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Intrepid 3800 Enterprise SSD

2.5” Solid-State Drive

IT3RSK41ET3XX-xxxx

The OCZ 2.5” Intrepid 3000 Series of Solid State Drives are designed specifically to address Enterprise storage and computing applications where demanding performance, reliability, and the total cost of ownership (TCO) are major factors.

SSD Datasheet

OCZ Intrepid 3800 SATA Solid State Drive

Part Number	Description	UPC
IT3RSK41ET330-0100	OCZ Intrepid 3800 2.5" SATA III 100GB	842024034407
IT3RSK41ET330-0200	OCZ Intrepid 3800 2.5" SATA III 200GB	842024034414
IT3RSK41ET340-0400	OCZ Intrepid 3800 2.5" SATA III 400GB	842024034421
IT3RSK41ET350-0800	OCZ Intrepid 3800 2.5" SATA III 800GB	842024034445

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Product Specifications

- Available in 2.5" Form Factor
- SATA III / 6Gb/s Interface
- Capacity: 100GB, 200GB, 400GB and 800GB
- Components: 19nm eMLC NAND Flash Memory
- Security: AES 256-bit Encryption
- Bandwidth Performance Specifications[1,3,4]
  - Sustained Sequential Read: 500 MB/s
  - Sustained Sequential Write: 450 MB/s
- Read and Write IOPS specifications (Full LBA Range, Iometer*Queue Depth 32)[1,2,4]
  - Sustained Random 4KB Reads: 89K IOPS
  - Sustained Random 4KB Writes: 40K IOPS
- Compatibility
  - SATA Revision 3.0, compatible with SATA 1.5 Gb/s, 3 Gb/s and 6Gb/s interface rates
  - ATA/ATAPI-8 Compliant
  - Enterprise SMART ATA feature set
  - Native Command Queuing (NCQ) command set
  - Data set management TRIM Command
- Power Management
  - 5 V SATA Supply Rail
  - Supports ATA Power Management Specification
  - OS-Aware Hot Plug/Removal
- Power Specifications[5]
  - Active: up to 3.4W (Typical)
  - Idle: up to 2 W (Typical)
- Temperature
  - Operating[6]: 0°C to 70°C
  - Non-Operating: -45°C to 85°C
  - Temperature monitoring and logging
- Reliability
  - Mean Time Between Failures (MTBF) 2 Million Hours
- Endurance Rating – 4 DWPD
  - 100GB: 730 TBW
  - 200GB: 1460 TBW
  - 400GB: 2920 TBW
  - 800GB: 5840 TBW
- Bit Error Rate (BER): 1 sector per 10^{17} bits read
- End to End data protection via CRC
- Internal RAID recovery in the event of catastrophic failures
- PFAIL Protection – full in flight data protection for unexpected system power loss
- Consistent latency IO operations
- Shock (Operating and non-operating)
  - 1000G/0.5 msec.
- Vibration
  - Operating Range: - 2.17 GRMS (5-700 Hz)
  - Non-operating: 3.13 GRMS (5-800 Hz)
- Altitude
  - Operating Range: -1,500 ft. to 15,000 ft.
  - Non-operating: -1000 ft. to 40,000 ft.
- Product Ecological Compliance
  - RoHS
- Certifications and Declarations:
  - CE, FCC, KCC, BSMI, C-TICK, VCCI, UL, WEEE
  - Services and Support: 5 years

1. Performance values vary by capacity
2. Based on Random 4KB QD32 workload, measurement taken once the workload has reached steady state
3. Based on 128KB sequential transfer, measurement taken once the workload has reached steady state
4. Sustained performance measured using IOmeter* with Queue Depth 32. Measurements are performed using SNIA based metrics.
5. Power based on 5V supply and highest capacity
6. As measured by temperature sensor

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Part Number Decoder:

# of chars	3	1	1	1	1	1	1	1	1	1	1	1	4	2 (OPTIONAL)
	[xxx]	[x]	[x]	[x]	[x]	[x]	[x]	[x]	[x]	[x]	[x]	-	[xxxx]	[xx]

Level:
C: Commercial
R: Reliability

Product:
IT3: Intrepid 3
DEN: Deneva 1
D2: Deneva 2 [no longer conforms]
DNx : Future Deneva (e.g. "DN3")
ITD: Intrepid
ZD4: Z-Drive R4
TL2: Talos 2

Interface:
S: SATA
A: SAS
P: PCIe

Interface:
B: 1.5Gb SATA
D: 2.5b PCI-e 1.0
E: 3Gb SATA 2/SAS 3
F: 5Gb PCI-e 2.0
K: 6Gb SATA 3/SAS 6
L: PCIe Gen 3.0 x4
M: PCIe Gen 3.0 2x2
N: PCIe Gen 3.0 x8
O: PCIe Gen 3.0 x16
P: 16Gb/s SATA Express
Q: 12Gb SAS x4
R: 12Gb SAS 2x2

