OWENS ASSOCIATES

MARINCHIP SYSTEMS M9900 CPU

The Complete, Compatible 16 bit CPU for the S-100 Bus

The Marinchip Systems M9900 CPU lets you move up from an 8 bit micro to a 16 bit minicomputer without losing the economy and compatibility of the S-100 bus. You gain the computing power only a 16 bit processor can deliver and extensive software support to help you put that power to work for you. The M9900 CPU is a 16 bit minicomputer CPU board that uses the industry standard S-100 bus, affording the widest possible choice of compatible memory and peripherals. When you choose the M9900 CPU, you choose more than a piece of hardware; you choose one of the most complete and flexible software systems available anywhere . . . and it's included with the CPU *at no additional cost!*

Whether you're an application developer, an OEM, a serious hobbyist, or an engineer designing with the 9900, you will find that the M9900 CPU gives you the power you need to do your job and the software you need to start developing your programs as soon as you turn the system on. It's all included! Disc Operating System, BASIC, Word Processor, Text Editor, Assembler, Linker, diagnostics, and debug tools! Marinchip Systems designs and implements its own software, so you get a system where all the pieces fit together smoothly, where you don't have to spend all your time making the system work instead of doing your own work.

Support for the M9900 CPU does not stop there. Optional software includes a Sequential Pascal compiler, META — a compiler writing language, and a system generation kit that lets you add custom I/O drivers to the operating system and configure the operating system for your machine. Optional hardware includes the unique Marinchip PROM/RAM/SIO/RTC board, which includes 10K PROM, 1K RAM, a Serial I/O port, and real-time clock on a single board. This board operates in a 16 bit parallel mode on the S-100 bus and can increase system performance up to a factor of two.

THE PROCESSOR
The heart of the M9900 CPU is the Texas Instruments TMS 9900—a complete 16 bit mini on a single chip. It has everything you expect in a mini—multiply and divide instructions, 16 general registers, multiple register sets, and numerous addressing modes. The TMS9900 is unique among the single-chip 16 bit processors in that it was designed as a minicomputer, not as an upgraded microprocessor.

THE CPU BOARD
The M9900 CPU board brings the TMS9900 to the S-100 bus. It translates the 16 bit transfers of the CPU into the 8 bit transfers of the S-100 bus, and generates all the control signals so that most S-100 memory and I/O devices can be used without modification. (The M9900 CPU is in compliance with the proposed IEEE standard for the S-100 bus). Marinchip Systems invented 16 bit operation on the S-100 bus, and included it in the M9900 CPU so that none of the performance of the TMS9900 would be lost. Special 16 bit memories, such as the Marinchip PROM/RAM board, can be intermixed with regular S-100 memories to increase overall system throughput by a factor of two.

STANDARD SOFTWARE
All the standard software is included with the M9900 CPU at no additional cost. The software is supplied on floppy disc, configured for your machine, complete with extensive documentation.

Disc Executive
The Disc Executive is a file-oriented operating system featuring automatic file allocation, program chaining, and support of all peripherals as files. Floating point emulation and a complete output editing package are included in the system.

BASIC
Marinchip BASIC features automatic integer arithmetic for faster execution, file I/O, symbolic statement trace for easy debugging, and a full set of string and mathematical functions. All storage is dynamically allocated, so there are no restrictions on string and array size other than total system memory.

Word Processor
The Marinchip Word Processor features right justification, centering, multiple column output, automatic page titles, footings, and section numbers. Designed to be easy to use, the Word Processor often requires no special commands to produce well-formatted text, but includes all the macro and string capability you need for form letter generation and automated documentation systems.

Text Editor
The Marinchip Text Editor features both context and line-oriented editing, as well as character-by-character interactive editing. It pages large files to disc so files much larger than memory can be edited without concern of the user.

Assembler
The Assembler generates relocatable code, and permits conditional assembly as well as complex expressions in source code.

Linker

The Linker allows large programs to be written as small modules, then combined into an executable program. The Linker accepts T.I. relocatable code, allowing the user to move programs developed on the M9900 CPU to Texas Instruments minicomputers.

. . . and more

Also included with the M9900 CPU are an instruction trace debug utility, debug monitor, processor, memory, and disc diagnostics, PROM programming utility, disc utility, and more.

SOFTWARE OPTIONS

The following software packages complement the basic M9900 CPU system by adding capabilities desired for specific applications. All these packages are fully integrated into the system, and can interchange files with all other M9900 software.

Pascal

Marinchip Systems supplies the Sequential Pascal compiler originally developed by Per Brinch Hansen for the PDP-11, converted to the M9900 CPU by Marinchip Systems. This Pascal allows very large programs to be compiled and permits Pascal programs to read and write any system file, sequential or random.

META

The META compiler-writing language has been implemented on the M9900 CPU by Marinchip Systems. META is a language designed expressly for the implementation of compilers and macro processor and reduces the job of compiler implantation from months to days. Source code is included with META to allow user modification.

System Generation Kit

The System Generation Kit allows the user to build the Disc Executive, configuring the system for any memory size or complement of peripherals. User-written device drivers can be added. The kit includes source code for the standard Marinchip device drivers for user modification or as an example.

HARDWARE OPTIONS

PROM/RAM Board

The Marinchip PROM/RAM/SIO/RTC board provides up to 10K of PROM, 1K of RAM, a serial I/O port, and real-time clock on a single board. It comes complete with debug monitor and disc boot in PROM, and makes the job of bringing up an M9900 system easy. The board operates in 16 bit mode, making the most of the 16 bit CPU, and can hold up to 8K of user PROM for user-written high performance code.

NETWORK OPERATING SYSTEM

The M9900's Network Operating System is a system without limits - designed to grow as computer hardware evolves, without forcing you to change programs every time you change the hardware. The system provides byte addressable files up to four billion bytes in length, complete dynamic allocation and release, random/sequential access and linked directories for complex file structures. The system automatically pages file data to memory to optimize performance. All I/O devices are treated as files, eliminating device-dependent code in applications.

EXTENDED COMMERCIAL BASIC

The M9900 Extended Commercial Basic gives you 16 digit accuracy, PRINT USING, random and sequential files, CHAIN with common variables and a choice of interpretive execution for debugging or compilation for production. If you already have applications in BASIC, you'll be glad to know that the M9900's BASIC is similar enough to the most popular 8 bit BASIC that conversion won't be a chore.

APPLICATIONS

If you are interested in applications you can really use, you'll find the M9900 Word processor, Payroll, Accounts Payable and Receivable and General Ledger to be flexible, easily maintained and ready to use when you plug the system in.

1. Do you maintain your own operating system? If not, who do I call when I have a question or problem?

2. Do you maintain your own BASIC? If not, who do I call when I have a question or problem?

3. Do you maintain your own Pascal? If not, who do I call when I have a question or problem?

4. Do you maintain (or even sell) your own Word Processor? If not, who do I buy it from, and how do I get support for it?

5. Do you maintain (or even sell) your own business application packages? If not, where do I get them, how do I know they will work on your machine, and who supports them?

6. What do I do when I have a problem and I'm not sure whether it's the hardware, the operating system, the BASIC, or in one of the applications?

7. Can I interchange files between BASIC, Pascal, the text editor, the Word Processor, and the operating system? If not, what are the restrictions?

8. Exactly how much do I have to pay to get a system that does all the things your advertisement says it does? Can I buy all those things from you? If not, who sells them?

9. Do you include hardware diagnostics with your system? If not, how do I know it's working correctly?

10. Do you publish a list of hardware made by other vendors that is known to be compatible with your machine? If not, how do I find out about a board I'm planning to buy?

11. Does your CPU have hardware for 16 bit add, subtract, multiply, and divide?

12. Do you provide floating point subroutines for assembly language? Do they offer both single and double precision? Do they use IBM format?

13. Does your system read and write industry-standard IBM 8" diskettes?

14. Can your machine use 16 bit parallel memories on the S-100 bus to double performance? Can I mix them with existing 8 bit memories?

15. Does your software support fixed and removable storage module hard discs? Can I choose and mix sizes from 10 to 40 megabytes? Do I have to change my programs when I go from a floppy to a hard disc and back?

16. Is your processor a member of an instruction-compatible family that includes single chip computers, 8- and 16-bit bus machines, and a high-speed TTL minicomputer with extended addressing?