

Introduction

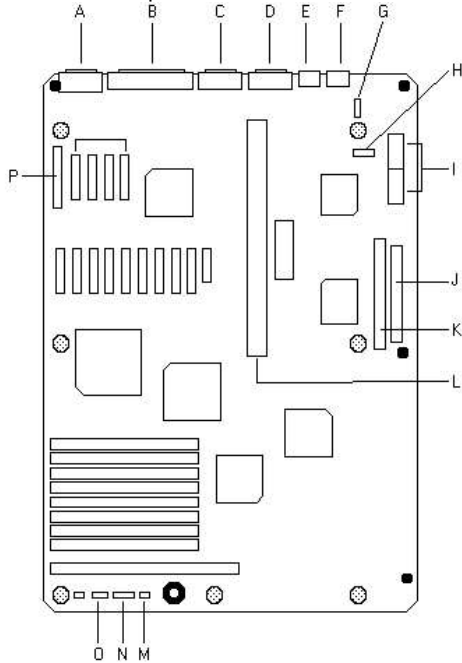
Intel™486 Classic S-Series incorporates a high performance SuperVGA solution in an affordable i486 platform. A wide range of i486™ CPU offerings gives performance flexibility to start and the OverDrive™ Processor Socket gives a future path to higher performance. An LPX form factor system design with video, hard disk, floppy control, mouse, and other I/O ports integrated, as well as five slots and 4 bays provides the expandability needed for traditional desktop PC applications.

The onboard Western Digital 90C31 SuperVGA controller gives solid performance for VGA applications and superior Windows performance, even at the maximum resolution of 1024 X 768 X 256 colors. This performance is attained via hardware built into the 90C31 which accelerates the most essential Windows graphics functions.

An easy upgrade path to higher CPU performance is built into S-Series. The OverDrive™ Processor Socket allows installation of either an i487™SX to provide power for numeric intensive applications, or an OverDrive™ Processor, Intel's clock doubling upgrade processor, to significantly improve CPU performance.

General Board Layout

- A. VGA video Connector (J1)
- B. Parallel Connector (J2)
- C. Serial Port 1 Connector (J3)
- D. Serial Port 2 Connector (J4)
- E. Mouse Connector (J5)
- F. Keyboard Connector (J6)
- G. Offboard Battery Header (J7)
- H. Auxilliary Fan Power Header (J11)
- I. Power Connector (J10,J15)
- J. 3 ½ - inch Floppy Disk Drive Header (J18)
- K. IDE Disk Drive Header (J17)
- L. ISA Riser Card Connector (J8)
- M. Front Panel Reset Switch Header (J24)
- N. Front Panel Keyboard Lock Switch/Power LED Header (J23)
- O. Hard Disk Activity LED Header (J22)
- P. VESA - Compliant 8514/A Standard Feature Header (J12)



CPU

Intel™486 Classic S-Series provides several different base CPU options; an i486™SX running at 20, or 25 MHz or an i486DX at 33 MHz. This provides a wide price/performance range to fit a variety of customer application needs.

The S-Series supports complete i486 CPU functionality. Common features of the three CPUs include backward compatibility with the 8086, 80286, and i386™ CPUs, burst mode bus cycles, and an on-chip 8 Kbyte cache. The cache is 4-way set associative and uses a write-through policy, and can be disabled via software. The i486DX CPU contains an on-chip numeric coprocessor to increase the speed of floating point operations. This coprocessor is backward code compatible with 387DX and 387SX math coprocessors and complies to ANSI/IEEE standard 754-1985. The i486SX does not include the numeric coprocessor.

System Memory

The S-Series memory sub-system consists of three logical banks of SIMM memory. Bank one supports a single 36-bit SIMM socket, while banks two and three consist of four 9-bit SIMM sockets respectively. All production systems ship with one 4 MB (1 Mb x 36) SIMM in bank one. This SIMM can be removed and replaced with a 2 MB (512 Kb x 36) or 8 MB (2Mb x 36) of memory. Banks 2 and 3 each consist of four 9-bit SIMM sockets and can be populated with 256K X 9, 1M X 9, or 4M X 9 SIMMs. SIMMs must be installed in the 9-bit sockets in sets of four of the same size and type, but no other restrictions exist. The maximum memory size for S-Series is 40MBs. For a complete list of possible memory configurations, refer to Appendix D. Each bank supports 80-ns fast page mode SIMM memory. Faster DRAM can be installed, however no improvement in performance will be seen.

