# WT56F248/232
# Starter Kit Board
# Operation Manual

REV. 1.0

June 6, 2014

| Ver. | Date | Applicant | Description |
|---|---|---|---|
| 1.0 | 2014/06/06 | Louis | 1st version |

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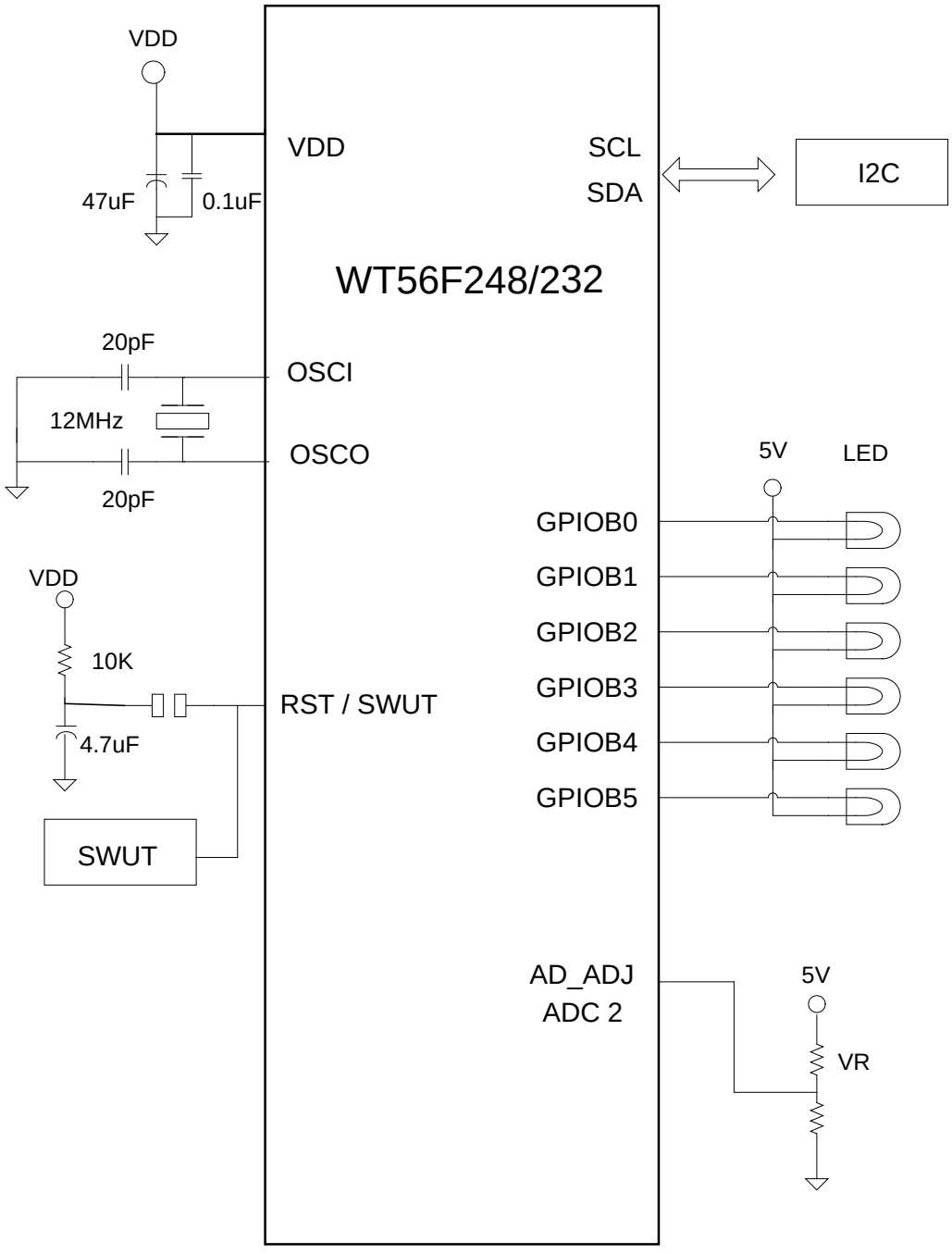
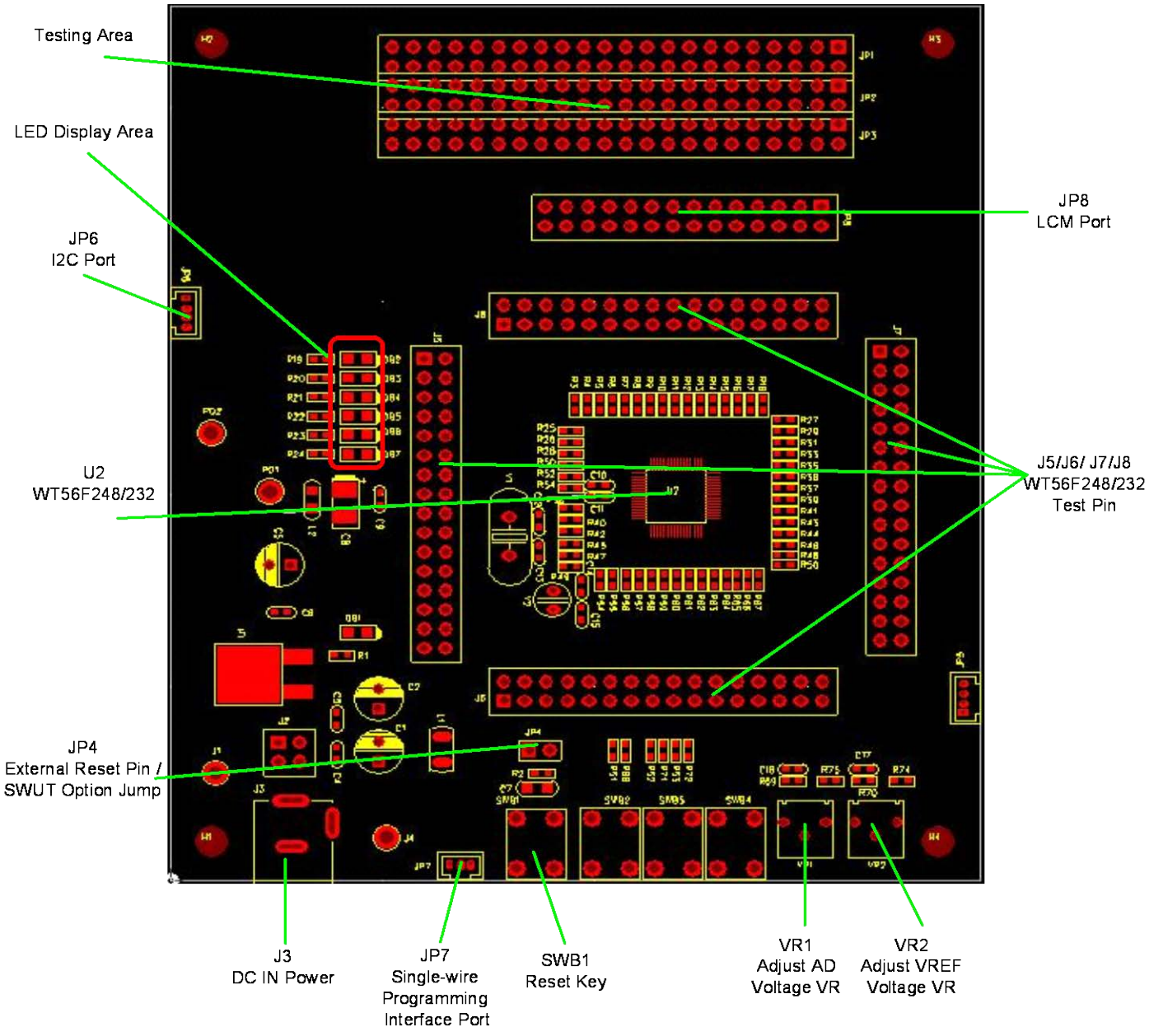
# Chapter 1 WT56F248/232 Starter Kit Board Hardware Description

