

## QF3DFX-DK Development Kit Quick Start Guide

### 1. Introduction

The QF3DFX-DK Development Kit is a complete solution for evaluation and system development using the QF3DFX, a powerful 3-channel system-on-a-chip designed for seamless insertion in an audio serial data path. This Quick Start Guide describes the following:

- Kit Contents
- Installation (Section 2)
- Overview (Section 3)
- Reference (Section 4)

*Note: There is a section index at the end of the document.*

The Quickfilter Pro software also features built-in help files. You can access them from within the program by clicking on “**Help > Help Topics**” in the Menu bar located at the top of the main window or via the help icon in the dialog window located at the top right.

### Kit Contents



**Figure 1.** QF3DFX-DK

- QF3DFX Development Board
- USB Cable
- Quick Start Guide

## 2. Installation

### System Requirements:

- Windows XP (SP2), Vista, or Windows 7.
- Pentium 4 or better.
- At least 17MB of hard disk space.

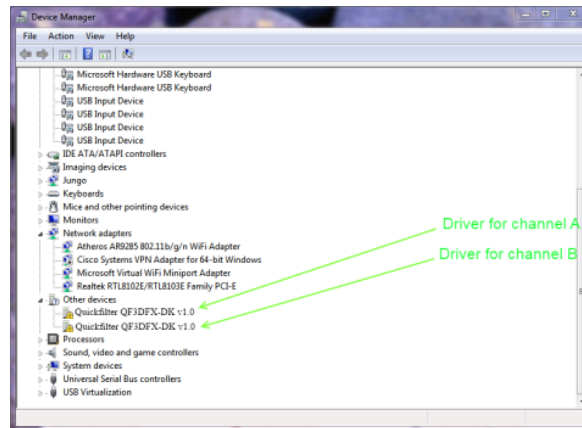
Install the QFPro software by double-clicking the install file, and then connect the QF3DFX-DK to a computer using the supplied USB cable, when prompted at the end of the install.

Follow the prompts for installation of the USB drivers (Note: you have to go through the “Found new Hardware” wizard twice to install both A and B drivers).

The drivers usually install automatically with no intervention required. For each of the drivers you will see a message stating that the system is installing device driver software. After a few seconds, it will be followed by another message stating that the driver has installed correctly.

Successful device driver installation is sensitive to the state of the Windows operating system (whether or not it is current on updates and service packs, etc.) and therefore, occasionally, they won't install correctly. If the drivers do not install correctly, then follow this procedure to manually install them:

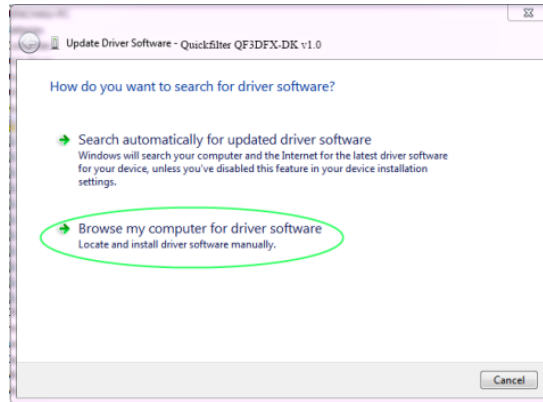
Open the **Device Manager** and locate the problematic drivers:



**Figure 2.** Drivers Incorrectly Installed

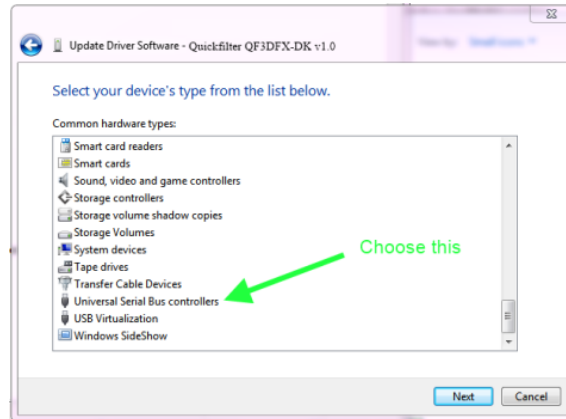
The driver that failed to load correctly will be marked with a small icon of a black exclamation mark on a yellow background. There will be two drivers, one for each of the two channels in the FTDI device.

To find the correct driver, Right click on the first faulty driver and select **Update Driver Software**. In the **Update Driver** window, select **Browse my computer for driver software**.



