EPSON
EXCEED YOUR VISION

SOFTWARE EVALUATION TOOL FOR S1C33L17

S5U1C33L17T1100

Hardware Manual

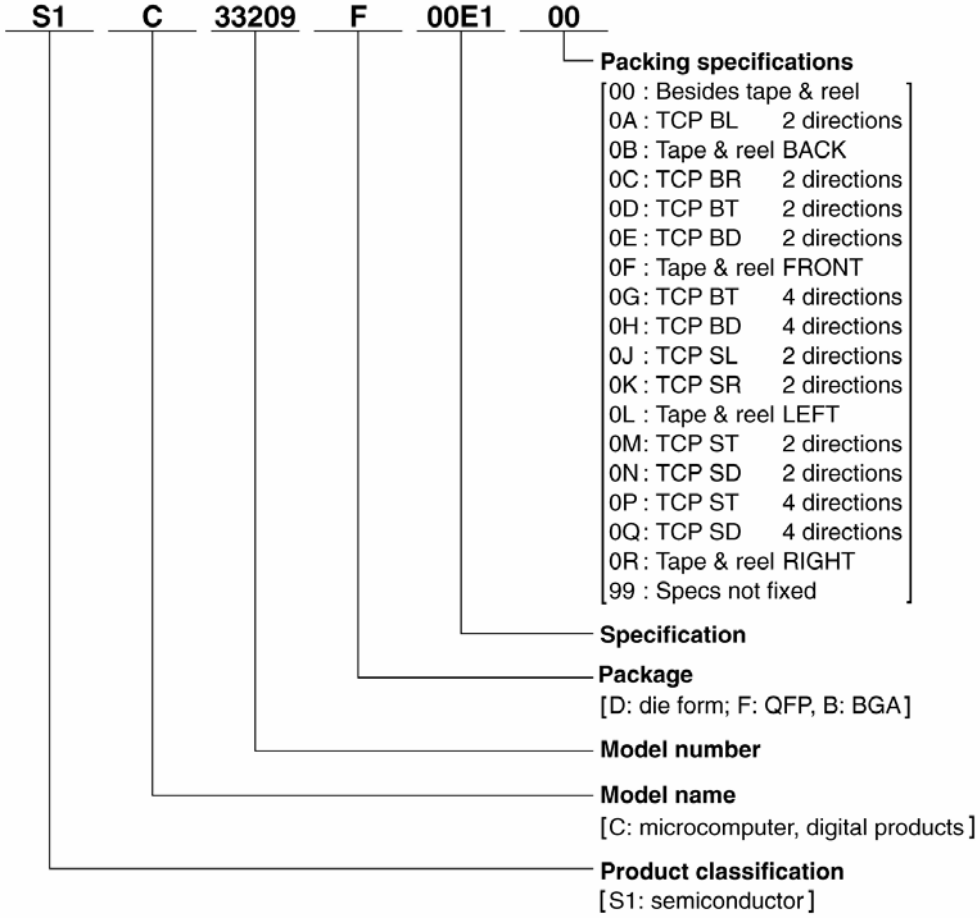
SEIKO EPSON CORPORATION

NOTICE

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. This material or portions thereof may contain technology or the subject relating to strategic products under the control of the Foreign Exchange and Foreign Trade Law of Japan and may require an export license from the Ministry of Economy, Trade and Industry or other approval from another government agency.

Configuration of product number

Devices



Development tools

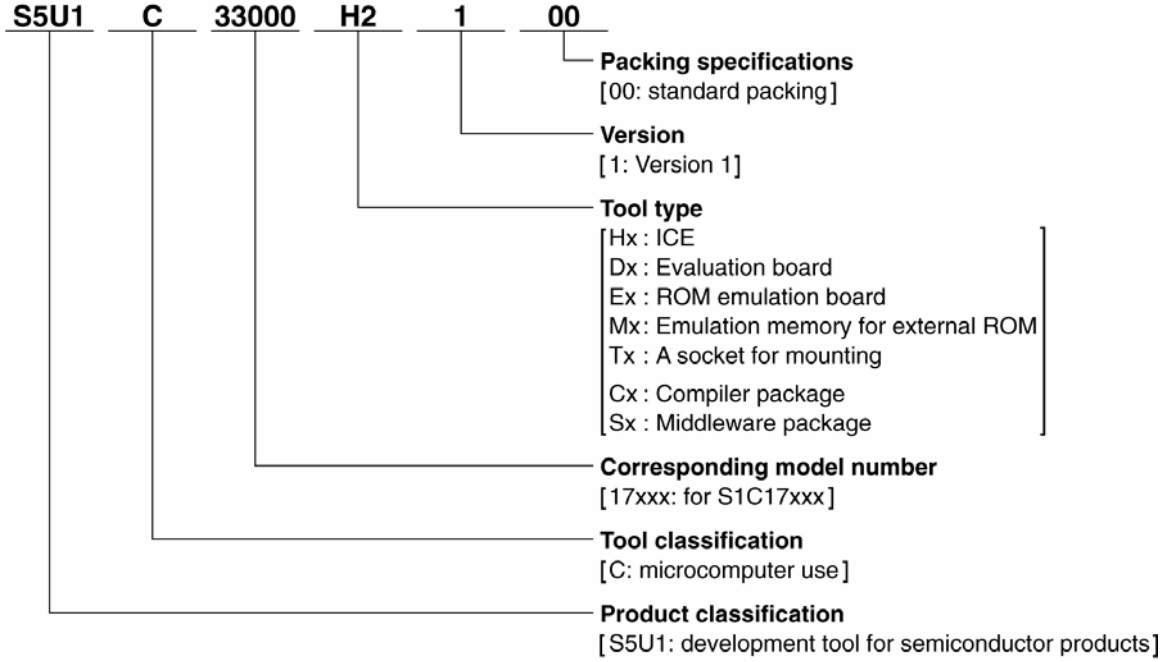


Table of Contents

1. Features

The S5U1C33L17T1100 (SVT33L17: Software Evaluation Tool for S1C33L17) is an evaluation board for the S1C33L17 MCU produced by Seiko Epson.

The SVT33L17 consists of four boards (CPU, ICD, LCD, Audio). The ICD and CPU boards can be connected for software debugging, eliminating the need to use other ICD debugging tools. The LCD and Audio boards can be connected to perform simple evaluations of LCD panel and audio input/output.

<CPU board>

CPU	S1C33L17
Input power supply voltage	+5.0 V ±5% DC
Regulator output voltage	+3.3 V DC (I/O), +1.8 V DC (CPU core)
CPU input clock	OSC1: 32.768 kHz (real-time clock) OSC3: 48 MHz
Functions/devices	• NOR Flash (64 Mbit) • SDRAM (128 Mbit) • NAND Flash (2 Gbit) • Serial Flash (8 Mbit) • MMC card socket • USB mini-B connector • UART (RS-232C) connector • Key switches (6 keys) • Expansion interface connector (LCD board) • Expansion interface connector (Audio board) • External expansion connector (not fitted) • ICD board connector • ICD33 connector • ICD Mini connector • Boot mode setting switch • Reset switch • Power switch

<ICD board>

PC interface	USB 1.1
Power supply voltage	USB bus power (onboard regulator output voltage: 3.3 V)
Functions/devices	• Status display LED (3-color) • Reset switch • CPU board connector

<LCD board>

Functions/devices	• 3.5-inch TFT QVGA 320 (xRGB) x 240 dot panel • LED backlight • Backlight driver DC converter

<Audio board>

Functions/devices	• Audio IC (CS42L51 CIRRUS LOGIC) • Audio input jack • Audio output jack • Microphone

2. Package Contents

The S5U1C33L17T1100 package contains the following items.

(1) SVT33L17 CPU board (main unit) 1

(2) SVT33L17 ICD board 1

(3) SVT33L17 LCD board 1

(4) SVT33L17 Audio board 1

(5) USB cable (A-mini-B connector) 1

(6) AC adaptor 1

(7) Warranty card ..... 1 in English & 1 in Japanese

(8) Precautions ..... 1 in English & 1 in Japanese

(9) Manual download details ..... 1 in English & 1 in Japanese

3. Part Names and Functions

The part names and functions are as shown below.

3.1 Part names

3.1.1 Overview

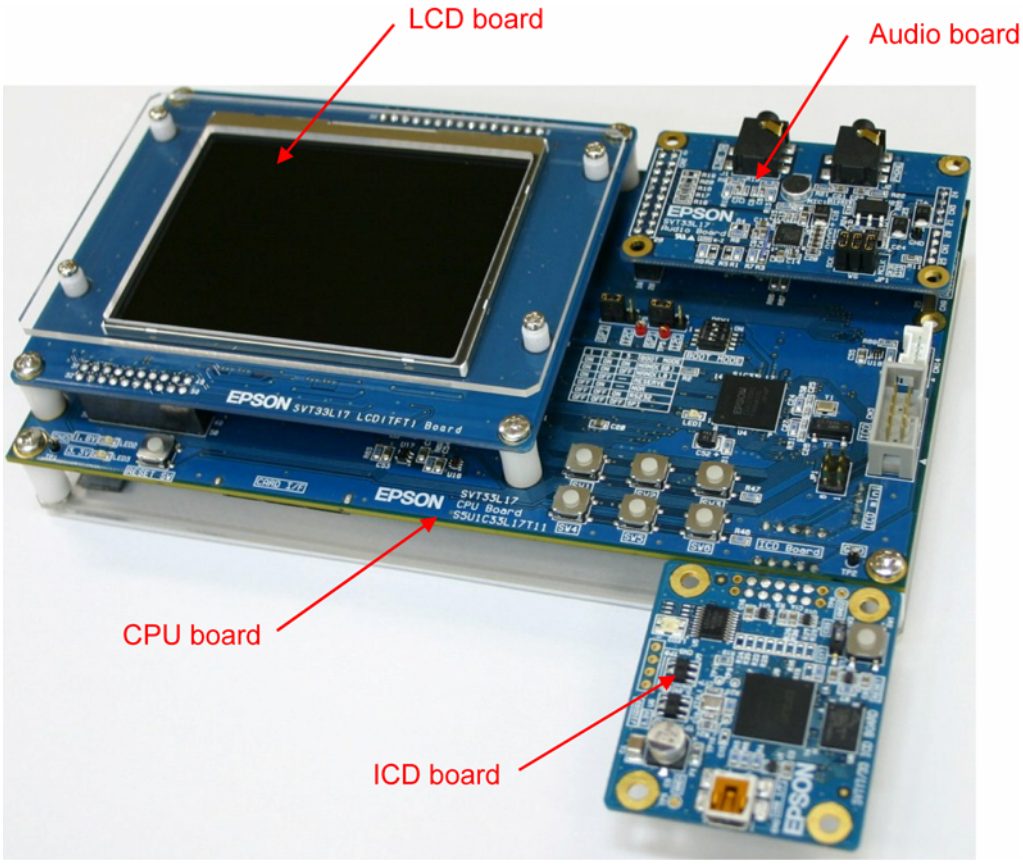


Figure 3.1 Overview

3.1.2 CPU board (excluding LCD and Audio boards)

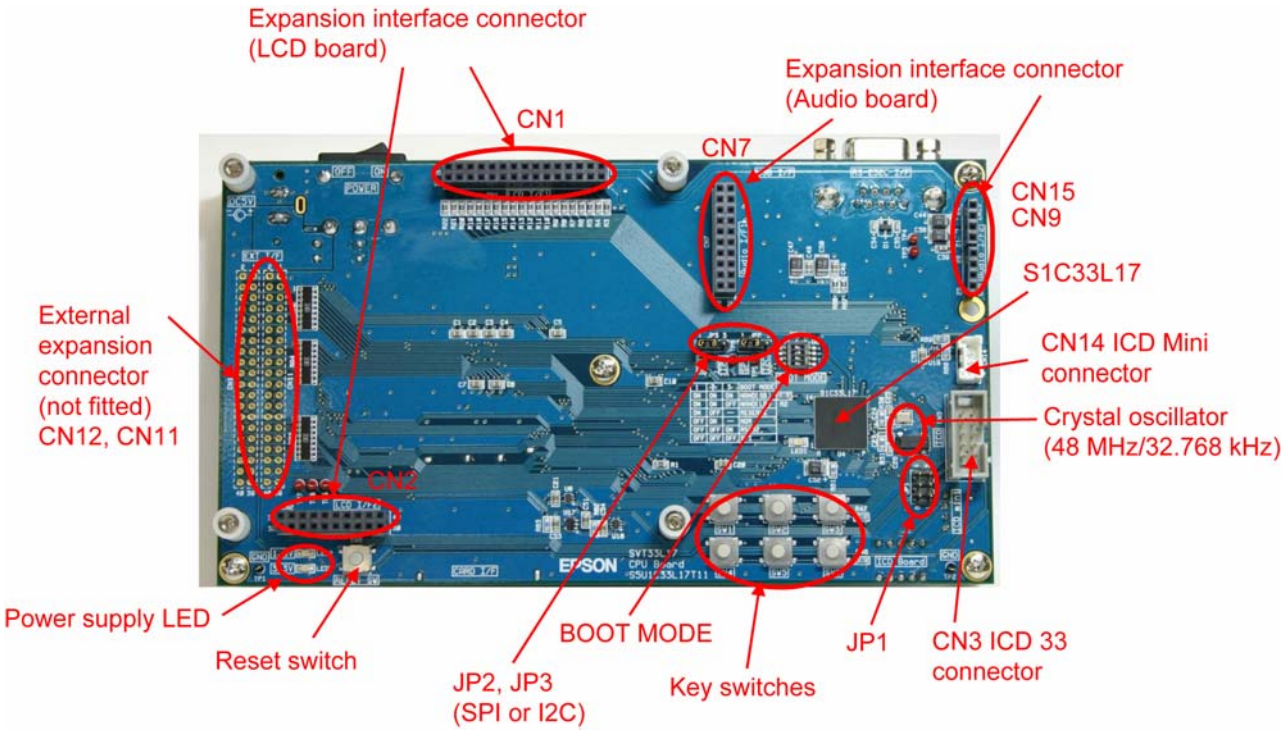


Figure 3.2 CPU board upper-side component names (excluding LCD and Audio boards)

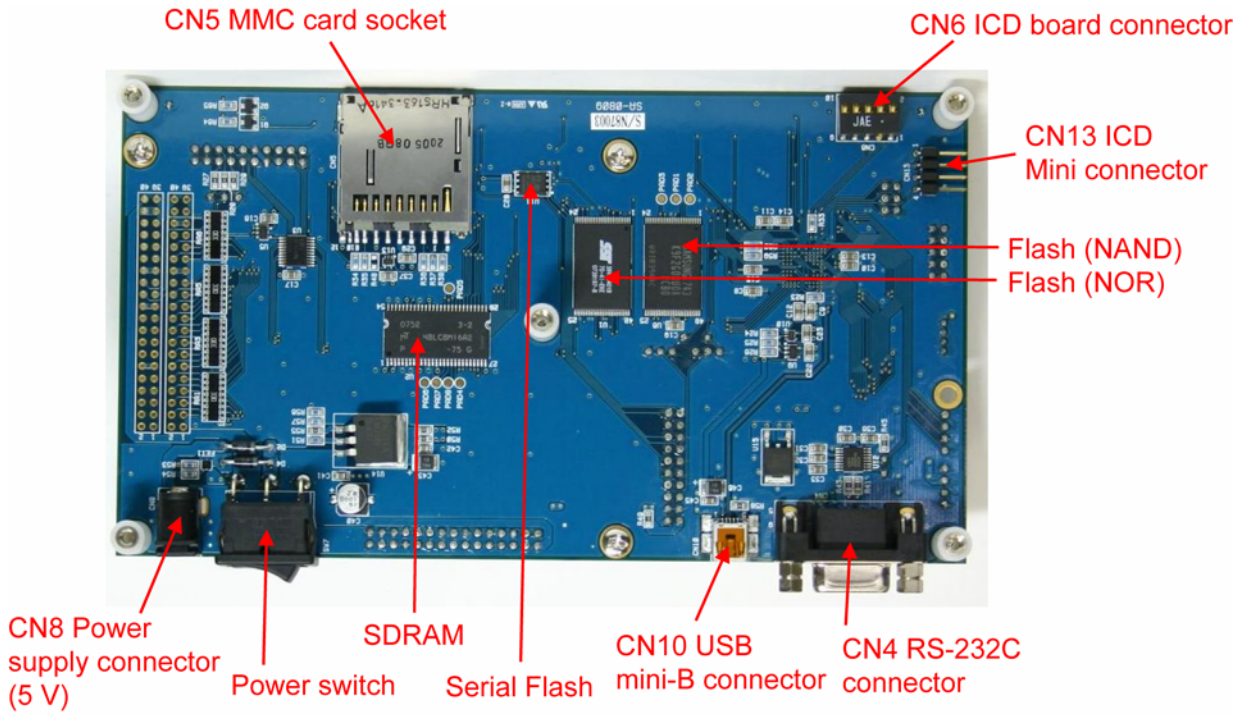


Figure 3.3 CPU board underside component names (excluding LCD and Audio boards)

