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V2X On-Board Unit

iG-Rainbow-G41V

The V2X On-Board Unit from iWave is a ruggedized V2X Solutions for connected vehicles with the support for C-V2X and 5G Connectivity. The Unit also features 5 CAN-FD port with complete Linux BSP Support. The hub serves to enhance safety in advanced intelligent transportation systems. Enabling different to serve different levels of V2X Applications, the OBU provides a scalable and modular platform that reduces complexity to support global Connected Mobility solutions. V2X OBU incorporates advanced security methods at every level of the transmission.

Key Features

- C-V2X PC5 Connectivity
- Optional DSRC (IEEE 802.11p) Connectivity
- Powerful Processor: NXP i.MX 8XLite
- 5 CAN-FD Ports
- 5G Connectivity
- Wi-Fi 6 and Bluetooth 5.3 Connectivity
- Industrial Ethernet & Automotive Ethernet
- Integrated Hardware Secure Element
- IP67 Enclosure for Rugged Installations
- LINUX BSP and API for peripherals

Software flexibility

Powered by a powerful processor, The V2X On-Board Unit is equipped with Linux 5.4 Kernel supported on the BSP with the API for all the peripherals. The API and root access provide customers the flexibility and transparency to build their custom software and analytics applications.

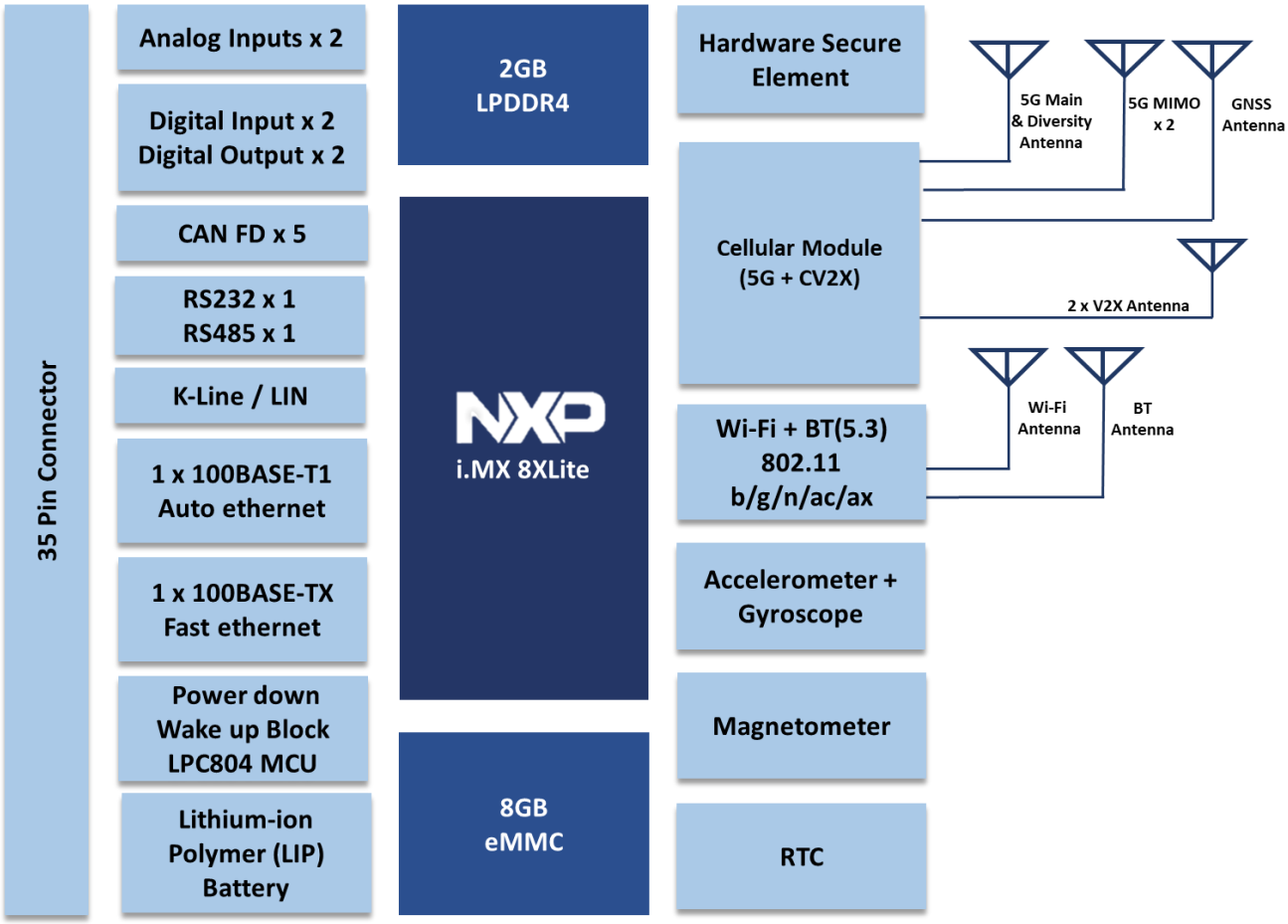
The V2X OBU is integrated with protocol stacks such as J1939, UDS, and ISO 15675-4, making the solution compatible with different bus standards and architectures.

Benefits and Value Proposition

The i.MX 8XLite processor is purpose-built to support standalone telematics units in automotive applications while enabling various protocol support, making the device compatible with different types of vehicles. The ruggedness of the solution with compact design makes it a perfect fit.

The software flexibility and value add for the customer to build their proprietary application and integration, makes the device the right choice of consumers.

Functional Block Diagram



Note: *Above block diagram shows all supported optional features. Depending on the ordered configuration, the delivered features would vary.*

Ordering Part Numbers

Part number	Description
iG-G41VOA-02G-08G-VEIA-SM-15-EM-LI4BXX-D	V2X On-Board Unit Evaluation Kit (C-V2X, 5G Connectivity – EMEA / APAC , Wi-Fi, BT, Harness Cables and External Antennas)
iG-G41VOA-02G-08G-VNIA-SM-15-EM-LI4BXX-D	V2X On-Board Unit Evaluation Kit (C-V2X, 5G Connectivity – NA / Canada , Wi-Fi, BT, Harness Cables and External Antennas)
iG-G41VOA-02G-08G-VEIA-SM-15-EM-LI4BXX	V2X On-Board Unit (C-V2X , 5G Connectivity – EMEA / APAC, Wi-Fi , BT)
iG-G41VOA-02G-08G-VNIA-SM-15-EM-LI4BXX	V2X On-Board Unit (C-V2X , 5G Connectivity – NA / Canada, Wi-Fi , BT)

Note:

- *For production orders, custom configurations could be supported as per requirement. please contact iWave sales team at mktg@iwave-global.com*

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V2X On-Board Unit

Processor Core and Storage

CPU	NXP i.MX 8XLite Processor 2 x Cortex-A35 @1.2GHz 1 x Cortex-M4F cores @264MHz
MCU	Arm Cortex-M0+ MCU LPC 804 Micro-Controller
RAM	LPDDR4 - 2GB
FLASH	eMMC Flash – 8GB (Expandable up to 128GB)

Wireless Connectivity

Cellular Connectivity	EMEA/ Australia/ India/ Southeast Asia 5G NSA - n41/ 77/ 78 5G SA - n1/ 3/ 5/ 7/ 8/ 20/ 28A/ 38/ 40/ 41/77/ 78 LTE - CAT 16 - B1/3/5/7/8/ 20/26/ 28/ 32/ 38/40/ 41/ 42 UMTS /WCDMA - B1/ 5/ 8 GSM - 900/ 1800 MHz
	NA: North America 5G NSA - n41/ 77/ 78 5G SA - n2/5 7/14/25/29/30/41/48/66/ 71/ 77/ 78 LTE - CAT 16 - B2/ 4/ 5/ 7/ 12/ 13/ 14/ 17/ 25/26/ 29/ 30/ 41/ 48/66/ 71 UMTS /WCDMA - B2/ 4/ 5
	LTE CAT 4[1] EMEA/APAC - B1/B3/B7/B8/B20/B28 North America/Canada - B2/ B4/ B5/ B12/B13/ B25/ B26
V2X	C-V2X – PC5 / DSRC IEEE 802.11p[1]
Wi-Fi	IEEE 802.11a/b/g/n/ac/ax Hotspot and client mode with WPA2 feature
Bluetooth	Bluetooth v5.3 BR/EDR/LE

Interfaces and Peripherals

CAN FD	5 ports
	Data rate up to 5Mbps
	Identifier Support: 11 and 29 bit
	Classic CAN compatible
Ethernet	1 x 100BASE-TX [Fast Ethernet] 1 x 100BASE-T1 [Automotive Ethernet]
RS232	2-wire x 1 port
RS485	2-wire x 1 port [Half Duplex]
Analog Input	2 Ports (0-32V)
Digital Input	2 Ports (Max 32V)
Digital Output	2 Ports (5V- 24V, Sink Current: 200mA)
K-Line/LIN[1]	1 Port

Positioning

GNSS	GPS/GLONASS[1]/BeiDou[1]/Galileo
Receiving Channel[2]	72 Channel
Time to update position[2]	1 Second
Receiver sensitivity[2]	Tracking & Nav: –157 dBm
	Cold starts: –146 dBm
	Hot starts: –157 dBm
Time to First Fix[2]	Cold starts: 11.57s
	Hot starts: 1.8s
	GPS/GLONASS[1]/BeiDou[1]/Galileo

Sensors

Accelerometer	Function: 3 Axis
	Sensitivity Range: ±2/ ±4/ ±8/ ±16 g full scale
Gyroscope	Function: 3 Axis
	Sensitivity Range: ±125/±250/±500/±1000/±2000 dps
Magnetometer[1]	Function: 3 Axis
	Sensitivity Range: Up to ±50 gauss magnetic dynamic range

Antenna

External Antenna Connectors	SMA: 1 x V2X front, V2X rear, 5G main, 5G diversity, GNSS, 2 x MIMO RP-SMA: 1 x Wi-Fi, BT

Security

Security Module[1]	Integrated Hardware Secure Element Crypto-Automotive Security IC Microchip TA100

Power Characteristics

Power Input	9 - 32V
Power Consumption	Current consumption at normal mode: 300mA at 12V
Power saving modes	Stand-by Mode: 20mA Deep Power Down Mode : 2mA

[1] Optional features: For more information please contact iWave sales team at mktg@iwave-global.com

[2] Above table gives information about satellite positioning as per the module specification

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Internal Battery

Capacity	1500mAh Lithium-ion Polymer (LIP)
Temperature Support	Battery when discharging: -20°C to +60°C Battery when charging: 0°C to 50°C
Certification	Certified with UN38.3 and IEC 62133-2

Environmental Conditions

Temperature Range	Operating Temperature: -40°C to +85°C [3] Storage Temperature: -40°C to +85°C [3]

SIM Provision

SIM connector	Micro SIM Connector eSIM[1]

RTC

RTC	Dedicated RTC (Powered by internal Lithium-Ion polymer Battery)

