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User manual MAXTOR ST340015A
User guide MAXTOR ST340015A
Operating instructions MAXTOR ST340015A
Instructions for use MAXTOR ST340015A
Instruction manual MAXTOR ST340015A



.....
Barracuda 5400.1 Family
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ST340015A
.....

.....
Ultra ATA Interface Drives
.....

Product Manual
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Manual abstract:

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11 11 22 23 24 25 28 vi Barracuda 5400.1 Product Manual, Rev. G Barracuda 5400.1 Product Manual, Rev. G 1 1.0 Introduction This manual describes the functional, mechanical and interface specifications for Seagate® Barracuda® 5400.1 ST340015A model drives. This drive provides the following key features: · Low power consumption. · High instantaneous (burst) data transfer rates (up to 100 Mbytes per second) using Ultra DMA mode 5.

· Giant magnetoresistive (GMR) recording heads and EPRML technology provide the drives with increased areal density. · State-of-the-art cache and on-the-fly error-correction algorithms. · Full-track multiple-sector transfer capability without local processor intervention. · Quiet operation. · 350 Gs nonoperating shock. · SeaTools diagnostic software performs a drive self-test that eliminates unnecessary drive returns. · Support for S.M.A.R.

T. drive monitoring and reporting. · Support for drive self-test (DST) with S.M.A.

R.T. Execute Off-line Immediate. · Support for Read Multiple and Write Multiple commands. · Support for autodetection of master/slave drives that use cable select (CSEL).

2 Barracuda 5400.1 Product Manual, Rev. G Barracuda 5400.1 Product Manual, Rev. G 3 2.0 Drive specifications Unless otherwise noted, all specifications are measured under ambient conditions, at 25°C, and nominal power. For convenience, the phrases the drive and this drive are used throughout this manual to indicate ST340015A model drives. 2.1 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.

4 Barracuda 5400.1 Product Manual, Rev. G Drive specification Formatted Gbytes (x106 bytes) Guaranteed sectors Bytes per sector Default sectors per track Default read/write heads Default cylinders Physical read/write heads Discs Recording density BPI (bits/inch max) Track density TPI (tracks/inch max) Areal density (Mbits/inch² max) ST340015A 40 78,165,360 512 63 16 16,383 1 1 475,127 94,000 49,888 5,800 511 100 PIO modes 04 Multiword DMA modes 02 Ultra DMA modes 05 2 19.99 102 146.9 454 grams (1.1 lb) 12.5 (read); 13.5 (write) 0.3 (read); 0.7 (write) 15.

5 (read); 16.5 (write) 26 (read); 28 (write) 6.5 seconds 6.0 seconds 10 seconds 1.20 amps (5V); 2.

0 amps (12V) 7.3 watts 6.6 watts Spindle speed (RPM) Internal data transfer rate (Mbits/sec) I/O data transfer rate (Mbytes/sec max) ATA data-transfer modes supported Cache buffer (Mbytes) Height (mm max) Width (mm max) Length (mm max) Weight (typical) Average seek time (msec typical) Track-to-track seek time (msec typical) Read/write seek time (msec typical) Full-stroke seek time (msec typical) Power-on to ready (max) Standby to ready (typical) Spindown (typical) Startup current (max) Seek power (typical) Read/Write power Barracuda 5400.1 Product Manual, Rev. G 5 Drive specification Idle mode (typical) Standby mode (typical) Sleep mode (typical) Voltage tolerance (including noise) Ambient temperature Temperature gradient (°C per hour max) Relative humidity Relative humidity gradient Wet bulb temperature (°C max) Altitude, operating Altitude, nonoperating (below mean sea level, max) Shock, operating (Gs max at 2 msec) Shock, nonoperating (Gs max at 1 and 2 msec) Vibration, operating Vibration, nonoperating Drive acoustics Sound power (bels) ST340015A 5.

0 watts 1.4 watts 1.0 watts 5V +/- 5%; 12V +/- 10% 0° to 60°C (operating) 40° to 70°C (nonoperating) 20°C (operating) 5% to 90% (operating) 5% to 95% (nonoperating) 30% per hour max 33 (operating) 40 (nonoperating) 60.



