

Product Specification

Product Name: Multi Protocol Host Gateway
Model Name: DSGW-290/DSGW-291

Revision History

Specification		Sect.	Update Description	By
Rev	Date			
1.0	2022-07-08		New version release	Li
1.1	2022-07-13		Add hardware block	Li
1.2	2022-7-19		Change coreboard into RK3568	Li
1.3	2022-7-29		Adjust interface	Li
1.4	2023-03-02		Add resource list	WX
1.5	2023-04-03		Adjust resource list	Li

Approvals

Organization	Name	Title	Date



DSGW-290



DSGW-291

Model List

Model Feature	wifi2.4/5G	BLE	LTE cat.4	ZigBee	Z-wave	Ethernet 1000Mbps	lora	tuya-Zigbee	sub-g
DSGW-290-X-1	•	•	•	•	•	•			•
DSGW-290-X-2	•	•	•			•		•	
DSGW-291-X-1	•	•	•	•	•	•	•		•
DSGW-291-X-2	•	•	•			•	•	•	
DSGW-290-X-3	•	•				•			

Resource List

Model Feature	RAM	eMMC	SSD	Remark
-G	2GB	32GB	Slot Support ^[2]	
-H	4GB	64GB	Slot Support	Default Sample Resources
-I	8GB	128GB	Slot Support	

Remark :

[1] Model corresponds to the model list chart above;

[2] M.2 SSD slot is reserved on the gateway, users can install SSD by themselves

[3] Note:DSGW-290-X-N .X means different RAM and eMMC configurations.N means support protocols.

