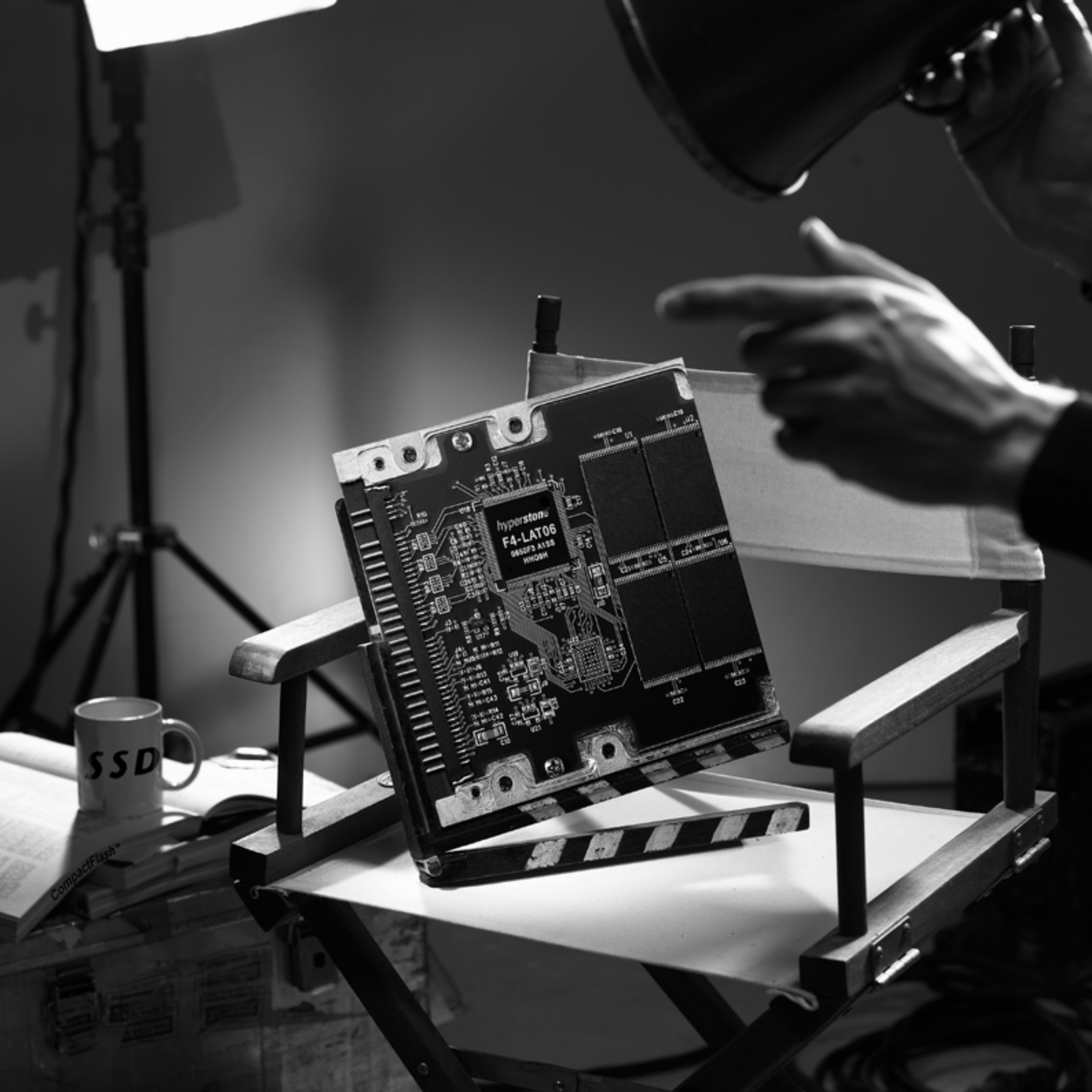


F4 Flash Memory Controller

F4

hyperston® 



hyperstone
FA-LAT06
60GB 3.5" SATA II
VH05H

SSD

CompactFlash

F4

Flash Memory Controller

The Hyperstone F4 family of Flash Memory Controllers together with provided application and flash specific firmware offers an easy-to-use turnkey platform for high endurance flash disks of various form factors and interface standards.

