# Alveo U50 Data Center Accelerator Card Data Sheet

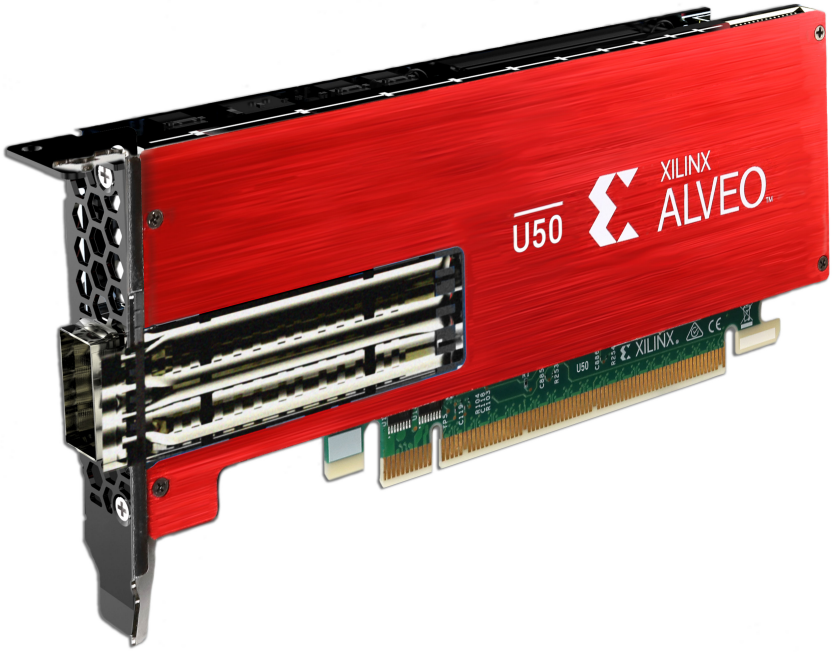
DS965 (v1.5) February 18, 2020 **Advance Product Specification**

## Summary

The Xilinx® Alveo™ U50 Data Center accelerator card, shown in the following figure, is a single slot, low profile form factor passively-cooled card operating up to a 75W maximum power limit. It supports PCI Express® (PCIe®) Gen3 x16 or dual Gen4 x8, is equipped with 8 GB of high-bandwidth memory (HBM2), and Ethernet networking capability. The Alveo U50 is designed to accelerate memory-bound, compute intensive applications in financial computing, machine learning, computational storage, and data search and analytics.

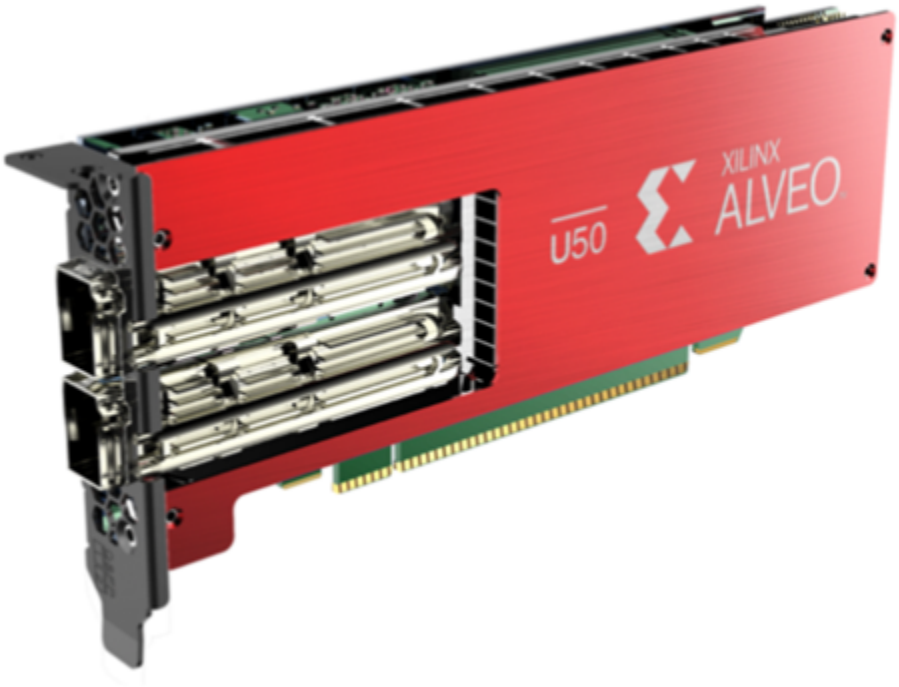
The U50 production card, qualified for deployment, has a single QSFP28 connector capable of 4x25G.

*Figure 1:* **Alveo U50 Production Data Center Accelerator Card**



The U50DD ES3 card has two SFP-DD (small form factor pluggable-double density) connectors each capable of 2x25G performance.

