INDUSTRIAL CONNECTIVITY / ENGLISH TECHNICAL DOCUMENT

# CM510-71 / 72 Series

## DTU installation and configuration manual




Original source photograph

Source filename v1.9-1 | body V1.9, 2020-08-06 | English review edition | 19 October 2026

REVIEW EDITION - translated from the supplied Chinese document. Source inconsistencies and optional features are retained. See the final review checklist.

### Inside this document

Overview and configuration / Functions / Interfaces / Radio specifications / Power and mechanics / Applications / Company profile / Source review notes

# Notices, support and revision history

Source pp. 1-4

Source copyright 2003-2021, Xiamen CAIMORE Communication Technology Co., Ltd. All contents are protected by copyright. Written authorization is required to copy, reproduce, republish or distribute all or part of the manual. CAIMORE marks belong to the company; other marks belong to their owners.

Contents may change with product upgrades. Unless otherwise agreed, this is an operating guide; statements and recommendations do not constitute an express or implied warranty. Recommended/default settings are not necessarily suitable for the project. Inspect every delivered parameter and configure it for the actual application. The source disclaims liability for incorrect settings and communication problems caused by virus attacks; users must strengthen protection.

This English edition consolidates repeated steps and page headers. Commands, message formats and model limits are retained. Original Chinese tool screens remain reference images; they do not imply English firmware or current software availability. Example addresses and phone numbers are source examples, not deployment settings.

## Source contact information

| Parameter | Source specification |
|---|---|
| **Company** | Xiamen CAIMORE Communication Technology Co., Ltd. |
| **Main address** | Units 901 and 904, No. 63 Chengyi North Street, Software Park Phase III, Xiamen, China; postal code 361009. |
| **Main telephone / fax** | +86-592-5902655 / +86-592-5975885 |
| **Support address** | Rooms 901/904, Building B20, Software Park Phase III, Xiamen, as printed. |
| **Support** | +86-592-5908952 / +86-592-5908953; support@caimore.com |
| **Website / general email** | www.caimore.com / caimore@caimore.com |

## Source revisions

| Version | Change | Date | Author / approved by |
|---|---|---|---|
| **V1.0** | Initial release | 2017-05-25 | Hongws / Liugb |
| **V1.1** | Parameter updates | 2017-06-12 | Hongws / Liugb |
| **V1.2** | Parameter updates | 2017-07-08 | Luot / Liugb |
| **V1.3** | Dimension correction | 2017-10-25 | Luot / Liugb |
| **V1.4** | I/O control/alarm | 2018-08-21 | Lizj / Liugb |

| Version | Change | Date | Author / approved by |
|---|---|---|---|
| **V1.5** | SMS, remote configuration and other updates | 2019-01-07 | Liaosy / Liugb |
| **V1.6** | Registration/heartbeat descriptions | 2019-06-05 | Liugb / Liugb |
| **V1.7** | Device dimensions and other descriptions | 2020-03-28 | Lizj / Liugb |
| **V1.8** | Additional models | 2020-06-24 | Lizj / Liugb |
| **V1.9** | Additional models | 2020-08-06 | Lizj / Liugb |

# 1. Product introduction and system

Source pp. 5-7

The CM510-71/72 DTU family provides industrial transparent TCP/UDP wireless transfer. The source calls the processor ARM7, describes a real-time OS, continuous-online maintenance, three-level protection, a 3000 V electrical test and a 2010 supplier award. These are source statements, not new test results.

The environmental report described covers 80 °C/85% humidity and -30 °C, with continuous data transfer for 4 hours at each temperature. Rated operation is separately -30 to +75 °C. Applications include electricity/water metering, heat/gas/water monitoring, environment/oil/security/weather/seismic monitoring.

