

ZARUBA A3

Advanced Portable Passive
RF Sensing Platform



ZARUBA. TECH

Technical Manual – US Edition
Assembled in California

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INTRO

Years of field experience shaped the technology behind today's **ZARUBA** products. Earlier generations of the platform, developed under the name Chuyka (Chuika), received extensive operational feedback from professional users working in demanding environments. That feedback drove continuous engineering improvements in hardware design, RF performance, power efficiency, ergonomics, and reliability.

ZARUBA A3 is a portable passive RF sensing device designed to receive compatible analog video transmissions for lawful situational awareness, education, testing, and operational support. Depending on the user's equipment, configuration, and applicable laws, the device may be used in a variety of legitimate civilian and professional environments.

ZARUBA A3 is intended for lawful use. It is a passive radio-frequency receiving device and does not transmit, jam, interfere with, control, or disable drones or any other radio-frequency systems. Users are solely responsible for ensuring that their use of this device complies with all applicable federal, state, local, and international laws and regulations.

SAFETY INFORMATION

Read this entire section before operating the device. Failure to follow these guidelines may result in equipment damage, personal injury, or violation of applicable law.

GENERAL

Do not disassemble the device beyond user-accessible battery service. Opening the enclosure beyond that voids the warranty.

The housing is rated IP54 – resistant to dust and water splashes, but not waterproof. Do not immerse or expose to sustained heavy rain.

Do not leave the device for extended periods in direct sunlight or in enclosed spaces where the temperature exceeds +140 °F (+60 °C), such as a parked vehicle.

Attach antennas before powering on. Do not operate with damaged antennas or connectors. Inspect antennas and SMA connectors periodically for damage, corrosion, or looseness; degraded antennas directly reduce detection range.

Clean the housing with a dry or slightly damp cloth. Do not use solvents. This is a receive-only (passive) device. It does not transmit; however, treat all RF equipment with standard care around medical implants such as pacemakers.

LITHIUM BATTERY

The device is powered by two 21700 lithium-ion cells (2S pack, 8.4 V max charge, 4500 mAh) installed in the housing. Do not puncture, crush, short-circuit, incinerate, or expose to temperatures above 140 °F (60 °C).

Always power off using the physical switch at the bottom of the device. Leaving the device on leads to total battery discharge, which permanently damages lithium-ion cells.

During long-term storage, recharge the device at least once every 3 weeks.

Charge only with a Quick Charge (QC) compatible charger and cable – use the included cable. Charge on a non-flammable surface and do not leave charging unattended for extended periods.

If a battery swells, overheats, emits odor, or leaks – power off with the switch, move the device away from combustible materials, and contact support.

ENVIRONMENT OF USE

Extreme cold significantly reduces battery runtime; keep the device insulated in freezing conditions.

Detection performance depends on terrain, line of sight, antenna condition, transmitter power, and sensitivity settings. Never rely on this device as the sole means of personal protection or safety-critical warning.

LAWFUL USE NOTICE

This device passively receives radio-frequency signals; it does not transmit or jam. Federal law, including the Wiretap Act / Electronic Communications Privacy Act (18 U.S.C. § 2511) and the Communications Act (47 U.S.C. § 605), restricts the interception and disclosure of certain wire, oral, and electronic communications. Displaying or recording video feeds transmitted by third parties may be unlawful depending on circumstances and jurisdiction. The user is solely responsible for ensuring that use of this device complies with all applicable federal, state, and local laws.

DISPOSAL & RECYCLING

Do not dispose of the device or batteries in household trash. Lithium-ion batteries must be recycled or disposed of per state and local requirements (e.g., California Universal Waste rules).

PACKAGE CONTENTS

ITEM	QTY	NOTES
PASSIVE RF SENSING DEVICE	1	—
21700 LI-ION BATTERIES	2	INSTALLED IN THE HOUSING
ANTENNAS (SMA)	3	ONE PER BAND: 900-1680 / 3060-3700 / 4990-6000 MHZ
USB TYPE-C CHARGING CABLE	1	QC-COMPATIBLE; USE WITH A QC CHARGER

PRODUCT OVERVIEW

This device is a tri-band portable passive RF sensing device for FPV drones. It detects and observes compatible analog video transmitted from an FPV drone to its operator, alerting the user with sound and light indication and – when signal quality allows – displaying the video on the built-in 3.5” screen.

