

# **MG32F02K128 Evaluation Board**

## **Explanation Manual**

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## 1. Introduction

The **MG32F02K** is a single-chip 32-bit microcontroller based on a high performance Core ARM® 32-bit Cortex® -M0 CPU with embedded Nested Vectored Interrupt Controller (NVIC).

The **MG32F02K** has up to **128K** bytes of embedded main flash memory for code and data, programmable memory size of embedded system flash memory for boot load code and 64 bytes of embedded option-byte flash memory for chip configuration. The all flash memory can be programmed either in serial writer mode (ICP, In-Circuit-Programming). Also, the main flash memory can be programmed in ISP (In-System Programming) mode or SRAM (Boot on SRAM) mode. ICP and ISP allow the user to download new code without removing the microcontroller from the actual end product; IAP means that the device can write nonvolatile data in the flash memory while the application program is running. There needs no external high voltage for programming due to its built-in charge-pumping circuitry.

The **MG32F02K** retains all features of the ARM® 32-bit Cortex® -M0 with **16K** bytes of SRAM, **5** I/O ports, **32** external interrupts source with 4-level interrupt controller and seven 8/16-bits timer/counters. In addition, the **MG32F02K** has a System Tick Timer, two Watchdog Timers, three Advance timer modules with IC/OC, four Basic timer modules for universal using, on-chip crystal oscillator for 32.768 KHz or 4 to 25MHz, two high precision internal oscillators IHRCO for 11.059/12MHz and ILRCO for 32 KHz, one 12-bit ADC with one temperature sensor, two programmable threshold comparators and one Operational Amplifier.

Also, the **MG32F02K** support multiple and flexible communicate interface for production application. It provides alternate function pins those are including of GPIO, I2C, SPI, UART, CAN, ASB(ARGB Serial Bus), Timer with IC/PWM, ADC, Analog Comparator, NCO, CCL and SWD(on chip debug). It has maximum **73** GPIO pins and provides programmable IO type - quasi-bidirectional , push-pull output , open-drain output , input only(Hi-z) with optional pull-high. In addition, it is built-in internal de-bounce circuit to deglitch noise for worse signals.

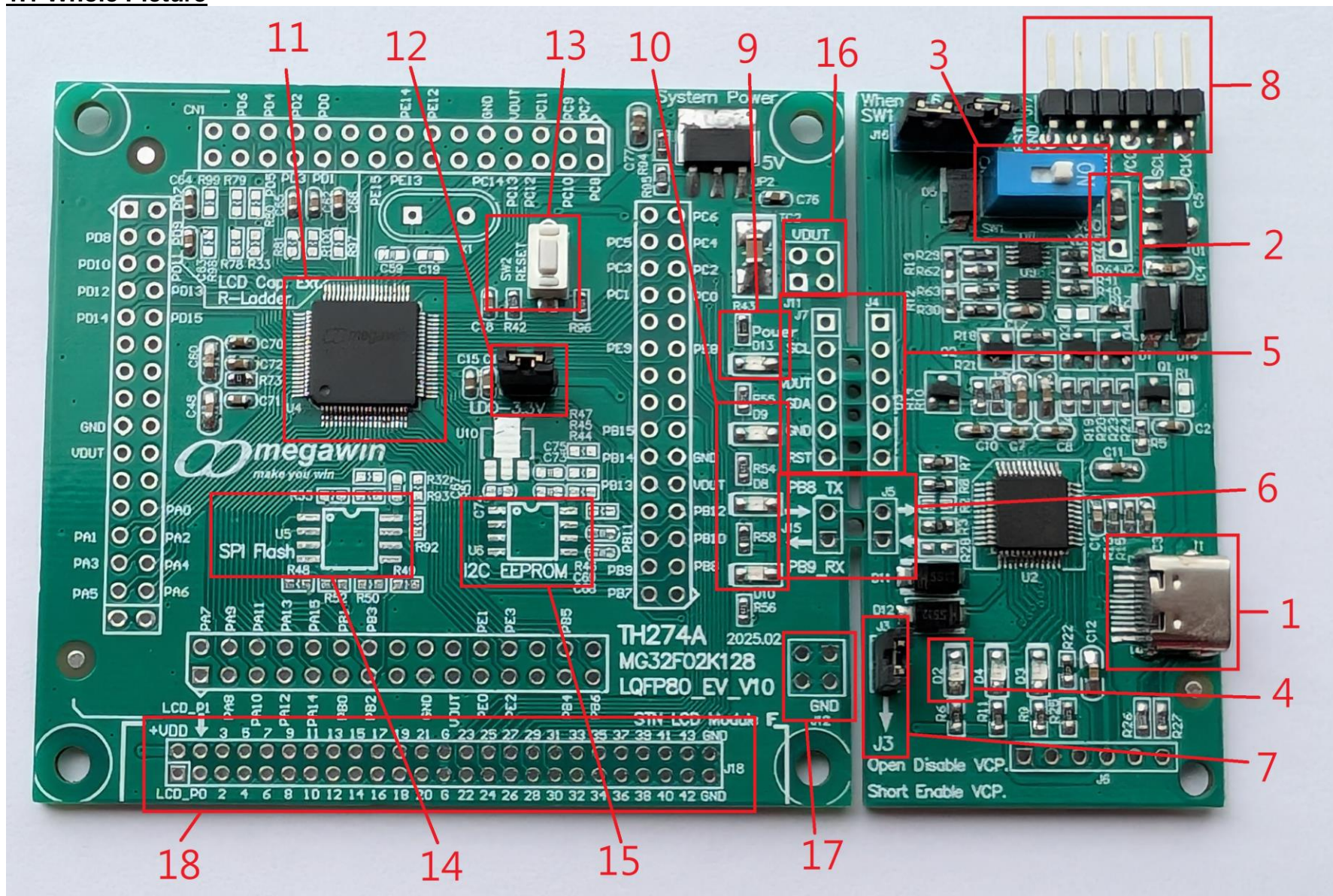
One direct memory access (DMA) controller is used to improve data transfer between peripherals and memory and memory to memory. The data can be transfer by DMA controller and does not cost any CPU time.

