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Dpofirs Dpofirsg7rpysawxg

ESP32 S3 A7670E 4G Development Board User Manual

Model: Dpofirsg7rpysawxg

1. Introduction

The Dpofirs ESP32 S3 A7670E 4G Development Board is a versatile and high-performance microcontroller board designed for a wide range of IoT, mobile, and smart home applications. It integrates an ESP32 S3R2 chip with low-power Wi-Fi and BLE 5.0, along with an A7670E 4G communication module, providing robust connectivity and advanced features for your projects.
This manual provides detailed instructions on the board's components, specifications, setup, operation, and troubleshooting to help you maximize its potential.

2. Product Overview

2.1 Package Contents

Upon opening the package, verify that all the following components are included:

- 1 x ESP32 S3 A7670E 4G Development Board
- 1 x Camera Module
- 1 x Speaker
- 1 x Ceramic Antenna
- 1 x FPC Antenna
- 1 x Ribbon Cable
- 1 x Screwdriver
- 1 x Screw Pack
- 4 x Double-sided Adhesive Tape
- 4 x Acrylic Panel
- 1 x USB Cable
- 1 x Terminal Connector



Figure 2.1: Overview of all components included in the package, showing the development board, camera, speaker, antennas, cables, tools, and acrylic panels.

2.2 Key Features

- **Enhanced Connectivity:** Features ESP32 S3R2 with low-power Wi-Fi and BLE 5.0, 16MB external flash, and 2MB stacked PSRAM.
- **Advanced Communication:** Equipped with an A7670E 4G communication module supporting LTE Cat-1/2G bands (B1, B3, B5, B7, B8, B20).
- **GNSS Positioning:** Supports GPS, Beidou, and GLONASS for accurate location tracking.
- **Camera Interface:** Includes an OV camera interface, compatible with ESP32 Camera framework for image recognition.
- **Flexible Power Options:** Supports onboard lithium battery charging, solar charging, and USB port charging with power management and protection circuits.
- **Rich Peripherals:** Multifunctional Type-C port, micro storage card slot (up to 32GB), RGB lighting, and various other interfaces.
- **Security Features:** Hardware encryption accelerator, RNG, HMAC, and digital signature module for enhanced IoT security.