The device requires no configuration: all auto-scanning algorithms are pre-set by the manufacturer, and scanning begins within seconds of power-on after a brief self-calibration. It is fully passive – it only receives and never emits RF energy, so its operation cannot be detected by radio means. Designed for lawful civilian, commercial, industrial, research, educational, and public-sector applications.

TECHNICAL SPECIFICATIONS

GENERAL

DIMENSIONS (WITHOUT ANTENNAS)	95 × 158 × 47 MM (3.74" × 6.22" × 1.85")
WEIGHT	UP TO 650 G (1.4 LB)
HOUSING MATERIAL	IMPACT-RESISTANT PETG PLASTIC
INGRESS PROTECTION	IP54 – DUST-PROTECTED, RESISTANT TO WATER SPLASHES
SMALL SCREEN	SERVICE INFORMATION (CHANNELS, HISTOGRAM, VOLTAGE)
LARGE SCREEN	3.5" – DISPLAY SHOWS RECEIVED COMPATIBLE VIDEO FOR ANALYSIS
MAX AMBIENT (STORAGE/SUN)	+140 °F (+60 °C)

RF PERFORMANCE

ARCHITECTURE	PASSIVE RECEIVER (NO RF EMISSION); PARALLEL HIGH-SPEED AUTOSCAN
BAND 1.2 GHZ / 3.3 GHZ / 5.8 GHZ	900-1680 / 3060-3700 / 4990-6000 MHZ – UP TO 4,000 M / 2.5 MI*
FULL-RANGE SCAN CYCLE	4-8 SECONDS
BAND SELECTION	ANY COMBINATION OF BANDS CAN BE ENABLED OR DISABLED
SENSITIVITY CONTROL	MANUAL (RECOMMENDED 10-15%) OR AUTOMATIC, PER BAND
FALSE-ALARM MITIGATION	FILTERING OF NON-VIDEO INTERFERENCE; CHANNEL BLACKLIST
SCRAMBLED SIGNALS	INVERTED-VIDEO TRANSMISSION SUPPORTED (DESCRAMBLER)
ANTENNA INTERFACE	3 × SMA FEMALE – SUPPORTS HIGHER-SENSITIVITY ANTENNAS
TUNING MODES	AUTOSCAN (DEFAULT); STANDARD VRX MODE WITH MANUAL CHANNEL TUNING

