



STM32F769 Discovery Board Setup Guide

**Audio Weaver
November 2017**

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Change Log

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Overview

This document describes how to use Audio Weaver with the STM32F769 Discovery board. This is a low-cost evaluation boards for the STM32F7 series of Cortex-M7 processors. The instructions show how to setup the F769 board.

Features

Audio I/O:	8-in (stereo USB, 4 mics and stereo line-in). 4 out (stereo USB record and stereo line-out).
CPU clock speed	216 MHz
Tuning interface:	USB HID device
Flash file system support:	Yes
Booting from flash:	Yes
Fundamental block size:	32 samples
Native data type:	Floating-point



Setup

First, download the ST Board Support Package (BSP) for the appropriate target. These BSPs are provided on the DSP Concepts website at:

<https://www.dspconcepts.com/downloads>

After running the installer and accepting the licensing agreement, the BSP will be installed to a directory in C:\DSP Concepts.

After the BSP is installed on your computer, connect the ST Discovery board to your computer. The board has Two USB connections:

- Micro-USB – ST_LINK for power and programming
- Micro-USB – USB HS for audio and control

NOTE: Charge-only USB cables will not work. If you are having trouble flashing or connecting to the board, make sure that your USB cables support data transfer. A common symptom of a bad cable is an error message while attempting to connect that reads “Unable to create USB port - is this port in use by another program?”.

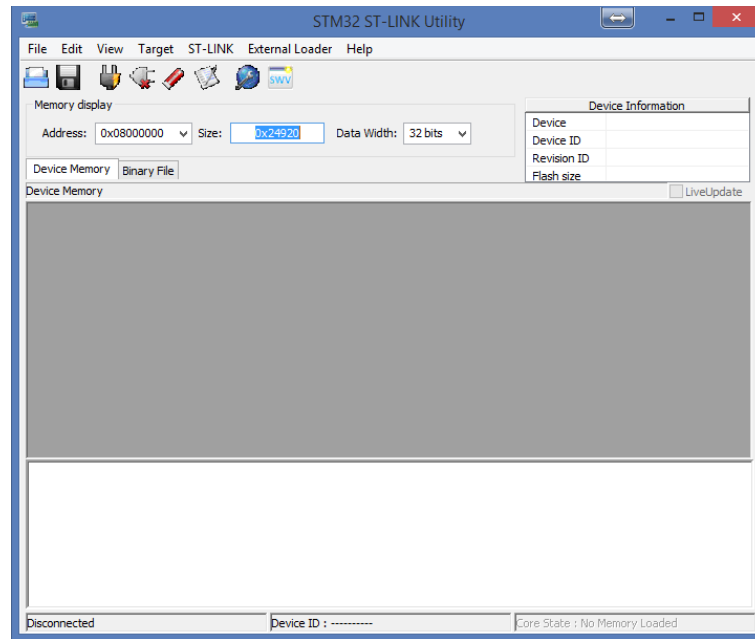
Connect your PC to the two micro-USB connectors (USB HS and USB ST_LINK) on the Discovery board. This will power on the board and several LEDs will light.

NOTE: USB hubs can cause unpredictable communication errors, so we recommend making a direct connection to the PC. If there is only one USB port on the PC, then use an external power supply to power the board (ST-LINK Micro USB connector) and use the PC's USB port for the USB-HS connection.

