

MM32 eMiniBoard User Guide

Introduction

Insight Series MM32 eMiniBoard (hereinafter referred to as eMiniBoard) development board, with ARM Keil/IAR integrated development environment, MM32 Program programming software, MM32 FDS firmware development platform and embedded MM32-LINK-OB emulator, Form a complete development ecology of the MM32 Cortex-M0/M3 MCU.

The eMiniBoard development board contains the following six models:

- eMiniBoard MB-020 Based on Cortex-M0 Bluetooth development board, support MM32W051 MCU
- eMiniBoard MB-021 Based on Cortex-M3 Bluetooth development board, support MM32W373 MCU
- eMiniBoard MB-022 Based on Cortex-M0 Low Pin Count development board, support MM32F031/F003 MCU
- eMiniBoard MB-023 Based on Cortex-M0 Low Power development board, support MM32L073 MCU
- eMiniBoard MB-024 Based on Cortex-M3 General series development board, support MM32L373 MCU
- eMiniBoard MB-025 Based on Cortex-M0 Enhanced General series development board, support MM32F032 MCU

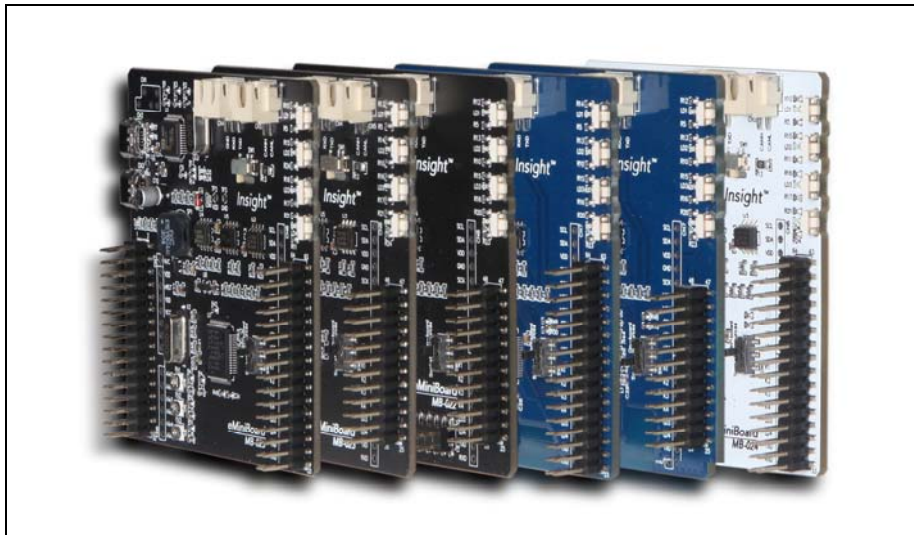


Figure 1. the eMiniBoard series development board

Features

The MM32 eMiniBoard development board has the following features:

- Support MindMotion MM32 Cortex-M series MCU development evaluation
- Support integrated development environment of Keil uVision v5.0 / IAR EWARM v7.80 or above
- Support MindMotion MM32 FDS firmware development platform
- Support MindMotion MM32 Program programming software
- Development board MCU power supply based on 3.3V voltage design
- Support up to 4KV EFT anti-interference ability
- Embedded MM32-LINK-OB in-circuit emulator, support SWD debugging interface and intelligently connected CDC virtual serial port
- Unified design of component numbers, locations, and functions of common parts of all development boards
- Emulator USB interface or target MCU USB interface power supply
- 4-Side button
- 4-LED
- 1-UART Connector
- 1-CAN Connector and CAN driver and terminal matching resistor switch
- 1-16 Mbit SPI Flash memory
- 1-2048 bit I2C EEPROM memory
- 1-Speaker
- 1-3 analog input potentiometers
- 1-Built-in expansion function and MCU pin function selection switch
- 0.1 inch pitch double-row pin socket with the same MCU pin (some function pins are not led out)
- Compatible with Arduino NUO interface, PCB size 3.0*2.85 inches
- Quickly distinguish the blue, black and white PCB color matching of the development board function
- SMT manufacturing process

General part

The eMiniBoard development board is based on the General part of the buttons, LED indicators, UART / CAN connector and MM32-LINK virtual serial port connection functions and relationships as shown in the following table:

Table 1. Key function and MCU connection relationship table

KEY	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
K1	PD2	PB1	PB1	PB1	PB1	PB1
K2	PC13	PB2	PB2	PB2	PB2	PB2
K3	PC14	PB10	PB10	PB10	PB10	PB10
K4	PC15	PB11	PB11	PB11	PB11	PB11

Table 2. LED and MCU connection relationship table

LED	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
LD1	PD3	PA15	PA15	PA15	PA15	PA15
LD2	PA15	PC10	PB3	PB3	PB3	PB3
LD3	PA3	PC11	PB4	PB4	PB4	PB4
LD4	PA4	PC12	PB5	PB5	PB5	PB5

Table 3. CN2 MM32-LINK Emulator USB Socket

PINS	FUNCTION	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
1	VCC	VCC					
2	USB-DM	USB-DM					
3	USB-DP	USB-DP					
4	GND	GND					
5	GND	GND					

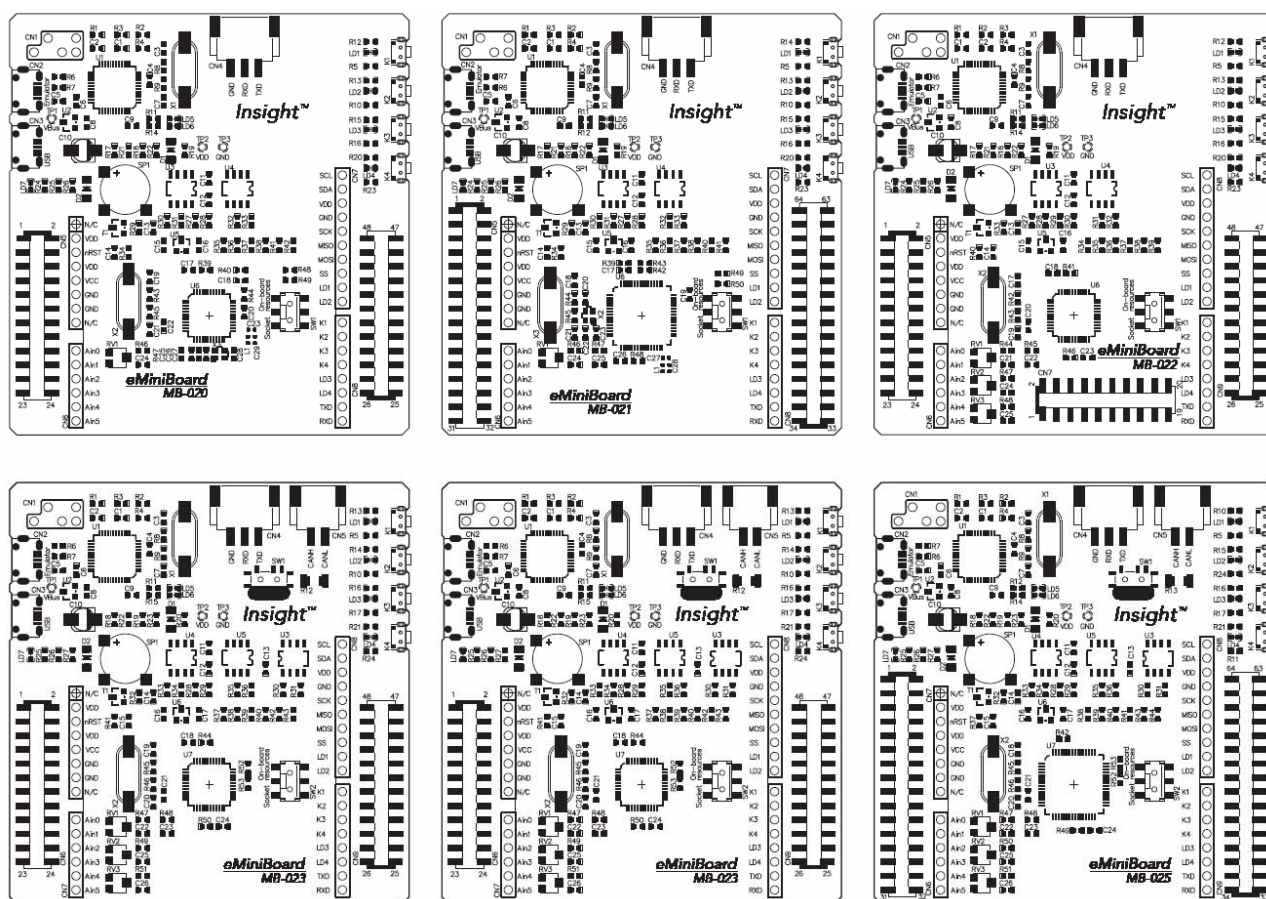


Figure 2. eMiniBoard PCB layout

Table 4. CN3 Target MCU USB Socket

PINS	FUNCTION	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
1	VCC	VCC					
2	USB-DM	PA11					
3	USB-DP	PA12					
4	GND	GND					
5	GND	GND					

