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FEBL22530RB-03

RB-S22530TB48
User's Manual

Issue Date: March 26, 2020

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1. Overview

This instruction manual is for the RB-S22530TB48 which is the ML22530 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 ML22530.
- 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-S22530TB48.

2. Operational notes

The following describes the precautions to follow when handling the RB-S22530TB48.

- Turn off the power when attaching the RB-S22530TB48 to the SDCB3.
- Turn off the power when loading devices into the RB-S22530TB48. 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 ML22530 supply voltages are 2.7 to 3 6V / 3.3 to 5 5V. Use the RB-S22530TB48 with a power supply voltage of 3. 0V.
- RB-S22530TB48 is a device used only by experts in R&D facilities for research and development purposes. RB-S22530TB48 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-S22530TB48 support. Replace only in case of initial failure.

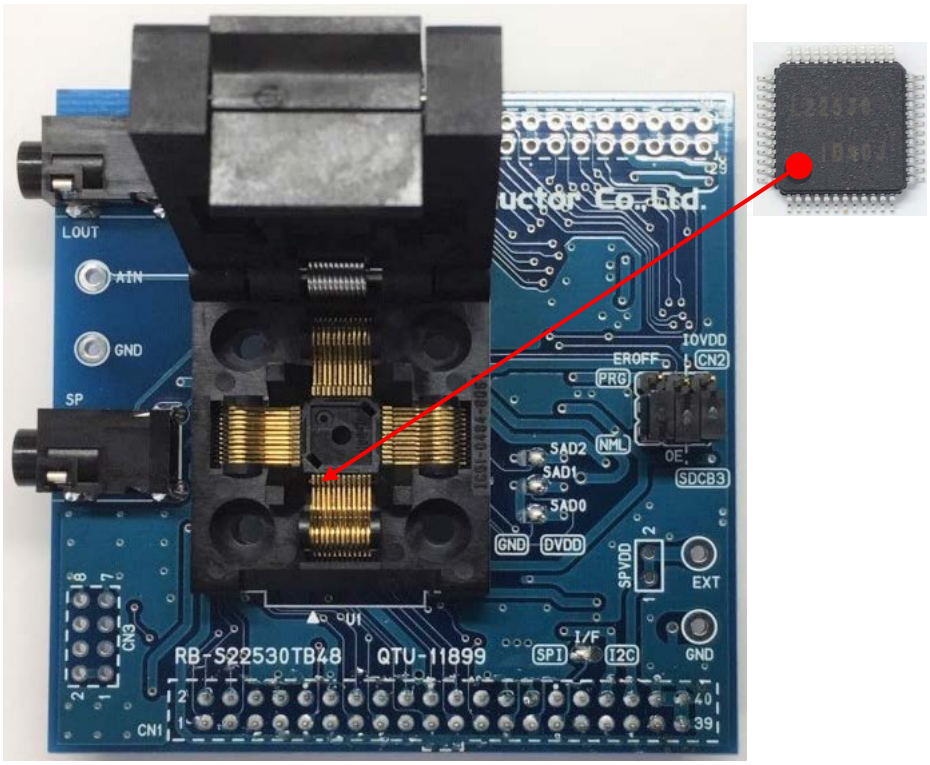


Figure 1 Outline Diagram

3. Specification

3.1. Jumper Pin Setting

Table 1 shows the RB-S22530TB48 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-S22530TB48 PCB layout.

