

GigaDevice Semiconductor Inc.

GD32170C-START

User Guide

V3.1

(Dec.31.2021)

Table of Contents

| | |
|--|-----------|
| Table of Contents | 1 |
| List of Figures..... | 2 |
| List of Tables..... | 3 |
| 1. Summary | 4 |
| 2. Function Pin Assign | 4 |
| 3. Getting started..... | 4 |
| 4. Hardware layout overview..... | 5 |
| 4.1. Power supply..... | 5 |
| 4.2. Boot option..... | 5 |
| 4.3. LED | 5 |
| 4.4. KEY | 6 |
| 4.5. GD-Link | 6 |
| 4.6. Extension | 7 |
| 4.7. MCU..... | 7 |
| 5. Routine use guide | 7 |
| 5.1. GPIO_Running_LED | 7 |
| 5.1.1. DEMO purpose..... | 7 |
| 5.1.2. DEMO running Result..... | 8 |
| 5.2. GPIO_Key_Polling_mode | 8 |
| 5.2.1. DEMO purpose..... | 8 |
| 5.2.2. DEMO running Result..... | 8 |
| 5.3. EXTI_Key_Interrupt_mode..... | 8 |
| 5.3.1. DEMO purpose..... | 8 |
| 5.3.2. DEMO running Result..... | 9 |
| 5.4. TIMER_Key_EXTI | 9 |
| 5.4.1. DEMO purpose..... | 9 |
| 5.4.2. DEMO running result | 9 |
| 6. Revision history | 10 |

List of Figures

| | |
|--|---|
| Figure 4-1 Schematic diagram of power supply | 5 |
| Figure 4-2 Schematic diagram of boot option..... | 5 |
| Figure 4-3 Schematic diagram of LED function | 5 |
| Figure 4-4 Schematic diagram of Key function | 6 |
| Figure 4-5 Schematic diagram of GD-Link function | 6 |
| Figure 4-6 Schematic diagram of Extension Pin | 7 |
| Figure 4-7 Schematic diagram of MCU Pin | 7 |

List of Tables

| | |
|------------------------------------|----|
| Table 2-1 Pin assignment | 4 |
| Table 4-1 Boot configuration | 5 |
| Table 6-1 Revision history | 10 |

1. Summary

GD32170C-START-V1.0 board uses GD32F170C8T6 as the main controller. As a complete development platform of GD32F1x0 powered by ARM® Cortex™-M3 core, the board supports full range of peripherals. It uses mini-USB interface to supply 3.3V power. SWD, Reset, Boot, User button key, LED and Extension Pin are also included. This document details its hardware schematic and the relevant applications.

2. Function Pin Assign

Table 2-1 Pin assignment

| Function | Pin | Description |
|----------|-----|-------------|
| LED | PF6 | LED1 |
| | PF7 | LED2 |
| KEY | PA0 | K1-User Key |
| RESET | - | K2-Reset |

3. Getting started

The START Board uses mini-USB connector to get power, the hardware system power is +3.3V. A mini-USB cable are necessary to down programs. Select the correct boot mode and then power on, the LED3 will turn on, which indicates the power supply is ready.

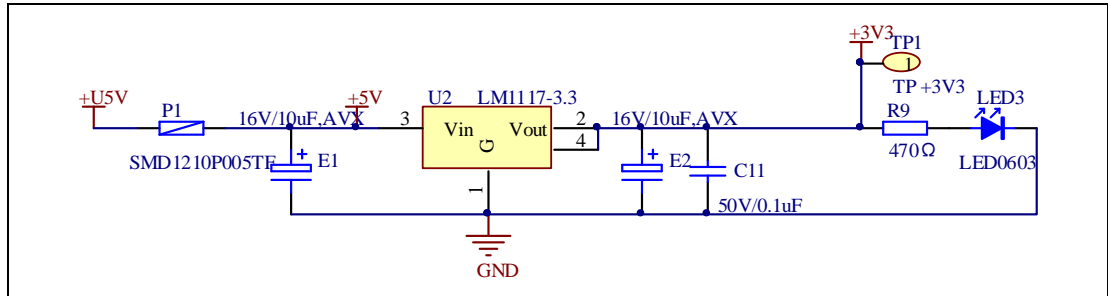
There are Keil version and IAR version of all projects. Keil version of the projects are created based on Keil MDK-ARM 4.74 uVision4. IAR version of the projects are created based on IAR Embedded Workbench for ARM 7.40.2. During use, the following points should be noted:

1. If you use Keil uVision4 to open the project, install the GD32F1x0_AddOn.3.2.0.exe to load the associated files.
2. If you use Keil uVision5 to open the project, there are two ways to solve the "Device Missing (s)" problem. One is to install GigaDevice.GD32F1x0_DFP.3.2.0.pack. In Project menu, select the Manage sub menu, click on the "Version Migrate 5 Format..." menu, the Keil uVision4 project will be converted to Keil uVision5 project. Then add "C:\Keil_v5\ARM\Pack\ARM\CMSIS\4.2.0\CMSIS\Include" to C/C++ in Option for Target. The other is to install Addon directly. Select the installation directory of Keil uVision5 software, such as C:\Keil_v5, in Destination Folder of Folder Selection. Select the corresponding device in Device of Option for Target and add "C:\Keil_v5\ARM\Pack\ARM\CMSIS\4.2.0\CMSIS\Include" to C/C++ in Option for Target.
3. If you use IAR to open the project, install IAR_GD32F1x0_ADDON.3.2.0.exe to load the associated files.

4. Hardware layout overview

4.1. Power supply

Figure 4-1 Schematic diagram of power supply



4.2. Boot option

Figure 4-2 Schematic diagram of boot option

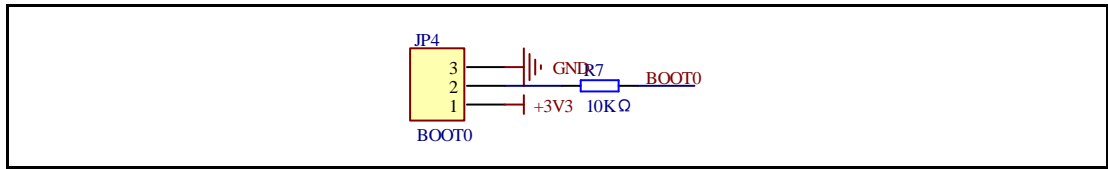
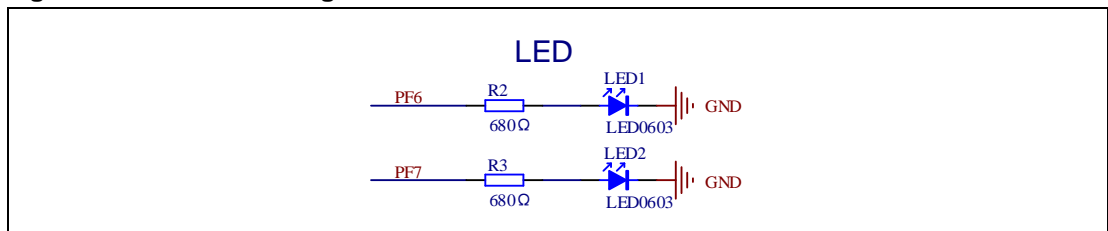


Table 4-1 Boot configuration

| BOOT1 | BOOT0 | Boot Mode |
|----------------|-------|---------------|
| Default | 2-3 | User memory |
| | 1-2 | System memory |
| Changed by ISP | 1-2 | SRAM memory |

