

WT56F108
Starter Kit Board
Operation Manual
REV. 1.0
January 31, 2013

Ver.	Date	Applicant	Description
1.0	2013/01/31	Louis	1 st version

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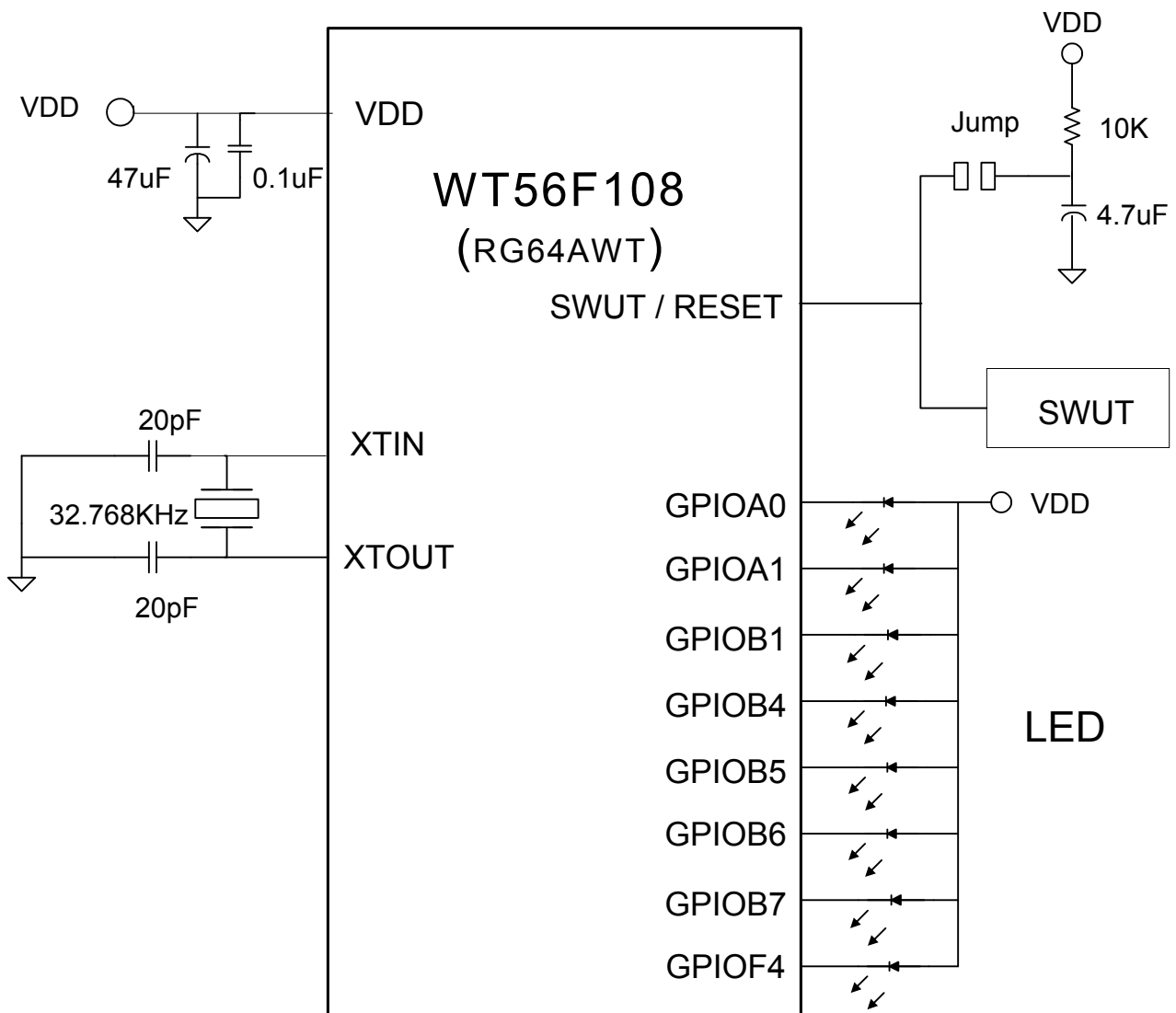
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Chapter 1 WT56F108 Starter Kit Board Hardware Description

1.1 System Block Diagram

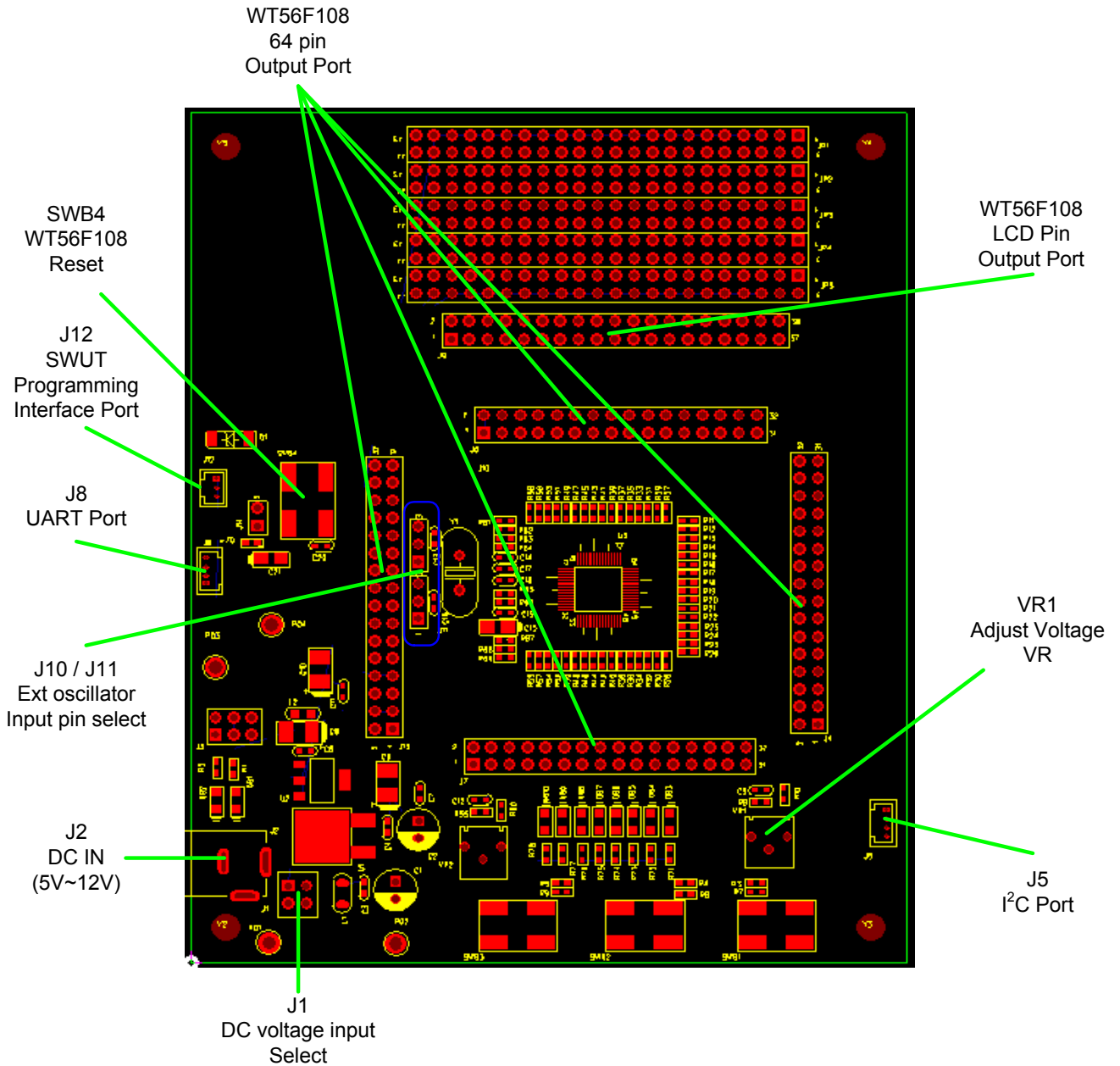
WT56F108 is an enhanced 8052 micro controller with LCD driver function, and the Starter Kit Board used 64-pin LQFP type IC to design and demonstrate its functions. System structure is as the figure below.

