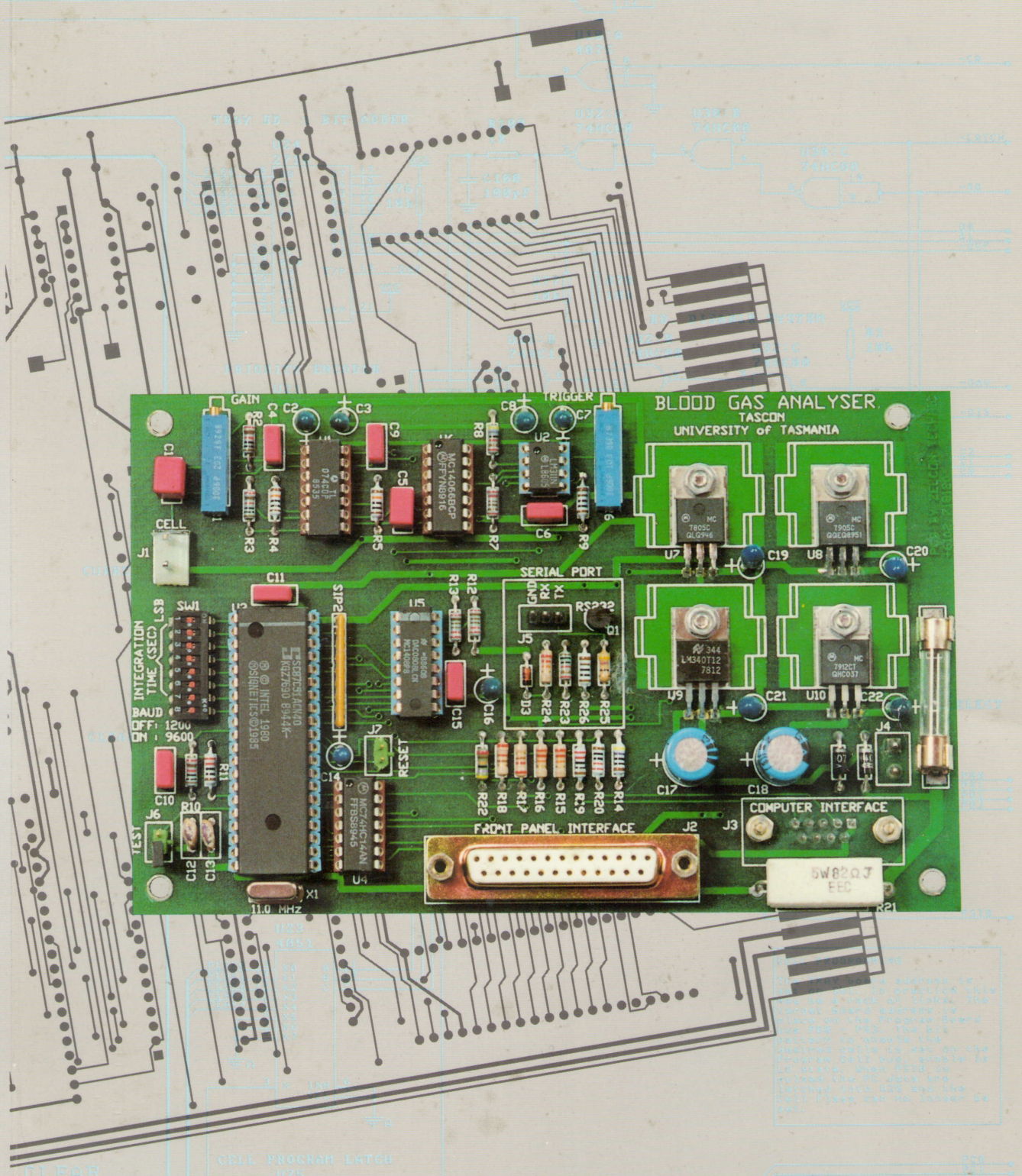
Zelcon Technic Pty Ltd

A.C.N. 009 499 361



ELECTRONIC ENGINEERING • SERVICES • TRAINING COURSES

FOREWORD

This Directory of Services is your introduction to the comprehensive range of ***Zelcon Technic's*** electronic engineering services.

It has been designed to provide both a general summary for those who have little knowledge of the electronics industry as well as detailed technical information for the initiated. New technical sections will be added and all material will be regularly up-dated.

At ***Zelcon Technic*** we have a commitment to provide the highest level of service and quality. We believe this can only be achieved by working in close conjunction with you, our Customer.

To ensure your expectations are met we constantly direct a percentage of our resources to develop our specialised electronic engineering services through research and innovation.

