

# TI Serial Port Service (SPS)

Service and characteristic description

# Serial Port Service

The serial port service is designed to be as versatile and easy to use as possible. It is not protocol specific, and can be adapted to most UART communication protocols (RS-232, RS-485, etc).

The serial port service has been given the

**UUID : F00C0E0-0451-4000-B000-00000000-0000**

The service comprises of three characteristics :

- Data characteristic (UUID : **F00C0E1-0451-4000-B000-00000000-0000** )
- Status characteristic (UUID : **F00C0E2-0451-4000-B000-00000000-0000** )
- Config characteristic (UUID : **F00C0E3-0451-4000-B000-00000000-0000** )

# Data characteristic

The data characteristic is used to transfer the serial port data. It can handle packets of arbitrary length up to 20 bytes per packet.

Properties of the data characteristic :

- Notify
- Write

When central (client) has data to send, it writes this data to the peripheral's data characteristic, and will receive notifications when the peripheral (server) has received data from its serial port.

# Status characteristic

The status characteristic is used to check the status of the communication :

- Framing error count
- Parity error count
- RF link overrun (received more bytes on serial port than able to send over the RF link) count
- RX bytes (received from client device, sent on serial port)
- TX bytes (sent to client device, received on serial port)

Properties of the status characteristic :

- Read (when characteristic is read, the counters are cleared).

# Status characteristic (cont'd)

Read from status characteristic format :

| Byte 0              |   |   |   |   |   |   |   | Byte 1             |   |   |   |   |   |   |   | Byte 2                |   |   |   |   |   |   |   | Byte 3       |   |   |   |   |   |   |   | Byte 4       |   |   |   |   |   |   |   | Byte 5       |   |   |   |   |   |   |   | Byte 6       |   |   |   |   |   |   |   |
|---------------------|---|---|---|---|---|---|---|--------------------|---|---|---|---|---|---|---|-----------------------|---|---|---|---|---|---|---|--------------|---|---|---|---|---|---|---|--------------|---|---|---|---|---|---|---|--------------|---|---|---|---|---|---|---|--------------|---|---|---|---|---|---|---|
| 7                   | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7                  | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7                     | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7            | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7            | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7            | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7            | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Framing error count |   |   |   |   |   |   |   | Parity error count |   |   |   |   |   |   |   | RF link overrun count |   |   |   |   |   |   |   | RX Bytes MSB |   |   |   |   |   |   |   | RX Bytes LSB |   |   |   |   |   |   |   | TX Bytes MSB |   |   |   |   |   |   |   | TX Bytes LSB |   |   |   |   |   |   |   |

- Byte 0 - Framing error count (number of framing errors since last status readout)
- Byte 1 – Parity error count (since last status readout)
- Byte 2 – RF link overrun count (number of bytes lost due to overrun from serial device)
- Byte 3,4 – RX Bytes count (since last status readout)
- Byte 5,6 – TX Bytes count (since last status readout)

# Config characteristic

The config characteristic is used to configure the parameters for the server's serial port, these include :

- Baud rate
- Stop bits
- Start bits
- Parity
- Hardware flow control

Properties of the config characteristic :

- Read
- Write

# Config characteristic (cont'd)

When read and writes are performed on the config characteristic use the following format :

| Byte 0             |   |   |   |   |   |   |   | Byte 1             |   |   |   |   |   |   |   | Byte 2                          |   |   |   |   |   |   |   |
|--------------------|---|---|---|---|---|---|---|--------------------|---|---|---|---|---|---|---|---------------------------------|---|---|---|---|---|---|---|
| 7                  | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7                  | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7                               | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Baud rate / 10 MSB |   |   |   |   |   |   |   | Baud rate / 10 LSB |   |   |   |   |   |   |   | FLOW EVEN PARITY SPB STOP START |   |   |   |   |   |   |   |

- Byte 0,1 - Baudrate is actual baudrate / 10
- Byte 2 bit definitions :
  - START (bit 0) – Start bit level :
    - 0 – low start bit
    - 1 – high start bit
  - STOP (bit 1) – Stop bit level (must be different from start bit level)
    - 0 – low stop bit
    - 1 – high stop bit
  - SPB (bit 2) – Number of stop bits
    - 0 – 1 stop bit
    - 1 – 2 stop bits

# Config characteristic (cont'd)

- PARITY (bit 3) – Parity enable :
  - 0 – parity disabled
  - 1 – parity enabled
- EVEN (bit 4) – Parity level :
  - 0 – Odd parity
  - 1 – Even parity
- FLOW (bit 5) – Flow control enabled :
  - 0 – Flow control disabled
  - 1 – Flow control enabled



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