➤ WT56F108-RG64AWT PKG Type



1.2 EVB Components Location Description

➤ WT56F108-RG64AWT PKG Type

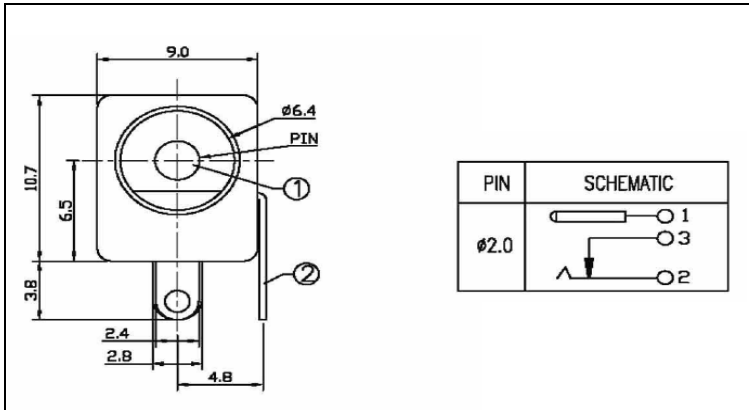


Chapter 2 WT56F108 Starter Kit Board Connecting Port Description

2.1 DC Input Connector

Components Location (J2)

This is EVB DC voltage input connector port (supporting voltage DC 5V~12V)



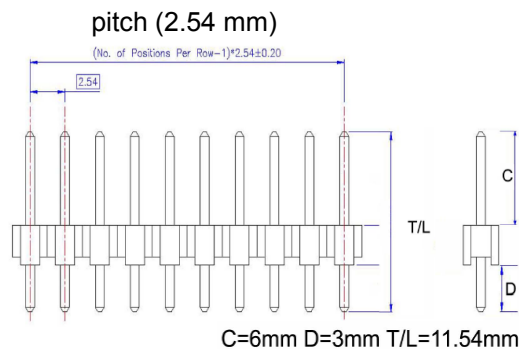
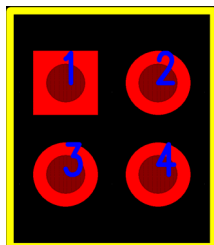
Pad Number	Description
1	Positive Input Pin
2	--
3	Negative Input Pin

2.2 DC Input Voltage Selection

Components Location (J1)

This is DC input voltage selection socket. Transformer:

1. When DC is 5V (Jump 1-2 short)
2. When DC is 9V~12V (Jump 3-4 short)



Jump (2.54 mm)

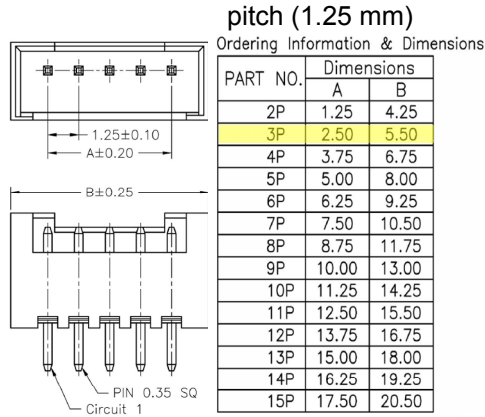
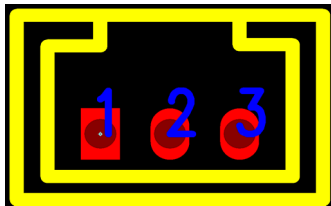


Pad Number	Description
1-2	DC 5V INPUT (Jump 1-2 short)
3-4	DC 9V~12V INPUT (Jump 3-4 short)

2.3 SWUT (Single Wire UART) Interface Programming Port

Components Location (J12)

This is WT56F108 single wire programming port

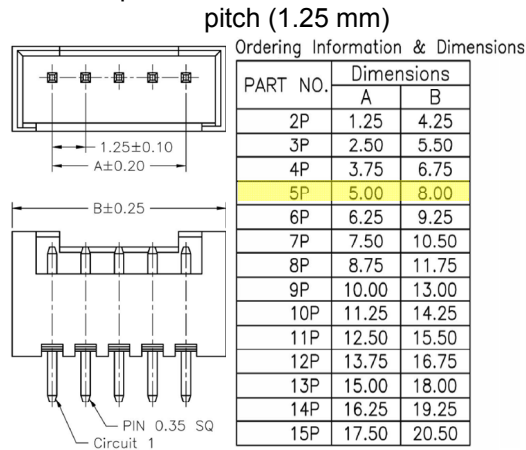
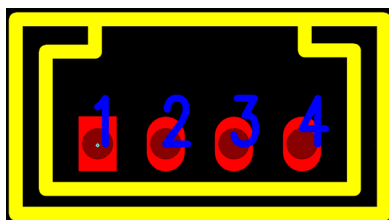


Pad Number	Description
1	VDD
2	SWUT
3	GND

2.4 UART Interface Connector Port

Components Location (J8)

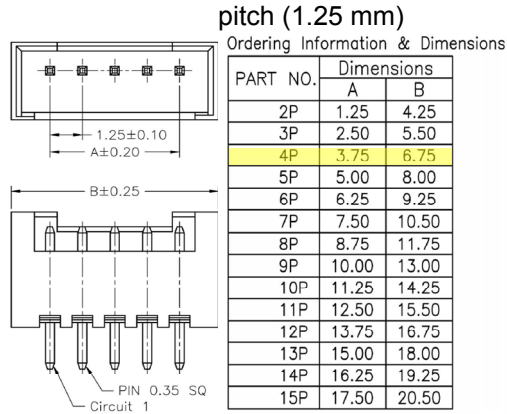
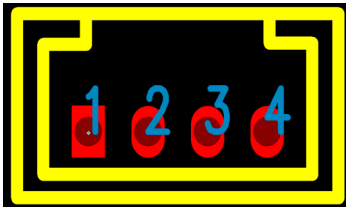
This is UART serial transmission interface connector port



