

RACE RESULT SYSTEM

DATA SHEETS

- Decoder
- Passive Antenna
- Passive Transponders
- Active Extension
- Active Transponders
- Loop Box
- USB Timing Box
- Management Box
- Track Box



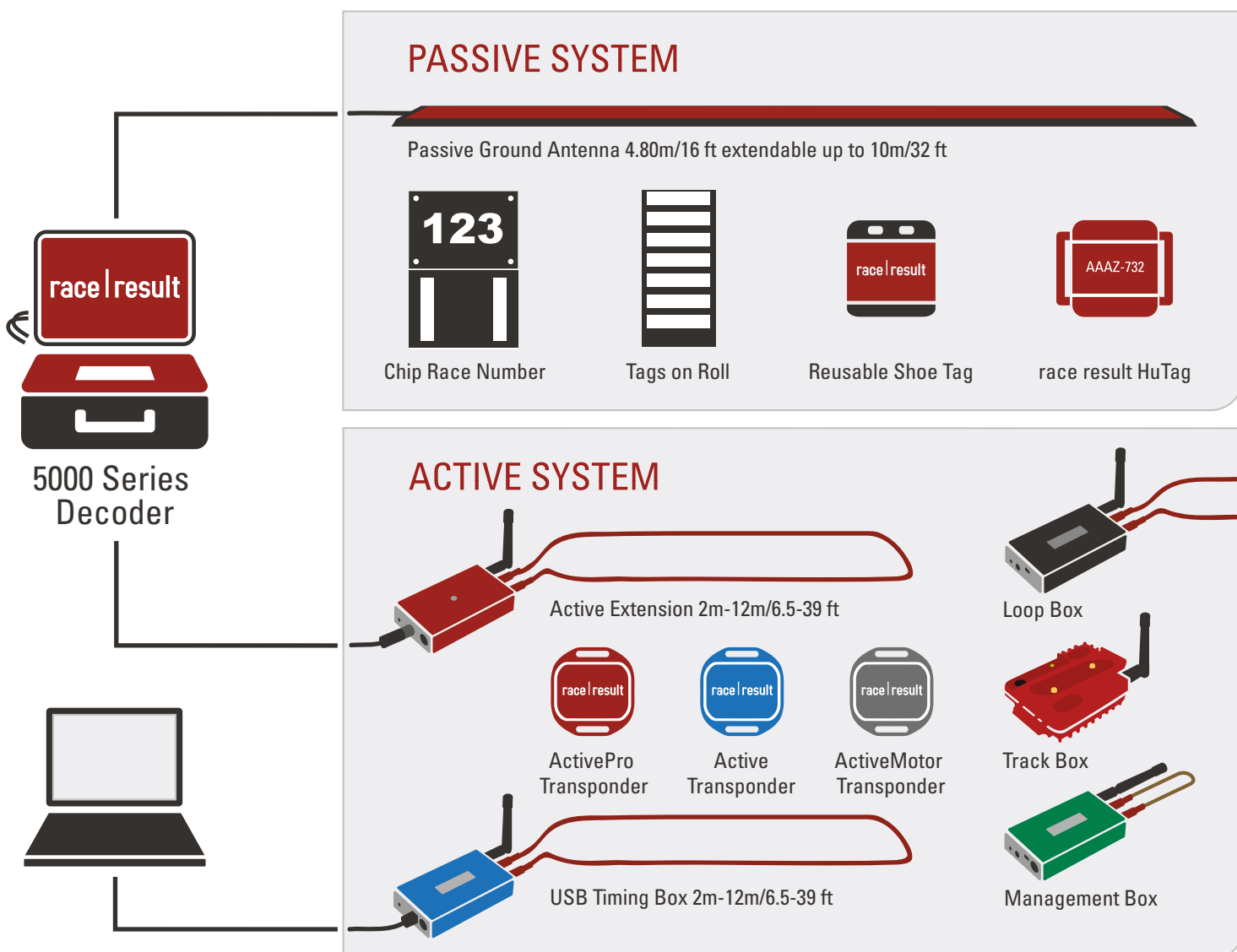
race | result

Precision. Passion. German Engineering.

www.raceresult.com

RACE RESULT SYSTEM 5000 SERIES.

The race|result System is a race timing system for any type of active sport. It supports both active transponders (with battery) for complex or high speed races with high demands on precision (e.g. cycling, inline, ski or motorsports), and passive transponders (without battery) for mass events like marathons, road races, or mountain bike races.



DECODER.

The race|result Decoder receives the signals from the transponders, calculates the exact finish time and provides the data to the scoring software like race|result 11 in real time. The system runs independently from your computer and from your power supply.

