

ANC23FA008

OPERATIONAL FACTORS/HUMAN PERFORMANCE

Attachment 16

King Air C90B Pilot Operating Handbook and FAA Approved Airplane Flight Manual
[Excerpt]

November 11, 2023

Raytheon Aircraft Company

Beechcraft

King Air® C90B (Model C90A)

**(Serials LJ-1353 and After, except LJ-1367, LJ-1373, LJ-1377,
LJ-1384, LJ-1386, LJ-1389, LJ-1394, LJ-1397, LJ-1403,
LJ-1411, LJ-1425, LJ-1431, LJ-1498, and LJ-1538)**

Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (English/Metric Units)

FAA Approved in the Normal Category based on CAR Part 3. This document must be carried in the airplane at all times, and be kept within reach of the pilot during all flight operation. This handbook includes the material required to be furnished to the pilot by CAR Part 3.

Airplane Serial Number: _____

Airplane Registration Number: _____

FAA Approved by: _____
John Tighe
Raytheon Aircraft Company
DOA-230339-CE

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ENGINE OIL

SPECIFICATION

Any oil specified by brand name in the latest revision of Pratt & Whitney Service Bulletin No. 1001.

OIL KINEMATIC VISCOSITY

7.5 Centistoke Turbine Engine Oils

5 Centistoke Turbine Engine Oils

OIL CAPACITY (EACH ENGINE)

Total 14 U.S. quarts (13.3 liters)
Undrainable 1.5 U.S. quarts (1.4 liters)
Refill Capacity. 12.5 U.S. quarts (11.8 liters)
Operating Range Full to 4 quarts (3.8 liters) low

MAXIMUM CERTIFICATED WEIGHTS

Maximum Ramp Weight 10,160 pounds (4608 kilograms)
Maximum Take-off Weight 10,100 pounds (4581 kilograms)
Maximum Landing Weight 9600 pounds (4354 kilograms)
Maximum Zero Fuel Weight No Structural Limitation
Maximum Weight in Rear Baggage Compartment 350 pounds (159 kilograms)
Maximum Weight in Nose Avionics Compartment 350 pounds (159 kilograms)

CABIN AND ENTRY DIMENSIONS

Cabin Width (Maximum) 54 inches (137 centimeters)
Cabin Length (Partition to Partition) 155 inches (394 centimeters)
Cabin Length (Maximum between pressure bulkheads) 214 inches (544 centimeters)
Cabin Height (Maximum) 57 inches (145 centimeters)
Entry Width (Minimum) 27 inches (69 centimeters)
Entry Height (Minimum) 51.6 inches (131 centimeters)
Sill Height (Maximum). 48 inches (122 centimeters)
Pressurized Compartment Volume. 313.6 cu ft (8880 cu dm)

REAR BAGGAGE COMPARTMENT VOLUME

53.5 cu ft (1515 cu dm)

NOSE AVIONICS COMPARTMENT VOLUME

16 cu ft (453 cu dm)

SPECIFIC LOADINGS

Wing Loading 34.4 lbs/sq ft (168 kg/sq m)
Power Loading 9.2 lbs/shp (4.2 kg/shp)

The limitations included in this section have been approved by the Federal Aviation Administration and they must be observed in the operation of the Model C90A.

AIRSPED LIMITATIONS

SPEED	KCAS	KIAS	REMARKS
Maximum Operating Speed V _{MO} MMO	226 .46 Mach	226 .46 Mach	Do not exceed this airspeed in any operation.
Maneuvering Speed V _A	169	169	Do not make full or abrupt control movements above this speed.
Maximum Flap Extension Speed/Extended Speed V _{FE} Approach Down	182 140	184 148	Do not extend flaps or operate with flaps extended above these speeds.
Maximum Landing Gear Operating Speed V _{LO} Extension Retraction	182 164	182 163	Do not extend or retract the landing gear above these speeds.
Maximum Landing Gear Extended Speed V _{LE}	182	182	Do not exceed this speed with the landing gear extended.
Air Minimum Control Speed V _{MCA}	82	80	This is the lowest speed at which the airplane is directionally controllable after sudden loss of engine when the remaining engine is at take-off power.

AIRSPED INDICATOR MARKINGS*

MARKING	KCAS VALUE OR RANGE	KIAS VALUE OR RANGE	SIGNIFICANCE
Red Radial	82	80	Air Minimum Control Speed (V _{MCA}).
White Arc	76 to 140	78 to 148	Full-flap Operating Range.
Wide White Arc	76 to 88	78 to 88	Lower Limit is the Stalling Speed (V _{SO}) at maximum weight with Flaps Down and idle power.
Narrow White Arc	88 to 140	88 to 148	Lower Limit is the Stalling Speed (V _S) at maximum weight with Flaps Up and idle power. Upper Limit is the maximum speed permissible with flaps extended beyond Approach.
White Triangle	182	184	Maximum Speed with Approach Flaps.
Blue Radial	110	108	One Engine Inoperative Best Rate-of Climb Speed.
Red and White Hash-marked Pointer	226 KCAS (226 KIAS) or value equal to .46 Mach, whichever is Lower**		Maximum Speed for any operation.

* The Airspeed Indicator is marked in IAS values.

**Airspeed is not to exceed the Red and White Hash-marked Pointer.

FUEL MANAGEMENT

USABLE FUEL

(GALLONS x 6.7 = POUNDS)

- Total Usable Fuel Quantity 384 gal. (1453 liters), 2573 lbs
 - Each Side 192 gal. (727 liters), 1286.5 lbs
 - 1) Each Wing Tank System 131 gal. (496 liters), 877.5 lbs
 - 2) Each Nacelle Tank 61 gal. (231 liters), 409 lbs

FUEL IMBALANCE

Maximum allowable fuel imbalance between fuel systems is 200 pounds.

FUEL CROSSFEED

Crossfeeding of fuel is permitted only in the event of:

1. Electric Boost Pump Failure, or
2. Engine Failure

FUEL GAGES IN THE YELLOW ARC

Do not take off if fuel quantity gages indicate in the yellow arc or if fuel quantity is less than 265 pounds in each wing system.

OPERATING WITH LOW FUEL PRESSURE

Operation of either engine with its corresponding fuel pressure annunciator (L FUEL PRESS or R FUEL PRESS) illuminated is limited to 10 hours before overhaul or replacement of the engine-driven fuel pump. Windmilling time need not be charged against this time limit.

BOOST PUMPS

Both boost pumps must be operational prior to takeoff.

OIL SPECIFICATION

Any oil called out by brand name in the latest revision of Pratt & Whitney Service Bulletin Number 1001 is approved for use in the PT6A-21 engine.

APPROVED ENGINE OILS

7.5 Centistoke Turbine Engine Oils
5 Centistoke Turbine Engine Oils

NUMBER OF PROPELLERS

2

PROPELLER MANUFACTURER

McCauley Propeller (Vandalia, Ohio)

PROPELLER HUB AND BLADE MODEL NUMBERS

Two full-feathering, constant-speed, reversing, four-bladed propellers consisting of 94LMA-4 blades and 4HFR34C768 hubs.

MISCELLANEOUS INSTRUMENT MARKINGS

FUEL QUANTITY INDICATORS

Yellow Arc (No-takeoff Range) 0 to 265 lbs

CABIN DIFFERENTIAL PRESSURE GAGE

Green Arc (Approved Operating Range) 0 to 5.0 psi

Red Arc (Unapproved Operating Range) above 5.0 psi to end of scale

PNEUMATIC PRESSURE GAGE

Green Arc (Normal Operating Range) 12 to 20 psi

Red Line (Maximum Operating Limit) 20 psi

PROPELLER DEICE AMMETER

Green Arc (Operating Range) 18 to 24 amps

GYRO SUCTION GAGE

Narrow Green Arc (Normal from 35,000 to 15,000 feet) 2.8 to 4.3 in. Hg

Wide Green Arc (Normal from 15,000 feet to Sea Level) 4.3 to 5.9 in. Hg

35K marked on the face of gage at 3.0 in. Hg

15K marked on the face of gage at 4.3 in. Hg

WEIGHT LIMITS

Maximum Ramp Weight 10,160 lbs (4608 kg)

Maximum Take-off Weight 10,100 lbs (4581 kg)

Maximum Landing Weight 9600 lbs (4354 kg)

Maximum Zero Fuel Weight No Structural Limitation

Maximum Rear Baggage Compartment Load 350 lbs (159 kg)

Maximum Nose Avionics Compartment Load 350 lbs (159 kg)

CENTER OF GRAVITY LIMITS (LANDING GEAR EXTENDED)

AFT LIMIT

160.0 inches aft of datum at all weights.

FORWARD LIMITS

152.0 inches aft of datum at 10,100 lbs (4581 kg)

150.7 inches aft of datum at 9600 lbs (4354 kg)

144.7 inches aft of datum at 7850 lbs (3560 kg) or less

DATUM

The reference datum is located 83.5 inches (212 centimeters) forward of the center of the nose jack point.

MEAN AERODYNAMIC CHORD (MAC)

The leading edge of the MAC is 135.9 inches (345.2 centimeters) aft of datum.

The MAC length is 75.9 inches (193 centimeters).

MANEUVER LIMITS

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

FLIGHT LOAD FACTOR LIMITS (10,100 POUNDS / 4581 KILOGRAMS)

FLAPS UP	FLAPS DOWN
3.29 positive g's	2.00 positive g's
1.33 negative g's	0.00 g

MINIMUM FLIGHT CREW

One Pilot

MAXIMUM OPERATING PRESSURE-ALTITUDE LIMIT

30,000 feet

MAXIMUM OUTSIDE AIR TEMPERATURE LIMIT

ISA + 37°C

CABIN PRESSURIZATION AND STRUCTURAL LIMITATION

Maximum Cabin Differential Pressure. 5.1 psi
Fuselage Pressure Vessel Structure Inspections in Chapters 5 and 53-10-00 of
the *King Air 90 Series Maintenance Manual*
are required for continued airworthiness.

