

neoVI-PI

Robust and Open Raspberry Pi 4 Platform for Automotive

Introducing the Automotive Industry's first open and robust platform for the Raspberry Pi. The neoVI PI has a built-in Raspberry Pi 4 Compute Module (RPi4 CM) that contains quad 64-bit processors and a gigabit Ethernet port, paired with Intrepid's CAN FD technology. This allows you to simulate, test and datalog with the flexibility that the Raspberry Pi 4 Compute allows. The neoVI PI has all the features of the RPi4 CM plus up to four CAN FD networks.

The neoVI PI is designed and tested for the automotive environment. This includes a wide power supply range, EMC protection, rugged packaging and environmental testing. The neoVI PI allows you to use the Raspberry Pi 4 Compute while avoiding additional development to adapt to the automotive network environment. That makes the neoVI PI powerful enough to solve your vehicle network problems, yet small enough to fit in your backpack.

Features:

- Built-in RPi4 Compute Module supports all variations of EMCC, SDCard, and Wireless
- 2x internal ValueCAN4-2 for 4 CAN FD / CAN 2.0 Channels
- Intrepid Open source APIs on github/intrepidcs: libicsneo for C/C++ and python_ics for Python
- Automotive Power Supply (5-60V operation)
- 1x Native 1000BASE-T Ethernet with PoE sink support
- 4x High Speed USB Host Ports with high current sourcing
- Integrated Raspberry Pi Pico Module connected to RPi4 via USB
- M.2 NVMe slot for hosting PCIe flash up to 4TB
- Expandable IO : Internal RPi and Rpi Pico GPIO access with open connector pins for custom hardware applications
- Tested and Packaged for in-vehicle use
- HDMI connector for RPi4 OS display
- DB26 HD Vehicle signal connector compatible with various cables for vehicle attachment - compatible with other neoVI Cables
- Open DB9 connector for Expandable IO from RPi and RPi Pico
- WiFi from RPi4
- Expandable via RPi4 and RPi Pico GPIO
- 10 Full Color Membrane LEDs and buzzer for status indication
- Membrane Buttons to manually trigger data logging
 - 2x Camera Ports and 2x Display Ports
- RTC
- Options:
 - Add Thermocouple, Voltage, and Pulse measurement and Relay, Analog or pulse control via RAD-IO2 Series
 - Add 100/1000BASE-T1 support via RAD-Moon Series media converters
 - neoVI MIC2 with GPS
 - Add Vehicle interface cables for DB26 connector
 - Add Cellular support via RAD-4G



INTREPID
CONTROL SYSTEMS
www.intrepidcs.com

1850 Research Drive
Troy, MI 48083 USA
Phone: +1 (586) 731-7950
Fax: +1 (586) 731-2274



www.aeta-rice.com

neoVI-PI

Applications

- Standalone data logger with edge processing
- Standalone ECU or vehicle simulator
- In-vehicle data acquisition system
- Vehicle interface with Raspberry Pi



Remote audio recording, indication and triggering



Convert to Automotive Ethernet with RADMoon Device powered via USB Port

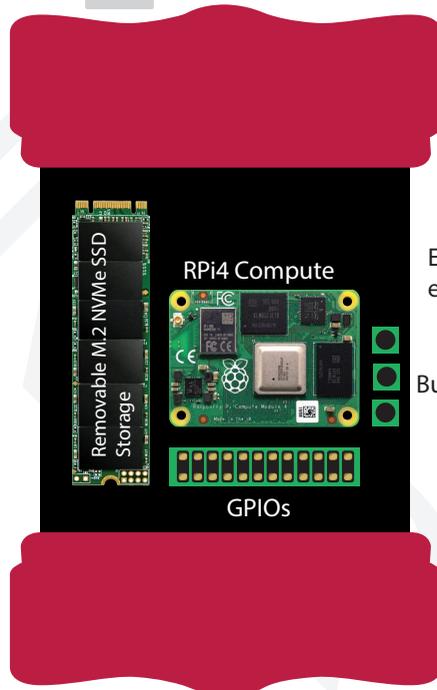


USB Type A



USB-C

Add Thermocouple, Voltage, and Pulse measurement and Relay, Analog or pulse control via RAD-IO2 Series (intrepidcs.com/radio2)



