



# SERVICE INSTRUCTION **SI0039** Rev NC **Page 1 of 16**

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**EFFECTIVE DATE:** This Service Instruction is effective March 3, 2024.

**COMPLIANCE TIME:** *This retrofit installation is optional and not required. Compliance with this service instruction is at the discretion of the owner/operator.*

**SUBJECT:** *INSTALLATION OF BERINGER BRAKES*

**MODELS AFFECTED:** *CCK/CCX-1865, CCK/CCX-2000*

**PURPOSE:** *This Service Instruction provides details for the optional replacement of the existing wheels and brakes with Beringer wheels and brakes.*



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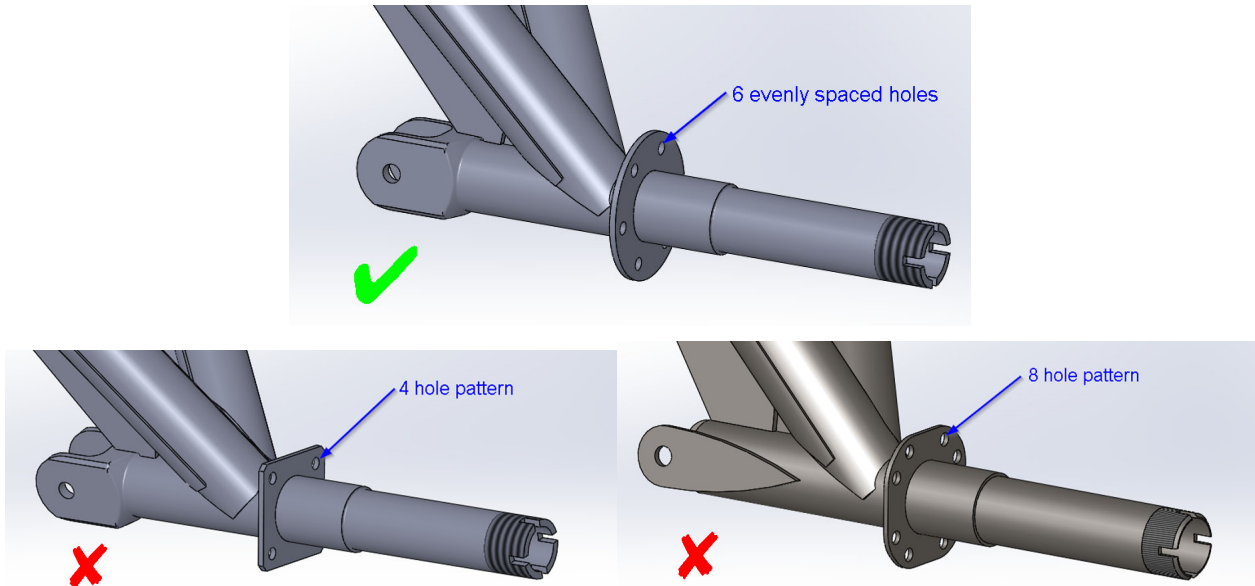
**PARTS LIST:**

| <u>PART</u>              | <u>DESCRIPTION</u>                | <u>QTY</u>                |
|--------------------------|-----------------------------------|---------------------------|
| AN4-6A                   | Bolt                              | 8                         |
| AN822-4D                 | Elbow Fitting, 90°                | 4                         |
| AN960-4L                 | Washer, Thin                      | 2                         |
| AN960-10                 | Washer                            | 12                        |
| AN960-10L                | Washer, Thin                      | 4                         |
| AN960-416L               | Washer, Thin                      | 8                         |
| HDW-91249A126            | 4-40 X 1-1/2 Pan Head Screw       | 2                         |
| MS20995C41 <sup>5</sup>  | Stainless Safety Wire, .041       | Not included <sup>5</sup> |
| MS21042L4                | Nut, Self Locking                 | 8                         |
| PC40101-001 <sup>2</sup> | Brake Line Assembly               | 2                         |
| RM0567-001 <sup>5</sup>  | Loctite 567 Thread Sealant        | Not included <sup>5</sup> |
| RM1004-001 <sup>2</sup>  | Spiral Wrap                       | 2'                        |
| SK41110-003 <sup>3</sup> | Covered Landing Gear, LH          | 1                         |
| SK41110-004 <sup>3</sup> | Covered Landing Gear, RH          | 1                         |
| SK96106-001              | Plumbing Brace                    | 4                         |
| SK96300-001 <sup>1</sup> | Rudder Pedal                      | 2                         |
| SP56206-003              | M10 to 1/8 NPT Adaptor            | 4                         |
| VP1101-001 <sup>2</sup>  | Straight Fitting, Hydraulic       | 2                         |
| VP9120-001               | Wheel and Brake Assy, 6" Beringer | 2                         |
| VP9125-001               | Master Cylinder, Beringer         | 2                         |
| XC41010-101 <sup>4</sup> | Landing Gear Leg, LH, Uncovered   | 1                         |
| XC41010-104 <sup>4</sup> | Landing Gear Leg, RH, Uncovered   | 1                         |

<sup>1</sup> Rudder Pedal not required for all installations. Reference Step 6.  
<sup>2</sup> Parts are required if polyflow tubing is being replaced, or if a new uncovered gear leg is being ordered.  
<sup>3</sup> For installations where a new gear leg is required (reference step 2) and a covered leg is desired (brake line is included).  
<sup>4</sup> For installations where a new gear leg is required (reference step 2) and an uncovered leg is desired.  
<sup>5</sup> must be provided by installer

**INSTRUCTIONS:**

1. Read all instructions before beginning any work.
2. First, verify the style of gear legs installed on your aircraft. Use the brake flange as an indicator to determine if your landing gear is compatible with this Beringer installation. A circular flange with six evenly spaced mounting holes is required. See Figure 1.

