TECHNICAL SERVICE BULLETIN: 104750-000 Beechcraft Series 36 Autopilot Servo Update, Rev A

Original Bulletin: September 5, 2023
This Document Supersedes: 104686-000 Beechcraft Series 36 Yaw Servo Cable Misalignment

PLEASE READ THIS BULLETIN IN ITS ENTIRETY BEFORE CONTACTING DYNON AVIONICS

Description

This technical service bulletin includes details for implementing two related fixes. Implementing these fixes at the same time is recommended, as both require accessing and removing several of the same parts. This bulletin identifies the specific tasks and parts required for each fix, as some aircraft may have already been updated with the Yaw Servo Cable Misalignment Fix (see below).

Yaw Servo Cable Misalignment Fix

Dynon has received reports of Beechcraft Series 36 aircraft where the yaw servo bridle cable on one side of the capstan is misaligned by a few degrees (see Figure 1). Over time, this misalignment could lead to wear on the capstan's grooves. This bulletin details the fix (see Figure 1) for the misalignment.

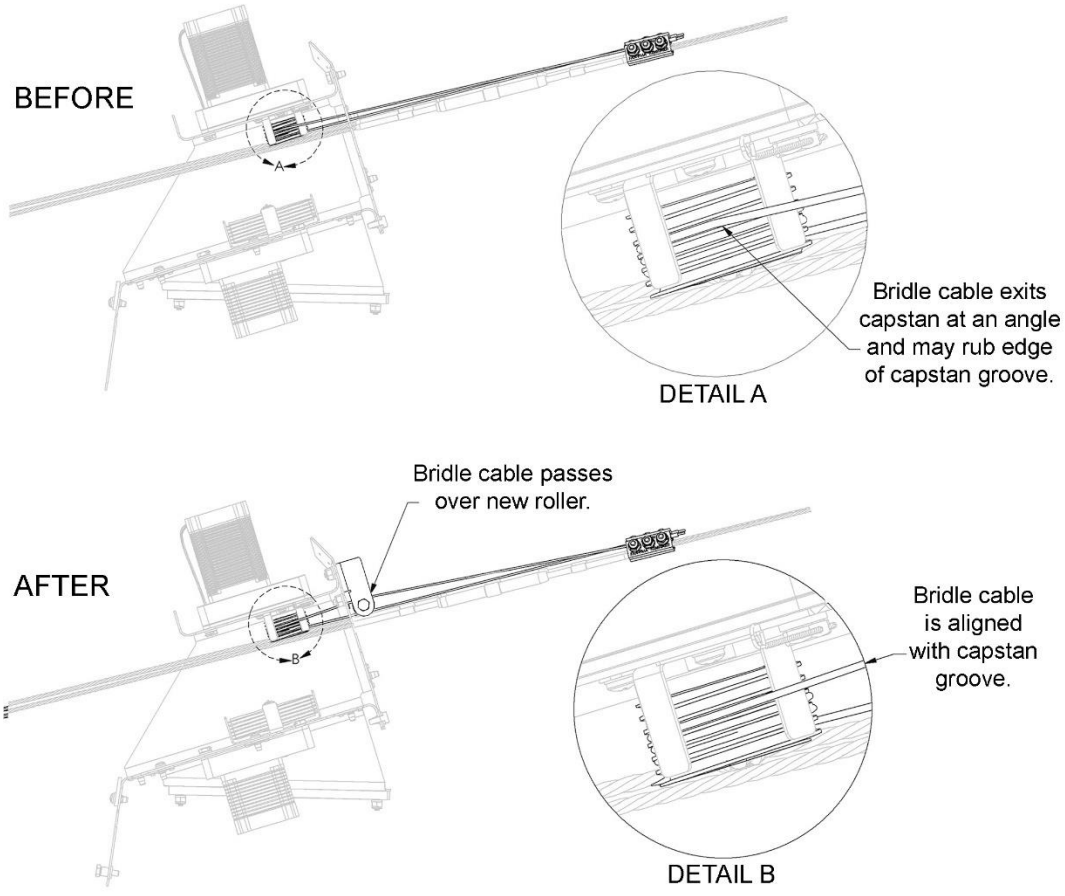

Figure 1: Before/After Implementing the Yaw Servo Cable Misalignment Fix

Bracket Assembly Brace Attachment Fix

Dynon learned that existing pitch/yaw servo bracketry installations in Beechcraft Series 36 aircraft may introduce higher loads into aircraft structure at bulkhead FS207 than originally calculated. However, Dynon has received no reports of failure or damage in this area occurring in the field. This bulletin details a fix (see Figure 2) to prevent any potential issues in this area.

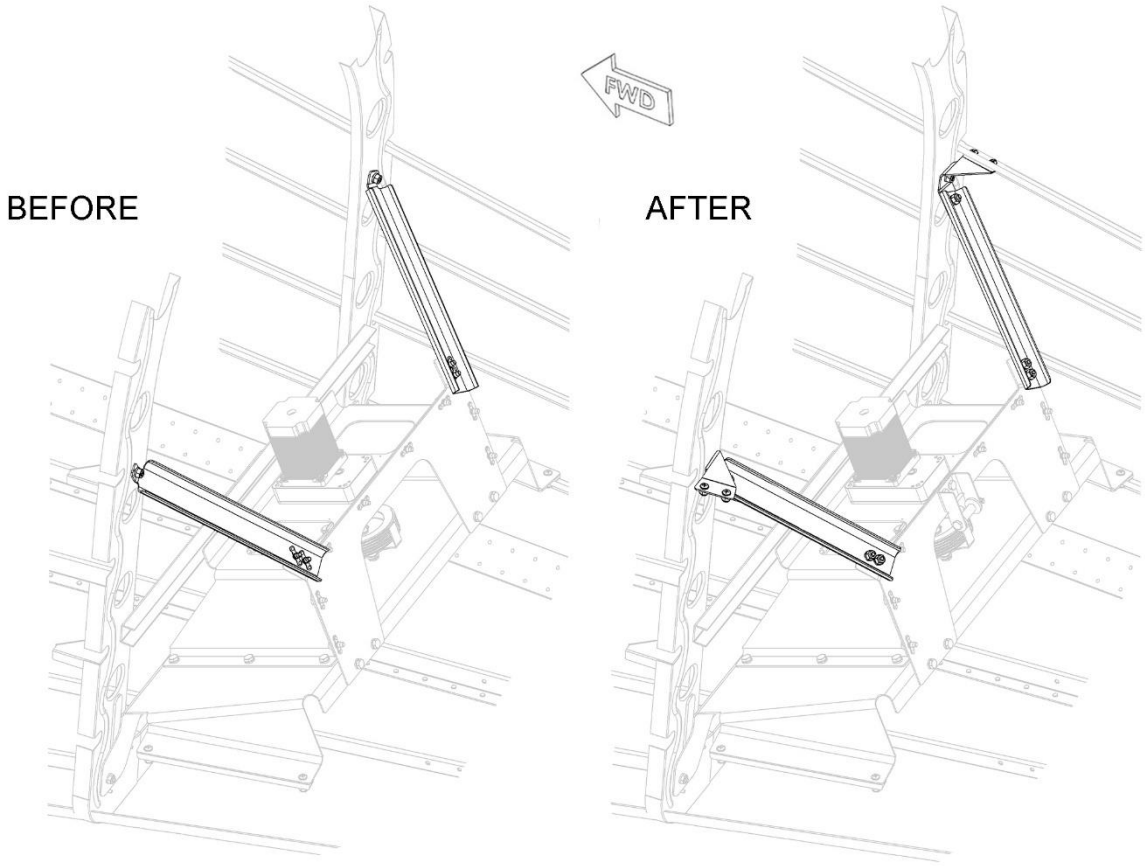

Figure 2: Before/After Implementing Bracket Assembly Brace Attachment Fix

Applicability and Affected Equipment

This bulletin affects the following certified aircraft models.