3.1.3 ICD board

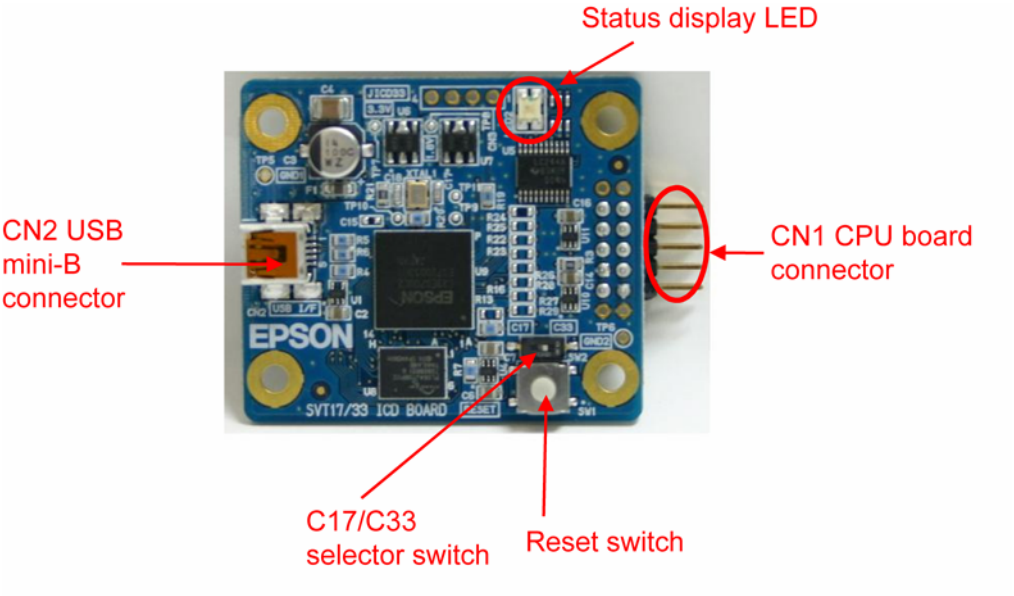


Figure 3.4 ICD board upper-side component names

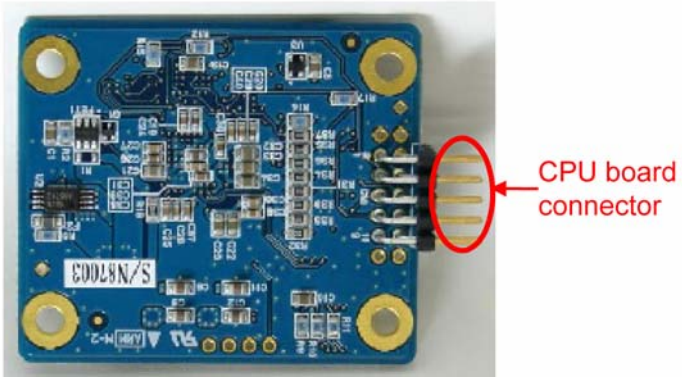


Figure 3.5 ICD board underside component names

3.1.4 LCD board

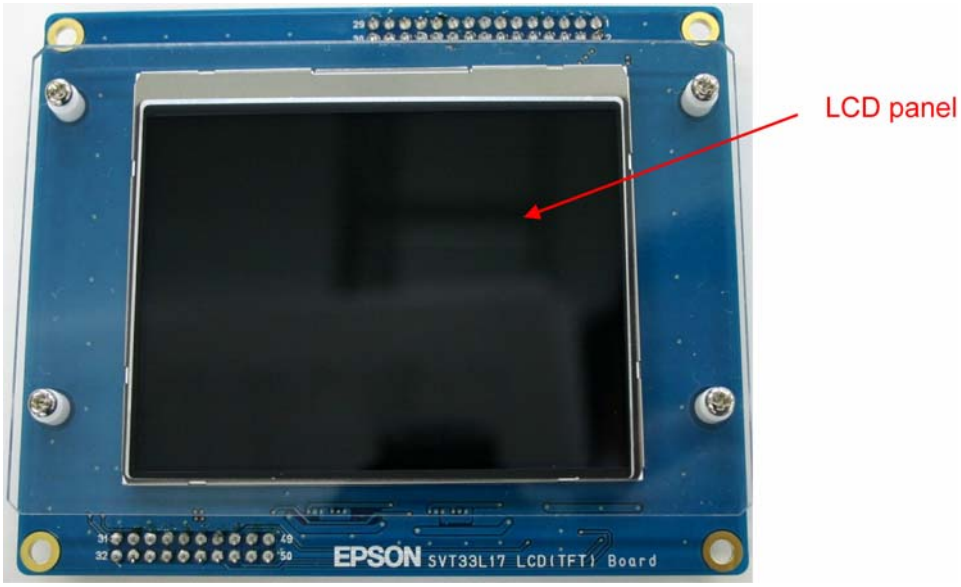


Figure 3.6 LCD upper-side component names

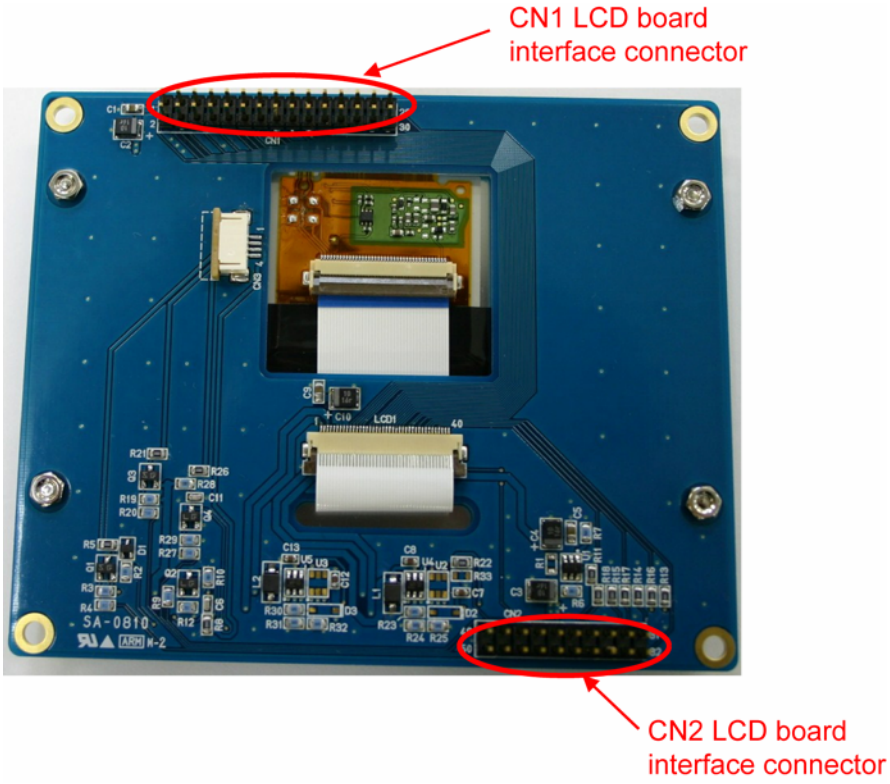


Figure 3.7 LCD underside component names

3.1.5 Audio board

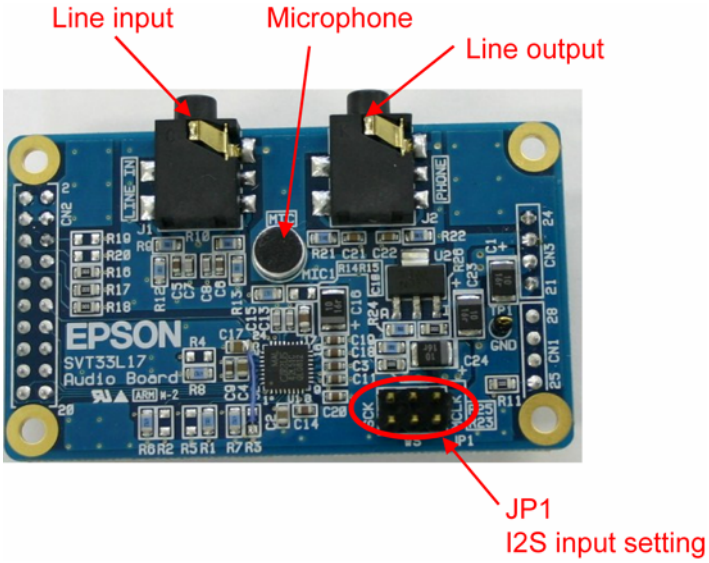


Figure 3.8 Audio board upper-side component names

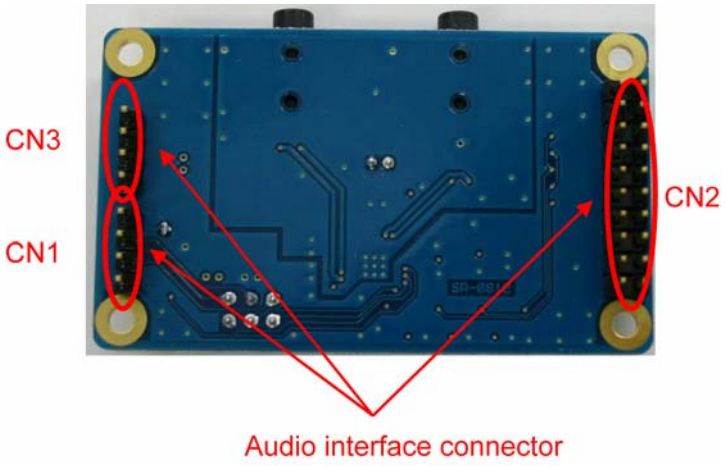


Figure 3.9 Audio board underside component names

3.2 Jumpers and DIP switch functions and settings

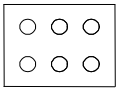
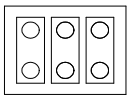
3.2.1 CPU board

3.2.1.1 JP1 function and settings

Connect JP1 when using CPU DST0, DST1, and DPC0 signals as LCD board control signals with the multifunction feature. (If so, note that the DST0, DST1, and DPC0 signals cannot be used for debugging.)

Normally, JP1 should be left open. (The initial configuration is “open.”)

Table 3.1 JP1 settings

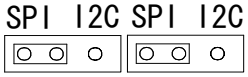
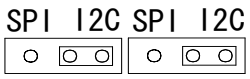
JP1	State
All pins open (initial configuration) 	DST0, DST1, and DPC0 signals can be used as debugging pins by ICD33.
All pins shorted 	Can be used as TFT_CTL0, 2, 3 pins. Cannot be connected to ICD33, since they duplicate DST0, DST1, and DPC0.

3.2.1.2 JP2/JP3 functions and settings

JP2 and JP3 determine whether SPI or I2C is used for Audio board control signals.

They are initially connected to SPI.

Table 3.2 JP2/JP3 settings

JP, JP3	State
SPI selection (initial configuration) 	SPI function (P65, P66, P67) used.
I2C selection 	I2C function (P41, P50) used.

* The Audio board provided should be used with SPI.

3.2.1.3 DIP switch (DSW1) function and settings

DSW1 sets the CPU (S1C33L17) boot mode.

The following boot modes can be selected using the switch settings.

The initial boot mode is set to NOR Flash.

Table 3.3 DSW1 settings

SW1			Boot Mode	Boot code start from	MBR Execute from
1	2	3			
ON	ON	ON	Small Page NAND Flash	0x20004	0x0 of A0RAM
ON	ON	OFF	Big Page NAND Flash		
ON	OFF	--	Reserved	-	-
OFF	ON	--	NOR Flash (initial setting)	0x2000C of A1ROM	Depending on Content in 0xC00000 of NOR Flash
OFF	OFF	ON	PC RS232	0x20010 of A1ROM	0x0 of A0RAM
OFF	OFF	OFF	SPI EEPROM		0x400 of A0RAM

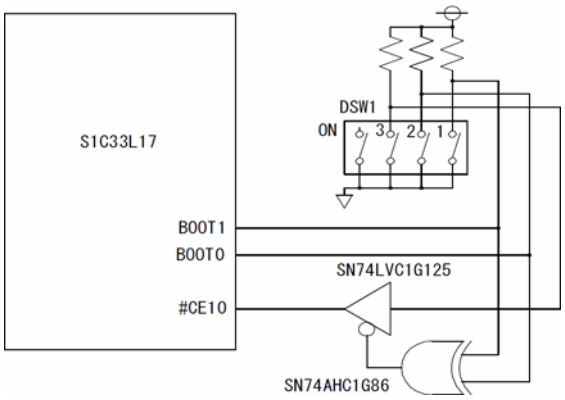


Figure 3.10 Boot mode setting switch circuit diagram

3.2.2 Audio board

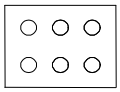
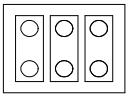
3.2.2.1 JP1 functions and settings

JP1 determines whether the I2S interface SCKI, WSI, or MCLKI is connected.

This connection makes it possible to input audio data from the Audio IC to the CPU.

Since this entails connection to SCKO, WSO, and MCLKO (output from CPU) on the circuit; software support is required. When the product is shipped, JP1 is connected.

Table 3.4 JP1 settings

JP1	State
All pins open 	Only data output from CPU.
All pins shorted (initial configuration) 	SCKI, WSI, and MCLKI are connected to SCKO, WSO, and MCLKO respectively. Data can be sent to the CPU.

3.3 Main components

Table 3.5 Main CPU board components

Component	Location	Code	Manufacturer
CPU	U4	S1C33L17	SEIKO EPSON CORP.
Crystal oscillator (48 MHz)	Y1	FA-238	EPSON TOYOCOM CORP.
Crystal oscillator (32.768 kHz)	Y2	MC-306	EPSON TOYOCOM CORP.
SDRAM	U2	MT48LC8M16A2P	MICRON
NOR Flash	U1	SST39VF6401B-70-4I	SST
NAND Flash	U6	K9F2G08U0A-PCB0	SAMSUNG
Serial Flash	U11	M45PE80-VMP6G	ST-Micro
RS-232C driver	U12	SP3220EBEY	Sipex
Power switch	SW7	D501J12S2AHQF	C&K
Reset switch	SW8	SKRAAKE010	ALPS
Expansion connector (LCD board)	CN1	SSW-115-01-G-D	SAMTEC
Expansion connector (LCD board)	CN2	SSW-110-01-G-D	SAMTEC
Expansion connector (Audio board)	CN7	SSW-110-01-G-D	SAMTEC
Expansion connector (Audio board)	CN9,CN15	SSW-104-01-G-S	SAMTEC
ICD board connector	CN6	PS-10SD-D4T1-1	JAE
ICD33 connector	CN3	7610-6002PL	3M
ICD Mini power connector	CN14	B04B-PASK-1 (LF) (SN)	JST
ICD Mini connector	CN13	A2-4PA-2.54DS (71)	HIROSE
UART (RS-232C DSUB) connector	CN4	DELC-J9SAF-23L9E	JAE
MMC card connector	CN5	DM1B-DSF-PEJ (82)	HIROSE
DC power jack	CN8	PJ-037AH	CUI
USB mini-B connector	CN10	54819-0572	molex
Key switch	SW1-SW6	SKRAAKE010	ALPS
Power LED (green) (1.8 V, 3.3 V)	LED2,LED3	SML-210PT	ROHM

Table 3.6 Main ICD board components

Component	Location	Code	Manufacturer
USB mini-B connector	CN2	54819-0572	molex
LED (RGB)	LED2	598-9920-307F	Dialight
Reset switch	SW1	SKRAAKE010	ALPS
Debugger connector	CN1	9-103801-0	Tyco

Table 3.7 Main LCD board components

Component	Location	Code	Manufacturer
LCD panel	-	L5S30739	EPSON IMAGING DEVICES
Connector (CPU board connection)	CN1	TSW-115-26-G-D	SAMTEC
Connector (CPU board connection)	CN2	TSW-110-26-G-D	SAMTEC
Connector (LCD panel connection)	LCD1	FH12A-40S-0.5SH (55)	HIROSE
Power IC	U4,U5	MIC3289-16YD6	MICREL

* Contact Seiko Epson for more information on obtaining an LCD panel.

Table 3.8 Main Audio board components

Component	Location	Code	Manufacturer
Connector (CPU board connection)	CN1	TSW-110-26-G-D	SAMTEC
Connector (CPU board connection)	CN2,CN3	TSW-104-26-G-S	SAMTEC
Audio jack	J1,J2	SJ1-3515-SMT	UCI
Microphone	MIC1	MB6022APC-0	KNOWLES
Audio IC	U1	CS42L51	CIRRUS LOGIC
Power IC	U2	LM1117MPX-ADJ	NS

Table 3.9 Other components

Component	Location	Code	Manufacturer
AC adapter	-	UIA324-05	UNIFIVE

3.4 Individual component functions

3.4.1 ICD board

The ICD board is a hardware tool (emulator) designed to ensure efficient S1C33L17 software development. It establishes a simple S1C33L17 software development configuration, controlling communications between the PC and the target IC (S1C33L17) on the CPU board. Refer to Section 6 for detailed information on functional differences with respect to the ICD33 S5U1C33001H development tool, which supports all S1C33 core products.

* The C17/C33 selector switch (SW2) in Figure 3.11 should be permanently set to “C33.” No operations are possible if this is set to “C17.”

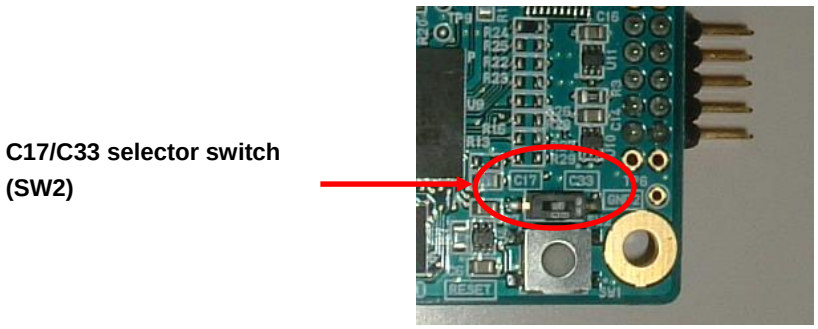


Figure 3.11 C17/C33 selector switch

ICD board Reset switch

Press the ICD board Reset switch (SW1) to restart the ICD board firmware and issue a target reset signal (XRESET_OUT) to the CPU board. If the ICD board is physically connected to the CPU board, the connection required for communications is complete. The system remains in standby if no physical connection is established.

ICD board LED

This LED displays different colors to indicate the status of the ICD board and target.

- (blue) Power on (before target and initial connection is established)
- (green) Target is in debugging mode.
- (red) Target is not connected or is connected incorrectly.
  Target is running a user program.

3.4.2 CPU board

The CPU board is a simple target evaluation board on which the target CPU (S1C33L17) is mounted. It also includes peripheral functions and circuits such as memory devices (SDRAM, NAND Flash, NOR Flash, Serial Flash), UART (RS-232C), MMC card, and USB and can be used to develop and evaluate control software for these devices. It also features expansion interface connectors to connect to the LCD and Audio boards provided, enabling development and evaluation of software designed to control the panel display and audio input/output.

3.4.2.1 Power supply

The board power supply consists of an external 5 V feed to the power connector (CN8). (Use the AC adaptor provided.)

Power can also be provided via the USB pin. (Note consumption current when providing power via USB.)

The regulator on the board generates 3.3 V and 1.8 V, with 3.3 V fed to the I/O and other peripheral circuits and 1.8 V fed to the CPU core. (The peripheral I/O interface voltage is 3.3 V.) The power supply monitoring LED (1.8 V/3.3 V) illuminates when the power switch (SW7) is turned on.

3.4.2.2 CPU clock

The CPU clock consists of a 48 MHz crystal oscillator to OSC3 and a 32.768 kHz crystal oscillator for OSC1 (real-time clock).

3.4.2.3 CPU board Reset switch

Press the CPU board Reset switch (SW6) to reset the CPU board.

3.4.3 LCD board

The LCD board is connected to the LCD board interface connector on the CPU board. The LCD board is provided with an LCD panel (L5S30739, Epson Imaging Devices) for evaluation monitoring.

The LCD panel is a general-purpose TFT panel with a 320 (xRGB) x 240 dot display and LED backlight.

It can be controlled using the CPU (S1C33L17) internal LCD controller via SPI serial communications for simple evaluations of displayed images.

Main LCD panel (L5S30739) specifications:

- Dots: 960 (320 x RGB) x 240
- Dot pitch: 0.074 x 0.222 mm
- MPU Serial I/F: SPI
- RGB I/F: 18bit (RED 6bit, GREEN 6bit, BLUE 6bit) or 16bit (RED 5bit, GREEN 6bit, BLUE 5bit)
- DCKcycle: 8.25 MHz (TYP) HSYNC cycle: 512CLK, VSYNC cycle: 263H
- Backlight: 6 LED

3.4.4 Audio board

The Audio board is connected to the Audio board interface connector on the CPU board. The Audio board includes an Audio IC (CS42L51, Cirrus Logic), microphone, and audio (input/output) jack. The CPU (S1C33L17) can input and output PCM data in I2S format via the internal I2S module for simple evaluations of audio input and output through the Audio IC on the Audio board.

The Audio IC is controlled from the CPU (S1C33L17) via the SPI interface.

4. Block Diagram

The overall block diagram for the SVT33L17 is shown below. (Includes CPU, ICD, LCD, and Audio boards.)

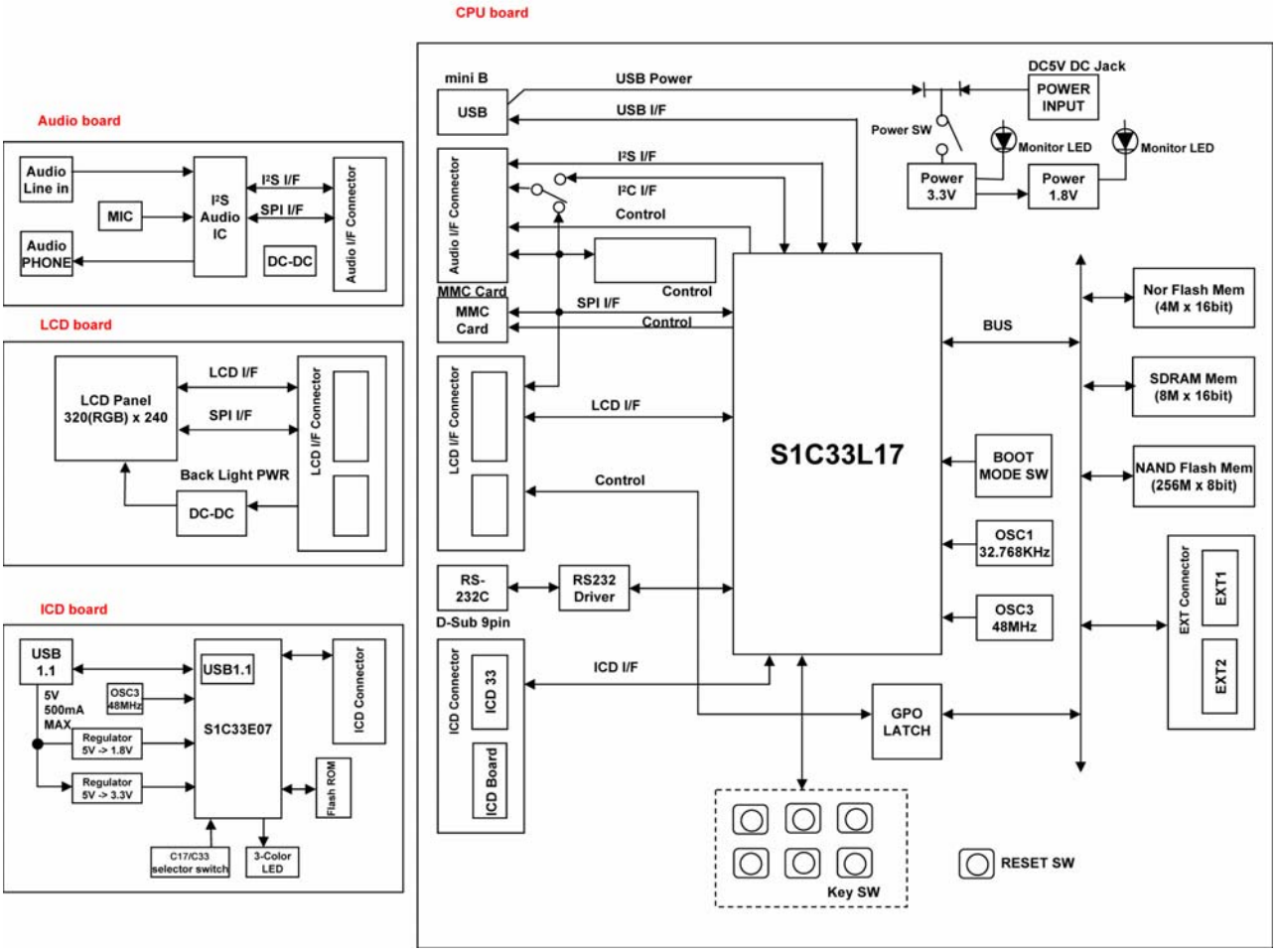


Figure 4.1 SVT33L17 block diagram

5. Operating Configuration and Startup Procedure

The SVT33L17 can be controlled with commands executed on and issued from a PC debugger by connecting it to a PC via the ICD board. It is also possible to operate the CPU board independently, without the ICD board or PC. The corresponding connection configurations and startup procedures are described below.

5.1 Simple software development configuration

The SVT33L17 provides a simple S1C33L17 software development configuration for the target CPU board by connecting it to a PC via the ICD board and using it in conjunction with S1C33 development tools on the PC (e.g., GNU33 IDE, compiler, and debugger included in the S5U1C33001C package).

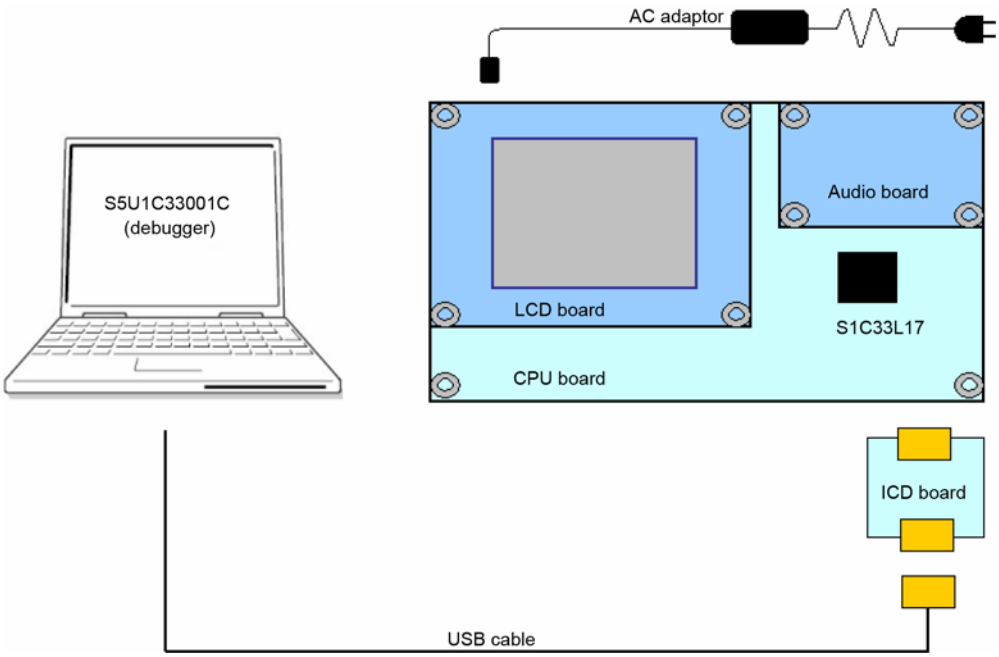


Figure 5.1 Simple software development configuration

Using the simple software development configuration

In this operating configuration, the target CPU (S1C33L17) is controlled by commands executed on and issued from the debugger running on the PC connected to the ICD board. Commands issued by the debugger are sent via USB to the ICD board, where they are analyzed before being converted to an S1C33L17 debugging signal and sent to the CPU board. Programs and data can be downloaded from the PC debugger to the CPU board for debugging by starting and stopping program execution.

CPU operation mode

The target CPU (S1C33L17) halts target program operation on receiving a brk command or debug interrupt (e.g., forced break operation on the debugger) from the ICD board, switching to debug mode (break state). This state allows commands to be executed from the PC debugger. The ICD board LED illuminates in green to indicate debug mode. The state in which the target program is executed by the target CPU is called normal mode. The ICD board LED illuminates in red for normal mode.

Connection and startup

The connection and startup procedure for the simple software development configuration is described below.

(1) Connect the CPU board to the ICD board. Connect the two 10-pin connectors.

(2) Turn on the PC (assuming it is turned off).

(3) Turn on power for the CPU board and connect the PC to the ICD board with a USB cable.

(4) Install the appropriate USB driver via the driver install screen displayed on the PC monitor. (This is necessary only the first time, not for subsequent connections.) Refer to the section ("Installing USB Driver") further below for installation procedure specifics.

(5) Confirm that the ICD board LED changes from blue to green (target is in debug mode).

(6) Launch the debugger on the PC and run the program. Confirm that the ICD board LED changes to red (target in normal mode) while the program is running.

For detailed information on using the debugger and debugging commands, refer to the *S5U1C33001C Manual (S1C33 Family C/C++ Compiler Package)*.

Note: Never disconnect the USB cable between the PC and ICD board while the debugger is running.

Installing USB Driver

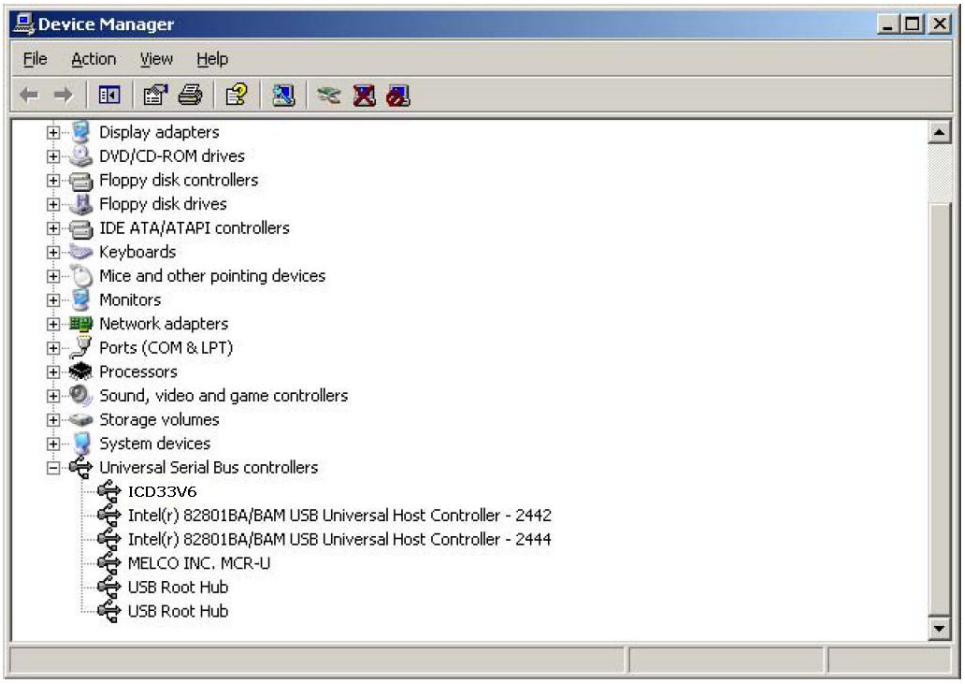
(1) The following screen will appear once the ICD board is connected to the host computer via a USB cable.

(2) Install the USB driver as directed by the install wizard.

Specify “C:\EPSON\GNU33\utility\drv_usb\Icd33v60” for the USB driver directory.

* This path specifies the path where the IDE is installed.

The Device Manager appears as shown below once the USB driver is successfully installed.



Note: If the screen does not appear as shown above, re-install the USB driver.

5.2 SVT33L17 independent operation

The SVT33L17 can be used as the CPU board alone, without the ICD board or PC.

Independent operation

In this operating configuration, the S1C33L17 on the CPU board operates in normal mode and runs the program written to the Flash memory on the CPU board. This means the user program must be downloaded beforehand to the Flash memory on the CPU board.

(The SVT33L17 is shipped with demo programs stored in internal Flash memory.)

For detailed information on downloading user programs to the internal Flash memory, refer to the *S5U1C33001C Manual (S1C33 Family C/C++ Compiler Package).*

Connections and startup

The procedure for using the SVT33L17 by itself is described below.

(1) Turn on the PC (assuming it is turned off).

(2) With the CPU board connected to the ICD board, connect the PC to the ICD board using a USB cable and turn on CPU board power.

(3) Launch the debugger on the PC and download the user program to internal memory. For detailed information on downloading programs, refer to the *S5U1C33001C Manual (S1C33 Family C/C++ Compiler Package).*

(4) Once the debugger terminates, turn off CPU board power and disconnect the USB cable and ICD board.

(5) When the CPU board power is turned on once again, the S1C33L17 on the CPU board will begin running the user program downloaded to Flash memory.

5.3 ICD board firmware update procedures

The SVT33L17 allows the ICD board firmware to be updated from the PC debugger. ICD board firmware is available on request from Seiko Epson. (Update files have the file extension ".sa.")

The firmware update procedure is described below.

Note: The USB driver must be installed before firmware updates.

(1) Turn on CPU board power with the ICD board connected to the CPU board.
Connect the ICD board to the PC with a USB cable.

(2) Press the ICD board Reset switch (SW1).

(3) Launch the debugger from the command prompt.
>cd c:\EPSON\gnu33 (Specifies the path at which the gnu33 tool was installed.)
>gdb

(4) Enter the following commands once the debugger is running.
(gdb) target icd6 usb
(gdb) c33 firmupdate *path\filename*.sa
(For "*path\filename*.sa," specify the name of the file to be updated.)

(5) The process is complete when the ICD board LED lights up in green (●).

(6) Press the ICD board Reset switch to restart the firmware.

6. Differences between ICD Board and ICD33

Table 6.1 compares specifications for the S5U1C33001H (ICD33) S1C33 Family development tool and the SVT33L17 ICD board. Although the SVT33L17 provides an ICD33 interface, the ICD board and ICD33 cannot be connected simultaneously. Refer to the *S5U1C33001H1400 Manual* for detailed information on using the ICD33.

Table 6.1 Comparison of ICD board and ICD33 functions

Product	S5U1C33001H1400 (ICD33V6)	S5U1C33L17T1100 (SVT33L17) ICD board
Core supported	S1C33 core	
Host interface	USB 1.1	
Max. data download speed	Approx. 27 kB/s when DCLK = 12 MHz *1*3	Approx. 21 kB/s when DCLK = 12 MHz *1 *3
Communication frequency with target (DCLK frequency)	4 kHz to 40 MHz	
Independent Flash writer function	**Yes**	**No**
Firmware update function	Yes	
Flash write power supply	**Yes**	**No**
Trace function	**Yes**	**No**
Run cycle measurement function	**Yes**	**No**
Reset signal output to target	Yes	
Target system I/O compatible voltage	**3.3 V, 1.8 V, voltage input from target (1.0 V to 5.0 V)**	**3.3 V**
Target connector	**10-pin, 4-pin *4**	**10-pin *2 *4**

*1 Frequency supported when I/O interface voltage is 3.3 V. Upper frequency limit may be lower than the value specified due to peripheral noise, temperature conditions, product type, or variability.

*2 Connect to CPU board only.

*3 SVT33L17 operates at a frequency of 48 MHz (DCLK = 12 MHz)

*4 Note that the ICD 10-pin and ICD board 10-pin connectors have differing pin configurations and shape.
(For detailed information on pin configurations and shape, refer to Section 14.1.1.)

7. Internal Memory

The CPU includes the following memory types.

NOR Flash SST39VF6401B-70-4I (SST) (64 Mbit)

SDRA MT48LC8M16A2P (MICRON) (128 Mbit)

NAND Flash K9F2G08U0A-PCBO (Samsung) (2 Gbit)

Serial Flash M45PE80-VMP6G (ST) (8 Mbit)

A memory map is shown below.

Table 7.1 Memory map

Area	Address	Chip Select	Function
Area22 (2 GB)	XFFFF_FFFF x8000_0000	#CE9:SDRAM is Disable #CE7:SDRAM is Enable	External SDRAM
Area21 (1 GB)	x7FFF_FFFF x4000_0000	#CE8	Not Use
Area20 (512 MB)	x3FFF_FFFF x2000_0000	#CE10	Nor Flash (8 MB)
Area19 (256 MB)	x1FFF_FFFF x1000_0000	#CE7	SDRAM (16 Mbyte)
Area18 (64 MB)	x0FFF_FFFF x0C00_0000	#CE6	Serial Flash
Area17 (64 MB)	x0BFF_FFFF x0800_0000	#CE6	Serial Flash (1 MB)
Area16 (32 MB)	x07FF_FFFF x0600_0000	#CE5	Extended GPO Port
Area15 (32 MB)	x05FF_FFFF x0400_0000	#CE5	Extended GPO Port
Area14 (16 MB)	x03FF_FFFF x0300_0000	#CE4	Not Use
Area13 (16 MB)	x02FF_FFFF x0200_0000	#CE10	Nor Flash (8 MB)
Area12 (8 MB)	x01FF_FFFF x0180_0000	#CE11	Nand Flash (8 MB)
Area11 (8 MB)	x017F_FFFF x0100_0000	#CE11	Nand Flash (8 MB)
Area10 (4 MB)	x00FF_FFFF x00C0_0000	#CE10	Nor Flash (4 MB) x00C0_0000- x00FF_FFFF
Area9 (4 MB)	x00BF_FFFF x0080_0000	#CE9	External I/F
Area8 (2 MB)	x007F_FFFF x0060_0000	#CE8	Not Use
Area7 (2 MB)	x005F_FFFF x0040_0000	#CE7	SDRAM (2 MB) 0x0040_0000-0x005F_FFFF
Area6 (1 MB)	x003F_FFFF x0030_0000	PeripheralModule	
Area5 (1 MB)	x002F_FFFF x0020_0000	#CE5	Extended GPO Port
Area4 (1 MB)	x001F_FFFF x0010_0000	#CE4	Not Use

7.1 NOR Flash circuit

SST39VF6401B-70-4I (SST) (64 Mbit)

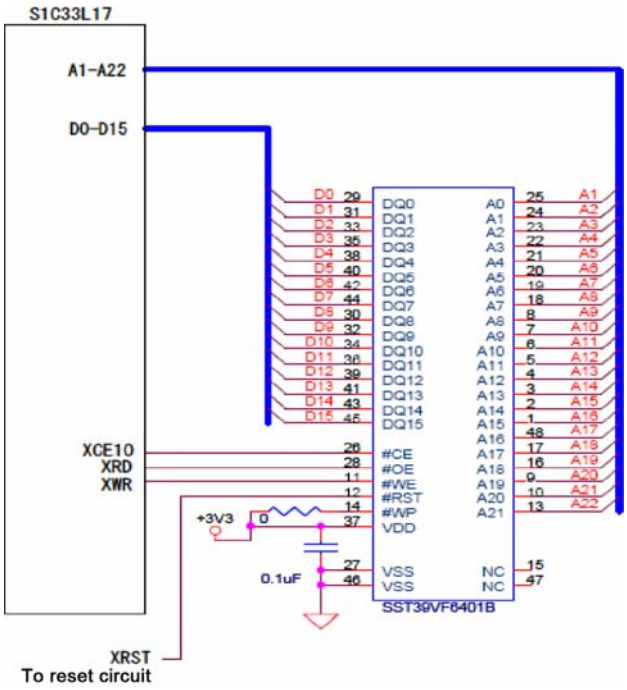


Figure 7.1 NOR Flash circuit diagram

7.2 SDRAM circuit

MT48LC8M16A2P (MICRON) (128 Mbit)

