sinbad
engineering corp

Polish Mountain
Wireless Timing System
Installation

September 10, 2011

Summary

For the Polish Mountain Hillclimb course, there is good line of site between the start and finish lines. This means that we are able to place the B T-Link antenna near the finish line, and the Z T-Link antenna near the start line (and Timing station). Long cable runs are not needed for the Z T-Link antenna, but a 150' cable run is needed at the finish for the B T-Link antenna.

Antenna Setup Detail

B T-Link	**Antenna Type**	Yagi
	Location	In clearing, down hill from finish line, on left side of the road (facing finish line)
	Height	35'
	Direction	minimum angle down, aimed at 270° (magnetic)
Z T-Link	**Antenna Type**	Yagi
	Location	Near first entrance to pit area (closest to timing station)
	Height	33'
	Direction	minimum angle up, and aimed at 100° (magnetic)
A T-Link	**Antenna Type**	Omni
	Location	At start line
	Height	No elevation necessary, omni antenna attached to A T-Link unit, no extender cable necessary
	Direction	N/A

Cable Runs

B T-Link to Finish Sensor	**150' needed.** The B T-Link unit is slightly too far away from the finish line; we used approximately half of a 300' cable reel.
A T-Link to Start Sensor	**None Needed.** The A T-Link unit is at start line, less than 25 feet from finish sensors
Z T-Link to Timing Station	**Under 50' needed.** Used long Cat 5E cable.

Signal Strength at Previous Events

2011: B-Z signal strength was 90-100%, with no significant dips in strength noticed. A-Z signal strength was 100%, occasional drops to 90%

2010: B-Z Signal strength averaged from 30-90%, generally staying above 50%, but sometimes dipping as low as 10% (B at finish line, 26 feet up on telephone pole, Z at start line in tree, 21 feet up). A-Z strength generally stayed above 50% (A in same location as 2011). One missed finished signal.

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Map and Photos

Figure 1: Polish Mountain Course Map and Wireless Component Locations

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Figure 2: Polish Mtn B T-Link Direction

Figure 3: Polish Mtn B T-Link Base

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Figure 4: Polish Mtn Z T-Link Direction

Figure 5: Polish Mtn Z T-Link Base

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Figure 6: Polish Mtn - Direction to Aim the Z T-Link Antenna (gap)

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A T-Link to Sensor Cabling

Since the A T-Link unit is within 25 feet of the start line, all that is needed to connect it to the sensor is the Race America Sensor cable.

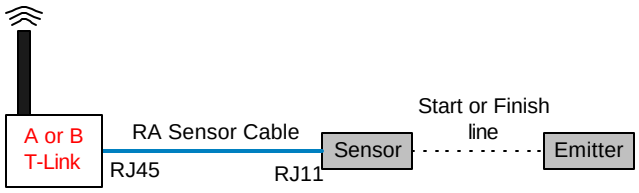

Figure 7: Basic Sensor Connection Wiring Diagram

NOTE: Plug the RJ45 (8 pin) connector into the T-Link unit, and the RJ11 (6 pin) connector into the sensor.

B T-Link to Sensor Cabling

The B T-Link unit is more than 50 feet from the finish line. Since the shortest cable that will work is one of the 300' cable reels, we need to use the "long distance" method, with special "Sensor Cat5e Coupler" boxes on each end to reduce the 8 wires to 4. This effectively doubles up each wire, which provides better signal quality for long distance sensor cable runs.

Note that the "Sensor Cat5e Coupler" boxes can be distinguished from the regular in-line coupler boxes, because one connector the standard Conec RJ45 connector (to match the connector on the Cat5e cable), but the other is an Assman RJ45 connector.

To use a long Cat 5e cable, you will need the Race America Sensor Cable, a white RJ45 Inline Coupler, 2 "To Sensor OR to RA Sensor Cable" cables (Assman RJ45 connector one end, RJ11 on other end, straight thru), 2 "Sensor Cat 5e Coupler" boxes and Cat 5e cable for the necessary distance.

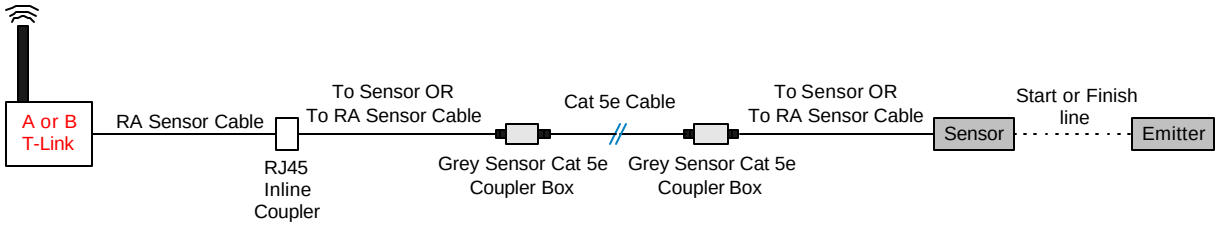

Figure 8: Sensor Long Distance Connection Wiring Diagram

NOTE: When connecting the RA Sensor Cable, plug the RJ45 (8 pin) connector into the T-Link unit, and the RJ11 (6 pin) connector into the RJ45 inline coupler.