Table 5. CN4 UART Connector Sockets

PINS	FUNCTION	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
1	GND	GND					
2	RXD	PA3					
3	TXD	PA2					

Table 6. CN5 CAN Connector Sockets

FUNCTION	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025	NOTES
TX	--	--	--	PB8	PB8	PB8	Pin1: CAN-H Pin2: CAN-L
RX	--	--	--	PB9	PB9	PB9	

Table 7. Virtual Serial Port CDC and MCU Connection Relationship Table

MM32-LINK	FUNCTION	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
TXD	RXD	PB7	PA10	PA10	PA10	PA10	PA10
RXD	TXD	PB6	PA9	PA9	PA9	PA9	PA9

The eMiniBoard development board MM32-LINK-OB emulator function is identical to the stand-alone standard MM32-LINK emulator. The firmware upgrade code is the same as the MM32-LINK emulator. The MM32-LINK emulator power supply is powered by an independent power supply and is separated from the target MCU power supply. Connector CN1 is only used to program the emulator MCU.

When using the emulator and powering the board, plug one end of the USB cable into the CN2 socket of the connector and the other end to the USB port of the PC. The red LED of the MM32-LINK emulator indicates that the emulator is not connected to the personal computer, and green indicates that the emulator is connected to the personal computer.

When using the USB function of the target MCU, connect the USB cable to the CN3 socket.

Whether the emulator USB cable is connected or not is independent of the USB connection of the target MCU.

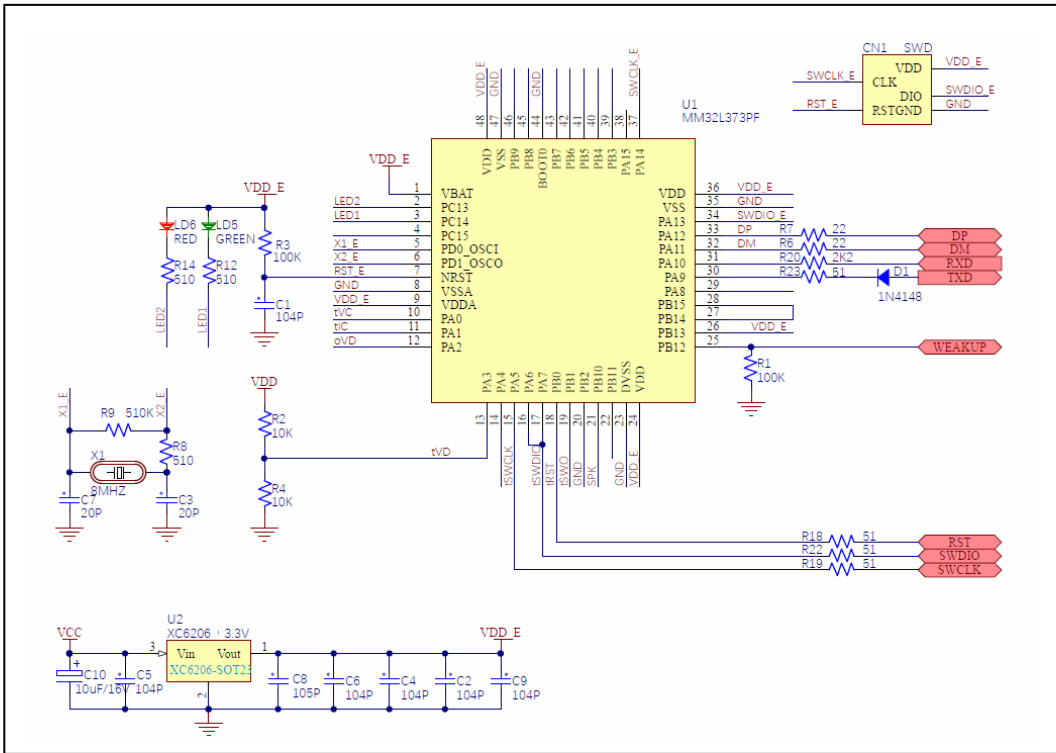


Figure 3. Schematic of the MM32-LINK-OB

Target

The eMiniBoard development board is based on the development object section: analog input, PWM, UART, CAN, SPI Flash, I2C and Bluetooth communication.

