

# Remote Wireless Car Intelligent Terminal T-BOX Introduction(G-M402)



Shenzhen Dragon Bridge Technology Co.,Ltd

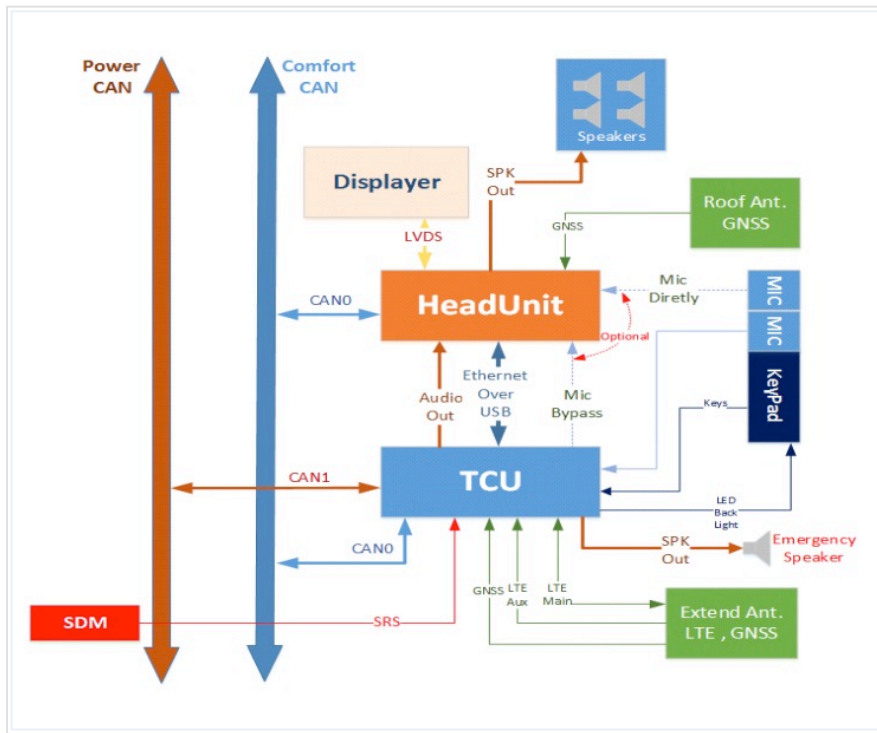
Web:[www.roadragon.com](http://www.roadragon.com)

