

# Demo Board Manual

**megawin**

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**MG32F02**  
***CAN Demo Set***  
***(MG04-08)***  
***Using Manual***

***Version 0.1***  
***Date 2024/9/23***

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## 1. Introduction

### PCB Version

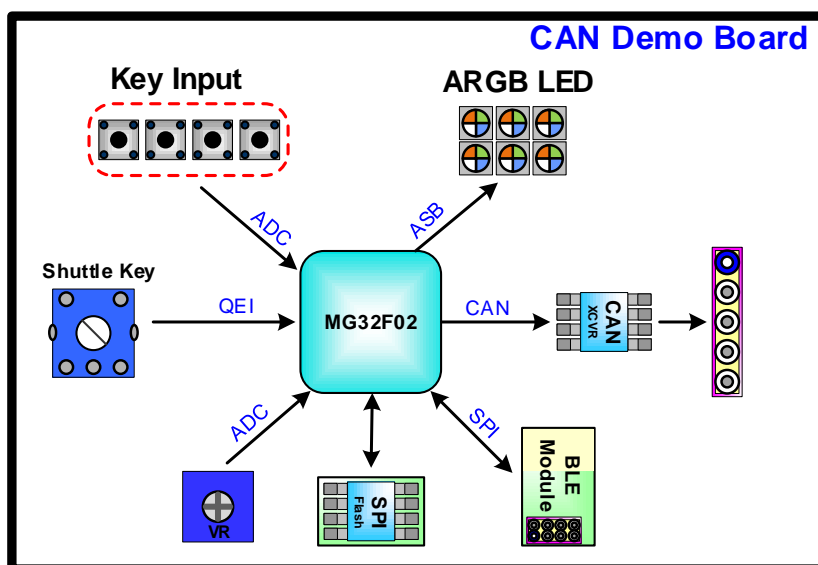
MG04-08(MG32F02\_CAN)

### Features

1. CAN Communication : CAN device communication with external CAN device.  
(For demo set code, this board is only able to communicate with external CAN device of MG04-09 PCB.)
2. SPI LCD Display : Display picture on 240x320 LCD through SPI interface.
3. ARGB LED Display : Display serial pattern on ARGB LED\*6.
4. Button Key : Detect multi-key input by SARADC and show message on LCD.
5. Shuttle Key: Detect shuttle key input by Timer QEI and show message on LCD.
6. SPI Flash Access : Store and get data on SPI flash.
7. BLE Module : BLE Module with SPI interface.

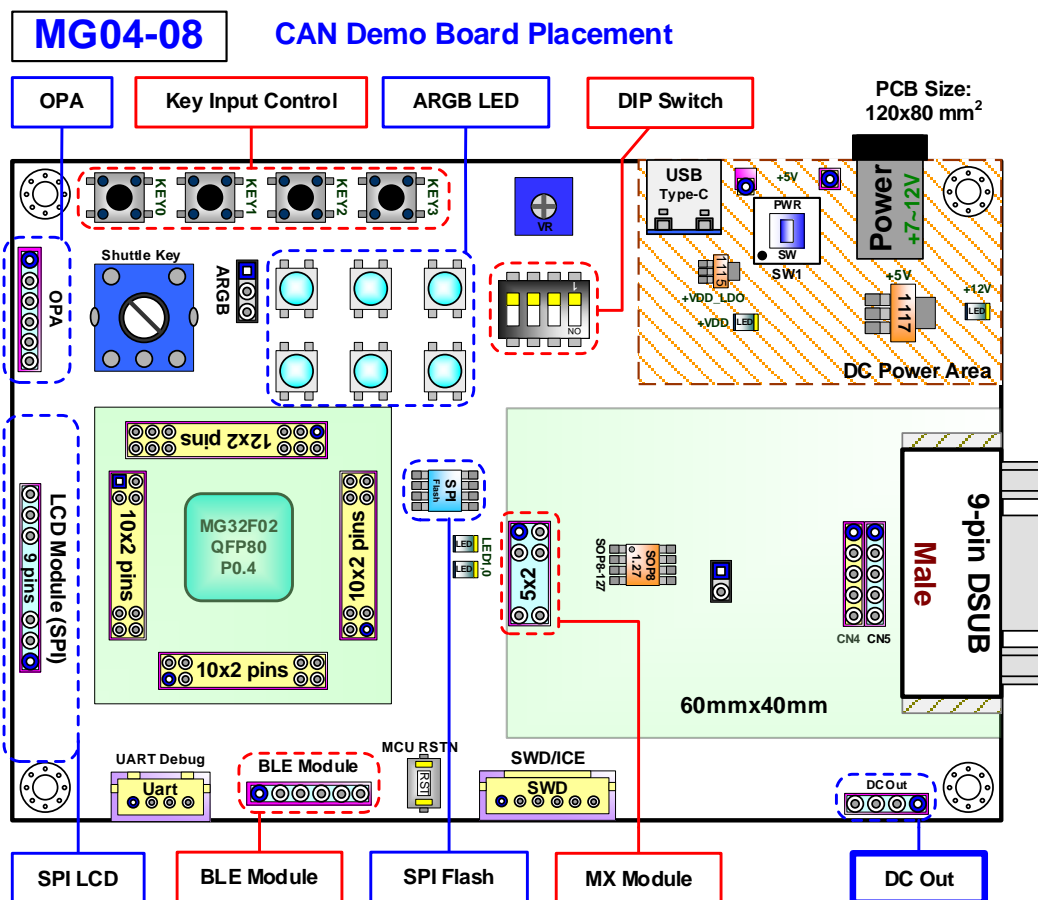
(The SPI Flash and BLE module function are not implemented in Demo board default project code.)

