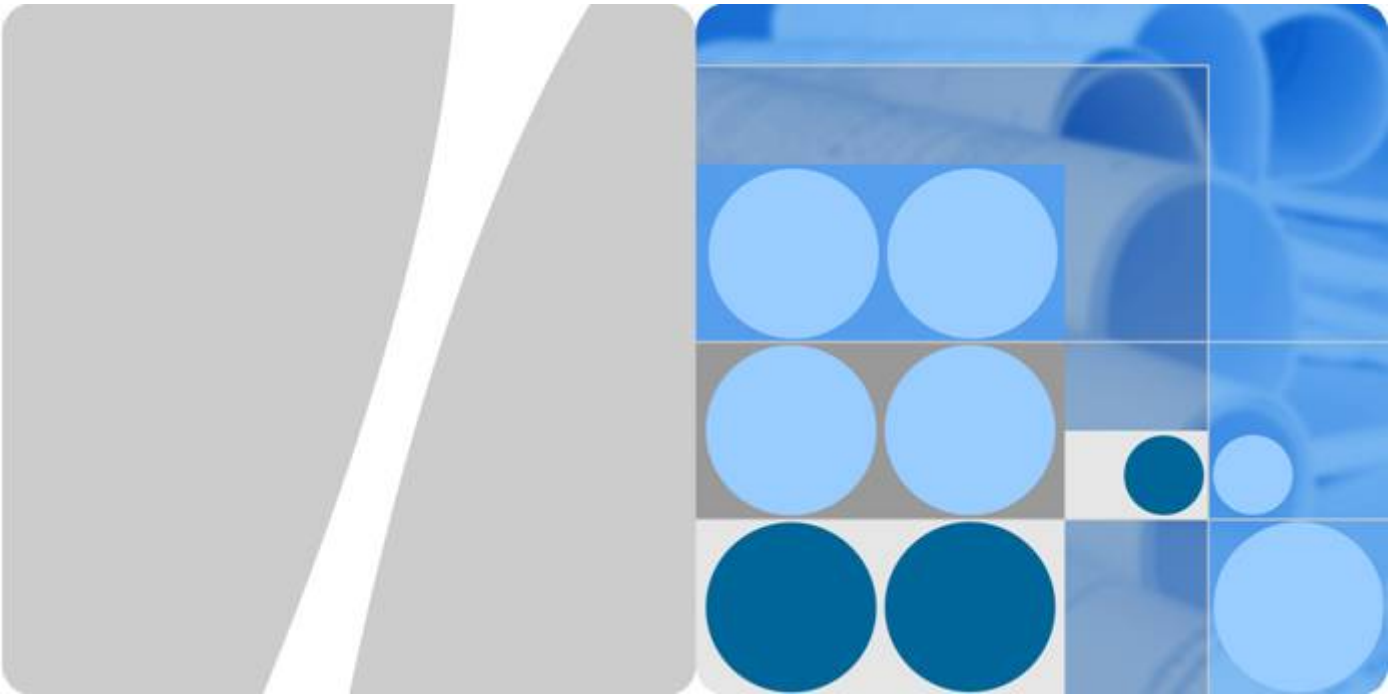

Huawei AR500&AR510&AR530&AR550&AR2500 Series Industrial Switch Routers

V200R008

Product Description

Issue 02

Date 2016-11-25

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About This Document

Intended Audience

This document helps you understand the characteristics and features of the AR.

This document is intended for:

- Network planning engineers
- Hardware installation engineers
- Commissioning engineer
- Data configuration engineers
- On-site maintenance engineers
- Network monitoring engineers
- System maintenance engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Security Conventions

- Password setting
  - When configuring a password, the cipher text is recommended. To ensure device security, change the password periodically.
  - When you configure a password in plain text that starts and ends with %@%@, @%@%, %#%#, or %^%# (the password can be decrypted by the device), the password is displayed in the same manner as the configured one in the configuration file. Do not use this setting.
  - When you configure a password in cipher text, different features cannot use the same cipher-text password. For example, the cipher-text password set for the AAA feature cannot be used for other features.
- Encryption algorithm

  Currently, the device uses the following encryption algorithms: 3DES, AES, RSA, SHA1, SHA2, and MD5. 3DES, RSA and AES are reversible, while SHA1, SHA2, and MD5 are irreversible. The encryption algorithms DES/3DES/RSA (RSA-1024 or lower)/MD5 (in digital signature scenarios and password encryption)/SHA1 (in digital signature scenarios) have a low security, which may bring security risks. If protocols allowed, using more secure encryption algorithms, such as AES/RSA (RSA-2048 or higher)/SHA2/HMAC-SHA2, is recommended. The encryption algorithm depends on actual networking. The irreversible encryption algorithm must be used for the administrator password, SHA2 is recommended.
- Personal data

  Some personal data may be obtained or used during operation or fault location of your purchased products, services, features, so you have an obligation to make privacy policies and take measures according to the applicable law of the country to protect personal data.
- The terms mirrored port, port mirroring, traffic mirroring, and mirroring in this manual are mentioned only to describe the product's function of communication error or failure detection, and do not involve collection or processing of any personal information or communication data of users.

Mappings Between Product Software Versions and NMS Versions

The mappings between product software versions and NMS versions are as follows.

AR500&AR510&AR530&AR550&AR2500 Product Software Version	eSight
V200R008(C00&C20&C30)	V300R006C00

Change History

Changes between document issues are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Changes in Issue 02 (2016-11-25)

This version has the following updates:

The following information is modified:

- **8.1 Router Purchase List**

Changes in Issue 01 (2016-07-30)

Initial commercial release.

Contents

1 Product Positioning and Characteristics

About This Chapter

1.1 Product Positioning

The AR500&AR510&AR530&AR550&AR2500 Industrial Switch Routers, developed by Huawei, is applied to the Internet of Things. It is a next-generation industrial routing gateway that provides routing, switching, wireless, and security functions. In addition to gateway functions, the AR500&AR510&AR530&AR550&AR2500 provides various extensions. For example, it can function as the gateway on the Internet of Things to aggregate data. It applies to various industries.

The AR500&AR510&AR530&AR550&AR2500 can work stably in challenging industry environments for a long time, meeting local and remote networking requirements.

1.2 Product Characteristics

The AR500&AR510&AR530&AR550&AR2500 uses leading hardware platforms and software architectures. The AR500&AR510&AR530&AR550&AR2500 provides integrated network solutions for enterprises with minimum investment costs; therefore, they can meet many facets of future business expansion and developments of the Internet of Things.

1.2.1 Industrial Environment Adaptability

As the industrial routing and switching device, the AR500&AR510&AR530&AR550&AR2500 adapts to various industry environments:

- Complies with IEC 61000-6-2.
- Protection level
  - AR500 series: IP30
  - AR530 series: IP51
  - AR550 series: IP40
  - AR2500 series: IP40
- Uses fanless design and the operating temperatures are as follows:
  - AR500 series operating at maximum LTE transmit power: -25°C to +65°C
  - AR500 series operating at typical LTE transmit power:-25°C to +70°C
  - AR531-2C-H and AR531-F2C-H: -40°C to +70°C
  - AR531GPe-U-H, AR531G-U-D-H:-40°C to +60°C
  - AR550 series: -40°C to +70°C
  - AR2500 series: -40°C to 65°C
- Complies with transformer substation environment standard IEC61850-3/IEEE1613.

1.2.2 Industry-Class Reliability

- The AR500&AR510&AR530&AR550&AR2500 complies with industry standards and provides quality service.
- The AR500&AR510&AR530&AR550&AR2500 defends against network attacks.

- The AR500&AR510&AR530&AR550&AR2500 supports in-service patching so that the system software can be upgraded during system operation.
- The AR500&AR510&AR530&AR550&AR2500 supports fast switching on a data channel and provides highly reliable networking.

1.2.3 Service Integration Capability

The AR500&AR510&AR530&AR550&AR2500 integrates various services:

- Integrates routing, switching, and wireless services.
- Uses open software architecture to support various industry services.

1.2.4 Hardware Extensibility

The AR500&AR510&AR530&AR550&AR2500 uses the modular design and daughter cards for communication modules. The daughter cards can be flexibly replaced and extended, meeting requirements for different services and installation environments.

1.2.5 Remote Maintenance Capability

In addition to one-stop deployment, plug and play capability, and remote commissioning functions, the AR500&AR510&AR530&AR550&AR2500 manages the customer premises equipment (CPE) remotely. The remote maintenance function improves efficiency and greatly reduces maintenance costs.

1.2.6 Strong Access Capability

The AR500&AR530 provide FE, GE, and RS485 interfaces, supports IEC62056 (DLMS/COSEM), Modbus, DLT645, and PoweRline Intelligent Metering Evolution (PRIME), and connects to various networks to transmit different industry services, which greatly reduces investment and maintenance costs.

The AR2500 series supports GE interfaces and the AR2504E-H supports 10GE interfaces. The AR2500 can connect to downstream terminals and access switches, greatly reducing investment and maintenance costs.

2 Applications

About This Chapter

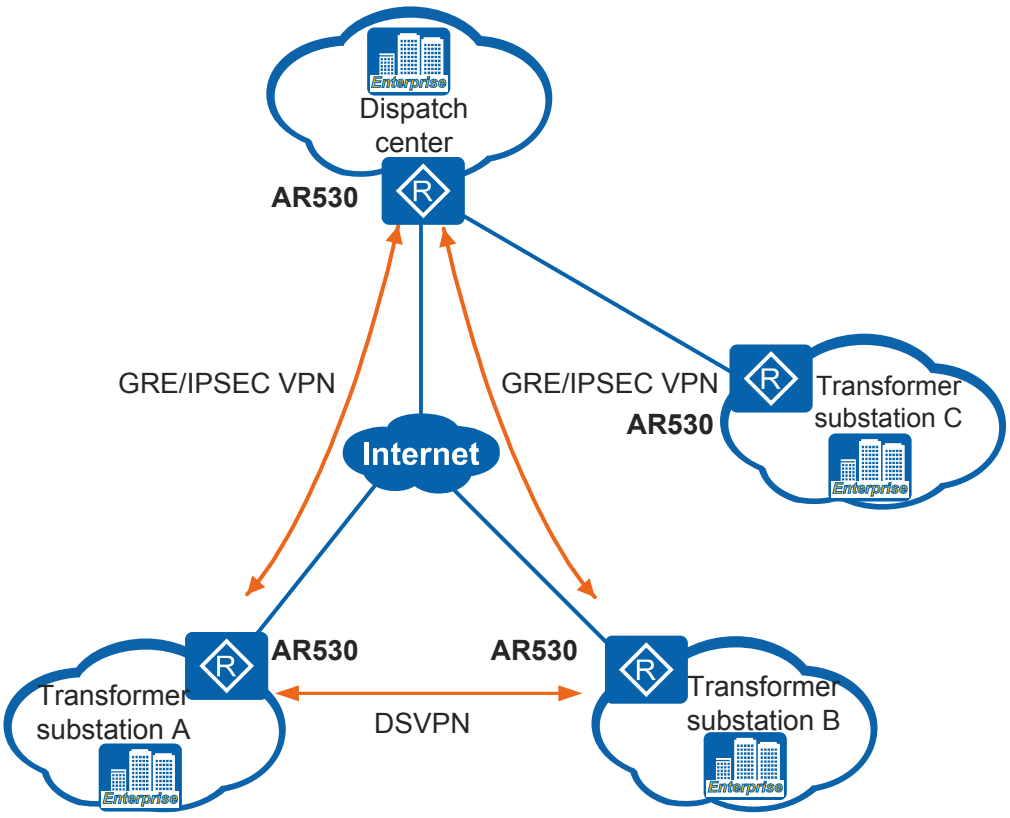
2.1 AR530 as a Industrial Router

As the industrial router, the AR530 can connect a transformer substation to a dispatch center (monitoring center) through the Internet, and establish a GRE/IPSec VPN or Dynamic Smart Virtual Private Network (DSVPN) tunnel to secure data transmission. A transformer substation can also use dedicated lines to connect to a dispatch center on a private network through an AR530.

As shown in **Figure 2-1**, the dispatch center connects to the Internet, and transformer substation A and transformer substation B connect to the Internet through the AR530. A GRE VPN or IPSec VPN tunnel is established between the dispatch center and transformer substation A/B so that the dispatch center can communicate with transformer substation A/B and transformer substations A and B can communicate through the DSVPN tunnel.

You can also use an AR530 to directly connect the transformer substation (for example, transformer substation C) to the dispatch center through dedicated lines to construct a private network.

Figure 2-1 AR530 as the industrial router



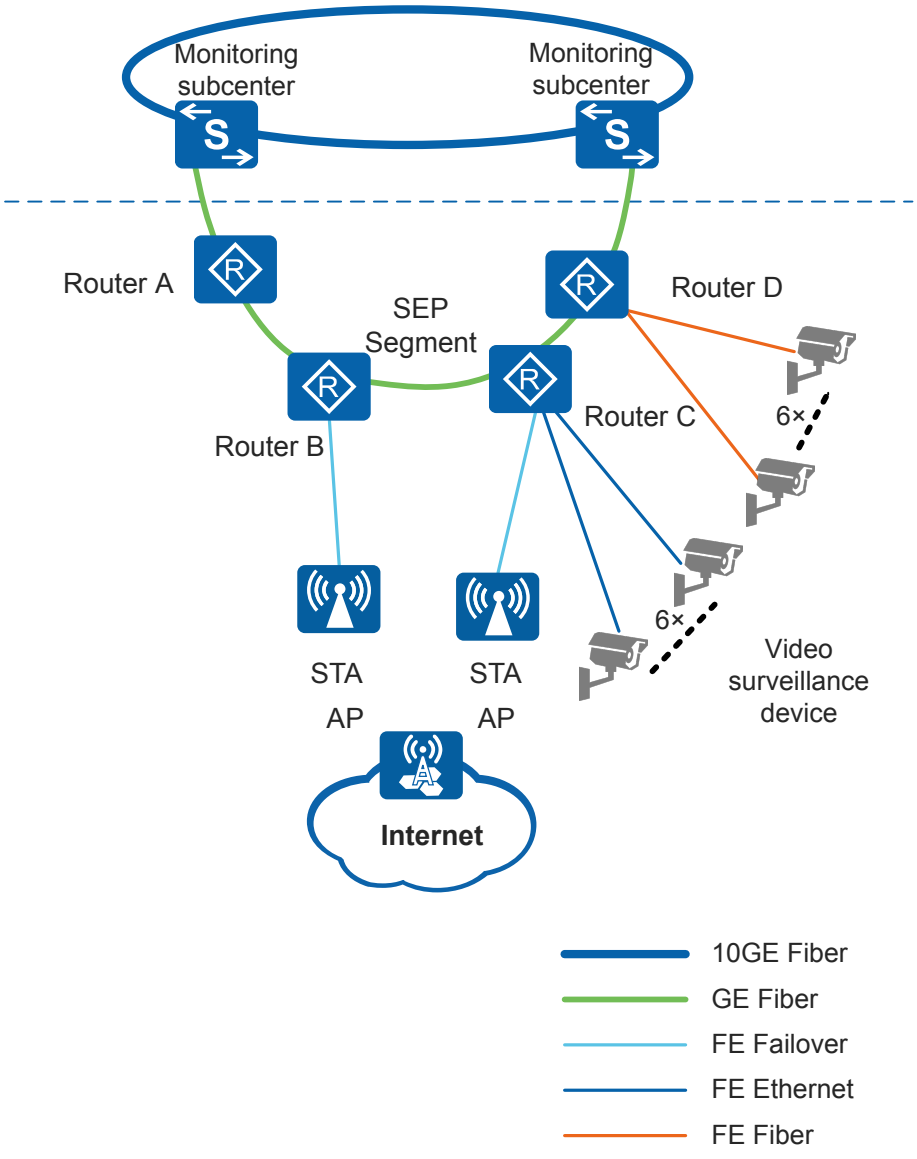
2.2 AR500 or AR530 as the Industrial Switch

An AR500 or AR530 can function as a switch in industry fields to implement fast switching on a data channel, which improves reliability.

In **Figure 2-2**, highway device access is used as an example.

Router A, Router B, Router C, and Router D are AR500 or AR530s and connected through GE optical interfaces, constitute an open-ring network, and connect to the aggregation layer ring network composed of monitoring subcenters. SEP runs on the open-ring network and ensures fast switching of data channels between the four AR500 or AR530s.

Figure 2-2 AR500 or AR530s as industrial switches

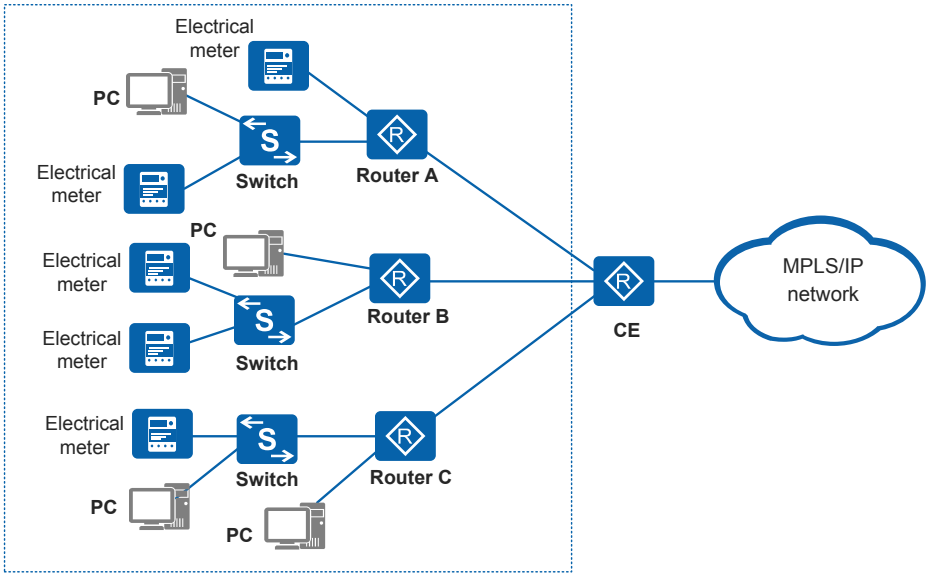


2.3 AR2500 Used as the Industrial Switch

The AR2500 can function as a switch in industry fields. It provides multiple LAN interfaces to connect to terminals and switches. In **Figure 2-3**, Router A, Router B, and Router C are all

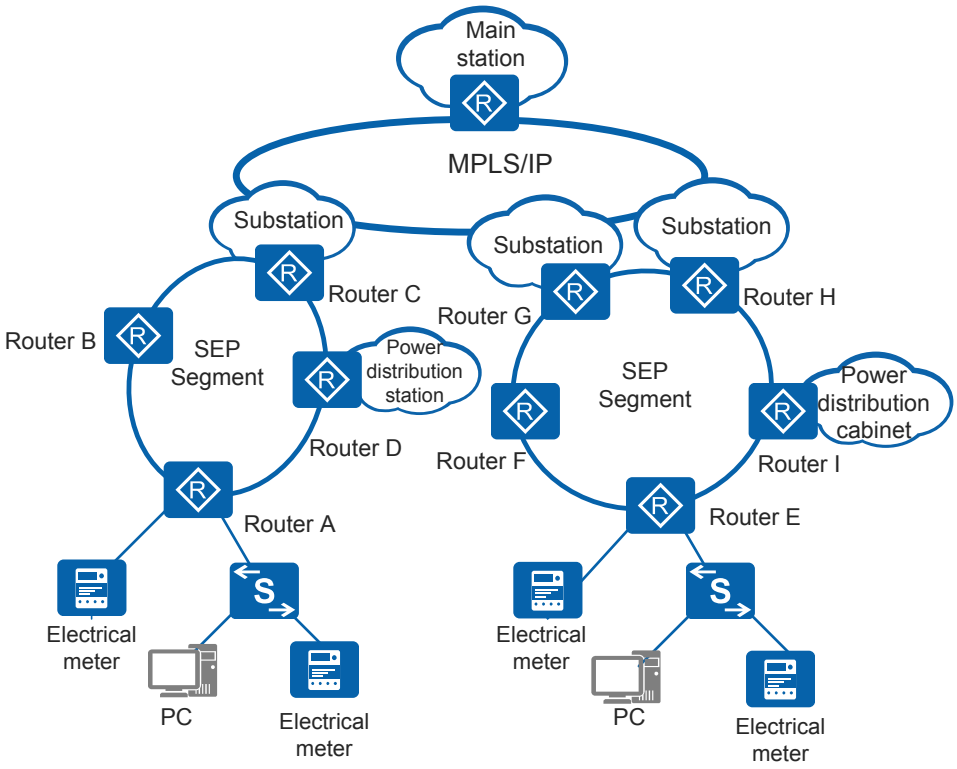
AR2500s and play roles of switches. They connect to the MPLS/IP network through a CE, and connect to terminals (for example, electrical meters and PCs) and switches.

Figure 2-3 AR2500 used as industrial switches to connect to terminals and access switches



An AR2500 can function as a switch in an industry field to implement fast switching on a data channel, which improves network reliability in the industry field. In **Figure 2-4**, Router A through Router I are AR2500s and connected through GE interfaces. They constitute two ring networks and connects to the substations, power distribution station, and power distribution cabinet. SEP runs on the ring network and ensures fast switching of data channels between the AR2500s.

Figure 2-4 AR2500s used as industrial switches to implement fast switching of data channels



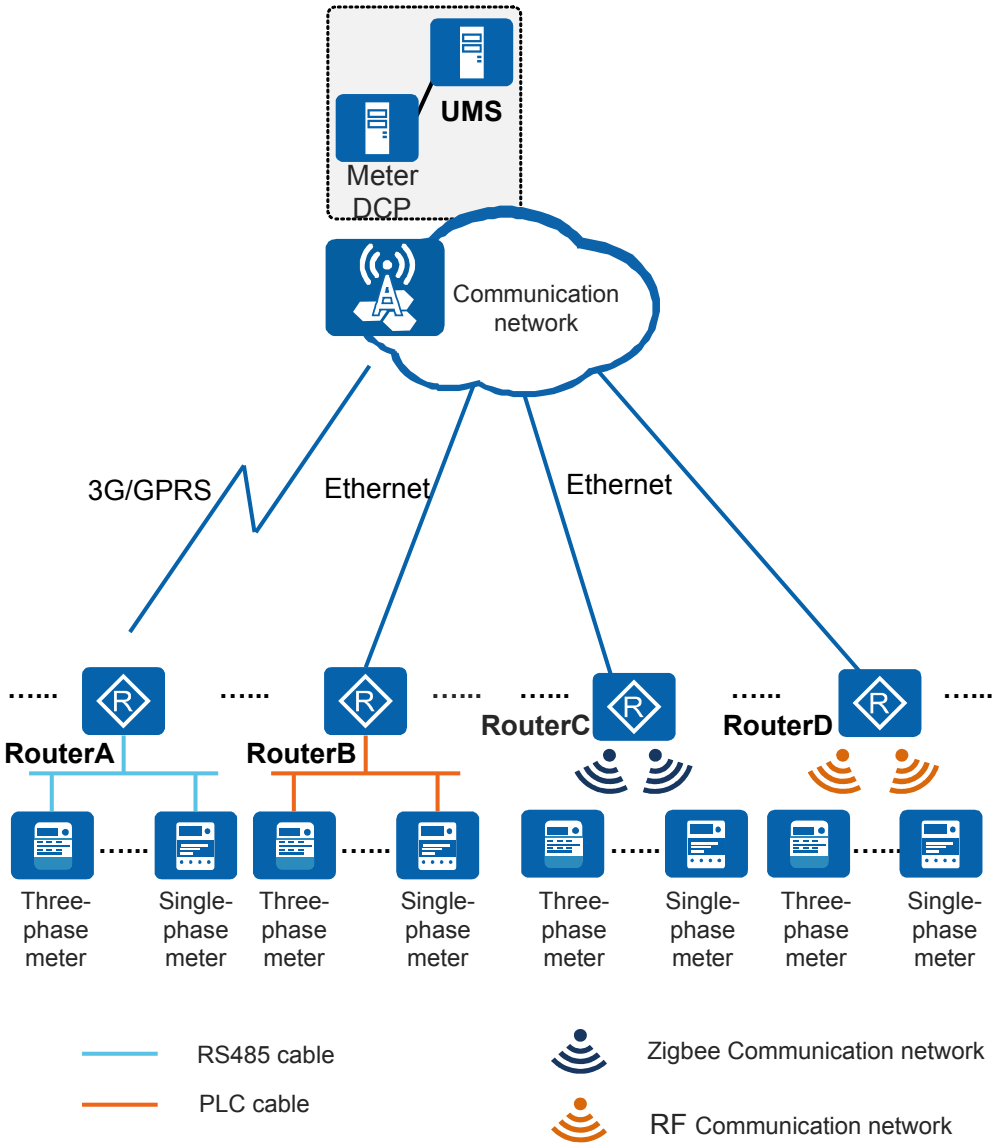
2.4 AR500&AR530 Used as Industrial Gateways

As industrial gateways, AR500&AR530 integrate routing, switching, and data collection functions, which facilitates installation and commissioning, and saves investments.