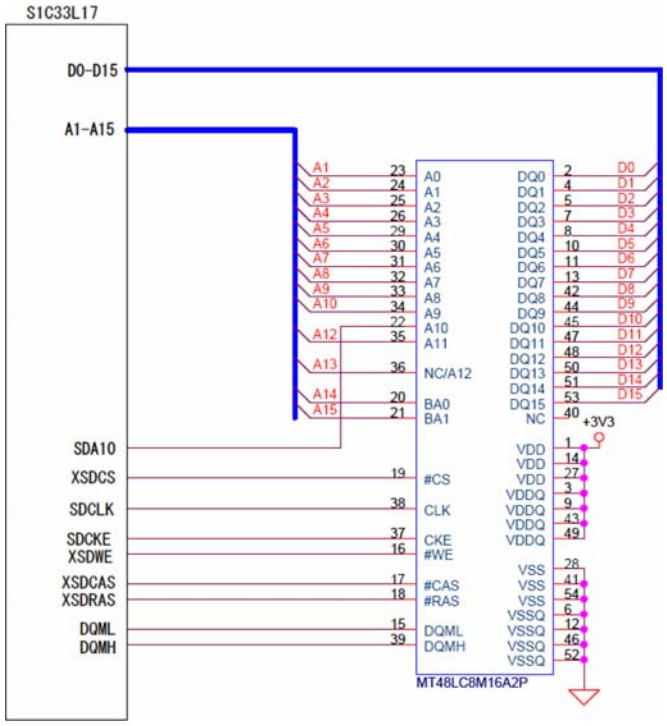


Figure 7.2 SDRAM circuit diagram

7.3 NAND Flash circuit

K9F2G08U0A-PCB0 (Samsung) (2 Gbit)

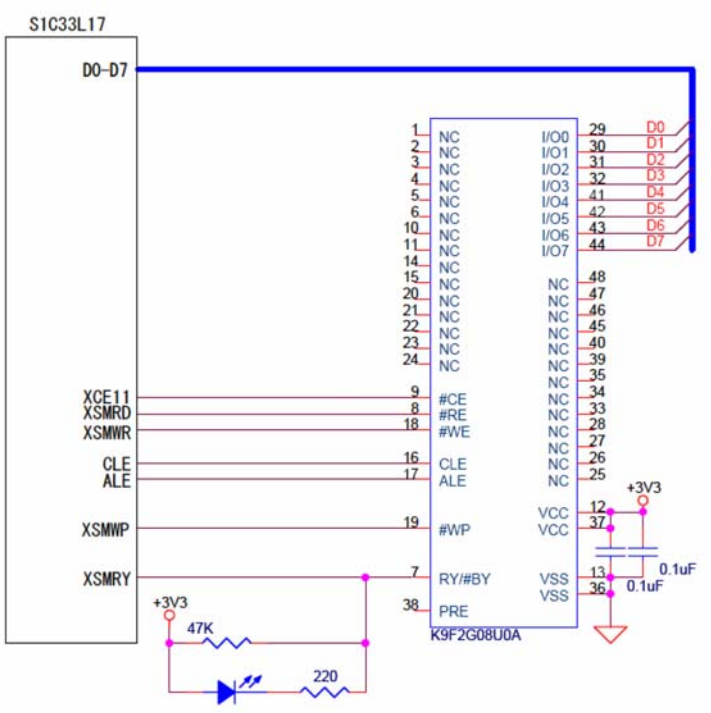


Figure 7.3 NAND Flash circuit diagram

7.4 Serial Flash circuit

M45PE80-VMP6G (ST) (8 Mbit)

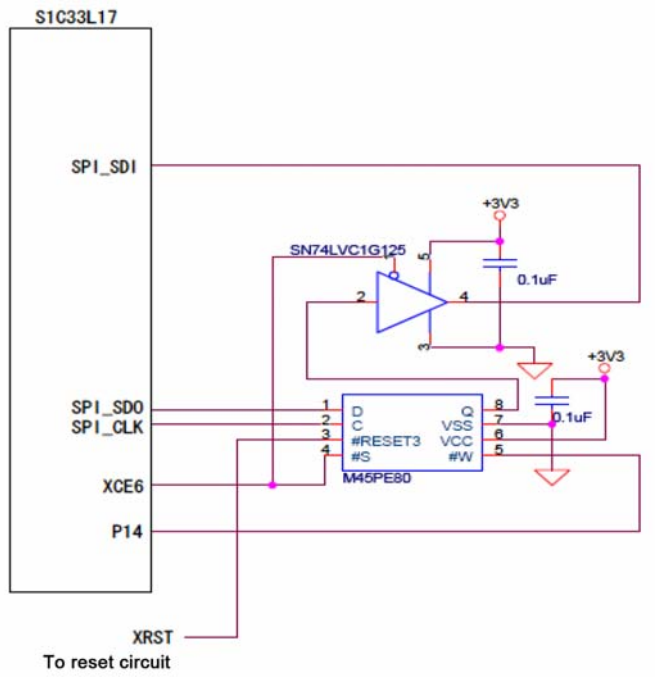


Figure 7.4 Serial Flash circuit diagram

8. CPU Key Input Circuit

The SVT33L17 provides six key switches on the CPU board.

These scan the key states from the CPU board as a key matrix.

The key switch circuit is shown below.

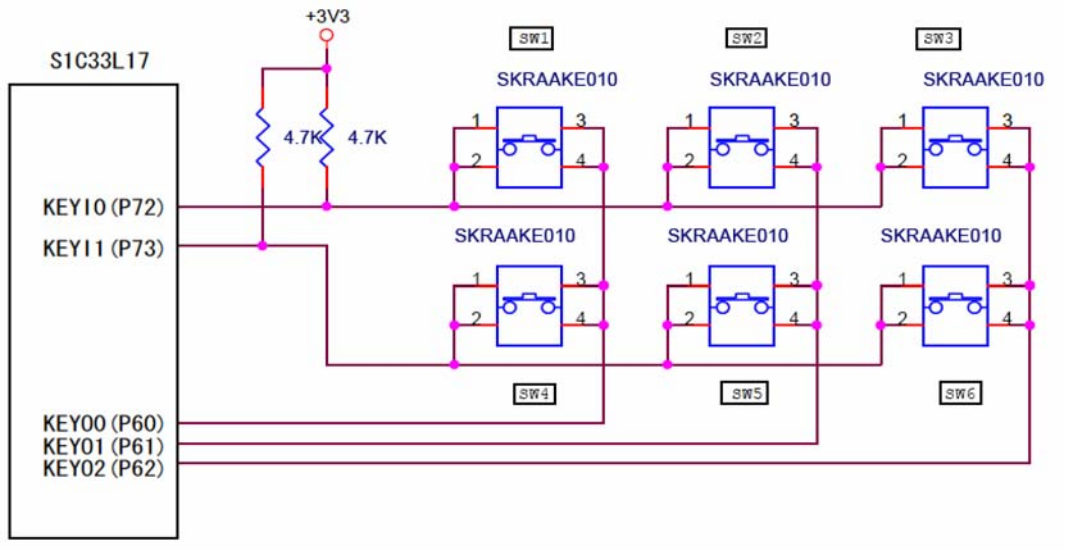


Figure 8.1 Key input circuit diagram

9. MMC Card Interface Circuit

The SVT33L17 provides an MMC card interface on the CPU board.

The SPI interface is used for communication between the CPU and MMC card.

The MMC card peripheral circuit is shown below.

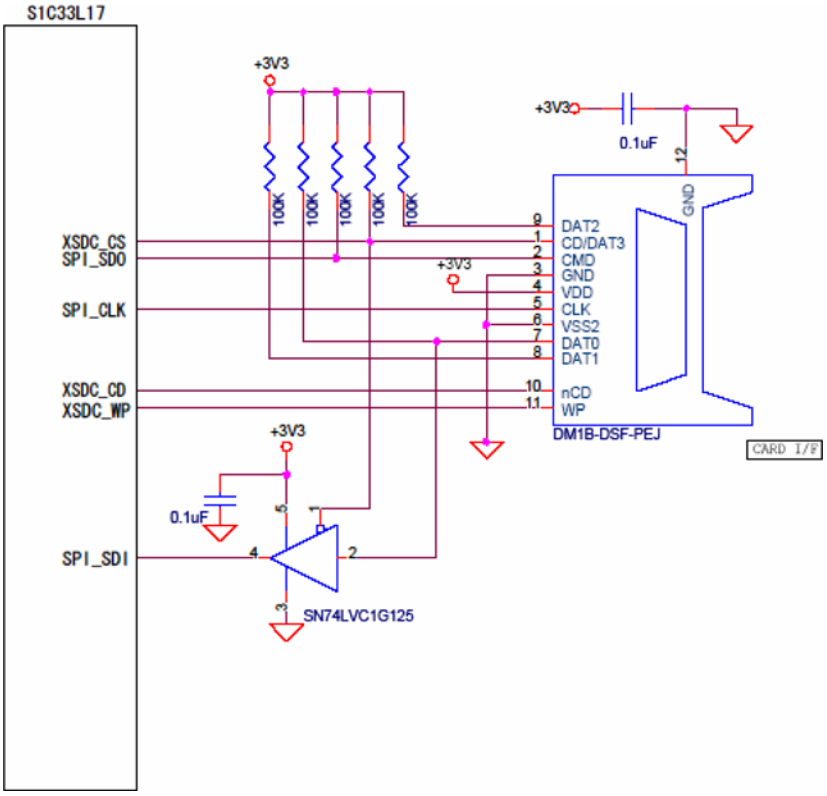


Figure 9.1 MMC card circuit diagram

10. UART (RS-232C) Interface Circuit

The SVT33L17 provides an RS-232C interface on the CPU board.

Use a straight cable to connect to a PC.

The RS-232C interface peripheral circuit is shown below.

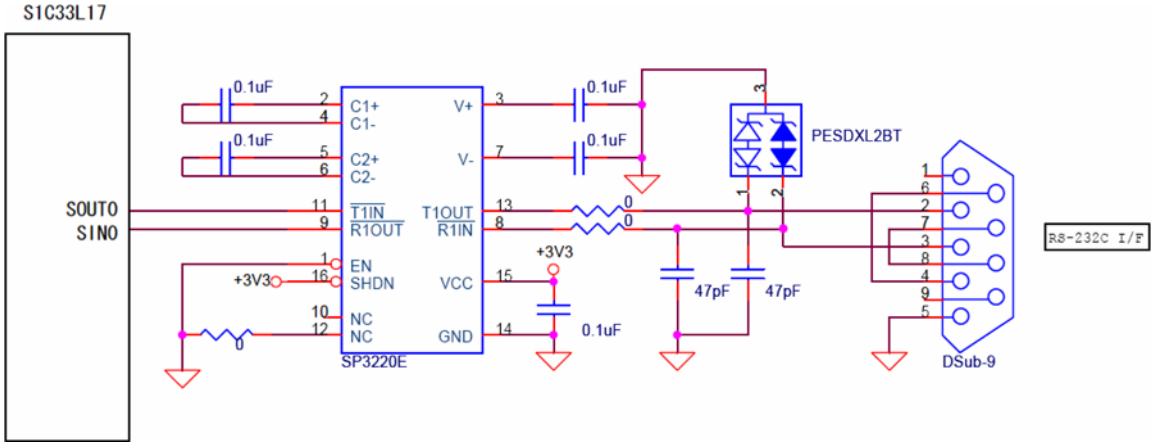


Figure 10.1 UART (RS-232C) interface circuit diagram

11. USB Interface Circuit

The SVT33L17 provides a USB interface on the CPU board.

The USB interface peripheral circuit is shown below.

The CPU board can also be powered via the USB connector.

(Confirm that the current required can be provided via the USB connection.)

The CPU (S1C33L17) supports FS (12 Mbps) transfer mode.

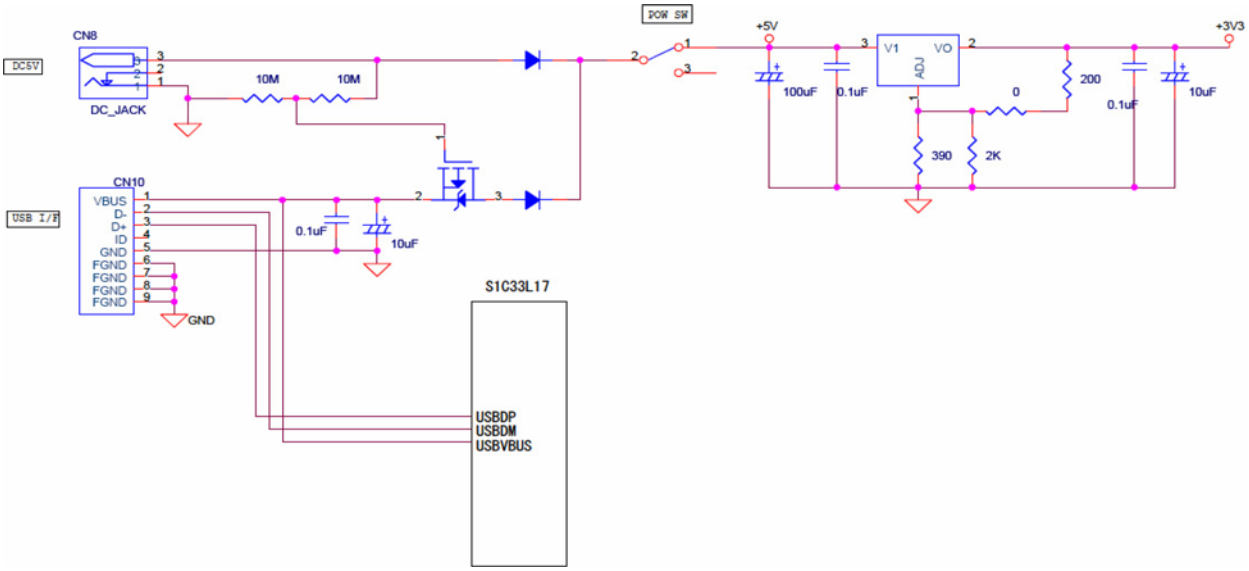


Figure 11.1 USB interface circuit diagram

12. LCD Circuit

The LCD function circuit configuration is shown below.

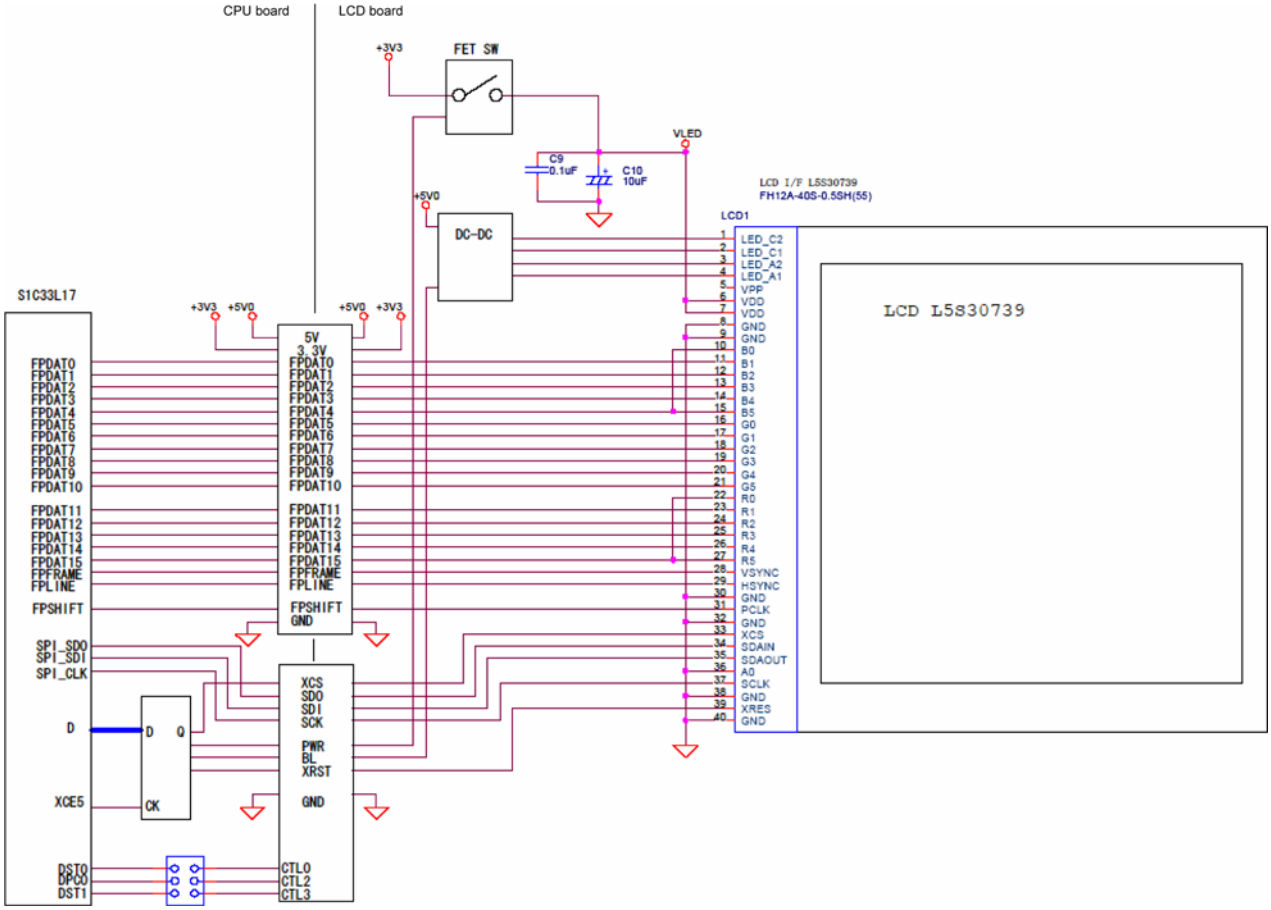


Figure 12.1 LCD function circuit diagram

13. Audio Circuit

The Audio function circuit diagram is shown below.

