UMS2

USB to UART interface module

User’s manual

ASIX®

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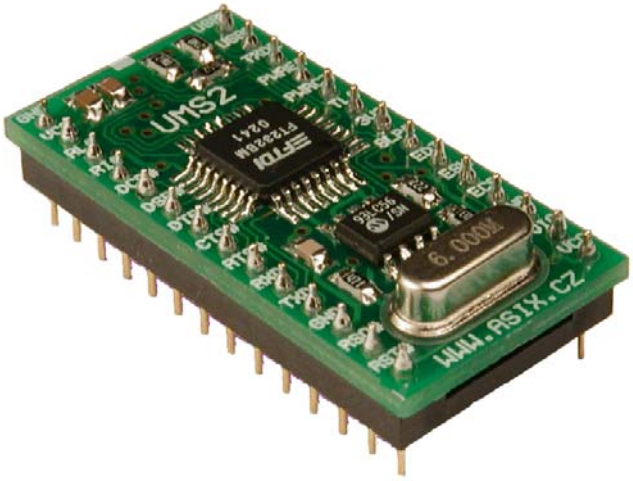
1. UMS2

UMS2 is a module based on FT8U232BM integrated circuit manufactured by FTDI Ltd., which provides with easy to use USB connectivity to PC without any need of additional knowledge about USB itself.



2. USAGE

UMS2 is a USB to UART interface with full hardware flow control capability. It is capable of data transfer rates up to 1 MBd (RS232) and up to 3 MBd (RS485). In addition, there is an EEPROM memory which may be used to store VID and PID identifiers for OEM applications.

The module connects by 2 signals directly to USB connector, the application side provides with UART signals including hardware flow control.

From mechanical standpoint, the module is arranged as DIP28 with standard pin spacing of 0.1 inch (2.54 mm) so it is possible to fit it into either standard or precise DIP28 socket, or to solder it directly to printed circuit board. The USB connector is to be connected externally which allows the designer to choose the placement of the connector and its type: 'B' or 'mini B' or USB cable soldered directly to the board may be used. This design sigificantly simplifies the development in small production series.

There is a separate power supply for IO pins (VCCIO), which allows the module to be connected to 3.0 V application easily.

PWREN# signal is designated to drive a P-channel MOSFET for applications which consume more than 100 mA (max. 500 mA) from USB. In such case it is advisable to turn on 'enable pull-down' option in EEPROM configuration.

Module UMS2 can also operate in "BitBang mode", in which the data pins act as 8-bit parallel input/output. This mode can be used for example to configure field-programmable logic array directly from PC over USB.

Further, there is RSTOUT# signal, which stays in high impedance state for about 2 ms after power up and then it is connected to internal 3.3 V voltage regulator. Signal RSTOUT# is also in high inpedance state whenever signal RESET# is active (RESET#=log.0), but it is not affected by reset from USB (USB Bus RESET).

The module is equipped with 93LC56 memory of 128×16 bits. Lower half of this memory is used for module's needs (64×16 bits). Using EEDATA, EESK and EECS the application may use upper 64×16 bits for its own purposes. While the application is accessing module's EEPROM memory, the RESET# signal must be active (RESET#=log.0).

