

Connective Peripherals Pte Ltd

USBC-FS-RS232-100- DB9

Datasheet



USBC-FS-RS232-100-DB9 is a USB Type C to full-handshake RS232 cable with a male DB9 connector. This cable is available with or without an enclosure.

1 Introduction

The USBC-FS-RS232-100-DB9 is a USB Type C to RS232 level full-handshake UART cable. USBC-FS-RS232-100-DB9 utilises the [FT231XS](#) USB to full-handshake UART IC and a RS232 transceiver IC. A male DB9 (aka DE9) connector provides the connectivity for RS232 communications and a USB-C plug tethered by a 10cm cable to the PCB provides connectivity for USB communications. All components used are Pb-free (RoHS compliant).

1.1 Features

- Entire USB protocol handled on the FT231XS chip
- FTDI's royalty-free VCP and D2XX drivers eliminate the requirement for USB driver development in most cases
- 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.
- Data transfer rates from 300 baud to 250 kilo-baud at RS232 voltage levels.
- 512 byte receive buffer and 512 byte transmit buffer utilising buffer smoothing technology to allow for high data throughput
- Adjustable receive buffer timeout.
- ESD protection on RS232 I/O s exceeding $\pm 15\text{kV}$ IEC1000-4-2 Air Gap Discharge, $\pm 15\text{kV}$ for Human Body Mode (HBM) and $\pm 8\text{kV}$ IEC1000-4-2 Contact Discharge.
- ESD protection on USB lines exceeding $\pm 2\text{kV}$ for Human Body Mode (HBM), $\pm 200\text{V}$ for Machine Mode (MM) and $\pm 500\text{V}$ for Charged Device Mode (CDM).
- Integrated MTP-ROM for storing USB VID, PID, serial number and product description strings.
- Low operating and USB suspend current.
- Low USB bandwidth consumption.
- USB 2.0 Full Speed compatible.
- -40°C to 85°C extended operating temperature range.
- Latch-up Free



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Table of Contents

1	Introduction	1
1.1	Features.....	1
2	Driver Support.....	3
3	Available Cables and Part Numbers.....	3
4	Ordering Information	4
5	Functional Description	5
5.1	Block Diagram.....	5
5.2	Electrical Details	5
6	USBC-FS-RS232-100-DB9 Signals and Pin Out	6
6.1	RS232 Signals.....	6
6.2	USB Signals.....	6
7	Module Dimensions	7
8	USBC-FS-RS232-100-DB9 Circuit Schematic.....	8
9	Internal MTP ROM Configuration	10
10	Contact Information	11
Appendix A – References		12
	Document References	12
	Acronyms & Abbreviations	12
Appendix B – List of Tables and Figures.....		13
	List of Figures	13
	List of Tables	13
Appendix C – Revision History		14

2 Driver Support

Royalty-Free VIRTUAL COM PORT (VCP) DRIVERS for:

- Windows 10 32,64-bit
- Windows 8/8.1 32, 64-bit
- Windows 7 32,64-bit
- Windows Vista
- Windows XP 32,64-bit
- Windows XP Embedded
- Windows CE.NET 4.2 , 5.0 and 6.0
- MAC OS OS-X
- Linux Kernel 3.3.0 and onwards
- Android

Royalty-Free D2XX Direct Drivers (USB Drivers + DLL S/W Interface):

- Windows 10 32,64-bit
- Windows 8/8.1 32, 64-bit
- Windows 7 32,64-bit
- Windows Vista
- Windows XP 32,64-bit
- Windows XP Embedded
- Windows CE.NET 4.2, 5.0 and 6.0
- MAC OS OS-X
- Linux Kernel 3.3.0 and onwards
- Android

The drivers listed above are all available to download for free from www.ftdichip.com. Various Third Party Drivers are also available for various other operating systems - visit www.ftdichip.com for details.

For driver installation instructions please see:
<http://www.ftdichip.com/Support/Documents/InstallGuides.htm>.

3 Available Cables and Part Numbers

The following Table 3.1 gives details of the available USBC-FS-RS232-100-DB9 cables.

