Vehicle intelligent terminal instruction manual

V1.0

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directory

一、overview

High-definition intelligent AI video terminal F4 is a new generation of intelligent driving early warning system based on industrial-grade core high-speed processing chips and ADAS, DSM, BSD and so on 4G broadband multimedia wireless transmission, WIFI communication, maximum 6-channel DVR HD surveillance and video storage, Beidou/GPS Dual-mode high-precision positioning in one vehicle intelligent video terminal.

Product reference to the following standards:

Standard number	Standard name	Release date
GB/T 21413.1	Railway applications Electrical equipment for rolling stock Part 1 General conditions of use and general rules	2008
GB/T 25119	Rail transit Locomotive and rolling stock electronics	2021
GB/T 24338.4	Rail Transit Electromagnetic Compatibility Part 3-2: Rolling Stock Equipment	2018
GB/T 21563	Rail Transit Rolling Stock Equipment Shock and vibration test	2018
GB/T 30512	Automotive Banned Substance Requirements	2014
GB/T 4208	Enclosure rating	2008
GB/T 28046.2	Road vehicles - Environmental conditions and tests for electrical and electronic equipment - Part 2 Electrical loads	2011
GB/T 28046.3	Road vehicles Environmental conditions and tests for electrical and electronic equipment Part 3	2011
GB/T 28046.4-2011	Environmental conditions and tests for electrical and electronic equipment for road vehicles　Part 4	2011
GB/T 21437.2	Road vehicles Electrical disturbances caused by conduction and coupling Part 2: Electrical transients along power lines	2008
GB/T 21437.3	Road vehicles Electric commotion caused by conduction and coupling	2008
GB/T 20145	Photobiological safety of lamps and lamp systems	2006

二、 Product features

- The technical core of the forward-looking dangerous driving warning system and driver monitoring system has the world's leading level of visual recognition algorithm engine, which is accurate and reliable;

- Support ADAS (Advanced Driver Assistance System), BSD (Blind Spot Detection) and DSM (Driver Behavior Safety Warning), passenger status, cabin loading and cargo status and other intelligent monitoring functions;

- Support network remote upgrade procedure;

- Support GPS/Beidou satellite dual-mode positioning;

- 6-channel analog video input flexible combination design, support up to 2 channels of 1080P HD video, 2 channels of audio input, 1 channel IPC input; 1 CVBS output, all-round audio and video intelligent monitoring and recording;

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

- Support hard disk data storage and SD card storage; Dual storage to ensure data security;

- Hard disk shock protection mechanism (four-way version for SD card machine);

- UPR (uninterruptible power supply recording) function to ensure that the video is not lost at the moment of power failure;

- Low voltage protection function to ensure the safety of vehicle battery;

- Patented storage media protection device to prevent random removal of hard disks and SD cards;

- Support H265 video standard;

- Single board design, high integration and high reliability;

- Unique streaming media file system storage mode ensures data security and is not tampered with.

三、Product feature introduction

3.1 Advanced Driver Assistance Features (ADAS).

Alarm type	illustrate	Default enabling condition	remark
Forward Collision Warning (FCW).	Real-time monitoring of the distance between vehicles ahead can alert the driver as early as 2.7 seconds before a collision is expected to prevent rear-end collisions.	Speed≥ 30km/h	Matching
Lane Departure Warning (LDW).	Monitor current lane markings and vehicle trajectories to alert drivers when they are about to inadvertently deviate from the lane, reminding drivers to stay in a safe lane.	Speed≥ 30km/h	Matching
Vehicle Distance Monitoring and Early Warning (HMW).	Monitors the distance (in seconds) of the vehicle ahead and alerts you when approaching a preset hazard distance.	Speed≥ 30km/h	Matching
Pedestrian Collision Warning (PCW).	Identify pedestrians ahead and detect distances, sound alerts in dangerous situations, and alert drivers to avoid collision with pedestrians.	< per hour50km/h	Matching
Zebra crossing detection	Identify zebra crossings ahead and detect distances, issuing early warnings in dangerous situations and alerting drivers to avoid collisions with pedestrians		

Concentrate:

1) The driver can recognize normally during the day and night, wearing myopic glasses and ordinary sunglasses;

2) The enabling speed can be configured according to actual usage;

3) Strong resistance to external light sources, no matter in daytime, cloudy days or night and other different lighting scenes can work normally;

4) Support DSM camera occlusion prompt.

