



Dear customer

ROHM Co., Ltd. ("ROHM"), on the 1st day of April, 2024,
has absorbed into merger with 100%-owned subsidiary of LAPIS Technology Co., Ltd.

Therefore, all references to "LAPIS Technology Co., Ltd.", "LAPIS Technology"
and/or "LAPIS" in this document shall be replaced with "ROHM Co., Ltd."

Furthermore, there are no changes to the documents relating to our products other than
the company name, the company trademark, logo, etc.

Thank you for your understanding.

ROHM Co., Ltd.
April 1, 2024

Dear customer

LAPIS Semiconductor Co., Ltd. ("LAPIS Semiconductor"), on the 1st day of October, 2020, implemented the incorporation-type company split (shinsetsu-bunkatsu) in which LAPIS established a new company, LAPIS Technology Co., Ltd. ("LAPIS Technology") and LAPIS Technology succeeded LAPIS Semiconductor's LSI business.

Therefore, all references to "LAPIS Semiconductor Co., Ltd.", "LAPIS Semiconductor" and/or "LAPIS" in this document shall be replaced with "LAPIS Technology Co., Ltd."

Furthermore, there are no changes to the documents relating to our products other than the company name, the company trademark, logo, etc.

Thank you for your understanding.

LAPIS Technology Co., Ltd.

October 1, 2020

ML2282X Reference Board User's Manual

NOTICE

1. The information contained herein can change without notice owing to product and/or technical improvements. Before using the product, please make sure that the information being referred to is up-to-date.
2. The outline of action and examples for application circuits described herein have been chosen as an explanation for the standard action and performance of the product. When planning to use the product, please ensure that the external conditions are reflected in the actual circuit, assembly, and program designs.
3. When designing your product, please use our product below the specified maximum ratings and within the specified operating ranges including, but not limited to, operating voltage, power dissipation, and operating temperature.
4. **LAPIS SEMICONDUCTOR assumes no responsibility or liability whatsoever for any failure or unusual or unexpected operation resulting from misuse, neglect, improper installation, repair, alteration or accident, improper handling, or unusual physical or electrical stress including, but not limited to, exposure to parameters beyond the specified maximum ratings or operation outside the specified operating range.**
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6. The products listed in this document are intended for use in general electronics equipment for commercial applications (e.g., office automation, communication equipment, measurement equipment, consumer electronics, etc.). These products are not, unless specifically authorized by LAPIS SEMICONDUCTOR authorized for use in any system or application that requires special or enhanced quality and reliability characteristics nor in any system or application where the failure of such system or application may result in the loss or damage of property, or death or injury to humans.

Such applications include, but are not limited to, traffic and automotive equipment, safety devices, aerospace equipment, nuclear power control, medical equipment, and life-support systems.
7. Certain products in this document may need government approval before they can be exported to particular countries. The purchaser assumes the responsibility of determining the legality of export of these products and will take appropriate and necessary steps at their own expense for these.
8. No part of the contents contained herein may be reprinted or reproduced without our prior permission.

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1 . Overview

This is the instruction manual for ML2282X Reference Board

ML2282X Reference Board supports following functions in combination with Sound Device Control Board.