Part Number	Description	End Connector	Cable details
USBC-FS-RS232-100-DB9	USB Type C Full Speed to RS232 level full-handshake cable	DB9 Male Connector	USB 2.0 UL 28/24+ADB 0D4.5 White (100mm length)

Table 3.1 - USBC-FS-RS232-100-DB9 Cable Descriptions and Part Numbers

CP supports customised end connector designs. For more information, please contact your local CP Sales office (see section **10** for contact details).

4 Ordering Information

Part Number	Description
USBC-FS-RS232-100-DB9	USB Type C to RS232 converter with a 10cm cable and an enclosure. FCC and CE approved.

Table 4.1 – USBC-FS-RS232-100-DB9 Ordering Information

5 Functional Description

5.1 Block Diagram

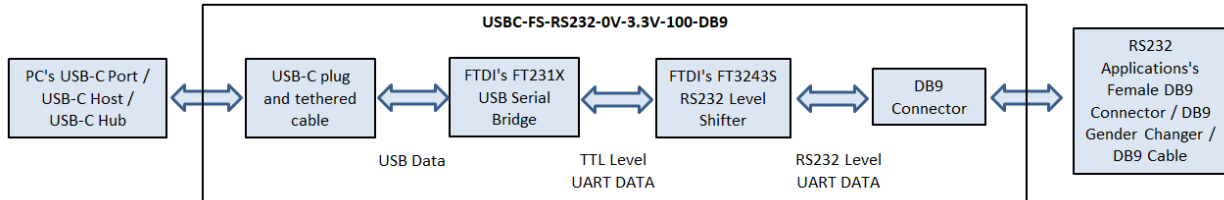


Figure 5-1 – USBC-FS-RS232-100-DB9 Block Diagram

5.2 Electrical Details

Parameter	Description	Minimum	Typical	Maximum	Units	Conditions
Vtrans	Transmitter output voltage swing	+/- 5	+/- 6.5	+/- 15	V	
Vrec	Receiver input voltage range	-25		+25	V	

Table 5.1 – USBC-FS-RS232-100-DB9 I/O Characteristics

Description	Conditions	Minimum	Typical	Maximum
ESD HBM	RS-232 Inputs and Outputs		±15 kV	
EN61000-4-2ContactDischarge	RS-232 Inputs and Outputs		±8 kV	
EN61000-4-2AirGapDischarge	RS-232 Inputs and Outputs		±15 kV	

Table 5.2 – USBC-FS-RS232-100-DB9 ESD Tolerance

6 USBC-FS-RS232-100-DB9 Signals and Pin Out

6.1 RS232 Signals

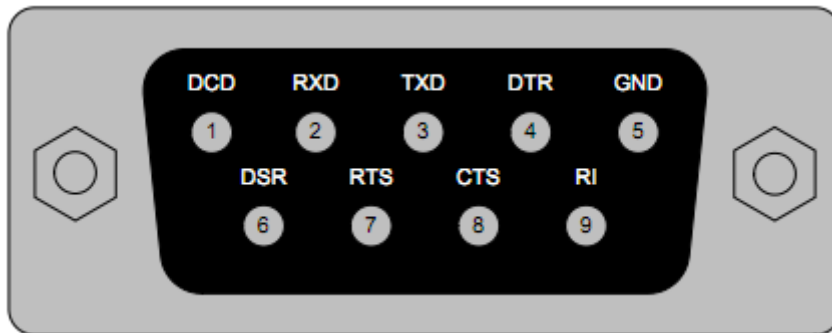


Figure 6-1 – USBC-FS-RS232-100-DB9 DB9 Pin Out

DB9 pin No.	Name	Type	Description
1	DCD	Input	Data Carrier Detect control input.
2	RXD	Input	Receive Asynchronous Data input.
3	TXD	Output	Transmit Asynchronous Data output.
4	DTR	Output	Handshake signal: Data Terminal Ready control output.
5	GND	Ground	Device ground supply pin
6	DSR	Input	Handshake signal: Data Set Ready control input
7	RTS	Output	Handshake signal: Request To Send Control Output
8	CTS	Input	Handshake signal: Clear to Send Control input
9	RI	Input	Ring Indicator control input. When remote wakeup is enabled in the FT231XS's internal MTP-ROM taking RI# low can be used to resume the PC USB host controller from suspend.

Table 6.1 – USBC-FS-RS232-100-DB9 RS232 Signals

6.2 USB Signals

Wire Colour.	Name	Type	Description
Red	VBUS	Power	5V power.
White	DM	Signal	USB data.
Green	DP	Signal	USB data.
Black	GND	Ground	Ground.
Black (longer wire)	Shield	Shield	Cable shield

Table 6.2 – USBC-FS-RS232-100-DB9 USB Lines

7 Module Dimensions

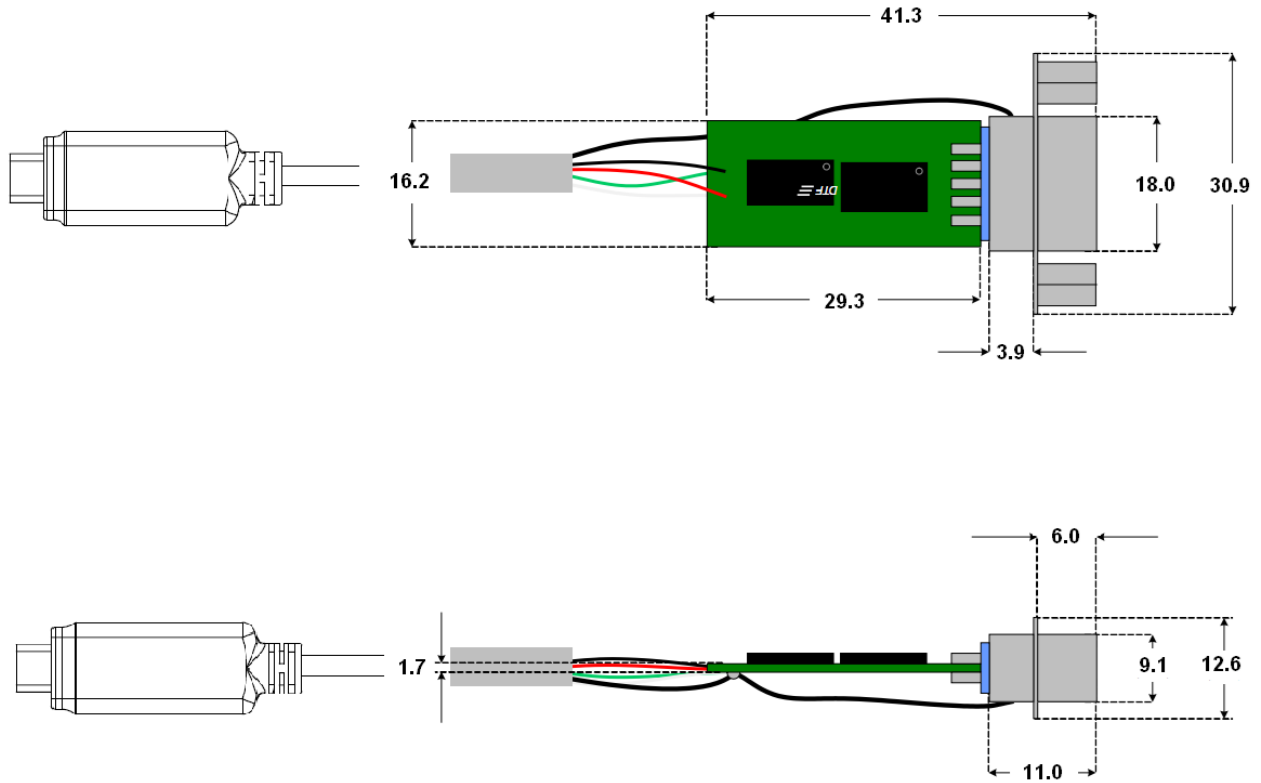


Figure 7-1 – USBC-FS-RS232-100-DB9 Dimensions

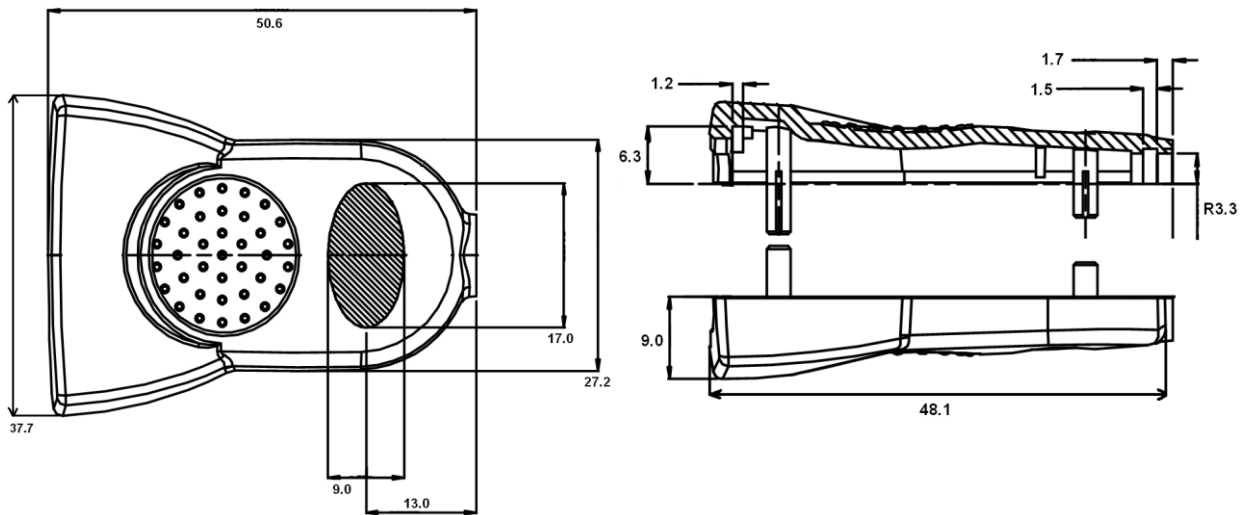


Figure 7-2 – Enclosure Dimensions

All dimensions are given in millimetres.

USBC-FS-RS232-100-DB9 cables only use lead free components, and are fully compliant with European Union directive 2002/95/EC.

8 USBC-FS-RS232-100-DB9 Circuit Schematic

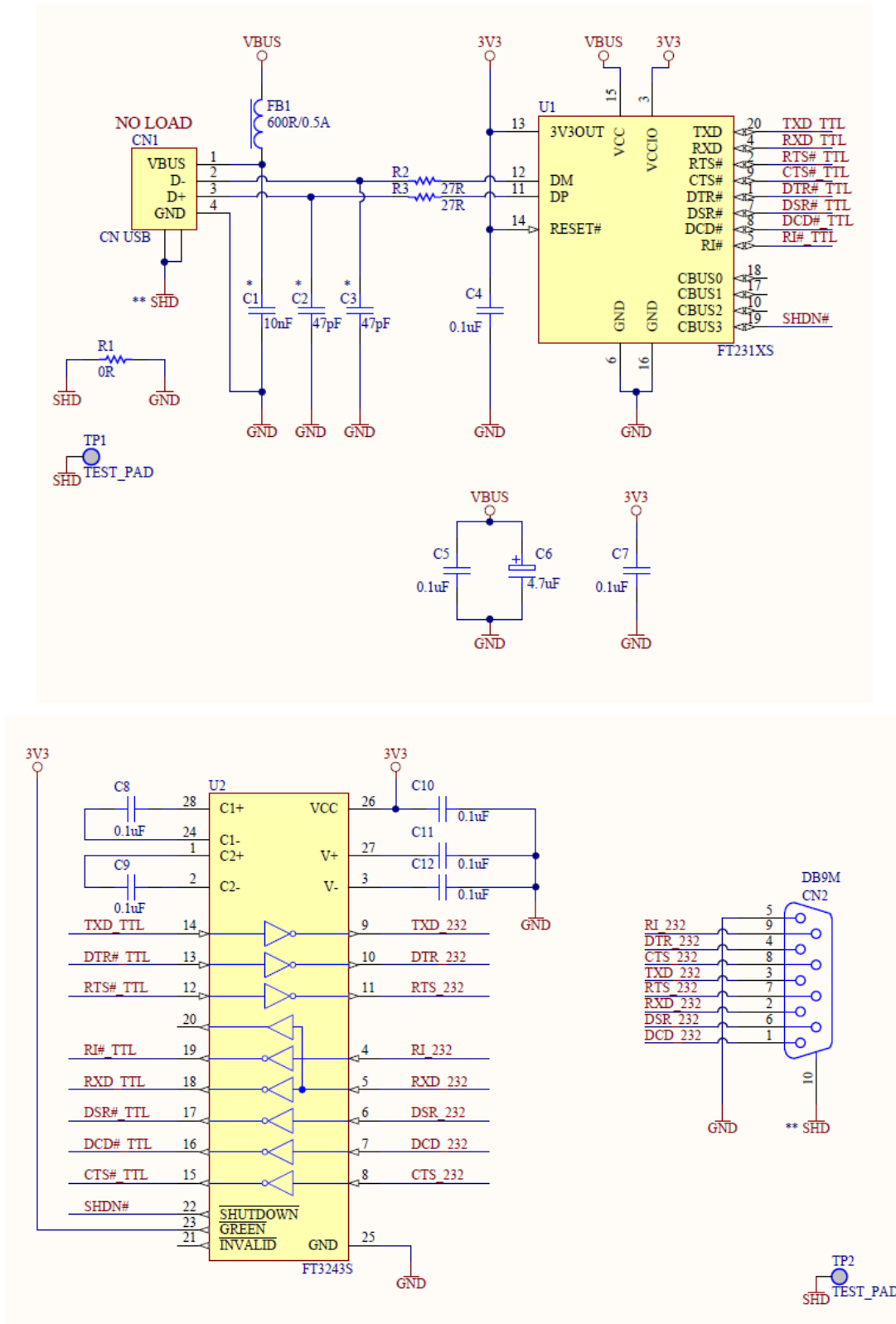


Figure 8-1 – USBC-FS-RS232-100-DB9 Circuit Schematic (At enclosure side)

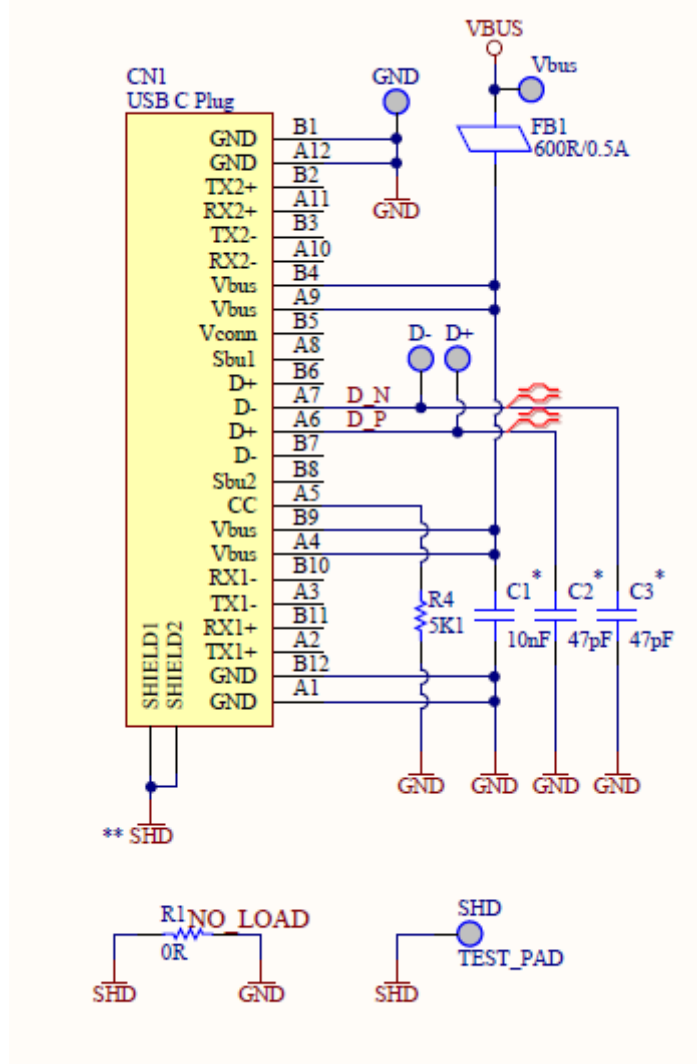


Figure 8-2 – USBC-FS-RS232-100-DB9 Circuit Schematic (At USB-C connector side)

9 Internal MTP ROM Configuration

Following a power-on reset or a USB reset, the [FT231X](#) will scan its internal MTP ROM and read the USB configuration descriptors stored there. The default values programmed into the internal MTP ROM in the FT231XS used on the USBC-FS-RS232-100-DB9 are shown in Table 9.1.

