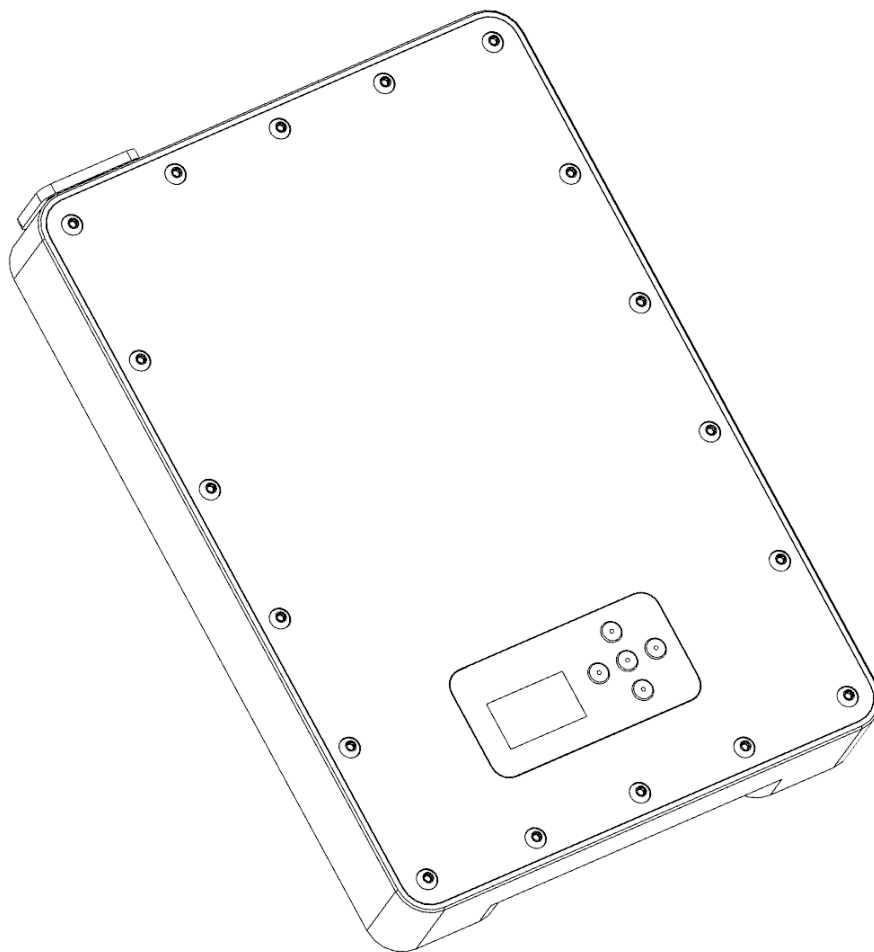




8-WAY EVENT TIMER

IRC LapRF 8

SKU: 6116



User Manual

v1.1 | January 2025



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1. Introduction

LapRF technology uses the emitted 5.8GHz RF from race quadcopters (or fixed wing aircraft) to detect a passage through the start-finish gate.

Built-in GPS module provides an accurate real-time clock reference, enabling automatic time correction after a power loss, minimizing disruptions during events.

Different from other offerings on the market, the LapRF uses custom timing receivers with specially designed antennas to ensure that only quads which pass through the 'beam' are timed, and other sources of interference are ignored.

All that is required to use the LapRF in a race is to program the band, and channel that each pilot will use, place the timer in the start/finish gate, and go fly! No transponders required.

2. Product Features

5.8GHz RF Detection

Frequency	5.3-6.0GHz
Programmable Attenuation	0-32dB
Antenna	Custom linearly polarized (Suitable for LHCP, RHCP, Linear use)
GPS	Built-in GPS module
Channels	Arbitrary (defined by connected app.)
Pilots	1-16, depending upon required precision and gate speed

Mechanical

Dimensions	L = 222mm, W = 152mm, H = 31mm
Weight	1.1kg
Cooling	Passive, no moving parts

Power

External	Power over Ethernet (PoE) 802.3at
Consumption	~10W

Interface

Ethernet	Waterproof RJ45 connection
USB	Optional internal USB connection

App Support

Platforms	Windows, LiveTime scoring engine Android and/or iOS application
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3. Getting Started

3.1. Setup

The LapRF has been designed to be used by anyone interested in timing an FPV racing event, without special skills.