## 1.1 System Block Diagram

WT56F248/232 is an enhanced 8052 Micro Controller with a variety of peripheral functions, and the Starter Kit Board is designed for 64-pin LQFP type IC to demonstrate its functions. System structure is as the figure below.



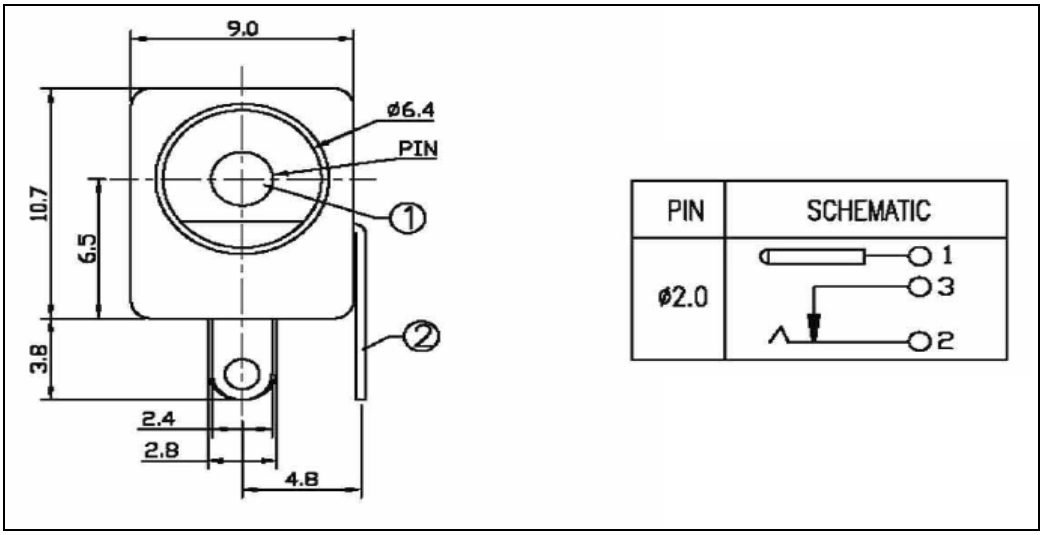
## 1.2 Starter Kit Board Components Location



# Chapter 2 WT56F248/232 Starter Kit Board I/O Port Description

## 2.1 DC Input Connector (J3)

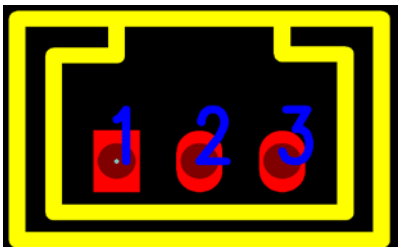
This is DC input connector for Starter Kit Board (supporting voltage: DC 5V/12V).



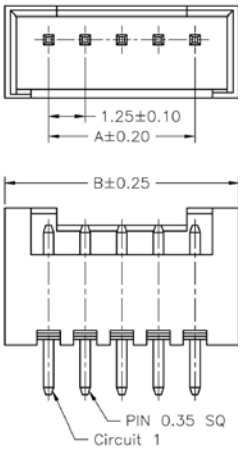

| Pad Number | Description |
|---|---|
| 1 | Positive Input Pin |
| 2 | -- |
| 3 | Negative Input Pin |

## 2.2 SWUT (Single-wire UART) Programming Interface Port (JP7)

WT56F248/232 Single-wire programming port as below:




Pitch (1.25 mm)



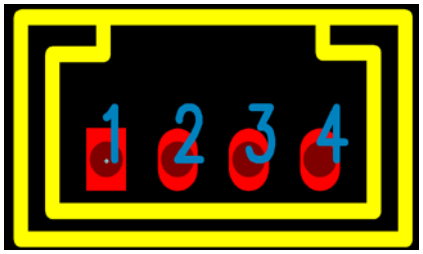

Ordering Information & Dimensions

| PART NO. | Dimensions | |
|---|---|---|
| | A | B |
| 2P | 1.25 | 4.25 |
| 3P | 2.50 | 5.50 |
| 4P | 3.75 | 6.75 |
| 5P | 5.00 | 8.00 |
| 6P | 6.25 | 9.25 |
| 7P | 7.50 | 10.50 |
| 8P | 8.75 | 11.75 |
| 9P | 10.00 | 13.00 |
| 10P | 11.25 | 14.25 |
| 11P | 12.50 | 15.50 |
| 12P | 13.75 | 16.75 |
| 13P | 15.00 | 18.00 |
| 14P | 16.25 | 19.25 |
| 15P | 17.50 | 20.50 |

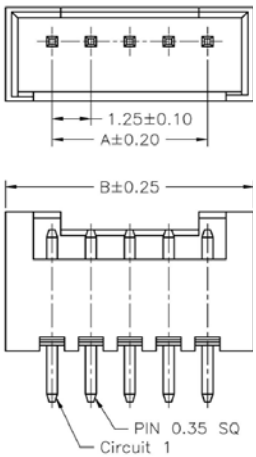
| Pad Number | Description |
|---|---|
| 1 | VDD |
| 2 | SWUT |
| 3 | GND |

## 2.3 WT56F248/232 I²C Interface Port

Components Location (JP6): Slave I²C Interface Port.




