Readme

APM32F107 EVAL SDK

Rev：V1.0

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1 Introduction

The Geehy Semiconductor APM32F107 EVAL board software development kit includes a series driver library, a group of example applications that demonstrate key peripheral functionality, and other development files.

Software development kit have a hierarchy as follows:

- SDK directory
  - Boards
  - Documents
  - Examples
  - Libraries
  - Middlewares

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2 About boards

The boards folder includes a board support package for APM32F107 EVAL board. It can help drive the peripheral circuit or components on the board quickly. The BSP can be found in the ~/Boards directory.

The BSP provided are built for APM32F107 EVAL board compatibility. For other user development board use, some minor modifications may be required.

Boards have a hierarchy as follows:

- Boards folder
  - Board folder
    - inc
    - src
  - Board.c
  - Board.h

Board APM32F107 EVAL include following board support package:

- Board_ APM32F107_ EVAL src folder
  - Board_APM32F107_EVAL
  - bsp_delay
  - bsp_i2c_ee
  - bsp_key
  - bsp_lcd
  - bsp_w25q16

3 About documents

The documents folder includes a link file that can be redirected to the technical support center of Geehy semiconductor. The BSP can be found in the ~/Documents directory.

4 About examples

The example applications can be found in the ~/Examples directory.

The examples provided are built for APM32F107 EVAL board compatibility. For other user development board use, some minor modifications may be required.

Example projects have a hierarchy as follows:

- Example folder
  - Include
  - Project
    - IAR
    - MDK
  - Source

All example applications tested with: **APM32F10x_StdPeriphDriver V1.0.3**, include the following examples:

- Examples
  - ADC
    - ADC_Potentiometer
  - CAN
    - CAN_Dual
  - ETH
    - ETH_Ping
    - ETH_Ping_Interrupt
    - ETH_FreeRTOS_TcpClient
    - ETH_FreeRTOS_TcpServer
    - ETH_RT-Thread_TcpClient
    - ETH_RT-Thread_TcpServer
  - I2C
    - I2C_EEPROM

* RTC
  - RTC_Clock
* RTOS
  - FreeRTOS
  - RT-Thread
* SPI
  - SPI_FLASH
  - SPI_LCD
* Template
  - Template
* USART
  - USART_Interrupt
  - USART_Printf
  - USART_RS485
* USB_Device
  - USBD_HID
  - USBD_MSC
  - USBD_VCP

4.1 ADC_Potentiometer

4.1.1 Example Description

This example shows how to use ADC Peripheral to detect potentiometer. Press KEY1 to start test. If detect operation is success, LCD will display the test information.

4.1.2 Directory contents

This example can be found in the ~ /Examples/ADC/ADC_Potentiometer directory.

4.2 CAN_Dual

4.2.1 Example Description

This example shows how to configure the CAN1 and CAN2 peripherals to send and receive CAN frames in normal mode. The sent frames are used to control LCD by pressing KEY1 or KEY2 push buttons.

4.2.2 Directory contents

This example can be found in the ~ /Examples/CAN/CAN_Dual directory.

4.3 ETH_Ping

4.3.1 Example Description

This example describes how to use ethernet PHY by using APM32F1xx_ETH_Driver library. After configured ethernet mainboard will be use UART4 to printf static IP address. Receive network data in polling mode. If computer ping static IP address 169.254.90.123, computer will be visit mainboard normality.

4.3.2 Directory contents

This example can be found in the ~ /Examples/ETH/ETH_Ping directory.

4.4 ETH_Ping_Interrupt

4.4.1 Example Description

This example describes how to use ethernet PHY by using APM32F1xx_ETH_Driver library. After configured ethernet mainboard will be use UART4 to printf static IP address. Receive network data in interrupt mode. If computer ping static IP address 169.254.90.123, computer will be visit mainboard normality.

4.4.2 Directory contents

This example can be found in the ~ /Examples/ETH/ETH_Ping_Interrupt directory.

4.5 ETH_FreeRTOS_TcpClient

4.5.1 Example Description

This example shows how to create the TCP client based on the FreeRTOS V10.4.3, and then connect to the server to send and receive data.

4.5.2 Directory contents

This example can be found in the ~ /Examples/ETH/ETH_FreeRTOS_TcpClient directory.

4.6 ETH_FreeRTOS_TcpServer

4.6.1 Example Description

This example shows how to create the TCP server based on the FreeRTOS V10.4.3. Received and send data to TCP Client by tcp assisatant.

4.6.2 Directory contents

This example can be found in the ~ /Examples/ETH/ETH_FreeRTOS_TcpServer directory.

4.7 ETH_RT-Thread_TcpClient

4.7.1 Example Description

This example shows how to create the TCP client based on the RT-Thread V3.1.5, and then connect to the server to send and receive data.

4.7.2 Directory contents

This example can be found in the ~ /Examples/ETH/ETH_RT-Thread_TcpClient directory.

4.8 ETH_RT-Thread_TcpServer

4.8.1 Example Description

This example shows how to create the TCP server based on the RT-Thread V3.1.5. Received and send data to TCP Client by tcp assisatant.

4.8.2 Directory contents

This example can be found in the ~ /Examples/ETH/ETH_RT-Thread_TcpServer directory.