Once you have had the opportunity to read about our range of services I look forward to fulfilling your requirements through our reliable, quality service.

David Warren
Director
Zelcon Technic Pty Ltd

CONTENTS

INTRODUCTION

Zelcon Technic Pty Ltd is situated in the Tasmanian Development Authority sponsored Technopark at Dowsings Point, Hobart, Tasmania.

The need for an industrial area which would attract highly technical companies into an environment which would foster and encourage them was recognised by the Tasmanian State Government in 1986.

The Technopark Management Services manage the complex and offer business within, access and networking to the Tasmanian Development Authority as a whole, the Tasmanian Innovation Council, National Industry Extension Service and the Federal Department of Industry, Technology and Commerce.

The sighting of ***Zelcon Technic*** in such a centre has played a part in our growth as we have a supporting infrastructure of compatible industries around us offering high quality sub-contracting services.

Into the centre we have introduced the latest technology to insure your work is facilitated to the highest specifications. This combined with highly skilled staff is your guarantee of quality.

PHOTOPLOTTING AND PCB SUPPLY

We can produce photoplots from Protel format PCB files , Gerber format plot files or HPGL plot files.

A Protel PT101 photoplotter is utilised to provide the service which is geared for fast turn around and high quality plots.

Photoplotting from Protel PCB files

We specialise in producing photoplots from customers Protel format PCB files. Our experience in undertaking this type of work allows us to guarantee you a successful plot from a PCB file providing there are no engineering faults with the design.

To facilitate efficient plotting of a new PCB design we suggest you select pad and track sizes from our preferred aperture list available at the back of this directory.

Photoplotting from Gerber files

Customer generated Gerber format files are fulfilled by ***Zelcon.***

Our experience shows that the best results are obtained from Gerber files by using the standard aperture list enclosed with this directory. This list is applicable regardless of which CAD package is used.

In cases where utilisation of our aperture selection is not convenient then you should simply supply a list of D-codes with shapes and sizes used.

Prior to starting a Gerber file plot all technical details are checked with you the customer prior to being committed to film.

PCB Supply

Once your photoplot is completed to your exacting requirements another ***Zelcon*** service takes over to supply your PCB.

Using our experience in the electronic engineering field we choose from one of our specialist suppliers the company best suited to undertake the manufacture of your PCB. All work subcontracted in this way is closely supervised to ensure it is carried out completely in accordance with your brief and to our exacting requirements.

In this way we are able to achieve optimum results in the most cost effective manner.

No job is too big or too small for us. Whether your requirements range from a simple single sided board to a complex multi-layer PCB we have a comprehensive service and technical staff to carry out your requirements to the highest standard.

We stand behind this claim with our guarantee of supplying PCB's without manufacturing defects.

SMT Prototyping and Assembly Services

PCB assembly is another service offered by ***Zelcon.***

We offer a number of assembly options of a very high quality.

Our assembly unit can handle simple through hole assembly through to the more sophisticated Surface Mount Technology tasks.

We have geared our through hole assembly system to handle small to medium production runs in the most economical and fail safe fashion.

Where your process demands the state of the art SMT ***Zelcon*** once again provides the service. Our screening facilities, machine assisted placement equipment and on-line infrared reflow oven offer a highly accurate assembly service.
Whichever method is utilised, full static safe and documented assembly is part of our standard operating procedure. It is this commitment to quality assurance that once again provides you with a defect free quality product.

PCB Design Service

If you are unsure of your exact requirements or specifications our skilled engineers will assist. They will prepare schematic diagrams and in consultation fine tune them until the design meets your requirement.

With the design decided, the value of your PCB layout can be calculated so that you can be sure of the final cost. With this system any nasty shocks when the job is completed are eliminated.

By using the latest in specialist PCB CAD design software a number of options can be explored economically.

Depending upon your budget various levels of auto-assisted placement and auto-routing can be utilised.

TRAINING IN SCHEMATIC AND PCB CAD DESIGN

Specialist training courses are conducted by ***Zelcon*** with the purpose of improving your productivity at a professional level.

These courses can be run at your own establishment or as part of a structured seminar for industry personnel.

Zelcon has particular expertise with the Protel range of products as our Managing Director David Warren was a Software Development Manager and Photoplotting Development Team Leader with Protel prior to establishing his own successful company.

Protel now endorse his training programs in conjunction with the supply of their products.

In all cases where training programs are provided they are designed to provide hands on experience in a workplace environment.

A detailed list of the types of training courses available are enclosed with this directory.

SPECIALIST RESEARCH AND DEVELOPMENT

We have undertaken major projects for customers which involved specialised research and development.

