

## 7214

**INSTRUCTIONS FOR STRUT FRONT, LADDER BAR REAR,  
1 5/8 FRAME, INTERMEDIATE, ELIMINATOR CHASSIS**

<u>ITEM</u>	<u>QTY</u>	<u>SIZE/PART NO.</u>	<u>TUBE CODE</u>	<u>DESCRIPTION</u>
1	2	4138		Cage Side
2	2	4219		Forward strut
3	1	4038		Main Hoop
4	1	4227		Cage top
5	2	4214		Rear frame 1 5/8
6	2	4709		Engine support
7	1	4708		Rack and pinion crossmember
8	2	1 5/8 x 108		Front frame
9	2	1 5/8 x 54	A B	Long side bar
10	2	1 5/8 x 23	H	Upper side bar
11	2	1 5/8 x 32	J K	Lower side bar
12	2	1 5/8 x 53	F G	Rocker support
13	1	1 5/8 x 54	C	Mid mount
14	1	1 5/8 X 54	L	Main hoop crossmember
15	1	4216		Back brace
16	3	1 5/8 x 23	I	Frame crossmember
17	1	1 5/8 x 40	J	Long cross brace
18	1	1 5/8 x 60	E	Continuous cross brace
19	1	1 5/8 x 15	C	Short cross brace
20	2	1 5/8 x 19	F G	Cage side extension
21	2	1 5/8 x 12	A B	Foot brace
22	1	1 5/8 x 26	K	Transmission crossmember
23	2	1 1/4 x 20	Q S	Ladder bar support
24	2	1 1/4 x 54	M N	Rocker triangulator
25	2	1 1/4 x 72	O P	Accessories strut
26	2	1 1/4 x 9	M	Rear strut support
27	4	1 1/4 x 6	N S	Roll cage gusset
28	1	1 1/4 x 52	Q	Cage top triangulator
29	2	1 1/4 x 36	R	Forward strut support
30	2	1 1/4 x 42	S	Frame triangulator
31	16	2101		1/2 hole suspension tabs
32	2	2300		Rack and pinion brackets
33	4	2015		Frame end cap
34	4	2100		Ladder bar chassis mount
35	2	2012		Ladder bar chassis mount gusset
36	4	3200		Locknut 1/2 - 20
37	4	3100		Bolt 1/2 - 20 x 2 1/4
38	8	1000		Misalignment bushing 1/2
39	1	927214		Assembly drawing

All straight tubes are cut from the box #4404, it contains the following tubes:

<b><u>QTY</u></b>	<b><u>SIZE</u></b>	<b><u>TUBE CODE</u></b>	<b><u>ITEM FROM INSTRUCTION</u></b>
12	1 5/8 x .120 x 72	A	9 and 21
		B	9 and 21
		C	13 and 19
		D	
		E	18
		F	12 and 20
		G	12 and 20
		H	10 and 10
		I	16, 16 and 16
		J	11 and 17
		K	11 and 22
		L	14
8	1 1/4 x .083 x 72	M	24, 26 and 26
		N	24, 27, 27, & 27
		O	25
		P	25
		Q	28 and 23
		R	29 and 29
		S	30, 27 and 23

NOTE: READ ALL INSTRUCTIONS AND MAKE SURE YOU UNDERSTAND THEM BEFORE YOU BEGIN!!! ONLY TACK WELD THE CHASSIS IN CASE YOU MAKE A MISTAKE AND HAVE TO REMOVE SOMETHING. Remove the body when the chassis is completely tacked together to make welding easier. Construction of a chassis cannot be accomplished without a jig. To assemble the chassis you will need a level surface as large as the car. This should be a steel table or an "I" beam. You will need to hold the body up off your surface at ride height, the table surface will simulate the ground. Also, weld a little of each joint at a time to help avoid distortion. Cut the straight tubes out as needed and be careful when measuring because lengths may vary a little from the instructions. With the advent of sonic testing, it is important that you measure the wall thickness of every tube in the roll cage that is subject to the sonic test. See your Association rule book to determine which tubes must be .118 minimum wall thickness. Do not install any tube that is not .118 minimum. Chassisworks will replace any tube that is undersized and has not been installed.

Do not assemble your chassis using only the dimensions on the assembly drawing. You must use a body to help in the tube placement. The dimensions on the assembly drawing are for a 1982-1990 Camaro/Firebird. To vary the wheel base, lengthen or shorten the distance from the firewall to the front axle centerline. If your body has a shorter wheel base, do not shorten the driver's compartment more than is absolutely necessary, you need the leg room for the driver.

The chassis can easily be adapted to fit other intermediate size vehicles. When altering the dimensions on the blueprints for different vehicles, do not change any dimensions that are not inside rectangular boxes. Only the dimensions in boxes should be altered to fit different vehicles. See the chart for dimensions for other vehicles. Dimensions "A" through "G" need to be determined for your car. Write them on the Assembly Drawing in the boxes provided. If your car is not in the chart, you will have to measure your body.

