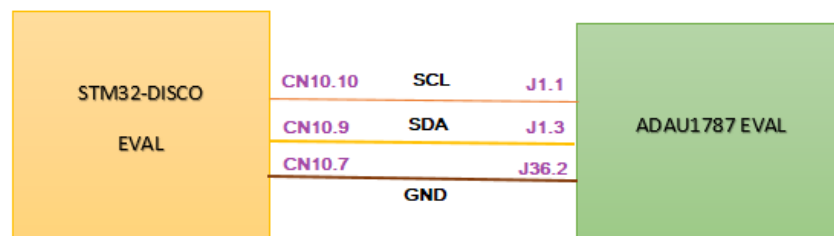
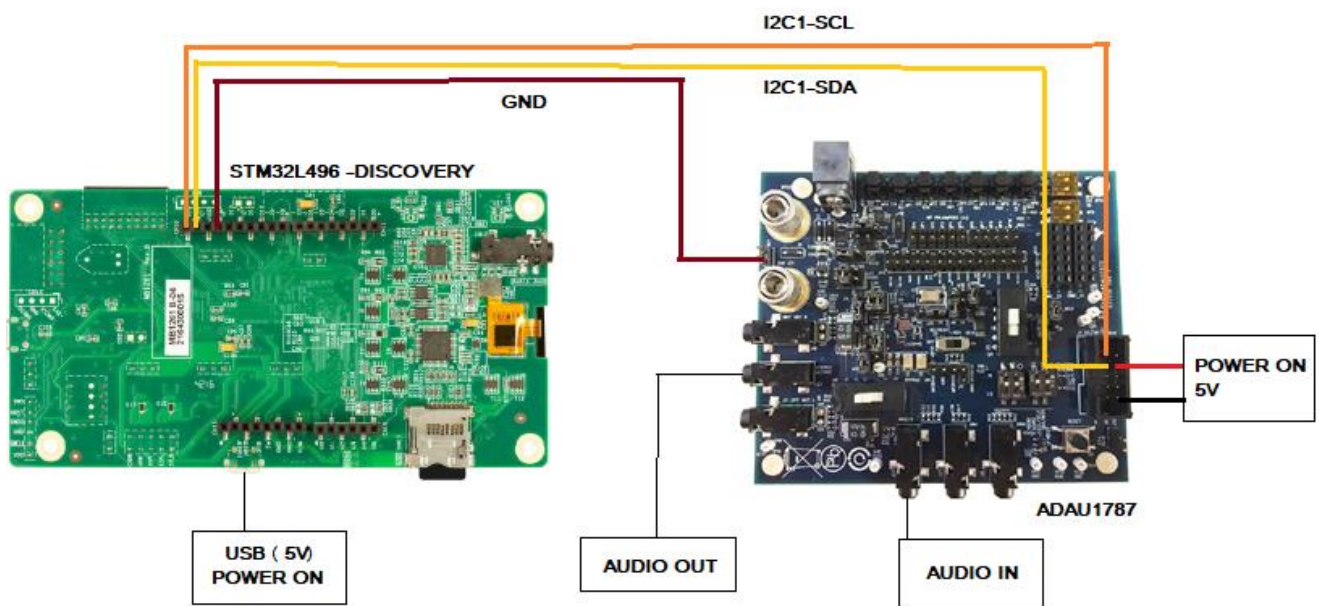


PROGRAMMING ADAU1787 WITH STM32

PROBLEM STATEMENTS

- Not able to get Audio Output at J23 of ADAU1787 when it is programed through a MCU (STM32L496-G) by I2C

HARDWARE CONNECTIONS



STM32- I/O CONFIGURATION

Timing configuration	
Custom Timing	Disabled
I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	100
Fall Time (ns)	100
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x0040364E
Slave Features	
Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length sele...	7-bit
Dual Address Acknowledged	Disabled

- ❖ The VDDIO of STM32 is 1.8V.
- ❖ Since ADAU1787 EVAL-KIT has a ON Board pullup of 1.8V.I have configured my STM32 I2C pins to make use of external pullup that is provided on ADAU1787-EVAL.