1. Install at the start/finish gate
2. Hook up the Ethernet cable to an appropriate PoE switch
3. Set an appropriate IP address using the built-in OLED display
 - a. If used on a network, reserve a static address for the LapRF
 - b. If a direct connection is used, set an address compatible with the static IP address of the timing PC

e.g. If the timer is on 192.168.1.9, place the PC on 192.168.1.1

4. Ping the LapRF using the Windows command line to ensure that it is reachable

ping 192.168.1.9

5. Start up LiveTime FPV on the Windows PC, and follow the [LiveTime instruction manual](#) for how to set up the LapRF

LiveTime and Orqa have worked in close collaboration to fully integrate the GPS Syncing feature. This enhancement enables the simultaneous use of multiple LapRF units, unlocking new possibilities for split timing and track configurations with checkpoints.

For an overview of the gain and threshold settings, please refer to the LapRF Personal Edition manual. For 25mW races, values of 59 and 800 respectively are generally suitable, and don't need tweaking during the event.

3.2. Placement

The LapRF's integrated patch antennas form a beam which emits from the top of the product. Ideal placement is at the center of the gate, but that does expose it to strikes from low-flying (high speed) racers.

For grass tracks, a small hole in the ground works well to protect it. If digging a hole is not possible, either protect the timer from strikes by placing a solid object in front of it, or place the timer at a 45 degree angle from one corner of the gate.

When laying out tracks for RF timing, avoid parts of the track that come close to the timing gate to prevent false readings. For start grid positioning, place it at least 5m from the gate to ensure that the first crossing is registered.

3.3. App Download

Search for the term “LapRF” in either the iOS App. store, or the Google Play store, then download the free app. and install it.

4. GPS Integration

Built-in GPS module provides an accurate real-time clock reference, enabling automatic time correction after a power loss, minimizing disruptions during events. Additionally, it will make split-time synchronization easier than ever, delivering perfect timing accuracy across all checkpoints. While this feature is not yet available in the current firmware, it is coming very soon.

5. Connecting to the LapRF

 NOTE	Only the iOS app currently supports the Ethernet/WiFi access required by the event version of the LapRF. A future change to the Android app will add support for this. For the moment, the remainder of this manual applies to both the personal, and event version of the timer.
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Start the app you downloaded on your mobile device and click on ‘Race Setup’ and subsequently on the ‘Select Timing System’ in the top left corner. This will list all available timing systems, check at the bottom of yours to see how it is called, for example “TidyLawn” and select it, refer to the below noted image for an impression of what the ‘Race Setup’ page looks like, note the ‘Select Timing System’ top left. Subsequently the ‘Start Race’ icon on the Race page should go green to indicate a good connection.

