

产品说明书

制造商：树根互联股份有限公司

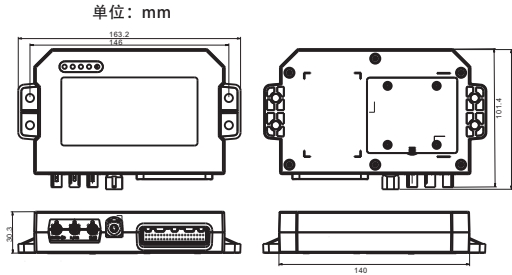
地址：广州市海珠区华洲路190号8栋

1. 产品概述

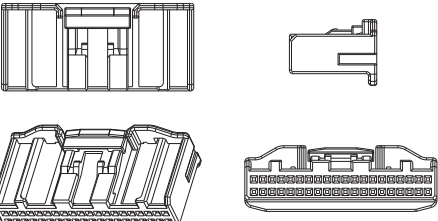
本产品为针对当前工程机械、运输车队以及设备分时租赁等移动设备和离散工业节点，提供的一款高防护、低功耗、多功能车载VBOX平台产品。

2. 整机规格

2.1 外形尺寸



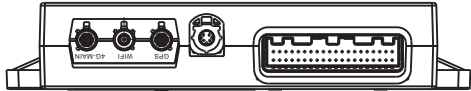
2.2 工业连接器



品牌：TE 型号：1318389-1 线径：20#AWG

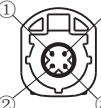
3. 产品接口

3.1 接口图



3.1 接口说明

3.2.1 USB接口



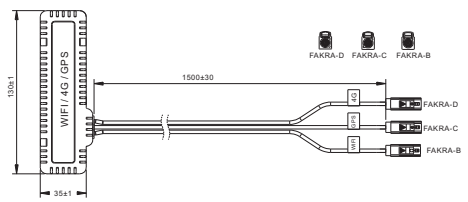
序号	定义
①	D-
②	GND
③	D+
④	+5V

3.2.2 指示灯



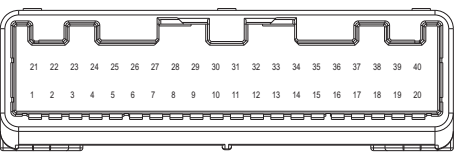
名称	颜色	定义说明	闪烁	常亮	常灭
1 (4G)	绿色	4G状态灯	连接中	4G网络正常	4G网络异常
2 (CAN)	绿色	CAN状态灯	总线有数据传输	无	总线无数据传输
3 (GPS)	绿色	GPS状态灯	连接中	GPS定位正常	GPS天线异常
4 (WIFI)	绿色	WIFI状态灯	无	WIFI已连接	WIFI未连接
5 (PWR)	红色	系统指示灯	系统运行正常	与Open向SPI连接建立	电源异常或系统异常

3.2.3 天线



序号	项目	说明
1	天线	GPS+4G+WIFI 三合一有源天线
2	长度	1.5米 (标配) /3米/5米
3	增益	GPS(28±3dB); 4G(-0.95 ~ 2.84dBi)
4	阻抗	50Ω

3.2.4 主接口



管脚号	定义	车辆连接	说明
1	BUS_ACC	ON/H	通电源开关
2	DI_IN_01	充电唤醒	高电平有效 (禁止启动自动补电)
3	GND	地	车载常电电源负极
4	DI_IN_02	开关量2	
5	DO_24V_PWM_02	驱动输出2/PWM1	DC24V电流0.5A
6	DO_24V_PWM_03	驱动输出3/PWM2	DC24V电流0.5A
7	DI_IN_03	开关量3	
8	AI_V_ADC_07	模拟量输入1 (温度传感器)	
9	DO_24V_04	驱动输出4	DC24V电流0.5A
10	AI_V_ADC_08	模拟量输入2 (温度传感器)	
11	DI_PWM_04	开关量4/脉冲捕获, 正反转转速, 外接传感器转速, 兼容D输入	
12	DI_IN_05	开关量5	
13	DO_24V_05	驱动输出5	DC24V电流0.5A
14	RS232_RX1	RS232_RX	
15	MX2_N	以太网端子第6脚	
16	MX1_N	以太网端子第2脚	
17	CAN3_H	CAN3	符合 CAN2.0B 规范, 选配CAN唤醒
18	CAN2_L	ICAN-L	CAN2, 符合 CAN2.0B 规范, 选配CAN唤醒
19	CAN1_H	PCAN-H	CAN1, 符合 CAN2.0B 规范, 选配CAN唤醒
20	VBAT+	常电	车载常电电源正极

