

# F/Port

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## Fast Parallel Port for the PC Installation Manual

Release 7.1





FCC ID: LE9-FPRT01

Federal Communications Commission  
R.F. Interference Statement

**Warning:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Notice to user:** Use of a shielded cable is required for FCC compliance. Please contact Warp Nine Engineering if you experience any problems.

## SOFTWARE LICENSE AGREEMENT

F/Port software (FPCONFIG, FLPT, FASTPORT) is owned by Warp Nine Engineering, which reserves all rights. The purchaser of F/Port has been granted a single user license to use the F/Port software in conjunction with the F/Port PC card that it was originally sold, or with any subsequent authorized replacement card. No warranty, expressed or implied, pertaining to the software's fitness for any purpose is contained in this agreement.

## WARRANTY INFORMATION

The PC card sold with the F/Port software is warranted by Warp Nine Engineering, to the original purchaser, to be free of defects in materials and workmanship for three (3) years from the date of original purchase. Warp Nine Engineering makes no other warranties, expressed or implied, including implied warranties of merchantability and fitness for purpose.

During the warranty period, if a component is proven to be defective, Warp Nine Engineering will repair or replace it, at our option, with no charge for parts or labor, when returned to Warp Nine Engineering with dated proof of purchase. This warranty does not apply to any component which has been misused, defaced, or modified, or which has been serviced or repaired by other than Warp Nine Engineering. This warranty gives you specific legal rights. You may have other rights which vary from state to state.

Important: Terms of warranty require that the proof of purchase date be presented by the owner to obtain warranty service. Please retain your dated sales receipt.

# **F/Port Installation Manual**

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# INTRODUCTION TO F/PORT

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Congratulations! You've purchased the most advanced, highest-performance parallel port card available today. The F/Port card delivers parallel port data at rates of up to 1.25 megabytes per second. A versatile interface, the F\Port can be connected to any IEEE 1284 standards-compliant Enhanced Parallel Port (EPP) peripheral, such as an external LAN adapter, external hard disk drive, tape backup system, CD-ROM player, or SCSI adapters.

In addition, the F/PORT also supports high-speed connections to standard Centronics parallel port (SPP) printers. When connected to the Centronics port of a laser printer, F/PORT delivers performance far beyond previous PC parallel port connections.

The F/PORT card represents a novel approach to hardware adapter cards. The logic for this card is implemented using a Field Programmable Gate Array (FPGA). The FPGA logic provides the user with the ability to select multiple design “personalities” with one card. The entire functionality of the card may be changed by using software to download a new hardware personality.

The modes currently supported are for two types of data transfer protocols: EPP and Centronics signaling. The EPP personality implements the IEEE 1284 EPP interface protocol. This is a bi-directional, fully-interlocked, signaling method capable of 800KBytes to 1.25MBytes per second. The Centronics interface printer personalities use the onboard FIFO and state machine to implement a block-oriented, high-speed Centronics signaling interface. This protocol is capable of 1Million characters per second, dependent upon the printer that it is connected to.

The implementation of the card enables us to provide different “personalities” for different printers. Since many printers have different I/O capabilities, we have developed different personalities for a number of popular laser printers. This enables the F/PORT card to drive the printer as fast as the printer can accept the data. See the FPCONFIG section for detailed information on the available personalities.

# CUSTOM PERSONALITIES

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The architecture of the F/Port card enables Warp Nine Engineering to provide custom configurations for the card.

If you have a special need or application, please contact Warp Nine Engineering to discuss your custom requirements.

# SYSTEM REQUIREMENTS

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The F/Port card will operate with any 286, 386, 486 or Pentium-based personal computer with an ISA bus.

On systems that allow for adjustment of the ISA bus speed, you can increase performance by setting this speed higher (up to 10 MHz BUSCLOCK).

**CAUTION: The user should be careful adjusting clock speeds as this may affect the performance of other ISA installed devices.**

On some PCI-based machines, the ISA bus timing may be altered from the standard. For these machines we have provided the FPORT\_A personality. Use the FPCONFIG program to configure the card with this personality.

