## The Club Special Updates *Introduction*

In the year or so since the prototype was introduced, a few things have been learned. As promised on the previous page, we've made some updates and improvements . Those already having a set of these plans can download the updates from www.kingmidgetswest.com. They include a few minor corrections to the CAD drawings which have been fixed in this edition.

Perhaps the biggest problem encountered has been the challenge of the task. Some have noted it's just too big a job to undertake in their shop. Others want more detailed instructions. It is, in fact, a somewhat daunting task. The Club Special is an automobile, and though far simpler than most, it's more complex than the Model 1 reproductions several fans have built. We worked hard to keep the design and construction as simple as possible while documenting the construction thoroughly. Yet some look at all the CAD drawings and just don't know where to start. With this edition, we'll try to add some clarity. First build a rolling chassis.

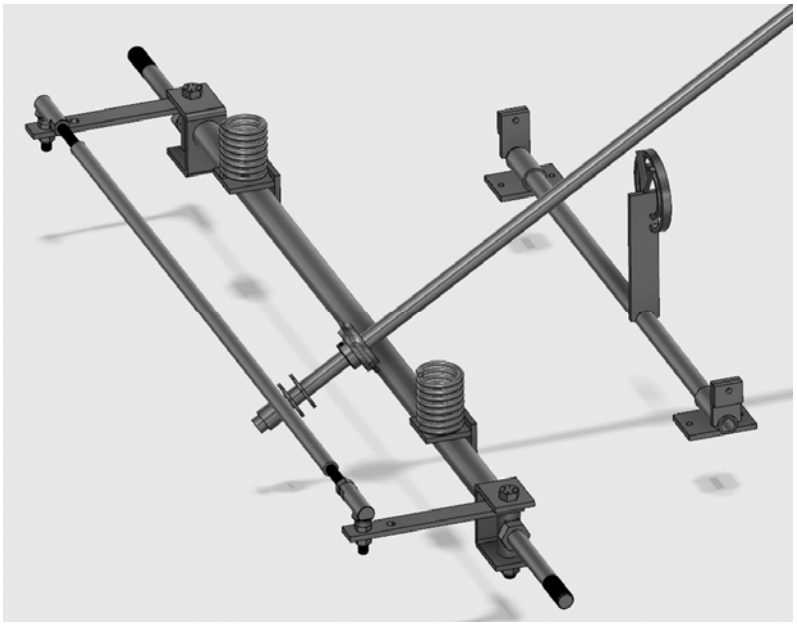
| **Rolling Chassis Material** | **Cost** |
|---|---|
| Frame Rails | $ 19.15 |
| Steel Framing | 57.46 |
| Front Axle | 10.67 |
| Front Springs | 11.90 |
| Steering Parts | 6.26 |
| Brake Parts | 20.27 |
| Brakes | 101.97 |
| Steering Controls | 52.42 |
| Rear Springs | 10.50 |
| Rear Axle | 23.49 |
| Sprocket and Chain | 39.02 |
| Rear Axle Bearings | 15.00 |
| Wheels | 116.98 |
| Tires | 75.32 |
| Transmission | 151.04 |
| Engine | 115.16 |
| Seat | 47.00 |
| Steering Controls | 52.42 |
| **Total** | **$906.88** |

Undertake your project in simplest terms. A simple rolling chassis you can drive around the back yard. A couple of oak boards for the frame, axles front and rear with trailer tires, go kart brakes, cable steering, an inexpensive engine and some steel bracing. Less than a thousand bucks and you can drive it! So—what's so complicated?

The transmission, that's what. Building an efficient transmission and reverse is historically the biggest stumbling block to home-built cars. The simplest transmission, a centrifugal clutch, is inadequate for road use. CVT's work well but involve lots of pulleys, shafts and bearings. The Torq-A-Verter, developed by Comet, solves this challenge, but provides no reverse. The reverse we developed for the Club Special is simple and effective, but you have to build it—or do without reverse. Maybe you'll find that acceptable, as Midget Motors did with the Model 1. Just omit the reverse portion of this design. You can add it later if you change your mind.

Actually, two of the hardest things about building a car include building the body and getting the proportions right. The use of off-the-shelf metal and fiberglass grille with wood panels simplify the body. Follow the plans and the proportions will work out fine. The trick is to take one step at a time, starting with the chassis pieces.

