DreamLNK®
骏晔科技

Your Reliable RF Module & IoT Solution Provider

ChirpLAN™ Wireless Gateway Suite

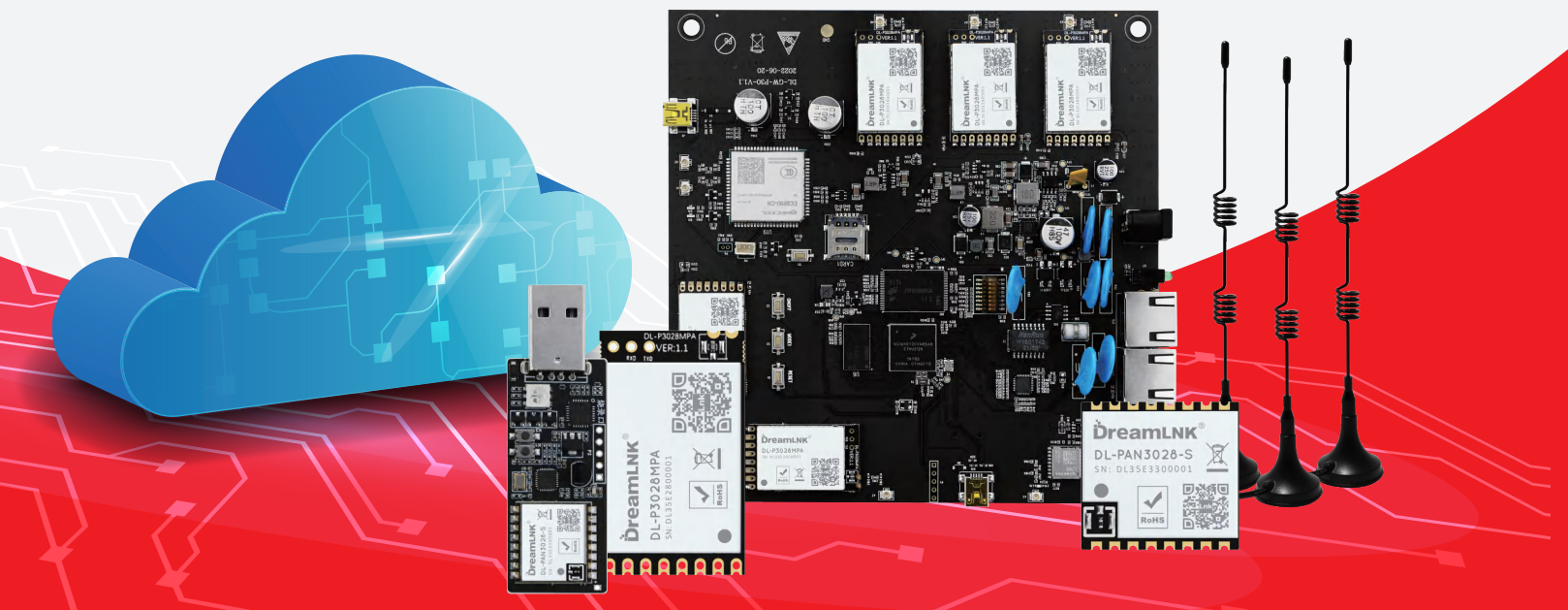
ChirpIoT™ Wireless Module | ChirpLAN™ Gateway Solution | Open Sources PaaS Software

PAN3028/3031

Large Capacity
> 500 Nodes

Long Range
> 5km

High Security



One-stop Solution

ChirpLAN™ Gateway Suite

Brief Introduction

ChirpLAN™ Gateway Suite is a series of wireless star networking products designed by DreamLNK for IoT remote communication technology. It has built-in Wireless Local Area Network (LAN), which can easily realize sub-1G and extranet transparent data transmission. The Gateway Suite includes Gateway DL-GW-P30, terminal SPI Wireless Module DL-PAN3028-S, terminal UART Wireless Module DL-P3028MPA with AT command, and demonstration USB dongle DL-DB-USB001.

This ChirpLAN™ gateway device is plug-and-play, and the built-in WEB UI can be used to configure parameters, while corresponding setting tools can be also provided. The built-in networking protocol integrates the TCP Client and MQTT protocols. The upstream and downstream interfaces are clear, and the third-party cloud platform can be easily connected. Its applications include cloud collection, data acquisition, remote data transmission, descending control, active reporting, status uploading, etc.

The above Gateway Solution & PaaS Software are open sources, while relative Wireless Modules can be also provided (for IoT sensor applications). Moreover, this gateway solution is easy to deploy and has low maintenance cost, which is quite convenient for solution integration and secondary development base on that.

Working Mode

Peer-to-Peer, Network Mode, etc

ChirpLAN™

Star WLAN Protocol

Long Range

Long Range > 5km

Ethernet /4G

Easy Network Access
Ethernet /4G
Connections Supported

Capacity

More than 500 nodes available,
4-way RX and 1-way TX

Location

Precise Positioning Function
Built-in GPS Module

Cloud Platform

Easy to connect with third-party cloud platforms

Security

AES128-bit Encryption
High Transmission Speed
and High Security

Secondary Development

Gateway Solution & PaaS
Software are open sources

Wireless Modules + Gateway Solution + PaaS Software for Server

SYSTEM

Gateway

Name: ChirpLAN™ Gateway Solution
Model: DL-GW-P30

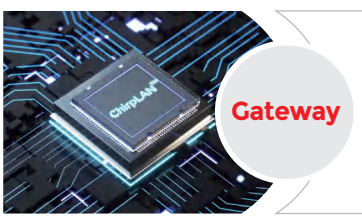
- Network Access Supported
- Communication Encryption and Decryption Supported
- Multiple Working Modes Supported
- Web Server Configuration Supported
- Online Upgrade Available
- Secondary Development Available
- UART Configuration Available
- TCP/MQTT Client Supported (to access cloud services)

Module

UART / SPI Wireless Module
DL-P3028MPA / DL-PAN3028-S

Demonstration USB Dongle
DL-DB-USB001

- Peer-to-Peer and Network Modes Supported
- Serial AT Commands Supported
- Full Speed Operation / WOR Mode Supported
- Low-power Transmitting and Receiving Mode Supported



Gateway

ChirpLAN™ gateway is a gateway device that uses ChirpIOT™ wireless modulation technology to achieve long-distance data transmission. The gateway is the core of the star network, the information bridge between the terminal devices and the server, and also the transceiver of multiple signals. It can be combined with terminal devices (RF modules), without changing any protocol or data. It adopts the open-source star WLAN protocol (ChirpLAN) to realize wireless data transmitting and receiving.

