

IoT Demonstration Board

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User manual
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Document information

Information	Content
Keywords	Class-D amplifier, Digital input, IoT
Abstract	This User Manual describes the IoT Demonstration PCB for NXP Semiconductors' Class-D audio amplifier devices.



Revision history		
Rev	Date	Description
1	20190812	Release

1 Introduction

This User Manual describes the IoT Demonstration PCB for NXP Semiconductors' Class-D audio amplifier devices.

The IoT demonstration PCB is designed in such a way that it is easy to attach daughter boards containing several types of NXP Class D audio amplifiers.

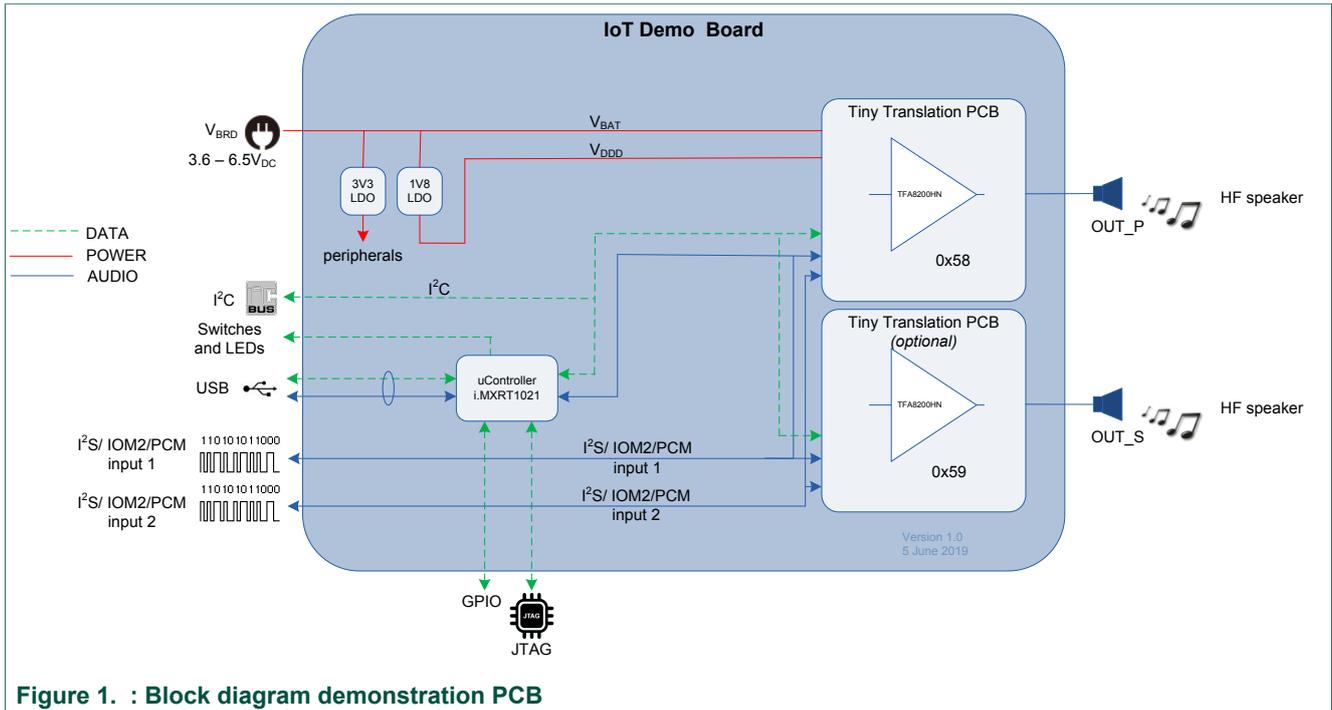


Figure 1. : Block diagram demonstration PCB

2 Setup demonstration PCB

2.1 Hardware setup

Figure 2 is showing the hardware setup of the IoT demonstration PCB with screw terminals for connecting the speaker cables (J26 and J27), J25 for the power supply and jumpers (JP1, JP2 and JP3) to configure the DUT voltages.

The speaker(s) can be driven by the Class-D amplifier(s) (TFA#1 and TFA#2) with:

- A digital audio signal via the header J32;
- A USB audio stream via the USB-C connector J37.