- Software, CPU watchdog, external hardware watchdog and System Watch Protect (SWP) are described as three-layer protection; source layer counting is not technically resolved.
- Fast protocol conversion; automatic/manual DNS; 15 kV RS232/RS485 and SIM ESD protection; 1.8/3/5 V SIM interface; 5-35 V design input with reverse-polarity/overvoltage/overcurrent protection.
- Up to 4 simultaneous TCP/UDP centers; fixed IP or dynamic domain; SCADA integrations named RealInfo/Zijin Bridge, KingView/Yakong and ForceControl; APN; automatic link maintenance.
- 72F/T: RS232/RS485 communication port, RS232 debug port and 4 I/O; 71F/T: one RS232. F models seven-mode; T LTE/GSM; R models 2G/3G/4G/5G as stated.
- Serial upgrade, SMS IP/port configuration, remote parameter management, AT interface, heartbeat, VWM, multiple centers, data/I/O wakeup and remote I/O control/SMS alarms on terminal variants.
- Architecture: field serial equipment connects through RS232/RS485 transceivers to the processor/memory; the wireless module links through SIM and antenna; power circuitry and watchdog/reset support operation.

### Model selection as printed

| Model | Interface | Network | Serial | Buffer |
|---|---|---|---|---|
| **CM510-72F** | Terminal | Seven-mode network | RS232 / RS485 | 8k |
| **CM510-72T** | Terminal | 4G + GSM | RS232 / RS485 | 8K |
| **CM510-72R** | Terminal | 2G/3G/4G/5G | RS232 / RS485 | 8K |
| **CM510-71T (first row)** | DB9 | Seven-mode network | RS232 | 8K |
| **CM510-71T (second row)** | DB9 | 4G + GSM | RS232 | 8K |
| **CM510-71R** | DB9 | 2G/3G/4G/5G | RS232 | 8K |

### System composition

| Parameter | Source specification |
|---|---|
| **CPU** | Source calls STM32F401RET6 a 32-bit ARM7 processor. Architecture identification NEEDS_VERIFICATION; not silently corrected. |
| **Memory** | 96 kB SDRAM and 512 kB Flash, as printed. |
| **Radio** | Industrial wireless module. |

# 1.6 Technical specifications

Source pp. 8-9

### Serial, power and environment

| Parameter | Source specification |
|---|---|
| **Antenna / SIM** | SMA female, 50 ohm; automatic 1.8/3 V SIM detection. |
| **Serial interfaces** | 72F/T: standard RS232/RS485; 71F/T: DB9. |
| **Baud rates** | 300/600/1200/2400/4800/9600/14400/19200/38400/5600/57600/115200 as printed; 5600 needs verification. |
| **Framing** | 8 data bits; none/odd/even parity; 1/1.5/2 stop bits; no flow control. |

| Parameter | Source specification |
|---|---|
| **Power** | 9 V DC / 1.5 A adapter; 5-35 V input. |
| **Currents** | 25 mA standby and 60 mA communication at 12 V DC. |
| **Environment** | Operating -30 to +75 °C; storage -40 to +90 °C; 95% RH non-condensing. |
| **Dimensions** | 100 x 62 x 24 mm excluding antenna mounts in source technical table; see family drawings. |

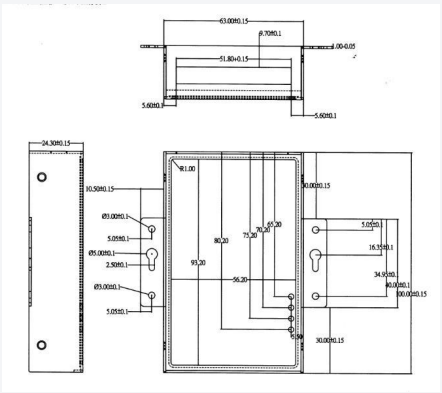
### Source radio groups

| Parameter | Source specification |
|---|---|
| **71F / 72F** | LTE FDD B1/B3; LTE TDD B39/B40/B41; TD-SCDMA B32/B39 as printed; WCDMA B1; CDMA2000 1X/EVDO B5; GSM/GPRS/EDGE B3/B8. |
| **71T / 72T** | LTE FDD B1/B3; LTE TDD B39/B40/B41; GSM/GPRS/EDGE B3/B8. |
| **71R / 72R** | 5G NR n1/n2/n3/n5/n7/n8/n20/n28/n41/n66/n71/n77/n78/n79, as shown in source p. 9. Confirm ordered modem. |

