![iWave - Embedding Intelligence]

DATASHEET

Telematics Control Unit

iW-Rainbow-G26

The Telematics Control Unit is built to power your connected mobility and telematics applications across a range of connected vehicles. Integrated with multiple CAN ports, a wide range of protocol support and a multitude of wireless connectivity options such as 4G, Wi-Fi and Bluetooth, The globally certified TCU powers applications such as Electric Vehicles, Motor Bikes, Diesel Engines, fleet management and personalized driving experiences.
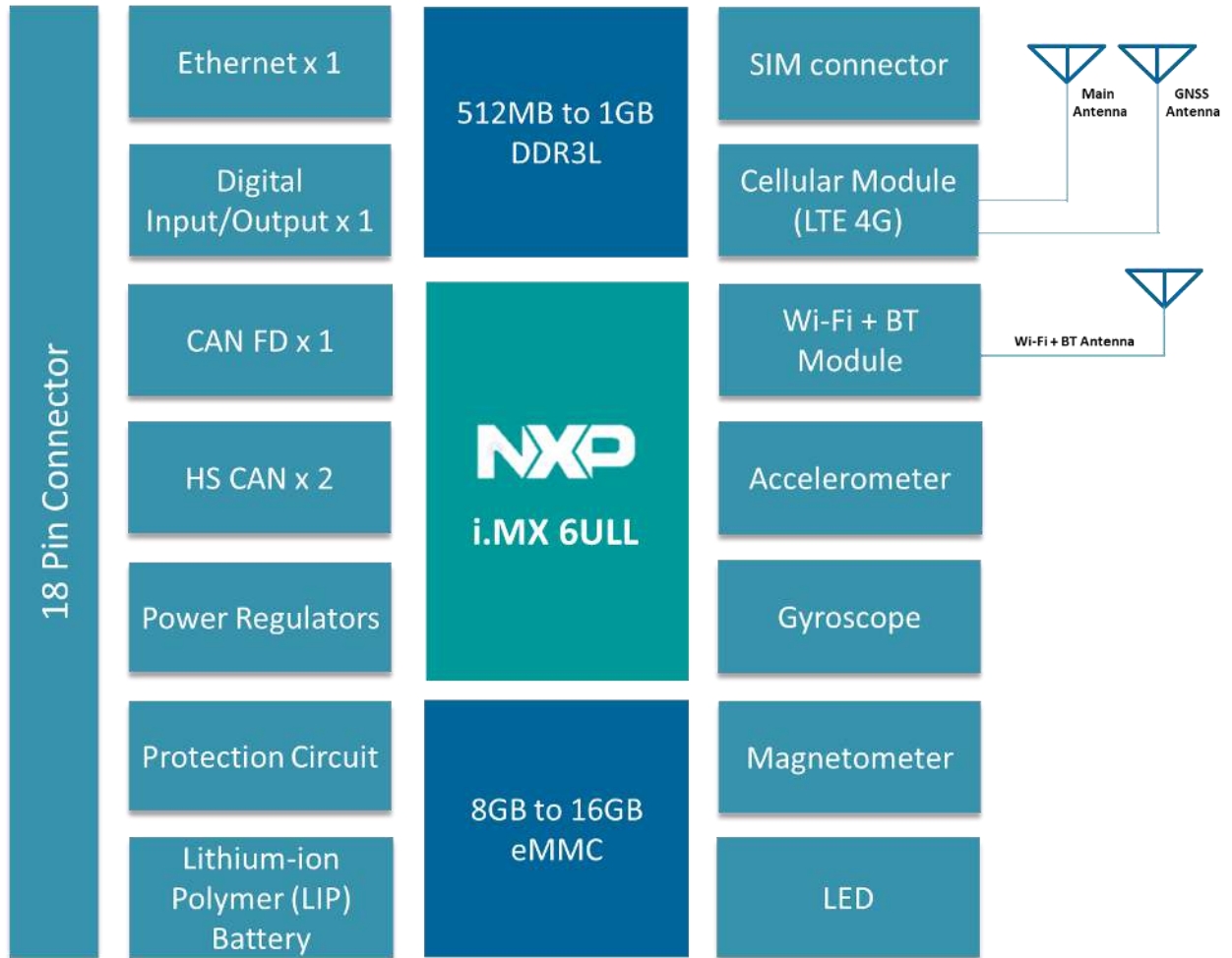
Key Features

- NXP i.MX 6ULL CPU
- 3 CAN Ports: 1 x CAN FD and 2 x HS CAN
- Wireless Connectivity: 4G / Wi-Fi / BT
- Sensors: Accelerometer and Gyroscope
- LINUX 5.4 BSP and API for peripherals
- Wide range of protocol support
  - o ISO 15765-4 / J1939 / CANopen
- Internal Battery Back Up

Software flexibility and Security

Powered by a powerful processor, The TCU is equipped with LINUX 5.4 Kernel and API's available for the various peripherals, sensors and connectivity modems. The i.MX 6 powered telematics unit provides consumers the flexibility to build their custom application and integrate with various cloud and analytics platforms.

The processor helps you integrate various security functions on the connected device such as secure boot, secure storage and remote firmware updates over the air.

Benefits and Value Proposition

The TCU is globally certified with FCC / ISED / CE and various country specific regulatory approvals. The powerful micro-processor provides the provision to enable various protocol standards, 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 for the customer to build their proprietary application and integration, makes the device the right choice for end applications.

Functional Block Diagram

18 Pin Connector

- Ethernet x 1
- Digital Input/Output x 1
- CAN FD x 1
- HS CAN x 2
- Power Regulators
- Protection Circuit
- Lithium-ion Polymer (LIP) Battery

512MB to 1GB DDR3L

NXP i.MX 6ULL

8GB to 16GB eMMC

- SIM connector
- Cellular Module (LTE 4G)
- Wi-Fi + BT Module
- Accelerometer
- Gyroscope
- Magnetometer
- LED

Main Antenna

GNSS Antenna

Wi-Fi + BT Antenna

Note: Standard delivery varies with respect to the few sections of this block diagram, depending on the ordered configuration

Ordering Part Numbers

Part number	Description
iW-G26U-Y2-512M3-008GE-MIWB-04-TH-LI5X	TCU with LTE Cat M1 (Global), Wi-Fi & BLE
iW-G26U-Y2-512M3-008GE-LIWB-04-TH-LI5X	TCU with LTE Cat 4 (EMEA/APAC), Wi-Fi & BLE
iW-G26U-Y2-512M3-008GE-AIWB-04-TH-LI5X	TCU with LTE Cat 4 (North America/Canada), Wi-Fi & BLE

Note:

- *In production, The telematics control unit can be configured as per the required features*

- *For more details on the TCU configurations, please contact iWave sales team at mktg@iwavesystems.com*

Telematics Control Unit

Processor Core and Storage

CPU	Arm® Cortex®-A7 based CPU @ 792MHz i.MX 6ULL Micro-Processor
RAM	DDR3L SDRAM – 512MB (Expandable upto 1GB)
FLASH	eMMC Flash – 8GB (Expandable upto 16GB)

Wireless Connectivity

Cellular Connectivity	LTE Cat 4 EMEA/APAC - B1/B3/B7/B8/B20/B28 North America/Canada - LTE FDD - B2/ B4/ B5/ B12/B13/ B25/ B26
	LTE Cat M1 LTE FDD - B1/ B2/ B3/ B4/ B5/ B8/ B12/ B13/ B18/ B19/ B20/B28 LTE TDD - B39 (for Cat M1 only)
Wi-Fi	802.11a/b/g/n/ac Hotspot and client mode With WPA2 feature
Bluetooth	Bluetooth v5.0 BR/EDR/LE

Interfaces and Peripherals

CAN FD	1 port
	Data rate up to 5Mbps
	Identifier Support: 11 and 29 bit
	Classic CAN backwards compatible
High-speed CAN	2 ports
	Data rate up to 1 Mbps
	Identifier Support: 11 and 29 bit
Ethernet	10/100Mbps x 1 (10Base-T/100Base-TX)
Digital Input/Output	Digital Input x 1 (Voltage: 12V/24V) Digital Output x 1 (Voltage: 12V/24V, Current: 500mA)

Environmental Conditions

Operating Temperature	-40°C to +70°C [3]
Storage Temperature	-40°C to +85°C [3]

Power Characteristics

Power Input	9V - 36V
Power Consumption	Current consumption at normal mode: 270mA at 12V
Sleep Current	5mA at 12V

Positioning

GNSS	GPS/GLONASS/BeiDou/Galileo
Receiving Channel[2]	72 Channel
Time to update position[2]	1s
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
	Aided starts: 3.4s

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

SIM Provision

SIM connector	Micro SIM Connector eSIM[1]

Antenna

Internal Antenna	GNSS x 1 (SMT Patch Antenna)
	Cellular x 1 (SMD Antenna)
	WiFi/BLE x 1 (PCB Antenna)

[1] *Optional features: For more information please contact iWave sales team at mktg@iwavesystems.com*

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

[3] *Temperature range subject to use case and operational functionality*

Internal Battery

Capacity	Lithium-ion Polymer (LIP) 1500mAh
Temperature Support	Battery when discharging: -20°C to +60°C Battery when charging: 0°C to 45°C
Certification	Certified with UN38.3 and IEC 62133-2

LED

LED 1	Red Cellular Module Power Indication
LED 2	Green Status Indication Software configurable

Software Specifications

Board support package (BSP)	U-Boot 2020.04 Linux version: 5.4.70
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
Wake-Up Modes	Ignition / CAN / Timer / Accelerometer
CAN Protocol[1]	Socket CAN ISO 15765-4 CANopen J1939 UDSonCAN K-Line
Data reading[1]	• ISO 9141-2 (5 baud init, 10.4kbps) • ISO 14230-4 KWP (5 baud init, 10.4kbps) • ISO 14230-4 KWP (fast init, 10.4kbps) • ISO 15765-4 CAN (11 bit ID; 250kbps, 500kbps) • ISO 15765-4 CAN (29 bit ID; 250kbps, 500kbps) • SAE J1939 (29 bit ID, 100kbps, 125kbps, 250kbps, 500kbps, 1000kbps)
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

Telematics Control Unit

Mechanical

Dimensions (H x W x D)	106 x 87 x 28.5 mm
Weight	160 gm
Enclosure Material	Polycarbonate UL 94 V0
Manufacturing Process	Injection Moulded
Assembly Type	Snap Fit
Colour of Enclosure	Black (RAL 9005) Opaque
Enclosure Surface Finish	Texture Finish VDI 30
Protection Class	IP30
Mounting Options	Slots for Cable Tie
Number of Enclosure Parts	2
Enclosure Certification	Flammability rating, UL94-V0

Top View
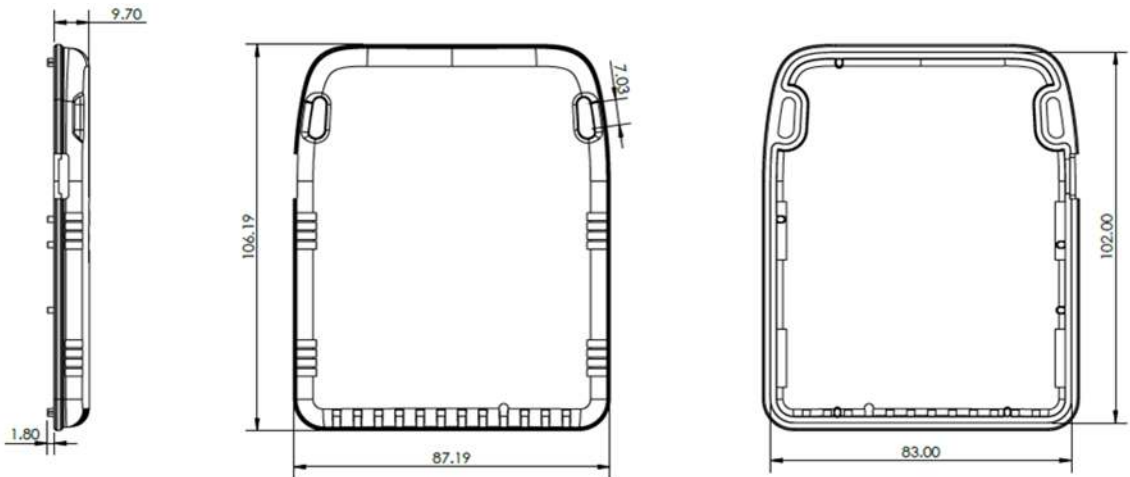
Bottom View
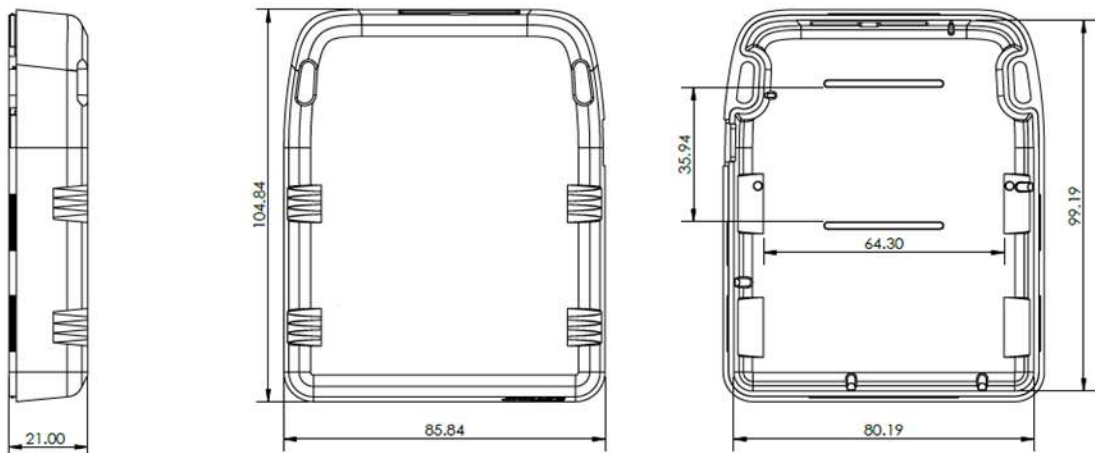
Regulatory

CE

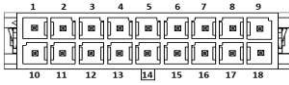| Safety & Health	EN 62368-1, EN 62311
EMC	EN 301 489-1 (EN 55032, EN 61000-4-3, ISO 7637-2, ISO 16750-2)
Radio	EN 301 511, EN 300 328, EN 303 413, EN 301 908-1, EN 301 908-2, EN 301 908-13, ETSI EN 301 893
RoHS	2011/65/EU & (EU) 2015/863, EN 50581

FCC/ISED

Part	FCC Part 2, Part 22, Part 27

Thermal Cycling Test

Standard	STD J1455

Connector Specifications

Description	18 Pin Micro-Fit Connector (Part Number: CP3518P1HST-NH)

Connector Pinout

Pin No	Signal Name	Description
1	HS_CAN2_H	Software BSP reference is CAN1
2	UART_RXD / DIN1[1]	UART RXD / Digital Input 1
3	FD_CAN_H	Software BSP reference is CAN2
4	Battery +	External Battery Input Voltage Positive
5	IGN_DET	Ignition Detection Input
6	UART_TXD / DOUT1[1]	UART TXD / Digital OUT 1
7	DOUT2	Digital OUT 2
8	ETH_MAG_TXM	Ethernet TXM
9	ETH_MAG_RXM	Ethernet RXM
10	HS_CAN2_L	Software BSP reference is CAN1
11	DIN2 / ETH_ACTIVATE[1]	Digital IN 2 / ETH_ACTIVATE
12	FD_CAN_L	Software BSP reference is CAN2
13	HS_CAN1_H	Software BSP reference is CAN0
14	HS_CAN1_L	Software BSP reference is CAN0
15	Battery -	External Battery Input Voltage Negative
16	ETH_ACTIVATE	Ethernet Activate
17	ETH_MAG_TXP	Ethernet TXP
18	ETH_MAG_RXP	Ethernet RXP

[1] *Marked one are optional features, in standard delivery these features are not supported by default. For example, pin 6 is UART_TXD/DOUT1[1], in standard delivery UART_TXD is supported and DOUT1 is an optional feature. For optional features support, contact iWave.*

Mating connector	18 pin TCU Mating connector (Part Number: CP3518S0010-NH)

Mating Harness Cable Specifications

Image	

Note on Cable Length:

P1 - P2 Cable length: 1000 mm

P1 - P3 Cable length: 1000 mm

P1 - P4 Cable length: 100 mm

Specification	
	P1: 18 pin TCU mating connector (Part Number: CP3518S0010-NH)
	P2: Standard Male OBD II connector (Part Number: Standard OBD II Connector)
	P3: Standard Male OBD II connector - Blue (Part Number: Standard OBD II Connector)
	P4: 10 pin IO Connector (Part Number: CP3510S0010-NH)

Pinout

Pin No	Standard OBD II Connector (CAN)-P2	Standard OBD II Connector (Ethernet)-P3	IO Connector-P4
1	HS_CAN2_H	IGN_DET	Battery -
2	NC	NC	UART_TXD / DOUT1[1]
3	FD_CAN_H	ETH_MAG_RXP	UART_RXD / DIN1[1]
4	NC	NC	DOUT2
5	Battery -	Battery -	DIN2 / ETH_ACTIVATE[1]
6	HS_CAN1_H	HS_CAN1_H	ETH_ACTIVATE
7	NC	NC	IGN_DET
8	HS_CAN2_L	ETH_ACTIVATE	HS_CAN1_H
9	NC	NC	HS_CAN1_L
10	NC	NC	Battery +
11	FD_CAN_L	ETH_MAG_RXM	
12	NC	ETH_MAG_TXP	
13	NC	ETH_MAG_TXM	
14	HS_CAN1_L	HS_CAN1_L	
15	NC	NC	
16	Battery +	Battery +	

[1] *Marked one are optional features, in standard delivery these features are not supported by default. For example, in P4, pin 2 is UART_TXD/DOUT1[1] in standard delivery, UART_TXD is supported and DOUT1 is an optional feature. For supporting optional features, contact iWave.*

Related Products
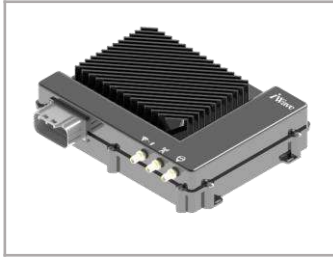
Telematics Gateway

The i.MX 8XLite powered Telematics Gateway is built with extensive interfaces: 4 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.

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.

V2X Connectivity Hub

Integrated with C-V2X and DSRC technologies, the hybrid V2X Connectivity Hub provides as a scalable and modular platform. Designed to serve a plethora of V2X Applications, the V2X Gateway can be positioned as an On-Board Unit (OBU) or as a Road-Side Unit (RSU).

Document Revision History

Document Number	iW-PRGET-RS-01-R3.0-REL1.0	
Release	**Date**	**Description**
1.0	10th June 2020	Official Release Version
1.1	27th April 2022	Harness Cable Pinouts Update

CONTACT US

We are committed to provide the best possible support to our customers. For assistance and more detailed information please contact us at,

Email : mktg@iwavesystems.com

Website : www.iwavesystems.com

Address : iWave Systems Technologies Pvt. Ltd.

7/B, 29th Main, BTM Layout 2nd Stage,

Bangalore, Karnataka, India – 560076

NOTE: "Please refer the actual configuration that has been ordered. Few sections of this manual may not apply, depending on the ordered configuration"

INDIA
iWave Systems Technologies Pvt Ltd.
#7/B, 29th Main, BTM Layout 2nd Stage,
Bangalore - 560 076, INDIA.
Ph: +91-80-26683700, 26786245
mktg@iwavesystems.com

JAPAN
iWave Japan Inc.
8F Kannai Sumiyoshi Building, 3-29 Sumiyoshi-cho,
Naka-ku, Yokohama Kanagawa, JAPAN
Ph: 045-227-7626, 045-227-7646
mktg@iwavesystems.com

EUROPE
International Sales and Marketing Europe
Venkelbaan 55 2908KE Capelle aan den IJssel
The Netherlands
Ph: +31 10 28403383
info@iwavesystems.eu

USA
iWave USA
1692 Westmont Ave.
Campbell, CA95008 USA
Ph: 408-206-5958
info@iwavesystems.us

iwavesystems.com