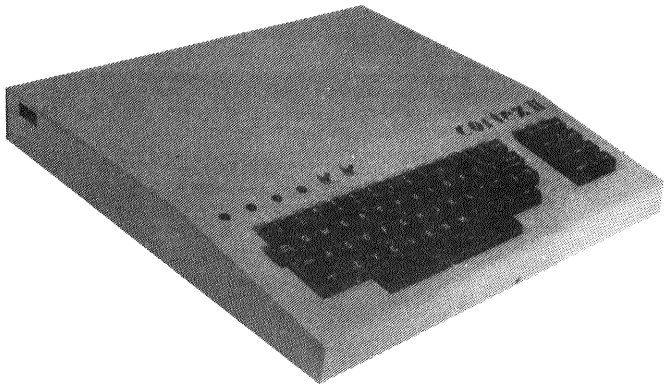
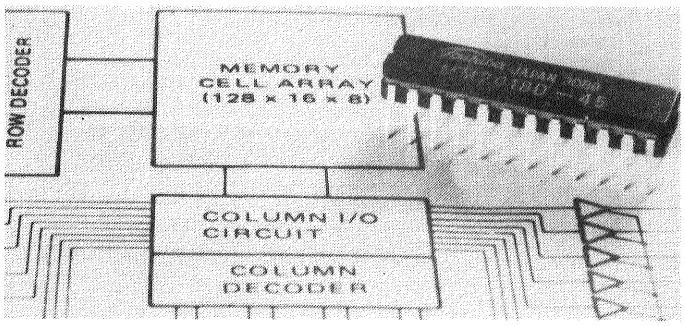
DIGEST



Cortex Facelift

The Cortex computer, as described in ETI in November and December 1982 and January 1983 (and also in a recently published edition of Electronics Digest, Vol 5 No 1) is to get a facelift, if that's the right phrase. Powertran Cybernetics will shortly be marketing the kit in a new-style case, which will be a lot slimmer than the original. The unit will include a re-designed PCB, incorporating all the modifications that have accrued since the Cortex was originally published. Powertran are also in the process of revising the Cortex manual, and hope to be able to provide a cheap disc operating system in the near future.

A users' group is being started up, and all purchasers of the Cortex should be receiving a letter about it; if you haven't already heard from him, drop Tony Lydeard a line at Powertran, as he is currently organising the group. He would particularly like to hear from people who would like to write letters or articles for the newsletter. Powertran may be found at Portway Industrial Estate, Andover, Hants SP10 3NN.



Fast 16K Static RAMs

Byte-wide 16K static RAMs operating at high speed and incorporating a low-power standby mode are now available. Organised as 2K x 8 bits, the Toshiba TMM2018D features a maximum access time of 45ns.

Maximum operating current from a single 5V supply is 150mA. A low power standby mode is entered when $\overline{CS}$ goes high and the device is deselected, when maximum standby current is 20mA.

These fully static devices are suitable for use in cache memory and other high speed storage applications. All inputs and outputs are directly TTL compatible, and inputs are protected against static charge.

Efficient operation in bus structured environments is facilitated by the provision of an output buffer control line, OE. These devices are supplied in a 24 pin cerdip package with a pin spacing of 0.3 inch width (unusual in 24 pin packages), which allows maximum utilisation of printed circuit board space.

For further details contact Impulse Electronics Limited, Croudace House, Caterham, Surrey CR3 6XQ, tel 0883 40325.

