

**GigaDevice Semiconductor Inc.**

**GD32150C-START**

**User Guide**

**V3.0**

(Nov.20.2019)

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## 1. Summary

GD32150C-START board uses GD32F150C8T6 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
USB	PA11	USBDM
	PA12	USBDP
	PA8	USBDP pull up pin

## 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:

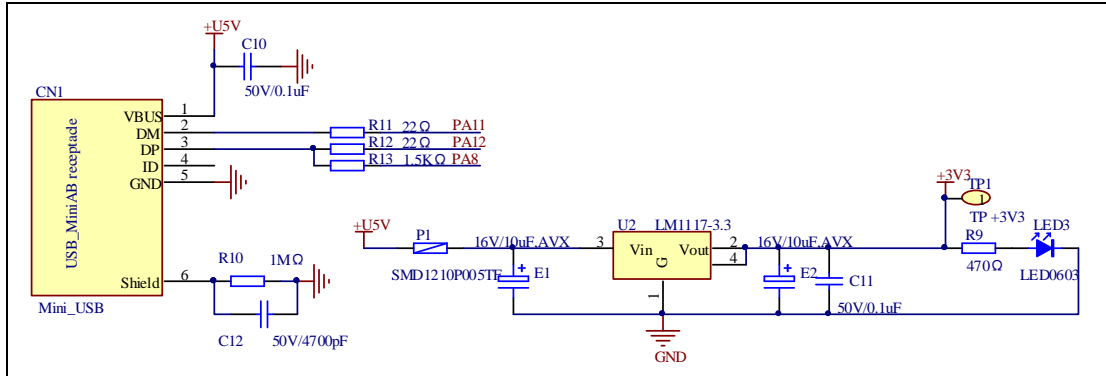
1. If you use Keil uVision4 to open the project, install the GD32F1x0\_AddOn.3.2.0.exe to load the associated files.
2. If you use Keil uVision5 to open the project, there are two ways to solve the "Device Missing (s)" problem. One is to install GigaDevice.GD32F1x0\_DFP.3.2.0.pack. In Project menu, select 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

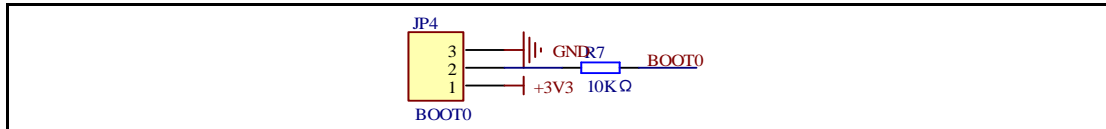
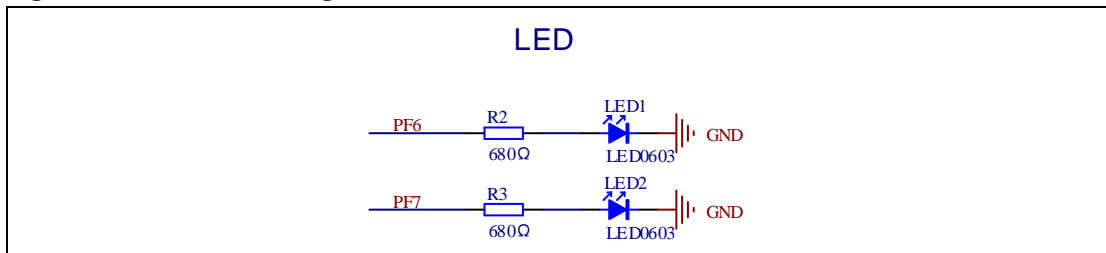