MAXIMUM OCCUPANCY LIMIT

13 including crew

SYSTEMS AND EQUIPMENT LIMITS

LANDING GEAR CYCLE LIMITS

Landing gear cycles (1 up - 1 down) are limited to one every 3 minutes for a total of 10 cycles followed by a 15 minute cool down period.

AFT-FACING SEATS

The seatback of each occupied aft-facing seat must be in the upright position and the headrest fully extended for takeoff and landing.

ICING LIMITATIONS

Minimum Airspeed (KIAS) for Sustained Icing Flight 140 knots
Minimum Temperature for Operation of Deicing Boots. -40°C
Temperature requiring Engine Anti-ice, if conditions free
of visible moisture cannot be assured. + 5°C or lower
Sustained flight in icing conditions with flaps extended is prohibited except for approach and landings.

GLIDE

1. Landing Gear UP
2. Flaps UP

WARNING

Determine that procedures for re-starting first and second failed engines are ineffective before feathering second engine propeller.

3. Propellers FEATHERED
4. Airspeed 125 KNOTS
5. Glide Ratio. 1.8 nautical miles for each 1000 feet of altitude.
Decrease by 0.2 nautical miles for each 10 knots of headwind.

ELECTRICAL

INVERTER INOPERATIVE [INVERTER]

1. Other inverter SELECT
2. Voltage/FrequencyCHECK
(volts = 105 - 120, f = 380 - 480)

FLIGHT CONTROLS

UNSCHEDULED ELECTRIC ELEVATOR TRIM

(For Raytheon Aircraft Electric Trim System only. See Section 9, SUPPLEMENTS, for appropriate supplements which may modify this procedure when an autopilot is installed.)

1. Maintain pitch control with elevator.
2. Control Wheel Trim Switch ATTEMPT TO TRIM IN OPPOSITE DIRECTION OF RUNAWAY
3. Elevator Trim Switch (Pedestal) OFF
4. Manual Trim RETRIM AS REQUIRED

CAUTION

DO NOT reactivate electric trim system until cause of malfunction has been determined.

UNSCHEDULED RUDDER BOOST ACTIVATION

Rudder boost operation without a large variation of power between the engines indicates a failure of the system.

1. Rudder Boost. OFF

If Condition Persists:

2. Rudder TrimADJUST

ELECTRICAL SYSTEM

GENERATOR INOPERATIVE [L DC GEN] or [R DC GEN]

1. Generator RESET, THEN ON

If Generator Will Not Reset:

2. Generator OFF
3. Operating Generator DO NOT EXCEED 100% LOAD

BATTERY CHARGE RATE [BATTERY CHARGE] (Airplanes Prior To LJ-1534)

Ground Operations:

Illumination of the [BATTERY CHARGE] indicates an above-normal charge current.

The [BATTERY CHARGE] should extinguish within 5 minutes after a battery start.

If the [BATTERY CHARGE] does not extinguish, or it re-illuminates, the battery charge current should be checked every 90 seconds using the procedures below until the [BATTERY CHARGE] extinguishes.

No decrease in charging current between checks indicates an unsatisfactory condition. Remove battery and check prior to flight.

Do not takeoff with the [BATTERY CHARGE] illuminated unless a decreasing charge current is confirmed.

1. Either Generator OFF
2. Voltmeter VERIFY INDICATION OF 28 VOLTS
3. Battery OFF MOMENTARILY, NOTING DECREASE IN LOADMETER
4. Battery ON

If Decrease in Loadmeter Exceeds 2.5%:

5. Battery CONTINUE TO CHARGE, REPEATING STEPS 3 & 4 EVERY 90 SECONDS
6. [BATTERY CHARGE] EXTINGUISHED WHEN DECREASE IN LOADMETER IS LESS THAN 2.5%.

In Flight:

In-flight illumination of the [BATTERY CHARGE] indicates a possible battery malfunction.

1. Battery OFF
2. [BATTERY CHARGE] Extinguished CONTINUE TO DESTINATION
3. [BATTERY CHARGE] Still Illuminated LAND AT NEAREST SUITABLE AIRPORT

GENERATOR TIE OPEN [L GEN TIE OPEN] or [R GEN TIE OPEN]

1. Appropriate Load Meter MONITOR
 - a. If Less Than 100% BUS SENSE SWITCH TO RESET
 - b. If Greater Than 100% TURN APPROPRIATE GENERATOR OFF
(monitor opposite loadmeter; not to exceed 100%)
2. If Gen Tie Will Not Reset MONITOR LOADMETERS

BOTH GENERATOR TIES OPEN [L GEN TIE OPEN] and [R GEN TIE OPEN]

1. GEN TIES MAN CLOSE
2. If Gen Ties Will Not Close MONITOR LOADMETERS
 - a. Batter will not charge
 - b. Battery will be depleted by equipment on center bus

BATTERY TIE OPEN [BAT TIE OPEN]

1. Center Bus Voltage MONITOR

If Center Bus Voltage is Normal (27.5 - 29.0 vdc):

- 2. BUS SENSE Switch RESET
[BAT TIE OPEN] - EXTINGUISHED

If Center Bus Voltage is Zero:

- 3. GEN TIES OPEN
 - Battery will not charge
 - Systems powered by the center bus will not be operational
 - Landing gear will have to be manually extended
- 4. LANDING GEAR RELAY Circuit Breaker (Pilot's Subpanel). PULL

CIRCUIT BREAKER TRIPPED

- 1. Nonessential Circuit. DO NOT RESET IN FLIGHT
- 2. Essential Circuit
 - a. Circuit Breaker (after allowing to cool for a minimum of 10 seconds).PUSH TO RESET
 - b. If Circuit Breaker Trips AgainDO NOT RESET

AVIONICS MASTER POWER SWITCH FAILURE

- If the Avionics Master Pwr Switch fails to operate in the ON position:
 - Avionics Master circuit breakerPULL

NOTE

Turning on the Avionics Master Pwr switch removes power that holds the avionics relay open. If the switch fails to the OFF position, pulling the Avionics Master circuit breaker will remove power to the relay and should restore power to the avionics busses.

NOTE

The elevator trim tab "0" (neutral) position is determined by observing that the alignment marks on the elevator trim tab push rods align with the alignment marks on the elevator when the elevator is resting against the downstops.

FUSELAGE (LEFT)

1. Access Panels SECURE
2. Static Ports CLEAR

NOTE

To obtain lighting for cabin entry, use the switch located next to cabin floor at left side of entry door.

BEFORE ENGINE STARTING

Items marked with an "*" may be omitted at pilot's discretion after the first flight of each day.

1. Cabin Door LIFT STEP, CHECK LOCKED
(Check security by attempting to turn handle toward unlocked position without depressing release button. Handle should not move.)

WARNING

Only a crew member or properly trained ground personnel should close and lock the cabin door.

2. Cabin and/or Cockpit Lighting:
 - a. With Battery Switch OFF: PUSH INSTRUMENT EMERGENCY LIGHTS switch at the right end of the overhead light control panel for partial indirect instrument lights.
 - b. With Battery Switch ON:
 - 1) Indirect instrument lights are available using control on overhead light control panel.
 - 2) Cabin lights are available using switch on copilot's left subpanel.
 - c. With Battery Switch ON and Bus Ties Switch MAN CLOSE - all cockpit lights and external lights are available.
- * 3. Monogram Electric Toilet (if installed) KNIFE VALVE OPEN
4. Load and Baggage SECURE
5. Weight and CG CHECKED
- * 6. Emergency Exit LATCHED
7. Seats and Tables POSITIONED
 - a. All Seats - Seatbacks Upright, Headrests fully extended
 - b. Lateral-tracking Seats - Outboard position
 - c. Tables - Stowed
8. Control Locks REMOVE
9. Seat Belts and Shoulder Harnesses FASTENED
10. Parking Brake CONFIRM SET
11. Overhead Panel CHECK
- * 12. Oxygen System Preflight Inspection CONFIRM COMPLETE
13. Oxygen System Control CONFIRM ON
14. Right Side Panel Circuit Breakers CHECK
- * 15. Alternate Static Air Source NORMAL
16. Copilot's Mic Switch AS REQUIRED
17. Cabin Temp Mode OFF
18. Vent Blower AUTO
19. Bleed Air Valves OPEN
20. Condition Levers FUEL CUT-OFF

- 21. Prop Levers HIGH RPM
- 22. Power Levers IDLE
- 23. EFIS Power Switches (if installed) OFF
- 24. Landing Gear Control DOWN
- 25. Left Subpanel Switches OFF, OR AS REQUIRED
- 26. Engine Anti-ice ON

CAUTION

To minimize ingestion of ground debris, the engine anti-ice system should be ON for all ground operations.

- 27. Pilot's Mic Switch AS REQUIRED
- 28. EFIS Aux Power (if installed) CHECK
 - a. ON-OFF-TEST Switch HOLD TO TEST FOR A MAXIMUM OF 5 SECONDS
(check for momentary illumination of green TEST annunciator)
 - b. ON-OFF-TEST Switch RELEASE TO OFF
- 29. Fuel System CHECK
 - * a. Circuit Breakers IN
 - * b. Battery ON
 - * c. Fuel FW Shutoff Valves CLOSE
 - * d. Battery OFF
 - * e. Crossfeed OPEN
[FUEL CROSSFEED] - ILLUMINATED, THEN CLOSE
 - f. Boost Pumps ON (listen for operation)
 - g. Battery ON
[L FUEL PRESS] and [R FUEL PRESS] - ILLUMINATED
 - h. Firewall Fuel Valves OPEN
[L FUEL PRESS] and [R FUEL PRESS] - EXTINGUISHED
 - i. Fuel Quantity CHECK
 - * j. Transfer Pumps TEST
 - 1) Transfer Pumps AUTO
 - 2) Transfer Test Switch LEFT, THEN RIGHT
[L NO FUEL XFER], then [R NO FUEL XFER] - BLINK
 - 3) Transfer Pumps OFF

If transfer pumps begin operating when AUTO is selected, annunciators will not blink.

Use the following procedure.

