



Gowin\_EMPU\_M1

# **Serial Debugging Reference Guide**

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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>

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# 1 Overview

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

# 2Hardware Resource

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



# 3 Software Resource

- GOWIN FPGA Designer version 1.9.x Beta
- ARM Keil MDK or GOWIN MCU Designer
- Serial Debugging Assistant Software

# 4 Reference Design

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

# 5 Debugging 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  
GNU\_RefDesign\cm1\_uart

## 5.3 Board Level Connection

Connect DK-START-GW2A18 V2.0 to USB to serial port board using jumper. The UART0 and UART1 port connection in the 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 Debugging 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



