



Chassis Frame Overview

The Blue Bird All American's chassis frame consists of two main C-channel rails which run the entire length of the bus, and several different kinds of cross members located at strategic intervals. This ladder-like structure forms the backbone of the vehicle's chassis. The exact number and placement of cross members varies according to body length, type of suspension and other equipment.

On Forward Engine All Americans, engines are supported by S-shaped sub-frame members which are bolted into the C-channel of the front end of the main frame rails. The front bumper brackets and tow hooks are bolted to these sub frame members. Rear bumper brackets are mounted to the main frame rails.

The All American's body assembly is mounted to the chassis's main frame rails by a system of bolted-on clamps and angled brackets. Square rubber pads are clamped at floor-to chassis contact points to help minimize vibration and metal fatigue.

Frame Maintenance Overview

The All American's frame was developed under stringent accelerated wear and fatigue testing to ensure robust performance and long life. The major structural components of the frame should not require servicing under normal conditions. However, they should be included in routine visual inspections. The body-to-chassis attachment points should be regularly inspected and tightened.

- Inspect frame rails and cross members for signs of cracks, vibration, or loose fittings any time work is being performed under the bus, at regular inspection intervals of 3 months. Watch for telltale signs of possible structural damage, such as cracked paint, vibration residue around joints and fasteners, and/or corrosion.
- Check for deteriorated, shifting or missing tie-down pads. Replace if needed.
- After the first 1000 miles of operation and at 3 month intervals thereafter, tighten all body tie-down points to the torque value appropriate for each type of tie-downs.

Huck Fasteners

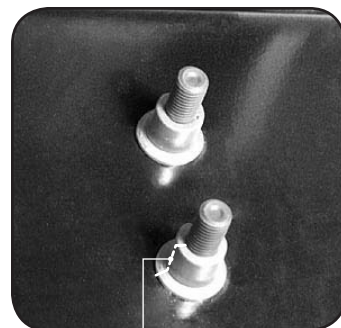
Frame members and many related components are assembled using special Huck Spin fasteners which provide extremely secure and fatigue-resistant permanent joints. A Huck fastener consists of a threaded pin onto which a collar is permanently swaged under high mechanical pressure.

Huck Spin fasteners require special tools for assembly and should not be considered serviceable items under normal circumstances. However, damage due to collision or extreme operating conditions may require replacement of a part which is assembled with Huck fasteners. If the need for such a repair is determined, contact your Blue Bird Dealer for consultation.

Removal/Replacement

Although normally meant to be a permanent attachment, a Huck fastener may be successfully removed as follows:

1. Inspect the joint thoroughly and take all safety measures and precautions to ensure that all components, which are affected on both sides of the fastener, are fully supported.
2. Cut along the length of one side of the collar using one of these methods:
 - Drilling: Using a drill bit slightly larger than the nut's wall thickness, drill along the length of the collar, parallel to and against the side of the pin.
 - Grinding: Using a grinding/cutting wheel on a high-speed rotary tool, cut along the length of the collar.
 - Chiseling: Using an air hammer equipped with a chisel blade, cut the collar on one side of its length.
 - Torch: Using an oxy-acetylene cutting torch, cut the collar along one side of its length.



Huck Fastener

Removal requires cutting along length of swaged collar.

huckspin				grade 8 bolt, washers, nut						
Blue Bird Part Number	Huck Number	Nominal Length	Grip Range	Blue Bird Part Number	Nominal Length	Thread	Flat Washer	Nut	Locking Nut	Material Thickness
1636943	10	2.25	0.43–0.90	0803239	1.5	½–13	1003045	½–20	0850800	0.25–0.75
1636943	10	2.25	0.43–0.90	0803148	1.75	½–13				0.50–1.00
1636950	16	2.60	0.85–1.25	0803148	1.75	½–13				0.50–1.00
1636943	10	2.25	0.43–0.90	0959452	1.75	½–20				0.50–1.00
1636950	16	2.60	0.85–1.25	0959452	1.75	½–20				0.50–1.00
1636950	16	2.60	0.85–1.25	0803205	1.75	½–13				0.75–1.25
1746817	20	2.85	1.09–1.50	0803205	2.00	½–13				0.75–1.25



WARNING Whenever using a cutting torch to cut a Huck fastener collar, ensure that the torch does not also damage the mounted brackets or parts. If the fastener to be cut is in proximity to any part that may be damaged by the conducted heat of the cutting operation, use another method to remove the collar.

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3. After drilling, use a cold chisel to break the collar or to spread it enough to allow removal. Remove the threaded bolt, using a hammer to tap it out if necessary.
4. Discard all parts of the removed Huck fastener. Do not attempt to re-use the bolt. Removed Huck fasteners must be replaced with appropriately-sized grade 8 bolts lock nuts, using hardened washers on both sides.