# HARDWARE INSTALLATION

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These instructions will guide you through the hardware installation of the F/Port I/O card. The steps include:

- Determining your system configuration
- Configuring the parallel port
- Installing the F/Port I/O card in the PC

## ***Determining Your System Configuration***

In order to perform the setup and installation of your F/Port card, you will need to know what settings to use for the parallel port base address and IRQ settings. This is easily done by running the LISTIO program from DOS, or a DOS window running under Windows. Use these steps to determine the current configuration of your system.

1. Run the LISTIO program. Insert the F/Port diskette into your floppy drive (drive A for example) and type the following command:

```
A:LISTIO<return>
```

The table shows the system configuration for a PC with all the standard LPT and COM ports filled.

I/O and LPT Ports are installed at addresses:

```
COM1 = 3f8h  
COM2 = 2f8h  
COM3 = 3e8h  
COM4 = 2e8h  
LPT1 = 3bch  
LPT2 = 378h  
LPT3 = 278h
```

Typically, your PC would have some of these settings set to 000h. 000h indicates there is no board or port installed at that location. A LISTIO of a “typical” PC will look like the following:

I/O and LPT Ports are installed at addresses:

```
COM1 = 3f8h  
COM2 = 2f8h  
COM3 = 000h  
COM4 = 000h  
LPT1 = 3bch  
LPT2 = 000h  
LPT3 = 000h
```

This table indicates the PC has 2 COM ports installed, COM1 and COM2, at addresses 3f8h and 2f8h, respectively. This means that up to two additional COM ports could be installed for COM3 and COM4. The table also shows that this PC has only one LPT (parallel port) installed (or configured) at address 3bch, and that up to two more LPT ports can be installed for LPT2 and LPT3.

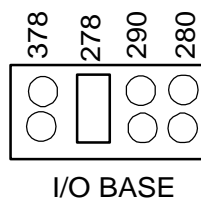
### **Configuring the F/Port I/O Card**

Refer to the table displayed by the LISTIO program to determine the I/O addresses already used for the installed LPT ports on your PC.

1. Locate the **I/O BASE** Jumper Block on the F/Port card. To select the desired I/O Base Address, place one of the Black Jumpers across the desired address Jumper Pins.

The I/O Base is used by software programs to communicate with the F/Port card. The following I/O Base Addresses may be selected.

<b>I/O Base</b>	<b>Description</b>
278	Standard LPT2 setting (default)
378	Default LPT1 setting
280	General purpose (factory default)
290	General purpose (factory default)



Some products require that a printer port have either the standard LPT1 or LPT2 I/O Base Address. If this is the case we recommend that you select 278 as the I/O Base Address.

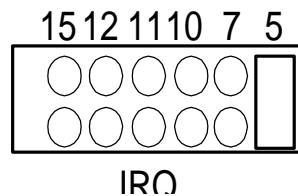
NOTE: The F/Port card comes shipped from the factory with the I/O Base Address of 280.

NOTE: **BIOS assigns** the parallel port to LPT1, 2 or 3 dependent on the address. The highest address is assigned to LPT1 and then the next highest is assigned to LPT2, etc.

NOTE: The F/Port card must be installed as LPT1 or LPT2 in order to operate properly under Microsoft Windows.

2. Locate the **IRQ** Jumper Block on the F/Port card. To select the desired Interrupt Request address, place one of the Black Jumpers across the desired address Jumper Pins. The following Interrupt Request Addresses may be selected.

<b>IRQ</b>	<b>Description</b>
5	Standard LPT2 setting (default)
7	Standard LPT1 setting
10	General purpose AT interrupt
11	General purpose AT interrupt
12	General purpose AT interrupt
15	General purpose AT interrupt



Products that require standard LPT (printer) port I/O Base Address settings occasionally require selecting the corresponding standard IRQ setting. For example, if the F/Port card is set up as a standard LPT2 port, then an IRQ setting of 5 should be selected.

