

# QUICK START GUIDE

EVAL\_AUDIO\_MA12040P

Class D Audio Team  
March 2019



# Product overview and features

## Overview

The demonstration board [EVAL\\_AUDIO\\_MA12040P](#) is an evaluation and demonstration board for MERUS™ audio [MA12040P](#). It contains a digital input 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, 1xBTL, 1xBTL+2xSE
Audio input format	Digital (I2S)
Amplifier gain	20 dB / configurable 26dB
Supply voltage	18 V
Output noise level	<150 uVrms(AW)
Dynamic range	>95 dB
Idle consumption @ PVDD=18V	<19 mA
Crosstalk	<-85 dB
Efficiency, full-scale, 8 ohm	91%

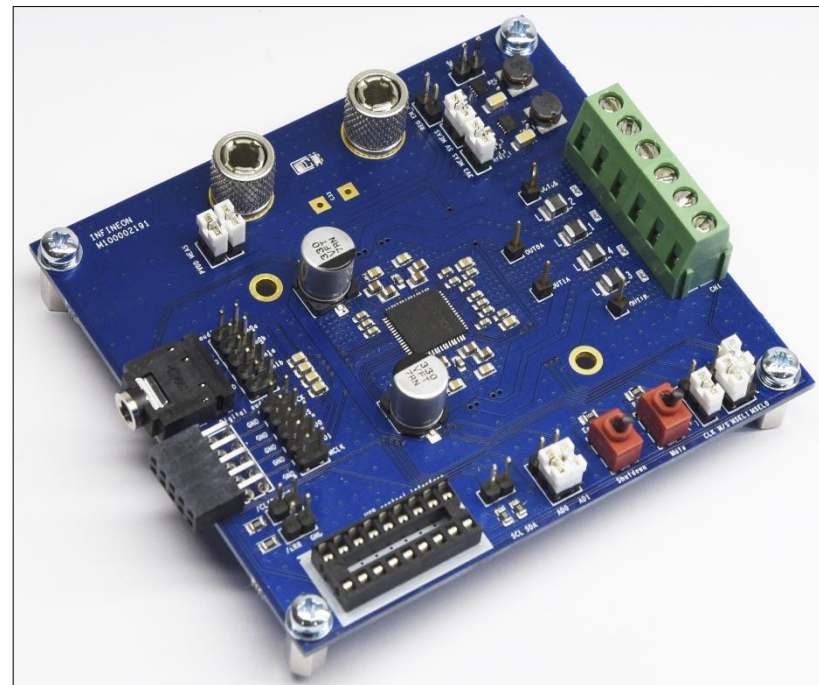


Figure 1. Overview of EVAL\_AUDIO\_MA12040 evaluation board

# Board description

3V3 / 5 V internal supply with measurement and enable jumpers

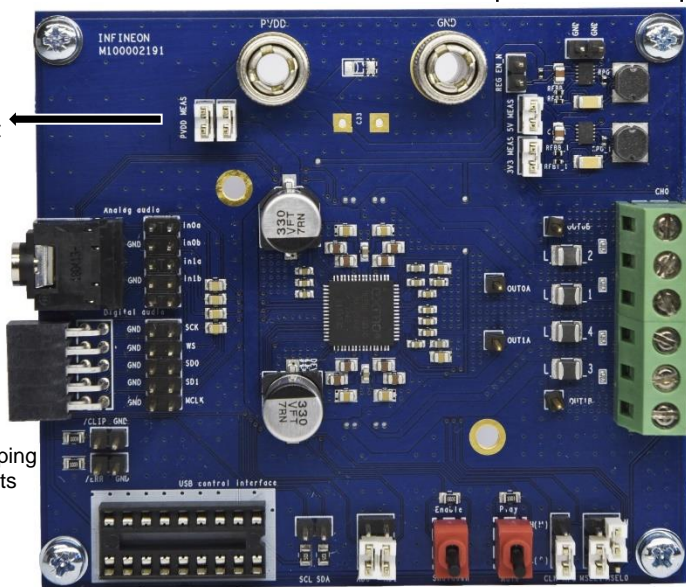
Power supply terminals

Power input measurement jumpers

Analog audio input (non p versions)

I2S digital audio input (p versions only)

Error and clipping reading outputs



USB control interface

I2C serial clock and data

I2C address selection

Device enable/mute

Output configuration jumpers

Speaker output terminals

## > Recommended operation conditions

Parameter	Part Nr	Minimum	Nominal	Maximum	Unit
PVDD	MA12040P	5.5		18	V
Output peak current	MA12040P			6.0	A

## > 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	0.010	%
Total harmonic distortion + noise	1kHz, POUT = 20 W, RL = 4 Ω	0.012	%
Efficiency*	POUT = 2×40 W, 4 Ω, PMP = 0	88	%
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:

## Digital audio (I2S) source

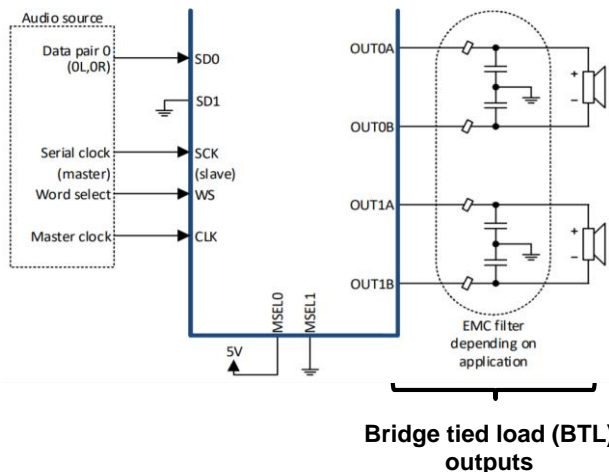


Figure 3. Bridge tied load (BTL) configuration with digital audio inputs for MA12040P

Jumper	State	Picture
MSEL0	H	
MSEL1	L	
CLK M/S	L(S)	
AD0 & AD1	L	
Analog audio	Do not Jumper	
Digital audio	Do not Jumper. Use individual pins for I2S input	
PVDD MEAS	Jumpered	
3V3 & 5V MEAS	Jumpered	
REG EN_N	Do not Jumper	

**Note:** Please refer to the manual for other input/output configurations.

# Power and start-up procedure

The following slides describe the power up procedure and its software tool setup. This will allow to monitor and configure the power mode profiles. In addition, I2S and digital audio processing parameters can be configured. 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 is 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

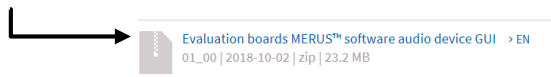


Figure 5. File download for GUI software

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

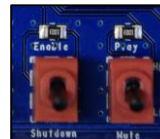


Figure 6. Toggle buttons set to “mute” and “shutdown”

5. Connect all the sources and speaker/load cables:
  - a) Audio source to the I2S digital audio input header.
  - b) Power source and its ground to PVDD and GND.
  - c) Speaker/load to audio output terminals.
  - d) USB control interface to the computer.

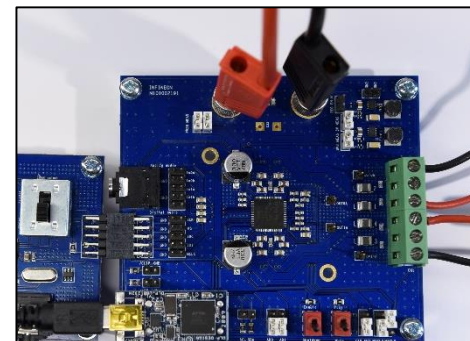


Figure 7. Complete evaluation board connections.

# Power and start-up procedure

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



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

- Open the “MA120xx\_GUI” file to run the monitoring interface.

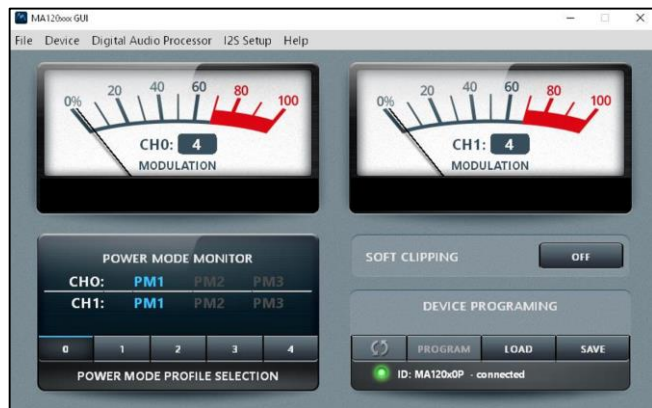


Figure 9. MA120xx control software interface

- 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.

- Press “I2S setup” in order to setup the I2S settings and the audio processor parameters. Note they should follow the same parameters as the source.

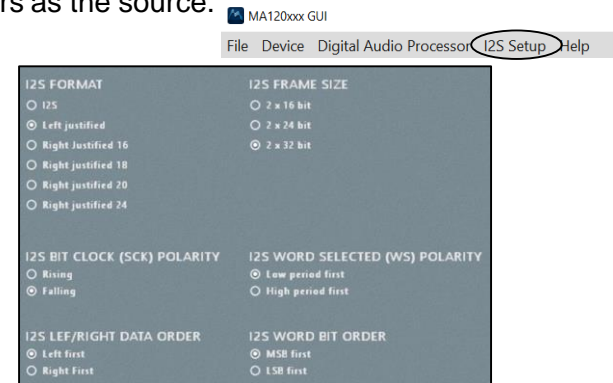


Figure 11. I2S configuration screen.