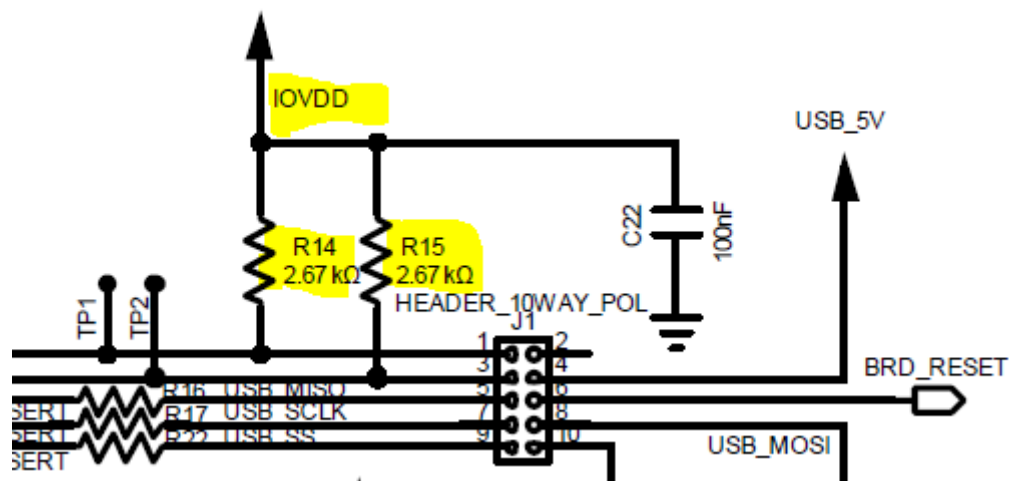
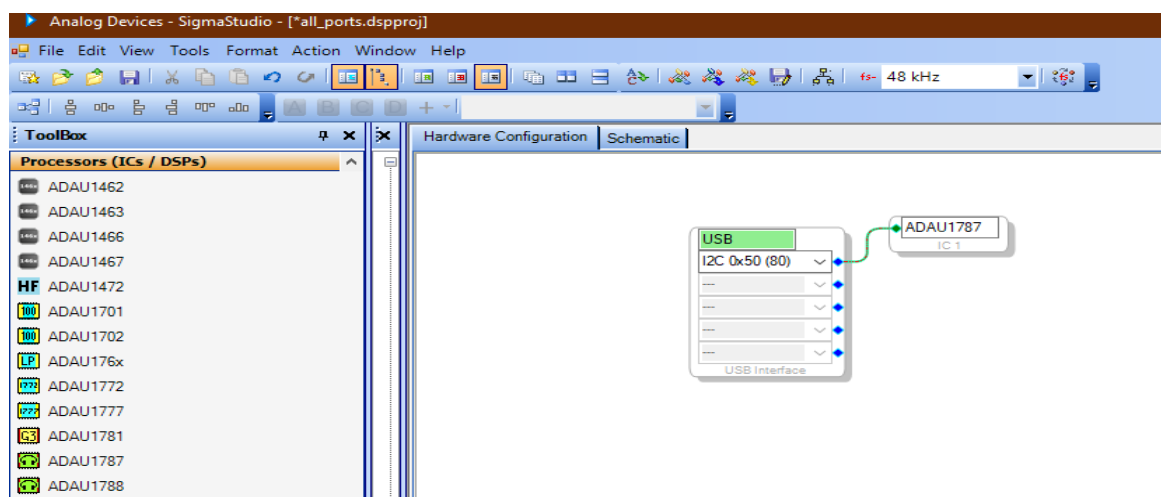
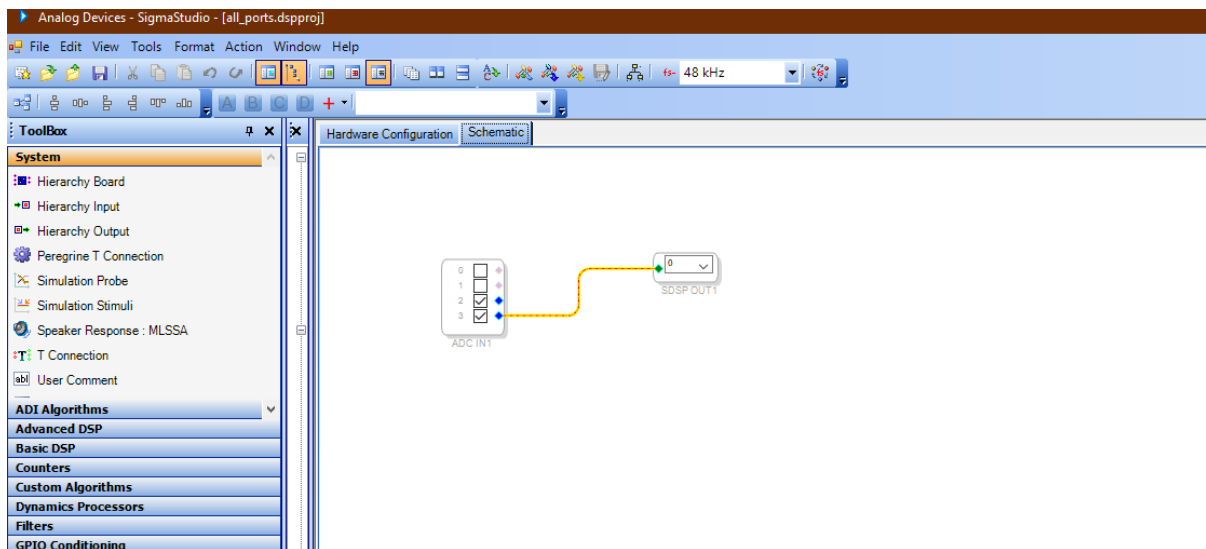


FIG: External pull-up of 1.8V (IOVDD) provided in ADAU1787-EVAL (J1)

