

Changes to Utilities

1. Multiple printer support has been fixed in the line printer spooler (lpr). The lpr program has also been changed to use record locking to synchronize 2 line printer daemons running at the same time.
2. /etc/termcap now contains 8 entries that have been completely tested with the programs; vi(1), bsh(1), and ua(1). The supported terminals are:

```
dumb
DEC vt100
Wyse 100
ADM 3A
TVI 912
TVI 925
TVI 950
ADDS Viewpoint
```

3. Altos has also tested 3 serial printers with the ACS-586;

```
Epson RX-80
NEC Spinwriter
Texas Instruments Omni 800
```

4. The "date" command now supports the real-time clock. The following options are new to the "date" command.

```
date -c Read the real-time clock
```

```
date -c [yyymmdd]hhmm
Set the real-time clock
```

```
date -s Set the system (software) clock from the
real-time clock. This will be done
automatically during system boot-up and
once a day during normal operation.
```

5. A new utility 'ftp' has been included which simplifies communication between two Xenix systems, or between CP/M-MP/M systems and Xenix. The manual page for ftp(1) is included in this release note.

NAME

ftp - transfer files between machines

SYNOPSIS

ftp [-f device] [-s speed] [name]

DESCRIPTION

Ftp allows file transfer between two Altos Computer Systems via an asynchronous serial channel. On the sending side, name is a file or list of files to be sent. If name is -, standard input is sent. On the receiving side, name is an existing directory into which the files are received. If name is omitted, files are put into the current directory. If name is --, the files are written to standard output.

The following options are interpreted by ftp:

-f The special file device is used to transfer files between the machines. The ports associated with the devices on each machine should be connected via a null modem cable. The default device is /dev/tty6, which uses port 6.

-s The transmission rate is set to speed. Currently supported speeds are 1200, 2400, 4800, and 9600 bits per second. The default transmission rate is 9600 baud.

Ftp is compatible with the Ftp program available for Altos CP/M and MP/M systems, so files can be transferred between CP/M-MP/M systems and Xenix systems. See the CP/M-MP/M documentation for details of the CP/M-MP/M Ftp.

Ftp must be run on both the sending and receiving computer. The port that ftp is running on must have login disabled (see disable(1)). Either side may be started first, but both sides must be started within about 1 minute of each other. The sending side will output 's' every few seconds until communication is established with the other side; likewise, the receiving side will output 'w' every few seconds. During file transfer, ftp will output a '*' every time a 128 byte block is successfully transmitted, and a '?' every time a block is retransmitted to overcome a transmission error.

BUGS

If the cable gets disconnected, you must wait for ftp to die (which might take up to a minute) before you can restart ftp on the same port, otherwise the first will interfere with the second.

Since MP/M and CP/M pad files with control-Z's (octal 32), control-Z's are deleted from the end of files sent to Xenix systems.

Files sent to MP/M and CP/M systems must have filenames which are legal on those systems.

Introduction to XENIX Printer Spooling (lpr and lpd)

Printer Spooling

Printer spooling is a technique that mediates printer activity in a manner that allows all users of a system to share a printer without conflict. With this mechanism, files to be printed are first copied to a spool directory (/usr/spool/lpd) and a background process moves those copies to a line printer device. This technique assures that several files queued for the same printer are printed in sequence with no interleaving of output.

Line printer devices are found in /dev, and are called "lp" (lp1, lp2, etc). Files in /dev are known as "special files", and are the interface to UNIX I/O. For an expanded discussion of special files in specific and I/O in general, see sections 29-32 of the UNIX Programmer's Manual 2B. A great deal of this material is specific to the PDP-11, however the mechanisms are the same as those for the Altos machines.

ACS 8600

The 8600 XENIX system contains two printer devices in /dev. They are "lp" and "plp". The "plp" device is the parallel printer driver. The "lp" device is the default printer port, which is installed as /dev/tty8. If it is desired to make the parallel printer the default, the following command sequence is used:

```
login as root
cd /dev
mv lp olp
mv plp lp
```

Note: If you intend to set up more than one printer, skip the steps outlined above. Please read the remainder of this document to learn how to configure multiple printers. The above sequence of commands renames the parallel printer device as "lp".

ACS 586

The 586 XENIX does not support a parallel printer interface. All printers must be attached to the ACS 586 via the serial ports. XENIX on the 586 is shipped with the "lp" device linked to /dev/tty6. Therefore, the user need not move device files around on the 586.

The Line Printer Spooler

Files to be printed may be copied to the /dev/lp device in a number of ways.

For example, the command:

```
cat /usr/john/doc > /dev/lp
```

copies the file "/usr/john/doc" to the default printer. The "cat" command is adequate for this purpose, but it is not the preferred method for presenting material to be printed. If, for example, another user is running a similar command to the same printer at the same time, output from both users will become interleaved. Another problem is that the cat program knows nothing about printers, and therefore nothing about baud rates, page sizes, margins, etc.