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96 m to 3,048 m (200 ft to 10,000+ ft) 60.96 m to 12,192 m (200 ft to 40,000+ ft) 63 350 0.5 Gs (0 to peak, 22350 Hz) 5 Gs (0 to peak, 22350 Hz) Idle* 2.6 (typical), 2.8 (max) Quiet Seek 2.7 (typical), 2.9 (max) Performance Seek 2.

8 (typical), 3.0 (max) Nonrecoverable read errors Mean time between failures (power-on hours) Service life 1 per 1014 bits read 600,000 5 years Contact start-stop cycles (25°C, 40% relative 50,000 humidity) SeaShield No *During periods of drive idle, some offline activity may occur according to the S.M.A.R.T. specification, which may increase acoustic and power to operational levels. 6.2.2 Barracuda 5400.1 Product Manual, Rev.

G Formatted capacity Formatted capacity 40 Gbytes Model ST340015A Guaranteed sectors 78,165,360 Bytes per sector 512 2.3 Default logical geometry Cylinders 16,383 Read/write heads 16 Sectors per track 63 LBA mode When addressing these drives in LBA mode, all blocks (sectors) are consecutively numbered from 0 to n1, where n is the number of guaranteed sectors as defined above. 2.4 Drive Model ST340015A Physical organization Read/write heads 1 Number of discs 1 Barracuda 5400.1 Product Manual, Rev.

G 2.5 Interface Recording method Recording density BPI (bits/inch max) Track density TPI (tracks/inch max) Areal density (Mbits/inch² max) Spindle speed (RPM) (± 0.2%) Internal data transfer rate (Mbits/sec) 7 Recording and interface technology ATA GPRML detector with NPML post processor 475,127 94,000 49,888 5,800 511 I/O data transfer rate (Mbytes/sec max) Interleave Cache buffer 16.6 (PIO mode 4) 100 (Ultra DMA mode 5) 1:1 2 Mbytes (2,048 kbytes) 2.6 Physical characteristics ST340015A (mm) (inches) (mm) (inches) (mm) (inches) (grams) (pounds) 19.

99 0.783 102 4.02 146.9 5.78 454 1.1 Drive specification Maximum height Maximum width Maximum length Typical weight 8 2.7 Seek time Barracuda 5400.1 Product Manual, Rev. G Seek measurements are taken with nominal power at 25°C ambient temperature. All times are measured using drive diagnostics.

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. Typical seek times (msec) Average Track-to-track Read/write Full stroke Read 12.5 0.3 15.5 26 Write 13.5 0.7 16.5 28 Note. These drives are designed to consistently meet the seek times represented in this manual.

Physical seeks, regardless of mode (such as track-to-track and average), are expected to meet or exceed the noted values. However, due to the manner in which these drives are formatted, benchmark tests that include command overhead or measure logical seeks may produce results that vary from these specifications. 2.8 Start/stop times 6.5 (max) 6.

0 (typical) 10 (typical) Power-on to Ready (sec) Standby to Ready (sec) Ready to spindle stop (sec) 2.9 Power specifications The drive receives DC power (+5V or +12V) through a four-pin standard drive power connector. Barracuda 5400.1 Product Manual, Rev. G 2.

9.1 Power consumption 9 Power requirements for the drives are listed in the table on page 10. Typical power measurements are based on an average of drives tested, under nominal conditions, using 5.0V ndby mode automatically after the drive has been inactive for a specifiable length of time. The standby timer delay is established using a Standby or Idle command. In Standby mode, the drive buffer is enabled, the heads are parked and the spindle is at rest. The drive accepts all commands and returns to Active mode any time disc access is necessary. · Sleep mode The drive enters Sleep mode after receiving a Sleep command from the host. In Sleep mode, the drive buffer is disabled, the heads are parked and the spindle is at rest. The drive leaves Sleep mode after it receives a Hard Reset or Soft Reset from the host.

