



**SERVICE MANUAL
SUPPLEMENT
FOR RAM WINGLET INST'L**

**MODEL
421C
GOLDEN EAGLE**

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LIST OF SECTIONS

Section

- | | |
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| 1 | General Information |
| 2 | Inspection and Servicing |
| 3 | Airframe |
| 13 | Electrical Systems |
| 15 | Structural Repair |

INTRODUCTION

I. FOREWARD

- A. This Service Manual Supplement is intended to be a supplement to the existing Cessna Service Manual for Cessna 421C aircraft.
- B. Only aircraft that are equipped with RAM Winglet Assembly are covered by this Supplement.
- C. This Supplement Manual is divided into 5 sections. The section numbers correspond to the section numbers of existing Cessna Service Manual.
- D. Only the sections that are noted in this Manual have had changes and/or additions, all other sections remain unchanged.
- E. For list of parts shown in this Manual see RAM Parts Catalog Supplement No. 1124.
- F. This Supplement Service Manual covers the following airplanes modified by RAM Aircraft Modifications, Inc.

<u>MODEL</u>	<u>SERIAL NUMBERS</u>	<u>STC NO.</u>
421C	421C0001 and on	SA5811SW

Section 1

Specification Changes:

A. Airplane weight

(1.) Ramp weight	<u>7560</u>
(2.) Gross weight takeoff	<u>7560</u>
(3.) Landing weight - maximum	<u>7200</u>
(4.) Maximum zero fuel weight	<u>6533</u>

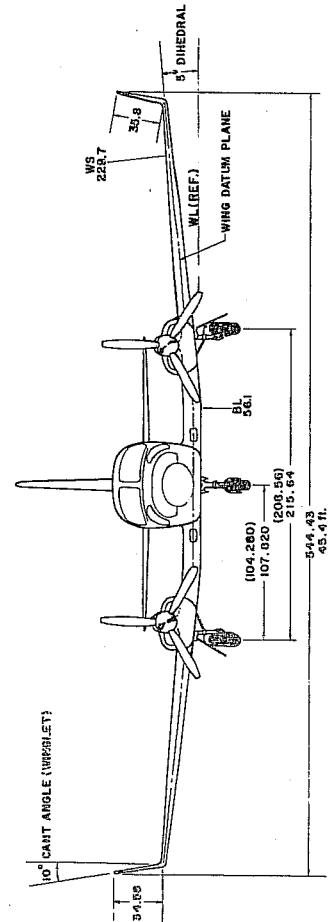
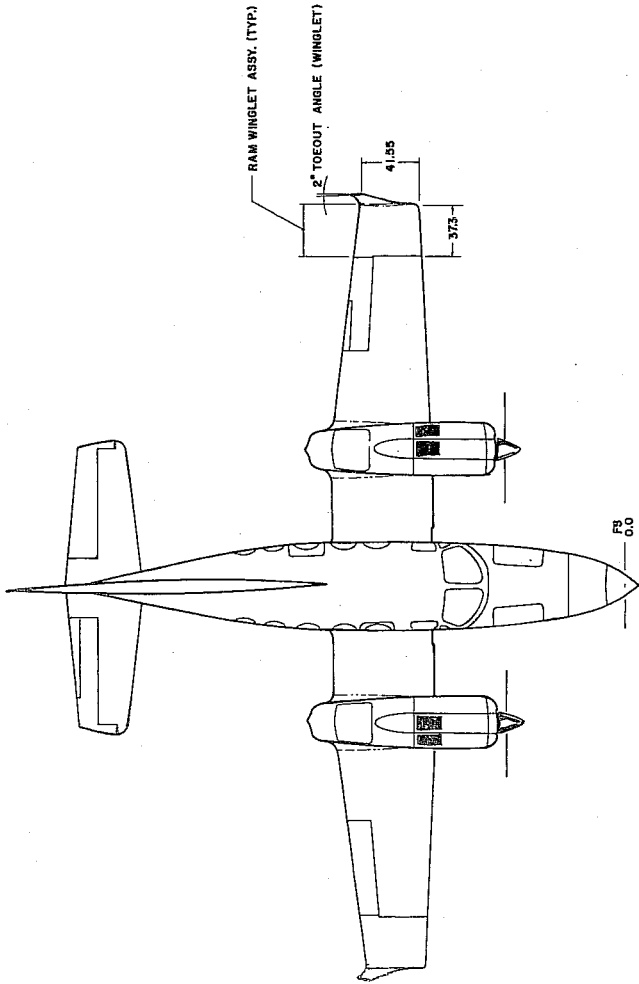
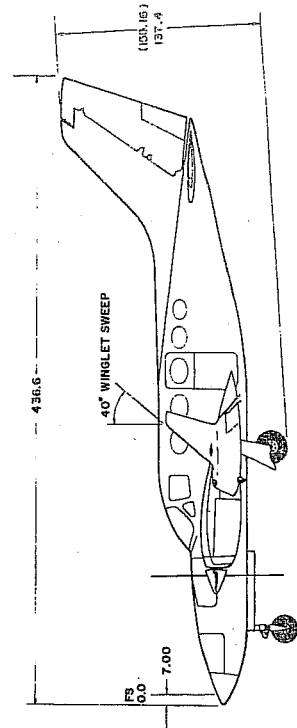
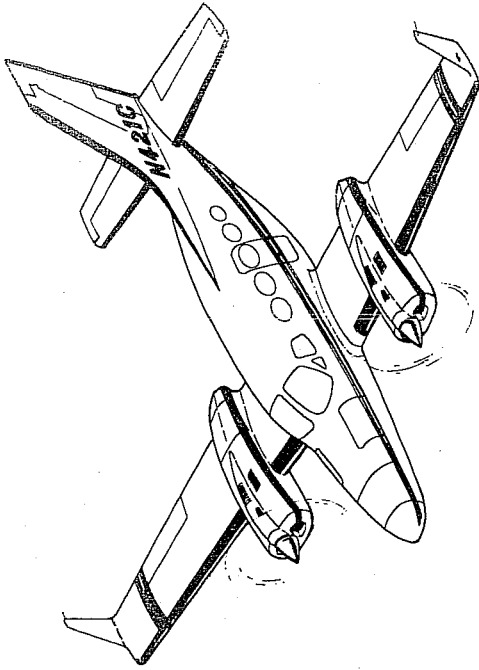
B. Airplane Dimensions:

- (1.) Wing span-overall approx. 544.43 inches

BOLT TORQUE SPECIFICATIONS

Winglet main spar bracket bolts (NAS 144-13)	90-100 in.-lbs.
Winglet main spar bolts (NAS 1004-16)	75- 85 in.-lbs.
Winglet rear spar bolts (NAS 1003-17)	20- 25 in.-lbs.