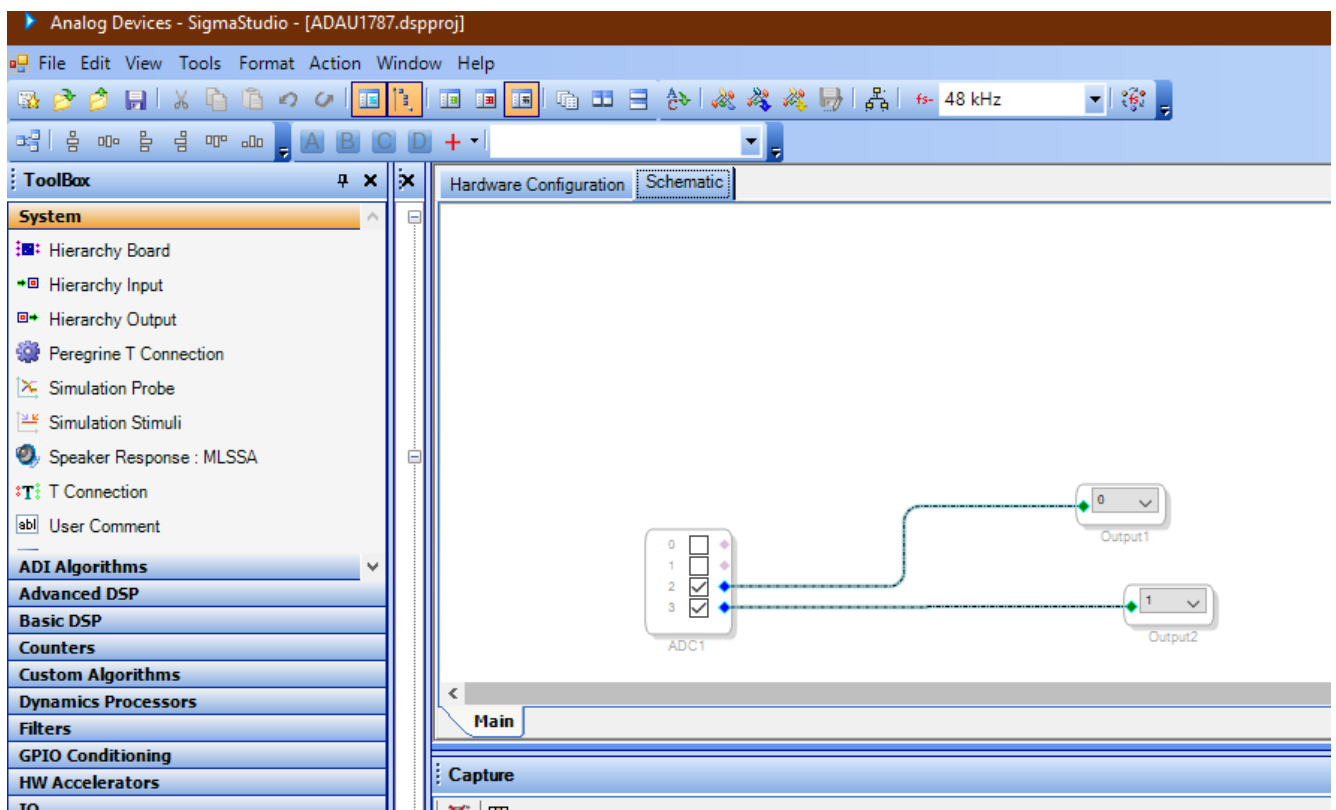
MY ADAU1787 DESIGN





➤ I have provided the sequence of register dump of this design in EXCEL FORMAT, kindly do refer that

BLOG POST ADAU1787 DESIGN



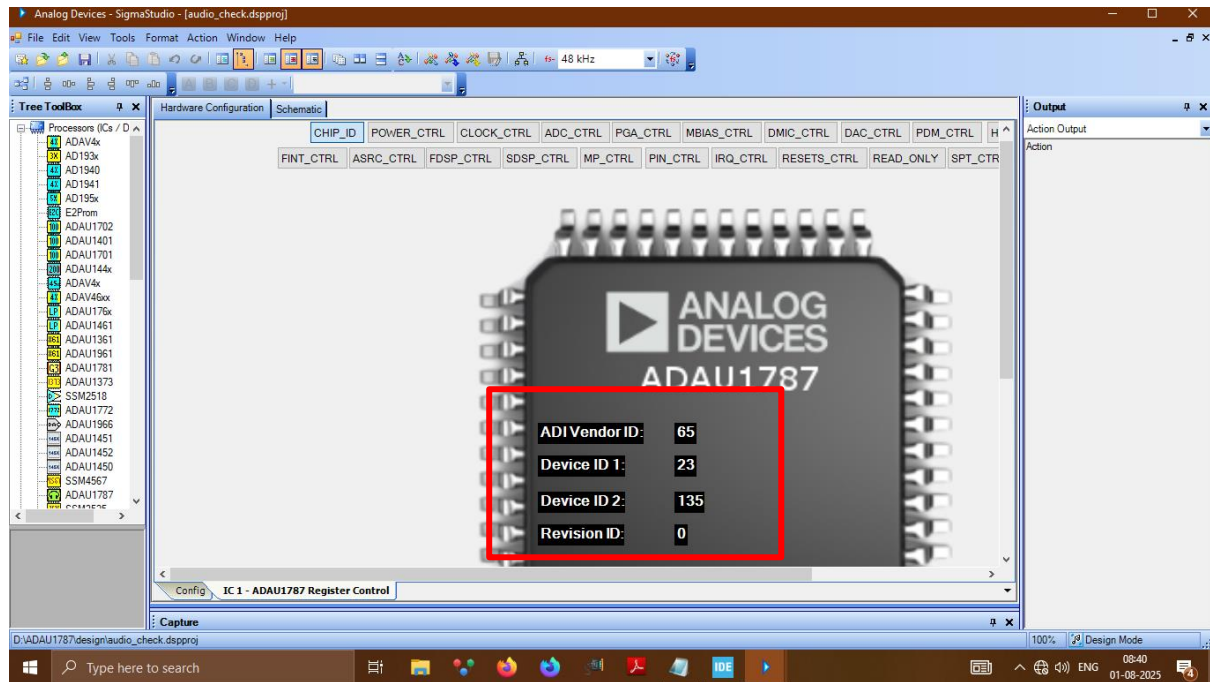


FIG: IC INFO OF ADAU1787

MCU (STM32)-PROGRAM EXPLANATION

```

MODE_0_download();
HAL_I2C_Mem_Read(&hi2c1, 0x28<<1, 0xC000, I2C_MEMADD_SIZE_16BIT, VENDOR_ID, 1, 10);
HAL_I2C_Mem_Read(&hi2c1, 0x28<<1, 0xC001, I2C_MEMADD_SIZE_16BIT, DEVICE_ID_1, 1, 10);
HAL_I2C_Mem_Read(&hi2c1, 0x28<<1, 0xC002, I2C_MEMADD_SIZE_16BIT, DEVICE_ID_2, 1, 10);
HAL_I2C_Mem_Read(&hi2c1, 0x28<<1, 0xC03D, I2C_MEMADD_SIZE_16BIT, Revision, 1, 10);

```

→ **MODE_0_download ()** => is a function that holds the register dump (Register Address And Values) of ADAU1787

→ **STM32 Library function** used to read the data present in the register address.

