Y212-G / Y212-GWR Technical Manual





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1. Overview

This manual applies to the Y212-G 4G DTU and the Y212-GWR 4G plus Wi-Fi plus RJ45 industrial router. Both products use the same AT command system and can be configured directly through the serial port, SMS, or remote API, without a graphical configuration tool.

Unless otherwise noted, AT commands are shared by both models. Hardware-dependent baseline values in Sections 1 and 2 use the current Y212-G hardware reference; router-only features for Y212-GWR are listed separately in Section 10 and in the Y212-GWR specification.

Model	Uplink	Physical Interfaces
Y212-G	Qualcomm Cat.4 multi-mode 4G	RS232, RS485, TTL secondary UART, `2 x IO`, ADC
Y212-GWR	Qualcomm Cat.4 multi-mode 4G + Wi-Fi STA / AP + dual RJ45	RS232, RS485, optional TTL secondary UART, dual RJ45, Wi-Fi, `2 x IO` plus function pin IO3

Frame format: All serial commands use `9600-8-N-1` by default, plain ASCII text, and end with `\r\n`.

2. Default Settings

Parameter	Default
Serial Baud Rate	`9600 bps`
Data Bits / Parity / Stop Bits	`8 / None / 1`
4G Mode	Y212-G reference: Qualcomm Cat.4 with 2G / 3G fallback

Parameter	Default
4G Bands	Y212-G reference: GSM EGSM900/DCS1800; WCDMA B1/B8; CDMA2000 BC0; TD-SCDMA B34/B39; LTE-FDD B1/B3/B5/B8; LTE-TDD B34/B38/B39/B40/B41
Power Input	Y212-G reference: `6 to 28 VDC`, typical `12 V / 2 A`
Heartbeat	`60 s`, header `$$$`, `AT*HBTIME=60`, `AT*HBHEAD=$$$`
Registration Packet	Enabled, format `@@@ + DTUID`, `AT*REGPKG=1`
DTUID	Read from module IMEI by default

3. AT Command Conventions

- **Set command**: `AT*CMD=param1,...,paramN\r\n`, returns `OK` on success and `ERROR` on failure
- **Query command**: `AT*CMD?\r\n`, returns `+CMD:...` followed by `OK`
- Multiple commands can be sent in one batch, but a single command must not be split
- Operations protected by the system password require `AT*SYSPWD=<curr_pwd>` first

4. Server Connection and Online Strategy

4.1 Server Configuration, Required

Command	Description	Example
`AT*SERVERn=protocol,ip,port`	Configure server channel `n`, `0 to 5`. Protocol `0=TCP`, `1=UDP`, `8=HTTP`, `9=MQTT`, `10=Alibaba IoT`, `14=MQTTS`, `19=WebSocket`, and more	`AT*SERVER0=9,47.94.253.148,1883`

Command	Description	Example
`AT*SERVERn?`	Query the selected server channel	`AT*SERVER1?`

4.2 Online Mode, `AT*GPRSMODE`

Value	Mode	Description
`0`	Offline	No automatic connection
`1`	Always online, default	Auto reconnect on disconnect, heartbeat keepalive
`2`	Wake-up online	Goes online after a wake-up command or SMS and disconnects after idle timeout
`3`	On-demand online	Goes online when serial data arrives and disconnects after idle timeout
`4`	Scheduled online	Goes online periodically according to `AT*SCHTIME`

4.3 Multi-Center Connection, `AT*CHMODE`

- `0`: Primary center only
- `1`: Primary / backup switchover, default
- `2`: Primary and backup connected at the same time, dual send
- `3`: Independent primary and backup channels, use `SNDPORTn` and `RCVPORTn` to distinguish them

4.4 Access Point Name, APN

Use `AT*APN=apn,username,password`. For standard IoT SIM cards in China, `cmnet` or `cmiot` may be used. Private SIM cards should follow carrier requirements.

