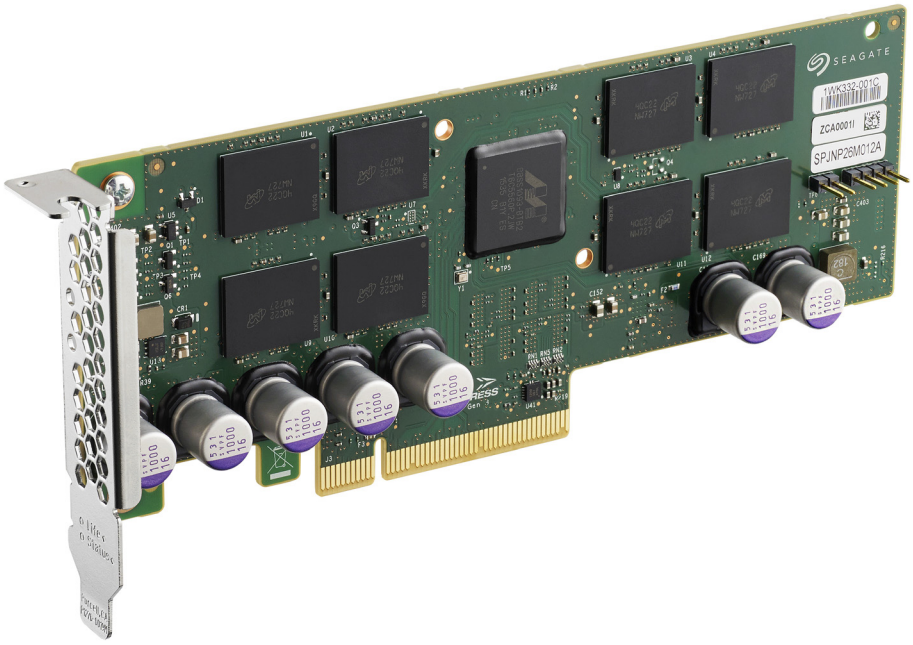
Seagate® Nytro® XP7102 NVMe Flash Accelerator Card

User Guide

XP7102 -1A2048
XP7102-1A1024



100786980, Rev. A
July 2016

Revision History

Version and Date	Description of Changes
Rev A, July 2016	First release.

Contents

Seagate Technology Support Services

For Nytro Support, visit: http://www.seagate.com/support/by-product/ssd-and-pcie-flash/

For information regarding online support and services, visit: http://www.seagate.com/contacts/

Available services include:

- Presales & Technical support
- Global Support Services telephone numbers & business hours
- Authorized Service Centers

For information regarding Warranty Support, visit: http://www.seagate.com/support/warranty-and-replacements/

For information regarding data recovery services, visit:
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1. Introduction

This chapter describes the Seagate® Nytro® XP7102 Flash Accelerator card and its features.

1.1 Overview

This document describes how to use the Seagate Nytro XP7102 Flash Accelerator card. To configure, monitor, and maintain the card using the software tools provided, refer to the *Seagate® Nytro® XP7102 Nytro™ CLI User Guide*.

The Nytro XP7102 is a half-height, half-length PCIe card that brings high performance with a low power requirement. The low power requirement makes cooling easier and allows you to add cards in a wider range of servers.

Table 1 Nytro XP7102 Card Characteristics Summary

Device Name	Model Name	Usable Capacity	Connector	Card Style
Nytro XP7102	XP7102-1A1024	800GB	X8PCIe 3.0	half-height, half-length
Nytro XP7102	XP7102-1A2048	1600 GB	X8PCIe 3.0	half-height, half-length

1.2 Features

- Inrush Current Protection
- Power loss data protection
- Low power
  - Max power 13.63 W
  - Typical power 7.5 W
  - Idle power 4 W
- Ease of use
  - Half-height, Half-length profile
  - Support for Windows,® Linux® operating systems
  - LED indicator
  - NVMexpress® *(NVMe)* 1.1b support
  - CLI-based management utilities

1.3 National, International, and Industry Standards

- IEEE Std 1149.1-1990, *IEEE® Standard Test Access Port and Boundary-Scan Architecture*
- *PCI Express Local Bus Specification, Revision 3.0*

2. Installation

This chapter presents hardware and software installation guidance.

2.1 Hardware Installation Instructions

1. **Unpack the Nytro XP7102 card and inspect it for damage.** Unpack the card in a static-free environment and follow good antistatic grounding procedures. Remove the Nytro XP7102 card from the antistatic bag, and carefully inspect it for damage. If you notice any damage, contact Seagate, or your reseller support representative.

