

SUPERTALENT SUPERCACHE (AIC34) DATASHEET

HHHL PCIE GEN3 X4 SOLID STATE DRIVE



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1.0 PRODUCT DESCRIPTION

1.1 PRODUCT OVERVIEW

SuperCache is a PCIe NVMe Add In Card type Solid State Drive. It supports a max read speed of up to 3.0 GB/sec and a max write speed as fast as 2.2 GB/sec for Audio/Video Cache application. It also has a great performance of Random 4KB Read/Write up to 340K/260K IOPS. This AIC can also fit into 1U/2U/4U Rack Server System

1.2 TARGET APPLICATIONS

- Audio/Video Streaming Server Cache storage
- Data Center Server Cache storage
- Web server Cache storage
- Super computing
- Near-line backup
- Security systems

1.3 PRODUCT FEATURES

- PCIe Gen3 x4 lane host interface.
- Max Speed: Read up to 3.0 GB/s, Write up to 2.2 GB/s
- Capacity: 480GB, 960GB, 1920GB.
- MLC NAND Flash
- Ultra rugged and reliable
- High-speed performance
- Silent, no moving parts
- Proprietary wear leveling algorithms
- 100% tested hardware and software
- Support Commercial Temperature
- Data Set Management command(TRIM)

1.4 SYSTEM REQUIREMENTS

Operating Voltage Requirement: $V_{CC} = 12V \pm 8\%$

Operating System:

- Windows® Win7 32bit/Win8 32bit/Win8.1/Win10
- Windows® Server 2008R2 32bit/2012 32bit/2012 R2
- Linux

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Interface: PCIe I/II/III x4 interface

Installation Requirements:

- System Mounting Hardware

2.0 PRODUCT ORDERING PART NUMBERS

2.1 ORDERING PART STRUCTURE

Table 1: Ordering Part Structure

Prefix X	Product Type XX	Density XXX	Technology XX	Form and Case Factor XX
↓	↓	↓	↓	↓
F-Channel	PG - PCIe Gen3 x 4 MLC	480 - 480GByte 960 - 960GByte 1T9 – 1920GByte	PS	R8 - PCIe AIC Commercial

2.2 VALID ORDERING PART NUMBERS

Table 2: Valid Ordering Part Numbers

Product Family	Capacity	Flash	Form Factor	Channel Part Number
SuperCache (AIC34)	Commercial Temp			
	480GB	MLC	PCIe Gen3 x 4	FPG480PSR8
	960GB			FPG960PSR8
	1920GB			FPG1T9PSR8

