

# Microelectronics.

The basis for continuing innovation.  
From the leader...

# Texas Instruments.



# TI's 990/9900 First Family.

## Most cost-effective means of using microelectronics. To improve. To change. To innovate for today and tomorrow.

### TI's 990/9900 Family

Software Compatibility  
from Components to  
Boards to Systems



Not quite twenty years ago, the integrated circuit was born at Texas Instruments. And sparked a pervasive revolution that's impacting all our lives.

It launched the thrust toward today's incredible circuit complexities. Causing product sizes to shrink as performance increases. And as prices decline.

The Kilby integrated circuit was the catalyst for today's "computer on a chip." TV games. Intelligent terminals. Distributed processing. Digital watches. The multi-function personal calculators now becoming as ubiquitous as transistor radios.

Throughout this swift progression, Texas Instruments was—and remains—in the forefront of leadership. With a continuous succession of new technologies in materials and methods. Advances in circuit architecture. In processing and imaging techniques. In software. And in packaging.

All making technology readily affordable. Giving you the means to employ microelectronics for change. For innovation. For creating new and better designs.

The latest, most challenging and potentially most advantageous development in microelectronics from TI: the unique 990/9900 First Family.

#### Broad compatible choice

TI's 990/9900 family offers the broadest available selection of software-supported microprocessors, microcomputers, minicomputers and systems.

*All are software compatible.* From components up through the minicomputers. And as technology advances, new members of the 990/9900 family will evolve to keep you up to date.

Thus, the programs and training you develop not only apply today. But also in the years ahead. Your design and software investments are protected. As you adapt. Innovate. Move from application to application.

Already, 9900 microprocessors are finding widespread use. To name a few areas: Test instruments. Process controls. Data terminals. Cars. Distributed processing networks. Programmable calculators. Telecommunications.

First Family microcomputer modules suit many of these applications. Particularly where production runs are small and economics do not warrant developing a custom circuit board.

The 990 mini/microcomputers are proving indispensable in a variety of data processing systems. Such as room and car reservations. Retail/wholesale order entry and inventory control. Automated manufacturing.

#### Five microprocessor options

First Family microprocessors utilize an advanced memory-to-memory architecture. That locates general-purpose register files in memory. To give you the combination of cost and performance best suited to your application.

- TMS 9900—Single-chip N-channel Metal Oxide Semiconductor (NMOS) 16-bit microprocessor with full minicomputer capability.

- SBP 9900—Single-chip 16-bit Integrated Injection Logic (I<sup>2</sup>L) twin to the TMS 9900 for severe operating environments.

- TMS 9980—Single-chip 16-bit NMOS microprocessor incorporating 8-bit oriented memory.

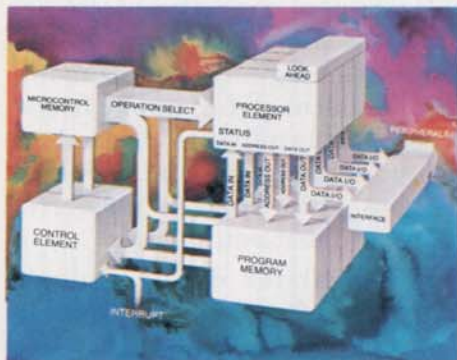
- TMS 9940—single-chip 16-bit NMOS microcomputer incorporating memory and input/output (available soon).

- S481 Chip Set—Transistor Transistor Logic (TTL) modularly expandable, microprogrammable building blocks.

#### Peripheral circuits in plenty

A wide choice of peripheral circuits supports these microprocessors. Included are parallel and serial communication devices plus dedicated input/out-

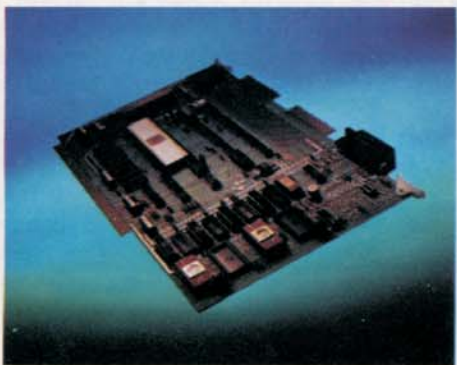
put components. Coming: Large-scale controllers for high speed data transfers, floppy discs and cathode ray tubes.



### Microcomputer chip set

When your design calls for the performance of a customized microcomputer, the logical choice is the First Family's S481 microcomputer chip set.

The S481 offers extremely fast throughput. And complete microprogrammability. Emulates 9900 instructions as well as other instruction sets.



### Economical microcomputer modules

Another way the First Family helps you meet time and cost goals effectively is through its series of ready-to-use microcomputer modules.

