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**User manual MAXTOR MARATHON 810**  
**User guide MAXTOR MARATHON 810**  
**Operating instructions MAXTOR MARATHON 810**  
**Instructions for use MAXTOR MARATHON 810**  
**Instruction manual MAXTOR MARATHON 810**



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*Marathon 810*  
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*ATA Interface Drive*  
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*Product Manual*  
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**Manual abstract:**

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..... *Marathon 810* .....

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... *ATA Interface Drive* ..

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.... *Product Manual* .....

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... *Marathon 810 (ST9816AG)* ..

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..... *ATA Interface Drive* .....

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. Product Manual ....  
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19 Figure 5. I/O pins and associated ATA signals supported by the ST9816AG .....

..... @@@@@Fast microprocessor for lower command overhead · 120-Kbyte multisegmented adaptive cache · Advanced caching and on-the-fly error-correction algorithms · Supports Read Multiple and Write Multiple commands · Supports autodetection of master/slave drives using cable select and DASP signals. 2 Marathon 810 (ST9816AG) Product Manual, August 1995 Specification summary table The specifications listed in this table are for quick reference.

For details on specification measurement or definition, see the appropriate section of this manual. Drive Specification Guaranteed Capacity (×106 bytes) Guaranteed sectors Bytes per sector Default sectors per track Default Read/Write heads Default cylinders Physical read/write heads Discs Recording density (bits/inch) Track density (tracks/inch) Areal density (Mbits/inch) Spindle speed (RPM) Internal data-transfer rate (Mbits/sec, max) I/O data-transfer rate (Mbytes/sec, max) ATA data-transfer modes supported Cache buffer (Kbytes) Height (inches, max) Width (inches, max) Depth (inches, max, excluding I/O pins) Weight (ounces, typical) Track-to-track seek time (msec, typical) Average seek time (msec, typical) Full-stroke seek time (msec, max) 2 ST9816AG 810 1,583,568 512 63 16 1,571 8 4 90,000 3,807 342 4,500 44 16.6 PIO modes 0, 1, 2, 3, 4; Multiword DMA modes 0, 1, 2 120 0.754 2.76 4.010 7.4 6 (read), 7 (write) 16 (read), 20 (write) 26 (read), 28 (write) Marathon 810 (ST9816AG) Product Manual, August 1995 3 Drive Specification Average latency (msec) Power-on to ready (seconds, typical) Standby to ready (seconds, typical) Spinup power and current (typical) Seek power and current (typical) Read/Write power and current (typical) Idle mode power and current (typical) Standby mode power and current (typical) Sleep mode power and current (typical) Voltage tolerance (including noise) Ambient temperature (°C) Temperature gradient (°C per hour, max) Relative humidity Wet bulb temperature (°C, max) Altitude (meters above mean sea level, max) Shock, operating (Gs, max at 2 or 11 msec) Shock, nonoperating (Gs, max) Vibration (Gs max at 22-450 Hz) Drive Acoustics, Idle mode (dBA) Drive Acoustics, seeking (dBA) Nonrecoverable read errors Mean time between failures (power-on hours) Contact start-stop cycles Service life (years) ST9816AG 6.67 7 3 3.50 watts, 0.700 amps 2.10 watts, 0.420 amps 1.30 watts, 0.260 amps 0.40 watts, 0.080 amps 0.30 watts, 0.060 amps +5 volts +5% 10% 5 to 55 (op.

), 40 to 70 (nonop.) 30 8%80% (10%/hr max grad.) 29 (op.), 40 (nonop.) 300 to 3,040 (op.), 300 to 12,190 (nonop.) 100 250 (2 msec), 150 (11 msec) 0.50 (op.) 4.0 (nonop.) 26 (typical), 30 (max) 29 (typical), 33 (max) 1 per 1013 bits read 300,000 50,000 5 Marathon 810 (ST9816AG) Product Manual, August 1995 5 1.0 Drive specifications Unless otherwise noted, all specifications are measured under ambient conditions, at 25°C, at sea level, and nominal power. 1.1 Formatted

capacity ST9816AG Guaranteed Mbytes (1 Mbyte = 106 bytes) Guaranteed sectors Bytes per sector 810.7 1,583,568 512 1.

