



USBC-FS-UART-5V-5V-1800-WE

Datasheet

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Version 1.2

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1 Introduction

The **USBC-FS-UART-5V-5V-1800-WE** is a USB Type C to TTL serial UART converter cable incorporating the FT232R USB to Serial UART interface IC device which handles all the USB signalling and protocols. The cables provide a fast, simple way to connect devices with a logic level serial interface to USB Type C.

Each USBC-FS-UART-5V-5V-1800-WE contains a small internal electronic circuit board, utilising the [FT232R](#), which is encapsulated into the USB Type C connector end of the cable. Refer to the [FT232R](#) datasheet more details. The other end of the cable is wire ended. The cable can be used for TTL or interface logic.

Cable are FCC, CE, UKCA and RoHS compliant at TTL levels of + 5V.

The USB Type C side of the cable is USB powered and is USB 2.0 full speed compatible. Each cable is 1.8m long and supports a data transfer rate up to 3 Mbaud. Each cable supports the FTDIChip-ID™, with a unique USB serial number programmed into the FT232R. This feature can be used to create a security or password protected file transfer access using the cable. Further information and examples on this feature are available at [FTDIChip-ID Projects](#).

The USBC-FS-UART-5V-5V-1800-WE requires USB drivers, available free from <http://www.connectiveperipherals.com>, which are used to make the FT232R in the cable appear as a virtual COM port (VCP). This 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 driver, can also be used with application software to directly access the FT232R on the cable through a DLL. This is illustrated in Figure 1-1.

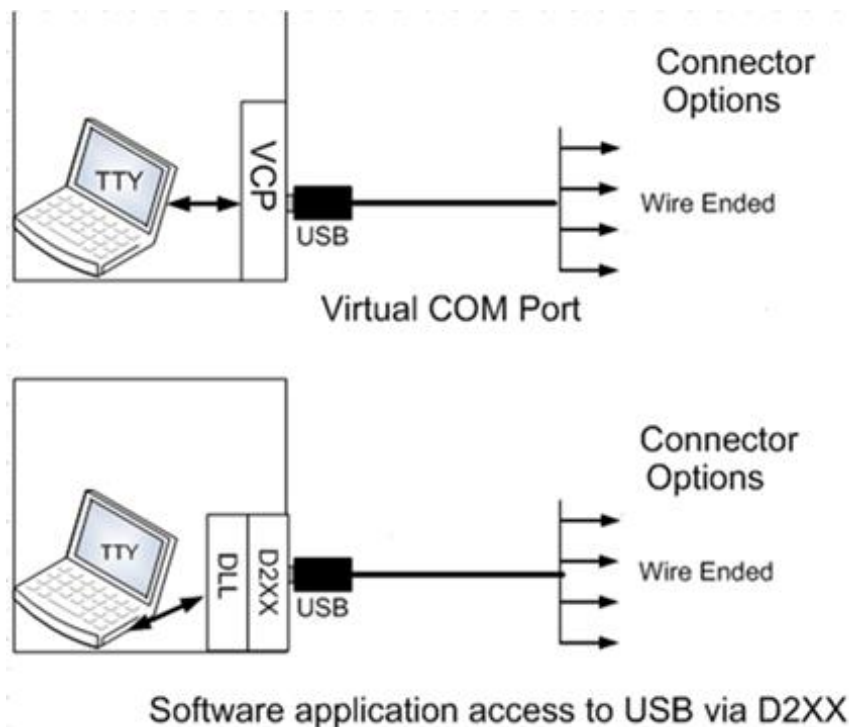


Figure 1-1 - Using the USBC-FS-UART-5V-5V-1800-WE

1.1 Part Numbers

The following Table 1.1 gives details of USBC-FS-UART-5V-5V-1800-WE part numbers.

| Part Number | Description | End Connector* | Cable details |
|----------------------------|--|---------------------------|--|
| USBC-FS-UART-5V-5V-1800-WE | USB Type C to UART cable with up to 5V TTL level UART signals. Maximum output of 450mA on VCC (see Note 1) | Wire Ended (no connector) | 6 core, UL2464 26 AWG, diam=4.8mm, Black |

Table 1.1 USBC-FS-UART-5V-5V-1800-WE Descriptions and Part Numbers

Note 1: The VCC power output signal (RED wire) is 5.0V. The source of 5.0V is the USB Type C VBUS input, which is switched onto the power output signal (enabled when the FT232R is enumerated and not in suspend)

CP supports customised end connector designs. For more information, please contact your local CP sales office (see section 6 for contact details).

