This brief document describes what you will need in order to operate as a mobile in a QSO party using the CQ/X client. Of course this depends somewhat on the type of operation you would like to do. In this document it is assumed that the user is interested in using a full-blown configuration that utilizes the following complete capabilities of the program.:

- Interface to radio for tracking and control of frequency and mode
- Interface to external keyer for generation of CW
- Interface to GPS for access to lat/lon data to drive the GPS-based features
- Passing GPS data to a mapping application for real-time tracking of position

Here are the challenges you will need to overcome in order to operate CQ/X at its full capability:

Challenge 1: Interfacing the above three devices to a laptop. Given the minimal serial port capabilities of today's generation of laptops use of all three of the above devices will certainly require a USB to RS232 Port Expander or one of the USB interface boxes such as the Navigator by US Interface or one of the USB devices by Micro Ham. In some cases it may also require a separate serial to USB adapter. Note that the requirements of this challenge may be reduced somewhat if you have an Elecraft K3. In this case you can use the internal keyer of the K3. Also many GPS receivers come with USB connector and the GPS on the USB port presents itself as an standard (RS-232) com port.

Challenge 2: Passing GPS data to a mapping application for real-time position tracking. In order to avoid additional real com ports it is best to use the GPS pass through capability of CQ/X along with a pair of virtual serial ports to pass data to the mapping program. Several free virtual serial port (VSP) software is described in the document **Notes on Virtual Serial Ports** found under the Getting Started Help menu on CQ/X.

Challenge 3: **Interfacing a USB GPS to CQ/X**. Many of today's Garmin GPS devices provide serial output via a USB connection in a proprietary protocol whereas CQ/X requires data in the standard NMEA format over a normal serial com port. Some software exists for converting these protocols. GPS Gate Express is a very inexpensive version of GPS Gate that allows data from a Garmin USB GPS to appear on multiple virtual com ports in the standard NMEA format – see http://www.gpsgate.com. It is useful to note that use of GPS Gate Express will also solve Challenge 2 since it provides a means of splitting the GPS signal into two data streams. You can download a trial version of the GPS Gate Express software to test whether it will work with your particular GPS.

Appendix A to these notes covers several possible configurations that can be used to meet these challenges. Now let's look at the required computing platform and the individual devices.

Computer and Operating System – You will need a desktop or laptop running a late version of the Windows operating system to run this program. Any Pentium class

machine capable of running Windows XP and having at least 512MB of RAM should work fine – but 1GB of RAM will give better performance. The program has also been tested on W2K and works fine with that operating system. It has been used successfully on Win 7 and Win 10 but for those operating systems you will need to run it as administrator by Right Clicking the CQ/X icon and choosing that option. If you inadvertently try to start it on Win 7 or Win 10 you will probably get a file creation error. On Win 7 you can also run it in Compatibility Mode where it is running under XP and on my recently purchased Win 7 I have that to be necessary in order to obtain the right screen resolution for the forms.

Radio – If it is desired to have the program automatically track changes in the frequency and mode of the radio then, of course, the radio must be interfaced with the computer. To see the radios supported by the program and to connect those radios use the Radio menu item to get to the connection dialog. If your radio is not on the list or if you do not have sufficient ports to interface the radio to the computer you can use the manual tracking option under the Radio menu item. If you use certain Yaesu or Kenwood radios and don't find your radio listed in the device connection dialog look for the file Devices.dat in subdirectory Devices. Removal of the double slashes for the radios listed under "These radios are untested" will enable them on the connection dialog following a restart of the program. Of course, as noted, the interface for these radios is untested. If you test any of these radios your results would be very useful to the author.

External Keyer – If you are planning to use CQ/X as a CW operator it is important to note that CQ/X does not generate CW internally but relies on an external keyer provided by the user. The program sends commands and message strings to the external keyer causing the keyer to generate CW appropriate to the situation at hand. Two external keyers are currently supported: the Hamation keyer and the popular WinKey by K1EL. While you could operate CW without an external keyer that is interfaced to the program that would defeat the convenient automatic message management of the program. If you wish to operate CW it is strongly recommended that you obtain one of these inexpensive keyers. It should also be noted that the WinKey is built into the Navigator by US Interface and certain models by microHam. Also note that CQ/X has the capability to use the internal keyer in the Elecraft K3.