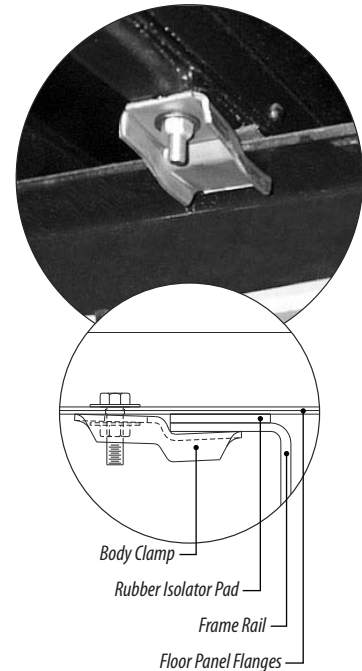
Body Tie-down Clamps and Angles

At most places where a joint between two adjacent body floor sections crosses the main frame rails, body tie-down clamps secure the body to the main frame rails. The clamps bolt to the floor joint body bar angles and, when tightened, clamp against the inboard edge of the frame rail's upper flange.

Wherever equipment mounted between the main frame rails prevents the use of a body tie-down clamp (for example, in the area of the rear mounted fuel tank), body tie-down angles are bolted to the outboard side of the frame rail and to the floor joint flanges.

Inspection/Adjustment

All body tie-down clamps and angles should be checked for proper tightness after the first 1000 miles of operation and every three months thereafter. Tighten to 37–41 ft. lbs. (50–56 Nm).



Rubber Mounting Pads

At each location where an Auxiliary Floor Cross Member crosses the main frame rails, a small square rubber pad is clamped between the body floor and the chassis rail. These pads help minimize vibration and fatigue.

Inspection/Replacement

Loss of the rubber pads can result in an airspace and subsequent loosening of the associated tie-down clamp(s) or angle(s). Wherever the rubber pads have deteriorated or fallen out, they should be replaced as follows:

1. Prepare the bus for working underneath according to the precautions in Chapter 1.
2. Loosen the tie-down clamp bolt(s) near the damaged or missing rubber pad.
3. Using an appropriate jack positioned on the Auxiliary Cross Member, raise the body floor only sufficiently to replace the pad.

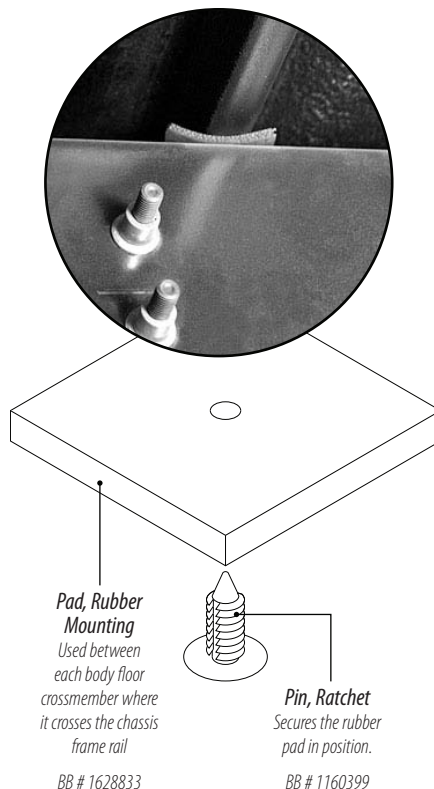
CAUTION *Raise the body bar with the jack only the minimum distance required, to insert the new pad and its plastic push in retainer. Do not overstress the body. If undue resistance is encountered, loosen more body tie-down points in the vicinity of the repair.*

4. After replacing the pad, retighten all body clamps that were loosened to 37–41 ft. lbs. (50–56 Nm).

Swing-Out Radiator

Your bus may be equipped with an optional swing-out radiator. This feature allows better access for service or replacement of the engine belt, fan or fan clutch, as well as radiator cleaning.

1. Park the bus on a flat level surface. Remove Ignition key. Chock wheels. Turn off master power switch or disconnect battery positive cable.
2. Remove engine hood by first removing the cup holder and PA mic, then releasing the external rubber tension latches and the internal draw-down latches. See **Engine Access** in the Power Drivetrain chapter of this manual.
3. Remove curbside charge air cooler pipe by loosening the upper and lower spring clamps. *Note: Cover turbo outlet to prevent contamination.*





4. Open front grille and access panels by releasing the press button latches.
5. Swing the front bumper down by removing upper tow hook bolts then loosening lower bolts. See **Bumpers and Tow Hooks** in this chapter.

