

# Readme

**APM32E10x EVAL SDK**

**Rev: V1.0**

# 1 Introduction

The Geehy Semiconductor APM32E10x 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 APM32E10x 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 APM32E10x 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 APM32E103 EVAL include following board support package:

- Board\_APM32E103\_EVAL src folder
  - \* Board\_APM32E103\_EVAL
  - \* bsp\_can
  - \* bsp\_delay
  - \* bsp\_i2c\_ee
  - \* bsp\_key
  - \* bsp\_lcd
  - \* bsp\_sdio
  - \* 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 APM32E103 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: **APM32E10x\_StdPeriphDriver v1.0.1**, include the following examples:

- Examples
  - \* ADC
    - [ADC Potentiometer](#)
  - \* CAN
    - [CAN Dual](#)
  - \* EMMC
    - [DMC SDRAM](#)
  - \* I2C
    - [I2C EEPROM](#)
  - \* RTC
    - [RTC Clock](#)

- \* SDIO
  - [SDIO\\_SDCard](#)
- \* SPI
  - [SPI\\_FLASH](#)
  - [SPI\\_LCD](#)
- \* Template
  - [Template](#)
- \* USART
  - [USART\\_Printf](#)
- \* USB
  - [USB\\_CDC\\_VirtualCOMPort](#)
  - [USB\\_HID\\_Mouse](#)
  - [USB\\_MSC\\_Disk](#)

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## 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 DMC\_SDRAM

### 4.3.1 Example Description

The program aims to show how to use DMC to read and write data to external SDRAM. The test results will be displayed on the LCD screen, and printed by USART1.

### 4.3.2 Directory contents

This example can be found in the [~/Examples/EMMC/DMC\\_SDRAM](#) directory.

## 4.4 I2C\_EEPROM

### 4.4.1 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 usart1. If error, LED3 will turn on. And LCD will display the test information.

#### **4.4.2 Directory contents**

This example can be found in the [~/Examples/I2C/I2C EEPROM](#) directory.

### **4.5 RTC\_Clock**

#### **4.5.1 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 and written to the backup area.

#### **4.5.2 Directory contents**

This example can be found in the [~/Examples/RTC/RTC Clock](#) directory.

### **4.6 SDIO\_SDCard**

#### **4.6.1 Example Description**

The program aims to show how to DMA or polling mode to write and read SD card data by SDIO. In this case, the application will mount the file system in SD Card. If there is no the file System, you can Press KEY1(PF9) twice to creat a file system which could make you data lost. When the file system is mounted success, you can press KEY1, KEY2 and KEY3 to operation the file system.

#### **4.6.2 Directory contents**

This example can be found in the [~/Examples/SDIO/SDIO SD Card](#) directory.

### **4.7 SPI\_FLASH**

#### **4.7.1 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.

## 4.7.2 Directory contents

This example can be found in the [~/Examples/SPI/SPI\\_FLASH](#) directory.

## 4.8 SPI\_LCD

### 4.8.1 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. Directory contents

### 4.8.2 Directory contents

This example can be found in the [~/Examples/SPI/SPI\\_LCD](#) directory.

## 4.9 Template

### 4.9.1 Example Description

This demo is based on the APM32E103 EVAL board. It provides a template project.

### 4.9.2 Directory contents

This example can be found in the [~/Examples/Template/Template](#) directory.

## 4.10 USART\_Printf

### 4.10.1 Example Description

The program shows how to send data by using USART, in this case, USART1 sends data "Hello USART1" to upper computer. You can check the data in a Serial Port Utility.

### 4.10.2 Directory contents

This example can be found in the [~/Examples/USART/USART\\_Printf](#) directory.

## 4.11 USB\_CDC\_VirtualCOMPort

### 4.11.1 Example Description

This example describes how to use the USB device module on APM32E103 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.

### 4.11.2 Directory contents

This example can be found in the [~/Examples/USB/USB\\_CDC\\_VirtualCOMPort](#) directory.

## 4.12 USB\_HID\_Mouse

### 4.12.1 Example Description

This example shows how to use USB. Download the program, then connect the device to your computer through USB. If the USB is configured correctly, you can see a new HID-mouse in your computer.

### 4.12.2 Directory contents

This example can be found in the [~/Examples/USB/USB\\_HID\\_Mouse](#) directory.

## 4.13 USB\_MSC\_Disk

### 4.13.1 Example Description

This example describes how to use the USB device module on APM32E103 to enumerated as a MSC USB disk. This example use PC as host, and APM32E103 use RAM to simulate USB flash drives. PC will recognize the motherboard as a disk, and formatting the U disk. This example will be used to test USB speed.

### 4.13.2 Directory contents

This example can be found in the [~/Examples/USB/USB\\_MSC\\_Disk](#) directory.

## 5 About libraries

The libraries folder includes a series library. It can provide supports for APM32E10x MCU such as device support and standard peripheral and USB OTG etc. The libraries can be found in the [~/Libraries](#) directory.

APM32E10x MCU include following library:

- Libraries folder
  - \* APM32E10x\_StdPeriphDriver
  - \* CMSIS
  - \* Device
  - \* USB\_Device\_Lib

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## 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 APM32E103 EVAL include following:

- Middlewares folder
  - \* fat\_fs

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## 7 Revision History

Table 1 File Revision History

Date	Rev	Description
2022.09.30	1.0	First Release version of APM32E103 EVAL SDK

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#### 8. Scope of Application

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