The TM 990 microcomputer modules consist of single circuit boards containing a TMS 9900 or TMS 9980 microprocessor, memory, input/output and other circuitry. Preassembled. Pre-tested. And expandable.

They're ideal for evaluating 9900 microprocessors. For implementing a microprocessor-based design where time-to-market is short. And, in quantity, affordable for production runs.



The First Family's 990/4 microcomputer is an off-the-shelf answer to many production problems. It also comes in a choice of low-cost chassis. And with power supplies, operator's front panel, interfaces and peripherals to make it a complete microcomputer system.



### Affordable minicomputer

The 990/10 general purpose minicomputer is the First Family's most powerful member. Providing the high performance speeds demanded by many applications. Built to give maximum processing power. And backed by high-level software languages—FORTRAN IV, COBOL and multi-use BASIC—as well as a large selection of peripherals.

### Applications support systems

A variety of software and hardware development aids support the 990/9900 spectrum. For example, dedicated software and firmware development support is provided by the new FS 990/4 and AMPL\* systems.

The FS 990/4 combines the high performance of the 990/4 microcomputer with the low-cost flexibility of a floppy disc. With a video display terminal, interactive development and maintenance software, and FORTRAN IV—an optional higher-level

language. All the features and components required to develop and execute a wide range of programs.

Capitalizing on the power of the FS 990/4 is the AMPL Advanced Microprocessor Prototyping Lab. A dedicated design lab where 990/9900-based systems can be developed in an integrated software/hardware design and debug sequence.



AMPL features TMS 9900 microprocessor emulation. The interactive process allows simulation/test and emulation/test. With minimum delay between identifying and implementing a needed design change. Result: Substantial savings in design time and cost.

The First Family is further supported by nationwide time-share and cross-support—transportable assemblers and simulators—for in-house computers.

TI's original integrated circuit changed the entire character of electronics. Judging from that impact, the effect of today's microelectronics will probably be far beyond anything we can forecast now.

The 990/9900 First Family—broad, compatible and growing—is designed to give you the sound, secure basis for entering the microelectronics era today. And for remaining abreast of future developments. With minimum redesign. Minimum relearning. And minimum software reinvestment.

Investigate the First Family's benefits and advantages. Call your nearest TI field sales office or TI distributor.



\*Trademark of Texas Instruments

# TI leadership in memories: New CCD memory. New bubble memory.

Progress in memories at Texas Instruments parallels developments in microprocessors. Two significant memory innovations from TI offer greater performance. Greater capacity. And eliminate several serious design bottlenecks.

## New 65K CCD memory

TI's new TMS 3064 is the first 65K charge-coupled device (CCD) memory on the market. A low-cost, high-performance memory that plugs the gap between high-speed Random Access Memories (RAMs) and low-speed, serial-access magnetic memories.

It utilizes a unique CCD structure developed by TI to achieve

the highest density of any semiconductor memory.

## New 92K bubble memory

Non-volatile, TI's new TIB 0103 is one-up on other memories. It remembers when the power is off.



Having a capacity of 92,304 bits, it's the first commercially available magnetic bubble memory. A natural for applications where portability is desired in programmable calculators. Data loggers. Voice storage. Measurement and test equipment.

It's ideal for data terminals (see below). Word processing. Controllers. As an alternative to disc and drum storage. With its microprocessor-compatible interface family, the TIB 0103 can also handle the microprocessor mass memory function.

For more information on these new memories, call your TI field sales office.

## Distributed processing: Putting computing power closer to the problem.

Distributed logic and memory locates data bases and processing at the points of greatest use. And promises vast potential for increasing productivity.



### Bubble memory terminals

A major step forward is TI's new Silent 700\* Model 765 Portable Memory and Model 763 Memory Send-Receive Terminals.

\*Trademark of Texas Instruments

Their TIB 0103 bubble memory permits data to be entered and stored all day long. Then, when phone rates are lowest, the data can be transmitted to the computer at high speeds.

These new memory data terminals have 20K bytes of bubble-memory storage expandable to 80K bytes—the equivalent of 16 to 20 fully typed pages. And virtually silent, non-impact printing means high performance and reliability.

### Intelligent terminals

The new Model 770 Intelligent Terminals remove a burden from host computers by preprocessing data on the spot. Errors are reduced and speed and accuracy are increased in source data entry applications.



Additional savings result from transmitting batched data when line rates are lowest.

Both the bubble memory and the intelligent terminals use the TMS 9900 microprocessor for control of logic functions.

For more information on these terminals, call your TI sales office or write Texas Instruments Incorporated, P. O. Box 1444, M/S 784, Houston, Texas 77001.



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