



**ADSP-21489 EZ-Kit
Setup Guide**

**Audio Weaver
March 2017**

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Change Log

Version	Date	Description	Author
01	2017.Apr.20	Original document + updates for new BSP	MM
02	2017.Apr.28	Updates for CCES loader file flashing	MM

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1. Overview

This document describes how to use Audio Weaver with the SHARC ADSP-21489 EZ-Kit.

2. Version Information

EZ-Kit:

21489 silicon revision: 0.1
 Part number: ADDS-21489-EZBOARD

VisualDSP++: 5.1

CCES: 2.5.1

3. Features

Audio I/O: 4-in and 8-out at 48 kHz
 CPU clock speed: 400 MHz
 Tuning interface: RS232 or SPI
 Flash file system support: Yes
 Booting from flash: Yes
 Fundamental block size: 32 samples
 Native data type: Floating-point

4. Setting up the 21489 EZ-Board

This section describes how to connect the 21489 EZ-Board to VDSP++ to run the Audio Weaver platform.

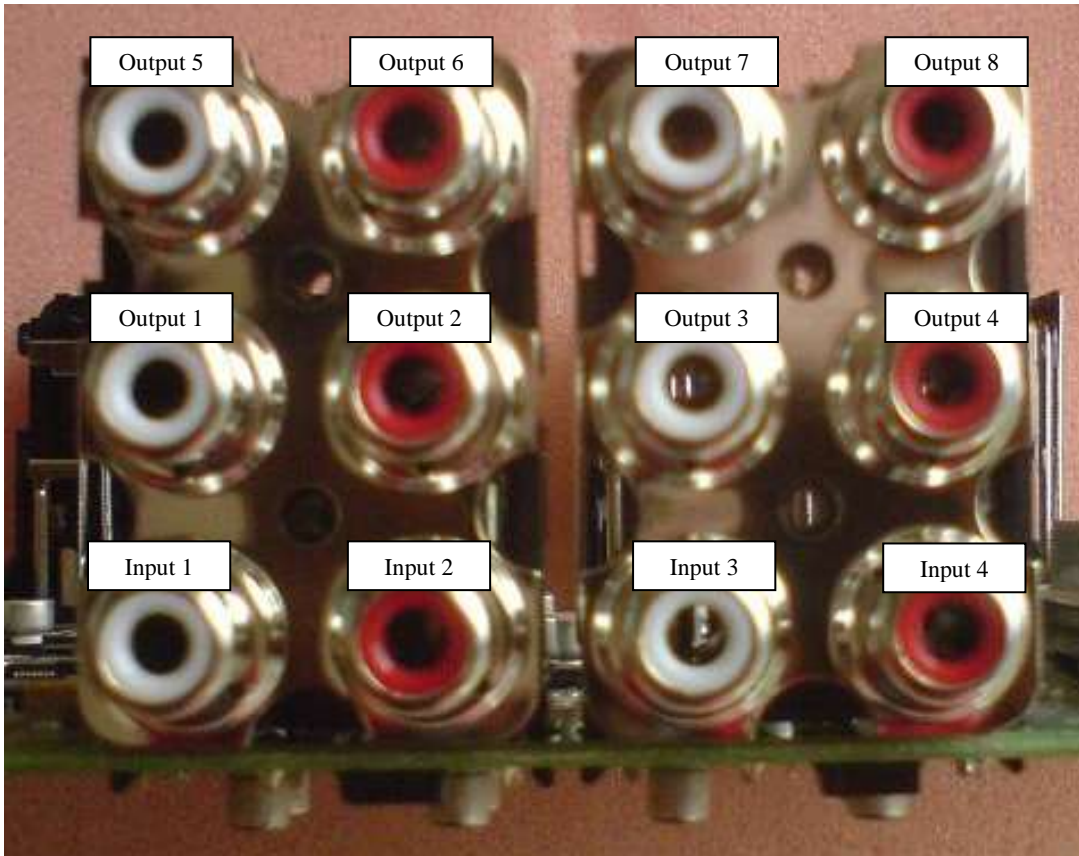
- Make sure EZ-Board has the following Switch and Jumper settings.

