Connecting Print Partner V Series to a Unix Print Server using Ethernet C or D card.

Introduction

This document describes how to use a Unix machine as a print server for Fujitsu's Print Partner V series printer range, using the optional Ethernet C or D cards. The examples are based on BSD UNIX, but other versions of UNIX will work in a similar way.

The Ethernet C and D cards are optional interfaces which plug into the option slot of your Print Partner V series printer. Once the printer is connected to your network you could in theory print directly form any machine on the network to the printer. However it is recommended that one machine on the network is designated as the print server and all print jobs are sent to the printer via this machine.

The print server machine will then "queue" print jobs from other machines on your network prior to being sent to the printer. The advantage of using a print server in this way means that all queuing is managed by the print server and not the printer network card, which has limited resources to manage queues.

In a UNIX environment the print server is also the place where filters get applied. A filter converts the file to be printed into a format that the printer will understand.

Setup Procedure

1) [Install the printer network adapter card into the printer](#). Connect the printer to its mains supply, and then plug in its network connection. Switch the printer on.
2) Now [set up the IP address of the printer's network adapter card](#).
3) Lastly [configure your UNIX machine's printing system](#).

Installing the printer network adapter into the printer

The Print Partner V series printers use the Fujitsu Ethernet C or D adapter cards, to connect to Ethernet type networks. The major differences between these two cards are that the D variant no longer supports 10Base2, but does support AppleTalk. The card should be installed into the printer as follows:
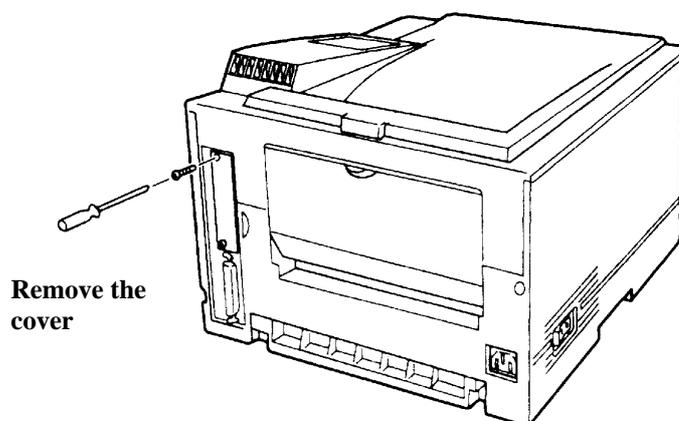
Remove the cover

1) Remove the blanking cover above the parallel port by removing the two securing screws.

Securing screws
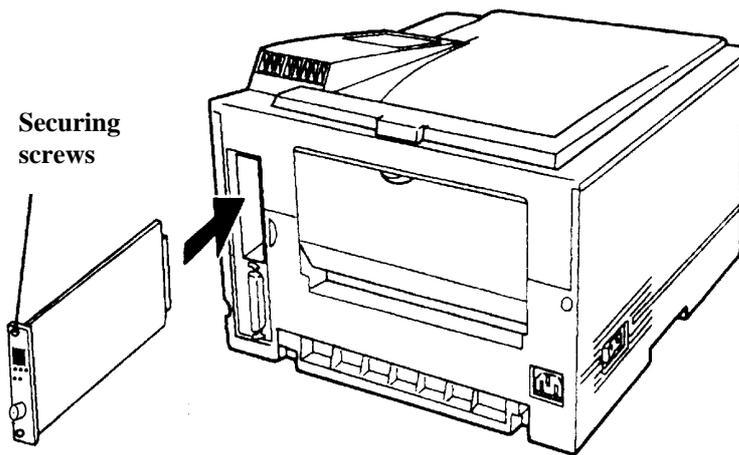
2) Use a tested and working anti-static wrist strap in accordance with its manufacture's instructions. Remove the network adapter from its packaging, and slide the board into the interface slot, and push it home. Secure the board with the screws supplied.

3) Connect the adapter card to your network. The printer will automatically detect the Ethernet adapter when the printer is powered up. If you have the Ethernet C card the network port in use (10Base2 to 10BaseT) will also be detected. Connect the power lead and switch on.

