

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.

**Challenge 2: Passing GPS data to a mapping application for real-time position tracking.** In order to avoid additional real com ports (2 + a null modem) 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. Free virtual serial port (VSP) software is used in the High Performance Software Defined Radio (HPSDR) project and is available at <http://www.philcovington.com/>. Follow the link labeled "N8VB vCOM Virtual Serial Ports Driver" and then scroll down to the open source software section..

**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. The program will not run under DOS or Windows 3.x and, although not tested on Windows 95, it probably will not run very well, if at all, on a Windows 95 machine. Limited testing has been performed on Windows 98 so performance on that operating system is an unknown at this time as is performance on Vista. If you use either W98 or Vista your results would be of interest to the author.

**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 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 a normal RS-232 serial port. The NMEA protocol is currently the only protocol supported by CQ/X. While most GPS receivers support this protocol there are a number of GPS devices that only support their own proprietary protocol and many use USB rather than RS-232. To simplify matters you should also make sure that you use a receiver that provides RS-232 outputs. If your GPS only provides USB outputs you may need to insert a USB-RS232 adapter between the GPS and the PC or for Garmin GPS you may be able to insert a piece of software (GPS Gate Express) between the USB input and CQ/X. Also, please note that information is available on [www.no5w.com](http://www.no5w.com) describing how to interface the Delorme LT-20 to the program without using an adapter but using a serial port emulator available from the Delorme site.

**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. These ports can be obtained from a single USB port using a USB to RS232 Port Expander which normally come in four serial port configurations. My best results have been with the Keyspan device described on [www.keyspan.com](http://www.keyspan.com). I have also used the Navigator box that is available from US Interface. This box provides all of the interfaces needed: radio CAT, WinKey, and an auxiliary RS-232 port which is convenient for interfacing the GPS. Other similar interface boxes such as the ones available from MicroHam should also work but have not been tested.

**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. As mentioned previously, free software implementing a virtual null modem is available from <http://www.philcovington.com/>. This eliminates the need for two additional serial ports and a null modem to interface CQ/X and the mapping program. Of course, you could also use a serial splitter to drive the mapping program and CQ/X simultaneously but this would require two additional real com ports.

**Mapping Program** – A software item that is very handy if you are planning to operate mobile in a QSO party is a mapping program. This 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. It should be obvious that it is important to make sure that the mapping program is capable of showing the county lines.

**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.

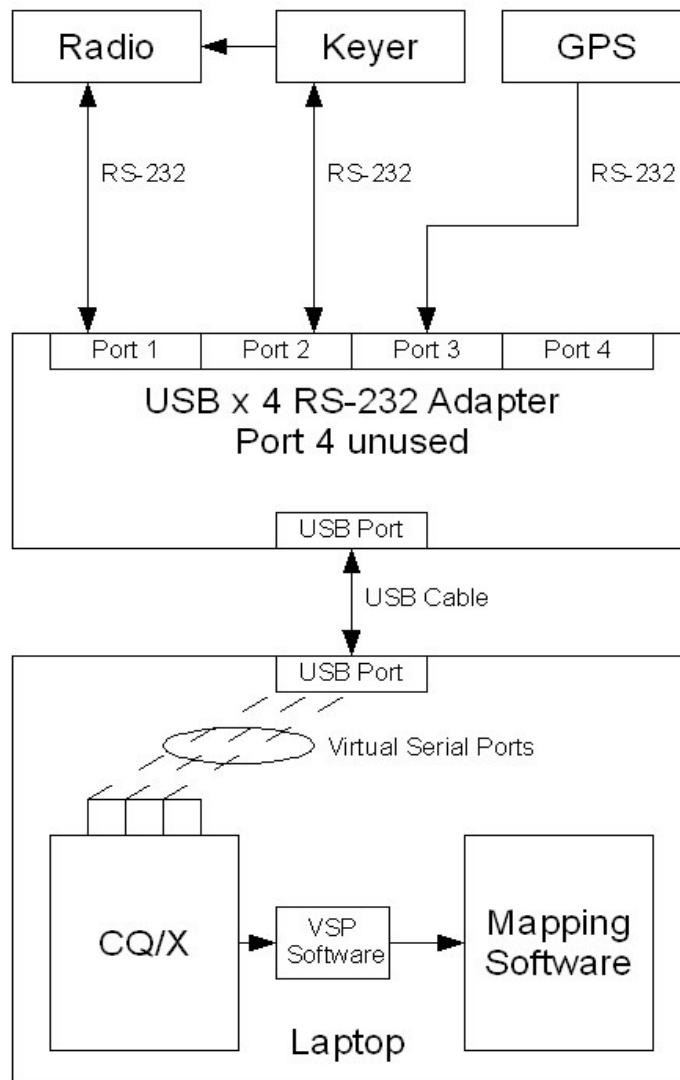
The following appendix provides a number of example configurations.

### 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.

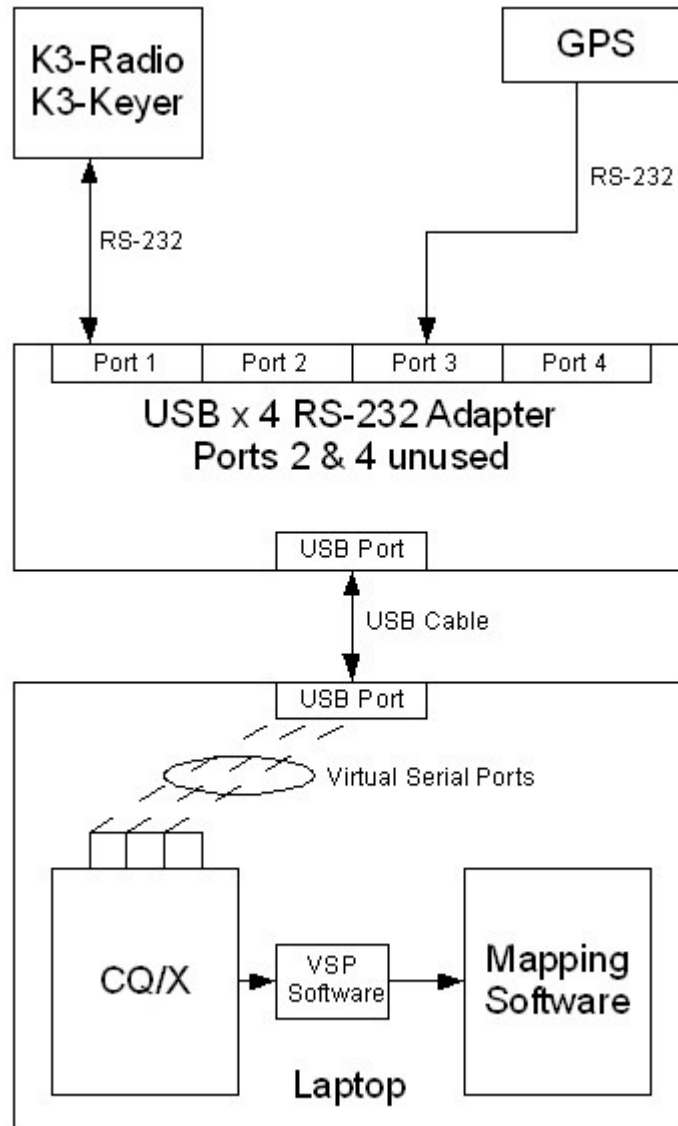
**Configuration 1:** In this configuration it is assumed that the following are available

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



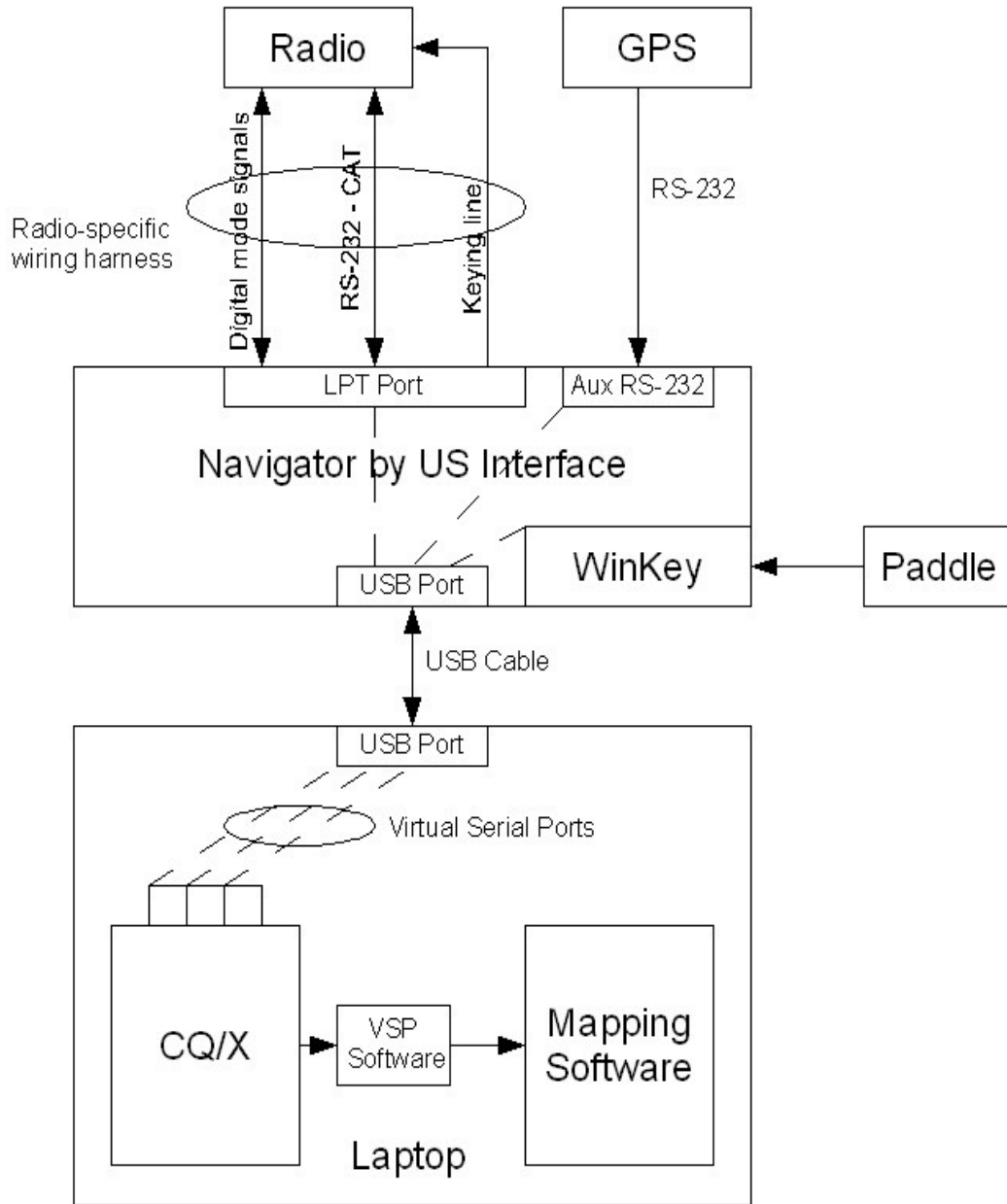
**Configuration 1-K3:** In this configuration it is assumed that the following are available

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

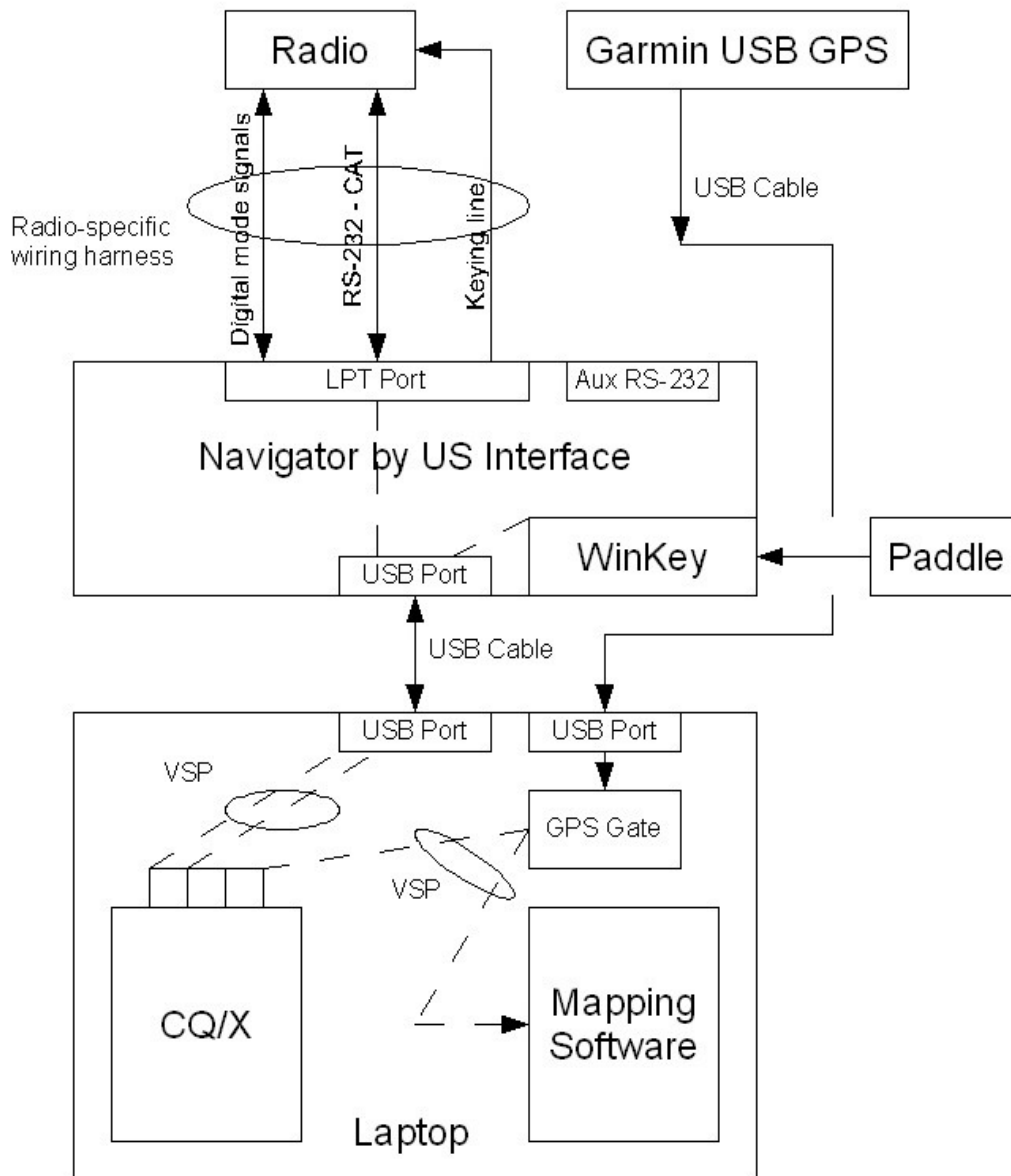
1. Radio with RS-232 I/O port
2. Navigator by US Interface (contains an embedded WinKey)
3. GPS with RS-232 output in NMEA format
4. Laptop with at least one USB port
5. VSP software



**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

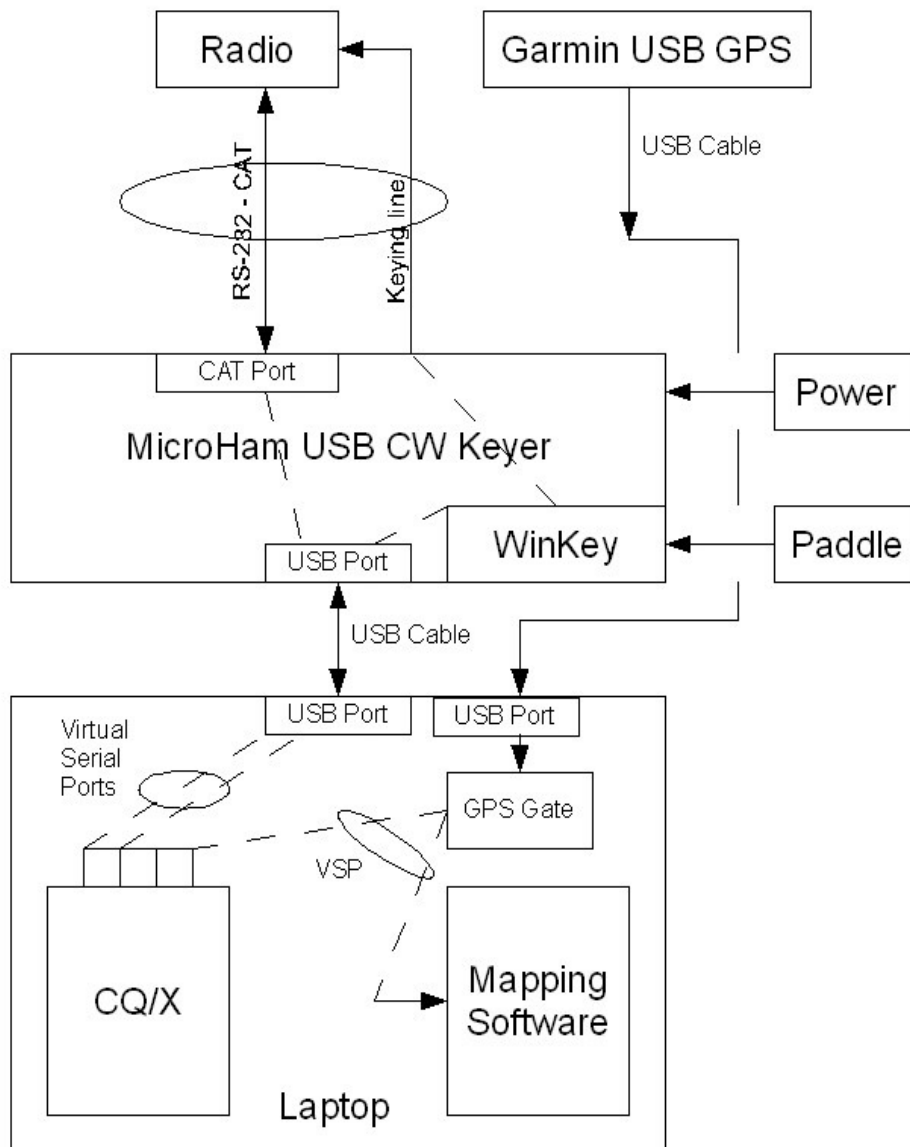
In this case it is not possible to use the auxiliary serial port on the Navigator so it is necessary to use a second USB port on the laptop.



**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 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.