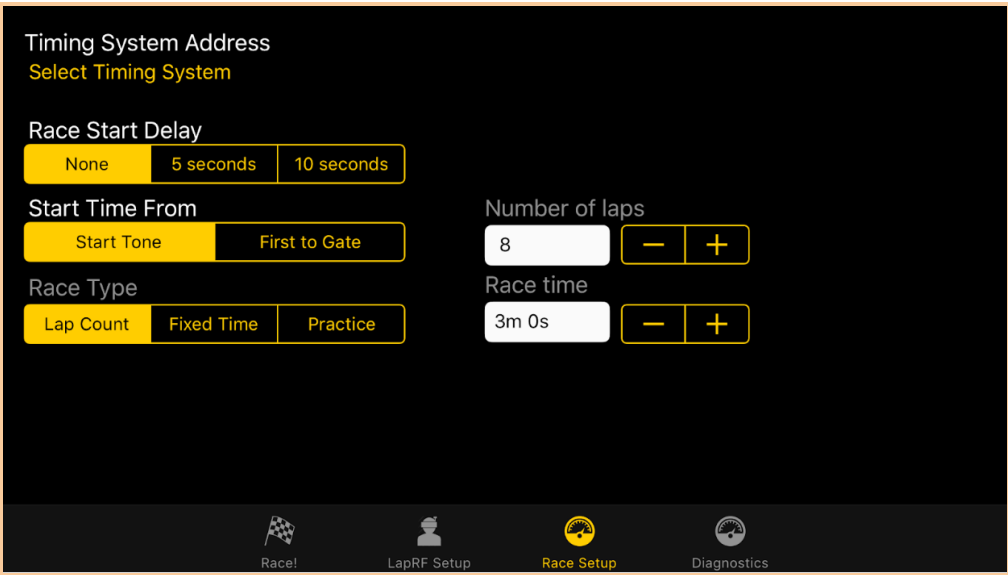


Fig 4.1: Timing System Address screen

6. Mobile app

6.1. iOS App for iPhone and iPad

6.1.1. Main Screen

The main screen shows the lap times, including average, best, and total times, for each active pilot. Times in green are the best lap times for each pilot.

 NOTE	When a timing system is not connected, touching the large pilot number on the left side of the screen will create a manual time, and can be used to evaluate the app.
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The color of the 'Start Race' button currently indicates a valid connection to the LapRF. Red for no connection, green for a good connection.

		Start Race Stop Race +		Race Clock 069:7											
			Lap 1	Lap 2	Lap 3	Lap 4	Lap 5	Lap 6	Lap 7	Lap 8	Avg	Best	Total	#	
1	Pilot 1		2.87	19.24	1.71	-	-	-	-	-	7.94	1.71	23.82	3	
2	Pilot 2		0.97	15.32	-	-	-	-	-	-	8.14	0.97	16.29	2	
3	Pilot 3		-	-	-	-	-	-	-	-	-	-	0.00	-	
4	Pilot 4		16.24	-	-	-	-	-	-	-	16.24	16.24	16.24	1	
5	Pilot 5		1.40	12.57	-	-	-	-	-	-	6.98	1.40	13.97	2	
6	Pilot 6		16.97	3.80	-	-	-	-	-	-	10.38	3.80	20.77	2	
7	Pilot 7		-	-	-	-	-	-	-	-	-	-	0.00	-	
8	Pilot 8		-	-	-	-	-	-	-	-	-	-	0.00	-	
															
		Race!	LapRF Setup		Race Setup		Diagnostics								

Fig 5.1: iOS app main screen

On the race screen, the pilot icon shows Red when the app is in 'First to Gate' mode, and the pilot hasn't reached the first gate to start timing yet. Once the pilot does reach the gate, it will turn Green, and times will start appearing.

6.1.2. LapRF Setup

The LapRF setup page is where the number of active pilots is set, plus the band and channel that each pilot is using. In addition, the power level used for the race (all pilots should ideally use the same vTx power) is set here, along with a 'sensitivity tweak' which works a bit like the exposure correction on most high-end cameras. If you are missing laps, increase sensitivity, if you are getting false hits, decrease it.

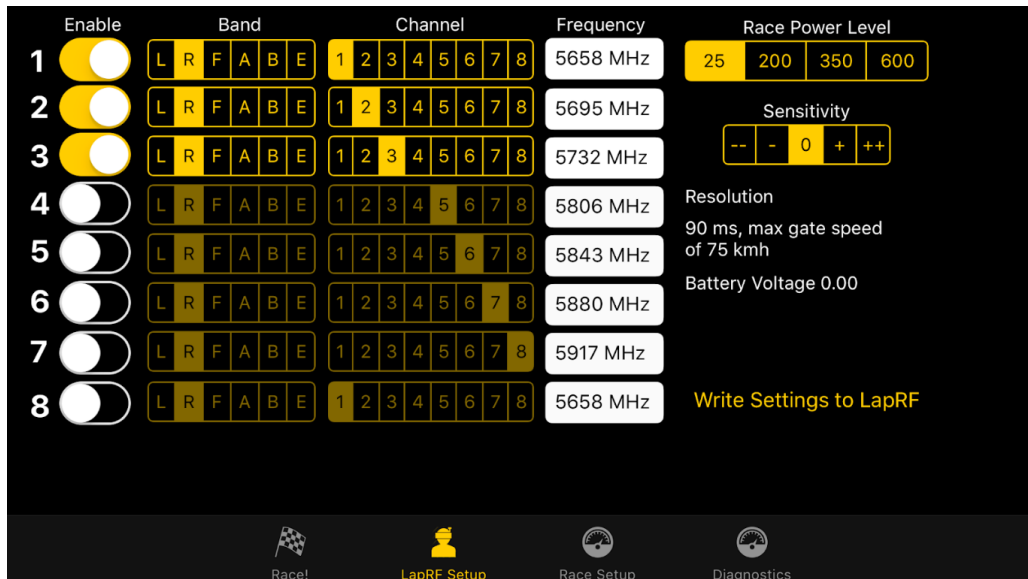


Fig 5.2: iOS app setup screen

6.1.3. Race Setup

The Race Setup page is where miscellaneous race settings/preferences are configured.

