TB-EB-KN-AUDIO
Hardware User Manual

Rev.1.01

Revision History

Version	Date	Description	Publisher
Rev.1.00	2012/09/27	Release version	Amano
Rev.1.01	2013/01/11	Modify Features	Amano

Table of Contents

List of Figures

List of Tables

Introduction

Thank you for purchasing the **TB-EB-KN-AUDIO** board. Before using the product, be sure to carefully read this user manual and fully understand how to correctly use the product. First read through this manual, and then always keep it handy.

SAFETY PRECAUTIONS

Be sure to observe these precautions

Observe the precautions listed below to prevent injuries to you or other personnel or damage to property.

- **Before using the product, read these safety precautions carefully to assure correct use.**
- **These precautions contain serious safety instructions that must be observed.**
- **After reading through this manual, be sure to always keep it handy.**

The following conventions are used to indicate the possibility of injury/damage and classify precautions if the product is handled incorrectly.

Danger	Indicates the high possibility of serious injury or death if the product is handled incorrectly.
Warning	Indicates the possibility of serious injury or death if the product is handled incorrectly.
Caution	Indicates the possibility of injury or physical damage in connection with houses or household goods if the product is handled incorrectly.

The following graphical symbols are used to indicate and classify precautions in this manual.
(Examples)

	Turn off the power switch.
	Do not disassemble the product.
	Do not attempt this.

Warning	
	**In the event of a failure, disconnect the power supply.** If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately and contact our sales personnel for repair.
	**If an unpleasant smell or smoking occurs, disconnect the power supply.** If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately. After verifying that no smoking is observed, contact our sales personnel for repair.
	**Do not disassemble, repair or modify the product.** Otherwise, a fire or electric shock may occur due to a short circuit or heat generation. For inspection, modification or repair, contact our sales personnel.
	**Do not touch a cooling fan.** As a cooling fan rotates in high speed, do not put your hand close to it. Otherwise, it may cause injury to persons. Never touch a rotating cooling fan.
	**Do not place the product on unstable locations.** Otherwise, it may drop or fall, resulting in injury to persons or failure.
	**If the product is dropped or damaged, do not use it as is.** Otherwise, a fire or electric shock may occur.
	**Do not touch the product with a metallic object.** Otherwise, a fire or electric shock may occur.
	**Do not place the product in dusty or humid locations or where water may splash.** Otherwise, a fire or electric shock may occur.
	**Do not get the product wet or touch it with a wet hand.** Otherwise, the product may break down or it may cause a fire, smoking or electric shock.
	**Do not touch a connector on the product (gold-plated portion).** Otherwise, the surface of a connector may be contaminated with sweat or skin oil, resulting in contact failure of a connector or it may cause a malfunction, fire or electric shock due to static electricity.

Caution	
	Do not use or place the product in the following locations. • Humid and dusty locations • Airless locations such as closet or bookshelf • Locations which receive oily smoke or steam • Locations exposed to direct sunlight • Locations close to heating equipment • Closed inside of a car where the temperature becomes high • Staticky locations • Locations close to water or chemicals Otherwise, a fire, electric shock, accident or deformation may occur due to a short circuit or heat generation.
	Do not place heavy things on the product. Otherwise, the product may be damaged.

■ Disclaimer

This product is an evaluation board for Audio/FA application designed specifically for use with **inrevium** evaluation boards. Tokyo Electron Device Limited assumes no responsibility for any damages resulting from the use of this product for purposes other than those stated.

Even if the product is used properly, Tokyo Electron Device Limited assumes no responsibility for any damages caused by:

(1) Earthquake, thunder, natural disaster or fire resulting from the use beyond our responsibility, acts by a third party or other accidents, the customer's willful or accidental misuse or use under other abnormal conditions.
(2) Secondary impact arising from use of this product or its unusable state (business interruption or others)
(3) Use of this product against the instructions given in this manual.
(4) Malfunctions due to connection to other devices.

Tokyo Electron Device Limited assumes no responsibility or liability for:

(1) Erasure or corruption of data arising from use of this product.
(2) Any consequences or other abnormalities arising from use of this product, or
(3) Damage of this product not due to our responsibility or failure due to modification

This product has been developed by assuming its use for research, testing or evaluation. It is not authorized for use in any system or application that requires high reliability.

Repair of this product is carried out by replacing it on a chargeable basis, not repairing the faulty devices. However, non-chargeable replacement is offered for initial failure if such notification is received within two weeks after delivery of the product.

The specification of this product is subject to change without prior notice.

The product is subject to discontinuation without prior notice.

1. Related Documents and Accessories

All documents relating to this board can be downloaded from our website Club-X.
[Mounted accessory]
Rubber foot: 4, Screw M3 x 6: 8, Spacer M3 x 10: 4
[Accessory]
AC Adaptor (Akizuki Denshi: LTE(GFP)451DA-1238 [or equivalent]): 1
D-SUB Cable (HOSA: DTP802 [D-SUB25 to TRS]): 1
Jumper Socket (OMRON: XJ8A-0211): 8

2. Overview

This product is an interface expansion board designed specifically for use with the inrevium evaluation board “TB-6S-LX25-FANET” (hereafter referred to as “platform board”). The board is intended for product design and evaluation purposes in audio/FA applications using Xilinx FPGA. It should be noted that **the bank voltage (VCCO) of an FPGA on the platform board must be +3.3V.**

The board is equipped with 4-ch analog input/output and 2-ch digital input/output interfaces that are connected to high performance Analog to Digital Audio Converter (hereafter referred to as “ADC”) and Digital to Analog Audio Converter (hereafter referred to as “DAC”). It also provides RS232 and RS485 interfaces for connection to external devices and can support the demand for increasing storage capacity by adding microSD to the microSD sockets. (Tested SD-C02G[HAGIWARA SYS-COM])

3. Features

ADC Device:	TI 192KHz/24bit PCM4204
DAC Device:	TI 192KHz/24bit PCM4104
Input/Output Amplifier:	TI OPA1632
Audio Clock (24.576MHz VCXO):	Fox FVXO-HC73B-24.576
Audio Clock (22.5792MHz OSC):	Kyocera KC7050B22.5792C3
D-SUB25 Audio AD/DA Connector:	OMRON XM3B-2522-122
SPDIF Coaxial Input/Output Connector:	Keystone Electronics 972
RS232C Driver Receiver:	MAXIM MAX3243
RS485 Driver Receiver:	TI SN65HVD33
MicroSD Socket:	Hirose DM3AT-SF-PEJM5

4. Board Overview

4.1. Block Diagram

Figure 4-1 shows the TB-EB-KN-AUDIO block diagram.