*Figure 2:* **Alveo U50DD ES3 Data Center Accelerator Card**




The card can be used with the Xilinx® Vitis™ unified software platform and target platform that simplifies the design process and allows for high-level languages such as C, C++ and OpenCL™ to be used. A platform enables the card to be configured from onboard flash memory and upgraded through PCI Express. For experienced programmable logic developers, the card can be used with the Vivado® Design Suite where the full resources of the programmable logic device are made available for development. See the *Alveo U50 Data Center Accelerator Card User Guide* (UG1371) for more information.

# Alveo Product Details

*Table 1:* **Alveo U50 Accelerator Card Product Details**

| Specification | U50DD ES3[1, 2] | U50 Production |
|---|---|---|
| Product SKU | A-U50DD-P00G-ES3-G | A-U50-P00G-PQ-G |
| Total electrical card load[3] | 75W | 75W |
| Thermal cooling solution | Passive | Passive |
| Weight | 278g – 287g | 300g – 325g |
| Form factor | Half height, half length | Half height, half length |
| Network interface | 2x SFP-DD | 1x QSFP28 |
| PCIe interface[4, 5] | Gen3 x16, Gen4 x8, CCIX | Gen3 x16, Gen4 x8, CCIX |
| HBM2 total capacity | 8 GB | 8 GB |
| HBM2 bandwidth | 201 GB/s[6] | 201 GB/s[6] |
| Look-up tables (LUTs) | 872K | 872K |

*Table 1:* **Alveo U50 Accelerator Card Product Details** *(cont'd)*

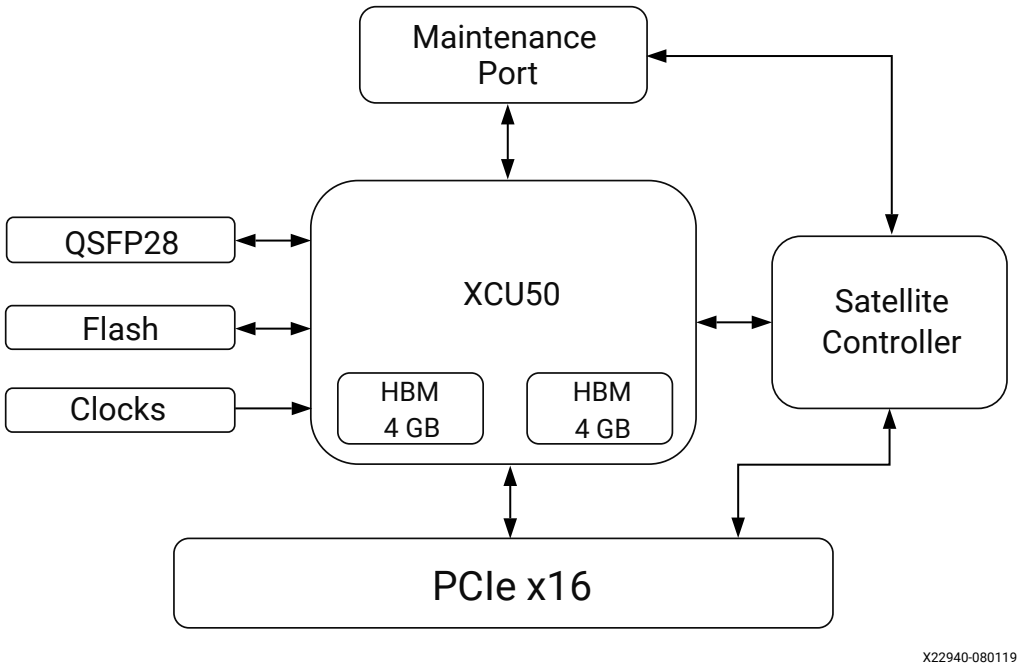
| Specification | U50DD ES3[1, 2] | U50 Production |
|---|---|---|
| Registers | 1,743K | 1,743K |
| DSP slices | 5,952 | 5,952 |
| Max. Dist. RAM | 24.6 Mb | 24.6 Mb |
| 36 Kb block RAM | 1344 (47.3 Mb) | 1344 (47.3 Mb) |
| 288 Kb UltraRAM | 640 (180.0 Mb) | 640 (180.0 Mb) |
| GTY transceivers | 20 | 20 |
| Qualified for deployment | No | Yes |