- Certified Bonanza 36, A36, A36TC, B36TC models with autopilot servo installations.

Required Actions

Inspect before next flight, and if no issues are observed, perform the work in accordance with this service bulletin within the next 25 flight hours. To request Dynon-provided kits, fill out and submit the following form: Beechcraft Series 36 Service Bulletin Request Form.

This action must be performed by an appropriately-rated certified mechanic and must be entered into the aircraft records showing compliance with this service bulletin in accordance with 14 CFR 43.9(a) and the instructions in this service bulletin. The record must be maintained as required by 14 CFR 91.417.

1. Disconnect aircraft power.
2. Access pitch/yaw servo installation by removing the access panel located behind baggage area in accordance with manufacturer's service manual.

3. If implementing only the *Bracket Assembly Brace Attachment Fix*, unfasten and remove existing bracket assembly braces (see Figure 4), and then skip to Steps 21-22.

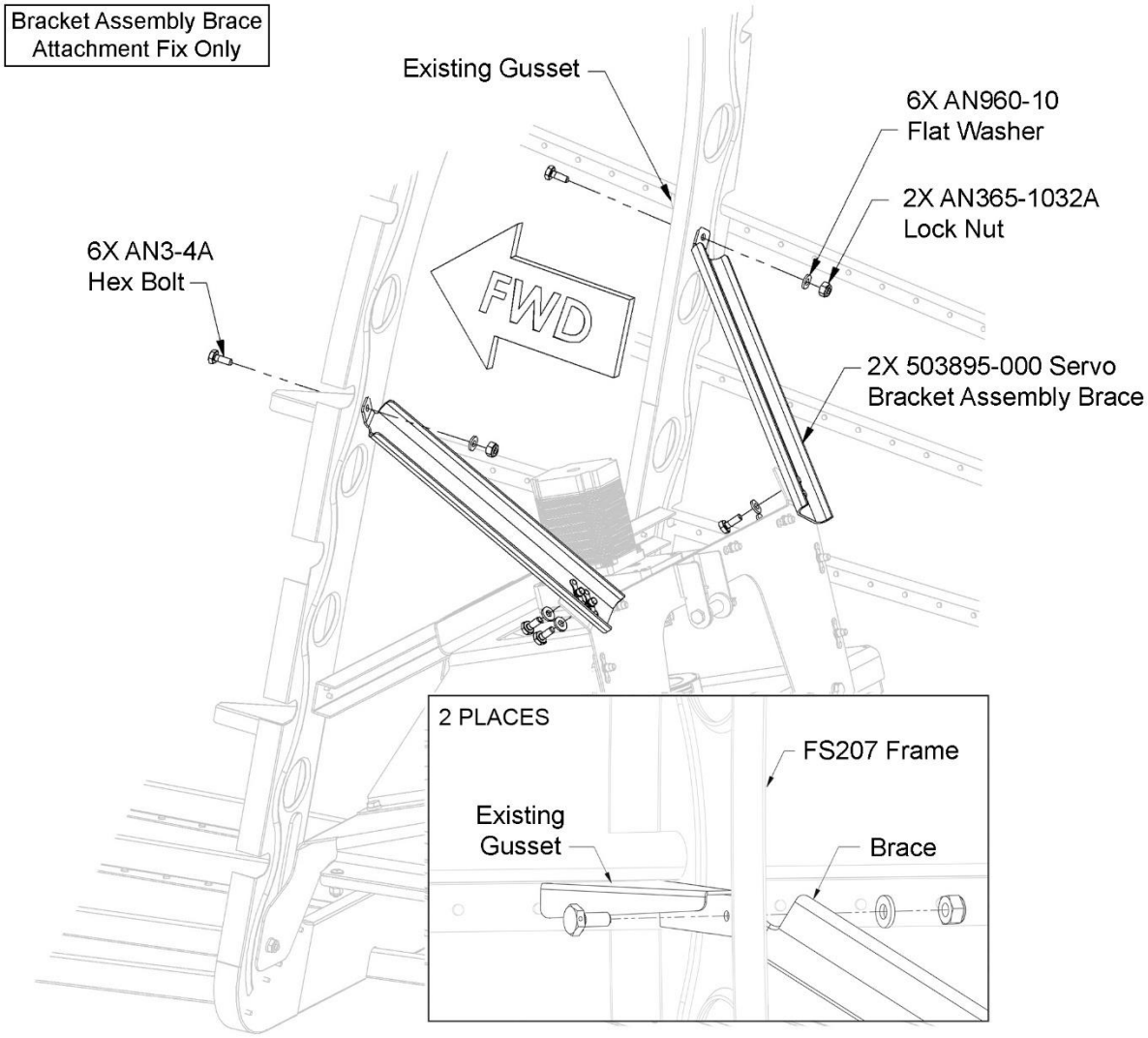

Figure 3: Unfastening Bracket Assembly Braces

4. If implementing both fixes, disconnect wire harness connector from the yaw servo, and then complete the remaining steps.

5. Unfasten bracket assembly braces, bridge bracket, and boxing plate, as shown in Figure 4. Keep bracket assembly hardware for re-installation.