Timing System for

- Running
- Triathlon
- MTB
- Cycling
- Inline skating
- Skiing
- ...
- 6-8 h (passive) / 24 h (active) internal battery
- Precise, synchronized GPS time
- Integrated 3G module
- Easy setup and handling
- Online firmware update

Endless application options in combination with race|result 11 software

- Net time timing
- Lap counting and lap timing
- Team scores and age group results
- Multiple distances on the same lap track at the same time
- Multiple timing points and decoders per timing point
- Real time presentation of results
- Simultaneous work via internet or local network
- ...



Safety & conditions Decoder	
Protection class with closed cover	IP54
Safety norm	EN60950
Regulatory conformity	CE, RoHS, FCC
Relative humidity	Max. 90% non-condensing
Temperature range	-20°C to 50°C

	Weight	Pack-size
Decoder	12.5 kg	36 x 26 x 45 cm

Ports & features	
Antenna Ports	8 x BNC

Power & battery Decoder	
AC power supply	110 V-230 V 50-60 Hz (2 A fuse)
DC power supply	12 V-14 V 2 A (when battery full)
Battery flight safety	15 Ah (Pb) IATA - A48 / A67
Charging time	4 h (switched off) 8 h (running)
Power consumption	30 W (battery full) 60 W (charging)
Battery life (passive)	6-8 h ¹⁾
Battery life (active)	24 h ¹⁾

Ports & features	
Internal GPS	uBlox 50 channel receiver, 30 seconds cold start
Internal 3G	7 band 3G + quadband GPRS standard SIM-card
2 x LAN	Dual 100 MBit / 10 MBit lan port. auto crossover detection. Switched internally for loop through to next device.
USB	Thumb drive for backup
Antenna ports	8 x BNC
Feature port	Supplies 5V (500mA), 12V (500mA) output, start gun, photo sensor
Audio beep	3.5 mm headphone plug (mono)

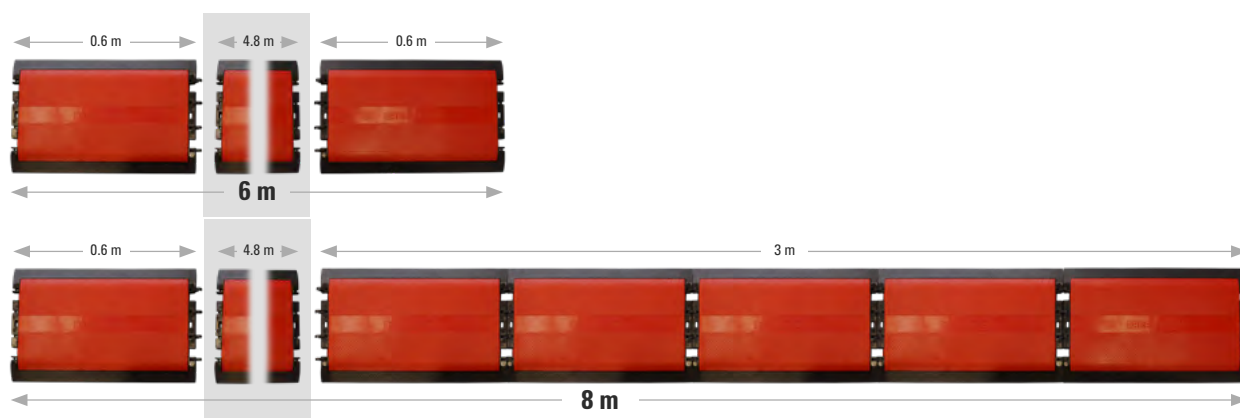
¹⁾ Battery life can be reduced by usage of 3G (-10 %), low temperature (-25 % @ 0°C/32°F) and battery age.

PASSIVE ANTENNA.

The passive UHF antenna can be used with all passive race|result transponders. Standard length is 4.8 m / 16 ft (antenna every 60 cm / 2 ft), extendable to 6 m / 20 ft or 8.4 m / 26 ft.

Passive antenna features

- **Easy setup in just a few seconds.**
Simply unfold the antenna and connect it to the decoder.
- **Easy to ship**
The 4.8 meter antenna weighs 25.9 kg / 57 lbs and can be shipped via regular mail.
- **Flat design**
The height of only 2 cm ensures excellent safety for all kinds of events.
- **Incredibly durable**
The antenna can be passed over by cars or even trucks.
- **German engineering inside**
Application optimized antennas guarantee the best detection rates.
- **6 m or 8 m Extension Kit**
Two or six additional elements to extend the antenna to 6 m / 20 ft or 8.4 m / 26 ft.



