



Fairchild's PPS-25 system uses a four-bit parallel processor that responds to 95 instructions, of which 63 can be assigned for I/O control. Interfacing with keyboards and displays is done with standard ICs. The operation time on a register of 16 characters is 62.5 μ s. Two groups of 16-digits can be added in 125 μ s.

of the processor, one standard ROM and 20 standard TTL circuits. For faster execution times, the 8008-1 offers a typical cycle time of 12.5 μ s.

The design support offered by Intel includes a prototyping board that forms an operational processor with erasable pROMs instead of mask-programmable ROMs. The standard board for the MCS-4 can hold up to 8000 bits of pROM and 1280 bits of RAM. In addition FORTRAN IV assemblers and simulators for the MCS-4 enable designers to use any general-purpose computer to develop the processor program and to simulate the microprocessor prior to mask-programming of the ROMs.

For the MCS-8, a bootstrap loader consisting of three pROMs permits data to enter the RAMs from a teletypewriter paper tape or keyboard. The MCS-8 prototyping board holds up to 16,000 bits of pROM and 8000 bits of RAM. And various test programs are available on pROMs that plug into the prototyping board. For both systems, Intel offers a library of programs, which have been contributed by and are free to users.

The PPS-25 for scientific calculators

For arithmetic operations, Intel's MCS-4 generally isn't as fast as Fairchild's four-bit processor. Intended for scientific calculators, control systems and peripheral systems, the Fairchild processor features overlapping instructions for faster numerical calculations.

In the Fairchild system—called the PPS-25—the 3805 arithmetic unit and the 3806 function and timing unit perform all the timing, control

and arithmetic functions. The 3810 ROM stores microprograms and data lookup tables, while the 3808/3809 registers provide data storage.

The PPS-25 requires at least one 3810 ROM, which can store 256 program steps, each 12 bits wide. However, up to 26 ROMs can be used for a total read-only memory storage of 6656 words. Similarly up to seven 25-digit registers can be implemented for total data storage of 700 bits of BCD as well as hexadecimal data.

The 3805 and 3806 form a four-bit parallel processing section with a 95-instruction set. The system is organized in 25-digit serial, four-bit parallel format and features a 62.5- μ s word time and 2.5- μ s bit time, corresponding to a maximum clock rate of 400 kHz (two phase).

The instructions for fetch, data access and operation are overlapping. Hence operations involving data manipulation can be executed in one cycle, independent of the number of bits, or characters. The arithmetic unit, for example, can operate on one group of 25 digits in a single 62.5- μ s cycle. Similarly data characters can be transferred directly from the ROM to a data register in one instruction.

Input/output requirements for keyboards and displays can be met with the 3803/3807 keyboard encoder and the 3811 display driver. The 3803/3807 permits direct interfacing with up to 62 key switches and 32-mode switches. The 3811 provides decoded data for displays having up to 16 digits. In the 95-instruction set, 63 I/O commands can be assigned for control.

As part of the function and timing chip, two 25-bit status registers can be used to store 25 flags under program control. When the 3803/3807 keyboard encoder is used, the status of 16-mode switches can be stored eight at a time in eight discrete flag bits for each register. And two return addresses for subroutine calls can be stored for each register, for a total of four levels of subroutine testing.

Other features of the PPS-25 system include the following: two and three-way branching; immediate or delayed program-address modification under external control; and conditional external interrupt from a single input line.

As an introductory kit, Fairchild offers the 3025A. The six-part kit allows designs as complex as a 12-digit, one-memory calculator.

The IMP-16C—a microprogrammable system

National Semiconductor's microprocessor system, the IMP-16C is a 16-bit microprogrammable parallel processor on an 8-1/2-by-11-inch PC board. It consists of the processor, clock system, I/O bus drivers, 256 words of RAM and provisions for 512 words of ROM or pROM memory. The IMP-16C uses a standard set of 42 micro-