

WT56F216
Starter Kit Board
Operation Manual
REV. 1.0
April 24, 2012

Ver.	Date	Applicant	Description
1.0	2012/04/24	Louis	1 st version

Table of contents

CHAPTER 1 WT56F216 STARTER KIT BOARD H/W DESCRIPTION.....4

1.1 SYSTEM BLOCK DIAGRAM4

1.2 EVB COMPONENTS LOCATION6

CHAPTER 2 WT56F216 STARTER KIT BOARD I/O PORT DESCRIPTION.....8

2.1 DC INPUT CONNECTOR.....8

2.2 SWUT (SINGLE WIRE UART) PROGRAMMING INTERFACE PORT8

2.3 WT56F216 OUTPUT PIN PORT9

CHAPTER 3 WT56F216 STARTER KIT BOARD CIRCUIT DESCRIPTION 12

3.1 VDD POWER SELECTION:12

3.2 POWER CIRCUIT.....12

3.3 RESET CIRCUIT13

3.4 OSCILLATE CIRCUIT13

CHAPTER 4 WT56F216 STARTER KIT BOARD OPERATION MANUAL 14

4.1 WT56F216 TESTING AND DEMO PLATFORM14

4.2 LED DISPLAY15

CHAPTER 5 DRIVER MODULE 16

5.1 DRIVER MODULE SUMMARY16

5.2 MAIN PROGRAM <MAIN.C>17

5.3 ADC DRIVER <DRV_ADC.C>17

5.4 INTERRUPT SUB-PROGRAM <INTERRUPT.C>17

CHAPTER 6 APPENDIX 18

6.1 CIRCUIT18

6.2 BOM20

6.3 ORDERING INFORMATION21

Chapter 1 WT56F216 Starter Kit Board H/W Description

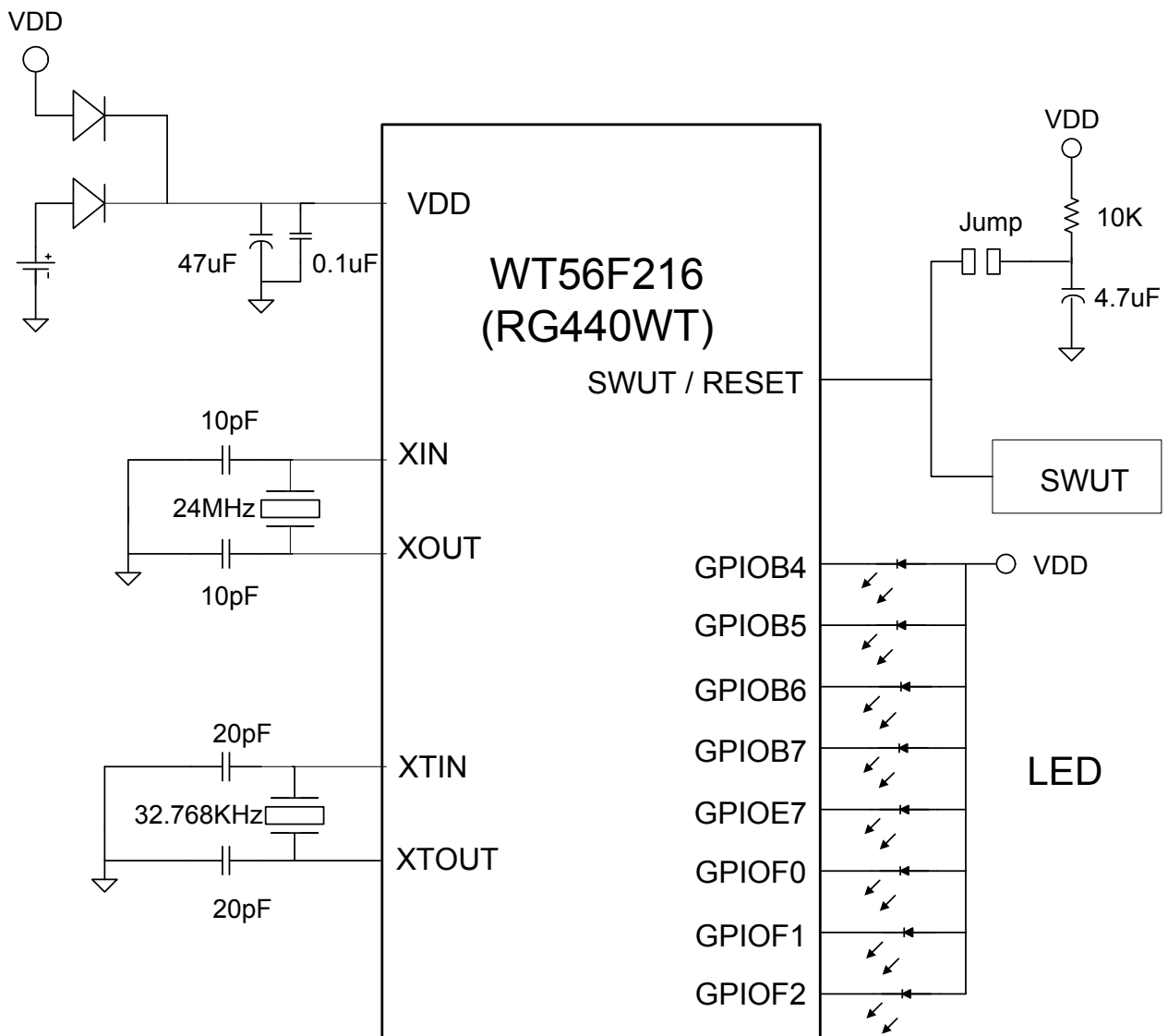
1.1 System Block Diagram

WT56F216 is an 8052 Micro Controller with LCD Driver functions enhanced, The Starter Kit Board was designed by QFP 44pin, the functions display and the system structure diagram as below.

