USB 3.0 Serial ATA Bridge IC
MB86C30A

Releasing a USB 3.0 serial ATA (hereafter referred to as SATA) bridge IC optimal for external memory devices such as hard disk drives (hereafter referred to as HDDs) complied with the USB 3.0 standard SuperSpeed with 5Gbps transfer speed.

Overview

In recent PCs and digital AV devices, the data sizes for photos, music files and video files have been growing rapidly, leading to a demand for larger capacities and higher speeds in memory devices such as HDDs to meet market needs. The maximum transfer speed for the widely adopted USB 2.0 standard in external HDD devices, USB memories and so forth is only 480Mbps. There is a strong demand for faster reading and writing of larger data in shorter periods.

The USB 3.0 standard whose specifications were developed in November 2008 is the innovative next-generation USB standard that realizes more than 10 times the transfer speed of the USB 2.0 standard as well as low power consumption through improved protocol efficiency and power management methods.

FUJITSU has developed an ASSP (Application Specific Standard Product) for external USB storage products to be connected to PCs and so forth supporting this USB 3.0 standard. This product especially provides an optimal solution for simple and low-end desktop USB HDDs composed of one HDD unit and portable USB HDDs that require encryption functions.

Product Features

Table 1 presents the main specifications, **Figure 1** application examples of encryption functions, and **Figure 2** the block diagram.

Supports USB 3.0 standard SuperSpeed

This product conforms to both the USB 2.0 standard and USB 3.0 standard SuperSpeed (5Gbps) with performance that is 10 times better than that of USB 2.0 standard Highspeed (480Mbps). The file copy elapsed time for 10 to 30Gbytes data such as an HD video can be reduced to approximately 1/3 to 1/4 compared to the conventional USB 2.0 when USB HDD is constructed using 3.5-HDD.

Integrates the necessary functions for USB storage products on 1 chip

This product integrates the interface block and the control circuit block on 1 chip and allows the facile construction of a storage product supporting USB 3.0 by combining it with a few peripheral circuits and a SATA device such as HDD and Blu-ray. This product also adopts a small package (LQFP 64-pin, 0.4mm-pitch) to enable a simple upgrade from conventional USB 2.0 products to the latest USB 3.0 products.

Photo 1 External View

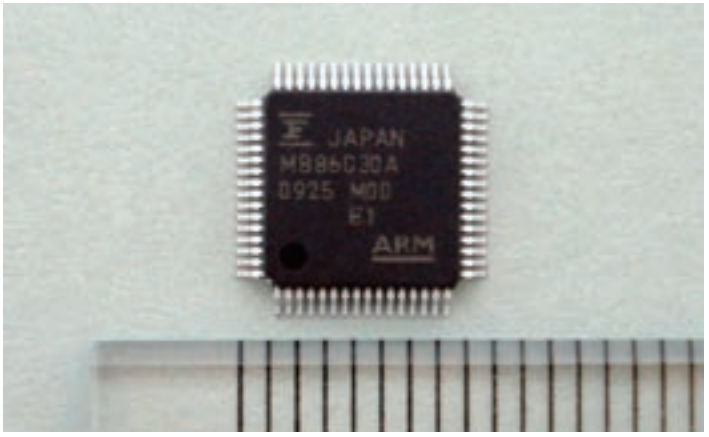


Table 1 Main Specifications

USB	Standard	Universal Serial Bus Specification 3.0, Revision 1.0
		Universal Serial Bus Specification, Revision 2.0
	Bit rate	5 Gbps (SuperSpeed)/480 Mbps (High Speed)
	Device class	Mass Storage Class Bulk-Only Transport, Revision 1.0
SATA	Standard	Serial ATA Specification Revision 2.6
	Bit rate	3 Gbps (Gen2i) /1.5 Gbps (Gen1i)
	ATA/ATAPI device	HDD/SSD/Blu-ray/DVD/CD
Encryption hardware	Algorithm	AES
	Mode	CBC/XTS
	Block length	128-bit
	Key length	128-bit/256-bit (CBC mode)
		128-bit + 128-bit/256-bit+256-bit (XTS mode)
	Throughput	200 Mbytes/sec (CBC mode, 128-bit)
		150 Mbytes/sec (CBC mode, 256-bit)
		300 Mbytes/sec (XTS mode, 128-bit+128-bit)
		270 Mbytes/sec (XTS mode, 256-bit+256-bit)
MPU	Type	ARM7 TDMI-S™
	Maximum operating frequency	75 MHz
	RAM size	64 Kbytes
Package		LQFP64-pin, 7mm×7mm (0.4mm pitch)
Process technology		65 nm CMOS

Built-in high-speed AES encryption/decryption engine

This product employs a built-in Advanced Encryption Standard (AES) method selected by the National Institute of Standards and Technology (NIST) of the U.S. Department of Commerce. It conforms to the CBC mode and the XTS mode, which are suited to HDDs in terms of security strength and encryption/decryption speed. It is capable of encryption and decryption processes at a maximum speed of 300Mbytes/sec, and it addresses an external HDD with an encryption function to avoid the risk of data leak in case of theft, loss, or disposal without impairing the standard HDD performance.