### System Block

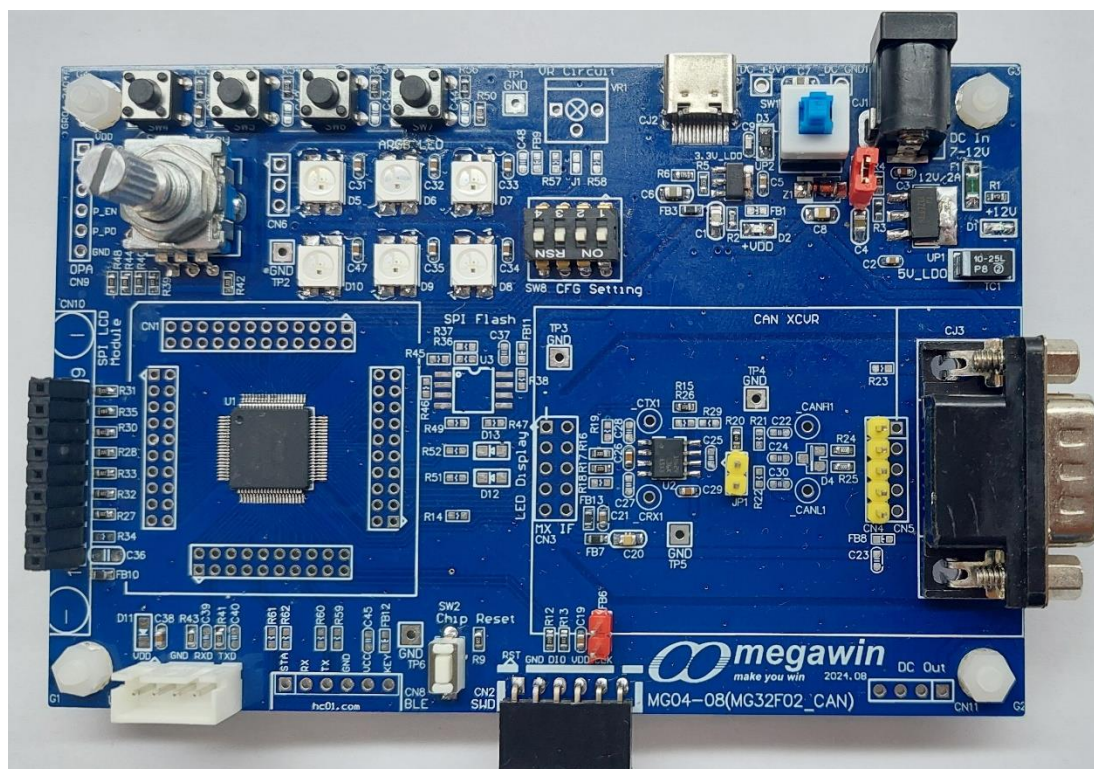


## 2. PCB Information

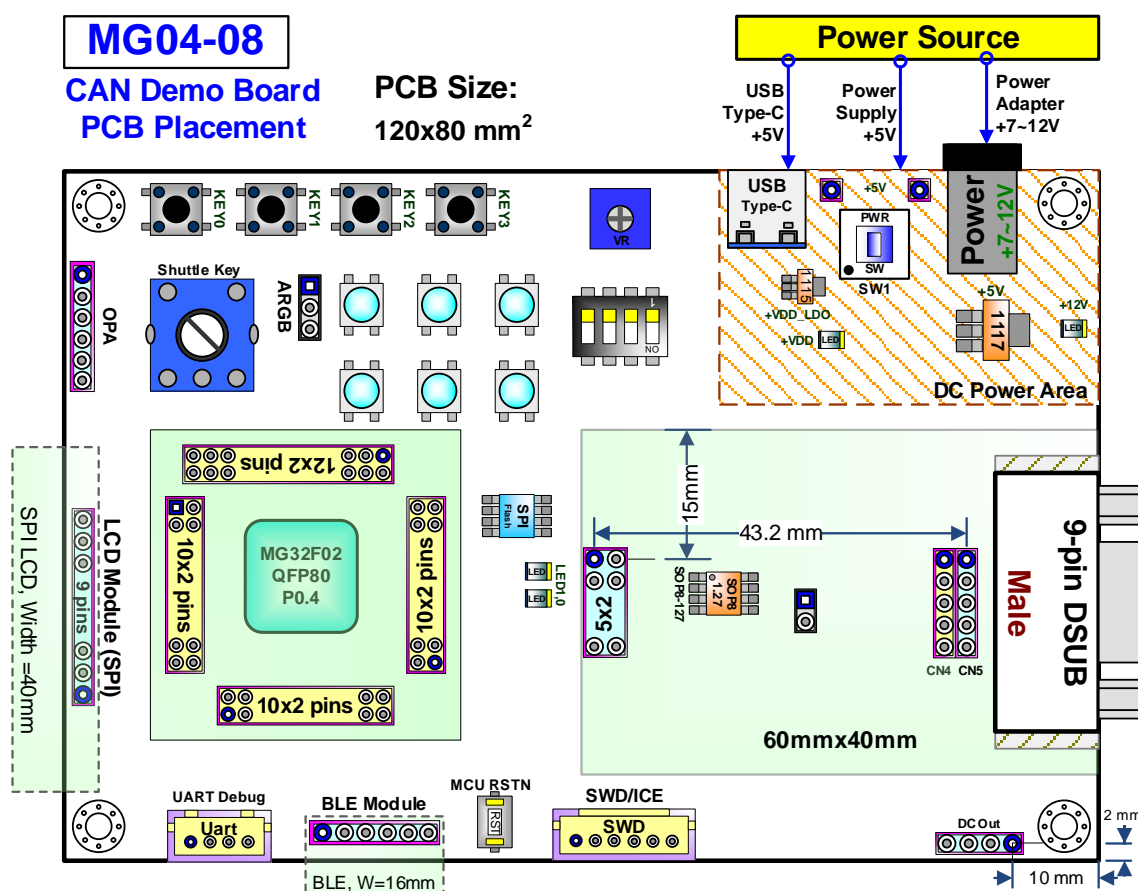
### PCB Placement and Function Block Diagram



