

**WT51F104 EVB
Starter Kit Board
Operation Manual
REV. 1.0
April 26, 2012**

Ver.	Date	Applicant	Description
1.0	2012/04/26	Louis	1 st version

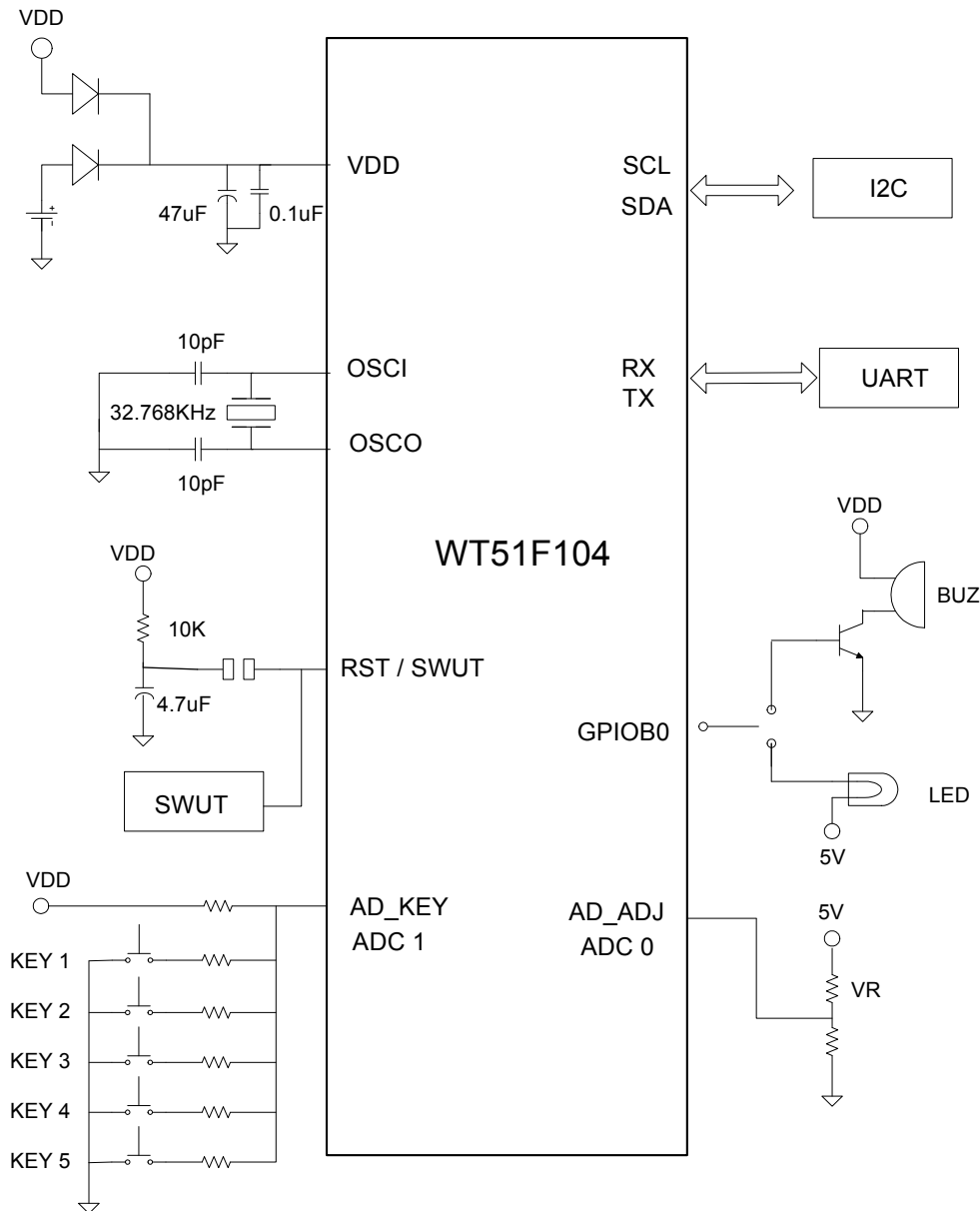
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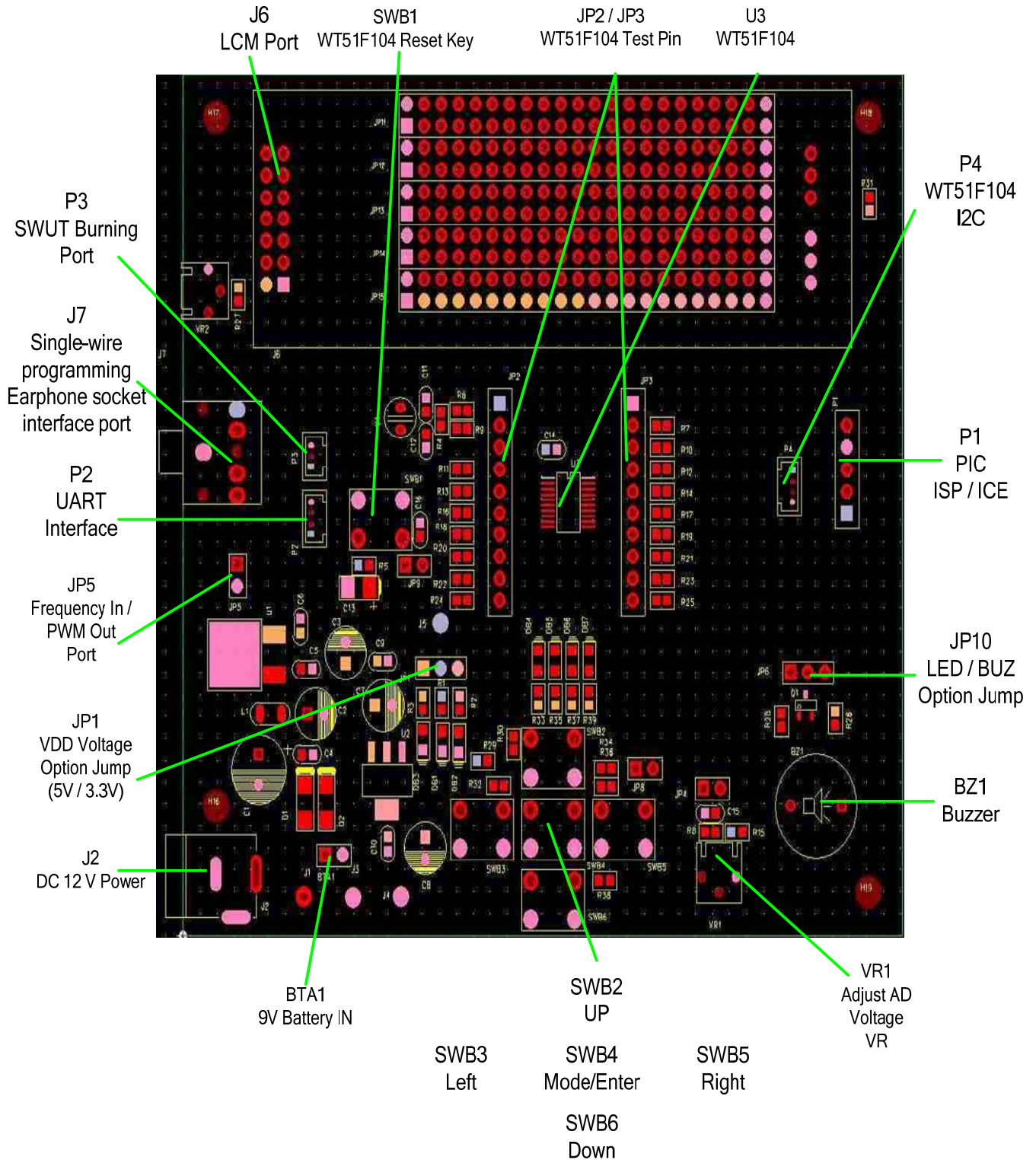
Chapter 1 WT51F104 Starter Kit Board Hardware Description

1.1 System Block Diagram

WT51F104 is an enhanced 8052 Micro Controller with a variety of peripheral functions, the Starter Kit Board is designed for 20-pin SSOP PKG type, the functions display and the system structure diagram as below.