# Features

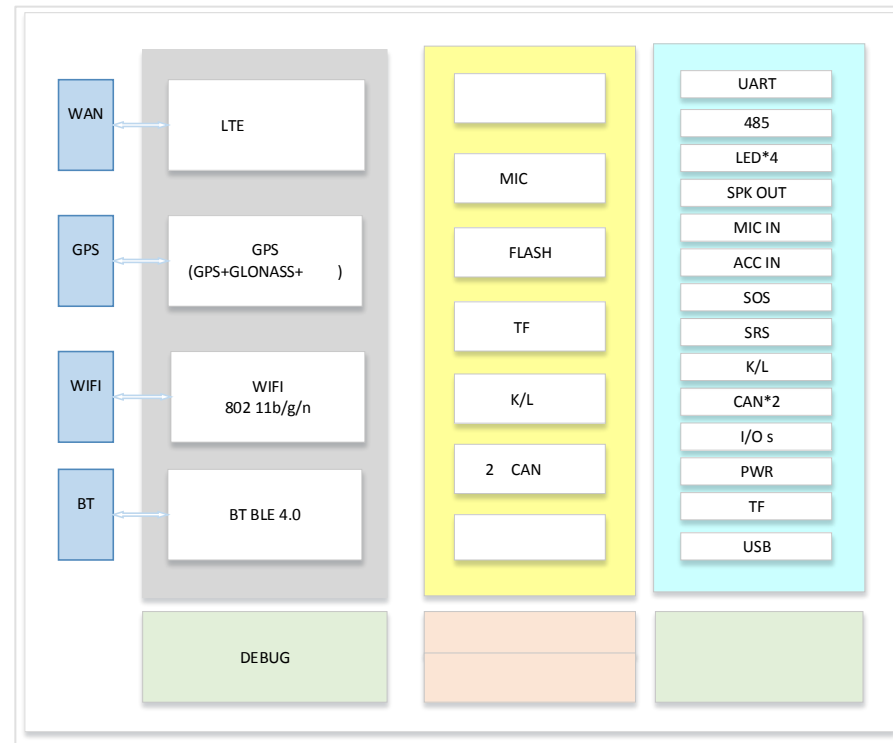


- Designed for car application, multi-function, low power consumption, remote monitor terminal system ;
- Support ECALL, BCALL, ICALL, CAR searching, security alarm, remote checking, etc ;
- WA N: Support 2G/3G/4G voice & data ;
- GPS: Support GPS/BeiDou/Glonass system ;
- WIFI: Support 2.4G frequency, 802.11 b/g/n, support Soft AP function, ;  
Support WEP/TKIP/AES encryption technology ;  
Support WPA & WPA 2.0 standard ;
- Bluetooth : Support low consumption BLE 4.0 ;
- CAN: Support 2 channel high speed CAN, fit for CAN 2.0 standard ;
- K/L : Support KWP2000 all kinds of protocol can-bus
- OBD : Support 9 protocol of passenger car OBD , support J1939 protocol of business car , vehicle private protocol ;
- TF Card : Support TF card & TF card encryption
- Chipset encryption : Hardware chipset data encryption
- Six-Axis Gyroscope : Support Wake up alarm when ACC off and car-dragging, Algorithm of driver behavior
- Audio signal : Support voice communication and MIC input, TTS voice broadcast
- SRS signal input : Support Air bag blow out signal input ;
- SOS button : Support SOS button input ;
- Back up battery : Built-in back up batter
- External interface : Support 1 RS585 and 1 RS232 interface ;
- Waterproof : Support IP54 & IP65

# Car communication Architecture



# System block diagram



## Main function

### Real time function

E-Call	Users can press this button when it's in emergency condition, it will connect to calling center in priority
B-Call	If car accident happens, press this button, send road rescue signal to control center, to get help from them
I-Call	Press this button can connect to calling center, device will send real-time location to server, to do destination search and navigation
Internet function	Device provide WIFI hot pot, other device can use this hot pot to connect internet
Remote control	Control car windows up, car searching, door lock/unlock, air blast, Windows auto up after ACC off, auto fold rearview mirror after ACC by CAN BUS

### Communication management function

Sleep mode	Goes into sleep mode 5 minutes after ACC OFF
2G/3G/4G reconnect after offline	Auto reconnect after GPRS offline
Communication protocol	Use TCP protocol
Back up IP	Total 3 IP gateway address and port, include 2 reserved backup IP, switch to backup IP when gateway is busy
Parameters configure	Set up IP address, port, APN by platform, and it has password protection

## Main function

### Alarm function

Ignition alarm	Upload ignition alarm, include alarm time, GPS information
Engine off alarm	Upload engine off alarm, include alarm time, GPS information
Car low voltage alarm	Upload low voltage alarm when lower than configured voltage, include alarm time, GPS information
Long idling alarm	Upload alarm when idling time longer than configured time, include alarm time, GPS information
Water temperature alarm	Upload alarm when water temperature over than configured value, include time, GPS information and temperature value( for vehicle support OBD water temperature data)
Over speed alarm	Upload alarm when speed over than configured speed, include time, GPS information Accelerated speed higher than configured value during car driving, after filter out front & rear car speed, is defined as serious collision scene, upload alarm, include time, GPS information, collision accelerated speed
Collision alarm	
Car-dragging alarm	Upload alarm when car-dragging, include time, GPS information
Driver fatigue alarm	Automatic Upload driver fatigue alarm when driving too long
Device plug in alarm	Upload alarm when device plug in
Device plug out alarm	Upload alarm when device plug out
Long time positioning alarm	Positioning time longer than configured value when ACC on, upload long time positioning alarm, include alarm time, GPS information
Air bag blow out alarm	Upload alarm when air bag blow out, include alarm time, GPS location, etc.