The main function of the wireless module (for terminal device) is to exchange data with the gateway. The gateway and terminal devices have been connected to realize data communication. The communication distance can be more than 5km, when it working at 125khz@SF11 with TX power of 22dBm.

Module

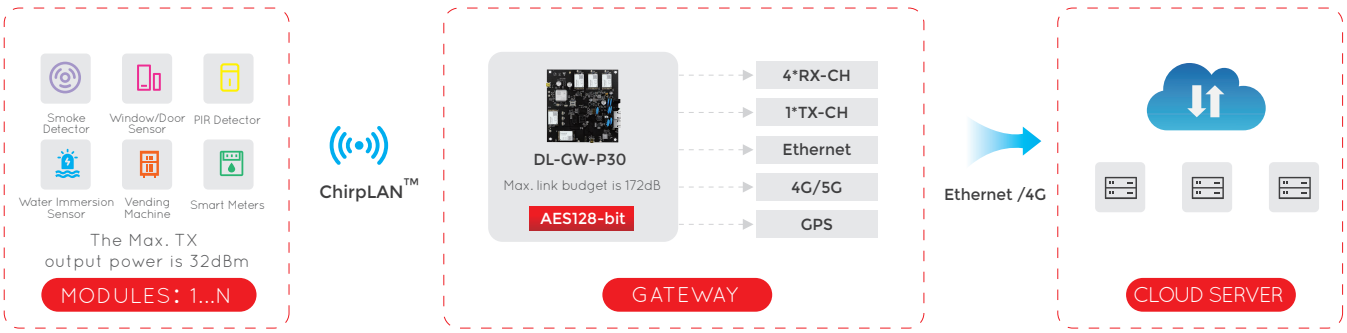
SERVER

Mainstream Cloud Platforms Supported (can be developed based on Alibaba IoT SDK, Tencent IoT SDK platform). The data and status of terminal devices can be checked through the corresponding IoT platform.

Wireless Modules + Gateway Solution + PaaS Software for Server

SYSTEM

Block Diagram of System Architecture



Large Capacity:
node products > 500, CAD detection supported, 4-way RX and 1-way TX

High Security:
AES128-bit Encryption, hardware encryption algorithms supported

Secondary Development:
Gateway Solution & PaaS Software are open sources, which is convenient to do 2nd development and integration

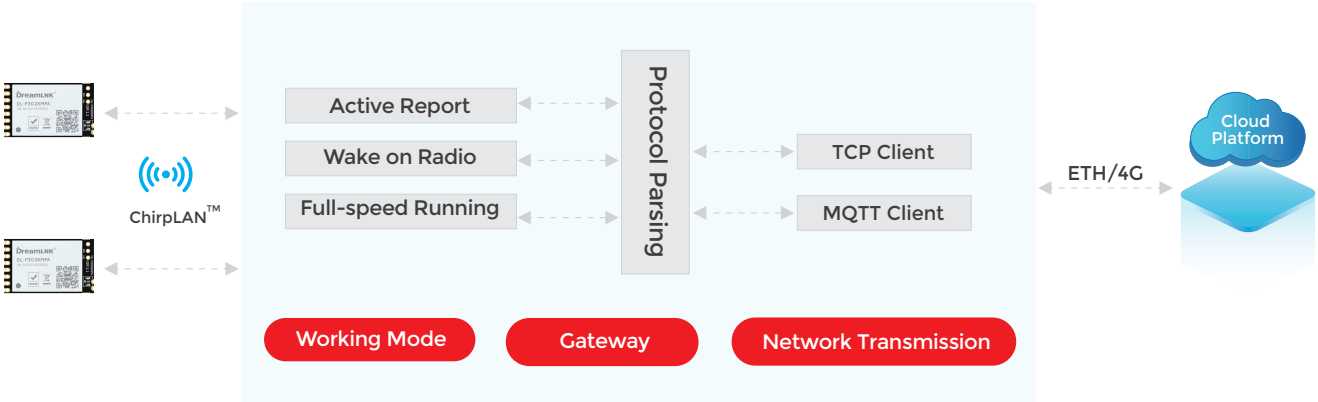
Long Range ChirpIoT

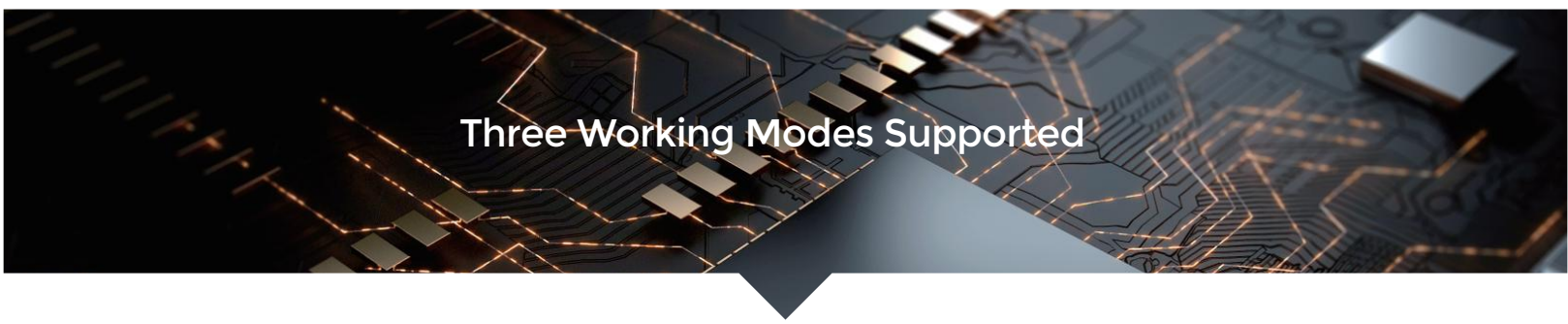
- >300m@sf7,250khz,TX power:22dBm
- >2000m@sf9,125khz,Tx power:22dBm
- >5000m@sf11,125khz,Tx power:22dBm

