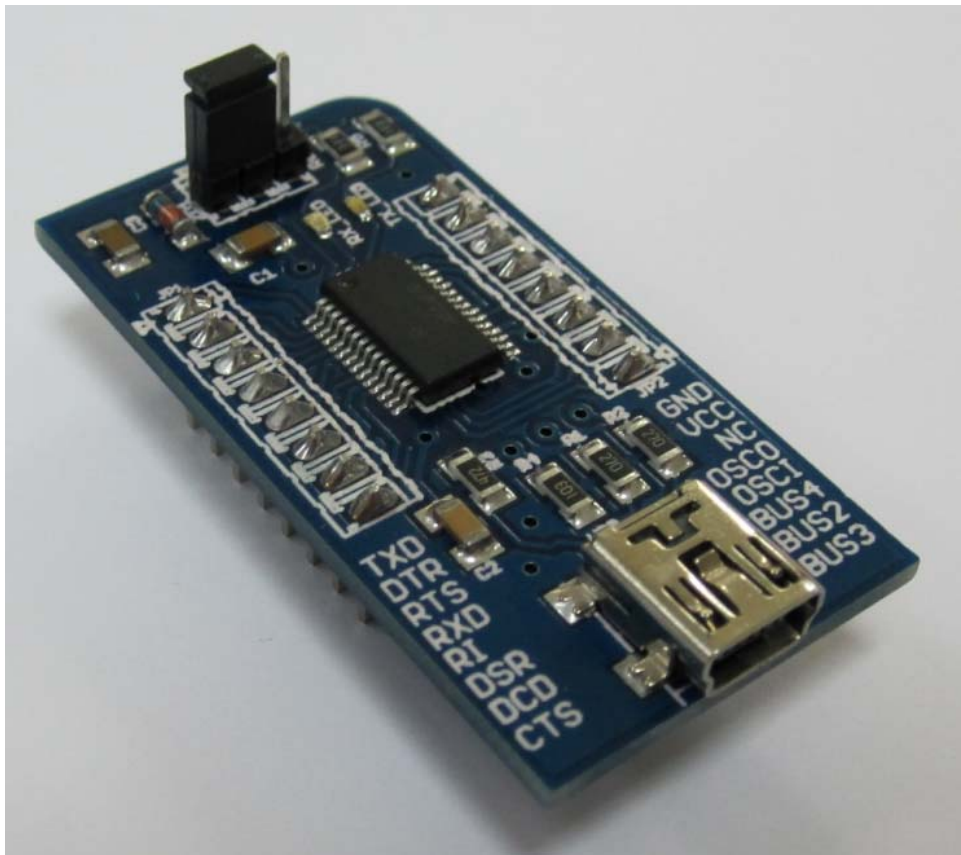


Nawatt neXus Technical Reference

Ver. 1.0



1.1- Introduction:

Nawatt USB module is an inexpensive device that assists technologists, engineers and hobbyists to have USB connectivity in their designs and circuits. This module is very important in the era of plug and play devices, where almost every device and computer are going USB, and one can easily notice the absence of old fashion interconnectivity like LPT and RS232 from the modern computers.

1.2- Typical Applications:

- USB to RS232/RS422/RS485 Converters in order to upgrade systems from RS232 interface into USB interface with minimal hardware changes.
- Design and Development of Peripherals to USB.
- Interfacing MCU/PLD/FPGA based designs to USB.
- USB Software and Hardware Encryption Dongles.
- Design of USB data transfer interfaces.
- Design of USB based industrial controllers.