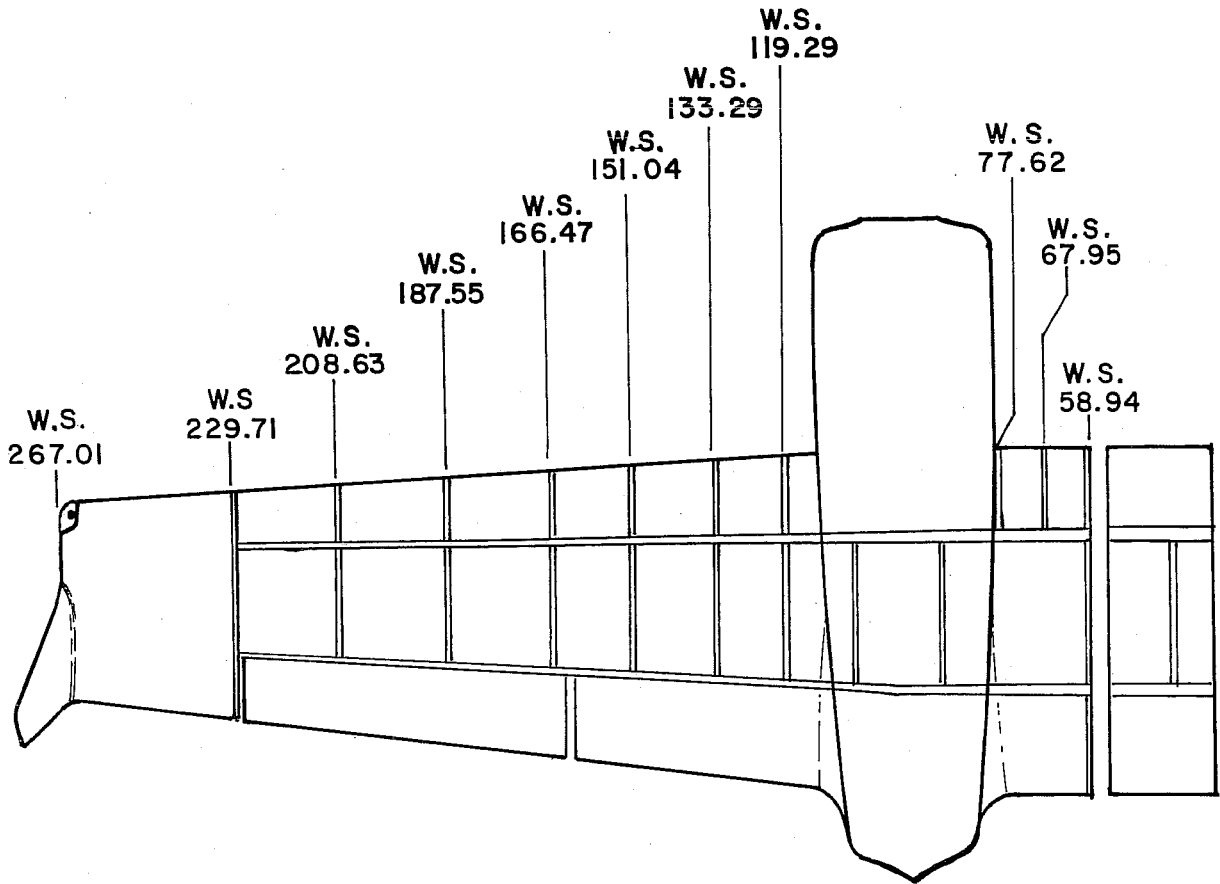
1 2 3 4 5 6 7 8 9



WINGLET MODIFIED 421C

DATE	1093
REV.	
DATE	8/1/65
BY	

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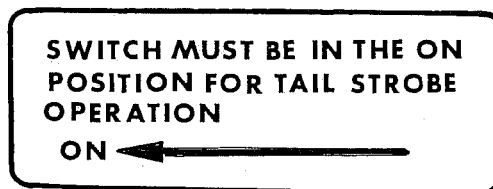


" WING RIB LOCATION "
STATION DIAGRAM

REQUIRED PLACARDS

RAM	AIRCRAFT, MODIFICATIONS INC. WACO, TEXAS
P/N	<input type="text"/>
S/N	<input type="text"/>
AIRCRAFT ELIGIBILITY	<input type="text"/>
DATE OF MANUFACTURE	<input type="text"/>
FAA PMA	

1040-30
WINGET DATA PLATE
LOCATED ON MAIN SPAR
AS VIEWED THRU. FWD
INSPECTION HOLE

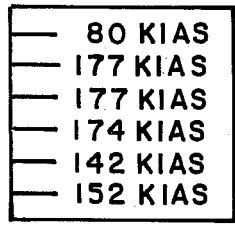


1041-11
TAIL STROBE PLACARD
LOCATED ON AFT BULKHEAD SUPPORT F.S. 289
SEE DWG. 1041 SHEET 2

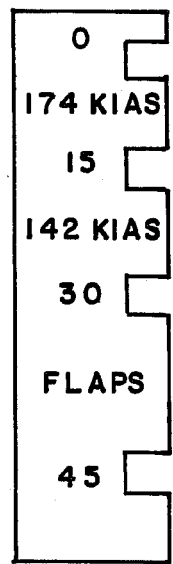
REQUIRED PLACARDS

**WARNING WITH VISIBLE ICE ACCUMULATION
ON THE AIRCRAFT DO NOT EXCEED 185 KIAS**

**1040 - 75
ICE ACCUMULATION PLACARD, LOCATED ON
INSTRUMENT PANEL**



**1088 - 89
OPERATIONAL LIMITS PLACARD
LOCATED ON THE LEFT FWD SIDE PANEL
OR
ON PILOT'S SUN VISOR**



**1088 - 90
FLAP PLACARD
LOCATED ON FLAP SELECTOR**

Section 2

PAINTING

The skin of the Winglet assembly is made of Divynycell foam sandwiched between glass and carbon cloth with epoxy resin.

