FL-850/SK4H
FL-850/SK4H-S
Hardware Manual

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Tessera Technology Inc.

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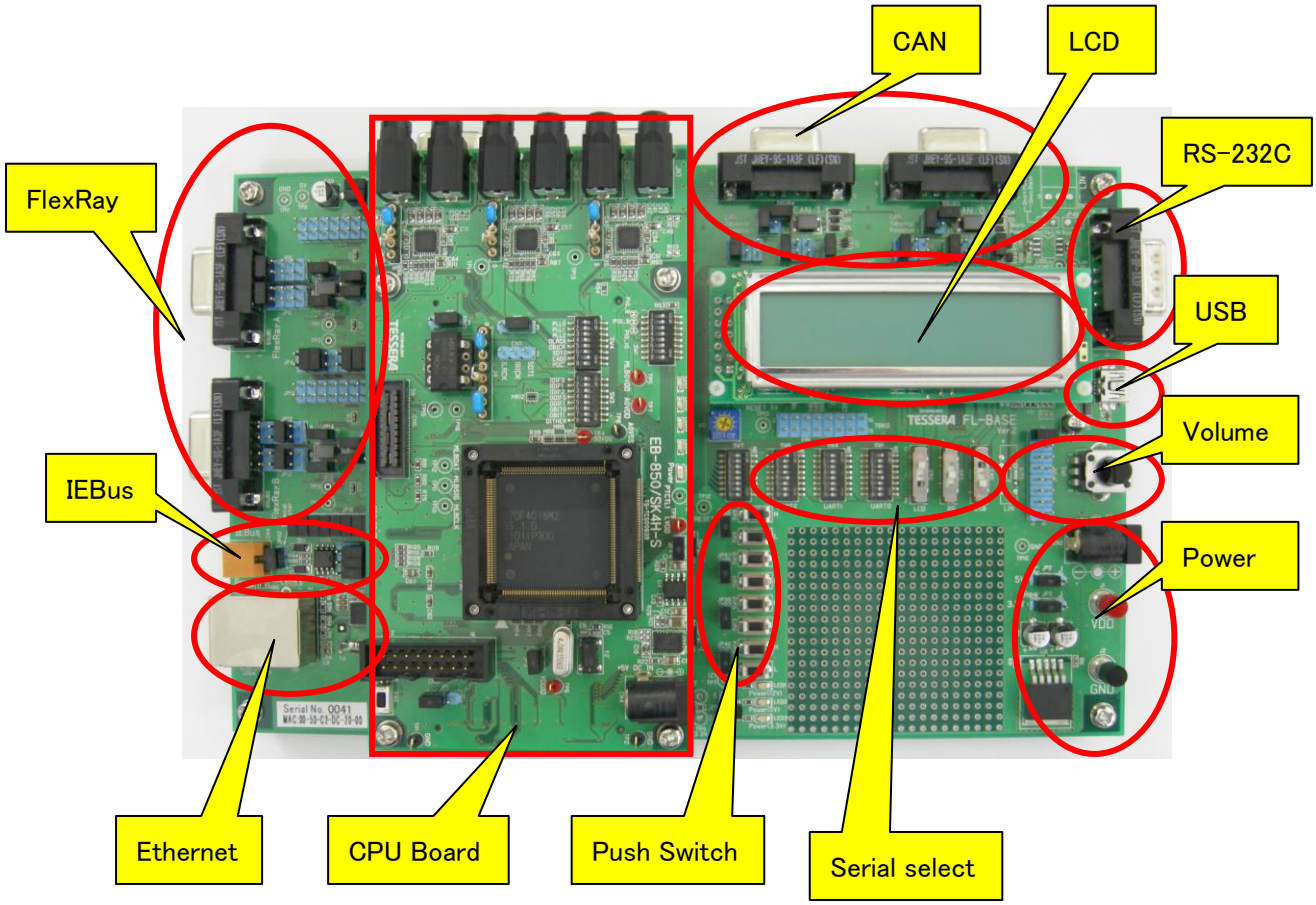
1 Introduction

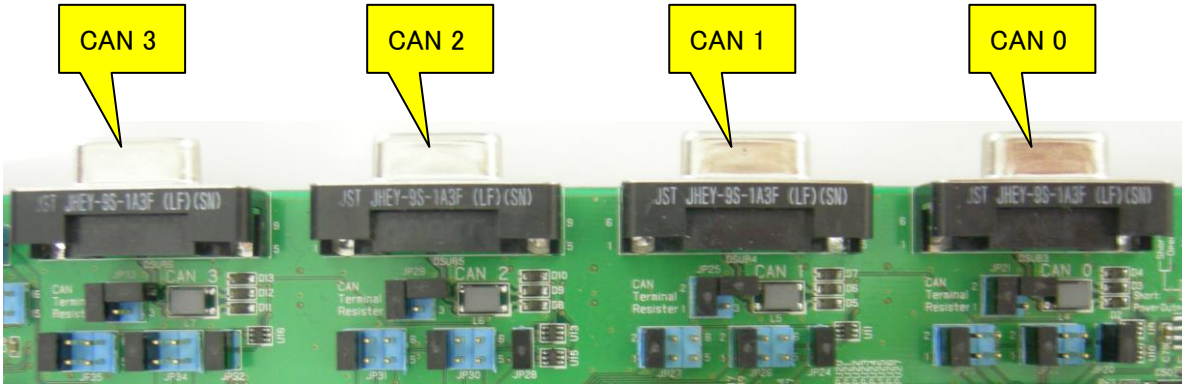
In this document, features and hardware specifications of FL-850/SK4H, which the 32-bit single-chip microcomputer V850E2/SK4-H from Renesas Electronics Corporation is mounted, are described.

2 Features


CAN
LCD
RS-232C
FlexRay
USB
Volume
IEBus
Power
Ethernet
CPU Board
Push Switch
Serial select

2.1 CAN

The CAN controller of the microcomputer is connected to the CAN transceiver (TJA1040). It supports CAN physical layer. Also, CAN bus signal is connected to DSUB 9pin female connector.



One terminal can be selected by using jumpers from maximum of three multipurpose terminals, and can be connected to CAN transceiver.

Only one line must be shorted in each jumper.

Following table shows the connection of V850E2/SK4-H.

		Jumper		Connecter
P0_4/IEBB0RX/FCN0TX/INTP8/CSIH1SI/URTE0TX/IICB2SDA	TxD	JP22	1-2	CAN 0
N.C.			3-4	
N.C.			5-6	
P0_5/FCN0RX/IEBB0TX/INTP9/URTE0RX/CSIH1SO/IICB2SCL	RxD	JP23	1-2	
N.C.			3-4	
N.C.			5-6	
P1_13/TAUA0I13/TAUA0O13/PCM0CLK/ENCA1TIN0/IICB1SCL	MODE0	JP20	Short	
P0_6/FCN1TX/INTP10/CSIH1RYI/CSIH1RYO/CSIH1SSI/URTE10TX	TxD	JP26	1-2	CAN 1
N.C.			3-4	
N.C.			5-6	
P0_7/FCN1RX/INTP11/CSIH1SC/URTE10RX	RxD	JP27	1-2	
N.C.			3-4	
N.C.			5-6	
P21_5/MEMC0RD/URTE2RX/IEBB0TX/CSIG0SO/IICB0SCL	MODE1	JP24	Short	
N.C.	TxD	JP30	1-2	CAN 2
N.C.			3-4	
N.C.			5-6	
N.C.	RxD	JP31	1-2	
N.C.			3-4	
N.C.			5-6	
N.C.	MODE2	JP28	Short	
N.C.	TxD	JP34	1-2	CAN 3
N.C.			3-4	
N.C.			5-6	
N.C.	RxD	JP35	1-2	
N.C.			3-4	
N.C.			5-6	
N.C.	MODE3	JP32	Short	

Default

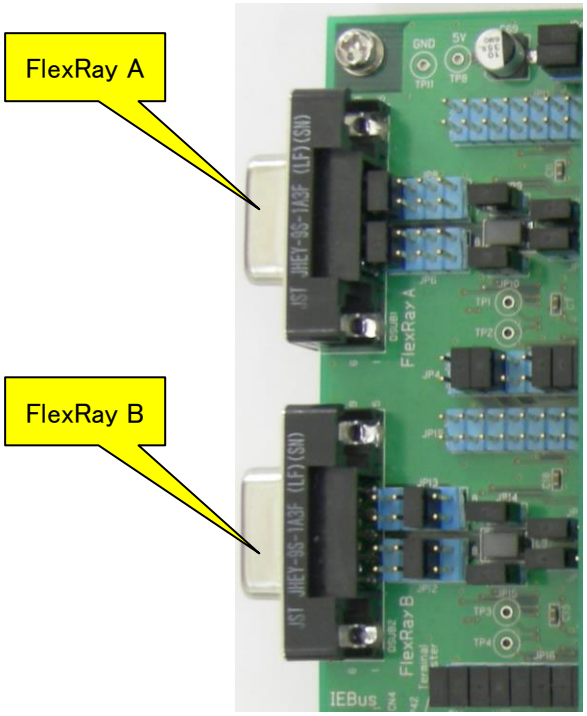
JP21, JP25, JP29, and JP33 are termination resistor connect. Open or short these as needed.

		termination resistor
JP21:CAN 0 JP25:CAN 1 JP29:CAN 2 JP33:CAN 3	1-2 Short 3-4 Short	60Ω
	1-2 Short 3-4 Open	120Ω
	1-2 Open 3-4 Open	Non

CAN 0,1,2,3 DSUB Connector	
Pin Number	Signal Name
1	N.C.
2	**CANL**
3	**GND**
4	N.C.
5	0.1uF
6	N.C.
7	**CANH**
8	N.C.
9	N.C.