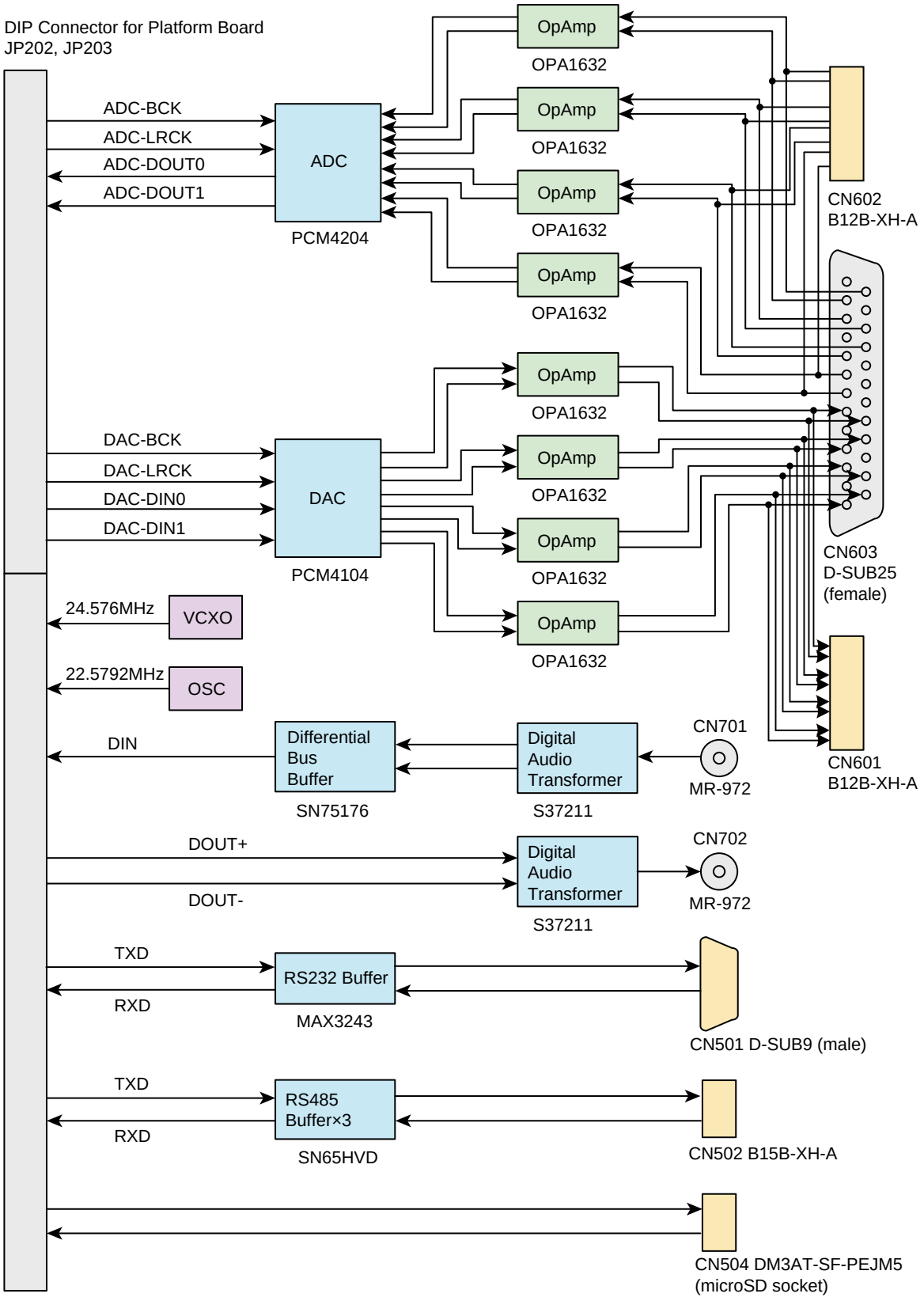

Figure4-1 TB-EB-KN-AUDIO Block Diagram

4.2. External View of Board

Figure 4-2 shows the external view of the TB-EB-KN-AUDIO board.

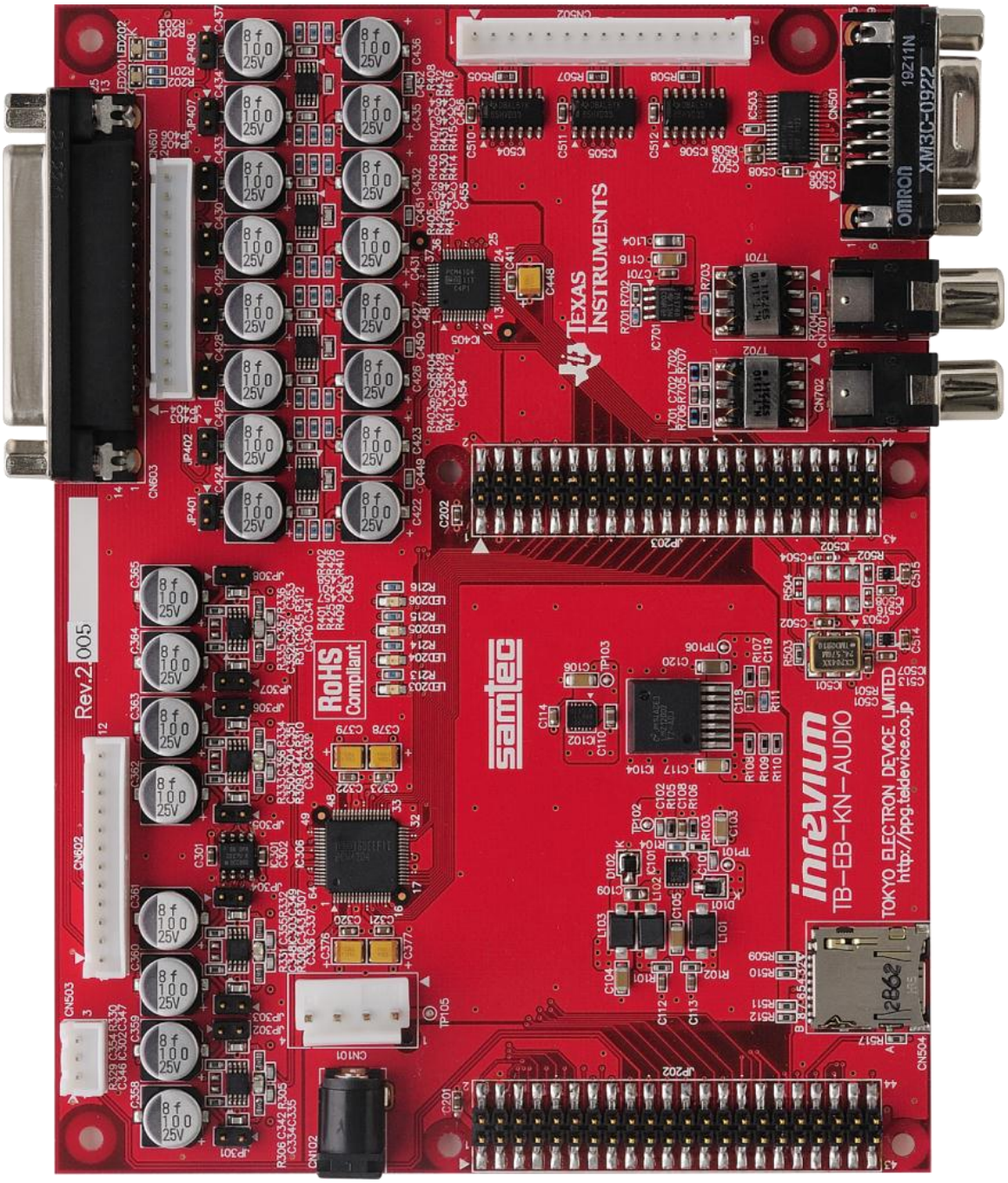

Figure4-2 External View of Board (Component Side)

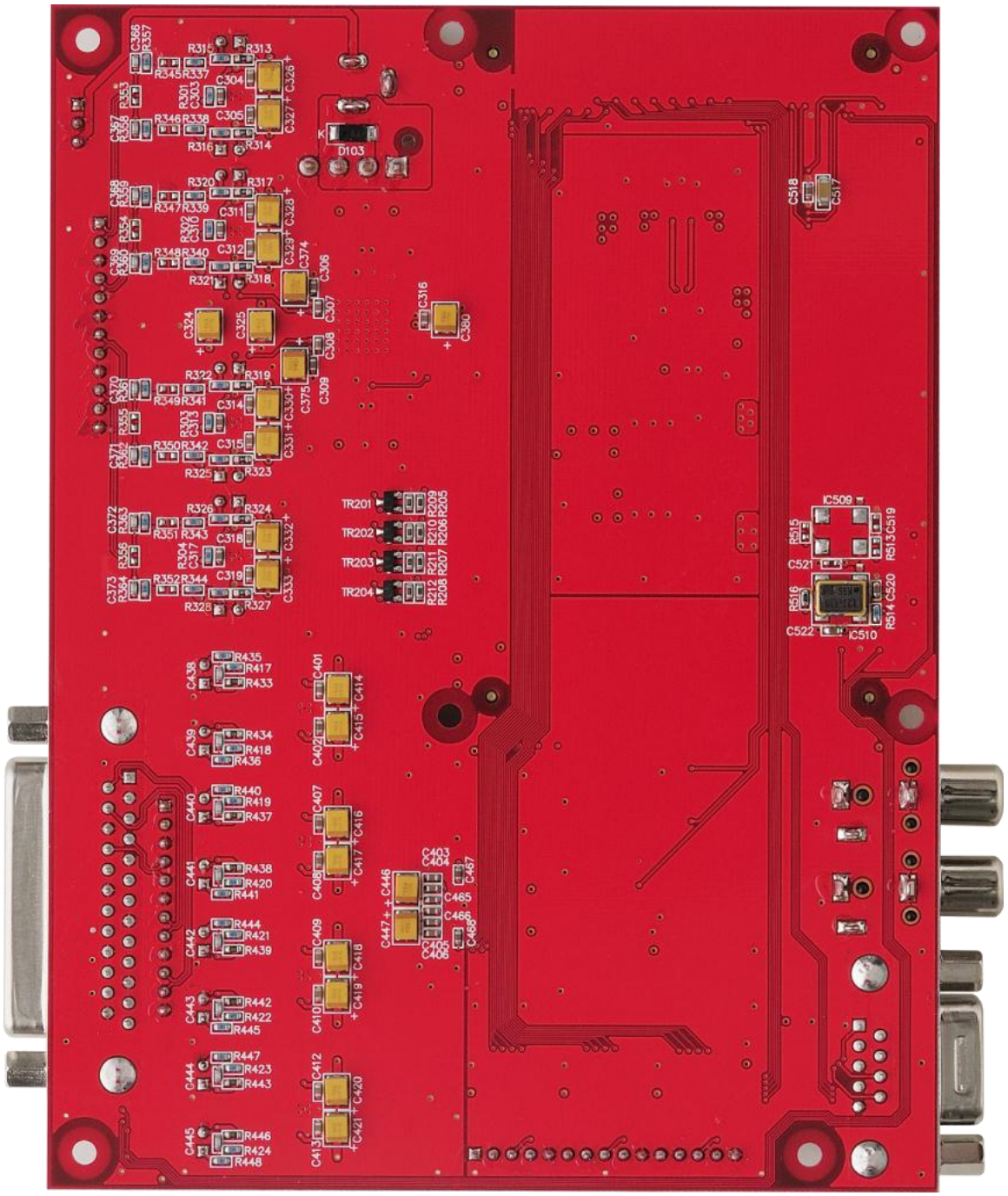

Figure4-3 External View of Board (Solder Side)

4.3. Board Specification

Figure 4-4 shows the TB-EB-KN-AUDIO board specification.

