FlashPoint

ShareDrive

Xmultiple FlashPoint Dual Directional Copy Technology For Flash Memory

Introduction

Xmultiple's patent pending FlashPoint dual directional copy technology is a chip-based firmware and hardware technology which can be incorporated into any USB type flash memory device. Products enabled with the FlashPoint technology can transfer data from the enabled device to any "standard" flash memory device (Share) or can copy data from a standard device to the enabled device (Dump). The core technology also controls the standard flash drive functions, replacing existing flash controllers.

Both Share and Dump features are possible **without the use of a computer** or other support or connection devices. The FlashPoint device contains both a male and a female USB connector. The male USB connector permits connection to a PC or other host device for uploading data into the FlashPoint device. The female connector links the FlashPoint device to any other flash memory device in preparation for file transfers between the two.

About FlashPoint

Xmultiple's FlashPoint is a new supplement to the USB 2.0 specification. It challenges the capability of existing mobile devices and USB peripherals by giving them an added host capability for connection to other USB devices. These new features were needed to upgrade standard USB technology for mobile and peripheral devices. These new features include the additional host capability, smaller connectors, and low power output, which eliminate the current limitation in the USB that requires a PC to act as host.

Technical Specifications

CSM6x51 8-bits Controller Core

- 8 bits 8051compatible MCU core
- Turbo mode with 2 clocks per machine cycle
- 12MHz external ceramic resonator
- 24MHz internal CPU clock
- Two 16-bits timer
- Support power saving mode
- Built in power on reset with watchdog function

Memory

- 64K byte internal ROM
- 256 byte internal RAM
- In-chip 12K byte external mode data RAM

USB OTG Module

- Fully compliant with the USB specification Rev. 2.0 (full-speed) and OTG supplement Rev. 1.0
- Support 4 endpoints for bulk, interrupt and control transfer
- USB host and peripheral dual role device in one
- Supports Suspend, Resume and Wakeup features
- Integrated USB transceiver

Interface

- All NAND type flash available in the market with capacity 256MB~1GB of x 8/16 organization
- Support external devices with USB Mass Storage
- Compliant devices and/or with PTP protocol direct file transfer with internal flash.
- Support file to file; directory to directory; disk to disk bi-direction transfer with each other.

Miscellaneous

- Function buttons
  - Power: Turn on power
  - Share: Upload data
  - Dump: Download data
  - Reset: System reset
- Function indicators
  - LED #1: Single color, Power functions
  - LED #2: Bi-color, Data functions
- Rechargeable Li-ion power module with DC or USB charge
- Operation system support WindowsXP/2000/Me; MacOS9.X

Mechanical

- LQFP-128 pin package
- 16mm X 16mm X 1.6mm

Mechanical Design Elements

Incorporating FlashPoint technology into a marketable product requires five essential design elements, in addition to those required for standard flash drive production. While significant in function, these components represent a small percentage of the space required for packaging and in some cases, replace existing components.

•***Xmultiple's Proprietary USB FlashPoint Disk Controller with FlashPoint Technology:*** This device provides the FlashPoint features and functions and is a standard controller as well. This component is manufactured in a LQFP-128 pin package and measures just 16mm X 16mm X 1.6mm.

•***Female USB 2.0 Connector:*** Unlike all other flash memory drives, a FlashPoint enabled device can transfer data ***to*** other devices, not just copy ***from*** other devices. This, in effect, makes FlashPoint devices a "host" and as such, can accommodate other devices connected to it. Therefore, a FlashPoint enabled flash drive has both a male and female USB connector.

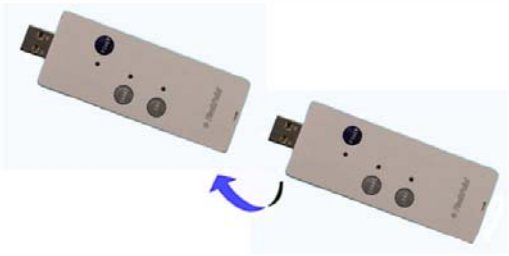
•***Internal Power Source:*** Because the FlashPoint device is a host, it needs to be able to provide power for the data transfer functions. The FlashPoint Disk Controller contains battery charging and management functions to control a lithium-ion battery. Power to charge the battery is obtained by plugging the FlashPoint's male USB connector into a PC's USB port, a powered USB Hub or by directly connecting it to a DC power adapter. The Lithium-ion battery in the FlashPoint ShareDrive is removalable.