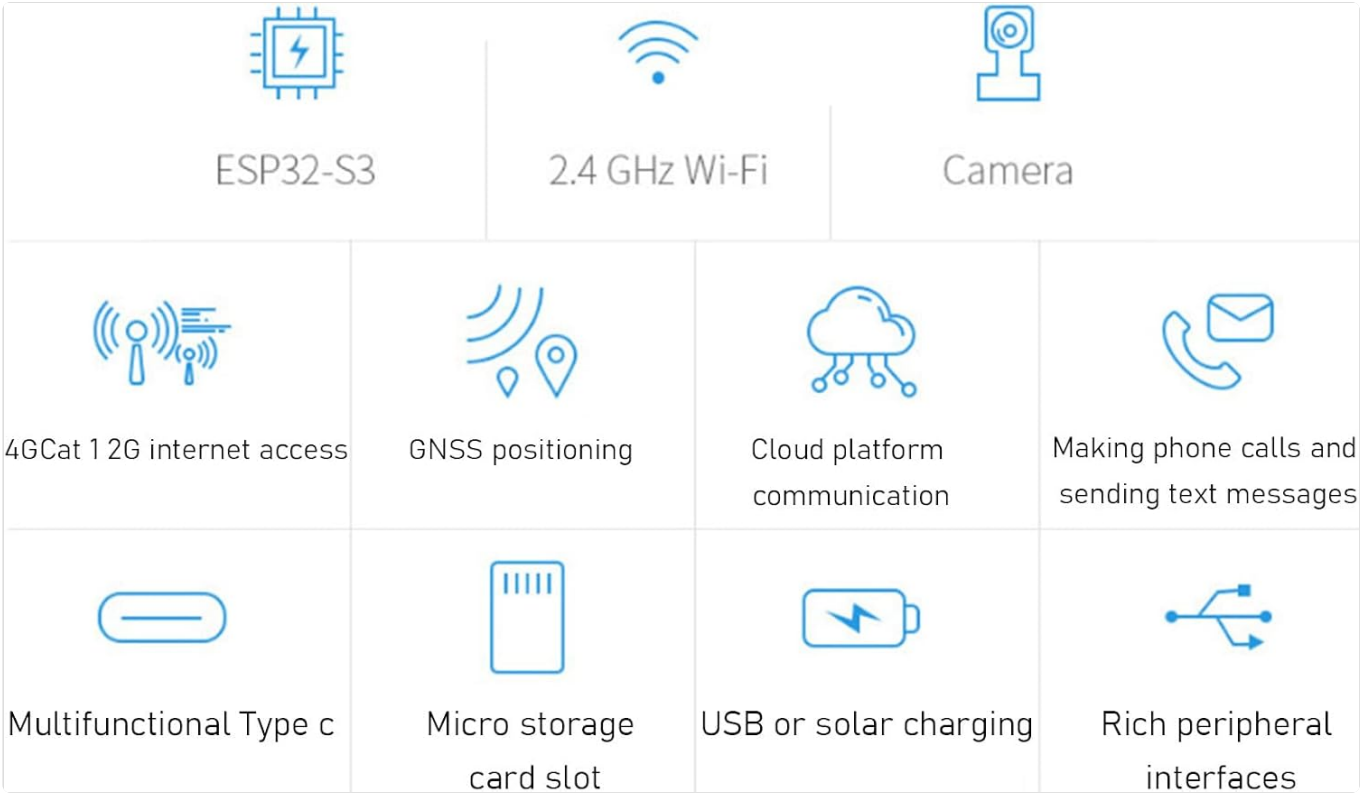

Figure 2.2: Visual representation of the board's core capabilities, including wireless communication, positioning, and power options.

3. Specifications

Feature	Description
Item Type	4G LTE Development Board
Material	PCB, Ceramic
Supported Frequency Bands	LTE FDD B1, B3, B5, B7, B8, B20
Data Transfer (UL/DL)	≤5 Mbps (UL), ≤10 Mbps (DL)
GNSS Support	GPS, Beidou, GLONASS
Processor	High-performance 32-bit LX7 Dual Core, up to 240 MHz
Wireless Connectivity	2.4 GHz Wi-Fi (802.11 b/g/n) and BT 5 (LE) with integrated antenna
Memory	512KB SRAM, 384KB ROM, 2MB Stacked PSRAM, 16MB External Flash (integrated)
Battery Support	1 (not included)
Memory Card Support	Max 32GB (not included)
Model Number	Dpofirsg7rpysawxg

4. Setup

4.1 Assembly

Follow these steps to assemble the development board and its components:

1. **Attach Acrylic Panels:** Use the provided screws and double-sided adhesive tape to secure the acrylic panels to the development board. These panels protect the board and provide a stable enclosure.
2. **Connect Antennas:** Carefully connect the ceramic antenna for GNSS and the FPC antenna for 4G/Wi-Fi/Bluetooth to their respective ports on the board. Ensure a firm connection.
3. **Install Camera Module:** Connect the OV camera module to the dedicated 24PIN camera interface on the board using the ribbon cable.
4. **Connect Speaker:** Attach the speaker to its designated audio output pins on the board.
5. **Power Connection:** Connect the USB cable to the Type-C port on the board and to a power source (e.g., computer USB port or USB power adapter). If using a battery, insert it into the battery slot (battery not included).

4.2 Initial Connection and Driver Installation

To begin using the board with your computer, you may need to install necessary drivers:

- **USB Connection:** Connect the board to your computer via the provided USB cable. The onboard USB switching chip allows direct connection to the A7670E USB for internet access or debugging.
- **Driver Installation:** For Windows and Linux systems, the necessary drivers for the ESP32 S3 and A7670E modules should typically install automatically. If not, refer to the official documentation for ESP32 and A7670E modules for manual driver installation instructions.

