Xerxes Pi Network Attached Compute Blade 1.0

A headless network server blade carrier board for Raspberry Pi 4 & 5 compatible compute modules.

© 2025

Colophone

© Rapid Analysis PTY LTD. All rights reserved.

Release	1
Build date	07/01/26
Build Version	001

Legal Disclaimer Notice

This document is provided for informational purposes only and is subject to change without notice. Rapid Analysis PTY LTD makes no representations or warranties, express or implied, regarding the accuracy, completeness, or suitability of the information contained herein. All information, specifications, descriptions, and illustrations in this datasheet are believed to be accurate at the time of publication but are not guaranteed.

The Xerxes Pi device is intended for use by hobbyists, developers, and professionals in commercial and industrial environments. Unless expressly stated otherwise in writing by Rapid Analysis PTY LTD, the device is not designed, authorized, or warranted for use in life-support systems, medical devices, safety-critical systems, or any application where failure could result in personal injury, death, or significant property or environmental damage.

Rapid Analysis PTY LTD reserves the right to make changes to the Xerxes Pi device, its specifications, features, or documentation at any time without obligation to notify any person or entity. Performance characteristics provided are typical values only and may vary depending on system configuration, operating conditions, and component selection.

To the maximum extent permitted by law, Rapid Analysis PTY LTD disclaims all warranties not expressly required under the Australian Consumer Law, including any implied warranties of merchantability or fitness for a particular purpose. Nothing in this document is intended to exclude, restrict, or modify any consumer guarantees, rights, or remedies conferred by the Australian Consumer Law or any other applicable legislation that cannot be excluded.

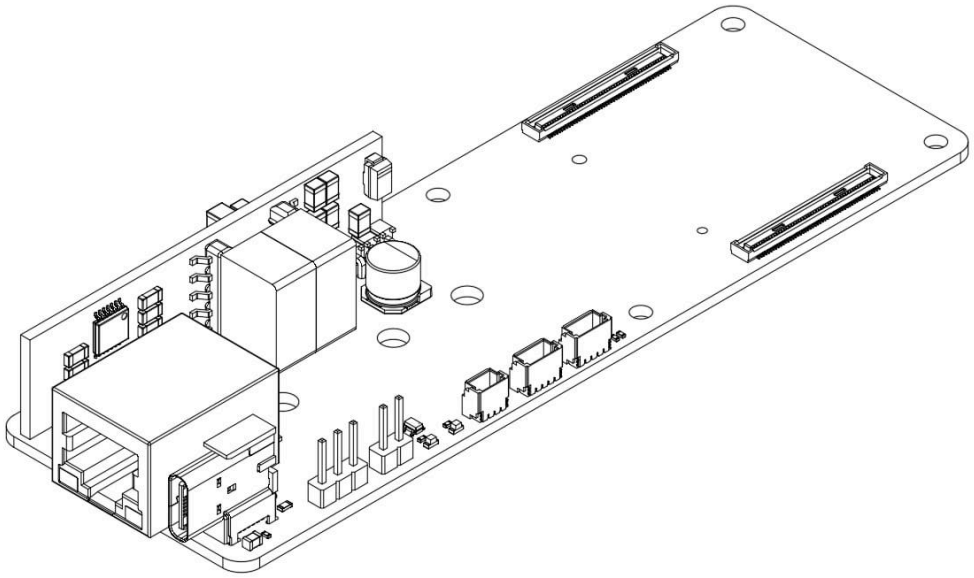
To the extent permitted by law, Rapid Analysis PTY LTD shall not be liable for any direct, indirect, incidental, special, consequential, or punitive damages arising out of the use of, or inability to use, the Xerxes Pi device or the information contained in this document, including but not limited to loss of profits, data, or business interruption. All trademarks, product names, and company names referenced herein are the property of their respective owners and are used for identification purposes only.