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

2.5 I²C Interface Port

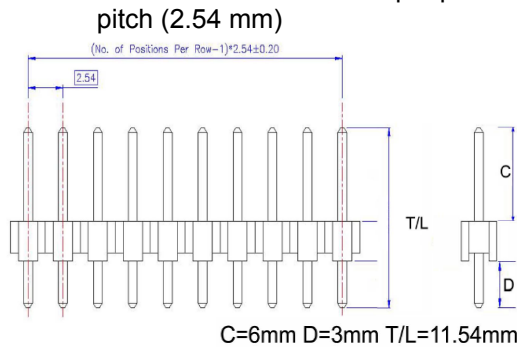
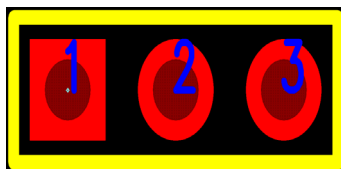
Components Location (J5)
This is SLAVE I²C Interface port



Pad Number	Description
1	VDD
2	Slave_SCL
3	Slave_SDA
4	GND

2.6 External Oscillator Input Pin Selection

Components Location (J10 / J11)
This is input pin selection socket that is for external oscillator. WT56F108 offers two sets input pin for external oscillator.
Starter Kit Board reserved socket it can offer external oscillator input pin.



Jump (2.54 mm)

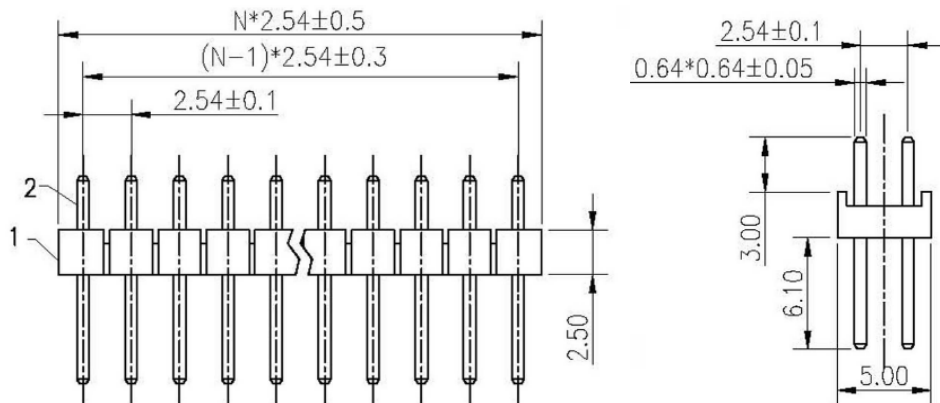
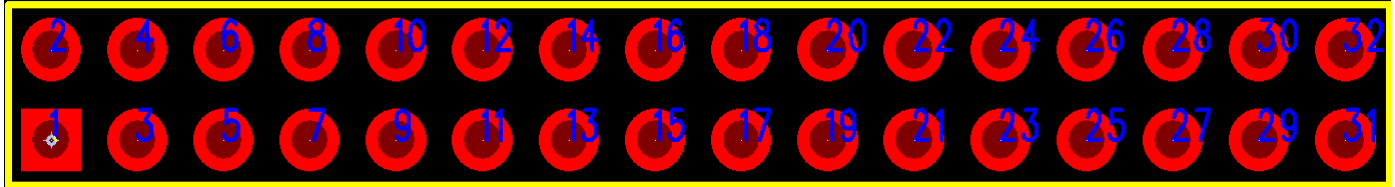


J10		J11	
Pad Number	Description	Pad Number	Description
1	MOSCI 1	1	MOSCO 1
2	MOSCI	2	MOSCO
3	MOSCI 2	3	MOSCO 2

2.7 WT56F108 Pin Output Port

Components Location (J6 /J13 /J7 /J4)

This is WT56F108 pin output port, it is for customer's external testing use.



WT56F108-RG64AWT PKG Type

J6		J13	
Pad Number	Description	Pad Number	Description
1-2	GPIOG0/SEG0	1-2	GPIOA3DH/PWM0B/IRQ1/ETMIB
3-4	GPIOG1/SEG1	3-4	GPIOA4DH/MOSCO1
5-6	GPIOG2/SEG2	5-6	GPIOA5DH/MOSCI1
7-8	GPIOG3/SEG3	7-8	VDD
9-10	GPIOG4/SEG4	9-10	GPIOA6DH/TXA
11-12	GPIOG5/SEG5	11-12	GPIOA7DH/RXA/P00/IRQ0/ETMIA
13-14	GPIOG6/SEG6	13-14	VSS
15-16	GPIOG7/SEG7	15-16	NRST/SWUT
17-18	GPIOF5/SEG8	17-18	VLCD3
19-20	GPIOF6/SEG9	19-20	VLCD2
21-22	GPIOF7/SEG10	21-22	VA
23-24	GPIOE0/SEG11	23-24	VB
25-26	GPIOE1/SEG12	25-26	GPIOF0/COM0/MOSCI2
27-28	GPIOE2/SEG13	27-28	GPIOF1/COM1/MOSCO2

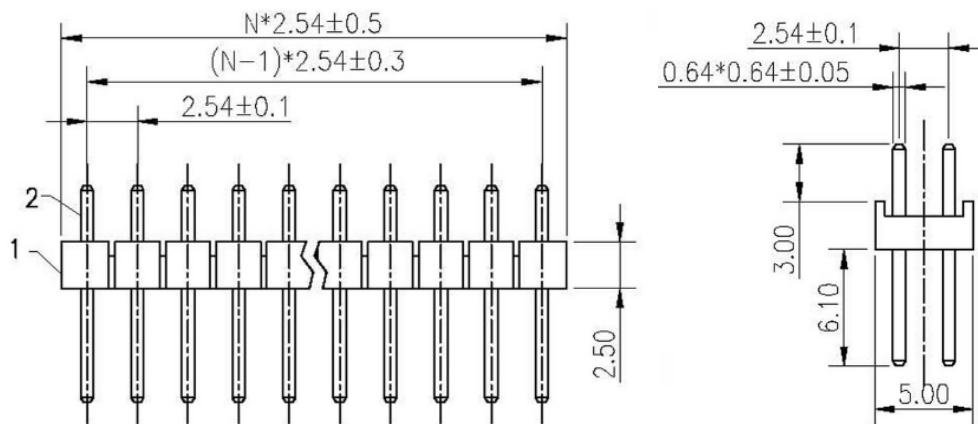
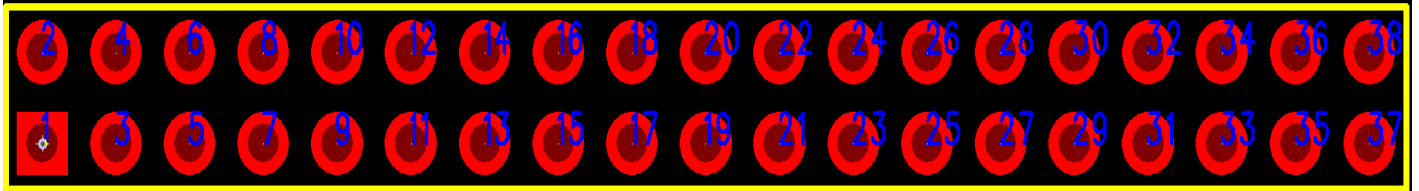
J6		J13	
Pad Number	Description	Pad Number	Description
29-30	GPIOE3/SEG14	29-30	GPIOF2/COM2
31-32	SEG15	31-32	GPIOF3/COM3