# Power and start-up procedure

11. Press “Digital Audio Processor” in order to setup the audio processor parameters .



Figure 12. Digital audio processor configuration screen.

12. 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 MA12040P data sheet and Infineon MERUS™ evaluation board user’s guide.



Figure 13. 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.

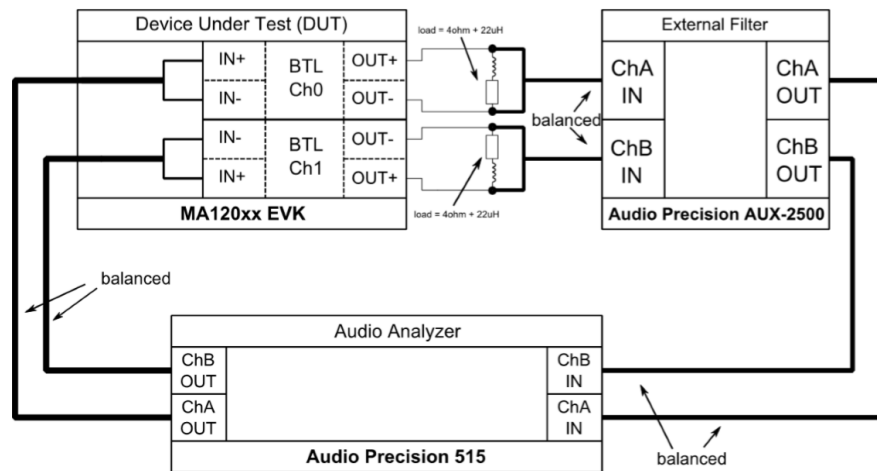


Figure 14. Measurement setup for MA120xx amplifiers.



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- Product briefs
- Selection guides
- Application brochures
- Presentations
- Articles

## [Technical material](#)

- Application notes
- Whitepapers
- Datasheets, MCDS files
- PCB design data

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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

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

\* coming soon

# Support

## Online tools and services

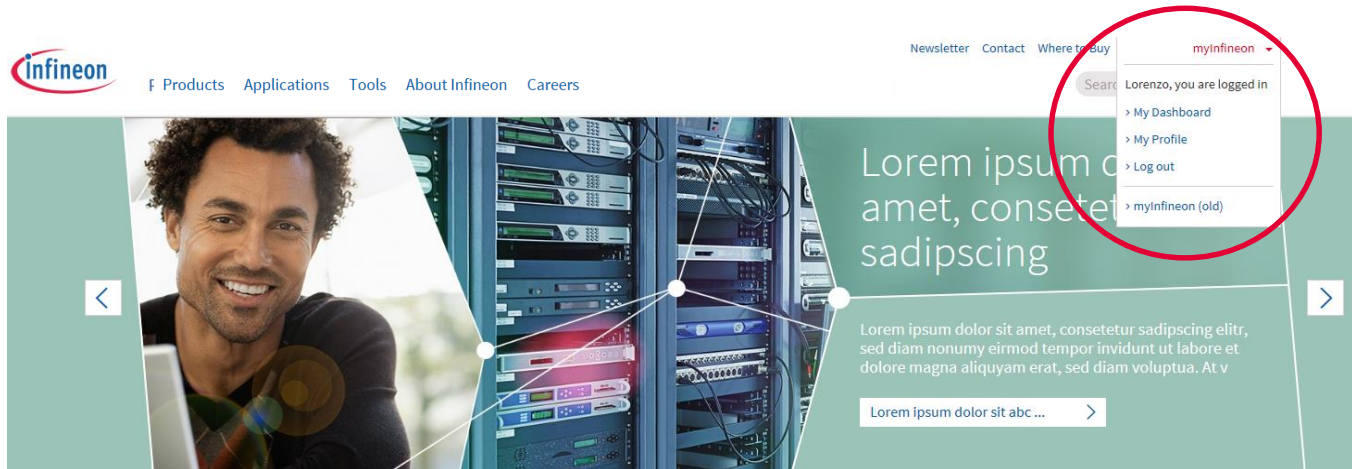
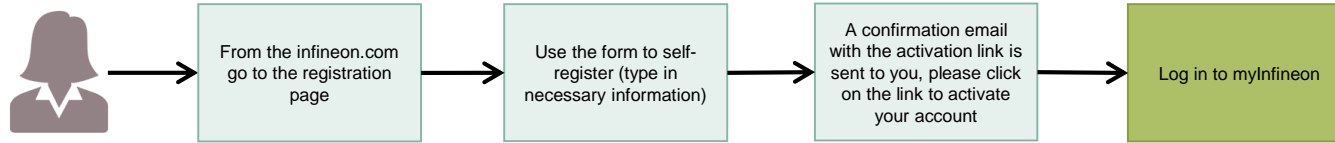
The screenshot shows the Infineon website's navigation and main content area. Callouts 1 through 5 are placed over various elements:

- 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 large 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](http://www.infineon.com/support) (available 24/7)



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