

TUX4PI

Product Datasheet



Revision History			
Version	Date	Author	Changes
1.0	21/09/2025	Francesco Ficili	Initial Release.

SUMMARY

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1. Introduction

The **Tux4Pi** is a standard **carrier board** for the **Raspberry Pi Compute Module 4 (CM4) and Compute Module 5 (CM5)**, designed to provide all the essential connectivity and expansion options needed to make a Compute Module fully usable in a system. What makes Tux4Pi truly unique is that it is **designed to fit perfectly into a tux-shaped case**, combining the full functionality of a standard carrier board with a playful, visually striking form factor.

With Tux4Pi, you get all the connectivity you expect from a professional carrier board — including **Gigabit Ethernet, HDMI, USB, M.2 NVMe, SD card support, and serial console access** — while also enjoying a design that is **fun, approachable, and memorable**. Onboard features such as **user and system LEDs** and a **Neopixel port** add flexibility for interactive applications, visual indicators, or decorative effects.

This combination of **standard carrier functionality** and a **tux-shaped enclosure-ready design** makes Tux4Pi ideal for projects where both performance and aesthetics matter. Whether you are building a home media system, an interactive IoT project, or an educational setup, Tux4Pi turns a Compute Module into a complete, stylish solution without any compromise on technical capability.

Key use cases include:

- **Home media and entertainment systems:** Stream video through HDMI and Gigabit Ethernet in a fun, desktop-ready package.
- **IoT and robotics applications:** Control sensors, actuators, and RGB lighting through GPIO and the Neopixel port.
- **Edge computing and AI/ML deployments:** Combine the Raspberry CM's compute power with fast M.2 NVMe storage for high-performance workloads.
- **Educational and interactive projects:** Engage students and hobbyists with a system that is both functional and visually appealing.

2. Board Block Diagram

The **Tux4Pi** carrier board is structured around the **Raspberry Pi Compute Module 4 (CM4) or Compute Module 5 (CM5)**, providing all key interfaces required for a complete embedded system. At its core, the Compute Module handles processing, memory, and GPU tasks, while the carrier board exposes the necessary peripherals for connectivity, storage, and interaction.

Figure 1 shows the board block diagram:

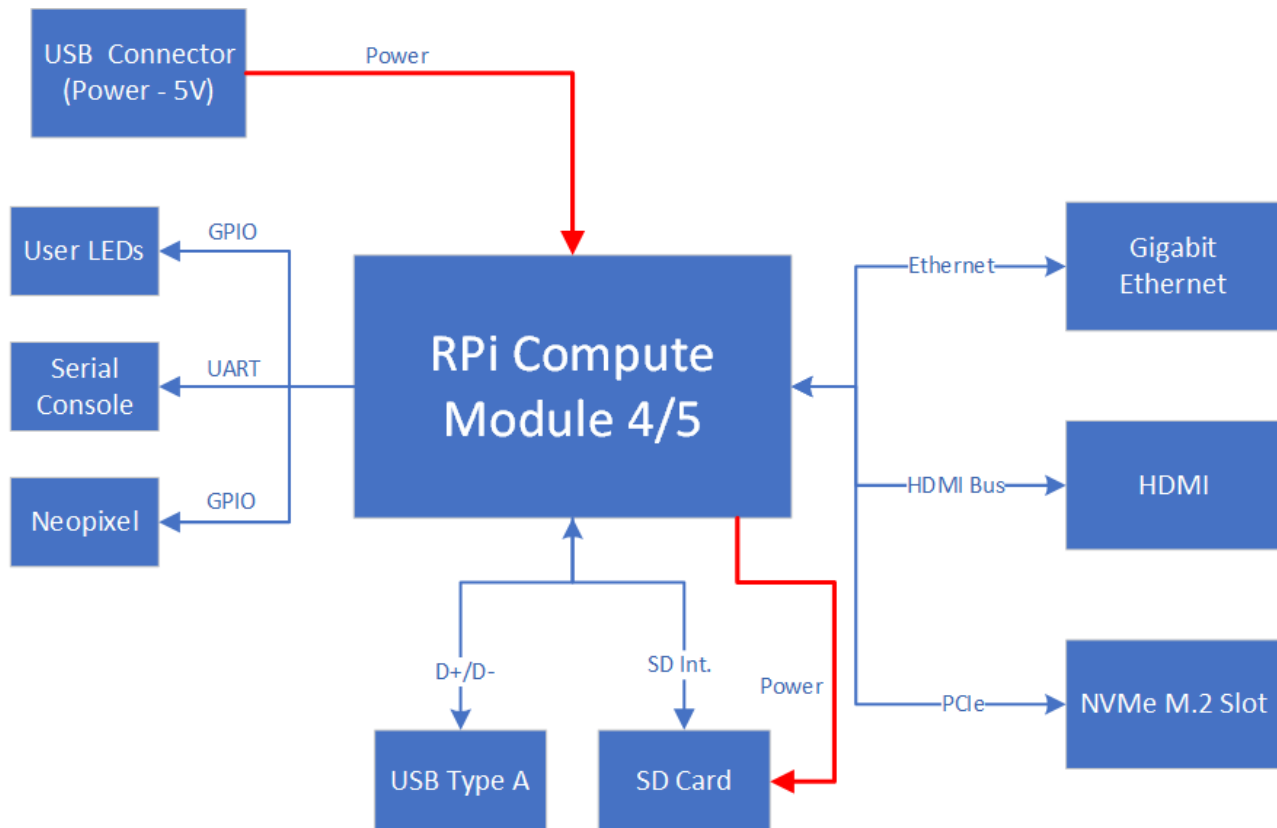


Figure 1 – Board Block Diagram

The main subsystems of Tux4Pi include:

- **Power System:** The board is powered via **USB Type-C**, delivering stable 5V to the Compute Module and connected peripherals.
- **Networking:** A **Gigabit Ethernet interface** provides high-speed network access for servers, media streaming, or IoT connectivity.
- **Video Output:** The **HDMI port** enables high-definition video and display connections for multimedia or user interfaces.
- **USB and Storage:** A **USB Type-A port** allows peripheral connections, while the **M.2 NVMe slot** provide removable and high-speed storage options.
- **Debug and Control Interfaces:** The **serial console port** allows low-level access to the Compute Module for debugging, configuration, or updates.