Form Factor:
1: 1.8"
2: 2.5" 5mm
3: 2.5" 7mm
4: 2.5" 9.5mm
5: 2.5" 15mm
6: 3.5"
A: HHHL
B: HHFL
C: FHHL
D: FHFL
E: mSATA

Controller Count:
1: 1
2: 2
4: 4
8: 8

Flash Type:
S: SLC
M: MLC
E: eMLC
A: Async MLC
T: TLC

Flash Vendor
X: Unlocked
M: Micron
N: Intel
T: Toshiba
H: Hynix
S: Samsung
D: Sandisk
Z: OCZ

Flash Node
0: 24nm
1: 22nm
2: 20nm
3: 19nm
4: 16nm

Flash Part # Detail*
0-5 : Gen.1 Tosh. 19nm

Revision**

Density:
0200: 200GB
0500: 500GB
1000: 1.0TB
1200: 1.2TB
1500: 1.5TB
2000: 2.0TB
3200: 3.2TB

Temp:
IT: Industrial
ET: Extended

1. Introduction

This document describes the specification and capabilities of OCZ Intrepid 3800 Solid State Drives. The OCZ Intrepid 3800 SSDs are optimized to deliver high performance and reliability that is required for mission critical enterprise computing applications.

1.1 Product Overview

The Intrepid 3800 SSDs deliver the industry's best steady state performance, with highly developed flash management capabilities that extend NAND flash life and enhance drive reliability.

Built with the Marvell® 88SS9187 controller combined with OCZ's optimized firmware architecture, Intrepid 3800 SSDs deliver data at a high-level of performance, with consistent IO (Input/Output) latency response designed to dramatically improve efficiency and application performance. The drive also comes with a built-in full Power Fail protection that protects in-flight data during unexpected system power losses.

This 2.5" form factor SSD product has a Serial ATA-6Gb/s interface and it is designed with Toshiba 19nm eMLC NAND flash memory available in 100GB, 200GB, 400GB, 800GB capacities.

OCZ Intrepid 3800 SSD's offers these key features:

- Comprehensive S.M.A.R.T. attributes
- Optimized End-to-End data protection via CRC
- Internal RAID recovery mechanism in the event of catastrophic failures
- Full in-flight data protection at the event of sudden power loss
- UBER: 10^{17} bits read
- Temperature Sensor for monitoring and logging
- Inrush current management
- AES 256-bit Encryption
- 4 DWPD
- Backed by a 5 year warranty

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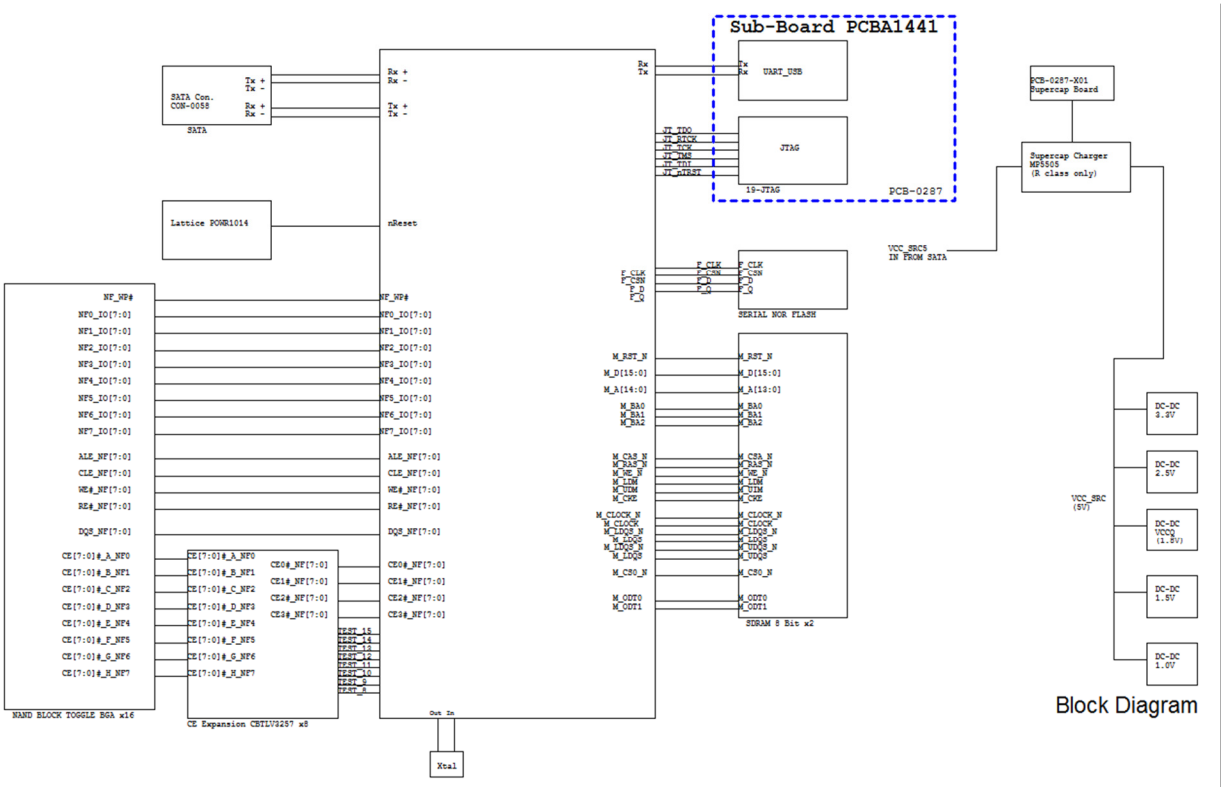
1.2 Block Diagram



2. Product Regulatory Certification and Compliance

Table 1.