LED

LED 1	Red: Power
LED 2	Green: Status Indication

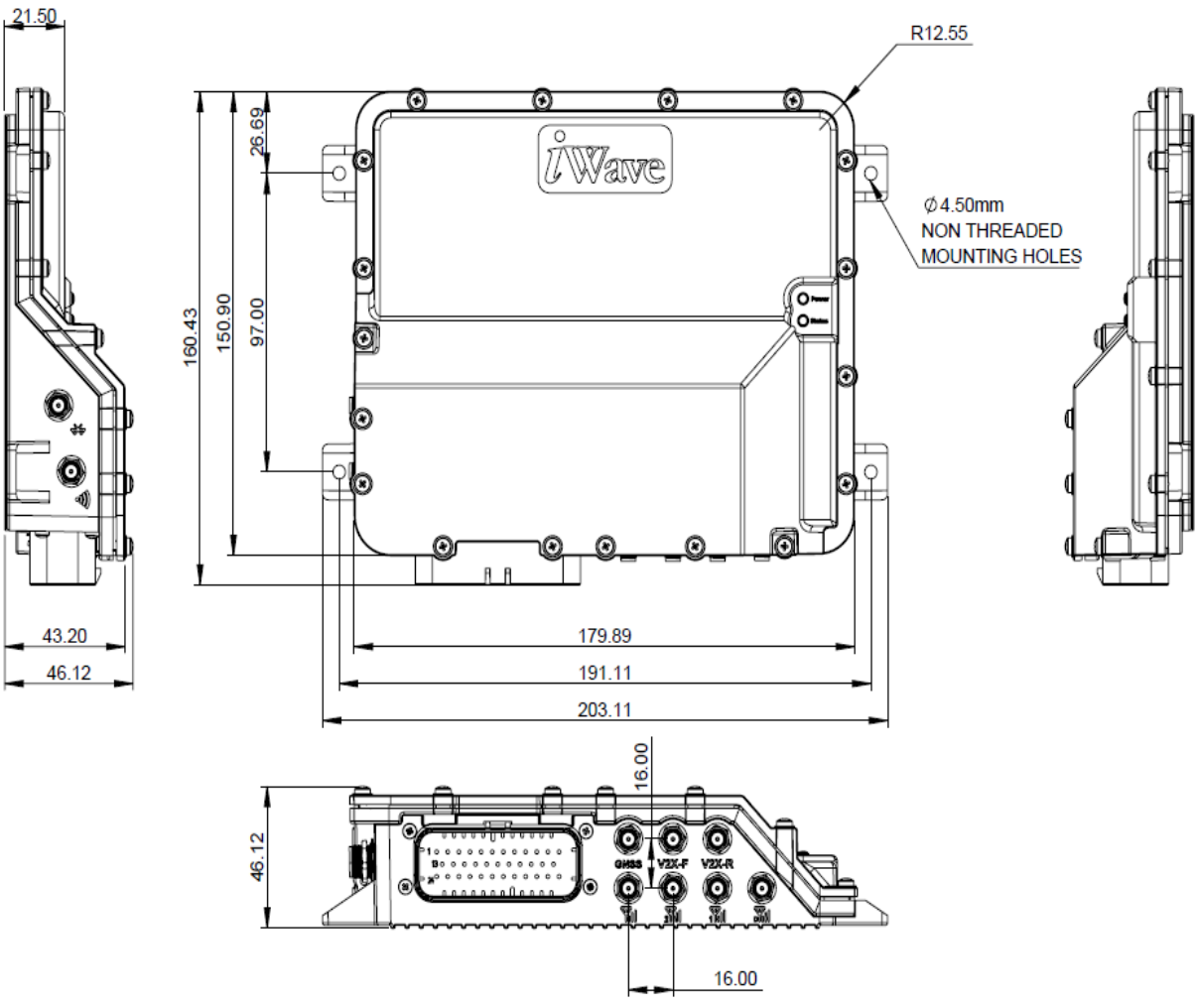
Software Specifications

Board support package (BSP)	• Linux version: 5.4.24
API Support	• Sensors / Cellular Connectivity / Wi-Fi / Bluetooth • Interface peripherals: CAN Data • Wake-Up based on Ignition / CAN / Timer / Accelerometer • LED
Time Synchronization	GNSS and NTP
Power Saving Modes	Stand-By Mode / Deep Power Down Mode
Wake-Up Modes	Ignition / CAN / Timer / Accelerometer
CAN Protocol[1]	• Socket CAN • ISO 15765-4 • CANopen • J1939 • UDSonCAN • K-Line • UDSonIP
Security[1]	• Secure boot • Secure storage • Wi-Fi Security
Software Modules[1]	• OTA Update • Power Management • Data collection application on the device • Cloud Platform SDK Integration

[1] Optional features: For more information please contact iWave sales team at mktg@iwave-global.com
[3] Temperature range subject to use case and operational functionality

Mechanical	
Dimensions (H x W x D)	203 x 160 x 46 mm
Enclosure Material	Top: Polycarbonate (Plastic) Bottom: ADC 12 (Aluminium Alloy)
Manufacturing Process	Injection Molding & Die casting
Assembly Type	Screw
Colour of Enclosure	Black (RAL 9005)
Enclosure Surface Finish	Textured Finish & Powder Coating
Protecting Class	IP67
Mounting Options	Panel mount
Number of Enclosure Parts	2

Top and Bottom View



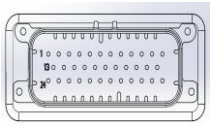
Compliance Test Standards and Certifications*	
Test Cases	**Standards**
Electrical Test	
Direct current supply voltage	ISO 17650-2-4.2
Overvoltage	ISO 17650-2-4.3
Slow decrease and increase of supply voltage	ISO 17650-2-4.5
Reverse voltage	ISO 17650-2-4.7
Open circuit tests	ISO 17650-2-4.9
Short circuit protection	ISO 17650-24.10.2
Pulse 1	ISO 7637-2
Pulse 2a	ISO 7637-2
Pulse 3a	ISO 7637-2
Pulse 3b	ISO 7637-2
Pulse 4	ISO 7637-2
Pulse 5b	ISO 16750-2-4.6.4.2.3
Mechanical Test	
Mechanical shock	IEC 60068-2-27
Random Vibration Test	IEC 60068-2-64
Sinusoidal vibration Test	IEC 60068-2-6
Environmental Test	
Ingress Protection test	IEC 20653
Humidity test	ISO 16750-4: 2010/ 5.6.2
Temperature Storage test	ISO 16750-4: 2010/ 5.1.1 and 5.1.2
High temperature operating	ISO 16750-4: 2010/ 5.1.2
Low temperature operating	ISO 16750-4: 2010/ 5.1.1
Temperature Cyclic	ISO 16750-4:2010 5.3.1
ESD	ISO 10605
Immunity and Emission Test	
Radiated Emission test	ISO 13766-1
Radiated Immunity (BCI)	ISO 11452-4
Radiated Immunity (ALSE) #	ISO 11452-2
Conducted Emissions (CE Test)	CISPR 25

** Certifications can vary based on the configuration. Please contact iWave sales team for more information at mktg@iwave-global.com*
 # In Progress

Connector Specifications

Number of Pins	**Connector on Device :** 35 Pin Ampseal Connector Tin Plated (Part Number: 776163-1) **Mating Connector :** 35 Pin Ampseal Connector Housing (Part Number: 776164-1)

Connector Pinout



Pin No	Signal Name	Description
1	Analog_I/P_1	Analog input 1
2	DOUT2	Digital Output 2
3	RS232_DOUT	RS232 transmit Data
4	RS232_RIN	RS232 Receive data
5	FD_CAN4_H	Flexible data rate CAN4 Data High
6	FD_CAN4_L	Flexible data rate CAN4 Data Low
7	FD_CAN1_L	Flexible data rate CAN1 Data Low
8	FD_CAN1_H	Flexible data rate CAN1 Data High
9	USB_OTG2_DN_C	USB OTG data negative
10	FD_CAN3_L	Flexible data rate CAN3 Data Low
11	ETH_MAG_A_RXP	Ethernet RXP
12	ETH_MAG_A_RXM	Ethernet RXM
13	DIN1	Digital Input 1
14	AUTO_0_N0	Automotive ethernet TXN0
15	DIN2	Digital_Input_2
16	RS485_A	RS485_TD_A+
17	RS485_B	RS485_TD_B-
18	FD_CAN0_H	Flexible data rate CAN0 Data High
19	FD_CAN0_L	Flexible data rate CAN0 Data Low
20	USB_OTG2_DP_C	USB OTG2 Positive data
21	FD_CAN3_H	Flexible data rate CAN3 Data High
22	UART_RX	Debug console UART RX
23	UART_TX	Debug console UART TX
24	MAIN_VCC_OBD_IN	Main Power Input
25	GND_OBD	Main OBD Ground
26	IGN_DET	Ignition Detection signal
27	DOUT1	Digital Output 1
28	ANALOG_I/P_2	Analog Input 2
29	FD_CAN2_H	Flexible data rate CAN2 Data High
30	FD_CAN2_L	Flexible data rate CAN2 Data Low
31	USB_GND	USB Ground
32	USB_OTG_VBUS_C	USB OTG Power
33	AUTO_0_P0	Automotive ethernet TXP0
34	ETH_MAG_A_TXP	Ethernet TXP
35	ETH_MAG_A_TXM	Ethernet TXM

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Related Products

V2X Roadside Unit

Integrated with C-V2X and DSRC technologies, the hybrid V2X RSU provides a scalable and modular platform. Designed to serve a plethora of V2X Applications, it enhances road safety by facilitating real-time data exchange between vehicles and infrastructure.

Telematics Connect Hub

The Telematics Connect Hub is a powerful compact device that supports 2 CAN-FD ports, an integrated hardware secure element, LTE Cat-1 bis cellular connectivity and Bluetooth Connectivity. The hub is an ideal solution for electric vehicles, 2 Wheelers, racing motorbikes, enabling next generation telematics and edge intelligence.

Rugged Telematics Device

The Rugged Telematics Device with IP67 protection class is integrated with 3 CAN Ports, RS232 and RS485 Ports, with various wireless connectivity options such as 4G, Wi-Fi and Bluetooth. Rugged device is built to track your vehicles even in tough conditions.

Telematics EdgePrime

Telematics EdgePrime, powered by the i.MX 93 processor, features 4 CAN-FD ports, automotive Ethernet, LTE Cat-4, Wi-Fi, and Bluetooth. Its IP67 enclosure supports external antennas for rugged use. The device includes a secure element, onboard RTC, lithium-polymer battery, and super capacitor support for reliable power backup.

Telematics Gateway

he i.MX 8XLite powered Telematics Gateway is built with extensive interfaces: 5 CAN Interfaces, RS232, RS485, Analog Inputs and Digital Inputs. With the support for multiple protocols and powerful edge firmware, the gateway is suitable for wide range of applications.

Document Revision History

Document Number	iG-PRGOT-DS-01-REL1.1	
Release	**Date**	**Description**
1.0	4th July, 2025	Official Release
1.1	8th July, 2025	Description corrected for Dout1 in Connector specification sheet

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