WARNING *Be careful to support the bumper while loosening the lower bolts to prevent the weight of the bumper from pivoting on the bolt and causing bodily harm.*

6. Relieve any pressure in cooling system through the deaeration tank cap.

WARNING *If cooling system is hot allow ample cool down time for the system before removing deaeration tank cap.*

7. Disconnect overflow hose at fill neck.
8. Disconnect 3/8 inch vent hose at driver side of deaeration tank and remove hose from elbow. *Note: Clamp or plug the hose to help prevent spillage.*
9. Loosen spring clamp on road side charge air cooler pipe.
10. Loosen, but do not remove, curb side radiator mounting bolts.
11. Remove radiator mounting bolts on the driver's side of the radiator and partially open the swing-out radiator.
12. Remove 1/4 inch tubing from the quick disconnect at the shutters control cylinder, if so equipped.
13. Loosen S-hook fastener at end of retaining cable on front of radiator/charge air cooler package. Attach S-hook end of cable to end of frame rail to hold radiator.
14. After service is complete and radiator is returned to its operating position, check all upper and lower hoses and tubes to ensure they are free of kinks and there is ample clearance to adjacent components.



Latches



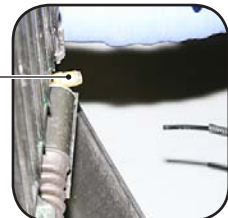
Vent Hose



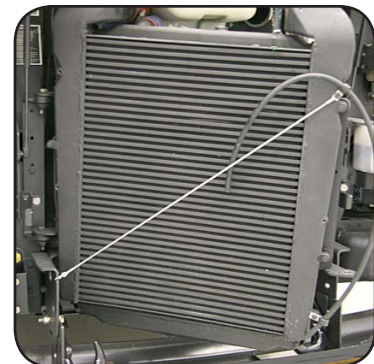
Spring Clamp

Remove Bolts
(Driver's Side)

Retaining Cable

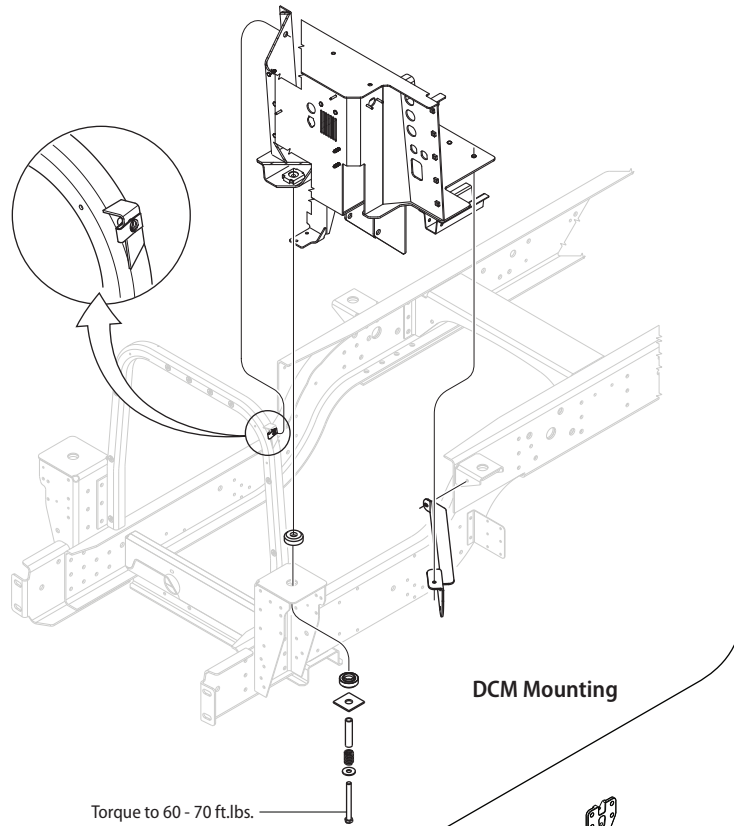


Quick Disconnect

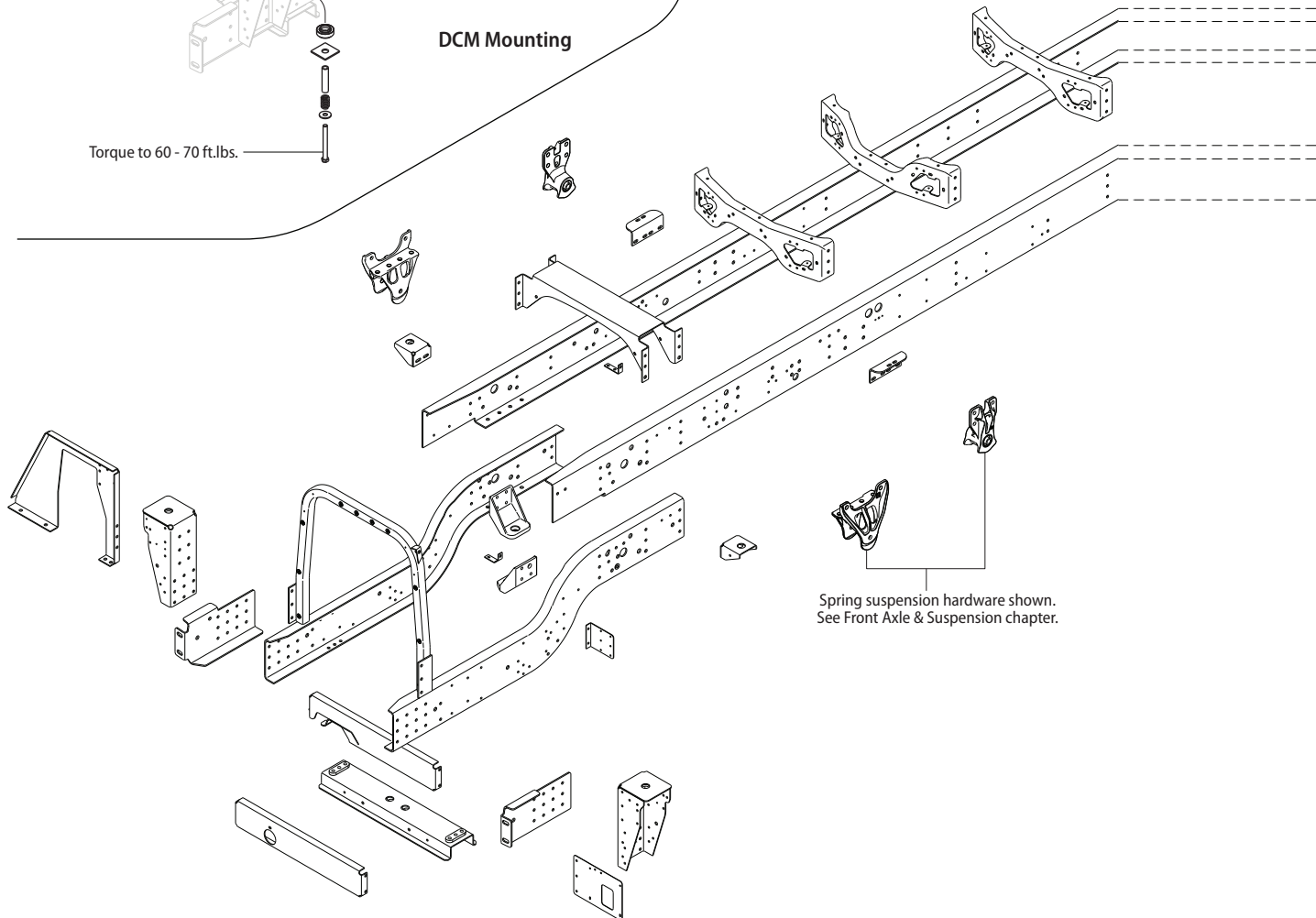


Radiator Open Position

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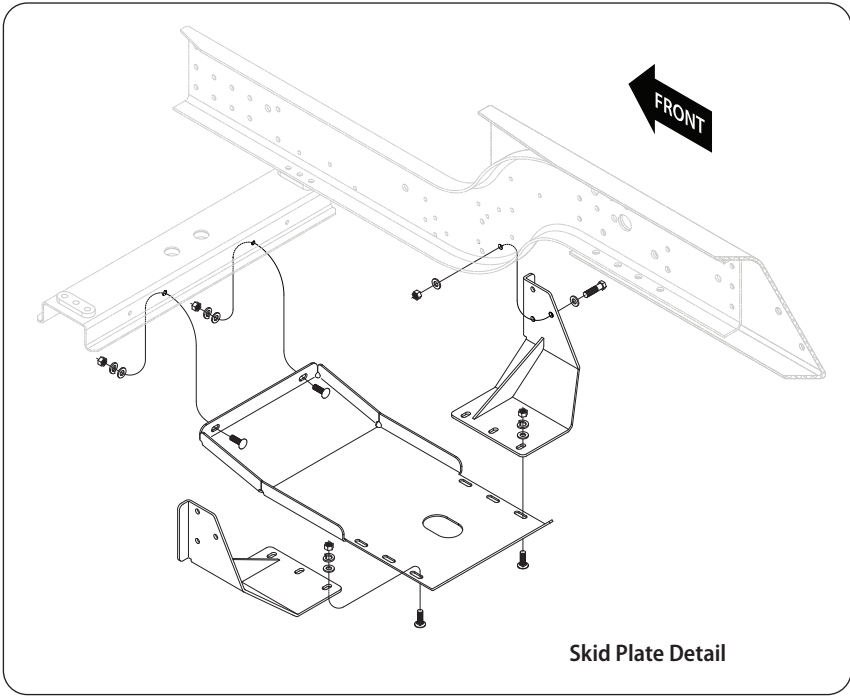
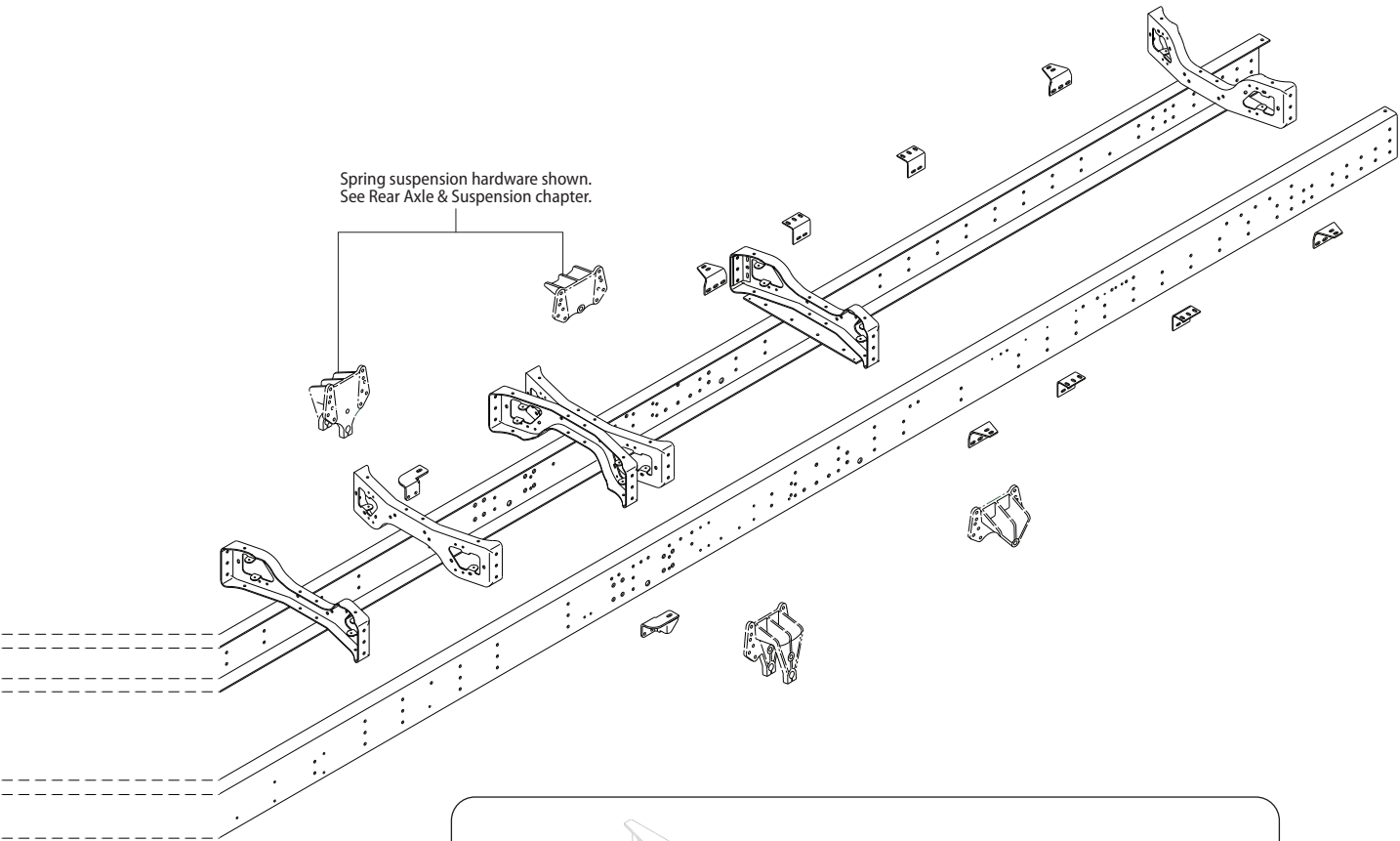


FRONT





Spring suspension hardware shown.