Colophone **2**
Introduction **4**
Applications **4**
Connection to CM4 & CM5 **5**
Features **5**
Power management and status indicators **5**
Connectors **6**
Fan Connector 6
USB Connector 6
Ethernet Connector 6
JTAG Deb Connector 6
PoE+ Connector 7
microSD card connector (CM4Lite & CM5Lite only) 7
M.2 M Key Connector 7
I2C Connector 7
Configuration Options **8**
PoE+ Jumpers 8
Boot Header 8
Mechanical Layout **9**
Appendix. Documentation History **10**

Introduction

Xerxes Pi is a compact, headless network server blade carrier board designed for compute modules compatible with the Raspberry Pi Compute Module 4 and Compute Module 5. Built for reliability and flexibility, it enables high-density, low-power deployments for hobbyist, commercial, and industrial applications. Xerxes Pi is ideal for edge computing, home lab servers, network services, and embedded systems where scalable performance and robust connectivity are required.
Note: Raspberry Pi CM4 and Radxa CM5 modules cannot currently access M.2 Peripherals in Revision 1 of the Xerxes Pi.

Figure 1.
The Xerxes Pi Network Attached Compute Blade 1.0.



The Xerxes Pi has convenient connectors for I2C, JTAG, and FAN expansion. For more information, please see documentation in the following sections.

Applications

A Raspberry Pi Compute Module 5 (CM5) is like a Raspberry Pi but without any physical connectors on the board. A Xerxes Pi provides the physical connectors for a CM5 tailored for a high density clustered network environment. This means some connectors, e.g., HDMI, are removed, while others, e.g., PoE+ and JTAG Debugging, are more tightly coupled.

The Xerxes Pi's main qualities are affordability, accessibility, and extensibility. It's affordable for bulk purchases, sensitive to cost changes as compute module prices rise. Its compact 120 × 40 mm fractional Nano ITX design allows under-1U stacking and fits Nano ITX cases, ensuring easy integration with existing systems, including the Xerx86 SBC. Extensibility ensures compatibility with a wide range of compute modules, including third-party CM4 and CM5 boards.

Mounting CM4 & CM5

Both CM4 and CM5 boards attach directly to two high-density connectors on the Xerxes Pi. These connectors give access to nearly all of the compute module's interfaces including PCIe, USB, I2C, and others. Connector placement is designed to optimise routing and performance. However, the board is not optimised for wireless performance and is not recommended on the Xerxes Pi.

Note: Raspberry Pi CM4 and Radxa CM5 modules cannot currently access M.2 Peripherals in Revision 1 of the Xerxes Pi.

Features

The Xerxes Pi is a compact (120 mm × 40 mm) carrier board that accepts Raspberry Pi compatible CM4 & CM5 boards. Key features of the Xerxes Pi include:

- External 5 V input through Type-C PSU.
- Tightly integrated Power over Ethernet option with jumper.
- I2C integration via standardized, polarized 4-pin JST connector (Qwiic).
- PCIe M.2 M Key in 2230, 2242, 2260 sizes plus 2280 with optional bracket.
- Standard hardware JTAG Debugger.
- Four-pin JST-SH PWM fan connector (CM5 compatible) for active cooling.
- microSD card slot (for CM5Lite without eMMC).
- Gigabit Ethernet (RJ-45) for network connectivity.
- Jumpers for eMMC booting and initialization using USB-C 2.0.

Power management and status indicators

The Xerxes Pi requires a 5 V DC power supply with a minimum current of 3 A, delivered via the 5V Power Rail, providing up to 5V 3A (15 W) of power in accordance with the Raspberry Pi Compute Module 4 & 5 specifications.

The Xerxes Pi distributes power to the Compute Module via a 5 V Vin rail, supporting up to 5 A (25 W) for the module and connected peripherals, and provides a dedicated 3.3V 3A power rail for M.2 peripherals, ensuring stable operation for both the CM5 and high-power add-on devices.

The green LED indicates activity, blinking during SD/eMMC or system access, while the red LED indicates power, remaining solid when the 5 V supply is present and within specification.

The Xerxes Pi-compatible PoE+ module is an isolated 5 V, 4.5 A power supply that accepts AC input voltages from 44 V to 57 V over Ethernet and provides stable, regulated 5 V output for the board and peripherals, ensuring safe galvanic isolation between the network and the system.

Connectors

Xerxes Pi provides multiple interface options for networking, USB, and fan connectivity. For networking, it offers a Gigabit Ethernet connector with PoE+ support, and USB connectivity via a USB 2.0 (Type-C) data connector. See the full list of connectors below.

