

AD7028V(T)&AD7028V(Z) Cellular Router User Manual

Support 5G/4G/3G/2G Industrial Grade Cellular Router



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Applicable Models:

Shell Type	Product Type	Model	Product Name
Iron shell + iron cover	Standard	AD7028V(T)-R	5G Cellular Router
		AD7028V(T)-A	4G Cellular Router
		AD7028V(T)-B	TDD/FDD-LTE Cellular Router
		AD7028V(T)-H	4G Cat1 Cellular Router
		AD7028V(T)-F	FDD-LTE Cellular Router
	Dual SIM	AD7028V(T)-RS	5G Dual SIM Cellular Router
		AD7028V(T)-AS	4G Dual SIM Cellular Router
		AD7028V(T)-BS	TDD/FDD-LTE Dual SIM Cellular Router
		AD7028V(T)-HS	4G Cat1 Dual SIM Cellular Router
		AD7028V(T)-FS	FDD-LTE Dual SIM Cellular Router
	GPS	AD7028V(T)-RP	GPS+5G Cellular Router
		AD7028V(T)-AP	GPS+4G Cellular Router
		AD7028V(T)-BP	GPS+TDD/FDD-LTE Cellular Router
		AD7028V(T)-HP	GPS+4G Cat1 Cellular Router
		AD7028V(T)-FP	GPS+FDD-LTE Cellular Router
	GPS+Dual SIM	AD7028V(T)-RSP	GPS+5G Dual SIM Cellular Router
		AD7028V(T)-ASP	GPS+4G Dual SIM Cellular Router
		AD7028V(T)-BSP	GPS+TDD/FDD-LTE Dual SIM Cellular
		AD7028V(T)-HSP	GPS+4G Cat1 Dual SIM Cellular Router
		AD7028V(T)-FSP	GPS+FDD-LTE Dual SIM Cellular Router
Iron shell + plastic cover	Standard	AD7028V(Z)-R	5G Cellular Router
		AD7028V(Z)-A	4G Cellular Router
		AD7028V(Z)-B	TDD/FDD-LTE Cellular Router
		AD7028V(Z)-H	4G Cat1 Cellular Router
		AD7028V(Z)-F	FDD-LTE Cellular Router
	Dual SIM	AD7028V(Z)-RS	5G Dual SIM Cellular Router
		AD7028V(Z)-AS	4G Dual SIM Cellular Router
		AD7028V(Z)-BS	TDD/FDD-LTE Dual SIM Cellular Router
		AD7028V(Z)-HS	4G Cat1 Dual SIM Cellular Router
		AD7028V(Z)-FS	FDD-LTE Dual SIM Cellular Router
	GPS	AD7028V(Z)-RP	GPS+5G Cellular Router
		AD7028V(Z)-AP	GPS+4G Cellular Router
		AD7028V(Z)-BP	GPS+TDD/FDD-LTE Cellular Router
		AD7028V(Z)-HP	GPS+4G Cat1 Cellular Router
		AD7028V(Z)-FP	GPS+FDD-LTE Cellular Router
	GPS+Dual SIM	AD7028V(Z)-RSP	GPS+5G Dual SIM Cellular Router
		AD7028V(Z)-ASP	GPS+4G Dual SIM Cellular Router
		AD7028V(Z)-BSP	GPS+TDD/FDD-LTE Dual SIM Cellular
		AD7028V(Z)-HSP	GPS+4G Cat1 Dual SIM Cellular Router
		AD7028V(Z)-FSP	GPS+FDD-LTE Dual SIM Cellular Router