- 4) Transfer Test Switch HOLD TO LEFT SIDE
- 5) Left Transfer Pump AUTO, THEN OFF
[L NO FUEL XFER] - BLINKS
- 6) Transfer Test Switch HOLD TO RIGHT SIDE
- 7) Right Transfer Pump AUTO, THEN OFF
[R NO FUEL XFER] - BLINKS
- 8) Transfer Test Switch RELEASE
- 30. Voltmeter:
 - a. BAT and CTR 23 VOLTS MIN
 - b. TPL FED 22 VOLTS MIN
 - c. LEFT & RIGHT GENERATOR, EXT PWR 0 VOLTS
- * 31. Stall Warning Annunciator PRESS TO TEST
- * 32. Annunciator Lights TEST
- * 33. Fire Detectors (if installed) and Fire Extinguisher (if installed) TEST

Section 4
Normal Procedures

Raytheon Aircraft Company

Model C90A

- * 34. Landing Gear Control Lights TEST
- * 35. Gear Down AnnunciatorsCHECK
- * 36. Hyd Fluid Sensor..... TEST
[HYD FLUID LO] - ILLUMINATED
- 37. Beacon ON
(Beacon will not illuminate until a generator, or external power is on line or BUS TIES are manually closed)

ENGINE STARTING (BATTERY)

- 1. Right Ignition and Engine Start ON
[R IGNITION ON] - ILLUMINATED
- 2. Right Condition Lever (12% N₁ minimum)..... LOW IDLE
- 3. Right ITT and N₁MONITOR (1090°C maximum)

CAUTION

If no ITT rise is observed within 10 seconds after moving the Condition Lever to LOW IDLE, move the Condition Lever to CUT-OFF and Start Switch to OFF. Allow 30 seconds for fuel to drain and starter to cool; then follow ENGINE CLEARING procedures. If starting attempt is discontinued, the entire starting sequence must be repeated after allowing the engine to come to a complete stop.

- 4. Right Oil PressureCHECK
- 5. Right Ignition and Engine Start (51% N₁ or above)..... OFF
- 6. Right Condition Lever HIGH IDLE
- 7. Right Generator RESET, THEN ON
[R DC GEN], [L GEN TIE OPEN], and [R GEN TIE OPEN] - EXTINGUISHED
- 8. Battery CHARGE
(until loadmeter reads approximately 50% or less)

NOTE

Airplanes Prior To LJ-1534:

The [BATTERY CHARGE] will illuminate approximately 6 seconds after generator is on the line. If the annunciator does not extinguish within 5 minutes, refer to the BATTERY CHARGE RATE procedure in Section 3A, ABNORMAL PROCEDURES.

- 9. Left Ignition and Engine Start ON
[L IGNITION ON] - ILLUMINATED
- 10. Left Condition Lever (12% N₁ minimum)..... LOW IDLE
- 11. Left ITT and N₁MONITOR (1090°C maximum)
- 12. Left Oil PressureCHECK
- 13. Left Ignition and Engine Start (51% N₁ or above)..... OFF
- 14. Right Condition Lever REDUCE TO LOW IDLE
- 15. Left and Right Prop RPM..... 1100 MINIMUM
- 16. Voltmeter (L GEN)..... 27.5 TO 29.0 VOLTS
- 17. Left Generator RESET, then ON
[L DC GEN] - EXTINGUISHED
- 18. Right Generator..... RESET, THEN ON
[L GEN TIE OPEN] and [R GEN TIE OPEN]
remain extinguished with switch in the reset position)
- 19. Condition LeversAS REQUIRED

ENGINE STARTING (EXTERNAL POWER)

CAUTION

NEVER CONNECT AN EXTERNAL POWER SOURCE TO THE AIRPLANE UNLESS A BATTERY INDICATING A CHARGE OF AT LEAST 20 VOLTS IS IN THE AIRPLANE. If the battery voltage is less than 20 volts, the battery must be recharged, or replaced with a battery indicating at least 20 volts, before connecting external power.

NOTE

When an external power source is used, it must be set to 28.0 to 28.4 volts and be capable of producing 1000 amperes momentarily and 300 amperes continuously. The battery should be ON to absorb transients present in some external power sources. An [EXT PWR] is provided to alert the crew when an external DC power plug is connected to the airplane.

1. Avionics Master. OFF
2. Left and Right Generators. OFF
3. Battery. ON
4. External Power Output Voltage SET (28.0 - 28.4 VOLTS)
5. External Power OFF and CONNECT TO AIRPLANE
[EXT PWR] - ILLUMINATED
6. External Power ON
7. Volt Meter (EXT PWR) 28.0 - 28.4 VOLTS
8. EXT PWR Switch (if voltage is within acceptable limits) ON

NOTE

Airplanes Prior To LJ-1534:

The [BATTERY CHARGE] will illuminate approximately 6 seconds after generator is on the line. If the annunciator does not extinguish within 5 minutes, refer to the BATTERY CHARGE RATE procedure in Section 3A, ABNORMAL PROCEDURES.

9. Prop Controls FEATHERED
10. Right Ignition and Engine Start ON
[R IGNITION ON] - ILLUMINATED
11. Right Condition Lever (12% N₁ minimum) LOW IDLE
12. Right ITT and N₁ MONITOR (1090°C maximum)

CAUTION

If no ITT rise is observed within 10 seconds after moving the Condition Lever to LOW IDLE, move the Condition Lever to CUT-OFF and IGNITION AND ENGINE START switch to OFF. Allow 30 seconds for fuel to drain and starter to cool, then follow ENGINE CLEARING procedures. If starting attempt is discontinued, the entire starting sequence must be repeated after allowing the engine to come to a complete stop.

13. Right Oil Pressure CHECK
14. Right Ignition and Engine Start (51% N₁ or above). OFF
15. Left Ignition and Engine Start ON
[L IGNITION ON] - ILLUMINATED
16. Left Condition Lever (12% N₁ minimum). LOW IDLE
17. Left ITT and N₁ MONITOR (1090°C maximum)
18. Left Oil Pressure CHECK
19. Left Ignition and Engine Start (51% N₁ or above). OFF
20. EXT PWR Switch OFF
21. External Power Source TURN OFF;
DISCONNECT FROM AIRPLANE; DOOR SECURE
22. [EXT PWR] VERIFY EXTINGUISHED

Section 4
Normal Procedures

Raytheon Aircraft Company

Model C90A

- 23. Right Generator RESET, THEN ON
[R DC GEN], [L GEN TIE OPEN], and [R GEN TIE OPEN] - EXTINGUISHED
- 24. Voltmeter (L GEN) 27.5 TO 29.0 VOLTS
- 25. Left Generator RESET, THEN ON
[L DC GEN] - EXTINGUISHED
- 26. Right Generator RESET, THEN ON
[L GEN TIE OPEN] and [R GEN TIE OPEN]
remain extinguished with switch in the reset position)
- 27. Prop Controls FULL FORWARD
- 28. Left and Right Prop RPM 1100 MINIMUM

HOT START OR HUNG START

If rate of ITT increase predicts an over-temperature occurrence, or if N₁ ceases to accelerate in a normal manner:

- 1. Condition Lever FUEL CUTOFF
- 2. Ignition and Engine Start STARTER ONLY
(for remainder of starter time limit)
- 3. Ignition and Engine Start OFF
- 4. Do not attempt another start until the cause of the hot start or hung start has been corrected.

NO LIGHT START

If no ITT rise is observed within 10 seconds after moving the Condition Lever to LOW IDLE:

- 1. Condition Lever FUEL CUTOFF
- 2. Ignition and Engine Start OFF
- 3. Follow ENGINE CLEARING procedure.

ENGINE CLEARING

Use the following procedure to remove internally trapped fuel and vapor, or if there is evidence of a fire within the engine.

- 1. Condition Lever CONFIRM FUEL CUTOFF
- 2. Starter COOL FOR 1 MINUTE AFTER PREVIOUS START ATTEMPT
- 3. Ignition and Engine Start STARTER ONLY
(for a maximum of 40 seconds)
- 4. Ignition and Engine Start OFF
- 5. Starter COOL FOR 1 MINUTE BEFORE ATTEMPTING ANOTHER START

BEFORE TAXI

- 1. Transfer Pumps AUTO
- 2. Crossfeed AUTO
- 3. Both Inverters CHECK
(volts = 105 - 120, freq = 380 - 420 Hz, [INVERTER] illuminates with inverter off)
- 4. Inverter To Be Used ON
- 5. Electrical System CHECK
 - a. GEN TIES OPEN
[L GEN TIE OPEN] and [R GEN TIE OPEN] - ILLUMINATED
 - b. Voltmeter CHECK
 - 1) TPL FED 26.5 TO 28.0 VOLTS
 - 2) R GEN and L GEN 27.5 TO 29.0 VOLTS
(within 1.0 volt of each other)
 - 3) CTR 23 VOLTS MINIMUM

- c. Gen Ties. NORM
[L GEN TIE OPEN] and [R GEN TIE OPEN] - EXTINGUISHED
- d. Bus Sense Switch MOMENTARILY TO TEST
[L GEN TIE OPEN], [R GEN TIE OPEN], and [BAT TIE OPEN] - ILLUMINATED
- e. Voltmeter (CTR) 0 VOLTS
- f. Bus Sense Switch MOMENTARILY TO RESET
[L GEN TIE OPEN], [R GEN TIE OPEN], and [BAT TIE OPEN] - EXTINGUISHED
- g. Voltmeter (CTR) 27.5 TO 29.0 VOLTS
- h. Generator Load PARALLELED WITHIN 10%
- 6. Avionics Master. ON
- 7. EFIS Power (if installed) ON
- 8. EFIS Aux Power (if installed) ON
- 9. External Lights AS REQUIRED
- 10. Environmental System Controls SET
(observe N₁, ITT, and generator limits if air conditioning or electric heat is used.)
- a. Vent Blower AS REQUIRED

NOTE

With the Cabin Temp Mode set to AUTO, MAN HEAT, or MAN COOL and the vent blower set to AUTO, the ventilation blower operates in the low position. For increased air circulation, turn the blower switch to HIGH.

