

Example 01: LED Serial Control

Ready-made example:

- Open the “STM32xxxx-Slot0” project
- Uncomment:

```
#define EXAMPLE_01_LED_SERIAL_CONTROL
```

- In STM32CubeIDE ⇒ Run ⇒ Run

How to make custom example:

- Configure USART DMA as described in this file
- Add uart.h to includes
- Add COM_Init() immediately after HAL initialization
- Use COM_Read() to implement serial command reader

Send Commands with HTML

- Use HTML buttons to send commands 0x01 or 0x02 via serial_helper.js:

```
<body>

<h1>STM32 LED Control</h1>

<script src="serial_helper.js"></script>

<button onclick="COM_Write([0x01])">
LED On
</button>

<button onclick="COM_Write([0x02])">
LED Off
</button>

</body>
```

Receive Commands on STM32

- Read one command byte from UART and toggle the LED when it matches 0x01 (ON) or 0x02

```
while (1)
{
    // invalid command by default
    uint8_t cmd = 0xff;

    // read one byte
    COM_Read(&cmd, 1);

    // 0x01: Turn LED on
    if (cmd == 0x01) {...}

    // 0x02: Turn LED off
    if (cmd == 0x02) {...}
}
```

Bidirectional Transfers

- Browser → STM32

```
COM_Write([0x01]);  
COM_Read(&cmd, 1);
```

- STM32 → Browser

```
COM_Write(&tmp, 1);  
let rx = await COM_Read(1);
```

Preparations for STM32

Configure UART port using STM32CubeMX:

- Enable Circular DMA for RX
- Enable DMA for TX (normal mode)
- Enable USART global interrupt

Initialize Universal Serial Library:

```
COM_Init(0,           // Port number
         &huart1,      // HAL port handle
         uartBuffer,   // RX buffer array
         UART_BUFFER_SIZE); // RX buffer size
```

STM32 Serial Library is ready:

```
COM_Read(&data, data_length);
COM_Write(&data, data_length);
```