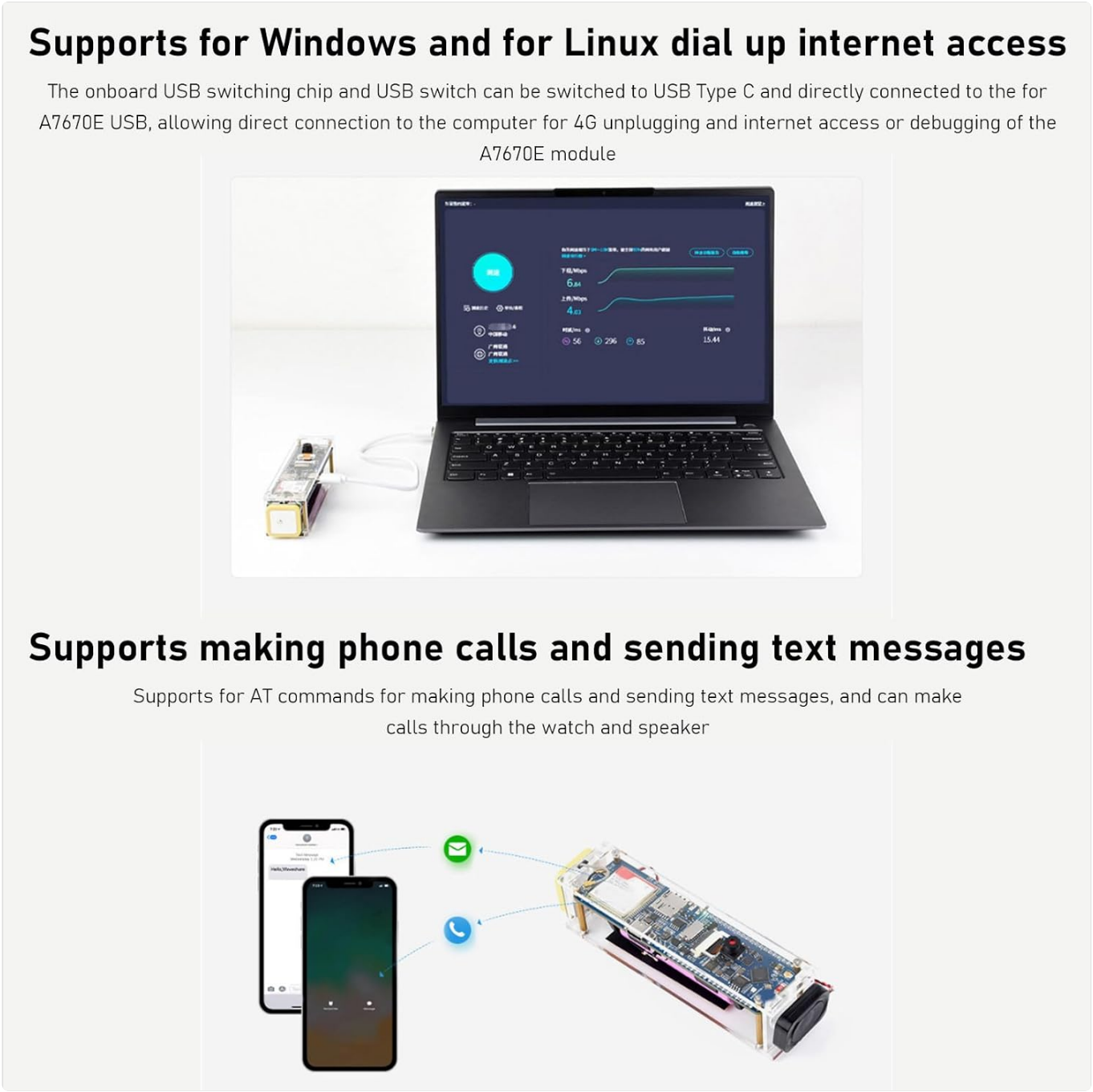

Figure 4.1: The development board connected to a laptop, illustrating its capability for dial-up internet access.

5. Operating Instructions

5.1 4G/2G Internet Access

The integrated A7670E module enables mobile network connectivity. Insert a compatible SIM card (not included) into the board's SIM card slot. The board supports LTE Cat-1 and 2G networks for data transfer.
You can use AT commands to configure and manage the 4G connection. Refer to the A7670E module's datasheet for a comprehensive list of AT commands.

