

LAZER CHASSIS *The Ultimate Weapon* X

2017

Serial #2000 and up
Updated 09/20/16



Manufactured By:



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Front Suspension

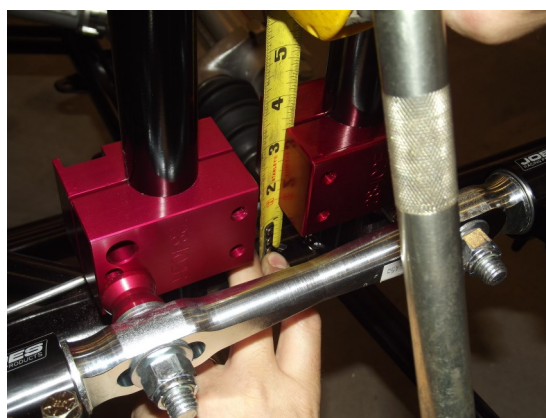
I. "X" Factor Front End

A. Upper Control Arms

1. Right– 8 1/4" w/ 3/4" spacers (add additional 1" for RF out)
2. Left– 11 1/2" - Mounted inside frame

B. A-arm sliders – top of frame to top of block

1. Dual position mounts
 - a. Left front– 4 7/8"
 - b. Left rear– 4 5/8"
 - c. Right front– 3 3/8"
 - d. Right rear– 3 1/8"
2. Dual position mounts
 - a. Left side– use bottom holes
 - b. Right side– use bottom holes



C. Lower control arms

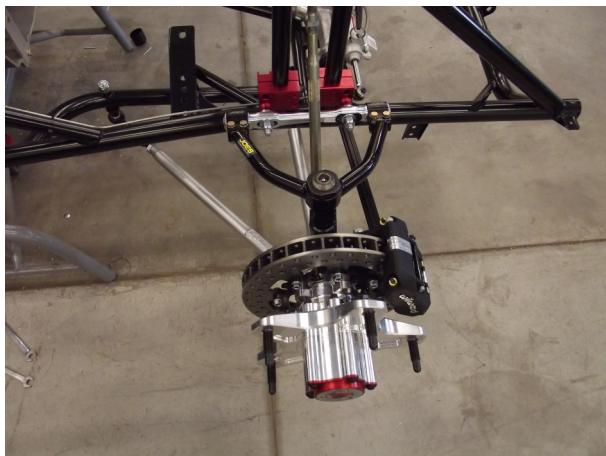
1. Left– 16 3/8" on center
2. Right– 19 7/8" on center (1/4" spacer between frame and heim)

D. Strut rods– 3/4" spacer RF, 1" spacer LF (between strut rod heim and frame)

Right front standard or 1" out– There are many factors that have an affect on this adjustment. They include but are not limited to available horse power, engine weight, track configuration and surface, driver preference, etc. The following is a general guideline.

RF standard– Above average traction, low horse power, stop and go track

RF out 1"- low traction, high horsepower, momentum track





Front Suspension-continued

- E. 1/4" Rack spacer-at mount (Center rack in slots on frame bracket, it may be necessary to slide rack to the left to gain engine clearance)

Sweet w/ upside down slotted rack eyes and double RF



- F. 18 1/4" Rack— baseline 4" w/ .220 servo

- G. Bump steer spacers and settings

1. Standard spindle
 - a. RS— 1/8" spacer
 - b. LS— 1/2" spacer
2. Ackerman spindle
 - a. RS— 1/8" spacer (center of tie rod to center of ball joint 5")
 - b. LS— 3/8" spacer (center of tie rod to center of ball joint 4 7/8")
3. At rack
 - a. RS— 5/8" up from bottom of slot
 - b. LS— bottom of slot

- H. Tie rod tubes— 16" tube RS—Use RS to adj. Toe out)
 14" tube LS- 17 1/4" center to center standard spindle
 13" tube LS— 16 3/4" center to center ackerman spindle

- I. RF shock mount— correct upper mount must be installed for running standard (#41190) or 1" out (#41191) to attain proper shock angle and travel



RF 1" out mount



(RS bump steer at rack)



Front Suspension-continued

J. Alignment

1. Camber— Right side, 5 1/2 degrees Neg./ Left side, 5 degrees Pos.
2. Caster— Right side, 6 degrees Pos./ Left side, 3 degrees Pos.
3. Toe 5/8" out
4. Bump steer— If Rack & Tie-Rod spacers are used as Instructed, Bump Steer Will be Correct
5. Alignment Procedure
 - Place the chassis on 4 jack stands
 - Level car front to back & side to side
 - Remove coil-overs
 - Support lower control arms to simulate ride height (use #8415-2 ride height sticks)
 - Adjust strut rod length to set *caster*
 - Space upper control arm in & out to set *camber*
 - Any deviation in procedure will result in incorrect alignment

