



Application Notes

AN_370

FT60X Configuration Programmer User Guide

Version 1.5

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This document provides a guide on how to use the FT60X Chip Configuration Programmer application for customizing the chip configuration.

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Table of Contents

1 Introduction	3
1.1 Overview	3
1.2 Prerequisite.....	3
2 User Interface	4
3 Chip Configuration Configurable	5
4 Chip Configuration Initialization Status	9
5 Contact Information	12
Appendix A – References	13
Document References	13
Acronyms and Abbreviations.....	13
Appendix B – List of Tables & Figures	14
List of Tables.....	14
List of Figures	14
Appendix C – Revision History	15

1 Introduction

This document explains how to use the FT60X Series Chip Configuration Programmer, a utility application for customizing the chip configuration.

1.1 Overview

The FT600 and FT601 are the first USB devices in a brand new SuperSpeed series from FTDI Chip. The devices provide a USB 3.0 SuperSpeed to FIFO Bridge, with up to 5Gbps of bandwidth. Delivering the option of 16 bit (FT600) and 32 bit (FT601) wide parallel FIFO interfaces; the FT60X series enables connectivity for numerous applications including high resolution cameras, displays, multifunction printers and much more.

During initialization, the FT60X devices read configuration data and initialize the system using these values. If the chip configuration data read is empty or invalid, the default chip configuration data will be used. The Chip Configuration Programmer application allows the user to get, set or update this chip configuration data.

1.2 Prerequisite

A PC running Windows 7 Operating System or greater is required.

The PC should also be installed with D3XX Direct Drivers. FT60X uses D3XX (FTDI's latest USB driver targeted for USB 3.0 SuperSpeed devices). They can be obtained here:

<http://www.ftdichip.com/Drivers/D3XX.htm>

The PC should also be installed with the Microsoft Visual C++ 2013 Redistributable (x86) package. Please use the following steps to install it:-

1. Go to <https://www.microsoft.com/en-us/download/details.aspx?id=40784>
2. Click '**Download**' button
3. Check the '**vc redistrib_x86.exe**' and click '**Next**'.
4. After download completes, run '**vc redistrib_x86.exe**' to install the package

2 User Interface

Below is a screenshot of the FT60X Chip Configuration Programmer application.