One Liquid Crystal Display (LCD) controller is used to drive external STN LCD with embedded LCD data RAM and supports LCD display on SLEEP and STOP modes. It provides maximum 8 lines of common and 40 lines of segment those are total 44 pins with GPIO alternate function. It supports 1/2, 1/3, 1/4 bias voltage and 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8 duty control. The controller can operate type-A or type-B frame control mode optionally with programmable dead time between frames or duty phases. Also it supports LCD blinking display.

For power management and reset control, the **MG32F02K** is built-in a power supervisor including of a Low Voltage Detector(LVD), three Brown-out Detectors(BOD0/BOD1/BOD2), a Power-On Reset(POR) , a Lowvoltage Reset(LVR). The **MG32F02K** has multiple power-down modes to reduce the current consumption: Sleep mode and Stop mode.

In the Sleep mode the CPU is frozen while the peripherals and the interrupt system are still operating. In the Stop mode the RAM and SFRs' value are saved and all other functions are inoperative; most importantly, in the Sleep mode the chip can be waked up by many interrupt or reset sources(POR/LVR/BOD0/BOD1/BOD2).

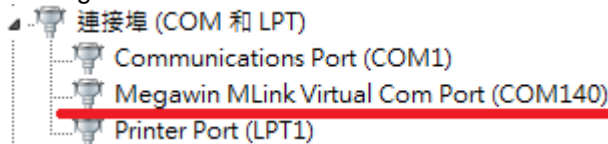
## 1.1 Whole Picture





## 1.2 Ev Board Hardware Instruction

1. J1: Micro USB Connector.
2. J2: Power select.
  - a. VDD5 – USB 5V Output.
  - b. VDD – Select 5V or 3.3V to MG32F02K serial.
  - c. VDD3 -- On Board LDO 3.3V Output(U1).
3. SW1: Control U8 power on/off.
4. D2: PC identify MLink successful when D2 turn ON, but only programming turn ON at Win10.
5. J4: Connector in ICE adaptor(MLink) for connecting with EV board to program MG32F02V serial.  
J7: Connector in EV board for connecting with ICE adaptor(MLink).
6. J5: Connector in ICE adaptor(MLink) for connecting with EV board to transfer UART data.  
J15: Connector in EV board for connecting with ICE adaptor(MLink).
7. J3: Virtual Com Port function selection, when J3 open and plug out → plug in PC, VCP function is disable. when J3 short and plug out → plug in PC, VCP function is enabled. After installing driver(how to install driver, refer the [2. Driver Install](#)), Device Manager will appear “Megawin MLink Virtual Com Port” as below figure.



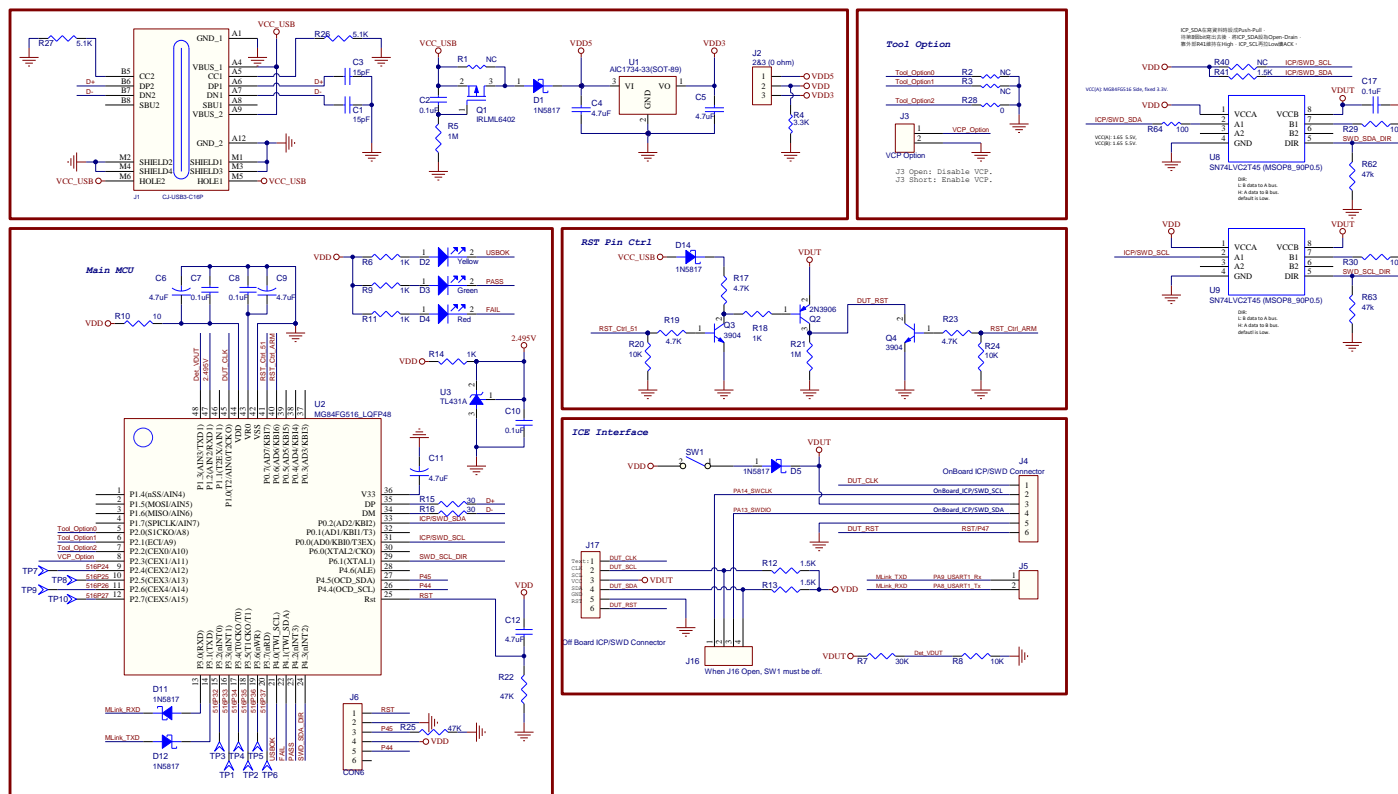
“Megawin MLink Virtual Com Port” support as below as baud rate only:

**600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 128000, 7200, 14400, 28800...**etc bps.

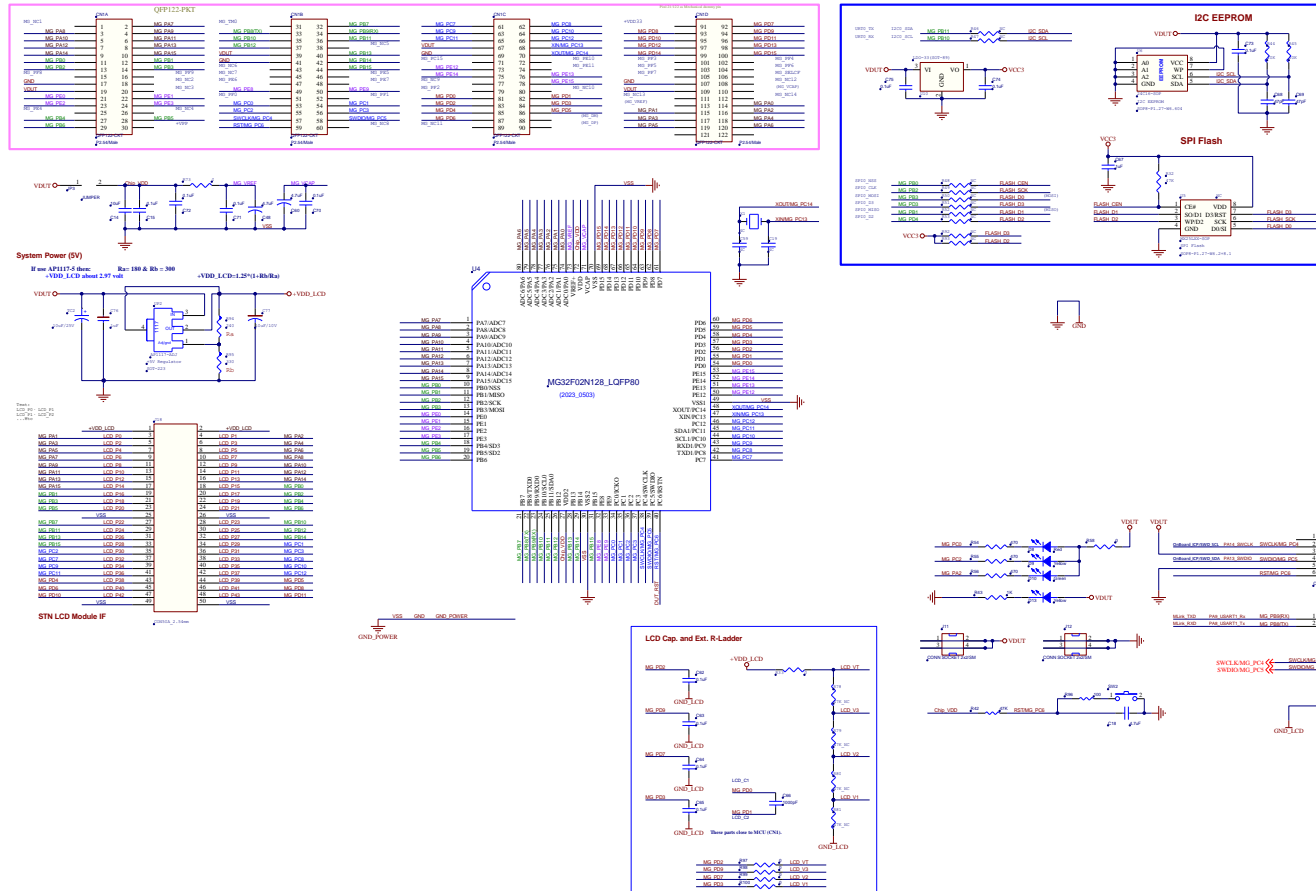
“Megawin MLink Virtual Com Port” also support **Stop Bit 1** only.