External Dimensions: W:160mm x H:120mm (not including projections)

Layer Structure: 6-Layer

Board Thickness: 1.6mm

Material: FR-4

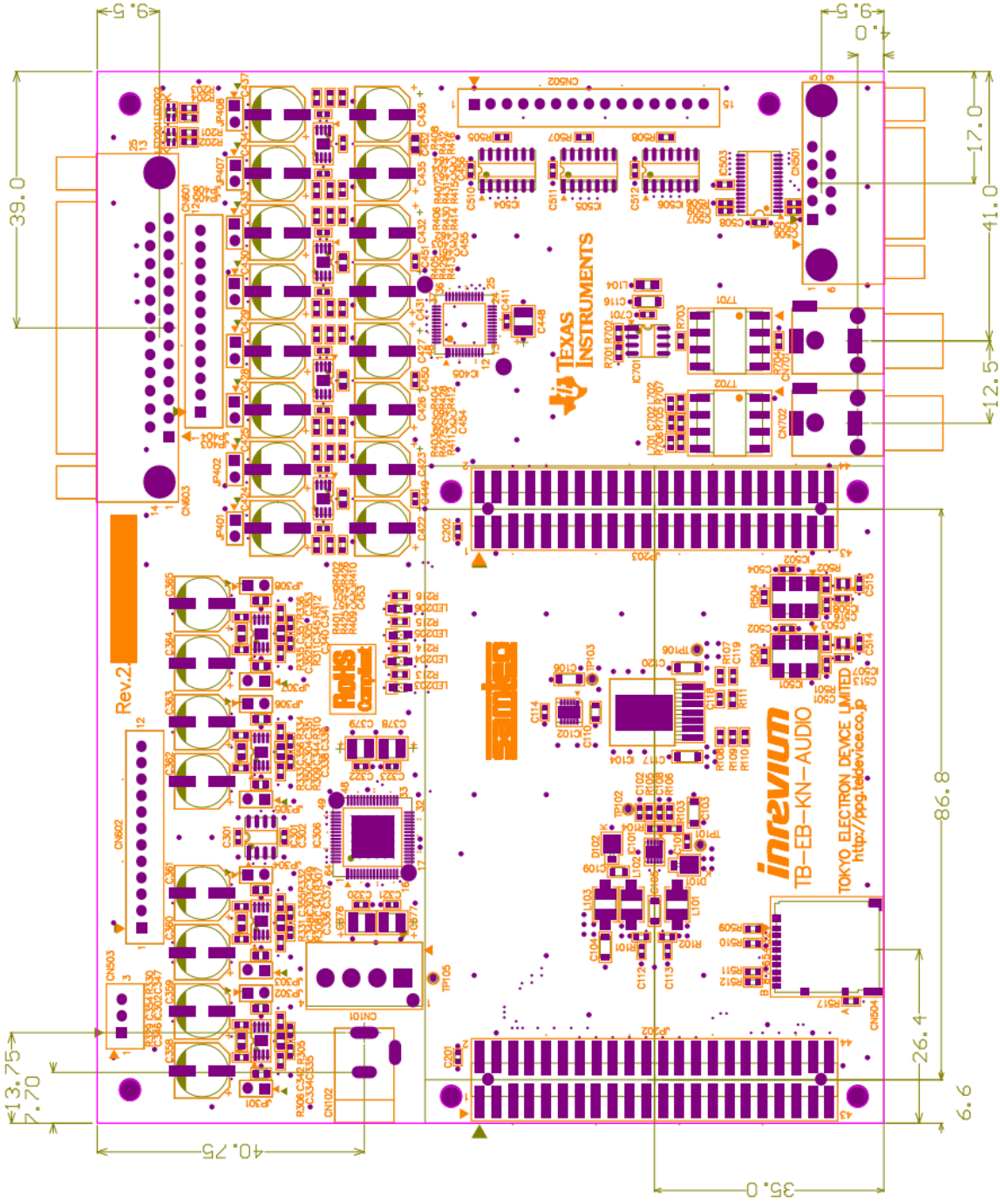

Figure4-4 External Dimensions (Component Side of Board)

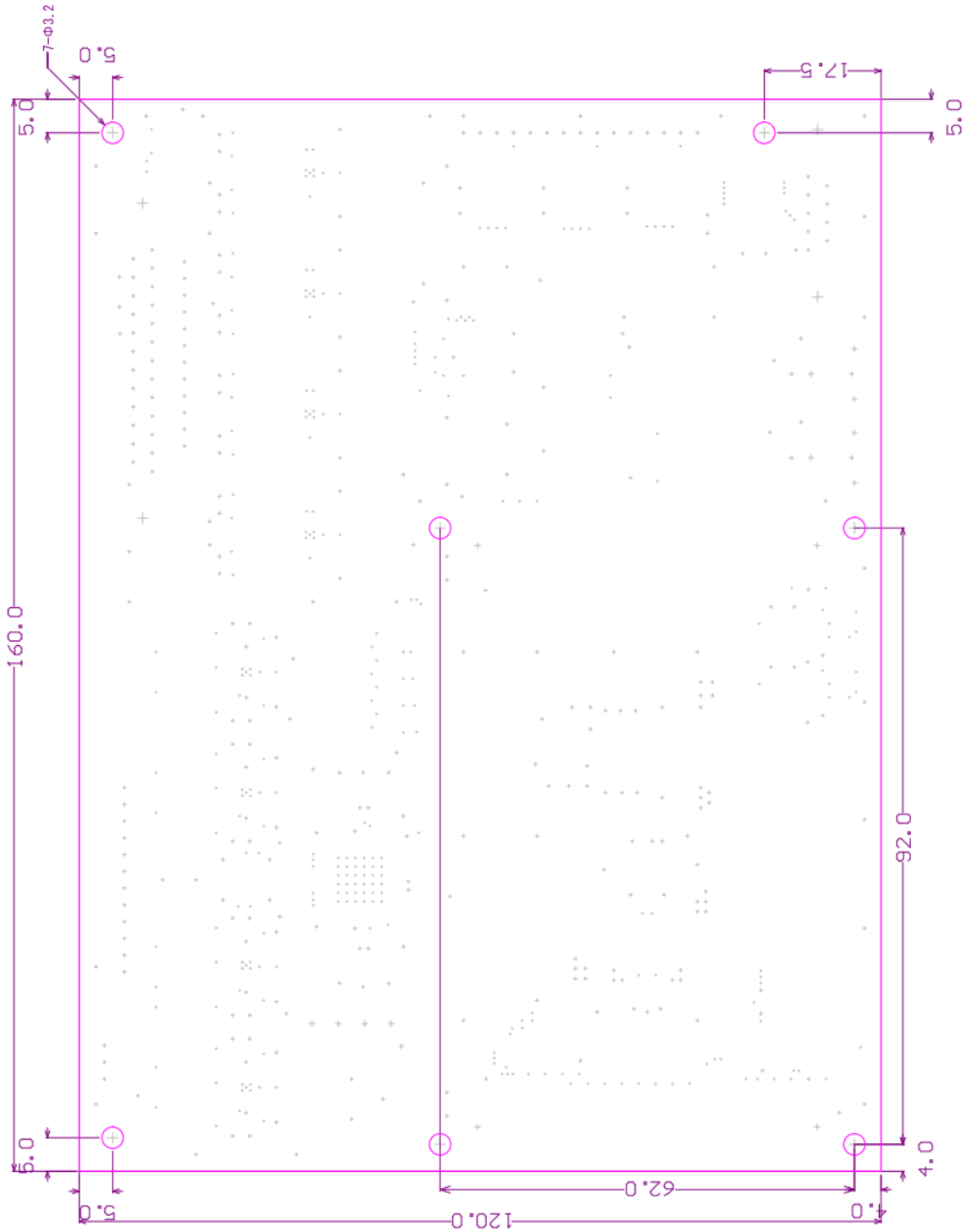

Figure4-5 External Dimensions (Solder Side of Board)

5. Power Supply Structure

Figure 5-1 shows the power supply circuit of the TB-EB-KN-AUDIO board.