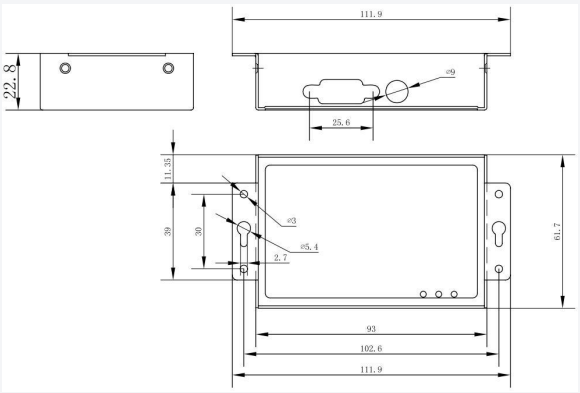
# 2. Installation and pin definitions

Source pp. 10-14

Install only with power removed and under appropriately qualified engineering guidance. Check shipment contents against the order. The source illustrates 72F/T/R terminal wiring and insertion, followed by 71/72 dimension drawings. Communication serial is used for data, configuration and software downloading; the extra debug port allows diagnostics while field equipment remains connected.



Original 72-series dimension drawing




Original 71-series dimension drawing

## 72F/T/R terminal pins

| Pin | Signal | Function |
|---|---|---|
| **1 / 2** | POWER / GND | Positive supply 5-35 V / power ground. |
| **3 / 4** | 485A / 485B | RS485 A/B. |
| **5 / 6** | RXD / TXD | RS232 receive input / transmit output; communication/configuration /download. |
| **7** | GND | Shared communication/debug ground. |
| **8 / 9** | DRX / DTX | RS232 debug receive/transmit; 115200,8,1,N. |
| **10** | SW | Reserved input; source electrical description says 0 V OFF, floating/high ON. Verify voltage limits. |
| **11-14** | IO1-IO4 | Digital input/output; I/O status/control. |

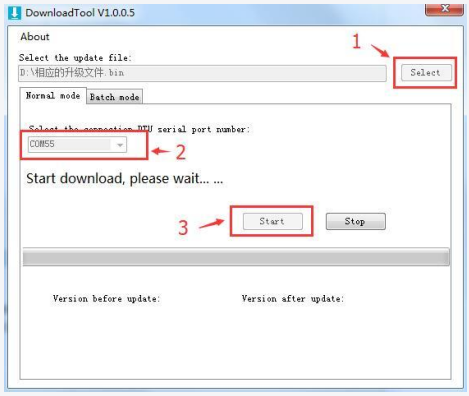
## 71F/T/R DB9 pins

| Pin | Signal | Function |
|---|---|---|
| **1 / 4 / 6 / 8 / 9** | NC | Unused. |
| **2 / 3** | RX / TX | RS232 input from PC / output to PC. |
| **5** | GND | RS232 ground. |
| **7** | SW | Optional enable: description says -10 to 0 V/floating ON, 3.3-30 V OFF; electrical column says 0 V OFF, floating/high ON. Conflicting logic; NEEDS_VERIFICATION before wiring. |

# 3. Firmware downloading

Source pp. 15-17

- 1. Open DownloadTool.exe.
- 2. Click Select to choose the matching upgrade .bin file. Select the COM port connected to the DTU communication port.
- 3. Click Start; wait for Start download,please wait....
- 4. Power-cycle the DTU. A progress bar appears while downloading.
- 5. Wait for Download completed. Use manufacturer-supplied firmware appropriate to the exact hardware.




Original source download-tool reference

# 4.1 Local and 4.2 Remote configuration

Source pp. 18-21

- Local: open the configuration tool and select Serial Configuration. Select the COM port, click Open, then power-cycle the DTU.
- The tool reads factory/default parameters; successful reading indicates configuration mode. If this fails, contact technical support. Change parameters, Save Parameters and restart the device.
- Remote configuration supports TCP communication only. Open Remote Configuration on the server PC, listen on the appropriate port and wait for the DTU.
- When connected, the tool reads parameters. Modify and save, wait for the success prompt and restart the device to apply changes.




Original configuration-tool reference




Original source interface reference, p. 19; software labels remain as supplied.

# 4.3 SMS IP/port and 4.4 Combined remote configuration

Source pp. 22-23




Original source interface reference, p. 22; software labels remain as supplied.