GPS Receiver – The main innovation in CQ/X is the integration of a GPS receiver with the contest logging software to support mobile QSO party contest operation. If you plan to operate mobile in a QSO party it is strongly recommended that you obtain a GPS that will generate the industry standard NMEA 0183 protocol and that will provide this data over either a normal RS-232 serial port or a USB port that presents itself as a standard com port. Here it is a good idea to become familiar with the Device Manager program provided as part of the OS in order to check the com ports. The NMEA protocol is the only protocol supported by CQ/X. While most GPS receivers support this protocol there are some devices that only support their own proprietary protocol.

USB to RS232 Port Expander/Adapter – In order to interface a radio, an external keyer, and a GPS receiver at least three serial ports will be required. I have used the Navigator box that is available from US Interface for this purpose. This box provides all

of the interfaces needed: radio CAT, WinKey, and an auxiliary RS-232 port which is convenient for interfacing a GPS that has a DB-9 connector. Other similar interface boxes such as the CWMicroKeyr ones available from MicroHam have been used for the CAT and the WinKey over USB leaving only the GPS to interface via another means.

Virtual Null Modem/Serial Ports – For communication between CQ/X and a mapping program it is possible to use a pair of virtual serial ports as a virtual null modem. Free software implementing a pair of virtual serial ports connected via a virtual null modem is available from a number of sources, including K5FR and com0com. CQ/X does not depend on the mapping program but the mapping is useful if the driver gets off the planned track and needs to be navigated back on track

Mapping Program – A software item that is very handy if you are planning to operate mobile in a QSO party is a mapping program. It is useful in the trip planning as well as trip real-time tracking phase of a mobile QSO party operation. CQ/X provides the ability to pass GPS data through to the mapping program to allow real-time display of position without the need for an additional GPS to drive the mapping program.

GPS Gate Express Software - If you have a Garmin USB GPS you can use this software to convert the GPS output from the Garmin proprietary protocol on USB to the NMEA protocol on a virtual com port. It is not clear whether this software will provide the same functionality for non-GarminUSB GPS devices.

The following appendix provides a number of example configurations.

Appendix A

This appendix describes several possible ways to meet the challenges introduced in the main body of these notes. The first two configurations have been used by the author. Configuration 2 is the one in current use at NO5W/M. Configurations 3-6 should also work fine but have not been tested by the author.
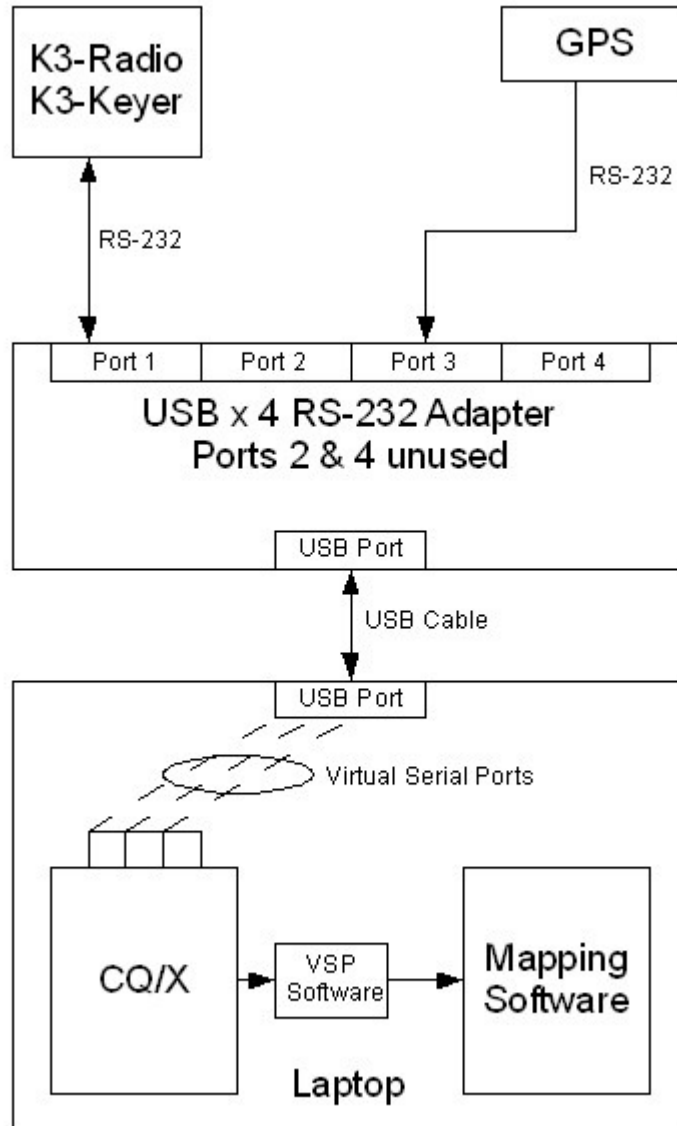
Configuration 1: In this configuration it is assumed that the following are available