8. J17: When J16 open and SW1 off, MLink can program other DUT board through J17 connector.
9. D13: EV board power indicator LED.
10. D8, D9, D10: IO LED.
11. U4: MG32F02K128 LQFP-80 package.
12. JP3: User can measure MG32F02K128 operating current by connecting an ammeter.
13. SW2: Pressing the button will trigger external reset signal to U4(MG32F02K128).
14. U5: SPI flash, user can choose a SPI flash then place on the position. It is NC default.
15. U6: I<sup>2</sup>C EEPROM, user can choose a I<sup>2</sup>C EEPROM then place on position. It is NC default.
16. J11: EV board VDUT connector.
17. J12: EV board GND connector.
18. J18: LCD connector.

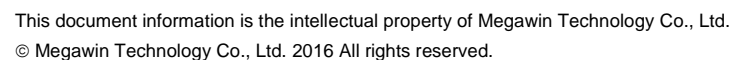
### **1.3.1 MLink Circuit**



## 1.3.2 MG32F02K128 Circuit

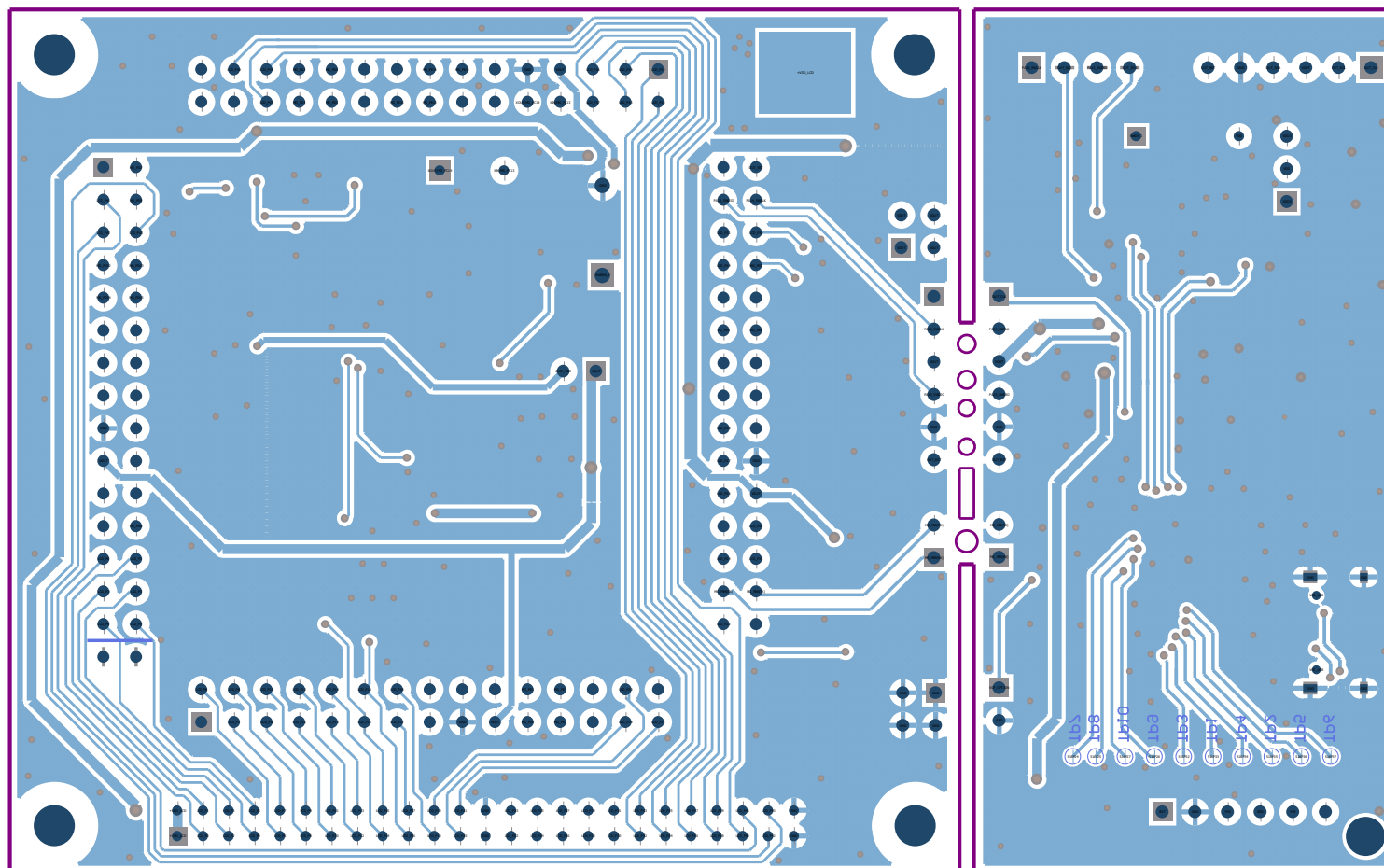


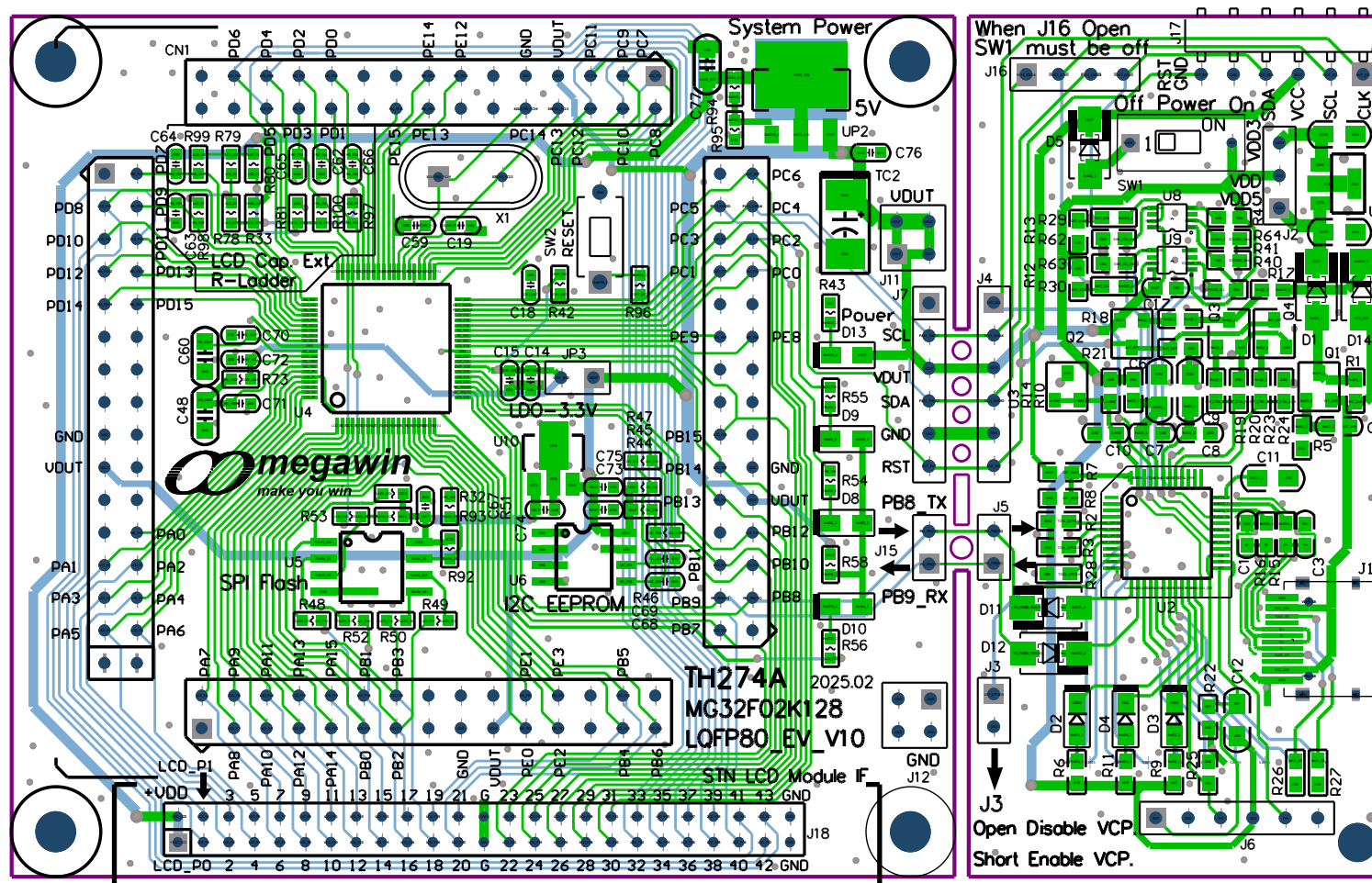
**Top**





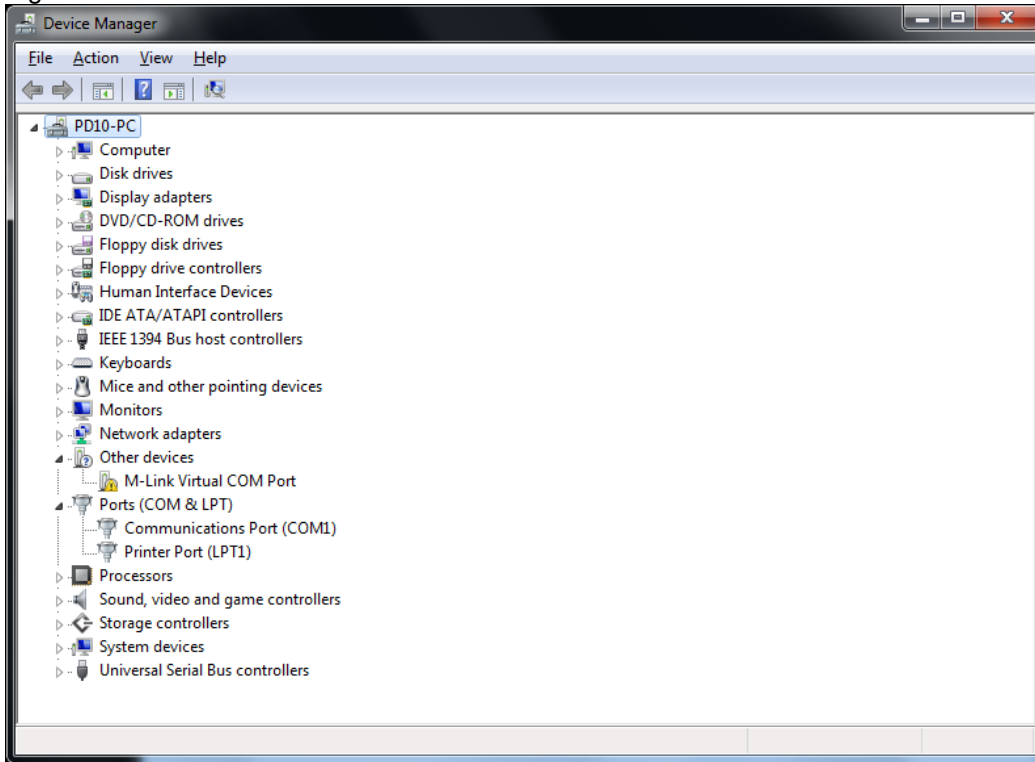
**Bottom**



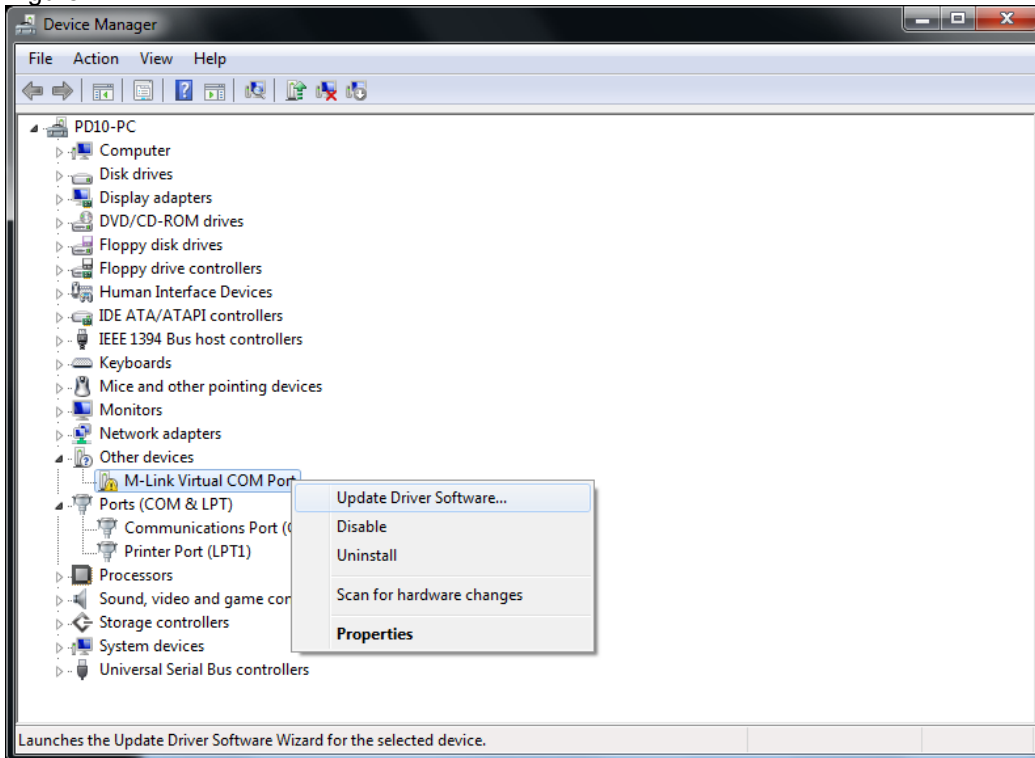


## 2. Driver Install

Step 1: The user short J3 plug MG32F02K128 EV board into any USB port in a PC, then open Device Manager.  
Figure 2-1