## Locaton function

Location data	Include Longitude,latitude,time,satallite numbers, speed, direction, ACC status, battery voltage,OBD speed
LBS function	include LBS station LAC & Cell ID info, operator code
Intelligent route	Teminal automatic decide the route, intelligent upload GPS point, achive route batterfly effective
Search vehicle location	Realtime search vehicle location
Upload loccation by time interval	Platform set sending gps location back method & time interval

## Driver behavior

Driver behavior	Include terminal time of the drive cycle start, drive cycle total mileage, average speed, max speed, over speed time, over speed times, idling time, sudden accelerate, sudden decelerate, sudden turn info.
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## Car CAN BUS function

Car data flow	Upload key data low of car in every 30S, include total mileage, toal oil consumption, RPM, car speed, water temperature, batter voltage, air income temperature, enviroment temperature, air income voltage, meter mileage, brake pad attrition rate, tire pressure data, oil level, gears, door, windows, safty belts, car lights, etc. Car data status. Detail data depends on car data supports
Read vehicle faults	Device identify vehicle fault info, vehicle fault status changing, upload to platform
Clear vehicle faults	Clear vehicle faults by send command through platform
CAN control	Control windows up, car searching, door lock/unlock, air blast, fold rearview mirror by CAN or K/L cables

## Remote management function

Remote upgrade	Remote upgrade firmware by GPRS, through FTP server
Remote re-start	Re-start device by command through data channel
Remote search	Search variety alarm parameters like device info, vehicle types, GPRS communication parameters, heartbeat parameters, GPS/CAN return parameters, SIM card info, GPS/CAN data flow, present fault,sudden acceleration,sudden deceleration, sudden turn, through platform by send GPRS command
Remote configuration	Set up device info, vehicle types, GPRS communication parameters, heartbeat parameters, GPS/CAN return parameters, clear vehicle faults, control restart, recover to factory setup, clear blind area data, different alarms parameters, sudden deceleration, sudden turn, through platform by send GPRS command
Version upload	Upload version info everytime when ACC ON, Platform send command to checking car version info
SIM card info upload	Upload SIM card IMEI number everytime when ACC ON, platform send command to check IMEI info
Module self-check	Device status self-check: check different function modules( GPS module, CAN module, Flash, 3D module), if works normal and upload alarms when error happens

## Bluetooth

Bluetooth connection control	Control vehicle's door lock/unlock, searching car, air blast by bluetooth
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## Backup batter

Track & alarm by backup battery	When device plug out, provide power by backup battery, upload plug out alarm and route location info (Option)
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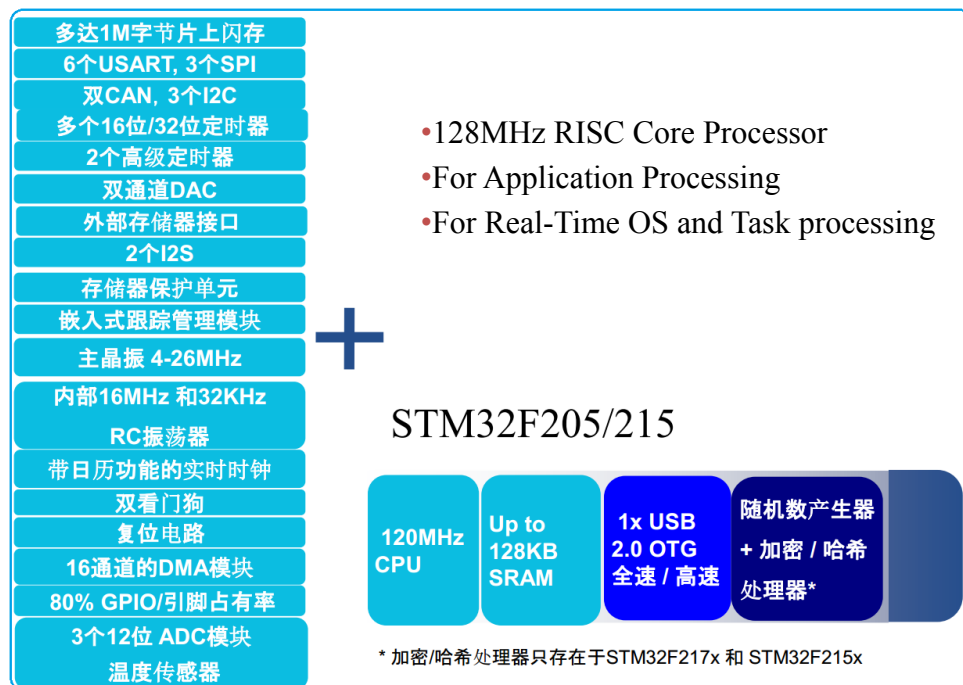
## External interface