5.2 GNSS Positioning

The board supports GPS, Beidou, and GLONASS for global navigation satellite system positioning. Ensure the ceramic antenna is properly connected for optimal signal reception.
You can retrieve positioning data using specific AT commands or through programming interfaces. This feature is ideal for tracking and location-based applications.

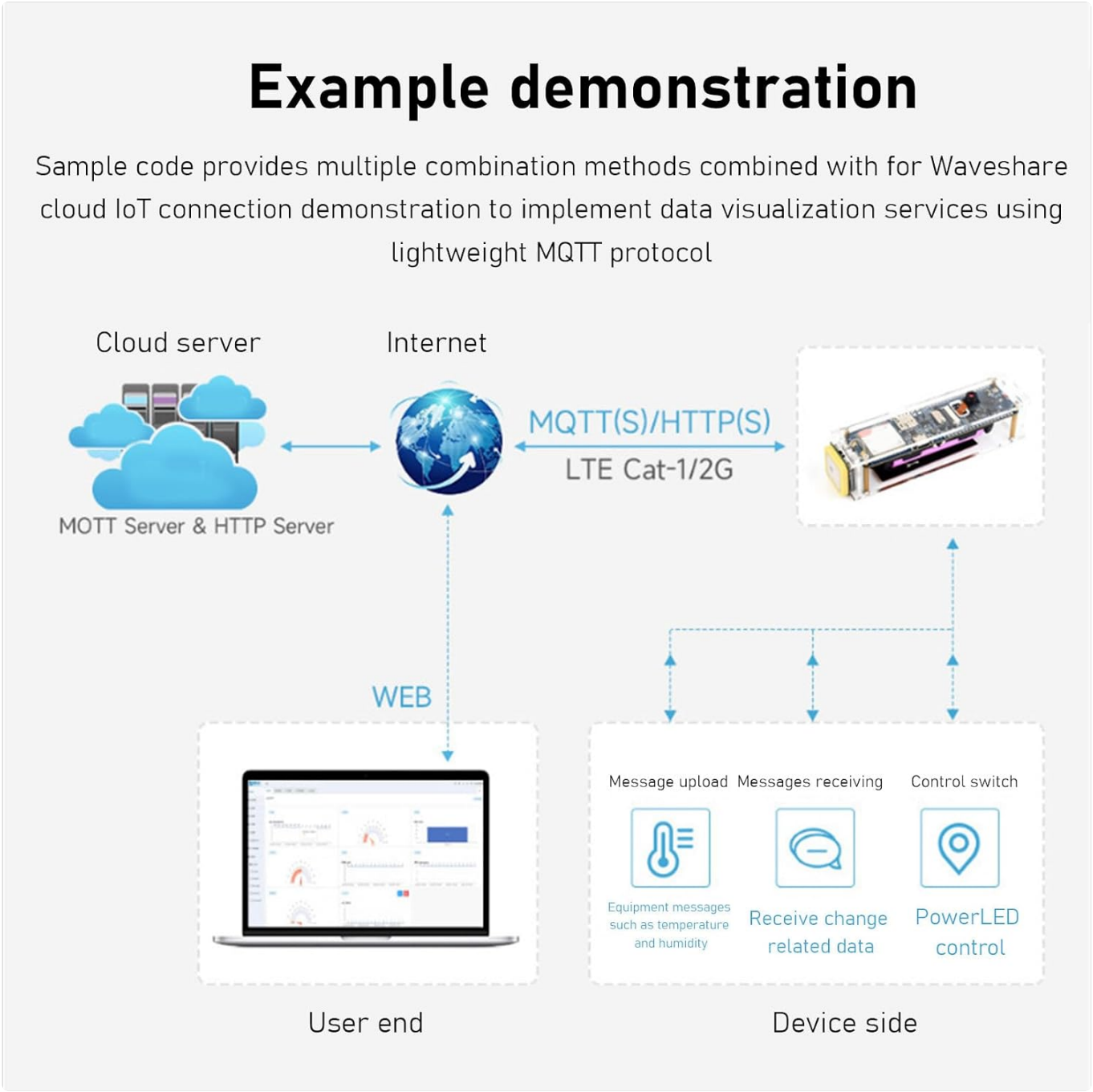

Figure 5.1: The board's support for GNSS positioning, including GPS, Beidou, and GLONASS.