Antenna & transponder (passive)	
Transponder frequency	866 MHz (EU) 903-927 MHz (US) 920-925 MHz (AUS)
TX power	33 dBm max
Track length	4.8 m 6 m or 8 m with Extension Kit
Read range ¹⁾	4 m
Detection rate read rate	> 99.8% ²⁾ > 3,000 chips/min
Maximum transponder speed ³⁾	40 km/h 25 mph
Timing accuracy ⁴⁾	200 ms

	Weight	Size
4.8 m antenna	25.3 kg 25.5 kg (incl. packaging)	60 x 37 x 19 cm 60 x 40 x 20 cm (pack size)
6 m Extension Kit	6.2 kg	60 x 37 x 5 cm
8 m Extension Kit	18.6 kg	60 x 37 x 15 cm
Antenna height	2 cm	
Antenna width	29 cm	

- ¹⁾ Transponders are detected multiple times while crossing the antenna. The detection with the highest signal strength – right above the antenna – is used for timing.
²⁾ With transponders attached correctly.
³⁾ Higher speeds are possible, detection rate may be lower.
⁴⁾ Use GPS time to get most accurate results.

PASSIVE TRANSPONDERS.

SINGLE USE



Chip Race Number



Chip MTB Plate



Race Bib with Shoe Transponder (single/duo)



race|result Bib Tag with foam spacer



Chip Bike Tag



Triathlon Tag (disposable)

MULTI USE



race|result HuTag



reusable Shoe Tag



race|result Baton

ACTIVE EXTENSION.

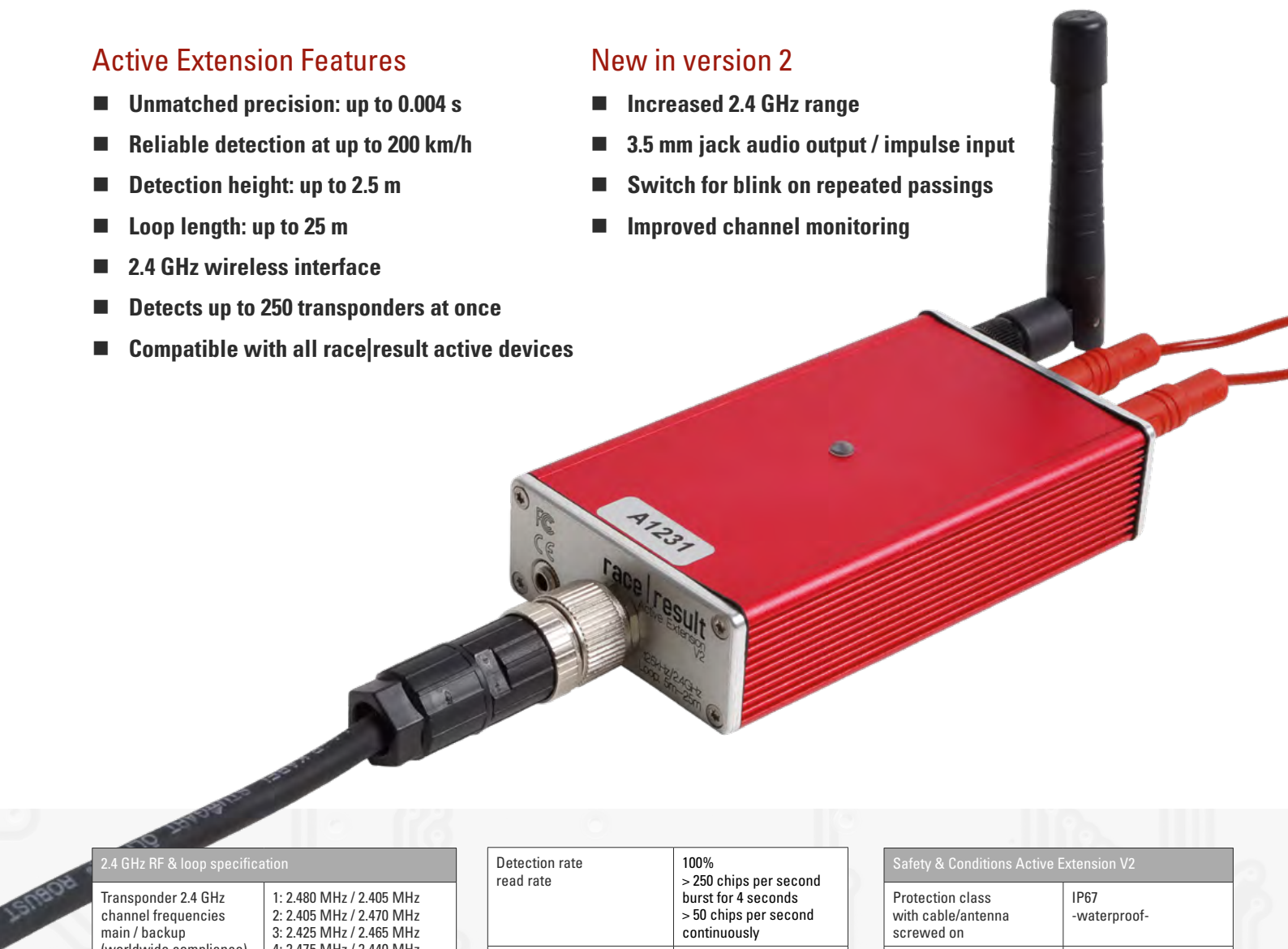
Using the Active Extension, your race|result System also supports the race|result active transponders. Active transponders ensure highest precision, accuracy and reliability for cycling, triathlons, inline, skiing or motor sports.