•***LED Function Indicators:*** 2 LED's indicate Data and Power status. Various schemes are possible using bi-color LED's and their impact on mechanical design is nominal.

•***Function Switches:*** User controllable switches are incorporated to operate Power, Share, Dump and Reset functions. Various schemes are possible using "membrane" which can be integral with the device housing.

Device Connection

A FlashPoint device can be connected to a PC for data upload by inserting its male USB connector into the PC's female connector. In this case, the FlashPoint operates as a traditional USB flash drive. For Sharing the contents of the FlashPoint's (HOST) SHARE Directory with another FlashPoint device or traditional flash drive memory device (GUEST), or to DUMP the data contents of the GUEST device into the FlashPoint HOST device, connect the male USB connector on the GUEST flash drive with the female USB connector on the HOST FlashPoint.



Data Transfer – Upload to FlashPoint

When connected to a PC, notebook or other similar device the FlashPoint enabled flash drive reacts the same as any "traditional" flash drive device and may be used for any storage purpose up to its memory capacity. This function is a condition of the manufacturer and is not discussed here. Files that are intended to be "Shared" with other users in the future must be placed into the Directory named SHARE. This Directory is automatically created, if not found, each time the FlashPoint device is powered up.

Data Transfer – Share Data from FlashPoint to other flash drive devices

1. Connect the devices.
2. Push the “Power” button.
   a. LED #1 POWER, steady red = *Power*
   b. LED #2 DATA, (bi-color) steady green = *Ready*
3. Push the “Share” button.
4. Automatic memory capacity check initiated
   a. LED #2 DATA, (bi-color) flashing green *Data transferring.*
   b. LED #2 DATA, (bi-color) flashing red = *Memory Overload Error*
5. Push “Reset” button for Memory Overload Error
   a. LED #2 DATA, (bi-color) steady green = *Ready, Repeat*
6. Data Transfer complete.
   a. LED #2 DATA, (bi-color) off = *Transfer complete*

In the above scenario, all of the contents of the FlashPoint enabled device (HOST) SHARE Directory have been copied to the GUEST device. The HOST device will automatically create a Directory in the GUEST device named SHARE. If a Directory Named Share is already present in the GUEST, its contents will be overwritten. Note: A “Memory Overload Error” will be indicated when the GUEST device has less total memory available than the contents of the HOST’s SHARE Directory.

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Data Transfer – Load Data from other flash drive devices to FlashPoint

1. Connect the devices.
2. Push the “Power” button.
   a. LED #1 POWER, steady red = *Power On*
   b. LED #2 DATA, (bi-color) steady green = *Ready*
3. Push the “Load” button.
4. Automatic memory capacity check initiated.
   a. LED #2 DATA, (bi-color) flashing green *Data transferring*
   b. LED #2 DATA, (bi-color) flashing red = *Memory Overload Error*
5. Push “Reset” button for Memory Overload Error.
   a. LED #2 DATA, (bi-color) steady green *Ready, Repeat*
6. Data Transfer complete.
   a. LED #2 DATA, (bi-color) off = *Transfer complete*

In this scenario all of the contents of the GUEST device have been copied to the FlashPoint HOST device (Disk Copy). Note: A “Memory Overload Error” will be indicated when the HOST FlashPoint device has less total memory available than the contents of the GUEST device.

Power Management and Battery Life

When rechargeable batteries are chosen as the power source, Xmultiple’s Proprietary USB FlashPoint Disk Controller manages a single lithium-ion battery, including charge functions and low voltage indication. Charge current is board-level selectable. When connected to a PC’s USB port, a powered USB hub or an independent DC power adapter (through the USB or optional DC power jack), charging is automatically initiated.

1. Connect the FlashPoint to the power source.
   a. LED #1 POWER, steady red = *Battery charging*
   b. LED #1 POWER, off = *Battery ready*
   c. LED #1 POWER, flashing red = *battery fault (charge mode); low battery (data mode)*

Battery life can be defined as the number of data transfer cycles possible and is a direct result of the battery capacity (mAh) selected by the electronics designer. The battery referenced in this preliminary specification will provide approximately 100, 15-second data transfers per battery charge Lithium-ion batteries can deliver up to 500 recharge cycles; therefore, the estimated life of this battery is approximately 50,000 data transfers.