



Future Technology Devices International Ltd.

Application Note AN_127

User Guide For FT2232H/D Factory Test Utility

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This application note explains how to use the FT2232H/D factory test utility, FT2232_UART, which provides a user interface to program and test the FTDI FT2232H/D devices.

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1 Introduction

The FT2232_UART program is intended for use in a FT2232D/H manufacturing test environment. It has a single button user interface and returns a simple pass or fail for USB - RS232 designs. The executable version is hard-coded for use with the default VID and PID. The FT2232H/D default VID/PID is 0403/6010. The source code for this program is provided on the FTDI website at the [C# Builder examples](#) page and can be built by VC# 2008. The test program also requires a special cable to operate correctly.

The features of FT2232_UART are:

1. Auto-detect FT2232D and FT2232H
2. Support two testing methods: normal test (uses a RS232 Null Modem cable) and special test (uses a custom cable) to check RI/DCD Pins
3. Selection of test only or programming and testing.
4. Repeat test feature.

The FT2232_UART utility is available as a free download from the FTDI [Utilities](#) page of the [FTDI website](#).

2 Hardware Configuration

EEPROM Configuration:

The FTDI FT2232H/D devices require an external 93C46 EEPROMs organized in 16-bit words. They also support the 93C56 and 93C66 EEPROMs organized in 16-bit words.

CABLE Configuration:

This utility supports two testing methods. Both require a cable to be manufactured. Users require selecting one test method and manufacturing the appropriate cable. The following details the DB9 female connections for this cable:

1. Normal testing cable (RS232 Null cable):

DB9 female_1 Pin 3 (TXD) to DB9 female_2 Pin 2 (RXD)
DB9 female_1 Pin 2 (RXD) to DB9 female_2 Pin 3 (TXD)
DB9 female_1 Pin 7 (RTS) to DB9 female_2 Pin 8 (CTS)
DB9 female_1 Pin 8 (CTS) to DB9 female_2 Pin 7 (RTS)
DB9 female_1 Pin 6 (DSR) to DB9 female_2 Pin 4 (DTR)
DB9 female_1 Pin 5 (GND) to DB9 female_2 Pin 5 (GND)
DB9 female_1 Pin 4 (DTR) to DB9 female_2 Pin 6 (DSR)

2. Special testing cable:

DB9 female_1 Pin 3 (TXD) to DB9 female_2 Pin 2 (RXD)
DB9 female_1 Pin 2 (RXD) to DB9 female_2 Pin 3 (TXD)
DB9 female_1 Pin 7 (RTS) to DB9 female_2 Pin 8 (CTS)
DB9 female_1 Pin 8 (CTS) to DB9 female_2 Pin 7 (RTS)
DB9 female_1 Pin 6 (DSR) to DB9 female_2 Pin 4 (DTR)
DB9 female_1 Pin 5 (GND) to DB9 female_2 Pin 5 (GND)
DB9 female_1 Pin 4 (DTR) to DB9 female_2 Pin 6 (DSR)
DB9 female_1 Pin 1(DCD) short to DB9 female_1 Pin 6(DSR) and Pin 9 (RI)
DB9 female_2 Pin 1(DCD) short to DB9 female_2 Pin 6(DSR) and Pin 9 (RI)

Device connection configuration:

Connect the device under test to a PC using a USB cable. Then, depending on the selected test method, connect the RS232 null cable or special cable to the COM port used for testing. This connection is shown in the following diagram

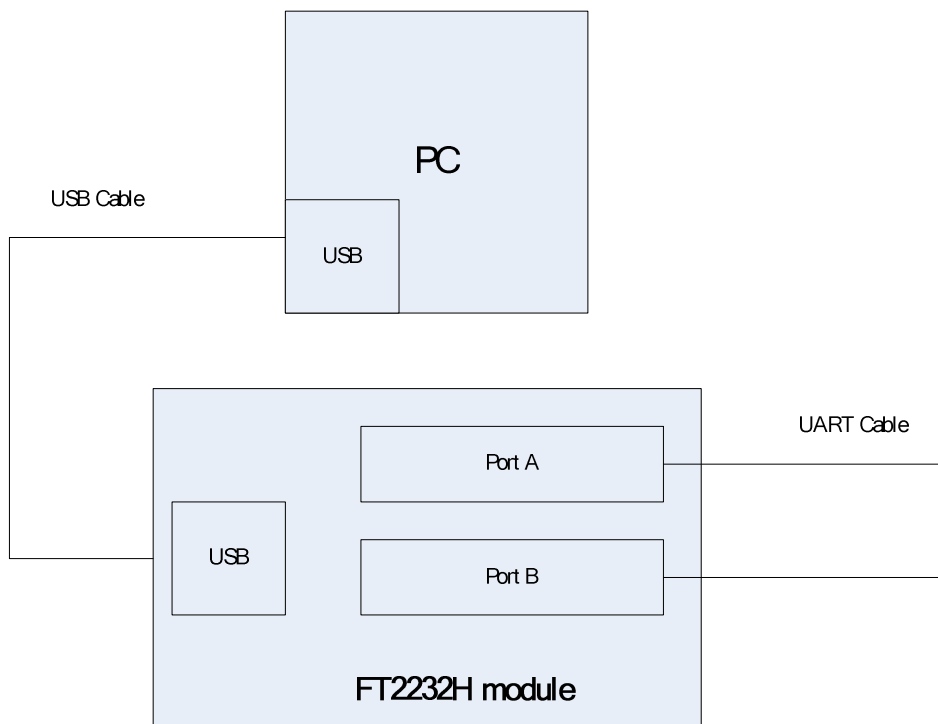


Figure 2-1 Connection configuration of Device Under Test

3 Utility Basics

When the FT2232_UART utility is run then the following screen appears:

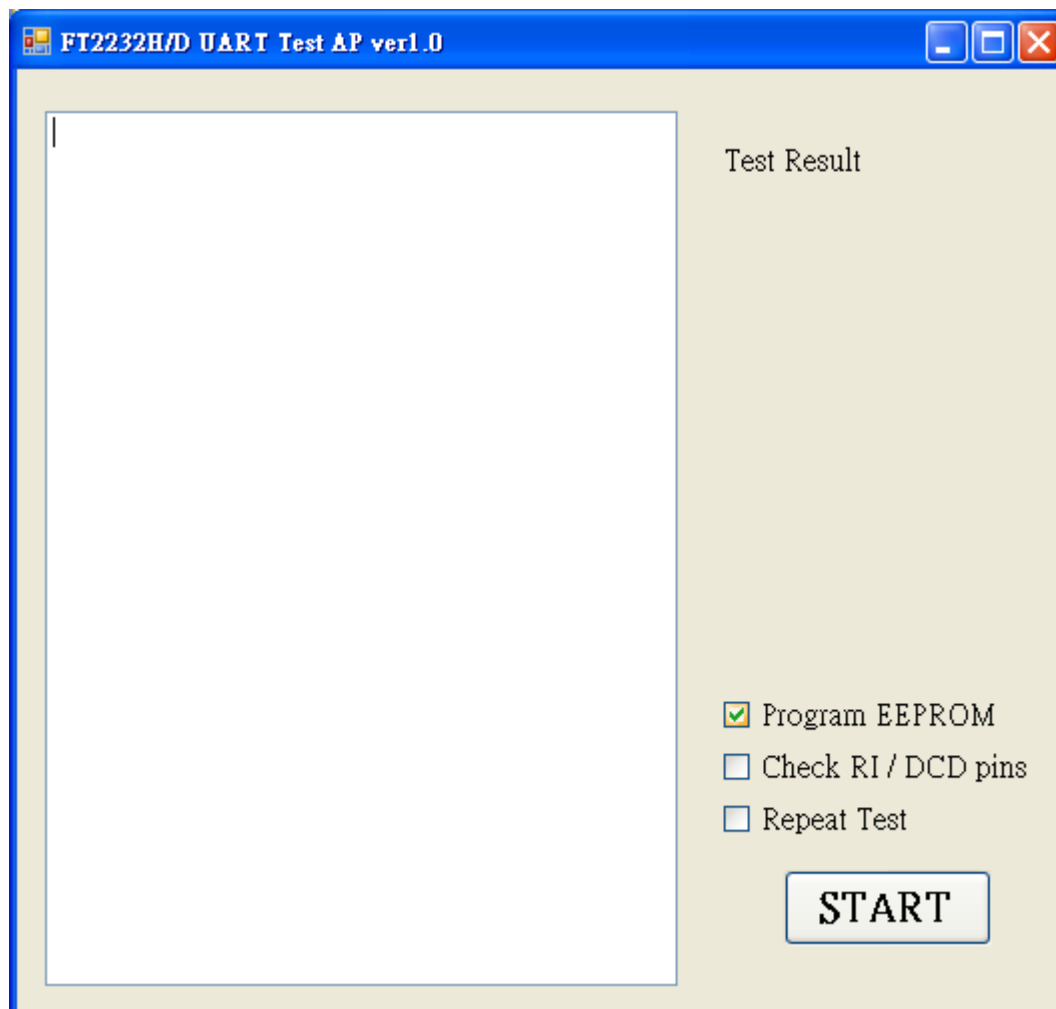


Figure 3-1 FT2232_UART Default GUI

The following sections explain the operation of the GUI shown above.

3.1 Operation

The FT2232_UART has three functions:

Program EEPROM: users can enable or disable the program EEPROM function.

The following table describes the functions of this button:

Program EEPROM Test	Description of operation
Selected(default)	Update Default data to EEPROM
not selected	Do not update EEPROM