A surfacer is applied to the fiberglass skin to provide a surface the polyurethane paint will adhere to.

Before painting, refer to Cessna Service Manual, Section 2, "Ground Handling, Servicing & Inspection", Topic: "Preparing Kevlar and Fiberglass Surface for Painting".

CAUTION: Never use any form of paint stripper on Winglet assembly.

PAINT RESTRICTIONS

- A. The Winglets should be painted only light colors, example: white, off-white or beige.
- B. Only paints that provide ultraviolet barrier protection should be used. See recommended paints.

RECOMMENDED SURFACER

U.S. Paint
Awl Grip
Base D8003/60W72
Hardener D-9001/60-Y-35

or

Koppers Co., Inc.
801 E. Lee
Irving, Texas 75060
Base P-900
Hardener Thinner C-916
Hardener C-918
Thinner T262

RECOMMENDED PAINT

U.S. Paint
Alumigrip Urethane
Base AA-92
Catalyst AA-92-C-39
Thinner T-732A

or

Sterling Paint
Base U-1000 Series
Catalyst U-1001
Thinner U-1275

Both of these paints provide ultraviolet barrier protection.

Section 2

INSPECTION

A. INSPECTION GUIDELINES:

1. Metal parts for: security of attachment, cracks, metal distortion, broken welds, corrosion and any other apparent damage.
2. Wiring for: security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration and corroded terminals.
3. Bolts in critical areas for: correct torque in accordance with torque values given in the chart in Section 1, when installed or when visual inspection indicates the need for a torque check.
4. Fiberglass for: cracks, delamination, deterioration, and any other apparent damage.

B. INSPECTION FREQUENCY

- | | |
|---|----------|
| 1. Wire bundles | 200 hrs. |
| 2. Winglet electric ground | 200 hrs. |
| 3. Fiberglass | 100 hrs. |
| 4. Spar fittings (ALL) | 100 hrs. |
| 5. Spar attaching bolts | * |
| 6. Front carry thru spar web
inspection per Cessna Service
Letter ME84-12 | 800 hrs. |

* Check torque first 100 hrs., then every 100 hrs. Thereafter check for security, looseness and working.

DO NOT TORQUE

NOTE: All spar fittings inspection frequency same as basic aircraft.

Section 3

REMOVAL & INSTALLATION OF WINGLET ASSEMBLY

A. REMOVAL

1. Ensure aircraft electrical power is turned OFF.
2. If airplane is equipped with wing de-ice boots, see Cessna Service Manual, Section 12, "Equipment and Furnishings", for de-ice boot removal.
3. Remove the three inspection access doors from bottom of Winglet.
4. Remove screws in skin securing Winglet to wing at w.s. 229.
5. Unplug electrical connection on aft side of rear spar.
6. Disconnect ground wire from end rib, w.s. 229.
7. Remove the two bolts that attach the rear spar.
8. Support Winglet assembly with padded supports to prevent damage to painted skins.
9. Remove the seven NAS 1004 bolts that attach the main spar.
10. While supporting the Winglet assembly, pull Winglet outboard.

B. INSTALLATION OF WINGLET ASSEMBLY

1. Position supported Winglet assembly to wing.
2. With Winglet assembly supported, install the seven bolts that attach main spar snug bolts.
3. Install the two bolts that attach rear spar, snug bolts.
4. Reconnect the electrical plug and ground wire.
5. Install screws securing Winglet to wing at w.s. 229.
6. Torque Bolts on main and rear spars. Bolt torque specifications in Section 1 of this Manual.
7. Check Winglet alignment with wing with straight edge at trailing edge of Winglet assembly. Winglet assembly trailing edge to be in alignment with wing and aileron trailing edge.

8. Before installing inspection access doors, check to see that all bolts have been installed and torqued. Check the bolts that hold the main spar bracket are tight. Torque specifications in Section 1 of this manual. Check to insure that the wiring is not chafing. Install all three of the inspection access doors.
9. Re-install wing de-ice boots per Cessna Service Manual, Section 12 "Equipment and Furnishings".