As shown in **Figure 2-5**, RouterA, RouterB, RouterC, and RouterD, are AR500s or AR530s. They are used as industrial gateways and provide the following functions:

- Router: functions as the egress gateway and connects to the remote Head-End with data collection functions through the Ethernet or 3G/GPRS.
- IoT gateway: RouterA, RouterB, RouterC, and RouterD function as concentrators and connect to meters using RS485, ZigBee, RF, or PLC to implement remote management. When the AR500 functions as the IoT gateway, electrical meters can connect to the AR500 through RS485 only.

Figure 2-5 AR500&AR530 used as industrial gateways



3 Product Characteristics

About This Chapter

3.1 Feature List

Feature list of AR500 series

Table 3-1 Features supported by the AR500

Feature	Sub-Feature	Description	Difference
LAN	VLAN	VLAN services including basic VLAN, super VLAN, MUX VLAN, and voice VLAN; dynamic VLAN learning using Generic Attribute Registration Protocol (GVRP)	AR503 EDGW-Lc, AR503 EW, AR509 CG-Lc, AR509 CG-Lt do not support GVRP. AR503 GW-LM7, AR503 GW-LcM7, AR503 EDGW-Lc, AR503 EW, AR509 CG-Lt, AR509 CG-Lc do not support Voice VLAN.
LAN	MAC	Dynamic MAC address learning and static MAC address configuration; MAC address learning limit, blackhole MAC entries, sticky MAC entries, and anti-MAC flapping	None

Feature	Sub-Feature	Description	Difference
LAN	STP	Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), and STP security	AR502EG-L, AR502EGW-L, AR502CG-L, AR503EDGW-Lc, AR503EW, AR509CG-Lc, and AR509CG-Lt do not support STP/RSTP and MSTP.
LAN	SEP	Ring network protocol applied to the link layer of an Ethernet network that provides open ring, closed ring, single ring, and multi-ring, and implements link redundancy in these topologies	None
LAN	Link aggregation	Static link aggregation and Link Aggregation Control Protocol (LACP)-based aggregation	Only AR503EDGW-Lc, AR503EW, AR509CG-Lt, AR509CG-Lc, AR502CG-L, AR502EG-L, and AR502EGW-L support link aggregation.

Feature	Sub-Feature	Description	Difference
LAN	WLAN	WLAN Fat AP functions.	Only the AR502 EGW-L, AR510 series, AR503 GW-LM7, AR503 GW-LcM7, AR503 EW, AR503 EDGW-Lc, AR515 GW-LM9-D provide WLAN Fat AP functions.
WAN	WAN interface	Provides multiple uplink interfaces including 3G/LTE and GE interfaces.	None
IP application	ARP	Address resolution for Ethernet	None
IP application	IPv4 host	IPv4 address management, TCP/UDP socket, ICMP, ping and tracert	None
IP application	DNS	DNS client and DNS proxy	None
IP application	DHCP	DHCP client(v4), DHCP relay(v4), and DHCP server(v4), and DHCP security	None
IP application	NAT	NAT, port address translation (PAT), port application mapping (PAM), Easy NAT, and NAT server, providing application layer gateways (ALG) for each application	None

Feature	Sub-Feature	Description	Difference
IP routing	IPv4 Static route	Basic routing functions	None
Security	AAA	AAA for administrators and access users, including local, RADIUS, and HWTACACS AAA	None
Security	Local attack defense	Device protection measures, including CPCAR	None
Security	ACL	Traffic classification based on physical ports, Layer 2 information, IP protocols, and TCP/UDP ports.	None
QoS	MQC	Modular traffic classification	None
QoS	Priority mapping	Mapping between local priorities, 802.1p priorities, DSCP priorities, and EXP priorities	None
QoS	Traffic policing	Single-rate-two-bucket and two-rate-two bucket policy based on traffic classifiers, permanent virtual circuits (PVCs)/VLANs/data link connection identifiers (DLCIs), and interfaces	None
QoS	Traffic shaping	Traffic shaping based on traffic classifiers, PVCs/VLANs/DLCIs, and ports, traffic shaping adaptation, and three-level traffic shaping	None
QoS	Congestion management	Congestion management based on traffic classifiers, PVCs/VLANs/DLCIs, and ports; queue mechanisms including PQ, WRR, DRR, WFQ, PQ+WRR/PQ +DRR/PQ+WFQ, and CBQ	None
QoS	Congestion avoidance	Priority-based weighted random early detection (WRED) and tail drop	None
QoS	HQoS	Hierarchical Quality of Service (HQoS) implements hierarchical scheduling based on queues and differentiates services and users.	None
Device management	Information center monitoring	Managing boards, power supply units, fans, and e-labels	None
Device management	Version management	In-service upgrade, rollback, and patch installation	None
Device management	Deployment	Automatic deployment using a universal serial bus (USB) flash drive	None

Feature	Sub-Feature	Description	Difference
Network management	Ping and Tracert	Network connectivity detection	None
Network management	NTP	Time synchronization for traditional IP networks	None
Network management	Service Diagnosis	The service diagnosis function monitors user status changes and protocol processing during user access and exports the monitored information to a terminal or server. Maintenance personnel can refer to and analyze the monitored information to locate user access faults.	None

Feature list of AR510 series

Table 3-2 Features supported by the AR510

Feature	Sub-feature	Description	Difference
Android open platform	Android open platform	External USB interface, audio interface, HDMI/YPbPr/CVBS interface, GPS interface, and bluetooth interface Support for integration of third-party applications	None
LAN	VLAN	Basic VLAN	None
LAN	MAC	Dynamic MAC address learning and static MAC address configuration; MAC address learning limit, blackhole MAC entries, sticky MAC entries, and anti-MAC flapping	None
LAN	Link aggregation	Static link aggregation and Link Aggregation Control Protocol (LACP)-based aggregation	None
LAN	LLDP	Neighboring device discovery	None
LAN	WLAN	Wireless access to LANs and AC integration Device as the STA to connect to the WLAN	None

Feature	Sub-feature	Description	Difference
WAN	WAN interface	WAN interfaces: GE interface, 3G/LTE cellular interfaces	None
WAN	Link layer protocol	Link layer protocols such as Point-to-Point Protocol. IPv4 PPPoE Server and IPv4 PPPoE Client	None
WAN	Dialing	Dial control center (DCC) function and logical interfaces that transmit the dialing service	None
WAN	Network bridge	Bridge between Ethernet interfaces and WAN interfaces	None
WAN	3G/LTE	3G/LTE uplink, allowing access to 3G/LTE networks using the DCC function	None
IP application	ARP	The Address Resolution Protocol (ARP) maps IP addresses into MAC addresses.	None
IP application	IPv4/IPv6	IPv4/IPv6 address management, TCP/UDP socket, ICMP, ping and tracert, and UDP helper	None
IP application	IP FRR	IP FRR	Among the AR510 series routes, the AR515GW-LM9-D do not support the function.
IP application	DNS	DNS client(IPv4/IPv6), DNS proxy(IPv4/IPv6), and dynamic DNS (DDNS) client(IPv4)	None
IP application	DHCP	DHCP client(IPv4/IPv6), DHCP relay(IPv4/IPv6), and DHCP server(IPv4), and DHCP security	None
IP application	NAT	NAT, port address translation (PAT), port application mapping (PAM), Easy NAT, and NAT server, providing application layer gateways (ALG) for each application	None
IP routing	IPv4 Static route	Basic routing functions	None

Feature	Sub-feature	Description	Difference
IP routing	RIP	Routing protocol	None
IP routing	OSPFv2	Routing protocol	None
IP routing	ISIS	Routing protocol	None
IP routing	BGP	Routing protocol	None
IP routing	Routing policy	Basic routing policy functions	None
IP routing	Policy-Based Routing (PBR)	IP unicast PBR (IPv4), including local PBR, interface PBR, and smart policy routing (SPR)	None
Multicast	IGMP	IGMP basic function, and IGMP proxy	None
Multicast	Multicast routing	Multicast route management, multicast route load balancing, and source-specific multicast (SSM) mapping	None
Multicast	PIM(IPv4)	PIM-DM (IPv4), PIM-SM (IPv4), and PIM SSM (IPv4)	None
Multicast	MSDP	Inter-domain (PIM-SM domain) multicast routing	None
QoS	MQC	Modular traffic classification	None
QoS	Priority mapping	Mapping between local priorities, 802.1p priorities, DSCP priorities, and EXP priorities	None
QoS	Traffic policing	Single-rate-two-bucket and two-rate-two bucket policy based on traffic classifiers, permanent virtual circuits (PVCs)/ VLANs/data link connection identifiers (DLCIs), and interfaces	None
QoS	Traffic shaping	Traffic shaping based on traffic classifiers, PVCs/VLANs/DLCIs, and ports, traffic shaping adaptation, and three-level traffic shaping	None

Feature	Sub-feature	Description	Difference
QoS	Congestion management	Congestion management based on traffic classifiers, PVCs/VLANs/DLCIs, and ports; queue mechanisms including PQ, WRR, DRR, WFQ, PQ+WRR/PQ +DRR/PQ+WFQ, and CBQ	None
QoS	Congestion avoidance	Priority-based weighted random early detection (WRED) and tail drop	None
QoS	HQoS	Hierarchical Quality of Service (HQoS) implements hierarchical scheduling based on queues and differentiates services and users.	None
Security	AAA	AAA for administrators and access users, including local, RADIUS, and TACACS AAA	None
Security	Firewall	DMZ firewall, packet filtering firewall, stateful firewall, blacklist and whitelist, and attack detection	None
Security	Access security	802.1x authentication, MAC address authentication, MAC address bypass authentication, and direct MAC address authentication based on users and ports; portal authentication for access users	None
Security	Local attack defense	Device protection measures, including CPU attack defense and attack source tracing.	None
Security	ARP security	Suppression of ARP packets from the user side and network side, and ARP anti-spoofing	None
Security	IP security	ICMP anti-attack, and URPF	None
Security	PKI	Certificate request, update, and verification	None
Security	HTTPS	HTTPS server function, ensuring transmission security between users and devices using SSL features such as data encryption and identity verification	None

Feature	Sub-feature	Description	Difference
Security	ACL	Traffic classification based on physical ports, Layer 2 information, IP protocols, and TCP/UDP ports.	None
Reliability	Interface backup	Backup between WAN interfaces, ensuring service reliability Association between interface backup and NQA/BFD/routing	None
Reliability	Interface monitoring group	In a dual-device backup scenario, when a specific proportion of network-side interfaces goes down, the user-side interface status goes Down. Then traffic is switched between the master and backup links.	None
Reliability	HSB	Backup of firewall services	None
Reliability	BFD	Single-hop and multi-hop BFD, BFD for VRRP, BFD for a routing protocol	None
Reliability	VRRP	Redundancy backup mechanism for IP services, IPv4 VRRP supported only.	None
Device management	Information center monitoring	Managing boards, power supply units, fans, and e-labels	None
Device management	Version management	In-service upgrade, rollback, and patch installation	None
Device management	Mirroring	Port- and flow-based mirroring	None
Device management	Web-based network management system	Internal web management system, providing GUI to manage and maintain devices	None

Feature	Sub-feature	Description	Difference
Device management	OPS Configuration	The open programmability system (OPS) is an open platform that provides Application Programming Interfaces (APIs) to achieve programmability, allowing third-party applications to run on the platform.	None
Device management	Deployment	Automatic deployment using a universal serial bus (USB) flash drive; Auto-Config function for the entire network	The AR511GW-L-B3, AR511GW-LM7 has only one Layer 3 interface, which is used for factory settings and does not support the Auto-Config function.
Network management	SNMP	SNMP agent, fault management (FM), and trap switch control (TSC)	None
Network management	Ping and Tracert	Network connectivity detection	None
Network management	CWMP	CWMP for remotely managing AR devices	None
Network management	NQA	Detecting the performance of protocols running on the network	None
Network management	NTP	Time synchronization for traditional IP networks	The AR510 series (except AR515GW-LM9-D) do not support NTP.
Network management	RMON	Monitoring and traffic statistics for traffic on a network segment	The AR510 series do not support RMON and RMON2.
Network management	NetStream	Fixed packet sampling and packet statistics collection, with flow output in V5, V8, V9, or V10 format	The AR510 series (except AR515GW-LM9-D) do not support NetStream.

Feature	Sub-feature	Description	Difference
Network management	IP Accounting	Information statistics: ● Collecting statistics on all IPv4 data flows passing the device ● Collecting statistics on the IPv4 data flows with specified attributes ● Collecting statistics on all IPv4 data flows passing the device based on IP precedence	The AR510 series (except AR515GW-LM9-D) do not support IP Accounting.
VPN	L2TP	Functioning as the LAC or LNS and allowing concurrent user access on multiple channels	None
VPN	GRE	GRE tunnel for interconnecting the headquarters and branches	None
VPN	DSVPN	Dynamic setup of a data forwarding channel between hubs	None
VPN	SSL VPN	Virtual gateway for management of SSL VPN users and SSL VPN services	None
VPN	IPSec	Efficient VPN supported only	None

Feature list of AR530 series

Table 3-3 Features supported by the AR530

Feature	Sub-Feature	Description	Difference
LAN	SEP	SEP prevents logical loops on a ring network by blocking redundant links.	None
LAN	VLAN	VLAN services including basic VLAN and super VLAN; dynamic VLAN learning using Generic Attribute Registration Protocol (GVRP)	None
LAN	MAC	Dynamic and static MAC address learning; MAC address learning limit, blackhole MAC entries, sticky MAC entries, and anti-MAC flapping	None
LAN	STP	Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), and Multiple Spanning Tree Protocol (MSTP); STP security	None
LAN	Link aggregation	Static link aggregation and Link Aggregation Control Protocol (LACP)-based aggregation	None

Feature	Sub-Feature	Description	Difference
LAN	LLDP	Neighboring device discovery	None
WAN	WAN interface	Provides multiple uplink interfaces including 3G and FE/GE interfaces.	Only the AR531GPe-U-H and AR531G-U-D-H support 3G interfaces.
WAN	3G	Provides 3G uplink and supports the 3G module. Dual cards, single standby. The dual SIM cards connect to different 3G networks in active/standby mode, improving data transmission reliability of the 3G link.	Only the AR531GPe-U-H and AR531G-U-D-H support 3G interfaces.
IP application	ARP	Address resolution for Ethernet	None
IP application	IPv4/IPv6 host	IPv4 and Ipv6 address management, TCP/UDP socket, ICMP, ping and tracert, and UDP helper	None
IP application	IP FRR	IP FRR	None
IP application	DNS	DNS client, DNS proxy, and dynamic DNS (DDNS) client	None
IP application	DHCP	DHCP client(v4/v6), DHCP relay(v4/v6), and DHCP server(v4/v6), and DHCP security	None
IP application	NetStream	Fixed packet sampling and packet statistics collection, with flow output in V5, V8 V9 or V10 format	None

Feature	Sub-Feature	Description	Difference
IP application	NAT	NAT, port address translation (PAT), port application mapping (PAM), Easy NAT, and NAT server, providing application layer gateways (ALG) for each application	None
IP application	VRRP	Redundancy backup mechanism for IP services	None
IP application	BFD	Single-hop BFD, multi-hop BFD, BFD for VRRP, and BFD for routing protocols	None
IP application	Network Quality Analysis (NQA)	Detecting the performance of protocols running on the network	None
IP routing	IPv4 and IPv6 Static route	Basic routing functions	None
IP routing	RIP and RIPng	Routing protocol	None
IP routing	OSPFv2 and OSPFv3	Routing protocol	None
IP routing	ISIS and ISISv6	Routing protocol	None
IP routing	BGP and BGP4+	Routing protocol	None
IP routing	Routing policy	Basic routing policy functions	None
IP routing	Policy-Based Routing (PBR)	IP unicast PBR (IPv4/IPv6), including local PBR, interface PBR, and smart policy routing (SPR)	None
Multicast	IGMP	Basic IGMP functions.	None
Multicast	Multicast routing	Multicast route management, multicast route load balancing, and source-specific multicast (SSM) mapping	None

Feature	Sub-Feature	Description	Difference
Multicast	PIM (IPv4/IPv6)	PIM-DM (IPv4/IPv6) and PIM-SM (IPv4/IPv6)	None
Multicast	MSDP	Inter-domain (PIM-SM domain) multicast routing	None
QoS	MQC	Modular traffic classification	None
QoS	Priority mapping	Mapping between local priorities, 802.1p priorities, DSCP priorities, and EXP priorities	None
QoS	Traffic policing	Single-rate-two-bucket and two-rate-two bucket policy based on traffic classifiers, permanent virtual circuits (PVCs)/VLANs/data link connection identifiers (DLCIs), and interfaces	None
QoS	Traffic shaping	Traffic shaping based on traffic classifiers, PVCs/VLANs/DLCIs, and ports, traffic shaping adaptation, and three-level traffic shaping	None
QoS	Congestion management	Congestion management based on traffic classifiers, PVCs/VLANs/DLCIs, and ports; queue mechanisms including PQ, WRR, DRR, WFQ, PQ+WRR/PQ +DRR/PQ+WFQ, and CBQ	None
QoS	Congestion avoidance	Priority-based weighted random early detection (WRED) and tail drop	None
QoS	HQoS	Hierarchical Quality of Service (HQoS) implements hierarchical scheduling based on queues and differentiates services and users.	None
Security	AAA	AAA for administrators and access users, including local, RADIUS, and HWTACACS AAA	None
Security	Firewall	DMZ firewall, packet filtering firewall, and stateful firewall; blacklist and whitelist, and attack detection	None
Security	Traffic suppression	Traffic suppression based on ports	None
Security	Access security	802.1x authentication and MAC address authentication based on users and ports; portal authentication for access users	None
Security	Local attack defense	Device protection measures, including CPU attack defense and attack source tracing	None
Security	ARP security	Suppression of ARP packets from the user side and network side, ARP anti-spoofing, ARP gateway attack inspection, and dynamic ARP inspection (DAI)	None
Security	IP security	ICMP anti-attack and URPF	None

Feature	Sub-Feature	Description	Difference
Security	PKI	Certificate request, update, and verification	None
Security	HTTPS	HTTPS server function, ensuring transmission security between users and devices using SSL features such as data encryption and identity verification	None
Security	ACL	Traffic classification based on physical ports, Layer 2 information, IP protocols, and TCP/UDP ports.	None
VPN	IPSec	Interconnecting headquarters and branches using IKE V1/V2 IPSec tunnels; hardware-based MD5 and SHA algorithms; AES, DES, and 3DES algorithms	None
VPN	SSL VPN	Virtual gateway, front-door VPN function, and management of SSL VPN users and SSL VPN services	None
VPN	DSVPN	Dynamic setup of a data forwarding channel between hubs	None
VPN	L2TP	Functioning as the LAC or LNS and allowing concurrent user access on multiple channels	None
VPN	GRE	GRE tunnel for interconnecting the headquarters and branches Used together with IPSec. IPSec cannot protect multicast data, but GRE VPN can protect multicast data	None
Device management	Information center monitoring	Managing boards, power supply units, and e-labels	None
Device management	Version management	In-service upgrade, rollback, and patch installation	None
Device management	Mirroring	Port- and flow-based mirroring	None
Device management	Deployment	Automatic deployment using a universal serial bus (USB) flash drive	None
Network management	SNMP	SNMP agent, fault management (FM), and trap switch control (TSC)	None

Feature	Sub-Feature	Description	Difference
Network management	Ping and Tracert	Network connectivity detection	None
Network management	NTP	Time synchronization for traditional IP networks	None
Network management	RMON	Monitoring and traffic statistics for traffic on a network segment	None

Feature list of AR550 series

Table 3-4 Features supported by the AR550

Feature	Sub-Feature	Description	Difference
LAN	SEP	SEP prevents logical loops on a ring network by blocking redundant links.	None
LAN	VLAN	VLAN services including basic VLAN.	None
LAN	MAC	Dynamic and static MAC address learning; MAC address learning limit, blackhole MAC entries, sticky MAC entries, and anti-MAC flapping	None
LAN	STP	Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), and Multiple Spanning Tree Protocol (MSTP); STP security	None
LAN	Link aggregation	Static link aggregation and Link Aggregation Control Protocol (LACP)-based aggregation	None
LAN	LLDP	Neighboring device discovery	None
Interface Management	WAN interface	Provides multiple uplink interfaces including 3G and FE/GE interfaces.	None
IP application	ARP	Address resolution for Ethernet	None

Feature	Sub-Feature	Description	Difference
IP application	IPv4/IPv6 host	IPv4 and IPv6 address management, TCP/UDP socket, ICMP, ping and tracert	None
IP application	IP FRR	IP FRR	None
IP application	DNS	DNS client and DNS proxy	None
IP application	DHCP	DHCP client(v4/v6), DHCP relay(v4/v6), and DHCP server(v4/v6), and DHCP security	None
IP routing	IPv4 and IPv6 Static route	Basic routing functions	None
IP routing	RIP	Routing protocol	None
IP routing	OSPF	Routing protocol	None
IP routing	Routing policy	Basic routing policy functions	None
IP routing	Policy-Based Routing (PBR)	IP unicast PBR (IPv4), including local PBR and interface PBR	None
QoS	MQC	Modular traffic classification	None
QoS	Priority mapping	Mapping between local priorities, 802.1p priorities, DSCP priorities, and EXP priorities	None
QoS	Traffic policing	Single-rate-two-bucket and two-rate-two bucket policy based on traffic classifiers, permanent virtual circuits (PVCs)/VLANs/data link connection identifiers (DLCIs), and interfaces	None
QoS	Traffic shaping	Traffic shaping based on traffic classifiers, PVCs/VLANs/DLCIs, and ports, traffic shaping adaptation, and three-level traffic shaping	None

Feature	Sub-Feature	Description	Difference
QoS	Congestion management	Congestion management based on traffic classifiers, PVCs/VLANs/DLCIs, and ports; queue mechanisms including PQ, WRR, DRR, WFQ, PQ+WRR/PQ +DRR/PQ+WFQ, and CBQ	None
QoS	Congestion avoidance	Priority-based weighted random early detection (WRED) and tail drop	None
QoS	HQoS	Hierarchical Quality of Service (HQoS) implements hierarchical scheduling based on queues and differentiates services and users.	None
Security	AAA	AAA for administrators and access users, including local and RADIUS AAA	None
Security	Traffic suppression	Traffic suppression based on ports	None
Security	Access security	802.1x authentication and MAC address authentication based on users and ports	None
Security	Local attack defense	Device protection measures, including CPU attack defense and attack source tracing	None
Security	ARP security	Suppression of ARP packets from the user side and network side, ARP anti-spoofing, ARP gateway attack inspection, and dynamic ARP inspection (DAI)	None
Security	IP security	ICMP anti-attack and URPF	None
Security	PKI	Certificate request, update, and verification	None
Security	ACL	Traffic classification based on physical ports, Layer 2 information, IP protocols, and TCP/UDP ports.	None
VPN	IPSec	Interconnecting headquarters and branches using IKE V1/V2 IPSec tunnels; hardware-based MD5 and SHA algorithms; AES, DES, and 3DES algorithms	None
Device management	Information center monitoring	Managing boards, power supply units, and e-labels	None
Device management	Version management	In-service upgrade, rollback, and patch installation	None

Feature	Sub-Feature	Description	Difference
Device management	Mirroring	Port- and flow-based mirroring	None
Device management	Deployment	Automatic deployment using a universal serial bus (USB) flash drive	None
Network management	SNMP	SNMP agent, fault management (FM), and trap switch control (TSC)	None
Network management	Ping and Tracert	Network connectivity detection	None
Network management	NTP	Time synchronization for traditional IP networks	None
Network management	RMON	Monitoring and traffic statistics for traffic on a network segment	None

Feature list of AR2500 series

Table 3-5 Features supported by the AR2500

Feature	Sub-Feature	Description	Difference
LAN	VLAN	VLAN services including basic VLAN and super/sub VLAN Provides access, trunk, and hybrid link types and provides VLANIF interfaces	None
LAN	MAC	Dynamic and static MAC address learning Supports trap sending to the NMS when receiving a packet with an illegal MAC address	None
LAN	STP	Spanning Multiple Spanning Tree Protocol (MSTP); MSTP security	None