EZ-BOARD Settings:

Switch Settings for EZ-Board	
SW1	ALL ON
SW2	ON-ON-ON-ON-OFF-OFF-ON-ON
SW3	ON-ON-ON-ON-ON-ON-OFF-OFF
SW4 (Boot Mode)	Position 2 for RS-232 Tuning Position 1 for SPI Tuning
SW5	OFF-ON
SW7	ALL ON
SW13	ON-ON-OFF-ON-ON-OFF-ON-OFF
SW14	ON-ON-OFF-OFF-ON-ON
SW15,SW16,SW17,SW18	ON-OFF- ON-OFF- ON-OFF
SW19	ON-OFF-ON-OFF-ON-OFF-ON-OFF
SW20	ON-OFF
SW21	ON-OFF

SW22	OFF-OFF
All Jumper settings should be in default positions	

- ADSP-21489 EZ-Board has 4-inputs and 8-outputs as shown below. The mapping from physical connectors to Audio Weaver channels is also shown.



4.1 SPI Tuning Setup

Aardvark SPI/I2C Dongle	ADSP-21489 EZ-Board Expansion Header (P2)
P.8 (MOSI)	P2.30 (MOSI)
P.5 (MISO)	P2.33 (MISO)
P.9 (SS)	P2.34 (SS)
P.7 (SCK)	P2.29 (SPICLK)
P.10 (GND)	P2.5 (GND)

- Connect the SPI pins from TotalPhase Aardvark SPI/I2C dongle to Expansion Interface on 21489 EZ-Board as per the connections specified in the table above.

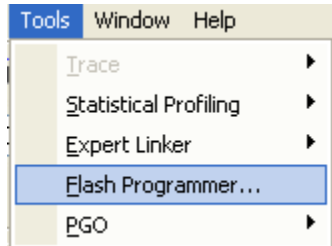
- Install the drivers given along with *Total Phase SPI/I2C* hardware before connecting dongle to PC. Then connect the device to the PC and PC will detect new device found and it will install the drivers automatically for the first time only.

5. Booting Pre Programmed code (Loader file) - VDSP

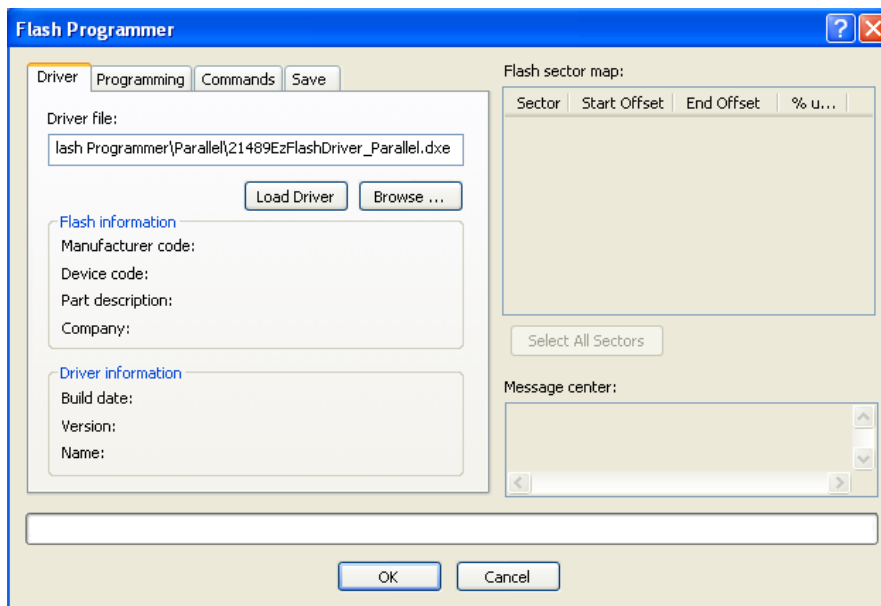
Open Visual DSP++ 5.1 IDDE session with ADSP-21489 EZ-Kit via HPUSB-ICE JTAG or HPPCI-ICE JTAG.



