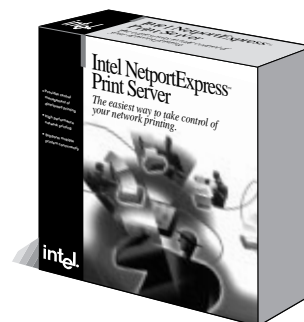


What's New in Intel NetportExpress™ Print Servers

Take advantage of the latest print server technology with NetportExpress™ print servers. NetportExpress is the high performance print server for printing on your heterogeneous networks.

Now NetportExpress XL supports all major network operating systems and protocols. This means easier installation and compatibility with all the latest network operating systems, including:

- NetWare* 4.1 native NDS support
- Windows NT* (available August 1995)
- UNIX* (SCO*, SunOS*, Solaris*, UnixWare*, HP/UX*, IBM AIX*)
- LAN Manager
- LAN Server
- AppleTalk*



**Now with
NetWare* 4.1
native NDS
and native
Windows NT*
Support!**

- *Simultaneous
Multi-NOS Support*
- *High Performance*
- *Ease of Use*
- *Upgradeable*
- *Centralized
Management*
- *Trade-up Program*

Trade-up to NetportExpress print servers and receive \$150 from Intel!

Experience the benefits of NetportExpress print servers now and get \$150 back per print server.

Follow these two simple steps:

1. Purchase a new NetportExpress print server

AND

2. Trade in your old print server†

†This includes your old NetPort® print servers, NetPort II print servers, or **any other** print server brand!

Simply ship the old print server to us with proof of performance (dated reseller invoice) and a completed upgrade form (FaxBack* document 9929) and we will send you \$150 per print server.

Want more information?

For more information on the NetportExpress print server call Intel's 24-hour FaxBack service at 800-525-3019 and request the following documents:

NetportExpress XL and EL Print Server Data Sheet	9604
Solutions for Reliable, Cost Effective Printing White Paper	9005
NetportExpress Trade-up Program	9929



Intel NetportExpress™ Print Servers

Technical Questions and Answers

Q Are there any advantages in using external print servers over an internal print server card?

A Yes, there are three major advantages:

1. **Better value** – Since the NetportExpress™ print server family supports multiple printers per unit, they cost less on a per printer basis. Also, an external print server, especially one with software upgradability, means the print server need not be replaced just because the printers need to be.
2. **All makes and models of printers** – Standard parallel and serial ports allow the NetportExpress print server products to support all makes and models of printers, including ink jet printers, providing increased flexibility to your network.
3. **Ease of use** – NetportExpress print server is a plug-and-print product. You don't have to open the printer cover, install a card, deal with switches or jumpers. The external unit allows simple setup and configuration.

Q Is it true that external print servers are not as fast as internal printer cards?

A No. It's not true. With the high-speed parallel ports, the XL and EL are equal to or faster than internal cards.

Q Is it true that external print servers are not as convenient as internal printer cards?

A This is true if convenience is defined as "inside the machine, out of sight." But if convenience is defined as "making the best use of printers," then the multi-port XL and EL allow better utilization and lower cost for the available printers.

Q How does the NetportExpress XL Print Server support multiple network protocols?

A The XL simultaneously services up to three different network protocols on each printer connected to the XL. The XL will ship with standard support for NetWare* IPX/SPX, TCP/IP and AppleTalk*.

Q What about support for NetWare 4.1?

A NetportExpress print servers offer native NDS support for NetWare 4.1 today.

Q What about support for Windows NT*?

A NetportExpress print servers will offer native support for Windows NT in August 1995.

Q What UNIX support does Intel offer?

A Currently, the XL supports the leading versions of UNIX on the market (SCO, SunOS*, Solaris*, HP/UX, UnixWare*, and IBM AIX*). The TCP/IP implementation Intel uses covers both the Berkeley lpd and System V lp systems. Intel is continually adding additional UNIX support.



Intel NetportExpress™ Print Servers

Q Does the NetportExpress™ print server support SNMP?

A The NetportExpress XL Print Server supports SNMP. Its MIB can be browsed from any SNMP-based management console.

Q Will the EL or NetPort® II Print Server support multiple protocols?

A No. Both the EL and NetPort II Print Servers were specifically designed and optimized for NetWare and do not have the CPU bandwidth or memory capacity to support other protocols. The XL model provides a multiple protocol solution.

Q What is the future of the NetPort II Print Server?

A Intel continues to fully support the NetPort II Print Server. However, new development and support for NOSs will take place on the NetportExpress print server family of products. NetPort II Print Server customers are encouraged to utilize the trade up program (FaxBack* 9929) so that they can benefit from the latest NetportExpress print server technology, including NetWare* native NDS support and Windows NT*.