After receiving a reset, the drive exits Sleep mode and enters Standby mode with all current translation parameters intact. · Idle and Standby timers Each time the drive performs an Active function (read, write or seek), the standby timer is reinitialized and begins counting down from its specified delay times to zero. If the standby timer reaches zero before any drive activity is required, the drive makes a transition to Standby mode. In both Idle and Standby mode, the drive accepts all commands and returns to Active mode when disc access is necessary. 2.10 2.10.1 Environmental specifications Ambient temperature Ambient temperature is defined as the temperature of the environment immediately surrounding the drive. Actual drive case temperature should not exceed 69°C (156°F) within the operating ambient conditions. Above 1,000 feet (305 meters), the maximum temperature is derated linearly to 112°F (44°C) at 10,000 feet (3,048 meters).

Operating: Nonoperating: 0° to 60°C (32° to 140°F) 40° to 70°C (40° to 158°F) 14 2.10.2 Operating: Nonoperating: 2.10.3 2.

10.3.1 Operating: Nonoperating: 2.10.3.

2 Operating: Nonoperating: 2.10.4 Operating: Nonoperating: Altitude Barracuda 5400.1 Product Manual, Rev. G Temperature gradient 20°C per hour (68°F per hour max), without condensation 30°C per hour (86°F per hour max) Humidity Relative humidity 5% to 90% noncondensing (30% per hour max) 5% to 95% noncondensing (30% per hour max) Wet bulb temperature 33°C (91.4°F max) 40.0°C (104°F max) 60.96 m to 3,048 m (200 ft to 10,000+ ft) - 60.96 m to 12,192 m (200 ft to 40,000+ ft) Barracuda 5400.1 Product Manual, Rev.

G 2.10.5 Shock 15 All shock specifications assume that the drive is mounted securely with the input shock applied at the drive mounting screws. Shock may be applied in the X, Y or Z axis. 2.10.5.1 Operating shock These drives comply with the performance levels specified in this document when subjected to a maximum operating shock of 63 Gs based on half-sine shock pulses of 2 msec. Shocks should not be repeated more than two times per second. 2.

10.5.2 Nonoperating shock The nonoperating shock level that the drive can experience without incurring physical damage or degradation in performance when subsequently put into operation is 350 Gs based on a nonrepetitive half-sine shock pulse of 2 msec duration. 2.10.

6 Vibration All vibration specifications assume that the drive is mounted securely with the input vibration applied at the drive mounting screws. Vibration may be applied in the X, Y or Z axis. 2.10.6.

1 Operating vibration The following table lists the maximum vibration levels that the drive may experience while meeting the performance standards specified in this document. 521 Hz 22350 Hz 2.10.6.2 0.02-inch displacement (peak to peak) 0.50 Gs acceleration (zero to peak) Nonoperating vibration The following table lists the maximum nonoperating vibration that the drive may experience without incurring physical damage or degradation in performance when subsequently put into operation.



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521 Hz 22350 Hz 0.2-inch displacement (peak to peak) 5.0 Gs acceleration (zero to peak) 16 2.

11 Acoustics Barracuda 5400.1 Product Manual, Rev. G Drive acoustics are measured as overall A-weighted acoustic sound power levels (no pure tones). All measurements are consistent with ISO document 7779. Sound power measurements are taken under essentially free-field conditions over a reflecting plane.

For all tests, the drive is oriented with the cover facing upward. Note. For seek mode tests, the drive is placed in seek mode only. The number of seeks per second is defined by the following equation: (Number of seeks per second = $0.4 / (\text{average latency} + \text{average access time})$) Table 1: Fluid Dynamic Bearing (FDB) motor acoustics Acoustic mode Model ST340015A Idle* 2.

6 bels (typ) 2.8 bels (max) Quiet seek 2.7 bels (typ) 2.9 bels (max) Performance seek 2.8 bels (typ) 3.