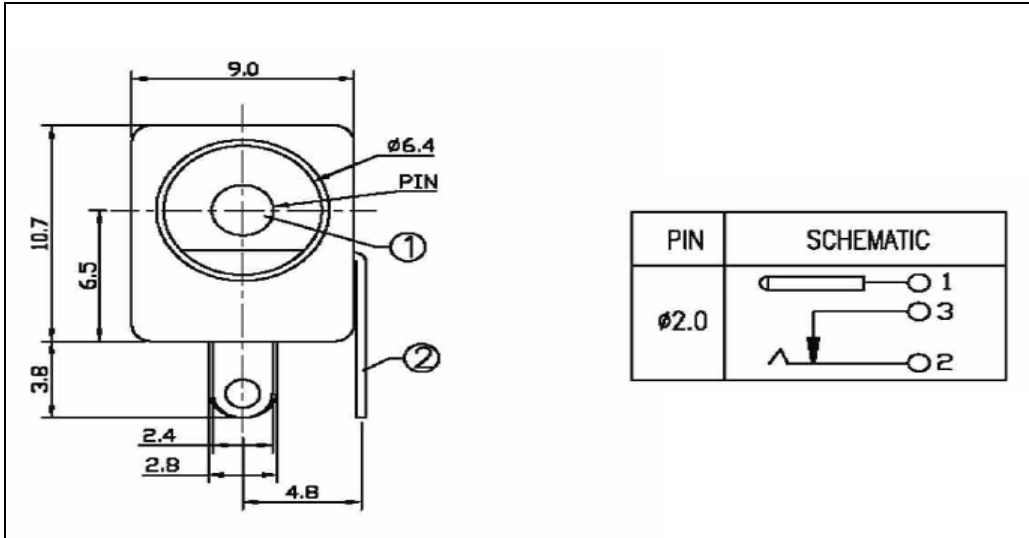
1.2 Starter Kit Board Components Location



Chapter 2 WT51F104 Starter Kit Board Port Description

2.1 DC Input connector (J2)

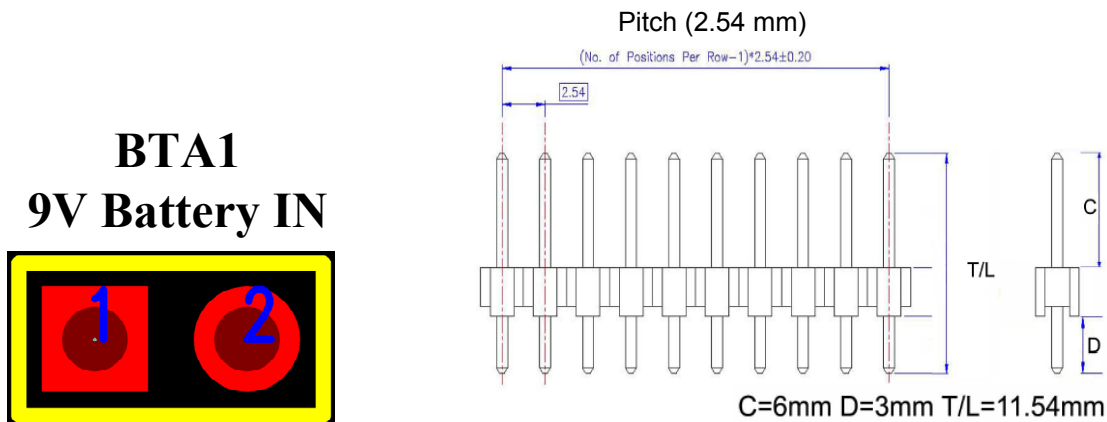
This is DC input connector for Starter Kit Board (supporting voltage: DC 7V~18V).



Pad Number	Description
1	Positive Input Pin
2	--
3	Negative Input Pin

2.2 Battery Inputs Connector (BTA1)

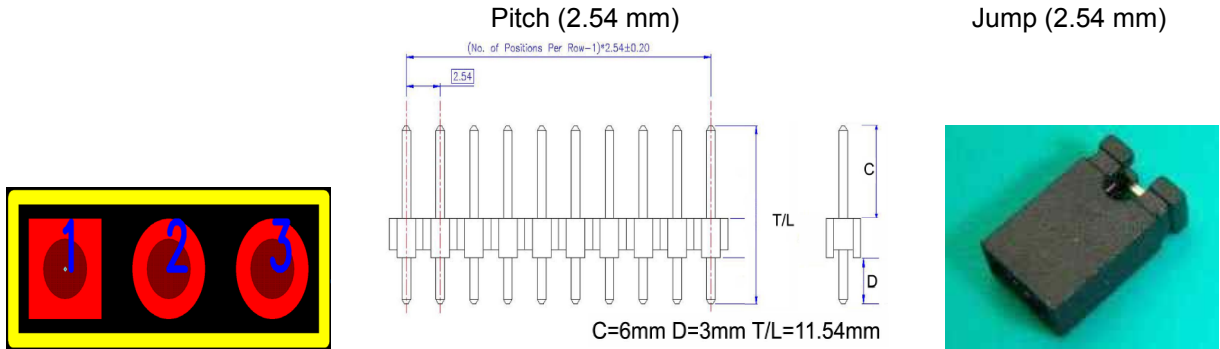
This is an external 9V battery compartment connector (supporting voltage DC 7V~18V).



Pad Number	Description
1	Positive Input Pin
2	Negative Input Pin --

2.3 VDD Power Selection (JP1)

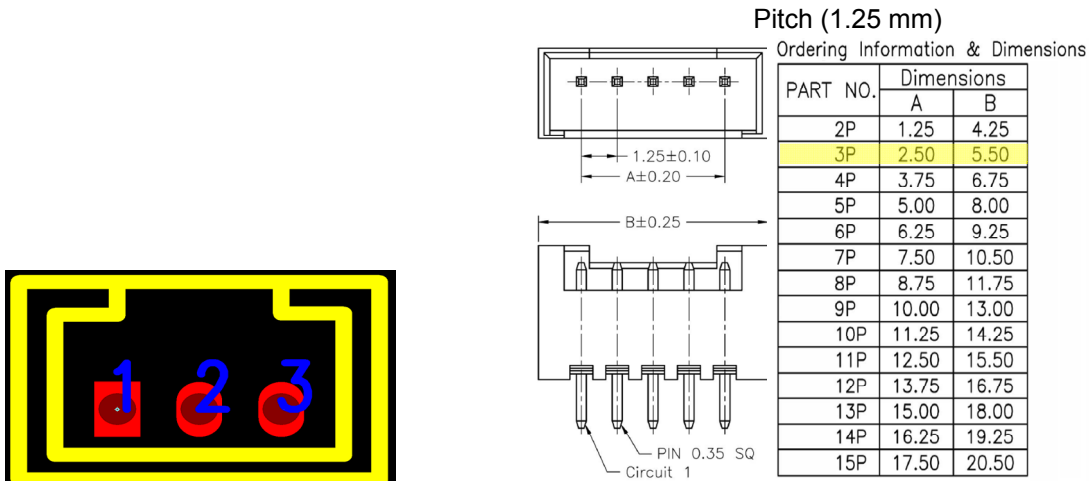
This is VDD voltage selection socket, WT51F104 can support input voltage 2.2V ~ 5.5V, the socket can input voltage 3.3V, 5V, or provide by external power supply (External power input cannot exceed Max. 5.5V as spec definition).



Pad Number	Description
1	5V (Jump 1-2 short)
2	VDD (external power input pin)
3	3.3V (Jump 2-3 short)

2.4 SWUT (Single Wire UART) Interface Programming Port (P3)

This port is for WT51F104 single wire programming.