1. Voice Playback by ML2282X
2. Writing voice data into ML2282X.

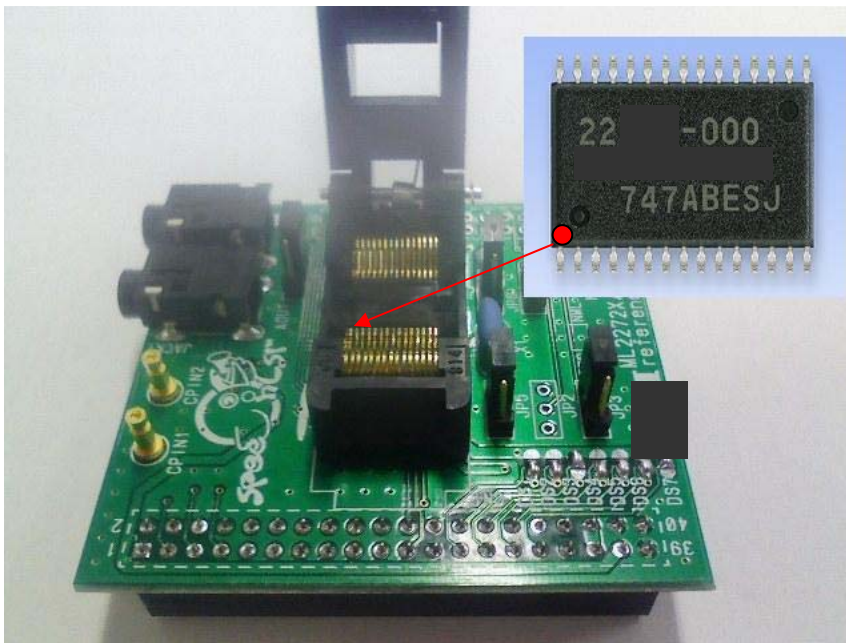
Please notice that the LSI written by this reference board can be used only as a prototype.

It is not guaranteed as a mass-produced quality.

2 . Operating Suggestions

It is the operating suggestions for ML2282X Reference Board.

1. Please do not supply a power to sound device control board, when the reference board is being mounted on it.
2. Please do not supply a power to sound device control board, when the LSIs are being mounted in the socket on the reference board. Then please confirm the aspect of the LSIs. The pin no.1 of LSIs must be placed at left near side of the socket.
3. LAPIS SEMICONDUCTOR will not provide any support for this board, but the board can be exchanged with a new product only when it has an initial failure.



