



**CONNECTIVE PERIPHERALS**

**USBC-HS-UART**

**USB 2.0 Type C Hi-Speed to UART**

**Datasheet**



**Document Reference No.: CP\_000065**

**Version 1.2**

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# 1 Description

## 1.1 Functional Description

The **USBC-HS-UART** cable provides a fast, simple way to connect devices with 3.3 volt digital interfaces to USB Type C.

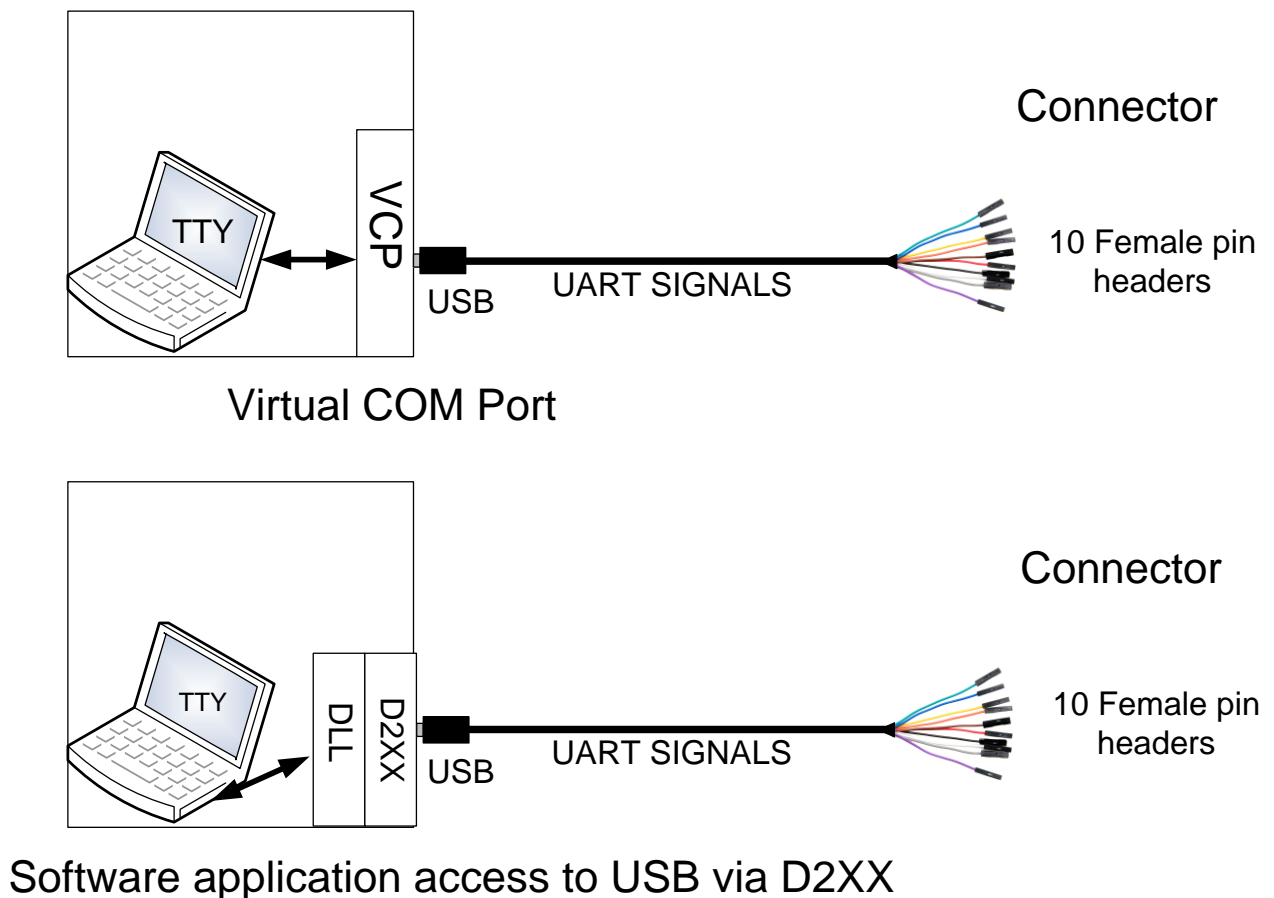
The USBC-HS-UART contains a small internal electronic circuit board, utilising the FT232H, which is encapsulated into the USB Type C connector end of the cable. The FT232H handles the USB signalling and protocols. The FT232H is a single channel USB 2.0 Hi-Speed (480Mb/s) to UART IC. For full details, features and enhancement descriptions please refer to [FT232H datasheet](#).