The board generates the following voltages from a +12V external power supply source:

+13.0V/-13.0V from an LT power supply IC "LT3471"

+5.0V from an LT power supply IC "LT1763"

+3.3V from a TI power supply IC "LMZ14203"

It should be noted that the bank voltage (VCCO) of an FPGA on the platform board (TB-6S-LX25-FANET) must be +3.3V.

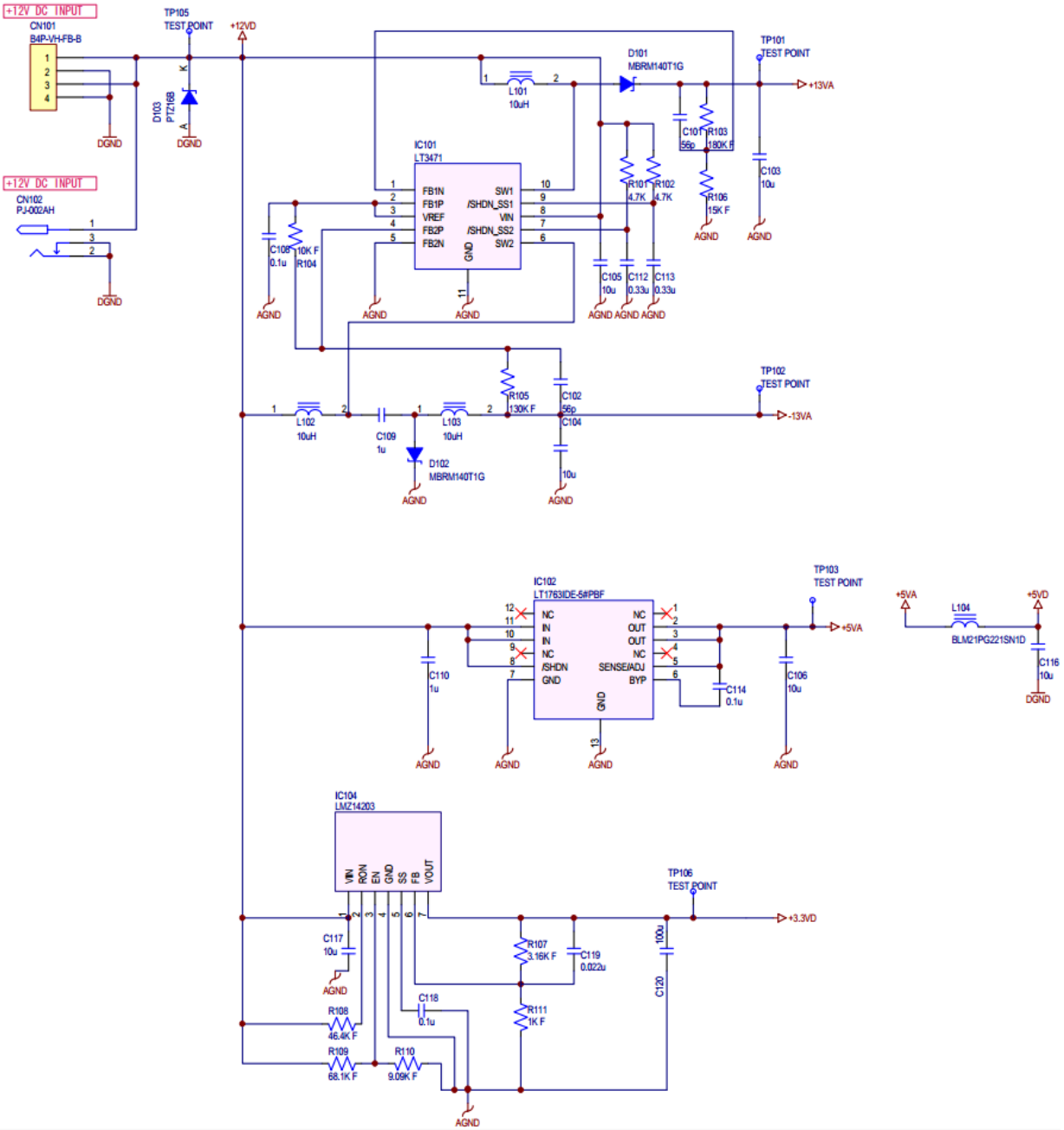

Figure5-1 Power Supply Circuit

*AGND and DGND are connected.

5.1. Pin Header Power Connector (CN101)

The board uses a JST B4P-VH-FB-B pin header power connector.

Caution: Do not connect a CN102 simultaneously. Otherwise, the board components may be damaged. Be sure to use either one of these power connectors for power feeding.

Figure5-2 Pin Header Power Connector Pin

Table 5-1 shows the connector pin assignment.

Table5-1 Pin Header Power Connector Pin Assignment

Pin #	Name
1	+12V
2	GND
3	+12V
4	GND

5.2. DC Jack Power Connector (CN102)

An AC adaptor comes with the board.

The board uses a CUI PJ-002AH DC jack power connector.

Caution: Do not connect a CN101 simultaneously. Otherwise, the board components may be damaged. Be sure to use either one of these power connectors for power feeding.

Figure5-3 DC Jack Power Connector

Table 5-2 shows the connector pin assignment.

Table5-2 DC Jack Power Connector Pin Assignment

Pin #	Name
1	+12V
2	GND
3	GND

6. Connectors and ICs

6.1. Platform Board Connection Connector (JP202, 203)

This is a Samtec TSM-122-01-L-DV-A connector used to connect the TB-6S-LX25-FANET platform board.

Caution: When inserting or removing the connector, some of the connector pins may become bent or broken. It is recommended not to insert or remove the connector frequently.

The **Direction** field in the table shows a signal direction:

Direction = I Platform Board to TB-EB-KN-AUDIO (Input)

Direction = O TB-EB-KN-AUDIO to Platform Board (Output)

For information on FPGA pin assignment of the TB-6S-LX25-FANET Platform Board, refer to the web site for board purchasers (“Master UCF File” or “Platform Board Circuit”).