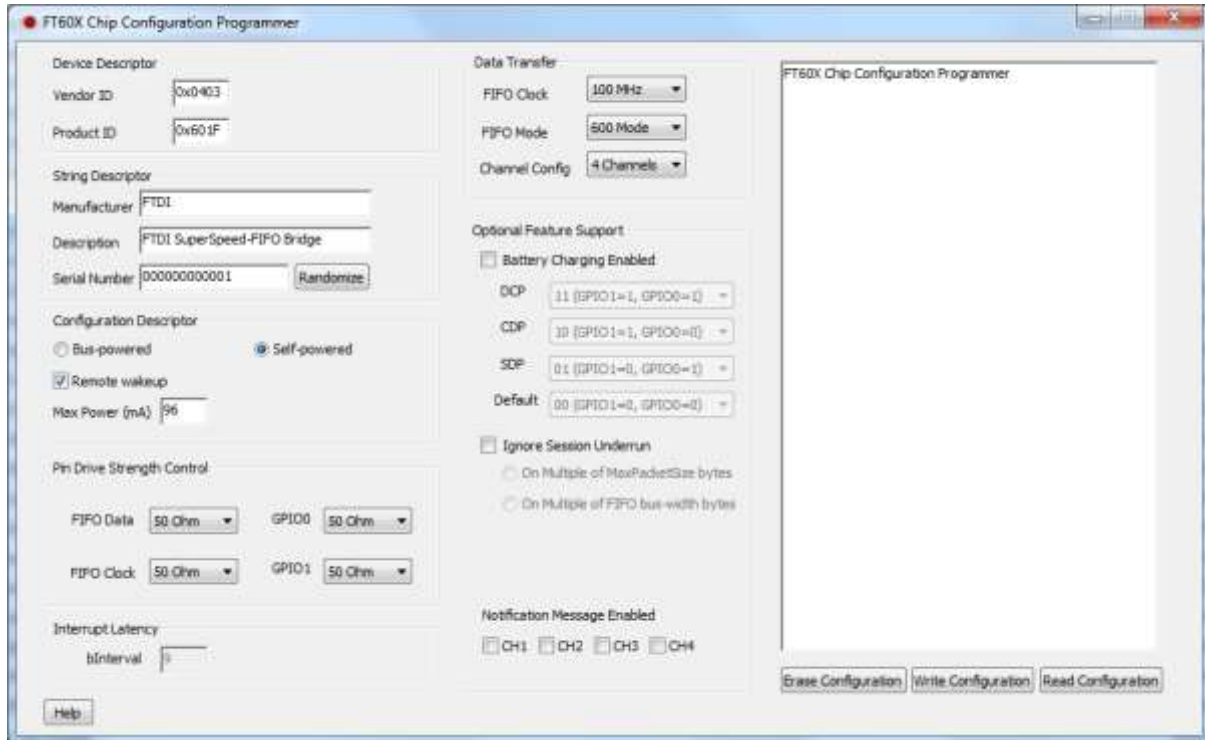


Figure 2.1 Application Screenshot

The application allows the user to reset/clear, write and read the device configuration.

Main Buttons	Description
Erase Configuration	Clicking this button will erase the custom configuration in the device. After erasing, the chip will automatically reset using its default configuration and the application template values will also change to reflect the configuration from the chip.
Write Configuration	Clicking this button will set the custom configuration that the user has selected. The chip will automatically reset using the new configuration.
Read Configuration	Clicking this button will show the current settings that the device is configured with.

Table 2.1 Description of Main UI Controls

Note: when changing FIFO Clock, or any of the drop-down menus, you must scroll to the selected item and click on it. Make sure the selection is highlighted in blue before writing the configuration. If the selection is not highlighted, the chip configuration will not change.

3 Chip Configuration Configurable

Controls	Default Value	Description
Vendor ID	0x0403	<p>Vendor identification as specified in the idVendor field of the USB Device Descriptor</p> <p>This should match the VID in the Windows installation file (INF).</p> <p>If this parameter is changed, then the corresponding change is required in the INF installation file.</p> <p>NOTE: changes to the INF file will invalidate any driver certification.</p>
Product ID	0x60IF	<p>Product identification as specified in the idProduct field of the USB Device Descriptor</p> <p>This should match the PID in the Windows installation file (INF).</p> <p>If this parameter is changed, then the corresponding change is required in the INF installation file.</p> <p>NOTE: changes to the INF file will invalidate any driver certification.</p>
Manufacturer	FTDI	Name of Manufacturer as specified in the USB Device Descriptor
Product Description	FTDI SuperSpeed-FIFO Bridge	Product name as specified in the USB Device Descriptor
Serial Number	000000000001	<p>Serial Number as specified in the USB Device Descriptor</p> <p>The Serial Number field may be customised to uniquely identify a device and does not require the INF file to be updated.</p> <p>The total number of bytes for this field is 128 bytes, which is shared across the string descriptors for Manufacturer, Product Description and Serial Number.</p>
Bus-powered/Self-powered	Self-powered	Bus-powered or self-powered capability as specified in Bit 6 of the bmAttributes field of the USB Configuration Descriptor
Remote Wakeup	Enabled	Remote wakeup capability as specified in the bmAttributes field of the USB Configuration Descriptor
Max Power	96 (mA)	Maximum power consumption derived from the bMaxPower field of the USB Configuration Descriptor. This value is equivalent to bMaxPower/8 if USB 3 and bMaxPower/2 if USB 2.