K. Front ride height

1. Right lower control arm optimum 1.7 degrees (1.5-2 degrees acceptable range)
2. Left lower control arm optimum 4 degrees (3.5-4.5 degrees acceptable range)
Both are uphill from chassis to wheel





4 Link Rear Suspension

II. 4 Link Rear Suspension

A. Lift Bar Slider– 12 1/2” center to center from top right rail

B. Lift Bar– Steel adjustable (BRC)

1. 5/8” Bolt in top and bottom- Head @ Heim (older cars used a 1/2” top bolt, for strength we recommend 5/8”)
2. 7/8” Spacer between rod end and plate (Steel)
3. Mount on right side of plates
4. Use spacer for strength between plates
5. 5th Coil Initial setting– 3rd hole from front
6. Lift bar side brace- 7” tube 9 7/8” on center (Steel Lift bar, brace to frame)
7. Rear end through bolts on lift bar plates torque to 35 ft. lbs.
(Over tightening may cause failure)



C. Rear End Adjustment (side to side)

1. Left upper torque arm plate to left ride height tab– 14 1/4” w/Ride height @ 9 3/4” LR and 9” RR (see example on page 7)
2. Panhard bar
 - a. R.S. pinion- 0 mark on walk-up mount
 - b. At frame w/ 2 position bracket- -1 mark (below 0) on walk-up mount
 - c. 21” center row (Note option for 19”) 21” is baseline setting
19” recommended for stop and go or slick tracks (must remove LRF shock or mount LRF towards axle tube)



2014 design walk up bracket



Walk-up Mount

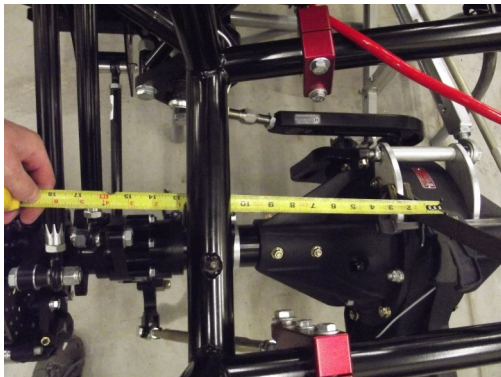
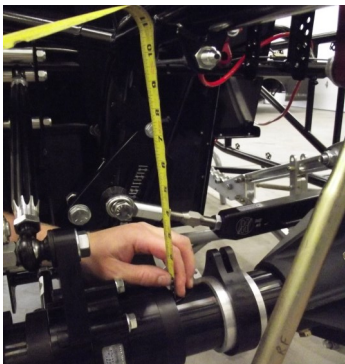




4 Link Rear Suspension- Continued

D. Rear Ride Height

1. Wehr's birdcages– tab to top of axle tube
 - a. Left ??? Depends on LR bite (9 3/4" min. to 10 1/4" max)
 - b. Right 9" (8 5/8" to clamp bracket)



- E. Pinion Angle– 7.5 degrees negative- Put angle finder on rear cover nuts, make sure lift bar is level in car, use 6th coil (chain and heim) and adjuster on lift bar to set

F. Birdcage– Assembly and Location

1. Shock Brackets

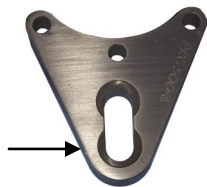
- a. L.S. Front– inside of birdcage (adjust to allow chain to limit drop)
- b. L.S. Rear– lower holes outside of birdcage towards the wheel (7")
- c. R.S. Front– top holes outside of birdcage towards outside of the car (5")
For inboard RR move bracket to inside of birdcage and then move Shock to inboard setting on the frame with the 2 pos. mount