21	AI_V_ADC_01	模拟量输入1 (温度传感器)
22	DI_WKUP_06	开关量6, 充电信号, 高唤醒
23	DI_IN_07	锁钥1
24	GND	ADC接地
25	AI_V_ADC_02	模拟量输入2 (温度传感器)
26	AI_V_ADC_03	模拟量输入3 (温度传感器)
27	AI_V_ADC_04	模拟量输入4 (温度传感器)
28	AI_V_ADC_05	模拟量输入5 (温度传感器)
29	AI_V_ADC_06	模拟量输入6 (温度传感器)
30	DI_IN_08	气缸松开反馈
31	DI_PWM_09	开关量9/脉冲捕获, 正反转信号, 外接传感器信号, 兼容D输入
32	DI_IN_10	开关量10
33	DO_24V_06	VC40
34	RS232_TX1	RS232_TX
35	MX2_P	以太网端子第3脚
36	MX1_P	以太网端子第1脚
37	CAN3_L	CAN3, 符合 CAN2.0B 规范, 选配CAN唤醒
38	CAN2_H	ICAN-H
39	CAN1_L	PCAN-L
40	VBAT-	GND

四、功能清单

功能名称	标识符	描述
时间与日期	时间	可提供车辆所在地时间与日期 (精确到毫秒)
	自动校时	可自动校时, 使24小时内时间误差在±55内
	授时	从云平台, 获取时间并授时
定位服务	GNSS	通过CAN网络, 对ECU授时 (需要车厂协议支持)
	天线检测	支持GPS天线断线检测及天线保护
	定位精度	水平定位精度: < 2.5 m CEP50
网络通信	运行轨迹	过滤算法去除无效数据, 不良数据, 使运行轨迹准确
	LTE FDD: B1/ B2/ B3/ B4/ B5/ B7/ B8/ B12/ B13/ B18/ B19/ B20/ B25/ B26/ B28	
	LTE TDD: B38/ B39/ B40/ B41	
SIM卡	WCDMA: B1/ B2/ B4/ B5/ B8/ B6/ B19	
	GSM: 850/900/1800/1900MHz	
	支持全球通信	
多中心接入	支持同时连接两个以上的平台 (最大4个平台)	
	支持向不同平台发送不同数据内容	
	2.4GHz Wi-Fi	
WIFI	支持IEEE 802.11 b/g/n标准	
	工作模式AP/STA	
	以太网 (选配)	1路百兆以太网 RJ45接口

数据采集	CAN	标配2路 (250Kbps/500Kbps), 最高支持3路高速CAN通信接口
	RS232	支持1路RS232实现数据交互
	RS485 (选配)	支持1路RS485实现数据交互
数据补发	数字量采集	支持10路D1输入
	数字量输出	支持6路DO输出, DC24V电流0.5A
	电压采集	支持采集与1路整定蓄电池电压和备用电池电压
数据交互	模拟量采集	支持8路ADC输入, 例如温度传感器应用
	实时数据存储	拓展大容量EMMC存储, 默认32GB, 可扩展
	数据上传	数据上传及下发双向认证
数据加密 (选配)	数据下发	支持远程数据/指令下发控制
	支持断点续传	
	通信异常时, 设备将采集的实时数据存储到本地存储介质中, 等待通信恢复正常后进行实时数据的补发	
电源管理	输入电压	支持ECC/RSA/3DES/AES/SHA/SM1/SM2/SM3/SM4/SM9等常用加密算法; 具有安全等级要求的信息在传输或存储时进行加密处理; 符合HJ1239信息安全要求;
	额定功率	CAN交互: 支持通过CAN总线与车身交互
	工作模式	RS232交互: 支持通过RS232串口配置参数 (选配)
终端管理	OTA	DC直流 9~36V
	OPENVPN	正常工作: <100mA@24V
	终端控制	待机状态: <10mA@24V (支持ACC, CAN, RTC唤醒)
自检	远程解锁机	休眠状态 (选配): <20uA@24V (仅支持ACC, RTC唤醒)
	设备防拆	设备至少存在2种工作模式: 工作模式、待机模式
	设备防拆	休眠状态根据客户需求选配
换电功能	设备防拆	设备在外部供电异常断开后, 仍可独立运行, 外部供电断开前数据须全部上传至企业平台, 且至少能保障外部供电断开后 10min 的数据上传到企业平台
	设备防拆	支持对车内其他ECU升级, 具体方案需与ECU厂家确
	设备防拆	融合重卡车辆, 完成对车内其他ECU的OTA功能