Via the input selector (SW1) the audio path can be configured.

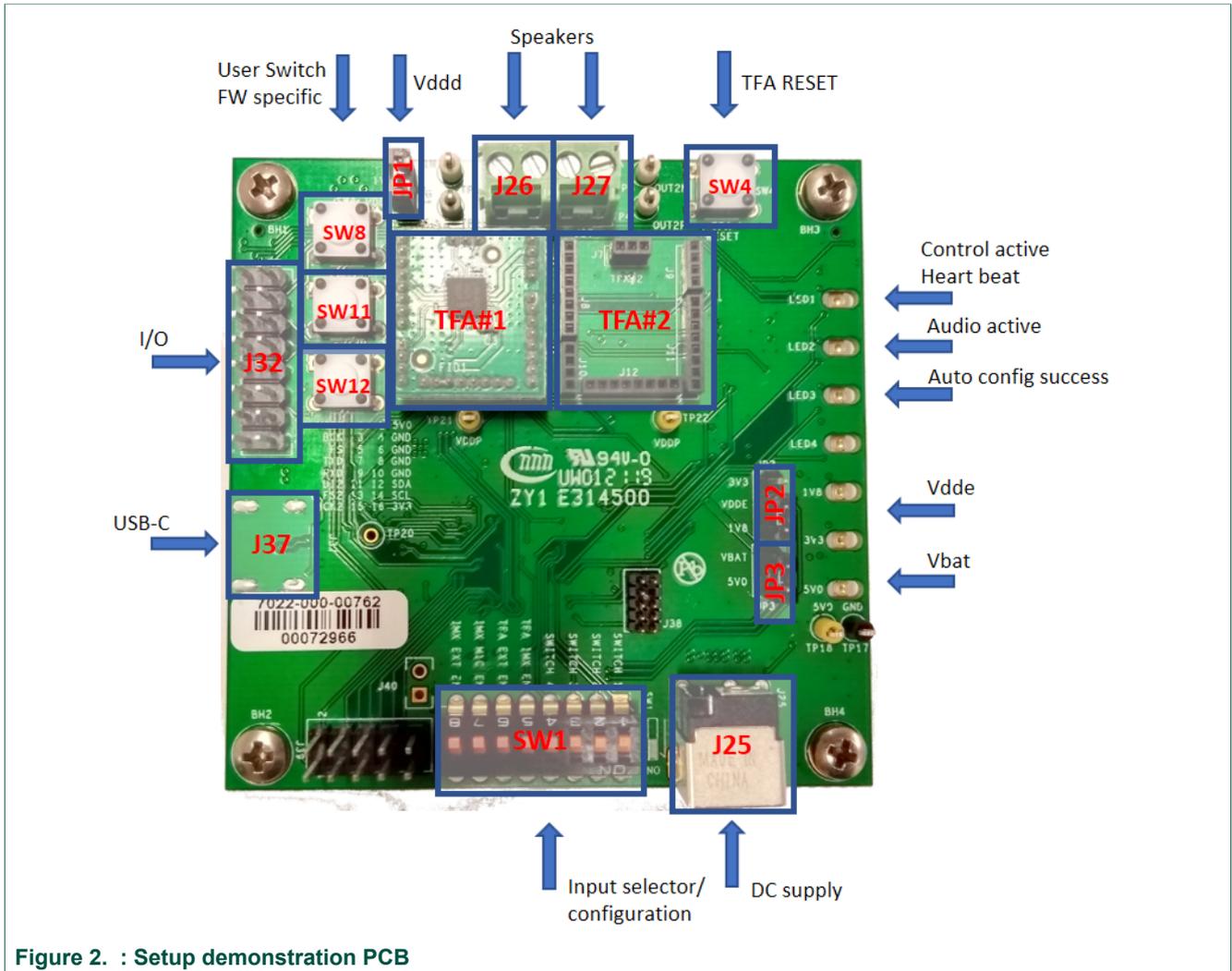


Figure 2. : Setup demonstration PCB

Table 1. Input/output connector assignment

REF	TYPE	Pin	Label	Description
J26	Terminal block, screw	1	OUTP	TFA#1 PWM positive output
		2	OUTN	TFA#1 PWM negative output
J27	Terminal block, screw	1	OUTP	TFA#2 PWM positive output
		2	OUTN	TFA#2 PWM negative output
X32	Header, double row	1	MCLK	TDM/ I ² S Master Clock ^[1]
		2	5V0	5Vdc supply for peripheral
		3	BCK	TDM/ I ² S Bit Clock ^[1]
		4,6,8,10	GND	Ground
		5	FS	TDM/ I ² S Frame Select ^[1]
		7	TXD	TDM/ I ² S Data Transmit ^[1]
		9	RXD	TDM/ I ² S Data Receive ^[1]

REF	TYPE	Pin	Label	Description
		11	DI2	TDM/ I ² S Data Receive bus 2 (if applicable) ^[1]
		12	SDA	I ² C Data ^[1]
		13	FS2	TDM/ I ² S Frame Select bus 2 (if applicable) ^[1]
		14	SCL	I ² C Clock ^[1]
		15	BCK2	TDM/ I ² S Bit Clock bus 2 (if applicable) ^[1]
		16	3V3	3.3Vdc supply for peripheral
J37	USB type C	1	USB-C	Board supply, HID and USB Audio
JP1	Header, single row	1	1V8	1.8Vdc supply voltage
		2	VDDD	TFA Supply Digital
JP2	Header, single row	1	1V8	1.8Vdc supply voltage
		2	VDDE	TFA Supply I/O
		3	3V3	3.3Vdc supply voltage
JP3	Header, single row	1	5V0	5Vdc supply voltage
		2	VBAT	TFA Battery
TFA#1	Headers, single row		TFA#1	Daughter board #1
TFA#2	Headers, single row		TFA#2	Daughter board #2

[1] Logic level can be set to 1.8V or 3.3V via solder joints

2.1.1 PCB switch settings

PCB switch SW1 is an array of DIP-switches for audio path input selection and configuration.

Table 2.

Switch	Label	Description ON	Description OFF
1	SWITCH 1	Automatic configuration ON	Automatic configuration OFF
2	SWITCH 2	I ² S Clock always on	I ² S Clock only on when there is data active
3	SWITCH 3	64FS mode	32FS mode
