

SSM2529 REV 1 EVALUATION BOARD OPERATION (PRELIMINARY!)

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Description of Setup:

The SSM2529 evaluation setup consists of the following:

- 1) A fully integrated SSM2529 evaluation board, EVAL-SSM2529
- 2) Analog Devices USB-to-I2C adapter dongle, EVAL-ADUSB2Z.

The SSM2529 can operate in stand-alone mode without the need for I2C control, as shown in *Figure 1*. In order to evaluate full functionality of the SSM2529, the user must use I2C. A GUI has been developed using the SigmaStudio development platform. The ADUSB2Z dongle is able to interface between the GUI and the evaluation board, as shown in *Figure 2*.

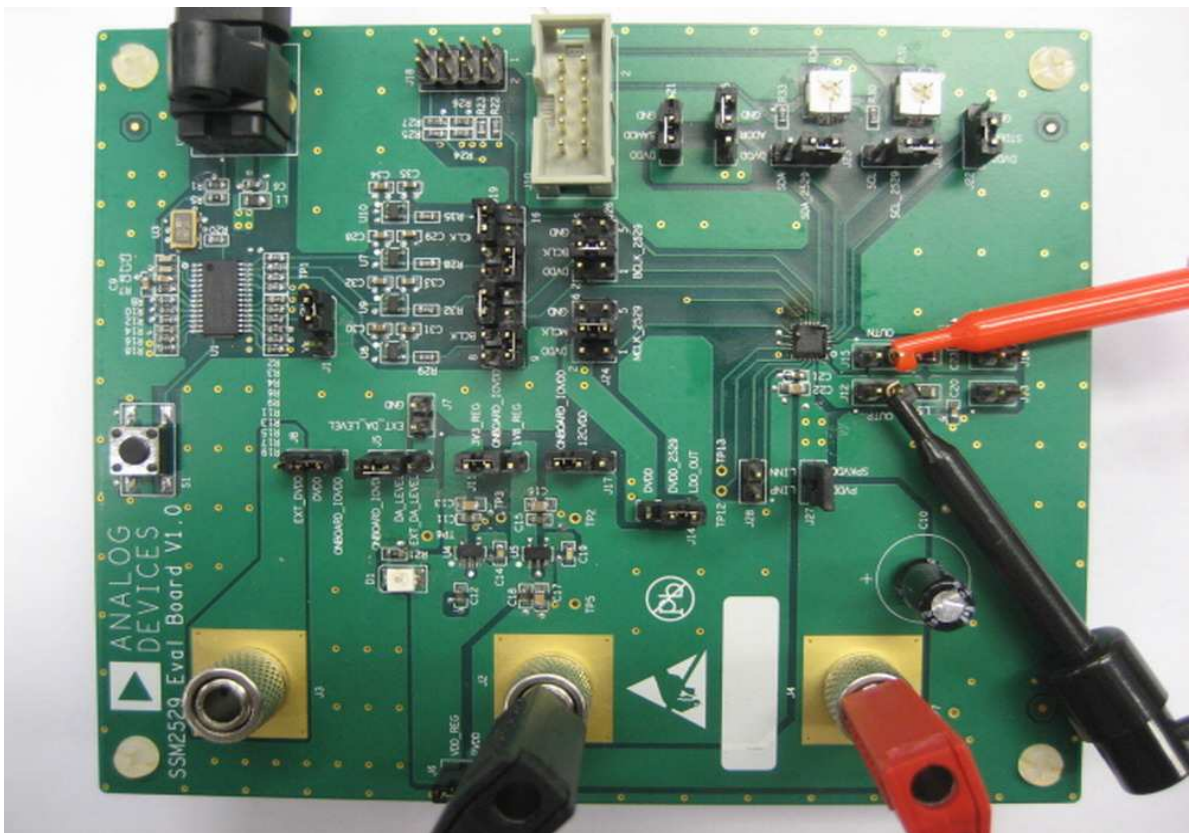


Figure 1: Picture of SSM2529 Evaluation Board (operating in stand-alone mode, without I2C)