Parameter	Value	Notes
USB Vendor ID (VID)	0403h	FTDI default VID (hex)
USB Product UD (PID)	6015h	FTDI default PID (hex)
Serial Number Enabled	Yes	
Serial Number	See Note	A unique serial number is generated and programmed into the MTP ROM during final test of the cable.
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-RS232-DB9
Max Bus Power Current	90mA	
Power Source	Bus Powered	
Device Type	FT231X	
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) as opposed to a USB 2.0 High Speed device (480Mb/s).
Remote Wake Up	Enabled	Taking RI# low will wake up the USB host controller from suspend.
High Current I/Os	Disabled	Enables the high drive level on the UART and CBUS I/O pins.
Load VCP Driver	Enabled	Makes the device load the VCP driver interface for the device.
CBUS0	Tristate	
CBUS1	Tristate	
CBUS2	Tristate	
CBUS3	SLEEP#	
Invert UART	Disabled	Signal on this pin becomes TXD# if enable.

Table 9.1 – Default Internal MTP ROM Configuration

The internal MTP ROM in the [FT231X](#) can be programmed over USB using the utility program [FT_PROG](#). Users who do not have their own USB vendor ID but who would like to use a unique Product ID in their design can contact CP for a free block of unique PIDs. Contact support@connectiveperipherals.com for this service, also refer to the following technical notes - [TN_100_USB_VID-PID_Guidelines](#) and [TN_101_Customising_FTDI_VID_PID_In_Linux](#).

10 Contact Information

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Appendix A – References

Document References

[DS_FT231XS](#) (FT231X USB to Full Handshake UART IC Datasheet)

[TN_100_USB_VID-PID_Guidelines](#)

[TN_101_Customising_FTDI_VID_PID_In_Linux](#)

Acronyms & Abbreviations

Terms	Description
CDM	Charged Device Mode
DLL	Dynamic Link Library
ESD	EVE Screen Designer
HBM	Human Body Mode
IC	Integrated Circuit
RoHS	Restriction of Hazardous Substance
USB	Universal Serial Bus
UART	Universal Asynchronous Receiver/Transmitter
USBC	Universal Serial Bus Type C
VCP	Virtual COM Port

Appendix B – List of Tables and Figures

List of Figures

Figure 5-1 – USBC-FS-RS232-100-DB9 Block Diagram	5
Figure 6-1 – USBC-FS-RS232-100-DB9 DB9 Pin Out.....	6
Figure 7-1 – USBC-FS-RS232-100-DB9 Dimensions	7
Figure 7-2 – Enclosure Dimensions.....	7
Figure 8-1 – USBC-FS-RS232-100-DB9 Circuit Schematic (At enclosure side)	8
Figure 8-2 – USBC-FS-RS232-100-DB9 Circuit Schematic (At USB-C connector side)	9

List of Tables

Table 3.1 - USBC-FS-RS232-100-DB9 Cable Descriptions and Part Numbers.....	3
Table 4.1 – USBC-FS-RS232-100-DB9 Ordering Information.....	4
Table 5.1 – USBC-FS-RS232-100-DB9 I/O Characteristics	5
Table 5.2 – USBC-FS-RS232-100-DB9 ESD Tolerance.....	5
Table 6.1 – USBC-FS-RS232-100-DB9 RS232 Signals.....	6
Table 6.2 – USBC-FS-RS232-100-DB9 USB Lines.....	6
Table 9.1 – Default Internal MTP ROM Configuration.....	10

Appendix C – Revision History

Revision	Changes	Date
Version 1.0	Initial Release	29-07-2020
Version 1.1	Updated the Part Number & Device Description	07-10-2020
Version 1.2	Updated the Part Number	06-11-2020