CLOUD 9

FLIGHT SERVICES

N3427H (serial ME-350)
1981 Beechcraft Duchess BE-76

OVERVIEW

This guide is meant to quickly familiarize you with the Beechcraft Duchess N3724H. It is not meant to be a substitute for reading and understanding the Pilot's Operating Handbook. The AFM or POH should be used as the official source of information any time this guide differs from the POH.

The BEECHCRAFT Duchess 76 is an all-metal, low-wing, twin-engine airplane with retractable tricycle landing gear. The T-tail empennage assembly consists of a vertical stabilizer and a top-mounted horizontal stabilizer.

LIMITATIONS

Weights

Maximum Ramp Weight	3,916 pounds
Maximum Take-off Weight	3,900 pounds
Maximum Landing Weight	3,900 pounds
Maximum Zero Fuel Weight	3,500 pounds
Maximum Weight in Baggage Compartment	200 pounds
Standards Empty Weight	2,446 pounds
Maximum Useful Load	1,470 pounds

CENTER OF GRAVITY

Forward Limits: 106.6" in aft of datum at 3240 lbs and under, then straight line variation to 110.6" in aft of datum at a weight of 3,900 pounds.
Aft Limit: 117.5" in aft of datum at all weights.
Datum Reference: 129.37" in forward of the center of wing spar jacks.

MANEUVERS

This is a normal category airplane. Aerobatic maneuvers, including spins, are prohibited.

Maximum Slip Duration: 30 seconds

LOAD FACTORS (3,900 pounds)

POSITIVE MANEUVERING LOAD FACTORS:
Flaps Up 3.8G
Flaps Down (DN) 2.0G

NEGATIVE MANEUVERING LOAD FACTOR:

Flaps Up ~1.52G

KINDS OF OPERATION

Minimum Flight Crew: 1 Pilot
1. VFR day and night
2. IFR day and night
3. FAR part 91 operations when all pertinent limitations and performance considerations are complied with

ICING

Flight into known icing conditions is prohibited.

CROSSWINDS

The maximum demonstrated crosswind component of this aircraft is 25 knots.

V-SPEEDS

Configuration	Speed (KIAS)
V_r	71
V_y	85
V_x	71
V_a	132
V_{fe}	120/110
V_{le}	140
V_{lr}	112
V_{sse}	71
V_{yse}	85
V_{xse}	85
V_{mc}	65
V_g	82/95
V_{s0}	60
V_{cc}	100
V_{no}	154
V_{ne}	194

PRESSURES AND TEMPERATURES

Takeoff and Maximum Continuous Power	Full throttle, 2,700 RPM
Maximum Oil Temperature	245° F
Maximum CHT	500° F
Minimum Oil Pressure (Idle)	25 PSI
Minimum Oil Pressure	100 PSI
Maximum Fuel Pressure	8.0 PSI
Minimum Fuel Pressure	.5 PSI

POWERPLANTS

Two Avco Lycoming Engines are installed; one O-360-A1G6D (clockwise rotating) located on the left wing and one LO-360-A1G6D (counterclockwise rotating) located on the right wing. The engines are four-cylinder, direct drive, horizontally opposed, air-cooled, naturally-aspirated, and each rated at 180 horsepower at 2,700 RPM. The engines use a wet sump pressure type oil system with a maximum of 8 quarts and a minimum of 5 quarts. The oil to be used is Phillips 20XC50.

The engine is equipped with a carburetor heat system which allows heated unfiltered air to enter the induction system to alleviate the possibility of induction ice. Cowl flaps are controlled by levers inside the cockpit; they allow the amount of engine cooling air to be controlled to maintain a desired cylinder head temperature. Engine ignition is provided through a dual engine driven magneto system which is independent of the electric system (if electrical power is lost, engine will continue to run).

Each engine is equipped with fuel pressure, oil pressure, oil temperature, cylinder head temperature (CHT), manifold pressure, RPM, and exhaust gas temperature (EGT) gauges.

Generally, cowl flaps are open for ground operations or climbs, and closed for cruise and descent. The cowl flaps are controlled manually by separate levers located just below the carburetor heat controls on the pedestal. Each control has three placarded positions: CLOSE — HALF — OPEN The alternate air source for each engine is unfiltered air from carburetor heat.