**Notes:**

1. Alveo™ U50DD cards with the SFP-DD interface (A-U50DD-P00G-ES3-G) are not qualified for production. Alveo U50 cards with QSFP28 (A-U50-P00G-PQ-G) are qualified for production.
2. An Alveo programming cable (HW-DMB-1-G) is included with the purchase of the A-U50DD-P00G-ES3-G. Customers purchasing the A-U50-P00G-PQ-G need to purchase the Alveo programming cable separately. For more information about this cable, refer to *Alveo Programming Cable User Guide* (UG1377).
3. The Alveo U50 card has separate power rails for FPGA fabric and HBM memory. Developers must ensure their designs do not draw too much power for each rail. More information can be found in *Alveo U50 Data Center Accelerator Card Installation Guide* (UG1370).
4. The PCIe interface can be configured to support a variety of link widths and speeds. The maximum is Gen3 (8 GT/s) x16, Gen4 (16 GT/s) x8 or CCIX operating at 16 GT/s x8. The PCIe interface can also be configured into dual x8 interfaces and connected to hosts that support PCIe bifurcation.
5. This block operates in compatibility mode for 16.0 GT/s (Gen4) operation. Refer to *UltraScale+ Devices Integrated Block for PCI Express LogiCORE IP Product Guide* (PG213) for details on compatibility mode.
6. The HBM2 power is limited to 10W from the PCIe 3.3V rail. The performance that can be achieved using HBM2 is limited by this power limit and varies between designs. The nominal bandwidth for HBM2 is 201 GB/s. Peak HBM2 bandwidth measured for the A-U50DD-P00G-ES3-G and A-U50-P00G-PQ-G cards is 316 GB/s in the non-PCIe compliant specification.

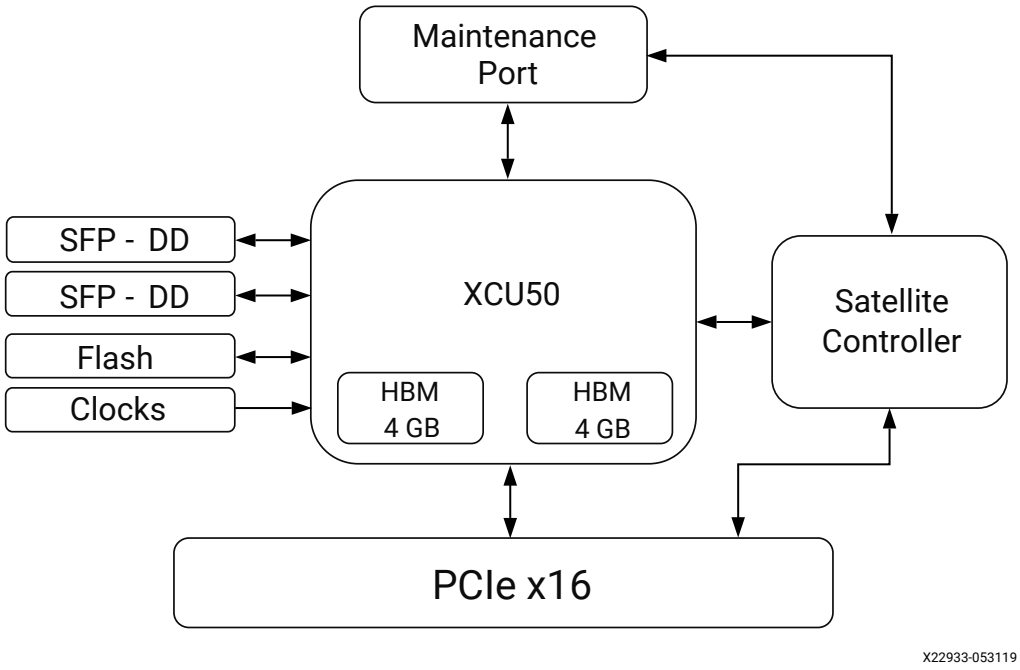
The following figure shows the components within an Alveo U50 production accelerator card.

*Figure 3:* **U50 Production Block Diagram**




The following figure shows the components within an Alveo U50DD ES3 accelerator card.

*Figure 4:* **U50DD ES3 Block Diagram**



# Card Specifications

## Dimensions

The U50DD ES3 and U50 production cards are compliant with the PCIe CEM rev.3.0 Specification as single slot, half height, half length cards.

*Table 2:* **Card Dimensions**

| Parameter | Dimension |
|---|---|
| Height | 2.46 inch (62.40 mm) |
| PCB thickness (± 0.13 mm (0.005 inch)) | 0.62 inch (1.57 mm) |
| Primary side width | 0.570 inch (14.47 mm) |
| Secondary side width | 0.105 inch (2.67 mm) |
| Length | 6.60 inch (167.65 mm) |

## PCIe Connector/Data Rates

The Alveo U50 accelerator card uses an UltraScale+™ FPGA containing a PCIE4C block. The PCIE4C block is compliant to the PCI Express Base Specification v3.1 supporting up to 8.0 GT/s (Gen3 x16) and compatible with PCI Express Base Specification v4.0 supporting up to 16.0 GT/s (Gen4 x8). The PCIE4C block is also compliant with CCIX Base Specification Revision 1.0 v0.9, supporting speeds up to 16.0 GT/s.