Two particular projects which gave us the most amount of satisfaction were the development of:

. **X-ray Telescope Controller Electronics Module**

. **Electrocardiographic Data Acquisition System Electronics Module.**

The first of these R & D projects was undertaken as a joint development exercise in conjunction with the Department of Physics, University of Tasmania. It involved the collection of pulses from 64 anodes output from the Department of Physics X-ray Group detector.

The detector is a Xenon filled pressure vessel and high voltage anode array comprising a complex proportional counter. The output from each anode is passed to a Peak Detector and Pulse Discriminator. Upon the occurrence of a pulse the central CMOS processor begins a detailed validation sequence at the end of which the pulse is either rejected or deemed to be part of an X-ray detection.

The entire assembly is required to operate at 40 Km altitude with a temperature range of -20^{o} C through to $+60^{o}$ C.

The second project was undertaken as part of an exercise with the Department of Medicine, University of Tasmania.

This involved the collection of a signals from 128 electrodes arranged in a Torso Jacket.

The packaging solution put forward by ***Zelcon*** led to a contract to re-engineer the electronic unit.

Our system utilised eight analogue input cards of 16 channels to collect the signals which were then steered to a high performance 12 bit ADC via a system multiplexer. The 128 signals are sampled simultaneously by the use of ganged Sample and Hold Amplifiers.

The jacket information can be acquired at 2 KHz or 256,000 samples per second.

Recently we have redesigned the very high performance amplifier modules used to collect the 128 signals. The resulting SMT, 20 pin, SIL module integrates an instrumentation amplifier front end with filtering, gain control, and the SHA.

This has been a major joint success and demonstrates the type of specialist networks to which we have access.

These projects are indicative of the type of work we are trained in fulfilling. A detailed list of specialised R & D projects are included in the back of this directory.

IN CONCLUSION

It's obvious ***Zelcon Technic*** wants your business.

But that is only part of the story. The important thing is what we can provide for you in return.

Electronic engineering work of the highest quality.

Access to sophisticated photoplotting and PCB supply

SMT prototyping and assembly services

PCB design service

Training in schematic and PCB CAD design

A wide range of associated products and complimentary services

The services of highly skilled scientists, engineers and technicians

Our guarantee of supplying PCB's without manufacturing defects.

We do not expect this directory to do as good a job explaining our services as we can do personally.

So, all we ask you to do is to ring ***Zelcon*** on 002 71 8120 or fax your enquiries to 002 72 0768.

We are eager to start working with you.

APPENDIX 1

Aperture file ZT.APT

All apertures are "preferred" only. We can rematch files using your apertures.

DCODE	SHAPE	X	Y	HOLE
D10	CIRCULAR	5	5	0
D11	CIRCULAR	8	8	0
D12	CIRCULAR	10	10	0
D13	CIRCULAR	12	12	0
D14	CIRCULAR	15	15	0
D15	CIRCULAR	20	20	0
D16	CIRCULAR	25	25	0
D17	CIRCULAR	30	30	0
D18	CIRCULAR	35	35	0
D19	CIRCULAR	40	40	0
D20	CIRCULAR	45	45	0
D21	CIRCULAR	50	50	0
D22	CIRCULAR	55	55	0
D23	CIRCULAR	60	60	0
D24	CIRCULAR	65	65	0
D25	CIRCULAR	70	70	0
D26	CIRCULAR	75	75	0
D27	CIRCULAR	80	80	0
D28	CIRCULAR	85	85	0
D29	CIRCULAR	90	90	0
D30	CIRCULAR	100	100	0
D31	CIRCULAR	110	110	0
D32	CIRCULAR	120	120	0
D33	RECTANGULAR	10	10	0
D34	RECTANGULAR	20	20	0
D35	RECTANGULAR	25	25	0
D36	RECTANGULAR	40	40	0
D37	RECTANGULAR	50	50	0
D38	RECTANGULAR	60	60	0

APPENDIX 2

Current Projects

128 Input electrocardiograph

256 Input electrocardiograph

Electrocardiographic amplifier module
- Implemented as a 20 pin SIL, SMT device
- Instrumentation amplifier front end
- Gain controls
- Programmable high & low pass filters & SHA.

Blood oxygen analyser controller

X-ray telescope controller
- 64 anodes feeding peak detectors
- Pulse detectors
- Rise time discriminator
- 18 analogue guard channels
- Coincidence logic noise rejection
- Advanced end guard electronics.

2 kilowatt power meter
- Plus and minus true power
- AC and DC operation
- 1 watt resolution
- Accuracy of 0.2% at room temperature.