NOTE: The F/Port card comes shipped from the factory using an IRQ of 15.

### ***Installing the F/Port I/O card in the PC***

Now that the jumpers have been set up, you may install the F/Port card in your PC.

NOTE: The F/Port card may be installed in either an 8 or 16-bit I/O slot if you are using IRQ 5 or 7. If you are using IRQ 10, 11, 12 or 15, then the card must be installed in a 16-bit slot.

# SOFTWARE INSTALLATION

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There are two essential aspects of installing the software for the F/Port card.

The first is to download a “personality” to enable and configure the F/Port; the second is to provide a high-speed DOS LPT driver necessary for DOS and Windows applications to take advantage of the capabilities of the F/Port.

The personality is downloaded via one of two methods, the FASTPORT.SYS driver or the FPCONFIG.EXE utility. The *fast* printing is accomplished via the FLPT.SYS driver.

After installing the F/Port card into your PC you will need to configure the software to operate in your environment. During the install process the FPCONFIG and FLPT.SYS programs will be modified from their original, default settings, to the settings you selected during the setup. These modified programs will then be copied to the directory that you selected.

**NOTE:** If you want to modify the jumper settings or the LPT port number, then you must rerun the install program. The drivers will be updated to the new parameters.

These instructions will guide you through the software installation of the F/PORT I/O card. The steps include:

- Installing and configuring the software
- Enabling the F\Port Card and LPT Driver
- “*Personality*” Enable
- FASTPORT.SYS Device Driver

## ***Installing and configuring the software***

Insert the F/PORT Installation Disk into the floppy drive of your PC.

From the prompt, type:

`d:install`                      -where *d* is the floppy drive (A, B, etc.)

The Install program prompts you for the following information:

I/O Base                      - the I/O base Address you selected via the **I/O BASE** Jumper

- IRQ - the Interrupt Request Address you selected via the **IRQ** Jumper.
- LPT - the LPT number (e.g., LPT1, 2 or 3) to which the card will correspond.
- F/Port /Sub directory - the sub directory where F/Port software utilities will be stored.  
Suggest using /FPORT for the sub directory.

**NOTE: During the install process, you will be prompted to answer YES or NO to the message “Update your AUTOEXEC.BAT file?”. Answer NO to this query.**

**IF YOU ANSWER YES TO THIS QUERY, YOU MAY EXPERIENCE SYSTEM PROBLEMS.**

You must still add the appropriate commands in your CONFIG.SYS and/or your AUTOEXEC.BAT file to configure (download) the card and install the LPT device driver.

After answering the configuration questions, the install program will modify the appropriate files and copy them to the directory you have selected. Since new personalities may have been added to a revised Installation Disk since the last update of the install program, it may be necessary for you to copy (or update) all the personalities to the directory. The following command will copy all of the personalities on the distribution diskette to the current directory.

From the C: prompt, type:

COPY *d*:\* -where *d* is the floppy drive (A, B, etc.)

### ***Enabling the F/Port Card and LPT Driver***

Now that the software has been configured and the personalities have been copied to your working directory, you must set up your CONFIG.SYS and AUTOEXEC.BAT files to enable the F/Port card and LPT driver.

First, to enable the high-speed printing capability of the F/Port card you must add the appropriate command text to your CONFIG.SYS file.

From the C: prompt, type:

EDIT CONFIG.SYS

Then add the following to the CONFIG.SYS file:    DEVICE=C:\{path}\FLPT.SYS

where “path” is the directory (/FPORT) you selected during install.

**NOTE: The *fast* Centronics printing is only available when the card is enabled in one of the non-EPP modes. WHILE IN EPP MODE, THE *FAST* PRINTING OPTION IS NOT AVAILABLE.**

### **“Personality” Enable**

The particular “Personality” of your F/Port card may be enabled by either the FASTPORT.SYS device driver in your CONFIG.SYS file, or by the use of the appropriate command text added to your AUTOEXEC.BAT file or simply executed from the DOS command line.