0 bels (max) *During periods of drive idle, some offline activity may occur according to the S.M.A.R.T.

specification, which may increase acoustic and power to operational levels. Barracuda 5400.1 Product Manual, Rev. G 2.12 Electromagnetic immunity 17

When properly installed in a representative host system, the drive operates without errors or degradation in performance when subjected to the radio frequency (RF) environments defined in the following table: Performance level Reference standard EN 61000-4-2: 95 EN 61000-4-3: 96 ENV 50204: 95 Test

Electrostatic discharge Radiated RF immunity Description Contact, HCP, VCP: ± 4 kV; B Air: ± 8 kV 80 to 1,000 MHz, 3 V/m, A 80% AM with 1 kHz sine 900 MHz, 3 V/m, 50% pulse modulation @ 200 Hz ± 1 kV on AC mains, ± 0.5 kV on external I/O ± 1 kV differential, ± 2 kV common, AC mains B B

Electrical fast transient Surge immunity Conducted RF immunity Voltage dips, interrupts EN 61000-4-4: 95 EN 61000-4-5: 95 EN 61000-4-6: 97 EN 61000-4-11: 94 150 kHz to 80 MHz, 3 Vrms, A 80% AM with 1 kHz sine 0% open, 5 seconds 0% short, 5 seconds 40%, 0.10 seconds 70%, 0.01 seconds C C

C B 2.13 Reliability 1 per 10¹⁴ bits read, max. 600,000 power-on hours .

(nominal power, 25°C ambient temperature) The drive shall have a useful service life of five years. 50,000 cycles. (at nominal voltage and temperature, with 60 cycles per hour and a 50% duty cycle) None required. Nonrecoverable read errors Mean time between failures Service life Contact start-stop cycles

Preventive maintenance 18 2.14 2.14.1 Barracuda 5400.1 Product Manual, Rev. G Agency certification Safety certification The drives are recognized in accordance with UL 1950 and CSA C22.2 (950) and meet all applicable sections of IEC950 and EN 60950 as tested by TUV North America.

2.14.2 Electromagnetic compatibility Hard drives that display the CE mark comply with the European Union (EU) requirements specified in the Electromagnetic Compatibility Directive (89/336/EEC). Testing is performed to the levels specified by the product standards for Information Technology Equipment (ITE). Emission levels are defined by EN 55022, Class B and the immunity levels are defined by EN 55024.

Seagate uses an independent laboratory to confirm compliance with the EC directives specified in the previous paragraph. Drives are tested in representative end-user systems. Although CE-marked Seagate drives comply with the directives when used in the test systems, we cannot guarantee that all systems will comply with the directives. The drive is designed for operation inside a properly designed enclosure, with properly shielded I/O cable (if necessary) and terminators on all unused I/O ports. Computer manufacturers and system integrators should confirm EMC compliance and provide CE marking for their products.

Korean RRL If these drives have the Korea Ministry of Information and Communication (MIC) logo, they comply with paragraph 1 of Article 11 of the Electromagnetic Compatibility control Regulation and meet the Electromagnetic Compatibility (EMC) Framework requirements of the Radio Research Laboratory (RRL) Ministry of Information and Communication Republic of Korea. These drives have been tested and comply with the Electromagnetic Interference/Electromagnetic Susceptibility (EMI/EMS) for Class B products. Drives are tested in a representative, end-user system by a Korean-recognized lab. · EUT name (model numbers): ST340015A · Certificate number: E-H011-02-4735 (B) · Trade name or applicant: Seagate Technology · Manufacturing date: January 2003 · Manufacturer/nationality: Singapore and China Barracuda 5400.1 Product Manual, Rev. G Australian C-Tick (N176) 19 If these models have the C-Tick marking, they comply with the Australia/New Zealand Standard AS/NZS3548 1995 and meet the Electromagnetic Compatibility (EMC) Framework requirements of the Australian Communication Authority (ACA). 2.14.3 FCC verification These drives are intended to be contained solely within a personal computer or similar enclosure (not attached as 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 verification or certification of the device is required. Seagate Technology LLC has tested this device in enclosures as described above to ensure that the total assembly (enclosure, disc drive, motherboard, power supply, etc.) does comply with the limits for a Class B computing device, pursuant to Subpart J, Part 15 of the FCC rules. Operation with noncertified assemblies is likely to result in interference to radio and television reception. Radio and television interference. This equipment generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. This equipment is designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television, which can be determined by turning the equipment on and off, you are encouraged to try one or more of the following corrective measures: · Reorient the receiving antenna. · Move the device to one side or the other of the radio or TV.