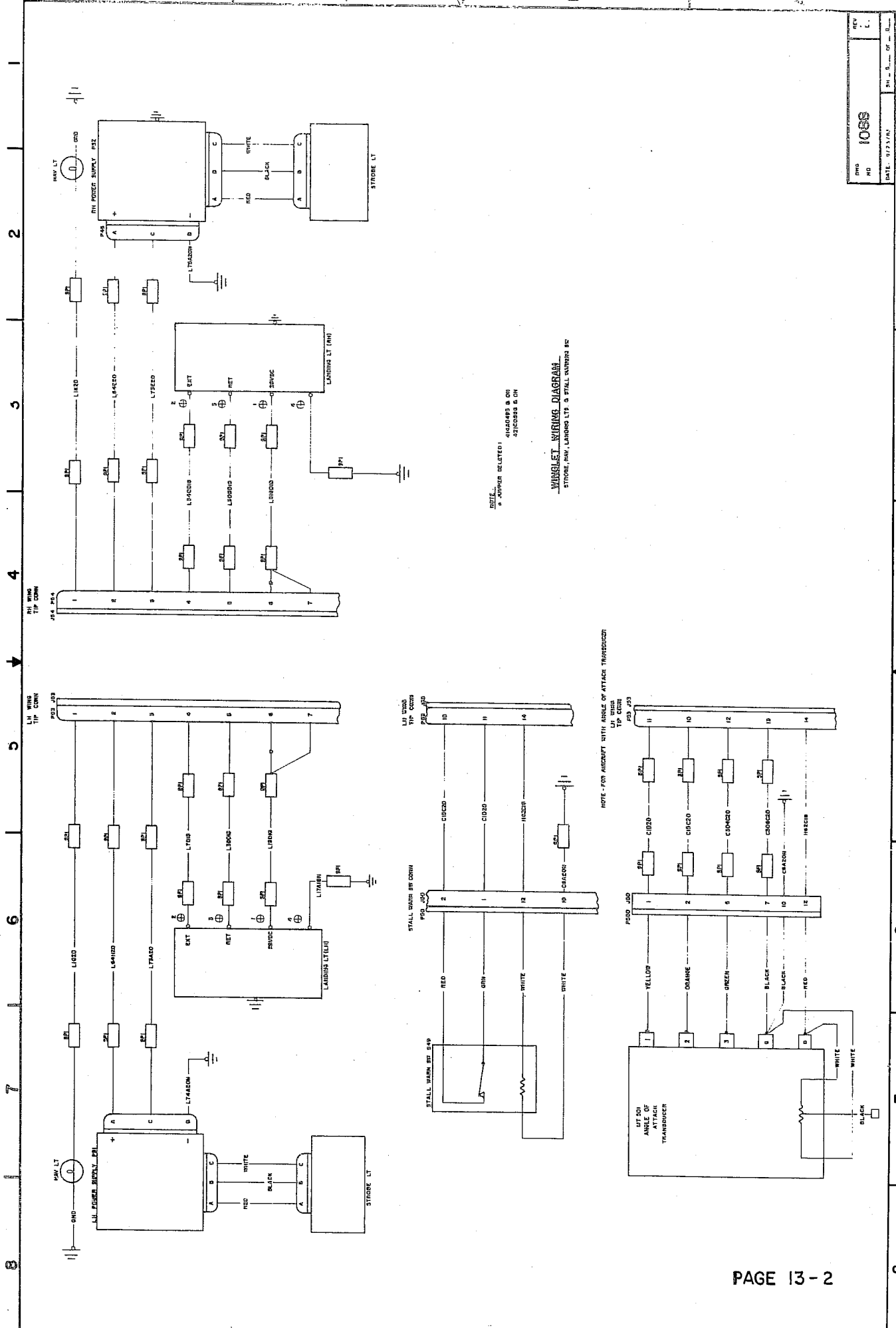
C. MAIN SPAR LOCK NUTS

1. The nuts that attach the main spar bracket are sealing locknuts. If a fuel leak develops, DO NOT seal over nuts with fuel tank sealant. New sealing locknuts may be ordered from RAM.
2. Install new sealing locknuts with sealing insert next to spar fitting plate.

Section 13

ELECTRICAL SYSTEMS

Dwg. 1088	Winglet Wiring Diagram
Dwg. 1041	Tail Strobe Installation

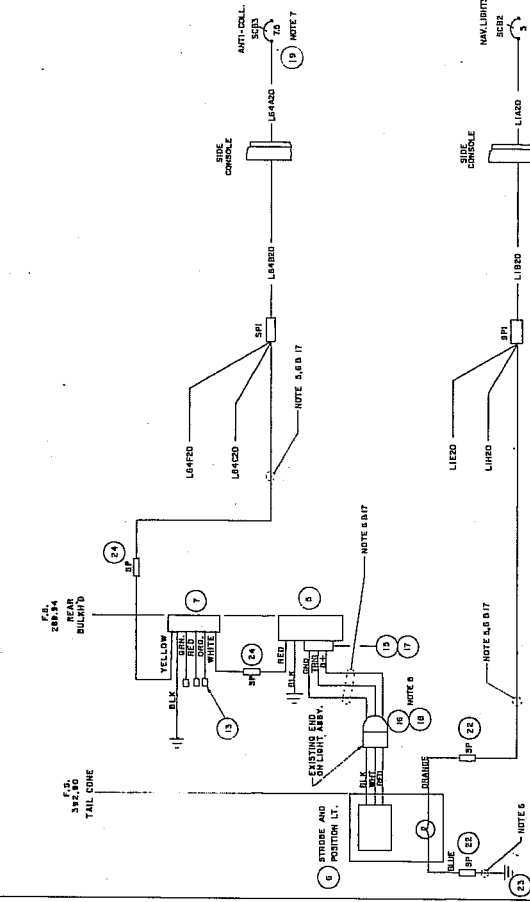


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REV	DESCRIPTION	BY	DATE
1	ADDED NOTE 15 & 16, ADDED ITEM 21, 22 & 23	C. PADGETT	8-9-82
2	CHANGED ITEM 20 TO SHIELDED WIRE	C. PADGETT	10-21-82
3	DELETED BRACKET & HARDWARE	J. VERA	11/3/82
4	ADDED ITEM 17, 18, 19, 20, 21, 22 & 23	J. VERA	12/3/82
5	ADDED ITEM 24, 25, 26, 27	C. PADGETT	8/31/83
6	CHANGED NOTE 15 TO REFERENCE ITEM 16		
7	ADDED 421C, ADDED NOTE 33		

NOTES:

1. DIM. EFFECTIVITY: MODEL.
2. SECURE WIRES AS REQ'D TO PREVENT CHANGING EVERY 18 INCHES MIN.
3. WIRES MAYBE ROUTED WITH EXISTING WIRE BUNDLES.
4. ANY GROUP EXISTING SPARE WIRE IF AVAILABLE, MUST BE 200A WIR.
5. ALL NEW WIRING MUST BE MIL-C-20782/2-20-1, 20 GA. (ITEM 20).
6. EXISTING 9 AMP SCRS MUST BE REPLACED WITH ITEM 19 (17&8 AMP SCR).
7. TT-RAP LIGHT CONNECTOR WITH ITEM NO. 21.
8. ITEM 8 MATCH MILL AT ASST. AND PAINT TO MATCH AIRCRAFT.
9. BREAK ALL SHARP EDGES.
10. FINISH ZINC CHROMATE ALL METAL.
11. MIN. EDGE DISTANCE - 29.
- 12.
- 13.
14. POWER SUPPLY (ITEM 4) INSTALLED BEHIND AFT PRESSURE BULKHEAD, SEE SHEET 2.
15. ITEM 8 REQUIRED ON 41A-4000 THRU 41A-5000 AIRCRAFT ONLY. ALL OTHERS HAVE THIS PART EXISTING.
16. INSTALL ALL WIRING IN ACCORDANCE WITH THE REQUIREMENTS OF 4043.13-1A CHAPTER 11, SECTION 77: ELECTRICAL SYSTEMS, ROUTING, TYPING, LACING AND CLAMPING.
17. GROUND ALL SHIELDED WIRES TO AIRFRAME.
18. IF IT IS DETERMINED THE NOISE IS BEING RADIATED FROM THE TAIL LIGHT, FLASH TUBE, THE INTERFERENCE CAN BE MINIMIZED BY INSTALLING A STRIP OF ALUMINUM METALIZED TAPE AROUND OUTSIDE OF GLASS AND INSURING THE ALUMINUM STRIP IS GROUNDED TO THE METAL CASE OF THE LIGHT ASSEMBLY.
19. ITEM 4 MAY BE SUBSTITUTED FOR ITEM 6
20. ITEM PART WEIGHT FORELASE STATION
 4.3 PART .2918
 5.3 POWER SUPPLY .2918
 6.3 THERMISTOR .2918
 7.3 THERMISTOR .2918
21. EACH PART SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH:
 (A) THE LETTERS "FAA-PHA"
 (B) PMA HOLDER TRADEMARK "RAM"
 (C) THE APPLICABLE PART NUMBER
22. ITEM 6 MANUFACTURED PER RAM TOOL 1041-30 AND PER RAM SPECIFICATION NO. RF88-02. NATIONAL SPECIFICATION MIL-C-20782/2-20-1. NATIONAL SPECIFICATION MIL-C-20782/2-20-1. NATIONAL SPECIFICATION MIL-C-20782/2-20-1.
23. ITEM 8 REQUIRED ON 41A-4000 THRU 41C50000 AIRCRAFT ONLY. ALL OTHERS HAVE THIS PART EXISTING.



ITEM	QTY./ASBY.	PART NO.	PART NAME	SIZE	MATERIAL	NOTE
1	1	1041-1	STROBE LIGHT INST'L.			
2	1					
3	1					
4	1					
5	1					
6	1					
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9	1					
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REV. NO. 1041