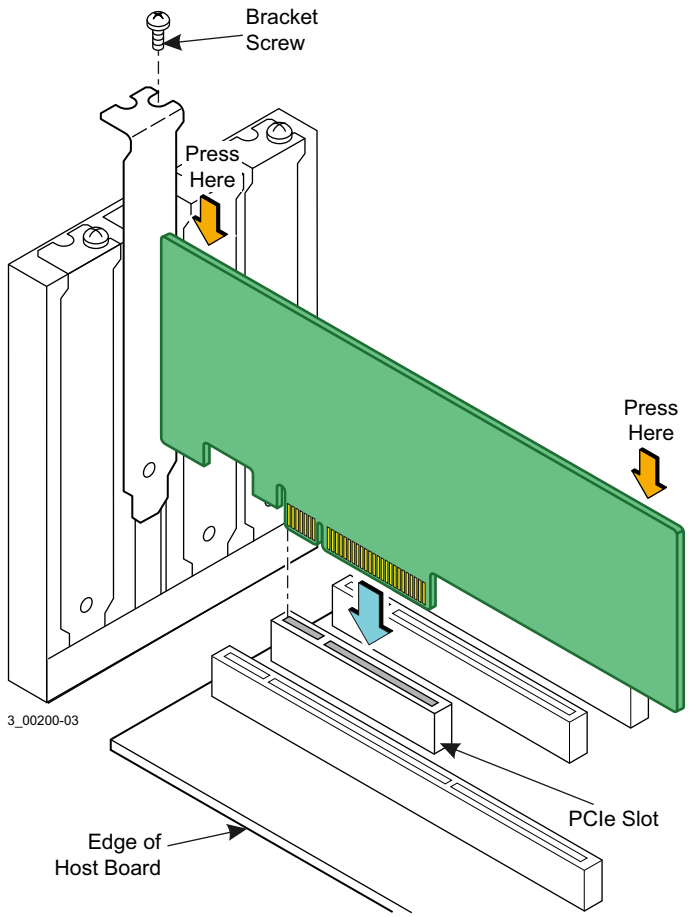
   NOTE Back up your data before changing your system configuration.

2. **Prepare the server.** Turn off the server, and disconnect the power cords from the power supply. Remove the cover from the chassis.

   CAUTION To avoid electrical shock, disconnect the server from the main power and from any networks before you install the card.

3. **Insert the Nytro XP7102 card in a 25 W PCIe slot.** Locate an empty 25 W PCIe slot. Without sufficient power the Nytro XP7102 card may be damaged or run at less than optimal performance. Remove the blank bracket panel on the server chassis that aligns with the empty PCIe slot. Save the bracket screw, if applicable. Align the card to the PCIe slot. Press down gently, but firmly, to properly seat the card in the slot. The following figure shows how to insert the card in a PCIe slot.

Figure 1 Nytro XP7102Card Installation



NOTE Your card shape, size, and component locations might vary from this drawing.

CAUTION For highest performance, PCIe slot must be PCIe 3.0 and must have an active width of dedicated four lanes.

CAUTION The location must meet the 300 LFM (linear feet/minute) minimum airflow requirement.

4. **Secure the bracket to the system's chassis.** Install the bracket screw, if applicable, or engage the system retention mechanism to secure the card to the system's chassis.
5. **Replace the cover, reconnect the power cords, and power up the system.** Replace the server's cover, reconnect the power cords, and reconnect any network cables. Turn on the power.

Use the next procedure to install the appropriate operating system drivers.

2.2 UEFi

The Nytro XP7102 card is UEFi -compatible with version 2.3.1.

2.3 Troubleshooting the Nytro XP7102 Card

For any problems with your Nytro XP7102 card that you cannot resolve, contact Seagate Technology Support Services or, contact your FAE. Keep these tips in mind when reporting a problem:

- Clearly identify and report the revision level of the Nytro XP7102 card. To view this information in the command line interface tool, use the `nytrocli list` command with the respective controller number.
- Report the part number listed on the label, and clearly identify the board revision.
- Describe the steps leading up to the error.

Report the operating system version and the host driver version.

2.4 Software Driver Installation

The Nytro XP7102 supports the following operating systems:

- Windows Server® 2012 R2, Windows Server 10
- CentOS® 6.6, 7.0
- Red Hat® 7.0
- Ubuntu® Server 14.04.04

3. Characteristics

This chapter presents characteristics for each Nytro XP7102 card.