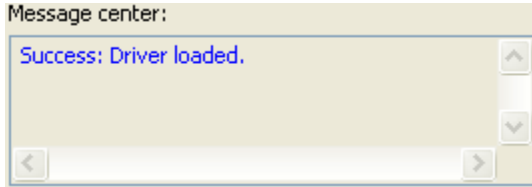
Once VisualDSP++ is connected to ADSP-21489 EZ-Board, go to Flash programmer window from Tools menu as shown below:



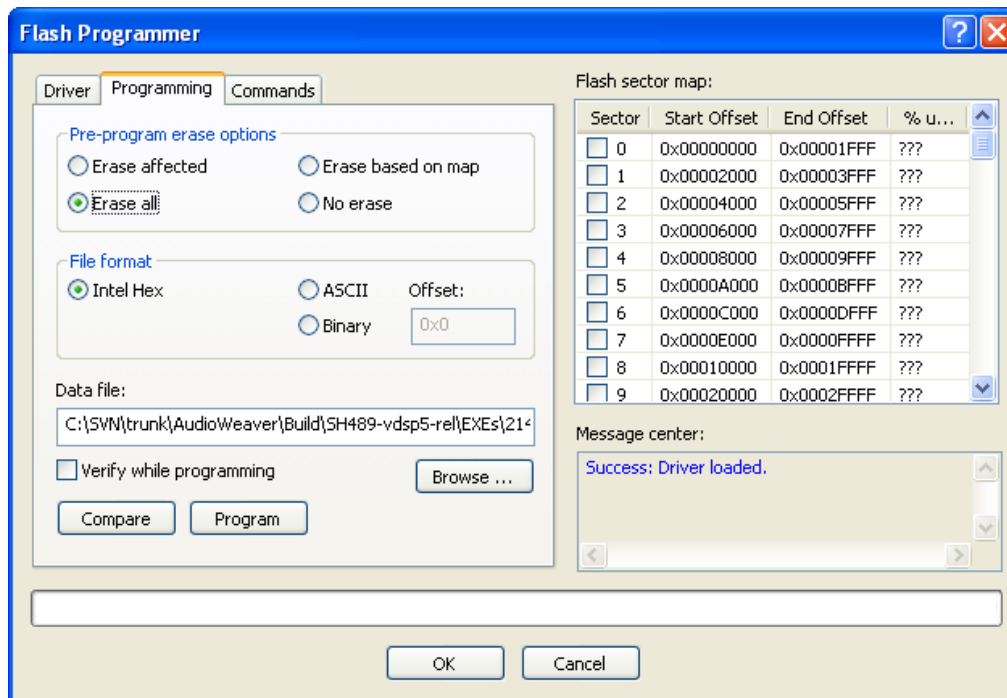
5.1 Flashing RS-232 Tuning Loader File



In the Flash Programmer window, first load the Driver file “21489EzFlashDriver_Parallel.dxe”. This is available at <AWE Target BSP>\Vendor\Lib\VendorLib\VDSP or in the VDSP++ installation directory <VDSP 5.1> \214xx\Examples\ADSP-21489 EZ-Board\Flash Programmer\Parallel. Where, <VDSP 5.1> is the VisualDSP++ 5.1 installation directory. Browse to the above path and select “21489EzFlashDriver_Parallel.dxe” driver file and click on Load Driver. If the driver file is loaded successfully, following message will be displayed in Message center:

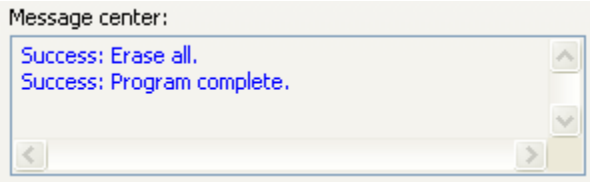


Next go to the Programming tab on top of the Flash Programmer window.



In the programming sub window, select File format as *Intel Hex*. To program the flash, browse to the path <AWE Target BSP>\Bin\VDSP and select “21489_EZKIT_RS232.ldr” loader file. Then click on Program.

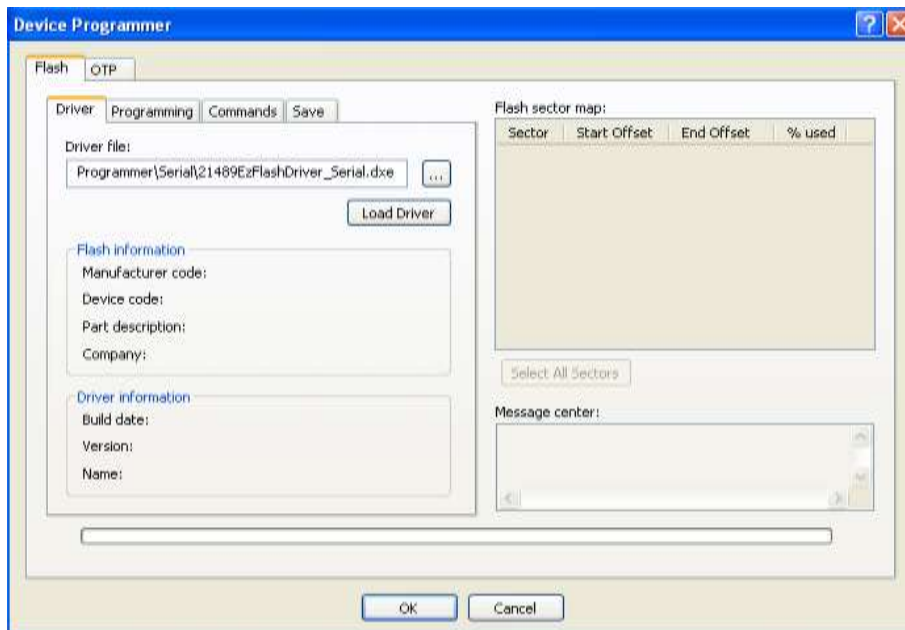
Upon successful completion of flash programming, Message center will shows:



Then click on OK. Close the Visual DSP session and reset the board. Now the EZ-Kit is ready with flash programmed.

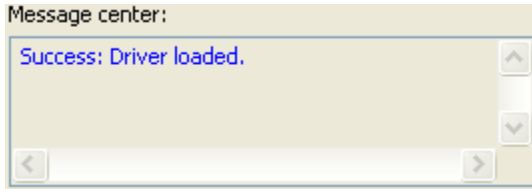
When the board boots, LED1 will be lit and all others will be off. LED2 blinks in response to tuning messages. After each message is processed the LED2 is toggled.

5.2 Flashing SPI Tuning Loader File

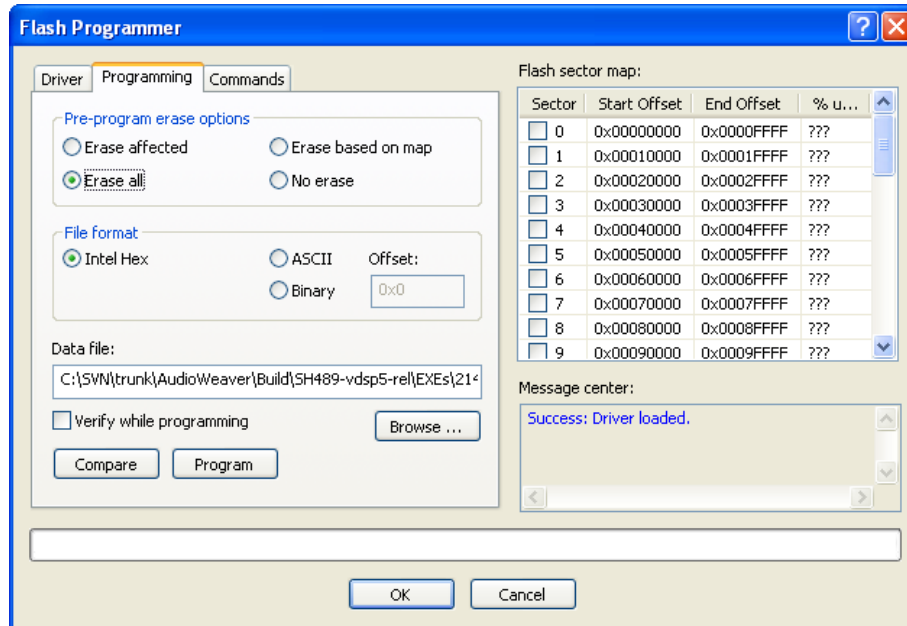


In the Flash Programmer window, first load the Driver file “21489EzFlashDriver_Serial.dxe”. This is available at *<AWE Target BSP>\Vendor\Lib\VendorLib\VDSP* or in the VDSP++ installation directory *<VDSP 5.1>\214xx\Examples\ADSP-21489 EZ-Board\Flash Programmer\Serial*.

Where, *<VDSP 5.1>* is the VisualDSP++ 5.1 installation directory. Browse to the above path and select “21489EzFlashDriver_Serial.dxe” driver file and click on Load Driver. If the driver file is loaded successfully, following message will be displayed in Message center:

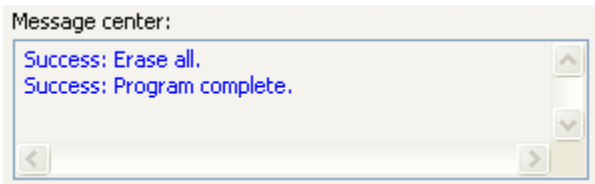


Next go to the Programming tab on top of the Flash Programmer window.



In the programming sub window, select *Erase all* option and File format as *Intel Hex*. To program the flash, browse to the path <AWE Target BSP>\Bin\VDSP and select “21489_EZKIT_SPI.ldr” loader file. Then click on Program.

Upon successful completion of flash programming, Message center will shows:



Then click on OK. Close the Visual DSP session and reset the board. Now the EZ-Kit is ready with flash programmed.

When the board boots, LED1 will be lit and all others will be off. LED2 blinks in response to tuning messages. After each message is processed the LED2 is toggled.

6. Booting Pre Programmed code (Loader file) - CCES

There is no GUI utility to flash the loader file on to the EZ-Kit and Command-Line Device Programmer (CLDP) is the only way to flash. Make sure HP-USB (any other) ICE is connected to ADSP-21489 EZ-Kit. Open the CMD window and navigate to the base location of CrossCore Embedded Studio (CCES) is installed. For example, "C:\Analog Devices\CrossCore Embedded Studio 2.5.1".

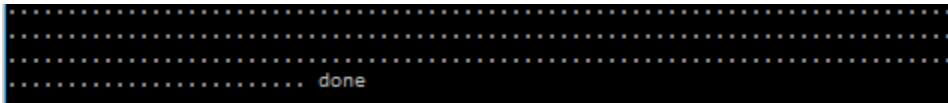
6.1 Flashing RS232 Tuning Loader File

Issue the below command to start flash programming with RS232 tuning loader file.

```
cldp.exe -proc ADSP-21489 -emu HPUSB -driver  
<AWE_Target_BSP>\Vendor\Lib\VendorLib\CCES\21489_m29w320_dpia.dxe -cmd  
prog -erase affected -format hex -file  
<AWE_Target_BSP>\Bin\CCES\21489_EZKIT_RS232.ldr
```

Where, <AWE_Target_BSP> is the root folder of ADSP-21489 EZKit BSP.

Device program status will be displayed as shown below.



```
.....  
.....  
..... done .....
```

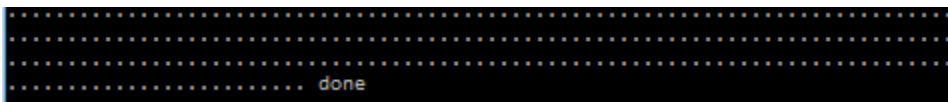
6.2 Flashing SPI Tuning Loader File

Issue the below command to start flash programming with SPI tuning loader file.

```
cldp.exe -proc ADSP-21489 -emu HPUSB -driver  
<AWE_Target_BSP>\Vendor\Lib\VendorLib\CCES\21489_m25p16_dpia.dxe -cmd  
prog -erase affected -format hex -file  
<AWE_Target_BSP>\Bin\CCES\21489_EZKIT_SPI.ldr
```

Where, <AWE_Target_BSP> is the root folder of ADSP-21489 EZKit BSP.

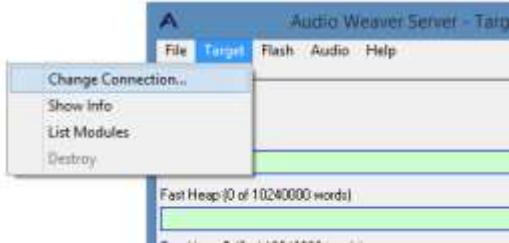
Device program status will be displayed as shown below.



```
.....  
.....  
..... done .....
```

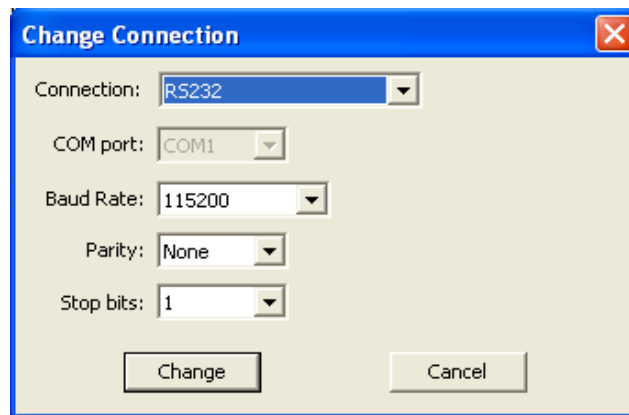
7. Configuring the Audio Weaver Server

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



7.1 RS-232 Tuning

Under the connection drop list, select RS232 and then click "Change" to dismiss the dialog.