Beginning on the next page, we've included a series of CAD illustrations to help you picture how the chassis and frame pieces fit together and are assembled.



## *SUB ASSEMBLIES*

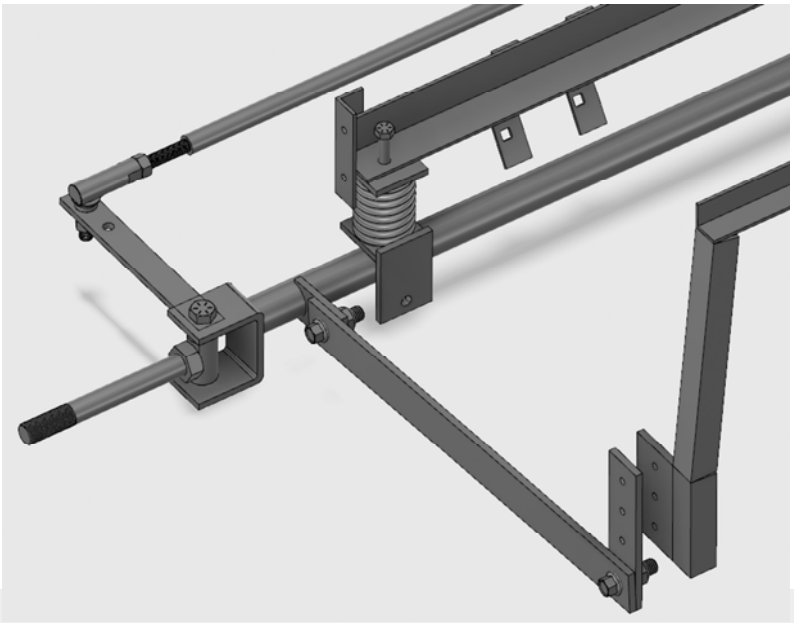
Here are parts of the front axle sub assembly with the brake pedal assembly behind it. The steering arms point forward to keep the steering mechanism out of the way of the driver's feet. The steering center link enables toe-in adjustment while steering is controlled by cables between the arms and wrapped around the steering column. Yokes incorporate an angle to provide one degree positive camber. No Ackerman is provided or needed for this light front end.

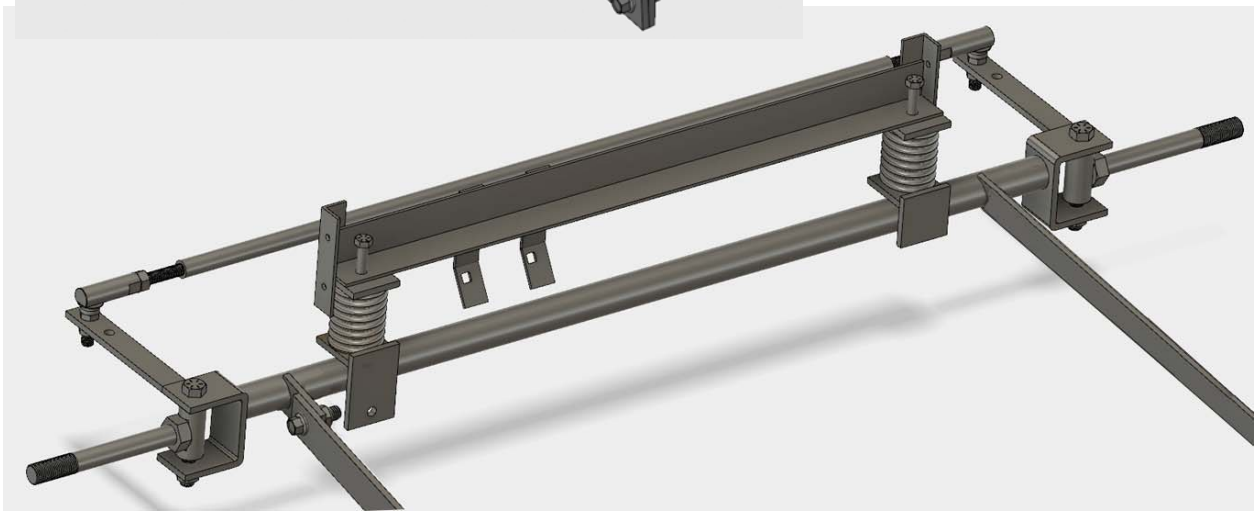
The view at left shows how the springs sit on threaded saddles welded to the front axle with bolts running down through them to limit upward movement of the body. The left saddle has a hole for attaching the front Panhard rod. The steering column is attached to the tabs shown.