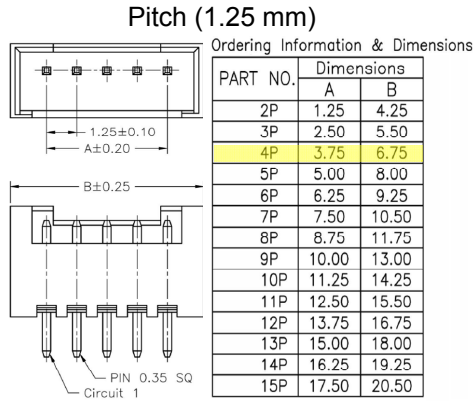
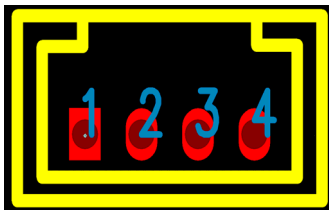


Pad Number	Description
1	VDD
2	SWUT
3	GND

2.5 I²C Interface Port

Components Location (JP4)

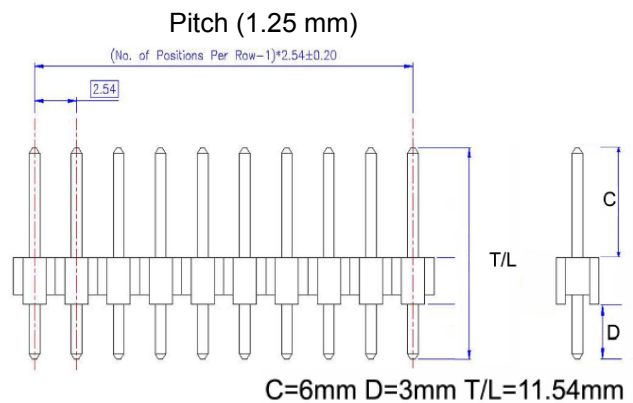
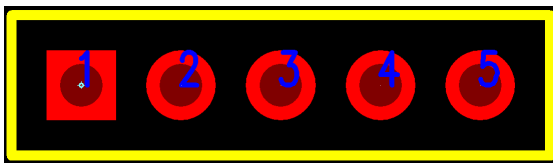
This is SLAVE I²C interface port.



Pad Number	Description
1	VDD
2	Slave SCL
3	Slave SDA
4	GND

2.6 Microchip PIC16F6XX Programming Port (P1)

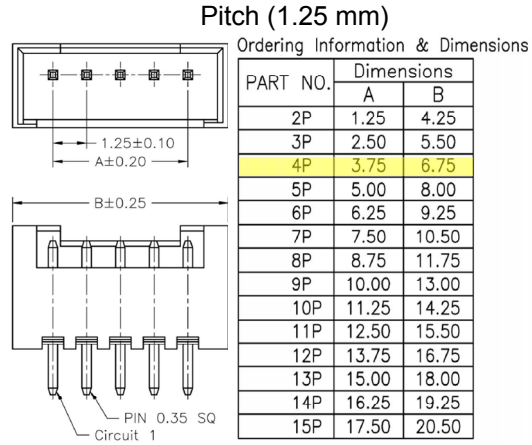
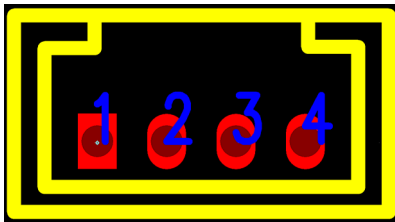
WT51F104 is compatible with Microchip PIC16F6XX series the programming port can support PIC16F6XX.



Pad Number	Description	Pad Number	Description
1	5V	4	GND
2	SCL	5	NRST
3	SDA	-	-

2.7 UART Interface Port (P2)

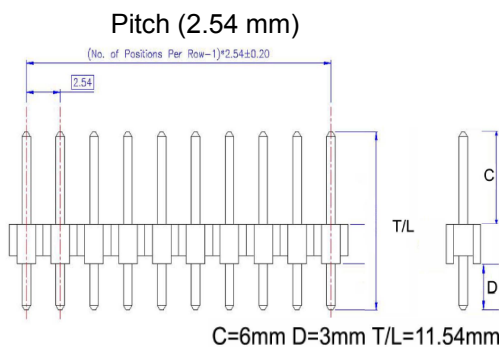
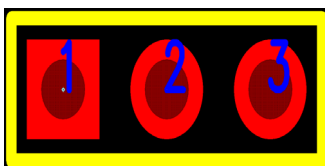
This is UART serial transmission interface.



Pad Number	Description
1	5V
2	TXD
3	RXD
4	GND

2.8 BUZ/LED function selection (JP6)

This is BUZ / LED functions selection.



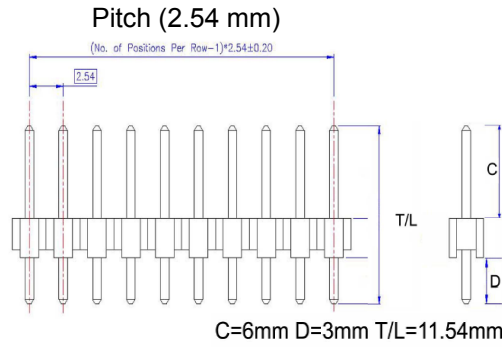
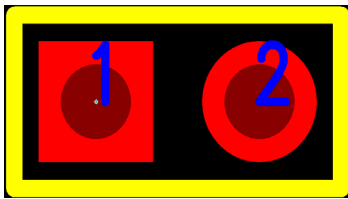
Jump (2.54 mm)



Pad Number	Description
1	BUZZER (Jump1-2 short)
2	BUZ / LED (GPIOB0)
3	LED (Jump 2-3 short)

2.9 External PWM Input port (JP5)

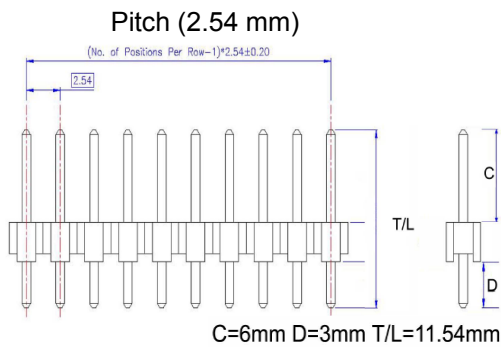
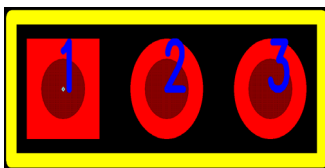
This is PWM Input Port.



Pad Number	Description
1	External PWM Input
2	GND

2.10 RW (LCM) / LED Function Selection (JP10)

This is LCM RW controller / LED functions selection socket.



Jump (2.54 mm)

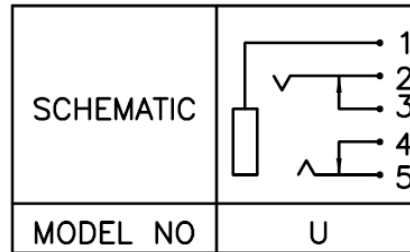
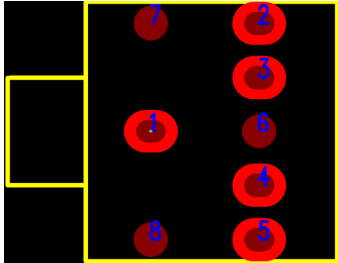


Pad Number	Description
1	LED (Jump1-2 short)
2	RW / LED (GPIOB3)
3	RW (LCM Controller, Jump2-3 short)

2.11 Single Wire Programming Earphone Jack Interface Port

Components Location (J6)

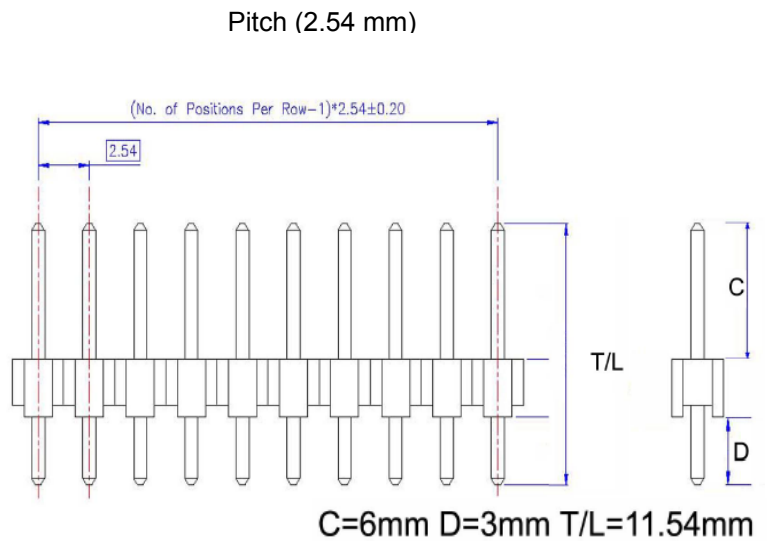
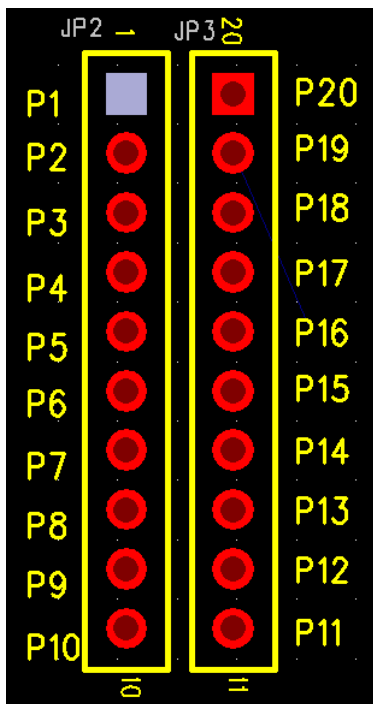
This is single wire (SWUT) earphone jack interface port.



