LD1001

LoRaWAN® Indoor Gateway with Built-in Network Server



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1. Description

1.1 Overview

> The LD1001 is an original Linxdot gateway product. Siliqs is the value-added system provider for the LoRaWAN system: it supplies the management software and features on the gateway (chapter 2), pre-shipment configuration, integration of Siliqs nodes, and technical support.

The LD1001 is an indoor 8-channel LoRaWAN gateway that Siliqs ships ready to use: the LoRaWAN network server (ChirpStack v4) runs inside the gateway, so a small site needs no separate server, no cloud account and no internet connection to start collecting sensor data.

Siliqs adds its own management firmware on top of the original Linxdot hardware: a bilingual (Traditional Chinese / English) "Simple mode" web page for everyday tasks, a device catalogue for Siliqs nodes, gateway-to-gateway mesh relay to extend coverage, and automatic recovery of ABP nodes after a power loss (Auto-Resync).

The LD1001 is hardware- and software-compatible with the LD1002; this datasheet applies to both.

1.2 Siliqs product line

The LD1001 is the gateway of the Siliqs LoRaWAN product line. Nodes are added from the gateway's own web page, with the decoder already set up:

Table 1.2: Supported nodes (built-in device catalogue)

Node	Function	Join mode
Siliqs SQC485I	RS485 / Modbus to LoRaWAN industrial node — brings existing meters and controllers onto the network	ABP
Siliqs SQS-TH-I	Wireless temperature and humidity node	ABP
Milesight UC502	Multi-interface LoRaWAN controller (e.g. with an RS485 temperature and humidity sensor)	OTAA

Typical systems:

- RS485 metering: Modbus meters → SQC485I → LoRaWAN → LD1001 (built-in server) → your back-end over MQTT.
- Environmental monitoring: SQS-TH-I or UC502 + sensor → LoRaWAN → LD1001 → data on the gateway web page or your back-end.
- Large or obstructed sites: extra LD1001 units in Relay role extend coverage into areas the main gateway cannot reach, without network cabling to the relays (section 2.2).

Other LoRaWAN Class A / C devices can be added through the built-in ChirpStack interface.

1.3 Product Features

- 8-channel LoRaWAN gateway, Semtech SX1302 concentrator, shipped configured for AS923-1 (Taiwan), 923.2 – 924.6 MHz.
- Built-in ChirpStack v4 network server and MQTT broker — works stand-alone on a LAN, no internet needed.
- Mesh relay — a gateway can act as Main node or Relay; relays forward LoRaWAN traffic to the main node over LoRa, with no internet connection at the relay.
- ABP Auto-Resync — ABP nodes that lose power and restart their frame counter are re-synchronised automatically, without manual work on the server.
- Simple-mode web page in Traditional Chinese / English: status, network, time, devices, password.
- Network-setting safeguard: a wrong IP setting is rolled back automatically if not confirmed within 3 minutes.
- Can forward to your own LoRaWAN server instead of the built-in one (ChirpStack MQTT forwarder).
- Gigabit Ethernet, Wi-Fi access point for on-site configuration, mDNS host name (`<hostname>.local`).

- Quad-core Rockchip RK3566, 2 GB RAM, 32 GB eMMC, ATECC608 secure element.
- Outdoor version planned: cast-aluminium enclosure with PoE, N-type antenna connector and pole mounting (section 4.4).

2. Software

2.1 Built-in network server

Item	Description
Network server	ChirpStack v4, running on the gateway
Web interface	ChirpStack UI on port 8080
Integration	MQTT (ChirpStack v4 JSON event format); broker on the gateway, port 1883
Data decoding	Decoders for Siliqs nodes pre-installed; decoded values in the `object` field
Device management	Add / delete nodes from the Simple-mode page (ABP or OTAA fields shown per model)
External server	Optional: forward to your own ChirpStack-compatible server over MQTT instead of the built-in one

> Each gateway's built-in server keeps its own device list. When several gateways run as independent Main nodes, register each node on one gateway only.

2.2 Mesh relay

Each LD1001 can be set to one of two roles from the Simple-mode page:

Role	Function
Main node	Works as a normal gateway; sends data to the built-in or your own server. Also receives traffic forwarded by relays.
Relay	Placed where the main node cannot hear the devices. Receives LoRaWAN uplinks and forwards them to the main node over LoRa (ChirpStack Gateway Mesh). Needs power only — no internet or network cable.

