



# Gowin\_EMPU\_M1 Serial Debug Reference Manual

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## Revision History

Date	Version	Description
02/19/2019	1.0E	Initial version published.
07/18/2019	1.1E	MCU hardware design and software programming design support extended peripherals: CAN, Ethernet, SPI-Flash, RTC, DualTimer, TRNG, I2C, SPI, SD-Card.
08/18/2019	1.2E	<ul style="list-style-type: none"><li>● MCU hardware design and software programming design support extended peripheral: DDR3 Memory;</li><li>● Known issues of ITCM, DTCM Size and IDE fixed.</li></ul>
09/27/2019	1.3E	<ul style="list-style-type: none"><li>● MCU hardware design and software programming design support read, write and erasure of SPI-Flash peripheral;</li><li>● MCU software programming design supports a continuous multi-byte read and write of I2C peripheral;</li><li>● Fixed known issues of address mapping of AHB2 and APB2 extended interface in MCU software programming design;</li><li>● Fixed known issues of continuous read and write of DDR3 Memory in MCU software programming design.</li></ul>
12/06/2019	1.4E	<ul style="list-style-type: none"><li>● MCU hardware design and software programming design supports PSRAM peripheral;</li><li>● MCU compiling software GMD V1.0 updated;</li><li>● RTOS reference design updated;</li><li>● Hardware and software reference design of AHB2 and APB2 extension bus interface added.</li></ul>

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# 1 Overview

Gowin\_EMPU\_M1 supports serial port debug. The master communicates with the slave by serial ports. Serial debugging assistant software is used to trace the debugging information on the PC side.

# 2 Hardware Resource

- Development board: DK-START-GW2A18 V2.0
  - GW2A-LV18PG256C8/I7
- USB to serial port interface board
- PC Computer



# 3 Software Resource

- Gowin\_V1.9.3.01 Beta
- ARM Keil MDK (V5.24.2.0 and above) or GOWIN MCU Designer V1.0
- Serial Debugging Assistant Software

# 4 Reference Design

Gowin\_EMPU\_M1 supports serial debug reference design in ARM Keil MDK (V5.24.2.0 and above) and GOWIN MCU Designer environment:

- Gowin\_EMPU\_M1\ref\_design\MCU\_RefDesign\Keil\_RefDesign\uart
- Gowin\_EMPU\_M1\ref\_design\MCU\_RefDesign\GMD\_RefDesign\cm1\_uart

# 5 Debug Flow

## 5.1 Gowin\_EMPU\_M1 Hardware Design

### 5.1.1 Hardware Design

1. Select Gowin\_EMPU\_M1 in Gowin IP Core Generator.
2. Configure Cortex-M1 and APB Bus Peripherals, select UART0 or UART1, and generate Gowin\_EMPU\_M1 hardware design with UART function.
3. Instantiate Gowin\_EMPU\_M1, import user designs, and connect ports between user design and Gowin\_EMPU\_M1,
4. Or use Gowin\_EMPU\_M1 reference design:  
Gowin\_EMPU\_M1\ref\_design\FPGA\_RefDesign\Debug\_RefDesign or NoDebug\_RefDesign

### 5.1.2 Physical Constraints

Constrain the UART0 and UART1 port in Gowin\_EMPU\_M1 to FPGA IO.

## 5.2 Gowin\_EMPU\_M1 Software Programming

Please refer to  
Gowin\_EMPU\_M1\ref\_design\MCU\_RefDesign\Keil\_RefDesign\uart or  
GMD\_RefDesign \ cm1\_uart

## 5.3 Board Level Connection

Connect DK-START-GW2A18 V2.0 to USB to serial port board using jumper. The gowin\_empu\_m1 UART0 and UART1 ports connection in Gowin\_EMPU\_M1Hardware Reference Design is as shown in Table 5-1.

Table 5-1 UART0/1 Port Constraint

UART	Ports	IO
UART0	RXD	M14
	TXD	K12
UART1	RXD	J13
	TXD	H13

## 5.4 Serial Debug Assistant

Open the serial debugging assistant software, as shown in Figure 5-1.

1. Refer to the PC device manager to select a proper communication port.
2. Refer to the baud rate set in the software programming design to configure the serial port communication baud rate.
3. Open the serial port.
4. Send and receive the debugging information.

Figure 5-1 Serial Debugging Assistant Software