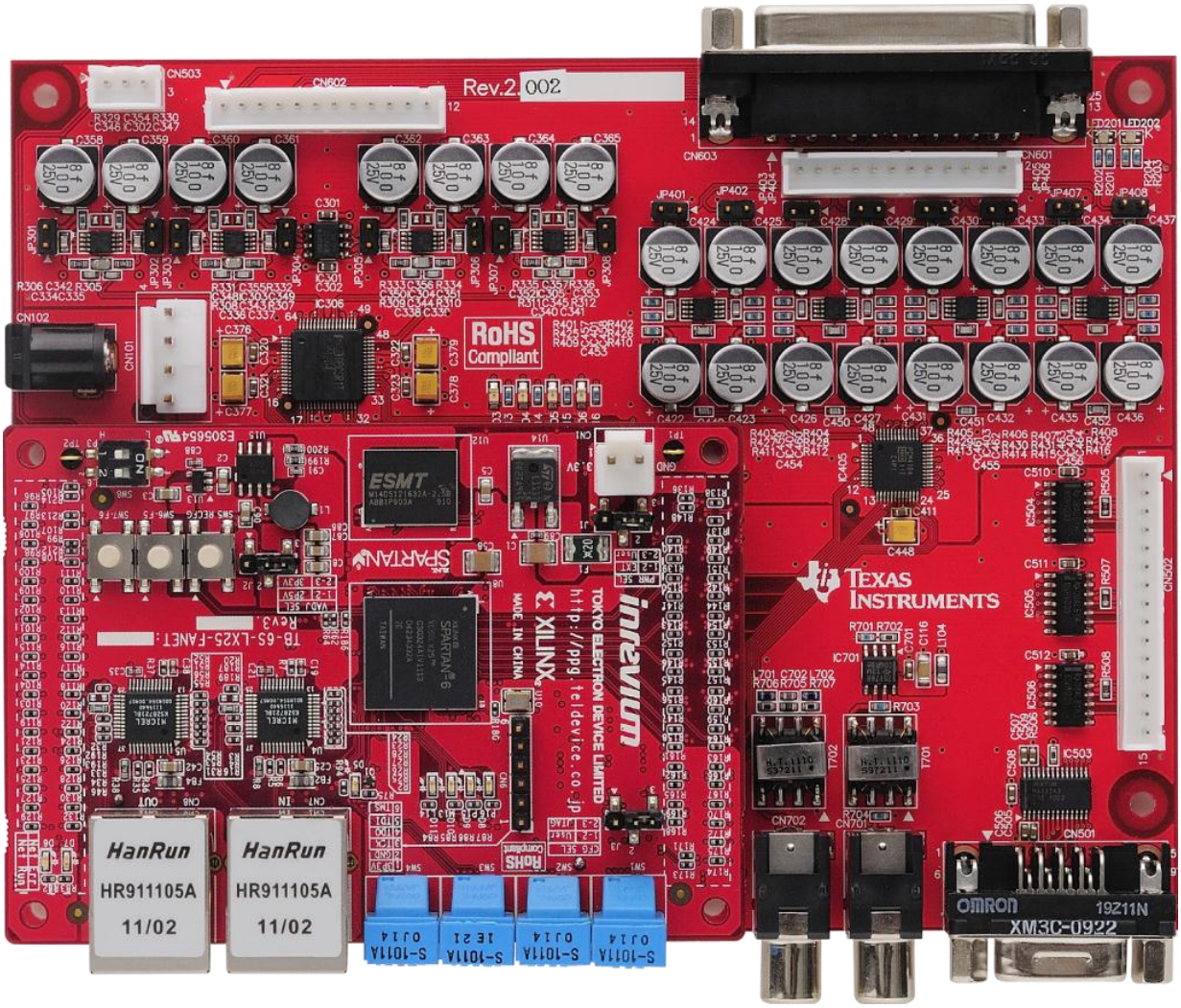

Figure6-1 Platform Board

The subsequent pages show the connector pin assignments.

Table6-1 Platform Board Connection Connector (JP202) Pin Assignment

Pin #	TB-6S-LX25-FANET CN2 Pin Name	DIR	Signal Name	Connecting to	Description
1	USER_3P3V	-	+3.3VD	-	+3.3V Power (to Platform Board)
2	uC_DAT_ENA	I	DAC_0_FMT0	IC405(25)	PCM4104 Audio Data Format Configuration
3	uC_ADR0	O	TTL1RXD	IC504(2)	SN65HVD33 R
4	GND	-	GND	-	Ground
5	uC_ADR1	I	TTL1TXD	IC504(5)	SN65HVD33 D
6	uC_nBUSY	I	DAC_0_FMT1	IC405(26)	PCM4104 Audio Data Format Configuration
7	uC_ADR2	O	TTL2RXD	IC505(2)	SN65HVD33 R
8	uC_nIRQ	I	DAC_0_FMT2	IC405(27)	PCM4104 Audio Data Format Configuration
9	uC_ADR3	I	TTL2TXD	IC505(5)	SN65HVD33 D
10	uC_nCS	I	DAC_0_FS0	IC405(28)	PCM4104 Sampling Mode Configuration
11	uC_ADR4	O	TTL3RXD	IC506(2)	SN65HVD33 R
12	uC_DATA0	I	DAC_0_FS1	IC405(29)	PCM4104 Sampling Mode Configuration
13	uC_ADR5	I	TTL3TXD	IC506(5)	SN65HVD33 D
14	uC_DATA1	O	TTL0RXD	IC503(19)	MAX3243 R1OUT
15	uC_ADR6	O	TTL4RXD	CN503(1)	Debug Connector Pin 1
16	uC_DATA2	O	TTL0DSR	IC503(18)	MAX3243 R2OUT
17	uC_ADR7	I	TTL4TXD	CN503(2)	Debug Connector Pin 2
18	uC_DATA3	O	TTL0DCD	IC503(17)	MAX3243 R3OUT
19	uC_ADR8	I	TTL1RE	IC504(3)	SN65HVD33 RE (Active Low)
20	uC_DATA4	O	TTL0CTS	IC503(16)	MAX3243 R4OUT
21	uC_ADR9	I	TTL1DE	IC504(4)	SN65HVD33 DE
22	uC_DATA5	O	TTL0RI	IC503(15)	MAX3243 R5OUT
23	uC_ADR10	I	TTL2RE	IC505(3)	SN65HVD33 RE (Active Low)
24	uC_DATA6	I	TTL0TXD	IC503(14)	MAX3243 T1IN
25	uC_ADR11	I	TTL2DE	IC505(4)	SN65HVD33 DE
26	uC_DATA7	I	TTL0RTS	IC503(13)	MAX3243 T2IN
27	uC_ADR12	I	TTL3RE	IC506(3)	SN65HVD33 RE (Active Low)
28	uC_DATA8	I	TTL0DTR	IC503(12)	MAX3243 T3IN
29	uC_ADR13	I	TTL3DE	IC506(4)	SN65HVD33 DE
30	uC_DATA9	O	DIN	IC701(1)	Digital Audio Input
31	uC_ADR14	I/O	SD_DAT2	CN504(1)	microSD DATA2
32	uC_DATA10	I	DOUT+	CN702(2)	Digital Audio Output P
33	uC_ADR15	I/O	SD_DAT1	CN504(8)	microSD DATA1
34	uC_DATA11	I	DOUT-	CN702(1)	Digital Audio Output N
35	uC_EMULATION	O	SD_SW	CN504(A)	microSD SW-A
36	uC_DATA12	I	SD_CLK	CN504(5)	microSD Clock
37	uC_nBHE	I	LED1_1	LED201(4)	2-color type LED Green (Active Low)
38	uC_DATA13	I/O	SD_CMD	CN504(3)	microSD CMD
39	uC_nRD	I	LED1_2	LED201(2)	2-color type LED Red (Active Low)
40	uC_DATA14	I/O	SD_DAT3	CN504(2)	microSD DATA3/CD
41	uC_nWR	-	NC	-	Non Connect
42	GND	-	GND	-	Ground
43	USER_3P3V	-	+3.3V	-	+3.3V Power (to Platform Board)
44	uC_DATA15	I/O	SD_DAT0	CN504(7)	microSD DATA0

Table6-2 Platform Board Connection Connector (JP203) Pin Assignment

Pin #	TB-6S-LX25-FANET CN3 Pin Name	DIR	Signal Name	Connecting to	Description
1	USR_IOP0	O	ADC_0_CLIP1	IC306(34)	PCM4204 Channel 1 Clipping Flag (Active High)
2	USER_3P3V	-	+3.3V	-	+3.3V Power (to Platform Board)
3	GND	-	GND	-	Ground
4	USR_IOP10	I	ADC_0_HPFD	IC306(38)	PCM4204 High-Pass Filter Disable (Active High)
5	USR_ION0	O	ADC_0_DOUT1	IC306(32)	PCM4204 PCM Data for Channels 3 and 4
6	USR_ION10	O	ADC_0_CLIP4	IC306(37)	PCM4204 Channel 4 Clipping Flag (Active High)
7	USR_IOP1	O	ADC_0_DOUT0	IC306(31)	PCM4204 PCM Data for Channels 1 and 2
8	USR_IOP11	O	ADC_0_CLIP3	IC306(36)	PCM4204 Channel 3 Clipping Flag (Active High)
9	USR_ION1	I	ADC_0_LRCK	IC306(30)	PCM4204 Audio Serial Port Left/Right (or Word) Clock
10	USR_ION11	O	ADC_0_CLIP2	IC306(35)	PCM4204 Channel 2 Clipping Flag (Active High)
11	USR_IOP2	I	ADC_0_BCK	IC306(29)	PCM4204 Audio Serial Port Bit Clock
12	USR_IOP12	I	DAC_0_MODE	IC405(8)	PCM4104 Operating Mode (0 = Standalone, 1= Software Controlled)
13	USR_ION2	I	ADC_0_FMT2	IC306(20)	PCM4204 Audio Data Format
14	USR_ION12	I	DAC_0_RST	IC405(9)	PCM4104 Reset/Power Down (Active Low)
15	USR_IOP3	I	ADC_0_FMT1	IC306(19)	PCM4204 Audio Data Format
16	USR_IOP13	I	DAC_0_MUTE	IC405(10)	PCM4104 All−Channel Soft Mute (Active High)
17	USR_ION3	I	ADC_0_FMT0	IC306(18)	PCM4204 Audio Data Format
18	USR_ION13	I	DAC_0_SCKI	IC405(14)	PCM4104 System Clock
19	USR_IOP4	I	ADC_0_SM	IC306(17)	PCM4204 Audio Serial Port Slave/Master Mode (0 = Master, 1 = Slave)
20	USR_IOP14	I	DAC_0_BCK	IC405(15)	PCM4104 Audio Bit (or Data) Clock
21	USR_ION4	I	ADC_0_SCKI	IC306(15)	PCM4204 System Clock
22	USR_ION14	I	DAC_0_LRCK	IC405(16)	PCM4104 Audio Left/Right (or Word) Clock
23	USR_IOP5	I	ADC_0_FS2	IC306(14)	PCM4204 Sampling Mode
24	USR_IOP15	I	DAC_0_DIN0	IC405(17)	PCM4104 Audio Data for Channels 1 and 2
25	USR_ION5	I	ADC_0_FS1	IC306(13)	PCM4204 Sampling Mode
26	USR_ION15	I	DAC_0_DIN1	IC405(18)	PCM4104 Audio Data for Channels 3 and 4
27	USR_IOP6	I	ADC_0_FS0	IC306(12)	PCM4204 Sampling Mode
28	USR_IOP16	I	DAC_0_CS	IC405(21)	PCM4104 SPI Chip Select (Active Low)
29	USR_ION6	I	ADC_0_RST	IC306(10)	PCM4204 Reset/Power Down (Active Low with internal pull-up to VDD1)
30	USR_ION16	I	DAC_0_CCLK	IC405(22)	PCM4104 SPI Data Clock
31	USR_IOP7	O	CLK_24P576	IC501(4)	VCXO 24.576MHz Input
32	USR_CLK_P	I	DAC_0_CDTI	IC405(23)	PCM4104 SPI Data Input
33	USR_ION7	O	CLK_22P579	IC510(3)	22.579MHz Input
34	USR_CLK_N	O	DAC_0_CDTO	IC405(24)	PCM4104 SPI Data Output
35	SYNC_OUT0	I	VCXO_CTRL0	IC507(3)	VCXO 0 VC
36	MOTH_MOSI	-	NC	-	No connect
37	SYNC_OUT1	I	VCXO_CTRL1	IC508(3)	VCXO 1 VC
38	MOTH_DIN	-	NC	-	No connect
39	LATCH_IN0	I	LED2_1	LED202(4)	2-color type LED Green (Active Low)
40	MOTH_XCS	-	NC	-	No connect
41	GND	-	-	-	Ground
42	MOTH_CCLK	-	NC	-	No connect
43	LATCH_IN1	I	LED2_2	LED202(2)	2-color type LED Red (Active Low)
44	USER_3P3V	-	+3.3V	-	+3.3V Power (to Platform Board)