Table 8. Target MCU Analog Function Connection Relationship Table

POTS	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
RV1	PA1	PA5	PA1	PA1	PA1	PA1
RV2	---	---	PA4	PA4	PA4	PA4
RV3	---	---	PA5	PA5	PA5	PA5

Table 9. Target MCU PWM Output Connection Relationship Table

SPEAK	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
SP1	PB5	PA8	PA8	PA8	PA8	PA8

Table 10. Target MCU PWM Output Connection Relationship Table

UART	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
TX1(1)	PB7	PA9	PA9	PA9	PA9	PA9
RX1(1)	PB6	PA10	PA10	PA10	PA10	PA10
TX2(2)	PA2	PA2	PA2	PA2	PA2	PA2
RX2(2)	PA3	PA3	PA3	PA3	PA3	PA3

Note 1: When using the MM32-LINK CDC function, the emulator's TXD/RXD is cross-connected with the MCU's TX1 and RX1.

Note 2: The corresponding pins of the MCU's TX1 and RX1 connected to the double-row straight-pin connector are also connected to the CN4 UART expansion socket.

Table 11. Target MCU I2C Functional Connection Relationship Table

I2C	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
SCL	PB8	PB6	PB8	PB6	PB6	PB6
SDA	PB9	PB7	PB9	PB7	PB7	PB7

Table 12. Target MCU SPI Function Connection Relationship Table

SPI	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
nSS(1)	PB0	PB12	PB12	PB12	PB12	PB12
SCLK	PA5	PB13	PB13	PB13	PB13	PB13
MISO	PA6	PB14	PB14	PB14	PB14	PB14
MOSI	PB7	PB15	PB15	PB15	PB15	PB15

Note 1: SPI access to the SPI Flash resources on the board or to the double row pins is supported by the function selection switch.

Table 13. Target MCU CAN Function Connection Relationship Table

CAN	MB-020	MB-021	MB-022	MB-023	MB-024	MB-025
TX	--	--	--	PB8	PB8	PB8
RX	--	--	--	PB9(1)	PB9(1)	PB9(1)

Note 1: Support CAN access to CAN driver resources on the board or to double-row pins via the function selector switch.