### Main Board Pictures



## PCB Outline and Functions

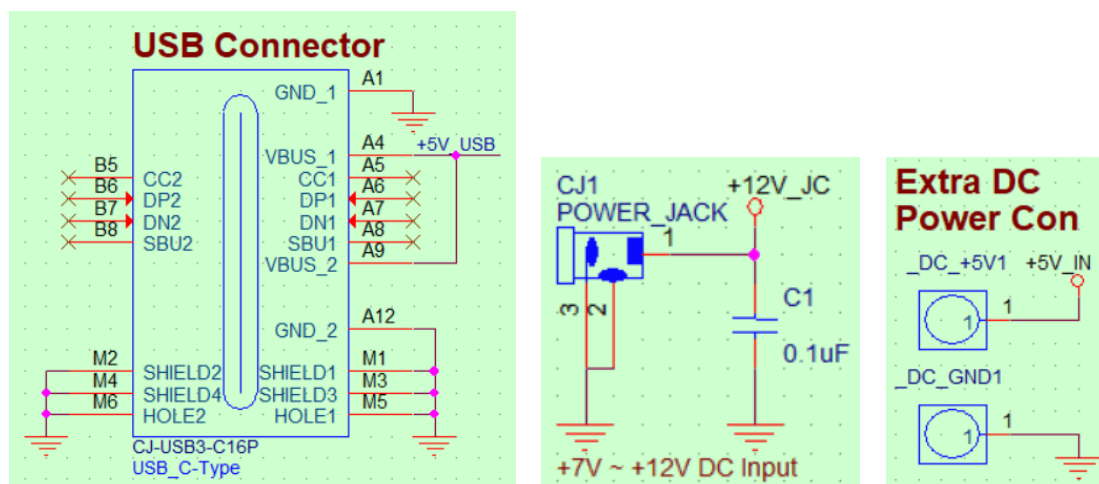


### ◆ DC Input Power Source

User can input +5 volt DC power to the C-type USB connector (CJ2) from external USB power source or optional on board +5V/GND connection holes from external power supply. The push button SW1 is used to turn on/off the input DC +5V power.

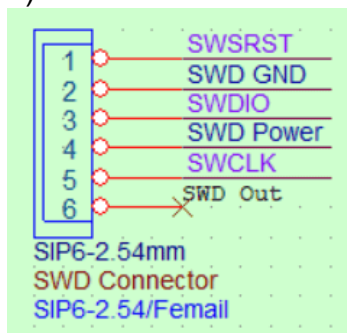
*[Notify]: Please use "Type-A to Type-C" cable when power inputs from C-type connector.*

These is one optional +7~12 volt DC input to the DC power jack (CJ1) from external power adapter. The input +7~12 volt DC power can also generate the +5 volt DC power by through the optional +5V\_LDO power regulator.



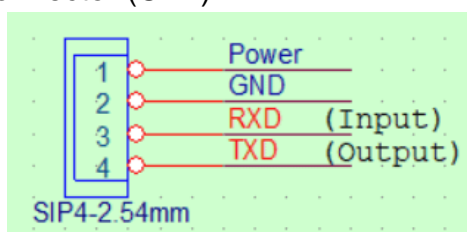
### ◆ SWD Connector

User can connect the MG32F02x MCU to the external SWD controller or debug ICE by through the SWD connector (CN2).



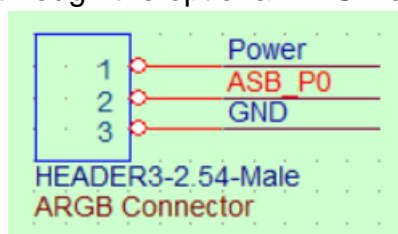
### ◆ UART Connector

User can connect the MG32F02x MCU to the external UART controller or PC COM port by through the UART Debug connector (CN7).



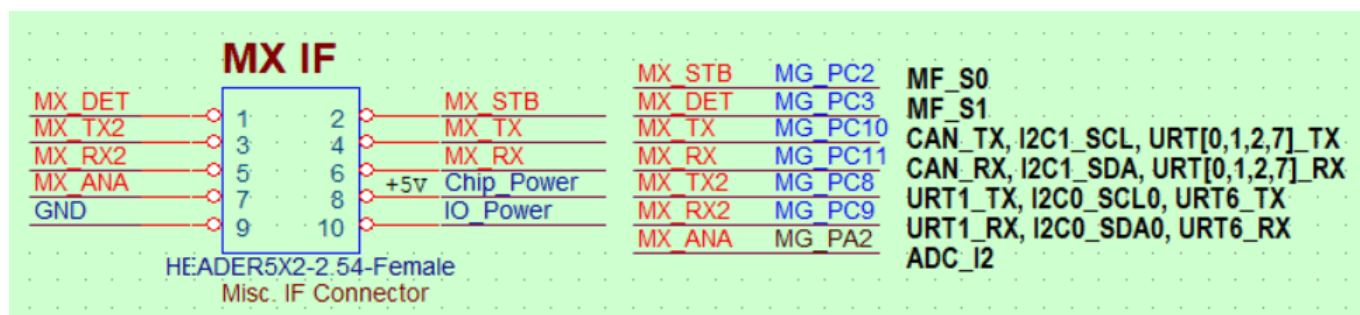
### ◆ ARGB LED and ARGB Connector

There are six on-board ARGB LED parts. User can connect the MG32F02x MCU to the external ARGB LED strip line through the optional ARGB connectors (CN6).