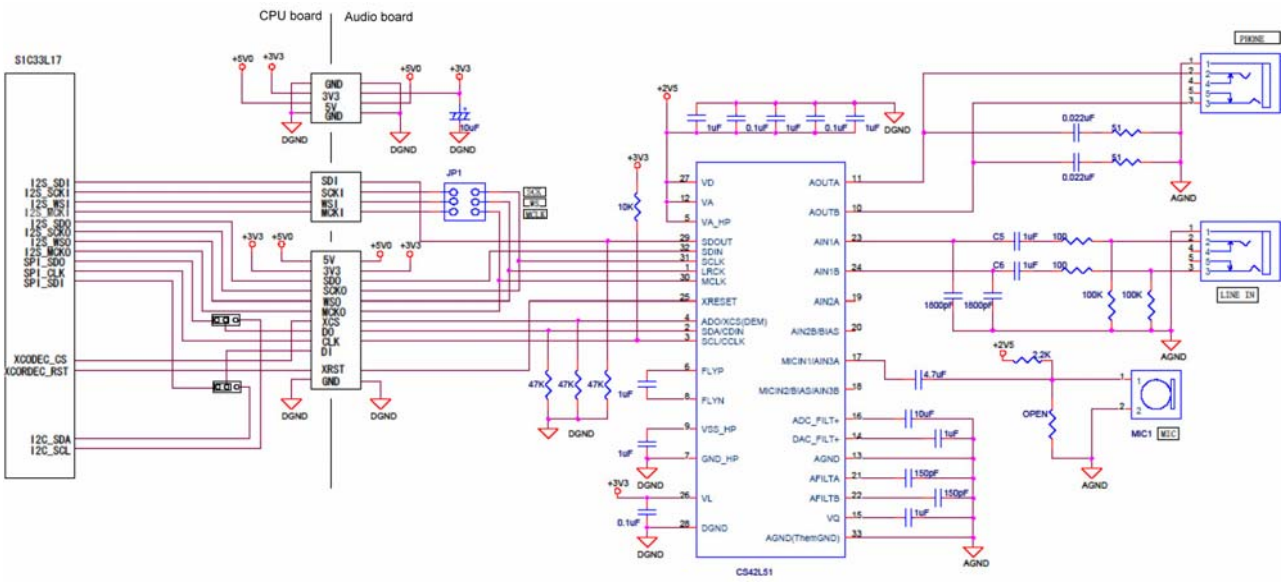


Figure 13.1 Audio function circuit diagram

14. Expansion Interface Connectors

14.1 CPU board

14.1.1 Debugger connectors

This board includes ICD board, ICD33, and ICD Mini connectors.

Refer to the *S5U1C33001C Manual (S1C33 Family C/C++ Compiler Package)* for debugging procedure specifics.

Table 14.1 ICD board interface

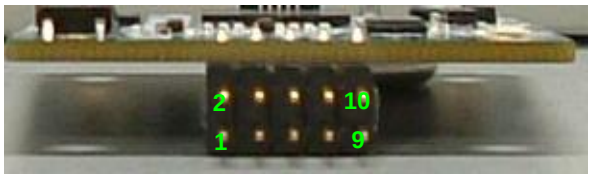
ICD board interface (CN6)

Manufacturer: JAE
Code: PS-10SD-D4T1-1 (female)

<CPU board side view (upper-side)>

(ICD board connector)
Manufacturer: Tyco Electronics
Code: 9-103801-0 (male)

<ICD board side view>



No.	Name	I/O	Function
1	DCLK	O	On-chip debugger clock output port
2	GND	-	Power supply ground (Connecting to all pins is recommended.)
3	GND	-	Power supply ground (Connecting to all pins is recommended.)
4	XRESET	I	Target reset signal input port
5	DSIO	I/O	On-chip debugger data input/output port
6	TGT_EN	-	NC (Target enable signal)
7	DST2	O	On-chip debugger status signal output port
8	N.C	-	N.C
9	VCC	-	N.C
10	VCC	-	N.C

* Note that attempting to connect this connector incorrectly may damage both boards. See Section 3 for a diagram showing the ICD board connected to the CPU board. (Connect with the ICD board Reset switch facing up.)

Table 14.2 ICD33 interface

ICD33 interface (CN3)

Manufacturer: 3M
Code: 7610-6002PL

<CPU board (upper-side) connector>

No.	Name	I/O	Function
1	DCLK	O	On-chip debugger clock output port
2	GND	-	Power supply ground (Connecting to all pins is recommended.)
3	DSIO	I/O	On-chip debugger data input/output port
4	GND	-	Power supply ground (Connecting to all pins is recommended.)
5	DST2	O	On-chip debugger status signal output port
6	GND	-	Power supply ground (Connecting to all pins is recommended.)
7	DST1	O	On-chip debugger signal output port
8	GND	-	Power supply ground (Connecting to all pins is recommended.)
9	DST0	O	On-chip debugger signal output port
10	DPCO	O	On-chip debugger signal output port

* The DST0, DST1, and DPC0 signals pass through the LCD connector (CN2) via JP1. Note that debugging is not possible using ICD33 if this signal is used for LCD control.

Table 14.3 ICD Mini interface

ICD Mini interface (CN13, CN14)			
CN13 **Manufacturer: Hirose** **Code: A2-4PA-2.54DS (71)** **CN14** **Manufacturer: JST** **Code: B04B-PASK-1 (LF) (SN)**			**<CPU board (underside) connector>**  **<CPU board (upper-side) connector>** 
CN13			
No.	Name	I/O	Function
1	DCLK	O	On-chip debugger clock output port
2	GND	-	Power supply ground
3	DSIO	I/O	On-chip debugger data input/output port
4	DST2	O	On-chip debugger status signal output port
CN14			
No.	Name	I/O	Function
1	N.C	-	-
2	GND	-	Power supply ground
3	XRESET	I	Target reset signal input port
4	VCC (+3.3 V)	-I	+3.3 V power supply pin

* As of January 2009, ICD Mini connectors supporting ICD33 have not been released.

* Connect the cable to CN13 so that the blue cable coincides with pin 1.

14.1.2 USB interface

The SVT33L17 provides a USB interface with a USB mini-B connector.

Table 14.4 USB interface

USB interface (CN10)			
Manufacturer: Molex **Code: 54819-0572**			**<CPU board (underside) connector>** 
No.	Name	I/O	Function
1	VBUS	Power	USB BUS Power
2	D-	I/O	D-
3	D+	I/O	D+
4	ID	-	ID (N.C)
5	GND	-	Power supply ground

14.1.3 MMC interface

The SVT33L17 provides an MMC interface with an MMC card connector.

SPI is used to control the MMC card.

Table 14.5 MMC card interface

MMC card interface (CN5)			
Manufacturer: Hirose **Code: DM1B-DSF-PEJ (82)**			**<CPU board (underside) connector>** 
No.	Name	I/O	Function
1	CD/DAT3	O	XSCD_CS chip select signal
2	CMD	O	SPI_SDO serial data output
3	GND	-	Power supply ground
4	VDD	-	+3.3 V power supply feed
5	CLK	O	SPI_CLK
6	VSS2	-	Power supply ground
7	DAT0	I	SPI_SDI serial data input
8	DAT1	-	Pulled up with resistance
9	DAT2	-	Pulled up with resistance
10	nCD	I	XSDC_CD card detection signal
11	WP	I	XSDC_WP write protect signal
12	GND	-	Power supply ground

14.1.4 UART (RS-232C) interface

The SVT33L17 provides an RS-232C interface with a D-Sub (9-pin) connector.

Table 14.6 RS-232C interface

RS-232C interface (CN4)

Manufacturer: JAE
Code: DELC-J9SAF-23L9E (female)

<CPU board (underside) connector>

No.	Name	I/O	Function
1	DCD	-	N.C
2	TxD	O	Serial data output
3	RxD	I	Serial data input
4	DTR	-	Connected to DSR
5	GND	-	Power supply ground
6	DSR	-	Connected to DTR
7	RTS	-	Connected to CTS
8	CTS	-	Connected to RTS
9	RI	-	N.C

* Use a straight cable for connections to a PC.

14.1.5 LCD board interface

This provides the connection signal with the SVT33L17 LCD board.

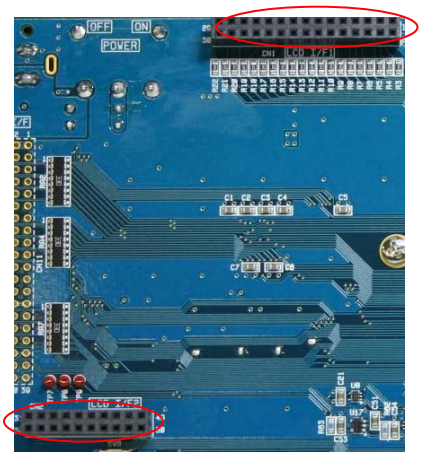
The CPU (S1C33L17) includes an LCD controller supporting a 4/8-bit monochrome/color LCD panel and 16-bit general-purpose TFT panel. The LCD control signal is connected to the connector on this board.

Table 14.7 LCD board interface

LCD board interface (CN1, CN2)

CN1
Manufacturer: Samtec
Code: SSW-115-01-G-D (female, 30-pin)
CN2
Manufacturer: Samtec
Code: SSW-110-01-G-D (female, 20-pin)

<CPU Board (upper-side) connector>



CN1

No.	Name	I/O	Function
1	+5V	-	5 V power supply pin – feeds to LCD board
2	+3.3V	-	3.3 V power supply pin – feeds to LCD board
3	FPDAT0	O	LCD display data output
4	FPDAT1	O	LCD display data output
5	FPDAT2	O	LCD display data output
6	GND	-	Power supply ground (Connecting to all pins is recommended.)
7	FPDAT3	O	LCD display data output
8	FPDAT4	O	LCD display data output
9	FPDAT5	O	LCD display data output
10	GND	-	Power supply ground (Connecting to all pins is recommended.)
11	FPDAT6	O	LCD display data output
12	FPDAT7	O	LCD display data output
13	FPDAT8	O	LCD display data output
14	GND	-	Power supply ground (Connecting to all pins is recommended.)
15	FPDAT9	O	LCD display data output
16	FPDAT10	O	LCD display data output
17	FPDAT11	O	LCD display data output
18	GND	-	Power supply ground (Connecting to all pins is recommended.)
19	FPDAT12	O	LCD display data output
20	FPDAT13	O	LCD display data output
21	FPDAT14	O	LCD display data output
22	FPDAT15	O	LCD display data output
23	GND	-	Power supply ground (Connecting to all pins is recommended.)
24	FPFRAME	O	LCD frame clock output
25	FPLINE	O	LCD line clock output

26	GND	-	Power supply ground (Connecting to all pins is recommended.)
27	FPSHIFT	O	LCD shift clock output
28	GND	-	Power supply ground (Connecting to all pins is recommended.)
29	FPDRDY	O	LCD DRDY/MOD signal output
30	GND	-	Power supply ground (Connecting to all pins is recommended.)
CN2			
31	TFT_CTL0	O	TFT interface control signal *1
32	TFT_CTL2	O	TFT interface control signal *1
33	TFT_CTL3	O	TFT interface control signal *1
34	GND	-	Power supply ground (Connecting to all pins is recommended.)
35	SDO	O	SPI interface SDO signal
36	SDI	I	SPI interface SDI signal
37	SPICLK	O	SPI interface CLK signal
38	XLCD_CS	O	LCD controller select signal (general-purpose port output)
39	XLCD_RST	O	LCD controller reset signal (general-purpose port output)
40	LCD_PWR	O	LCD controller power supply control signal (general-purpose port output)
41	LCD_BL	O	LCD controller backlight control signal (general-purpose port output)
42	GND	-	Power supply ground (Connecting to all pins is recommended.)
43	GND	-	Power supply ground (Connecting to all pins is recommended.)
44	P70/AIN0	I/O	
45	P71/AIN1	I/O	
46	-	-	
47	-	-	
48	-	-	
49	-	-	
50	-	-	

*1 Enabled when JP1 is connected to TFT_CTL0, TFT_CTL2, and TFT_CTL3. In this case, ICD33 cannot be used, since it is used in conjunction with the ICD33 debugging signal.

14.1.6 Audio board interface

This provides the connection signal with the SVT33L17 Audio board.

The CPU (S1C33L17) includes a module for controlling PCM data in I2S format. Related signals pass through the connector to enable audio functions.

Table 14.8 Audio board interface

Audio board interface (CN7, CN9, CN15)

CN7
Manufacturer: Samtec
Code: SSW-110-01-G-D (female 20-pin)
CN9
Manufacturer: Samtec
Code: SSW-104-01-G-S (female 4-pin)
CN15
Manufacturer: Samtec
Code: SSW-104-01-G-S (female 4-pin)

<CPU board upper-side view>

CN7

No.	Name	I/O	Function
1	GND	-	Power supply ground (Connecting to all pins is recommended.)
2	+3.3V	-	3.3 V power supply pin – feeds to Audio board
3	GND	-	Power supply ground (Connecting to all pins is recommended.)
4	GND	-	Power supply ground (Connecting to all pins is recommended.)
5	SDO /SCL	O	Switched by SPI SDO / I2C SCL JP3
6	SDI /SDA	I	Switched by SPI SDI / I2C SDA JP2
7	XCORDEC_CS	O	Audio IC select signal
8	SPI_SCK	O	SPI interface CLK signal
9	GND	-	Power supply ground (Connecting to all pins is recommended.)
10	GND	-	Power supply ground (Connecting to all pins is recommended.)
11	OPEN	-	N.C
12	XCORDEC_RST	O	Audio IC select signal
13	GND	-	Power supply ground (Connecting to all pins is recommended.)
14	I2S_MCLKO	O	I2S MCLKO signal
15	I2S_WSO	O	I2S WSO signal
16	GND	-	Power supply ground (Connecting to all pins is recommended.)
17	GND	-	Power supply ground (Connecting to all pins is recommended.)
18	GND	-	Power supply ground (Connecting to all pins is recommended.)
19	I2S_SCKO	O	I2S SCKO signal
20	I2S SDO	O	I2S SDO signal
CN15			
21	GND	-	Power supply ground (Connecting to all pins is recommended.)
22	+3.3V	-	3.3 V power supply pin – feeds to Audio board
23	+5V	-	5 V power supply pin – feeds to Audio board
24	GND	-	Power supply ground (Connecting to all pins is recommended.)
CN9			
25	I2S SDI	I	I2S SDI signal
26	I2S_SCKI	I	I2S SCKI signal
27	I2S_WSI	I	I2S WSI signal
28	I2S_MCLKI	I	I2S MCLKI signal

14.1.7 External expansion interface

The signals listed below pass through the external expansion connectors.

Note that the external expansion connector is not initially fitted.

Through holes on the board have a diameter of 1.0 mm and a pitch of 2.54 mm.

Table 14.9 External expansion interface

External expansion interface (CN11, CN12)			
CN11			
No.	Name	I/O	Function
1	+3.3V	-	3.3 V power supply pin
2	+3.3V	-	3.3 V power supply pin
3	EXT_A0	O	Address bus
4	EXT_A1	O	Address bus
5	EXT_A2	O	Address bus
6	EXT_A3	O	Address bus
7	EXT_A4	O	Address bus
8	EXT_A5	O	Address bus
9	EXT_A6	O	Address bus
10	EXT_A7	O	Address bus
11	EXT_A8	O	Address bus
12	EXT_A9	O	Address bus
13	EXT_A10	O	Address bus
14	EXT_A11	O	Address bus
15	EXT_A12	O	Address bus
16	EXT_A13	O	Address bus
17	EXT_A14	O	Address bus
18	EXT_A15	O	Address bus
19	EXT_A16	O	Address bus
20	EXT_A17	O	Address bus
21	EXT_A18	O	Address bus
22	EXT_A19	O	Address bus
23	EXT_A20	O	Address bus
24	EXT_A21	O	Address bus
25	EXT_A22	O	Address bus
26	OPEN	-	N.C
27	GND	-	Power supply ground
28	GND	-	Power supply ground
29	EXT_XRD	O	Read signal
30	EXT_XWR	O	Write signal
31	EXT_XCE9	O	Area 9 chip enable signal
32	EXT_XBSH	O	Bus strobe signal
33	OPEN	-	N.C
34	OPEN	-	N.C
35	GND	-	Power supply ground
36	GND	-	Power supply ground

37	EX_XRST	I	External reset input, 0: Reset enabled, 47 kΩ pull-up resistance
38	XNMI	I	External NMI input signal, 0: Enabled, 100 kΩ pull-up resistance
39	GND	-	Power supply ground
40	GND	-	Power supply ground
CN12			
1	+3.3V	-	3.3 V power supply pin
2	+3.3V	-	3.3 V power supply pin
3	EXT_D0	I/O	Data bus
4	EXT_D1	I/O	Data bus
5	EXT_D2	I/O	Data bus
6	EXT_D3	I/O	Data bus
7	EXT_D4	I/O	Data bus
8	EXT_D5	I/O	Data bus
9	EXT_D6	I/O	Data bus
10	EXT_D7	I/O	Data bus
11	GND	-	Power supply ground
12	GND	-	Power supply ground
13	EXT_D8	I/O	Data bus
14	EXT_D9	I/O	Data bus
15	EXT_D10	I/O	Data bus
16	EXT_D11	I/O	Data bus
17	EXT_D12	I/O	Data bus
18	EXT_D13	I/O	Data bus
19	EXT_D14	I/O	Data bus
20	EXT_D15	I/O	Data bus
21	GND	-	Power supply ground
22	GND	-	Power supply ground
23	EXT_SPI_SDI	I	SPI SDI signal
24	EXT_SPI_SDO	O	SPI SDO signal
25	OPEN	-	N.C
26	EXT_SPI_CLK	O	SPI CLK signal
27	GND	-	Power supply ground
28	GND	-	Power supply ground
29	EXT_I2S_MCLKI	I	I2S MCLKI signal
30	EXT_I2S_WSI	I	I2S WSI signal
31	EXT_I2S_SCKI	I	I2S SCKIsignal
32	EXT_I2S_SDI	I	I2S SDI signal
33	EXT_I2S_MCLKO	O	I2S MCLKO signal
34	EXT_I2S_WSO	O	I2S WSO signal
35	EXT_I2S_SCKO	O	I2S SCKO signal
36	EXT_I2S_SDO	O	I2S SDO signal
37	+5V	-	5 V power supply pin
38	+5V	-	5 V power supply pin
39	GND	-	Power supply ground
40	GND	-	Power supply ground

14.2 LCD board

The SVT33L17 LCD is provided with an L5S30739 (Epson Imaging Devices) LCD panel capable of displaying 16-bit RGB (5-bit red, 6-bit green, 5-bit blue) 320 (x RGB) x 240 dots. This panel incorporates an LED backlight.

Table 14.10 LCD board interface

LCD board interface (CN1, CN2)

CN1
Manufacturer: Samtec
Code: TSW-115-26-G-D (male 30-pin)
CN2
Manufacturer: Samtec
Code: TSW-110-26-G-D (male 20-pin)

<LCD board connector>

CN1

No.	Name	I/O	Function
1	+5V	-	5 V power supply pin
2	+3.3V	-	3.3 V power supply pin
3	FPDAT0	I	LCD display data input
4	FPDAT1	I	LCD display data input
5	FPDAT2	I	LCD display data input
6	GND	-	Power supply ground (Connecting to all pins is recommended.)
7	FPDAT3	I	LCD display data input
8	FPDAT4	I	LCD display data input
9	FPDAT5	I	LCD display data input
10	GND	-	Power supply ground (Connecting to all pins is recommended.)
11	FPDAT6	I	LCD display data input
12	FPDAT7	I	LCD display data input
13	FPDAT8	I	LCD display data input
14	GND	-	Power supply ground (Connecting to all pins is recommended.)
15	FPDAT9	I	LCD display data input
16	FPDAT10	I	LCD display data input
17	FPDAT11	I	LCD display data input
18	GND	-	Power supply ground (Connecting to all pins is recommended.)
19	FPDAT12	I	LCD display data input
20	FPDAT13	I	LCD display data input
21	FPDAT14	I	LCD display data input
22	FPDAT15	I	LCD display data input
23	GND	-	Power supply ground (Connecting to all pins is recommended.)
24	FPFRAME	I	LCD frame clock input
25	FPLINE	I	LCD line clock input
26	GND	-	Power supply ground (Connecting to all pins is recommended.)
27	FPSHIFT	I	LCD shift clock input
28	GND	-	Power supply ground (Connecting to all pins is recommended.)
29	N.C	-	NC (FPDRDY not used)
30	GND	-	Power supply ground (Connecting to all pins is recommended.)