High-Tech Students In Demand

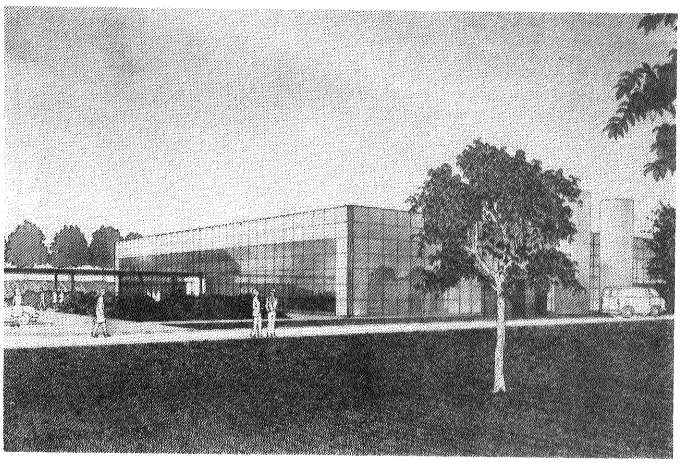
Students from a pilot training programme in the field of opto-electronics are in such demand from industry that the Manpower Services Commission has decided to repeat the project.

The courses, at Swansea, Newcastle and Coventry, are sponsored by the MSC under a scheme that aims to identify emerging high technology skill needs and stimulate the development of training to meet them. Opto-electronics is one of those new fields, and three years ago MSC sponsored a course to train unemployed graduates in the subject at Newcastle Polytechnic.

Such was its success that a further two courses, designed to retrain and update qualified engineers and technicians, began last year at West Glamorgan Institute of Higher Education, Swansea, and Lanchester Polytechnic, Coventry. "Demand for students from industry is very great, so we have decided to run all three courses again in the Autumn," said Mike Yates, Head of the MSC's Technologist and Technician Training Section.

Courses involve a period of college-based training, lasting 36 weeks, followed by about 10 weeks of industrial experience. In college, the students cover such areas as micro-electronics, optics, mathematics, electronics, data transmission, fibre optics, image processing, video displays and lasers.

These courses are likely to be over-subscribed, and ads will be appearing in the press (perhaps even ETI!) in the near future, but local MSC training division offices or job centres should be able to obtain further details for you.



Silicon Factory For UK?

Monsanto, the world's largest supplier of polished silicon wafers, plans to invest more than $35 million in a research and manufacturing facility in the United Kingdom. It is expected to create more than 400 jobs during the next five years.

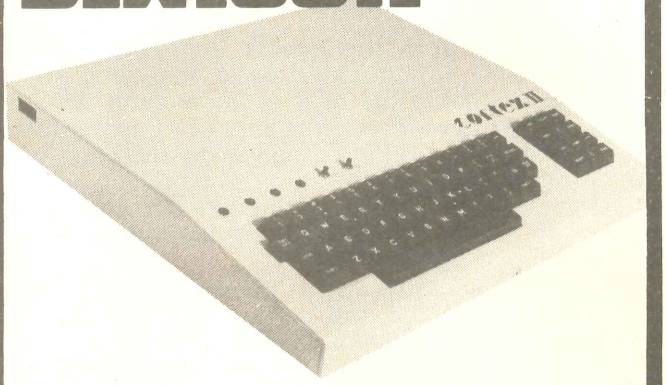
This project still requires Monsanto Board approval, but is intended to provide the UK with a domestic source of Czochralski silicon polished wafers currently imported by the integrated circuit manufacturers, while the research facility should play a critical role in Monsanto's worldwide electronics research programme.

Construction of the Milton Keynes facility is scheduled to start later this year on a prime 10 acre greenfield site at Wolverton Mill. The first phase is due for completion early in 1986 and will employ 100-130 people. The new plant will be based on Monsanto's most recent technology and produce the advanced 100, 125 and 150 mm wafers used in the manufacture of the very latest VLSI circuits.

The research centre will focus on development of the near perfect crystal structures needed for the next generation of high speed memories and microprocessors. Many of the centre's planned fundamental and applied research programmes will involve collaboration with device manufacturers, universities and industry research centres in the UK and throughout Europe.

Monsanto will also consolidate its European electronic materials business management, marketing and applications groups at the new Milton Keynes site. Monsanto Europe SA, Avenue de Tervuren, 270-272 B-1150 Brussels, Belgium, tel (Belgium) 02-762-11-12.

sweet sixteen



The Cortex II offers serious users speed (12 MHz CPU) and power (16-bit) at an easily affordable price.