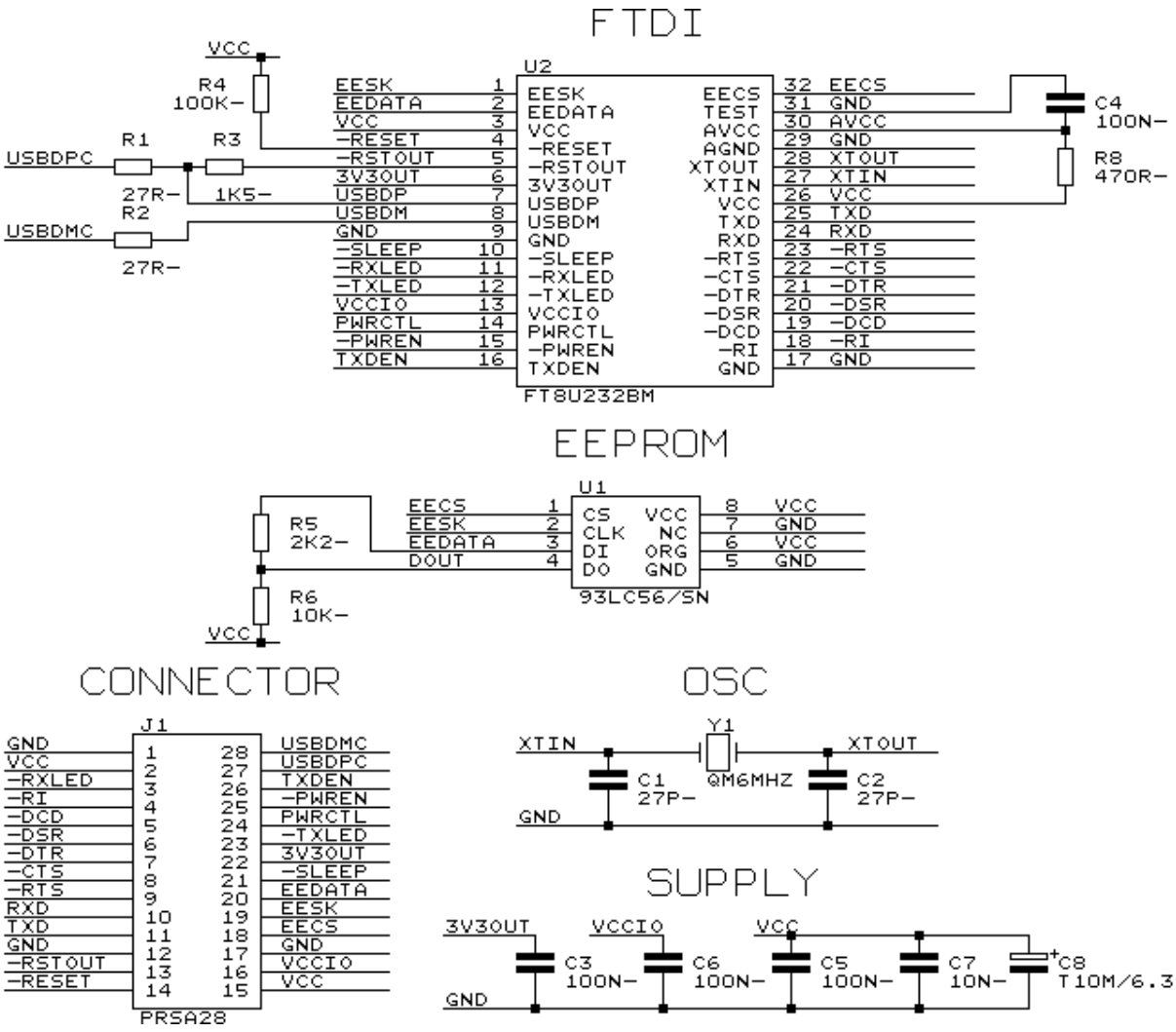
Software drivers fow Windows 98/ME/2K/XP, Mac OS8/OS9/OS X and Linux are available for free on FTDI website (http://www.ftdichip.com).