The line printer spooler consists of several programs (lpr and lpd), spool directories (/usr/spool/lpd*), and a control file (/etc/ttys). This utility controls printer requests and knows how to set baud rates, etc.

The program used to initiate a printer request is named "lpr". The main responsibility of lpr is to place copies of files to be printed in an appropriate spool directory. The program which presents those files to a specific printer is named "lpd" and is a "daemon" or background process. This permits a user of the print spooler to continue working while files are being printed. If necessary, changes may be made to files which have been submitted to the spooler while printing takes place, since it is a copy of these files which are being printed, not the files themselves.

Lpr is invoked as follows:

```
lprN [-b[NAME]] [file_list]
```

"N" is a digit from 0 to 7 and selects one of 8 printers. "lpr0" may be invoked as "lpr", which assumes the default printer. The "-b" option is used to turn on the generation of a banner page for the listing. Use of the "-b" option has one other effect; if it is present, the printer will eject a page before printing the banner page, and will not eject a page after the file is completely printed. In similar fashion, not using the -b option produces a formfeed after the file is printed, and not before. This action is to aid users of slow or character printers. If -b is supplied without the optional "NAME" (truncated to 4 characters), the logname of the user is used.

Supporting Multiple Printers

In general, several things must be done to support more than one printer. The user must be logged in as "root" and must create the appropriate device files in /dev with the link ("ln") command. First, select which printer is to be the default. This printer should be the most used printer on the system and may be serial or parallel.

For the ACS 8600 the following procedure should be used.

```
mv /dev/lp /dev/olp
ln /dev/plp /dev/lp
```

These commands make the default printer the parallel printer. If the parallel printer is not to be the default, the following command should be used:

```
ln /dev/plp /dev/lpN
```

where "N" is the printer number of the parallel printer.

If a serial printer is to be the default printer on an 8600 or 586, select the port to which this printer is to be connected. Then link the appropriate serial port to the default printer device as follows;

```
ln /dev/ttyP /dev/lp
```

where "P" is the port number of the serial port. If other printers are to be configured, select which printer number (1-7) they are to be, and the number of the serial port to which they are to be connected. Again, you must then link the serial port to the corresponding printer device;

```
ln /dev/ttyP /dev/lpN
```

where "P" is the serial port number, and "N" is the printer number. The printer number, "N", should be assigned in ascending order, that is, the first printer on the system is called "/dev/lp", the second is "/dev/lp1", etc. This convention is used by several applications programs. Printer numbers may be assigned arbitrarily, but you may then be required to reconfigure some applications programs that use the print spooler. An "ln" command should be done for each printer to be supported.

The next step in getting multiple printers to work is to create an lpr command for each printer configured on your system. The link ("ln") command will create command names for invoking lpr. For each printer device file made in the previous step:

```
ln /bin/lpr /bin/lprN
```

where "N" is a printer number.

The next step to setting up multiple printers involves creating spool directories. These directories are used to hold copies of material to be printed for each printer. For each printer device file made:

```
mkdir /usr/spool/lpdN
chmod 0777 /usr/spool/lpdN
```

where "N", as above, is a printer number. The default directory is already installed, do not try to make it.

The last step in setting up multiple printers on your system is to configure any printers which have baud rates other than 9600. The /etc/ttys file is used by the line printer spooler and other system programs to determine the characteristics of serial lines. The /etc/ttys file contains entries of the form:

```
l2ttyP
```

The first digit ("1" (one) in the above example) tells the system to attempt to log on ttyP ("P" is a serial port number). The second digit specifies the baud rates for that particular terminal (see GETTY(8) in volume I of the UNIX Programmer's Guide for the baud rates associated with these values). For each printer made with the above procedure, use the "disable" command to disable login for that port. This command has the effect of changing the first digit of the line in /etc/ttys which corresponds to that printer from a "1" to "0". The syntax of the "disable" command is:

```
disable /dev/ttyN
```

where "N" is a port number. For example, if a printer is set up for port 6, the line:

```
disable /dev/tty6
```

is used to turn off login on tty 6.

If the printer to be installed is serial and must run at a baud rate other than 9600, a line should be added to /etc/ttys (with vi or ed) which reads:

OBIP

This line may be anywhere in the file, but must start on the first character of its line and must not have any embedded spaces or tabs. "B" is a baud rate specifier from the table below. "N" is the printer number. This line is for the benefit of the spooler daemon which uses this information to set up a printer baud rate. If the default printer is a serial printer and its baud rate is other than 9600; with a UNIX editor, add:

OBip

where "B" is taken from the table below. Printers whose baud rate is 9600 do not require a corresponding line in /etc/ttys.

Baud Rate Table

0	300
1	150
2	9600
3	1200
5	300
6	2400
7	4800

For further information or explanation, call Altos Customer Service (408) 942-0555.