

Disc-o fever

Has your school invested in a set of iPads? If so, what are they used for in science? Web browsing? Document viewing? Simulations? If you go to the *Physics* subject area of www.sserc.org.uk and select the *Miscellaneous* category, you will find a list of iOS and Android apps that people attending the 2013 IoP/SSERC Summer School found useful.

As we have mentioned in previous articles, some datalogger manufacturers are now building in tablet and smartphone compatibility into their products. The latest that we have come across is the Labdisc (Figure 1).

Around the size of a smoke detector, the Globisens Labdisc has a series of onboard sensors and ports, most of them located around the perimeter of the device (Figure 2).

You can buy a basic Labdisc for £349 ex VAT at the time of writing. This has seven onboard sensors and you can add external probes at a later date. We opted for the "General Science Set". This costs £403 for one, with bulk discounts available. For that we received a datalogger with Voltage, Current, Light, Air Pressure, Temperature, Ambient Temperature, pH (Figure 3), Distance (Figure 4), Relative Humidity, Microphone, Sound Level and GPS sensors, plus a "Universal input" for adding third party probeware.



Figure 1 - Labdisc datalogger.

The sampling rate depends on the sensor. It can be as high as 24 kHz. Sampling resolution is given as "12 bit". This means that, whatever the sensor range, if you divide this by 2 to the power 12, i.e. 4096,

you will get the resolution of the individual sensor. For example, the voltage sensor is stated to have a range from -10 V to +10 V. This is a range of 20 V. The voltage resolution is therefore 20 divided by 4096, giving about 5 mV.



Figure 2 - Some of the Labdisc ports.

So, for the price of a Pasco Spark or Vernier Labquest 2, you get a datalogger and a set of sensors that have been well-chosen to support a fair number of school experiments. Unlike the Spark or LQ2, you don't get a sophisticated touch screen. We can see where Globisens is coming from on this one - why spend money on a touch screen when pupils will probably have access to a better one on their desk if not in their



Figure 3 - PH sensor.

schoolbag or pocket? At this point, we should note that Pasco, Vernier and DataHarvest all have systems linking other computers or tablets to their sensors.

The Labdisc uses Bluetooth for connectivity. Only one device can hook up to a Labdisc (a limitation not encountered with the Vernier LQ2). The systems supported are Windows, Mac and iOS. We're told that Android and Linux are on the

way. In the case of the iPad, users first download the free GlobiLab app from App Store. Next, they enter **Settings**, select **Bluetooth** and tap on the Labdisc, which will be visible in the list of broadcasting devices (Figure 5).

Next, Globilab is launched on the iPad and the relevant sensor, sampling rate and number of samples to be taken are chosen (Figure 6).

An icon is tapped to begin logging. All the usual iOS pinch-to-zoom features are implemented. Figure 7 shows a typical data plot.

Data can be displayed in a variety of formats, including analogue and digital instrument displays and can be mailed either as a graph image or a spreadsheet file. Note the Map button on the screenshot shown in Figure 7. The Labdisc has GPS. The user can take it for a walk and record, for example, light level at



Figure 4 - Ultrasonic distance sensor.

various points on the journey. The app then integrates with Google maps, to display the light level throughout the walk.

Whether a Labdisc or other system is used, it would be good to see tablets, laptops and smartphones used as part of a datalogging setup. Science needs to be seen as an up-to-date, cutting edge subject utilising the latest technology rather than just foosty, tarnished wood and brass instruments.

The Labdisc is distributed in the UK by Tyn Can [1].



Figure 5 - Hooking the Labdisc up to an iPad.

Reference

[1] www.tyncan.com.



Figure 6 - Selecting the sensor and logging parameters on GlobiLab.

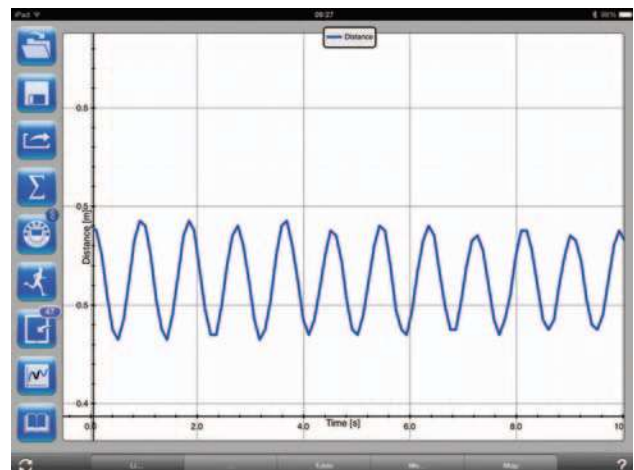


Figure 7 - Data plot on GlobiLab.