- b. Cabin Temp Control AS REQUIRED
- c. Cabin Temp Mode AUTO
- d. Bleed Air Valves. OPEN OR CLOSED
 - 1) Use OPEN for more efficient heating on the ground.
 - 2) Use CLOSED for more efficient cooling on the ground.
- e. Electric Heat (ground operations only) AS REQUIRED

NOTE

Electric heat in the NORM position is automatically controlled when the Cabin Temperature Mode control is in AUTO. The GND MAX position may be used for fast warm up. Observe N₁, ITT, and generator limits when operating in this mode. The electric heat switch is solenoid-held in the GND MAX position and will drop to the NORM position at lift-off.

- 1) Cabin Temp Mode AUTO OR MAN HEAT
- 2) Vent Blower HIGH
- 3) Electric Heat NORM OR GROUND MAX
- f. Cabin Air AS REQUIRED
 - 1) Pull to increase airflow to the cockpit.
 - 2) Push to increase airflow to the cabin.
- g. Copilot Air. AS REQUIRED
- h. Pilot Air. AS REQUIRED
- i. Windshield Defrost AS REQUIRED
 - 1) Pull to increase; push to decrease.
 - 2) Push the pilot and copilot air controls fully in and pull the Cabin Air Control fully out if increased windshield defrost airflow is required.
- 11. Cabin Sign FSB or NO SMOKE & FSB
- 12. Instruments CHECK

TAXI

1. BrakesCHECK
2. GyrosCHECK

NOTE

Care must be exercised during taxi on unimproved surfaces. If possible, conduct engine runup on a hard surface free of sand and gravel, to preclude pitting of propeller blades and airplane surfaces.

BEFORE TAKEOFF (RUNUP)

Items marked with an "" may be omitted at pilot's discretion after the first flight of each day.*

CAUTION

If either [CHIP DETECT] illuminates during runup, do not take off. Shut down the engine, investigate the cause and initiate necessary repairs.

1. Boost Pumps and Auto Crossfeed TEST
 - a. Left Boost Pump OFF
[L FUEL PRESS] - EXTINGUISHED
[FUEL CROSSFEED] - ILLUMINATED
 - b. Left Boost Pump ON
 - c. Crossfeed CLOSE, THEN AUTO
[FUEL CROSSFEED] - EXTINGUISHED
 - d. Right Boost Pump OFF
[R FUEL PRESS] - EXTINGUISHED
[FUEL CROSSFEED] - ILLUMINATED
 - e. Right Boost Pump ON
 - f. Crossfeed CLOSE, THEN AUTO
[FUEL CROSSFEED] - EXTINGUISHED
2. Avionics and RadarCHECK
3. EFIS (if installed)CHECK
4. Pressurization CHECK AND SET
 - * a. Cabin Altitude Selector Knob ADJUST
SO THAT "CABIN ALT" DIAL INDICATES AN ALTITUDE 1000 FEET BELOW FIELD PRESSURE ALTITUDE.
 - * b. Rate Control Selector KnobSET INDEX AT 12-O'CLOCK POSITION
 - * c. Condition Levers HIGH IDLE
 - * d. Cabin Pressurization Switch HOLD AT THE "TEST" POSITION
 - * e. Cabin Climb Indicator CHECK FOR RATE OF DESCENT INDICATION
 - * f. Cabin Pressurization Switch RELEASE TO THE "PRESS" POSITION
WHEN PRESSURIZING IS CONFIRMED
 - * g. Condition Levers LOW IDLE
 - h. Cabin Altitude Selector Knob ADJUST
SO THAT INNER SCALE (ACFT ALT) INDICATES PLANNED CRUISE ALTITUDE PLUS 1000 FEET. (If this setting does not result in an outer scale (CABIN ALT) indication of at least 500 feet above take-off field pressure altitude, adjust as required.)
5. AutopilotCHECK, THEN OFF
6. Electric Elevator Trim ControlCHECK
(Refer to appropriate Autopilot Flight Manual Supplement for possible variations to these procedures)
- * a. Elevator Trim Switch ON
- * b. Pilot's Control Wheel Trim Switch CHECK OPERATION
7. Trim TabsSET
8. Engine Control Friction LocksSET

- 9. Flaps CHECK AND CONFIRM UP
- 10. Flight Controls CHECK FREEDOM OF MOVEMENT AND PROPER DIRECTION OF TRAVEL
- * 11. Engine Anti-ice CHECK
- * 12. Overspeed Governors TEST
 - a. Rudder Boost Control Switch RUDDER BOOST
 - b. Prop Levers HIGH RPM (Balance of test is performed on individual engines)
 - c. Prop Gov Test Switch HOLD TO PROP GOV TEST
 - d. Power Lever INCREASE UNTIL PROP IS STABILIZED AT 1940 TO 2060 RPM.
CONTINUE TO INCREASE UNTIL RUDDER MOVEMENT
IS NOTED. (observe ITT and Torque Limits)

NOTE

Left rudder pedal will follow left POWER LEVER movement and right rudder pedal will follow right POWER LEVER movement.

- e. Power Lever IDLE
- f. Repeat steps d and e on the opposite engine.
- g. Prop Gov Test Switch RELEASE
- * 13. Primary Governors EXERCISE AT 1900 RPM
[RVS NOT READY] - ILLUMINATED as prop levers retarded
- * 14. Gyro Suction and Pneumatic Pressure Gages CHECK at 1900 RPM
- * 15. Autofeather (if installed) CHECK
 - a. Power Levers APPROXIMATELY 500 FT-LBS TORQUE
 - b. Autofeather Switch HOLD TO TEST
[L AUTOFEATHER] and [R AUTOFEATHER] - ILLUMINATED
 - c. Power Levers RETARD INDIVIDUALLY;
then return to approximately 500 ft-lbs torque
 - 1) At approximately 400 ft-lbs OPPOSITE ANNUNCIATOR EXTINGUISHED
 - 2) At approximately 260 ft-lbs [AUTOFEATHER]
will cycle on and off with each fluctuation of torque and the propeller will start to feather.
 - d. Power Levers BOTH RETARDED
[L AUTOFEATHER] & [R AUTOFEATHER] - EXTINGUISHED
(neither propeller feathers)
- 16. Autofeather (if installed) ARM
- 17. Prop Feathering (manual) CHECK (LO IDLE)
- 18. Ice Protection Equipment (if required) CHECK
 - a. Auto Ignition CHECK
 - 1) Power Levers IDLE
 - 2) Auto Ignition ARM [L IGNITION ON] & [R IGNITION ON] - ILLUMINATED
 - 3) Power Levers ADVANCE ABOVE 425 FT-LBS TORQUE
[L IGNITION ON] & [R IGNITION ON] - EXTINGUISHED
 - 4) Power Levers IDLE
[L IGNITION ON] & [R IGNITION ON] - ILLUMINATED
 - 5) Auto Ignition OFF
[L IGNITION ON] & [R IGNITION ON] - EXTINGUISHED
 - b. Engine Anti-Ice CHECK (system initially ON)

WARNING

Either the MAIN or STANDBY actuator must be operational on each engine before takeoff.

- 1) Engine Anti-Ice Actuators STANDBY

Section 4
Normal Procedures

Raytheon Aircraft Company

Model C90A

- 2) Engine Anti-Ice OFF
[L ENG ANTI-ICE] and [R ENG ANTI-ICE] - EXTINGUISHED
- 3) Engine Anti-Ice Actuators MAIN
- 4) Engine Anti-Ice ON
[L ENG ANTI-ICE] and [R ENG ANTI-ICE] - ILLUMINATED
- c. Windshield Anti-Ice, Pilot's and Copilot's CHECK INDIVIDUALLY
 - 1) Windshield Anti-Ice HI
(observe increase on left and right loadmeters)
 - 2) Windshield Anti-Ice OFF, THEN NORMAL
(observe increase on left and right loadmeters)
 - 3) Windshield Anti-Ice OFF
- d. Electrothermal Propeller Deice CHECK

CAUTION

Do not operate propeller deice when the propellers are static.

- 1) Prop Deice ON
- 2) Deice Ammeter 18 TO 24 AMPS
(monitor for 90 seconds to ensure automatic timer operation)
- 3) Prop Deice OFF
- e. Surface Deice System CHECK
 - 1) Condition Levers HIGH IDLE
 - 2) Pneumatic Pressure GREEN ARC (12-20 PSI)
 - 3) Surface Deice Switch SINGLE AND RELEASE
 - a) Pneumatic Pressure Gage WILL DECREASE MOMENTARILY
 - b) Boots CHECK BOTH WING AND BOTH HORIZONTAL STABILIZER BOOTS
VISUALLY, IF POSSIBLE, FOR INFLATION AND VACUUM HOLD DOWN
 - c) Wing Boots will inflate in approximately 6 seconds, followed by horizontal stabilizer boots.
 - 4) Surface Deice Switch MANUAL AND HOLD
 - a) Pneumatic Pressure Gage WILL DECREASE MOMENTARILY
 - b) Boots CHECK BOTH WING AND BOTH HORIZONTAL STABILIZER
BOOTS VISUALLY, IF POSSIBLE, FOR INFLATION
 - 5) Surface Deice Switch RELEASE
 - Boots CHECK BOTH WING AND BOTH HORIZONTAL STABILIZER BOOTS
VISUALLY, IF POSSIBLE, FOR VACUUM HOLD DOWN
 - 6) Condition Levers LOW IDLE
- f. Pitot Heat CHECK
(observe slight increase in loadmeter)

CAUTION

Prolonged use of the pitot heat on the ground will damage the heating elements.

- 19. Fuel Quantity, Flight and Engine Instruments CHECK
- 20. Takeoff Speeds CONFIRM

BEFORE TAKEOFF (FINAL ITEMS)

- 1. Engine Auto Ignition ARM (if required)
[L IGNITION ON] and [R IGNITION ON] - ILLUMINATED
- 2. Engine Anti-ice AS REQUIRED
[L ENG ANTI-ICE] and [R ENG ANTI-ICE] - ILLUMINATED, if on
- 3. Autofeather (if installed) CONFIRM ARMED

4. Prop Sync AS REQUIRED
5. Exterior Lights AS REQUIRED
6. Ice Protection AS REQUIRED
 - a. Windshield Anti-iceNORMAL/HI (if required)
 - b. Prop Deice ON (if required)
 - c. Left and Right Fuel Vent HeatON
 - d. Stall Warning HeatON
 - e. Left and Right Pitot HeatON
7. Transponder ALT
8. Prop Levers CONFIRM FULL FORWARD
9. Trim CONFIRM SET
10. Flaps CONFIRM SET
11. Bleed Air Valves CONFIRM OPEN
12. Interior Lights AS REQUIRED
13. Generator Load CHECK
14. Battery Ammeter (Airplanes LJ-1534 and After) CHECK
(charge current 10 amps or less if required)
15. Annunciators EXTINGUISHED OR CONSIDERED

ON TAKEOFF ROLL

- [L AUTOFEATHER] and [R AUTOFEATHER] (if installed) ILLUMINATED

TAKEOFF

WARNING

Do not cycle deice boots during takeoff.

