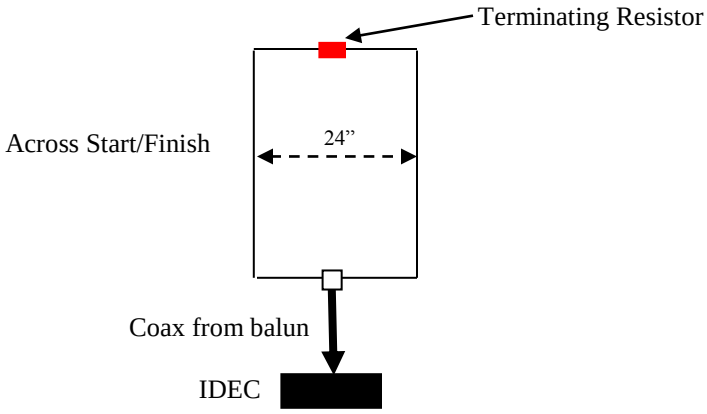
Antenna Creation and Installation Instructions

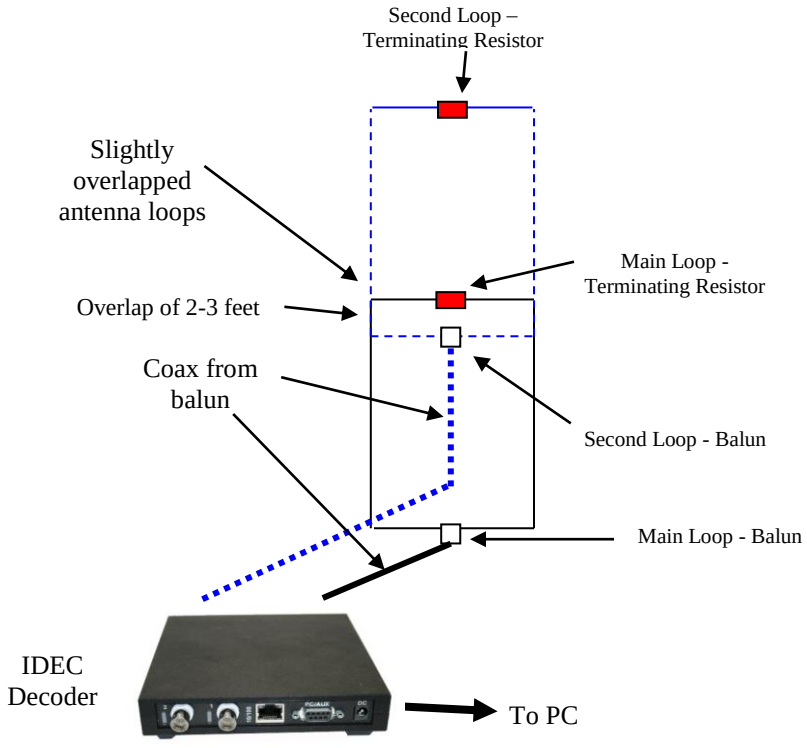
Antenna Creation and Installation

Introduction

There are two methods for setting up the antenna for the RMS. We have the single loop and two loop methods. See the figure below for the single and two loop setups.



(A) – Single Loop



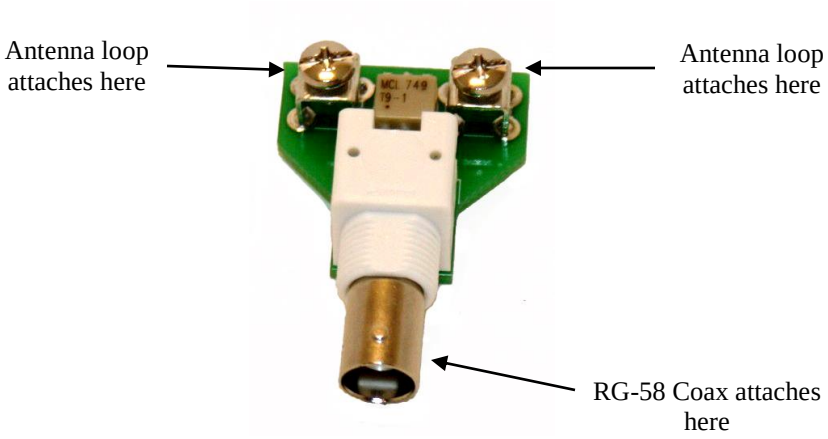
(B) – Two Loop

Generally the longer the loop is, the less detection height you'll get. The latest generation equipment has a great deal of sensitivity. Thus it is possible to stretch the loop out and still have enough detection distance. Some testing should be done before the loop is completely buried to verify that adequate performance exists.

Antenna Construction

For dirt tracks the antenna loop should be placed in plastic PVC pipes for weather protection. The pipes will also help keep the loop in a flat plane, parallel to the surface of the track. Be sure to seal the pipes such that water will not leak into them. Water immediately touching the wires will reduce the sensitivity of the system.

Once the antenna has been constructed and placed in PVC pipes, attach each leg of the antenna loop to a screw terminal on the balun device. The balun is a small circuit board with 2 screw terminals and one BNC (coax) connector. Attach one end of the coax cable to the balun and connect the other end to an IDEC. Do the same with the second loop if you are using 2 loops.



Balun

Trouble Shooting the RMS

1. **Introduction**

This section describes how to spot signs of poor performance and methods for trouble-shooting these problems. It will focus on identifying and addressing these issues. The document is structured such that the most common problems are described towards the beginning of the document and the more rare problems are towards the end.