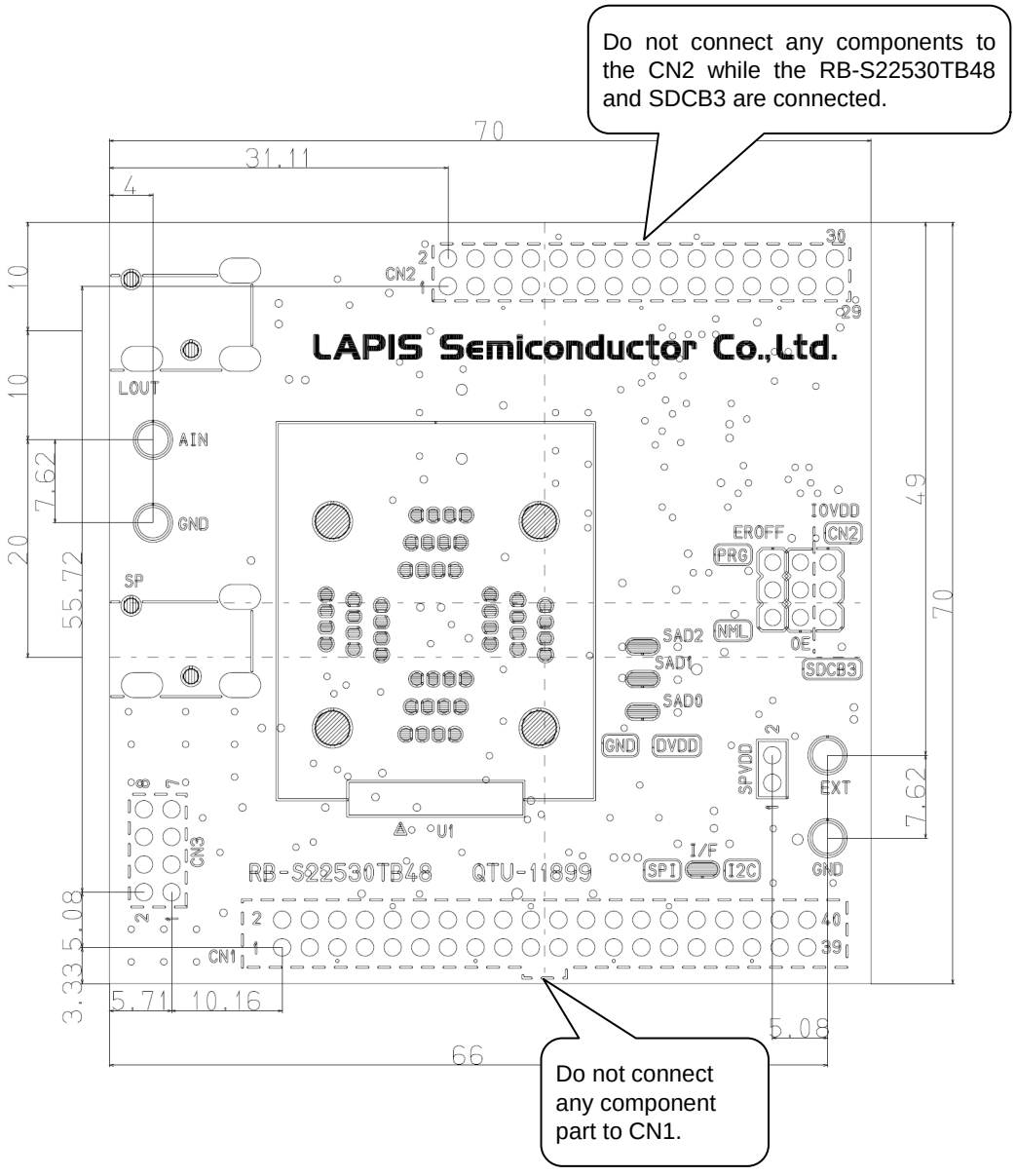
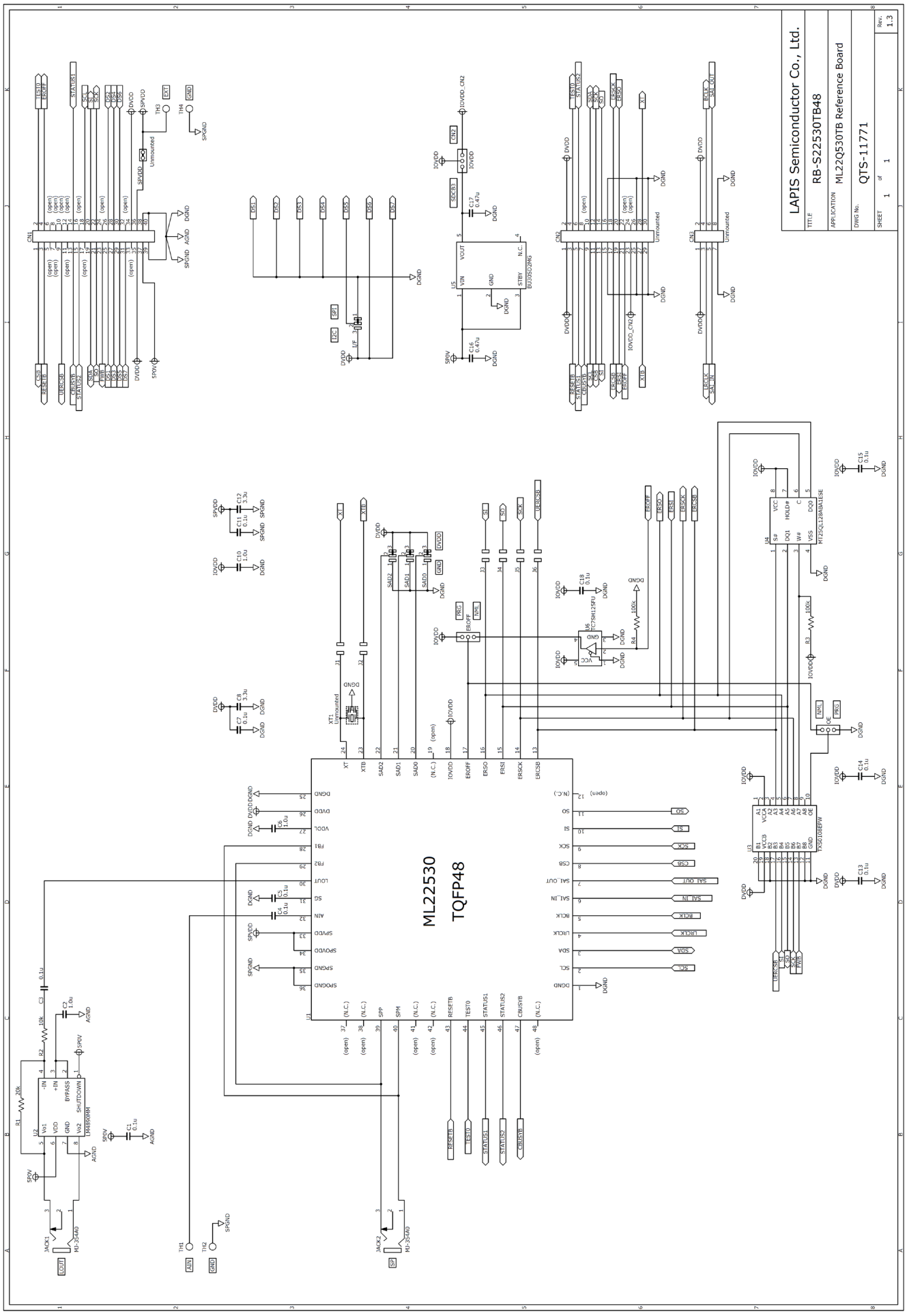


