LAZER CHASSIS X

the Ultimate Weapon

14-16 w/18 updates

Updated 2/12/18

Manufactured By:

BERNHEISEL Race COMPONENTS 1-800-426-2570

1 Bordnersville Rd.
Jonestown, Pa 17038
Phone 717-865-3119
Fax 717-865-0904
E-mail lazerchassis@comcast.net
On The Web at www.lazerchassis.com

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Congratulations on your purchase of a precision crafted Lazer Racing Chassis by Bernheisel Race Cars. We take great pride in supplying the high level of quality and service our customers have come to know and expect.

On the bottom of this page is your chassis serial number. Please refer to this number when calling for parts or technical assistance.

Our goal is to help you improve your racing program no matter what level you are now racing at. The following pages should assist you in that regard. You are also welcome to access our website @ **www.bernheiselracecars.com** or call our **tech line** at **717-865-6691** for further information.

Thank you and Good Luck. Jim Bernheisel-president

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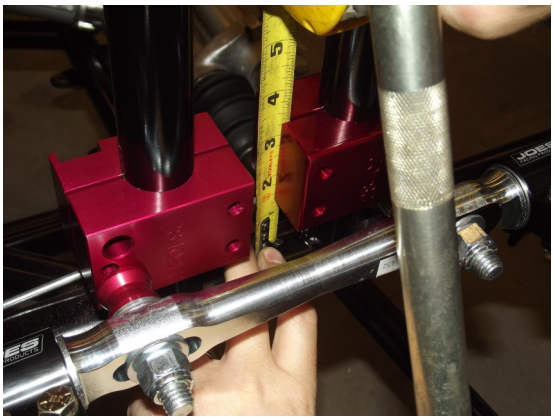
Front Suspension

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

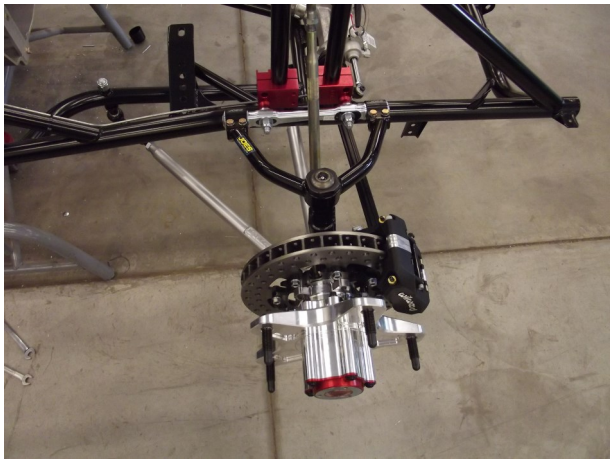
B. A-arm sliders – top of frame to top of block
1. Dual position mounts
   a. Left front– 4 5/8"
   b. Left rear– 4 3/8"
   c. Right front– 3 3/8"
   d. Right rear– 3 1/8"
2. Dual position mounts
   a. Left side– use bottom holes
   b. Right side– use bottom holes



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 (Rack to the left in slots on frame bracket if slotted)

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

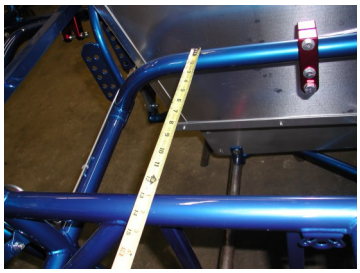
J. Alignment
1. Camber– Right side, 5 1/2 degrees Neg./ Left side, 5 degrees Pos.
2. Caster– Right side, 6 degrees Pos./ Left side, 3 degrees Pos.
3. Toe 5/8" out
4. Bump steer– If Rack & Tie-Rod spacers are used as Instructed, Bump Steer Will be Correct
5. Alignment Procedure
   - Place the chassis 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 rod end length to set *caster* (rear rod on right, front rod on left)
   - 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

L. Set LF tether- 18 1/2" center to center by measuring the shock mounts
1. Less drop– car will steer better, will unstick RR in center
2. more drop– car will not steer as positively, will stick RR a little more

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– 3nd 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)

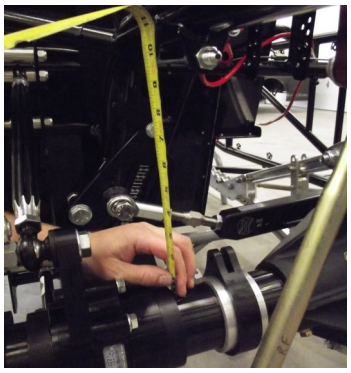
C. Rear End Adjustment (side to side)
1. Left upper torque arm plate to left ride height tab– 13” w/Ride height @ 9 3/4” LR and 9” RR (see example on page 7)
2. Panhard bar
   a. R.S. pinion- 0 mark on walk-up mount
   b. At frame w/ 2 position bracket- -1 mark (below 0) on walk-up mount
   c. 21” outer row (Note option for 19”) 21” is baseline setting
      19” recommended for stop and go or slick tracks (must remove LRF shock or move LRF towards axle tube

