



# **Future Technology Devices International Ltd**

## **USB-Key**

## **Datasheet**

**Document Reference No.: FT\_000062**

**Version 1.00**

**Issue Date: 2008-07-17**

**Future Technology Devices International Ltd (FTDI)**

**373 Scotland Street, Glasgow G5 8QB United Kingdom**

**Tel.: +44 (0) 141 429 2777 Fax: + 44 (0) 141 429 2758**

**E-Mail (Support): [support@ftdichip.com](mailto:support@ftdichip.com) Web: <http://www.ftdichip.com>**

Neither the whole nor any part of the information contained in, or the product described in this manual, may be adapted or reproduced in any material or electronic form without the prior written consent of the copyright holder. This product and its documentation are supplied on an as-is basis and no warranty as to their suitability for any particular purpose is either made or implied. Future Technology Devices International Ltd will not accept any claim for damages howsoever arising as a result of use or failure of this product. Your statutory rights are not affected. This product or any variant of it is not intended for use in any medical appliance, device or system in which the failure of the product might reasonably be expected to result in personal injury. This document provides preliminary information that may be subject to change without notice. No freedom to use patents or other intellectual property rights is implied by the publication of this document. Future Technology Devices International Ltd, 373 Scotland Street, Glasgow G5 8QB United Kingdom. Scotland Registered Number: SC136640

---

## Table of Contents

|          |                                                            |          |
|----------|------------------------------------------------------------|----------|
| <b>1</b> | <b>Introduction.....</b>                                   | <b>2</b> |
| 1.1      | Overview .....                                             | 2        |
| 1.2      | Features and Applications.....                             | 2        |
| 1.3      | USB Key Connections.....                                   | 2        |
| <b>2</b> | <b>FTDI USB KEY User Guide.....</b>                        | <b>3</b> |
| 2.1      | USB Connection .....                                       | 3        |
| 2.2      | Reading The FTDIChip-ID™ USB Key.....                      | 3        |
| 2.3      | Basic Description of the FTDIChipID Function calls .....   | 3        |
| 2.4      | Using the EEPROM Writeable Area of the FTDI USB Key.....   | 4        |
| 2.5      | Viewing Contents of FTDI USB Key .....                     | 4        |
| <b>3</b> | <b>Application Examples .....</b>                          | <b>5</b> |
| 3.1      | Security Dongle Using SafeGuard-IT.....                    | 5        |
| <b>4</b> | <b>Mechanical Dimensions .....</b>                         | <b>6</b> |
| <b>5</b> | <b>Contact Information.....</b>                            | <b>7</b> |
|          | Appendix A – FTDI USB Key FT232R EEPROM Configuration..... | 8        |
|          | Appendix B – Revision History .....                        | 9        |

## 1 Introduction

### 1.1 Overview

The FTDI USB Key is security device which has a unique identification number burnt into it during manufacture. This is the FTDIChip-ID™ number.

This FTDIChip-ID™ number is only readable over the USB interface making it an ideal “key” for “unlocking” particular applications.

### 1.2 Features and Applications

The FTDI USB Key has the following features:

- Simple to use USB interface to any USB host or hub.
- Unique FTDIChip-ID™ number can be used to provide a security dongle for software applications.
- Additional security possible by encrypting the FTDIChip-ID™ number and storing in EEPROM writeable area of FTDI USB Key.
- Enhanced security protection using SafeGuard-IT Active-X control for Windows. This can be used to generate asymmetric public-private key encryption to provide secure dongle functionality.
- USB Key can be used to unlock security systems – access control.
- Password protected access.

### 1.3 USB Key Connections

The USB Key connects to PC USB interface. The following Table 1.1 describe the function of the connector:

| Pin Number | Name | Type        | Description      |
|------------|------|-------------|------------------|
| 1          | VBUS | Power Input | +5V from USB bus |
| 2          | D-   | Input       | Data Minus       |
| 3          | D+   | Input       | Data Plus        |
| 4          | GND  | Power Input | 0V               |
| 5          | GND  | Power Input | 0V               |

**Table 1.1 USB Connector Signal Description**

## 2 FTDI USB KEY User Guide

The following illustration, **Figure 2.1**, shows a representation of the FTDI USB Key unit. The user interface is described below.



**Figure 2.1 FTDI USB Key Illustration.**

### 2.1 USB Connection

The FTDI USB Key module connects to a USB hub or host port via the USB connector. This will supply power to the FTDI USB Key.