Table 4-1 Boot configuration

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

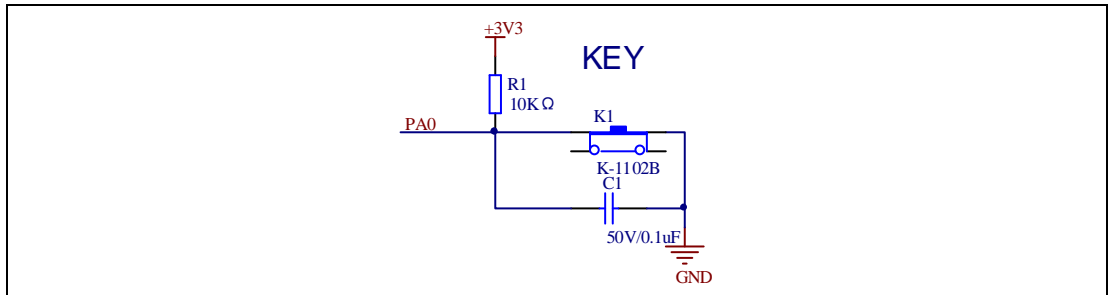
### 4.3. LED

Figure 4-3 Schematic diagram of LED function



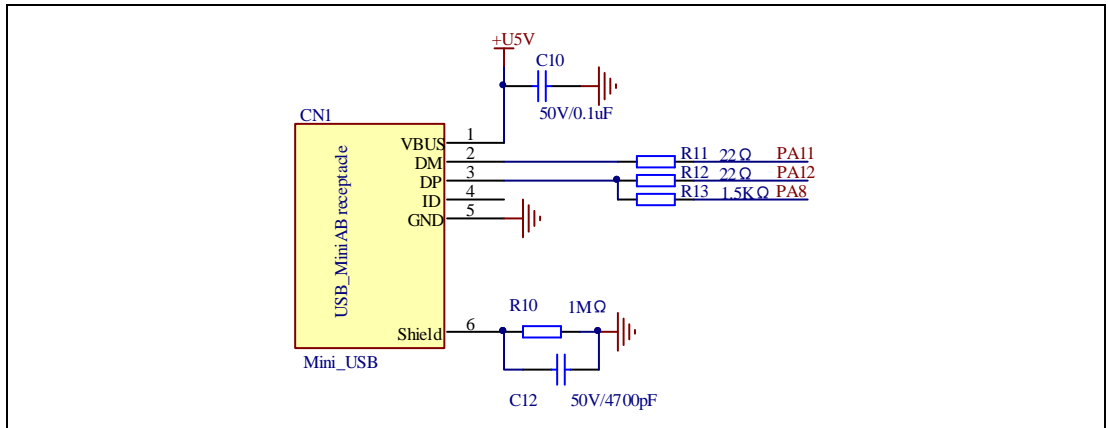
#### 4.4. KEY

Figure 4-4 Schematic diagram of Key function



#### 4.5. USB

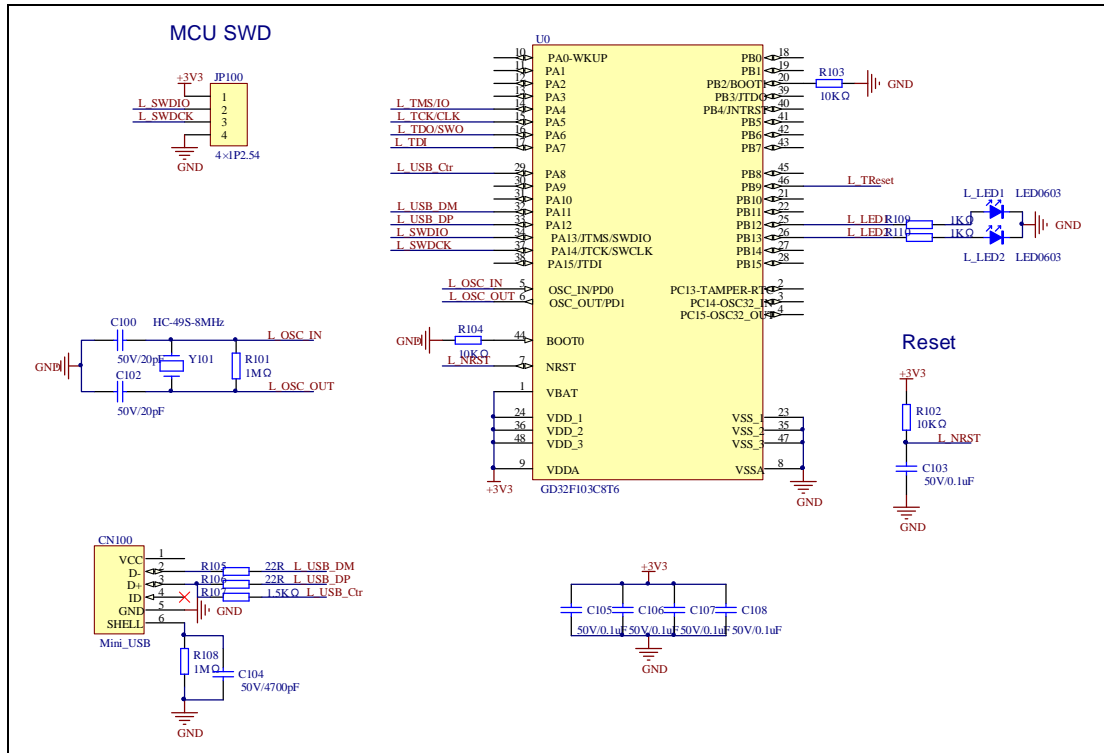
Figure 4-5 Schematic diagram of USB function





