Y201-G Technical Manual



> Y201-G Specification

Contents

1. Overview
   - Hardware Wiring
2. Default Parameters
3. Serial Modes and Packetization
4. Data Transfer and Sockets
5. AT Command Conventions
6. AT Command Quick Reference
7. Modbus Polling and JSON Reporting
8. Maintenance, Upgrade, and Exception Handling

9. Troubleshooting

1. Overview

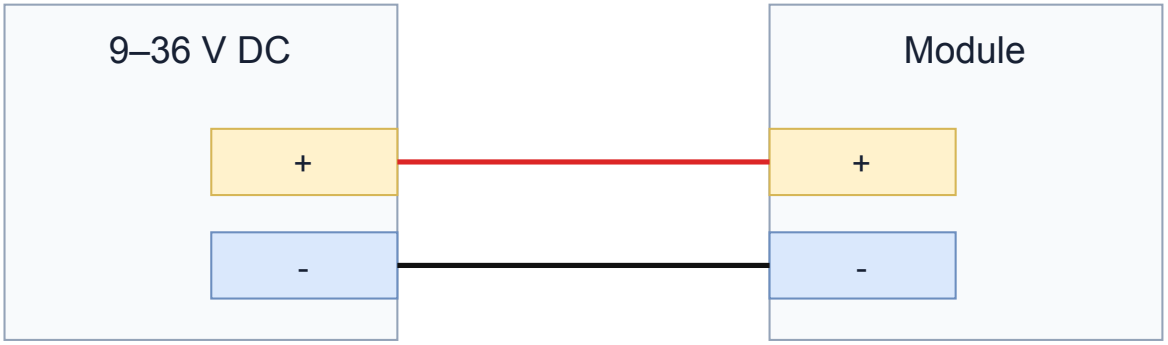
Y201-G is used for remote communication between serial devices and a `4G Cat.1` network. It supports TCP, UDP, HTTP, MQTT, peer-to-peer transmission, SMS transparent transmission, serial or network or SMS AT commands, and Modbus polling with JSON reporting.

Item	Description
Uplink	`4G Cat.1`
Serial Interface	One serial port with RS232, RS485 or TTL interface options
Socket Channels	Multiple network channels on the single serial port, Socket A enabled by default
Maintenance Methods	Config tool, serial AT, network AT, SMS AT

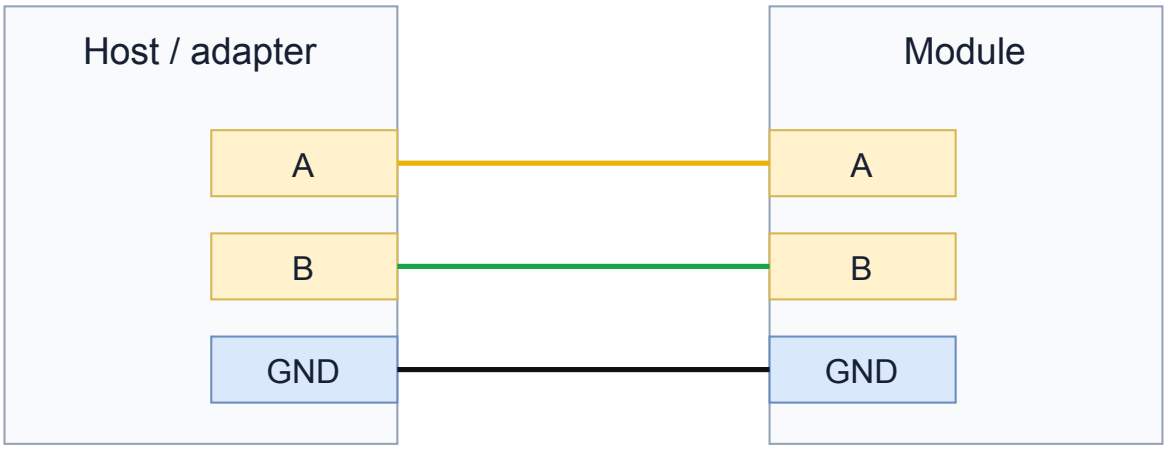
1.1 Hardware Wiring

Power off before wiring. Select the ordered serial interface and use the terminal labels on the supplied module. The drawings show electrical connections, not connector pin order.

