

Why build my own USB to RS232 converter when there are adapters already available from Keyspan and Belkin?

The Answer is simple:

Neither the Keyspan's or the Belkins actually worked *properly* with all the devices I tried. They did not seem to support ALL the RS232 lines.

That is a problem if you want to, as in my case, program your Stamp Microcontroller on a USB based Mac using Virtual PC.

Does it work with other devices?

Not only does this adapter work with the Stamp IDE natively under Virtual PC, but I have also tested it OK on the Macintosh with

a Palm Pilot
a Modem
My Cassette Deck Controller

The adapter also works with MacBS2 under OS X. Note, make sure you have installed the latest OS X driver, and are running the latest version of MacBS2.

The Solution

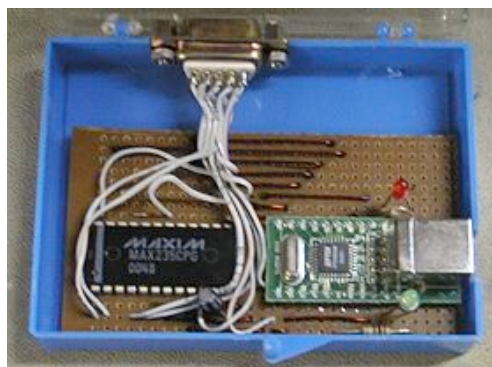
A USB to RS232 converter using the FTDI FT8U232AM and a Maxim-IC MAX235.

The FT8U232AM requires a small number of external components to produce a device that converts USB to TTL level RS232 signals. All you need to add is a TTL to RS232 converter to provide the +/-12V RS232 logic levels.

The FT8U232AM and supporting components is also available as a complete module - called a USBMOD1 - in a 32pin DIL IC package, making the whole project very easy to build.

Distributor information for the USBMOD1 is mentioned later.

Below is a photo of my finished Adapter:



OK, this is what you will need:

Hardware:

- Veroboard
- DB9 male socket
- 2 x 100ohm resistors
- 1uF Electrolytic Capacitor (16VW or higher).
- 3mm RED LED
- 3mm GREEN LED