Table 3.1 EEPROM Data Selection switch

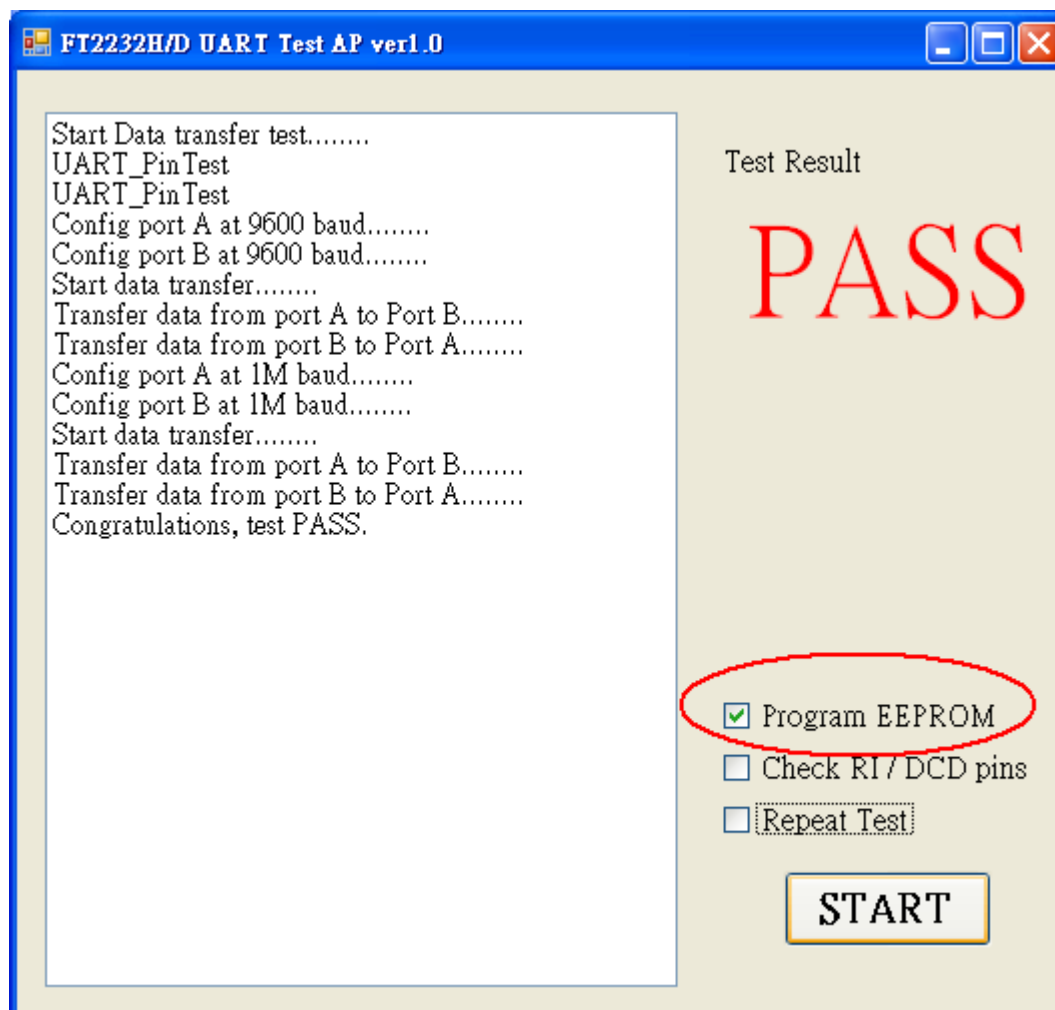


Figure 3-2 enable Program EEPROM

If "Program EEPROM" is not selected, then the RS232 function only is tested.

Check RI/DCD pins:

The default is that this is disabled. This means the utility is set to normal test mode. If enabled then this function puts the utility into a special test mode. This special test mode is a full test of all signals.

This function can be enabled/disabled using the "Check RI/DCD Pins" to change the testing methods

Check RI/DCD Pins	Description
not selected(default)	The utility is set to normal mode. Please use the RS232 null cable for testing
selected	The utility is set to special test mode. Please use the special cable for testing