1.3- Driver Support:

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

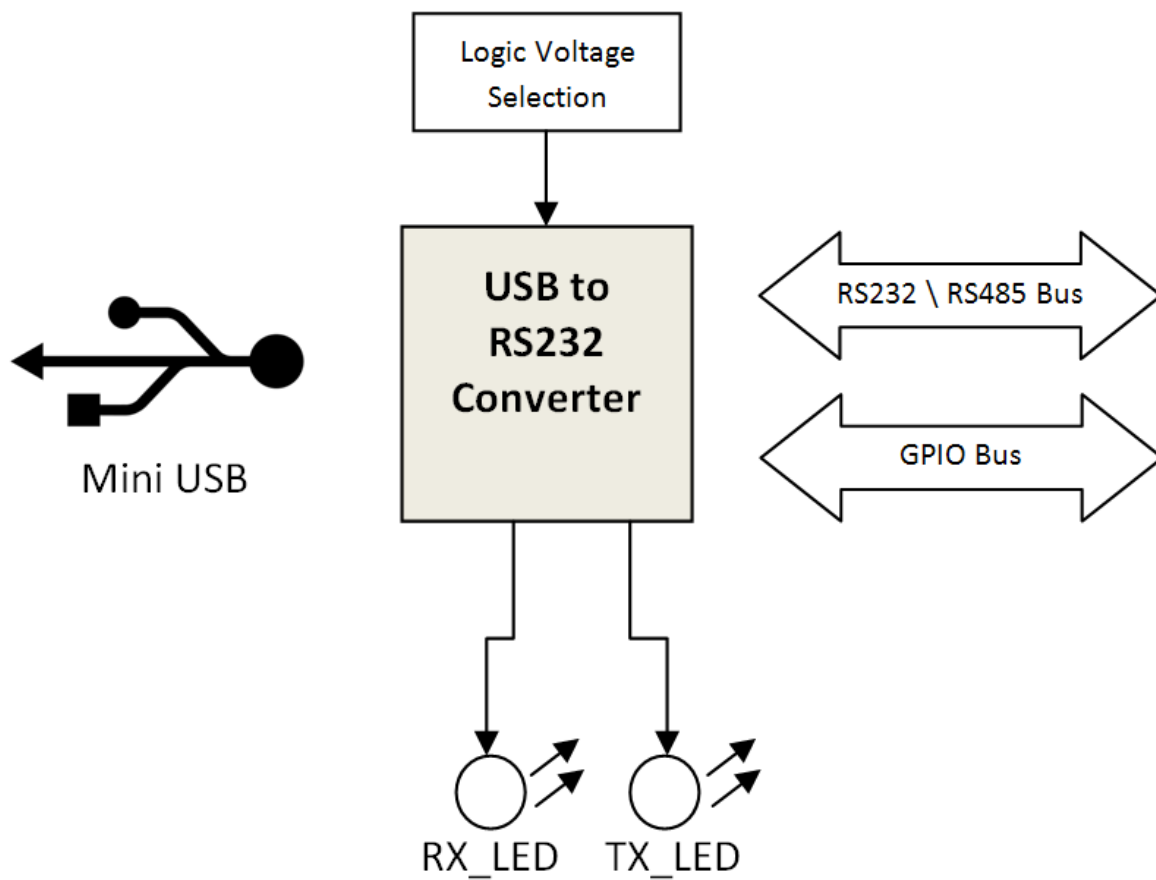
- Windows 98, 98SE, ME, 2000, Server 2003, XP and Server 2008.
- Windows XP and XP 64-bit.
- Windows Vista and Vista 64-bit.
- Windows XP Embedded.
- Windows CE 4.2, 5.0 and 6.0.
- Mac OS 8/9, OS-X.
- Linux 2.4 and greater.

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

- Windows 98, 98SE, ME, 2000, Server 2003, XP and Server 2008.
- Windows XP and XP 64-bit.
- Windows Vista and Vista 64-bit.
- Windows XP Embedded.
- Windows CE 4.2, 5.0 and 6.0.
- Linux 2.4 and greater.

