Numeric Coprocessor 2C87

OVERVIEW

The IIT-2C87 is a high performance numerics processor extension that is plug and object-code compatible with the 80287. The IIT-2C87 is a low power CMOS device capable of operating at clock rates up to 20 MHz. The IIT-2C87 performs most of its functions in far fewer clock cycles than is required by the 80287. When combined with the faster clock frequency (the IIT-2C87 can operate on the same clock as the 80286), the floating point processor achieves performance at least two times faster than the 80287. When used with an 80286 processor the computing system fully conforms to the IEEE Floating Point Standard. The IIT-2C87 is packaged in a 40-pin ceramic package.

- ☐ Object code and plug compatible with the 80287 and 80C287A
- ☐ Low power CMOS device, ideal for lap-top applications
- ☐ High performance 80-bit internal architecture
- ☐ Implements ANSI/IEEE standard 754-1985 for binary floating point arithmetic
- ☐ Up to 200% faster than the 80287
- ☐ Upward object code compatible from 8087
- ☐ Expands 80286 data types to include 32-, 64-, 80 bit floating point, 32-, 64-, bit integers and 18-digit BCD operands
- ☐ Available in 40-pin dual in-line package
- ☐ Directly extends 80286 instructions set to include trigonometric, logarithmic, exponential and arithmetic instructions
- ☐ Full range transcendental operations for sine, cosine, tangent, arctangent and logarithm
- ☐ Built-in exception handling
- ☐ Operates in both real and protected mode of the 80286
- ☐ Thirty-two 80-bit numeric registers, 24 usable as 3 banks of 8 register stacks
- ☐ Built-in instruction to calculate 4x4 matrix transformation
- ☐ Operates at clock rates up to 20 MHz (can use 80286 clock)

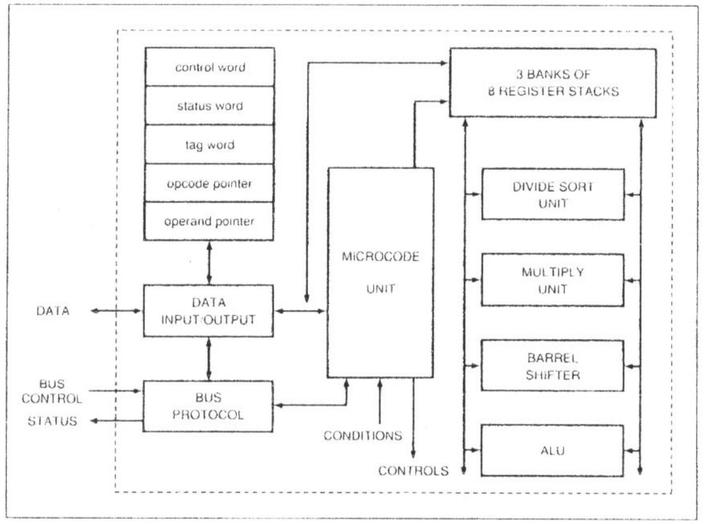

Figure 1. IIT-2C87 Block Diagram

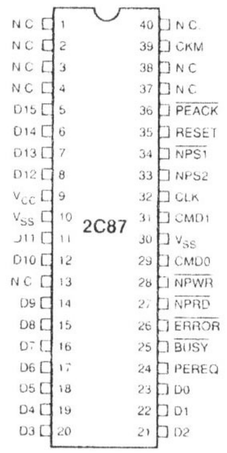

Figure 2. 2C87 Pin Configuration

ENHANCED PERFORMANCE

In addition to operating at clock speeds up to 20 MHz, the IIT-2C87 requires far fewer clock cycles than the 80287 in Instruction execution. Table 1 compares the range of clock cycles required to perform typical floating point instructions.

	CLOCK CYCLES REQUIRED	
INSTRUCTION	IIT-2C87	80287
ADD	15-17	70-100
MPY	19	90-145
DIV	48	193-203
SQRT	49	180-186
COMPARE	17	40-50
REM	58	15-190
TAN	196	30-540
LOG	235	900-1100

FUNCTIONALITY

The IIT-2C87 is object code and plug compatible with the 80287. The IIT-2C87 includes all of the instructions of the 80287. In addition the IIT-2C87 provides all the 80387 instructions and enhancements (SIN, COS, IEEE COMPARE, IEEE REMAINDER, larger range for transcendental functions).

The IIT-2C87 provides extra functions which are not available on the 80287.

There are thirty-two 80-bit floating point registers, 24 of which are usable as 3 banks of register stacks.

The IIT-2C87 includes a built-in instruction to calculate a 4x4 matrix transformation. This results in the capability to perform matrix transformations 6 to 8 times faster than the 80287.

FEATURES:

CMOS IMPLEMENTATION

The IIT-2C87 numeric co-processor is implemented in advanced 1.2 micron CMOS technology. The device dissipation is typical at 0.5 Watt. The advantages of low power 1.2 micron CMOS implementation include higher reliability and enhanced system performance. The IIT-2C87 is capable of operating at clock frequencies up to 20 MHz. The device may be operated using the 80286 clock.

The IIT-2C87 is ideally suited for LAP-TOP computer implementation.