1. Refer to Section 5, PERFORMANCE for minimum take-off power, take-off speed, take-off distance and climb data.
2. Monitor ITT and engine torque. Increasing airspeed will cause torque and ITT to increase.
3. Rotating beacons, strobe lights, and tail flood lights should be switched off (at the pilot's discretion) when encountering haze, fog, or clouds.

CLIMB

1. Landing GearUP
2. Climb Power SET (Observe maximum ITT, torque, and N₁ limits)
3. Prop RPM2200 (MCP)/ 2000 (Cruise Climb)
4. Prop SyncON
5. Windshield Anti-Ice NORMAL

CAUTION

The practice of turning the windshield anti-ice on early in the flight is recommended if it is anticipated that it will be required later in the flight after the windshield has been cold-soaked. Activating the windshield anti-ice after the windshield has been cold-soaked may cause the windshield to crack.

6. Engine InstrumentsMONITOR
7. Cabin Sign AS REQUIRED
8. Cabin Pressurization CHECK

WARNING

Do Not Lift Power Levers In Flight.

1. Cruise Power SET per CRUISE POWER TABLES or GRAPHS
2. Autofeather (if installed) OFF
3. Engine Instruments MONITOR
4. Pressurization MONITOR
(Reset if cruise altitude changes by 1000 feet or more.)

ICING CONDITIONS

WARNING

Due to distortion of the wing airfoil, ice accumulations on the leading edges can cause a significant loss in rate of climb and in speed performance, as well as increases in stall speed. Even after cycling the deicing boots, the ice accumulation remaining on the boots and unprotected areas of the airplane can cause large performance losses. For the same reason, the aural stall warning system may not be accurate and should not be relied upon. Maintain a comfortable margin of airspeed above the normal stall airspeed. In order to minimize ice accumulation on unprotected surfaces of the wing, maintain a minimum of 140 knots during operations in sustained icing conditions. Prior to a landing approach, cycle the deicing boots to shed any accumulated ice.

1. Engine Ice Protection

Before visible moisture is encountered at +5°C and below, or:

At night when freedom from visible moisture is not assured at +5°C and below. (Operation of strobe lights will sometimes show ice crystals not normally visible.)

- a. Engine Anti-ice ON
[L ENG ANTI-ICE] & [R ENG ANTI-ICE] - ILLUMINATED
- b. Engine Instruments DROP IN TORQUE AND INCREASE IN
ITT INDICATES PROPER OPERATION

NOTE

Illumination of the L and/or R [ENG ICE FAIL] indicates a failure of the selected Engine Anti-ice System. Immediate illumination indicates loss of power to the actuator(s). Select the other actuator(s).

- c. Power RESET, IF DESIRED (observe engine limitations)

WARNING

If in doubt, actuate the Engine Anti-ice System. Engine icing can occur even though no surface icing is present. If freedom from visible moisture cannot be assured, engine ice protection should be activated. Visible moisture is moisture in any form; clouds, ice crystals, snow, rain, sleet, hail or any combination of these.

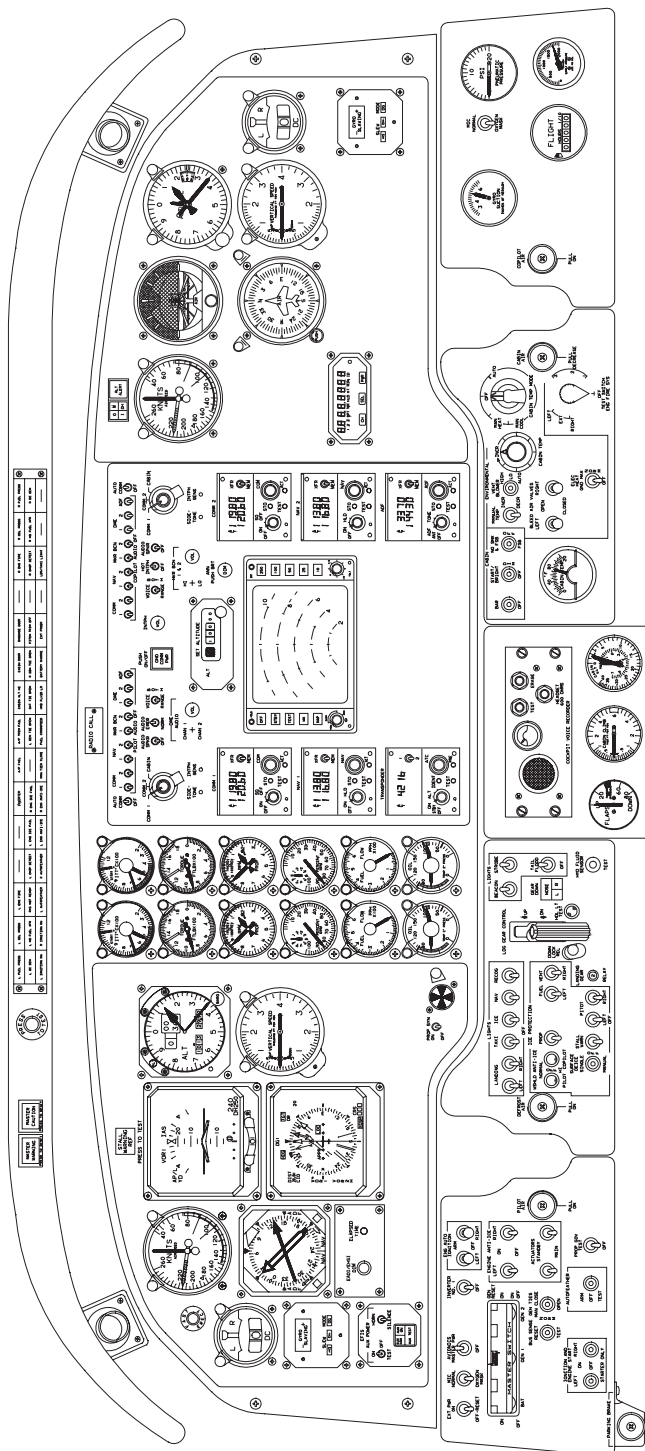
2. Auto Ignition ARM

NOTE

Engine Auto Ignition must be armed for icing flight, precipitation, and operation during turbulence. To prevent prolonged operation of the ignitors with the system armed, do not reduce power levers below 425 ft-lbs torque.

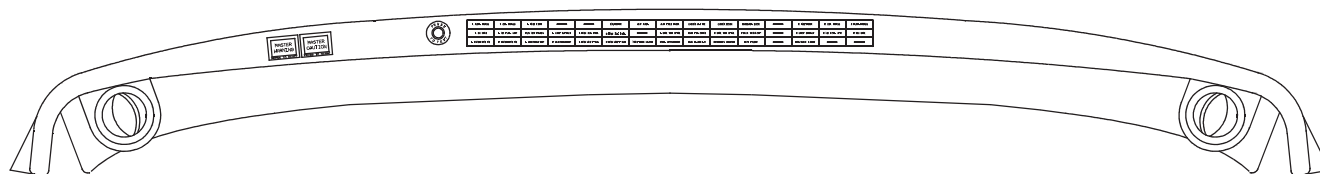
3. Electrothermal Prop Deice ON
 - a. The system may be operated continuously in flight, and will function automatically until the switch is turned off.
 - b. Prop RPM MODULATE BRIEFLY TO RELIEVE PROPELLER
IMBALANCE DUE TO ICE. REPEAT AS NECESSARY.

TYPICAL ILLUSTRATIONS



C94LJ07C1376

**TYPICAL INSTRUMENT PANEL
(LJ-1353 THRU LJ-1360, LJ-1362)**



GLARESHIELD

L FUEL PRESS	L OIL PRESS	+ L ENG FIRE	—	—	INVERTER	A/P FAIL	A/P TRIM FAIL
L DC GEN	L NO FUEL XFR	RVS NOT READY	L CHIP DETECT	L ENG ICE FAIL	R ENG ICE FAIL	—	L GEN TIE OPEN
L IGNITION ON	R IGNITION ON	L AUTOFEATHER	R AUTOFEATHER	L ENG ANTI-ICE	R ENG ANTI-ICE	MAN TIES CLOSE	FUEL CROSSFEED

CABIN ALT HI	CABIN DOOR	** BAGGAGE DOOR	—	+ R ENG FIRE	R OIL PRESS	R FUEL PRESS
BAT TIE OPEN	R GEN TIE OPEN	PITCH TRIM OFF	—	R CHIP DETECT	R NO FUEL XFR	R DC GEN
HYD FLUID LO	*BATTERY CHARGE	EXT PWR	—	LDG/TAXI LIGHT	***L BL AIR OFF	*** R BL AIR OFF