#### **FPCONFIG Command**

As mentioned previously, the FPCONFIG command may be used to enable the “Personality” of the card from any DOS command prompt.

From the prompt, type:

```
FPCONFIG -d(personality) -p(base_address) -l(LPT_number)
```

or

```
FPCONFIG FPORT(personality)
```

where: *personality* is the configuration desired

*base\_address* (optional) is the **jumped** Base Address of the card (278, 378, 280, 290)

*LPT\_number* (optional) is the desired LPT port number for the card (LPT1, 2, 3)

The FPCONFIG software “remembers” the base address and the LPT Base Address selected during install. You use the *base\_address* parameter if you have multiple F/Port cards in your PC. The *LPT\_number* option may be used to enable the card in a different LPT port. This will not effect the FLPT.SYS function.

For example:                    FPCONFIG -dEPP

configures the card to EPP Mode at the base address and LPT assignment selected during install.

```
FPCONFIG -dMETRUM_A -l3
```

will configure the card with the METRUM\_A personality as LPT3, located at the base address selected during install.

```
FPCONFIG -dHPLJ4 -p290 -l2
```

configures the card with the HPLJ4 personality as LPT2, located at the base address of 290.

NOTE: A card **MUST** be jumpered and installed at this address.

The FPCONFIG command is very versatile. It may be used at any time to reconfigure the card. For instance, if you are using a laser printer and sometimes use an EPP device, then you can initially configure the card for FPORT (or one of the other printing “personalities”), then use the “FPCONFIG -dEPP” when you want to switch to the EPP device. When done, use the same command to configure the card back to the original “personality”.

The FPCONFIG command will override any “personality” mode selected by the FASTPORT device driver.

The printer personalities include:

FPORT	Standard bi-directional, compatible with all printers
FPORT_A	Standard for PCs with ISA and PCI bus
HPLJ4	Use with Hewlett Packard LaserJet series 4 printers.
LEX4039A	Use when connected to a Lexmark 4039, 4029 or 4019 printer. Can also be used with the Hewlett Packard 4 series and other high performance laser printers.
METRUM_A	Use with the Metrum FotoPrint products. (Please contact Metrum for driver information)
TI600_RA	May be used with the Texas Instruments microLaser Pro 600.

In an on-going effort to provide our customers with the latest technology, additional printer “Personalities” are added to the current Installation Diskette and Revision distribution Diskettes for our customers.

## ***FASTPORT.SYS Device Driver***

The FASTPORT.SYS driver may be used to configure the F/Port card from the CONFIG.SYS file. When you install using this driver, you may not need to use the FPCONFIG command. This driver is generally necessary when you are using EPP devices that are enabled at boot time via the CONFIG.SYS file.

Add the following command text to your CONFIG.SYS file **BEFORE** any other device drivers for any EPP peripheral

DEVICE=C:\{directory}\FASTPORT.SYS (type) (address) [(type) (address)]

where:           type = FPORT, EPP or HPLJ4  
                  address = 280, 290, 278, 378

The driver will configure the appropriate F/Port card (at the address given) and installs it at the first open LPT port. It will enable only **ONE** of the three "personalities": FPORT, EPP or HPLJ4.

If a different "personality" is desired, use the FPCONFIG command to override the FASTPORT setting.

The following illustrates how this driver works.

Example 1. To install on a PC with one standard parallel port at LPT1, address 378.

```
DEVICE =C:\FPORT\FASTPORT.SYS EPP 290
```

installs the EPP "Personality" to the F/Port installed at address 290, set as LPT2.

Example 2. To install on a machine with no parallel port and two F/Port cards.

```
DEVICE = C:\FPORT\FASTPORT.SYS FPORT 280 EPP 378
```

will install the FPORT configuration at address 280 as LPT1 and the EPP configuration at address 378 as LPT2. If this machine already had a standard parallel port as LPT1, then the cards would be installed as LPT2 and 3.

