

QUICK START GUIDE

EVAL_AUDIO_MA12040

Class D Audio Team
March 2019



Product overview and features

Overview

The demonstration board [EVAL_AUDIO_MA12040](#) is an evaluation and demonstration board for MERUS™ audio [MA12040](#). It contains analog inputs and a variety of output and setup/selection features. It also contains two on-board power supply generators (5 V and 3.3 V buck-converted) so only one external power supply (PVDD) is necessary. The board can be used for evaluating or demonstrating key features/advantages of the MERUS™ technology:

- > Energy efficiency: Power losses at typical audio listening levels / Idle power loss
- > Adaptive power management system
- > Minimum output filter components: Significant cost and size reduction.
- > THD performance and audio quality

> General features and audio performance

| | |
|-------------------------------|---------------------------|
| Number of audio channels | 2xBTL, 1xPBTL, 1xBTL+2xSE |
| Audio input format | Analog |
| Amplifier gain | 20 dB / configurable 26dB |
| Supply voltage | 18 V |
| Output noise level | <100 uVrms(AW) |
| Dynamic range | >100 dB |
| Idle consumption @ PVDD=18V | <16 mA |
| Crosstalk | <-85 dB |
| Efficiency, full-scale, 8 ohm | 91% |

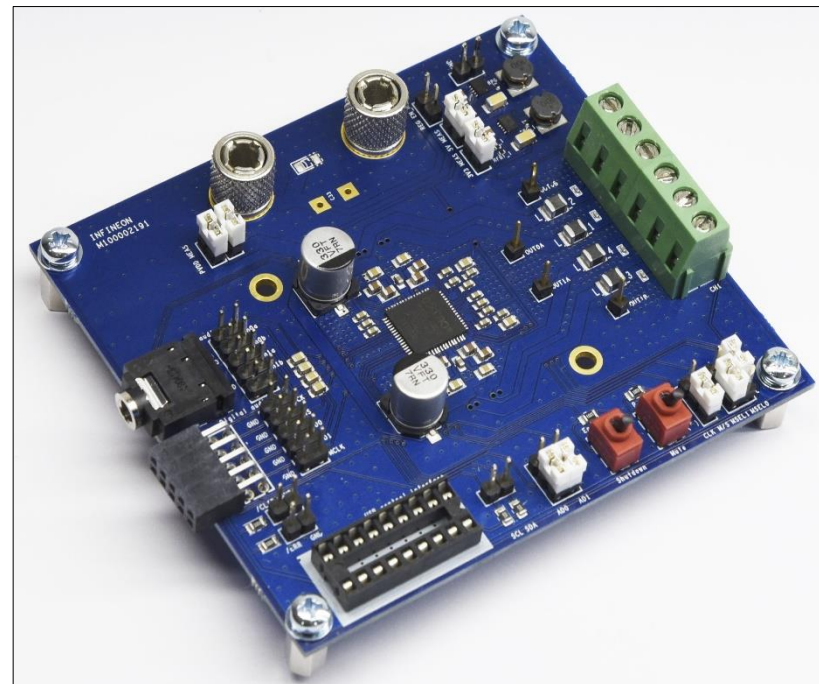


Figure 1. Overview of EVAL_AUDIO_MA12040 evaluation board

Board description

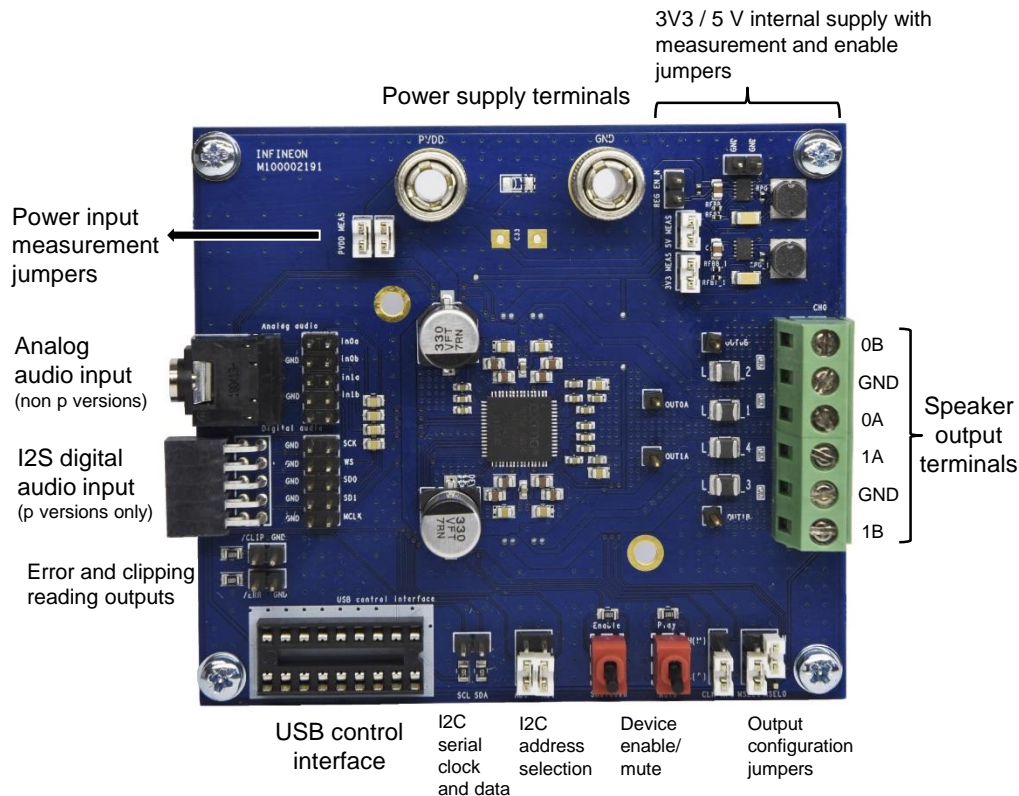


Figure 2. Top board view of EVAL_AUDIO_MA12040

> Recommended operation conditions

| Parameter | Part Nr | Minimum | Nominal | Maximum | Unit |
|---|---------|---------|---------|---------|-----------------|
| PVDD | MA12040 | 5.5 | | 18 | V |
| Output peak current | MA12040 | | | 6.0 | A |
| AC Analog input level IN0A, IN0B, IN1A, IN1B | MA12040 | | | 6.0 | V _{pk} |

> Typical audio and electrical specifications

(BTL default configuration; Power Mode Profile = 0)

| Parameter | Conditions | Typ | Unit |
|-----------------------------------|----------------------------------|-------|------|
| Output power p/channel (peak) | THD+N = 10%, RL = 4 Ω, f = 1 kHz | 40 | W |
| Output power p/channel (peak) | THD+N = 10%, RL = 8 Ω, f = 1 kHz | 20 | W |
| Total harmonic distortion + noise | 1kHz, POUT = 1 W, RL = 4 Ω | 0.008 | % |
| Total harmonic distortion + noise | 1kHz, POUT = 20 W, RL = 4 Ω | 0.010 | % |
| Efficiency* | POUT = 2×40 W, 4 Ω, PMP = 0 | 87 | % |
| Efficiency* | POUT = 2×20 W, 8 Ω, PMP = 0 | 91 | % |

* Efficiency values do not take into account the 5 V and 3V3 board power supplies' consumption.

