



Industrial IoT Solution Guide

WoMaster
Master in IIoT World

Private Cloud Platform ThingsMaster OTA

Network Management System NetMaster



Industrial IoT Router

Serial 4G/5G WLAN Routers

WR312/322GR WR312/322A-M12



Serial 4G/NB-IoT WLAN Routers

WR222/224



PoE 4G WLAN Routers

WR319/329P



WR316GPS



5G MESH AP Router

WA512GM-D-5GM2



MESH AP

WA512GM-D



Programmable Gateway

WR312/322GR-EC



LoRaWAN Gateway

WR312/322GR-EC-LoRaWAN



Outdoor City Box

All-in-One Smart City Box

SCB1200/1000/400



MESH WLAN AP Router

WA512GM-IP67



Smart Meter Gateway

SCB211/270



ETHERNET

LoRa Controller

LM100 / LC144



LoRaWAN Node

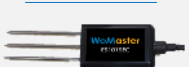
LR140



Multiple Sensors



Soil Sensors



Air Sensors



Water Sensors



Rugged L3 L2 Managed PoE Switches

RS628/RS428/RP428



DS612/DS412
DS610/DS410/DS410L
DP612/DP412/DP410/DP310



Entry Level PoE Switches Converters

DS208/DS205
DP208/DP208-LV
DS108/DS105A/DS105
DS201/DS101/DP101



Railway M12 PoE Switches

MP614/MS614
MP310



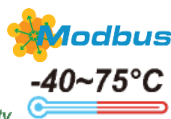
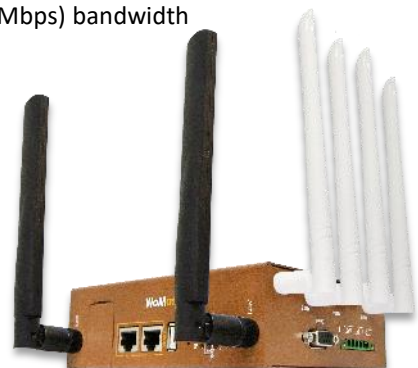
Parking Sensor
Waste Bin Sensor
Manhole Sensor



Dual Core and Dual WLAN Secured and Rugged 5G NR / LTE Serial Router for IIoT

WR312/322GR-2C-5GM / WR312/322GR-2C-LTE

- Dual Core High Speed Processor
- 5G New Radio, SA+NSA, backward compatible LTE Cat.16-20 Downlink, LTE Cat.18 Uplink
- Dual Radio 5GHz + 2.4GHz Wi-Fi for local coverage, up to 1166(866Mbps + 300Mbps) bandwidth
- 2-port Gigabit Ethernet Routing and Bridging
- One RS232/422/485 DB9 ports with Modbus TCP/RTU
- OpenVPN, IPSec, L2TP, GRE Tunnel for secured connection
- USB for easy field configuration and firmware upgrade
- Cellular to WAN redundancy, dual SIM backup
- 1:1 NAT, port forwarding and NAPT for local traffic protection
- RIPv1&v2, OSPFv1&v2, VRRP routing
- MQTT with Built-in Cloud AWS Agent, Azure Agent, ThingsMaster OTA
- TACACS+ multi-user authentication for privileged user management
- Reboot, Configuration and Firmware Upgrade over the air (OTA)
- -40°~75°C wide operation temperature
- EN50121-4 railway compliance



NetMaster

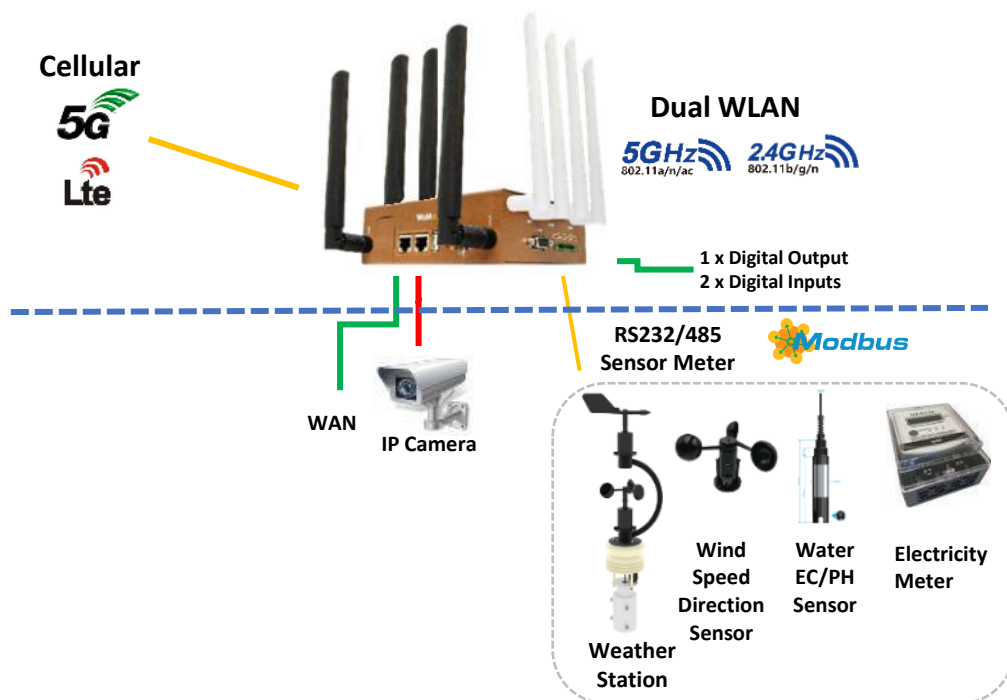
ThingsMaster OTA

Model (* Project Order)	CPU	Series	Serial	ETH	Radio 1	Radio 2	USB	SD	SIM	Relay	DI/DO
WR325GR-WLAN+5GM2-2C*	Dual Core		0	4 x GE LAN	5G NR AE/GL	2.4Ghz 11n + 5Ghz 11ac	1	1	2	1	0
WR325GR-WLAN+LTE-2C*			0		LTE Cat.4 EUX/ECGA/AU/G	2.4Ghz 11n + 5Ghz 11ac	1	1	2		0
WR315GR-5GM2-2C*			0	+ 1 x GE WAN	5G NR AE/GL	-	1	1	2		0
WR315GR-LTE-2C*			0		LTE Cat.4 EUX/ECGA/AU/G	-	1	1	2		0
WR312GR-5GM2-2C*			1		5G NR AE/GL	-	1	1	2		2/1
WR322GR-WLAN+5GM2-2C*			1		5G NR AE/GL	2.4Ghz 11n + 5Ghz 11ac	1	1	2		2/1
WR312GR-LTE-2C			1		LTE Cat.4 EUX/ECGA/AU/G	-	1	1	2		2/1
WR322GR-WLAN-2C			1		5Ghz 11ac	2.4Ghz 11n	1	1	0		2/1
WR322GR-WLAN+LTE-2C			1		LTE Cat.4 EUX/ECGA/AU/G	2.4Ghz 11n + 5Ghz 11ac	1	1	2		2/1
WR312G-LTE-2C (C Series)*		C	1		LTE Cat.4 EUX/ECGA/AU/G	-	0	0	2		0
WR312G-LTE*-2C (D Series)*		D	2		LTE Cat.4 EUX/ECGA/AU/G	-	1	0	2		0
WR312G-LTE	1 Core		2	+ 1 x GE WAN	LTE Cat.4 EUX/ECGA/AU/G	-	1	1	1		0
WR312G-WLAN			2		5Ghz 11ac /or 2.4Ghz 11n	-	1	1	0		0
WR322GR-WLAN+LTE			2		LTE Cat.4 EUX/ECGA/AU/G	5Ghz 11ac /or 2.4Ghz 11n	1	1	1		0
WR312G-LTE (C Series)*		C	1		LTE Cat.4 EUX/ECGA/AU/G	-	0	0	2		0
WR312G-LTE (D Series)*		D	2		LTE Cat.4 EUX/ECGA/AU/G	-	1	0	2		0



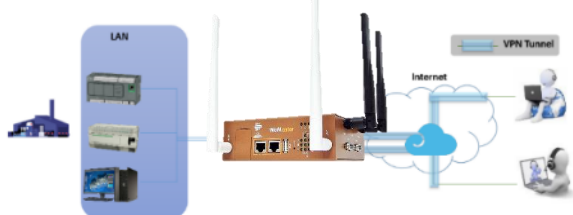
✓ Ready Total Solution for IoT

Cloud Service



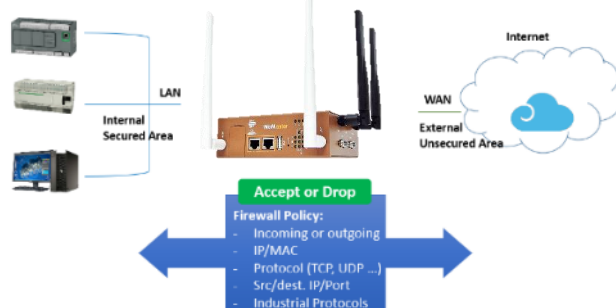
✓ Secured Remote Access by VPN

The router can act as a VPN server for data encryption and dynamic remote access. Multiple VPN protocols are supported such as OpenVPN, DMVPN, and L2TP. The channels between multiple networks, ex. private/public/hybrid networks are fully secured and with authentication features.



✓ Cyber Security Guard

Advanced cybersecurity features are included such as TLS v1.2, HTTPs/SSH, WLAN AP Share Key, WPA/WPA2-PSK(Pre-Shared Key), WPA/WPA2 Enterprise Encryption 64/128-bit WEP(Wired Equivalent Privacy), TKIP(WPA-PSK), AES(WPA2-PSK), MAC Filter, Firewall Stateful Inspection firewall(SIP). IP/Port Filter. MAC ACL.





Features & Benefits

Secure IoT Modbus Tags

Tag-based data acquisition with MQTTS/CoAP support

MQTT client acting as publisher and subscriber

The latest TLS encryption and X.509 authentication

Selectable serial port and data type. Sensor alive check and display sensor value.

Home > IoT > Modbus Device

Modbus Logging

Modbus Logging ☒ Enable

Name: // Tag Name

Serial:

Slave ID:

PLC Address:

Function: // Slave Address

Data Type:

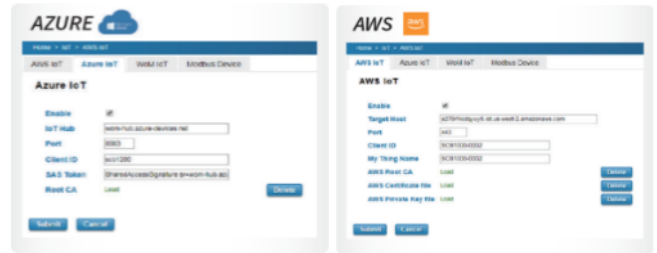
Submit Cancel // Data Address, Register Address

Modbus RTU Slave Tag List

Select	Name	Serial	Slave ID	Address	Function Code	Data Type	Edit	Alive	Value
☐	PM1	1	4	1	03	uint16	Edit	Yes	10
☐	PM2_5	1	4	2	03	uint16	Edit	Yes	13
☐	PM10	1	4	3	03	uint16	Edit	Yes	13
☐	CO2	1	1	562	03	uint16	Edit	Yes	1107
☐	Temperature	1	1	564	03	uint16	Edit	Yes	255
☐	Humidity	1	1	566	03	uint16	Edit	Yes	629
☐	Temperature_f	1	1	1	03	float	Edit	Yes	25.486620

Delete Selected Delete All Refresh

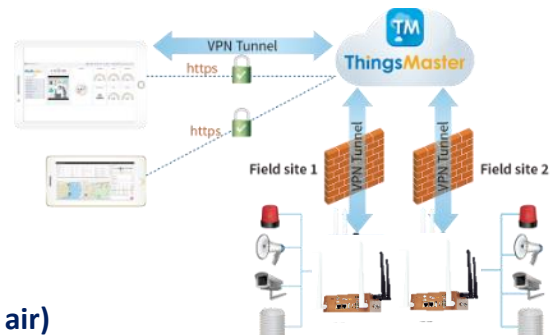
✓ Built-in Microsoft Azure and Amazon AWS agent



✓ Multi-Level User Passwords

Different centralized authentication servers are supported such as RADIUS and TACACS+. Using a central authentication server simplifies account administration, when you have more than one switches in the network.

Authentication Chain is also supported. An authentication chain is an ordered list of authentication methods to handle more advanced authentication scenarios. For example, you can create an authentication chain which first contacts a RADIUS server, and then looks in a local database if the RADIUS server does not respond.



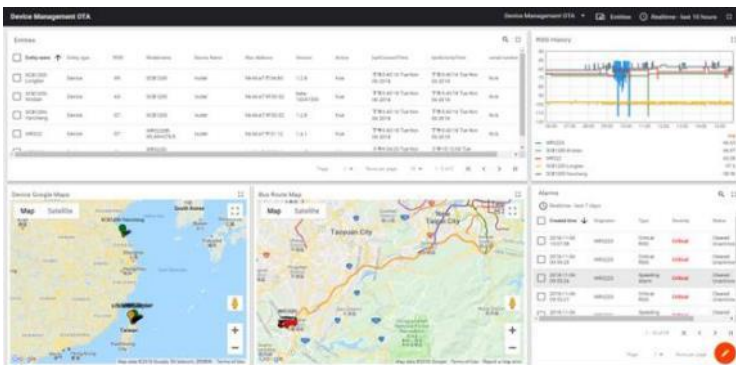
Secured Multi-sites Management

N to N VPN

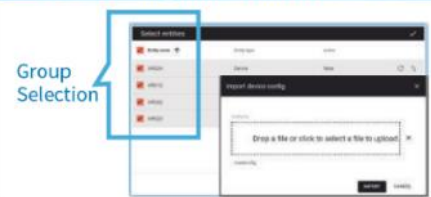
Latest TLS encryption and X.509 authentication

✓ ThingsMaster OTA (device management over the air)

The OTA agent embedded in WR322 upgrades device management over the air, anywhere you are and any time you want over your mobile devices. ThingsMaster OTA is a secured local OTA software that can be installed in a private or public server or even QNAP NAS (network attached storage). With OTA, all device information such as location, warning event can be shown in real time. The maintenance such as configuration reload, or device reboot can also be run by group.



Batch Configuration and Reboot OTA

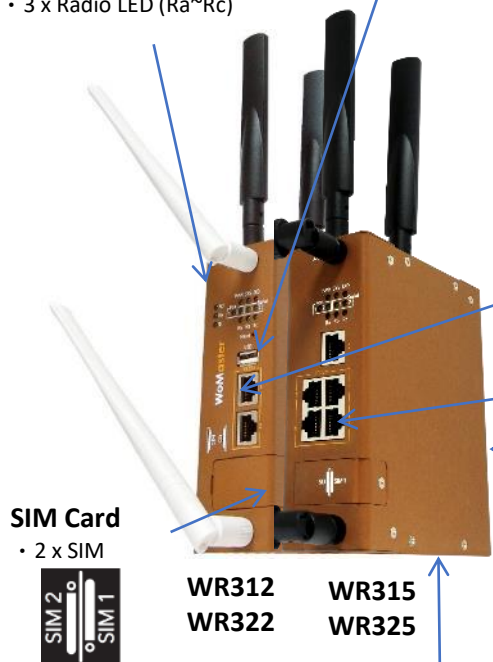


System LED

- 1 x Power
- 1 x System Status
- 1 x DO(Relay)
- 2 x Ethernet Port
- 1 or 2 x Serial Port (By Model)
- 3 x Radio LED (Ra~Rc)

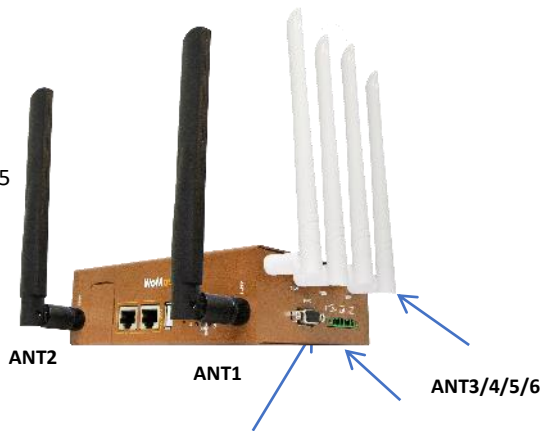
USB Extension Port

- USB for Configuration/ Firmware update
- External Storage



	WR312GR-LTE WR315GR-LTE	WR312GR-5GM2 WR315GR-5GM2	WR322GR-WLAN+LTE WR325GR-WLAN+LTE
Ant 1	LTE-Main	5GNR-Main	LTE-Main
Ant 2	LTE- Diversity/ GPS (by model)	5GNR-Main	LTE- Diversity/ GPS (by model)
Ant 3	-	5GNR-Div./GNSS	Wi-Fi 5 Main
Ant 4	-	5GNR-Div./GNSS	Wi-Fi 4 Main
Ant 5	-		Wi-Fi 5 Div.
Ant 6	-		Wi-Fi 4 Div.