3.2 Driver Status Detection (DSM).

Alarm type	illustrate	Default	remark
Drowsy driving warning	Identify status with eye closure and yawning (mild and severe)	Speed≥ 30km/h	Matching
Distraction alert	Identify left and right twist persistence states as well as low/head up states	Speed≥ 30km/h	Matching
Answer the call alarm	Identify the posture of the call	Speed≥ 30km/h	Matching
Smoking alarm	Identify smoking postures	Speed≥ 30km/h	Matching
Off-duty alarm	Identify the driver leaving the seat	Speed≥ 30km/h	Matching
Driver change tips	The currently detected face is different from the last time	Speed≥ 30km/h	Matching
Expiration prompt	Device occlusion failure alarm	Speed ≥ 0km/h	Matching
	Infrared glasses block alarm	Speed ≥ 0km/h	Matching
Face recognition	Recognize faces through the local face library		Matching

Concentrate:

1) The speed can be configured according to the actual usage;

2) It can be used in most scenarios such as day, night, tunnel, rainy days (except extreme weather);

3) Support ADAS occlusion failure prompt.

3.3 Video

The terminal adopts H264/H265 video compression technology, dedicated streaming media format, realizes 6-channel real-time image monitoring, timing recording, event recording, alarm recording functions, and can support 6-channel 720P analog high-definition

video acquisition and image resolution 720P/D1 optional. If you use H265 video compression technology, you can greatly save storage space and transmission traffic, improve smoothness under low bandwidth conditions, and increase H265 by 20%~50% compared with H264 in the same scenario of compression efficiency.

3.4 Mass Storage

Images and videos are stored on SD cards and hard drives (solid-state/mechanical). The capacity size is determined according to the customer's choice, and the unique patented streaming media file system is used to adapt to the security of video and data files in the vehicle environment.

3.5 Image Transmission

Through the 5G/4G wireless network, surveillance video can be transmitted in real time, dual stream transmission, and the speed is adjustable. It can be captured remotely, and pictures can be uploaded according to alarm events.

3.6 Multimedia Analytics

Using multimedia driving record analysis software, it can realize audio and video synchronous playback, conditional playback, clip storage, license plate overlay, geographic information and driving record overlay functions, event analysis and record extraction functions.

3.7 Vehicle Monitoring

Vehicle automatic monitoring and positioning function, area setting, electronic fence function, GPS mileage statistics, vehicle mileage statistics, blind spot supplementary report function, trajectory storage function, base station auxiliary positioning function.

3.8 Signal Detection and Control

8 signal inputs, 1 output, 5V power control.

3.9 Alarm

Emergency alarm, parking timeout alarm, overspeed alarm, overspeed warning, fatigue driving alarm, deviating line alarm, power loss, low power alarm, GPS fault alarm, GPS/4G antenna open short circuit alarm, etc.

3.10 Drive recorder

The terminal has the vehicle driving record function, continuously records and stores the vehicle driving status data at a time interval of 1s, the driving data includes: the real-time time of the vehicle during driving, the corresponding average speed in the interval of each second and the status signal of the corresponding time, and the effective data record is not less than the last 48 hours. The speed recording unit is kilometers per hour (km/h), and the measurement range is 0km/h~220km/h.

3.11 Vehicle Driving Analysis

A function that supports analysis of driving behavior (sharp acceleration, sharp deceleration, idle, hard braking, etc.) using body data (CAN, analog signal data, etc.).

3.12 Cloud Guardian

It supports remote "cloud" guardian functions such as remote fault diagnosis and debugging, remote automatic program maintenance, remote parameter configuration and terminal operation statistics. Improve equipment installation and maintenance efficiency, save maintenance time and costs.

3.14 Road Inspection

Realize yaw, segmented speed limit alerts and alarms, inbound/outbound reporting, and site association control.

3.15 Voice and Calls

Remote monitoring function, voice prompter function and TTS text voice broadcast function.