J7		J4	
Pad Number	Description	Pad Number	Description
1-2	GPIOA2DH/VREF/PWM0A/P01/IRQ2	1-2	GPIOC3/SEG31
3-4	GPIOA1DH/ADC11/PWM1A/P02/IRQ3/ ETMIC	3-4	GPIOC2/SEG30
5-6	GPIOA0DH/ADC10/P03/IRQ4/ETMO	5-6	GPIOC1/SEG29
7-8	GPIOB7DH/ADC9/PWM1B/IRQ5	7-8	GPIOC0/SEG28
9-10	GPIOB6DH/ADC8	9-10	GPIOD7/SEG27
11-12	GPIOB5DH/ADC7/IRQ6	11-12	GPIOD6/SEG26
13-14	GPIOB4DH/ADC6/PWM0C/IRQ7	13-14	GPIOD5/SEG25
15-16	GPIOF4/ADC5	15-16	GPIOD4/SEG24
17-18	GPIOB3/SEG39/ISP_SCL/RXB	17-18	GPIOD3/SEG23
19-20	GPIOB2/SEG38/ISP_SDA/TXB	19-20	GPIOD2/SEG22
21-22	GPIOB1/SEG37/ADC4	21-22	GPIOD1/SEG21
23-24	GPIOB0/SEG36/ADC3	23-24	GPIOD0/SEG20
25-26	GPIOC7/SEG35/ADC2	25-26	GPIOE7/SEG19
27-28	GPIOC6/SEG34/ADC1	27-28	GPIOE6/SEG18
29-30	GPIOC5/SEG33/ADC0	29-30	GPIOE5/SEG17
31-32	GPIOC4/SEG32	31-32	GPIOE4/SEG16

2.8 LCD Pin Output Port

Components Location (J9)

The port is WT56F108 supporting LCD pin output port, it's for customer's external testing use.



J9			
Pad Number	Description	Pad Number	Description
1	SEG0	2	SEG1
3	SEG2	4	SEG3
5	SEG4	6	SEG5
7	SEG6	8	SEG7
9	SEG8	10	SEG9
11	SEG10	12	SEG11
13	SEG12	14	SEG13
15	SEG14	16	SEG15
17	SEG16	18	SEG17
19	SEG18	20	SEG19
21	SEG20	22	SEG21
23	SEG22	24	SEG23
25	SEG24	26	SEG25

J9			
Pad Number	Description	Pad Number	Description
27	SEG26	28	SEG27
29	SEG28	30	SEG29
31	SEG30	32	SEG31
33	SEG32	34	NC
35	COM0	36	COM1
37	COM2	38	COM3

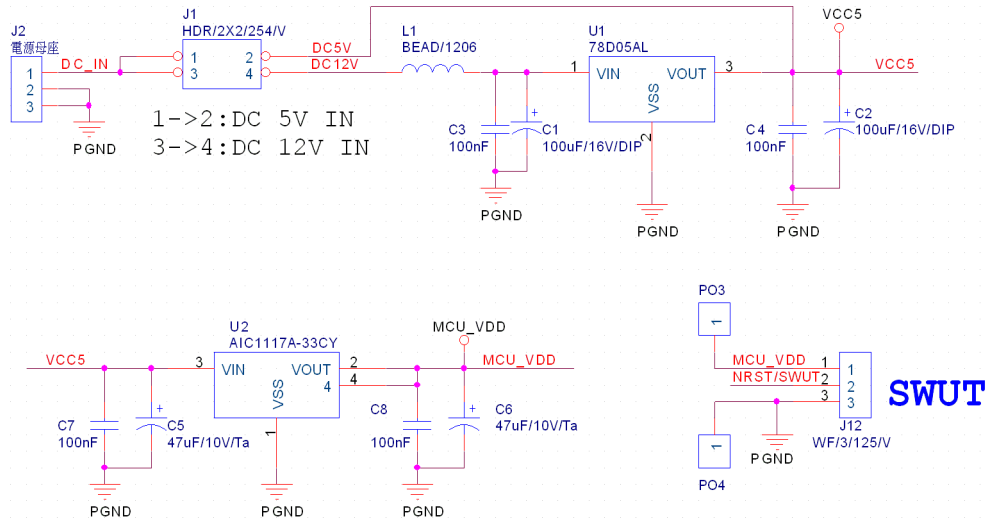
Chapter 3 WT56F108 Starter Kit Board Circuit Description

3.1 VDD Power Selection:

There are three options for WT56F108 Starter Kit Board VDD power.

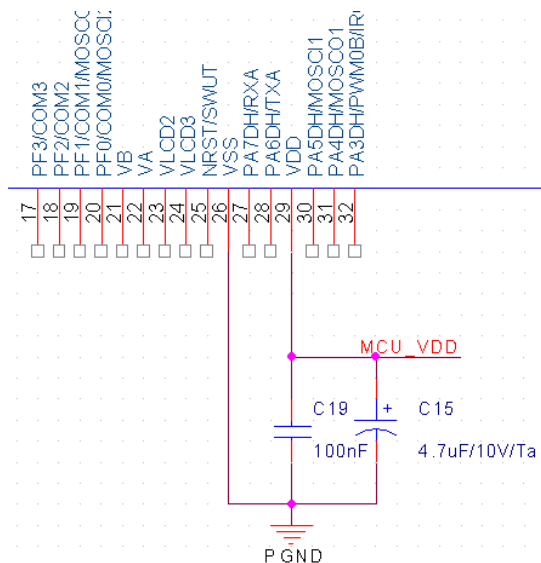
(External input power must not exceed Max. 3.6V as spec. definition).

1. J1 DC Jack: Means the power can supply from transformer, DC input voltage (5V~12V), from LDO offers WT56F108 VDD power. (The options way: please refer to the 2.2 DC input voltage selection)
2. WLINK-SWUT VDD: Use VDD of WLINK-SWUT as WT56F108 VDD power.
3. External VDD: You can input from PO3 pin (positive), PO4 is negative power , external VDD input don't exceed the definition of specification.(Max. 3.6V)



3.2 Power Circuit

VDD power input must have filter capacitance, its position more closed the pin is better.