3.0 MECHANICAL SPECIFICATIONS

Length: 169.55 mm ± 0.20 mm

Width: 68.90 mm ± 0.20 mm

High: 17.14 mm ± 0.20 mm

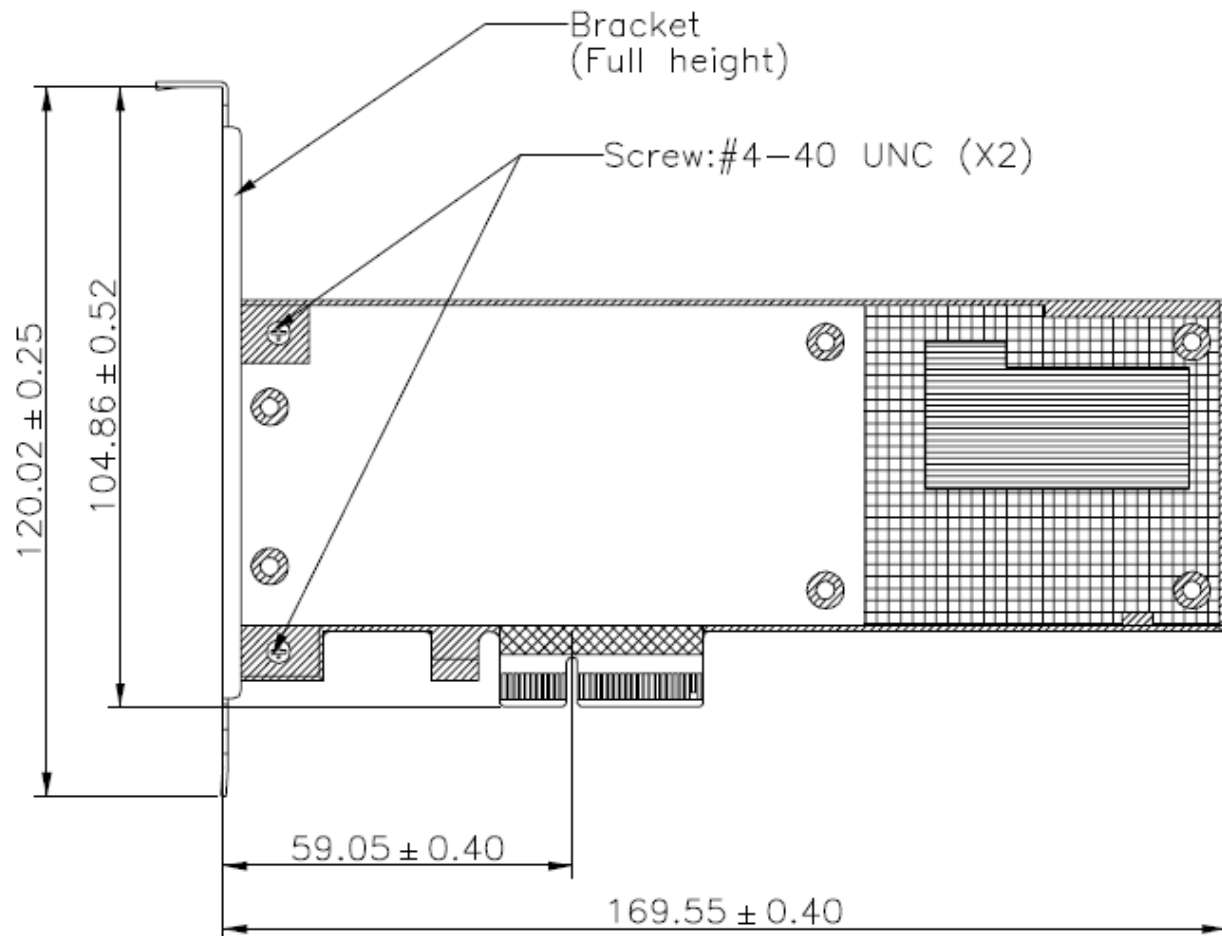


Figure 1: SuperCache (AIC34) Outline Drawing

4.0 ELECTRICAL SPECIFICATIONS

Operating Voltage: $V_{CC} = 12V$

Modes: PCIe I/II/III x4 interface

4.1 PERFORMANCE SPECIFICATIONS

Access Time: 0.1 ms

Seek Time: 0 ms

Mount Time: The mount time for initializing and mounting the SSD depends on the O/S and testing platform.

Data Transfer Time:

Table 3: Data Transfer Time Specifications

Device	Sequential Read Max (MB/Sec)	Sequential Write Max (MB/Sec)
FPG480PSR8	3000	2200
FPG960PSR8	3000	2200
FPG1T9PSR8	3000	2200

4.2 ABSOLUTE MAXIMUM RATINGS

Table 4: Absolute Maximum Ratings

Symbol	Rating	Value	Unit
V _{IN}	Input Voltage	12	V
T _{OPR}	Operating Temperature	0 to 70	°C
T _{STR}	Storage Temperature	-40°C to 85°C	°C

5.0 ENVIRONMENTAL SPECIFICATIONS

Operating Temperature

- Commercial Grade: 0°C to +70°C

Humidity: 0% to ~90% RH

6.0 QUALITY AND RELIABILITY SPECIFICATIONS

Wear Leveling: Static and dynamic wear-leveling algorithm.

Bad Block Management: Failed Blocks of Flash will be replaced with new ones by the SSD.

ECC (Error Correction Code):

- AIC PCIe SSD can correct up to 120 bits error in 2K Byte data.