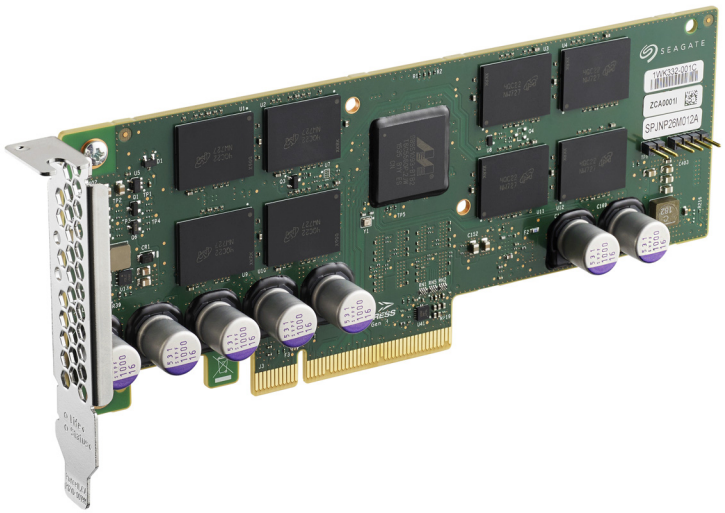
3.1 Nytro XP7102 Card Characteristics

The Nytro XP7102 card uses a low-profile, half-height, and half-length PCIe board.

The Nytro XP7102 card can be used for persistent or nonpersistent data, and offers high performance with low latency and a low CPU burden.

The following figure shows the Nytro XP7102-1A2048 (1600GB) card.

Figure 2 Nytro XP7102-1A2048 (1600GB) Card



NOTE For the Nytro XP7102-1A1024 (800 GB) card, only half the NAND are populated.

3.2 Weight

The Nytro XP7102 card weighs 0.2 lb, 0.8 Kg +/- 5%.

3.3 LEDs

One LED shines through the hole in the PCI bracket.

The LED provides key status information to diagnose a problem with the Nytro XP7102 card. The following figure shows the LED location.

Figure 3 Nytro XP7102 Card Bracket Showing the LED Location

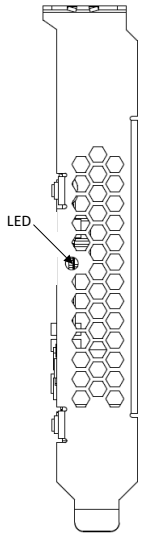


Table 2 LED Status Indicators

Color	LED Description
Green	**On, steady** – Card is in optimal state. During IO activity, the LED stays lighted green.
Red	**On, steady** – One of the following conditions applies: ■ Overall card life is less than 10%. ■ Card has 0% P/E cycles remaining. ■ The drive has failed ■ The drive is reporting a critical temperature. ■ Card is reporting critical temperature. ■ Backup power rail monitor failure detected. ■ Other component issues: Run the `list` and `health` commands in the command line interface to determine which component has an issue. **CAUTION** If the critical temperature warning persists, you might damage your card. Increase cooling speed or shut down your system to prevent damaging the card. The maximum sensor temperature for the Nytro XP7102 cards is 85 °C. The red LED lights up at 70°C to indicate a warning.

If you experience a fatal error in the firmware, such as catastrophic controller failure, your device might or might not be visible in your operating system. For any problems with your Nytro XP7102 card that you cannot resolve, contact Seagate Technology Support Services or, contact Customer Technical Support (CTS).

3.4 Power Consumption for the Nytro XP7102 Card

The Nytro XP7102 card receives power from the PCIe 12 V power rail. Use the following data for power consumption.

Table 3 Nytro XP7102Card Power Consumption

Card	Idle	Typical Power with I/O	Maximum Power with I/O
Nytro XP7102	4 W	7.5 W	13.63 W[a]

a. Maximum Power is the maximum value obtained after sampling and averaging every 100 ms.

NOTE Typical power with I/O is measured at 8 KB, 100% random access, 30% write, 70% read, Queue Depth (QD)=32/SSD. Maximum power I/O is measured at 256 KB, 100% sequential access, 100% write, QD=32/SSD.

3.5 Thermal Considerations

The board is designed to operate in an environment defined by the following parameters:

- Temperature range: 0 °C to 45 °C
- Relative humidity range: 20% to 80% noncondensing
- Maximum wet bulb temperature: 28 °C
- Minimum airflow: 300 LFM
- Operating altitude: 3000 m
- De-rate: 2°C per 1000 m above 1000 m

The board is designed for the following storage and transit environmental parameters:

- Temperature range: –25 °C to 85 °C
- Relative humidity range: 8% to 80% non-operating

3.5.1 Maximum Sensor Temperature

System design and cooling capacity variations can affect the actual airflow delivered to the Nytro XP7102 cards. System-level fan speeds might require adjustment to make sure that the Nytro XP7102 sensor temperature does not exceed the maximum values. The maximum sensor temperature for the Nytro XP7102 cards is 85 °C.