The digital interface of the cable is made up of ten individual wires which are terminated with single pole connectors which can be connected next to each other on a male header. The cables digital interface logic is 3.3 volts.

The USB Type C side of the cable is USB powered and is USB 2.0 Hi-Speed compatible. The cable is 1.8m long and supports a data transfer rate up to 12 MBaud.

The USBC-HS-UART requires USB device drivers, available free from Windows Update or from <https://connectiveperipherals.com> which used to make the FT232H in the cable appear as a virtual COM port (VCP). This then allows the user to communicate with the USB Type C interface via a standard PC serial emulation port (for example TTY).

Another USB driver, the D2XX, is used with application software to directly access the FT232H on the cable though a DLL. This is illustrated in the Figure 1-1.



**Figure 1-1 Using the USBC-HS-UART**

## 1.2 Part Numbers

The following Table 1.1 gives details of the USBC-HS-UART part numbers.

| Part Number                     | Description   | End Connector                | Cable details  |
|---------------------------------|---|------------------------------|--|
| USBC-HS-UART-3.3V-3.3V-1800-SPR | USB Type C to UART with +3.3V digital level signals. Maximum output of 250mA @ 3.3VDC on VCC (see <b>Note 1</b> ) | Single pole, receptacle x 10 | 10 core, UL2464 26 AWG, diameter=6.0mm length = 1800mm black |
| USBC-HS-UART-5V-3.3V-1800-SPR   | USB Type C to UART with +3.3V digital level signals. Maximum output of 450mA @ 5.0VDC on VCC (see <b>Note 2</b> ) | Single pole, receptacle x 10 | 10 core, UL2464 26 AWG, diameter=6.0mm length = 1800mm black |

**Table 1.1 USBC-HS-UART Descriptions and Part Numbers**

**Note 1:** The VCC power output signal (RED wire) is 3.3V. The source of 3.3V is the on-board regulator Output, which is switched onto the power output signal.

**Note 2:** The VCC power output signal (RED wire) is 5.0V. The source of 5.0V is the USB VBUS input, which is switched onto the power output signal.

CP supports customised end connector designs. For more information, please contact your local CP sales office (see section 5 for contact details).

## 1.3 Certifications

The USBC-HS-UART are fully RoHS compliant as well as CE and FCC certified.

## 1.4 USB Compliant

The USBC-HS-UART are fully compliant with the USB 2.0 specification and have been given the USB-IF Test-ID (TID) 10820025.



