

ZARUBA TECH

[Логотип]

Electronic intelligence device “Zaruba 4.5.0”

User Manual

Rev 1.0

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1. Introduction

The **Zaruba 4.5.0 electronic intelligence device** is a portable FPV drone video signal detector developed by Zaruba Tech to meet the needs of modern drone detection in the security sector.

The device detects sources of analog video signals, including FPV drones, UAVs, unmanned ground vehicles (UGVs), fixed-wing UAVs, and other platforms equipped with analog video transmitters.

2. Device Description

The **Zaruba 4.5.0 electronic intelligence device** features four scanning bands — 1.2 GHz, 3.3 GHz, 5.8 GHz, and 8.8 GHz — two screens, a video output, active cooling, an additional 12–28 V power input, an IP54-rated enclosure, and a USB Type-C fast-charging port.

The device requires no configuration before use and begins scanning immediately after being switched on. The Zaruba 4.5.0 is supplied with recommended settings and the latest firmware version.

All four frequency bands are scanned simultaneously. A complete scanning cycle takes 4–8 seconds, depending on the frequency band in which detection occurs.

2.1. Technical Specifications

Parameter	Specification
Detection at 1080–1800 MHz	4,000 m or more*
Detection at 1800–2200 MHz	3,000 m or more*
Detection at 2870–4000 MHz	4,000 m or more*
Detection at 4000–4500 MHz	2000 m or more*
Detection at 4890–6040 MHz	4,000 m or more*
Detection at 6050–8800 MHz	3,000–3,500 m**
Scanning speed	4–8 seconds, with all frequency bands scanned simultaneously
Scanning Step	≤10 MHz across all frequency bands
Power Supply	4 × 21700 cells, 5,000 mAh, 2S2P configuration
Operating Voltage Range	6.4–8.4V
Battery Life	Up to 4.5 hours on the built-in battery
External Power Supply	12–28 V, 25 W
Dimensions	4.09 × 6.22 × 2.64 in

Weight	Up to 2.07 lb
Enclosure Material	PETG plastic
Small Display	Displays system information
Large Display	Displays intercepted video signals
Additional Video Output	Available, 0.14 in connector
Cooling	Active
Enclosure Protection Rating	IP54

* At a video transmitter power of 4 W and with no obstructions in the first Fresnel zone.

* The maximum detection range depends on the type of antennas used.

** The detection range of the 4th band is based on available test results and may depend on operating conditions.

2.2. External Design



Fig.1 – Front view of the ELINT device “Zaruba 4.5.0”



Fig.2 – Rear view of the ELINT device “Zaruba 4.5.0”

The device enclosure features:

- 4 antenna connectors;
- Small information display;
- Large display for viewing video signals;
- Control buttons;
- Indicator lights;
- Power ON/OFF switch;
- Type-C charging port;
- Connector for an additional or continuous power supply (12–28 V DC);
- Video output;
- Active cooling components.

IMPORTANT!!!

The antennas must be connected to the corresponding connectors according to the markings on the enclosure.

2.3. Package Contents

The **Zaruba 4.5.0 electronic intelligence device** package includes:

- **Zaruba 4.5.0 electronic intelligence device**
- Antennas for the corresponding frequency bands — 4 pcs.
- USB Type-C charging cable.
- Vehicle power cable (XT60-to-cigarette-lighter plug).
- 0.14 in-to-0.14 in video cable.
- MOLLE mounting holder.
- Strap mounting holder (for handles, etc.).
- 0.098 in hex key.
- **Zaruba 4.5.0** User Manual.

2.4. Device functions

The Zaruba 4.5.0 electronic intelligence device provides rapid scanning of the specified frequency bands with parallel automatic scanning.

In the current version, the device operates in the following frequency bands:

- 1080–2200 MHz;
- 2870–4500 MHz;
- 4890–6040 MHz;
- 6050–8800 MHz.