Version

Version	Author	Check	Date	Description
V1.0	Deron		2022-8-18	Initial

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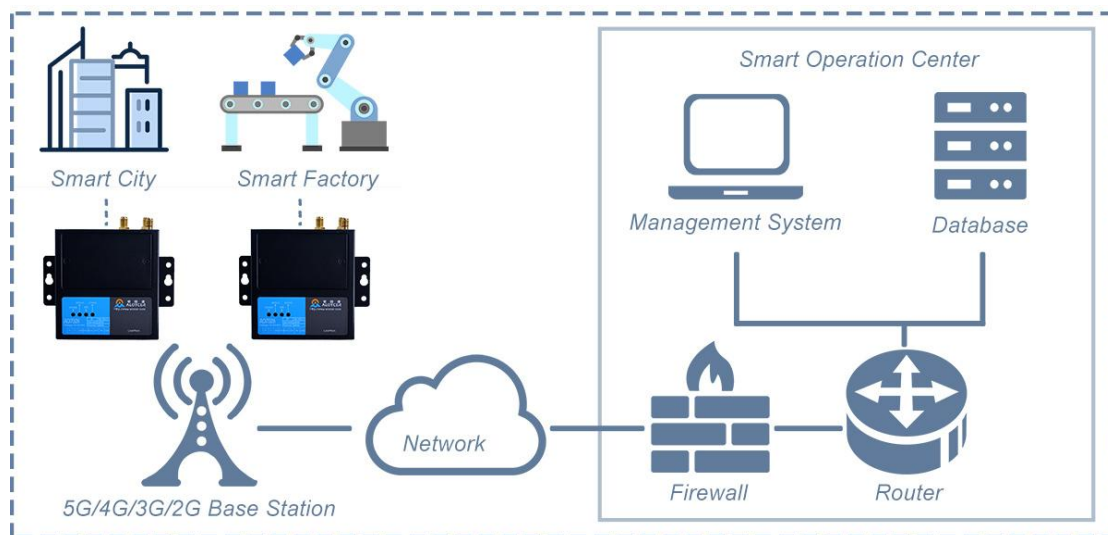
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Chapter 1 Brief Introduction

1.1 General

AD7028V(T)&AD7028V(Z) Cellular Router is a kind of cellular terminal device that developed based on 5G/4G/3G/2G connectivity, VPN client, among other features. It adopts high-powered industrial 32 bits CPU and embedded real time operating system. It supports 2 separate RS232 (or 1 RS232 and 1 RS485) and 1 LAN/WAN port that can conveniently and transparently connect one device to a cellular network. It is support wide power range 9-60V DC. With a compact and robust design, it includes the necessary accessories for Mount kit or DIN rail.

It has been widely used on M2M fields, such as intelligent transportation, smart grid, industrial automation, telemetry, finance, POS, water supply, environment protection, post, weather, and so on.



