



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# SATA 6Gb/s Industrial Slim SATA Manual



Slim SATA is a non-volatile, solid-state storage device. With its Serial ATA interface and Slim SATA (MO-297) form factor, it is a drop in replacement for hard disk drives. Slim SATA delivers extremely high levels of performance, reliability and ruggedness for I/O intensive or environmentally challenging applications.

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 1 of 44

## Revision History

Date	Revision	Description	Checked by
7/21/14	X1	Initial release based on modified PSFS22xxxGTxxx_A	
10/31/14	X2	Add tolerance info to Mechanical Dimensions	
4/29/15	A	Add photo. Update per PSG	
5/08/15	B	Revise power consumption table. IOPS per IOMeter8	
8/08/15	C	Add 15nm PN's	
11/08/15	D	Update per PSG	
1/13/16	E	Update per PSG	
9/20/16	F	Revise logo and color scheme. Remove temp sensor and SATA attribute.	



## Legal Information

### Legal Information

Copyright© 2016 Sanmina Corporation. All rights reserved. The information in this document is proprietary and confidential to Sanmina Corporation. No part of this document may be reproduced in any form or by any means or used to make any derivative work (such as translation, transformation, or adaptation) without written permission from Sanmina. Sanmina reserves the right to revise this documentation and to make changes in content from time to time without obligation on the part of Sanmina to provide notification of such revision or change.

Sanmina provides this documentation without warranty, term or condition of any kind, either expressed or implied, including, but not limited to, expressed and implied warranties of merchantability, fitness for a particular purpose, and non-infringement. While the information contained herein is believed to be accurate, such information is preliminary, and should not be relied upon for accuracy or completeness, and no representations or warranties of accuracy or completeness are made. In no event will Sanmina be liable for damages arising directly or indirectly from any use of or reliance upon the information contained in this document. Sanmina may make improvements or changes in the product(s) and/or the program(s) described in this documentation at any time.

Sanmina, Viking Technology, Viking Modular Solutions, and Element logo are trademarks of Sanmina Corporation. Other company, product or service names mentioned herein may be trademarks or service marks of their respective owners.

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 3 of 44

## Ordering Information: Slim SATA SSD Solid-State Drive

Part Numbers	SATA Interface	Application	Useable Capacity (GB) <sup>1</sup>	NAND Technology	Temperature Range	NAND
VPFEM1064GTCBMTL	SATA 6GB	Client	64	MLC	(0 to +70°c)	TSB 15nm MLC
VPFEM1128GTCBMTL	SATA 6GB	Client	128	MLC	(0 to +70°c)	TSB 15nm MLC
VPFEM1256GTCAMTL	SATA 6GB	Client	256	MLC	(0 to +70°c)	TSB 15nm MLC
VPFEM1512GTCZMTL	SATA 6GB	Client	512	MLC	(0 to +70°c)	TSB 15nm MLC

**Notes:**

1. Usable capacity based on a level of over-provisioning applied to wear leveling, bad sectors, index tables etc.
2. Higher capacity points may be available based on customer application.  
Consult your local Viking Field Application Engineer.
3. SSD's ship unformatted from the factory unless otherwise requested.
4. 1 GB = 1,000,000,000 Byte
5. One Sector = 512 Byte.
6. "x" is a wild card in the PN to indicate NAND Device capacity. Contact Viking for device options.  
yy is a wild card to indicate customer specifications

Viking’s solid state drives are available in Enterprise and Client versions:

**Enterprise SSD** – An Enterprise SSD contains hardware and firmware that detect and manage power failures. This allows the drive to flush the controller cache and harden data to NAND flash. No data is lost or corrupted.

