

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Model PA-28R-180
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APPROVED		PAGE _____

AIRPLANE FLIGHT MANUAL

MODEL PA-28R-180  
RETRACTABLE

FAA IDENTIFICATION NO. N3936T

SERIAL NO. 28R-30277

THIS DOCUMENT MUST BE KEPT IN AIRPLANE AT ALL TIMES.

FAA APPROVED: *Henry C. Fuller*  
*for* John F. Vogel  
 Chief, Engineering & Manufacturing Branch  
 Southern Region---Atlanta, Georgia

DATE: June 8, 1967



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Piper Model PA-28R-180  
Normal Category Only

AIRPLANE FLIGHT MANUAL

1. Limitations Section The following limitations must be observed in the operation of this airplane:
- Engine Lycoming IO-360-B1E
- Engine Limits For all operations 2700 rpm, 180 hp
- Fuel 100/130 minimum octane aviation fuel
- Propeller Hartzell HC-C2YK-1/7666A-0  
Low pitch stop 13.0°  
High pitch stop 29.0°  
Maximum diameter 76 inches, minimum diameter 74.5 inches  
Avoid continuous operation 2000 - 2200 rpm
- Power Instruments Oil Temperature: GREEN arc (normal operating range)  
75° F to 245° F  
RED line (maximum) 245° F
- Oil Pressure: GREEN arc (normal operating range)  
60 psi to 90 psi  
YELLOW arc (caution range) 25 psi to 60 psi  
RED line (minimum) 60 psi  
RED line (maximum) 90 psi
- Fuel Pressure: GREEN arc (normal operating range)  
14 psi to 45 psi  
RED line (minimum) 14 psi  
RED line (maximum) 45 psi
- Tachometer: GREEN arc (normal operating range)  
500 to 2000 and 2200 to 2700 rpm  
RED arc 2000 to 2200 rpm  
RED line (maximum continuous power)  
2700 rpm

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Airspeed Limits (Calibrated Airspeed) (Miles per Hour)	Never exceed .....	214
	Maximum structural cruise .....	170
	Maneuvering .....	134
	Flaps extended .....	125
	Maximum gear extension .....	150
	Maximum gear retraction.....	125
	Maximum positive load factor .....	3.8
	Maximum negative load factor .....	No inverted maneuvers approved

Maximum Weight 2500 lbs

Baggage Capacity 200 lbs

C. G. Range The datum used is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

<u>Weight (Pounds)</u>	<u>Forward Limit (In. aft of datum)</u>	<u>Rearward Limit (In. aft of datum)</u>
2500	91.0	95.9
1925	81.0	95.9

Straight line variation between points given.

NOTE: It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. See weight and balance section for proper loading instructions.

Maneuvers All acrobatic maneuvers including spins prohibited.

Placards

1. In full view of the pilot:

"THIS AIRCRAFT APPROVED FOR NIGHT IFR NON-ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH FAR 91 FAR 135."

"THIS AIRCRAFT MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS."

2. In full view of the pilot:

"NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED."

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Placards  
(Continued)

3. On the instrument panel in full view of the pilot:  
"MANEUVERING SPEED - 134 MPH."
4. On the instrument panel in full view of the pilot:  
"DEMONSTRATED CROSS WIND COMPONENT - 20 MPH."
5. Adjacent to upper door latch:  
"ENGAGE LATCH BEFORE FLIGHT."
6. On the inside of the baggage compartment door:  
"BAGGAGE MAX. 200 LBS. SEE WEIGHT AND BALANCE  
DATA FOR BAGGAGE LOADINGS BETWEEN 150 LBS AND  
200 LBS."
7. Near EMERGENCY GEAR LEVER: "EMERGENCY DOWN"  
"OVERRIDE UP"
8. Near landing gear selector switch:  
"GEAR UP 125 MPH MAX"  
"DOWN 150 MPH MAX"
9. In full view of the pilot when the autoflite is installed:  
"FOR HEADING CHANGES: PRESS DISENGAGE SWITCH  
ON CONTROL WHEEL. CHANGE HEADING, RELEASE  
DISENGAGE SWITCH."

Airspeed  
Instrument  
Markings

RED radial line	Never exceed	214 mph (186 knots)
YELLOW arc	Caution range (Smooth air only)	170 to 214 mph (148 to 186 knots)
GREEN arc	Normal operating range	69 to 170 mph (60 to 148 knots)
WHITE arc	Flap down range	63 to 125 mph (55 to 109 knots)

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2. Procedures Section

1. The stall-warning system is inoperative with the master switch off.
2. The electric fuel pump must be on for both landing and takeoff.
3. This airplane is equipped with an airspeed-power sensing system (back-up gear extender) which extends the landing gear under low airspeed-power conditions\* even though the pilot may not have selected gear down. This system will also prevent retraction of the landing gear by normal means when the airspeed power values are below a predetermined minimum. (See Item 5, Procedures Section)

For normal operation, the pilot should extend and retract the landing gear with the gear selector switch located on the instrument panel, just as he would if the back-up gear extender system were not installed.

\* Approximately 105 mph IAS at any altitude, power off.

4. Landing gear position indication and warning lights:
  - (a) The red gear warning light on the instrument panel and the horn operate simultaneously when:
    - (1) In flight, when the throttle is reduced to where the manifold pressure is approximately 14 inches of mercury or below, and the gear selector switch is not in the down position.
    - (2) In flight, when the back-up gear extender system has lowered the landing gear and the gear selector switch is not in the down position and the throttle is not full open.
    - (3) On the ground, when the master switch is on and the gear selector switch is in the up position.
  - (b) The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.
  - (c) The yellow "In Transit" light on the instrument panel operates whenever any of the three gears is not in either the fully retracted position or the fully extended and locked position.

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2. Procedures Section  
(Continued)

5. Takeoff considerations:

During takeoff, if the gear selector switch is placed in the gear up position before reaching the airspeed at which the back up gear extender system no longer commands gear down, \* the gear will not retract. For obstacle clearance on takeoff and for takeoffs from high altitude airports, the landing gear can be retracted at the pilot's discretion by placing the gear selector switch in the up position and then holding the emergency gear lever in the override up position. It is necessary to hold the lever in the override up position until the speed required for retraction by the back up gear extender system has been attained.

\* Approximately 85 mph IAS at sea level to approximately 100 mph IAS at 10,000 ft, with a straight line variation between.

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2. Procedures Section  
(Continued)

6. Emergency landing gear extension instructions:
- (a) Reduce airspeed below 100 mph.
  - (b) Move landing gear selector switch to gear down position.
  - (c) If gear has failed to lock down, raise emergency gear lever to "Override Up" position.
  - (d) If gear has still failed to lock down, move emergency gear lever to "Emergency Down" position.
  - (e) If gear has still failed to lock down, yaw the airplane abruptly from side to side with the rudder.

7. Gear up emergency landing:

In the event a gear up landing is required, make an initial approach at not less than 110 mph to prevent the gear from free falling.

- (a) Leave flaps up (to reduce wing and flap damage).
- (b) Close the throttle and shut off the master and ignition switches.
- (c) Turn the fuel selector valve to off.
- (d) Hold the emergency gear lever in the override up position while reducing airspeed and until the airplane has come to rest. Contact the surface at minimum airspeed.

NOTE: With the master switch off, the landing gear cannot be retracted.

8. (Electric Pitch Trim Installation Only)

The following emergency information applies in case of electric pitch trim malfunction:

- (a) In case of malfunction, disengage electric pitch trim by pushing pitch trim switch on instrument panel to off position.
- (b) In an emergency, electric pitch trim may be overpowered using manual pitch trim.
- (c) In cruise configuration, malfunction results in 10° pitch change and 30 ft. altitude variation.

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2. Procedures Section  
(Continued)

9. (Automatic Pilot Installation Only)

- (a) Automatic pilot off during takeoff and landing.
- (b) For normal operation, refer to Manufacturer's Operation Manual.
- (c) For other than normal operation:
  - (1) In case of malfunction, disengage automatic pilot controls.
  - (2) In emergency, automatic pilot may be over-powered manually.
  - (3) Delay malfunctions in cruise or approach configurations result in bank and altitude loss as follows:

Automatic Pilot System	Cruise		Approach	
	3-Second Delay Bank	Altitude	1-Second Delay Bank	Altitude
Autoflite	60°	200'	10°	0'
Autocontrol III	60°	200'	10°	0'

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3. Performance Section

The following performance figures were obtained during FAA type tests and may be realized under conditions indicated with the airplane and engine in good condition and with average piloting technique. All performance is given for 2500 pounds.

Loss of altitude during stalls varied from 100 to 310 feet, depending on configuration and power.

Stalling speeds, in mph, power off, versus angle of bank (Calibrated airspeed):

Angle of bank	0	20	40	50	60
Flaps up (gear down)	69	71	79	86	98
Flaps down (gear down)	63	65	72	79	89

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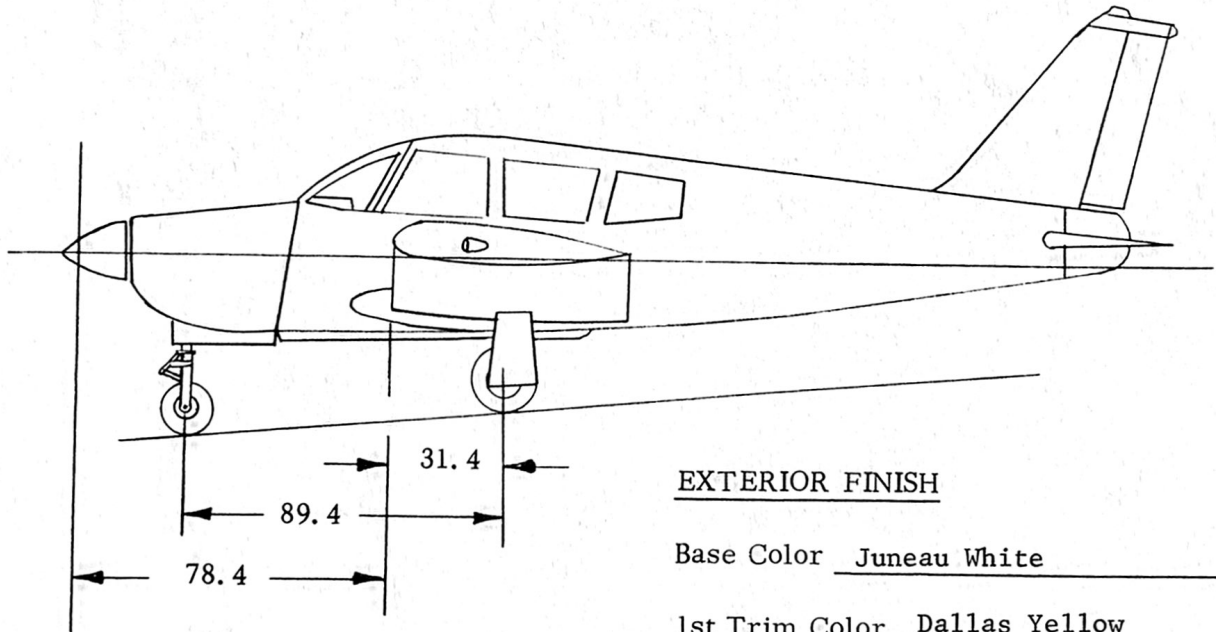
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COMPUTED  
~~ACTUAL~~ WEIGHT AND BALANCE  
 MODEL PA-28R-180  
 (RETRACTABLE)

SERIAL NUMBER 28R- 30277

CERTIFICATE NUMBER N3936T

DATE DEC 26 1967



EXTERIOR FINISH

Base Color Juneau White

1st Trim Color Dallas Yellow

2nd Trim Color Dakota Black

Registration No. Color Dakota Black

Type Finish Lacquer

J. M. Smith  
 Inspection Representative

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WEIGHT AND BALANCE  
STANDARD EQUIPMENT LIST  
MODEL PA-28R-180

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Engine Accessories</u>			
<u>X</u>	Engine - Lycoming Model IO-360-B1E	284.5	23.4	6657
<u>X</u>	Fuel Pump, Electric Auxiliary, Weldon #8120-AB	2.8	47.9	134
<u>X</u>	Fuel Pump, Engine Driven, Lycoming 75247	1.6	37.0	59
<u>X</u>	Oil Cooler, PAC 18622, Harrison #C-8526250	2.2	45.0	99
<u>X</u>	Filter, Fram Model CA-144PL	.5	42.2	21
<u>X</u>	Alternator, 60 amp, Chrysler 2642997	12.5	14.6	183
<u>X</u>	Starter - Lycoming 76211 (Prestolite MZ4206)	* 18.0	15.5	279

Propeller and Propeller Accessories

<u>X</u>	Propeller, Hartzell HC-C2YK-1/7666A-0	55.0	3.1	171
<u>X</u>	Spinner and Attachment Plates F-2-7(A)	5.0 <del>3.9</del>	2.8 <del>4.8</del>	14 19
<u>X</u>	Governor, Hartzell <del>XXXXXXXX</del>	5.5	39.1	215

\* Included in Engine Weight

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Landing Gear and Brakes</u>			
<u>X</u>	Two Main Wheel Assemblies 6.00-6	31.5	109.8	3459
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-84 Brake Assembly No. 30-41			
	(b) Two Main 4-Ply Rating Tires 6.00-6 with Regular Tubes			
<u>X</u>	One Nose Wheel 5.00-5	8.1	20.5	166
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-77 (Less Brake Drum)			
	(b) One Nose Wheel 4-Ply Rating Tire 5.00-5 with Regular Tube			
	<u>Electrical Equipment</u>			
<u>X</u>	Stall Warning Device, Safe Flight Instrument Corporation No. C52207-4	.2	80.2	16
<u>X</u>	Voltage Regulator, Wico Electric No. X-16300	.5	64.4	32
<u>X</u>	Battery 12 V, 25 A.H., Rebat Model S-24 or S-25	21.5 <del>22.0</del>	168.0 <del>188.0</del>	3612 <del>3598</del>

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Instruments</u>			
<u>X</u>	Compass, PAC #67462	.9	65.7	59
	Airspeed Indicator, PAC 67434-2	.6	66.8	40
<u>X</u>	Tachometer, Stewart-Warner, PAC #62177-5	.8	66.2	53
	Altimeter, Karnish No. AC-157 or	1.0	65.9	66
<u>X</u>	MacLeod No. 12003	1.0	65.9	66
	Manifold Pressure and Fuel Flow, PAC #67414	.8	65.8	53
<u>X</u>	Engine Cluster, PAC #67441-2	.9	67.4	61
<u>X</u>	Engine Cluster, PAC #67441-3	.9	67.4	61
<u>X</u>	Manifold Pressure Gauge, PAC 21962	.8	66.5	53
	<u>Miscellaneous</u>			
<u>X</u>	Forward Seat belts	1.0	86.9	87
<u>X</u>	Aft Seat Belts	.8	123.0	98
<u>X</u>	Flight Manual	-	-	-
<u>X</u>	Toe Brakes (Single)	5.0	54.6	273
<u>X</u>	Tow Bar	1.5	122.3	183
	TOTAL			
	AIRCRAFT EMPTY WEIGHT AS COMPUTED (INCLUDES ITEMS CHECKED ON STANDARD EQUIPMENT LIST, UNUSABLE FUEL AND UNDRAINABLE OIL)	1422.0	84.6	120236

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OPTIONAL EQUIPMENT LIST  
MODEL PA-28R-180

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Engine Accessories</u>			
<u>X</u>	Vacuum Pump and Drive, Airborne Mechanisms	5.0	34.6	173
<u>X</u>	Vacuum Regulator and Filter	2.2	57.0	125
<u>X</u>	Oil Filter - Lycoming #74911 (AC 81-A #6437032)	3.3	38.1	126
	<u>Electrical Equipment</u>			
<u>X</u>	Rotating Beacon, Grimes #40-0101-7-12	1.5	263.4	395
<u>X</u>	Landing Light, G. E. Model 4509	.5	15.0	8
<u>X</u>	Navigation Light (Rear)(1) Grimes Model A2064 (White)	.2	281.5	56
<u>X</u>	Navigation Lights (2) Grimes Model A1285 (Red and Green)	.4	106.6	43
<u>X</u>	Dome Light	.3	104.0	31
<u>X</u>	Speaker	.8	104.0	83
	Battery 12V, 35 A. H., Rebat R-33 or R-35	<del>27.0</del> <del>22.0</del>	<del>168.0</del> <del>165.0</del>	<del>4536</del> <del>4872</del>
<u>X</u>	Auxiliary Power Receptacle and Diode, PAC Drawing 65647	2.7	178.5	482
	External Power Cable, PAC 62355-2	4.6	142.8	657
	Piper Pitch Trim	4.0	158.0	632
	Heated Pitot Head	.4	100.0	40

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Instruments</u>			
<u>X</u>	Exhaust Gas Temperature Gage, PAC Drawing 25668	.7	60.4	42
	Brittain Turn Coordinator #TC-100(12)	2.6	64.7	168
<u>X</u>	Rate of Climb, Karnish #135-3	1.0	65.9	66
	Rate of Climb, AN5825	1.4	65.9	92
<u>X</u>	Air Temperature Gage, Manning, Maxwell & Moore NHM-70	.2	82.6	17
<u>X</u>	Clock, 8-Day, MIL-C-7939	.4	67.4	27
<u>X</u>	Tru-Speed Indicator, PAC Dwg. 67433-2	Same as Standard Equipment Weight		
	Electric Turn & Bank	2.2	64.9	143
<u>X</u>	Pictorial Rate of Turn, Mitchell 52D69	1.3	65.3	85
	Directional Gyro, Garwin #4000B	2.4	64.7	155
	or AIM #200	3.1	64.0	198
	Attitude Gyro, Garwin #5000B	1.8	64.9	117
	or AIM #100	2.2	64.4	142
<u>X</u>	Artificial Horizon, R.C. Allen (3")	2.2	65.6	144
<u>X</u>	Directional Gyro, R.C. Allen (3")	3.3	64.8	214
	<u>AutoPilots</u>			
<u>X</u>	AutoFlite			
<u>X</u>	Roll Servo, Mitchell #1D363-183R	2.6	122.2	318
<u>X</u>	Gyro Amplifier, Mitchell #1C359-1	1.8	111.8	201