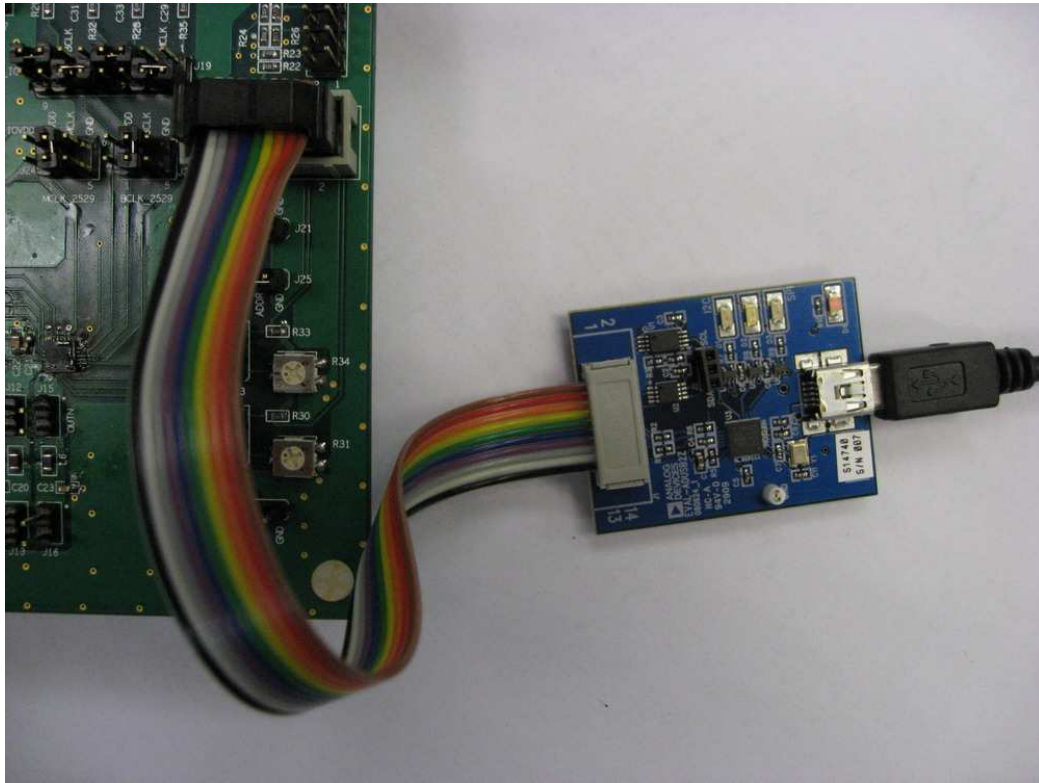


Figure 2: Picture of ADI USB-to-I2C Dongle (ADUSB2)

Setup Instructions:

Section 1 – Power Supply:

The SSM2529 evaluation board requires several different power supplies. The main power supplies required for operation are **PVDD** (PVDD jack) and **DVDD** (DVDD jack). In addition to the main power supplies, there are several other auxiliary power sections. The most basic setup for the SSM2529 evaluation board is to generate all onboard power directly from **PVDD** utilizing jumper placements, eliminating the need for multiple power supplies. The correct jumper settings for this mode are shown in *Figure 3*.

LDO_POWER: The SSM2529 board integrates two voltage regulators, U4 (3.3V) and U5 (1.8V). Note that the 3.3V regulator powers most of the onboard digital audio interface circuitry. Inserting a jumper across J6 allows for PVDD to power and activate these regulators. For current measurements on the PVDD pin of SSM2529, the device must be isolated from this circuitry. In order to do so, remove the J6 jumper and connect an external power supply to J9 to activate U4 and U5 voltage regulators.

ONBOARD_IOVDD: ONBOARD_IOVDD is a generalized power supply that is selected from the output of one of the voltage regulators. ONBOARD_IOVDD can be selected as 1.8V or 3.3V by inserting a jumper across the designated pins of J11. From that point, ONBOARD_IOVDD can be selected to power several different features: It can power DVDD (J8), it can set the logic level of the onboard digital audio circuitry (J5), and it can be used as the I2C pull-up voltage (J17).

DA_LEVEL: This is the logic level for the onboard digital audio signals. It can either be generated by ONBOARD_IOVDD, as described above, or can be externally powered using J7. The logic level for these signals is established on U7 – U10.

I2CVDD: This is the pull-up voltage for the I2C pins of SSM2529. This voltage can be set to either ONBOARD_IOVDD or an external I2C pull-up by inserting a jumper across the designated pins of J17.

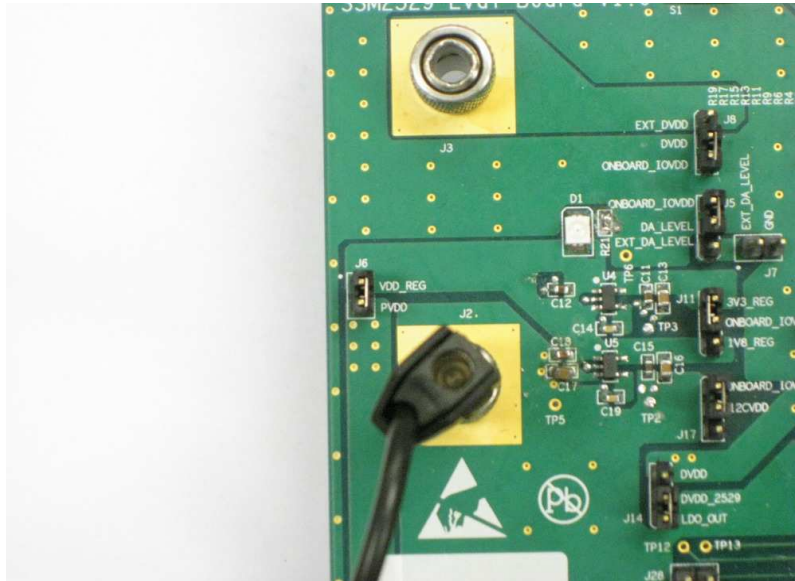


Figure 3: Picture of SSM2529 Eval Board Power Section – Basic Configuration with PVDD supplying all onboard power

Section 2 – Digital Audio Source:

The SSM2529 evaluation board has two options for digital audio signals: 1) Use an external digital audio source, such as Audio Precision PSIA 2722 (source on J18), or 2) Use the onboard digital audio receiver and source digital audio using the TORX connection. To select between external or onboard digital audio signals, insert the appropriate jumpers across the J19 bank of header pins. Please note: after setup of the evaluation board is complete, it is helpful to press the S1 button near the TORX port in order to initialize the onboard digital audio circuitry.