Setting the IP address of the printers adapter card

The printer needs an address on the network, so that the print server can send print jobs to it. This procedure involves setting three values, the IP address, netmask, and gateway address, if you are not familiar with these terms see IP addresses. The values can be set from the printers control panel. To do this:

1) Power up the printer and wait for the control panel to display 'READY'. Press the ready button to take the printer off line (the online LED goes off), then use the menu button to scroll through the menu options until the printer displays:

POWER	ONLINE	DATA	ERROR

SETUP MENU
NETWORK MENU

READY	FORM FEED	MENU	+
		RESET MENU	
CONT.	TRAY SELECT	ENTER	−
RESET	MFF PAPER SIZE	SELF TEST	PRINT FONT
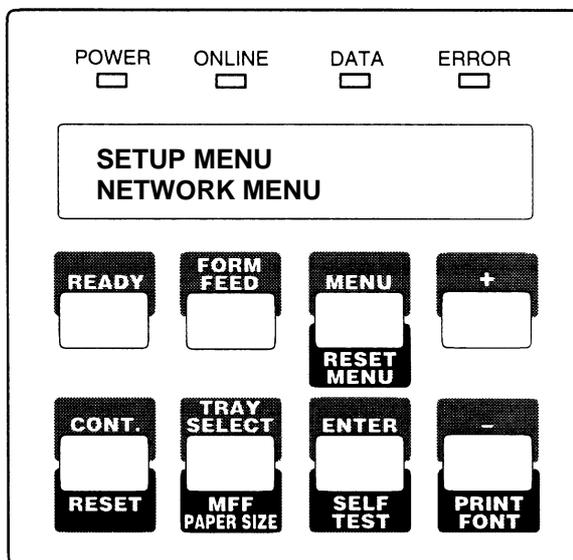
2) Press the enter button to select the menu, then using the menu button again, scroll through the network menu until the printer displays:

POWER   ONLINE   DATA   ERROR

IP ADDRESS
OOO.OOO.OOO.OOO*

READY | FORM FEED | MENU / RESET MENU | +
CONT. / RESET | TRAY SELECT / MFF PAPER SIZE | ENTER / SELF TEST | − / PRINT FONT
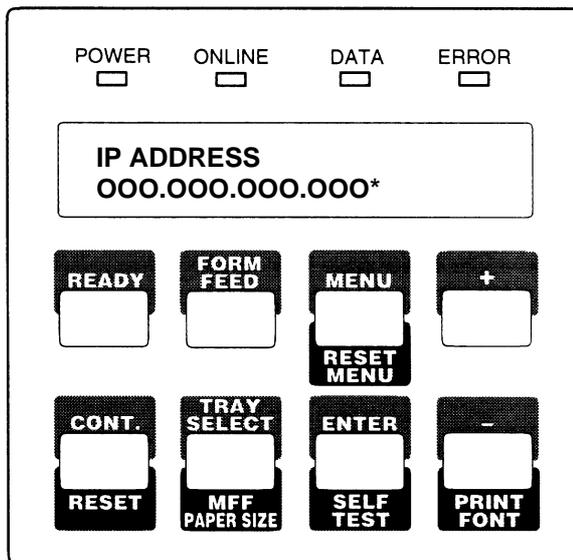
3) Press the enter button again, and the display will change to:

POWER   ONLINE   DATA   ERROR

IP ADDRESS
OOO<OOO.OOO.OOO

READY | FORM FEED | MENU / RESET MENU | +
CONT. / RESET | TRAY SELECT / MFF PAPER SIZE | ENTER / SELF TEST | − / PRINT FONT
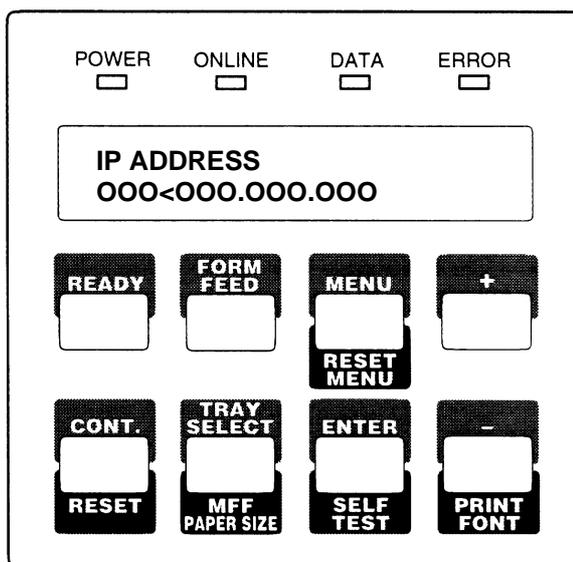
4) Use the plus (+) and minus (-) buttons to set the first three digits of the IP address. Then press the menu button to set the next three digits in the same way. Repeat until the whole IP address has been entered. Press the enter button to enter the address. The '<' symbol will change to a '*'.

