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Thank you for your understanding.

LAPIS Technology Co., Ltd.

October 1, 2020

# **RB-S22660TB32**

## **User's Manual**

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Issue Date: March 26, 2020

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## 1. Overview

This instruction manual is for the RB-S22660TB32 which is the ML22660 reference board.

Combining the board with a Sound Device Control Board 3 (hereinafter referred to as "SDCB3") enables the following functions to be implemented:

- Voice playback by ML22660.
- Writing voice data into serial FLASH memory.

Voice data can be written to the serial flash memory by connecting a flash writer to the RB-S22660TB32.

## 2. Operational notes

The following describes the precautions to follow when handling the RB-S22660TB32.

- Turn off the power when attaching the RB-S22660TB32 to the SDCB3.
- Turn off the power when loading devices into the RB-S22660TB32. Be sure to orient the device correctly. Pin 1 direction is toward the lower left side when the lid is opened. The Figure 1 shows the setting directions of devices.
- The ML22660 supply voltages are 2.7 to 3.6V / 3.3 to 5.5V. Use the RB-S22660TB32 with a power supply voltage of 3.0V.
- RB-S22660TB32 is a device used only by experts in R&D facilities for research and development purposes. RB-S22660TB32 is not intended to be used in mass-produced products or parts thereof.
- The information in this document is subject to change without notice due to product improvement and technological improvement. Prior to use, please ensure that the information is up to date.
- LAPIS Semiconductor does not provide any RB-S22660TB32 support. Replace only in case of initial failure.