Optional Cache

An optional cache is designed into Classic. The Opti chipset includes a direct mapped, write back cache controller, while DIP sockets for SRAM installation on the motherboard support either 64K , 128K, or 256K of cache SRAM. For SRAM vendors and installation details, refer to Appendices B and E.

Approved SRAM list

The Classic S-Series can be upgraded with an external cache by adding SRAM components to DIP sockets on the baseboard. The design requires 20 ns data SRAM and 15 ns tag and dirty bit SRAM. Installation is as follows. Refer to Appendix B for jumper settings.

Cache Size	SRAM Size			
	Bank 0 U46-U49	Bank 1 U42-U45	Tag U50	Dirty Bit U51
64 K	(4) 8Kb x 8	(4) 8Kb x 8	(1) 8Kb x 8	(1) 64Kb x 1
128K	(4) 32Kb x 8	none	(1) 32Kb x 8	(1) 64Kb x 1
256K	(4) 32Kb x 8	(4) 32Kb x 8	(1) 32Kb x 8	(1) 64Kb x 1

The list below details the part numbers for a 64K, 128K, or 256K cache from several different vendors.

Device Type	Motorola	Cypress	IDT	Samsung	Mitsubishi
8 Kb x 8, 15 ns	MEM6264PC15	CY7C185-15PC	7164S15TP	KM68685BP-15	N/A
8 Kb x 8, 20 ns	MEM6264PC20	CY7C185-20PC	7164S20TP	KM68685BP-20	N/A
32 Kb x 8, 15 ns	MEM6206PC15	CY7C199-15PC	71256S15TP	KM68257BP-20	N/A
32 Kb x 8, 20 ns	MEM6206PC15	CY7C199-20PC	71256S20TP	KM68257BP-20	N/A
64 Kb x 1, 15 ns	MEM6287P15	CT7C187A-15PC	7187S15P	N/A	M5M5187BP-15

Opti Chipset

The Opti 486SXWB is a three-chip solution for i486™DX and i486SX ISA-based systems. It includes an 82C495 System Controller, an 82C392 Data Buffer Controller, and an 82C206 Integrated Peripheral Controller. Each of these chips functions is detailed below.

Related Topics:

[82C495 System Controller](#)

[82C392 Data Buffer Controller](#)

[82C206 Integrated Peripheral Controller](#)

Approved Video DRAM

The Classic S-Series can be upgraded to 1MB of video DRAM by installing four 70ns 256Kx4 Page Mode DIP DRAM. Below are several vendors and their part numbers.

Texas Instruments TMS44C256-70N

Siemens HYB514256B-70

Toshiba TC514256AP-70

NEC uPD424256

Performance Upgrade

Upgrades to higher performance are easy using the Performance Enhancement Socket incorporated into Classic. An i487SX can be added to any of the i486SX systems to provide improved floating point performance. The S-Series can also be upgraded with an OverDrive Processor, providing significantly higher CPU performance and numerics capability for i486 systems. For specific details concerning the upgrade process, refer to Appendix G.

Board Product History

As of June 15, 1994

Current PBA Numbers	CPU	Current Shipping BIOS
518725-013	i486SX-20	1.00 08.W0
518726-016	i486SX-20	1.00 08.W0
518726-013	i486SX-25	1.00 08.W0
518726-016	i486SX-25	1.00 08.W0
611418-006	i486SX-33	1.00 08.W0
518727-013	i486DX-33	1.00 08.W0
518727-016	i486DX-33	1.00 08.W0
611018-007	i486DX2-66	1.00 08.W0

Related Topics:

[Engineering Change Orders](#)

[Board Revision History](#)