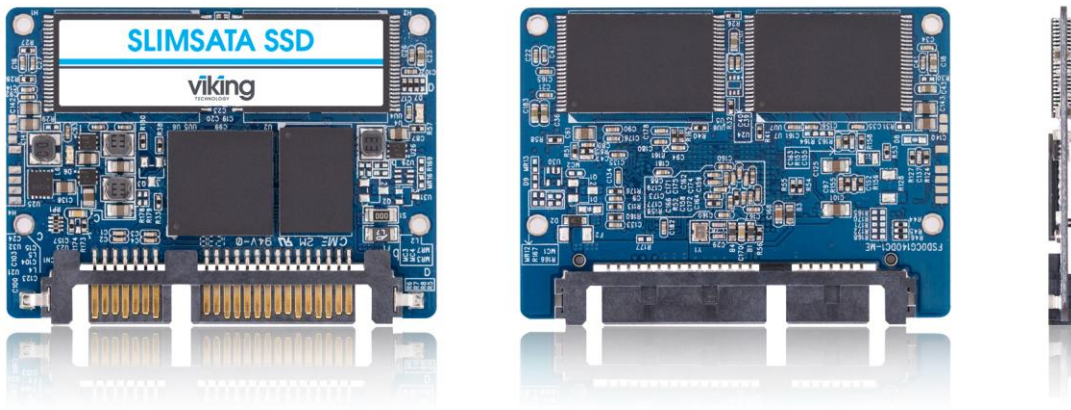
**Client SSD** – A Client SSD does not include power failure detection or management features. MLC NAND, as opposed to SLC NAND, can become corrupted if power is removed during a write, also known as lower page corruption. Therefore, a Client SSD using MLC NAND is well-suited in a system that already manages power fail events, allowing for graceful SSD shutdown. Accordingly, system support should include issuing a Standby Immediate command to the SSD while maintaining power for at least 50ms.

If a Client drive with MLC NAND is used in a system that does not manage power failures and shutdowns, there is a small chance of data corruption. Viking Client SSD’s take sophisticated hardware and firmware measures to prevent or mitigate such issues making the chance of corruption very small.

If the SSD controller detects data corruption, the drive will be locked. The only way to recover the drive is to return it to the factory for reprogramming; all data will be lost.

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 5 of 44

## Product Picture(s)



Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 6 of 44

## Table of Contents

<b>1</b>	<b>INTRODUCTION</b>	<b>10</b>
1.1	Features	10
1.2	Block Diagram	11
1.3	SATA Interface	11
<b>2</b>	<b>PRODUCT SPECIFICATIONS</b>	<b>12</b>
2.1	Capacity and LBA count	12
2.2	Performance	12
2.3	Timing	13
2.4	<b>Electrical Characteristics</b>	<b>13</b>
2.4.1	Absolute Maximum Ratings	13
2.4.2	Supply Voltage	13
2.4.3	Power Consumption	13
2.5	<b>Environmental Conditions</b>	<b>14</b>
2.5.1	Temperature and Altitude	14
2.5.2	Shock and Vibration	14
2.5.3	Electromagnetic Immunity	15
2.6	<b>Reliability</b>	<b>16</b>
2.7	<b>Data Security</b>	<b>16</b>
2.7.1	Encryption	16
2.7.2	Quick Erase	16
2.7.3	Military Secure Erase / Sanitization/ Purge Routines	17
<b>3</b>	<b>MECHANICAL INFORMATION</b>	<b>29</b>
3.1	Slim SATA SSD Weight	30
<b>4</b>	<b>PIN AND SIGNAL DESCRIPTIONS</b>	<b>30</b>

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 7 of 44



<b>4.1</b>	<b>Pin Locations</b>	<b>30</b>
<b>4.2</b>	<b>Signal and Power Description Tables</b>	<b>30</b>
<b>4.3</b>	<b>Hot Plug Support</b>	<b>31</b>
<b>5</b>	<b>COMMAND SETS</b>	<b>31</b>
<b>5.1</b>	<b>ATA Commands</b>	<b>31</b>
5.1.1	48-Bit Address Command Set	32
5.1.2	ATA General Feature Command Set	33
5.1.3	Device Configuration Overlay Command Set	33
5.1.4	General Purpose Log Command Set	33
5.1.5	Host Protected Area Command Set	33
5.1.6	Power Management Command Set	34
5.1.7	Security Mode Feature Set	34
5.1.8	Identify Device Data	35
5.1.1	S.M.A.R.T. Support	38
5.1.2	S.M.A.R.T. Command Set	39
<b>5.2</b>	<b>SATA Commands</b>	<b>42</b>
5.2.1	Native Command Queuing (NCQ)	42
<b>6</b>	<b>REFERENCES</b>	<b>43</b>
<b>7</b>	<b>GLOSSARY</b>	<b>44</b>