四、Product specifications

project	Detailed specifications	hard disk High-end version	SD card Economy Edition	remark
Exterior structure	Size: 145×58×193mm Shell material: PC+ABS, body material: aluminum alloy			
Degree of protection	IP54			
Environmental suitability	Working temperature: -30°C~70°C Storage temperature: -40 °C ~ 85 °C			
Operating voltage	Operating voltage range: 9 - 32V			
	Support automotive battery protection: 8.5V±0.5V/12V system, 17V±0.5V/24V system			12V/24V adaptive 36V systems are not supported
Ultra-low power design	Quiescent current <2mA			
	Supports zero-power sleep			
	Ignition wake-up, RTC timing wake-up, key power on/off			
power consumption	The average power consumption is less than 30W			
Supercapacitors	Three supercapacitors power the system and camera			2~3s working time, save the complete video before the power failure
Light	4 (1 positioning signal, 1 communication signal, 1 video, 1 terminal operation indication).			
External interface	Power supply: TE-1318384-2			
	Positioning antenna connector: Fakra-C blue			
	Communication antenna connector: Fakra-D			
	Video interface: M12-4			
	IPC interface: M12-6			

Video	Up to 6 AHD/CVBS video inputs It can supply power to the camera, the output voltage value is 12V, and the maximum output current of a single channel is 0.5A	6-way	4-way	
	1 IPC video input interface, 12V power supply	In the tank	Not supported	
	1 CVBS output	In the tank	Not supported	
audio	Standard 2-way camera recording, recording cable supports key input detection			
	2W hands-free speaker output	1-way	1-way	
storage	2.5 inch mechanical/solid-state drive, can support 7mm/9.5mm, hard disk shock absorber device fixed in the terminal, no separate hard disk box, hard disk SATA interface connected to the motherboard, hard disk easy to plug and unplug	In the tank	Not supported	The maximum capacity supports 2TB
	2 SD cards, pluggable mode, do not support simultaneous recording			The maximum capacity supports 512GB
Data interface	2-way RS232 interface, 5V power supply @500mA			
	1 channel 485 interface			
	CAN, without wake-up	1-way	Not supported	
	1 IPC interface, 12V power output (1A).	1-way	Not supported	
Positioning module	GPS and Beidou positioning module			
Communication module	4G module	CAT4	CAT1	
SIM card	Drawer plug-in SIM card			
IO function	8 inputs: ACC, left steering, right steering, door side, emergency, reversing, braking, speed pulse			
	1 output: oil and electricity	In the tank	Not supported	

五、Illustration of product structure and appearance

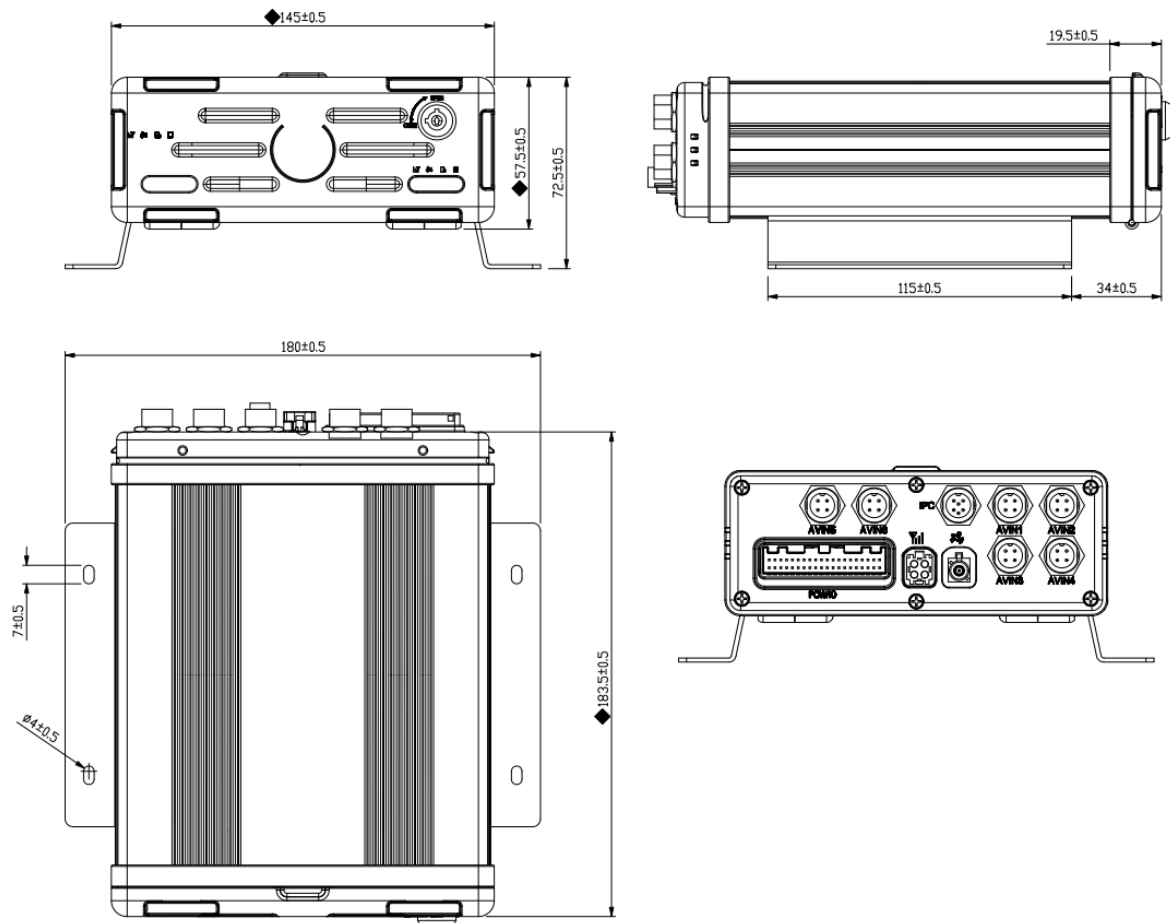## 5.1 Schematic diagram of the structure