# DOS PRINTING

---

The FLPT.SYS device driver provides a high speed Centronics mode for printing. The driver utilizes the available FIFO on the F/Port I/O card. This mode is capable of delivering data to the printer at rates of up to 1MByte per second, in burst mode. It should be noted that the printer must be capable of accepting the data this fast. In any case, the F/Port will deliver the data to the printer as fast as the printer can accept it.

This driver does not operate with a card configured as EPP.

The FLPT.SYS device driver is an LPTx DOS driver. This driver replaces the regular DOS LPT driver and implements a high-speed, Centronics-style protocol for data transfer to the printer. To take advantage of the *fast* printing, use the following command to print files to your laser printer:

```
"COPY /b <filename> LPTx"
```

where x is either 1, 2 or 3 depending on how the card was configured. To use this card under Microsoft Windows, the card must be installed as LPT1 or LPT2. The /b option must be used to take advantage of the driver.

**NOTE:** Do not use the DOS PRINT command to print files. This command does not take advantage of the features of the F/Port card.

## ***DOS Application Printing***

In order for DOS applications to take advantage of the *fast* printing capability of the F/Port, the application print driver must use DOS to print to the printer.

First set the driver to print to the correct LPT port. If you do not see any gain in printing performance, then set the application to print to a file. The file name should be set to LPTx, where x is either 1, 2 or 3 dependent upon how the card was configured.

# WINDOWS PRINTING

---

In order to use the F/Port card with Microsoft Windows, perform the following simple steps:

1. When you install the F/Port card, select either LPT1 or LPT2.
2. Start Windows
3. Select “Control Panel”, then “Printer”, and then click on “Connect”.
4. The “Connect” menu lets you choose the interface for the printer. For Windows 3.0 or earlier, choose:

LPTx.OS2

For Windows 3.1, choose:

LPTx.DOS

Where x is either 1 or 2 as selected in step 1.

5. Exit the “Control Pane”l.

**NOTE:** Printing performance will vary depending upon the application, file content, and printer being used. You may find that it is faster to print to a file and then shell to DOS., then use the COPY command to print the file.

This driver will only operate with a card configured in one of the printer (non-EPP) modes.

# WINDOWS NT PRINTING

---

This section describes the procedures for installing the Windows NT Software Drivers for the F/Port. These drivers are for Windows/NT v3.51 and Windows/NT v4.0 only.

NOTE: BEFORE you install the software, it is wise to back-up all of your data files on your computer system prior to installing this software and on a daily basis. The data stored on your hard disk may and can be corrupted by power surges, mechanical failures, unforeseen interactions of the various software on your computer system, computer virus, fire, or other unexpected causes. If you need more information on procedures for backing up data, see your system administrator or a professional consultant.

These instructions will guide you through the installation of the F/Port I/O card. The steps guide you through installation of the hardware, driver installation, and configuration for operation.

- Determine your system configuration
- Configure the F/Port card
- Install the NT Driver
- Personality Files

## ***Determining Your System Configuration***

In order to perform the setup and install of your F/Port card, you will need to know what settings to use for the parallel port base address, IRQ, and serial port settings.

The installation software requires you to enter or confirm the I/O address of all the existing parallel ports and all the new F/Port parallel ports installed in the system. Moreover, when installing the F/Port cards you must be sure the I/O address you choose for each card is unique and is not already in use by another parallel port. Typically the motherboard's parallel port is at I/O address 0x378 so this address should not be used for a F/Port card.

Before installing the F/Port card(s), check the system BIOS settings:

1. From the "Start" button, select "Programs"
2. Select "Administrative Tools (Common)"
3. Select "Windows NT Diagnostics". This will open the "Windows NT Diagnostics window.
4. Select the "Resources Tab".