DATE: 7/7/83

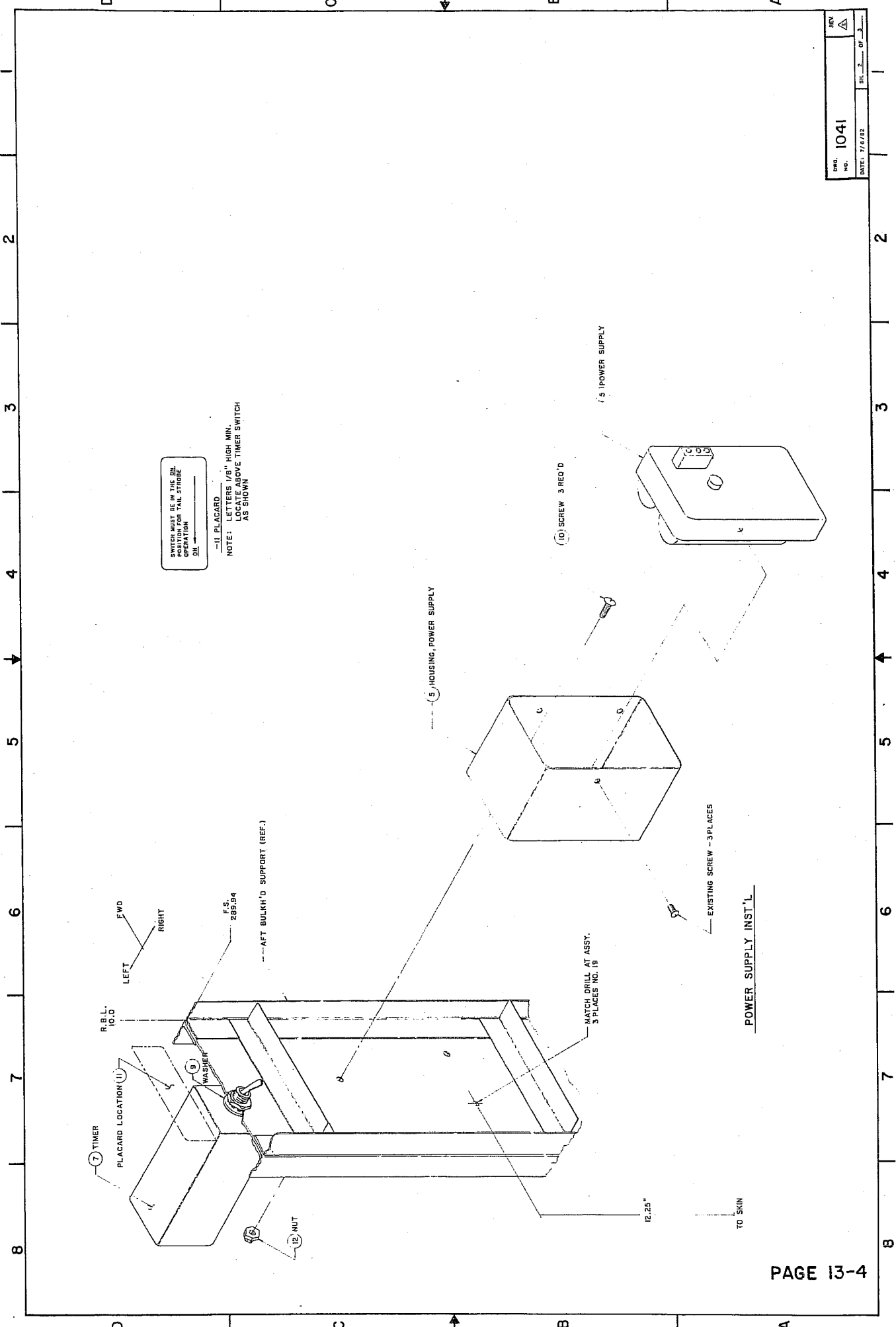
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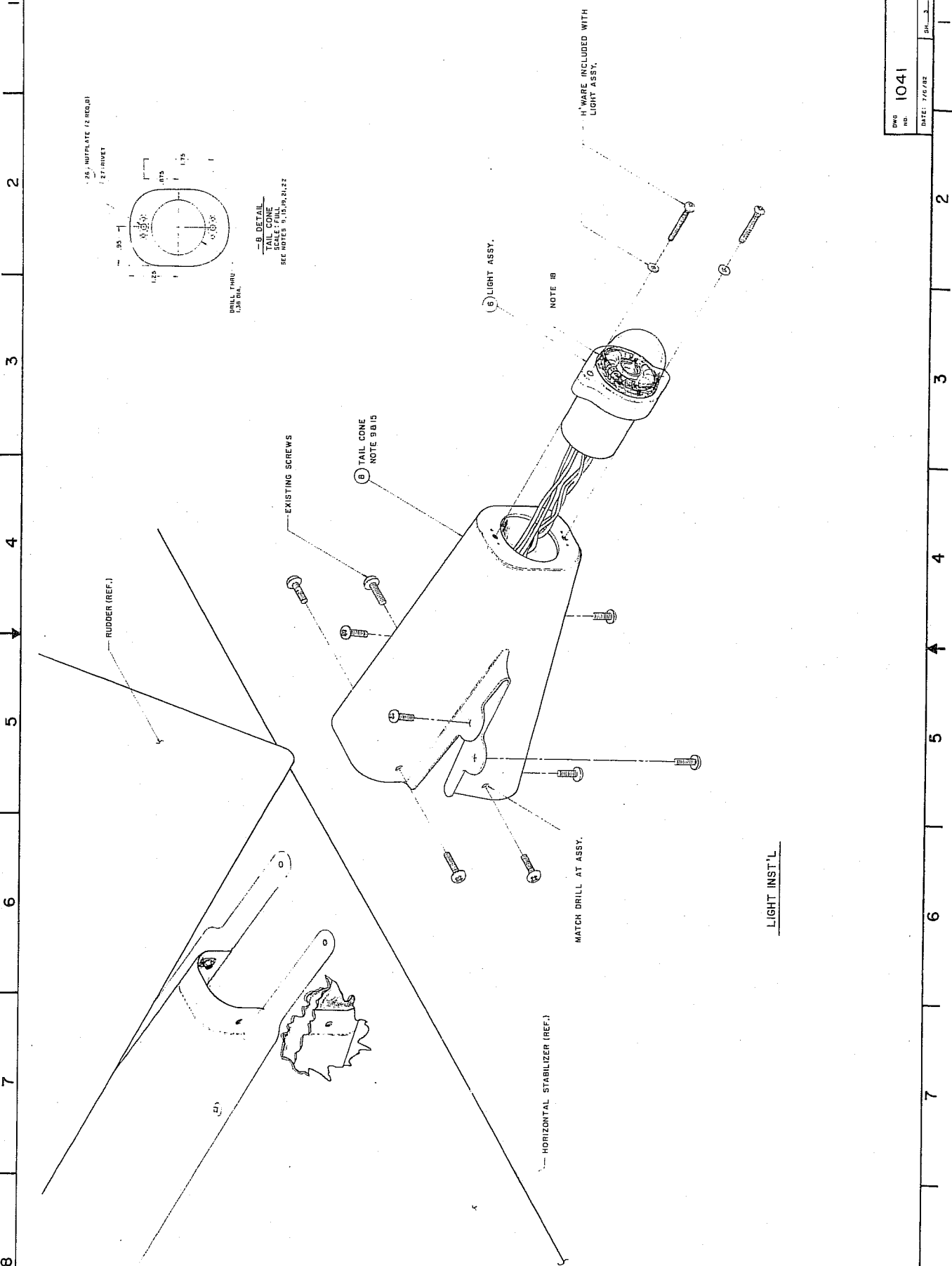
BY: C. PADGETT

TITLE: TAIL STROBE INST'L. FOR CESSNA 400 SERIES

RAM AIRCRAFT CORPORATION

REV. 1 OF 3





LIGHT INST'L

DWG NO.	REV
1041	△
DATE: 7/2/52	SH. 3 OF 3

Section 15

STRUCTURAL REPAIR

I. Fiberglass Parts

NOTE: If Winglet Assembly has sustained damage refer to Cessna Service Manual, Section 15, "Structural Repair", Topics: "Definition of Damage" and "Fiberglass Parts".

A. Negligible Damage

Any small scratches which can be polished or sanded out, may be considered as negligible damage.

B. Repairable Damage

- (1) Damaged fiberglass skin must be repaired as shown in Figure I. Cut & trim the area just beyond the noticeable damage. If the parts are painted, remove paint & sand clean an area at least two inches beyond the edge of the cutout. Prepare the necessary size & number of patches of glass cloth. Mix a sufficient amount of resin in accordance with the manufacturer's instructions. See Section E.

WARNING: ALWAYS FOLLOW THE MANUFACTURER'S MIXING INSTRUCTIONS CAREFULLY AS THE MIXING OF PEROXIDE & COBALT TOGETHER WILL RESULT IN A SPONTANEOUS FIRE.