1.1 Default logical geometry ST9816AG 63 16 1,571 Sectors per track Read/Write heads Cylinders 1.1.2 Supported translation geometries The ST9816AG supports all head, cylinder and sector geometries, subject to the maximums specified below and to the following condition: (sectors) × (heads) × (cylinders) total sectors per drive ST9816AG Sectors per track (max) Read/Write heads (max) Cylinders (max) 63 16 1,571 1.2 Physical organization ST9816AG

Read/Write heads Discs 8 4 6 Marathon 810 (ST9816AG) Product Manual, August 1995 1.

3 Recording and interface technology Interface Recording method Recording density (bits/inch) ATA RLL (1,7) 90,000 Flux density (flux change/inch) 67,500 Track density (tracks/inch) Areal density (Mbits/inch) Spindle speed (RPM) ( ± 0.



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5%) Internal data-transfer rate (Mbits per sec max--ZBR) I/O data-transfer rate (Mbytes per sec max) Interleave Cache buffer (Kbytes) 2 3,807 342 4,500 44  
16.6 (PIO mode 4 with IORDY) 16.6 (multiword DMA mode 2) 1:1 120 1.4 Physical dimensions Height (max) inches (mm) Width (max) inches (mm) Depth  
(max) inches (mm) Weight (typical) ounces (kg) 0.754 (19.15) 2.76 (70.10) 4.010 (101).

85) 7.4 (0.21) Note. Maximum depth excludes I/O connector pins, which may extend up to 0.010 inches beyond the edge of the head/disc assembly. Marathon  
810 (ST9816AG) Product Manual, August 1995 7 1.5 Seek time All seek times are measured using a 25 MHz 486 AT computer (or faster) with a 8.3 MHz I/O  
bus. The measurements are taken with nominal power at sea level and 25°C ambient temperature. The specifications in the table below are defined as follows:

· Track-to-track seek time is an average of all possible single-track seeks in both directions.

· Average seek time is a true statistical random average of at least 5,000 measurements of seeks between random tracks, less overhead. · Full-stroke seek time  
is one-half the time needed to seek from the first data cylinder to the maximum data cylinder and back to the first data cylinder. The full-stroke typical value is  
determined by averaging 100 full-stroke seeks in both directions. Seek type Track-to-track Average Full-stroke Average latency: 6.67 msec Typical read  
(msec) 6 16 26 Typical write (msec) 7 20 28 1.

6 Startup times Power-on to Ready (sec) Standby to Ready (sec) 7 (typical) 3 (typical), 10 (max.) Note. The drive responds to nonmedia commands within 2  
seconds (max) of power-up, and responds to media commands within 12 seconds (max) of power-up. 1.7 Power specifications The drive receives DC power  
(+5V) through pin 41 and pin 42 of the ATA interface connector.

1.7.1 Power consumption Power requirements for the drive are listed in the table below. Typical power measurements are based on an average of drives  
tested under nominal conditions, using 5.0V input voltage at 25°C ambient temperature at sea 8 Marathon 810 (ST9816AG) Product Manual, August 1995  
level. Active mode current and power are measured with a 32-msec delay between each operation and the drive in default logical geometry. Seeking power  
and currents are measured during one-third-stroke buffered seeks. Read/Write power and current are measured with the heads on track, based on a 16-sector  
write followed by a 32-msec delay, then a 16-sector read followed by a 32-msec delay. Spinup power is measured from time of power-on to time of drive-  
ready for normal operation. Typical watts RMS Typical amps RMS (at nominal voltage) (at nominal voltage) 3.

50 2.10 2.10 1.30 0.40 0.30 0.700 0.420 0.420 0.260 0.

080 0.060 Mode Spinup Active Seeking Read/Write Idle Standby Sleep 1.7.1.1 Typical current profile Figure 1 shows a typical current profile for the  
ST9816AG.

Current (Amps) 1.6 Spinup 1.4 1.2 1.0 Drive ready Upload code 0.