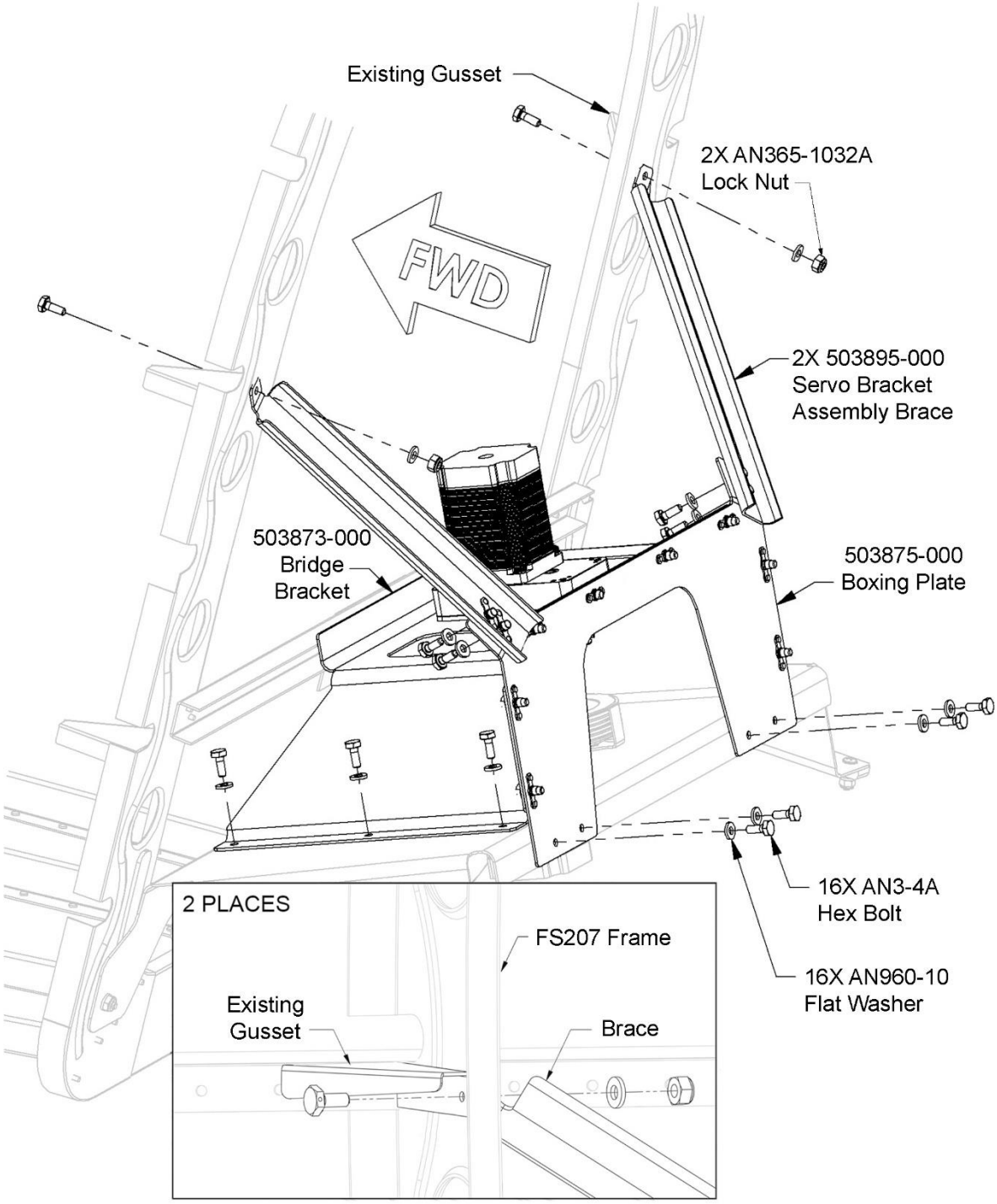

Figure 4: Unfastening Bracket Assembly Braces, Bridge Bracket, and /Boxing Plate.

6. Loosen, but do not remove, cable clamps to disconnect bridle cable from the rudder control cables.
7. Remove bracket assembly, with yaw servo attached, from aircraft.

8. Remove bridle cable and capstan from the yaw servo (see Figure 5). *DO NOT loosen or remove the shear screw from the servo disc!*

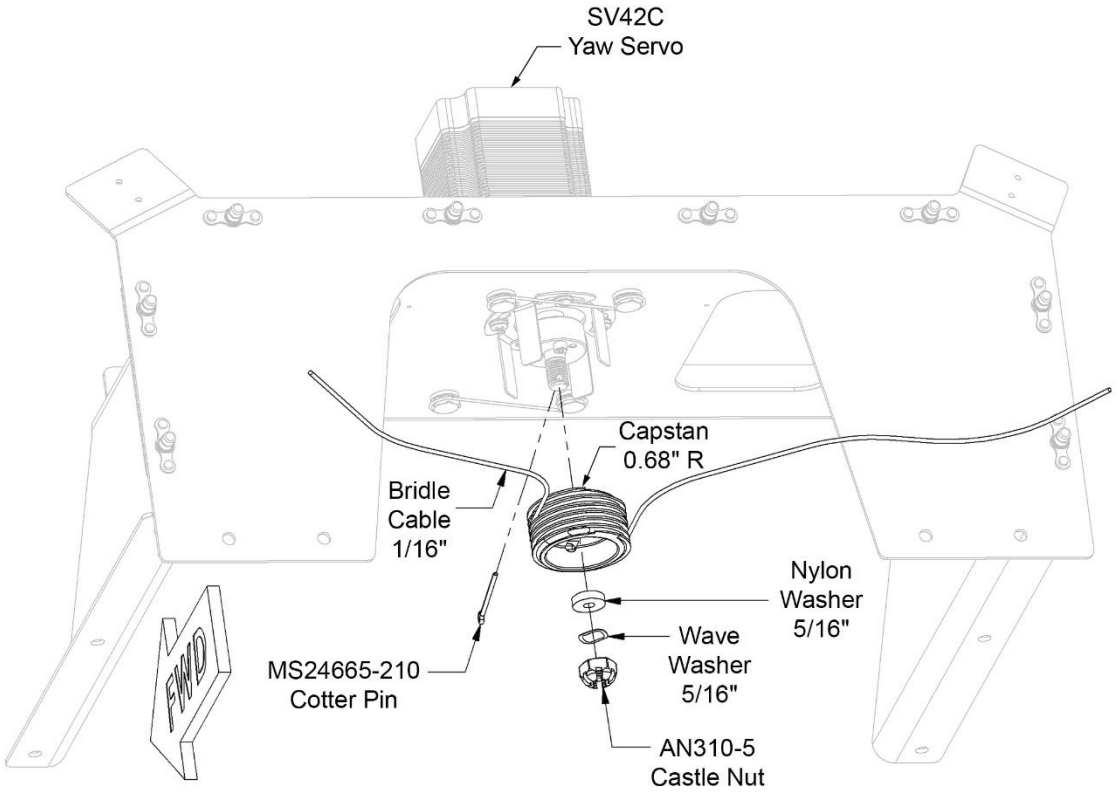

Figure 5: Removing Bridle Cable and Capstan from Yaw Servo

9. On a workbench, separate boxing plate from bridge bracket, and then drill out rivets and remove nutplate and hardware, as shown in Figure 6.

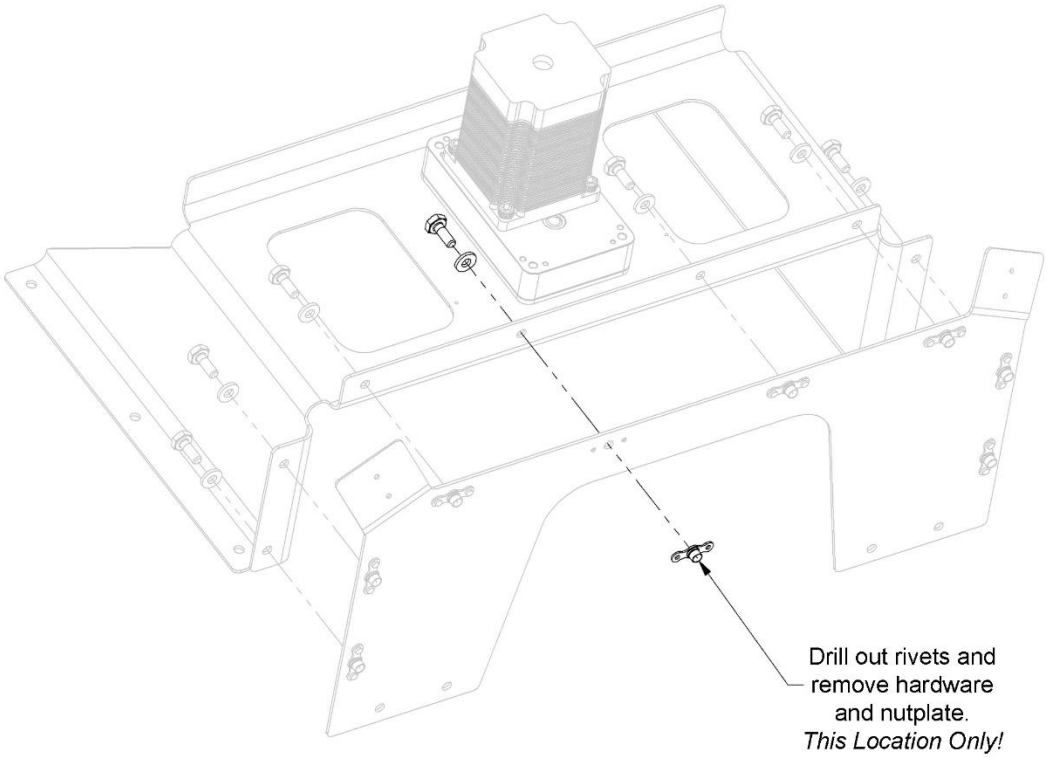

Figure 6: Removing Nutplate from Boxing Plate

10. Re-attach boxing plate to bridge bracket. Torque fasteners per specifications in AC 43.13-1B, Table 7-1.
11. Position and clamp roller bracket in place, as shown Figure 7, and then drill holes through the brackets (see Figure 7).