3 . Reference Board

3.1 Circuit Diagram

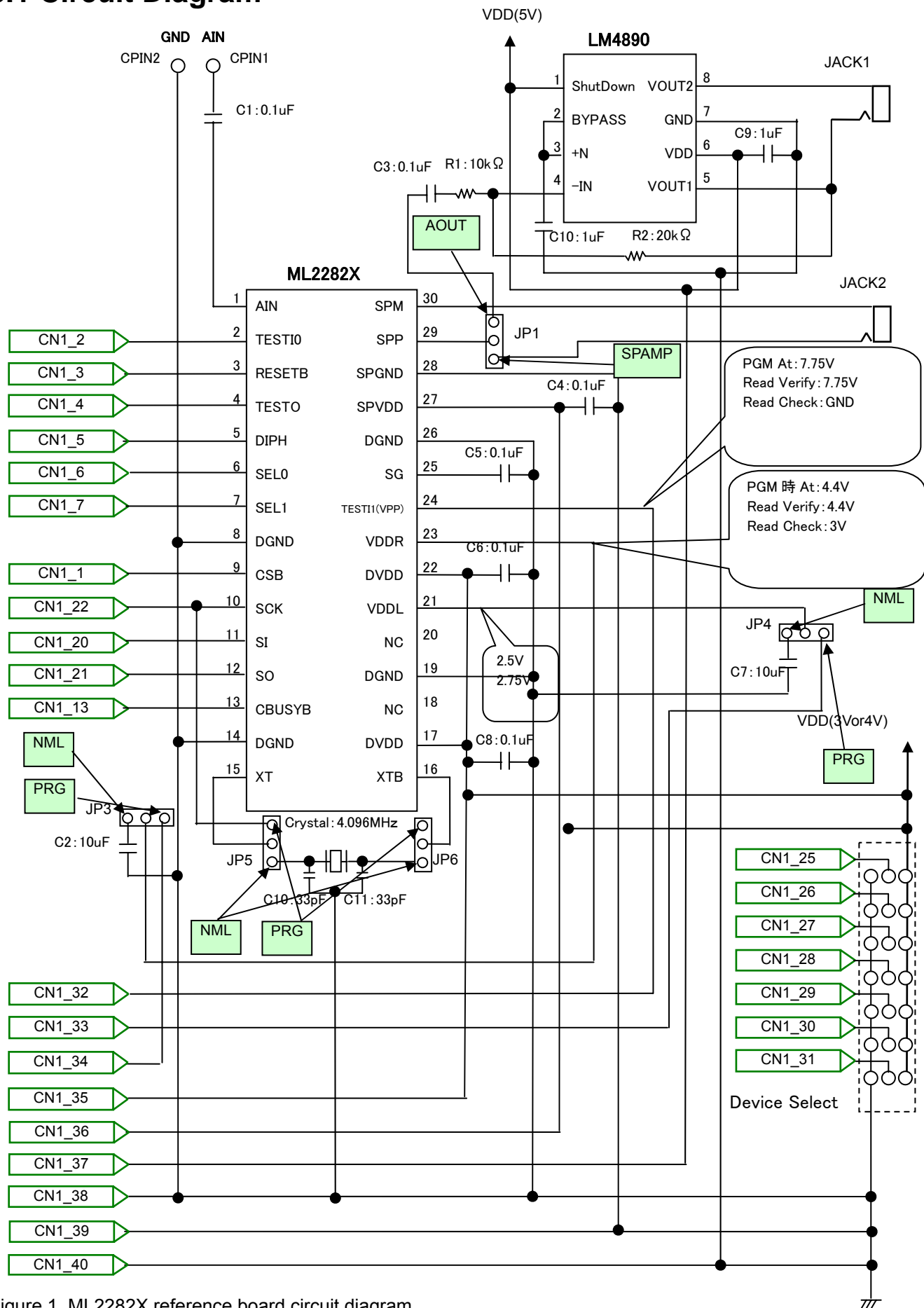


Figure 1, ML2282X reference board circuit diagram