1.2 Certifications

The USBC-FS-UART-5V-5V-1800-WE is fully RoHS compliant and FCC, CE and UKCA approved.



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2 Typical Applications

- USB to Serial TTL Level Converter
- Upgrading Legacy Peripherals to USB
- Interface Microcontroller UART or I/O to USB
- Interface FPGA / PLD to USB
- USB Instrumentation PC interface
- USB Industrial Control
- USB Software / Hardware Encryption Dongles
- Replace MAX232 type level shifters allowing for direct connection of products with logic level signals to the PC via USB

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 legacy and 3rd Party Drivers are also available for other operating systems. Refer to <https://connectiveperipherals.com> and www.ftdichip.com for details.

2.2 Driver Installation

For driver installation, please refer to the **Connective Peripherals USB to Serial Converters Driver Installation Guide (CP_000084)** which is available from www.connectiveperipherals.com.

2.3 Features

- USBC-FS-UART-5V-5V-1800-WE provides a USB Type C to TTL Serial interface.
- On board FT232R provides single chip USB to asynchronous serial data transfer interface.
- Entire USB protocol handled by the electronics in the cable USB Type C.
- Connect directly to a microcontroller UART or I/O pins.
- UART interface support for 7 or 8 data bits, 1 or 2 stop bits and odd / even / mark / space / no parity.
- Fully assisted hardware (RTS#/CTS#) or X-On / X-Off software handshaking.
- Data transfer rates from 300 baud to 3 Mbaud at TTL levels.
- Internal EEPROM with user writeable area.
- 5.0V safe TTL inputs makes the USBC-FS-UART-5V-5V-1800-WE easy to interface to 5.0V MCU's.
- FTDI's royalty-free VCP allow for communication as a standard emulated COM port and D2XX 'direct' drivers provide DLL application programming interface.
- Support for FT232R FTDIChip-ID™ feature for improved security.
- Voltage output power allows external logic to be powered from the USB Type C port.
- 6 way outputs provide Tx, Rx, RTS#, CTS#, VCC and GND.
- Low USB bandwidth consumption.
- UHCI / OHCI / EHCI host controller compatible.
- USB 2.0 (12Mb/s) Full Speed compatible.
- -40°C to +85°C operating temperature range.
- Cable length is 1.80m (6 feet).
- FCC, CE and UKCA compliant.
- Custom versions also available (subject to MOQ).

3 FT232R features applicable to USBC-FS-UART-5V-5V-1800-WE

The USBC-FS-UART-5V-5V-1800-WE use the FT232R USB to serial IC device. This section summarises the key features of the FT232R which apply to the USBC-FS-UART-5V-5V-1800-WE USB to serial TTL converter cable. For further details, and a full features and enhancements description refer to the [FT232R](#) datasheet.

Internal EEPROM. The internal EEPROM in each cable is used to store USB Vendor ID (VID), Product ID (PID), device serial number, product description string and various other USB configuration descriptors. Each cable is supplied with the internal EEPROM pre-programmed as described in [Appendix A](#). A user area in the internal EEPROM is available to system designers to allow storing additional data. The internal EEPROM descriptors can be programmed in circuit, over USB without any additional voltage requirement. It can be programmed using the FTDI utility software called FT_Prog, which can be downloaded <https://www.ftdichip.com/Support/Utilities.htm>. Note that the user area is not modifiable using FT_Prog.

Lower Operating and Suspend Current. The FT232R has a low 15mA operating supply current and a very low USB suspend current of approximately 70µA. (Note that during suspend mode, the current drawn by application should not exceed 2.5mA to remain USB compliant).

Low USB Bandwidth Consumption. The USB interface of the FT232R, and therefore the USBC-FS-UART-5V-5V-1800-WE, has been designed to use as little as possible of the total USB bandwidth available from the USB host controller.