*Antenna: Wi-Fi in White; LTE in Black



Serial Communication

- RS232/422/485 Full functions
- DB9 female

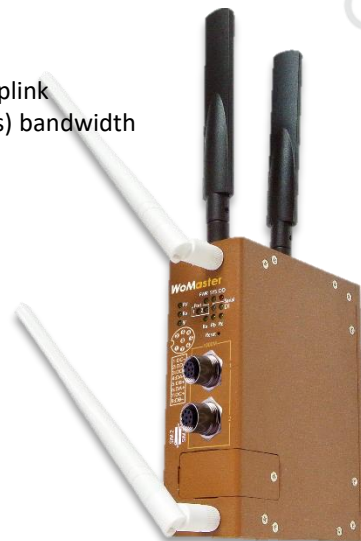
2x Digital Input
1x Digital Output
*Optional Serial 2
by request.

5G NR NSA/SA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48/n66/n71/n77/n78/n79 LTE FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD B34/B38/B39/B40/B41/B42/B48 LTE LAA B46 WCDMA B1/B2/B3/B4/B5/B6/B8/B19 GNSS GP/GLONASS/BeiDou(Compass)/Galileo	5G NR NSA/SA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48/n66/n71/n77/n78/n79 LTE FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD B34/B38/B39/B40/B41/B42/B48 LTE LAA B46 WCDMA B1/B2/B3/B4/B5/B6/B8/B19 GNSS GP/GLONASS/BeiDou(Compass)/Galileo
5G NR NSA: n41/n77/n78/n79 5G NR SA: n1/n2/n3/n5/n7/n8/n12/n20/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 LTE FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD B34/B38/B39/B40/B41/B42/B48 LTE LAA B46 WCDMA B1/B2/B3/B4/B5/B6/B8/B19 GNSS GP/GLONASS/BeiDou(Compass)/Galileo	5G NR NSA: n41/n77/n78/n79 5G NR SA: n1/n2/n3/n5/n7/n8/n12/n20/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 LTE FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD B34/B38/B39/B40/B41/B42/B48 LTE LAA B46 WCDMA B1/B2/B3/B4/B5/B6/B8/B19 GNSS GP/GLONASS/BeiDou(Compass)/Galileo
Band Information: LTE-EUX	LTE: FDD B1/B3/B7/B8/B20/B28A LTE: TDD B38/B40/B41 WCDMA: FDD B1/B8, GSM: B3/B8
Band Information: LTE-ECGA	LTE: FDD B1/B3/B7/B8/B20/B28A WCDMA: FDD B1/B8, GSM: B3/B8
Band Information: LTE-AU (By MoQ Request)	LTE: FDD B1/B2*/B3/B4/B5/B7/B8/B28 LTE: TDD B40 WCDMA: FDD B1/B2/B5/B8, GSM: B2/B3/B5/B8
Band Information: LTE-G (By MoQ Request)	LTE: FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28 LTE: TDD B38/B39/B40/B41 WCDMA: FDD B1/B2/B4/B5/B6/B8/B19, GSM: B2/B3/B5/B8

Secured and Rugged Dual Core LTE/5G NR M12 Router for Vehicle and Railway

WR322A-M12 2C Series

- Dual Core High Speed Processor
- 5G New Radio, SA+NSA, backward compatible LTE Cat.16-20 Downlink, LTE Cat.18 Uplink
- Dual Radio 5GHz + 2.4GHz Wi-Fi for local coverage, up to 1166(866Mbps + 300Mbps) bandwidth
- 2-port M12 Connector Gigabit Ethernet Routing and Bridging
- One RS232/422/485 DB9 ports with Modbus TCP/RTU
- OpenVPN, IPSec, L2TP, GRE Tunnel for secured connection
- USB for easy field configuration and firmware upgrade
- Cellular to WAN redundancy, dual SIM backup
- 1:1 NAT, port forwarding and NAPT for local traffic protection
- RIPv1&v2, OSPFv1&v2, VRRP routing
- MQTT with Built-in Cloud AWS Agent, Azure Agent, ThingsMaster OTA
- TACACS+ multi-user authentication for privileged user management
- Reboot, Configuration and Firmware Upgrade over the air (OTA)
- -40~75°C wide operation temperature
- Shock/Vibration: EN 50155:2017/EN 61373:2010 Railway Shock/Vibration



Model	CPU	Serial	ETH	Radio 1	Radio 2	USB	SD	SIM	Relay	DI/DO
WR312A-M12-5GM2-2C	Dual Core	1	1 x GE LAN + 1 x GE WAN	5G NR AE/GL	-	1	1	2	1	2/1
WR322A-M12-WLAN+5GM2-2C		1		5G NR AE/GL	2.4Ghz 11n + 5Ghz 11ac	1	1	2		2/1
WR312A-M12-LTE*-2C		1		LTE Cat.4 EUX/ECGA/AU/G	-	1	1	2		2/1
WR322A-M12-WLAN-2C		1		5Ghz 11ac LTE Cat.4 EUX/ECGA/AU/G	2.4Ghz 11n 2.4Ghz 11n + 5Ghz 11ac	1	1	0		2/1
WR322A-M12-WLAN+LTE-2C		1		LTE Cat.4 EUX/ECGA/AU/G	-	1	1	1		0
WR312A-M12-LTE	1 Core	2		5Ghz 11ac/or 2.4Ghz 11n	-	1	1	0		0
WR312A-M12-WLAN		2		LTE Cat.4 EUX/ECGA/AU/G	5Ghz 11ac/or 2.4Ghz 11n	1	1	1		0
WR322A-M12-WLAN+LTE		2								



Gigabit Ethernet

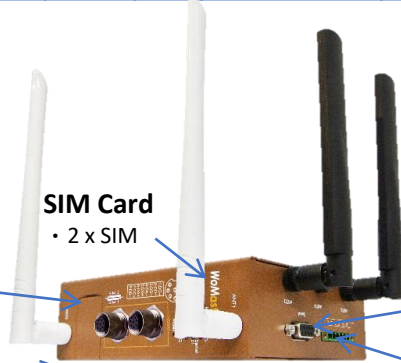
- 2-port 10/100/1000M M12 A/X-code
- WAN + LAN configurable

Integrated Power Connector

- M12 4 pin D-Code Male

SIM Card

- 2 x SIM



Serial Communication

- RS232/422/485 Full functions
- DB9 female

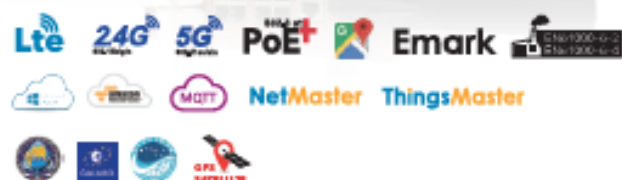
- 2xDigital Input
- 1xDigital Output

Industrial Cellular Wi-Fi PoE Routing Switch

WR329P Series



- LTE Cat.4/Cat.6, 2x2 MIMO, 150M/300M downlink and 50M uplink
- 5G/2.4G Wi-Fi for local coverage, up to 866Mbps bandwidth
- 8x Fast Ethernet PoE+ ports, up to 120W@70°C PoE power budget
- 12/24V to 54VDC Booster PoE
- 1x Gigabit Ethernet WAN port for uplink or NVR
- WAN to LTE Redundancy
- GNSS supports GPS/GLONASS/BeiDou/Galileo
- Periodically Report GPS data for Real time Location Tracking
- OpenVPN, IPsec, L2TP*, GRE for secure connection
- Built-In Cloud AWS Agent, Azure Agent, ThingsMaster Agent
- EN50121-4 Railway compliance
- IEC61000-6-2/IEC61000-6-4 heavy Industrial EMC
- Vehicle: E-mark compliance
- -40°~75°C wide operation temperature

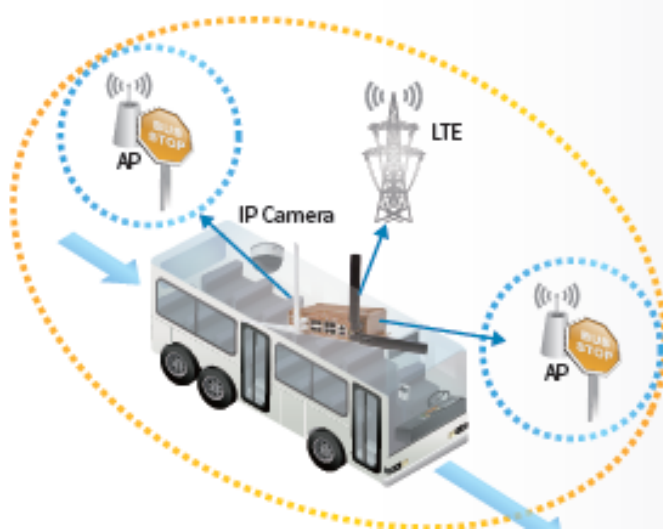


Model	Radio 1	Radio 2	Eth-WAN	Eth-LAN	USB	DI/DO	Temp.	SIM	eSIM(Optional)	GPS	Power Input
WR309	-	-	1xGE	8xFE	1	0/1	-40~75°C	0	-	-	8~32VDC
WR309P	-	-	1xGE	8xFE PoE	1	0/1	-40~75°C	0	-	-	8~32VDC
WA329	802.11ac	802.11ac	1xGE	8xFE	1	0/1	-40~75°C	0	-	-	8~32VDC
WA329P	802.11ac	802.11ac	1xGE	8xFE PoE	1	0/1	-40~75°C	0	-	-	8~32VDC
WR329-WLAN+LTE	802.11ac	LTE Cat.4	1xGE	8xFE	1	0/1	-40~75°C	2 Redundant	1	Yes	8~32VDC
WR329P-WLAN+LTE	802.11ac	LTE Cat.4	1xGE	8xFE PoE	1	0/1	-40~75°C	2 Redundant	1	Yes	8~32VDC

Auto-Offload

When the BUS approaches to the main station, it will transmit the data of surveillance videos and traffic information to the station via Wi-Fi network of the station.

The Patented Auto-Offload technology allows moving devices to seamlessly switch Wi-Fi network to LTE network without stopping the communication.



Industrial Cellular PoE Routing Switch

WR316GPS series

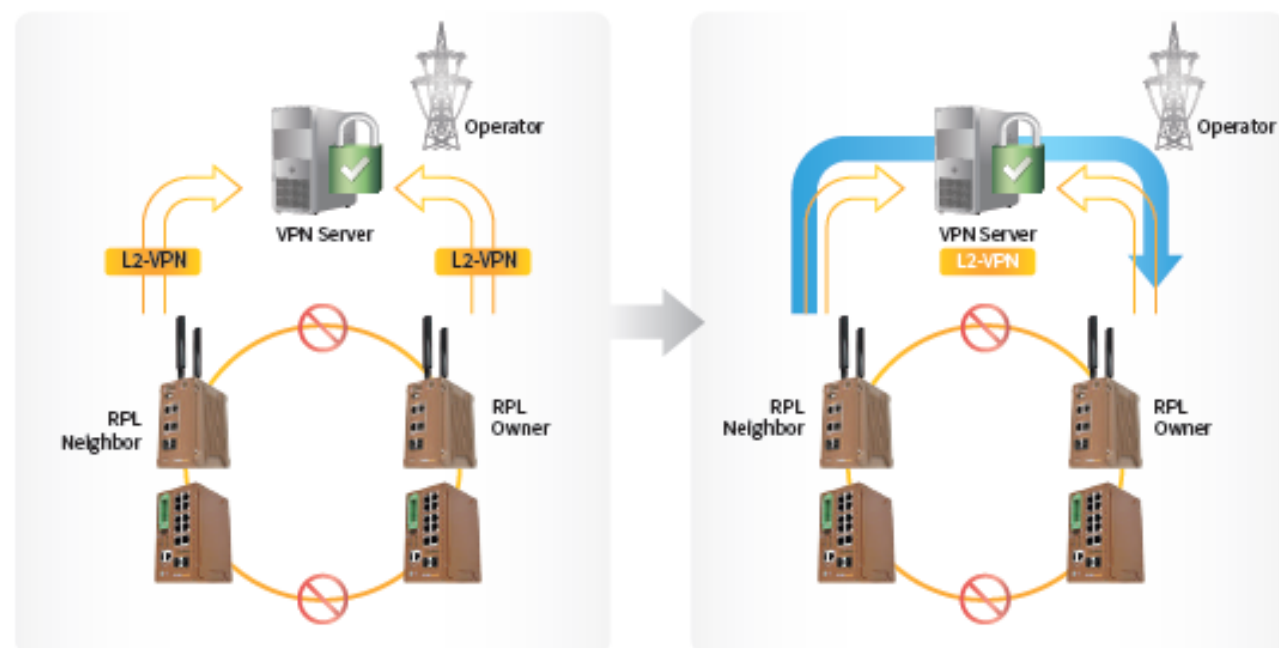
- High-speed LTE Cat.4 routing and dual SIM standby
- Full-Giga: 4x 1000M RJ45 Copper + 2x 100/1000M SFP Fiber
- 4-port IEEE PoE 802.3af/at 30W per port and 120W total PoE budget
- ITU-T G.8032 ERPS v2 Ring Redundancy
- Ring failure to LTE Redundancy
- VRRP redundancy
- OpenVPN, IPsec, L2TP for secured connection
- USB for easy field configuration and firmware upgrade
- Built-In Cloud AWS Agent, Azure Agent, ThingsMaster Agent
- Support TACACS+ multi-user authentication for privileged user management
- -40°~75°C wide operation temperature
- EN50121-4 railway compliance
- NetMaster- NMS system for individual node monitoring
- ViewMaster- Remote configuration software utility for distributed management



Model	Eth-LAN	PoE	Radio	USB	SD	SIM	DI/DO	Power Input	Temp.	Certification
WR316GPS-LTE	2xGF SFP	4xGE	LTE Cat.4	1	-	2	0/1	48/54 VDC	-40~75°C	EN50121-4 Radio RED

ERPS Backup by Wireless Network

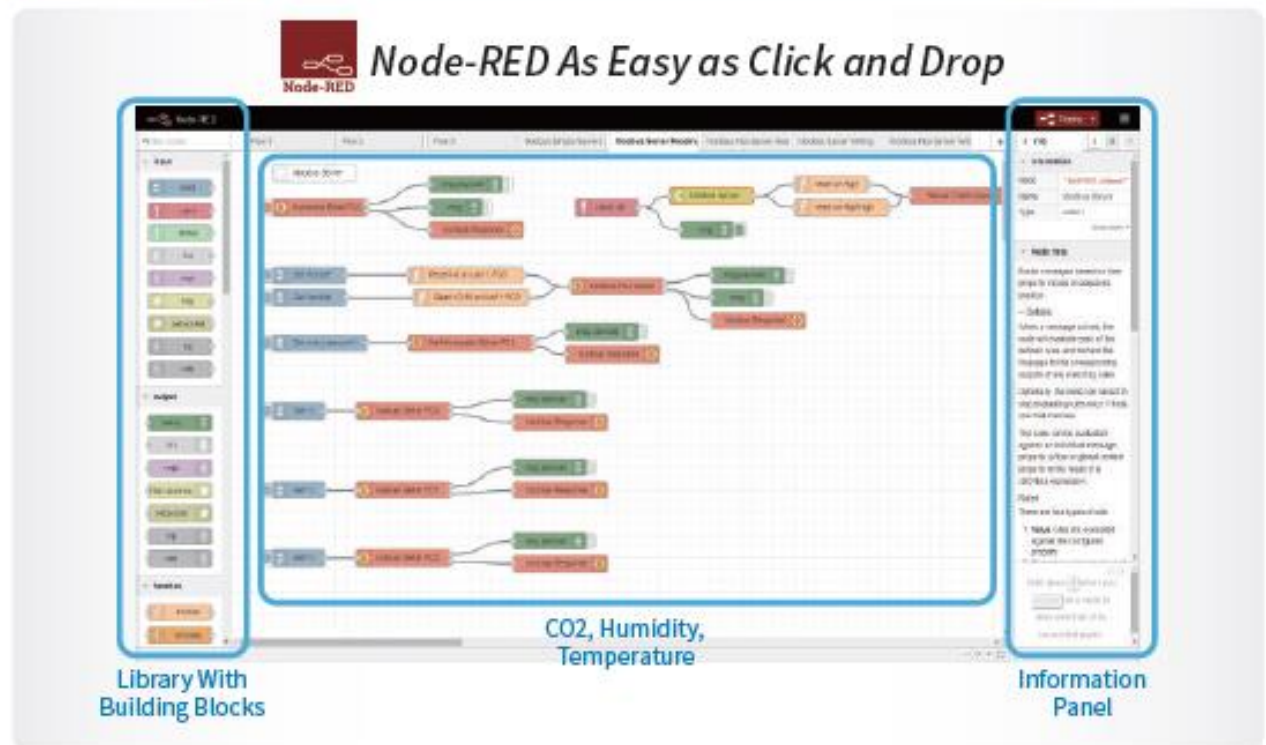
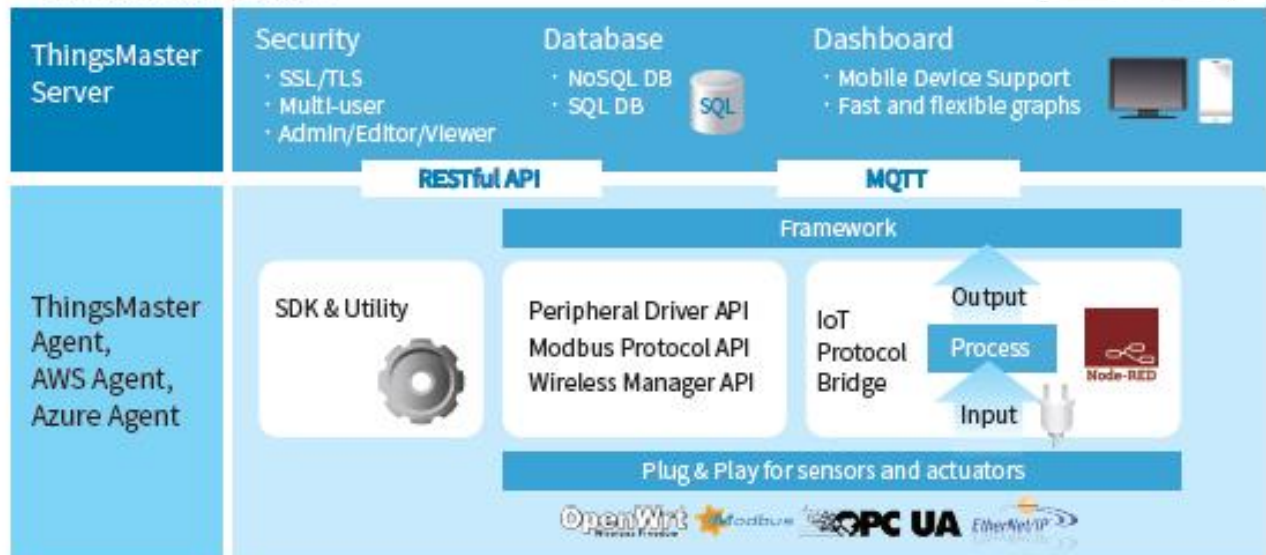
ITU-T G.8032 ERPS v2 is a crucial deployment in the industrial redundant network. However it can only protect in one link failure of a Ring. If there is more than one link failed, the ERPS Ring will still break. The patented Wireless ERPS Backup technology uses L2 VPN to provide the wireless L2 backup mechanism.