Technical Parameters

Function	Parameter	Remarks
Working Voltage	DC9V 2A; POE supported	
Frequency Band	433/470MHz	
Main Control Chip	NXP IMX6ULL	The Gateway Runs Linux
Serial Port	TTL debugging serial port (RJ45); Serial port rate is 115200bits/s	
Ethernet	Standard wired WAN port, supports 10/100 MBPS	
Working Temperature	Gateway: -20 to 85℃ / Terminal: -40 to 85℃	
Status Indicator	Power Supply, WAN port, Data Transceiver Indicator	
Cloud Communication Protocol	MQTT/TCP Client	
NO. of Channels	5 channels: 4RX+1TX	Configurable
4G Module	Supports 4G Module access to Ethernet	Customized as Needed
RF Module	DL-P3028MPA/DL-PAN3028-S	Terminal RF Module

Block Diagram of Gateway





Active Report Mode Available

The gateway automatically replies to the cloud / server (or ACK), after receiving the reported content, make sure reliable data communication.

Wake on Radio (WOR) Supported

The gateway sends a long preamble code with longer transmission time than the periodic wake-up time of the terminal, as well as the data to the terminal.

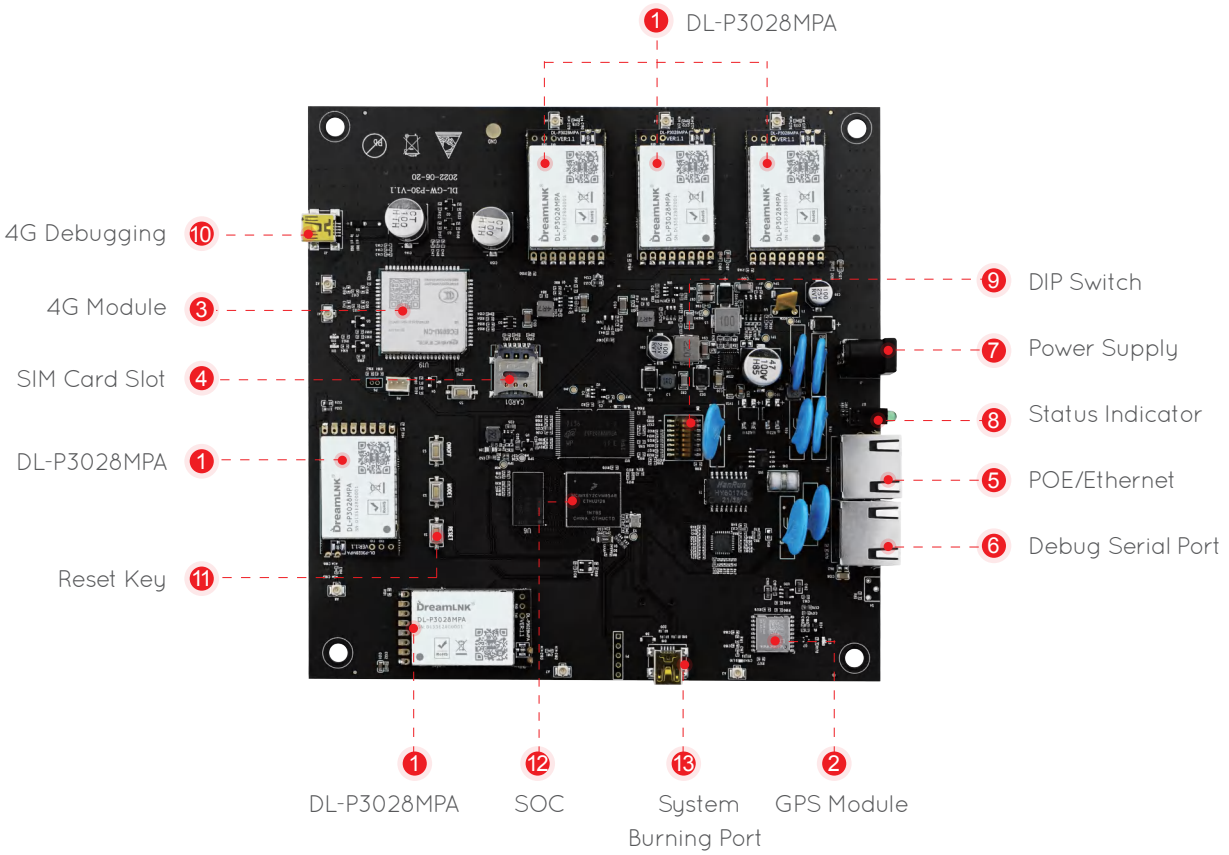
Full-speed Running Mode Supported

The gateway can send data to the terminal in this mode at any time in real time.

More Functions

- **Built-in Gateway Networking Logic:** it supports terminal access to the network. The reasonable channel allocation mechanism can balance the workload of each communication sub-card.
- **Built-in 4G Module:** it can realize the 4G Internet access function in the environment without Ethernet. The 4G function is enabled on the gateway by default. When 4G is unavailable, the gateway returns to the Ethernet mode and tries to connect to the network.
- **Built-in GPS Module:** it facilitates gateway deployment and management by the cloud.
- **Online Upgrade Available:** it supports WEB configuration and firmware upgrade.