Once the Server connects to the target processor, you will see the following Target Information displayed on the Server's output window:

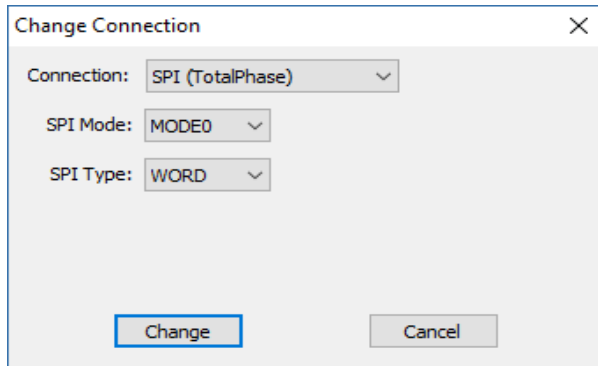
```

Target Information
Name: 489EZKIT
Version: 5.1.4.17
Processor type: SHARC
CPU clock rate: 400 MHz
Profile clock rate: 400 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': 1
Core ID: 0
Static core: yes
Threads: 2
Number of primary inputs: 4
Number of primary outputs: 8

```

7.2 SPI Tuning

Under the connection drop list, select *SPI (TotalPhase)* tuning. Select SPI mode to either MODE0 or MODE3 depending on the target settings (by default the target loader file is created with SPI in MODE0). Please refer any SPI documents for details about different SPI modes. Also user can select SPI transfer type as WORD by WORD transfer or BULK transfer. Finally click on "Change" to dismiss the dialog.



Following are the configurations supported by the Audio Weaver:

- MODE0 with WORD transfers. Even if user selects BULK transfer type Audio Weaver will use WORD transfers only.
- MODE3 with WORD transfers.
- MODE3 with BULK transfers. This configuration may not work properly if the DSP uses Core Driver SPI transfers.

Once the Server connects to the target processor, you will see the following Target Information displayed on the Server's output window:

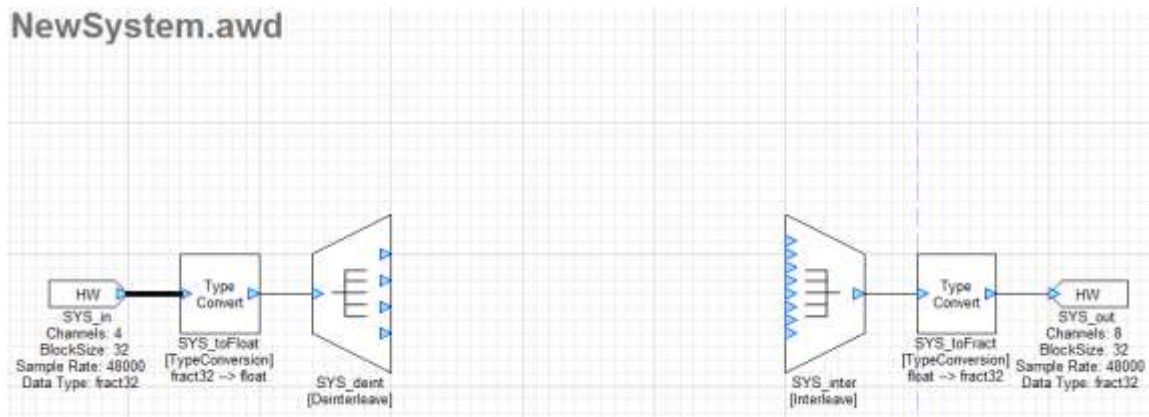
```

Target Information
Name: 489EZKIT
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Is floating point: Yes
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Size of 'int': 1
Core ID: 0
Static core: yes
Threads: 2
Number of primary inputs: 4
Number of primary outputs: 8
    
```

At this point the Audio Weaver Server can communicate with the EZ-Kit. 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 4 channels of input from 4 analog input RCA connectors from the EZ-Kit. The right output pin ‘SYS_out’ is 8 channels output mapped to 8 analog output RCA connectors on the EZ-Kit.