

# TDS NEWS



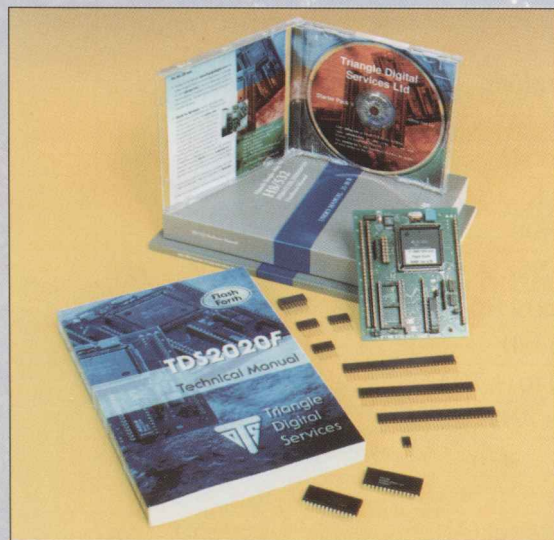
NEWSLETTER OF EMBEDDING COMPUTING

THE FAST AND EASY WAY TO PUT COMPUTERS INTO INSTRUMENTS, PROCESS CONTROL AND DATA LOGGERS

## Weeks not Months!

These card computers enable you to build equipment meeting exact requirements, without having to be a computer expert.

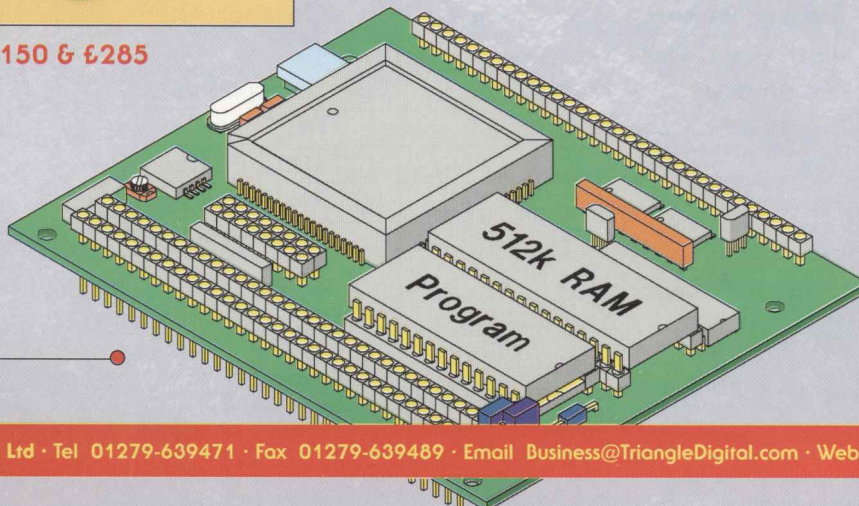
We regularly see new users shipping a prototype within weeks of purchase of a Starter Pack. The TDS2020F and TDS9092 boards are half way between assembly from electronic components and purchase of finished equipment. They give you the flexibility to tailor an instrument to your needs, without having to start from scratch. The TDS2020F has a rewriteable Flash memory so there is no need for a PROM programmer or chip swapping AND you can modify the system



remotely. The Forth language on both boards is interactive making for fast learning and debugging. The ready-made software modules are plugged together with your own code to make the computer do exactly what you want. Starter Packs cost £285 and £150 so can be readily justified on most budgets.

Contact us for full technical data on the 16-bit TDS2020F or the 8-bit TDS9092

Starter Pack cost £150 & £285



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Technical Support is usually available 7 days a week, 14 hours a day, and is FREE!

Here are unsolicited comments from customers:

The elegance and modular nature of Forth makes it the ideal language of choice for control-type applications

I was apprehensive about Forth at first, but it's not that hard after all. And with all the libraries you supply the project I have in mind may turn out to be a lot easier than I expected. Looks like you have a great product

It's nice to see (for a change) that there are still some people out there that still care about servicing their customers. I'm frustrated to death dealing with those that have forgotten

I must say that your equipment is proving most reliable in the field

## Users include:

- Lockheed
- Honeywell
- Shell
- British Gas
- British Steel
- Ferodo
- British Aerospace
- Rolls Royce
- Technology Partnership
- Transport Research Laboratory
- Plymouth Marine Laboratory
- Woods Hole Oceanographic Inst.