ANNUNCIATOR PANEL

* AIRPLANES PRIOR TO LJ-1534

** AIRPLANES PRIOR TO LJ-1531

*** AIRPLANES LJ-1688, LJ-1689, LJ-1691 AND AFTER

+ OPTIONAL

LJ07C
031471AA

ANNUNCIATOR PANEL		
NOMENCLATURE	COLOR	PROBABLE CAUSE FOR ILLUMINATION
L FUEL PRESS	Red	Low fuel pressure on left side.
L OIL PRESS	Red	Low oil pressure in left engine.
*L ENG FIRE	Red	Fire in left engine compartment.
---	Red	---
---	Red	---
INVERTER	Red	The inverter selected is inoperative.
A/P FAIL	Red	Autopilot is disconnected.
A/P TRIM FAIL	Red	Improper trim or no trim from autopilot trim command.
CABIN ALT HI	Red	Cabin pressure altitude exceeds 12,500 feet.
CABIN DOOR	Red	Cabin door open or not secure.
** BAGGAGE DOOR	Red	Nose baggage door not secure.
---	Red	---
*R ENG FIRE	Red	Fire in right engine compartment.
R OIL PRESS	Red	Low oil pressure in right engine.
R FUEL PRESS	Red	Low fuel pressure on right side.
L DC GEN	Amber	Left generator off the line.
L NO FUEL XFR	Amber	Left wing tank empty or transfer pump failure.
RVS NOT READY	Amber	Propeller levers are not in the high rpm, low pitch position with the landing gear extended.
L CHIP DETECT	Amber	Metal contamination in left engine oil is detected.
L ENG ICE FAIL	Amber	Left engine anti-ice vanes in transit or inoperative.
R ENG ICE FAIL	Amber	Right engine anti-ice vanes in transit or inoperative.
---	Amber	---
L GEN TIE OPEN	Amber	Left generator bus isolated from center bus.
BAT TIE OPEN	Amber	Battery isolated from generator buses.
R GEN TIE OPEN	Amber	Right generator bus isolated from center bus.
*PITCH TRIM OFF	Amber	Pitch trim de-energized by a trim disconnect switch on the control wheel with the system power switch on the pedestal turned on.
---	Amber	---
R CHIP DETECT	Amber	Metal contamination in right engine oil is detected.
R NO FUEL XFR	Amber	Right wing tank empty or transfer pump failure.
R DC GEN	Amber	Right generator off the line.
L IGNITION ON	Green	System is armed and left engine torque is below 400 ft-lbs or left ignition and engine start switch is ON.
R IGNITION ON	Green	System is armed and the right engine torque is below 400 ft-lbs or right ignition and engine start switch is ON.

*Optional Equipment

** Airplanes Prior To LJ-1531

NOMENCLATURE

+ L AUTOFEATHER
+ R AUTOFEATHER
L ENG ANTI-ICE
R ENG ANTI-ICE
MAN TIES CLOSE
FUEL CROSSFEED
HYD FLUID LO
**BATTERY CHARGE
EXT PWR

LDG/TAXI LIGHT
***L BL AIR OFF
***R BL AIR OFF

COLOR

Green
Green
Green
Green
Green
Amber
Amber
Amber
Amber
Amber
Green
Amber
Amber

ANNUNCIATOR PANEL

PROBABLE CAUSE FOR ILLUMINATION

Left Autofeather armed with power levers advanced above 90% N₁.
Right Autofeather armed with power levers advanced above 90% N₁.
Left engine anti-ice vanes in position for icing conditions.
Right engine anti-ice vanes in position for icing conditions.
Manually close generator bus ties.
Crossfeed valve is open.
Hydraulic fluid is low in the hydraulic fluid reservoir.
Excessive battery charge current.
External power connector is plugged in.

Landing lights or taxi light on with landing gear UP.
The left bleed air valve switch is in the CLOSED position.
The right bleed air valve switch is in the CLOSED position.

+ If Installed

** Airplanes Prior To LJ-1534

*** Airplanes LJ-1688, LJ-1689, LJ-1691 and After

FLIGHT INSTRUMENTS

ELECTRONIC PILOT ALTIMETER (LJ-1567 AND AFTER)

The altimeter is a solid-state unit with liquid crystal display. Barometric corrected altitude is displayed by a digital read-out, plus a dial pointer display graduated in 20- and 100-foot increments. Barometric setting is displayed in both hectopascals and inches of mercury.

With lighting control turned on, dimming is controlled by the PILOT FLIGHT INSTR rheostat. With lighting control turned off, dimming is controlled by a built-in light sensor. Power to the altimeter is provided from the battery bus through the right generator avionics bus. In the event of loss of power from the battery bus, lighting control is provided by the light sensor.

An amber CODE flag, located in the upper part of the display, will be displayed with any fault that causes the altitude encoder output to be invalid. A white FAIL message replaces the digital altitude when the altimeter self-test detects a fault. This self-test is a Built In Test (BIT) that monitors several altimeter parameters.

ALTITUDE ALERT UNIT (LJ-1567 AND AFTER)

The Altitude Alert Unit is a solid-state unit with liquid crystal display. The alert unit monitors the altitude displayed on the Pilot Altimeter and compares that with the altitude set on the alert unit. The desired altitude can be pre-selected in increments of 100 feet by a control located on the alert unit.

As the set altitude is approached on the outer limit (± 1000 ft), visual warnings and a two-second audio begins. The visual warnings remain on until the inner limit (± 200 ft) of the set altitude is reached. Visual warnings consist of amber ALT ALERT annunciators located on the face of the alert unit and above the copilot airspeed indicator, and an amber annunciator located on the upper left corner of the pilot altimeter. Deviations outside the inner limit will reactivate both the two-second audio warning and the visual warnings.

The visual warning will continue to operate until:

- The airplane returns to within the inner limit (± 200 ft) of the selected altitude.
- The airplane reaches and departs from the outer limit (± 1000 ft) of the selected altitude.
- A new altitude is selected and set on the alert unit.
- The visual warning is cancelled by depressing the ALT ALERT annunciator/switch on the face of the alert unit.

FUEL PURGE SYSTEM

Engine compressor discharge air (P3 air) pressurizes a purge tank. On engine shutdown, the fuel manifold pressure subsides, allowing the engine fuel manifold poppet valve to open. The purge tank pressure then forces fuel out of the engine fuel manifold lines through the fuel nozzles and into the combustion chamber. As the fuel is burned, a momentary surge in gas generator rpm (N₁) should be observed. The entire operation is automatic and requires no input from the crew.

On engine start-up, fuel manifold pressure closes the fuel manifold poppet valve allowing P₃ air to pressurize the purge tank.

USE OF AVIATION GASOLINE

If aviation gasoline is used as an alternate or emergency fuel, the hours of operation on gasoline must be calculated to avoid exceeding the maximum of 150 hours of operation on gasoline between overhauls. Since the gasoline is being mixed with regular fuel, record the number of gallons taken aboard for each engine. Determine the average fuel consumption for each hour of operation. If one engine has an average fuel consumption of 40 gallons (151.4 liters) per hour, for example, it is allowed 6000 gallons (22,712.4 liters) of aviation gasoline between overhauls or 12,000 gallons (45,424.8 liters) between overhauls for both engines.

ELECTRICAL SYSTEM

The electrical system of the King Air C90B is a 28-volt direct current (vdc) negative ground system. The power sources include one battery and two generators. Power from these sources is distributed to the individual electrical loads with a multi-bus system as depicted in the Power Distribution Schematic. The distribution system consists of a hot battery bus, left generator bus, right generator bus, center bus, and a triple-fed bus. The power sources are connected to the distribution system through line contactors and relays. A voltmeter in the overhead instrument panel is provided to monitor battery, external power and individual bus voltages.

BATTERY

The battery is a 34-ampere-hour, air-cooled, 20-cell nickel-cadmium battery (airplanes prior to LJ-1534) or a 42-ampere-hour, sealed, lead-acid battery (airplanes LJ-1534 and after). The battery is controlled by a battery switch located in the pilot's outboard subpanel and placarded BAT-OFF/ON. The battery switch controls the battery relay and the battery bus tie. When the battery switch is in the ON position, the battery relay closes to apply power to the triple-fed bus and the battery bus tie closes to apply power to the center bus. In the OFF position, the battery relay and the battery bus tie open to disconnect the battery from all buses except the hot battery bus.

On airplanes prior to LJ-1534, the battery voltage can be monitored with the voltmeter located in the overhead instrument panel. A battery monitor circuit continuously

senses battery current and illuminates the BATTERY CHARGE annunciator whenever a high charge rate exists. The BATTERY CHARGE annunciator illuminates after an engine start and should extinguish within 5 minutes. If the BATTERY CHARGE annunciator remains illuminated for more than 5 minutes during ground operations, the battery charge current can be monitored using the procedures found in the OTHER PROCEDURES portion of Section 4. If the annunciator illuminates in flight, the procedures found in Section 3A, under BATTERY CHARGE RATE should be followed.

On airplanes LJ-1534 and after, the battery voltage and current can be monitored with the voltmeter and battery ammeter located in the overhead instrument panel. A battery ammeter reading of 10 amps or less prior to takeoff indicates the battery is approaching a full charge.

GENERATORS

There are two engine-driven, 250-amp starter-generators installed on the airplane. Individual control switches are provided in the pilot's subpanel and are placarded GEN 1 and GEN 2 - OFF/ON/GEN RESET. The generators are self-excited and do not require battery power for operation. To bring a generator on line, the generator switch should be momentarily placed in the GEN RESET position, then released to ON. In the GEN RESET position, the generator voltage builds up to 28 volts and the line contactor is open. When the generator switch is released to ON, the line contactor is allowed to close.

Generator control units provide voltage regulation, differential voltage, reverse current protection, paralleling, cross-start current limiting, and overvoltage protection control for the generators. The voltage regulation circuit controls the generator to maintain a constant 28-volt output. The differential voltage circuit compares the generator output and the center bus voltages then closes the line contactor if the generator is within acceptable limits of the center bus voltage.

Reverse current protection circuitry opens the line contactor and disconnects the generator if a reverse current condition occurs. If the condition corrects itself, the line contactor will re-close automatically.

The paralleling circuit provides load equalization between both generators. The cross-start current limiting circuit limits the generator output during engine cross-start operation.

The overvoltage protection circuit senses the generator output voltage and de-excites the generator and opens the line contactor if an overvoltage occurs. If the generator is disconnected for overvoltage, it will be necessary to select GEN RESET, then ON to reset the generator.

L DC GEN and R DC GEN annunciators are provided. Illumination of the L or R DC GEN annunciator indicates that the line contactor is open and the generator is off line. Loadmeters in the overhead instrument panel indicate the load applied to each generator as a percent of generator rating.