Active Extension Features

- Unmatched precision: up to 0.004 s
- Reliable detection at up to 200 km/h
- Detection height: up to 2.5 m
- Loop length: up to 25 m
- 2.4 GHz wireless interface
- Detects up to 250 transponders at once
- Compatible with all race|result active devices

New in version 2

- Increased 2.4 GHz range
- 3.5 mm jack audio output / impulse input
- Switch for blink on repeated passings
- Improved channel monitoring



2.4 GHz RF & loop specification	
Transponder 2.4 GHz channel frequencies main / backup (worldwide compliance)	1: 2.480 MHz / 2.405 MHz 2: 2.405 MHz / 2.470 MHz 3: 2.425 MHz / 2.465 MHz 4: 2.475 MHz / 2.440 MHz 5: 2.415 MHz / 2.445 MHz 6: 2.460 MHz / 2.430 MHz 7: 2.435 MHz / 2.455 MHz 8: 2.450 MHz / 2.420 MHz
2.4 GHz TX power	17.5 dBm
Loop frequency & data	125 kHz Data-Packet = Loop ID + channel Packet rate: 150 Hz OOK-modulation, manchester encoded, 16 bit anti-false-wakeup pattern
Loop power	100% = 250 mA RMS regulated peak current
Loop cable & length	5 m - 25 m, >0,5 mm ² standard 4 mm banana plugs
Data cable	5 m (standard), 15 m, 20 m
Read range	60 cm (2 ft)
25% loop power	2.5 m (8 ft)
100% loop power	

Detection rate read rate	100% > 250 chips per second burst for 4 seconds > 50 chips per second continuously
Internal data buffer	1,000 passings
Clock stability	24/1,000th second per day 0.28 ppm TCXO calibrated to rubidium frequency standard traceable to NIST
Forewarn data delay	100 ms (from entering the loop field)
Max Passing Data Delay	250 ms (after loop center)
Repetitive Passing rate over loop	1 per second

Safety & Conditions Active Extension V2	
Protection class with cable/antenna screwed on	IP67 -waterproof-
Safety norm	EN60950
Regulatory conformity	CE, RoHS, FCC
Temperature	-30°C to 70°C
Dimensions / weight	27 x 66 x 117 mm / 190g

race|result System firmware version 1.94 or higher recommended

ACTIVE TRANSPONDERS.



Active transponder features

■ Three options

The ActivePro and the ActiveMotor are high-end transponders with a 3D activation antenna, very high precision and a revolutionary tracking feature. The ActiveBasic is the cost-efficient alternative with 1D activation and less precision.

■ Flexibility

All transponders can be used in the same race (for example ActivePro for elite riders, ActiveBasic for amateurs).

■ 3D activation antenna

The 3D activation antenna of the ActivePro ensures reliable detection in any orientation.

■ Precision

Because of the 3D antenna, the ActivePro offers a true 1/100th second precision.

■ Battery lifetime

The ActivePro and ActiveMotor transponders can be set to deep sleep mode, which reduces the energy consumption and increases battery lifetime.

New in version 2

The best active transponders on the market just got better. Based on 3 years experience with the first version, we redesigned and optimized our active transponders, offering you the following improvements:

■ Tracking

You can now track participants live, without an additional GPS tracker. All you need is to activate tracking on the timing chips, and set up Track Boxes along the course or on following vehicles.

■ Designed for motorsports

With a precision of up to 4/1,000th of a second at speeds of up to 200 km/h, the ActiveMotor transponder is the perfect solution for motorsports. The higher sensitivity of the Active Motor and reduced reaction time ensure a much quicker transmission of the detections. The ActiveMotor comes with our new Active Chip Holder, for an easy mount on the vehicles.

■ Longer lifetime

The power consumption of our transponders has been reduced, for an increased battery lifetime.