High temperature K-type thermocouple unit
- 0°C-1200°C
- Panel mount

Low temperature K-type thermocouple unit
- -50°C to 200°C ± 0.1° accuracy
- Panel mount.

Very high frequency stepper motor drive
- 0Hz to 60kHz operation
- 120 volt supply.

Improvements to the Protel PT101 Photoplotter
- Under agreement with Protel Technology P/L
- Dave Warren is the principle designer of PT101

Programmable 4 channel mains time switch
- Micro-controller with clock/calendar.

Other Areas of Expertise
- Complex PCB design (high voltage, high power, low noise)
- Micro controller applications (8051 family)
- Temperature measurement. (-100°C to 2000°C)
- Ultrasound and piezoceramic applications
- Bio-electrical equipment design
- Electro-surgical equipment design
- Stepper and servo motor applications
- Negative feedback control
- Electronics for acupuncture.

APPENDIX 3

Training for the professional

Available in all major capital cities, these one day courses are designed for experienced users of the Protel products. They are to be run in a computer laboratory format and are strictly HANDS ON.

- Protel for Windows upgrade course

The aim of this course is to give advanced users a flying start with "Protel for Windows" and thus enhance productivity.

- Advanced Autotrax for 1992

The aim of this course is to arm advanced users with concise information which will improve productivity.

"David is eminently qualified to conduct Protel training courses. He has an intimate knowledge of our products through his past association with their development and also through his everyday use of them in his own business.

If you want to discover how to extract every last ounce of performance from our products, particularly our new Protel for Windows, then look no further than the training course provided by Zelcon Technic."

Richard Chapman, General Manager, Protel Technology

Special in-house training is also available by arrangement.The topics covered are:

- SMT techniques
- PCB design using CAD
- Use of Protel CAD products.

Zelcon Technic Pty Ltd

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SBT150 ARCHIVAL TAG

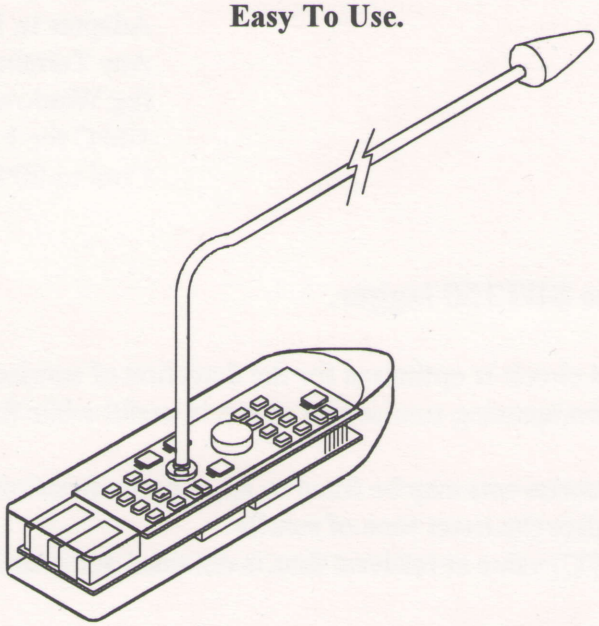
256K Memory.

8 Year Life.

User Programmable.

Depth Rating to 500m.

Easy To Use.



Designed for use in free ranging fish these dataloggers record light-level, temperature, and depth accurately with time. The memory provides data storage for some 60,000 records of these parameters. An on board lithium battery provides power for RTC operation and data retention for up to 8 years.
The assembly is potted in heat cured epoxy to provide proven environmental protection. These units are tested from -10°C to 30°C and 0 - 500m depth.

Specifications on reverse page.

ELECTRONIC ENGINEERING • SERVICES • TRAINING COURSES

Zelcon Technic Pty Ltd
Technopark, Dowsings Point, Glenorchy, Tasmania
Phone (002) 71 8120 Fax (002) 72 0768

SBT150 FISH LOGGER SPECIFICATIONS

Dimensions (W x D x L) (L = 82mm with insertion fairing option)	25 x 12 x 77mm
Weight	39g
Battery	350mAh Lithium.
Mean Current Consumption	4.5µA
Temperature Range Max.	-10°C to 35°C
Temperature Range with 0.2C Resolution	0°C to 30°C
Depth Range	0m to 500m
Depth Resolution	2m
Light Measurement Dynamic Range (The practical result is first counts at about 40 min pre-sunrise, and count saturation at about 1 hour after sunrise. These results are for 42°S, 4 May, at sea level, clear sky)	254 counts
Data Format	ASCII
Interface Requirements	Adapter to PC serial port.
Software required	Any Terminal Program (eg Windows 3.1 Terminal)
Autoclaving	100°C for 1 minute. Cool to 20°C.