Section 7

Systems Description

BUS TIES

The generator buses are connected to the center bus with the left and right bus tie relays. A three-position generator bus tie control switch is located in the pilot's subpanel. It is placarded GEN TIES - OPEN/NORM/MAN CLOSE. The OPEN position causes both the left and right bus tie relays to open and isolate the generator buses from the center bus. The NORM position allows the automatic closure of the left and right bus tie relays when either generator or the external power comes on line. If the battery is the only source on line, both generator bus ties open to isolate the left and right generator bus loads from the battery. In addition, the normal and max electric head and air conditioner are also disabled. Equipment, which remains operational during only operation, is identified with a white ring around the control switch. Momentarily selecting the MAN CLOSE position during battery operation closes both generator bus ties to power the generator buses from the battery. However, this will severely limit the battery duration.

The battery bus tie connects the battery to the center bus. The battery switch closes the battery bus tie when the battery switch is in the ON position, making the battery available for center bus loads or for recharging.

Bus current sensors are installed which sense current to each generator bus from the center bus and to the center bus from the battery. If either generator bus sensor detects a high current condition, it opens the corresponding bus tie to isolate the bus from the rest of the system. If the battery bus sensor detects a high battery discharge current, it opens the battery bus tie to isolate the battery. The battery bus sensor is defeated during engine starts and landing gear operation. The bus current sensors are controlled with the three position bus sense control switch placarded BUS SENSE - TEST/NORM/RESET. Momentarily selecting the TEST position tests the bus current sensors causing the generator bus ties and battery tie to open. Momentarily selecting the RESET position will reset the bus current sensors if they have been tripped either as a result of a test or an actual high current condition.

L GEN TIE OPEN, R GEN TIE OPEN, and BAT TIE OPEN annunciators are provided to indicate the positions of the bus ties. Illumination of these annunciators indicate that the corresponding bus tie is open. The MAN TIES CLOSE annunciator indicates that the generator bus ties have been manually closed during battery operation and generator bus loads are applied to the battery.

EXTERNAL POWER

The external power receptacle, located under the right wing outboard of the nacelle, is provided to facilitate connecting a 28 vdc external power unit to the airplane electrical system. A control switch, placarded EXT PWR - ON/OFF - RESET is located in the pilot's left subpanel and controls the external power relay. The external power relay will close when the switch is in the ON position. It is recommended that the battery be on line whenever the external power is in use. Before selecting EXT PWR - ON, the airplane voltmeter in the

Raytheon Aircraft Company

Model C90A

overhead instrument panel should be used to verify that the external power voltage is within acceptable limits.

Reverse polarity protection and overvoltage protection are provided. The reverse polarity protection circuit prevents the external power relay from closing if the external power polarity is different than the airplane electrical system. The overvoltage protection circuit opens the external power relay to electrically disconnect the external power from the airplane if an overvoltage occurs. After an overvoltage disconnect occurs, it is necessary to turn off the external power control switch to rest the overvoltage.

The EXT PWR caution annunciator is provided to indicate the state of the external power. Continuous illumination of the EXT PWR annunciator indicates that external power is electrically connected and supplying power to the airplane electrical system. A flashing EXT PWR annunciator indicates that an external power plug is connected to the airplane, but the external power output voltage is low or the external power is electrically disconnected from the airplane electrical system. Either condition should be corrected to prevent depleting the battery.

EXTERNAL POWER UNIT REQUIREMENTS

For ground operation, 28.2 $\pm$ 2 VDC electrical power may be supplied to the airplane from external power. The external power unit should be capable of producing 1000 amps for 5 seconds, 500 amperes for 2 minutes and 300 amps continuously.

CAUTION

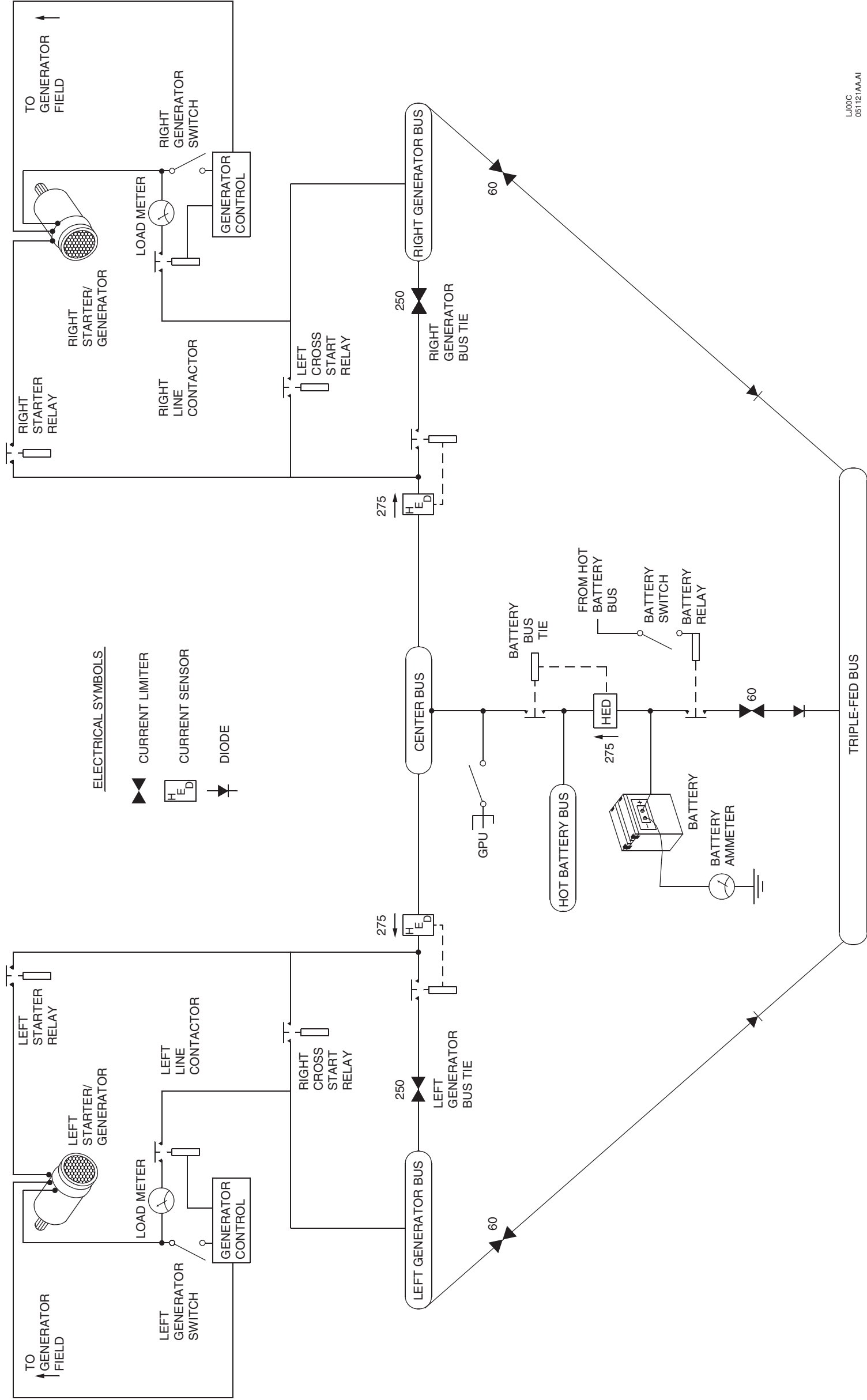
Do not exceed 350 amperes continuous power. Any current in excess of 1000 amperes may overtorque the drive shaft of the starter-generator or produce heat sufficient to shorten the life of the unit.

INVERTERS

Two solid-state inverters are installed. The inverters convert dc input power to single-phase 400 Hz ac at 115 volts and 26 volts. The inverters are connected to the center bus during battery operation. The No. 1 inverter transfers to the left generator bus and the No. 2 inverter transfers to the right generator bus when one or both generators is on line.

The inverters are controlled by a single switch in the pilot's outboard subpanel placarded INVERTER - NO.1/OFF/NO. 2. Only one inverter can be selected at a time. Either inverter can provide power to all ac loads.

The 115-vac output of the operating inverter can be monitored with the volt/frequency meter in the overhead instrument panel. The volt/frequency meter normally indicates frequency but voltage can be selected by depressing the button in the lower left corner of the meter. Illumination of the INVERTER annunciator indicates that the selected inverter is inoperative.



Right - Fold Over

AVIONICS/ELECTRICAL EQUIPMENT BUS CONNECTION

AVIONICS

Avionics No. 2 Bus
DSP
DSPL PRCRP
EADI
EFIS Fans Normal
EHSI

ELECTRICAL

Inverter No. 1

ENGINE

L Chip Detector
L Main Engine Anti-Ice
R Stby Engine Anti-Ice Control

ENVIRONMENTAL

R Bleed Air Control
Vent Blower

FLIGHT CONTROL

Flap Control Indicator
Flap Motor

LEFT GENERATOR BUS

FUEL

R Boost Pump
R Firewall Valve
R Fuel Pressure Warning
R Fuel Quantity Indicator
R Transfer Pump

FURNISHINGS

Cigar Lighter

LIGHTS

Avionics & Engine Instrument Lights
Flashing Beacon
Flight Instrument Lights
L Landing Light
Tail Flood Lights (Opt)

PROPELLERS

Propeller Balance
Propeller Sync

WEATHER

L Fuel Control Heat
L Fuel Vent Heat
Pilot Windshield Heat

RIGHT GENERATOR BUS

FUEL

Crossfeed Valve
L Boost Pump
L Firewall Valve
L Fuel Pressure Warning
L Fuel Quantity Indicator
L Transfer Pump

FURNISHINGS

Furnishings Master Control
Electric Toilet (Opt)

LIGHTS

R Landing Light
Recognition Lights (Opt)
Side Panel Lights
Strobe Lights (Opt)
Subpanel, Overhead & Console Lights