## Settings and procedures

| Parameter | Source specification |
|---|---|
| **Format** | ***SMS CONFIG***:2;IP:110.80.17.72;PORT:28001 |
| **Meaning** | Changes center 2 to the example IP and port. Header ***SMS CONFIG***:; index 0-4, where 0 invokes remote configuration and 1-4 directly changes that center and reconnects. |
| **Processing** | DTU processes SMS every 10 seconds. Success response: Successfully modified of Centre2=110.80.17.72:28001. Error: Error:Please refer to the specification format and Confirm the parameters of range. |

| Parameter | Source specification |
| --- | --- |
| **Precautions** | Use English half-width punctuation. Weak signal may delay replies; incorrect SMSC may prevent replies. |
| **One device among many** | To avoid stopping a production server serving other DTUs, use SMS to redirect only the target to a separate reachable PC/port, use the remote tool to change the required parameter, restore the original center IP/port, save and restart. Source example changes 9600 to 115200 baud for one of 100 devices. |

# 4.5 I/O alarm and 4.6 I/O control

Source p. 23

### Settings and procedures

| Parameter | Source specification |
| --- | --- |
| **Alarm setup** | 72F/T heading: set the SIM SMSC, configure relevant pins as input and preconfigure 1-5 receiving phone numbers. |
| **Alarm example** | ***PIN TRIGGER***:ON1OFF3 means IO1 low-to-high, IO3 high-to-low; IO2/IO4 unchanged. Alarm text is customizable and can be sent by SMS/network. |
| **Control setup** | 72F/T/R: configure APN/dial information and SMSC; set relevant pins to output; preconfigure 1-5 authorized numbers. |
| **Control format** | ***CTRL PIN***:ONpOFFp, p from 1 to 4; multiple pins per command. |
| **Control example** | ***CTRL PIN***:ON1OFF3 drives IO1 high and IO3 low, leaving IO2/IO4 unchanged. |
| **Responses** | Success: CTRL PIN OK: IO(1). IO(3). Failure: CTRL PIN Failed: Invalid Command! |
| **Precautions** | Use English half-width punctuation. Weak signal or SMSC errors can delay/prevent replies. Confirm the configured custom command text and actual I/O electrical limits. |

# 4.7 Registration and 4.8 Heartbeat packets

Source pp. 23-24

The registration packet is the first data sent on connection and identifies the DTU ID and SIM identifier. Heartbeats maintain the connection and help the server detect whether the DTU is online. Configure Custom Registration Packet or Custom Heartbeat Packet using the following rules.

### Packet text rules

| Parameter | Source specification |
|---|---|
| **Default** | <DEFAULT> or blank sends the default packet. Source explanatory notes also say type DEFAULT without brackets; verify tool syntax. |
| **Disabled** | <NONE> suppresses the packet. Source explanatory notes also say type NONE. |
| **Tokens** | <ID> inserts the ID; <PHONE> the SIM identifier; <IP> the local IP. Tokens may be combined with other characters. |
| **Visible characters** | Enter abc directly or as 0x610x620x63. |
| **Control characters** | Use 0x-prefixed hexadecimal ASCII bytes; TAB is 0x09. |
| **Combined example** | abc<ID><PHONE><IP>0x0A or 0x610x620x63<ID><PHONE><IP>0x0A for a line feed. This is the 7X manual example. |

# 5. Power and network tests; Appendices 1-4

Source pp. 25-27

The source specifies 9 V / 1.5 A standard supply, 5-35 V input. It recommends supply capacity above 1 A at 9 V because modem registration, roughly within 40 seconds of powering on, produces current peaks; weaker signal can increase the demand. This is especially relevant to battery supplies.

Connect/check cables, antenna and valid SIM before powering on. POWER should illuminate. Online is off before dialing, flashes 500 ms on / 500 ms off while connecting to the center and remains on when connected. ACT flashes when downstream equipment sends data.