## **Table of Contents**

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Description.....</b>   | <b>2</b>  |
| 1.1      | <b>Functional Description .....</b>   | <b>2</b>  |
| 1.2      | <b>Part Numbers.....</b>  | <b>3</b>  |
| 1.3      | <b>Certifications .....</b>   | <b>3</b>  |
| 1.4      | <b>USB Compliant .....</b>  | <b>3</b>  |
| <b>2</b> | <b>Typical Applications .....</b>   | <b>5</b>  |
| 2.1      | <b>Driver Support .....</b>   | <b>5</b>  |
| 2.2      | <b>Driver Installation.....</b>   | <b>5</b>  |
|          | <b>Features.....</b>  | <b>6</b>  |
| <b>3</b> | <b>USBC-HS-UART connection and Mechanical Details .....</b>                               | <b>7</b>  |
| 3.1      | <b>USBC-HS-UART Cable Signal Descriptions .....</b>                                       | <b>8</b>  |
| 3.2      | <b>USBC-HS-UART Signal Descriptions .....</b>   | <b>9</b>  |
| 3.3      | <b>USBC-HS-UART Electrical Parameters .....</b>   | <b>9</b>  |
| 3.3.1    | USBC-HS-UART-3.3V-3.3V-1800-SPR Electrical Parameters .....                               | 9         |
| 3.3.2    | USBC-HS-UART-5V-3.3V-1800-SPR Electrical Parameters.....                                  | 9         |
| 3.3.3    | USBC-HS-UART-3.3V-3.3V-1800-SPR & USBC-HS-UART-5V-3.3V-1800-SPR I/O Characteristics ..... | 9         |
| <b>4</b> | <b>Cable PCB Circuit Schematic.....</b>   | <b>11</b> |
| <b>5</b> | <b>Contact Information.....</b>   | <b>13</b> |
|          | <b>Appendix A - Cable EEPROM Configuration .....</b>                                      | <b>14</b> |
|          | <b>Appendix B - References .....</b>  | <b>15</b> |
|          | <b>Document References .....</b>  | <b>15</b> |
|          | <b>Acronyms &amp; Abbreviations .....</b>   | <b>15</b> |
|          | <b>Appendix C - List of Figures and Tables .....</b>                                      | <b>16</b> |
|          | <b>List of Figures .....</b>  | <b>16</b> |
|          | <b>List of Tables.....</b>  | <b>16</b> |
|          | <b>Appendix D – Revision History .....</b>  | <b>17</b> |

## 2 Typical Applications

- Interfacing MCU / PLD / FPGA based designs to USB
- USB Medical applications
- Rapid USB integration into existing electronic systems
- Prototyping platform for USB interface on new systems
- USB to RS232 / RS422 Converters
- Set Top Box PC - USB interface
- USB Hardware Modems
- USB Wireless Modems
- USB Bar Code Readers
- USB Industrial Control
- Upgrading Legacy Peripherals to USB Type C
- USB Instrumentation

### 2.1 Driver Support

#### Royalty free VIRTUAL COM PORT (VCP) DRIVERS for...

- Windows 11, 10, 8.x, 7
- Windows XP (legacy)
- Windows CE 4.2, 5.0 and 6.0 (Legacy)
- macOS 10.9 and above
- Linux 2.4 and greater

#### Royalty free D2XX Direct Drivers (USB Drivers + DLL S/W Interface)

- Windows 11, 10, 8.x, 7
- Windows XP (legacy)
- Windows CE 4.2, 5.0 and 6.0 (Legacy)
- macOS 10.9 and above
- Linux 2.4 and greater

The drivers listed above are all available to download for free from <https://connectiveperipherals.com> Various 3rd Party Drivers are also available for other operating systems. Refer to <https://connectiveperipherals.com> and [www.ftdichip.com](http://www.ftdichip.com) for details.

### 2.2 Driver Installation

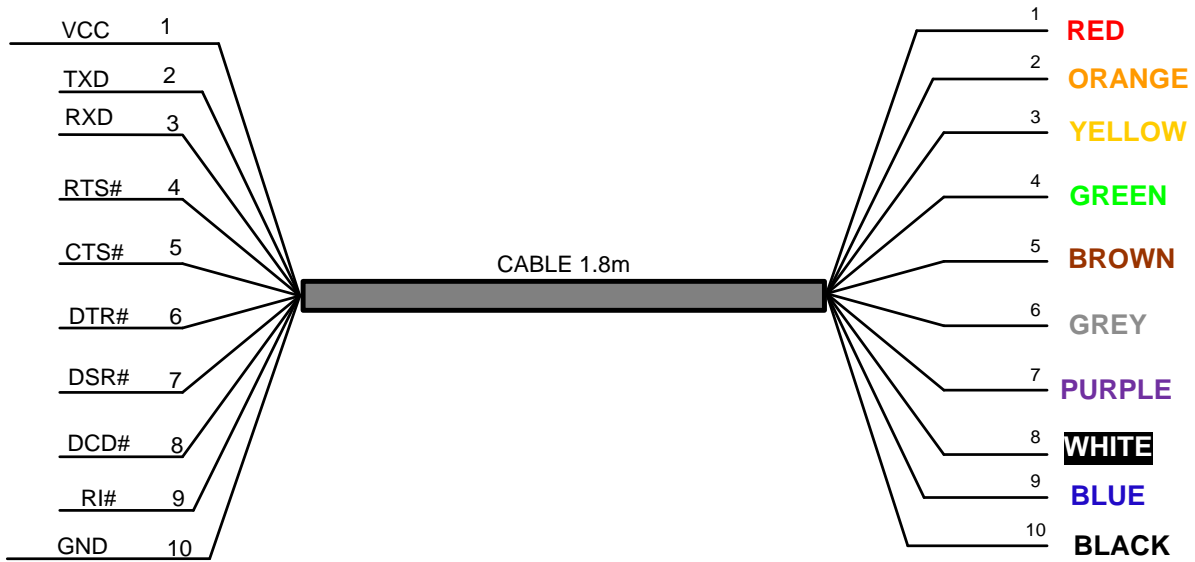
For driver installation and troubleshooting, please refer to the **Connective Peripherals USB to Serial Converters Driver Installation Guide (CP\_000084)** which is available from [www.connectiveperipherals.com](http://www.connectiveperipherals.com).

## 2.3 Features

- Based on the single chip USB Hi-Speed FT232H device
- USB 2.0 Hi-Speed (480Mbits/Second) and Full Speed (12Mbits/Second) compatible
- Entire USB protocol handled on the chip – No USB-specific firmware programming required
- USB Type C connector for direct connection to USB TYPE C host or hub
- USB bus powered
- Asynchronous UART transfer data rate up to 12Mbaud
- UART interface support for 7 or 8 data bits, 1 or 2 stop bits and odd / even / mark / space / no parity
- Fully assisted hardware or X-On / X-Off software handshaking
- 1kByte receive and transmit buffers for high data throughput
- Adjustable receive buffer timeout
- Support for USB suspend and resume
- Low operating and USB suspend current
- Low USB bandwidth consumption
- UHCI / OHCI / EHCI host controller compatible
- -40°C to +85°C operating temperature range
- Cable length is 1.8m (6 feet)
- Custom versions also available (subject to Minimum Order Quantity (MOQ))
- Royalty-free VCP and D2XX drivers eliminate the requirement for USB driver development in most cases

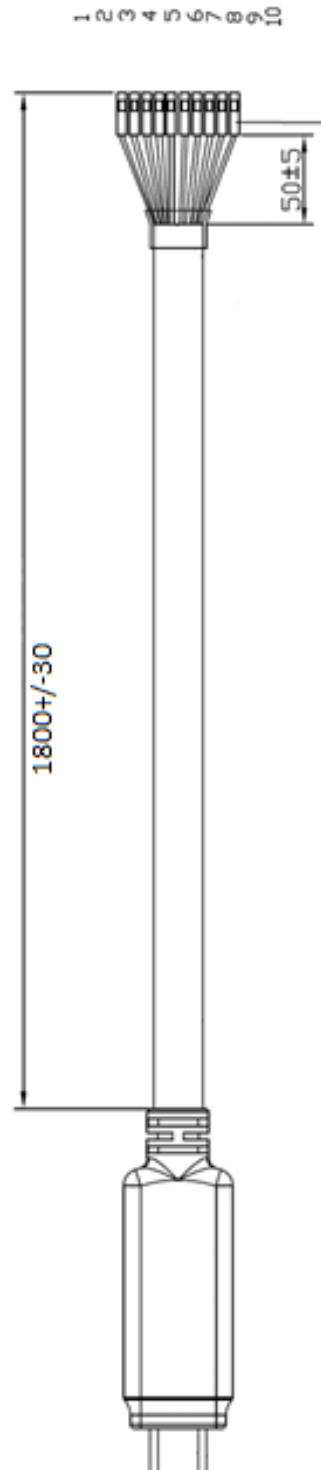
### 3 USBC-HS-UART connection and Mechanical Details

The following Figure 3-1 shows the cable signals and the wire colours for these signals on the USBC-HS-UART.



**Figure 3-1 USBC-HS-UART Connections (numbers refer to pad numbers on the PCB)**

### 3.1 USBC-HS-UART Cable Signal Descriptions



**Figure 3-2 USBC-HS-UART Mechanical Details (dimensions in mm)**



## 3.2 USBC-HS-UART Signal Descriptions

| Colour | Pin Number | Name | Type   | Description  |
|--------|------------|------|--------|--|
| Red    | 1          | VCC  | Output | Power Supply Output to target board.   |
| Orange | 2          | TXD  | Output | Transmit Asynchronous Data output.   |
| Yellow | 3          | RXD  | Input  | Receive Asynchronous Data input.   |
| Green  | 4          | RTS# | Output | Request To Send Control Output / Handshake signal.   |
| Brown  | 5          | CTS# | Input  | Clear to Send Control input / Handshake signal.  |
| Gray   | 6          | DTR# | Output | Data Transmit Ready modem signalling line  |
| Purple | 7          | DSR# | Input  | Data Set Ready modem signalling line   |
| White  | 8          | DCD# | Input  | Data Carrier Detect modem signalling line  |
| Blue   | 9          | RI#  | Input  | RI# = Ring Indicator Control Input. When the Remote Wake up option is enabled in the EEPROM, taking RI# low can be used to resume the PC USB Host controller from suspend. |
| Black  | 10         | GND  | GND    | Device ground supply pin.  |

**Table 3.1 USBC-HS-UART Signal Descriptions**

## 3.3 USBC-HS-UART Electrical Parameters

### 3.3.1 USBC-HS-UART-3.3V-3.3V-1800-SPR Electrical Parameters

| Parameter      | Description                 | Minimum | Typical | Maximum | Units | Conditions |
|----------------|-----------------------------|---------|---------|---------|-------|------------|
| VCC            | Output Power Voltage        | 3.2     | 3.3     | 3.6     | V     |            |
| I <sub>o</sub> | Output Power Current        | -       | -       | 250     | mA    |            |
| T              | Operating Temperature Range | -40     |         | +85     | °C    |            |

**Table 3.2 USBC-HS-UART-3.3V-3.3V-1800-SPR**

### 3.3.2 USBC-HS-UART-5V-3.3V-1800-SPR Electrical Parameters

| Parameter      | Description                 | Minimum | Typical | Maximum | Units | Conditions                              |
|----------------|-----------------------------|---------|---------|---------|-------|---|
| VCC            | Output Power Voltage        | 4.75    | 5       | 5.25    | V     |   |
| I <sub>o</sub> | Supply Current              | -       | -       | 450     | mA    | Must be less than 2.5mA during suspend. |
| T              | Operating Temperature Range | -40     |         | +85     | °C    |   |