Certification/Compliance	Description
CE Compliant	Low Voltage DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006, and EMC Directive 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004.
FCC Compliant B	FCC Class B devices are those that are for use in a commercial. Industrial or business environment. Class B devices are those that are marketed for use in the home.
KC mark (Korea Certification)	Compliance with paragraph 1 of Article 11 of the Electromagnetic Compatibility Control Regulation and meets the Electromagnetic Compatibility (EMC) Framework requirements of the Radio Research Laboratory (RRL) Ministry of Information and Communication Republic of Korea.
BSMI	Bureau of Standards, Metrology, and Inspection (BSMI) is required for electrical, mechanical, and chemical products.
C-TICK	Compliance with the Australia/New Zealand Standard AS/NZS3548 and Electromagnetic Compatibility (EMC) Framework requirements of the Australian Communication Authority (ACA).
VCCI	Voluntary Control Council for Interface to cope with disturbance problems caused by personal computers or facsimile.
RoHS Compliant	Restriction of Hazardous Substance Directive.

UL Recognized	Underwriters Laboratories, Inc., Bi-National Component Recognition, UL-60950-1, 2nd Edition,2007-03-27 (Information Technology Equipment-Safety – Part 1: General Requirements) CSA C22.2 No.60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment – Safety – Part 1: General Requirements)
WEEE	The Waste Electrical and Electronic Equipment Directive (WEEE Directive) is the European Community directive 2002/96/EC on waste electrical and electronic equipment.

3. Product Specifications

3.1 Capacity

Table 2.

RAW Capacity	Usable Capacity	Total User Addressable Sectors in LBA Mode
128GB	100GB	195,371,568
256GB	200GB	390,721,968
512GB	400GB	781,422,768
1024GB	800GB	1,562,824,368

Notes: 1GB = 1billion bytes, actual formatted capacity less

LBA count shown represents total user storage capacity and will remain the same throughout the life of the drive. The total usable capacity of the SSD may be less than the total physical capacity because a small portion of the capacity is used for NAND flash management and maintenance purposes.

3.2 Performance

Table 3. Maximum Sequential Read and Write Bandwidth

Metric	Units	OCZ Intrepid 3800			
		100GB	200GB	400GB	800GB
Max Read	MB/s	510	530	540	540
Max Write	MB/s	250	420	480	480

Notes: Maximum performance measured using ATTO Benchmark Version 2.47

Table 4. Maximum Random Read/Write Input/Output per Second (IOPS)

Metric	Units	OCZ Intrepid 3800			
		100GB	200GB	400GB	800GB
4KB Random Read	IOPS	91,800	93,100	92,300	91,600
4KB Random Write		62,900	82,100	82,200	82,500

Notes:

Performance measured using IOmeter*, with Queue Depth 32, 1 minute. Measurements are performed on a full Logical Block Address (LBA) using 4KB Random Writes/Reads

Table 5. Sustained Performance

Metric	Units	OCZ Intrepid 3800			
		100GB	200GB	400GB	800GB
128K Sequential Read[1]	MB/s	390	410	500	500
128K Sequential Write[1]	MB/s	230	400	460	450
4K Random Read[1]	IOPS	91,000	91,000	89,000	89,000
4K Random Write[1]	IOPS	20,000	31,000	38,000	40,000

Notes: [1]Sustained performance measured using IOmeter* with Queue Depth 32. Measurements are performed using SNIA based metrics.

4. Reliability

OCZ SSD Intrepid 3800 series meets or exceeds SSD endurance and data retention requirements as specified in the JESD218 standard. Reliability specifications are listed in the tables below:

4.1 Endurance Rating

The Endurance Rating of 4 DWPD for the SSD is represented in TBW, terabyte written by a host to the SSD.

Table 6.

Description	I/O Workload Condition	100GB	200GB	400GB	800GB
TBW over product lifetime	4K Random Write[1]	730	1460	2920	5840

Notes: [1] TBW is the total amount of data written for entire product lifetime. 1 Terabyte = 1,000,000,000 Byte.

4.2 Reliability Specifications

Table 7.