Supports HDD, SSD, Blu-ray, and DVD

This product supports not only ATA devices but also ATAPI devices as default. In addition, since ATA PASS-THROUGH commands are supported, device-specific ATA commands can be executed via Windows standard API.

Firmware provision and customization functions

Firmware supporting default functions and a firmware update tool are provided.

Unique data for the USB device (Vendor ID, Product ID, serial number, and so forth) can be set up from the PC via USB.

Figure 1 Application Examples of Encryption Function

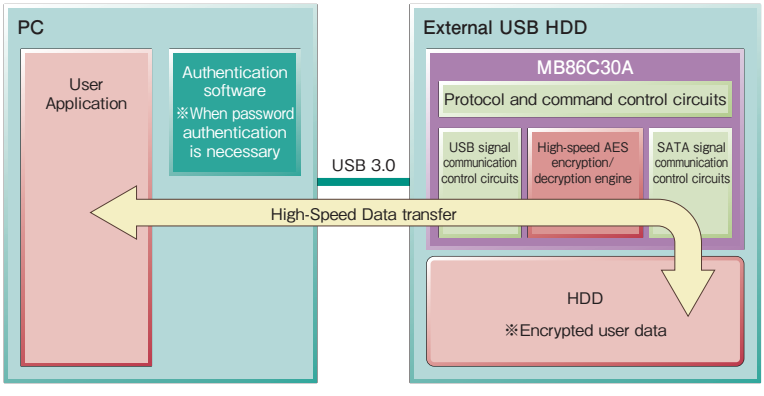
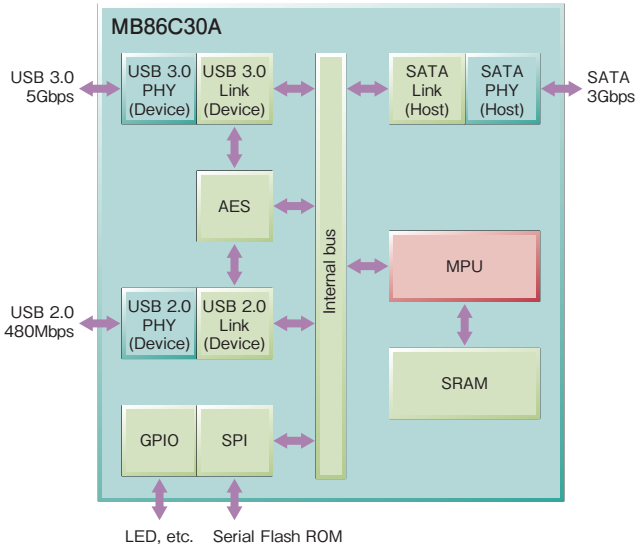


Figure 2 Block Diagram

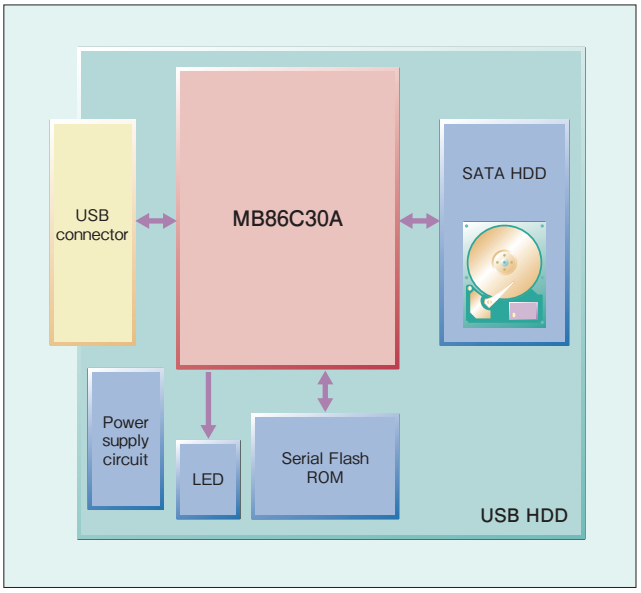


Application Examples

Figure 3 presents a USB HDD product as an application example.

This product enables the simple construction of storage products supporting USB 3.0 through combination it with a few peripheral circuits such as the power supply circuits and serial Flash ROM and a SATA device such as HDD or Blu-ray. ✱

Figure 3 Application Example



NOTES

* Windows is a registered trademark of the U.S. Microsoft Corporation in the U.S. and other countries.
* ARM7TDMI-S is a trademark of ARM Limited in the EU and other countries.