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User manual MAXTOR BARRACUDA 7200.7
User guide MAXTOR BARRACUDA 7200.7
Operating instructions MAXTOR BARRACUDA 7200.7
Instructions for use MAXTOR BARRACUDA 7200.7
Instruction manual MAXTOR BARRACUDA 7200.7



Barracuda 7200.7 Plus

ST3200822A
ST3200021A

Barracuda 7200.7

ST3160023A
ST3160021A
ST3120026A
ST3120022A
ST380013A
ST380011A
ST340014A



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ST3200822A, ST3160023A, ST3120026A, and ST380013A · 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, which 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. · The 3D Defense System™, which includes Drive Defense, Data Defense, and Diagnostic Defense, offers the industry's most comprehensive protection for disc drives. · Support for S.M.A.R.

T. drive monitoring and reporting. · Support for Read Multiple and Write Multiple commands. · Support for autodetection of master/slave drives that use cable select (CSEL). Barracuda 7200.

7 Product Manual, Rev. N 1 2 Barracuda 7200.7 Product Manual, Rev. N 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 ST3200822A, ST3200021A, ST3160023A, ST3160021A, ST3120026A, ST3120022A, ST380013A, ST380011A, and ST340014A 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. ST3200822A ST3200021A 200 390,721,968 512 63 16 16,383 4 2 671,500 98,000 68.



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5 7,200 85.4 58 100 PIO modes 04 Multiword DMA modes 02 Ultra DMA modes 05 2 Mbytes (2,048 kbytes) 4 2 595,000 94,600 56.3 3 2 595,000 94,600 56.3
2 1 595,000 94,600 56.3 1 1 595,000 94,600 56.

3 ST3160023A ST3160021A 160 312,581,808 ST3120026A ST3120022A 120 234,441,648 ST380013A ST380011A 80 156,301,488 Drive specification
Formatted Gbytes (512 bytes/sector)* 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, (Gbits/inch² max) Spindle speed (RPM)
Internal data transfer rate OD, (Mbytes/sec max) Sustained data transfer rate OD (Mbytes/sec) I/O data-transfer rate (Mbytes/sec max) ATA data-transfer
modes supported Cache buffer ST3200021A, ST3160021A, ST3120022A, ST380011A, and ST340014A ST3200822A, ST3160023A, ST3120026A, and
ST380013A Height (mm max) ST340014A 40 78,165,360 8 Mbytes (8,192 kbytes) 26.035 mm (1.028 inches) Barracuda 7200.7 Product Manual, Rev. N 3
Drive specification Width (mm max) Length (mm max) Weight (typical) Average latency (msec) Power-on to ready (sec max) Standby to ready (sec max)
Startup current (typical) 12V (peak) Track-to-track seek time (msec typical) Average seek, read (msec typical) Average seek, write (msec typical) Seek power
(typical) Read/write power (typical) Idle mode (typical) Standby mode Sleep mode 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 2 msec) Vibration, operating Vibration, nonoperating Drive
acoustics, sound power (bels) Idle** Performance seek Nonrecoverable read errors ST3200822A ST3200021A ST3160023A ST3160021A ST3120026A
ST3120022A ST380013A ST380011A ST340014A 101.6 mm (4.000 inches) 146.99 mm (5.787 inches) 635 grams (1.4 lb.)
) 4.16 10 sec 10 sec 2.8 amps <1.0 (read), <1.2 (write) 8.
5 9.5 12.5 watts 12.0 watts 7.5 watts 0.

9 watts (typical) 0.9 watts (typical) 5V ± 5% 12V ± 10% 5° to 55°C (op) 40° to 70°C (nonop) 20°C (operating) 30°C (ined 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) Track-to-track Average latency: Read <1.0 8.5 4.16 Write <1.2 9.5 4.16
*Measured in performance mode.

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 10 (max) 10 (max) 10 (max) Power-
on to Ready (sec) Standby to Ready (sec) Ready to spindle stop (sec) Barracuda 7200.7 Product Manual, Rev. N 7 2.9 Power specifications The drive receives
DC power (+5V or +12V) through a four-pin standard drive power connector. 2.