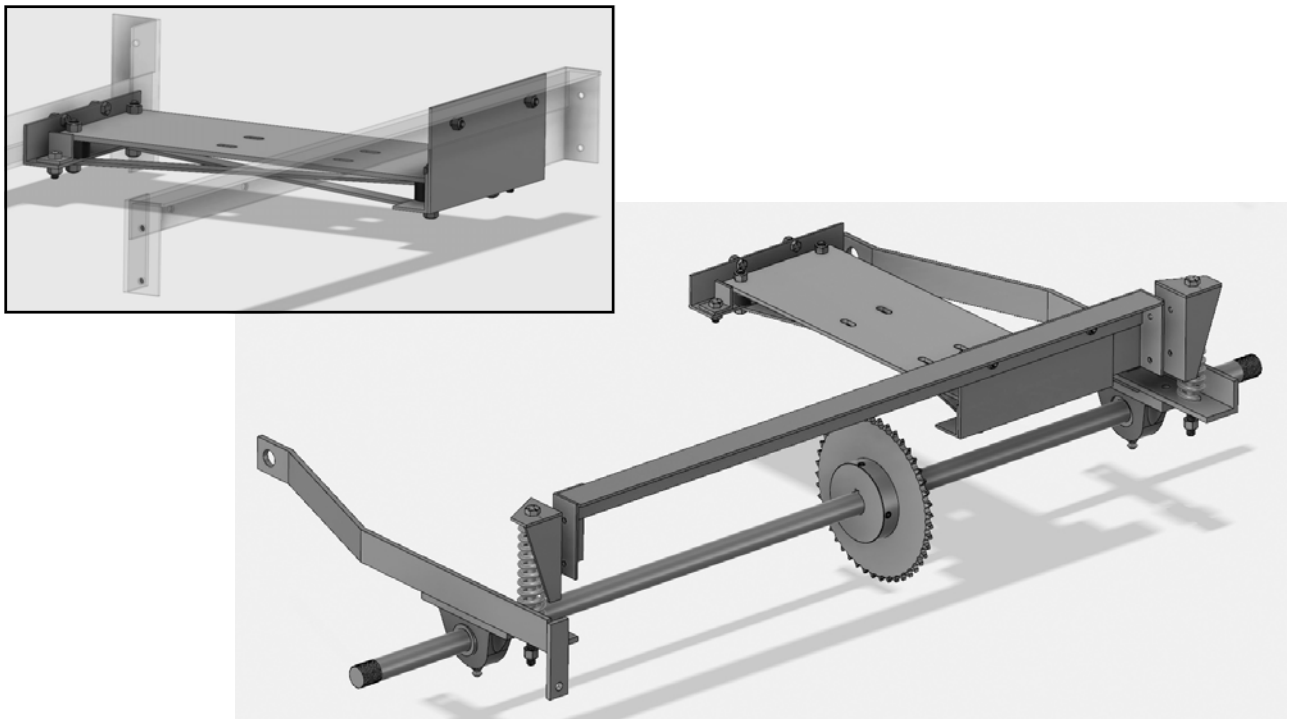
The suspension arms extend back to pivot points below the windshield frame. The one on the left is articulated to provide flexibility for traversing bumps and dips.

When pulled together the frame rails are bolted to this sub assembly, forcing them into a natural bow.

Bolts welded securely to the spindles serve as front axles. The tab below the left spring is the attachment point for the front Panhard rod.

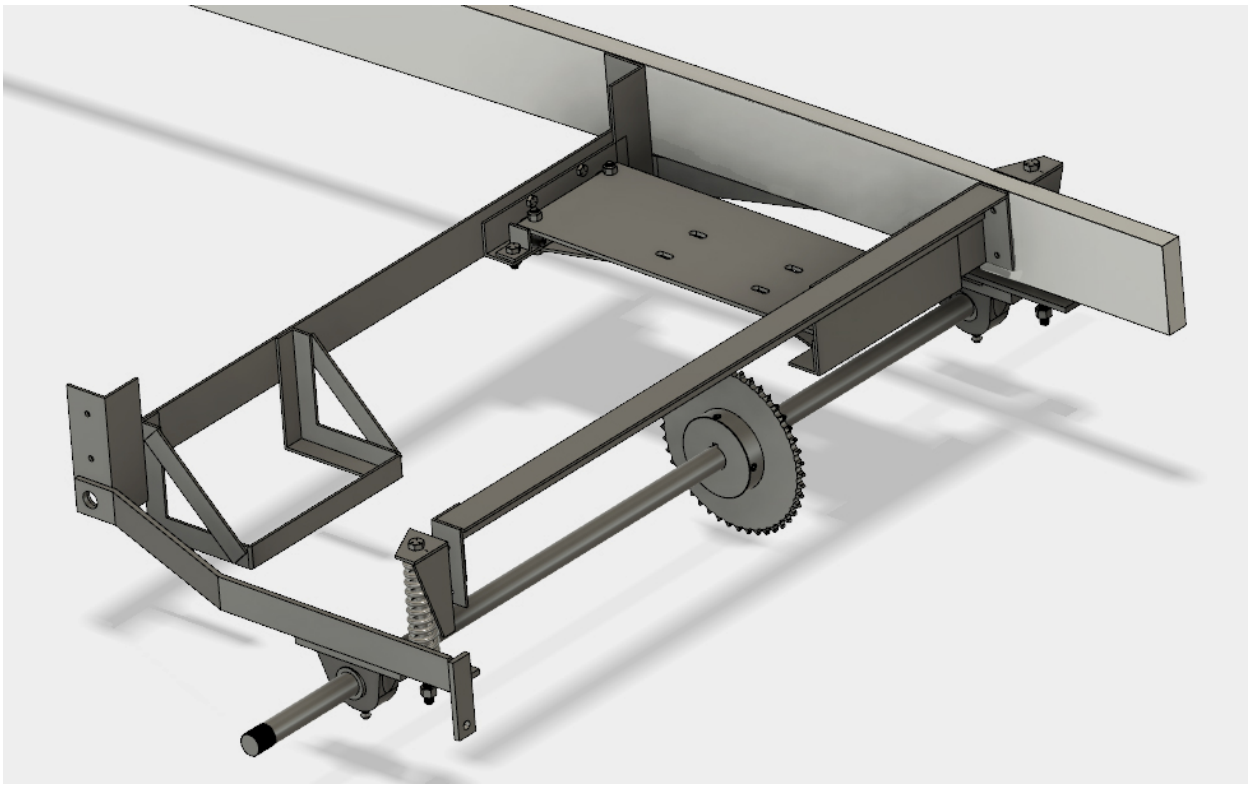


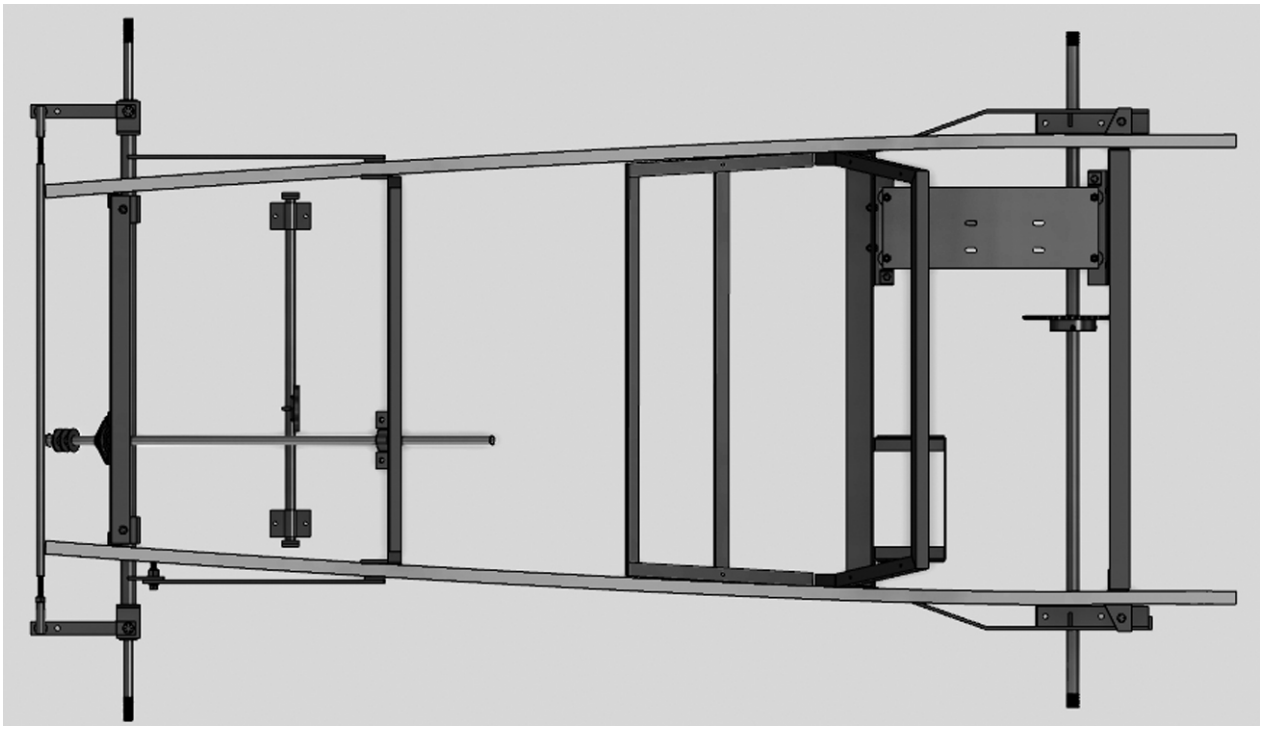




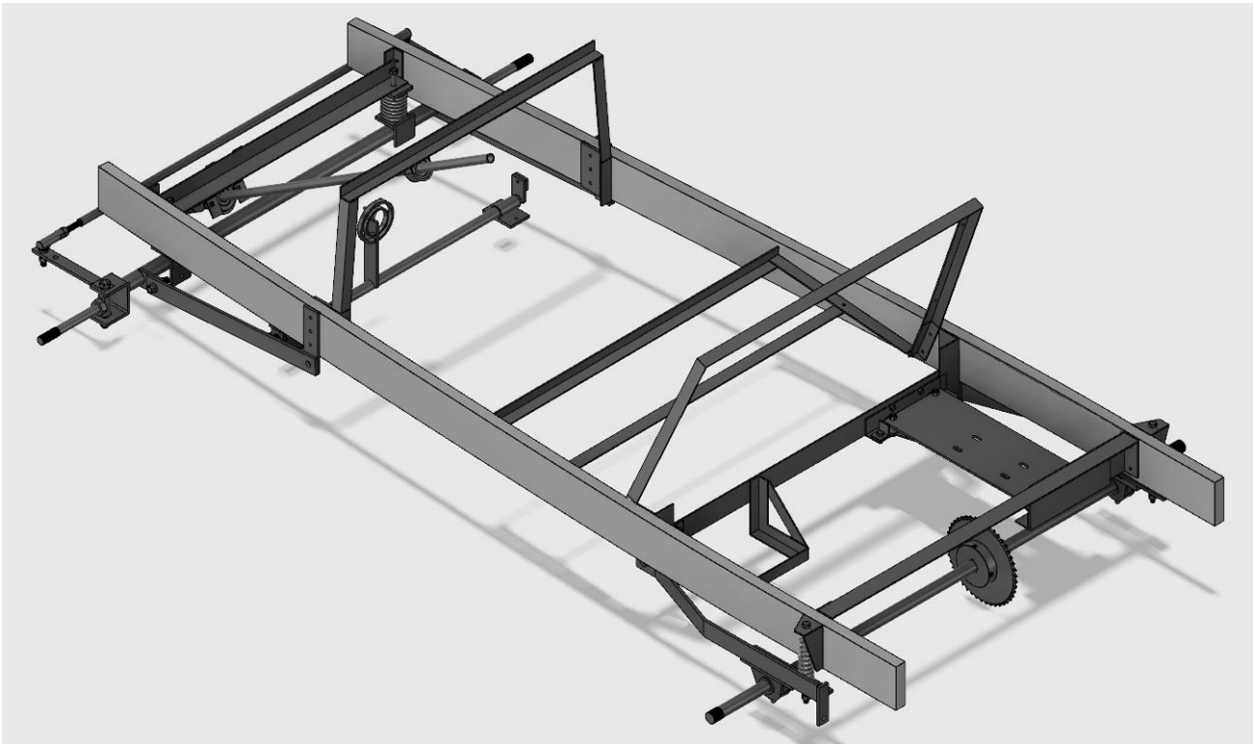
This is the rear sub assembly with the suspension arms and engine mounting plate in place. That plate (see detail inset) sits on four motor mounts isolated from the frame. The bottom diagonal straps ensure engine isolation front and rear and tabs to constrain deformation under acceleration. The engine defines the location of adjustment holes.

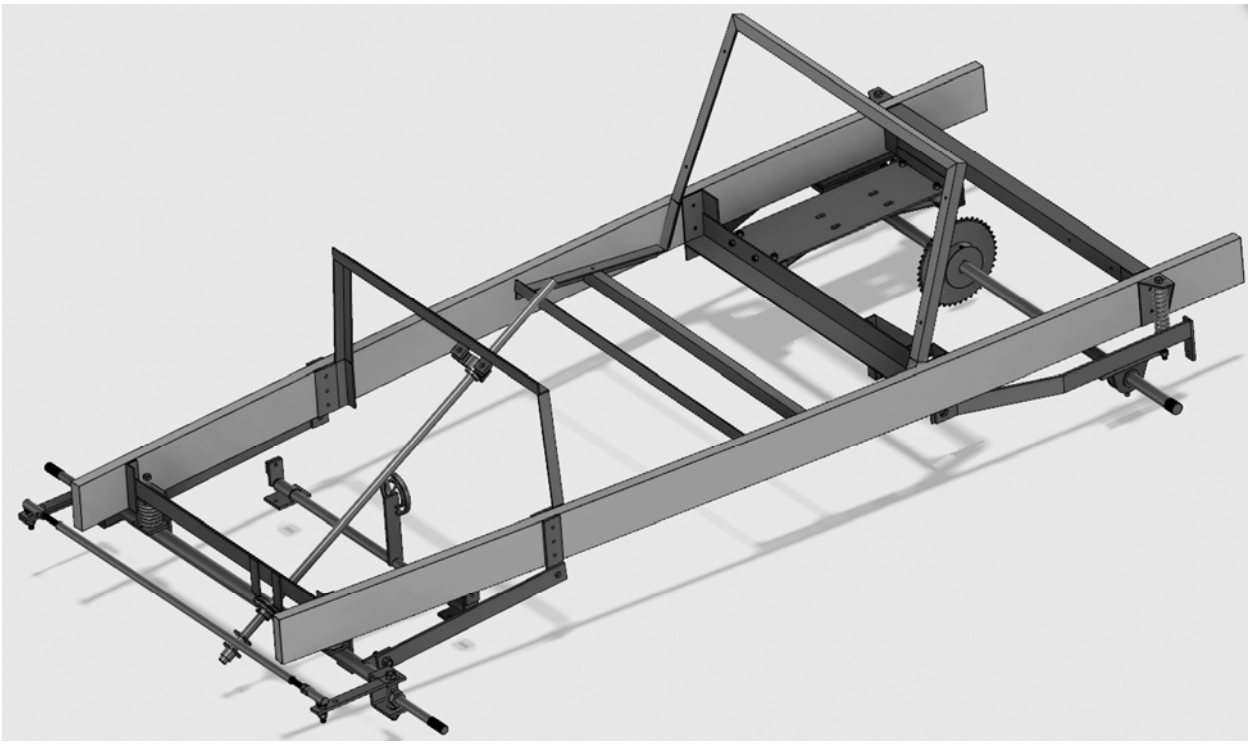
Below, the main crossmember, battery box and one frame rail are bolted to the rear sub assembly. Note the rear springs are mounted on the outside and the frame rails run straight forward until pulled together by the front sub assembly. The rear Panhard rod (not shown), is attached to the tab below the left suspension arm.





