

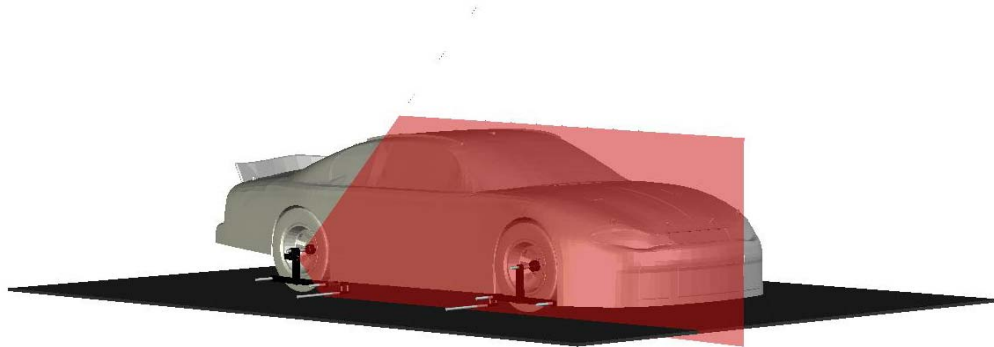


## *Real Square™ RSX User Instructions*

v. 10.2

### **Basic RSX Kit Contents:**

- (1) RSX Shaft Mounted Laser Assembly
- (2) Axle Alignment Fixtures (Hub Mount or Spindle Thread-on Mount)
- (2) Wheel Measurement Fixtures with 6" Scales
- (2) Magnetic or Clamp-on Frame Squares
- (1) Tool Kit
- (1) Wall Board Storage System



### **Technical Help:**

Please call 540-483-4442, Monday-Friday 8:00AM-5:30PM or e-mail questions to [tech@drpperformance.com](mailto:tech@drpperformance.com).



## ***RSX Quick Start Instructions***

### **Step 1:**

#### ***Check Rear End Axle Tubes***

Install axle alignment fixtures (AAF's) on left and right rear. Next, slide wheel measurement fixtures onto AAF's. Space wheel fixture horizontal bar a consistent distance from tire sidewall on both left and right sides. You may use the included ¼" hex driver as a spacer if you wish. Level wheel fixture horizontal bar and tighten.

#### ***Rear Camber\****

Once wheel fixtures are installed you can measure rear camber and toe. To measure rear camber, simply place a digital level or caster/camber gauge against the wheel fixture upright. If your rear end has "0" camber the left side should read exactly opposite of the right side. Remember, stagger creates camber. Example: If the right rear reads .5 negative camber, the left rear should read .5 positive camber. If there is a difference, you have camber in one axle tube. To determine which tube has camber, level the rear and recheck. Each side should rear 0 .

\*This step may be skipped for basic alignment measurements.

#### ***Rear Toe (Using Tape Measure)***

To measure rear toe using a tape measure, simply measure from left side to right side on the wheel fixtures behind the rear wheels and note measurement. Next, measure from left side to right side in front of the rear wheels. If the measurement is the same, you have 0" toe and may go to the next step. If the front measurement is larger than the rear, you have toe out in the rear, smaller measurement and you have toe in.

#### ***Rear Toe (Using RSX Digital Caliper)***

To measure rear toe using the RSX Digital Caliper, simply place the caliper over the studs on the left rear and right rear, behind the rear wheels and press zero on the caliper control. Next, move the caliper to the front studs and read toe on the digital read out.

Checking rear toe is critical. Unknown rear toe can cause the rear to be run out of square.

## **Step 2:**

### ***Square Rear End***

Install frame squares onto master frame rail. The master rail is the users choice, but the same frame rail points should be used every time. Most chassis builders have a master frame rail or frame rail points.

#### *Left Side Master*

For users with a left side master rail, install the RSX laser onto the left rear AAF shaft. The placement of the laser is not critical, however, the laser must be level . With the laser pointing toward the frame squares, you can now read rear end location and square rear. If the laser reads the same measurement on both frame squares, your rear is square with the chassis. If the laser reads a larger measurement on the front frame square, the left rear is pulled back (or the right rear is ahead). If the laser reads a smaller measurement on the front frame square, the left rear is ahead (or the right rear is back). To determine which side is ahead or back, measure wheel base and compare against chassis builder specifications. (See wheel base section.)

Example:

If the front frame square reads 13 ½" and the rear frame square reads 13 ¾" the left rear is ahead ¼" (or the right rear is back ¼") .

#### *Right Side Master*

For users with a right side master rail, install the RSX laser onto the right rear AAF shaft. The placement of the laser is not critical, however, the laser must be level . With the laser pointing toward the frame squares, you can now read rear end location and square rear. If the laser reads the same measurement on both frame squares, your rear is square with the chassis. If the laser reads a larger measurement on the front frame square, the right rear is pulled back (or the left rear is ahead). If the laser reads a smaller measurement on the front frame square, the right rear is ahead (or the left rear is back). To determine which side is ahead or back, measure wheel base and compare against chassis builder specifications. (See wheel base section.)

Example:

If the front frame square reads 13 ½" and the rear frame square reads 13 ¾" the right rear is ahead ¼" (or the left rear is back ¼") .

User Tip: Mark the points on your master frame rail so that you place the frame squares in the same location each time you install the system.

User Tip: The measurement scales on your Real Square™ frame squares and wheel measurement fixtures will rotate so that you can position the scales toward the lasers for more clarity.

User Tip: Your Real Square™ frame squares and wheel measurement fixture horizontal bars are height adjustable. For maximum accuracy, you should adjust these scales so that they are the same distance from the ground.

### **Step 3:**

#### **Set Right Front**

With wheel fixtures installed on both the right rear and right front and the RSX laser installed on the right rear, read the wheel measurement scales on the right front wheel fixture. For 0" right front toe, adjust right front until both measurement scales read the same measurement. For toe out, set the wheel so that the front scale reads a smaller measurement than the rear scale. Toe in is opposite.

User Tip: At this point you can read the rear end location left to right in relation to the right front. You will notice the RSX laser displays on the front wheel measurement scale. Compare this measurement to the average right front measurements. This is the rear end location vs. right front *at the contact patch*. See Contact Patch vs. Wheel Center Line section for more information.

### **Step 4:**

#### **Set Front Toe**

Install second wheel fixture onto left front wheel.

##### ***Front Toe*** (Using Tape Measure)

To measure front toe using a tape measure, simply measure from left side to right side on the wheel fixtures behind the front wheels and note measurement. Next, measure from left side to right side in front of the front wheels. If the measurement is the same, you have 0" toe. If the front measurement is larger than the rear, you have toe out, smaller measurement and you have toe in. You may now adjust left front until the desired toe is achieved.

##### ***Front Toe*** (Using RSX Digital Caliper)

To measure front toe using the RSX Digital Caliper, simply place the caliper over the studs on the right front and left front, behind the front wheels and press zero on the caliper control. Next, move the caliper to the front studs and read toe on the digital read out.

User Tip: If split toe is desired (road race applications), you must subtract the amount of right front toe set in step 3 from the measurement in step 4. Example: If you set your right front to 1/16" toe out, you will need to subtract 1/16" from your total toe measurement to set the left front. In other words, the total toe will measure 1/8" toe out to achieve 1/16" toe out on each front wheel.

## Measuring Wheel Base

To measure wheel base, simply install an axle alignment fixture on both front and rear wheels. Turn front wheel until zero toe is achieved. The axle alignment fixture shaft has been machined to a point. Using a tape measure (or the RSX digital wheel base tool) measure wheel base.

## Measuring Ackermann

With wheel alignment complete, turn the front wheels to the left the same amount as would be typical at your track. (5° is typically a maximum turn) Now measure front toe using the same method as outlined in step 4. Subtract the static toe setting and the difference is Ackermann. Ackermann is simply, toe gain (or loss).

Example: You have 1/8" static toe out. Turn the front wheels 5° left. Re-measure toe. Toe now measures 5/16" out. You have 3/16" Ackermann.

## Contact Patch Measurements vs. Wheel Centerline Measurements

Real Square™ fixtures measure wheel location at (or close to) the contact patch level. Traditional wheel alignment measurements have been performed at the wheel centerline. This is mainly due to not having enough tire surface at the bottom of the tire to take an accurate measurement. Of course this problem is eliminated with the Real Square™ wheel fixtures.

We strongly believe that the most consistent place to take wheel location measurements is at the contact patch. This is due to camber. With zero camber on the front or rear wheels (which would also require zero stagger), it would make no difference between wheel centerline and contact patch locations. Because we do have camber, we should measure at the contact patch because this is the only point the chassis recognizes. The chassis does not know where the wheel centerline is.

The other reason is consistency. If you use wheel centerline for measurements and you change camber, the front contact moves in the opposite direction from the wheel centerline. Check out this example: Right side wheels are aligned (side to side) at the wheel centerline. While at the track, you add 1° negative camber to the right front. This moves the right front wheel centerline to the left. However, the right front contact patch moves to the right (because the front wheels pivot off of the lower ball joint, not the wheel centerline). Now, when you get back to the shop and go through your wheel alignment, you see you need to move the rear to the left, when it actually should be moved to the right to be located in the same relative position.

This does not mean that we suggest adjusting the right (or left) side wheels to be equal, side to side, at the contact patch. We simply recommend using the contact patch as your measurement point. Our suggestion is to first align your chassis using your traditional method and then, measure the wheel locations at the contact patch to have a cross reference measurement.

## Quick Tips:

- Always use slip plates under all four wheels during chassis set-up.
- Use your digital level against the wheel measurement fixture uprights to measure camber on all four wheels.
- If your laser line becomes faint or fails to come on, replace the batteries.
- If a laser is blinking, check the battery compartment. The batteries may not be in their sockets fully.
- You can make any chassis adjustments without resetting the laser. Double check your frame squares if you think the laser stand has moved.
- Align your chassis using your standard procedure. Then install your Real Square system and record all measurements. This is now your base line.
- If you have been aligning your right side tires at the wheel centerline, your right rear will show that is to the left at the contact patch (due to wheel camber). Use the chart below to reference wheel centerline measurements.

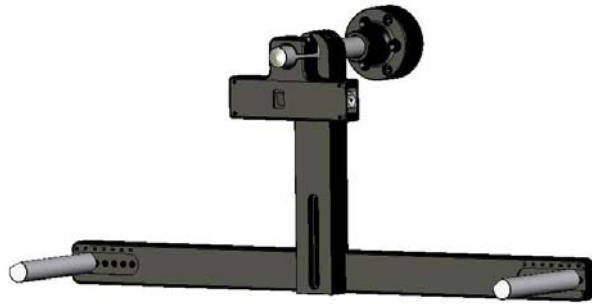
### Wheel Centerline vs. Contact Patch

Tire Diameter	1 Deg	1.5 Deg	2 Deg	2.5 Deg	3 Deg	3.5 Deg	4 Deg	4.5 Deg	5 Deg	5.5 Deg	6 Deg
28"	0.244	0.366	0.488	0.610	0.732	0.854	0.976	1.098	1.220	1.342	1.464
27"	0.236	0.354	0.472	0.590	0.708	0.826	0.944	1.062	1.180	1.298	1.416
26"	0.227	0.341	0.454	0.568	0.681	0.795	0.908	1.022	1.135	1.249	1.362
25"	0.218	0.327	0.436	0.545	0.654	0.763	0.872	0.981	1.090	1.199	1.308
24"	0.209	0.314	0.418	0.523	0.627	0.732	0.836	0.941	1.045	1.150	1.254
23"	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000	1.100	1.200
22"	0.191	0.287	0.382	0.478	0.573	0.669	0.764	0.860	0.955	1.051	1.146

- To check Ackermann, first record your front wheel toe. Then turn your wheels the amount your driver turns the wheels on the track. Typically less than 5 degrees. Now re-read the toe measurements. The toe gain is positive Ackermann, loss is negative.
- To check Bump Steer, compress the front of the chassis from static ride height to full travel. Read wheel movement on your wheel measurement fixtures. Use your bump steer gauge with the optional 81015 bump steer plates.

# REAL SQUARE™

Wheel Alignment Systems for Motorsports



Real Square™, Designed, Developed & Manufactured in the U.S.A