9.1 Power consumption Power requirements for the drives are listed in the table on page 8. Typical power measurements are based on an average of drives
tested, under nominal conditions, using 5.0V and 12.0V input voltage at 25°C ambient temperature.

· Spinup power Spinup power is measured from the time of power-on to the time that the drive spindle reaches operating speed. · Seek mode During seek
mode, the read/write actuator arm moves toward a specific position on the disc surface and does not execute a read or write operation. Servo electronics are
active. Seek mode power represents the worstcase power consumption, using only random seeks with read or write latency time. This mode is not typical and
is provided for worst-case information.

· Read/write power and current Read/write power is 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. · Operating power and current Operating power is measured using 40 percent random seeks, 40 percent
read/write mode (1 write for each 10 reads) and 20 percent drive idle mode. · Idle mode power Idle mode power is measured with the drive up to speed, with
servo electronics active and with the heads in a random track location. · Standby mode During Standby mode, the drive accepts commands, but the drive is
not spinning, and the servo and read/write electronics are in power-down mode. Power dissipation (watts) Example: ST3160021A, 2-disc Spinup Idle Idle*
(with offline activity) Operating 40% r/w, 40% seek, 20% inop. Seeking Standby Sleep Average (watts, 25° C) -- 7.5 9.3 12.0 12.5 0.

900 0.900 5V typ amps -- 0.482 0.587 0.638 0.412 0.144 0.144 12V typ amps 2.8 (peak) 0.424 0.
530 0.739 0.870 0.015 0.015 *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.
8 Barracuda 7200.7 Product Manual, Rev. N 2.9.1.1 Typical current profile 1.2 1.0 0.8 Amps 0.6 0.

4 0.2 +5 Volt Current during spindle start -- Typical Amperes 0.0 1 2 3 4 5 Seconds 6 7 8 9 Figure 1. Typical 5V startup and operation current profile 3.0
+12 Volt Current during spindle start -- Typical Amperes 2.5 2.0 Amps 1.5 1.0 0.5 0.

0 0 1 2 3 4 Seconds 5 6 7 8 Figure 2. Typical 12V startup and operation current profile Barracuda 7200.7 Product Manual, Rev. N 9 2.9.

2 Conducted noise Input noise ripple is measured at the host system power supply across an equivalent 80-ohm resistive load on the +12 volt line or an
equivalent 15-ohm resistive load on the +5 volt line. · Using 12-volt power, the drive is expected to operate with a maximum of 120 mV peak-to-peak square-
wave injected noise at up to 10 MHz. · Using 5-volt power, the drive is expected to operate with a maximum of 100 mV peak-to-peak square-wave injected
noise at up to 10 MHz. Note. Equivalent resistance is calculated by dividing the nominal voltage by the typical RMS read/write current.

2.9.3 Voltage tolerance Voltage tolerance (including noise): 5V ± 5% 12V ± 10% 2.9.4 Power-management modes The drive provides programmable power
management to provide greater energy efficiency. In most systems, you can control power management through the system setup program. The drive features
the following power-management modes: Power mode Active Idle Standby Sleep Heads Tracking Tracking Parked Parked Spindle Rotating Rotating Stopped
Stopped Buffer Enabled Enabled Enabled Disabled · Active mode The drive is in Active mode during the read/write and seek operations.



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· Idle mode The buffer remains enabled, and the drive accepts all commands and returns to Active mode any time disc access is necessary. · Standby mode The drive enters Standby mode when the host sends a Standby Immediate command. If the host has set the standby timer, the drive can also enter Standby 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 10 Barracuda 7200.7 Product Manual, Rev.

N 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 for standard models, or 64°C (147°F) within the operating ambient conditions for ST3200822A and ST3200021A (PLUS) models. 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 0° to 60°C (32° to 140°F) for standard models 5° to 55°C (41° to 131°F) for ST3200822A and ST3200021A (PLUS) models 40° to 70°C (40° to 158°F) Nonoperating 2.10.

2 Operating Temperature gradient 20°C per hour (68°F per hour max), without condensation 30°C per hour (86°F per hour max) Nonoperating 2.10.3 2.10.3.1 Operating Humidity Relative humidity 5% to 90% noncondensing (30% per hour max) 5% to 95% noncondensing (30% per hour max) Nonoperating 2.10.3.2 Operating Wet bulb temperature 33°C (91.4°F max) 40.

0°C (104°F max) Nonoperating 2.10.4 Operating Altitude 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.) Nonoperating Barracuda 7200.7 Product Manual, Rev.

N 11 2.10.5 Shock 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. 522 Hz 23350 Hz Limited displacement 0.5 G acceleration 2.10.6.2 Nonoperating vibration The following table lists the maximum nonoperating vibration that the drive may experience without incurring physical damage or degradation in performance when subsequently put into operation. 522 Hz 23350 Hz Limited displacement 5.0 Gs 2.11 Acoustics 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 / (average latency + average access time) 12 Barracuda 7200.7 Product Manual, Rev. N Table 1: Models ST3200822A ST3200021A ST3160023A ST3160021A ST3120026A ST3120022A ST380013A ST380011A ST340014A Fluid Dynamic Bearing (FDB) motor acoustics Idle* <2.5 bels (typ) 2.7 bels (max) Performance seek 3.

4 bels (typ) 3.7 bels (max) <2.2 bels (typ) 2.6 bels (max) 3.1 bels (typ) 3.5 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. 2.12 Electromagnetic immunity 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 B A 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; Air: ± 8 kV 80 to 1,000 MHz, 3 V/m, 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 150 kHz to 80 MHz, 3 Vrms, 80% AM with 1 kHz sine 0% open, 5 seconds 0% short, 5 seconds 40%, 0.10 seconds 70%, 0.01 seconds Electrical fast transient Surge immunity Conducted RF immunity Voltage dips, interrupts B B A C C C B EN 61000-4-4: 95 EN 61000-4-5: 95 EN 61000-4-6: 97 EN 61000-4-11: 94 Barracuda 7200.7 Product Manual, Rev. N 13 2.13 Reliability 1 per 1014 bits read, max. 600,000 power-on hours (nominal power, 25°C ambient temperature) 50,000 cycles (at nominal voltage and temperature, with 60 cycles per hour and a 50% duty cycle) 5 years To determine the warranty for a specific drive, use a web browser to access the following web page: www.seagate.com/support/service/ From this page, click on the "Verify Your Warranty" link. You will be asked to provide the drive serial number, model number (or part number) and country of purchase.



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The system will display the warranty information for your drive. None required Nonrecoverable read errors Mean time between failures Contact start-stop cycles Service Life Warranty Preventive maintenance 2.

14 2.14.1 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. 14 Barracuda 7200.

7 Product Manual, Rev. N 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): ST3200822A, ST3200021A, ST3160023A, ST3160021A, ST3120026A, ST3120022A, ST380013A, ST380011A, and ST340014A. · Certificate numbers: ST3200822A, ST3200021A ST3160023A ST3160021A ST3120026A ST3120022A ST380013A ST380011A ST340014A E-H011-03-3949 E-H011-03-0089 E-H011-03-0085 E-H011-03-0086 E-H011-03-0087 E-H011-03-0088 E-H011-03-0084 E-H011-03-0083 · Trade name or applicant: Seagate Technology · Manufacturing date: January 2003 (ST3160023A, ST3160021A, ST3120026A, ST3120022A, ST380013A, ST380011A, and ST340014A) · Manufacturing date: September 2003 (ST3200822A, ST3200021A) · Manufacturer/nationality: Singapore and China Australian C-Tick (NI76) 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). Barracuda 7200.7 Product Manual, Rev. N 15 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.

2.15 Environmental protection Seagate designs its products to meet environmental protection requirements worldwide, including regulations restricting certain chemical substances. European Union Restriction of Hazardous Substances (RoHS) The European Union Restriction of Hazardous Substances (RoHS) Directive restricts the presence of chemical substances, including Lead (Pb), in electronic products effective July 2006. Although amendments to the Euro-pean Union's Restriction of Hazardous Substances (RoHS) Directive have not been finalized, to the best of our knowledge the disc drives documented in this publication will comply with the final RoHS Directive require-ments. A number of parts and materials in Seagate products are procured from external suppliers. We rely on the rep-resentations of our suppliers regarding the presence of RoHS substances in these parts and materials. Our supplier contracts require compliance with our chemical substance restrictions, and our suppliers document their compliance with our requirements by providing material content declarations for all parts and materials for the disc drives documented in this publication. Current supplier declarations include disclosure of the inclusion of any RoHS-regulated substance in such parts or materials. Seagate also has internal systems in place to ensure ongoing compliance with the RoHS Directive and all laws and regulations which restrict chemical content in electronic products. These systems include standard operat-ing procedures that ensure that restricted substances are not utilized in our manufacturing operations, labora-tory analytical validation testing, and an internal auditing process to ensure that all standard operating procedures are complied with.

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7 Product Manual, Rev. N 2.16 Corrosive environment Seagate electronic drive components pass accelerated corrosion testing equivalent to 10 years exposure to light industrial environments containing sulfurous gases, chlorine and nitric oxide, classes G and H per ASTM B845. However, this accelerated testing cannot duplicate every potential application environment.

Users should use caution exposing any electronic components to uncontrolled chemical pollutants and corrosive chemicals as electronic drive component reliability can be affected by the installation environment. Sulfur is found to be the most damaging. N 17 18 Barracuda 7200.7 Product Manual, Rev. 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. Use the following settings to configure the drive as a master or a slave.

Master or single drive. The drive is configured at the factory for a master or single-drive operation with a jumper set on pins 7 and 8. Drive as slave. Remove all jumpers. Drive as master with a non-ATA-compatible slave.

Use this jumper setting only if the drive does not work as a master with no jumpers installed. Options jumper block Master or single drive Drive is slave Master with non ATA-compatible slave Cable select Limit drive capacity to 32 Gbytes 7531 8642 Figure 1. Circuit Board Master/slave jumper settings 3.3.2 Cable-select option Computers that use cable select determine the master and slave drives by selecting or deselecting pin 28, CSEL, on the interface bus. Master and slave drives are determined by their physical position on the cable. To enable cable select, set a jumper on pins 5 and 6 as shown in Figure 1.

Refer to your computer manual to determine whether your computer supports this option. 3.3.

3 Alternate capacity jumper Some older computers may "hang" at startup if their BIOS detects a disc drive with a capacity greater than 32 Gbytes. This limits the drive's capacity to 32 Gbytes when the alternate capacity jumper is used. To access the full capacity of the drive, you can: Update the BIOS Use third-party software such as DiscWizard™ or Disk Manager Use a third-party host adapter For drives with capacities greater than 32 Gbytes, the alternate capacity jumper changes the total available LBA sectors to 32 Gbytes to solve issues with some BIOS during power on. The ATA Set Features subcommand "F1H Report Full Capacity Available" causes Identify Data words 60 and 61 to report the full capacity. See Section 4.

1.3 on page 32 for more details on the Set Features command. Barracuda 7200.7 Product Manual, Rev. N 21 Windows XP, Windows Me, Windows 98 or newer versions are needed to support drives with capacities greater than 32 Gbytes.

3.3.4 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 evennumbered 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 gray connector to the slave. Master Slave Pin 1 Co Mo mpu the ter rbo ard Figure 1. 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). 3.4 Drive mounting You can mount the drive in any orientation using four screws in the side-mounting holes or four screws in the bottom-mounting holes. See Figure 1 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. 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. 22 Barracuda 7200.7 Product Manual, Rev. N Notes: 1.

Dimensions are shown in inches (mm). 2 Dimensions per SFF-8301 specification. 0.228 (5.79) 1.

028 max (26.11) 3 x 0.25 0.015 (6.35 0.037) both sides 2.23 (56.56) 2.83 (71.80) 3.

71 (94.35) 0.178 (4.27) 1.122 0.02 (28.5 0.51) 2 1.625 (41.28 0.

02 0.51) 1.638 (41.61 0.01 0.

25) 5.787 max (146.99) 1.75 0.01 (44.

45 0.25) 4.0 0.01 (101.60 0.25) 4 x 6-32 UNC-2B 0.150 (3.81) max. fastener penetration. 3 threads minimum engagement.

Recommended case temperature measurement location 3 x 6-32 UNC-2B 0.150 (3.81) max. fastener penetration both sides. 3 threads minimum engagement. 0.125 0.01 (3.18 0.25) 3.

75 0.01 (95.25 0.25) 4.0 0.

01 (101.60 0.25) Recommended case temperature measurement location Figure 1. Mounting dimensions--top, side and end view Barracuda 7200.7 Product Manual, Rev.

N 23 24 Barracuda 7200.7 Product Manual, Rev. N 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-6), NCITS T13 1410D, subsequently referred to as the Draft ATA-6 Standard. 4.1 ATA interface signals and connector pins Figure 1 on page 26 summarizes the signals on the ATA interface connector that the drive supports.

For a detailed description of these signals, refer to the Draft ATA-6 Standard. Barracuda 7200.7 Product Manual, Rev. N 25 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).



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Drive 1 (slave) 28 34 39 Drive 0 (master) 28 34 39 CSEL PDIAG DASP Host 28 34 39 Figure 1. I/O pins and supported ATA signals 26 Barracuda 7200.7 Product Manual, Rev. N 4.1.1 Supported ATA commands The following table lists ATA-standard commands that the drive supports.

For a detailed description of the ATA commands, refer to the Draft ATA-6 Standard. See "S.M.A.R.

T. commands" on page 32 for details and subcommands used in the S.M.A.R.

T. implementation. Command name ATA-standard commands Download Microcode Execute Device Diagnostics Flush Cache Flush Cache Extended Identify Device Initialize Device Parameters Read Buffer Read DMA Read DMA Extended Read Multiple Read Multiple Extended Read Native Max Address Read Native Max Address Extended Read Sectors Read Sectors Extended Read Verify Sectors Read Verify Sectors Extended Seek Set Features Set Max Note:

Individual Set Max commands are identified by the value placed in the Set Max Features register as defined to the right. Set Multiple Mode S.M.A.R.T. Write Buffer Write DMA Write DMA Extended Write Multiple Write Multiple Extended Write Sectors C6H B0H E8H CAH, CBH 35H C5H 39H 30H, 31H 92H 90H E7H EAH ECH 91H E4H C8H, C9H 25H C4H 29H F8H 27H 20H, 21H 24H 40H, 41H 42H 70H EFH F9H Address: Password: Lock: Unlock: Freeze Lock: 00H 01H 02H 03H 04H Command code (in hex) Barracuda 7200.7 Product Manual, Rev.

N 27 Command name Write Sectors Extended Command code (in hex) 34H ATA-standard power-management commands Check Power Mode Idle Idle Immediate Sleep Standby Standby Immediate 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 98H or E5H 97H or E3H 95H or E1H 99H or E6H 96H or E2H 94H or E0H 28 Barracuda 7200.7 Product Manual, Rev. N 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 27. 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-6 Standard. 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) Drive model number (40 ASCII characters, padded with blanks to end of string) Value 0C5AH 0 1 2 3 4 5 6 7 9 1019 20 21 22 2326 2746 16,383 0000H 16 0000H 0000H 003FH 0000H ASCII 0000H 0400H 0000H x.xx ST3200822A ST3200021A ST3160023A ST3160021A ST3120026A ST3120022A ST380013A ST380011A ST340014A 8010H 0000H 2F00H 0000H 0200H 0200H 0007H xxxH 47 48 49 50 51 52 53 54 (Bits 70) Maximum sectors per interrupt on Read multiple and Write multiple (16) Reserved Standard Standby timer, IORDY supported and may be disabled ATA-reserved PIO data-transfer cycle timing mode Retired Words 5458, 6470 and 88 are valid Number of current logical cylinders Barracuda 7200.7 Product Manual, Rev. N 29 Word 55 56 5758 59 6061 Description Number of current logical heads Number of current logical sectors per logical track Current capacity in sectors Number of sectors transferred during a Read Multiple or Write Multiple command Total number of user-addressable LBA sectors available (see Section 2.

