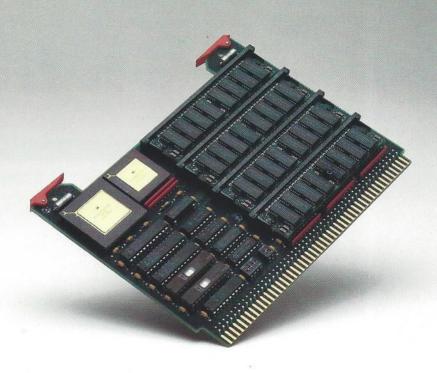
TURBO-33



General Description

Compatible Models

BASIC and PASCAL

Speed Improvement

The TURBO-33 is a 33 Mhz accelerator card for Hewlett Packard Series 9000 computers. The card contains a Motorola 68020 processor, an optional Motorola 68882 coprocessor and 1 to 4 megabytes of 80 nanosecond dynamic ram. An internal 32 bit data bus provides high speed data transfers between the processors and the memory.

The TURBO-33 is compatible with the HP 216, 217, 220, 226, 236, 237, 310 and 320 workstations. The card uses one slot in the host computer.

The TURBO-33 is designed for the BASIC and PASCAL operating systems. No modifications are required for user programs.

Programs run from 6 to over 100 times faster.

The speed increase depends on the type of computation. The following table shows the range of speed improvements.

PROGRAM TYPE	COMPUTATION TYPE	SPE	ED I	NCREASE
Compiled Programs	Integer Arithmetic	6	to	8
	Real Arithmetic	29	to	50
	Real Transcendental	142	to	293
Interpreted Programs	Integer Arithmetic	6	to	7
	Real Arithmetic	9	to	11
	Real Transcendental	32	to	63

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Benchmark Comparisons

The following tables compare system performance of the HP Series 200 computers, the HP-310 and the TURBO-33. An HP-236 was used for the Series 200 tests. System performance is approximately the same for the various HP Series 200 computers. The TURBO-33 was configured with the Motorola 68882 for the tests. The figures represent the time in seconds to execute 100,000 iterations of the indicated function.

Program Type	Benchmark	HP-200	HP-310	TURBO-33
Interpreted BASIC	Integer Arithmetic	32.91	30.15	5.10
	Real Arithmetic	68.70	60.26	6.44
	Square Root	216.61	186.72	5.68
	Sine	411.89	349.28	6.45
Compiled Basic	Integer Arithmetic	4.30	3.09	.55
	Real Arithmetic	38.49	31.46	1.08
	Square Root	192.19	162.74	1.00
	Sine	395.35	332.45	2.33
Compiled Pascal	Integer Arithmetic	4.07	3.76	.65
	Real Arithmetic	39.92	26.76	.79
	Square Root	178.90	115.88	.61
	Sine	373.79	240.19	1.41

Memory cards which have been added to the HP computers are too slow to run with the TURBO-33. These memory cards must be removed when installing the TURBO-33.

The installation process is quick and easy. Two switches must be set on the TURBO card. Existing memory cards are removed from the computer and then the TURBO-33 is plugged into any available slot.

The TURBO-33 requires a maximum of 1.2 Amps from the 5 Volt supply.

The TURBO-33 has a 5 year warranty.

Product Description	Reference
TURBO-33 with 1 megabyte	10-00-0012
TURBO-33 with 2 megabytes	10-00-0013
TURBO-33 with 4 megabytes	10-00-0014
TURBO-33/68882-33 with 1 megabyte	10-00-0015
TURBO-33/68882-33 with 2 megabytes	10-00-0016
TURBO-33/68882-33 with 4 megabytes	10-00-0017

System Memory

Installation Proceedure

Power Requirements

Product Warranty

Ordering Information

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