FORTHCHIPS2020 & FORTHCHIPS9092

Chip Sets

CUT COSTS
for large volume production of TDS2020*F* and TDS9092 embedded computers

16-bit system

Software is made easy using an interactive high level language. A complementary pair, the Microprocessor contains Forth and symbolic assembler, the Gate Array extra parallel ports, keyboard scanning facility, watchdog timer, PROM and RAM chip selects and spare address decodes including LCDs.

The integrated circuits are manufactured by Hitachi and MCE (division of Smiths Industries) as custom chips for Triangle Digital Services Ltd. They are the basis of the well-known TDS2020*F* and TDS9092 card computers and are also available for use in other embedded systems.

8-bit system

Technical Data
FORTHCHIPS2020 & FORTHCHIPS9092

MINIMUM CONFIGURATION

TDS2020*F*- PARTS NEEDED

To build a minimum system based on TDS2020*F* you need the microprocessor, gate array, a Flash-EEPROM or EPROM, some logic gates and a few passive components. The order code **FORTHCHIPS2020** comprises:

- ❑ **H8/532 Microprocessor** has 8 general-purpose 16-bit registers, hardware multiply and divide and runs at 19.6608MHz. It has RAM for variables, four counter-timers and a prioritised interrupt system. The interactive Forth language includes pre-emptive multitasking, 155µA data logging, Compact Flash and PCMCIA support. There are drivers for I²C bus, LCDs, parallel ports, two serial ports, watchdog timer, keyboard and low power modes.

- ❑ **TDS9 Gate Array** provides 16 extra parallel ports. There is hardware support for the keyboard scanning routines and LCD drivers in the microprocessor. A watchdog timer brings the system back into the application program in case of a

crash. Chip selects are provided for external memory chips. In addition there are spare decoded address lines for directly adding other peripherals.

- ❑ **Licence** to use one copy of the TDS2020*F* Forth software.

Program storage can be a Flash-EEPROM (Xicor 28HC256) or 27C256 32k byte EPROM containing the Forth and/or assembler instructions. This chip is sometimes not necessary as application code can be blown into the H8/532's internal PROM.

TDS9092 - PARTS NEEDED

For a minimum system of TDS9092 you need the microprocessor, gate array, an EPROM, a RAM of 8 or 32k bytes, some logic gates and a few passive components. The order code **FORTHCHIPS9092** comprises:

- ❑ **63B01Y0FP Microprocessor** featuring masked Forth, symbolic assembler, event-driven, multitasking, time of day clock, full-screen editor and interrupt support in Forth or assembler. There are