Cortex II offers over 34K byte memory for basic programmes. High speed 24k byte basic interpreter. Auto-line numbering facilities and full renumbering command. Full textural error messages. Arrays and strings limited only by memory. Extended Basic (IF-THEN-ELSE). Assembler/Disassembler. Machine code monitor. Real time clock.

Cortex II has excellent colour graphic capability. High resolution graphics (256 x 192). 16 colours.
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All these features as standard, with various upgrades available.

Supplied either as a self-assembly kit or fully built and tested, the Cortex II is designed to grow with the needs of the operator.

Cortex II is the successor to the popular Cortex, which first appeared in November 1982. The new model incorporates a number of modifications to the original and is supplied with a 216 page users manual.

Cortex II standard kit (Includes RS232C, TV & Cassette Interfaces)	**£299.00**
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Floppy disc interface kit (electronics)	**£86.50**
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Centronics printer interface kit	**Contact Sales**
E-bus kit	**Office for details**
Cortex II Built and Tested — Standard Model	**£399.00**

Contact Sales Office for other options.

All prices are VAT exclusive and are correct at time of going to press.

Cortex II is available by mail order from:

Powertran Cybernetics Limited
Portway Industrial Estate
Andover
Hants
SP10 3ET

Access/Visa card holders can order by phone on (0264) 64455

cortex II

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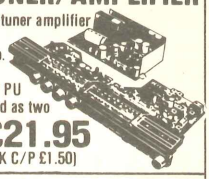

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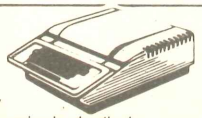

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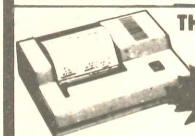

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TMK500 23 range bench 30K/Volt De luxe. 12A DC, plus cont. Buzzer, 20 Meg ohm	£23.95
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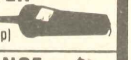

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CORTEX CENTRONICS INTERFACE

In the slightly delayed second part of this article, we present the construction and use details.

The overlay of the PCB is shown in Fig. 4. There have been three modifications between this and the original circuit given in the June ETI. Firstly, the address lines A4 and A8 were the wrong way round in the original circuit diagram and this has been corrected.

Secondly, an extra package, IC6, has been added, of which only one inverter gate is used. This is to provide a complement of STROBE as well as STROBE itself on the Centronics output; this is to increase flexibility, as some printers will require the complement rather than the original.

Finally, and also to increase flexibility, the W and Y outputs of IC4 are link-selectable; using the Y output, the BUSY IN line is inverted to become the CRUIN signal; using the W output, it is not; one or other of these will be appropriate to your printer. Needless to say, you should not use both links at the same time!

Using the special PCB, assembly of the circuit should be quite straightforward, but do make sure you get the links in the right places and be careful with IC orientation. Some clearances are a

