is sent to the printer, one page at a time, through the image generator. |
| Interpress decomposer (IPD) (4050F) | Used when an Interpress job is run. Decomposes simple Interpress masters and sends them to input for processing. Decomposes the Publication Set of Interpress and provides limited Professional Set support. |
| Print Description Language processor (PDL) | Allows you to enter statements that specify the printing environment, including input and output formats and processing requirements. |
| Forms Description Language processor (FDL) | Allows you to describe forms using simple, English language commands. |
| Text editor | Allows you to edit and manipulate source files. |
| Font editor | Allows you to create new or modify existing font files. |
| File management subsystem | Maintains system disk files. |
| Host Interface Processor (HIP) | Receives data from a remote host, a DEC host, or local area Ethernet networks. In the 4050F and 4135, HIP supports IBM SNA/SDLC or BSC (HIP HOST=871), Ethernet (HIP HOST=XNS), DEC (HIP HOST=DMR), and Xerox Printer Access Facility (HIP HOST =XPF). |
| Diagnostic software | Operating System Diagnostic Software (OSDS) and Standalone Field Engineering Software (SAFES) are used to identify and diagnose hardware failures. |
| Utilities | Several utilities provide a disk save/restore capacity, accounting summaries, and file directory lists. They also include routines to compress files and directories, restrict command use, etc. |

Resident languages

There are three languages resident on the LPS: Forms Description Language (FDL), Interpress, and Print Description Language (PDL).

FDL

FDL is an LPS resident language you use to design electronic forms. You can include logos, signature fonts, and shading in the forms you create. Source and object form libraries are stored on the system disks.

Reference Refer to the *Xerox Laser Printing System Forms Creation Guide* for more information.

Interpress

Interpress is a PDL capable of describing any two-dimensional image intended for a raster device such as an LPS. This language describes the data you create on the page; it is not a page composition language.

You can use Interpress to describe 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. You can create an Interpress master at the host computer system or at a workstation and transfer it to the LPS.

PDL

PDL is a resident language that you use to describe the input, logical processing, and output requirements of your print job.

Reference Refer to the *Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Reference* for more information.

Host software

There are several software packages which are resident on the host computer system. These software packages enhance the functionality of the LPS.

Electronic Printing Image Construction (EPIC)

EPIC is a host-resident software package available on IBM MVS or VM/CMS, which translates computer-generated text and graphics into high-quality images you can print on an LPS.

A version of EPIC which is independent of the host computer system is also available for non-IBM users. Refer to EPIC documentation for more information. The GHO option is required on the 4050/4450 LPS. The GVG option is required on the 4090/4650 LPS.

Host Forms Description Language (HFDL) HFDL is a host-resident forms design software package available on IBM MVS or VM, which allows you to create, change, and merge forms with data at the host computer system for printing.

Reference Refer to the *Xerox Laser Printing System Forms Creation Guide* for more information.

Xerox Printer Access Facility (XPAF) 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 datastream. XPAF accepts numerous types of datastreams, transforms and conditions them, and then sends them to the printer you select. To users of IBM Advanced Function Printing (AFP), XPAF appears to be an extension of the IBM product.

Operating system

The LPS Operating System Software (OSS) is a set of programs which allow the printing system to manage its own resources. Xerox distributes new versions of the OSS on magnetic tapes or floppy disks. These release media contain the following programs:

- New system files
- System generation processor program you use to load and configure new system files onto system disks
- Concatenated version of the system files and system generation processor you use to perform an online system generation for your tape system
- Patch files you use to modify the new system files for optimal performance.

System generation

System generation, or sysgen, is the process you use to install, upgrade or modify the OSS. There are three types of sysgens that you can perform: mini, update, or full. Table 3-2 provides an overview of sysgen types.

Reference Refer to the *Xerox 4050/4090/4450/4650 LPS System Administration Guide* for complete instructions for each of these sysgens.

Table 3-2. Sysgen types

| Sysgen type | What it does . . . |
|-------------|--|
| Mini | Existing operating system is modified in a manner that does not require new system file input or patching. For example, an existing feature is deactivated or reactivated, or a specification that is transparent to the operating system is changed. |
| Update | Existing operating system is upgraded to include new features or is replaced with a new version of the system. During this process, some or all of the existing system files on the system disks are replaced with new files; user files are not affected. |
| Full | New operating system is built on empty system disks, such as new or used disks that have been cleared and formatted prior to system generation. |

Command statements and files

You use Print Description Language (PDL) command statements to describe data layout and provide instructions for data placement on a page. You can use PDL command statements whether or not you use an FDL-created form. The .JSL file contains PDL statements which define the format of the input, the process requirements, and the format of the printed output you want. When you compile a .JSL file, it creates a .JDL file that the system uses when you print your job.

Within a .JDL file, you can have one or more unique definitions for different processing features, output formats, and tape formats. Each set of unique definitions represents a job and is called a JDE file or a JOB.

You must use a .JDL file when you print on the LPS. You can request specialized printing functions using PDL statement commands in addition to the .JDL file.

Reference

Refer to the *Xerox 4050/4090/4450/4650 LPS Print Description Language (PDL) Reference*, the *Xerox 4050/4090/4450/4650 LPS Operator Guide*, and the *Xerox 4050/4090/4450/4650 LPS Forms Creation Guide* for more information.

The Operating System Software (OSS) provides several basic .JSL files: For example, ENET.JSL is provided for printing Ethernet jobs, ONLINE.JSL is provided for printing online jobs, XEROX.JSL is provided for printing magnetic tape jobs, and so forth. To meet specific application needs, you can copy and modify any OSS-supplied .JSL file.

All Xerox LPS offer the LPS Editor utility as a standard feature. This feature allows you to create and modify program source files such as .JSL and .FSL files.

The LPS Editor allows you to enter the program source file into the system, thus entering forms into the system as data. You use the Forms Description Language (FDL) commands to design forms with the ability to use variable data.

The FDL commands combine to create a Forms Source Library (.FSL) file, which, when compiled, becomes a form (.FRM) file. The PDL statement commands describe the job to the system.

You create .FRM files for use with your forms.

Reference

Refer to the *Xerox 4050/4090/4450/4650 LPS Forms Creation Guide* for more information.

4. Network connectivity

The 4050/4090/4450/4650 Laser Printing Systems (LPS) can be connected in several environments such as IBM mainframes, DEC minicomputers, and PC Local Area Networks (LANs). This chapter discusses interface connections and provides a visual overview of typical configurations within these environments.

Interface options

Several optional interfaces are available for use with the LPS. Each interface offers different connection options.