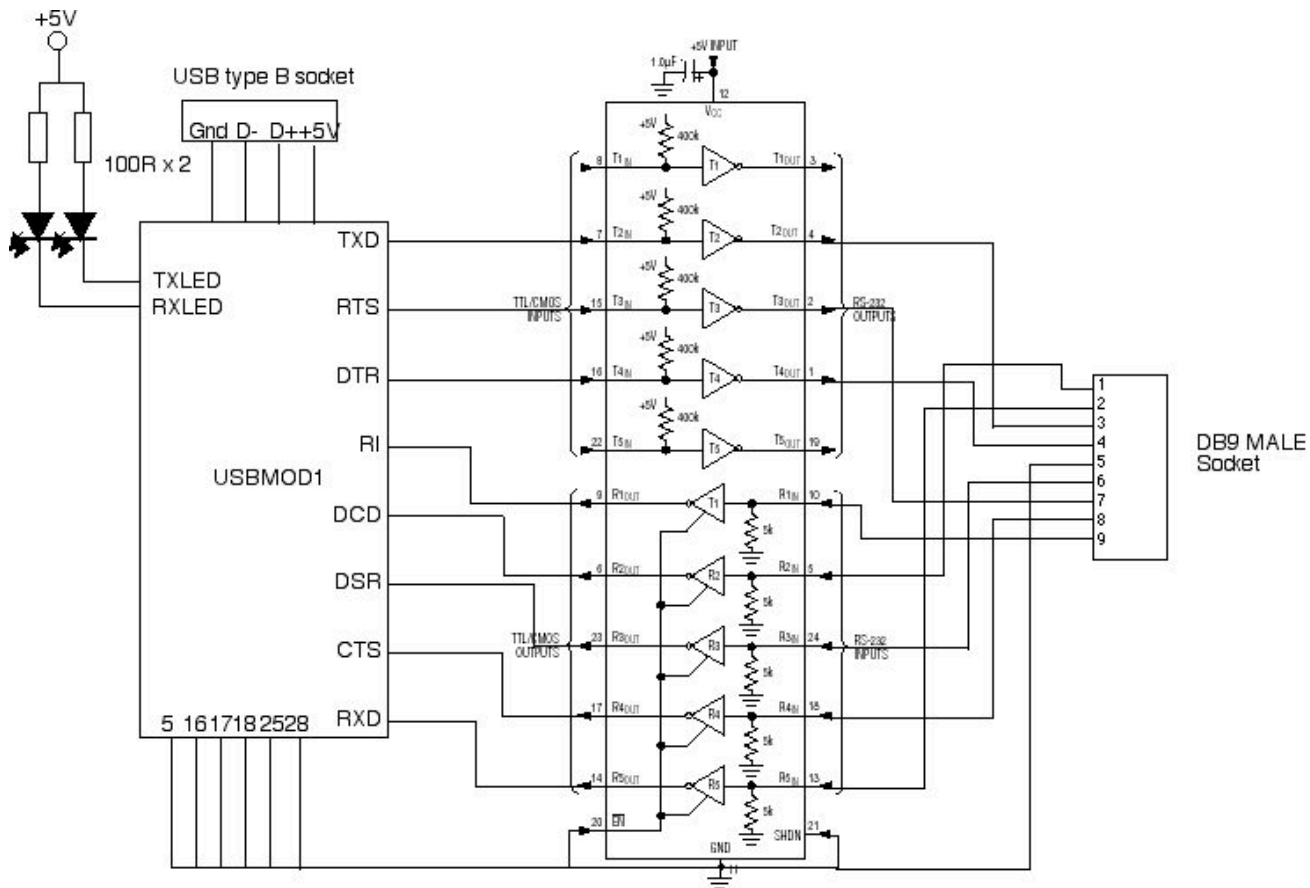
- MAX235 Intergrated Circuit
- USBMOD1 Hybrid Module

Computer:

These are the specs as used on my system. Higher spec systems should work fine, but I can not be sure about lower spec systems.

- Macintosh:
Processor: G3 @300MHz
RAM: 128MB
OS 9.2.2
A USB port (I'm using a Belkin USB PC Card on my Powerbook Wall Street PDQ)
- Virtual PC:
Virtual PC v3.0, with RAM setup for 64MB.
Windows 98
Stamp IDE v1.098, or v1.33 (also tested OK with v2.5b1), also works with the Javelin Java IDE
- Stamp:
Tested OK with a BS2 (24pin DIP and OEM), BS2sx OEM, and Javelin Stamp

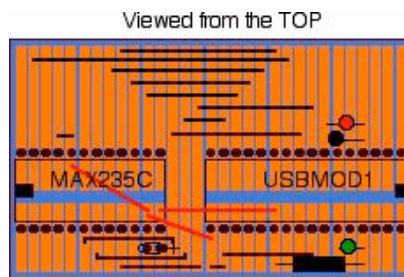
Circuit Diagram:



The circuit is powered from the USB Bus. No external capacitors are needed with the MAX235 (except for the decoupling capacitor), as they are all on the chip.

Construction:

- Cut your veroboard to 31 tracks x 18 holes.
- Use the diagram below to determine where to break the tracks, and where to place the components.
- Install the jumpers first (the red ones go underneath), then the resistors, decoupling capacitor, MAX235, LEDs, and USBMOD1.
- Lastly, using the circuit diagram above, wire up the DB9 connector and solder the wires to the appropriate tracks for the MAX235.