See Rear Axle & Suspension chapter.



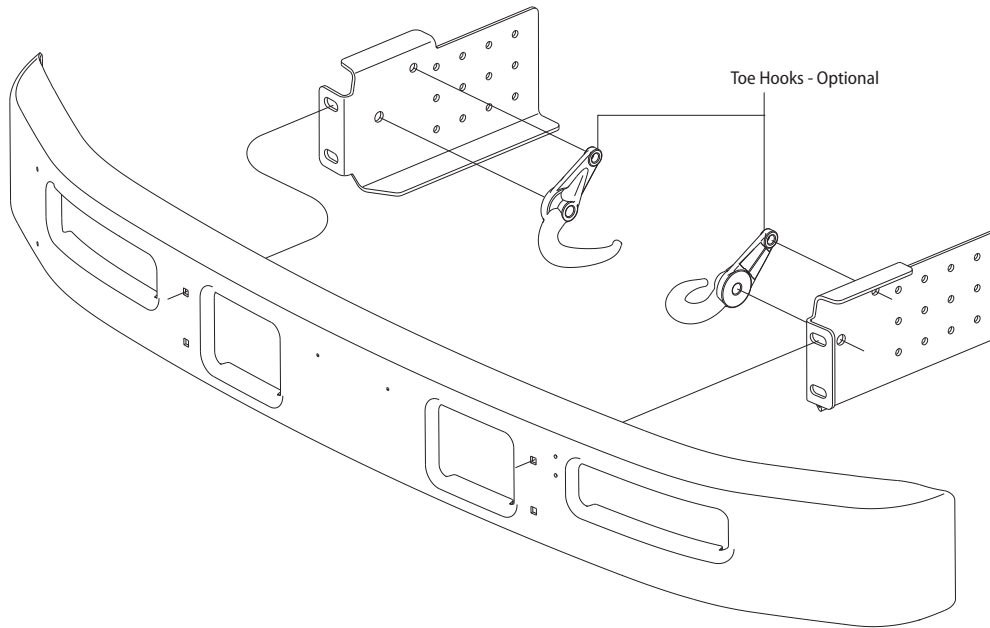
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Chassis Frame

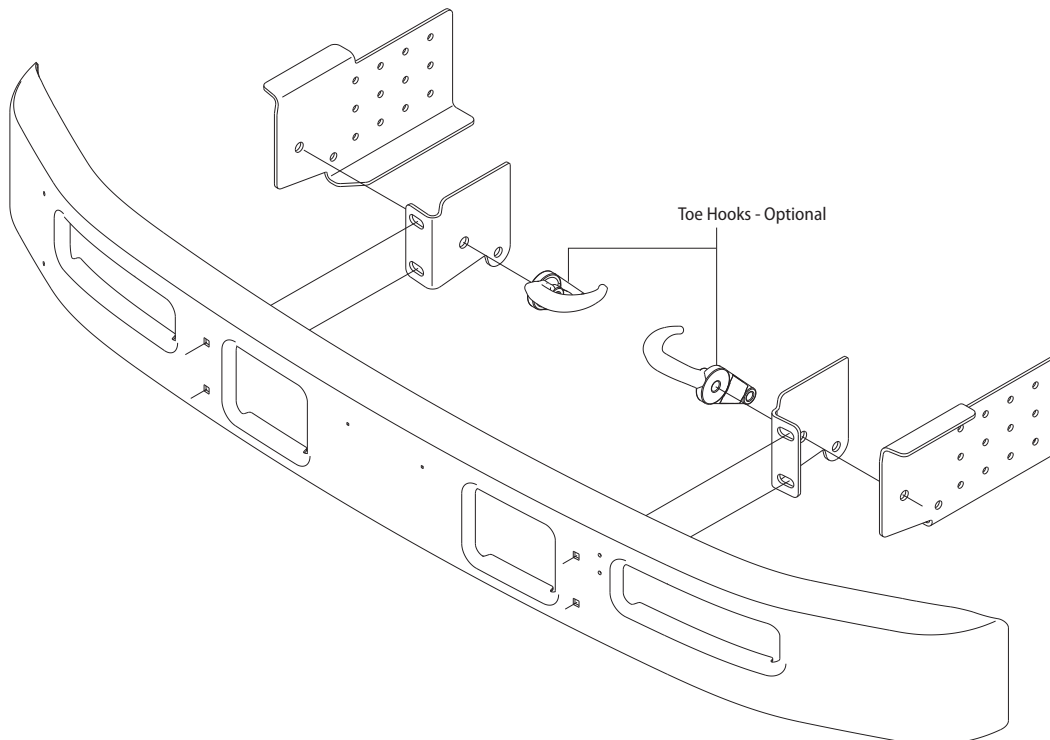
Bumpers & Tow Hooks

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Front Bumper, Standard



Front Bumper, Pivot

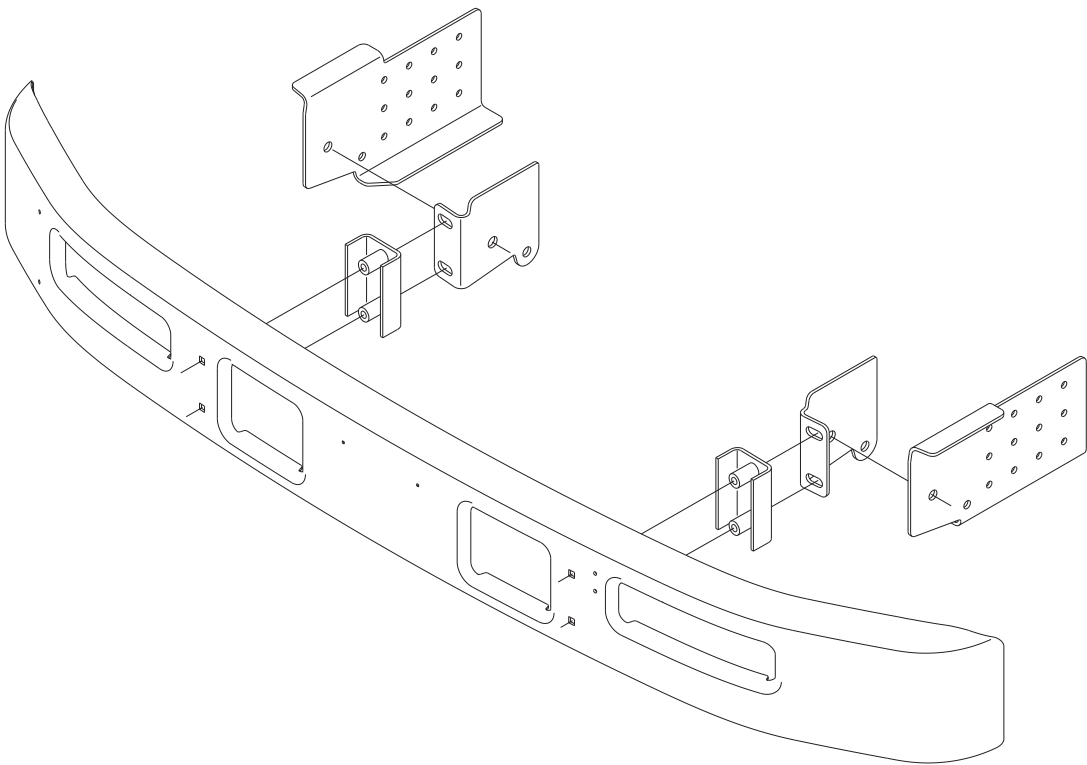


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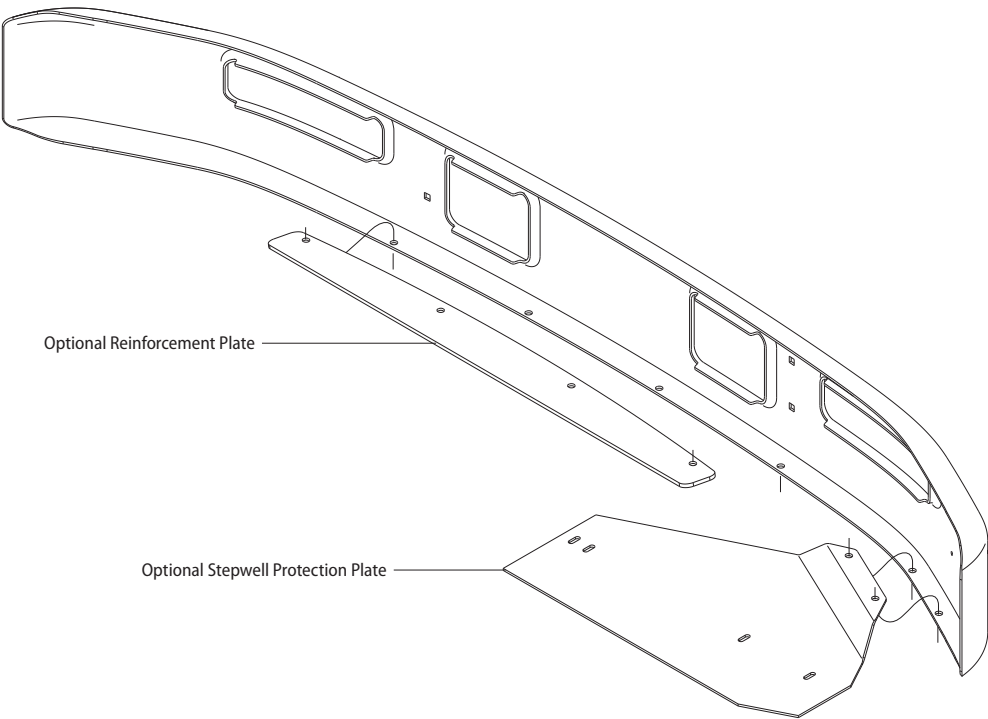