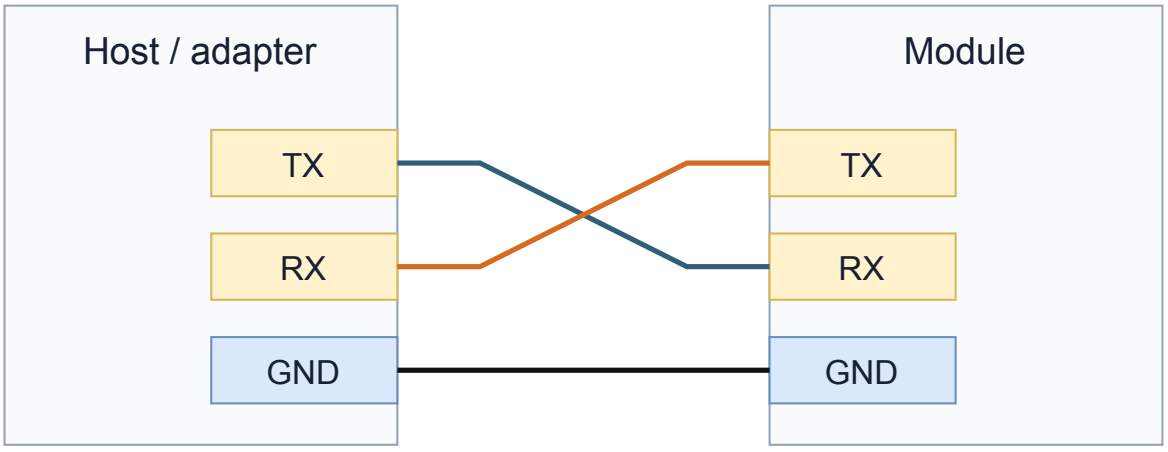
Module power: 9-36 VDC. Connect supply positive to `+` and negative to `–`.



RS485 variant: A to A, B to B, signal GND to GND. `TX/A` and `RX/B` are the shared terminal labels. Use a twisted pair and terminate only the two physical bus ends when required.



RS232 / TTL variant: cross TX and RX; connect GND to GND. Match the adapter's electrical interface and verify the TTL logic voltage before connecting.



See the Y201 User Manual for model-specific power and uplink connections.

2. Default Parameters

Parameter	Default
Serial Baud Rate	`9600`
Data Bits / Stop Bits / Parity	`8 / 1 / NONE`

Parameter	Default
Packet Interval `UARTTLn.tm`	`5 ms`
Packet Length `UARTTLn.len`	`1024`
Socket Enable	Only Socket A on the single serial port enabled by default
Offline Cache `CACHEn`	`ON`
Registration Packet `REGMDn`	`OFF`
Heartbeat Mode `HEARTMDn`	`OFF`
Heartbeat Interval `HEARTTMn`	`60 s`
Extended AT `EXAT`	`ALL, NAT@`
Reboot on No Downlink Data `SOCKRTO`	`1440 min`
Remote Device Management `RDM`	`OFF`

3. Serial Modes and Packetization

3.1 Serial Working Modes

- **Transparent Mode, default**: Serial data is forwarded to the network
- **AT Mode**: Serial input is executed as AT commands and network downlink data is discarded

3.2 Entering AT Mode

Recommended sequence:

1. Send `+++`
2. Wait, `500 ms` recommended and less than `3 s`
3. Send `a`

4. Enter AT mode after receiving `+ok`

Notes:

- After receiving `+++`, the device pauses network data output for up to about `3 s`
- AT mode is not saved across power cycles; the device returns to transparent mode after reboot

Exit AT mode with `AT+EXIT` or reboot the device.

3.3 Packetization, `AT+UARTTLn`

Transmission is triggered when either condition is met:

- Length trigger: `len >= packet length`, range `64 to 1024`
- Interval trigger: inter-character gap `>= packet interval`, range `1 to 300 ms`

Example:

```text
AT+UARTTL1=30,1024
AT+REBOOT
```

4. Data Transfer and Sockets

4.1 Protocol Types

`SOCKns.type` supports:

- `TCPC`: TCP client
- `UDPC`: UDP client
- `HTPC`: HTTP client, only on `SOCKnA`
- `EDP`: Peer-to-peer transmission, only on `SOCKnA`
- `SMS`: SMS transparent transmission, only on `SOCKnA`
- `MQTT`: MQTT, only on `SOCKnA`
- `HYTCP` / `HYMB`: Cloud service forwarding, only on `SOCKnA`

4.2 Typical Configuration Flow, TCP Example

```text
AT+SOCKEN1A=ON
AT+SOCK1A=TCPC,test.example.com,8168
AT+REBOOT
```

4.3 HTTP Example, POST

```text
AT+SOCK1A=HTPC,www.example.com,80
AT+HTPURL1=/service/echo
AT+HTPHD1=Connection:keep-alive
AT+HTPREQ1=POST
AT+REBOOT
```

5. AT Command Conventions

5.1 Format Rules

- Commands start with `AT+` and end with `\r` or `\n`
- Commands are case-insensitive, uppercase is recommended
- Maximum command length is `256 bytes`
- Multiple parameters are separated by commas
- Wait for the previous command response before sending the next one, maximum timeout about `12 s`
- In command names, `n` is `1`, identifying the single physical serial port, and `s` represents the Socket channel `A/B`

Call forms:

- Query: `AT+CMD` or `AT+CMD?`
- Set: `AT+CMD=v1,v2,...`
- Help: `AT+CMD=?`

5.2 Error Codes

Error Code	Meaning
`ARGS`	Invalid parameter
`ARGC`	Wrong number of parameters
`CMD_UNKNOWN`	Unknown command
`CMD_FORMAT`	Invalid format
`CMD_LENGTH`	Command too long
`DEV_MEMORY`	Memory error
`DEV_SAVE`	Save failed

6. AT Command Quick Reference

6.1 Basic Control and Status

Command	Function	Notes
`AT+LIST`	Command list	Preferred for debugging
`AT+EXIT`	Exit AT mode	Returns to transparent mode
`AT+REBOOT`	Reboot device	Applies parameters
`AT+RSTCFG`	Restore backup parameters	Equivalent to Reload
`AT+BKCFG`	Back up current parameters	Recommended after configuration
`AT+CLRCFG`	Restore factory parameters	Full factory reset
`AT+DEVINFO`	Device information	`MODULE / VERSION / IMEI / SN` and more

Command	Function	Notes
`AT+SOCKLK`	Query TCP client status	Returns `OFF` for UDP or TCP server
`AT+CSQ`	Signal strength	`0 / 1 / 2 to 30 / 31 / 99`
`AT+CEREG`	Network registration status	`0` not registered, `1` registered
`AT+CGATT`	Data network attach status	`0` detached, `1` attached
`AT+IP`	Query IPv4 address	Current network address
`AT+IMEI`	Query IMEI	`15 digits`
`AT+ICCID`	Query ICCID	Usually `20 digits`
`AT+IMSI`	Query IMSI	Usually `15 digits`
`AT+PING=addr`	Ping	Returns latency or error reason

6.2 Serial, APN, and Socket

Command	Range / Default
`AT+UARTn=<baud>,<data>,<stop>,<parity>,<fc>`	`baud` `2400 to 460800`, default `9600`; `data` `7/8`; `stop` `1/2`; `parity` `NONE/EVEN/ODD`; `fc` `NFC/485`, default `485`
`AT+UARTTLn=<tm>,<len>`	`tm` `1 to 300 ms`, default `5`; `len` `64 to 1024`, default `1024`
`AT+CACHEn=<state>`	`ON`, default / `OFF`
`AT+APN=<state>,<apn>,<user>,<pass>,<auth>`	`state`: `0` default APN, default / `1` custom; `auth`: `0` `NONE / 1 PAP / 2 CHAP`
`AT+SOCKENns=<state>`	`ON / OFF`, only `1A` enabled by default
`AT+SOCKns=<type>,<addr>,<port>`	`type` see Section 4; `addr` up to `64 bytes`; `port` depends on protocol

6.3 HTTP and MQTT

Command	Range / Default
`AT+HTPURLn=<url>`	URL `1 to 64 bytes`, valid for POST
`AT+HTPHDn=<hd>`	Header `1 to 64 bytes`, use `|` for multiple headers
`AT+HTPFTn=<state>`	`ON`, default and filters HTTP header / `OFF`
`AT+HTPREQn=<request>`	`GET / POST / AUTO`
`AT+HTPTOn=<to>`	`1 to 30 s`, default `6`
`AT+MQCONFn=<ver>,<clean>,<keepalive>`	`ver` `3/4`, default `4`; `clean` `0/1`, default `1`; `keepalive` `30 to 65535 s`
`AT+MQAUTHn=<id>,<user>,<pass>`	ID `1 to 64`; user `1 to 64`; pass `1 to 128`
`AT+MQSUBn=<enable>,<topic>,<qos>`	`enable` `1`, default / `0`; topic `1 to 64`; `qos` `0/1/2`
`AT+MQPUBn=<enable>,<topic>,<qos>,<retain>`	Publish enabled by default; `qos` default `0`; `retain` default `0`
`AT+MQWILLn=<enable>,<topic>,<qos>,<msg>,<retain>`	Last will configuration
`AT+MQMDn=<mode>`	`STD`, default / `ALI`

6.4 SMS, Registration Packet, Heartbeat, and Transparent AT

Command	Range / Default
`AT+SMSS=<num>,<msg>`	Send SMS; `msg` does not support CR or LF
`AT+REGTPn=<type>`	`IMEI / ICCID / USER`
`AT+REGMDn=<mode>`	`OFF`, default / `FIRST / EVERY / ALL`

Command	Range / Default
`AT+REGDATn=<data>,<fmt>`	`fmt` : `HEX` , up to `64 bytes` / `ASCII` , up to `32 bytes`
`AT+HEARTMDn=<mode>`	`OFF` , default / `UART / NET`
`AT+HEARTTMn=<time>`	`1 to 86400 s` , default `60`
`AT+HEARTDATn=<data>,<fmt>`	`fmt` : `HEX / ASCII`
`AT+EXAT=<mode>,<key>`	`mode` : `OFF / NET / UART / ALL` , default `ALL` ; default key `NAT@`
`AT+SOCKRTO=<time>`	`0 to 4320 min` , default `1440` ; `0` disables the function
`AT+DOWNLOAD=<uri>`	HTTP download upgrade, returns `OK` or `+ERROR:FAIL`
`AT+DTCVTn=<up>,<down>`	Data conversion: `RAW / BTS / STB` ; `up` is serial-to-network and `down` is network-to-serial

7. Modbus Polling and JSON Reporting

The full Modbus command family:

- `AT+MODBUSn` : Modbus TCP / RTU gateway enable
- `AT+MBCFGn` : Polling enable, interval, and period
- `AT+MBCMDn` : Polling command, HEX format, multiple commands separated with `|`
- `AT+MBJSn` : Combined Modbus and serial transparent reporting mode
- `AT+HJREG` : Register point table configuration for JSON
- `AT+JSERRn` : Control whether failed reads are reported as `null`
- `AT+JSUDn` , `AT+JSTMn` , `AT+JSIMEIn` , `AT+JSICCIDn` , `AT+JSIOn` , `AT+JSGPSn` : Additional JSON fields

Key ranges:

- `MBCFGn.tv`: `100 to 35535 ms`
- `MBCFGn.period`: `1 to 2592000 s`
- `MBJSn.mode`: `OFF / POLL / ALL`

8. Maintenance, Upgrade, and Exception Handling

8.1 Upgrade

- Local USB upgrade, driver required
- HTTP upgrade through `AT+DOWNLOAD=host:port/path.bin`

8.2 Parameter Partitions

- **Parameter Area**: Current runtime parameters
- **Backup Area**: Saved with `AT+BKCFG`, restored with `AT+RSTCFG`
- **Factory Area**: Restored with `AT+CLRCFG`

Recommended flow:

1. Configure parameters.
2. Run `AT+BKCFG`.
3. Use `AT+RSTCFG` when rollback is required.

8.3 Exception Self-Recovery

- `AT+SOCKRTO=<time>` controls automatic reboot on no downlink data
- Default value is `24 hours`, suitable for unattended deployments

9. Troubleshooting

Symptom	Check Steps
Cannot register to the network	Check `AT+CSQ`, `AT+CEREG`, `AT+CGATT`, SIM status, and antenna status

Symptom	Check Steps
Network is up but server is not connected	Check `SOCKEN` and `SOCK` parameters and use `AT+SOCKLK` to view connection status
Serial data is abnormal	Verify `AT+UARTn` settings match the field device and check `UARTTLn` packetization parameters
HTTP or MQTT fails	Check `HTP*` or `MQ*` parameters one by one and verify basic TCP transparent transmission first
Registration packet or heartbeat is invalid	Check whether `REG*` or `HEART*` is enabled and whether the mode matches the application
Frequent reboot	Check whether `AT+SOCKRTO` is set too short
Remote transparent AT does not work	Check `AT+EXAT` mode and key, default `ALL,NAT@`

- **Manufacturer:** Hunan YenGear Tech Co., Ltd.
- **Address:** Room 21014, Building 1, Fudi Xingguang Tiandi, Yingxin Road, Yuhua District, Changsha, Hunan, China
- **Email:** hi@yengear.com
- **Website:** www.yengear.com