Mainboard Diagram



Hardware Resource List

No.	Interface	QTY.	Description
1	ChirploT Module	5	Communicate with the main control chip through serial port, for data sending and receiving with the ChirploT Module, 4RX+1TX
2	GPS Module	1	Used to obtain the longitude, latitude and time calibration of the Gateway. An external GPS antenna is needed for the GPS Module
3	4G Module	1	EC600U-CN
4	SIM Card Slot	1	Place the SIM card
5	POE/Ethernet	1	10/100M adaptive
6	Debug Serial Port	1	Used for program debugging, the baud rate is 115200 Bits/S
7	DC Power Supply	1	9V/2A
8	Status Indicator	5	Power supply, WAN port, Data transceiver indicator (quick flashing indicates RF data in communication)
9	DIP Switch	1	When burning firmware, the second switch is set to 1, and the rest are set to 0. When working normally, the 1st, 5th and 8th switches are set to 1, and the rest are set to 0.
10	4G Debugging	1	4G Debugging Port
11	Button	1	Reset Key
12	SOC	1	NXP IMX6ULL
13	System Burning Port	1	System Burning Port

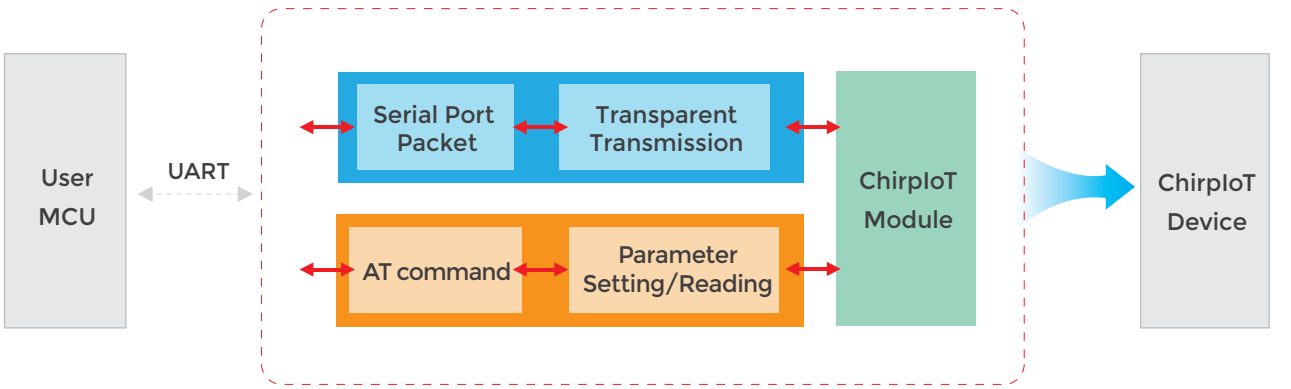
The Indicator Lights

- PWR Power indicator, keep shining after power on
- TXD ChirploT keep shining when data is sending, and turn off after completed
- RXD ChirploT keep shining when data is receiving, and turn off after completed
- ETH Blinking when data is exchanged in the network
- 4G Blinking slowly (200ms high /1800ms low): the network fails to be detected.
  Quick blinking (high 234ms/low 266ms): the network is successfully established, and the system is in standby state.
  Fast blinking (63ms low /62ms high): data transfer mode
- GPS Blink once every second when GPS reception is normal

Gateway Parameters

Parameter	Value
Working Power Supply	DC9V2A /POE
Working Frequency Band	433/470MHz
ChirpIOT Channel No.	4RX+1TX 5 channels
Data Communication Interface	Ethernet / 4G
Cloud Communication Protocol	MQTT Protocol /TCP Client
Working Temperature	Gateway: -20 to 85 °C / Terminal: -40 to 85 °C
Transmission Power	Max. 32dBm
RF Module	DL-P3028MPA / DL-PAN3028-S
GPS Module	Map function supported
4G Module	Supports 4G module access to the cloud
Supported Nodes	> 500 Nodes; test conditions: node transmission frequency 5 minutes/time, BW250KHZ @ SF7, packet length = 16 bytes
Communication Distance	(1) >300M@SF7, BW250khz, TX power:22dBm (2) >2000M@SF9, BW125khz, Tx power:22dBm (3) >5000M@SF11, BW125khz, Tx power:22dBm

Functional Architecture Diagram



Wireless Modules

DL-P3028MPA

Terminal UART Module with AT Command

It is a ChirpLAN™ Gateway Terminal UART Module designed base on PAN3028 chip from PANCHIP, using the new generation of ChirpIoT™ modulation technology, with built-in PA and LNA, convenient for users to quickly develop gateway equipment.

Development Way	UART	TX Power	32dBm(peak value)
Frequency	433/470MHz	Sensitivity	-140dBm
Supply Voltage	5 V	TX Rate	0.16~21.8 kbps

DL-PAN3028-S

Terminal SPI Wireless Module

It adopts the new generation Chirp-IoT™ modulation technology for ultra-long range spread spectrum communications. The RF module is compact in size, low power consumption, but strong anti-interference ability and longer transmission distance than the traditional modulation.

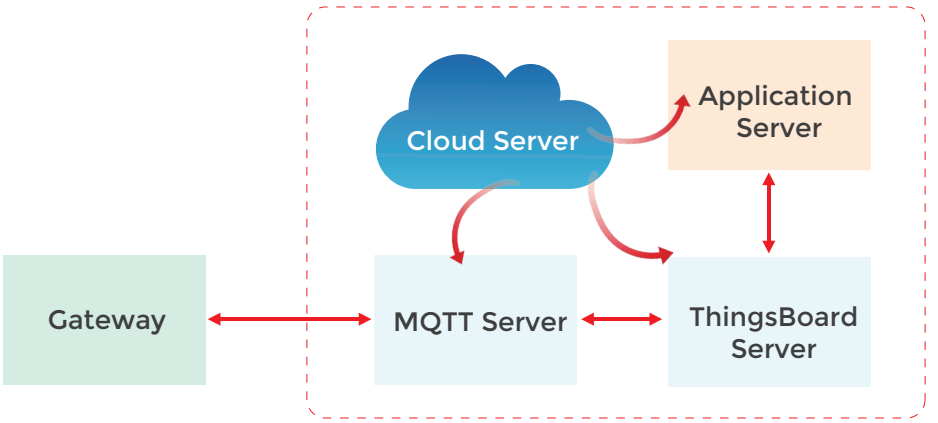
Development Way	SPI	TX Power	-7~22dBm
Frequency	433/470MHz	Sensitivity	-138dBm
Supply Voltage	1.8~3.6 V	TX Rate	0.16~21.8 kbps

DL-DB-USB001

Demonstration USB Dongle

Working Voltage	5V	Control Interface	Serial port, baud rate 115200bits/s
MCU	HDSC L130	Control Instruction	AT Command
Frequency	470~510MHz	Configuration	Host Computer Software

Functional Architecture Diagram



The Cloud Server consists of MQTT Server, Application Server and ThingsBoard Server

Server Description

MQTT Server

It is responsible for receiving network connections from clients and processing subscription/message publishing requests from clients, while it also forwarding messages published by clients to other subscribers. In this application, the MQTT server is the communication vehicle between the gateway, the application server, and the ThingsBorad server.