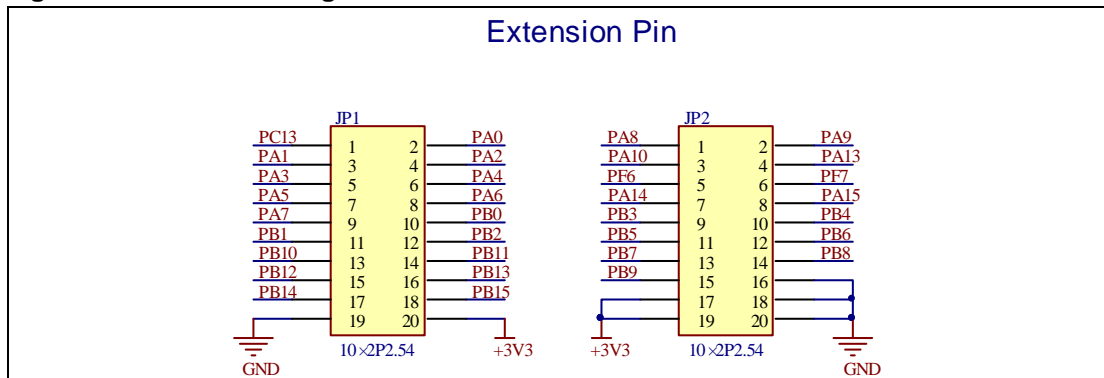
## 4.6. GD-Link

Figure 4-6 Schematic diagram of GD-Link function



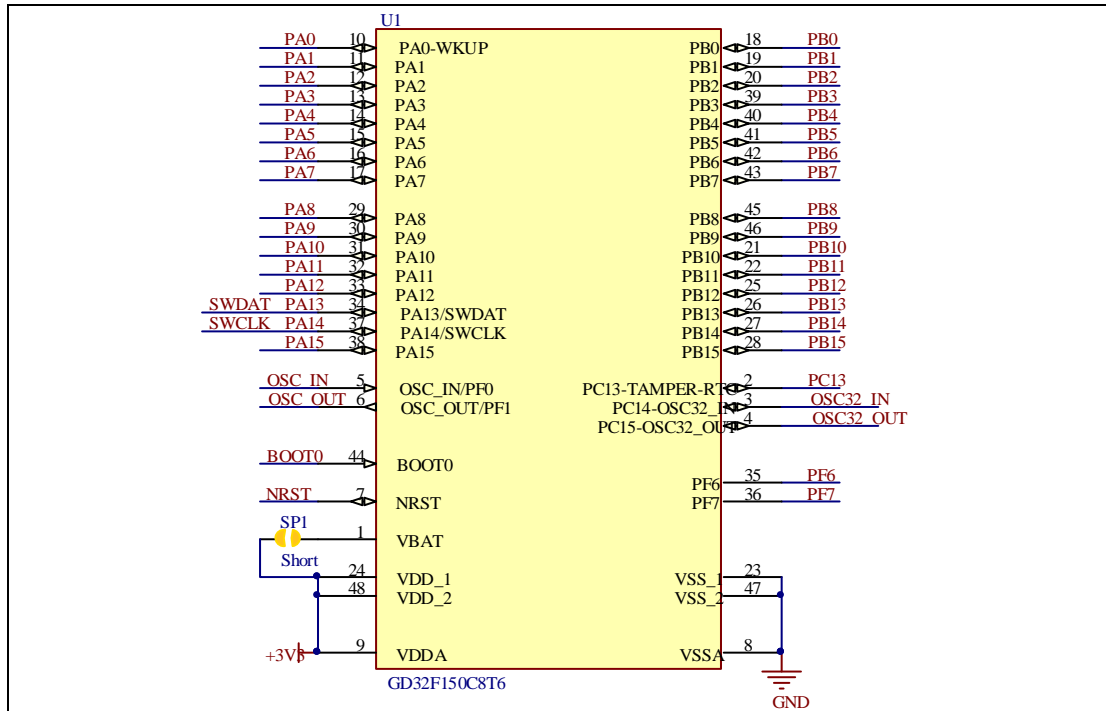
## 4.7. Extension

Figure 4-7 Schematic diagram of Extension Pin



## 4.8. MCU

Figure 4-8 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

GD32150C-START-V1.1 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

GD32150C-START-V1.1 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

GD32150C-START-V1.1 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, 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.

## 5.4. 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

GD32150C-START 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 trigger EXTI interrupt 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.

## 5.5. USBD\_HID\_keyboard

### 5.5.1. DEMO purpose

This demo includes the following functions of GD32 MCU:

- Learn how to use the USBD peripheral
- Learn how to implement USB HID(human interface) device

GD32150C-START board has one user key and one USB interface. In this demo, the GD32150C-START board is enumerated as an USB keyboard, which uses the native PC Host HID driver, as shown below. The USB Keyboard uses the user key to output 'a' in the PC screen.



### 5.5.2. DEMO running Result

Download the program <05\_USBD\_HID\_keyboard > to the start board and run. If you press the user key, it will output 'a' in the PC screen.

## 5.6. USBD\_CDC\_ACM

### 5.6.1. DEMO purpose

This demo includes the following functions of GD32 MCU:

- Learn how to use the USBD peripheral
- Learn how to implement USB CDC device

GD32150C-START board has one USBD interface. In this demo, the GD32150C-START board is enumerated as an USB virtual COM port, which was shown in device manager of PC as below. This demo makes the USB device look like a serial port, and loops back the contents of a text file over USB port. To run the demo, input a message using the PC's keyboard. Any data that shows in HyperTerminal is received from the device.



### 5.6.2. DEMO running result

Download the program <06\_USBD\_CDC\_ACM> to the board and run. When you input message through computer keyboard, the HyperTerminal will receive and shown the message. For example, when you input "GigaDevice MCU", the HyperTerminal will get and show it as below.



## 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

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