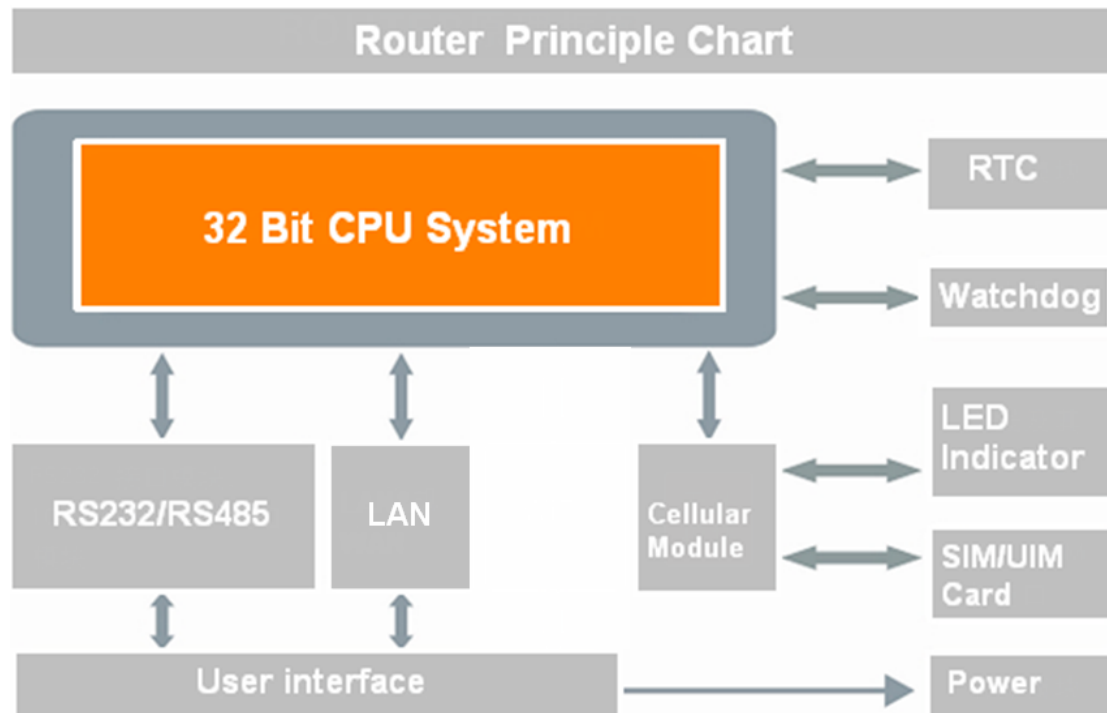
Application Topology

1.2 Product Feature

Items	Contents
Industrial Design	High-powered industrial cellular module
	High-powered industrial 32bits CPU
	Wide Operating Temperature(-35~+75°C)
	Power range: DC 9~60V
High	Support hardware and software WDT

Reliability	Support auto recovery mechanism, including online detect, auto redial when offline to make it always online
	Ethernet port: 1.5KV magnetic isolation protection
	RS232/RS485ports:15KV ESD protection
	SIM/UIM port: 15KV ESD protection
	Power port: reverse-voltage and overvoltage protection
	large serial port data cache(10MB) ,ensure the data is not lost
	Antenna port: lightning protection(optional)
Standard and Convenience	Adopt terminal block interface, convenient for industrial application
	Support standard two RS232(orRS232 and RS485) and Ethernet ports that can connect to serial devices directly
	Support several work modes
	Support intellectual mode, enter into communication state automatically when powered
	Convenient configuration and maintenance interface
High-performance and Security	Support TCP server
	Support double data centers, one main and another backup
	Support multi data centers and it can support 5 data centers at the same time
	Support NTP, RTC embedded.
	Support MAC address cloning.
	Support dynamic domain name(DDNS) and IP access to data center
	Design with standard TCP/IP protocol stack
	Support APN/VPDN
	Support local log storage.
	Support dual SIM/UIM card (optional).
	Support GPS(optional).
	Support hardware encryption/decryption (optional)

1.3 Block Diagram



1.4 Product SPEC

Items		Contents
Hardware System	CPU	Industrial 32 bits CPU
	FLASH	16MB (Extendable to 64MB)
	DDR2	64MB
Interface	Serial	2 RS232 ports (or 1 RS232 and 1 RS485), 15KV ESD protection Serial port: 8PIN industrial terminal, 3.81mm pitch Data bits: 5, 6, 7, 8 Stop bits: 1, 1.5(optional), 2 Parity: none, even, odd, space, mark Baud rate: 110~230400 bps Large serial port data cache:10MB
	LAN/WAN	1 10/100Mbps Ethernet ports(RJ45), auto MDI/MDIX, 1.5KV magnetic isolation protection
	Antenna	Standard SMA female interface, 50 ohm
	SIM/UIM	Standard 3V/1.8V user card interface, 15KV ESD protection

	Power	Terminal block interface, reverse-voltage and overvoltage protection
	Reset	Inside the module. Press this key for 8 seconds to restore the module to its original factory default settings
	Indicator	"POWER"、"MODULE"、"SIM"、"STATUS"
Network	Wireless Network	5G NR SA/NSA:n1/2/3/5/7/8/12/20/28/41/66/71/77/78/79 TDD-LTE:B38/39/40/41 FDD-LTE:B1/2/3/4/5/7/8/13/17/20/25/28 WCDMA:850/900/1900/2100MHz TD-SCDMA:1880-1920/2010-2025MHz(A/F) CDMA2000 1x/ EVDO Rev. A:800/1900MHz GSM/GPRS/EDGE:850/900/1800/1900MHz CDMA:800/1900MHz
	PPP Protocol	Support PPP Protocol
	PPP Heartbeat	Maintaining links with the cellular network to prevent forced sleep, to ensure the stability of dial-up link.
	Network Authentication	Support CHAP/PAP Authentication
	TCP Heartbeat	Monitor the server connection
Power supply	Power range	DC 9~60V,Recommended 12VDC
	Communication Current(4G)	175mA (@12VDC)
	Communication Current(5G)	220mA (@12VDC)
	Max Current	<350mA (@12VDC) ^①
Physical	Dimensions	110x85x32mm
	Weight	330g
	Installation	Mount Kit or DIN Rail35mm (optional)
Environmental Limits	Operating Temperature	-35~+75°C (-31~+167°F)
	Storage Temperature	-40~+85°C (-40~+185°F)
	Operating Humidity	95% (unfreezing)

