ST7265x FAMILY
USB1 POCKET FLASH DRIVE

(Reference Design)

User Manual

Rev. 1

April 2005

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USER MANUAL

USB1 POCKET FLASH DRIVE (Reference Design)

1 INTRODUCTION

The USB1.1 Pocket Flash Drive (PFD) Reference Design provided by ST is based on the USB Full Speed Microcontroller ST7265. The PFD can be based on 1 to 4 NAND Flash chips. Total capacity of the drive is the sum of the individual capacities. The 7265x micro can interface parallelly with a maximum of four NAND Flash ICs. The subsequent sections will provide the detailed System and User Interface of this reference design.

The PFD is based on BOT(Bulk Only Transfer) Class Specifications of USB and implements SCSI command set.

The Pocket Flash Drive Object Code can be downloaded from the internet at

http://www.st.com/mcu

(Click the Downloads link), then under the categories "USB-->Software - Microcontrollers".

2 SYSTEM INTERFACE

The PFD firmware supports both ST72F651(TQFP64) and ST72652(TQFP48) devices. The schematic is available in Section 5. For the PFD application, only those ports are used, which are applicable to both packages.

The ICC connector can be used for the PFD based on flash device ST72F651 for reprogramming the micro-controller.

3 USER INTERFACE

3.1 WRITE PROTECT SWITCH

A Write Protect Switch is provided on port PA7 of the MCU. It is also connected to the #WP pin (19) of the NAND Flash. A High (3.3V) on PA7 indicates that the write protect is disabled and Low(Gnd) on PA7 indicates that the disk is write protected, hence no data can be written or deleted from the disk. The usage instructions for this switch are provided in Section 4 USAGE.

3.2 LED INDICATOR

The four LEDs are provided on ports PD0 (LED1), PD1(LED2), PD2(LED3), PD3(LED4). LED1 and LED4 glow when the PFD is inserted in the USB port. While the blinking of LED2 and LED3 show that the drive is busy in read or write operation

4 USAGE

No driver installation is required on Windows ME/2000/XP, Mac OS 9.x/Mac OS X and Linux Kernel 2.4.x. These Operating systems have the built-in Native drivers which recognise the USB removable Disk.

If you are using Windows 98, please install the device driver. The drivers can be downloaded from the internet

http://www.st.com/mcu

Click the Downloads link. (Refer to Section Using the PFD Tool for details)

4.1 WINDOWS 98/ME/2000/XP

1) Boot your computer and connect the Pocket Flash Drive to the USB port.

2) A "Removable Disk" icon will be added to "My Computer" or "Windows Explorer". In case of Windows Me/2000/XP, an extra icon will appear on the taskbar.

3) Now you can copy, delete or save data on Pocket Flash Drive, same as an additional hard disk available on the PC.

4) To correctly remove the PFD, use one of the following methods subject to your operating system:

- For Windows 98: unplug the PFD from the USB Port directly when the LED stops blinking.
- Click "Unplug or Eject Hardware" icon on task bar & click on "STOP". Click on "Stop a hardware device", and a window indicating "the USB Disk drive can be safely removed from the system" shows. Then click "OK" to safely unplug PFD.

4.2 MAC OS 9.X/ MAC OS X

1) Boot Mac OS 9.x/MAC OS X and connect Pocket Flash Drive to the USB port.

2) A new icon named "Untitled" will appear on the desktop if the disk(PFD) is not labelled. You can enjoy using PFD, just as additional Hard Disk.

4.3 LINUX 2.4.X

To use the Pocket Flash Drive with Linux, it is a pre-requiste that the Linux kernel supports both USB interface and USB File System.

1) Boot your computer and connect PFD to it.

2) Login as "root" and input the command "mount /dev/sda/mnt". This command is to create a directory where PFD will be mounted.

3) Before unplugging PFD, input the command "umount /mnt" to release mount. Otherwise the files or data in the PFD might be lost.

4.4 USING THE WRITE PROTECT SWITCH

Write Protection facility through a switch is available in the application design. If the Write Protect is enabled using the "Write Protect" Switch, no data can be written into the PFD and the PFD cannot be formatted.

However, there is no problem in reading the data from the PFD.

IMP: Do not toggle the "Write Protect" switch when data is being written into the Pocket Flash Drive.

4.5 USING THE PFD TOOL

To access advanced functions on the Pocket Flash Drive, PFDTool.exe is required which can be downloaded from

http://www.st.com/mcu

(Click the Downloads link), then from sections "USB--> Software - PC"

Unzip the downloaded file on a local folder, run Setup.exe.

After successful installation, PFDtool.exe can be found in the folder C:\Program Files\STM. The PFDTool is only usable with Microsoft Windows Operating Systems only.

To use the PFDTool, first insert the Pocket Flash Drive into the USB Port and then run PFD-Tool.exe.