## Table of Tables

<i>Table 2-1: Maximum Sustained Read and Write Bandwidth</i>	12
<i>Table 2-2: Random Read and Write Input/Output Operations per Second (IOPS)</i>	12
<i>Table 2-3: Timing Specifications</i>	13
<i>Table 2-4: Absolute Maximum Ratings</i>	13
<i>Table 2-5: Operating Voltage</i>	13
<i>Table 2-6: Typical Power Consumption at 3.3V</i>	13
<i>Table 2-7: Temperature and Altitude Related Specifications</i>	14
<i>Table 2-8: Shock and Vibration Specifications</i>	14
<i>Table 2-9: Reliability Specifications</i>	16
<i>Table 2-10: Military Secure Erase / Sanitize Routines</i>	18
<i>Table 4-1: Serial ATA Connector Pin Signal Definitions</i>	30
<i>Table 4-2: Serial ATA Power Pin Definitions</i>	31
<i>Table 5-1: Supported ATA Commands</i>	31
<i>Table 5-2: List of Device Identification</i>	35
<i>Table 5-3: S.M.A.R.T. Command Set</i>	39
<i>Table 5-4: Extended SMART Attribute Table</i>	39
<i>Table 5-5: Extended SMART Attribute Actual Data</i>	40
<i>Table 5-6: Supported S.M.A.R.T. EXECUTE OFF-LINE IMMEDIATE Subcommands</i>	42

## Table of Figures

<i>Figure 1-1: High-Level Block Diagram</i>	11
<i>Figure 3-1: Dimensions</i>	29
<i>Figure 4-1: Layout of Signal and Power Segment Pins</i>	30

## 1 Introduction

Viking's rugged industrial designed SSD's offer the highest flash storage reliability and performance in harsh environments such as shock, vibration, humidity, altitude, ESD, and extreme temperatures.

### 1.1 Features

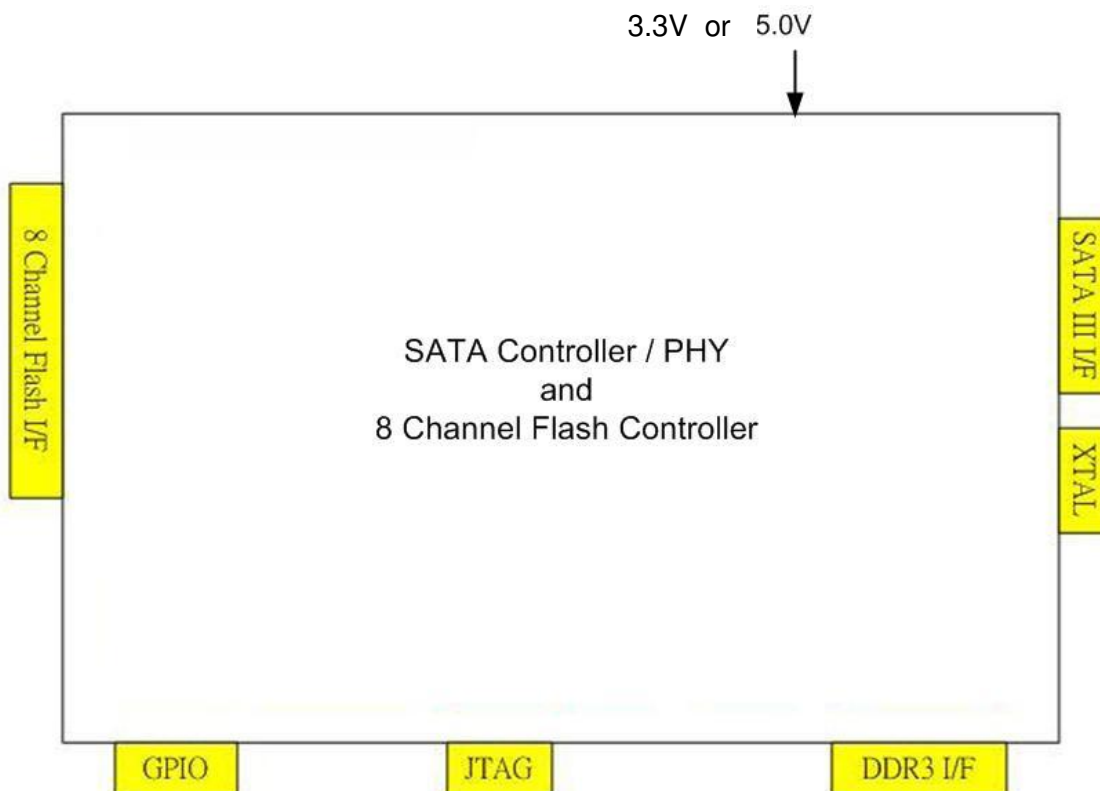
The SSD delivers the following features:

- Seamless SATA Revision 3.2 interface support for SATA up to 6Gb/s
- Low overall SSD power consumption
- Supports Native Command Queuing (NCQ) to 32 commands
- Compatible with all major SLC and MLC flash technologies
- S.M.A.R.T.
- Superior static and dynamic wear-leveling algorithm
- Efficient error recovery
- TRIM Support
- 48-bit LBA Support

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 10 of 44

## 1.2 Block Diagram

Figure 1-1: High-Level Block Diagram



**Notes:** Support for up to 8-channels and 32 CE in the NAND Flash interface

### 1.3 SATA Interface

- The Serial ATA (SATA) interface is compliant with the SATA IO Serial ATA specification, revision 3.2 that supports SATA up to 6GB/s.
- The SATA interface connects the host computer to the SSD subsystem.
- The SATA interface runs at a maximum speed of 6.0 Gbps (Giga-bits per second). If the host computer is unable to negotiate a speed of 6.0 Gbps, the SATA interface automatically renegotiates to a speed of 3GBPs or 1.5Gbps.

For a list of supported commands and other specifics, please see Chapter 5.

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 11 of 44

## 2 Product Specifications

### 2.1 Capacity and LBA count

Raw Capacity (GB)	User Capacity (GB)	LBA Count <sup>1</sup>
16	14	27,3xx,xxx (27,370,224)
16	16	31,2xx,xxx (31,277,232)
32	30	58,6xx,xxx (58,626,288)
32	32	62,5xx,xxx (62,533,296)
64	60	117,xxx,xxx (117,231,408)
64	64	125,xxx,xxx (125,045,424)
128	120	234,xxx,xxx (234,441,648)
128	128	250,xxx,xxx (250,069,680)
256	240	468,xxx,xxx (468,862,128)
256	256	500,xxx,xxx (500,118,192)
512	460	937,xxx,xxx (937,703,088)
512	512	1,xxx,xxx,xxx (1,000,215,216)

**Notes:**

1. Per IDEMA, LBA1-03, LBA counts = (97,696,368) + (1,953,504 \* (Advertised Capacity in GBytes – 50))

### 2.2 Performance

**Table 2-1: Maximum Sustained Read and Write Bandwidth**

Access Type	MB/s
Sequential Read, 256K	Up to 540
Sequential Write, 256K	Up to 448

**Notes:**

1. Performance measured using IOMeter 08 with queue depth set to 32.
2. Write Cache enabled with DDR3 cache.
3. Refer to Application Note AN0006 for Viking SSD Benchmarking Methodology.
4. Data is based on SSD's capacities > 250GB, using Synchronous NAND devices (ONFI or toggle mode)

**Table 2-2: Random Read and Write Input/Output Operations per Second (IOPS)**

Access Type	IOPS
Read, 4K	Up to 100,000
Write, 4K	Up to 90,000

**Notes:**

1. Performance measured using Iometer 08 with queue depth set to 32
2. Write Cache enabled.
3. Random IOPS cover the entire range of legal logical block addresses (LBA's).  
Measurements are performed on a full drive (all LBA's have valid content).
4. Performance may vary by NAND type and host.



- 5. Refer to Application Note AN0006 for Viking SSD Benchmarking Methodology.
- 6. Data is based on 240GB, using Synchronous NAND devices (ONFI or toggle mode)

## 2.3 Timing

**Table 2-3: Timing Specifications**

Type	Average Latency
Read (at 64KB)	0.14mS
Write (at 64KB)	2.12mS
Power On Ready (POR)	436mS

**Notes:**

- 1. Device measured using Drivemaster.
- 2. DRQ (Data Transfer Requested) bit being asserted

## 2.4 Electrical Characteristics

### 2.4.1 Absolute Maximum Ratings

Values shown are stress ratings only. Functional operation outside normal operating values is not implied. Extended exposure to absolute maximum ratings may affect reliability.

**Table 2-4: Absolute Maximum Ratings**

Description	Min	Max	Unit
Maximum Voltage Range for Vin	-0.2	6	V
Maximum Temperature Range	-40	85	c

### 2.4.2 Supply Voltage

The operating voltage is 3.3V or 5.0v

**Table 2-5: Operating Voltage**

Description	Min	Max	Unit
Operating Voltage for 3.3 V or 5.0 (+/- 5%)	3.135	5.25	V

### 2.4.3 Power Consumption

All onboard power requirements of the SSD are derived from the SATA 3.3V rail.