Note: ①The working current is the average value

1.5 Ordering Information

Model	Version	
	Network Abbreviation	Function Extension
AD7028V(T)/ AD7028V(Z)	-R:5G -A:4G -B:TDD/FDD-LTE -F:FDD-LTE -H:4G Cat1	S:Dual SIM Card P:GPS
Example	AD7028V(T)-FSP: AD7028V(T) FDD-LTE Router, Support GPS and Dual SIM Card.	

Chapter 2 Installation Introduction

2.1 General

The Cellular router must be installed correctly to make it work properly.

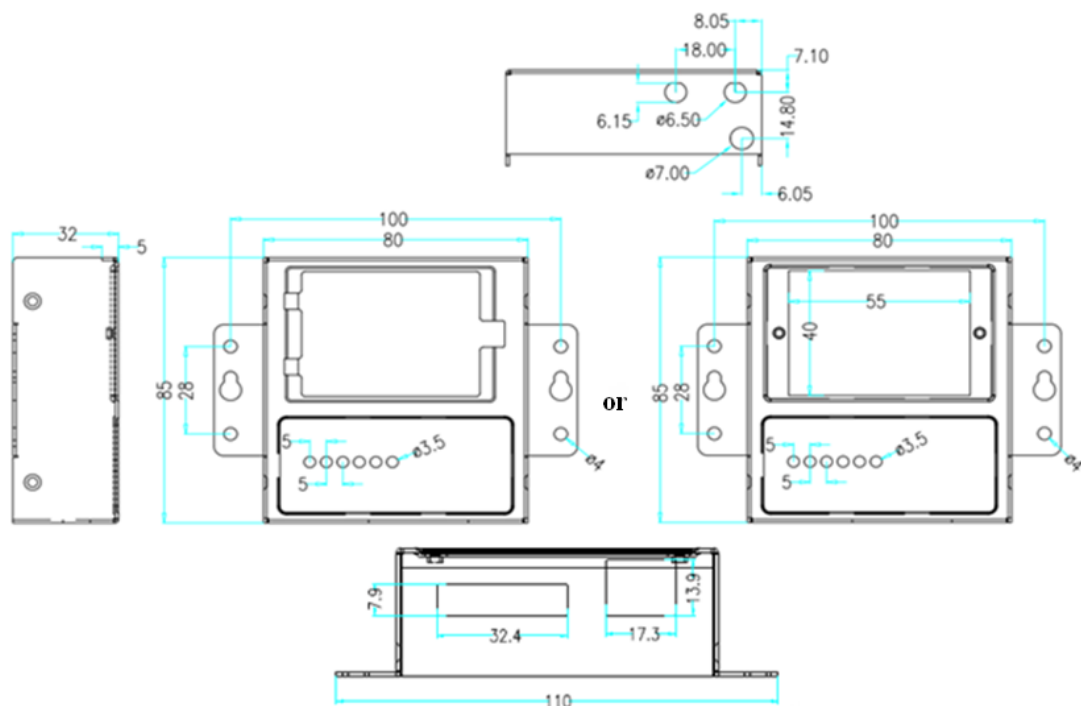
Warning: Forbid to install the router when powered!