5. Select the "I/O Port" button. The parallel port(s) should be listed as "Parport" under the "Device" heading of the "Resources" Tab.
6. Document the "Physical Address" (I/O Address(es)) used by the existing parallel ports and their IRQs if available.
7. When installing the F/Port card(s), also document the I/O Address (**JP1, JP2**) and IRQ (**JP3**) jumper settings on the F/Port card before installing in the PC.

## ***Hardware Installation***

Please refer to the F/Port "HARDWARE INSTALLATION" section of this manual for instructions on installing the F/Port card.

## ***NT Driver Installation***

After installing the F/Port card(s), power on the computer and start the Windows NT operating system. As with any other low-level device driver installation, you should log on with Administrative Rights to properly install the driver.

Run the SETUP.EXE on the drive/directory (e.g. A:) containing the installation files to install the drivers.

During installation, the SETUP Wizard will ask about all the various parallel port I/O addresses in the system. During installation, SETUP will ask you to configure each F/Port card with the proper Printer "Personality". This "Personality" must match the printer attached to the port

For each address, you must select one of the following:

- Standard Port
- F/Port
- No Port

Use the notes you made in Determining Your System Configuration to set up each port address.

NOTE: Installing this software will disable the standard parallel port and class drivers that ship with Windows/NT. These files can be found in the WINNT35\SYSTEM32\drivers directory and are named PARPORT.SYS and PARALLEL.SYS. These files are not deleted, just disabled via an entry change in the registry. They are re-enabled by the un-Install program.

The following files are installed:

%F/PORT%\	
README.TXT	This text file about Installation.
LICENSE.TXT	Terms of software license agreement.
FPUNINST.EXE	F/Port un-Install assist program.

%F/PORT%\printers\	Printer emulation files.
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%WINDIR%\	
System32\F/Port.cpl	F/Port Control Panel applet.

%WINDIR%\	
system32\drivers\	

FarPort.sys	The replacement parallel port driver.
FarClass.sys	The replacement parallel class driver.

Where %F/PORT% is a symbol for the drive and directory you selected at F/Port Driver installation time and %WINDIR% is a symbol for the drive and directory you selected during Windows/NT installation, the default installation directory is <disk>:\F/Port.

For NT 3.51: A program group with README Icon, F/Port Config Icon, and un-Install Icon are created. The F/Port Config Icon in the "F/PORT Driver" program group is a duplicate of the same Icon in the Control Panel program group. You can access the F/Port Config program, a control panel applet, from either location.

For NT 4.0: A "F/Port Driver" start menu item is created in the Programs folder with sub-menus for ReadmeFile (this file), F/Port Config and un-Install. A "F/Port Config" control panel applet will appear in the Control Panels folder.

For convenience, the installation setup program will automatically launch the F/Port Config control panel applet after copying the files to your disk drive. Please make sure you have selected the correct port address for the card you installed and choose the "personality" module that matches the printer you have attached to the card (next section). Select the "FPORT" module if you are unsure of which module to use with your printer.

When you close the "Control Panel", the setup program will complete and ask if you want to restart your computer. Make sure you remove the Installation diskette from drive A:. You must restart your computer to enable the F/Port card(s).

## ***NT Driver Un-install***

NOTE: Ensure that the F/Port Config control panel applet is not running and that the "Control NT Panel" window is closed prior to un-installing the software.

3.51: Double-clicking on the un-Install Icon in the "F/Port Driver" program group will launch the un-Install program.

This program removes the F/Port drivers, F/Port control panel applet, and supporting files that were loaded at installation time. Your original Windows/NT drivers will be marked for use upon the next system restart. You must restart for the original drivers to be restarted.

NT4.0: Choose the Start Menu/Programs/F/PORT/Driver/un-Install sub-menu to launch the un-Install program. This program removes the F/Port drivers, F/Port control panel applet, and supporting files that were loaded at installation time. Your original Windows/NT drivers will be marked for use upon the next system restart. You must restart in order for the original drivers to be restarted.