Controls	Default Value	Description
FIFO Clock	100 MHz	Clock speed of the FIFO in MHz
FIFO Mode	600 Mode	<p>Mode of the FIFO (245 mode or 600 mode)</p> <p>Note that FIFO mode selected should match the protocol used by the external FIFO master.</p> <p>Data transfer will not work if the FIFO protocol used does not match.</p>
Channel Configuration	4 Channels	<p>Number of channels or pipes. A channel is equivalent to 2 pipes – 1 for OUT and 1 for IN. (4 channels, 2 channels, 1 channel, 1 OUT pipe only, 1 IN pipe only)</p> <p>Note that maximum performance decreases as the number of pipes increases. To achieve maximum performance, use as few pipes or channels as possible.</p>
Battery Charging Enabled	Disabled	Enables/disables detection of the power source type. E.g. Standard Downstream Port (SDP) , Charging Downstream Port (CDP) or Dedicated Charging Port (DCP)
Battery Charging Settings	DCP (11) CDP (10) SDP (01) Default (00)	GPIO Pin Configuration used to indicate the type of power source detected by the Battery Charging module of the chip.
Ignore Session Underrun	Not set	<p>Controls the chip behavior when the chip receives less data than expected from the FIFO Master.</p> <p>There are two subcategories which are mutually exclusive.</p> <ul style="list-style-type: none"> ○ On Multiple of MaxPacketSize bytes ○ On Multiple of FIFO bus-width bytes <p>“On Multiple of FIFO bus-width bytes “option is available only from RevB.</p> <p>These sub-options are disabled by default and are enabled when ‘Ignore Session Underrun’ option is checked. A read session is said to underrun, when the FIFO master stops or pauses writing before the length of data requested in a corresponding FT_ReadPipe is reached. i.e. If the host issues FT_ReadPipe (X bytes) and the master pauses or stops before X bytes are written, the session is said to have underrun. The FT_ReadPipe will return with the length of data written by the FIFO master up to the point where it stopped/paused.</p> <p>A session underrun may be ignored so that the session remains open until the requested length of data is reached. This allows FIFO masters to write as when data is available</p>

Controls	Default Value	Description
		18 ohm
	GPIO0: 50 Ohm	Configuration to control the drive strengths of the GPIO pins Output drive strength setting for gpio0 50 ohm (default) 35 ohm 25 ohm 18 ohm
	GPIO1: 50 Ohm	Output drive strength setting for gpio1 50 ohm (default) 35 ohm 25 ohm 18 ohm
Interrupt Latency (bInterval)	9 (Available from RevB)	Notification Callback and GPIO pin state reads are over the interrupt endpoint and hence have a minimum latency of $2^{bInterval-1}$ USB frames. Default value of 9, will give a latency of 2^{9-1} USB frames. That is 256 frames. As 1 frame is 125us, this gives a latency of 32ms. bInterval can be modified to reduce or increase this latency. Minimum value is 1 and the max is 16.

Table 3.1 Description of User Configurable

FTDI provides a set of APIs to query and set the chip’s configuration. Please refer to the [D3XX Programmer’s Guide](#).

Note: When calculating the maximum string length of a string descriptor the following rules must be applied:

Each string descriptor requires a 2 byte header therefore of the maximum 128 bytes there is 128-6=122 bytes available.

As the data is sent in Unicode, this then divides down to 122/2=61 bytes.

Additional restrictions are also applied:

Max size for SerialNumber is 16 characters

Max size for Description is 32 characters

Max size for Manufacturer is 61-32-16=13 characters when Description and SerialNumber are maxed out.

4 Chip Configuration Initialization Status

When the user clicks on the **Read Configuration** button, the current configuration values used during initialization will be displayed, including the status information. The status reflects the FT60X actual configuration result when the chip has completed the startup process. Below is a table showing the description of the status information of the chip configuration initialization.

Status Information	Values	Description
Custom Configuration Validity	Invalid or Valid	Indicates whether the configuration data read is valid or not. If custom configuration is invalid, the chip will use the default configuration.
Custom Configuration Checksum	Invalid or Valid	Indicates whether the configuration data is corrupted or not by validating the checksum. If the custom configuration checksum is invalid, the chip will use the default configuration.
GPIO Input	Used or Ignored	Indicates whether the GPIOs are used as configuration input. Note that the GPIOs will only be used as a configuration input when the device is running a default configuration. Below is the pin setting corresponding to mode and channel configuration. GPIO1 0 – GPIO0 0 – 245 mode – 1 channel GPIO1 0 – GPIO0 1 – 600 mode – 1 channel GPIO1 1 – GPIO0 0 – 600 mode – 2 channels GPIO1 1 – GPIO0 1 – 600 mode – 4 channels
GPIO 0	High or Low	Indicates whether GPIO 0 is set to high or low.
GPIO 1	High or Low	Indicates whether GPIO 1 is set to high or low.
Configuration Used	Default or Custom	Indicates whether the chip was initialized using some custom chip configuration or the default chip configuration.