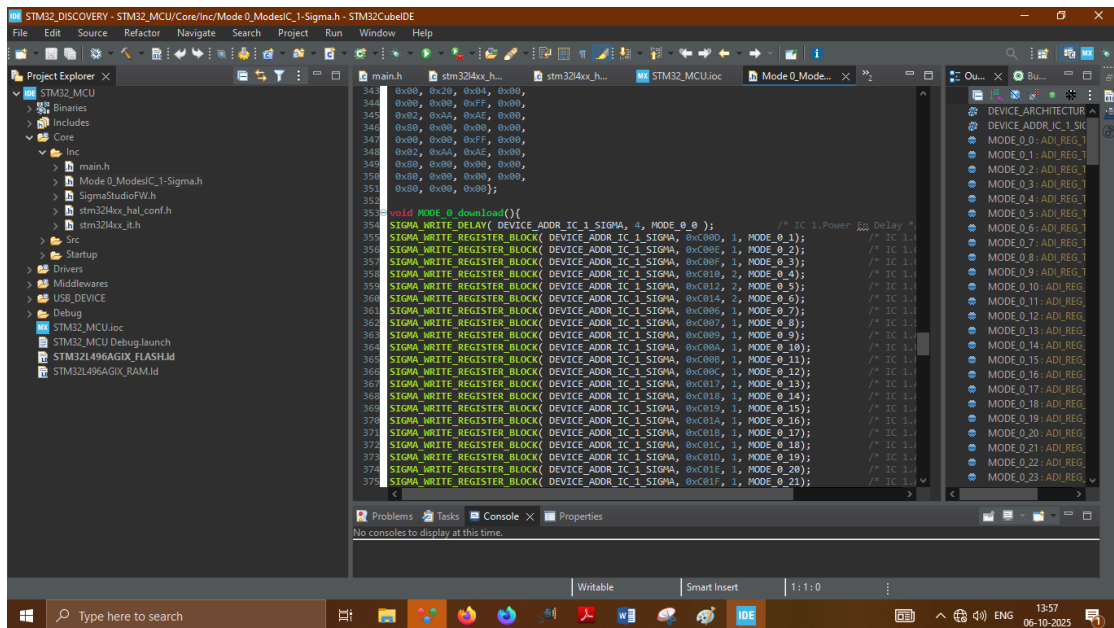


FIG: MODE_0_download () FUNCTION AND ITS REGISTER DUMPS

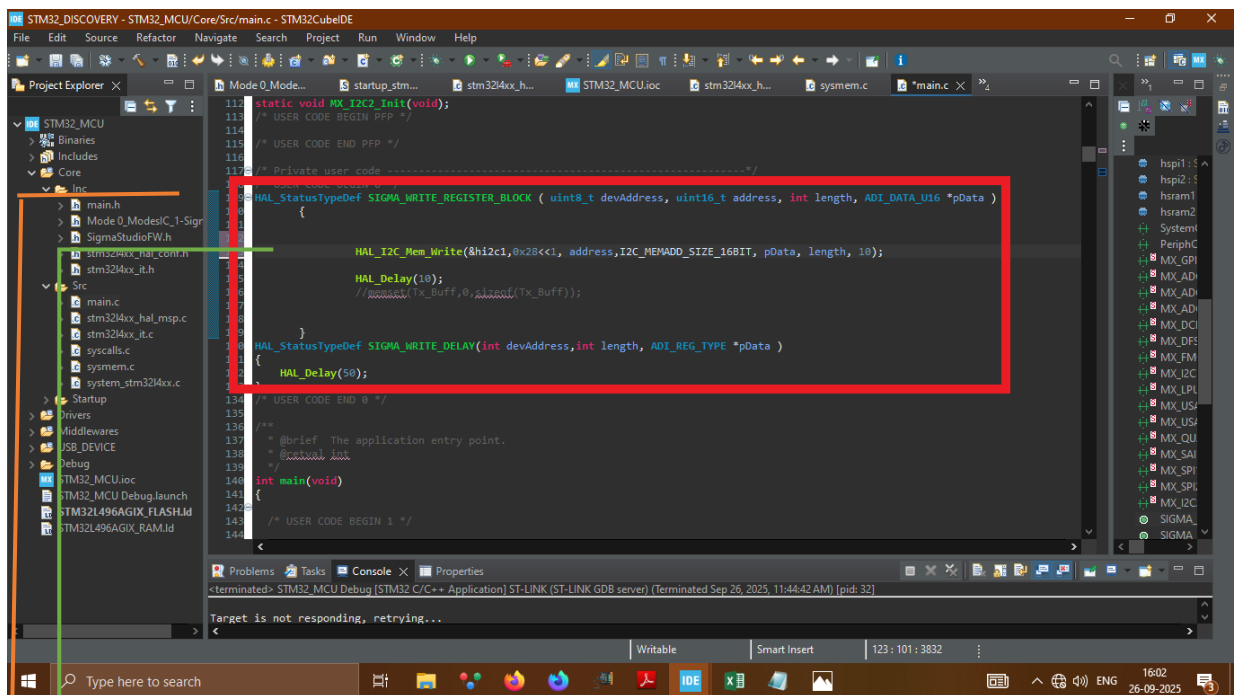


FIG: FUNCTION DEFINITION OF SIGMA_WRITE_REGISTER_BLOCK ()

STM32 library function used to write the data in particular memory address.