Some of the key support features of the F/Port cards for Windows/NT are high-speed Centronics communication, field upgradability, an on-board 512 byte FIFO buffer, along with support for custom personalities. Standard printer port "personalities" include:

FPORT	Generic "Fast" Centronics
HPLJ4	Hewlett Packard LaserJet
LEX4039	Lexmark 4039 series printers
METRUM	Metrum/Sienna Imaging Foto Printer
OPTRA	Lexmark OPTRA series printers
TI600	Texas Instruments microLaser Pro 600

The card(s) are operated in polled mode.

# CABLING

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A word of caution is required concerning the use of ordinary or “standard” parallel printer cables.

The F/PORT interface is compliant with the IEEE 1284 level II electrical interface specifications. This means that performance is guaranteed at cable lengths up to 30' when connected to a 1284-compliant peripheral. The cable must be IEEE 1284-compliant in order to guarantee this performance.

IEEE 1284-compliant cables have, among others, the following features:

- 25 twisted pairs of conductors
- Full foil shield
- Wire braid
- Controlled impedance- 62 ohm
- Limited crosstalk

These features guarantee the cable will perform at the much higher bandwidth rates that the fast Centronics, EPP and ECP modes perform at.

Ordinary or “standard” parallel cables may have only 17 wires with a drain wire, unmatched and uncontrolled impedance and exhibit high incidences of crosstalk. If you are using this kind of cable you may experience data transfer errors. These may be reported as Paper Empty (when actually there is paper in the tray), unknown error, or data errors in the printed data.

On the Hewlett Packard LaserJet 4 series of printers, this is reported as an "Error 22" error.

**If you experience any of these symptoms please contact Warp Nine Engineering to order your 1284-compliant cable:**

FP-AB-10	10' Printer cable
FP-AB-20	20' Printer cable
FP-AB-30	30' Printer cable

# PARALLEL PORT MODES

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This section is provided as an introduction to the various types of parallel port transfer modes. This is provided as reference only.

The parallel port of the F/Port supports 3 advanced modes of operation:

- Bi-directional Centronics (i.e.: PS/2 or Byte mode)
- Fast Centronics FIFO
- EPP - Enhanced Parallel Port

In addition to these modes, the F/Port supports software drivers that operate in the following modes:

- Ordinary Uni-directional
- Nibble
- Byte

In the following descriptions, forward channel or mode refers to the normal printing direction (i.e.: PC to printer), and reverse channel refers to data transfer from the printer or peripheral to the PC (i.e.: tape backup verify operation).

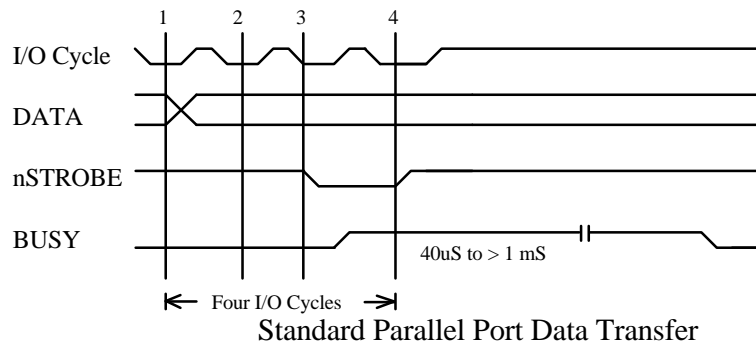
## ***Bi-directional PS/2 Mode***

This mode operates as a regular IBM-compatible parallel port for data transfer in the forward direction (to printer). The data port can be set to read direction (reverse channel) by setting bit 5 of the parallel port control register (base + offset 2). This mode is available in all printer personalities and modes of operation.

This mode is used by many peripheral devices such as portable tape backup systems like the Colorado Memory Trakker 250, and the Mountain Network Solutions FileSafe SideCar.