2.2 FlexRay

V850E2/SK4-H does not have FlexRay controller, therefore it cannot use FlexRay.



Default Settings

Jumper	Short
JP41	1-2
	3-4
JP11	All Open
JP8	1-2
JP6	1-2
JP9	1-2
JP10	1-2
JP7	1-2
JP5	1-2
JP4	3-4
	5-6
	11-12
	13-14
	15-16

Jumper	Short
JP19	All Open
JP13	5-6
JP12	5-6
JP14	1-2
JP15	1-2
JP18	1-2
JP17	1-2
JP16	1-2
	3-4
	5-6
	7-8
	9-10
	11-12
	13-14
	15-16

2.3 IEBus

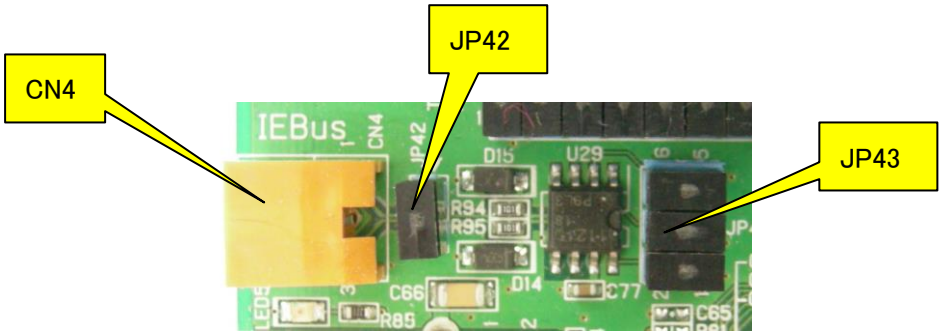
IEBus of the microcomputer is connected to bus interface driver/receiver IC (R2A11210SP).

The signal of the driver/receiver is connected to 3-pin connector.

JP42 is the termination resistor (68Ω). Open or short (default) this as needed.

Notes

These parts are not mounted in the product in June 2014 and afterwards.

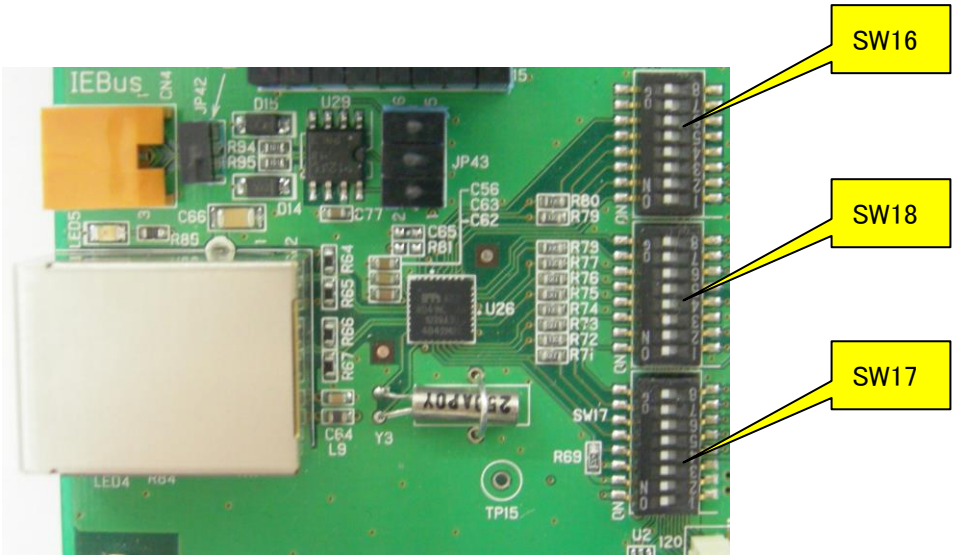


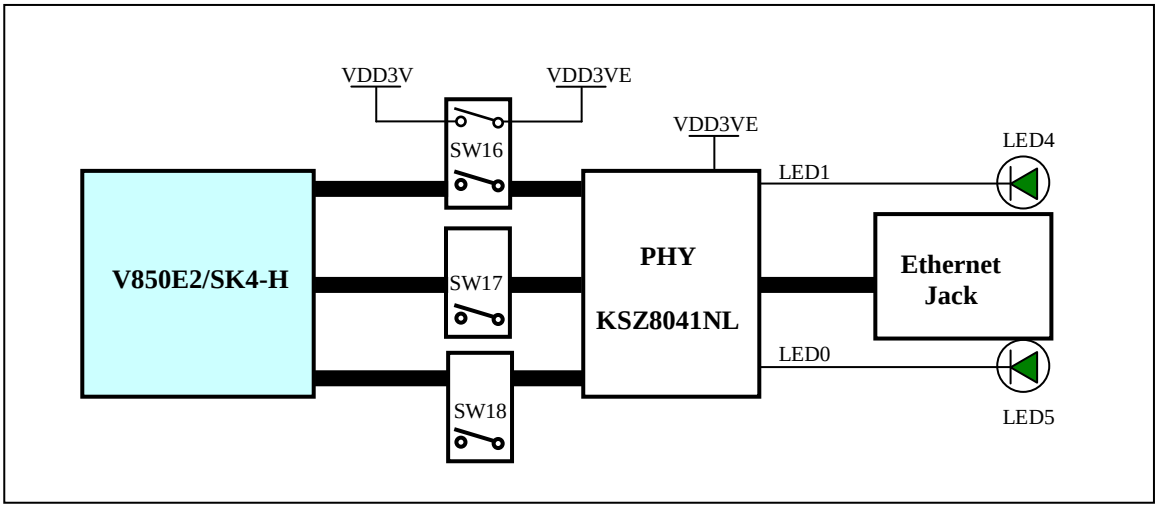
	Jumper JP43	Connect to U29
P0_4/IEBB0RX/FCN0TX/INTP8/CSIH1SI/URTE0TX/IICB2SDA	5-6	R
P0_5/FCN0RX/IEBB0TX/INTP9/URTE0RX/CSIH1SO/IICB2SCL	3-4	S1
P0_8	1-2	STB

CN4 Pin Number	Function Name
1	(+) Bus Output, (+) Receiver Input
2	GND
3	(−) Bus Output, (−) Receiver Input

2.4 Ethernet

Ethernet can be used by connecting PHY Chip (KSZ8041NL) from MICREL to the built-in Ethernet controller.





Set following DIP switches to ON when you use Ethernet.

- SW16 (default setting: ON)
- SW17 (default setting: ON)
- SW18 (default setting: ON)

*** Ethernet circuit can only be used when the microcomputer's IO voltage is 3.3V.**

	KSZ8041NL
P24_13/MEMC0D29/INTP13/CSIH1CSS5/ETH0TXCLK	TXC
P24_5/MEMC0AD21/INTP5/CSIH0CSS5/ETH0TXD0	TXD0
P24_6/MEMC0AD22/INTP6/CSIH0CSS6/ETH0TXD1	TXD1
P24_7/MEMC0AD23/INTP7/CSIH0CSS7/ETH0TXD2	TXD2
P24_8/MEMC0AD24/INTP8/CSIH1CSS0/ENCA1AIN/ETH0TXD3	TXD3
P24_9/MEMC0AD25/INTP9/CSIH1CSS1/ENCA1BIN/ETH0TXEN	TXEN
P24_11/MEMC0AD27/INTP11/CSIH1CSS3/ENCA1TIN0/ETH0REFCLK/ETH0TXER	N.C.
P21_0/MEMC0BEN3/MEMC0DQM3/ETH0COL	COL
P21_1/MEMC0BEN2/MEMC0DQM2/ETH0CRSDV	CRS
P24_15/MEMC0D31/INTP15/CSIH1CSS7/ETH0RXCLK	RXC
P24_1/MEMC0AD17/INTP1/CSIH0CSS1/ENCA0BIN/ETH0RXD0	RXD0
P24_2/MEMC0AD18/INTP2/CSIH0CSS2/ENCA0ZIN/ETH0RXD1	RXD1
P24_3/MEMC0AD19/INTP3/CSIH0CSS3/ENCA0TIN0/ETH0RXD2	RXD2
P24_4/MEMC0AD20/INTP4/CSIH0CSS4/ENCA0TIN1/ETH0RXD3	RXD3
P24_14/MEMC0D30/INTP14/CSIH1CSS6/ETH0RXDV	RXDV
P24_0/MEMC0AD16/INTP0/CSIH0CSS0/ENCA0AIN/ETH0RXER	RXER
P24_10/MEMC0AD26/INTP10/CSIH1CSS2/ENCA1ZIN/ETH0MDC	MDC
P24_12/MEMC0D28/INTP12/CSIH1CSS4/ENCA1TIN1/ETH0MDI/ETH0MDO	MDIO

Strapping Options

PHY Address 00001

MII Mode

ISOLATE mode: Disable

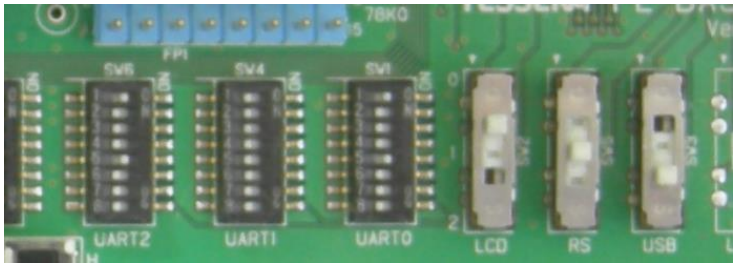
SPEED mode: 100Mbps

DUPLEX mode: Half Duplex

Nway Auto-Negotiation Enable

2.5 Serial select

It can be connected by selecting the microcomputer's UART terminal to "LCD", "RS-232C", and "USB Serial Conversion".