1. Radio with RS-232 I/O port
2. Discrete WinKey or Hamation Keyer with RS-232 I/O port
3. GPS with RS-232 output in NMEA format
4. USB x 4 RS-232 Adapter (e.g. Keyspan USA-49WG) with driver software providing 4 virtual serial ports
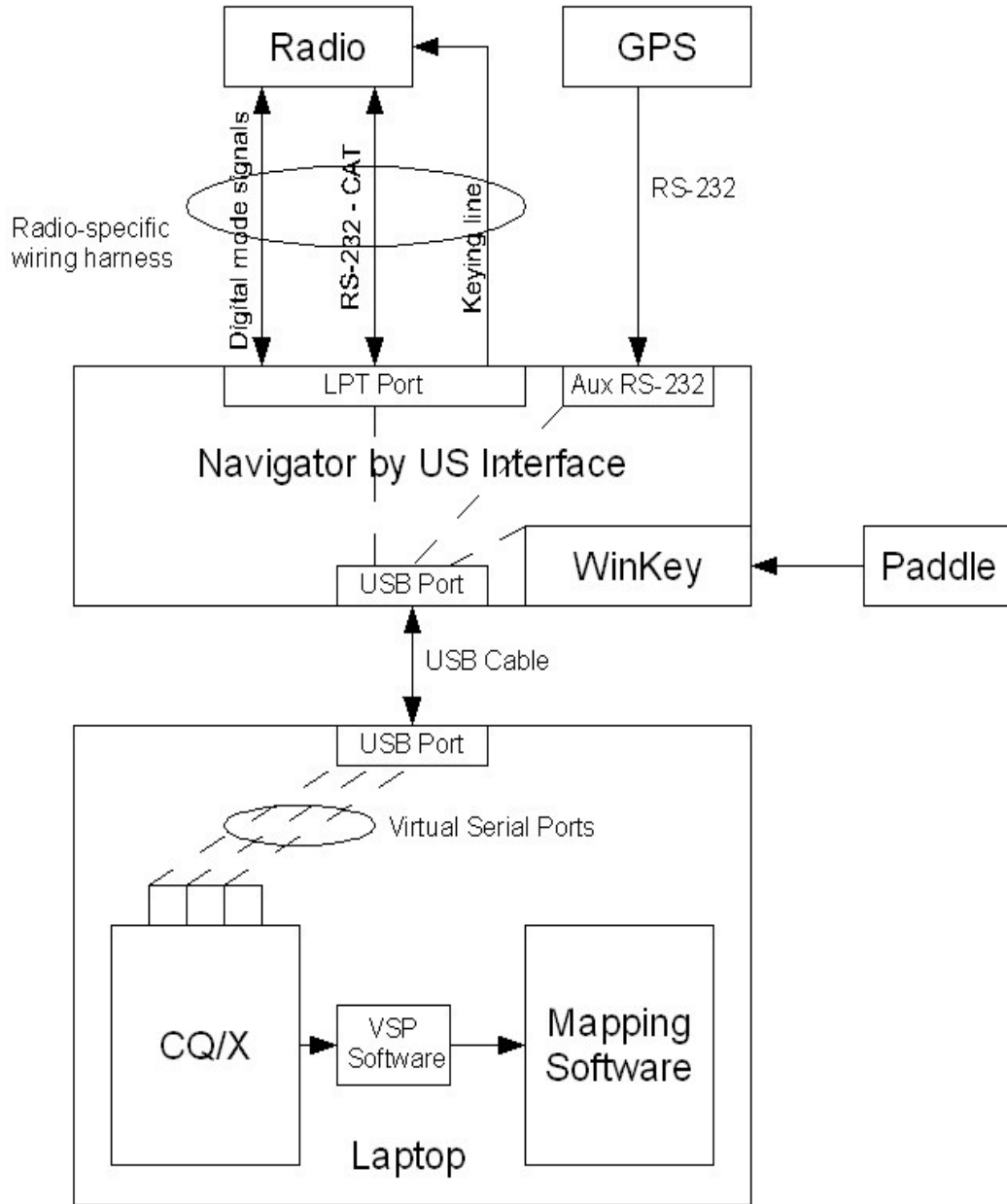5. Laptop with at least one USB port
6. VSP software
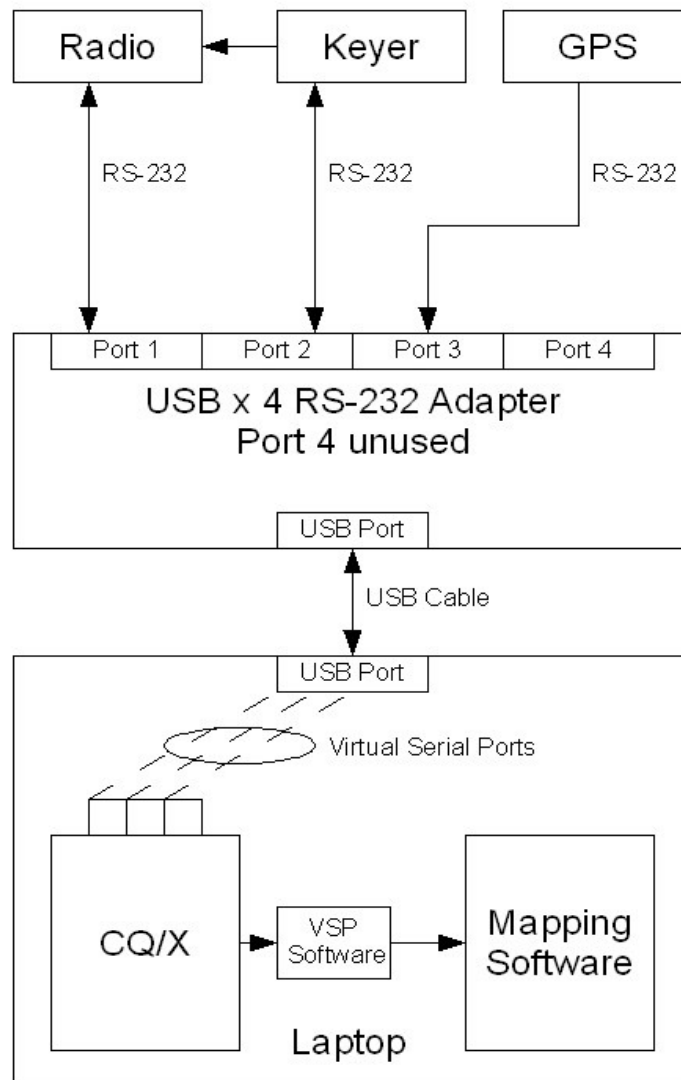
Configuration 1-K3: In this configuration it is assumed that the following are available

1. K3 Radio
2. GPS with RS-232 output in NMEA format
3. USB x 4 RS-232 Adapter (e.g. Keyspan USA-49WG) with driver software providing 4 virtual serial ports
4. Laptop with at least one USB port
5. VSP software

Configuration 2: In this configuration it is assumed that the following are available
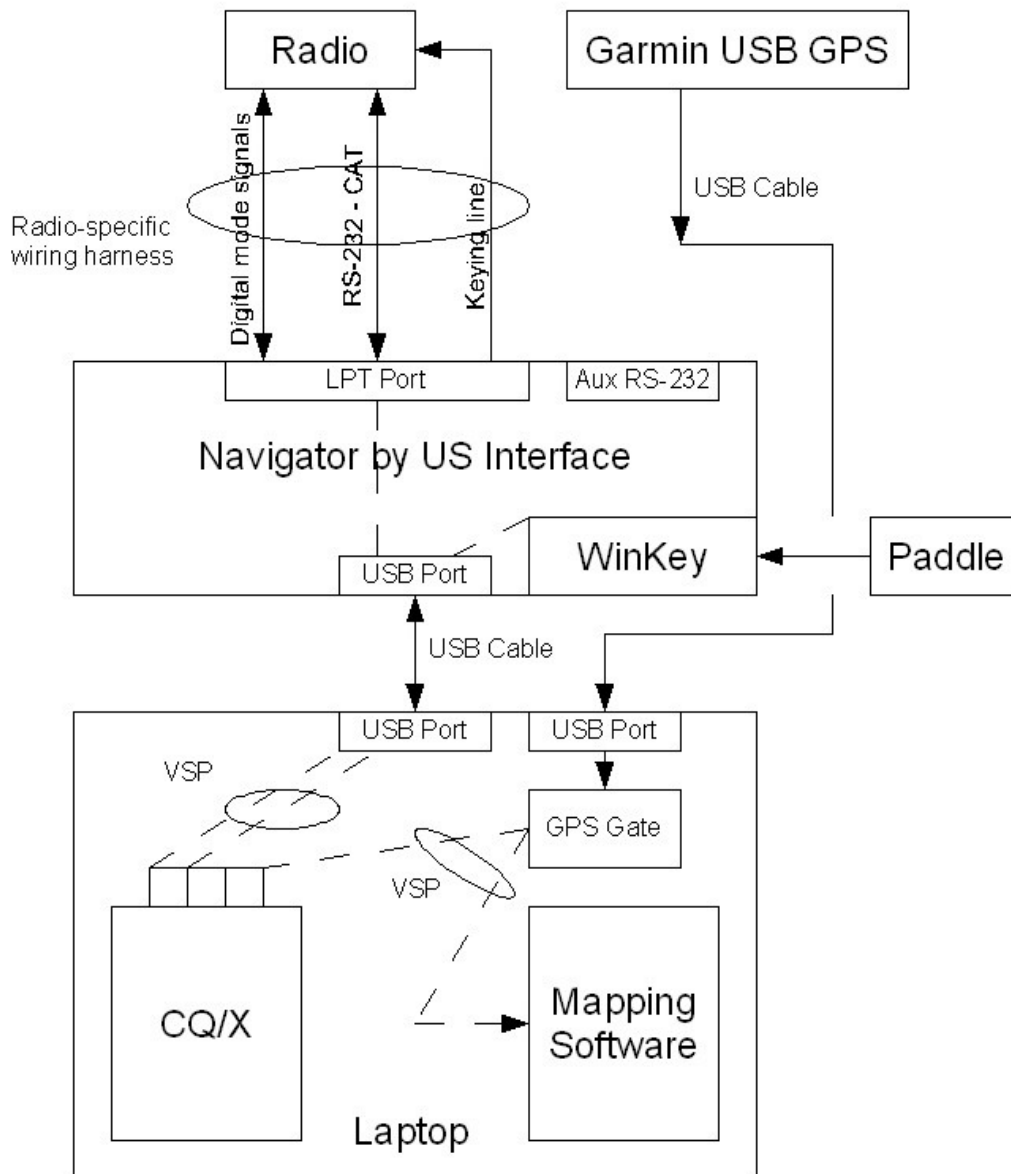
1. Radio with RS-232 I/O port
2. Navigator by US Interface (contains an embedded WinKey)
3. GPS with RS-232 output in NMEA format
4. Laptop with at least one USB port
5. VSP software

Configuration 3: In this configuration it is assumed that the following are available

1. Radio with RS-232 I/O port
2. Navigator by US Interface (contains an embedded WinKey)
3. Garmin GPS with USB output
4. Laptop with at least two USB ports
5. GPS Gate Express Software

In this case it is not possible to use the auxiliary serial port on the Navigator so it is necessary to use a second USB port on the laptop.

Configuration 4: In this configuration it is assumed that the following are available

1. Radio with RS-232 I/O port
2. microHam USB CW Keyer (contains an embedded WinKey)
3. Garmin GPS with USB output
4. Laptop with at least two USB ports
5. GPS Gate Express Software

In this case there is no port available on the microHam device so it is necessary to use a second USB port on the laptop for the GPS input.
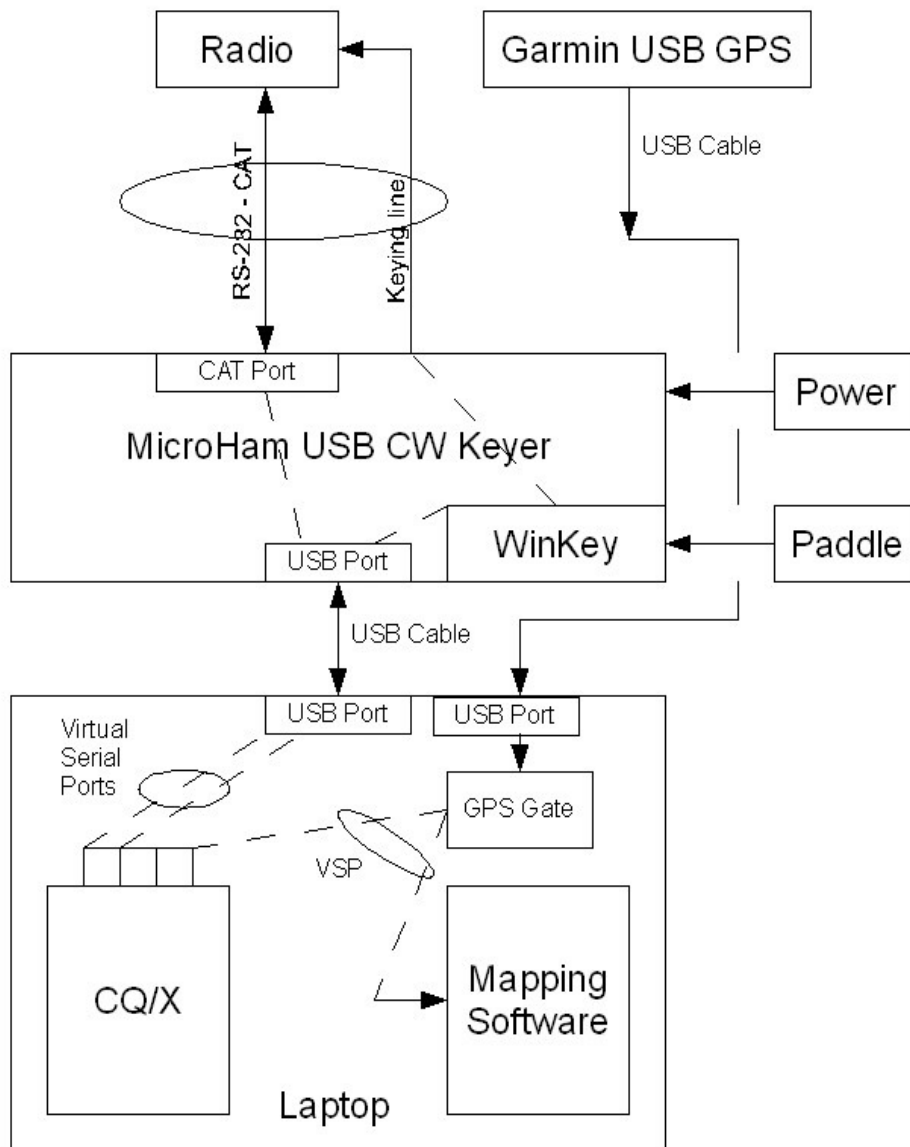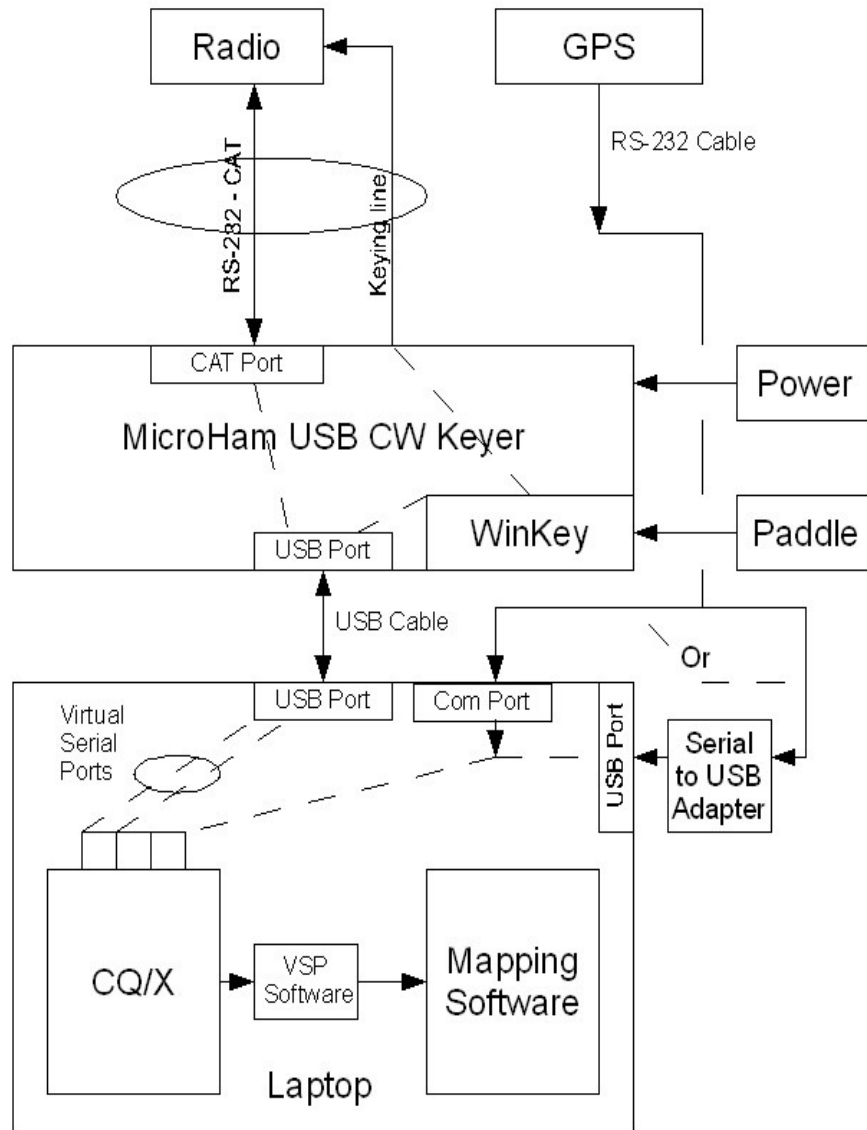
Configuration 5: This configuration is similar to the previous except that the GPS has RS-232 output and it is assumed that the following are available

1. Radio with RS-232 I/O port
2. microHam USB CW Keyer (contains an embedded WinKey)
3. GPS with RS-232 output
4. Laptop with at least one USB port and one com port (or a com port on a serial to USB adapter)
5. VSP software

In this case there is no port available on the microHam device so it is necessary to connect the GPS directly to a serial port on the laptop or to a serial port on a serial to USB adapter.

Configuration 6: In this configuration it is assumed that the following are available

1. Radio with RS-232 I/O port
2. Navigator or microHam USB CW Keyer (contains an embedded WinKey)
3. Delorme GPS with USB output
4. Laptop with at least two USB ports
5. Delorme Serial Emulation Software

In this case there is no USB port available on either the Navigator or the microHam device so it is necessary to use a second USB port on the laptop for the GPS input.