- Relays and main node share a mesh key, which can be changed from the web page; the gateway warns when the factory default key is still in use.
- Main-node ↔ relay end-to-end uplink has been verified in the Siliqs lab.
- Maximum number of hops, number of relays per main node and relay range: TBC.

2.3 ABP Auto-Resync (power-loss recovery)

ABP nodes such as SQC485I restart their LoRaWAN frame counter after a power loss. A standard network server would then reject their data until someone resets the device on the server.

With the built-in server, the LD1001 detects the restart from the first uplinks after power-up and rebuilds the session with the same keys, typically within about one minute (at a 15 s reporting interval). No manual action is needed.

Conditions and limits:

- Works only with the built-in server, and only for nodes added from the Simple-mode device page.
- To allow recovery, the server does not reject repeated frame counters for these nodes. A recorded old radio frame replayed later may be accepted as new data; keys are not exposed. Where stricter security is required, use OTAA nodes.
- Recovery is rate-limited per node (at most once per 10 minutes and 6 times per 24 hours). Beyond the limit, data is still received; only adaptive data rate (ADR) pauses until the next node restart.
- Data sent while the gateway itself is off is not stored or re-sent by the nodes.

2.4 Web management

Function	Description
Simple mode	Status card (network, LoRa module, server, last data received), role and server selection, language switch (繁中 / EN)
Network	DHCP or static IP; changes roll back automatically unless confirmed within 3 minutes
Time	NTP (up to 5 servers), time zone, "set from this computer" when offline
Devices	Device cards with last report, RSSI / SNR and latest values; colour status (< 1 h / 1 – 24 h / > 24 h)
Device catalogue	Pre-defined node models with decoders (Table 1.2)
Advanced mode	Full settings: Wi-Fi, MQTT, concentrator, mesh, Semtech UDP packet forwarder
Access	HTTPS (self-signed certificate); SSH

3. Specifications

3.1 General specifications

Table 3.1: General specifications

Parameters	Description
Processor	Rockchip RK3566, quad-core, up to 1.8 GHz
Memory	2 GB RAM
Storage	32 GB eMMC
Security element	Microchip ATECC608
Operating system	OpenWrt-based Linux
LoRa concentrator	Semtech SX1302, 2 × SX1250 RF front-end, note 1
LoRaWAN	Class A / C devices, LoRaWAN 1.0.x (ABP and OTAA)
Network server	ChirpStack v4 (built-in)
Enclosure	ABS plastic, indoor (outdoor version planned: cast aluminium, section 4.4)
Dimensions	190 × 190 × 50 mm (excluding antenna)
Weight	512 g

> Note 1: An SX1261 is also fitted for Listen-Before-Talk / spectral scan; LBT support in the shipped firmware is TBC.

3.2 LoRa radio

Table 3.2: LoRa radio

Parameter	Value
Shipped channel plan	AS923-1 (Taiwan)
Uplink channels	8 × 125 kHz, 923.2 – 924.6 MHz
RX2	923.2 MHz, DR2
Other regional plans (EU868, US915, AS923-x …)	Supported by the concentrator hardware; not yet released by Siliqs — TBC
Max. TX power	27 dBm (conducted), note 2
RX sensitivity	TBC
Antenna	3 dBi LoRa antenna included; higher-gain options available
Antenna connector	RP-SMA female

> Note 2: TX power is set within the regional LoRaWAN Max EIRP and the radio regulations of the country of deployment. Regional type approval: TBC.

3.3 Interfaces

Table 3.3: Interfaces

Interface	Description
Ethernet	1 × RJ45, 10/100/1000 Mbps, DHCP by default

Wi-Fi	2.4 GHz; used as an access point for on-site configuration (or as client uplink), note 3
Bluetooth	Bluetooth 5.0 / BLE (BT Pair button on rear panel)
USB	1 × USB-A, 1 × USB Type-C
LoRa antenna	RP-SMA female
Power	DC IN, 12 V

> Note 3: The original hardware specification lists 802.11 b/g/n/ac; the Wi-Fi interface observed on shipped units operates in 2.4 GHz. 5 GHz support is TBC.