PROPELLERS

The airplane is equipped with two Hartzel 76 inch, constant-speed, full feathering, two-blade propellers. Springs and dome air pressure, aided by counterweights, move the blades to the high pitch (feathered) position. Propeller RPM is controlled by the engine-driven propeller governor which regulates oil pressure in the hub. The propeller controls, on the control console, allow the pilot to select the governor's RPM range. Springs and dome air pressure, aided by counterweights, move the blades to high pitch. Engine oil under governor-boosted pressure moves the blades to the high rpm position. Each propeller has a blade angle range of 12° to 81° of pitch, with internal pitch stops that limit pitch.

Constant Speed is the ability to vary propeller pitch to maintain a constant engine RPM. When the propeller control is moved forward, positive oil pressure, regulated by a propeller governor, drives a piston, which rotates the blades to a low pitch high RPM (unfeathered) position. When the propeller control is moved aft, oil pressure is reduced by the propeller governor. After an RPM is selected, the propeller governor will automatically adjust oil pressure inside the propeller hub. This results in a constant propeller RPM regardless of flight attitude or manifold pressure setting.

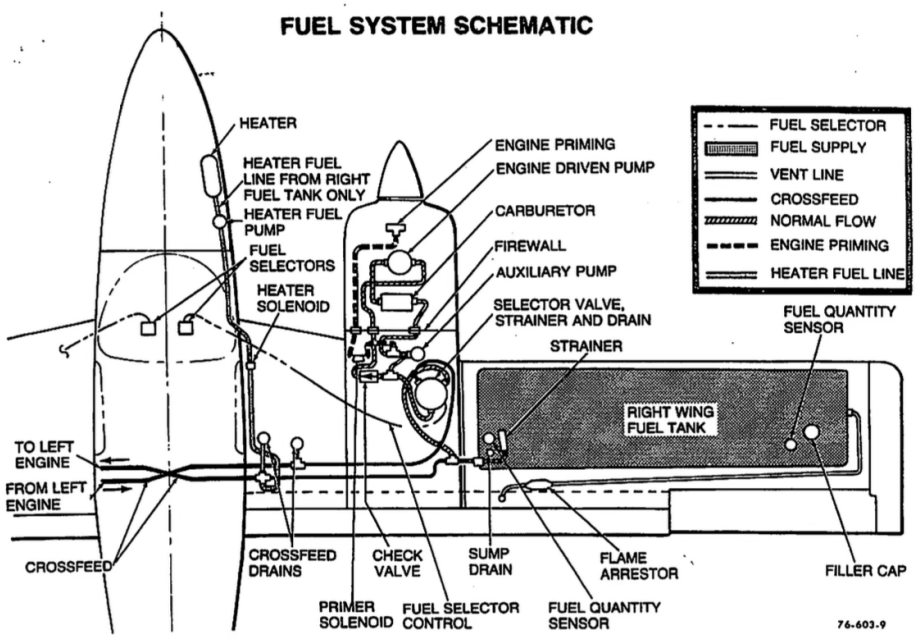
Feathering is when the propeller blades are in alignment with relative wind. Feathering reduces the amount of drag produced by the propeller windmilling by reducing its exposed area to the relative wind. This is accomplished by moving the propeller control to the low RPM (feather) position.

The propellers should be cycled occasionally during cold weather operations. This will maintain warm oil inside the propeller hubs.

If oil pressure is lost when the engine is operating above 950rpm's (it will be in any phase of normal flight) then the propeller will automatically go into the feather position. Locking pins prevent feathering when RPM drops below 800 RPM. Each propeller has an unfeathering accumulator. There is no propeller synchronizer/synchrophaser on this aircraft.

FUEL SYSTEM

N3724H uses aviation gasoline, grade 100 (green), grade 100LL (blue) or grade 94UL (purple). The fuel system is an "ON—CROSSFEED—OFF" arrangement and controlled by the fuel selectors located on the lower center floor panel. Total capacity is 51.5 gallons per wing tank with 50 gallons is unusable in each tank. Each wing fuel tank has a visual measuring tab with markings for 30 (28.5 useable), 40 (38.5 useable) and full at tank top.



There are two engine-driven and two electrically driven auxiliary fuel pumps, placarded as AUX FUEL PUMP L ON and AUX FUEL PUMP R ON on the pilot's sub-panel. The electric fuel pumps are used for engine start, takeoff, landing, and fuel selector changes. The fuel selector remains in the on position during normal operations, with each tank feeding its respective engine. Engine priming (cylinders 1, 2 and 4) is accomplished by using the "PUSH TO PRIME" switch in accordance to normal procedures.