Geolocation using the SBT150 logger.

The gain of the light-level circuit is optimised for the detection of sunrise and sunset.
Data from the periods encompassing sunrise and sunset is useful while full sunlight adds little extra information.
Data from pre and post sunrise sets may be fitted to appropriate functions and the intersection used to calculate the exact time of sunrise.
The Real Time Clock (RTC) value at retrieval time is obtained and a time correction fitted to the data.

New Developments

Under development are models featuring:

- Smaller dimensions (25 x 10 x 62mm).
- 512K and 1M units.
- 0.1°C temperature resolution unit.
- External Logger.
- Extended Life (15y to battery shelf life)

Developed in conjunction with the CSIRO Marine Laboratories, Hobart.

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MK2 Penguin Radio Beacon

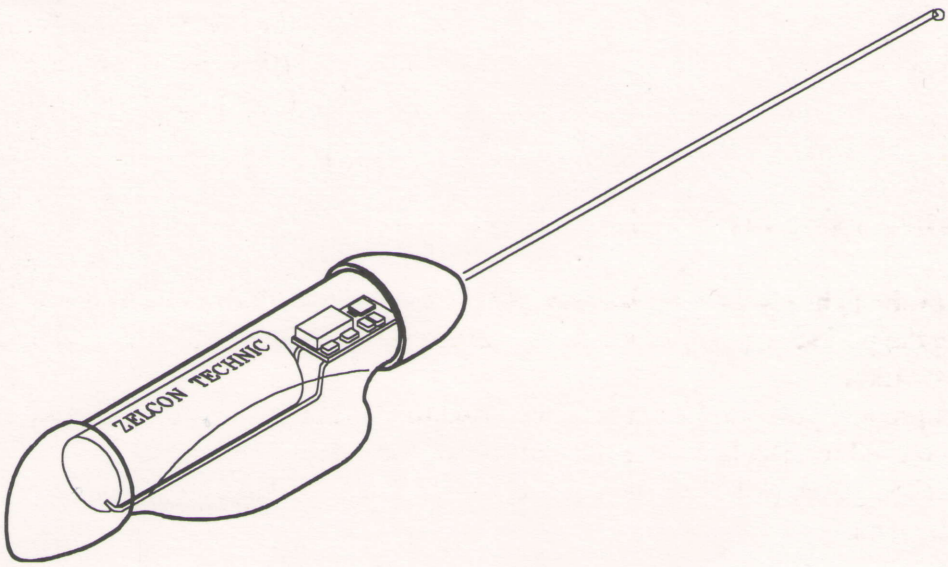
150 MHz Band

Low Temperature Operation.

Long Life.

Depth Rating to 500m.

Long Range.



Based on the Sirtrack VHF transmitter module the beacon incorporates a long life lithium battery, reed switch, and marine environment whip antenna.
The assembly is potted in heat cured epoxy to provide proven environmental protection.
These units are tested to -30°C and 500m depth.
Bollards at each end allow hose clamp fixing to feathers. A wide base gives stability and provides a large glue area. The entire unit is streamlined to minimise drag.

