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Tesla Benchmarks

The microprocessor support group, part of the scientific computer center, has completed preliminary tests comparing the efficiency of TESLA Version 1 with cross PL/W and cross PL/M.

Three benchmark programs were used in the tests:

—build a binary tree (using based variables and arrays).

—multiply 8-bit operands.

—subtract and add 16-bit operands.

The results of the tests are summarized in the table. In each comparison the amount of code generated by TESLA is the standard (100%).

MAKING COMPARISONS

In comparing TESLA 8080 with PL/M, it is worth remembering that TESLA makes all calculations using signed operands but PL/M does not allow signed calculations. Also, PL/M generates in-line code when arithmetic operators are used, but TESLA generates calls to subroutines.

VERSION 2

The microprocessor support group is finishing TESLA Version 2 for some types of microprocessors. The code generated by Version 2 is generally more efficient than for Version 1. The Version 2 code generator for the M6800 will be ready for testing and evaluation by the end of June. TMS 9900 and 8080 code generators are also being written.

QUESTIONS?

If you have questions, call Les Matheson on ext. 6577, or drop by 50-454.

	Relative Size of Absolute Code Generated			
Benchmark programs	TESLA 6800	PL/W 6800	TESLA 8080	PL/M 8080
build binary tree	100%	168%	100%	98%
multiply 8-bit operands	—	—	100%	123%
subtract and add 16-bit operands	100%	100%	—	—

TESLA 6800 is far more efficient than PL/W 6800 in building binary trees, but they have the same efficiency for subtracting and adding 16-bit operands. TESLA 8080 is slightly less efficient than PL/M 8080 in building binary trees, but much more efficient than PL/M 8080 in multiplying 8-bit operands. Because some operations aren't fully implemented in TESLA, comparisons of those operations were not made for TESLA 6800 and PL/W 6800 or for TESLA 8080 and PL/M 8080.

A Benchmark

In the most general terms, a benchmark is a reference for comparison or measurement. In programming, a benchmark is a standardized program used to evaluate the power of a computer. Here we're using the term in a special sense. Instead of comparing the power of several computers, the microprocessor support group used benchmark programs to evaluate the efficiency of three high level languages. The purpose of the test was to see how much absolute code each language generated for a given benchmark.

Special Design File

Battery Protection Circuit

This circuit was designed to safely prevent any one cell within a rechargeable battery chain from going into deep discharge. As shown in the schematic, opto-couplers (LED's shining on photo-transistors) are wired in parallel to the battery chain.

CIRCUIT OPERATION

If one of the cell's voltage drops below a certain value, the opto-coupler assigned to it develops a high resistance causing relay K to open and disconnect the load from the battery. K will remain open until the power switch is opened and closed again.

When the power is switched on, the opto-coupler receiver chain is conducting the voltage drop across R1 sets G1 input HI and G1 output LO. G2 output is pulled HI by D1. C2 is charged slowly through R2, setting one of the G2 inputs HI. The existing HI condition at G2 output brings T into conduction and makes K switch on, connecting the main load to the battery.

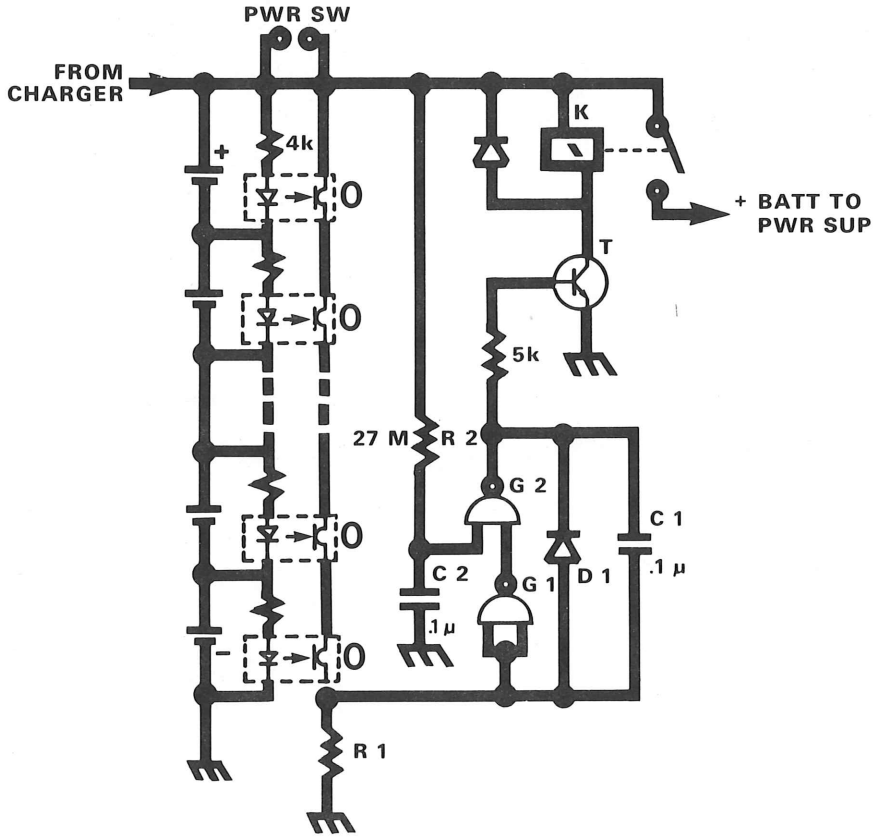
If one of the opto-couplers stops conducting, G1 input will go LO, G1 output HI, G2 output LO, T will stop conducting, and K will open. The LO at G2 output will make D1 conduct and also clamp G1 input LO as long as the power switch remains closed, even if the opto-coupler chain starts conducting again.