Q Does the EL have a serial port?

A Only the XL and the NetPort II Print Server have a serial port.

Q Can I attach a serial modem to the serial port?

A No. NetPort Print Servers do not support modems.

Q What central management software utilities come with the NetportExpress print server and what do they do?

A All NetportExpress print servers come with Windows* NPManger, and registered users receive LANQView and LANPrint.

- The Windows NPManger provides centralized access to and management of all Intel print servers on a network. It allows remote monitoring and configuration of all NetPort print servers, as well as a “domain” capability to logically group NP’s together for case administration.
- The LANQView utility is a DOS based application, allows a LAN administrator to view any three print queues simultaneously on one screen and manage the print jobs in those queues. It will let the LAN administrator halt, delete or reorder jobs within a queue, as well as move on queue to another – even across servers.
- The LANPrint utility has both a version for DOS and Windows and provides network users with the ability to connect to network printers or change their job configuration from within any application. It makes connecting to network printers as simple as selecting an available print job configuration from a list.

Q Do I have to down my file server to install and configure Intel print servers?

A No. Intel's print servers plug directly to any open network connection. Install the Windows software, configure the NetportExpress and start printing. The network is not interrupted.

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Intel NetportExpress™ Print Servers

Q What type of warranty and support come with Intel print servers?

A Intel print servers come with a 3-year hardware warranty. Technical support is offered via automated systems (FaxBack*, BBS, CompuServe, Internet), as well as Intel's CNE qualified technical support staff.

Q Does RBL limit the usefulness/flexibility of the print server?

A Remote Boot Load (RBL) is a well-established way for diskless workstations to attach to the network. Intel utilizes this technology to provide the simplest way to upgrade and control all NetportExpress™ Print Servers on the network.

Q Does RBL require a NetWare* server to be present?

A Not anymore. With the new support in the XL for LAN Manager and LAN Server, the RBL file can be loaded from either a NetWare server, LAN Server or LAN Manager file server. In order to boot, the XL must be able to access one of the servers. After initial booting, the file server is only used for standard print job queuing specific to LAN Manager, LAN Server or NetWare. TCP/IP and AppleTalk* print jobs do not utilize NetWare resources; instead they communicate directly with the XL. Since the EL is a NetWare-only print server, it obviously requires a NetWare file server.

Q How should a customer measure performance? Is it just raw throughput of data over the wire? Where is the bottleneck in the printing process?

A The answers to these questions depend on the situation. By considering the key elements of a network printing system, a more accurate answer may be provided. Figure 1 shows the basic elements of a network printing system. (The following assumes a NetWare environment but the same concepts apply in other situations.)

■ **Print Job Preparation Time –**

The time it takes a word processor to convert a document from its own internal format to a format the printer can understand, such as PCL4 or PostScript. This conversion process may be quick or take a fair amount of time depending on the size of the document and the efficiency of the word processor in performing the conversion. It is also highly dependent on the performance of the PC. An Intel386™, Intel486™ or Pentium® microprocessor-based PC will perform better than an original PC or PC/AT.