7. Audio Input / Output

7.1. D-SUB25 Audio AD/DA Connector (CN603)

The board supports 4ch analog audio inputs and outputs.
OMRON XM3B-2522-112 connectors are used for these signal connections.

Input and output gains can be controlled by setting onboard jumper pins.

Figure7-1 D-SUB25 Audio AD/DA Connector

Table 7-1 shows the connector pin assignment.

Table 7-1 D-SUB25 Audio AD/DA Connector Pin Assignment

Pin #	Name	Pin #	Name
1	DAC_0_VOUT4+	14	DAC_0_VOUT4-
2	AGND	15	DAC_0_VOUT3+
3	DAC_0_VOUT3-	16	AGND
4	DAC_0_VOUT2+	17	DAC_0_VOUT2-
5	AGND	18	DAC_0_VOUT1+
6	DAC_0_VOUT1-	19	AGND
7	ADC_0_VIN4+	20	ADC_0_VIN4-
8	AGND	21	ADC_0_VIN3+
9	ADC_0_VIN3-	22	AGND
10	ADC_0_VIN2+	23	ADC_0_VIN2-
11	AGND	24	ADC_0_VIN1+
12	ADC_0_VIN1-	25	AGND
13	NC	-	-

D-SUB Cable
Following table shows connection of D-SUB and TRS.

Table 7-2 D-SUB and TRS in/out channel assign

TRS No.	Connect to
1	AD Input CH1
2	AD Input CH2
3	AD Input CH3
4	AD Input CH4
5	DA Output CH1
6	DA Output CH2
7	DA Output CH3
8	DA Output CH4

7.2. Pin Header Audio AD Connector (CN602)

All analog audio inputs are connected to the JST B12B-XH-A connector in a multipoint connection.

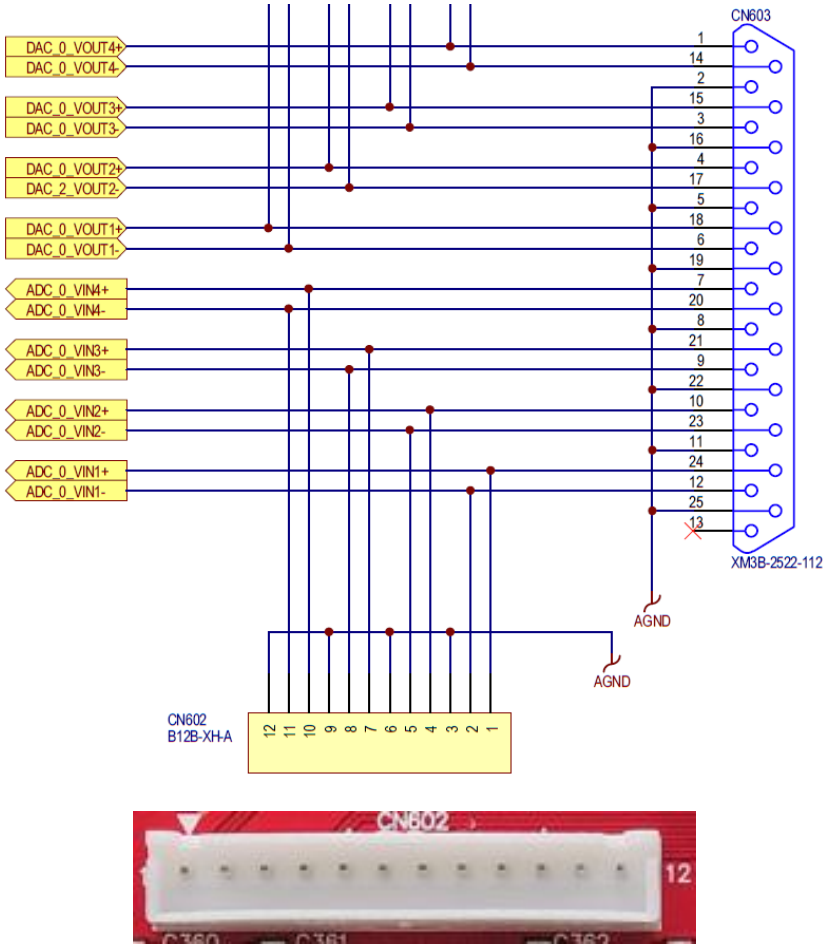

Figure7-2 Pin Header Audio AD Connector

Table 7-3 shows the connector pin assignment.

Table7-3 Pin Header Audio AD Connector Pin Assignment

Pin #	Name
1	ADC_0_VIN1+
2	ADC_0_VIN1-
3	AGND
4	ADC_0_VIN2+
5	ADC_0_VIN2-
6	AGND
7	ADC_0_VIN3+
8	ADC_0_VIN3-
9	AGND
10	ADC_0_VIN4+
11	ADC_0_VIN4-
12	AGND

7.3. Audio AD Input Decoupling

The audio inputs decoupling capacitors are inserted in series.

7.4. Audio AD Input Gain Setting (JP301, 302, 303, 304, 305, 306, 307 & 308)

A desired audio input gain is selectable using these jumper pins.

Figure7-3 Audio AD Input Gain Jumper Pins

Rated Input + 4dBu, Max Input + 18dBu (balanced inputs):

ADC_0_VIN1:	JP301 and JP302 = SHORT.
ADC_0_VIN2:	JP303 and JP304 = SHORT.
ADC_0_VIN3:	JP305 and JP306 = SHORT.
ADC_0_VIN4:	JP307 and JP308 = SHORT.

Rated Input - 10dBV, Max Input + 4dBV (unbalanced inputs):

ADC_0_VIN1:	JP301 and JP302 = OPEN.
ADC_0_VIN2:	JP303 and JP304 = OPEN.
ADC_0_VIN3:	JP305 and JP306 = OPEN.
ADC_0_VIN4:	JP307 and JP308 = OPEN.

7.5. Audio ADC (IC306)

The board is equipped with a TI PCN4204 device that supports 24bit/192kHz ADC.
4ch analog audio inputs are supported. These audio inputs are connected to the onboard CN602/603 connectors via a TI OPA1632.

Caution: DSDCLK (24), DSD1 (25), DSD2 (26), DSD3 (27) and DSD4 (28) are NC and SUB (39) is connected to GND.

Figure7-4 ADC

7.6. Audio AD Clip Display LEDs (LED203, 204, 205 & 206)

The following four audio AD clip display LEDs are provided that can be controlled from the ADC state display pin.

Figure7-5 Audio AD Clip Display LEDs

LED203: State of a clip in Channel 1	Clip = ON
LED204: State of a clip in Channel 2	Clip = ON
LED205: State of a clip in Channel 3	Clip = ON
LED206: State of a clip in Channel 4	Clip = ON

7.7. Pin Header Audio DA Connector (CN601)

All analog audio outputs are connected to the JST B12B-XH-A connector in a multipoint connection.