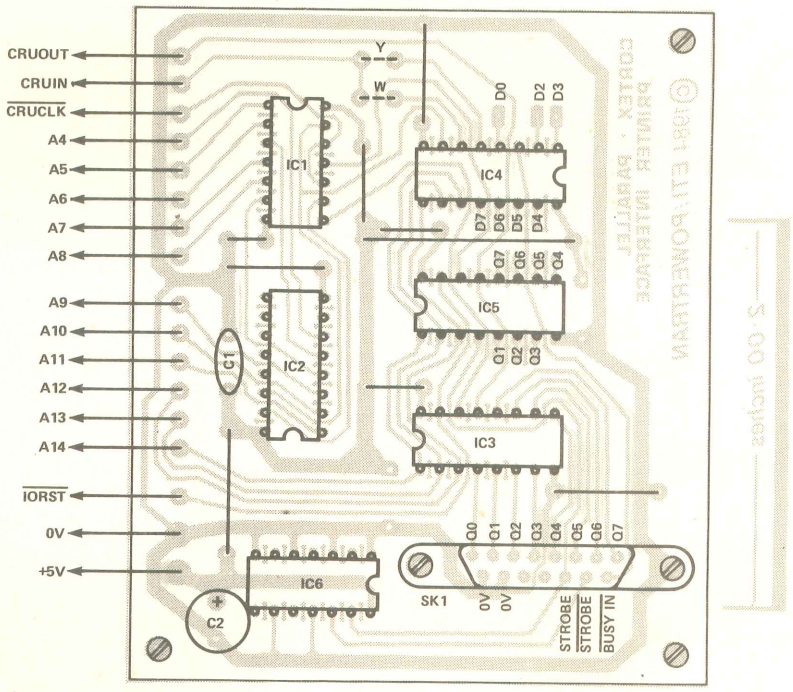


Fig. 4 Overlay diagram for the PCB. The points marked D0, D2, D3 etc and Q1, Q2, etc on the PCB (not the connector) are for the unused locations that readers may wish to make use of. Note that there are two additional decoupling capacitor location points, in the unlikely event of any supply line problems arising.

PARTS LIST

CAPACITORS

C1	100n ceramic
C2	10μPCB electrolytic

SEMICONDUCTORS

IC1	74LS32
IC2	74LS138
IC3,5	74LS259
IC4	74LS241
IC6	74LS04

MISCELLANEOUS

15-way D-type connector socket & plug; PCB; connector to suit printer; ribbon cable, etc.

BUYLINES

A full kit of parts for this project will be available through Powertran Cybernetics Ltd, Portway Industrial Estate, Andover, Hants SP10 3ET. Powertran hold the copyright on the PCB so it will be available only from them.

Fig. 5 Test program for the interface, to print a row of 'A's.

```
10  BASE  0800H          ! I/O BASE ADDRESS
20  CRB (8) = 0          ! RESET STROBE
30  CRF (8) = 0 41H      ! O/P ASCII 'A'
40  IF CRB (9) = 1 THEN GOTO 40     ! WAIT FOR FREE
50  CRB (8) = 1 : CRB (8) = 0       ! PULSE STROBE
60  GOTO 30              ! LOOP
```

bit tight, so do check carefully for any solder bridges after you have finished.

In Use

Once the interface is connected between the computer and the printer, then typing in the command UNIT 4 will enable printing, while the command UNIT — 4 will disable printing. If the printer fails to print or a paper-out condition arises, then pressing both the GRAPH and RUBOUT keys together will cause all output to be reset to UNIT 1 only.

The BASIC program shown in Fig. 5 can be used; this should print a stream of letter 'A's.

Having built the printer interface you will have noticed that there are seven spare I/O bits and if the printer is not in use then seven other parallel data ports with separate strobes and status bits can be used with a common data port. Also six other I/O address slots are decoded by IC2 as shown:—

O/P	ADDRESS	
Y0	0800	Parallel data output
Y1	0810	Single bit I/O
Y2	0820	
Y3	0830	
Y4	0840	Unused
Y5	0850	
Y6	0860	
Y7	0870	

We look forward to receiving project ideas from readers that make use of these!

ETI

quencies than any anechoic or free-field measurement, so there is no absolute way of showing who is right. The formulae given in the article will allow calculated response curves that are accurate to about 1dB to be plotted, which is a lot better than I can measure at frequencies below 100Hz. Mr Morgan is correct with his second point — the bottom term should be bracketed.

Dear Sir,

As a sail plane, as opposed to hang glider, pilot I am very interested in your Vertical Speed Indicator design (variometer is a much neater name), and I shall be building at least one when time permits, but could the designer be prevailed upon to add a refinement known as Total Energy Compensation considered to be essential by sailplane pilots?