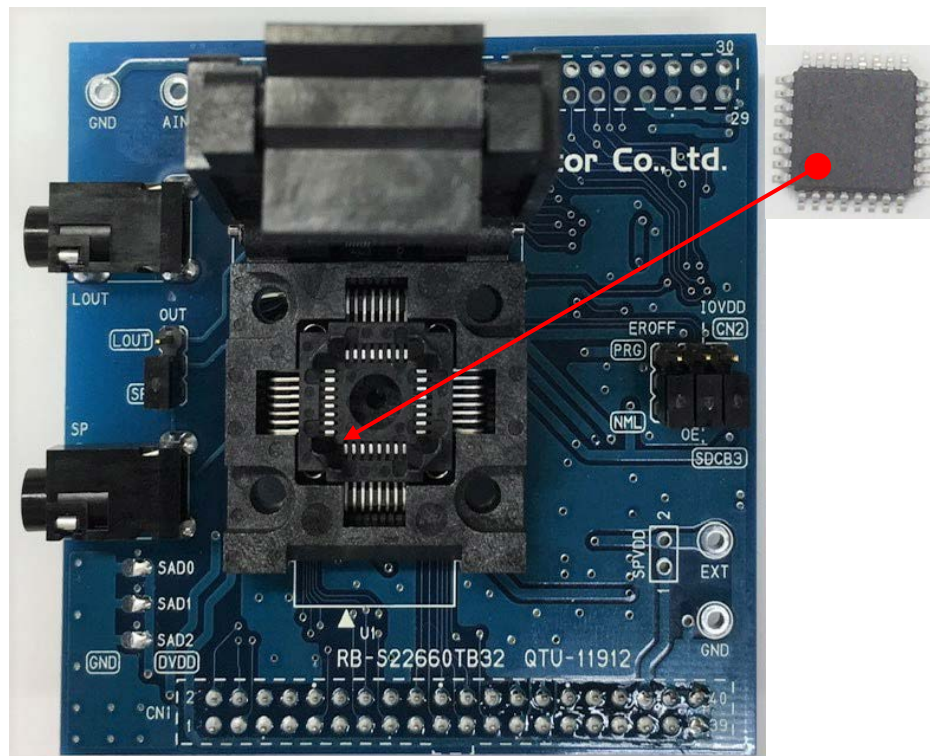


Figure 1 Outline Diagram

### 3. Specification

#### 3.1. Jumper Pin Setting

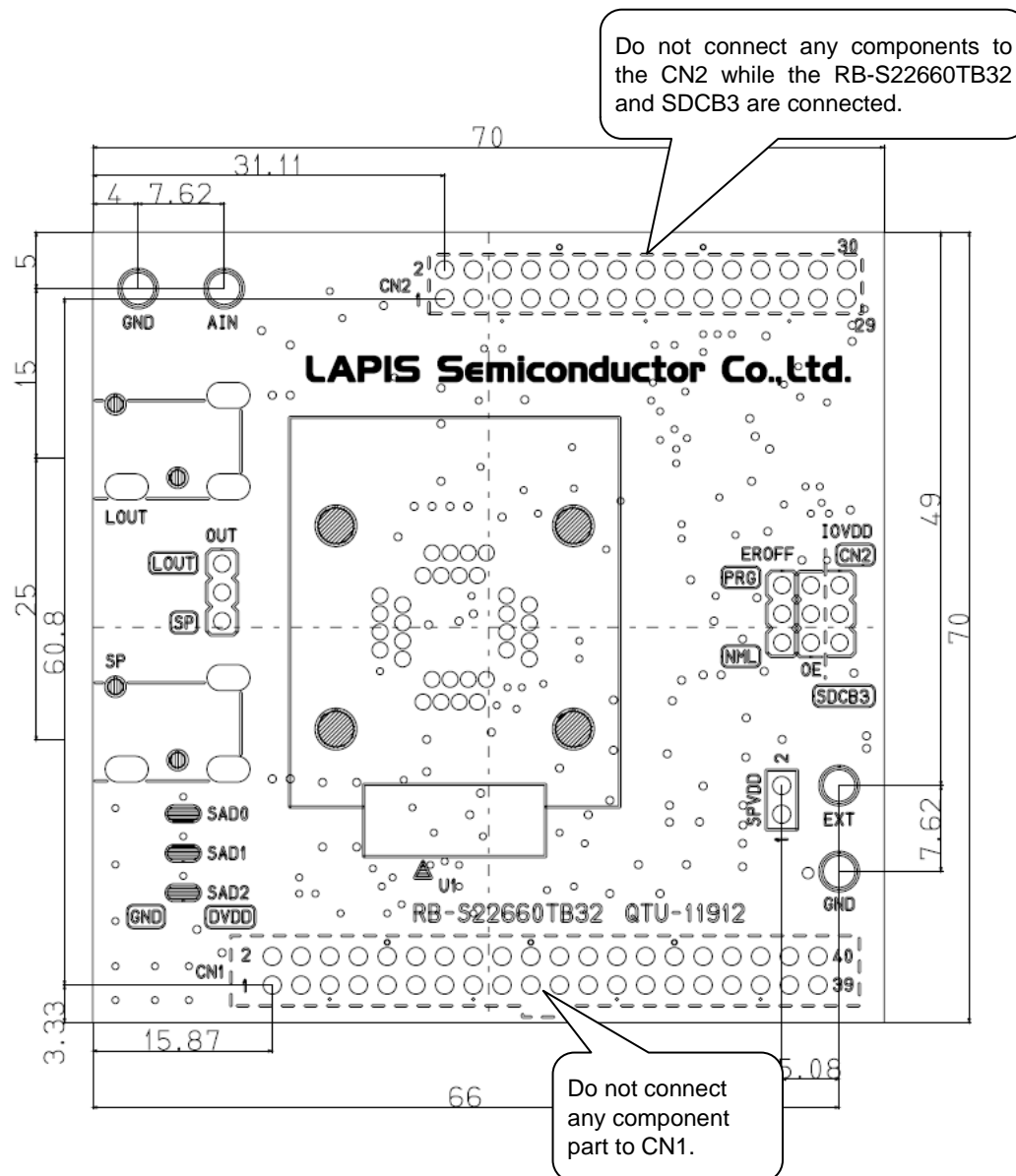
Table 1 shows the RB-S22660TB32 jumper pin settings.

**Table 1**

Jumper Pin Name	Setting	
	Connecting the Board to the SDCB3	Connecting the Board to a FLASH writer
EROFF	Fixed on the NML side	Fixed on the PRG side
OE	Fixed on the NML side	Fixed on the PRG side
IOVDD	Fixed on the SDCB3 side	Fixed on the CN2 side

#### 3.2. PCB layout

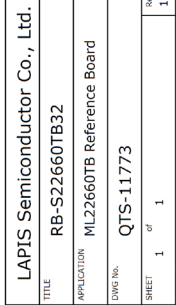
Figure 2 shows the RB-S22660TB32 PCB layout.