Feature	Sub-Feature	Description	Difference
LAN	Link aggregation	Static link aggregation and Link Aggregation Control Protocol (LACP)-based aggregation	None
LAN	Port Group	Permanent port group and temporary port group	None
Interface Management	Physical interfaces	Supports GE interfaces and 10GE interfaces by itself. Supports 8ES2G, 8ES2GS and 8AS interface cards	Only the AR2504E-H supports 10GE interfaces
Interface Management	Logical interfaces	Ethernet Sub-interfaces, dialer interfaces, loopback interfaces, NULL interfaces, VT interfaces, VE interfaces and Tunnel interfaces	None
WAN	DCC	Circular DCC (C-DCC) and resource-shared DCC (RS-DCC)	None
WAN	PPPoE	IPv4/IPv6 PPPoE Client	None
IP application	ARP	Address resolution for Ethernet	None
IP application	IPv4/IPv6	IPv4 and IPv6 address management, TCP/UDP socket, ICMP, ping and tracert, and UDP helper	None
IP application	DNS	IPv4/IPv6 DNS client, IPv4/IPv6 DNS proxy, and dynamic DNS (DDNS) client	None
IP application	DHCP	IPv4/IPv6 DHCP client, IPv4/IPv6 DHCP relay, and IPv4/IPv6 DHCP server, and DHCP security	None
IP application	NAT	NAT, port address translation (PAT), port application mapping (PAM), Easy NAT, and NAT server, providing application layer gateways (ALG) for each application	None
IP application	Network Quality Analysis (NQA)	Detecting the performance of protocols running on the network ICMP jitter test is not supported	None
IP routing	IPv4 and IPv6 Static route	Basic routing functions	None

Feature	Sub-Feature	Description	Difference
IP routing	RIP and RIPng	Routing protocol	None
IP routing	OSPFv2 and OSPFv3	Routing protocol	None
IP routing	ISIS and ISISv6	Routing protocol	None
IP routing	BGP and BGP4+	Routing protocol	The AR2500 serise do not support MP-BGP
IP routing	Routing policy	Basic routing policy functions	None
IP routing	Policy-Based Routing (PBR)	IP unicast PBR, including IPv4 local PBR and IPv4/IPv6 interface PBR	None
Multicast	IGMP	Basic IGMP functions and IGMP Snooping	None
Multicast	Multicast routing	Multicast route management, multicast route load balancing, and source-specific multicast (SSM) mapping	None
Multicast	PIM (IPv4/IPv6)	PIM-DM (IPv4/IPv6) and PIM-SM (IPv4/IPv6)	None
Multicast	GMRP	Provides GMRP (GARP Multicast Registration Protocol)	None
Multicast	MLD	Provides MLD (Multicast Listener Discovery) Protocol	None
QoS	MQC	Modular traffic classification	None
QoS	Priority mapping	Mapping between local priorities, 802.1p priorities, DSCP priorities, and EXP priorities	None
QoS	Traffic policing	Single-rate-two-bucket and two-rate-two bucket policy based on traffic classifiers, permanent virtual circuits (PVCs)/VLANs/data link connection identifiers (DLCIs), and interfaces	None

Feature	Sub-Feature	Description	Difference
QoS	Traffic shaping	Traffic shaping based on traffic classifiers, PVCs/VLANs/DLCIs, and ports, traffic shaping adaptation, and three-level traffic shaping	None
QoS	Congestion management	Congestion management based on traffic classifiers, PVCs/VLANs/DLCIs, and ports; queue mechanisms including PQ, WRR, DRR, WFQ, PQ+WRR/PQ +DRR/PQ+WFQ, and CBQ	None
QoS	Congestion avoidance	Priority-based weighted random early detection (WRED) and tail drop	None
QoS	HQoS	Hierarchical Quality of Service (HQoS) implements hierarchical scheduling based on queues and differentiates services and users	None
Security	AAA	AAA for administrators and access users, including local, RADIUS, and HWTACACS AAA	None
Security	Firewall	Packet filtering firewall and ASPF; attack defense and attack defense logs	None
Security	Traffic suppression	Traffic suppression based on ports	None
Security	Access security	802.1x authentication and MAC address authentication based on users and ports; portal authentication for access users	None
Security	Local attack defense	Device protection measures, including CPU attack defense and attack source tracing	None
Security	ARP security	Suppression of ARP packets from the user side and network side, ARP anti-spoofing and dynamic ARP inspection (DAI)	None
Security	IP security	ICMP anti-attack, URPF, IPSG and DHCP/DHCPv6 Snooping	None
Security	PKI	Certificate request, update, and verification	None
Security	ACL	Provides basic ACL.	None
Reliability	Interface backup	Interface backup in active/standby mode and load balancing mode	None
Reliability	IPv4/IPv6 VRRP	Redundancy backup mechanism for IP services	None
Reliability	BFD	Single-hop BFD, multi-hop BFD, BFD for VRRP, and BFD for routing protocols	None

Feature	Sub-Feature	Description	Difference
VPN	IPSec	Interconnecting headquarters and branches using IKE V1/V2 IPSec tunnels; hardware-based MD5 and SHA algorithms; AES, DES, and 3DES algorithms	None
VPN	SVPN	Binding multiple WAN links to realize high-bandwidth and highly-reliable access to a public network, providing high-quality communication	None
VPN	GRE	GRE tunnel for interconnecting the headquarters and branches Used together with IPSec. IPSec cannot protect multicast data, but GRE VPN can protect multicast data	None
Device management	Information center monitoring	Managing boards, power supply units, and e-labels	None
Device management	Version management	In-service upgrade, rollback, and patch installation	None
Device management	Deployment	Automatic deployment using a universal serial bus (USB) flash drive	None
Network management	SNMP	SNMP agent, fault management (FM), and trap switch control (TSC)	None
Network management	CWMP	CWMP defines that the customer premises equipment (CPE) is remotely managed by an auto-configuration server (ACS)	None
Network management	IP Accounting	IP accounting effectively implements IP packet statistics with low costs	None
Network management	Ping and Tracert	Network connectivity detection	None

Feature	Sub-Feature	Description	Difference
Network management	NTP	Time synchronization for traditional IP networks	None
Network management	RMON	Monitoring and traffic statistics for traffic on a network segment	None

3.2 Key Features

3.2.1 SEP

The Smart Ethernet Protection (SEP) protocol is a ring network protocol applied to the link layer of an Ethernet network.

As the industrial routing and switching device, the AR500&AR510&AR530&AR550&AR2500 supports SEP. As Ethernet loop prevention mechanism, SEP applies to the Internet of Things and provides highly reliable QoS guarantee for the Layer 2 Ethernet.

- SEP eliminates loops on a Layer 2 network by blocking redundant links to prevent infinite packet transmission. This prevents broadcast storms on the network.
- SEP implements fast convergence to ensure fast switching of links when link faults occur.

3.2.2 VPN

The AR500&AR510&AR530&AR550&AR2500 provides an IP security (IPSec) mechanism to ensure high-quality, interoperable, and cryptology-based security for communication processes. The two parties in communication can encrypt data and authenticate the data source at the IP layer to ensure the confidentiality and integrity of the data and prevent replay on the network.

IPSec implements these functions by using two security protocols: Authentication Header (AH) and Encapsulating Security Payload (ESP). Internet Key Exchange (IKE) provides automatic key negotiation, SA establishment, and SA maintenance functions to simplify IPSec use and management.

The AR530 supports IPSec VPN and provides high reliability transmission tunnels. In addition, the AR530 uses Generic Routing Encapsulation (GRE) and Layer 2 Tunneling Protocol (L2TP) to support the following VPN services:

- GRE VPN
- IPSec VPN

- SSL VPN
- L2TP VPN
- DSVPN
- GRE over IPSec VPN
- L2TP VPN over IPSec VPN

For details about VPN features, see VPN Configuration Guide.

3.2.3 Security

ACL

An access control list (ACL) defines a series of filtering rules based on a certain policy, the ACL permits or forbids the passage of data packets.

The AR500&AR510&AR530&AR550&AR2500 can use ACL rules to filter packets.

Firewall

- ACL-based packet filtering

  ACL-based packet filtering is used to analyze the information of the packets to be forwarded, including source/destination IP addresses, source/destination port numbers, and IP protocol numbers. The AR500&AR510&AR530&AR550&AR2500 compares the packet information with the ACL rules and determines whether to forward or discard the packets.

  In addition, the AR500&AR510&AR530&AR550&AR2500 can filter the fragmented IP packets to prevent the non-initial fragment attack.

- ASPF

  Application Specific Packet Filter (ASPF) filters packets of the application layer based on packet status. ASPF, used for security policies, detects session information about application layer protocol packets that attempt to pass the AR500&AR510&AR530&AR550&AR2500, and prevents unsatisfied packets.

- Attack defense

  With the attack defense feature, the AR500&AR510&AR530&AR550&AR2500 can detect various network attacks and protect the internal network against attacks. Network attacks are classified into three types: DoS attacks, scanning and snooping attacks, and malformed packet attacks.

  - DoS attack

    The DoS attack is an attack to a system by using a large number of data packets. This prevents the system from receiving requests from authorized users or suspends the host. DoS attacks include SYN Flood attacks and Fraggle attacks. DoS attacks are different from other attacks because DoS attackers do not search for the ingress of a network, but prevent authorized users from accessing resources or routers.

  - Scanning and snooping attack

    The scanning and snooping attack is to identify the existing systems on a network by using ping scanning (including ICMP and TCP scanning), and then find out potential targets. By using TCP scanning, attackers can identify the operating system and the potential services. By scanning and snooping, an attacker can know

the service type and security vulnerability of the system and prepare for further intrusion to the system.

- Malformed packet attack

  The malformed packet attack is to send malformed packets to the system. If such an attack occurs, the system breaks down when processing the malformed IP packets. Malformed packet attacks include Ping of Death and Teardrop.

NOTE

- The AR2500 series do not support Firewall in HSB Mode.

ARP Security

There are various ARP attacks on networks, including attacks targeting hosts and gateways, address spoofing attacks and violent attacks, virus attacks, and malicious software attacks.

Address Resolution Protocol (ARP) security uses various ARP-based security mechanisms, such as strict ARP learning, ARP entry protection, and ARP packet rate limiting, to protect the network from attacks to the ARP protocol and ARP-based network scanning attacks.

NOTE

The AR500 series do not support ARP security.

IP Source Guard

Some attacks on networks aim at source IP addresses by accessing and using network resources through spoofing IP addresses. The attacks block authorized users from accessing networks or information leaks.

The AR500&AR510&AR530&AR550&AR2500 series routers support Unicast Reverse Path Forwarding (URPF). URPF blocks packets sent from bogus source addresses.

NOTE

The AR500 series do not support IP source guard.

Local Attack Defense

The Internet technology and size develop quickly and various network applications emerge. Many enterprises try to boost their own development by using their networks. They are concerned about how to protect confidential data and resources in an open network environment. Some unconscious operations may attack network devices and degrade device performance or even cause device failure.

A large number of packets including valid packets and malicious attack packets on a network must be processed by devices' CPUs. The malicious attack packets affect services and may even cause a system breakdown. In addition, excessive normal packets can also lead to high CPU usage, which degrades the CPUs' performance and interrupts services. Therefore, protecting the CPU is a necessary and important factor for processing services and system response.

The local attack defense and source tracing functions protect the AR500&AR510&AR530&AR550&AR2500 against attacks. When an attack occurs, these functions ensure nonstop service transmission and minimize the impact of the attack on network services.

NOTE

The AR500 series support only CPCAR.

PKI

The public key infrastructure (PKI) is a system that generates public keys and digital certificates, and verifies identities of certificate subjects to ensure information security. PKI issues digital certificates that bind public keys to respective user identities by means of a certificate authority (CA).

NOTE

The AR500 series (except , AR502CG-L and AR502EGW-L) does not support PKI function.

AAA

The AR500&AR510&AR530&AR550&AR2500 supports Authentication, Authorization, and Accounting (AAA).

- Authentication

  Verifies users' identities.
- Authorization

  Grants different rights for different users to restrict the services that can be used by users.
- Accounting

  Records information about network service usage of users, including service type, start time, and traffic volume.

For details about security features, see Security Configuration Guide.

3.2.4 QoS

Traffic Policing

Traffic policing discards excess traffic to limit the traffic within a specified range and to protect network resources as well as the carriers' interests.

The AR500&AR510&AR530&AR550&AR2500 uses committed access rate (CAR) to perform traffic policing. They support dual-rate-three-color markers and precise bandwidth management.

Traffic Shaping

When the rate of an interface on a downstream device is slower than that of an interface on an upstream device or burst traffic occurs, traffic congestion may occur on the downstream device interface. Traffic shaping can be configured on the interface of an upstream device so that outgoing traffic is sent at even rates and congestion is avoided.

The AR500&AR510&AR530&AR550&AR2500 supports traffic shaping adaptation and level-3 traffic shaping. Three-level shapers include the flow queue shaper, subscriber queue shaper, and port queue shaper.

Congestion Management

If a network transmitting both delay-sensitive and delay-insensitive services is congested intermittently, congestion management is required. However, if a network is always congested, bandwidth needs to be increased. Congestion management sends packet flows by using queuing and scheduling.

An interface on the AR500&AR510&AR530&AR550&AR2500 has four or eight default queues for outgoing packets. LAN-side interfaces support the scheduling modes of priority queuing (PQ), deficit round robin (DRR), weighted round robin (WRR), PQ+DRR, and PQ +WRR. WAN-side interfaces support the scheduling modes of PQ, WFQ, PQ+WFQ, and class-based WFQ (CBQ). Each scheduling algorithm schedules specific types of traffic, and affects bandwidth allocation, delay, and jitter.

Congestion Avoidance

Congestion avoidance is a flow control mechanism. A system configured with congestion avoidance monitors network resource usage such as queues and memory buffers. When congestion occurs or aggravates, the system discards packets.

The AR500&AR510&AR530&AR550&AR2500 supports tail drop and WRED.

- Tail drop

  When the queue length reaches the upper limit, the excess packets (buffered at the queue tail) are discarded.
- WRED

  WRED sets the upper and lower drop thresholds and the maximum drop probability for each queue. When the queue length is smaller than the lower threshold, no packets are discarded. When the length of the queue exceeds the upper threshold, all packets are discarded. When the queue length is between the lower threshold and the upper threshold, incoming packets are discarded randomly. The drop probability cannot be greater than the maximum drop probability.

  The AR500&AR510&AR530&AR550&AR2500 uses the WRED based on queue profiles or traffic policies.

For details about QoS features, see QoS Configuration Guide.

3.2.5 IPv6

The AR500&AR510&AR530&AR550&AR2500 provides the IPv6 host function, which maximizes customers' return on investment (ROI) and prevents repeated investment during network upgrade.

The AR500&AR510&AR530&AR550&AR2500 supports the following IPv6 functions:

- IPv6 ND
- IPv6 PMTU
- TCP6, UDP6, RawIP6, Ping IPv6, and Tracert IPv6
- ICMP6 and Socket6
- TFTP IPv6 client, TFTP IPv6 server, FTP IPv6 client, FTP IPv6 server, Telnet IPv6 client, and Telnet IPv6 server

The AR530 and AR2500 series also support the following IPv6 functions:

- IPv6 unicast routing protocols: RIPng, OSPFv3, IS-IS, BGP, and IPv6 static route

For details about IPv6 functions, see IP Service Configuration Guide and IP Unicast Routing Configuration Guide.

3.2.6 WLAN

A wireless local area network (WLAN) connects two or more computers or devices and enables the devices to communicate by using the wireless telecommunication technology. WLAN uses the wireless technology to implement fast Ethernet access. The primary advantage of WLAN is that terminals, such as computers, can access a network through a wireless medium rather than a physical cable. This facilitates network construction and allows users to move around without interrupting communication. WLAN is more flexible than traditional wired access.

WLAN is widely used in public areas such as on campuses, business centers, and airports. The WLAN uses cables at the backbone layer, and users access the WLAN through one or more access points (APs) using radio waves. The transmission distance of an AP is tens of meters.

IEEE 802.11 is widely used by WLANs. The device can function as a Fat access point (FAT AP). The device as the Fat AP supports 802.11a, 802.11b, 802.11g, and 802.11n.

NOTE

Only AR502EGW-L, AR510 series, AR503GW-LM7, AR503GW-LcM7, AR503EW, AR503EDGW-Lc, AR515GW-LM9-D supports WLAN-FAT AP.

The device supports the following WLAN features:

- WLAN user management
  - Dot1X access authentication
  - MAC address authentication
  - Pre-share-key (PSK) authentication
  - EAPOL-Key negotiation
  - User access control
  - AAA for WLAN users
- Radio frequency (RF) management
  - Country code
  - RF type
  - Setting radio transmission rate
  - Setting radio transmission power
  - Setting radio working channels
  - Monitoring and eliminating radio interference
  - Configurable wireless MAC layer parameters
  - Configuring and querying radio attributes
  - Collecting and querying performance statistics of radio frequency interfaces
- WLAN security
  - WEP Open-System link authentication and encryption
  - WEP Share-Key link authentication and encryption

  - WPA PSK authentication and encryption
  - WPA Dot1X authentication and encryption
  - WPA2 PSK authentication and encryption
  - WPA2 Dot1X authentication and encryption
  - WAPI authentication and encryption
  - TKIP/CCMP encryption
  - HMAC-MD5 algorithm
  - User blacklist and whitelist
- WLAN QoS
  - WMM (802.11e)
  - Mapping wireless-side priority to the wired-side priority
  - Bandwidth limit based on users
  - Bandwidth limit based on SSIDs

For details about WLAN features, see WLAN-FAT AP Configuration Guide.

4 Appearance

About This Chapter

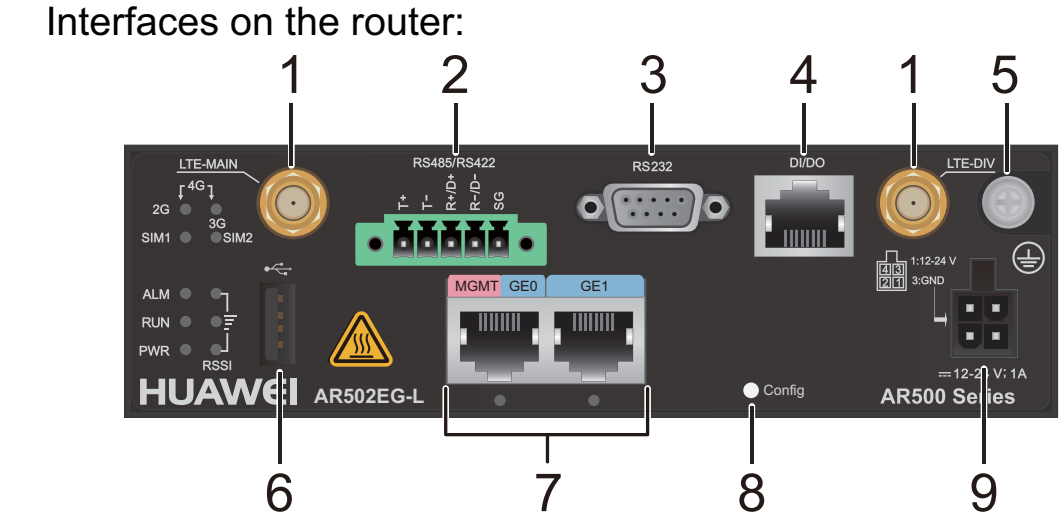
4.1 AR500 Series

4.1.1 AR502EG-L

Appearance and Structure

Figure 4-1 shows the appearance of the AR502EG-L router.

Figure 4-1 AR502EG-L appearance



Removing the SIM card cover from the bottom:

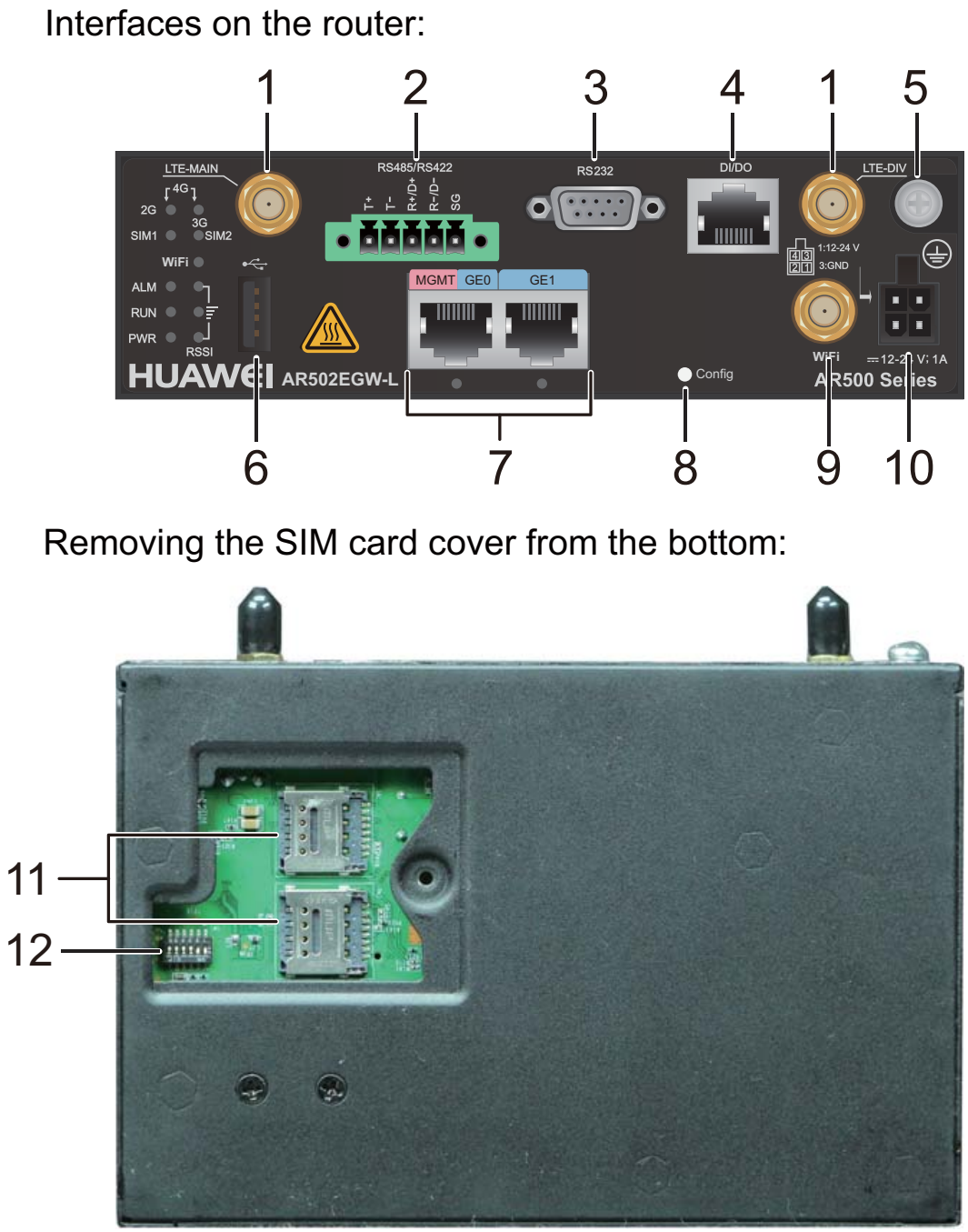
1	WAN interfaces: two LTE antenna interfaces	2	RS485/RS422 interface **NOTE** SG is the ground for RS485/RS422 signal isolation.
3	RS232 interface	4	DI/DO interface
5	Ground point **NOTE** To protect the router from lightning and interference, reliably ground the router using a Ground Cable.	6	USB interface
7	LAN interfaces: two GE electrical interfaces	8	Config button **NOTE** ● The configuration button is used to restore the factory settings and switch RS232 interfaces. ● Holding down the button for 5s or longer will restart the router and restore the factory settings. ● Holding down the button for less than 5s will switch between the CON and RS232 modes. The factory default mode is CON. ● Restoring the factory settings will cause service interruption. Exercise caution when using this button.
9	Power socket **NOTE** GND is the ground for power signal isolation.	10	Two SIM card slots **NOTE** ● Industrial SIM cards are recommended for the router. ● The router supports double-card single-standby, and SIM1 is the default master card. ● If only one SIM card needs to be installed, install it in slot SIM1.
11	DIP switch **NOTE** By default, the DIP switch is in RS485 state and works in half-duplex mode, with pull-up and pull-down resistance of 150 kohm and without 120 ohm matched load resistance.	-	-

4.1.2 AR502EGW-L

Appearance and Structure

Figure 4-2 shows the appearance of the AR502EGW-L router.

Figure 4-2 AR502EGW-L appearance



1	WAN interfaces: two LTE antenna interfaces	2	RS485/RS422 interface **NOTE** SG is the ground for RS485/RS422 signal isolation.
3	RS232 interface	4	DI/DO interface

5	Ground point **NOTE** To protect the router from lightning and interference, reliably ground the router using a Ground Cable.	6	USB interface
7	LAN interfaces: two GE electrical interfaces	8	Config button **NOTE** ● The configuration button is used to restore the factory settings and switch RS232 interfaces. ● Holding down the button for 5s or longer will restart the router and restore the factory settings. ● Holding down the button for less than 5s will switch between the CON and RS232 modes. The factory default mode is CON. ● Restoring the factory settings will cause service interruption. Exercise caution when using this button.
9	LAN interface: Wi-Fi antenna interface	10	Power socket **NOTE** GND is the ground for power signal isolation.
11	Two SIM card slots **NOTE** ● Industrial SIM cards are recommended for the router. ● The router supports double-card single-standby, and SIM1 is the default master card. ● If only one SIM card needs to be installed, install it in slot SIM1.	12	DIP switch **NOTE** By default, the DIP switch is in RS485 state and works in half-duplex mode, with pull-up and pull-down resistance of 150 kohm and without 120 ohm matched load resistance.