The terminals for using UART can be selected by DIP switch (SW1, SW4, and SW6).

※ Do not set multiple ON within a group.

※ To use the port listed in the "Short PAD" column of the table below, you need to solder the solder short pad on CPU board.

	Short PAD		SW1		
P21_15/MEMC0ASTB/URTE0TX/CSIG4SC			1	ON	
P1_1/TAUA0I1/TAUA0O1/IISA0SCK/CSIG4SSI/URTE1TX/ETH0RXD0/CSIH0CSS1	P1_1	TXD	2	OFF	
N.C.			3	OFF	
		N.C.	4	OFF	UART0
P21_14/MEMC0HLDAK/URTE0RX/FCN0TX/CSIG4SI/IICB2SCL			5	ON	
P1_0/TAUA0I0/TAUA0O0/IISAACK/URTE1RX/ETH0RXER/CSIH0CSS0	P1_0	RXD	6	OFF	
N.C.			7	OFF	
		N.C.	8	OFF	
			SW4		
P1_11/TAUA0I11/TAUA0O11/IISA2SDI/IISA2SDO/ENCA1BIN/CSIH0CSS6/ETH0CRSDV/URTE2TX	P1_11		1	OFF	
P0_6/FCN1TX/INTP10/CSIH1RYI/CSIH1RYO/CSIH1SSI/URTE10TX		TXD	2	OFF	
N.C.			3	OFF	
		N.C.	4	OFF	UART1
P1_10/TAUA0I10/TAUA0O10/IISA2WS/ENCA1AIN/CSIH0CSS5/URTE2RX/ETH0MDC	P1_10		5	OFF	
P0_7/FCN1RX/INTP11/CSIH1SC/URTE10RX		RXD	6	OFF	
N.C.			7	OFF	
		N.C.	8	OFF	
			SW6		
P1_14/TAUA0I14/TAUA0O14/PCM0SEN/ENCA1TIN1/URTE3TX/IICB3SDA			1	ON	
P27_4/INTP4/MEMC0A20/IISA0SCK/URTE10TX		TXD	2	OFF	
N.C.			3	OFF	
		N.C.	4	OFF	UART2
P1_15/TAUA0I15/TAUA0O15/PCM0SI/PCM0SO/URTE3RX/IICB3SCL			5	ON	
P27_5/INTP5/MEMC0A21/IISA0WS/URTE10RX		RXD	6	OFF	
N.C.			7	OFF	
		N.C.	8	OFF	

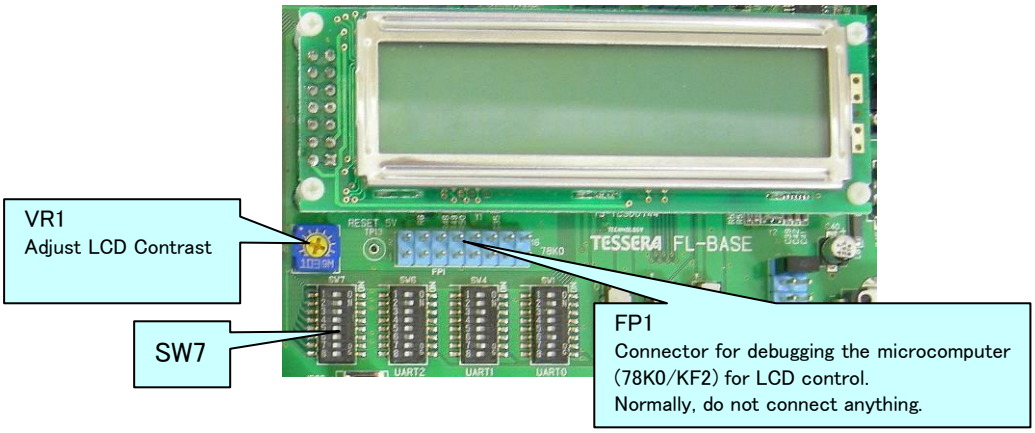
The destination for UART can be selected by the slide switch (SW2, SW3, and SW5).

	Slide Switch	
SW2 LCD	0	UART0
	1	UART1
	2	UART2
SW5 RS-232C	0	UART0
	1	UART1
	2	UART2
SW3 USB Serial Conversion	0	UART0
	1	UART1
	2	UART2

2.5.1 LCD

Words can be displayed on LCD panel by sending data to UART that is connected to LCD. "Binary mode" to display hexadecimal and "ASCII mode" to display ASCII characters can be selected by the DIP switch (SW7).

Initial screen displays when you press the reset switch on CPU board.



UART Communication Specifications

- Baud Rate 115.2Kbps (Fixed)
- Data Length 8bit (LSB First)
- Parity None
- Stop Bit 1bit
- Flow Control None (continuous transmission enabled)

Binary Mode 1 (SW7-1:ON, SW7-2:ON, SW7-3:Any)

It displays the hexadecimal data as sent with entering space between 1Byte data.

It can display 10Byte in 1 screen. It scrolls 1 line when it received 11Byte of data.

(example) URTH?TX = 0x01; TXWait();

URTH?TX = 0x02; TXWait();

.....

URTH?TX = 0x0A; TXWait();

0	1		0	2		0	3		0	4		0	5		
0	6		0	7		0	8		0	9		0	A		

URTH?TX = 0x10; TXWait();

0	6		0	7		0	8		0	9		0	A		
1	0													

(use case) By developing a program to send 10Byte once in 1 second, it will display the first 1Byte at the top-left of the screen.

Binary Mode 2 (SW7-1:ON, SW7-2:OFF, SW7-3:ON)

It displays the hexadecimal data as sent without entering space between 1Byte data.

It can display 16Byte in 1 screen. It scrolls 1 line when it received 17Byte of data.

(example) URTH?TX = 0x01; TXWait();

URTH?TX = 0x02; TXWait();

.....

URTH?TX = 0x10; TXWait();

0	1	0	2	0	3	0	4	0	5	0	6	0	7	0	8
0	9	0	A	0	B	0	C	0	D	0	E	0	F	1	0

URTH?TX = 0x11; TXWait();

0	9	0	A	0	B	0	C	0	D	0	E	0	F	1	0
1	1														

(use case) By developing a program to send 16Byte once in 1 second, it will display the first 1Byte at the top-left of the screen.

ASCII Mode Ver.2 (SW7-1:OFF, SW7-2:Any, SW7-3:Any)

It displays the characters as sent.

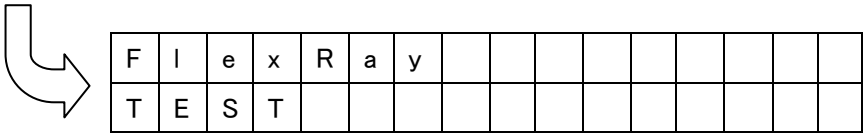
It can display 16 characters in 1 line. It scrolls 1 line when it received 17th character or linefeed code (0x0D: ¥r).

(example) URTH?TX = 'F'; TXWait();

URTH?TX = 'l'; TXWait();

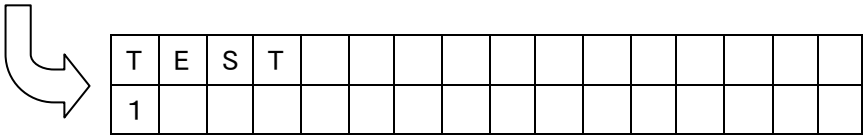
.....

URTH?TX = 'T'; TXWait();



URTH?TX = '¥r'; TXWait();

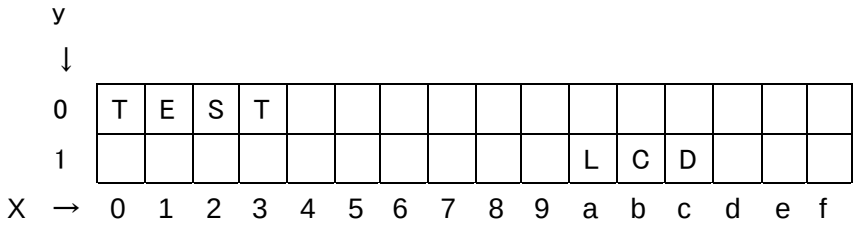
URTH?TX = '1'; TXWait();



The position of the cursor can be specified by sending xy-coordinate right after ESC code (0x1B).

ESC(0x1B) + xy x: 0(0x30)～9(0x39),a(0x61), b, c, d, e, f(0x66)
y: 0(0x30),1(0x31)

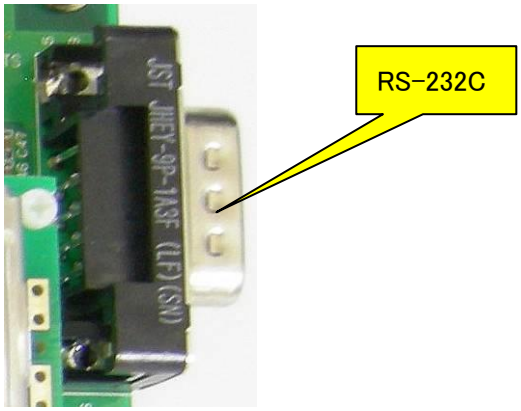
(example) printf(buf, "¥x1b00TEST¥x1ba1LCD");



2.5.2 RS-232C

UART that is connected to "RS-232C" can send and receive signals with the RS-232C level of D-SUB9 pin connector.