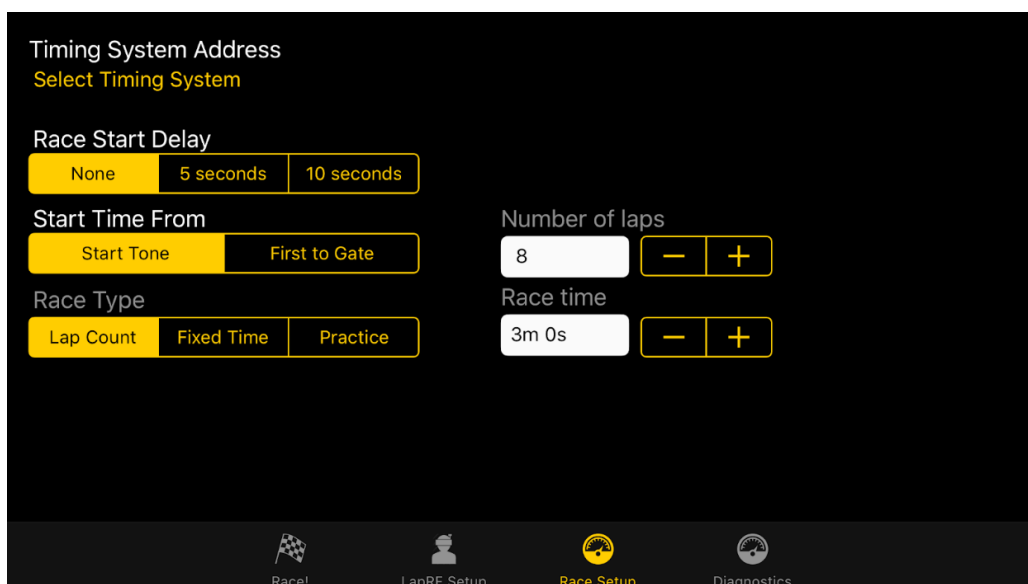


Fig 5.3.: iOS app race setup screen

6.1.3.1. Select Timing System

Click this to select the LapRF. If the device doesn't appear in the list, ensure that Bluetooth is enabled, and that no other mobile device is using it (even in the background).

6.1.3.2. Race Start Delay

Configure the delay between hitting the 'Start Race' button and the race starting. Use it to give time to get your goggles on before flying.

6.1.3.3. Start Time From

FPV races are usually either configured to start from the tone (start grid is positioned after the Start/Finish gate), or from 'First to Gate', where the start grid is positioned before it. With the latter, lap times are for full laps, including the first lap.

6.1.3.4. Race Type

For races with a fixed number of laps, select 'Lap Count', and set the number of laps to be raced. For races that are fixed-time, select 'Fixed Time' and be sure to enter the Race time. For Practice events, select 'Practice', the race will continue to run and record lap times until your LiPos croak. Note that only the first 8 times will be shown on the Race page.

6.1.4. Diagnostics

The diagnostics page shouldn't normally be required, but can be a useful tool during debugging. The RSSI level of each configured pilot slot is shown. Power on video transmitters and walk them through the gate to ensure correct configuration of the LapRF, and the video transmitter itself.