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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>AutoPilots</u>			
<u>X</u>	Cables	1.0	95.5	96
<u>X</u>	Panel Unit	.3	67.9	20
	<u>AutoControl III</u>			
	Roll Servo, Mitchell #1D363-183R	2.5	122.2	306
	Console, Mitchell #1C338	1.2	65.1	78
	Cables	.7	95.5	67
	Attitude Gyro, Garwin	1.9	64.9	123
	or AIM #700-2CF	2.3	64.4	148
	Directional Gyro, Garwin	2.5	64.7	162
	or AIM #200-6	3.2	64.0	205
	Omni Coupler	.9	64.3	58
	<u>Radio</u>			
	<u>Bendix ADF-T-12C</u>			
	Receiver	3.8	65.8	250
	Loop Antenna	1.2	160.8	193
	Servo Indicator	1.7	66.4	113
	Audio Amplifier	.8	56.0	45
	Antenna Cable	1.5	108.0	162

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (Continued)			
	Narco ADF-31			
	Receiver	5.1	63.5	324
	Loop Antenna	2.7	162.0	437
	Antenna Cable	1.7	108.0	184
	King KX150B	9.1	61.9	563
	Low Frequency Antenna	.5	167.0	84
	Narco Mark III	7.5	62.7	470
X	Narco Mark <del>12A &amp; B</del> <i>12B</i>			
<del>0</del>	Transceiver, Single	6.0	61.9	371
X	Transceiver, Dual	<del>12.0</del> <i>6.0</i>	61.9	<del>742</del> <i>371</i>
<del>0</del>	Modulator - Power Unit, Single	4.0	186.0	744
X	Modulator - Power Unit, Dual	<del>8.0</del> <i>4.0</i>	186.0	<del>1488</del> <i>744</i>
X	Cables - Single	1.7	120.0	204
	Cables - Dual	5.1	120.0	612
<del>0</del>	Junction Box	.6	67.2	40
	Transmitter Selector (Dual VHF Only)	.7	66.3	46
	Narco VOA-6 Omni Convertor	1.8	64.4	116
	Narco VOA-5 Omni Convertor	3.1	64.4	200

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio (Continued)</u>			
X	Narco VOA-4 Omni Convertor	3.0	64.4	193
<del>X</del>	<del>Narco VOA-4 OM Omni/Loc, Marker Conv</del>	<del>1.8</del>	<del>64.4</del>	<del>115.9</del>
X	Omni Receiving Antenna, Narco VTP-37 (Includes Cables)	1.4	203.0	284
<del>X</del>	<del>VHF #1 Transmitting Antenna, Narco VTP-17</del>	<del>.3</del>	<del>157.8</del>	<del>47</del>
X	VHF #2 Transmitting Antenna, Narco VTP-17	.3	192.8	58
X	Cable VHF #1 Trans Antenna	.4	118.0	47
X	Cable VHF #2 Trans Antenna	.5	135.0	68
<del>X</del>	<del>PM-1 Marker Beacon</del>			
<del>X</del>	<del>Receiver</del>	<del>1.1</del>	<del>121.3</del>	<del>133</del>
<del>X</del>	<del>Panel Unit</del>	<del>.3</del>	<del>68.1</del>	<del>20</del>
<del>X</del>	<del>Cable</del>	<del>.3</del>	<del>85.0</del>	<del>26</del>
	<u>Glide Slope - UGR-2</u>			
	Receiver	2.4	173.8	417
	Cable	2.1	128.0	269
	Antenna	.4	92.4	37
	Cable, Antenna	.5	145.0	73
X	<del>NARCO AT50A TRANSPONDER</del> <del>Genave Beta 4096 Transponder</del>	<del>2.7</del>	64.4	<del>173.9</del>
X	Genave Beta 4096 Antenna	.3	110.9	33.3
X	Genave Beta 4096 Ant Cable	.4	101.65	40.7
X	Alert Model 50 CRT	2.1	215.8	453.18
X	CYBUNT MASTER STERO	1.5	64.4	96.8

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (Continued)			
	Narco UDI-4, DME			
	Receiver	8.5	61.7	524
	Antenna	.3	113.9	34
	Cable	.4	100.0	40
X	Microphone	.5	75.0	38
X	Headset	.5	65.0	33
X	Omni Tracker (#1D482)	.5	54.9	27
	<u>Miscellaneous</u>			
X	Assist Step	1.8	156.0	281
	Toe Brakes (Right)	5.0	54.6	273
	Fire Extinguisher - Stop Fire #A-20	7.5	93.0	698
	Inertia Safety Belt	2.5	111.6	279
X	Assist Strap & Coat Hooks	.2	109.5	22
X	Lighter	.2	67.9	14
	TOTAL	43.9		3953

*Revised Weight & Balance Data  
New Spinner Installed as Per Piper Service Bulletin #309*

AIRCRAFT EMPTY WEIGHT	<u>1423.1</u> 1422.0	<u>120231</u> 120236
OPTIONAL EQUIPMENT	<u>44</u>	<u>3953</u>
LICENSED EMPTY WEIGHT	<u>1467.1</u> 1466.0	<u>124184</u> 124189
EMPTY C.G. AFT DATUM IS <u>84.6</u> 84.7	<i>Superseded 1-27-71</i>	

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED		PAGE <u>11</u> Section 1

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY. THE EMPTY WEIGHT C.G. IS FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO FORM FAA-337 WHEN ALTERATIONS HAVE BEEN MADE.

C. G. RANGE AND WEIGHT INSTRUCTIONS

30.00  
29.94

1. Add the weight of all items to be loaded to the licensed empty weight.
2. Use the loading graph to determine the moment of all items to be carried in the airplane.
3. Add the moment of all items to be loaded to the licensed empty weight moment.
4. Divide the total weight moment by the total weight to determine the C.G. location.
5. By using the figures of item 1 and item 4, locate a point on the C.G. range and weight graph. If the point falls within the C.G. envelope, the loading meets all weight and balance requirements.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)

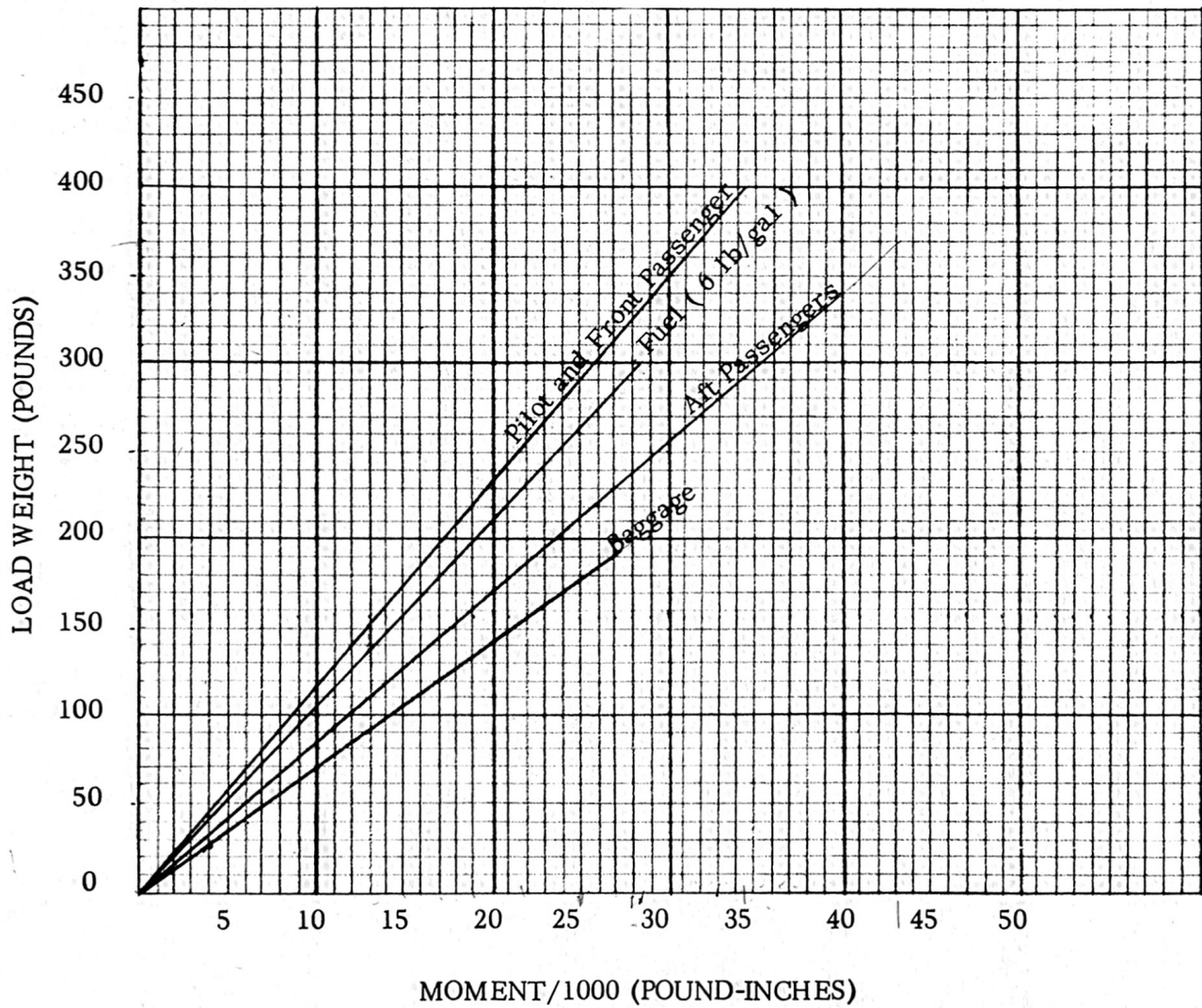
**SUPERCEDED**  
**DATE** \_\_\_\_\_

	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
LICENSED EMPTY WEIGHT	1466.0	84.7	124189
OIL (2 GAL)	15	29.5	443
PILOT & PASSENGER	340	85.5	29070
FUEL 41.7 Gal.	250	95.0	23750
PASSENGERS (REAR SEAT)	340	118.1	40154
BAGGAGE	89	142.8	12709
MOMENT DUE TO RETRACTING OF LANDING GEAR			819
TOTAL LOADED AIRPLANE	2500		231134
	$\frac{231134}{2500} = 92.5$ INCHES (ARM AFT DATUM)		

LOCATE THIS POINT ( 92.5 ) ON THE C.G. RANGE AND WEIGHT GRAPH. SINCE THIS POINT FALLS WITHIN THE C.G. ENVELOPE THE LOADING MEETS ALL WEIGHT AND BALANCE REQUIREMENTS.

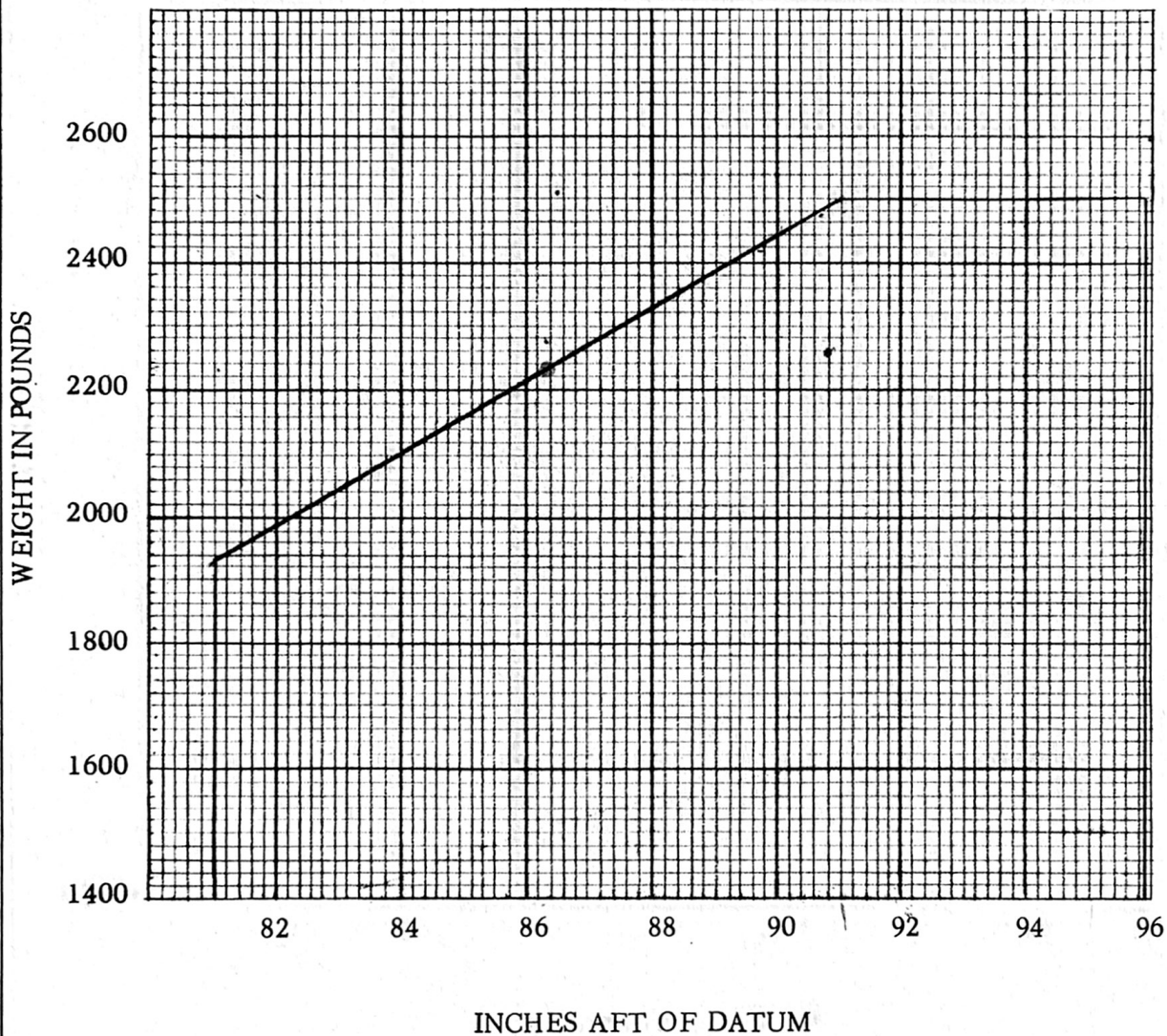
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CHECKED		
APPROVED		PAGE 12 Section 1

LOADING GRAPH



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C. G. RANGE AND WEIGHT



MOMENT DUE TO RETRACTING LANDING GEAR = +819 IN-LBS

# **NOTE**

**This Is A Revision Only  
This Is Not A Complete Manual**

**THIS REVISION IS APPLICABLE ONLY TO AIRPLANE FLIGHT  
MANUAL (AFM) VB-173.**

**IF YOUR AFM *DOES NOT* INDICATE VB-173, PLEASE DISCARD  
THIS REVISION PACKAGE.**

**This revision, dated March 22, 2013, shall be  
inserted into the current PA-28R-180, Airplane  
Flight Manual, VB-173, issued June 8, 1967.**



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CHECKED

APPROVED

PIPER AIRCRAFT CORP.  
DEVELOPMENT CENTER, VERO BEACH, FLA.

Airplane Flight Manual  
Model PA-28R-180

REPORT VB-173

PAGE II

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	Title	Allocated Piper Report No. VB-173 to this Manual.	<i>H.M. Toomey</i> Herb M. Toomey FAA DOA SO-1	11/14/68
	1	Propeller Section: Added tolerance to pitch stop callout.		
2	3	Placards Section: Added Placard No. 10	<i>H.M. Toomey</i> Herbert M. Toomey FAA DOA SO-1	12/29/69
3	3	Placards Section: Added Item 11		
	4	Placards Section: Added Item 12		
	6,7	Procedures Section: Revised Item 9		
	7,8	Procedures Section: Added Items 10 and 11	<i>G.C. Stephen</i> G. C. Stephen FAA DOA SO-1	8-26-70
4	Title	Added Serial Numbers	<i>Ward Evans</i>	8-7-72
5	1	Changed oil pressure gauge markings	<i>Ward Evans</i>	7-25-75
6	5	Move Procedure item 6 to page 6.		
	6	Move contents of page to page 7. Added Procedure item 6 from page 6. Completely revised Procedure item 6.		
	7	Move contents of page to page 8. Added contents from page 6.		
	8	Moved contents of page to page 9. Added contents from page 7.		
	9	Added page and contents from page 8.	<i>Ward Evans</i>	8-16-76
7	3	Added placard note.		
	4,4.1, 5 & 6	Revised landing gear system description and operating procedures	<i>A.H. Stephen</i>	
	7	Retype only		

FAA APPROVED

June 8, 1967

4114187

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-173	PAGE <u>III</u>

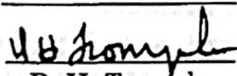
Log of Revisions  
(Continued)  
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REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
8	4	Changed Caution Range airspeed.	<i>D. H. Trompler</i> D. H. Trompler FAA DOA SO-1	May 24, 1989

FAA APPROVED -May 24, 1989

Prepared	<b>PIPER AIRCRAFT CORP.</b> <b>DEVELOPMENT CENTER, VERO BEACH, FLA.</b>	Airplane Flight Manual Model PA-28R-180
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Approved	REPORT VB-173	PAGE <u>III</u>

Log of Revisions  
(Continued)

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
8	4	Changed Caution Range airspeed.	 D. H. Trompler FAA DOA SO-1	May 24, 1989

Revision	Revised Pages	Description and Revision	FAA Approved Date
9	iii 4.1	Added Rev. 9 to L of R. Revised text in Procedures Section, Para. 3.	 Eric A. Wright March 22, 2013

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- Placards (Cont)
3. On the instrument panel in full view of pilot:  
"MANEUVERING SPEED - 134 MPH"
  4. On the instrument panel in full view of pilot:  
"DEMONSTRATED CROSSWIND COMPONENT 20 MPH"
  5. Adjacent to upper door latch:  
"ENGAGE LATCH BEFORE FLIGHT"
  6. On inside of baggage compartment door:  
"BAGGAGE MAX. 200 LBS. SEE WEIGHT AND BALANCE DATA FOR BAGGAGE LOADING BETWEEN 150 AND 200 LBS."
  7. Near EMERGENCY GEAR LEVER: "EMERGENCY DOWN"  
On airplanes equipped with backup gear extender:  
"OVERRIDE UP"
  8. Near landing gear selector switch:  
"GEAR UP 125 MPH MAX."  
"DOWN 150 MPH MAX."
  9. In full view of pilot when AUTOFLITE is installed:  
"FOR HEADING CHANGES: PRESS DISENGAGE SWITCH ON CONTROL WHEEL. CHANGE HEADING, RELEASE DISENGAGE SWITCH."
  10. On instrument panel in full view of pilot when the oil cooler winterization kit is installed:  
"OIL COOLER WINTERIZATION PLATE TO BE REMOVED WHEN AMBIENT TEMPERATURE EXCEEDS 50°F."
  11. On the instrument panel in full view of pilot when the AUTOFLITE II is installed:  
"TURN AUTOFLITE ON. ADJUST TRIM KNOB FOR MINIMUM HEADING CHANGE. FOR HEADING CHANGE, PRESS DISENGAGE SWITCH ON CONTROL WHEEL, CHANGE HEADING, RELEASE SWITCH. ROTATE TURN KNOB FOR TURN COMMANDS. PUSH TURN KNOB IN TO ENGAGE TRACKER. PUSH KNOB IN FOR HI SENSITIVITY. LIMITATIONS, AUTOFLITE OFF FOR TAKEOFF AND LANDING."

