

Load TAS5825M Configurations from EEPROM via SPI

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ABSTRACT

Loading TAS5825M configurations from an external serial EEPROM via SPI is necessary in some audio systems that require a very short load time. This application report explains the entire loading procedure in details.

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1 Introduction

The TAS5825M device is usually initialized by a host processor via I2C. However, a few audio systems demand a very short load time. In this use case, loading configurations from an external EEPROM via SPI is necessary due to the much higher speed full-duplex communication supported by SPI. Figure 1 shows how a TAS5825M device and a serial SPI EEPROM are connected to a host processor.

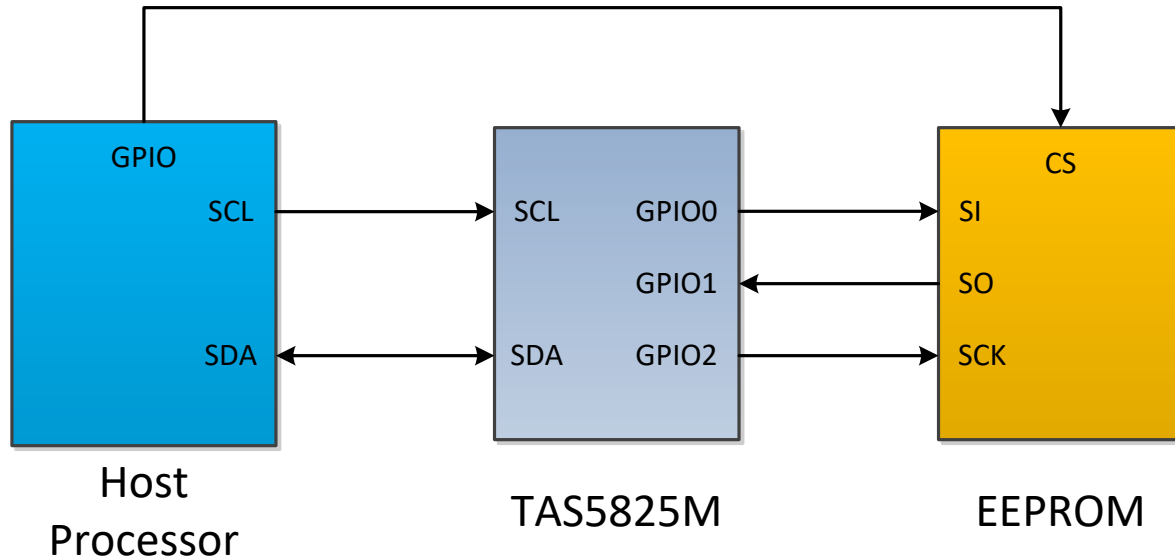


Figure 1. Typical Connections

2 Loading Procedure

The entire loading procedure can be split into three major steps:

1. Host processor downloads Book 0 register configurations to the TAS5825M device via I2C. This step cannot be ignored because these register configurations cannot be loaded directly from the external EEPROM.

NOTE: Book 0 registers refer to the registers that are described in details in the Register Maps of TAS5825M datasheet. They are all located in the Book 0.

2. Host processor initiates a load request and then the TAS5825M device starts to load configurations from the EEPROM via SPI automatically.
3. Host processor checks whether the configurations are successfully loaded and initiates another load request if the first request fails.

3 Tutorial

A tutorial is provided for each step.

3.1 Book 0 Register Configurations and EEPROM Image

The Book 0 register configurations and EEPROM image can be generated by using the Dump feature found in the End-System Integration Page.

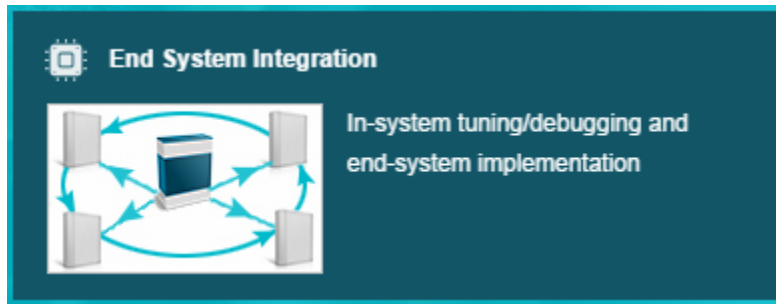
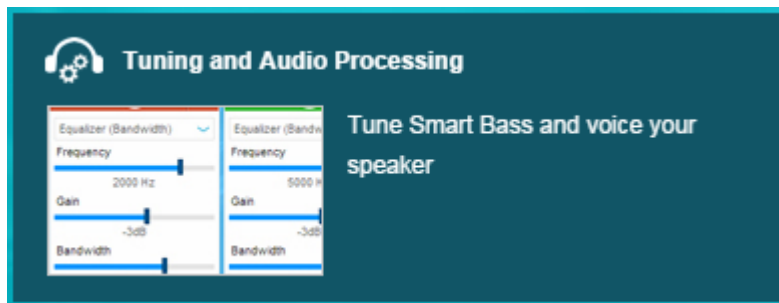


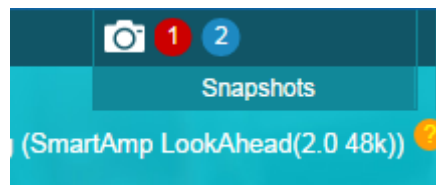
Figure 2. End-System Integration

NOTE: A [TAS5825MEVM](#) must be connected, and the system gain calibration must be performed properly.