*Table 3:* **PCI Express Data Transfer Rate Performance**

| PCI Express Generation | Performance |
|---|---|
| Gen 1 | 2.5 GigaTransfers per second (GT/s) |
| Gen 2 | 5.0 GT/s |
| Gen 3 | 8.0 GT/s |
| Gen 4 [1] | 16.0 GT/s |

**Notes:**

1. The Gen4 (16.0 GT/s) line rate is currently not supported in the Vitis environment for the target platform. Xilinx IP that supports PCIe operating at the Gen4 rate is available in the Vivado tools. For a list of limitations when operating at the Gen4 rate, see *UltraScale+ Devices Integrated Block for PCI Express LogiCORE IP Product Guide* (PG213).

## Network Interfaces

The Alveo U50 card comes with either a single 4-lane QSFP28 (U50 production) that can accept modules up to 5W or two SFP-DD pluggable connectors (U50 ES3). The QSFP28 can connect interfaces up to 100G using optical modules or cables. The SFP-DD connector can support 2x25G or 2x10G speeds using optical modules or cables. A 161.1328125 MHz clock is provided to the SFP-DD or QSFP28 interface such that different Ethernet IP cores can be enabled. Multiple I/O brackets are shipped with the U50 card, and the correct bracket can be attached to the card to match the panel interface size of the server slot. For the latest information about platform support for these connectors, see *Vitis Unified Software Platform Documentation: Application Acceleration Development* (UG1393).

## Satellite Controller

A TI MSP432 satellite controller resides on the U50 to control and monitor voltages, currents and temperatures. The host server board management controller (BMC) can interact with the satellite controller to monitor and control U50 cards through out-of-band communication. Xilinx supports the PLDM protocol over MCTP over SMBUS, complying with DMTF standards. Refer to the *Alveo Out-of-Band Management Specification for Server BMC User Guide* (UG1363) for more information. When used with the Xilinx provided platform, you can easily monitor for any abnormal operating conditions and react accordingly. If you are not using the platform, Xilinx provides a Card Management Solution IP allowing you to quickly develop and interact with the satellite controller from the FPGA. See the *Card Management Solution Subsystem Product Guide* (PG348) for more information.

## Maintenance Port

The maintenance port is a 30-pin connector that allows access to a number of different features and signals including JTAG, UARTs, PMBus, resets and more. Xilinx has developed a Debug and Maintenance Board (DMB) that attaches to the Maintenance Port allowing easy access to the ports and these features. (See the *Alveo Programming Cable User Guide* (UG1377) for more information.)

## Qualified Servers

A list of servers on which Alveo cards are fully qualified can be found here: https://www.xilinx.com/products/boards-and-kits/alveo/qualified-servers.html.

## Operating System Compatibility

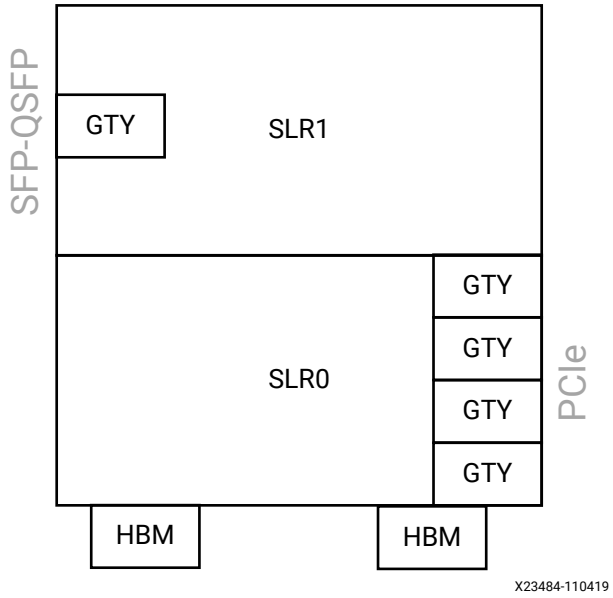
For the most up-to-date operating system support, refer to the *Vitis Unified Software Platform Documentation: Application Acceleration Development* (UG1393).

# FPGA Resource Information

The Xilinx Alveo U50 accelerator card is a custom-built UltraScale+ FPGA that runs optimally (and exclusively) on Alveo architecture. The Alveo U50 card features the XCU50 FPGA, which uses Xilinx stacked silicon interconnect (SSI) technology to deliver breakthrough FPGA capacity, bandwidth, and power efficiency. This technology allows for increased density by combining multiple super logic regions (SLRs). The XCU50 comprises two SLRs with the bottom SLR (SLR0) integrating an HBM controller to interface with the adjacent 8 GB HBM2 memory.