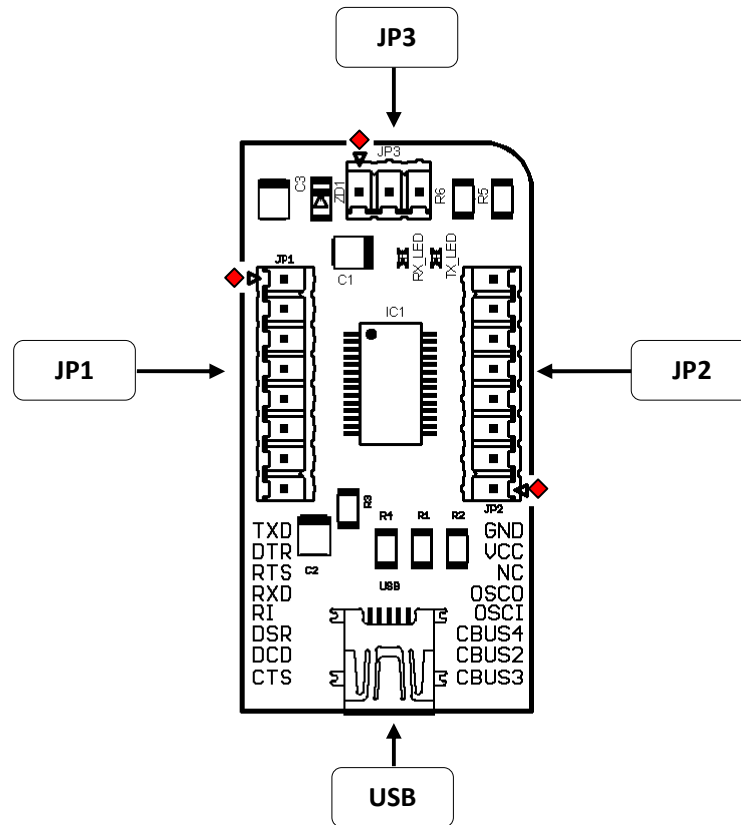
Drivers and installation tutorials are available on CD and on our website www.nawattlabs.com

1.4- Nawatt USB Module Block Diagram:



2.1- Module Layout:

Nawatt USB module has mainly four connectors including the Mini USB, JP1, JP2, and JP3 connectors. Following tables describe the function of each pin in the JP1, and JP2 connectors.



2.1.1- JP1 Connector PIN description:

Pin No	Name	Type	Description
1	TXD	OUT	Transmit Asynchronous Data Output.
2	DTR#	OUT	Data Terminal Ready Control Output / Handshake Signal.
3	RTS#	OUT	Request to Send Control Output / Handshake Signal.
4	RXD	IN	Receiving Asynchronous Data Input.
5	RI#	IN	Ring Indicator Control Input. When remote wake up is enabled in the internal EEPROM taking RI# low (20ms active low pulse) can be used to resume the PC USB host controller from suspend.
6	DSR#	IN	Data Set Ready Control Input / Handshake Signal.
7	DCD#	IN	Data Carrier Detect Control Input.
8	CTS#	IN	Clear To Send Control Input / Handshake Signal.

2.1.2- JP2 Connector PIN description:

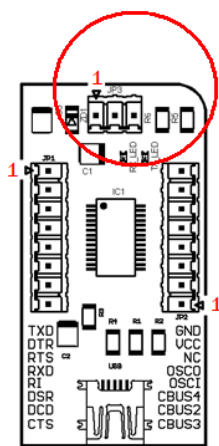
Pin No	Name	Type	Description
1	CBUS3	I/O	Configurable CBUS I/O Pin. Function of this pin is configured in the device internal EEPROM. PWREN# is a special function of CBUS3, and should be used with a 10kohm resistor pull up. <u>Factory default configuration is PWREN.</u>
2	CBUS2	I/O	Configurable CBUS I/O Pin. Function of this pin is configured in the device internal EEPROM. <u>Factory default configuration is TXDEN.</u>
3	CBUS4	I/O	Configurable CBUS output only Pin. Function of this pin is configured in the device internal EEPROM. <u>Factory default configuration is SLEEP#.</u>
4	OSCI	IN	Input 12MHz Oscillator Cell. Optional – Can be left unconnected for normal operation.
5	OSCO	OUT	Output from 12MHZ Oscillator Cell. Optional – Can be left unconnected for normal operation if internal Oscillator is used.
6	NC	-	Pin is Not Connected
7	VCC	PWR	+3.3V to +5.25V supply to the device.(Note 1)
8	GND	PWR	Device ground supply pins

