



“A Natural Selection”

Orbiter Timing System

Markets are Inexorable, and provide natural selection of products. Orbiter's design is stable. This means an Orbiter customer that purchased in 2006 with software upgrades, is still in use today.



Features for Sole Source with Orbiter

Orbiter's design is solely based on "functionality".

The form factor is **Rugged** .

1. Used in extreme weather.
2. The plastic enclosure is flexible and designed to be hit.
3. The antenna flexes into the body of the unit when hit.
4. The Spire may be left outside in the rain and heat for long periods of time.
5. Shock proof when dropped. Good in Mud, Humidity & Dust.



Timing Features



- Unique features are needed to keep timing software simple. So simple “Anyone” must be able to time a race.
- Without simplicity timing costs go up as trained engineers must be used. This become a constant human resource problem.
- **Features:**
- **Reprocessing** allows software settings to be changed during and after an event. This is needed in case the set up of an event is not correct.
- **Clone** to copy an event for fast back to back fitness testing.
- **RESTful Interface** so localized results may be transmitted to a national headquarters in near real time.
- **Daughter Events** so national totals may be gained from many local events
- **Event Manager** tracks many events at the same time.

RFID Tags



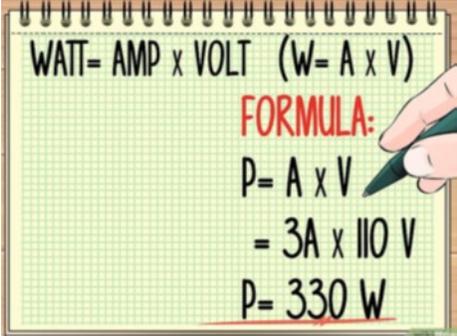
- ▶ **Orbiter Branded high quality triple tested tags.**
- ▶ Off Brand RFID tags are the number one issue with missed tag detects. Manufacturers read ranges, and functionality differs greatly. For example, with some suppliers 1% to 2% dead tags are normal. Other suppliers tags don't work in the sun. Some tags read at 6 feet but not 40 feet. Thus knowledge that all tags are not Standard is important.
- ▶ **UHF Passive Tags.** Orbiter co –developed the Hu-Tag and now 3D Tag that works well on metal, ankle and wrist.
- ▶ **Active Tags.** Orbiter's premium system uses microwave battery assisted tags that are “always on” and last 5 years guaranteed. No need for recharging the tags. Microwave means a small wave length and very accurate times. It also means they work well when placed on meal vehicles with engines that produce EMI.
- ▶ **Orbiter Active Tags:** For track side permanent mounted systems, they are the only tags that can span the full width of a track from afar with precision. Other active tags typically “power up” or “blink” and are not as time accurate. Orbiter tags are used on Japanese bullet trains.

Orbiter High 24 Volts DC Power

- **Voltage matters.** It is a well known fact that electronic devices operate better when maximum voltage for the design is used.
- With passive RFID each tag in the read zone absorbs power and the read zone area will shrink when many tags are in the zone.
- Greater voltage allows more tags to be read.
- Other readers use less voltage for DC operation and are less effective.
- AC power and automatic recharger works around the world.
- Low power battery indicator included.



Watts matter too



WATT= AMP x VOLT (W= A x V)
FORMULA:
P= A x V
= 3A x 110 V
P= 330 W

- ▶ Government regulations limit the wattage of RFID readers. Typically 1 Watt or less.
- ▶ With Orbiter there is a multiple wattage when more than one reader is overlapped on the same read zone. This also provides greater detections.
- ▶ **Each Orbiter reader is autonomous and independent.** When more than one reader is used multiple power is applied over the same read zone.
- ▶ Competitive systems often spread out antennas front and back to the finish line. This creates a fuzzy less accurate finish detection point.
- ▶ Orbiter overlaps the read zone on the same line (on top of each other) by automatically sensing the radio channel and varying it slightly, so the two readers do not jam each other. A multiple of power is applied making the read zone “hotter” and exciting the passive chips.

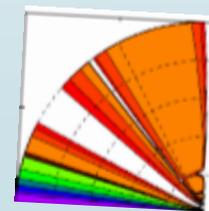
All In One Design – Easy roll out and use.