Application Server

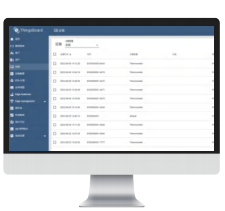
- It subscribes to the upstream data of all gateways, and generates a list of relationships between nodes and gateways, according to the network access data of uplink nodes.
- According to the node communication data on the uplink of the gateway, it is converted into the application data format corresponding to the ThingsBoard server, and sent to the TB platform through MQTT.
- Subscribe the downstream data of TB platform, convert the downstream application data into a common format that the gateway can recognize, and send it to the Topic downlink of the corresponding gateway through MQTT.

ThingsBoard Server

ThingsBoard is an open source IoT platform for data collection, processing, visualization, and device management.

- Responsible for receiving the application data of each device pushed by the application server;
- Graphical display of real-time application data, device list, storage of application data, and query of historical data;
- Graphical control of equipment status and control instructions;
- Customize the UI to set user access permissions.

Cloud System Instructions



Device List

After uploading data, relevant devices can be seen on the device page of ThngsBoard platform, and it can be set.

Data Shown

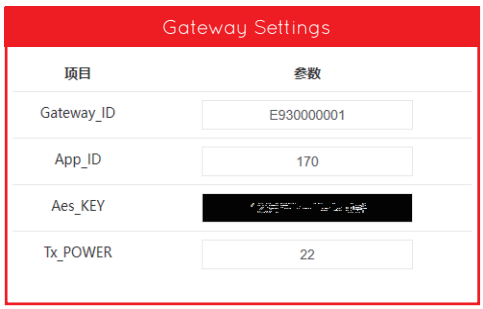
You can add data/corresponding controls to the dashboard library, associates the control with the corresponding device and displays the status in real time.

Device Control

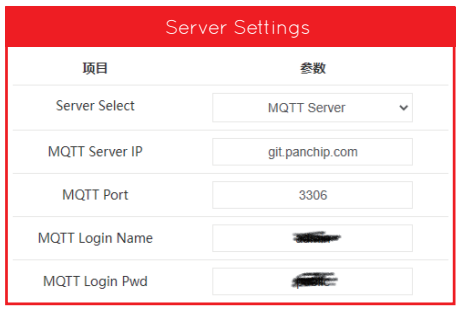
Adjust the brightness of the 3-color light, which can be associated with the relevant equipment in the sensor terminal

WEB Configuration for the EVB Gateway

Channel Settings

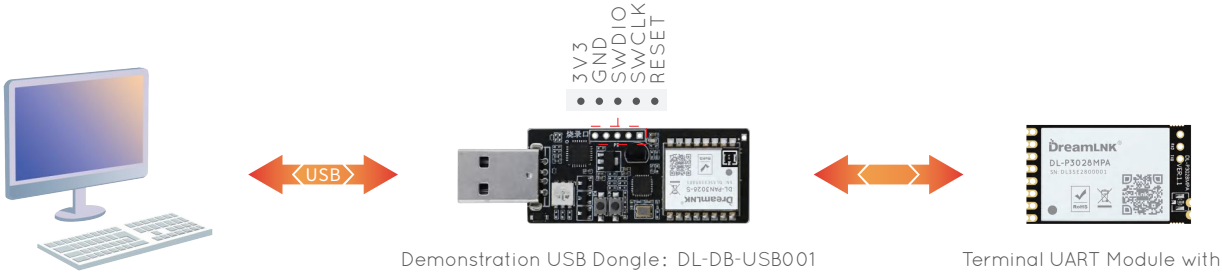


Gateway Settings



Server Settings

EVB Node Functions



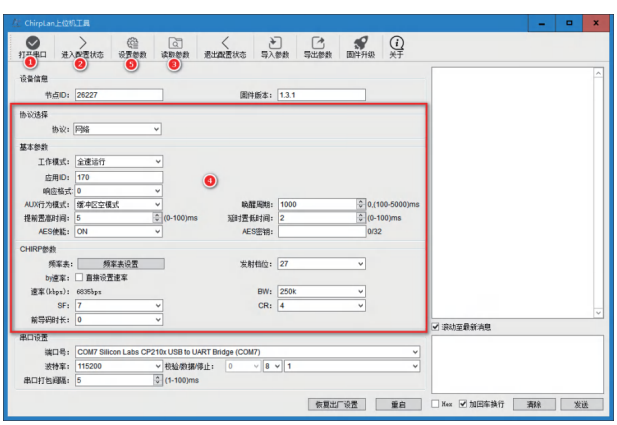
Demonstration USB Dongle: DL-DB-USB001

Terminal UART Module with AT Command: DL-P3028MPA

Parameter	Value
Working Voltage	3.3V
MCU	HDSC L130
Frequency	470-510Mhz
Control Interface	Serial port, baud rate 115200bits/s
Control Instruction	AT Command
TX Power	Max. 32dBm
Antenna	External
Configuration	Host Computer Software

Pin	I/O Type	Description
VCC	PWR	Power Supply Pin
GND	PWR	Reference Ground
ANT	Analog I/O	RF Signal Input/Output Pin
AUX	Output	Module Status Indicator Pin
UART-RX	Input	TTL Serial Port RX Pin 0: Transparent Transmission Mode 1: AT Command
UART-TX	Output	TTL Serial Port TX Pin
SETA	Input	Switching between AT Command and Transparent Transmission Mode, defaulted high level 0: Sleep (or wake-on-radio) 1: Wake up
SETB	Input	Control Module Sleep, defaulted high level 0: module can receive serial port data 1: module cannot receive serial port data