External interface	Provide external RS 485 & RS 232 interface, can connect camera, temperature sensor, RFID reader, fuel sensor, TPMS, etc
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# Key components

## MCU: STM32F205VET6

1. Common car processor, frequently used in different car electrical units
2. ARM-based 32-bit MCU, 150DMIPs, up to 1 MB Flash/128+4KB RAM, USB OTG HS/FS, Ethernet, 17 TIMs, 3 ADCs, 15 comm. interfaces & camera



Brand	ST
Model	STM32F205VET6
Structure sys	RISC
Built-in Memory	512KBytes
Built in RAM	128KBytes
Timer	Up to twelve 16-bit and two 32-bit timers
UARTS	4 USARTs and 2
IIC	3 × I2C interfaces (SMBus/PMBus)
SPI	Up to 3 SPIs (30 Mbit/s), 2 with muxed I2S
Watchdog Support	
External interruption	Up to 140
CAN	2 × CAN interfaces (2.0B Active)
Work tem	3.13 to 5.5v
Lowest power	<300uA
Tem range	-40 to 125°C
Restore tem	-60 to 155°C



# Key components

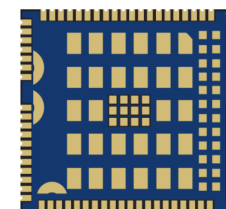
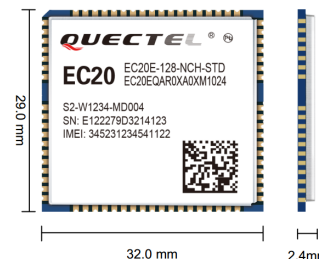
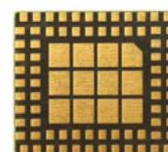
## GPRS/GPS module

2G--SIMCOM 800L  
 4G--QUECTEL EC20  
 泰斗 N303-2AR



Brand	泰斗
Central frequency	GPS: 1575.42MHz 北斗: 1561.098MHz
Hot start	<1 sec
Cold start	<32 sec
Sensitivity	-160 dBm (track ) -147 dBm ( capture )
Location accuracy	<10m (RMS) <5M(WAAS) <2.5m(DGPS)
Work tem range	-40°C to +85°C
Storage tem range	-40°C to +85°C

Brand	Quectel
Chipset	Qualcomm MDM9X07
Function	Voice/SMS/Data/TCP/UDP/PPP/FTP/HTTP/SMTP/MMS/FTP/SMTP/NTP/PING/DTMF/FILE*/CMUX/QMI
Work tem	-40°C to +85°C
Storage tem	-40°C to +90°C
Work voltage	3.3~4.3V
Interface	LCC packing
Speed constant	LTE Max 100Mb
Certificate	SRRC,3C
Frequency support	FDD LTE: B1/B3 TDD LTE: B38/B39/B40/B41 TDSCDMA: B34/B39 WCDMA: B1 CDMA2000 1x/EVDO: BC0 GSM: 900/1800MHz