2. Location on axle tube

- a. Left side– outside of rotor to center of behind shock bracket 8 1/4"
- b. Right side– located by caliper bracket if using 1.25" rotors
Call if you are using any other rotors



upper rod



Right lower rod
Bottom hole neutral



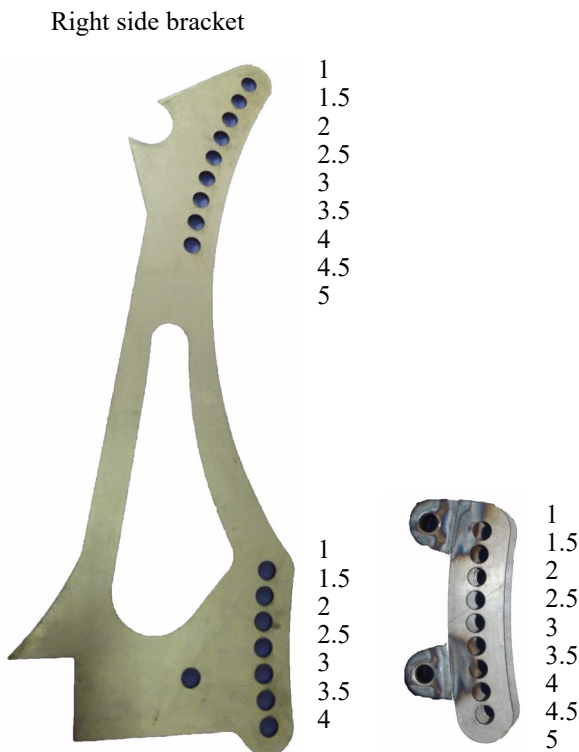
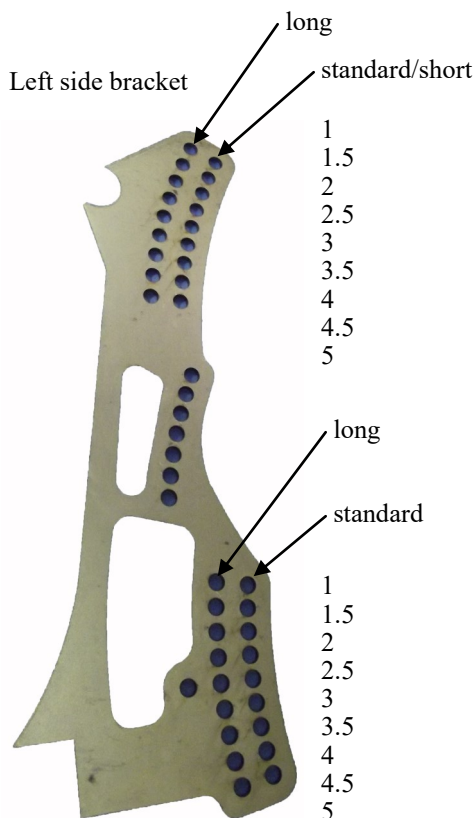
Standard left lower
Middle hole neutral



4 Link Rear Suspension- Continued

H. Wehrs and TWM Diamond Birdcages 4 Link Rods-Neutral Setting

1. L.S. rods on outside of birdcage with supplied spacer
2. R.S. rods on outside of birdcage with supplied spacer
3. 4 link rods in frame brackets installed w/ BRC spacer # 83040, On LS rods install all the way to the right w/ #83040. use spacer #83041 on left side of heim
4. Left Upper rod
 - a. 13" tube (short/standard) 14" tube (long)
 - b. 16 1/4" on center (short/standard) 17 1/4" (Long)
 - c. #2 on frame
 - d. #1 hole on birdcage (reference pictures on page 7)
5. Left Lower rod (bent steel)
 - a. 12" tube (standard) 13" tube (long)
 - b. 15 3/4" on center (standard) 16 3/4" (long)
 - c. #1.5 on frame
 - d. Neutral holes on birdcage (reference pictures on page 7)



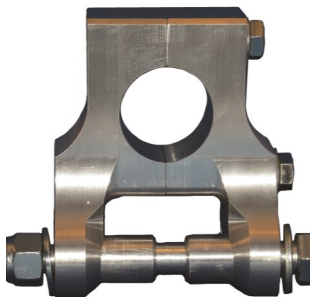
Short Right lower #8410-1



4 Link Rear Suspension- Continued

6. Right Upper rod
 - a. 14.5" tube
 - b. 18" on center
 - c. #3 on frame
 - d. #1 hole on birdcage (reference pictures on page 7)
7. Right Lower rod
 - a. 12.5" tube (standard) 11" (short)
 - b. 16" on center (standard) 14 1/2" short
 - c. #2 on frame
 - d. Neutral hole on birdcage (reference pictures on page 7)
- J. Square Rear
 1. Set 4 link rods accurately
 2. Drop a plumb bob from front of axle tube and measure to 2 x 2 outriggers
 - a. RR- 19 1/2"
 - b. LR- 19 3/8"
- K. Rear Shocks Aluminum Brackets-
 1. 2 Pos. Right 3 5/8" to center of 1/2" bolt from RR frame rail (#20395 mount)
 2. Left Front 3 1/4" gap between mount and frame rail (#20394 mount)
 3. Left Behind 3/4" gap between mount and frame rail (#20390 mount)

