

PI Labs IoT Gateway Datasheet (G2-T1/G2-T2/G2-T3)

List of contents

1. Abstract	1
2. Main features and device variations	2
3. Electrical Characteristics	3
3.1. Absolute Maximum Values	3
3.2. Recommended Operating Conditions	3
3.3. Performance Characteristics	4
3.3.1. Supply and wake-up characteristics	4
3.3.2. Interface characteristics	4
4. Mechanical Dimensions	5
4.1. Aluminium profile housing variant	5
4.2. 19" rack mount cassette housing variant	6
4.3. Mass	6
5. Pinout	7
5.1. Main connector	7

1. Abstract

This datasheet describes the PI Labs IoT Gateway together with its features and functionality, including the differences between the three product variations: G2-T1, G2-T2 and G2-T3.



Figure 1. 19" rack mount cassette housing, for G2-T1 and G2-T3 derivate



Figure 2. Aluminium profile housing (IP67), for G2-T2 derivate

2. Main features and device variations

The following table describes the main features of the IoT Gateway and the different between each product derivative. The highlighted cells within the table indicate the differences between the rest of the columns to remark the differences.

Main Features	G2-T1	G2-T2	G2-T3
Housing	19" rack mount cassette	Aluminium profile	19" rack mount cassette
Housing sealing protection level	IP20	IP67	IP20
ARM CPU with Cortex-A72 quad core up to 1.5 GHz and up to 8 GB RAM	Yes	Yes	Yes
Gigabit ethernet via RJ45 connector	Yes	Yes	Yes
Front panel button	Yes	No	Yes
USB2.0 host via USB-C Connector with up to 1.5 A output current	2X	1X	2X
RGB-LED for signaling the device state	Yes	Yes	Yes
2x CAN-FD up to 8 Mbit/s	Yes	Yes	Yes
Up to 15 flexible in/output pins for internal extension board	Yes	Yes	Yes
Integrated cellular modem miniPCIe slot (with external antenna)	Yes	Yes	No
Integrated M.2 card slot for SSD, modem, etc.external SMA antenna connector	Yes	Yes	Yes

Main Features	G2-T1	G2-T2	G2-T3
GNSS receiver for GPS, GLONASS, Galileo and QZSS (external SMA antenna connector)	Yes	Yes	Yes
WiFi (2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac) and BLE (external SMA antenna connector)	Yes	Yes	Yes
Internal accelerometer and gyroscope	Yes	Yes	Yes
2x internal SD card for system and data storage (up to 2x 64 GB)	Yes	Yes	Yes
Sleep mode with less than 10 mA and inactivity detection	Yes	Yes	Yes
Wake up sources: internal timer, CAN, accelerometer or input pin	Yes	Yes	Yes
Secure connection via integrated TPM2.0 module	Yes	Yes	Yes
Debian based embedded OS	Yes	Yes	Yes
CE and ECE certified (on process, not yet acquired)	Yes	Yes	Yes

3. Electrical Characteristics

3.1. Absolute Maximum Values

Exceeding the absolute maximum ratings can permanently damage the device. These values do not imply correct operation of the device.

Table 1. Absolute Maximum Ratings (all voltages referenced to GND, Pins on main connector)

Parameter	Symbol	Min	Max	Unit
Supply Voltage (Pin 6)	V_{in}	-40	42	V
Wake-up Input Voltage (Pin 7)	V_{WAKE}	-6	60	V
Case Voltage (Pin 21)	V_{Case}	-500	500	V
CAN Voltages (Pins 1, 2, 16, 17)	$V_{CAN_low}, V_{CAN_high}$	-58	58	V
USB Voltages (all USB pins)	V_{USB+}, V_{USB-}	-0.5	6	V
Ethernet Voltages (all RJ45 pins)	V_{ETH}	-1.5	1.5	kV
GPIO Voltage (all other pins) ¹	V_{GPIO}	-40	42	V
Storage temperature (unsupplied)	T_{stor}	-40	+85	°C

3.2. Recommended Operating Conditions

Table 2. Operating Conditions (all voltages referenced to GND, Pins on main connector)

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage (Pin 6)	V_{in}	7	12 or 24	38	V
Wake-up Input Voltage (Pin 7)	V_{WAKE}	0	-	V_{in}	V

Parameter	Symbol	Min	Typ	Max	Unit
CAN Voltages (Pins 1, 2, 16, 17)	$V_{CAN_low}, V_{CAN_high}$	-12	2	12	V
Ambient temperature	T_{amb}	-25	+25	+85	°C

3.3. Performance Characteristics

3.3.1. Supply and wake-up characteristics

Table 3. Supply characteristics (all voltages referenced to GND, $T_{amb} = 25\text{ °C}$, $V_{in} = 24\text{ V}$ unless otherwise noted)

Parameter	Symbol	Min	Typ	Max	Unit
Wake-up Pin Input Resistance	R_{WAKE}	12	13	-	kR
Wake-up Pin High Level	V_{WAKE_high}	4.5		V_{in}	V
Run state power consumption ²	P_{in}	-	5	30	W
Sleep Supply Current	I_{sleep}	-	10	30	mA
Boot time from power down to full power	t_{boot}	-	25	-	s
Power off time for guaranteed reset	t_{off}	50	-	-	ms

3.3.2. Interface characteristics

- supported CAN standards: CAN 2.0B, CAN-FD
- supported USB standards: USB 2.0 High speed, USB-C
- supported Ethernet standards: 1000BASE-T
- supported Wifi standards: IEEE 802.11 b/g/n/ac (2,4 and 5 GHz bands)
- supported Bluetooth standards: Bluetooth 5.0, BLE
- supported GNSS constellations: GPS L1, QZSS C/A, Galileo E1, BeiDou B1I, GLONASS L1, SBAS L1
- EU supported LTE bands between 2.6 GHz and 800 MHz

Table 4. Interface characteristics (all voltages referenced to GND, $T_{amb} = 25\text{ °C}$, $V_{in} = 24\text{ V}$ unless otherwise noted)

Parameter	Symbol	Min	Typ	Max	Unit
USB Output Voltages	V_{BUS}	4.75	5	5.25	V
Max. USB Output Current	I_{USB1}, I_{USB2}	0.5	1.5	1.8	A
USB data rate	C_{USB}	1.5	- ³	480	Mbit/s
Ethernet data rate	C_{Eth}	-	-	1000	Mbit/s
CAN-FD data rate	C_{CAN-FD}	-	-	8	Mbit/s
Accelerometer range	a_{Accel}	-16	-	+16	g
Gyroscope range	d_{Gyro}	-2000	-	+2000	dps
Button push force	F_{Button}	-	5	-	N

Parameter	Symbol	Min	Typ	Max	Unit
approximate LED brightness per color	I_{V_LED}	-	100	-	mcd

Table 5. Recommended Antenna characteristics

Parameter	Symbol	Min	Typ	Max	Unit
GNSS antenna total gain	A_{GNSS}	-	18	-	dB
GNSS antenna VSWR	r_{GNSS}	-	2	-	:1
Active GNSS antenna noise figure	P_{noise}	-	1.5	-	dB
Active GNSS antenna supply voltage	U_{GNSS}	3.0	3.3	3.5	V
Active GNSS antenna supply current	I_{GNSS}	-	-	25	mA
BT/Wifi antenna peak gain in 2.4GHz band	$A_{2.4GHz}$	-	-	3	dBi
BT/Wifi antenna peak gain in 5GHz band	A_{5GHz}	-	-	5	dBi
BT/Wifi antenna VSWR in used bands	r_{Wifi}	-	2	5	:1
Cellular antenna peak gain	A_{LTE}	-	-	6	dBi
BT/Wifi antenna input power	P_{Wifi}	150	-	-	mW
Cellular antenna VSWR in used bands	r_{LTE}	-	3	5	:1
Cellular antenna input power	P_{LTE}	350	-	-	mW

¹ depends on the used Extension Board, values are valid for no extension board used

² without external consumers attached

³ depends on USB device

4. Mechanical Dimensions

4.1. Aluminium profile housing variant

- IP Protection Level: IP67

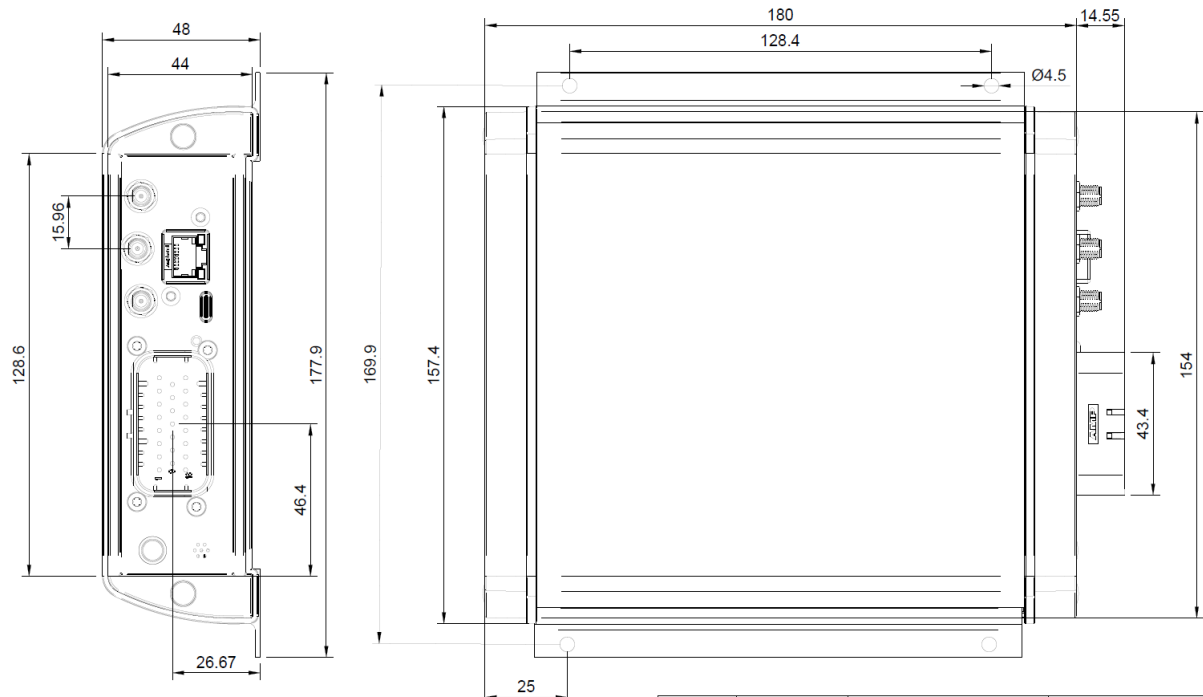


Figure 3. Dimensions of the IoT-Gateway 2 aluminium profile housing variant in mm

4.2. 19" rack mount cassette housing variant

- IP Protection Level: IP20

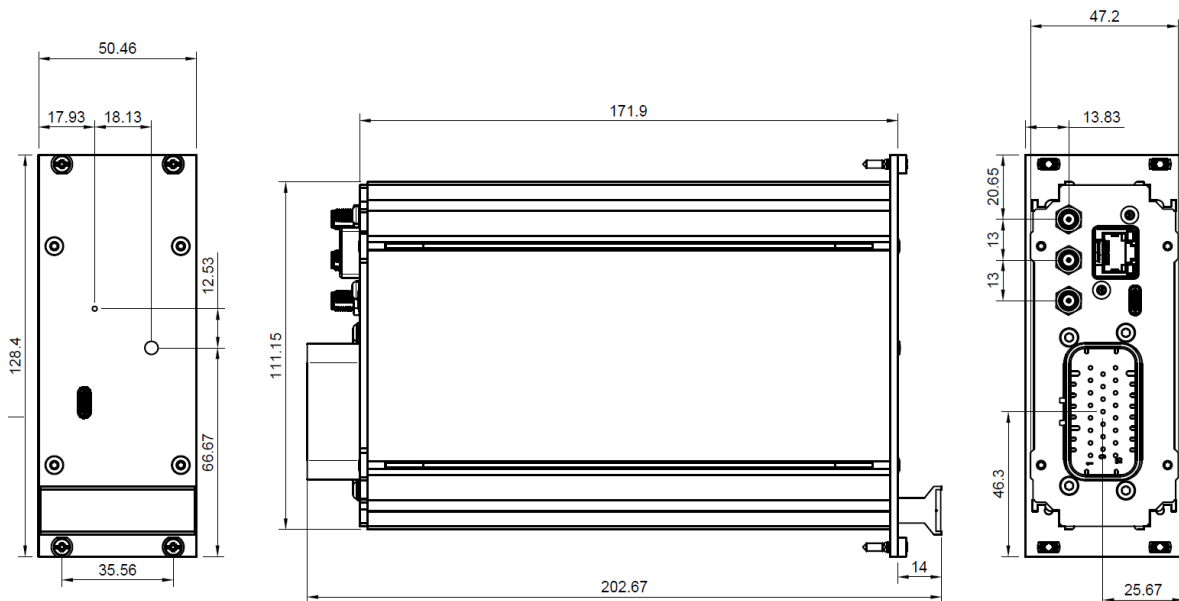


Figure 4. Dimensions of the IoT-Gateway 2 19" rack cassette housing variant in mm

4.3. Mass

	G2-T1	G2-T2	G2-T3
Mass	575 g	825 g	565 g

5. Pinout

5.1. Main connector

15 GPIOs (including up to 7 differential pairs with 120 Ohm differential impedance) are available on the main connector. All signals are connected to the Extension Board. The following image shows the [Front view of the main connector](#), the pins are described in the table [Main Connector Pin Assignment](#).

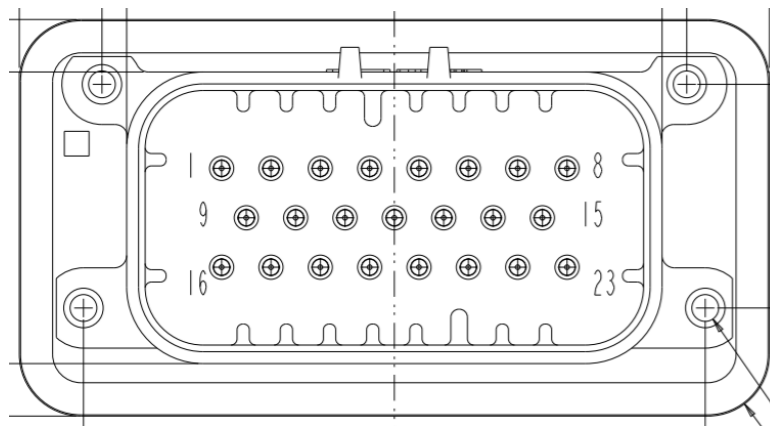


Figure 5. Front view of the main connector

Table 6. Main Connector Pin Assignment

Pin Number	Description
1	CANo_H
2	CANo_L
3	GPIO 0
4	diffPair 1-
5	diffPair 1+
6	V _{IN} +
7	diffPair 2-
8	diffPair 2+
9	GPIO 1 / diffPair 3+
10	GPIO 2 / diffPair 3-
11	WAKE
12	GPIO 3 / diffPair 4+
13	GPIO 4 / diffPair 4-
14	GPIO 5 / diffPair 5+
15	GPIO 6 / diffPair 5-
16	CAN1_L

Pin Number	Description
17	CAN1_H
18	GND
19	diffPair 6-
20	diffPair 6+
21	Case
22	diffPair 7+
23	diffPair 7-