5.3 Camera and Image Recognition

The board features an OV camera interface, allowing you to connect the included camera module. This enables image capture and, when combined with the ESP32 Camera framework, supports advanced applications like facial recognition and object detection.



Figure 5.2: The board's capability for image recognition using the connected camera module.

5.4 Voice Communication and SMS

With the A7670E module, the board supports making phone calls and sending text messages. Connect the included speaker for audio output during calls. These functions are typically controlled via AT commands.

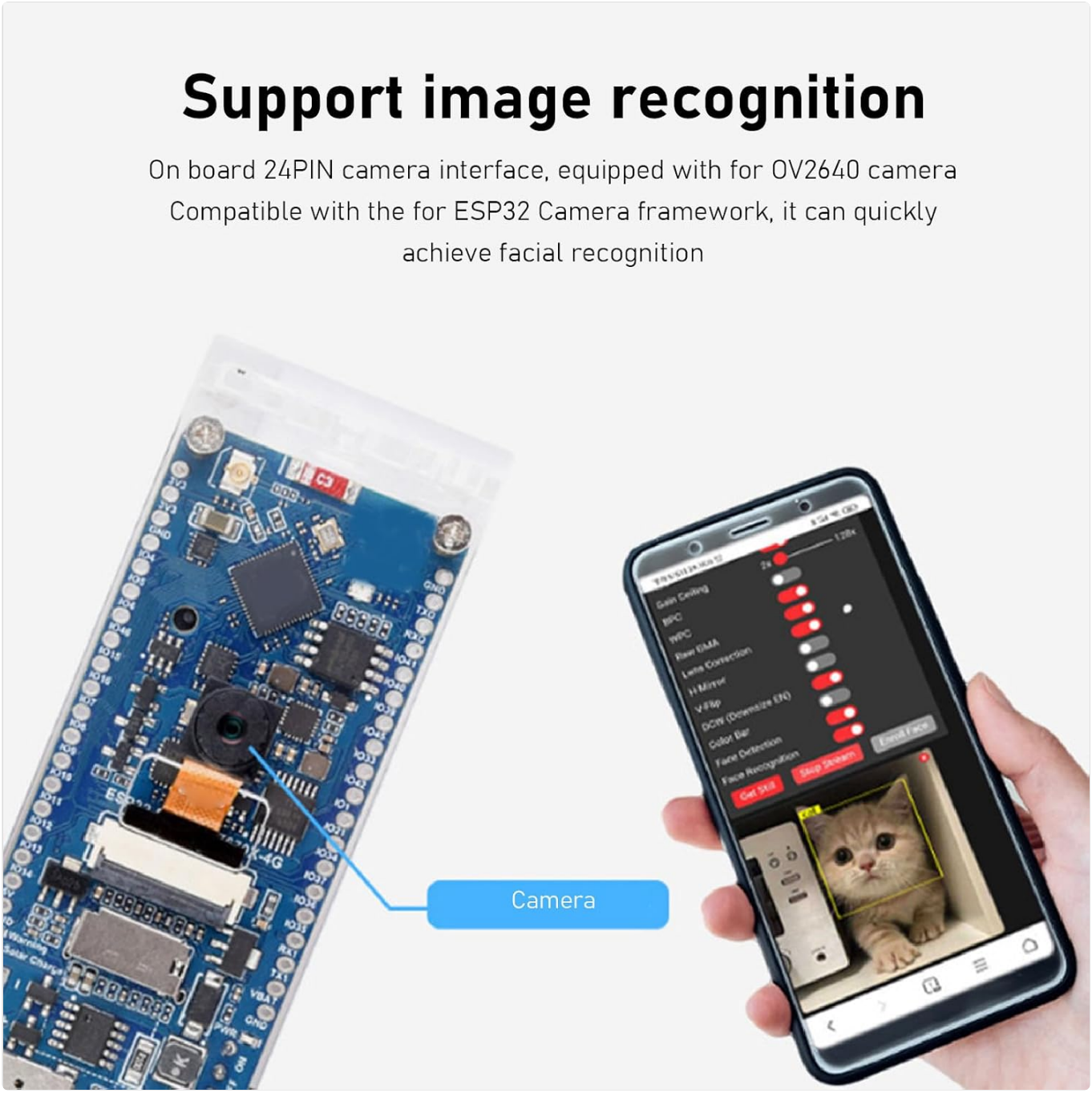

Figure 5.3: The board's support for voice calls and text messaging.