■ Better repeatable precision

Our transponders are even more consistent and precise, both in store and repeat mode.

■ More ergonomic and robust

The plastic casing of all active transponders is now even more robust, and more comfortable to wear thanks to its smoother edges. We have also improved our quality control, to ensure reliability to the highest standards.

■ Better immunity to interferences

Thanks to a better channel assessment process and a new dual-frequency transmission technique¹⁾, our active system and transponders are more immune to interferences from third-party devices using 2.4 GHz channels.

■ Improved ease of use

Our v2 transponders make your life easier, especially in store mode: the Loop Box can now beep and blink also for stored detections²⁾, you can now place two loops very close to one another (e.g. for speed traps), and the new overwrite logic ensures a cleverer storing of start detections.

ACTIVE TRANSPONDERS.



Active transponders	ActiveBasic	ActivePro v2	ActiveMotor v2
Loop detection antenna	1D activation antenna	3D activation antenna – detects equally in any orientation	
Detection speed	75 km/h (45 mph)	150 km/h (90 mph)	up to 250 km/h (125 mph)
Timing accuracy	2/10th second	1/100th second ³⁾	4/1,000th second ³⁾
Precision sweet spot	at 30-60 km/h		at 60-90 km/h
Reaction time	250 ms		125 ms
Passings storage	no	64 passings up to 24 hours time drift of ± 70 ms per hour (20 ppm)	128 passings up to 24 hours time drift of ± 70 ms per hour (20 ppm)
Tracking mode	no	tracking rate 1 time per second	tracking rate 2 times per second
Deep sleep mode	no	reduces power consumption by 40%	reduces power consumption by 70%
Prewarn before passing for fast identification	no	yes	yes Prewarn acknowledgement
Expected battery life	12 years & 300,000 passings	7 years & 200,000 passings	4 years & 300,000 passings
Guaranteed battery life	7 years & 150,000 passings	5 years & 100,000 passings	3 years & 200,000 passings
Tracking lifetime	-	2,000 hours	1,200 hours
Battery indicator	temperature compensated battery status data in passing		
Dimensions	36 x 40 x 9 mm		
Weight	16.8 g		
Housing	IP69 TPE molded case sealed with PU compound 100% salt water proof		
Temperature	-25°C to 70°C		
Shock Resistance	>1,000 G		

¹⁾ Only on Loop Box v2 from firmware version 2.5

²⁾ Only on Loop Box v2 from firmware version 2.4

³⁾ At 30% loop power & 30 cm wide loop

Active Transponder Tray	
Dimensions	522 x 297 x 12 mm
Weight	approx. 1 kg (including 50 transponders)
Material	4 mm rugged PE (UV stabilized)
Features	Stackable, with numbering 1-50 / 51-100



Active Chip Holder	
Dimensions	50 x 58 x 20 mm
Weight	14 g (incl. 3 O-rings)
Material	High-impact resistant plastic
Compatible with	Active Basic, Active Pro, Active Motor
Contents	Active Chip Holder, 3 O-rings
Feature	Can be mounted on plain surfaces or tubes



The Active Chip Holder is included with every Active Motor transponder.

Note: to guarantee full performance, the Active Motor transponder needs at least 5-10 mm distance to any metal/carbon part.

ACTIVE SYSTEM. LOOP BOX.

The stand-alone Loop Box is a revolutionary new way to collect split times. Loop Boxes at close-by split timing points will repeat detections wirelessly to the main system. In case of remote timing points, the active transponder saves the times and then transmits them when arriving at the finish.