Pad Number	Description	Pad Number	Description
1	GND	5	SWUT
2	VDD	6	NC
3	NC	7	NC
4	RESET	8	NC

2.12 Testing Pins and Daughter Board Interface (JP2)

This is signal measuring pin and daughter board interface.



Pad Number	Description	Pad Number	Description
1	VDD	11	GPIOC2
2	GPIOA5 / ADC15 / OSCI / PWM1B	12	GPIOC1 / ADC7
3	GPIOA4 / ADC14 / OSC0 / PWM0B	13	GPIOC0 / ADC6
4	GPIOA3 / ADC13 / NRST / SWUT	14	GPIOB2 / ADC5 / STB / PWM0D
5	GPIOB5 / ADC12 / RXA / PWM1A	15	GPIOB1 / ADC4 / MOSI / SCK
6	GPIOB4 / ADC11 / TXA / PWM1D	16	GPIOB0 / ADC3
7	GPIOB3 / ADC10 / PWM0A	17	GPIOA2 / ADC2 / PWM1C
8	GPIOC5 / ADC9	18	GPIOA1 / ADC1 / RXB / SCL
9	GPIOC4 / ADC8	19	GPIOA0 / ADC0 / TXB / SDA / PWM0C
10	GPIOC3	20	VSS

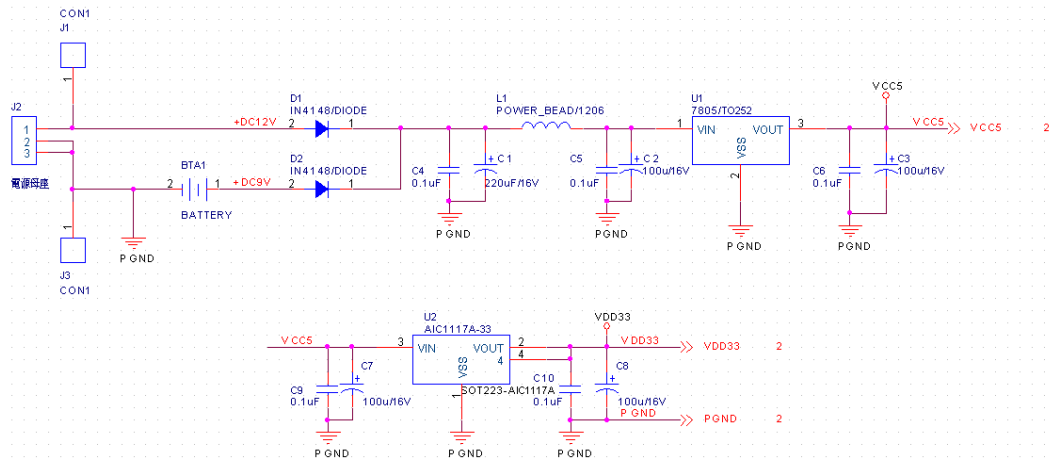
Chapter 3 WT51F104 Starter Kit Board Circuit Description

3.1 Main Power System

There are three main power options for WT51F104 Starter Kit Board.

1. External DC 12V (J2) Input: Through regulator and produce DC power 5V and 3.3V.
2. Battery (BTA1) Input: Through regulator and produce 5V and 3.3V.
3. VDD Input: There are no inputs for main power, please see below “VDD Power option” description.

WT51F104 Starter Kit Board Main Power System Circuit:

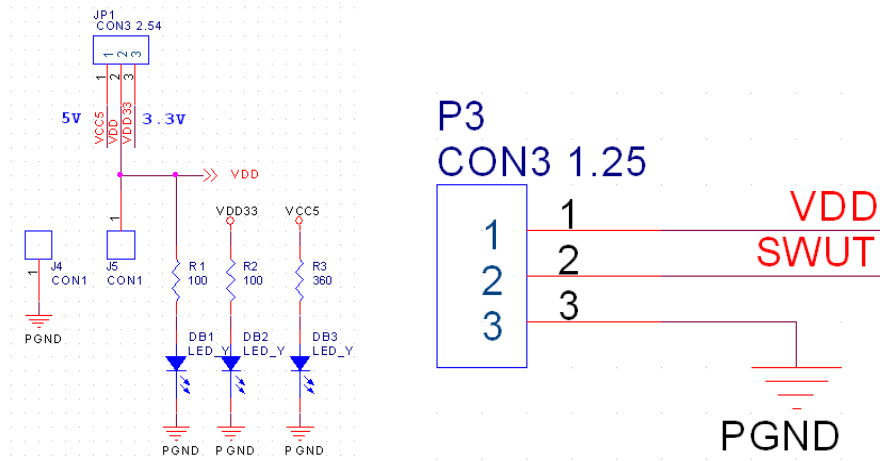


3.2 Power Selection

There are four options for WT51F104 VDD Power; the operation voltage is 5V, 3.3V or external input. (External input power must not exceed Max. 5.5V as spec definition).

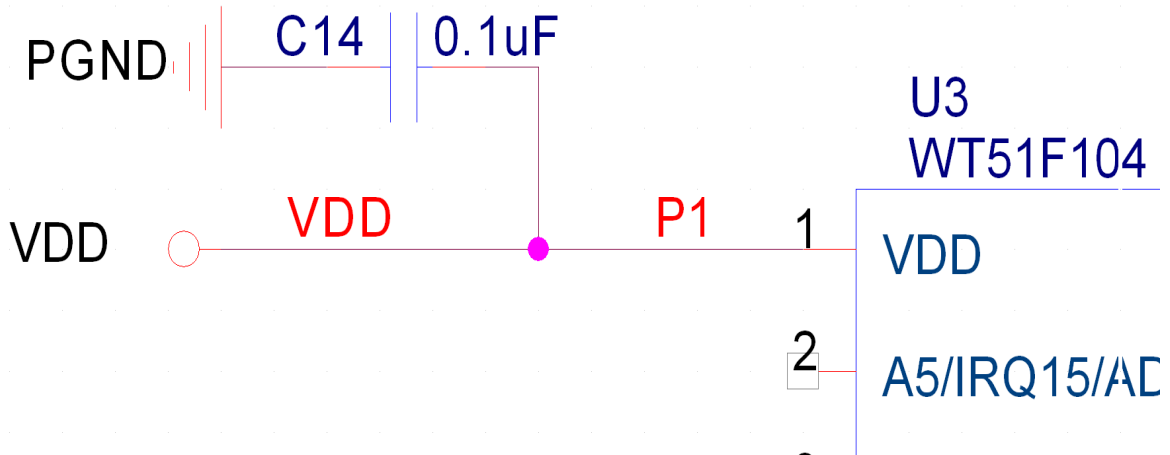
1. Pad JP1 1-2 connect: means that WT51F104VDD operation voltage is 5 V.
2. Pad JP1 2-3 connect: means that WT51F104 VDD operation voltage is 3.3V.
3. WLINK-SWUT VDD: Use WLINK-SWUT VDD for WT51F104 VDD power.
4. External VDD: It can input from J5 (Positive), J4 (Negative), external input VDD do not exceed Max. 5.5V as spec. definition.