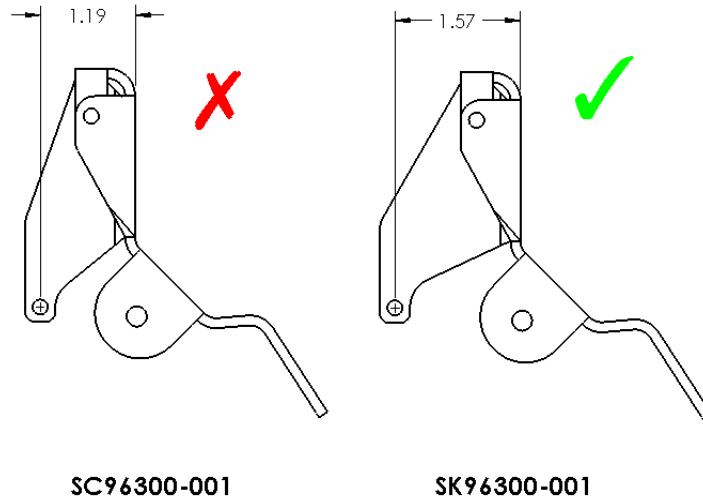


**Figure 1 - Gear leg identification**

If you do not have a gear leg with a brake flange with 6 evenly spaced holes, new legs will be required.

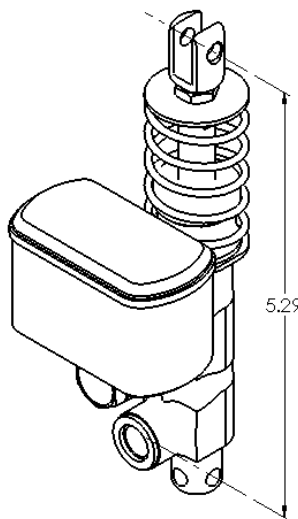
3. With the appropriate gear leg style verified, begin work by first stabilizing the aircraft. Place chocks under the main wheels and raise the tail onto a sawhorse or tripod as described in your maintenance manual.
4. With the parking brake valves open, drain the existing brake lines from the lowest point of the system. This may be at the lower end of the brake line, or a plug/valve on the brake itself.
5. The brake lines run from the master cylinder, located under the aft brake pedals, all the way down to the brakes. Disconnect the brake lines at both ends.

6. Depending on when your aircraft was built, you may need to replace the aft rudder pedals. An SK96300-001 is required for this installation. Reference Figure 2 to determine which pedal you have. If you need to replace your pedals, it is a fairly simple swap. Figure 4 may be referenced for installation details.