5.5 Power Management and Charging

The board offers flexible power options. It can be powered via the USB Type-C port. Additionally, it supports charging for an external lithium battery (not included) and can integrate with solar panels for charging, making it suitable for remote or off-grid applications. Onboard circuits manage power and provide protection.

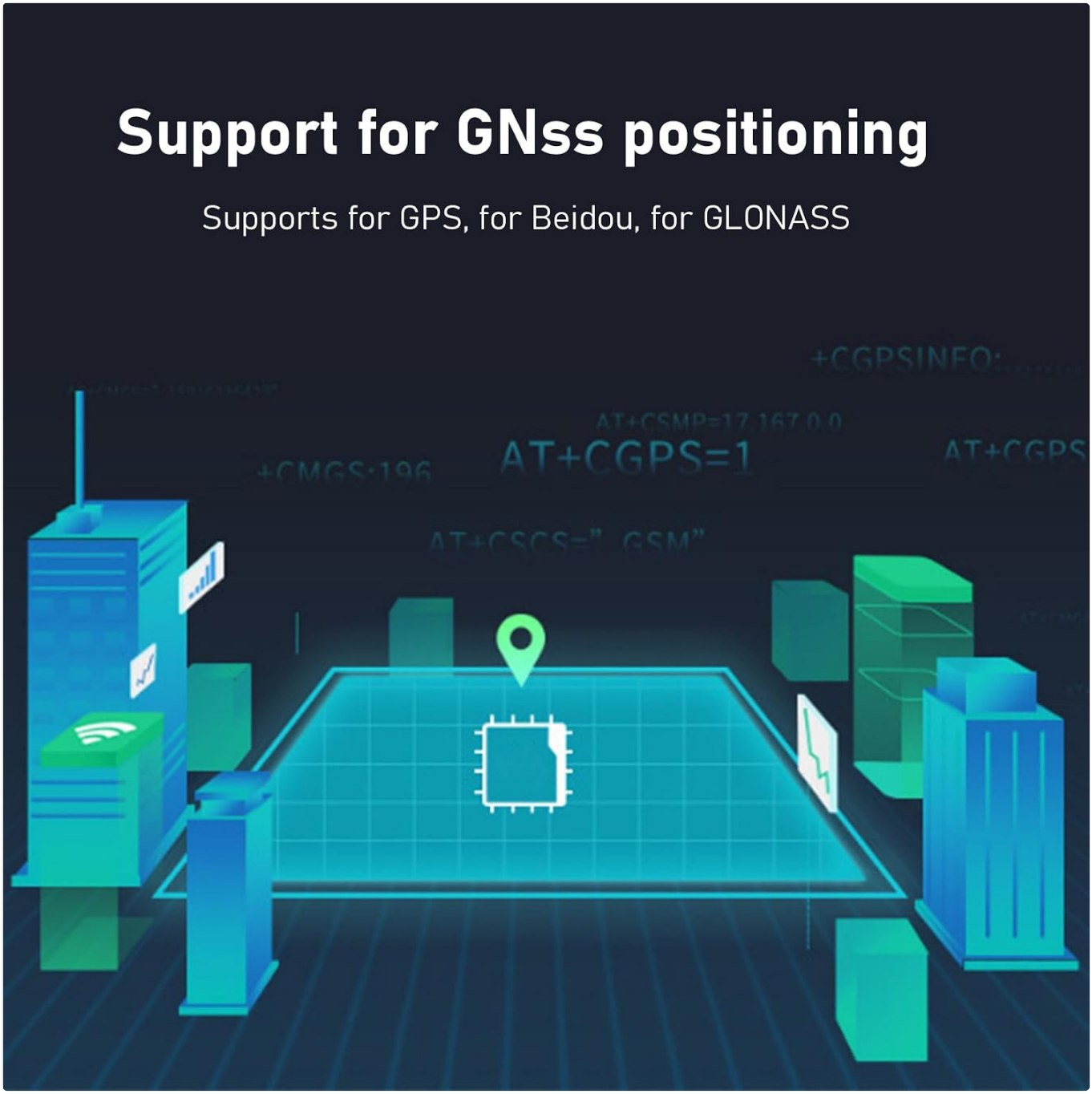

Figure 5.4: The board's support for solar panel or USB port charging.

5.6 Cloud Platform Integration and IoT Applications

The board is designed for seamless integration with cloud IoT platforms. It supports lightweight MQTT protocol for data visualization services. This allows for remote monitoring, control, and data reporting for various IoT applications, such as smart agriculture, environmental monitoring, and smart home systems.

Smart Garden Solution

This product can report various sensor data of the vegetable garden through MQTT, remotely control equipment switches, irrigation, fertilization, etc.



Figure 5.5: Example demonstration of cloud platform integration and data flow.



Server performance cloud monitoring:

This product can report various performance parameters of the for Pi server through MQTT, and monitor the running status in real time through a large visual screen on the cloud platform.



IoT GPS mobile positioning:

This product can regularly report the data of the GPS positioning module through MQTT, achieving mobile detection, animal or device positioning and tracking, etc.

Figure 5.6: Example of a Smart Garden Solution dashboard powered by the board.