Figure 2 PCB layout

3.3. BOM list, Schematic

	Parts Number	Symbol	Contents	Qty.	Vendor
1	QTU-11899	RB-S22530TB48	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,IOVDD,OE	3pin Pin Header	3	Hirose Electric Co., Ltd.
8	-	I/F,IOVDD	Select pad	1	-
9	MCR03EZPJ000	J7	Resistor 0Ω	1	Rohm Co., Ltd.
10	MJ-354A0	JACK1,JACK2	2-Conductor Miniature Jack	2	MARUSHIN ELECTRIC MFG. CO., LTD.
11	MCR03EZPJ203	R1	Resistor 20kΩ ±5%	1	Rohm Co., Ltd.
12	MCR03EZPJ103	R2	Resistor 10kΩ ±5%	1	Rohm Co., Ltd.
13	MCR03EZPJ104	R3,R4	Resistor 100kΩ ±5%	2	Rohm Co., Ltd.
14	-	SAD0,SAD1,SAD2	Select pad	3	-
15	IC51-806.A106725-001	U1	TQFP P0.50 48P Socket	1	YAMAICHI ELECTRONICS Co., Ltd.
16	LM4890MM/NOPB	U2	Audio Power Amplifier	1	Texas Instruments Incorporated
17	TXS0108EPWR	U3	Voltage level translation	1	Texas Instruments Incorporated
18	MT25QL128ABA1ESE	U4	128Mb Serial NOR Flash Memory	1	Micron Technology, Inc.
19	BU30SD2MG-MTR	U5	LDO Regulator	1	Rohm Co., Ltd.
20	TC7SH125FU	U6	Bus Buffer with 3-State Output	1	Toshiba Corporation
21	HIF3GA-2.54SP	-	Short Pin	3	Hirose Electric Co., Ltd.
22	-	CN2	Unmounted	1	-
23	-	CN3	Unmounted	1	-
24	-	J1,J2,J3,J4,J5, J6	Unmounted	6	
25	-	VDDR	Unmounted	1	-
26	-	SPVDD	Unmounted	1	-
27	-	TH1,TH2,TH3,TH4	Unmounted	4	-
28	-	XT1	Unmounted	1	-


LAPIS Semiconductor Co., Ltd.
TITLE RB-S22530TB48
APPLICATION ML22Q530TB Reference Board
DWG No. QTS-11771
SHEET 1 of 1
Rev. 1.3
ML22530
TQFP48

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 ML22530 terminals are connected.