### 2.2 Reading The FTDIChip-ID™ USB Key

The unique FTDI USB Key FTDIChip-ID™ number can only be read using function calls from the FTDChipID.dll. This DLL can be downloaded from the FTDI website for Windows (V1.1.0), Linux (V0.1.0) and Mac OS X (V0.1.0). The D2XX drivers must also be installed. The drivers can be downloaded from <http://www.ftdichip.com/Drivers/D2XX.htm>

The FTDChipID.dll and the D2XX.dll can reside in the same directory.

An FTDIChip-ID™ programmer's guide gives details of how to use the DLL and is available from the <http://www.ftdichip.com/Documents/ProgramGuides.htm> page. The programmers guide lists the function calls which need to be used by the software application to identify the unique FTDIChip-ID™ number.

### 2.3 Basic Description of the FTDIChipID Function calls

The following list gives a brief description of the function calls available in order to obtain the FTDIChip-ID™ number when using the FTDChipID.dll

- FTID\_GetNumDevices - returns the number of devices attached on the USB bus.
- FTID\_GetDeviceSerialNumber - Given a device index return the device serial number.
- FTID\_GetDeviceDescription - Given a device index returns with description of the device.
- FTID\_GetDeviceLocationID - Given a device index returns with location ID.
- FTID\_GetDeviceChipID - Given a device index returns the unique FTDIChip-ID™ number of the device.
- FTID\_GetChipIDFromHandle - Given a device handle returns the unique FTDIChip-ID™ (must use a valid D2XX device handle).
- FTID\_GetDllVersion - get the dll version.
- FTID\_GetErrorString - get the English translation of the error code.

## **2.4 Using the EEPROM Writeable Area of the FTDI USB Key.**

To further improve security, the unique FTDIChip-ID™ number read from the FTDI USB Key can be read, further encrypted and written back to a EEPROM user accessible area within the FTDI USB Key. This further security could make use of industry standard encryption methods (DES, 3DES, AES, Blowfish for example) plus make use of a timestamp for registration purposes. To access this user area it is necessary to use the FT\_EE\_UASize, FT\_EE\_UAWrite and the FT\_EE\_UARead function calls available in the D2XX.dll. This DLL is available from the FTDI driver download area at D2XX Direct Drivers. The D2XX programmers guide is also available from D2XXPG34.pdf.

The amount of EEPROM user available space available varies depending on what data has already been written to the EEPROM. Generally, the longer the strings written to the EEPROM, the less free space available. Users should check that sufficient space is available to write back any further encrypted data.

## **2.5 Viewing Contents of FTDI USB Key**

The FTDI USB Key Device Descriptors and Configuration Descriptors can be read using the USBView software utility.

USBView can be downloaded free from the FTDI website at <http://www.ftdichip.com/Resources/Utilities.htm>

### 3 Application Examples

Numerous examples showing how to access the unique FTDIChip-ID™ number is given in many different software languages on the FTDI website at <http://www.ftdichip.com/Projects/FTDIChip-ID.htm>

#### 3.1 Security Dongle Using SafeGuard-IT

SafeGuard-IT is an ActiveX control for Windows which works with the FTDI\_USB\_KEY to provide security dongle functionality. The SafeGuard-IT component works by exploiting the FTDIChip-ID™ feature of the FT232R within the FTDI-USB-KEY together with an asymmetric public-private key encryption scheme.

The SafeGuard-IT security scheme works as follows:

1. Generate a public-private key pair using the SafeGuard-IT ActiveX control. These keys should be saved to files.
2. Encrypt the FTDIChip-ID using the private key and an optional password. This encrypted information is then stored in the FTDI\_USB\_KEY.
3. Distribute the programmed FTDI\_USB\_KEY with the application software. The SafeGuard-IT DLL file and the public key are also required by the application software.
4. When the application software is loaded, it can use the SafeGuard-IT control to verify that the required FTDI\_USB\_KEY device is connected to the client PC. This can be used to prevent software from running if a licensed dongle is not connected.