The arguments are passed inside the function

❖ RESET BUTTON in ADAU1787 is pressed before MCU tries to load the program every time

TEST CASE 1:

PROGRAMING ENTIRE REGISTER DUMP PRESENT IN MODE_0_download() FUNCTION

ADAU1787 is not in SELFBOOT mode

MCU is just trying to load register address and its corresponding data into ADAU1787

STEP 1: Loading the entire register dump from MCU to ADAU1787 through I2C lines

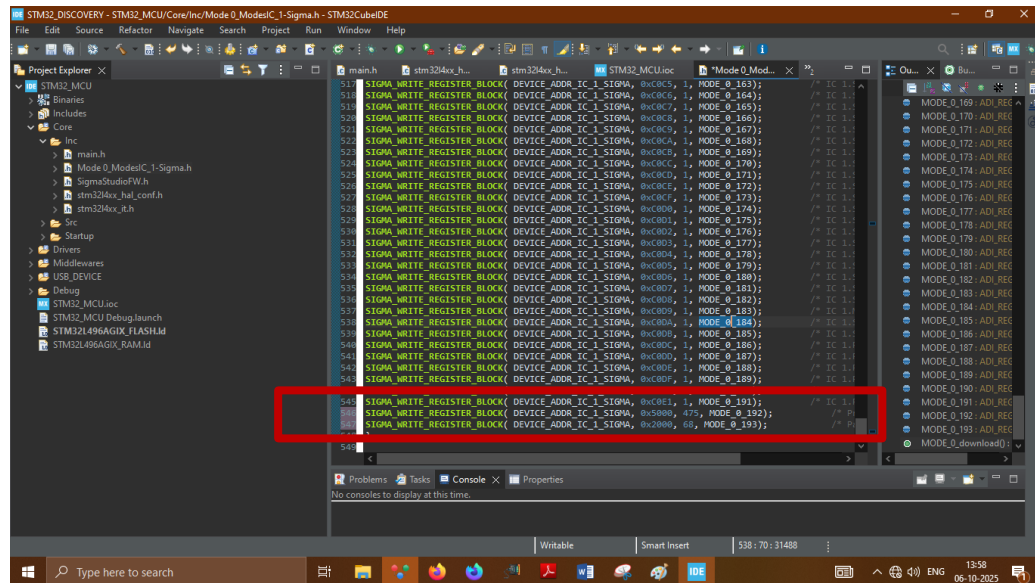
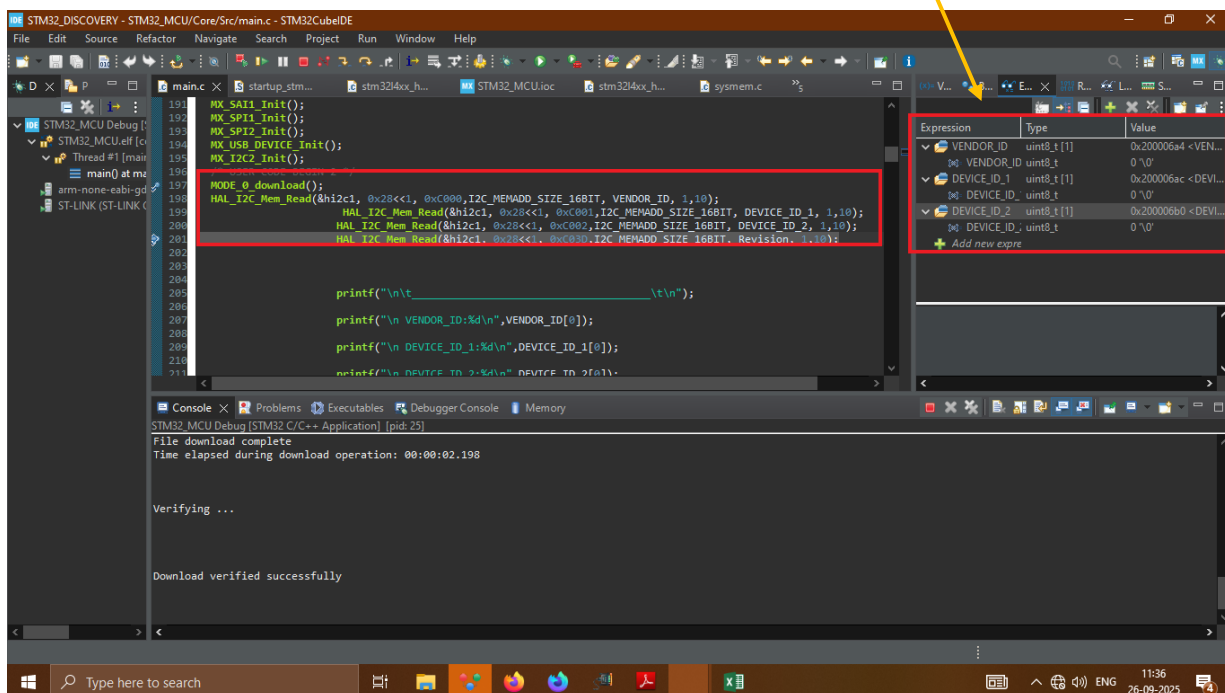


FIG: 0x5000_and_0x2000 REG Address left uncommented

STEP 2: Results observed by reading back the register addresses 0xC001,0xC002,0xC000



TEST CASE 2:

PROGRAMING THE REGISTER DUMP WITH REG ADDRESS 0x5000 AND 0x2000 COMMENTED IN MODE_0_download() FUNCTION

ADAU1787 is not in SELFBOOT mode

MCU is just trying to load register address and its corresponding data into ADAU1787