2G SIMCOM800L

Quectel 4G module

# Key component

Bluetooth: TI CC2541  
 WIFI : Quectel FC20



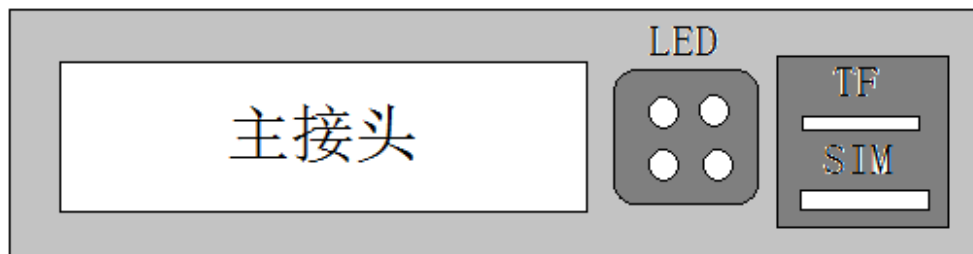
Brand	TI
Model No.	CC2541
Work voltage	3.9V
Speed constant	Support 250-kbps, 500-kbps, 1-Mbps, 2-Mbps
Work temp	-40° C to +85° C
External	5 channel DMA Universal timer (1 of 16 bit, 2 of 8 bit) Infrared (IR) generate circuit 8 channel 12 bit ADC (ADC) High encryption standard(AES) 2 of function UART 23 of universal I/O pin I2C port

Work voltage	3.14~3.46V, typical value 3.3 V
Data speed	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps
WLAN standard	IEEE 802.11b/g/n standard
Output power	802.11b/11Mbps: 6.5dBm 802.11g/54Mbps: 13.5dBm 802.11n/65Mbps: 9.5dBm
SDIO port	Support SDIO 2.0
Antenna port	Support antenna port 1x1
Work temp	Normal work temp: -35°C ~ +80°C Limit work temp: -40°C ~ -35°C and +80°C ~ +85°C Storage temp: -45°C ~ +90°C
Work voltage	

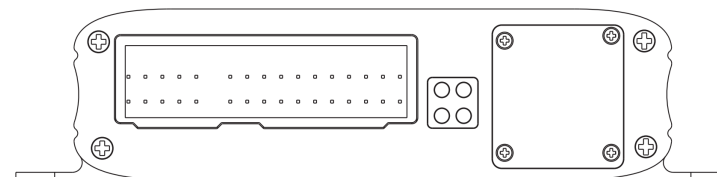
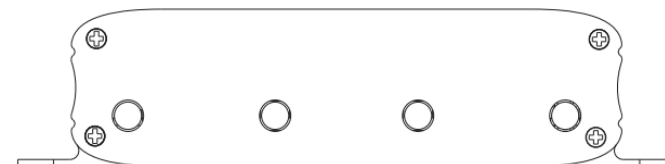


# Mechanical features

Product size : 123\*80\*35mm



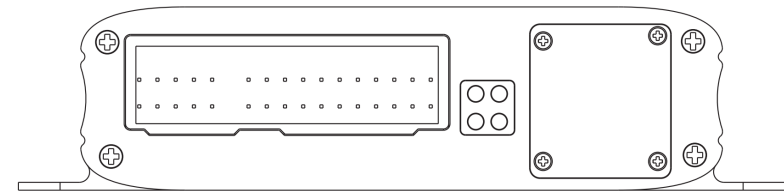
Connector	Model No.
Main connector	Normal MINI SIM
LED	CAN1、CAN2、GPS、4G
TF card	4G TF Card
SIM card	Rosenberger 59S22B-40MT5_D



# Interface definition

## Main interface : DJ7341-1.2-1.8-10AW

Pin number	Pin name	Signal description
1	NC	/
2	V+	Power input
3	CAN_H	CAN signal pin
4	IN	Signal input pin
	KBUS	K signal pin
5	CAN2_L/ 485/232	CAN signal pin (2 <sup>nd</sup> CAN signal pin) 485/232 signal pin
6	J1850- OUT	J1850- Signal output pin
7	NC	/
8	GND	GND
9	CAN_L	CAN Signal pin
10	OUT2 LBUS	Signal output pin L signal pin,
11	CAN2_H 485/232	CAN signal pin (2 <sup>nd</sup> CAN signal pin) 485/232 signal pin
12	J1850+ ACC_IN	J1850+ Signal input pin
13	GND	GND
14	CAN2_L/	CAN signal pin (2 <sup>nd</sup> CAN signal pin)
15	OUT4	Signal output pin
16	OUT3	Signal output pin
17	OUT2	Signal output pin