- **Visual Feedback: System and user LEDs** provide status indication for power, activity, and user-defined signals.

The board's design ensures that all interfaces are easily accessible, allowing the Tux4Pi to function as a complete system while maintaining a **compact layout that fits into a tux-shaped case**. Each subsystem is connected to the Compute Module in a straightforward, standardized manner, providing reliability and full compatibility with CM4 and CM5 modules.

3. Hardware

The Tux4Pi carrier board maximizes the capabilities of the Raspberry Pi CM4/CM5 while providing essential system interfaces in a compact layout. The board is powered via **USB Type-C**, delivering stable 5V power to both the Compute Module and connected peripherals.

Connectivity highlights include:

- **Gigabit Ethernet** for high-speed, reliable network connections.
- **HDMI output** for high-definition video displays.
- **USB Type-A port** for peripherals such as keyboards, mice, or external storage.
- **M.2 NVMe slot** for fast storage expansion.
- **MicroSD card slot** for OS on CM Lite version.
- **Serial console port** for low-level debugging and system access.
- **Neopixel port** for addressable RGB lighting projects.

Tux4Pi also features **user and system LEDs** for visual feedback. All interfaces are positioned for intuitive access while maintaining a clean, compact design suitable for the tux-shaped enclosure.

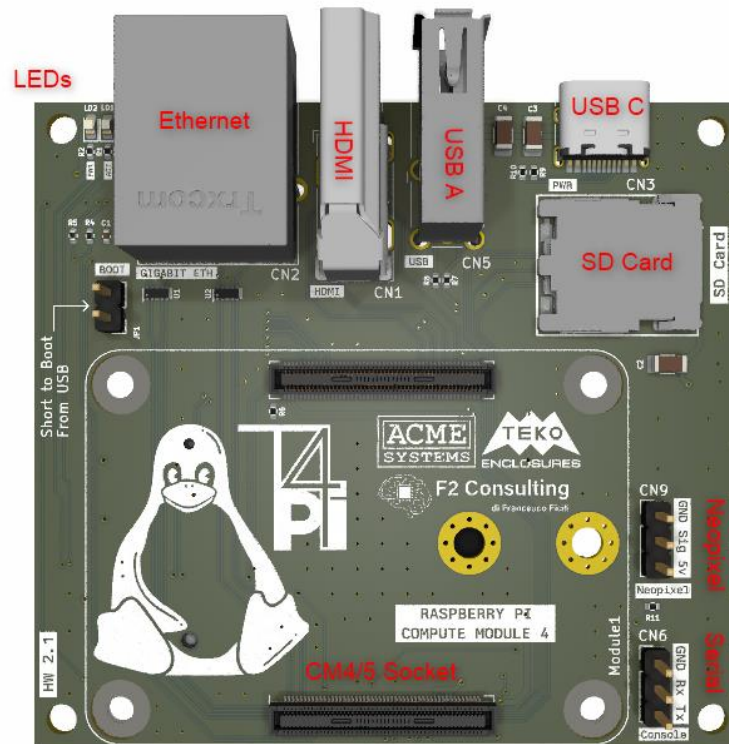


Table 1 provides a description of board's main components:

Table 1 – Board Components

Name	Description
CM4/5 Socket	The socket for the Raspberry PI compute module. It is compatible with CM4 and CM5.
Ethernet	Gigabit Ethernet Port.
USB A	USB 2.0 HOST/OTG capable interface, equipped with USB Type A connectors.
HDMI	HDMI 1.3a capable interface. It used an HDMI Standard A connector.
USB C	Connector for the board power supply. It employs an USB Type C connector.
SD CARD	MicroSD card Socket.
LEDs	2x System LEDs and 1x user LED.
Neopixel	Neopixel Port.
Serial	UART console port.
M.2 Key NVMe Slot	Standard M.2 Key Slot, suitable for connecting 2230 and 2242 NVMe drives.

4. Connector Pinouts

This section highlights the pinouts of Tux4Pi connectors.

Serial Connector

The Tux4Pi is equipped with a serial port interface, directly connected to the primary UART device. This interface is by default configured to output the Linux console.

The connector's pinout is depicted in Table 2:

Table 2 - Serial Connectors pinout

Pin Name	Pin Number	Description
GND	1	Ground
RX	2	Serial Receive
TX	3	Serial Transmit

Neopixel Connector

The Tux4Pi is equipped with a Neopixel connector, able to control Neopixel LED strips.

The connector's pinout is depicted in Table 3:

Table 3 - Neopixel Connectors pinout

Pin Name	Pin Number	Description
GND	1	Ground
Sig	2	Neopixel signal
5v	3	5V

5. Additional Features

This section shows some additional features of Tux4Pi.

System LEDs

The board features the standard Raspberry PI Pwr (red) and Act (green) LEDs.

User LED

The board feature also a USER LED connected to GPIO7.