

INNOVATIVE ELECTRONICS ENGINEERING

ZERO

V2X Node

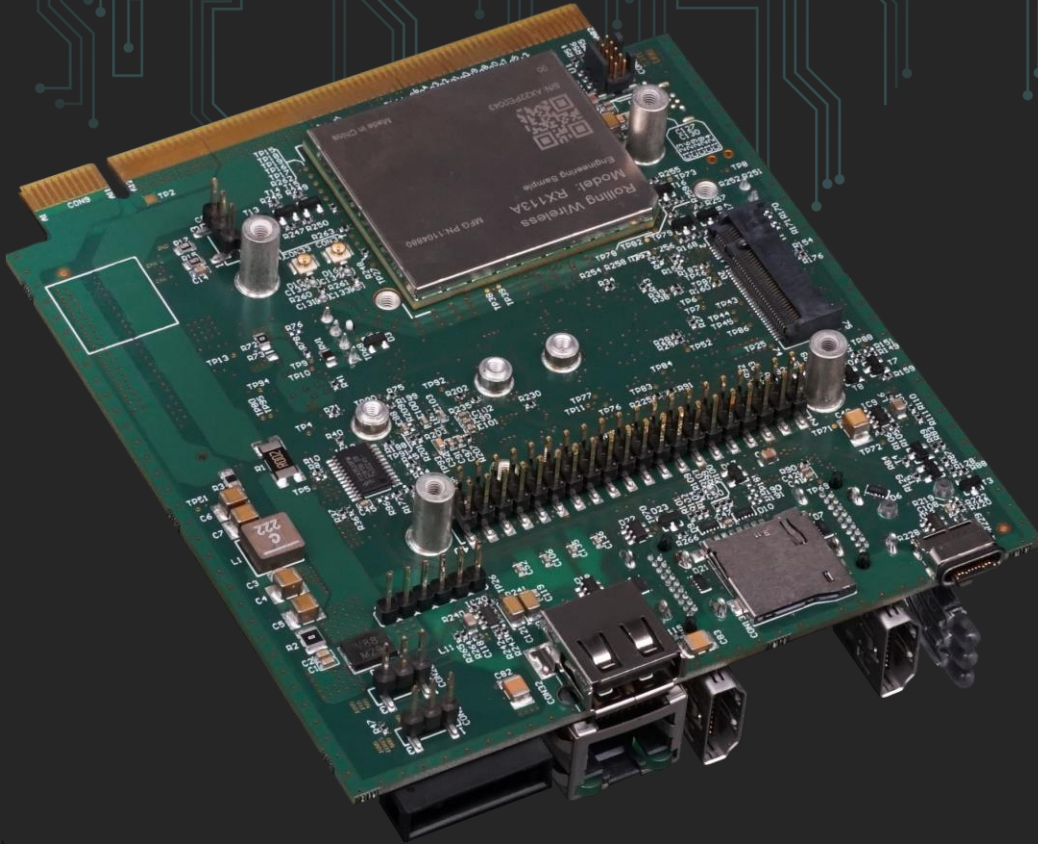
V2X connectivity research toolkit



ULTIMATE V2X PROTOTYPING PLATFORM



INNOVATIVE ELECTRONICS ENGINEERING



V2X Node

RASPBERRY PI Compute Module 4

ULTIMATE V2X PROTOTYPING PLATFORM

ROLLING WIRELESS V2X MODEM [3GPP R15]

RASPBERRY PI CM4 SOCKET

M.2 SLOT [B-Key] for 5G/WiFi/... CONNECTIVITY

RASPBERRY PI HAT CONNECTOR

ADAFRUIT FEATHER CONNECTOR

1X CAN FD [AUTOMOTIVE-GRADE CONNECTOR]

1X GIGABIT ETHERNET

2x HDMI OUT

WIDE RANGE INPUT VOLTAGE (9-55V)



V2X Node Wireless Connectivity Use Cases

V2X (C-V2X & DSRC)	Short-Range	Long Range
Vehicle-to-Infrastructure	WiFi 5/6/7	5G
Vehicle-to-Vehicle	Zigbee	LTE
Vehicle-to-Network	Bluetooth	LTE-NB
Vehicle-to-Device	LPD433	LoRa WAN
Vehicle-to-Pedestrian		WiFi HaLo
Vehicle-to-Grid		

--- optional
— built-in

- Vehicle-to-X (Rolling Wireless V2X modem [3GPP R15])
 - Send and receive V2X messages
 - Define and create your own V2X message formats thanks to the VANETZA Open-Source SW stack
 - Forward, dissect, and manipulate V2X messages
 - Integrate V2X into other networks
- use 5G modems, WiFi 7 connectivity or cards in the board's M.2 slot
- install Raspberry Pi HATs for outdoor localisation (e.g. GPS), mesh networking (e.g., Zigbee) or long-range communication (e.g., LoRa WAN)
- Adafruit FeatherWings are connected to the STM32 onboard microcontroller and let you use packetized radio (e.g., FSK/GFSK/MSK/GMSK/OOK) at 433MHz