18	OUT1	Signal output pin
19	SPK+	Speaker signal output pin
20	MIC+	Mic signal input pin
21	SOS_IN	SOS signal input pin
22	485_2B/232_2OUT	485/232 signal pin
23	485_1B/232_1OUT	485/232 signal pin
24	5V_OUT	5V power output
25	CAN2_H	CAN signal pin (2 <sup>nd</sup> CAN signal pin)
26	IN4	Signal input pin
27	IN3	Signal input pin
28	IN2	Signal input pin
29	ACC_IN	Signal input pin
30	SPK-	Speaker signal output pin
31	MIC-	Mic signal input pin
32	GND	GND
33	485_2A/232_2IN	485/232 signal pin
34	485_1A/232_1IN	485/232 signal pin

## 【EVCARD main car model & function】

### E-Car CAN main data

- 1、 Rest battery percentage ( SOC )
- 2、 Battery health status ( SOH )
- 3、 Battery pack voltage
- 4、 Battery pack current
- 5、 Single unit highest voltage
- 6、 Single unit lowest voltage
- 7、 Single unit highest temp
- 8、 Single unit lowest temp
- 9、 BMS charging status
- 10、 BMS error status

### E-Car models

广汽传祺的GA5

荣威E50

Cherry EQ

JAC IEV4/IEV5/IEV6

BJ motor EV260/EC200/EV150/EV160

BYD E6

智豆D2S/D1

众泰 云100

### Petrol car model

BMW118i/ Hyundai Verna/KIA K2/Brilliance Auto  
all series

### Vehicle status

Door、 windows、 lights、 Lock、 Horn、 Front wheel steering angle、 Gear  
、 Brake info、 Parking brake info、 Trunk、 Car sunroof、 Motor central  
warning, car frame number, error code, endurance mileage

### Intelligent control

Remote door lock

Remote door unlock

Remote ignition

Remote car searching

Remote window rolling up

Near field Mobile bluetooth control

Security alarm

Ignition capture pics, remote take pics

### Basic function

GPS location 、

Driver behavior、

Ignition on/off recognize、

GPRS/4G wireless transfer、

Bluetooth near field communication



阳光优车酷



中国南方电网  
CHINA SOUTHERN POWER GRID

## 【Car-sharing main function】

## BMW 118i

### CAN main data

- 1、 Dash board mileage
- 2、 Engine RPM
- 3、 Car speed
- 4、 Rest fuel level
- 5、 Endurance mileage
- 6、 Tire pressure
- 7、 Vehicle fault

### E-car CAN car model coverage

BMW 118

BMW F07 chassis

BMW F35 chassis

### Basic function

GPS location route 、  
Driver behavior、  
Ignition on/off recognize、  
GPRS/4G remote transfer、  
Bluetooth communication  
SOS calling center

### Vehicle status

Door、 windows、 lights、 Lock、 Horn、 Front wheel steering angle、 Gear、 Brake info、 Parking brake info 、 Trunk, Car sunroof、 Motor central warning、 car frame number

### Intelligent control

Remote door lock

Remote door unlock

Remote ignition

Remote car searching

Remote window rolling up

Near field fold rearview mirror

Air bag blow out alarm



## 【Commercial car management main functions】

Upload vehicle running status, driving mileage, vehicle fault, vehicle condition data, fuel consumption, driver behavior data to fleet management platform by GSM/GPRS module, external connect fuel sensor, temprature sensor, RFID reader, camera, speaker, MIC,etc.

GPS/location/route	Fatigue drive	Cold chain temp monitor	Mileage	Car speed	Engine work time	Cruise control switch	Key car
Sudden acceleration	idling	Remote voice alarm	Fuel consumption	RPM	Engine temp	Engine torque mode	CAN data
Sudden deceleration	High speed N gear drive	Bluetooth bracelet	Vehicle fault	accelerator pedal position	Air pressure	Fuel consumption rate	10-90 items
Sudden turn	ACC ON/OFF	Water temp alarm	Battery voltage	Brake pedal position	Inlet manifold pressure	Engine load rate	
Over speed	Plug out alarm	TPMS alarm	Air flow	Clutch switch	Engine oil pressure	Power take-off status	

### External accessories

Fuel sensor



Speaker



Camera



temp sensor



RFID reader





Thanks!