Fuel cannot be transferred from tank to tank; however, either tank may feed both engines in crossfeed mode. The cabin heater, located in the nose compartment uses approximately 2-3 gallon per hour from the right fuel system only. The cabin heater has it's own dedicated fuel pump. The fuel crossfeed system is to be used during emergency conditions in straight flight only.

The fuel system is drained at eight locations, for on each wing. A flush sump drain valve is located outboard of each nacelle on the underside of each wing tank. A drain is also provided for the fuel selector valve, located in the outboard underside of each nacelle after of the firewall. Two flush drains are located outboard inboard of each main gear wheel well for draining the crossfeed fuel lines. The drains are actuated manually by pushing up one-quarter inch, on the lower portion of the drain valve.

Fuel quantity is measured by two float-operated sensors located in each wing tank system. The sensors transmit electrical signals to the individual indicators. A minimum of 9 gallons of fuel must be present in each tank prior to flight.

FLIGHT CONTROLS

The control surfaces are bearing supported and operated through the conventional cable assembly using push-rods and bell cranks.

TRIM CONTROL

Aircraft trim is accomplished using either the manual or electric pitch trim system. An emergency disconnect button will disengage the trim motor when depressed allowing time to turn off the trim circuit breaker. The aileron trim is located in the lower center console; this is used to displace the ailerons for trimming through cable tension only. The elevator trim is located between the pilot and co-pilots seat.

FLAPS

Wing flaps (single slotted) are operated by a three position switch with the UP, DOWN, and OFF position. The switch must be pulled out of detent in order to change position. There is an indicator gauge with UP, 10, 20, and DOWN (35). (Note: it takes 3 seconds for flaps to move from UP to 10 position, 1 second from 10 to 20, and 1 second from 20 to 35 respectively)

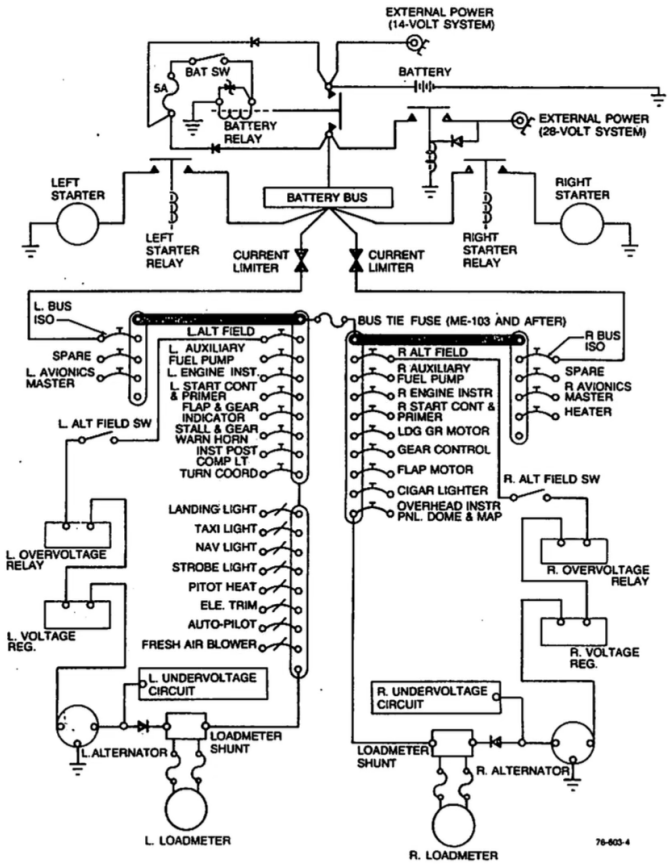
When flaps are positioned below 16 degrees the landing gear horn will sound if the gear is not down and locked (regardless of throttle position).

ELECTRICAL SYSTEM

N3724H is equipped with a 24-volt, 15.5 ampere-hour lead-acid battery installed in a battery box in the aft fuselage compartment. Two 55 ampere, 28-volt, belt-driven alternators provide

charging. The output of each alternator is controlled by a separate voltage regulator. The alternator systems are completely separate, except for the BUS TIE FUSE, the mutual tie to the battery bus through two bus isolation circuit breakers, and the paralleling circuit between regulators.