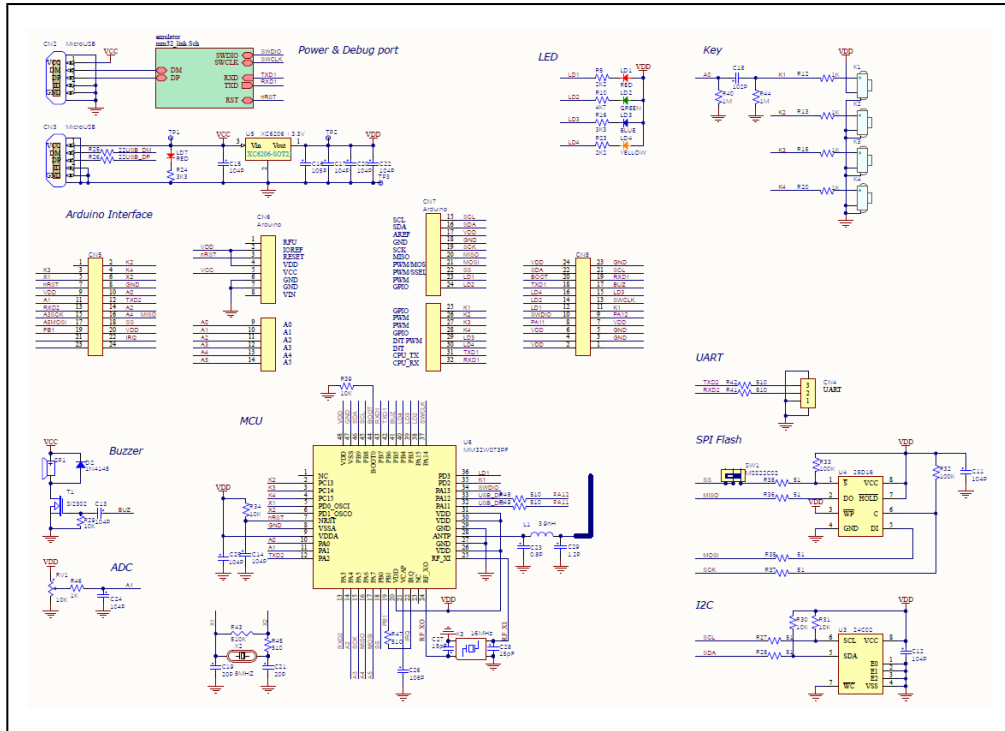


Figure 4. Schematic of the MM32 eMiniBoard MB-020

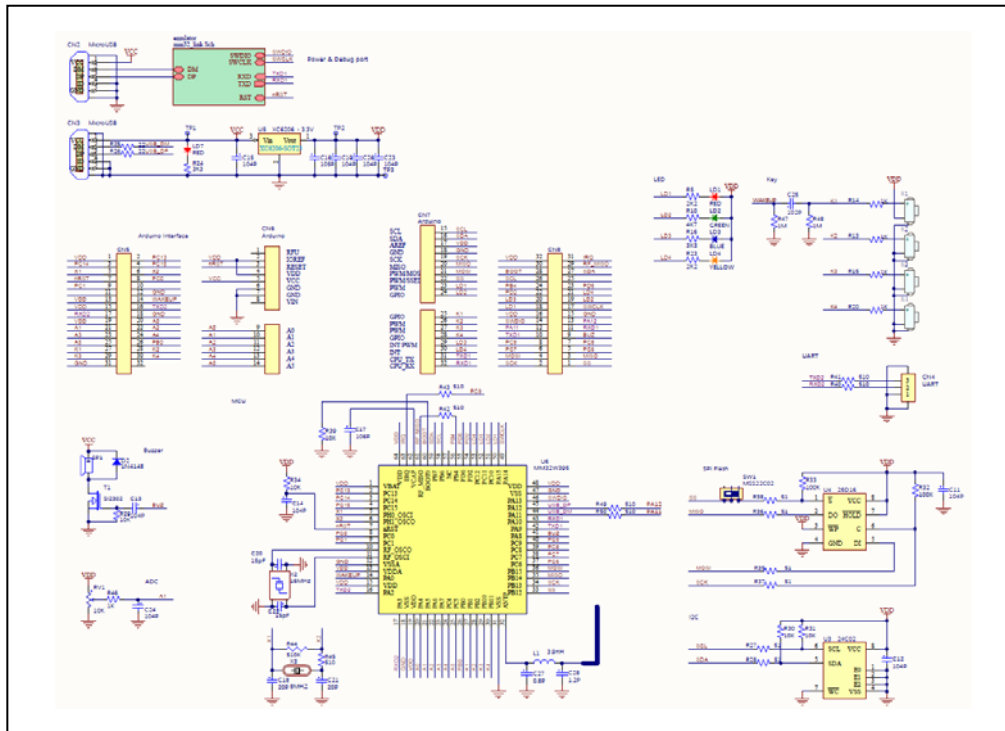


Figure 5. Schematic of the MM32 eMiniBoard MB-021

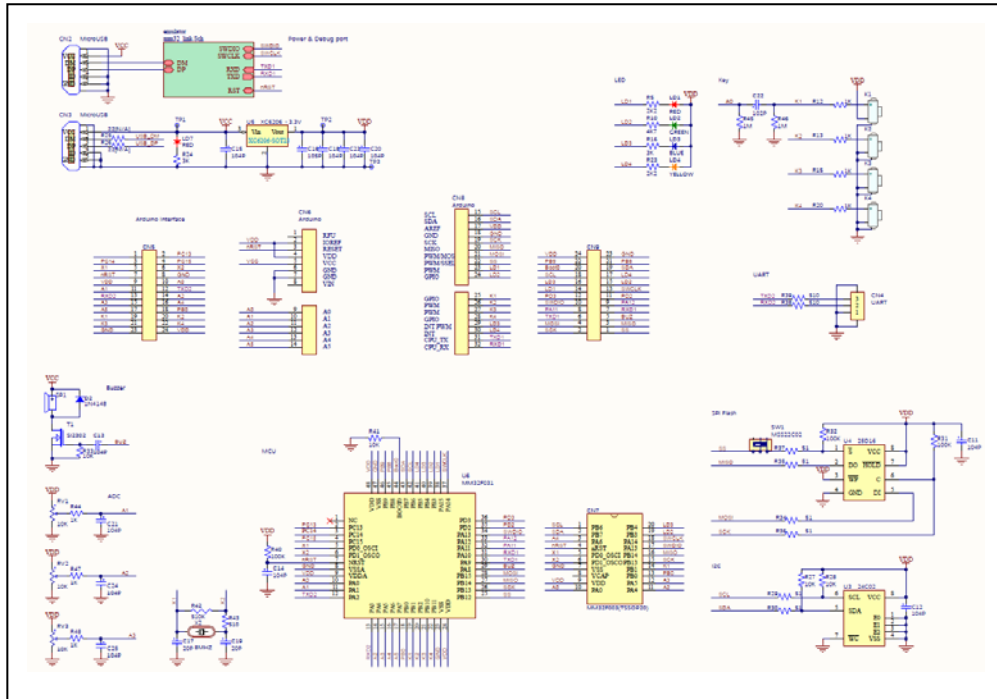