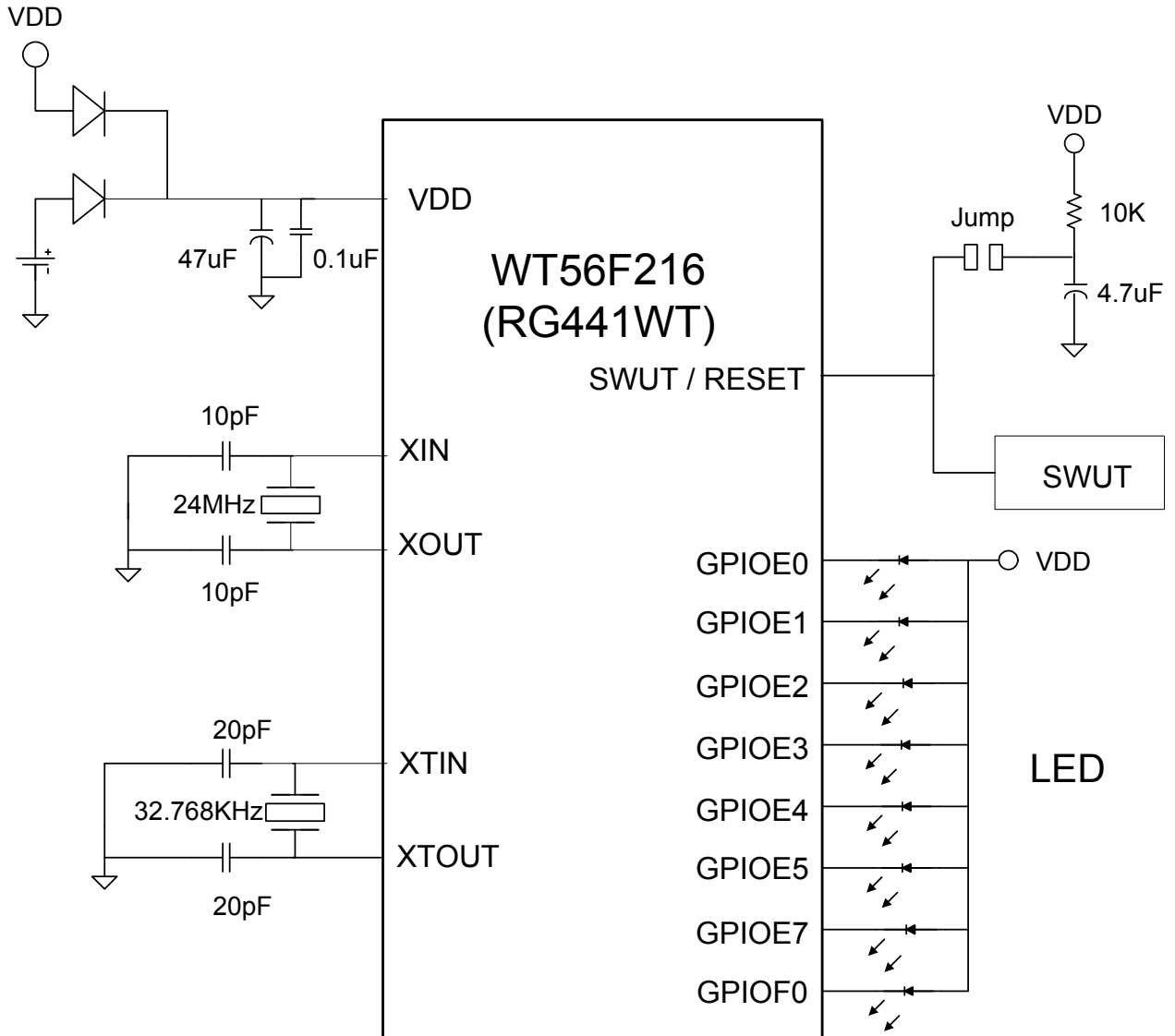
WT56F216 Starter Kit Boards have two versions.

1. WT56F216-RG440WT PKG type (the pin account is the same with Samsung-S3F9488)
2. WT56F216-RG441WT PKG type (the pin account is the same with Abov-MC80F7708)