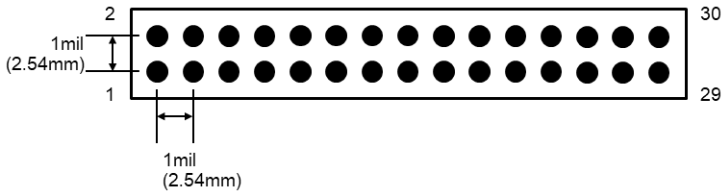


Figure 3 CN2 connectors hole pattern

Table 2 CN2 connector pin connections

CN2 Pin No		Connect LSI	LSI Pin No	LSI Pin Name
1	VDD (3V)	ML22530	26	DVDD
2	VDD (3V)	ML22530	26	DVDD
3	I/O	ML22530	43	RESETB
4	I/O	ML22530	44	TEST0
5	I/O	ML22530	45	STATUS1
6	I/O	ML22530	46	STATUS2
7	I/O	ML22530	47	CBUSYB
8	I/O	-	-	-
9	I/O	ML22530	2	SCL
10	I/O	ML22530	3	SDA
11	I/O	ML22530	8	CSB
12	I/O	ML22530	9	SCK
13	I/O	ML22530	10	SI
14	I/O	ML22530	11	SO
15	GND	ML22530	1, 25	DGND
16	GND	ML22530	1, 25	DGND
17	I/O	ML22530	13	ERCSB
18	I/O	ML22530	14	ERSCK
19	I/O	ML22530	15	ERSI
20	I/O	ML22530	16	ERSO
21	I/O	TC7SH125FU - ML22530	17	EROFF
22	I/O	-	-	-
23	IOVDD	ML22530	18	IOVDD
24	I/O	-	-	-
25	GND	ML22530	1, 25	DGND
26	GND	ML22530	1, 25	DGND
27	I/O	ML22530	23	XTB
28	I/O	ML22530	24	XT
29	GND	ML22530	1, 25	DGND
30	GND	ML22530	1, 25	DGND

3.6. CN3

The CN3 is an 8-pin connector to which the ML22530 serial audio interface terminals are connected.

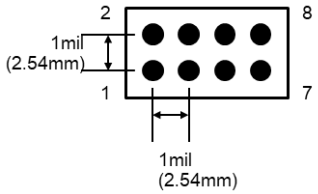


Figure 4 CN3 connectors hole pattern

Table 3 CN3 connector pin connections

CN3 Pin No		Connect LSI	LSI Pin No	LSI Pin Name
1	VDD (3V)	ML22530	26	DVDD
2	VDD (3V)	ML22530	26	DVDD
3	I/O	ML22530	4	LRCLK
4	I/O	ML22530	5	BCLK
5	I/O	ML22530	6	SAI_IN
6	I/O	ML22530	7	SAI_OUT
7	GND	ML22530	1, 25	DGND
8	GND	ML22530	1, 25	DGND

3.7. LOUT jack

LOUT is a jack to which the ML22530 line-amp outputs are connected via a speaker amplifier.

3.8. SP jack

SP is the jack to which ML22530 speaker amplifier outputs are connected.

3.9. AIN, GND terminal

This terminal is connected to the ML22530 speaker amplifier input terminal. Input a speaker amplifier input signal between the AIN pin and GND pin.

3.10. Serial FLASH memory

The RB-S22530TB48 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 [*1] of the application of the PC. RB-S22530TB48 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-S22530TB48. Table 4 shows how the CN2 is connected to the FLASH writer.

Table 4 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

*1 For details on using the SDCB Controller, see the Speech LSI Utility User's Manual.

3.11. Ceramic resonator, External Clock

Ceramic resonator can be mounted on a XT1. Table 5 table shows the ceramic resonators used.

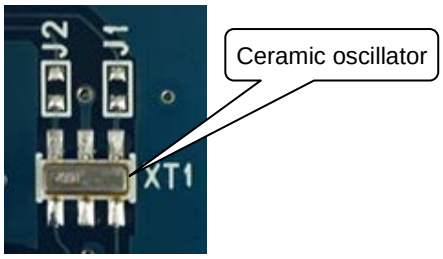


Figure 5 Ceramic resonator

Table 5 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.

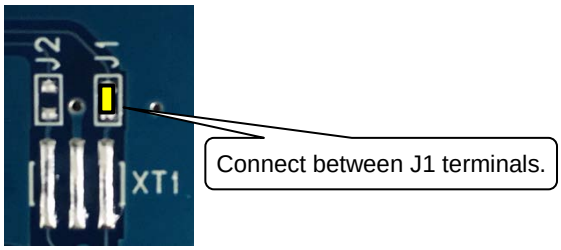


Figure 6 External clock

Revision History

Document No.	Issue Date	Page		Description
		Previous Edition	New Edition	
FEBL22530RB-01	October 31, 2019	–	–	First edition.
FEBL22530RB-03	March 26, 2020	3	3	3.3. BOM list, Schematic

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