Next, install the STM32 ST-LINK Utility (STSW-LINK004) programming utility provided by STMicroelectronics on their website (www.st.com).

http://www.st.com/content/st_com/en/products/embedded-software/development-tool-software/stsw-link004.html

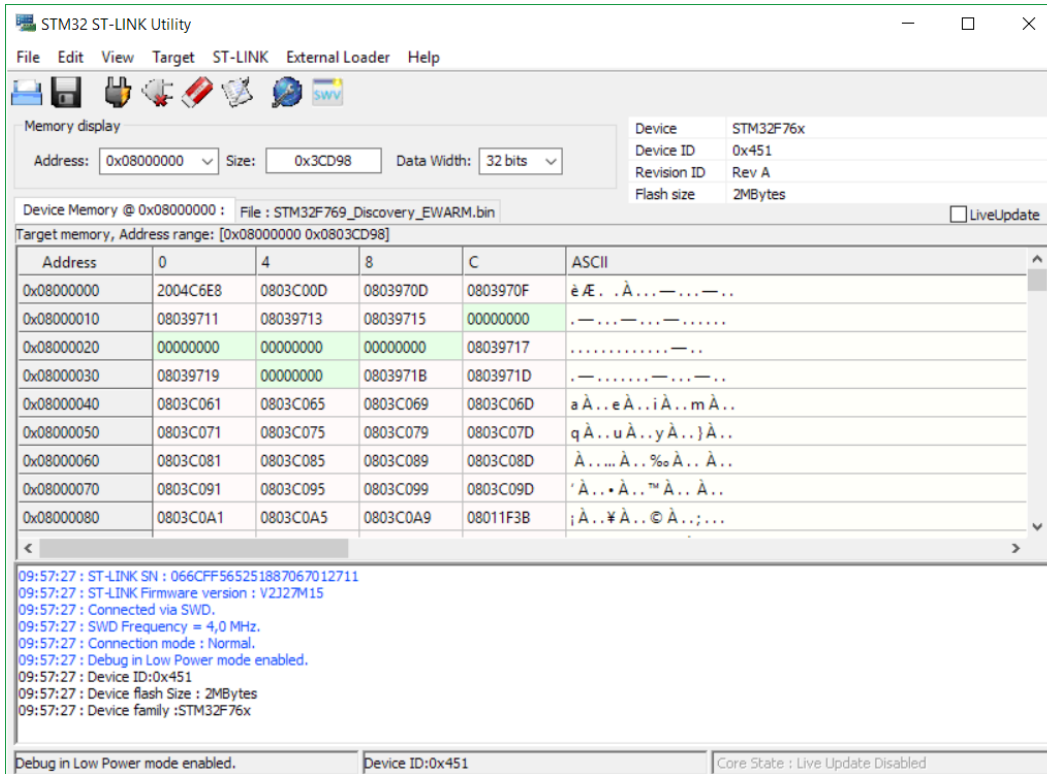
After installation, start the utility and the following window will appear:



From the toolbar, click on the



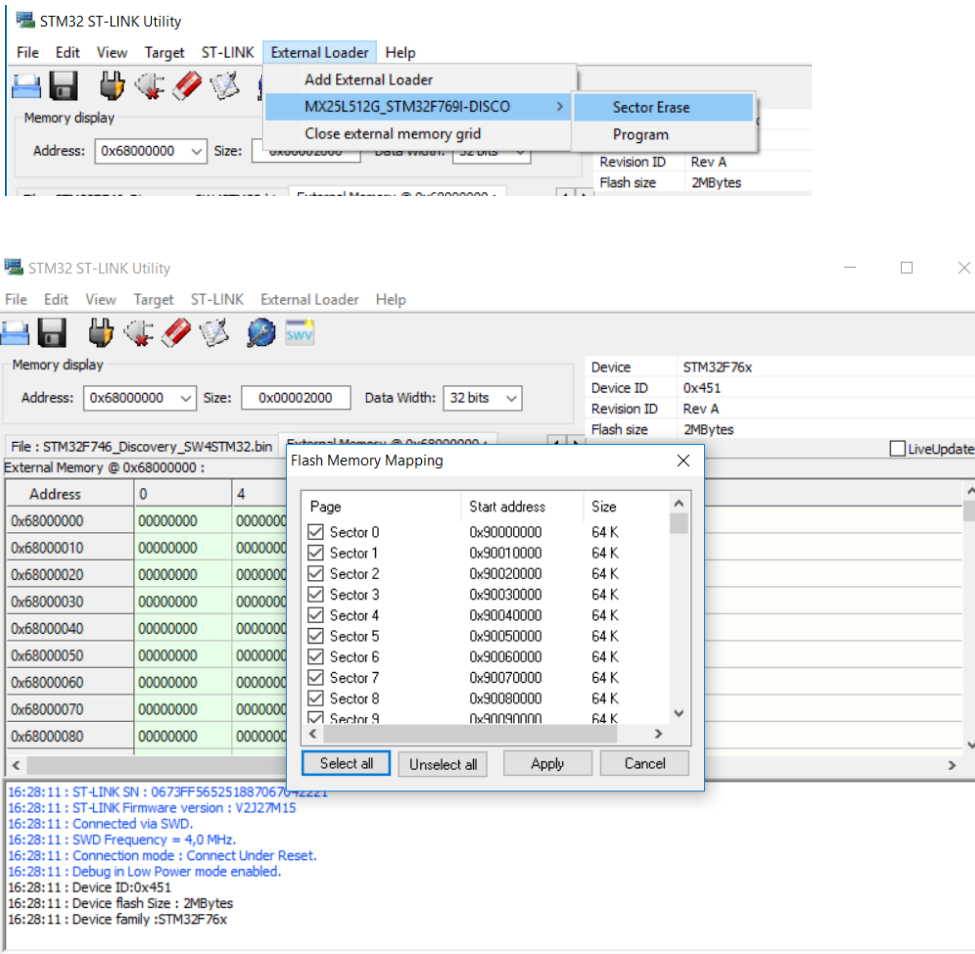
button to connect to the target. After a few seconds, the window will update to



Click on the “Full Chip Erase” button to completely erase the flash contents.



Click on External Loader, select the 769I Disco Flash NOR, select “Erase Sectors”, then select all sectors, and hit “Apply” to erase the off-chip flash.



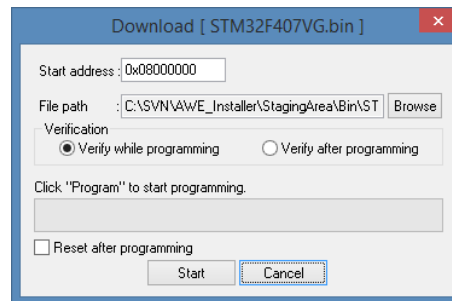
Then Click on the “Program and Verify” button:



Then browse and select a binary image file from the installed BSP package to program.

<BSP-Folder>/Bin/STM32F769I_Discovery_<toolchain>.bin. Note that a binary is provided for each supported toolchain: IAR Embedded Workbench (EWARM), Keil µVision (MDK_ARM), and OpenSTM32 (GCC).

You'll then advance to the next window. Click the "Start" button to begin updating the flash memory.



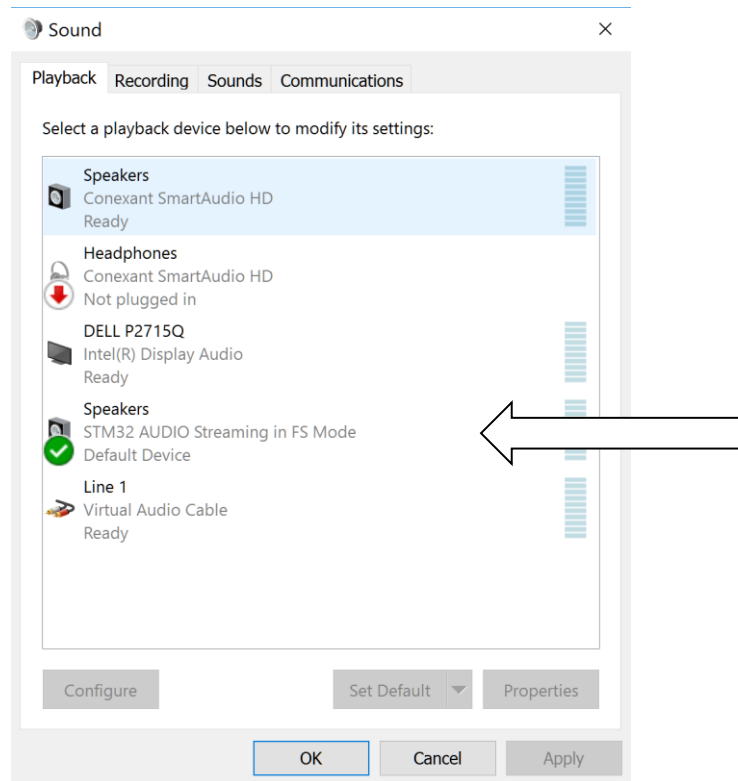
After a few seconds, the programming operation will complete.

If the firmware image update was successful you should now see LED1 flashing green.

The board will appear as two new USB devices (USB Audio and HID device) and the USB driver installation should happen automatically on Windows 7 and Windows 8. That is, the board uses default Windows drivers. No special drivers need to be installed¹.

¹ Windows XP is currently not supported.

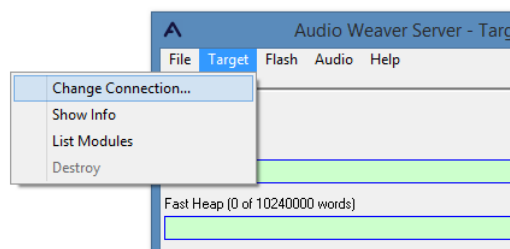
The board appears as a USB audio device. Select this under your Windows audio playback device settings. On Windows 10, it appears as:



Please note: you will not hear any audio until you have an Audio Weaver model running.

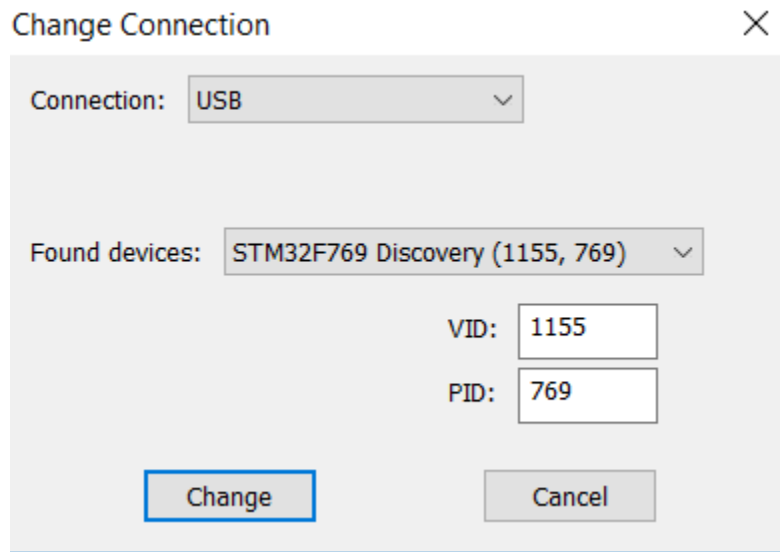
Connecting Audio Weaver to the Target

Launch Audio Weaver Designer application. Then from the Server Window (not from the Designer window) select the menu item Target→Change Connection



In the drop list select “USB” and change the PID and VID settings if necessary as shown below

For the STM32F769 board VID = 1155 and PID = 769.

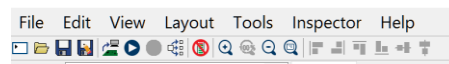


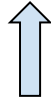
Click on the “Change” button. This window will dismiss and the Server window will update to reflect the connection to the Discovery board. You’ll see

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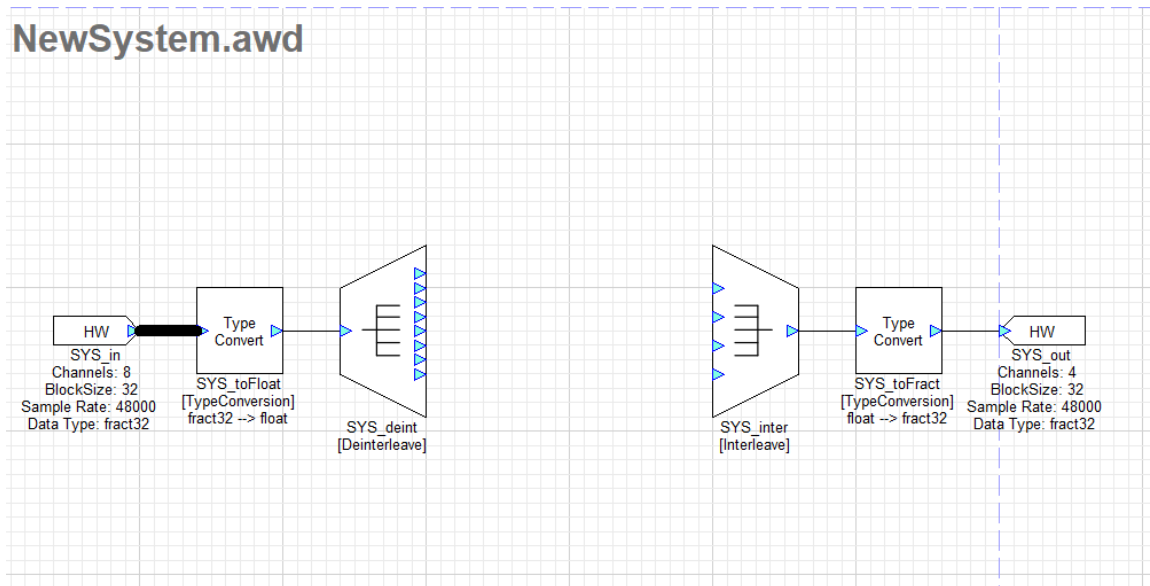
Target Information
Name: ST32F769
Version: 5.24.6.17
Processor type: CortexM7
CPU clock rate: 216 MHz
Profile clock rate: 216 MHz
Sample rate: 48000Hz
Basic block size: 32 samples
Communication buffer size: 264 words
Is floating point: Yes
Is FLASH supported: Yes
Size of 'int': 4
Core ID: 0
Static core: yes
Threads: 2
Number of primary inputs: 8
Number of primary outputs: 4
    
```

At this point the Audio Weaver Server can communicate with the board. To make sure that the Audio Weaver Designer sees this change, click on the “Reconnect to Server” button.





The default system drawn in Audio Weaver Designer is shown below.



The target has a fundamental block size of 32 samples and operates at a fixed sample rate of 48 kHz. The left input pin 'SYS_in' indicates 8 channels of input. The first two channels are USB stereo inputs, the next two channels are stereo inputs from the line-in and the last four channels are inputs from the four microphone inputs. The right output pin 'SYS_out' has four channels of output. The first two are USB record and the last two is the audio being output to the line-out connector.

Create and run a simple model in Audio Weaver, start playing audio on your PC, and plug in speakers or headphones to the STM32 Discovery board's 3.5 mm audio output jack. You should now hear audio being rendered by the STM32 Discovery board!

Using GPIO Inputs and Outputs

The Discovery boards have a variety of LEDs, I/O pins, and a blue user button. Audio Weaver has a GPIO block that allows either output to a GPIO pin or led or input from a GPIO pin or the blue user button. However, the block must be setup to access the desired pin. Each pin and led on the board is labelled. The GPIO block numbers pins starting with pin 1 need to be mapped to the actual pins on the board.

STM32F746NG-Discovery Board Available GPIO Pin Map

GPIO Block Pin Number	Board Input Pin Name	Board Output Pin Name
1	Blue User Button	LED