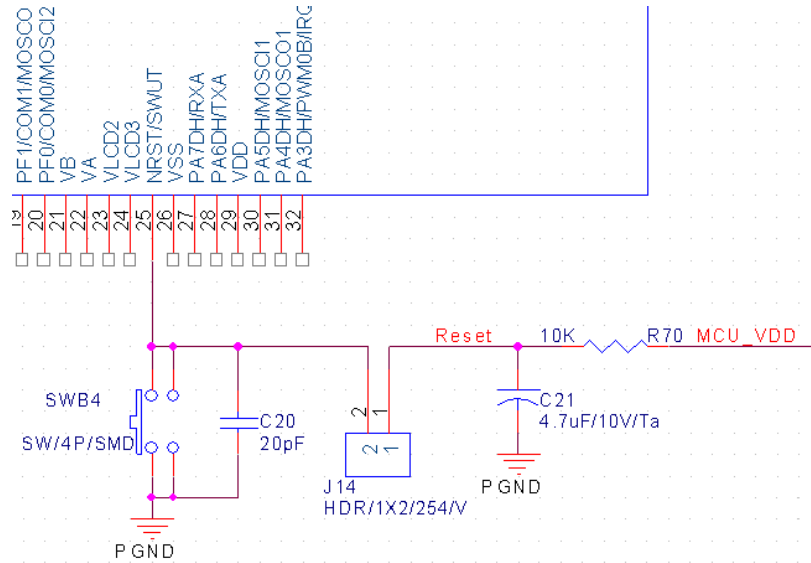


3.3 RESET Circuit

WT56F108 RESET circuit and SWUT (single-wire programming) use the same pin, the related circuit as the figure below:

When SWUT on programming the J14 JUMP should be removed, and disconnect from the external RC RESET .

After programming finished, J14 should be plugged back, if the REST function had been used.