- ▶ Competitive side antenna systems require the user to “build” a stand, affix antennas, use a separate box, a separate power supply, separate batteries or UPS, and worse.... screw and unscrew cables each time of use. Orbiter rolls out as ‘all – in – one’ and is ready as soon as you turn the power “On”.
- ▶ Competitors side antenna cables were designed for supply chain fixed to wall installations. They are delicate and the copper frays slightly with each use. This causes the system to be de-tuned over time. An example, of using a product designed for one purpose and used for another purpose. Not surprising their systems don’t work quite right.
- ▶ The many separate parts of competitive systems means greater risk of losing them.
- ▶ Screwing and unscrewing fittings risks damaging them by bending them and again risks that the system won’t work when needed.

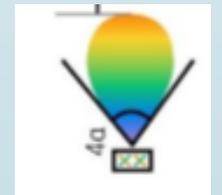


Phased Detect Antennas

- ▶ Look closely at Orbiter Spire patch antennas. They different than others. For example, the metal edge and that there is more than one antenna inside.
- ▶ Our antennas emanate at a precise 45 degree angle such that when turned 45 degrees to the start finish line create a straight detection line. Orbiter timing is more accurate than a patch antenna lobe.
- ▶ Our antennas oscillates thus able to position on the tag on a X – Y plane. As used by US Navy, Phased Array positions on X – Y – Z.



Orbiter
Array



Patch
Array

AGM Batteries not Lithium Ion

- ▶ No worries about air transport of Orbiter systems as they are internationally approved. Competitive system often “sneak lithium ion onto planes”.
- ▶ No worries about burning a building down either with Orbiter as AGM batteries are safe. They are commonly found in hardware stores all over the world.
- ▶ Orbiter uses the increased weight of lead acid batteries in the bottom of the 28 lbs Orbiter for stability. It is solid in windy conditions. However, if needed a sand bag on the axle in extreme wind weather can be used for quick stability.



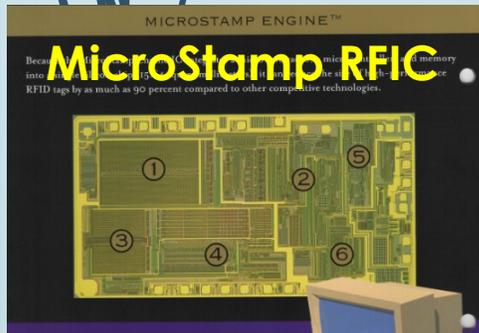
Antenna Cables matter



- Look closely at Orbiter antenna cables. They are very thick as compared to competitive antenna cables. This allows for greater power to the antenna.
- Competitive systems use a power regulator so less power is applied to the antenna. This allows for automatic balancing when various antennas are used, but is a compromise that impacts performance.
- Orbiter readers are matched to the antenna so full power may be applied.
- Thicker cables are better for race timing. Maximum power is needed for dense chip time starts with side antennas.
- However, Orbiter has a quick and easy power control dial when power is desired to be reduced. This is the case for indoor tracks or use in gyms.

More than Software Engineering...

- ▶ Manufacture of RFID requires expertise of electrical engineering, multiple types of software engineers, and RFIC (Radio Frequency Integrated Circuits) designers. Most large billion dollar entities do not have the RFID expertise Orbiter has inhouse.
- ▶ Off the shelf RFID readers are designed for Supply Chain. Timing is a small market by comparison. Supply chain RFID readers do not meet the requirements for Olympic class split timing.
- ▶ Orbiter coders work for the military. They code wireless communication for forward air controllers to military jets. Demanding work where absolute reliability is required.
- ▶ The reason competitive companies do not get involved in green board electrical engineering design is because they think they can make more money selling software only. This limits their product's RFID functionality.



Difficult to Copy Orbiter....



- ▶ **“Time”** is the most difficult type of software programming. This expertise is what programmers of space rockets do. This coding is very difficult to copy.
- ▶ Programming for different time zones, synchronizing with many devices at the same time, moving readers in random order during an event, leap frogging readers during an event, and operating readers together as one are **all tough to do.**
- ▶ Software programmers today are like Doctors. There are many specialties and one must be wary of those that claim, **“I can copy it !”** Time and money can be wasted in a failed effort. Plus, Orbiter has Patents and enforces them.



Does Rain and Metal Impact UHF and Microwave RFID?

- ▶ UHF and Microwave RFID can not be submerged under water or be inside a metal container. Mats have a problem with this....
- ▶ This because mats are placed on the ground where heavy rain can submerge them, and metal rebar in concrete pavements grounds them out.
- ▶ With side antennas there are few issues as there are decades of this type of use. Side antennas are in free air.
- ▶ For example, UHF is used road tolls, rail car tracking, and parking access. These use side antennas and are exposed to rain and metal in concrete. Side Antennas work well because they are up in the air and off the ground.

- Fin -

Natural Selection