# Who are Triangle?



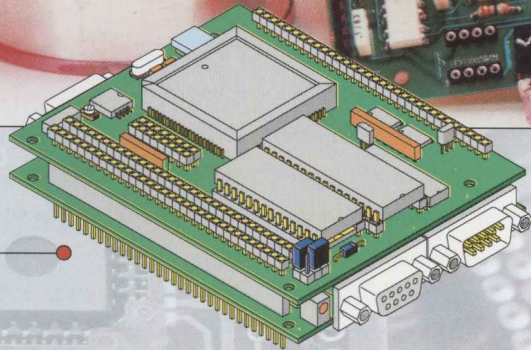
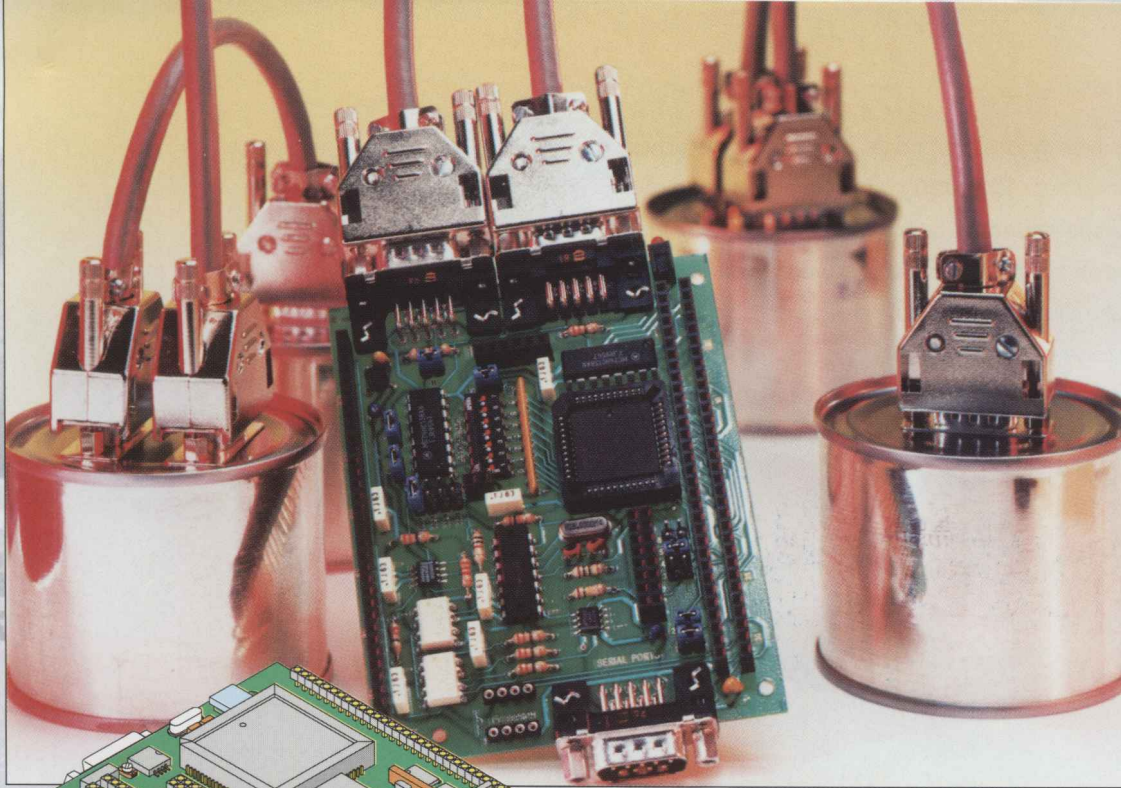
We have been making industrial Forth embedded computers for 20 years. Forward compatible in language and hardware, we always provide an upgrade path for customers. A bought-in computer will save front-end costs and shorten product development times. Expertise in the application is paramount, you don't need a specialist computer designer. Stability is needed in these industrial markets. Many advertisements have come and gone for board computers - you will have seen them yourself - yet we also make 'old timers', which will remain in production. We operate on a long-term basis and represent a secure source of leading-edge product at good prices. You have unrivalled technical support during development. We designed both software and hardware so can answer all questions.