- Patented superior wear leveling together with ECC ensuring highest reliability and endurance
- Optimized 32-Bit RISC core, instruction set and firmware for flash handling
- Dual channel controller provides optimal performance
- Most power efficient design together with power saving features
- S.M.A.R.T. and custom features possible with simple firmware upgrades
- ASSP with no need for external active components
- Exceptional power fail robustness
- Turnkey solution including firmware, manufacturing kit, test and development hardware, and reference schematics for a CF card or 2.5" solid state disk, and testmetrix log files

Targeted Applications

- High reliability & industrial CompactFlash™ Cards (CFC)
- Solid State Disks (SSD)
- IDE Disk-on-Modules (DoM)
- Embedded Flash
- Multi-Chip-Modules (MCM)
- Multi-Chip-Package (MCP)
- PCMCIA or ATA PC cards
- Disk-on-Board

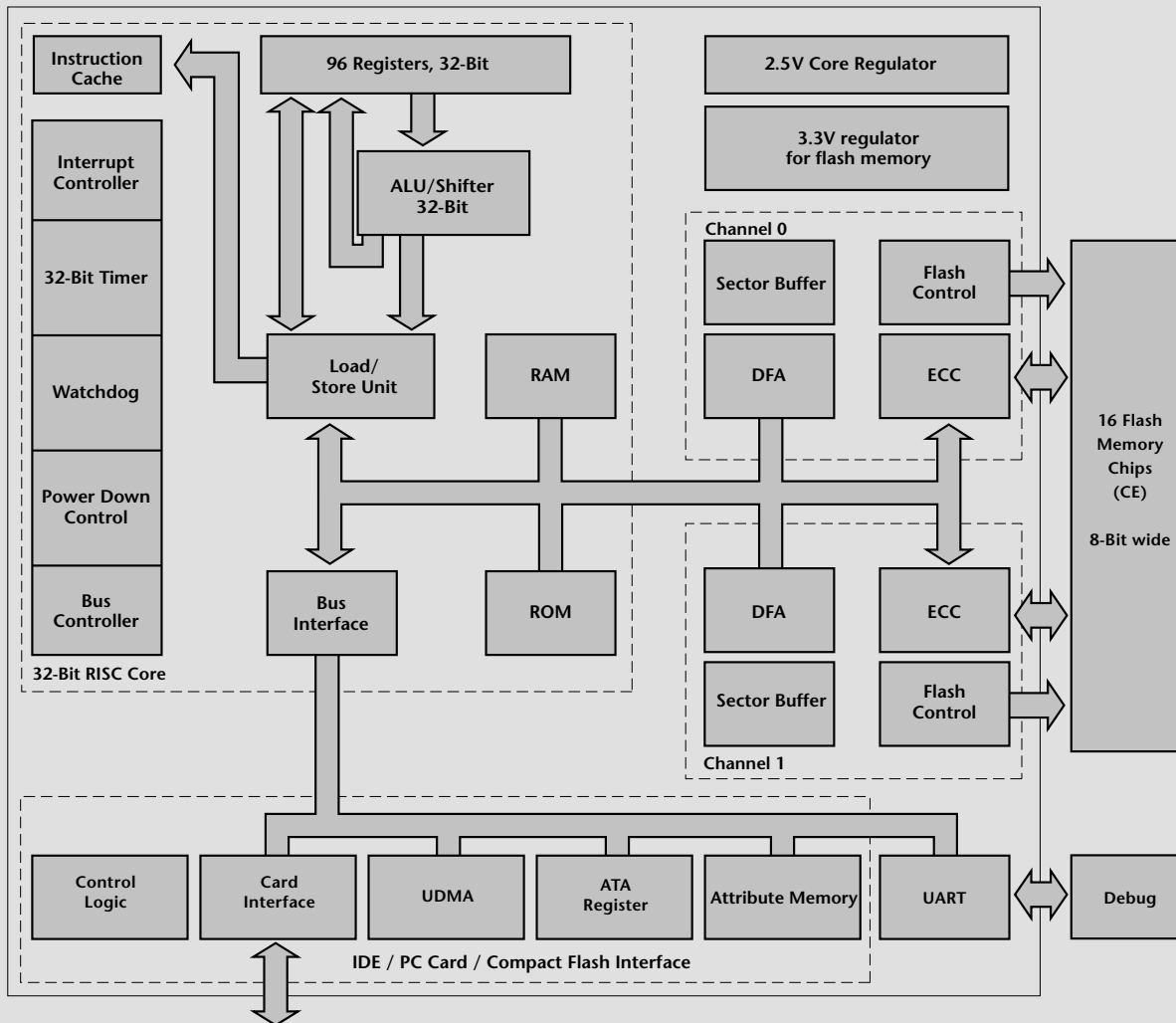
Order Information

- F4-LAT05 --- TQFP 100, 8 CEs, RoHS, 0 to +85 °C
- F4-ILAT05 --- TQFP 100, 8 CEs, RoHS, -40 to +85 °C
- F4-LAT06 --- TQFP 128, 16 CEs, RoHS, 0 to +85 °C
- F4-ILAT06 --- TQFP 128, 16 CEs, RoHS, -40 to +85 °C
- F4-0ABD0 --- KGD / Wafer, 16 CEs

Compliance & Performance

- Fully compliant to CompactFlash™ 3.0 and compatible to 4.1 specifications
- Fast ATA supporting PIO mode 6, MDMA mode 4, UDMA mode 4 in True-IDE mode
- PCMCIA specification version 2.1
- Configurable as removable, hot swappable, and fixed drive
- Sustained read up to 50 MB/s
- Sustained write up to 40 MB/s with interleaving
- Random read up to 40 MB/s
- Random write up to 9 MB/s
- Custom optimizations for specified file sizes possible
- Data transfer rate to flash memories: up to 80 MB/s
- Host data transfer rate in PIO mode 6 or MDMA mode 4 up to 25 MB/s
- Host data transfer rate in UDMA mode 4 up to 66 MB/s

F4 Block Diagram



Controller & CPU

- High performance 32-Bit Hyperstone RISC microprocessor
- 10 to 70 MHz clock frequency using adjustable internal oscillator
- Large internal RAM provides firmware flexibility
- Automatic power-down during wait periods, power saving incl. automatic wake-up and sleep mode with $I_{cc} < 250 \mu A$
- Supply voltage $5.0V \pm 10\%$ or $3.3V \pm 10\%$
- On-chip voltage regulator for 3.3V flash power supply
- On-chip voltage regulator for 2.5V core power supply
- Internal voltage detector

Host Interface & Compliance

- Fully compliant to CompactFlash™ 3.0 and compatible to 4.1 specifications
- Fast ATA host-to-buffer transfer rates supporting PIO mode 6, MDMA mode 4, UDMA mode 4 in True-IDE mode
- PCMCIA specification version 2.1
- Configurable as removable, hot swappable, and fixed drive
- Memory mapped or I/O operation
- Automatic sensing of PCMCIA or True-IDE mode
- Four integrated sector buffers and PCMCIA attribute memory
- PCMCIA configuration option register, card configuration and status register and pin replacement register support

Flash Memory Interface & Handling

- Dual channel with two direct flash memory access (DFA) units
- Supporting all control signals for NAND type flash memory connection
- Supporting direct connection of up to 16 flash memory chip enables (CE) - eight per channel
- Flash memory power down logic and flash memory write protect control
- Error Correcting Code (ECC) capable of correcting 4 symbols in a 512 Bytes sector with additional CRC
- Supporting all flashes and technologies MLC and SLC
- Firmware storage in flash memory
- Firmware is loaded into internal memory by the boot ROM
- Flash management including mapping of logical block addresses (LBA) to corresponding physical block addresses (PBA)
- Bad Block Management
- Wear leveling
- Sudden power-fail management
- Interleaving, cache, and multi-plane programming
- ...and much more



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