What's new on the equipment front?

Here we look at three pieces of apparatus that offer features that you might not have come across before.

Figure 1 *- Picoscope USB oscilloscope*

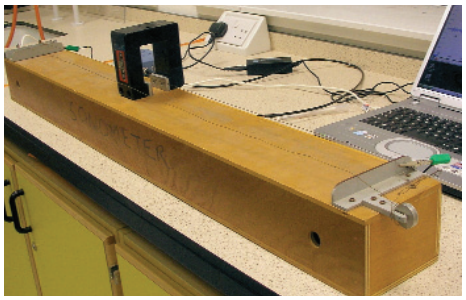

Figure 2 *- Apparatus set up by our plucky experimenter.*

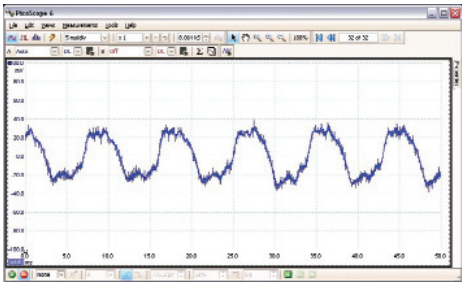

Figure 3 *- Trace from plucked sonometer wire.*

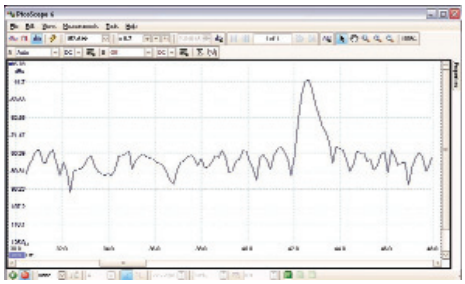

Figure 4 *- TFrequency spectrum plot (zoomed).*

Picoscope USB oscilloscope

First up is the Picoscope 2203 (Figure 1) from Picotech [1].

Connected to the USB port of a computer running the supplied software, this device becomes a two channel oscilloscope with signal generator output. To investigate it, we connected the Picoscope across a sonometer wire that was plucked in a magnetic field (Figure 2).

The trace is shown in Figure 3. Freezing a trace involves pressing the spacebar.

The software can be set to automatically select the most appropriate y-gain. Timebase settings are selected from a drop down menu. We found the frequency spectrum feature to be very useful for experiments such as the one above. An example of a frequency spectrum plot is shown in Figure 4. The zoom feature of the software has been used to examine the fundamental frequency of the plucked wire.

Our Picoscope sampled at 40 MHz if used in single channel mode, or 20 MHz if both channels were used. Accuracy is quoted as "8 bits". Thus, the selected voltage range is divided into 256 (2^8). On the most sensitive range, which reads from -50 mV to +50 mV, a range of 100 mV, the smallest division is therefore 100 ÷ 256, or around 0.4 mV. However, software enhancement can increase this by a further 4 bits. A full technical specification is available from the manufacturer [2].

The Picoscope is a genuine oscilloscope that does everything a CRO does, and it does it to the same level of accuracy as any device likely to be bought for a school. It has other useful features, such as the aforementioned frequency spectrum analysis tool and its output can be displayed on a large screen if the computer is hooked up to a projector. Our only reservation about the Picoscope is that it is a box connected to a computer and, unlike a CRO, its innards are unlikely to be comprehended by the average user.

Lascells Digital Signal Generator

We paid extra to have our Picoscope calibrated, so that we could use it as a test instrument. This helped us to assess our next piece of apparatus, the Lascells Digital Signal Generator [3]. This is pictured in Figure 5a.

Note the digital display (Figure 5b) that gives the frequency and output voltage. We were particularly interested in the former, because the markings on conventional signal generators are notoriously inaccurate, especially if wee Johnny has given the frequency dial a hearty twist, causing it to slip on its mounting spindle. We checked the accuracy of the display reading by using our Picoscope's frequency analyser. We sampled the sinusoidal signal from the Lascelles unit at different frequencies throughout its range, taking several readings per frequency. In all cases, the reading on the display was within two standard deviations of the mean reading from the Picoscope. Given that the timebase of the Picoscope has a stated accuracy of 100 ppm (parts per million), It is clear that the Lascells Digital Signal Generator display is orders of magnitude more accurate than a signal generator with a rotary dial. The manufacturer quotes an accuracy of between 0.1% and 0.5%. The unit, as can be seen from the picture, can produce square,

sinusoidal and sawtooth signals. It has a high impedance CRO output and a lower impedance power output for a loudspeaker or vibration generator. Note that we intend to do a fuller test of this equipment, in the near future.

Data Harvest EasySense Vision

A couple of years ago, we got quite excited at some recently introduced hand-held dataloggers [4]. Last year, along came the Pasco Spark, and impressed us with its relatively large touch screen [5]. Now, Data Harvest have brought out their own device, the EasySense Vision [6]. So, here is another 12-bit interface with a touch screen and 50 kHz maximum capture rate (Figure 6).

Are we still excited? Actually, yes. The common thread running through this article is "features you might not have come across before". In the case of the EasySense Vision, Figure 7 reveals something we have not seen on the other handhelds reviewed to date.

The Vision has a VGA port. It can connect directly to a monitor or LCD projector without having to hook up to a computer, though it is still capable of doing so. The facility for pupils to be able to show data they have gathered to the rest of the class simply by plugging in the logger to a projector is appealing.

We know that when we review equipment in the current financial climate many readers will tell us that they have no money. Is it cheeky to suggest that manufacturers of modern equipment like that reviewed above badge their apparatus with a year number such as Picoscope 2011? School computer systems seem reasonably up to date....

References

[1] www.picotech.com. Model 2203 £159 at the time of review

[2] http://www.picotech.com/picoscope2200-specifications.htm

[3] http://www.lascells.com/product_info.php?product=191 Also available from other suppliers, including Scientific and Chemical Supplies, who lent us the test model. www.scichem.com, product code XWV680010. £218 (Timstar) at the time of review.

[4] http://www.sserc.org.uk/members/SafetyNet/bulls/226/Interfaces.htm

[5] http://www.sserc.org.uk/members/SafetyNet/bulls/231/Pasco_Spark.htm

[6] www.dataharvest.co.uk, product code 2020. £279 at the time of review

Figure 5a *- Lascells Digital Signal Generator.*

Figure 5b *- Digital display with frequency & output voltage.*

Figure 6 *- Data Harvest EasySense Vision.*

Figure 7 *- Spot the port.*