“ I am very pleased with the support I've received. I am happily surprised by your promptness and thoughtfulness about your customers. ”

To quote one USA customer

## What you get in a Starter Pack

Feature	TDS2020F	TDS9092
Parallel Ports	26 - 41	35
Serial Ports (RS232 levels)	2	2
Max. SRAM (options available)	32k - 8M bytes	8k - 16k bytes
Max non-volatile storage	1 gigabyte	32k bytes
Max. compiled program	45k bytes	30k bytes
10-bit A-D (channels)	8	0
8-bit D-A (channels)	3	0
I <sup>2</sup> C serial bus	Yes	Yes
Real Time Clock	Standard	Optional
Matrix Keyboard Support	64	64
LCDs (Character & Graphic)	8 max.	8 max.
Power Supply	+6 to +16V DC	+6 to +16V DC
Power (typical)	31mA	15mA
Power (low power mode)	0.155mA	3.0mA
Microprocessor	Hitachi H8/532 (16-bit)	Masked HD6301 (8-bit)
Temp. Range (others available)	-10 to +70°C	-10 to +70°C
On Board High Level Language	16k ANS Forth	16k Fig-Forth
On Board Assembler	Yes	Yes
Extensive Existing Libraries	Yes	Yes
Floating Point	Optional (ANS)	optional
Background Tasking	Yes	Yes
Pre-emptive Multitasking	Yes (optional)	No
Development Environment	PC	PC
Size	100 x 80 mm	100 x 72 mm
Mounting (2 options)	PIN Headers or DIN41612C	PIN Headers or DIN41612C
<b>Starter Pack price</b>	<b>£285</b>	<b>£150</b>
<b>50+ price</b>	<b>£135</b>	<b>£60</b>



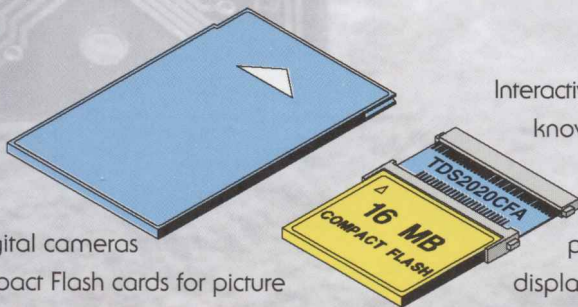
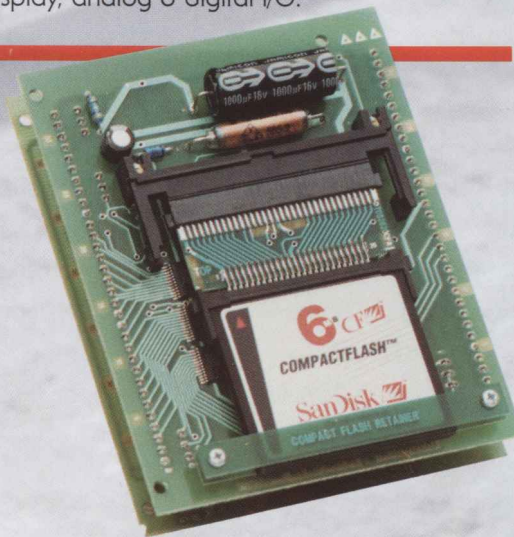
## Intelligent Nodes

Controller Area Network (CAN bus) connects multiple TDS2020F and TDS9092 card computers by thin telephone wire to a linked PC. Each node can provide local control, data logging, keypad, display, analog & digital I/O.

Contact us for full technical data on CAN networking.

## Digital Camera Memory Hijacked

This is not a data logger, but a module used to make a customised data logger. It means you get exactly what you want, but using the latest technology. Battery operation, with Compact Flash cards for data storage, make the instrument portable enough to be put in a pocket. The recording format is Windows compatible so that a PC can directly read the data.



Some digital cameras use Compact Flash cards for picture storage, so there is downward pressure on the price. These are smaller 50-pin adaptations of the PCMCIA card standard and interface to a PCMCIA adapter sandwiched with a TDS2020F card computer. The resulting module is entirely confined within a volume of 100 x 80 x 30mm.

Interactive design means that little programming knowledge is needed. Supplied example data-logging programs are the best starting points for a customised product. Because a keypad and graphics display can be added, the module may be turned into a complete portable instrument, not just a device to record measurements. Two serial ports and modem software give it communications capability.

Contact us for full technical information on data logger modules.