➤ **WT56F216-RG440WT PKG type**

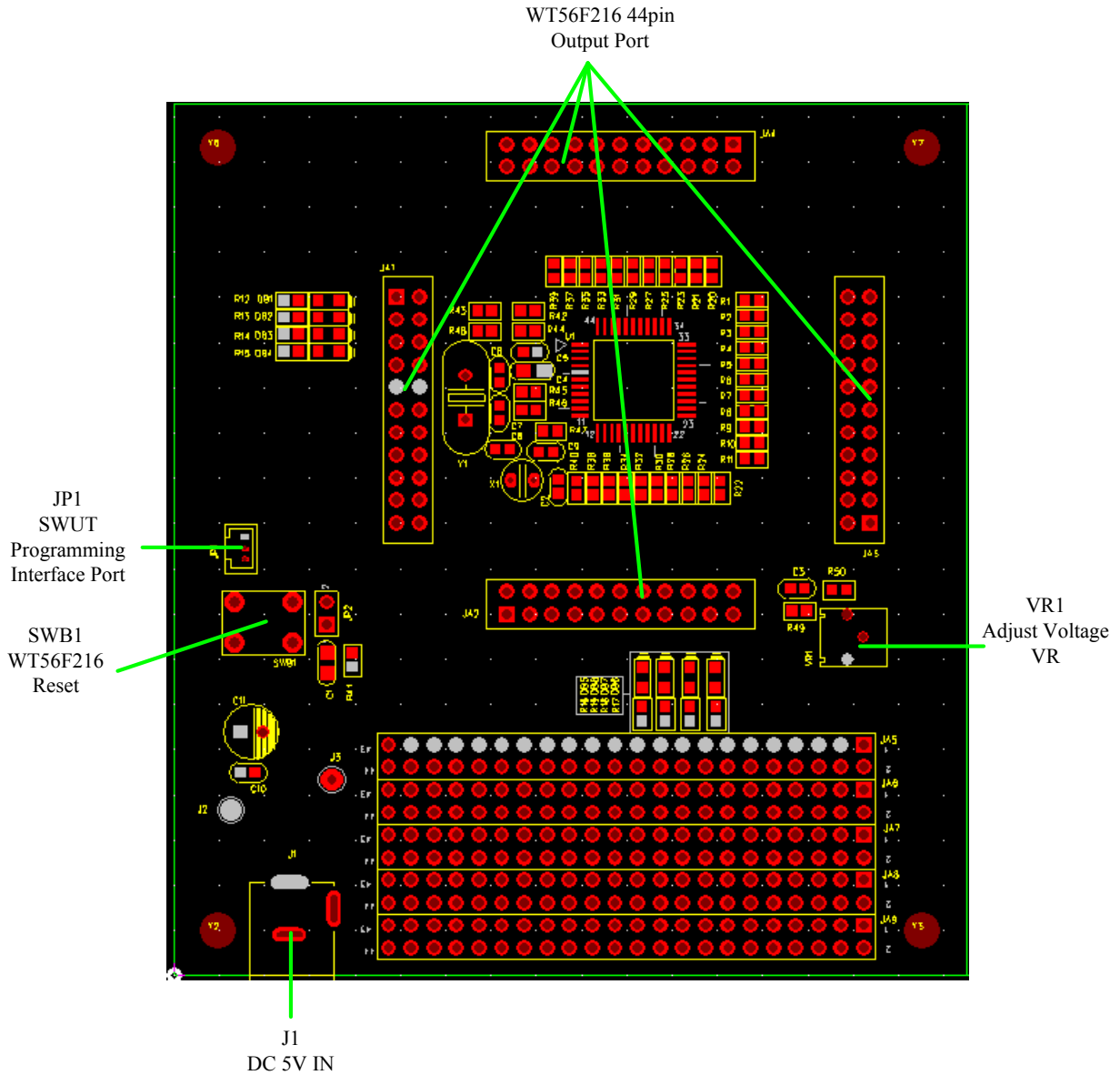


➤ **WT56F216-RG441WT PKG type**

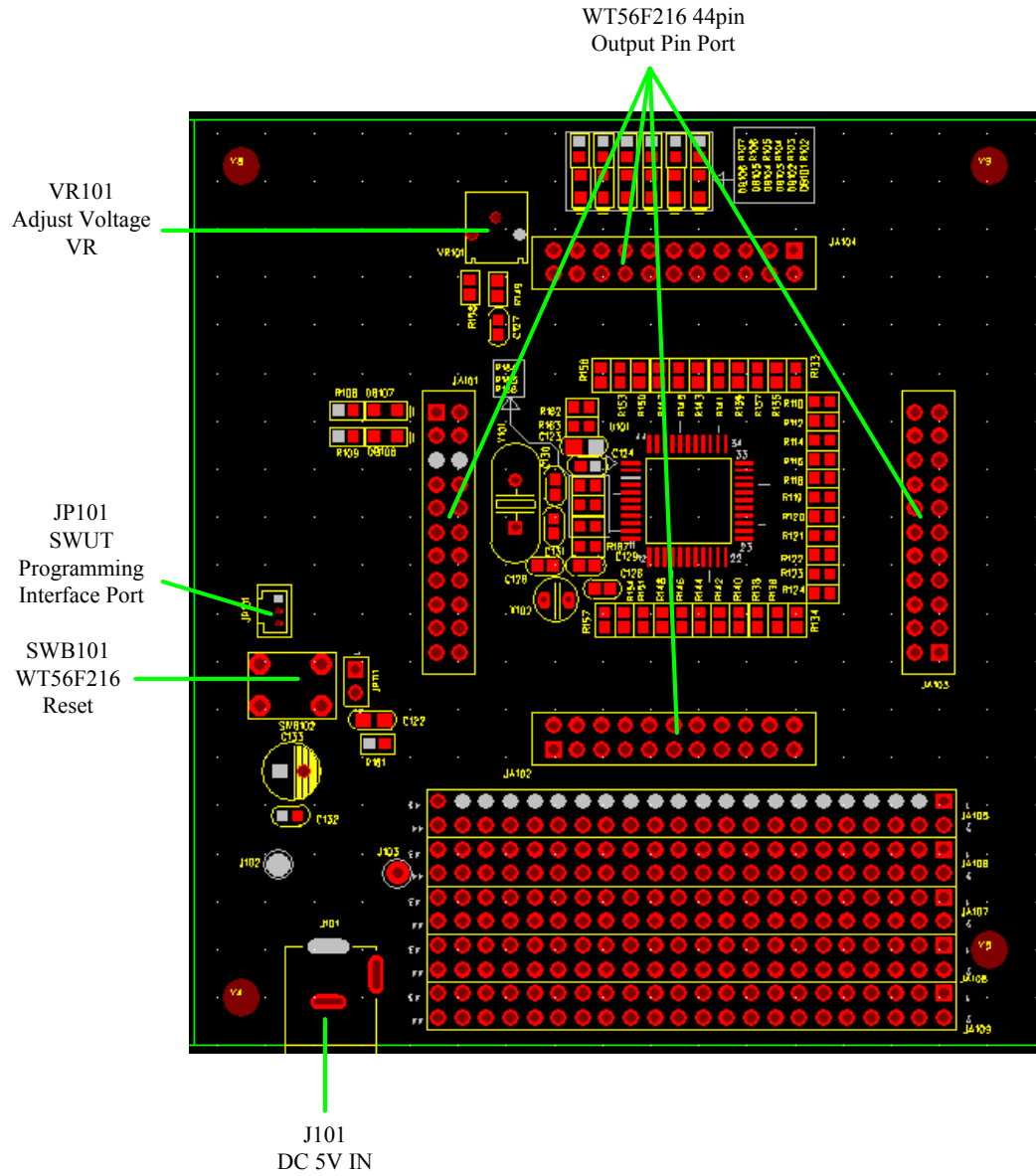


1.2 EVB Components Location

➤ **WT56F216-RG440WT PKG type**



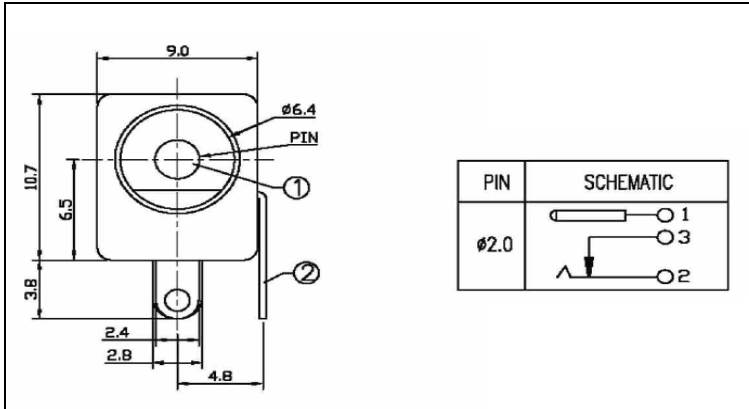
➤ **WT56F216-RG441WT PKG type**



Chapter 2 WT56F216 Starter Kit Board I/O Port Description

2.1 DC Input Connector

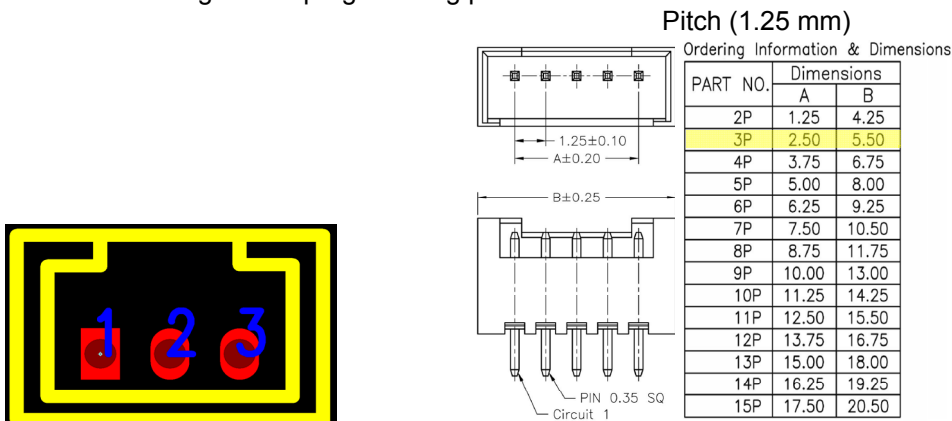
Components Location: RG440WT (J1) RG441WT (J101)
EVB DC Voltage Input port as below: (supporting voltage: DC 5V)