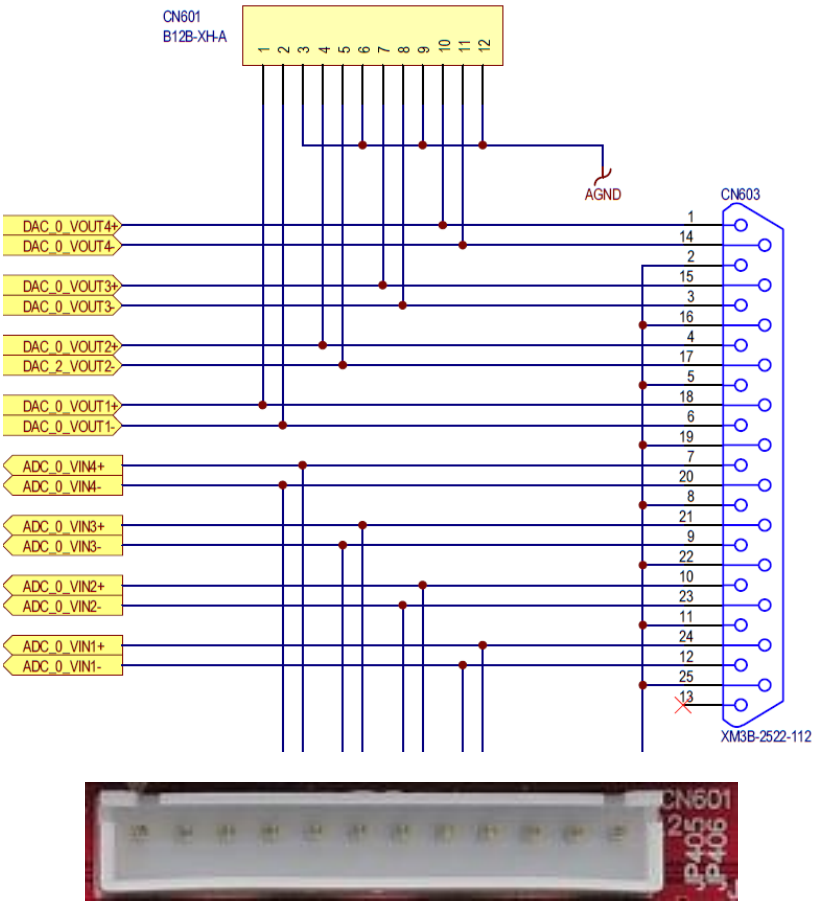

Figure7-6 Pin Header Audio DA Connector

Table 7-4 shows the connector pin assignment.

Table7-4 Pin Header Audio DA Connector Pin Assignment

Pin #	Name
1	DAC_0_VOUT1+
2	DAC_0_VOUT1-
3	AGND
4	DAC_0_VOUT2+
5	DAC_0_VOUT2-
6	AGND
7	DAC_0_VOUT3+
8	DAC_0_VOUT3-
9	AGND
10	DAC_0_VOUT4+
11	DAC_0_VOUT4-
12	AGND

7.8. Audio DA Output Gain Setting (JP401, 402, 403, 404, 405, 406, 407 & 408)

A desired audio output gain is selectable using these jumpers.

Figure7-7 Audio DA Output Gain Jumper Pins

Rated Output + 4dBu, Max Output + 18dBu (balanced outputs):

DAC_0_VOUT1: JP401 and JP402 = OPEN.
DAC_0_VOUT2: JP403 and JP404 = OPEN.
DAC_0_VOUT3: JP405 and JP406 = OPEN.
DAC_0_VOUT4: JP407 and JP408 = OPEN.

Rated Output - 10dBV, Max Output + 4dBV (unbalanced Outputs):

DAC_0_VOUT1: JP401 and JP402 = SHORT.
DAC_0_VOUT2: JP403 and JP404 = SHORT.
DAC_0_VOUT3: JP405 and JP406 = SHORT.
DAC_0_VOUT4: JP407 and JP408 = SHORT.

7.9. Audio DAC (IC405)

The board is equipped with a TI PCN4104 device that supports 24bit/192kHz DAC.
4ch analog audio outputs are supported. These audio outputs are connected to the CN601/603 onboard connectors via a TI OPA1632.

Figure7-8 DAC

7.10. SPDIF Coaxial Input / Output Connector (CN701, 702)

The SPDIF Transmitter/Receiver in the FPGA of the Platform Board can be used for digital audio inputs and outputs.
A Keystone Electronics 972 connector is used for this configuration.
The CN701 input pin is terminated with 75-ohms.

Figure7-9 SPDIF Coaxial Input / Output Connector

Table 7-5 shows the connector pin assignment.

Table7-5 SPDIF Coaxial Input/Output Connector Pin Assignment

Pin #	Name	Pin #	Name
CN701:1	DGND	CN702:1	DGND
CN701:2	DIN	CN702:2	DOUT
CN701:3	NC	CN702:3	NC

8. Clock

8.1. Onboard Clock (IC501, 510)

The board provides the following two onboard clock sources:
24.576MHz (VCXO), 22.5792MHz (FIX)
The VCXO enables self-oscillation and synchronization with external clock sources (48-kHz only).

Figure 8-1 24.576MHz Clock

Figure 8-2 22.5792MHz Clock

8.2. Control 24.576 VCXO

24.576 VCXO(IC501) has a Low Path Filer(LPF) circuit to the frequency control pin(VC). The frequency is adjustable by PWM control method from a FPGA to signal “VCXO_CTRL0”.

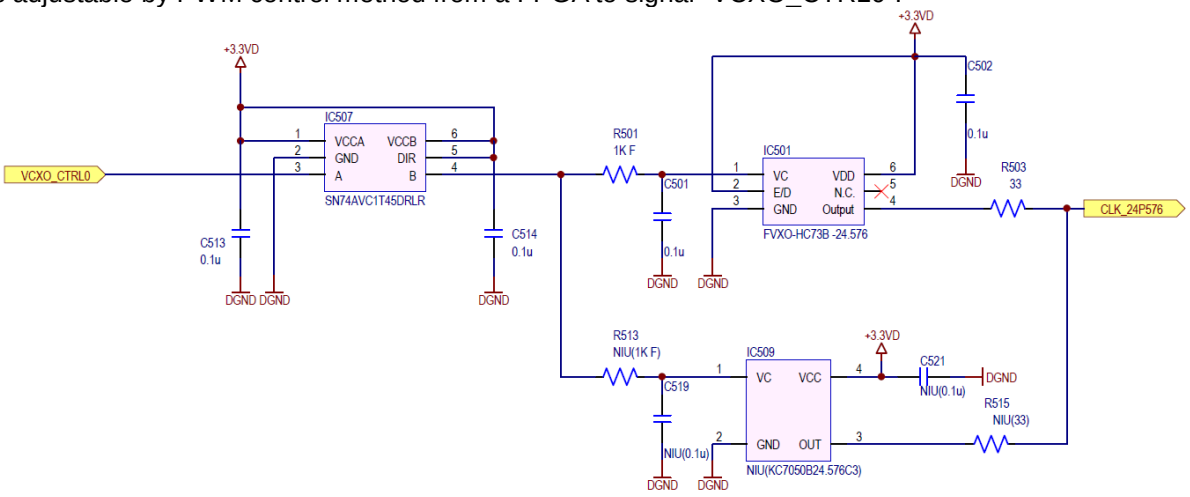

Figure 8-3 VCXO Circuit

The frequency is control -150PPM to +150PPM area by 0 to 3.3V voltage. (VC= 1.65: 24.576MHZ)
Please refer to the reference design for PWM control method.
Also, refer to the datasheet of VCXO(FVXO-HC73B-24.576)
http://www.foxonline.com/pdfs/FVXO_HC73.pdf

About 24.576 OSC
This board can use OSC instead of VCXO.
Please contact us if using OSC.

8.3. Control 22.5792MHz OSC

OSC is controlled by signal “VCXO_CTRL1” form FPGA.
VCXO_CTRL1: High- Enable, Low- Disable.

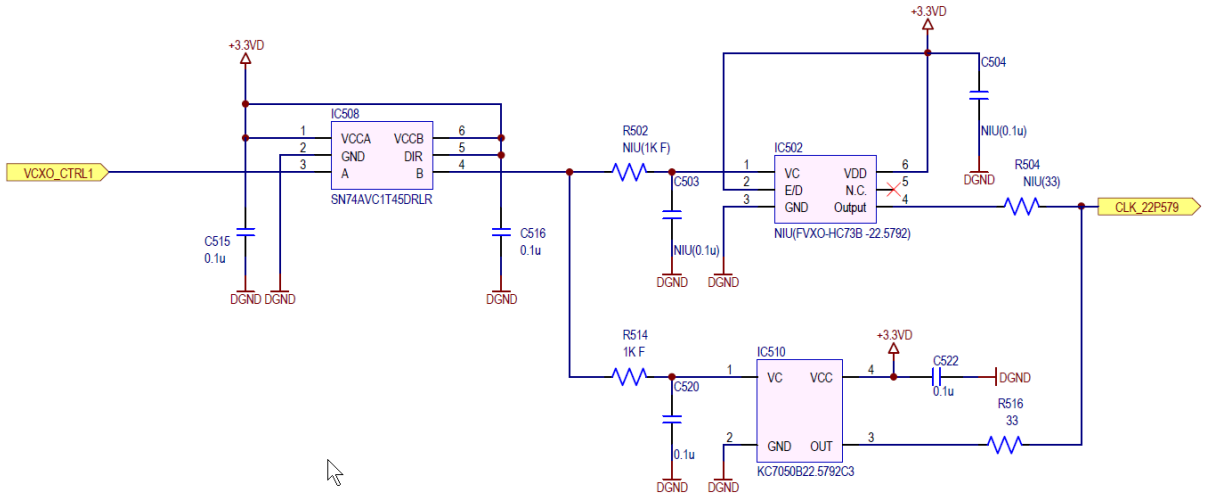

Figure 8-4 OSC circuit

About 24.576 VCXO
This board can use VCXO instead of OSC.
Please contact us if using VCXO.

9. Other Interfaces

9.1. D-SUB9 RS232C Connector (CN501)

This is a RS-232C interface using MAXIM MAX3243.
An OMRON XM3C-0922-112 connector is used.

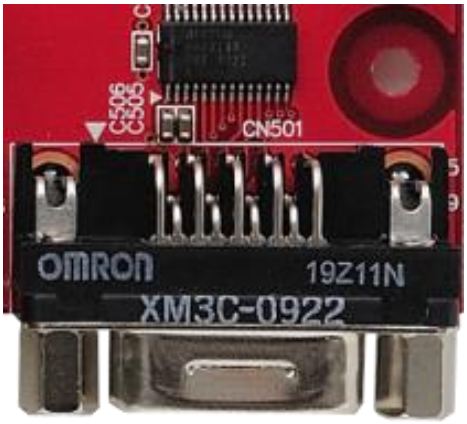

Figure9-1 D-SUB9 RS232 Connector

Table 9-1 shows the connector pin assignment.

Table9-1 D-SUB9 RS232C Connector Pin Assignment

Pin #	Name
1	RS232C0 DCD
2	RS232C0 RXD
3	RS232C0 TXD
4	RS232C0 DTR
5	DGND
6	RS232C0 DSR
7	RS232C0 RTS
8	RS232C0 CTS
9	RS232C0 RI

9.2. Pin Header RS485 Connector (CN502)

This is tree RS-485 interfaces using TI SN65HVD33.
A JST B15B-XH-A connector is used.

Figure9-2 Pin Header RS-485 Connector

Table 9-2 shows the Pin Header RS-485 connector pin assignment.

Table9-2 Pin Header RS-485 Connector Pin Assignment

Pin #	Name
1	RS422_1_RXD+
2	RS422_1_RXD-
3	RS422_1_TXD+
4	RS422_1_TXD-
5	DGND
6	RS422_2_RXD+
7	RS422_2_RXD-
8	RS422_2_TXD+
9	RS422_2_TXD-
10	DGND
11	RS422_3_RXD+
12	RS422_3_RXD-
13	RS422_3_RXD+
14	RS422_3_RXD-
15	DGND

9.3. microSD Socket (CN504)

Making up a controller using the FPGA on the Platform Board allows the use of a microSD card.
A HIROSE DM3AT-SF-PEJM5 microSD socket is used.
HAGIWARA SYS-COM SD-C02(microSD 2GB) is mounted.

Figure9-3 microSD Socket

Table 9-3 shows the connector pin assignment.

Table9-3 microSD Socket Pin Assignment

Pin #	Name
1	SD_DAT2
2	SD_DAT3
3	SD_CMD
4	+3.3VD
5	SD_CLK
6	DGND
7	SD_DAT0
8	SD_DAT1
A	SD_SW
B	DGND

9.4. Pin Header Debug Connector (CN503)

This is a multi-purpose pin header connected directly to the Platform Board.
A JST B3B-XH-A connector is used.

Figure9-4 Pin Header Debug Connector

Table 9-4 shows the connector pin assignment.

Table9-4 Pin Header Debug Connector Pin Assignment

Pin #	Name
1	TTL4RXD
2	TTL4TXD
3	DGND

9.5. Debug LED (LED201, 202)

These are multi-purpose LEDs connected directly to the Platform Board.
A 2-color Rohm SML-522MUW light emitting diode is used.

Figure9-5 Debug LEDs

Table 9-5 LED201 Control

Pin #	TB-6S-LX25-FANET CN2 Pin Name	DIR	Signal Name	Connected to	Description
37	uC_nBHE	I	LED1_1	LED201(4)	Green: Low Active
39	uC_nRD	I	LED1_2	LED201(2)	Red: Low Active

Table 9-6 LED202 Control

Pin #	TB-6S-LX25-FANET CN3 Pin Name	DIR	Signal Name	Connected to	Description
39	LATCH_IN0	I	LED2_1	LED202(4)	Green: Low Active
43	LATCH_IN1	I	LED2_2	LED202(2)	Red: Low Active

10. Factory Default Board Settings

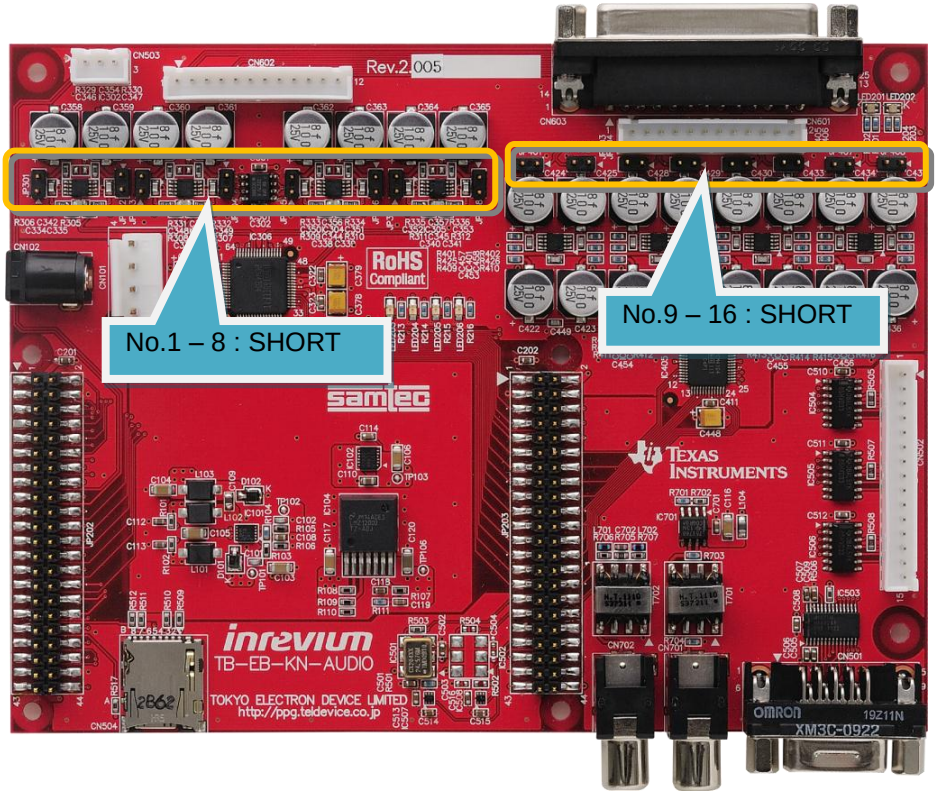

Figure10-1 Factory Default Board Settings

Table10-1 Factory Default Settings

No.	Silk No.	Initial Setting	Function
1	JP301	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
2	JP302	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
3	JP303	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
4	JP304	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
5	JP305	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
6	JP306	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
7	JP307	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
8	JP308	SHORT	Rated Input + 4dBu, Max Input + 18dBu (balanced inputs)
9	JP401	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
10	JP402	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
11	JP403	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
12	JP404	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
13	JP405	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
14	JP406	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
15	JP407	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)
16	JP408	OPEN	Rated Output + 4dBu, Max Output + 18dBu (balanced outputs)

™ TOKYO ELECTRON DEVICE

PLD Solution Dept. PLD Division
URL: **http://solutions.inrevium.com/**
E-mail: psd-support@teldevice.co.jp

HEAD Quarter: Yokohama East Square, 1-4 Kinko-cho, Kanagawa-ku, Yokohama City,
Kanagawa, Japan 221-0056
TEL: +81-45-443-4016 FAX: +81-45-443-4058