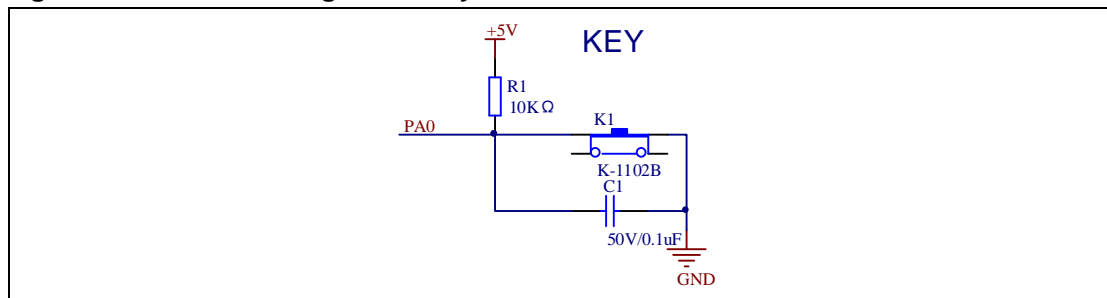
4.3. LED

Figure 4-3 Schematic diagram of LED function



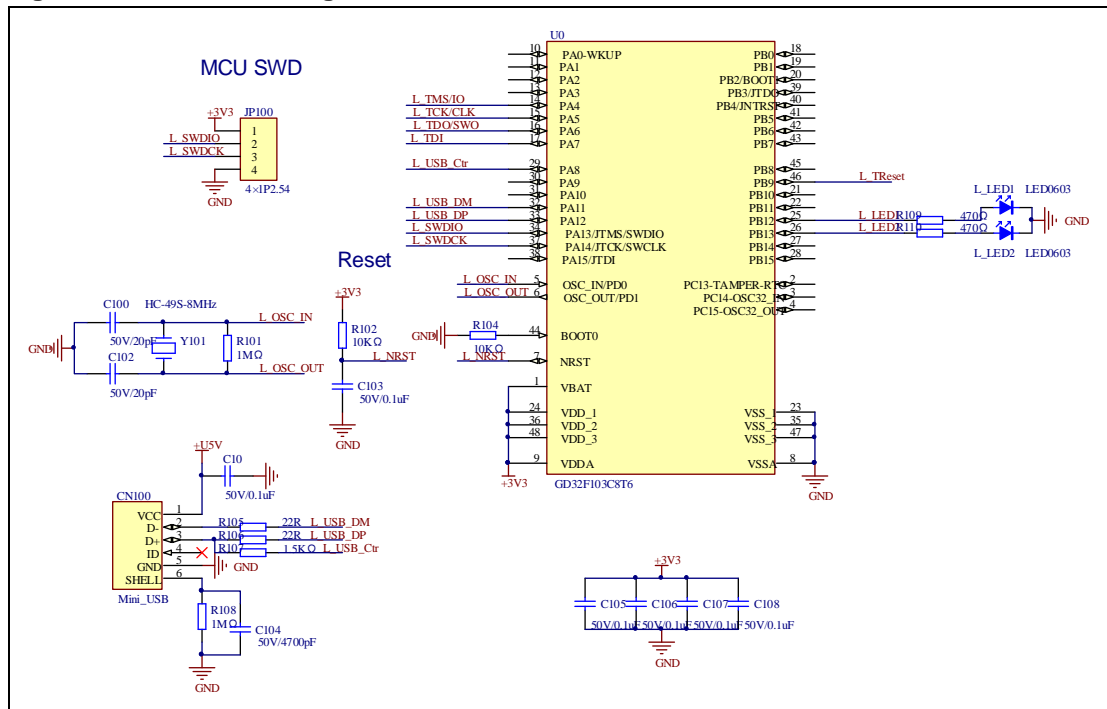
4.4. KEY

Figure 4-4 Schematic diagram of Key function



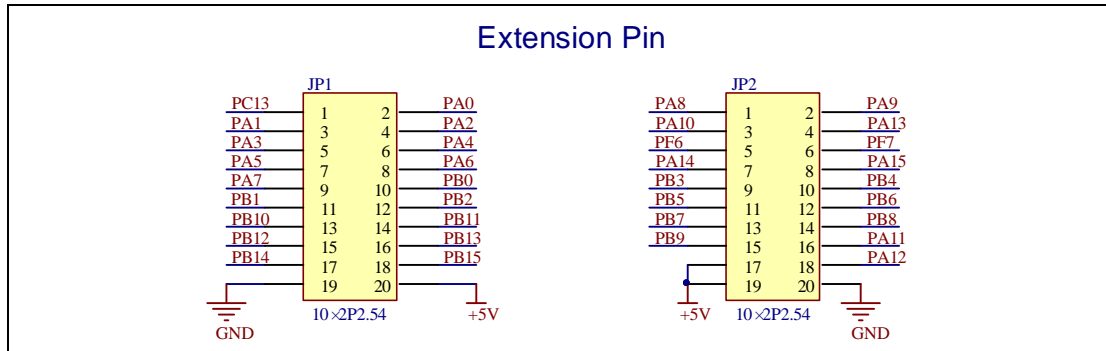
4.5. GD-Link

Figure 4-5 Schematic diagram of GD-Link function



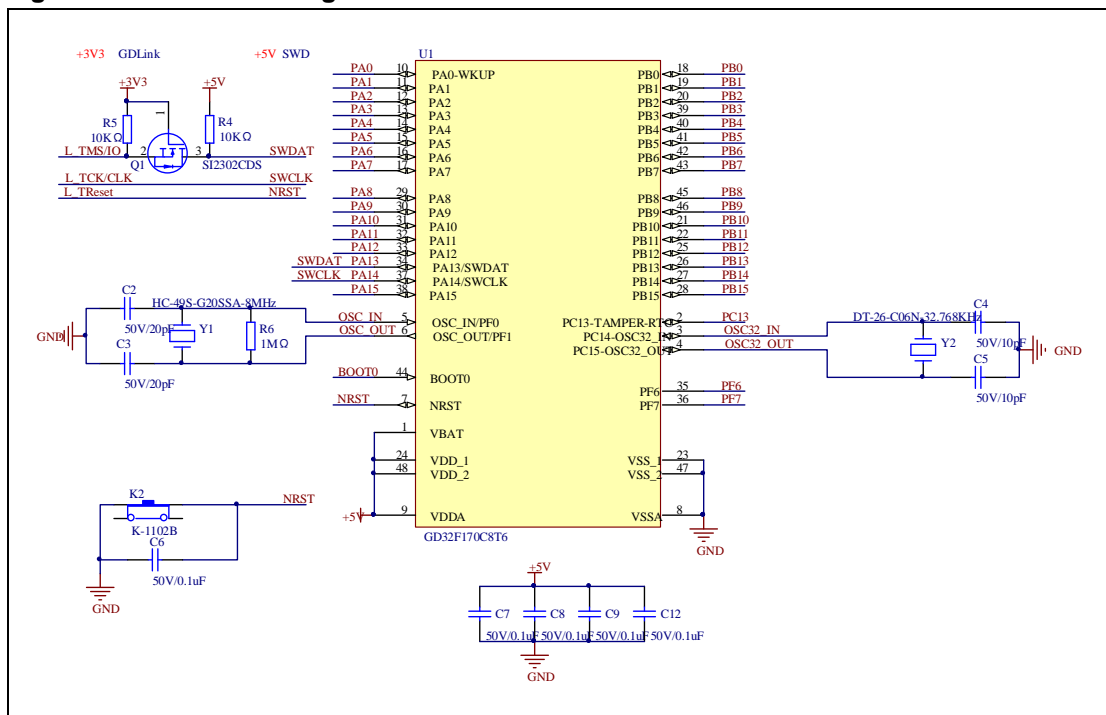
4.6. Extension

Figure 4-6 Schematic diagram of Extension Pin



4.7. MCU

Figure 4-7 Schematic diagram of MCU Pin



5. Routine use guide

5.1. GPIO_Running_LED

5.1.1. DEMO purpose

This Demo includes the following functions of GD32 MCU:

- Learn to use GPIO for controlling the LED
- Learn to use SysTick to generate 1ms delay

GD32170C-START-V1.0 board has two LEDs. The LED1 and LED2 are controlled by GPIO. This demo will show how to light the LED.

5.1.2. DEMO running Result

Download the program <01_GPIO_Running_LED> to the board, the states of LED1 and LED2 are toggled every 200ms.

5.2. GPIO_Key_Polling_mode

5.2.1. DEMO purpose

This Demo includes the following functions of GD32 MCU:

- Learn to use GPIO control the LED and the KEY
- Learn to use SysTick to generate 1ms delay

GD32170C-START-V1.0 board has two keys and two LEDs. The two keys are Reset key and User key. The LED1 and LED2 are controlled by GPIO.