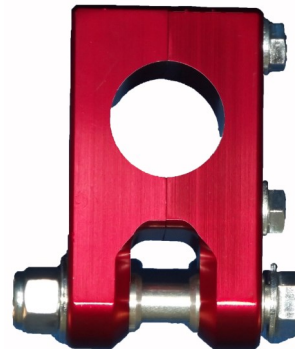
1.



2.



3.



M. 5th Coil

1. 7" Shock
2. 10" Spring
3. 3rd hole from front on lift bar
4. Back off when scaling car
5. Adjust nut until coil is seated
6. Pre-load- reference setup pages
7. Straight up & down- No angle



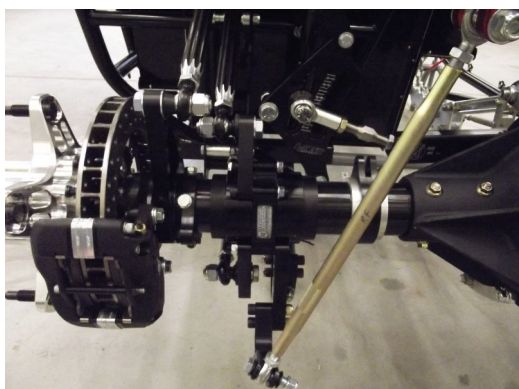
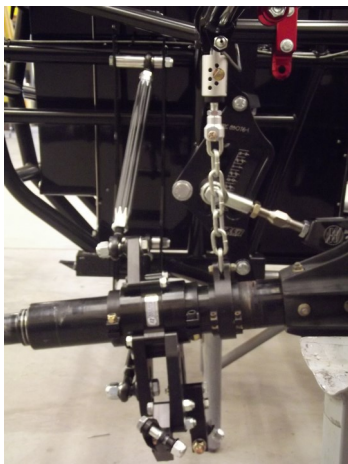
4 Link Rear Suspension- Continued

N. Rear Alignment Procedure

- Place the chassis on 4 jack stands
- Level car front to back and side to side
- Remove rear coil-overs
- Support rear housing to simulate ride height (use #8415-2 ride sticks)
- Set 4-link rods center to center
- Adjust Mini-sixth coil and lift bar heims to set pinion angle, lift bar must be level with lower frame rail
- Adjust panhard bar to set side to side measurement

O. Left Rear Chain Limiter

1. Use Wehrs quick adjust limiter #WM2691750A
2. With rear end hanging mount chain bracket on the frame so the chain is straight
3. All drop settings are in the setup packages
4. Drop is measured axle tube to tab just like ride height





General Information

III. General Information

- A. All scale work with 20 Gallons of Fuel
- B. Wheel offsets all 5"
- C. Stagger
 - 1. Front– 1"
 - 2. Rear– 4"
- D. Percentages
 - 1. Left side– 54.5%
 - 2. Rear– 54.5%
 - All percentages with driver in car.
- E. LR Bite
 - See set-up packages for recommended weights
- F. Drive Shaft
 - 1. Bert Ballspline– 39"
 - 2. Std. Bert– 38.5" with extra long yoke (make sure input shaft is splined correctly)
 - 3. Brinn & Falcon– 35.5" with extra long yoke
 - 4. Falcon Roller Slide– 38"
- G. Master cylinder
 - 1. Front– 1"
 - 2. Rear– 7/8"
- H. Axles and Tubes
 - 1. R.R. 35 1/2" axle, 29 1/8" tube
 - 2. L.R. 33" 1/2" axle, 27 1/8" tube



Replacement Parts

IV. Replacement Parts

"X" Factor Front Suspension Hybrid Strut

Left upper control arm– 11120DBJS

Right upper control arm– 30810S

Upper ball joint– 20031 LS / 20034 RS

Left lower control arm– 21197-1

Right lower control arm– 21198-1

Lower ball joint– 20036

Tie rod tube– 12016 RS / 12014 LS

Standard left spindle– 50397

Standard right spindle– 50398

5/8 Heims– CM10 / CML10

5/8 Jam Nuts– SJNR10 / SJNL10

Front Suspension Options

Howe upper ball joint– 22300 LS / 22320 RS

Howe lower ball joint– 22412

Joe's bearing right upper control arm– 15705-slb

Joe's bearing left upper control arm– 15370-slb

Scalloped tie rod tubes– 11016 RS / 11014 LS

Ackerman Spindle– 50397A (LS) / 50398A (RS)



Replacement Parts continued

Rear Suspension

Left Birdcage– 300LR
Right Birdcage– 300RR
Bolt on shock mount– 20390 (LRB, 5th), 20394 (LRF), 20395 (RR)
Lift bar– 29201
Lift bar plates– 29100S (steel)
Right lower radius rod tube– 12012.5
Left lower bent radius rod tube– 18012
Upper radius rod tubes– 12014, 12014.5
Lift bar link rod– 12007
Panhard bar– 20225K-21
Walk-up pinion mount– 84027
Walk-up frame mount– 83076-1
Full swivel 6th coil– 26401
LR chain bracket for frame– WM2691750A
Bearing limiter for rear– 84185

Rear Suspension Options

Alum. Panhard Bar– WM4019-21
Scalloped radius rods– 11012, 11012.5, 11013, 11014, 11014.5, 11015.5



Set-up Packages

V. Set-up Packages

Note: All setups based on any brand shocks by Focus Shocks. Both Left Rear shocks should be approximately 25" fully extended

A. Conventional Springs-Baseline Setup

1. Springs

	L.F.	450#	R.F.	300#
(Behind)	L.R.	200#	R.R.	250#

2. Shocks

	L.F.	74-8	R.F.	74-17
(Front)	L.R.	94-0	R.R.	94-5
(Behind)	L.R.	98-4		

3. 4-Link Bars, All neutral settings

4. Panhard, All standard settings at pinion and frame

5. 60# L.R. Bite

6. 5th Coil Standard hole 300# spring 73-7 shock 1/4" Preload

7. 14 3/4" LR drop limited by chain

Works well on momentum corners w/ any banking and tacky to average surface



Set-up Packages

V. Set-up Packages

Note: All setups based on any brand shocks by Focus Shocks. Both Left Rear shocks should be approximately 25" fully extended

B. Conventional Spring-Slick Setup

1. Springs

	L.F.	500#	R.F.	275#
(Behind)	L.R.	125#	R.R.	250#

2. Shocks

	L.F.	75	R.F.	74-17
(Front)	L.R.	94-0	R.R.	93-4
(Behind)	L.R.	911-4		

3. 4-Link Bars, All neutral settings except R.H. lower #3 on frame

4. Panhard, All standard settings except down 1/2" from neutral on pinion

5. 60# L.R. Bite

6. 5th Coil Standard hole 275# spring 73-9 shock 1/2" preload

7. 14 3/4" LR drop limited by chain

Works well on momentum corners w/ any banking and slick surface



Set-up Packages

V. Set-up Packages

Note: All setups based on any brand shocks by Focus Shocks. Both Left Rear shocks should be approximately 25" fully extended

C. Non Conventional Spring options- Some of the popular configurations are listed below. Others are available. (Call to have a custom stack or bump built on our spring smasher for your specific situation)

1. Stack RF
2. Stack LR
3. RR with Spring Rubbers
4. RF with Spring Rubbers
5. Stack RR
6. 5th coil w/ Bump spring



Misc. setup info

1. Both left side shocks should be approximately 25" center to center fully extended. Various brands and styles require different extensions.
2. All shock settings are based off of packages built by Focus Shocks (division of Bernheisel Race Cars). Consult your shock specialist and Lazer to get the right shocks for your car and track.
3. LR drop is set by a limiter chain connected to the LR axle tube and main frame rail. Do not set drop with the shocks. Chain must be tight when the car is on jack stands.

Please Remember:

These are basic setups designed to give you a base line starting point. Your situation may require additional tuning. There are literally millions of adjustments and combinations. For maximum results the best total package for your driver and track conditions must be achieved. There is no magic. Keep good records and work hard.