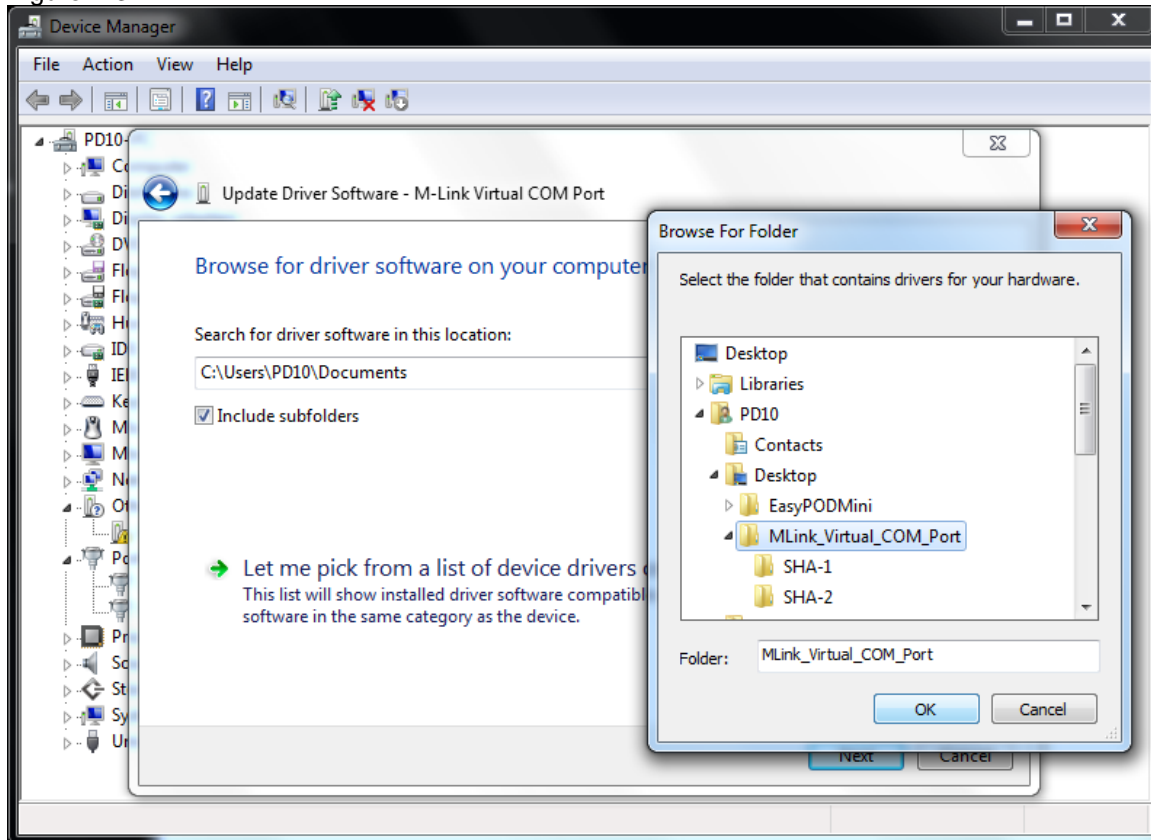


Step 2: Click "Right" key on Megawin MLink Virtual Com Port and "Update Driver Software"...  
Figure 2-2



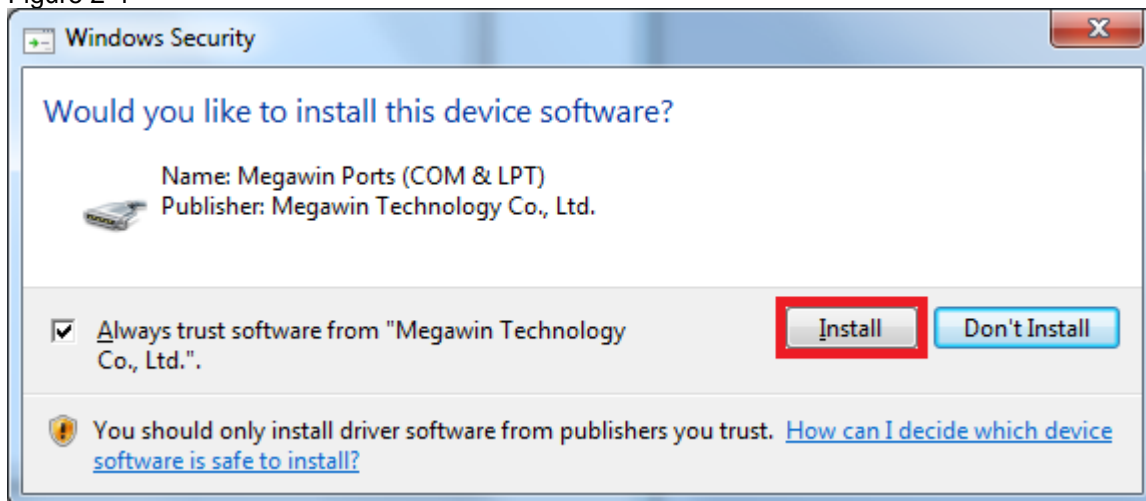
Step 3: Indicate Megawin MLink Virtual Com Port Driver path in the user's PC, OS will select SHA-1 or SHA-2 automatic.

Figure 2-3



Step 4: Click "Install" and wait a while.

Figure 2-4



Step 5: The user install driver successfully...