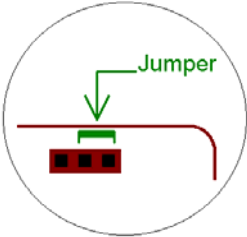
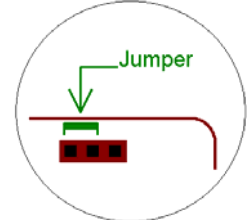
Notes:

1. The minimum operating voltage VCC must be +4.0V (could use VBUS=+5V) when using the internal clock generator. Operation at +3.3V is possible using an external crystal oscillator.

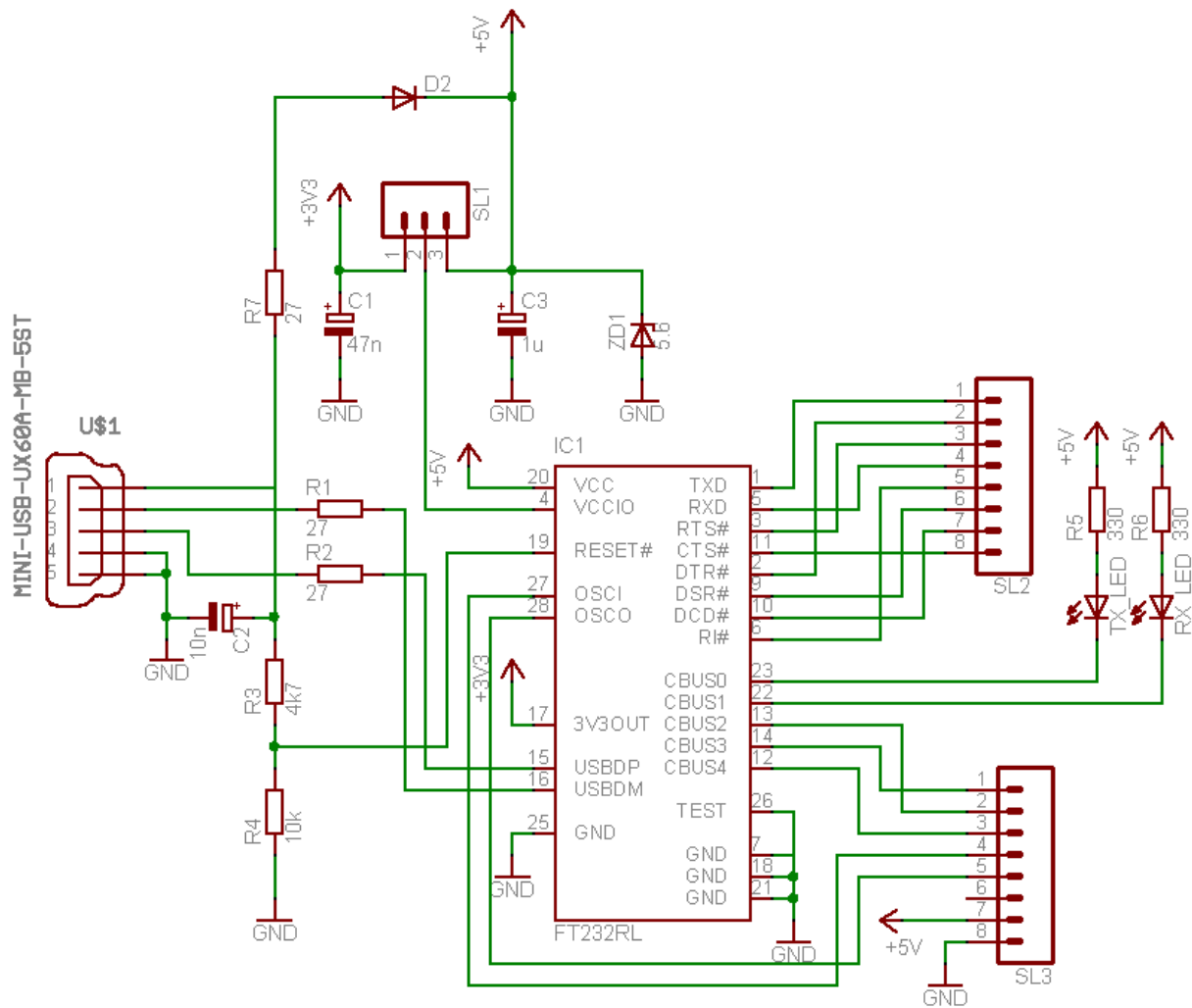
2.1.3- JP3 function:

JP3 is used to define the voltage level that could be driven by the UART and CBUS pins.