### CHASSIS DIMENSIONS FOR COMMON INTERMEDIATE CARS

<u>Year &amp; Model</u>	<u>Dim A</u>	<u>Dim B</u>	<u>Dim C</u>	<u>Dim D</u>	<u>Dim E</u>	<u>Dim F</u>	<u>Dim G</u>
Camaro/Firebird 82-90	104	47	26	38	53	24	44
Camaro/Firebird 78-81	108	47	30	40	58	24	44
Camaro/Firebird 67-69	108	47	30	37	60 1/2	26	40
Chevy II 62-67	110	54	25	40	65	24	40
Nova 68-76	110	49	30	45	63	26	43
Beretta 88-90	105 1/2	49	25 1/2	33	54 1/2	24	40
Thunderbird 83-89	104	49	24	42	57	24	40
Mustang 64-69	108	47	30	35	58	26	40
Mustang 83-90	101	46	24	31	54	24	40
Chrysler A body 68-74	108	51	26	43	61	26	40

1. Prepare the body for the frame by first measuring forward from the rear axle centerline and marking the rocker panel at 31 inches. The wheel base should also be measured, this will be Dimension "A". Both of these dimensions will be used when installing the frame. Also, measure the width of the car at the rocker panels, you will need this dimension later to assure the body is installed at the correct width.
2. Prepare the body by cutting out the entire floor and firewall, and by removing the doors, decklid, windows, and suspension. The body should be cut up so all that remains is the single outer skin. Make sure you have removed all of the double panels in the roof, door pillars rocker panels and quarter panels. When you are finished, the body needs to mount to the chassis in at least 6 places: 2 points attaching the rear frame rails to the taillight panels; 2 points attaching the main hoop to the rocker panels; and 2 points attaching the bend in the cage side to the "A" pillar just below the windshield. Add more mounts if the body is still flimsy.
3. Before starting, position the body so it is at the desired ride height off the ground. Block the rocker panels and rear of the body so the car will be held steady. You need at least 3 inches of ground clearance from the front bumper to the tire and 12 inches behind the tire. Do not let your car sit too low.
4. Install the main hoop crossmember in the chassis between the rocker panels. To position the main hoop crossmember in the car, you must place the backside 31 inches forward of the rear axle centerline. The rocker supports need to be cut to length and installed with the main hoop crossmember. Fit the main frame with the front crossmember and the main hoop crossmember tube at the same time so that you can tack the main hoop crossmember to the main frame to hold it up. Fit the main frame per the assembly drawing.
5. Cut the 5" straight off the front of the rear frame rails. Install them at the correct position per the Assembly Drawing. Measure from the back of the crossmember to the taillight panel, this length will be Dimension "D" plus 31 inches. Cut the frame rails to this length and tack them in place. The frame rails should be centered in the car an equal distance from the car's centerline. They should be 28" to 20" wide on the outside, this will be Dimension "F". Make the frame as wide as possible while leaving enough room for the tires. Center the rails on the taillight panel, the quarter panel, and on the crossmember. They should both be an equal distance from each side of the car and at the same height.

6. Install the crossmembers. The rear crossmember should be even with the bottom of the frame and approximately 1/2-inch forward of the taillight panel. Weld the shock brackets to the center cross-member at the dimension shown on the assembly drawing. Make sure they are straight to each other. Put the crossmembers between the frame rails at the dimensions shown.

7. Install the chassis ladder bar mount. The rear edge of the ladder bar mount is 2 inches behind the backside of the main hoop crossmember and hangs straight down. The brackets are centered under the frame 3/16 of an inch inboard from each side. Use a rod end to get the correct spacing between them. The brackets must be straight or the ladder bar will not fit right. The chassis front mount gusset caps the front of the brackets. Attach the ladder bars with adapter bushings and bolts (our part #6203).

8. The two 1/2 x 2 1/4 inch bolts and the two 1/2 inch locknuts are used in the upper shock mounts to mount the shocks. The four misalignment bushings are also used in the shock mounts. One goes on each side of the shock bearings to fill the gap in the shock mount bracket. Use #6216 Adjustable Shock Mount for the lower mount.

9. Before you can install the front frame and upper strut mounts, you must determine what strut mount width you need for your tires to clear your fenders, this will be Dimension "G". Due to the many different front wheel and tire combinations, you should do the following calculations for your vehicle, even if it is listed in the chart.

**Step 1:** Determine the outside front tire width that you need. Measure the width between the front fenders. You will need 4 to 5 inches of clearance from the side of the tire to the inner front fender lip. Subtract 8 to 10 inches from the inner fender width. This will equal the outside tire width.