3.4 Power and environment

Table 3.4: Power and environment

Parameter	Value
Power input	12 V DC (adapter included)
Power consumption	5 W peak; about 1.3 W measured in operation (LD1002, relay role)
PoE	Indoor model: not supported. Outdoor version (planned): PoE (section 4.4)
Operating temperature	TBC
Operating humidity	TBC
Ingress protection	Indoor use only (IP rating TBC)
Boot time	About 1 minute from power-on to operation

4. Hardware

4.1 Rear panel



LD1001 — rear view with ports (illustration)

All connectors are on the rear panel. From left to right (viewed from the rear):

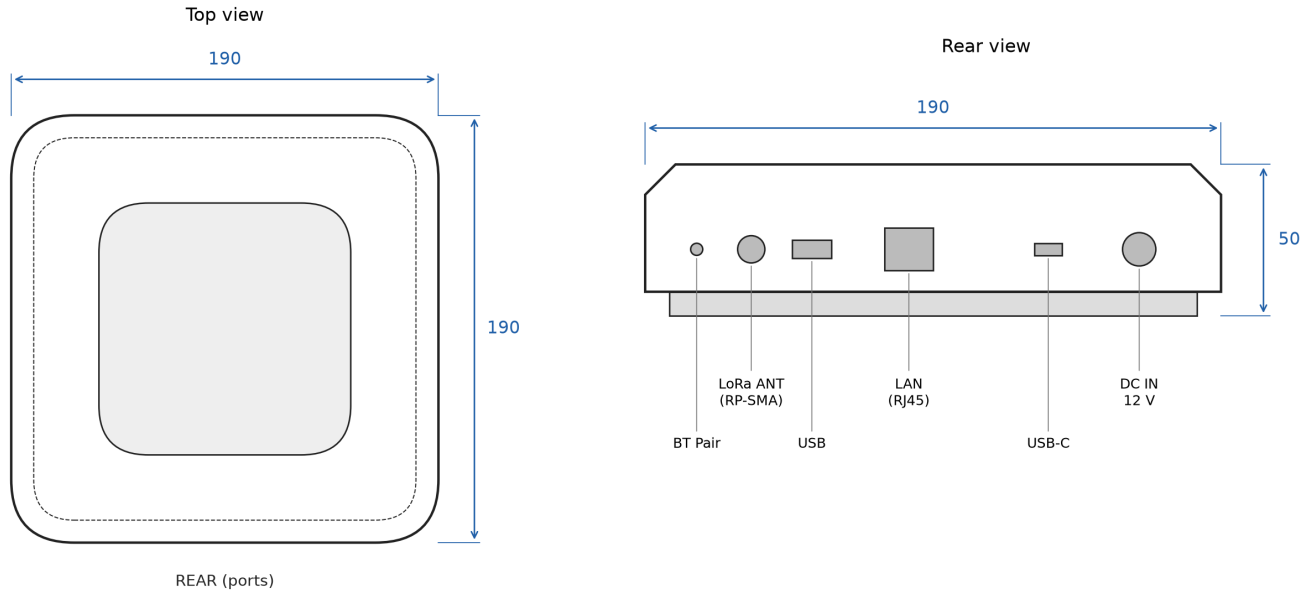
Table 4.1: Rear panel

Item	Function
BT Pair	Bluetooth pairing button
LoRa	RP-SMA antenna connector
USB	USB-A
LAN	Gigabit Ethernet (RJ45)
USB-C	USB Type-C
DC IN	12 V DC power input

> Fit the LoRa antenna before applying power. Place the gateway or antenna high and away from metal objects for best coverage.

4.2 Physical dimensions

Figure 4.2: Dimension drawing (mm)



Unit: mm. Overall size per manufacturer specification; corner radii, cover outline and port positions are indicative only.

LD1001 — top and rear dimension drawing

Overall size 190 × 190 × 50 mm, excluding antenna. Corner radii, top-cover outline and port positions are illustrative; refer to the actual product.