EVB Node Configuration

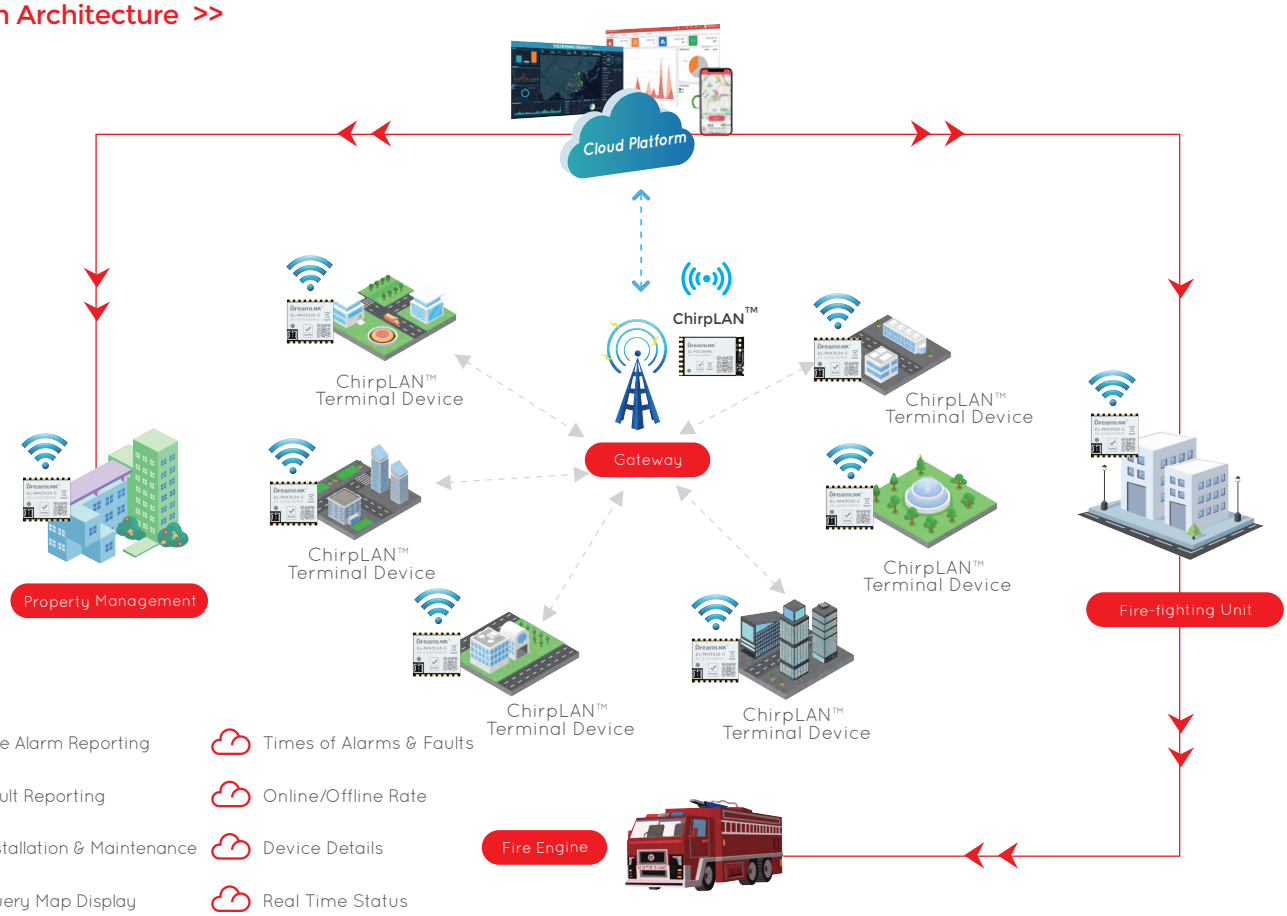


Intelligent Fire Alarm Solution

Brief Introduction >>

The ChirpLAN™ Gateway Suite leverages cloud computing, big data, IoT, Internet and mobile applications. By connecting fire-fighting facilities, socialized fire-fighting supervision and management platform, fire-fighting rescue through IoT information sensing and communication technologies, to realize real-time, dynamic, interactive and integrated information collection, data transmission and processing, which can provide intelligent fire protection products and smart solutions based on ChirpLAN™ solution according to your actual needs.

System Architecture >>



Applications >>

- Shopping malls, markets, hotels, restaurants, stadiums (gymnasiums), halls, entertainment venues and other public gathering places;
- Important scientific research institutions, schools, hospitals, libraries, archives and exhibition halls;
- High-rise office building, commercial and residential buildings, complex buildings and other public buildings;
- Large warehouses and stockyards for grain, cotton, wood and other materials;
- Construction sites of key projects and other large-scale projects;
- Power supply system substations, gas supply plants (stations), large and medium-sized oil depots, dangerous goods depots, petrochemical enterprises and other flammable and explosive materials units.

Smart Agriculture Solutions

Digital Platform System

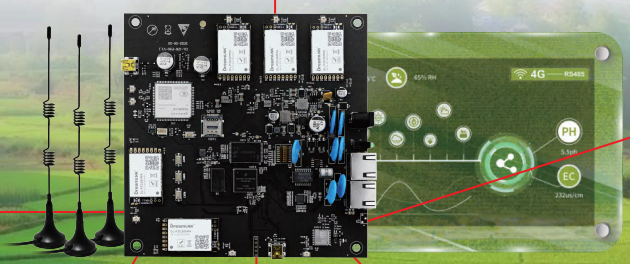
With the help of this ChirpLAN™ system, we can transmit and receive data between the gateway and remote devices. It can monitor irrigation, fertilization, temperature and humidity, images, gases, diseases, pests, etc. According to the different types and areas of crops, the number of functional IoT sensors can be appropriately increased or decreased, and the location can be also adjusted at any time. It can comprehensively improve the production and management level of the farm, improve economic efficiency and reduce operating costs.