The SafeGuard-IT ActiveX control and SafeGuard-IT.dll are available free from the FTDI website <http://www.ftdichip.com/Projects/SafeGuard-IT/SafeGuard-IT.zip>

## 4 Mechanical Dimensions

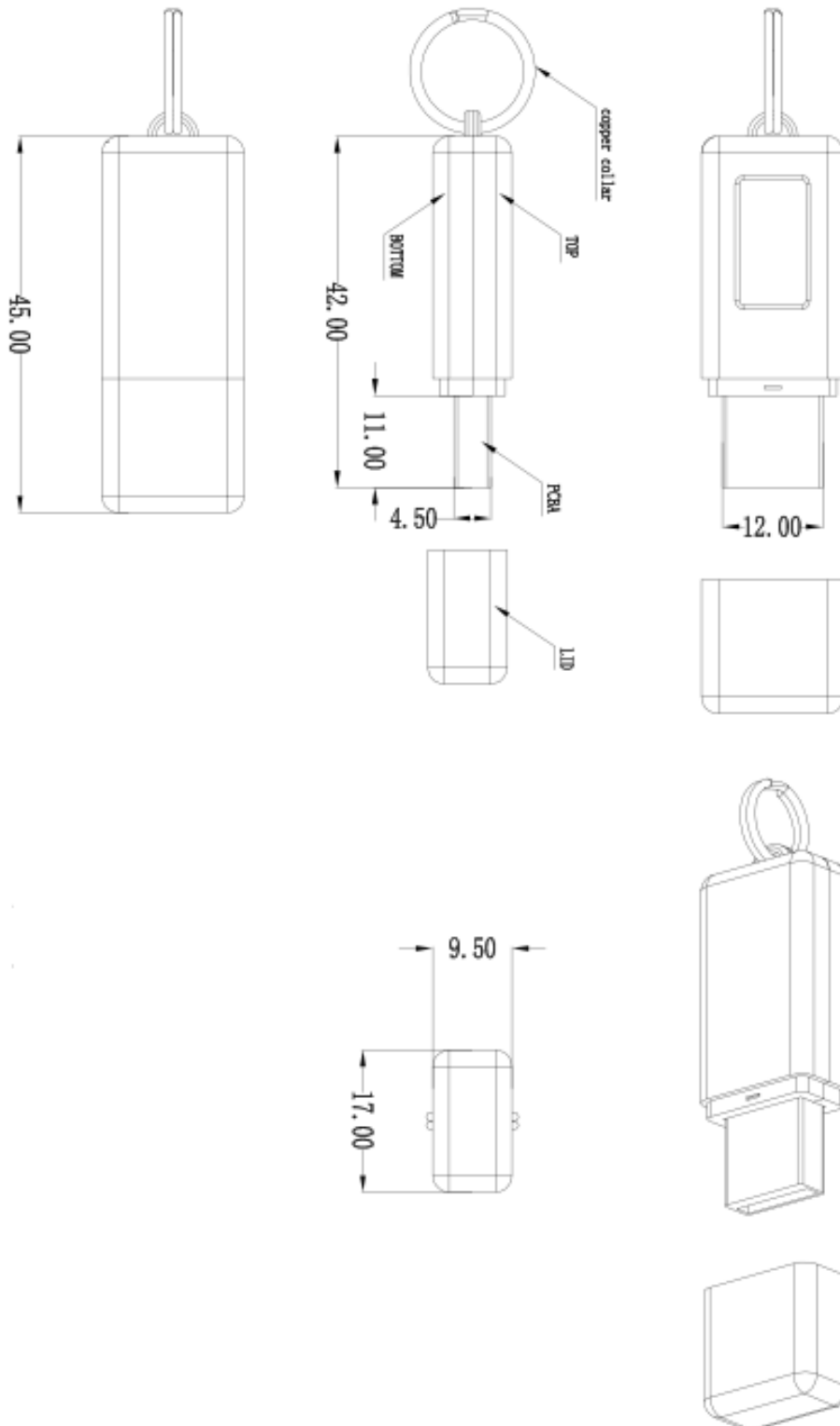


Figure 4.1 USB Key Dimensions

## **5 Contact Information**

### **Head Office – Glasgow, UK**

Future Technology Devices International Limited  
373 Scotland Street  
Glasgow G5 8QB  
United Kingdom  
Tel: +44 (0) 141 429 2777  
Fax: +44 (0) 141 429 2758

E-mail (Sales) [sales@ftdichip.com](mailto:sales@ftdichip.com)  
E-mail (Support) [support@ftdichip.com](mailto:support@ftdichip.com)  
E-mail (General Enquiries) [admin1@ftdichip.com](mailto:admin1@ftdichip.com)  
Web Site URL <http://www.ftdichip.com>  
Web Shop URL <http://apple.clickandbuild.com/cnb/shop/ftdichip>