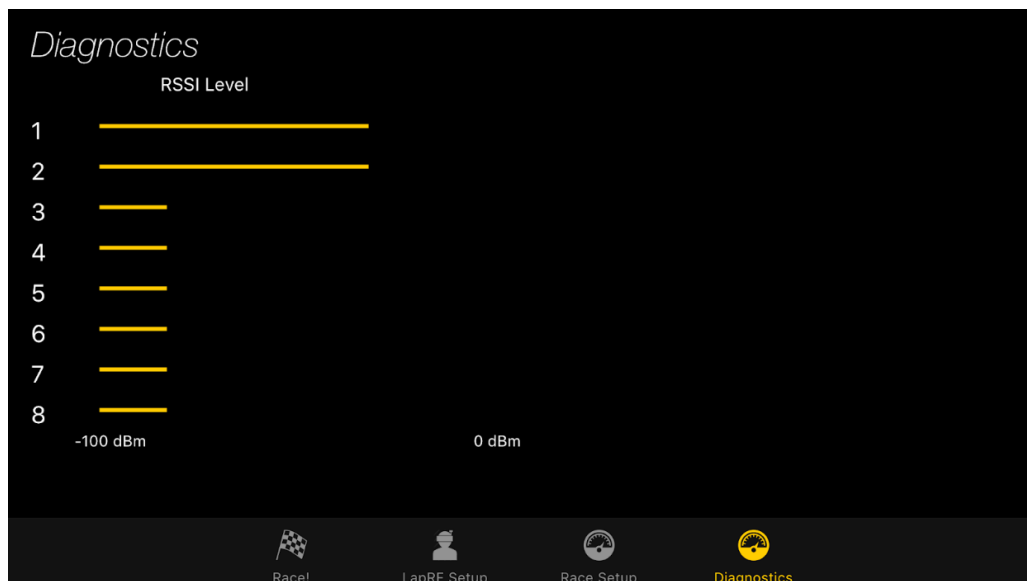


Fig 5.4.: iOS app diagnostics screen

6.2. Android App

6.2.1. Main Screen

The main screen shows the results of the race in progress. For each enabled pilot the individual lap times are shown, along with the Total, Best, Avg, and number of laps. The fastest lap per pilot is shown highlighted in green.

 NOTE	When a timer is not connected, starting the race will create a number of random lap times in order to demonstrate the results display.
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The status of the connection to the LapRF is also shown, along with the Bluetooth signal strength (RSSI) and the battery voltage. Each field will change color to indicate a problem (Green = all is ok, Red = problem).

LapRF														
	#	Lap 1	Lap 2	Lap 3	Lap 4	Lap 5	Lap 6	Lap 7	Lap 8	Avg	Best	Total	Lap	
1 Pilot 1	3	10.13	71.84	81.91	41.26	123.0	40.67	-	-	61.47	10.13	368.8	6	
2 Pilot 2	6	133.3	51.59	40.79	-	-	-	-	-	75.23	40.79	225.7	3	
3 Pilot 3	1 🏆	20.42	20.44	10.38	51.51	61.41	102.5	-	-	44.44	10.38	266.6	6	
4 Pilot 4	4	92.24	61.55	40.95	61.59	10.36	-	-	-	53.34	10.36	266.7	5	
5 Pilot 5	8	246.3	-	-	-	-	-	-	-	246.3	246.3	246.3	1	
6 Pilot 6	2 🏆	10.43	30.37	41.50	81.94	61.51	51.19	-	-	46.16	10.43	276.9	6	
7 Pilot 7	7	103.0	-	-	-	-	-	-	-	103.0	103.0	103.0	1	
8 Pilot 8	5	215.6	20.22	30.87	10.31	-	-	-	-	69.27	10.31	277.0	4	

START RACE

00:00

STOP RACE

DarkOlaf

-46 dBm

Battery:3.8 V

Fig 5.5.: Android app main screen

6.2.2. LapRF Setup

Before starting a race, the 5.8GHz band and channel of each pilot must be provided. In the LapRF setup screen enable pilots, and then click on the frequency value to display the band/channel picker.

You can also select the race transmitter power in the drop-down to the right. When you are happy with the settings, don't forget to click the 'Send' button to send them to your LapRF.

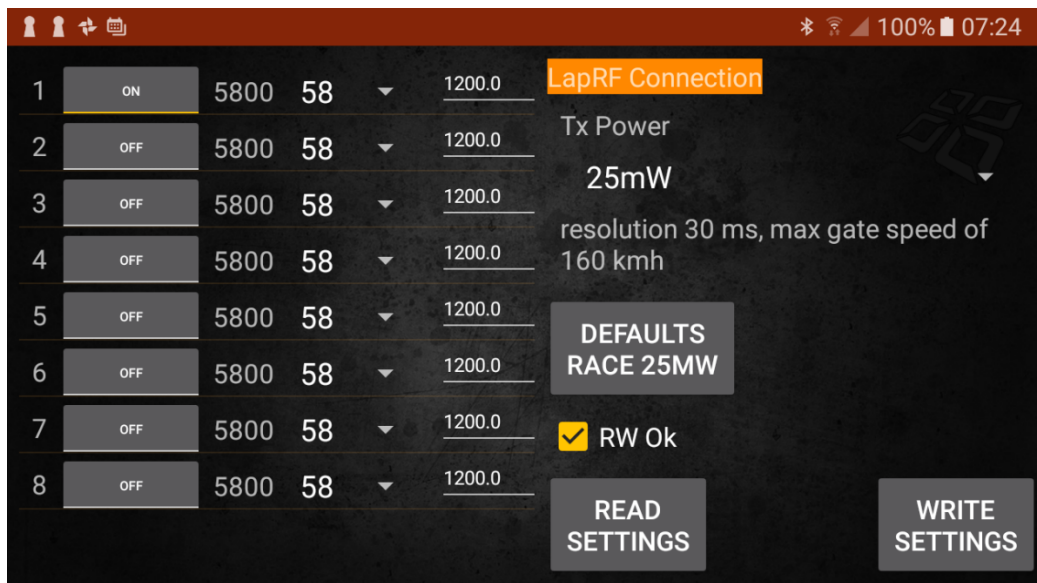


Fig 5.6.: Android app setup screen



NOTE

When selecting a band and channel the frequency is automatically displayed. For custom frequencies (for example, for the HDZero digital frequencies), simply type the value into the frequency control.

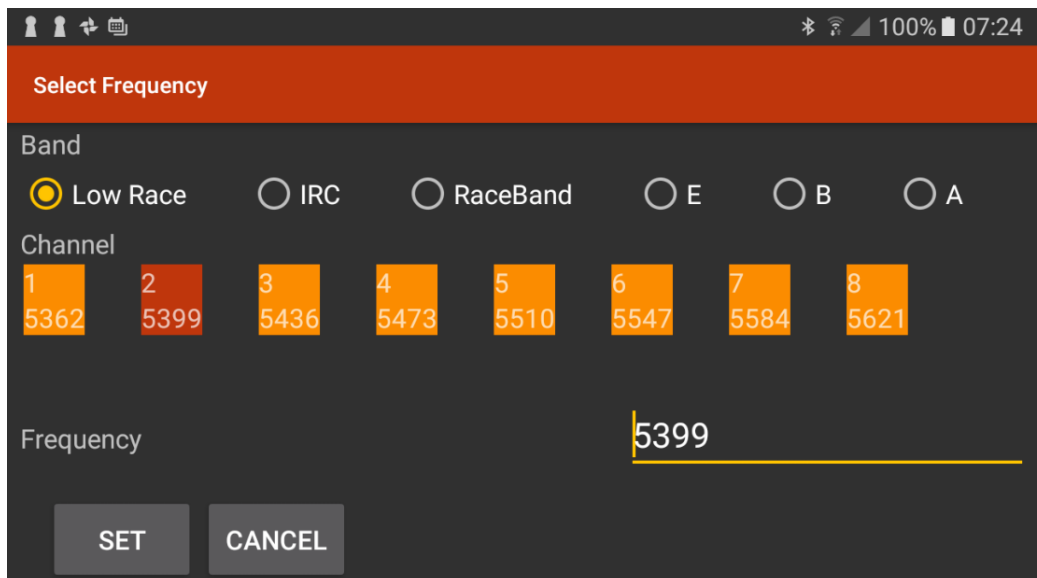


Fig 5.7.: Android app frequency screen

6.2.3. General Settings

The general settings page enables names to be entered for each of the pilots, along with the various race modes.