4	SWITCH 4	<i>reserved</i>	<i>reserved</i>
5	TFA IMX EN	Audio path i.MX ↔ TFA enabled	Audio path i.MX ↔ TFA disabled
6	TFA EXT EN	Audio path TFA ↔ I/O enabled	Audio path TFA ↔ I/O disabled
7	IMX MIC EN	Audio path MIC ↔ i.MX enabled	Audio path MIC ↔ i.MX disabled
8	IMX EXT EN	Audio path i.MX ↔ I/O enabled	Audio path i.MX ↔ I/O disabled

SW8, SW11 and SW12 are Firmware defined push buttons and are not assigned to any function in the current version.

Pressing SW4 causes the TFA(s) to reset. By default, this function is ‘active high’. By opening solder joint SJ12 and closing solder joint SJ13 it can be changed to ‘active low’.

2.1.2 LEDs

The demo board has seven LEDs which have an indicator function.

Table 3.

Label	Description
LED1	Control active / Heart beat
LED2	Audio active, playback/ record
LED3	Automatic configuration successful
LED4	<i>reserved</i>
1V8	1.8Vdc supply available
3V3	3.3Vdc supply available
5V0	5.0Vdc supply available

2.2 Firmware update

The firmware controlling the demonstration PCB may be updated by the user in a simple way. No specific hardware is needed.

Follow the steps below to update your board:

- Contact your NXP sales agent for the latest available FW revision.
- Save the zipped file called "flash_bin_vx_y" to your local disk. (x_y stands for the revision number of the FW version)
- Unpack the zipped file and open the folder.
- Close jumper J40 on the demonstration PCB (you may use tweezers) and plug in the USB connector. (you can remove the tweezers after plugging the USB)
- Double click the file "flash_bin_cx_y.bat" and wait till the script finishes. This takes about 15 - 20 seconds.
- Unplug the USB connector, open jumper J40 and plug the USB connector to use the board with the updated firmware.

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