Table 4.1 Status Information of Chip Configuration Initialization

Below is a sample illustration where the device is detected to be running using the default chip configuration.

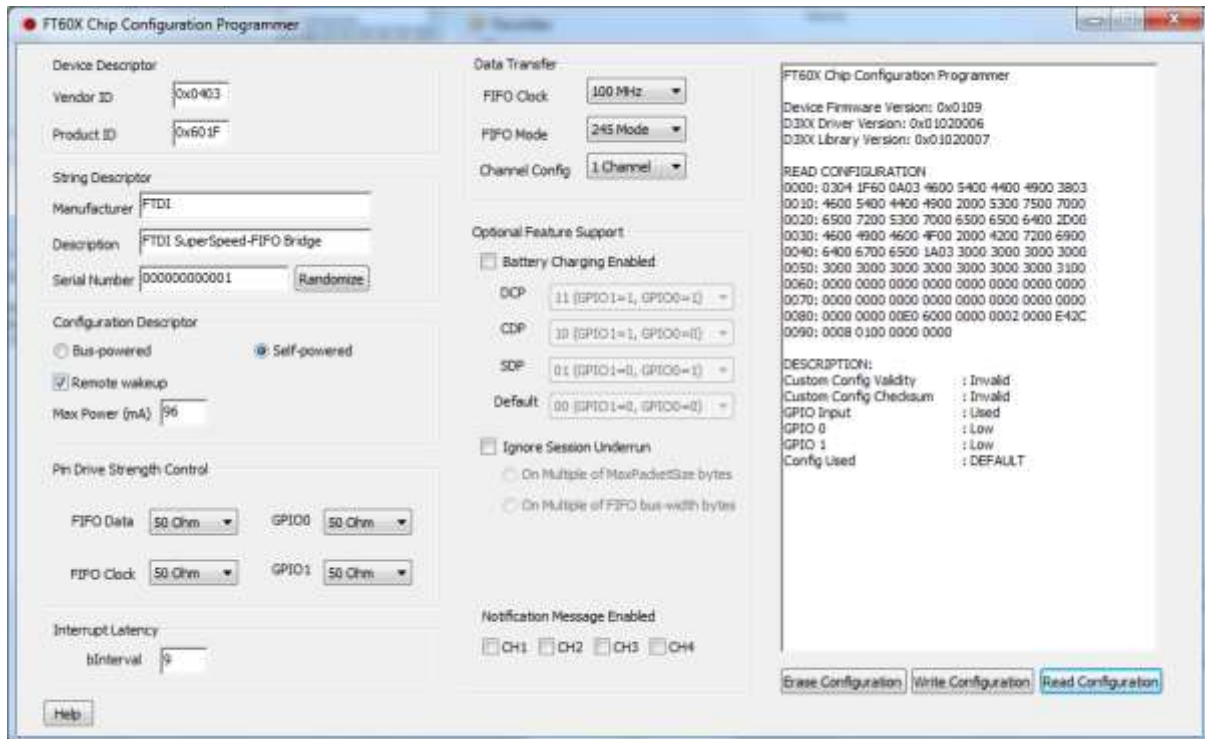


Figure 4.1 Chip Configuration Status - Default Chip Configuration

Below is a sample illustration where the device is detected to be running using some custom chip configuration. If the user wants to go back to the default chip configuration, the user can click on the Erase Configuration button. This will erase the custom setting in the chip.