2 for related information) *Note: The maximum value allowed in this field is: 0FFFFFFFh (268,435,455 sectors, 137 Gbytes). Drives with capacities over 137 Gbytes will have 0FFFFFFFh in this field and the actual number of user-addressable LBAs specified in words 100-103. This is required for drives that support the 48-bit addressing feature. Value xxxH xxxH xxxH xxxH ST3200822A = 0FFFFFFFh* ST3200021A = 0FFFFFFFh* ST3160023A = 0FFFFFFFh* ST3160021A = 0FFFFFFFh* ST3120026A = 234,441,648 ST3120022A = 234,441,648 ST380013A = 156,301,488 ST380011A = 156,301,488 ST340014A = 78,165,360 0000H xx07H 0003H 0078H 0078H 00F0H 0078H 0000H 0000H 0000H 007EH 0000H 346BH 7D01H 4003H 34xxH 3xxxH 4003H xx3FH 0000H 0000H FFEEH xxxH 0000H xxA5H 104127 128 129159 160254 255 ATA-reserved Security status Seagate-reserved ATA-reserved Integrity word Note. Note. Advanced Power Management (APM) and Automatic Acoustic Management (AAM) features are not supported See the bit descriptions below for words 63, 88, and 93 of the Identify Drive data: Description (if bit is set to 1) Bit 0 1 2 8 9 10 Bit 0 1 2 3 4 8 9 10 11 12 13 Bit 13 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. 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.



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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. Word 93 1 = 80-conductor cable detected, CBLID above VIH 0 = 40-conductor cable detected, CBLID below VIL Barracuda 7200.7 Product Manual, Rev. N 31 4.

1.3 Set Features command This command 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 55H 82H AAH F1H 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 PIO mode 3 PIO mode 4 (default) 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 Disable read look-ahead (read cache) feature. Disable write cache. Enable read look-ahead (read cache) feature (default). Report full capacity available Note. At power-on, or after a hardware or software reset, the default values of the features are as indicated above. S.

M.A.R.T. commands 4.1.4 S.M.A.R.

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.M.A.R.T. commands and implementation, see the Draft ATA-6 Standard. 32 Barracuda 7200.7 Product Manual, Rev. N 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 disabled. You must have a recent BIOS or software package that supports S.M.A.R.T. to enable this feature.

The table below shows the S.M.A.R.T. command codes that the drive uses. 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 7200.7 Product Manual, Rev.

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Barracuda 7200.7 Product Manual, Rev. N 35 Customer Service Operations Warranty Service Seagate offers worldwide customer support for Seagate drives. Seagate distributors, OEMs and other direct customers should contact their Seagate Customer Service Operations (CSO) representative for warrantyrelated issues. Resellers or end users of drive products should contact their place of purchase or one of the Seagate CSO warranty centers for assistance. Have your drive's "ST" model number and serial number available. Data Recovery Services Seagate offers data recovery services for all formats and all brands of storage media. @@@@to 11:45 A.M. and 1:00 P.

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7 Product Manual, Rev. N 37 Asia/Pacific support services For Asia/Pacific presales and technical support, dial the toll-free number for your specific location. The Asia/ Pacific toll-free numbers are available from 6:00 A.M. to 10:45 A.M. and 12:00 P.M. to 6:00 P.M. (Australian Eastern time) Monday through Friday, except as noted. If your location is not listed here, direct dial one of our technical support locations. Warranty service is available from 9:00 A.M. to 6:00 P.

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