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MTBF: >1,000,000 hours

Power Cycle: >1,000

Endurance: TBW (Total Bytes Written)

Table 5: Total Bytes Written In SSDs

Device	TBW (TB)
FPG480PSR8	698
FPG960PSR8	1396
FPG1T9PSR8	2793

7.0 COMPLIANCE SPECIFICATIONS

All SuperCache(AIC34) are compliant with the following standards and regulations:

- RoHS

8.0 PIN DESCRIPTIONS

8.1 DATA PIN ASSIGNMENTS

Table 6: Data Pin Signal Assignment

Pin	Side B		Side A	
	Name	Description	Name	Description
1	+12V	12 V power	PRSNT1#	Hot-Plug presence detect
2	+12V	12 V power	+12V	12 V power
3	+12V	12 V power	+12V	12 V power
4	GND	Ground	GND	Ground
5	SMCLK	SMBus (System Management Bus) clock	JTAG2	TCK (Test Clock), clock input for JTAG interface
6	SMDAT	SMBus (System Management Bus) data	JTAG3	TDI (Test Data Input)
7	GND	Ground	JTAG4	TDO (Test Data Output)
8	+3.3V	3.3 V power	JTAG5	TMS (Test Mode Select)
9	JTAG1	TRST# (Test Reset) resets the JTAG interface	+3.3V	3.3 V power
10	3.3Vaux	3.3 V auxiliary power	+3.3V	3.3 V power
11	WAKE#	Signal for Link reactivation	PERST#	Fundamental reset
12	RSVD	Reserved	GND	Ground

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13	GND	Ground	REFCLK+	Reference clock (differential pair)
14	PETp0	Transmitter differential pair, Lane 0	REFCLK-	
15	PETn0	Transmitter differential pair, Lane 0	GND	Ground
16	GND	Ground	PERp0	Receiver differential pair, Lane 0
17	PRSNT2#	Hot-Plug presence detect	PERn0	Receiver differential pair, Lane 0
18	GND	Ground	GND	Ground
19	PETp1	Transmitter differential pair, Lane 1	RSVD	Reserved
20	PETn1	Transmitter differential pair, Lane 1	GND	Ground
21	GND	Ground	PERp1	Receiver differential pair, Lane 1
22	GND	Ground	PERn1	Receiver differential pair, Lane 1
23	PETp2	Transmitter differential pair, Lane 2	GND	Ground
24	PETn2	Transmitter differential pair, Lane 2	GND	Ground
25	GND	Ground	PERp2	Receiver differential pair, Lane 2
26	GND	Ground	PERn2	Receiver differential pair, Lane 2
27	PETp3	Transmitter differential pair, Lane 3	GND	Ground
28	PETn3	Transmitter differential pair, Lane 3	GND	Ground
29	GND	Ground	PERp3	Receiver differential pair, Lane 3
30	RSVD	Reserved	PERn3	Receiver differential pair, Lane 3
31	PRSNT2#	Hot-Plug presence detect	GND	Ground
32	GND	Ground	RSVD	Reserved

9.0 SUPPORTED ATA COMMANDS

9.1 STANDARD COMMANDS

SuperCache(AIC34) supports the commands shown in the following tables.

Table 7: NVMe command List

Op Code	Description	Op Code	Description
Admin Commands			
00h	Delete I/O Submission Queue	01h	Create I/O Submission Queue
02h	Get Log Page	04h	Delete I/O Completion Queue
05h	Create I/O Completion Queue	06h	Identify
08h	Abort	09h	Set Features

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0Ah	Get Features	0Ch	Asynchronous Event Request
10h	Firmware Activate	11h	Firmware Image Download
Admin Commands – NVM Command Set Specific			
80h	Format NVM	81h	Security Send
82h	Security Receive		
NVM Commands			
00h	Flush	01h	Write
02h	Read	04h	Write Uncorrectable
05h	Compare	08h	Write Zeroes
09H	Dataset Management		

9.2 IDENTIFY DEVICE DATA

The following table details the sector data returned by the IDENTIFY DEVICE command.