五、软件规格

- 支持基于CAN2.0B的车控制器工况数据采集。
- 支持通过云平台进行车载控制器指令下发。
- 支持数据传输断线续传, 本地数据存储。
- 支持远程OTA升级, 本地U盘升级。
- 支持GPS位置信息采集。
- 支持驾驶行为分析。

六、随机附件

名称	数量	单位	备注
V-BOX主机	1	台	标配
主机电源&信号连接端子线	1	条	选配
LTE+GPS+WIFI 天线	1	条	三合一
包装盒	1	套	标配

七、认证



Model: LN1526-DC-T-BAT-GL

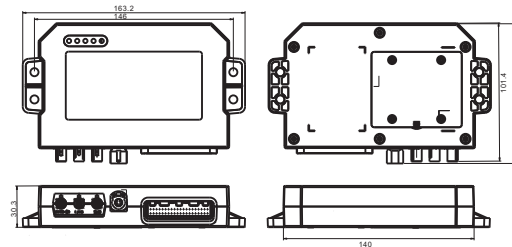
1.Description

This product is a high-protection, low-power consumption, and multifunctional vehicle-mounted VBOX platform designed for current construction machinery, transportation fleets, and equipment rental for the sharing economy, as well as for mobile devices and discrete industrial nodes.

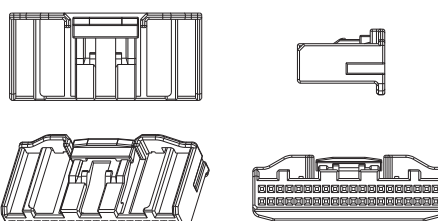
2.Specifications

2.1 Dimensions

unit: mm



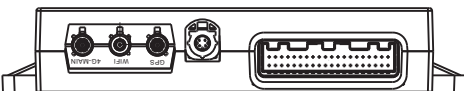
2.2 Connector (Optional)



Brand: TE Type: 1318389-1 Wire: 20#AWG

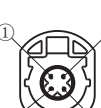
3.Interface

3.1 Interface diagram



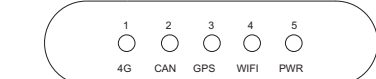
3.2 Interface description

3.2.1 USB interface



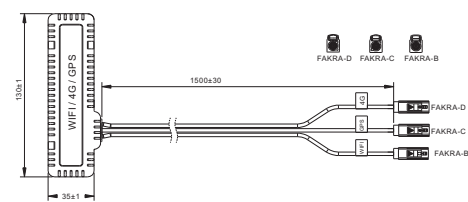
NUM	DEFINE
①	D-
②	GND
③	D+
④	+5V

3.2.2 Indicator light



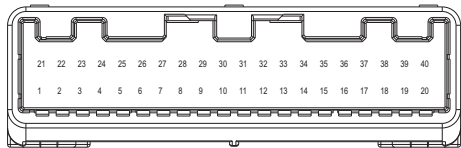
Num	Color	Definition	Flashing	Steady	Off
1 (4G)	Green	4G Status Indicator	Flashing	4G network is normal	4G network is abnormal
2 (CAN)	Green	CAN Status Indicator	Flashing	None	No data transmission on the bus
3 (GPS)	Green	GPS Status Indicator	Flashing	GPS positioning is normal	GPS antenna is abnormal
4 (WIFI)	Green	WIFI Status Indicator	Flashing	WIFI is connected	WIFI is not connected
5 (PWR)	Red	System Status Indicator	Flashing	System is running normally	Power or system is abnormal