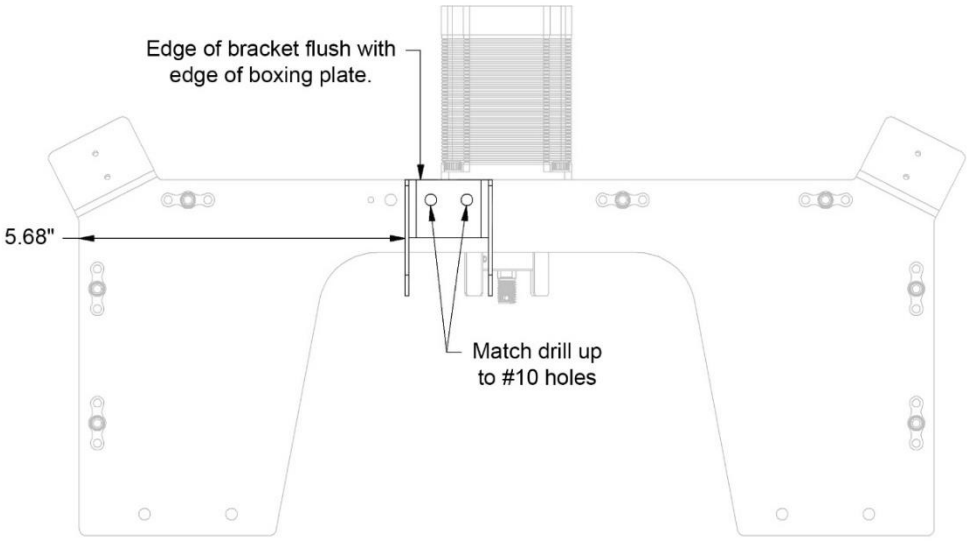

Figure 7: Positioning and Drilling Holes in Brackets

12. Attach roller bracket to bracket assembly, as shown in Figure 8.

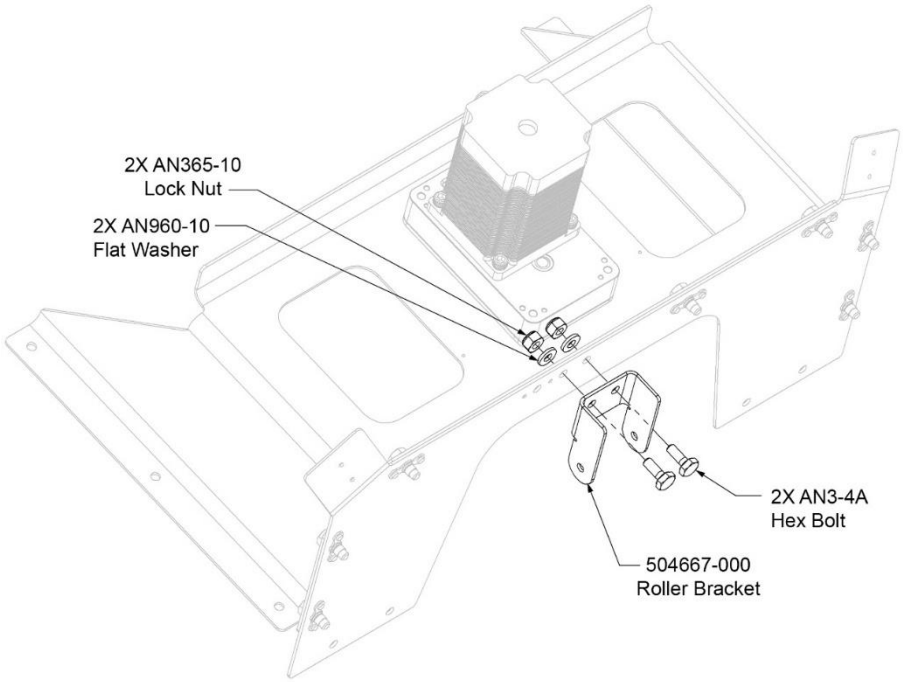

Figure 8: Attaching Roller Bracket to Bracket Assembly

13. Install roller, as shown in Figure 9.

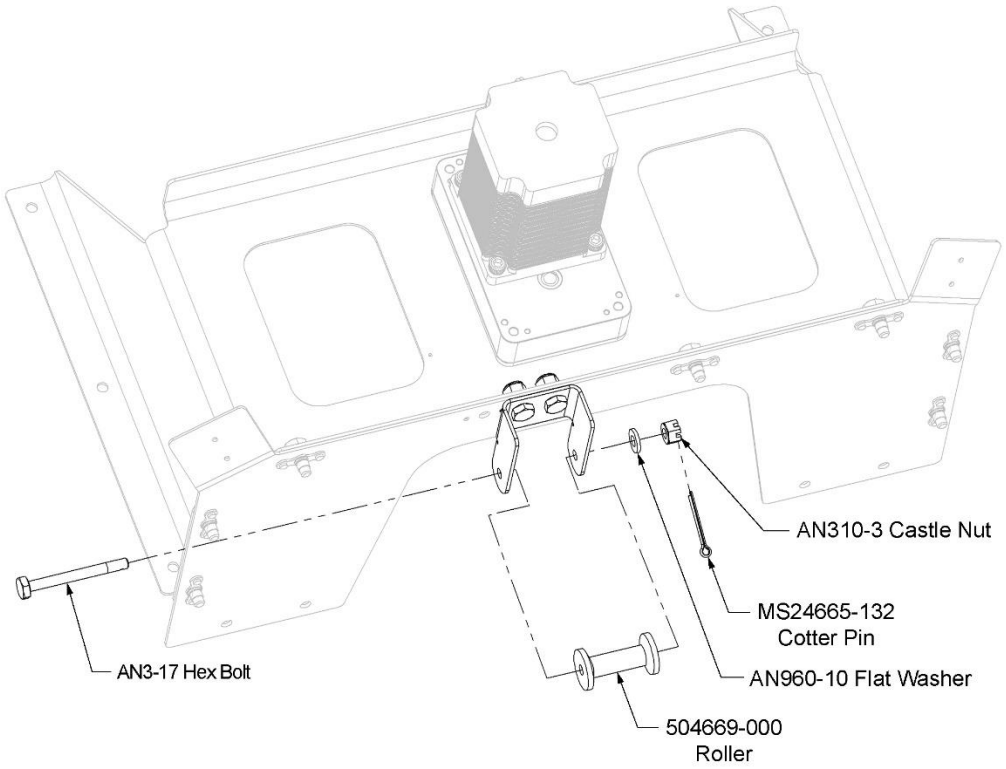

Figure 9: Installing Roller

14. Finger-tighten castle nut onto roller bolt, and then use a wrench to tighten until a slot in castle nut lines up with hole for cotter pin. *DO NOT overtighten the castle nut!*
15. Verify that roller moves freely and use a feeler gauge to ensure a gap between roller and bracket of at least 0.005". *An overtightened castle nut may prevent the roller from moving freely!*

16. Insert swage pin on new bridle cable into new capstan's engagement hole (see Figure 10).
17. Starting from engagement hole, wrap one end of bridle cable clockwise 1-1/4 times around capstan, and then wrap other end of bridle cable counterclockwise 1-1/4 times around capstan (see Figure 10).
18. Secure (e.g., tape) bridle cable to capstan grooves to prevent unraveling.
19. Temporarily attach capstan to the yaw servo (see Figure 10). *Do not fully tighten castle nut or insert cotter pin yet.*