· Move the device farther away from the radio or TV. · Plug the computer into a different outlet so that the receiver and computer are on different branch outlets. If necessary, you should consult your dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet prepared by the Federal Communications Commission: How to Identify and Resolve Radio-Television Interference Problems. This booklet is available from the Superintendent of Documents, U.

S. Government Printing Office, Washington, DC 20402. Refer to publication number 004-000-00345-4.



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G Barracuda 5400.1 Product Manual, Rev. G 21 3.0 Configuring and mounting the drive This section contains the specifications and instructions for configuring and mounting the drive. 3.1 Handling and static discharge precautions After unpacking, and before installation, the drive may be exposed to potential handling and electrostatic discharge (ESD) hazards. @@@@This minimizes handling damage. @@@@ Handle the drive by its edges or frame only. The drive is extremely fragile--handle it with care. Do not press down on the drive top cover.

@@@@@Removal voids the warranty. @@@@@@@@@@@@@@@@@@Master or single drive. @@Drive as slave. Remove all jumpers. Drive as master with a non-ATA-compatible slave. Set a jumper on pins 5 and 6 and another jumper on pins 7 and 8. @@@@@@@@@@G Ultra ATA/100 cable An 80-conductor 40-pin cable is required to run Ultra DMA mode 3, mode 4 and mode 5. This cable uses even-numbered conductors connected to the ground pins to improve signal integrity. Note. If you are using a 40-pin 80-conductor cable, attach the blue connector to the motherboard, the black connector to the master drive, and the grey connector Co Mopu to the slave.

the ter r bo ard Master Slave Pin 1 Figure 5. Ultra ATA cable connectors Note. The drive supports both host and drive cable detection. The host detects the 80-conductor cable by sampling pin 34, CBLID, on the interface bus. The drive detects the 80-conductor cable by sensing a capacitor at the host side through the CBLID signal.

The result is reported in a Fast Rise Detected bit (bit 13 of word 93 in the Identify drive parameter block). Drive mounting 3.4 You can mount the drive in any orientation using four screws in the sidemounting holes or four screws in the bottom-mounting holes. See Figure 6 for drive mounting dimensions. Follow these important mounting precautions when mounting the drive: Allow a minimum clearance of 0.

.030 inches (0.76 mm) around the entire perimeter of the drive for cooling. Use only 6-32 UNC mounting screws. Use only .045" +/- .005 high by .050" diameter bosses (4x) for bottom mounting applications to prevent deformation of the SeaShield. Do not overtighten the mounting screws (maximum torque: 6 inch-lb). Do not use a drive interface cable that is more than 18 inches long. Barracuda 5400.

I Product Manual, Rev. G 25 Notes: 1. Dimensions are shown in inches (mm) Dimensions are per SFF-8301 specification 0.787 in. max (19.99 mm) 0.250 in. max (6.350 mm) 1.140 +0.

024 in. 0.015 (28.956 +0.635 mm) 0.

381 0.226 in. (5.750 mm) 4.000 in.

(101.600 mm) 2.229 in. (56.616 mm) 2.829 in. (71.856 mm) 3.717 0.30 in.

(94.406 0.762 mm) 0.176 0.015 in. (4.480 0.381 mm) 1.683 +0.025 in.

0.015 (41.605 +0.635 mm) 0.381 5.

770 +0.015 in. 0.005 (146.56 +0.

38 mm) 0.13 2X 1.645 +0.020 in. 0.010 (41.783 +0.508 mm) 0.254 4.000 +0.

025 in. 0.015 (101.60 +0.635 mm) 0.381 2X 1.750 +0.020 in. 0.010 (44.

450 +0.508 mm) 0.254 4X 6-32 UNC-2B max. insertion depth 0.22 in.

3X 6-32 UNC-2B max. insertion depth 0.14 in. both sides 0.125 in.

(3.175 mm) 3.750 0.10 in. (95.250 0.254 mm) 4.000 +0.015 in. 0.

005 (101.60 +0.381 mm) 0.127 Recommended case temperature measurement location Figure 6. Mounting dimensions--top, side and end view 26 Barracuda 5400.1 Product Manual, Rev. G Barracuda 5400.1 Product Manual, Rev. G 27 4.0 ATA interface These drives use the industry-standard ATA task file interface that supports 16-bit data transfers.

It supports ATA programmed input/output (PIO) modes 04; multiword DMA modes 02, and Ultra DMA modes 05. The drive also supports the use of the IORDY signal to provide reliable high-speed data transfers. You can use a daisy-chain cable to connect two drives to a single AT host bus. For detailed information about the ATA interface, refer to the draft of AT Attachment with Packet Interface Extension (ATA/ATAPI-7), NCITS T13, subsequently referred to as the Draft ATA-7 Standard. 4.

I ATA interface signals and connector pins Figure 7 on page 28 summarizes the signals on the ATA interface connector that the drive supports. For a detailed description of these signals, refer to the Draft ATA-7 Standard. 28 Barracuda 5400.1 Product Manual, Rev. G Drive pin # 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 Signal name Reset Ground DD7 DD8 DD6 DD9 DD5 DD10 DD4 DD11 DD3

DD12 DD2 DD13 DD1 DD14 DD0 DD15 Ground (removed) DMARQ Ground DIOW STOP Ground DIOR HDMARDY HSTROBE Ground IORDY DDMARDY DSTROBE CSEL DMACK Ground INTRQ IOCS16 DA1 PDIAG CBLID DA0 DA2 CS0 CS1 DASP Ground Host pin # and signal description 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 Hardware Reset Ground Host Data Bus Bit 7

Host Data Bus Bit 8 Host Data Bus Bit 6 Host Data Bus Bit 9 Host Data Bus Bit 5 Host Data Bus Bit 10 Host Data Bus Bit 4 Host Data Bus Bit 11 Host Data Bus Bit 3 Host Data Bus Bit 12 Host Data Bus Bit 2 Host Data Bus Bit 13 Host Data Bus Bit 1 Host Data Bus Bit 14 Host Data Bus Bit 0 Device Data (15:0) Ground (No Pin) DMA Request Ground Device I/O Write: Stop Ultra DMA Burst Ground Device I/O Read: Host Ultra DMA Ready: Host Ultra DMA Data Strobe Ground I/O Channel Ready Device Ultra DMA Ready Device Ultra DMA Data Strobe Cable Select DMA Acknowledge Ground Device Interrupt

Reserved Host Address Bus Bit 1 Passed Diagnostics Cable Assembly Type Identifier Device Address (2:0) Device Address (2:0) Chip Select (1:0) Chip Select (1:0) Drive Active/Slave Present Ground Pins 28, 34 and 39 are used for master-slave communication (details shown below).

Drive 1 (slave) 28 34 39 Drive 0 (master) 28 34 39 CSEL PDIAG DASP Host 28 34 39 Figure 7. I/O pins and supported ATA signals Barracuda 5400.1 Product Manual, Rev. G 4.1.1 Supported ATA commands 29 The following table lists ATA-standard commands that the drive supports. Barracuda 5400.1 drives support ATA-7 specifications. For a detailed description of the ATA commands, refer to the Draft ATA-7 Standard. See "S.

M.A.R.T. commands" on page 38 for details and subcommands used in the S.M.A.R.T. implementation.

Command name Command code (in hex) ATA-standard commands Download Microcode Execute Device Diagnostics Flush Cache Format Track Identify Device Initialize Device Parameters Read Buffer Read DMA Read Multiple Read Native MAX Address Read Sectors Read Verify Sectors Recalibrate Seek Set Drive Parameters Set Features Set MAX Address Set Multiple Mode S.M.A.R.T.

Vendor Unique 92H 90H E7H 50H ECH 91H E4H C8H, C9H C4H F8H 20H, 21H 40H, 41H 10H 70H 91H EFH F9H C6H B0H 9AH, FAH, FBH 30 Barracuda 5400.1 Product Manual, Rev. G Command name Write Buffer Write DMA Write Multiple Write Sectors Command code (in hex) E8H CAH, CBH C5H 30H, 31H Barracuda 5400.