For non-gliding types, let me explain that to increase speed a sailplane (or hang glider) pilot has to lower the nose of the aircraft and dive; conversely, raising the nose slows the aircraft as it climbs. A variometer, being a very sensitive device, responds to very small control inputs even when the pilot thinks he is flying at constant speed. These climbs and descents involve only an interchange of potential and kinetic energy and any loss of height can be regained, within the constraints of the second law of thermodynamics, by reducing speed. The total energy of the glider remains essentially constant. The pilot therefore does not want these height changes to be indicated on his variometer, they confuse the important information whcih is the direction and speed of height variation caused by the air through which the glider is flying.

A total energy compensation system cancels out the unwanted signal, commonly by changing the volume of the capacity bottle in a flow measuring system by means of a diaphragm deflected by varying pilot pressure when speed changes occur. The pressure sensing system of the ETI design seems admirably suited to electronic compensation by means of a second pressure transducer in the pilot tube to provide an offset signal.

The design has caused considerable interest among sailplane pilots and a practical modification would be well received. Can you fix it?

A final word. I am not sure about open frame-work hang gliders, but if the variometer is to be fitted to a closed cockpit sailplane, the pressure sensor should be plumbed into the static vent pipework to prevent response to small pressure changes in the cockpit.

Yours faithfully,
Terence Jenvey,
Knole,
Somerset

Your points have been noted and passed to the author, who was last seen heading for his workshop: whether this was to get down to some serious prototyping or simply to hide from us, we do not know . . .

Dear Sir,

I have just finished filing the contents of ETI January 1983 to April 1984 inclusive and thought that you might be interested in the following observations.

It would greatly assist filing if the project/feature pages could be arranged so that they are i) totally separate, ie, not back-to-back with other articles and ii) not back-to-back with advert pages.

An analysis of projects over the above period breaks down as:–

Computing	*26*
Music	*5*
Audio	*9*
Test	*7*

Miscellaneous 19 (including everything not in the previous four categories).

Whilst I am fully aware that this is the age of the computer, there are magazines dedicated to this subject and I, for one, would welcome more high quality audio projects. I was particularly impressed with John Linsley Hood's Audio Design Series and would welcome more of the same.

Finally, a suggestion for a future feature article — how about an article on the design of PCBs, laying down the ground rules for component placement and input/output runs to minimise pickup, unwanted feedback, etc, etc?

I hope that you find the above of some interest; keep up the good work with one of the best electronics magazines around.

Yours faithfully,
A. G. Crane
Kings Lynn,
Norfolk

We are not sure that counting the number of projects is the best way of indicating what emphasis we are placing on particular fields. For instance, some of the longest projects we have published have been audio ones — for example, Barry Porter's Modular Preamplifier, and John Linsley Hood's 'Audio Design' amplifier (which may have to run to four parts rather than the three originally planned, due to the amount of material). Perhaps if the number of pages were counted, a quite different apparent balance would be arrived at.

That said, there is undoubtedly a very strong interest in using computers amongst our readers, and this shows in the numbers of contributions we get on the different subject areas. Whenever we are offered a project of sufficient merit, we do our best to use it, whatever its field.

Finally, the laying out of ETI pages is difficult enough as it is without trying to impose extra restrictions on us! Let it suffice to say that we do our best to produce a magazine that is, visually, easy to follow and attractive.