If power is in normal operation, DB1, DB2, and DB3 LED will light.



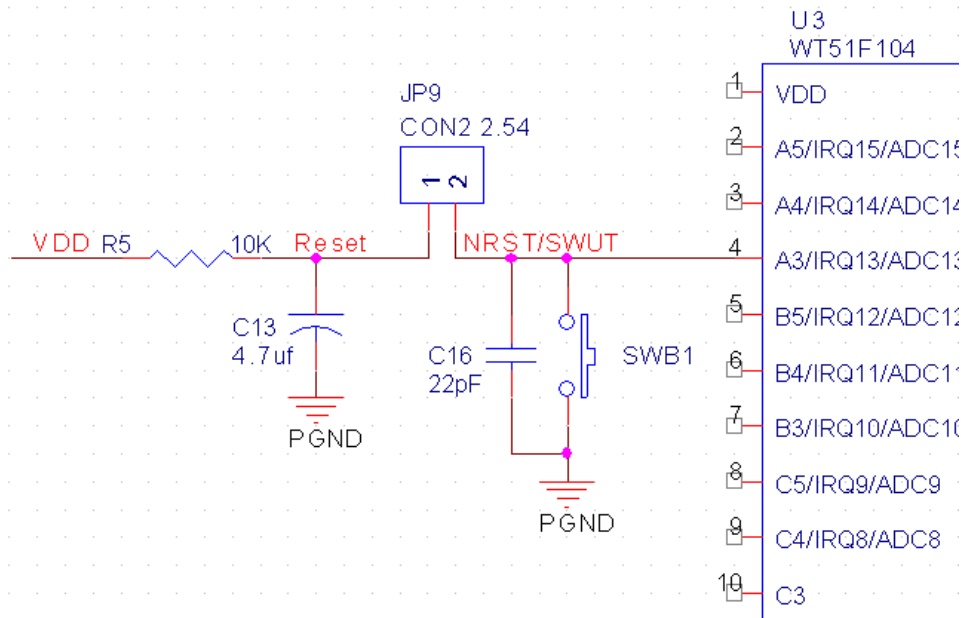
3.3 power Circuit

VDD input needs filter capacitor, this is best that layout is close to the pin.



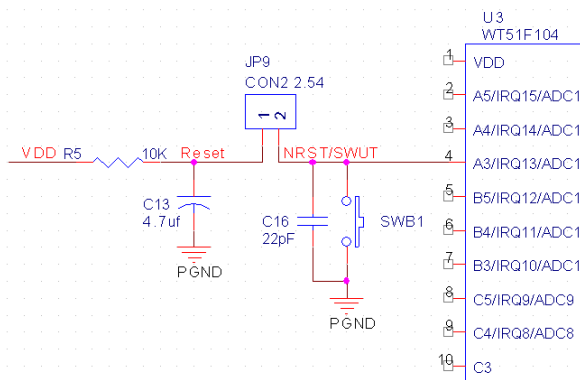
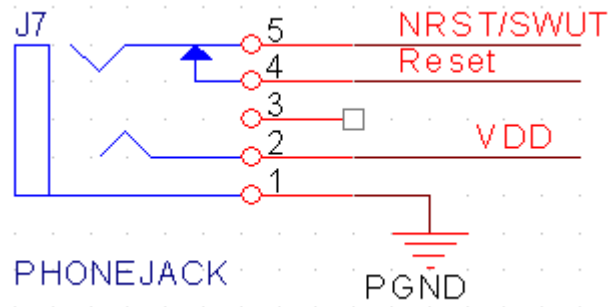
3.4 RESET Circuit

WT51F104 RESET circuit and SWUT (single wire programming) use the same pin, the related circuit as below:
When SWUT is on programming, JP9 JUMP should be removed, and do not connect with external RC RESET.
If the RESET functions had been used, when programming is finished, JP6 JUMP needs to plug again.



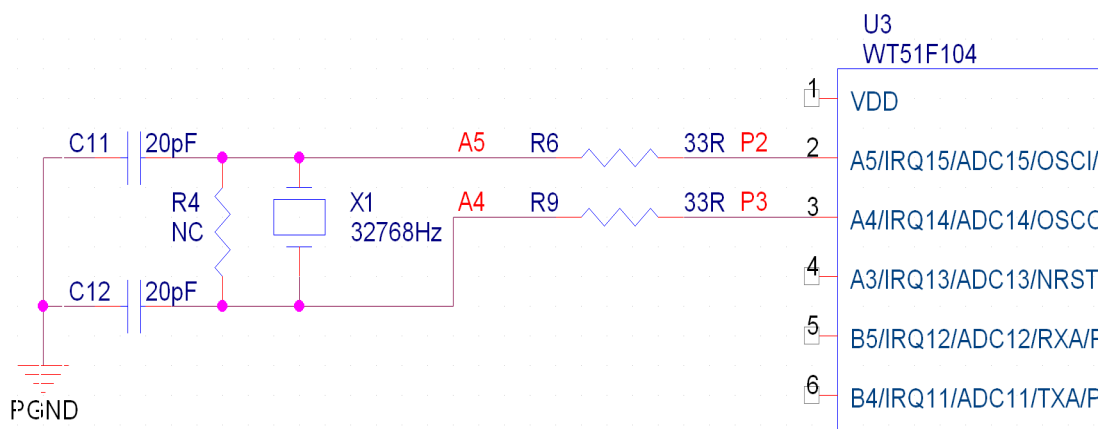
3.5 Single Wire Earphone Jack Interface Circuit

Since reset WT56F216 circuit and SWUT single wire burning both used the same pin, for update easily when mass production design the below circuit, when plugs the earphone programming line, the RESET/SWUT (4-5) will break, and start to program, after programming finished, removes the earphone programming line, the springs of earphone jack let RESET/SWUT (4-5) short, and RC will go back to RESET state.



3.6 Oscille Circuit

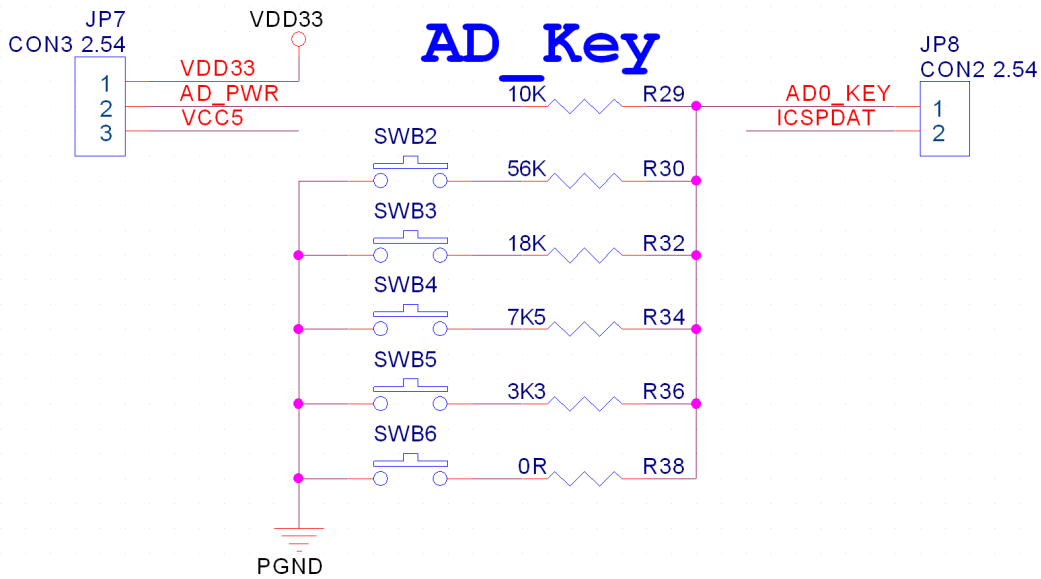
WT51F104 oscillate circuit as below:



3.7 Button function

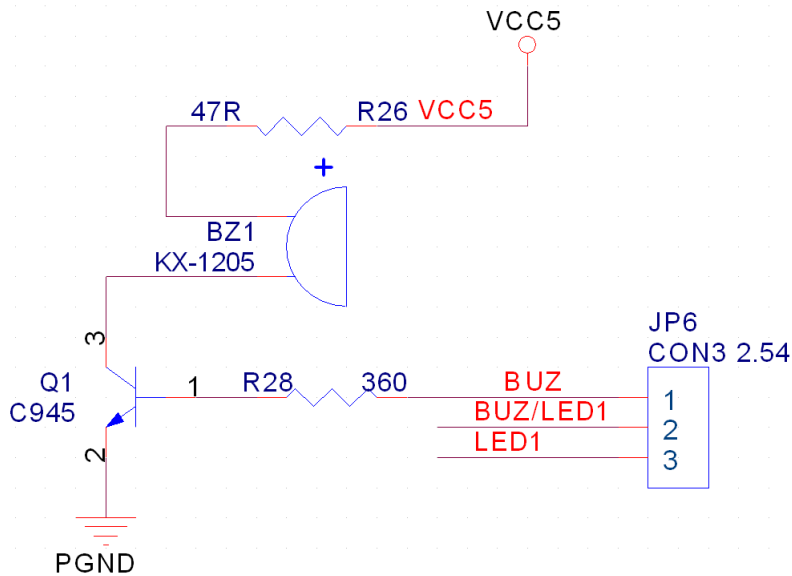
WT51F104 Starter Kit Board reserve five function buttons (AD_KEY).

1. Up (UP/SWB2)
2. Left (LEFT/SWB3)
3. Mode/Enter (Enter/SWB4) Mode (3~4 seconds press)/Enter (short press)
4. Right (RIGHT/SWB5)
5. Down (Down/SWB6)



3.8 BUZZER Circuit

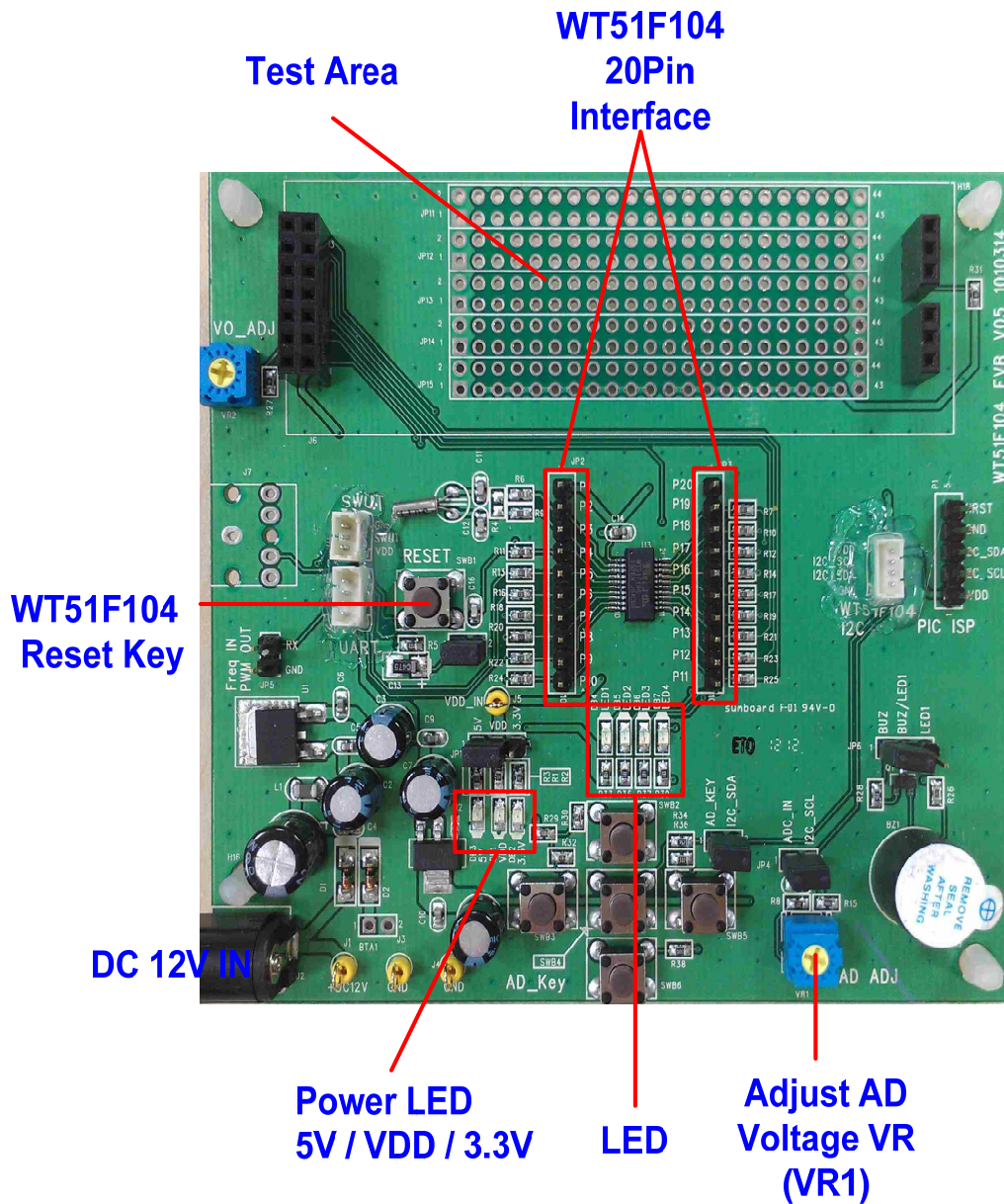
BUZZER Circuit as below.



Chapter 4 WT51F104 Starter Kit Board Operation Manual

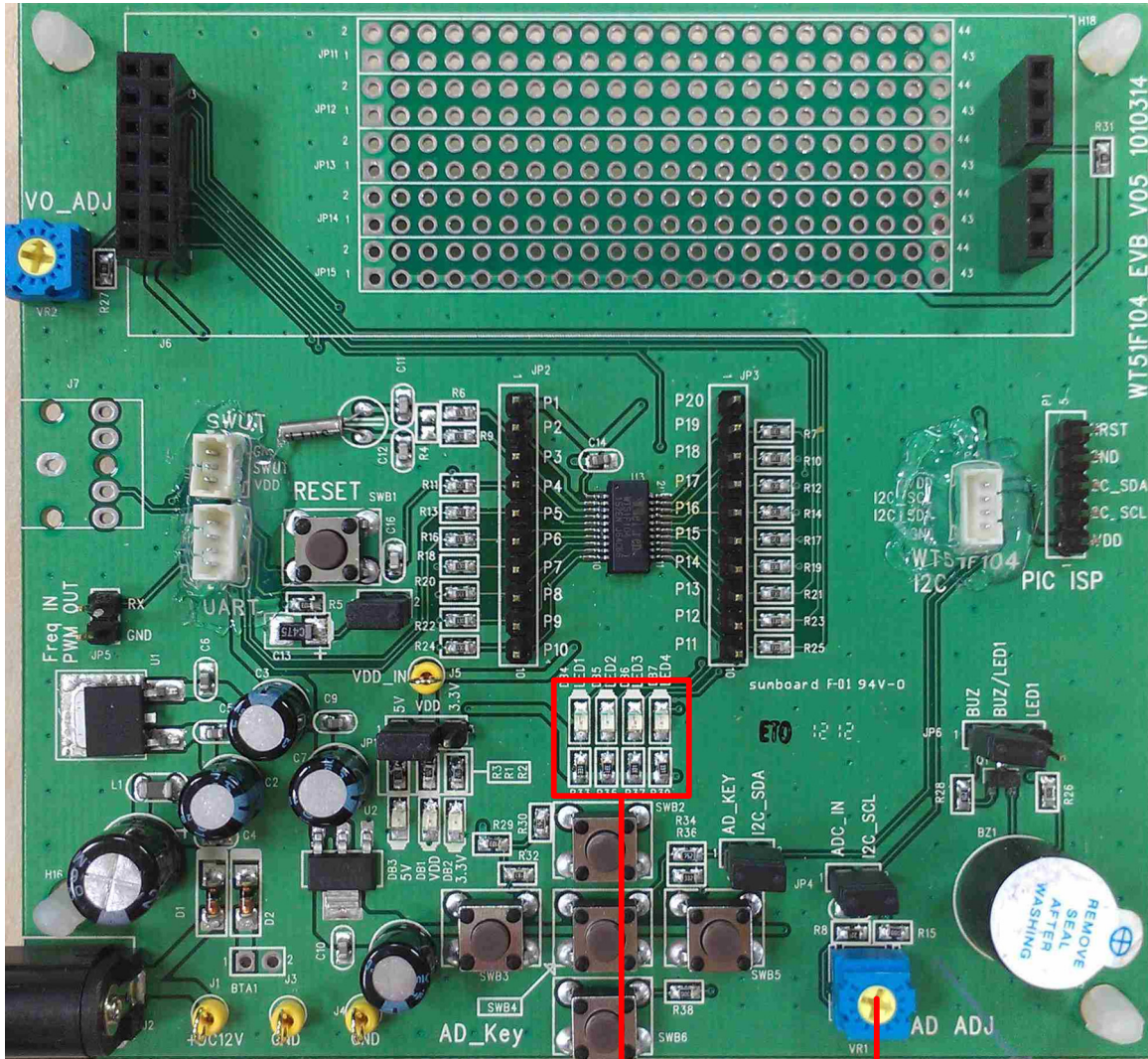
4.1 WT51F104 Testing and Demonstrate Platform