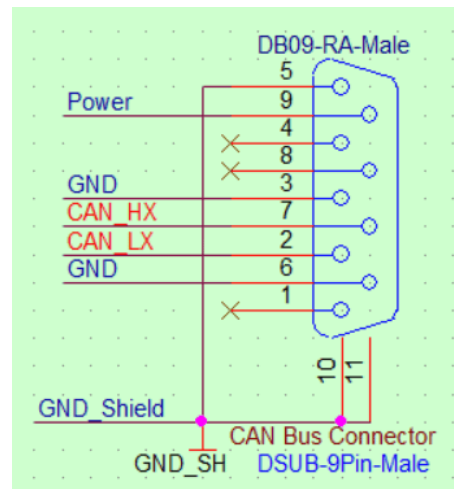
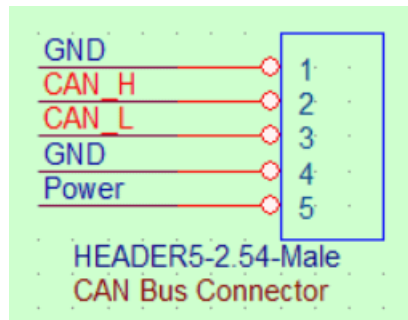
### ◆ MX IF Connector

User can connect the MG32F02x MCU to the external CAN XCVR device, I2C/UART device or analog voltage output device by through the MX IF connector (CN3).



### ◆ CAN Bus Connector

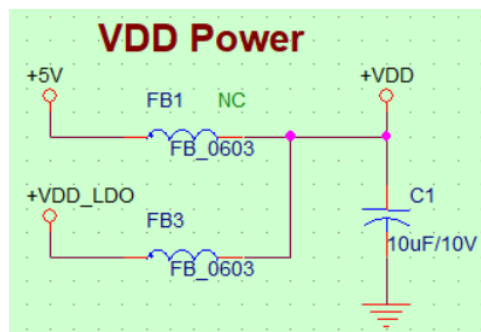
User can connect the MG32F02x MCU to the external CAN bus device by through the CAN bus connector (CN4, CJ3).



### PCB Design Options

#### ◆ VDD Power Option

The VDD power are default from +VDD\_LDO. The +VDD\_LDO is outputted from the UP1 LDO about +3.33 volt. Please notify the operation voltage of actual used SPI flash and BLE module.



#### ◆ CAN Bus Termination Option

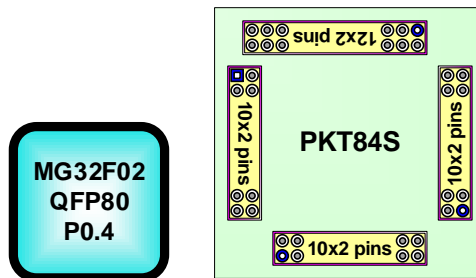
**JP1** : CAN bus termination resistance option

- Short : Enable on board 120 ohm termination
- Open : Disable on board 120 ohm termination

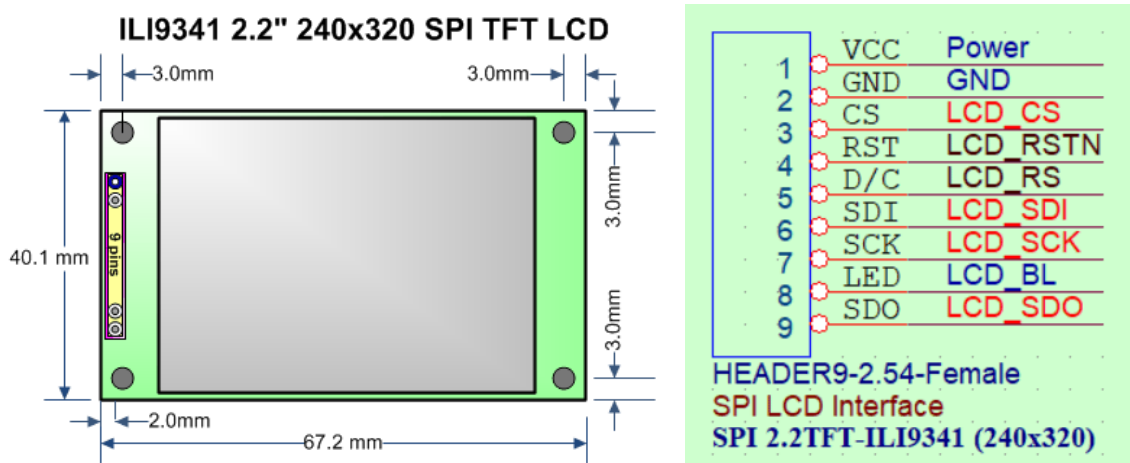


### Module Board and Components

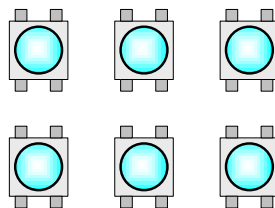
1. MG32F02Nxxx : 32-Bit ARM Cortex M0 MCU ~ directly chip on board or PKT84S MCU daughter board (MG07-03/04/05/06) option



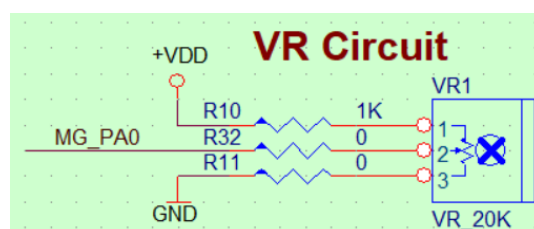
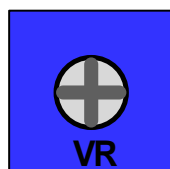
2. TCAN1462V-Q1 : CAN transceiver ~ MCU transmits or receives CAN data with external CAN bus devices by through this CAN transceiver.
3. SPI TFT LCD Module : Display LCD with SPI interface



4. ARGB LED : There are six on- board ARGB LED. MCU can control these LED display by through MCU ASB bus.



5. Variable Resistor : The variable resistor is used to do as a potentiometer. The voltage of potentiometer can be inputted to MCU ADC. User can get the ADC code and calculate to show 0 ~ 100 on LCD.