Online

You use the online interface for all IBM systems which support the channel-attached 3811/3211 and 4245 interface. The online channel interface receives input directly from the host computer system.

Offline

You can use the offline interface as an alternative to, or in addition to, an online system. The offline interface connects any 9-track or 18-track magnetic tape which conforms to one of the following formats:

- American National Standards Institute (ANSI)
- Burroughs format MCP 2500 through 4700, and 6700
- Control Data Communications (CDC) external format
- Digital Equipment Corporation (DEC) format RSX-11
- Honeywell format OS 220/2000 and OS 600/6000 series
- IBM formats OS/VS/370, OS/360, DOS/VS/370, or DOS 360/370
- ICL format 2900 VME/B
- Interpress on tape
- NCR format Century-B1
- Sperry/Univac Series 70 format 1100-OS standard files
- Tape input codes ASCII, Binary Coded Decimal (BCD), and EBCDIC
- Univac tapes format SDF.

OEM

You use the OEM interface for System Network Architecture and Synchronous Data Link Control (SNA and SDLC) protocol and for Binary Synchronous Communications (BSC) protocol. The 871-CM and the LPS resident OEM interface work together to allow ASCII and EBCDIC data transmission to the LPS, allowing the LPS to print jobs from a remote IBM-compatible host computer system. The 871-CM uses a telephone modem to eliminate the need for a channel-attached extender unit.

Reference

Refer to the *Xerox 4050/4090/4450/4650 LPS System Administration Guide* and to the *Xerox 871-CM System Guide* for more information on SNA, SDLC, and BSC communications.

DEC

You use the DEC interface for communication in VAX/VMS DEC Data Communications Message Protocol (DDCMP) environments. This interface allows communication between a DEC VAX/VMS system and an LPS through cable or modem connections, using Host Interface Processor (HIP) tasks. The DEC interface supports all UNIBUS, VAX-BI, or Q-Bus based DEC processors.

Ethernet

You use the Ethernet interface for devices connected to the network. Ethernet is the Xerox Local Area Network (LAN) which allows data to be transmitted by cable from one device to another. Using the Ethernet, your LPS can receive and print documents from other network devices such as the following:

- Ethernet workstations, such as the Xerox 6085 can transfer Interpress files to the LPS and can invoke LPS-stored forms and graphics for printing.
- Ethernet graphic scanners, such as the 7650 Pro Imager and the 150 Graphic Input Station (GIS), can transfer scanned graphic data, including line art and continuous tone images, to the LPS. The LPS must have GHO/GVG to receive digitized graphics.

Make sure you select both the communications interface and the Ethernet interface at system generation if you are using Ethernet communications.

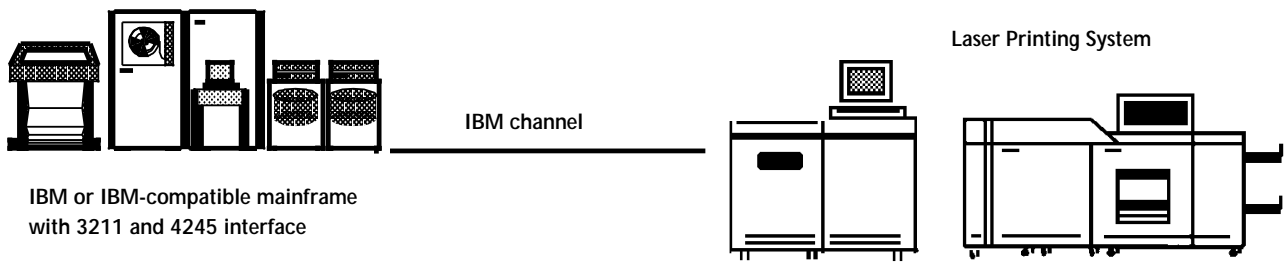
IBM and compatible mainframes

IBM and IBM-compatible mainframes can be connected to an LPS 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 4-1.

Figure 4-1. IBM online direct (channel)



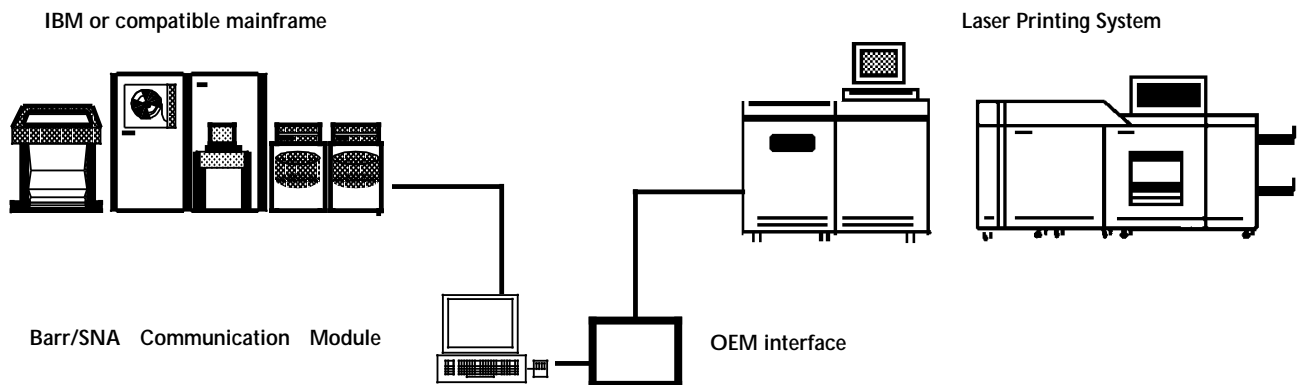
Datastreams

Application software used with IBM and IBM-compatible hosts in an online connection generally produces printer output in line printer or LCDS (Xerox metacode) datastreams. For those products that produce other datastreams, 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.

Remote interface

To connect an IBM or IBM compatible mainframe remotely, an OEM interface and Barr/SNA Bisynchronous Communication Module are required. In this configuration, the LPS can support SNA/SDLC or bisynchronous protocol environments as shown in figure 4-2.

Figure 4-2. IBM remote interface



Datastreams

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

Network interface

An IBM or IBM-compatible mainframe may be connected to an LPS through a LAN as shown in figure 4-3.