drivers for I²C bus, alphanumeric LCDs, parallel ports, two serial ports, watchdog timer, keyboard and low power modes. The Forth is an extended version with extensive 32-bit arithmetic, trigonometry and real-time speed measurement functions.
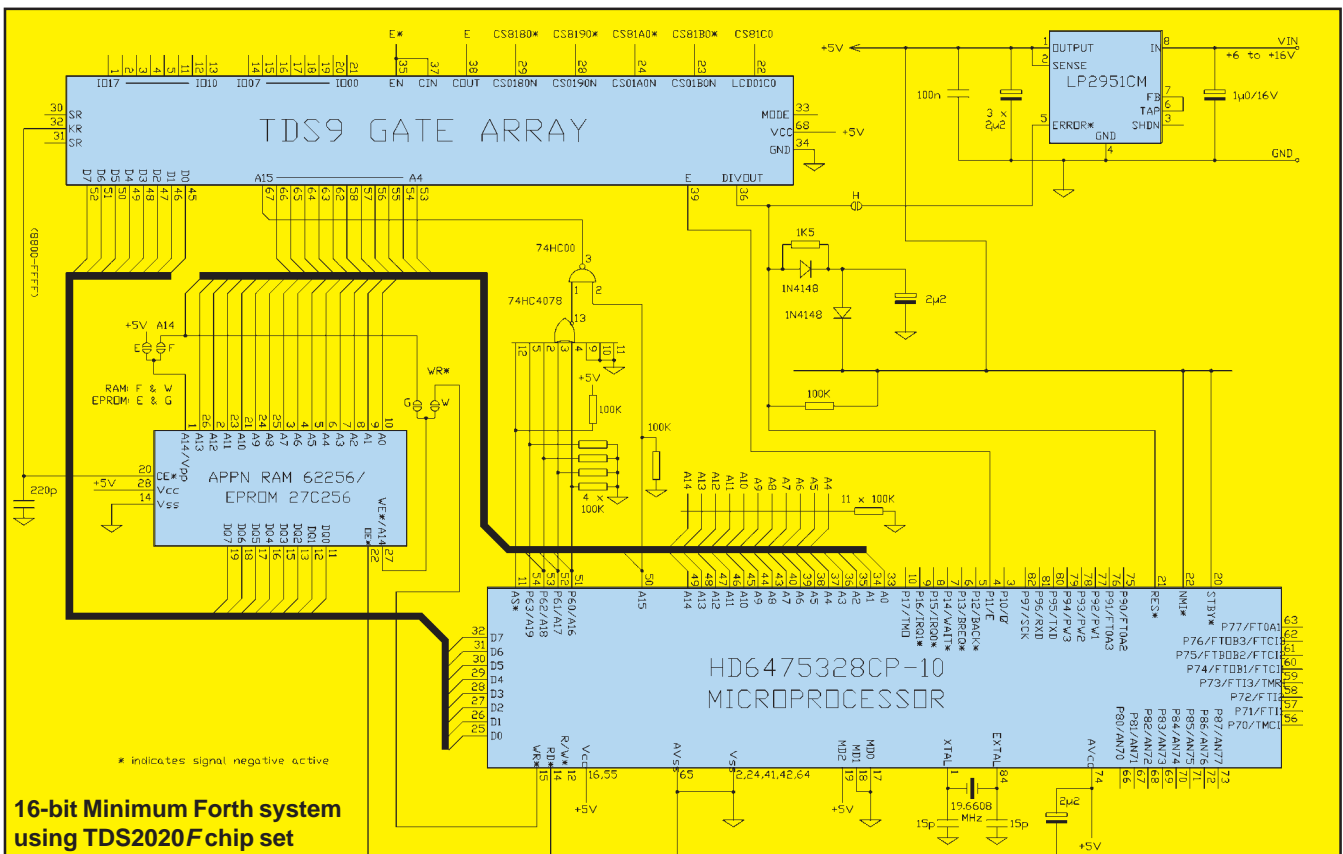
- ❑ **TDS9 Gate Array** – see above.

- ❑ **Licence** to use one copy of the TDS9092 Forth software.

A 27C256 EPROM holds the application program, which you write in Forth and/or assembler for your embedded system. The RAM provides variable space.

FREE OF CHARGE EXTRAS

As part of the licence you may also use

- ❑ those parts of the complete circuit diagram which are useful in your application,

- ❑ any section of the printed circuit layout that may be useful to you,

- ❑ the library routines or tools provided with the TDS2020*F* and TDS9092.