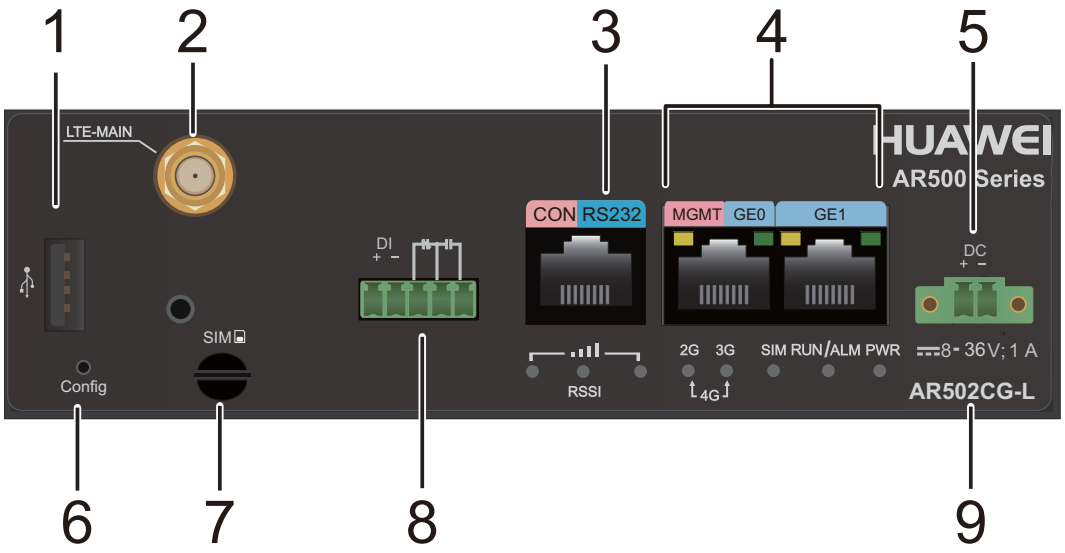
4.1.3 AR502CG-L

Appearance and Structure

Figure 4-3 shows the appearance of the AR502CG-L router.

Figure 4-3 AR502CG-L appearance

Removing the SIM card cover:



1	USB interface	2	WAN interface: LTE antenna interface **NOTE** ● The router has a built-in antenna and can be configured with an external antenna (optional). The external antenna is connected to the LTE antenna interface. ● You can choose the built-in or external antenna on the web management system.
3	CON/RS232 interface	4	LAN interfaces: two GE electrical interfaces **NOTE** ● GE0 is a management interface and is used to upgrade the router. ● The GE LAN interface can be used as a WAN interface.

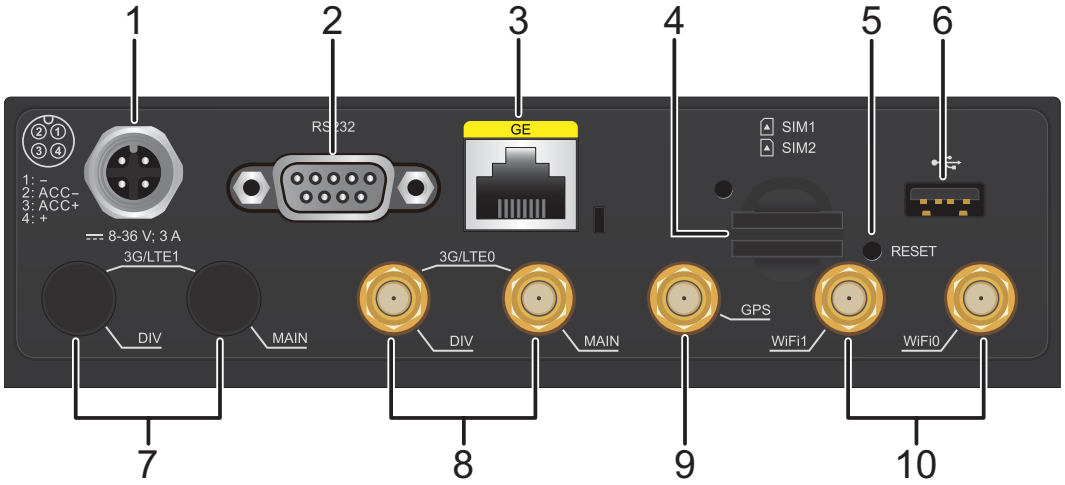
5	Power socket Applicable power modules: ● Recommended: Huawei 60 W AC power module ● Self-provided power modules of customers: see Technical Specifications for the recommended power parameters	6	Config button **NOTE** ● The configuration button is used to restore the factory settings and switch RS232 interfaces. ● Holding down the button for 5s or longer will restart the router and restore the factory settings. ● Holding down the button for less than 5s will switch between the CON and RS232 modes. The factory default mode is CON. ● Restoring the factory settings will cause service interruption. Exercise caution when using this button.
7	SIM card slot	8	DI/DO interface
9	Product model silkscreen	-	-

4.1.4 AR503GW-LM7

Appearance and Structure

Figure 4-4 shows the appearance of the AR503GW-LM7 router.

Figure 4-4 AR503GW-LM7 appearance



1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	RS232 interface **NOTE** The RS232 interface can be used as a console interface to configure the router.

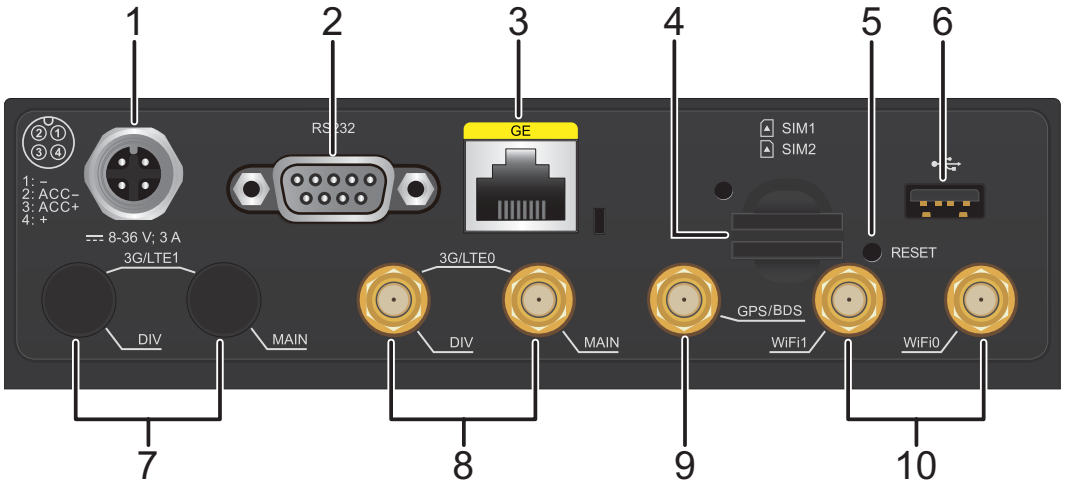
3	WAN interface: GE electrical interface	4	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.
5	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	6	USB interface (host)
7	Reserved 3G/LTE antenna interface	8	3G/LTE antenna interface
9	GPS antenna interface	10	Two Wi-Fi antenna interfaces

4.1.5 AR503GW-LcM7

Appearance and Structure

Figure 4-5 shows the appearance of the AR503GW-LcM7 router.

Figure 4-5 AR503GW-LcM7 appearance



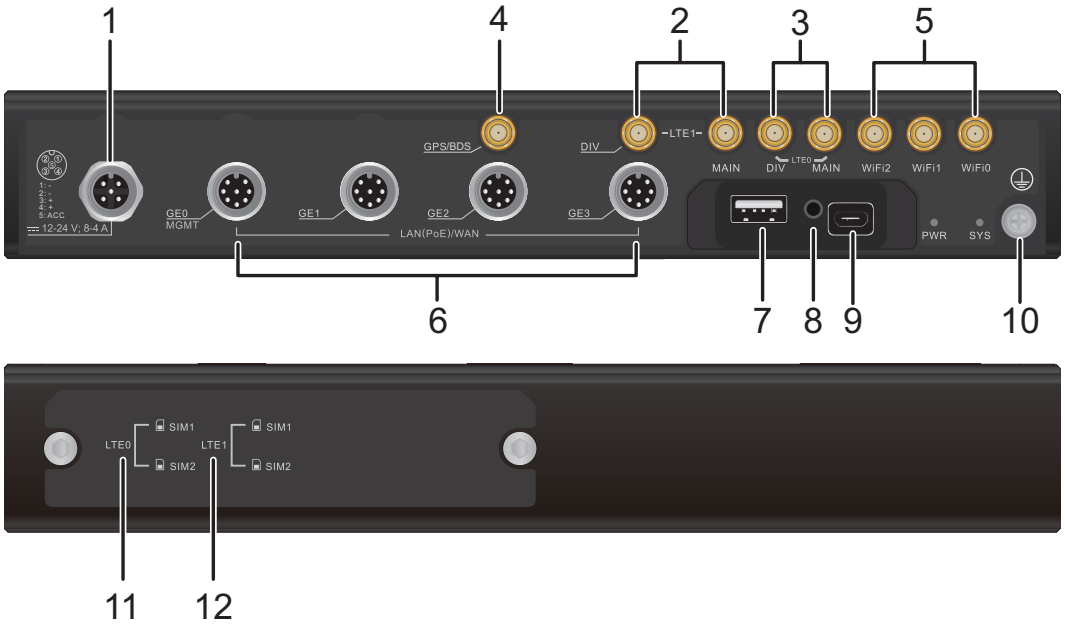
1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	RS232 interface **NOTE** The RS232 interface can be used as a console interface to configure the router.
3	WAN interface: GE electrical interface	4	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.
5	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	6	USB interface (host)
7	Reserved 3G/LTE antenna interface	8	3G/LTE antenna interface
9	GPS/BDS antenna interface	10	Two Wi-Fi antenna interfaces

4.1.6 AR503EDGW-Lc

Appearance and Structure

Figure 4-6 shows the appearance of the AR503EDGW-Lc router.

Figure 4-6 AR503EDGW-Lc appearance



1	Power input jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	LTE1 antenna interface
3	LTE0 antenna interface	4	GPS/BDS antenna interface
5	Three Wi-Fi antenna interfaces	6	LAN interfaces: four GE electrical interfaces **NOTE** ● LAN interfaces GE0 to GE3 can be configured as WAN interfaces. ● GE0 is a management interface and is used to upgrade the router.
7	USB interface (host)	8	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.
9	CONSOLE interface	10	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.

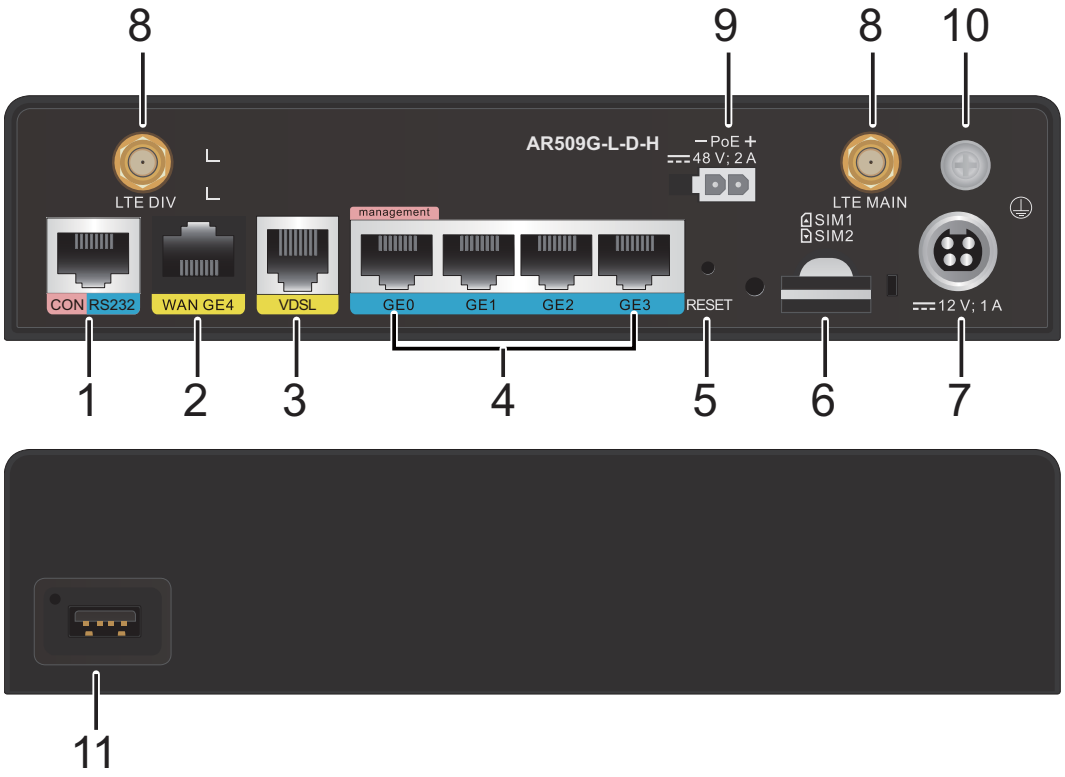
11	Two SIM card slots of LTE0 **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router.	12	Two SIM card slots of LTE1 **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router.

4.1.7 AR509G-L-D-H

Appearance and Structure

Figure 4-7 shows the appearance of the AR509G-L-D-H router.

Figure 4-7 AR509G-L-D-H appearance



1	CON/RS232 interface	2	WAN interface: GE electrical interface
3	WAN interface: VDSL interface	4	LAN interfaces: four GE electrical interfaces **NOTE** GE0 is a management interface and is used to upgrade the router.

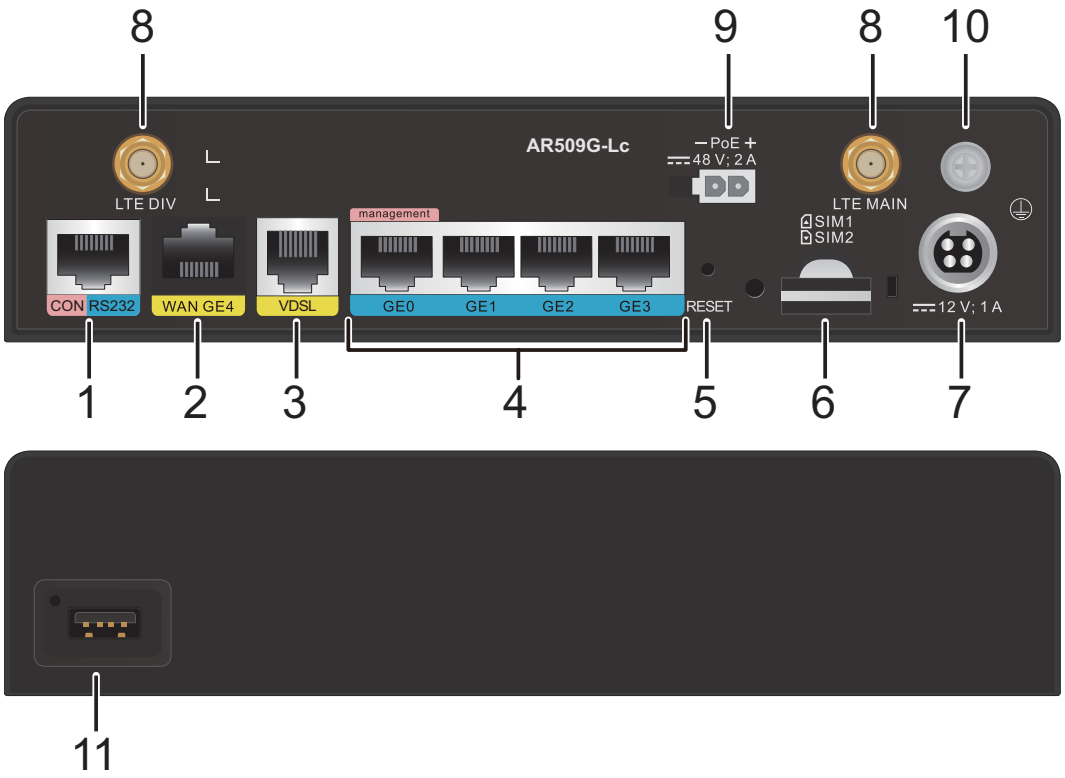
5	RST button **NOTE** This button is used to reset the router. ● To reset the system, press the button. ● To restore the factory settings, hold down the button for a period longer than 3 seconds and shorter than 10 seconds. ● Holding down the button for 10 seconds or longer will switch from the default CON mode to the RS232 mode or from RS232 to CON mode. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	6	Two SIM card slots **NOTE** ● Industrial SIM cards are recommended for the router. ● The router supports double-card single-standby, and SIM1 is the default master card. ● If only one SIM card needs to be installed, install it in slot SIM1.
7	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	8	LTE antenna interface
9	PoE power jack **NOTE** A PoE power jack connects to a 100 W AC PoE power module to provide power for PDs (such as IP phones, WLAN APs, and cameras) connected to GE interfaces of the router.	10	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.
11	USB interface (host)	-	-

4.1.8 AR509G-Lc

Appearance and Structure

Figure 4-8 shows the appearance of the AR509G-Lc router.

Figure 4-8 AR509G-Lc appearance



1	CON/RS232 interface	2	WAN interface: GE electrical interface
3	WAN interface: VDSL interface	4	LAN interfaces: four GE electrical interfaces **NOTE** GE0 is a management interface and is used to upgrade the router.
5	RST button **NOTE** This button is used to reset the router. ● To reset the system, press the button. ● To restore the factory settings, hold down the button for a period longer than 3 seconds and shorter than 10 seconds. ● Holding down the button for 10 seconds or longer will switch from the default CON mode to the RS232 mode or from RS232 to CON mode. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	6	Two SIM card slots **NOTE** ● Industrial SIM cards are recommended for the router. ● The router supports double-card single-standby, and SIM1 is the default master card. ● If only one SIM card needs to be installed, install it in slot SIM1.

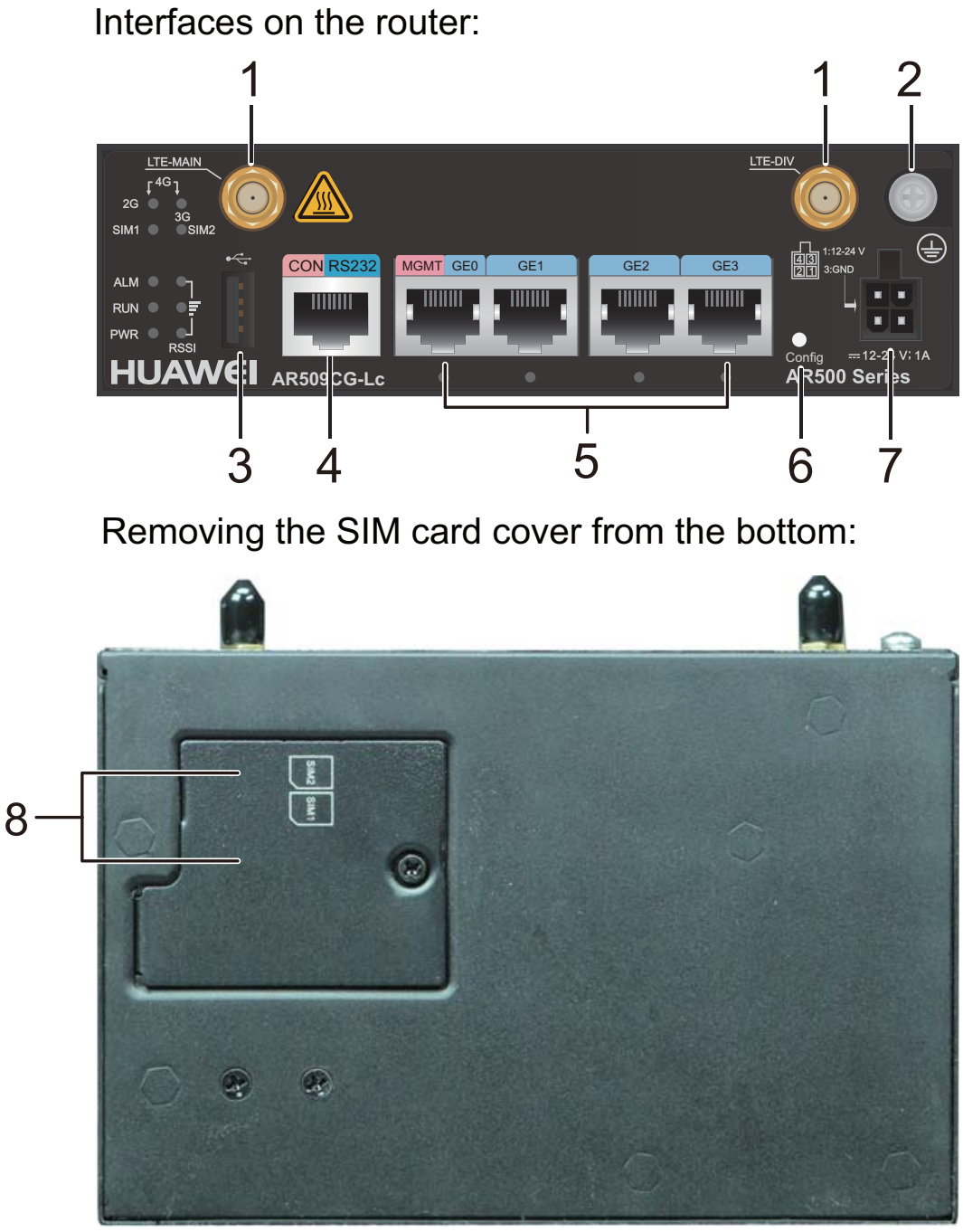
7	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	8	LTE antenna interface
9	PoE power jack **NOTE** A PoE power jack connects to a 100 W AC PoE power module to provide power for PDs (such as IP phones, WLAN APs, and cameras) connected to GE interfaces of the router.	10	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.
11	USB interface (host)	-	-

4.1.9 AR509CG-Lc

Appearance and Structure

Figure 4-9 shows the appearance of the AR509CG-Lc router.

Figure 4-9 AR509CG-Lc appearance



1	LTE antenna interface	2	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.
3	USB interface (host)	4	CON/RS232 interface

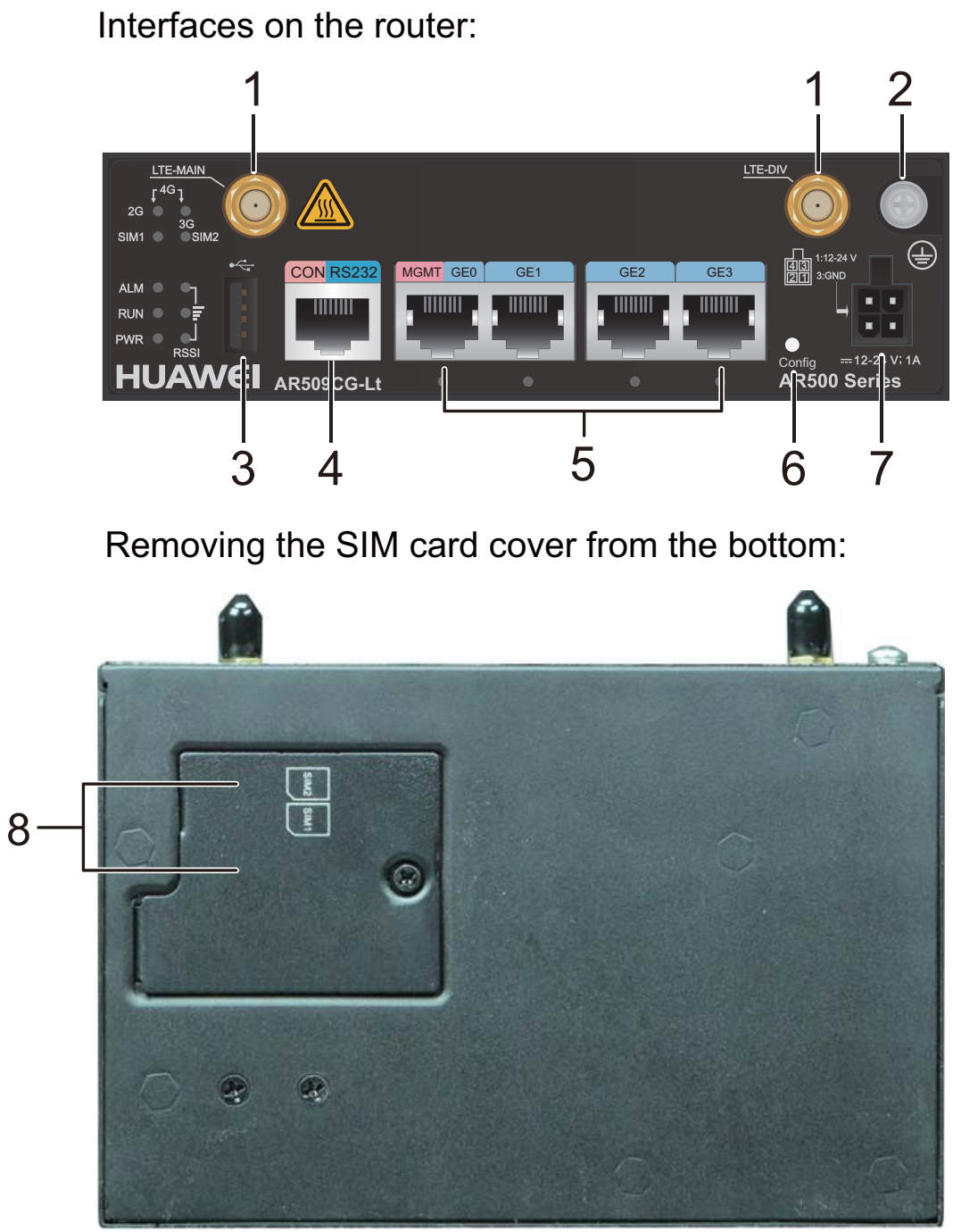
5	LAN interfaces: four GE electrical interfaces **NOTE** GE0 is a management interface and is used to upgrade the router.	6	Config button **NOTE** ● The configuration button is used to restore the factory settings and switch between console and RS232 interfaces. ● Holding down the button for 5s or longer will restart the router and restore the factory settings. ● Holding down the button for less than 5 seconds will switch from the factory default console management interface to the RS232 interface. ● Restoring the factory settings will cause service interruption. Exercise caution when using this button.
7	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	8	Two SIM card slots **NOTE** ● Industrial SIM cards are recommended for the router. ● The router supports double-card single-standby, and SIM1 is the default master card. ● If only one SIM card needs to be installed, install it in slot SIM1.