5) Now press the menu button, the printer will display:

```
 POWER    ONLINE    DATA    ERROR
  [==]     [==]     [==]    [==]

 ┌──────────────────────────────────┐
 │  IP NETMASK                      │
 │  OOO.OOO.OOO.OOO                 │
 └──────────────────────────────────┘

 [READY]   [FORM    [MENU]    [ + ]
            FEED]
            
           [RESET
            MENU]

 [CONT.]   [TRAY    [ENTER]   [ − ]
           SELECT]
 [RESET]   [MFF     [SELF     [PRINT
           PAPER SIZE] TEST]   FONT]
```
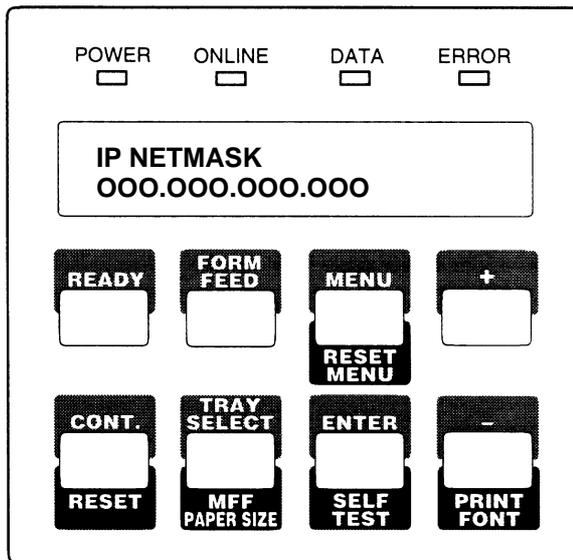
6) Set the netmask in the same way as the IP address. After the netmask has been entered, you'll be asked to set the gateway address, this is done in the same way as the IP address, and the netmask.

7) Put the printer back on line by pressing the READY button, the printer will display 'setting interface', the online LED will light up and the display will say READY.

Configure your UNIX machine's printing system

The Unix printing system is run by the LPD demon. This demon accepts print jobs, places them in the print queue and sends them to the printer when they reach the end of the queue. Print jobs are submitted to LPD using the LPR command.

To get the system up and running it will be necessary to set up the "printcap" file which defines printers, queues, filters and error log files. A filter is a program, which prepares the file to be printed such that it is correctly formatted for the printer.

As it stands the LPD system will output plain text to a printer connected to the computer via its parallel or serial port. Although laser printers such as the Print Partner V series can print plan text you're not going to be able to use the full range of capabilities of the printer. To make better use of the printer we are going to include a program in the filter, which converts plan text into Postscript. If you have a printer without PostScript capability you can include a program like Gostscript which will convert the PostScript into PCL which all the V series printers understand.

The last hoop we need to jump through is to get our nicely formatted print job across the network to the printer. The problem here is that although the LPD system allows us to print to a remote printer across the network, it expects the remote system to apply the filter. The Ethernet C or D card can not apply filters even though it looks like a standard LPD system from across the network. To get around this we will use a technique of recursively calling LPD to send the job to the printer after applying the filter the first time around.

1) First check that the LPD demon is running. The LPD demon is normally enabled by setting lpd_enable="yes" in /etc/rc.conf.

2) The next step is to develop a filter program. Typically a filter program formats the file to be printed so that it looks nice on paper. We are also going to use the filter program to convert the file to PostScript if necessary, add some PJL code, and redirect the output to the network printer. See the example below.

```
#!/bin/sh
#
# ca04040-FPS2if - Print Postscript or plan text on a Fujitsu Print Partner
# 14AV/14ADV/16ADV
# Installed in /usr/local/libexec/ca04040-FPS2if
#

read first_line
first_two_chars=`expr "$first_line" : '\(..\)'`

if [ "$first_two_chars" = "%!" ]; then
        #
        # This is a PostScript job so add PJL head and tail and print it.
        #
        (cat /usr/local/libexec/pjl.head && echo $first_line && cat \
        && cat /usr/local/libexec/pjl.tail \
        && printf "\004") | lpr -P pp14avremote && exit 0
        exit 2
else
        #
        # This is plan test so convert to PS and add PJL head and tail.
        #
        (cat /usr/local/libexec/pjl.head \
        && ( echo $first_line; cat ) | /usr/local/bin/a2ps -1 -M A4 --output=- \
        && cat /usr/local/libexec/pjl.tail && printf "\004") | \
        lpr -P pp14avremote \
        && exit 0
        exit 2
fi
```

The first part of the script determines whether the print job is already in the PostScript format by checking to see if the first two characters of the file are "%!" If the file is a PostScript file, a PJL header and tail are added to the PS code, then LPD is recursively called to send the job to the remote printer. This means that the first instance of LPD doesn't print anything, but it doesn't seem to complain.