Figure 1 Terminal structure diagram

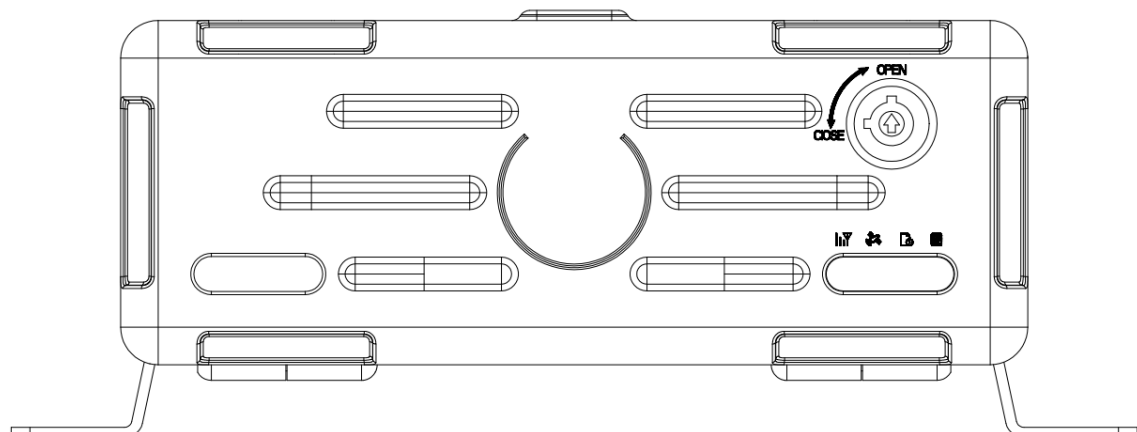## 5.2 Schematic diagram of the front panel of the terminal