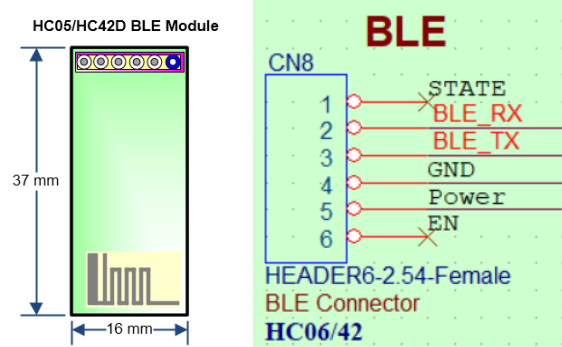




6. Mono LED : There are two on- board mono LED parts of LED0 and LED1.

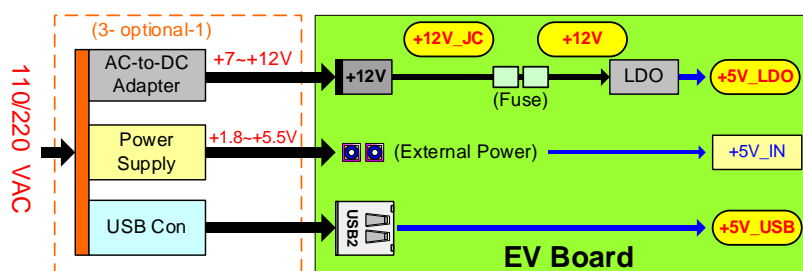
7. BLE Module: BLE module board (HC-05/42) by UART communication interface

Please notify the operation voltage of actual used BLE module. HC-42 module' operation voltage is +1.8V ~ +3.6V. (The +VDD power is default +3.3V)