Placards  
(Cont.)

12. On the instrument panel in full view of the pilot when the supplementary white strobe lights are installed:

"WARNING - TURN OFF STROBE LIGHTS WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT, OR DURING FLIGHT THROUGH CLOUD FOG OR HAZE."

Airspeed Instrument Markings	RED radial line	Never exceed	214 MPH (186 KTS)
	YELLOW arc	Caution Range Smooth air only	170 to 214 MPH (148 to 186 KTS)
	GREEN arc	Normal operating range	69 to 170 MPH (60 to 148 KTS)
	WHITE arc	Flap down range	63 to 125 MPH (55 to 109 KTS)

2. Procedures

1. The stall warning system is inoperative with the master switch OFF.
2. The electric fuel pump must be ON for both landing and takeoff.
3. Some airplanes are equipped with an airspeed-power sensing system (backup gear extender) which extends the landing gear under low airspeed-power conditions\* even though the pilot may not have selected the gear down. This system will also prevent retraction of the landing gear by normal means when the airspeed-power values are below a predetermined minimum. (See Item 5).

For normal operation, the pilot should extend and retract landing gear with the gear selector switch located on the instrument panel, just as he would if the backup gear extender were not installed.

\*Approximately 105 MPH IAS at any altitude, power off.

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Procedures  
Section  
(Cont)

4. Landing gear position indication and warning lights:
- (a) The RED gear warning light on the instrument panel and the horn operate simultaneously when:
    - (1) In flight, when the throttle is reduced to less than approximately 14 inches Hg manifold pressure, and the gear selector is not in the DOWN position.
    - (2) In flight, on airplanes equipped with the backup gear extender, when the system has lowered the landing gear and the gear selector switch is not in the DOWN position and the throttle is not full open.
    - (3) On the ground, when the master switch is on and the gear selector switch is in the UP position.
  - (b) The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.
  - (c) The yellow "In Transit" light on the instrument panel operates whenever any of the three gears is not in either the full retracted position or the fully extended position.

On airplanes NOT equipped with the backup gear extender, an additional switch is installed which activates the warning horn and light whenever the flaps are extended beyond the approach position (10°), and the landing gear is not down and locked.

Prepared	<b>PIPER AIRCRAFT CORP.</b> <b>DEVELOPMENT CENTER, VERO BEACH, FLA.</b>	Airplane Flight Manual Model PA-28R-180
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2. Procedures  
Section  
Section

Prior to takeoff and landing, the Emergency Gear Extension Lever should be verified in the normal/disengaged position to permit normal gear extension/retraction. For aircraft which do not have the back-up gear extender, the Emergency Gear Extension Lever should be verified in the up position to permit normal gear operation. In both gear operating system configurations, gear operation with the Emergency Gear Extension Lever in an intermediate position can result in a gear malfunction.

\*Approximately 105 MPH IAS at any altitude, power off.

4. Landing gear position indicator and warning lights:

- (a) The RED gear warning light on the instrument panel and the horn operate simultaneously when:
  - (1) In flight, when the throttle is reduced to less than approximately 14 inches Hg manifold pressure, and the gear selector switch is not in the DOWN position.
  - (2) In flight, on airplanes equipped with the backup gear extender, when the system has lowered the landing gear and the gear selector switch is not in the DOWN position and the throttle is not full open.
  - (3) On the ground, when the master switch is on and the gear selector switch is in the UP position.
- (b) The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.
- (c) The yellow "In Transit" light on the instrument panel operates whenever any of the three gears is not in either the full retracted position or the fully extended position.

On airplanes NOT equipped with the backup gear extender, an additional switch is installed which activates the warning horn and light whenever the flaps are extended beyond the approach position (10°) and the landing gear is not down and locked.

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Procedures  
Section  
(Cont)

5. Takeoff considerations:

During takeoff, on airplanes equipped with the backup gear extender, if the gear selector switch is placed in the gear UP position before reaching the airspeed at which the system no longer commands gear down,\* the gear will not retract. For obstacle clearance on takeoff and for takeoffs from high altitude airports, the landing gear can be retracted at the pilot's discretion by placing the gear selector in the UP position and then holding the emergency gear lever in the OVERRIDE UP position. It is necessary to hold the lever in this position, until the speed required for retraction by the system, has been attained.

\* Approximately 85 MPH IAS at sea level to approximately 100 MPH IAS at 10,000 ft. with a straight line variation between.

6. Emergency landing gear extension procedures:

Accomplish the following checks prior to initiation of the emergency extension procedures:

- (a) Master switch - Check ON
- (b) Circuit breakers - Check
- (c) Panel lights - OFF (in daytime)
- (d) Gear indicator bulbs - Check

If landing does not check down and locked:

- (e) Reduce airspeed below 100 MPH.
- (f) Move landing gear selector switch to gear down position.
- (g) On airplanes equipped with backup gear extender, if gear has failed to lock down, raise emergency gear lever to "OVERRIDE ENGAGED" position.
- (h) If gear has failed to lock down, move emergency gear lever to "EMERGENCY DOWN" position.
- (i) If gear has still failed to lock down, yaw the airplane abruptly from side to side with the rudder.



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Procedures  
Section  
(Cont)

6. Emergency landing gear extension procedures: (cont.)

If the nose gear will not lock down using the above procedure, slow the airplane to the lowest safe speed attainable using the lowest power setting required for safe operation and accomplish the following:

- (j) On airplanes equipped with backup gear extender, raise the emergency gear lever to "OVERRIDE ENGAGED" position.
- (k) Move landing gear selector switch to gear down position.

If landing gear does not check down, recycle gear through UP position, and repeat (k).

7. Gear up emergency landing:

In the event a gear up landing is required, make an initial approach at not less than 110 MPH to prevent the gear from free falling on airplanes equipped with the backup gear extender.

- (a) Leave flaps up (to reduce wing and flap damage).
- (b) Close the throttle and shut off the master and ignition switches.
- (c) Turn the fuel selector valve OFF.
- (d) On airplanes equipped with the backup gear extender hold the emergency gear lever in the "OVERRIDE UP" position while reducing airspeed and until the airplane comes to rest. Contact the surface at minimum airspeed.

NOTE: With the master switch off, the landing gear cannot be retracted.

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Procedures  
Section  
(Cont)

8. (Electric pitch trim only)

The following emergency information applies in case of electric pitch trim malfunction:

- (a) In case of malfunction, disengage electric pitch trim by pushing pitch trim switch on instrument panel to OFF position.
- (b) In an emergency, electric pitch trim may be overpowered using manual pitch trim.
- (c) In cruise configuration, malfunction results in 10° pitch change and 30 ft. altitude variation.

9. (Autoflite installation only)

I Limitations

- (a) None

II Procedures

- (a) Normal operations - Refer to Manufacturers Operation Manual.
- (b) Emergency
  - 1. In case of malfunction PRESS disconnect switch on pilot's control wheel.
  - 2. Rocker switch on instrument panel - OFF.
  - 3. Unit may be overpowered manually.

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EQUIPMENT LIST

MODEL PA-28R-180

SERIAL NOS. 28R-30000 THRU 28R-31270

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APPROVED	REPORT VB-174	PAGE <u>ii</u>

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	12	Added: R. C. Allen Turn Coordinator #80-9	<i>J. Mc Cleaver</i>	1-27-69
2	14	Changed Narco Mark 12A to read: Narco Mark 12A or Narco Mark 12B	<i>J. Mc Cleaver</i>	2-4-69
	15	Added: Narco Mark VIII Narco VOA-50M Omni Convertor Narco VOA-40 Omni Convertor (2)		
3	16	Removed: All miscellaneous items, total optional equipment and exterior finish.  Added: Narco Mark 16 Installations	<i>J. Mc Cleaver</i>	7-16-69
	17	Page added; Entered all miscellaneous items, total optional equipment and exterior finish (removed from page 16 above).  Added: Adjustable front seat installations and overhead vent system.		
4	11	Added: Strobe Light, Whelen Engineering Company	<i>J. Mc Cleaver</i>	10-5-69
5	17	Under Exterior Finish Changed 1st Trim Color to Trim Color and 2nd Trim Color to Accent Color	<i>J. Mc Cleaver</i>	12-4-69
6	17	Added: Calibrated Alternate Static Source Placard	<i>J. Mc Cleaver</i>	3-18-70
7	8	Added Spinner and Attachment Plate Installation	<i>J. Mc Cleaver</i>	5-27-70
8	1	Changed Unusable Fuel: 13 1/3 pints was 3 pints 10.0 lbs. was 2.2 lbs.	<i>J. Mc Cleaver</i>	6-23-70

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174	PAGE <u>iii</u>

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
9	7	Change Unusable Fuel: 13-1/3 Pints was 3 Pints 10.0 lbs. was 2.2 lbs.	<i>J. McLean</i>	8-26-70
10	Title	Added Serial Nos. 28R-30000 thru 28R-31270	<i>J. McLean</i>	8-28-70

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WEIGHT AND BALANCE DATA  
MODEL PA-28R-180 CHEROKEE

Airplane Serial Number 28 R -

Registration Number \_\_\_\_\_

Date \_\_\_\_\_

AIRPLANE EMPTY WEIGHT

Item	Weight (lbs.)	C. G. Arm X (Inches Aft of Datum)	Moment (In-lbs)
Standard Empty Weight *			
Optional Equipment			
Unusable Fuel (13 1/3 Pints)	10.0	103.0	1030
Licensed Empty Weight = Total of Above Items			

\* Standard Empty Weight includes paint, hydraulic fluid and undrainable engine oil.

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

(Gross Weight) - (Licensed Empty Weight) = Useful Load

(2500 lbs) - (            lbs) =            lbs.

THIS LICENSED EMPTY WEIGHT, C. G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO FORM FAA-337 WHEN ALTERATIONS HAVE BEEN MADE.

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C. G. RANGE AND WEIGHT INSTRUCTIONS

1. Add the weight of all items to be loaded to the licensed empty weight.
2. Use the loading graph to determine the moment of all items to be carried in the airplane.
3. Add the moment of all items to be loaded to the licensed empty weight moment.
4. Divide the total moment by the total weight to determine the C. G. location.
5. By using the figures of Item 1 and Item 4, locate a point on the C. G. range and weight graph. If the point falls within the C. G. envelope, the loading meets the weight and balance requirements.

SAMPLE LOADING PROBLEM (Normal Category)

	Weight (lbs)	Arm Aft Datum (Inches)	Moment (In - Lbs)
Licensed Empty Weight			
Oil (8 quarts)	15	29.5	443
Pilot and Front Passenger	340	85.5	29070
Passengers, Aft (Rear Seat)	340	118.1	40154
Fuel (50 Gal. Maximum)		95.0	
* Baggage		142.8	
Moment due to Retracting of Landing Gear	—	—	819
Total Loaded Airplane			

The center of gravity (C. G. ) of this sample loading problem is at \_\_\_\_\_ inches aft of the datum line. Locate this point ( ) on the C. G. range and weight graph. Since this point falls within the weight - C. G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

\* Check Aft C. G. between 150 lbs and 200 lbs.

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CHECKED

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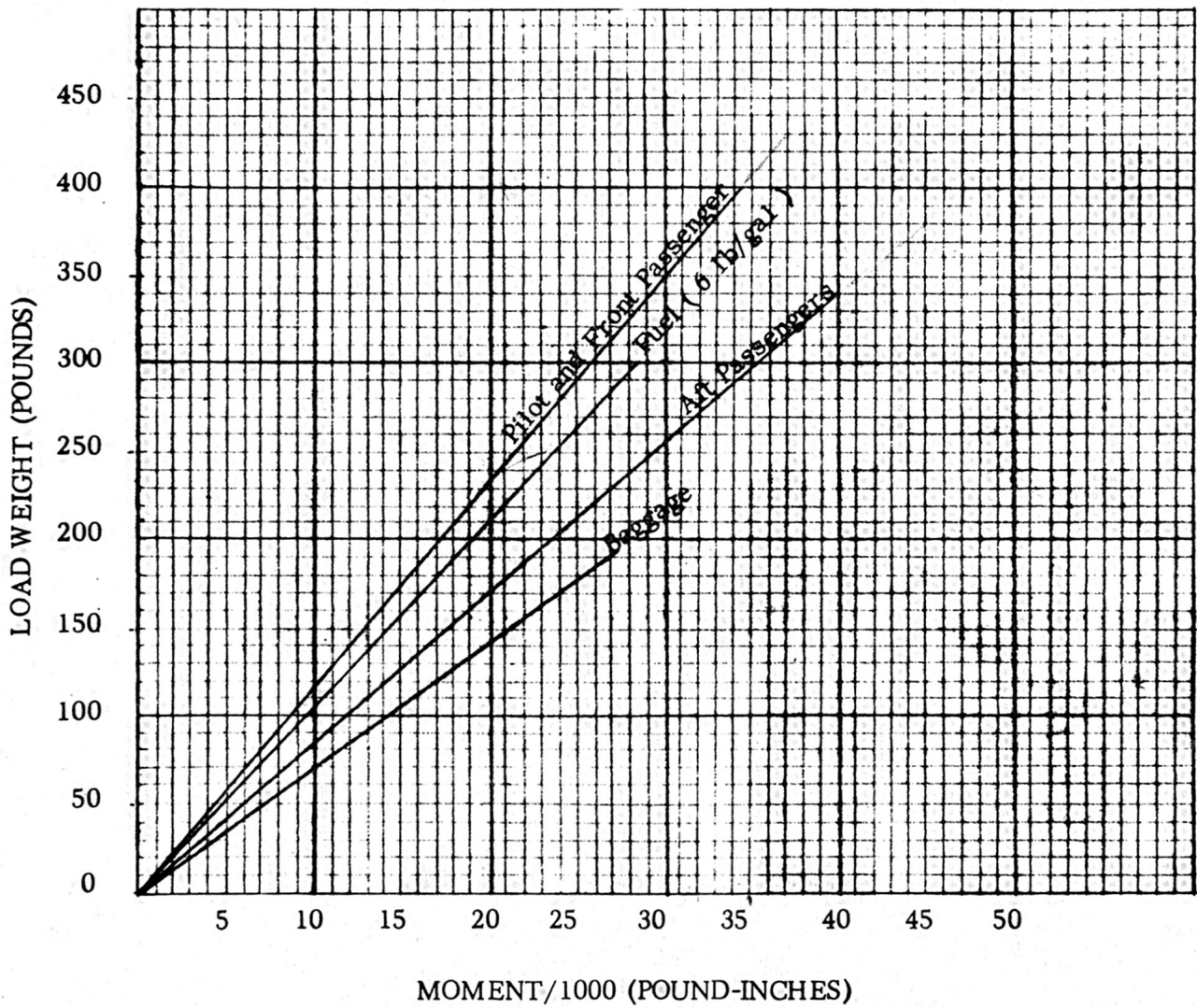
Weight and Balance Data  
Model PA-28R-180

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## LOADING GRAPH

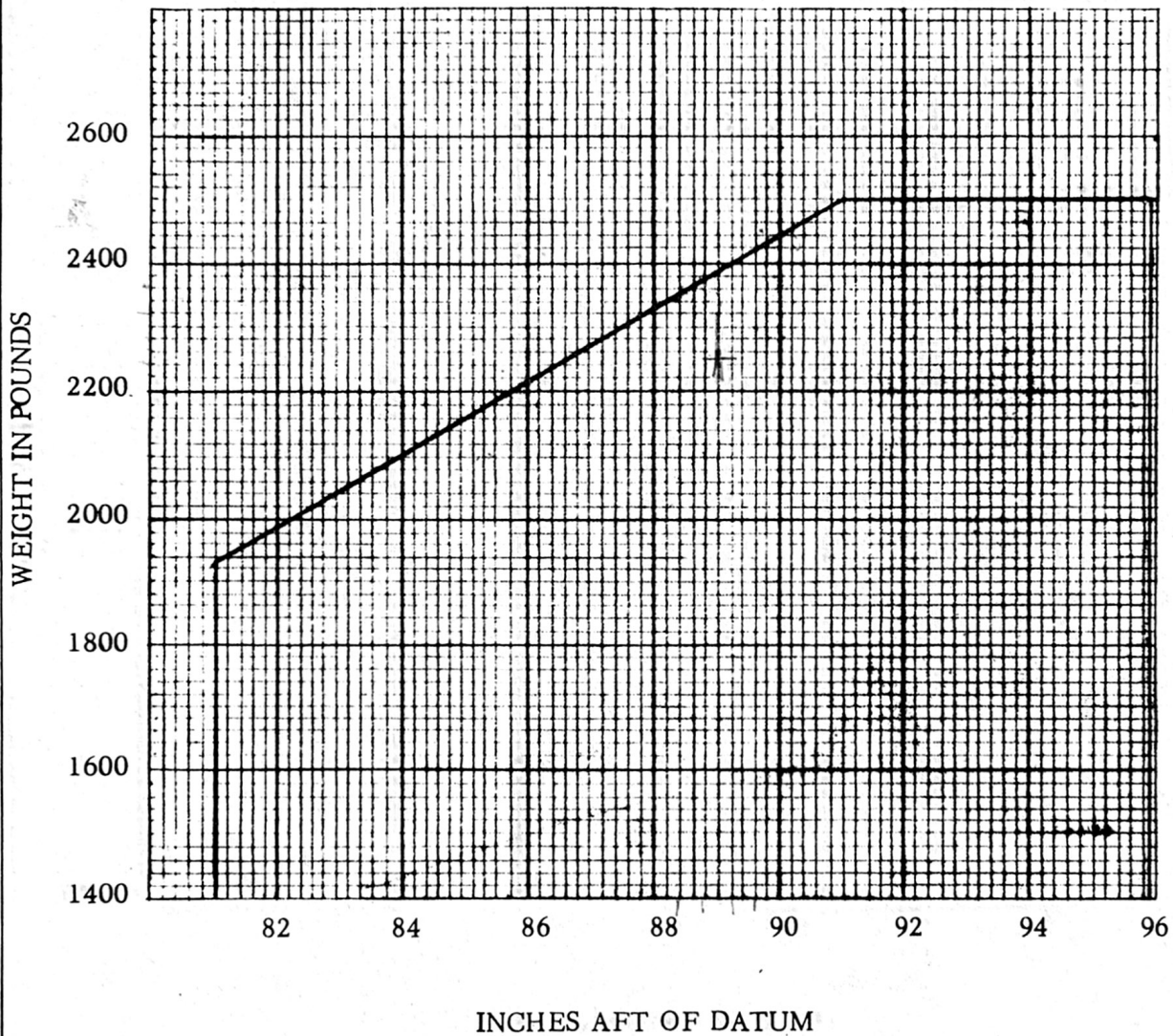
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11





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C. G. RANGE AND WEIGHT



MOMENT DUE TO RETRACTING LANDING GEAR = +819 IN-LBS

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WEIGHT AND BALANCE DATA

WEIGHING PROCEDURE

At the time of delivery, Piper Aircraft Corporation provides each airplane with the licensed empty weight and center of gravity location. This data is on Page 1, Section 1 of this Flight Manual.