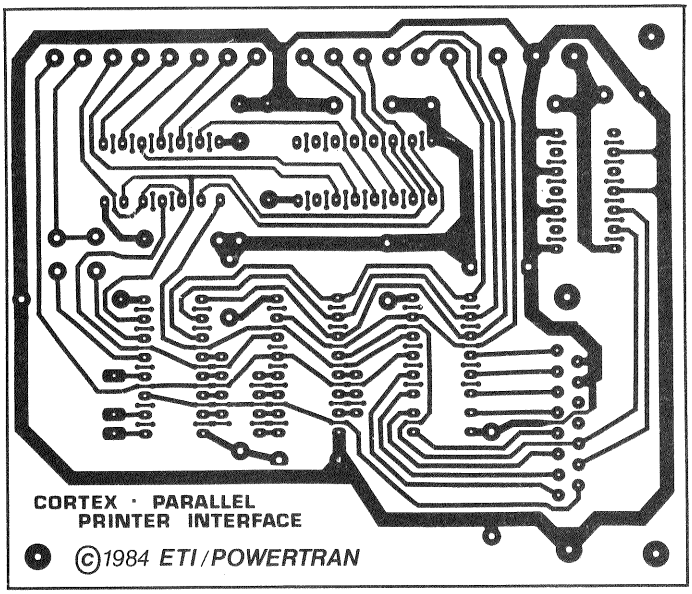
Dear Sir,

Thanks for a great mag; my only complaint is where are the follow-up articles/projects for the Cortex 16-bit computer? Your last article entitled "Cortex BASIC Part 1" (Feb. 1983) — what about part 2? And while I'm at it, how about a few circuits to add-on. A parallel in/out would do nicely for starters!

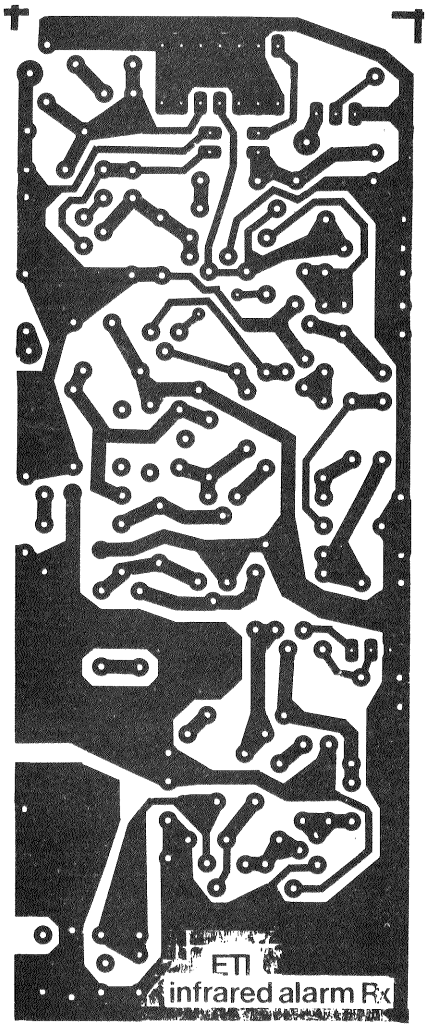
Yours faithfully
A Gibson
Edinburgh

It's been a long time coming, but the follow up on the Cortex does seem to be arriving! Firstly, we dropped the article on Cortex BASIC after the first part because we found that Powertran were sending out a manual to kit purchasers with exactly the same information as we were intending to print. Perhaps we could have explained our decision better at the time, though.

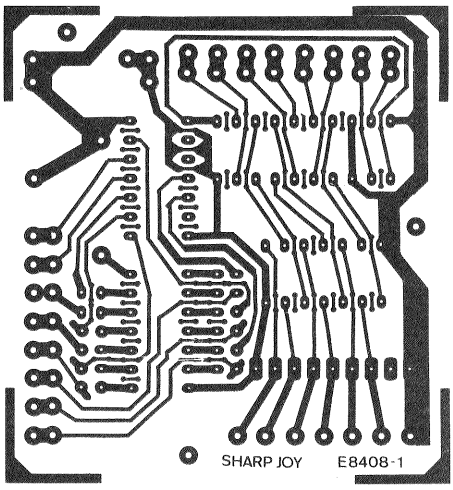
Hardware follow-ups depend on you, the readers. We are just completing one hardware add-on (the Centronics interface, the second part of which was delayed so that we could sort out a few problems with the PCB), and others are in the offing. However, what we print depends on what we get sent by you lot out there, so if you've built something for your Cortex, and you think it would be up to our standard, let us know about it! ETI



The Cortex Centronics Interface board.



The Infrared Alarm receiver board.



The Sharp Joystick Interface board.