2.2 Encasement List

Name	Quantity	Remark
Router host	1	
Cellular antenna (Male SMA)	1-3	
Network cable	1	
Certification card	1	
Power adapter	1	Optional
RS232 Console cable	1	Optional
RS485 Console cable	1	Optional
GPS antenna (Male SMA)	1	Optional
35mm Din buckle	1	Optional

2.3 Installation and Cable Connection

Dimension (The fixing piece is detachable): (Unit: mm)



Installation of antenna:



Cellular antenna (Standard)

Screw the SMA male pin of the cellular antenna to the female SMA interface of the router

Warning:

The antennas must be screwed tightly, or the signal quality of antenna will be influenced!

Installation of SIM/UIM card:

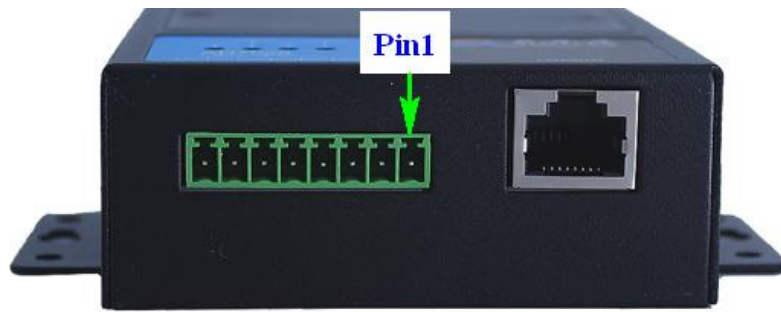


SIM/UIM Card Installation

The SIM/UIM card of the router is designed inside the device. When installing or removing the SIM/UIM card, first remove the cover. Then press the direction indicated on the SIM card holder ("OPEN" or "LOCK"), make sure that the metal contact surface of the SIM card is in full contact with the socket, and fasten it, and finally install the upper cover.

Warning: Forbid to install SIM/UIM card when powered!

Communication interface definition:



8PIN industrial terminal defined as follows:

Pin	Signal Name	Description
1	GND	Ground
2	TXD1	RS232-1 Transmit
3	RXD1	RS232-1 Receiver
4	TXD2/485-	RS232-2 Transmit or RS485-(optional)
5	RXD2/485+	RS232-2 Receiver or RS485+(optional)
6	GND	Ground
7	V-	Negative power supply
8	V+	Positive power supply

Installation of cable:



Network Cable (Standard) RS232 cable (optional) RS485 cable (optional)

Insert one end of the network cable into router RJ-45 interface, and insert the other end into the Ethernet interface of user's device. The signal connection of network direct cable is as follows:

RJ45-1	RJ45-2
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

RS232 cable (one end is DB9F)

Cable color	DB9F pin number
Blue	2
Brown	3
Black	5

The signal definition of the DB9F serial communication interface is as follows:

RS485 cable:

Cable color	Signal definition
Red	RS485+ (A)
Black	RS485- (B)

2.4 Power



Power Adapter (Optional)

The power range of the router is DC 9~60V.

Warning: When we use other power, we should make sure that the power can supply power above 6W, and the power ripple less than 300mV.

2.5 Indicator Lights Introduction

Indicator status description:

Indicator				Description
POWER (Red)	MODULE (Blue)	SIM (Green)	STATUS (Green)	
ON	X	Alternate Fast Blink		Module is turned on in AT mode
ON	X	OFF	Slow Blink	Initialize the module
ON	Fast Blink	OFF	Slow Blink	The system is dialing
ON	X	Slow Blink	OFF	Waiting for activation
ON	X	Alternate Slow Blink		The system dials successfully, the module is in data mode but the centers are not connected.
ON	X	Sync Slow Blink		APP normal, MP normal, WMMP normal

Note:

- 1, ON: Indicator Keep on at least 3s without blink;
- 2, OFF: Indicator Keep off at least 3s without blink;
- 3, Slow Blink: Indicator blink frequency is about 1Hz;
- 4, Fast Blink: Indicator blink frequency is about 3Hz.

2.6 Reset Button Introduction

There is a "Reset" button inside the module that to restore the module to its original factory default settings. When user press the "Reset" button for up to 8 seconds, the module will restore to its original factory default settings and restart automatically.

The auto-restart is as follows: The "POWER" indicator turns off for about 10 seconds and then functions normally.