Default configuration for a quick start

Slides 4 and 5 describe the start up and quick start operation procedures with the following configuration:

Verify that the jumpers are set in the following positions:

Single ended audio sources

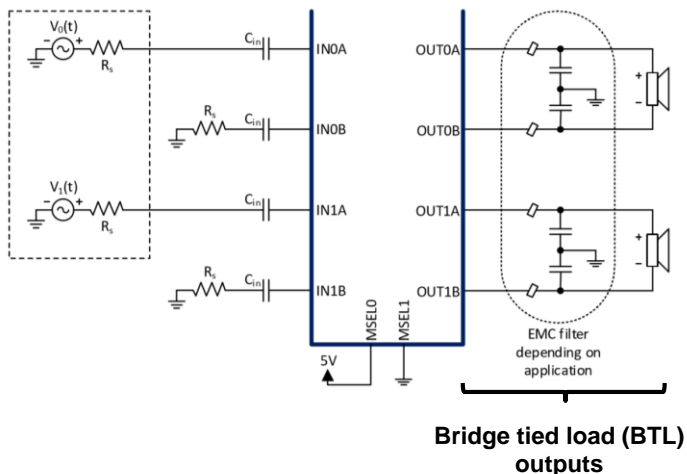


Figure 3. Bridge tied load (BTL) configuration with single ended inputs for MA12040

Note: Please refer to the manual for other Input/Output configurations. Typically balanced/differential inputs should be used to obtain optimum audio performance.

| Jumper | State | Picture |
|---------------|---|---------|
| MSEL0 | H | |
| MSEL1 | L | |
| CLK M/S | H(M) | |
| AD0 & AD1 | L | |
| Analog audio | Jack input = all jumpered Balanced input = use individual pints. | |
| Digital audio | Do not Jumper | |
| PVDD MEAS | Jumpered | |
| 3V3 & 5V MEAS | Jumpered | |
| REG EN_N | Do not Jumper | |

Power up and start procedure

Although it is not necessary to configure the MA12040 for quick start purposes, the following slides describe also the installation process of its software tool. This will allow to monitor and configure the power mode profiles. Power mode profile 0 is configured by default.

1. Before connecting any source or load (speaker) make sure all of them are turned off.
2. Open your web browser and download the USB control interface drivers from the following [Link](#). Press “setup executable” to download the automatic installation. Run the downloaded file “CDM21228_Setup” and follow the instructions to install the driver. **Do not connect the USB cable while the installing process in running.**



Figure 4. File download for USB control interface drivers

3. Open your web browser and download the software from the following [Link](#). A complete folder will be downloaded with the executable file “MA120xx_GUI” of gui software. — [Software](#)

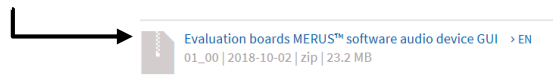


Figure 5. File download for GUI software

4. Make sure toggle buttons are in “shutdown” and “mute” positions.



Figure 6. Toggle buttons set to “mute” and “shutdown”

5. Connect all the sources and speaker/load cables:
 - a) Audio source to the analog audio jack input
 - b) Power source and its ground to PVDD and GND
 - c) Speaker/load to audio output terminals
 - d) USB control interface to the computer.

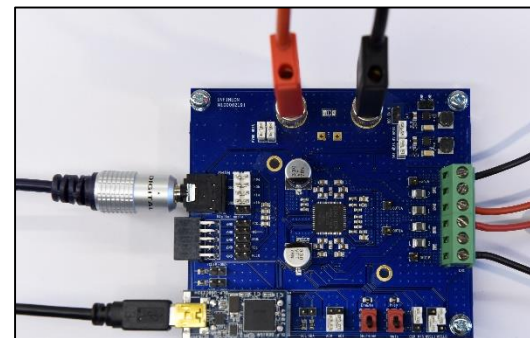


Figure 7. Complete evaluation board connections.

Power up and start procedure

6. Turn on the PVDD supply
7. Start board by setting toggle switch to “enable” position.



Figure 8. Left toggle switch set to “enable” position.

8. Open the “MA120xx_GUI” file to run the monitoring interface.



Figure 9. MA120xx control software interface

9. If the connection was successful it will be indicated in the ID status line:

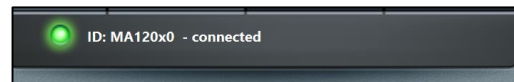


Figure 10. Control interface indicating a successful communication with the board.

10. Start playing music from your audio source and set the toggle switch to “play” position. You will be able to monitor the modulation index of both channels and the their current power modes. Also, the power mode profiles can be selected. For more information on power mode profiles please refer to the MA12040 data sheet and Infineon MERUS™ evaluation board user’s guide.



Figure 11. Right toggle switch set to “play” position.

Audio measurements set up

The need for an external filter:

MA120xx and MA120xxP are filterless amplifiers enabled by its MERUS™ audio multilevel technique. However, in order to obtain reliable measurements results an external low-pass filter is required in front of the input stage. This is because fast transients in the switching output signal might stress the bandlimited input of measurement instruments. Therefore, slew rate limiting and other distortion artifacts may appear due to this stress if no external filtering is applied.

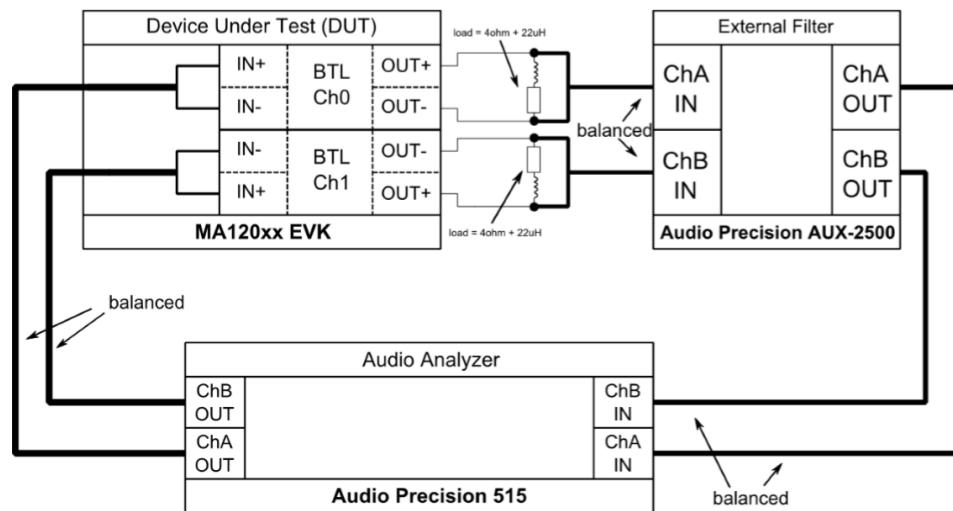


Figure 12. Measurement setup for MA120xx amplifiers.

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MERUS™ integrated audio amplifier ICs, multi-chip modules and discrete MOSFET/HEMT driver ICs
Cooler, smaller and lighter amplifiers for great sounding audio products

Infineon's MERUS™ class D audio amplifier solutions address a wide range of applications in the field of portable/battery powered, home and professional audio applications. The broad portfolio covers power ranges from 20W to 2kW per channel from the smallest single-chip devices and multi-chip module (MCMs) to highly scalable discrete audio amplifier solutions consisting of powerful MOSFET/**CoolGaN™ enhancement mode (e-mode) HEMT** and driver ICs combinations.

Thanks to the enhanced design and production standards, customers can rely on the robustness of the MERUS™ class D audio amplifiers to ensure complete system stability and reliability over their entire product lifetime. In addition to outstanding quality and reliability, Infineon's audio amplifier solutions are designed to maximize power efficiency and dynamic range while providing best-in-class audio performance in product form factors that make them an optimal fit for any high-end audio application.

