

## Review of the ALBA Interface and Logger

Review by Chris Butlin for the Institute of Physics Publication, Physics Education  
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Ease of use, a host of useful facilities, and a series of pre-programmed activities, has to be this device's forte. It will prove a delight to use for both the confident and less self-assured alike. Having often found problems loading software and getting ports recognised, I was pleased to get everything up and running without any problems. There was even a facility to autofind the required serial port. I knew mine was COM1, but I let it locate it.

So what does this device allow students and teachers do? The basic package provided incorporates the Investigator, a general purpose data capture and analysis tool. On it one can choose the number of readings to take, their rate of acquisition, the channels to use (two analogue with 4 mm sockets, two further analogue with DIN sockets for self-identifying and pre-calibrated sensors, and two digital with 4 mm sockets, are available), the required voltage input range, trigger settings, and a latching capacity.

Control of two digital outputs is also available. Logging periods can be set from 60 micro-seconds to 1 hour and, if data capture is too fast for direct transmission to the PC the data is stored in ALBA and transferred when all the data has been collected. Up to 65000 readings may be taken and displayed live or 16000 if they are to be stored prior to transmission. The digital outputs are compatible with the Unilab Alpha boards.

Additionally come ten applications dealing with capacitor charging/discharging, cooling by evaporation, plotting cooling curves, measuring the speed of sound and substantiating that the variation of the intensity of a point source of light obeys an inverse square law. Temperature probes, sound switches and a linear light sensor are needed for these, either the djb versions or the Philip Harris Sensor Meters through the djb Sensor Extension Unit. Shortly a new feature called the Calibration Manager is to be added and this will enable Blue Box and home made sensors to be calibrated (linear and quadratic fits) and this information stored for future use. The interface can be powered via the power unit supplied or via a PP3 type 9 V battery, the latter providing an opportunity to collect data remotely, feeding it into a computer for processing at a later time.

Three additional CD-ROMs (extra charge) are available for other applications. CD-ROM 2 provides access to an analogue snapshot, a fast timer, a gap timer, an event timer, an interval timer, and various applications related to speed/velocity and acceleration, displacement and velocity-time graphs,  $g$  by free-fall using an impact plate, and examining the link between charge and voltage for capacitors. CD-ROM 3 provides opportunities to look at a range of twelve a.c. characteristics including the relationship between current and voltage in capacitors and inductors together with the effect of frequency, and series and parallel resonance circuits. CD-ROM 4 provides a further eleven applications including d.c. investigations of inductors, the variation of pressure with depth, Boyle's Law, Newton's 2nd Law and use as a timer/ratemeter. See Figures 1, 2 and 3 below. Sensors and additional equipment are needed as with the basic package

and some of those available are shown in Figure 4. All are robustly constructed and easy to connect to the system. Of particular mention is the Geiger Muller detector with its built-in power supply - how inexpensive it makes work on radioactivity - the ALBA interface software providing the ratemeter.



Figure 1 Investigating acceleration using a light gate



Figure 2 Investigating the variation of pressure with depth of immersion in water