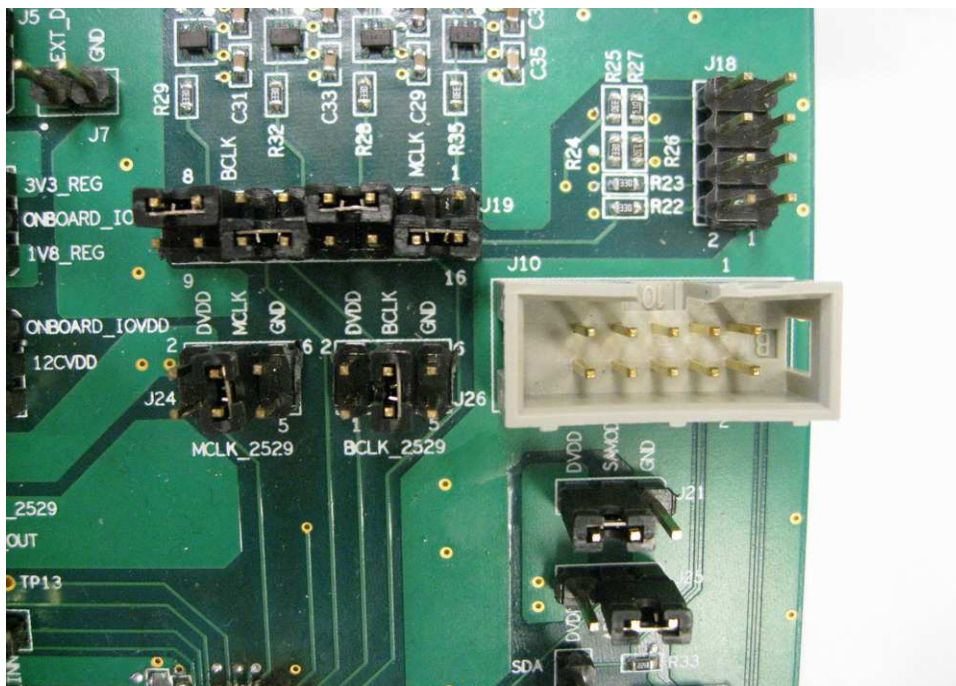


Figure 4: Digital Audio Selection Header (Configured for Onboard Source) External Digital Audio Ports

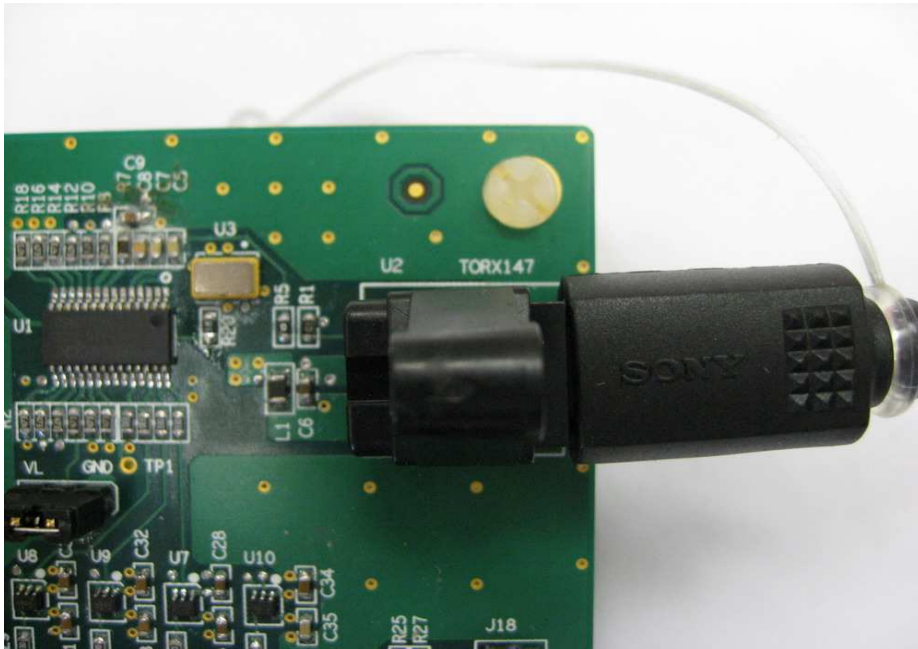


Figure 5: Onboard Digital Audio Source Section

Section 3 – I2C Section:

The SSM2529 can operate with or without I2C control. If it is desired to evaluate the part in Stand Alone mode, simply insert a jumper across the SAMOD and DVDD terminals of J21. To put the part into I2C mode, insert a jumper across the SAMOD and GND terminals of J21.