Industrial IoT Edge Computer / Gateway

Open Platform Software Architecture

- Linux OpenWRT LEDE (kernel v4.4)
- Latest Node-RED 0.19



Model	WAN	LAN	Serial	Radio 1	Radio 2	USB	SD	SIM	GPS	DI/DO	Power Input	Temp.	Standard
WR302G-EC	1xGE	1xGE	2xRS232/422/485	-	-	1	1	-	-	0/1	12/24/48VDC	-40~75°C	EN50121-4 EN61000-6-2/4 EN61000-4-12/16/17/18/29
WR312G-WLAN-EC				Wi-Fi 2.4G 11n/5G 11ac	-	1	1	-	-	0/1			EN50121-4 EN61000-6-2/4 EN61000-4-12/16/17/18/29 Radio RED
WR312G-LTE-EC				LTE Cat.4	-	1	1	1	-	0/1			
WR322GR-WLAN+LTE-EC				Wi-Fi 2.4G 11n/5G 11ac	LTE Cat.4	1	1	2	Yes	0/1			

Compact LTE/NB-IoT Wi-Fi Router for IIoT Applications

WR222-WLAN+LTE/NB2

WR224-WLAN+LTE

- Dual Radio 4G LTE Cat.4 (or NB-IoT/CatM1) + 2.4GHz Wi-Fi Network
- 2-port (WR222) / 4-port (WR224) Ethernet Routing and Bridging
- WR222: One RS232/422/485 DB9 ports with Modbus TCP/RTU
- Firewall, OpenVPN, HTTPs/SSH, GRE Tunnel for secured connection
- LTE to WAN auto-offload, Multi-port LAN/WAN routing
- 1:1 NAT, port forwarding and NAPT for local traffic protection
- L2TP with PPP, PAP, CHAP(LCP, IPCP)
- MQTT with Built-in Cloud AWS Agent, Azure Agent, ThingsMaster OTA
- TACACS+ multi-user authentication for privileged user management
- Reboot, Configuration and Firmware Upgrade over the air (OTA)
- -40~70°C wide operation temperature



NetMaster
ThingsMaster OTA

Model	Serial	ETH	Radio 1	Radio 2	USB	SD	SIM	DI/DO
WR214-WLAN	0	3FE LAN + 1 FE WAN	2.4Ghz 11n	-	0	0	0	0
WR224-WLAN+LTE	0		2.4Ghz 11n	LTE Cat.4 EUX/ECGA/AU/G	0	0	2	0
WR212-WLAN	1	1 FE LAN + 1 FE WAN	2.4Ghz 11n	-	0	1	0	1/1
WR222-WLAN+LTE	1		2.4Ghz 11n	LTE Cat.4 EUX/ECGA/AU/G	0	1	1	1/1
WR222-WLAN+NB+M1	1		2.4Ghz 11n	LTE-NB-IoT/CAT M1	0	1	1	1/1

IoT Cloud Security

- Firewall for inbound/outbound traffic
- OpenVPN (server/client)
- L2TP with PPP, PAP, CHAP(LCP, IPCP), GRE tunnel
- HTTPs/SSH secure login
- MQTTS with TLS encryption and X.509 authentication
- TACACS+ multi-user authentication for privileged user management



Complete LoRa Controller for Analog In/Output, PWM Output, and RS485 LM200 / LM100 / LC144 / LR140 Series

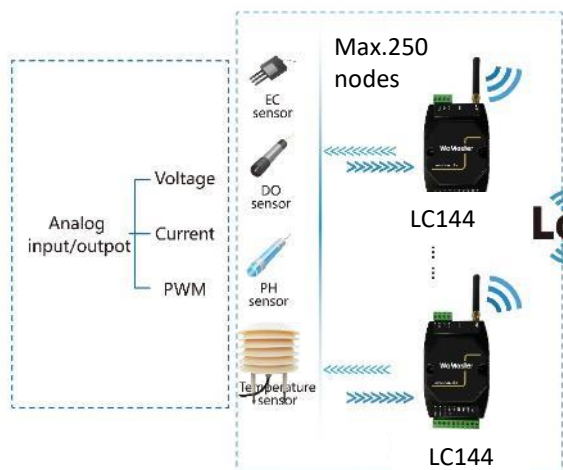
- Extend Modbus Control or Receive Modbus data over Wireless Private LoRa Network
- Max 1 LM100 LoRa Master to 250 LC144 LoRa Clients up to 6KM distance
- Transparent Two-Way Modbus Communication by Private LoRa
- Analog 0-10V and 4-20mA inputs/outputs, and PWM outputs on LC144
- Easy Configuration by USB Window Utility
- Secured AES 128 Data Encryption
- Adjustable Spreading Factor(SF6, SF7,SF8, SF9,SF10,SF11,SF12) for On-Air Reliability
- 10~30V DC wide power range input
- Industrial -40 ~ 75°C / 90%H Operating Temperature / Humidity
- EN 301489 / EN300220 / EN62368-1 Compliance
- LoRa Frequency Adjustable LC144-900 (850~930Mhz), LC144-400(410 ~493Mhz)



Model	LoRa	Modbus	Analog Input	Analog Output	PWM
LC144	LoRa Client	1 x RS485	2 x 0-10V 2 x 4-20mA	1 x 0-10V 1 x 4-20mA	1 x 0-5V 1 x 0-10V
LM100	LoRa Master	1 x RS485	-	-	-
LM200	LoRa Logic	-	-	-	-
LR140	LoRaWAN Node	1 x RS485	2 x 0-10V 2 x 4-20mA	-	-

CH0	Input Voltage 0~10V Positive
CH1	Input Current 4~20mA Positive
CH2	Input Voltage 0~10V Positive
CH3	Input Current 4~20mA Positive
CH4	Output Current 4~20mA Positive
CH5	Output Voltage(OC) 0~10V Positive
CH6	Output PWM Voltage 0~5V Positive
CH7	Output PWM(OC) 0~10V Positive
RS485A	
RS485B	

LC144



LM100 I/O Controller





LM200 I/O Tracking Controller



Tag Name (Rule Name)	Tracking Rule - Input	Tracking Rule -Output
Chain-1	ID:100-CH0	ID:130-CH5
Chain-2	ID:100-CH0	ID:110-CH5
Chain-3	ID:130-CH1	ID:110-CH4
Chain-4	ID:130-CH1	ID:120-CH4

✓ User Friendly Utility to configure Analog IO parameters

Serial	Group Net	LoRa	LoRaWan	I/O	RF	RTU	Rule Chain	Chain Monitor
Rule Parameters								
Tag : Chain-4								
In Device ID: 130								
In Device_CH: 1								
Type : A-A								
Out Device ID: 120								
Out Device_CH: 4								
Add								
Loop Time: 5 s Check Set								

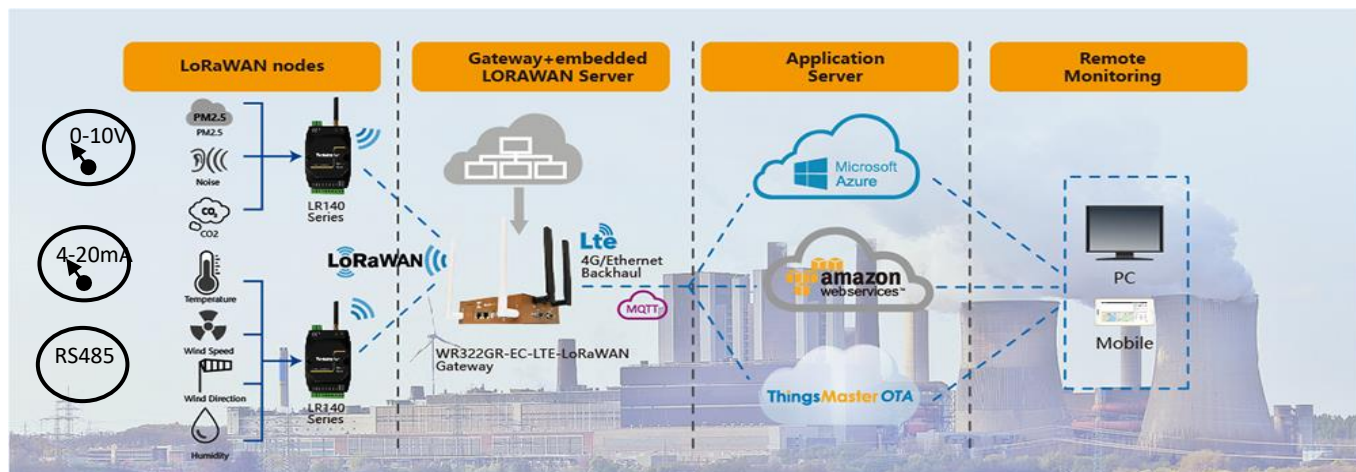
Tag	IN Dev_ID	IN_CH	Type	OUT Dev_ID	OUT_CH
Chain-1	100	0	V-V	130	5
Chain-2	100	0	V-V	110	5
Chain-3	130	1	A-A	110	4
Chain-4	130	1	A-A	120	4

- Easy Created Rule Chain
- V-V, V-A, A-A, A-V Ratio Control
- Single Input chains to Multiple Outputs
- Loop Delay Setting

WR312/322-EC-LoRaWAN Server

✓ Read Analog and RS485 Data to LoRaWAN Gateway

- Built-in LoRaWAN™ Server
- LoRaWAN™ 1.0.2 protocol, Class A, B, C
- LoRaWAN™ Frame filtering (node whitelisting)
- MQTT v3.1 Bridging with TLS encryption
- Support up to 1000 LoRaWAN™ nodes
- Support ThingsMaster OTA cloud service
- Receive 0~10V, 4~20mA and RS485 Modbus from LR140 remotely
- WAN Connectivity by Ethernet or LTE Cellular
- Node-RED flow-based programming
- Internal SD Storage



✓ LoRaWAN Cloud Server on ThingsMaster OTA

The LoRaWAN data can be sent to the ThingsMaster OTA server, located in the public domain or your corporate server. The device can be easily added and monitored on ThingsMasterOTA through the LoRaWAN gateway. WoMaster provides free demo account on ThingsMaster OTA for WR322GR-EC-LoRaWAN gateway. License for more nodes can be requested and supported.



Model	Input	ETH	Radio 1	Radio 2	USB	SD	SIM	DI/DO
WR312GR-EC-LORAWAN-(Region)	2 x RS232/422/485	1 GE WAN 1 GE LAN	LoRaWAN EU 868MHz LoRaWAN EU 433MHz LoRaWAN US 915MHz LoRaWAN AS 923MHz	-	1	1	0	0/1
WR322GR-EC-LTE-LORAWAN-EU868			LTE Cat.4 EUX/ECGA/AU/G	LoRaWAN EU 868MHz LoRaWAN EU 433MHz LoRaWAN US 915MHz LoRaWAN AS 923MHz	1	1	1	0/1
LR140-(Region)	2 x 0-10V 2 x 4-20mA	-	LoRaWAN EU 868MHz LoRaWAN EU 433MHz LoRaWAN US 915MHz LoRaWAN AS 923MHz	-	-	-	-	-

Industrial MESH WLAN 2.4G+5GHz 802.1ac Wave 2 AP/ Router with Add-On 5GNR/LTE6 Cellular

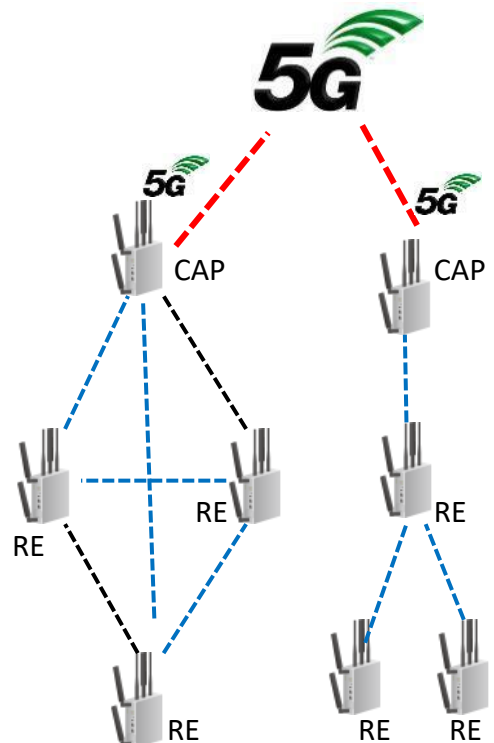
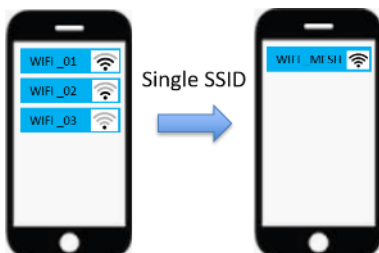
WA512GM-D/WA512GM-D-M2

- Quad-Core ARM Processor with Optional Add-On **5GNR / LTE6 modules**
- Concurrent dual-band 2.4 G+5GHz radio, up to 866Mbps + 300Mbps Bandwidth
- Dual Gigabit Ethernet ports in Router mode for WLAN/LAN to Eth-WAN routing
- **Wi-Fi SON MESH Network with Self Healing**
- Multi-hop up to 4 layers and 7 Range Extenders
- Self-Configuring Plug-and-play via Wireless network with ViewMaster utility
- Easy MESH setup and Group MESH setup and MESH Network Status Monitoring
- Autonomous performance optimization (802.11k)
- Interference management via band steering (802.11v)
- Seamless roaming
- Enhanced Security with Firewall, OpenVPN, IPSec, L2TP, GRE, TACACS+
- Slim size Din-Rail mounting with dual radio in one antenna to save cost and space
- Effective heat dissipation design for operating in -40~70°C environments
- Power Input 802.3af PD by Industrial PoE switch as a complete wire/wireless solution.
- 24VDC Power input with 9~50V range



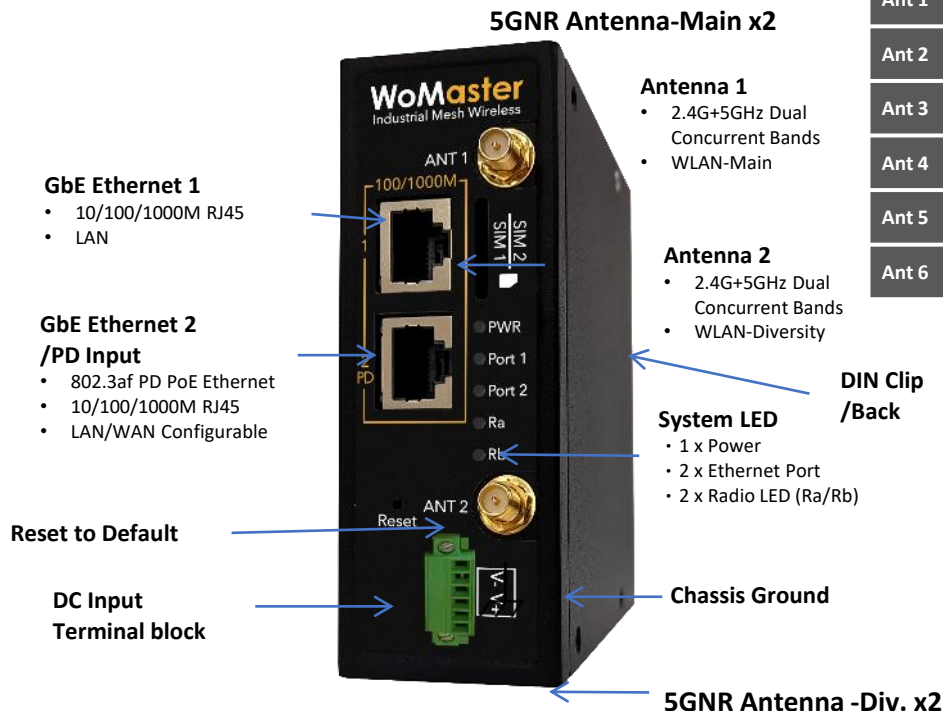
✓ Cellular 5G and MESH WiFi Dual Wireless