POWER

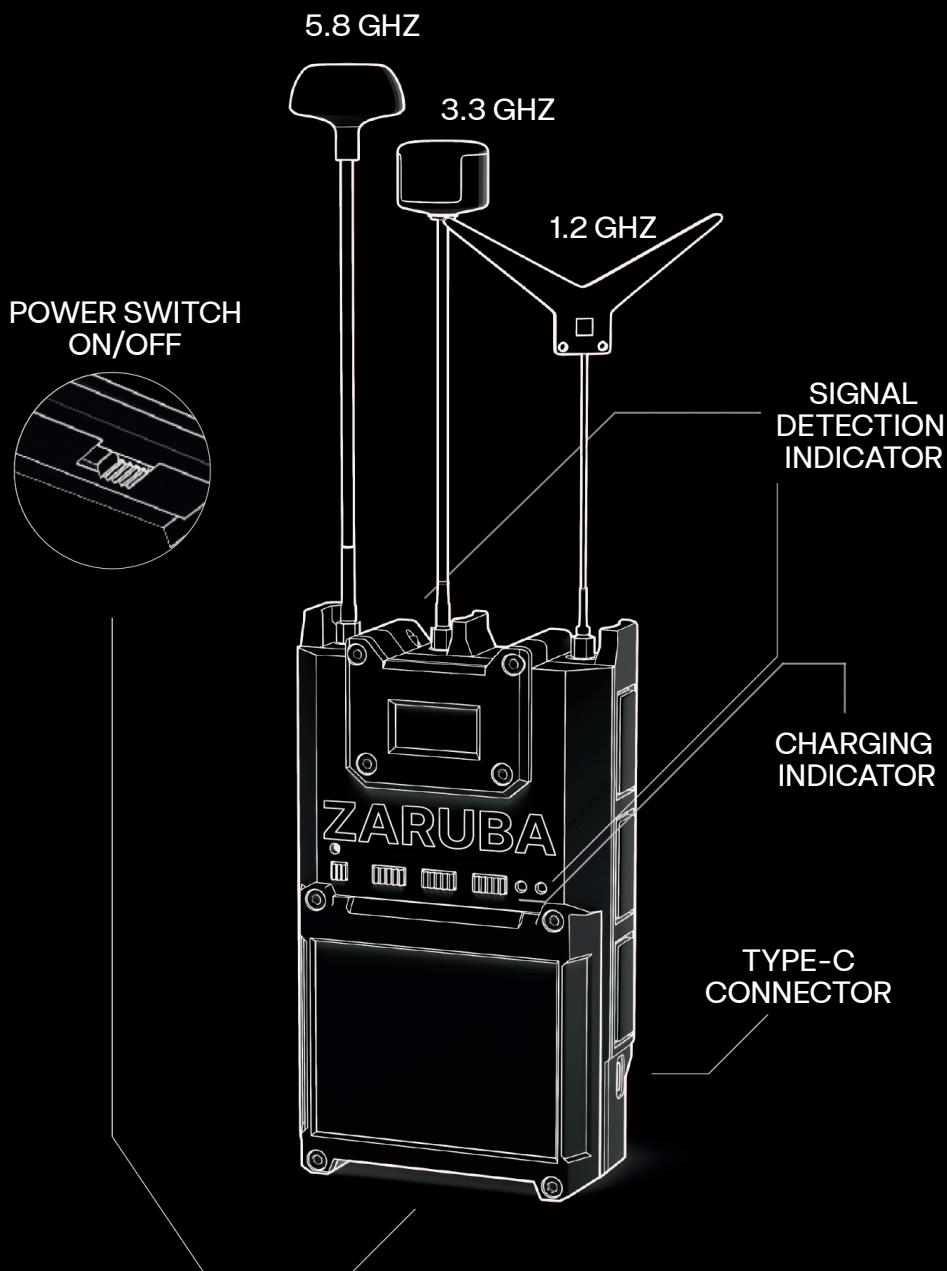
BATTERY	2 × 21700 LI-ION CELLS (2S), 4500 MAH, 8.4 V MAX CHARGE, 33.3 WH
RUNTIME	6-8 HOURS OF OPERATION
CHARGING	USB TYPE-C FAST CHARGING, QC PROTOCOL REQUIRED
CHARGE TIME	4 HOURS TO FULL WHILE OPERATING
VOLTAGE DISPLAY	REAL BATTERY VOLTAGE IS SHOWN ON THE INFORMATION SCREEN
LOW-BATTERY BEHAVIOR	WARNING AT 7.0 V; FORCED SHUTDOWN AT 6.4 V

* AT A VIDEO TRANSMITTER POWER OF 3W WITH NO OBSTACLES IN THE FRESNEL ZONE. MAXIMUM DETECTION DISTANCE DEPENDS ON THE ANTENNAS USED.

