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APPLICATION NOTE 3808

What Is an iButton?

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Abstract: This application note is a broad introduction to the iButton®. It discusses the iButton basics: what it is, how it is constructed, and some of its applications. It explains how a system can communicate to the iButton through its 1-Wire® interface. The note also describes: types of iButtons; iButton durability; its guaranteed unique 64-bit serial number; and available iButton accessories.

Introduction

The iButton is a computer chip enclosed in a 16mm thick stainless steel can. Because of this unique and durable container, up-to-date information can travel with a person or object anywhere they go. The steel iButton can be mounted virtually anywhere because it is rugged enough to withstand harsh environments, indoors or outdoors. It is small and portable enough to attach to a key fob, ring, watch, or other personal items, and be used daily for applications such as access control to buildings and computers, asset management, and various data logging tasks.

iButton Components

The Can and Grommet

An iButton uses its stainless steel 'can' as an electronic communications interface. Each can has a data contact, called the 'lid', and a ground contact, called the 'base'. Each of these contacts is connected to the silicon chip inside. The lid is the top of the can; the base forms the sides and the bottom of the can and includes a flange to simplify attaching the button to just about anything. The two contacts are separated by a polypropylene grommet.

The 1-Wire Interface

By simply touching the iButton to the two contacts described above, you can communicate with it through our 1-Wire protocol. The 1-Wire interface has two communication speeds: standard mode at 16kbps, and overdrive mode at 142kbps. For more information, please see our application note 3989, Add Control, Memory, Security, and Mixed-Signal Functions with a Single Contact.

The Address

Each iButton has a unique and unalterable address laser etched onto its chip inside the can. The address (e.g. 2700000095C33108) can be used as a key or identifier for each iButton.

iButton Versions

The iButton product line now comprises over 20 different products with different functionality added to the basic button. iButtons come in the following varieties:

- Address Only
- Memory
- Real-Time Clock

- Secure
- Data Loggers

See tutorial 1796, "Overview of 1-Wire® Technology and Its Use," for more details about the products.

How Do I Get Information Into and Out of the iButton?

Information is transferred between your iButton and a PC with a momentary contact at up to 142kbps. You simply touch your iButton to a Blue Dot receptor or other iButton probe, which is connected to a PC. The Blue Dot receptor is cabled to a 1-Wire adapter that is attached to a spare PC port. 1-Wire adapters exist for USB, serial, and parallel ports. The Blue Dot receptor and 1-Wire Adapter are inexpensive. See our Maxim Direct for pricing and availability.

The iButton is also the ultimate information carrier for AutoID and many portable applications. All the latest handheld computers and PDAs can communicate with iButtons. For a full listing of all portable devices that communicate with iButtons, go to the iButton Solutions Search.

How Durable Is the iButton?

The silicon chip within the iButton is protected by the ultimate durable material: stainless steel. You can drop an iButton, step on it, or scratch it. The iButton is wear-tested for 10-year durability.

What Can I Do with the iButton?

The iButton is ideal for any application where information needs to travel with a person or object. Affixed to a key fob, watch, or ring, an iButton can grant its owner access to a building, a PC, a piece of equipment, or a vehicle. Attached to a work tote, it can measure processes to improve efficiency, such as manufacturing, delivery, and maintenance. Some iButton versions can be used to store electronic cash for small transactions, such as transit systems, parking meters, and vending machines. The iButton can also be used as an electronic asset tag to store information needed to keep track of valuable capital equipment. Click here to see some of the iButton Applications used around the world.

What Do I Need to Put Together an iButton Application?

There are four components fundamental to any iButton application:

- iButtons
- A host system: this can be a PC, a laptop, a handheld computer, or an embedded system.
- A reader/writer device to get information into and out of the button. This can be the Blue Dot mentioned above, a pen-style probe, or a handheld device.
- A layer of software to interface iButtons to computers and produce the desired information in the desired format. Several software development kits (SDKs) are downloadable from this site at no charge. For a list of SDKs and links to download, see this page. We also offer 1-Wire Drivers for Microsoft platforms, along with the OneWireViewer, a demo application that can read/write/exercise any iButton.

How Much Does It Cost to Build a Simple iButton Application?

Under $50 (US$), plus your programming time.

- iButtons cost between $2 to $95 in quantities of one; larger quantities are discounted.
- The Blue Dot receptor and 1-Wire Adapter, which together make a simple reader/writer device, cost between $38 and $43.
- The OneWireViewer demo software and SDKs are free from our web site.

That is all you need to get started. You can review our Product Section and Online Store to get all product details and exact costs for all components, along with quantity discounts.

What Are the Advantages of iButtons Over Other Technologies?

When developing an iButton solution for an application, you can consider many complementary technologies. Bar codes, RFID tags, magnetic stripe, prox, and smart cards are some of the possibilities. Unlike bar codes and magnetic stripe cards, most of the iButtons can be read *AND* be written to. In addition, the communication rate and product breadth of iButtons goes well beyond the simple memory products typically available with RFID. As for durability, the thin plastic of smart cards is no match for the strength of the stainless-steel-clad iButton.

I Do Not Want to Build My Application Myself. Do You Provide Turnkey Solutions?

We have partnered with a number of companies called Authorized Solutions Developers, ASDs for short, who develop turnkey iButton systems for access control, time and attendance tracking, payroll, truck fleet maintenance, manufacturing control, fare collection, and more. The ASDs can also develop custom iButton applications for you—just talk to them. You can search our iButton Solutions Search to find our partners' solutions available worldwide.

Who Is Using the iButton?

With over 175 million iButtons currently in circulation, the list of users is very long. You can read about many of the applications here.

Also, take a look at our iButton videos for more information on how the iButton is being used.

Related Parts		
DS1402D-DR8	1-Wire Network Cables	
DS1904	RTC iButton	Free Samples
DS1920	Temperature iButton®	
DS1921G	Thermochron iButton	
DS1921H	High Resolution Thermochron iButton Range H: +15°C to +46°C; Z: -5°C to +26°C	
DS1921Z	High Resolution Thermochron iButton Range H: +15°C to +46°C; Z: -5°C to +26°C	
DS1922E	High-Temperature Logger iButton® with 8KB Data-Log Memory	
DS1922L	Temperature Logger iButton with 8KB Datalog Memory	
DS1922T	Temperature Logger iButton with 8KB Datalog Memory	
DS1923	Hygrochron Temperature/Humidity Logger iButton with 8KB Data-Log Memory	
DS1961S	1Kb Protected EEPROM iButton with SHA-1 Engine	
DS1963S	SHA iButton	
DS1971	256-Bit EEPROM iButton®	
DS1972	1024-Bit EEPROM iButton	Free Samples
DS1973	4Kb EEPROM iButton®	Free Samples
DS1977	Password-Protected 32KB EEPROM iButton	Free Samples

DS1982	1Kb Add-Only iButton®	Free Samples
DS1985	16Kb Add-Only iButton®	Free Samples
DS1990A	Serial Number iButton	Free Samples
DS1990R	Serial Number iButton	Free Samples
DS1992	1Kb/4Kb Memory iButton®	Free Samples
DS1993	1Kb/4Kb Memory iButton®	Free Samples
DS1995	16Kb Memory iButton®	Free Samples
DS1996	64Kb Memory iButton®	Free Samples
DS9097U-S09	Universal 1-Wire COM Port Adapter	
DS9490B	USB to 1-Wire/iButton Adapter	
DS9490R	USB to 1-Wire/iButton Adapter	

Next Steps

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