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

2.2 SWUT (Single Wire UART) Programming Interface Port

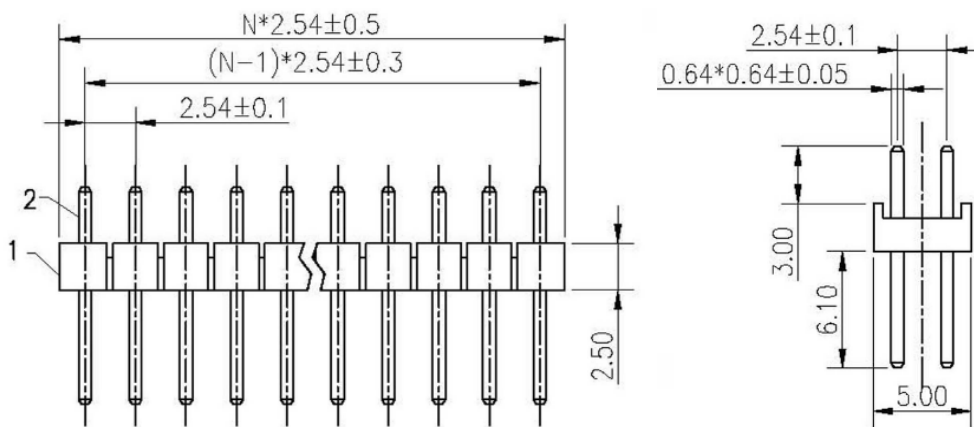
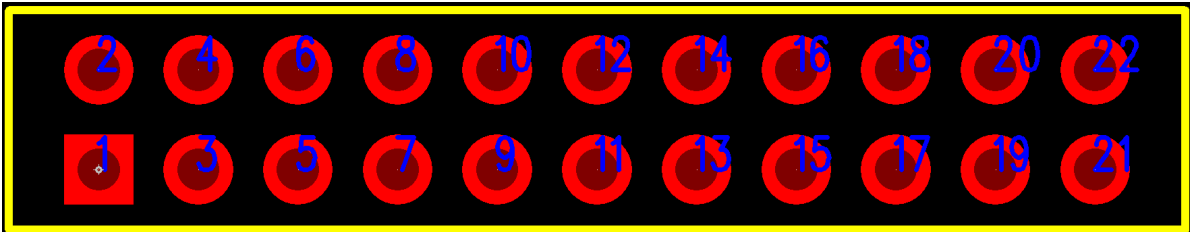
Components Location: RG440WT (JP1) RG441WT (JP101)
WT56F216 Single Wire programming port as below:



Pad Number	Description
1	VDD
2	SWUT
3	GND

2.3 WT56F216 Output Pin Port

Components Location: RG440WT (JA1 / JA2 /JA3 / JA4) RG441WT (JA101 / JA102 /JA103 / JA104)
WT56F216 pin output port as below, for customer external testing.



➤ **WT56F216-RG440WT PKG type**

JA1		JA2	
Pad Number	Description	Pad Number	Description
1-2	PE7/ASEG18/SCL/SCK/IRQ0	1-2	PF3/NRST/SWUT
3-4	PF0/IRQ1/BUZOA/PWM0	3-4	PA7/ADC0/IRQ7/PWM1
5-6	PF1/MOSIA/IRQ2	5-6	PB0/ACOM7/BSEG0/ADC1/RX0A/IRQ8
7-8	PF2/STBA/IRQ3	7-8	PB1/BSEG1/NREF/TX0A/IRQ9
9-10	VDD	9-10	PB2/ACOM6/BSEG2/ADC2
11-12	VSS	11-12	PB3/ACOM5/BSEG3/ADC3
13-14	PA1/XMOUT	13-14	PB4/ACOM4/BSEG4/ADC4
15-16	PA2/XMIN	15-16	PB5/BSEG5/ADC5/IRQ10
17-18	PA3/SDA/MISO/IRQ5	17-18	PB6/BSEG6/ADC6/BUZOB
19-20	PA4/XSIN	19-20	PB7/BSEG7/ADC7/RX0B
21-22	PA5/XSOUT	21-22	PC0/BSEG8/ADC8/TX0B

JA3		JA4	
Pad Number	Description	Pad Number	Description
1-2	PC1/ACOM3/BSEG9	1-2	PD4/ASEG7/BCOM3
3-4	PC2/ACOM2/BSEG10	3-4	PD5/ASEG8/BCOM2
5-6	PC3/ACOM1/BSEG11	5-6	PD6/ASEG9/BCOM1
7-8	PC4/ACOM0/BSEG12	7-8	PD7/ASEG10/BCOM0
9-10	PC5/ASEG0/BSEG13	9-10	PE0/ASEG11/ADC9
11-12	PC6/ASEG1/BSEG14	11-12	PE1/ASEG12/ADC10/IRQ11
13-14	PC7/ASEG2/BSEG15	13-14	PE2/ASEG13/ADC11/IRQ12
15-16	PD0/ASEG3/BSEG16/BCOM7	15-16	PE3/ASEG14/ADC12/IRQ13/BUZOC
17-18	PD1/ASEG4/BSEG17/BCOM6	17-18	PE4/ASEG15/ADC13
19-20	PD2/ASEG5/BSEG18/BCOM5	19-20	PE5/ASEG16/ADC14/RX1/IRQ14
21-22	PD3/ASEG6/BSEG19/BCOM4	21-22	PE6/ASEG17/ADC15/TX1/IRQ15

➤ **WT56F216-RG441WT PKG type**

JA101		JA102	
Pad Number	Description	Pad Number	Description
1-2	PE7/ASEG18/SCL/SCK/IRQ0	1-2	PA6/STBB/IRQ6
3-4	PF0/CMPP/IRQ1/T2O/BUZOA/PWM0	3-4	PA7/ADC0/IRQ7/ETMO/PWM1
5-6	VDD	5-6	PB0/ACOM7/BSEG0/ADC1/RX0A/IRQ8
7-8	VSS	7-8	PB1/BSEG1/VREF/TX0A/IRQ9
9-10	PA0/MOSIB/IRQ4	9-10	PB2/ACOM6/BSEG2/ADC2
11-12	PA1/XMOUT	11-12	PB3/ACOM5/BSEG3/ADC3
13-14	PA2/XMIN	13-14	PB4/ACOM4/BSEG4/ADC4
15-16	PA3/SDA/MISO/IRQ5/	15-16	PB5/ACOM5/ADC5/IRQ10
17-18	PA4/XSIN	17-18	PB6/BSEG6/ADC6/BUZOB
19-20	PA5/XSOUT	19-20	PB7/BSEG7/ADC7/RX0B
21-22	PF3/NRST/SWUT	21-22	PC0/BSEG8/ADC8/TX0B