- Each Mesh AP communicates with each other to automatically find best path for packets transmission.
- CAP- Central AP with WAN connection
- RE- Range Extender connected to CAP directly or indirectly
- Single SSID for all CAP/RE for easy/fast roaming
- 1 CAP extends up to 7 Range extenders or up to 4 layers for minimum performance
- All devices can be configured as CAP or RE (by default)
- Hop Distance- Max 50M with default omni antenna
- Optional Directional Long-Range antenna for long distance up to 10KM



WA512G-D

WA512GM-D-5GM2



	WA512GM-D	WA512GM-D-5GM2
Ant 1	WLAN-Main 2.4/5G Dual Band	WLAN-Main 2.4/5G Dual Band
Ant 2	WLAN-Diversity 2.4/5G Dual Band	WLAN-Diversity 2.4/5G Dual Band
Ant 3		5GNR-Main
Ant 4		5GNR-Main
Ant 5		5GNR-Div
Ant 6		5GNR-Div

Model Name	Description
WA512GM-D	Industrial 802.11ac Din-Rail Dual Radio 2.4+5GHz Concurrent Wireless Mesh AP, 802.11ac Wave 2 +802.11b/g/n WLAN, 2GE, Din-Rail, 24VDC Terminal Block
WA512GM-D-M2	Industrial Din-Rail Wireless Router with M2 expansion slot, 802.11ac Wave 2+802.11b/g/n WLAN MESH, 2GE, 2SIM, M2+4SMA, 24VDC
Cellular Module	
WM-5GNR-M2Q-E Kit	Wireless 5GNR M2 Module Kit, 5GNR Module, Heat Pad, 4xAntennas, Screws, QIG, EU Bands
WM-LTE6-M2Q-E Kit	Wireless LTE Cat6 M2 Module kit, LTE Cat6 Module, Heat Pad, 2xAntennas, Screws, QIG, EU Bands

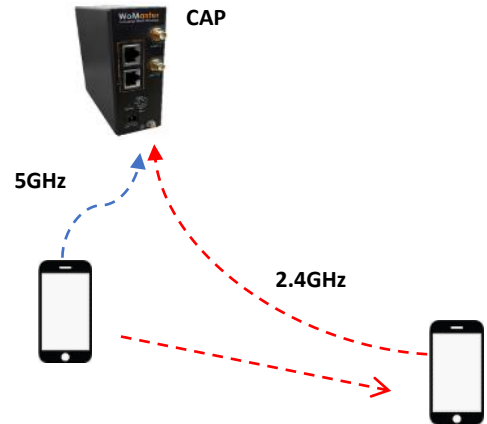
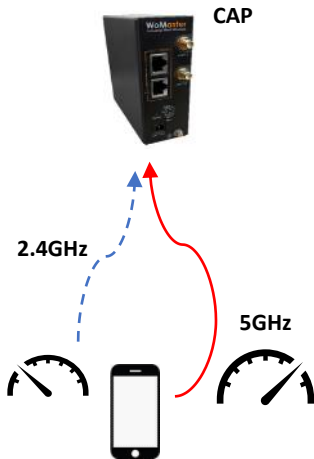


Outdoor Model	Description
WA512GM-IP67-U	Industrial Dual Radio 2.4+5GHz Concurrent Wireless MESH AP, 802.11ac Wave 2 + 802.11b/g/n WLAN, 2GE, USB, IP67 Enclosure, US-plug
WA512GM-IP67-E	Industrial Dual Radio 2.4+5GHz Concurrent Wireless MESH AP, 802.11ac Wave 2 + 802.11b/g/n WLAN, 2GE, USB, IP67 Enclosure, EU-plug

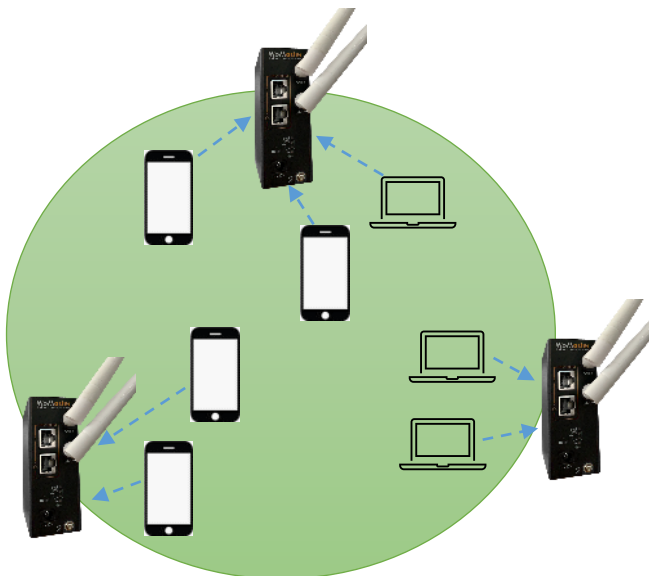


✓ Self-Organized Mesh Network

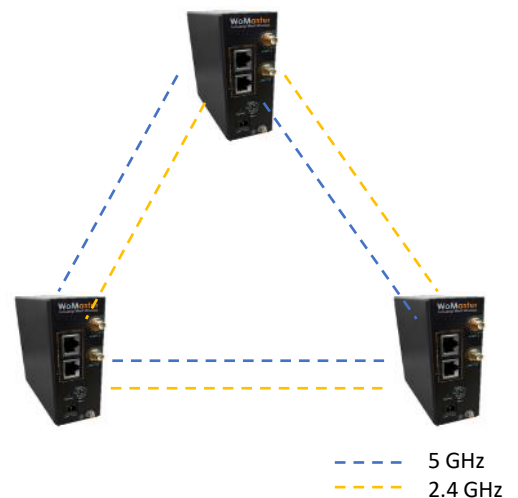
1. **Band Steering:** Auto select the best performance band and path.
 2. **Concurrent 2.4G+5GHz:** AP offers concurrent services of 2.4GHz and 5GHz Bands for different clients with default omni antennas
- Performance degradation detected- Change uplink to 5GHz
 - Longer distance detected- Change uplink to 2.4GHz



3. **AP Steering:** the wireless devices are always connected in the best AP via 802.11v Wireless network management



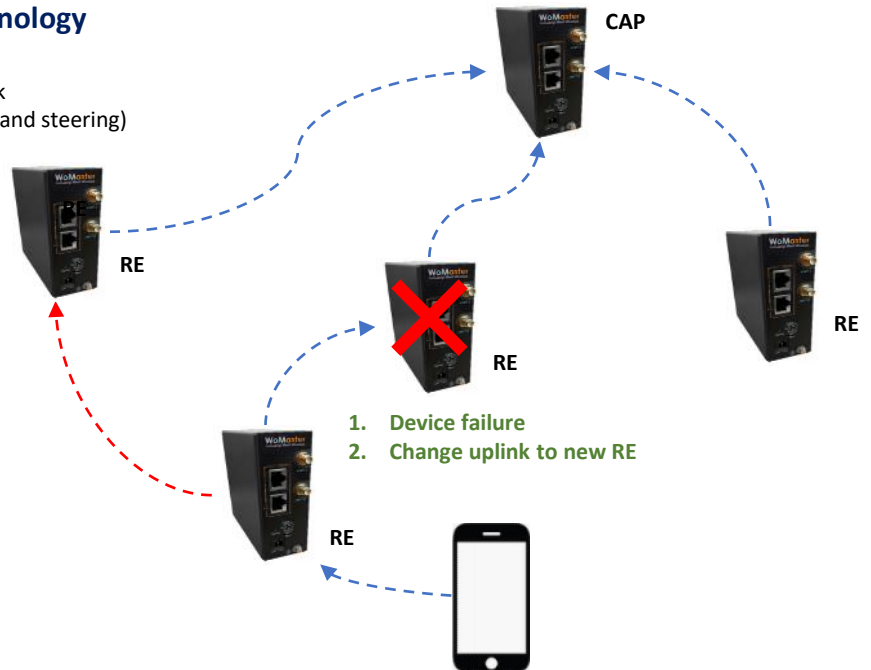
4. **Multiple Backhaul Links:** Failsafe and load-balancing backhaul links





✓ Self-Healing Mesh Technology

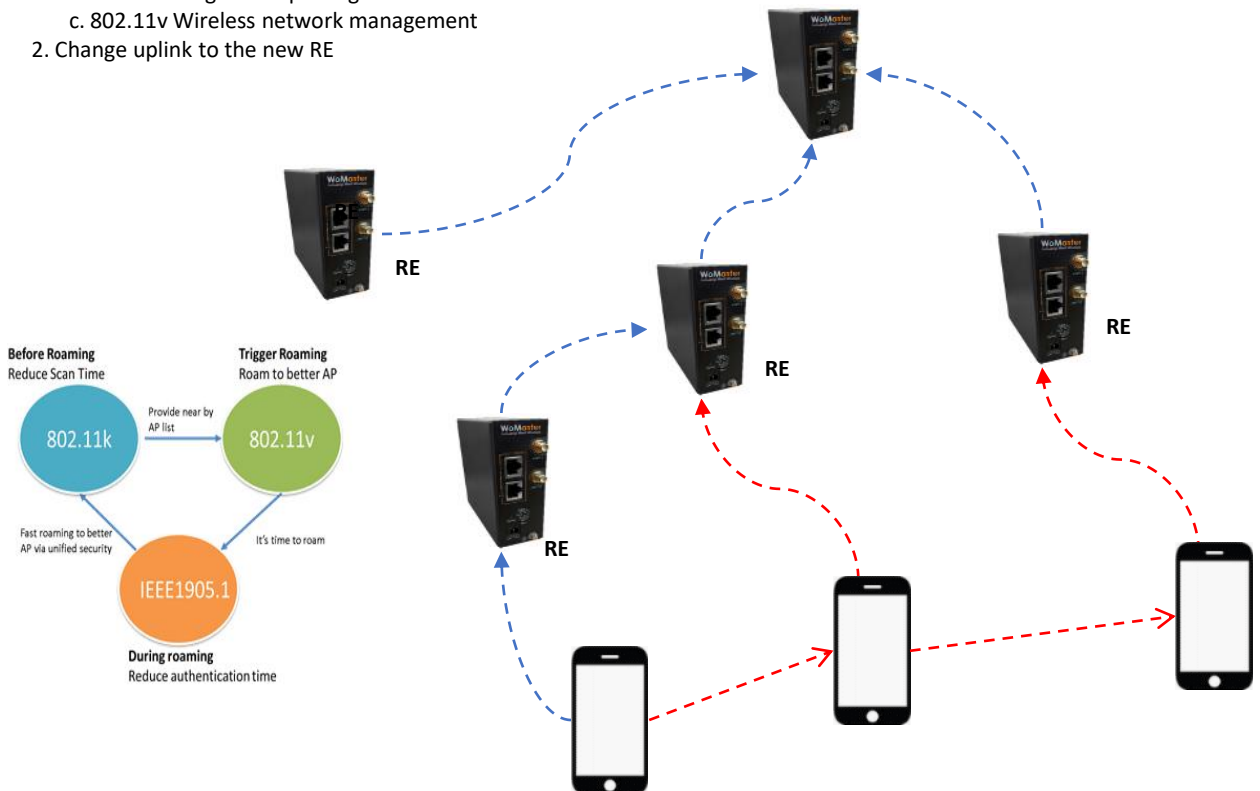
- Auto reroute when AP failed
- Eliminate network bottleneck
- Interference management (band steering)
- Airtime fairness
- Seamless roaming



✓ Seamless Roaming

- 802.11k (Radio Resource Measurement): Sends Clients list of neighbors.
- 802.11v (BSS Transition Management Frames): BSS Transition sends clients the new best AP.
- IEEE 1905.1: Enable AP auto-configuration and join the network with a unified security procedure.

1. Automatically find the optimal path by fewer hops/ less loading
 - b. 802.11k neighbor reporting
 - c. 802.11v Wireless network management
2. Change uplink to the new RE



All-in-One IP67 Smart City Box

SCB1200/1000/400 Series

- **Waterproof IP67 Protection**
- **Two 802.3bt Ultra PoE**, max. 60W/port and **Two 802.3at PoE+**, max. 36W per port
- **Solar Power 18V to 54V booster PoE**
- **Dual Giga Fiber long distance transmission with ERPS Redundancy**
- **1GT WAN port** with 802.3at PoE+ inside
- **IIoT Expansion**, include Voice, one Serial port, DI and DO
- Internal One Serial, one SD, and one USB for data storage and expansion
- **WIFI/LTE Expansion with outdoor Antenna, dual SIM**
- **AC 100~240V Power Input and DC24V Power Output**
- **Lithium Battery UPS (61850x13)**
- **Solar PV Input & Charger Board pack**
- **Management through the air ThingsMaster OTA**
- Interface Customization by requirement



ThingsMaster OTA



SCB1000

SCB1200

SCB400/400A-AC/DC

SCB400/400A-NP-AC/DC

External Interfaces				
Ethernet-LAN	2x10/100/1000M, 802.3bt UPoE, 60W/port 2x10/100/1000M, 802.3at PoE+, 30W/port	2x10/100/1000M, 802.3bt UPoE, 60W/port 2x10/100/1000M, 802.3at PoE+, 30W/port	2x10/100/1000M, 802.3at PoE+, 30W/port 1x10/100/1000M Ethernet-WAN	2x10/100/1000M Ethernet-LAN, 1x10/100/1000M Ethernet-WAN
Ethernet-LAN/Fiber	2x100/1000M SFP	2x100/1000M SFP	-	-
Power Input	100~240V AC	100~240V AC	100~240VAC or 24VDC(8~30V)	100~240VAC or 24VDC(8~30V)
DC Output	24VDC	24VDC	-	-
Serial	-	1xRS232/422/485, RJ45	1xRS232/485, 5-pin M8	1xRS232/485, 5-pin M8
Voice	-	1xMic. & 1x Speaker, RJ12	Audio Output, Audio amplifier board by option	Audio Output, Audio amplifier board by option
Digital Input	-	2xDI	2xDI	2xDI
Digital Output	-	2xRelay	1xRelay	1xRelay
Antenna Socket	2xN-Type female	2xN-Type female	2xN-Type female	2xN-Type female
Internal Interfaces				
Ethernet - WAN	1x10/100/1000M, 802.3at PoE+	1x10/100/1000M, 802.3at PoE+	(External Waterproof WAN Port)	(External Waterproof WAN Port)
Serial	-	1xRS232/422/485, DB9	-	-
mPCIe Socket	max.2	max.2	max.2	max.2
SIM Socket	2xNANO SIM or eSIM	2xNANO SIM or eSIM	2xNANO SIM or eSIM	2xNANO SIM or eSIM
USB Socket	-	1xUSB A-Type	1xUSB A-Type	1xUSB A-Type
SD Socket	-	1xmicro SD	-	-
Software				
L2 Management	VLAN, QoS, IGMP Snooping, LLDP, SNMP, Rate Control, Port/MAC/IP Security	VLAN, QoS, IGMP Snooping, LLDP, SNMP, Rate Control, Port/MAC/IP Security	VLAN, IPv4/IPv6, SNMP/Trap, Rate Control, DHCP server/client, TFTP, System Log	VLAN, IPv4/IPv6, SNMP/Trap, Rate Control, DHCP server/client, TFTP, System Log
Redundancy	STP/RSTP, ITU-T G.8032 ERPSv2, VRRP	STP/RSTP, ITU-T G.8032 ERPSv2, VRRP	-	-
Security	Port Security, HTTPs, SSH, Firewall, DMZ, Port Forwarding, NAT, Firewall, OpenVPN/IPSec VPN	Port Security, HTTPs, SSH, Firewall, DMZ, Port Forwarding, NAT, Firewall, OpenVPN/IPSec VPN	HTTPs, SSH, Force Changing password first time, Firewall, DMZ, Port Forwarding, NAT, Firewall, OpenVPN/IPSec/L2TP VPN	HTTPs, SSH, Force Changing password first time, Firewall, DMZ, Port Forwarding, NAT, Firewall, OpenVPN/IPSec/L2TP VPN
Wireless Expansion				
SCB WLAN Expansion	5G/2.4G 802.11ac/n	5G/2.4G 802.11ac/n	5G/2.4G 802.11ac/n	5G/2.4G 802.11ac/n
SCB LTE Expansion	LTE Cat.4, 150M DL/50M UL, 1x LTE+GPS Antenna	LTE Cat.4, 150M DL/50M UL 1x LTE+GPS Antenna	LTE Cat.4, 150M DL/50M UL	LTE Cat.4, 150M DL/50M UL
Other expansions				
Solar Charger Board	LV(18V) to 54V charger	LV(18V) to 54V charger	-	-
Battery UPS	48V/2.5AH	48V/2.5AH	-	-
Others	-	-	Optional Audio Amp. Board	Optional Audio Amp. Board