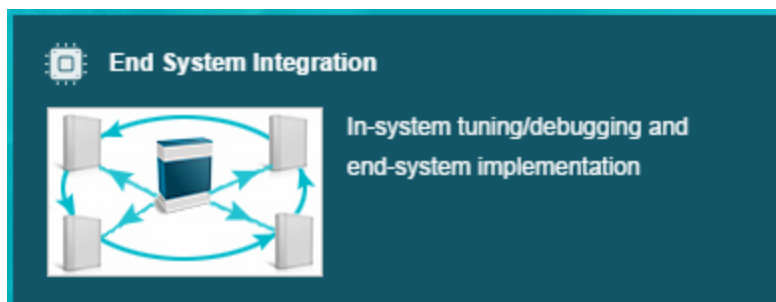
1. Open *Tuning and Audio Processing*. This loads tuning settings to the target TAS5825M device on the EVM.



2. Select the desired *Snapshot* if any has been saved before.



3. Go into *End System Integration*.

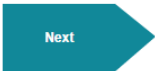


4. Select *Dump Current State into a Header File*.

App Center > TAS5825M Home > End System Integration

What would you like to do?

- Dump Current State into a Header File**
Choose this option to download the code to a header/cfg file. This generated file will contain the register addresses and the corresponding values that have to be written to the device during boot up.
- In-System Debugging**
Choose this option to read or write register values in the end system. Only Register Map and Direct I2C screens will be available.
- In-System Tuning**
Choose this option to make fine adjustments in the end system.

Next 

5. Click the *Dump to File* button. Make sure the right Destination and Format are selected.

Summary



Choose the settings with which to create header/cfg file.

Base Sample Rate :	48 KHz	Selected Sample Rate :	Auto-Detected
Selected Audio Mode :	SmartAmp LookAhead(2.0 48k)	Destination :	File
End System I2C Address :	0x98	Format :	.eeprom
Burst :	1	Dump Mode :	Current State

[Click here to open the folder location of generated header files](#)

Dump to File

Two files like the following are generated. Basically, the .cfg file is the Book 0 register configurations and the .eeprom file is the EEPROM image file.



3.2 EEPROM Programming

EEPROM manufacturers usually provide programming tools. In addition, there exist quite a few universal programmers that are able to support a variety of EEPROM chips from different manufacturers. Use the programming tool provided to program the EEPROM chip connected to the TAS5825M using the EEPROM image that has been built in [Section 3.1](#).

3.3 Loading Configurations from EEPROM

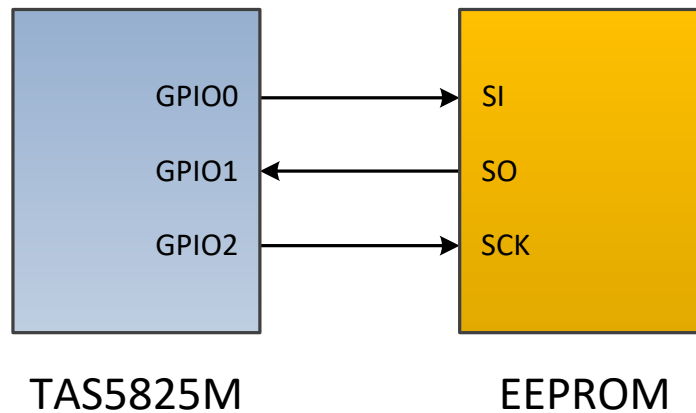
1. Make sure the chip select (CS) pin of EEPROM is high.
2. Host processor downloads Book 0 register configurations (the .cfg file generated in [Section 3.1](#)) to the TAS5825M device via I2C.
3. Put the TAS5825M into SLEEP or DEEP SLEEP mode.

```
w 98 00 00
w 98 7f 00
w 98 03 01 #Put TAS5825M into sleep
```

4. Configure GPIO pins as SPI.

```
w 98 61 0d #Configure GPIO0 as SPI MOSI pin
w 98 63 0c #Configure GPIO2 as SPI CLK pin
w 98 64 80 #GPIO1 is selected as SPI MISO pin
w 98 60 05 #Configure GPIO0 and GPIO2 as output pins
w 98 48 0c
```

NOTE: It is assumed that the connections between TAS5825M and EEPROM are as follows.



5. Set EEPROM starting address for read operations.

```
w 98 58 00 #Starting address = 0x000000 (24bit)
w 98 59 00
w 98 5a 00
```

6. Pull low the chip select (CS) pin of EEPROM.
7. Host processor checks whether the configurations are successfully loaded.

```
r 98 5b 01 #Check whether the load operation is done yet.
           #Make sure the LOAD_EEPROM_DONE bit of return value is set to 1.

r 98 71 01 #If the LOAD_EEPROM_ERROR bit is 0, that means configurations
           #in the EEPROM are successfully loaded.
```

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