

# Description of software functions

HSRT products are intelligent cockpit platform products based on Qualcomm 8155P chip , including MCU , QNX, Android system, the main functions include MCU, QNX, Android system basic driver, CAN Protocol Stack, log system, IMU, USB upgrade, Wifi , firewall, time synchronization, Android and QNX, communication between QNX and MCU and system power management, system diagnostics, AOSP , native Launcher, settings and other functions.

## 3.1 Android boot

Normal power-on start, Android can boot normally, display boot animation, Launcher display is normal, touch can respond normally.

## 3.2 USB adb

Support USB ADB function: adb interface can be recognized and connected normally, and adb can be used for debugging.

## 3.3 U disk upgrade

Support USB upgrade function: insert the U disk containing the USB upgrade package into the device, the upgrade package can be recognized, the user can choose to start the upgrade, after the upgrade is completed, the new version is updated successfully and successfully started, and the version number change can be checked.

### 3.4 Wifi STA / SoftAp

1. Support Wifi STA function, can connect to the Internet through AP hotspot.
2. Support Wifi SoftAP function, support other STA devices to connect to car hotspot.

### 3.5 Network configuration

1. Support QNX and Android virtual Ethernet network devices.
2. Support IP network configuration.
3. Support Ethernet communication, interconnection and related protocols. The support agreement is as follows:

| Layer   | Protocol          | SOC |
|---------|-------------------|-----|
| Layer 1 | 1000Base-T1       | √   |
| Layer 2 | IEEE Ethernet MAC | √   |
| Layer 3 | IPv4              | √   |
|         | IPv6              | √   |
|         | ICMP              | √   |

|           |       |   |
|-----------|-------|---|
|           | ARP   | √ |
|           | NAT   | √ |
| Layer 4   | TCP   | √ |
|           | UDP   | √ |
| Layer 5-7 | DHCP  | √ |
|           | RTP   | √ |
|           | RTCP  | √ |
|           | HTTP  | √ |
|           | HTTPS | √ |

## 3.6 Firewall

Support firewall rules preset, including black and white list management, IP, port, network port, URL, UID management policy configuration, support firewall function on/off, network isolation rules, etc.

You can configure the firewall black and white list by modifying the preset firewall rules to check whether the firewall works.

## 3.7 Power management

Support system power management, support CAN network wake-up (CAN message received within 10S is the wake-up source), CAN network sleep (CAN message not received over 10S) triggers sleep, support system abnormal voltage detection and state transition, support MCU sleep, SOC

power-on/power-off process management, display backlight control, warning pop-up window processing, etc.

### **3.8 Support CAN Protocol Stacking and Message Handling**

Support CAN message receiving, sending, processing (such as timeout processing, diagnostic correlation, etc.) and forwarding to QNX, and provide QNX with a development library for reading/sending CAN messages.

### **3.9 IMU data reading and calibration**

Support QNX side IMU driver, support IMU calibration, calibration data storage, update, sampling frequency configuration, original data source reading, calibration data reading and other functions.

### **3.10 Time synchronization**

In addition to retaining the original network time synchronization method, it also supports GNSS time source synchronization method and MCU time source synchronization method (this project has no GNSS, only provides MCU time synchronization), and reserves the synchronization interface of other external

clock sources, and provides the priority configuration of each time source. At the same time, the time synchronization and calibration with the QNX side in the hypervisor system architecture are considered.

### **3.11 System Diagnosis**

Support cockpit ECU diagnostic functions, including basic diagnostic services (session, reset, control, communication, security access control, etc.), data read and write, diagnostic information recording, system error diagnosis, peripheral device/IO program control.

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.

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.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

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

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter and must be installed to provide a separation distance of at least 20cm from all persons.