Features & Benefits

Cloud Service



ThingsMaster OTA



Video Surveillance



Device Management



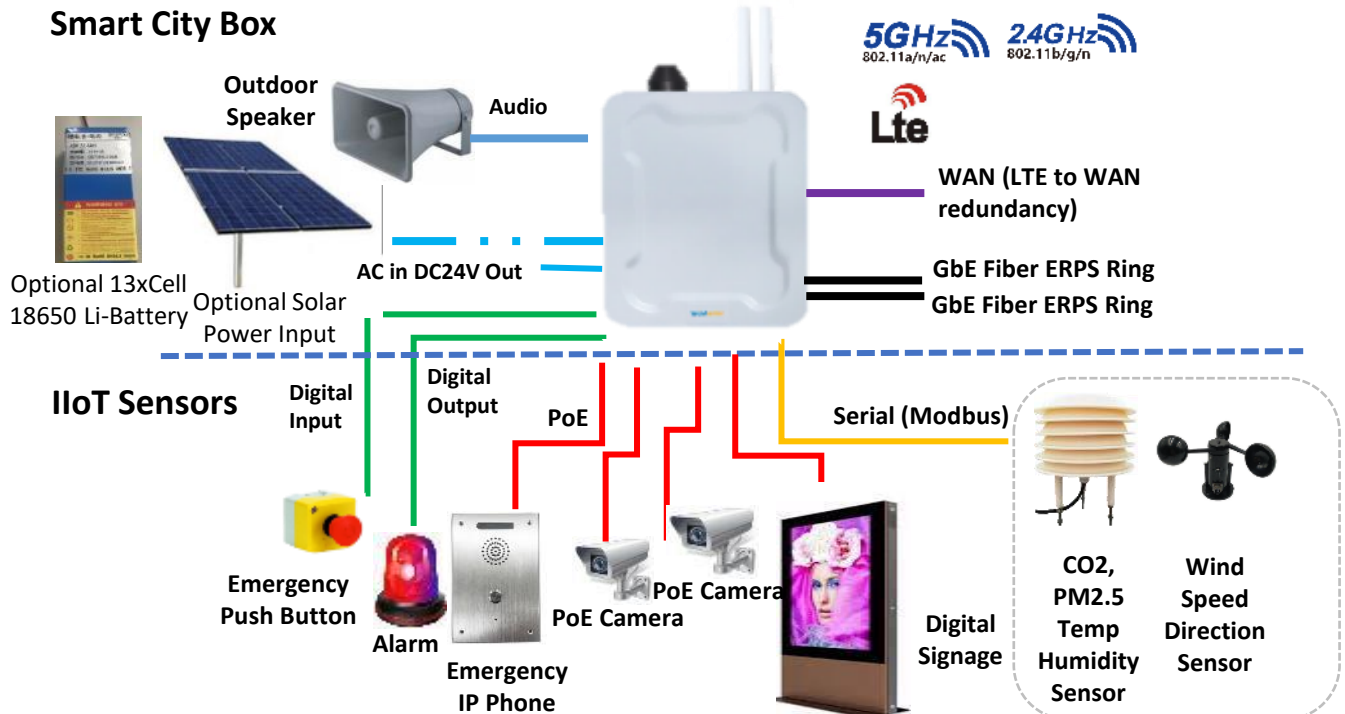
Dashboard/Database



Control Center



Smart City Box



ERPS v2 Ring with Two Gigabit Fiber ports

Two Gigabit SFP Ports

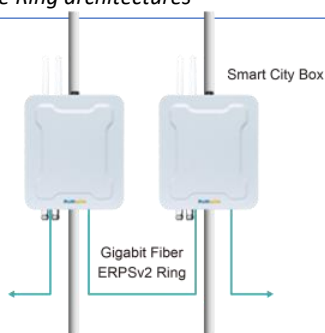
- Each supports 100M or 1000M SFP
- Wire-speed Switching, no traffic loss

Ring Redundancy

- 802.1D-2004 Rapid Spanning Tree Protocol
- ITU G.8032 Ethernet Ring Protection Switch version 2, <50ms recovery time, flexible Ring architectures

L2 Managements

- VLAN, QoS, IGMP Snooping
- LLDP, SNMP, Rate Control
- Port/MAC/IP Security



SCB1200 Basic Solar Kit

Basic Solar Kit

- Typ. 48V/2.5AH Battery
- 54V Battery charger board
- Reserved 2xM20 hole for PV input

Test and Assembly prior to shipment

MC4 Connector for PV+/PV- Input

Other optional Solar Power Band by Request

- High Power Solar Panel or Panel farm
- Pole mount external Battery
- Other optional Battery



Outdoor NB-IoT / CAT M1 / CAT 1 / 4G LTE Gateway for Single / Multi DLMS / MBUS / Modbus Meter Reading

SCB211/270 Series

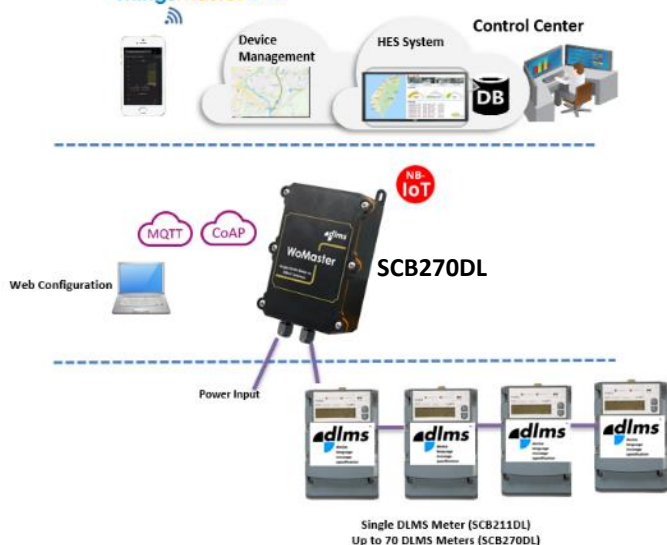
- Read Single or Multi Utility Meters of DLMS/COSEM, MBUS, Modbus protocols
- Internal RJ45 Ethernet Port and WEB UI for Configuration
- Support **MQTT/COAP** cloud protocol
- **LTE Cat NB-IoT v2**: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85
- **LTE Cat M1**: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85
- EGPRS: 850/900/1800/1900MHz
- **LTE Cat 1**: B1/B3/B7/B8/B20/B28
- Configuration and Firmware Upgrade over the air (ThingsMaster OTA)
- **IP67** Protection for operating in -40~70°C environments
- Support Firewall for inbound/outbound traffic and HTTPs/SSH secure login
- Support TACACS+ multi-user authentication for privileged user management
- NAT for local traffic protection
- Support SNMPv3 and entity-MIB (RFC4133), MIB II (RFC1213)



Model	Meter	Cellular	ETH (WEBUI)	Power	OTA	MQTT	CoAP
SCB211DL-NB-DC	Single DLMS	NB2+M1	1	24V DC	YES	YES	YES
SCB211RS-NB-DC	Single Modbus	NB2+M1	1	24V DC	YES	YES	YES
SCB270DL-NB-DC	Multi DLMS	NB2+M1	1	24V DC	YES	YES	YES
SCB270DL-C1-DC	Multi DLMS	CAT 1	1	24V DC	YES	YES	YES
SCB270DL-LTE-DC	Multi DLMS	4G LTE Cat 4	1	24V DC	YES	YES	YES
SCB270MB-NB-DC	Multi MBUS	NB2+M1	1	24V DC	YES	YES	YES
SCB270MB-C1-DC	Multi MBUS	CAT 1	1	24V DC	YES	YES	YES

Cloud Service

ThingsMaster OTA



✓ Support DLMS/COSEM Standard

Serial Port 1 Settings

Basic Settings

Interface	RS485-2w
Baudrate	9600
Parity	NONE
Databit	8 bits
Stopbit	One Stopbit
Flow Control	NONE
Terminal Resistor	DISABLE
Service Mode	DLMS

Submit

Cancel



ThingsMaster OTA

Cloud Service



Device Management



HES System



Control Center



Web Configuration



MQTT

CoAP



NB-IoT

LTE-1

LTE-M

Lte

SCB270MB

Power Input DC24V



✓ Periodic MBUS Meter Reading to Head End System

Home > IoT > Mbus

AWS IoT Azure IoT Private IoT CoAP Modbus Device RMS/OTA DLMS Mbus

Mbus Slave List

Serial	Name	Primary Address	Man	Medium	Alive
1	ITRON ECHODIS+	0	ITW	Water	Yes

Mbus Data List

Select	Index	Name	Edit	Alive	Value
☐	1		Edit	Yes	15015350.000000
☐	2	V	Edit	Yes	922.419000 m^3
☐	3		Edit	Yes	616368178.000000 -
☐	4		Edit	N/A	-
☐	5		Edit	Yes	
☐	6	R_V	Edit	Yes	0.000000 m^3
☐	7		Edit	Yes	9151.000000 -
☐	8		Edit	Yes	922.419000 m^3
☐	9	F_R	Edit	Yes	0.000000 m^3/h
☐	10	Temp	Edit	Yes	0.000000 °C

Basic Settings

Interface

MBus

Baudrate

2400

Parity

NONE

Databit

8 bits

Stopbit

One Stopbit

Flow Control

NONE

Service Mode

MBus

Submit

Cancel

Outdoor Entry-Level Cellular Gateway

IP68 Compact Modbus RS485 / MBUS to CAT M1 / NBIoT Gateway

- One Internal Nano SIM slot LTE NB2/ Cat-M1 B1/3/4/5/8/12/13/14/18/19/20/25/26/27 /28/66/71(Global Band) /72 (Europe Band) /85
- GSM850, EGSM900, DCS1800, PCS1900
- One Modbus 2-wire RS485A, RS485B and One Dry Relay Output
- Single MBUS Meter Periodic Reading
- Palm-size Wall Mounting
- Complete Serial RTU Parameters Configuration
- Configuration through micro-USB Interface
- ThingsMaster OTA for device remote management



SCB111-485 SCB111MB



Model	Device	Cellular	ETH (WEBUI)	USB Windows Utility	Power	OTA	MQTT	CoAP
SCB111-485-NBM1-DC	Modbus	NBiot + Cat M1	No	YES	24V DC (10-60V)	YES	YES	NO
SCB111-MB-NBM1-BT14	MBUS	NBiot + Cat M1	No	YES	Battery	YES	YES	NO

✓ SCB111MB Single MBUS Meter Periodic Reading to Head End System

SCB111-NB v1.0.2

Device Tools

COM: COM95

Model Name: SCB111MB-NB

Disconnect

MBus Cellular MQTT Meter Meter Polling

Number: 1

Model	Hydus
Serial Number	69468468
Addressing Mode	1
Primary Address	0
Secondary Address	69468468
Status	48
Manufacture	DME
Type	Hot Water
Version	112
Baudrate	2400

Attribute	Value	Magnitude
V	0.200	m³
R_V	0.000	m³
F_R	1622.443	m³/h
Temp	22.500	deg
DAT	2021-05-21T03:3	

Meter Polling

Show Next

Clear

SCB111-NB v1.0.2

Device Tools

COM: COM95

Model Name: SCB111MB-NB

Disconnect

MBus Cellular MQTT Meter Meter Polling Log

Cellular Configuration

APN: Internet

User Name:

Password:

PLMN: 0

Disconnect

Apply

Reload

Cellular Status

Registration: REGISTERED

Provider: CHINA MOBILE

IMEI: 881518040021411

IMSI: 460080662100363

PLMN: 48000

Band: 8

RSSI (dBm): -67

SIM Status: READY

IP: 100.83.64.245

Connection Status: CONNECTED

Refresh

M-Bus

Outdoor WLAN Directional Antennas

- 2.4Ghz / 5.8Ghz Wireless Access Point to Point
- High Gain, Long Distance Coverage
- Vertical Polarization, 50Ω **Input Impedance**
- IP65 Protection Enclosure and Prevention of Rust
- -40°C ~ +60°C operation temperature
- 190 * 190*30 mm (L x W x H)
- N Type Female Connector
- Two 1-meter RF Cables (C-RF-LMR200-NM_NM-1M)



Model	Frequency	Transmission	Gain	Max. Distance	Beam
A-D1T1R-2.4GHZ-14DB-6KM-NF	2.4 GHz	1T1R	14dBi	6KM	30° for Horizontal Plane and 28° Vertical
A-D1T1R-5GHZ-12DB-5KM-NF	5.8Ghz	1T1R	12dBi	5KM	40° for Horizontal Plane and 38° Vertical
A-D2T2R-5GHZ-15DB-6KM-NF	5.8Ghz	2T2R	15dBi	6KM	35° for Horizontal Plane and 16° Vertical
A-D2T2R-5GHZ-19DB-8KM-NF	5.8Ghz	2T2R	19dBi	8KM	90° for Horizontal Plane and 4° Vertical

Outdoor Omni Antennas

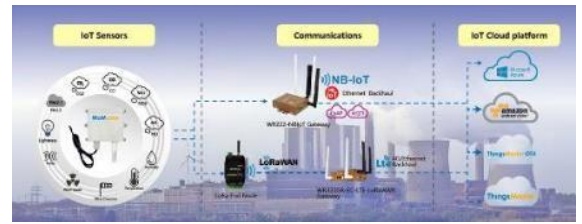
Model		Frequency	Gain	Enclosure	Dimension	RF Cable
A-2.4/5GHZ-2-RSM-2Mx2		2400-2500/5150~5850	2dBi	IP67	Φ80×15mm	Two 2-meter RG174 cables RP SMA male connector
A-LTE-2-SM-2M		700~960/1710~2690 /2900~3600	2dBi	IP67	Φ80×15mm	Two 2-meter RG174 cables SMA male connector
A-GPS-38-SM-3M		GPS 1575	38dBi	outdoor	50×38×17mm	3M RG174 cable SMA male
A-LORA433-7-SM-3M		433	7dBi	outdoor	Φ30×175mm	3M RG174 cable SMA male
A-LORA850-925-7-SM-3M		850~925	7dBi	outdoor	Φ30×290mm	3M RG174 cable SMA male

Outdoor Combo Antennas

Model		Frequency (MHz)	Gain (dBi)	Connector	Dimension (mm)	Cable (M)
A-LTE_WLAN_G-4_4-RSM-2M		LTE: 698~960/1710~2690/2900~3600 WLAN: 2400~2483.5/4900~5825 GNSS: 1561.1~1610 (GPS/GLONASS/GALILEO/BEIDOU)	4 4 28	3x SMA Male (LTE/GPS) 2x RP-SMA Male (Wi-Fi)	189x182x107	2
A-LTE_WLAN_G-3_2-RSM-2M		LTE: 698~960/1710~2690 WLAN: 2400~2483.5/4900~5825 GNSS: 1575.42~1610 (GPS/GLONASS)	3 2 28	3x SMA Male (LTE/GPS) 2x RP-SMA Male (Wi-Fi)	110x110x80	2
A-LTE_WLAN_G-5_5-RSM-1M		LTE: 700~2700 WLAN: 2400~2500 GNSS: 1575.42	5 5 28	2x SMA Male (LTE/GPS) 1x RP-SMA Male (Wi-Fi)	70x70x15	1

Outdoor Environment IoT Sensor

- Outdoor Protective Design against direct ultraviolet radiation
- Single or multiple parameters in small shutter, small size, light weight and easy to install
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140 LoRa/LoRaWAN nodes
- 24(10-30) VDC Power Input and Real-time measurement
- 4~20mA or 0~10V Output by Special Order



Model			Measurement	Accuracy	Dimension
ES102TH	Outdoor Temperature and Humidity Sensor		Temperature: -40~+80 °C Humidity: 0%~100%RH	Temperature accuracy: 0.5 °C(25 °C) Humidity: 3%RH (5%RH~95%RH, 25 °C)	110x85x44(mm)
ES101AT	Outdoor Air Atmospheric Pressure Sensor		air pressure:0-120kpa	Air Pressure ± 0.15 kpa (25 °C/75Kpa)	110x85x44(mm)
ES101NL	Outdoor Noise Level Sensor		30~120dB (20Hz~12.5KHz)	0.5dB	110x85x44(mm)
ES101UW	Outdoor Ultrasonic Wind Speed Direction Sensor		0~70Meters/Second Compass , 360 degree	0.1Meter/Second 1 degree	Base Φ141mm Height 115mm
ES101WS	Outdoor Anemometer Wind Speed Sensor		0~70Meters/Second	0.1Meter/Second	Base Φ80mm Height 160mm
ES101WD	Outdoor Wind Direction Sensor		Compass , 360 degree	1 degree	Base Φ80mm Height 190mm
ES101RG	Outdoor Rain Measurement Sensor		0~4mm/Min (Max.8mm/Min)	0.5mm/Min	Φ200mm
ES101UV	Outdoor UV Measurement Sensor		0~15 mW/ cm2	UV Strength: $\pm 10\%$ FS 0.01 mW/ cm2	110x85x44(mm)
ES101SR	Solar Radiation Sensor		1800 w/m ² 0.3 ~3 um	1 w/m ²	Base Φ80mm Height 90mm
ES101-FL (5M/10M /20M/30M	Outdoor Flood Water Detection Sensor		Water Detection Length 5M, 10M, 20M, 30M	1 meter	110x85x44(mm)