Figure 1. 1:PFD Tool Welcome Screen

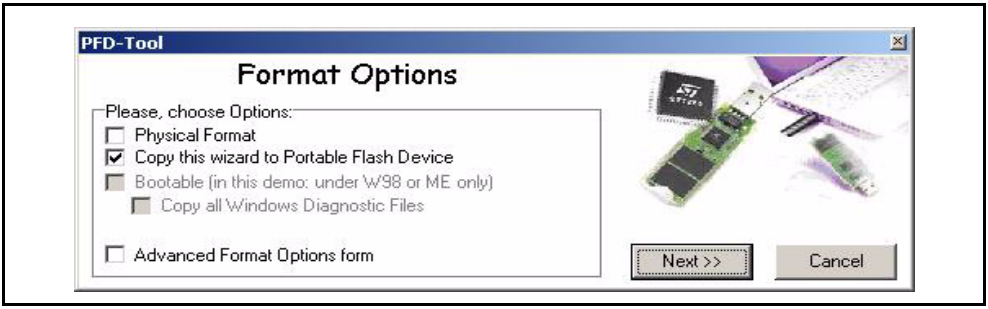
4.5.1 Formatting the Pocket Flash Drive

The Pocket Flash Drive can be formatted with PFD tool. Select "Format whole PFD" option and Click Next.

By default, PFD will be formatted logically, but you can select "Physical Format" option, to physically erase all the blocks and a check of bad blocks is done internally.

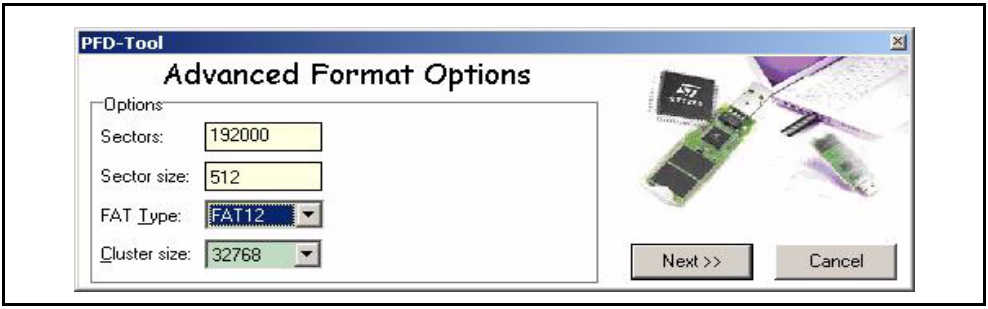
You can also make the disk "Bootable" by selecting "Bootable" option. To boot the computer with PFD, you will have to specify "USB-ZIP" or "USB-HDD" as "First Boot Device" on the BIOS Setup interface. Note that the Bootable option is only available for Windows98 and WindowsME operating systems.

Figure 2. PFD Tool Format Options



Using "Advanced format options", you can select the File System out of "FAT12", "FAT16" and "FAT32" and corresponding cluster size.

Figure 3. PFD Tool Advanced Format Options



4.5.2 Security

With the Security Features of the PFD Tool, the PFD can be divided into two zones, out of which one zone is password protected.

4.5.2.1 Security Implementation

To implement security, select "Change Security Scheme" and click next.

Step 1, Configure the sizes of Public and Private Zone by using the bar on left hand side.

Figure 4. PFD Tool: Defining Private Zone Size

Step 2, Enter the password for accessing the Private Zone.

After successful format, two icons of "Removable Disk" will be added to "My Computer". The first one is of Public Zone and second will be of Private Zone.

4.5.2.2 Accessing the Private Zone

Figure 5. PFD Tool: Various Security Options

To access the Private Zone, you will have to again run the PFDtool.exe. It will ask for the password. Enter the password and click Next.

If the password is correct it will show "Success". If the Password is not correct, the firmware will not allow the access of private zone.

4.5.2.3 Redifining zones

You can redefine the sizes of Public and Private zones in "Re-define Zone Size" option. All the data in the drive will be lost.

4.5.2.4 Leaving the Private Zone

Figure 6. PFD Tool: Leaving Private Zone

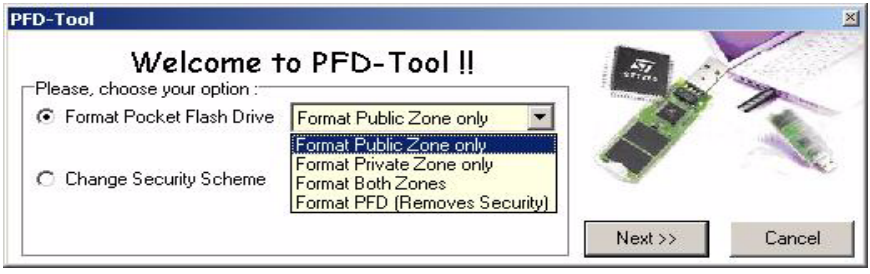
To leave the Private Zone, run the PFD Tool select, "Leave Private Zone" and click "Next". The private zone again becomes password protected.