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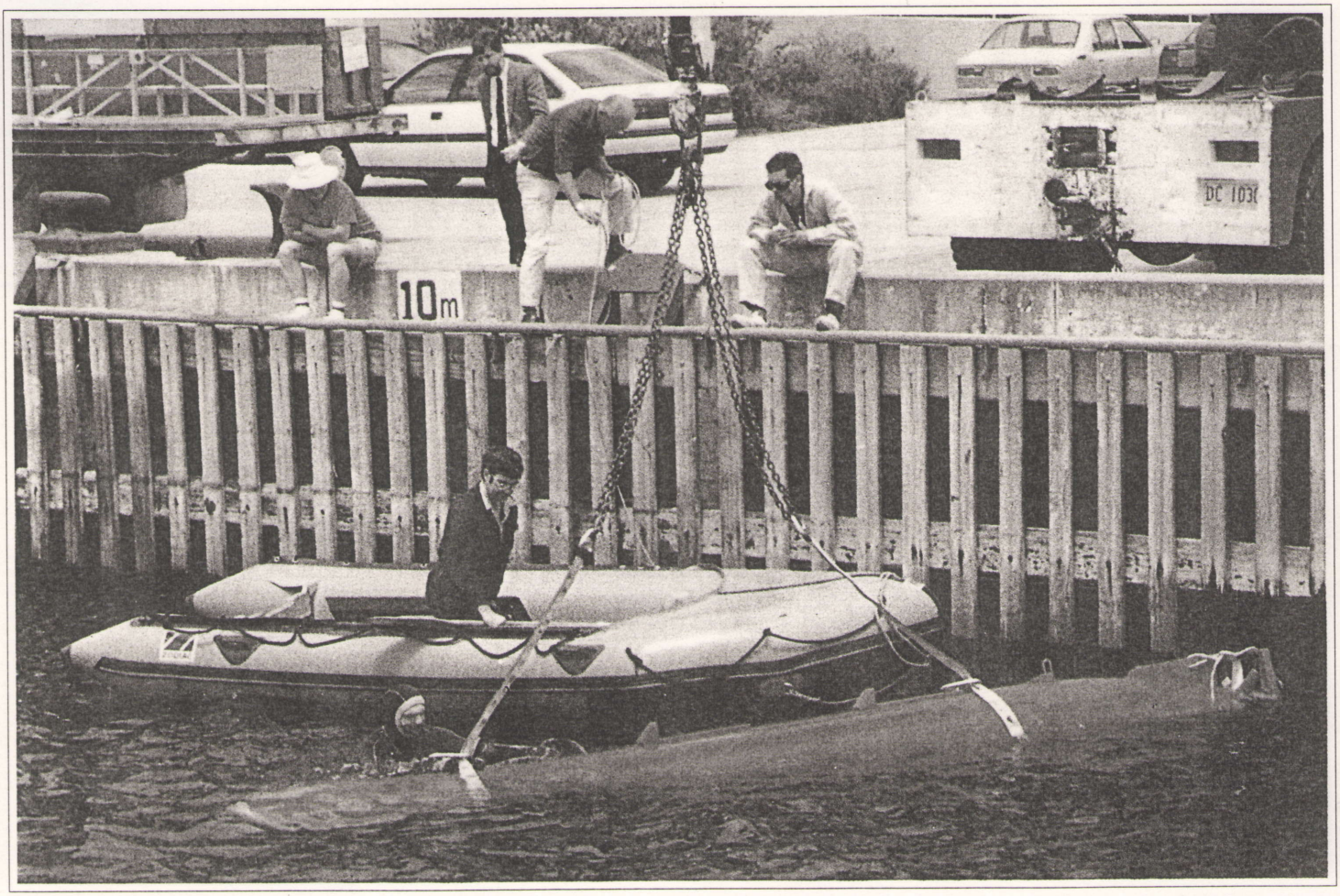
THE UNIVERSITY OF TASMANIA

Research News

Number 5, February 1993

Sword becomes ploughshare



The torpedo TADPOLE is lowered into the water at Ocean Pier in Hobart for inspection. ● Dr Kelvin Michael (yellow overalls) and Ian Knott (inflatable dinghy) supervise the operation.

Was there ever such a thing as a friendly torpedo? Well there is now, and the postgraduates at the Antarctic CRC have nicknamed it TADPOLE – the Torpedo for Advanced Polar Experiments. As the centrepiece of a project directed by Dr Kelvin Michael, TADPOLE has been adapted to nose its way around beneath sea ice, for ten kilometres at a time, sensing a profile of the ice thickness as it goes.

Measuring the varying thickness of Antarctic sea ice is important to glaciologists and climatologists because Southern Ocean ice has an enormous cold-blanket effect. By limiting the rate at which heat is exchanged between the oceans and the atmosphere above them, it influences atmospheric pressures, wind speeds and directions, snowfall and rainfall, and hence other aspects of the weather patterns right round the southern hemisphere.

Up to now, however, obtaining sea-ice thicknesses has been difficult and expensive. It has involved hundreds of expeditions by ship and helicopter in order to drill into the ice at many points and perform manual measurements. There had to be a better way, and Kelvin Michael and his colleagues are trialling one with this first-ever adaptation of a naval torpedo for under-ice exploration.

The plan is that in April this year, working from the Antarctic Division's research vessel *Aurora Australis*, the TADPOLE will follow predetermined courses beneath Antarctic sea ice.

This project is as much engineering as it is climatological science. The decommissioned torpedo, supplied at low cost by the Royal Australian Navy, has had its warhead removed and most of its other innards replaced or adapted for its new and peaceful purpose. It now contains a purpose-built computer, designed and constructed by Zelcon Technic Pty Ltd, which guides TADPOLE and stores its scientific data.