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1. Introduction

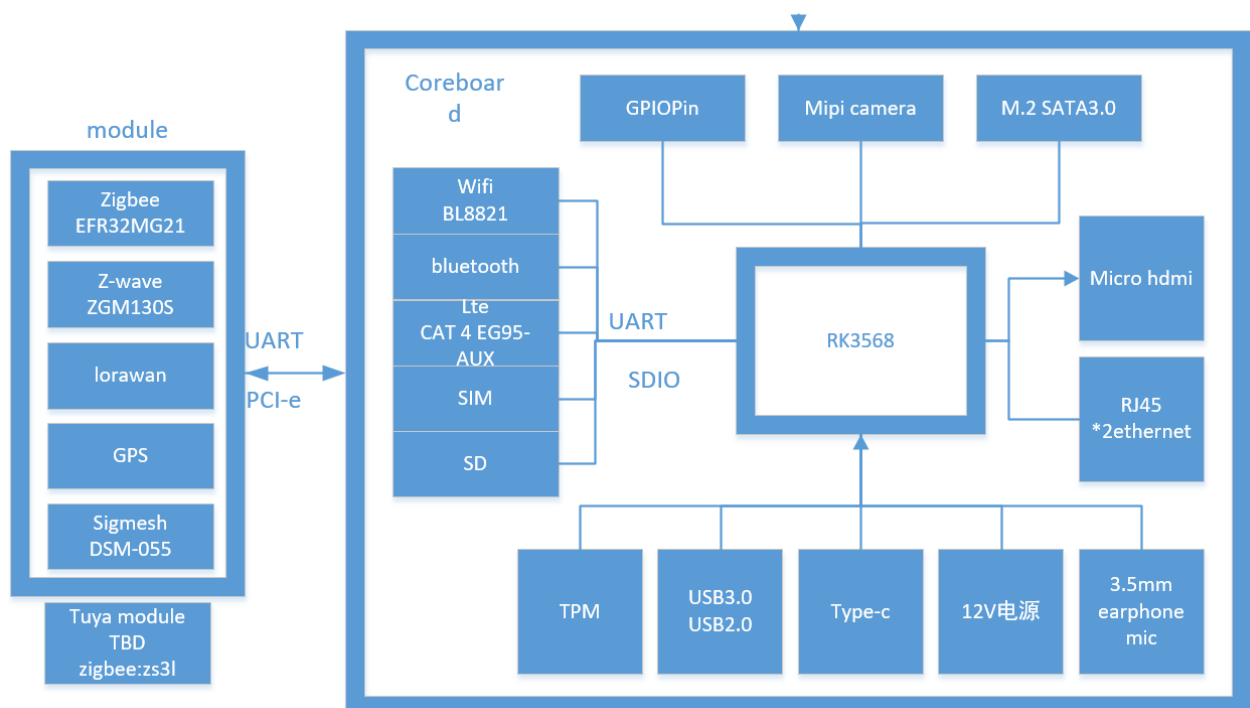
1.1 Purpose & Description

Dusun Pi4 is an IoT gateway for developers, which is basically similar to Raspberry Pi4. It adopts Rockchip RK3568 processor, based on ARM Quad-core Cortex-A55 core, 64bit, 2GHz. It can run multiple systems, linux, debian, android etc. there are rich external interface, HDMI, USB, Ethernet. And compared to raspberry pi 4, it has built-in IoT wireless module, including zigbee, z-wave, bluetooth, Wi-Fi, LTE. Developers can quickly develop their own gateways and hardware encryption and also supported.