Table 8: Identify Controller Data Structure

Bytes	Description
Controller Capabilities and Features	
01:00	PCI Vendor ID (VID)
03:02	PCI Subsystem Vendor ID (SSVID)
23:04	Serial Number (SN)
63:24	Model Number (MN)
71:64	Firmware Revision (FR)
72	Recommended Arbitration Burst (RAB)
75:73	IEEE OUI Identifier (IEEE)
76	Controller Multi-Path I/O and Namespace Sharing Capabilities (CMIC)
77	Maximum Data Transfer Size (MDTS)
255:80	Reserved
Admin Command Set Attributes & Optional Controller Capabilities	
257:256	Optional Admin Command Support (OACS)
258	Abort Command Limit (ACL)
259	Asynchronous Event Request Limit (AERL)
260	Firmware Updates (FRMW)
261	Log Page Attributes (LPA)
262	Error Log Page Entries (ELPE)
263	Number of Power States Support (NPSS)
264	Admin Vendor Specific Command Configuration (AVSCC)
265	Autonomous Power State Transition Attributes (APSTA)
511:266	Reserved
NVM Command Set Attributes	

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Bytes	Description
512	Submission Queue Entry Size (SQES)
513	Completion Queue Entry Size (CQES)
515:514	Reserved
519:516	Number of Namespaces (NN)
521:520	Optional NVM Command Support (ONCS)
523:522	Fused Operation Support (FUSES)
524	Format NVM Attributes (FNA)
525	Volatile Write Cache (VWC)
527:526	Atomic Write Unit Normal (AWUN)
529:528	Atomic Write Unit Power Fail (AWUPF)
530	NVM Vendor Specific Command Configuration (NVSCC)
531	Reserved
533:532	Atomic Compare & Write Unit (ACWU)
535:534	Reserved
539:536	SGL Support (SGLS)
703:540	Reserved

Table 9: Identify Namespace Data Structure & NVM Command Set Specific

Bytes	Description
7:0	Namespace Size (NSZE)
15:8	Namespace Capacity (NCAP)
23:16	Namespace Utilization (NUSE)
24	Namespace Features (NSFEAT)
25	Number of LBA Formats (NLBAF)
26	Formatted LBA Size (FLBAS)
27	Metadata Capabilities (MC)
28	End-to-end Data Protection Capabilities (DPC)
29	End-to-end Data Protection Type Settings (DPS)
30	Namespace Multi-path I/O and Namespace Sharing Capabilities (NMIC)
31	Reservation Capabilities (RESCAP)
119:32	Reserved
127:120	IEEE Extended Unique Identifier (EUI64)
131:128	LBA Format 0 Support (LBAF0)
135:132	LBA Format 1 Support (LBAF1)
139:136	LBA Format 2 Support (LBAF2)
143:140	LBA Format 3 Support (LBAF3)
147:144	LBA Format 4 Support (LBAF4)
151:148	LBA Format 5 Support (LBAF5)
155:152	LBA Format 6 Support (LBAF6)
159:156	LBA Format 7 Support (LBAF7)
163:160	LBA Format 8 Support (LBAF8)
167:164	LBA Format 9 Support (LBAF9)
171:168	LBA Format 10 Support (LBAF10)

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Bytes	Description
175:172	LBA Format 11 Support (LBAF11)
179:176	LBA Format 12 Support (LBAF12)
183:180	LBA Format 13 Support (LBAF13)
187:184	LBA Format 14 Support (LBAF14)
191:188	LBA Format 15 Support (LBAF15)
383:192	Reserved
4095:384	Vendor Specific (VS)

10.0 SUPPORT AND CONTACT INFORMATION

Technical Support

- If additional support is needed, please visit the Super Talent Web site at www.supertalent.com for the following topics
- Warranty Services: Includes the warranty service policy and the RMA request forms.
- Technical Information: Includes product data sheets and various SSD whitepapers.
- Tools Section: Includes frequently asked questions (FAQs).
- Contact Support: support@supertalent.com

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CHANGE RECORD

Table 10: Change Record

Version	Release Date	Changes
1.0	February 22, 2016	Initial Release in new template
2.0	April 21,2016	Modify Product Picture and Outline Drawing
3.0	May 5,2016	Modify Product Name (Super AIC change SuperCache(AIC34))