**Figure 2 - Rudder pedal identification**

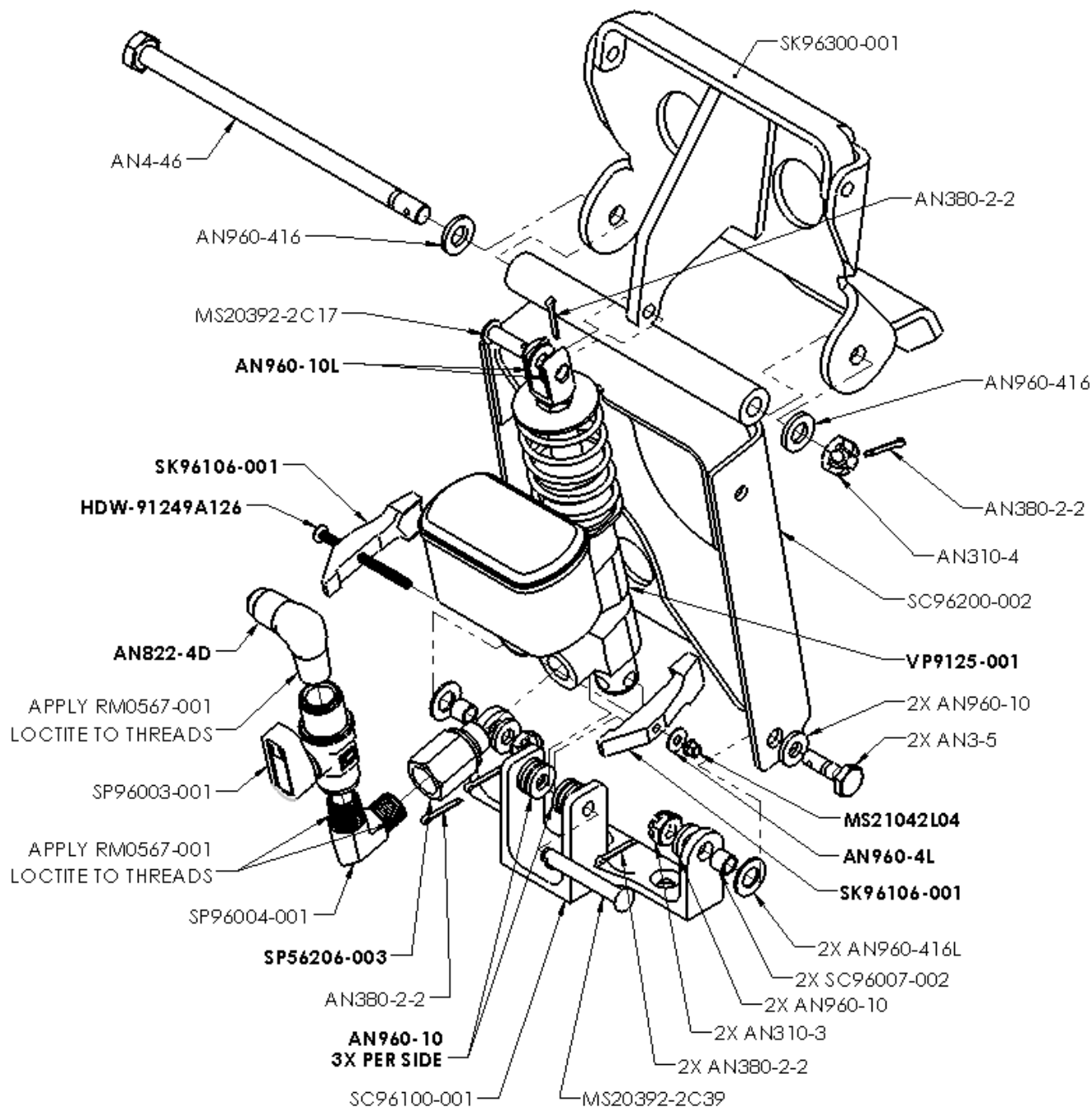
7. Locate the Beringer master cylinder and adjust rod end as necessary, such that the hole-to-hole distance is 5.29". Tighten the jam nut to preserve this height. Do this for both Beringer cylinders.



**Figure 3 - Cylinder adjustment**

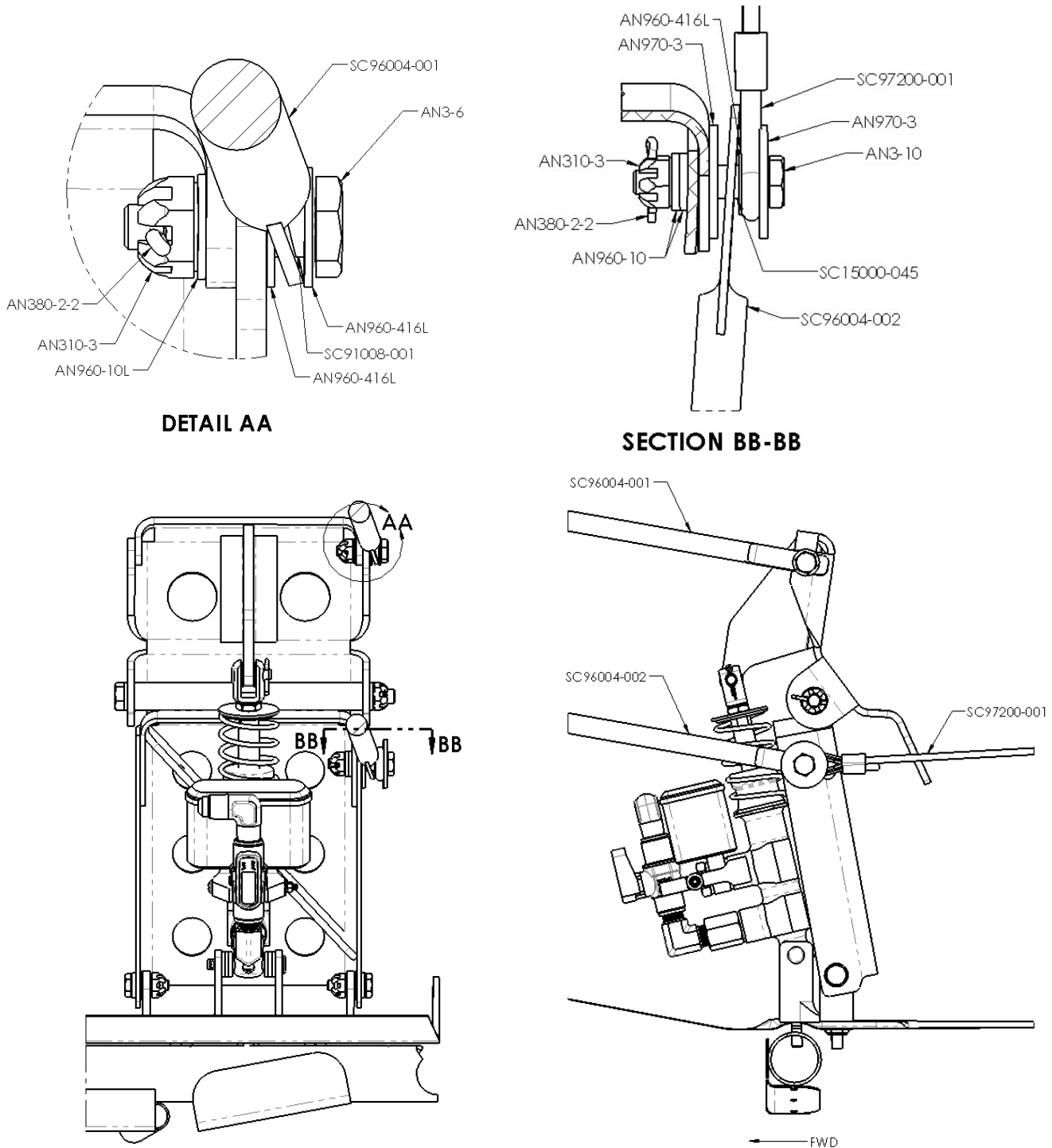
8. Remove the existing master cylinder and install the Beringer cylinder in accordance with Figure 4. Components with bold text are new to this installation. Components not in bold should already be present and may be re-used (cotter pins should be replaced if removed).