This demo will show how to use the User key to control the LED1 and LED2. When press down the User Key, it will check the input value of the IO port. If the value is 0, wait for 50ms. Then check the input value of the IO port again. If the value is still 0, indicates that the button is pressed down successfully, and toggle the state of LED1 and LED2.

5.2.2. DEMO running Result

Download the program <02_GPIO_Key_Polling_mode> to the board, first of all, all the LEDs will be flashed once for test. Then press down the User Key, LED1 and LED2 will be turned on. Press down the User Key again, LED1 and LED2 will be turned off.

5.3. EXTI_Key_Interrupt_mode

5.3.1. DEMO purpose

This Demo includes the following functions of GD32 MCU:

- Learn to use GPIO to control the LED and the KEY
- Learn to use EXTI to generate external interrupt

GD32170C-START-V1.0 board has two keys and two LEDs. The two keys are Reset key and User key. The LED1 and LED2 are controlled by GPIO.

This demo will show how to use EXTI interrupt line to control the LED1 and LED2. When press down the User Key, it will produce an interrupt. In the interrupt service function, the demo will toggle LED1 and LED2.

5.3.2. DEMO running Result

Download the program <03_EXTI_Key_Interrupt_mode> to the board, first of all, the LED2 will be flashed once for test. Then press down the User Key, LED2 will be turned on. Press down the User Key again, LED2 will be turned off.

5.4. TIMER_Key_EXTI

5.4.1. DEMO purpose

This demo includes the following functions of GD32 MCU:

- Learn to use GPIO control the LED and the KEY
- Learn to use EXTI to generate external interrupt
- Learn to use TIMER to generate PWM

GD32170C-START-V1.0 board has two keys and two LEDs. The two keys are Reset key and User key. The LED1 and LED2 are controlled by GPIO.

This demo will show how to use the TIMER PWM to toggle the state of LED2 and EXTI interrupt line to control the LED1. When press down the User Key, it will produce an interrupt. In the interrupt service function, the demo will toggle LED1.

5.4.2. DEMO running result

Download the program < 04_TIMER_Key_EXTI > to the EVAL board, all the LEDs are flashed once for test, press down the User Key, LED1 will be turned on. Press down the User Key again, LED1 will be turned off. Connect PA6 (TIMER2_CH0) and PF7 with DuPont line. The LED2 will be toggled every 500ms.

6. Revision history

Table 6-1 Revision history

| Revision No. | Description | Date |
|--------------|--|--------------|
| 1.0 | Initial Release | Jun.28, 2017 |
| 2.0 | Updated format across the whole document | Jun.1, 2019 |
| 3.0 | Updated format across the whole document | Nov.20, 2019 |
| 3.1 | Updated format across the whole document | Dec.31, 2021 |

Important Notice

This document is the property of GigaDevice Semiconductor Inc. and its subsidiaries (the "Company"). This document, including any product of the Company described in this document (the "Product"), is owned by the Company under the intellectual property laws and treaties of the People's Republic of China and other jurisdictions worldwide. The Company reserves all rights under such laws and treaties and does not grant any license under its patents, copyrights, trademarks, or other intellectual property rights. The names and brands of third party referred thereto (if any) are the property of their respective owner and referred to for identification purposes only.

The Company makes no warranty of any kind, express or implied, with regard to this document or any Product, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The Company does not assume any liability arising out of the application or use of any Product described in this document. Any information provided in this document is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Except for customized products which has been expressly identified in the applicable agreement, the Products are designed, developed, and/or manufactured for ordinary business, industrial, personal, and/or household applications only. The Products are not designed, intended, or authorized for use as components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, atomic energy control instruments, combustion control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or Product could cause personal injury, death, property or environmental damage ("Unintended Uses"). Customers shall take any and all actions to ensure using and selling the Products in accordance with the applicable laws and regulations. The Company is not liable, in whole or in part, and customers shall and hereby do release the Company as well as its suppliers and/or distributors from any claim, damage, or other liability arising from or related to all Unintended Uses of the Products. Customers shall indemnify and hold the Company as well as its suppliers and/or distributors harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of the Products.

Information in this document is provided solely in connection with the Products. The Company reserves the right to make changes, corrections, modifications or improvements to this document and Products and services described herein at any time, without notice.