16-bit Minimum Forth system using TDS2020*F* chip set

Technical Data
FORTHCHIPS2020 & FORTHCHIPS9092

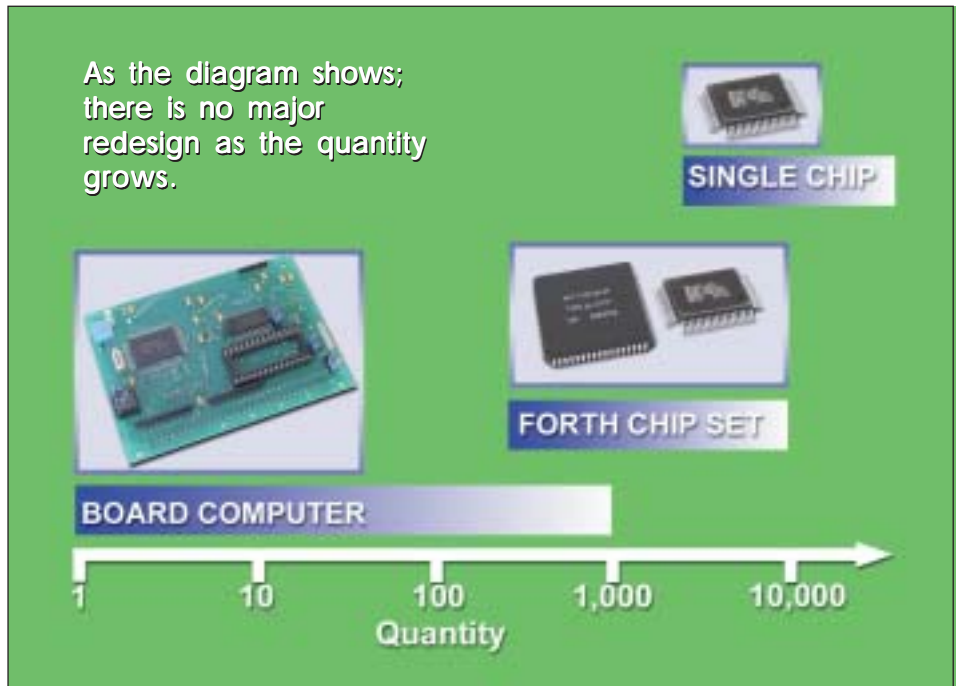## ORDERING INFORMATION

The order codes for the chip sets are **FORTHCHIPS2020** and **FORTHCHIPS9092** and each comprises the three items described above.
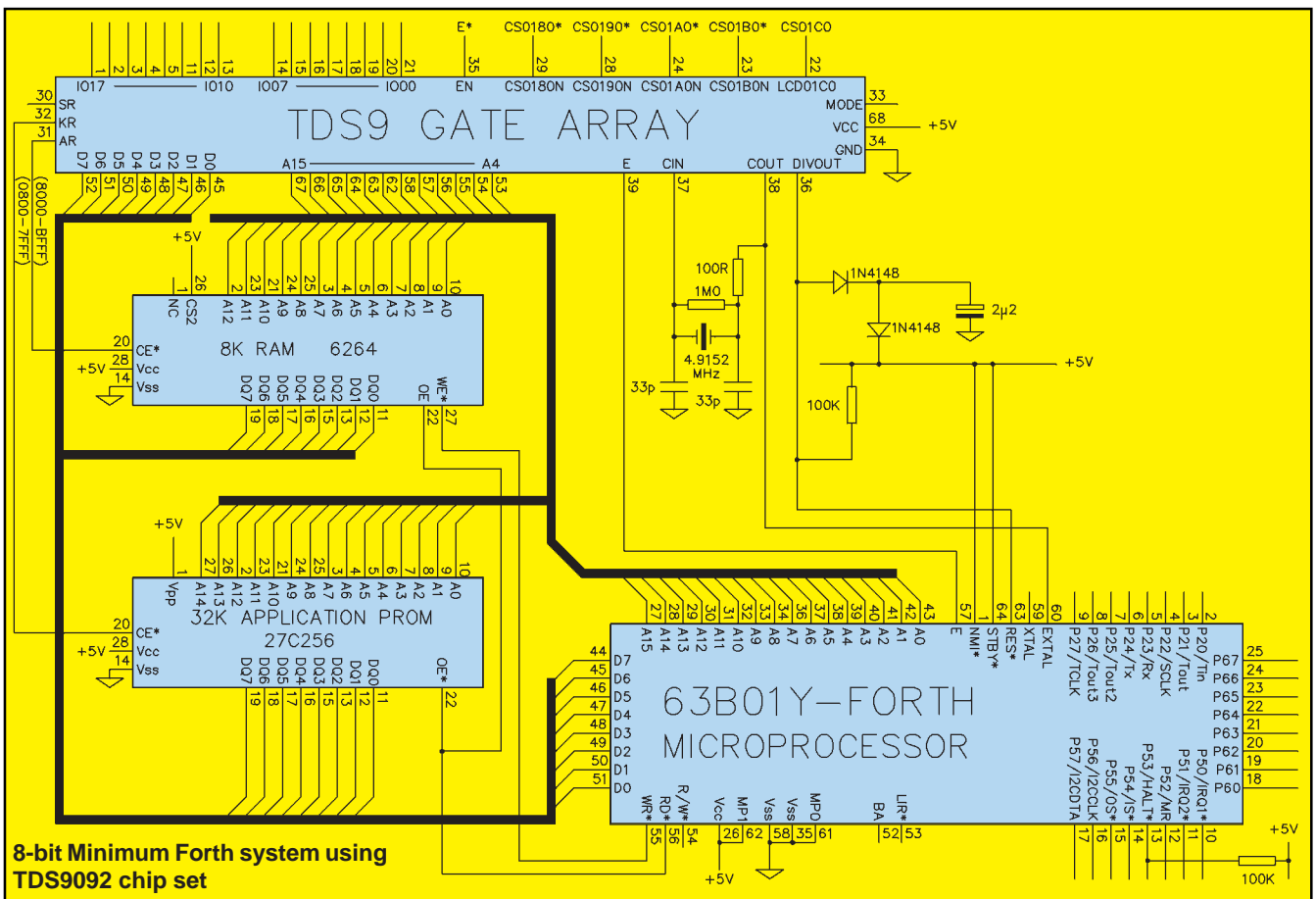
It is unlikely that use of Forth Chips will be cost-effective in quantities under 500 sets. Use the complete TDS2020*F* or TDS9092 computer unless you have a special requirement for small space or an unusually shaped printed circuit board. The TDS2020*F* and TDS9092 are available at particularly competitive prices when ordered in quantity—ask for a quotation. Supply arrangements can be negotiated against individual requirements and we offer flexible contracts in instances where you cannot be sure yet of the total quantity involved. All the logic gates and passive components used to build TDS2020*F* and TDS9092 are available from us, or on the