When a signal within the device's sensitivity range is detected, the Zaruba 4.5.0 emits an audible alert accompanied by a visual indication.

The audible alert is enabled by default. It can be disabled using the Mute button if needed. The visual indication remains active.

The small display shows:

- Number of detected signals;
- Histogram of scanning bands;
- Frequencies and channels of active signals;
- Battery charge percentage;
- Current button assignments.

The large display is used to view the intercepted video signal. The device also features a video output for connecting an external display or another device capable of displaying analog video.

3. Preparation for Operation

Before use, make sure the device is charged, the antennas are undamaged, and the connectors and cables show no signs of mechanical damage.

4. Getting Started with the Device

After the antennas are connected and the power is switched on, the device performs automatic calibration and begins scanning the frequency bands configured by the manufacturer.

Procedure:

1. Connect the antennas to the corresponding connectors on the device.
2. Make sure each antenna is installed for its designated frequency band.
3. Secure the antennas firmly to prevent poor contact.
4. If necessary, connect an external DC power supply rated at 12–28 V.
5. Turn on the device using the power switch.
6. Make sure the device is charged. The battery charge level is displayed as a percentage on the information screen.

After being switched on, the device performs calibration. Once calibration is complete, the Zaruba 4.5.0 automatically begins scanning the frequency bands configured by the manufacturer.

If a threat is detected, the device provides audible and visual alerts. To disable the audible alert, press **Mute**. The visual indication will remain active.

Important!

- The device calibrates automatically at startup and adapts to radio-frequency conditions during operation.
- If a powerful source of radiation is nearby, automatic calibration may increase the noise level to reduce false alarms. However, the device continues to search for signs of a video signal regardless of the noise level.

5. Device Operation

The device has three main buttons, whose functions change depending on the current mode. Each button's function always corresponds to the label displayed on the screen.



Fig. 3 – Button labels on the small display



Fig. 4 – Labels for main and secondary buttons

On the main screen (by default, in scanning mode):

- Left button No. 2 — Mute / UnMute;

- Middle button **No. 3 — Menu;**
- Far-right button **No. 4 — Monitor.**

The device also has a small **Alt button (No. 1)**, which activates alternative functions for the main buttons. Pressing and holding Alt changes the button assignments.

For example, pressing Alt in scanning mode changes the button labels as follows:

- **Select** — selects a frequency band for configuration;
- **Lock / UnLock** — locks or unlocks the buttons.

Please note!

To lock the buttons, press and hold Alt, then press Lock. To unlock the buttons, press and hold Alt, then press UnLock.

5.1. Viewing Detected Video Channels

If the device detects active channels, the user can view them in **Monitor** mode. To do so, press the Monitor button on the main screen.

In Monitor mode, you can:

- View detected active channels;
- Switch between channels using the Up and Down buttons;
- View the frequency, channel number, signal strength, RSSI, and video detection status;
- View the intercepted video on the large display;
- Switch to manual channel viewing mode, which allows you to tune to adjacent frequencies and view additional channel information (Alt + Manual).

The video signal displayed in Monitor mode is also output through the external video port.

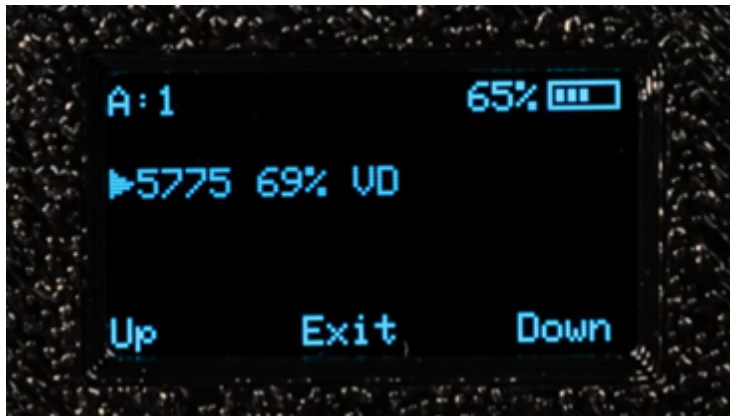


Fig. 5 – Screen display in Monitor mode

5.1.1. Monitor Mode: Operating Features

While viewing video in Monitor mode, the device **DOES NOT SCAN** the frequency band being viewed. For example, if the user is viewing a channel in the 5.8 GHz band, scanning of that band is temporarily suspended.

Newly detected channels are also not added to the list in this mode. To update the list, exit Monitor mode and return to scanning mode, then re-enter Monitor mode.

Recommended operating procedure:

1. Start video playback.
2. Assess whether the signal poses a threat.
3. Stop video playback.
4. Resume full scanning of all frequency bands.
5. If necessary, return to this channel periodically to monitor the situation.

Please note!!!

Do not leave video playback enabled when it is not needed.

5.2. Frequency Band Settings

The user can configure each frequency band individually. To enter configuration mode, press Alt + Select. The frame around the frequency band being configured will begin to blink.

Pressing the same button combination again switches to the next frequency band.

The current operating mode of each frequency band is displayed next to it on the information screen.

Frequency band labels:

- **1G** — 1.3 GHz band;
- **3G** — 3.3 GHz band;
- **5G** — 5.8 GHz band;
- **8G** — 8.8 GHz band.

One of the following labels may appear next to a frequency band: %, A, V, or X/D.

5.3. Frequency Band Detection Modes

Label	Mode	Description
10% / 15% / and other % values	Manual mode	The user sets the threshold above which a signal is considered active.
A	Auto	The device automatically adjusts the threshold based on the ambient RF noise level.

V	Video Only / VD Only	The device responds only to signals that exhibit characteristics of analog video.
X / D	Disabled Band	The frequency band is not scanned and does not participate in device operation.

5.3.1. Manual Mode

If a percentage value, such as 10%, appears next to a frequency band, the band is operating in Manual Mode. The percentage indicates the detection threshold. If a signal exceeds this threshold, the device considers the channel active and may add it to the list in Monitor mode. The lower the percentage, the weaker the signals the device may classify as active, but the higher the likelihood of false detections.

The higher the percentage, the fewer false detections, but weak or distant signals may not be classified as active.

Recommended value for Manual Mode: 10–15%.

Please note!

The percentage value does not change the receiver's physical sensitivity. It only determines the signal level above which a signal is considered active. If an analog video signal is present on a channel, it will be detected regardless of these settings.

5.3.2. Auto

A / Auto mode is suitable for standard use. In this mode, the device automatically adjusts the detection threshold based on current RF conditions.

If the RF environment contains many interfering signals or high noise levels, the device may raise the threshold to reduce false detections.

5.3.3. Video Only

V / Video Only / VD Only mode is used when the device needs to respond specifically to signals that exhibit characteristics of analog video. This mode is useful in areas with many interfering signals, such as GSM, Wi-Fi, electronic warfare (EW) systems, or other sources of RF emissions. Interfering signals may appear on the histogram, but if they do not exhibit characteristics of analog video, the device will not identify them as active video channels.

5.3.4. Disabling a Frequency Band

The **X/D** label indicates that the frequency band is disabled. In this mode, the band is not scanned. It can be disabled if it is temporarily not needed or causes excessive false detections.

Please note!!!

For most operating scenarios, the factory settings or VD Only mode are recommended. Manual Mode should be adjusted only when the user understands the RF environment and wants to reduce false detections or, conversely, detect weaker signals.

5.4. Alternative Functions

In Monitor mode, additional functions are available by pressing and holding Alt.

5.4.1. INV-V

The **INV-V** function enables video inversion on the selected channel. It is used when the device detects a signal, but the video is not displayed because a scrambler is being used. Pressing the button again disables video inversion. Video inversion applies to the selected channel only.

5.4.2. Blacklist

The current channel can be added to the **Blacklist** for 10 minutes using the Alt + (+10m) combination. Each subsequent press adds another 10 minutes. While a channel is on the Blacklist, the device does not provide visual or audible alerts for it. Pressing and holding the same button combination removes the channel from the Blacklist.

5.4.3. Manual / Adjacent Frequencies

The **Manual** function (Alt + Manual) in Monitor mode allows the user to check nearby adjacent frequencies. In this mode, the user can view video on neighboring channels, assess RSSI and video detection quality, and identify the best-performing frequency for clearer video reception.

6. Software Updates

To update the software, create a mobile hotspot with the name **update** and password **update123**.

Then, open the device menu, navigate to OTA Update, and select it. If an internet connection is available and stable, the available update options will appear on the screen:

- **Stable** — the recommended stable version;
- **Current** — the current version with verified functionality;
- **Beta** — a test version for evaluating new features.

After the update is complete, restart the device. Depending on the type of update, the device may prompt you to restore the factory settings.

6.1. Device Menu Functions

Menu Item	Description
Menu	Main device menu

Manual / 1,3; 5,8; 3,3; 8,8;	Manual receiver tuning / viewing a specific frequency or channel
Connections / Turn WiFi	Enables Wi-Fi
Connections / Mobile App	Enables mobile app support
Settings	Device settings
Settings / Quick Set	Quick settings
Settings / Factory Default	Restores factory settings with operating mode selection
Settings / Switch Firmware	Switches between stored firmware versions
OTA update	Software update
Version Info or Info	Device and software version information
Back	Returns to the previous menu

6.1.1. Manual Receiver Tuning Mode

Manual mode allows the user to tune to a specific frequency or channel manually. This auxiliary mode can be used to check individual frequencies or view a signal manually.

6.1.2. Factory Default

The **Factory Default** function restores the device to its factory settings. After selecting this option, choose the detection mode (described above) to be applied to ALL frequency bands.

Available options:

- Manual Mode;
- Auto Mode;
- Video Only Mode

6.1.3. Switch Firmware

The **Switch Firmware** function allows the user to switch between stored firmware versions. Depending on the device version, the device can store 2 to 5 firmware versions.

Switching does not require an internet connection because the firmware versions are already stored in the device's memory. The currently active firmware is marked with the letter **A**.

To switch to another firmware version:

1. Go to **Menu** → **Settings** → **Switch Firmware**.
2. Select the desired firmware version.
3. Press **Boot**.
4. The device will activate the selected version.

Please note!

Switch Firmware can be used to revert to a previous firmware version if the user is dissatisfied with the performance of the current version for any reason.

6.1.4. Version Info and Info

The **Version Info** section displays information about the device and its software version. The service center may request this information for diagnostics or technical support.

6.1.5. Connections

The **Connections** menu supports connection to the mobile app. In this menu, you can enable Wi-Fi and configure the app connection. The mobile app is available on Google Play and the App Store.

7. Battery Charge Indicator

The battery charge level is displayed as a percentage. Pressing **Alt** on the main screen displays the battery voltage. Depending on the device version, the device temperature may also be displayed.

Device operating voltage range: 6.4–8.4 V.

Voltage	Device behavior
8,4 - 7.0V	Normal battery status
7.0V	The Low Battery message is displayed for 10 seconds. It repeats after 30 seconds if OK is not pressed.
6.6V	The Low Battery message appears again, even if the previous warning was dismissed by pressing OK.
6.45V	The Critical Battery message is displayed for 10 seconds. It repeats after 30 seconds.
6.4V	Critical battery status. After the Critical Battery message appears, the device enters sleep mode after 10 seconds.

The warning message can be temporarily dismissed by pressing **OK**. When the battery reaches a critical charge level, the user can press the button to shut down the device immediately.

Please note!!!

The device can only be fully powered off using the switch on the bottom of the device. This is necessary to prevent excessive battery discharge.

7.1. Auxiliary Power Connector

The Zaruba 4.5.0 electronic intelligence device can be powered by a DC power source with a voltage of 12–28 V. For this purpose, an XT60 connector is located on the bottom of the enclosure, near the power switch. The device also features reverse-polarity protection for the input voltage.

Compatible power sources include external 4S to 6S batteries or an AC-to-DC power supply rated at 25 W with an output voltage of 12–28 VDC.

The device comes with a power cable designed to connect to a vehicle's cigarette lighter socket and rated for the required current load.

8. Audio signals

The **Mute** button disables all device sounds. The device provides audible battery status alerts:

- Low Battery — 3 rapid short beeps;
- Critical Battery — 5 rapid short beeps.

The following sound schemes are available in the settings:

1. **Classic** — the standard sound scheme, enabled by default.

- One beep — active channels detected;
- Additional beeps — battery status warnings.

Enable: Menu / Settings / Quick Set / Set Beep Classic

2. **Three-Level Beep Scheme / 3x**

- One short, infrequent beep — the device is on and the RF environment is clear;
- One long, frequent beep — an active channel is detected, but no video detection is confirmed;
- Two long, frequent beeps — a signal with confirmed video detection is detected;
- Additional beeps — battery status warnings.

Enable: Menu / Settings / Quick Set / Set Beep 3x

9. Cooling Control

The device supports the following operating modes for controlling the main active cooling fan

Режим	Опис	Шлях у меню
On	The fan is always on. Default mode.	Menu / Settings / Quick Set / Turn Cooler On
Off	The fan is off.	Menu / Settings / Quick Set / Turn Cooler Off
Auto	Automatic fan control.	Menu / Settings / Quick Set / Turn Cooler Auto

Auto mode is available on board versions 1.3.8 and later. Do not obstruct the active cooling vents while the device is operating.

Please note!!!

Only the main active cooling fan can be turned off. The auxiliary air recirculation fan remains on at all times.

10. Service and Warranty

Zaruba devices come with a warranty. If you have questions, experience a malfunction, or need diagnostics, you can contact the Zaruba Tech service center.

The service center may request the information displayed in the **Version Info** section.

11. Important notice!!!

1. Turn off the device using the power switch after use to prevent the batteries from fully discharging.
2. When viewing video in Monitor mode, the device does not scan the frequency band being viewed. For example, when viewing a channel in the 5.8 GHz band, scanning continues only in the 1.3 GHz, 3.3 GHz, and 8.8 GHz bands. New channels are also not added to the list in this mode. To update the list, exit Monitor mode, return to scanning mode, and then re-enter Monitor mode.
3. The Mute button disables all device sounds, including battery status alerts.
4. The device monitors battery status and displays Low Battery or Critical Battery warnings according to the battery voltage.
5. When the critical voltage level of 6.4 V is reached, the device enters sleep mode after displaying a warning.
6. Do not leave the device in direct sunlight for extended periods or in enclosed spaces where the temperature exceeds +140°F.
7. Long-term storage with the battery fully charged to 100% is not recommended.
8. Do not use the device with damaged antennas, cables, connectors, or battery packs.
9. Before operation, make sure the antennas are installed according to the frequency band markings.

10. Do not obstruct the active cooling vents while the device is operating.
11. Changing the activity threshold affects which signals are considered active but does not change the receiver's physical sensitivity.
12. If you discover any malfunctions or damage, contact the manufacturer, **Zaruba Tech**.

12. Stay in Touch with Us

For more information about our solutions, contact our team using the details below.

Designed for field operations, our systems deliver reliable performance, clear situational awareness, and consistent data monitoring in demanding environments.

Have questions or need service support?

Website: <https://zaruba.tech/>

Email: contact@zaruba.tech

We're always here to help resolve your technical issues.