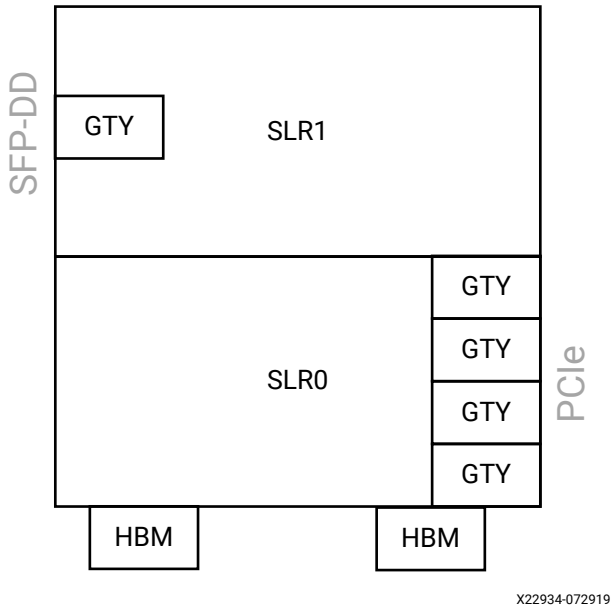
The following figure shows the two SLR regions along with the connections for PCIe and SFP-QSFP. The HBM is co-located on the XCU50 device and connects directly to SLR0.

*Figure 5:* **Floorplan of the XCU50 Device with SFP-QSFP Connection**




The following figure shows the two SLR regions along with the connections for PCIe and SFP-DD.

*Figure 6:* **Floorplan of the XCU50 Device with SFP-DD Connection**




For customers using the Vitis application acceleration development flow, a platform is created that manages the PCIe interface, data transfers, and card status information. It also remotely loads kernels and performs a number of other functions. This platform is part of the static region (an area of the FPGA that is not reconfigurable). This platform consumes resources from the available resources listed in Table 1. The specific amount of resources depends on which platform, and even which version of a platform is used. This information is available in the *Alveo U50 Data Center Accelerator Card User Guide* (UG1371).

For developing applications, refer to the *Vitis Unified Software Platform Documentation: Application Acceleration Development* (UG1393).

# Thermal Specification

## Ambient Conditions

The ambient conditions are detailed in the following sections.

## Operating and Storage Temperature Conditions

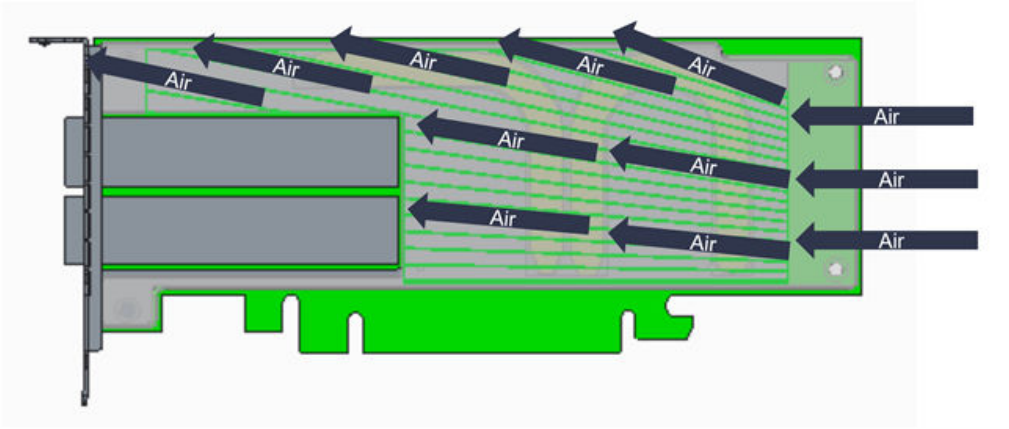
*Table 4:* **Operating and Storage Temperatures and Humidity Conditions**

| Specification | Condition |
|---|---|
| Operating temperature | 0°C to 50°C |
| Storage temperature | –40°C to 75°C |
| Operating humidity, non-condensing | 8% to 85% |
| Storage humidity, non-condensing | 5% to 90% |

## Airflow Direction Support

Forced airflow is required when the card is powered at all times. The Alveo U50 cards support front-to-back airflow. The following figure illustrates this supported airflow.

*Figure 7:* **Airflow Direction for Passively Cooled Cards**

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## Operating Conditions

### Inlet Temperature versus Airflow Requirement in Server

The following tables state the required airflow rate and airflow speed to the U50 card under different operating conditions.