As the diagram shows; there is no major redesign as the quantity grows.

open market. Because of the quantities we buy, our prices are usually advantageous. If the need exceeds 5000 chip sets per year we can probably reduce your application PROM and the Forth in ROM to give a consolidated program for masking into a single chip to give even lower costs. The TDS2020*F* and TDS9092 systems are continuous from single unit quantities to large volume consumer uses.

8-bit Minimum Forth system using TDS9092 chip set

Chip Sets

Contact us if you would like a copy of any other datasheets

TDS2020*F* 16-Bit Embedded Computer

At last - the embedded computer that doesn't need a PROM programmer. An ideal way to develop instruments and data loggers. The datasheet is available in PDF format from our website: www.TriangleDigital.com.

TDS9092 8-Bit Embedded Computer

For simpler applications in control or datalogging the TDS9092 has many similar features to the TDS2020*F* but at a lower price. The datasheet is available in PDF format from our website: www.TriangleDigital.com

Data Logger Module

A PCMCIA and Compact Flash solution for TDS2020*F* to hold large quantites of data in removable or transmittable forms. The datasheet is available in PDF format from our website: www.TriangleDigital.com

Can Bus Adapter

Communicate over secure Controller Area Network to control dispersed systems. Use re-programmable intelligent nodes and a PC link. For TDS2020*F* or TDS9092.

Application Software Library

Descriptions of source code available to customers and Update Service subscribers - continuously being updated.

Text to Speech

If you can display it, you can speak it. Converters for text to speech in PC, card and boxed formats from RC Systems Inc.

A Promotional CD is also available containing prices, specifications, circuit diagrams, web site, *TDS-PC for Windows* development environment, full technical manuals and most of the applications software library.

UPDATE SERVICE

For a yearly subscription you can receive the latest releases of TDS library routines plus the following:

- Latest updates to *TDS-PC for Windows*
- Source code for *TDS-PC for Windows*
- Forth words database and indexing utility
- Source code optimisation utility
- Extended software library routines
- New additions to the library
- New Forth kernel if and when there is an update
- Co-operative traditional Forth multitasker for TDS2020*F*
- Pre-emptive multitasking for TDS2020*F*

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