**Step 2:** To determine the hub width, you need to know how much wider the outside of the tire is than the front hub. Put a yardstick across the outside of the tire and measure through the center to the side of the wheel that bolts to the hub. When the wheel is bolted on, it is this much wider than the hub. Multiply this by 2 and subtract this amount from the outside tire width you calculated in step one. This will be the required hub width.

**Step 3:** Subtract 11 1/2 inches from the hub width to find the top strut mount width. Write your top mount width on the Assembly Drawing.

10. Position the new front frame rails in the chassis. The rear end will most likely be too long, it attaches to the crossmember welded between the rocker panels. If the front frame does not clear the grillwork, shorten it. Be careful not to cut too much. The end of the frame must be at least 16 inches forward of the front spindle centerline. The rails should be parallel at the correct width and centered in the frame. Measure diagonally to make sure the frame is square. Measure from the side of the frame to the body in several places to make sure the frame is centered in the body.

The bottom of the frame rail (measured at the front crossmember) should be 3 1/2 inches off the ground. This will give you at least 3 1/2 inches of ground clearance on the bottom of the frame. The frame does not have to be level in the engine bay or the driver's compartment. Use whatever frame rake is necessary to attach the rear of the frame correctly. The top of the frame in the engine compartment should be within 3 degrees of level.

11. Measure forward from the crossmember welded between the rocker panels to locate the front spindle line, this Dimension is equal to "B" and "C". Put a line on both sides of the new front frame rails, which will represent the front spindle centerline. All of your brackets will locate off of this line.

12. Install the front crossmember. It is 26 inches long with a 30-degree angle on each end and 16 inches forward of the front spindle centerline. Cut the legs off of the steering box tube so they are only 1 5/8 inches tall and the correct width for your chassis. Locate the steering box tube per the assembly drawing. If you are using the pro box rack and pinion, part #6109, the rack and pinion mounts should only be 1 1/2 inches above the frame. Upon completion, the bottom of the front crossmember will be approximately 3 1/2 inches off of the ground when using a 25" diameter tire.

13. Install the forward and rear control arm mounts. Check the assembly drawing for their locations and angles. The angle of the brackets is determined by the angle of the control arm leading into them. For best results, position the brackets with the strut and control arms hanging in place. Also, install the rack and pinion mounts per the assembly drawing.

14. Install the complete front suspension and steering less the springs. Use the remaining 1/2-inch bolts and misalignment bushings to attach the top of the strut. Align the front end to 1/32 to 1/8-inch toe in, zero degree camber, and 6 to 10 degrees of caster. the front end can be aligned by using a machinist level on the spindle flats.

15. Move the strut spindle through its full travel to make sure nothing binds up. Also, check for bump steer. If assembled correctly, all unnecessary bump steer can be removed by shimming the tie rods up and down at the spindle arm or by raising or lowering the rack and pinion slightly (1/16 of an inch at a time).

16. Install the main hoop. It stands straight up and attaches to the top of the main hoop crossmember at the junction with the rocker support.

17. Install the seat back brace in the center of the bend on the main hoop.

18. Install the cage top per the assembly drawing, Dimension "E".

19. Tack the cage sides in place. Keep the lower leg of the cage side and the frame as close to 90 degrees as possible. This will make installation of the firewall easier.

20. Install the cage side extension and foot brace per the assembly drawing, the driver's and passenger's sides are the same. The rocker supports should be installed under the cage side extension and main hoop. The rocker supports should be positioned so the front and rear ends are open. This will give you an effective and protective tube to run your battery cable and fuel lines through to the front of the chassis.

21. Install the mid mount bar at the correct height.

22. Install all three pieces of X-brace.

23. Install both rear frame accessory struts so that the lower end is centered over the rear crossmember. In some cases, the rear end will be forward of the rear crossmember to clear the rear window. The upper end attaches to the main hoop.

24. Install the rear strut supports between the rear frame accessory struts and shock crossmember.
25. Install all 3 pieces of the door bar X-braces.
26. Install the main hoop support tubes.
27. Install the forward struts per the Assembly Drawing. Make sure they are at the correct height and width that you determined.
28. Install the strut support tube and frame struts per the assembly drawing.
29. Install the cage top triangulator.
30. Install the front and rear cage gussets.
31. Install the engine support tubes at the mid mount per the drawing (each "U" bend makes 2 parts). If the engine is too far back, it can be moved forward for more windshield clearance. The mid plate attaches to the front of the engine support tubes. Install the tubes at 2 degrees from perpendicular to the ground. Remember that the engine runs uphill to the rear 2 degrees. Install the front engine support tubes with the motor plate to assure the correct location.
32. Install the transmission crossmember, and frame triangulators when you are installing the transmission.
33. Use the frame end caps to cap the forward ends of the front frame crossmember.
34. Recheck all dimensions, remove the body and finish welding the chassis.
35. Chris Alston's Chassisworks, Inc. carries a complete line of accessories to make completion of your car easier.

Revision Date: May 23, 2006