**Figure 2 PCB layout**

## 3.3. BOM list, Schematic

	Parts Number	Symbol	Contents	Qty.	Vendor
1	QTU-11912	RB-S22660TB32	PCB	1	LAPIS Semiconductor Co., Ltd.
2	CGA3E2X7R1E104K080AA	C1,C3,C4,C5, C7,C11,C13,C14, C15,C18	Ceramic Capacitor 0.1μF/25V X7R	10	TDK Corporation
3	CGA3E1X7R1C474M080AC	C16,C17	Ceramic Capacitor 0.47μF/16V X7R	2	TDK Corporation
4	CGA3E1X7R1C105K080AC	C2,C6,C10	Ceramic Capacitor 1.0μF/16V X7R	3	TDK Corporation
5	C1608X5R1C335K080AC	C8,C12	Ceramic Capacitor 3.3μF/16V X5R	2	TDK Corporation
6	HIF3FB-40DA-2.54DSA(71)	CN1	40pin Receptacle	1	Hirose Electric Co., Ltd.
7	A2-3PA-2.54DSA	EROFF,OUT,IOVDD,OE	3pin Pin Header	4	Hirose Electric Co., Ltd.
8	MJ-354A0	JACK1,JACK2	2-Conductor Miniature Jack	2	MARUSHIN ELECTRIC MFG. CO., LTD.
9	MCR03EZPJ203	R1	Resistor 20kΩ ±5%	1	Rohm Co., Ltd.
10	MCR03EZPJ103	R2	Resistor 10kΩ ±5%	1	Rohm Co., Ltd.
11	MCR03EZPJ104	R3,R4	Resistor 100kΩ ±5%	2	Rohm Co., Ltd.
12	-	SAD0,SAD1,SAD2	Select pad	3	-
13	FPQ-32-0.8-007S-00	U1	QFP P0.80 32P Socket	1	Enplas Corporation
14	LM4890MM/NOPB	U2	Audio Power Amplifier	1	Texas Instruments Incorporated
15	TXS0108EPWR	U3	Voltage level translation	1	Texas Instruments Incorporated
16	MT25QL128ABA1ESE	U4	128Mb Serial NOR Flash Memory	1	Micron Technology, Inc.
17	BU30SD2MG-MTR	U5	LDO Regulator	1	Rohm Co., Ltd.
18	TC7SH125FU	U6	Bus Buffer with 3-State Output	1	Toshiba Corporation
19	HIF3GA-2.54SP	-	Short Pin	4	Hirose Electric Co., Ltd.
20	M20-7831542	CN2	Unmounted	1	Harwin Plc
21	-	J1,J2,J3,J4, J5,J6	Unmounted	6	-
22	A2-2PA-2.54DSA	SPVDD	Unmounted	1	Hirose Electric Co., Ltd.
23	-	TH1,TH2,TH3,TH4	Unmounted	4	-
24	CSTCR4M00G55B-R0	XT1	Unmounted	1	Murata Manufacturing Co., Ltd.



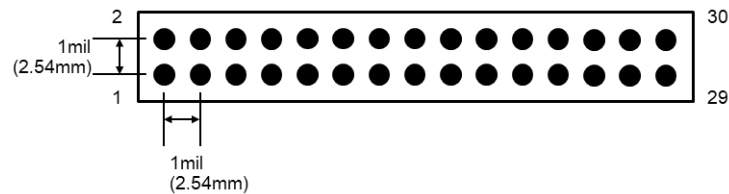


### 3.4. CN1

CN1 is a 40-pin connector that is used to connect to the SDCB3.

### 3.5. CN2

CN2 is a 30-pin connector to which ML22660 terminals are connected.