Pitch (1.25 mm)



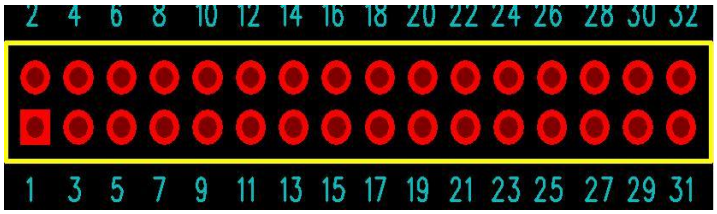

Ordering Information & Dimensions

| PART NO. | Dimensions | |
|---|---|---|
| | A | B |
| 2P | 1.25 | 4.25 |
| 3P | 2.50 | 5.50 |
| 4P | 3.75 | 6.75 |
| 5P | 5.00 | 8.00 |
| 6P | 6.25 | 9.25 |
| 7P | 7.50 | 10.50 |
| 8P | 8.75 | 11.75 |
| 9P | 10.00 | 13.00 |
| 10P | 11.25 | 14.25 |
| 11P | 12.50 | 15.50 |
| 12P | 13.75 | 16.75 |
| 13P | 15.00 | 18.00 |
| 14P | 16.25 | 19.25 |
| 15P | 17.50 | 20.50 |

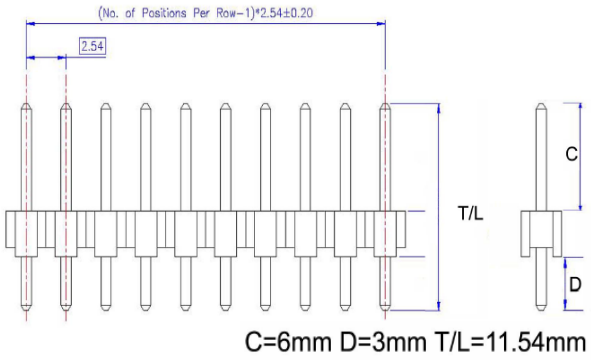
| Pad Number | Description |
|---|---|
| 1 | VDD |
| 2 | Slave_SCL |
| 3 | Slave_SDA |
| 4 | GND |

## 2.4 Test Pins (J5/J6/J7/J8)

These are testing signal pins.




Pitch (2.54 mm)




C=6mm D=3mm T/L=11.54mm

| J5 | | J6 | |
|---|---|---|---|
| **Pad Number** | **Description** | **Pad Number** | **Description** |
| 1-2 | GPIOF0DH/IRQ1/T2O/BUZOA/PWM0A | 1-2 | XSIN |
| 3-4 | GPIOF1DH/MOSIA/IRQ2/P01/PWM2B | 3-4 | XSOUT |
| 5-6 | GPIOF2DH/STBA/IRQ3/P02/PWM3B | 5-6 | GPIOA5D |
| 7-8 | GPIOG3/IRQ2B/P06/PWM4A | 7-8 | GPIF3/NRST/SWUT |
| 9-10 | GPIOG4/IRQ3B/P07/PWM5A | 9-10 | GPIOA6D/STBB/IRQ6/PWM2A |
| 11-12 | GPIOG5 | 11-12 | GPIOA7D/ADC0/IRQ7/ETMO/PWM1A |
| 13-14 | VDD | 13-14 | GPIOF4DH |
| 15-16 | GND | 15-16 | GPIOF5DH |
| 17-18 | GPIOA0D/MOSIB/IRQ4 | 17-18 | GPIOB0/ACOM7/BSEG0/ADC1/RX0/IRQ8 |
| 19-20 | GPIOA1D | 19-20 | GPIOB1/BSEG1/VREF/TX0/IRQ9/PWM4B |
| 21-22 | XMOUT | 21-22 | GPIOB2/ACOM6/BSEG2/ADC2 |
| 23-24 | XMIN | 23-24 | GPIOB3/ACOM5/BSEG3/ADC3 |
| 25-26 | GPIOA2D | 25-26 | GPIOB4/ACOM4/BSEG4/ADC4 |
| 27-28 | GPIOA3D/SDA/MISO/IRQ5/P03/PWM3A | 27-28 | GPIOB5/BSEG5/ADC5/IRQ10/PWM0B |
| 29-30 | GPIOA4D | 29-30 | GPIOB6/BSEG6/ADC6/BUZOB |
| 31-32 | NC | 31-32 | GPIOB7/BSEG7/ADC7/RX0B |

| J7 | | J8 | |
|---|---|---|---|
| **Pad Number** | **Description** | **Pad Number** | **Description** |
| 1-2 | NC | 1-2 | NC |
| 3-4 | GPIOD2/ASEG5/BSEG18/BCOM5 | 3-4 | GPIOE7DH/ASEG18/SCL/SCK/IRQ0/PWM1B |
| 5-6 | GPIOD1/ASEG4/BSEG17/BCOM6 | 5-6 | GPIOE6DH/ASEG17/ADC15/TX1/IRQ15 |
| 7-8 | GPIOD0/ASEG3/BSEG16/BCOM7 | 7-8 | GPIOE5DH/ASEG16/ADC14/RX1/IRQ14 |
| 9-10 | GPIOC7/ASEG2/BSEG15 | 9-10 | GPIOE4DH/ASEG15/ADC13 |
| 11-12 | GPIOC6/ASEG1/BSEG14 | 11-12 | GPIOE3DH/ASEG14/ADC12/IRQ13/BUZOC |
| 13-14 | GPIOG0 | 13-14 | GPIOE2DH/ASEG13/ADC11/IRQ12/PWM5B |
| 15-16 | GPIOF7DH | 15-16 | GPIOE1DH/ASEG12/ADC10/IRQ11 |
| 17-18 | GPIOF6DH | 17-18 | GPIOE0DH/ASEG11/ADC9 |
| 19-20 | GPIOC5/ASEG0/BSEG13 | 19-20 | GPIOG2/IRQ1B |
| 21-22 | GPIOC4/ACOM0/BSEG12 | 21-22 | GPIOG1/IRQ0B |
| 23-24 | GPIOC3/ACOM1/BSEG11 | 23-24 | GPIOD7/ASEG10/BCOM0 |
| 25-26 | GPIOC2/ACOM2/BSEG10 | 25-26 | GPIOD6/ASEG9/BCOM1 |
| 27-28 | GPIOC1/ACOM3/BSEG9 | 27-28 | GPIOD5/ASEG8/BCOM2 |
| 29-30 | GPIOC0/BSEG8/ADC8/TX0B | 29-30 | GPIOD4/ASEG7/BCOM3 |
| 31-32 | NC | 31-32 | GPIOD3/ASEG6/BSEG19/BCOM4 |