Software installation:

Some important information:

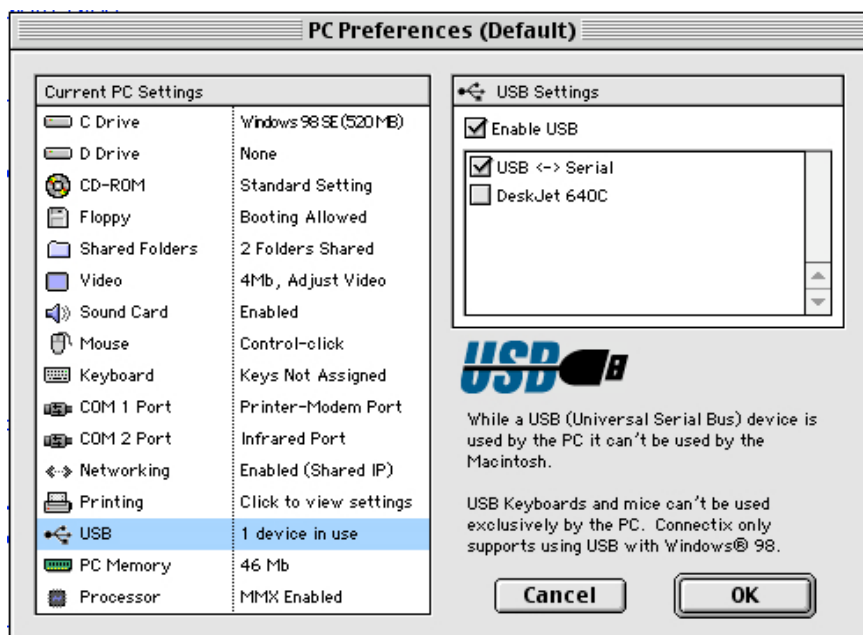
FTDI's site has drivers for Macintosh and Windows for their USB controller chips. If you want to use this adapter for Macintosh devices and Windows devices, you will need to set up different extension sets in the Extensions manager.

- One with the Macintosh Extension for the FTDI chip enabled, and one with it disabled.

If you don't, and you start up Virtual PC with the FTDI Macintosh extension enabled, you will cause Virtual PC (and your Mac) to crash.