Use a cross cable when you connect to PC.

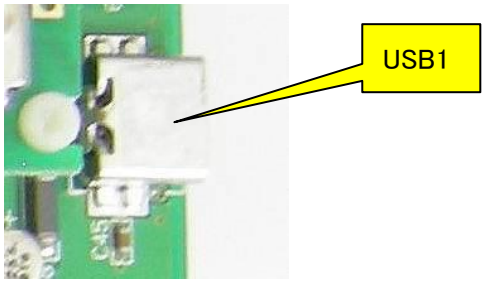


RS-232C D-SUB Connector	
Pin Number	Signal
1	N.C.
2	**RxD**
3	**TxD**
4	N.C.
5	GND
6	N.C.
7	RTS(N.C.)
8	CTS(N.C.)
9	N.C.

2.5.3 USB Serial Conversion

UART that is connected to "USB serial conversion" can communicate with the COM port of PC through USB microcomputer (uPD78F0730).

USB driver is stored in the same media as this manual. When you encountered a warning "Windows Logo Test" while installing the USB driver, please select "Continue".



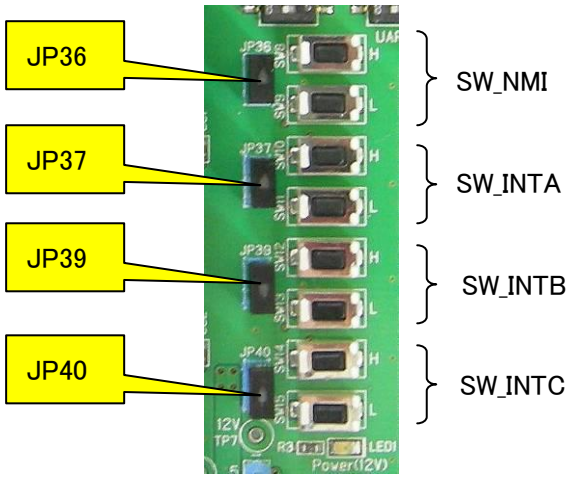
Recommended UART communication specification

- Baud rate 115.2Kbps
- Data length 8bit (LSB First)
- Parity None
- Stop Bit 1bit
- Flow Control None

2.6 Push Switch

4 interrupt signals can be connected to microcomputer's interrupt terminals. The signal can be set to High by pressing H button, and to Low by pressing L button. It becomes High by reset signal of the CPU.

Also, it has chattering prevention circuit.

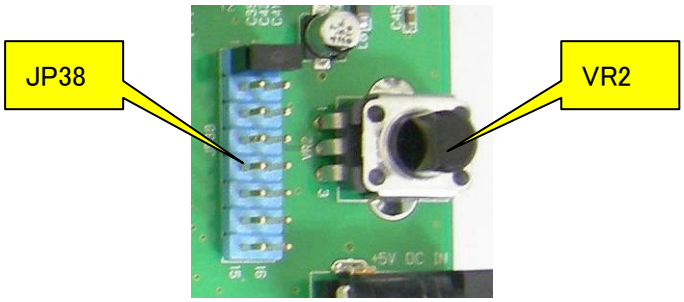


The interrupt signals are disconnected by taking each jumper pin out.

	Jumper	Switch	Signal
P3_4/TAUB2I6/TAUB2O6/INTP15/IISA3SDO/KR0I4/CSIH1CSS4/ETH0COL	JP36	SW8/9	SW_NMI
P27_1/INTP1/MEMC0A17/IISA2SDI/IISA2SDO/CSIH1CSS1	JP37	SW10/11	SW_INTA
P27_2/INTP2/MEMC0A18/IISA1SDI/IISA1SDO/CSIH1CSS2	JP39	SW12/13	SW_INTB
P26_14/INTP14/MEMC0A14/TAUB2I14/TAUB2O14/IISA5SDI/IISA5SDO	JP40	SW14/15	SW_INTC

2.7 Volume

It can output variable voltage (0V-IO voltage) to A/D terminal of CPU by variable resistor of 10KΩ.

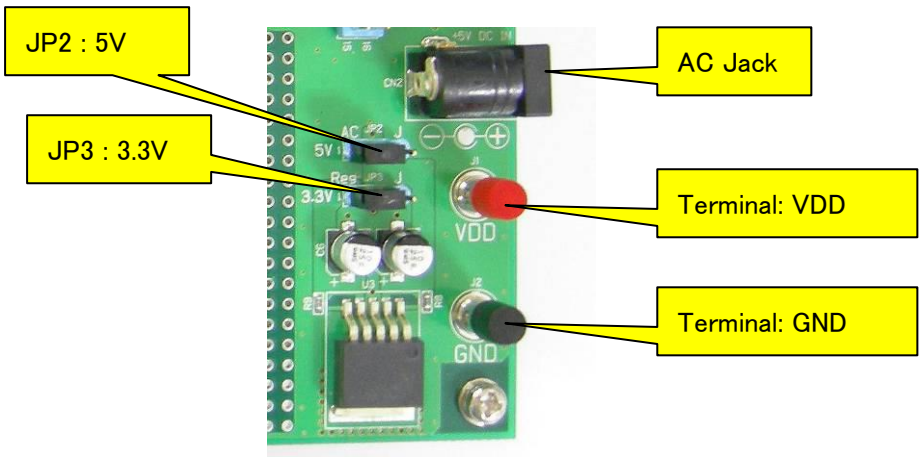


	JP38
P10_0/ADCA0I0	1-2
P10_1/ADCA0I1	3-4
P10_2/ADCA0I2	5-6
P10_3/ADCA0I3	7-8
P10_4/ADCA0I4	9-10
P10_5/ADCA0I5	11-12
P10_6/ADCA0I6	13-14
P10_7/ADCA0I7	15-16

2.8 Power

Connect bundled AC adapter (+5V) to AC Jack. You do not need to connect to the AC Jack on the CPU board.

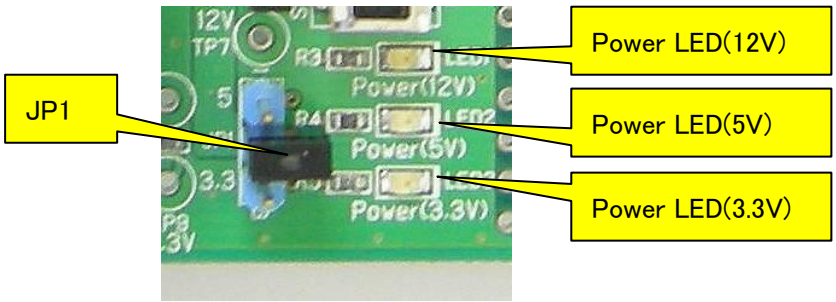
It generates the power of +12V for FlexRay driver and +3.3V for Ethernet PHY chip power from this power supply with using regulator.



Power supply source can be changed by JP2 and JP3.

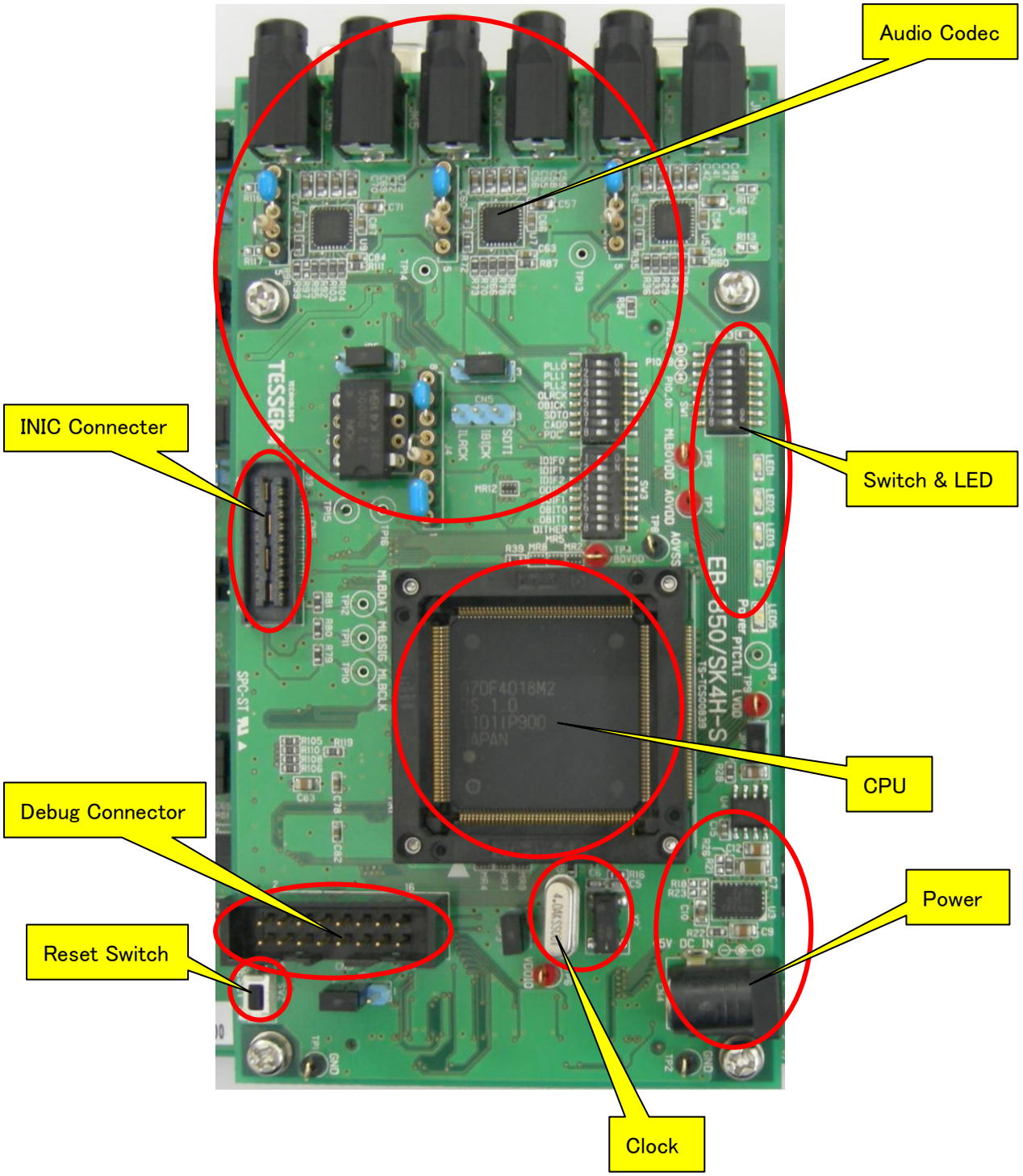
JP2	1-2	AC adapter
5V	2-3	Terminal
JP3	1-2	Regulator
3.3V	2-3	Terminal