**Figure 3 CN2 connectors hole pattern**

**Table 2 CN2 connector pin connections**

CN2 Pin No		Connect LSI	LSI Pin No	LSI Pin Name
1	VDD (3V)	ML22660	19	DVDD
2	VDD (3V)	ML22660	19	DVDD
3	I/O	ML22660	28	RESETB
4	I/O	ML22660	29	TEST0
5	I/O	ML22660	30	STATUS1
6	I/O	ML22660	31	STATUS2
7	I/O	ML22660	32	CBUSYB
8	I/O	-	-	-
9	I/O	ML22660	4	SCL-
10	I/O	ML22660	5	SDA
11	I/O	-	-	-
12	I/O	-	-	-
13	I/O	-	-	-
14	I/O	-	-	-
15	GND	ML22660	1, 18	DGND
16	GND	ML22660	1, 18	DGND
17	I/O	ML22660	9	ERCSB
18	I/O	ML22660	10	ERSCK
19	I/O	ML22660	11	ERSI
20	I/O	ML22660	12	ERSO
21	I/O	TC7SH125FU - ML22660	13	EROFF
22	I/O	-	-	-
23	IOVDD	ML22660	14	IOVDD
24	I/O	-	-	-
25	GND	ML22660	1, 18	DGND
26	GND	ML22660	1, 18	DGND
27	I/O	ML22660	16	XTB
28	I/O	ML22660	17	XT
29	GND	ML22660	1, 18	DGND
30	GND	ML22660	1, 18	DGND

### 3.6. LOUT jack

LOUT is a jack to which the ML22660 line-amp outputs are connected via a speaker amplifier.

### 3.7. SP jack

SP is the jack to which ML22660 speaker amplifier outputs are connected.

### 3.8. AIN, GND terminal

This terminal is connected to the ML22660 speaker amplifier input terminal. Input a speaker amplifier input signal between the AIN pin and GND pin.

### 3.9. Serial FLASH memory

The RB-S22660TB32 has 128-Mbit serial FLASH memory (Micron Technology, Inc., MT25QL128ABA1ESE) for voice data. The FLASH memory is used for voice data.

The serial FLASH memory can write voice data by the SDCB Controller <sup>\*1</sup> of the application of the PC. RB-S22660TB32 is combined with SDCB3. Connect the SDCB3 to a computer.

Voice data can be written to the serial FLASH memory by using the FLASH writer. Connect the FLASH writer to the CN2 of the RB-S22660TB32. Table 3 shows how the CN2 is connected to the FLASH writer.

**Table 3 Connecting the CN2 to the FLASH writer**

	CN2 Pin No	LSI Pin Name	FLASH writer function
16	GND	DGND	GND
17	I/O	ERCSB	CSB
18	I/O	ERSCK	SCK
19	I/O	ERSI	MOSI
20	I/O	ERSO	MISO
23	IOVDD	IOVDD	VDD

<sup>\*1</sup> For details on using the SDCB Controller, see the Speech LSI Utility User's Manual.

3.10. Ceramic resonator, External Clock

Ceramic resonator can be mounted on a XT1. Table 4 table shows the ceramic resonators used.

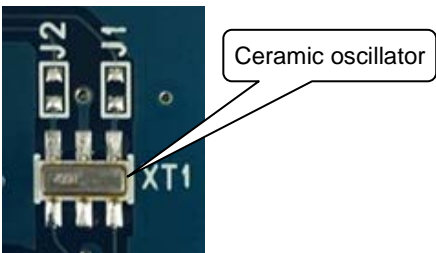


Figure 4 Ceramic resonator

Table 4 Ceramic resonator

Vendor	Frequency[Hz]	Parts Number
Murata Manufacturing Co., Ltd.	4M	CSTCR4M00G55B-R0
Murata Manufacturing Co., Ltd.	4.096M	CSTCR4M09G55B-R0

External clocks can be entered from the CN2's 28 pins. Connect between J1 terminals.

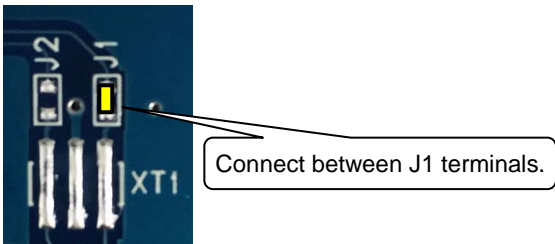


Figure 5 External clock

## Revision History

Document No.	Issue Date	Page		Description
		Previous Edition	New Edition	
FEBL22660RB-01	October 31, 2019	–	–	First edition.
FEBL22660RB-03	March 26, 2020	1	1	Figure 1 Outline Diagram
		2	2	Figure 2 PCB layout
		3	3	3.3. BOM list, Schematic

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