Table 3.2 Test Method Selection switch

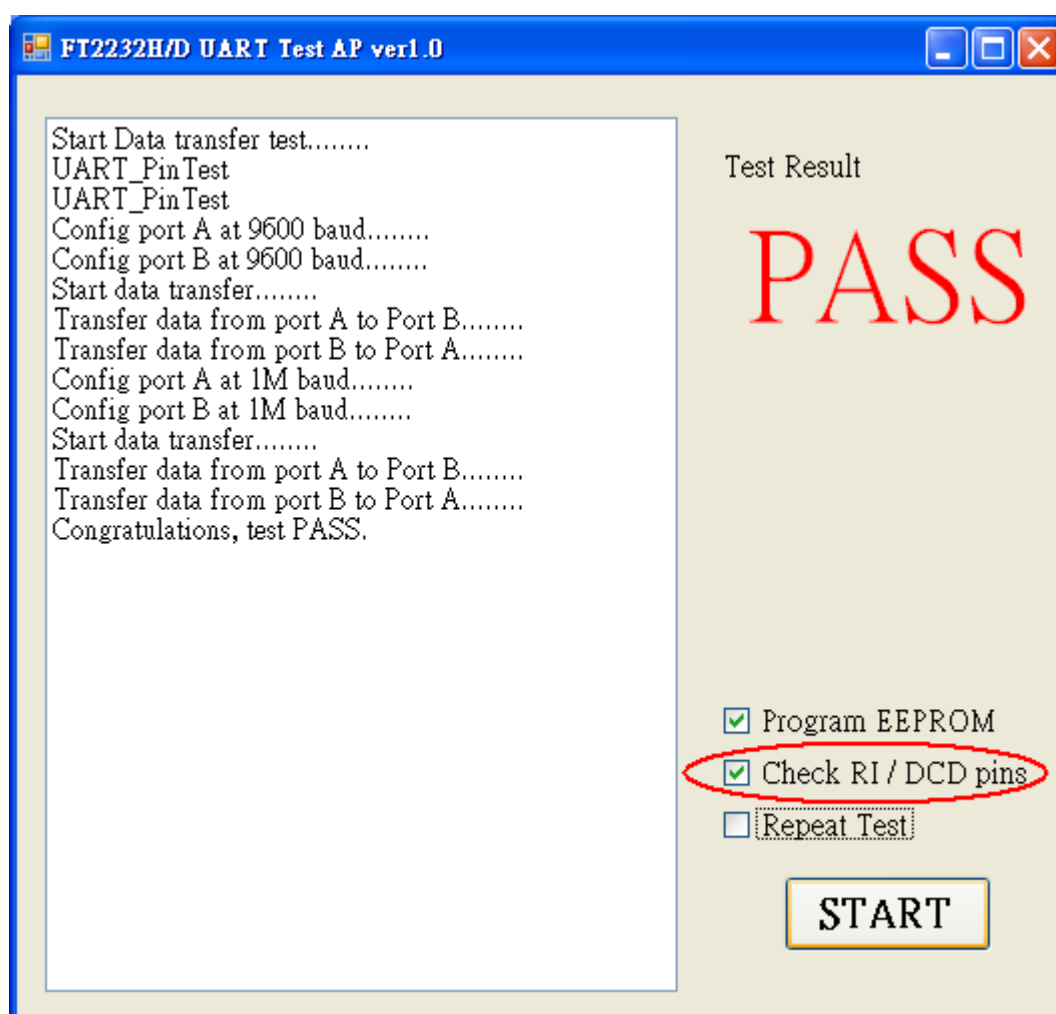


Figure 3-3 enable Check RI/DCD Pins

Repeat Test: if this function is enabled and "START" is pressed, then the utility will repeat the COM port data commutation testing. If this is not required then disable the "Repeat test" function.

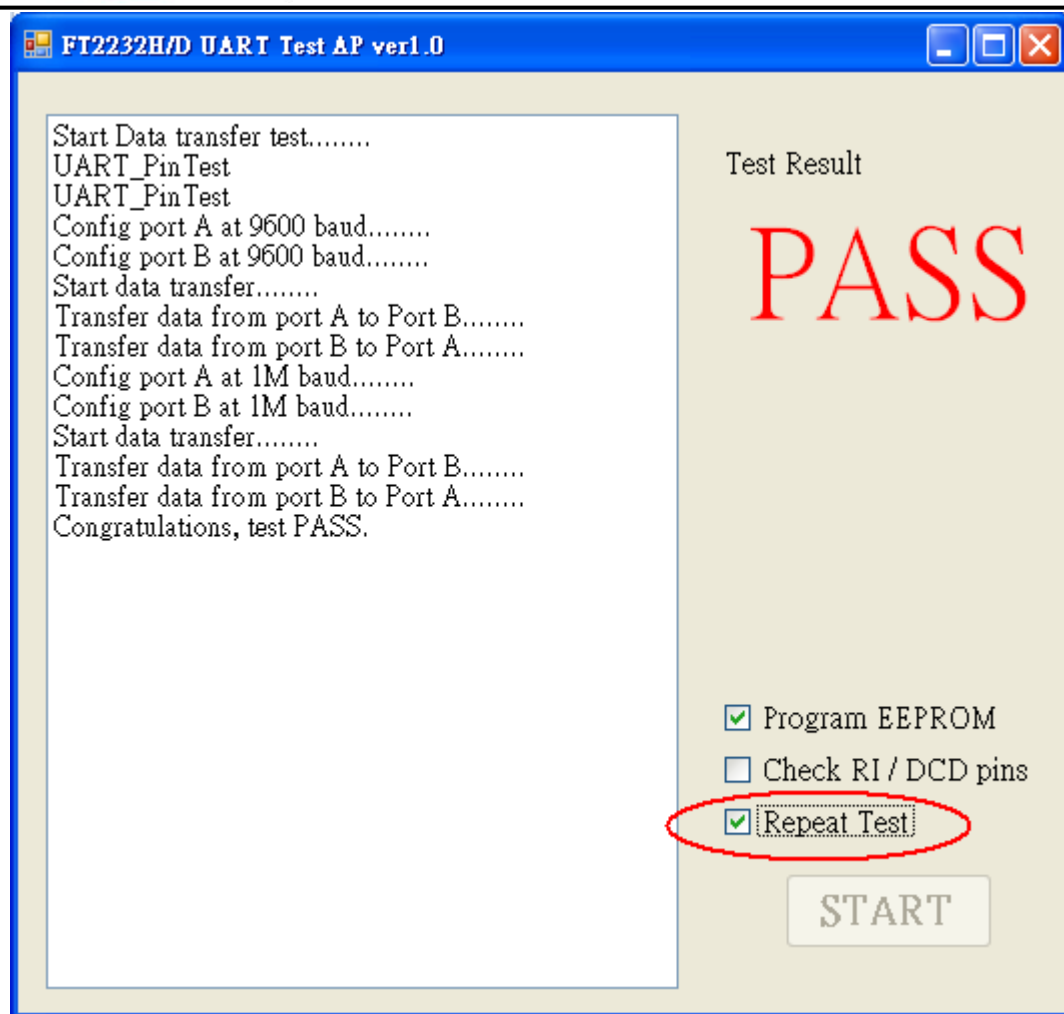


Figure 3-4 Enable Repeat test function

4 Device EEPROM Parameters

The source code for this utility is provided on the FTDI website at the [C# Builder examples](#) page and can be built by VC# 2008.

