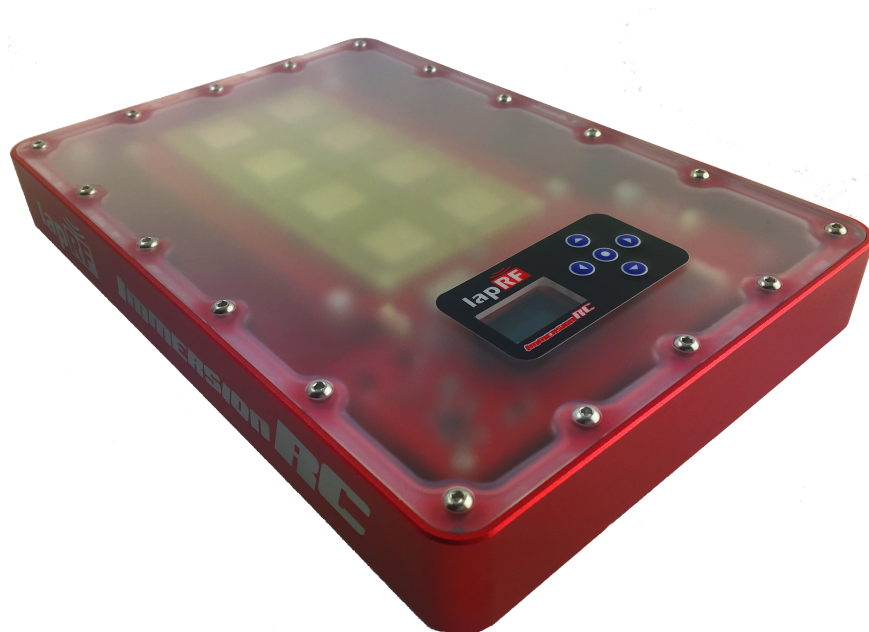




LapRF Event Timing System
Preliminary Operator's Manual

Rev 0.99 - May 2017



IMMERSION RC
REAL VIRTUALITY

Specifications

5.8GHz RF Detection	
Frequency	5.3-6.0GHz
Programmable Attenuation	0-32dB
Antenna	Custom linearly polarized (Suitable for LHCP, RHCP, Linear use)
Channels	Arbitrary (defined by connected app.)
Pilots	1-16, depending upon required precision and gate speed
Mechanical	
Dimensions	L =220mm, W = 160mm, H =30mm
Weight	1.1kg
Cooling	Passive, no moving parts
Power	
External	9V - 17V (3s/4s LiPo ideal for field use)
Consumption	~10W
Interface	
Ethernet	Waterproof RJ45 connection
USB	Optional internal USB connection
App Support	
Platforms	Windows, LiveTime scoring engine

Introduction

The LapRF 8-Way Event Timing Edition is the first in a family of race timing systems from ImmersionRC.

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

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.

Base Manual

The LapRF 8-Way shares many features with the LapRF Personal Edition, and therefore the manual for the Personal Edition forms the base of the 8-way manual.

This manual covers the additional features for the 8-way.

[LapRF Personal Edition Manual](#)

Getting Started

The 8-way has been designed to be used by anyone interested in timing an FPV racing event, without special skills.

- 1) Apply power, and install in the start/finish gate.
- 2) Hook up the Ethernet cable to either a network, or a direct connection to the timing PC
- 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 setup the LapRF.

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.

Heat, the #1 enemy of electronics

FPV races are a lot more pleasant when the snow has melted, and the days are long enough for more packs than your charger can keep up with.

These spring and summer months closer to the equator brings the sun, and the potential damage that it can cause to electronics used for FPV racing.

The LapRF Event System uses a milled, anodized, waterproof housing, which keeps electronics protected from dust, and moisture, which appears to be attracted to FPV events (especially those held on the Spanish isle of Ibiza).

This housing also acts as a heatsink to keep the sensitive timing receivers cool, and ensuring that they have a long working life.

When placed in direct sunshine, at elevated temperatures, the effectiveness of this heatsink is reduced, so care does need to be taken.

Simply protect the LapRF from direct sunlight, using anything that is transparent to RF. A piece of white fabric, a pizza-box lid (ideally with tomato sauce removed), even the cardboard box that the product ships in.

Placement

The lapRF's integrated patch antennas form a beam which emits from the top of the product.

Ideal placement is in the center of the gate, but that does expose it to strikes from low-flying (high speed) racers.

A small hole in the ground works well to protect it for grass tracks, or where this is not possible, either protect the timer from strikes 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 which 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.

Limitations

In general, you will find the LapRF to be truly best-in-class when it comes to RSSI timing systems. The custom timing modules, coupled with a significant amount of processing power on-board, and some highly refined curve-fitting algorithms, help to run races without an engineer present.

The one limitation that we will be very honest about is running the system in indoor environments which are in the 'RF Hell' category.

Buildings with huge amounts of metal, roofs, walls, etc. are not only unsuitable for analog FPV racing, they are a real challenge for RF lap timing also, and are best avoided.