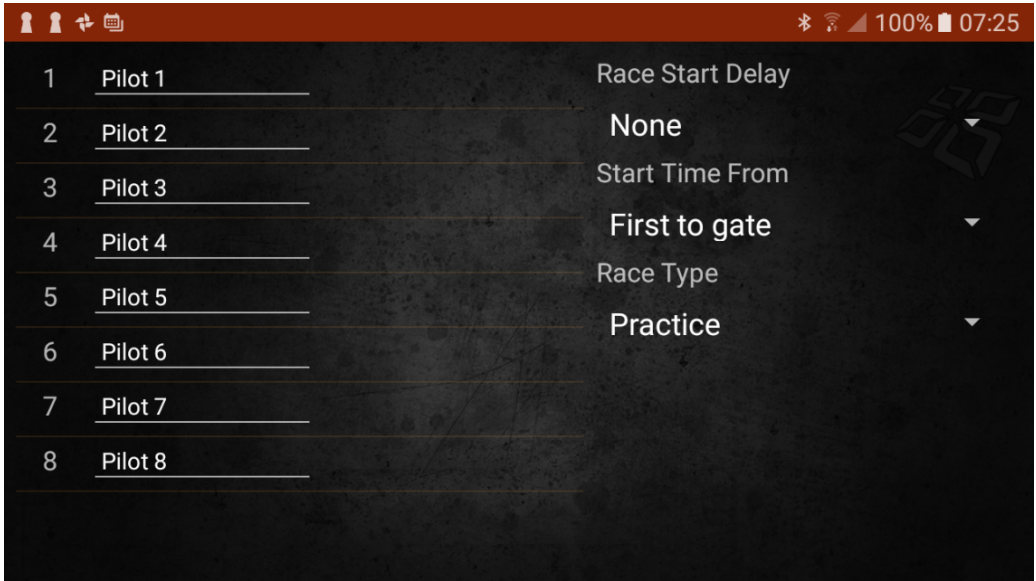


Fig 5.8.: Android app general settings screen

6.2.4. Diagnostics

The diagnostics page shouldn't normally be required, but can be a useful tool during debugging.

The RSSI level of each configured pilot slot is shown. Power on video transmitters and walk them through the gate to ensure correct configuration of the LapRF, and the video transmitter itself.



Fig 5.9.: Android app diagnostics screen

7. Miscellaneous

Support

For support about this product (and access to our knowledge base), please login/register at orqafpv.freshdesk.com (or scan the QR code below to send an email).

If you submit a ticket we'll get back to you in 24 hours (or the next workday).

support@orqafpv.com



Warranty & Services

Warranty Period

Exclusive Warranty - ORQA d.o.o., (Orqa) warrants that the Product purchased (the "IRC LapRF 8") will be free from defects in materials and workmanship for a period of 2 years from the date of purchase by the Purchaser.

2-year Limited Warranty

Orqa reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(a) This warranty is not limited to the original Purchaser ("Purchaser") and is transferable exclusively with Proof of purchase for all warranty claims.

(b) Limitations - ORQA MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy - Orqa's sole obligation hereunder shall be that Orqa will, at its option, (i) repair or (ii) replace, any Product determined by Orqa to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Orqa reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the discretion of Orqa, or in agreement with the Purchaser, when possible. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Orqa. Return of any Product by Purchaser must be approved in writing by Orqa before shipment.

Damage Limits

ORQA SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Orqa exceed the individual price of the Product on which liability is asserted. As Orqa has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase. Law: These Terms are governed by Croatian law (without regard to conflict of law principals).

Warranty Services

Questions, Assistance, and Repairs

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Orqa directly. This will enable Orqa to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to support@orqafpv.com. You may also find information on our website at <https://orqafpv.com/>.

Inspection or Repairs

If this Product needs to be inspected or repaired, please contact Orqa support at support@orqafpv.com first in order to determine the best course of action. Shipping will be arranged in agreement with Orqa support agent via DHL by default (unless arranged otherwise in agreement with Orqa support agent and/or Orqa logistical team) which provides tracking and insurance for lost or damaged parcels, as Orqa is not responsible for merchandise until it arrives and is accepted at our facility. When arranging shipment with Orqa support agent, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. All additional information and instructions required will be provided by the Orqa support agent.

Notice: Do not ship batteries to Orqa. If you have any issue with the battery, please contact Orqa customer service.

Warranty Inspection and Repairs

To receive warranty service, you must provide your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Orqa, or in agreement with the Purchaser, when possible.

Non-Warranty Repairs

Should your repair not be covered by warranty, the repair will be completed after the Product has been assessed by Orqa and subsequent payment has been completed by the Purchaser, if required. Repair and payment cost estimates will be provided after the Product assessment by Orqa. In addition, you will be billed for return freight.