The subroutine WriteEEPROM() is available in file "Form1.cs". Its function is used to program the device external EEPROM.

The following sections explain which parameter can be modified using the file "Form1.cs".

4.1 Default EEPROM data

If the device is an FT2232D, the default settings are as below:

//the EEPROM parameters below can be modified in the file "Form1.cs".

```
ee2232D.Description = "FT2232D device";  
ee2232D.Manufacturer = "FTDI";  
ee2232D.ManufacturerID = "FT";  
ee2232D.MaxPower = 200;  
ee2232D.VendorID = 0x0403;  
ee2232D.ProductID = 0x6010;  
ee2232D.RemoteWakeup = false;  
ee2232D.SelfPowered = false;  
ee2232D.SerialNumber = "FT" + GenSerialNo();//the default serial number is general by  
current time
```

If the device is an FT2232H, the default settings are as below:

// the EEPROM parameters below can be modified in the file "Form1.cs".

```
ee2232h.Description = "FT2232H device";  
ee2232h.Manufacturer = "FTDI";  
ee2232h.ManufacturerID = "FT";  
ee2232h.MaxPower = 200;  
ee2232h.VendorID = 0x0403;
```



```
ee2232h.ProductID = 0x6010;
```

```
ee2232h.RemoteWakeup = false;
```

```
ee2232h.SelfPowered = false;
```

```
ee2232h.SerialNumber = "FT" + GenSerialNo();//the default serial number is general by  
current time
```

5 Definition of Error Messages

The following section shows some error messages which may be displayed if issues occur. It also indicates possible reasons for the failure to help with factory debugging.

- If the PC cannot detect FT2232H or FT2232D device, please check the device is connected to a PC and the [FTDI Driver](#) has been installed.

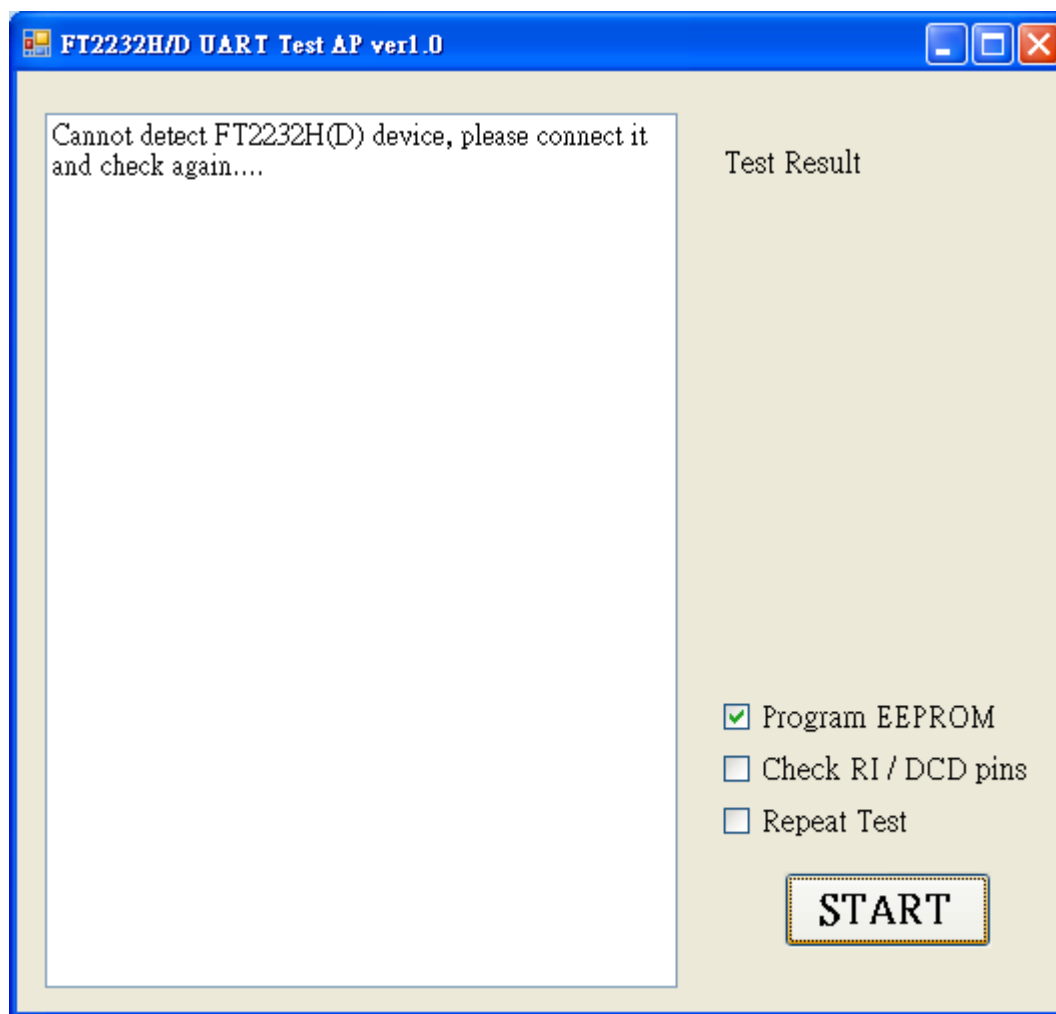


Figure 5-1 Failure message 1

- If the following message appears, then connect the device to a PC and wait the device to initialize, and press the "START" again.

