DFU loader for XMOS USB AUDIO devices

Version 1.1

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1 Introduction

The DFU loader is a flash device firmware upgrade mechanism. To work correctly your development board must contain the latest DFU enabled firmware.

The firmware upgrade for XMOS USB devices implementation uses the USB standard DFU device class mechanism and is based on the following specification:

http://www.usb.org/developers/devclass_docs/usbdfu10.pdf

Supported Functionality

- Download of new firmware to device
- Upload of existing firmware from device
- Revert device back to factory image
- Automatic reboot of device on firmware upgrade

You must use XMOS Development Tools version 10.4.1 (or later) with firmware interface.

The DFU device on Windows requires the Theyscon USB Audio 2.0 Windows driver version 1.13.3.0 or later

2 Installing the factory image to the device

To rebuild the USB audio firmware with the DFU device interface edit the device_defines.h file and comment in the #define DFU line.

Use the XMOS Development Tools to run the command:

```
xflash --boot-partition-size 0x20000 usb_audio.xe
```

This programs the factory default firmware image into the flash device. This will add a new interface to the device that supports the DFU mechanism.

To use the firmware upgrade mechanism you need to build a firmware upgrade image.

1. Edit the `device_defines.h` file and change the `BCD_DEVICE` number for the application.
2. Rebuild the application.

To generate the firmware upgrade image run the following command

```
xflash --upgrade 1 usb_audio.xe 0x20000 -o new_firmware.bin
```

You should now have the file `usb_audio_class1.bin` which contains the firmware for the audio class 1 implementation.

3 Using the DFU loader–Windows

3.1 Set up the image loader

1. Open the DFU Console Window from the Thesycon folder on the Start menu (Program Files>Thesycon>USB Audio 2.0 Class Driver EVAL>DFU console).
2. change directory to where the files have been extracted.

To check the device has been detected, run the following command in the DFU console:

```
dfucons info
```

The console shows the DFU devices that have been detected.

3.2 Download new firmware

To program the new firmware run the command

```
dfucons download usb_audio_class1.bin
```

Note that once this is done the device restarts as an XMOS audio 1.0 device. The original factory default audio 2 application is still present but the device is now running the upgraded application firmware.

You can check the device has been updated by running the command:

```
dfucons info
```

This will display the device revision.

3.3 Uploading existing firmware from the device

You can retrieve a firmware image from the device, providing an upgrade image is present.

Run the command

```
dfucons upload currentfirmware.bin
```

The file `currentfirmware.bin` contains the latest upgrade image. This file is an exact copy of the data from the flash and can be downloaded to the device again to test.

3.4 Reverting firmware to factory image

To revert the device back to its factory (i.e XFLASH) installed state from the new firmware, run the command:

```
dfucons revertfactory
```

The device will now only contain the factory firmware and will be running as an audio 2 device again.

4 Using the DFU loader–OSX

4.1 Set up the image loader

1. Open a terminal
2. Change directory to where the files have been extracted
3. Source the `setup.sh` script

4.2 Download new firmware

To program the new firmware run the command

```
./xmosdfu --download usb_audio_class1.bin
```

Note that once this is done the device restarts as an XMOS audio 1.0 device. The original factory default audio 2 application is still present but the device is now running the upgraded application firmware.

4.3 Uploading existing firmware from the device

You can retrieve a firmware image from the device, providing an upgrade image is present.

Run the command

```
./xmosdfu --upload currentfirmware.bin
```

The file `currentfirmware.bin` contains the latest upgrade image. This file is an exact copy of the data from the flash and can be downloaded to the device again to test.

4.4 Reverting firmware to factory image

To revert the device back to its factory (i.e XFLASH) installed state from the new firmware, run the command:

```
./xmosdfu --revertfactory
```

The device will now only contain the factory firmware and will be running as an audio 2 device again.

5 Building the loader–OSX

The loader is compiled using libusb, the code for the loader is contained in the file xmosdfu.cpp

5.1 To build the loader

```
g++ -m32 -o xmosdfu -I. xmosdfu.cpp libusb-1.0.0.dylib
```

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