Stand Alone Mode Operation: Please refer to *Table 1* for the functionality available while in Stand Alone mode.

Normal Op Pin	SA_MODE=1
SCL	Volume Control A
SDA	Volume Control B
STDNb	0 – Shutdown/Mute 1 – Normal Operation
ADDR	1 – PDM
BCLK	0 –16 BCLK Cycles provide by PLL 1 –32 BCLK Cycles provide by PLL clock–32 BCLK Cycles provide off-chip
MCLK	0 – I2S 1 – PCM

Table 1: Stand Alone Mode Settings

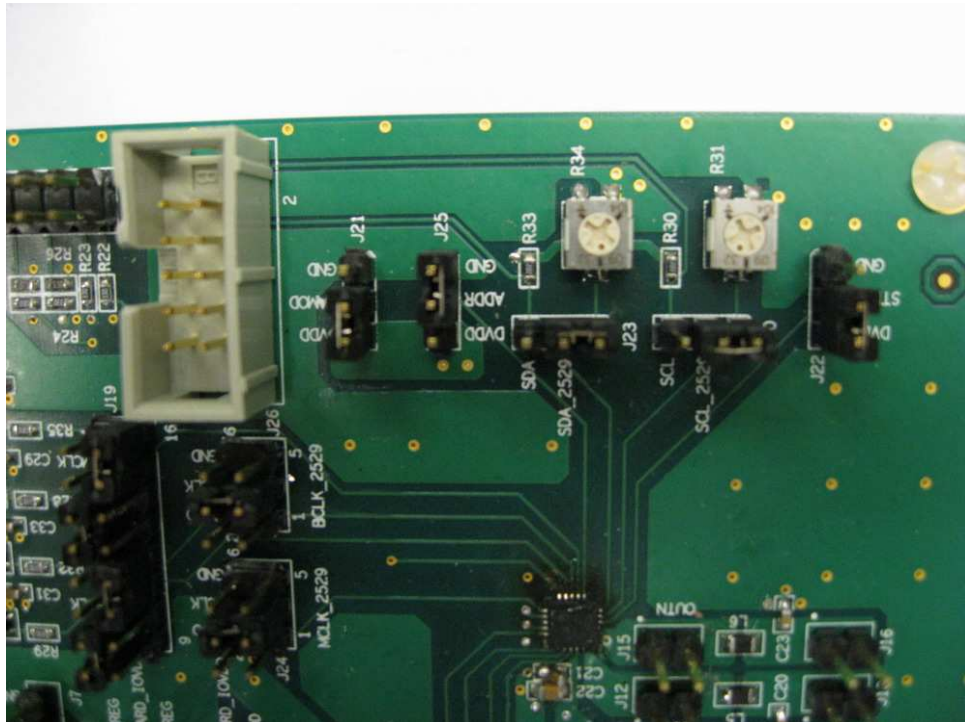


Figure 6: SSM2529 Stand Alone Mode Configuration

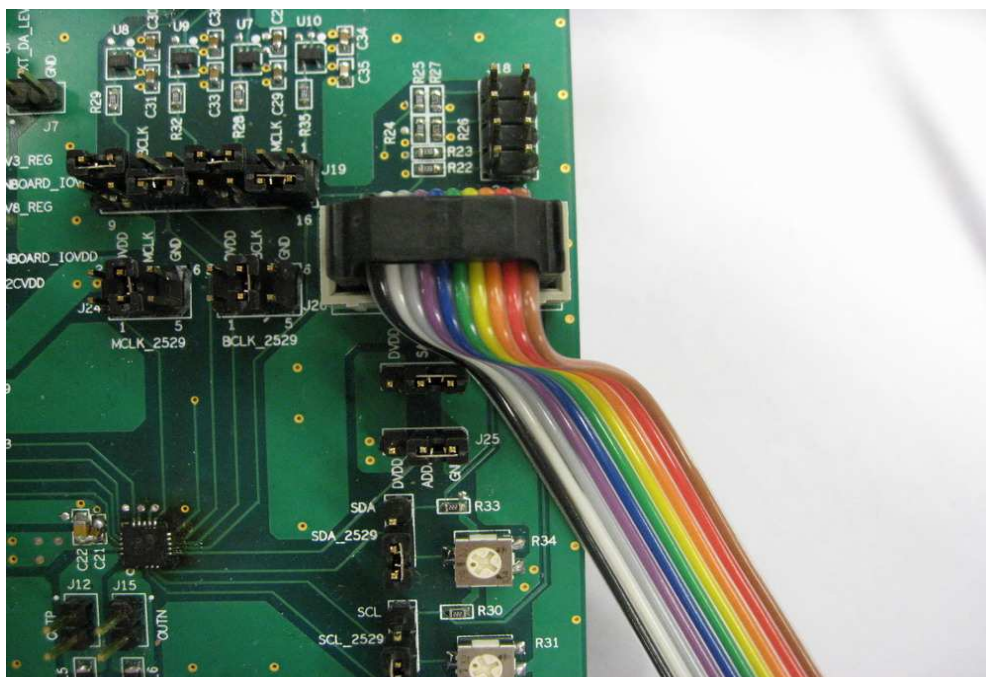


Figure 7: SSM2529 I2C Mode Configuration using ADUSB2 Dongle

Section 4 – GUI / ADUSB2 Installation:

A graphical user interface for the SSM2529 has been created in the Analog Devices, Inc. SigmaStudio environment. SigmaStudio must first be downloaded and installed on the user's PC from the following link:

http://www.analog.com/en/audiovideo-products/audio-signal-processors/products/overview/cu_over_sigmastudio_graphical_dev_tool_overview/resources/fca.html

Please note:

- 1) Do not connect ADUSB2 dongle board until software is installed. Also, please ensure ADUSB dongle is not connected to the SSM2529 evaluation board until the ADUSB drivers are properly installed on the host PC.
- 2) The SSM2529 software interface requires Microsoft .NET Framework (Version 2.0 or newer). The installer will automatically download if .NET v2.0 was not previously installed. A warning: this is a large file and may require a long download time and a fast internet connection.

Once SigmaStudio is properly installed on the user's PC, the ADUSB2 dongle must then be properly installed. This procedure only needs to be executed once on each computer that uses the SSM2529 software. This procedure can be skipped if the user has previously installed any SigmaStudio or USBi related drivers from Analog Devices, Inc.

- 1) Ensure that the ADUSB2 dongle is not attached to the SSM2529 evaluation board.
- 2) Connect the ADUSB2 board to the PC via the USB cable.
- 3) The PC will recognize the new hardware. Once the hardware is recognized, a prompt will ask to let windows find the proper drivers for the hardware. **Do not let Windows install the drivers.**
- 4) The user must direct the driver installation to the following path by clicking the "Browse" tab:
C:\Program Files\Analog Devices Inc\SigmaStudio 3.1\USB drivers
- 5) Once the above path has been properly selected, the user can continue with the driver installation process. Windows will take control and properly establish the link between the Cypress USB controller and the PC.

Section 4 – GUI Operation:

Prior to opening SigmaStudio, please save a copy of the SSM2529 GUI file, SSM2529.DLL in the following directory:

C:\Program Files\Analog Devices Inc\SigmaStudio 3.1

After launching SigmaStudio, follow this sequence to initiate the SSM2529 GUI:

- 1) From the main SigmaStudio window, click File -> New Project to start a new GUI project file
- 2) From the main SigmaStudio window, click Tools -> Add-Ins Browser -> File -> Add .DLL and browse to the location where SSM2529.DLL is stored. This will load the SSM2529 as a "Processor" in the SigmaStudio interface.
- 3) Under the Hardware Configuration window, drag a USBi icon and a SSM2529 icon into the main window. Use your mouse to connect the two icons.
- 4) Click the "Link Compile Connect" icon on the SigmaStudio toolbar to initialize communication from the PC to the ADUSB2 dongle and SSM2529 evaluation board.
- 5) The various user interface options are available by selection via a right mouse click on the main SSM2529 icon in the Hardware Configuration window.
- 6) Upon completion, the project may be saved in order for quick loading.