**Table 2-6: Typical Power Consumption at 3.3V**

Capacity	Flash: TSBA19	Read()	Write	Idle	Partial	Slumber
----------	---------------	--------	-------	------	---------	---------

128GB	8GBx1Diex16CE	2.224	3.446	0.505	0.0911	0.0911
256GB	8GBx1Diex32CE	2.21	4.31	0.566	0.0695	0.068
512GB	8GBx2Diex32CE	2.335	4.431	0.632	0.0824	0.0798
1TB	16GBx2Diex32CE	2.481	4.234	0.651	0.1014	0.1009

Capacity	Flash: M L95B	Read()	Write	Idle	Partial	Slumber
128GB	16GBx1Diex8CE	2.193	2.524	0.625	0.1158	0.0716
256GB	16GBx1Diex16CE	2.161	3,624	0,571	0.0675	0,0659
512GB	16GBx2Diex16CE	2.39	3.971	0.567	0.1199	0.0968

**Notes:**

1. The average value of power consumption is achieved based on 100% conversion efficiency.
2. The measured power voltage is 5V.
3. Samples were built of Toshiba A19nm Toggle MLC NAND flash and measured under ambient temperature.
4. Sequential R/W is measured while testing 400MB sequential R/W 5 times by CrystalDiskMark.
5. Power Consumption may differ according to flash configuration and platform.

## 2.5 Environmental Conditions

### 2.5.1 Temperature and Altitude

**Table 2-7: Temperature and Altitude Related Specifications**

Conditions	Operating	Shipping	Storage
<b>Commercial Temperature- Ambient</b>	0 to 70°C	-40 to 85°C	-40 to 85°C
<b>Industrial Temperature- Ambient</b>	-40 to 85°C	-40 to 85°C	-40 to 85°C
<b>Humidity (non-condensing)</b>	90% under 40C	93% under 40C	93% under 40C

### 2.5.2 Shock and Vibration

SSD products are tested in accordance with environmental specification for shock and vibration

**Table 2-8: Shock and Vibration Specifications**

Stimulus	Description
Shock	500G, 2ms
Vibration	20 – 80 Hz/1.52mm

Stimulus	Description
	80 – 2000 Hz/20G (X,Y,Z axis / 30 min for each)

### 2.5.3 Electromagnetic Immunity

M.2 is an embedded product for host systems and is designed not to impair with system functionality or hinder system EMI/FCC compliance.

## 2.6 Reliability

**Table 2-9: Reliability Specifications**

Parameter	Description					
ECC	120-bit per 2KByte					
Read Endurance	Unlimited					
Write Endurance	<b>32GB</b>	<b>64GB</b>	<b>128GB</b>	<b>256GB</b>	<b>512GB</b>	<b>1024GB</b>
	79 TBW	158 TBW	317 TBW	635 TBW	1272 TBW	2548 TBW
Data retention	> 90 days at NAND expiration					

## 2.7 Data Security

### 2.7.1 Encryption

The SSD drive is a self-encrypting drive (SED), with a bulk data encryption feature that provides automatic hardware-based data security and enhanced secure erase capability.

A self-encrypting drives, scrambles data using a data encryption key as it is written to the drive and then descrambles it with the key as it is retrieved. This gives the user the highest level of data protection available and provides a fast erase simply by deleting the encryption key, eliminating the need for time consuming data-overwrite. Data on the drive is instantly rendered unreadable.

The SSD supports AES-256 encryption and ATA Secure Erase features to protect sensitive data.

The SSD drives support the following security features:

- AES 256 on the fly support.
- RSA 512/1024/2048
- SHA 160/256/512
- TCG OPAL SSC V1.0

### 2.7.2 Quick Erase

Quick Erase has been designed to remove data under prompt and urgent situation and is triggered by sending an ATA Command.

### Input Info of Executing Quick Erase Command

Register	7	6	5	4	3	2	1	0
Features	01h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

### Normal Output Info of Executing Quick Erase Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.

## 2.7.3 Military Secure Erase / Sanitization/ Purge Routines

Many government and military organizations such as NIST/NSA define their own standard and procedures for performing a Military Secure Erase which overwrite different patterns to sanitize the flash media. Some of the more common military or government purge routines are defined in the following table and the data

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 17 of 44



security features of the drive comply with Department of Defense (DoD) and US military data security standards.

