MODEL FFP
Fast Floating Point Co-Processor
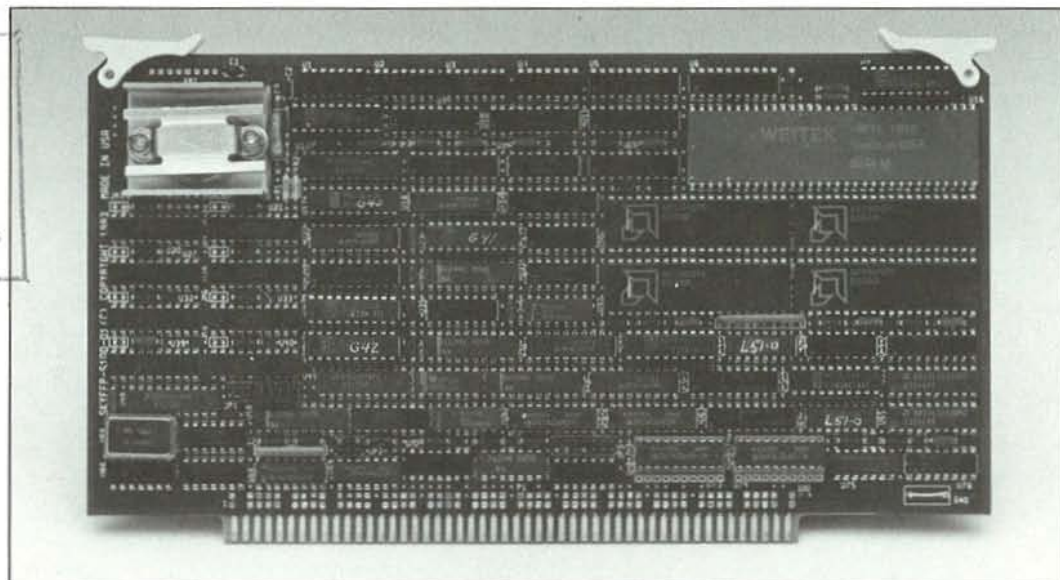
FEATURES

- 3.0-Microsecond Floating-Point Add
- 32-Bit and 64-Bit IEEE Floating-Point Format
- 16-Bit and 32-Bit Integer Operations
- User Transparent Execution
- Transcendental Functions
- Single Plug-in Module

The Fast Floating Point Co-Processor Board is a high-speed processor which performs 32-bit and 64-bit precision floating-point operations for 68000-based systems. The FFP performs basic arithmetic operations such as add, subtract, multiply and divide, as well as advanced operations such as logarithm, exponentiation, sin, cos, tan and arctan. The FFP instruction set also includes type conversion, modulus, minimum, maximum and compare operations. The processor contains 4K words of RAM program memory and 16K words of data memory. The FFP, when used with Cromemco's Fast Fortran, Fast Pascal or Fast C, is user transparent. Its operation requires no modifications to existing FORTRAN, Pascal, or C programs. These programs typically execute two to five times faster when the FFP is added to the system.

ARITHMETIC EXECUTION TIMES (in microseconds)

Operation	32-Bit Single Precision	64-Bit Double Precision
Add, Subtract or Multiply	3.0	12.0
Pivot (multiply–add)	6.0	24.0
Divide	18.0	36.0
Square Root, Sine or Cosine	48.0	

TECHNICAL SPECIFICATIONS

Architecture:
2901-bit sliced ALU; 16 × 16 high-speed multiplier; separate program and data memories; writeable control store PROM and RAM program memory

Data Formats:
IEEE Floating Point
Single Precision (SP): Exponent — 8 bits
Mantissa — 24 bits
Double Precision (DP): Exponent — 11 bits
Mantissa — 53 bits
Integer: Single word — 16 bits
Double word — 32 bits
Data Type: Single Precision, floating point, Real
Double Precision, floating point, Real
Single Precision, floating point, Complex
Single Word Integer, (Real)
Double Word Integer, (Real)

Floating Point Instruction Set:
SP/DP: $+$, $-$, $*$, $/$, pivot, load reg., store reg.
SP Real: Product, Sum, Prod-sum (all include DP conversion); sin, cos, atan, e^x, $\log_e(x)$, x^y, square root, minimum, maximum, clip, inverted clip, modulus
SP Complex: Mag. squared, multiply
Integer: SP/DP integer convert to SP floating point, SP floating point convert to SP/DP integer

Program Memory: 4K × 32 bits RAM; 2K × 32 bits PROM

Data Memory:
Dual-ported 16 × 16-bit RAM (supports scalar math)

I/O: Occupies 16 locations in extended I/O space

Instruction Cycle: 125 nsec

Power Requirements: +8 volts at 4.0 amps typical

Bus: S-100 (IEEE-696)

Operating Environment: 0 to 55 degrees Centigrade