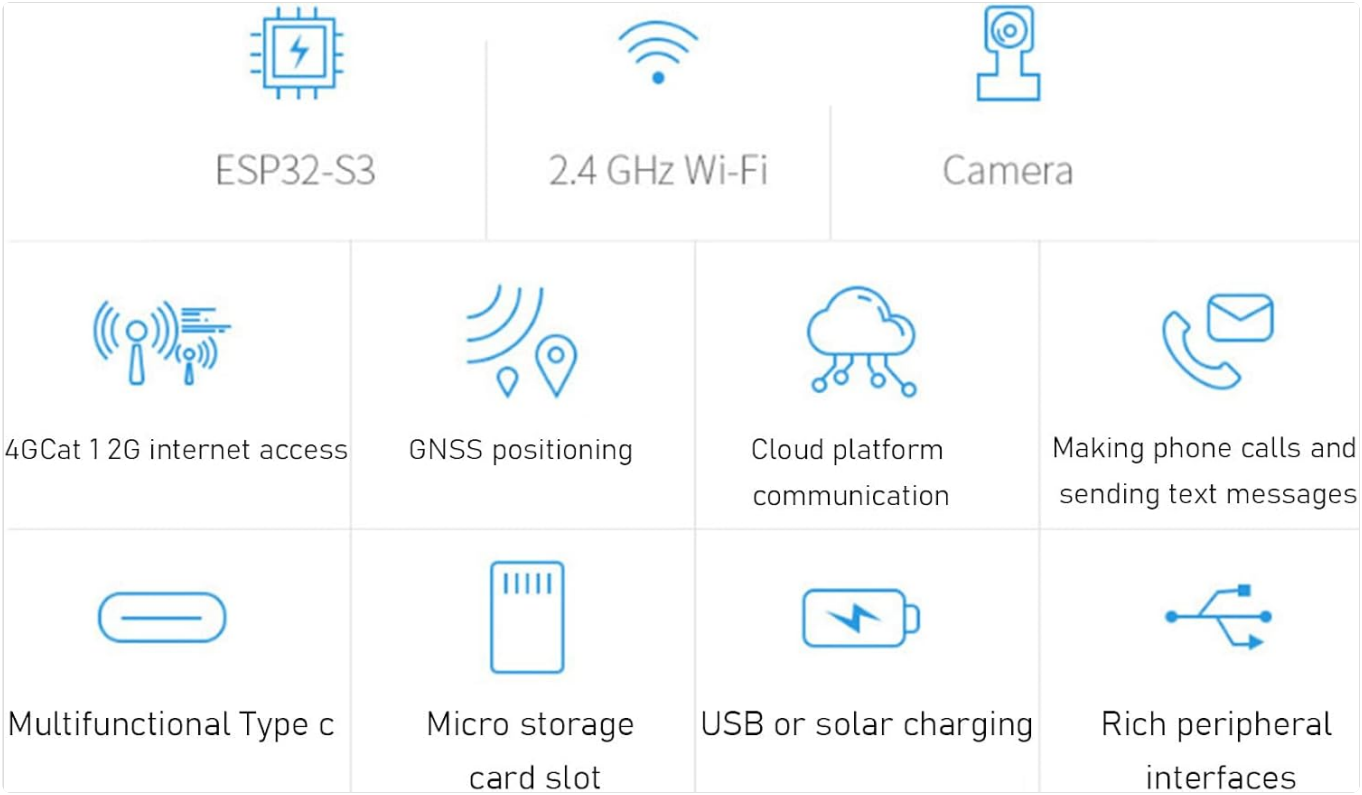

Figure 5.7: Examples of server performance monitoring and IoT GPS mobile positioning dashboards.

6. Maintenance

To ensure the longevity and optimal performance of your ESP32 S3 A7670E 4G Development Board, follow these maintenance guidelines:

- **Keep Clean:** Regularly clean the board with a soft, dry cloth. Avoid using liquids or abrasive cleaners.
- **Handle with Care:** Avoid dropping the board or subjecting it to strong impacts.
- **Storage:** Store the board in a cool, dry place, away from direct sunlight and extreme temperatures.
- **Static Electricity:** Always handle the board by its edges and use anti-static precautions to prevent damage from electrostatic discharge.
- **Firmware Updates:** Periodically check for firmware updates for the ESP32 S3 and A7670E modules from official sources to ensure the latest features and security patches.

7. Troubleshooting

This section addresses common issues you might encounter and provides solutions.

7.1 Power Issues

- **Board not powering on:**
  - Ensure the USB cable is securely connected to both the board and the power source.
  - Try a different USB cable or power adapter.
  - If using a battery, ensure it is charged and correctly inserted.

7.2 Connectivity Issues (Wi-Fi/Bluetooth/4G)

- **No Wi-Fi connection:**
  - Verify that the Wi-Fi antenna is properly connected.

- Check your Wi-Fi network credentials (SSID, password).
- Ensure the board is within range of the Wi-Fi access point.

- **No 4G/2G network:**
  - Ensure a valid and active SIM card is inserted correctly.
  - Verify the FPC antenna is securely connected.