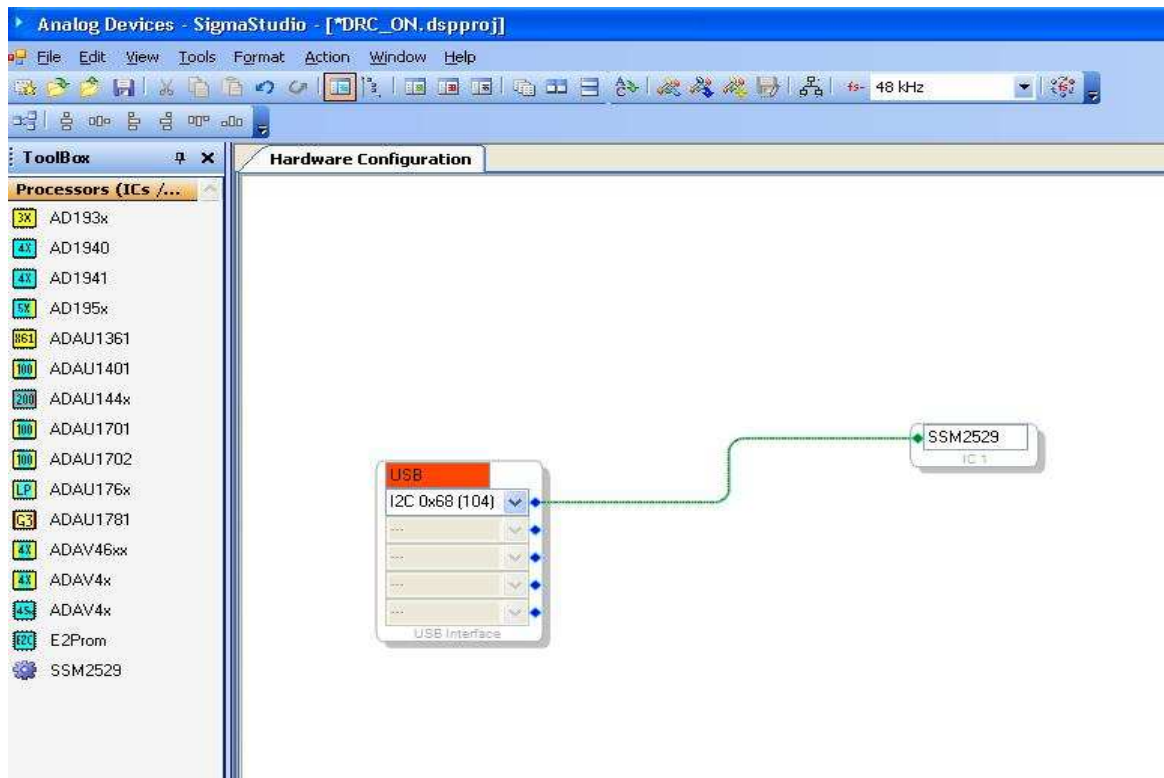


Figure 8: SSM2529 GUI – Initial Project Setup in SigmaStudio (*note, Link-Compile-Connect button is highlighted)