3.2.3 antenna



Number	Item	Explanation
1	Antenna	Active GPS, 4G, and WIFI triple antenna in one
2	Length	1.5m (standard) /3m/5m
3	Gain	GPS (28±3dB); 4G (-0.95 ~ 2.84dBi)
4	Impedance	50 Ω

3.2.4 main interface



NUM	Define	Terminal Connection	Description
1	BUS_ACC	ON power	Turn-on switch
2	DI_IN_01	Charging wake-up	High level effective (Prohibition of starting auto charging)
3	GND	Ground	Car constant power supply negative
4	DI_IN_02	Switch 2	
5	DO_24V_PWM_02	Drive output 2/PWM1	DC24V current 0.5A
6	DO_24V_PWM_03	Drive output 3/PWM2	DC24V current 0.5A
7	DI_IN_03	Switch 3	
8	AI_V_ADC_07	Analog input 7 (temperature sensor)	
9	DO_24V_04	Drive output 4	DC24V current 0.5A
10	AI_V_ADC_08	Analog input 8 (temperature sensor)	
11	DI_PWM_04	Switch 4/Pulse capture, Forward and reverse speed, External sensor speed foot, Compatible with DI input	
12	DI_IN_05	Switch 5	
13	DO_24V_05	Drive output 5	DC24V current 0.5A
14	RS232_RX1	RS232_RX	
15	MX2_N	Ethernet terminal pin 6	
16	MX1_N	Ethernet terminal pin 2	
17	CAN3_H	CAN3, Complies with CAN2.0B specification, Optional CAN wake-up	
18	CAN2_L	ICAN-L	CAN2, Complies with CAN2.0B specification, Optional CAN wake-up
19	CAN1_H	PCAN-H	CAN1, Complies with CAN2.0B specification, Optional CAN wake-up
20	VBAT+	Constant electric power	Car constant power supply positive

61	AI_V_ADC_01	Analog input 1 (temperature sensor)	
62	DI_WKUP_06	Switch 6, Charging signal, High wake-up	
63	DI_IN_07	Lock 1	Switch 7
64	GND	ADC ground	
65	AI_V_ADC_02	Analog input 2 (temperature sensor)	
66	AI_V_ADC_03	Analog input 3 (temperature sensor)	
67	AI_V_ADC_04	Analog input 4 (temperature sensor)	
68	AI_V_ADC_05	Analog input 5 (temperature sensor)	
69	AI_V_ADC_06	Analog input 6 (temperature sensor)	
70	DI_IN_08	Cylinder release feedback	Switch 8
71	DI_PWM_09	Connector in place feedback	Switch 9/Pulse capture, Forward and reverse signal, External sensor signal flow, Compatible with DI_inpp1
72	DI_IN_10	Switch 10	
73	DO_24V_06	VC40	12V/24V controllable output
74	RS232_TX1	RS232_TX	RS232_TX
75	MX2_P	Ethernet terminal pin 3	
76	MX1_P	Ethernet terminal pin 1	
77	CAN3_L	CAN3, Complies with CAN2.0B specification, Optional CAN wake-up	
78	CAN2_H	ICAN-H	CAN2, Complies with CAN2.0B specification, Optional CAN wake-up
79	CAN1_L	PCAN-L	CAN1, Complies with CAN2.0B specification, Optional CAN wake-up
80	VBAT-	GND	Car constant power supply negative