Parameter	Value
Data Retention The time period for retaining data in the NAND at maximum rated endurance	3 months power-off retention once SSD reaches rated write endurance at 40°C
MTBF Mean Time Between Failures is estimated based on Telcordia* methodology and demonstrated through Reliability Demonstration Test (RDT).	2,000,000 hours
Error Correction Code (ECC) Error-Correcting Code defines the number of correctable symbols for a given size of data.	85 bits correctable per 2K/data path parity protection

Uncorrectable Bit Error Rate (UBER) Uncorrectable bit error rate will not exceed one sector in the specified number of bits read. In the unlikely event of a non-recoverable read error, the SSD will report it as a read failure to the host; the sector in error is considered corrupt and is not returned to the host.	1 sector per 10^{17} bits read with 1 year data retention at the end of life

5. Electrical Characteristics

5.1 Supply Voltage

Table 8.

Description	Min	Max	Unit
Operating Voltage for 5 V (+/- 5%)[1]	4.75	5.25	V

Notes: [1] Measurement on highest capacity (800GB), measured device from the initial device power supply application.

5.2 Power Consumption: (5V Supply)

Table 9.

Mode	Typical	Unit
Active[1]	3.4	W
Idle[2]	2	W
Standby/Sleep[3]	0.41	W

Notes:

[1] Active mode is measured off power supply using Bench Supply Software for maximum, average and minimum values. IOmeter 2008 is used to measure the values @ QD128 for Random Read/ Write, Sequential Read/Write @ 4K to 256K blocks.

[2] Idle modes are measured off power supply using Bench Supply Software for maximum, average and minimum values.

[3] Standby or Sleep mode is measured off of Power Supply using Bench Supply Software for maximum, average, minimum values. The drive is prepared as boot drive with Windows OS and Sleeper program installed to run "Standby/Sleep" mode. No load is applied done to the drive and measurements are obtained from the power supply and Digital Volt Meter reading.

6. Environmental Specifications

6.1 Temperature, Shock, Vibration, Altitude

Table 10.

Temperature	Range
Case Temperature Operating[1] Non-operating	0 – 70°C -45 – 85°C
Shock, Vibration, Altitude	**Range**
Shock[2] Operating Non-operating	1000G/0.5ms 1000G/0.5ms
Vibration[3] Operating Non-operating	2.17 GRMS (5-800 Hz) 3.13 GRMS (5-800 Hz)
Altitude[4] Operating Non-operating	-1,500 ft. to 15,000 ft. -1000 ft. to 40,000 ft.

Notes:

[1] As measured by temperature sensor

[2]Shock specifications assume the SSD is mounted securely with the input vibration applied to the drive-mounting screws. Stimulus may be applied in the X, Y or Z axis. Shock specification is measured using Root Mean Squared (RMS) value.

[3] Vibration specifications assume the SSD is mounted securely with the input vibration applied to the drive-mounting screws. Stimulus may be applied in the X, Y or Z axis. Vibration specification is measured using RMS value.
[4] Applies to atmospheric pressure only

6.2 Acoustics

The drive has no moving or noise-emitting parts. Therefore, it produces no audible sound (0 dB) in all modes of operation.

6.3 Emissions

The OCZ Intrepid 3800 Series SSDs are compliant to the FCC and CE Emission regulations.

Table 11.

Standards	Description	Results
FCC § 15.107	Conducted Emissions	Compliant
FCC § 15.109	Radiated Emissions	Compliant
EN 55024 § 4.2.1	Electrostatic Discharge EN 61000-4-2	Compliant
EN 55024 § 4.2.2	Electrical Fast Transients EN 61000-4-4	Compliant
EN 55024 § 4.2.3.1	Continuous Radiated Disturbances EN 61000-4-3	Compliant
EN 55024 § 4.2.3.2	Continuous Conducted Disturbances EN 61000-4-6	Compliant
EN 55024 § 4.2.4	Power-frequency Magnetic Fields EN 61000-4-8	N/A
EN 55024 § 4.2.5	Surges EN 61000-4-5	Compliant
EN 55024 § 4.2.6	Voltage Dips and Interruptions EN 61000-4-11	Compliant
EN 55022 § 5	Conducted Emissions	Compliant

EN 55022 § 6	Radiated Emissions	Compliant
EN 61000-3-2	Harmonic Current Emissions	Compliant
EN 61000-3-3	Voltage Fluctuations and Flicker	Compliant

7. Additional Features

7.1 Encryption

The OCZ Intrepid 3800 SSDs features AES-256-bit encryption with automatic hardware encryption to provide protection of all metadata and user's data at all times.

7.2 Power Failure Protection

The Intrepid 3800 SSD supports testing of the power loss capacitor. The status of the power loss protection can be monitored via the SMART attribute. Additionally, Clout can be used to conduct a super capacitor test.

7.3 Level RAID Protection

The Intrepid 3800 SSDs has an internal RAID that provides Block recovery mechanism in the event of catastrophic failures.

7.4 Temperature Monitor and Logging

The Intrepid 3800 SSDs has an internal temperature sensor for monitoring and logging of airflow temperature. The feature can be monitored using SMART attributes

7.5 Device Activity Signal (DAS) indication

The Intrepid 3800 SSD's DAS LED polarity is set automatically to the default state during manufacturing. Its polarity can be inverted in the field using Clout.