The removal or addition of an excessive amount of equipment or excessive airplane modifications can affect the licensed empty weight and empty weight center of gravity. The following is a weighing procedure to determine this licensed empty weight and center of gravity location:

1. PREPARATION

- a. Be certain that all items checked in the airplane equipment list are installed in the proper location in the airplane.
- b. Remove excessive dirt, grease, moisture, foreign items such as rags and tools from the airplane before weighing.
- c. Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Operate engine on each tank until all undrainable fuel is used and engine stops.
- d. Drain all oil from the engine, by means of the oil drain, with the airplane in ground attitude. This will leave the undrainable oil still in the system. Engine oil temperature should be in the normal operating range before draining.
- e. Place pilot and co-pilot seats in fourth (4th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. Tow bar should be in the proper location and all entrance and baggage doors closed.
- f. Weigh the airplane inside a closed building to prevent errors in scale readings due to wind.

2. LEVELING

- a. With airplane on scales, block main gear oleo pistons in the fully extended position.
- b. Level airplane (see diagram) by deflating nose wheel tire, to center bubble on level.

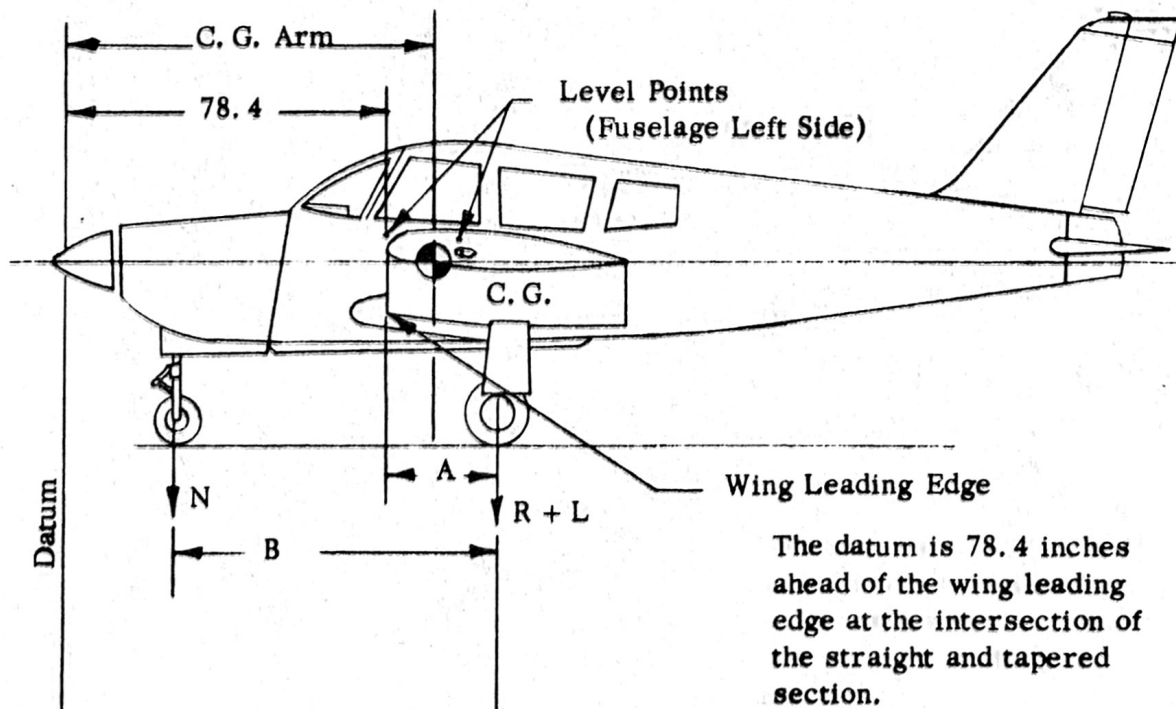
3. WEIGHING - AIRPLANE EMPTY WEIGHT

- a. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

Scale Position and Symbol	Scale Reading	Tare	Net Weight
Nose Wheel (N)			
Right Main Wheel (R)			
Left Main Wheel (L)			
Airplane Empty Weight, as Weighed (T)			

4. EMPTY WEIGHT CENTER OF GRAVITY

- a. The following geometry applies to the PA-28R-180 airplane when airplane is level (See Item 2) .



The datum is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

A =

B =

- b. Obtain measurement "A" by measuring from a plumb bob dropped from the wing leading edge, at the intersection of the straight and tapered section, horizontally and parallel to the airplane centerline, to the main wheel centerline.
  
- c. Obtain measurement "B" by measuring the distance from the main wheel centerline, horizontally and parallel to the airplane centerline, to each side of the nose wheel axle. Then average the measurements.
  
- d. The empty weight center of gravity (as weighed including optional equipment and undrainable oil) can be determined by the following formula:

$$C. G. Arm = 78.4 + A - \frac{B(N)}{T}$$

C. G. Arm = 78.4 + (            ) -  $\frac{(            )(            )}{(            )}$  =            inches

5. LICENSED EMPTY WEIGHT AND EMPTY WEIGHT CENTER OF GRAVITY

	Weight	Arm	Moment
Empty Weight (as weighed)			
Unusable Fuel (13-1/3 Pints)	+ 10.0	103.0	+ 1030
Licensed Empty Weight			

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174 STANDARD EQUIPMENT LIST	PAGE 8 Section 1

WEIGHT AND BALANCE  
STANDARD EQUIPMENT LIST  
MODEL PA-28R-180

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Engine Accessories</u>			
_____	Engine - Lycoming Model IO-360-B1E	284.5	23.4	6657
_____	Fuel Pump, Electric Auxiliary, Weldon #8120-AB	2.8	47.9	134
_____	Fuel Pump, Engine Driven, Lycoming 75247	1.6	37.0	59
_____	Oil Cooler, PAC 18622, Harrison #C-8526250	2.2	45.0	99
_____	Filter, Fram Model CA-144PL	.5	42.2	21
_____	Alternator, 60 amp, Chrysler 2642997	12.5	14.6	183
_____	Starter - Lycoming 76211 (Prestolite MZ4206)	* 18.0	15.5	279
	<u>Propeller and Propeller Accessories</u>			
_____	Propeller, Hartzell HC-C2YK-1/7666A-0	55.0	3.1	171
_____	Spinner and Attachment Plates	3.5	4.8	17
_____	Governor, Hartzell F-2-2 ( )	5.5	39.1	215
_____	Governor, Hartzell F-2-7 ( )	5.5	39.1	215
_____	Spinner and Attachment Plate Installation Piper Drawing 99374	5.0	2.8	14

\* Included in Engine Weight

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28R-180
APPROVED		REPORT VB-174 STANDARD EQUIPMENT LIST
		PAGE 9 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Landing Gear and Brakes</u>			
	Two Main Wheel Assemblies 6.00-6	31.5	109.8	3459
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-84 Brake Assembly No. 30-41			
	(b) Two Main 4-Ply Rating Tires 6.00-6 with Regular Tubes			
	One Nose Wheel 5.00-5	8.1	20.5	166
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-77 (Less Brake Drum)			
	(b) One Nose Wheel 4-Ply Rating Tire 5.00-5 with Regular Tube			
	<u>Electrical Equipment</u>			
	Stall Warning Device, Safe Flight Instrument Corporation No. C52207-4	.2	80.2	16
	Voltage Regulator, Wico Electric No. X-16300B	.5	64.4	32
	Battery 12 V, 25 A. H., Rebat Model S-24 or S-25	21.5	168.0	3612

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174 STANDARD EQUIPMENT LIST	PAGE 10 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Instruments</u>			
_____	Compass, Piper Drawing 67462	.9	65.7	59
_____	Airspeed Indicator, Piper Drawing 67434-2	.6	66.8	40
_____	Tachometer, Stewart-Warner, PAC 62177-5	.8	66.2	53
_____	Altimeter, Karnish No. AC-157	1.0	65.9	66
_____	Altimeter, Macleod No. 12003 or 12003M	1.0	65.9	66
_____	Manifold Pressure and Fuel Flow, Piper Drawing 67414 or 67474	1.1	65.8	72
_____	Engine Cluster, Piper Drawing 67441-2	.9	67.4	61
_____	Engine Cluster, Piper Drawing 67441-3	.9	67.4	61
_____	Manifold Pressure Gauge, PAC 21962	1.1	65.8	72
_____	Engine Cluster, Piper Drawing 95241-2	.9	67.4	61
_____	Engine Cluster, Piper Drawing 95241-3	.9	67.4	61
	<u>Miscellaneous</u>			
_____	Forward Seat Belts (2)	1.5	86.9	130
_____	Aft Seat Belts (2)	1.4	123.0	172
_____	Flight Manual	-	-	-
_____	Toe Brakes (Single)	5.0	54.6	273
_____	Tow Bar	2.3	133.0	306

THE ABOVE ITEMS ARE INCLUDED IN THE AIRPLANE STANDARD EMPTY WEIGHT.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174 OPTIONAL EQUIPMENT LIST	PAGE 11 Section 1

OPTIONAL EQUIPMENT LIST  
MODEL PA-28R-180

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Engine Accessories</u>			
_____	Vacuum Pump and Drive, Airborne Mechanisms	5.0	34.6	173
_____	Vacuum Regulator and Filter	2.2	57.0	125
_____	Oil Filter-Lycoming #74911 (AC 81-A #6437032)	3.3	38.1	126
	<u>Electrical Equipment</u>			
_____	Rotating Beacon, Grimes #40-0101-7-12 or Grimes #40-0101-15-12	1.5	263.4	395
_____	Landing Light, G. E. Model 4509	.5	15.0	8
_____	Navigation Light (Rear)(1) Grimes Model A2064 (White)	.2	281.5	56
_____	Navigation Lights (2) Grimes Model A1285 (Red and Green)	.4	106.6	43
_____	Dome Light	.3	104.0	31
_____	Speaker	.8	104.0	83
_____	Battery 12V, 35 A. H. , Rebat R-33 or R-35 (Weight 27.0 lbs)	5.5 *	168.0	924
_____	Auxiliary Power Receptacle and Diode, Piper Drawing 65647	2.7	178.5	482
_____	External Power Cable, Piper Dwg. 62355-2	4.6	142.8	657
_____	Piper Pitch Trim	4.0	158.0	632
_____	Heated Pitot Head	.4	100.0	40
_____	Strobe Light, Whelen Engineering Co.	2.7	217.4	587

\* Weight and moment difference between standard and optional equipment.



PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28R-180
APPROVED	REPORT VB-174 OPTIONAL EQUIPMENT LIST	PAGE 12 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Instruments</u>			
	Exhaust Gas Temperature Gage, PAC Drawing 25668	.7	60.4	42
	Brittain Turn Coordinator #TC-100(12)	2.6	64.7	168
	Rate of Climb, Karnish #135-3	1.0	65.9	66
	Rate of Climb, AN5825	1.4	65.9	92
	Air Temperature Gage, Manning, Maxwell & Moore NHM-70	.2	82.6	17
	Clock. 8-Day, MIL-C-7939	.4	67.4	27
	Tru-Speed Indicator, PAC Drawing 67433-2	Same as Standard Equipment Weight		
	Electric Turn & Bank	2.2	64.9	143
	Pictorial Rate of Turn, Mitchell 52D69	1.3	65.3	85
	Directional Gyro, Garwin #4000B	2.4	64.7	155
	or AIM #200	3.1	64.0	198
	Attitude Gyro, Garwin #5000B	1.8	64.9	117
	or AIM #100	2.2	64.4	142
	Attitude Gyro, R. C. Allen (3")	2.2	65.6	144
	Directional Gyro, R. C. Allen (3")	3.3	64.8	214
	Rate of Climb, Standard Precision SP-1403-(1)-PIP	.5	65.9	33
	Suction Gauge-Piper Drawing 67481	.5	67.2	34
	Suction Gauge-U. S. Gauge AW1821AFO3	.5	67.2	34
	Suction Gauge-Airborne Mechanisms 1G3-4	.5	67.2	34
	R. C. Allen Turn Coordinator #80-9	2.3	64.7	149
	<u>AutoPilots</u>			
	<u>AutoFlite</u>			
	Roll Servo, Mitchell #1D363-183R	2.6	122.2	318
	Gyro Amplifier, Mitchell #1C359-1	1.8	111.8	201

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174 OPTIONAL EQUIPMENT LIST	PAGE 13 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>AutoPilots</u>			
_____	Cables	1.0	95.5	96
_____	Panel Unit	.3	67.9	20
	<u>AutoControl III</u>			
_____	Roll Servo, Mitchell #1D363-183R	2.5	122.2	306
_____	Console, Mitchell #1C338	1.2	65.1	78
_____	Cables	.7	95.5	67
_____	Attitude Gyro, Garwin	1.9	64.9	123
_____	or AIM #700-2CF	2.3	64.4	148
_____	Directional Gyro, Garwin	2.5	64.7	162
_____	or AIM #200-6	3.2	64.0	205
_____	Omni Coupler	.9	64.3	58
	<u>Radio</u>			
	<u>Bendix ADF-T-12</u>			
_____	Receiver	3.8	65.8	250
_____	Loop Antenna	1.2	160.8	193
_____	Servo Indicator	1.7	66.4	113
_____	Audio Amplifier	.8	56.0	45
_____	Antenna Cable	1.5	108.0	162
_____	Sense Antenna and Cable	.4	150.0	60

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28R-180
APPROVED		REPORT VB-174 OPTIONAL EQUIPMENT LIST
		PAGE 14 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (Continued)			
	Narco ADF-31A, Piper Dwg. 67456			
	Panel Unit	4.8	63.5	305
	Sensor Unit and Doublers	2.2	162.7	358
	Sensor Cable	2.3	105.6	243
	Sense Antenna and Cable	.4	150.0	60
	King KX150B	9.1	61.9	563
	Low Frequency Antenna	.5	167.0	84
	Narco Mark III	7.5	62.7	470
	Narco Mark 12A or Narco Mark 12B			
	Transceiver, Single	6.0	61.9	371
	Transceiver, Dual	12.0	61.9	742
	Modulator - Power Unit, Single	4.0	186.0	744
	Modulator - Power Unit, Dual	8.0	186.0	1488
	Cables - Single	1.7	120.0	204
	Cables - Dual	5.1	120.0	612
	Junction Box	.6	67.2	40
	Transmitter Selector (Dual VHF Only)	.7	66.3	46
	Narco VOA-6 Omni Convertor	1.8	64.4	116
	Narco VOA-5 Omni Convertor	3.1	64.4	200

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174 OPTIONAL EQUIPMENT LIST	PAGE 15 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (Continued)			
_____	Narco VOA-4 Omni Convertor	3.0	64.4	193
_____	Omni Receiving Antenna, Narco VRP-37 (Includes Cables)	1.4	203.0	284
_____	VHF #1 Transmitting Antenna, Narco VTP-17	.3	157.8	47
_____	VHF #2 Transmitting Antenna, Narco VTP-17	.3	192.8	58
_____	Cable VHF #1 Trans Antenna	.4	118.0	47
_____	Cable VHF #2 Trans Antenna	.5	135.0	68
_____	PM-1 Marker Beacon			
_____	Receiver	1.1	121.3	133
_____	Panel Unit	.3	68.1	20
_____	Cable	.3	85.0	26
_____	Glide Slope - UGR-2			
_____	Receiver	2.4	173.8	417
_____	Cable	2.1	128.0	269
_____	Antenna	.4	92.4	37
_____	Cable, Antenna	.5	145.0	73
_____	Narco VOA-4 Omni Convertor	3.0	64.4	193
_____	Narco Mark VIII	7.5	62.7	470
_____	Narco VOA-50M Omni Convertor	2.1	64.9	136
_____	Narco VOA-40 Omni Convertor	1.9	64.9	123
_____	Narco VOA-40 Omni Convertor	1.9	64.9	123

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		REPORT VB-174 OPTIONAL EQUIPMENT LIST
APPROVED		PAGE 16 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (Continued)			
	Narco UDI-4, DME			
	Receiver	8.5	61.7	524
	Antenna	.3	113.9	34
	Cable	.4	100.0	40
	Microphone	.5	75.0	38
	Headset	.5	65.0	33
	Omni Tracker (#1D482)	.5	54.9	27
	Narco VOA-8 Omni Convertor	3.3	64.4	213
	Narco VOA-9 Omni Convertor	3.4	64.4	219
	Narco Mark 16			
	Transceiver, Single	7.5	61.9	464
	Transceiver, Dual	15.0	61.9	929
		.7	56.1	39.3
<u>X</u>	Narco AR 850 Alt. Report			

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28R-180
CHECKED		
APPROVED	REPORT VB-174 OPTIONAL EQUIPMENT LIST	PAGE 17 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Miscellaneous</u>			
_____	Assist Step	1.8	156.0	281
_____	Toe Brakes (Right)	5.0	54.6	273
_____	Fire Extinguisher-Stop Fire #A-20	7.5	93.0	698
_____	Inertia Safety Belt	2.5	111.6	279
_____	Assist Strap & Coat Hooks	.2	109.5	22
_____	Lighter	.2	67.9	14
_____	Alternate Static Source	.4	64.9	26
	Calibrated Alternate Static Source			
	Placard Rquired: Yes ___ No ___			
_____	Fire Extinguisher-Kidde Kompact VI (With Brackets)	5.3	85.0	451
_____	Adjustable Front Seat (Left)	3.8 *	85.5	325
_____	Adjustable Front Seat (Right)	3.8 *	85.5	325
_____	Overhead Vent System	1.2	129.7	156

TOTAL OPTIONAL EQUIPMENT

EXTERIOR FINISH

Base Color \_\_\_\_\_ Registration No. Color \_\_\_\_\_

Trim Color \_\_\_\_\_ Type Finish \_\_\_\_\_

Accent Color \_\_\_\_\_

\* Weight and moment difference between standard and optional equipment.