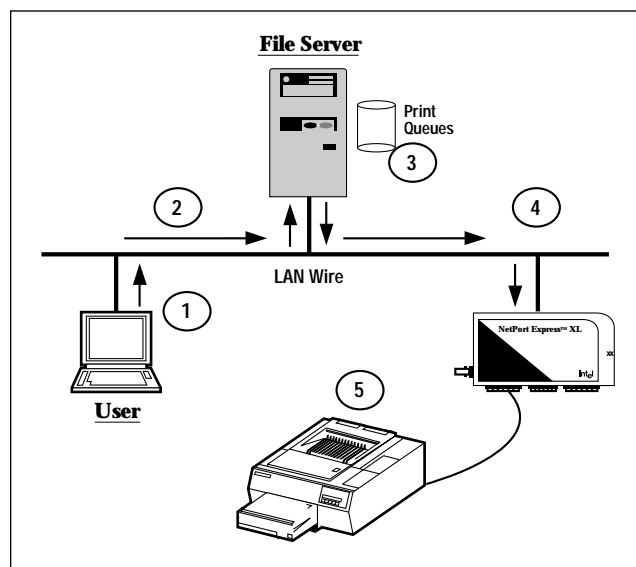


Figure 1 – Network Printing System

Intel NetportExpress™ Print Servers

- **Spooling Time** – The time required to move an entire print job from the word processor to a print queue is known as Spooling Time. The controlling factors on this time are the efficiency of the application in moving data to a printer port or print queue and the performance of the network as the print job data moves across the wire and into the print queue.
- **Wait Time** – The time a print job waits in a print queue until it is actually printed is known as the Wait Time. How long a print job waits depends on a number of factors, including how many jobs are in front of it, the size of those jobs, speed of the file server, and the file server utilization.
- **De-Spooling Time** – A print server periodically checks a print queue to see if any print jobs are waiting to be printed. If there is a print job waiting and the printer is on-line and ready, the print server will start moving the print job data from the print queue to the printer. This process is known as de-spooling or de-queuing, and the time required to move the entire print job to the printer is known as de-spooling time. The controlling factors on de-spooling time are the rate at which the print server can remove data from the print queue and the rate at which it can move that data to the printer. Another key factor is the rate at which the printer can accept data.
- **Pages-Per-Minute** – One other performance factor is how fast the printer can roll out a page once it has a full page of data in memory. This is strictly a function of the print engine in the printer and is the factor that gives most laser printers their performance rating in Pages-Per-Minute (ppm). But, as we see from the “network print path” description above, a printer's ppm rating may or may not be the gating factor in the performance of a network printing system. This is especially true in today's graphics-intensive environment, where a single printed page may be composed of several hundred kilobytes of data.

Of all these times, the de-spooling time can often have the biggest overall impact on your network printing system. In a well-organized network printing system, there is typically a short average wait time since your print job will often be the only print job in the queue. In this case, once your word processor is finished spooling, the only thing left is for the pages to start coming out of the printer. This is mainly de-spooling time and a function of the print server.

Q How do you measure de-spooling time?

A This is fairly easy. Take a reasonably sized print job, something several hundred kilobytes in size. Use Novell's PConsole to get the print job into a print queue serviced by your print server and printer. Watch the light on the front of the printer – when it starts blinking, the printer has started receiving data. When the page starts coming out, all the data for that page is in the printer. Determine the total time in seconds from when the light started blinking until the page started coming out. Now the math: divide the size of the print job in bytes by the time it took in seconds. The result is the rate at which data was moved to the printer in bytes per second. This is the de-spooling rate. The table below provides some examples.

Intel NetportExpress™ Print Servers

Size of Print Job (Bytes)	Time to Print (Seconds)	De-spooling Rate (Bytes/Second)
100,000	5	20,000
500,000	5	100,000
1,000,000	5	200,000

Since NetportExpress™ Print Servers are designed for high performance, the de-spooling time is no longer a bottleneck. The slowest part of the printing process will more likely be the mechanical paper movement process of the printer itself. And with the high-speed, bi-directional parallel ports, this should remain true well into the future.

Q What is bi-directional (bi-di) printing and why is it important?

A In today's network printing environment, information is sent one way, from the user to the printer. The only time users receive feedback is when they physically walk to the printer to retrieve their output. Then they find out if their job is finished or the printer is out of paper, etc. Using rudimentary utilities such as PConsole, users can view their jobs as they go through queues, but the vast majority of users care about printers, not queues.

Bi-di protocols provide the capability for the printer to send information back over the network to the user. This information can consist of many items: job completed, job hung, paper out, third in line for printer, need letterhead, etc. The users will receive this information on their screen instead of physically having to walk to the printer, thus increasing productivity. In a sense, this is regaining the real-time feedback users had when printers connected directly to their PCs and they could visibly see the printer and its status. Bi-di provides the capability of a virtual printer for users. In addition, bi-di will simplify the LAN administrator's job by providing statistics (pages printed, usage, etc.) and status (toner low, paper out, etc.), allowing them to proactively plan their printing environment instead of being reactive.

There are two main protocols being implemented for bi-directional printing. The first is Printer Job Language (PJL) from Hewlett-Packard. This is a proprietary protocol that HP uses with its LaserJet* series of printers. It provides a full set of information about the printer, inventory, error conditions and jobs that are waiting for that printer. The second is the Network Printing Alliance Protocol (NPAP). The NPA's goals are to develop the high-speed, bi-directional parallel port specification (which was ratified by the IEEE 1284 committee), and to provide an open, NOS-independent, printer-independent protocol allowing printers to provide status back to host computers. The NPAP is an open specification that any printer manufacturer or software developer can take advantage of.

The NetportExpress print servers come standard with high-speed bi-directional parallel ports (IEEE 1284 compliant). Intel is developing software that takes advantage of these hardware ports, first for PJL then for NPAP. Of course, only recently released printers from Lexmark, Compaq, and HP have the bi-di parallel ports necessary to take advantage of this capability.

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