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I Product Manual, Rev. G 31 Command name Command code (in hex) ATA-standard power-management commands Check Power Mode Idle Idle Immediate Sleep Standby Standby Immediate 98H or E5H 97H or E3H 95H or E1H 99H or E6H 96H or E2H 94H or E0H ATA-standard security commands Security Set Password Security Unlock Security Erase Prepare Security Erase Unit Security Freeze Lock Security Disable Password F1H F2H F3H F4H F5H F6H 4. 1.2 Identify Device command The Identify Device command (command code ECH) transfers information about the drive to the host following power up. The data is organized as a single 512-byte block of data, whose contents are shown in the table on page 29. All reserved bits or words should be set to zero. Parameters listed with an "x" are drive-specific or vary with the state of the drive. See Section 2.0 on page 3 for default parameter settings. The following commands contain drive-specific features that may not be included in the Draft ATA-7 Standard. 32 Barracuda 5400.1 Product Manual, Rev.

G Word Description Configuration information: · Bit 15: 0 = ATA; 1 = ATAPI · Bit 7: removable media · Bit 6: removable controller · Bit 0: reserved Number of logical cylinders ATA-reserved Number of logical heads Retired Retired Number of logical sectors per logical track: 63 Retired Serial number: (20 ASCII characters, 0000H = none) Retired Retired Obsolete Firmware revision (8 ASCII character string, padded with blanks to end of string) Value 0C5AH 0 1 2 3 4 5 6 79 1019 20 21 22 2326 16,383 C837H 16 0000H 0000H 003FH 0000H ASCII 0000H 1000H 0004H x.xx 2746 47 48 49 50 51 52 53 Drive model number: (40 ASCII charac- ST340015A ters, padded with blanks to end of string) (Bits 70) Maximum sectors per interrupt 8010H on Read multiple and Write multiple (32) Reserved Standard Standby timer, IORDY supported and may be disabled ATA-reserved PIO data-transfer cycle timing mode Retired Words 54-58, 6470 and 88 are valid 0000H 2F00H 0000H 0200H 0200H 0007H Barracuda 5400.1 Product Manual, Rev. G 33 Word 54 55 56 5758 59 6061 Description Number of current logical cylinders Number of current logical heads Value xxxH xxxH Number of current logical sectors per logical track Current capacity in sectors xxxH Number of sectors transferred during a xxxH Read Multiple or Write Multiple command Total number of user-addressable LBA sectors available (see Section 2.2 for related information) ST340015A = 80,022,600 62 63 64 65 66 67 68 6974 75 7679 80 81 82 83 84 Retired Multiword DMA active and modes supported (see note following this table) 0000H xx07H Advanced PIO modes supported (modes 0003H 3 and 4 supported) Minimum multiword DMA transfer cycle time per word (120 nsec) Recommended multiword DMA transfer cycle time per word (120 nsec) Minimum PIO cycle time without IORDY flow control (240 nsec) 0078H 0078H 00F0H Minimum PIO cycle time with IORDY flow control (120 nsec) ATA-reserved Queue depth ATA-reserved Major version number Minor version number Command sets supported Command sets supported Command sets support extension 0000H 0000H 0000H 007EH 0000H 346BH 5901H 4003H 34 Barracuda 5400.1 Product Manual, Rev. G Word 85 86 87 88 89 90 91 92 93 94 95127 128 129159 160254 255 Description Command sets enabled Command sets enabled Command sets enable extension Ultra DMA support and current mode (see note following this table) Security erase time Enhanced security erase time Advanced power management value Master password revision code Hardware reset value (see description following this table) Auto acoustic management setting ATA-reserved Security status Seagate-reserved ATA-reserved Integrity word Value 3469H 1A01H 4003H xx3FH 0000H 0000H 0000H (Not Supported) 8002H xxxH xxxH (Not Supported) 0000H 0001H xxxH 0000H xxA5H Note. Advanced Power Management (APM) and Automatic Acoustic Management (AAM) features are not supported. Barracuda 5400.1 Product Manual, Rev.