2. **Transponder Mounting**

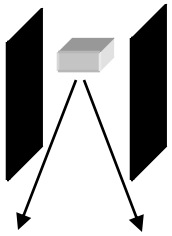
The most common problem is incorrect mounting position of the transponder. Symptoms of a poorly mounted transponder are below:

Symptoms:
1. Missed crossings
2. Low hits and/or power numbers

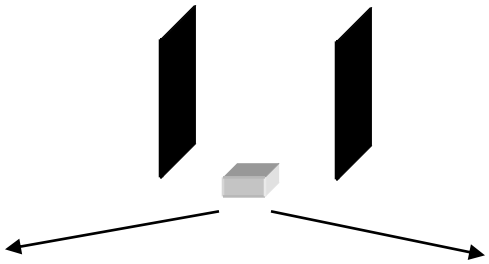
Hit numbers represent the number of times the system "sees" the transponder as it crosses the loop. When the racers are traveling slowly you should see higher numbers, for example 200 at parade speed (up to 30-50 Miles per hour) and 100 at race speed. As the vehicles travel faster the numbers will get smaller as the system "sees" the transponders in detection range for a shorter amount of time. This is normal. However, if the numbers are dropping under 20 hits then this indicates possible mounting problems – either poor location or incorrect orientation.

The symptoms for poor mounting follow a transponder. In other words poor numbers should not be a global problem unless all racers have poorly mounted transponders. The hit/power numbers can tell you a great deal about the type of problem.

Symptoms:
1. Low hit number versus other transponders. The transponder might be recessed. Transponder has very narrow view of the track and is "seen" for a short period of time.

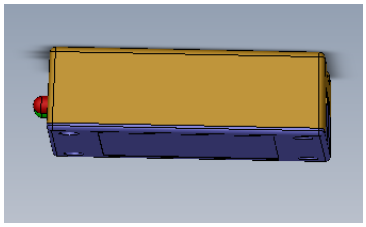


Poor location: Narrow window for detection. The signal can't be seen well.

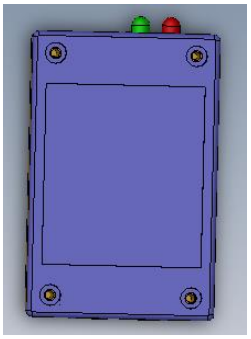


Good location: No metal to block the signal. The detection window is very wide.

2. Low power number versus other transponders. Possibly oriented in incorrect direction or mounted with metal or carbon fiber between transponder and track.



Best Orientation – Label side facing down toward track



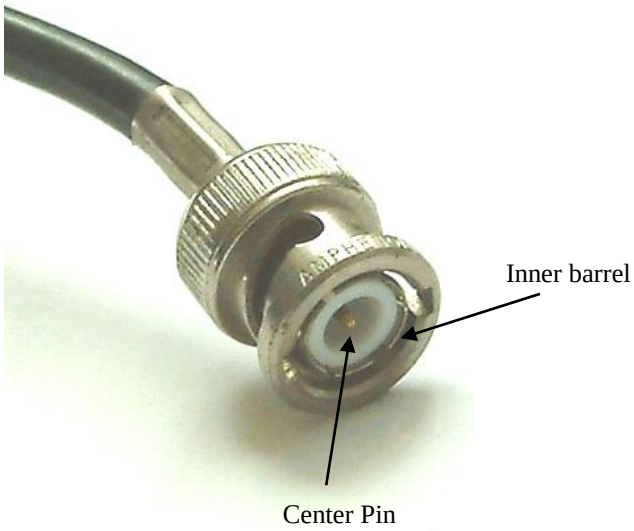
Poor Orientation – Label side facing sideways

3. **Antenna and Cabling Problems**

Antenna and cabling problems are global in nature and generally low hit and/or power numbers will affect all transponders. Most problems will results in global lower numbers. However, occasionally the effect is random.

Symptoms:

1. Low hit numbers
2. Low power numbers



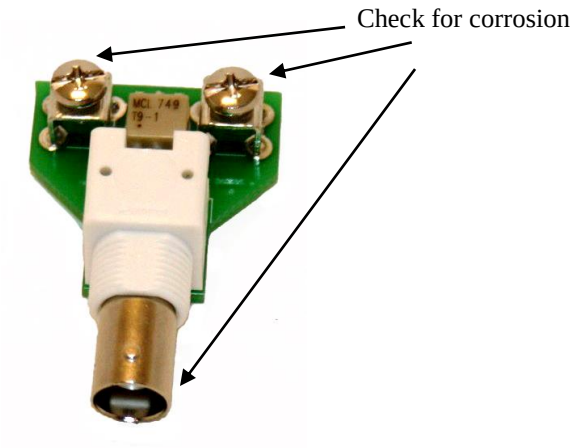
Make sure the center pin and inner barrel are flush on both ends of the cable. This is often the source of low hit numbers.

Other things to check for:

Measure the resistance (ohms) between the center pin and outer barrel with the balun connected on the other end. It should read only 2-3 ohms. If it's more than a few ohms difference from these numbers you have a problem. If you see 0 ohms or if you see an open or some large number then there is something wrong with the cable or connector.

NOTE: For AMB coax it will read about 100K ohms when it is connected to their balun.

Check the balun end of the coax as well. Also see if there are signs of corrosion at the below indicated areas.



Check antenna loop for proper resistance. Disconnect the antenna loop from the balun terminals and measure between the two ends of the loop. It should read about 470 ohms. If it is within +/- 50 ohms then the reading is ok. If you see large resistance or an open it means there is a break in the loop.

NOTE: For AMB loops the resistance should read about 470 ohms as well.

Loops are not as likely to have problems as the balun and coax, but they can be the source of inconsistent detection. It's generally the interfaces between the different pieces that are the points of failure.