*Table 5:* **Specification for the U50 Card at Sea Level for 85°C Optical**

| Inlet Temperature versus Airflow Requirement of PCIe Card Slot (19.51 mm x 56.15 mm) at Sea Level for 85°C Optical | | | |
|---|---|---|---|
| **Inlet Temperature to the Card (°C)** | **Linear Feet per Minute (LFM)** | **Cubic Feet per Minute (CFM)** | **Pressure (inwg)** |
| 5 | 160 | 1.9 | 0.07 |
| 10 | 170 | 2.0 | 0.07 |
| 15 | 180 | 2.1 | 0.08 |
| 20 | 200 | 2.4 | 0.09 |
| 25 | 260 | 3.1 | 0.13 |
| 30 | 300 | 3.5 | 0.15 |
| 35 | 390 | 4.6 | 0.22 |
| 40 | 520 | 6.1 | 0.35 |
| 45 | 680 | 8.0 | 0.53 |
| 50 | 870 | 10.3 | 0.79 |
| 55 (not supported) | 1000 | 11.8 | 1.00 |

*Table 6:* **Specification for the U50 Card at Sea Level for 70°C Optical**

| Inlet Temperature versus Airflow Requirement of PCIe Card Slot (19.51 mm x 56.15 mm) at Sea Level for 70°C Optical | | | |
|---|---|---|---|
| **Inlet Temperature to the Card (°C)** | **Linear Feet per Minute (LFM)** | **Cubic Feet per Minute (CFM)** | **Pressure (inwg)** |
| 5 | 160 | 1.9 | 0.07 |
| 10 | 170 | 2.0 | 0.07 |
| 15 | 180 | 2.1 | 0.08 |
| 20 | 200 | 2.4 | 0.09 |
| 25 | 260 | 3.1 | 0.13 |
| 30 | 300 | 3.5 | 0.15 |
| 35 | 390 | 4.6 | 0.22 |
| 40 | 520 | 6.1 | 0.35 |
| 45 | 680 | 8.0 | 0.53 |
| 50 | 870 | 10.3 | 0.79 |
| 55 (not supported) | 1000 | 11.8 | 1.00 |

*Table 7:* **Specification for the U50 Card at 1200m above Sea Level for 85°C Optical**

| Inlet Temperature versus Airflow Requirement of PCIe Card Slot (19.51 mm x 56.15 mm) at 1200m above Sea Level for 85°C Optical | | | |
|---|---|---|---|
| **Inlet Temperature to the Card (°C)** | **Linear Feet per Minute (LFM)** | **Cubic Feet per Minute (CFM)** | **Pressure (inwg)** |
| 5 | 170 | 2.0 | 0.07 |
| 10 | 180 | 2.1 | 0.08 |
| 15 | 200 | 2.4 | 0.09 |
| 20 | 210 | 2.5 | 0.09 |

*Table 7:* **Specification for the U50 Card at 1200m above Sea Level for 85°C Optical** *(cont'd)*

| Inlet Temperature versus Airflow Requirement of PCIe Card Slot (19.51 mm x 56.15 mm) at 1200m above Sea Level for 85°C Optical | | | |
|---|---|---|---|
| **Inlet Temperature to the Card (°C)** | **Linear Feet per Minute (LFM)** | **Cubic Feet per Minute (CFM)** | **Pressure (inwg)** |
| 25 | 280 | 3.3 | 0.14 |
| 30 | 320 | 3.8 | 0.17 |
| 35 | 420 | 5.0 | 0.25 |
| 40 | 560 | 6.6 | 0.39 |
| 45 | 730 | 8.6 | 0.59 |
| 50 | 930 | 11.0 | 0.88 |
| 55 (not supported) | 1080 | 12.7 | 1.14 |

*Table 8:* **Specification for the U50 Card at 1200m above Sea Level for 70°C Optical**

| Inlet Temperature versus Airflow Requirement of PCIe Card Slot (19.51 mm x 56.15 mm) at 1200m above Sea Level for 70°C Optical | | | |
|---|---|---|---|
| **Inlet Temperature to the Card (°C)** | **Linear Feet per Minute (LFM)** | **Cubic Feet per Minute (CFM)** | **Pressure (inwg)** |
| 5 | 170 | 2.0 | 0.07 |
| 10 | 180 | 2.1 | 0.08 |
| 15 | 200 | 2.4 | 0.09 |
| 20 | 210 | 2.5 | 0.09 |
| 25 | 280 | 3.3 | 0.14 |
| 30 | 320 | 3.8 | 0.17 |
| 35 | 420 | 5.0 | 0.25 |
| 40 | 560 | 6.6 | 0.39 |
| 45 | 730 | 8.6 | 0.59 |
| 50 | 930 | 11.0 | 0.88 |
| 55 (not supported) | 1080 | 12.7 | 1.14 |

## Temperature Gradient

The Alveo accelerator card and its thermal management device should be able to operate at a temperature/time gradient of 15°C/hour in its ambient surroundings. The thermal management device is the heat sink, shroud, backplate, top plate, and fan (for active solutions).

## Humidity

The Alveo accelerator card and its thermal management device should be able to operate in a RH (relative humidity) range of 8% to 85% and a dew point of –12°C DP without condensation.