As an example of how the ordinary parallel port is used to transfer data, let's look at the sequence required to output a byte of data to a printer:

1. Write the data to the data register
2. Program reads the status register to check that the printer is not BUSY
3. If not BUSY, then Write to the Control Register to assert the STROBE line
4. Write to the Control register to de-assert the STROBE line



### ***Fast Centronics FIFO Mode***

This is the mode used by the Warp Nine Engineering FLPT.SYS driver that is provided with the F/Port card. In this mode, the printer interface is driven from a hardware state machine that transfers data from the FIFO on the F/Port card to the printer. The state machine automatically generates the data STROBE and handshakes with the printers' BUSY status line.

Depending upon the loaded personality and the printer that is connected, this mode can transfer data up to 1MByte per second and will work with any laser printer that supports the Centronics interface.

### ***EPP- Enhanced Parallel Port Mode***

The EPP mode is a new bi-directional parallel interface protocol defined by the IEEE 1284 standard. This mode provides for single instruction bi-directional data transfer between the host PC and the peripheral.

The interface hardware automatically generates the necessary strobes and interlocks with the peripheral to guarantee successful data transfer in the forward and reverse directions. This mode supports 2 types of data transfer, Address and Data cycles. EPP mode is used with peripherals that are "register oriented" in nature, i.e.: network adapters, disk drives, SCSI adapters, etc..

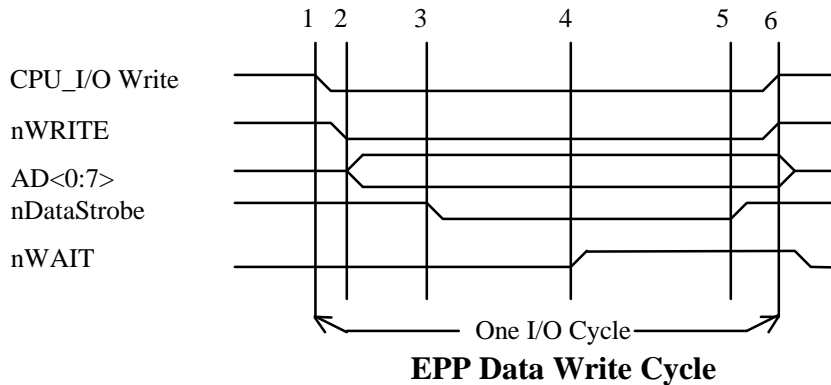
The EPP mode supports four basic type of cycles:

Data\_Read    Data\_Write    Address\_Read    Address\_Write

Below is an example of a Data\_Write cycle . The CPU signal nIOW is shown just to emphasize that this entire handshake occurs within a single I/O cycle.

1. Program executes an I/O write cycle to port 4 (EPP Data Port)
2. The nWrite line is asserted and the data is output to the parallel port
3. The data strobe is asserted

4. The port waits for the acknowledge from the peripheral (nWAIT deasserted)
5. The data strobe is deasserted and the EPP cycle ends
6. The CPU I/O cycle ends



**In order for this mode to work, both the PC interface adapter and the peripheral must support the EPP mode.** This mode will not work with ordinary parallel port devices. EPP mode is used by devices such as the Xircom Pocket Ethernet Adapters, Micro Solutions Backpack CD ROM drive, Disctec removable hard drive, and the Adaptec/Trantor EPP Mini-SCSI adapter.

### ***Nibble and Byte Modes***

The Nibble and Byte modes of operation are defined by the IEEE 1284 standard. These modes are for data transfer in the reverse direction only, i.e.: reading data from the printer or peripheral. The F/Port card supports application software drivers that operate with this mode.

The Nibble mode of operation uses the printer status lines to transfer 4 bits of data at a time. The software driver must read two nibbles and then repack the data in to one byte. This mode should work with any IBM-compatible printer adapter.

The Byte mode of operation uses the data lines to transfer one byte of data at a time. This mode requires that the parallel port support bi-directional control. The F/Port card supports this mode of operation.