3. FEATURES

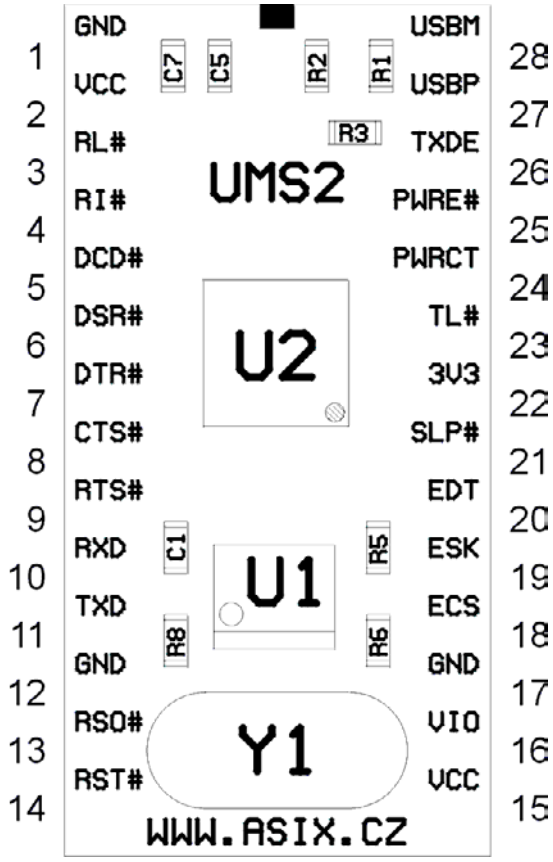
- Data inputs/outputs 3.0 to 5 V - CMOS compatible
- Powered from USB or external supply
- Data transfer rates up to 1 MBd (RS232) and up to 3 MBd (RS485)
- Full hardware data flow control available
- 384 byte receive buffer
- 128 byte transmit buffer
- Support for RS485 level converter
- Integrated frequency multiplier 6 MHz - 48 MHz
- Supports USB 1.1 protocol, USB 2.0 compatible
- Support for OEM applications (VID and PID can be stored in EEPROM memory, which is part of the module)
- BitBang mode
- PWREN# signal for driving P-channel MOSFET for applications consuming more than 100 mA from USB (max. 500 mA)
- Data flow optimization see web page, application note 4
- Ability to use use free EEPROM capacity (64×16 bits)
- Drivers for Windows 98/2K/ME/XP, Mac OS8/OS9/OS X and Linux available for free
- DIP28 socket compatible, PCB mountable