4.1.10 AR509CG-Lt

Appearance and Structure

Figure 4-10 shows the appearance of the AR509CG-Lt router.

Figure 4-10 AR509CG-Lt appearance



1	LTE antenna interface	2	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.
3	USB interface (host)	4	CON/RS232 interface

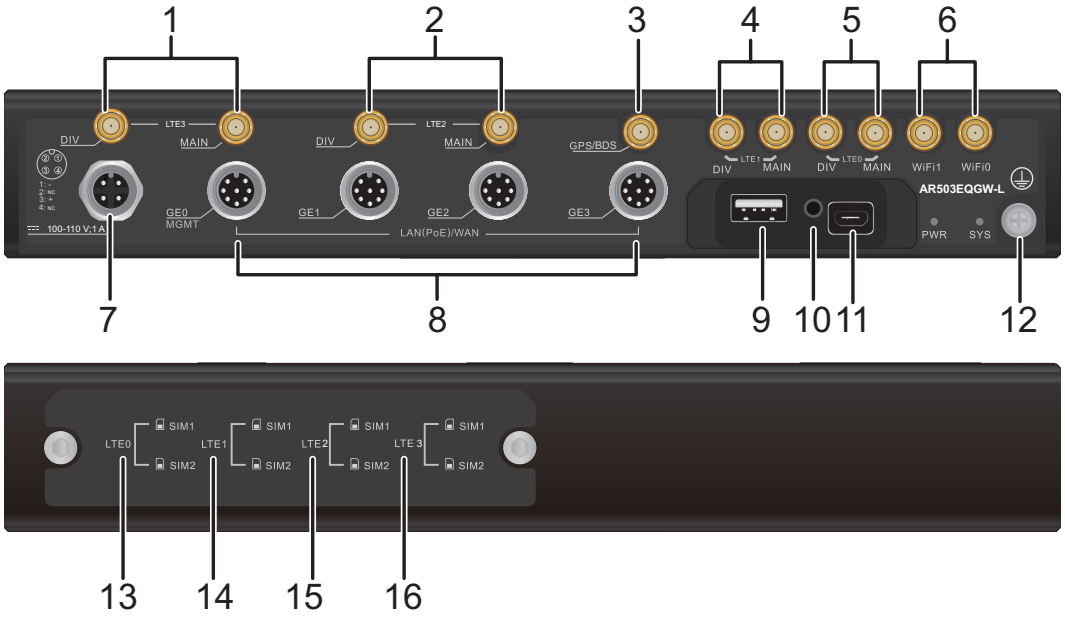
5	LAN interfaces: four GE electrical interfaces **NOTE** GE0 is a management interface and is used to upgrade the router.	6	Config button **NOTE** ● The configuration button is used to restore the factory settings and switch between console and RS232 interfaces. ● Holding down the button for 5s or longer will restart the router and restore the factory settings. ● Holding down the button for less than 5 seconds will switch from the factory default console management interface to the RS232 interface. ● Restoring the factory settings will cause service interruption. Exercise caution when using this button.
7	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	8	Two SIM card slots **NOTE** ● Industrial SIM cards are recommended for the router. ● The router supports double-card single-standby, and SIM1 is the default master card. ● If only one SIM card needs to be installed, install it in slot SIM1.

4.1.11 AR503EQGW-L

Appearance and Structure

Figure 4-11 shows the appearance of the AR503EQGW-L router.

Figure 4-11 AR503EQGW-L appearance



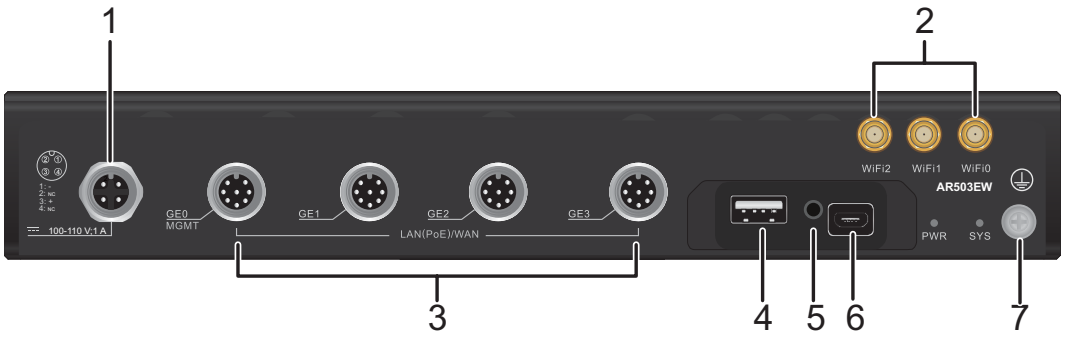
1	LTE3 antenna interface	2	LTE2 antenna interface
3	GPS/BDS antenna interface	4	LTE1 antenna interface
5	LTE0 antenna interface	6	Two Wi-Fi antenna interfaces
7	Power input jack **NOTE** Use a DC power cable to connect the router to an external power source.	8	LAN interfaces: four GE electrical interfaces **NOTE** ● LAN interfaces GE0 to GE3 can be configured as WAN interfaces. ● GE0 is a management interface and is used to upgrade the router.
9	USB interface (host)	10	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.
11	CONSOLE interface	12	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.
13	Two SIM card slots of LTE0 **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router.	14	Two SIM card slots of LTE1 **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router.
15	Two SIM card slots of LTE2 **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router.	16	Two SIM card slots of LTE3 **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router.

4.1.12 AR503EW

Appearance and Structure

Figure 4-12 shows the appearance of the AR503EW router.

Figure 4-12 AR503EW appearance



1	Power input jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	Three Wi-Fi antenna interfaces
3	LAN interfaces: four GE electrical interfaces **NOTE** ● LAN interfaces GE0 to GE3 can be configured as WAN interfaces. ● GE0 is a management interface and is used to upgrade the router.	4	USB interface (host)
5	RST button	6	CONSOLE interface
7	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.	-	-

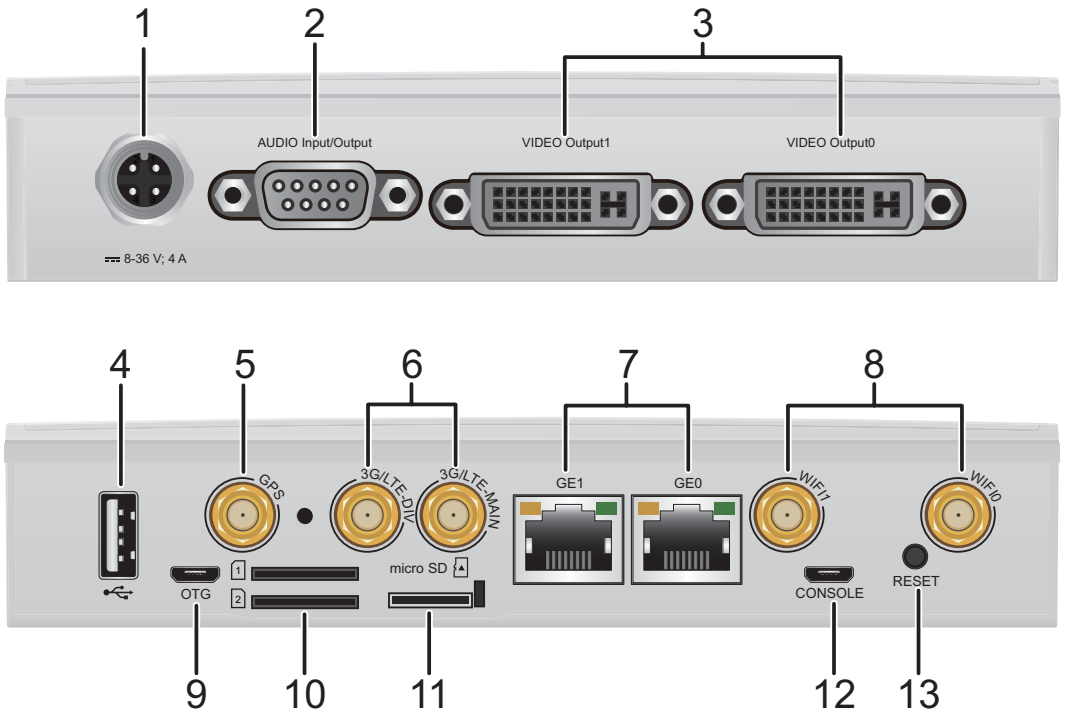
4.2 AR510 Series

4.2.1 AR511GW-LAV2M3

Appearance and Structure

Figure 4-13 shows the appearance of the AR511GW-LAV2M3 router.

Figure 4-13 AR511GW-LAV2M3 appearance



1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	Audio interface
3	Two video interfaces	4	USB interface (host)
5	GPS antenna interface	6	3G/LTE antenna interface
7	WAN interfaces: two GE electrical interfaces	8	Two Wi-Fi antenna interfaces
9	USB interface (OTG)	10	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.
11	Micro SD card slot	12	CONSOLE interface

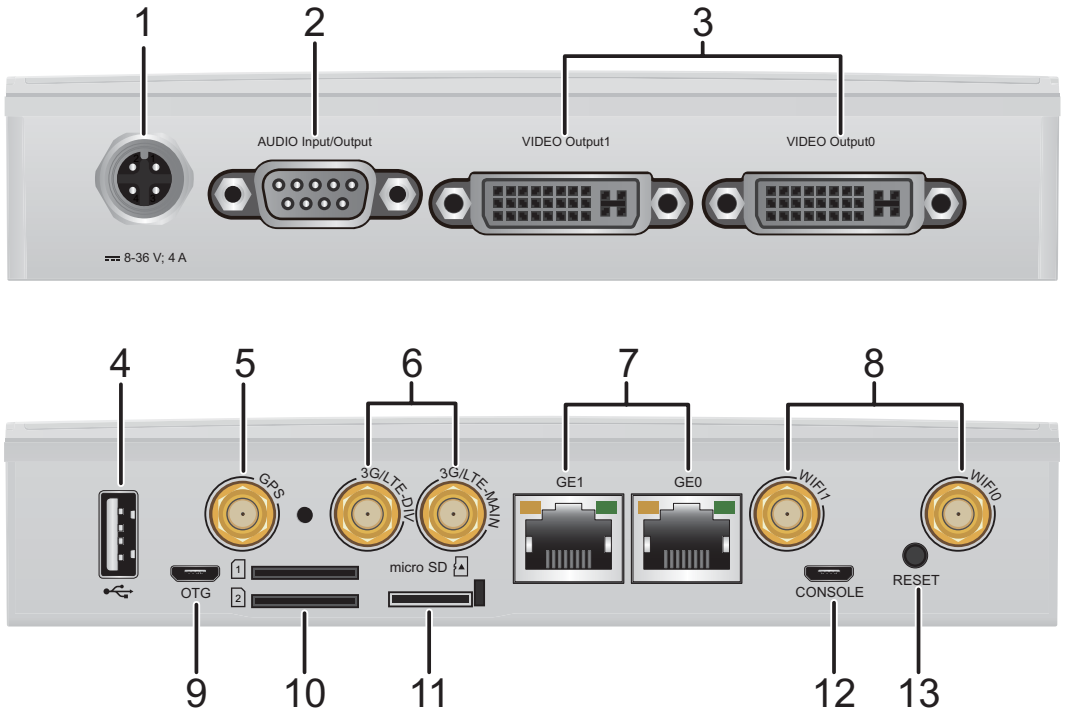
13	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	-	-

4.2.2 AR511CGW-LAV2M3

Appearance and Structure

Figure 4-14 shows the appearance of the AR511CGW-LAV2M3 router.

Figure 4-14 AR511CGW-LAV2M3 appearance



1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	Audio interface
3	Two video interfaces	4	USB interface (host)
5	GPS antenna interface	6	3G/LTE antenna interface

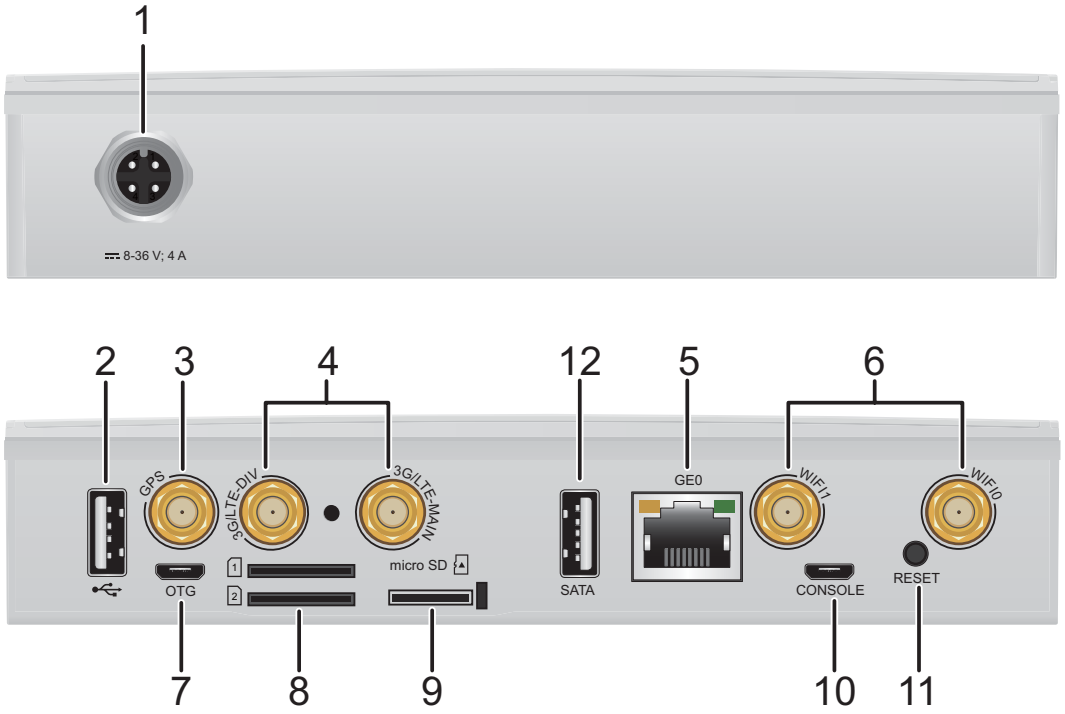
7	WAN interfaces: two GE electrical interfaces	8	Two Wi-Fi antenna interfaces
9	USB interface (OTG)	10	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.
11	Micro SD card slot	12	CONSOLE interface
13	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	-	-

4.2.3 AR511GW-LM7

Appearance and Structure

Figure 4-15 shows the appearance of the AR511GW-LM7 router.

Figure 4-15 AR511GW-LM7 appearance



1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	USB interface (host)
3	GPS antenna interface	4	3G/LTE antenna interface
5	WAN interface: one GE electrical interface	6	Two Wi-Fi antenna interfaces
7	USB interface (OTG)	8	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.
9	Micro SD card slot	10	CONSOLE interface

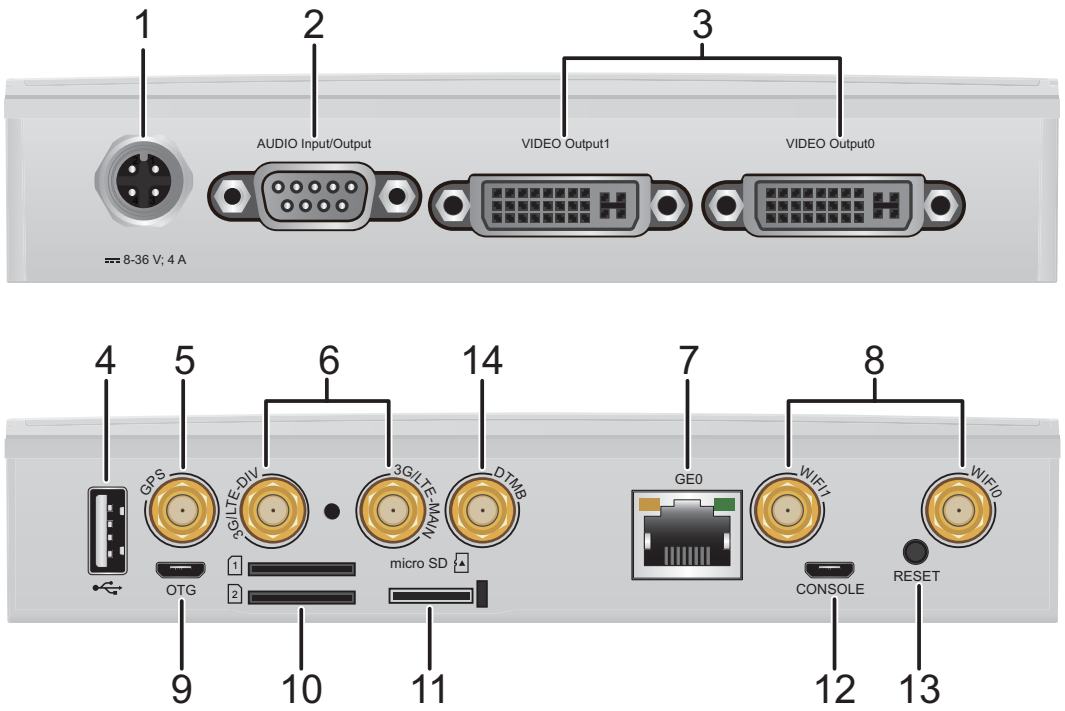
11	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	12	mSATA Interface **NOTE** This interface can have a mini SATA (mSATA) hard disk connected but the mSATA hard disk is not hot swappable.

4.2.4 AR511GW-L-B3

Appearance and Structure

Figure 4-16 shows the appearance of the AR511GW-L-B3 router.

Figure 4-16 AR511GW-L-B3 appearance



1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	Audio interface
3	Two video interfaces	4	USB interface (host)
5	GPS antenna interface	6	3G/LTE antenna interface

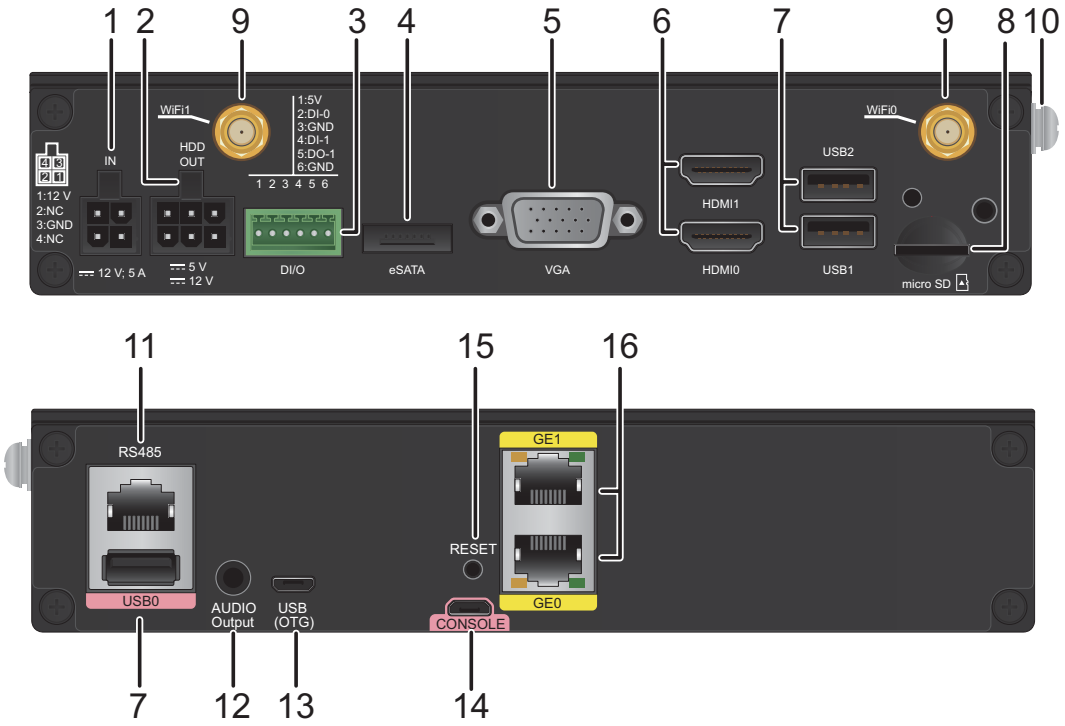
7	WAN interface: one GE electrical interface	8	Two Wi-Fi antenna interfaces
9	USB interface (OTG)	10	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.
11	Micro SD card slot	12	CONSOLE interface
13	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	14	DTMB interface

4.2.5 AR513W-V3M8

Appearance and Structure

Figure 4-17 shows the appearance of the AR513W-V3M8 router.

Figure 4-17 AR513W-V3M8 appearance



1	Power jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	SATA hard disk power jack
3	DI/DO interface **NOTE** Connect cables according to the signal types identified above the DI/O interfaces.	4	eSATA interface **NOTE** This interface can have an external SATA (eSATA) hard disk connected. The eSATA hard disk and its data cable and power cable are hot swappable.
5	VGA interface	6	HDMI video interface
7	Three USB interfaces (host)	8	Micro SD card slot
9	Two Wi-Fi antenna interfaces	10	Ground point **NOTE** Reliably ground the router by connecting a ground cable to the ground point to protect the router against lightning and interference.
11	RS485 interface **NOTE** The router does not support RS485 serial interface functions. This interface is reserved for future use.	12	Audio interface (output)

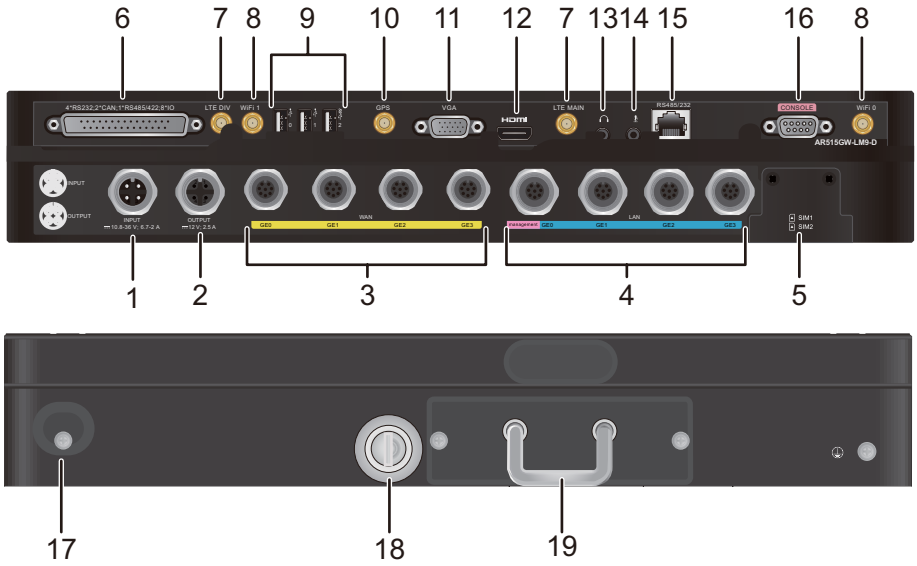
13	USB interface (OTG)	14	CONSOLE interface
15	RST button **NOTE** This button is used to reset the router. ● To restore the factory settings, hold down the button for at least 5 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	16	WAN interfaces: two GE electrical interfaces

4.2.6 AR515GW-LM9-D

Appearance and Structure

Figure 4-18 shows the appearance of the AR515GW-LM9-D router.