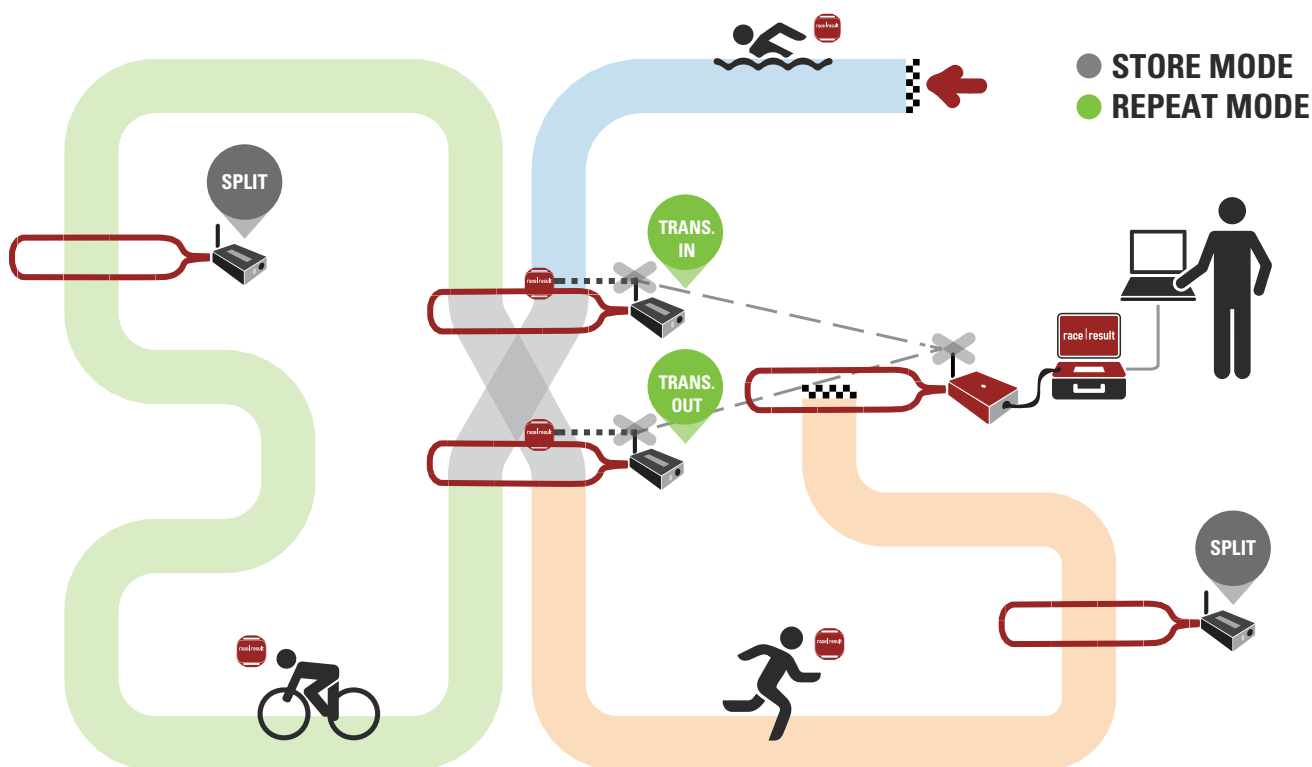


Loop Box Features

- **Easy setup**
No wiring needed between main system and split timing points.
- **Small investment**
For an additional timing point you only need a Loop Box instead of a complete timing system.
- **Stand-alone**
With its internal battery the Loop Box can run for 12-20 hours.

New in version 2

- **Increased repeat mode range**
of up to 900 m
- **3.5 mm input-/output-plug**
Audio output or start impulse input



Safety & conditions Loop Box	
Protection class with cable / antenna screwed on	IP67 -waterproof-
Safety norm	EN60950
Regulatory conformity	CE, RoHS, FCC
Temperature	-30°C to 70°C
Dimensions / weight	27 x 66 x 117 mm / 272 g

Loop Box	
Maximum repeat range	Up to 900 m with direct line of sight
Passings transmission	Up to 40/second continuously
Passing transmission delay	200 ms – compensated
Internal data buffer	1,000 passings

Power & battery	
AC power supply Loop Box V2	110 V-230 V 50-60 Hz (2 A fuse)
Loop Box V2	10 V-15 V, 100 mA (at 100% loop power)
Battery	LiPo, 4,000 mAh, 3.7 V 12-20 h depending on loop power

ACTIVE SYSTEM. USB TIMING BOX.

The race|result USB Timing Box enables you to setup your timing line in a split second: directly connected to a computer, the USB Timing Box does not require a decoder.

The USB Timing Box is used best to time sporting events, to scan tags at race pack pick-up, or for just about any other application: the open-source software of the USB Timing Box allows you to develop any solution that may have nothing to do with sports timing.

USB Timing Box features:

- **Wireless reception of split times from a Loop Box**
- **100% detection rate**
- **Open software development kit**
- **Internal memory stores 1,000 detections**
no lost times - even if your computer crashes
- **Internal backup battery for 12 h**
- **Highest clock stability on the market: 0.28 ppm**
- **Compatible with all race|result active devices**
- **Repeatable accuracy of 1/100th**
- **Works with low end computers**
only requirement USB 1.1
- **Loop power can be set by user**

The
**smallest & most
cost-effective**

timing system
in the world!