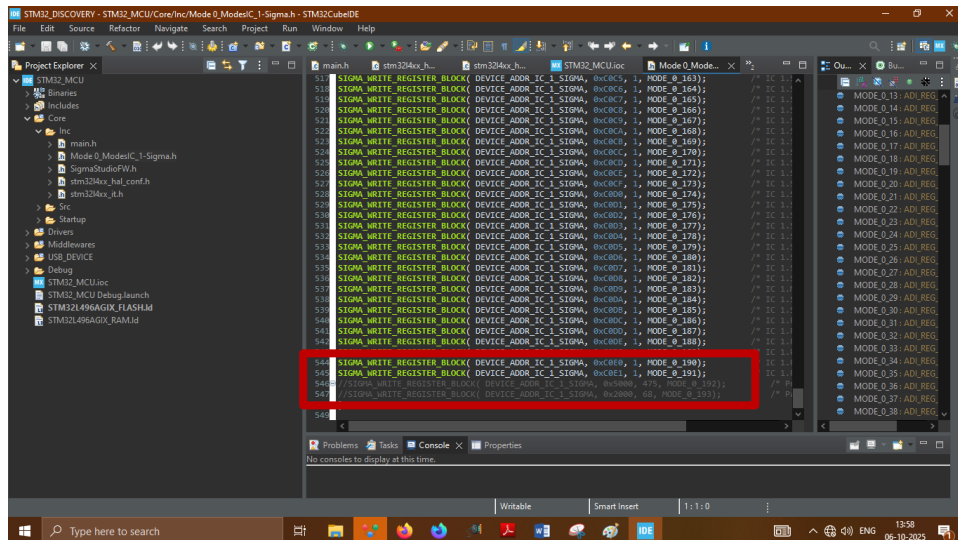
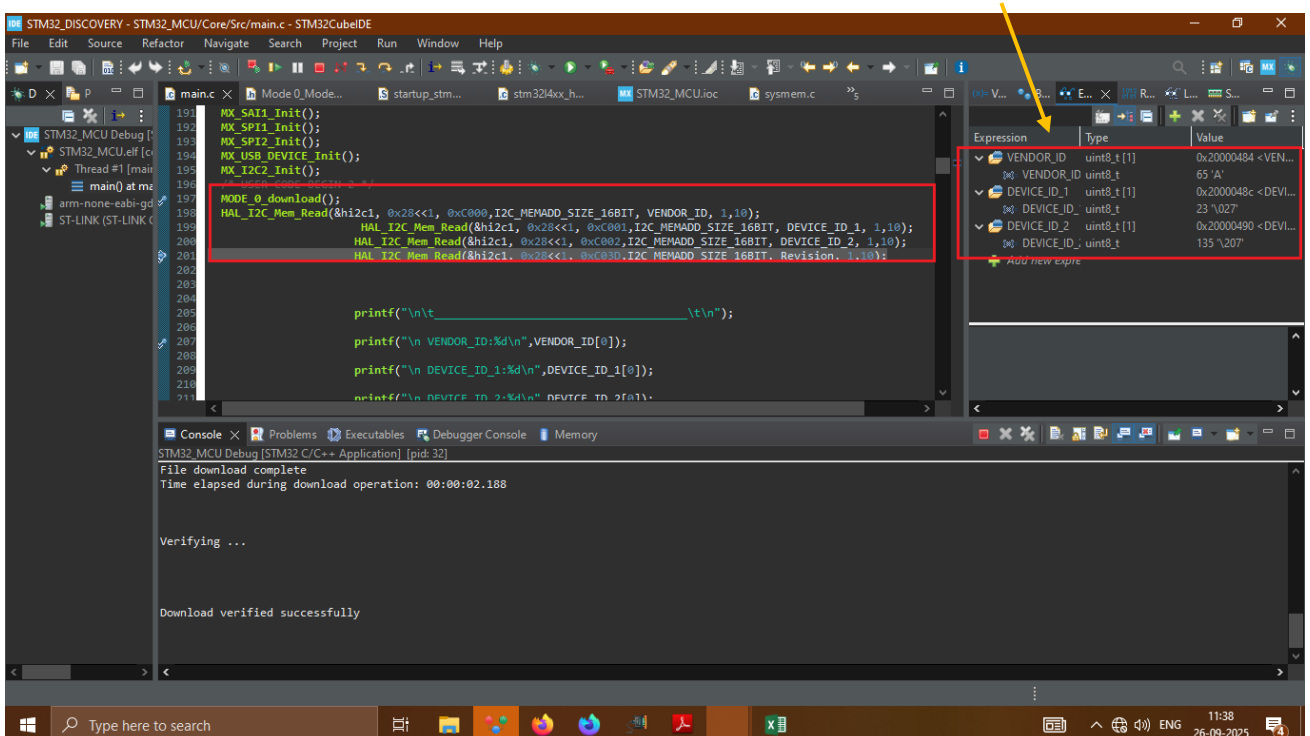
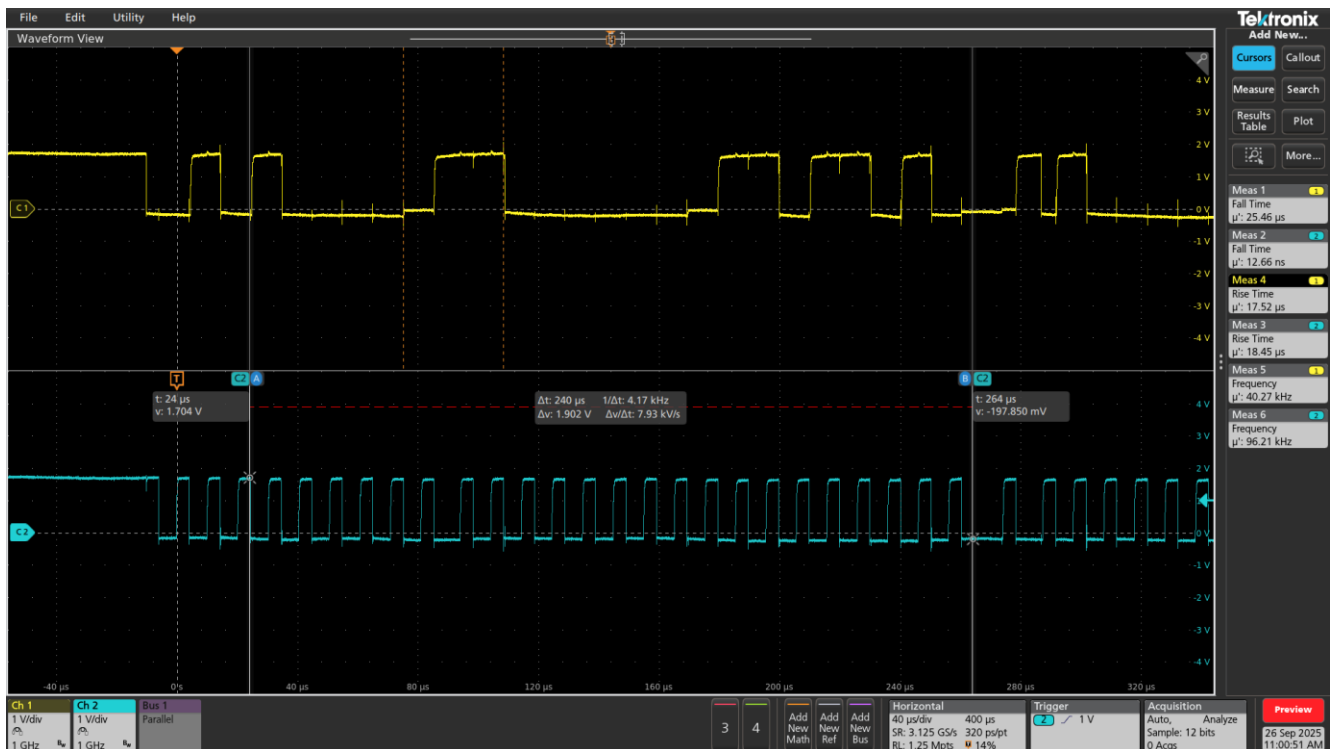


FIG:(REGISTER ADDRESS AND ITS VALUE) 0x5000_and_0x2000_commented in
MODE_0_download() FUNCTION

Results observed by reading back the register addresses 0xC001, 0xC002, 0xC000 (same as IC INFO)



OSCILLOSCOPE OUTPUT



TEST CASE 3:

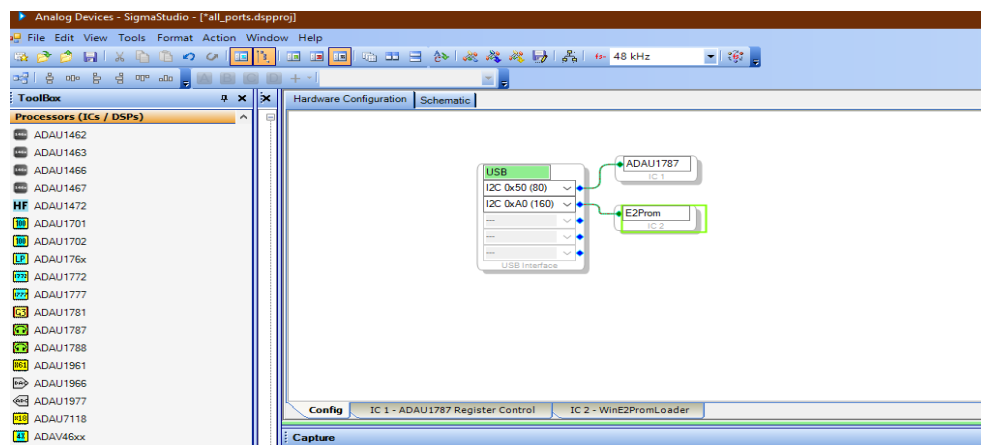
READING REGISTER VALUES OF ADAU1787 WITH STM32

ADAU1787 is in **SELFBOOT** mode

MCU is trying to **read** register address and its data, which is already loaded in ADAU1787

Program is already loaded in ADAU1787 using Sigma Studio and kept it in SELFBOOT MODE

This exercise is just performed see whether our MCU is communicating with ADAU1787 properly. But my ultimate aim is to make MCU program my ADAU1787