Figure 6. Schematic of the MM32 eMiniBoard MB-022

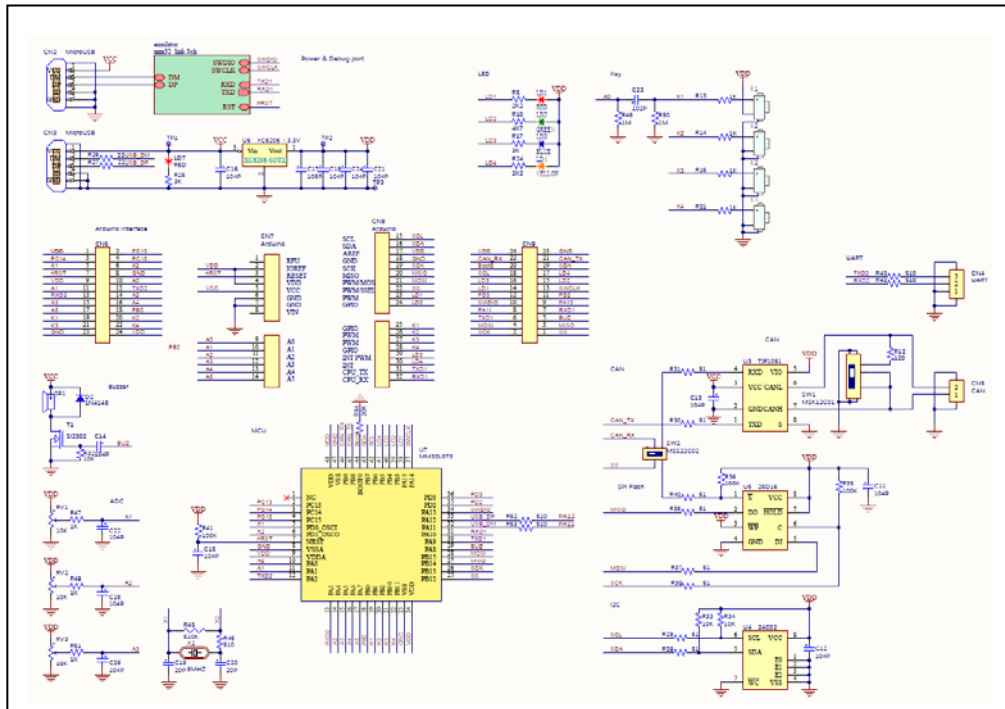


Figure 7. Schematic of the MM32 eMiniBoard MB-023

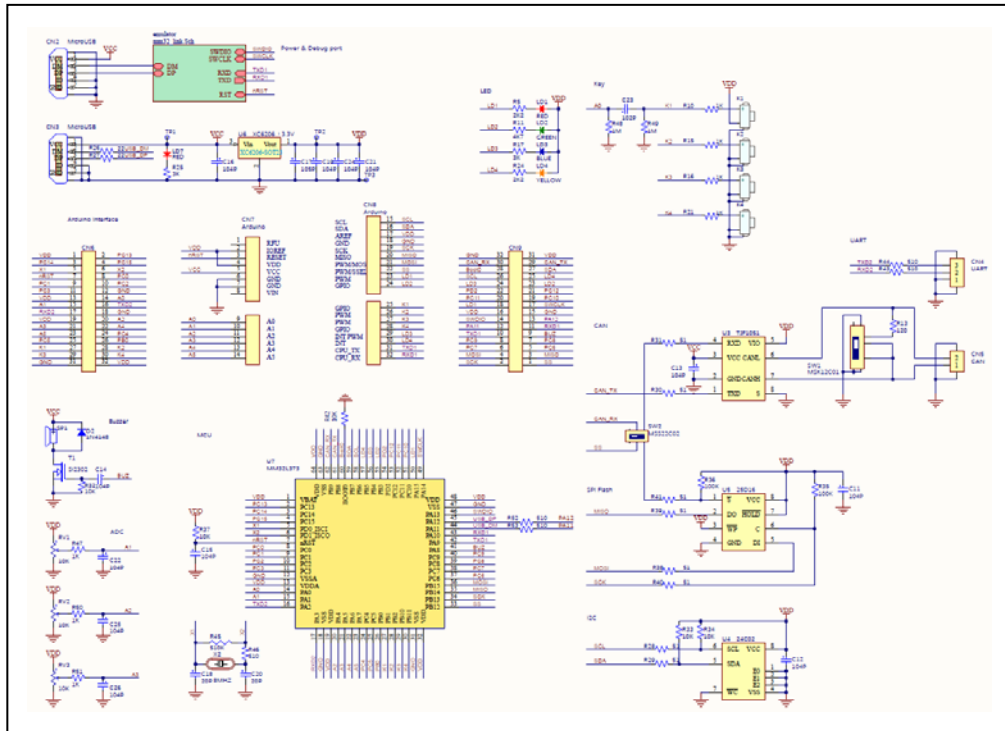