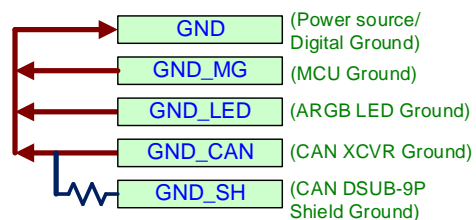


## PCB Power Connection

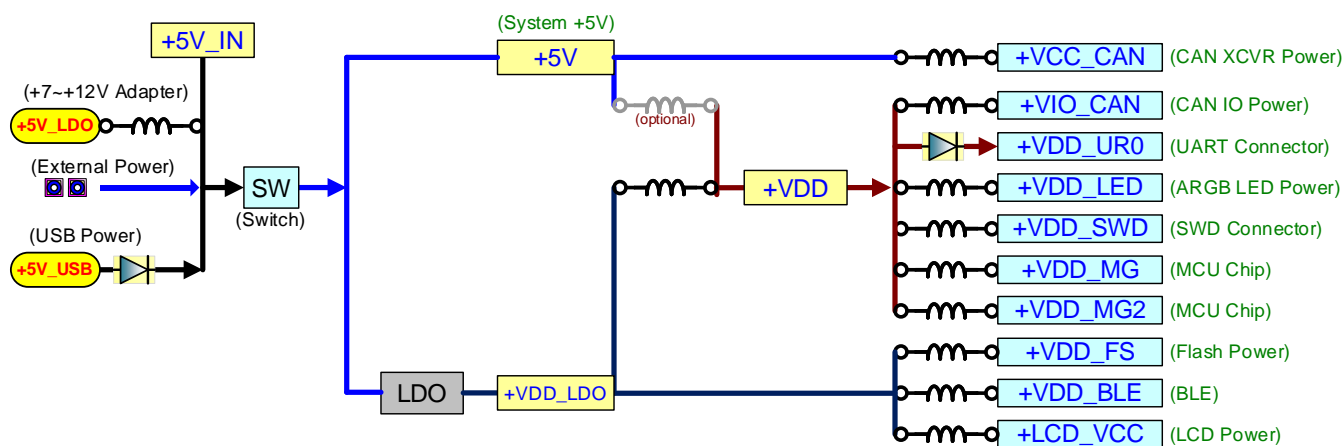
## Power Supply Source Diagram



## Ground Connection Diagram

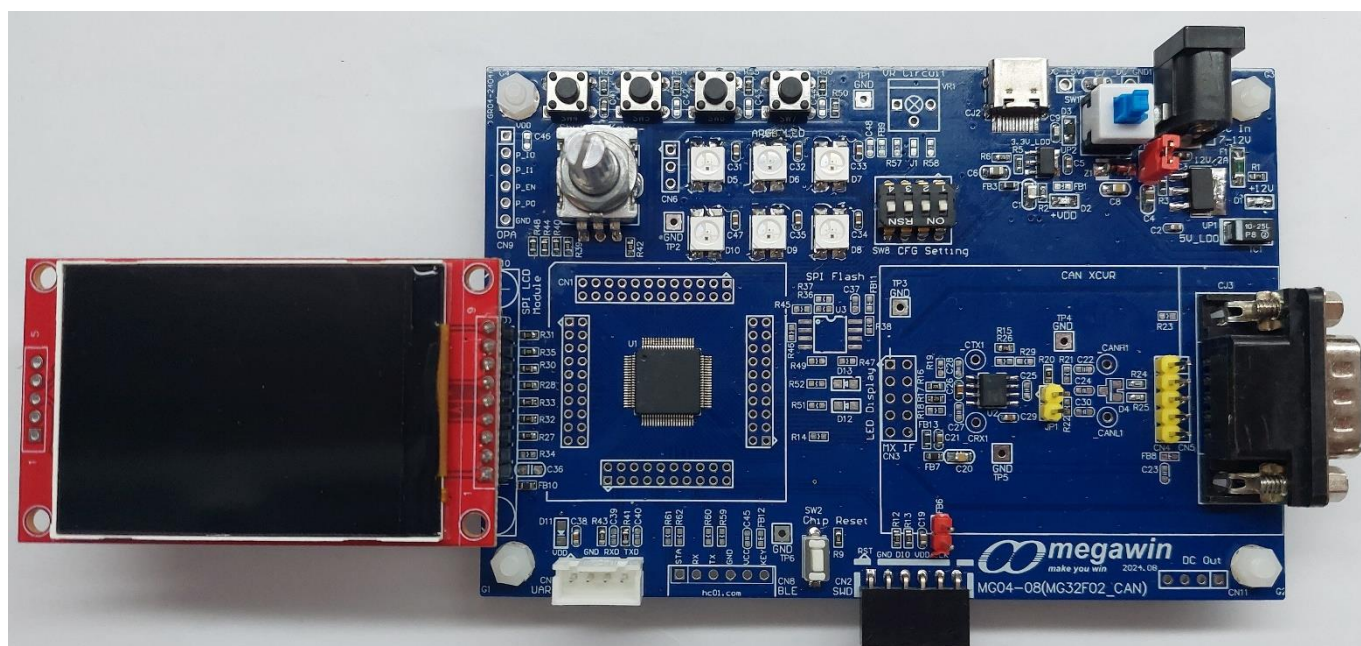


## Power Connection Diagram

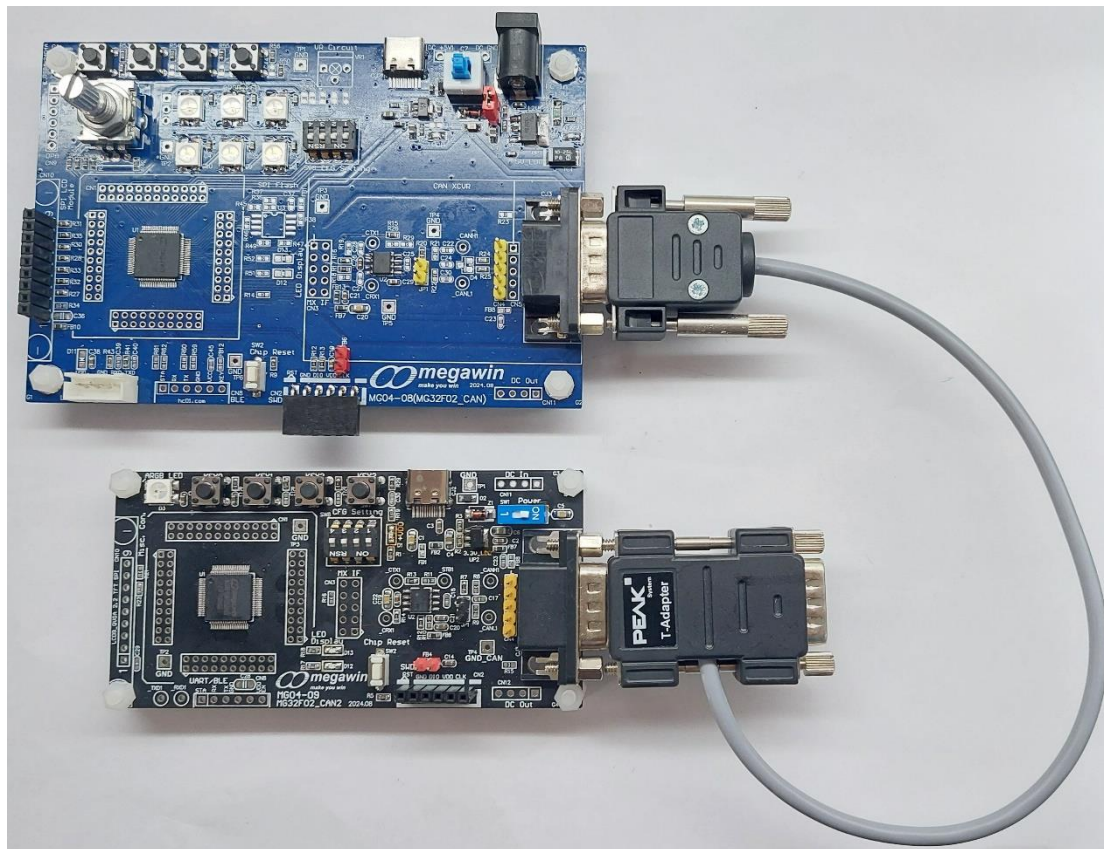


## PCB Assembly and Connection

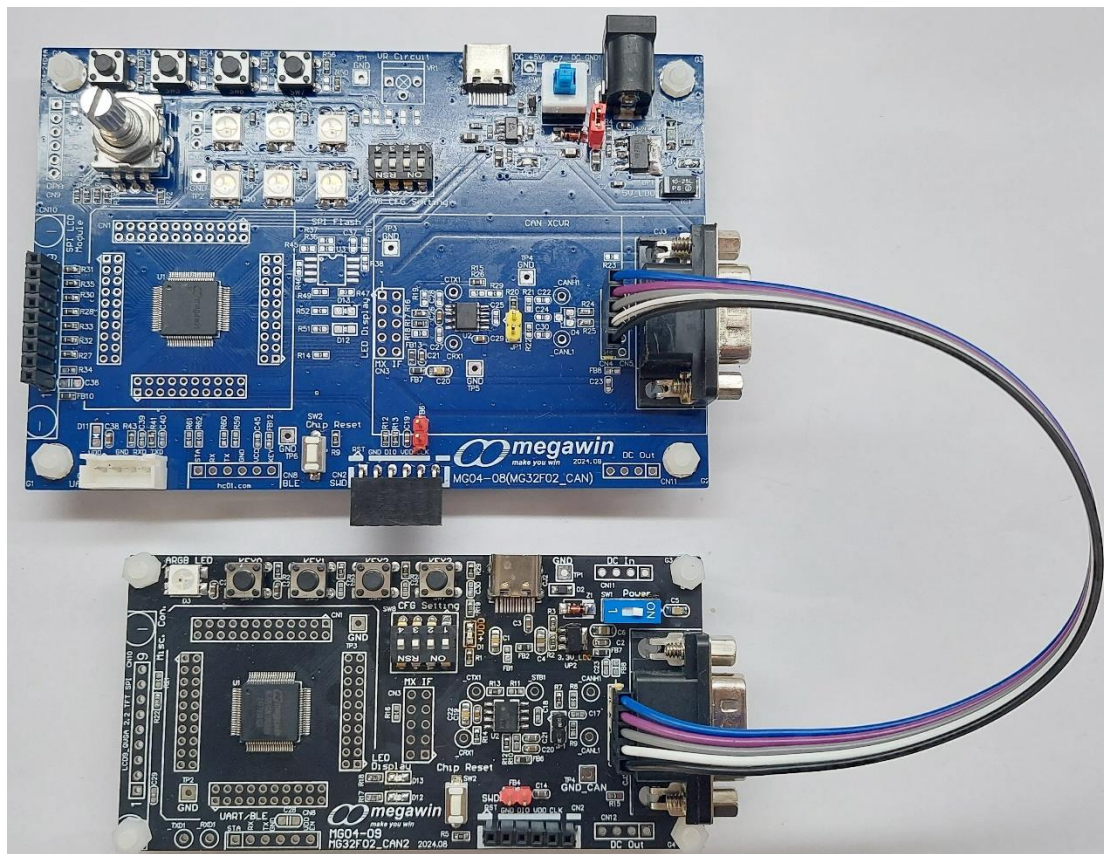
## ◆ MG04-08 + SPI LCD



## ◆ MG04-08 + MG04-09 Connect with CJ3 (DB9) Connector



## ◆ MG04-08 + MG04-09 Connect with CN4 (Header5)

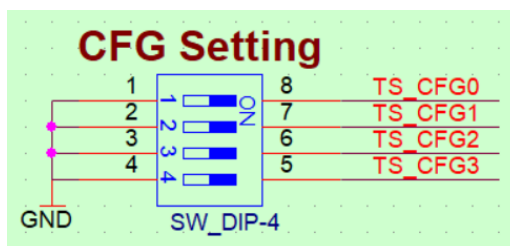




### 3. Board Function

#### Configure Setting

The function is setting and demonstrated by sample firmware pack.



#### ◆ CFG0 ~ CFG2

CAN Device identification number setting {#0 ~ #6}. User can set #0 for this MG04-08 PCB and set #1 ~ #6 for other MG04-09 PCB for demo platform.

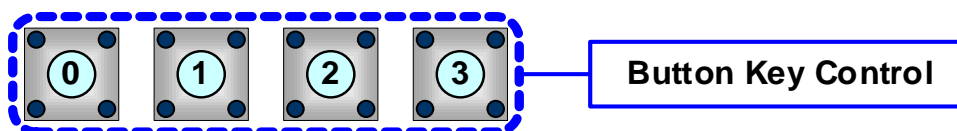
- #0 ~ This ID is set to indicate that this is the major CAN device for demo set.
- #7 ~ This ID is set to indicate that this is controlled CAN device for demo set.

#### ◆ CFG3

Reserved

#### Button Keys

The keys of 0, 1, 2 and 3 are used for on demand menu control on SPI LCD display by push-pop button-key.



#### ◆ Key Control

Button Key	< KEY0 >	< KEY1 >	< KEY2 >	< KEY3 >