### Appendix AT commands

| Parameter | Source specification |
|---|---|
| **ATE0 / ATE1** | Echo off / on. |
| **AT+CSQ** | Network signal strength. |
| **AT+CPIN?** | SIM status. |
| **AT+CREG?** | Network attachment status. |
| **ATI** | Communication-module information. |

### Reference consumption / interfaces

| Parameter | Source specification |
| --- | --- |
| **Measured reference** | 60 mA communication / 25 mA standby at 12 V DC, under normal signal; actual consumption depends on network conditions. |
| **Serial** | 8 data; 1/1.5/2 stop; none/odd/even; 300-115200 bit/s; no flow. |
| **Antenna/SIM/power** | SMA female 50 ohm, optional 3/5/10/15 m leads; 1.8/3/5 V SIM with 15 kV ESD; three-pin locomotive-style power socket. |

### Troubleshooting

| Parameter | Source specification |
| --- | --- |
| **No POWER** | Check wiring and approved power supply; wrong supply can damage the DTU. |
| **No Online** | Check coverage, signal, SIM validity/installation, center software and firewall. |
| **LEDs normal, no data** | Confirm mobile-data service/coverage, destination IP/domain/port and serial baud/framing match. |
| **Cannot configure** | Connect the communication serial port first, select/open the correct COM in the tool, THEN power on. Check serial cable. |

# Appendices 5-6: TCP and UDP protocols

Source pp. 27-29

The source hex-dump examples use SIM identifier 13312345678. They illustrate the layouts above and must be checked against the actual firmware and escape rules. Source copyright and contact details are consolidated in the opening section.

### TCP registration packet

| Parameter | Source specification |
| --- | --- |
| **ID** | 4 bytes; 8 hexadecimal digits. |
| **PHONE_NUMBER** | 11 bytes, ASCII phone/SIM identifier. |
| **0** | 1 separator byte. |
| **IP_ADD** | 4 bytes, acquired dynamic IP in hexadecimal representation. |

| Parameter | Source specification |
| --- | --- |
| **ETX** | 1 byte, 0x00; packet terminator. |
| **Total** | 21 bytes. Source recommends keeping this length when using the manufacturer demo with a modified registration packet. |
| **Heartbeat** | Default byte FE after 60 seconds without traffic. Data containing FE requires escaping; obtain the exact escape rules from CAIMORE before implementing a server. |

## UDP packet layouts

| Parameter | Source specification |
| --- | --- |
| **Registration / heartbeat** | Start 0x7b (1 byte), type 0x01 (1), length 0x0016 (2), device/SIM identifier (11), IP address (4), local port (2), end 0x7b (1). |
| **Application uplink, 7X manual** | Start 0x7b; type 0x09; length field printed 0x0010; identifier 11 bytes; end 0x7b; application payload <1024 bytes. |
| **Application downlink, 7X manual** | Same field layout; type 0x89; source length printed 0x0010. |
| **Interpretation** | Confirm byte order, length semantics and escaping against firmware. Printed examples are not an independently validated codec. |

# Translation and source review notes

Editorial review, not additional manufacturer specifications

Translated from the supplied Chinese file. Repeated page furniture and repeated procedures are consolidated. Original hardware figures are preserved; Chinese software screenshots remain visual references with English explanations. NEEDS_VERIFICATION identifies unresolved source issues. No device tests or website upload have been performed.

## Review checklist

| Source / topic | Review note |
|---|---|
| **Identity / revisions** | Filename v1.9-1; body revision history ends V1.9 dated 2020-08-06. Model list duplicates CM510-71T with two network descriptions; do not silently relabel one as F. |
| **Hardware / electrical** | ARM7 label with STM32F401RET6; 5600 baud entry; TD-SCDMA B32; SW logic conflict; dimensions/input limits differ from separate datasheets. NEEDS_VERIFICATION. |
| **Message syntax** | Bracketed DEFAULT/NONE vs unbracketed explanations, length semantics, byte order and escaping require actual tool/firmware confirmation. |
| **Safety / current status** | Procedures and legacy software UI are translated source material, not executed device tests. Source service/contact examples may be historical. |
| **Source-era statements** | Company office, patent, software-copyright and years-of-experience counts differ among the supplied documents. Each translation preserves its own source counts rather than combining them into a new current company profile. |
| **Certificates and historic awards** | Certification and award statements are translations of source material, not independent verification. No certificate numbers were supplied; CGD and Mo'er naming are not expanded into assumed issuing bodies. |
| **Publication status** | This English review edition is prepared for technical/editorial review. Resolve the identified source discrepancies before replacing the review status with a public website release. |