>Download MERUS™ class D audio amplifier solutions application brochure

Click on a button to find out more

20 100 1000 2000
Output power [W/Channel]

■ Lowest idle power ■ Highest power w/o heatsink ■ Scalable in output power ■ Best audio performance

* coming soon

Support

Online tools and services



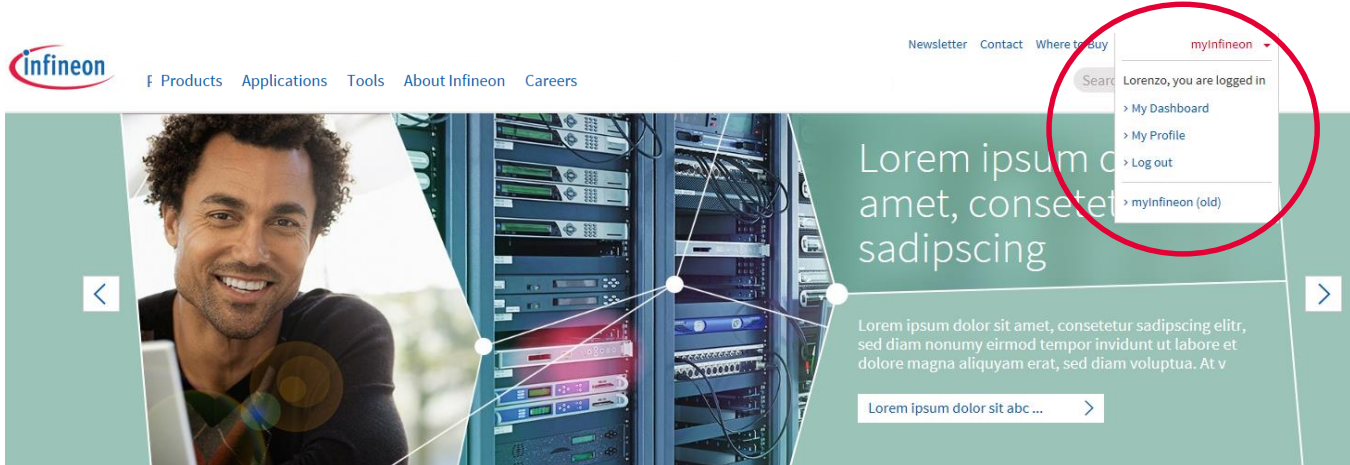
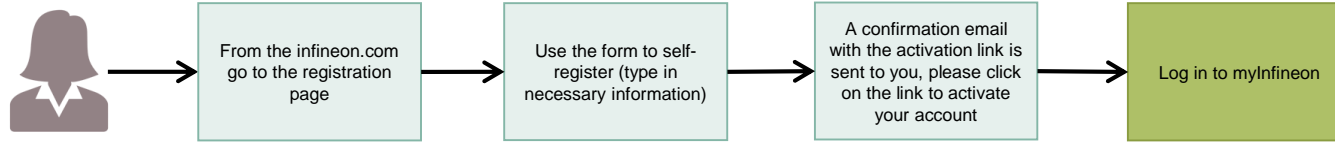
The screenshot shows the Infineon website's navigation and main content. Callouts are placed as follows:

- 1**: Points to the 'Support' link in the left-hand navigation menu.
- 2**: Points to the 'Tools' link in the top navigation bar.
- 3**: Points to the 'Newsletter' link in the top right navigation bar.
- 4**: Points to the 'Where to Buy' link in the top right navigation bar.
- 5**: Points to the 'myInfineon' user account link in the top right navigation bar.

The main content area features a banner for 'Smartify homes the secured way...' with a 'Learn more' button. Below the banner is a navigation menu with three columns: Products, Power, and Power Overview. The 'Support' link is highlighted in the 'Products' column.

- 1 Get support
- 2 Tools, finders and selectors
- 3 Subscribe to newsletter
- 4 Where to buy
- 5 myInfineon

Tailor made information via myInfineon



In case of problems with the access, the registration or all other type of issues, please get in touch with your Infineon contact person or with our official support at www.infineon.com/support (available 24/7)



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