	ESC	Down/Forward Minus	Function Select	Up/Backward Plus

##### • <KEY0>

User can directly press this key to escape current menu to upper level menu on LCD display. If current menu is root menu, it is no effect to press this key.

##### • <KEY1>

User can directly press this key to minus the value for current selected function item or change the selected item to forward/down function item on current menu of LCD display.

##### • <KEY2>

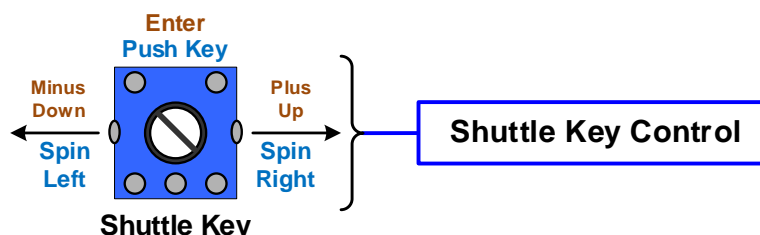
User can directly press this key to select current function item on current menu of LCD display.

##### • <KEY3>

User can directly press this key to plus the value for current selected function item or change the selected item to backward/up function item on current menu of LCD display.

## Shuttle Key

The Shuttle key are used for on demand menu control on SPI LCD display.



- <Spin Left>

User can spin left for shuttle key to minus the value for current selected function item or change the selected item to forward/down function item on current menu of LCD display.

- <Enter Key>

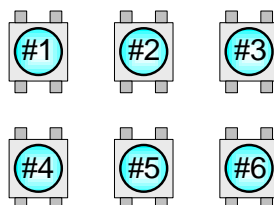
User can directly press this key to select current function item on current menu of LCD display.