**Table 3.3 USBC-HS-UART-5V-3.3V-1800-SPR Power Supply Output Parameters**

### 3.3.3 USBC-HS-UART-3.3V-3.3V-1800-SPR & USBC-HS-UART-5V-3.3V-1800-SPR I/O Characteristics

| Parameter       | Description         | Minimum | Typical | Maximum | Units | Conditions  |
|-----------------|---------------------|---------|---------|---------|-------|---|
| V <sub>oh</sub> | Output Voltage High | 2.40    | 3.14    |         | V     | I <sub>oh</sub> = +/-2mA<br>I/O Drive strength* = 4mA |
|                 |                     |         | 3.20    |         | V     | I/O Drive strength* = 8mA                             |
|                 |                     |         | 3.22    |         | V     | I/O Drive strength* = 12mA                            |
|                 |                     |         | 3.22    |         | V     | I/O Drive strength* = 16mA                            |
| V <sub>ol</sub> | Output Voltage Low  |         | 0.18    | 0.40    | V     | I <sub>ol</sub> = +/-2mA                              |

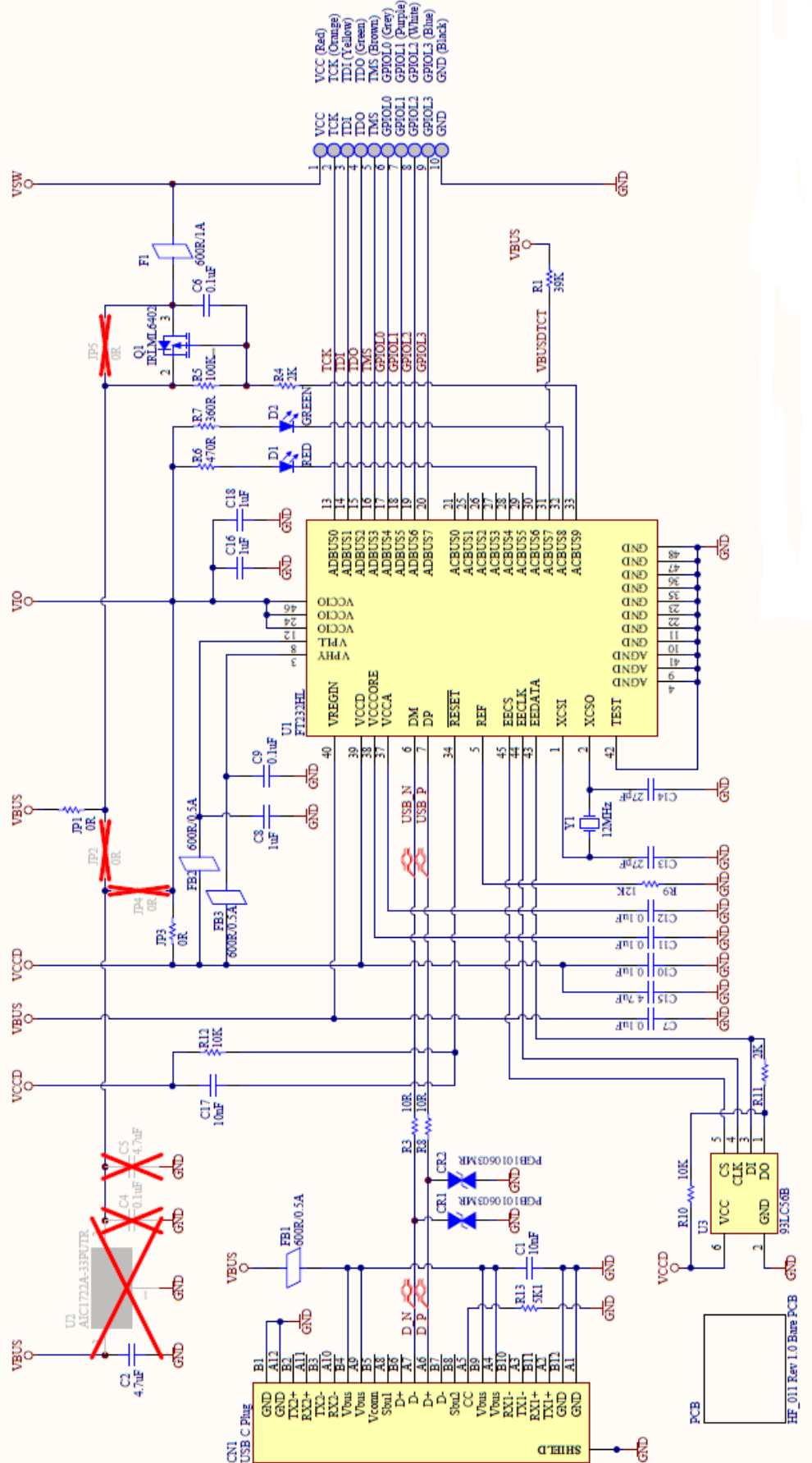
|     |  |      |      |      |    |                               |
|-----|--|------|------|------|----|-------------------------------|
|     |  |      |      |      |    | I/O Drive strength*<br>= 4mA  |
|     |  |      | 0.12 |      | V  | I/O Drive strength*<br>= 8mA  |
|     |  |      | 0.08 |      | V  | I/O Drive strength*<br>= 12mA |
|     |  |      | 0.07 |      | V  | I/O Drive strength*<br>= 16mA |
| Vil | Input low Switching Threshold                    |      | -    | 0.80 | V  | LVTTL                         |
| Vih | Input High Switching Threshold                   | 2.00 | -    |      | V  | LVTTL                         |
| Vt  | Switching Threshold                              |      | 1.50 |      | V  | LVTTL                         |
| Vt- | Schmitt trigger negative going threshold voltage | 0.80 | 1.10 | -    | V  |                               |
| Vt+ | Schmitt trigger positive going threshold voltage |      | 1.60 | 2.00 | V  |                               |
| Rpu | Input pull-up resistance                         | 40   | 75   | 190  | KΩ | Vin = 0                       |
| Rpd | Input pull-down resistance                       | 40   | 75   | 190  | KΩ | Vin = VCCIO                   |
| Iin | Input Leakage Current                            | 15   | 45   | 85   | μA | Vin = 0                       |
| Ioz | Tri-state output leakage current                 |      | ±10  |      | μA | Vin = 5.5V or 0               |