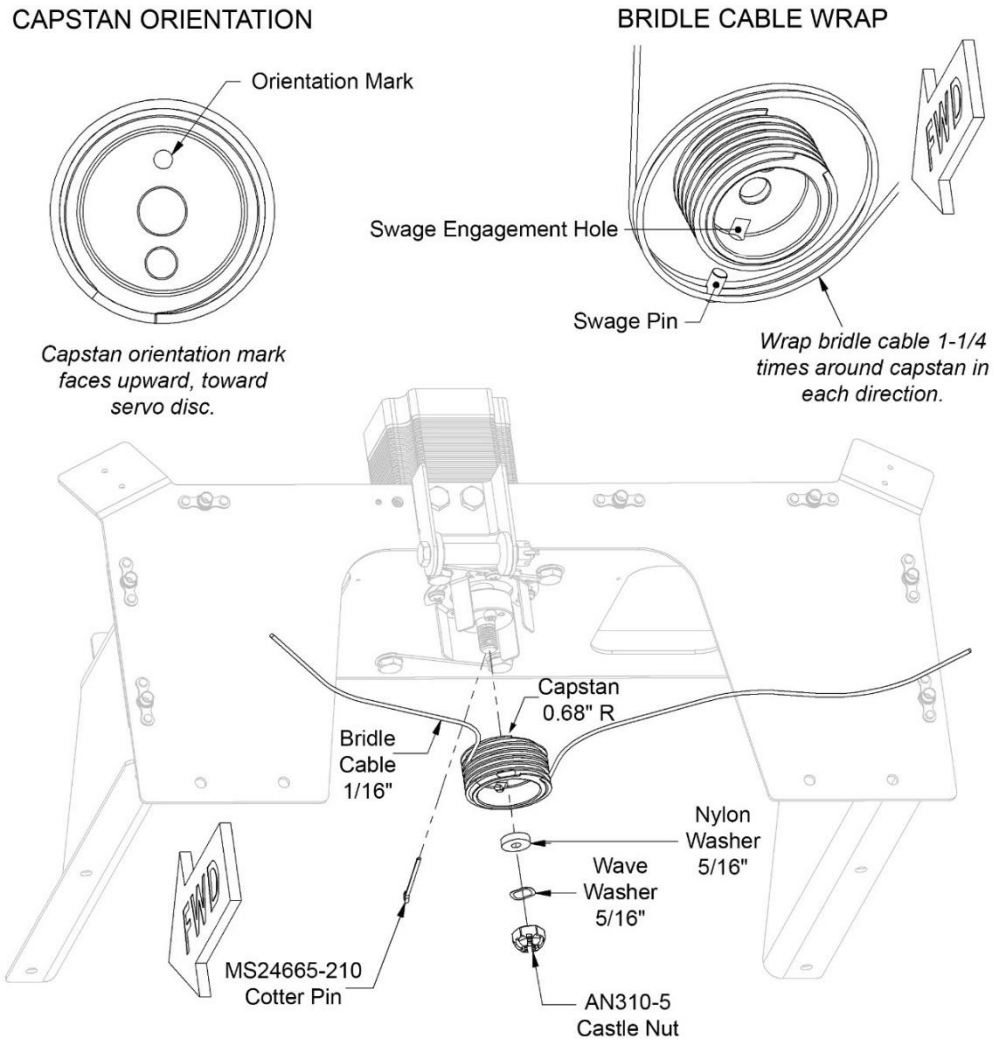

Figure 10: Attaching Capstan with Bridle Cable to Yaw Servo

20. Ensure capstan is positioned so:
    - It is fully seated on servo disc.
    - The orientation mark faces servo disc.
    - The swage engagement hole points forward.
    - The shear screw head is within its hole on the capstan.

21. Using provided templates, mark centerlines on gussets and stringers, as shown in Figure 11.

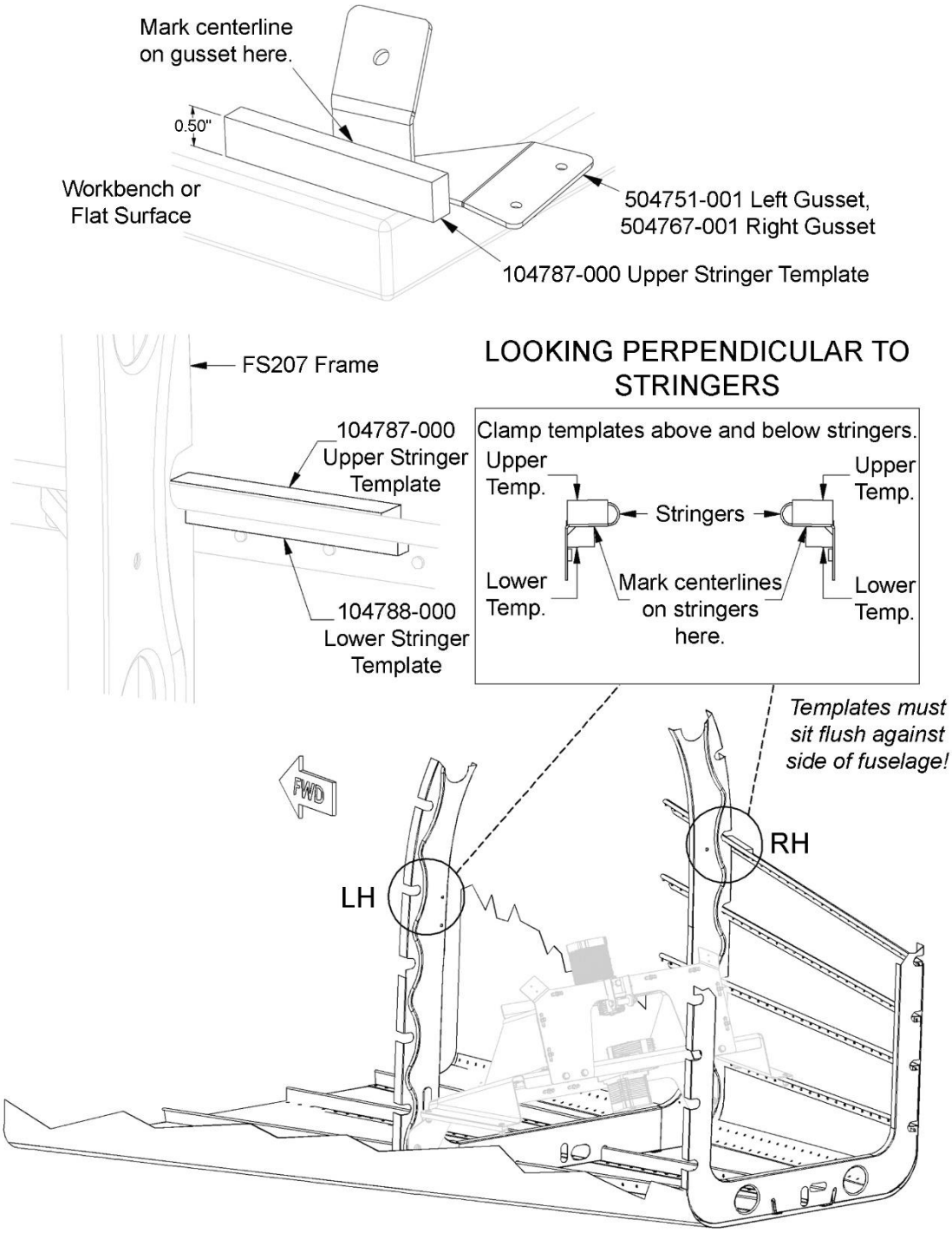

Figure 11: Marking Centerlines on Gussets and Stingers

22. Temporarily fasten gussets to stringers, as shown in Figure 12.

The upper stringer template is disposable and may be drilled through when match drilling stringer