Figure 4-18 AR515GW-LM9-D appearance



1	Power input jack **NOTE** Use a DC power cable to connect the router to an external power source.	2	Power output jack **NOTE** It can be connected to a powered device (PD) using a DC power cable to supply power to the PD.
3	WAN interfaces: four GE electrical interfaces	4	LAN interfaces: four GE electrical interfaces

5	Two SIM card slots **NOTE** ● The SIM card slots support double-card single-standby. ● Industrial SIM cards are recommended for the router. ● The mounting hole above the SIM card slots is used to fix the SIM card cover with a screw.	6	DB37 interface **NOTE** It can have a DB37 adapter cable connected to provide any of the following interfaces: ● 4*RS232 ● 2*CAN ● 1*RS485/RS422 ● 8*I/O (3*DI/DO 5 V level; 2*DI 5 V level; 3*AI 24 V level) ● 5V/GND
7	LTE antenna interface	8	Two Wi-Fi antenna interfaces
9	Three USB interfaces (host)	10	GPS antenna interface
11	VGA interface	12	HDMI video interface
13	Earphone jack	14	Microphone jack
15	RS485/232 interface	16	Console interface
17	USB interface (host)	18	Hard disk lock
19	Pluggable disk enclosure	-	-

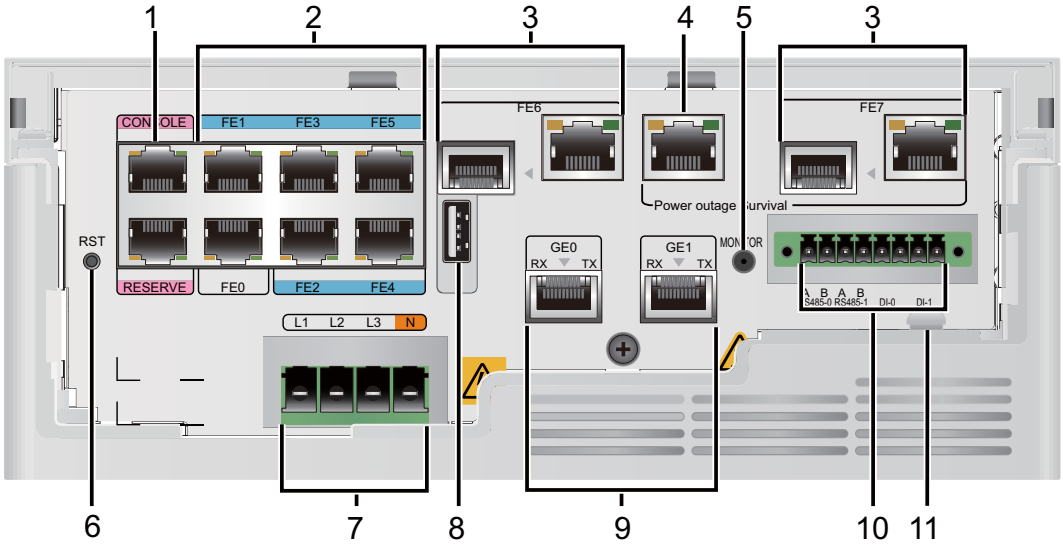
4.3 AR530 Series

4.3.1 AR531-2C-H

Appearance and Structure

Figure 4-19 shows the panel of the AR531-2C-H router.

Figure 4-19 AR531-2C-H panel



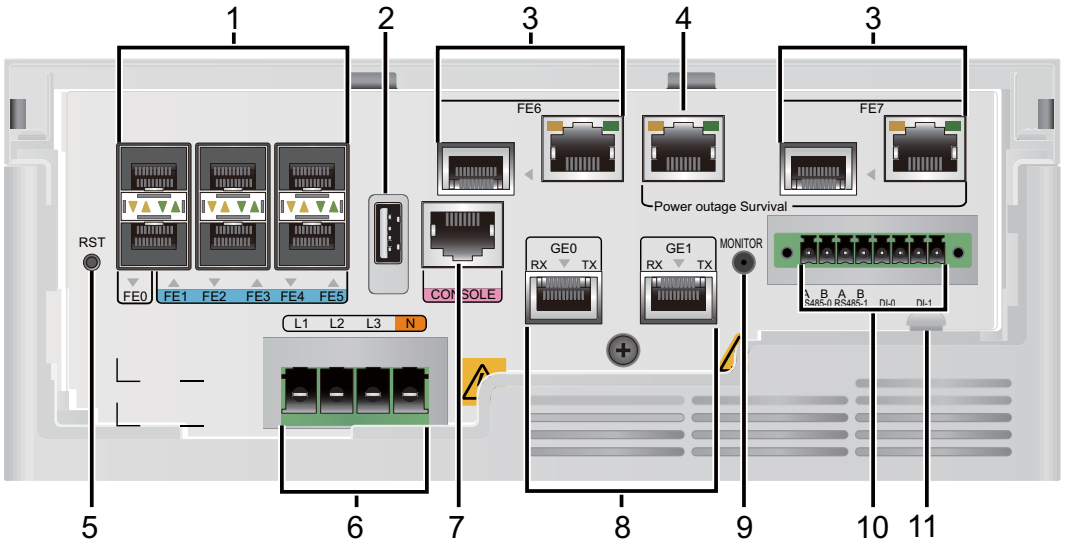
1	Console interface **NOTE** The interface marked RESERVE is a reserved console interface.	2	LAN interfaces: six FE electrical interfaces **NOTE** FE0 can be configured as a WAN interface.
3	FE combo interface	4	Power outage survival interface **NOTE** It is the survival interface for FE7 combo interface.
5	Cover open sensor	6	RST **NOTICE** This button is used to reset the router. ● To restore the factory settings, hold down the button for 10 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.
7	AC power socket **NOTE** It is connected to an AC power supply device using a 4-pin AC power cable.	8	USB interface
9	Two GE optical interfaces **NOTE** The two interfaces GE0 and GE1 can be used as WAN interfaces.	10	Two RS485 interfaces and two DI interfaces **NOTE** ● RS485 interfaces: connected to meters or other devices with RS485 interfaces ● DI interfaces: connected to digital input devices
11	Ground point **NOTE** The router must be reliably grounded using a ground cable to protect the router from lightning and electromagnetic interference.	-	-

4.3.2 AR531-F2C-H

Appearance and Structure

Figure 4-20 shows the panel of the AR531-F2C-H.

Figure 4-20 AR531-F2C-H panel



1	LAN interfaces: six FE optical interfaces	2	USB interface
3	FE combo interface	4	Power outage survival interface **NOTE** It is the survival interface for FE7 combo interface.
5	RST **NOTICE** This button is used to reset the router. ● To restore the factory settings, hold down the button for 10 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	6	AC power socket **NOTE** It is connected to an AC power supply device using a 4-pin AC power cable.
7	Console interface **NOTE** The interface marked RESERVE is a reserved console interface.	8	Two GE optical interfaces **NOTE** The two interfaces GE0 and GE1 can be used as WAN interfaces.
9	Cover open sensor	10	Two RS485 interfaces and two DI interfaces **NOTE** ● RS485 interfaces: connected to meters or other devices with RS485 interfaces ● DI interfaces: connected to digital input devices

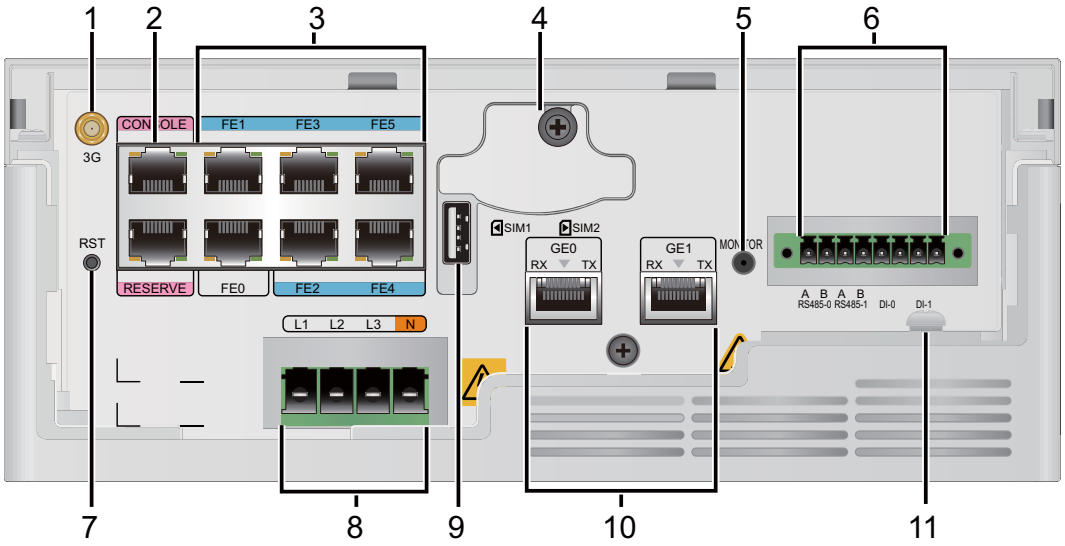
11	Ground point **NOTE** The router must be reliably grounded using a ground cable to protect the router from lightning and electromagnetic interference.	-	-

4.3.3 AR531GPe-U-H

Appearance and Structure

Figure 4-21 shows the panel of the AR531GPe-U-H.

Figure 4-21 AR531GPe-U-H panel



1	3G antenna interface	2	Console interface **NOTE** The interface marked RESERVE is a reserved console interface.
3	LAN interfaces: six FE electrical interfaces **NOTE** FE0 can be configured as a WAN interface.	4	Double SIM card slots **NOTE** ● The router supports double-card single-standby. ● Industrial SIM cards are recommended for the router. If only one SIM card needs to be installed, install it in slot SIM1.

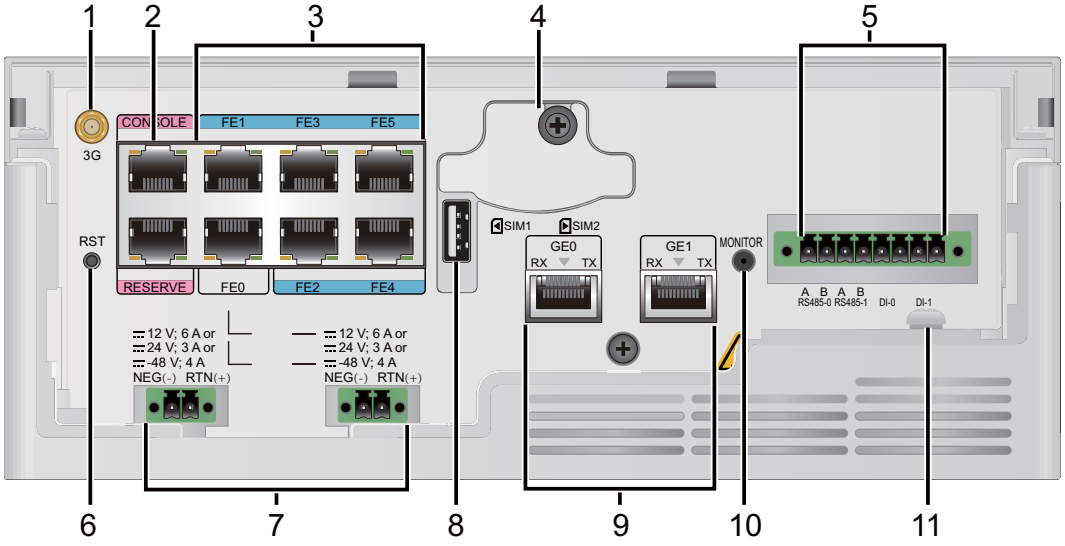
5	Cover open sensor	6	Two RS485 interfaces and two DI interfaces **NOTE** ● RS485 interfaces: connected to meters or other devices with RS485 interfaces ● DI interfaces: connected to digital input devices
7	RST **NOTICE** This button is used to reset the router. ● To restore the factory settings, hold down the button for 10 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.	8	AC power socket **NOTE** ● It is connected to an AC power supply device using a 4-pin AC power cable. ● It can also be used as a PLC interface.
9	USB interface	10	Two GE optical interfaces **NOTE** The two interfaces GE0 and GE1 can be used as WAN interfaces.
11	Ground point **NOTE** The router must be reliably grounded using a ground cable to protect the router from lightning and electromagnetic interference.	-	-

4.3.4 AR531G-U-D-H

Appearance and Structure

Figure 4-22 shows the panel of the AR531G-U-D-H.

Figure 4-22 AR531G-U-D-H panel



1	3G antenna interface	2	Console interface **NOTE** The interface marked RESERVE is a reserved console interface.
3	LAN interfaces: six FE electrical interfaces **NOTE** FE0 can be configured as a WAN interface.	4	Double SIM card slots **NOTE** ● The router supports double-card single-standby. ● Industrial SIM cards are recommended for the router. If only one SIM card needs to be installed, install it in slot SIM1.
5	Two RS485 interfaces and two DI interfaces **NOTE** ● RS485 interfaces: connected to meters or other devices with RS485 interfaces ● DI interfaces: connected to digital input devices	6	Cover open sensor
7	Double DC power sockets **NOTE** ● The router can run normally when it receives power from either DC power socket. ● Each DC power socket is connected to a DC power supply device using a 2-pin DC power cable.	8	USB interface

9	Two GE optical interfaces **NOTE** The two interfaces GE0 and GE1 can be used as WAN interfaces.	10	RST **NOTICE** This button is used to reset the router. ● To restore the factory settings, hold down the button for 10 seconds. ● To reset the system, press the button. Resetting the router will interrupt services. Exercise caution when deciding to press this button.
11	Ground point **NOTE** The router must be reliably grounded using a ground cable to protect the router from lightning and electromagnetic interference.	-	-

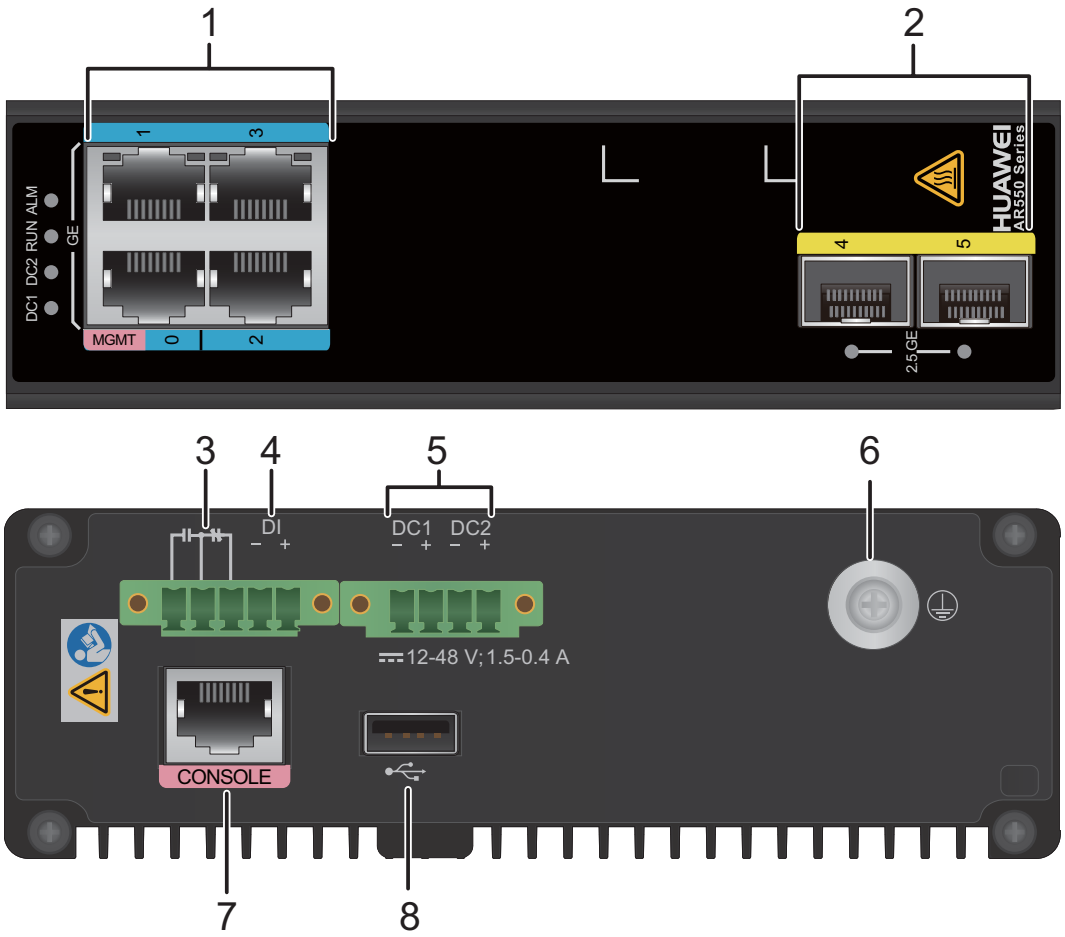
4.4 AR550 Series

4.4.1 AR550C-4GE

Appearance and Structure

Figure 4-23 shows the appearance of the AR550C-4GE router.

Figure 4-23 AR550C-4GE appearance



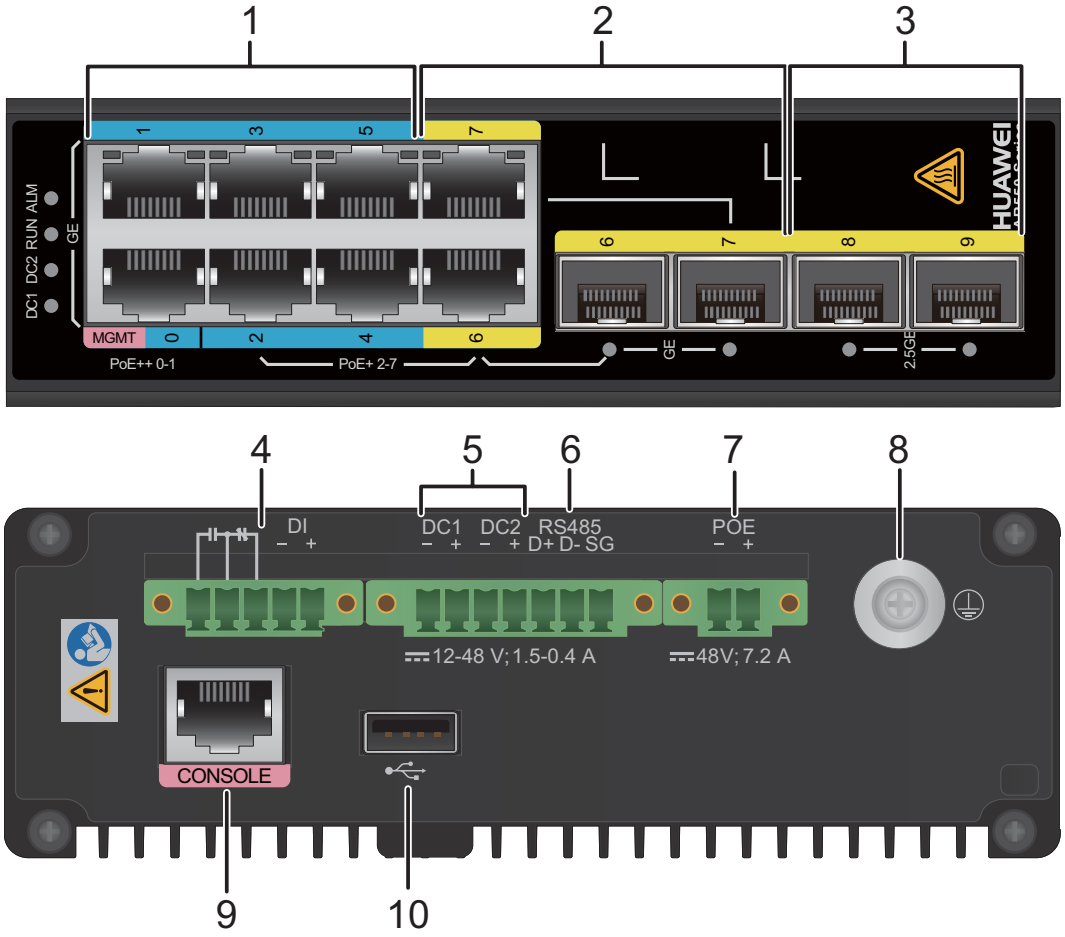
1	LAN interfaces: four GE electrical interfaces **NOTE** GE0 is a management interface and is used to upgrade the router.	2	WAN interfaces: two 2.5GE optical interfaces
3	DO interface	4	DI interface
5	Two DC power sockets	6	Ground point **NOTE** To protect the router from lightning and interference, reliably ground the router using a Ground Cable.
7	Console interface	8	USB interface

4.4.2 AR550C-2C6GE

Appearance and Structure

Figure 4-24 shows the appearance of the AR550C-2C6GE router.

Figure 4-24 AR550C-2C6GE appearance



1	LAN interfaces: six GE electrical interfaces **NOTE** ● GE0 is a management interface and is used to upgrade the router. ● Interfaces GE0 and GE1 support PoE++, and interfaces GE2 to GE5 support PoE +.	2	WAN interfaces: two GE combo interfaces **NOTE** Electrical interfaces GE6 and GE7 support PoE+.
3	WAN interfaces: two 2.5GE optical interfaces	4	DO interface and DI interface
5	Two DC power sockets	6	RS485 interface
7	PoE power socket	8	Ground point **NOTE** To protect the router from lightning and interference, reliably ground the router using a Ground Cable.
9	Console interface	10	USB interface

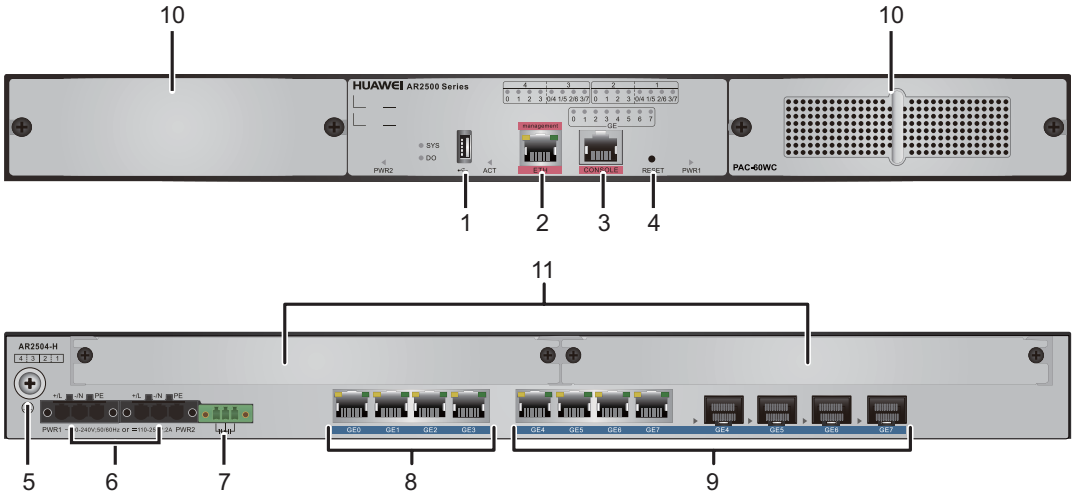
4.5 AR2500 Series

4.5.1 AR2504-H

Appearance and Structure

Figure 4-25 shows the panels of the AR2504-H router.