Extruded aluminum enclosure

Buttons



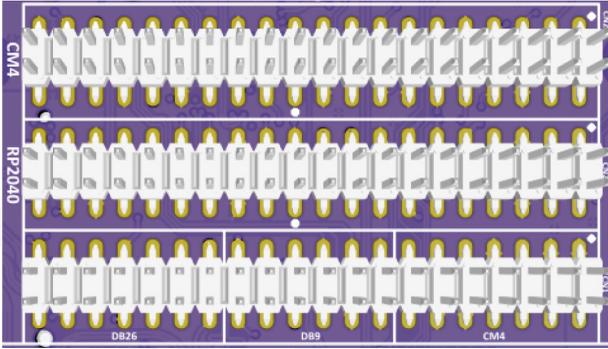
INTREPID
CONTROL SYSTEMS
www.intrepidcs.com

1850 Research Drive
Troy, MI 48083 USA
Phone: +1 (586) 731-7950
Fax: +1 (586) 731-2274

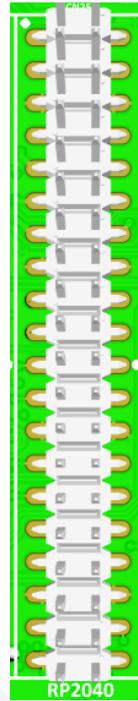


www.aeta-rice.com

neoVI-PI



RP2040/Pi Pico Pinout (Matches Pi Pico)



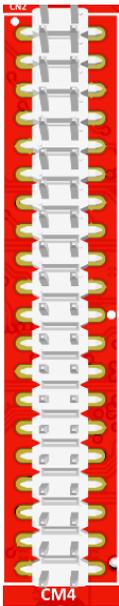
| | |
|---------|------------|
| GPIO 0 | GPIO 23 |
| GPIO 1 | GPIO 24 |
| GND | GND |
| GPIO 2 | GPIO 29 |
| GPIO 3 | 3.3V (out) |
| GPIO 4 | ADC_VREF |
| GPIO 5 | GPIO 28 |
| GND | GND |
| GPIO 6 | GPIO 27 |
| GPIO 7 | GPIO 26 |
| GPIO 8 | RUN |
| GPIO 9 | GPIO 22 |
| GND | GND |
| GPIO 10 | GPIO 21 |
| GPIO 11 | GPIO 20 |
| GPIO 12 | GPIO 19 |
| GPIO 13 | GPIO 18 |
| GND | GND |
| GPIO 14 | GPIO 17 |
| GPIO 15 | GPIO 16 |

Flexible Internal Expansion: Take Advantage of GPIO Headers

These open-ended pins can be used for a variety of purposes, most commonly, to collect input such as sensors or interface to other tools or writing your own scripts. There are three different headers for interconnection between four components:

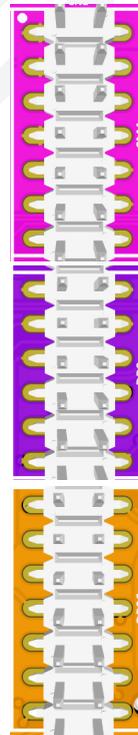
- RP2040 corresponds to the embedded RPi Pico
- CM 4 corresponds to the signals from RPi CM 4 signals
- DB 9 corresponds to the signals on the DB9 Connector
- DB 26 corresponds to signals on the DB 26 connector