JP1 is the jumper to fix the IO voltage when it does not connect CPU board. Normally, do not short this.



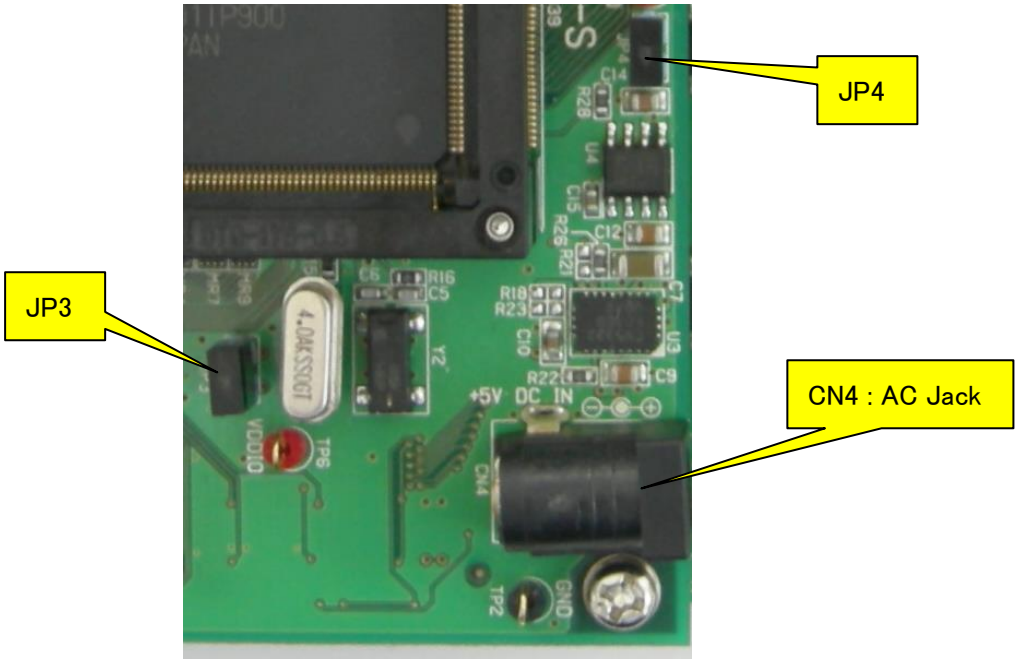
2.9 CPU Board

One of "EB-850/SK4H" or "EB-850/SK4H-S" is mounted on the CPU board



2.9.1 Power

There is a jumper pin for measuring the current when you use only CPU board itself.

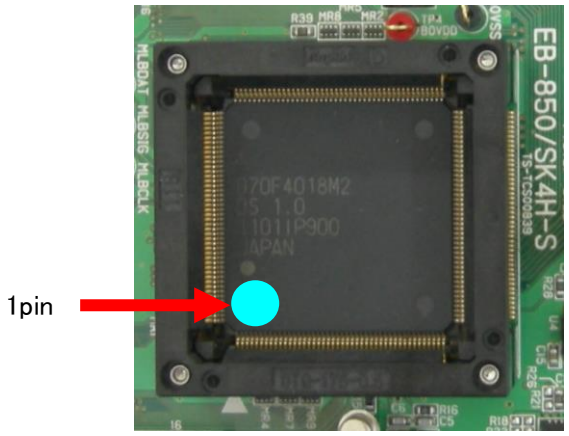


JP4	1.2V power Connect ammeter to check the current
JP3	3.3V power Connect ammeter to check the current

2.9.2 CPU

CPU is direct-mounted for "EB-850/SK4H".

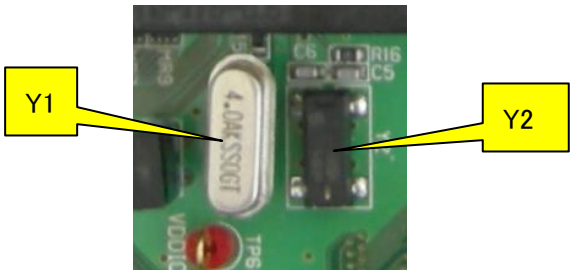
For "EB-850/SK4H-S", only socket is mounted. Make sure the position of 1pin when you mount CPU.



2.9.3 Clock

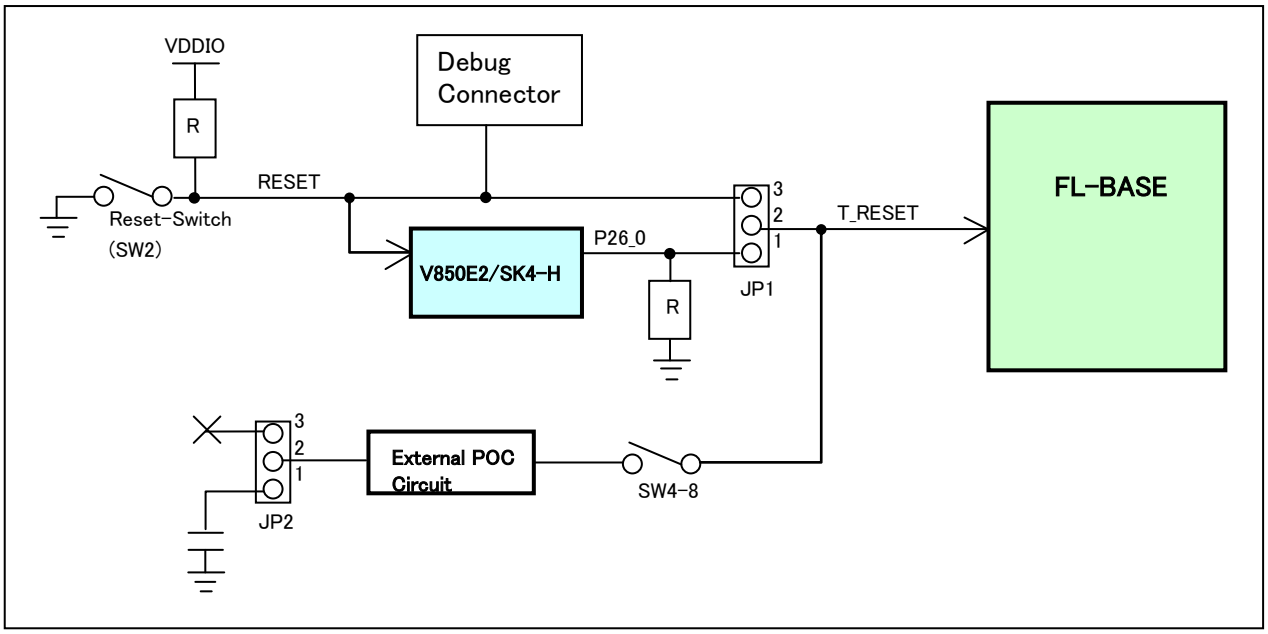
For the X1 and X2 of the CPU, **4MHz** crystal oscillator (Y1) is mounted on the socket.

For the XT1 and XT2 of the CPU, 32.768KHz crystal oscillator (Y2) is connected.



2.9.4 Reset

Reset circuit is described in below diagram.



2.9.4.1 Reset Switch

CPU can be reset by pressing the Reset switch (SW2).

You can select the reset for FL-BASE board from pressing the Reset switch (SW2) or CPU port terminal (P26_0) by using jumper pin.

Part No.	Setting	Comment
JP1	1-2	CPU port terminal (P26_0)
	2-3	Reset switch

2.9.4.2 External POC Circuit

When the 3.3V power supply becomes lower than the threshold value of 2.7V±2.5%, it outputs Low. When it becomes more than the threshold value of +110mV±40%, it cancel the Low output after retardation time. If the microcomputer (M2) does not have the POC function, please use external POC circuit.