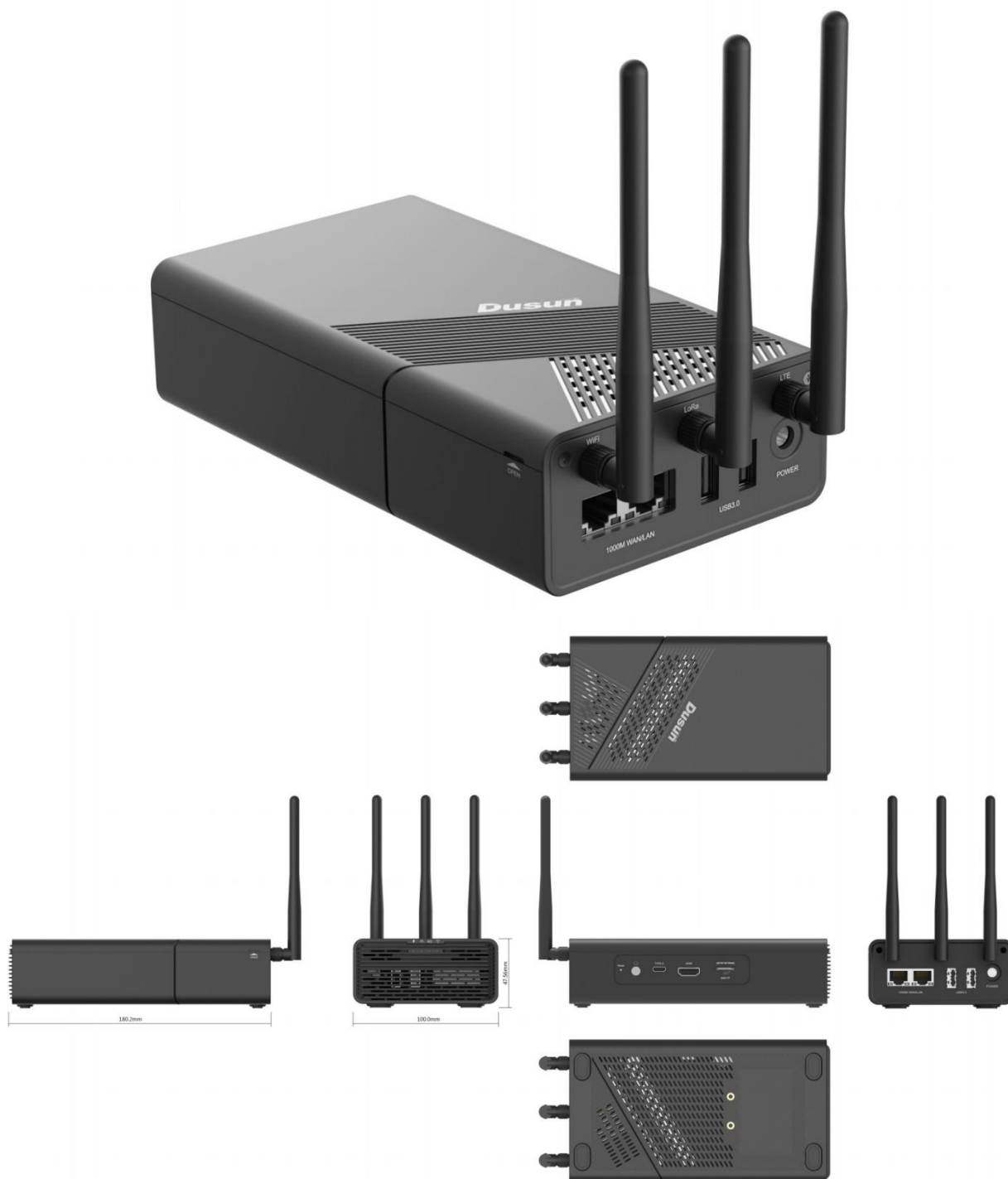
1.2 Product Feature Summary

- Support audio input and output (3.5mm)
- 1000M Ethernet*2
- 2 × USB 3.0 ports
- 1 × micro HDMI port
- SD card support: Micro SD card slot for loading operating system and data storage
- Input power: 12V DC via USB-C connector (minimum 3A1)
- Power over Ethernet (PoE)–enabled (requires separate PoE HAT)
- supports 2.4GHz / 5GHz dual-band WiFi, 802.11a/b/g/n/ac protocol
- Support zigbee3.0, BLE5, Z-WAVE, sub-G, LoRaWAN, LTE
- Support Android, Linux, Ubuntu and other operating systems

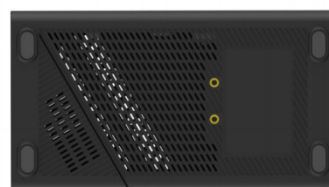
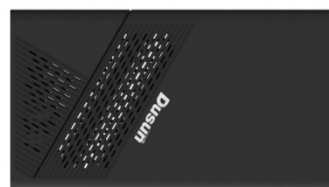
1.3 Hardware block



2.Mechanical Requirement



DSGW-291 (External antennas with lora)



- DSGW-290 (Built-in antennas without lora)

3.Specifications

3.1 Basic parameters

Basic parameters	
Main chip	RK3568
CPU	ARM® Quad-core 64-bit processor, Quad-core Cortex-A55
GPU	ARM G52 2EE Support OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1
Video Processor	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60fps 1080P multi-format video decoding (WMV, MPEG-1/2/4, VP8) 1080P video encoding, support H.264, VP8 format Video post processor: de-interlacing, denoising, edge/detail/color optimization
Power Management	RK808 PMU Power Management Unit
RAM	8GB dual channel 64Bit LPDDR4(2GB/4GB/8GB optional)
Storage	Up to 128GB high-speed eMMC (32GB/64GB/128GB optional) M.2 SSD option
TF card	support
Hardware features	
Ethernet	Integrated GMAC Ethernet Controller*2 10/100/1000-Mbps data transfer rate supported using RGMII interface 10/100-Mbps data transfer rate supported using RMII interface Support to expand Realtek RTL8211E to achieve 10/100/1000Mbps Ethernet
Display	Video output interface: - 1 x HDMI 2.0, support 4K@60HZ output and HDCP 1.4/2.2 - 1 x MIPI-DSI, support dual channel 2560x1600@60fps output
Audio	1 x HDMI 2.0, 3.5mm Audio port
Camera	1 x MIPI-CSI camera interface (built-in dual hardware ISP, up to single 13Mpixel or dual 8Mpixel)(developer mode)
PCIE	1 x PCIe2.1 interface
Power	12V (Voltage error $\pm 5\%$)
USB	USB3.0 $\times 2$
Debug	Debug serial port $\times 1$ for development and debugging
Power dissipation	Standby power dissipation:0.015W Typical power dissipation: 2.9W Maximum power dissipation: 5.6W
Environment	Working temperature: -10°C- 50°C Storage temperature: -40°C- 85°C Storage humidity: 10% ~ 80%

System software	
System Support	Ubuntu18.04 (Pre-installed),Android10.0, Buildroot+QT
Appearance specification	
Core board size	82mm × 50.5mm (plate thickness 1.2mm)
Interface Type	MXM3.0 (314 PIN, 0.5mm pitch)
PCB specification	8-layer board design, immersion gold process
Hardware encryption	Hardware Support for Symmetric Algorithms(TPM) – SHA-256 & HMAC Hash including off-chip context save/restore – AES-128: Encrypt/Decrypt, Galois Field Multiply for GCM