- 1  Connecting pins 2 and 3 in JP3 will configure the module to drive out at 5V CMOS level
- 2  Connecting pins 1 and 2 in JP3 will configure the module to drive out at +3.3V levels

3.1- Module Schematic:



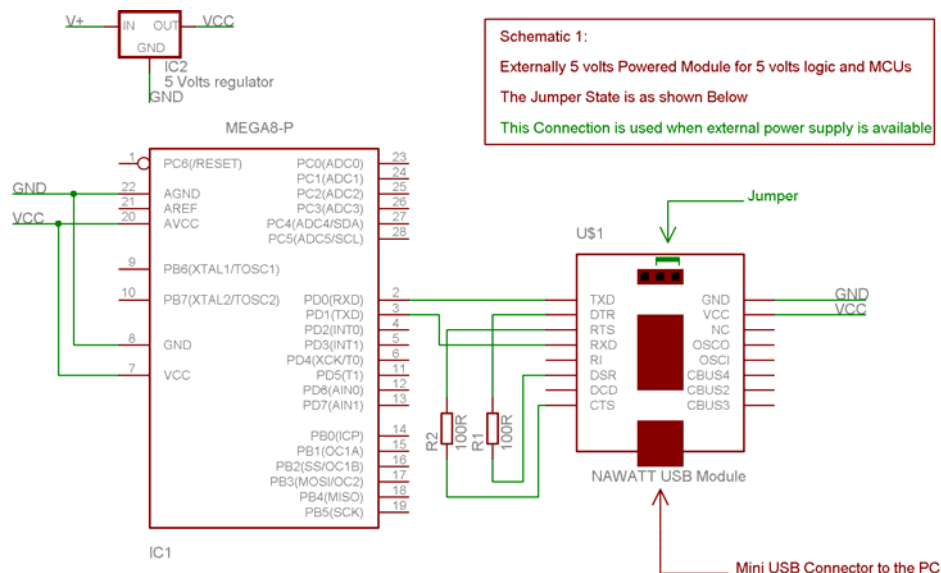
3.2- Typical application schematics:

The Nawatt USB module is mainly used to have a USB interconnectivity between Computers and other logic devices such as 8 bit microcontrollers, PLD's, or FPGA's. The following schematics show the typical connections and powering modes of the Nawatt USB module. ATMEGA8 microcontroller from ATMEL[®] is used as an example of 8-bit microcontroller.

Note that these methods of connection applies for all types of microcontroller, FPGA's and PLD's that operate at 5 or 3.3 volts logic.