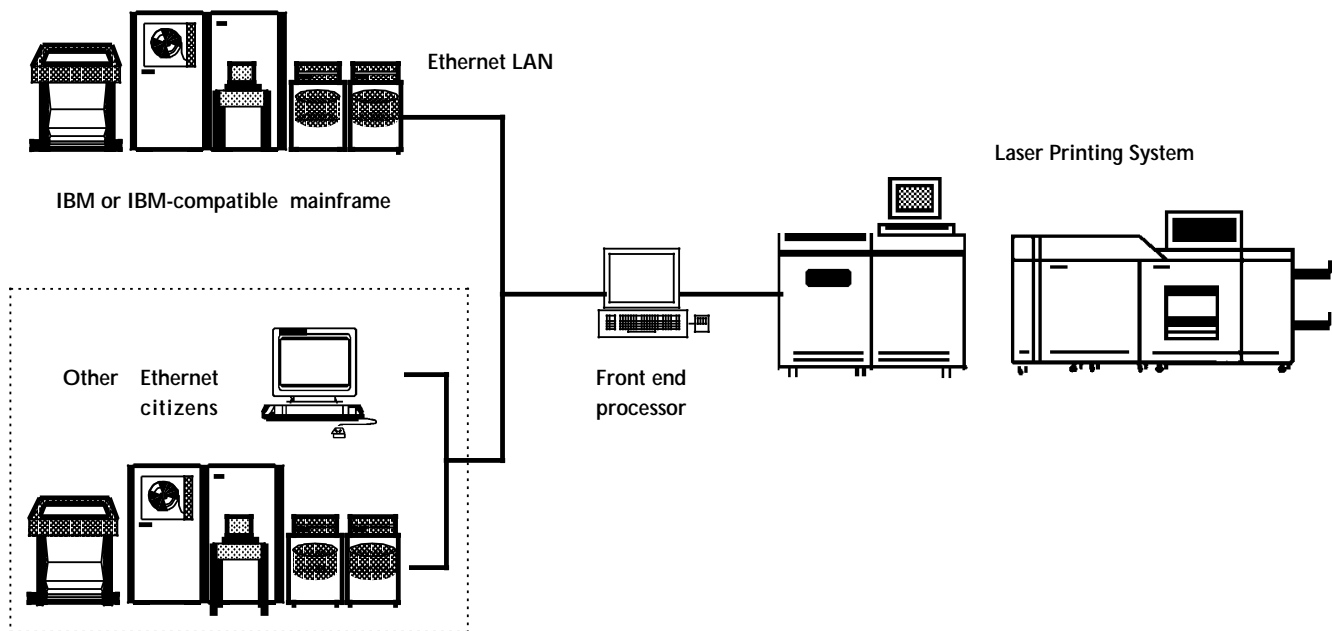
Ethernet LAN

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.

Figure 4-3. IBM and IBM-compatible Ethernet interface



Datastreams

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

DEC VAX and MicroVAX mainframes

An 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. See figure 4-4 for a DEC SPMF-VMS online interface.

Communications interface

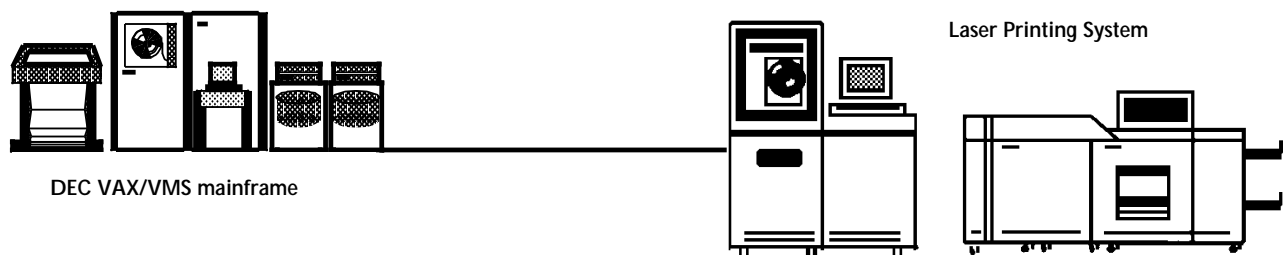
A DEC VAX/VMS platform can use the XPMF-VMS option to connect to an LPS through a DEC communications interface. For a local connection, the Xerox-supplied modem eliminator may be used to provide a point-to-point communications link. You can use modems to create a remote connection.

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

Reference

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

Figure 4-4. DEC XPMF-VMS online interface



Datastreams

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

Network interface

A DEC VAX/VMS mainframe is connected to an LPS through an Ethernet LAN as shown in figure 4-5. 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 DEC TCP/IP Services for OpenVMS (or equivalent), if it is not already present.

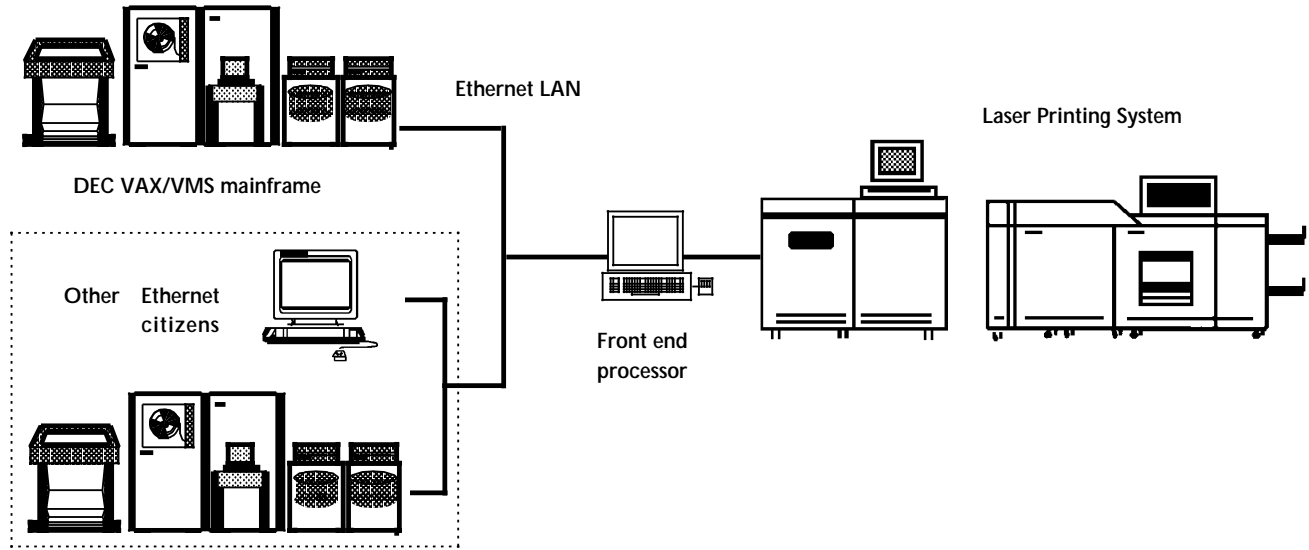
Xerox XNS 5.0 for VMS: If the Xerox XNS for 5.0 for the VMS software package is used, no communications protocol conversion is required. If XNS 5.0 is not used, then a bridge that provides connectivity between the VAX Ethernet TCP/IP or DECnet protocol and the selected Xerox interface is required.