3.2 Rough PCB layout

ML2282X reference board rough layout is described.

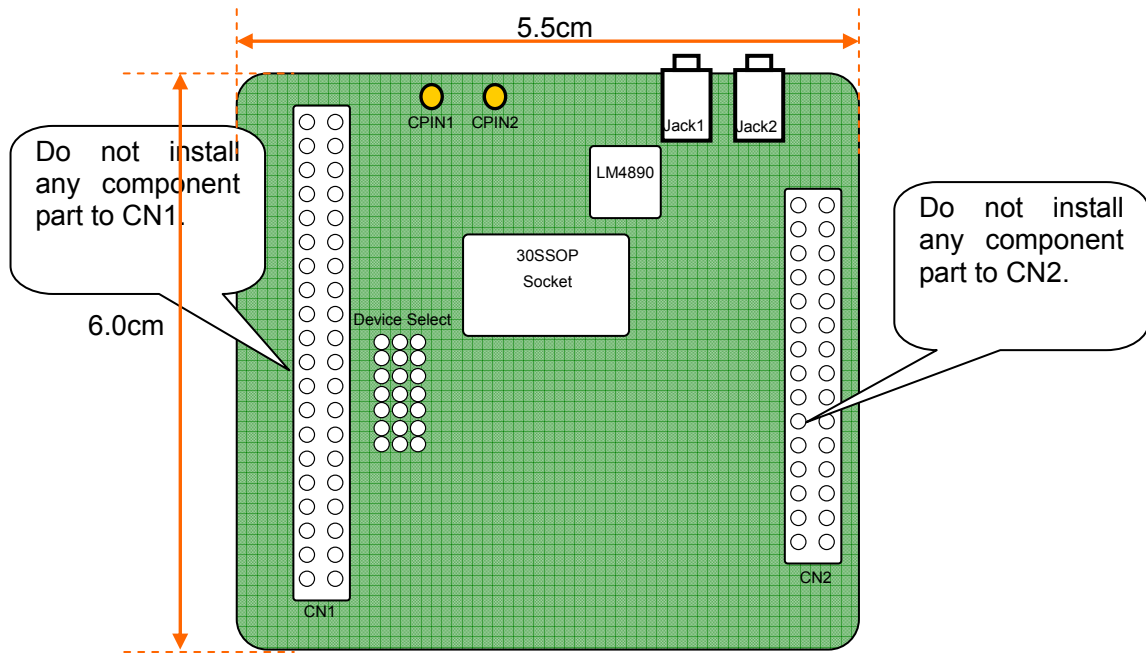
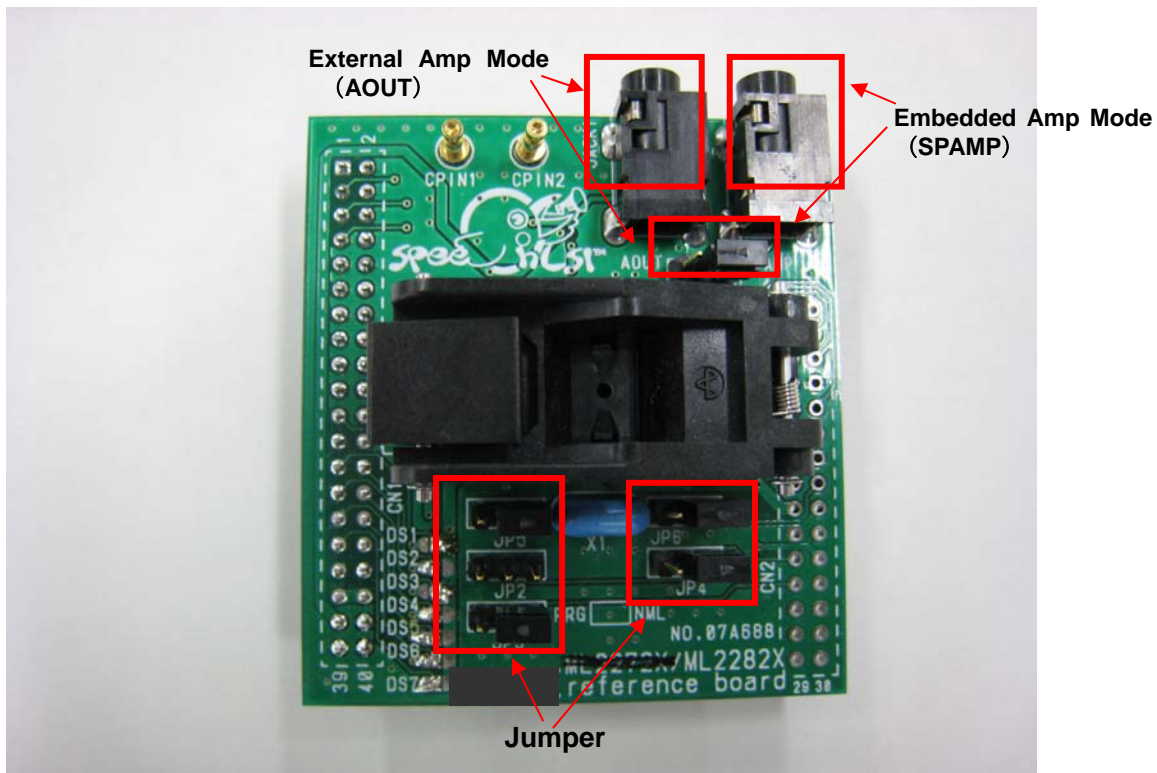