WT51F104 Starter Kit Board built in a single and easy led flash to display function and reserve some pin for testing development.



4.2 LED Display

After power on, LED will alternately blink on the EVB board. Meanwhile adjusting VR1 can change LED blinking speed.



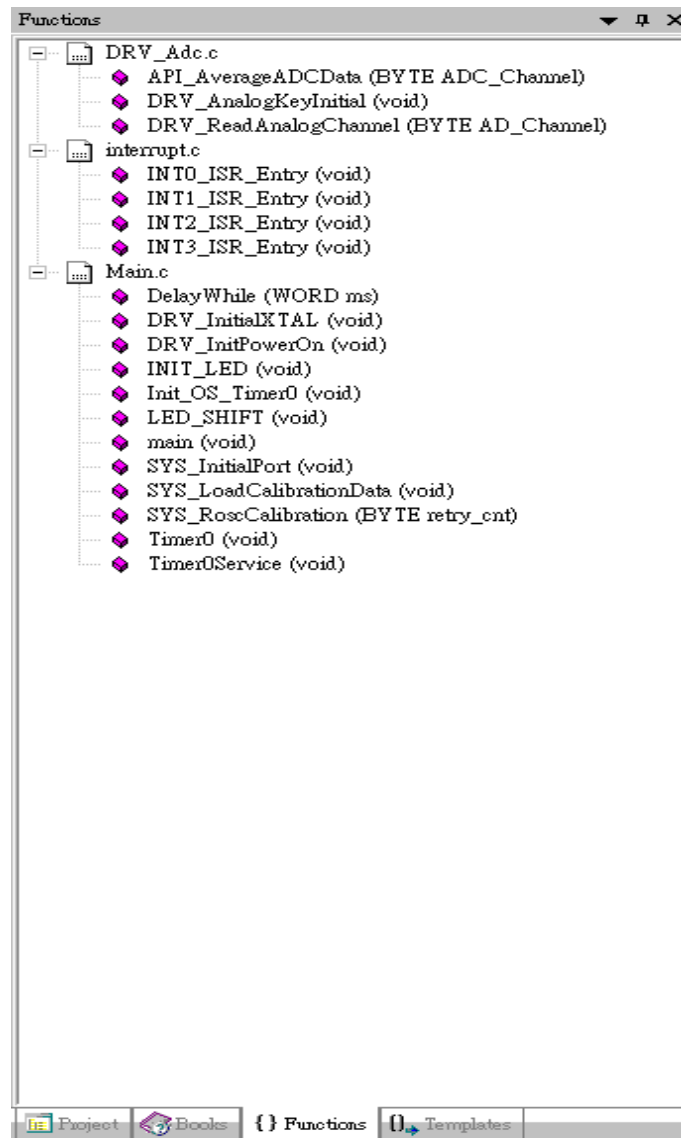
LED Display

Adjust AD Voltage VR (VR1)

Chapter 5 Driver Module

5.1 Driver Module Summary

Please refer to the driver module display, as below:



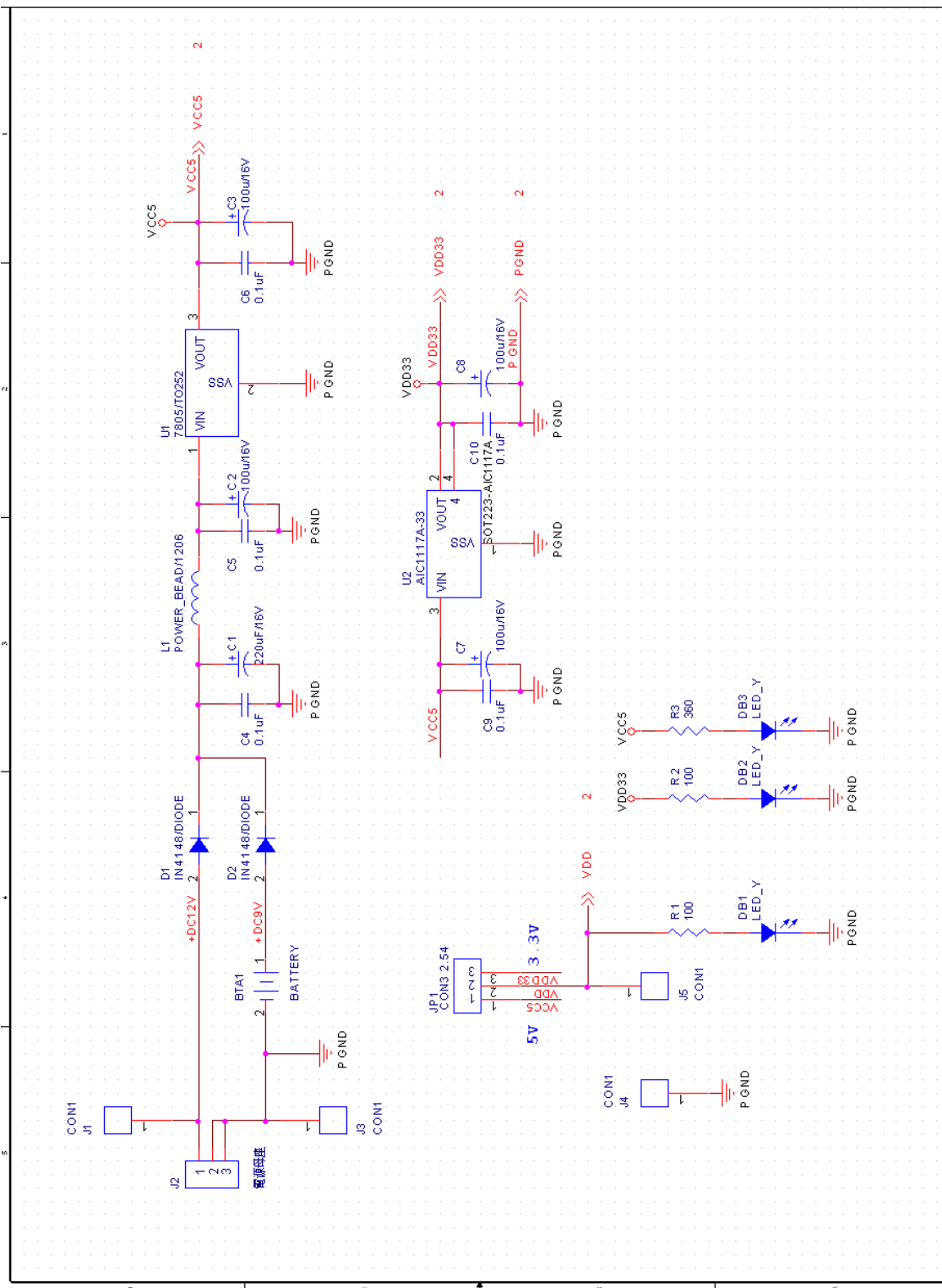
5.2 LED Driver Module <LED.C>

Function	Description
void INIT_LED(void)	Initializes "LED" (driver level)
void LED_SHIFT (void)	Turn run "LED" light (application level)