Safety & conditions USB Timing Box	
Protection class with cable / antenna screwed on	IP67 -waterproof-
Safety norm	EN60950
Regulatory conformity	CE, RoHS, FCC
Temperature	-30°C to 70°C
Dimensions / weight	27 x 66 x 117 mm / 266 g

2.4 GHz RF & loop specification		
Transponder 2.4 GHz channel frequencies main / backup (worldwide compliance)	1: 2.480 MHz / 2.405 MHz 2: 2.405 MHz / 2.470 MHz 3: 2.425 MHz / 2.465 MHz 4: 2.475 MHz / 2.440 MHz	5: 2.415 MHz / 2.445 MHz 6: 2.460 MHz / 2.430 MHz 7: 2.435 MHz / 2.455 MHz 8: 2.450 MHz / 2.420 MHz
2.4 GHz TX power	17.5 dBm	
Loop frequency & data	125 kHz data-packet = Loop ID + channel packet rate: 150 Hz OOK-modulation, manchester encoded, 16bit anti-false-wakeup pattern	
Loop power	100% = 250 mA RMS regulated peak current	
Loop length	5 m - 25 m, >0.5 mm ² standard 4 mm banana plugs	
Internal data buffer	1,000 transponders	
Read range 25% Loop power 100% Loop power	60 cm (2 ft) 2 m (6 ft)	
Detection rate	100% > 250 chips/second burst for 4 seconds	
Read rate	> 50 chips/second continuously	
Battery	LiPo, 4,000 mAh, 3.7 V 12 hours	
USB 1.1	500 mA	

ACTIVE SYSTEM. MANAGEMENT BOX.

The Management Box is a key element of the race|result tracking solution, as it is required to activate tracking mode on the transponders, and to manage Track Boxes.

It also allows you to keep track of your active transponders, generate chip files in a few seconds, and set the active transponders to deep sleep mode between events to extend their battery life.

In deep sleep mode, the energy consumption of your active transponders is 40% lower. Systematically setting your transponders to deep sleep mode may increase their lifespan by up to 30%.

Management Box features

- Activate and deactivate tracking
- Manage Track Boxes
- Set transponders to deep sleep mode
- Keep track of transponder battery status
- Generate chip files
- Scan trays to check
- USB connection



Safety & conditions Management Box	
Protection class with cable/antenna screwed on	IP67 -waterproof-
Safety norm	EN60950
Regulatory conformity	CE, RoHS, FCC
Temperature	-30°C to 70°C
Dimensions / weight	27 x 66 x 117 mm / 274 g

2.4 GHz RF & Loop Specification	
Transponder 2.4GHz channel frequencies (worldwide compliance)	1: 2.480 MHz / 2.405 MHz 5: 2.415 MHz / 2.445 MHz 2: 2.405 MHz / 2.470 MHz 6: 2.460 MHz / 2.430 MHz 3: 2.425 MHz / 2.465 MHz 7: 2.435 MHz / 2.455 MHz 4: 2.475 MHz / 2.440 MHz 8: 2.450 MHz / 2.420 MHz
2.4 GHz TX Power	17.5 dBm
Loop frequency & data	125 kHz data-packet = loop ID + channel packet rate: 150 Hz OOK-modulation, manchester encoded, 16 bit anti-false-wakeup pattern
Loop power	100% = 250 mA RMS regulated peak current
Loop length	5 m - 25 m, >0.5 mm² standard 4 mm banana plugs
Internal data buffer	1,000 transponders
Read range 25% loop power 100% loop power	60 cm (2 ft) 2 m (6 ft)
Detection rate	100% > 250 chips/second burst for 4 seconds
Read rate	> 50 chips/second continuously
Battery	LiPo, 4,000 mAh, 3.7 V

ACTIVE SYSTEM. TRACK BOX.

With the Track Box, you can provide tracking and timing with the same transponder. Track Boxes placed along the course or on race vehicles receive pings from all tracking-enabled transponders within a 50 m radius and transmit the data live online.

You can then use this data to produce live tracking visualisation, and to publish an unprecedented amount of timing data. Have you ever dreamt of covering an extreme triathlon with 30 splits and a 3 persons crew? Now you can!

Track Box features

- Receive track pings from active transponders in a 50 m radius
- Upload GPS tracking data live online
- Up to 5 days battery life
- Built-in magnets for easy mounting
- Practical stack charging



Safety & conditions Track Box	
Protection class	IP64 -waterproof-
Safety norm	EN60950
Regulatory conformity	CE, RoHS, FCC
Temperature	-20°C to 70°C
Dimensions / weight	165 x 102 x 32 mm / 400 g