8. Performance Optimization

8.1 TRIM

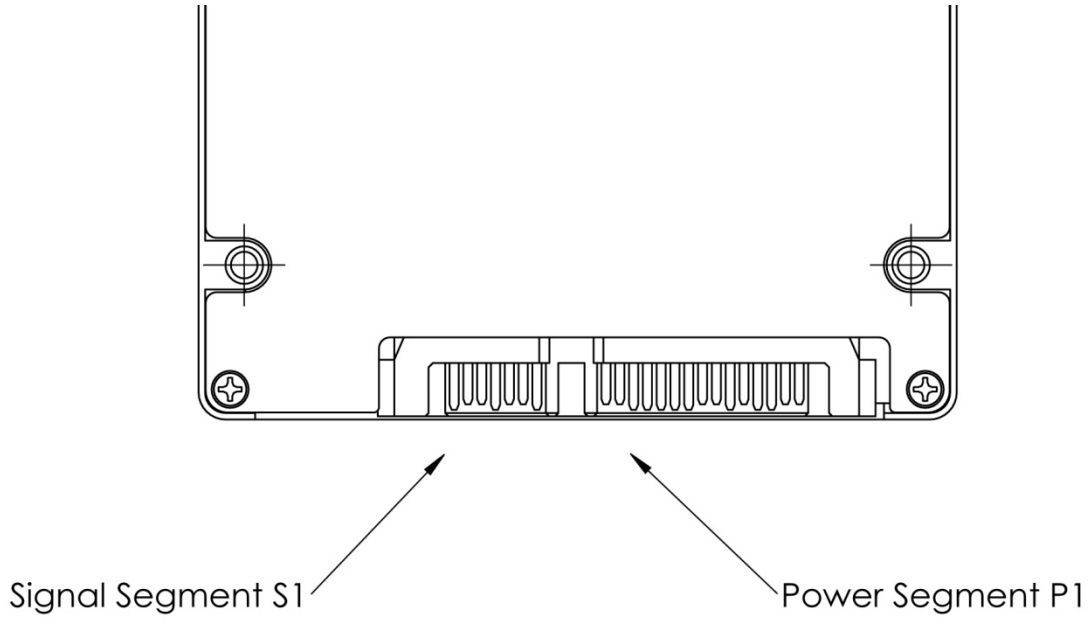
ATA8 Command that provides for the operating system to inform the drive when sectors no longer contain valid data.

Notes: TRIM support requires Operating System support

9. Pin and Signal Descriptions

This section identifies the pin locations and signal descriptions of the OCZ High Performance SSD's.

9.1 Pin Locations



9.2 Hot Plug Support

Hot Plug insertion and removal are supported in the presence of a proper connector and appropriate operating system (OS) support as described in the SATA 2.6 specification. This product supports Asynchronous Signal Recovery and will issue an unsolicited COMINIT when first mated with a powered connector to guarantee reliable detection by a host system without hardware device detection.

9.3 Signal Description Table

Table 12.

	No.	Plug Connector pin definition	
Signal	S1	GND	2nd mate
	S2	A+	Differential signal A from PHY
	S3	A-	
	S4	GND	2nd mate
	S5	B-	Differential signal B from PHY
	S6	B+	
	S7	GND	2nd mate
Key and spacing separate signal and power segments			
Power	P1	V33	3.3V power (Unused)
	P2	V33	3.3V power (Unused)
	P3	V33	3.3V power, pre-charge, 2nd mate (Unused)
	P4	GND	1st mate
	P5	GND	2nd mate
	P6	GND	2nd mate
	P7	V5	5V power, pre-charge, 2nd mate
	P8	V5	5V power
	P9	V5	5V power
	P10	GND	2nd mate
	P11	DAS/DSS	Device Activity Signal

	No.	Plug Connector pin definition	
	P12	GND	1st mate
	P13	V12	12V power, pre-charge, 2nd mate (Unused)
	P14	V12	12V power (Unused)
	P15	V12	12V power (Unused)

10. ATA Support

The OCZ Intrepid 3800 SSD supports ATA-8 features listed in the table below:

Table 13.

Feature	ATA-8 Reference
General	4.2
48-bit address	4.4
General purpose logging (GPL)	4.10
Host protected area (HPA)	4.11
Native command queuing (NCQ)	4.15
Power management	4.18
Security	4.20
S.M.A.R.T.	4.21
TRIM	ATA/ATAPI Command Set (ACS-2)

10.1 ATA Command Support

The OCZ Intrepid 3800 SSD supports all the commands described in the table below and complies with ATA-8/ACS-2 specification.

Table 14.