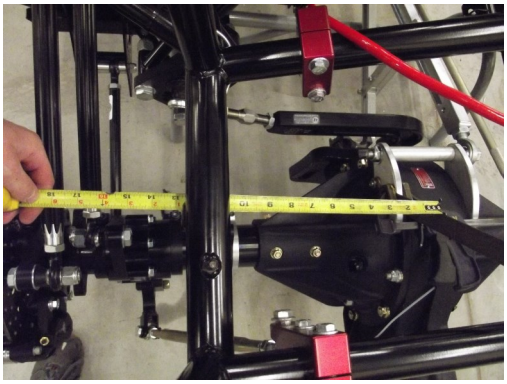
Walk up bracket

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)





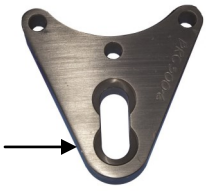
E. Pinion Angle– 7 (83) degrees negative- Put angle finder on rear cover nuts, use 6th coil chain to make lift bar level (cannot run downhill), fine tune pinion angle with top heim.

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– middle 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

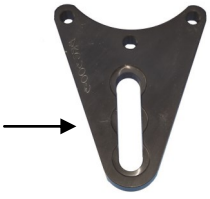
2. Location on axle tube
   a. Left side– outside of rotor to center of behind shock bracket 8 1/4"
      (7 1/4" if using a 26 1/8"" LR axle tube)
   b. Right side– outside of rotor to center of behind shock bracket 8 3/8"

1
2
3

upper rod



Right lower rod
Bottom hole neutral



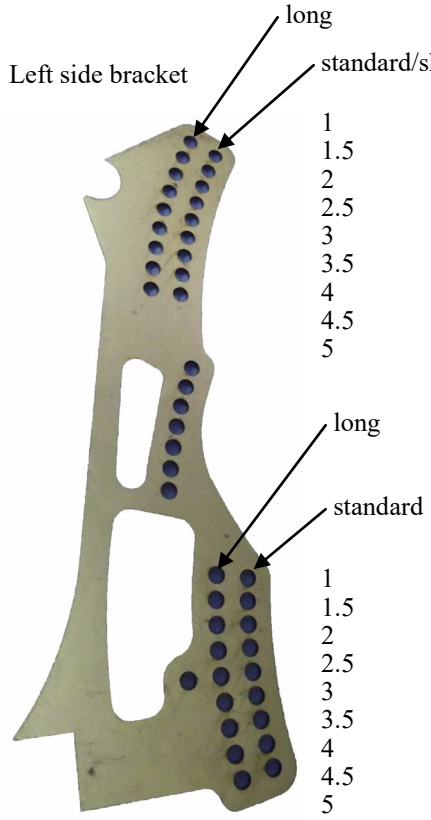
Standard left lower
Middle hole neutral

4 Link Rear Suspension- Continued

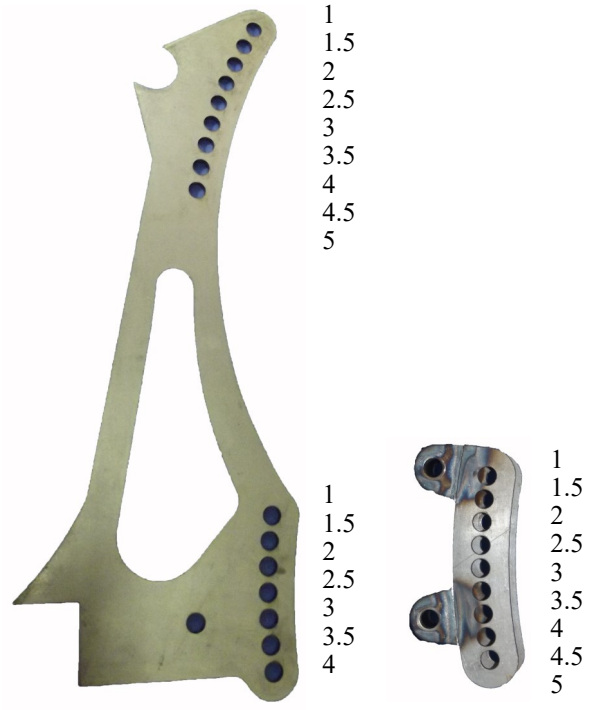
H. Wehrs Birdcages 4 Link Rods-Neutral Setting

1. L.S. rods on outside of birdcage with supplied spacer
2. R.S. rods on outside of birdcage with supplied spacer
3. RS rods installed in center with spacers #83040, LS rods install all the way to the right w/ #83040 spacer and 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 1/2 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)