Front Bumper, 2" Extended

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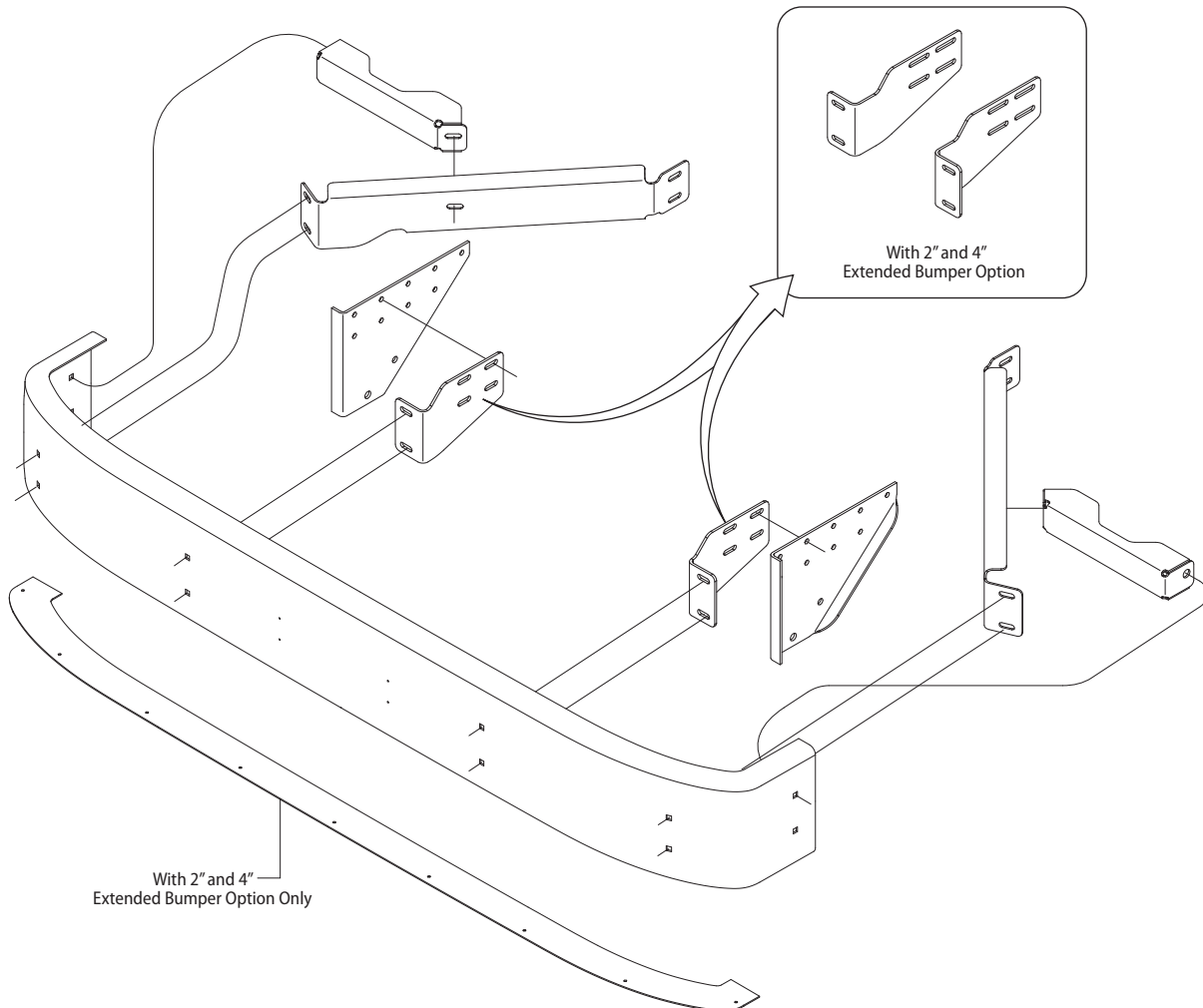
Front Bumper, Options



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Rear Bumper & Rear Bumper Extended

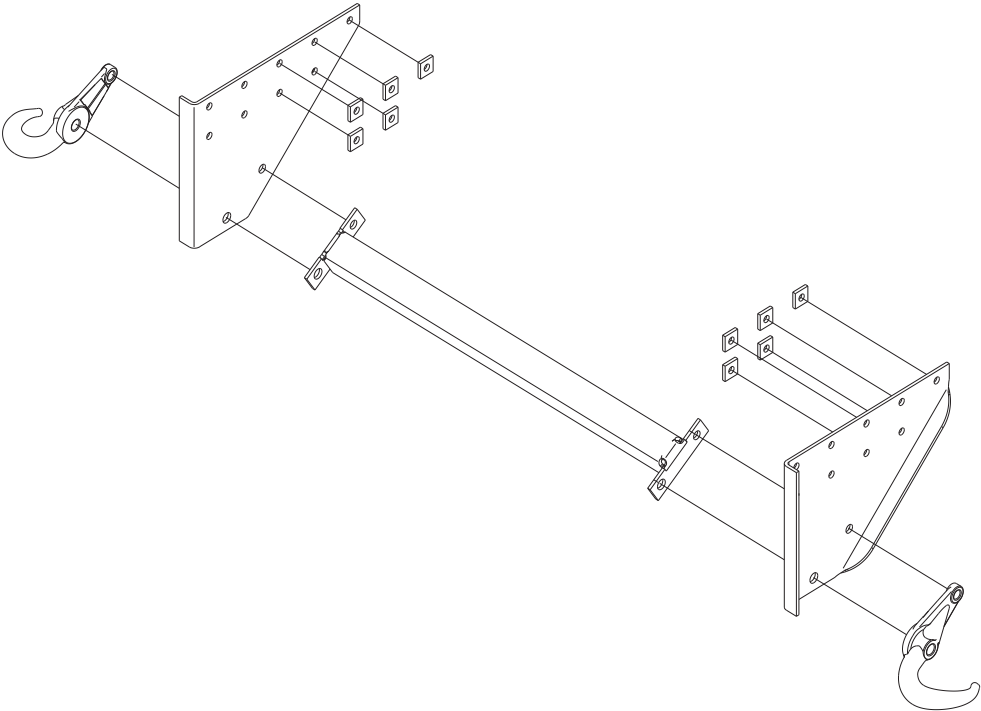
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Rear Tow Hooks



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