3.6 Electrical Characteristics

The Nytro XP7102 card consumes power from the PCIe 12.0 V rail.

Use the following data for power consumption measured with the 16 KB I/O size:

- 12.0 V DC at 1.06 Amps (12.72 W)

3.7 Block Size

The Nytro XP7102 card supports both 512 b and 4 K sector sizes. The default size is 4 K. LBA format change may require power cycle before the change takes effect.

CAUTION When you change the sector size, ***all*** data on the drive is destroyed. Make sure there is no I/O activity to the drive before changing sector size.

4. Safety, Standards, and Compliance

4.1 Safety Characteristics

All Seagate PCIe boards meet or exceed the requirements of UL flammability rating 94V-0. Each bare board is marked with the supplier's name or trademark, type, and UL flammability rating. Because these boards are installed in a PCIe bus slot, all voltages are below the SELV 42.4 V limit.

A CB and UL report has been generated for EN60950.

4.2 Electromagnetic Compliance and Standards

The Nytro XP7102 card is designed to minimize electromagnetic emissions, susceptibility to radio frequency energy, and the effects of electrostatic discharge. The card carries the CE mark, RCM, Canadian Compliance Statement, KCC, Taiwan BSMI, Japan VCCI, and FCC Class B, and the card is marked with the FCC Self-Certification logo. The card also meets the requirements of CISPR Class B.

4.3 Standards

The Nytro XP7102 card is recognized in accordance with UL 60950-1, CAN/CSA C22.2 No. 60950-1 and IEC/EN60950-1 as tested by UL.

4.4 Electromagnetic Compatibility

Electromagnetic Compatibility Notices

Electromagnetic Compatibility Notices
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables for SCSI connection external to the cabinet are used in the compliance testing of this Product. Seagate is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Seagate Technology LLC. The correction of interferences caused by such unauthorized modification, substitution, or attachment will be the responsibility of the user.
The Nytro Application Acceleration Card is tested to comply with FCC standards for home or office use.
This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

4.5 Electromagnetic Compliance

Seagate uses an independent laboratory to confirm compliance with the directives/standards for CE Marking and RCM Marking. The Nytro XP7102 card was tested in a representative system for typical applications and complies with the Electromagnetic Interference/Electromagnetic Susceptibility (EMI/EMS) for Class B products. The selected system represents the most popular characteristics for test platforms. The system configurations include:

- Typical current-use microprocessor
- Keyboard
- Monitor display
- Printer
- Mouse

Although the test system with this Seagate model complies with the directives and standards, we cannot guarantee that all systems comply. The computer or server manufacturer or the system integrator must confirm EMC compliance and provide the appropriate marking for their product.

4.6 Electromagnetic Compliance for the European Union

If this model has the CE Marking it complies with the European Union requirements of the Electromagnetic Compatibility Directive 2004/108/EC as put into place on 20 July 2007.

4.7 Australian RCM

If this model has the RCM Marking it complies with the Australia/New Zealand Standard AS/NZ CISPR22 and meets the Electromagnetic Compatibility (EMC) Framework requirements of Australia's Spectrum Management Agency (SMA).

4.8 Korean KCC

If this model has the Korean Communications Commission (KCC) logo, it complies with KN22, KN 24, and KN61000.

4.9 Taiwanese BSMI

If this model has the Taiwanese certification mark then it complies with Chinese National Standard, CNS13438.

4.10 Japan VCCI

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction guide.

4.11 China Requirements — China RoHS 2

China RoHS 2 refers to the Ministry of Industry and Information Technology Order No. 32, effective July 1, 2016, titled Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products. To comply with China RoHS 2, we determined this product's Environmental Protection Use Period (EPUP) to be 10 years in accordance with the *Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products,* SJT 11364-2014.

中国电器电子产品有害物质限制使用管理办法

(Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products _ China RoHS)

产品中有害物质的名称及含量

(Name and Content of the Hazardous Substances in Product)

Table 4 Hazardous Substances

部件名称 Part Name	有害物质 Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (CF (VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
印刷电路板组装 PCBA	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。

This table is prepared in accordance with the provisions of SJ/T 11364-2014

O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

O: Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T26572.

X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

X: Indicates that the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T26572.

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