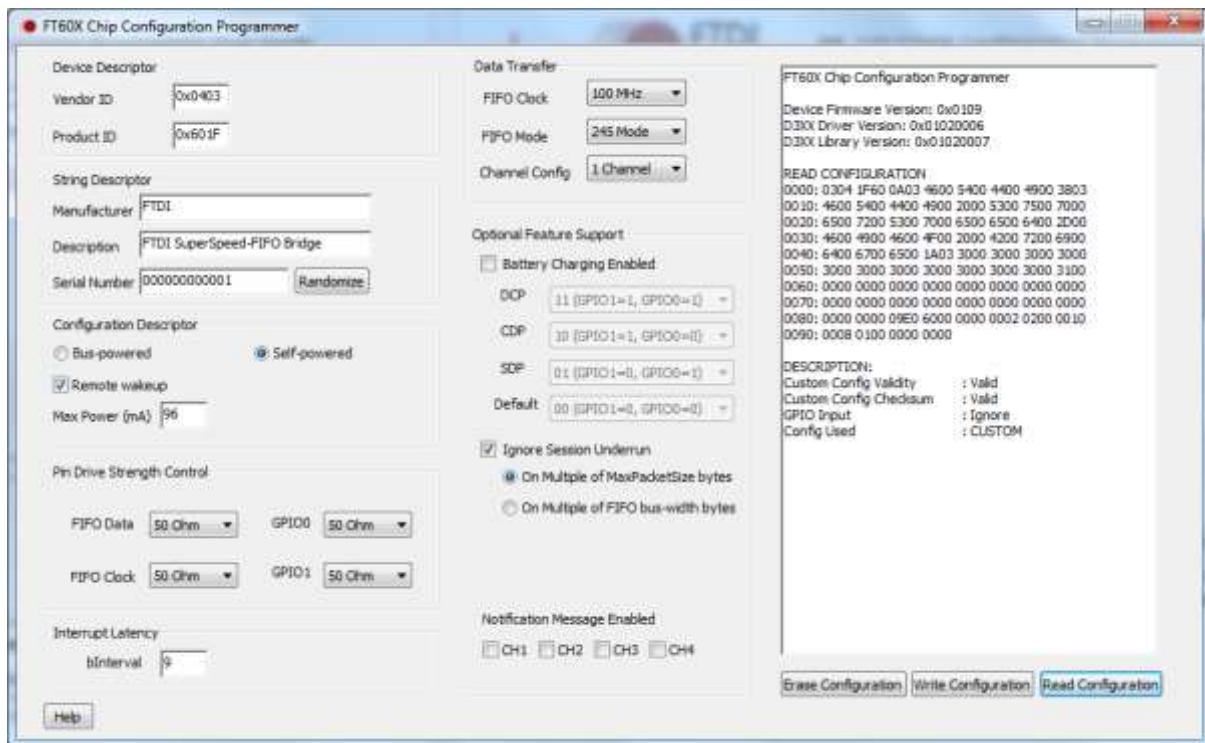


Figure 4.2 Chip Configuration Status - Custom Chip Configuration

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Appendix A – References

Document References

[FT600Q-FT601Q SuperSpeed USB3.0 IC Datasheet](#)

[DS_UMFT60xx module datasheet](#)

[D3XX Programmer's Guide](#)

Acronyms and Abbreviations

Terms	Description
CDP	Charging Downstream Port
DCP	Dedicated Charging Port
FIFO	First In First Out
GPIO	General Purpose Input / Output
ID	Identification
INF	Windows driver installation file
SDP	Standard Downstream Port
UI	User Interface
USB	Universal Serial Bus
VID	Vendor Identification

Appendix B – List of Tables & Figures

List of Tables

Table 2.1 Description of Main UI Controls.....	4
Table 3.1 Description of User Configurable	8
Table 4.1 Status Information of Chip Configuration Initialization	9

List of Figures

Figure 2.1 Application Screenshot	4
Figure 4.1 Chip Configuration Status - Default Chip Configuration	10
Figure 4.2 Chip Configuration Status - Custom Chip Configuration.....	11

Appendix C – Revision History

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Revision	Changes	Date
1.0	Initial Release	2015-09-03
1.1	In Section 3.Chip Configuration Configurable table, updated the following parameters - Controls -> FIFO Clock; Default Value->100 MHZ;	2015-12-21
1.2	Updated Section 1.2 Prerequisites	2016-04-05
1.3	Updated section 3, to remove the references to GPIO2.	2016-07-07
1.4	Figure 2.1/4.1/4.2 have been updated to reflect the GUI changes Updated Table 3.1	2016-08-24
1.5	The following configuration options has been removed: <ol style="list-style-type: none">1. FIFO Clock on in Suspend.2. Disable Chip Power down. GUI screen shots have been updated to reflect the new change.	2017-12-08