4.9 I2C_EEPROM

4.9.1 Example Description

This example shows how to use I2C Peripheral to read and write EEPROM. Press KEY1 to write data to EEPROM and read data form EEPROM. If read and write success, LED2 will turn on. The data will be shown on serial assistant trough uart4. If error, LED3 will turn on. And LCD will display the test information.

4.9.2 Directory contents

This example can be found in the ~ /Examples/I2C/I2C_EEPROM directory.

4.10 RTC_Clock

4.10.1 Example Description

This example shows how to use RTC Peripheral to make a clock. After power on, program will read the backup area data to determine whether to reconfigure RTC time. Then the RTC time will display in the LCD. You also can check the RTC time through the serial assistant.

4.10.2 Directory contents

This example can be found in the ~ /Examples/RTC/RTC_Clock directory.

4.11 FreeRTOS

4.11.1 Example Description

This example describes how to use FreeRTOS for APM32F107. For this example, You can see that LED1 is constantly blinking, and printing information through the serial assistant.

4.11.2 Directory contents

This example can be found in the ~ /Examples/RTOS/FreeRTOS directory.

4.12 RT-Thread

4.12.1 Example Description

This example describes how to use RT-Thread for APM32F107. For this example, You can see that LED1 is constantly blinking, and printing information through the serial assistant.

4.12.2 Directory contents

This example can be found in the ~ /Examples/RTOS/RT-Thread directory.

4.13 SPI_FLASH

4.13.1 Example Description

This example shows how to use SPI Peripheral to write data to W25Q16 flash and read data from W25Q16 flash. Press KEY1 to start test. If detect operation is success, LCD will display the test information, and you can also view the print information through the serial port assistant.

4.13.2 Directory contents

This example can be found in the ~ /Examples/SPI/SPI_FLASH directory.

4.14 SPI_LCD

4.14.1 Example Description

This example describes how to use SPI peripheral to drive LCD screen. The LCD screen displays multi-level menus, you can press KEY1, KEY2 and KEY3 to operation the multi-level.

4.14.2 Directory contents

This example can be found in the ~ /Examples/SPI/SPI_LCD directory.

4.15 Template

4.15.1 Example Description

This demo is based on the APM32F107 EVAL board. It provides a template project.

4.15.2 Directory contents

This example can be found in the ~ /Examples/Template/Template directory.

4.16 USART_Interrupt

4.16.1 Example Description

This example shows how to use UART4 Peripheral to send data and receive data from serial assistant by interrupt. Press KEY1 to write data to serial assistant, and you can also send data to device use serial assistant.

4.16.2 Directory contents

This example can be found in the ~ /Examples/USART/USART_Interrupt directory.

4.17 USART_Printf

4.17.1 Example Description

This example shows how to send and receive data by using USART. In this case, the UART4 of MCU and upper computer can send data to each other. You can check the data in a Serial Port Utility.

4.17.2 Directory contents

This example can be found in the ~ /Examples/USART/USART_Printf directory.

4.18 USART_RS485

4.18.1 Example Description

This example describes how to use MAX485 module to transfer data with serial COM. When you send some data from PC to the RS458, then MCU will send the same data to PC through RS458.

4.18.2 Directory contents

This example can be found in the ~ /Examples/USART/USART_RS485 directory.

4.19 USBD_HID

4.19.1 Example Description

This example describes how to use the USB OTG device module on APM32F107 to enumerated as a HID Mouse. This example use PC as host, and KEY1 and KEY2 and KEY3 is used to control the direction of the mouse. When KEY1 is pressed, cursor will move left, otherwise KEY2 to right, KEY3 to up.

4.19.2 Directory contents

This example can be found in the ~ /Examples/USB_OTG/USB_Device/USBD_HID directory.

4.20 USBD_MSC

4.20.1 Example Description

This example describes how to use the USB OTG device module on APM32F107 to enumerated as a MSC USB disk. This example use PC as host, and APM32F107 will use sram array to simulate a fake U disk, unable to store files, only Used to test speed of file transfering.

4.20.2 Directory contents

This example can be found in the ~ /Examples/USB_OTG/USB_Device/USBD_MSC directory.

4.21 USBD_VCP

4.21.1 Example Description

This example describes how to use the USB OTG device module on APM32F107 to enumerate as a Virtual Com Port. This example use PC as host, you can use serial assistant to transfer USB data. Once serial assistant send data to device through the Virtual Com Port that USB enumerated, then device will send the same data back to PC.

4.21.2 Directory contents

This example can be found in the ~ /Examples/USB_OTG/USB_Device/USBD_VCP directory.

5 About libraries

The libraries folder includes a series library. It can provide supports for APM32F10x MCU such as device support and standard peripheral and USB OTG etc. The libraries can be found in the ~/Libraries directory.

APM32F0xx MCU include following library:

- Libraries folder
  - APM32F10x_ETH_Driver
  - APM32F10x_StdPeriphDriver
  - CMSIS
  - Device
  - USB_OTG_Lib

6 About middlewares

The middlewares folder includes a series third-party middleware. The middlewares can be found in the ~/middlewares directory.

The middlewares used by APM32F107 EVAL include following:

- Middlewares folder
  - FreeRTOS
  - lwip-1.4.1
  - RealThread

7 Revision History

Table 1 File Revision History

Date	Rev	Description
2022.11.22	1.0	First Release version of APM32F107 EVAL SDK

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8. Scope of Application

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