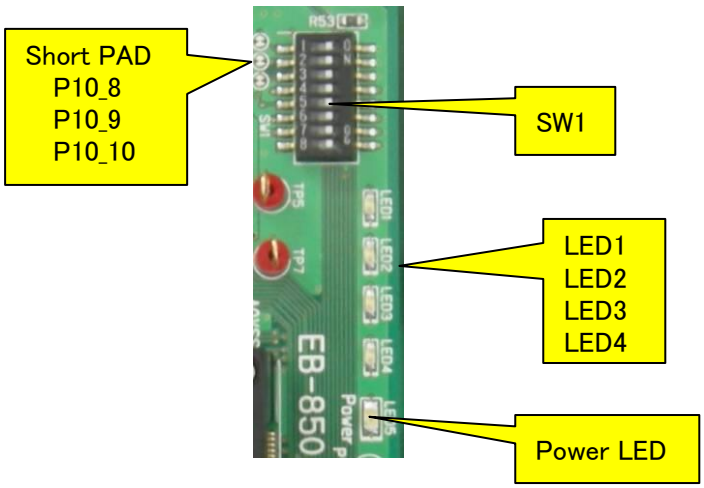
External POC Circuit	Settings	
Use	SW4-8: ON	JP1: 2-3
Not use	SW4-8: OFF	JP1: Any

The retardation time for canceling Low output can be set by JP2.

Part No.	Settings	Comment
JP2	1-2	retardation time: 1.3ms
	2-3	retardation time: less than or equal to 0.3ms

2.9.5 Switch & LED

They are connected to port terminals of the CPU.

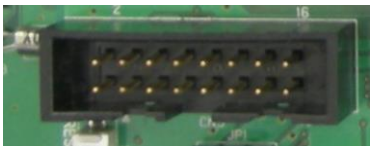


- P10_8, P10_9, and P10_10 can be used for the switch inputs.
  It connects 10KΩ pull-up resistor. Set the switch to OFF to read High and to ON to read Low.
- P10_11, P10_12, P10_13, and P10_14 can be connected to LED. Set the switch ON and output Low from the port to light the LED.
- SW1-8 is power indicator. Power LED is off when power is OFF.

	SW1	Connect to
P10_8/ADCA0I8	1	GND
P10_9/ADCA0TRG0/ADCA0I9	2	GND
P10_10/ADCA0TRG1/ADCA0I10	3	GND
P10_11/ADCA0TRG2/ADCA0I11	4	LED1
P10_12/ADCA0I12	5	LED2
P10_13/ADCA0I13	6	LED3
P10_14/ADCA0I14	7	LED4
3.3V Power Supply	8	Power LED

2.9.6 Debug Connector

Debugger or writer can be connected to CN4.



It supports "QB-V850MINIL" and "E1" emulator.

Please use the 16pin conversion adaptor of the "QB-V850MINIL" attachment when you connect "QB-V850MINIL".

Please use the 14pin conversion adaptor "E1-16C" of this product attachment when you connect "E1".

For the Flash writer, it supports "PG-FP5" writer.

CN4

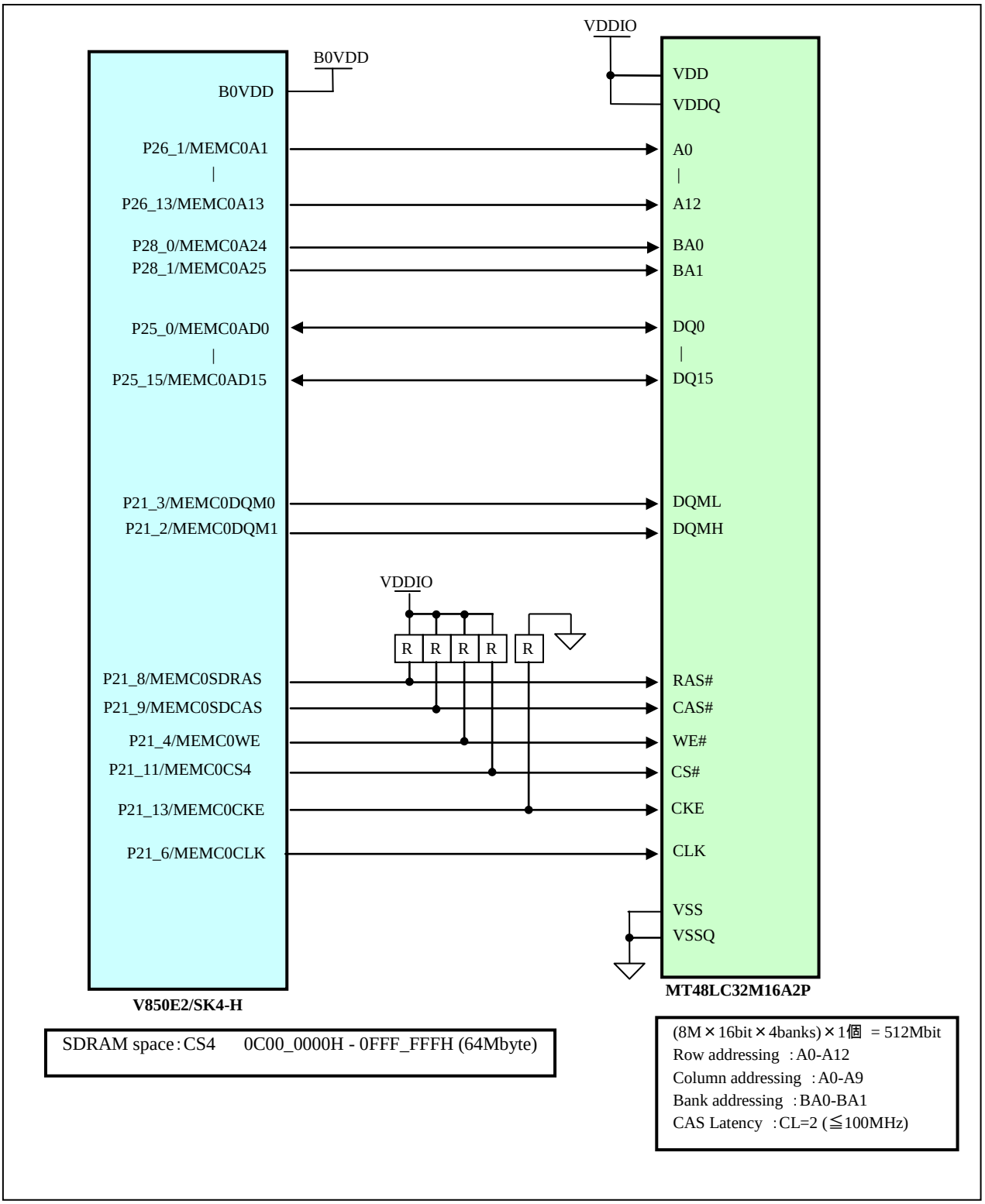
Pin Number	Signal		
	Debugger	Writer	
1	GND	←	←
2	RESET	←	←
3	DCUTDO	SO	
4	VDD	←	←
5	DCUTDI	SI	RxD/TxD
6	N.C.		
7	DCUTCK	SCK	
8	DCUTRDY		
9	DCUTRST		
10	N.C.		
11	N.C.		
12	DCUTMS		
13	N.C.		
14	FLMD0	←	←
15	T_RESET		
16	N.C.		

E1-16C

Pin Number	Signal
1	DCUTCK
2	GND
3	DCUTRST
4	FLMD0
5	DCUTDO
6	T_RESET
7	DCUTDI
8	VDD
9	DCUTMS
10	RESET
11	DCUTRDY
12	GND
13	RESET
14	GND

2.9.7 SDRAM

It mounts the SDRAMM of 64MByte (MT48LC32M16A2P-75) from Micron.



	SDRAM
P21_2/MEMC0BEN1/MEMC0DQM1	DQMH
P21_3/MEMC0BEN0/MEMC0DQM0	DQML
P21_4/MEMC0WR/IEBB0RX/URTE2TX/CSIG0SSI/MEMC0WE/IICB0SDA	WE#
P21_6/MEMC0CLK/URTE1TX/CSIG0SI/IICB1SDA	CLK
P21_8/MEMC0SDRAS/IICB3SDA	RAS#
P21_9/MEMC0CS2/MEMC0SDCAS/IICB3SCL	CAS#
P21_11/MEMC0CS4/FCN1TX	CS#
P21_13/MEMC0HLDRQ/MEMC0DSTB/FCN0RX/MEMC0CKE/CSIG4SO/IICB2SDA	CKE
P25_0/MEMC0AD0/TAUA0I0/TAUA0O0/IISAACK/IISA0SDO/CSIH0SSI	DQ0
P25_1/MEMC0AD1/TAUA0I1/TAUA0O1/IISA0SCK/CSIH0SI	DQ1
P25_2/MEMC0AD2/TAUA0I2/TAUA0O2/IISA0WS/CSIH0DCS/CSIH0SO	DQ2
P25_3/MEMC0AD3/TAUA0I3/TAUA0O3/IISA0SDI/IISA0SDO/CSIH0RYI/CSIH0RYO	DQ3
P25_4/MEMC0AD4/TAUA0I4/TAUA0O4/IISA1SDO/CSIH0SC	DQ4
P25_5/MEMC0AD5/TAUA0I5/TAUA0O5/IISA1SCK	DQ5
P25_6/MEMC0AD6/TAUA0I6/TAUA0O6/IISA1WS	DQ6
P25_7/MEMC0AD7/TAUA0I7/TAUA0O7/IISA1SDI/IISA1SDO	DQ7
P25_8/MEMC0AD8/TAUA0I8/TAUA0O8/IISA2SDO/CSIH1SSI	DQ8
P25_9/MEMC0AD9/TAUA0I9/TAUA0O9/IISA2SCK/CSIH1SI	DQ9
P25_10/MEMC0AD10/TAUA0I10/TAUA0O10/IISA2WS/CSIH1SO	DQ10
P25_11/MEMC0AD11/TAUA0I11/TAUA0O11/IISA2SDI/IISA2SDO/CSIH1RYI/CSIH1RYO	DQ11
P25_12/MEMC0AD12/TAUA0I12/TAUA0O12/IISA3SDO/CSIH1SC	DQ12
P25_13/MEMC0AD13/TAUA0I13/TAUA0O13/IISA3SCK	DQ13
P25_14/MEMC0AD14/TAUA0I14/TAUA0O14/IISA3WS	DQ14
P25_15/MEMC0AD15/TAUA0I15/TAUA0O15/IISA3SDI/IISA3SDO	DQ15
P26_1/KR0I1/MEMC0A1/TAUB2I1/TAUB2O1/IISA4SCK/CSIH2SI	A0
P26_2/KR0I2/MEMC0A2/TAUB2I2/TAUB2O2/IISA4WS/CSIH2SO	A1
P26_3/KR0I3/MEMC0A3/TAUB2I3/TAUB2O3/IISA4SDI/IISA4SDO/CSIH2RYI/CSIH2RYO	A2
P26_4/KR0I4/MEMC0A4/TAUB2I4/TAUB2O4/IISA5SDO/CSIH2SC	A3
P26_5/KR0I5/MEMC0A5/TAUB2I5/TAUB2O5/IISA5SCK/CSIH2CSS0	A4
P26_6/KR0I6/MEMC0A6/TAUB2I6/TAUB2O6/IISA5WS/CSIH2CSS1	A5
P26_7/KR0I7/MEMC0A7/TAUB2I7/TAUB2O7/IISA5SDI/IISA5SDO/CSIH2CSS2	A6
P26_8/INTP8/MEMC0A8/TAUB2I8/TAUB2O8/IISA3SCK/CSIH2CSS3	A7
P26_9/INTP9/MEMC0A9/TAUB2I9/TAUB2O9/IISA3WS/CSIH2CSS4	A8
P26_10/INTP10/MEMC0A10/TAUB2I10/TAUB2O10/IISA2SCK/CSIH2CSS5	A9
P26_11/INTP11/MEMC0A11/TAUB2I11/TAUB2O11/IISA2WS/CSIH2CSS6	A10
P26_12/INTP12/MEMC0A12/TAUB2I12/TAUB2O12/IISA0SCK/CSIH2CSS7	A11
P26_13/INTP13/MEMC0A13/TAUB2I13/TAUB2O13/IISA0WS	A12
P28_0/INTP6/MEMC0A22/MEMC0A24/IISA1SCK	BA0
P28_1/INTP7/MEMC0A23/MEMC0A25/IISA1WS	BA1

2.9.8 INIC Connector

INIC board from SMSC can be connected to CN6.

pin no.	connect to
1	N.C.
2	MLBA0CLK
3	N.C.
4	N.C.
5	N.C.
6	MLBA0SIG
7	N.C.
8	N.C.
9	N.C.
10	MLBA0DAT
11	N.C.
12	N.C.
13	N.C.
14	N.C.
15	N.C.
16	N.C.
17	N.C.
18	N.C.
19	N.C.
20	N.C.

pin no.	connect to
21	N.C.
22	N.C.
23	N.C.
24	N.C.
25	P21_12/MEMC0CS7/CSIG4SSI
26	N.C.
27	N.C.
28	N.C.
29	N.C.
30	N.C.
31	N.C.
32	N.C.
33	P3_1/TAUB2I2/TAUB2O2/PCM1SEN/KR0I1/CSIH1CSS1/IICB0SCL
34	P27_0/INTP0/MEMC0A16/IISA3SDI/IISA3SDO/CSIH1CSS0
35	P3_0/TAUB2I1/TAUB2O1/PCM1CLK/KR0I0/CSIH1CSS0/IICB0SDA
36	N.C.
37	VDDIO(3.3V)
38	VDDIO(3.3V)
39	VDDIO(3.3V)
40	N.C.
FG1	GND
FG2	GND
FG3	GND
FG4	GND

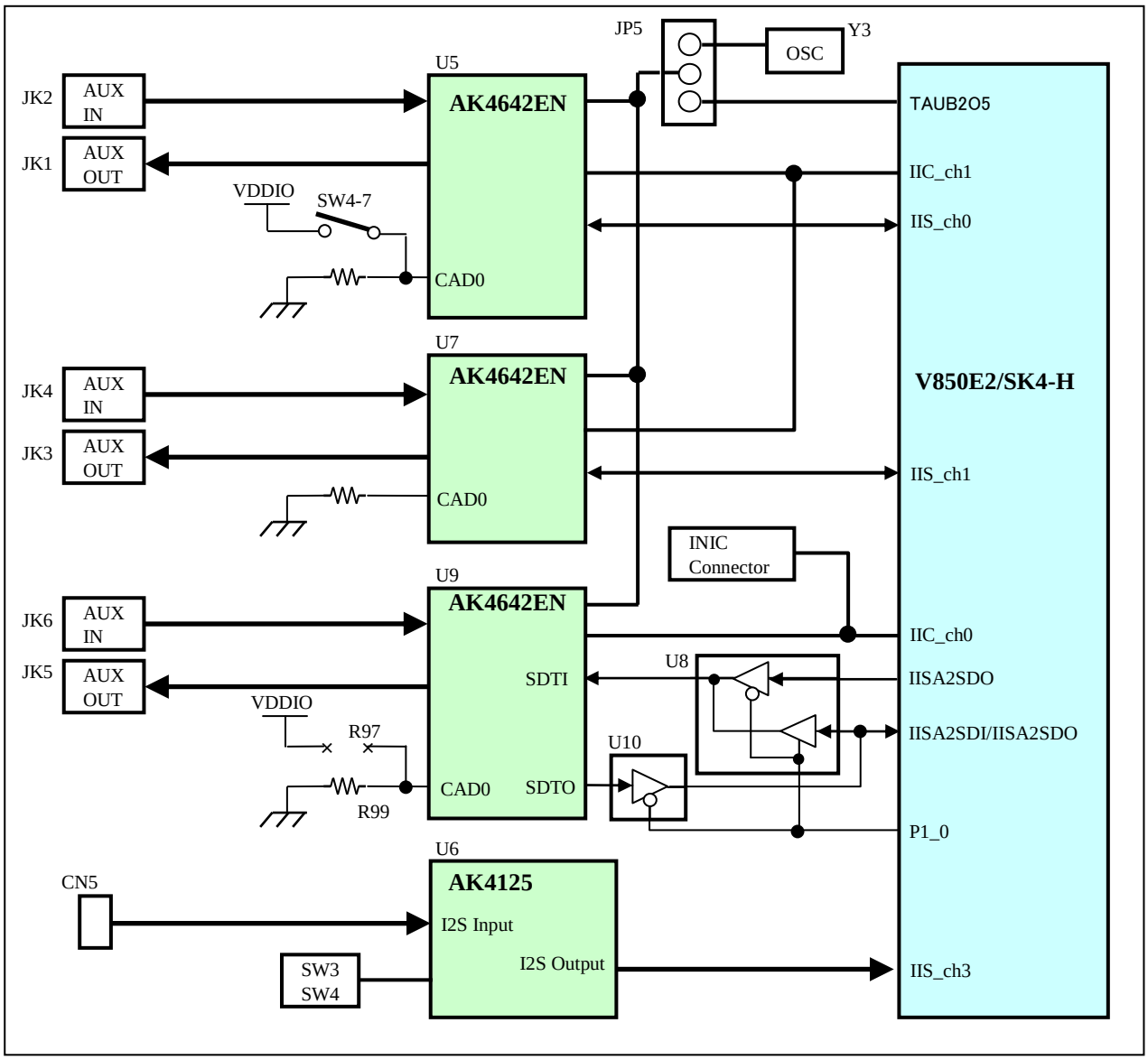
CN6 (Samtec: QSH-020-01-L-D-DP-A)

※ The IICB0 connected to CN6 is connected to the codec IC(AK4642EN:U9). Make sure the IIC slave address does not overlap.

※ Please put the spacer, bundled in this product, on the INIC board.

2.9.9 Audio Input/Output

It mounts the digital codec IC (AK4642EN) and sample rate converter IC (AK4125).



2.9.9.1 Digital Codec IC (AK4642EN)

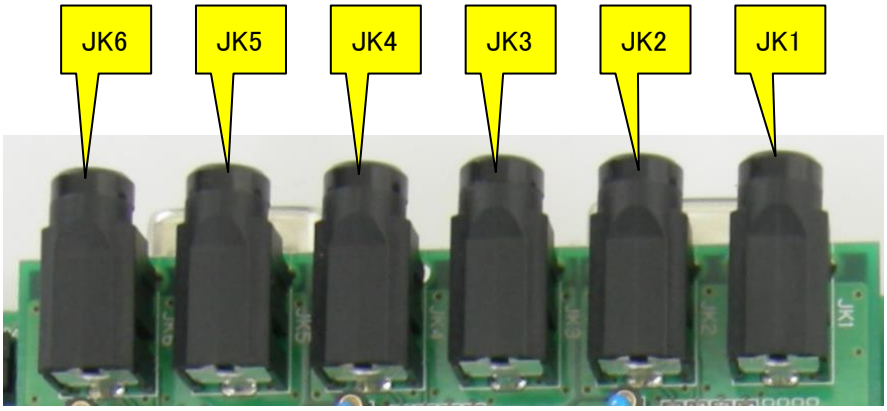
The following table describes how the digital codec IC (AK4642EN) and microcomputer are connected.