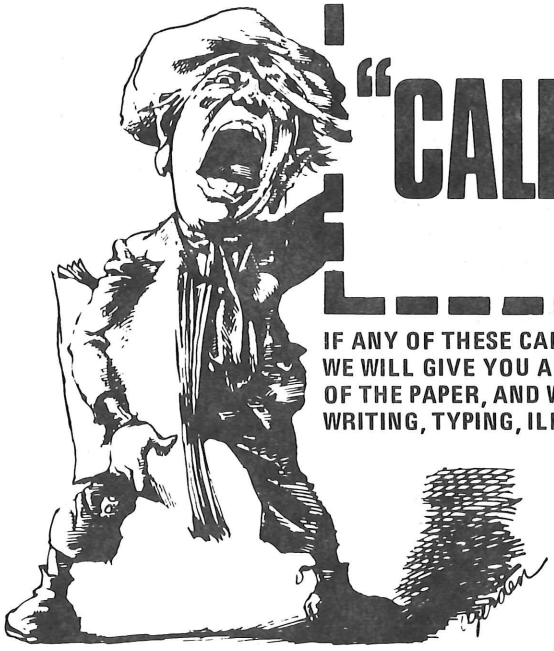
THE DESIGNER

The circuit designer was a Mr. Kuhner who works with Rohde and Schwarz Karlsruhe Lab (a European company, independent of Tektronix, which is the exclusive sales outlet for Tektronix products in Germany). Rohde and Schwarz people have installed the circuit in one 400 series monitor. They proposed the circuit to Tektronix Limited (Guernsey) who, in turn, passed it on to the Tektronix International Sales Office (Beaverton).

INTERESTED?

If you think you might be able to use this circuit, give us a call on ext. 5674.





"CALL FOR PAPERS!"

IF ANY OF THESE CALLS INTEREST YOU, GIVE US A CALL (EXT. 5674). WE WILL GIVE YOU ALL THE DETAILS YOU NEED (LENGTH AND FORMAT OF THE PAPER, AND WHERE TO SEND IT). WE CAN ALSO HELP WITH THE WRITING, TYPING, ILLUSTRATIONS, AND MAILING.

ELECTRON DEVICES

The 1977 IEEE International Electron Devices Meeting is calling for abstracts for its conference, December 5-7, 1977. If you are interested in giving a talk at the conference, you are invited to send in a 200 word abstract for review by August 8, 1977. These areas will be covered: solid state devices, device technology, integrated electronics, electron tubes, energy conversion devices, quantum electronic devices, detectors and displays.

If this interests you, give us a call (ext. 5674). We will provide all the details you will need (length and format of the paper, and where to send it). We can also help you with the writing, illustrating, typing, and mailing.

SIGNAL PROCESSING

On April 10-12, 1978 the International Conference on Acoustics, Speech, and Signal Processing will be held in Tulsa, Oklahoma. The conference will be devoted to the areas of general signal processing, speech processing, underwater acoustics, seismic signal analysis, electroacoustics and noise measurement.

The conference sponsors are inviting 100 word abstracts (they are due by September 22, 1977) for review. Authors whose abstracts are accepted will be invited to submit four-page papers by December 19, 1977.

If you would like to submit an abstract for review, let us know (ext. 5674). We can provide all the details you will need to know (mailing address, and format). We can also help with the writing, illustrating, typing and mailing.

Component Engineering Moves

June 10, 1977 was moving day for Component Engineering and the Engineering Services groups that were in building 39. Now all component evaluation personnel will be located at 58-299.

In addition to being centrally located with other Engineering Services groups in building 58, Component Engineering will be closer to Purchasing (all vendor contacts will be channeled through Purchasing).

Also moving to 58-299 are Harley Perkins, Engineering Services manager, and the Technical Communications group (Component News, ManuFACTuring and vendor data book distribution).