SUPPLEMENT TO AIRCRAFT WEIGHT AND BALANCE:

PIPER CHEROKEE APROW PA28R-180 N3936T Serial 28R-30277

- Removed Piper Junction Box.
- Installed MARCO Mark 12B "360" transceiver.
- Installed MARCO VOA-40M Omni/Loc, Marker Converter.
- Installed MARCO Master VP-22A Selector Switch.
- Installed Piper PM-1 Marker Beacon Receiver (connected to VOA-40B)
- Installed Beta 4096 Transponder.
- Installed Mitchell Autoflite.
- Installed Mitchell Nav Tracker.

ITEM	WT	ARM	MOMENT
A/C EWT	1467.1	84.6	124184.0
Removed: Junction Box	- .6	67.2	- 40.0
Installed:			
Mark 12B Transceiver	+ 6.0	61.9	+ 371.0
VOA-40M Omni/Loc Converter	+ 1.8	64.4	+ 115.9
<del>VP-22A Selector Switch</del>	<del>+ .5</del>	<del>67.2</del>	<del>+ 33.6</del>
VTP-17 Trans Antenna	+ .3	192.8	+ 58.0
Cable-VHF #2 Tx Antenna	+ .5	135.0	+ 68.0
Piper PM-1 MB Rec	+ 1.1	121.3	+ 133.0
Piper PM-1 Cable	+ .3	85.0	+ 26.0
Genave Beta 4096 Transponder	4.4	64.4	+ 283.4
Genave Beta 4096 Antenna	+ .3	110.9	+ 33.3
Genave Beta 4096 Ant Cable	+ .4	101.65	+ 40.7
Mitchell-Roll Servo	+ 2.6	122.2	+ 318.0
Mitchell-Gyro Amplifier	+ 1.8	111.8	+ 201.0
Mitchell-Cables	+ 1.0	95.5	+ 96.0
Mitchell-Panel Unit	+ .3	67.9	+ 20.0
Mitchell-Nav Tracker	+ .5	54.9	+ 27.0
	<u>1488.3</u>	<u>84.6</u>	<u>125968.9</u>

New A/C EWT = 1488.3  
 New EWT CG = 84.6  
 New Useful Load = 1011.7

DATED: January 27, 1971

*Superseded 5/15/74*

Donald W. LeGore  
 Donald W. LeGore  
 c/o Graham Flying Service, Inc.  
 Repair Station No 304-3

IOWA CITY FLYING SERVICE, INC.  
MUNICIPAL AIRPORT  
IOWA CITY, IA.

REVISION OF WEIGHT & BALANCE DATA & EQUIPMENT LIST

FOLLOWING EQUIPMENT REMOVED OR INSTALLED

AIRPLANE PA-28R 180 SERIAL NO. 28R-30227 NC N3936T DATE 5/15/74

IN	OUT	ITEM	WEIGHT	ARM	MOMENT
		Old A/c Empty weight	1488.3	84.6	125910.18
X		Alert Model 50 EIT	2.1	215.8	453.18

*Supper exceeded  
by 10-3-74  
M. P. Kelly*

CURRENT EMPTY WIEGHT 1490.4  
CURRENT EMPTY WEIGHT C.G. 84.8  
CURRENT USEFUL LOAD 1009.6  
GROSS WEIGHT 2500  
SIGNATURE Richard Vitaleum Jr  
RATING & NUMBER AIP 2209970



REVISION OF WEIGHT & BALANCE AND EQUIPMENT LIST

DATE 10-3-74

AIRCRAFT MAKE & MODEL Piper PA-28R 180

N 3936T

SERIAL # 28R-30277

IN	OUT	ITEM	WEIGHT	ARM	MOMENT
		Previous empty weight	1490.4	84.8	126385.9
X	X	Genave Beta 4096 Transponder	- 4.4	64.4	- 283.4
		Narco AT50A Transponder	2.7	64.4	173.9
			1488.7	84.8	126276.4

*Defg increased 1-13-77  
Bruce W. Smith*

GROSS WEIGHT 2500.0

NAME Michael D. Podhajsky

EMPTY WEIGHT 1488.7

NUMBER A&P 2048592

USEFUL LOAD 1011.3

E.W. CG 84.8

Revision of Weight & Balance Data and Equipment List  
and Loading Schedule.

The following equipment removed or installed under the  
provisions of FAR43:13.1 and 43:13.2 as a Minor  
Alternation.

FAA APPROVED REPAIR STATION NO. 30432

OWNER James J. Bader ADDRESS 3908 Knollcrest CT. NE  
Cedar Rapids, IA  
AIRPLANE Piper PA-28R SERIAL NO. 28R-30277  
DATE January 13, 1977 "N" NO. N39364

INSTALLED REMOVED	ITEM	WEIGHT	ARM	MOMENT
Installed by Persons un- known	Channel Master Stereo Unit	1.5	64	96.0
<p><b>SUPERSEDED</b> Weight and balance and equipment list. DATE <u>5-2-83</u> SIGNED <u>[Signature]</u></p>				
Previous Empty Airplane		1488.7	84.8	126276.4
Current Empty Airplane		1490.2	84.8	126372.4
Current Useful Load at Gross		1009.8		

Continuous duty electrical load is \_\_\_\_\_ amps. Generator capacity is \_\_\_\_\_ amps. It  
is the operators responsibility to determine that the aircraft remains within safe elec-  
trical and weight and balance limits. Refer to weight and balance sheet and loading  
schedule and center of gravity chart for proper loading.

*Bruce W. Smith*  
AIP 1597581

REVISION OF WEIGHT & BALANCE AND EQUIPMENT LIST

DATE 5/2/83

AIRCRAFT MAKE & MODEL Piper PA-28R

N 3936T

SERIAL # 28R-30277

IN	OUT	ITEM	WEIGHT	ARM	MOMENT
		<u>PREVIOUS EMPTY WEIGHT</u>	1490.2		126372.4
	X	Narco VP-22A Selector Switch	- .5	67.2	- 33.6
	X	PM-1 Marker Beacon Receiver	- 1.1	121.3	- 133.0
	X	Panel Unit	- .3	68.1	- 20.0
	X	Cable	- .3	85.0	- 26.0
	X	Narco VOA-40M Omni/COC Marker Conv.	- 1.8	64.4	- 115.9
	X	Narco 12A Transceiver	- 6.0	61.9	- 371.0
	X	Narco 12A T-12 MP-12A Power Unit	- 4.0	186.0	-744.0
	X	Narco 12A Cable	- 1.7	120.0	- 204.0
	X	Narco VTP-17 Transmitter Antenna	- .3	157.8	- 47.0
X		King KMA-24 Audio Panel/Marker Beacon	1.7	65.3	111.0
X		AD-8 Marker Beacon Antenna	.6	197.0	118.2
X		King KX 155 VHF Nav/Comm Transceiver	5.3	63.1	334.4
X		King KI 209 Indicator	1.2	65.1	78.1
X		AD-11 Comm Antenna	.9	157.8	142.0
X		King KN 64 DME	2.6	63.4	164.8
X		KA-60 DME Antenna	.2	59.5	12.0
			1486.7		125638.4

**SUPERCEDED**

DATE 6-8-83

GROSS WEIGHT 2500.0

NAME *Lyle Grimm*

EMPTY WEIGHT 1486.7

NUMBER CRS 3003

USEFUL LOAD 1013.3

E.W. CG 84.5

# KINGS AVIONICS, INC.

600 RICHARDS RD.

PHONE (816) 474-4606

KANSAS CITY, MISSOURI  
64116

MINOR ALTERATION

WEIGHT & BALANCE AND INSTALLED EQUIPMENT DATA

Date	Make & Model	Registration Number	Serial Number
6-8-83	Piper	3936T	28R-30277

Owner: Jim Lamb

Item	Weight	Arm	Moment
Aircraft empty weight	1486.7		125638.4
REMOVED:			
Gyro amplifier IC359-1	- .3	67.9	-20
RC. Allen Horizon and D.G.	±1.8	111.8	-201
	-5.5	65.3	-358
INSTALLED:			
Control Console IC338	1.2	65.1	78
Edo-Aire Horizon 52D6	2.2	64	140.8
Edo-Aire Direction Gyro 52D54	2.6	65	169.0
Cables	.7	95.5	67
King KR85 ADF with rack and plug	4.	62	248
KI 225 ind.	1.2	65	78
KA 442B antenna	2.4	154	369
Note: Processed for Your Radio Connection	1493.4		126209.2
<b>SUPERCEDED</b>			
DATE <u>10-28-85</u>			

Gross Weight = 2500  
 Empty Weight = 1493.7  
 Useful Load = 1006.6  
 C. G. (Arm) = 84.51

Signature of Authorized Individual

*Raymond* 2128501  
 KINGS AVIONICS, INC.  
 Repair #311-7

IN	OUT	I T E M	WEIGHT	ARM	MOMENT
		Previous weight and balance	1493.4	84.51	126209.2
X		Standby Vacuum System (Precise Flight Inc.)	1.5	38.1	126266.35

**SUPERSEDED**  
 Weight and balance and equipment list.  
 DATE 10-29-87  
 SIGNED [Signature]  
CR53003

GROSS WEIGHT 2500

NAME James Bearce

EMPTY WEIGHT 1494.9

NUMBER AP 481862653

USEFUL LOAD 1005.1

E. W. CG 84.46



REVISION OF WEIGHT & BALANCE AND EQUIPMENT LIST

DATE 10/29/87

AIRCRAFT MAKE & MODEL Piper PA 28R 180 N 3936T SERIAL # 28R-30277

IN	OUT	ITEM	WEIGHT	ARM	MOMENT
		PREVIOUS EMPTY WEIGHT	1494.9		126266.4
X		Navco AR-850 Altitude Reporter	.7	56.1	39.3
			1495.6		126305.7

SUPERCEDED

DATE 3-1-96

SPENCER AVIATION, INC.

GROSS WEIGHT 2500

NAME *John L. ...*

EMPTY WEIGHT 1495.6

NUMBER CRS 3003

USEFUL LOAD 1004.4

E.W. CG 84.5

WEIGHT AND BALANCE - SUPPLEMENTAL EQUIPMENT LIST REVISION

**SPENCER AVIONICS, INC.**

Municipal Airport Spencer, Iowa 51301  
FAA Repair Station #KU2R965K

OWNER: James Lamb/James Bader DATE: Mar. 01, 1996 TACH: 3475.89 hrs

AIRCRAFT: Piper PA-28R-180 S/N: 28R-30277 #: N3936T

<u>DESCRIPTION</u>	<u>WEIGHT</u>	<u>ARM</u>	<u>MOMENT</u>
PREVIOUS AIRCRAFT:	1495.6	84.45	126305.7

REMOVED:

a) Narco MK-12B Nav/Com #2 with tray	-6.0	61.9	-371.0
b) Narco VOA-4 VOR/LOC Indicator #2	-3.0	64.4	-193.0
c) Narco T-12MP-12A1 Power Supply w/mount	-4.0	186.0	-744.0
d) AD-8 Marker Beacon Antenna	-0.6	197.0	-118.2

INSTALLED:

a) King KLX-135A GPS/COMM #2 with tray	5.0	64.1	320.5
b) King GPS Database Loader Jack and Wiring	0.1	69.4	6.9
c) King KA-92 GPS Antenna, Coax, & Doubler	0.7	100.9	70.6
d) Comant CI-102 Marker Beacon Antenna	0.6	197.0	118.2

CURRENT AIRCRAFT: 1488.4 84.25 125395.7

CURRENT EMPTY WEIGHT 1488.4 lbs.

CURRENT EMPTY WEIGHT C.G. 84.25 "

CURRENT USEFUL LOAD 1011.6 lbs.

SIGNATURE

*William R. Heeme*



# REVISION OF WEIGHT AND BALANCE

06/01/2015

MAKE: PIPER

MODEL: PA28R-180

SERIAL NUMBER: 28R-30277

REGISTRATION: N3936T

<u>ITEM</u>	<u>WEIGHT</u>	<u>ARM</u>	<u>MOMENT</u>
1. Previous empty weight	1488.4	84.25	125395.7
2. Removed 2 bladed prop HC-C2YK/7666A-0	-55.0	-3.10	-170.5
3. Removed spinner assy.	-5.0	-2.8	-14.0
4. Installed 3 bladed prop Hartzell HC-C3YR-1RF/w spinner assy	72.4	3.1	224.44
<b>5. TOTALS</b>	<b>1500.8</b>	<b>83.58</b>	<b>125435.64</b>

NEW EMPTY WEIGHT: 1500.8 LBS.

NEW EMPTY WEIGHT C.G.: 83.58

MAX. GROSS: 2500 LBS.

NEW USEFUL LOAD: 999.2 LBS

\*\*THIS WEIGHT AND BALANCE REPORT SUPERCEDES REPORT DATED MAR. 01, 1996

1

*Duke Ball*

AP3170153



US Department  
of Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

OMB No. 2120-0020  
Exp: 5/31/2018

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

<b>1. Aircraft</b>	Nationality and Registration Mark <b>N3936T</b>	Serial No. <b>28R-30277</b>	
	Make <b>PIPER</b>	Model <b>PA28R180</b>	Series <b>PA28</b>
<b>2. Owner</b>	Name (As shown on registration certificate) <b>GREENCASTLE AERO CLUB</b>		Address (As shown on registration certificate) Address <b>2154 250TH STREET</b>
			City <b>OXFORD</b> State <b>IOWA</b> Zip <b>52322</b> Country <b>USA</b>

### 3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	<u>PIPER</u>	<i>(As described in Item 1 above)</i>	<u>28R-30277</u>
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

### 6. Conformity Statement

A. Agency's Name and Address		B. Kind of Agency		C. Certificate No.	
Name <b>Charles A. Spangur</b>		<input checked="" type="checkbox"/>	U. S. Certificated Mechanic	<b>AP482840153</b>	
Address <b>20956 230th Street</b>		<input type="checkbox"/>	Foreign Certificated Mechanic		
City <b>Bloomfield</b> State <b>Iowa</b>		<input type="checkbox"/>	Certificated Repair Station		
Zip <b>52537</b> Country <b>USA</b>		<input type="checkbox"/>	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual <i>Charles A. Spangur</i> <b>10/04/19</b>
--	--

### 7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  Approved  Rejected

BY	FAA Flt. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
	FAA Designee	Repair Station <input checked="" type="checkbox"/>	Inspection Authorization	Other (Specify)

Certificate or Designation No. <b>3170153IA</b>	Signature/Date of Authorized Individual <i>Duke Bell</i> <b>10/04/2019</b>
---	---

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N3936T

10/04/2019

Nationality and Registration Mark

Date

Installed uAvionix Sky Beacon ADS-B out transmitter P/N UAV-1001856-002 at left nav/position light location I.A.W. STC SA04362CH and instructions provided by the manufacturer. Used existing position light circuit with ref. to AC43.13-1B, Chapter 11, Sections 5 and 6. Placard installed next to position light switch stating switch must be "ON" for operation of the transmitter. Electrical load does not exceed 80% of the generator output. Weight change negligible. This installation meets the requirements of 14 CFR section 91.227. For Instructions for Continued Airworthiness see the most current revision of uAvionix Document #UAV-1002112-001.

-----END-----

Additional Sheets Are Attached

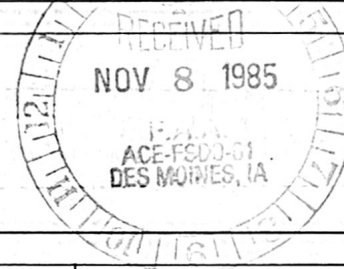
**MAJOR REPAIR AND ALTERATION**  
**(Airframe, Powerplant, Propeller, or Appliance)**

FOR FAA USE ONLY  
OFFICE IDENTIFICATION

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form.

1. AIRCRAFT	MAKE PIPER	MODEL PA 28R180
	SERIAL NO. 28R-30277	NATIONALITY AND REGISTRATION MARK N 3936T
2. OWNER	NAME (As shown on registration certificate) Lamb James L.	ADDRESS (As shown on registration certificate) 2020 Sandalwood Dr. NE Cedar Rapids Iowa 52402

3. FOR FAA USE ONLY



4. UNIT IDENTIFICATION

5. TYPE

UNIT	MAKE	MODEL	SERIAL NO.	5. TYPE	
				REPAIR	ALTERATION
AIRFRAME	~~~~~ (As described in item 1 above) ~~~~~				X
POWERPLANT	LYCOMING	IO-360-B1E	L-4467-51A		X
PROPELLER					
APPLIANCE	TYPE				
	MANUFACTURER				

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS Larry J Bearce Jr Box G Wyoming Iowa 52362	B. KIND OF AGENCY		C. CERTIFICATE NO. AP 481862653
	<input checked="" type="checkbox"/>	U.S. CERTIFICATED MECHANIC	
	<input type="checkbox"/>	FOREIGN CERTIFICATED MECHANIC	
	<input type="checkbox"/>	CERTIFICATED REPAIR STATION	
	<input type="checkbox"/>	MANUFACTURER	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

DATE 11-1-85	SIGNATURE OF AUTHORIZED INDIVIDUAL <i>Larry J Bearce Jr.</i>
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7. APPROVAL FOR RETURN TO SERVICE

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

FAA FLT. STANDARDS INSPECTOR	MANUFACTURER	<input checked="" type="checkbox"/>	INSPECTION AUTHORIZATION	OTHER (Specify)
FAA DESIGNEE	REPAIR STATION	<input type="checkbox"/>	CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION 11-1-85	CERTIFICATE OR DESIGNATION NO. IA 478402485	SIGNATURE OF AUTHORIZED INDIVIDUAL <i>John A Tollen</i>
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## NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. DESCRIPTION OF WORK ACCOMPLISHED (If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

Installed Precise Flight Inc. Standby Vacuum System i/a/w  
installation instructions Standby Vacuum System No. SVSIII

STC's STC SE 1779NM  
STC SA 2167NM

Tested	Results:	Pressure	RPM	Man.	SVS Vac.
		Alt.		Pressure	In.Hg.Min.
		2000	Max. Cont.	23"	4"
		4000	Max. Cont.	21"	4"
		6000	Max. Cont.	19"	4"
		8000	Max. Cont.	17"	4"
		10000	Max. Cont.	15"	4"

Weight & Balance and equipment list revised. Operating  
instructions go in aircraft flight manual

END

ADDITIONAL SHEETS ARE ATTACHED

RECEIVED

A/C Copy

MAR 04 1996

ACE-FSDO-61  
DES MOINES, IOWA



### MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020  
For FAA Use Only  
Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

1. Aircraft	Make <b>Piper</b>	Model <b>PA-28R-180</b>
	Serial No. <b>28R-30277</b>	Nationality and Registration Mark <b>N3936T</b>
2. Owner	Name (As shown on registration certificate) <b>Lamb, James L. Bader, James J.</b>	Address (As shown on registration certificate) <b>2020 Sandalwood Drive NE Cedar Rapids, IA 52402</b>

#### 3. For FAA Use Only

The data/entry identified herein complies with the applicable airworthiness requirements and is approved only for the above described aircraft, subject to conformity inspection by a person authorized in F.A.R. 43.7 (a)

MAR 07 1996  
(date)

*Samuel J. Hallschlag*  
F.A.A. Inspector, ACE-DSM FSDO

#### 4. Unit Identification

#### 5. Type

Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in Item 1 above) ~~~~~				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

#### 6. Conformity Statement

A. Agency's Name and Address <b>Spencer Avionics, Inc. Municipal Airport, RR #3 Spencer, Iowa 51301</b>	B. Kind of Agency	C. Certificate No.
	<input type="checkbox"/> U.S. Certificated Mechanic	<b>KU2R965K RADIO-CLASS I, II LIMITED-AIRFRAME</b>
	<input type="checkbox"/> Foreign Certificated Mechanic	
	<input checked="" type="checkbox"/> Certificated Repair Station	
<input type="checkbox"/> Manufacturer		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date <b>March 1, 1996</b>	Signature of Authorized Individual <i>William R. Hemme</i> <b>William R. Hemme</b>
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#### 7. Approval for Return To Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

FAA FIT Standards Inspector	Manufacturer	Inspection Authorization	Other (Specify)
FAA Designee <input checked="" type="checkbox"/>	Repair Station	Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection <b>3-11-96</b>	Certificate or Designation No. <b>KU2R965K</b>	Signature of Authorized Individual <i>William R. Hemme</i> <b>William R. Hemme</b>
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**NOTICE**

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

**8. Description of Work Accomplished**

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

Removed Narco MK-12B Nav/Com System #2 including Narco VOA4 VOR/LOC Indicator and T-12MP-12A1 Power Supply.

Installed new King KLX-135A GPS/COMM system #2 with KA-92 GPS Antenna and GPS Database Loader Jack.

KLX-135A unit was mounted in factory provided standard instrument panel left side radio rack at the bottom replacing the removed MK-12B unit. KA-92 GPS antenna was mounted on top of fuselage at station location #100.9 using factory provided mounting doubler riveted to fuselage skin. KLX-135A GPS was coupled to existing AutoControl IIIB Autopilot via GPS position of AUTOPILOT - NAV-1/GPS toggle selector switch.

Optional Mode-C encoder input to the KLX-135A GPS receiver from existing Narco AR-850-25 encoder was provided.

KLX-135A/KA-92 system was installed in accordance with Bendix/King factory installation manual (P/N 006-10500-0003) and AC 43.13-2A, Chapter #2, Paragraphs 21, 22, 23, and 27, and Chapter #2, Paragraphs 36 and 42. A similar KLX-135A GPS/COMM system installation has been previously approved for GPS navigation system VFR use only in a Mooney M20C aircraft under STC #SA00247WI-D issued to Allied Signal Avionics, Inc. Also, the Bendix/King KLX-135A GPS Navigation System was installed and tested in accordance with VFR requirements of Section 7 of AC 20-138 as a stand alone system and is approved for VFR use only. A permanent placard was installed on pilot's instrument panel just to the left of the the GPS receiver indicating to the flight crew: GPS NOT APPROVED FOR IFR.

New weight and balance and equipment list revision was prepared and entered into aircraft flight manual.

----- END -----

# Supplemental Type Certificate

Number SA4008NM

*This certificate, issued to* **Bogert Aviation**  
**308 S. Perry Place**  
**Kennewick, WA 99336**

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part \* of the \* Regulations.*

*Original Product—Type Certificate Number:* \*See attached FAA Approved Model List (AML)  
*Make:* Number SA4008NM for list of approved airplane  
*Model:* models and applicable airworthiness regulations.

*Description of the Type Design Change:* Installation of removable panels on the battery box sides in accordance with applicable Bogert Aviation Drawing listed on FAA approved AML SA4008NM, dated April 12, 2004, or later FAA approved revision. This installation does not require specific continued airworthiness instructions. Federal Aviation Regulations Part 43 and applicable Owner's Manual are adequate to ensure Continued Airworthiness of this modification.

Note: This is compatible with STC SA3531NM.

*Limitations and Conditions:* Approval of this change in type design applies to the airplane models listed on the AML only. This approval should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is determined that the relationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that aircraft. A copy of this certificate, FAA Approved Model List (AML) No. SA4008NM, dated April 12, 2004, or later FAA Approved revision must be maintained as part of the permanent records for the modified aircraft.

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application:* May 23, 1986

*Date reissued:*

*Date of issuance:* August 17, 1987

*Date amended:* April 12, 2004



*By direction of the Administrator*

*Dorr M Anderson*  
 (Signature)

Acting Manager, Seattle Aircraft  
 Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.



**BOGERT AVIATION  
 FAA APPROVED MODEL LIST (AML) NUMBER SA4008NM  
 FOR  
 INSTALLATION OF BATTERY BOX REMOVABLE PANELS**

ISSUE DATE: August 17, 1987

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	NUMBER	*FAA DRAWING LIST REVISION DATE	AML REVISION DATE
1.	Piper	PA-18, PA-18S, PA-18-"105", PA-18S-"105", PA-18A, PA-18-"125", PA-18S-"125", PA-18 "135", PA-18A "135", PA-18S "135", PA-18AS "135", PA-18 "150", PA-18A "150", PA-18S "150", PA-18AS "150"	1A2	CAR 3 and TCDS 1A2	1-1	10/14/2003	4/12/04
2.	Piper	PA-20 "115", PA-20S "115", PA-20 "135", PA-20S-"135"	1A4	CAR 3 and TCDS 1A4	1-1	10/14/2003	4/12/04
3.	Piper	PA-22-135, PA-22-108, PA-22S-135, PA-22-150, PA-22-150, PA-22-160, PA-22S-160,	1A6	CAR 3 and TCDS 1A6	1-1	10/14/2003	4/12/04
4.	Piper	PA-23, PA-23-160, PA-23-235, PA-23-250	1A10	CAR 3 and TCDS 1A10	1-1	10/14/2003	4/12/04
5.	Piper	PA-24, PA-24-250, PA-24-260, PA-24-400	1A15	CAR 3 and TCDS 1A15	1-1	10/14/2003	4/12/04
6.	Piper	PA-25, PA-25-235, PA-25-260	2A10	CAR 3 and TCDS 2A10	1-1	10/14/2003	4/12/04
7.	Piper	PA-28-140, PA-28-150, PA-28-160, PA-28-180, PA-28-235, PA-28R-180, PA-28R-200	2A13	FAR 23 and TCDS 2A13	1-1	10/14/2003	4/12/04
8.	Piper	PA-30, PA-39	A1EA	FAR 23 and TCDS A1EA	1-1	10/14/2003	4/12/04
9.	Piper	PA-32-301, PA-32-260, PA-32-300, PA-32R-300	2A13	FAR 23 and TCDS 2A13	1-1	10/14/2003	4/12/04

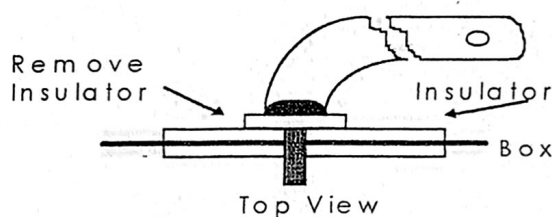
\* or later FAA Approved Revision

FAA Approved: Don M Anderson  
 Acting Manager, Seattle Aircraft  
 Certification Office

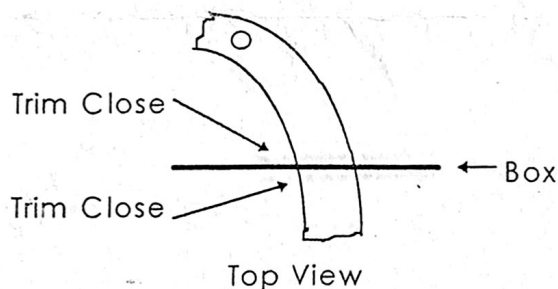
Amendment Date: March 23, 1990, April 12, 2004

Battery Box Modification  
Instructions 1-1  
Rev. May 18, 1990

- 1 Gain access to the battery box.
- 2 Remove battery and battery box.
- 3 Remove the battery box positive insulator by drilling out the rivets which attach it to the box. NOTE: If your box has two of this type, repeat step 3 for the negative terminal and disregard step 4.



- 4 Disconnect negative braided strap at fuselage. Cut off as close as it is practical on the inside and outside of the battery box.



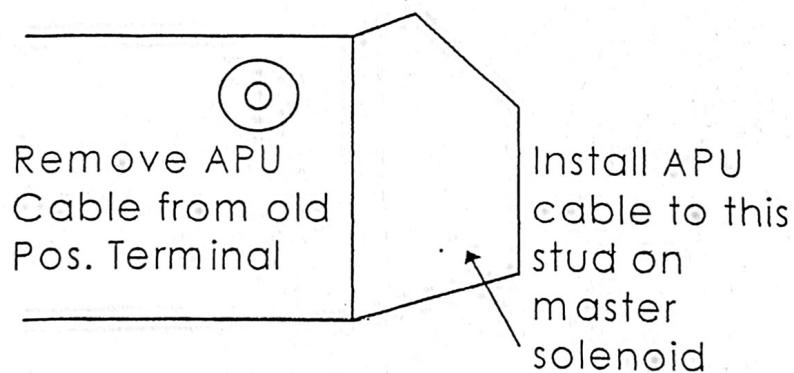
- 5 Align and attach template labeled "negative" PN1-1T above and outboard of the negative terminal. See drawing 1-2.
- 6 Align and attach template labeled "positive" PN1-2T outboard and above the original battery box positive terminal. See drawing 1-2. (PA-22/22 Series aircraft see DWG 1-5 notes and DWG. 1-7 before doing #6)
- 7 Remove the two portions of the battery box covered by the shaded areas of the two templates. Reference drawing 1-2. Trim and file all edges smooth.
- 8 Rivet cover plate PN1-1-5 in place on the outside of the box over the holes left by the removal of the insulator. See drawing 1-3. Use the MS20470AD3-3 rivets provided.
- 9 Using one PN1-1-4 battery box adapter for each cutout, check the fit of each adapter. The adapters must fit flush at the top of the box. The battery box lid will hold the adapters in place.

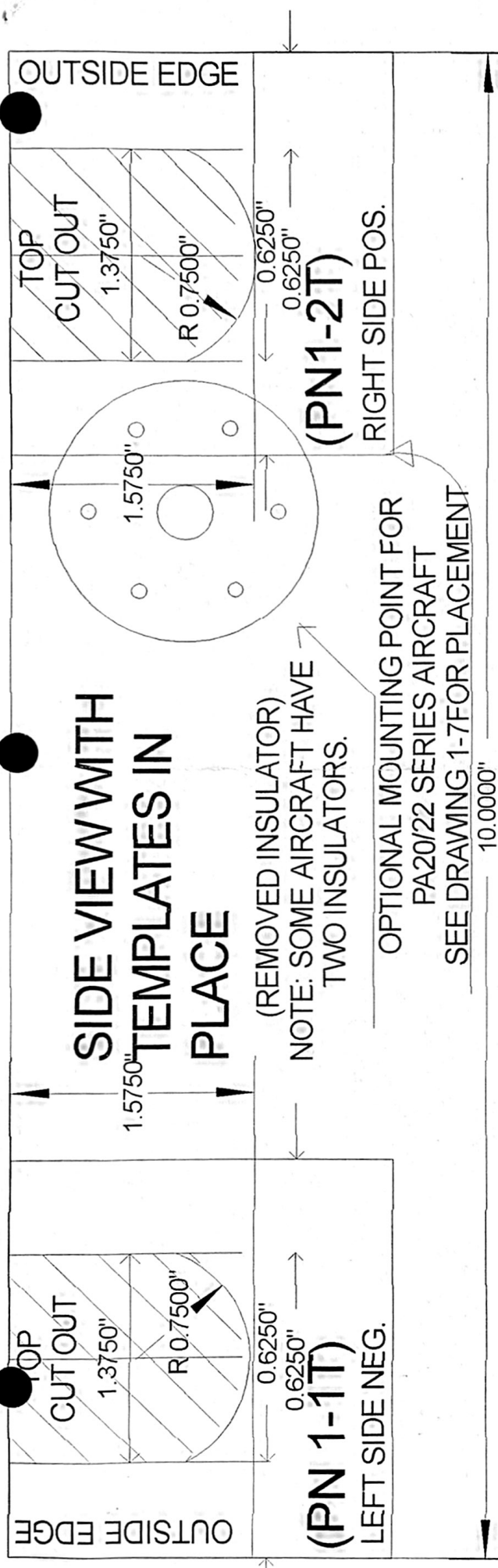
- 10 After the adapters have been fit, remove them and clean the box of any debris. Paint any bare exposed metal parts of the battery box with paint, (TEMPO PN# 20-131) or its equivalent. Install the battery box in aircraft.
- 11 Attach Bogert Aviation negative battery cable at its airframe ground connection, as per Bogert Aviation STC SA3531NM.
- 12 Place the negative cable through the grommet in PN#1-1-4 adapter. See drawing #1-5.
- 13 Remove the original battery to master solenoid cable. Replace it with a Bogert Aviation cable assembly as per STC SA3531NM.
- 14 Place the battery end of the positive cable through the grommet in the PN1-1-4 adapter plate. See drawing 1-5.
- 15 Place the battery into the battery box.
- 16 Slip the Bogert Aviation positive battery cable STC SA3531NM over the battery's positive post while inserting the adapter into the slot in the box. Attach the cable to the battery post with the battery terminal nut and washers.
- 17 Slip the Bogert Aviation negative battery cable STC SA3531NM over the battery's negative post while inserting the adapter into the slot in the box. Attach the cable to the post with the battery terminal nut and washers.
- 18 Reinstall the battery box lid and safety the wing nuts.
- 19 Make log book entries and fill out 337 form. Weight and balance change is negligible.

Special Note:

Some aircraft that have APU (ground power) plugs ran the wire from the APU plug to the positive stud that has been removed during the modification. It can not be run into the box! It must be attached to the large stud of the master relay or master solenoid that the positive battery cable attaches to. This is electrically the same as the original installation. If your APU cable is too short to reach, you may do one of two things:

Call Bogert Aviation for a longer cable or remove the APU cable.





**SIDE VIEW WITH  
TEMPLATES IN  
PLACE**

(REMOVED INSULATOR)  
NOTE: SOME AIRCRAFT HAVE  
TWO INSULATORS.

OPTIONAL MOUNTING POINT FOR  
PA20/22 SERIES AIRCRAFT  
SEE DRAWING 1-7 FOR PLACEMENT

10.0000"

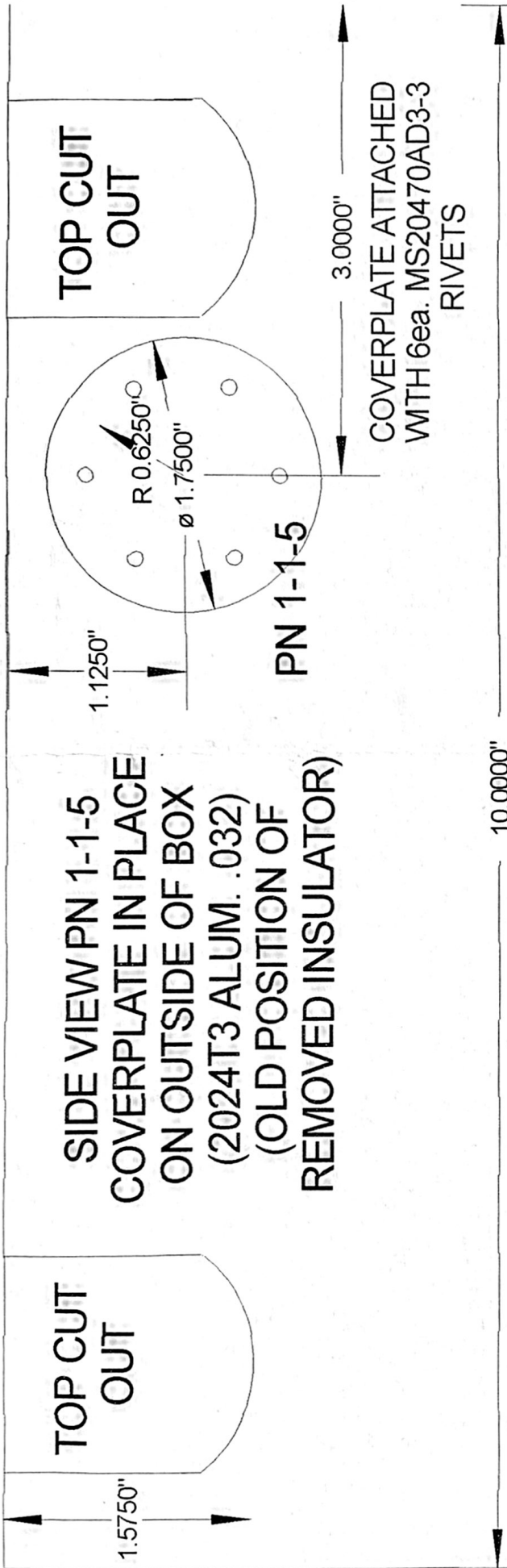
**NOTES:**

1. SOME AIRCRAFT MAY HAVE TWO INSULATORS INSTALLED, ONE FOR THE POSITIVE AND ONE FOR THE NEGATIVE. SEE BATTERY BOX MOD INSTRUCTIONS 1-1 #3 AND #8
2. PA22 AND PA20 SERIES AIRCRAFT SEE DRAWING 1-7 FOR DETAILS REGARDING AN OPTIONAL PLACEMENT OF TEMPLATE 1-2T.
3. SHOULD YOU BE SHORT A PN 1-1-5 COVERPLATE, CALL BOGERT AVIATION TO REQUEST ONE.

**DIMENSIONS**

**+/- .040"**

<b>BOGERT AVIATION</b>	
Piper, Slopedtop, Metal, Battery Box Modification	
MODEL: See Master Eligibility List	
PAGE: one of one	
DRAWING:	<b>1-2</b>
SCALE: 1" = 1"	
ORIG. DWG. DATE: 07-09-87	
REVISED: 10-14-2003	
REVISION CHANGES: CAD DRAWN, CHANGED FRACTIONS TO DECIMALS, ADDED DIMENSIONS, ADDED NOTES, UPDATED TEMPLATES	

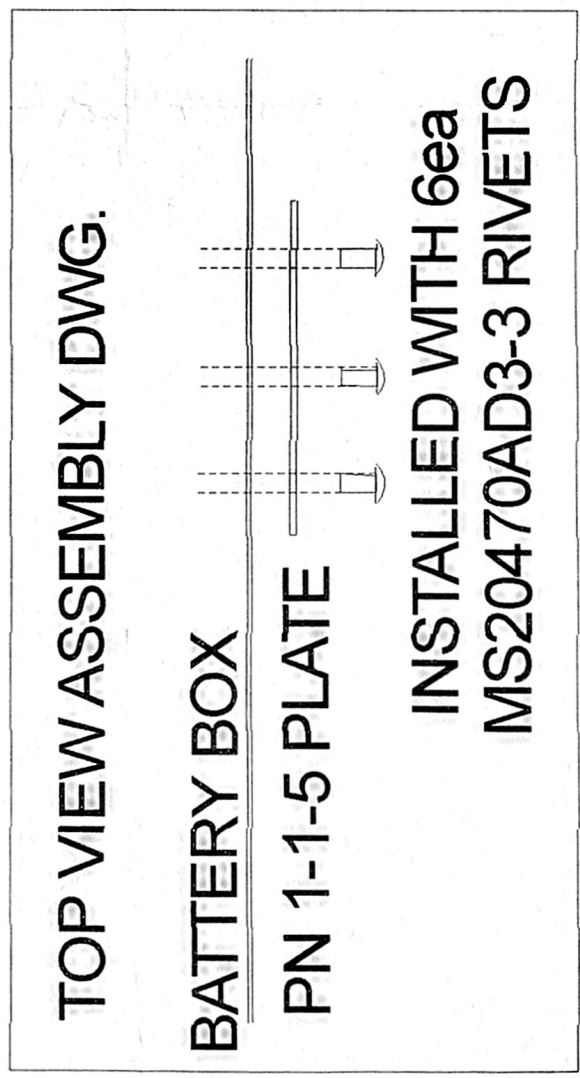


SIDE VIEW PN 1-1-5  
COVERPLATE IN PLACE  
ON OUTSIDE OF BOX  
(2024T3 ALUM. .032)  
(OLD POSITION OF  
REMOVED INSULATOR)

TOP CUT  
OUT

PN 1-1-5

COVERPLATE ATTACHED  
WITH 6ea. MS20470AD3-3  
RIVETS



TOP VIEW ASSEMBLY DWG.

BATTERY BOX

PN 1-1-5 PLATE

INSTALLED WITH 6ea  
MS20470AD3-3 RIVETS

DIMENSIONS  
+/- .040"

<b>BOGERT AVIATION</b>
Piper, Slopedtop, Metal, Battery Box Modification
MODEL: See Master Eligibility List
PAGE: one of one
DRAWING: <b>1-3</b>
SCALE: 1" = 1"
ORIG. DWG. DATE: 07-09-87
REVISED: 10-14-2003
REVISION CHANGES: CAD DRAWING, CONVERTED TO DECIMAL DIMENSIONS.

# BATTERY BOX TOP VIEW

<b>BOGERT AVIATION</b>	
Piper, Slopedtop, Metal, Battery Box Modification	
MODEL: See Master Eligibility List	
PAGE: one of one	
DRAWING: 1-5	
SCALE: 1" = 1"	
ORIG. DWG. DATE: 2-14-87	
REVISED: 10-14-2003	
REVISION CHANGES: CAD DRAWING, CONVERTED TO DECIMAL DIMENSIONS	

NOTE: PA20/22 SERIES AIRCRAFT  
Dotted lines represent optional mounting position to allow for gear movement and ease of installation.

5.5000"

NEG. BAT. POST

POS BAT. POST

CABLES AS PER STC SA3531NM

1.2500"

1.2500"

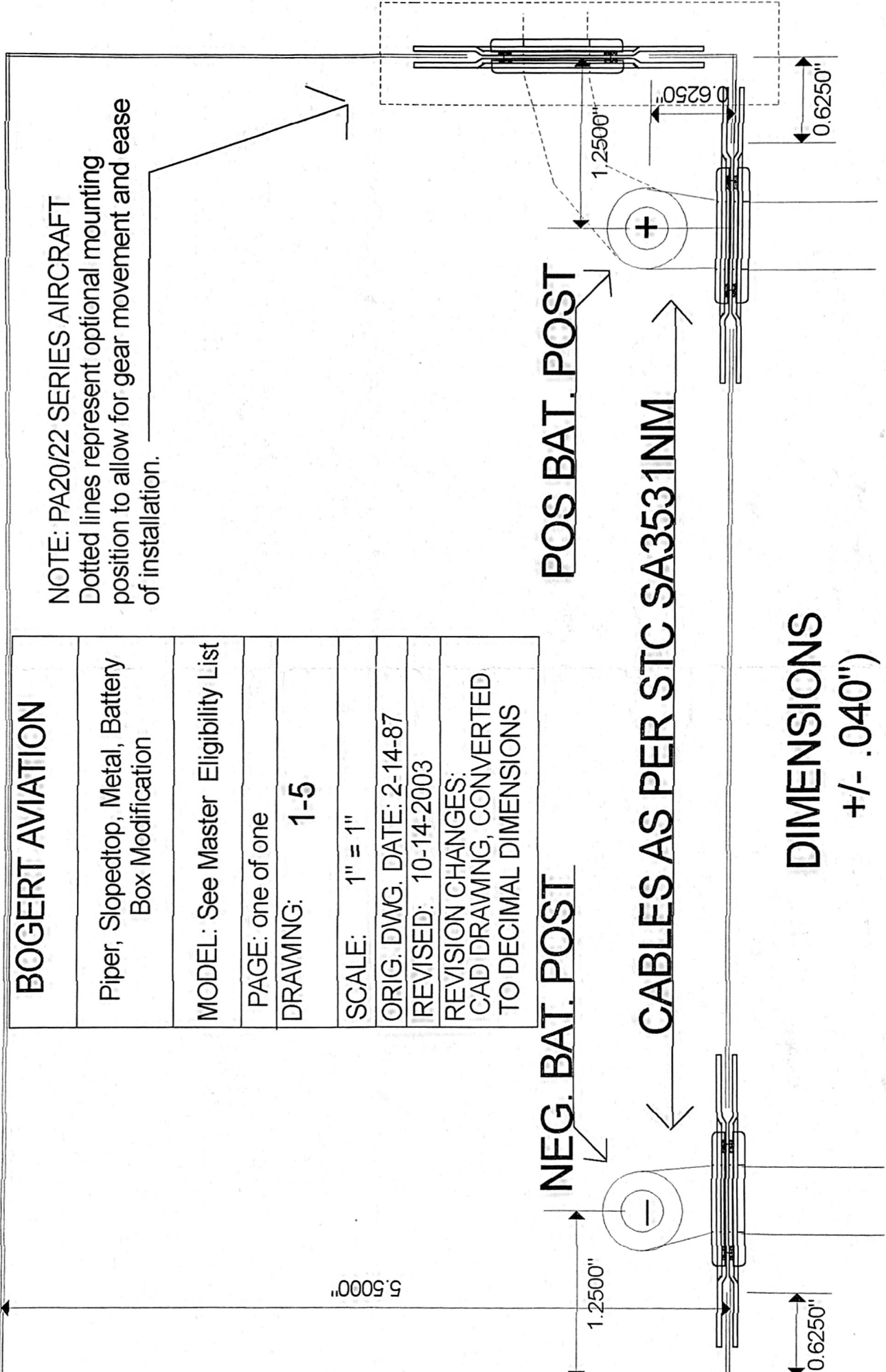
0.6250"

0.6250"

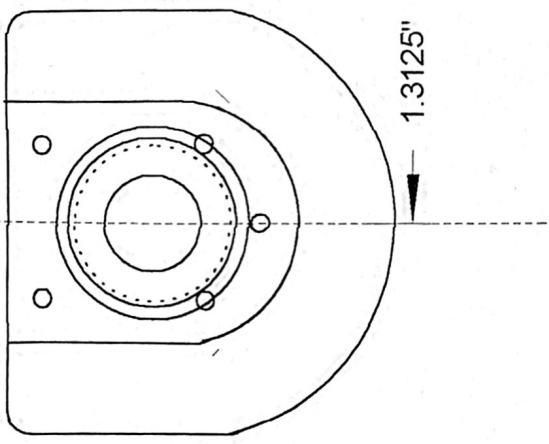
0.6250"

0.6250"

**DIMENSIONS  
+/- .040"**

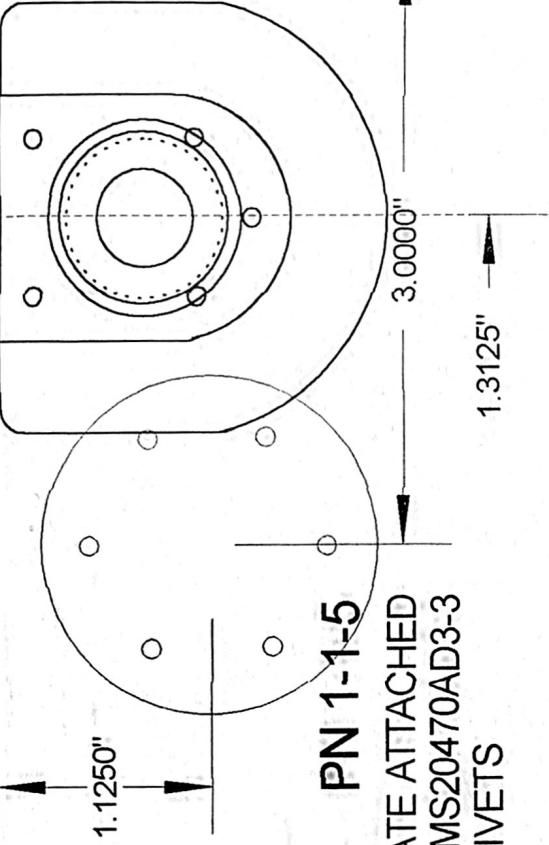


**SIDE VIEW  
PN1-1-4  
ADAPTERS  
INSTALLED**



**PN1-1-5  
INSTALLED**

COVERPLATE ATTACHED  
WITH 6ea. MS20470AD3-3  
RIVETS



10.0000"

**DIMENSIONS  
+/- .040"**

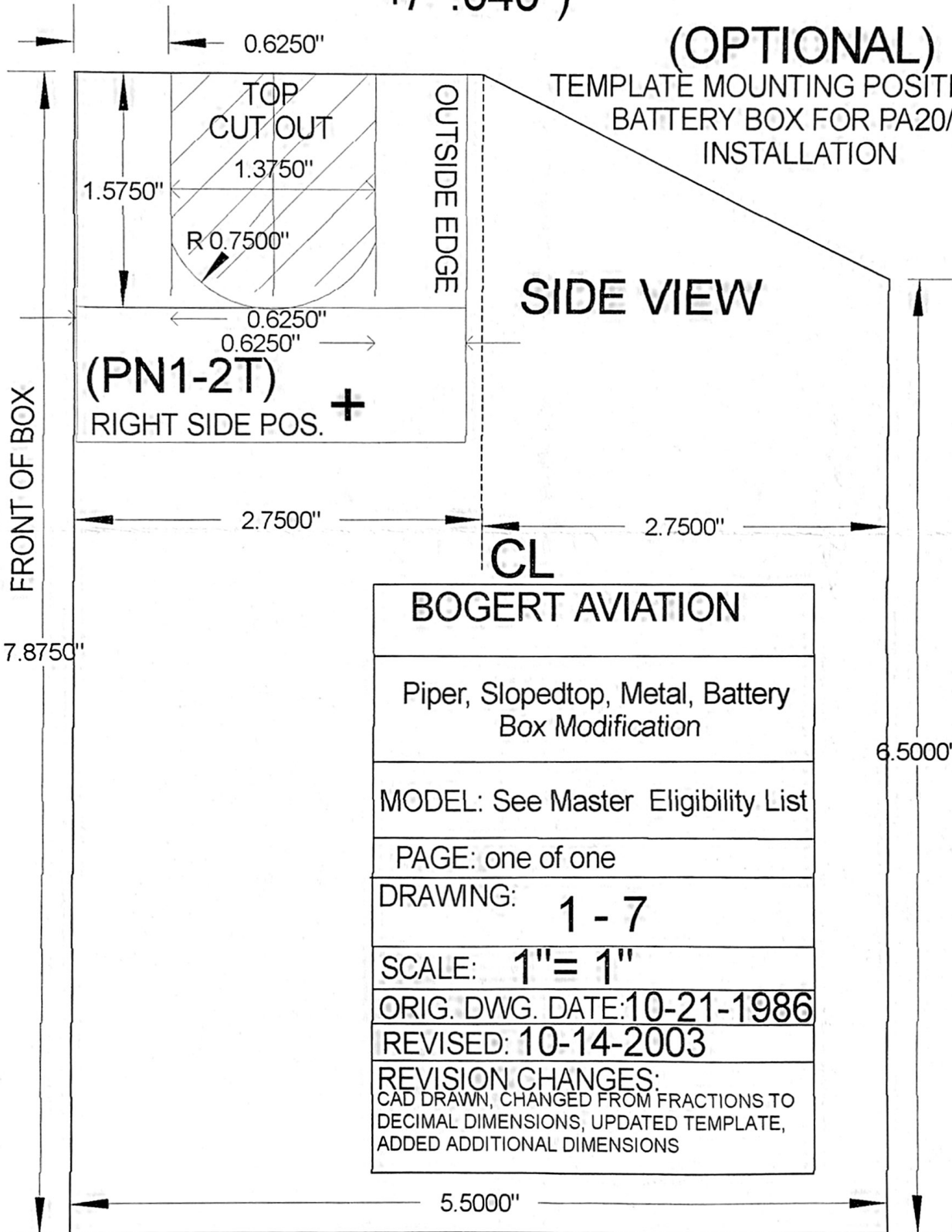
<b>BOGERT AVIATION</b>
Piper, Slopedtop, Metal, Battery Box Modification
MODEL: See Master Eligibility List
PAGE: one of one
DRAWING: <b>1-6</b>
SCALE: 1" = 1"
ORIG. DWG. DATE: 07-09-87
REVISED: <b>10-14-2003</b>
REVISION CHANGES: CAD DRAWING, CONVERTED TO DECIMAL DIMENSIONS,

# DIMENSIONS

+/- .040"

(OPTIONAL)

TEMPLATE MOUNTING POSITION ON BATTERY BOX FOR PA20/22 INSTALLATION



(PN1-2T)  
RIGHT SIDE POS. +

SIDE VIEW

CL

**BOGERT AVIATION**

Piper, Slopedtop, Metal, Battery  
Box Modification

MODEL: See Master Eligibility List

PAGE: one of one

DRAWING: 1 - 7

SCALE: 1" = 1"

ORIG. DWG. DATE: 10-21-1986

REVISED: 10-14-2003

REVISION CHANGES:  
CAD DRAWN, CHANGED FROM FRACTIONS TO  
DECIMAL DIMENSIONS, UPDATED TEMPLATE,  
ADDED ADDITIONAL DIMENSIONS



APPENDIX TO AD 99-24-10

PRECISE FLIGHT, INC.  
AFMS for STANDBY VACUUM SYSTEM

SYSTEM DESCRIPTION

A Precise Flight Standby Vacuum System may be installed to provide a temporary vacuum system in the event of a primary vacuum failure. The Standby Vacuum System operates on the differential between the intake manifold and ambient air pressure and is directed through a shuttle valve system to drive your flight instruments.