High Output Drive Option. The UART interface I/O pins on the USBC-FS-UART-5V-5V-1800-WE (RXD, TXD, RTS#, and CTS#) can be configured to use the FT232R's high output drive option. This option allows the FT232R I/O pins to drive up to three times the standard signal drive level. This allows multiple devices to be driven, or devices that require greater signal drive strength to be interfaced to the cable. This option is enabled in the internal EEPROM.

UART Pin Signal Inversion. The sense of each of the eight UART signals can be individually inverted by configuring options in the internal EEPROM. For example CTS# (active low) can be changed to CTS (active high), or TXD can be changed to TXD#.

FTDICHIP-ID™. The FT232R includes the FTDICHIP-ID™ security dongle feature. This FTDICHIP-ID™ feature allows a unique number to be burnt into each cable during manufacture. This number cannot be reprogrammed. This number is only readable over USB can be used to form the basis of a security dongle which can be used to protect any customer application software being copied. This allows the possibility of using the USBC-FS-UART-5V-5V-1800-WE as a dongle for software licensing. Further to this, a renewable license scheme can be implemented based on the FTDICHIP-ID™ number when encrypted with other information. This encrypted number can be stored in the user area of the FT232R internal EEPROM, and can be decrypted, then compared with the protected FTDICHIP-ID™ to verify that a license is valid. Refer to [AN232R-01 FTDICHIP-ID for the FT232R and FT245R](#) for more details.

Improved EMI Performance. The USBC-FS-UART-5V-5V-1800-WE is FCC, CE and UKCA certified.

Extended Operating Temperature Range - The USBC-FS-UART-5V-5V-1800-WE is capable of operating over an extended temperature range of -40° to +85° C thus allowing them to be used in automotive or industrial applications.

4 USBC-FS-UART-5V-5V-1800-WE connection & mechanical details

The following Figure 4-1 shows the cable signals and the wire colours for these signals on the USBC-FS-UART-5V-5V-1800-WE.

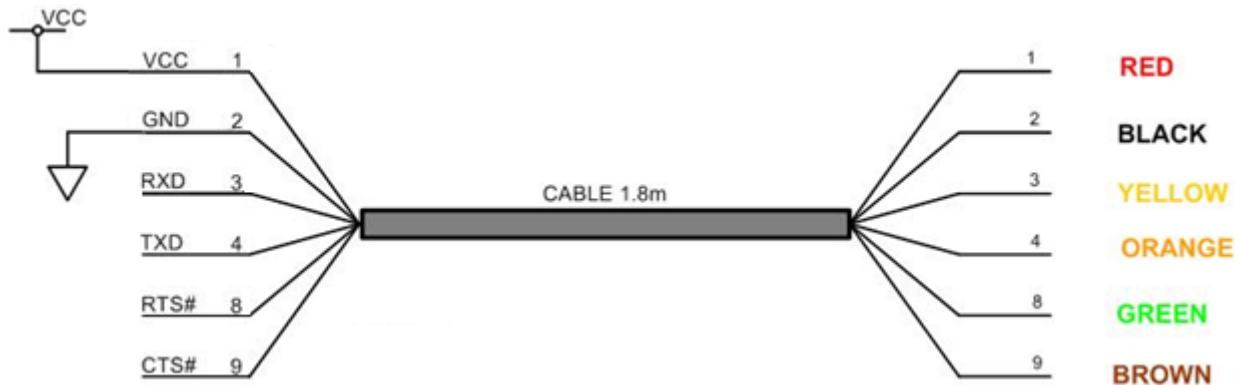


Figure 4-1 USBC-FS-UART-5V-5V-1800-WE Connections (nos. refer to pad numbers on the PCB)

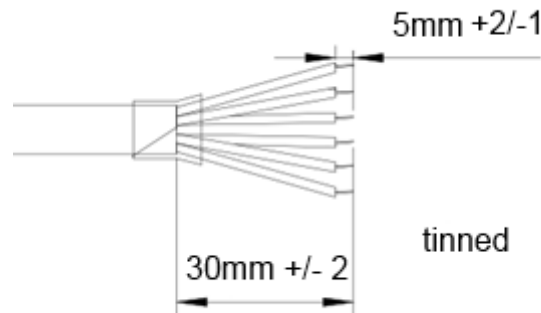


Figure 4-2 USBC-FS-UART-5V-5V-1800-WE Mechanical Details (dimensions in mm)