Fan Connector

The Xerxes Pi uses the same 4-pin fan connector and pin-out as the Raspberry Pi 5, allowing any fan designed for Raspberry Pi 5 to be used without modification. The connector provides 5 V power, Ground, a PWM control signal, and a tachometer input. When used with a Compute Module 5, fan speed is actively controlled via the CM5 PWM control pin. When a CM4 compatible board is installed, PWM control is not available and the fan will operate at full speed only. When the board is powered down, the PWM control signal is inactive; depending on the fan design, this may cause the fan to continue running while power is present.

***Please note**: Some third party boards are named "CM5" but use Raspberry Pi CM4 compatible architecture for things like power delivery and fan control.*

USB Connector

The Xerxes Pi USB connector uses a USB Type-C receptacle and operates using the USB 2.0 standard. The connector exposes the standard VBUS (5 V power), GND, D+ and D− data lines, enabling both power delivery and USB data connectivity over a single cable. It also supports USB "gadget" mode, allowing the device to present itself as a USB Ethernet interface for direct network access when connected to a host system. The USB Type-C port is wired for USB 2.0 device operation and is compatible with all third-party Raspberry Pi–compatible compute modules.

Ethernet Connector

The Xerxes Pi ethernet connector (JG0926HENL) is a high-performance single-port RJ45 jack with integrated magnetics, supporting 10/100/1000 Base-T (Gigabit) data throughput for reliable, high-speed network communications. Designed to meet IEEE 802.3at PoE+ standards, it enables both power and data to be delivered over a single Ethernet connection. The connector features a right-angle, through-hole mounting style with built-in Green/Yellow link/activity LEDs.

UART Debug Connector

The Xerxes Pi includes a 3-pin JST UART debug header that provides a 3.3 V TTL serial console for bring-up and troubleshooting. The connector exposes TXD, RXD, and GND, allowing connection to a USB-to-UART adapter for viewing boot messages and accessing the Linux serial console during development and diagnostics.

PoE+

The PoE+ consists of eight plated through-holes that mate with the corresponding 8-pin header on the companion PoE+ daughterboard which carries power and control signals required for Power over Ethernet operation while keeping the base board modular and compact. The Xerxes Pi incorporates additional ESD protection on the PoE+ interface to improve resilience against electrostatic discharge and transient events commonly encountered in networked environments. The PoE+ daughterboard supports 25 W of power delivered over Ethernet, enabling reliable operation of Raspberry Pi CM4 & CM5 compatible modules without the need for USB delivered power..

microSD card connector (CM4Lite & CM5Lite only)

CM5Lite doesn't include on-board eMMC and so relies on the microSD card connector for external storage. The microSD card connector isn't available for the standard CM4 or CM5, which already has built-in eMMC storage. The microSD card connector is a push-push slot:

- To insert a microSD card, gently push it into the slot until it clicks.
- To release a microSD card, gently push on the card to unlock it, then pull it out.

M.2 M Key Connector

The Xerxes Pi includes an M.2 M key connector, designed for 2230, 2242, and 2260 M.2 M key cards. This connector is typically used for NVMe SSDs, which are fast storage drives that use the PCIe interface to communicate. It is also compatible with AI accelerators and Oculink port expansion. Ensure that the operating system (OS) has a compatible driver for your card. Without the driver, the card might not work properly. By default, the M.2 M key connector runs at PCIe Gen 2 ×1, which provides 5 Gb/s. PCIe Gen 3 ×1 (which provides 8 Gb/s) is possible, but experimental and therefore unsupported.

Note: Raspberry Pi CM4 and Radxa CM5 modules cannot currently access M.2 Peripherals in Revision 1 of the Xerxes Pi.

I2C Connector

The Xerxes Pi uses a single Qwiic I2C standardized plug-and-play connector which is designed to simplify I2C peripheral connections without soldering. It uses a 4-pin JST-SH connector carrying GND, 3.3 V power, SDA (data), and SCL (clock), ensuring consistent pin configuration across compatible devices. Qwiic operates at 3.3 V logic levels, allowing multiple sensors and peripherals to be daisy-chained on the same I2C bus using keyed cables, reducing wiring errors and enabling rapid prototyping and expansion. The Xerxes Pi has been tested successfully with NFC and OLED using the PN532 and SSD1306 Raspberry Pi driver and library.

Configuration Options

The Xerxes Pi includes a 3-pin power-select header for choosing between PoE+ and USB power input, and a 2-pin jumper header used to control the Compute Module boot mode.