Tech Tips

1. Four Link

- A. More upward angle on rods (toward chassis) increases loading on that wheel (up in front, down in back)
- B. Rod angle changes also affect roll steer (typically lowering the lower rods at the frame decreases roll steer)
- C. Roll steer generally loosens the car through the center of the corner
- D. Lowering left upper rod on birdcage greatly increases initial drive off however also increases rotation on initial throttle up
- E. Specific rod angles (Do not do all adjustments at once!)
 - 1. Drop right upper for slick track (On frame)
 - 2. Drop left upper for tacky track (On frame)
 - 3. Raise right lower for tacky track (On frame)
 - 4. Lower left lower for slick track– decreases roll steer(On frame)
 - 5. Lower right lower for slick track– Also decreases roll steer (On frame)
 - 6. Lower left upper on birdcage for tight corner slick track(Commonly called indexing)
 - 7. Raise left upper for slick track (On frame)

F. Left lower 4-link bar

When tuning on the car for maximum drive such as a soft rebound L.R. shock, Indexing the birdcage, and raising the left lower bar interference can occur. The left lower bar can come in contact with the birdcage causing a suspension bind or possibly even rod failure. To correct this condition we have available a bent steel rod . It is part# 18012

G. 4-Link Holes

Hole # 3 is neutral (Both upper & lower)



All frame adjustments for the four bar rods are on arced holes. It does not matter what hole you are in for scaling purposes. Also you can make angle adjustments at the track without changing your setup. However, when indexing down on the left upper birdcage you lose approx. 10#s of wedge per slot. (30#s if you go all the way down) This is because the slot is straight instead of curved. It is not necessarily a bad thing to reduce wedge when indexing, but be aware that it happens.

Common 4-Bar Adjustments

Left Upper-

#3 on frame #2 birdcage slot– Tacky track

#2 1/2 on frame #2 birdcage slot– Average track

#2 1/2 on frame #1 birdcage slot short left upper rod- Slick

Note: Extreme indexing and height on frame can cause a bind and hurt forward drive
Your upper rod should be 45-50 degrees at full drop. 45 is an ideal baseline setting and 47 works well in the slick. 50 is a maximum angle.



Tech Tips

Common 4-Bar Adjustments continued-

Left Lower-

- # 2 Frame hole– Tacky track
- # 2 1/2 Frame hole– Average track
- # 3 Frame hole- Neutral starting point

Right Upper-

- # 2 Frame hole–Tacky track
- # 3 Frame hole- Neutral starting point
- # 4 Frame hole-Super slick track

Right Lower-

- # 2 Frame hole-Tacky track
- # 3 Frame hole- Neutral starting point
- # 4 Frame hole-Slick track

Note: Not all holes & slots are to be used– Some are for future testing

2. Lift bar

- A. Longer and softer on the 5th coil brings weight transfer/bite in slower but lasts longer
- B. Shorter and stiffer on the 5th coil brings weight transfer/bite in faster but does not last long

3. Panhard bar

- A. Shorter and more angle exaggerates wheel loading increasing side bite for a shorter time
- B. Longer and flatter smoothes out wheel loading and side bite

4. Ballast

- A. Higher ballast causes the car to move around more (side to side and front to rear) increasing amount of weight transfer
- B. Lower ballast settles car down by limiting weight transfer
- C. A neutral spot for ballast is on the tunnel behind the shifter or upright from X to 5th coil bar

5. L.R. behind setup

- A. Amount of lift (roll-up) should be controlled by a limiter chain (check LR drop by measuring ride height with rear hanging on jack stands)
Recommended measurement is 14 1/4" to 14 3/4".

6. Helper Springs

- A. A 5# helper spring on the LF ensures that the spring remains seated when car lifts
- B. A Nylon collar is utilized with the helper spring to prevent shock damage
- C. One can also be used on LR Behind shock– It keeps spring seated when car gets up- on the bars



Tech Tips

7. Driving

- A. Momentum and slick tracks require more driver finesse and a smoother less radical setup
- B. Stop and go tracks and traction tracks can more easily handle a radical combination and a stomp and steer driver

8. Shock Tuning

Recent changes in shock construction and the availability of many styles and brands of shocks has added an additional variable into the mix. Make sure you are aware of the characteristics of the shocks you are using. Also when calling for tech assistance be sure to tell us what brand & style you use.

9. Short rod options

- A. Use #8410-1 on Right lower rod to run 1 1/2" shorter rod
(shorter rod decreases roll steer and loses angle quicker for overall tighter handling)
- B. Left upper rod Short rod (standard)
(shorter rod gains angle quicker and provides instant drive and rear steer)
- C. Left upper rod Long rod (1" longer than standard)
(longer rod gains angle slower and provides more gradual drive and rear steer, commonly used on extreme slick situations where keeping your momentum is paramount)

10. Do not over tighten!!! Fix corner entry first!!!

NOTES: