# User Manual

STM32F2/4
Evaluation Board

Introduction

The STM32F417IGH6 evaluation board
STM32F2/4-EVB is designed as complete
development platform for STMicroelectronic's
ARM Cortex-M3 core-based STM32F417IGH6
microcontroller with digital camera module
interface, High speed USB OTG, Full speed
USB OTG, Ethernet MAC, FSMC interface,
two channels of CAN2.0A/B compliant interface,
 2channels I2S, 3 channels I2C, 6 channels
USART with smart card support, 3 channels
SPI, SDIO, 3 ADC, 2 DAC, internal 128KB
SRAM and 1MB Flash, JTAG&SWD debugging
support. The full range of hardware features
on the board is able to help you evaluate all
peripherals (USB OTG HS, USB OTG FS,
Ethernet, CAN, SD card, Smart card, USART, Audio DAC, RS232, PSRAM,NAND, MEMS,
EEPROM… etc.) and develop your own applications. Extension headers make it possible to
easily connect a daughter board or wrapping board for your specific application.
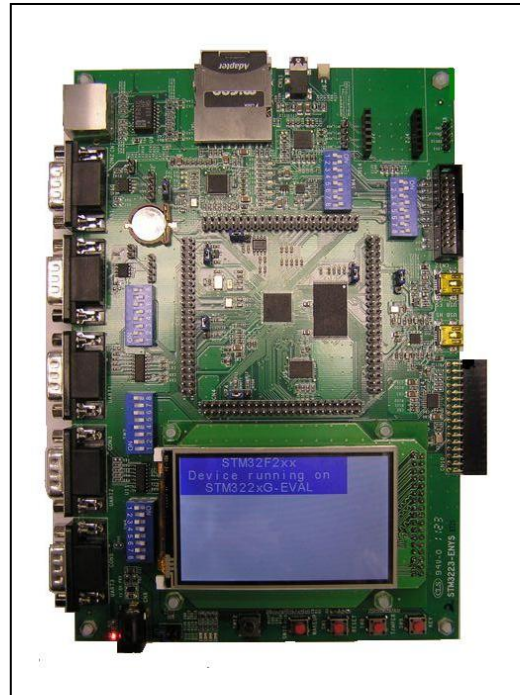
Features

■ Four 5V power supply options: Power jack, USB FS connector, USB HS connector or
daughter board.

■ Boot from User Flash, System memory or SRAM.

■ I2S Audio DAC, stereo audio jack.

■ 1GByte or more SD card.

■ Both type A&B Smart card support.

■ I2C compatible serial interface 64KBit EEPROM, MEMS .

■ RS232 communication.

■ IrDA transceiver.

■ USB OTG HS and FS with Micro-AB connector.

■ IEEE-802.3-2002 compliant Ethernet connector.

■ Camera module

- 4Mbit PSRAM

- 512Mbit NAND

- Two channels of CAN2.0A/B compliant connection.

- Inductor Motor Control connector.

- JTAG ,SW and Trace Debug support.

- 3.2" 240x400 TFT color LCD with touch screen.

- Joystick with 4-direction control and selector.

- Reset, Wakeup, Tamper and User button.

- 4 color LEDs.

- RTC with backup battery.

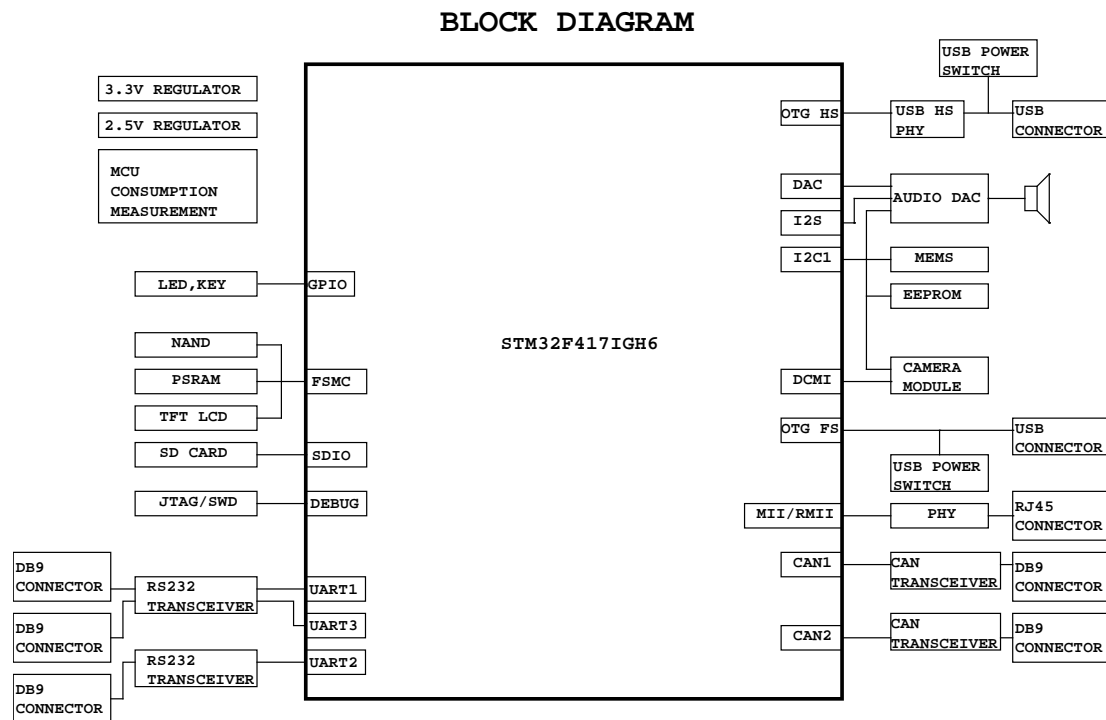- Extension connector for daughter board or wrapping board.
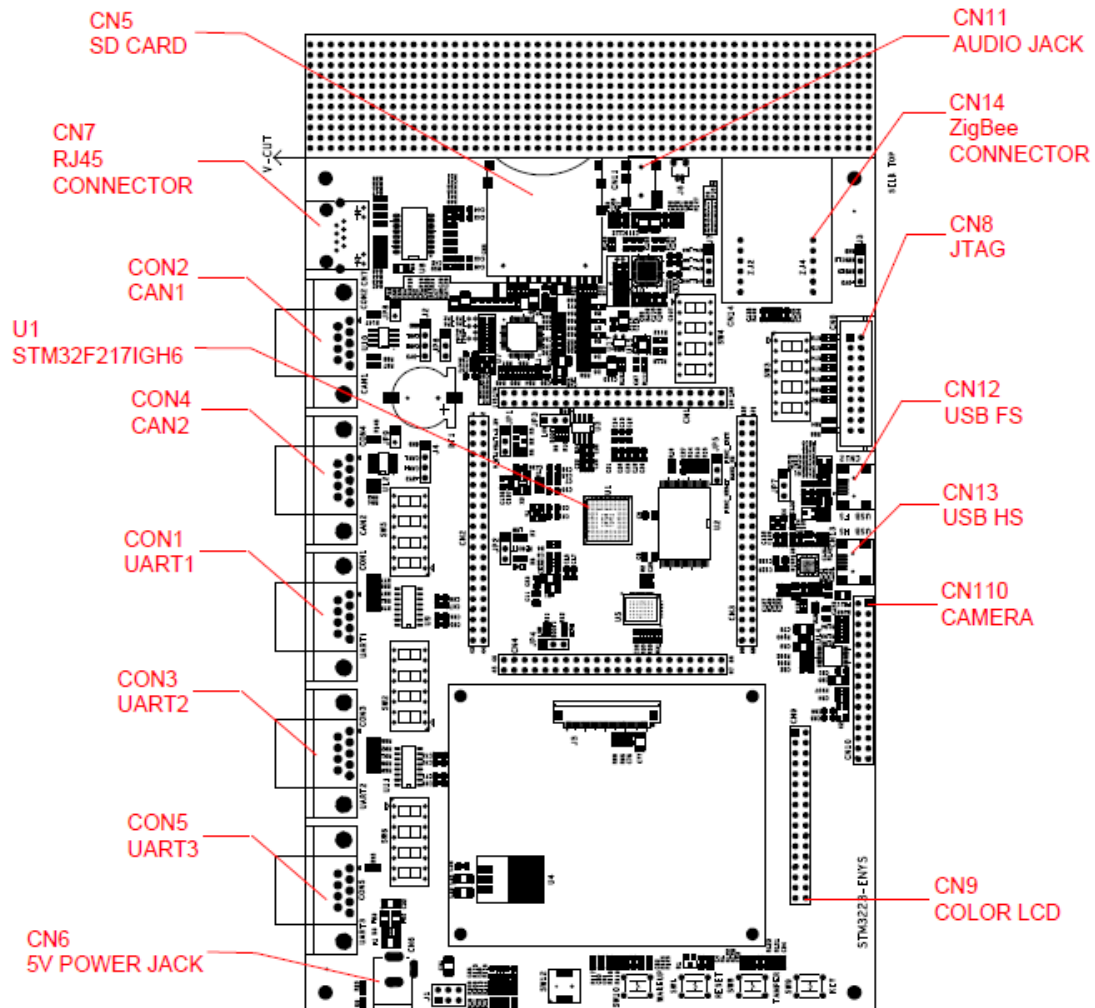
Contents

1. Hardware Layout and configuration

The STM32F2/4-EVB evaluation board is designed around the STM32F417IGH6 in 176-pin UFBGA package. The hardware block diagram Figure 2 illustrates the connection between STM32F417IGH6 and peripherals (Camera module, LCD, PSRAM, NAND, EEPROM, MEMS, USART, USB OTG HS, USB OTG FS, Ethernet, Audio, CAN bus, SD card) and Figure 3 will help you locate these features on the actual evaluation board.

Figure 2: **Hardware Block Diagram**

BLOCK DIAGRAM

```
  3.3V REGULATOR                                                    USB POWER
                                                                    SWITCH
  2.5V REGULATOR
                                          OTG HS        USB HS       USB
  MCU                                                   PHY          CONNECTOR
  CONSUMPTION
  MEASUREMENT                             DAC           AUDIO DAC
                                          I2S
  LED,KEY         GPIO                    I2C1          MEMS
                                                        EEPROM
  NAND                      STM32F417IGH6
  PSRAM          FSMC                     DCMI          CAMERA
                                                        MODULE
  TFT LCD
                                          OTG FS                     USB
  SD CARD        SDIO                                                CONNECTOR
                                                        USB POWER
  JTAG/SWD       DEBUG                                  SWITCH
                                          MII/RMII      PHY          RJ45
                                                                     CONNECTOR
  DB9                                     CAN1          CAN          DB9
  CONNECTOR     RS232        UART1                      TRANSCEIVER  CONNECTOR
                TRANSCEIVER
  DB9                        UART3        CAN2          CAN          DB9
  CONNECTOR                                             TRANSCEIVER  CONNECTOR
                RS232        UART2
  DB9           TRANSCEIVER
  CONNECTOR
```

Figure 3: STM32F2/4-EVB Evaluation board layout
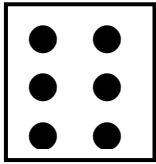
1.1 Power Supply

STM32F2/4-EVB evaluation board is designed to be powered by 5V DC power supply and to be protected by PolyZen from wrong power plug-in event. It's possible to configure the evaluation board to use any of following Four sources for the power supply.

■ 5V DC power adapter connected to CN6, the Power Jack on the board (PSU on silk screen for Power Supply Unit).

■ 5V DC power with 500mA limitation from CN12, the USB OTG FS Mini-B connector (FS on silkscreen).
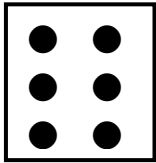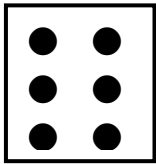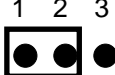
■ 5V DC power with 500mA limitation from CN13, the USB OTG HS Mini-B connector (HS on silkscreen).

The power supply is configured by setting the related jumpers **JP1,JP7** as described in table 1.

Table 1 Power related Jumpers

JUMPER	Description
JP1	JP1 is used to select one of the four possible power supply resources. For **power supply jack**(CN6) to the STM32F2/4-EVB only, JP1 is set as shown to the right: (Default Setting) J1 **PSU** ● ● FS ● ● HS ● ●
	For power supply from USB OTG FS (CN12) to STM32F2/4-EVB only, JP1 is set as shown to the right: J1 PSU ● ● **FS** ● ● HS ● ●
	For power supply from USB OTG HS (CN13) to STM32F2/4-EVB only, JP1 is set as shown to the right: J1 PSU ● ● FS ● ● **HS** ● ●

	Vbat is connected to battery when JP1 is set as shown to the right:	
JP7	1 2 3 ● ●●●	
	Vbat is connected to 3.3V power when JP1 is set as shown to the right: (Default setting)	
	1 2 3 ●●● ●	

The LED D9 is lit when the STM32F2/4-EVB evaluation board is powered by the 5V correctly.

1.2 Boot Option

The STM32F2/4-EVB evaluation board is able to boot from:

■ Embedded User Flash

■ System memory with boot loader for ISP

■ Embedded SRAM for debugging

The boot option is configured by setting switch SW1 (BOOT1) and SW2 (BOOT0).

Table 2 Boot related Switch

BOOT0	BOOT1	Boot from	JP3 BOOT0	JP4 BOOT1
0	X	STM32F2/4-EVB boot from **User Flash** when BOOT0 is set as shown to the right. BOOT1 is don't care in this configuration. (Default setting)	1 2 3 ●●● ●	1 2 3 ●●● ●
1	0	STM32F2/4-EVB boot from **System Memory** when BOOT0 and BOOT1 are set as shown to the right.	1 2 3 ● ●●●	1 2 3 ●●● ●
1	1	STM32F2/4-EVB boot from **Embedded SRAM** when BOOT0 and BOOT1 are set as shown to the right.	1 2 3 ● ●●●	1 2 3 ● ●●●

1.3 Clock Source

Four clock sources are available on STM32F2/4-EVB evaluation board for STM32F417IGH6 and RTC embedded.

■ Y2, 25MHz Crystal for Ethernet PHY.

■ Y3, 24MHz Crystal for USB OTG HS PHY.

■ X1, 32KHz Crystal for embedded RTC.

■ Y1, 25MHz Crystal with socket for STM32F417IGH6 Microcontroller, it can be removed when internal RC clock is used.

1.4 Reset Source

The reset signal of STM32F2/4-EVB evaluation board is low active and the reset sources include:

■ Reset button SW1

■ Debugging Tools from JTAG connector CN8.

■ Daughter board from CN2

1.5 Audio

STM32F2/4-EVB evaluation board supports stereo audio play thanks to an audio DAC CS43L22 connected to both I2S2 port and one channels of DAC of microcontroller STM32F417IGH6. The CS43L22 can be configured via I2C1. The automatically switch between the speaker and headphone is supported by both CS43L22 and audio jack with plug detection pin.

1.6 EEPROM

A 64KBit EEPROM connected to I2C1 bus of STM32F417IGH6.

1.7 CAN

STM32F2/4-EVB evaluation board supports two channels of CAN2.0A/B complaint CAN bus communication based on 3.3V CAN transceiver. The two CAN bus are disabled and disconnected by jumpers from relevant STM32F417IGH6 IO's CAN2 is shared with USB OTG HS. The switch must be re-set to enable CAN2 as listed in table 6 and table 7.

Table 3 CAN1 related Jumpers

Jumper	Description
JP8	CAN1 terminal resistor is enabled when JP8 is fitted.
	Default setting: Not fitted

Table 4 CAN2 related Jumpers

Jumper	Description
JP9	CAN2 terminal resistor is enabled when JP9 is fitted.
	Default setting: Not fitted
SW5-7	CAN2_TX is connected to PB13 and USB OTG HS is disabled(SW5-8 OFF)
	Default setting: Not fitted
SW5-5	CAN2_RX is connected to PB5 and USB OTG HS is disabled(SW5-6 OFF)
	Default setting: Not fitted

1.8 RS232

RS232 communication is supported by D-type 9-pins RS232 connectors CON1(UART1) , CON3(UART2) , CON5(UART3) which are connected of STM32F417IGH6 on STM32F2/4-EVB evaluation board.

RS232 can be selected by setting of SW2,SW3,SW5:

Table 5 RS232 Related Switch

UART1: (shared with USB FS)

Switch_ ON	Description
SW3-1	UART1_TX is connected to PA9 and USB OTG FS is disabled(SW3-2 OFF) Default setting: Not fitted
SW3-3	UART1_RX is connected to PA10 and USB OTG FS is disabled(SW3-4 OFF) Default setting: Not fitted

UART2:(shared with USB HS & ETHERNET)

Switch_ ON	Description
SW2-1	UART2_CTS is connected to PA0 and WAKE is disabled(SW2-2 OFF) Default setting: Not fitted
SW2-3	UART2_RTS is connected to PA1 and ETHERNET is disabled(SW2-4 OFF) Default setting: Not fitted
SW2-5	UART2_TX is connected to PA2 and ETHERNET is disabled(SW2-6 OFF) Default setting: Not fitted
SW2-7	UART2_RX is connected to PA3 and USB OTG HS is disabled(SW2-8 OFF) Default setting: Not fitted

UART3:(shared with USB HS)

Switch_ ON	Description
SW5-1	UART3_TX is connected to PB10 and USB OTG HS is is disabled(SW5-2 OFF) Default setting: Not fitted
SW5-3	UART3_RX is connected to PB11 and USB OTG HS is is disabled(SW5-4 OFF) Default setting: Not fitted

1.9 MicroSD card

The 1GByte or more MicroSD card connected to SDIO of STM32F417IFT6 is available on the board. MicroSD card Detection is managed by standard IO port PF11.

1.10 MEMS

A ST MEMS device LIS3DH is connected to I2C1 bus of STM32F417IGH6 on the board.
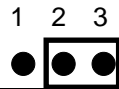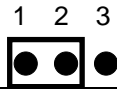
1.11 USB OTG FS

STM32F2/4-EVB evaluation board support USB OTG full speed communication via a USB MINI-B connector (CN12) and USB power switch (JP7) connected to VBUS. The evaluation board can be powered by this USB connection at 5V DC with 500mA current limitation.

1.12 Ethernet

STM32F2/4-EVB evaluation board support 10M/100M Ethernet communication by a PHY IP101A (U7) and integrated RJ45 connector (CN7). Both MII and RMII interface mode are supported and can be selected by setting of Jumper JP6 and Switch SW2 as listed below:

Table 6 Ethernet Related Jumpers

Jumper	Description
JP6	25MHz clock is provided by external crystal X1 (for MII interface mode only) when JP6 is set as shown to the right: 1 2 3 ● ●●●
	25MHz clock for MII or 50MHz clock for RMII is provided by MCO when JP6 is set as shown to the right (Default setting): 1 2 3 ●●● ●

Table 7 Ethernet Related Switch(shared with UART2)

Switch_ ON	Description
SW2-4	ETH_RX_CLK is connected to PA1 and USART2_RTS is disabled(SW2-3 OFF) Default setting: fitted
SW2-6	ETH_MDIO is connected to PA2 and USART2_TX is disabled(SW2-5 OFF) Default setting: fitted

1.13 USB OTG HS

STM32F2/4-EVB evaluation board support USB OTG High speed communication via a USB Mini-B connector (CN13), USB High speed PHY (U19) and USB power switch (U18) connected to VBUS. The evaluation board can be powered by this USB connector (CN13) at 5V DC with 500mA current limitation.

The USB ULPI bus is shared with UART2,MEMS,SPI1,UART3,CAN2,the SW2~SW5 must be serring for USB OTG HS.

Table 8 Ethernet Related Switch(shared with UART2,MEMS,SPI1,UART3,CAN2)

Switch_ON	Description
SW2-8	ULPI_D0 is connected to PA3 and USART2_RX is disabled(SW2-7 OFF) Default setting: fitted
SW3-6	ULPI_D1 is connected to PB0 and MEMS_INT1is disabled(SW3-5 OFF) Default setting: fitted
SW3-8	ULPI_D2 is connected to PB1 and MEMS_INT2is disabled(SW3-7 OFF) Default setting: fitted
SW4-8	ULPI_D7 is connected to PB5 and SPI1_MOSI is disabled(SW4-7 OFF) Default setting: fitted
SW5-2	ULPI_D3 is connected to PB10 and USART3_TX is disabled(SW5-1 OFF) Default setting: fitted
SW5-4	ULPI_D4 is connected to PB11 and USART3_RX is disabled(SW5-3 OFF) Default setting: fitted
SW5-6	ULPI_D5 is connected to PB12 and CAN2_RX is disabled(SW5-5 OFF) Default setting: fitted
SW5-8	ULPI_D6 is connected to PB13 and CAN2_TX is disabled(SW5-7 OFF) Default setting: fitted

1.14 Camera Module

Camera module is connected to DCMI bus of STM32F417IGH6.

1.15 PSRAM and NAND

The 4Mbit PSRAM and 512Mbit NAND are connected to FSMC bus of STM32F417IGH6.

1.16 Development and Debug support

The two debug connectors available on STM32F2/4-EVB evaluation board are:

1. CN8, standard 20-pins JTAG interface connector that is compliant with debug tools of ARM7 and ARM9.

2. 1.17 Display and Input devices

The 3.2" TFT color LCD connected to FSMC bus and 4 general purpose color LED's (D10,11,12,13) are available as display device. A touch screen connected to TSC2007, direction joystick with selection key, general purpose button (SW9), Wakeup button (SW10) and Tamper detection button (SW8) are available as input devices.

Table 9 LCD modules(TFT LCD with touch screen (CN9))

Pin on CN16	Pin name	Pin connection	Pin on CN16	Pin name	Pin connection
1	CS	FSMC_NE3 (PG10)	**2**	RS	FSMC_A0(PF0)

3	WR/SCL	FSMC_NWE(PD5)	4	RD	FSMC_NOE(PD4)
5	RESET	RESET#	6	PD0	FSMC_D0(PD14)
7	PD1	FSMC_D1(PD15)	8	PD2	FSMC_D2(PD0)
9	PD3	FSMC_D3(PD1)	10	PD4	FSMC_D4(PE7)
11	PD5	FSMC_D5(PE8)	12	PD6	FSMC_D6(PE9)
13	PD7	FSMC_D7(PE10)	14	PD8	FSMC_D8(PE11)
15	PD9	FSMC_D9(PE12)	16	PD10	FSMC_D10(PE13)
17	PD11	FSMC_D11(PE14)	18	PD12	FSMC_D12(PE15)
19	PD13	FSMC_D13(PD8)	20	PD14	FSMC_D14(PD9)
21	PD15	FSMC_D15(PD10)	22	BL_GND	GND
23	BL_CONTROL	+5V	24	VDD	+3.3V
25	VCI	+3.3V	26	GND	GND
27	GND	GND	28	BL_VDD	+5V
29	SDO	SDO(PB6)	30	SDI	SDI(PB9)
31	XL	XL	32	XR	XR
33	YD	YD	34	YU	YU

2. Connector

2.1 Daughter board extension connector CN1,2,3 and CN4

Four male headers CN1,2,3 and CN4 can be used to connect with daughter board or standard wrapping board to STM32F2/4-EVB evaluation board. All total 140 GPI/Os are available on it.

Table 10 Daughter board extension connector CN2

Pin	Description	Alternative Function
1	PE2	FSMC_A23
2	PE3	FSMC_A19
3	PE4	FSMC_A20
4	PE5	FSMC_A21
5	PE6	FSMC_A22
6	VBAT	--
7	PI8-RTC_AF2	GPIO(KEY)
8	PC13-RTC_AF1	GPIO(TAMPER)
9	PC14-OSC32_IN	OSC32_IN
10	PC15-OSC32_OUT	OSC32_OUT

11	PI9	CAN1_RX
12	PI10	ETH_RX_ER
13	PI11	ULPI_DIR
14	VSS-14	GND
15	VDD_14	VCC
16	PF0	FSMC_A0
17	PF1	FSMC_A1
18	PF2	FSMC_A2
19	PF3	FSMC_A3
20	PF4	FSMC_A4
21	PF5	FSMC_A5
22	VSS_5	GND
23	VDD_5	VCC
24	PF6	GPIO(SDC_WP)
25	PF7	GPIO(K_UP/LED1)Change form SW6
26	PF8	GPIO(K_LEFT/LED2)Change form SW6
27	PF9	GPIO(K_RIGHT/LED3)Change form SW6
28	PF10	GPIO(K_DOWN/LED4)Change form SW6
29	PH0-OSC_IN	OSC_IN(25MHz)
30	PH1-OSC_OUT	OSC_OUT(25MHz)
31	NRST	CPU Reset(LOW Reset)
31	PC0	ULPI_STP
33	PC1	ETH_MDC
34	PC2	ETH_TXD2
35	PC3	ETH_TX_CLK
36	VDD_12	VDD
37	VSSA	GND
38	VREF+	VREF+
39	VDDA	VDDA
40	PA0-WKUP	WAKE/USART2_CTS(Change form SW2)
41	PA1	ETH_RX_CLK/USART2_RTS(Change form SW2)
42	PA2	ETH_MDIO/USART2_TX(Change form SW2)
43	PH2	ETH_CRS
44	PH3	ETH_COL

Table 11 Daughter board extension connector CN3

Pin	Description	Alternative Function

45	PH4	ULPI_NXT
46	PH5	----
47	PA3	ULPI_D2/USART2/RX(Change form SW2)
48	VSS_4	GND
49	VDD_4	VCC
50	PA4	AUDIO_DAC
51	PA5	ULPI_CLK
52	PA6	CAM_PCLK
53	PA7	ETH_RX_DV
54	PC4	ETH_RXD0
55	PC5	ETH_RXD1
56	PB0	ULPI_D1/MEMS_INT1(Change form SW3)
57	PB1	ULPI_D2/MEMS_INT2(Change form SW3)
58	PB2	GPIO(TOUCH_INT)
59	PF11	GPIO(SD_RDY)
60	PF12	FSMC_A6
61	VSS_6	GND
62	VDD_6	VCC
63	PF13	FSMC_A7
64	PF14	FSMC_A8
65	PF15	FSMC_A9
66	PG0	FSMC_A10
67	PG1	FSMC_A11
68	PE7	FSMC_D4
69	PE8	FSMC_D5
70	PE9	FSMC_D6
71	VSS_7	GND
72	VDD_7	VCC
73	PE10	FSMC_D7
74	PE11	FSMC_D8
75	PE12	FSMC_D9
76	PB13	FSMC_D10
77	PE14	FSMC_D11
78	PE15	FSMC_D12
79	PB10	ULPI_D3/USART3_TX(Change form SW5)
80	PB11	ULPI_D4/USART3_RX(Change form SW5)
81	VCAP1	VCAP1

82	VDD_1	VCC
83	PH6	ETH_RXD2
84	PH7	ETH_RXD3
85	PH8	CAM_HSYNC
86	PH9	CAM_DATA0
87	PH10	CAM_DATA1
88	PH11	CAM_DATA2

Table 12 Daughter board extension connector CN4

Pin	Description	Alternative Function
89	PH12	CAM_DATA3
90	VSS_14	GND
91	VDD_14	VCC
92	PB12	ULPI_D5/CAN2_RX(Change form SW5)
93	PB13	ULPI_D6/CAN2_TX(Change form SW5)
94	PB14	GPIO(LCDBKL_CTL)
95	PB15	GPIO(K_SEL)
96	PD8	FSMC_D13
97	PD9	FSMC_D14
98	PD10	FSMC_D15
99	PD11	FSMC_A16
100	PD12	FSMC_A17
101	PD13	FSMC_A18
102	VSS_8	GND
103	VDD_8	VCC
104	PD14	FSMC_D0
105	PD15	FSMC_D1
106	PG2	FSMC_A12
107	PG3	FSMC_A13
108	PG4	FSMC_A14
109	PG5	FSMC_A15
110	PG6	FSMC_INT2
111	PG7	ZIGBEE_WAKE
112	PG8	ZIGBEE_INT
113	VSS_9	GND
114	VDD_9	VCC
115	PC6	I2S_MCK

116	PC7	----
117	PC8	SDC_D0
118	PC9	SDC_D1
119	PA8	ETH_MCO
120	PA9	USB_FS_DETECT/UART1_TX(Change form SW3)
121	PA10	USB_FS_ID/UART1_RX*(Change form SW3)*
122	PA11	USB_FS_DN
123	PA12	USB_FS_DP
124	PA13	JTMS
125	VCAP2	VCAP2
126	VSS_2	GND
127	VDD_2	VCC
128	PH13	CAN1_TX
129	PH14	CAM_DATA4
130	PH15	----
131	PI0	I2S_CMD
132	PI1	I2S_CLK

Table 13 Daughter board extension connector CN1

Pin	Description	Alternative Function
133	PI2	TOUCH_INT
134	PI3	I2S_DIN
135	VSS_15	GND
136	VDD_15	VCC
137	PA14	JTCK
138	PA15	JTDI/SPI1_NSS(Change form SW4)
139	PC10	SDC_D2
140	PC11	SDC_D3
141	PC12	SDC_CLK
142	PD0	FSMC_D2
143	PD1	FSMC_D3
144	PD2	SDC_CMD
145	PD3	FSMC_CLK
146	PD4	FSMC_NOE
147	PD5	FSMC_NWE
148	VSS_10	GND
149	VDD_10	VCC

150	PD6	FSMC_NWAIT
151	PD7	FSMC_NE1
152	PG9	FSMC_NE2
153	PG10	FSMC_NE3
154	PG11	ETH_TX_EN
155	PG12	----
156	PG13	ETH_TXD0
157	PG14	ETH_TXD1
158	VSS_11	GND
159	VDD_11	VCC
160	PG15	----
161	PB3	JTDO/SPI1_SCK(Change form SW4)
162	PB4	JTRST/SPI1_MISO(Change form SW4)
163	PB5	ULPI_D7/SPI1_MISO(Change form SW4)
164	PB6	I2C1_SCL
165	PB7	FSMC_NL
166	BOOT0	BOOT0
167	PB8	ETH_TXD3
168	PB9	I2C1_SDA
169	PE0	FSMC_NBL0
170	PE1	FSMC_NBL1
171	RFU	Reserved
172	VDD_3	VCC
173	PI4	CAM_DATA5
174	PI5	CAM_VSYNC
175	PI6	CAM_DATA6
176	PI7	CAM_DATA7

2.2 SD connector CN5

Figure 4 SD connector CN5
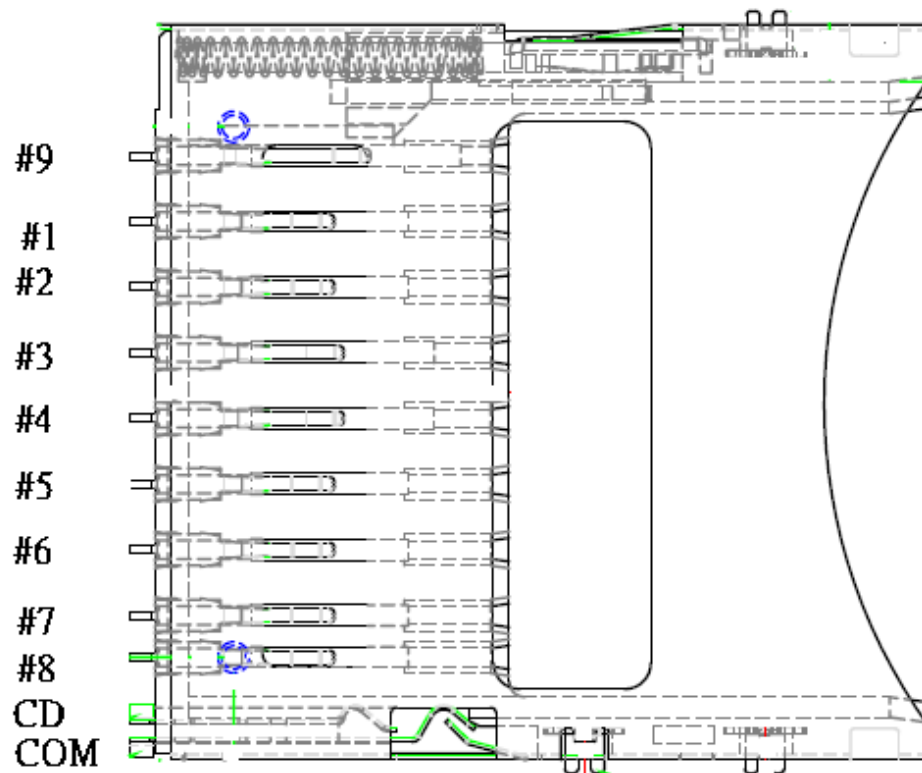
Table 14 SD connector CN5

Pin number	Description	Pin name
1	SDC_D3	PC11
2	SDC_CMD	PD2
3	VSS	
4	VDD	
5	SDC_CLK	PC12
6	VSS	
7	SDC_D0	PC8
8	SDC_D1	PC9
9	SDC_D2	PC10
CD	SD_RDY	PF11
WP	SDC_WP	PF6

2.3 Ethernet RJ45 connector CN7

Figure 5 Ethernet RJ45 connector CN7
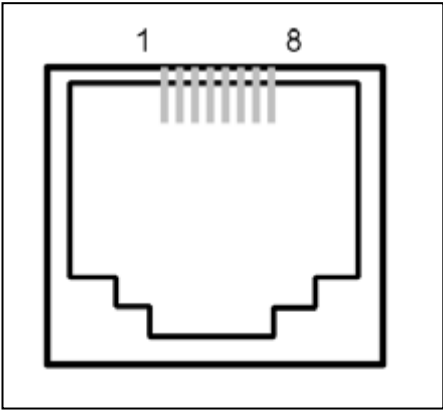
Pin number	Description
1	TxData+
2	TxData-
3	RxData+
4	Shield
5	Shield
6	RxData-
7	Shield
8	Shield

2.4 USB OTG FS MINI-AB connector CN12

Figure 6 USB OTG FS MINI-B connector CN12
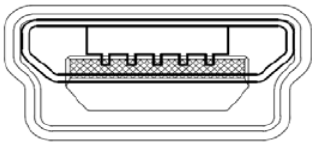
Pin number	Description
1	VBUS (PA9)
2	D- (PA11)
3	D+ (PA12)
4	ID (PA10)
5	GND

2.5 USB OTG HS MINI-B connector CN13

Figure 7 USB OTG HS Micro-AB connector CN9

Pin number	Description
1	VBUS
2	D-
3	D+
4	ID
5	GND

2.6 CAN D-type 9-pins male connector CON4(CAN2) & CON2(CAN1)

Figure 8 CAN D-type 9-pins male connector CON4 (CAN2) & CON2 (CAN1)
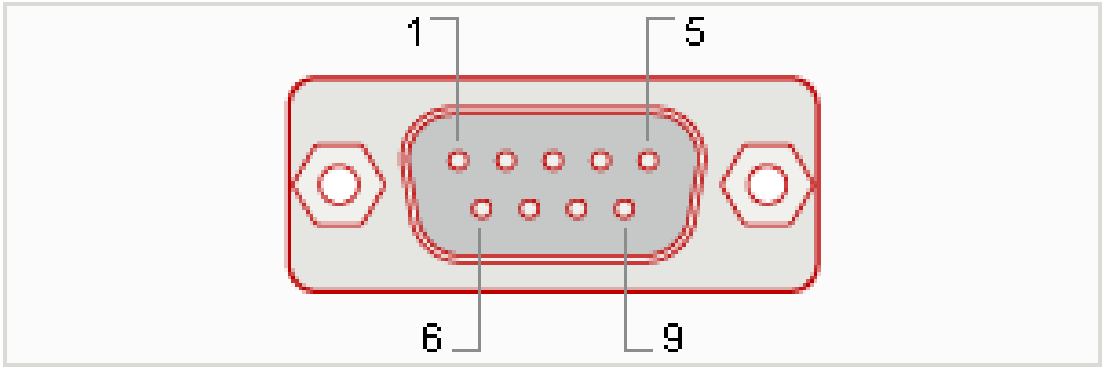
Table 15 CAN D-type 9-pins male connector CON4 (CAN2) & CON2(CAN1)

Pin number	Description
1,4,8,9	NC
2	CANL
7	CANH
3,5,6	GND

2.7 Audio connector CN11

A 3.5mm Stereo audio jack CN11 with plug-detection feature connected to audio DAC is available on STM32F2/4-EVB board.

2.8 JTAG debugging connector CN8

Figure 9 *JTAG debugging connector* **CN8**
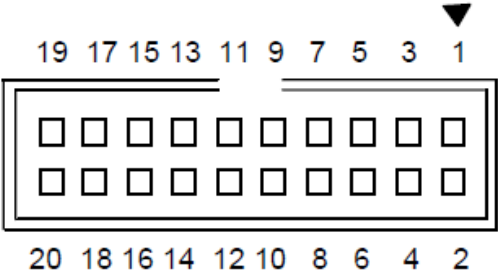
Table 16 *JTAG debugging connector* **CN8**

Pin number	Description	Pin number	Description
1	3.3V power	2	3.3V power
3	JTRST/PB4	4	GND
5	JTDI/PA15	6	GND
7	JTMS/PA13	8	GND
9	JTCK/PA14	10	GND
11	RTCK	12	GND
13	JTDO/PB3	14	GND
15	RESET#	16	GND
17	DBGRQ	18	GND
19	DBGACK	20	GND

2.9 Camera module connector CN10

Figure 10 Camera module connector CN10
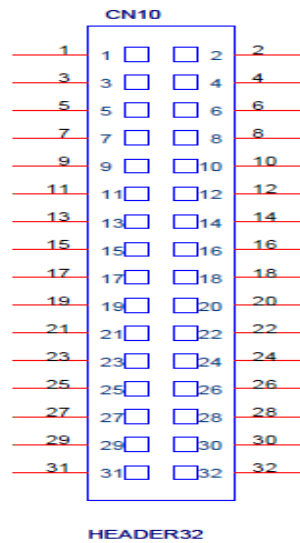
Table 17 Camera module connector CN10

Pin number	Description	Pin number	Description
1	CAM_DATA3/PH12	2	CAM_DATA2/PH11
3	CAM_DATA5/PI4	4	CAM_DATA4/PH14
5	CAM_DATA7/PI7	6	CAM_DATA6/PI6
7	TBD/PI2	8	TBD/PI1
9	RESET#	10	
11	NC	12	SDA/PB9
13	CAM_HSYNC/PH8	14	SCL/PB6
15	CAM_VSYNC/PI5	16	GND
17	CAM_PCLK/PA6	18	GND
19	+3V3	20	CLK
21	+3V3	22	GND
23	CAM_DATA1/PH10	24	CAM_DATA0/PH9
25	CAM_GPIO0	26	CAM_GPIO1/
27	NC	28	NC
29	NC	30	NC
31	GND	32	GND

2.10 RS232 connector CON1 & CON5

Figure 11 RS232 connector CON1 & CON5
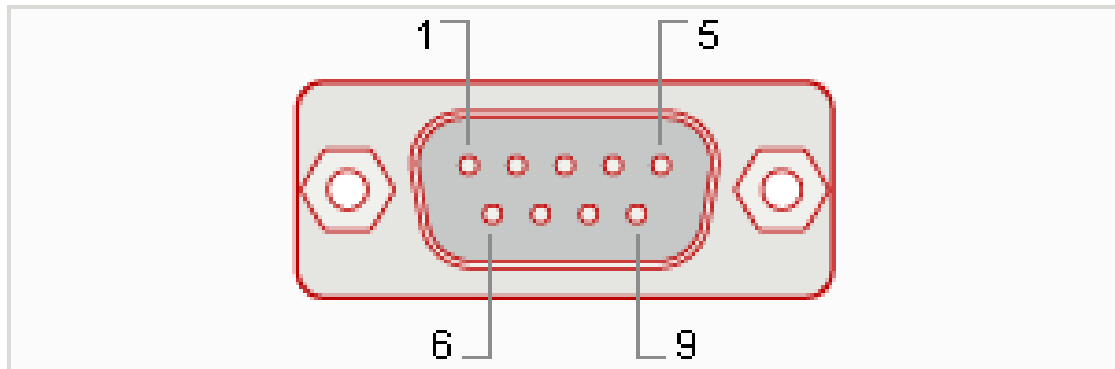
Table 18 RS232 connector CON1 & CON5

Pin number	Description	Pin number	Description
1	NC	6	NC
2	RS232_RX	7	NC
3	RS232_TX	8	NC
4	NC	9	NC
5	GND		

2.11 RS232 connector CON1 & CON5

Figure 12 RS232 connector CON3
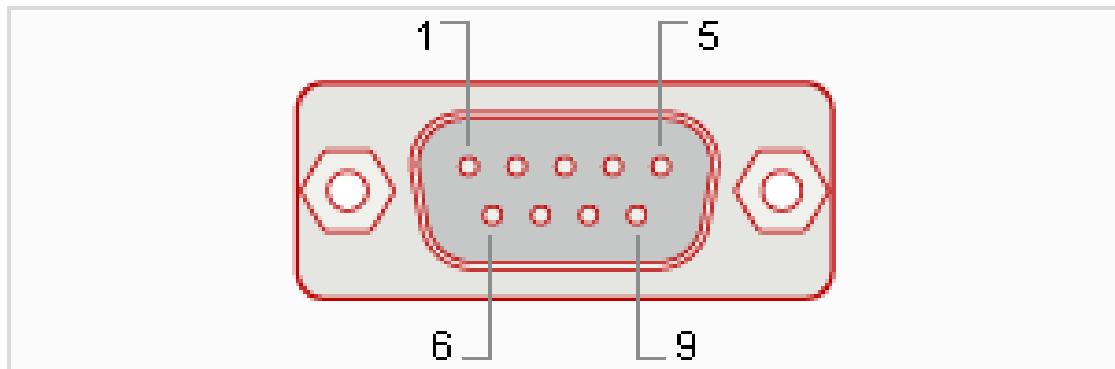
Table 19 RS232 connector CON3

Pin number	Description	Pin number	Description
1	NC	6	NC
2	RS232_RX	7	RS232_RTS
3	RS232_TX	8	RS232_CTS
4	NC	9	NC
5	GND		

2.12 Power connector CN6

Your STM32F2/4-EVB evaluation board can be powered from a DC 5V power supply via the external power supply jack (CN6) shown in Figure13. The central pin of CN6 must be positive.

Figure 13 Power supply connector CN6

DC +5V   GND
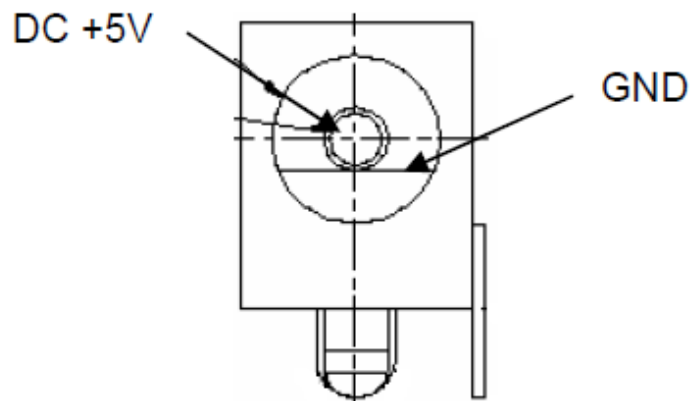
2.13 TFT LCD connector CN9

One 34-pin male header CN19 is available on the board to connect LCD module board MB785. Please refer to chapter 1.17 for detail.

CN9

FSMC_NE3	PG10	1	1		2	2	PF0	FSMC_A0
FSMC_NWE	PD5	3	3		4	4	PD4	FSMC_NOE
RESET#	RESET#	5	5		6	6	FSMC_D0	FSMC_D[0..15]
FSMC_D[0..15]	FSMC_D1	7	7		8	8	FSMC_D2	
	FSMC_D3	9	9		10	10	FSMC_D4	
	FSMC_D5	11	11		12	12	FSMC_D6	
	FSMC_D7	13	13		14	14	FSMC_D8	
	FSMC_D9	15	15		16	16	FSMC_D10	
	FSMC_D11	17	17		18	18	FSMC_D12	
	FSMC_D13	19	19		20	20	FSMC_D14	
	FSMC_D15	21	21		22	22		
LCDBKL_CTL	PB14	23	23		24	24	+3V3	
+3V3		25	25		26	26		
		27	27		28	28	+3V3	
SCL	PB6	29	29		30	30	PB9	SDA
X1		31	31		32	32		X2
Y2		33	33		34	34		Y1

2.54 Female Header

Pin number	Description	Pin number	Description
1	FSMC_NE3/PG10	2	FSMC_A0/PF0
3	FSMC_NWE/PD5	4	FSMC_NOE/PD4
5	RESET#	6	FSMC_D0
7	FSMC_D1	8	FSMC_D2
9	FSMC_D3	10	FSMC_D4
11	FSMC_D5	12	FSMC_D6
13	FSMC_D7	14	FSMC_D8
15	FSMC_D9	16	FSMC_D10
17	FSMC_D11	18	FSMC_D12
19	FSMC_D13	20	FSMC_D14
21	FSMC_D15	22	GND
23	LCDBKL_CTL/PB14	24	+3V3
25	+3V3	26	GND
27	GND	28	+3V3
29	SCL/PB6	30	SDA/PB9
31	X1	32	X2
33	Y2	34	Y1

3. Schematic

MAIN +5VDC POWER INPUT

STM32F2XX EVB POWER IN

| Size | Document Number | Rev |
| A | STM32F2XX EVB 00 | 00 |

Date: Friday, September 28, 2012 Sheet 4 of 14

PSRAM

Title	<Title>		
Size	Document Number		Rev
B	<Doc>		<RevCode>

Date: Friday, September 28, 2012 Sheet 5 of 14

YOSUN STM32F2XX EValuation Board Schematic

Title
STM32F2XX 16BIT LCD

Size	Document Number	Rev
A	STM32F2XX EVB 00	00

Date: Friday, September 28, 2012   Sheet 8 of 14

YOSUN STM32F2XX EValuation Board Schematic

Title
STM32F2XX EVB TOUCH

Size	Document Number	Rev
A	STM32F2XX EVB 00	00

Date: Friday, September 28, 2012   Sheet 9 of 14

Headphone Out

U16 CS43L22

SDA / SCL / A0 / MCLK / SCLK / SDIN / LRCK / RESET
-VHPFILT / FLYN / FLYP / +VHP / VA / VD / TSTO / TSTO / VL / DGND / DGND

HP/LINE_OUTA / HP/LINE_OUTB / SPKR/HP
SPKR_OUTA+ / SPKR_OUTA- / SPKR_OUTB+ / SPKR_OUTB- / VP / VP
AIN1B / AIN1A / AIN2B / AIN2A / AIN3B / AIN3A / AIN4B / AIN4A / VQ / AFILTB / AFILTA / FILT+ / AGND

SDA PB9 / SCL PB6 / A0 PB5
I2S_MCK PC6 / I2S_CLK PI1 / I2S_DIN PI3 / I2S_CMD PI0

AUDIO+2V5
AUDIO_DAC

FB7 GTH-1608-P-S-47N-J
C95 10U / C96 47P
FB8 GTH-1608-P-S-47N-J
C97 10U / C98 47P

SM02B-SRSS-TB J6
+5V

R128 100 / C104 1U
C102 0.1U / C103 0.1U
TP9 / TP10
R130 100K
R129
R124 47K
+3V3

CN11
PJ-3896D

C109 TBD
FB9 GTH-1608-P-S-60N-J
R149 0

R126 10K

C99 0.1U / C100 1U / C101 1U
C105 1U / C106 0.1U / C107 0.1U / C108 0.1U
C110 0.1U
C111 1U / C112 1U / C113 47P / C114 47P

U17 AME8822AEEV250Z
IN OUT / EN / GND NC
+3V3
C115 10U / R131 0 / C116 10U / C117 0.1U
AUDIO+2V5

USB FS

USB HS

DC_IN / VBUS_FS

USB_FS_DETECT / R133 10K / R134 100K

USB_FS_DP PA12 / USB_FS_DM PA11 / R135 22 / R136 22
C118 22P / C119 22P
USB_FS_ID / C121 0.22U / R137 100K
CN12 CKS-B5-6B-L
C120 4.7U
FB10 GBD201209GA601YN

changed to SIP4612B, active high to turn on switch.

C123 and C122 close to pin30
C123_1 and C122_1 close to pin6
C124 and C124_1 close to pin16

FB11_1 GBD201209GA601YN
3V3A_USB
C122 / C123_1 / C122_1 / C123 / C124_1 / C124
U19 RN4133GQWWQFN6x5-32L

ULPI_D[0..7]
ULPI_DIR PI11 / ULPI_NXT PH4 / ULPI_STP PC0 / ULPI_CLK PA5
R140 10K / C127 4.7U / C129 0.1U / C131 10U

+5V U18 SIP4612B
IN OUT / NC / GND SET / ON
C125 4.7U / R138 6.81K
C126 4.7U
VBUS_HS
R139 100
R142 1M / X4 24MHz / R143 20K%

D14 / D15 / D16 TBD
keep layout on the PCB, we could mount ESD protector, if we want to enhance ESD protection.

C139, C139_1, C139_2, C139_3 close to CN13 shield for EMI
C130 0.1U / C130_1 0.1U / C130_2 0.1U / C139_3 0.1U
CN13 CKS-B5-5B-L
FB11 GBD201209GA601YN

USB D+ and D- trace differential impendence is 90ohm, and trace could not have stub

C128 and C129 close to pin29
C130 and C131 close to pin25

1. pin32 is very sensitive and the trace must be shielding
2. pin32 trace don't be interfered by X4