OpCode	Command
E5h	CHECK POWER MODE
E7h	FLUSH CACHE

Opcode	Command
F6h	SECURITY DISABLE PASSWORD
F1h	SECURITY SET PASSWORD

OpCode	Command
ECh	IDENTIFY DEVICE
E3h	IDLE
E1h	IDLE IMMEDIATE
E4h	READ BUFFER
C4h	READ MULTIPLE
F8h	READ NATIVE MAX ADDRESS
Ch8	READ DMA
00h	NOP
2Fh	READ LOG EXT
06h	DATA SET MANAGEMENT
20h	READ SECTOR(S)
24h	READ SECTOR(S) EXT
25h	READ DMA EXT
27h	READ NATIVE MAX ADDRESS EXT
29h	READ MULTIPLE EXT
30h	WRITE SECTOR(S)
40h	READ VERIFY SECTOR(S)
42h	READ VERIFY SECTOR(S) EXT
60h	READ FPDMA QUEUED
90h	EXECUTE DEVICE DIAGNOSTIC

Opcode	Command
F2h	SECURITY UNLOCK
70h	SEEK
EFh	SET FEATURES
C6h	SET MULTIPLE MODE
E0h	STANDBY IMMEDIATE
C5h	WRITE MULTIPLE
10h	RECALIBRATE
37h	SET MAX ADDRESS EXT
E2h	STANDBY
F3h	SECURITY ERASE PREPARE
CAh	WRITE DMA
3Dh	WRITE DMA FUA EXT
E6h	SLEEP
34h	WRITE SECTOR(S) EXT
39h	WRITE MULTIPLE EXT
FEh	VENDOR SPECIFIC COMMAND
CEh	WRITE MULTIPLE FUA EXT
D0h	SANITARY ERASE (VENDOR SPECIFIC COMMAND)
B0h	SMART
F5h	SECURITY FREEZE LOCK

OpCode	Command
91h	INITIALIZE DEVICE PAREMETERS
92h	DOWNLOAD MICROCODE

Opcode	Command
F9h	SET MAX ADDRESS
F4h	SECURITY ERASE UNIT

10.2 IDENTIFY Device Data

The table below shows 256 words (512 bytes) of sector data returned after the host issues an IDENTIFY DEVICE command. All references comply with ACS-2 specification.

Table 15.

Word	Setting	Default Value	Description
0	M	0000h	0 = ATA device
1	X	3FFFh	Obsolete
2	O	C837h	Obsolete
3	X	0010h	Obsolete
4-5	X	0h	Retired
6	X	003Fh	Obsolete
7-8	V	0h	Reserved for assignment by the CFA association
9	X	0h	Retired
10-19	M	Varies	Serial number (20 ASCII characters)
20-21	X	0000h FFFFh	Retired
22	X	3000h	Obsolete
23-26	M	Varies	Firmware revision (8 ASCII characters)
27-46	M	Varies	Model number (40 ASCII characters)
47	M	8010h	Max. number of sectors transferred per interrupt on MULTIPLE commands
48	O	4000h	Trusted Computing feature set options
49	M	2F00h	Reserved for IDENTIFY packet device command
50	F	4000h	Capabilities
51-52	X	0h	Obsolete
53	M	0006h	Word 88 and 70:64 valid
54	X	3FFFh	Obsolete
55	X	0010h	Obsolete

Word	Setting	Default Value	Description
56	X	003Fh	Obsolete
57-58	X	FC10h	Obsolete
59	M	0110h	Number of sectors transferred per DRQ interrupt on MULTIPLE commands
60-61	M	FFFFh 0FFFh	Total number of user addressable sectors
62	X	0h	Obsolete
63	M	0007h	Reserved
64	M	0003h	PIO modes supported (ATA only)
65	M	0078h	Minimum Multiword DMA transfer cycle time per word
66	M	0078h	Manufacturer's recommended Multiword DMA transfer cycle time
67	M	0078h	Minimum PIO transfer cycle time without flow control
68	M	0078h	Minimum PIO transfer cycle time without IORDY flow control
69	O	0D00h	Additional supported
70	X	0h	Reserved
71-74	F	0h	Reserved for the IDENTIFY PACKET DEVICE command
75	O	001Fh	Queue depth support
76	O	010Eh	Serial ATA capabilities
77	F	0006h	Reserved for Serial ATA future definition
78	O	0016h	Serial ATA features supported
79	O	0014h	Serial ATA features enabled
80	M	03C0h	Major Version number
81	M	0000h	Minor Version number
82	M	742Bh	Command and feature sets supported
83	M	5401h	Command and feature sets supported
84	M	4160h	Command and feature sets supported
85	M	7469h	Command and feature sets supported
86	M	9401h	Command and feature sets supported
87	M	4160h	Command and feature sets supported
88	O	407Fh	Ultra DMA Modes
89	O	000Ah	Time required for security erase unit completion
90	O	00C8h	Time required for enhanced security erase completion
91	O	0h	Current advanced power management

Word	Setting	Default Value	Description
92	O	FFFEh	Master password revision code
93	M	0h	Hardware reset result. The contents of bits (12:0) of this word shall change only during the execution of a hardware reset (see 7.18.7.47)
94	O	0h	Vendor's recommended and actual acoustic management value (see 7.18.7.48)
95	O	0h	Stream minimum request size
96	O	0h	Stream transfer time - DMA
97	O	0h	Streaming access latency – DMA and PIO
98-99	O	0h	Streaming performance granularity
100-103	O	Varies	Maximum user LBA for 48-bit address feature set
104	O	0h	Streaming transfer time – PIO
105	O	0010h	Reserved
106	O	4000h	Physical sector size/logical sector size
107	O	0h	Inter-seek delay for ISO-7779 acoustic testing in microseconds
108-111	M	Varies	World Wide Name
112-115	O	0h	Reserved for World Wide Name extension to 128 bits
116	O	0h	Reserved for INCITS TR-37-2004
117-118	F	0h	Logical sector size (see 7.18.7.61)
119	M	4006h	Commands and feature sets supported
120	M	400Eh	Commands and feature sets supported
121-126	F	0h	Reserved for expanded supported and enable settings
127	X	0h	Obsolete
128	O	0001h	Security status
129-159	O	0h	Vendor specific
160	O	0h	CFA power mode (see 7.18.7.68)
161-175	O	0h	Reserved for the CompactFlash association
176-205	O	0h	Current media serial number (60 ASCII characters)
206	O	0021h	SCT command transport
207-208	O	0h	Reserved for CE-ATA
209	O	4000h	Alignment of logical blocks within a larger physical block
210-211	O	0h	Write-Read-Verify sector count mode 3 only
212-213	O	0000h 0000h	Write-Read-Verify sector count mode 2 only
214	O	0h	NV cache capabilities

Word	Setting	Default Value	Description
215	O	0h	NV cache size in logical blocks
217	M	0001h	Nominal media rotation rate
218-221	F	0h	Reserved
222	M	107Fh	Transport major revision number
223	M	0h	Transport minor revision number
224-233	F	0h	Reserved for CE-ATA
234	O	0h	Minimum number of 512 byte units per DOWNLOAD
235	O	0h	Maximum number of 512 byte units per DOWNLOAD
256-254	F	0h	Reserved
255	M	Varies	Integrity word

Setting:

F/V/X: Fixed/Variable/Undefined Content

O/M: Optional/Mandatory Requirement

10.3 Power Management Support

The OCZ Intrepid 3800 SDDs supports ATA and SATA power management modes as described below:

10.3.1 ATA Power Modes

The ATA power modes supported by OCZ Intrepid 3800 SSDs are:

- ACTIVE
- IDLE
- STANDBY
- SLEEP

10.3.2 SATA Link Power States

The SATA power states supported by the OCZ Intrepid 3800 SSDs are:

- ACTIVE: PHY Ready, full power, Tx & Rx operational

11. S.M.A.R.T. Attribute Support

This section describes the S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) attributes supported by the OCZ Intrepid 3800 SSDs and the corresponding threshold settings.

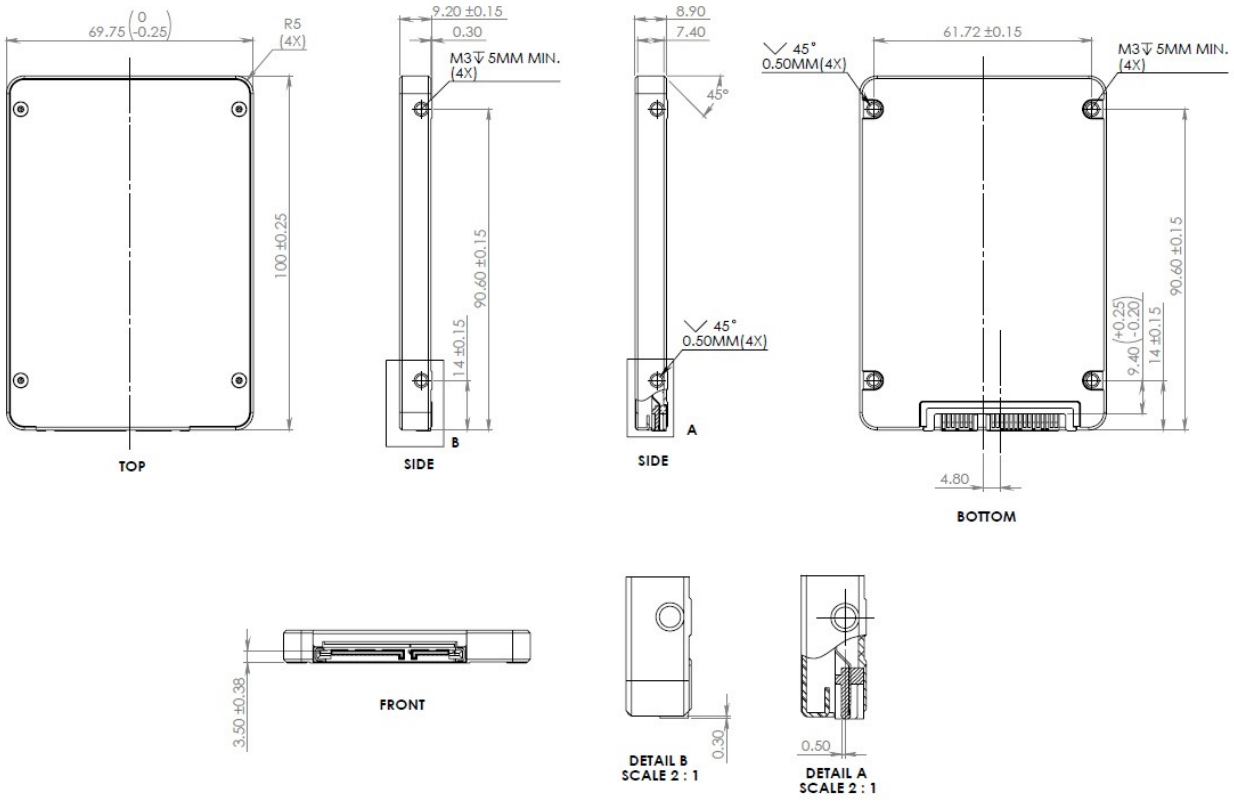
Table 16.