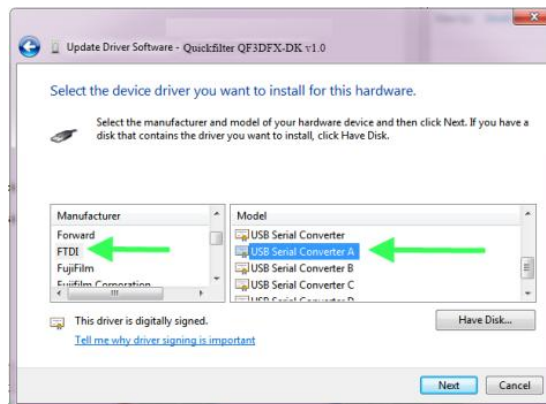
**Figure 3.** Browse for Drivers

In the next window, select **Universal Bus controllers** and click the **Next** button.



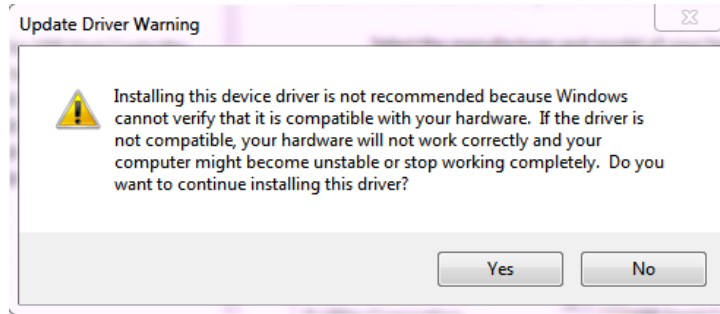
**Figure 4.** Select USB Controllers

Scroll to and select **FTDI** in the **Manufacturer** window and select **USB Serial Converter A** in the **Model** window. Then click the **Next** button.



**Figure 5.** Choose FTDI

Respond to any warnings with permission to continue. The driver will successfully update. Here is a possible warning:

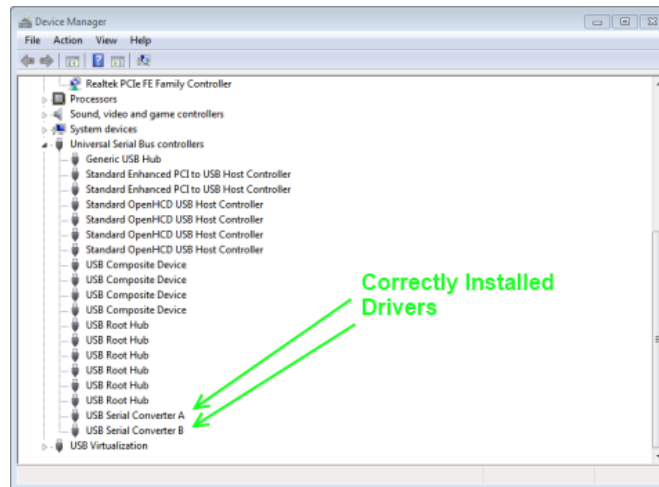


**Figure 6.** Answer Yes

Repeat the above procedure for USB Serial Converter B.

Follow the exact same procedure for channel B, except in Step3, after selecting **FTDI** in the **Manufacturer** window, select **USB Serial Converter B** in the **Model** window and then, complete the process.

Successfully installed drivers will look like this in the Device Manager:



**Figure 7.** Correctly Installed Drivers

## OVERVIEW

This section provides a short overview of Quickfilter's QFPro software and its use. NOTE, for proper use of QFPro the QF3DFX-DK must be connected. For an in depth discussion of the QF3DFX psychoacoustics audio processor, the QF3DFX-DK Development Board, and QFPro, refer to these additional documents:

The QF3DFX Datasheet

The QF3DFX-DK User's Guide

The QF3DFX-DK Tuning Guide

## 3. Opening Screen

Double click on the "QFPro QF3DFX" icon on your desktop. The following screen appears:

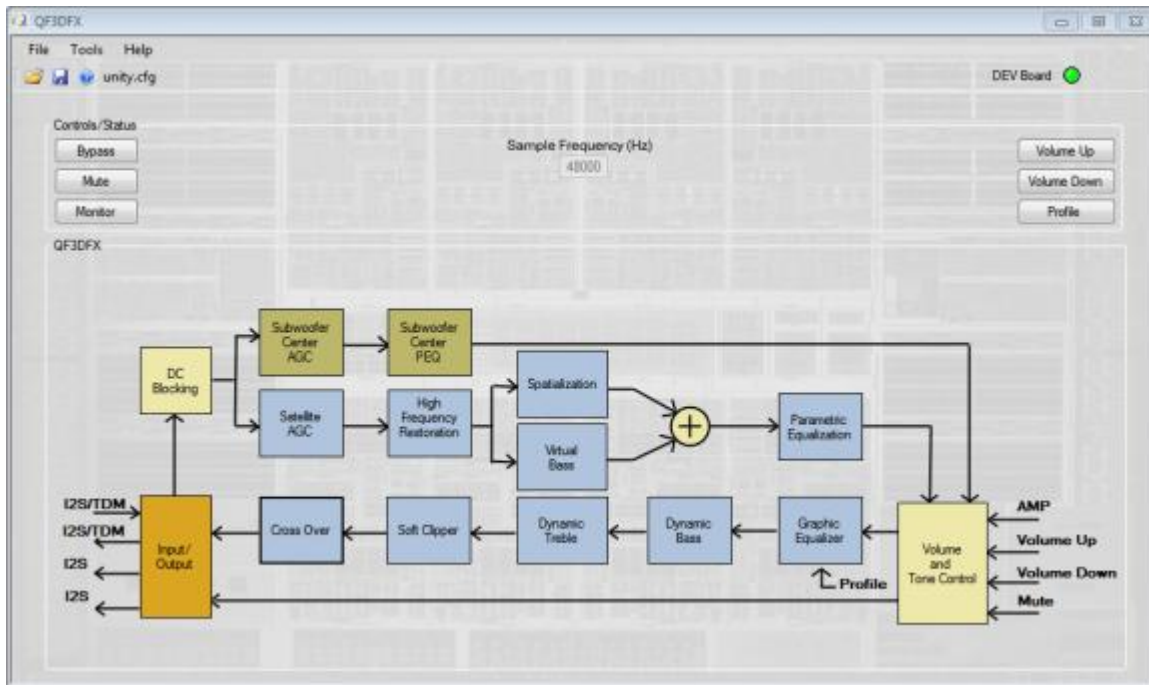




Figure 8. Dev Kit Functional Control Blocks and Basic User Interface

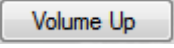
This window is the main control point for configuring and using all aspects of the QF3DFX-DK development board.

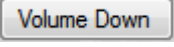
In the Controls/Status area are Bypass and Monitor buttons as well as Mute, Volume Up, Volume Down, and Profile - buttons that correspond to signals available as pushbutton inputs on the QF3DFX.


The  button alternately enables and disables the QF3DFX to process the audio stream, as configured. When the Bypass button is blue, , the QF3DFX is bypassed and the audio passes through the QF3DFX


unchanged. That is, the signal at dSDI passes unchanged to dSDO1, dSDO2, and dSDO3. When white, the QF3DFX performs all configured functions.

The  button alternately mutes and un-mutes the QF3DFX. When blue, , the QF3DFX is muted.

Clicking on the  button increments the volume by the amount called out by the next entry in the Volume Table.

Clicking on the  button decrements the volume by the amount called out by the previous entry in the Volume Table.

The  button will load the next (higher numbered) profile with each selection, rolling around to the first profile in a continuous loop.

The  button opens a window which provides a means to observe the real-time performance of any four of the functional blocks.

While QFPro is running and connected to the QF3DFX-DK, the Mute, Volume Up, Volume Down, and Profile buttons are active and the corresponding physical buttons on the QF3DFX-DK are inactive. Clicking on one of these buttons in the QFPro window causes a corresponding effect on the audio:

The Sample Frequency box displays the sampling frequency of 48000sps. The sample rate is currently fixed at 48000sps but will be variable in a future release

Each of the functional blocks controls a feature inherent in the QF3DFX audio processor.

A function can be alternately enabled or disabled with a single left-click of the mouse. When a block is pale in color, the respective function is disabled and data passes unaffected by the block. This is the default state for all blocks. When darker in color, the is enabled and the block's function is applied to the incoming data. A right-click launches the appropriate dialog for setting the parameters of the selected block. When tuning in real-time, the dialog can remain visible and the parameters changed in real-time.

When connected to the Quickfilter development board, the parameters values within a dialog are sent to the chip on the development board in real-time when either the pointer focus is moved from the changed parameter field or the Return/Enter key is pressed.