When launched from the ship, the torpedo will travel in a U-shaped route – not in a circle, because the idea of a torpedo, however neutered, being

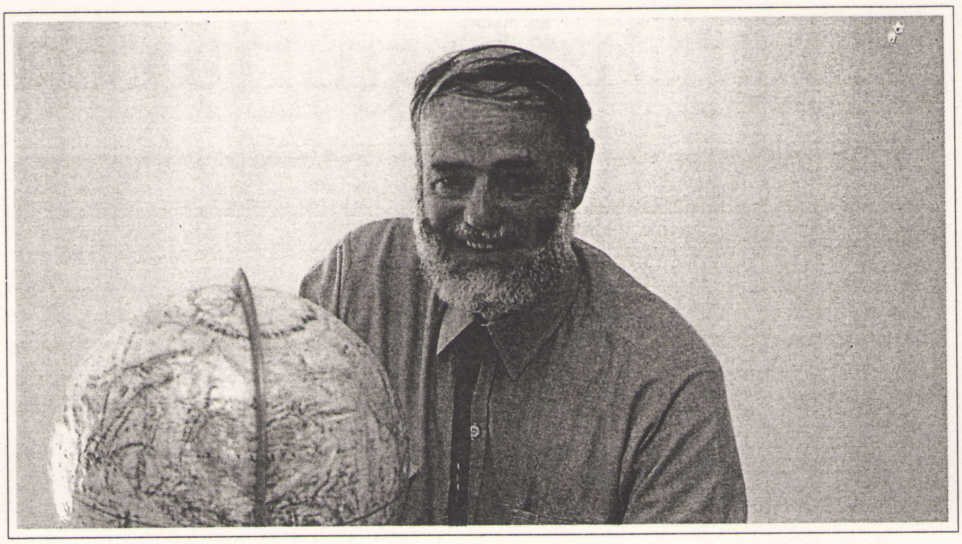
• Continued on back page.

Professor Bill Budd is a climatologist who tracks climate change, both observationally and through mathematical modelling.

The Earth's climate system is a continuous process of heat exchange involving the atmosphere, ice, oceans and land-surfaces. Some sea ice is highly reflective and reflects heat back into space. The resultant Antarctic cooling allows more sea ice to form, which in turn feeds the oceans with cold, deep water.

But the converse can happen too. More than half of the global oceans' water originates from the Antarctic region, and as global atmospheric warming – the greenhouse effect – brings about a reduction in sea ice, there is less deep water formed. Also, the cold surface water does not sink as deeply as before, so the oceans warm up as well as the atmosphere.

Mathematical models can both predict and, in some instances, confirm



these broad effects. Using data accumulated since the 1950s, together with the estimates of sea-ice cover from the last two decades, Professor Budd has shown how far the predicted trends in warming and in decrease of sea ice are now being borne out. There are small but significant trends of rising temperature and decreasing sea-ice cover, and the changes are of the order expected from the increasing greenhouse gases.

The Antarctic CRC

This issue of *Research News* draws exclusively on the work of one of the major research centres located at the University's Hobart campus.

The Australian Research Centre for the Antarctic and Southern Ocean Environment was established in 1991 as one of the first of the Co-operative Research Centres sponsored by the Commonwealth Government. There will eventually be up to 50 such centres supporting research and research training in areas of economic significance to Australia. Each will involve industrial organisations and at least one university.

The Antarctic CRC (to give it its conveniently short everyday name) works with the whole international scientific community but especially closely with the Australian Antarctic Division, the CSIRO Divisions of Oceanography and Fisheries, the Australian Geological Survey Organisation, and the Bureau of Meteorology. As one of the world's focal points for Antarctic and Southern Ocean research, it has an operating budget of over $8 million a year and has already become a major employer of scientists in Tasmania.

The main emphasis of research in the Antarctic CRC lies naturally in the physical and biological sciences. The Centre provides high-quality postgraduate training in polar study for environmental scientists, and currently there are some 50 of these enrolled for degrees. But it also aims to enlarge the whole knowledge base supporting Australian legal and political initiatives relating to Antarctica and the Southern Ocean.

The Director of the Centre is Professor Garth Paltridge.

• Continued from page 1.