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.

Figure 4-5. DEC network interface



Datastreams

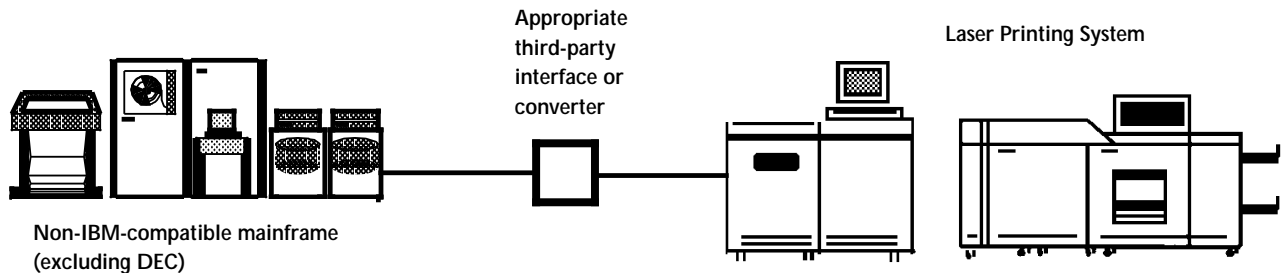
In these configurations, application output can be either Interpress, LCDS (Xerox metacode), or PostScript, depending on the interface option selected.

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

Other mainframes

Several non IBM-compatible mainframes may be connected to an LPS printer through the appropriate third-party interface. More information on third-party interfaces is available from The Xerox Connection or your Xerox representative. Figure 4-6 shows a mainframe in an online configuration through a third-party interface.

Figure 4-6. Mainframe in an online configuration



Datastreams

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

IBM PC and PC-compatible workstations

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

Ethernet interface

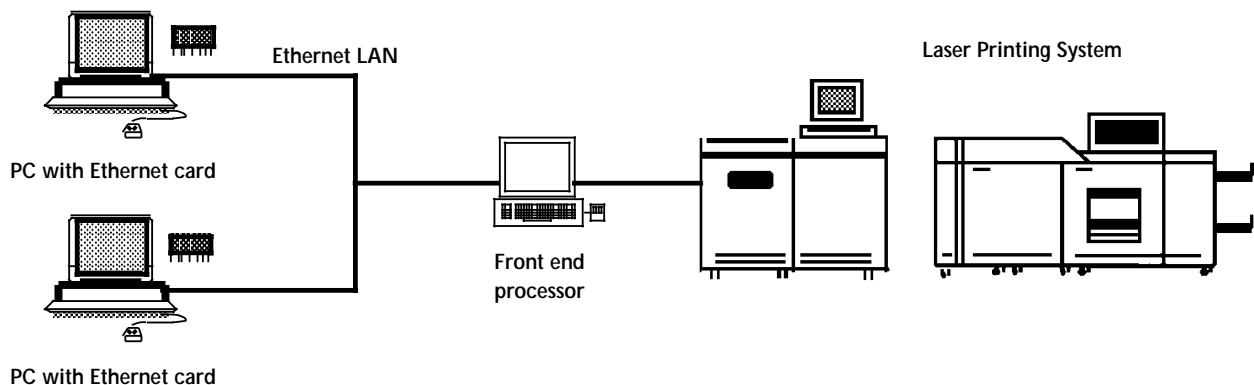
A PC may be connected to an LPS through an Ethernet Local Area Network.

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 if it is used with software applications that produce LCDS or Interpress datastreams.

Figure 4-7. PC Ethernet interface



Datastreams

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

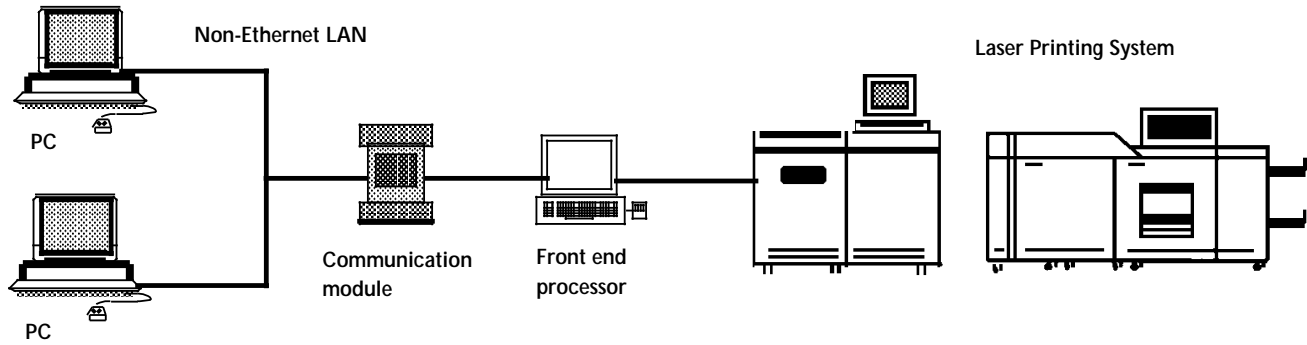
Other network interfaces

PCs may be connected to networks other than Ethernet as shown in figure 4-8, including a 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 4-8. PC non-Ethernet network interface



Datastreams Datastreams are 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 an LPS in an online configuration. Contact The Xerox Connection or your Xerox representative for connectivity and application software information for this configuration.

Macintosh workstations

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 LPS. If you want only a few of your Macintosh PCs to be capable of sending documents to the LPS, 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.