ID	Description	Unit	Starting	Increments	Current	Worst
05h	Accumulated runtime bad blocks		0	1	NA	NA
09h	Power-On Hours Count	Hour	0	1	NA	NA
0Ch	Power Cycle Count		0	1	NA	NA
64h	Total blocks erased	In # of blocks	0	1	NA	NA
ABh	Available OP block count	%		1	percentage	0
AEh	Power Cycle Count(unplanned)		0	1	Percentage (raw / total power cycle)	NA
B8h	Factory bad block count total		0	1	Percentage (raw / total allowable BB)	100
BBh	Total count uncorrectable NAND reads (errors that could not be recovered using ECC)		0	1	NA	NA
BEh	Temperature	In Celsius		1	Raw	NA
C3h	Total programming failures		0	1	Percentage (raw / total allowable BB)	100
C4h	Total erase failures		0	1	Percentage (raw / total allowable BB)	100
C5h	Total read failures(uncorrectable)		0	1	Percentage	100

					(raw / total allowable BB)	
C6h	Host reads	In GB	0	1	NA	NA
C7h	Host writes	In GB	0	1	NA	NA
CAh	Total number of read bits corrected	In Number	0	1	NA	NA
CDh	Max rated PE count		0	1	NA	NA
CEh	Min erase count		0	1	Percentage (raw / Max PE Count)	NA
CFh	Max erase count		0	1	Percentage (raw / Max PE Count)	NA
D0h	Average erase count		0	1	Percentage (raw / Max PE Count)	NA
D2h	SATA CRC error count		0	1	NA	NA
D3h	SATA UNC count(not same with uncorrectable NAND read count)		0	1	NA	NA
D4h	Total count NAND page reads requiring read retry		0	1	NA	NA
D5h	Total count simple read retry attempts		0	1	NA	NA
D6h	Total count adaptive read retry attempts		0	1	NA	NA
DDh	Internal data path protection uncorrectable errors		0	1	NA	NA
DEh	RAID recovery count		0	1	NA	NA
E6h	Status flag for super cap charging	1 when fully charged. 0 when not charged.	0	1	NA	NA

		2 when unknown.				
E9h	Lifetime remaining	In Percentage	0	1	Raw	0
F9h	Total NAND programming count	In GB	0	1	NA	NA
FBh	Total NAND read count	In GB	0	1	NA	NA

12. Mechanical Specifications



Notes:

- All dimensions are in millimeters

13. Glossary

Term	Definition
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment Packet Interface
DMA	Direct Memory Access
ECC	Error-Correcting Code
EXT	Extended
KB	KiloByte

MB	Mega-byte defined as $1x10^6$ bytes
Gb	Gigabit
GB	Giga-byte defined as $1x10^9$ bytes
TB	Terabyte
TBW	Terabyte Written
PB	Petabyte
GC	Garbage Collection, can be real time or idle time (background)
HDD	Hard Disk Drive
Hot Plug	A term used to describe the removal or insertion of a SATA hard drive when the system is powered on.
IOPS	Input output operations per second
LBA	Logical Block Address
TYP	Typical
MTBF	Mean time between failures
NCQ	Native Command Queuing. The ability of the SATA hard drive to queue and re-order commands to maximize execution efficiency.
NOP	No Operation
OS	Operating System
Port	The point at which a SATA drive physically connects to the SATA controller.
P/E	Program / Erase cycles, defines NAND lifecycle
UBER	Uncorrectable Bit Error Rate
SAS	Serial Attached SCSI
SATA	Serial ATA
SFF	Small Form Factor
SMART	Self-Monitoring, Analysis and Reporting Technology: an open standard for developing hard drives and software systems that automatically monitors a hard drive's health and reports potential problems.
SSD	Solid State Drive
MLC	Multi-level Cell
eMLC	Enterprise Multi-level Cell
TRIM	ATA8 Command informing the drive when sectors no longer contain valid data

14. Revision History

Rev.	*Date*	*By*	*Reason For Change*
1.0	21-Nov-2013	Product Management	Preliminary Release
1.1	23-Jan.-2014	Product Management	Preliminary Release
1.2	20-Feb-2014	Product Management	Final Release
1.3	5-Dec-2014	Product Management	Updated endurance to 4 DWPD