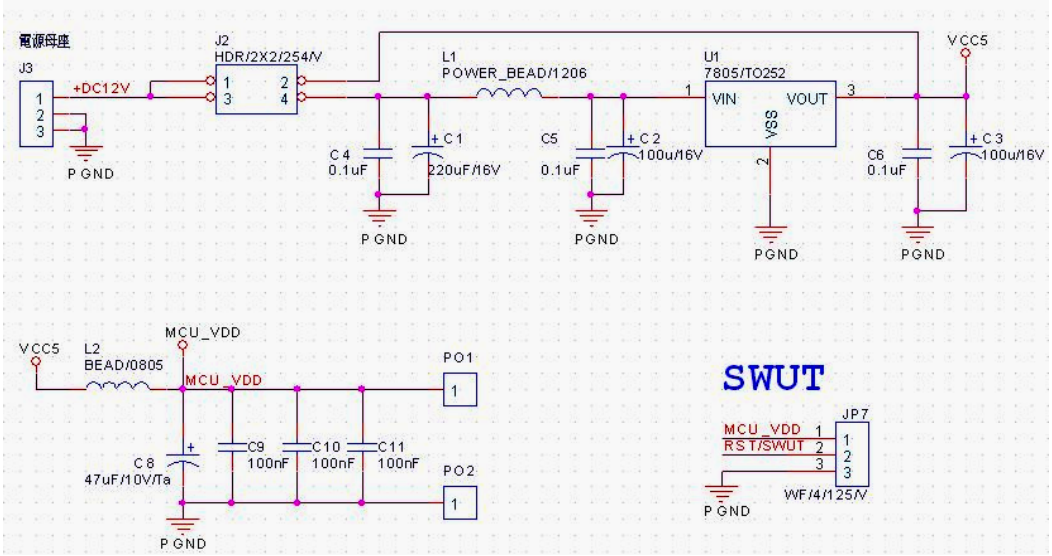
# Chapter 3 WT56F248/232 Starter Kit Board Circuit Description

## 3.1 VDD Power Selection

There are three main power options for WT56F248/232 Starter Kit Board.
(External power input cannot exceed Max. 5.5V as spec. definition).

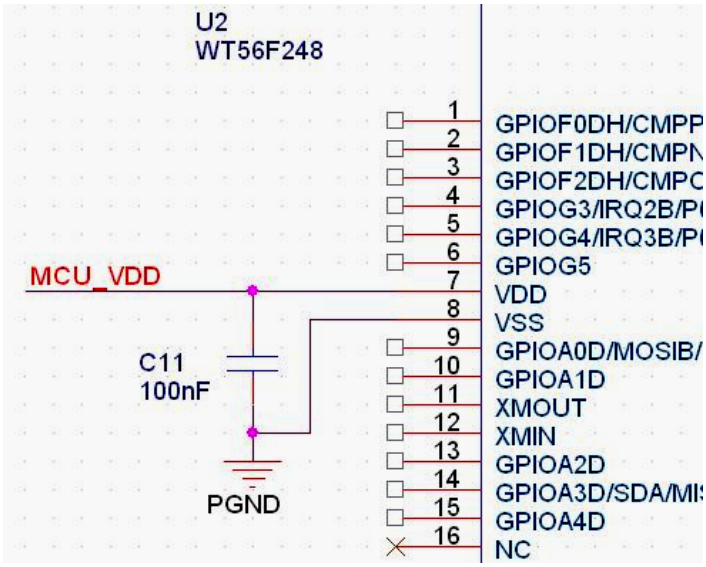
1. 5V/12V adapter (Select input is 5V/12V by J2), J3 DC Jack (VDD)
2. External VDD: P01 positive input, P02 negative power, external VDD cannot exceed Max 5.5V as spec. definition.
3. WLINK-SWUT VDD: Using WLINK-SWUT MCU_ VDD as WT56F248/232 VDD power.

If power works normally, DB1 LED will light up.