Figure 2, ML2282X reference board rough layout



3.3 CN1 connector pin connections

CN1 Pin No		Connect LSI	LSI Pin No	LSI Pin Name
1	I/O	ML2282X	9	CSB
2	I/O	ML2282X	2	TESTI0
3	I/O	ML2282X	3	RESETB
4	I/O	ML2282X	4	TESTO
5	I/O	ML2282X	5	DIPH
6	I/O	ML2282X	6	SEL0
7	I/O	ML2282X	7	SEL1
8	I/O	—	—	—
9	I/O	—	—	—
10	I/O	—	—	—
11	I/O	—	—	—
12	I/O	—	—	—
13	I/O	ML2282X	13	CBUSYB
14	I/O	—	—	—
15	I/O	—	—	—
16	I/O	—	—	—
17	I/O	—	—	—
18	I/O	—	—	—
19	I/O	—	—	—
20	I/O	ML2282X	11	SI
21	I/O	ML2282X	12	SO
22	I/O	ML2282X	10	SCK
23	I/O	—	—	—
24	I/O	—	—	—
25	Device Select	VDD	—	—
26	Device Select	GND	—	—
27	Device Select	VDD	—	—
28	Device Select	GND	—	—
29	Device Select	GND	—	—
30	Device Select	GND	—	—
31	Device Select	VDD	—	—
32	VPP	ML2282X	24	TESTI1(VPP)
33	VDD()	JP4	1	—
34	VDD(3V)	JP3	1	—
35	VDD(Variable)	ML2282X	17,22	—
36	VDD(3V)	ML2282X	27	SPVDD
37	VDD(5V)	LM4890	6 1	VDD ShutDown
38	GND	ML2282X	8,14,19,26	DGND
39	GND	ML2282X	28	SPGND
40	GND	LM4890	7	GND

3.4 CN2 connector specification

CN2 is connecting to all ML2282X terminals. It has two rows 30 pins.