Figure 2-5

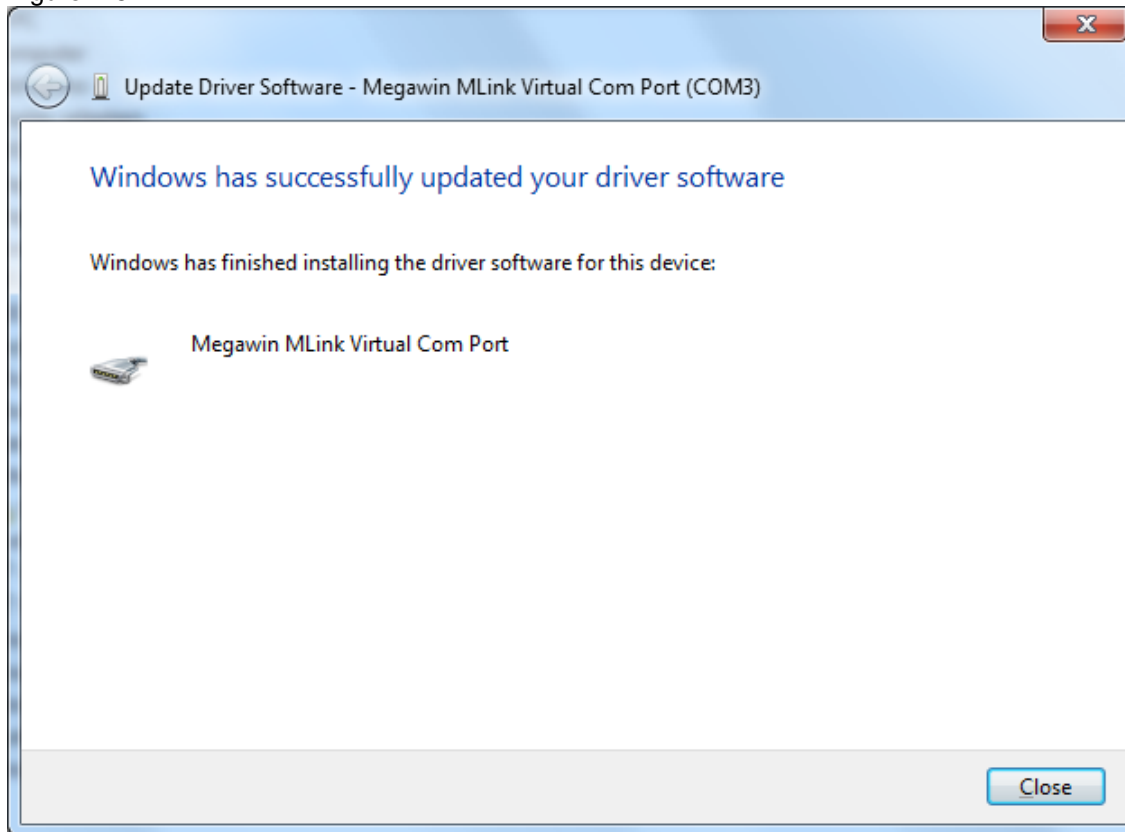
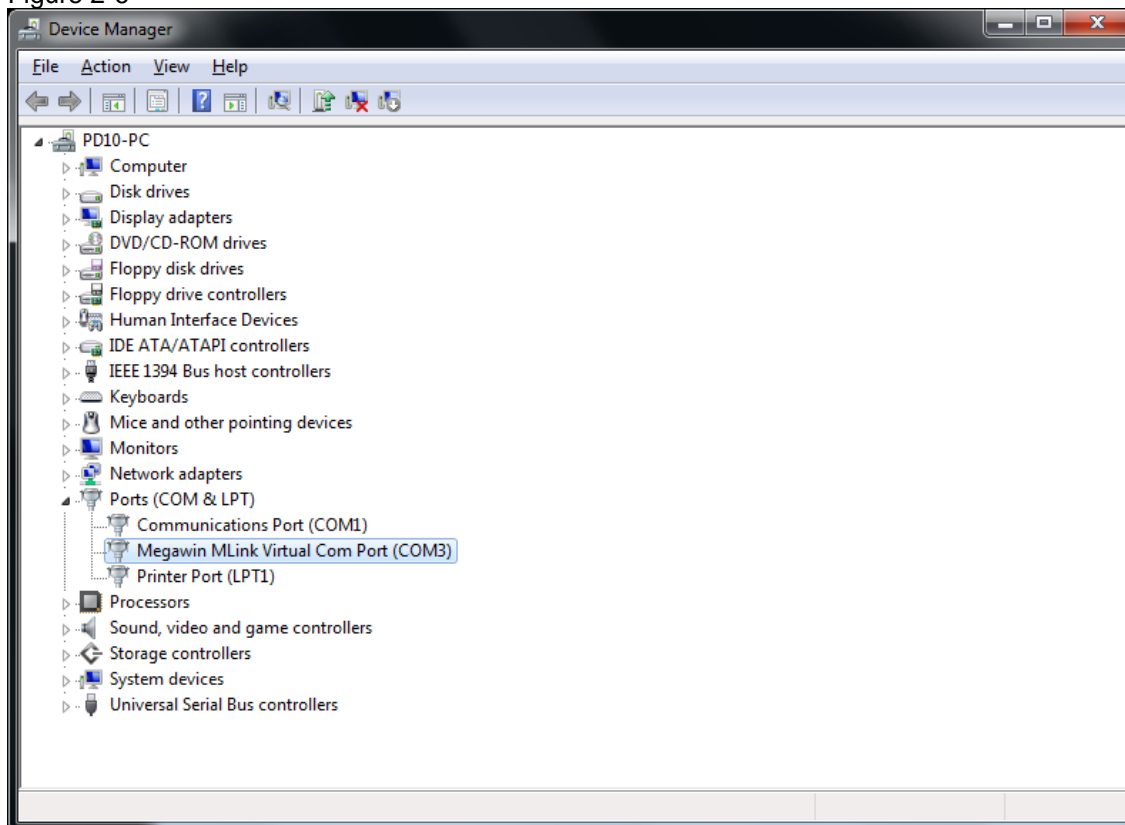


Figure 2-6





### 3. Revision History

Revision	Description	Date
V1.00	(1) New Create.	2025/05/14

## 4. Disclaimers

Herein, Megawin stands for “**Megawin Technology Co., Ltd.**”

**Life Support** — This product is not designed for use in medical, life-saving or life-sustaining applications, or systems where malfunction of this product can reasonably be expected to result in personal injury. Customers using or selling this product for use in such applications do so at their own risk and agree to fully indemnify Megawin for any damages resulting from such improper use or sale.

**Right to Make Changes** — Megawin reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in mass production, relevant changes will be communicated via an Engineering Change Notification (ECN).