4.1 USBC-FS-UART-5V-5V-1800-WE Generic Cables Signal Desc.

| Colour | Name | Type | Description |
|--------|------|--------|--|
| Black | GND | GND | Device ground supply pin. |
| Brown | CTS# | Input | Clear to Send Control input / Handshake signal. |
| Red | VCC | Output | Power Supply Output |
| Orange | TXD | Output | Transmit Asynchronous Data output. |
| Yellow | RXD | Input | Receive Asynchronous Data input. |
| Green | RTS# | Output | Request To Send Control Output / Handshake signal. |

Table 4.1 USBC-FS-UART-5V-5V-1800-WE Generic Cable Signal Descriptions

4.2 USBC-FS-UART-5V-5V-1800-WE Electrical Parameters

| Parameter | Description | Minimum | Typical | Maximum | Units | Conditions |
|-----------|-----------------------------|---------|---------|---------|-------|---|
| VCC | Output Power Voltage | 4.25 | 5.0 | 5.25 | V | |
| IO | Supply Current | - | 450 | | mA | Must be less than 2.5mA during suspend. |
| T | Operating Temperature Range | -40 | | +85 | oC | |

Table 4.2 USBC-FS-UART-5V-5V-1800-WE I/O Operating Parameters

| Parameter | Description | Minimum | Typical | Maximum | Units | Conditions |
|-----------|----------------------------|---------|---------|---------|-------|----------------|
| Voh | Output Voltage High | 3.2 | 4.1 | 4.9 | V | I source = 6mA |
| Vol | Output Voltage Low | 0.3 | 0.4 | 0.6 | V | I sink = 6mA |
| Vin | Input Switching Threshold | 1.0 | 1.2 | 1.5 | V | |
| VHys | Input Switching Hysteresis | 20 | 25 | 30 | mV | |

Table 4.3 USBC-FS-UART-5V-5V-1800-WE I/O Pin Characteristics

5 Cable PCB Circuit Schematic

The circuit schematic for the small internal electronic circuit board, utilising the FT232R, which is encapsulated into the USB Type C connector end of the cable, is shown in Figure 5-1.

Customised versions of these cables are also available. Users interested in customised versions of these cables should contact Connective Peripherals Sales - sales@connectiveperipherals.com.