The function blocks are color coded as follows:

**The pale yellow/orange blocks are global and can affect all 3 internal channels.**

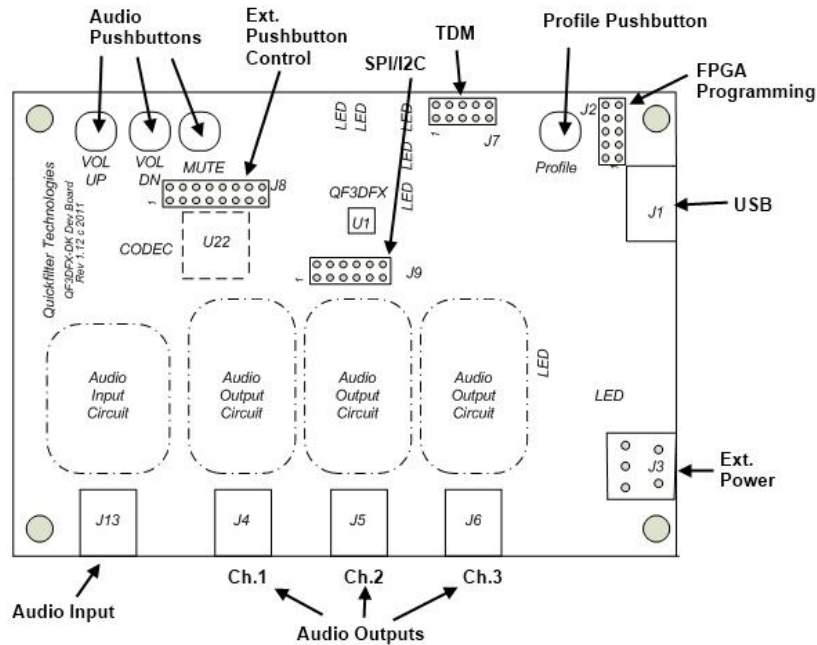
**The pale green/dark green blocks are Subwoofer/Center (Sw/Ce) blocks and affect the Sw/Ce channel only.**

**The pale blue/dark blue blocks are Satellite blocks and affect both Satellite channels.**

## REFERENCE

### 4. External Connections

This section provides details for the various connectors on the development board. Figure 45 shows a global view of all connections.



**Figure 9.** QF3DFX-DK Main Features

#### Expansion Connectors

J2 is used to program the FPGA. This is reserved for Quickfilter internal use only. Inappropriate use of this connector can result in the board becoming inoperable.

J7 is used to connect to an external TDM source and/or sink. It can be used to connect multiple QF3DFX-DK boards in order to implement and test 5.1 and 7.1 stereo system implementations.

J8 and J9 are used to interface the QF3DFX-DK to a QF3DFX on an external target board. J8 allows the pushbuttons on the QF3DFX-DK to signal the external part. J9 interfaces all other control signals necessary for the operation of the external QF3DFX. The use of these two connectors allows the QF3DFX-DK to fully control the external QF3DFX (assuming the external target board has been designed with this functionality in mind) while providing the full functionality of the QFPro software to build, test, and evaluate the performance on the target board.

## Audio Connectors

The input and output audio connector level switch positions,

- Toward audio connect position
  - Input: 2Vpp
  - Outputs: 1Vpp
- Away audio connect position
  - Input: 1Vpp
  - Outputs: 2Vpp

## External Power, Connector J3

The development board is usually powered via the USB connection on J1 and features on-board voltage regulators to provide a clean supply. However, if the board is to be run in stand-alone mode, then power must be provided via connector J3. **Note: If power is supplied via connector J3, it must be +5V DC (+/- 5%).**

Although it is unnecessary, power can be supplied from both J1 and J3 simultaneously. In this case, for correct operation, ensure that the USB cable is plugged into J1 and is powering the board prior to plugging in the power source to J3.

## Booting into Stand-Alone Mode

The QF3DFX-DK can self-boot into Stand-Alone mode using any of the four stored configurations. By default, the QF3DFX-DK will boot into Stand-Alone mode using Configuration #1 when powered up with no USB cable connected.

To boot from a designated configuration:

1. Press and hold down MUTE
2. Press and Release the following
  - a. Configuration #1: VUP
  - b. Configuration #2: VDN
  - c. Configuration #3: PROF
  - d. Configuration #4: VUP and VDN (at the same time)
3. Release MUTE

After you have released MUTE, the QF3DFX-DK will reboot and light LED's in this manner (the Green LED is always lit):

CFG1	○	○	●
CFG2	○	●	●
CFG3	●	○	●
CFG4	●	●	●

## Test Points

A number of test points are provided for your convenience. Please refer to the schematics for their location and connection.



## 5. Development Board Schematics

Full schematics for the QF3DFX-DK can be found in the documents folder created during the Quickfilter Pro install (C:\Program Files (x86)\Quickfilter Technologies\QF3DFX or C:\Program Files\Quickfilter Technologies\QF3DFX\Documents). For your convenience you can open this folder from within the program by clicking on **Help** in the menu bar. The schematics can be found in the file name that begins QF3DFX-DK-Schematics.

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