



EZ-USB FX2 USB to ATA Reference Design Operating Instructions

This device connects an ATA device to the USB 2.0 bus. Connecting it is simple, since it uses the standard Windows Plug-n-Play driver mechanisms.

Getting Started

Before you start, you should have the following:

- CY4611 "tailgate" board or CY3681 development kit (rev C or higher) and standard 80 pin IDE cable (or 40 pin cable if you are not using UDMA). See "Using this Design with an FX2 Development Kit" below for configuration details for the development kit board.
- The 2.0B9, 2.10 and higher releases require rev E chips. These releases will NOT work with rev B or rev D chips.

Revision E chips are marked:
CY7C68013-56PVC
E 01xx (Datecode)

- An ATA device, such as a hard drive or CD-RW device
- Disk Drive Power Supply
- A Windows 2000, XP, 98 or ME PC with a USB 2.0 host controller and required drivers installed (for 480Mbit operation).

Software Installation

The Mass Storage Reference Design Software is an add-on to the Cypress EZ-USB Development Kit. Therefore, The EZ-USB Development Kit must be installed on the system to perform functions such as building and modifying firmware or re-programming the EEPROM. The full EZ-USB Development Kit has been included on the Mass Storage Reference Design CD. Also, in order to compile the Mass Storage firmware you must install the full version of the Keil 8051 tools (available from Keil Software at www.keil.com).

Installation Steps

1. Install the EZ-USB Development Kit by running setup.exe located in the "FX2 Dev Kit" directory on the CD.
2. Copy the "FX2_ata" directory and all of its contents to the c:\cypress\usb directory.

Reference Design CD Contents

\FX2_ATA\DOCS - Reference Design Documentation.
\FX2_ATA\HARDWARE - Hardware
\FX2_ATA\SOFTWARE - Mass Storage Reference Design firmware source code and images
\FX2 Dev Kit\ - Development kit installation

Connecting the CY4611 tailgate board

- ☐ Start with your drive power supply turned off.
- ☐ Change the jumpers on the disk drive to "master".
- ☐ Connect the 'Y' cable to the same power supply as the disk drive.
- ☐ Connect the smaller connector on the 'Y' cable to the tailgate board.
- ☐ Make sure that JP2 is not inserted.
- ☐ Connect the tailgate board to your drive.

Now that the drive and board are connected, power up the drive and connect it to USB. Or connect it to USB and then power it up. Either connection order is okay. If this is the first time that this device has been connected to the computer, the computer will prompt you for a driver for the device. Use the standard class driver. A new drive letter will appear. If the device contains multiple partitions, multiple drive letters will appear.

Disconnecting the device

Microsoft recommends that you use the "Eject Hardware" icon to shut down USB disk drives before they are unplugged. This prevents potential data loss.

Converting the demonstration board to a new Firmware Image

The tailgate board is shipped with the latest firmware image already programmed in the EEPROM. If firmware updates are required, this simple procedure will allow you to update your firmware.

1. Turn off the power.
2. Remove the EEPROM jumper (jp1) from the board. This will force the device to come up as an unconfigured FX2 rather than a Mass Storage device.
3. Keep the power cable connected to the tailgate board. Disconnect the drive from the tailgate board. Turn on the power.
4. Plug the board into USB.
5. Install the jumper (JP1) again.
6. Start the Cypress USB Control Panel "EZMR.exe".
7. Make sure that the FX2 button is pressed (in the middle of the toolbar).
8. Press the DOWNLOAD button.
9. Download "examples\fx2\vend_ax\vend_ax.hex".
10. Enter the following settings on the VendReq toolbar:

Req	0xA9
Value	0x0000
Index	0xBEEF
Length	1
Dir	0-OUT
Hex Bytes	FF

11. Press the vendReq button to reprogram the EEPROM.
12. Cycle power on the tailgate board.
13. Press the EEPROM button.
14. Download the new fx2_ata.iic file to the EEPROM.
15. Turn off the power and disconnect the device from USB.
16. Reconnect the board to the drive.
17. Turn on power and connect to USB.

Using this Design with an FX2 Development Kit

Important Notes:

- There are three solder points (SP1, SP2, and SP3) that must be connected in order to

enable pull-ups and pull-downs needed for reliable ATA operation.

- The 2.10 code senses VBUS on PA6. Either connect VBUS to PA6 or disable this code by removing the VBUS_DETECT define from the compile options in the code.
1. Start with the Development Board Disconnected from USB
 2. Attach a short (4" or less) 80 pin ATA cable (or a 40 pin cable is UDMA/66 is not used) to the ATA connector on the Development Board. Attach the cable such that pin 1 of the cable is attached to pin 1 of the ATA connector on the Development Board.
 3. Attach the other end of the cable to the IDE drive. The connector on the IDE drive should be keyed for the cable. If not, ensure that pin 1 of the cable corresponds to pin 1 of the IDE connector on the drive.
 4. Attach the Development Board to the USB 2.0 host controller.
 5. Verify that the Development Board has enumerated successfully. To verify enumeration, start the EZ-USB control panel and press the "Get Dev" button to retrieve the Device Descriptor.
 6. Power up the IDE drive.
 7. Download firmware. Download the fx2_ata.hex firmware using the "Download" button on the EZ-USB Control Panel.
 8. The device should re-enumerate as a mass storage device. See the section on driver installation for information on installing device drivers.

Compiling for UDMA/100

The current release is configured to support the highest speed available **other than** UDMA/100. To enable UDMA/100, insert the **bold** code below at ATARESET.c line 161:

```
if ((halfKBuffer[IDENTIFY_FIELD_VALIDITY] & bmBIT2) &&
(halfKBuffer[IDENTIFY_UDMA_MODES] & (UDMA_MODE2 |
UDMA_MODE4 | UDMA_MODE5)))
{
    if (halfKBuffer[IDENTIFY_UDMA_MODES] & UDMA_MODE5)
    {
        udmaMode = TRANSFER_MODE_UDMA5;
    }
    else if (halfKBuffer[IDENTIFY_UDMA_MODES] &
UDMA_MODE4)
```



Document Revision History

Revision #	Date	Comments
2.10	2/1/02	Requires rev E chips Added VBUS detection circuit
2.0B8	8/15/01	Updated descriptions for 2.0B8 release.
2.0B7	7/2/01	Updated descriptions for 2.0B7 release.
2.0B6	6/15/01	Updated descriptions for 2.0B6 release.
2.0B5	5/20/01	Changed format, updated instructions for 2.0B5 IDE release, removed host controller installation tips.
2.0B2	4/10/01	Added 2.0 Host Controller installation tips
2.0B2	4/6/01	Updated rev C dev board instructions
2.0B1	3/26/01	Updated for Beta release Added Tailgate board information
1.8	9/5/00	Separated board operation into this document.