4.5 Heartbeat and Registration Packet

Command	Function and Notes
`AT*HBHEAD=<pattern>`	Set heartbeat header, supports `HEX`, `NID`, `FIX`, and wildcards such as `{DTUID}` or `{IMEI}`
`AT*HBTIME=<seconds>`	Heartbeat interval, `0 to 3600 s`, `0` disables it
`AT*REGHEAD=<text>`	Registration packet header, often used for backend identification
`AT*REGPKG=<mode>`	`0=off`, `1=header+DTUID`, default, `2=header only`, `3=hex`, `5=send registration packet to MQTT as well`

5. Serial Transparent Transmission and Packetization

Function	Command	Description
Inter-frame interval	`AT*DFI=<10~5000>`	Maximum inter-frame interval; when exceeded, the current frame is sent
Fixed frame length	`AT*DFLEN=<n>`	Send when received serial data reaches `n` bytes
Data mode	`AT*DATAMD=<0~3>`	`0=stream`, `1=frame`, `2=JSON packet`, `3=custom`
Append ID	`AT*DATAID=<0~4>`	Controls whether DTUID or time is attached to the report
HEX / string conversion	`AT*HEX2STR`, `AT*STR2HEX`	`0=off`, `1=on`
Header filter	`AT*DATAFLAG=...`	Transparently forwards only data matching specific headers; supports multiple headers with `&`

Function	Command	Description
Data compare	`AT*CMPDATA=<0~2>`	`1=drop duplicates`, `2=polling comparison`
Receive window	`AT*RXDTIME=schedule,time_long`	Periodically opens a receive window to reduce traffic
Hourly traffic limit	`AT*URFC=<KB>`	`0 to 1000 KB/h`
Buffer policy	`AT*BUFMODE=<0~2>`	Controls offline buffer retention policy
Buffer query	`AT*BUFLEN?`, `AT*BUFCLN`	Check or clear the buffer

6. Serial Parameters and Online Control

Command	Function
`AT*UART=baud,dataBits,parity,stopBits`	Set main serial port; use `AT*UARTB` for the secondary UART
`AT*WAKEUP`	Trigger online state in wake-up mode
`AT*OFFLINE`	Manually disconnect in on-demand or wake-up mode
`AT*IDLTIME=<5~3600>`	Auto-disconnect timeout with no data, valid for modes `2 / 3 / 4`
`AT*SCHTIME=<minutes>`	Online interval for scheduled mode

7. I/O and Analog Functions

Function	Command	Description
GPO output	`AT*GPO=no,mode`	`mode` : `0=low` , `1=high` , `3/4=pulse` , `5 to 8=indicator functions`
GPI input	`AT*GPI=mode,schedule,en1,en2`	`1=periodic report` , `2=change report` ; use `AT*GPI#` to query state
ADC sampling	`AT*ADC?`	Returns millivolt value, `0 to 8000 mV` , depending on model

8. Status Query and Maintenance

Command	Description
`AT*VERSION?`	Returns hardware and software version
`AT*LIST?`	Lists all current settings
`AT*CSQ?`	Queries cellular or Wi-Fi signal strength
`AT*GSTATE?`	Checks online state for each center channel
`AT*DSTATE?`	Checks runtime state such as no SIM, not registered, or low signal
`AT*DTUIP?`	Queries the current dial-up IP
`AT*REG?`	Returns registration status, LAC, and Cell ID
`AT*ICCID?` , `AT*IMEI?`	Query SIM and device identifiers
`AT*TIME?` , `AT*UTC?`	Query local and UTC time
`AT*SYSPWD=curr,new`	Change system password, `6 digits`
`AT*RESET=<pwd>`	Restore default parameters and reboot