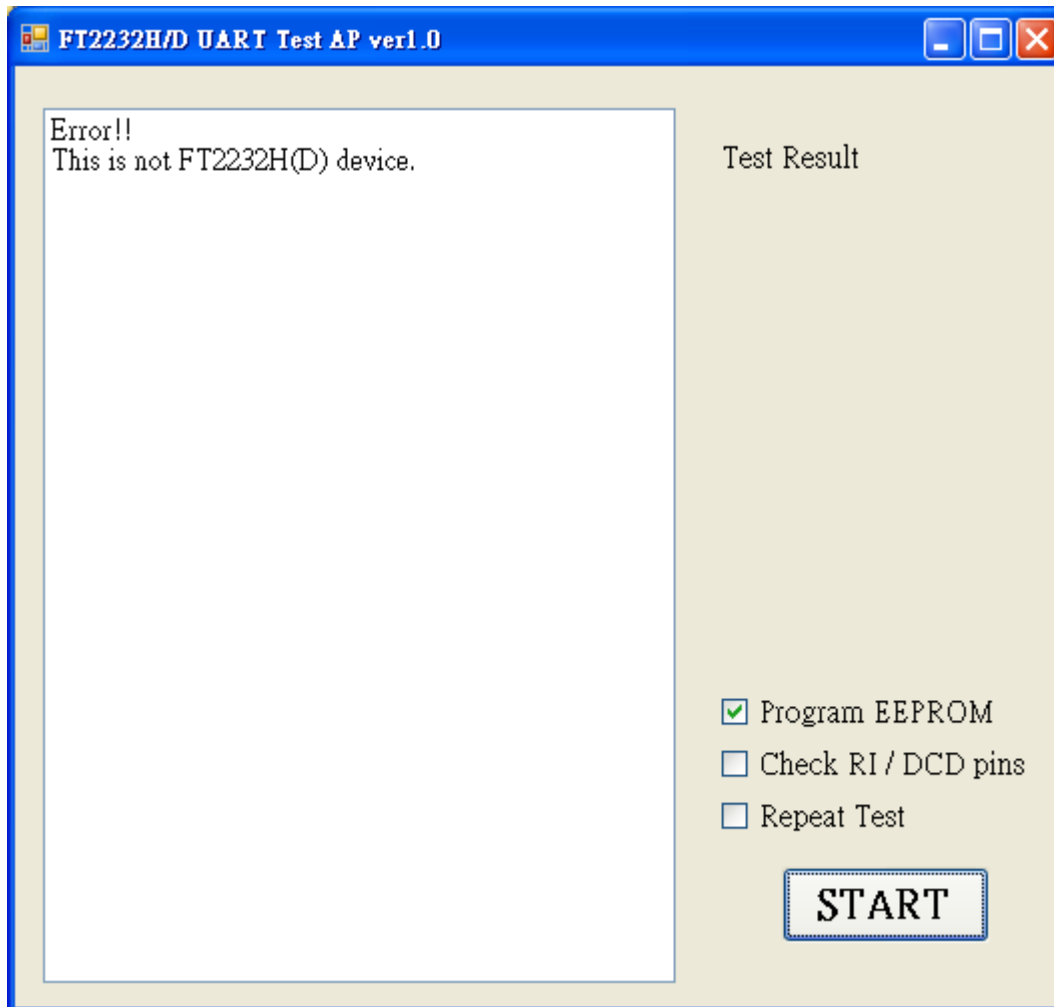


Figure 5-2 Failure message 2

- If the following message appears then check that the Null cable is connected correctly or check that the DSR signal schematic design under test.