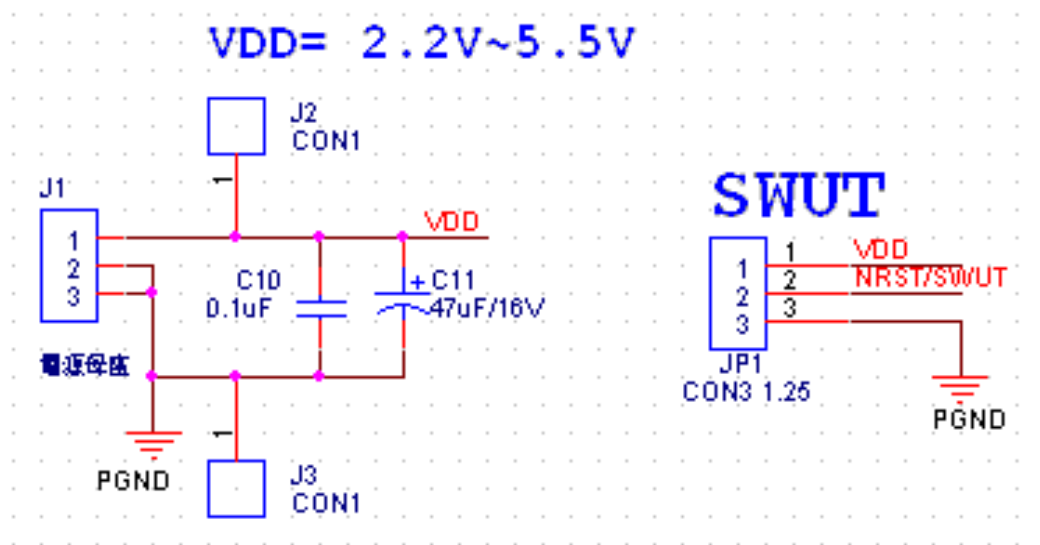
JA103		JA104	
Pad Number	Description	Pad Number	Description
1-2	PC1/ACOM3/BSEG9	1-2	PD4/ASEG7/BCOM3
3-4	PC2/ACOM2/BSEG10	3-4	PD5/ASEG8/BCOM2
5-6	PC3/ACOM1/BSEG11	5-6	PD6/ASEG9/BCOM1
7-8	PC4/ACOM0/BSEG12	7-8	PD7/ASEG10/BCOM0
9-10	PC5/ASEG0/BSEG13	9-10	PE0/ASEG11/ADC9
11-12	PC6/ASEG1/BSEG14	11-12	PE1/ASEG12/ADC10/IRQ11
13-14	PC7/ASEG2/BSEG15	13-14	PE2/ASEG13/ADC11/IRQ12
15-16	PD0/ASEG3/BSEG16/BCOM7	15-16	PE3/ASEG14/ADC12/IRQ13BUZOC
17-18	PD1/ASEG4/BSEG17/BCOM6	17-18	PE4/ASEG15/ADC13
19-20	PD2/ASEG5/BSEG18/BCOM5	19-20	PE5/ASEG16/ADC14/RX1/IRQ14
21-22	PD3/ASEG6/BSEG19/BCOM4	21-22	PE6/ASEG17/ADC15/TX1/IRQ15

Chapter 3 WT56F216 Starter Kit Board Circuit Description

3.1 VDD Power Selection

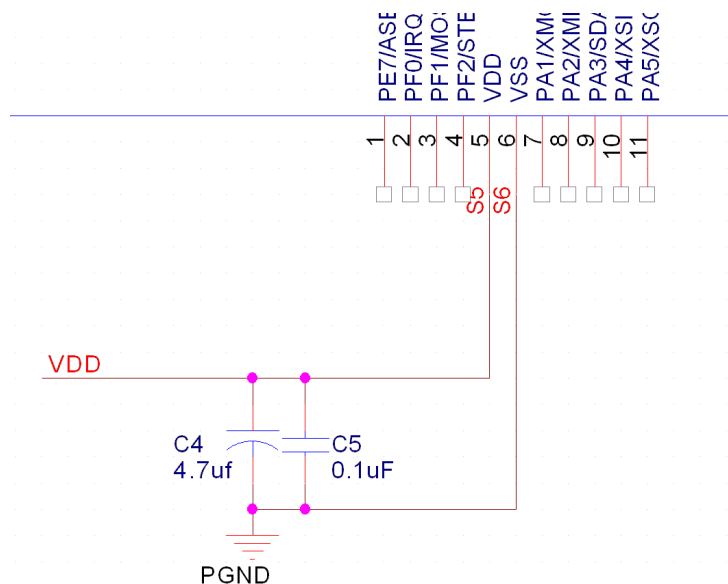
There are three options for WT56F216 Starter Kit Board VDD Power.
(External power input doesn't exceed Max. 5.5V as spec definition).

1. J1 DC Jack: means the power can supply from transformer, VDD input don't exceed Max 5.5V as spec definition.
2. WLINK-SWUT VDD: Using WLINK-SWUT VDD supplies WT56F216 VDD power.
3. External VDD: J2 positive input, J3 negative power, external VDD don't exceed Max 5.5V as spec definition.