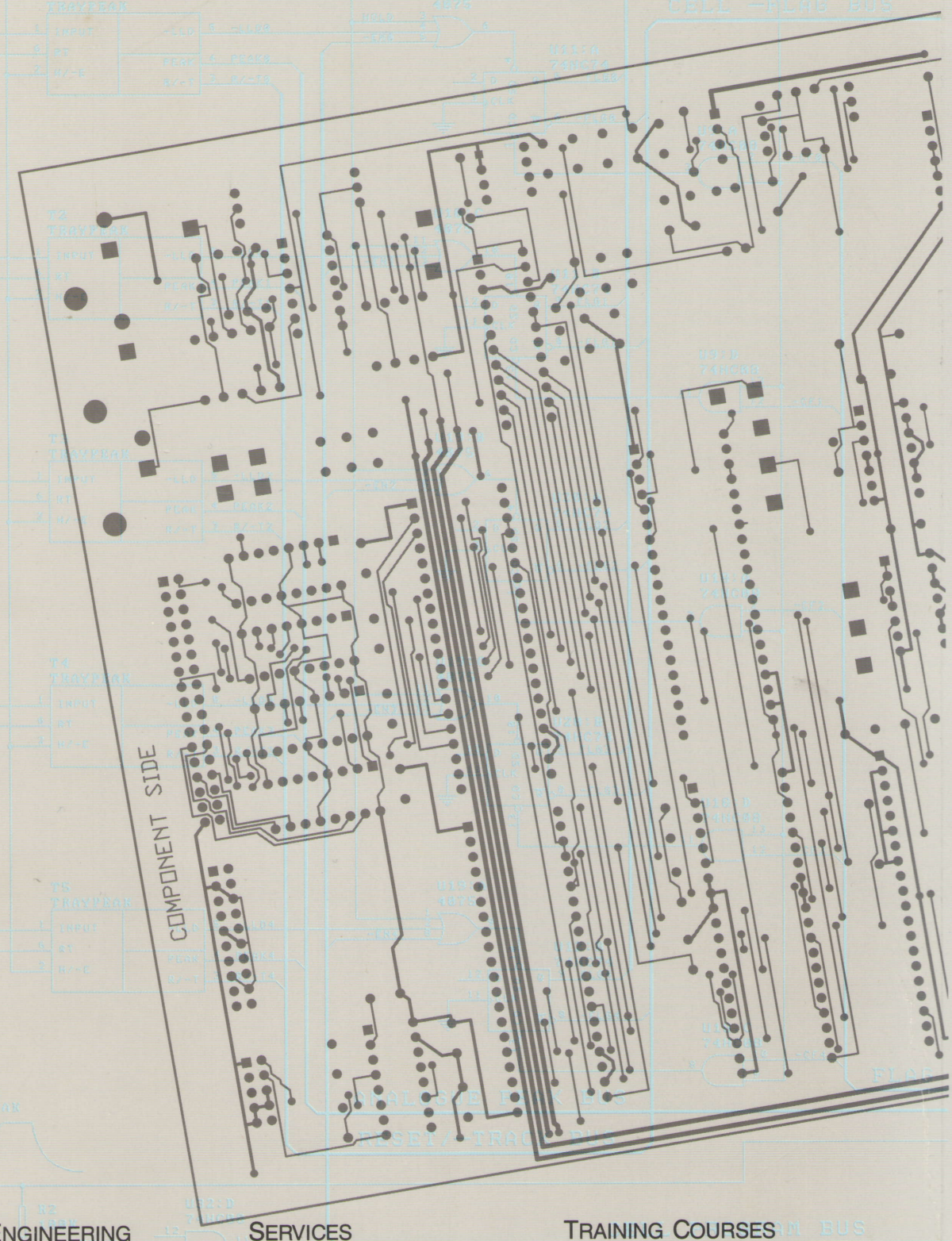
pointed back to the ship that launched it is an unwelcome one. TADPOLE will be guided back to a homing buoy, and then winched in on a towline. This will not only ensure that it will complete its circuit safely, but will also bring it back to a convenient area of ice-free water.

The torpedo is powered by a bank of 24 batteries which supply the 700 amps driving its twin contra-rotating propellers. When it is sent out on its two planned circuits, in April this year, it will travel at around 15 knots, taking 20–30 minutes to complete each journey, at a depth of about 15 metres. (And the keel depth of *Aurora Australis*, do you ask? Seven metres.)

An important element of the preparations for these trials was in selecting suitable instruments with which the TADPOLE will measure both the water pressure immediately around it and the varying distance between the torpedo itself and the underside of the sea ice. All these measurements have to be finely accurate to be useful. Other equipment will report to the control computer the attitudes of the torpedo itself as it yaws, pitches and rolls during travel.

If these trials are successful, more elaborate explorations could be tackled in later projects. Improvements to TADPOLE may include a television camera and the ability to measure fluorescence from which concentrations of organic pigments in the seawater could be calculated. Thus the research could gain a biological dimension. Marine science is like that. Once you start . . .

For further information about these and other areas of research contact
Office for Research, GPO Box 252C, Hobart, Tasmania 7001
Phone 002 20 2764, Fax (Aust.) 002 20 2765 International +6102 20 2765



ELECTRONIC ENGINEERING

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- SCHEMATIC DESIGN
- PCB DESIGN
- ROUTING

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- PCB SUPPLY
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