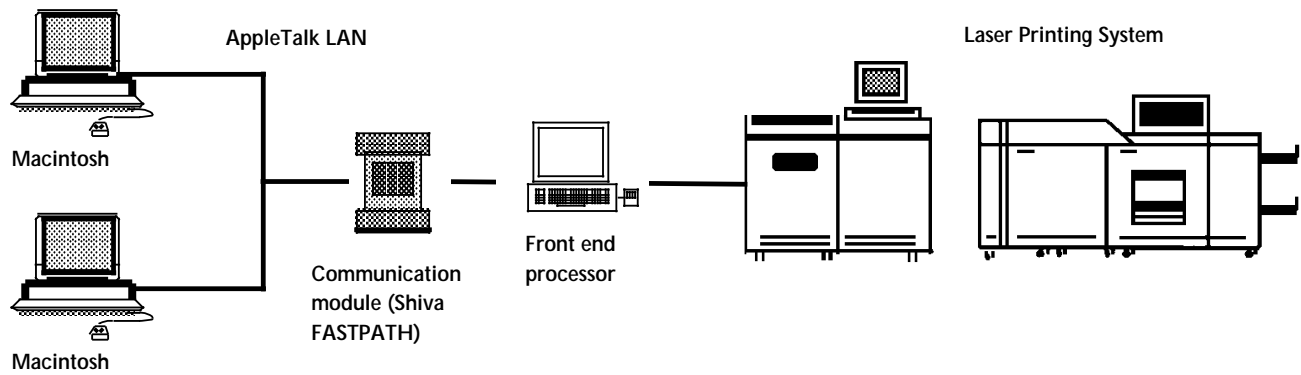
AppleTalk network interface

The standard Macintosh LAN configuration is through AppleTalk, as shown in figure 4-9. Most networked Macintosh PCs use AppleTalk to communicate with a printer.

Communication protocols

The LPS 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 processor.

Figure 4-9. Macintosh AppleTalk network interface



Datastreams

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

Ethernet interface

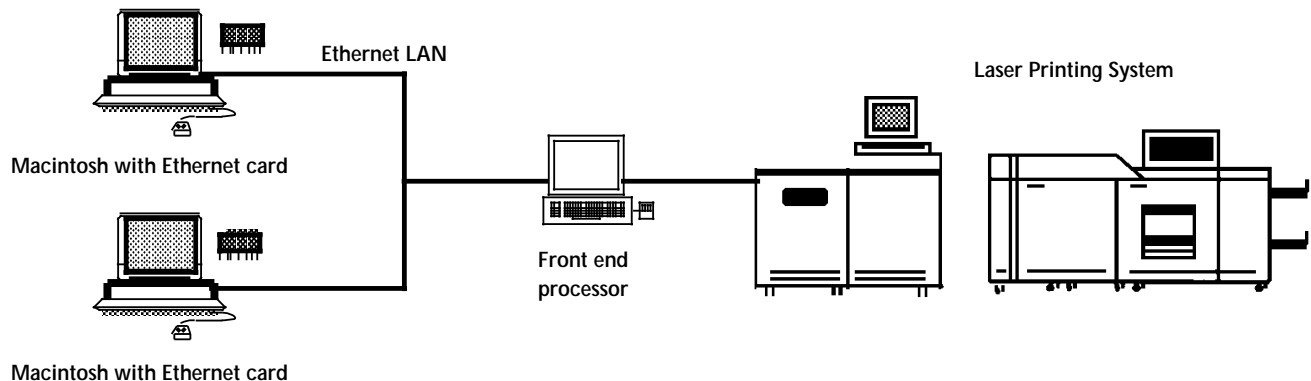
Each Macintosh connected to the network must have its own Ethernet card. One or a few Ethernet cards are less expensive than the communication module needed to convert AppleTalk to Ethernet.

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.

Communication protocols

With the Ethernet card in place, output is in TCP/IP on Ethernet. A front end processor is then required to connect TCP/IP to XNS.

Figure 4-10. Macintosh Ethernet interface



Datastreams

The front end processor also converts the PostScript datastreams output of Macintosh application software to .IMG files for printing.

Sun workstations

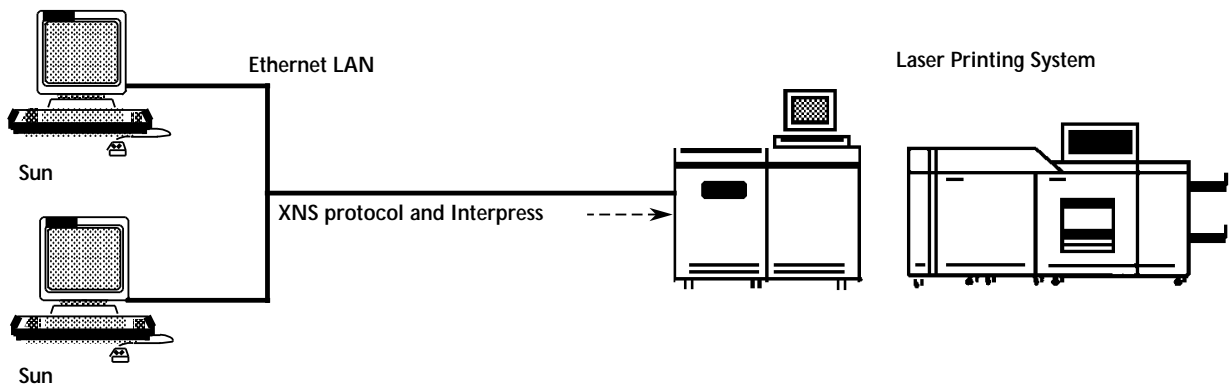
The Sun workstation connects to an LPS through an Ethernet interface. The equipment needed for connectivity depends upon the communication protocol and the datastreams used. The workstations communicate to the LPS through the Xerox Network System (XNS) using XNS protocols.

Ethernet with XNS protocol

Communication protocols

A Sun workstation can be configured to produce XNS protocol output on Ethernet as shown in figure 4-11. This communication protocol is acceptable to the LPS without conversion.

Figure 4-11. **Sun Ethernet interface involving XNS protocol and Interpress datastreams**



Datastreams

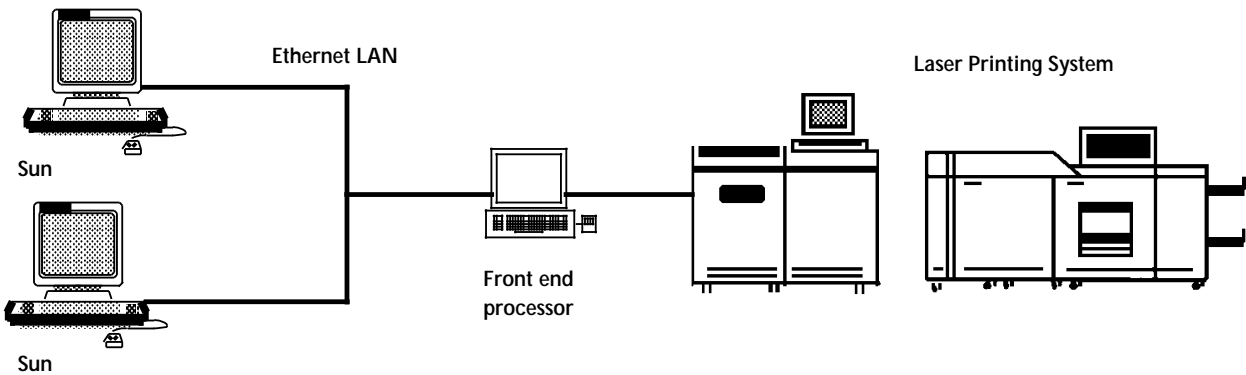
If the application software you are using on your Sun produces an Interpress datastream, then conversion is not necessary and a front end is not required. However, if you are using an application that produces PostScript datastreams, a front end processor is required to convert the PostScript data into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