For a complete listing of personnel involved in this move and a map of the new area, see Component News No. 246 or contact Technical Communications, ext. 6867.

In Print

INTRODUCTION TO MICROPROCESSORS

Need an introduction to the world of microprocessors? The IEEE Press has just published **Microprocessors: Fundamentals and Applications**, a collection of 43 reprints edited by Wen C. Lin of Case Western Reserve University.

The purpose of the book is to help readers who are weak in computer fundamentals learn how microprocessors work and how they are applied in the design of instruments and systems. The book is divided into four sections:

—introduction to microprocessors.
—microprocessor architecture, software, interface, system development aids, and testing.
—applications.
—microprogramming techniques as a bridge between hardware and software engineering, and other topics.

The book also includes a glossary of software terms, and a bibliography.

The 344-page volume costs $9.95 to members for the paperback edition. A clothbound edition costs $14.95 for IEEE members, but $19.95 for nonmembers. You may order the book from:

IEEE Service Center
445 Hoes Lane
Piscataway, N.J. 08854

Payment should accompany the order.

VIR PROCESSING

An article (in **IEEE Transactions on Consumer Electronics**) by Charlie Rhodes discusses "Some Practical Problems in Implementing the Vertical Interval Reference Signal in Broadcasting." In particular the paper focuses on production mixing, residual subcarrier, and matrix correction decoding and suggests automatic correction as an accurate method of noise averaging and VIR signal parameter control.

If you would like a copy of the paper, call the library on ext. 5388. The paper appeared in the May, 1977 issue on pages 158-165.

SAW DEVICES

Gene Chao (Tek Labs' Instrument Research Group) is the author of a recent article in **Electronic Design News**, "Surface Acoustic Wave Devices Move into High-Volume Markets." Gene describes the basics of SAW technology, some applications of that technology, and the role of SAW devices in an increasingly digital world.

The article appeared in the May 5, 1977 issue of **Electronic Design News** on pages 96-99. For a copy, call the library on ext. 5388.

THE 7L18

The Tektronix 7L18 Spectrum Analyzer is the subject of a recent article by Bob Alm (Spectrum Analyzers), Dave Shores (Spectrum Analyzers) and Al Huegli (F.D.I. Mechanical Engineering) (May 1977) in **Microwave Systems News**. The article explains how coordination of sweep rates, preselection filtering and digital processing of displays make the new plug-in easy to use, and how precisely made Yig-tuned filters, cat-whisker probes, ridged waveguides and phase locking to crystal sources make it accurate.

If you would like a copy of the article, call the library at ext. 5388. The article appeared on pages 63, 64, 67, 68 and 70.

An A-to-D Converter for Automatic Measurements

A paper presented by Phil Crosby (TV Products Engineering) at Electro 77 describes the design of a novel high-speed a/d converter employing two monolithic 4-bit converters and a monolithic 4-bit d/a converter, resulting in an 8-bit converter that can be used at sample rates up to 20 MHz.

For copies of the paper, call the library on ext. 5388.

In Print cont.

Another General Purpose Computer Architecture

The Information Display Group recently issued Technical Report 77-1 which describes a computer architecture designed to support applications that require the sharing of data storage and processing facilities with other users. The report describes the architecture operating from the system and compiler designer's point of view. This computer architecture features:

—32-bit data words.
—24-bit address spaces.
—descriptor-based indirect addresses.
—segmented virtual memory.
—up to 256 explicitly addressed virtual registers (i.e. they are located in memory) for each subroutine.
—a 4-bit tag for protection of addresses and control information.
—an automatic stack for storing subroutine virtual registers and call and return information.
—hardware management of interprocess message traffic.
—hardware control and scheduling of multiple processors.
—treatment of all processors (general purpose, special purpose and input/output) in a consistent manner.

In a different format, the report appeared in the April 1977 issue of SIGARCH. If you would like a copy of the report, call Karen Warren on ext. 2502 in Wilsonville.

PASSIVATING THIN FILM HYBRIDS WITH POLYMIDE

The April issue of Circuits Manufacturing carried an article written by Sam Miller (Hybrid Circuits Engineering) on Tektronix' use of polyimide to passive thin film hybrids. Most hybrids are protected from the environment (especially humidity) by completely encapsulating the finished assembly or by enclosing the sensitive part in a ceramic or metal package. The article traces the efforts to find a way to protect a microwave circuit that couldn't be encapsulated because the metal box that contained it had to be opened for field replacement of the circuit.

The article doesn't present only the results of the search for the best passivator, but also gives the reader a feel for the frustrations of looking at and having to reject many alternatives.

The article appears on pages 54, 56 and 58 of the April issue of **Circuits Manufacturing**. If you would like a copy, call the library at ext. 5388.

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