Figure 4-25 AR2504-H panels



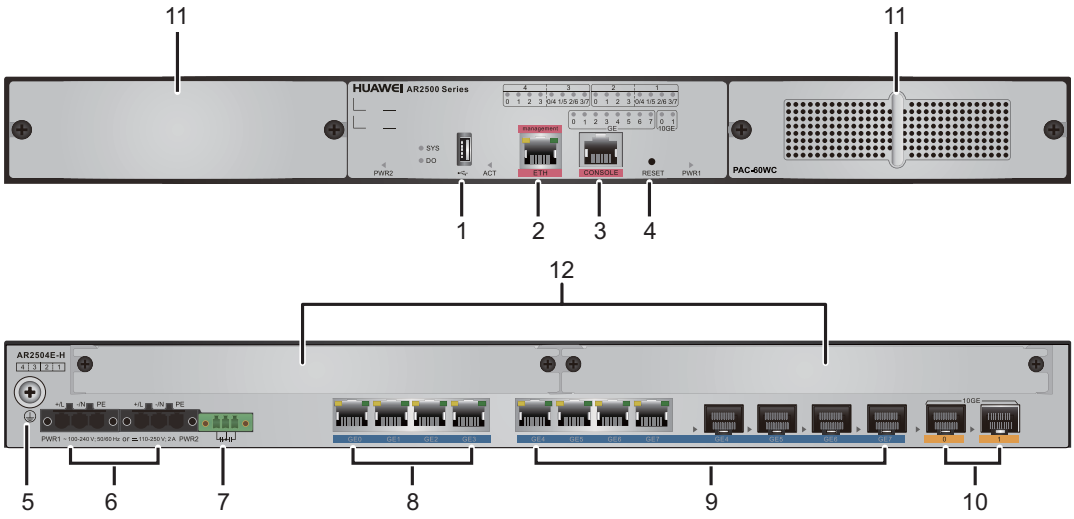
1	USB interface	2	ETH interface
3	Console interface	4	RST button **NOTE** ● This button is used to reset the router. ● Resetting the router will interrupt services. Exercise caution when deciding to press this button.
5	Ground point **NOTE** The router must be reliably grounded using a ground cable to protect the router from lightning and electromagnetic interference.	6	Two power sockets
7	DO interface	8	Four GE electrical interfaces
9	Four GE combo interfaces	10	Two power module slots
11	Two WSIC slots	-	-

4.5.2 AR2504E-H

Appearance and Structure

Figure 4-26 shows the panels of the AR2504E-H router.

Figure 4-26 AR2504E-H panels



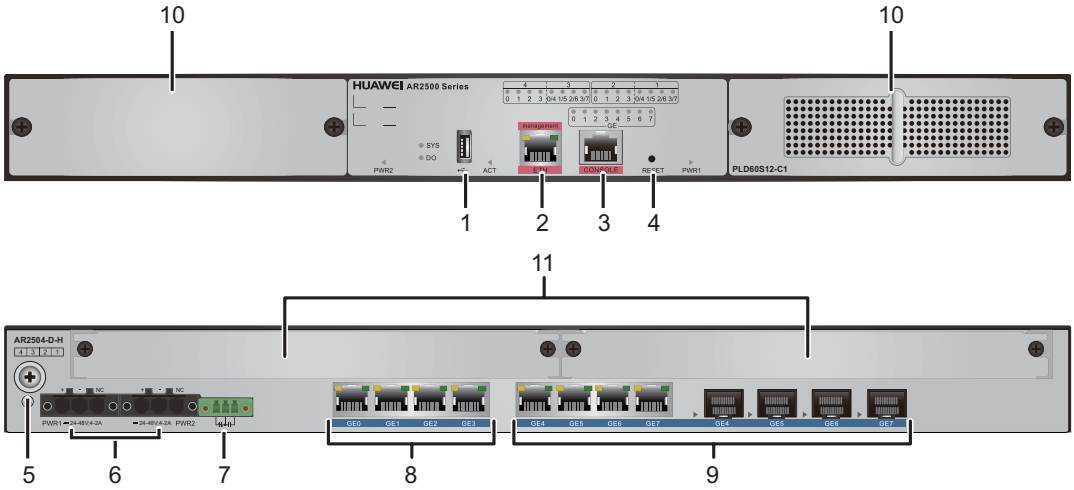
1	USB interface	2	ETH interface
3	Console interface	4	RST button
5	Ground point **NOTE** The router must be reliably grounded using a ground cable to protect the router from lightning and electromagnetic interference.	6	Two power sockets
7	DO interface	8	Four GE electrical interfaces
9	Four GE combo interfaces	10	Two 10GE optical interfaces
11	Two power module slots	12	Two WSIC slots

4.5.3 AR2504-D-H

Appearance and Structure

Figure 4-27 shows the appearance of the AR2504-D-H router.

Figure 4-27 AR2504-D-H appearance



1	USB interface	2	ETH interface
3	Console interface	4	RST **NOTE** This button is used to reset the router. ● Holding down the button for 10 seconds will restore the factory settings. ● Pressing the button will reset the system. Resetting the system will interrupt services. Exercise caution when performing this operation.
5	Ground point **NOTE** To protect the router from lightning and interference, reliably ground the router using a Ground Cable.	6	Two DC power sockets
7	DO interface	8	LAN interfaces: four GE electrical interfaces
9	LAN interfaces: four GE combo interfaces	10	Two power module slots Applicable power module: 60 W DC power module
11	Two WSIC slots	-	-

5 Maintenance and Management

About This Chapter

5.1 Various Maintenance Methods

5.1.1 Remote Deployment and Maintenance Using USB

As the network expands, more and more network devices are used and software commissioning costs increase. USB-based deployment does not require software commissioning, which reduces deployment costs.

Before using a USB flash drive to configure an AR, store software package and configuration files on the USB flash drive. Software engineers do not need to commission devices onsite. After installing the AR, hardware engineers will insert the USB flash drive into the USB interface on the AR and power on the AR. After being started, the AR automatically loads and upgrades the software.

5.1.2 SNMP-based Maintenance

The AR500&AR510&AR530&AR550&AR2500 supports the Simple Network Management Protocol (SNMP) v1/v2c/v3 and the Client/Server model. The device can be managed by the network management system (NMS), such as iManager U2000.

5.1.3 CLI-based Maintenance

The AR500&AR510&AR530&AR550&AR2500 provides the command line mode for local or remote maintenance:

- Local maintenance using the console interface
- Local or remote maintenance using Telnet
- Secure shell (SSH) maintenance: guarantees security and provides authentication for login users on an insecure network, and defends against various attacks, including IP address spoofing, plain text password interception, and denial of service (DoS).

5.2 Fault Location

5.2.1 Device Fault Location

The AR500&AR510&AR530&AR550&AR2500 support the following functions to locate device faults:

- Information center

  After detecting a service error or recovery event, the AR500&AR510&AR530&AR550&AR2500 provides unified management of logs, traps, and debugging information, and redirects information to different directions for fault location.
- Fast information collection

A system administrator can use **display diagnostic-information** to collect device fault information.

- Device monitoring

  The AR500&AR510&AR530&AR550&AR2500 can monitor key indexes and components such as the voltage, temperature, power supply, and card. In addition, the AR500&AR510&AR530&AR550&AR2500 can send a trap if an error occurs.

5.2.2 Routing Service Fault Location

The AR500&AR510&AR530&AR550&AR2500 supports the following functions to locate service faults:

- Locating Ethernet interface faults

  The AR500&AR510&AR530&AR550&AR2500 supports interface status display, line tests, and loopback tests on interfaces. The AR500&AR510&AR530&AR550&AR2500 tests packet sending and receiving on interfaces and collects packet statistics, which helps you locate network faults and Ethernet interface connection faults.

- Network-side interface faults

  The AR500&AR510&AR530&AR550&AR2500 supports WAN interface tests, which collect traffic statistics and event statistics on WAN interfaces and perform tests such as interface loopback. These tests help network administrators rapidly locate network-side interface interconnection problems.

- Port mirroring and traffic mirroring

  The AR500&AR510&AR530&AR550&AR2500 supports packet mirroring on Ethernet interfaces, mirrors packets from a network-side interface to a user-side Ethernet interface, and mirrors protocol packets sent to the CPU.

- Connection faults

  The AR500&AR510&AR530&AR550&AR2500 tests connections and displays the connection status on network-side interfaces, and collects connection statistics.

6 Industry Standards

This section describes AR500&AR510&AR530&AR550&AR2500 industry standards.

The AR500&AR510&AR530&AR550&AR2500 complies with the following industry standards:

- IEC 62056-47
- IEC 62056-53
- IEC 62056-61
- IEC 62056-62
- PRIME
- UPA DHS
- OPERA

7 Technical Specifications

About This Chapter

7.1 AR500 Series

7.1.1 AR502EG-L

Technical Specifications

Table 7-1 lists technical specifications of the AR502EG-L router.

Table 7-1 AR502EG-L technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	150 mm x 100 mm x 44 mm (5.91 in. x 3.94 in. x 1.73 in.)
Weight	0.85 kg (1.87 lb)
Power consumption	
Maximum power consumption	8 W
Power specifications	
DC power input	● Rated voltage: 12 V DC/24 V DC ● Maximum voltage range: 8 V DC to 36 V DC
DI/DO interface parameter	Voltage level standard: LVTTL
Interface density	
Management interfaces	1
USB interfaces	1
Service interfaces	LAN interfaces: two GE electrical interfaces WAN interfaces: two LTE antenna interfaces Industrial service interfaces: RS485/RS422, RS232, and DI/DO interfaces
Environment parameters	

Item	Specification
Operating temperature	● Operating at maximum LTE transmit power: -25°C to +65°C (-13°F to +149°F) ● Operating at typical LTE transmit power: -25°C to +70°C (-13°F to +158°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010307

7.1.2 AR502EGW-L

Technical Specifications

Table 7-2 lists technical specifications of the AR502EGW-L router.

Table 7-2 AR502EGW-L technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	150 mm x 100 mm x 44 mm (5.91 in. x 3.94 in. x 1.73 in.)
Weight	0.85 kg (1.87 lb)
Power consumption	
Maximum power consumption	8 W
Power specifications	
DC power input	● Rated voltage: 12 V DC/24 V DC ● Maximum voltage range: 8 V DC to 36 V DC
DI/DO interface parameter	Voltage level standard: LVTTL
Interface density	

Item	Specification
Management interfaces	1
USB interfaces	1
Service interfaces	LAN interfaces: two GE electrical interfaces and one Wi-Fi antenna interface WAN interfaces: two LTE antenna interfaces Industrial service interfaces: RS485/RS422, RS232, and DI/DO interfaces
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	-10°C to +70°C (+14°F to +158°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010309

7.1.3 AR502CG-L

Technical Specifications

Table 7-3 lists technical specifications of the AR502CG-L router.

Table 7-3 AR502CG-L technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	150 mm x 100 mm x 44 mm (5.91 in. x 3.94 in. x 1.73 in.)
Weight	0.38 kg (0.84 lb)
Power consumption	
Maximum power consumption	8 W
Power specifications	

Item	Specification
DC power input	● Rated voltage: 12 V DC/24 V DC ● Maximum voltage range: 8 V DC to 36 V DC
Recommended specifications for self-provided power modules	● Rated output power: ≥8 W ● Operating temperature: -25°C to +70°C (-13°F to +158°F) ● Surge protection: 6 kV in both the differential mode and common mode, 1.2/50 us pulse
Interface density	
Management interfaces	1
USB interfaces	1
Service interfaces	LAN interfaces: two GE electrical interfaces, which can be used as WAN interfaces WAN interfaces: one LTE antenna interface Industrial service interface: CON/RS232 interface and DI/DO interface
Environment parameters	
Operating temperature	● Operating at maximum LTE transmit power: -25°C to +60°C (-13°F to +149°F) ● Operating at typical LTE transmit power: -25°C to +70°C (-13°F to +158°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010363

7.1.4 AR503GW-LM7

Technical Specifications

Table 7-4 lists technical specifications of the AR503GW-LM7 router.

Table 7-4 AR503GW-LM7 technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1 GHz
Memory	1 GB
Flash memory	256 MB
Micro SD card (default: sd1)	None
Hard disk	mSATA hard disk supported
Dimensions and weight	
Dimensions (W x D x H)	200 mm x 160 mm x 44 mm (7.87 in. x 6.30 in. x 1.73 in.)
Weight	1.4 kg (3.09 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V
Maximum input voltage (DC)	8 V to 36 V
Maximum output current	3 A
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	
Maximum power consumption	13 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	None
RS232 interfaces	1 (DB9)
USB 2.0 interfaces	1

Item	Specification
Service interfaces (standard configuration)	WAN interfaces: one GE electrical interface and two 3G/LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia service interface: one GPS antenna interface
Extended slots	Not supported
Environment parameters	
Operating temperature	0°C to +50°C (32°F to 122°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010236

7.1.5 AR503GW-LcM7

Technical Specifications

Table 7-5 lists technical specifications of the AR503GW-LcM7 router.

Table 7-5 AR503GW-LcM7 technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1 GHz
Memory	1 GB
Flash memory	256 MB
Micro SD card (default: sd1)	None
Hard disk	mSATA hard disk supported
Dimensions and weight	
Dimensions (W x D x H)	200 mm x 160 mm x 44 mm (7.87 in. x 6.30 in. x 1.73 in.)

Item	Specification
Weight	1.4 kg (3.09 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V
Maximum input voltage (DC)	8 V to 36 V
Maximum output current	3 A
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	
Maximum power consumption	13 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	None
RS232 interfaces	1 (DB9)
USB 2.0 interfaces	1
Service interfaces (standard configuration)	WAN interfaces: one GE electrical interface and two 3G/LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia service interface: one GPS/BDS antenna interface
Extended slots	Not supported
Environment parameters	
Operating temperature	0°C to +50°C (32°F to 122°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)

Item	Specification
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010278

7.1.6 AR503EDGW-Lc

Technical Specifications

Table 7-6 lists technical specifications of the AR503EDGW-Lc router.

Table 7-6 AR503EDGW-Lc technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1.2 GHz
Memory	1 GB
Flash Memory	512 MB
Micro SD card	Not supported
Hard disk	mSATA hard disk supported
Dimensions and weight	
Dimensions (W x D x H)	280 mm x 200 mm x 44.4 mm (11.02 in. x 7.87 in. x 1.75 in.)
Weight	2.6 kg (5.73 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V
Maximum input voltage (DC)	9 V to 36 V
RPS power supply	Not supported
PoE power supply	Supported (interfaces GE0 to GE3), 20 W power on each GE electrical interface
Power consumption	
Maximum power consumption	62 W

Item	Specification
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	1 (M12 interface)
Console interfaces	1 (MicroUSB interface)
USB 2.0 interfaces	1
Service interfaces	WAN interfaces: four LTE antenna interfaces LAN interfaces: three Wi-Fi antenna interfaces and four GE electrical interfaces Multimedia service interface: One GPS/BDS antenna interface
Extended slots	Not supported
Environment parameters	
Operating environment temperature	-10°C to +60°C (+14°F to +140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	02350TEB

7.1.7 AR509G-L-D-H

Technical Specifications

Table 7-7 lists technical specifications of the AR509G-L-D-H router.

Table 7-7 AR509G-L-D-H technical specification

Item	Specification
System parameters	

Item	Specification
Processor	Dual-core, 1 GHz
Memory	512 MB
Flash memory	512 MB
Micro SD card (default: sd1)	None
Hard disk	Not supported
Dimensions and weight	
Dimensions (W x D x H)	190 mm x 220 mm x 44 mm (7.5 in. x 8.7 in. x 1.73 in.)
Weight	1.52 kg (3.35 lb)
Power specifications	
Rated input voltage (DC)	12 V
Maximum input voltage (DC)	10.8 V to 13.2 V
Maximum output current	1 A
RPS power supply	Not supported
PoE power supply	Supported
Power consumption	
Maximum power consumption	12 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	1 (RJ45)
CON/RS232 Interface	1 (RJ45)
USB 2.0 interfaces	1

Item	Specification
Service interfaces (standard configuration)	WAN interfaces: one GE electrical interface, one VDSL interface and two LTE antenna interfaces LAN interfaces: four GE electrical interfaces
Extended slots	Not supported
Environment parameters	
Operating temperature	● PoE power supply used: 0°C to +40°C (32°F to 104°F) ● PoE power supply not used: -25°C to +60°C (-13°F to +140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010221

7.1.8 AR509G-Lc

Technical Specifications

Table 7-8 lists technical specifications of the AR509G-Lc router.

Table 7-8 AR509G-Lc technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1 GHz
Memory	512 MB
Flash memory	512 MB
Micro SD card (default sd1)	None
Hard disk	Not supported
Dimensions and weight	
Dimensions (W x D x H)	190 mm x 220 mm x 44 mm (7.5 in. x 8.7 in. x 1.7 in.)

Item	Specification
Weight	1.52 kg (3.35 lb)
Power specifications	
Rated input voltage (DC)	12 V
Maximum input voltage (DC)	10.8 V to 13.2 V
Maximum output current	1 A
RPS power supply	Not supported
PoE power supply	Supported
Power consumption	
Maximum power consumption	12 W
Heat dissipation	
Fan module	None
Airflow	N/A
Interface density	
Management interfaces	1 (RJ45)
CON/RS232 interfaces	1 (RJ45)
USB 2.0 interfaces	1
Service interfaces (standard configuration)	WAN interfaces: one GE electrical interface, one VDSL interface, and two LTE antenna interfaces LAN interfaces: four GE electrical interfaces
Extended slots	Not supported
Environment parameters	
Operating environment temperature	● PoE power supply used: 0°C to +40°C (32°F to 104°F) ● PoE power supply not used: -25°C to +60°C (-13°F to +140°F) **NOTE** When the altitude is between 1800 m (5905 ft.) and 5000 m (16404 ft.), the highest operating temperature reduces by 1°C every time the altitude increases by 220 m (722 ft.).
Storage temperature	-40°C to +85°C (-40°F to +185°F)

Item	Specification
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010297

7.1.9 AR509CG-Lc

Technical Specifications

Table 7-9 lists technical specifications of the AR509CG-Lc router.

Table 7-9 AR509CG-Lc technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	150 mm x 100 mm x 44 mm (5.91 in. x 3.94 in. x 1.73 in.)
Weight	0.85 kg (1.87 lb)
Power consumption	
Maximum power consumption	8 W
Power specifications	
DC power input	● Rated voltage: 12 V DC/24 V DC ● Maximum voltage range: 8 V DC to 36 V DC
Interface density	
Management interfaces	1
USB interfaces	1

Item	Specification
Service interfaces	LAN interfaces: four GE electrical interfaces WAN interfaces: two LTE antenna interfaces Industrial service interface: CON/RS232 interface
Environment parameters	
Operating temperature	● Operating at maximum LTE transmit power: -25°C to +65°C (-13°F to +149°F) ● Operating at typical LTE transmit power: -25°C to +70°C (-13°F to +158°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010329

7.1.10 AR509CG-Lt

Technical Specifications

Table 7-10 lists technical specifications of the AR509CG-Lt router.

Table 7-10 AR509CG-Lt technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	150 mm x 100 mm x 44 mm (5.91 in. x 3.94 in. x 1.73 in.)
Weight	0.85 kg (1.87 lb)
Power consumption	
Maximum power consumption	8 W

Item	Specification
Power specifications	
DC power input	● Rated voltage: 12 V DC/24 V DC ● Maximum voltage range: 8 V DC to 36 V DC
DI/DO interface parameter	Voltage level standard: LVTTL
Interface density	
Management interfaces	1
USB interfaces	1
Service interfaces	LAN interfaces: four GE electrical interfaces WAN interfaces: two LTE antenna interfaces Industrial service interface: CON/RS232 interface
Environment parameters	
Operating temperature	● Operating at maximum LTE transmit power: -25°C to +65°C (-13°F to +149°F) ● Operating at typical LTE transmit power: -25°C to +70°C (-13°F to +158°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010311

7.1.11 AR503EQGW-L

Technical Specifications

Table 7-11 lists technical specifications of the AR503EQGW-L router.

Table 7-11 AR503EQGW-L routers technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1.2 GHz

Item	Specification
Memory	1 GB
Flash memory	512 MB
Micro SD card	Not supported
Hard disk	mSATA hard disk not supported
Dimensions and weight	
Dimensions (W x D x H)	280 mm x 200 mm x 44.4 mm (11.0 in. x 7.9 in. x 1.75 in.)
Weight	2.7 kg (5.95 lb)
Power specifications	
Rated input voltage (DC)	100 V to 110 V
Maximum input voltage (DC)	110 V
RPS power supply	Not supported
PoE power supply	Supported on GE electrical interfaces GE0 to GE3, with a maximum of 30 W power on each interface
Power consumption	
Maximum power consumption	65 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	1 (M12)
Console interface	1 (MicroUSB)
USB 2.0 interfaces	1
Service interfaces	WAN interfaces: eight LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces and four GE electrical interfaces Multimedia service interface: One GPS/BDS antenna interface
Extended slots	Not supported
Environment parameters	

Item	Specification
Operating temperature	-10°C to +70°C (14°F to 158°F) (PoE not enabled) -10°C to +60°C (14°F to 140°F) (PoE enabled) **NOTE** When the altitude is 1800 m-5000 m (5096 ft-16404 ft.), the highest operating temperature reduces by 1°C (1.8°F) every time the altitude increases by 220 m (722 ft.).
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	02350UGC

7.1.12 AR503EW

Technical Specifications

Table 7-12 lists technical specifications of the AR503EW router.

Table 7-12 AR503EW technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1.2 GHz
Memory	1 GB
Flash memory	512 MB
Micro SD card	Not supported
Hard disk	mSATA hard disk supported
Dimensions and weight	
Dimensions (W x D x H)	280 mm x 200 mm x 44.4 mm (11.0 in. x 7.9 in. x 1.75 in.)
Weight	2.6 kg (5.73 lb)
Power specifications	
Rated input voltage (DC)	100 V to 110 V

Item	Specification
Maximum input voltage (DC)	110 V
RPS power supply	Not supported
PoE power supply	Supported on GE electrical interfaces GE0 to GE3, with a maximum of 30 W power on each interface
Power consumption	
Maximum power consumption	55 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	1 (M12)
Console interface	1 (MicroUSB)
USB 2.0 interfaces	1
Service interfaces	LAN interfaces: three Wi-Fi antenna interfaces and four GE electrical interfaces
Extended slots	Not supported
Environment parameters	
Operating temperature	-10°C to +70°C (14°F to 158°F) (PoE not enabled) -10°C to +65°C (14°F to 149°F) (PoE enabled) **NOTE** When the altitude is 1800 m-5000 m (5096 ft-16404 ft.), the highest operating temperature reduces by 1°C (1.8°F) every time the altitude increases by 220 m (722 ft.).
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	02350UGD

7.2 AR510 series

7.2.1 AR511GW-LAV2M3

Technical Specifications

Table 7-13 lists technical specifications of the AR511GW-LAV2M3 router.

Table 7-13 AR511GW-LAV2M3 technical specifications

Item	Specification
System parameters	
Processor	Quad-core, 1.2 GHz
Memory	2 GB
Nand flash memory	2 GB
EMMC flash memory	4 GB
Micro SD card (default: sd1)	None
Hard disk	Not supported
Dimensions and weight	
Dimensions (W x D x H)	275.0 mm x 160.0 mm x 30.0 mm (10.8 in. x 6.3 in. x 1.2 in.)
Weight	1.3 kg (2.87 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V **NOTE** The router has two power terminals for DC power supply and supports power supply control using a power key.
Maximum input voltage (DC)	8 V DC to 36 V DC
Maximum output current	4A
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	

Item	Specification
Maximum power consumption	30 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	None
Console interfaces	1 (Micro USB)
USB 2.0 interfaces	1
Service interfaces (standard configuration)	WAN interfaces: two GE electrical interfaces and two 3G/LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia service interfaces: one GPS antenna interface, one audio interface, and two video interfaces
Extended slots	Not supported
Environment parameters	
Operating temperature	-10°C to +60°C (14°F to 140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010176

7.2.2 AR511CGW-LAV2M3

Technical Specifications

Table 7-14 lists technical specifications of the AR511CGW-LAV2M3 router.

Table 7-14 AR511CGW-LAV2M3 technical specifications

Item	Specification
System parameters	
Processor	Quad-core, 1.2 GHz
Memory	2 GB
Nand flash memory	1 GB
EMMC flash memory	4 GB
Micro SD card (default: sd1)	None
Hard disk	Not supported
Dimensions and weight	
Dimensions (W x D x H)	275.0 mm x 160.0 mm x 30.0 mm (10.8 in. x 6.3 in. x 1.2 in.)
Weight	1.3 kg (2.87 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V **NOTE** The router has two power terminals for DC power supply and supports power supply control using a power key.
Maximum input voltage (DC)	8 V DC to 36 V DC
Maximum output current	4A
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	
Maximum power consumption	30 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	

Item	Specification
Management interfaces	None
Console interfaces	1 (Micro USB)
USB 2.0 interfaces	1
Service interfaces (standard configuration)	WAN interfaces: two GE electrical interfaces and two 3G/LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia service interfaces: one GPS antenna interface, one audio interface, and two video interfaces
Extended slots	Not supported
Environment parameters	
Operating temperature	-10°C to +60°C (14°F to 140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010279

7.2.3 AR511GW-LM7

Technical Specifications

Table 7-15 lists technical specifications of the AR511GW-LM7 router.