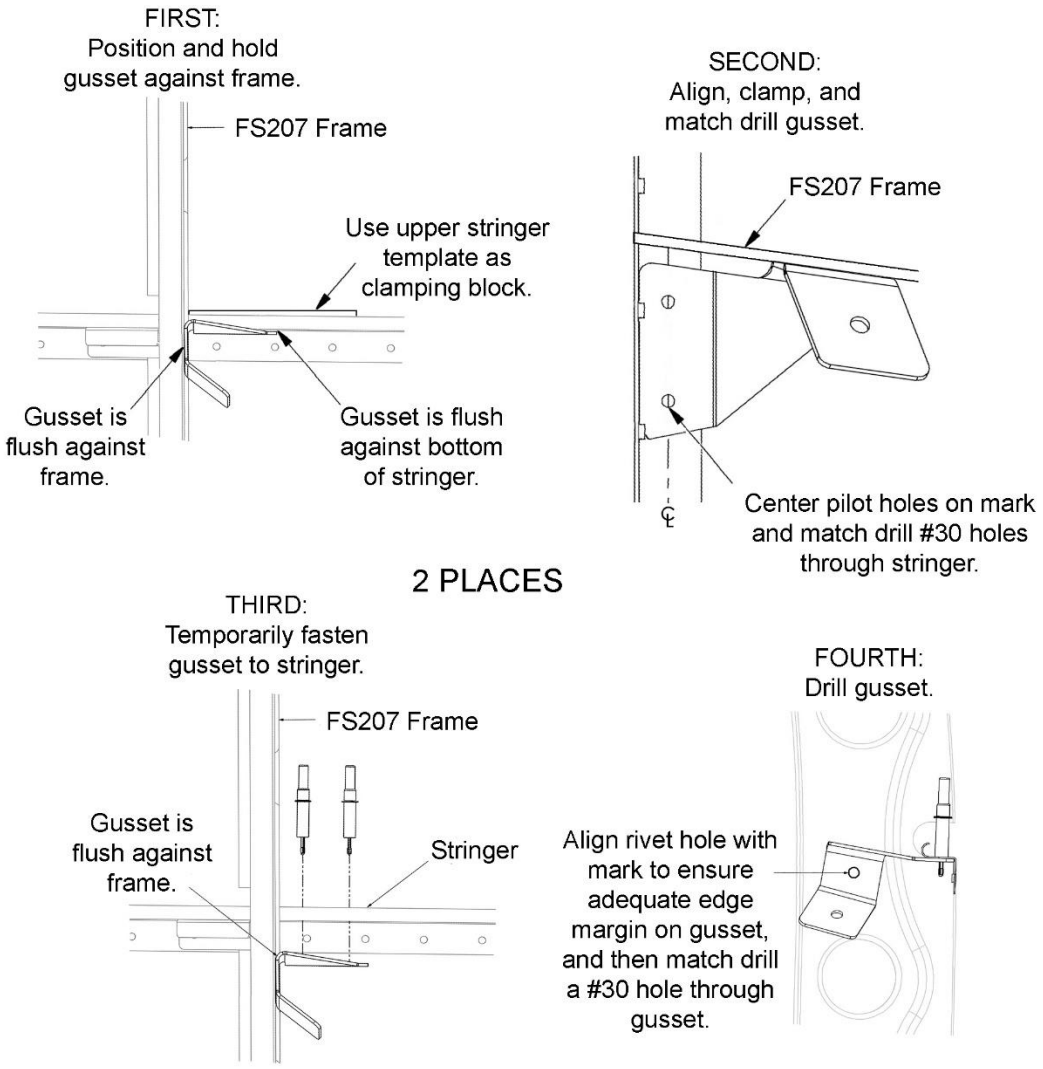

Figure 12: Temporarily Fastening Gussets to Stringers

23. Attach gussets to FS207 frame (see Figure 13), and then remove temporary fasteners and attach gussets to stringers. Do not fully tighten hardware yet.

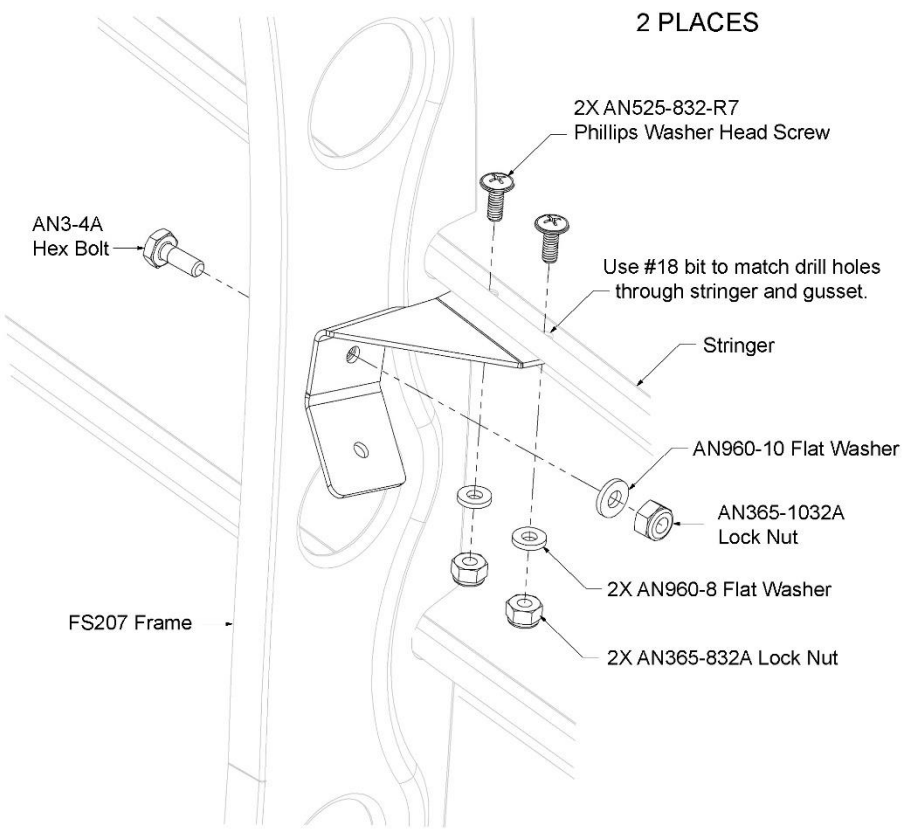

Figure 13: Attaching Gussets to Frame and Stringers (Right Side Shown)

24. If implementing only the FS207 Frame Attachment Fix, attach new bracket assembly braces to gussets and boxing plate, as shown in Figure 14, and then skip to Step 44. Torque fasteners per specifications in AC 43.13-1B, Table 7-1.

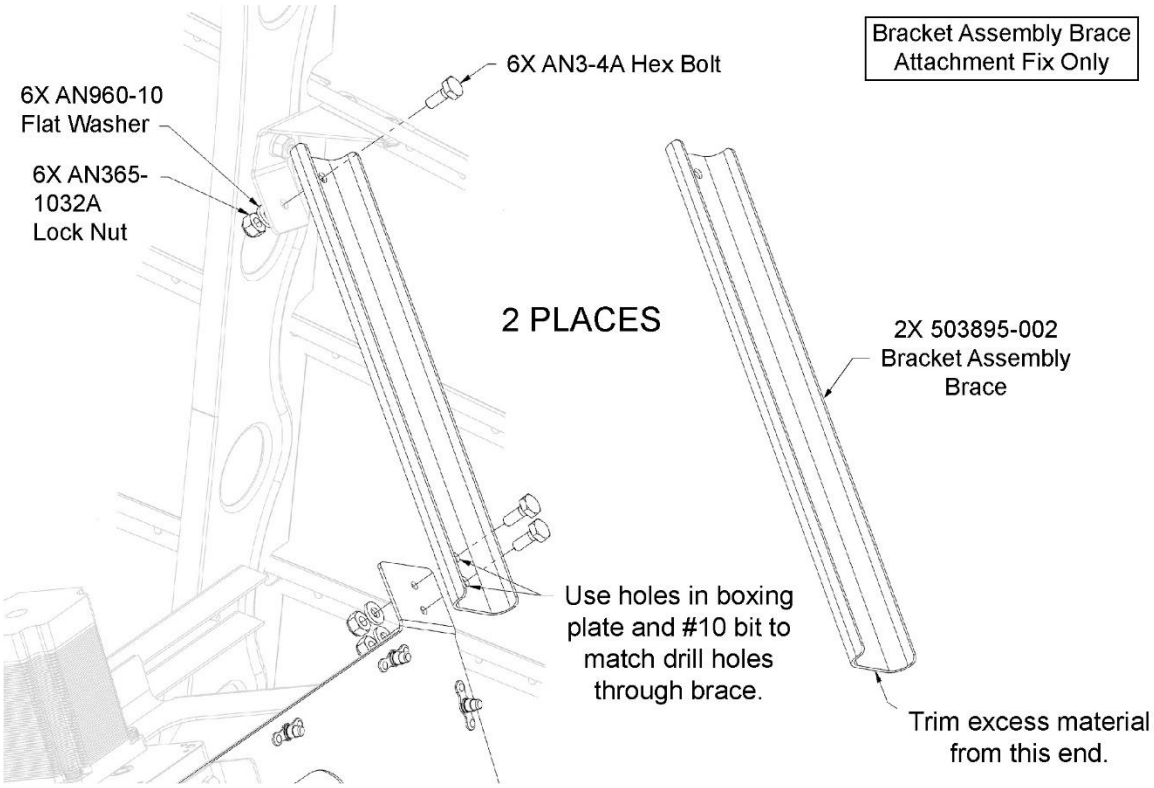

Figure 14: Installing New Bracket Assembly Braces

25. If implementing both fixes, install bracket assembly with yaw servo and attach new bracket assembly braces to gussets and boxing plate, as shown in Figure 15, and then complete the remaining steps. Torque fasteners per specifications in AC 43.13-1B, Table 7-1.

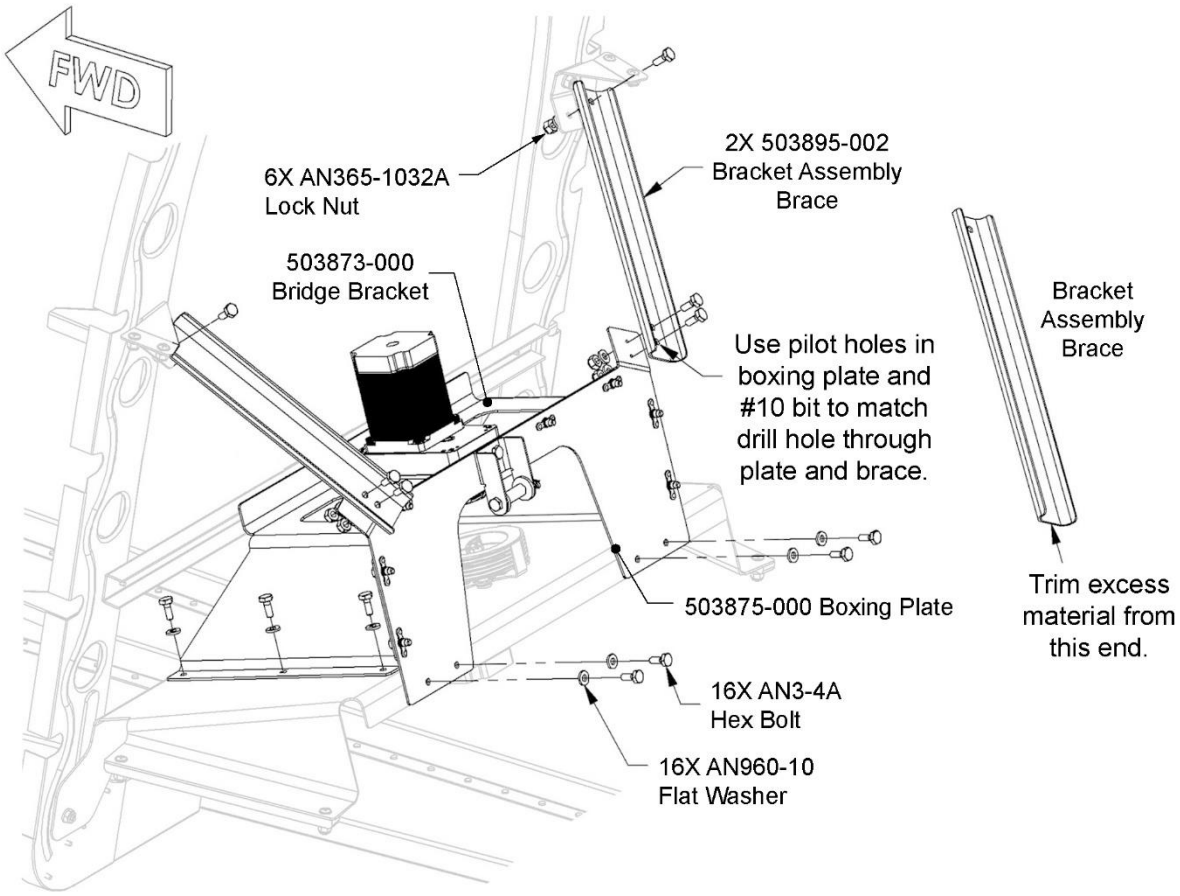

Figure 15: Re-installing Bracket Assembly and New Bracket Assembly Braces

26. Secure rudder in neutral position.

27. Connect bridle cable to rudder control cables with cable clamps (see Figure 16). Position bridle cable so it travels over (not under) the roller, as shown in Figure 16. *Do not fully tighten fasteners.*
28. Position bridle cable clamps as shown in Figure 16 and ensure they do not contact any structures.
29. Mark locations for swage stops on bridle cable at outside edges of cable clamps.
30. Remove bridle cable from cable clamps.
31. Slide a swage stop onto one end of bridle cable so it is aligned with mark.
32. Permanently attach swage stop to bridle cable, and then trim bridle cable end flush with outside edge of swage stop. Repeat on the other end of bridle cable.
33. Re-connect bridle cable to rudder control cables with cable clamps (see Figure 16). *Do not fully tighten fasteners.*