Figure 2 Terminal front panel

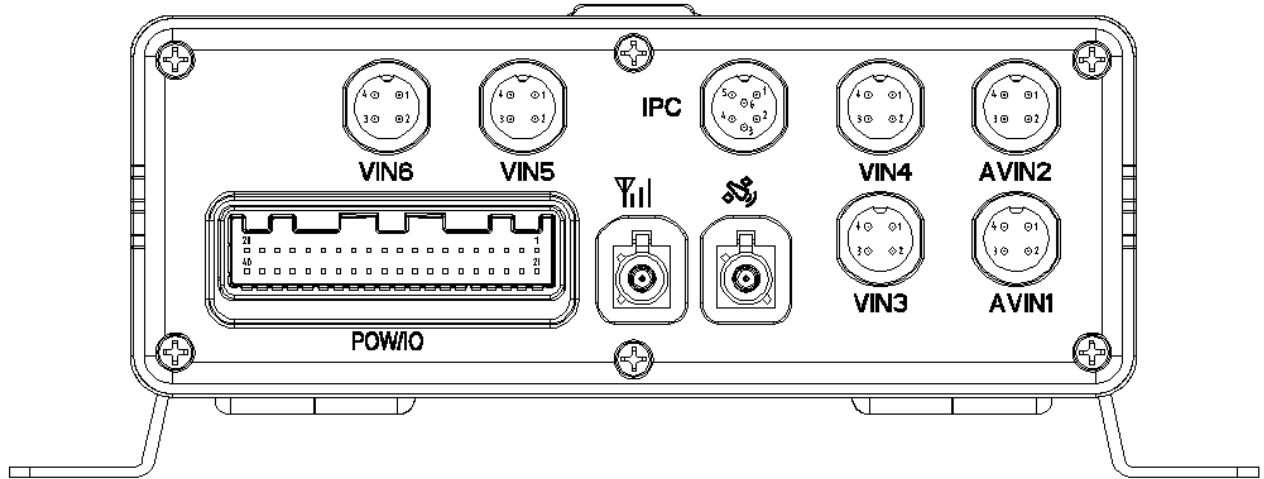| serial number	name	Introduction to the feature	illustrate
1		Communication indicator	The GPRS indicator ---- green 1. Flashing for 5 seconds indicates no signal. 2. Two flashes in 5 seconds indicate that there is a signal but there is no connection to the central server. 3. Three flashes in 5 seconds indicate that there is a signal and the connection to the central server is online. 4. After 10 seconds of power-on, it flashes quickly, and flashes 4 times in a row to indicate that the card is not detected, and the card needs to be re-inserted
2		Positioning LED	The GNSS indicator ---- orange 1. A flash of 5 seconds indicates that there is no satellite signal. 2, 5 seconds flashing twice indicates that there is a satellite signal but it does not reach more than four satellites, and there is no positioning. 3. Three flashes in 5 seconds indicate that there are satellite signals that reach more than four satellites and are located. 4. The light is always on to indicate that the GPS antenna is open, check the GPS antenna wiring or fault or disconnection. 5. The long light is on for 4 seconds and off for 1 second indicates that the GPS antenna is short-circuited, check the GPS antenna wiring failure
3		Run LED	Run the light 1. Off means no power supply 2. Constant light indicates normal operation 3. A flash of 5 seconds indicates an abnormal CAN
4		Storage LED	Storage lights 1. Off means that there is no reading and writing 2. Flashing for 5 seconds indicates reading data 3. 5 seconds flashing twice indicates that the data is written 4, 5 seconds flashing three times indicates reading and writing data
5		Switch lock orientation	Rotate clockwise to be on and counterclockwise to off

5.3 Schematic diagram of the rear panel of the terminal

Figure 3   Terminal Back Panel

serial number	interface	Interface name	Introduction to the feature
1	POW/IO	Main signal interface	Connect the terminal to the on-board power supply and collect various signals of the vehicle
2		Communication antenna interface	Get the base station signal
3		Locate the antenna interface	Get satellite signals
4	AVIN1 /AVIN2	Camera interface	Support audio and video input (can be connected to DSM and ADAS).
5	AVIN3/ AVIN4 AVIN5/ AVIN6	Camera interface	Support video input
6	IPC	IPC interface	

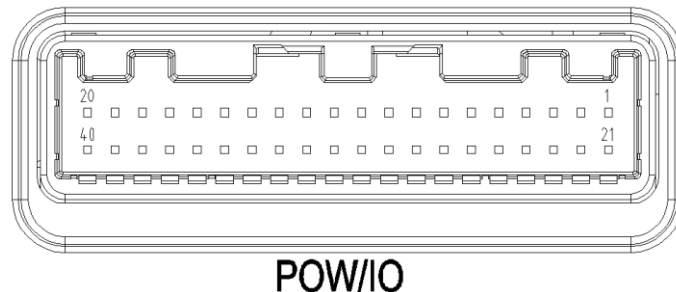## 5.4 Definition of the main signal interface of the rear panel of the terminal

Figure 4: Main signal interface definition

serial number	Signal Name	remark	serial number	Signal Name	remark
1	earth		21	Speed	
2	CVBS signal		22	earth	
3	earth		23	SMALL-	

4	Horn 2 positive		24	SMALL+	
5	Horn 2 minus		25	earth	
6	Horn 1 positive		26	RS485_B	
7	Horn 1 minus		27	earth	
8	RS485_A		28	urgent	
9	brake		29	Reversing	
10	Turn right		30	Turn left	
11	/		31	By the door	
12	EX2_RXD232		32	EX2_TXD232	
13	Oil-off electrical output		33	ACC	
14	EX1_RXD232		34	EX1_TXD232	
15	5V output		35	GND	
16	Motor power supply 24V output		36	Motor power ground	
17	CAN2L		37	CAN2H	
18	CAN1L		38	CAN1H	
19	Power positive		39	Power ground	
20	Power positive		40	Power ground	