## Instant solutions

Software modules that easily connect can form the major part of your application program. Ready-made routines are available for:

- Analog input
- Analog output
- ANS Forth
- Audio
- Battery power
- Benchmarks
- CAN bus
- Control loops
- Data logging
- Date & time
- Digital input
- Digital output
- EEPROM memory
- FFTs
- Flash memory
- Floating point
- Forth extensions
- Frequency
- GPS data logging
- Hard disks
- I<sup>2</sup>C bus
- IEEE-488 bus
- Integer maths
- Interrupts
- Keypads
- LCDs - CAD drawings
- LCDs - character
- LCDs - colour
- LCDs - graphic
- LCDs - pictures
- LCDs - touch
- LCDs - VGA
- Light input
- Memory expansion
- Microphone
- Modems
- Motor control
- Multitasking
- Networking
- NV-Memory
- Operator input
- Opro-isolation
- PC cards (PCMCIA)
- Portable use
- Printers
- Protocol conversion
- PROM programming
- Radio clock
- Regular events
- Resource locks
- Serial communications
- Shaft encoders
- Speech
- Stepper motors
- Strings
- System security
- Temperature sensing
- Timekeeping
- Timer-counters
- Touch-screens
- Trigonometry
- VGA screens
- Video
- Watchdogs

Contact us for a free copy of the Applications Software booklet.

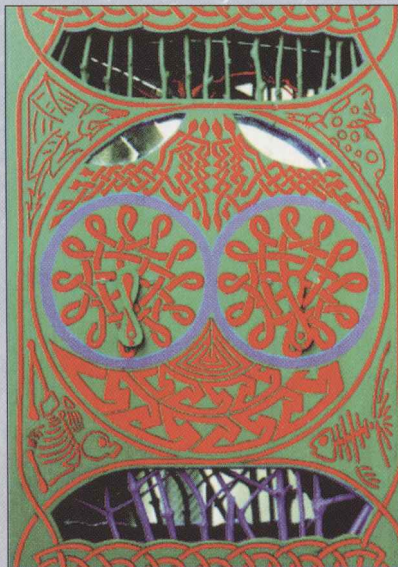
## The green TDS2020

University of Cambridge chemistry researchers have sent **TDS2020** card computers on high altitude scientific balloons in France. They tested novel solid state ozone and water vapour sensors, returning with valuable data and atmospheric ozone and water vapour measurements. So far, no problems have been encountered with the harsh conditions offered to the instruments during these flights.



## TDS2020 as Art

Owen Ransen's famous Sleepy Clock sculpture was the exhibit shown at the entrance to the anti-deconstructionist exhibition Unimplosive Art at the biennial Venice Art Show. The Sleepy Clock sleeps at 6.30 and only shows the real time when it hears someone nearby. It is made from a **TDS2020** computer, microphone, loudspeaker, two stepper motors and lots of eccentricity.



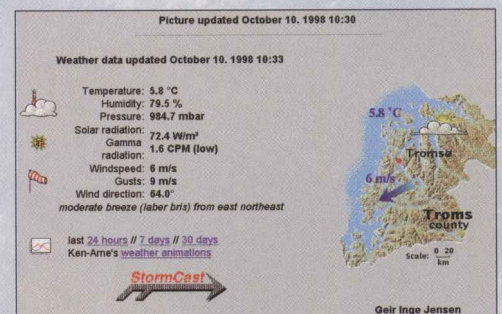
© Frank Greenaway

## TDS2020 discovers new bat

The high speed of the **TDS2020** has enabled Ultrasound Advice to make several hand-held instruments that measure high frequency signals, from a fault diagnosis system for railway track signalling systems to a spectrum analyser for ultrasonic sonar from bats.

The common pipistrelle bat had been thought a single species for centuries. Then Fast Fourier Transforms carried out by a **TDS2020** card computer showed that the frequency v. time characteristics of the ultrasound they emit for echolocation fell into two distinct groups. Two non-interbreeding species have now been formally acknowledged and recently the Latin name *Pipistrellus pygmaeus* has been assigned to the 'new' bat.

**Ultrasound Advice is at tel: 0171 359 1718**



## North of the Arctic Circle

Have a look at the present weather in northern Norway! A Web site at the University of Tromsø uses a **TDS2020** to capture local meteorological data in real-time and disseminate it to the world. Go now to <http://www.cs.uit.no/cgi-bin/weather/en>.