  - Check network coverage in your area.
  - Confirm APN settings are correct for your mobile carrier.

- **Bluetooth pairing issues:**
  - Ensure the Bluetooth device you are trying to pair with is in pairing mode.
  - Check that the board's Bluetooth is enabled in your code/configuration.

7.3 GNSS (GPS) Issues

- **No GPS fix:**
  - Ensure the ceramic antenna is properly connected and has a clear view of the sky.
  - Test outdoors or in an area with good satellite visibility.
  - Verify that the GNSS module is enabled and configured correctly in your software.

7.4 Camera Issues

- **Camera not detected or no image:**
  - Ensure the ribbon cable connecting the camera module to the board is correctly and securely seated.
  - Verify that the camera module is compatible and properly initialized in your code.

8. Warranty and Support

8.1 Manufacturer's Warranty

The Dpofirs ESP32 S3 A7670E 4G Development Board comes with a**2-year manufacturer's warranty**. This warranty covers defects in materials and workmanship under normal use. Please retain your proof of purchase for warranty claims.
The warranty does not cover damage caused by misuse, accident, unauthorized modification, or improper installation.

8.2 Customer Support

For technical assistance, troubleshooting, or warranty inquiries, please contact Dpofirs customer support through the retailer where you purchased the product or visit the official Dpofirs brand store on Amazon:

Visit Dpofirs Store on Amazon

Please have your product model number (Dpofirsg7rpysawxg) and purchase details ready when contacting support.

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