June 22, 2018

**ExtReme Sub Frame**

The following instructions are intended for professional installers and are guidelines only. Speedtech Performance assumes NO responsibility for the installation of any of its products. All products are intended for off road use only and must be installed by qualified professionals.

Thank you for purchasing your new Speedtech Sub Frame suspension kit. Installing this product will require the removal of your old sub frame, engine and transmission from the car. Take all necessary precautions whenever jacking up your vehicle and use safe and sturdy jack stands to support the vehicle whenever it is off the ground. Be sure to take all other safety precautions required to do the job correctly.

Read all instructions thoroughly before beginning any assembly. For the most part, initial assembly and set up of your new suspension can be done in a home garage with simple hand tools. Included in these tools should be a quality torque wrench, a ratchet strap, Anti-seize lubricant, Blue Loctite, and suspension grease. As your final step, go over each assembly step again to be sure all fasteners are correctly secured.

Once assembled you will need a professional wheel alignment performed. Driving the vehicle without a proper alignment can be dangerous, towing is recommend. Info on setting toe close enough to drive onto a trailer is with our performance alignment instructions on page 24.

After assembly you still have work to do. While Speedtech's ExtReme suspension systems work great as a direct bolt in replacement for your factory suspension, they are also designed to meet the needs of those intending to race their vehicles on a regular basis. Part of having this versatility includes some anticipated adjusting and tuning of the suspension to achieve maximum performance results for each individual driver, vehicle and type of racing. Some of this, such as tuning sway bars and shock settings, can be done track side through making adjustments and seeing/ feeling how the car reacts to these changes. We recommend a tire pyrometer and good quality air pressure gauge be in your track side tuning kit.

Other adjustments, such as tuning bump steer and caster may require specialized equipment and professional help. Speedtech’s technical department can share insight on making some of these adjustments, however we are somewhat limited to how much help we can offer over a phone call. If you require help with a more thorough chassis set up for a specific racing application we recommend a reputable professional coach such as Ron Sutton Race Technologies. These resources can be a great help in getting the most out of your particular car.

Good luck and enjoy your build!
Additional parts you will need:

- LS Oil Pan
- LS Engine Starter Motor
- LS Engine Adapter Plates
- Engine to frame Motor Mounts
- Headers
- Transmission mount
- Steering Shaft Kit
- Custom Brake Line Kit
- 10) 12mm x 1.5 Lug Nuts

**LS Oil Pan** - Factory LS oil pans will have clearance issues and will not work.

Speedtech offers two types of LSx oil pans for use with our sub frames. Pictured above is the ATS # 70003 LSx Road Race oil pan. It features internal baffling, trap doors and a windage tray. It also features bungs and fittings for remote oil filter mount, oil pressure and temp gauges, and turbo oil line.
Also available from Speetech is the ATS # 70004 LS7 and LS9 dry sump oil pans. These pans feature internal passages that maintain the use of a dry sump style oiling system. It also features fittings for remote oil filter and cooler lines.

**Engine Starter**- For the most amount of clearance we suggest using a GM starter for a 2005-2007 Corvette, or equivalent Powermaster #9201. Speedtech does not carry these starters.

**Engine Mounts**- When installing your engine you must use an LS motor mount adapter plate, we recommend the ATS # 070001 and our Speedtech custom machined polyurethane motor mounts # 220530.

![Engine Mounts Image]

**Transmission Mount**- An Energy Suspension polyurethane transmission mount can be purchased from Speedtech, part # 220531.

**Headers**- Our ExtReime subframes have very tight fitting frame rails for additional wide tire clearance and steering angle. If you have not already purchased headers, Speedtech has designed 1 7/8" long tube headers specifically for our ExtReime frames that fit Chevrolet LSx, engines. They are designed to optimize engine to frame clearance as well as ground clearance for lowered vehicles. Please call us at 435-628-4300 for specific part numbers for your application.

**Note**: Because we have designed our headers specifically for Speedtech ExtReime frames, we have not, and will not be testing any other brand of headers for fitment clearance. We do not know what brand of other headers, if any, might fit.
**Steering Shaft** - You will need to order a steering shaft connection according to your specific vehicle and steering column type. Speedtech offers several different configurations that meet most needs. Call us at 435-628-4300 for specific part numbers.

*Note: It is imperative when setting up and installing the steering shaft that the shaft does not protrude beyond the end of the u-joint housing. Damage and binding will occur if this is not installed properly.*

![Correct vs Incorrect Steering Shaft](image)

The steering shaft is typically left long to allow for trimming. Mock up the shaft assembly in place and trim as needed to ensure that the correct length is achieved.

When installing the shaft you will find one end is splined to allow the shaft to be rotated and “phased” to eliminate any binding. You may have to adjust the phasing slightly from this initial starting position to allow smooth operation and completely eliminate any binding.

![Initially clock U-Joints as shown.](image)

**Brake Lines** - Factory brake lines will not work with an *ExtReme* frame. Custom brake lines must be made up. Refer brake line construction only to those with professional level experience.
Sub Frame Hardware Kit Checklist

A.  
- 4- Upper control arm cross shaft bolts  7/16 x 2 ¼"
- 4- Upper control arm cross shaft nylock nuts  7/16"
- 4- Upper control arm washers  7/16"

B.  
- 4- Lower Control arm bolts  9/16 x 3 ½"
- 4- Lower Control arm nylock nuts 9/16"

C.  
- 3- Rack mount bolts  ½ x 1" Course

D.  
- 4- 1/2" Shock mount shoulder bolts, 3/8" course thread
- 4- Shock mount nylock nuts 3/8" Course
- 4- Shock mount washers 3/8".

E.  
- 4- Engine stand  ½ x 1 ¼"
- 4- Engine stand nylock nuts 1/2"
- 8- Engine stand Washers  1/2"

F.  
- 8- Transmission crossmember bolts  3/8 x 1 1/4"
- 8- Transmission crossmember nylock nuts 3/8
- 16- Transmission mount flat washer 3/8"

G.  
- 2- Outer tie rod Shoulder bolt 5/8 x 2 ½"
- 2- Outer tie rod bolt nylock nuts ½" Course

H.  
- 2- Inner steering tube adjusters
- 2- Left hand jam nuts for adjuster

I.  
- 2- Stainless outer tie rod heim spacers .650 tall

J.  
- 4- Inner / Outer 5/8 tie rod heim Joints right hand
- 2- Jam nuts 5/8" Right hand for inner heim joint
- 2- Jam nuts 5/8" Right SMALL OUTSIDE DIAMETER for the Heim Joint at steering arm end

K.  
- 2- Tie rod tubes

L.  
- 1 PK outer tie rod heim joint spacers .500 tall
- 2 PK outer tie rod heim joint spacers .250 tall

M.  
- 2- Bump stops lower (tall cone shape)

Sway bar mounting hardware is included with the sway bar and billet steering arm hardware is included with the steering arms.
Assembling the Sub Frame

1. Support the sub frame with jack stands at each corner, be sure it is sturdy and level. For powder coated frames, use something non abrasive such as a shop rag between the stands and frame to protect the finish.

> You may need to chase any threaded holes with a tap to remove powder coating to achieve proper bolt torque and fitment.

2. Install the supplied engine mount frame stands in the locations shown below. Do not fully tighten the bolts at this time to allow adjustment later when installing the engine.

Note: LS Series motors use 2 different length frame pads, **the Taller Pad must be installed on the Driver Side.** This will move the motor over 1/2” to clear the oil pan rail. You must also use an LS motor mount adapter such as the ATS # 070001.
3. Install the transmission cross member. Once the subframe is bolted into the car the cross member can then be loosened and adjusted accordingly to fit your transmission mount position. Another option (recommended) is to install the motor and transmission into the frame before installing the frame into the car.
Not the positioning of the holes. The offset holes will be used for LS applications. The centered holes will be used for all other platforms.

The lowest side holes will be used for a T-56. Many options here will accommodate most any common transmission, use the best holes for each application.
4. Install the lower control arms. Begin by sliding the frame end up into the frame pockets. The boxed portion of the arm will be towards the front. Note: For maximum performance Speedtech component tolerances are designed to be tight. Excessive thickness of paint or powder coating may require additional effort for installation of lower control arms.

Apply anti-seize lubricant to the shank of the 9/16 x 3 1/2" bolts and install with 9/16" nylock nuts. Torque to 70 ft. lbs.
5. Using the three 1/2 x 1" bolts, secure the steering rack to the frame. Note the bolts will thread in from the underside. Use Blue Loctite and torque to 40 ft. lbs.
Photo above shows the ExtReme Camaro subframe, however rack and pinion location is the same on all ExtReme chassis models. Note: For alignment purposes notice inner tie rod ends line up with bolt heads for the lower control arms.

Notice left port is Pressure from the pump and right port is Tank or return.
**ExtReme Power Steering System Requirements**

The Sweet dual power steering rack is a very high quality part. Considering the way Speedtech has spec’d its internals for maximum all round performance and through extensive testing and racing our Sweet equipped test cars we have come up with the following critical requirements to ensure proper function, reliability, and longevity of your power steering system.

The use of a very high quality power steering pump is **required**
- We recommend either Jones Racing or Sweet Manufacturing. Both of these pumps are hand built and have extensive internal modifications to increase both performance and longevity over any other pump that we are aware of.
- Do not use a factory style or spec’ed steering pump.

**MAXIMUM** RPM of the steering pump is 5200 RPM
Please ensure your pullies are sized for this max speed accordingly with max engine RPM. Although individual needs may vary, we generally recommend:
- 5" crank Pulley
- 6.5" power steering pulley

**Required Power Steering Pump Specifications**
- 3+ Gallons per minute
- 1300 psi

We recommend a series 60 eccentric in the power steering pump.

You **MUST** use a quality power steering cooler
- Minimum of at least 44 sq inches.

You **MUST** use a high quality fluid, we recommend
- Jones full synthetic, or
- Sweet full synthetic
6. Assemble the coilover shocks as shown below. Start by installing the large adjusting nuts threaded to the bottom of the shock. Install the adjusting thrust bearings and washers on top of the nuts prior to the spring. Install the spring and spring cap. The spring may need to be compressed in order to get the cap on correctly.
7. Install the shock into the lower control arm and the upper shock mount. Install the socket head shoulder bolts and accompanying nylock nuts and tighten them to 20 ft/lbs. Note orientation in the photo, assemble with the nuts on the forward side, driver's side shown below.
8. Assemble a matching set of caster alignment slugs into the upper control arms. Note only one side of the control arm cross shaft is machined for the slugs.

A. The front of the arm is where the slug pocket is closer to the control arm bushing, see (A.) below.
B. There are three different caster slug settings in only two pairs of slugs. One pair has a centered bolt hole and is 8 degrees caster. The other pair has an offset bolt hole. With the hole towards the rear you will have 7 degrees of caster. With the hole to the front you will have 9 degrees of caster. **Be sure all four slugs are offset in the same direction!** *Refer to the alignment specs at the end of these instruction sheets for initial caster settings for different types of driving.*
Install arms with the cross shafts on the inside of the frame mounts using the 7/16 x 2 1/4" Bolts. Tighten as needed, the alignment shop will torque them to specs. Note brake line mount loop on frame below front control arm bushing.

9. Install the spindles onto the control arms. Note the brake caliper mounts will be to the rear side of the spindle. Tighten the lower ball joint to 60 ft/lbs and install the cotter pin. Tighten the upper ball joint to 40 ft/lbs. and install the cotter pin.
Install the billet steering arms with the tie rod end towards the front and curved outwards. With the nuts on the outside, torque the two steering arm to spindle socket head bolts and nylock nuts to 50 ft. lbs.

10. Assemble the tie rod assemblies. Apply Anti-seize to female end threads on the sleeve and the adjuster.
A.) Thread outer steering arm side almost all the way in and lock down with the lock nut.

B.) To be able to achieve a full range of toe adjustment, thread the adjuster into the sleeve about one turn. Then thread the heim joint into the adjuster the same amount, about one turn. While holding the heim and sleeve steady, turn the adjuster to equally further engage the threads on both sides simultaneously. Initial toe set up is discussed at the end of the instructions near the alignment specs.

**Please read and closely follow assembly diagram on the next page.**

Note: The SMALL OUTSIDE DIAMETER 5/8" lock down nuts should be used on the outer steering arm heim joint as seen below. DO NOT ignore this step!

Photo below shows completed assembly.
maximum adjustment range.

Heim joint the same amount for

B. Initially thread the adjuster and

way in and lock down.

A. Thread most of the

*Apply Anti-seize to all threads.

Longer portion and adjuster are inward towards the rack.

Right hand threads

Right hand threads

Bend goes towards rear of car.
Install the .650" bushing on the rack pin under the heim joint, then a flat spacer between the heim and nylock nut. Torque to 65 ft. lbs. See below. Note- older photo above shows darker heim on front. We now supply polished heims up front.

Inner Tie Rod initial set-up.

Passenger Side Shown
Install outer tie rod bushings as seen in the illustration below. This initial set up can be tuned further with additional bushings not included in your kit. A bump steer gauge will be required to help you adjust it for specific needs. Torque to 55 ft. lbs.

**Outer Tie Rod initial set-up.**

- Nylock nut
- .250
- Spindle Billet Steering Arm
- .500 and .250 shims are included in the subframe hardware kit.

*Taper orientation for shims must be assembled as shown!*

This thin flat shim is included with the steering rack.

Passenger Side Shown
11. Assemble both sway bar end links as seen above so that they are 3 1/2" center to center. Shown installed in (B.) on the next page.

Install one Delrin sway bar shaft bushing into the sway bar tube on the frame. Position the grease fitting for easy access. Assemble one sway bar arm onto the splined sway bar shaft and torque to 45 ft. lbs see (A.) on the next page. Note the arm curves outward. Slide the assembled sway bar arm and shaft through the installed frame bushing then install the opposite side shaft bushing.
Install one sway bar link onto the lower control arm with tapered bushings orientated as shown below. Torque the bottom bolt to 30 ft. lbs.
Note: For tuning purposes there are two positions for the sway bar link (C.) in photo on last page. Using the forward hole increases spring rate, the rearward hole decreases spring rate. We recommend using the rearward hole to start with and for street cruising. As you drive the car you may find you'd like to change the sway bar spring rate either by moving to the forward hole or moving up to a heavier rate bar all together. This can easily be done by simply replacing the center sway bar shaft, you can reuse the sway bar arms and links included in this kit.

Attach to the end link to the assembled sway bar (C.) and torque the bolt to 50 ft. lbs. Now install the second sway bar arm on the other side. Leave the second sway bar link off until you have the vehicle assembled and at ride height. At that point install the 2nd sway bar link.

12. Apply blue Loctite to the threads and fully thread the bump stop up into the pre-tapped threads on the bottom side of frame. Note: This is a common area for powdercoat buildup and these threads should be cleared of paint to thread the bumpstop in. Bumpstops should make contact on the control arm near the rearward bar of the lower control arm at full compression.
That completes the assembly of the *ExtReme* sub frame and you will now need to install it into the car. It is recommended you fill all grease fittings at this time. We suggest using Permatex Ultra Slick Synthetic Grease, but any high quality chassis grease will do.

You now have the choice to either install the sub frame into the car or, as we would recommend, install the motor and transmission into the sub frame, then install the entire assembly into the car, for example like this Speedtech Pro Touring subframe and engine assembly pictured below.
13. You must square align the subframe, equalizing the measurements on lines “F” and “G”. Squaring it this way using both the front to back (G) and diagonal (F) methods will ensure the best possible frame to body alignment. Torque all body mount bolts to 140 ft/lbs. Note: This diagram works for 1970-1981 Camaros as well. 


14. Once you have the frame properly squared, reinstall and reconnect all accessories as they were before.

Torque 5/8” Bolts to 140 ft/lbs.
1/2” Bolts to 40 ft/lbs.
Our ExtReme chassis and subframes' geometry is designed and optimized to have ride height set at 5" between the ground and the large crossmember that's under the engine. This is with a typical Pro Touring type tire diameter of 25.5 inches such as a 275-35-18 or a 315-30-18. Height should vary according to tire diameter, for example a 26" tall front tire should have 5.5" of clearance, a 25" diameter tire should have 4.5" of clearance. You are free to vary this height according to your tastes, however those who will be racing and want to achieve optimum geometry and performance should follow this rule.

Pinion angle should be within range at the ride height as stated above. If you feel a drive shaft vibration at speed, you may need to adjust your driveline working angle. We have found this to be at optimum on our ExtReme products between 1.5-2 degrees. Use shims on either the rear pinion mount as seen in the diagram below or at the transmission crossmember until you have the correct angle and any driveline vibrations should go away.

With all finished weight in the car adjust the pinion angle by:

**Option 1.** Shimming between the billet pinion mount and the torque arm.

**Option 2.** Raise, Lower or shim, the transmission crossmember mount to achieve the correct working angle. Note- pay attention to the headers' relation to the floor pan. Raising the mount too much could potentially touch the floor pan under load while lowering it may make driveline angles worse or reduce ground clearance. **Be sure to check drive shaft clearance throughout the tunnel for either method.**

If you do not have access to an angle gauge, most smart phones have a free angle measurement download app. available.
Do not drive the car until it has had a proper suspension alignment.

Once you have completed the sub frame install, we recommend you have the vehicle towed to a competent professional alignment shop to have the alignment performed. You can get the toe setting close by measuring the front tires, center to center on both the front and the back side. With the car at ride height and the steering wheel straight, adjust accordingly to get the front of the tire and the rear of the tire measurement as close as possible to each other. This should be good enough to safely drive up onto a trailer or tow vehicle.

Note: Use our suggested alignment specifications, DO NOT allow the alignment shop to use pre-programmed factory alignment specs! If your chosen alignment shop cannot match our suggestions, find a different shop familiar with performance alignment set-up.

Alignment Specifications 67-81 Camaro 68-74 Nova

Note: These are only suggestions and may need additional changes to achieve the optimum settings for your driving style or situation. If you are unsure which set-up to use, please call our technical department for help at 435-628-4300.

**Daily Driving, Street Performance Specifications**

<table>
<thead>
<tr>
<th>Driver Side</th>
<th>Passenger Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Deg. positive Caster</td>
<td>7 1/4 (7.25) Deg. positive Caster</td>
</tr>
<tr>
<td>1/2 (.5) Deg. negative Camber</td>
<td>1/2 (.5) Deg. negative Camber</td>
</tr>
</tbody>
</table>

3/32 Total Toe-in

**Stiff Front Spring Rate/Low Travel Set Up (550# & Higher front springs)**
<table>
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<th>Driver Side</th>
<th>Passenger Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Deg. positive Caster</td>
<td>9 1/4 (9.25) Deg. positive Caster</td>
</tr>
<tr>
<td>1 3/4 (1.75) Deg. negative Camber</td>
<td>1 3/4 (1.75) Deg. negative Camber</td>
</tr>
</tbody>
</table>

### 1/8 Total Toe-OUT

**Moderate Front Spring Rate/Mid Travel Set-up (450-500# front springs)**

<table>
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<th>Passenger Side</th>
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<tbody>
<tr>
<td>9 Deg. positive Caster</td>
<td>9 1/4 (9.25) Deg. positive Caster</td>
</tr>
<tr>
<td>1 1/4 (1.25) Deg. negative Camber</td>
<td>1 1/4 (1.25) Deg. negative Camber</td>
</tr>
</tbody>
</table>

### 1/8 Total Toe-OUT

**Soft Front Spring Rate/High Travel Set-Up (300-400# front springs)**

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<td>9 Deg. positive Caster</td>
<td>9 1/4 (9.25) Deg. positive Caster</td>
</tr>
<tr>
<td>3/4 (.75) Deg. negative Camber</td>
<td>3/4 (.75) Deg. negative Camber</td>
</tr>
</tbody>
</table>

### 1/8 Total Toe-OUT

**Speedtech Performance USA LLC**
3884 S. River Rd. Bldg A
St. George, UT 84790
(435)-628-4300
www.speedtechperformance.com
1. Terms and Conditions of Sale

1. Effective January, 2008, supersedes all previous policy statements. Policies are subject to change without notice. Speed tech performance Ltd. is not responsible for printing errors.

2. Speedtech Performance USA LLC does not endorse, nor recommend modification of vehicles for use on public highways, since warranty or government regulations may be violated. As an express condition of sale of any performance part, the buyer acknowledges and agrees to use the performance parts for the modification of vehicles in sanctioned OFF-ROAD competitive events and show purposes only. Customers should exercise their discretion on matters with regards to the purchase and installation of these products.

3. Speedtech Performance USA LLC does not secure the legal use of these products. We do not guarantee the fitment of these products for anything other than their intended application nor do we assume any responsibilities what so ever for the misuse or losses incurred by the use of any of these components. While every effort is made to provide technical information and assistance, we have no control over owner installation, modification, and unusual stress that performance parts are subject to.

4. The customer acknowledges that Speedtech Performance USA LLC and its employees are not responsible for any mechanical failures due to the use of parts sold, supplied or installed not for their intended application. Speedtech Performance USA LLC will not be held liable for any damages which are incurred directly or indirectly on the vehicles or operators or passengers of the vehicle.

5. Please consult your sales agent and/or technician prior to purchase of any of Speedtech Performance USA LLC products to ensure proper fit. The buyer assumes all responsibilities for determining the suitability of the product. All aftermarket products should always be installed by professionals only.

2. How to File a Warranty Claim:

1. Speed tech Performance Ltd. Warrants its products against materials and workmanship failure for the term of 12 months (1 year) from the date of purchase and only up to the amount paid with proof of purchase.

2. Seller’s liability shall be limited to repairing or replacing, at its option, any defective product which is returned, freight prepaid to Seller, according to the Merchandise Return Procedure set forth in Section 3-B below. Buyer shall bear all responsibility for shipping charges and risk of loss or damage during transit to Seller. Products which have been subjected to abuse, misuse, alteration, neglect or unauthorized repair or installation, as determined solely by Seller, are not covered by this warranty. Any alterations, addition, improvements or attachments to the product(s) not authorized in writing by the Seller shall be deemed to be a waiver of this warranty by Buyer and shall render this warranty null and void. Seller shall return repaired or replaced product(s) to Buyer, at its expense via regular ground service in the U.S. Shipping charges by all other methods and to all other destinations shall be borne by Buyer.

3. As per section 3-B below, all shipments MUST be prepaid, include the original invoice and show the RGA on the outside of the package, otherwise it will be refused. Please include a brief explanation letter in order to expedite the warranty analysis process.

This Warranty DOES NOT Cover-
- Removal, installation, shipment and insurance costs
- Improper installation or maintenance
- Alterations on the original design or unauthorized repairs.
- Normal wear and tear
- Misuse or abuse, negligence
- Damage to related components
- Costs incurred due to down time of vehicle

3. Merchandise General Return Procedure:

A. If you purchased your Speedtech Performance USA LLC product from us or from an authorized dealer, you are covered by the terms of our general product return policy. All claims however, must be submitted directly to Speedtech Performance USA LLC. The answer to ALL of the following questions should be YES before contacting our Customer Service Department.

1. Is the part appropriate to your application?
2. Did you carefully and thoroughly read the instructions provided along with the part?
3. Do you have the proof of purchase?
4. Are you the original purchaser?
5. Is the part unmodified and clean?
6. Is the return date within 3 months from the purchase date?
7. Is the reason for return a legitimate product defect?

If all answers are yes, please do the following:

B. Call our customer service representatives at 1-435-628-4300.
- Provide the invoice number, date of purchase and reason for return
- You will be assigned a Returned Goods Authorization Number (RGA) valid for 30 days. The package you return must show the RGA on the outside of the package, include a copy of the original invoice and be shipped prepaid to our facility. The part has to be in its original packaging materials and be in a resellable condition. For parts presenting signs of installation and/or use, only warranty claims will be accepted.
- Ship to seller, freight pre-paid and insured for replacement cost in original packaging.
- Replacement or repair decision will be made when merchandise is received by seller. No advance replacement is available.
- A Restocking fee may be applied.

All warranties implied by law are limited in duration of this warranty. You have specific rights that may vary from state to state or Province to Province. By purchasing any of the products that are manufactured by speed tech performance you agree to any and all of the above terms and conditions. Copyright © Speedtech Performance USA LLC