# Ultimate QM.com



# **ARC Squaring Manual**

Ultimate QM 111B Poplar Pointe Dr, Mooresville, NC 28117 (855)-682-4403 www.UltimateQM.com

### **Radius Rod Positions & Lower Control Arm Pivot**

Before you get started, confirm positioning of the following mounting locations.

- Left rear radius rods should be in the second hole from the top in both locations as indicated by the red dots.
- 2 Right rear radius rods should be in the second hole from the top in both locations as indicated by the red dots.
- **3** Right and left front lower control arms should be bolted in the top mounting location of the lower control arm tabs as seen in the photo.
- **4** The right lower control arm rod end should have 1/2" of thread showing and the left front should have 3/8" showing.

# **Getting Started**

- 5 The first step in squaring your ARC car is to install all 4 Ultimate QM alignment plates. Be sure to note the position/corner laser etched on each plate. Insert the ½" x ½" cross bars into the front and back plates.
- 6 Install the steering box centering tool at this time.











#### **Setting the Jacobs Ladder**

- **1** The left-to-right placement of the rear axle is determined by the location of the rod end in the right rear bearing carrier.
- **2** Make sure car is on 1-1/2" blocks on all 4 corners.
- **3** Mount the Jacobs ladder in the position indicated by your setup sheet.
  - Take the pin out of the Jacobs ladder where it connects to the RR birdcage rod end
- 4 Place your L tool between the left rear radius rods and the chassis at the furthest back point before the rod tapers. Slide the axle left or right until the L tool fits snugly between the rods and chassis, this sets the LR rods parallel (if you don t have the L tool the measurement from the rod to the chassis is 4 1/8").

Screw the RR birdcage rod end in or out until the pin will slide freely through the Jacobs ladder and the rod end without moving the axle.









#### Squaring the rear axle

Swap out the the 1-1/2" blocks with blocks that are at the ride height that your setup sheet indicates.

- 1 Next, the birdcages need to be timed, do this by taking a 90° square and adjusting the rear radius rods until the square sits flush against the flat on the birdcages, do this on the LR and the RR individually.
- 2 After both birdcages are timed, you can square the rear axle. Using a 90° square and a tape measure, measure from the furthest back point on the axle to the back of the rear cross tube. The measurement should be 4-1/2" on both the left and the right. These measurements should be taken as far left on the axle as possible and as far right on the axle as possible. (When squaring the rear end adjust the radius rods by turning the top and bottom rods equally so you don t lose your birdcage timing.)

As you make adjustments to square the rear axle, check that your birdcage timing is still correct.

Tighten down all jam nuts in the rear, after tightening the rods check that the birdcages are timed and that both measurements are still 4-1/2".





### **Setting the Wheel Base**

Keep the car on the ride height blocks that your setup sheet indicates.

- **1** For this measurement to be accurate the wheels need to have the toe set to zero. Use the 90° square to make sure that the setup plate and setup rod are perpendicular to each other, do this by lengthening or shortening the tie rods.
- 2 Then, using a tape measure, measure from the back of the rear setup rod to the back of the front setup rod to determine the wheelbase.
- **3** To change the wheelbase, adjust the strut rod to either lengthen or shorten the wheelbase, changing the wheelbase will also affect the toe so they both must be adjusted together. Start on the right side and set the wheelbase to the proper measurement for your size car, once the wheelbase and toe is set on the right side, repeat the process on the left side. After completing the left side go back and check the right side as it could change.







# **Squaring the Right Front**

After the wheelbase and toe are correct on each side, begin to square the right front.

Start with caster, to check caster place an angle finder 1 on one of the 90° squares and set in on the spindle arm parallel to the setup plate.

Set the caster to the measurement that your setup sheet indicates, usually 4° on the right front (positive caster is when the spindle is leaning backward and negative is leaning forward, caster should always be positive).

To change caster adjust the upper control arms, to roll 2 the caster forward (take caster out) shorten the front upper control arm rod and lengthen the rear rod, do the opposite to add caster.

Adjusting the caster will affect the wheelbase and toe, so as you adjust the caster use the tape measure and square to keep track of the wheelbase and toe and adjust it as needed.

- Once the caster, wheelbase, and toe are set on the right 3 front check the camber. Do this by placing the angle finder flat against the setup plate.
- **4** To adjust the camber, lengthen or shorten both upper control arm rods evenly so that the caster is not affected. Lengthen the rods to add positive camber and shorten them to add negative camber, the right front will always have negative camber typically around -3.5° (leaned towards the car). Set the camber to the measurement your setup sheet indicates and check the toe as you adjust the camber. After setting the camber verify that the toe, caster, and wheelbase are still the correct measurements.











# **Squaring the Left Front**

When the right front is properly squared repeat the process on the left side.

- 1 The left side will almost always be at 0° of caster.
- **2** The camber will be positive and around 2.5° (leaned away from the car).

After the left side is set go back and check that everything on the right side is still the square.

# **Setting the Toe**

Once both sides are square use the tape measure to check the toe more accurately.

- **3** Use the 90° square to set the right front perpendicular to the setup rod.
- **4** Then measure from the bottom slit on the right front plate to the bottom slit on the left front plate on both the front and rear of the plate.

Adjust only the left front tie rod to make both measurements the same and achieve zero toe.

If the measurement in the front is bigger it has toe out and vice versa.









#### **Finalizing Front Suspension**

After the toe is set tighten all jam nuts (use two wrenches to prevent rods from spinning)

When tightening the jam nuts make sure that all heims are in the middle of the chassis tabs to prevent them from binding up.

After all the rods are tight go back and check all measurements.

# **Useful tips**

1 The direction of the arrow on the ARC logo on the rods are directional indicators, turning the rods in the direction of the arrow lengthens the rod.

Unhook one end of each of the shocks so the car sits flat on the ride height blocks.

When setting caster, camber, toe, and wheelbase, adjust all three simultaneously to get faster results, for example if you lengthen the wheelbase you will also have too roll the caster forward to keep the same measurement.

When a locked hub is on the LR the key in the hub may need to be removed for the setup plate to sit flat.





Front

F Upper Rear

Rod

#### **Technical Info**

# **Caster Angle**

Caster is the inclination of the steering axis from vertical in the longitudinal plane (wheel viewed from the side). Positive caster is achieved when the steering axis is inclined toward the rear of the vehicle at the top in the side view. Negative caster is when the steering axis is inclined toward the front of the vehicle at the top in the side view.



#### **Camber Angle**

Camber is defined as the inward or outward tilt of a wheel at the top relative to vertical at the center of the wheel in the lateral plane. If the top of the tire is leaning inward toward the center of the car (viewed from the front of the vehicle), the tire has negative camber. If the top of the tire is leaning outward, it has positive camber.



