EasyUSB Datasheet

Preliminary Rev 0.3 – Nov/2010

1. Description

The EasyUSB is an embedded Universal Serial Bus interface with solid state memory and external asynchronous serial interface, designed to facilitate the file sharing and direct communication between host and device applications, therefore improving the end-user experience, reducing development costs and time to market.

On the host side, in almost any computer or portable device, no driver or further installation procedure is needed as the USB Mass Storage Class implemented is widely supported by almost any operating system.

On the device, the file system is accessible through a classical Universal Asynchronous Serial Interface. Eventually the software can be distributed inside the embedded memory, rendering it really plug-n-play and usable everywhere.

Furthermore host computer and embedded controller can directly communicate over a dedicated serial link, built using an innovative technique[1], without implementing the Communication Device Class. In practice it can benefit from both interfaces, mass storage and communication, using only the simple and widespread Mass Storage Class, eliminating the need of problematic composite peripherals or expensive custom driver development and maintenance.

2. Specifications

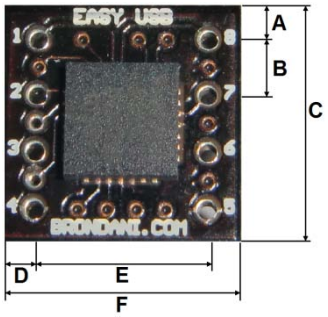
USB MSC Specification 2.0 compliant
File system: FAT16
Memory size: 2MB to 16MB
Typical Input Voltage: 5.0V
Input Voltage Range: 3.0V to 5.2V
Logic Signal: TTL/CMOS voltage levels
Baud rate: 9600, 19200, 38400, 57600, 115200, 921600 bps
Temperature: 0°C to 70°C
Package: DIP8 style

[1] Patent Application UD2010A000038

3. Dimensions

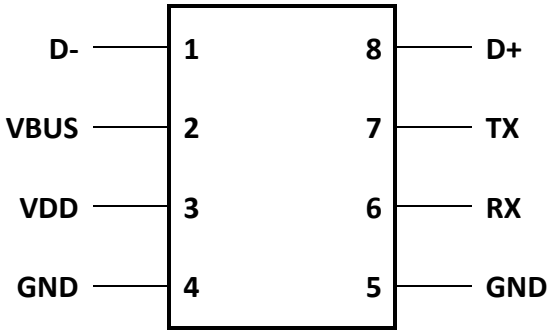
Part Number: EASYUSB-M01 (2MB)

The module fits a standard DIP8 socket:



Dimension	mm	inch
A	1.78	0.070
B	2.54	0.100
C	11.18	0.440
D	1.78	0.070
E	7.62	0.300
F	11.18	0.440
Thickness	2.54	0.100

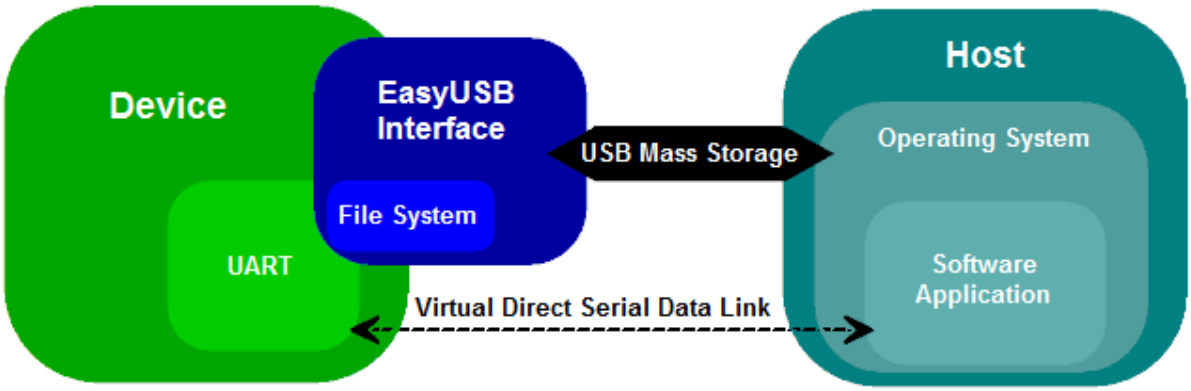
4. Pinout Description



Pin	Name	Type	Description
1	D-	I/O	USB Data Minus
2	VBUS	Input	VBUS Sense input
3	VDD	PWR	5V Power supply
4	GND	PWR	Ground supply
5	GND	PWR	Ground supply
6	RX	Input	UART Receive
7	TX	Output	UART Transmit
8	D+	I/O	USB Data Plus

5. Functional Description

With the EasyUSB Interface is easier and faster to add USB connectivity to an embedded system. Using a common UART port, the device can access the file system to store and share files and also communicate in real time with software applications.



5.1. Host

The host recognizes the EasyUSB interface as a standard mass storage device when it's plugged in. No further user operation is needed.

The UART interface is virtually direct accessed by the host through the library functions, detailed on the EasyUSB API documentation. External formatting is not supported.

A software application that demonstrates all the library functions is available.

5.2. Device

The EasyUSB is easily controlled by embedded systems through the standard UART interface.

When the VBUS is high (USB host is plugged) it outputs the message "Serial Bridge Mode" and acts as a bridge between the UART signals and the library read/write functions.

When VBUS is low (USB host is unplugged), it outputs the message "File System Mode" and the embedded processor can access the file system using the commands detailed in the next section.

6. Commands

The commands can be transmitted through the UART interface when the File System Mode is active. After the command prompt “>” (0x3E), the byte code corresponding to the desired command must be issued followed by the respective parameters.
If the byte <ESC> (0x1B) is sent, the command execution is canceled and it returns to the command prompt.

6.1. Read File

Description: Reads the content of a file stored on the file system root. If the file does not exist, the message "File Not Found" is returned.
Byte code: “r” (0x72)
Parameters: String “filename.ext” where:
“filename” = name of the file with a length from 1 to 8 characters.
“ext” = extension of the file with a length of 3 characters.
Return data: “Read File: filename.ext” <CR><LF>
<read data bytes>

6.2. Write File

Description: Appends up to 32 bytes to a file. If the file does not exist, it is created. If the length is out of range, the message "Invalid Length" is returned.
Byte code: “w” (0x77)
Parameters: String “filename.ext” “nn” <data bytes> where:
“filename” = name of the file with a length from 1 to 8 characters.
“ext” = extension of the file with a length of 3 characters.
“nn” = length of the data to be written from ”00” to “32”.
<data bytes> = data to be written
Return data: “Write File: filename.ext” <CR><LF>
“Length: nn” <CR><LF>
<written data bytes>

6.3. Delete File

Description: Deletes a file. If the file doesn’t exist, the message "File Not Found" is returned.
Byte code: “d” (0x64)
Parameters: String “filename.ext” where:
“filename” = name of the file with a length from 1 to 8 characters.
“ext” = extension of the file with a length of 3 characters.
Return data: “Delete File: filename.ext” <CR><LF>

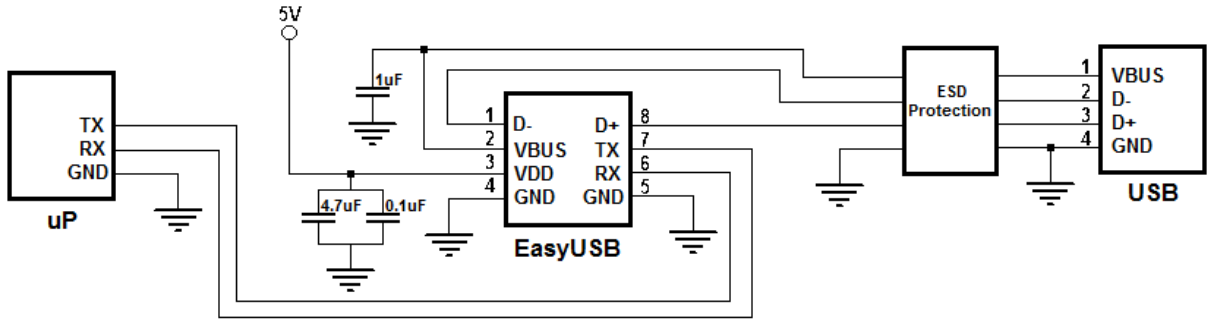
6.4. Format

Description: Formats the memory.
Byte code: “f” (0x66)
Parameters: “y” to confirm, “n” to cancel
Return data: “Format Disk? (y/n)” <CR><LF>

6.5. Erase

Description: Erase and formats the memory.
Byte code: “e” (0x65)
Parameters: “y” to confirm, “n” to cancel
Return data: “Erase Disk? (y/n)” <CR><LF>

7. Typical Application Circuit



Contacts

This is a preliminary release of the EasyUSB project.

For technical questions, software, documentation and for information about producing, distributing, licensing, please contact the developer:

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Disclaimer