AK4642EN connection		V850E2/SK4-H terminal name for connection			
		AK4642EN(U5)	AK4642EN(U7)	AK4642EN(U9)	
				P1_0 = High	P1_0 = Low
IIS channel	SDTO	P27_3/IISA0SDI	P1_7/IISA1SDI	N.C.	P1_11/IISA2SDI
	SDTI	P1_3/IISA0SDO	P1_4/IISA1SDO	P1_11/IISA2SDO	P1_8/IISA2SDO
	LRCK	P1_2/IISA0WS	P1_6/IISA1WS	P1_10/IISA2WS	
	BICK	P1_1/IISA0SCK	P1_5/IISA1SCK	P1_9/IISA2SCK	
IIC channel	SCL	P0_3/IICB1SCL		P3_1/IICB0SCL ※	
	SDA	P0_2/IICB1SDA		P3_0/IICB0SDA ※	

※ IICB0 is also connected to INIC connector. Make sure the board connected to INIC connector and IIC slave address do not overlap.

Input and output lines of the digital codec IC are connected to following jacks.

Item.	AK4642EN terminal name	Connected Part No.		
		AK4642EN(U5)	AK4642EN(U7)	AK4642EN(U9)
Output line	LOUT	JK1	JK3	JK6
	ROUT			
Input line	LIN1/IN1-	JK2	JK4	JK5
	RIN1/IN1+			



The slave address of the digital codec IC can be set.

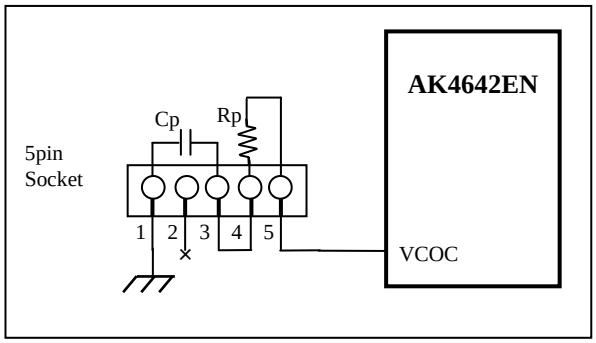
Device No.	Settings	Slave Address							
			A6	A5	A4	A3	A2	A1	A0
U5	SW4-7 : OFF	0x12	0	0	1	0	0	1	0
	SW4-7 : ON	0x13	0	0	1	0	0	1	1
U7	Fixed	0x12	0	0	1	0	0	1	0
U9	0Ω chip resistor mounted / not mounted								
	R97 : not mounted, R99 : mounted (default setting)	0x12	0	0	1	0	0	1	0
	R97 : mounted, R99 : not mounted	0x13	0	0	1	0	0	1	1

The clock supplied to the external master clock input pin (MCKI) of digital codec IC can be set by JP5.

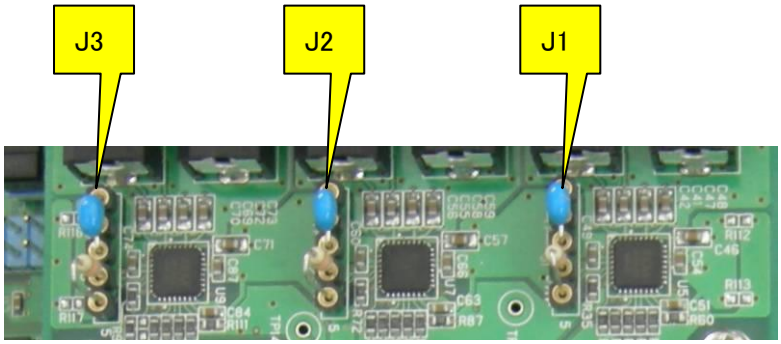
Part No.	Setting	Supply Clock
JP5	1-2	Oscillator mounted to Y3 (default: 12MHz)
	2-3	Output from microcomputer (P3_3/TAUB2O5)

The output pin (VCOC) for PLL loop filter of the digital codec IC is connected to 5pin socket.

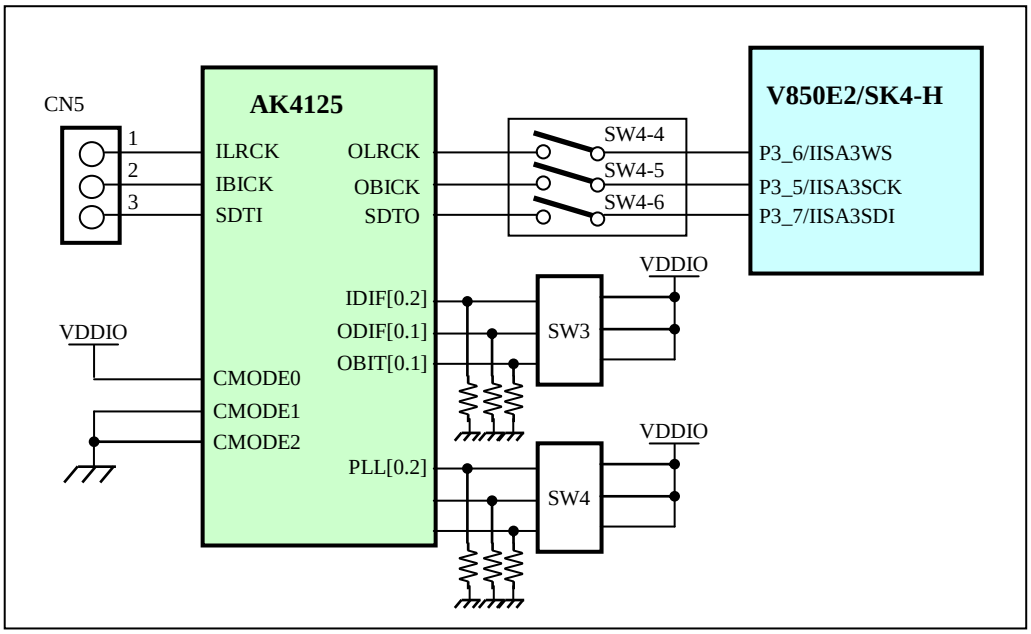
∗ 4.7nF capacitor and 10kΩ resistor are mounted on 5pin socket as default.



Device No.	Socket No.
U5	J1
U7	J2
U9	J3



2.9.9.2 Sample Rate Converter IC (AK4125)



The IIS data output terminal of the sample rate converter IC (AK4125) and IIS data input terminal of the microcomputer are connecter as below table.

Also, those connections can be modified by DIP switches.

AK4125	V850E2/SK4-H	Part No	Setting
OLRCK terminal	P3_6/IISA3WS terminal	SW4-4	ON: connect
			OFF: disconnect
OBICK terminal	P3_5/IISA3SCK terminal	SW4-5	ON: connect
			OFF: disconnect
SDTO terminal	P3_7/IISA3SDI terminal	SW4-6	ON: connect
			OFF: disconnect

The IIS data input terminal of the sample rate converter IC and the connector (CN5) are connecter as below table.

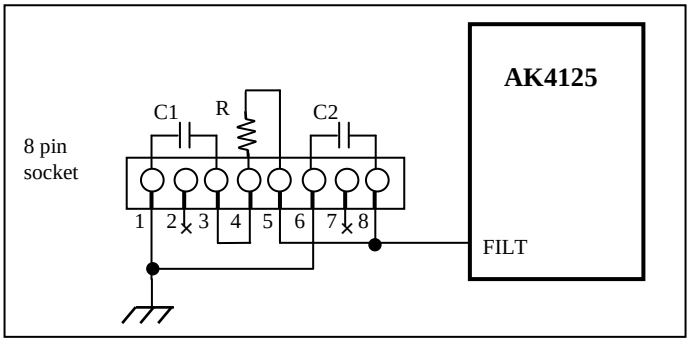
AK4125 Terminal	Connector Terminal No.
ILRCK	CN5-1
IBCK	CN5-2
SDTI	CN5-3

The setting terminals of the sample rate converter are set by DIP switch (SW3, SW4).

AK4125 Setting Terminal Name	Settings		Status	Function
IDIF0	SW3-1	ON	High	Select the audio interface format of the input port
		OFF	Low	
IDIF1	SW3-2	ON	High	
		OFF	Low	
IDIF2	SW3-3	ON	High	
		OFF	Low	
ODIF0	SW3-4	ON	High	Select the audio interface format of the output port
		OFF	Low	
ODIF1	SW3-5	ON	High	
		OFF	Low	
OBIT0	SW3-6	ON	High	
		OFF	Low	
OBIT1	SW3-7	ON	High	
		OFF	Low	
DITHER	SW3-8	ON	High	Select dithering
		OFF	Low	
PLL0	SW4-1	ON	High	Select PLL mode
		OFF	Low	
PLL1	SW4-2	ON	High	
		OFF	Low	
PLL2	SW4-3	ON	High	
		OFF	Low	
CMODE0	High (fixed)			Select clock mode (fixed slave mode)
CMODE1	Low (fixed)			
CMODE2	Low (fixed)			
SMUTE	Low (fixed)			Select soft mute

Output pin (FILT) for PLL loop filter of the sample rate converter is connected to 8 pin socket.

* 0.22uF (C1), 1.0nF (C2) capacitor, and 470Ω resistor are mounted on 8 pin socket as default.



Device No.	Socket No.
AK4125	J4

3 CPU Terminal Connection List

Please refer to the Excel file which separately distributed.