Table 7-15 AR511GW-LM7 technical specifications

Item	Specification
System parameters	
Processor	Quad-core, 1.2 GHz
Memory	2 GB
Nand flash memory	2 GB

Item	Specification
EMMC flash memory	4 GB
Micro SD card (default: sd1)	None
Hard disk	Supported
Dimensions and weight	
Dimensions (W x D x H)	275.0 mm x 160.0 mm x 30.0 mm (10.8 in. x 6.3 in. x 1.2 in.)
Weight	1.3 kg (2.87 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V **NOTE** The router has two power terminals for DC power supply and supports power supply control using a power key.
Maximum input voltage (DC)	8 V DC to 36 V DC
Maximum output current	4 A
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	
Maximum power consumption	25 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	None
Console interfaces	1 (Micro USB)
USB 2.0 interfaces	1

Item	Specification
Service interfaces (standard configuration)	WAN interfaces: one GE electrical interface and two 3G/LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia interface: mSATA interface
Extended slots	Not supported
Environment parameters	
Operating temperature	0°C to +50°C (32°F to 122°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010193

7.2.4 AR511GW-L-B3

Technical Specifications

Table 7-16 lists technical specifications of the AR511GW-L-B3 router.

Table 7-16 AR511GW-L-B3 technical specifications

Item	Specification
System parameters	
Processor	Quad-core, 1.2 GHz
Memory	2 GB
Nand flash memory	1 GB
EMMC flash memory	4 GB
Micro SD card (default: sd1)	None
Hard disk	Not supported
Dimensions and weight	

Item	Specification
Dimensions (W x D x H)	275.0 mm x 160.0 mm x 30.0 mm (10.8 in. x 6.3 in. x 1.2 in.)
Weight	1.3 kg (2.87 lb)
Power specifications	
Rated input voltage (DC)	12 V/24 V **NOTE** The router has two power terminals for DC power supply and supports power supply control using a power key.
Maximum input voltage (DC)	8 V DC to 36 V DC
Maximum output current	4 A
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	
Maximum power consumption	30 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	None
Console interfaces	1 (Micro USB)
USB 2.0 interfaces	1
Service interfaces (standard configuration)	WAN interfaces: one GE electrical interface and two 3G/LTE antenna interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia service interfaces: one GPS antenna interface, one audio interface, two video interfaces, and one DTMB interface
Extended slots	Not supported
Environment parameters	

Item	Specification
Operating temperature	-10°C to +60°C (14°F to 140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010177

7.2.5 AR513W-V3M8

Technical Specifications

Table 7-17 lists technical specifications of the AR513W-V3M8 router.

Table 7-17 AR513W-V3M8 technical specifications

Item	Specification
System parameters	
Processor	Quad-core, 1.2 GHz
Memory	2 GB
Nand flash memory	1 GB
EMMC flash memory	4 GB
Micro SD card (default: sd1)	None
Hard disk	Supported
Dimensions and weight	
Dimensions (W x D x H)	275.0 mm x 180.0 mm x 40.0 mm (10.9 in. x 7.1 in. x 1.6 in.)
Weight	2.3 kg (5.07 lb)
Power specifications	
Rated input voltage (DC)	12 V

Item	Specification
Maximum input voltage (DC)	11.4 V DC to 12.6 V DC
Maximum output current	5 A
Maximum output power	60 W
RPS power supply	Not supported
PoE power supply	Not supported
Power consumption	
Maximum power consumption	30 W
Heat dissipation	
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	None
Console interfaces	1 (Micro USB)
USB 2.0 interfaces	3
Service interfaces (standard configuration)	WAN interfaces: two GE electrical interfaces LAN interfaces: two Wi-Fi antenna interfaces Multimedia service interfaces: one DI/O interface, one VGA interface, two HDMI interfaces, and one eSATA hard disk interface
Extended slots	Not supported
Environment parameters	
Operating temperature	-10°C to +60°C (14°F to 140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)

Item	Specification
Part number	02350CQL

7.2.6 AR515GW-LM9-D

Technical Specifications

Table 7-18 lists technical specifications of the AR515GW-LM9-D routers.

Table 7-18 AR515GW-LM9-D series routers technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 1 GHz
Memory	512 MB
Nand flash memory	512 MB
Micro SD card	None
Hard disk	Supported
Dimensions and weight	
Dimensions (W x D x H)	406.0 mm x 270.0 mm x 68.0 mm (15.98 in. x 10.63 in. x 2.68 in.)
Weight	6.9 kg
Power	
Rated input voltage (DC)	24 V
Maximum input voltage (DC)	10.8 V DC to 36 V DC
RPS	Not supported
PoE	Not supported
Power consumption	
Maximum power consumption	72 W **NOTE** The maximum power consumption is 42 W and the output voltage is 30W (12 V, 2.5 A).
Heat dissipation	

Item	Specification
Fans	None
Airflow (facing the front panel)	None
Interface density	
Management interfaces	1 (M12)
Console interfaces	1 (DB9)
USB 2.0 interfaces	3
USB 3.0 interfaces	1
Service interfaces (standard configuration)	WAN interfaces: 4 GE electrical, 2 LTE LAN interfaces: 2 Wi-Fi, 1 GPS, 4 GE electrical Multimedia service interfaces: 1 earphone jack, 1 microphone jack, 1 HDMI, 1 VGA, 1 pluggable hard disk cartridge
Extended slots	Not supported
Environment	
Operating temperature	● With a Hard Disk Drive (HDD) installed: 0°C to +45°C (32°F to 113°F) ● With a Solid State Drives (SSD) installed: －25°C to +60°C (-13°F to 140°F) ● With no hard disk installed: －25°C to +60°C (-13°F to 140°F) **NOTE** When the altitude is between 1800 m and 5000 m, the operating temperature reduces by 1°C every time the altitude increases 220 m.
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	50010246

7.3 AR530 Series

7.3.1 AR531-2C-H

Technical Specifications

Table 7-19 lists technical specifications of the AR531-2C-H router.

Table 7-19 AR531-2C-H technical specifications

Item	Description
System parameters	
Processor	Dual-core, 533 MHz
Memory	512 MB
Flash	512 MB
Dimensions and weight	
Dimensions (W x D x H)	220 mm x 250 mm x 88 mm (8.7 in. x 9.8 in. x 3.5 in.)
Weight	≤ 5 kg (11.0 lb)
Power consumption	
Maximum power consumption	17 W
Power specifications	
AC power input	● Rated voltage range: 100 V to 240 V (single-phase) or 345 V to 415 V (three-phase) ● Maximum voltage range: 90 V to 290 V (single-phase) or 304 V to 456 V (three-phase)
Interface density	
Console interfaces	2
USB 2.0 interfaces	1
RS485 interfaces	2
DI interfaces	2
Service interfaces (standard configuration)	● LAN interfaces: six FE electrical interfaces ● Two GE optical interfaces ● One FE combo interface
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	-40°C to +70°C (-40°F to +158°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	≤ 5000 m (16404 ft.)
Storage altitude	≤ 5000 m (16404 ft.)

Item	Description
Part number	50010172

7.3.2 AR531-F2C-H

Technical Specifications

Table 7-20 lists technical specifications of the AR531-F2C-H router.

Table 7-20 AR531-F2C-H technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 533 MHz
Memory	512 MB
Flash	512 MB
Dimensions and weight	
Dimensions (W x D x H)	220 mm x 250 mm x 88 mm (8.7 in. x 9.8 in. x 3.5 in.)
Weight	≤ 5 kg (11.0 lb)
Power consumption	
Maximum power consumption	21 W
Power specifications	
AC power input	● Rated voltage range: 100 V to 240 V (single-phase) or 345 V to 415 V (three-phase) ● Maximum voltage range: 90 V to 290 V (single-phase) or 304 V to 456 V (three-phase)
Interface density	
Console interfaces	2
USB 2.0 interfaces	1
RS485 interfaces	2
DI interface	2

Item	Specification
Service interfaces (standard configuration)	● LAN interfaces: six FE optical interfaces ● Two GE optical interfaces ● One FE combo interface
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	-40°C to +70°C (-40°F to +158°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	≤ 5000 m (16404 ft.)
Storage altitude	≤ 5000 m (16404 ft.)
Part number	50010173

7.3.3 AR531GPe-U-H

Technical Specifications

Table 7-21 lists technical specifications of the AR531GPe-U-H router.

Table 7-21 AR531GPe-U-H technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 533 MHz
Memory	512 MB
Flash	512 MB
Dimensions and weight	
Dimensions (W x D x H)	220 mm x 250 mm x 88 mm (8.7 in. x 9.8 in. x 3.5 in.)
Weight	≤ 5 kg (11.0 lb)
Power consumption	
Maximum power consumption	25.50 W
Power specifications	

Item	Specification
AC power input	● Rated voltage range: 100 V to 240 V (single-phase) or 345 V to 415 V (three-phase) ● Maximum voltage range: 90 V to 290 V (single-phase) or 304 V to 456 V (three-phase)
Interface density	
Console interfaces	2
USB 2.0 interfaces	1
RS485 interfaces	2
DI interfaces	2
3G antenna interfaces	1
Service interfaces (standard configuration)	● LAN interfaces: six FE electrical interfaces ● Two GE optical interfaces
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	-40°C to +60°C (-40°F to +140°F) **NOTE** If the router has been placed in a low-temperature environment (below -20°C) for more than 1.5 hours before they are powered on, the 3G module can work normally 20 minutes after startup.
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	≤ 5000 m (16404 ft.)
Storage altitude	≤ 5000 m (16404 ft.)
Part number	50010169

7.3.4 AR531G-U-D-H

Technical Specifications

Table 7-22 lists technical specifications of the AR531G-U-D-H.

Table 7-22 AR531G-U-D-H technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 533 MHz
Memory	512 MB
Flash	512 MB
Dimensions and weight	
Dimensions (W x D x H)	220 mm x 250 mm x 88 mm (8.7 in. x 9.8 in. x 3.5 in.)
Weight	≤ 5 kg (11.0 lb)
Power consumption	
Maximum power consumption	18.24 W
Power specifications	
DC power input	● Rated voltage: 12 V/24 V/-48 V ● Maximum voltage range: 9.6 V to 36 V; -38.4 V to -60 V
Interface density	
Console interfaces	2
USB 2.0 interfaces	1
RS485 interfaces	2
DI interfaces	2
3G antenna interfaces	1
Service interfaces (standard configuration)	● LAN interfaces: six FE electrical interfaces ● Two GE optical interfaces
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	--40°C to +60°C (-40°F to +140°F) **NOTE** If the router has been placed in a low-temperature environment (below -20°C) for more than 1.5 hours before they are powered on, the 3G module can work normally 20 minutes after startup.
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	≤ 5000 m (16404 ft.)

Item	Specification
Storage altitude	≤ 5000 m (16404 ft.)
Part number	50010171

7.4 AR550 Series

7.4.1 AR550C-4GE

Technical Specifications

Table 7-23 lists technical specifications of the AR550C-4GE router.

Table 7-23 AR550C-4GE technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	44 mm x 133 mm x 150 mm (1.73 in. x 5.24 in. x 5.91 in.)
Weight	1.5 kg (3.31 lb)
Power consumption	
Maximum power consumption	16.5 W
Power specifications	
DC power input	● Rated voltage: 12 V DC to 48 V DC ● Maximum voltage range: 9.6 V DC to 60 V DC
DO attributes	● Input withstand voltage: 60 V DC ● Current rating: 1.0 A
DI attributes	Rated voltage: 9.6 V DC to 60 V DC
Interface density	
Console interfaces	1
USB interfaces	1

Item	Specification
RS485 interfaces	1
DO interfaces	1
DI interfaces	1
Service interfaces	● LAN interfaces: four GE electrical interfaces ● WAN interfaces: two 2.5GE electrical interfaces
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	-40°C to +70°C (-40°F to +158°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	≤ 5000 m (16404 ft.)
Part number	50010300

7.4.2 AR550C-2C6GE

Technical Specifications

Table 7-24 lists technical specifications of the AR550C-2C6GE router.

Table 7-24 AR550C-2C6GE technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 700 MHz
Memory	256 MB
Flash memory	512 MB
Dimensions and weight	
Dimensions (W x D x H)	44 mm x 133 mm x 150 mm (1.73 in. x 5.24 in. x 5.91 in.)
Weight	1.1 kg (2.43 lb)
Power consumption	
Maximum power consumption	17.5 W
Power specifications	

Item	Specification
DC power input	● Rated voltage: 12 V DC to 48 V DC ● Maximum voltage range: 9.6 V DC to 60 V DC
DO attributes	● Input withstand voltage: 60 V DC ● Current rating: 1.0 A
DI attributes	Rated voltage: 9.6 V DC to 60 V DC
Interface density	
Console interfaces	1
USB interfaces	1
RS485 interfaces	1
DO interfaces	1
DI interfaces	1
Service interfaces	● LAN interfaces: six GE electrical interfaces ● WAN interfaces: two GE combo interfaces and two 2.5GE optical interface
Environment parameters	
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating temperature	-40°C to +70°C (-40°F to +158°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	≤ 5000 m (16404 ft.)
Storage altitude	≤ 5000 m (16404 ft.)
Part number	50010301

7.5 AR2500 Series

7.5.1 AR2504-H

Technical Specifications

Table 7-25 lists technical specifications of the AR2504-H router.

Table 7-25 AR2504-H technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 533 MHz
Memory	2 GB
Flash memory	512 MB
Dimensions (W x D x H)	● With no mounting bracket installed: 442.0 mm x 420.0 mm x 44.4 mm (17.4 in. x 17.4 in. x 1.7 in.) ● With mounting brackets installed: 482.0 mm x 420.0 mm x 44.4 mm (19.0 in. x 17.4 in. x 1.7 in.)
Weight (empty chassis)	7 kg (15.4 lb)
Power consumption (empty chassis)	
Typical power consumption	15 W
Maximum power consumption	25 W
Power specifications	
AC power input	● Rated voltage: 100 V AC to 240 V AC, 50/60 Hz ● Maximum voltage range: 90 V AC to 264 V AC, 47 Hz to 63 Hz
DC power input	● Rated voltage: 110 V DC to 250 V DC ● Maximum voltage range: 88 V DC to 300 V DC
Maximum output power	● One power module configured: 60 W ● Two power modules configured: 120 W
Interface density	
Console interfaces	1
USB 2.0 interfaces	1
DO interfaces	1
ETH interfaces	1
Service interfaces (standard configuration)	● Four GE electrical interfaces ● Four GE combo interfaces
Environment parameters	

Item	Specification
Operating environment temperature	-40°C to +65°C (-40°F to +149°F) **NOTE** In compliance with IEC60068-2-1-2007 and ETSI EN 300 019-2-3 V2.2.2:2003, the router can operate reliably for 24 hours in a temperature range of -40°C to +70°C (-40°F to +158F).
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	02350KKH

7.5.2 AR2504E-H

Technical Specifications

Table 7-26 lists technical specifications of the AR2504E-H router.

Table 7-26 AR2504E-H technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 533 MHz
Memory	2 GB
Flash memory	512 MB
Dimensions (W x D x H)	● With no mounting bracket installed: 442.0 mm x 420.0 mm x 44.4 mm (17.4 in. x 17.4 in. x 1.7 in.) ● With mounting brackets installed: 482.0 mm x 420.0 mm x 44.4 mm (19.0 in. x 17.4 in. x 1.7 in.)
Weight (empty chassis)	7 kg (15.4 lb)
Power consumption (empty chassis)	
Typical power consumption	20 W
Maximum power consumption	28 W
Power specifications	

Item	Specification
AC power input	● Rated voltage: 100 V AC to 240 V AC, 50/60 Hz ● Maximum voltage range: 90 V AC to 264 V AC, 47 Hz to 63 Hz
DC power input	● Rated voltage: 110 V DC to 250 V DC ● Maximum voltage range: 88 V DC to 300 V DC
Maximum output power	● One power module configured: 60 W ● Two power modules configured: 120 W
Interface density	
Console interfaces	1
USB 2.0 interfaces	1
DO interfaces	1
ETH interfaces	1
Service interfaces (standard configuration)	● Four GE electrical interfaces ● Four GE combo interfaces ● Two 10GE optical interfaces
Environment parameters	
Operating environment temperature	-40°C to +65°C (-40°F to +149°F) **NOTE** In compliance with IEC60068-2-1-2007 and ETSI EN 300 019-2-3 V2.2.2:2003, the router can operate reliably for 24 hours in a temperature range of -40°C to +70°C (-40°F to +158F).
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing
Operating altitude	< 5000 m (16404 ft.)
Part number	02350RBM

7.5.3 AR2504-D-H

Technical Specifications

Table 7-27 lists technical specifications of the AR2504-D-H router.

Table 7-27 AR2504-D-H technical specifications

Item	Specification
System parameters	
Processor	Dual-core, 533 MHz
Memory	2 GB
Flash memory	512 MB
Dimensions (W x D x H)	● With no mounting bracket installed: 442.0 mm x 420.0 mm x 44.4 mm (17.4 in. x 16.5 in. x 1.74 in.) ● With mounting brackets installed: 482.0 mm x 420.0 mm x 44.4 mm (18.98 in. x 16.5 in. x 1.74 in.)
Weight (empty chassis)	7 kg (15.43 lb)
Power consumption (empty chassis)	
Typical power consumption	15 W
Maximum power consumption	25 W
Power specifications	
DC power input	● Rated voltage range: 24 V DC to 48 V DC ● Maximum voltage range: 18 V DC to 60 V DC
Maximum output power	● One power module configured: 60 W ● Two power modules configured: 120 W
Interface density	
Console interfaces	1
USB 2.0 interfaces	1
DO interfaces	1
ETH interfaces	1
Service interfaces	LAN interfaces: four GE electrical interfaces and four GE combo interfaces
Environment parameters	
Operating temperature	-40°C to +60°C (-40°F to +140°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Operating relative humidity	5% to 95%, noncondensing

Item	Specification
Operating altitude	< 5000 m (16404 ft.)

8 Component Selection Guide

About This Chapter

8.1 Router Purchase List

Purchase list of AR500 series

Table 8-1 Purchase list of AR500 series

Component	Typical Configuration	Remarks
AR502EG-L	AR502EG-L, 1*RS485/RS422, 1*RS232, 1*DI/DO, 2*GE (10/100/1000M RJ45), LTE (dual SIM), 1*USB2.0, 8-36VDC	Mandatory
AR502EGW-L	AR502EGW-L, 1*RS485/RS422, 1*RS232, 1*DI/DO, 802.11abgn, 2*GE (10/100/1000M RJ45), LTE (dual SIM), 1*USB2.0, 8-36VDC	Mandatory
AR502CG-L	AR502CG-L, 1*RS232, 1*DI/1*DO, 2*GE (10/100/1000M RJ45), LTE, 1*USB2.0, 8-36VDC	Mandatory
AR503GW-LM7	AR503GW-LM7, 1*GE, Wi-Fi 2.4G+5G, LTE, 1*USB2.0, 1*mSATA, DC Input(8-36V)	Mandatory
AR503GW-LcM7	AR503GW-LcM7, 1*GE, Wi-Fi 2.4G+5G, LTE, 1*USB2.0, 1*mSATA, DC Input(8-36V)	Mandatory
AR503EDGW-Lc	AR503EDGW-Lc, 4*GE(M12), 3*3 MIMO Wifi(2.4G/5G Surpported), 1*USB, 2*LTE(Dual SIM Card Switch Surported), 1*GPS, DC Power Input(12V-24V)	Mandatory
AR509G-L-D-H	AR509G-L-D-H, 1GE WAN, 1VDSL WAN, 4GE LAN(POE+), LTE	Mandatory
AR509G-Lc	AR509G-Lc, 1GE WAN, 1VDSL WAN, 4GE LAN(POE+), LTE	Mandatory
AR509CG-Lc	AR509CG-Lc, 4GE LAN(1GE WAN), 1LTE	Mandatory
AR509CG-Lt	AR509CG-Lt, 1*RS232, 4*GE (10/100/1000M RJ45), LTE (dual SIM), 1*USB2.0, 8-36VDC	Mandatory
AR503EQGW-L	AR503EQGW-L, 4*GE(M12), 2*2 MIMO Wifi(2.4G/5G Surpported), 1*USB, 4*LTE(Dual SIM Card Switch Surported), 1*GPS/BDS, DC Power Input(100V-110V)	Mandatory
AR503EW	AR503EW, 4*GE(M12), 3*3 MIMO Wifi(2.4G/5G Surpported), 1*USB, DC Power Input(100V-110V)	Mandatory

Purchase list of AR510 series

Table 8-2 Purchase list of AR510 series

Component	Typical Configuration	Remarks
AR511GW-LAV2M3	AR511GW-LAV2M3, 2*GE, Wi-Fi 2.4G+5G, LTE, 2*Video Output(HDMI/CVBS/ YPbPr), 2*Audio Output +1*Audio Input, 2*USB2.0, 2*DC Input(8-36V)	Mandatory
AR511CGW-LAV2M3	AR511CGW-LAV2M3, 2*GE, Wi-Fi 2.4G+5G, LTE, 2*Video Output(HDMI/CVBS/ YPbPr), 2*Audio Output +1*Audio Input, 2*USB2.0, 2*DC Input(8-36V)	Mandatory
AR511GW-LM7	AR511GW-LM7, 1*GE, Wi-Fi 2.4G+5G, WCDMA, 2*USB2.0, 1*sata, 2*DC Input(8-36V)	Mandatory
AR511GW-L-B3	AR511GW-L-B3, 1*GE, Wi-Fi 2.4G+5G, LTE, DTMB, 2*Video Output(HDMI/CVBS/ YPbPr), 2*Audio Output +1*Audio Input, 2*USB2.0, 2*DC Input(8-36V)	Mandatory
AR513W-V3M8	AR513W-V3M8, 2*GE, 2*2 MIMO Wi-Fi(2.4G/5G supported), 3*Video Output(2*HDMI+1*VGA), 1*Audio Output, 1*eSATA, 1*DI/O, 3*USB+1*USB OTG, DC 12V Input	Mandatory
AR515GW-LM9-D	AR515GW-LM9-D, 4GE WAN, 4GE LAN, LTE, Wi-Fi 2.4G+5G, 3*USB2.0, 2*Video Output(1*HDMI +1*VGA), 1*3.5 Audio Output (earphone), 1*3.5 Audio Input (MIC)	Mandatory
LTE/GPS cable	LTE/GPS cable	Optional
AR510 Box Mount Angle	AR510 Box Mount Angle	Optional

Component	Typical Configuration	Remarks
AR510 Protection support	AR510 Protection support	Optional
GPS+LTE Antenna	GPS+LTE Antenna	Optional
Wi-Fi cable	3m Wi-Fi cable	Optional
Wi-Fi cable	0.5m Wi-Fi cable	Optional

Purchase list of AR530 series

Table 8-3 Purchase list of AR530 series

Component	Typical Configuration	Remarks
AR531-2C-H	AR531-2C-H, AC, 6 FE, 2 GE, 2 FE combo, 2 RS485, 2 DI	Mandatory
AR531-F2C-H	AR531-F2C-H, AC, 6 FE SFP, 2 GE, 2 FE combo, 2 RS485, 2 DI	Mandatory
AR531GPe-U-H	AR531GPe-U-H, AC, 6 FE, 2 GE, 3G (dual SIM), 2 RS485, 2 DI, PLC	Mandatory
AR531G-U-D-H	AR531G-U-D-H, 2 DC, 6 FE, 2 GE, 3G (dual SIM)	Mandatory

Purchase list of AR550 series

Table 8-4 Purchase list of AR550 series

Component	Typical Configuration	Remarks
AR550C-4GE	AR550C-4GE, 2 GE SFP WAN, 4 GE LAN, 1 DO, 1 DI, 1 RS485, 1 USB2.0, 2 POWER 9.6-60V	Mandatory
AR550C-2C6GE	AR550C-2C6GE, 2 SFP WAN 2.5GE, 2 GE LAN(POE++), 4 GE LAN(POE+), 2 GE COMBO WAN(POE+), 1 DO, 1 DI, 1 RS485, 1 USB2.0	Mandatory

Purchase list of AR2500 series

Table 8-5 Purchase list of AR2500 series

Component	Typical Configuration	Remarks
AR2504-H	AR2504-H, 8GE LAN(4GE Combo), 1 USB, 1 DO, 2 WSIC, 60W AC-DC POWER	Mandatory
AR2504E-H	AR2504E-H, 8GE LAN(4GE Combo), 2 10GE, 1 USB, 1 DO, 2 WSIC, 60W AC-DC POWER	Mandatory
AR2504-D-H	AR2504-D-H, 8GE LAN(4GE Combo), 1 USB, 1 DO, 2 WSIC, 60W DC POWER	Mandatory

8.2 Card Category

Table 8-6 lists the cards supported by AR routers.

Table 8-6 Card types supported by AR models

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight
Ethernet LAN interface card	8ES2G	8-port 1000BASE (RJ45) L2 Ethernet interface card (industry)	7 W	0.7 kg (1.54 lb)
	8ES2GS	8-port 1000BASE (SFP) L2 Ethernet interface card (industry)	11 W	0.7 kg (1.54 lb)
WAN interface card	8AS	8-Port Async Serial Port Interface Card	15.1 W	0.6 kg (1.32 lb)

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight
	1LTE-L-H	FDD/HSPA+ Industrial Data Card	7.3 W	0.58 kg (1.28 lb)