Note: The above feature works differently in Windows 2000 with SP2 or below. When security is implemented, only one Removable Drive is shown in the Explorer window which is the public zone by default. Private zone is accessible by entering a password, but in doing so, the Public Zone is no longer available. The Public zone is accessible again after leaving the Private Zone. This is due to the fact that this operating system supports only a Single LUN.

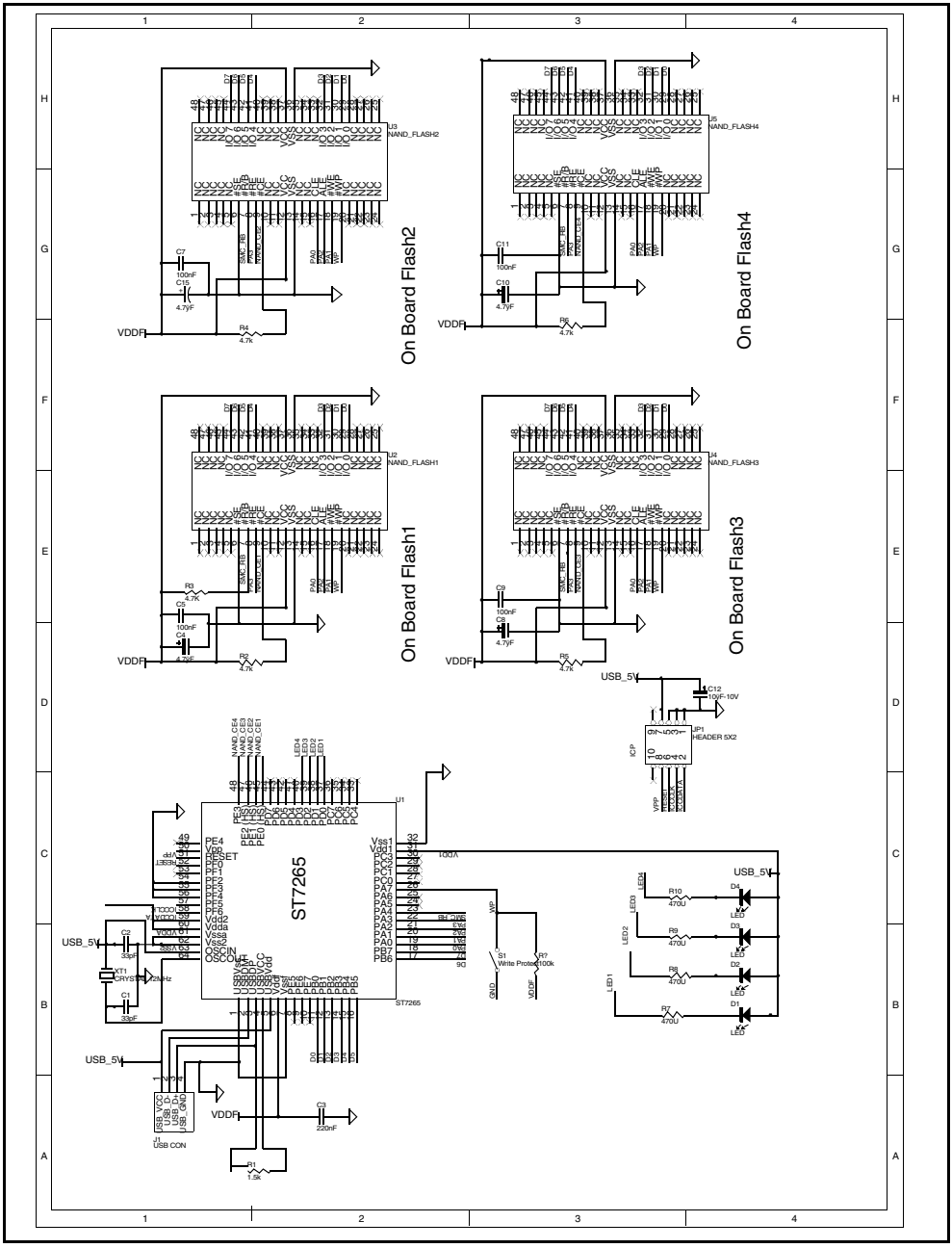
4.5.2.5 Removing security

To remove the security implementation, run the PFDTool.exe and select the option "Format PFD(Removes Security)". All the data in the two zones will be lost in this case.

Figure 7. PFD Tool: Various Format options after Security Implementation.



5 REFERENCE DESIGN SCHEMATIC



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