Ethernet with TCP/IP protocol

Communication protocols

If a Sun workstation is connected to an Ethernet LAN using a TCP/IP protocol, as shown in figure 4-12, the TCP/IP must be converted on the front end processor to XNS protocols before the data reaches the printer.

Figure 4-12. Sun Ethernet interface involving TCP/IP protocol or PostScript datastreams



Datastreams

A front end processor is required in this configuration to connect TCP/IP to XNS. The front end processor also converts PostScript datastreams 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 processor connects TCP/IP to XNS and passes the Interpress datastreams through without further conversion.

Other workstations

Workstations other than the IBM PC, Macintosh, and Sun may also be connected to the LPS through a LAN. The connectivity products needed depend upon the type of network used, the communication protocols used on that network, and the datastreams 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 LPS.

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

Refer to Figure 4-7 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 processor is required to convert TCP/IP to XNS. The front end processor is also necessary if the application software used produces a datastream other than Interpress or LCDS.

Refer to Figure 4-8 for an example of an interface involving a non-Ethernet LAN.

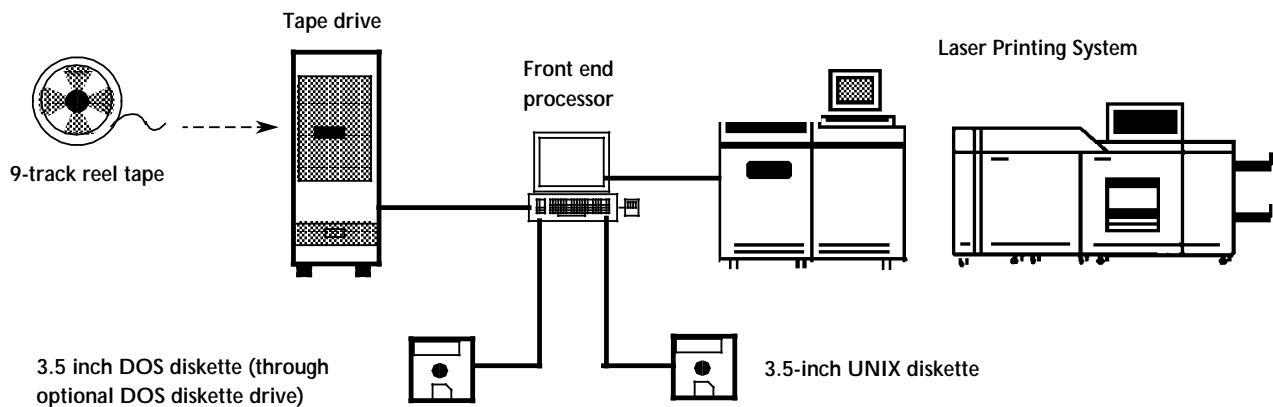
Offline connectivity for workstations

An offline interface option is available for workstations. These interfaces require a front end processor as shown in figure 4-13.

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

- Application job is loaded directly onto an Entire front end using a 3.5 inch UNIX disk.
- Optional 3.5 inch DOS disk drive is also available for the front end processor, allowing input from a DOS-formatted 3.5 inch diskette.
- Optional tape drive allows application input from a 9-track reel-to-reel tape and an 18-track cartridge tape.
- Optional quarter-inch cartridge (QIC) drive allows application input from a QIC tape.

Figure 4-13. **Offline connection through a front end processor**



The Xerox 4050/4090/4650 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 4050/4090/4650 running Version 3.8 software. This will help you to determine if your system is compatible with other Xerox printers at your site.

This chapter contains LPS comparison and compatibility tables.

Refer to the *Xerox 4450 Mid-Range Printer Product Reference* for information on the 4450 MRP.

Processing components

System components are used each time you process a job. Table A-1 compares the 4050/4090/4650 LPS components with other Xerox laser printing systems.

Table A-1. LPS product comparison

| Feature | 4050 | 4090 | 4650 | 4850 | 4890 | 4135 | 8790 | 8790 |
|---|-------------|------------------------------|---------------------------------------|-------------------|-------------|-------------------|-----------|-----------|
| LPS optional connections | | | | | | | | |
| • Online (3811/3211/4245 interface) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Offline (9- and 18-track tape) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • 871-CM: SNA/SDLC and BSC (OEM interface) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • BARR/SNA | Yes | Yes | Yes | Yes | Yes | No | No | No |
| • XNS (Ethernet interface) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • DMR (DEC interface) | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| • 850/860 Communication option | No | No | No | No | No | Yes | Yes | Yes |
| System controller | | | | | | | | |
| • System disk capacity (MB): —Standard | 2-50 | 2-170 (V3.5) 2-182 (V3.8) | 2-170 (V3.5) 2-182 (V3.8) | 2-182 | 1-400 | 2-182 | 2-50 | 2-50 |
| —Optional | 2-50 | 2-170 (V3.5) 2-182 (V3.8) | 2-170 (V3.5) 2-182 (V3.8) 2-380 | 2-182 or 2-380 | 3-400 | 2-182 or 2-380 | 2-50 | 2-50 |
| • Multinational terminal | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Control memory | 512KB | 512KB | 512KB | 512KB | 512KB | 1024KB | 512KB | 512KB |
| • Font memory (MB) | 8 | 64 | 64 | 32 | 64 | 32 | 8 | 8 |
| —Expandable to (MB) | 16 | 128 | 128 | 128 | 128 | 128 | 16 | 16 |
| • 5.25 inch floppy drive | Yes | Yes | Yes | Yes | Yes | Yes (opt.) | Yes | Yes |
| • GVG memory (MB) | No | 32 | 32 | 32 | 32 | 32 | No | No |
| —Expandable to (MB) | — | 256 | 256 | 256 | 256 | 256 | — | — |
| • GHO memory (MB) (option) | 8 | 8 | — | — | — | No | 8 | 8 |
| • QIC tape drive (option) | No | No | No | Yes | Yes | Yes | No | No |
| • Peripheral cabinet (option) | No | No | No | No | Yes | Yes | No | No |
| Printer | | | | | | | | |
| • Rated speed (PPM) | 50 | 92 | 50 | 50 | 92 | 135 | 72 | 120 |
| • Output resolution (spi) | 300 | 300 | 600 | 300 | 300 | 300 | 300 | 300 |
| • Image size (inches) | 8.6 X 13.65 | 8.6 X 14 | 8.6 X 14 | 8.62 X 14 | 8.62 X 14 | 17 X 14.3 | 8.66 X 12 | 8.66 X 12 |
| • Duplex printing | Standard | Standard | Standard | Standard | Standard | Standard | Standard | Standard |
| • Sample tray capacity (sheets) | 100 | 100 | 100 | 100 | 100 | 100 | 25 | 25 |
| • Stacker options: —Dual stacker (capacity per tray) —Stitcher/stacker (sheets) | 750 2000 | 750 2000 | 750 2000 | 750 2000 | 750 2000 | No — | 500 — | 500 — |