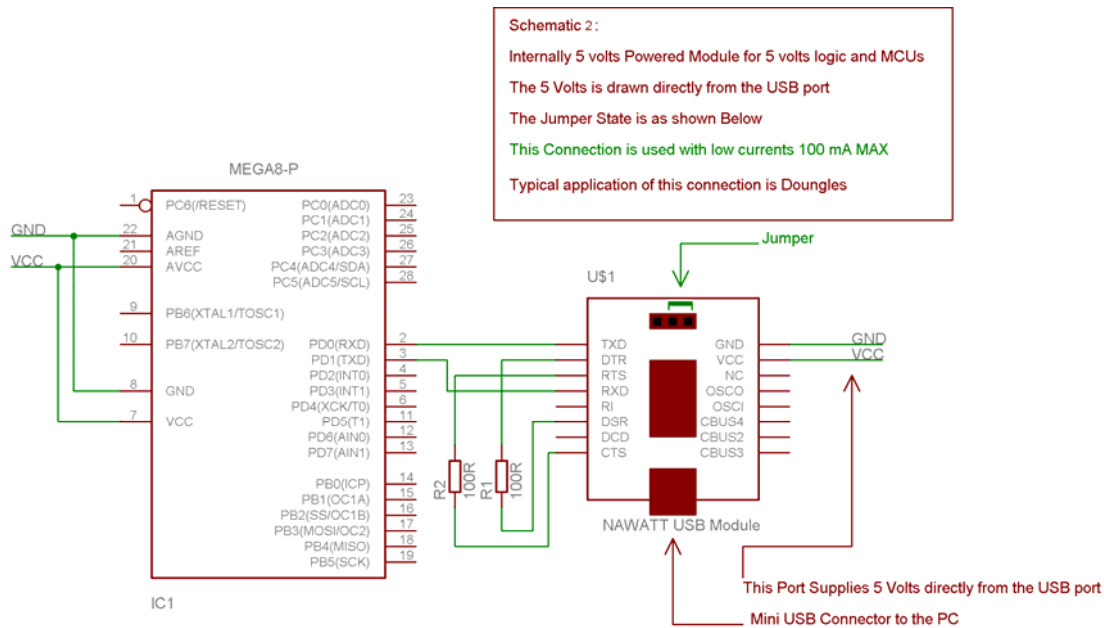
3.2.1- Externally Powered and 5 volts TTL logic:

The Nawatt USB module is connected to the serial port of an 8-bit microcontroller (ATMEGA8). In this application the power supply is applied externally to the system through a voltage regulator, this powering method is typical for high current consumption (like USB motor controller or a LED screen), This method is also safer for the USB port on the computer.



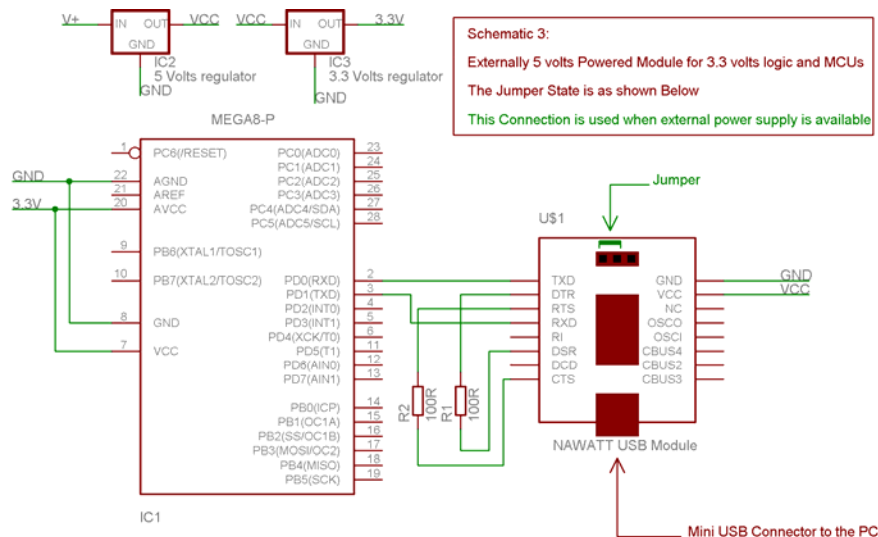
3.2.2- Internally Powered and 5 volts TTL logic:

The following schematic shows the Nawatt USB module connected to an 8-bit microcontroller. The main difference is that the system uses the 5 volts supplied directly from the USB port. This application is typical for low current consumption systems. No external power supply is needed and it is typical for dongles, USB card readers, USB storage devices, and ...