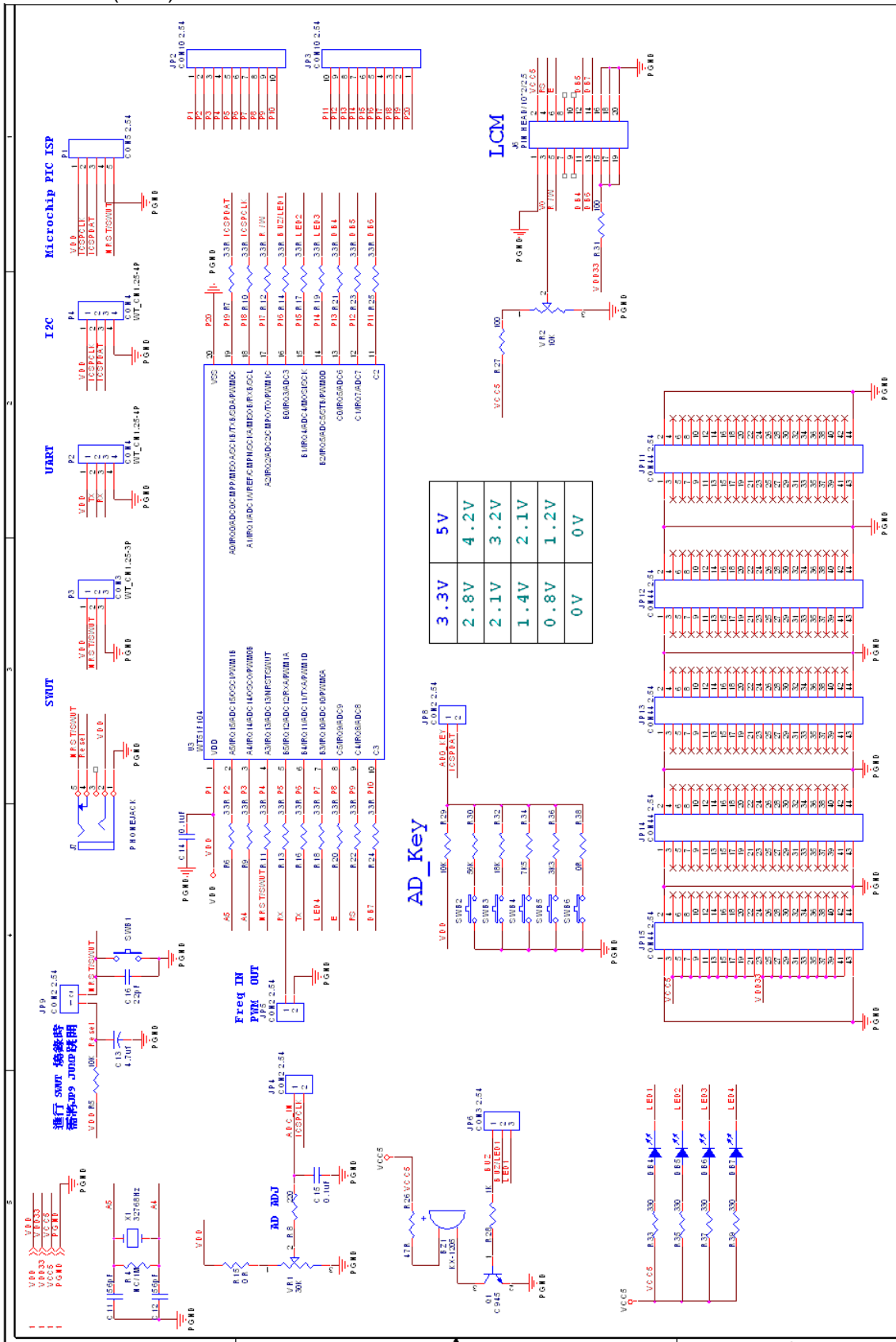
Chapter 6 Appendix

6.1 Circuit

1. Power



2. WT51F104 (MCU)



6.2 BOM

WT51F104 EVB BOM				
Item	Quantity	Reference	Part	PCB Footprint
1	1	C16	22pF	SC0603
2	2	C11,C12	56pF	SC0603
3	7	C4,C5,C6,C9,C10,C14,C15	0.1uF	SC0603
4	1	C13	4.7uf	SCE-A
5	4	C2,C3,C7,C8	100u/16V	DCE030
6	1	C1	220uF/16V	DCE035
7	2	R15,R38	OR	SR0603
8	18	R6,R7,R9,R10,R11,R12,R13,R14,R16,R17, R18,R19,R20,R21,R22,R23,R24,R25	33R	SR0603
9	1	R26	47R	SR0603
10	4	R1,R2,R27,R31	100	SR0603
11	1	R8	220	SR0603
12	4	R33,R35,R37,R39	330	SR0603
13	1	R3	360	SR0603
14	1	R28	1K	SR0603
15	1	R36	3K3	SR0603
16	1	R34	7K5	SR0603
17	2	R5,R29	10K	SR0603
18	1	R32	18K	SR0603
19	1	R30	56K	SR0603
20	1	Q1	C945	SOT23
21	3	DB1,DB2,DB3	LED_Y	SLED0805
22	2	DB4,DB6	LED_BLUE	SLED0805
23	2	DB7,DB5	LED_YELLOW	SLED0805
24	2	D2,D1	IN4148/DIODE	DIODESMD
25	2	JP6,JP1	CON3 2.54	CM-3-2.54
26	2	JP3,JP2	CON10 2.54	CM-10-2.54
27	4	JP4,JP5,JP8,JP9	CON2 2.54	CM-2-2.54
28	5	JP11,JP12,JP13,JP14,JP15	CON44 2.54	HEADER2X22-2.54
29	4	J1,J3,J4,J5	CON1	TESTPIN_H2XP2.5
30	1	J2	電源母座	JACK-3P
31	1	J6	PIN HEAD/10*2/2.5	DISPLY_VC1624
32	1	J7	PHONEJACK	PHONE_JACK
33	1	L1	POWER_BEAD/1206	SL1206
34	1	P1	CON5 2.54	CM-5-2.54
35	2	P4,P2	CON4	WT_CN1.25-4P
36	1	P3	CON3	WT_CN1.25-3P
37	1	BTA1	BATTERY	CM-2-2.54
38	1	BZ1	KX-1205	KX-1205
39	6	SWB1,SWB2,SWB3,SWB4,SWB5,SWB6	POWER ON	KEY
40	1	U1	7805/TO252	TO252
41	1	U2	AIC1117A-33	SOT223-AIC1117A
42	1	U3	WT51F104	SSOP20-WT69P5
43	1	VR1	30K	VR3-DIPA
44	1	VR2	10K	VR3-DIPA
45	1	X1	32768Hz	XTAL-CRY32

6.3 Ordering information

1. WT51F104 Development Kit

Kit	Product Name	Number
WT51F104 Development Kit	WLINK-SWUT x 1	WA000
	Development and Demo Board (WT51F104 EVB With LCM Module) x 1	WB001
	SWUT Programming Cable x 1	

2. WT51F104 Starter Kit

Kit	Product Name	Number
WT51F104 Starter Kit	WLINK-SWUT x 1	WA000
	(WT51F104 Starter Kit Board) x 1	WB006
	SWUT Programming Cable x 1	

3. WT51F104 Development and Demo Board

Kit	Product Name	Number
WT51F104 Development and Demonstrate Board	Development and Demo Board (WT51F104 EVB With LCM Module)	WB001
	EVB Operation Manual	DOC13

4. WT51F104 Starter Kit Board (simple version)

Kit	Product Name	Number
WT51F104 Simple version	Simple version (WT51F104 Starter Kit Board)	WB006
	EVB Operation Manual	DOC24

5. Single Wire Programming Board (WLINK-SWUT)

Kit	Product Name	Number
Single Wire Programming Board WLINK-SWUT	Single Wire Programming Board PL-2303 (WLINK-SWUT)	WA000
	Single Wire Programming Board CP-2102 (WLINK-SWUT)	
	WLINK-SWUT Operation Manual	DOC2