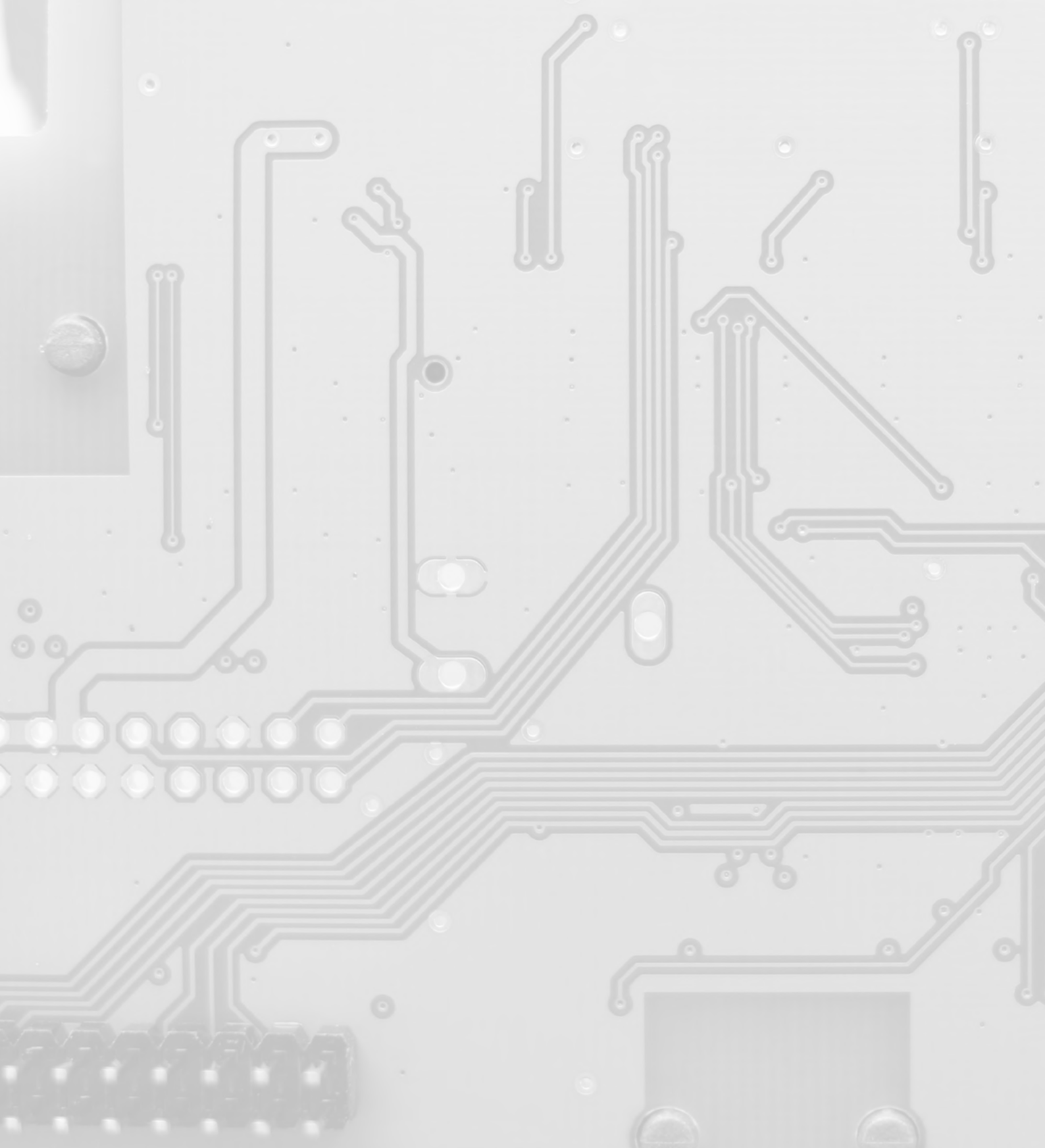
Connectivity	
Internal GPS	Qualcomm gpsOne Gen8 with GLONASS
Internal 3G	7 band 3G + quadband GPRS Standard SIM-Card

Battery	
Battery type	LiPo, 4,000 mAh, 3.7 V
Charge current	230mA at 15V (full in 5h) 150mA at 12V (full in 10h)
Battery life	Moving: 1 day Stationary: 3-5 days

2.4 GHz RF specification	
Transponder 2.4GHz channel frequencies (worldwide compliance)	1: 2.480 MHz 5: 2.415 MHz 2: 2.405 MHz 6: 2.460 MHz 3: 2.425 MHz 7: 2.435 MHz 4: 2.475 MHz 8: 2.450 MHz
2.4 GHz TX Power	3,5 dBm
Internal Data Buffer	10,000 tracking records
Read Range	50 m - 150 m

10 Track Boxes Pack	
Content	Foam-padded suitcase with shoulder strap 10 Track Boxes Track Box charge adapter 15 V AC adaptor with universal power inlet Mains power lead
Dimensions / weight	390 x 300 x 135 mm / 5.5 kg





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