## Storage and Non-Operating Conditions

The Alveo accelerator card and its thermal management device should be stored or maintained in non-operating conditions in a RH range of 5% to 90% without condensation and an ambient temperature range of –40°C to 75°C.

# Regulatory Compliance Statements

***Note*:** The following sections contain information in languages other than English. This is required for regulatory compliance.

## FCC Class A Products

***Note*:** These devices are for use with UL Listed Servers or I.T.E.

### Safety Compliance

The following safety standards apply to all products listed above.

- UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements)
- CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements)
- EN 60950-1:2006+A11:2009+A1:2012+A12:2011+A2:2013 (European Union)
- IEC 60950-1:2005 (2nd Edition); Am 1:2009 (International)
- EU LVD Directive 2014/35/EU
- IEC 62368-1:2014 (2nd Edition)

## EMC Compliance

The following standards apply.

### Class A Products

- FCC Part 15 – Radiated & Conducted Emissions (USA)
- CAN ICES-3(A)/NMB-3(A) – Radiated & Conducted Emissions (Canada)
- CISPR 32 – Radiated & Conducted Emissions (International)
- EN55032: 2015 – Radiated & Conducted Emissions (European Union)
- EN55024: 2010 +A1:2001+A2:2003 – Immunity (European Union)
- EMC Directive 2014/30/EU
- VCCI (Class A)– Radiated & Conducted Emissions (Japan)
- CNS13438 – Radiated & Conducted Emissions (Taiwan)
- CNS 15663 - RoHS (Taiwan)

- AS/NZS CISPR 32 – Radiated and Conducted Emissions (Australia/New Zealand)
- Article 58-2 of Radio Waves Act, Clause 3 (Korea)

### Regulatory Compliance Markings

When required, these products are provided with the following Product Certification Markings:

- UL Listed Accessories Mark for the USA and Canada
- CE mark
- FCC markings
- VCCI marking
- Australian C-Tick mark
- Korea MSIP mark
- Taiwan BSMI mark
- German GS mark

## FCC Class A User Information

The Class A products listed above comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

**IMPORTANT!** *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.*

**IMPORTANT!** *Cet équipement a été testé et jugé conforme à la Class A digital device, conformément à la règle 15 du standard FCC. Ces limites sont conçues pour fournir des protections contre des interférences nuisibles lorsque l'équipement est utilisé dans un environnement commercial. Cet équipement génère, utilise et peut émettre des énergies de radio-fréquence et, s'il n'est pas installé et utilisé conformément aux instructions, peut nuire aux communications radio. L'exploitation de cet équipement dans une zone résidentielle est susceptible de causer des interférences nuisibles, auquel cas auquel cas l'utilisateur peut être tenu de prendre des mesures adéquates à ses propres frais.*

**WICHTIG!** *Dieses Gerät wurde getestet und entspricht den Grenzwerten für digitale Geräte der Klasse A gemäß Teil 15 der FCC-Bestimmungen. Diese Grenzwerte bieten einen angemessenen Schutz gegen schädliche Interferenzen, wenn das Gerät in einer gewerblichen Umgebung betrieben wird. Dieses Gerät erzeugt und verwendet Hochfrequenzenergie und kann diese abstrahlen. Wenn es nicht gemäß den Anweisungen installiert und verwendet wird, kann dies Funkstörungen verursachen. Der Betrieb dieses Geräts in einem Wohngebiet kann schädliche Interferenzen verursachen. In diesem Fall muss der Benutzer die Interferenz auf eigene Kosten beheben.*

**CAUTION!** *If the device is changed or modified without permission from Xilinx, the user may void his or her authority to operate the equipment.*

**ATTENTION!** *Si l'appareil est modifié sans l'autorisation de Xilinx, l'utilisateur peut annuler son abilité à utiliser l'équipement.*

**VORSICHT!** *Wenn das Gerät ohne Erlaubnis von Xilinx geändert wird, kann der Benutzer seine Berechtigung zum Betrieb des Geräts verlieren.*

## Canadian Compliance (Industry Canada)

CAN ICES-3(A)/NMB-3(A)

## China RoHS Compliance

SJ/T 11363-2006, 11364-2006, and GB/T 26572-2011

## VCCI Class A Statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。
この場合には使用者が適切な対策を構ずるよう要求されることがあります。 VCCI-A

## KCC Notice Class A (Republic of Korea Only)

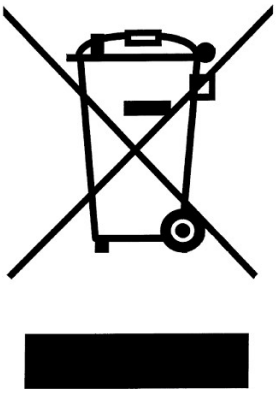
| | |
|---|---|
| A급 기기<br>(업무용 방송통신기기)<br><br>**CLASS A device**<br>(commercial broadcasting and communication equipment | 이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.<br><br>This device has been appoved by EMC registration. Distributors or users pay attention to this point. This device is usually aimed to be used in other area except at home |

## BSMI Class A Notice (Taiwan)

警告使用者:

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適對當的對策。

## EU WEEE Logo



## Manufacturer Declaration European Community

CE

### Manufacturer Declaration

Xilinx declares that the equipment described in this document is in conformance with the requirements of the European Council Directive listed below:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- RoHS Directive 2011/65/EU, 2015/863

These products follow the provisions of the European Directive 2014/53/EU.

