Revealing VELA

VELA is undoubtedly the most significant development for school science teaching since Nuffield. Why? Three reasons.

First it transforms instrumentation. Whereas in the past a laboratory would have to be equipped with dedicated instrumentation — one scalar, two multimeters, one timer, one signal generator, one logic tutor and so on — it is now possible to equip it with a set of VELAs each of which can 'mimic' all these — and more — by simply keying in the appropriate two figure code.

Second because it transforms instrumentation it liberates the curriculum. Whereas in the past what could or could not be done within the context of school science was constrained by instrumentation rather than imagination, the reverse is now undoubtedly the case. *It is profoundly to be hoped that Examination Boards realise that this is the case and immediately begin to consider the curriculum implications of VELA.* They are vast and revolutionary. (Already the implications of VELA have been given some consideration in relation to the revision of Nuffield 'A' level Physics currently taking place.)

Third because it is 'user friendly'. The concept of VELA arose as a result of experience gained by Drs. Ashley Clarke and Keith Jones of the University of Leeds Department of Physics when they began to run Microprocessor courses for local Physics teachers in 1981. Feedback from those teachers made two things absolutely clear. First, the potential that microprocessor systems offered for developing physics education: second, the need to make such systems as accessible to computer illiterates as possible.

VELA is the tangible outcome of these realisations. Close liaison with local teachers, support from the University of Leeds, the ASE, the JMB and eventually, MEP, brought about the manufacture of a number of prototype VELAs for field trials in North and West Yorkshire during last Autumn Term. Suggestions resulting from these trials were then, as far as possible, incorporated in the final version of VELA although as always, some compromises had to be made in order to keep the cost of the instrument down to a level which would make it commercially viable. Judging from the overwhelmingly favourable reactions of the 500 or so teachers who have had the opportunity to try out VELA since January, there can be little doubt about its success.

Conservatively, one VELA provides the facilities previously associated with individual instruments costing, in total, well over £2,000. There can be little doubt that even at full price VELA is really an incredible bargain. No one in the fortunate position of being required to kit out a new laboratory should do so without considering the financial, pedagogical and curriculum implications of making a class set of VELAs that laboratory's basic unit of instrumentation.

What then can VELA actually do? The answer must be practically anything. The initial EPROM contains seventeen separate programmes designed primarily with physics teachers in mind. However, many of these programmes are equally relevant to Biology and Chemistry. For example, program 03 — each program is called up by a simple two digit entry code — sets up VELA to data log analogue information presented simultaneously on four separate analogue input channels. Sampling times on this programme (30 microseconds on some others) can be set to anything between 1s and 999s; 1023 readings are taken and stored on each channel. Clearly any physical parameter-temperature, pressure, light intensity, relative humidity, wind speed, pH., oxygen content etc. — which can be converted into a suitable electrical signal is capable of being monitored by such a system. Once logged the data can be recalled in numerical or graphical form and output to chart recorder, oscilloscope or micro as appropriate using another simple two key sequence. The potential of such a program must be obvious to all science and, indeed, technology teachers.

EPROM 1 contains seventeen such programmes. EPROM 2, currently in preparation, contains some further twenty programs. These will include, in addition to programs related to the teaching of electronics, logic and control, a

The educational electronics VELA acting as an 'intelligent' interface to a 380Z microcomputer.

number of utilities which further increase the versatility of VELA and make it not just an instrument for school use but also one with considerable potential in Higher Education for research as well as for teaching. It will also be possible with the EPROM to output information from VELA to standard parallel input printers. Other programmes related to Biology, Chemistry and Environmental Studies teaching are proposed and if that is not enough, a third and possibly fourth EPROM socket will be available for those users who still find there is something different they need to do.

At a very early stage it was realised that full documentation should accompany VELA and two excellent manuals have been produced to support it. One, the User Manual, has been written by an experienced seconded school Physics teacher, Andrew Lambert, who has worked on VELA throughout the year. It contains full details of how to use VELA including some sample experiments and tested sensor circuits. Further documentation on sensors is currently being written. The Technical Manual, written by Dr. Clarke, is, unlike almost all other technical manuals in this field, a model of clarity and, includes, in addition to a full list of the contents of EPROM 1, basic routines for linking VELA to PET, BBC and 380Z microcomputers.

The ASE has been responsible for publishing both manuals and extra copies can be purchased from Hatfield. Finally it is worth mentioning that a VELA User Group has been set up which all purchasers of VELA are being encouraged to join.

The panegyric nature of this review arises from the fact that VELA is such a revolutionary device. It does have some limitations. For example, its dynamic range is not as great as that of some of the instruments it replaces; its alpha numeric display could be better — at a price; and it would help its use in the field if its power consumption was less. This modification has already taken place with MoS chips replacing the original TTL ones. None of these comparatively trivial points takes away anything from the achievement of those academics, school teachers and manufacturers alike, who in less than a year produced an instrument which in world terms, is in a class of its own.

Two further comments. Despite Department of Industry publicity VELA is not primarily an add-on to a microcomputer, it is designed as a stand alone instrument. For the price of one microcomputer system a school science department could purchase up to five VELAs. This reviewer has no doubt which purchase would make most teaching sense. Second, VELA demonstrates very clearly that the real importance of microelectronics technology is in how it helps us to do other things better. VELA is important not because it is microelectronic but because it transforms what can be done within the context of school science and technological education. That, unless like Miss Jean Brodie one is teaching in an institution intent on preserving the status quo to the point of petrification, will be the real revolution.

Reviewed by B.R. Chapman
ECT Co-ordinator, North & West Yorks MEP