**Table 3.4 USBC-HS-UART-3.3V-3.3V-1800-SPR & USBC-HS-UART-5V-3.3V-1800-SPRI/O Pin Characteristics**

\* The I/O drive strength and slow slew-rate are configurable in the EEPROM.

The I/O pins are +3.3v cells, which are +5V tolerant





**Figure 4-2 Circuit Schematic of PCB - USBC-HS-UART-5V-3.3V-1800-SPR**

## 5 Contact Information

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| Web Shop URL     | <a href="http://www.connectiveperipherals.com">http://www.connectiveperipherals.com</a>  |

## Appendix A - Cable EEPROM Configuration

Each USBC-HS-UART cable is controlled by the FTDI FT232H IC. This cable contains an EEPROM which contains the USB configuration descriptors for that device. When the cable is plugged into a PC or a USB reset is performed, the PC will read these descriptors. The default values stored into the internal EEPROM are defined in the following table.

| Parameter                         | Value       | Notes   |
|-----------------------------------|-------------|---|
| USB Vendor ID (VID)               | 0403h       | FTDI default VID (hex)  |
| USB Product ID (PID)              | 6014h       | FTDI default PID (hex)  |
| Serial Number Enabled?            | Yes         |   |
| Serial Number                     | See Note    | A unique serial number is generated and programmed into the EEPROM during device final test.  |
| Pull down I/O Pins in USB Suspend | Disabled    | Enabling this option will make the device pull down on the UART interface lines when the power is shut off (PWREN# is high).  |
| Manufacturer Name                 | FTDI        |   |
| Product Description               | See note    | Product description depends on the cable. The following lists the Product descriptions for each different cable.<br>USBC-HS-UART-3.3V-3.3V-1800SPR<br>USBC-HS-UART-5V-3.3V-1800-SPR |
| Max Bus Power Current             | 500mA       | Includes power to operate the FT232H plus the cable output current.   |
| Power Source                      | Bus Powered |   |
| Device Type                       | FT232H      |   |
| USB Version                       | 0200        | Returns USB 2.0 device description to the host.<br><b>Note:</b> The device is a USB 2.0 Hi-Speed device (480Mb/s).  |
| Remote Wake Up                    | Disabled    |   |
| High Current I/Os                 | Enabled     | The device supports 4mA, 8mA, 12mA and 16mA drive strength settings. Default is 4mA.  |
| Load VCP Driver                   | Enabled     | Makes the device load the VCP driver interface for the device.  |