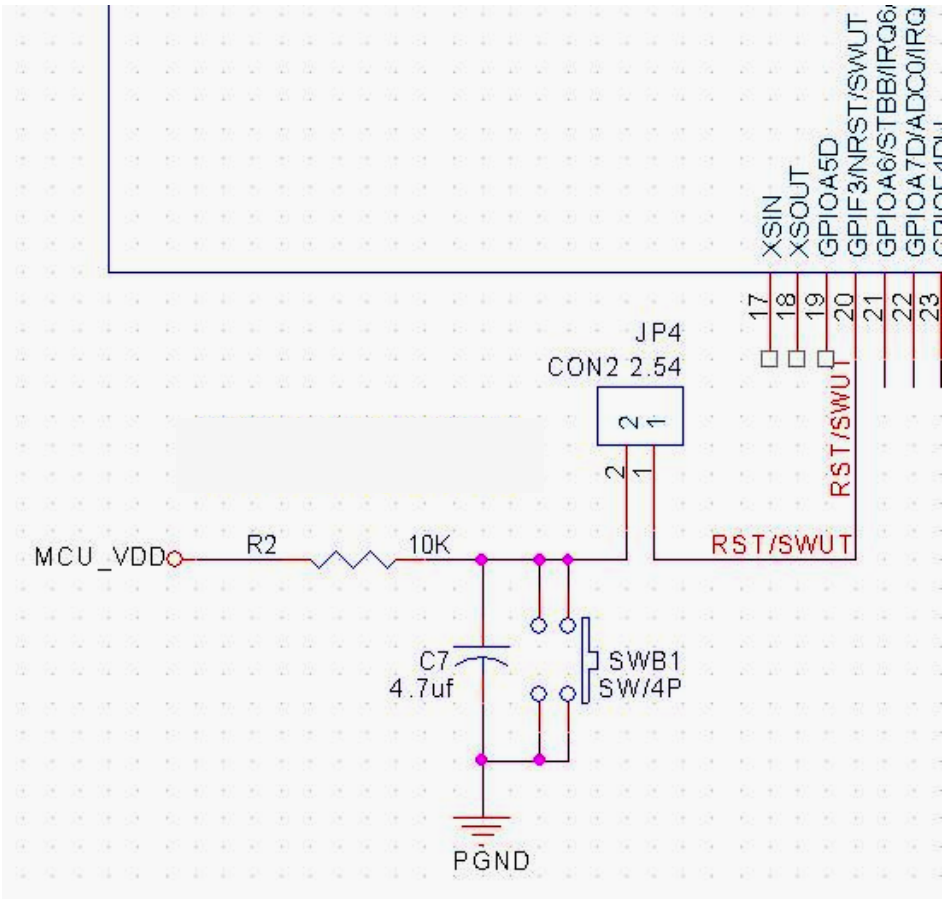

## 3.2 Power circuit

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



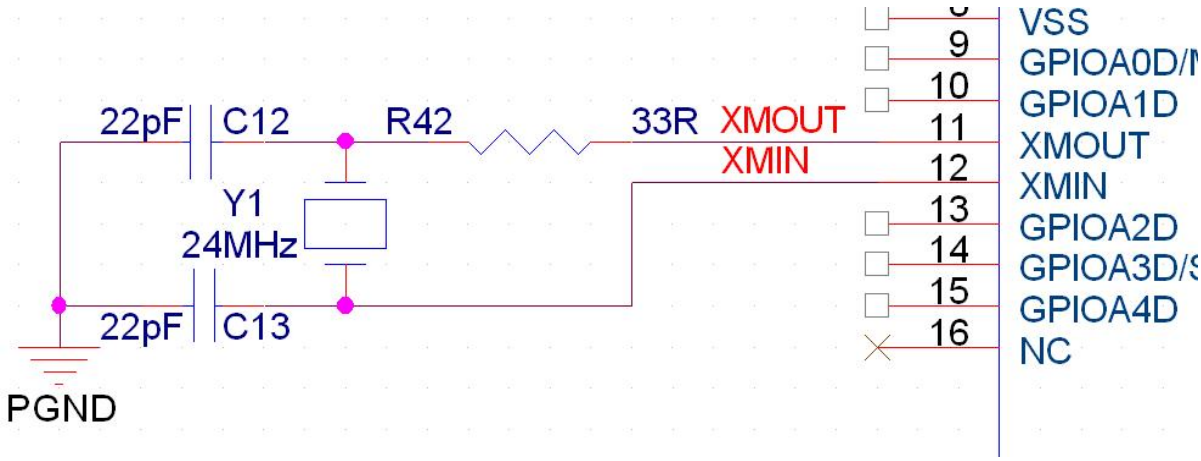
## 3.3 RESET Circuit

WT56F248/232 RESET circuit and SWUT (Single-wire programming) use the same pin, the related circuit description as below. When SWUT on programming, J4 JUMP should be removed, and disconnect from the external RC RESET. After programming finished, J4 JUMP should be plugged in again, if the REST function had been used.




## 3.4 Oscillate Circuit

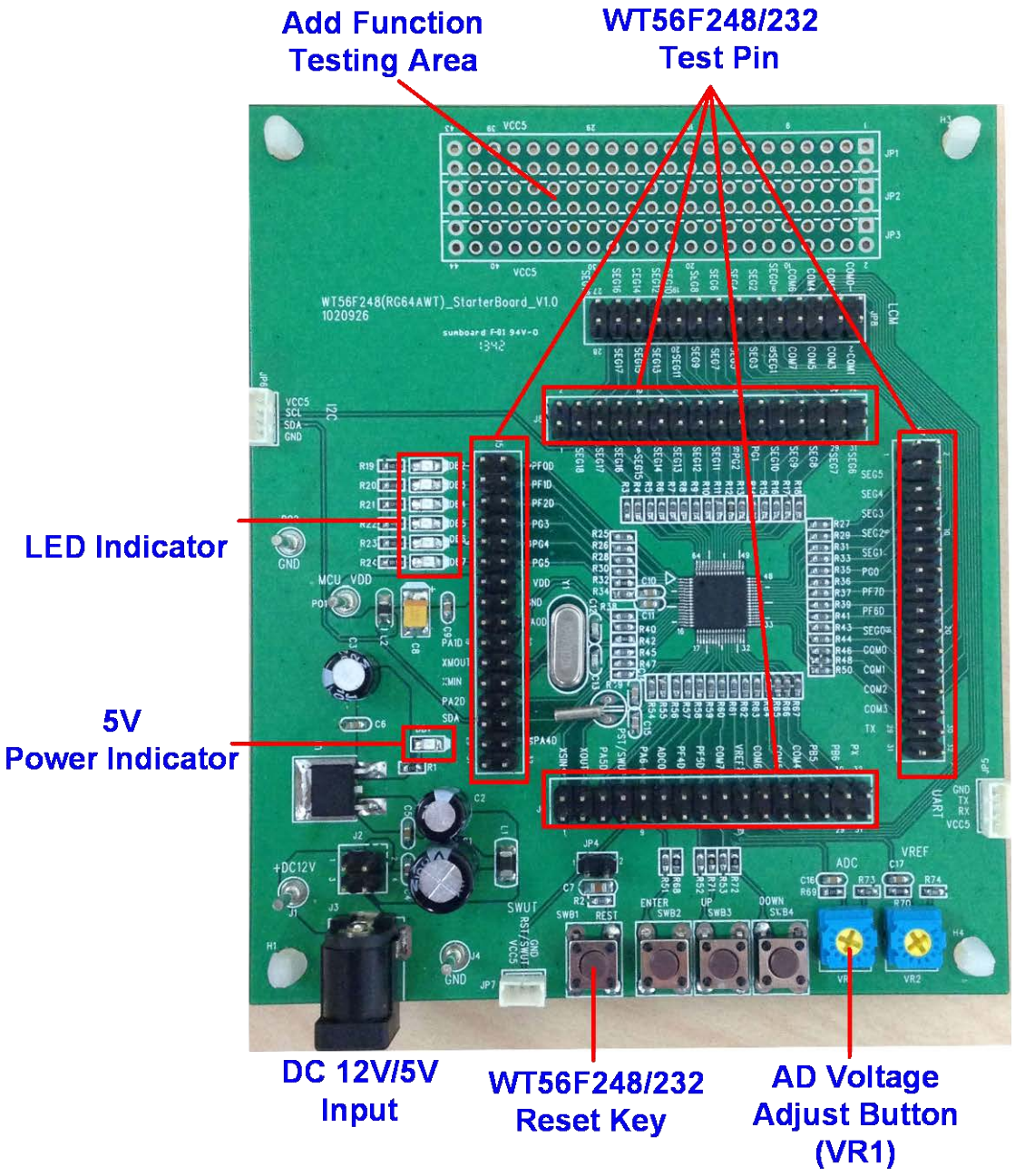
WT56F248/232 oscillates circuit as bellow:



# Chapter 4 WT56F248/232 Starter Kit Board Operation Manual

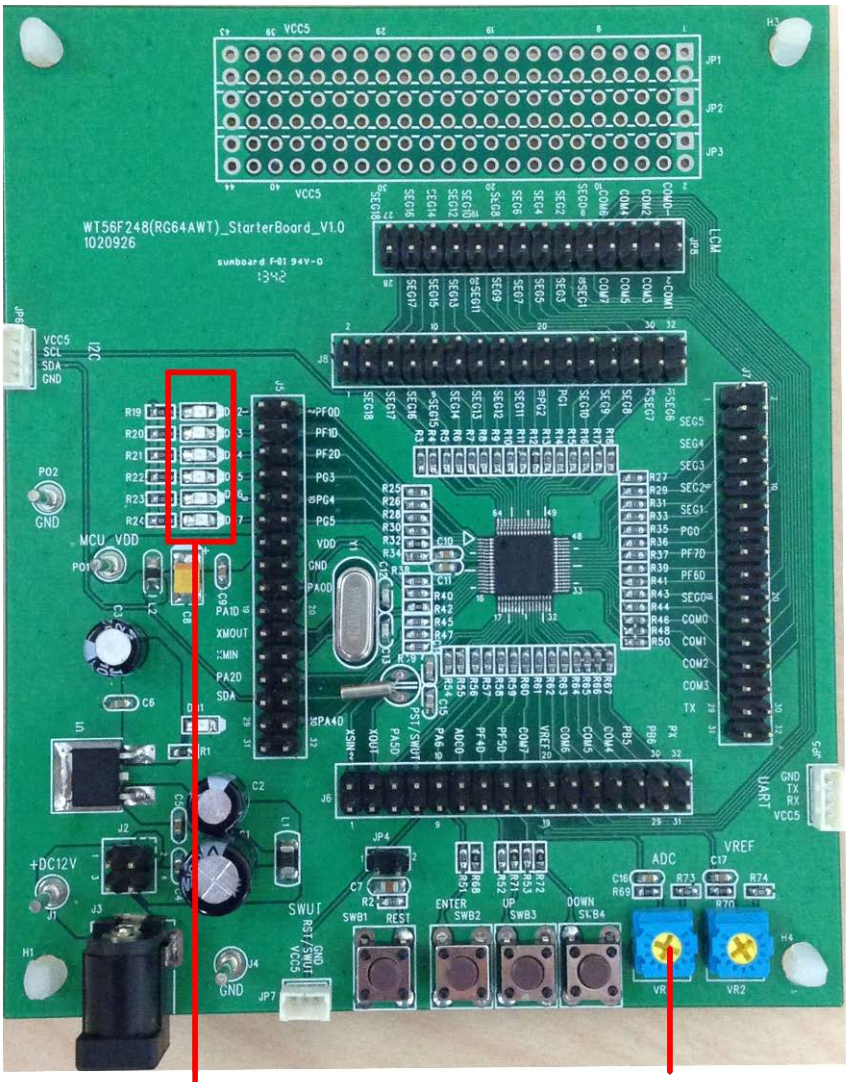
## 4.1 WT56F248/232 testing and demo platform

WT56F248/232 Starter Kit Board built in a single and easy led flash to display functions, and reserved some pins for testing usage.



## 4.2 LED display

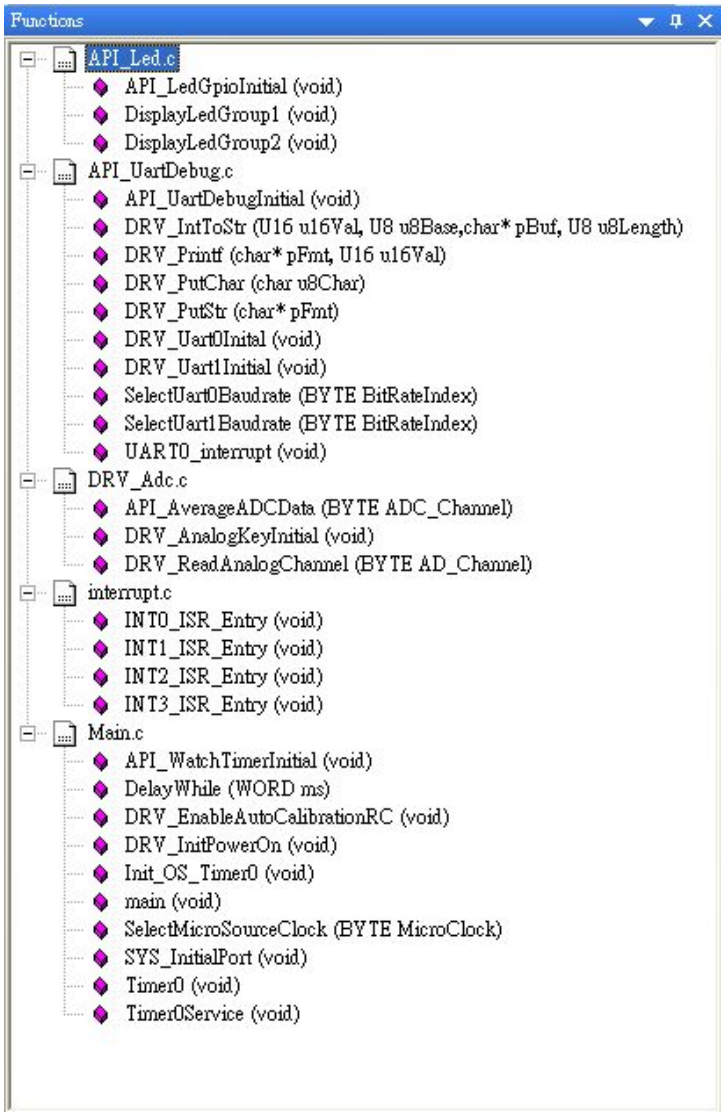
After Power on, LED will alternately blink on the Starter Kit Board. Meanwhile, adjusting VR1 can change LED blinking speed.



# Chapter 5 Driver Module

## 5.1 Driver Module Summary

Please refer to the Driver module display, as below:



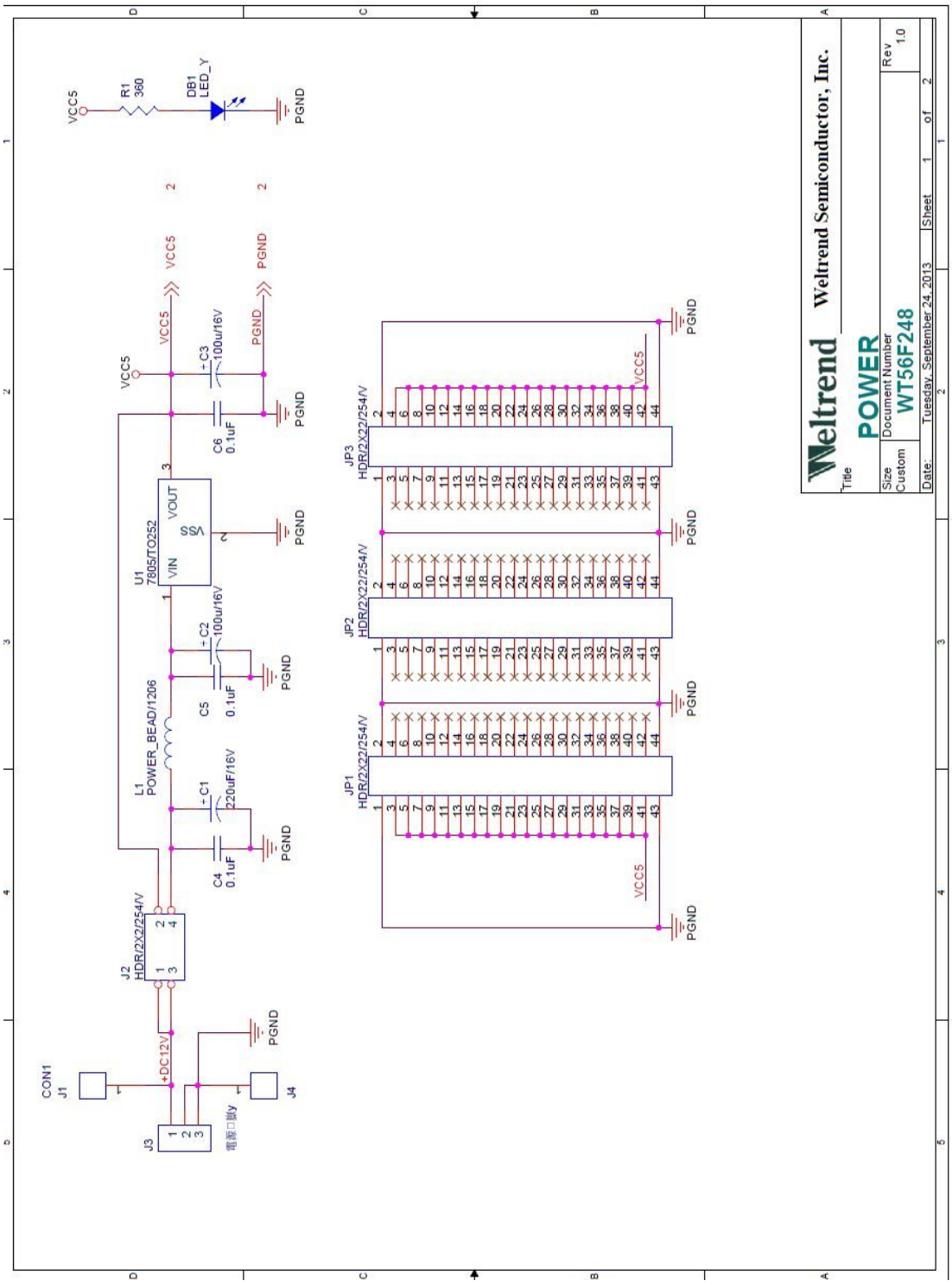

## 5.2 LED Driver Module <LED.C>

| Function | Description |
|---|---|
| void API_LedGpioInitial (void) | Initialize “LED port” (Driver layer) |
| void DisplayLedGroup1 (void) | Rotate “LED” light (Application layer) |

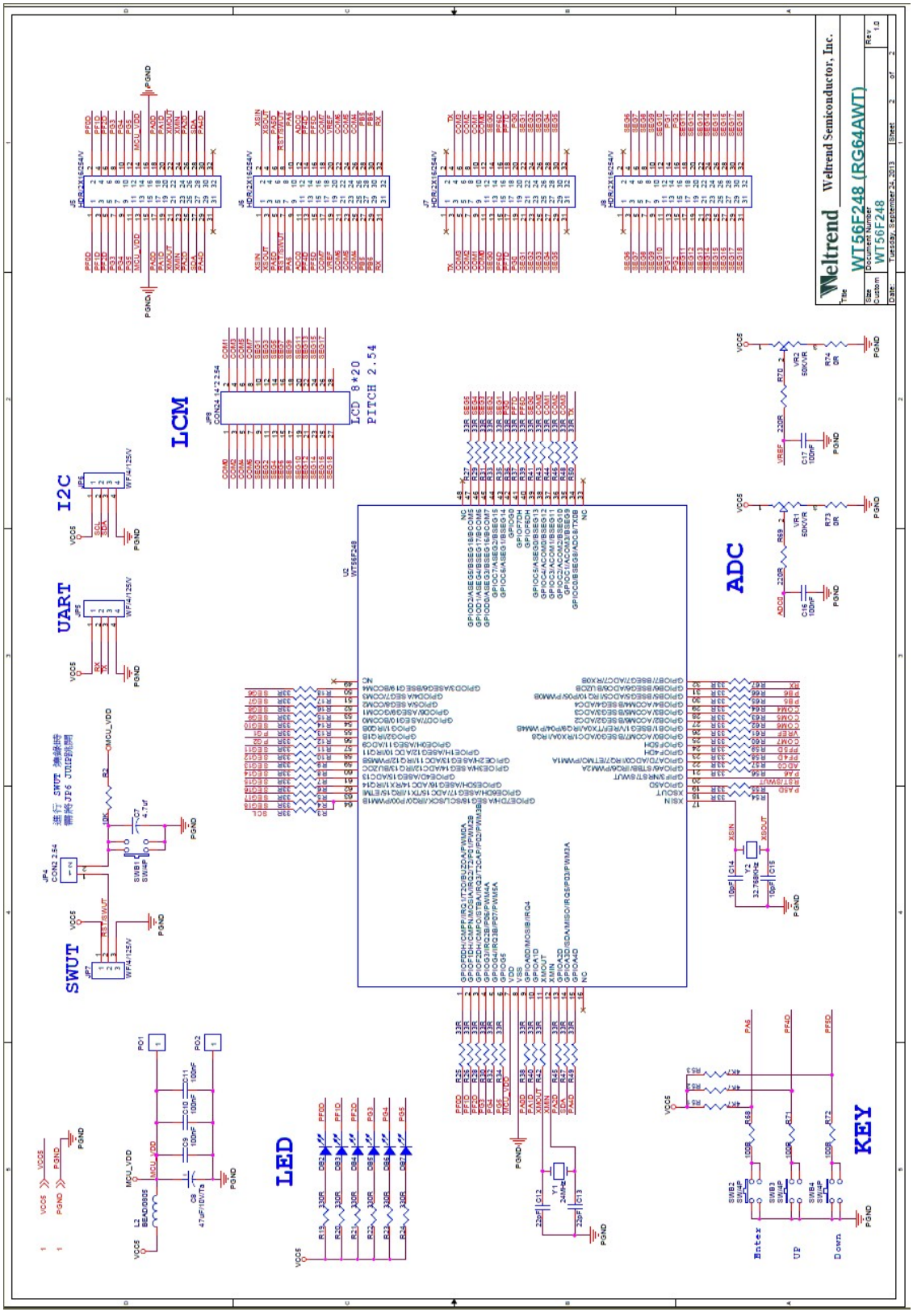
# Chapter 6 Appendix

## 6.1 Circuit

1. Power



2. WT56F248/232 (MCU)



## 6.2 BOM

| WT56F232/248 EVB BOM | | | | |
|---|---|---|---|---|
| Item | Quantity | Reference | Part | PCB Footprint |
| 1 | 2 | C15,C14 | 10pF | SC0603 |
| 2 | 2 | C12,C13 | 22pF | SC0603 |
| 3 | 8 | C4,C5,C6,C9,C10,C11,C16,C17 | 100nF | SC0603 |
| 4 | 1 | C7 | 4.7uf | SC0805 |
| 5 | 1 | C8 | 47uF/10V/Ta | SCE-B |
| 6 | 2 | C3,C2 | 100u/16V | DCE030 |
| 7 | 1 | C1 | 220uF/16V | DCE030 |
| 8 | 1 | DB1 | LED_Y | SLED0805 |
| 9 | 6 | DB2,DB3,DB4,DB5,DB6,DB7 | LEDS/RG | SLED0805 |
| 10 | 3 | JP1,JP2,JP3 | HDR/2X22/254/V | Header2X22-2.54-V |
| 11 | 1 | JP4 | CON2 2.54 | CM-2-2.54 |
| 12 | 1 | JP5 | WF/4/125/V | CN1.25-4P |
| 13 | 1 | JP6 | WF/4/125/V | ISP_CN1.25-4P |
| 14 | 1 | JP7 | WF/4/125/V | WT_CN1.25-3P |
| 15 | 1 | JP8 | CON24 14*2 2.54 | HEADER2X14-2.54 |
| 16 | 2 | J1,J4 | CON1 | TESTPIN_H2XP2.5XSILK3 |
| 17 | 1 | J2 | HDR/2X2/254/V | Header2X2-2.54-V |
| 18 | 1 | J3 | 電源母座 | JACK-3P |
| 19 | 4 | J5,J6,J7,J8 | HDR/2X16/254/V | Header2X19-2.54-V |
| 20 | 1 | L1 | POWER_BEAD/1206 | SL1206 |
| 21 | 1 | L2 | BEAD/0805 | SL0805 |
| 22 | 2 | R73,R74 | 0R | SR0603 |
| 23 | 56 | R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13, R14,R15,R16,R17,R18,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,R54,R55,R56,R57,R58, R59,R60,R61,R62,R63,R64,R65,R66,R67 | 33R | SR0603 |
| 24 | 3 | R68,R71,R72 | 100R | SR0603 |
| 25 | 2 | R69,R70 | 220R | SR0603 |
| 26 | 6 | R19,R20,R21,R22,R23,R24 | 330R | SR0603 |
| 27 | 1 | R1 | 360R | SR0603 |
| 28 | 3 | R51,R52,R53 | 4K7 | SR0603 |
| 29 | 1 | R2 | 10K | SR0603 |
| 30 | 4 | SWB1,SWB2,SWB3,SWB4 | SW/4P | KEY |
| 31 | 1 | U1 | 7805/TO252 | TO252 |
| 32 | 1 | U2 | WT56F248 | LQFP44P-WT61P802 |
| 33 | 2 | VR1,VR2 | 50K/VR | VR3-DIP |
| 34 | 1 | Y1 | 24MHz | XDIP-4MHZ |
| 35 | 1 | Y2 | 32.768KHz | XDIP-4MHZ |

## 6.3 Ordering Information

1. WT56F248/232 Starter Kit

| Kit | Product Name | Number |
|---|---|---|
| WT56F248/232 Starter Kit (WK007) | Single-wire Programming Board PL-2303 (WLINK-SWUT) x 1 | WA000 |
| | Simple Version (WT56F248/232 Starter Kit Board) x 1 | WB010 |
| | SWUT Programming Wire x 1 | |

2. WT56F248/232 Starter Kit Board (Simple Version)

| Kit | Product Name | Number |
|---|---|---|
| WT56F248/232 Simple Version | Simple Version (WT56F248/232 Starter Kit Board) | WB010 |
| | EVB Operation Manual | DOC30 |

3. 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 |
| | WLINK-SWUT Operation Manual | DOC2 |