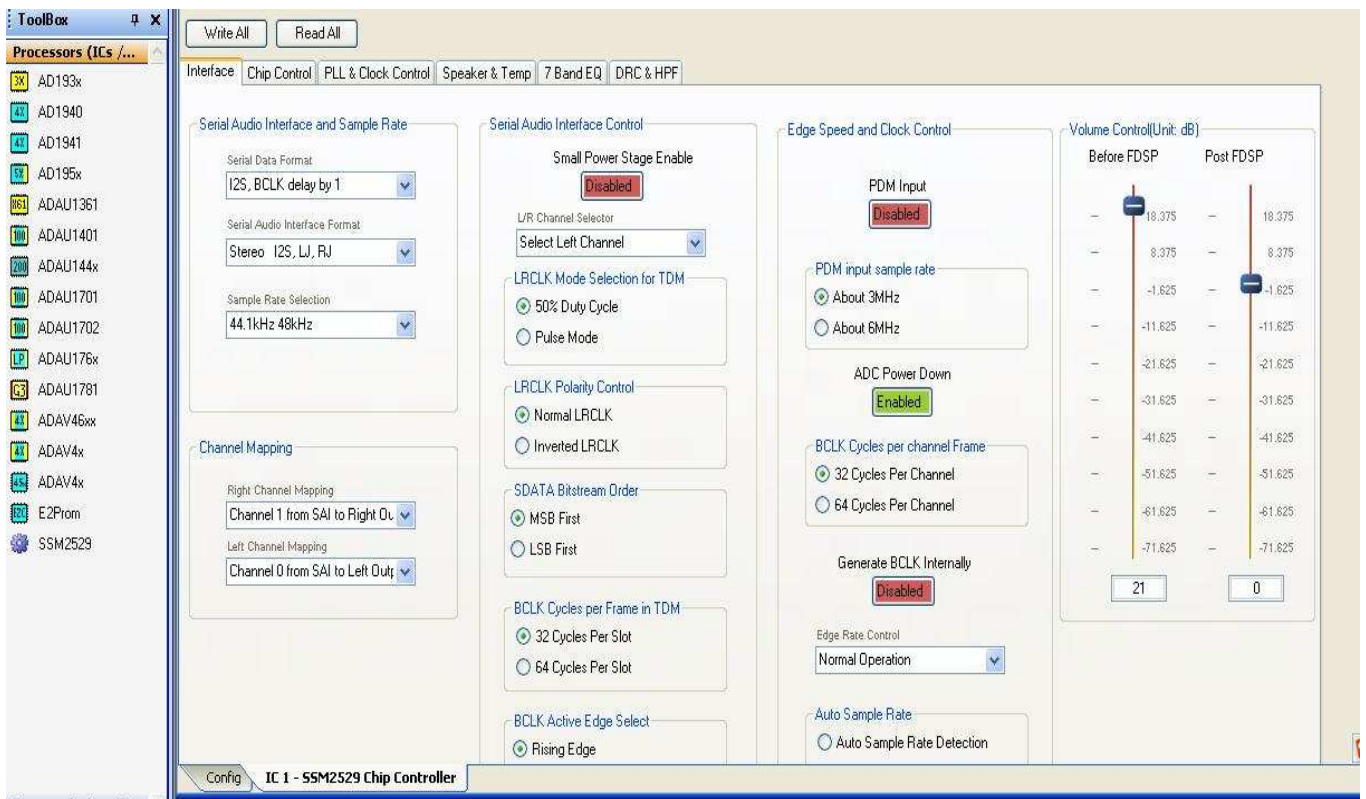


Figure 9: SSM2529 GUI – Main Functionality Window

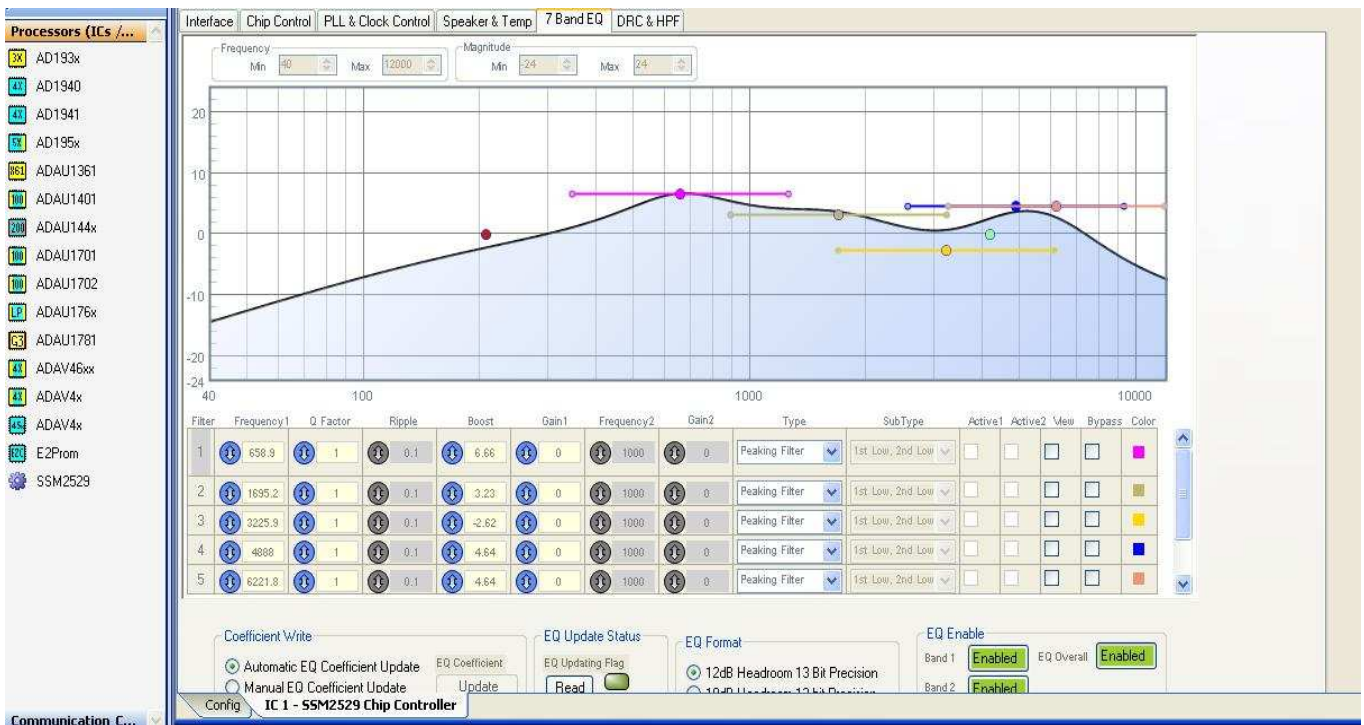


Figure 10: SSM2529 GUI – EQ Functionality Window