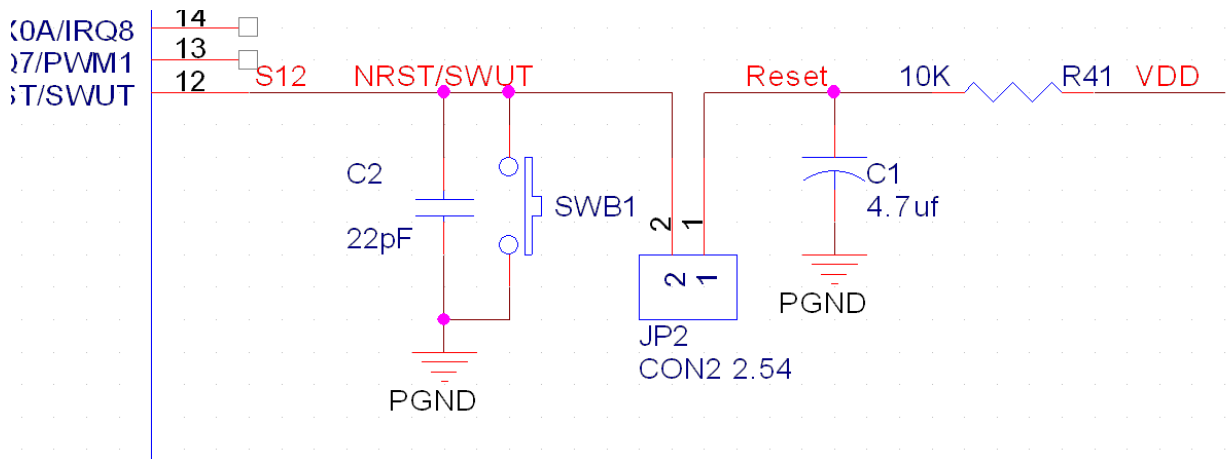
3.2 Power circuit

VDD power input should with filter capacitance, this is best that the layout is closed to the pin.



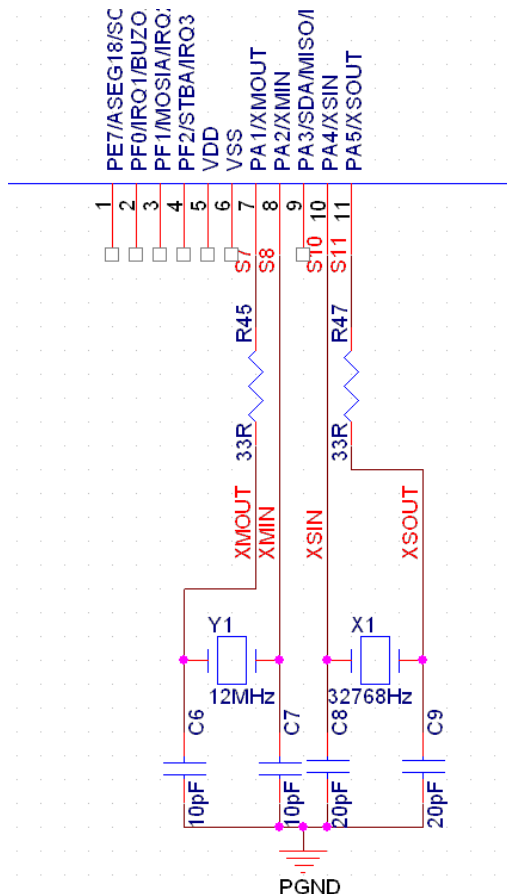
3.3 RESET Circuit

WT56F216 RESET circuit and SWUT (single wire programming) using the same pin, the related circuit description as below. When SWUT on programming, JP2 JUMP should be removed, and disconnect from the external RC RESET, after programming finished, JP2 should be plugged back, if the REST function had been used.



3.4 Oscillate Circuit

WT56F216 12 MHz and 32.768 kHz oscillate circuit as bellow:

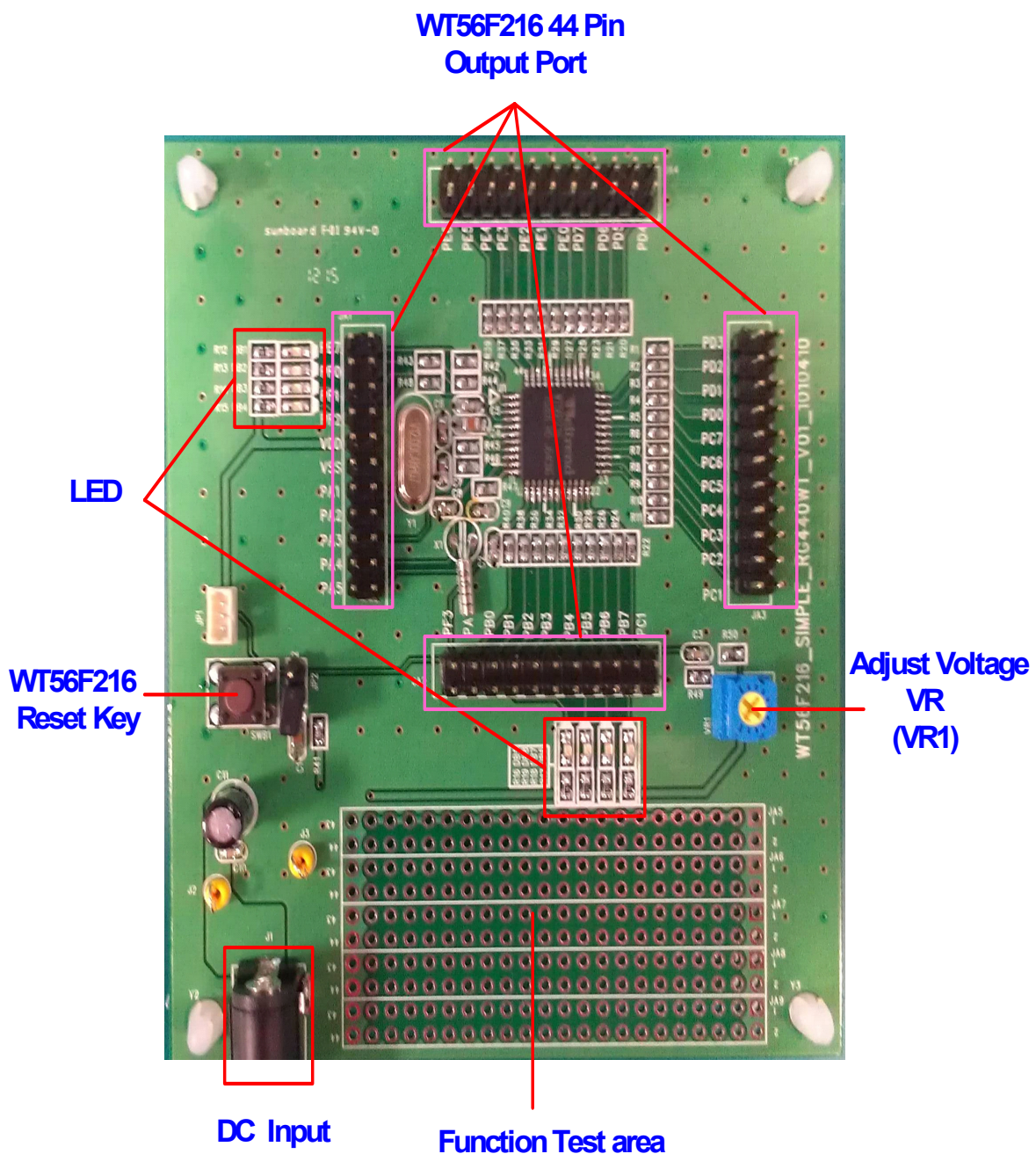


Chapter 4 WT56F216 Starter Kit Board Operation Manual

4.1 WT56F216 testing and demo platform

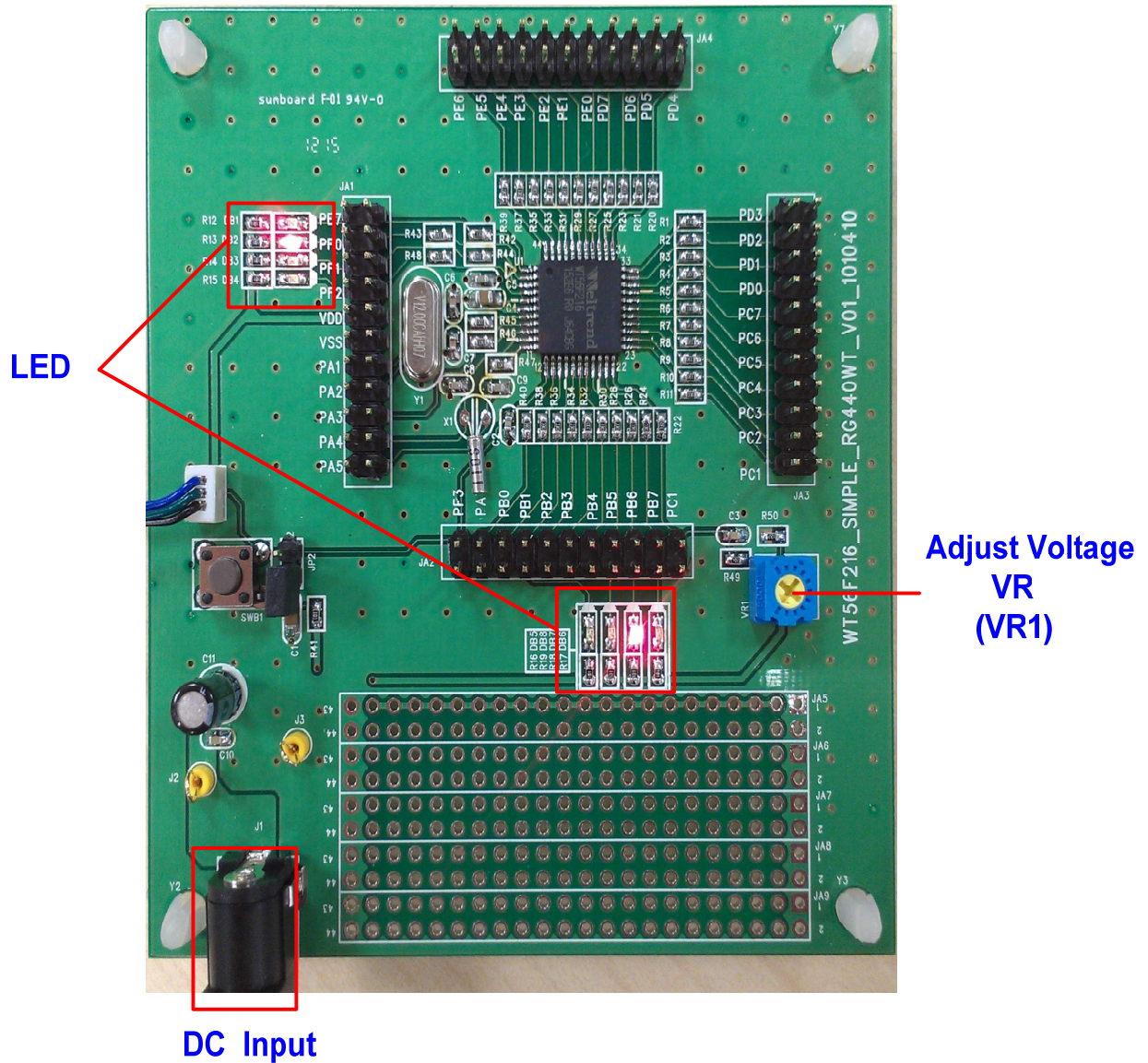
WT56F216 Starter Kit Board built in a single and easy led flash to display functions, and Starter Kit Board reserve some pin or testing usage.

- **Starter Kit Board outline (WT56F216-RG440WT PKG type)**



4.2 LED display

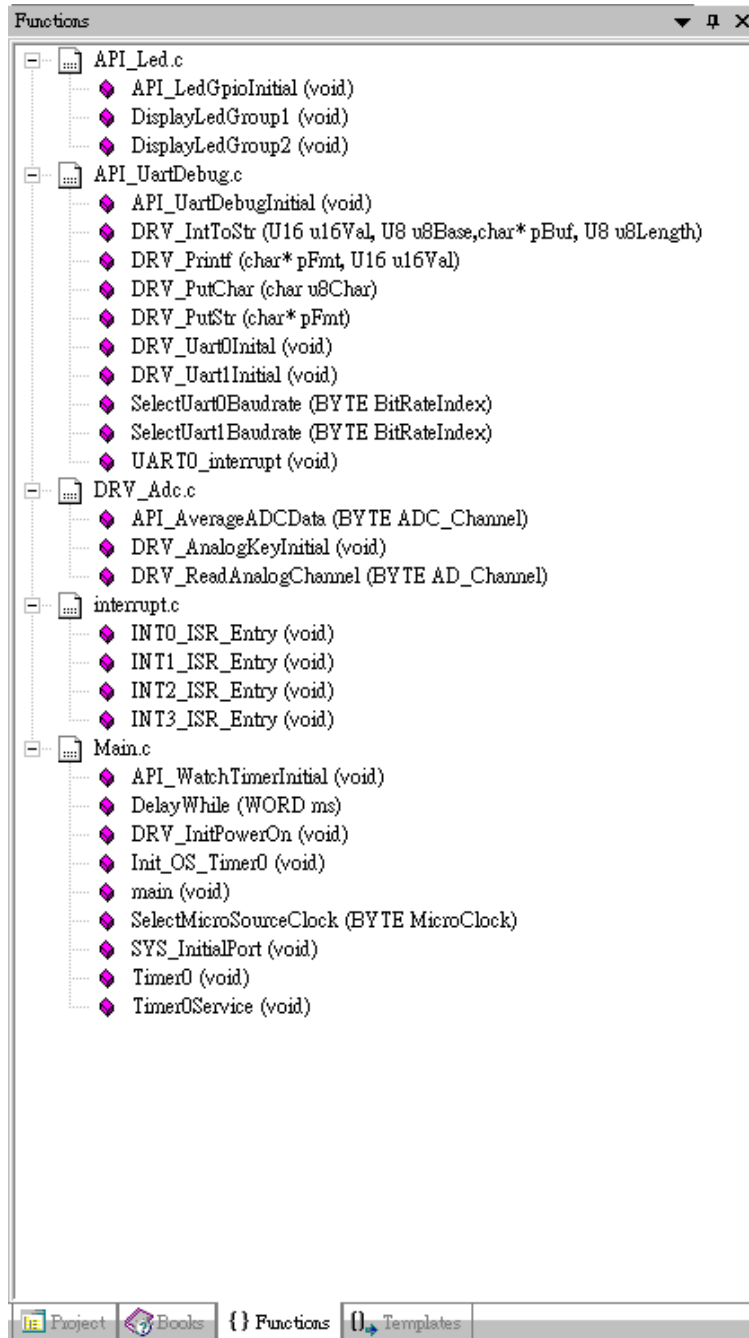
After Power on, LED will alternately blink on the EVB board. Meanwhile, adjusting VR1 can change LED blinking speed.



Chapter 5 Driver Module

5.1 Driver Module Summary

Please refer to the Driver module display, as below:



5.2 Main Program <Main.c>

Function	Description
void API_WatchTimerInitial (void)	Initialize Watch Timer and uses 32.768 kHz oscillator as Watch Timer clock source.
void DelayWhile (WORD ms)	NOP delay sub program
void DRV_InitPowerOn (void)	Disable Watch Dog and Initial ADC
void Init_OS_Timer0 (void)	Initial Timer0 set 10ms interrupt
Void SelectMicroSourceClock (BYTE MicroClock)	Set up MUC uses external crystal oscillate as clock source
void SYS_InitialPort (void)	All GPIOs initial status as input port and enable internal pull high resistor
void Timer0 (void) interrupt 1	Timer 0 interrupts sub-Program
void Timer0Service (void)	Timer 0 service 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)	Initialized Analog to Digital convert
WORD DRV_ReadAnalogChannel (BYTE AD_Channel)	Assigned channel executing Analog to Digital

5.4 Interrupt sub-program <Interrupt.c>

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

6.2 BOM

➤ Starter Kit Board BOM (WT56F216-RG440WT PKG type)

WT56F216 BOM				
Item	Quantity	Reference	Part	PCB Footprint
1	2	C6,C7	10pF	SC0603
2	2	C8,C9	20pF	SC0603
3	1	C2	22pF	SC0603
4	3	C3,C5,C10	0.1uF	SC0603
5	2	C4,C1	4.7uf	SC0805
6	1	C11	47uF/16V	bCE030
7	39	R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R20,R21,R22,R23,R24,R25,R26,R27,R28,R29,R30,R31,R32,R33,R34,R35,R36,R37,R38,R39,R40,R42,R43,R44,R45,R46,R47,R48	33R	SR0603
8	8	R12,R13,R14,R15,R16,R17,R18,R19	100R	SR0603
9	1	R49		220 SR0603
10	1	R50	1K	SR0603
11	1	R41	10K	SR0603
12	8	DB1,DB2,DB3,DB4,DB5,DB6,DB7,DB8	LED_BLUE	SLEDO805
13	4	JA1,JA2,JA3,JA4	CON 11*2 2.54	HEADER2X11-2.54
14	1	JP1	CON3 1.25	WT_CN1.25-3P
15	1	JP2	CON2 2.54	CM-2-2.54
16	1	J1	電源母座	JACK-3P
17	2	J3,J2	CON1	H2XP2.5XSILK3
18	1	SWB1	POWER ON	KEY
19	1	U1	WT56F216_RG440WT	LQFP44P-WT61P802
20	1	VR1	30K	VR3-DIP
21	1	X1	32768Hz	XTAL-CRY32
22	1	Y1	12MHz	XDIP-4MHZ

➤ Starter Kit Board BOM (WT56F216-RG441WT PKG type)

WT56F216 (RG441WT)BOM				
Item	Quantity	Reference	Part	PCB Footprint
1	2	C130,C131	10pF	SC0603
2	2	C128,C129	20pF	SC0603
3	1	C126	22pF	SC0603
4	3	C124,C127,C132	0.1uF	SC0603
5	2	C123,C122	4.7uf	SC0805
6	1	C133	47uF/16V	bCE030
7	39	R110,R112,R114,R116,R118,R119,R120,R121,R122,R123,R124,R133,R134,R135,R136,R137,R138,R139,R140,R141,R142,R143,R144,R145,R146,R147,R148,R150,R151,R153,R154,R156,R157,R162,R163,R164,R165,R166,R167	33R	SR0603
8	8	R102,R103,R104,R105,R106,R107,R108,R109	100R	SR0603
9	1	R149	220	SR0603
10	1	R158	1K	SR0603
11	1	R161	10K	SR0603
12	8	DB101,DB102,DB103,DB104,DB105,DB106,DB107,DB108	LED_BLUE	SLEDO805
13	4	JA101,JA102,JA103,JA104	CON 11*2 2.54	HEADER2X11-2.54
14	1	JP101	CON3 1.25	WT_CN1.25-3P
15	1	JP111	CON2 2.54	CM-2-2.54
16	1	J101	電源母座	JACK-3P
17	2	J102,J103	CON1	H2XP2.5XSILK3
18	1	SWB102	POWER ON	KEY
19	1	U101	WT56F216_RG440WT	LQFP44P-WT61P802
20	1	VR101	30K	VR3-DIP
21	1	X102	32768Hz	XTAL-CRY32
22	1	Y101	12MHz	XDIP-4MHZ

6.3 Ordering Information

1. WT56F216 Development Kit

Kit	Product Name	Number
WT56F216 Development Kit	WLINK-SWUT x 1	WA000
	Development and Demo boardx1 (WT56F216 EVB With LCD Module)	WB000
	SWUT Programming Wire x 1	

2. WT56F216 Starter Kit

Kit	Product Name	Number
WT56F216 Starter Kit	WLINK-SWUT x 1	WA000
	Development and Demo Board (WT56F216 Starter Kit Board) x 1	WB005
	SWUT Programmer Wire x 1	

3. WT56F216 Evaluation Board Development and Demo Board

Kit	Product Name	Number
WT56F216 Development and Demo Board	Development and Demo Board (WT56F216 EVB)	WB000
	EVB operation manual	DOC12

4. WT56F216 Starter Kit Board (simple version)

Kit	Product Name	Number
WT56F216 simple version	Simple version (WT56F216 Starter Kit Board)	WB005
	EVB Operation Board	DOC23

5. Single Wire Programming Board (WLINK-SWUT)

Kit	Product Name	Number
Single Wire Programmer 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