CN2			
31	N.C	-	TFT interface control signal not used
32	N.C	-	TFT interface control signal not used
33	N.C	-	TFT interface control signal not used
34	GND	-	Power supply ground (Connecting to all pins is recommended.)
35	SPISDI	I	SPI interface data input signal
36	SPISDO	O	SPI interface data output signal
37	SPICLK	I	SPI interface CLK signal
38	XLCD_CS	I	LCD controller select signal
39	XLCD_RST	I	LCD controller reset signal, 0: Reset
40	LCD_PWR	I	Turns LCD panel power on/off, 1: On
41	LCD_BL	I	Turns LCD panel backlight on/off, 1: On
42	GND	-	Power supply ground (Connecting to all pins is recommended.)
43	GND	-	Power supply ground (Connecting to all pins is recommended.)
44	-	-	Not used
45	-	-	Not used
46	-	-	Not used
47	-	-	Not used
48	-	-	Not used
49	-	-	Not used
50	-	-	Not used

14.3 Audio board

The SVT33L17 Audio board includes a CS42L51 (Cirrus Logic) Audio IC with Line in, Line out, and Mic input. The I2S interface is used for data communications with the CPU. The SPI interface is used to send and receive commands.

Table 14.11 Audio board interface

Audio board interface (CN1, CN2, CN3)

CN2
Manufacturer: Samtec
Code: TSW-110-26-G-D (male 20-pin)
CN3
Manufacturer: Samtec
Code: TSW-104-26-G-S (male 4-pin)
CN1
Manufacturer: Samtec
Code: TSW-104-26-G-S (male 4-pin)

<Audio board connector>

CN2

No.	Name	I/O	Function
1	GND	-	Power supply ground (Connecting to all pins is recommended.)
2	+3.3V	-	3.3 V power supply pin
3	GND	-	Power supply ground (Connecting to all pins is recommended.)
4	GND	-	Power supply ground (Connecting to all pins is recommended.)
5	DO	I	Connected to Audio IC SPI SDI.
6	N.C	-	Corresponds to SPI SDO, but no output from Audio IC.
7	XCORDEC_CS	I	Audio IC chip select signal
8	SPI_SCK	I	SPI interface CLK signal
9	GND	-	Power supply ground (Connecting to all pins is recommended.)
10	GND	-	Power supply ground (Connecting to all pins is recommended.)
11	OPEN	-	N.C
12	XCORDEC_RST	O	Audio IC reset signal, 0: Reset
13	GND	-	Power supply ground (Connecting to all pins is recommended.)
14	I2S_MCLKO	I	I2S MCLKO signal (output from CPU)
15	I2S_WSO	I	I2S WSO signal (output from CPU)
16	GND	-	Power supply ground (Connecting to all pins is recommended.)
17	GND	-	Power supply ground (Connecting to all pins is recommended.)
18	GND	-	Power supply ground (Connecting to all pins is recommended.)
19	I2S_SCKO	I	I2S SCKO signal (output from CPU)
20	I2S SDO	I	I2S SDO signal (output from CPU)
CN3			
21	GND	-	Power supply ground (Connecting to all pins is recommended.)
22	+3.3V	-	3.3 V power supply pin (Power supply for Audio IC I/O)
23	+5V	-	5 V power supply pin (Generates 2.5 V for Audio IC internally.)
24	GND	-	Power supply ground (Connecting to all pins is recommended.)
CN1			
25	I2S SDI	O	I2S SDI signal (Output data from Audio IC)
26	I2S_SCKI	O	I2S SCKI signal (Output clock from Audio IC)
27	I2S_WSI	O	I2S WSI signal (Output from Audio IC)
28	I2S_MCLKI	O	I2S MCLKII signal (Output from Audio IC)

Appendix A Board Dimensional Diagrams

A.1 External views (CPU board/ICD board/LCD board/Audio board)

External views of the various boards (CPU board/ICD board/LCD board/Audio board) are shown below.

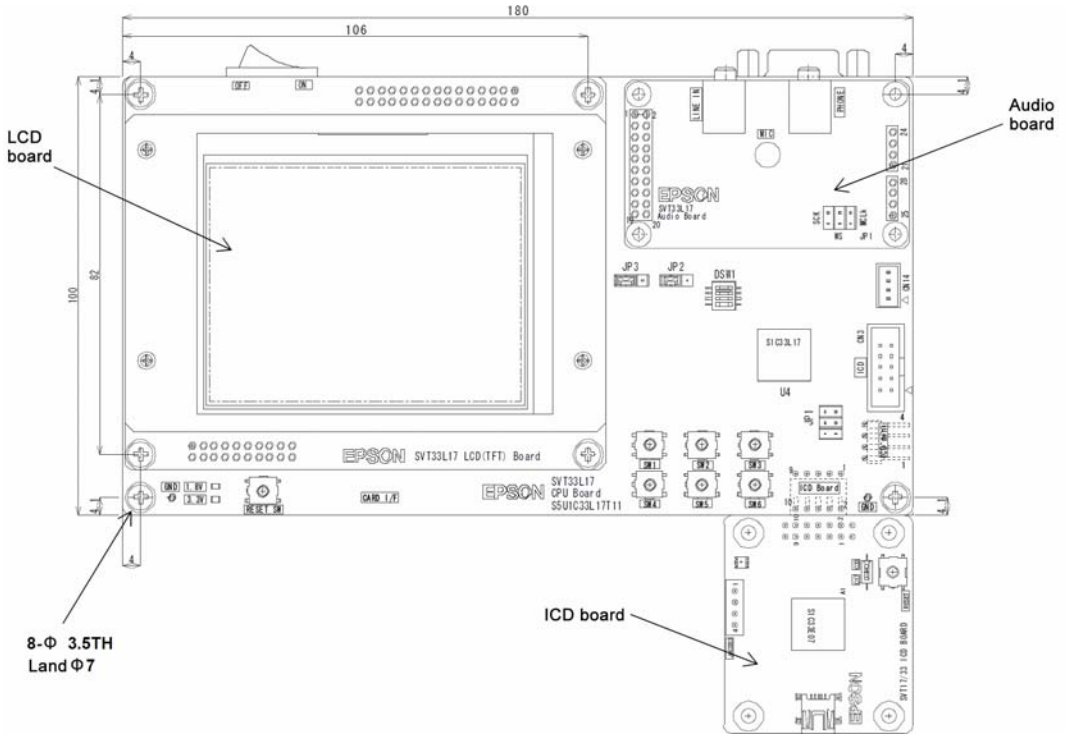


Figure A.1 External dimensional diagram (Overall, top)

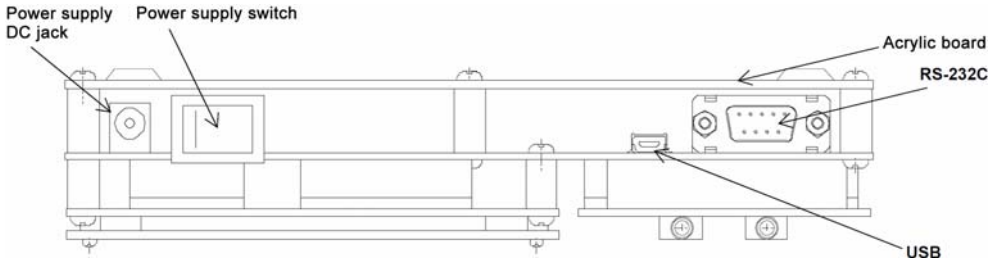


Figure A.2 External dimensional diagram (Overall, rear)

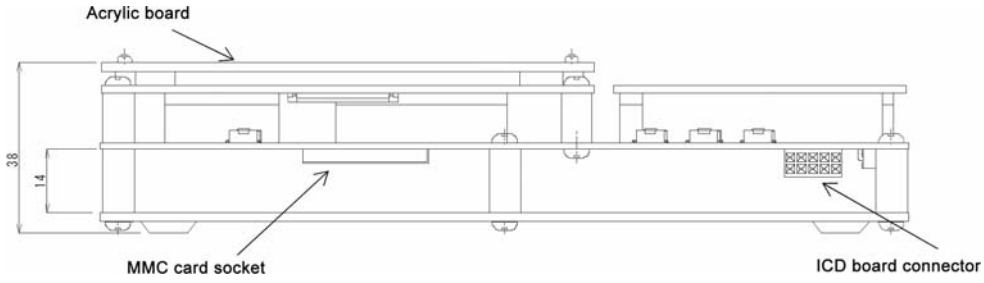


Figure A.3 External dimensional diagram (Overall, front)

A.2 CPU board dimensional diagram

The CPU board dimensional diagram is shown below.

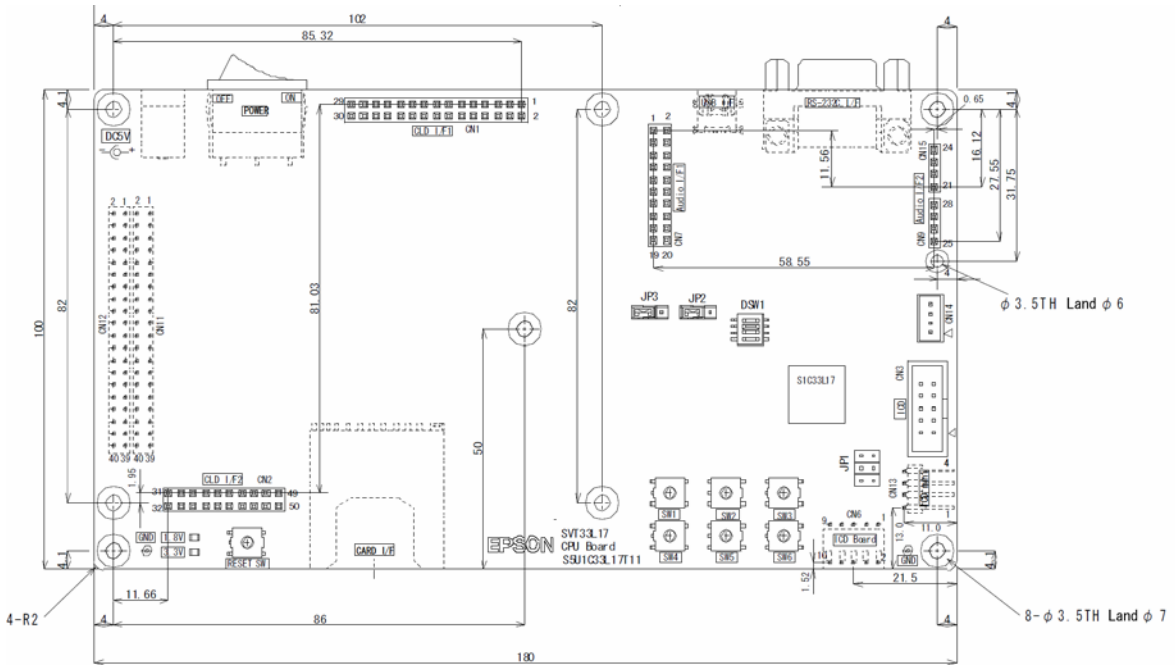


Figure A.4 CPU board dimensional diagram (viewed from above)

A.3 ICD board dimensional diagram

The ICD board dimensional diagram is shown below.

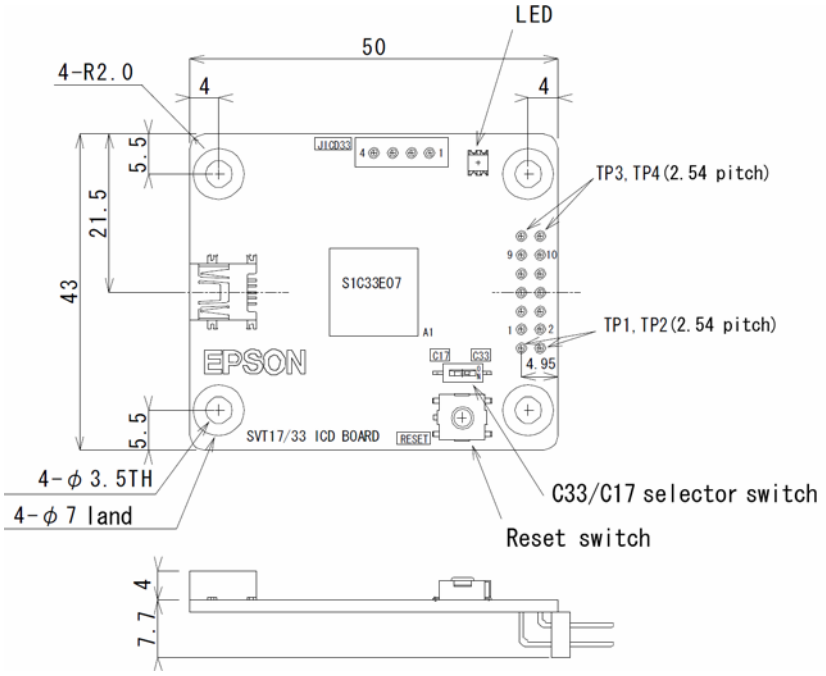


Figure A.5 ICD board dimensional diagram (viewed from above)

A.4 LCD board dimensional diagram

The LCD board dimensional diagram is shown below.

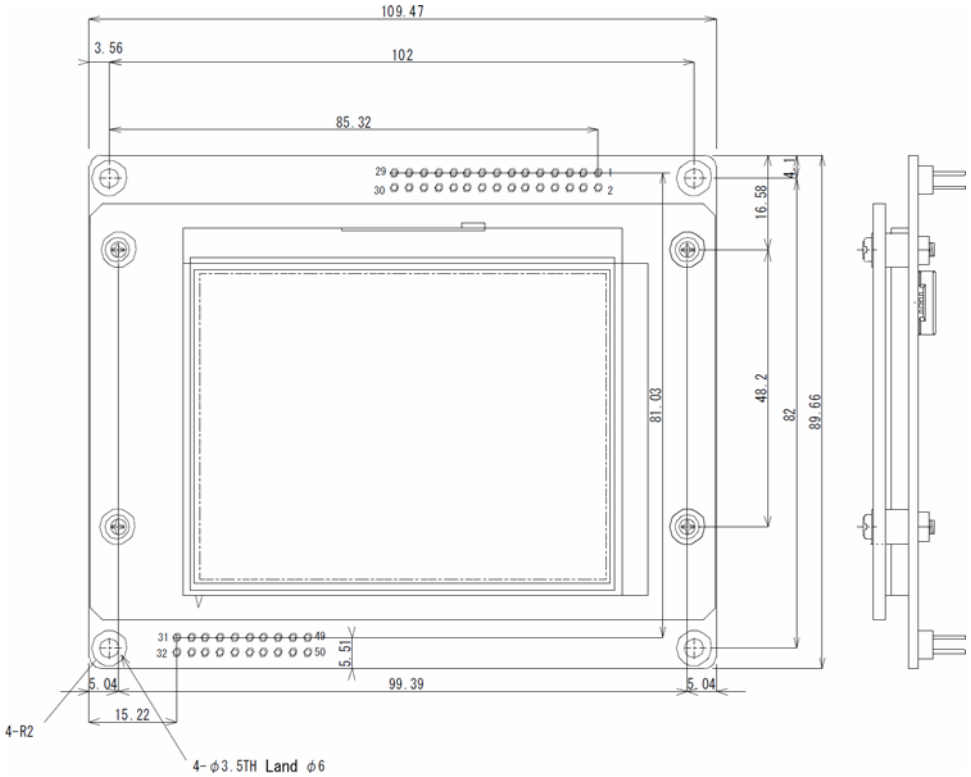


Figure A.6 LCD board dimensional diagram

A.5 Audio board dimensional diagram

The Audio board dimensional diagram is shown below.