RPi CM4 Pinout (PiHat Compatible)



| | |
|-----------|---------|
| 3.3V(OUT) | 5V(OUT) |
| GPIO 8 | 5V(OUT) |
| GPIO 9 | GND |
| GPIO 7 | GPIO 15 |
| GND | GPIO 16 |
| GPIO 0 | GPIO 1 |
| GPIO 2 | GND |
| GPIO 3 | GPIO 4 |
| 3.3V(OUT) | GPIO 5 |
| GPIO 12 | GND |
| GPIO 13 | GPIO 6 |
| GPIO 14 | GPIO 10 |
| GND | GPIO 11 |
| SDA 0 | SDA 0 |
| GPIO 21 | GND |
| GPIO 22 | GPIO 26 |
| GPIO 23 | GND |
| GPIO 24 | GPIO 27 |
| GPIO 25 | GPIO 28 |
| GND | GPIO 29 |

Miscellaneous Pinout



| | |
|-----------|------------|
| GND | nRPIBOOT |
| GND | EEPROM nWP |
| AIN 0 | AIN 1 |
| GND | SYNC IN |
| SYNC OUT | GND |
| TV OUT | GND |
| RUN PG | GLOBAL EN |
| GND | GND |
| DB9 1 | GND |
| DB9 2 | DB9 6 |
| DB9 3 | DB9 7 |
| DB9 4 | DB9 8 |
| DB9 5 | DB9 9 |
| FDCAN 9 P | LIN0 |
| FDCAN 9 N | FDCAN 10 P |
| MISCIO 1 | FDCAN 10 N |
| FDCAN 5 P | FDCAN 7 P |
| FDCAN 5 N | FDCAN 7 N |
| FDCAN 6 P | FDCAN 8 N |
| FDCAN 6 N | FDCAN 8 P |

MAGENTA - CM4

PURPLE - DB9

ORANGE - DB26



INTREPID
CONTROL SYSTEMS
www.intrepidcs.com

1850 Research Drive
Troy, MI 48083 USA
Phone: +1 (586) 731-7950
Fax: +1 (586) 731-2274



www.aeta-rice.com

neoVI-PI

neoVI PI Specification

- 1x Gigabit Ethernet (1000Base-T)
- Support for RPi CM4 variants with EMCC and SDCard for OS storage.
- Micro USB interface for RPi OS EMCC update (EMMC CM4 only)
- Micro SD Card interface for RPi OS (Non EMMC CM4 only)
- Fast wake 70 milliamps
- Power supply: 5-60V operation
- Temperature range: -30°C to +80°C
- Dimensions: 13.60cm by 11.22cm by 3.97cm
- LEDs (user programmable): 10 programmable tri-color LEDs
- M2 NVMe 2.0 SSD
- Vehicle connectors: 26-pin male HD D-sub
- One-year limited warranty
- 4x HS USB host ports with high current sourcing
- Buzzer

Device Specification - 2x ValueCAN4-2

- Field-upgradeable flash firmware
- Standalone mode, including real-time coremini scripting, receive messages, transmit messages, expressions, I/O and transport layers
- 64-bit timestamping to an accuracy of 25 nanoseconds on all networks

Network Specifications – CANFD

- 4x CAN FD / CAN 2.0 channels (Bosch MCAN core) with:
 - MCP MCP2562FD PHY
 - Compatible with Device Net and CANopen
 - Double-buffered CAN transmission
 - Software selectable CAN termination
 - CCP protocol hardware acceleration
- Listen-only mode support
- Termination check feature
- Error frame transmit support

ORDERING INFORMATION:

| Part Number | Description |
|------------------------|---|
| NEOVIPI-VCAN4-CMW8GE32 | Robust Raspberry PI 4 platform for automotive with CM4 with wireless, 32 Gbyte EMCC, and 8 Gigabytes of RAM |

Specifications subject to change; please contact Intrepid for the latest information. All trademarks are the property of their respective owners.

Rev. 20240603



INTREPID
CONTROL SYSTEMS
www.intrepidcs.com

1850 Research Drive
Troy, MI 48083 USA
Phone: +1 (586) 731-7950
Fax: +1 (586) 731-2274



www.aeta-rice.com