Table A-1. LPS product comparison (continued)

| Feature | 4050 | 4090 | 4650 | 4850 | 4890 | 4135 | 8790 | 8790 |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|--------------------------------|--------------------------------|
| Printer (continued) | | | | | | | | |
| • Stitched reports maximum | 50 | 50 | 50 | 50 | 50 | — | — | — |
| • Feeder options: —Dual feeder trays | | | | | | | | |
| Tray 1 (Main) capacity (sheets) | 1000 | 1000 | 1000 | 1000 | 1000 | 1100 | 2500 | 2500 |
| Tray 2 (Aux) capacity | 500 | 500 | 500 | 500 | 500 | 600 | 500 | 500 |
| —Expanded aux tray | — | — | — | — | — | — | 2500 | 2500 |
| —High-capacity feeder (HCF) | | | | | | | | |
| Tray 3 capacity (sheets) | 1000 | 1000 | 1000 | 1000 | 1000 | 2600 | — | — |
| Tray 4 capacity (sheets) | 1000 | 1000 | 1000 | 1000 | 1000 | 2600 | — | — |
| • Bypass transport (option) | Yes | Yes | Yes | Yes | Yes | No | No | No |
| Forms | | | | | | | | |
| • Electronically created and stored | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Page-to-page changeability | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Preprinted forms | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fonts | | | | | | | | |
| • Proportional or fixed spaced | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Multinational character set | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Standard character sizes (pt) | 4-24 | 4-24 | 6-36 | 4-36 | 4-36 | 3-36 | 4-24 | 4-24 |
| • Max. number of fonts per page | 128 | 128 | 128 | 128 | 128 | 128 | 95 | 95 |
| • Downloadable from host | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Floppy disk loadable | Yes | Yes | Yes | Yes | Yes | Yes (opt.) | Yes | Yes (opt.) |
| • Magnetic tape loadable | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| • Resolution (spi) | 300 | 300 | 600/300 | 300 | 300 | 300 ppi | 300 | 300 |
| • Logo and signature fonts | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| • Character-to-character selectable | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Paper | | | | | | | | |
| • Variable paper sizes (inches) | 8 X 10 to 8.5 X 14 (incl. A4) | 8 X 10 to 8.5 X 14 (incl. A4) | 8 X 10 to 8.5 X 14 (incl. A4) | 8 X 10 to 8.5 X 14 (incl. A4) | 8 X 10 to 8.5 X 14 (incl. A4) | 8 X 10 to 11 X 17 (incl. A4) | 8.5 X 11, 8.5 X 14 or A4 | 8.5 X 11, 8.5 X 14 or A4 |
| • Weight: Index, cut-sheet, colored, preprinted, predrilled, or preperforated paper | 20-110 lb. (75-200 gsm) | 20-110 lb. (75-200 gsm) | 20-110 lb. (75-200 gsm) | 20-110 lb. (80-200 gsm) | 20-110 lb. (80-200 gsm) | 16-110 lb. (60-200 gsm) | 16-110 lb. (60-200 gsm) | 16-110 lb. (60-200 gsm) |
| • Transparencies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Notes: 1. Within the LPS Reference Set, spots, dots, and pixels are used interchangeably.
2. Resolution (300 spi or 600 spi) applies to both coordinate axes.

Paper sizes and special stocks

If your job requires a particular paper size, make sure your LPS is capable of handling it. Table A-2 identifies the paper sizes for several Xerox laser printing systems.

Table A-2. LPS paper handling capabilities

| Paper Size (Inches) | Laser Printing System | | | | |
|------------------------|-----------------------|---------------------------------|---------------|------|------|
| | 4135 | 4050/ 4090/ 4450/ 4650 | 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.

If your job requires specialty paper, make sure the 4890 LPS is capable of handling it. Table A-3 identifies the type of specialty paper and stock for several laser printing systems.

Table A-3. **Specialty paper and stock**

| Specialty paper or stock | Laser Printing System | | | | |
|------------------------------|-----------------------|---------------------------------|---------------|------|------|
| | 4135 | 4050/ 4090/ 4450/ 4650 | 4850/ 4890 | 9790 | 8790 |
| Card stock (up to 110 lb.) | • | • | • | • | • |
| Divider stock (65 pound) | • | • | • | • | • |
| Index stock (90 pound) | • | • | • | • | • |
| Image Series Elite (20 lb.) | • | • | • | • | • |
| Edge reinforced 3-hole | | • | • | • | • |
| Carbonless paper | • | | | • | • |
| Antique parchment (24 lb.) | • | • | • | • | • |
| Envelopes | | | | * | |
| Labels (self adhesive) | | • | • | • | • |
| Labels (high speed) | • | • | • | • | • |
| Perforated | • | \$ | • | • | • |
| Predrilled | • | • | • | • | • |
| Preprinted | • | \$ | • | • | • |
| Tinted | • | • | • | • | • |
| Transparencies | • | • | ** | ** | • |
| Zero Solvent Vellum (20 lb.) | • | • | • | • | • |
| 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 the *Xerox 4050/4090/4450/4650 LPS Operator Guide* before using this stock.

Print resolution considerations

Since 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 A-4 illustrates the print resolution functions of several laser printing systems.