**Table 2-10: Military Secure Erase / Sanitize Routines**

Standard	Action	SSD Code <sup>1</sup>
NSA/CSS 9-12	Erase and overwrite all locations with a known unclassified pattern. Verify the overwrite procedure by randomly rereading the overwritten information to confirm that only the known pattern can be recovered.	Note 1
NSA/CSS 130-2	Erase the media and overwrite with random data 2 times, then erase and overwrite with a character	Note 1
DoD5220.22-M	Erase the media and overwrite with single character, then erase again	Note 1
NISPOMSUP Chap 8, Sect.8-501	Erase the media and overwrite with single character, then erase again and overwrite with single character, then erase again and overwrite with random character then erase again	Note 1
USA Army 380-19	Erase the media and overwrite with random data, erase and overwrite with a character, then erase and overwrite with complement of the character	Note 1
Navy NAVSO P-5239-26	Erase the media and overwrite with random data, then erase again	Note 1
Air Force AFSSI 5020	Erase the media and overwrite with pattern, repeat 3 times	Note 1
Air Force AFSSI 8580	TBD	Note 1

**Notes:**

1. Enabled using ATA commands

### 2.7.3.1 AFSSI 5020

Pattern:

- 1) To erase the whole disk.
- 2) To fill the whole disk with random data.

#### Input Info of Executing AFSSI 5020 Command

Register	7	6	5	4	3	2	1	0
Features	02h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

#### Normal Output Info of Executing AFSSI 5020 Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.

### 2.7.3.2 DOD 5220.22-M

Pattern:

- 1) To fill the whole disk with fixed character pattern of 0x55.
- 2) To erase the whole disk.

#### Input Info of Executing DoD 5220.22-M Command

Register	7	6	5	4	3	2	1	0
Features	03h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

#### Normal Output Info of Executing DoD 5220.22-M Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.

### 2.7.3.3 USA NAVY NAVSO P-5239-26

Pattern:

- 1) To erase the whole disk.
- 2) To fill the whole disk with random data.
- 3) To erase the whole disk again.

#### Input Info of Executing USA Navy NAVSO P-5239-26 Command

Register	7	6	5	4	3	2	1	0
Features	04h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

#### Normal Output Info of Executing USA Navy NAVSO P-5239-26 Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.

### 2.7.3.4 NSAMANUAL 130-2

Pattern:

- 1) To erase the whole disk.
- 2) To fill the whole disk with random data.
- 3) To fill the whole disk with random data one more time.
- 4) To erase the whole disk again.
- 5) To fill the whole disk with fixed character pattern of 0x55.

#### Input Info of Executing NSA Manual 130-2 Command

Register	7	6	5	4	3	2	1	0
Features	05h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

#### Normal Output Info of Executing NSA Manual 130-2 Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.



ERR shall be cleared to zero.

Manual	9/20/16
PSFEM1xxxGTxxx	Viking Technology
Revision F	Page 23 of 44

### 2.7.3.5 USA-ARMY 380-19

Pattern:

- 1) To erase the whole disk.
- 2) To fill the whole disk with random data.
- 3) To fill the whole disk with fixed character pattern of 0x55.
- 4) To fill the whole disk with fixed character pattern of 0xAA.

#### Input Info of Executing USA-Army 380-19 Command

Register	7	6	5	4	3	2	1	0
Features	06h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

#### Normal Output Info of Executing USA-Army 380-19 Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.

### 2.7.3.6 NISPOMSUP CHAP 8, SECT. 8-501

Pattern:

- 1) To fill the whole disk with fixed character pattern of 0x55.
- 2) To fill the whole disk with fixed character pattern of 0xAA.
- 3) To fill the whole disk with random data.

#### Input Info of Executing NISPOMSUP chap 8, Sect. 8-501 Command

Register	7	6	5	4	3	2	1	0
Features	07h							
Sector Count	2Fh							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	A0h							
Command	6Fh							

#### Normal Output Info of Executing NISPOMSUP chap 8, Sect. 8-501 Command

Register	7	6	5	4	3	2	1	0
Features	na							
Sector Count	na							
Sector Number	na							
Cylinder High	na							
Cylinder Low	na							
Device/Head	obs	na	obs	DEV	na	na	na	na
Command	BSY	DRDY	DF	na	DRQ	na	na	ERR

Device/Head Register:

DEV shall indicate the selected device.

Status Register:

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.