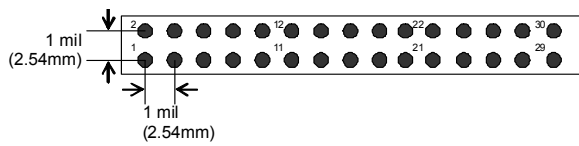


Figure 3, CN2 connectors hole pattern

3.5 CN2 connector pin connections

CN2 Pin No	LSI Pin No	LSI Pin Name
1	1	AIN
2	2	TESTI0
3	3	RESETB
4	4	TESTO
5	5	DIPH
6	6	SEL0
7	7	SEL1
8	8	DGND
9	9	CSB
10	10	SCK
11	11	SI
12	12	SO
13	13	CBUSYB
14	14	DGND
15	15	XT
16	16	XTB
17	17	DVDD
18	18	NC
19	19	DGND
20	20	NC
21	21	VDDL
22	22	DVDD
23	23	VDDR
24	24	TESTI1(VPP)
25	25	SG
26	26	DGND
27	27	SPVDD
28	28	SPGND
29	29	SPP
30	30	SPM

3.6 Jumper specifications

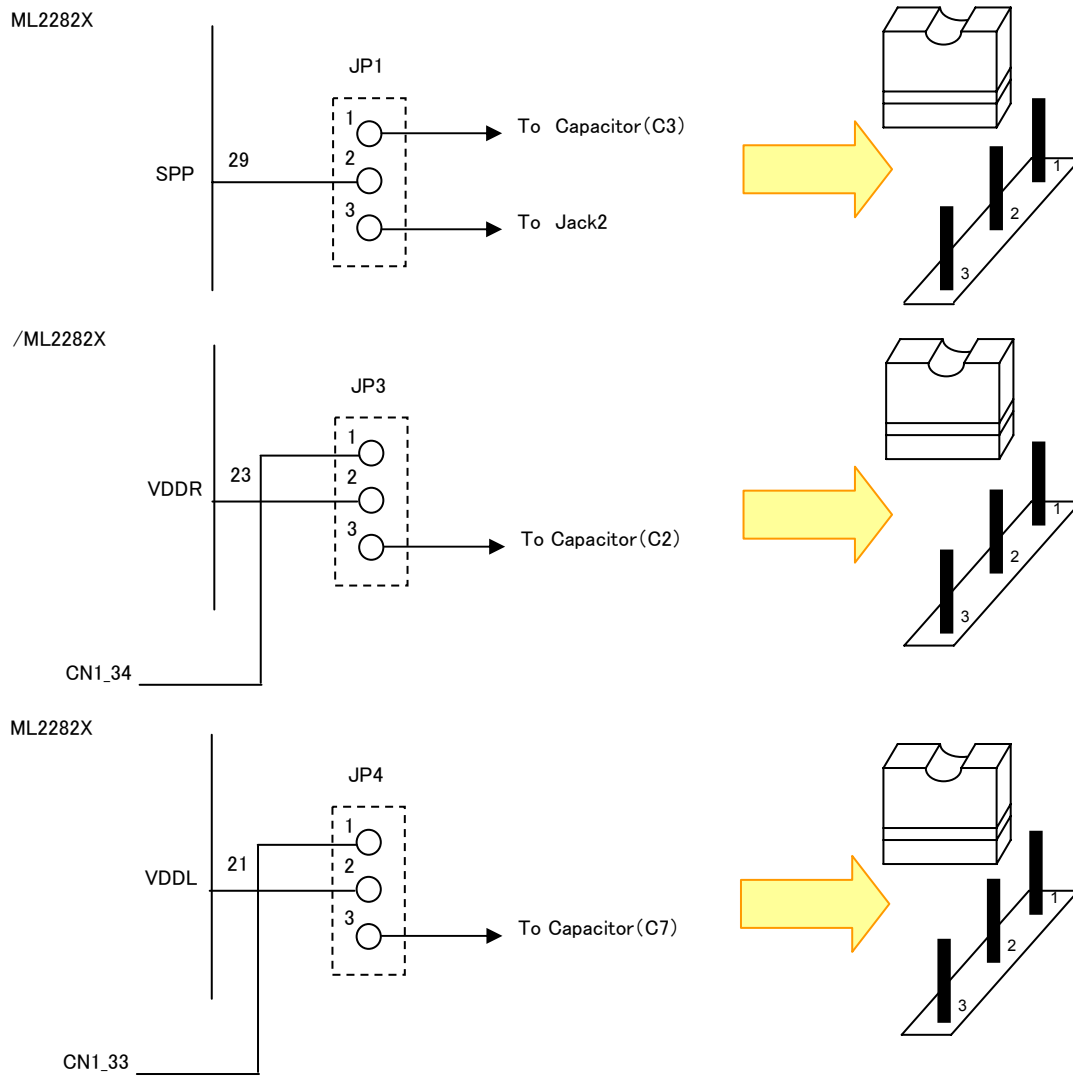


Figure 4, JP1/JP3/JP4 pattern

3.7 Jumper Pin Setting

① AMP

Jumper Pin No.	SPAMP	AOUT
JP1	Fixed on the right side	Fixed on the left side

② Playback/Write

Jumper Pin No.	Playback		Write / Verify
	3.3V	5.0V	
JP2	Open	Open	Open
JP3	Fixed on the left side	Fixed on the right side	Fixed on the left side
JP4	Fixed on the right side		Fixed on the left side
JP5	Fixed on the right side		Fixed on the left side
JP6	Fixed on the right side		Fixed on the left side

Revision History

Revision NO.	Date	Page		Description	
		Previous Edition	Current Edition		
1	2008.10.20	—	—	Preliminary edition 1	
4	2009.08.11	1	1	Change Notice Number : NOTICE1-9 -> NOTICE1-8	
		—	—	2007/2008 -> 2009	
		5	5	Change the Pin Name : TEST -> TESTI0 VPP->TESTI1(VPP)	
				Change LSI Name : ML2272X/ML2282X -> ML2282X	
				Add the Text (Figure1)	
		6	6	Change the Product Name : ML2272X/ML2282X -> ML2282X	
				Add the Text (Figure2)	
		7	7	CN1 Pin No 1-7,20-22,32,36,38,39 Change the Connect LSI Name: ML2272X/ML2282X -> ML2282X	
				CN1 Pin No 2,32 : Change the LSI Pin Name: TEST -> TESTI0 VPP->TESTI1(VPP)	
				CN1 Pin No 25 : Change the Connect LSI Name (GND -> VDD)	
				CN1 Pin No 25-31 : Change the text (Board Select -> Device Select) Fixed condition is specified	
				CN1 Pin No 33 Change the Connect LSI Name (- -> JP4) Change the LSI Pin No (- -> 1)	
				CN1 Pin No 34 Change the Connect LSI Name (- -> JP3) Change the LSI Pin No (- -> 1) Change the LSI Pin Name (DVDD -> -)	
				CN1 Pin No 35 Change the Connect LSI Name (- -> ML2282X) Change the LSI Pin No (- -> 17,22) Change the LSI Pin Name (- -> DVDD)	
				CN1 Pin No 37 Change the LSI Pin No (6 -> 1,6) Change the LSI Pin Name (VDD -> ShutDown,VDD)	
		8	8	Change the Product Name : ML2272X/ML2282X -> ML2282X	
				CN1 Pin No 2,24 Change the LSI Pin Name : TEST -> TESTI0 VPP->TESTI1(VPP)	
Add the Text (Figure3)					
9	9	Change the Product Name : ML2272X/ML2282X -> ML2282X			
		Add the Text (Figure4)			
5	2011.02.02	3	3	Add to operating suggestions	

ML2282X Reference Board
User's Manual

Issue Date: February 02, 2011
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