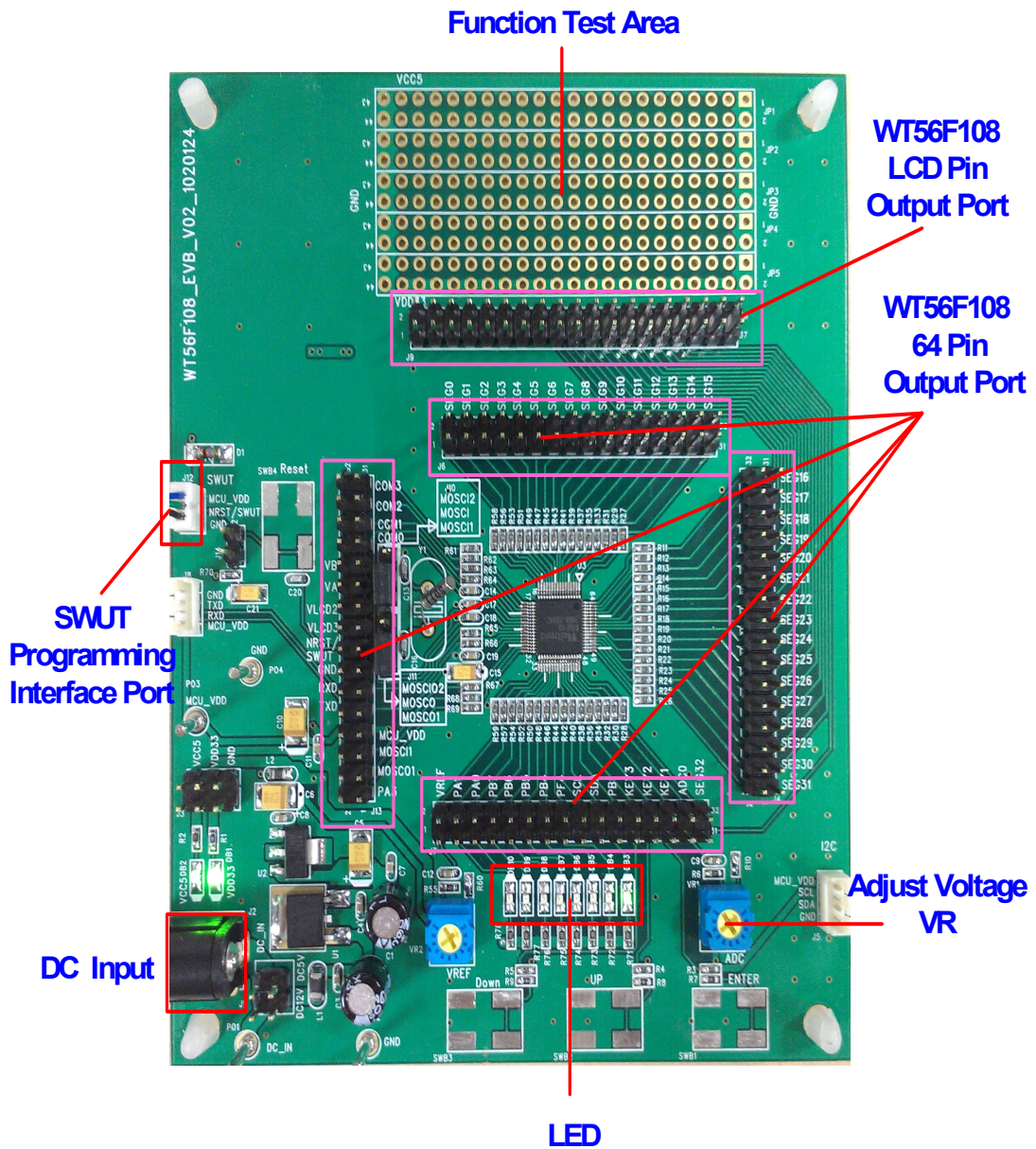


Chapter 4 WT56F108 Starter Kit Board Operation Manual

4.1 WT56F108 Test and Demonstration Platform

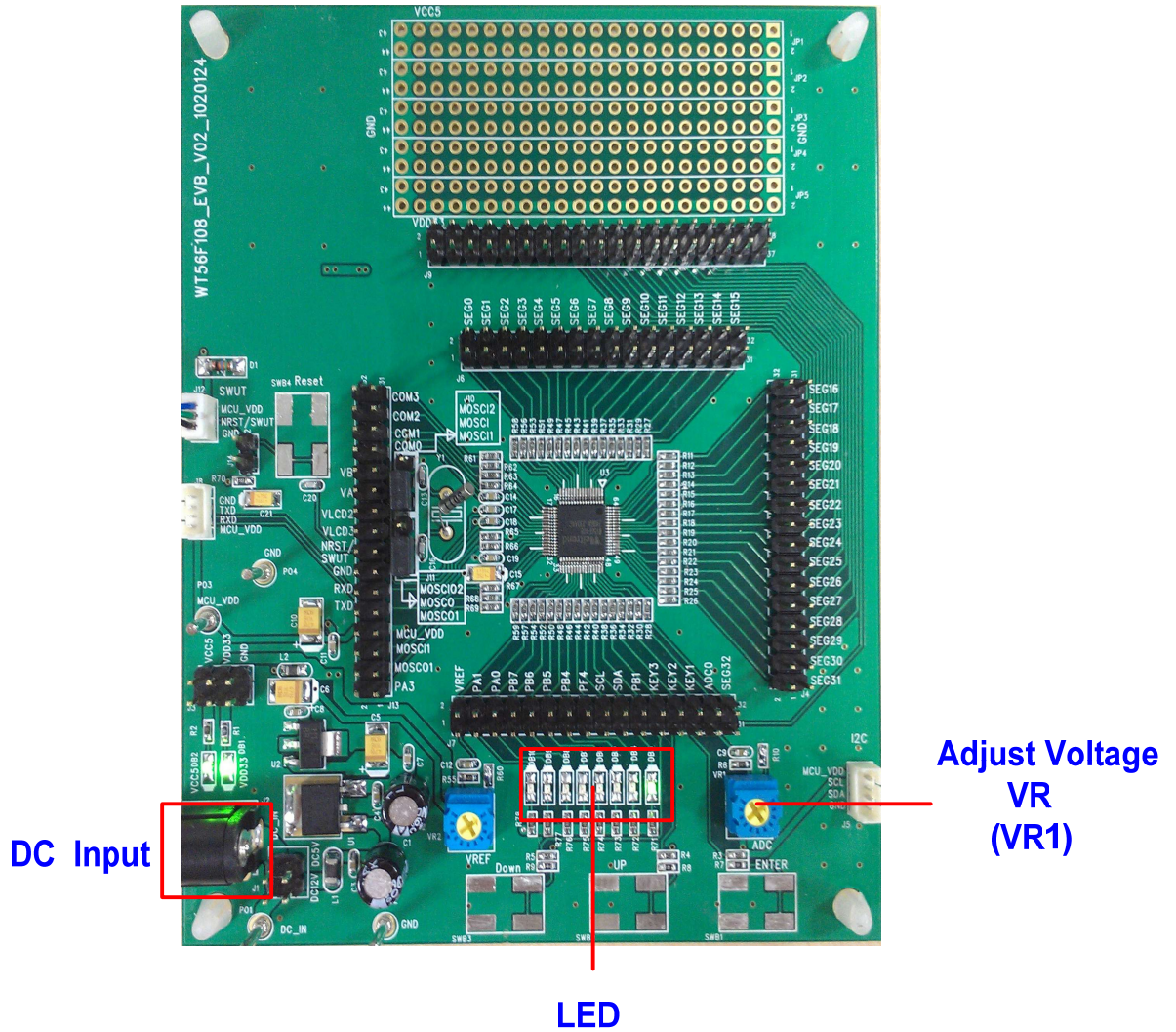
WT56F108 Starter Kit Board built-in a single and easy LED flash to display functions, and Starter Kit Board reserve some pin for testing usage.

- Starter Kit Board outline (WT56F108-RG64AWT PKG Type)



4.2 LED Display

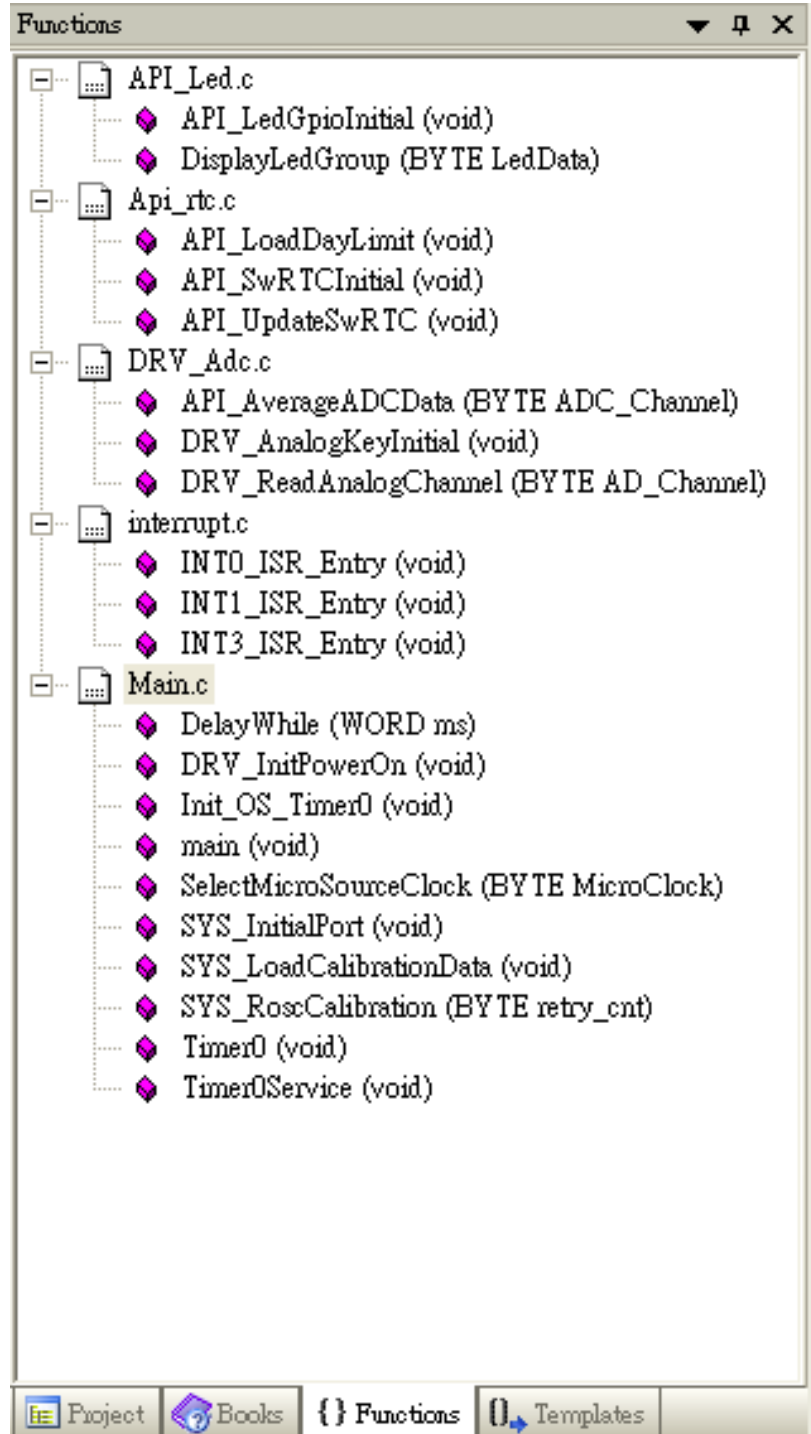
After power on, LED will alternately blink on the EVB board. Meanwhile adjusting VR1 can change LED blinking speed.