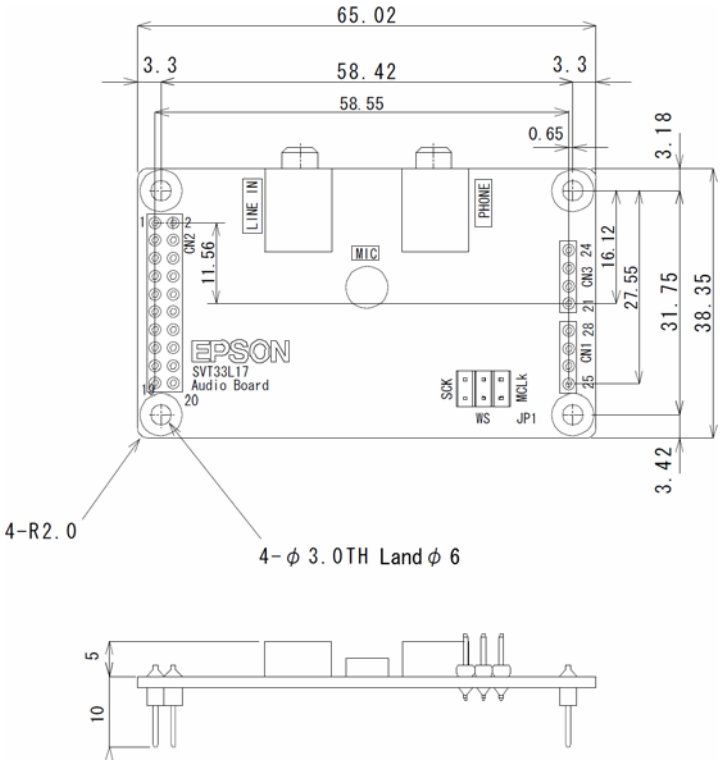
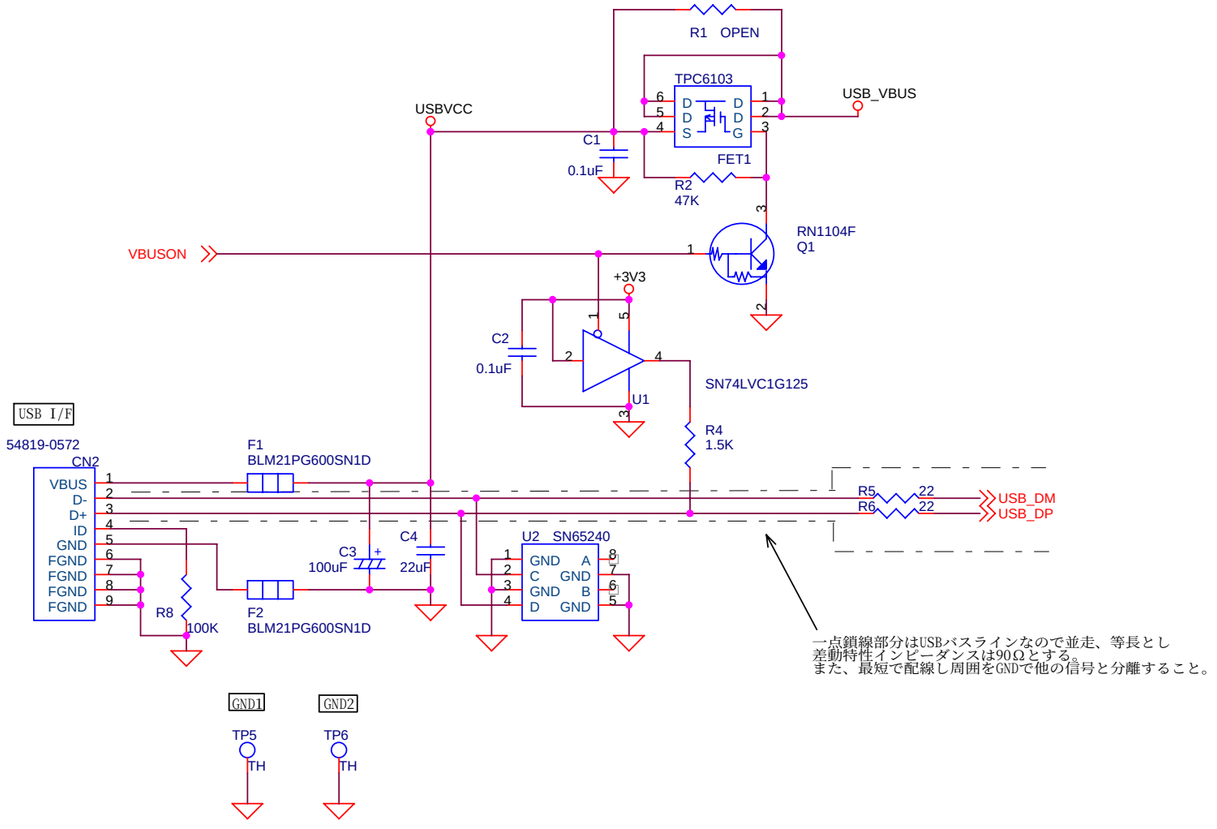
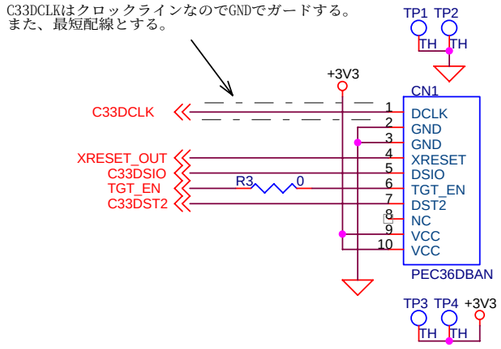
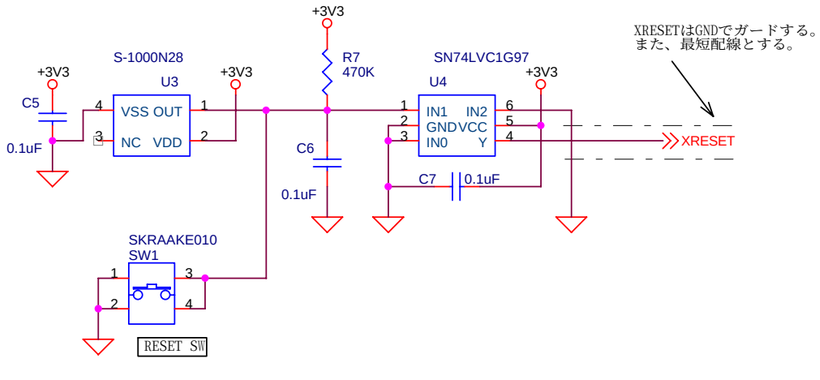
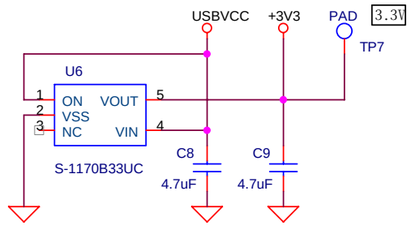


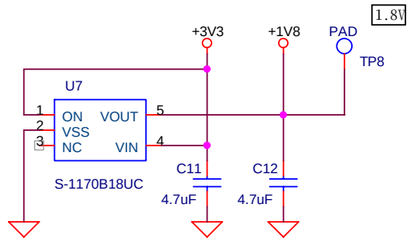
Figure A.7 Audio board dimensional diagram

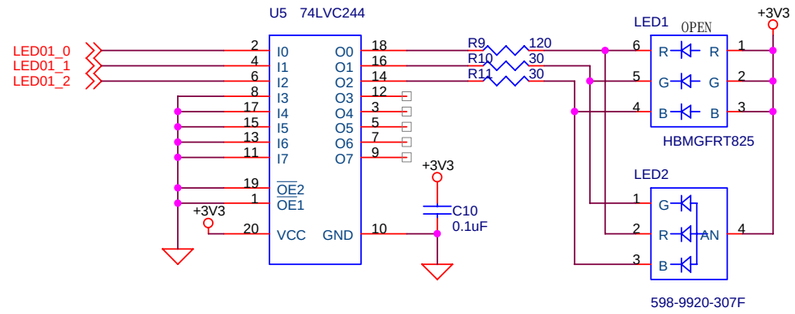












注意
1．+3V3,+1V8,USBVCC,USB_VBUS,CN2.1-F1は電源ラインなので太くする。
+3.3V,+1.8Vは内層

2．GNDはベタGNDとする。内層と接続するための適当数のビアがあること。

Title	SVT33L17 ICD Board	
Size A3	Document Number DR-4220-3205	Rev <RevCode>
Date: Monday, April 14, 2008	Sheet 1 of 2	

U9

S1C33E07

PFBGA(180Pin)

U8 BGA(48Pin) S29PL064J

U10 SN74LVC1G97

U11 TS5A3159A

CN3 JTCD33 PBC36SGAN

XTAL1 FA-238

SW2 CHS-01B1

TP9 PAD

TP10 PAD

TP11 PAD

R17 4.7K

R18 0

R19 33

R20 1M

R21 0

R12 100K

R13 4.7K

R14 4.7K

R15 4.7K

R16 OPEN

C13 0.1uF

C14 0.1uF

C15 0.22uF OPEN

C16 0.1uF

C17 9pF

C18 9pF

C19 1uF

C20 1uF

C21 0.1uF

C22 0.1uF

C23 0.1uF

C24 0.01uF

C25 0.01uF

C26 0.01uF

C27 1000pF

C28 1000pF

C29 1000pF

C30 1uF

C31 1uF

C32 0.1uF

C33 0.1uF

C34 0.1uF

C35 0.01uF

C36 0.01uF

C37 0.01uF

C38 1000pF

C39 1000pF

C40 1000pF

R22 OPEN

R23 OPEN

R24 OPEN

R25 OPEN

R26 OPEN

R27 OPEN

R28 OPEN

R29 OPEN

R30 0

R31 0

R32 0

R33 0

R34 0

R35 0

R36 0

R37 0

+3V3

+1V8

SIO

C33DCLK

C33DST2

XRESET_OUT

TIMER

P10

P11

P12

P13

P14

P30

P31

P32

P81

LED01_0

LED01_1

LED01_2

XRESET

TGT_EN

VBUSON

USB_VBUS

USB_DM

USB_DP

C33DSIO

P00/SIN0/#DMAACK2
P01/SOUT0/#DMAACK3
P02/#SCLK0/#DMAEND2
P03/#SRDY0/#DMAEND3
P04/SIN1/I2S_SDO
P05/SOUT1/I2S_WS
P06/#SCLK1/I2S_SCK
P07/#SRDY1/I2S_MCLK
P10/TM0/SIN0/#DMAEND0
P11/TM1/SOUT0/#DMAEND1
P12/TM2/#SCLK0/#DMAACK0
P13/TM3/#SRDY0/#DMAACK1
P14/TM4/SIN1
P20/SDCKE
P21/SDCLK
P22/#SDCS
P23/#SDRAS/TFT_CTL1
P24/#SDCAS
P25/#SDWE
P26/DQML
P27/DQMH
P30/CARD2/#DMAREQ0
P31/CARD3/#DMAREQ1
P32/CARD4/#DMAREQ2
P33/CARD5/#DMAREQ3
P60/SIN2/DCSIO0/EXCL0
P61/SOUT2/DCSIO1/EXCL1
P62/#SCLK2/#ADTRG/CMU_CLK
P63/#SRDY2/WDT_CLK/#WDT_NMI
P64/#WAIT/EXCL2
P65/SDI/FPDAT8
P66/SDO/FPDAT9
P67/SPICLK/FPDAT10
P70/AIN0
P71/AIN1
P72/AIN2
P73/AIN3
P74/AIN4/EXCL5
P80/FPFRAME
P81/FPLINE
P82/FPSHIFT
P83/FPDRDY/TFT_CTL1/BCLK
P84/DCSIO0/FPDAT11
P85/DCSIO1
#RESET
#NMI
BOOT0
BOOT1
VCP
DSIO/P34
DCLK/P35
DST2/P36
DST0/P15/TM5/SOUT1/TFT_CTL0
DST1/P16/DCSIO0/#SCLK1/TFT_CTL3
DPCO/P17/DCSIO1/#SRDY1/TFT_CTL2
MCLKI
MCLKO
RTCCLK1
RTCCLKO
TEST0
BURNIN
PLL VSS
D0/PC0
D1/PC1
D2/PC2
D3/PC3
D4/PC4
D5/PC5
D6/PC6
D7/PC7
#CE4/P50/CARD0
#CE5/P51/CARD1
P52/BCLK/#CE6/CMU_CLK
#CE7/P53/SDA10
#CE8/P54/CARD1
#CE9/P55/CARD0
#CE10/P57
#CE11/P56
#WRL
#WRH/#BSH
#RD
P90/FPDAT0
P91/FPDAT1
P92/FPDAT2
P93/FPDAT3
P94/FPDAT4
P95/FPDAT5
P96/FPDAT6
P97/FPDAT7
PA0/TFT_CTL0
PA1/FPDAT8/TFT_CTL0
PA2FPDAT9/TFT_CTL1
PA3/FPDAT10/TFT_CTL2/CARD0
PA4/FPDAT11/TFT_CTL3/CARD1
PB0/FPDAT8/I2S_SDO/CARD2
PB1/FPDAT9/I2S_WS/CARD3
PB2/FPDAT10/I2S_SCK/CARD4
PB3/FPDAT11/I2S_MCLK/CARD5
USBVBUS
USBDM
USBDP
A0/#BSL
A16/DQML
A17/DQMH
A18/P46/TFT_CTL2
A19/P45/FPDAT11
A20/P44/FPDAT10
A21/P43/FPDAT9
A22/P42/FPDAT8
A23/P41/EXCL3/#SDRAS
A24/P40/EXCL4/#SDCAS

一点鎖線内は発振回路なので最短配線、GNDでガード。
実装裏面での他のパターンの横断を行わないこと。

最短配線、GNDでガード

C19-C29,C30-C40はU9用バイパスコンデンサ。
BGA裏面等に最短で配置すること。

Title	STV33L17 ICD Board		
Size A3	Document Number DR-4220-3205		Rev <RevCode>
Date: Monday, April 14, 2008	Sheet 2 of 2		

U4用パスコン

XRST,XNMIはそれぞれGNDでガードする。

DSW1の近くにこの表をシルクで記入する。

1	2	3	BOOT MODE
ON	ON	ON	NAND(SB)
ON	ON	OFF	NAND(LB)
ON	OFF	-	RESERVE
OFF	ON	-	NOR
OFF	OFF	ON	RS232
OFF	OFF	OFF	SPI

IC U4に近く

クロック部分は最短で配線し他の部分とGNDで分離する。
また、他の配線が横切らないこと。

一点鎖線以内は最短で配線し、他の部分とGNDで分離する。
DCLK,DSIO,DST2の配線長は5cm以内を目標とする。
DCLK、DSIOはそれぞれGNDでガードする。
R33はIC U4端子の近くに配置する。

USBVBUSは電源ライン(パターン幅1mm目標)
USBDM,USBDPは差動特性インピーダンス90Ω等長配線とすること。他の信号とGNDで分離すること。
配線長が短いこと。

CPU P54(A2),PA0(P11) Not Use

TP1-9はφ0.8のTHとする。

PAD1-8はφ1.5のパッドとし裏面にあってもよい。

Title	SVT33L17_MAIN-BOARD	
Size A2	Document Number DR-4220-3201	Rev 1.0
Date: Thursday, July 17, 2008	Sheet 1 of 2	

電源の入力部分なので極力太く配線すること。

POW SW

DC5V

CN8

DC_JACK

R53 10M

R54 10M

1N5819
D2

SW7

CW-SA12KKNEH

+5V0

C40
100uF

C41
0.1uF

U14 LM1086

V1 VO ADJ

電源部分は太く配線する。

R50 0

R52 0

+3V3

R51
200

C42
0.1uF

C43
10uF

R55 0

R56
390

R57
2K

54819-0572
CN10

USB I/F

VBUS
D-
D+
ID
GND
FGND
FGND
FGND
FGND

C45
0.1uF

C46
10uF

1N5819
D4

RTF010P02
FET1

USBDP
USBDM
USBVBUS

R58 0

TP1
TH

TP2
TH

GND

GND

FGND

+3V3

C47
10uF

C48
0.1uF

U15 LP38691DT

V1 GND VO

電源部分は太く配線する。

+1V8

R66 0

R67 0

C49
0.1uF

C50
10uF

+5V0

LED2
SML-210PT

1.8V

R64
510

+1V8

RN1405
Q1

+5V0

LED3
SML-210PT

3.3V

R65
510

+3V3

RN1405
Q2

EX_XRSTはGNDでガードする。

+3V3

R62
47K

EX_XRST

74LVC1G97
U16

IN1 IN2
GND VCC
IN0 Y

+3V3

C54
0.1uF

XRST

XRSTはGNDでガードする。

RESET SW

SKRAAKE010
SW8

R63 1K

C53
0.1uF

U17

NC RES
VDD
CD GND

NCP303LSN27T

C51
0.1uF

+3V3

ICD_XRST

EXT I/F

+3V3 CN11 +3V3

EXT_A0 EXT_A1
EXT_A2 EXT_A3
EXT_A4 EXT_A5
EXT_A6 EXT_A7
EXT_A8 EXT_A9
EXT_A10 EXT_A11
EXT_A12 EXT_A13
EXT_A14 EXT_A15
EXT_A16 EXT_A17
EXT_A18 EXT_A19
EXT_A20 EXT_A21
EXT_A22

EXT_XRD EXT_XWR
EXT_XCE9 EXT_XBSH

EX_XRST XNMI

CN40A

XNMIはGNDでガードする。

+5V0 +3V3 CN12 +3V3 +5V0

EXT_D0 EXT_D1
EXT_D2 EXT_D3
EXT_D4 EXT_D5
EXT_D6 EXT_D7
EXT_D8 EXT_D9
EXT_D10 EXT_D11
EXT_D12 EXT_D13
EXT_D14 EXT_D15

EXT_SPI_SDI EXT_SPI_SDO
EXT_SPI_CLK

EXT_I2S_MCLKI EXT_I2S_WSI
EXT_I2S_SCKI EXT_I2S_SDI
EXT_I2S_MCLKO EXT_I2S_WSO
EXT_I2S_SCKO EXT_I2S_SDO

CN40A

CN2B8470J RA2

D0 D1 D2 D3 D4 D5 D6 D7

EXT_D0 EXT_D1 EXT_D2 EXT_D3 EXT_D4 EXT_D5 EXT_D6 EXT_D7

CN2B8470J RA4

D8 D9 D10 D11 D12 D13 D14 D15

EXT_D8 EXT_D9 EXT_D10 EXT_D11 EXT_D12 EXT_D13 EXT_D14 EXT_D15

CN2B8470J RA6

XRD XWR XCE9 XBSH

EXT_XRD EXT_XWR EXT_XCE9 EXT_XBSH

SPI_SDO SPI_SDI SPI_CLK

EXT_SPI_SDO EXT_SPI_SDI EXT_SPI_CLK

CN2B8470J RA7

I2S_MCLKI I2S_WSI I2S_SCKI I2S_SDI I2S_MCLKO I2S_WSO I2S_SCKO I2S_SDO

EXT_I2S_MCLKI EXT_I2S_WSI EXT_I2S_SCKI EXT_I2S_SDI EXT_I2S_MCLKO EXT_I2S_WSO EXT_I2S_SCKO EXT_I2S_SDO

RA1 CN2B8470J

XBSL A1 A2 A3 A4 A5 A6 A7

EXT_A0 EXT_A1 EXT_A2 EXT_A3 EXT_A4 EXT_A5 EXT_A6 EXT_A7

RA3 CN2B8470J

A8 A9 A10 A11 A12 A13 A14 A15

EXT_A8 EXT_A9 EXT_A10 EXT_A11 EXT_A12 EXT_A13 EXT_A14 EXT_A15

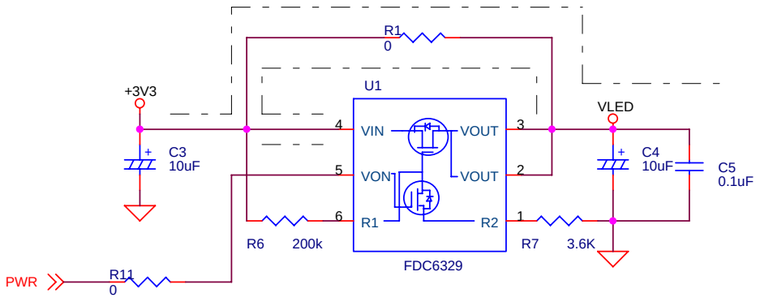
RA5 CN2B8470J

A16 A17 A18 A19 A20 A21 A22

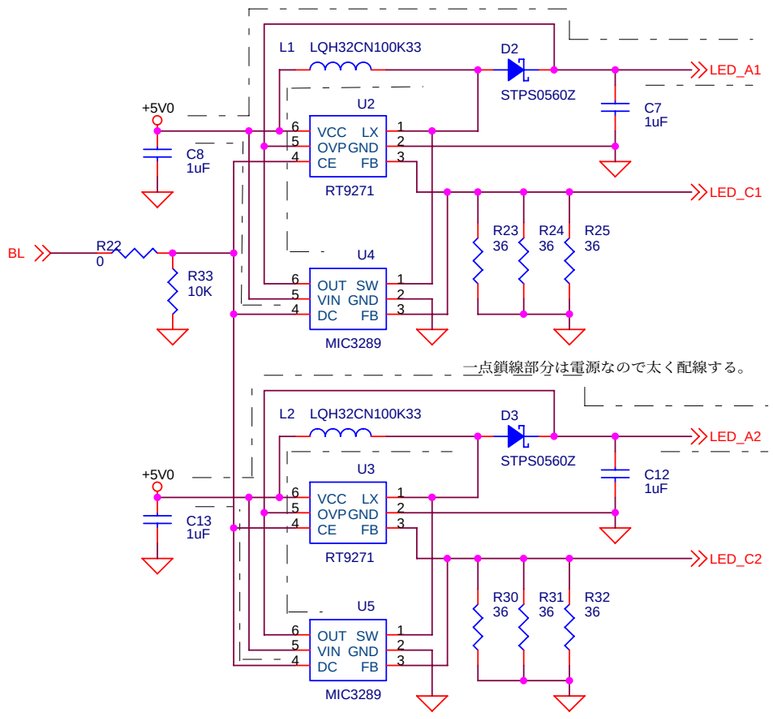
EXT_A16 EXT_A17 EXT_A18 EXT_A19 EXT_A20 EXT_A21 EXT_A22

Title	SVT33L17 CPU board	
Size A3	Document Number DR-4220-3201	Rev <RevCode>
Date: Thursday, July 17, 2008	Sheet 2 of 2	

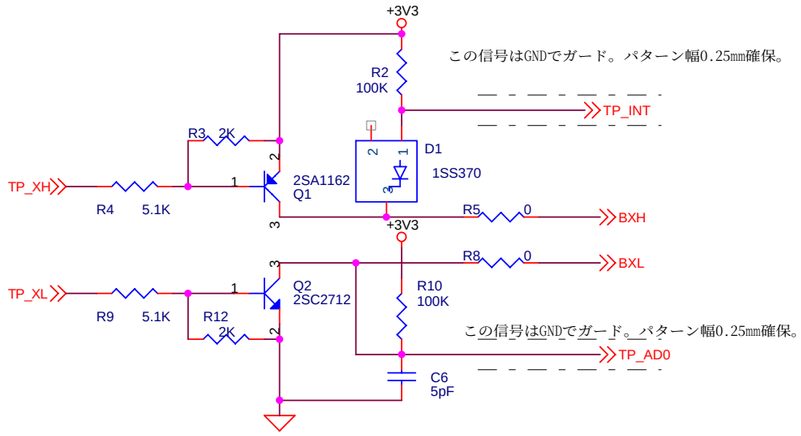
一点鎖線部分は電源なので太く配線する。

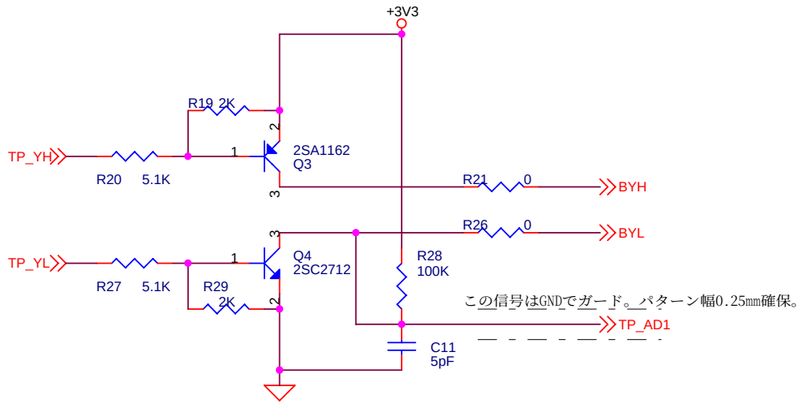


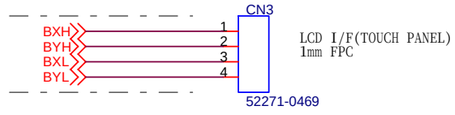
一点鎖線部分は電源なので太く配線する。



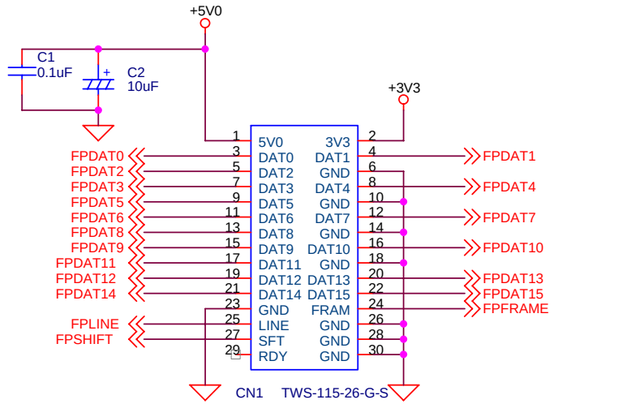
RT9271の代替としてMIC3289を使用できるパターンとする。
MIC3289使用時はショットキーダイオードは未実装。

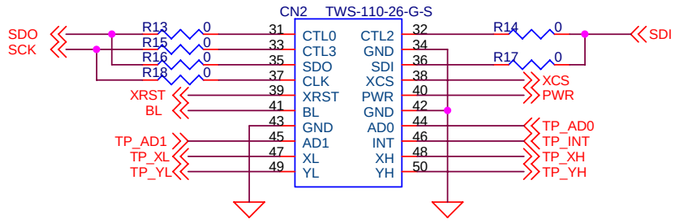


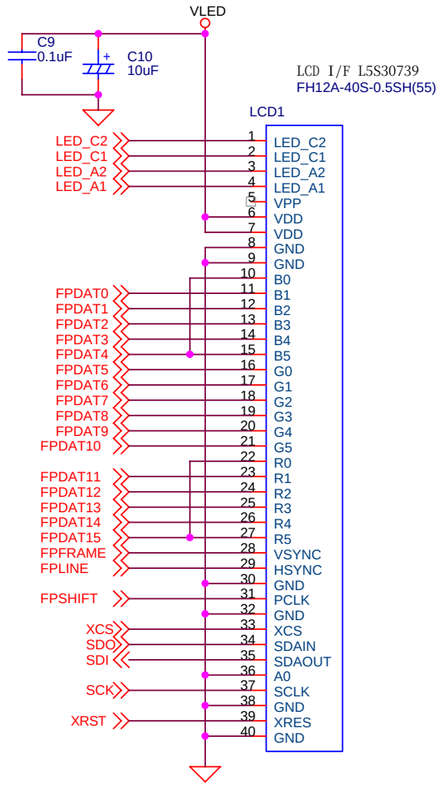




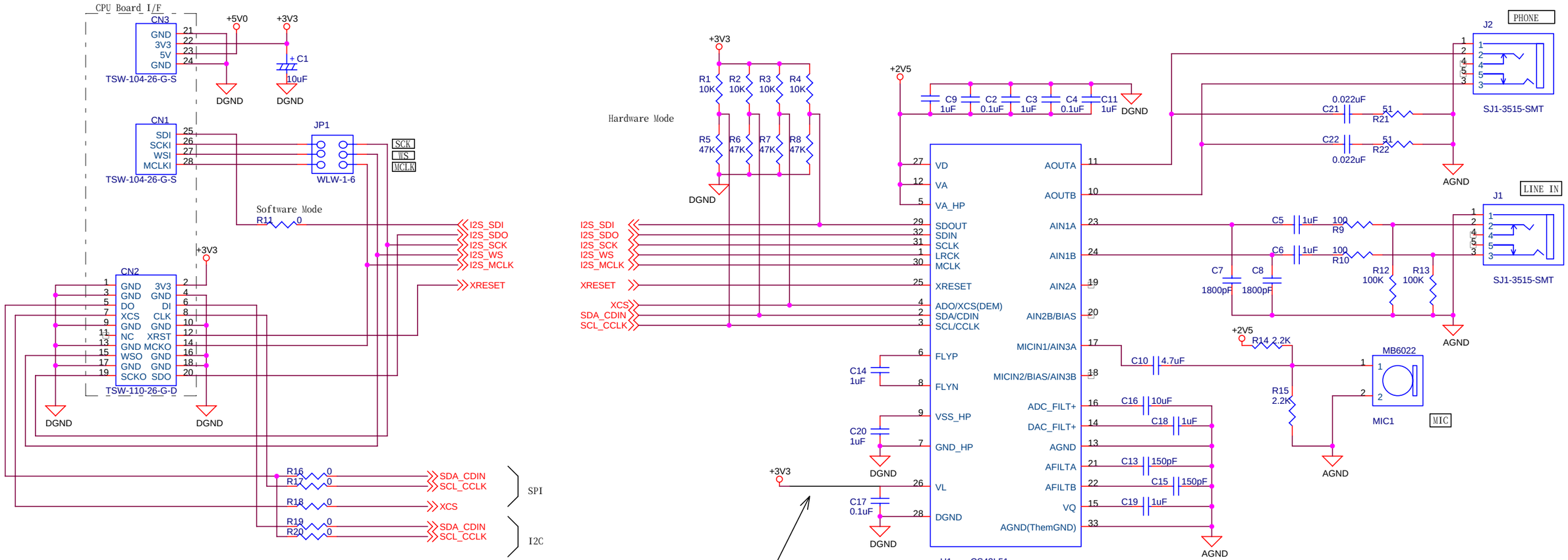
BYL,BXL,BYH,BXHの信号はパターン幅0.5mm確保のこと。







Title	SVT33L17 CLD(TFT) Board	
Size A3	Document Number DR-4220-3202	Rev <RevCode>
Date: Wednesday, May 21, 2008	Sheet 1 of 1	



080717:回路修正　U1 Pin26をジャンパーにて+3V3に接続する。（改造）

AGNDとDGNDはR23で接続される。
内層、ベタともAGNDとDGNDに分離する。

080717: R2,R3,R4,R5,R15,R19,R20は未実装とする。

Title: SVT33L17 Audio Board		
Size: A3	Document Number: DR-4220-3204	Rev: <RevCode>
Date: Saturday, May 17, 2008	Sheet 1 of 1	

NO.	Parts name	Location	Model number	SPEC	mfr
1	connector	CN1	SSW-115-01-G-D	SOCKET 30Pin dual	samtec
2	connector	CN7,CN2	SSW-110-01-G-D	SOKET 20Pin dual	samtec
3	connector	CN3	7610-6002PL	BOX	3M
4	D-SUB connector	CN4	DELC-J9SAF-23L9E	D-SUB 9Pin socket	JAE
5	SD Card socket	CN5	DM1B-DSF-PEJ(82)	Reverse	HIROSE
6	connector	CN6	PS-10SD-D4T1-1	socket 10Pin	JAE
7	DC jack	CN8	HEC2305-016250 PJ-037AH PJ-050AH	f 2f 6.5	HOSHIDEN CUI CUI
8	connector	CN9,C15	SSW-104-01-G-S	SOCKET 4Pin single	samtec
9	USB connector	CN10	54819-0572	USB nimiB	molex
10	connector	CN11,CN12	WLW-1-20PW	-	MAC8
11	laminated ceramic capacitor	C1,C2,C3,C4 C5,C6,C7,C8 C9,C10,C11,C12 C13,C14,C15,C16 C17,C18,C19 C20,C21,C22 C23,C28,C29 C30,C31,C32 C33,C36,C37 C39,C41,C42 C45,C48,C49 C51,C53,C54,C55	GRM219F11H104ZA01D	2012 0.1uF F	murata
12	laminated ceramic capacitor	C24,C25,C26,C27	C1608CH1H100D	1608 10pF CH	TDK
13	laminated ceramic capacitor	C35,C34	GRM1882C1H470JA01D C16082C1H470J	1608 47pF CH	murata TDK
14	tantalum capacitor	C38,C43,C44 C46,C47,C50 C52	ESVB21C106M	3.5*2.8 10uF/16V	NEC TOKIN
15	electrolytic capacitor	C40	UWZ1C101MCL1GB	6.3*5.4 100uF 16V	NICHIKON
16	ESD diode	D1	PESD24VL2BT	SOT-23 24V	PHILIPS
17	Diode	D2,D4	1N5819	CASE59(DIP)	ON SEMI
18	FET	FET1	RTF010P02	Pch TUMT3	ROHM
19	Jumper pin	JP1	WLW-1-3PW	6Pin Jamper	MAC8
20	Jumper pin	JP2,JP3	3Pin 1列Jamper	WL-1 3P	MAC8
21	LED	LED1,LED2,LED3	2012 pure green	SML-210PT	ROHM
22	Transistor	Q2,Q1	1.6*1.6 2-2HA1A	RN1405F	TOSHIBA

NO.	Parts name	Location	Model number	SPEC	mfr
23	resistance-aray	RA1,RA2,RA3 RA4,RA5,RA6 RA7	33O	CN2B8330J	KOA
24	resistor	R1,R3,R4,R5 R6,R7,R8,R9 R10,R11,R12 R13,R14,R15 R16,R17,R18 R19,R20,R21 R22,R27,R28 R29,R41,R43 R45,R49 R50,R52,R55 R58,R66,R67	2012 0O	RK73Z2AT	KOA
25	resistor	R2,R33,R61	2012 33O	RK73H2ATTD33R0F	KOA
26	resistor	R23,R24,R25 R26,R34,R35 R36,R37,R38	2012 100KO	RK73H2ATTD1003F	KOA
27	resistor	R31,R53 R54	2012 10MO	RK73H2ATTD1005F	KOA
28	resistor	R30	2012 1MO	RK73H2ATTD1004F	KOA
29	resistor	R47,R46	2012 4.7KO	RK73H2ATTD4701F	KOA
30	resistor	R48	2012 OPEN	RK73H2ATTDxxxxF	KOA
31	resistor	R51	2012 200O	RK73H2ATTD2000F	KOA
32	resistor	R56	2012 390O	RK73H2ATTD3900F	KOA
33	resistor	R57	2012 2KO	RK73H2ATTD2001F	KOA
34	resistor	R59	2012 220O	RK73H2ATTD2200F	KOA
35	resistor	R60,R62	2012 47KO	RK73H2ATTD4702F	KOA
36	resistor	R63	2012 1KO	RK73H2ATTD1000F	KOA
37	resistor	R64,R65	2012 510O	RK73H2ATTD5100F	KOA
38	resistor	R68,R69	2012 10KO	RK73H2ATTD1002F	KOA
39	power switch	SW7	D501J12S2AHQF		C&K
40	Nor Flash Memory	U1	SST39VF6401B-70-4I-EKE	TSOP 48Pin	SST
41	SDRAM	U2	MT48LC8M16A2P-75	TSOP 54Pin 128MBit	MICRON
42	Logic IC	U3	SN74ALVCH373PW	TSSOP	TEXAS
43	CPU	U4	S1C33L17	PFBGA 180Pin	EPSON
44	Logic IC	U5	SN74AHC1G02DBV	SOT-23	TEXAS
45	NAND Flash Memory	U6	K9F2G08U0A-PCB0	TSOP 48Pin 2GBit	samsung
46	Logic IC	U8,U10,U13	SN74LVC1G125DCK	SC-70	TEXAS

NO.	Parts name	Location	Model number	SPEC	mfr
47	Logic IC	U9	SN74AHC1G86DBV	SOT-23	TEXAS
48	Serial Flash Memory	U11	M45PE80-VMP6G	VFQFPN8 8MBit	ST
49	RS-232C Driver	U12	SP3220EBEY-L	16Pin TSSOP	Sipex
50	Power source IC	U14	LM1086IS-ADJ	TO263	N.S
51	Power source IC	U15	LP38691DT-1.8	TO-252	N.S
52	Reset IC	U17	NCP303LSN27T1G	SOT-23	On Semi
53	crystal oscillator	Y1	FA-238 48MHz	48MHz 2.5*3.2	EPSON TOYOCOM
54	crystal oscillator	Y2	MC-306 32.768KHz		EPSON TOYOCOM
55	dip switch	DSW1	CHS-04B1		COPAL
56	TEST terminal	TP1,TP2	LC-33-G black	f 0.9 TH	MAC8
57	Logic IC	U16、U18	SN74LVC1G97DCK	SC-70	TEXAS
58	TEST terminal	TP3-TP9	LC-33-G red		MAC8
59	connector	CN13	A2-4PA-2,54DS(71)		HIROSE
60	connector	CN14	B04B-PASK-1(LF)(SN)		NICHIATSU
61	tact switch	SW1,SW2,SW3 SW4,SW5,SW6 SW8	SKRAAKE010	6.2*6.8	ALPS

EPSON

International Sales Operations

AMERICA

EPSON ELECTRONICS AMERICA, INC.
2580 Orchard Parkway,
San Jose, CA 95131, USA
Phone: +1-800-228-3964 FAX: +1-408-922-0238

EUROPE

EPSON EUROPE ELECTRONICS GmbH
Riesstrasse 15, 80992 Munich,
GERMANY
Phone: +49-89-14005-0 FAX: +49-89-14005-110

ASIA

EPSON (CHINA) CO., LTD.
7F, Jinbao Bldg., No.89 Jinbao St.,
Dongcheng District,
Beijing 100005, CHINA
Phone: +86-10-6410-6655 FAX: +86-10-6410-7320

SHANGHAI BRANCH
7F, Block B, Hi-Tech Bldg., 900 Yishan Road,
Shanghai 200233, CHINA
Phone: +86-21-5423-5522 FAX: +86-21-5423-5512

SHENZHEN BRANCH
12F, Dawning Mansion, Keji South 12th Road,
Hi-Tech Park, Shenzhen 518057, CHINA
Phone: +86-755-2699-3828 FAX: +86-755-2699-3838

EPSON HONG KONG LTD.
20/F, Harbour Centre, 25 Harbour Road,
Wanchai, Hong Kong
Phone: +852-2585-4600 FAX: +852-2827-4346
Telex: 65542 EPSCO HX

EPSON TAIWAN TECHNOLOGY & TRADING LTD.
14F, No. 7, Song Ren Road,
Taipei 110, TAIWAN
Phone: +886-2-8786-6688 FAX: +886-2-8786-6660

EPSON SINGAPORE PTE., LTD.
1 HarbourFront Place,
#03-02 HarbourFront Tower One, Singapore 098633
Phone: +65-6586-5500 FAX: +65-6271-3182

SEIKO EPSON CORP.
KOREA OFFICE
50F, KLI 63 Bldg., 60 Yoido-dong,
Youngdeungpo-Ku, Seoul 150-763, KOREA
Phone: +82-2-784-6027 FAX: +82-2-767-3677

SEIKO EPSON CORP.
SEMICONDUCTOR OPERATIONS DIVISION

IC Sales Dept.
IC International Sales Group
421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN
Phone: +81-42-587-5814 FAX: +81-42-587-5117

S5U1C33L17T1100
Hardware Manual

SEIKO EPSON CORPORATION
SEMICONDUCTOR OPERATIONS DIVISION

EPSON Electronic Devices Website

http://www.epson.jp/device/semicon_e/

Document code: 411655301
First Issue February, 2009
Revised February 2010 in JAPAN