GOWIN EMPU M1 Serial Port Debug User Manual
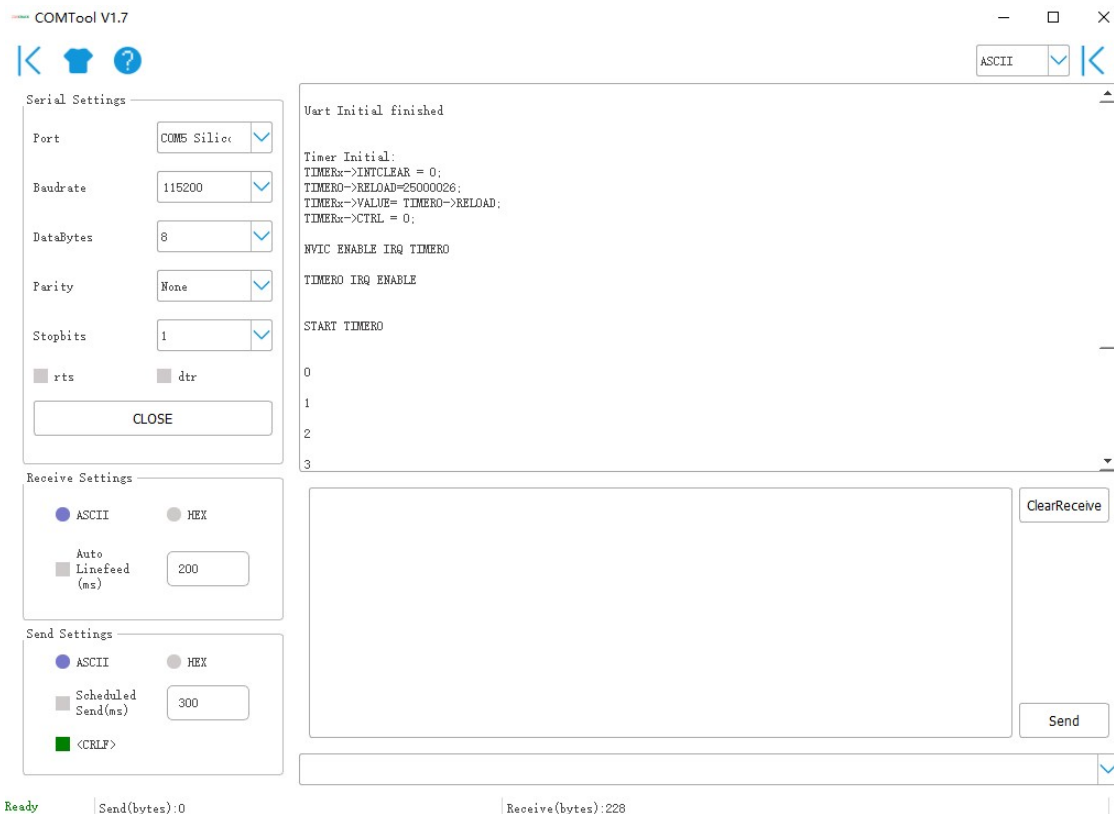
Contents

GOWIN EMPU M1 Serial Port Debug

Overview

Gowin_EMPU_M1 supports serial port debug. The master communicates with the slave via a serial port. Serial debug assistant software is used to trace the debug information on the PC side.

Hardware Resource

- DK-START-GW2A18 V2.0
  - GW2A-LV18PG256C8/I7
  - GW2A-18C (Version C)
- USB to serial port interface board
- PC

Software Resource

- Gowin_V1.9.8.01 and above
- ARM Keil MDK (V5.26 and above) or GOWIN MCU Designer (V1.1 and above)
- Serial Debug Assistant Software

Reference Design

Gowin_EMPU_M1 supports serial debug reference design in ARM Keil MDK (V5.26 and above) and GOWIN MCU Designer (V1.1 and above) software environment. Get following reference designs by the link:
http://cdn.gowinsemi.com.cn/Gowin_EMPU_M1.zip

