



# Application Note

## AN\_207

## USB-DUO

**Version 1.0**

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FTDI's USB-DUO is a kit of parts (FT231XS and FT3243S) offered by FTDI to enable customers to create their own USB to RS232 converters with FTDI silicon.

Use of FTDI devices in life support and/or safety applications is entirely at the user's risk, and the user agrees to defend, indemnify and hold FTDI harmless from any and all damages, claims, suits or expense resulting from such use.

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## 1 Introduction

FTDI is well known for developing silicon and drivers that allow engineers to convert a peripheral device serial port to USB. The silicon available from FTDI typically interfaces at levels between 1V8 and 5V0, whereas designs for cables and external modules often require RS232, RS422 or RS485 voltage levels. To enable customers to benefit from an easy to implement design FTDI has created an USB to RS232 kit called the USB Duo, which contains an FT231XS (USB to UART chip) and a FT3243S (line driver integrated circuit).

### 1.1 Overview

A UART is an industry standard universal asynchronous receiver, transmitter interface for serial data. The protocol is fixed within a set of basic parameters e.g. a start bit, a number of data bits (7, 8, or 9), parity bit (optional) and 1, 1.5, or 2 stop bits. The voltage levels and whether these signals are delivered on a single ended wire or a differential pair of wires does not affect the protocol but does affect how a system is wired.

RS232 is a recognized industry standard interface for serial communication. It is a single ended interface, with separate receive and transmit data lines which operate between +/-5V to +/-15V.

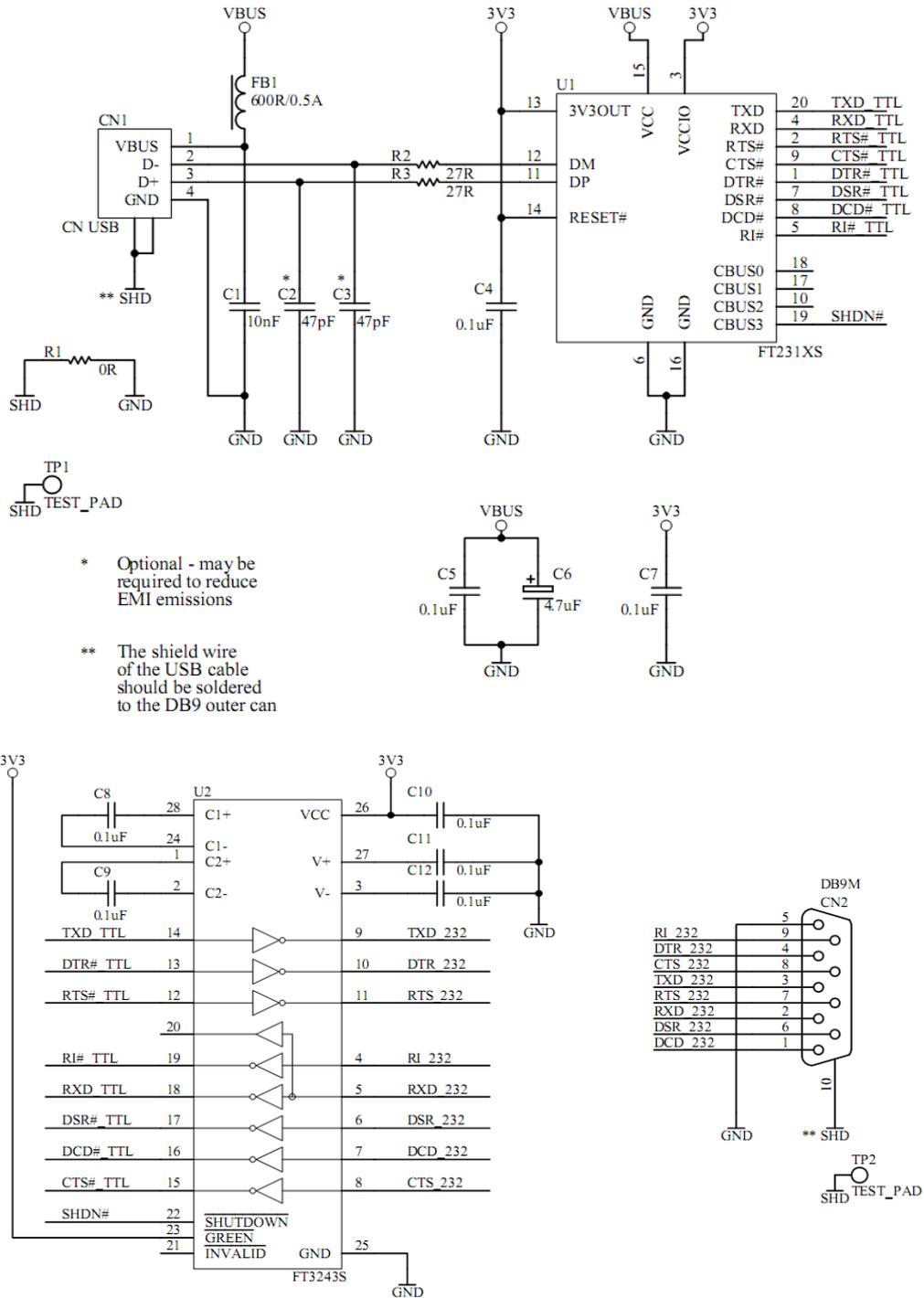
As the FT231XS provides a +3V3 IO interface, any design requiring RS232 interface voltage levels requires an additional IC referred in order to establish the correct voltage signaling level. This additional IC is commonly referred to as an RS232 transceiver (or line driver). Therefore, with the USB-DUO a two chip solution is provided; the FT231XS, which bridges USB to UART +3V3 signals, and a FT3243S transceiver, to convert the 3V3 level UART signals to RS232 voltage levels.

For more information on UARTs refer to [TN\\_111\\_What Is UART?](#)

For datasheets on the IC's in the kit see the [Document References](#) section of this application note.

## 2 Example Circuit

The diagram below shows how the USB-DUO kit may be connected to create a USB to RS232 interface device.



**Figure 2.1 FT231XS/FT3243S Schematic**

The FT231XS provides the USB to UART conversion while the FT3243S provides the digital to RS232 voltage level conversion.

Minimal additional components are required to complete the design. Primarily interface connectors and decoupling capacitors for the IC supplies.

In addition to the basic hardware on the PCB, the FT231XS device contains an internal EEPROM to allow for customising the device descriptors to match an OEMs preferred description.

The maximum speed of the USB to RS232 link with these devices is 250kbaud.

More information on the FT231XS may be obtained from the datasheet at:

[http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS\\_FT231X.pdf](http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT231X.pdf)

More information on the FT3243S may be obtained from the datasheet at:

[http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS\\_FT3243S.pdf](http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT3243S.pdf)

### 3 Ordering Information.

Part Number	Package
USB-DUO	2 reels – one with 2000 FT231XS devices and one with 2000 FT3243S devices

**Table 3.1 Part numbers**

Note: Although the FT231XS may be bought separately the FT3243S is only available as part of the USB-DUO.

## 4 Contact Information

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## Appendix A – References

### Document References

[FT231X Data Sheet](#)

[FT3243S Data Sheet](#)

[TN 111 What Is UART?](#)

### Acronyms and Abbreviations

Terms	Description
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
USB-IF	USB Implementers Forum

## **Appendix B – List of Tables & Figures**

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## Appendix C – Revision History

Document Title: AN\_207 USB-DUO  
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Document Feedback: [Send Feedback](#)

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1.0	Initial Release	2013-06-19