



**Future Technology Devices  
International Ltd.**

**AN232R-02 FTDIChip-ID™ for the  
FT232R and FT245R**

# **1 FTDIChip-ID for the FT232R and FT245R**

## **1.1 Overview**

Each FT232R USB UART IC and FT245R USB FIFO IC has a unique identification number burnt into it during manufacture, the FTDIChip-ID™.

The FTDIChip-ID™ is readable over USB, but cannot be altered by the end user. This feature provides a way of tying application software to a specific device with a high level of security.

The FTDIChip-ID™ feature can be used without affecting any of the other device features.

## 1.2 Using the FTDlChip-ID

The FTDlChip-ID™ is readable over USB, but cannot be modified. To read the device FTDlChip-ID™, the D2XX drivers need to be installed and a separate DLL to read the FTDlChip-ID™ is also required. This will read the unique FTDlChip-ID™ from the device and allow application software to check the hardware identity.

Further to using the FTDlChip-ID™ directly to tie hardware to application software, the FTDlChip-ID™ can be encrypted and then stored in the user area of the FT232R or FT245R device. The data stored in the integrated EEPROM user area can contain information in addition to the FTDlChip-ID™, such as date and time information or the name of the person the device is registered to. The EEPROM user area is accessible using the D2XX EEPROM user area functions FT\_EE\_UASize, FT\_EE\_UAWrite and FT\_EE\_UARead.

For example, the FTDlChip-ID™ can be read using a DLL and then combined with a date and time, perhaps to represent a registration date or licence expiration date. All of this information can then be encrypted and stored in the EEPROM user area. Application software can then decrypt this information to determine the date stored in the EEPROM and can compare the decrypted FTDlChip-ID™ with the unchangeable FTDlChip-ID™ to confirm that the EEPROM user area has not been modified by an end user.

## 1.3 Considerations

### **EEPROM User Area Size**

The integrated EEPROM is 1024 bits (128 bytes) in size. The size of the EEPROM user area available is determined by the length of the serial number and description strings programmed into the EEPROM. If these strings are long, there may not be enough user area available to store the encrypted data required. The D2XX function FT\_EE\_UASize returns the size of the user area in bytes and can be used to verify the required space is available before attempting to write data to the EEPROM.

### **Strong Encryption Method**

In order to maintain security, a strong encryption method should be implemented. There are many standard encryption routines (DES, 3DES, AES, Blowfish and many more) that may be used, or a unique encryption method may be chosen. A strong encryption key should also be chosen to maximise security.

## 1.4 FT232R/FT245R Web Registration Example

To demonstrate a possible use of the FTDIDChip-ID™ feature, FTDI have made an example available. This example consists of two applications, a server side application and a client application. The server side application is not available as an example, only the client application is distributed. The server maintains a list of all the registered devices and performs part of the data encryption. The client application handles the device EEPROM interfacing and part of the encryption.

In the case of this example, the FTDIDChip-ID™ is encrypted 3 times to maintain security at each phase of the registration process. The sequence is as follows:

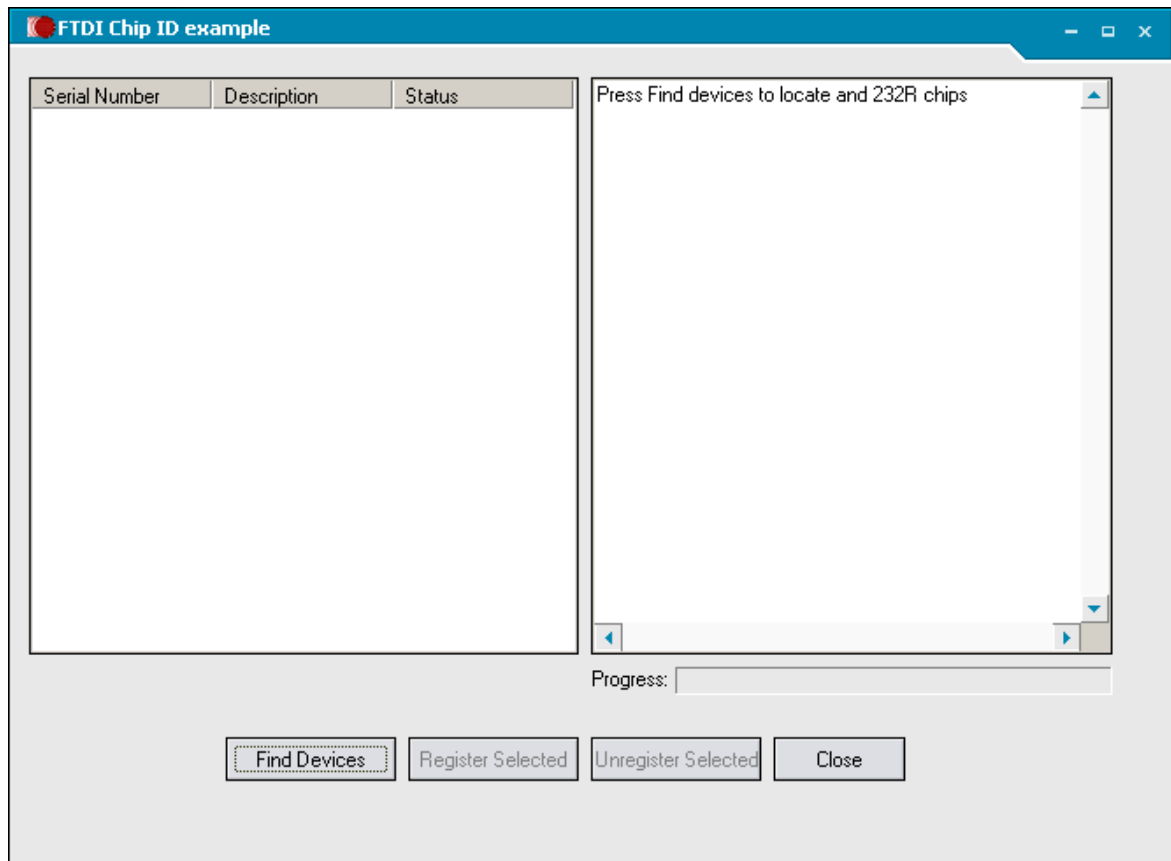
- Extract FTDIDChip-ID™ and obtain a date and time stamp from the server, encrypt it and then send it to the server
- Encrypt a second time and send back to the client application
- Encrypt the data returned from the server again and program the resulting data into the FT232R/FT245R EEPROM user area

To verify the device is registered, the client application decrypts the data from the EEPROM user area and compares the extracted FTDIDChip-ID™ with the protected FTDIDChip-ID™. If they do not match the device is recognised as not registered.

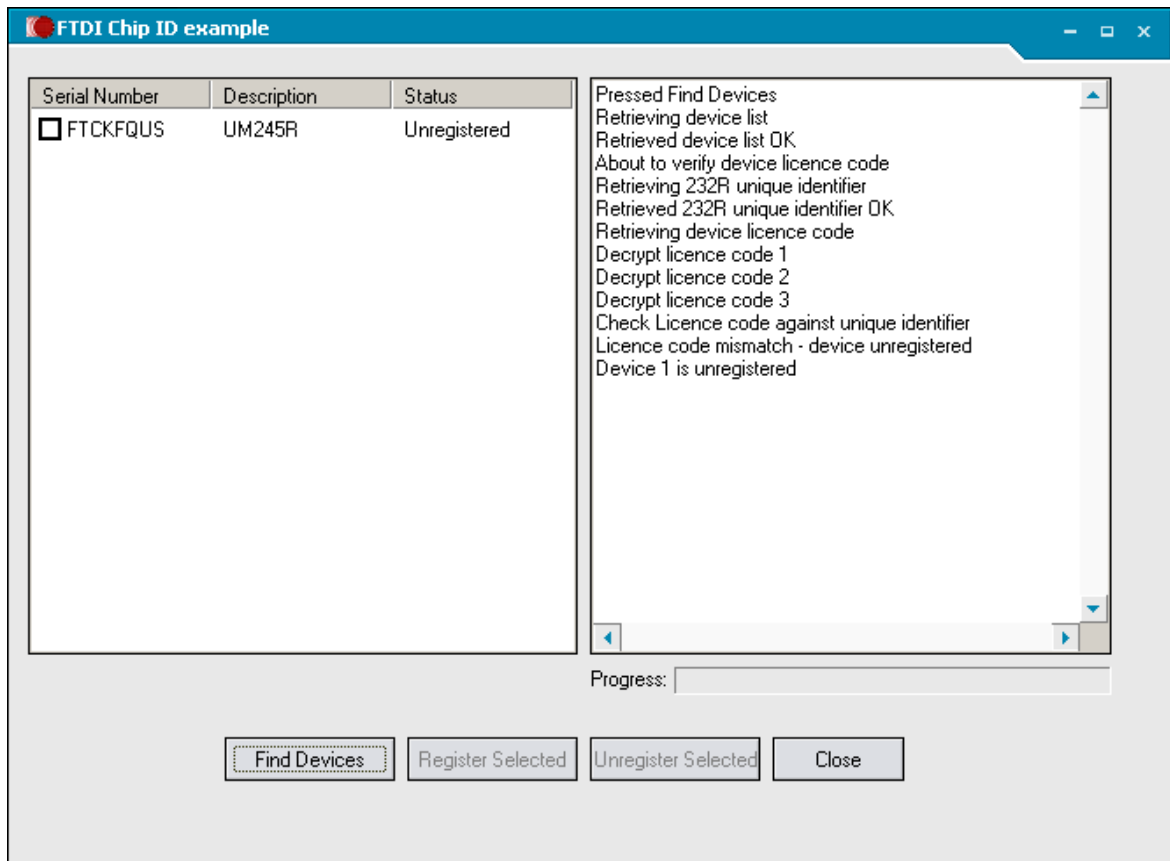
Please note that the D2XX drivers must be installed on the client PC before this example will work.

The process of registering a device using the example is as follows:

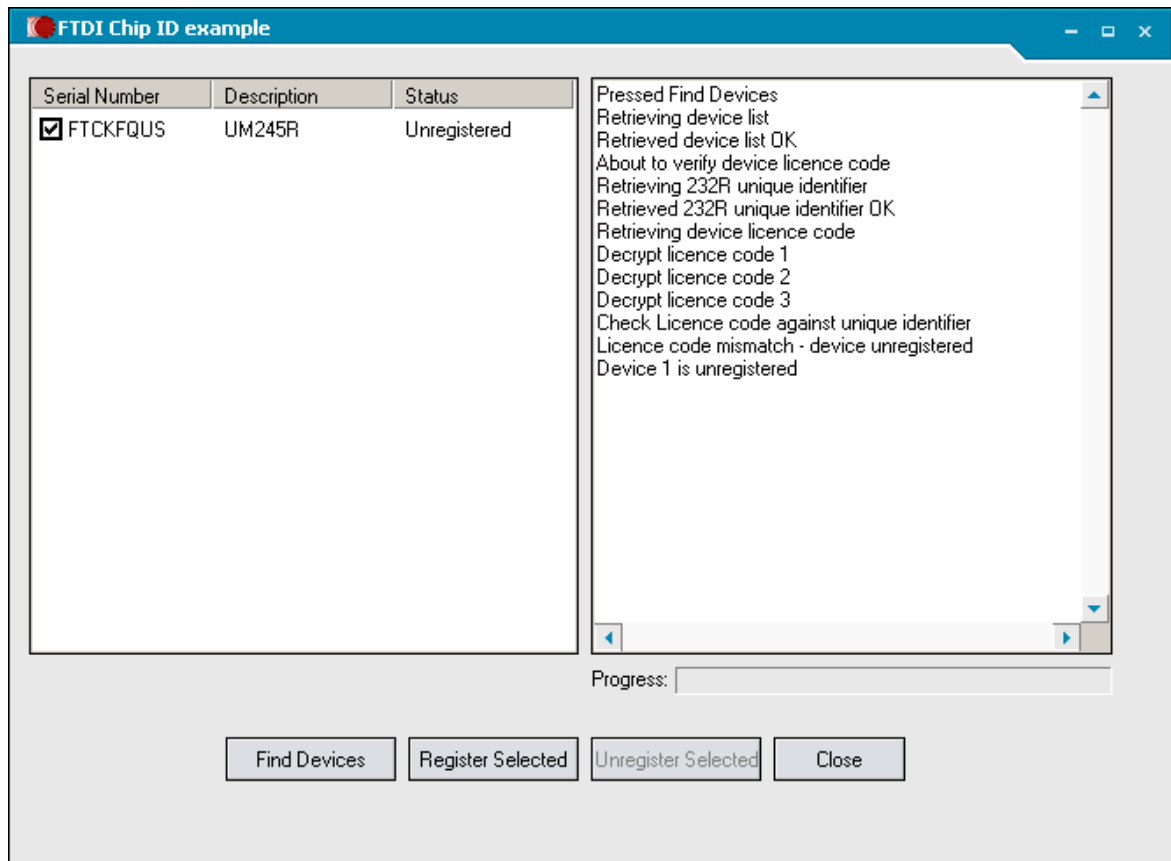
- Launch the FTDIDChip-ID™ example client application.