Pin	Function	Description
1-2	USB Power	Power the Xerxes Pi using 5V USB power.
2-3	PoE+ Power	Power the Xerxes Pi using Power over Ethernet.
4-5	eMMC bypass	Connect to the host computer in Boot Mode.

PoE+ Jumpers

The 3-pin PoE+ power-select header allows the user to select the active power source by positioning a jumper to connect the system power rail to either the PoE+ daughterboard input or the USB Type-C input. This provides a simple and reliable method to choose the primary power source during development, deployment, or servicing, and prevents back-feeding between power inputs. The header is intended to be configured while the board is powered off.

Boot Header

The 2-pin boot header is used to assert the Compute Module BOOT (USB boot/recovery) pin. When the jumper is fitted during power-up, the Compute Module enters USB boot mode, allowing firmware flashing or recovery via a host computer. When the jumper is removed, the system boots normally from its configured storage device. This header is primarily intended for system bring-up, recovery, and manufacturing use.

***Please note**: Use this header to install Raspberry Pi OS on a new Compute Module's eMMC storage.*

Using NVMe on M.2

The official tested NVMe drive for use on a Xerxes Pi is the Raspberry Pi SSD seen here: https://www.raspberrypi.com/products/ssd/



Note: Raspberry Pi CM4 and Radxa CM5 modules cannot currently access M.2 Peripherals in Revision 1 of the Xerxes Pi.

As stated on the website: "It is a reliable, responsive, and high-performance PCIe Gen 3-compliant SSD capable of fast data transfer, available with 256GB, 512GB or 1TB capacity."

To enable functionality of this drive on a Xerxes Pi, edit your config file to allow M.2 connections.

```
sudo nano /boot/firmware/config.txt
```

Then add the following line and reboot::

```
dtparam=pciex1
sudo reboot
```

If you have problems, try changing it to this line and reboot::

```
dtparam=pciex1_gen=2
```

After you reboot, type this command:

```
lsblk
```

You should see something that looks like this:

```
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
loop0         7:0    0     2G  0 loop
mmcblk0     179:0    0 119.1G  0 disk
├─mmcblk0p1 179:1    0   512M  0 part /boot/firmware
└─mmcblk0p2 179:2    0 118.6G  0 part /
zram0       254:0    0     2G  0 disk [SWAP]
nvme0n1     259:0    0 238.5G  0 disk
├─nvme0n1p1 259:1    0   512M  0 part
└─nvme0n1p2 259:2    0   238G  0 part
```

Note that there is a drive in this list with `nvme` in the name.

For an additional check, type this command:
`lspci`

You should see something like this:
```
0001:00:00.0 PCI bridge: Broadcom Inc. and subsidiaries BCM2712 PCIe Bridge
(rev 30)
0001:01:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd
NVMe SSD Controller 980 (DRAM-less)
0002:00:00.0 PCI bridge: Broadcom Inc. and subsidiaries BCM2712 PCIe Bridge
(rev 30)
0002:01:00.0 Ethernet controller: Raspberry Pi Ltd RP1 PCIe 2.0 South
Bridge
```

You should have a controller with NVMe in the name. This is a good sign. You can get more information about your drive by typing this command:
`lsblk -o NAME,SIZE,MODEL,TYPE,MOUNTPOINT`

You should see something like this:
```
NAME          SIZE MODEL                      TYPE MOUNTPOINT
loop0           2G                            loop
mmcblk0     119.1G                            disk
├─mmcblk0p1   512M                            part /boot/firmware
└─mmcblk0p2 118.6G                            part /
zram0           2G                            disk [SWAP]
nvme0n1     238.5G SAMSUNG MZ9LQ256HBJD-00BVL disk
├─nvme0n1p1   512M                            part
└─nvme0n1p2   238G                            part
```

If you see `nvme0n1p1, p2,` etc then the drive is already partitioned (as shown above). If you want to format it, you can use `fdisk` on the command line. Please search for many fdisk tutorials online to proceed.