Figure 4 shows the installation of the left rudder/brake assembly. Mirror this installation on the right hand side.



**Figure 4 - Aft rudder/brake pedal assembly**

9. The attachment of pedal rods (SC96004-001 & SC96004-002) and rudder cable assembly (SC97200-001) is unchanged from the previous installation. Reference Figure 5 as necessary.

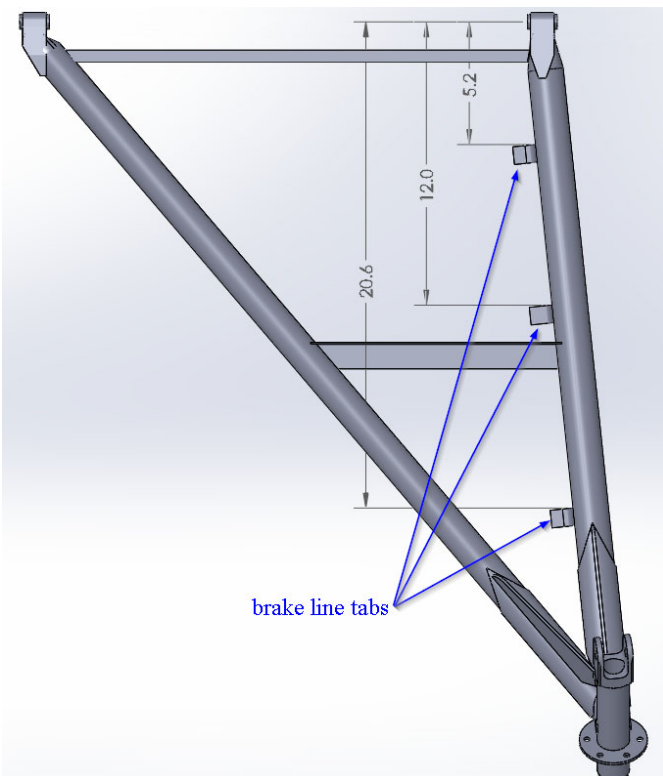


**Figure 5 - Aft pedal installation**

10. Verify the type of existing brake line. Beringer brakes are intended to be installed with a nylon or Teflon hose with a braided stainless steel sheath. If you have bare nylon polyflow tubing, it is recommended that this be replaced. For aircraft with braided stainless lines already, jump to step 21, otherwise proceed to the following steps.

11. There are 3 tabs welded to the aft side of the forward gear leg tube. These tabs serve to secure the brake line. Spread the tabs apart to allow the brake line to be pulled through easily.

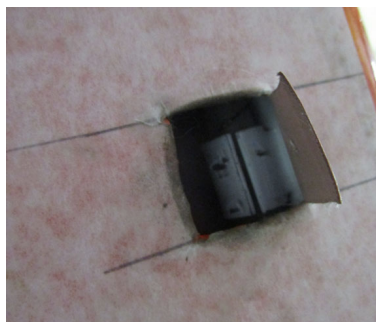
If you have covered gear, cut access flaps on the inboard side of the gear at each tab location. Spread the brake line tabs apart once accessible.