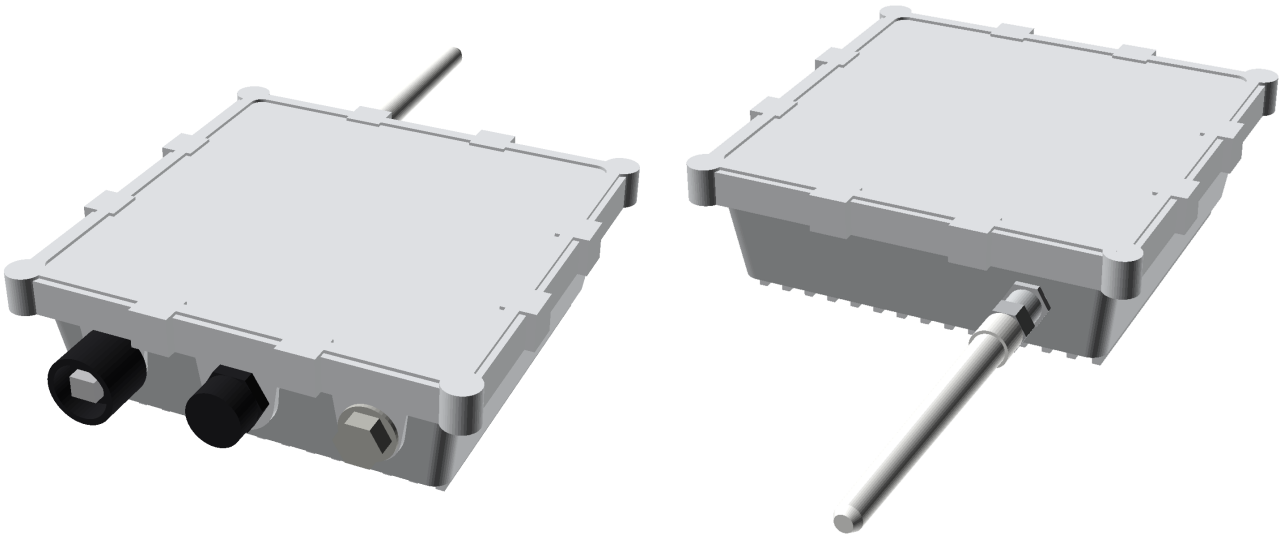
4.3 Package contents

Item	Qty
LD1001 gateway	1
12 V power adapter	1
LoRa antenna	1

The operation manual is provided as an electronic file.