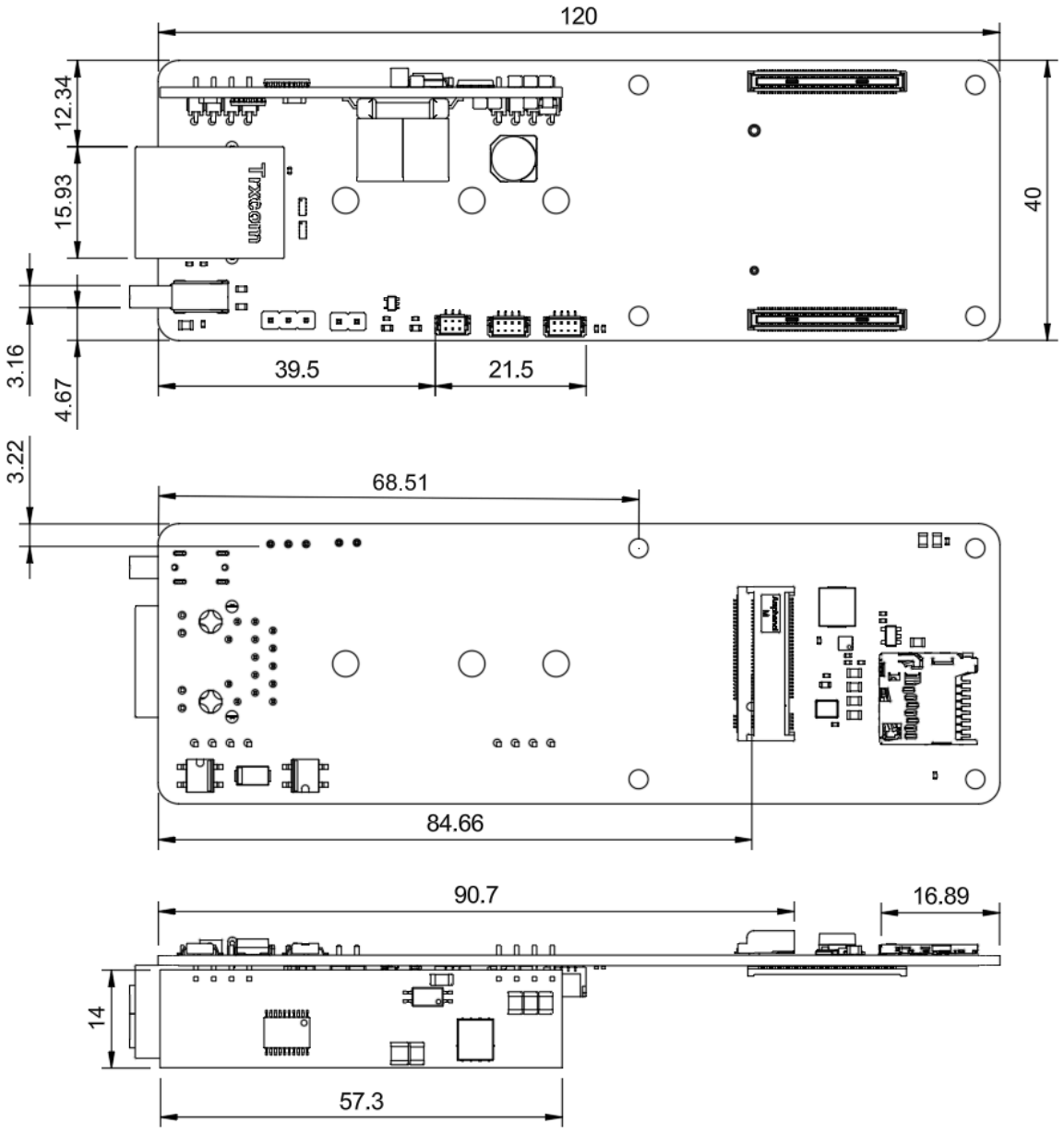
If you suspect power issues, use the following command:
`vcgencmd get_throttled`

If you see anything other than `throttled=0x0` there may be a power related issue.

Mechanical Layout

The mechanical diagram in **Figure 2** illustrates the outline (120 mm × 40 mm), component placement, and dimensions of the Xerxes Pi as seen from the top, bottom, and side..

Figure 2.
Mechanical diagram of the Xerxes Pi as seen from the top, bottom, and side. All measurements are in millimeters.



Appendix. Documentation History

Date	Changes
8 January, 2026	Created Document
25 January, 2026	Added SSD NVMe instructions for configuration
2 February, 2026	Added note: Raspberry Pi CM4 and Radxa CM5 modules cannot currently access M.2 Peripherals in Revision 1 of the Xerxes Pi.