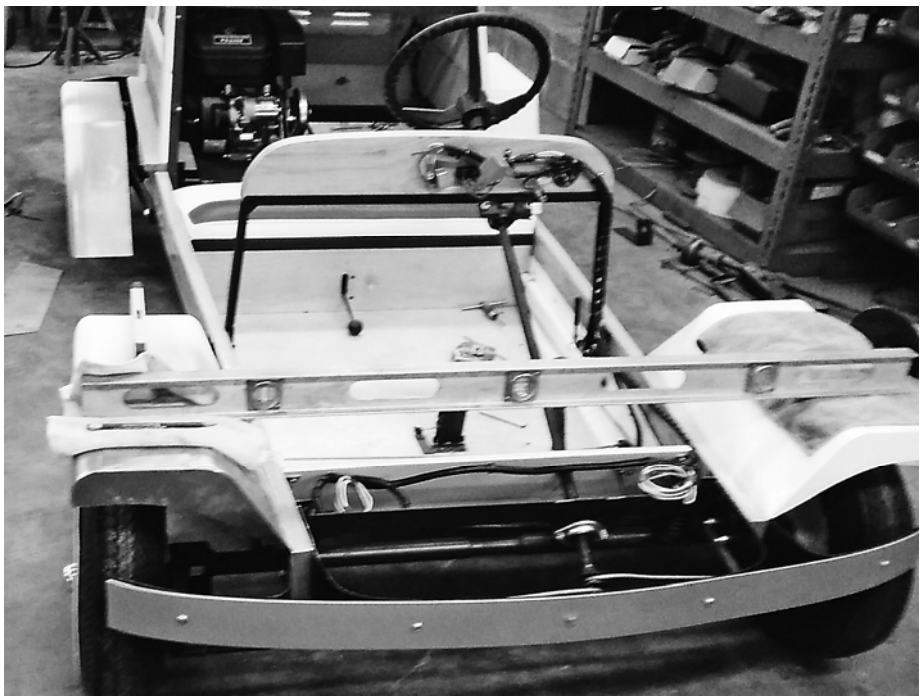
Here's how the major sub assemblies fit together. It's best to put the seat frame in place before pulling the frame rails together at the front. The front of the seat frame should fit equally between the frame rails and the final bolting ties it all together, but measure carefully on the diagonals to be sure the frame is square. The brakes are cable actuated as with the Model 2. The brake pedal assembly bolts to the plywood floor (not shown). Plywood is used as opposed to steel for stiffness and to enable the floor and rocker panels to follow the frame's curve . The cowl frame is topped by the dashboard which defines the arch of the hood.





Note that cowl frame and the seatback taper inward defining the body's "tumble-home". The tumblehome at the front of the hood is greater. following the grille's shape. These are crucial to the proper appearance of the car.

Install the floor pan, wheels, brakes and steering wheel and you're ready for a test run to be sure everything works properly. From there on, it's a matter of buying, building and installing body parts and the hardware that bring it all together.



Note the bumper shown here is a flat aluminum bar. A second narrower strip was added for increased stiffening and improved appearance.

This photograph of the prototype in Lee's shop shows some important details. It's best to paint the fenders and bodywork before installation, and before painting, be sure everything fits. The same goes for prefinishing the wood, including the frame built early in the process.

A mark of the true craftsman is fit and finish detail. Note how Lee has leveled the front fenders in both directions, and put shop rags under that level to avoid damage to the paint.

## THE CLUB SPECIAL PLANS *Introduction*

THE FOLLOWING 76 PAGES, separately numbered, are the heart of the plans. Lee built the prototype based on design sketches by Bob. Then Randy made these CAD (Computer Aided Design) drawings after the parts were built by Lee. Meanwhile, parts were being sourced, ordered and specifications drafted. As you'd expect, this process involved many changes and revisions.

With the three of us scattered around the country, thousands of emails, photos, sketches and phone calls were exchanged and each of us put in hundreds of hours of work that was often frustrating; always challenging. Randy had never met Lee. Bob met with Lee just once on this project and with Randy just twice. A major communications undertaking, and we're still friends!

We've tried to be as clear as possible but recognize that the drawings and specifications contained in these plans are likely to contain errors, or at least confusing details. Still, we believe you'll be able to understand how everything fits together and how it all works to add up to a neat little car. It's a relatively simple machine and in many cases, we expect you'll work out better ways than we discovered. The car we built, after all, is a prototype.

The CAD Plans are laid out landscape on the following pages and begin with an alphabetical list of the drawings. In addition, below is the same list of drawings in the sequence in which they appear. A few changes and updates have been made for this second edition, as well as corrections. If you find more, please report them to the authors.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