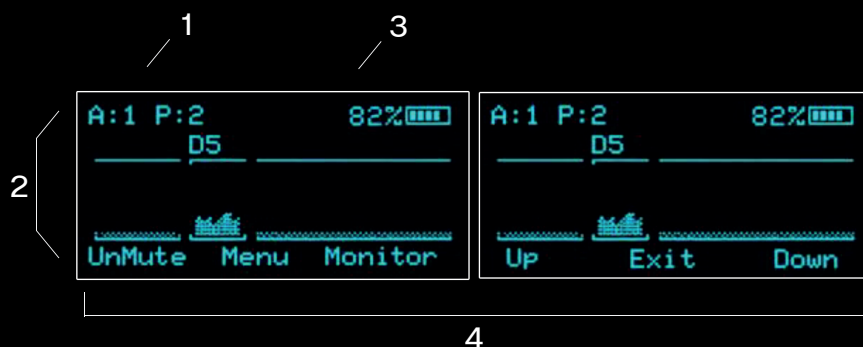
QUICK START

1. Connect each antenna to its corresponding SMA port (check external view) – every antenna is tuned for a specific band. Hand-tighten only.
2. Turn on the power switch at the bottom of the device.
3. Check the battery charge in the top-right corner of the information screen.
4. For the first few seconds the device calibrates itself, then automatically begins scanning the pre-set bands. No configuration is required.
5. On received compatible video transmission, the device produces a characteristic sound alert (repetition depends on the received video channel type) duplicated by light indication. Press Mute to silence the audio – light indication stays active.
6. To view the received video, press Monitor.
7. To power off, use the switch at the bottom. Always switch the device off to prevent total battery discharge.

EXTERNAL VIEW



OPERATION



- | | |
|---|------------------------------------|
| 1 | NUMBER OF DETECTED ACTIVE CHANNELS |
| 2 | FREQUENCY BAND HISTOGRAM |
| 3 | BATTERY CHARGE LEVEL |
| 4 | CONTEXT-SENSITIVE BUTTON FUNCTIONS |

Viewing Received Video Channels (Monitor)

Press Monitor to view received channels. Use Up / Down to cycle through found channels. The screen shows frequency, channel number, signal strength (RSSI), and video status (VD).

Note: while watching video in Monitor mode, the band currently being viewed is not scanned – e.g., when viewing a 5.8 GHz channel, scanning continues only on 1.2 GHz and 3.3 GHz.

Alternative Functions (Alt)

Holding the Alt button (small square) changes the function of the three option buttons:

Channel blacklist – hold Alt and press + 10m/off. Each press adds 10 minutes (from 10 minutes up to 1 hour); a long press removes the channel from the list. A blacklisted channel triggers no light or sound alerts until the timer expires or it is removed manually.

Adjacent-frequency check – hold Alt and press Manual. View video on neighboring channels, check their RSSI and VD, and find the best parameters for a more accurate picture.

Invert video (descrambler) – hold Alt and press invV; press again to disable. The setting stays active for the selected channel until the device is switched off. Press Exit to leave; hold Alt to return to full scan mode.

Keypad lock – hold Alt and press Lock; all keys are disabled. To unlock, hold Alt and press UnLock.

Sensitivity Adjustment

Hold Alt and use Select to choose the band to adjust (repeated presses cycle through bands; the selected band flashes). Release Alt, then set the detection threshold with AL- / AL+ (level shown in %). Auto/D toggles automatic sensitivity (“A” on the histogram) or disables the band entirely (“X” – the band is excluded from scanning). Pressing AL- / AL+ returns to manual mode. To save, hold Alt and press Save. Multiple bands can be configured and saved together.

The manufacturer recommends manual (fixed) sensitivity at 10-15% of the scale – this is also the factory-reset default and provides the best signal-to-noise ratio. If local noise is significant, raise the threshold manually: this reduces received compatible analog video of distant or weak signals but decreases false alarms.

Automatic mode works well where noise is fairly uniform and drone traffic is low: the device operates almost at the noise floor, enabling very long-range detection (or detection of low-power transmitters) at the cost of occasional false alarms. It is best combined with blacklisting of constantly present non-drone signals.

DEVICE MENU

MENU ITEM	FUNCTION
MENU	MAIN DEVICE MENU
MANUAL	MANUAL RECEIVER (VRX) SETUP MODE
SETTINGS	DEVICE SETTINGS
OTA UPDATE	SOFTWARE UPDATE
VERSION INFO	DEVICE INFORMATION AND SOFTWARE VERSION
CALIBRATE	CALIBRATION
FACTORY DEFAULT	RESET TO FACTORY SETTINGS
BACK	RETURN TO THE MAIN SCREEN

CHARGING & POWER MANAGEMENT

1. Connect the included USB Type-C cable to the device and to a QC-protocol charger. Fast charging requires both the charger and cable to support QC – the included cable is recommended.