- Gowin_EMPU_M1\ref_design\MCU_RefDesign\Keil_RefDesign\uart
- Gowin_EMPU_M1\ref_design\MCU_RefDesign\GMD_RefDesign\cm1_uart

Debug Flow

Hardware Design

1. Open the IP Core Generator tool of Gowin Software and select "Soft IP Core > Micorprocessor System > Soft-Core-MCU > Gowin_EMPU_M1".
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 Top Module, import user designs, and connect ports between user design and Gowin_EMPU_M1 Top Module.
4. Or use Gowin_EMPU_M1 reference design: Gowin_EMPU_M1\ref_design\FPGA_RefDesign\Debug_RefDesign or NoDebug_RefDesign.

Physical Constraints

Constrain the UART0 and UART1 ports in Gowin_EMPU_M1 to FPGA IO.

Software Programming Design
Please refer to 4 Reference Design Gowin_EMPU_M1\ref_design\MCU_RefDesign\Keil_RefDesign\uart or GMD_RefDesign\cm1_uart

Board Level Connection
Take development board reference design of DK-START-GW2A18 V2.0 in SDK for an instance. Connect Gowin DK-START-GW2A18 V2.0 to USB to serial port board using jumper. The UART0 and UART1 ports connection in Reference Design is as shown in Table 5-1.

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

Serial Debug Assistant
Open the serial debug assistant software, as shown in Figure 5-1.

1. Refer to the PC device manager to select a proper communication port.
2. Configure serial port attributes, such as the reference design in SDK:
   - Serial port baud rate: 115200
   - Stop bit: 1
   - Data bit: 8
   - Parity bit: None
3. Open the serial port.
4. Development board power on
5. Send and receive the debug information.

COMTool V1.7

Serial Settings

Port COM5 Silic

Baudrate 115200

DataBytes 8

Parity None

Stopbits 1

☐ rts ☐ dtr

CLOSE

Receive Settings

● ASCII ○ HEX

☐ Auto Linefeed (ms) 200

Send Settings

● ASCII ○ HEX

☐ Scheduled Send(ms) 300

■ <CRLF>

Ready   Send(bytes):0   Receive(bytes):228

```
Uart Initial finished

Timer Initial:
TIMERx->INTCLEAR = 0;
TIMER0->RELOAD=25000026;
TIMERx->VALUE= TIMER0->RELOAD;
TIMERx->CTRL = 0;

NVIC ENABLE IRQ TIMER0

TIMER0 IRQ ENABLE

START TIMER0

0

1

2

3
```

ClearReceive

Send

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	• MCU hardware design and software programming design support extended peripheral: DDR3 Memory. • Fixed known issues of ITCM, DTCM Size and IDE.
09/27/2019	1.3E	• MCU hardware design and software programming design support read, write and erasure of SPI-Flash. • MCU software programming design supports a continuous multi-byte read and write of I2C. • Fixed known issues of address mapping of AHB2 and APB2 extended interface in MCU software programming design. • Fixed known issues of continuous read and write of DDR3 Memory in MCU software programming design.

12/06/2019	1.4E	• MCU hardware design and software programming design supports PSRAM. • MCU compiling software GMD V1.0 updated. • RTOS reference design updated. • Hardware and software reference design of AHB2 and APB2 extension bus interface added.
03/06/2020	1.5E	Software version updated.
06/12/2020	1.6E	• MCU supports external instruction memory. • MCU supports external data memory. • Extension of 6 AHB bus interfaces. • Extension of 16 APB bus interfaces. • GPIO supports multiple interface types. • I2C supports multiple interface types.
01/25/2021	1.7E	• The reference design of GW1N-9C, GW2A-18C and GW2A-55C (Version C) updated. • The reference design of Gowin Software updated.
07/16/2021	1.8E	• The version of FPGA and MCU updated.
10/12/2021	1.9E	FPGA software version updated.

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Documents / Resources

GOWIN Gowin_EMPU_M1 Serial Debug **Reference Manual**	**GOWIN EMPU M1 Serial Port Debug** [pdf] User Manual EMPU M1, Serial Port Debug, EMPU M1 Serial Port Debug, Port Debug