4.Feature list

Function	Definition	Description
Time and Date	Time and Date	Provide local time and date of the vehicle (accurate up to milliseconds)
	Automatic Calibration	Can automatically calibrate the time, ensuring that the time error is within ±55 within 24 hours
	Time synchronization	Obtains time from cloud platform and synchronizes it
Location Service	Location Accuracy	Can synchronize time with ECU through CAN network (requires support for factory protocol).
	Antenna Detection	Supports GPS/BDS, first positioning time <32s, positioning accuracy <2.5m CEP50
	Running Track	Supports GPS antenna disconnection detection and antenna protection
Network Communication	Horizontal positioning accuracy	Horizontal positioning accuracy: <2.5m CEP50
	Supports global communication	Supports global communication
	Supports sending different data content to different platforms	Supports sending different data content to different platforms
Device Anti-tampering	WIFI	Surface-mount WGM SIM card
	WIFI	Can simultaneously connect to more than two platforms (maximum of 4 platforms)
	WIFI	2.4GHz Wi-Fi, Supports IEEE 802.11b/g/n standards, WPA/WPA2 security
Battery Swap	WIFI	Due 100 Mbps Ethernet RJ45 interface
	WIFI	
	WIFI	

Data Acquisition	CAN	Two channels (250Kbps/500Kbps) are standard, with a maximum support of three high-speed CAN communication interfaces.
	RS232	Supports one RS232 channel for data exchange.
	RS485 (optional)	Supports one RS485 channel for data exchange.
Data Redelivery	Digital Input	Collection of 10 DI inputs.
	Digital Output	Six DO outputs, DC24V current 0.5A.
	Voltage Collection	Can collect and report the voltage of the vehicle's battery and backup battery.
Data Encryption (optional)	Analog Input	Supports 8 ADC inputs, such as temperature sensor applications.
	Real-time data storage	Expands EMMC storage capacity, default 32GB, expandable.
	Data Upload	Redirection authentication for data upload and download.
Data Exchange	Data Download	Supports remote data/command download control.
	Supports remote data/command download control.	
	Supports remote data/command download control.	
Input Voltage	Rated Power	Supports remote data/command download control.
	Rated Power	Supports remote data/command download control.
	Rated Power	Supports remote data/command download control.
Power Management	Work mode	Supports remote data/command download control.
	Work mode	Supports remote data/command download control.
	Work mode	Supports remote data/command download control.
Independent Operation	Independent Operation	Supports remote data/command download control.
	Independent Operation	Supports remote data/command download control.
	Independent Operation	Supports remote data/command download control.
OTA	OTA	Supports remote data/command download control.
	OTA	Supports remote data/command download control.
	OTA	Supports remote data/command download control.
Terminal Management	Terminal Management	Supports remote data/command download control.
	Terminal Management	Supports remote data/command download control.
	Terminal Management	Supports remote data/command download control.
Self-Check	Self-Check	Supports remote data/command download control.
	Self-Check	Supports remote data/command download control.
	Self-Check	Supports remote data/command download control.
Battery Swap	Battery Swap	Supports remote data/command download control.
	Battery Swap	Supports remote data/command download control.
	Battery Swap	Supports remote data/command download control.

5.Software

- Support the data acquisition of vehicle controller based on CAN2.0B.
- Support the instruction distribution of controller through cloud platform.
- Support data transmission, continuous transmission, local data storage.
- Support remote OTA upgrade, local USB disk upgrade.
- Support GPS position information collection.
- Support Driving behavior analysis.

6.Element

Name	Quantity	Unit	Note
V-BOX mainframe	1	set	Standard
Terminal power & signal connection terminal wire	1	piece	Optional
LTE+GPS+WIFI Antenna	1	piece	Three-in-one
Package box	1	set	Standard

7.Certificate



ISED RSS warning

This device complies with Innovation, Science and Economic Development Canada licence-exempt RSS standard (s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Innovation, la science et le développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED Radiation Exposure Statement:

This equipment complies with ISED RF radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. Cet appareil est

conforme aux limites d'exposition de rayonnement RF ISED établies pour un environnement non contrôlé. Cet émetteur ne doit pas être co-implanté ou fonctionner en conjonction avec toute autre antenne ou transmetteur.

Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur & votre corps.

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

Tous les changements ou modifications non expressément approuvée par le responsable de la conformité pourrait vider l'utilisateur est habilité à exploiter l'équipement.

- (1) 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.

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

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.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.