**Figure 6 – Tab locations**

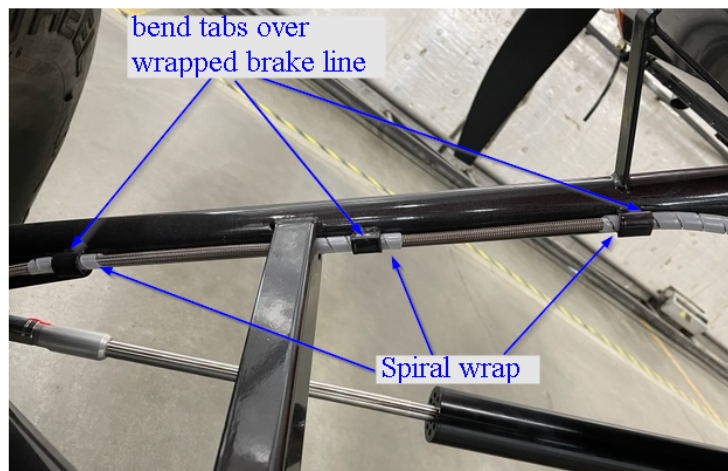


**Figure 7 – Access flaps in fabric**



**Figure 8 - Access flap detail**

12. Tape a long section of safety wire or string (at least 6 feet) to the end of the brake line that was attached to the master cylinder inside the fuselage.
13. From the lower end of the brake line, gently pull the line out through the bottom of the gear leg. Stop when a few inches of the safety wire are through.
14. Remove the polyflow tubing from the safety wire and discard.
15. PC40101-001 is the replacement brake line. This is a braided hydraulic line with a fitting pre-installed on one end. Secure the “non-fitting” end of the hydraulic line to the end of the safety wire by the master cylinder.
16. At the other end of the safety wire, begin pulling the brake line through fuselage and gear leg. This may require some back and forth between pushing and pulling from the ends and other access points. Getting the hydraulic line through the floorboard, the fuselage fabric, the gear leg fabric and each of the tabs in the gear leg will likely require special attention. Pull the line through until there is only enough remaining in the cabin for attachment to the master cylinder fittings.
17. At each tab location on the gear leg, wrap the braided hose with RM1004-001 spiral wrap.
18. Bend the tabs over the braided brake line.



**Figure 9 - Brake line tabs**

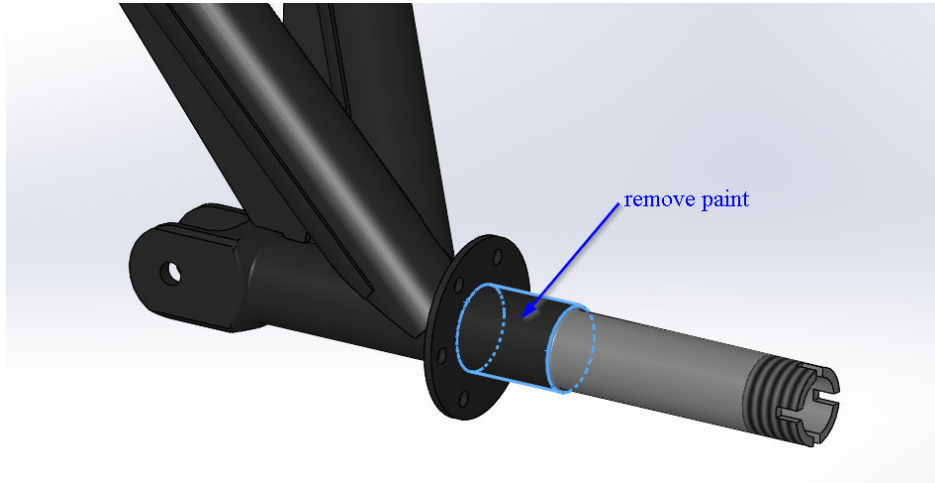
19. If your landing gear is covered, patch over the access flaps with adhesive backed vinyl or fabric patches adhered with Loctite 330.
20. The remaining steps will describe the wheel change on the left side of the aircraft. Once completed, the process can be repeated for the right side.
21. In accordance with your maintenance manual, raise the left side of the aircraft until the tire is no longer in contact with the ground.

Make sure your aircraft is secure before proceeding to next steps

22. Remove the left wheel and brake assembly.
23. For guidance when installing the tires on to your new Beringer wheels, reference the Beringer Maintenance Working Card MM-02-002 (available on the Beringer website).