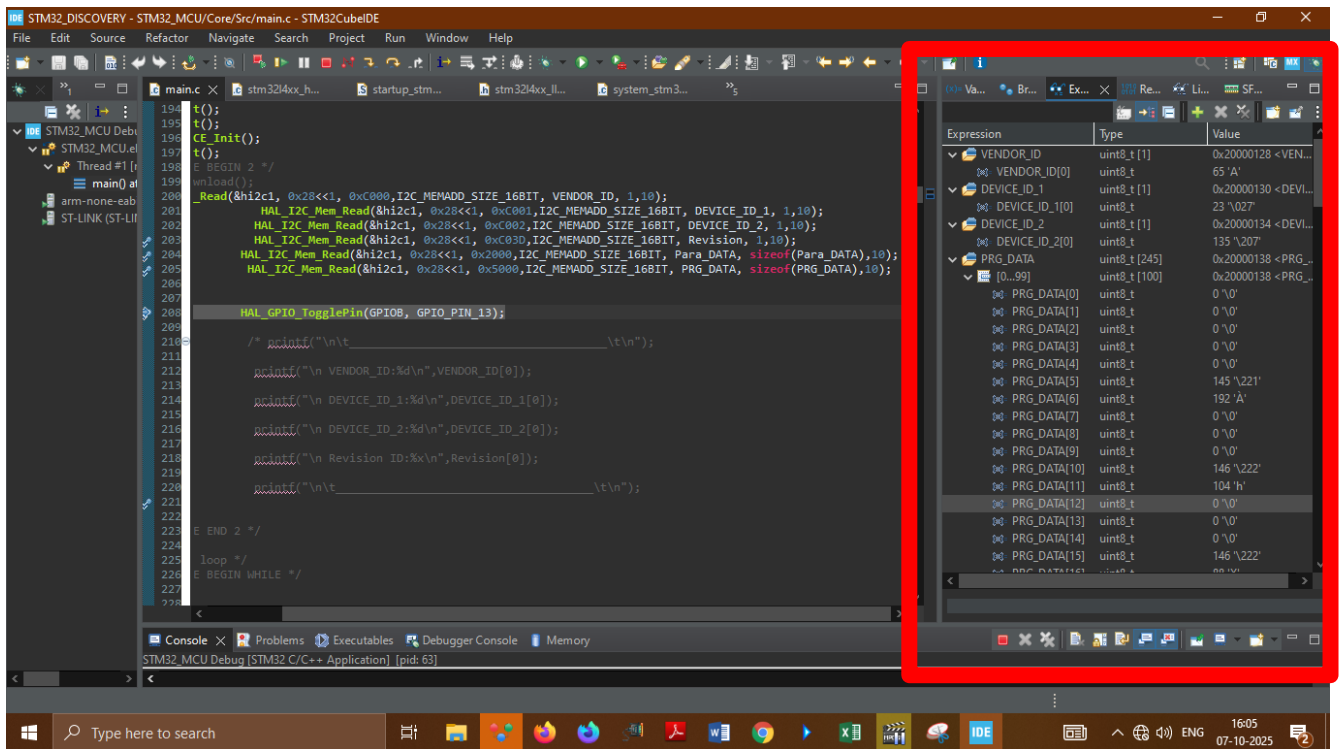


FIG: Values obtained by reading register address 0xC001, 0xC002, 0xC000, 0x5000 when ADAU1787 is in SELF BOOT MODE

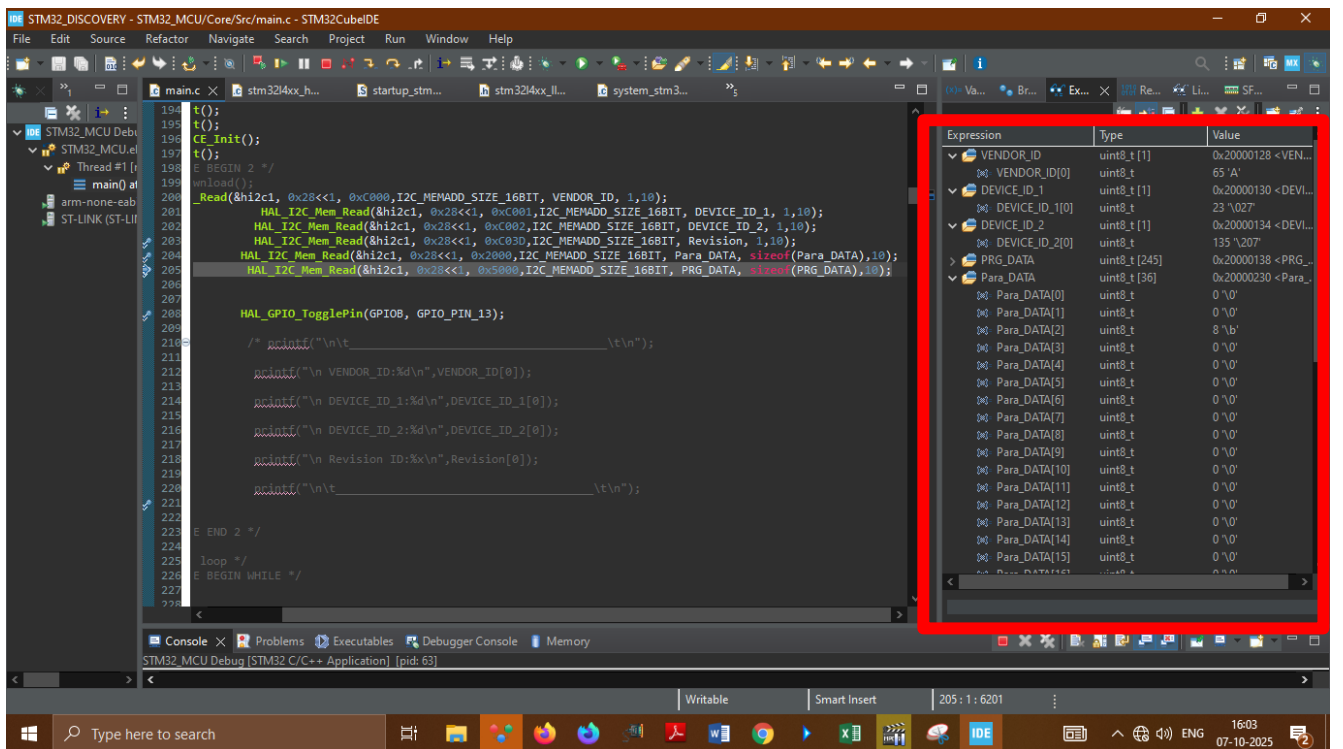


FIG: Values obtained by reading register address 0xC001, 0xC002, 0xC000, 0x2000 when ADAU1787 is in SELF BOOT MODE

TEST CASE 3 RESULTS:

- While feeding audio input I'm able to hear the audio out at J23 of ADAU1787
- The values present at register address (0xC001, 0xC002, 0xC000) are correct.

INTERPRETATION FROM TEST CASES-1, 2, 3

- While loading the entire register dump (along with program data and parameter data registers (0x5000 and 0x2000)) I am not able to read back data in the register address (0xC001, 0xC002, 0xC000) and also not able to see any output at the audio out (J23) in ADAU1787.
- Loading register dump with register address 0x5000 and 0x2000 commented I am able to read back data in the register address (0xC001, 0xC002, 0xC000)
- I am able to write and read the control register data through MCU problem arises only when I try to load data to register address 0x5000 and 0x2000 and I'm not able to see any output at my ADAU1787

These TEST CASE'S (1,2) are performed by the working code present in the following blog post of engineer zone <https://ez.analog.com/dsp/sigmadsp/f/q-a/597711/there-are-serious-bugs-when-generating-the-mcu-configuration-file-for-adau1787-using-sigma-studio-4-7-there-are-serious-bugs-when-generating-the-mcu-configuration-file-for-adau1787-using-sigma-studio-4-7/578314> the same kind of results are observed even if I use my own design and its register dump (I'm following the same sequence that I saw in capture window for my design)