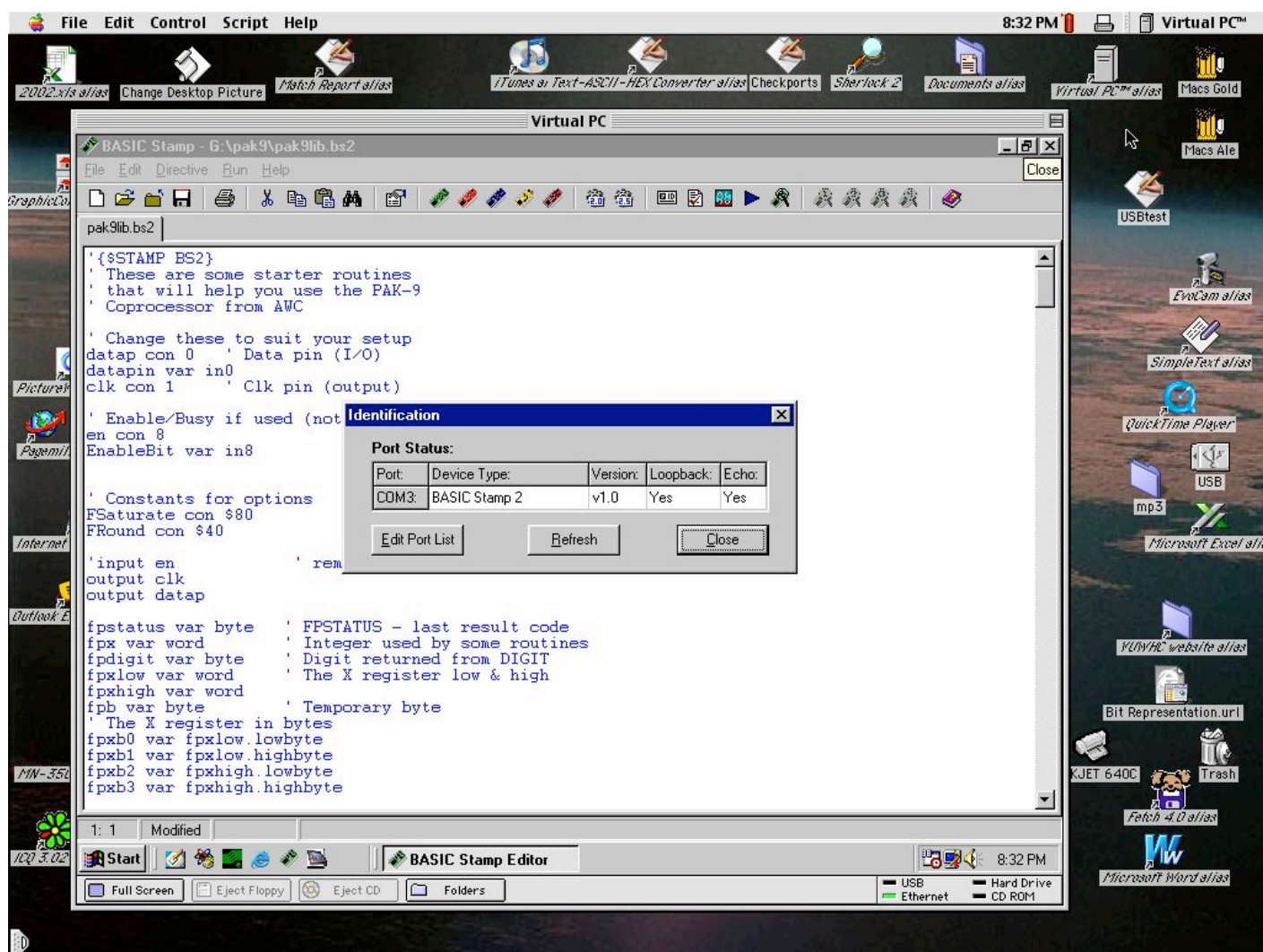
Installing the software:

- Don't plug the adapter in just yet.
- Click [here](#) to download the required Windows drivers. You will not need the Macintosh Extension in order for the USBMOD1 to work under Virtual PC. However, you will need it if you want to use the USBMOD1 on the Mac side. See note above re Extension sets if you want to install the Mac driver.
- The zip archive contains drivers and associated documentation to support FTDI's FT8U100AX, FT8U232AM and FT8U245AM USB controller products.
- Unzip the archive, and copy the files to a folder on the "C:" drive. *Note: In order for the Windows software to install, you need to make sure the install files from the zip archive are on the "C:" drive.*
- Make sure you have selected the USB <-> serial converter in the VPC preferences, as below (remember - disable the Mac FTDI extension)



- Now, when you plug in the USB adapter, Windows should see it and look for the install .inf file. Browse to the location on the "C:" drive where you have saved the Unzipped archive, and let Windows install the drivers.
- If all is present and correct, you should be able to open the Stamp IDE, and with the Stamp

connected, when you press the ID button, you should get a confirmation message like the one shown below.



Windows Driver | Mac OS 8.6 to 9.2.2 and Mac OS X drivers

Where to get the parts:

- Veroboard - Any Electronics Hobby Store
- DB9 male socket - Any Electronics Hobby Store
- 2 x 100ohm resistors - Any Electronics Hobby Store
- 1uF Electrolytic Capacitor (16VW or higher) - Any Electronics Hobby Store
- 3mm RED LED - Any Electronics Hobby Store
- 3mm GREEN LED - Any Electronics Hobby Store
- MAX235
 - RS Components
 - Power Technology Components Ltd
 - Free Phone: 0800 76 93 76
 - Web: <http://www.powertech.co.nz>
 - For distributors in other countries, visit Maxim IC
- USBMOD1
 - <http://www.gigatechnology.com/>
 - FTDI also has a list of distributors in other countries.