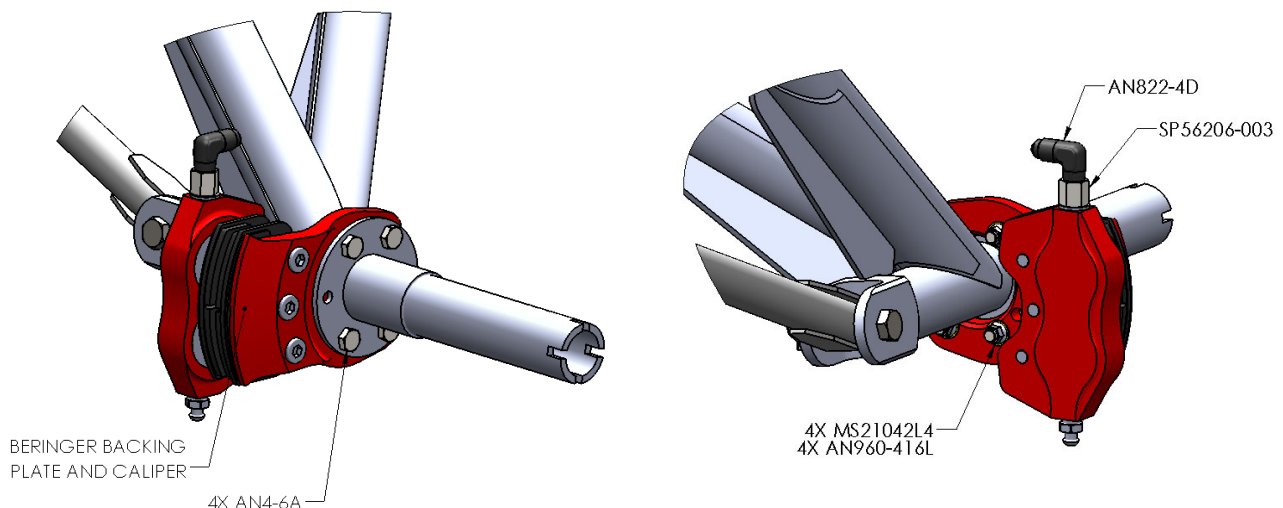


24. The Beringer wheel assembly slides onto the axle further than other wheel assemblies. For this reason, some paint must be removed from the axle in the area just outboard of the brake flange. Remove the paint with sandpaper (220 grit or finer) and/or paint stripper.



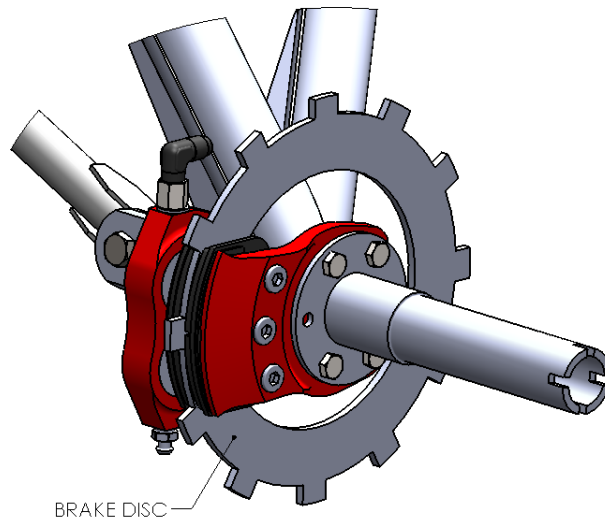
**Figure 10 - Paint removal from axle**

25. Install Beringer backing plate and caliper onto the brake flange as shown in Figure 11. Note that the backing plate of the brake is on the inboard side of the brake flange and the caliper is oriented towards the front of the aircraft.
26. Install the adapter fitting (SP56206-003) and elbow (AN822-4D) in the top port of brake. Use RM0567-001 Loctite thread sealant on threads of the AN822-4D fitting that goes into SP56206-003. Orient the elbow to point aft.



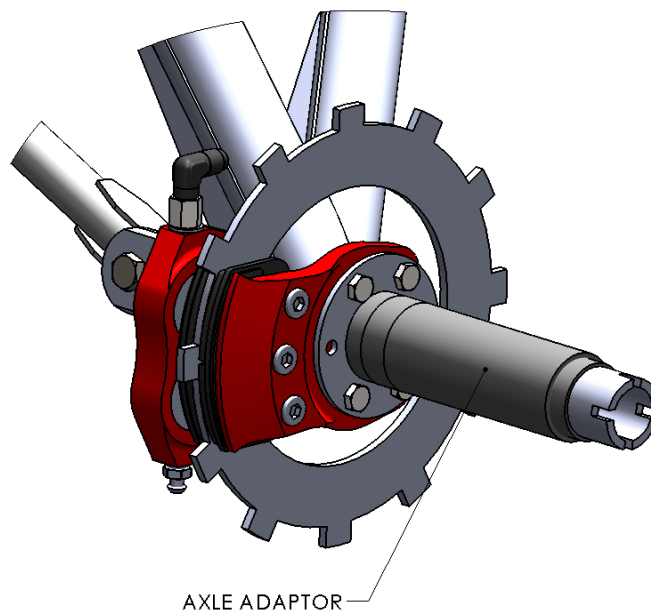
**Figure 11 - Caliper mounting**

27. Install the brake disc between the brake pads as shown in Figure 12. Unlike what is shown in the figure, the disc will likely drop down and rest on the gear leg axle. This is OK, as the disc will be repositioned when the wheel is installed.