2. The device can be charged while operating. Full charge time during operation is 4 hours.

3. Real battery voltage is displayed on the information screen (top-right).

Low-Battery Behavior

At 7.0 V, a low-battery warning appears; the device turns off after 10 seconds unless Cancel is pressed. If cancelled, operation continues until a second warning at 6.4 V, followed by a forced shutdown after a 10-second interval.

SOFTWARE UPDATES (OTA)

Create a mobile hotspot on your phone named **update** with the password **update123**. In the device **Menu**, select **OTA update**. With a stable internet connection, three update channels appear:

Stable – the manufacturer-recommended version; works for most users with no known issues, but may lack the newest features.

Current – contains almost all tested and confirmed features; minor undiscovered issues are possible.

Beta – test version, recommended only in relatively safe conditions for users willing to help test new functionality. Basic checks are passed, but wide-scale testing may be incomplete.

Select a version and press Update. When finished, the result is displayed – restart the device with the Reboot button. Depending on the update, a factory reset may be prompted and is recommended for correct operation; user settings (general and per-band) may be reset.

THE DEVICE IS CONTINUOUSLY IMPROVED; FUNCTIONS AND SETTINGS MAY BE ADDED OR CHANGED. CHECK THE MANUFACTURER'S INFORMATION RESOURCES FOR CURRENT DETAILS.

TROUBLESHOOTING

SYMPTOM	LIKELY CAUSE	SOLUTION
DEVICE DOES NOT POWER ON	BATTERY DEEPLY DISCHARGED	CHARGE WITH A QC CHARGER; IF LEFT ON UNTIL FULL DISCHARGE, CELLS MAY BE PERMANENTLY DAMAGED
SLOW CHARGING	CHARGER/CABLE WITHOUT QC SUPPORT	USE THE INCLUDED CABLE AND A QC-PROTOCOL CHARGER
NO DETECTIONS IN A KNOWN-SIGNAL AREA	ANTENNA ON WRONG PORT, LOOSE, OR DAMAGED; BAND DISABLED ("X"); THRESHOLD TOO HIGH	MATCH EACH ANTENNA TO ITS BAND PORT; RE-ENABLE THE BAND; LOWER SENSITIVITY THRESHOLD TOWARD 10-15%
NO ALERTS FOR A SPECIFIC CHANNEL	CHANNEL IS BLACKLISTED	HOLD ALT, LONG-PRESS +10M/OFF TO REMOVE IT, OR WAIT FOR THE TIMER TO EXPIRE
FREQUENT FALSE ALARMS	THRESHOLD TOO LOW / AUTO MODE NEAR NOISE FLOOR CONSTANT NON-DRONE SIGNAL NEARBY	RAISE MANUAL THRESHOLD; BLACKLIST THE PERSISTENT CHANNEL
MISSED DETECTIONS WHILE WATCHING VIDEO	MONITOR MODE – VIEWED BAND IS NOT SCANNED	EXIT MONITOR MODE TO RESUME SCANNING OF ALL ENABLED BANDS

VIDEO SHOWS STATIC ONLY	WEAK OR UNSTABLE TRANSMITTED SIGNAL	NORMAL AT RANGE LIMITS; TRY ADJACENT- FREQUENCY CHECK (ALT + MANUAL) OR INVV FOR SCRAMBLED SIGNALS
DEVICE SHUT DOWN UNEXPECTEDLY	BATTERY REACHED 6.4 V	RECHARGE; A T THE 7.0 V WARNING, PRESS CANCEL ONLY IF CONTINUED OPERATION IS ESSENTIAL
SHORT RUNTIME IN THE FIELD	LOW AMBIENT TEMPERATURE	KEEP THE DEVICE INSULATED / CLOSE TO THE BODY IN COLD WEATHER