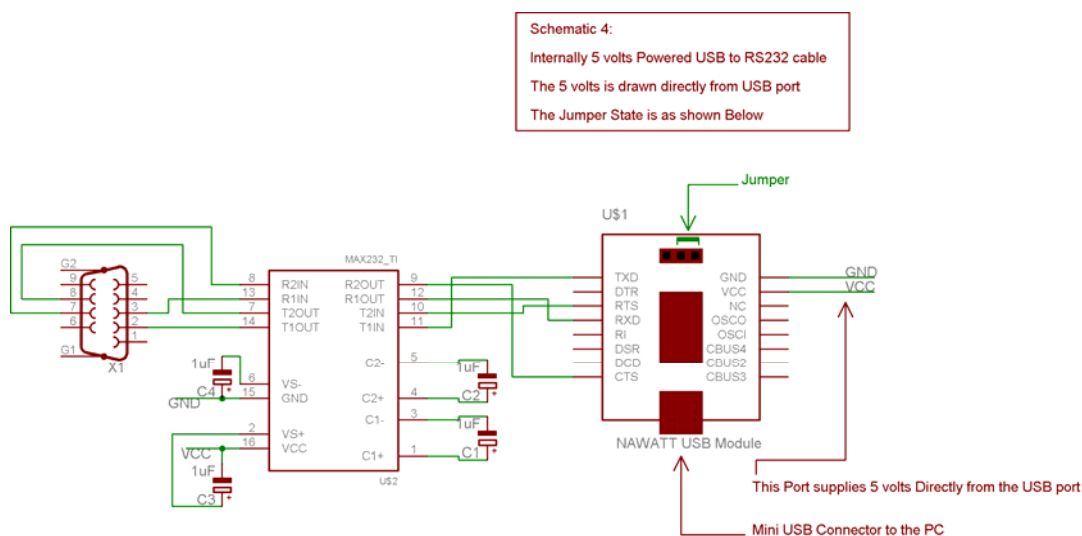
3.2.3- Externally Powered and 3.3 volts TTL logic:

The Nawatt USB module supports 3.3 volts logic. The following schematic shows how to connect the module to a 3.3 logic device. Here we used ATMEGA8 in the 3.3 volts mode. The main difference is the jumper position. The jumper should connect pins 1 and 2 in JP3.



3.2.4- USB to Serial cable :

A very popular application is a USB to serial cable. The Nawatt USB module is connected to a max232 from Maxim®. Note that we used the USB as a power supply.



4.1- Physical Dimensions:

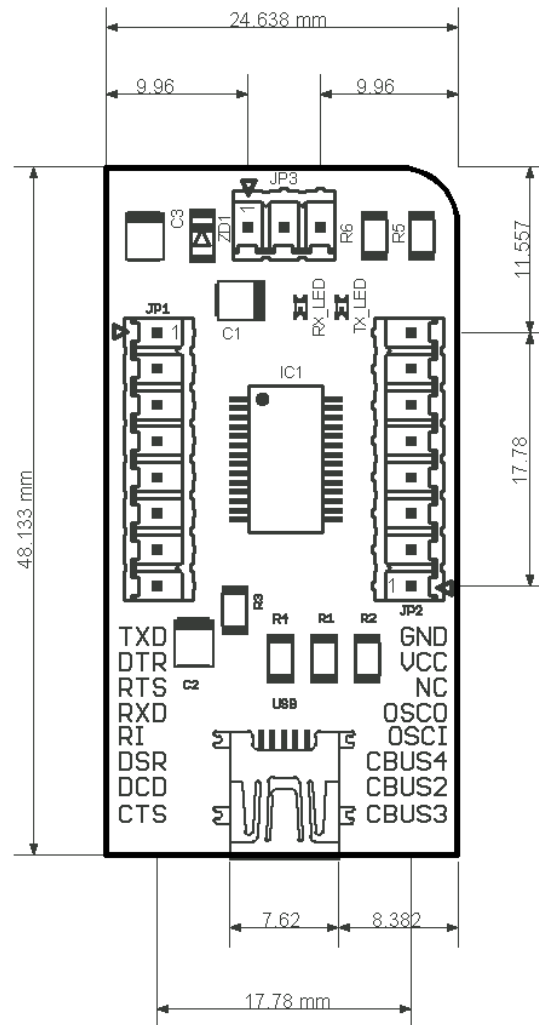


Figure is not to Scale