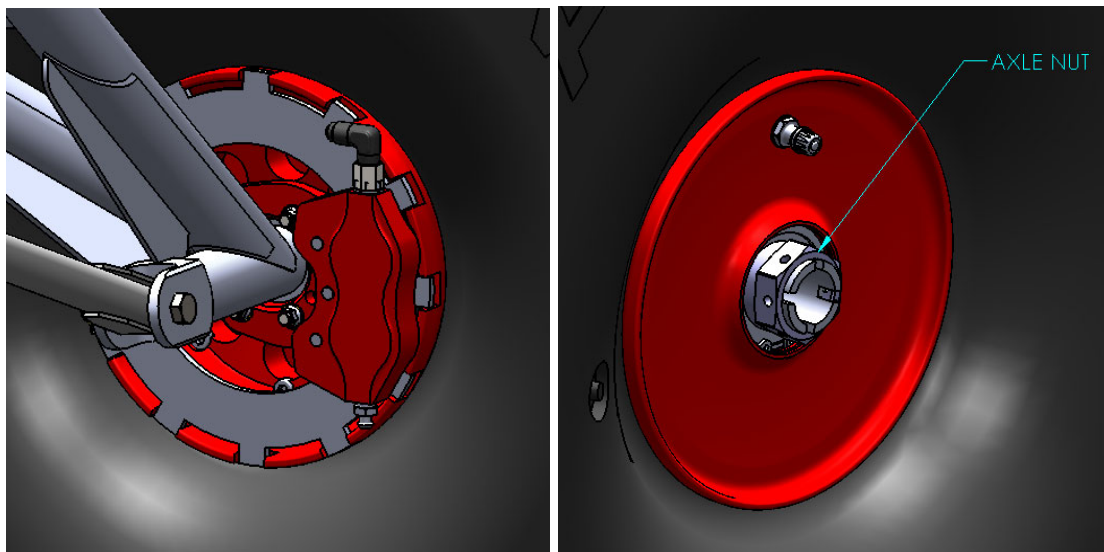
**Figure 12 - Brake disc install**

28. Slide the axle adaptor over the gear leg axle as shown in Figure 13. It's acceptable if the axle adaptor is already installed in the wheel assembly. If this is the case, it may stay in the wheel and the whole assembly can be installed together.



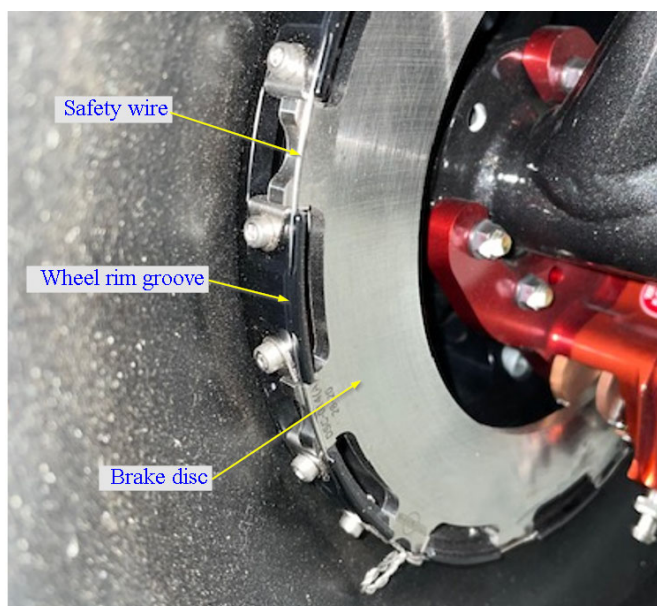
**Figure 13 - Axle adaptor installation**

29. Slide the assembled Beringer wheel (with tire) onto the axle. Adjust the brake disc to align the ears with the ones on the rim. Install the Beringer axle nut onto the axle. The axle nut should be hand tightened and then tightened further to the next alignment between the hole in the nut and the castellations in the axle. Safety the axle nut with cotter pin.



**Figure 14 - Wheel installation**

30. The inboard edge of the rim has a groove that runs along the outside of the ears. Use .041 safety wire (MS20995C41) inside the groove to retain the brake disc. The wire should not be so tight that it puts pressure on the ears but should be taut enough to ensure that it cannot come out of the groove. Twist the ends of the wire and trim excess. Bend over the twisted section to keep the cut ends pointed away from the tire.



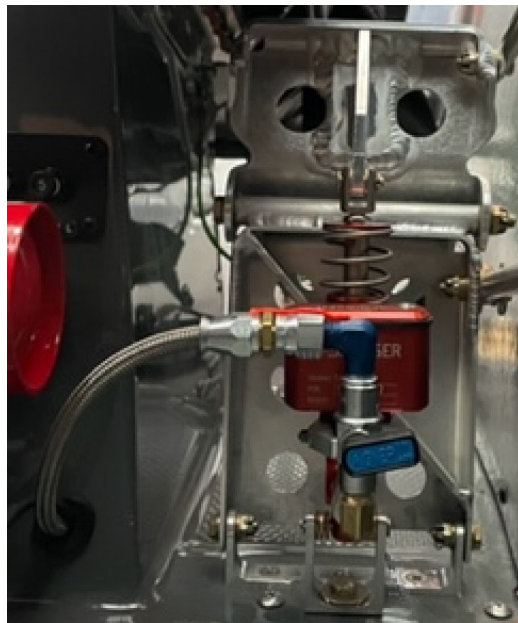
**Figure 15 - Safety wire for brake disc**

31. Connect the brake line to the brake. Reference Appendix A if you need to install a VP1101-001 hose fitting on the end of the hydraulic line.



**Figure 16 - Completed brake installation**

32. Connect the brake line to the master cylinder as shown in Figure 17.



**Figure 17 - Completed pedal installation**

33. Lower the aircraft to allow the left tire to contact the floor and bear the weight of the plane. Replace the right wheel following the same steps used to replace the left wheel (steps 21 - 32).



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34. With both main gear tires on the floor, and chocks in place, fill the brake system with Mil-H-5606 or Mil-PRF-87257 hydraulic oil. Bleed system carefully, ensuring no air is left in the brake lines. Top off reservoir, making sure that it is at least  $\frac{3}{4}$  full.

CAUTION: Care must be taken to avoid getting hydraulic oil on the brake disc, brake pads, or tires. Oil on the brake pads will necessitate their immediate replacement.

35. Apply heavy pressure to brake pedals and verify there are no leaks.
36. Lower the tail off of the sawhorse or stand.
37. Condition brakes in accordance with Beringer Maintenance working card MM-01-002 (available on Beringer website). After conditioning, check to verify there are no leaks.
38. Make a logbook entry stating the Beringer wheels, brakes, and master cylinders have been installed in accordance with SI0039 Rev NC.

If you are no longer in possession of this aircraft, please forward this information to the present owner/operator and notify Cub Crafters, Inc. Contact the customer service department at:

Cub Crafters, Inc.  
1918 S. 16<sup>th</sup> Avenue  
Yakima, WA 98903  
1-877-484-7865 or 1-509-248-9491  
[support@cubcrafters.com](mailto:support@cubcrafters.com)

Please include the aircraft registration number, serial number, current name, and address of the owner and/or operator.

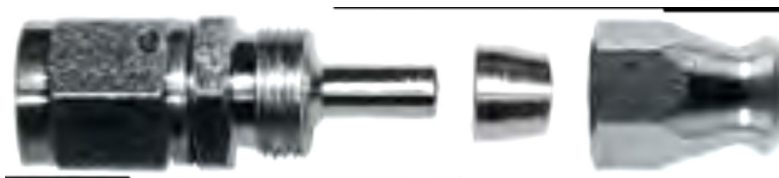
Appendix A – Brake Line Assembly

1. Using a fine tooth saw blade or cut off wheel, cut hose to the required length. Clean any loose debris from both the cut ends and inside the hose.



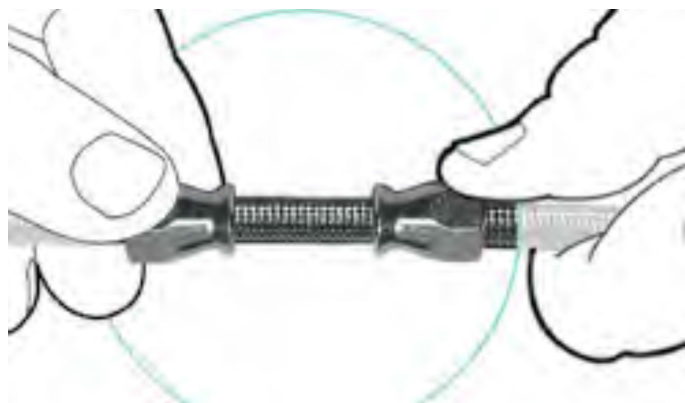
**Figure 18 – Hose End**

2. Carefully cut through abrasion cover 1" from hose end and remove, ensuring that stainless steel overbraid remains undamaged.
3. Main fitting body – Olive – Socket. On a clean, flat surface, disassemble the fitting. This consists of 3 parts, the Main fitting body, Olive, and Socket.



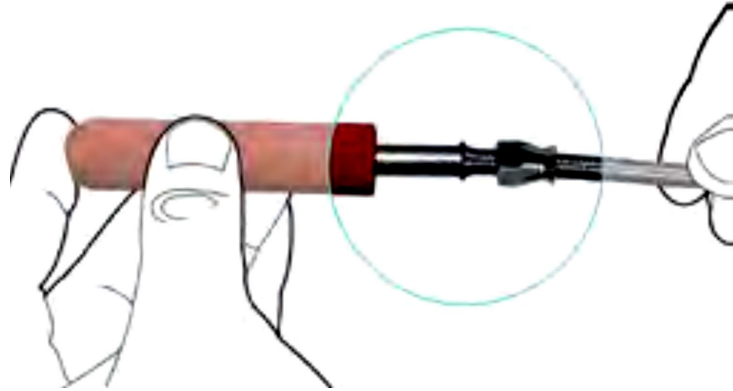
**Figure 19 - Main fitting body - Olive – Socket**

4. Push the socket over the overbraid.



**Figure 20 – Socket**

5. Using an appropriately sized mandrel, flare out the end of the stainless steel overbraid from the PTFE inner tube.



**Figure 21 - Flare Overbraid**

6. Push an Olive onto the end of the PTFE inner tube under the stainless steel overbraid by hand and finish off by pushing against a flat, solid surface, making sure the PTFE tube end is flush with end face of Olive.



**Figure 22 - Seating of Olive**

7. Holding the main fitting body firmly, lubricate the thread and push the hose over the nipple end and start to thread the socket onto the fitting by hand.



**Figure 23 - Fitting Assembly**

8. Finish tightening the socket onto the fitting with a good quality wrench until the socket is one full turn from the main fitting hex.



**Figure 24 - Finished Fitting End**

UNDER NO CIRCUMSTANCES SHOULD THE SOCKET BE LOOSENED IN AN ATTEMPT TO ADJUST THE ALIGNMENT AFTER ASSEMBLY.