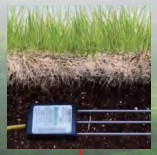
- Intelligent Sense
- Intelligent Early Warning
- Intelligent Analysis
- Online Guidance

- Fine Planting
- Visual Management
- Intelligent Decision-making
- Real Time Data Storage

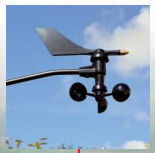
Server Data Descending

ChirpLAN™





Soil Moisture Sensor



Wind Speed / Light

Gateway

Valve Control

Temperature / Humidity Sensor

CO_2 Gas Sensor

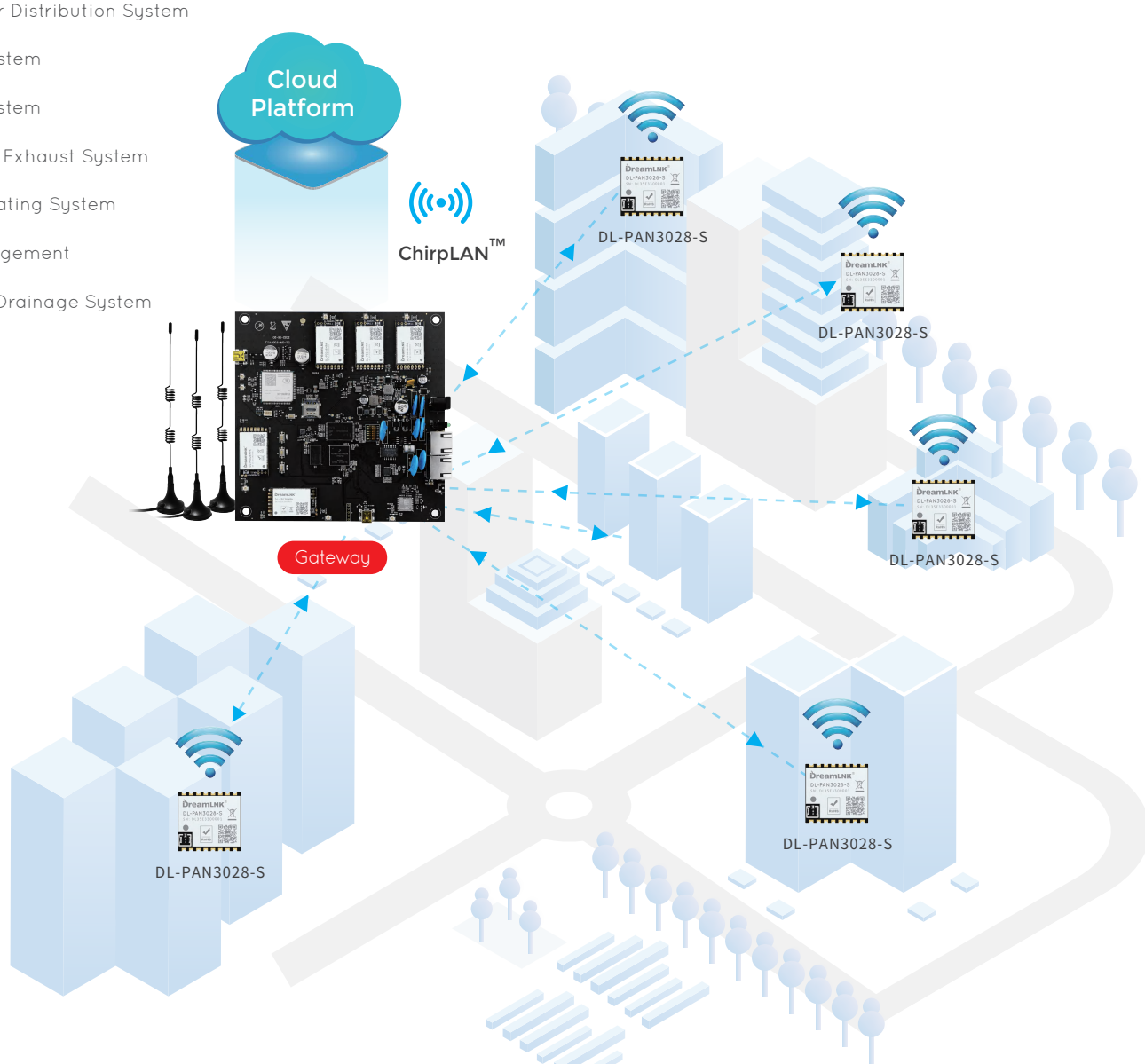
BUILDING AUTOMATION SYSTEM

Brief Introduction >>

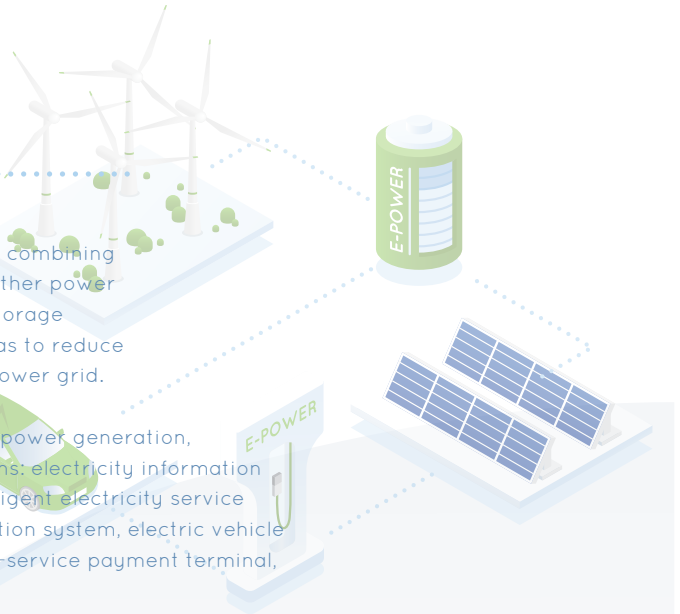
The system can centrally manage all kinds of electromechanical equipment, and realize remote operation such as partition monitoring and fault alarm. The building control system mainly includes air conditioning fresh air unit, supply and exhaust fan, water pit and drainage pump, elevator, power distribution, lighting, computer and so on.
Multiple ChirpIoT™ wireless modules can be used inside the building, to connect with air conditioning, computers, printers, lights and other equipment in different areas, with ChirpLAN™ Gateway, which controls the start and stop of related devices in different areas, centralizes and remotely manages and monitors all electromechanical devices. With this building automation system, we can save energy & reduce equipment damage in an all-round way, by reducing the workload of daily operation and maintenance;

System Architecture >>

- Air Conditioning System
- Transformer Distribution System
- Elevator System
- Lighting System
- Supply and Exhaust System
- Cooling/Heating System
- Zonal Management
- Water and Drainage System

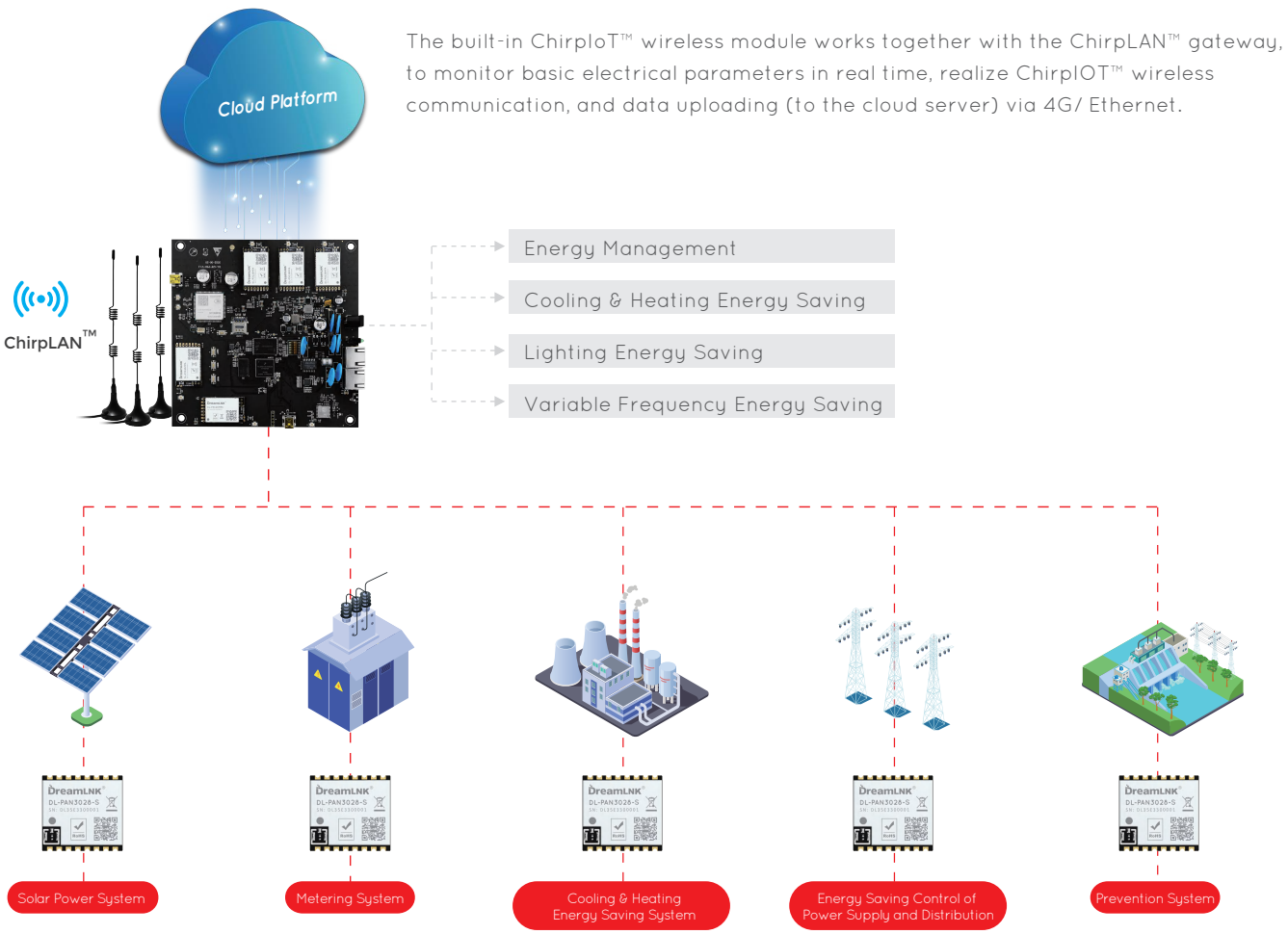


SMART POWER SOLUTIONS



The Smart Power Solution involves energy technology and IoT technology. By combining the distributed installation of solar energy, hydropower, thermal power and other power generation facilities, the Smart Power Solution integrates them into energy storage equipment and electrical equipment, and conducts integrated regulation, so as to reduce wind and light abandonment and improve the stability and reliability of the power grid.

ChirpLAN™ technology can be widely used for the Smart Grid area, including power generation, transmission, transformation, distribution, and electricity use. Main applications: electricity information collection, community distribution automation, power fiber to the home, intelligent electricity service interactive platform, grid connected operation of photovoltaic power generation system, electric vehicle charging pile management, smart home service, unified display platform, self-service payment terminal, smart meter, etc.



The built-in ChirpIoT™ wireless module works together with the ChirpLAN™ gateway, to monitor basic electrical parameters in real time, realize ChirpIOT™ wireless communication, and data uploading (to the cloud server) via 4G/ Ethernet.

- Realize the automatic data collection (electricity information), by using the Smart Meter technology;
- Improve the automation level of power grid to ensure reliable power supply;
- Power fiber direct to home, for better serving the Internet and telecommunications;
- Intelligent electricity service, realize real-time interaction between users and power supply enterprises;
- Realize remote meter reading and effectively integrate resources

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Commit to be a Leader in the Communications Industry

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