3.2 Wireless protocol parameters

Wi-Fi Parameters	● IEEE wireless LAN standard: IEEE802.11ac; IEEE 802.11a; IEEE802.11n; IEEE802.11g; IEEE 802.11b ● Data Rate: IEEE 802.11b Standard Mode:1,2,5.5,11Mbps IEEE 802.11g Standard Mode:6,9,12,18,24,36,48,54 Mbps IEEE 802.11n: MCS0~MCS7 @ HT20/ 2.4GHz band MCS0~MCS7 @ HT40/ 2.4GHz band MCS0~MCS9@ HT40/ 5GHz band IEEE 802.11ac: MCS0~MCS9 @ VHT80/ 5GHz band ● Sensitivity: ● VHT80 MCS9 : -60dBm@10% PER(MCS9) /5GHz band ● HT40 MCS9 : -63dBm@10% PER(MCS9) /5GHz band ● HT40 MCS7 : -70dBm@10% PER(MCS7) /2.4GHz band ● HT20 MCS7 : -71dBm@10% PER(MCS7) /2.4GHz band - IEEE 802.11ac: 13dBm @HT80 MCS9 /5GHzband - IEEE 802.11ac: 16dBm @HT80 MCS0 /5GHz band - IEEE 802.11n: 14dBm @HT20/40 MCS7 /5GHz band - IEEE 802.11n: 16dBm @HT20/40 MCS0 /5GHz band - IEEE 802.11n: 16dBm @HT20/40 MCS7 /2.4GHz band - IEEE 802.11g: 16dBm @54MHz - IEEE 802.11b: 18dBm @11MHz ● Wireless Security: WPA/WPA2, WEP, TKIP, and AES ● Working mode : Bridge、 Gateway、 AP Client ● Range: 50 meters minimum, open field ● Transmit Power:17dBm ● Highest Transmission Rate: 300Mbps ● Frequency offset: +/- 50KHZ ● Frequency Range (MHz): 2412.0~2483.5 ● Low Frequency (MHz):2400 ● High Frequency (MHz):2483.5 ● E.i.r.p (Equivalent Isotopically Radiated power) (mW)<100mW
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Wi-Fi Parameters	● Bandwidth (MHz):20MHz/40MHz ● Modulation: BPSK/QPSK, FHSSCCK/DSSS, 64QAM/OFDM
zigbee	● TX Power: 17.5dBm ● Range: 100 meters minimum, open filed ● Receiving Sensibility:-94dBm ● Frequency offset: +/-20KHZ ● Frequency Range (MHz):2401.0~2483.5 ● Low Frequency (MHz):2400 ● High Frequency (MHz):2483.5 ● E.i.r.p (Equivalent Isotopically Radiated power) (mW)<100mW ● Bandwidth (MHz):5MHz ● Modulation: OQPSK
Bluetooth	● TX Power: 19.5dBm ● Range: 150 meters minimum, open filed ● Receiving Sensibility: -80dBm@0.1%BER ● Frequency offset: +/-20KHZ ● Frequency Range (MHz):2401.0~2483.5 ● Low Frequency (MHz):2400 ● High Frequency (MHz):2483.5 ● E.i.r.p (Equivalent Isotopically Radiated power) (mW)<10mW ● Bandwidth (MHz):2MHz Modulation: GFSK
Lora(DSGW-291support only)	● Frequency band support: RU864, IN865, EU868, US915, AU915, KR920, AS923 ● TX power up to 27dBm, RX sensitivity down to -139dBm @SF12, BW125kHz
Z-wave	● TX power up to13dBm (20mW) ● Range: 100 meters minimum, open filed ● Default Frequency: 916MHz(Different country with different frequency) ● RX sensitivity: @100kbps-97.5dBm
LTE-cat4	● 4G FDD-LTE B1/B3/B7/B8/B20 (2100/1800/2600/900/800MHz) ● TDD-LTE B38/B39/B40/B41 (2600/1900/2300/2500MHz) ● 3G: DC-HSPA+/HSPA+/HSPA/UMTS B1/B8 (2100/900MHz)
Sub-g	● TX Power: 14dBm ● Range: 100 meters minimum, open filed ● Receiving Sensibility:-94dBm

4.QA Requirements

4.1Quality and Testing Information

Information Description	Standard(Yes) custom(No)
ESD Testing	Yes
RF Antenna Analysis	Yes
Environmental Testing	Yes

Reliability Testing	Yes
Certification	FCC, CE, Bluetooth(BQB), PTCRB, RoHs

FCC Statement

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

To comply with RF exposure requirements, a minimum separation distance of 20cm must be maintained between the user's body and the equipment, including the antenna.