### **Branch Office – Taipei, Taiwan**

Future Technology Devices International Limited (Taiwan)  
4F, No 18-3, Sec. 6 Mincyuan East Road  
Neihu District  
Taipei 114  
Taiwan, R.O.C.  
Tel: +886 (0) 2 8791 3570  
Fax: +886 (0) 2 8791 3576

E-mail (Sales) [tw.sales1@ftdichip.com](mailto:tw.sales1@ftdichip.com)  
E-mail (Support) [tw.support1@ftdichip.com](mailto:tw.support1@ftdichip.com)  
E-mail (General Enquiries) [tw.admin1@ftdichip.com](mailto:tw.admin1@ftdichip.com)  
Web Site URL <http://www.ftdichip.com>

### **Branch Office – Hillsboro, Oregon, USA**

Future Technology Devices International Limited (USA)  
7235 NW Evergreen Parkway, Suite 600  
Hillsboro, OR 97123-5803  
USA  
Tel: +1 (503) 547 0988  
Fax: +1 (503) 547 0987

E-Mail (Sales) [us.sales@ftdichip.com](mailto:us.sales@ftdichip.com)  
E-Mail (Support) [us.admin@ftdichip.com](mailto:us.admin@ftdichip.com)  
Web Site URL <http://www.ftdichip.com>

### **Distributor and Sales Representatives**

Please visit the Sales Network page of the FTDI Web site for the contact details of our distributor(s) and sales representative(s) in your country.



## Appendix A – FTDI USB Key FT232R EEPROM Configuration

This FT232R device within the FTDI\_USB\_KEY contains an EEPROM which contains the USB configuration descriptors for that device. When the FTDI\_USB\_KEY is plugged into a PC or a USB reset is performed, the PC will read these descriptors. The default values stored into the internal EEPROM are defined in Table 5.1

| Parameter                         | Value        | Notes                                                                                                                                                                   |
|-----------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USB Vendor ID (VID)               | 0403h        | FTDI default VID (hex)                                                                                                                                                  |
| USB Product ID (PID)              | 6001h        | FTDI default PID (hex)                                                                                                                                                  |
| Serial Number Enabled?            | Yes          |                                                                                                                                                                         |
| Serial Number                     | See Note     | A unique serial number is generated and programmed into the EEPROM during device final test.                                                                            |
| Pull down I/O Pins in USB Suspend | Disabled     | Enabling this option will make the device pull down on the UART interface lines when the power is shut off (PWREN# is high).                                            |
| Manufacturer Name                 | FTDI         |                                                                                                                                                                         |
| Product Description               | FTDI USB-KEY |                                                                                                                                                                         |
| Max Bus Power Current             | 90mA         |                                                                                                                                                                         |
| Power Source                      | Bus Powered  |                                                                                                                                                                         |
| Device Type                       | FT232R       |                                                                                                                                                                         |
| USB Version                       | 0200         | Returns USB 2.0 device description to the host.<br><br>Note: The device is be a USB 2.0 Full Speed device (12Mb/s) as opposed to a USB 2.0 High Speed device (480Mb/s). |
| Remote Wake Up                    | Disabled     | Taking RI# low will wake up the USB host controller from suspend.                                                                                                       |
| High Current I/Os                 | Disabled     | Enables the high drive level on the UART and CBUS I/O pins.                                                                                                             |
| Load VCP Driver                   | Enabled      | Makes the device load the VCP driver interface for the device.                                                                                                          |
| Invert TXD                        | Disabled     | Signal on this pin becomes TXD# if enable.                                                                                                                              |
| Invert RXD                        | Disabled     | Signal on this pin becomes RXD# if enable.                                                                                                                              |
| Invert RTS#                       | Disabled     | Signal on this pin becomes RTS if enable.                                                                                                                               |
| Invert CTS#                       | Disabled     | Signal on this pin becomes CTS if enable.                                                                                                                               |

**Table 5.1 Default Internal EEPROM Configuration**

The internal EEPROM in the FT232R can be re-programmed over USB using the utility program MPROG. MPROG can be downloaded from the [www.ftdichip.com](http://www.ftdichip.com). Version 2.8a or later is required for the FT232R chip. Users who do not have their own USB Vendor ID but who would like to use a unique Product ID in their design can apply to FTDI for a free block of unique PIDs. Contact FTDI support for this service.



---

## Appendix B – Revision History

Version 1.00 Initial Datasheet Release

July 2008



**Стандарт  
Электрон  
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331