

Pengantar Modul 8

Komunikasi USART (Universal Synchronous Asynchronous Receiver/Transmitter)

Transfer data pada sistem secara umum dibagi menjadi 2 cara, yaitu : “parallel” dan “serial”. Pada transfer data tipe “parallel”, umumnya menggunakan banyak kabel data untuk mentransfer data antara sistem, seperti misalnya printer ataupun “Hard disks” IDE. Tipe “serial” umum digunakan untuk mengkomunikasikan sistem yang terpisah dalam jarak tertentu. Pada praktikum ini, akan digunakan salah satu tipe komunikasi serial dari *AVR microcontroller*.

USART (Universal Synchronous Asynchronous Receiver / Transmitter)

Komunikasi yang memiliki fleksibilitas, yang dapat digunakan untuk melakukan transfer data baik antar mikrokontroler maupun dengan modul eksternal, termasuk PC yang memiliki fitur UART. Pada komunikasi USART, ada beberapa register yang perlu diaktifkan, yaitu UDR (Usart I/O Data Register), UCSRA, UCSRB, UCSRC, dan UBRRL-UBRRH.

1. UDR (USART I/O Data Register)

| | | | | | | | | | |
|---------------|------------------|-----|-----|-----|-----|-----|-----|-----|---------------------|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| | RxBn[7:0] | | | | | | | | UDRn (Read) |
| | TxBn[7:0] | | | | | | | | |
| Read/Write | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | UDRn (Write) |
| Initial Value | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

2. UCSRA (USART Control and Status Register A)

| | | | | | | | | | |
|---------------|-------------|-------------|--------------|------------|-------------|-------------|-------------|--------------|---------------|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| | RXCn | TXCn | UDREn | FEn | DORn | UPEn | U2Xn | MPCMn | UCSRnA |
| Read/Write | R | R/W | R | R | R | R | R/W | R/W | |
| Initial Value | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | |

- Bit 7 -RXCn : USART Receive Complete
- Bit 6 -TXCn : USART Transmit Complete
- Bit 5 -UDREn: USART Data Register Empty
- Bit 4 -FEn : Frame Error
- Bit 3 -DORn : Data OverRun
- Bit 2 – UPEn: Parity Error
- Bit 1 – U2Xn : Double the USART Transmission Speed
- Bit 0 – MPCMn : Multi_processor Communication Mode

3. UCSRB (USART Control and Status Register B)

| | | | | | | | | | |
|---------------|---------------|---------------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| | RXCIEn | TXCIEn | UDRIEn | RXENn | TXENn | UCSZn2 | RXB8n | TXB8n | UCSRnB |
| Read/Write | R/W | R/W | R/W | R/W | R/W | R/W | R | R/W | |
| Initial Value | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

- Bit 7 – RXCIEn : RX Complete Interrupt Enable
- Bit 6 – TXCIEn : TX Complete Interrupt Enable

Bit 5 – UDRIEn : USART Data Register Empty Interrupt Enable
Bit 4 – RXENn : Receiver Enable
Bit 3 – TXENn : Transmitter Enable
Bit 2 – UCSZn2: Character Size
Bit 1 – RXB8n : Receive Data Bit 8
Bit 0 – TXB8n : Transmit Data Bit 8

REFERENSI

Mazidi, Muhammad Ali. 2011. The Microcontroller and Embedded System: Using Assembly and C. Pearson Education, inc: New Jersey

_____, *8-bit Atmel Microcontroller with 128KBytes in-System Programmable Flash- ATmega128 and ATmega128L*, [pdf], (<http://www.atmel.com/images/doc2467> [pdf] diakses tanggal 19 Oktober 2016)