Left side bracket



Right side bracket



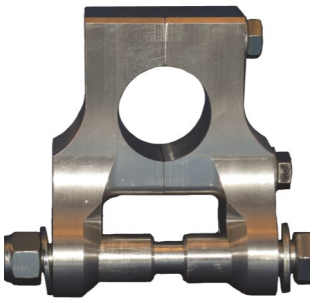
Short Right lower #8410-1

4 Link Rear Suspension- Continued

6. Right Upper rod
   a. 14.5” tube
   b. 18” on center
   c. #2 1/2 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. Rear end location of each wheel front to back
1. Set 4 link rods accurately– Recommended as standard procedure
2. Drop a plumb bob from front of axle tube and measure to 2 x 2 outriggers. Only use this method if you suspect something is bent, wrong, or messed up!
   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 (#20390/20395 mount)
2. Left Front 3 1/4”gap between mount and frame rail (#20394 mount)
3. Left Behind 1/4” gap between mount and frame rail (#20390 mount)

1. 

2. 

3. 

M. 5th Coil
1. 7” Shock
2. 10” Spring
3. Location and preload– reference setup packages
4. Straight up & down– No angle

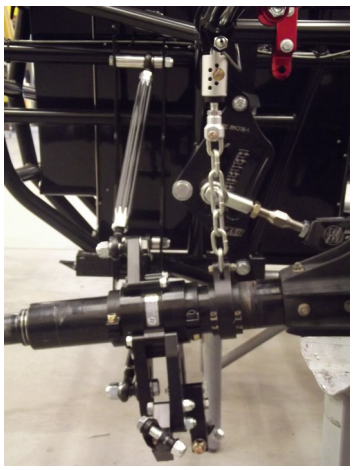
4 Link Rear Suspension- Continued

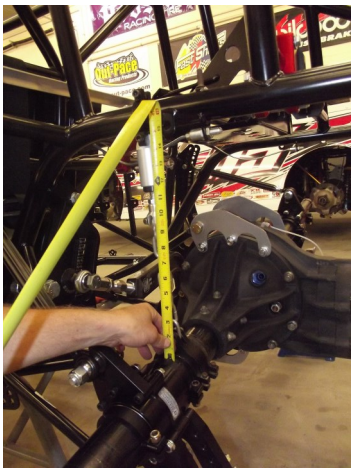
N. Rear Alignment Procedure

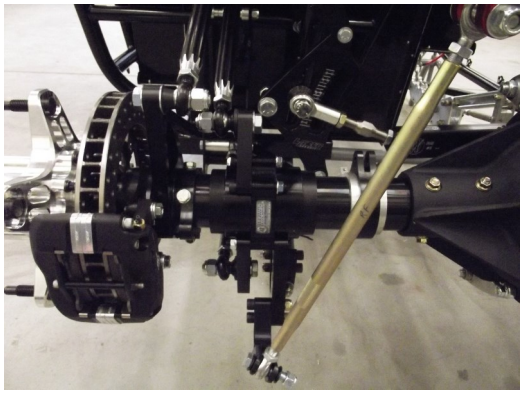
- Place the chassis on 4 jack stands
- Level car front to back and side to side
- Remove rear coil-overs
- Support rear housing to simulate ride height (use #8415-2 ride sticks)
- Set 4-link rods center to center
- Adjust Mini-sixth coil and lift bar heims to set pinion angle, lift bar must be level to maximum of up hill 1 deg. 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 15-20 Gallons of Fuel

B. Wheel offsets all 5”

C. Stagger
1. Front– 1”
2. Rear– 4”

D. Percentages- All percentages with driver in car.
1. Left side– 54.5%
2. Rear– 53.5-54.5%

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– 7/8”
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

I. RR wheel spacer– As a baseline setting you should start with a 1” wheel spacer. Use as a tuning tool by removing to tighten car in extreme slick conditions.

J. Calipers
1. 1 3/8” RF
2. 1 3/4” all other corners

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 or 12013 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 or 11013 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 tuned by Focus Shocks.

A. Baseline Setup

1. Springs

	L.F.	10” 450#	R.F.	12” 300
(Behind)	L.R.	16” 125	R.R.	12” 250

2. Loads

L.F.	17.486”– 630#	R.F.	18.020”– 600#
L.R.	20”– 645#	R.R.	19.5”– 380#

3. 4-Link Bars, All neutral settings

4. Panhard, All standard settings at pinion and frame

5. 80-100# L.R. Bite (Do not adjust on scales! Set with spring loads)

6. 5th Coil- 2nd hole from the front, 300# spring 1/4” preload

7. 14 3/4” LR drop limited by chain

Set-up Packages

V. Set-up Packages

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

B. 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.) We highly recommend having the items highlighted in **bold** built for your car. We have had tremendous success with these corners in tandem with each other/

1. Stack RF

2. Stack LR

3. RR with Spring Rubbers

4. RF with Spring Rubbers

5. Stack RR

6. Custom 5th coil

C. We highly recommend setting the car up by setting the loads with a spring smasher. The only scale work will be to set total weight, percentages, and 5th coil preload.

NOTES: