<u>N.B. Since writing this I have sorted out a means of altering the audio settings of the Bluefly vario from a menu inside XCSoar. See:</u>

<u>http://www.50k-or-bust.com/Kobo XCSoar/BlueFly XCSoar Audio Menu.pdf</u>

<u>Most pilots will find this much easier than the method below and I recommend they consider it first!</u>

These notes relate to the use of a Kobo mini ebook reader modified to run XCSoar with a Bluefly vario module. They are based on notes written by Chris Sangwin without which I would have got nowhere.  I cannot guarantee they are correct or represent ideal solutions but will correct and update them as and when I can.  Please inform me of any errors or better solutions you may find. The index for other Kobo/XCSoar notes can be found at:

http://www.50k-or-bust.com/Kobo XCSoar/Kobo XCSoar.htm

Chris's method also has a means of sending a file containing all the parameters to the Bluefly so that the parameters can be altered just by altering the file and resending it.  Unfortunately that method is beyond me!

<u>Accessing the Bluefly through Telnet</u>

Firstly install a "network watcher" on your computer. e.g.

http://www.nirsoft.net/utils/wireless_network_watcher.html

and a Telnet terminal like PuTTY.  The following instructions are based on these tools.

1) Turn the Kobo on.

2) In the XCSoar opening screen select "Network"

3) Select "Wifi ON".  After a few seconds it will change to "Wifi Off" indicating that the Kobo WiFi is now switched on.  (Buttons on XCSoar indicate what will happen when you press them, not what the status of the particular function is.)

4) The text "Wifi" in the box below will go from grey to black.  Select this and a list of WiFi hubs will appear.

5) Select your WiFi hub from the list and select "Connect".

6) Enter your password for the hub and select "OK".  It should return to the list of hubs and show "connected" against yours.  A line should appear on the Wireless Network Watcher showing the connection as "CyberTAN Technology Inc."  If you have already successfully connected to this hub before it may connect automatically.

7) Close the "Wifi" page on the Kobo.

8) Press "Telnet server" (there is no indication acnowledging this) and close the "Network" page.  You should now be at the XCSoar opening page again.

9) Start XCSoar in "Fly".  It should open as usual on the moving map.

10) Run PuTTY or your Telnet program.

11) Look for the IP address of your Kobo on the Wireless Network Watcher and enter it into the PuTTY start page.  N.B. This address is usually dynamically allocated and may change each time it is connected.

12) Select "Telnet" as the "Connection type" and click "Open".  If it connects to the Kobo a terminal screen should open with "~ #" and a cursor.

If you get the message "Network Error - Connection Refused" you have probably forgotten to select "Telnet server" at stage (8).

13) Check the connection by entering "ls" (lowercase LS) and hitting return.  It should come back with the directory listing followed by "~ #" and a cursor again.

You should now be in a position to send parameter commands to adjust the Bluefly vario audio settings individually as described in the list below.  The vario should respond immediately to changes you have made.

After you are happy with the settings close XCSoar, go into the "Network" page and select "Wifi OFF".  Alternatively power off the Kobo and the Wifi will be off the next time it is powered up.

Parameter Setting

Only whole numbers can be sent to the vario module so for each setting there is a "factor".  The value which the particular parameter is set to is the number sent to the Bluefly divided by the factor for that parameter.  The parameters

2

are listed in the Bluefly hardware settings manual available on the Bluefly web site.  Let's look at the lift threshold as a detailed example of how to use them.

N.B.  It is a good idea to keep a record of changes you have made to the parameters and what your favourite settings are.

Lift Threshold

The lift threshold is the rate of climb at which the vario starts to make a sound.  If it was set to zero the variometer would make a noise all the time even when stationary on the ground.  The usual setting for lift threshold is about 0.2 metres per second and that is the default value the Bluefly has programmed when new.  Suppose we want to change it to, say 0.15 m/s.

1) The factor for the lift threshold setting is 100.

2) The number we need to send to the Bluefly is 100 x 0.15 = 15

3) The code for lift threshold is "BFL"

4) To send the setting we type the following line in the Telnet terminal screen and hit "return":

```
echo '$BFL 15*' > /dev/ttymxc0
```

Let's not go into what all the other bits mean.  I don't understand them very well so let's just type them carefully making sure we include spaces and hope it works!  The terminal should come back with "~ #" and a cursor as before.

For each parameter there is a minimum and maximum value that the Bluefly module will accept.  For the lift threshold the minimum is 100 corresponding to 0.01 m/s and the maximum is 1000 corresponding to 10 m/s.

Simulating Vario Operation

The only way to properly set up a vario is to fly with it.  However a vario can be roughly tested by putting it in a plastic bag, trapping some air in the bag by holding the opening closed, and then squeezing it gently.  As you squeeze the bag the vario will indicate and beep "down" as the pressure is increased and by easing the pressure off gradually the "up" response can be tested.  The responses of two different varios can also be compared by putting them both in the same bag.  This is a very crude method but can sometimes help to get the adjustment "in the ball park" before flying with a vario.

## Audio Volume BVL

Adjustable from 1 to 1000.    Set to 1 to turn the audio off.
Factor 1 (Just a number from 1 to 1000)
Default value 1000 corresponds to maximum volume.
```
echo '$BVL 1000*' > /dev/ttymxc0
```

## Turning Off The Sink Tone

The sink tone cannot actually be turned off separately from the lift tone.
However if the sink threshold parameters BFS and BOS are set to 1000 the
sink tone will not sound at sink rates less than 10 m/s which is nearly as
good.  At this sort of sink rate you will probably either be worrying about other
things or in urgent need of a hint of what is going on!
```
echo '$BFS 1000*' > /dev/ttymxc0
echo '$BOS 1000*' > /dev/ttymxc0
```

## Setting The Sink Tone As A Sink Alarm

To do this we set the Sets the sink threshold parameters BFS and BOS to
around the sink rate of our glider.  So for a glider with a sink rate of 0.95 m/s
we have to set BFS and BOS to around 0.95 x 100 = 95
```
echo '$BFS 95*' > /dev/ttymxc0
echo '$BOS 95*' > /dev/ttymxc0
```

## Climb Parameters

## Lift Threshold - BFL

Sets the rate of climb at which the up audio starts to bleep.
Adjustable from 0 to 10 m/s
Factor 100
Default value 20 corresponds to 0.2 m/s
```
echo '$BFL 20*' > /dev/ttymxc0
```

## Lift Off Threshold - BOL

Sets the rate of climb at which the up audio stops bleeping as lift decreases.
Adjustable from 0 to 10 m/s
Factor 100
Default value 5 corresponds to 0.05 m/s
```
echo '$BOL 5*' > /dev/ttymxc0
```

## Lift Frequency Base - BFQ

Sets the frequency of the audio tone at the lift threshold.

Adjustable from 500 to 2000 Hz
Factor 1
Default value 1000
```
echo '$BFQ 1000*' > /dev/ttymxc0
```

## Lift Frequency Increment - BFI

Sets how much the frequency of the audio tone increases as the rate of climb increases.
Adjustable from 0 to 1000 Hz for each m/s increase in sink rate.
Factor 1
Default value 100
```
echo '$BFI 100*' > /dev/ttymxc0
```

## Lift Beep Cadence - BRM

Sets how rapidly the audio beeps as the rate of climb increases.
Adjustable from 0.1 to 10
Factor 100
Default value 1
```
echo '$BRM 100*' > /dev/ttymxc0
```

## Sink Parameters

## Sink Threshold - BFS

Sets the sink rate at which the down audio starts to bleep.
Adjustable from 0 to 10 m/s
Factor 100
Default value 20 corresponds to 0.2 m/s
```
echo '$BFS 20*' > /dev/ttymxc0
```

## Sink Off Threshold - BOS

Sets the sink rate at which the down audio starts to bleep.
Adjustable from 0 to 10 m/s
Factor 100
Default value 20 corresponds to 0.05 m/s
```
echo '$BOS 5*' > /dev/ttymxc0
```

## Sink Frequency Base - BSQ

Sets the frequency of the audio tone at the sink threshold.
Adjustable from 25 to 1000 Hz
Factor 1
Default value 400

```
echo '$BSQ 400*' > /dev/ttymxc0
```

Sink Frequency Increment - BSI

Sets how much the frequency of the audio tone decreases as the rate of sink increases.
Adjustable from 0 to 1000 Hz for each m/s increase in sink rate.
Factor 1
Default value 100
```
echo '$BSI 100*' > /dev/ttymxc0
```

Reset To Defaults

```
echo '$RSX*' > /dev/ttymxc0
```

Barometric Input To Flight Computer Functions

In XCSoar functions associated with height like glide ratio, average climb and vario will work from GPS height data.  However if a Bluefly module is fitted these functions can be generated from pressure information.  To use pressure information instead of GPS

Config 2 / System / Glide Computer / Glide Computer / set "Nav. by baro altitude" On or Off

As well as being unaffected by the quality of GPS reception barometric information will give a more rapid response and is probably the best choice.  However for actual height functions such as "Next altitude required" (the height required to reach the next waypoint) the pilot must ensure the barometric altimeter has been set appropriately.