### Default Internal EEPROM Configuration

The internal EEPROM in the cable can be re-programmed over USB using the utility program FT\_PROG. Both can be downloaded from <https://www.ftdichip.com/>

Note that the EEPROM is supplied programmed ready to use for most applications. Changing the EEPROM settings is for advanced users only. Changing the settings can cause incorrect operation of the device. Before editing the VID or PID, note that this requires the user to have a driver with matching VID/PID in order to install the device before it can be used again. It is recommended to contact technical support if in doubt before making any changes.

## Appendix B - References

### Document References

[FT232H datasheet](#)

### Acronyms & Abbreviations

| Terms  | Description   |
|--------|---|
| DLL    | Dynamic Link Library                                |
| EHCI   | Enhanced Host Controller Interface                  |
| EEPROM | Electrically Erasable Programmable Read Only Memory |
| FPGA   | Field Programmable Gate Array                       |
| IC     | Integrated Circuit                                  |
| MCU    | Microcontroller Unit                                |
| RoHS   | Restriction of Hazardous Substance                  |
| SIL    | Single In Line                                      |
| OHCI   | Open Host Controller Interface                      |
| PLD    | Programmable Logic Device                           |
| TTL    | Transistor-Transistor Logic                         |
| USB    | Universal Serial Bus                                |
| UART   | Universal Asynchronous Receiver/Transmitter         |
| UHCI   | Universal Host Controller Interface                 |

## Appendix C - List of Figures and Tables

### List of Figures

|   |    |
|---|----|
| Figure 1-1 Using the USBC-HS-UART .....   | 2  |
| Figure 3-1 USBC-HS-UART Connections (numbers refer to pad numbers on the PCB) ..... | 7  |
| Figure 3-2 USBC-HS-UART Mechanical Details (dimensions in mm) .....                 | 8  |
| Figure 4-1 Circuit Schematic of PCB - USBC-HS-UART-3.3V-3.3V-1800-SPR .....         | 11 |
| Figure 4-2 Circuit Schematic of PCB – USBC-HS-UART-5V-3.3V-1800-SPR.....            | 12 |

### List of Tables

|  |    |
|--|----|
| Table 1.1 USBC-HS-UART Descriptions and Part Numbers.....  | 3  |
| Table 3.1 USBC-HS-UART Signal Descriptions .....   | 9  |
| Table 3.2 USBC-HS-UART-3.3V-3.3V-1800-SPR.....   | 9  |
| Table 3.3 USBC-HS-UART-5V-3.3V-1800-SPR Power Supply Output Parameters .....                           | 9  |
| Table 3.4 USBC-HS-UART-3.3V-3.3V-1800-SPR & USBC-HS-UART-5V-3.3V-1800-SPRI/O Pin Characteristics ..... | 10 |



## Appendix D – Revision History

| Revision    | Changes   | Date       |
|-------------|---|------------|
| Version 1.0 | Initial Release   | 29-07-2020 |
| Version 1.1 | Updated Fig 4.1 & Fig 4.2 to new schematics<br>Updated the Part Number & Device Description<br>Updated Default Internal EEPROM Configurations table | 07-10-2020 |
| Version 1.2 | Added driver install section and other minor updates  | 30-01-2023 |