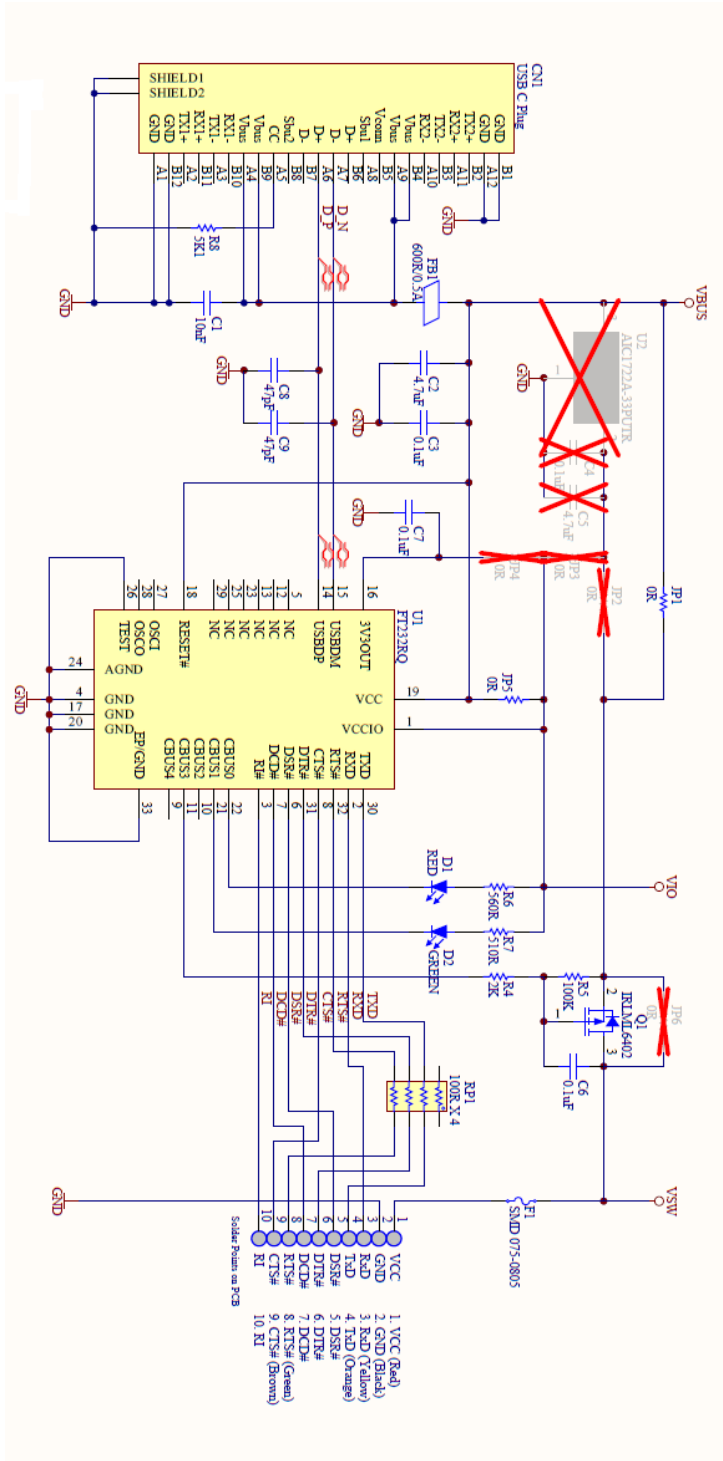


Figure 5-1 Circuit Schematic of PCB used in the TTL to USBC Serial Converter Cable

6 Contact Information

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Appendix A - Cable EEPROM Configuration

Each USBC-FS-UART-5V-5V-1800-WE is controlled by the FT232R IC. This FT232R device 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) | 6001h | 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 | USBC-FS-UART-5V-5V-1800-WE |
| Max Bus Power Current | 90mA | |
| Power Source | Bus Powered | |
| Device Type | FT232R | |
| USB Version | 0200 | Returns USB 2.0 device description to the host. Note: The device is a USB 2.0 Full Speed device (12Mb/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. |
| Invert TXD | Disabled | Signal on this pin becomes TXD# if enable. |
| Invert RXD | Disabled | Signal on this pin becomes RXD# if enable. |
| Invert RTS# | Disabled | Signal on this pin becomes RTS if enable. |
| Invert CTS# | Disabled | Signal on this pin becomes CTS if enable. |

Appendix B - References

Document References

[DS_FT232R](#)

[AN232R-01 FTDIChip-ID for the FT232R and FT245R](#)

Acronyms and Abbreviations

| Terms | Description |
|--------|---|
| DLL | Dynamic Link Library |
| EEPROM | Electrically Erasable Programmable Read Only Memory |
| EHCI | Enhanced Host Controller Interface |
| FCC | Federal Communications Commission |
| FPGA | Field Programmable Gate Array |
| I/O | Input Output |
| OHCI | Open Host Controller Interface |
| PC | Personal Computer |
| PLD | Programmable Logic Device |
| TTL | Transistor-Transistor Logic |
| UART | Universal Asynchronous Receiver Transmitter |
| UHCI | Universal Host Controller Interface |
| USB | Universal Serial Bus |
| VCP | Virtual COM Port |

Appendix C - List of Figures and Tables

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Appendix D – Revision History

| Revision | Changes | Date |
|-------------|---|------------|
| Version 1.0 | Initial Release | 29-07-2020 |
| Version 1.1 | Updated the Part Number & Device Description Updated the Default Internal EEPROM Configuration table | 07-10-2020 |
| Version 1.2 | Added driver install section and other minor updates | 30-01-2023 |