- Click Find Devices to list all FT232R and FT245R devices connected to the client PC. The screen below shows one device connected and it is unregistered.



- To proceed with registering the device, check the box next to the device serial number, then click Register.



- The user is then prompted with a dialog box to provide registration details. These details are held in a database on the server along with the device FTDIChip-ID™.

Register

Salutation: Mr. ▼

First Name:

Last Name:

Organisation:

Work Phone:

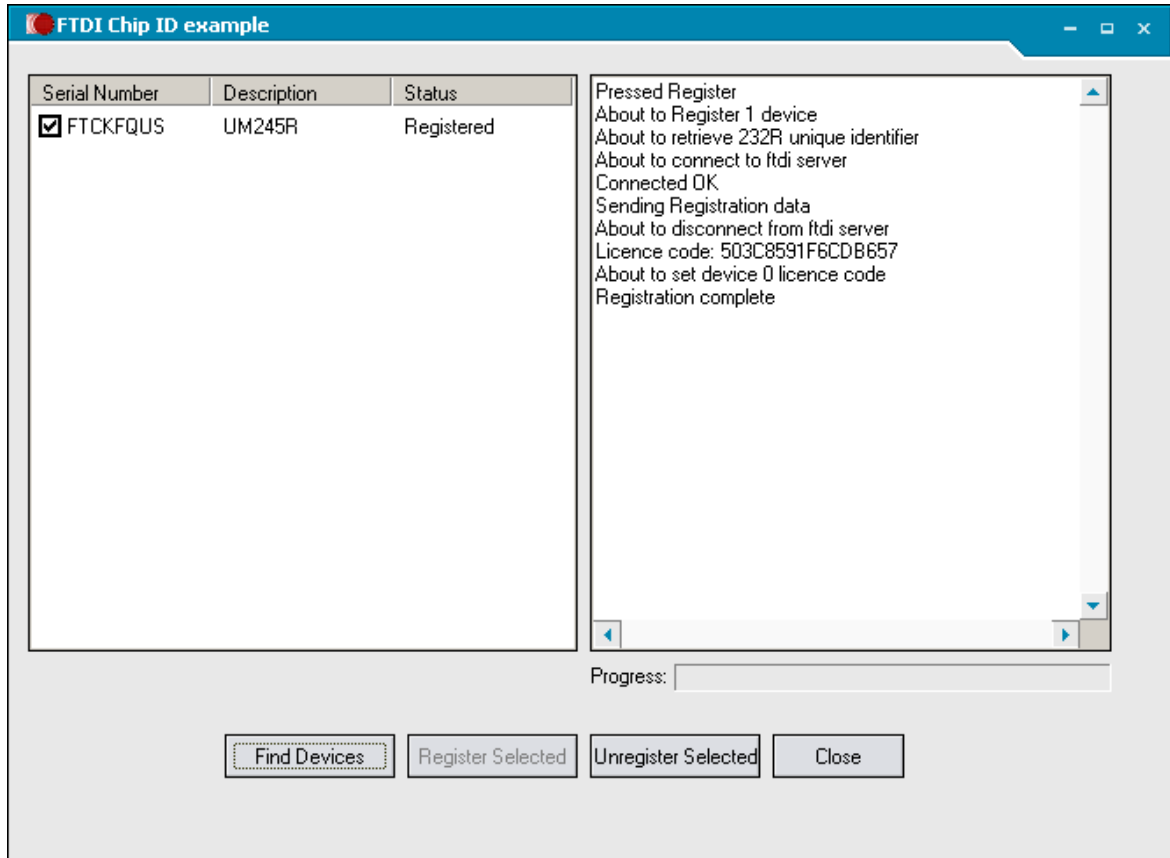
Email Address:

URL:

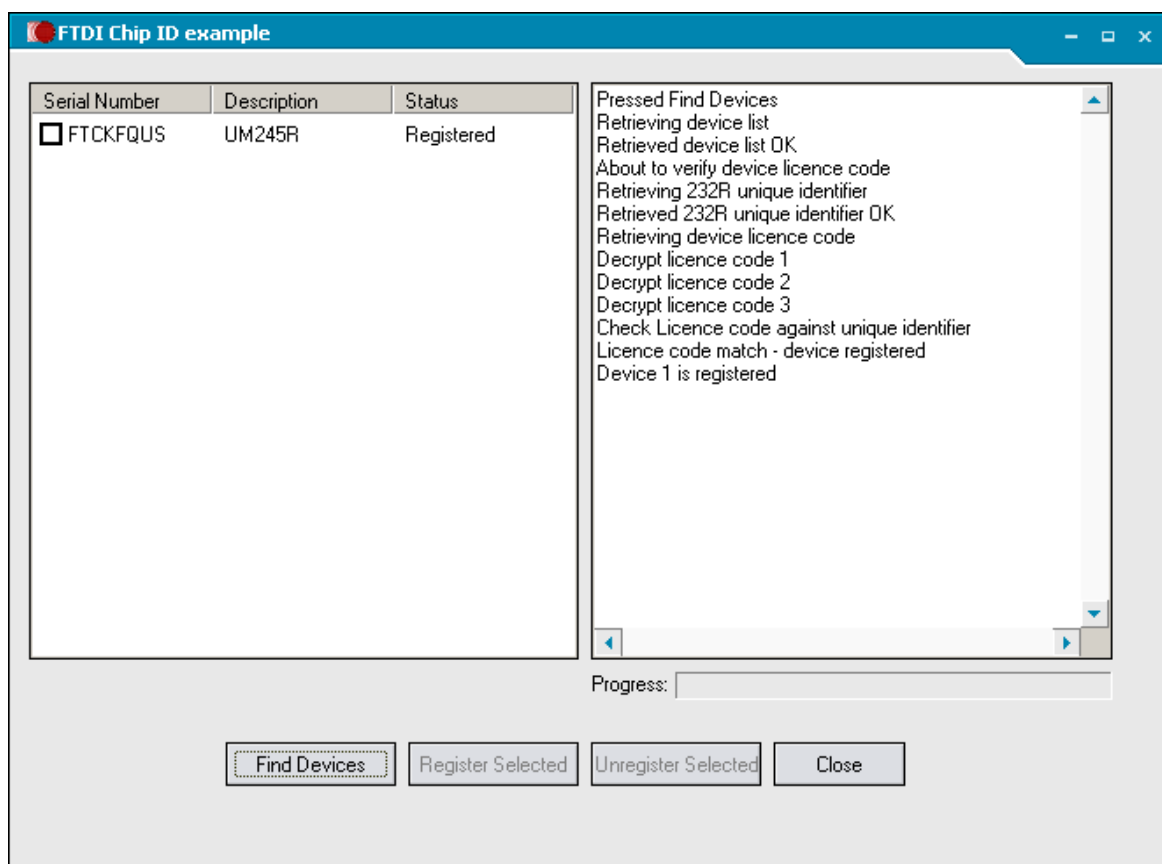
Cancel Register Details



- Clicking Register Details, the client application obtains a time and date stamp from the server which is combined with the FTDICHip-ID™, then encrypted and sent to the server. The server stores the registration details, encrypts the registration data again and returns the data to the client application. The client application then encrypts the data a third time and programs the resulting data into the EEPROM user area. This completes the device registration.



- Closing then reopening the application and pressing Find Devices, the device is found and recognised as a registered device. The device can be unregistered at any time by clicking the check box next to the registered device serial number and then clicking Unregister. If the portion of the device user area holding the encrypted data is altered, the decrypted FTDICHip-ID™ will not match the protected FTDICHip-ID™. If they do not match the device is recognised as not registered.



## 1.5 References

[FT232R Datasheet](#)  
[FT245R Datasheet](#)  
[FTDIChip-ID Examples](#)

## **2 History, Disclaimer, Contact**

### **2.1 Document Revision History**

**AN232R-02 Version 1.0** - Initial document created December 2005.

## 2.2 Disclaimer

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## 2.3 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): [sales1@ftdichip.com](mailto:sales1@ftdichip.com)  
E-Mail (Support): [support2@ftdichip.com](mailto:support2@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 - Taiwan**

Future Technology Devices International Limited (Taiwan)  
4F, No 16-1, Sec. 6 Mincyuan East Road  
Neihu District  
Taipei 114  
Taiwan  
ROC  
Tel: +886 2 8791 3570  
Fax: +886 2 8791 3576

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

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

Future Technology Devices International Limited (USA)  
5285 NE Elam Young Parkway  
Suite B800  
Hillsboro, OR 97124-6499  
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.support@ftdichip.com](mailto:us.support@ftdichip.com)  
E-Mail (General Enquiries): [us.admin@ftdichip.com](mailto:us.admin@ftdichip.com)  
Web Site URL: <http://www.ftdichip.com>

### **Agents and Sales Representatives**

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