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

Table A-4. **Print resolution of print jobs created or printed on LPS**

| Print resolution functionality | Laser printing system | | | | | | | 8790 |
|---|-----------------------|------|------|------|------|---------------|------|------|
| | 4135 | 4050 | 4450 | 4650 | 4090 | 4850/ 4890 | 9790 | |
| 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. | • | | | • | | | | |

Glossary

| | |
|-------------------------|--|
| A3 | International paper size measuring 297 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. |
| B4 | International paper size measuring 250 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. |
| BCD | Binary coded decimal. |
| 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. |
| blocking | Process of combining two or more records into a single block of data which can be moved, operated upon, stored, and so on, as a single unit by the computer. |
| 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. |
| BOF | Bottom-of-form. |
| BOT | Beginning-of-tape. |
| bpi | Bits per inch. |
| 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. |
| character set | Set of all characters defined in a font, including alphabetic, numeric, and special characters such as symbols. |
| 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. |

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| CME | Entry modifying the output printing characteristics of a report on a copy-to-copy basis. |
| compiler | Software that translates instructions written in high-level language into machine language for execution by a system. |
| Copy Modification Entry | See <i>CME</i> . |
| copy-sensitive | Job in which multiple copies of a report contain different data, such as paychecks and banking statements. |
| cpi | Characters per inch. |
| default | Value assigned to a field by the system if no input is received from the operator. You can change the default value of a field. |
| DJDE | Dynamic Job Descriptor Entry. Command within an input data stream used to modify the printing environment dynamically. |
| dot | Picture element (pixel) imaged by a printer. The number of dots imaged per inch measures printer resolution, for example, 300 dots per inch (dpi). See also <i>spot</i> . |
| 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. |
| 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 <i>DJDE</i> . |
| edgemarking | Use of graphic objects (usually lines or boxes) that bleed off the edge of the physical page. See also <i>physical page</i> . |
| embedded blanks | Blank spaces within a command line. |
| ENET | Ethernet network. |
| EOT | End of tape. |
| Ethernet | Xerox local area network (LAN) that allows transmission of data by cable from one device to another. |

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| FCB | Forms Control Buffer. Controls the vertical format of printed output. |
| FCP | File Control Parameter. |
| FCU | File Conversion Utility. |
| FDL | Forms Description language. LPS-resident source language used to design electronic forms. See also <i>FSL</i> and <i>form</i> . |
| FDR | File directory. |
| FIS | Font Interchange Standard. Defines the digital representation of fonts and character metrics for the generation of an entire series of Interpress fonts. |
| 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 | See <i>FIS</i> . |
| 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 <i>FDL</i> and <i>FSL</i> . |
| Forms Control Buffer | See <i>FCB</i> . |
| Forms Description Language | See <i>FDL</i> . |
| Forms Source Library | See <i>FSL</i> . |
| FSL | Forms Source Library. Uncompiled collection of user-created files containing FDL commands. See also <i>FDL</i> and <i>form</i> . |
| GHO | Graphics Handling Option. |
| GVG | Graphics Video Generator. |
| hexadecimal | Numbering system with a base of 16. The numbers 10 through 15 are represented by A through F. |
| 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. |

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| HIP | Host Interface Processor. |
| 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. |
| Interpress | Industry-standard page description language developed by Xerox. Interpress documents can be printed on any sufficiently powerful printer equipped with Interpress print software. |
| 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 <i>JSL</i> . |
| JID | Job Identifier. |
| job | Synonymous with a START command, a job is a group of print data sets called reports. A job may contain one or multiple reports. |
| job control | Program called into storage to prepare each job or job step to be run. |
| Job Descriptor Entry | See <i>JDE</i> . |
| Job Descriptor Library | See <i>JDL</i> . |
| job management | Collective functions of job scheduling and command processing. |
| Job Source Library | See <i>JSL</i> . |
| JSL | Job Source Library. Collection of uncompiled job descriptions. See also <i>JDE</i> and <i>JDL</i> . |
| 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. |
| landscape | Orientation in which text and images are positioned parallel to the long edge of the paper. |

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| 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. |
| 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. |
| lpi | Lines per inch. |
| LPS | Laser printing system. |
| 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. |
| 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. |
| monochrome | Printing in one color only. |
| nesting | Subroutine or set of data, such as a comment, contained sequentially within another set of data. |
| object file | Source file converted into machine language (binary code). |
| octal | System of representing numbers based on 8. |
| offset | To place printed output sets in slightly different positions from each other in an output bin for easy separation of collated sets. |
| operand | That which is acted upon, for example, data, in an operation or process. |

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| 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. |
| overprint ratio | Maximum number of variable data and form characters that can be intersected by a single scan line. |
| packet | A group of DJDE records terminated by an END command. |
| page end | Command character (form feed) to terminate the current page. |
| palette | Predefined set of colors or inks. Different versions are provided with the printer and with host- or PC-based application software. |
| parameter | Part of a command, other than the keyword. See <i>keyword</i> . |
| 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. |
| 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. |

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| portrait | Orientation in which text and images are positioned parallel to the short edge of the paper. |
| ppm | Pages per minute. |
| Print Description Language | See <i>PDL</i> . |
| 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. |
| PSC | Printer Subsystem Controller |
| query | Request for data or other information, entered by an operator while the system is processing. |
| record | A line of data as defined in the RECORD command. |
| report | A single output data set, delimited by an RSTACK command or as a file. In setting a separation boundary, reports are subsets of a job. |
| 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. |
| scale | To adjust font or image size according to given proportions. |
| 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. |
| simplex printing | Printing on one side of the page. |
| spi | Spots per inch. See <i>resolution</i> . |
| spot | A picture element imaged by the printer. Synonymous with <i>dot</i> and <i>pixel</i> . |
| statement | Detailed instructions in a program step, written according to specific rules called syntax. |
| stock | User-defined name in the JSL that specifies a certain type of paper for printing a job. |
| stockset | Collection of stocks to be used on a print job. See also <i>stock</i> . |

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| string | Connected sequence of alphanumeric characters treated as one unit of data by a program. |
| syntax | Rules governing the structure of expressions in a programming language. |
| 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. |
| TOF | Top of form. |
| two-up | Printing two logical pages on one side of a physical page. |
| UCSB | Universal Character Set Buffer. |
| UCS | Universal Character Set |
| 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. |
| virtual page | Page area selected by a forms designer for printing. |
| vpos | Vertical positioning. |
| 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. |
| 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 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. |
| XNS | Xerox Network Systems. |
| XPAF, XPF | Xerox Printer Access Facility. |

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