If the job is not a PostScript job, more or less the same thing happens except that the print job is passed through a program, which converts it to Postscript. I've used a program called A2PS, but you can substitute the program of your choice. Check out:

http://www-inf.enst.fr/~demaille/a2ps/

Generate the script above making any modifications you may need, then save it in an appropriate directory on you system.

The PJL header file (pjl.head) below sets the printer to a resolution of 600 x 600, displays a message on the printer's LCD and puts the printer into Postscript language mode. Note that "^[" means the escape code i.e. ASCII code $1B_{hex}$.

```
^[%-12345X@PJL SET RESLUTION = 600
@PJL RDYMSG DISPLAY = "Unix Print Job"
@PJL ENTER LANGUAGE = Postscript
```

The PJL tail file (pjl.tail) below clears down the LCD display and resets the printer ready for the next print job. Save the two files pjl.head and pjl.tail in an appropriate directory on your system and modify the filter script accordingly.

```
^[%-12345X@PJL RDYMSG DISPLAY=""
^[%-12345X@PJL RESET
```

Some possible enhancements you may like to add here are generating the PJL code within the filter script and getting the printer to display the file name of the print job. To do this you'd have to generate the appropriate "@PJL RDYMSG DISPLAY" command.

3) The last thing we need to do is define a "printcap" file which, you'll find in /etc/printcap, see an example below.

```
#   @(#)printcap   5.3 (Berkeley) 6/30/90
# $Id: printcap,v 1.5.2.1 1998/02/07 19:17:32 ache Exp $
#
#
pp14av|lp:\
    :sh:sd=/var/spool/output/lpd/pp14av:\
    :lp=/dev/lpt0:\
        :if=/usr/local/libexec/ca04040-FPS2if:\
        :lf=/var/log/lpd-errs:

pp14avremote:\
        :sh:\
        :rm=pp14_duplex:
```

The first printer definition is the dummy printer i.e. it will not actually print anything, this is where the filter gets applied using the "if" capability. Remember to modify this file if your filter lives in a different place then mine. The second printer definition is the remote printer this is the printer, which is called by the filter of the first printer. You need to use the "rm" capability to specify the host name or IP address of the remote printer. In this case the host name is "pp14_duplex". Remember to add the new host name of your printer to your hosts file, or DNS server or this bit will not work.

That's all you need to do, obviously modify the filter script etc to suite your own needs

IP addresses

IP addressing is the system used to address computers on the Internet and many private networks. The IP address performs a similar function to your postal address or telephone number, allowing one computer on a network to reliably communicate with another.

It is important that you first contact your system administrator and ask them to assign an IP address, netmask and gateway address.

If you do not have a system administrator the information below will help you to assign an address for each computer and printer on your network. However if you have an Internet connection you should contact your Internet Service Provider (ISP) for advice first. If the computers on your network already have TCP/IP installed, which, will be the case on a Unix network, you must get advice from the person who set up these machines, do not start changing IP address unless you know what your doing. The reason for this is that in order for machines to talk to each other, they must be on the same subnet, or there must be a router on your network. Using the numbers below insures all machines are on the same subnet.

To make them easier to read and use IP numbers are normally represented as four numbers separated by full stops, for example:

192.168.125.101

Each of the four numbers can be in the range 0 to 255, though 0 and 255 are normally reserved for other uses, so you should avoid using them.

To prevent two computers from having the same address, all IP addresses are assigned by the Internet Assigned Number Authority (IANA).

The IANA have set aside groups of numbers for use on private networks. If you have no system administrator to assign numbers for you, these are the numbers you should use. The table below identifies 254 numbers, which should be more then enough. Note it is possible to have many more IP address than this, but you need a better understanding of IP addressing then I can explain here.

IP Address
192.168.125.1
192.168.125.2
:
and so on
:
192.168.125.253
192.168.125.254

Assign a number to the printer, and to each computer, which needs to connect to the printer. Make sure you do not have any duplicate numbers on your network.

The Netmask you should use with these numbers is:

255.255.255.0

The Gateway on the printer should be set to:

0.0.0.0

This means that you do not have a gateway on your network. If you do, ask the gateway administrator for advice. Leaving this setting blank on your computer normally means the no gateway or router is installed.