Outdoor Air Quality Sensor

- Outdoor Protective Design against direct ultraviolet radiation
- Well ventilated for measure changes in external detection parameters
- Single or multiple parameters in small shutter, small size, light weight and easy to install
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140 LoRa/LoRaWAN nodes
- 24(10-30) VDC Power Input and Real-time measurement
- 4~20mA or 0~10V Output by Special Order



Model		Measurement	Accuracy	Dimension
ES101CO-2000	Outdoor CO Carbon Monoxide Sensor	0~2000ppm	±3%, 1ppm	110x85x44(mm)
ES101O3-10	Outdoor Ozon O ³ Sensor	0-10ppm	±6%, 0.01ppm	110x85x44(mm)
ES101-CO2-5000	Outdoor CO ² Carbon Dioxide Sensor	0-5000ppm	±40ppm +3%FS	110x85x44(mm)
ES101O2	Outdoor Oxygen O ² Sensor	0~25%Vol	±3%FS, 0.1%VOL	110x85x44(mm)
ES101PM	Outdoor Air Monitor Quality Sensor (PM2.5, PM10)	0~1000ug/m3	1ug/m3, 10%	110x85x44(mm)
ES101TVOC	Outdoor TVOC (Total Volatile Organic Compounds) Sensor	0~60000ppb	1ppb±8%FS±125ppb	110x85x44(mm)
ES101NO2-2000	Outdoor Nitrogen Dioxide NO ² Sensor	0-2000ppm	0.1ppm	110x85x44(mm)
ES101SO2-2000	Outdoor Sulphur Dioxide SO ² Sensor	0-2000ppm	1ppm +3%FS	110x85x44(mm)
ES101NH3-500	Outdoor Ammonia NH ³ Sensor	0-500ppm	1ppm±20%	110x85x44(mm)
ES101H2S-100	Outdoor Hydrogen Sulfide H2S Sensor	0-100ppm	1ppm +3%FS	110x85x44(mm)
ES101H2-1000	Outdoor Hydrogen H2 Sensor	0-1000ppm	1ppm +3%FS	110x85x44(mm)
ES101CH4	Outdoor Methane CH4 Sensor	0-100% Lower Explosive Limit (LEL)	1% LEL +5%FS	110x85x44(mm)

Outdoor Multiple Air Sensor

- Outdoor IP65 grade Anti-U/V lightweight ABS louver radiation shield 140x114mm
- Up to 5 Air quality modules in small shutter, max 3 type A sensors and 2 type B sensors
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140 LoRa/LoRaWAN nodes
- 24(10-30) VDC Power Input and Real-time measurement



ES105M-A1-A2-A3-B1-B2	Outdoor Multi Air Sensor RS485 Modbus, 10-30V Power, Max 3 x A type and 2 x B Type
A: TVOC	TVOC Sensor Module 0~60000 ppb (0~60 ppm), Resolution 1ppb ±125 ppb
A: CH2O	CH2O Sensor Module 0~5 ppm Resolution 0.01ppm ±5%
A: O3	O3 Sensor Module 0~10 ppm Resolution 0.01ppm ±6%
B: O2	O2 Sensor Module 0~25%Vol Resolution 0.1%Vol ±2%
B: H2S	H2S Sensor Module 0~100 ppm Resolution 1ppm ±3%
B: CH4	CH4 Sensor Module 0~100% LEL Resolution 1% LEL ±5%
B: CO	CO Sensor Module 0~100 ppm Resolution 1ppm ±3%
B: NO2	NO2 Sensor Module 0~20 ppm Resolution 0.1ppm ±3%
B: SO2	SO2 Sensor Module 0~20 ppm Resolution 0.1ppm ±3%
B: H2	H2 Sensor Module 0~1000 ppm Resolution 1ppm ±3%
B: NH3	NH3 Sensor Module 0~100 ppm Resolution 1ppm ±5%

Water Quality Sensor

- Reliable IP68 Water Quality Sensor for drinking water, sewage treatment, wastewater treatment, aquaculture and environmental monitoring
- Built-in Water Temperature sensor for 0~60°C
- 12(10-30) VDC Power Input and Real-time measurement
- Dual Output by 2-Wire RS485 Modbus output and 4~20mA
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140 LoRa/LoRaWAN nodes
- 5 Meter cable, 0.5kg



Model		Measurement	Accuracy	Pressure Range	Shell Material
WS102PH	Water PH Sensor	0~14pH	0.01pH ±0.01pH	0~300KPa	PPS
WS102DOS	Water Dissolved Oxygen Sensor	0~20mg/L	0.01mg/L ±0.2%FS	0~300KPa	PC+316L
WS102ORP	Water Oxidation Reduction Potential Sensor	-2000~2000mV	0.01mV ±0.01mV	0~300KPa	PPS
WS102CL	Water Residual Chloride Ion (CL-) Sensor	0~20mg/L	0.01mg/L ±0.2%FS	0~100KPa	PC+316
WS102EC	Water Electric Conductivity Sensor	1~2000μS/cm	1 μS ±1 μS	0~400KPa (0 – 4 Bar)	PC, PBT plastic
WS102BRM	Water Bromine Level Sensor	0.4~50000ppm	0.001ppm ±1%	0~300KPa	PC+316
WS102-TDS	Water Total Dissolved Solid Sensor	0~5000mg/L	0.01mg/L ±0.01mg/L	0~400KPa	PPS

Soil Quality Sensor

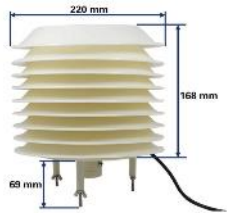
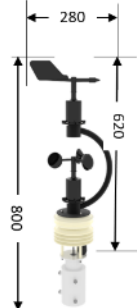
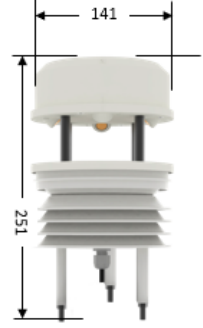
- 45*15*123mm, Probe length: 70 mm
- RS485 2-Wire Modbus Output, 5-30VDC Power Input
- Probe material: Anti-corrosion special electrode
- Sealing material: IP68 Epoxy resin (black flame retardant)
- Cable length: standard 2 meters (Can be customized)
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140 LoRa/LoRaWAN nodes



Model		Measurement	Accuracy
ES101SM	Soil Moisture Temperature Sensor	0~100% RH -40°C~80°C	Moisture accuracy : 0-50% ±2%RH, 50-100% ±3%RH, Temperature accuracy : ±0.5°C
ES101SPH	Soil pH sensor	3~9ph	±0.3pH
ES101SEC	Soil EC and Moisture Sensor	EC:0-20000us/cm Moisture: 0~100%RH Temperature: -40~80°C	EC: 10us/cm, 0-10000us/cm: ±3%; 10000-20000us/cm: ±5% Moisture:0.1%, 0-50% 2%; 50-100% 3% Temperature: 0.1°C, ±0.5°C

Integrated Outdoor Weather Station Sensor

- Outdoor Protective Design against direct ultraviolet radiation
- Well ventilated for measure changes in external detection parameters
- Multiple parameters in small shutter, small size, light weight and easy to install
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140 LoRa/LoRaWAN nodes
- 24(10-30) VDC Power Input and Real-time measurement

	ES104	ES105-5PM ES105-5-CO2	ES107PM ES107-CO2	ES108-PM ES108-CO2
				
Power Input	10~30VDC			
Output	RS485 Modbus RTU 2-Wire			
Enclosure	IP65 Shelter Box, ABS UL94V0 Anti-UV			
Temperature	-40~80°C ±0.5°C	-40-120 °C ±0.5 °C	-40-120 °C ±0.5 °C	-40°C~+80°C±0.5°C
Humidity	0~100% RH ±3% RH	0~100% RH ±3% RH	0~100% RH ±3% RH	0%RH~99%RH±3%RH
PM2.5 PM10	Laser Detection 0-1000ug/m³ 0.1ug/m³ ±10%	ES105-5-PM2 Laser Detection 0-1000ug/m³ 0.1ug/m³ ±10%	ES107-PM2 Laser Detection 0-1000ug/m³ 0.1ug/m³ ±10%	ES108-PM2 0-1000ug/m³±10ug/m3
CO2	-	ES105-5-CO2 0~5000ppm ±40ppm +3%FS	ES107-CO2 0~5000ppm ±40ppm +3%FS	ES108-CO2 0-5000ppm±50ppm
Atmospheric Pressure	-	0~120Kpa ±1.5Kpa	0~120Kpa ±1.5Kpa	0-120Kpa±0.15Kpa
Illumination	-	0~200000 Lux ±7%	-	0~200000 Lux ±7%
Noise	-	20Hz~12.5Hz 30dB~120dB ±0.5dB	20Hz~12.5Hz 30dB~120dB ±0.5dB	30dB~130dB±0.5dB
Wind Speed	-	-	0~60m/s ±0.1m/s	0~60m/s ±(0.2m/s±0.02*v)
Wind Direction	-	-	8 Directions	0~359°±3°

Smart City NBloT / LoRaWAN Sensor

- Outdoor IP67/68 Protection LPWAN Sensors
- Power Saving for Battery Power up to 8 years
- High Sensitivity Detection for Waste Bin Level, Parking Space, and Manhole Security
- NBloT Model with TCP protocol uplink to Cloud Server or ThingsMaster OTA
- LoRaWAN Model uplink to WR322GR-EC-LoRaWAN server



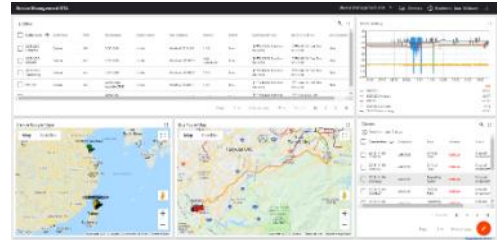
ThingsMaster OTA

	Fill-Level Ultrasonic Sensor	Parking Space Ultrasonic plus Geomagnetic Sensor	Manhole Security and Water Level Detection Sensor
	IS101-FL-NB-BT8-4M IS101-FL-LR-BT8-4M	PS102-USGM-NB-BT8-SB PS102-USGM-LR-BT8-SB	MS102-MHWL-NB-BT8 MS102-MHWL-LR-BT8
			
Detection Technology	Ultrasonic	Ultrasonic + Geomagnetic	Leveling Detection and Ultrasonic Detection
Object	Solid or Liquid Level	Parking Space Occupancy	Manhole
Range	4 meter	10~60cm	8 Meters Vertical
Enclosure	IP68 ABS	IP67 ABS	IP67 ABS
Installation	Mount on Container Cover	Surface mount	Bottom side of Manhole
Dimension	(D)115 x (H)40 mm	(D)115 x (H)40 mm	Φ115mm Round, 80mm depth
LoRaWAN	IS101-FL-LR-BT8-4M Class A EU868,AS923,AU915,US915,KR920, RU868	PS102-USGM-LR-BT8-SB LoRaWAN Class A EU868,AS923,US915,US915,CN470	MS102-MHWL-LR-BT8 LoRaWAN Class A EU868,AS923,US915,US915,CN470
NBloT	IS101-FL-NB-BT8-4M TCP ThingsMaster OTA NBloT (B1/3/5/8/20/28), 1 Micro SIM	PS102-USGM-NB-BT8-SB TCP ThingsMaster OTA NBloT (B1/3/5/8/20/28), 1 Micro SIM	MS102-MHWL-NB-BT8 TCP ThingsMaster OTA NBloT (B1/3/5/8/20/28), 1 Micro SIM
Weight	150g	150g	150g
Operating Temperature	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Supply	ER26500 lithium battery 8500mAh 3.6v	ER26500 lithium battery 8500mAh 3.6v	ER26500 lithium battery 8500mAh 3.6v
Battery Life	8 years(4 transmission times/day)	8 years(4 transmission times/day)	8 years(4 transmission times/day)
Application	Waste Bin, Postbox,	Parking Lot	Manhole

Private Cloud Platform for Device Management Over The Air

ThingsMaster OTA

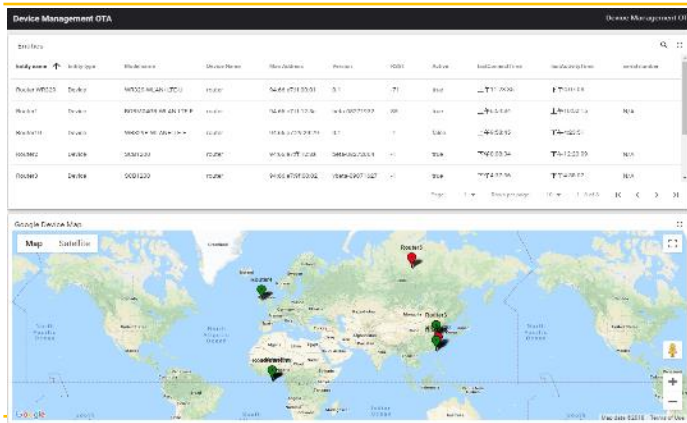
- Interactive monitoring dashboard with a map that displays device status, wireless signal strength, and the location of all deployed LTE/5G routers
- MAP shows devices online/offline/warning status in Green/Red/Orange color, respectively
- Supports over-the-air batch device configuration and firmware* update and batch register
- Set alerts on critical events to prevent downtime (i.e. signal strength is too low or temperature is too high)
- Support the latest TLS encryption and X.509 authentication
- Multi-Tenant and Project oriented IoT deployment
- Supports MQTT and RESTful APIs



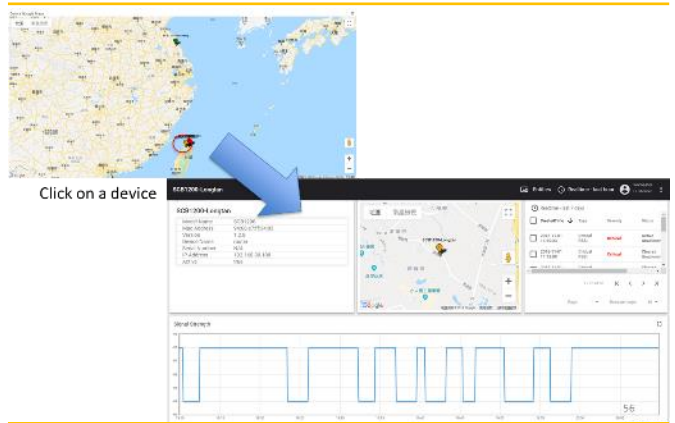
REST API

- Model name/MAC address/FW version/RSSI/Last Connection Time/Last Activity Time
- MAP shows devices online/offline/Warning status in **Green/Red/Orange** color, respectively

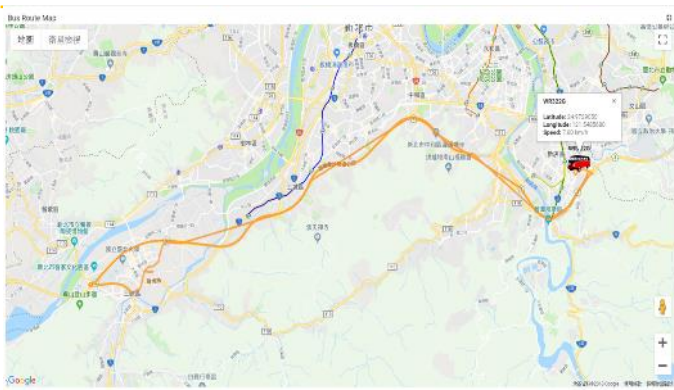
Google/Tencent/OpenStreet/Image Map



Monitor Device Information



Display device location, route and speed on the Map



Group Configuration and Firmware Upgrade

Group Selection

Select entities

Entity name	Entity type	active
☒ WR224	Device	false
☒ WR312		
☒ WR322		
☒ WR329		

Import device config

Config file

Drop a file or click to select a file to upload.

router.cfg

IMPORT CANCEL

The figure consists of five sequential screenshots from a network management interface:

- Screenshot 1:** A sidebar menu on the left with options like "Add Device", "Device Management", "Network Map", etc. The main area has tabs for "Policy management", "Customer management", "Account management", and "Device management". The "Device management" tab is selected, showing a "Devices" icon.
- Screenshot 2:** An "Add Device" modal window. It contains a "Name:" field with "Router1" entered, a "Device type:" dropdown set to "default", and a status indicator "No gateway". There are "ADD" and "CANCEL" buttons at the bottom.
- Screenshot 3:** A "Router Information" form. Fields include "IP Address:", "Username:", "Password:", "Access token:", "Device name:", "Device ID:", "Device type:", "Device model:", "Device location:", "Device status:", "Device category:", "Device group:", "Device role:", "Device priority:", "Device weight:", "Device height:", "Device width:", "Device depth:", "Device color:", "Device material:", "Device manufacturer:", "Device version:", "Device firmware:", "Device driver:", "Device protocol:", "Device port:", "Device interface:", "Device module:", "Device component:", "Device part:", "Device accessory:", "Device peripheral:", "Device external:", "Device internal:", "Device hidden:", "Device visible:", "Device detectable:", "Device undetectable:", "Device identifiable:", "Device unidentifiable:", "Device trackable:", "Device untrackable:", "Device traceable:", "Device untraceable:", "Device monitorable:", "Device unmonitorable:", "Device manageable:", "Device unmanageable:", "Device controllable:", "Device uncontrollable:", "Device configurable:", "Device unconfigurable:", "Device modifiable:", "Device unmodifiable:", "Device mutable:", "Device immutable:", "Device volatile:", "Device non-volatile:", "Device persistent:", "Device non-persistent:", "Device secure:", "Device insecure:", "Device safe:", "Device unsafe:", "Device reliable:", "Device unreliable:", "Device robust:", "Device fragile:", "Device resilient:", "Device non-resilient:", "Device fault-tolerant:", "Device non-fault-tolerant:", "Device self-healing:", "Device non-self-healing:", "Device adaptive:", "Device non-adaptive:", "Device flexible:", "Device inflexible:", "Device scalable:", "Device non-scalable:", "Device extensible:", "Device non-extensible:", "Device interoperable:", "Device non-interoperable:", "Device compatible:", "Device incompatible:", "Device conforming:", "Device non-conforming:", "Device compliant:", "Device non-compliant:", "Device standardizing:", "Device non-standardizing:", "Device normalizing:", "Device non-normalizing:", "Device harmonizing:", "Device non-harmonizing:", "Device synchronizing:", "Device non-synchronizing:", "Device coordinating:", "Device non-coordinating:", "Device collaborating:", "Device non-collaborating:", "Device cooperating:", "Device non-cooperating:", "Device supporting:", "Device non-supporting:", "Device assisting:", "Device non-assisting:", "Device helping:", "Device non-helping:", "Device aiding:", "Device non-aiding:", "Device supporting:", "Device non-supporting:", "Device assisting:", "Device non-assisting:", "Device helping:", "Device non-helping:", "Device aiding:", "Device non-aiding:". There are "ADD" and "CANCEL" buttons at the bottom.
- Screenshot 4:** A "Device Attribute Upload to Cloud" screen. It features a table with columns "ID", "Name", "Type", "Status", "Location", "Category", "Group", "Role", "Priority", "Weight", "Height", "Width", "Depth", "Color", "Material", "Manufacturer", "Version", "Firmware", "Driver", "Protocol", "Port", "Interface", "Module", "Component", "Part", "Accessory", "Peripheral", "External", "Internal", "Hidden", "Visible", "Detectable", "Undetectable", "Identifiable", "Unidentifiable", "Trackable", "Untrackable", "Traceable", "Untraceable", "Monitorable", "Unmonitorable", "Manageable", "Unmanageable", "Controllable", "Uncontrollable", "Configurable", "Unconfigurable", "Modifiable", "Unmodifiable", "Mutable", "Immutable", "Volatile", "Non-volatile", "Persistent", "Non-persistent", "Secure", "Insecure", "Safe", "Unsafe", "Reliable", "Unreliable", "Robust", "Fragile", "Resilient", "Non-resilient", "Fault-tolerant", "Non-fault-tolerant", "Self-healing", "Non-self-healing", "Adaptive", "Non-adaptive", "Flexible", "Inflexible", "Scalable", "Non-scalable", "Extensible", "Non-extensible", "Interoperable", "Non-interoperable", "Compatible", "Incompatible", "Conforming", "Non-conforming", "Compliant", "Non-compliant", "Standardizing", "Non-standardizing", "Normalizing", "Non-normalizing", "Harmonizing", "Non-harmonizing", "Synchronizing", "Non-synchronizing", "Coordinating", "Non-coordinating", "Collaborating", "Non-collaborating", "Cooperating", "Non-cooperating", "Supporting", "Non-supporting", "Assisting", "Non-assisting", "Helping", "Non-helping", "Aiding", "Non-aiding". Below the table are "Page", "Refresh", and "Export" buttons.
- Screenshot 5:** A "Remote Management System" configuration page. It includes fields for "Host:", "URL:", "Port:", "Access token:", "Device name:", "Device ID:", "Device type:", "Device model:", "Device location:", "Device status:", "Device category:", "Device group:", "Device role:", "Device priority:", "Device weight:", "Device height:", "Device width:", "Device depth:", "Device color:", "Device material:", "Device manufacturer:", "Device version:", "Device firmware:", "Device driver:", "Device protocol:", "Device port:", "Device interface:", "Device module:", "Device component:", "Device part:", "Device accessory:", "Device peripheral:", "Device external:", "Device internal:", "Device hidden:", "Device visible:", "Device detectable:", "Device undetectable:", "Device identifiable:", "Device unidentifiable:", "Device trackable:", "Device untrackable:", "Device traceable:", "Device untraceable:", "Device monitorable:", "Device unmonitorable:", "Device manageable:", "Device unmanageable:", "Device controllable:", "Device uncontrollable:", "Device configurable:", "Device unconfigurable:", "Device modifiable:", "Device unmodifiable:", "Device mutable:", "Device immutable:", "Device volatile:", "Device non-volatile:", "Device persistent:", "Device non-persistent:", "Device secure:", "Device insecure:", "Device safe:", "Device unsafe:", "Device reliable:", "Device unreliable:", "Device robust:", "Device fragile:", "Device resilient:", "Device non-resilient:", "Device fault-tolerant:", "Device non-fault-tolerant:", "Device self-healing:", "Device non-self-healing:", "Device adaptive:", "Device non-adaptive:", "Device flexible:", "Device inflexible:", "Device scalable:", "Device non-scalable:", "Device extensible:", "Device non-extensible:", "Device interoperable:", "Device non-interoperable:", "Device compatible:", "Device incompatible:", "Device conforming:", "Device non-conforming:", "Device compliant:", "Device non-compliant:", "Device standardizing:", "Device non-standardizing:", "Device normalizing:", "Device non-normalizing:", "Device harmonizing:", "Device non-harmonizing:", "Device synchronizing:", "Device non-synchronizing:", "Device coordinating:", "Device non-coordinating:", "Device collaborating:", "Device non-collaborating:", "Device cooperating:", "Device non-cooperating:", "Device supporting:", "Device non-supporting:", "Device assisting:", "Device non-assisting:", "Device helping:", "Device non-helping:", "Device aiding:", "Device non-aiding.". There are "Submit" and "Cancel" buttons at the bottom.

Model	Description
ThingsMaster OTA-Annual-100	ThingsMaster OTA Online OTA annual fee for 100 nodes
ThingsMasterOTA-5GW	ThingsMaster OTA for 5 gateways, one year license
ThingsMasterOTA-10GW	ThingsMaster OTA for 10 gateways, one year license
ThingsMasterOTA-50GW	ThingsMaster OTA for 50 gateways, one year license
ThingsMasterOTA-100GW	ThingsMaster OTA for 100 gateways, one year license
ThingsMasterOTA-300GW	ThingsMaster OTA for 300 gateways, one year license
ThingsMasterOTA-500GW	ThingsMaster OTA for 500 gateways, one year license
ThingsMasterOTA-1000GW	ThingsMaster OTA for 1000 gateways, one year license

Ruggedized Ethernet L2/L3 Switches



ITU-T G.8032 v1/v2 ERPS Ring Redundancy

- Provide sub-50ms protection and recovery switching for Ethernet traffic
- Interoperate with 3rd party industrial switch and still remain fast recovery time
- Interoperate with commercial switch instead of STP/RSTP
- Efficient network interconnection and topology with ERPS Chain, multiple chains

Management Features

- Various configuration paths, including WebGUI, CLI, Telnet, SNMP v1/v2c/v3 and RMON
- IEEE 1588v1/2 PTP time management, LLDP topology control
- Modbus/TCP, Ethernet/IP for factory automation
- ViewMaster for LAN devices management, and NetMaster for NMS Management

Enhanced Cyber Security for Critical Application

- L2-L7 IPv4/IPv6 Access Control List (ACL)
- DHCP Snooping, IP Source Guard, Dynamic ARP Inspection
- 802.1Q VLAN, Private VLAN, Advanced Port Security, Multi-Level user passwords
- HTTPS/SSH/SFTP, 256-bit encryption
- 802.1X MAB for non-802.1X compliant end devices
- RADIUS/TACACS+ centralized password authentication

Extreme PoE Capability

- 8-port IEEE 802.3af/at compliant PoE, up to 30W/port
- Up to 100W system power budget at 70°C operating temperature
- Complete PoE management including per-port Power Budget Control, PoE Scheduling and PoE Status



Model	Eth Copper	ETH Fiber	PoE	L3 Managed	L2 Managed	Redundancy	Power Input	IP
DS622	16 GE	6 100/1000 SFP	-	YES	YES	VRRP v2, ERPS v2	24VDC (10-60VDC)	IP31
DS422	16 GE	6 100/1000 SFP	-	-	YES	ERPS v2		IP30
DS612	8 GE	4 100/1000 SFP	-	YES	YES	VRRP v2, ERPS v2		
DS412	8 GE	4 100/1000 SFP	-	-	YES	ERPS v2		IP31
DS610	8 GE	2 100/1000 SFP	-	YES	YES	VRRP v2, ERPS v2		
DS410	8 GE	2 100/1000 SFP	-	-	YES	ERPS v2		IP31
DS410L	8 GE	2 100/1000 SFP	-	-	YES	eRSTP		
DS410L-MM-SC-2	8 GE	2 GSC Multimode 2KM	-	-	YES	eRSTP		
DS410L-SS-SC-40	8 GE	2 GSC Singlemode 40KM	-	-	YES	eRSTP	48VDC (46~57VDC)	IP30
DP612	8 GE PoE	4 100/1000 SFP	30W/port Max.240W	YES	YES	VRRP v2, ERPS v2		IP31
DP412	8 GE PoE	4 100/1000 SFP	-	-	YES	ERPS v2	24VDC (12~57VDC)	
DP412-4GT-LV	8 GE PoE + 4GE	-	30W/port Max. 120W	-	YES	ERPS v2	24VDC (12~57VDC)	IP31
DP410-LV	8 GE PoE	2 100/1000 SFP	30W/port Max. 145W	-	YES	eRSTP	24VDC (12~57VDC)	IP31
DP310	8 FE PoE + 2GE	2 100/1000 SFP RJ Combo	30W/port Max.240W	-	YES	ERPS v2	48VDC (46~57VDC)	IP31

Entry Level Ethernet PoE Switches and Converters

Full Gigabit Switching

- Full-Giga Ethernet with Auto Negotiation
- 4K MAC address table
- Support 9K Jumbo Frame

IEEE 802.3az EEE Power Management

- Ultra low power design, 2.6W when full loading
- Energy Efficient Ethernet for low power requirement
- Idle power saving mode for energy efficiency

QoS Service for Time-Sensitive Applications

- Supports QoS for heavy traffic priority

Rugged Mechanical Design

- Robust design protects from mechanical deformation
- IP40 ingress protection
- Wide operating temperature range **-40 ~ 70°C**
- CE marking
- IEC61000-6-2/IEC61000-6-4 heavy industrial EMC



PoE+

-40~70°C



Model	Eth Copper	ETH Fiber	PoE	L3 Managed	L2 Managed	Redundancy	Power Input	IP
DS101M-SC-2	1 FE	1 SC Multimode 2KM	-	-	-	-	24VDC (10~60VDC)	IP41
DS101S-SC-30	1FE	1 SC Singlemode 30KM	-	-	-	-		
DS201	1GE	1 FE/GE SFP	-	-	-	-	24VDC (10~60VDC) 24VAC (18-30VAC)	IP31
DS201-M-SC-05	1GE	1 GSC Multimode 550M	-	-	-	-		
DS201-S-SC-10	1GE	1 GSC Singlemode 2KM	-	-	-	-		
DS105	5 FE	-	-	-	-	-	5-30VDC (USB)	IP40
DS105A	5 FE	-	-	-	-	-	24VDC (10~60VDC) 24VAC (18-30VAC)	IP31
DS105A-M-SC-2	4 FE	1 SC Multimode 2KM	-	-	-	-		
DS105A-S-SC-30	4 FE	1 SC Singlemode 30KM	-	-	-	-		
DS205	5GE	-	-	-	-	-	24VDC (10~60VDC)	IP31
DS108	8 FE	-	-	-	-	-		
DS108-MM-SC-2	6 FE	2 SC Multimode 2KM	-	-	-	-		
DS108-SS-SC-30	6 FE	2 SC Singlemode 30KM	-	-	-	-	24VDC (10~60VDC) 24VAC (18-30VAC)	IP40
DS208	8 GE	-	-	-	-	-		
DS210	8FE+2GE	-	-	-	-	-	24VDC (8~32VDC)	IP30
DP101-M-SC-2	1 PoE FE	1 SC Multimode 2KM	90W	-	-	-	48/54 VDC (46~57VDC)	IP40
DP101-S-DC-30	1 PoE FE	1 SC Singlemode 30KM	90W	-	-	-		
DP208	8 PoE FE	-	30W/port Max.120W	-	-	-	48/54 VDC (46~57VDC)	IP40
DP208-LV	8 PoE FE	-		-	-	-	12VDC (12~40VDC)	IP30

AC/DC Power Supply	
MDR-40-24	INPUT:85-264VAC, 120-370VDC, OUTPUT: 24VDC/1.7A, -20 ~ +70°C
MDR-60-48	INPUT:85-264VAC, 120-370VDC, OUTPUT: 48VDC/1.25A, -20 ~ +70°C
EDR-120-24	INPUT:90-264VAC, 120-370VDC, OUTPUT: 24VDC/5A, -20 ~ +60°C
SDR-480P-48	INPUT:90-264VAC, 120-370VDC, OUTPUT: 48VDC/10A, -25 ~ +70°C
NDR 480-48	INPUT:90-264VAC, 120-370VDC, OUTPUT: 48VDC/10A, -20 ~ +70°C

Rackmount L2/L3 Switch

10G High Throughput Ethernet Switching

- 52-port Ethernet, including 48-port Gigabit Ethernet and 4-port 1/10GbE dual speed SFP+
- 131Mbps maximum forwarding rate, and 176Gps switching capacity
- 32K MAC address table, and 4MBytes packet buffer

Enhanced Cyber Security for Critical Applications

- ACL for L2/L3/L4, IPv6 ACL for L3/L4
- IP Source Guard, DAI, DHCP Snooping, 802.1X/RADIUS, TACACS+
- Port MAC secure learning, Private VLAN/IP Security/Port Security
- Private VLAN/IP Security/Port Security

Dynamic Routing with Redundancy Protection

- IPv4 and IPv6 routing: OSPF, OSPFv3, BGP4, and ECMP
- Multicast routing features for IGMP v1/v2/v3, PIM-DM/SM, MLD v1/v2 and PIM-DM6/SM6
- VRRP guarantees sustainable routing in a single point of failure

Management Features

- Various configuration paths, including WebGUI, CLI, SNMP and RMON
- IEEE 1588v1 PTP time management, LLDP topology control
- USB for easy field configuration and firmware update, ViewMaster for LAN devices

Rugged Design for Wayside Network Switching with Wide Power Input Range

- IEC61850/IEEE1613/EN50121-4 compliance for power substation and railway trackside
- NEMA TS2 compliance for wayside traffic control assemblies



ViewMaster NetMaster

EN50121-4

IEC61850-3

10G



Model	Eth Copper	ETH Fiber	PoE	L3 Managed	L2 Managed	Redundancy
RS752-AC	48 GE	4 x 10G SFP	-	YES	YES	VRRP v2, ERPS v2
RS628-AC	20 GE	4 100/1000 SFP + 4 100/1000 SFP RJ Combo	-	YES	YES	VRRP v2, ERPS v2
RS428-AC	20 GE		-	-	YES	ERPS v2
RP628-AC	20 GE PoE		30W/port Max.200W	YES	YES	VRRP v2, ERPS v2
RP428-AC	20 GE PoE			-	YES	ERPS v2

Railway M12 PoE L2/L3 Switch

2 Giga Link Bypass Ports

- Link Bypass function provides power fail safe solution

Management Features

- Various configuration paths, including WebGUI, CLI, Telnet, SNMP v1/v2c/v3 and RMON
- IEEE 1588v1/2 PTP time management, LLDP topology control
- Modbus/TCP, Ethernet/IP for factory automation
- M12 USB for easy field configuration and firmware update
- ViewMaster for LAN devices management and NetMaster for NMS Management

ITU-T G.8032 v1/v2 ERPS Ring Redundancy

- Provide sub-50ms protection and recovery switching for Ethernet traffic
- Interoperate with 3rd party industrial/commercial switch and instead of STP/RSTP still remain fast recovery time
- Efficient network interconnection and topology with ERPS Chain, multiple chains

Enhanced Cyber Security for Critical Application

- L2-L7 IPv4/IPv6 ACL, DHCP Snooping, IP Source Guard, DAI
- 802.1Q VLAN, Private VLAN, Advanced Port Security, Multi-Level user passwords
- HTTPS/SSH/SFTP, 256-bit encryption, 802.1X MAB, RADIUS/TACACS+

Extreme PoE Capability

- 8-port IEEE 802.3af/at compliant PoE, up to 30W/port
- Up to 100W system power budget at 70°C operating temperature
- Complete PoE management including per-port Power Budget Control, PoE Scheduling and PoE Status

Rugged Design for Surveillance in Rail, Rolling Stock applications

- EN50155/IEC61373 railway certification
- Railway 110VDC(77~137.5V) or 54V DC(46~57V) or 24/48/110V DC(16.8~137.5V) on-board power design
- Outstanding mechanical design with good heat dissipation and lightweight
- Rugged M12 connectors and -40~70°C wide operating temperature for harsh environments