Command	Description
`AT*RESTART`	Soft reboot

9. GNSS / LBS Positioning, Optional

Command	Description
`AT*GPSCFG=mode,period,lbs_enable`	`0=off`, `1=server only`, `2=serial only`, `3=both`, `4=on demand`; `period` in seconds; `lbs_enable=1` enables hybrid positioning
`AT*GPSINFO=<n>`	`0=GPRMC`, `1=GPGGA`, `2=both`
`AT*GMODE=<n>`	`0=multi-constellation`, `1=GPS`, `2=BeiDou`
`AT*GPSID=<0/1>`	Controls whether DTUID is added to the location message
`AT*GPSINFO?`	Returns the latest NMEA or LBRMC message
`AT*GSQ?`	Queries satellite count
`AT*LBS?`	Queries base-station positioning only
Modbus Read	Use `50 03 00 3D 00 04 D8 44` to read longitude and latitude as big-endian float values

> GNSS messages update every `5 s` by default. When `send_period=0`, the device reports once after the first position fix and then stops automatically.

10. Wi-Fi / RJ45 Router Extension, Y212-GWR Only

Function	Command	Description
Router / bridge mode	`AT*RMODE=<0/1>`	`0=router`, default; `1=bridge`

Function	Command	Description
Network environment	`AT*RNWK=<0/1/2>`	`0=local only`, `1=LAN`, `2=public`, default
Wi-Fi STA / AP	`AT*WSET=ssid,password,mode`	`mode=0` STA, `1` AP; `AT*WSET1/2` configures backup SSIDs
Current uplink	`AT*CNWK?`	Returns `0=offline`, `1=WAN`, `2=Wi-Fi`, `3=4G`
Client list	`AT*CLIST?`	Lists connected clients
Hotspot scan	`AT*WSCAN?`	Returns available SSIDs
Port 2 mode	`AT*WLAN=<0/1>`	`0=LAN`, `1=WAN`, default
LAN subnet	`AT*LANIP=ip`	Sets the internal gateway, default `192.168.77.1`
WAN static IP	`AT*WANIP=ip,mask[,gw]` or `DHCP`	Used for switch or fixed public network access
Wi-Fi STA static IP	`AT*WIFIIP=ip,mask,gw` or `DHCP`	Set a static address or use DHCP
MAC query	`AT*WMAC?` / `AT*WFMAC?` / `AT*LMAC?`	Query the WAN / Wi-Fi / LAN MAC address, respectively
Port forwarding	`AT*DNAT=index,sock_type,src_port,dest_ip,dest_port`	`sock_type=tcp / udp / none`

> On the current Y212-GWR hardware, port 1 is fixed as LAN and only port 2 is switchable between WAN and LAN. Reconnect the terminal after a subnet change. In AP mode, the password must be at least `8` characters long.

11. Troubleshooting

Symptom	Possible Cause	Suggested Command or Action
Cannot go online	Wrong server address or port, APN not configured, SIM not activated	`AT*SERVERn?`, `AT*APN?`, `AT*REG?`, `AT*CSQ?`
Serial port does not respond	Baud rate mismatch or system password not verified	`AT*UART?`, then send `AT*SYSPWD=<pwd>` before configuration
Data frames are malformed	Inter-frame interval or frame length not configured properly	Adjust `AT*DFI`, `AT*DFLEN`, and `AT*DATAMD`
Heartbeat or registration packet is not recognized by the cloud	Header format does not match	Check `AT*HBHEAD`, `AT*REGHEAD`, and `AT*REGPKG`
GNSS cannot get a fix	Antenna blocked or GNSS not enabled	Confirm `AT*GPSCFG` and check whether `AT*GPSINFO?` returns status `V`
Wi-Fi cannot connect, GWR only	Wrong mode or password, or subnet conflict	`AT*WSET?`, `AT*LANIP?`, `AT*CNWK?`

LED reference, Y212-GWR

LED	Status	Meaning
DATA	Blinking	Serial data activity
Server	On	Connected to center server
4G	On / `1 s` blink	Online / searching
Wi-Fi	On in STA / `1 s on, 2 s off` in AP	Connection status

LED	Status	Meaning
Network	Blinking	WAN active; blinking together with 4G or Wi-Fi means the device is searching