



Gowin_EMPU_M1 Serial Debug Reference Manual

IPUG535-1.7E,01/25/2021

Copyright© 2021Guangdong Gowin Semiconductor Corporation. All Rights Reserved.

No part of this document may be reproduced or transmitted in any form or by any denotes, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent of GOWINSEMI.

Disclaimer

GOWINSEMI®, LittleBee®, Arora, and the GOWINSEMI logos are trademarks of GOWINSEMI and are registered in China, the U.S. Patent and Trademark Office, and other countries. All other words and logos identified as trademarks or service marks are the property of their respective holders, as described at www.gowinsemi.com. GOWINSEMI assumes no liability and provides no warranty (either expressed or implied) and is not responsible for any damage incurred to your hardware, software, data, or property resulting from usage of the materials or intellectual property except as outlined in the GOWINSEMI Terms and Conditions of Sale. All information in this document should be treated as preliminary. GOWINSEMI may make changes to this document at any time without prior notice. Anyone relying on this documentation should contact GOWINSEMI for the current documentation and errata.

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, I ² C, SPI, SD-Card.
08/18/2019	1.2E	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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	Updated the version of software.
06/12/2020	1.6E	<ul style="list-style-type: none"> ● MCU supports for external instruction memory; ● MCU supports for 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	<ul style="list-style-type: none"> ● The reference design of GW1N-9C, GW2A-18C and GW2A-55C (Version C) updated; ● The reference design of Gowin Software updated.

Contents

Contents	i
List of Figures	ii
List of Tables	ii
1 Overview	1
2 Hardware Resource.....	2
3 Software Resource.....	3
4 Reference Design	4
5 Debug Flow.....	5
5.1 Hardware Design	5
5.1.1 Hardware Design	5
5.1.2 Physical Constraints	5
5.2 Software Programming Design.....	5
5.3 Board Level Connection	6
5.4 Serial Debug Assistant.....	6

List of Figures

Figure 5-1 Serial Debugging Assistant Software 7

List of Tables

Table 5-1 UART0/1 Port Constraint 6

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

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

3 Software Resource

- Gowin_V1.9.7.01 Beta and above
- ARM Keil MDK (V5.24 and above) or GOWIN MCU Designer (V1.1 and above)
- Serial Debugging Assistant Software

4 Reference Design

Gowin_EMPU_M1 supports serial debug reference design in ARM Keil MDK (V5.24 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

5 Debug Flow

5.1 Hardware Design

5.1.1 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

5.1.2 Physical Constraints

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

5.2 Software Programming Design

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

5.3 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.

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. 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. Power on the development board.
5. Send and receive the debugging information.

Figure 5-1 Serial Debugging Assistant Software