8 0.6 0.4 0.2 0.0 0 1 2 3 4 5 6 7 8 9 Active mode Idle mode Standby mode Sleep mode 10 11 12 13 Time (seconds) Figure 1. Typical startup and operation  
current profile for the ST9816AG Marathon 810 (ST9816AG) Product Manual, August 1995 9 1.7.2 Power recovery Except during execution of a write  
command, the drive's power can be interrupted without adversely affecting the drive or previously written data. If power is removed while the drive is  
performing a write operation, the integrity of the data b 300 m to 12,190 m (1,000 ft to 40,000 ft) Operating Nonoperating 1.8.

5 Shock All shock specifications assume that the drive is mounted in an approved orientation with the input levels at the drive mounting screws. The  
nonoperating specifications assume that the read/write heads are positioned in the shipping zone. Note. At power-down, the read/write heads automatically  
move to the shipping zone. The head and slider assembly park inside of the maximum data cylinder. When power is applied, the heads recalibrate to Track 0.  
1.8.5.1 Operating shock This drive incorporates SafeRite shock protection and can withstand a maximum operating shock of 100 Gs without nonrecoverable  
data errors (based on half-sine shock pulses of 2 or 11 msec).

1.8.5.2 Nonoperating shock The nonoperating shock level that the drive can experience with complete data recovery is 250 Gs (based on half-sine shock  
pulses of 2 msec duration) or 150 Gs (based on half-sine shock pulses of 11 msec duration). Shock pulses are defined by MIL-STD-202 F with the amplitude  
tolerance controlled to ± 5%.

1.8.6 Vibration All vibration specifications assume that the drive is mounted in an approved orientation with the input levels at the drive mounting screws.  
The nonoperating specifications assume that the read/write heads are positioned in the shipping zone. 1.

8.6.1 Operating vibration The following table lists the maximum vibration levels that the drive may experience without incurring physical damage or  
degradation in performance. 5450 Hz 4505 Hz 0.50 Gs acceleration (peak) 0.50 Gs acceleration (peak) 12 Marathon 810 (ST9816AG) Product Manual,  
August 1995 1.8.6.2 Nonoperating vibration The following table lists the maximum nonoperating vibration that the drive may experience without incurring  
physical damage or degradation in performance when put into operation. 522 Hz 22450 Hz 45022 Hz 225 Hz 0.

162-inch displacement (double amplitude) 4 Gs acceleration (peak) 4 Gs acceleration (peak) 0.162-inch displacement (double amplitude) 1.9 Drive acoustics  
Drive acoustics are measured as sound pressure 1 meter from the drive. Mode Idle mode (dBA) Seek (dBA) Typical 26 29 Maximum 30 33 1.10 Reliability  
Nonrecoverable read errors Mean time between failures 1 per 10<sup>13</sup> bits read 300,000 power-on hours (nominal power, at sea level, 25°C ambient  
temperature) 50,000 cycles (at nominal voltage and temperature, with 60 cycles per hour and a 50% duty cycle) None required 5 years Contact start-stop  
cycles Preventive maintenance Service life Marathon 810 (ST9816AG) Product Manual, August 1995 13 1.11 Agency certification 1.11.1 Safety certification  
The ST9816AG is listed in accordance with UL 1950 and CSA C22.2 (950-M89) and meets all applicable sections of IEC 380, IEC 435, IEC 950, VDE  
0806/08.81 and EN 60950 as tested by TUV-Rheinland, North America.

1.11.2 FCC verification The ST9816AG is intended to be contained solely within a personal computer or similar enclosure (not attached to an external  
device). As such, each drive is considered to be a subassembly even when it is individually marketed to the customer. As a subassembly, no Federal  
Communications Commission authorization, verification or certification of the device is required.

Seagate Technology, Inc. has tested this device in enclosures as described above to ensure that the total assembly (enclosure, disc drive, motherboard, power  
supply, etc.



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*Ground +5 volts DC (logic) +5 volts DC (motor) Ground for power pins Reserved Pins 28, 34 and 39 are used for master-slave communication (details shown below).*



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