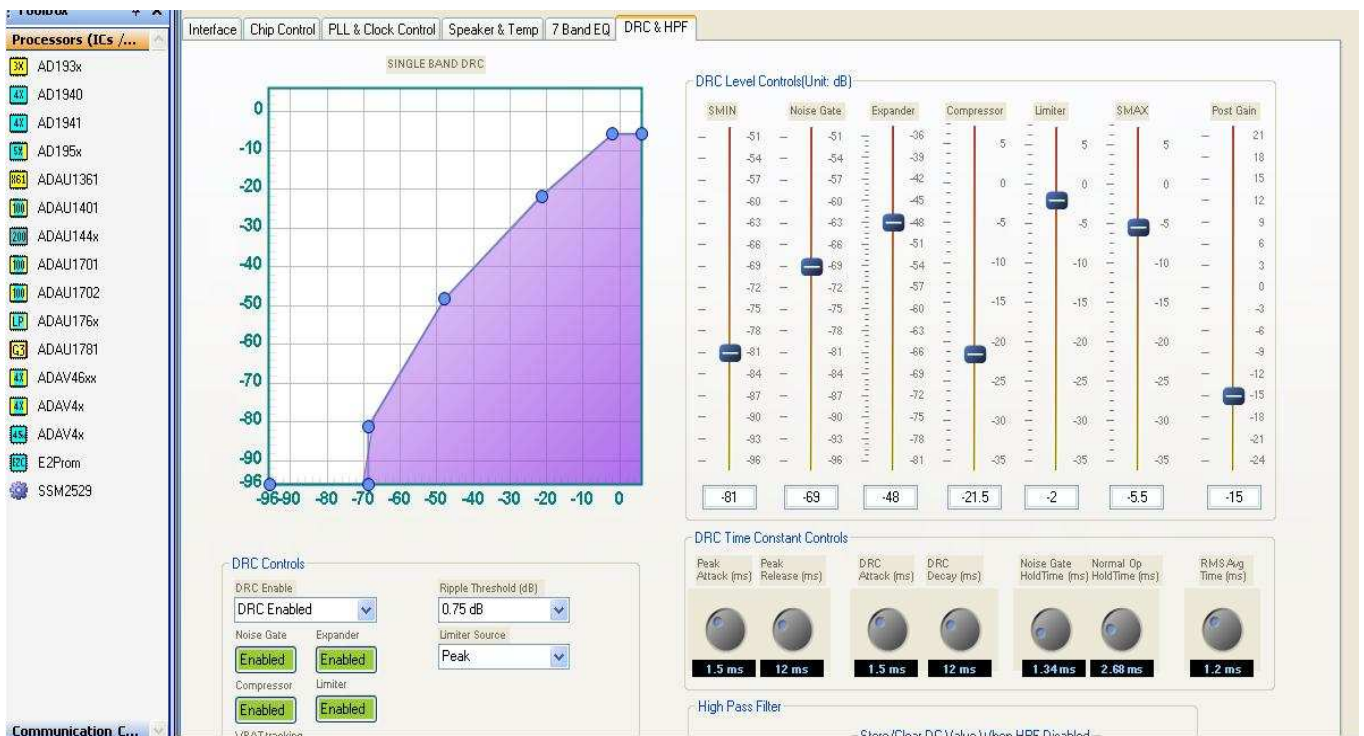


Figure 11: SSM2529 GUI – DRC Functionality Window

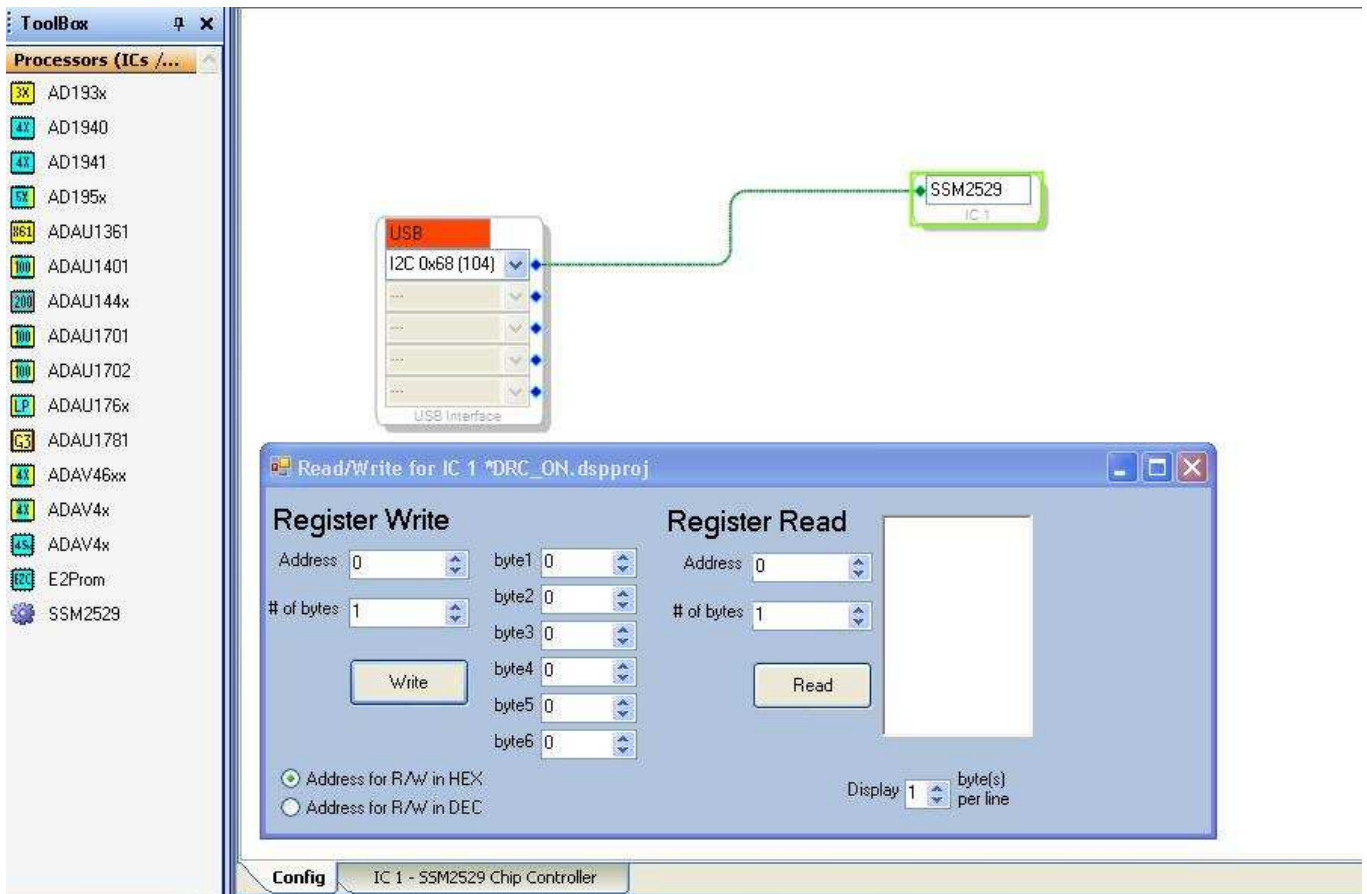


Figure 12: SSM2529 GUI – I2C Register Direct Read/Write Window