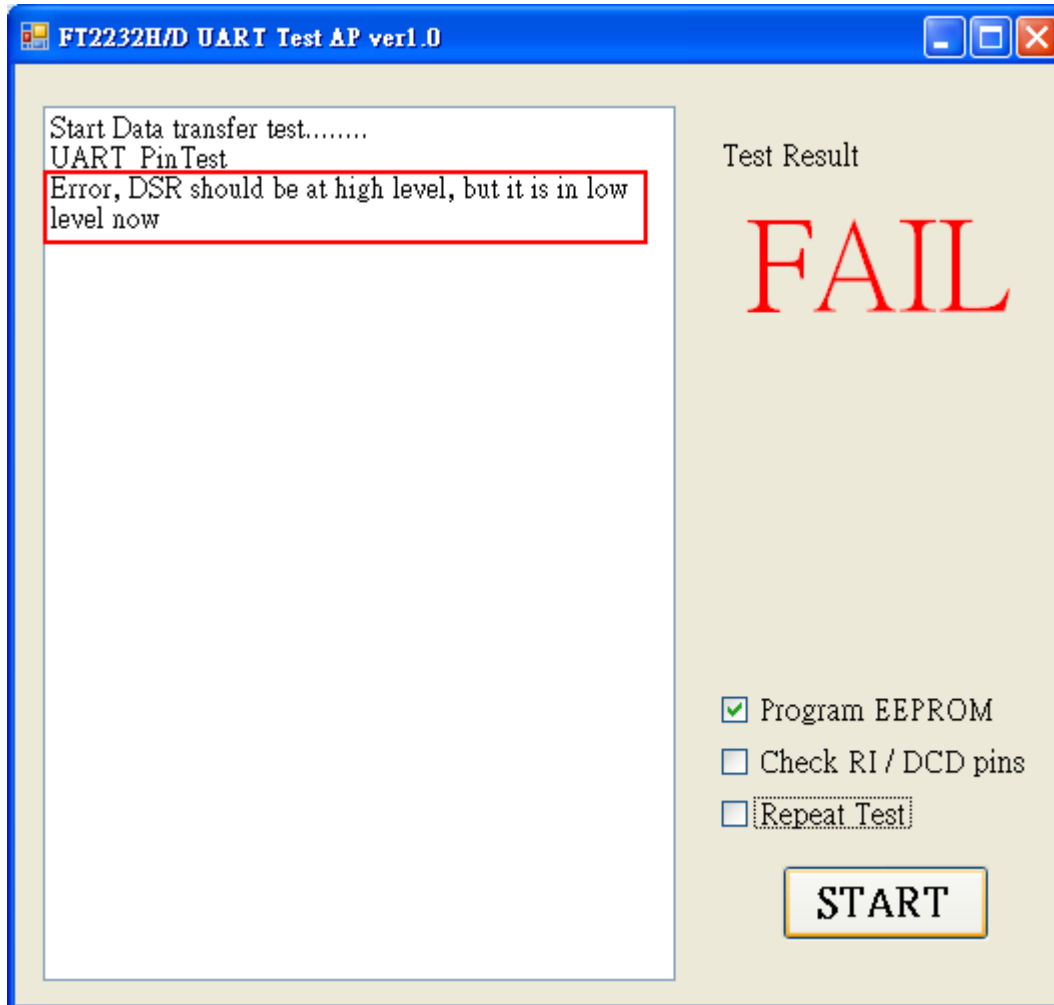


Figure 5-3 Failure message 3

- If the following message appears then check that the special cable is connected correctly or check the RI signal of the schematic design under test.

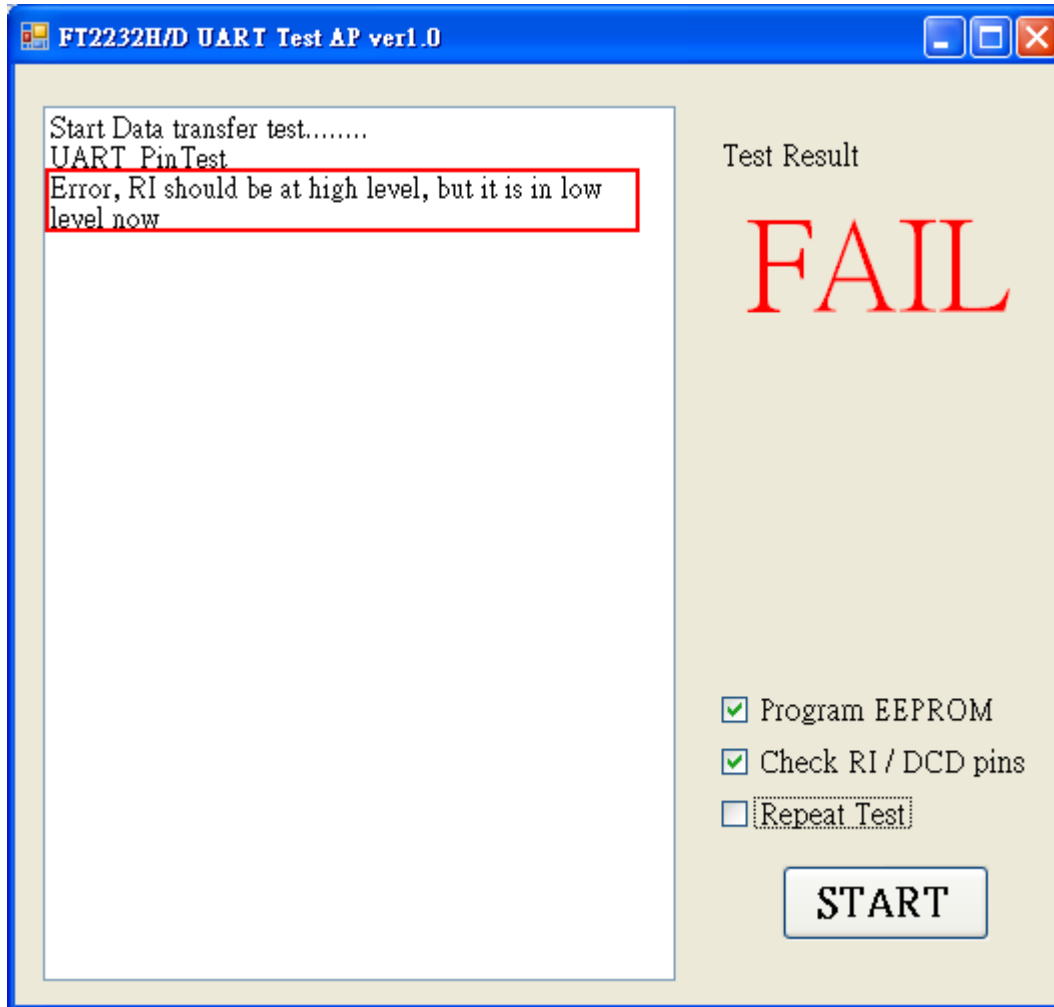


Figure 5-4 Failure message 4

- If the following message appears then check that the special cable is connected correctly or check the DCD signal of the schematic design under test.