The aircraft uses a split bus system with each alternator powering its respective bus. The battery is used for engine start and emergency power. Over-voltage protection is provided via circuit breakers. There are two loadmeters, alternator out annunciators, and under over-voltage annunciators. The alternator out annunciator light and zero indication on the ammeter indicate an alternator failure. If one alternator fails the other alternator will provide adequate electrical power.



POWER DISTRIBUTION SCHEMATIC

LIGHTING SYSTEMS

Lighting for the instrument panel is controlled by two Theo stat switches locatives on the copilot's sub-panel to the right control consoled, labeled INSTR FLOOD and the other POST LIGHTS.

The switches for all exterior lights are located on the lower portion of the pilot's sub-panel. The exterior lights consist of a landing light on the outboard leading-edge portion of the left wing, a taxi light on the outboard leading-edge portion of each wing, navigation lights on the wing tips and empennage and a strobe light located on each wing tips.

LANDING GEAR

The Duchess is equipped with a tricycle gear, hydraulically actuated, fully retractable landing gear. Hydraulic is provided by an electrically driven reversible hydraulic pump. There are two circuit breakers: one for the hydraulic pump, one for the control circuit. The gear is held up using hydraulic pressure and remains locked in the down position using over-center brace and spring. There is a time delay which will disengage the hydraulic pump after 30 seconds of continuous operation.

The aircraft is equipped with a gear warning system which will activate under the following conditions:

1. Gear is not in the down and locked position below approximately 16" of MP on either engine
2. Gear is not in the down and locked position with flaps extended below 16 degrees
3. Gear handle is in the up position on the ground

Gear retraction on the ground is prevented by the ground pressure safety switch located in the pitot system to deactivate the pump circuit when airspeed is below 59-63 KIAS. The gear warning systems are no replacement for proper checklist usage and should not be relied on to prevent an inadvertent gear up.

The gear system is equipped with a hydraulic bypass valve for manual gear extension in the event of an emergency. The valve is located beneath the floor panel in front of the pilot, by rotating 90 degrees hydraulic pressure is released and the gear is lowered manually. This can only be accomplished below 100 KIAS and the emergency checklist should be followed. In the event that hydraulic pressure is lost with gear retracted, gear will free fall to the down position.

ENVIRONMENTAL

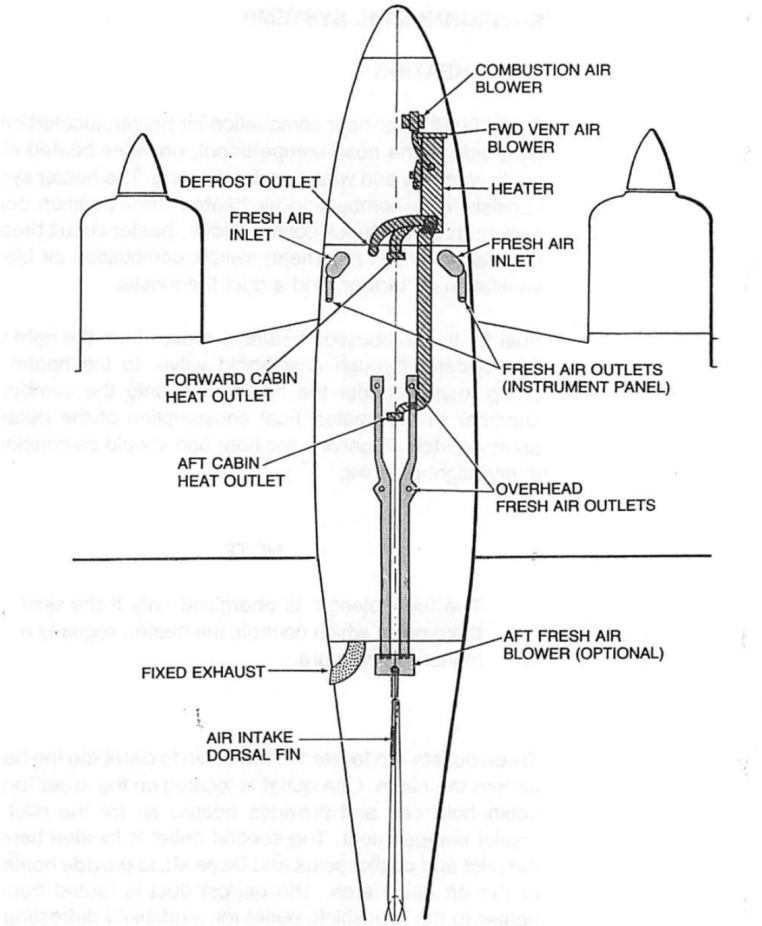
N3724H is equipped with a 45,000 BTU Janitrol gas heater located on the right side in the nose compartment. This provides heated air for cabin warming and windshield defrosting.