Chapter 5 Driver Module

5.1 Driver Module Summary

Please refer to the driver module display, as below:



5.2 Main Programs <Main.c>

Function	Description
Function	Description
void DelayWhile(WORD ms)	NOP Delay sub program
void DRV_InitPowerOn(void)	Call Timer 0 and ADC to initialize the functions
void Init_OS_Timer0(void)	Initialize Timer 0 count 10ms generate an interrupt
VoidSelectMicroSourceClock(BYTE MicroClock)	MCU Source clock chooses internal IRC 12 MHz and enable external oscillator 32.768 kHz
void SYS_InitialPort(void)	All GPIO initialized to the input port and Enable internal pull-up resistor
void SYS_LoadCalibrationData(void)	Load Default IRC 12 MHz correction value to register
void SYS_RoscCalibration(BYTE retry_cnt)	Auto calibration internal IRC 12 MHz $\pm 2\%$
void Timer0 (void) interrupt 1	Timer 0 interrupt sub program
void Timer0Service(void)	Timer 0service program

5.3 ADC Driver <DRV_Adc.c>

Function	Description
WORD API_AverageADCData(BYTE ADC_Channel)	Sampling analog to digital average (16 times)
void DRV_AnalogKeyInitial(void)	Initialize Analog to Digital convert
WORD DRV_ReadAnalogChannel(BYTE AD_Channel)	Assign channel executing Analog to Digital

5.4 LED Display Program <API_Led.c>

Function	Description
void API_LedGpioInitial(void)	Initialize LED pins as the output port
void DisplayLedGroup(BYTE LedData)	LED Display Producers

5.5 Watch Timer Program setup <Api_rtc.c>

Function	Description
void API_LoadDayLimit(void)	Counts of the number of days of the calendar Leap
void API_SwRTCInitial(void)	Initialize Watch Timer
void API_UpdateSwRTC(void)	Calendar counting program

5.6 Interrupt sub Program <Interrupt.c>

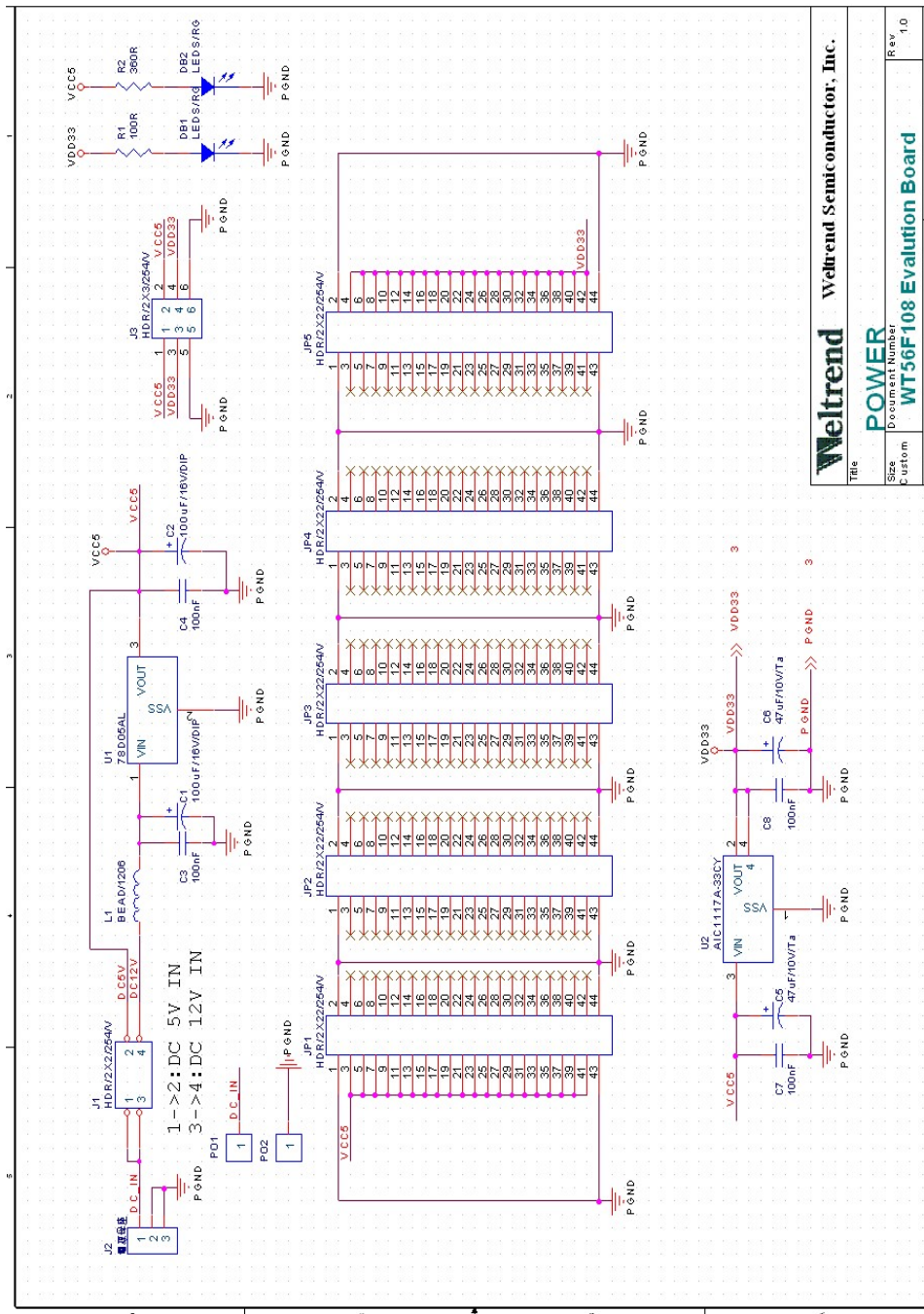
Function	Description
void INT0_ISR_Entry(void) interrupt 0	Watch Timer interrupt sub program