4.4 Outdoor version

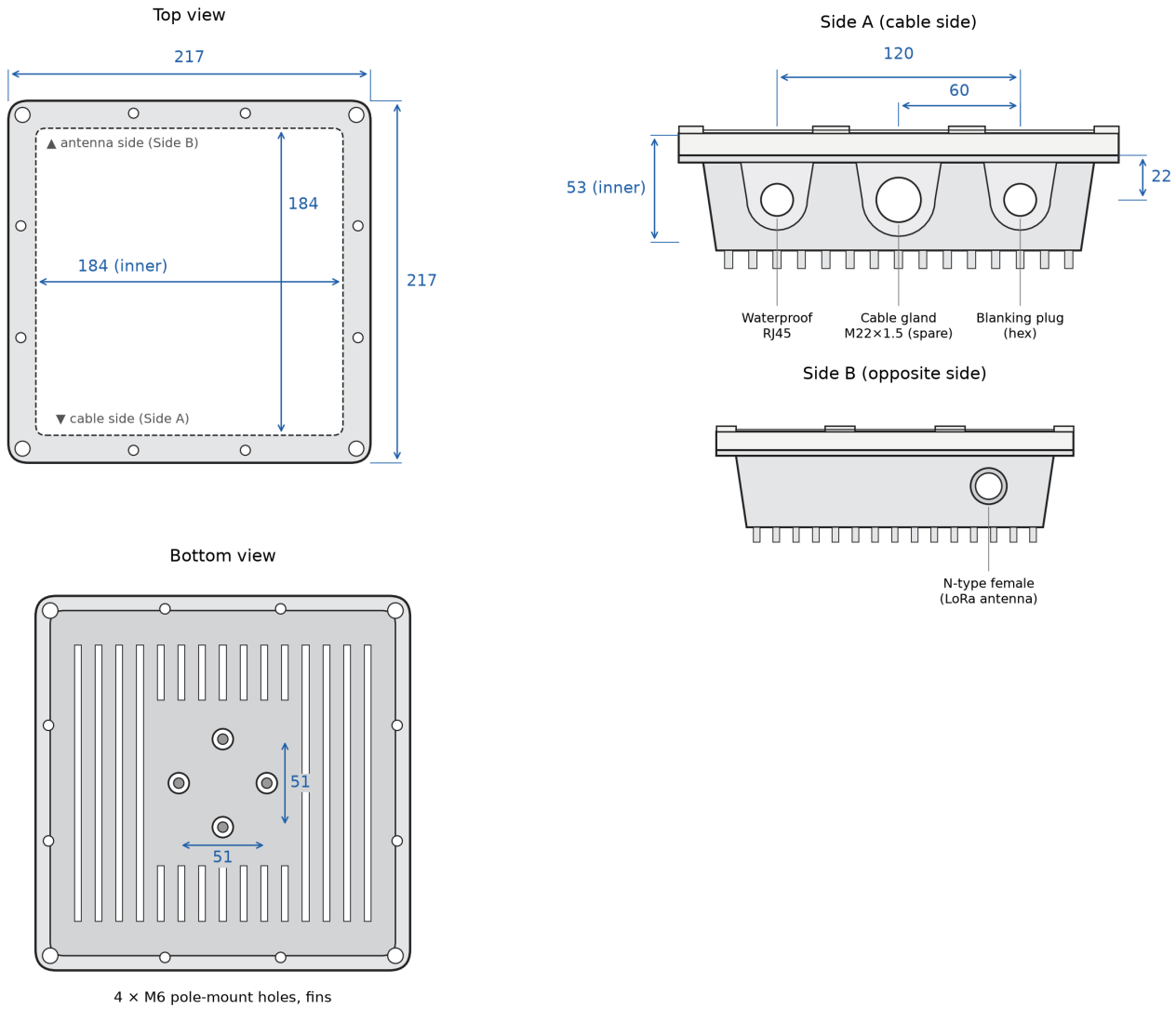
An outdoor version is planned: the gateway board installed in a cast-aluminium enclosure for pole or wall mounting, with the same software and functions as the indoor model. Enclosure model, availability and lead time: please contact us. The openings and fittings below follow the current prototype and may differ in production.



LD1001 outdoor version — cable side (left) and antenna side (right), illustration

Table 4.4: Outdoor version

Item	Description
Enclosure	Die-cast aluminium (ADC12), light-grey finish; outer 217 × 217 mm; inner 184 × 184 × 53 mm (base 43 + lid 10), enclosure maker's figures; overall height TBC
Ingress protection	IP67 as specified by the enclosure maker; not independently tested
Power	PoE over the Ethernet cable; a PoE splitter inside the enclosure supplies DC to the gateway. PoE standard (802.3af or passive) TBC
LoRa antenna	1 × N-type female bulkhead connector, on the side opposite the cable side; a 16 cm N-type antenna mounts directly on it (antenna gain TBC)
Cable side	Three openings, 60 mm apart: waterproof RJ45 panel connector, cable gland M22 × 1.5 (spare), hex blanking plug
Ethernet	Waterproof RJ45 panel connector (plug-in, no re-termination needed on site)
Mounting	Rear 4 × M6 holes in a diamond pattern, 51 mm apart, for a pole-mount bracket; wall mounting. Cooling fins on the rear
Weight	TBC
Configuration over Wi-Fi	Not guaranteed with the enclosure closed (metal enclosure); TBC — configure over Ethernet



Unit: mm. Outer, inner, opening and mounting-hole figures per enclosure maker's drawing; fittings as on the current unit. Wall, floor, fin, overall height and N-type position are indicative only (TBC).

LD1001 outdoor enclosure — top, cable side and bottom (mm)

5. Resource

5.1 Relevant resource

- Siliqs product website: https://siliqs.net
- SQC485lv2-LW Datasheet (RS485 / Modbus LoRaWAN node)
- LoRaWAN Gateway Operation Manual (provided with the product)

5.2 Contact Information

Siliqs (Guineatech)

- Web: https://siliqs.net
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- Pricing and lead time: please contact us.