G Note. 35 See the bit descriptions below for words 63, 88, 93 and 94 of the Identify Drive data: Bit 0 1 2 8 9 10 Word 63 Multiword DMA mode 0 is supported. Multiword DMA mode 1 is supported. Multiword DMA mode 2 is supported. Multiword DMA mode 0 is currently active. Multiword DMA mode 1 is currently active. Multiword DMA mode 2 is currently active. Description (if bit is set to 1) Bit 0 1 2 3 4 8 9 10 11 12 13 Word 88 Ultra DMA mode 0 is supported. Ultra DMA mode 1 is supported. Ultra DMA mode 2 is supported. Ultra DMA mode 3 is supported. Ultra DMA mode 4 is supported. Ultra DMA mode 0 is currently active. Ultra DMA mode 1 is currently active. Ultra DMA mode 2 is currently active. Ultra DMA mode 3 is currently active. Ultra DMA mode 4 is currently active. Ultra DMA mode 5 is currently active. Bit 13 Bit 07 815 Word 93 1 = 80-conductor cable detected, CBLID above VIH 0 = 40-conductor cable detected, CBLID below VIL Word 94 Current AAM setting AAM Power on default 36 4.1.

3 Barracuda 5400.1 Product Manual, Rev. G Set Features command This command (EFH) controls the implementation of various features that the drive supports. When the drive receives this command, it sets BSY, checks the contents of the Features register, clears BSY and generates an interrupt. If the value in the register does not represent a feature that the drive supports, the command is aborted. Power-on default has the read look-ahead and write caching features enabled. The acceptable values for the Features register are defined as follows: 02H 03H Enable write cache (default). Set transfer mode (based on value in Sector Count register). Sector Count register values: 00H 01H 08H 09H 0AH 0BH 0CH 20H 21H 22H 40H 41H 42H 43H 44H 45H Set PIO mode to default (PIO mode 2). Set PIO mode to default and disable IORDY (PIO mode 2). PIO mode 0 PIO mode 1 PIO mode 2 (default) PIO mode 3 PIO mode 4 Multiword DMA mode 0 Multiword DMA mode 1 Multiword DMA mode 2 Ultra DMA mode 0 Ultra DMA mode 1 Ultra DMA mode 2 Ultra DMA mode 3 Ultra DMA mode 4 Ultra DMA mode 5 55H 82H AAH Disable read look-ahead (read cache) feature. Disable write cache. Enable read look-ahead (read cache) feature (default). Barracuda 5400.1 Product Manual, Rev. G F1H Report full capacity available 37 Note. At power-on, or after a hardware or software reset, the default values of the features are as indicated above. 38 4.1.4 Barracuda 5400.

1 Product Manual, Rev. G S.M.A.R.T. commands S.M.A.R.T.

T. provides near-term failure prediction for disc drives. When S.M.A.R.T. is enabled, the drive monitors predetermined drive attributes that are susceptible to degradation over time. If self-monitoring determines that a failure is likely, S.M.A.R.T. makes a status report available to the host. Not all failures are predictable.

S.M.A.R.T.

predictability is limited to the attributes the drive can monitor. For more information on S.



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M.A.R.T. commands and implementation, see the Draft ATA-7 Standard. SeaTools diagnostic software activates a built-in drive self-test (DST S.M.A.

R.T. command for D4H) that eliminates unnecessary drive returns. The diagnostic software ships with all new drives and is also available at:
<http://seatools.seagate.com>. This drive is shipped with S.M.A.R.

T. features enabled. You must have a recent BIOS or software package that supports S.M.A.
R.T. to use this feature. The table below shows the S.M.

A.R.T. command codes that the drive supports. Code in features register D0H D1H D2H D3H D4H D5H D6H D7H D8H D9H DAH S.M.A.R.T. command S.

M.A.R.T. Read Data Vendor-specific S.M.A.R.T. Enable/Disable Attribute Autosave S.

M.A.R.T. Save Attribute Values S.

M.A.R.T. Execute Off-line Immediate (runs DST) S.

M.A.R.T. Read Log Sector S.M.A.R.T. Write Log Sector Vendor-specific S.

M.A.R.T. Enable Operations S.M.A.R.T. Disable Operations S.

M.A.R.T. Return Status Note.

If an appropriate code is not written to the Features Register, the command is aborted and 0x04 (abort) is written to the Error register. Barracuda 5400.1
Product Manual, Rev. G 39 5.0 Seagate Technology support services Online Services Internet www.seagate.com

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