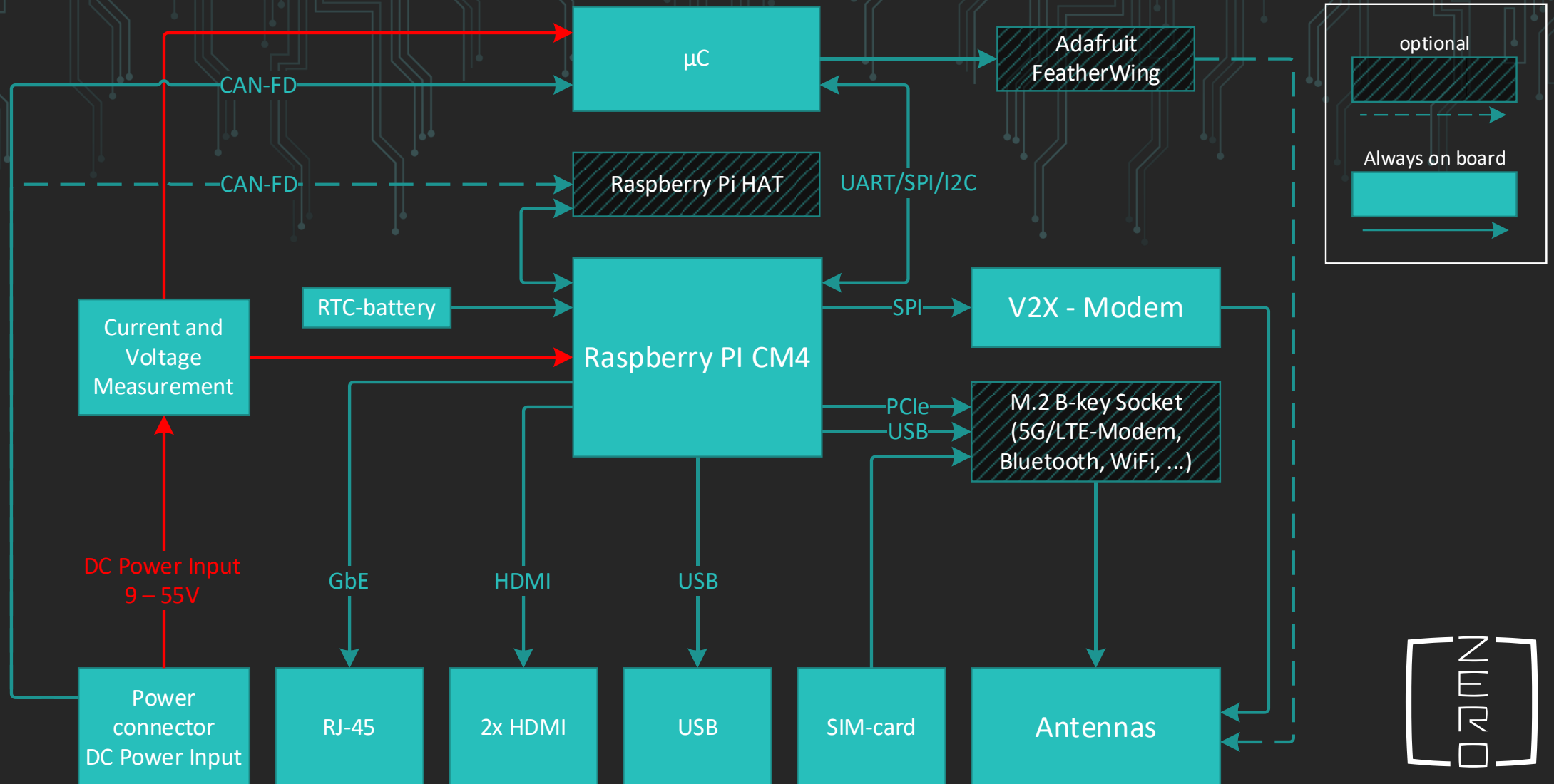
V2X Node Prototyping Use Cases



- Build dashboards for Home Automation and Industry with sensors connected to the Node
- Control actors and read sensors via the built-in interfaces and deploy interactive Human-Machine-Interfaces
- Use as a simple data Logging platform for Ethernet-based protocols, common bus systems (CAN, LIN) and other data transmission standards
- Bridge communication networks (e.g., CAN-2-LIN, RS-232 to Ethernet, UART to USB)
- Develop custom in-vehicle Entertainment solutions by running Android Automotive
- Monitor environmental variables with Python
- Control robots and Automated Guided Vehicles (AGV) with ROS (the Robot Operating System)
- Run any Raspberry-Pi compatible Operating System
- integrate all of the above with V2X messaging



V2X Node Block Diagram



V2X Node Datasheet

Interfaces (Front)	▪ 1x CAN-FD / Power (combined Connector) ▪ 2x HDMI-Out (full size) ▪ 1x USB 2.0 (to CM4) ▪ 1x USB-C (to STM32) ▪ 1x RJ-45 (1000Base-T)
On-board Connectors	▪ M.2 (B-Key) ▪ Adafruit Featherwing ▪ Raspberry Pi HAT ▪ Flex-Pins (STM32)
V2X	▪ Rolling Wireless RX113A V2X module ▪ Single-channel V2X modem with HW encryption ▪ C-V2X based on 3GPP Release 15 in the 5,9GHz band ▪ DSRC 802.11p (not supported in software, yet) ▪ Software: Vanetza Open Source V2X stack
Dimension	▪ 124 x 105 x 44 mm (w x d x h)
Weight	▪ 484g
Electrical Specification	▪ Input voltage: 9 – 55V DC ▪ Power consumption idle: 4,2W (with Quectel 5G modem: 7,2W)
Other	▪ Mounting: DIN rail (TH35) and screw straps ▪ Updates ▪ The V2X Node's firmware can be updated by the user ▪ Updates are installed via CAN / openBLT



V2X Node Pinout

Jack / Socket

Specification: 8POS,TAB0.5X0.4,HDR ASSY,90DEG,COD A
Part Number: 2315411-1

Plug / Connector

Specification: 8POS,NANOMQS,REC HSG,CODA
Part Number: 2282267-1

Crimp

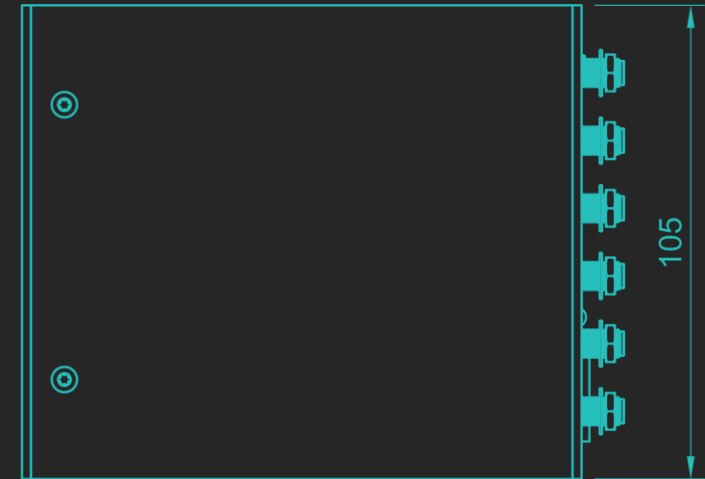
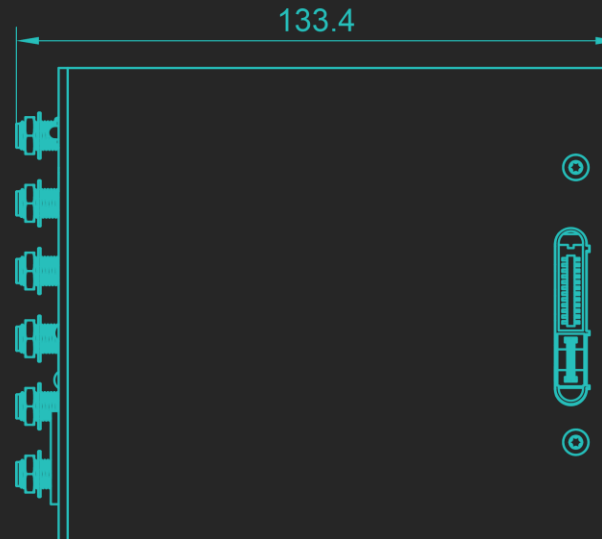
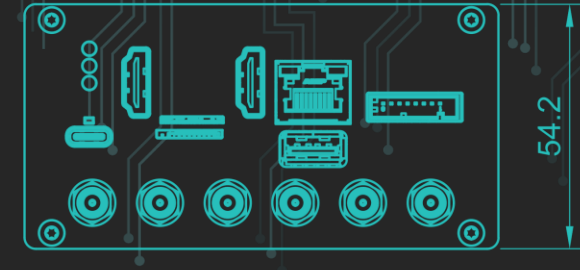
Specification: NANOMQS, RECEPTACLE TERMINAL
Part Number: 2-1703930-1

Pins

- 1 GND
- 2 VBAT
- 3 CAN_Low
- 4 CAN_High
- 5 FlexPin
- 6 FlexPin
- 7 FlexPin
- 8 FlexPin



V2X Node Drawing





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We appreciate your interest in our AMPS V2X Node! For further information, please visit our website or get in touch.

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