- (2) Be sure that your hands are free from oil, grease & dirt. Apply an even coat of resin on the sanded area. Impregnate all the glass cloth patches by laying them on a clean paper & working the resin through the fabric with a small brush. Place the larger patch over the cutout area, working out all air bubbles & wrinkles. If the cutout is large enough to cause the patch to sag, place a suitable support behind the repair area. Coat the support with automobile wax or wax paper to prevent the resin from adhering to the support. Apply a second patch over the first patch, etc., working out all wrinkles & air bubbles. After all the patches have been applied, brush the area with an even coat of resin and allow to cure. Smooth the patch area with fine sandpaper until the desired finish is obtained. Repaint the finish area with matching paint.

C. Repairable Damage per RAM

- (1) Call RAM Aircraft Modifications, Inc., Waco, Texas for repair instructions and advice; if main spar, rear spar or ribs are cracked or the bond between skin and spar has been broken.

D. Damage Necessitating Replacement of Parts

- (1) When the fiberglass parts are torn or cracked over a large area or show signs of strain through the appearance of small cracks or shows signs of loss of rigidity, the parts shall be replaced.

E. Approved Cloth and Resin

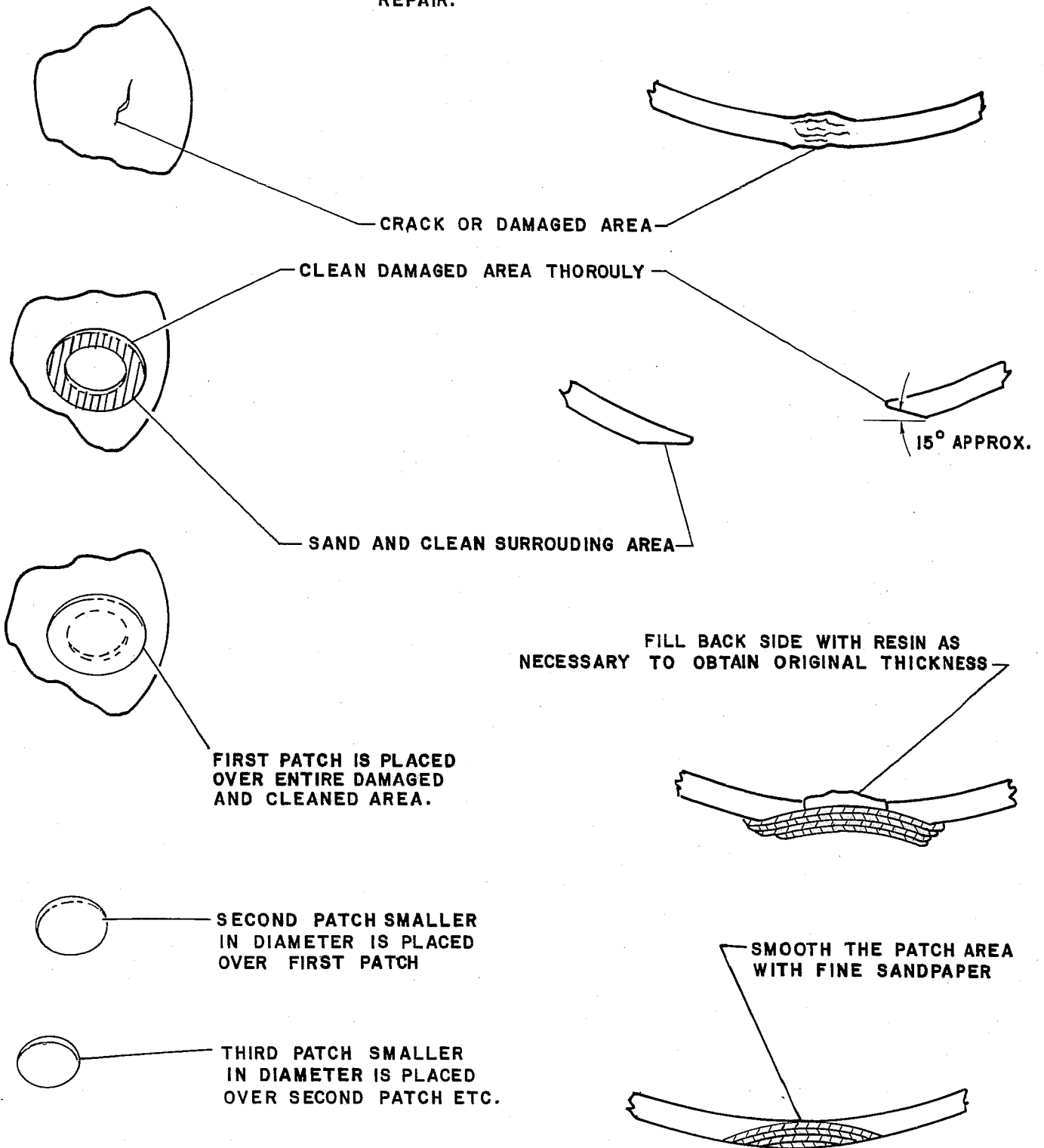
- (1) Fiberglass cloth - No. 7781 or equivalent aircraft quality cloth.

SOURCE: Hexcel Corporation
11711 Dublin Blvd.
Dublin CA

- (2) Safe-T-Poxy - No. 2410 Epoxy Resin
No. 2183 Hardener

SOURCE: (APCO) Applied Plastics Co., Inc.
612E Franklin Ave.
El Segundo CA 90245

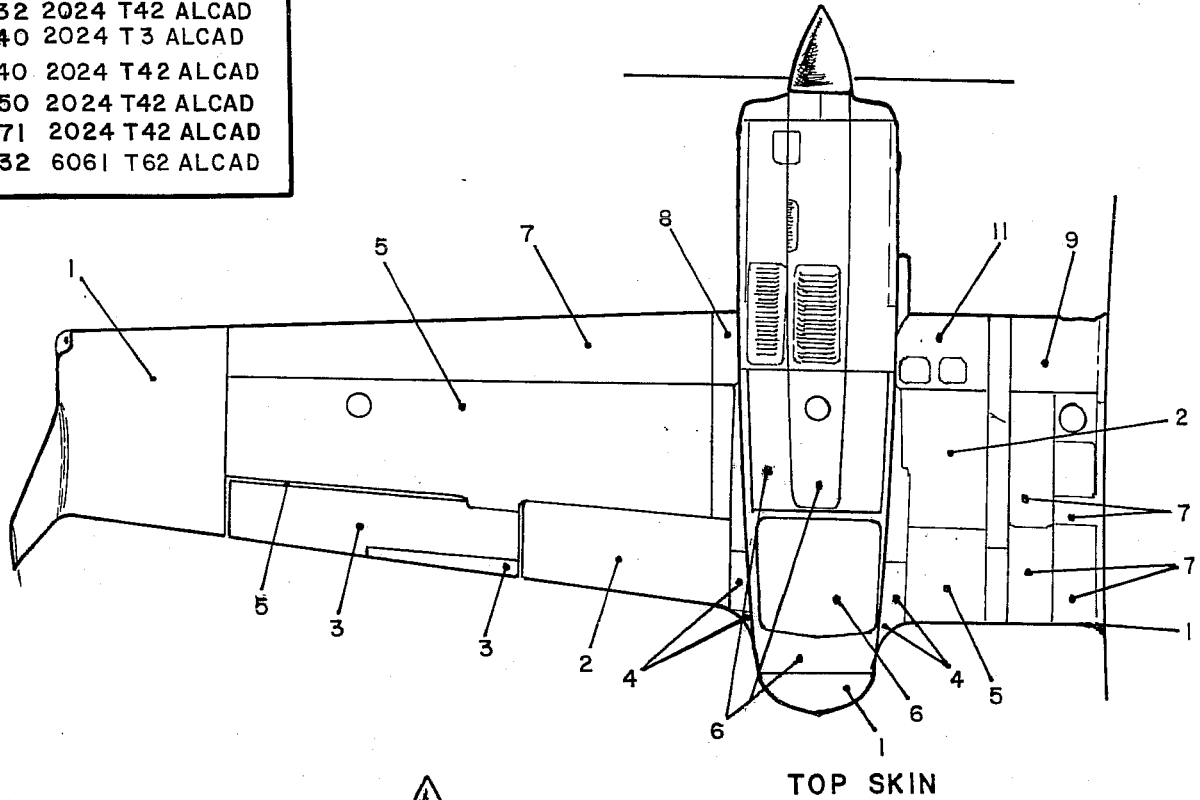
NOTE: SEE FIBERGLASS PARTS PARAGRAPH BEFORE ATTEMPTING A FIBERGLASS REPAIR.



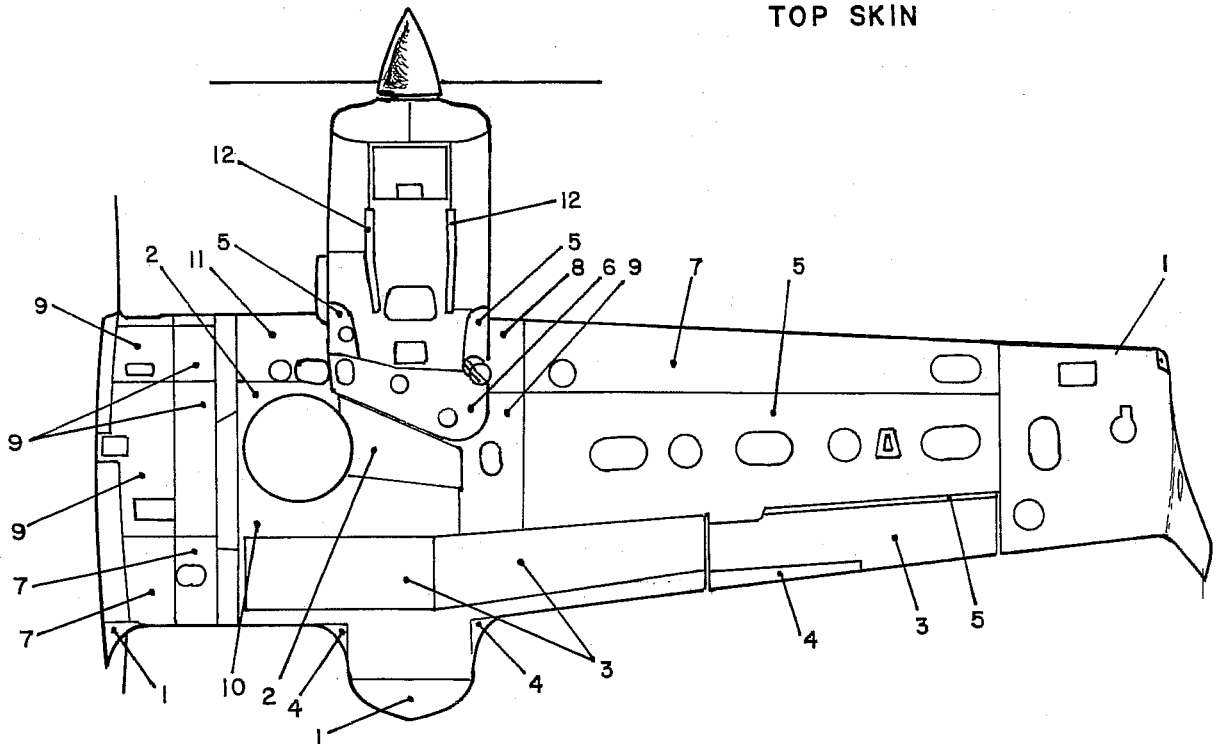
FIBERGLASS REPAIR
FIGURE 1

1. FIBERGLASS
2. HONEYCOMB
3. .016 2024 T3 ALCLAD
4. .020 2024 T42 ALCAD
5. .025 2024 T3 ALCAD
6. .025 2024 T42 ALCAD
7. .032 2024 T3 ALCAD
8. .032 2024 T42 ALCAD
9. .040 2024 T3 ALCAD
10. .040 2024 T42 ALCAD
11. .050 2024 T42 ALCAD
12. .071 2024 T42 ALCAD
13. .032 6061 T62 ALCAD

" WING SKIN "



TOP SKIN



BOTTOM SKIN