I. OPERATING LIMITATIONSA. INSTRUCTIONS

1. The Standby Vacuum System is for emergency or standby use only and not for dispatch purposes.
2. Vacuum powered and/or Vacuum gyro directed autopilot operation may be unreliable when the Standby Vacuum System is the sole source of vacuum. Vacuum powered or vacuum gyro directed autopilot should be **OFF** when operating with a failed primary vacuum system.
3. The Supplemental Vacuum System is not designed to operate pneumatic de-ice systems. **DO NOT** operate a pneumatic de-ice system when operating with a failed primary vacuum system.
4. Above 10,000 ft. pressure altitude, engine power settings may have to be significantly reduced to provide adequate vacuum power for proper gyro instrument operation.
5. The following placards are required to be in full view of pilot:

APPENDIX TO AD 99-24-10 (Continued)

PRECISE FLIGHT, INC.  
AFMS for STANDBY VACUUM SYSTEM

I. OPERATING LIMITATIONS (CONT.)

**B. PLACARDS**

Placard to be located on the push/pull control cable



Placard to be located around the LED for the pump inop warning light.



Placard to be placed in front and in full view of the pilot.

STANDBY VACUUM SYSTEM EQUIPPED: FOR  
OPERATING INSTRUCTIONS AND LIMITATIONS  
SEE SUPPLEMENT IN OWNERS MANUAL OR  
PILOTS OPERATING HANDBOOK

**APPENDIX TO AD 99-24-10 (Continued)**

**PRECISE FLIGHT, INC.**  
**AFMS for STANDBY VACUUM SYSTEM**

**I. OPERATING LIMITATIONS (CONT.)****B. PLACARDS**

One of the following placards must be placed in full view of the pilot near the instrument vacuum indicator after appropriate entries have been made.

Approximate Standby Vacuum Available - Altitude - Power Chart for aircraft with Constant Speed Propeller - Maximum Continuous RPM.

<b>PRESS ALT. (FT.)</b>	<b>RPM</b>	<b>MAN. PRESSURE</b>	<b>SVS VACUUM IN. HG MIN.</b>
2000	Max. Cont.		
4000	Max. Cont.		
6000	Max. Cont.		
8000	Max. Cont.		
10,000	Max. Cont.		

Approximate Standby Vacuum Available - Altitude - Power Chart for aircraft with a Fixed Pitch Propeller

<b>PRESS ALT. (FT.)</b>	<b>RPM</b>	<b>SVS VACUUM IN. HG MIN.</b>
2000		
4000		
6000		
8000		
10,000		

APPENDIX TO AD 99-24-10 (Continued)

PRECISE FLIGHT, INC.  
AFMS for STANDBY VACUUM SYSTEM

II. OPERATING PROCEDURES

**A. NORMAL PROCEDURES**

**1. GROUND CHECK**

- a. Cycle the Standby Vacuum Control Knob OUT - ON -, and return Control Knob IN - OFF - position.

**2. BEFORE TAKEOFF**

- a. Idle Engine at low speed, momentarily pull the standby vacuum knob out - ON - and check vacuum gauge. Normally, the vacuum reading will be slightly higher. After checking system push Standby Vacuum System knob IN - OFF -. Check that vacuum gauge has returned to the previous reading.

**3. ENROUTE**

- a. Regularly check vacuum gauge and monitor warning light for proper vacuum system operation.

**APPENDIX TO AD 99-24-10 (Continued)**

**PRECISE FLIGHT, INC.**  
**AFMS for STANDBY VACUUM SYSTEM**

**B. EMERGENCY PROCEDURES****1. PRIMARY VACUUM FAILURE WARNING LIGHT ILLUMINATES**

- a. Pull the Standby Vacuum System knob **OUT -ON-** and adjust throttle setting as required to maintain adequate vacuum for the primary instruments - Suction Gauge Reading in the Green Arc - If necessary descend to a lower altitude to obtain a larger differential between manifold and ambient pressure. Vacuum power must be closely monitored by checking the vacuum gauge frequently.
- b. The SVS is not designed for continued IFR flight. Immediate steps should be taken to return to VFR conditions or to land. If this is not possible, IFR flight should be continued only as long as necessary to return to VFR conditions or land the airplane.

**WARNING: FAILURE OF THE VACUUM SYSTEM STILL CONSTITUTES AN EMERGENCY SITUATION REGARDLESS OF THE INSTALLATION OF THE SVS. IT MAY NOT BE POSSIBLE TO MAINTAIN A SAFE ALTITUDE AND MAKE USE OF THE SVS. IN SUCH A SITUATION THE AIRPLANE MUST BE FLOWN USING NON-VACUUM POWERED INSTRUMENTS.**

- c. If descent is impractical:
  - Periodically and temporarily reduce power as required to provide adequate vacuum to the aircraft primary instruments.
  - Reapply power as required, while comparing vacuum driven gyros against the Turn and Bank Indicator, Turn Coordinator, VSI and/or other flight instruments.
  - When an obvious discrepancy is noted between the vacuum driven instruments and other flight instrumentation. Periodically and temporarily reduce power as required to provide adequate vacuum to the aircraft primary instruments.

**III. PERFORMANCE**

**NO CHANGE**

**FOR FURTHER INFORMATION CONTACT:**

Ms. Dorothy Lundy, Aerospace Engineer, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW, Renton, Washington 98055-4065; telephone: (425) 227-2260; facsimile: (425) 227-1181.

uAvionix Corporation  
300 Pine Needle Lane  
Bigfork, MT 59911 U.S.A.

FAA-APPROVED  
AIRPLANE FLIGHT MANUAL SUPPLEMENT  
for the  
uAvionix skyBeacon  
as installed in

---

Airplane Make and Model per AML

Registration Number: \_\_\_\_\_  
Serial Number: \_\_\_\_\_

This supplement must be attached to the FAA-approved Airplane Flight Manual when the skyBeacon is installed in accordance with Approved Model List Supplemental Type Certificate SA 04362CH

The information contained herein supplements the basic manual only in those areas listed. For limitations, procedures, performance and loading information not contained in this supplement, consult the FAA-approved Airplane Flight Manual, markings, or placards.

FAA Approved By: 

Manager, Southwest Flight Test Section, AIR-713  
Federal Aviation Administration  
Ft. Worth, TX

Date: 11/14/2018

---

Airplane Flight Manual Supplement  
uAvionix skyBeacon  
FAA Approved **NOV 14 2018**

UAV-1002111-001  
Rev A  
Page 1 of 11

## Log of Revisions

Revision	Page(s)	Description	Date	FAA Approved
A	All	Initial release	10/11/2018	See page 1

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## 1 GENERAL

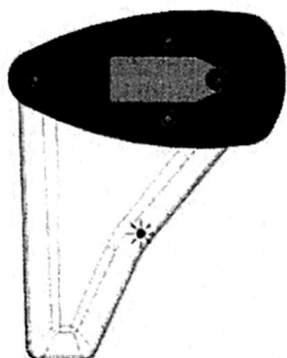
### 1.1 skyBeacon

skyBeacon is a wing-tip mounted unit that contains a 978 MHz transmitter, transponder monitor, GPS/SBAS receiver, LED navigation light and LED anti-collision light. This device transmits ownship Automatic Dependent Surveillance-Broadcast (ADS-B) data through the UAT data link.

skyBeacon performs the following functions:

- Position determination
  - An internal GPS/SBAS receiver allows the unit to function as its own position source.
- Transmission of ADS-B Out data on 978MHz UAT
  - Integration of data from internal and external sources to transmit data in compliance with 14 CFR 91.227.
- Transponder monitoring
  - The integrated Power Transcoder ensures proper synchronization of data elements between Secondary Surveillance Radar (SSR) replies and ADS-B transmissions. These elements include Mode A squawk code, Mode C altitude, and IDENT status. In remote areas where you may not be interrogated by SSR, these data elements may at times be unavailable.
- Altitude encoder with Continuous Calibration™
  - The integrated altitude encoder provides pressure altitude information and is continuously adjusted for correspondence with the transponder's altitude encoder.
- "Anonymous" mode
  - "Anonymous" mode transmits a temporary randomized address instead of the aircraft's FAA assigned ICAO address, and "VFR" instead of the aircraft's call sign. When this option is configured during installation, it may be enabled by selecting a squawk code of "1200" on the installed transponder.

- Annunciator LED
  - An annunciator LED is located on the pilot facing side of the fin, indicating the operating status of the skyBeacon. This indicator may or may not be visible in flight, depending on the geometry of the aircraft and mounting location.



LED Indication	Meaning
On (Constant)	Device Failure Internal self-test failure Invalid ICAO configured
Blinking (On/off every second)	Function Failure No GPS position ADS-B broadcast failure
Off	No Failure

- Red forward position light and anti-collision strobe
  - A TSO-C30c Type I (red) LED position/navigation light and TSO-C96a Class II LED anti-collision light replace or supplement existing lighting.

## 1.2 Capabilities

The skyBeacon as installed in this aircraft has been shown to meet the equipment performance requirements of 14 CFR 91.227, when operating in accordance with this supplement.

## 2 LIMITATIONS

### 2.1 Required Equipment

The skyBeacon must have the following system interfaced equipment fully functional to be compliant with the requirements for 14 CFR 91.227 ADS-B Out operations:

Interfaced Equipment	Number Installed	Number Required
Mode A/C or Mode S Transponder	1	1

### 2.2 Navigation Lights

The navigation lights must remain on at all times that ADS-B Out operation is required. The following placard should be installed:

NAVIGATION LIGHTS MUST REMAIN ON FOR ADS-B OUT
---

### 2.3 ADS-B OUT

The skyBeacon will only comply with 14 CFR 91.227 for ADS-B Out when all the above required equipment is operational. The skyBeacon annunciator LED will illuminate when skyBeacon is not transmitting a valid or complete ADS-B Out message.

In remote areas where you may not be interrogated by Secondary Surveillance Radar, aircraft Mode A squawk code may be broadcast as unavailable.

### 2.4 Maximum ADS-B Operating Altitude

In accordance with 14 CFR 91.225, aircraft with ADS-B Out UAT equipment, operating on 978 MHz and meeting the requirements in TSO-C154c, are limited to operations below 18,000 feet MSL.

Maximum Aircraft Operational Ceiling, when ADS-B is in use	18,000 feet MSL
--	-----------------

## 2.5 Anonymous Mode Operation

In anonymous mode, the skyBeacon transmits a randomized temporary address instead of the aircraft's assigned ICAO address code, and a non-identifying Call Sign. The temporary address and Call Sign are disabled if the operator selects a non-1200 squawk code on the transponder.

When enabled, the operator will not be eligible to operate on a flight plan or receive ATC services after January 1, 2020, when in 14 CFR 91.225 rule airspace. The operator will also have decreased visibility to ATC and surrounding airspace users.

Anonymous Mode must not be enabled when skyBeacon is installed in an aircraft with a Mode S transponder. Doing so will present an ICAO code mismatch to ATC.

## 3 EMERGENCY PROCEDURES

No Change.

## 4 ABNORMAL PROCEDURES

### 4.1 ADS-B Transmission Incomplete

When GPS position information is unavailable or the transmitter is experiencing broadcast failures, the annunciator LED will blink. skyBeacon will continue attempting to transmit, but the ADS-B messages will be incomplete and non-compliant.

skyBeacon Annunciator LED . . . . . **BLINKING**

skyBeacon Location . . . . . **ENSURE CLEAR VIEW OF SKY, NOTE INITIAL  
FIX COULD TAKE UP TO 20 MINUTES**

#### 4.2 Device Failure

When the device experiences a self-test failure or has not been properly configured, the annunciator LED will be constantly illuminated.

Resolving may require a maintenance action, but the pilot may attempt cycling the power once to resolve.

skyBeacon Annunciator LED . . . . . **CONSTANT ILLUMINATION**

Navigation Lights . . . . . **CYCLE POWER ONCE**

#### 4.3 Loss of Aircraft Electrical Power Generation

In the event of the electrical charging system becoming inoperative, attention must be paid to aircraft battery power. skyBeacon uses minimal electrical power, considerably less than a traditional incandescent navigation light, but the pilot should be familiar with electrical load-shedding methods and equipment requirements for various phases of flight. If an electrical emergency exists, the pilot should consider turning off the skyBeacon to preserve the operation of essential avionics.

Subject to aircraft equipment electrical load-shedding priorities,

Navigation Lights Circuit Breaker Position . . . . . **CONSIDER**

#### 4.4 skyBeacon Unit Disable

The skyBeacon may be disabled by turning off the Navigation Lights. Doing so will disable the aircraft Navigation Lights. 14 CFR 91.209 requires these lights to be lighted on the surface and in flight from sunset to sunrise. Consideration should be given to the consequences of disabling aircraft lighting.

Navigation Lights . . . . . **OFF**

**5 NORMAL PROCEDURES**

The skyBeacon requires no pilot intervention or direct control for normal operation. The skyBeacon is powered on with the navigation lights and will be fully operational once the configured Mode A/C transponder is set to ALT and a GPS/SBAS position is available.

Primary user interface controls are provided by the aircraft's existing transponder, including selection of Mode A squawk code and IDENT.

Additional configuration and control may be provided through the "uAvionix skyBeacon Installer" app.

**5.1 skyBeacon Unit Power On**

The skyBeacon should be powered on after starting the engine, and prior to entering an airport movement area. This is typically part of the TAXIING or BEFORE TAKEOFF procedure, or when avionics power is enabled.

- Navigation Lights ..... **ON**
- Transponder ..... **ALT, Code set**
- skyBeacon Annunciator LED ..... **EXTINGUISHED**

**NOTE**

In addition to in flight use requirements, AIM 4-1-20. a. 3. encourages pilots to operate with the transponder in the altitude reporting mode and ADS-B Out transmissions enabled at all airports, any time the aircraft is positioned on any portion of an airport movement area.

After power on, the skyBeacon Annunciator LED may illuminate momentary as the unit begins to receive input from external systems, including the GPS/SBAS position source.

The configured Mode A/C transponder must be set to ALT and the skyBeacon Annunciator LED must be **EXTINGUISHED** for the system to meet the requirements specified in 14 CFR 91.227. This system must be

operational in certain airspaces after January 1, 2020 as specified by 14 CFR 91.225.

### 5.2 Call Sign

The configured aircraft call sign may be adjusted on the ground using the “uAvionix skyBeacon Installer” app. It may not be adjusted in flight. If an aircraft will use identification other than an N-number for a given flight (as referred to by ATC or in flight plans), the configured call sign must be adjusted. Example applications are commercial, medical, or volunteer flight operations.

Within five minutes of skyBeacon being powered on, connect to the device with the app. Adjust the Call Sign field but not the ICAO Number. When changing the Call Sign ensure no other installation parameters are adjusted. The configured Call Sign persists through power cycles.

If necessary after the flight, cycle power to the device, connect with the app, and adjust the Call Sign field to back to the appropriate (N-number) value.

For more information on using the app, see the “skyBeacon TSO User and Installation Guide”.

### 5.3 skyBeacon Unit Power Off

The skyBeacon should remain powered during flight and when in airport movement areas. The unit should be powered off immediately prior to stopping the engine, or may be powered off upon exiting the airport movement area.

Navigation Lights ..... OFF

**6 PERFORMANCE**

No change.

**7 WEIGHT AND BALANCE**

No change.

**8 RELATED DOCUMENTATION**

The uAvionix skyBeacon documents, part numbers, and revisions listed below contain additional information regarding skyBeacon system description and function.

Part Number	Revision	Title
UAV-1001421-001	D (or subsequent)	skyBeacon TSO User and Installation Guide
UAV-1002305-001	A (or subsequent)	skyBeacon STC Installation Manual
UAV-1002112-001	A (or subsequent)	skyBeacon STC Instructions for Continued Airworthiness and Maintenance Manual





US Department of Transportation  
Federal Aviation Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020

For FAA Use Only

Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

<b>1. Aircraft</b>	Make Piper	Model PA28R-180
	Serial No. 28R-30277	Nationality and Registration Mark N3936T
<b>2. Owner</b>	Name (As shown on registration certificate) James L. Lamb	Address (As shown on registration certificate) 2020 Sandelwood Dr. NE. Cedar Rapids, Iowa 52402

**3. For FAA Use Only**

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	_____ (As described in Item 1 above) _____				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

**6. Conformity Statement**

<b>A. Agency's Name and Address</b> Monticello Aviation, Inc. Monticello Airport Monticello, Iowa 52310	<b>B. Kind of Agency</b> <input type="checkbox"/> U.S. Certificated Mechanic <input type="checkbox"/> Foreign Certificated Mechanic <input checked="" type="checkbox"/> Certificated Repair Station <input type="checkbox"/> Manufacturer	<b>C. Certificate No.</b> CRS K02R959K Limited Airframe
--	---	--

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

<b>Date</b> 5-05-04	<b>Signature of Authorized Individual</b> 
------------------------	---

**7. Approval for Return To Service**

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

<b>BY</b>	FAA Fit. Standards Inspector		Manufacturer	Inspection Authorization	Other (Specify)
	FAA Designee	X	Repair Station	Person Approved by Transport Canada Airworthiness Group	

<b>Date of Approval or Rejection</b> 5-05-04	<b>Certificate or Designation No.</b> CRS K02R959K	<b>Signature of Authorized Individual</b> 
---	---	---

**NOTICE**

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

**8. Description of Work Accomplished**

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

5-05-04 Piper PA28R-180 S/N 28R-30277 N3936T

Installed Bogert Aviation battery box modification in accordance with Bogert Aviation, Inc. Instructions dated May 18, 1990. Installation approved by STC # SA4008NM . No change in weight and balance.

-----END-----

Additional Sheets Are Attached