Figure 8. Schematic of the MM32 eMiniBoard MB-024

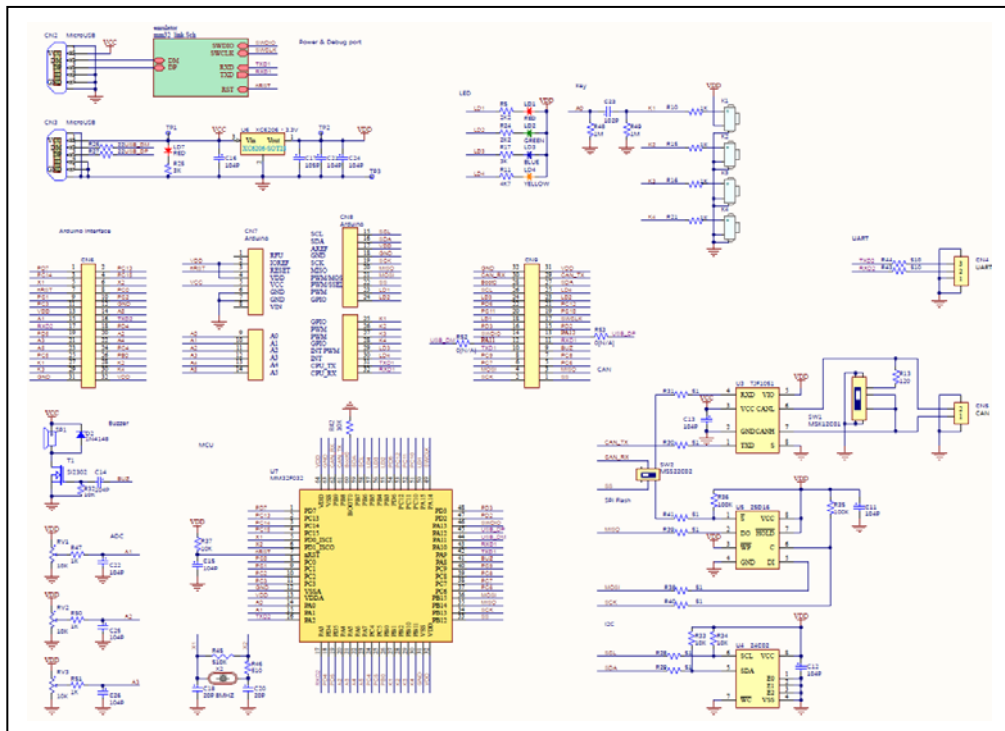


Figure 9. Schematic of the MM32 eMiniBoard MB-025

Revision history

Date	Modified markup	Update record
2019/11/25	V0.90	Initial version