- <Spin Right>

User can spin right for shuttle key to plus the value for current selected function item or change the selected item to backward/up function item on current menu of LCD display.

## ARGB LED Display

These six on- board ARGB LED can be used to display RGB color and indicate the external CAN device connection status. The demo set can connect maximum six external CAN devices. As following diagram, each AGB LED indicates one external CAN device and maps CAN ID from #1 to #6 independently.



When the any #1 ~ #6 CAN device connects to the CAN bus, the related ARGB LED will show **green** color. After the CAN device is connected and transmits data to the CAN bus, the related ARGB LED which is used to indicate #1 ~ #6 CAN device will show **yellow** color about 2 sec. When the any #1 ~ #6 CAN device disconnects from the CAN bus, the related ARGB LED will be off.

## Mono LED Display

There are two on- board mono LED parts of LED0 and LED1.

- <LED0>

This mono LED can be used to indicate the external CAN device communication status. When on board CAN device receives data from CAN bus, this LED will turn on. This LED will turn off after the CAN bus is idle without any data communication.

- <LED1>

Reserved.

#### 4. LCD Display Control

##### SPI LCD Display

The SPI LCD is used to show the demo functions' menu and CAN device information on the SPI LCD connector.

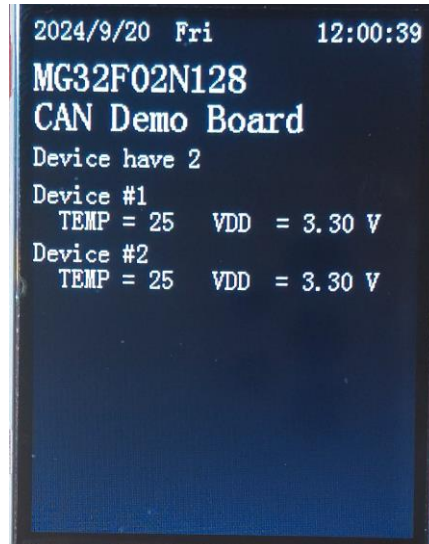


**SPI LCD Module**

##### Root Menu (Level-0 Menu)

On SPI LCD, this root menu is only used to show the information message of active CAN device on the CAN bus after power-on or pressed Chip Reset key. The information is including of CAN device temperature (TEMP) in °C and MCU chip operation voltage (VDD) in volt.

User can press any key to enter Level-1 menu. Also user can return the root menu from Level-1 menu by press escape key <KEY3>.



### Level-1 Menu

The Level-1 menu is used to select [**Global Command**] or [**CAN device #1 ~ #6**] for user demand. The items of [**CAN device #1 ~ #6**] list the active CAN device (MG04-09 PCB) on the CAN bus currently.

User can press down key <KEY1> or up key <KEY3> to change demanded item. User can press function key <KEY2> to enter Level-2 menu for user demanded item. Also user can return this menu from Level-2 menu by press escape key <KEY3>.



### Level-2 Menu

User can press down key <KEY1> or up key <KEY3> to change demanded item. User can press function key <KEY2> to select user demanded item. Also user can return to Level-1 menu by press escape key <KEY3> or select [Back] item.

#### ◆ [Global Command]

This menu is used to select [**LED Flashing**] or [**ARGB Flashing**]. By user select function item, the on board major CAN device can assert command to do flashing display for mono LED or ARGB LED on all external active CAN device #1 ~ #6 board (MG04-09 PCB).





- **[LED Flashing]**

When user selects this item, all the external active CAN device will flash the on board mono LED. The on board major CAN device can assert command to do flashing display. When the external CAN device receives this command, it will make the mono LED flashing N times and recover to normal display. The N value is 1 ~6 and equals the CAN ID number #1 ~ #6.

- **[ARGB Flashing]**

When user selects this item, all the active CAN device will flash the on board ARGB LED. The on board major CAN device can assert command to do flashing display. When the external CAN device receives this command, it will make the ARGB LED flashing N times and recover to normal display. The N value is 1 ~6 and equals the CAN ID number #1 ~ #6.



- ◆ **[CAN device #1 ~ #6]**

This menu is used to select **[ARGB Red]**, **[ARGB Blue]** or **[ARGB Green]**. By user selected function item, the on board major CAN device can assert command to set the RGB color of ARGB LED on external CAN device #1 ~ #6 board (MG04-09 PCB).

It also show the information message of selected CAN device (#1 ~ #6) about device temperature (TEMP) in °C, MCU chip operation voltage (VDD) in volt and key pressed status for on board keys.

- **[ARGB Red]**

When user selects this item, the selected CAN device (#1 ~ #6) will change the on board ARGB LED color to red color.

- **[ARGB Blue]**

When user selects this item, the selected CAN device (#1 ~ #6) will change the on board ARGB LED color to blue color.

- **[ARGB Green]**

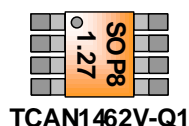
When user selects this item, the selected CAN device (#1 ~ #6) will change the on board ARGB LED color to green color.



## 5. Test List

### CAN Transceiver List

1. TCAN1462V-Q1

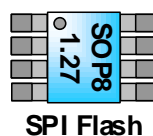


### SPI TFT LCD Module List

2. ILI9341 : 240x320 TFT LCD

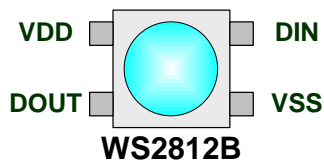
### SPI Flash Part List

1. MXIC MX25L3206E 32M-bit
2. MXIC MX25L12835F 128M-bit
3. Winbond W25Q16BV 16M-bit



### ARGB Part List

1. Worldsemi : WS2812B



## 6. Revision History

Revision V0.1 (2024_0923)		Chapter
1	Initial version	