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Z T-Link to Timing Computer Cabling

For Polish Mountain, we connect the Z T-Link unit to the timing PC using an extended 50' Cat 5E cable to essentially extend the standard Race America T-Link to PC Cable..

Connect the 50' Cat 5E cable to the Z T-Link unit. Connect the other end to the Race America T-Link to PC cable using a white inline coupler box. Plug the DB9 end of the Race America cable into the computer.

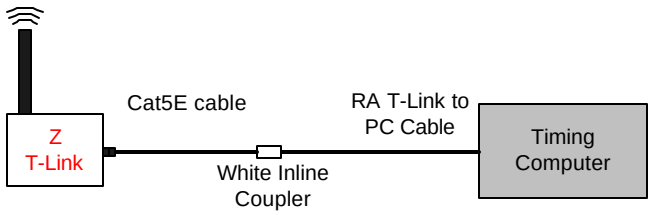

Figure 9: Basic Connection with a 50' extension, Wiring Diagram

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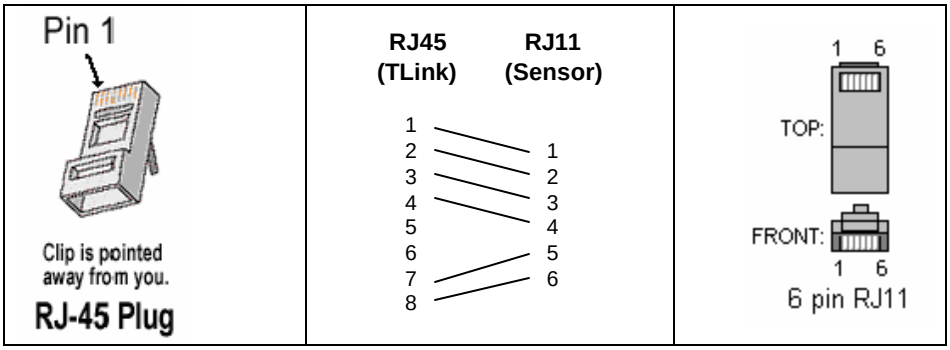
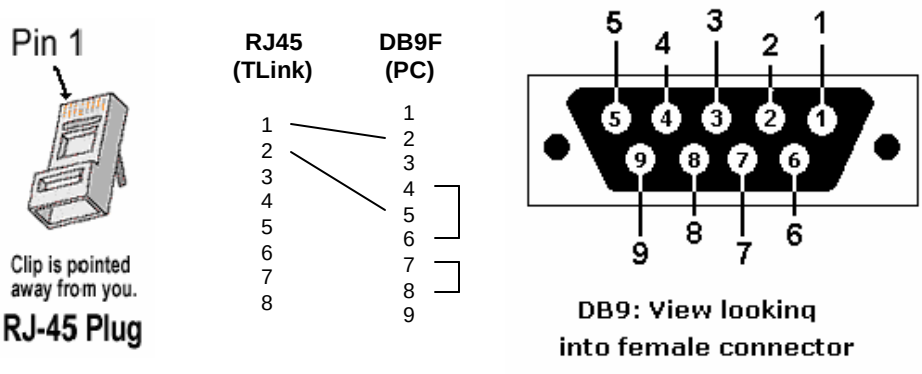
Cable Pinouts

This section includes pinouts for the Race America and other custom cables used for this event.

Race America Sensor Cable Pinout

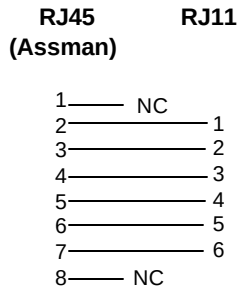


Race America Z T-Link to PC Cable Pinout



"To Sensor or To RA Sensor" Cable Pinout

Rhia cable has an Assman RJ45 connector on one end (A-RJ45M-SR-R), and an RJ11 connector on the other end, pinout as follows:



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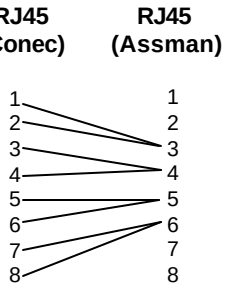
Gray “Sensor Cat5e Coupler” box

Gray “Sensor Cat5e Coupler” boxes have Conec 17-10019 jack on one side (with Conec 17-10002 cover), and Assman RJ45KU-R jack on the other side (with A-WP-COVER2-R connector). These boxes covert 8 wires to 4 wires as follows:



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