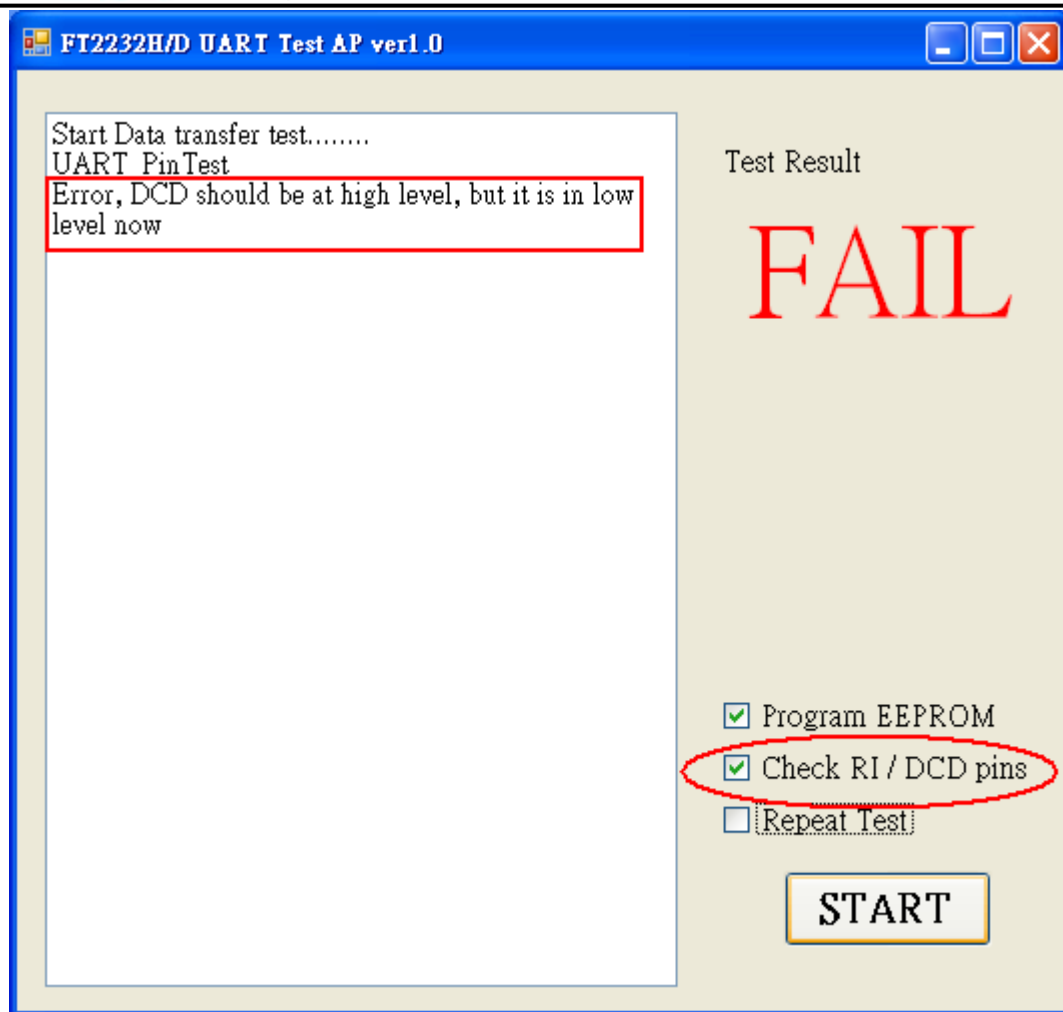


Figure 5-5 Failure message 5

- If the following message appears then go to <http://msdn.microsoft.com/en-us/netframework/default.aspx> to download the .NET Framework and install it.

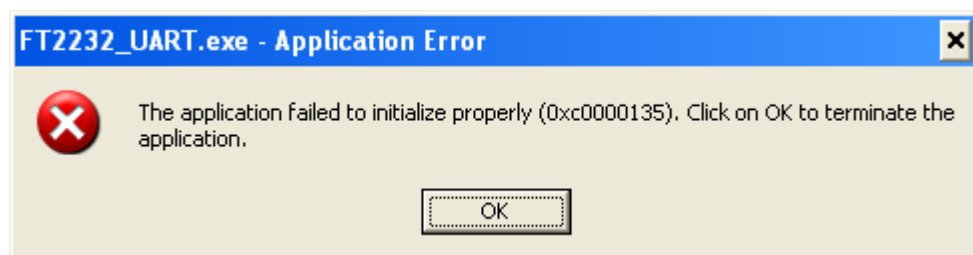


Figure 5-6 Failure message 6

6 Contact Information

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Appendix A - Revision History

Revision History

Version 1.0 First Release

20/10/2009