4. TECHNICAL REFERENCE

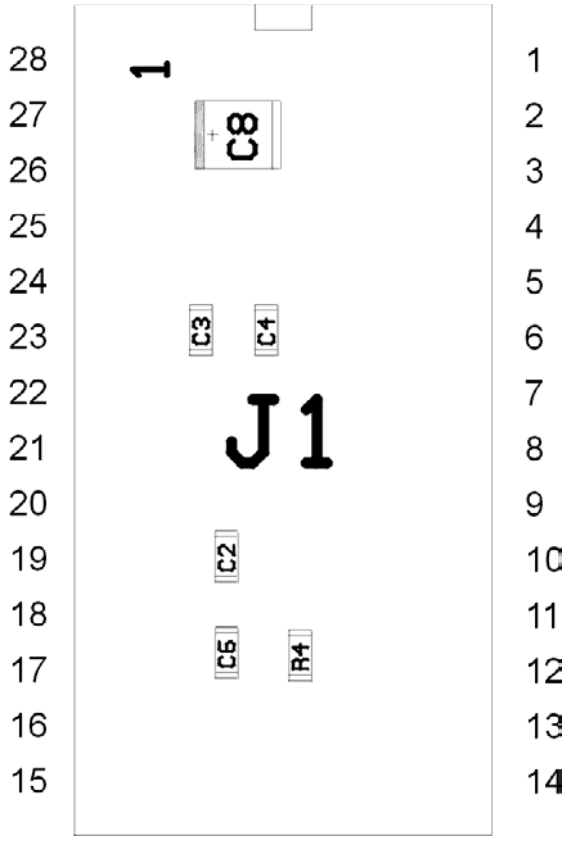
4.1. SCHEMATICS



4.2. TOP VIEW



4.3. BOTTOM VIEW



4.4. PIN DESCRIPTION

Pin	Label	FTDI	Typ	Description
1	GND	GND	PWR	Signal ground
2	VCC	VCC	PWR	Power supply +4.4 V to 5.25 V
3	RL#	RXLED#	O.C.	Receive LED
4	RI#	RI#	IN	Ring indicator
5	DCD#	DCD#	IN	Data carrier detect
6	DSR#	DSR#	IN	Data set ready
7	DTR#	DTR#	OUT	Data terminal ready
8	CTS#	CTS#	IN	Clear to send
9	RTS#	RTS#	OUT	Request to send
10	RXD	RXD	IN	Received data
11	TXD	TXD	OUT	Transmitted data
12	GND	GND	PWR	Signal ground
13	RSO#	RSTOUT#	OUT	High impedance for about 2 ms after power up and during #RESET is active, otherwise connected to output of internal 3.3 V voltage regulator. This signal is not affected by USB Bus Reset.
14	RST#	RESET#	IN	External reset. May be left unconnected if not used.
15	VCC	VCC	PWR	Power supply +4.4 V to 5.25 V.
16	VIO	VCCIO	PWR	Power supply +3.0 V to +5.25 V for output drivers of pins 10..12, 14..16, 18..25.
17	GND	GND	PWR	Signal ground
18	ECS	EECS	I/O	EEPROM enable – internal pull-up of 200 kOhm during reset.
19	ESK	EESK	OUT	EEPROM clock - high impedance during reset.
20	EDT	EEDATA	I/O	EEPROM data I/O - high impedance during reset.
21	SLP#	SLEEP#	OUT	Sleep mode indicatotor (log.0)
22	3V3	3V3OUT	OUT	3.3 V output from internal voltage regulator - this pin can source up to 5 mA.
23	TL#	TXLED#	O.C.	Transmit LED
24	PWRCT	PWRCTL	IN	Power supply selection - bus powered (log.0) or external supply (log.1)
25	PWRE#	PWREN#	OUT	PWREN# - switched to log.0 after the module is configured and held in log.1 during reset and sleep mode (USB suspend). This signal may be used to drive P-channel MOSFET, which allows to connect applications consuming more than 100 mA from USB.

26	TXDE	TXDEN	OUT	Transmit enable for RS485
27	USBDP	USBDP	I/O	USB data signal plus. It is necessary to connect resistor of 1.5 kOhm between USBDP and 3V3OUT or RSTOUT#.
28	USBDM	USBDM	I/O	USB data signal minus.

5. DRIVER INSTALLATION

For Windows operating systems there are two types of drivers:

- Virtual COM port, which can be accessed as common COM port using Win32 API
- Direct driver, to gain full control of the chip, a DLL to interface the driver is provided

Detailed description of driver installation procedure can be found on FTDI website (http://www.ftdichip.com).

6. TECHNICAL SPECIFICATION

6.1. ABSOLUTE RATINGS

Storage temperature	T_{STR}	min. -65 °C	max. 150 °C
Operational temperature	T_{PWR}	min. 0 °C	max. 70 °C
Power supply voltage	VCC_{MAX}	min. -0.5 V	max. 6.00 V
Input voltage – inputs	V_{IN1}	min -0.5 V	max VCC+0.5 V
Input voltage - I/O	V_{IN2}	min -0.5 V	max VCC+0.5 V
Output current – outputs	I_{O1}		max 24 mA
Output current - I/O	I_{O2}		max 24 mA
Power	W_{PWR}		max 500 mW

6.2. TYPICAL RATINGS

VCC Operating supply voltage	VCC	min. 4.4 V	max. 5.25 V
Operating supply current	ICC_1		max. 50 mA
Suspended supply current	ICC_2		max. 250 µA
Input voltage log.1	V_{IH}	min. 2.0 V	
Input voltage log.0	V_{IL}		max. 1.0 V
Output voltage log.1	V_{OH}	min. 2.8 V, Ri=15 kOhm	
Output voltage log.0	V_{OL}		max. 0.3 V, Ri=1.5 kOhm
Output current log.1	I_{OH}	4 mA, V_{OH}=VCC-0.5 V	
Input current log.0	I_{OL}	8 mA, V_{OL}=0.5 V	

7. CONTACT

Address:	ASIX s.r.o., Staropramenna 4, 150 00 Prague, Czech Republic
Tel.:	+420-257 312 378
Fax:	+420-257 329 116
E-Mail:	info@pic-tools.com, support@pic-tools.com, sales@pic-tools.com
WWW:	www.pic-tools.com

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