

ESE 381

Lab 8: Circular Buffers and AVR128DB48 USART Module  
in Asynchronous Serial (RS232) Mode

4/11/2025

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Section: L02 Bench 7

1. After reset, index `USART_RxHead` has the value 0. Why is the first byte of data received placed in `USART_RxBuf[1]` instead of `USART_RxBuf[0]`?

*To avoid a true overflow and help protect the buffer from overwriting data, the first byte is placed in index 1 rather than 0.*

2. Why is it that when 5 characters are typed into Terminate for transmission, 7 characters are actually sent? What are the extra two characters and where do they come from?

*One of the extra characters is the "Enter" key or send trigger, and the other is a string terminator or end-of-line character. Both are automatically added by Terminate.*

3. For Task 3, if the receive and transmit buffer sizes are set to 8 bytes, does the system work when you type in 6 bytes and send them? If not, why not?

*Yes, it will work. The buffers can handle 6 bytes without any issues.*

4. For Task 3, if the receive and transmit buffer sizes are set to 8 bytes, does the system work when you type in 7 bytes and send them? If not, why not?

*Yes, it will work fine. The buffer can accommodate 7 bytes as it's within the limit.*

5. What can you conclude from the answers to questions 3 and 4 about the required relationship between the number of characters you type in and the required size of the buffers for the system to work?

*The buffer size determines how many characters can be stored at once. Characters are only sent when the pushbutton is pressed, so if the buffer is too small, some characters may be lost. The system needs a buffer large enough to hold all characters before they're transmitted.*

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