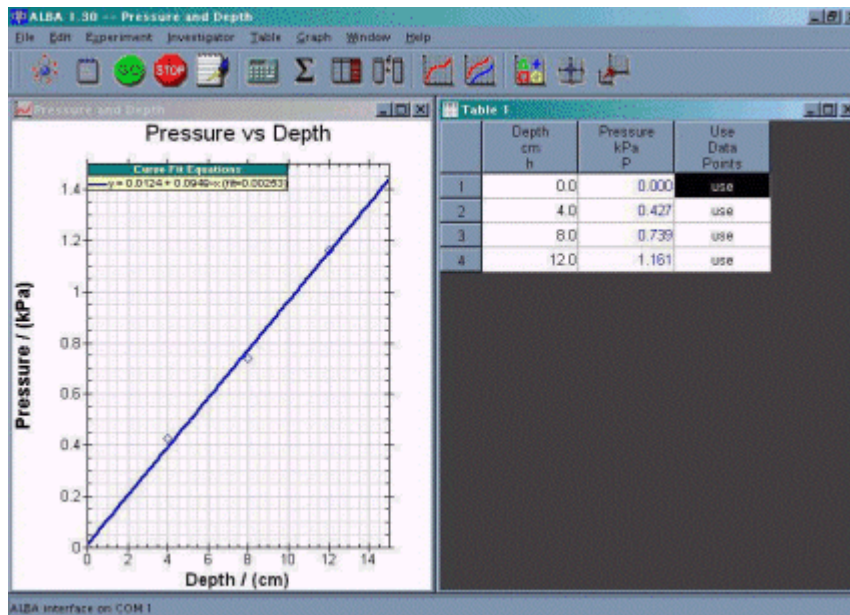


Figure 3 Graph of variation of pressure with depth of immersion in water

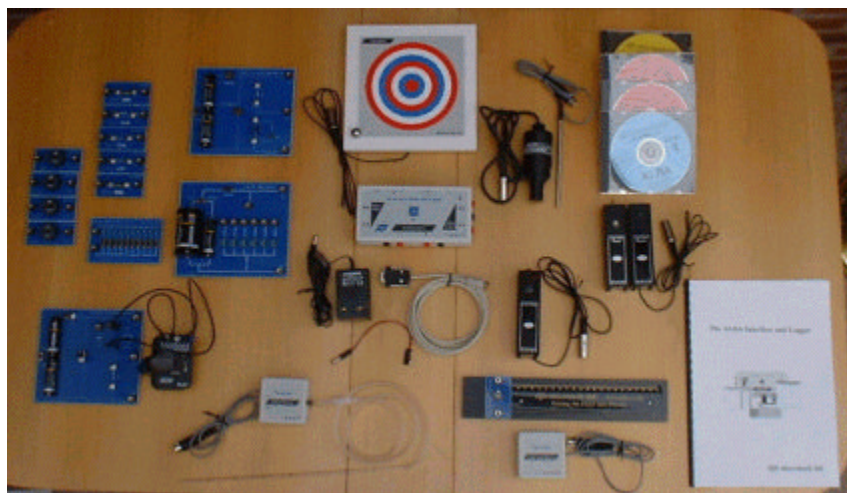


Figure 4 Additional hardware with the ALBA interface in the centre

Each application is well presented with notes for the student on how to set up the apparatus, how it works, the procedure to follow, any relevant safety points, follow-up possibilities and, where appropriate, additional questions are posed together with example calculations and uncertainties. Prompts are provided on-screen as the application is run. The graph plotting facilities allow students to select points to ignore or include, to choose appropriate curve fitting modes, to select scales, to select the size of error/uncertainty bars (symmetrical and non-symmetrical), calculate gradients and areas under graphs, together with a zoom facility to analyse behaviour around points of particular interest. Graphs can be overlaid on each other and calculations in data tables (e.g. Pressure ' Volume) can be performed automatically if required.

Teachers' notes are also provided via password protection and outline key teaching points and details on the use of apparatus. An editing facility is available to alter student notes in

terms of both words and pictures. Students can make use of copy and paste to include data tables and graphs in their reports composed on WordPad.

I tried out a number of the applications' investigations and was very impressed. One criticism was of a definition of acceleration in terms of 'change of speed', although in the relevant data table 'velocity' was correctly displayed. Teachers could easily change or elaborate on this wording as they felt appropriate through the editing facility mentioned above. I also felt that it would have been better to have 'change of velocity', 'Dv' and 'Dt' in place of 'delta v', 'Dv' and 'Dt' respectively in the data tables and I gather that this might well be dealt with in the future.

The manual provided was excellent, although I soon found little need for it as the software was pretty much intuitive. Help files are included on-screen but again I found little need for them.

Currently additional applications can only be added by proposing them to djb microtech ltd, but thoughts have been given to providing facilities for teachers (and students) to do this themselves. I hope that this comes about in the not too distant future as it would expand the device's usage even further.

Hardware requirements:

PC 150 MHz or faster

Windows 95 or more recent

32 MB ram

CD-ROM drive

Serial port 38.4 kilobaud or faster

1 MB hard disc space per application

Colour monitor

Colour video card 16 bit or greater

I ran the package on a 166 MHz Pentium MMX with 96 MB ram and the Windows Millennium (ME) operating system. The software has been running in Scottish schools for over eighteen months, being used on networks and stand-alone machines, all without reports of problems or bugs.

Overall an excellent product at a reasonable price.

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