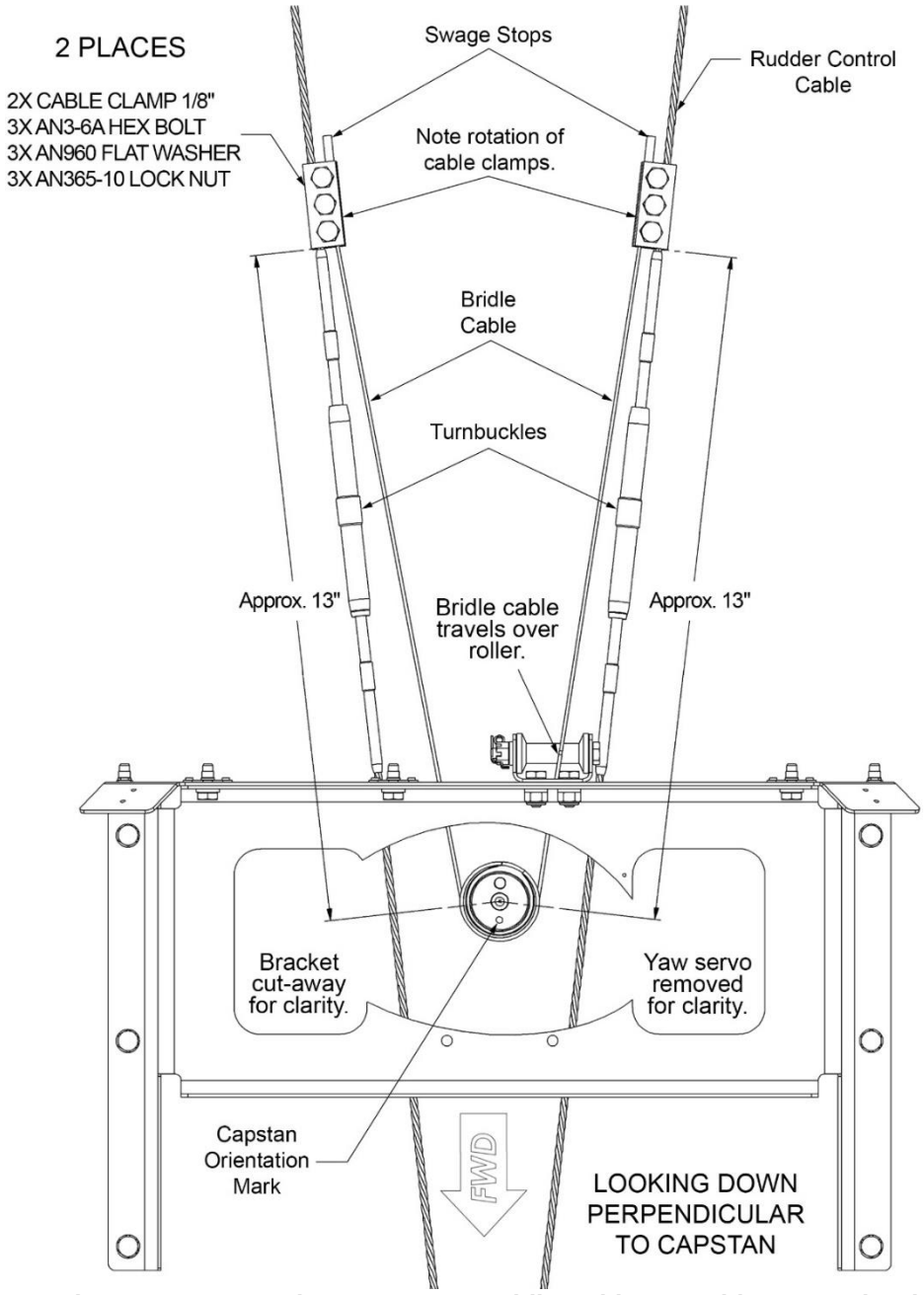

Figure 16: Connecting Yaw Servo Bridle Cable to Rudder Control Cable

34. Ensure bridle cable does not contact cable guard. *Note that the bridle cable will prematurely wear if it contacts the cable guard throughout its travel.*
35. If bridle cable contacts cable guard, adjust cable guard position:
    a) Remove capstan from yaw servo (see Figure 5).
    b) Remove screws and washers that secure capstan guard to servo.
    c) Rotate capstan guard to correct position.
    d) Secure capstan guard to servo with screws and washers.
    e) Re-attach capstan to servo (see Figure 10). *Do not fully tighten castle nut or insert cotter pin yet.*
    f) Ensure capstan is positioned so:
        - It is fully seated on servo disc.
        - The orientation mark faces servo disc.
        - The swage engagement hole points forward.
        - The shear screw head is within its hole on the capstan.
36. Tension and temporarily secure bridle cable to 15–20 lbs, while ensuring the swage engagement hole continues to point forward. *Note that the tension on bridle cable should never exceed the manufacturer's specified tension for the control cable.*
37. When satisfied with bridle cable tension and capstan position, tighten all bridle cable clamp nuts to 35-40 in-lb.
38. Use a feeler gauge to measure gaps between bridle cable clamp halves (top and bottom).
39. Ensure gap measurements on both sides of clamp are not less than 0.003" and not more than 0.050". *Note that out-of-specification bridle cable clamps can slip under load.*
40. If gap measurements do not meet criteria above, measure diameter of control cable, and then contact Dynon Technical Support at dynoncertified.com/contact for a resolution.
41. Use a wrench to permanently tighten castle nut onto yaw servo shaft and secure with cotter pin. *Do not overtighten castle nut! Tightening the castle nut beyond 4 in-lbs may prevent the capstan from rotating freely in event of shear screw failure.*
42. Release rudder.
43. Move rudder control through full range of motion per manufacturer's maintenance instructions, and verify the following:
    - Control is smooth throughout (i.e., no grinding, rubbing, or roughness).
    - Bridle cable clamps do not contact any structures during entire travel.
    - Capstan never rotates more than 150 degrees in either direction from neutral.
44. Cycle the control several times, return it to neutral, and verify the following:
    - Position of bridle cable clamps closely matches Figure 16.
    - Capstan orientation mark is positioned, as shown in Figure 16.
    - Bridle cable tension has not changed.
45. Report compliance of this service bulletin to Dynon Certified Technical Support at dynoncertified.com/contact.

Material Information

The Bonanza 36 Yaw Servo Roller Kit (P/N 504654-000) includes the following parts and hardware:

P/N	QTY	DESCRIPTION
504667-000	1	Yaw Servo Roller Bracket
504669-000	1	Yaw Servo Roller
AN3-17	1	Hex Bolt #10-32 x 2" Drilled Shank
AN3-4A	2	Hex Bolt #10-32 x 1/2"
AN310-3	1	Castle Nut #10-32
MS24665-210	1	Cotter Pin 5/64" x 3/4"
MS24665-132	1	Cotter Pin 1/16" x 1/2"
AN960-10	3	Flat Washer #10
AN365-1032A	2	Lock Nut #10-32
103892-000	1	Servo Capstan 0.68" R
101113-000	1	Bridle Cable 1/16"
101670-000	2	ST2-2 Stop Swage, 1/16" Cable

The Bonanza 36 Pitch/Yaw Bracket Assembly Brace Kit (P/N 504764-000) includes the following parts and hardware:

P/N	QTY	DESCRIPTION
503895-002	2	Pitch/Yaw Servo Bracket Assembly Brace
504751-001	1	Pitch/Yaw Bracket Assembly Gusset, Left
504767-001	1	Pitch/Yaw Bracket Assembly Gusset, Right
104787-000	1	Stringer Template, Upper
104788-000	1	Stringer Template, Lower
AN3-4A	8	Hex Bolt #10-32 x 1/2"
AN960-10	8	Flat Washer #10
AN365-1032A	8	Lock Nut #10-32
AN525-832-R7	4	Phillips Wash Head Screw #8-32 x 7/16"
AN960-8	4	Flat Washer #8
AN365-832A	4	Lock Nut #8-32

Time in Effect

This technical service bulletin is in effect indefinitely.

Additional Questions?

Contact Dynon Certified Technical Support at dynoncertified.com/contact.