Chapter 6 Appendix

6.1 Circuit

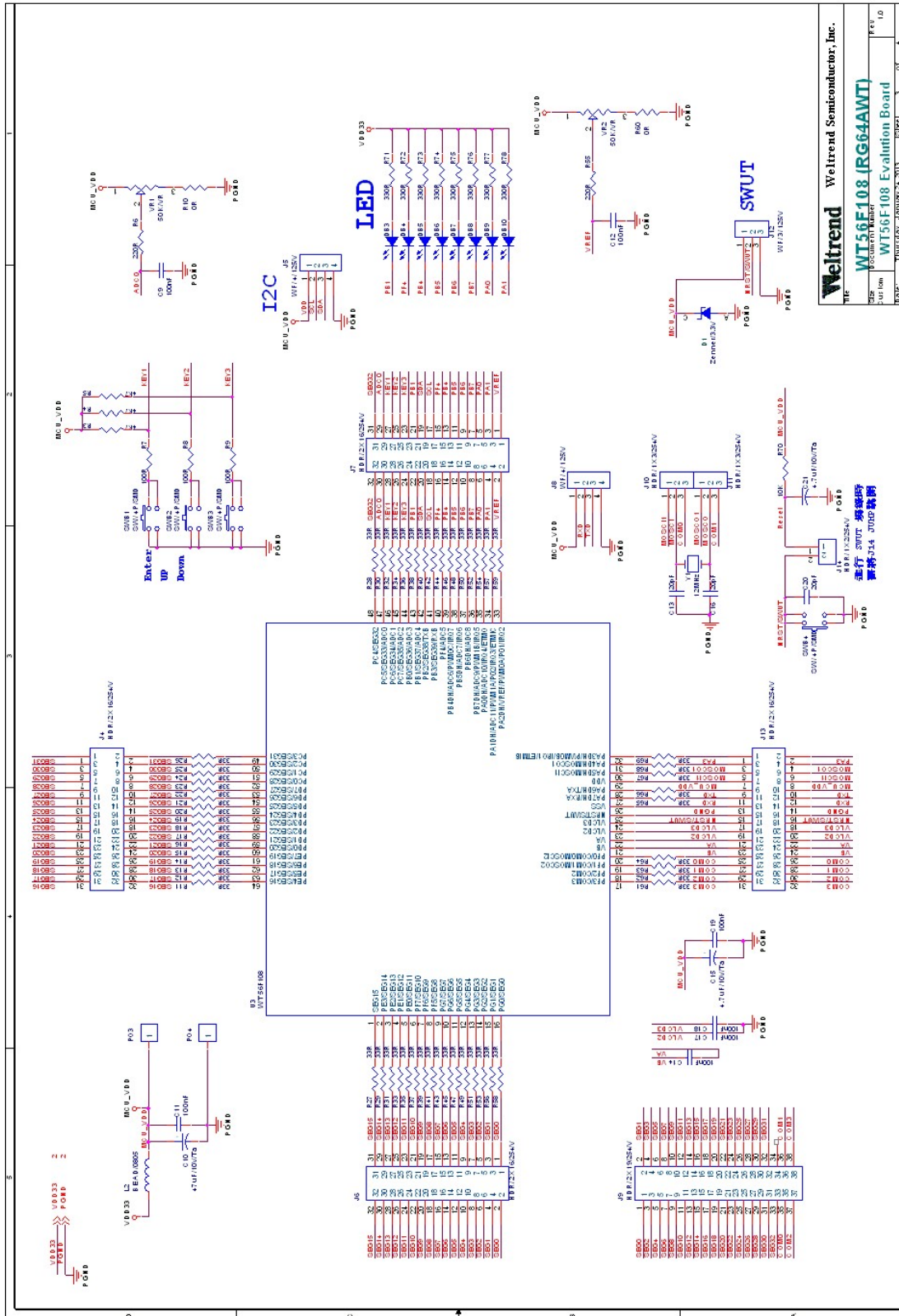
➤ Starter Kit Board circuit (WT56F108-RG64AWT PKG Type)

1. Power



Weltrend Semiconductor, Inc.
POWER
 Document Number
WT56F108 Evolution Board
 Size Custom
 Date: Wednesday, January 23, 2013 Sheet 2 of 4
 Rev 1.0

2. MCU WT56F108



Weltrend Weltrend Semiconductor, Inc.
WT56F108 (RG64AWT)
 WT56F108 Evaluation Board
 WT56F108-1.0

6.2 BOM

➤ Starter Kit Board BOM (WT56F108-RG64AWT PKG Type)

WT56F108 BOM				
Item	Quantity	Reference	Part	PCB Footprint
1	3	C13,C16,C20	20pF	SC0603
2	11	C3,C4,C7,C8,C9,C11,C12, C14,C17,C18,C19	100nF	SC0603
3	2	C21,C15	4.7uF/10V/Ta	SCE3216
4	3	C5,C6,C10	47uF/10V/Ta	SCE-B
5	2	C2,C1	100uF/16V/DIP	DCE030
6	2	R60,R10	OR	SR0603
7	57	R11,R12,R13,R14,R15,R16, R17,R18,R19,R20,R21,R22, R23,R24,R25,R26,R27,R28, R29,R30,R31,R32,R33,R34, R35,R36,R37,R38,R39,R40, R41,R42,R43,R44,R45,R46, R47,R48,R49,R50,R51,R52, R53,R54,R56,R57,R58,R59, R61,R62,R63,R64,R65,R66, R67,R68,R69	33R	SR0603
8	4	R1,R7,R8,R9	100R	SR0603
9	2	R55,R6	220R	SR0603
10	8	R71,R72,R73,R74,R75,R76, R77,R78	330R	SR0603
11	1	R2	360R	SR0603
12	3	R3,R4,R5	4K7	SR0603
13	1	R70	10K	SR0603
14	10	DB1,DB2,DB3,DB4,DB5,DB6, DB7,DB8,DB9,DB10	LED5/RG	SLED0805
15	1	D1	Zenner/3.3V	LL-34
16	5	JP1,JP2,JP3,JP4,JP5	HDR/2X22/254/V	Header2X22-2.54-V
17	1	J1	HDR/2X2/254/V	Header2X2-2.54-V
18	1	J2	電源母座	JACK-3P
19	1	J3	HDR/2X3/254/V	Header2X3-2.54-V
20	4	J4,J6,J7,J13	HDR/2X16/254/V	Header2X16-2.54-V
21	2	J5,J8	WF/4/125/V	Wafer4P-1.25-V
22	2	J101,J9	HDR/2X19/254/V	Header2X19-2.54-V
23	2	J10,J11	HDR/1X3/254/V	Header1X3-2.54-V
24	1	J12	WF/3/125/V	Wafer3P-1.25-V
25	1	J14	HDR/1X2/254/V	Header1X2-2.54-V
26	1	J102	LCD 4*32	LCD-GDE3900
27	1	L1	BEAD/1206	SL1206
28	1	L2	BEAD/0805	SL0805
29	4	PO1,PO2,PO3,PO4	TERMINAL/DIP	TESTPIN_H3XP1.9XSILK3.5
30	4	SWB1,SWB2,SWB3,SWB4	SW/4P/SMD	KEY_SMD
31	1	U1	78D05AL	TO252
32	1	U2	AIC1117A-33CY	SOT223
33	1	U3	WT56F108	WT59F064_LQFP64
34	2	VR2,VR1	50K/VR	VR3-DIP
35	1	Y1	12MHz	HC49US

6.3 Ordering Information

1. WT56F108 Starter Kit

Kit	Product Number	Number
WT56F108 Starter Kit	WLINK-SWUT x 1	WA000
	Development and Demo Board (WT56F108 Starter Kit Board) x 1	WB007
	SWUT Programming Wire x 1	

2. WT56F108 Starter Kit Board

Kit	Product Number	Number
WT56F108 Starter Kit Board	WT56F108 Starter Kit Board	WB007
	EVB Operation Manual	DOC27

3. Single Wire Programming Board (WLINK-SWUT)

Kit	Product Number	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