5.5 Terminal rear panel antenna interface
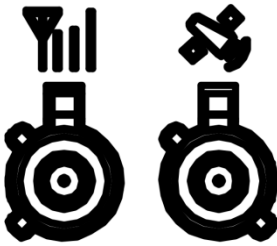
Figure 5 Antenna interface schematic

serial number	name	Model
1	Locate the antenna	Blue FAKRA C male
2	Networked antennas	PURPLE FAKRA D MALE

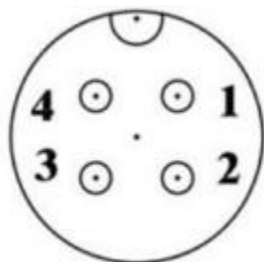## 5.6 Terminal rear panel camera interface definition

Figure 6   Input camera interface schematic

Input camera connector model: M12-4P, harness termination connector model: aviation head/M12 four-hole.

PIN	function
1	12V power supply
2	earth
3	AIN
4	WINE

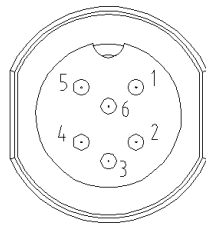## 5.7 Terminal rear panel IPC interface definition

Figure 7 Input camera interface schematic

Input camera connector model: M12-6P, harness termination connector model: aviation head/M12 six-hole.

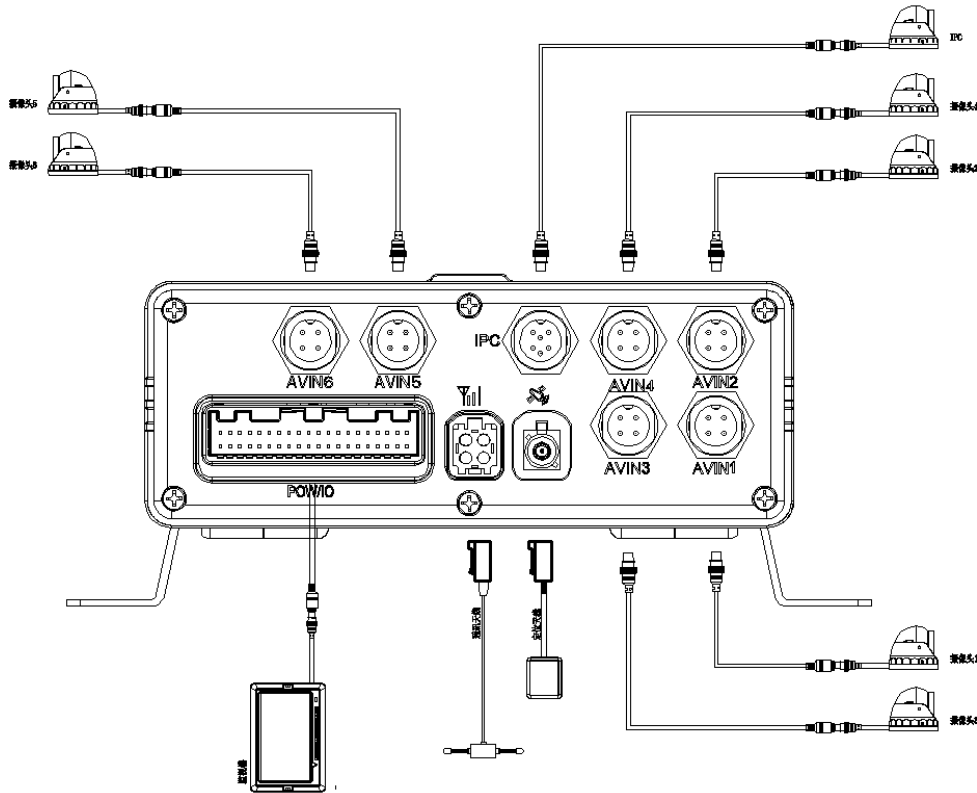| PIN	function
1	12V power supply
2	earth
3	Data Send+
4	Data Send-
5	Data Reception +
6	Data Reception -

5.8 Product wiring diagram

Figure 8: Product wiring diagram

六、Product configuration checklist

6.1 Standard Equipment List

numbering	name	Quantity/set
1	host	1
2	Locate the antenna	1
3	Communication antenna	1
4	Installing the cable (power cord)	1
5	Install the tripod	1
6	Lock key	1
7	Instruction manual/certificate of	1

	conformity/warranty card	

6.2 Optional List

numbering	name	Quantity/set
1	SD card	1
2	hard disk	1
3	ADAS cameras and mounting accessories	1
4	DSM camera and mounting accessories	1
5	External speaker	1
6	Waterproof emergency button	1

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