EN50155



PoE+

bypass

ViewMaster NetMaster

-40~70°C

NMS Manage Large and Resilient Wired/Wireless Networks for up to 2000 nodes

NetMaster

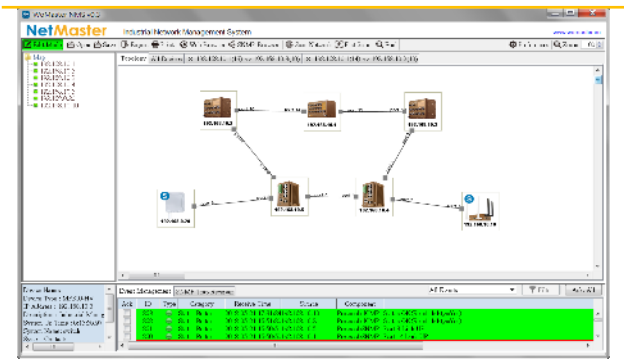
Network Discovery and Visualization

- Automatic discovery and intuitive visualization of network devices, wireless devices, physical link and network topology
- Real-time status of device availability and traffic performance for physical links
- Server-client operation to ensure network system reliability especially in large scale networks
- High scalability for up to 2000 network nodes by license upgrade
- Free download and permanently valid for 20 nodes trial
- VLAN view for VLAN network in topology

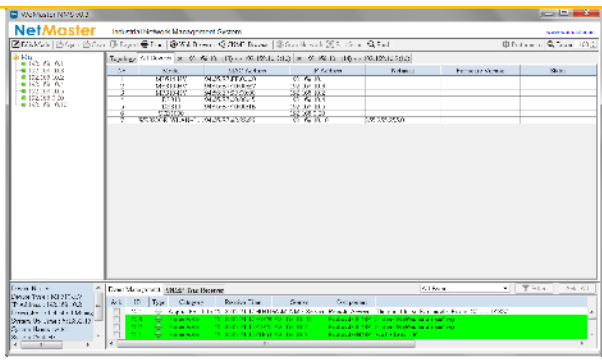
Configuration & Fault Management

- Centrally manage configurations and firmware versions
- Group IP Address assignment
- Group ERPS ring configuration & assignment
- MIB compiler and MIB browser for private MIBs and MIBs of 3rd party device
- Fault Alert and event logs including source IP filter, network error, login record and warning
- SNMP Trap receiver for all or specific IP addresses
- Multi-language support including English, Chinese & Russian

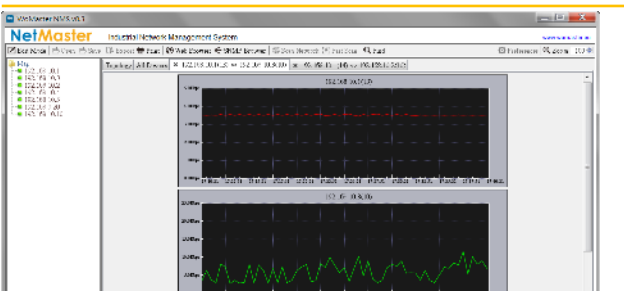
Automatic Discover and Intuitive Visualization of Network Devices and Topology



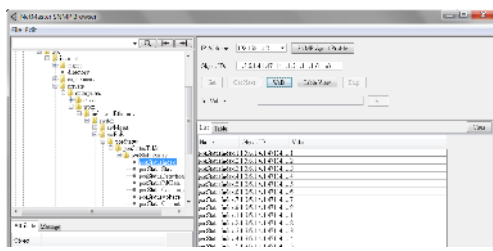
IP Device Lists, Device Information, Fault Alert and Event Logs



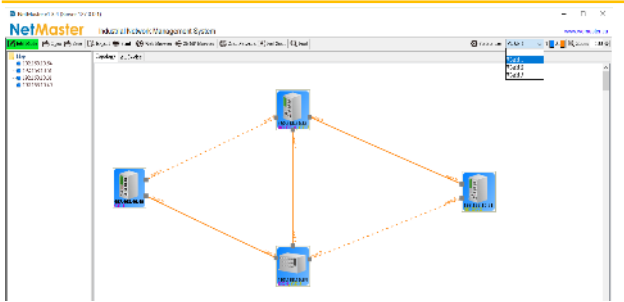
Physical Link Path Status and Monitoring



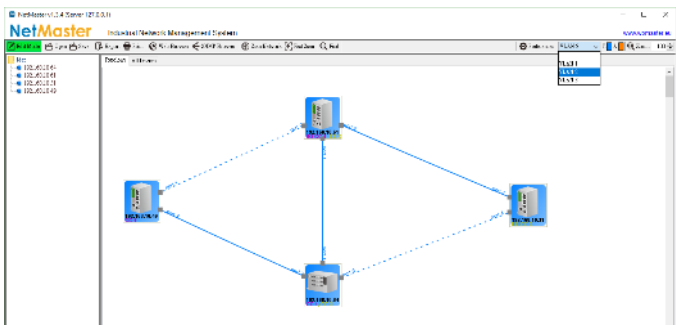
MIB Browser and Compiler for 3rd Party Device Management



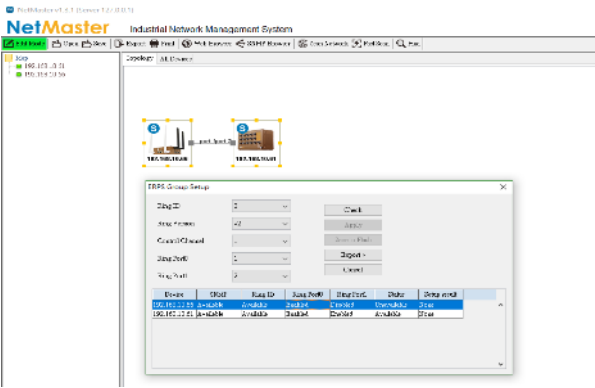
Devices, ports, and links with the VLAN ID will be colored-coded



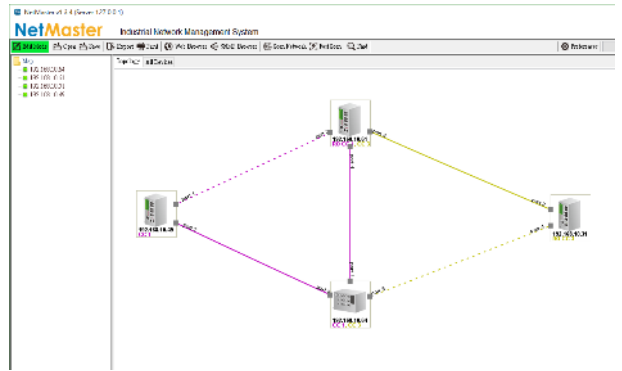
Device in Blue, trunk port/access port in Blue/Orange, link in Blue/Orange/Grey for trunk/access/mixed link



ERPS Group Settings for Ring ID, Ring Version, Control Channel, and Ring Ports



ERPS Visualization. Display ERPS Major ring and Sub ring in Purple/Yellow color



Model Name	Description
NetMaster-20	Industrial Network Management System software with a free license for 20 nodes
NetMaster-50	Industrial Network Management System software with a license for 50 nodes
NetMaster-100	Industrial Network Management System software with a license for 100 nodes
NetMaster-250	Industrial Network Management System software with a license for 250 nodes license
NetMaster-500	Industrial Network Management System software with a license for 500 nodes license
NetMaster-1000	Industrial Network Management System software with a license for 1000 nodes license
NetMaster-2000	Industrial Network Management System software with a license for 2000 nodes license

Accessory: SFP Fiber Transceivers for Switches

Model	XG(10G)/GE(Giga), S/M(Single/Multi), KM, T(Wide temperature), D(DDM)
SFPFEM2	SFP, 100Mbps, LC, multi-mode, 2KM, 0~70°C
SFPFEM2T	SFP, 100Mbps, LC, multi-mode, 2KM, -40~85°C
SFPFES30	SFP, 100Mbps, LC, single-mode, 30KM, 0~70°C
SFPFES30T	SFP, 100Mbps, LC, single-mode, 30KM, -40~85°C
SFPGEM05	SFP, 1000Mbps, LC, multi, 550M, 0~70°C
SFPGEM05T	SFP, 1000Mbps, LC, multi, 550M, -40~85°C
SFPGEM05D	SFP, 1000Mbps, LC, multi, DDM, 550M, 0~70°C
SFPGEM05DT	SFP, 1000Mbps, LC, multi, DDM, 550M, -40~85°C
SFPGEM2	SFP, 1000Mbps, LC, multi, 2KM, 0~70°C
SFPGEM2T	SFP, 1000Mbps, LC, multi, 2KM, -40~85°C
SFPGEM2D	SFP, 1000Mbps, LC, multi, DDM, 2KM, 0~70°C
SFPGEM2DT	SFP, 1000Mbps, LC, multi, DDM, 2KM, -40~85°C
SFPGES10	SFP, 1000Mbps, LC, single, 10KM, 0~70°C
SFPGES10T	SFP, 1000Mbps, LC, single, 10KM, -40~85°C
SFPGES10D	SFP, 1000Mbps, LC, single, DDM, 10KM, 0~70°C
SFPGES10DT	SFP, 1000Mbps, LC, single, DDM, 10KM, -40~85°C
SFPGES30	SFP, 1000Mbps, LC, single, 30KM, 0~70°C
SFPGES30T	SFP, 1000Mbps, LC, single, 30KM, -40~85°C
SFPGES30D	SFP, 1000Mbps, LC, single, DDM, 30KM, 0~70°C
SFPGES30DT	SFP, 1000Mbps, LC, single, DDM, 30KM, -40~85°C
SFPGES40	SFP, 1000Mbps, LC, single, 40KM, 0~70°C
SFPGES40T	SFP, 1000Mbps, LC, single, 40KM, -40~85°C
SFPGES40D	SFP, 1000Mbps, LC, single, DDM, 40KM, 0~70°C
SFPGES40DT	SFP, 1000Mbps, LC, single, DDM, 40KM, -40~85°C
SFPGEX120	SFP, 1000Mbps, LC, single, 120KM, 0~70°C

Model	XG(10G)/GE(Giga), S/M(Single/Multi), KM, T(Wide temperature), D(DDM)
SFPGETX	SFP, 1000Base-T, Copper, RJ45, 100m, 0~70°C
SFPGETXT	SFP, 1000Base-T, Copper, RJ45, 100m, -40~85°C
SFPGSM10-A	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1310nm RX-1550nm, 0~70°C
SFPGSM10T-A	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1310nm RX-1550nm, -40~85°C
SFPGSM10-B	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1550nm RX-1310nm, 0~70°C
SFPGSM10T-B	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1550nm RX-1310nm, -40~85°C
SFPGSM10D-A	SFP, 1000Mbps, LC, single, DDM, 10KM, BiDi TX-1310nm RX-1550nm, 0~70°C
SFPGSM10DT-A	SFP, 1000Mbps, LC, single, DDM, 10KM, BiDi TX-1310nm RX-1550nm, -40~85°C
SFPGSM10D-B	SFP, 1000Mbps, LC, single, DDM, 10KM, BiDi TX-1550nm RX-1310nm, 0~70°C
SFPGSM10DT-B	SFP, 1000Mbps, LC, single, DDM, 10KM, BiDi TX-1550nm RX-1310nm, -40~85°C
SFPXGM03D	SFP+, 10Gbps, LC, multi, DDM, 300M, 0~70°C
SFPXGM03DT	SFP+, 10Gbps, LC, multi, DDM, 300M, -40~85°C
SFPXGS10D	SFP+, 10Gbps, LC, single, DDM, 10KM, 0~70°C
SFPXGS10DT	SFP+, 10Gbps, LC, single, DDM, 10KM, -40~85°C



- European and South America Electricity Company
- Real time power monitor via serial, Ethernet, LTE
- Compatible with current monitor equipment and protocol

Power Distribution



- -40~75 °C wide temperature
- Enhanced Cybersecurity
- Dual SIM and LTE to WAN Redundancy
- High Compatibility over 2G/3G/4G

WR312G-LTE Serial over LTE Router



- Middle East Oil Gas Company
- Long Distance Communication to multiple Oil Wells
- Wide Operation Temperature

Oil Well Data Logger



- Private LoRa Network Distance >3 KM
- Multiple Analog Interfaces Management
- Modbus Protocol and Utility
- -40~75 °C wide temperature

LM100/LC144 LoRa Gateway Node



- National Water and Electricity Company
- Single and Multiple meter NBloT Gateway
- Wide Support for Cellular Networks
- Central Management over OTA

Smart Meter Gateway



- DLMS, COSEM, MBUS, Modbus Meters
- NBloT, Cat M1, Cat 1, Cat 4 LTE Cellular
- MQTT CoAP Cloud Protocols
- ThingsMaster OTA to manage devices over the air

SCB270 Multiple Meter Gateway



- Taiwan National Wastewater Plant
- Wide Wireless Coverage in Underground Level
- Wide Temperature and High Humidity

Wastewater Tunnel Network



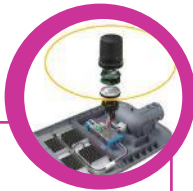
- MESH Group up to 8 MESH AP to save wiring cost
- Easy Installation and Auto Configuration
- Wide Temperature -40~70 °C under 95% Humidity

WA512GM Industrial MESH AP



- City Government
- NBloT Controller over Street Light
- Cybersecurity

Smart Street Light



- NBloT Light Controller
- Cybersecurity
- OTA Device Management
- Compact Size

NBloT Light Controller



- European Shopping Mall
- Real-Time Monitoring of Air Quality and Environment
- VPN Network for multiple sites

Environment Monitoring



- Multiple VPN channels
- Enhanced Cybersecurity
- LTE over WAN Redundancy
- ThingsMaster OTA management

WR222 LTE Gateway + ES105 Sensors



- Taiwan Starbucks Chain Stores
- WAN + LTE Redundant Network
- Cybersecurity
- OTA Management

Chain Store Management



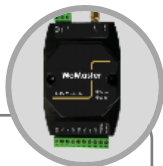
- Enhanced Cybersecurity
- LTE over WAN Redundancy
- ThingsMaster OTA for Configuration and Firmware Upgrade

WR224 LTE + WLAN Gateway



- International Cloud Platform
- Temperature and Door Sensor
- NBloT Gateway and GPS Tracker
- Battery and Power Saving Mode

Refrigerator Management



- MQTT Protocol and OTA Device Management
- Temperature and Door Sensor
- NBloT Gateway and GPS tracker
- Battery Power

NBloT Refrigerator Controller



- China International Airport
- Baggage Transport, Passenger Information, Video Surveillance, Runway Surveillance System

International Airport Management



- Layer 2 ERPS Redundancy
- Layer 3 Routing Redundancy
- Enhanced Cybersecurity
- High Power PoE Surveillance

RS628, RP428 Rackmount L3 L2 PoE Switch



- European Railway Company
- Railway Certificated M12 Switches
- Layer 3 Management
- High Reliability

Railway Communication



- EN50155 Railway Certificate
- EN45545 Fire Resistance Certificate
- Layer 3 Management
- Enhanced Cybersecurity

MP614 M12 Layer 3 Managed PoE Switch



- European BUS Company
- PoE Surveillance
- Layer 2 Management
- Industrial Design

BUS Surveillance



- EN50121-4 wayside certificate
- Enhanced Cybersecurity
- 24V DC Power Booster to PoE
- Wide Temperature -40~70 °C

DP412-LV Managed PoE 24V Boost Switch



- European BUS Company
- PoE Surveillance
- WiFi Service for Passengers

Smart BUS WiFi System



- GPS Tracking
- Enhanced Cybersecurity
- Passenger WiFi Service
- 24V DC Power Booster to PoE

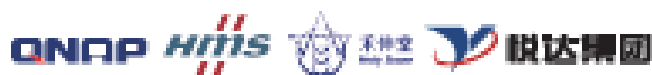
WR329P LTE PoE 24V Router

Master in IIoT World

With over 20 years of Industrial IoT market experience, WoMaster Group is deemed as one of the leading IoT providers in industrial world. The company is joint ventured by global listed industrial companies including QNAP for industrial computing and AIoT solutions, HNS Industrial Networks Group for Industrial Automation and AnyBus technology, and HolyStone Group for Industrial Electronics Components and Touch IC, for a clear vision to provide professional and innovative solutions and services for the booming IIOT market.

In China, WoMaster Group joint ventured with Jiangsu Yueda Group, the top 1 conglomerate in North Jiangsu, to setup WoM China for designing pioneer Industrial IoT and Smart City solutions.

Based on the core belief that the real success derived only from long term trust, WoMaster is devoted to design and manufacture high quality industrial products for critical applications such as railway, power and utility, intelligent transportation and smart city surveillance. From networking devices to all-in-one communication station, WoMaster adds value by the hardened design, public and private cloud platform, high levels of cyber security protection, and customer oriented solutions.



Reliability Lab

To verify product design for vertical certificates, WoMaster setups in-house product verification labs where required environmental tests are conducted for meeting or exceeding industrial standards such as NEMA TS2, EN50155, IEC61850, eMark, or DMV. Due to fulfilling extensive test plans and procedures, we can guarantee safety, compatibility, stability and longevity of the products in highly critical applications, such as railway, heavy industries, traffic control, etc.



WoMaster
Global Website



Feature Demo



News

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