Dette produkt er i overensstemmelse med det europæiske direktiv 1999/5/EC.

Dit product is in navolging van de bepalingen van Europees Directief 1999/5/EC.

Tämä tuote noudattaa EU-direktiivin 1999/5/EC määräyksiä.

Ce produit est conforme aux exigences de la Directive Européenne 1999/5/EC.

Dieses Produkt entspricht den Bestimmungen der Europäischen Richtlinie 1999/5/EC.

Þessi vara stenst reglugerð Evrópska Efnahags Bandalagsins númer 1999/5/EC.

Questo prodotto è conforme alla Direttiva Europea 1999/5/EC.

Dette produktet er i henhold til bestemmelsene i det europeiske direktivet 1999/5/EC.

Este produto cumpre com as normas da Diretiva Européia 1999/5/EC.

Este producto cumple con las normas del Directivo Europeo 1999/5/EC.

Denna produkt har tillverkats i enlighet med EG-direktiv 1999/5/EC.

This declaration is based upon compliance of the Class A products listed above to the following standards:

EN 55032 (CISPR 32 Class A) RF Emissions Control.

EN 55024:2010 (CISPR 24) Immunity to Electromagnetic Disturbance.

EN 60950-1:2006/A11:2009A1:2010/A12:2011 Information Technology Equipment- Safety-Part 1: General Requirements.

EN 50581:2012 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

**CAUTION!** *In a domestic environment, Class A products may cause radio interference, in which case the user may be required to take adequate measures.*

**ATTENTION!** *Dans un environnement domestique, les produits de Classe A peuvent causer des interférences radio, auquel cas l'utilisateur peut être tenu de prendre des mesures adéquates.*

**VORSICHT!** *In einer häuslichen Umgebung können Produkte der Klasse A Funkstörungen verursachen. In diesem Fall muss der Benutzer möglicherweise geeignete Maßnahmen ergreifen.*

### Responsible Party

Xilinx, Inc.
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# References

The following document provides additional information:

- *Getting Started with Alveo Data Center Accelerator Cards* (UG1301)
- *Alveo U50 Data Center Accelerator Card Installation Guide* (UG1370)
- *Alveo U50 Data Center Accelerator Card User Guide* (UG1371)
- *Card Management Solution Subsystem Product Guide* (PG348)
- *Alveo Programming Cable User Guide* (UG1377)
- *Alveo Out-of-Band Management Specification for Server BMC User Guide* (UG1363)
- *Alveo FRU Data Specification* (UG1378)

# Revision History

The following table shows the revision history for this document.

| Section | Revision Summary |
|---|---|
| **02/18/2020 Version 1.5** | |
| Table 2 | Updated height to 2.46 inch (62.40 mm). |
| Table 4 | Updated operating humidity and storage humidity conditions. |
| Satellite Controller | Added description of board management controller. |
| Operating Conditions | Updated inlet temperature versus airflow requirement table at sea level and added tables for 1200m above sea level at both 85°C and 70°C optical. |
| **12/19/2019 Version 1.4** | |
| Qualified Servers | Added web link to qualified servers. |
| **12/16/2019 Version 1.3** | |
| Operating and Storage Temperature Conditions | Revised the operating temperature from 55°C to 50°C. |
| Operating Conditions | Removed the 55°C row from Table 5. |
| **11/19/2019 Version 1.2** | |
| General updates | Updated to the Vitis unified software platform throughout. |
| Summary | Reversed order of figures. |
| Table 1 | • Corrected form factor to *half length*.<br>• Added HBM2 bandwidth.<br>• Updated note 1.<br>• Added note about Alveo programming cable. |
| Alveo Product Details | Reversed order of figures. |
| Dimensions | In first paragraph, replaced *half width* with *half length*. |
| Network Interfaces | Updated section. |
| Operating System Compatibility | Updated section. |
| Figure 5 | Added new figure. |
| **09/26/2019 Version 1.1** | |
| Table 1 | Added note about power rails. |
| **09/17/2019 Version 1.0.1** | |
| General updates | Editorial updates only. No technical content updates. |
| **08/02/2019 Version 1.0** | |
| Initial release | N/A |

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