Fuel consumption of the heater is approximately 2-3 gallons per hour from the right fuel tank and should be considered during flight planning. Operation of the heater is controlled by a three position switch on the pilots sub-panel labeled "HEATER-ON, BLOWER ONLY, OFF." The "BLOWER ONLY" position is only for ground operations.

Another switch labeled "CABIN AIR—PULL OFF" controls the amount of air entering the cabin from the heater. Pulling the knob more than half closed will deactivate the heater in order to prevent over-temperature situations. The push-pull knob labeled "CABIN TEMP—PULL TO INCREASE" controls the temperature of air entering the cabin.

To provide unseated air through the same outlets used for heating, push the CABIN AIR and CABIN TEMP controls forward. The air intake for this system is located on the right side of the nose compartment. For ventilation through these same outlets during ground operation, push the CABIN AIR control forward and place the three-position switch, on the pilot's sub panel, in

the BLOWER ONLY position. The BLOWER ONLY position is for ground operation only. Fresh air from the intake on the left side of the dorsal fin is ducted to the individual outlets located above each seat. The volume of air at each outlet can be regulated individually.



BRAKES

The Duchess has hydraulically actuated disk brakes on the main landing gear. The hydraulic system for the brakes is independent from the landing gear. The brakes are actuated by depressing the top of each respective rudder peddle. To set the parking brake, pressure must be applied to the top of the rudder pedal. The brake reservoir is located on the left side of the nose compartment.

PITOT-STATIC

The pitot tube is located on the left wing. There are two static ports on each side of the aft fuselage. There is an alternate static source located inside of the cockpit and is placarded OFF NORMAL — ON ALTERNATE. When the alternate static source is desired, move the selector to the ON ALTERNATE position. The pitot tube is also equipped with a pitot heat system. The

pitot-static system provides air pressure used for indications on the airspeed indicator, vertical speed indicator, and altimeter.

VACUUM SYSTEM

The vacuum system in this aircraft has been removed.

EXTERNAL POWER

The external power receptacle is located on the right side of the fuselage, just after of the cabin area. A negatively grounded external power source of 28V may be used for engine starting or for ground electrical system checks. When auxiliary power is desired, connect the power cable of the remote source, turn OFF the ALT switches, ensure the avionics equipment is OFF and then turn ON the BATT switches.

DE-ICE/ANTI-ICE SYSTEMS

There is no de-ice equipment installed on this aircraft and it is not certified for flight into known icing conditions. Pitot heat is available as an anti-ice countermeasure.

AVIONICS

Duchess 3724H has two Garmin G5 instruments, acting as the attitude indicator and HSI. There are round gauges for airspeed, altitude, vertical speed and turn coordinator. In addition, two CGR-30P instruments provide engine parameters that include manifold pressure, RPM, cylinder head temperature, exhaust gas temperature, oil pressure, oil temperature, fuel flow, and battery voltage.

A Garmin GTN 430W navigator that is suitable for RNAV approaches to LPV minimums and a VOR encompass the navigation equipment. The instrument panel also includes a GTX-345

TAXI

Taxi slow enough that the landing gear struts do not compress or bounce as the clearance between the propeller and the ground is about 7-8 inches. Avoid ditches.

POST FLIGHT

If it is anticipated to be gusty, ensure that the elevator trim is set to the takeoff position so that the rudder does not bang into the elevator trim control surface.

POWER SETTINGS

There are six simple power settings each pilot should remember:

1. Takeoff: Max MP / Max RPM
2. Climb power: 25″ MP, 2,300 RPM

3. Normal cruise: 23″ MP, 2,300 RPM
4. Slow cruise: 20″ MP, 2,300 RPM
5. Pattern / Landing: 18″ MP, 2,300 RPM
6. Clearing turns / Maneuver entry: 18″ MP, 2,300 MP

Version	Date	Change
1.0	09/01/2025	Initial version