WARNING/ANNUNCIATORS

NO SMOKE & FSB Signs

WEATHER

Copilot Windshield Heat
R Pitot Heat
Stall Warning Heat

AVIONICS

Avionics No. 3 Bus
Copilot Audio
EFIS Fan STBY

ELECTRICAL

Inverter No. 2
R Generator Bus

ENGINE

R Engine Chip Detector
R Main Engine Anti-ice
L Stby Engine Anti-Ice Control

FLIGHT CONTROL

Elevator Trim
Rudder Boost

FLIGHT INSTRUMENTS

Copilot Turn & Slip

AVIONICS

Inverter No. 1

Inverter No. 2

ELECTRICAL

Generator Reset

ENVIRONMENTAL

Air Conditioner Motor

Maximum Electric Heat

Normal Electric Heat

LIGHTS

Taxi Light

Ice Light

AVIONICS

Avionics Master Power

Avionics No. 1 Bus

ELECTRICAL

Bus Tie Control

ENGINE

Autofeather (Opt)

Fire Detector (Opt)

L Igniter Power

L Start Control

R Ignitor Power

R Starter Control

ENGINE INSTRUMENTS

L Engine Fuel Flow

L Engine Oil Pressure

L Engine Temperature

R Engine Oil Flow

R Engine Oil Pressure

R Engine Oil Temperature

ENVIRONMENTAL

Cabin Air Temp

Cabin Pressure Control

L Bleed Air Control

AVIONICS

RNAV Memory

ELECTRICAL

Battery Relay Power

Battery Voltmeter

ENGINE

L Engine Fire Extinguisher (Opt)

R Engine Fire Extinguisher (Opt)

CENTER BUS

LANDING GEAR

Landing Gear

PROPELLERS

Propeller Deice

WARNING/ANNUNCIATORS

Avionics Annunciation

WEATHER

Surface Deice

Windshield Wiper

TRIPLE-FED BUS

FLIGHT INSTRUMENTS

Outside Air Temp

Pilot Encoding Altimeter

Pilot Turn & Slip

LANDING GEAR

Landing Gear Control

LIGHTS

Cabin Floor Lights

Instruments Indirect Lights

Navigation Lights

PROPELLERS

Propeller Governor Test

WARNING/ANNUNCIATORS

Annunciator Indicator

Annunciator Power

L Oil Pressure Warning

Landing Gear Position Indicator

Landing Gear Warning Horn

R Oil Pressure Warning

Stall Warning

WEATHER

L Pitot Heat

HOT BATTERY BUS

FUEL

Fuel Crossfeed Valve

L Fuel Boost Pump

R Fuel Boost Pump

FURNISHINGS

MOD (Stereo)

LIGHTS

Entry Light

LEFT GENERATOR AVIONICS BUS No. 2

ADF 1
AFCS
AP Servo
Comm 2
DME 2
Radar
Radio Altimeter
Radio Phone
RMI 2
Transponder 2

RIGHT GENERATOR AVIONICS BUS No. 3

Air Data
Compass 2
DME 1
GPS
Hazard Avoid
MFD
Nav 2
RMI 1
Transponder 1

TRIPLE-FED AVIONICS BUS No. 1

Comm 1
Compass 1
Nav 1

STANDBY EFIS POWER SUPPLY

A standby EFIS power supply system is provided to prevent the pilot's EFIS displays from blanking during flight conditions where voltage to the system may drop momentarily below 28 VDC. Such conditions may include gear operations and airstarts. The system consists of an EFIS auxiliary battery located in the aft fuselage avionics compartment, an EFIS AUX POWER control panel located on the pilot's instrument panel, a 15-amp circuit breaker, placarded EFIS AUX BAT, located on the right circuit breaker panel, and a relay activated by the left squat switch which inhibits the ability of the standby battery to power the pilot's EFIS on the ground. The EFIS AUX PANEL contains an ON-OFF-TEST switch, a HORN SILENCE button, and a cluster of annunciators which provide the following information to the pilot.

AUX ARM (Green)	Illuminates when the standby battery is selected on, the avionics switch is on, and the pilot's EFIS displays are being powered by the Left Generator Bus through the No. 2 Avionics Bus.
AUX ON (Amber)	Illuminates when voltage to the pilot's EFIS has dropped below 18 VDC and operating power has switched to the standby battery power supply. A beeping warning horn will sound in conjunction with this annunciator.
AUX TEST (Green)	Illuminates when the ON-OFF-TEST switch is held to the TEST position. The test switch should not be held longer than 5 seconds, and released as soon as the AUX TEST annunciator illuminates. The annunciator may illuminate only momentarily, or as long as the switch is held to the TEST position. Either situation indicates the auxiliary battery has a sufficient charge. Refer to BEFORE ENGINE STARTING in Section 4, NORMAL PROCEDURES.

The EFIS auxiliary battery is continually charged by the No. 2 Avionics Bus.

A beeping warning horn is provided to alert the pilot that the standby battery is supplying power to the pilot's displays. This horn will activate in conjunction with the illumination of the AUX ON annunciator. The horn may be silenced by pressing the HORN SILENCE button. The horn and the annunciator will activate during shutdown if the avionics switch is turned off before the auxiliary battery is turned off.

The standby EFIS power supply is intended for only short periods of use such as during the momentary drops in operating voltage. It should not be relied upon to maintain operation of the EFIS if the normal power supply should fail.

LIGHTING SYSTEMS

COCKPIT

An overhead light control panel, accessible to both pilot and copilot, incorporates a functional arrangement of all lighting systems. Each light group has its own rheostat switch placarded BRT - OFF. The MASTER PANEL LIGHTS - ON - OFF switch is the master switch for: Pilot & Copilot Flight Instrument Lights, Pilot & Copilot Gyro Instrument Lights, Engine Instrument Lights, Avionic Panel Lights, Overhead, Pedestal & Subpanel Lights, and Side Panel Lights. The instrument indirect lights in the glareshield and overhead map lights are individually controlled by separate rheostat switches.

CABIN

A threshold light is located forward of the airstair door at floor level. A switch adjacent to the threshold light is for switching this light on and off. When the airstair door is closed, the threshold light will extinguish.

Raytheon Aircraft Company

Model C90A

When the battery switch is ON, the individual reading lights along the top of the cabin may be switched on or off by the passengers with a push-button switch adjacent to each light.

The baggage area light is controlled with a push-button switch adjacent to the light in the aft compartment headliner.

A three-position light switch located in the CABIN group of the copilot's left subpanel and placarded BRIGHT - DIM - OFF, controls the cold cathode cabin lights. This lighting group also incorporates a three-position light switch placarded NO SMOKE & FSB - OFF - FSB which controls the seat belt/no smoking signs and attendant chimes.

EXTERIOR

Switches for the landing lights, taxi lights, wing ice lights, navigation lights, rotating beacons, and if installed, recognition, wing tip and tail strobe lights, are located on the pilot's right subpanel. They are appropriately identified as to their function.

Tail floodlights, if installed, are incorporated into the horizontal stabilizers and are intended to illuminate both sides of the vertical stabilizer. A switch for these lights, placarded LIGHTS - TAIL FLOOD - OFF, is located on the pilot's right subpanel.

ENVIRONMENTAL SYSTEM

The environmental system consists of the bleed air pressurization, heating and cooling systems, and their associated controls.

PRESSURIZATION SYSTEM

The pressurization system is designed to provide a normal working pressure differential of $5.0 \pm .1$ psi, which will provide cabin pressure altitudes of approximately 6000 feet at an airplane altitude of 20,000 feet, and 12,000 feet at 30,000 feet. The controller range is limited to 10,000 feet cabin altitude.

Bleed air from the compressor section of each engine is utilized to pressurize the pressure vessel. A flow control unit in the nacelle of each engine controls the pressure of the bleed air and mixes ambient air with it in order to provide an air mixture suitable for the pressurization function. The mixture flows to the environmental bleed air shutoff valve, which is controlled by a switch placarded BLEED AIR VALVES - LEFT - RIGHT - OPEN - CLOSED in the ENVIRONMENTAL controls group on the copilot's left inboard subpanel. When this switch is in the OPEN position, the air mixture flows through the valve and to the air-to-air heat exchanger. Depending upon the position of the bypass valves, a greater or lesser volume of the air mixture will be routed through or around the heat exchanger. The temperature of the air flowing through the heat exchanger is lowered as heat is transferred to cooling fins, which are in turn cooled by ram airflow through the fins of the heat exchanger. The air leaving both (left and right) bypass valves is then ducted into a single muffler, located under the right

Section 7

Systems Description

floorboard, forward of the main spar, which ensures quiet operation of the environmental bleed air system. The air mixture is then ducted from the muffler into the mixing plenum.

The mixing plenum receives recirculated cabin air from the vent blower in addition to the air mixture from the bleed air system. The mixing plenum is also a distribution point. Air from the mixing plenum is ducted upward into the crew heat duct. A valve on the forward side of the crew heat duct allows air to be tapped off for delivery to the windshield defroster when the DEFROST AIR - PULL ON knob on the pilot's right subpanel is pulled out. Air from the environmental bleed air duct is mixed with recirculated cabin air in the mixing plenum, then routed into the floor outlet duct. This pressurized air is then introduced into the cabin through the floor registers. Finally, the air flows out of the pressure vessel through the outflow valve, located on the aft pressure bulkhead. A silencer on the outflow and safety valves ensures quiet operation.

The mixture from both flow control units is delivered to the pressure vessel at a rate of approximately 14 pounds per minute, depending upon outside air temperature and pressure altitude. Pressure within the cabin and the rate of cabin pressure changes are regulated by pneumatic modulation of the outflow valve, which controls the rate at which air can escape from the pressure vessel.

A vacuum operated safety valve is mounted adjacent to the outflow valve on the aft pressure bulkhead. It is intended to serve three functions: to provide pressure relief in the event of a malfunction of the outflow valve; to allow depressurization of the pressure vessel whenever the cabin pressure switch is moved into the DUMP position; and to keep the pressure vessel unpressurized while the airplane is on the ground with the left landing gear safety switch compressed. A negative pressure relief function is also incorporated into both the outflow and the safety valves. This prevents outside atmospheric pressure from exceeding cabin pressure by more than 0.1 psi during rapid descents, even if bleed air inflow ceases.

When the BLEED AIR VALVE switches on the copilot's left subpanel are OPEN (up), the air mixture from the flow control units enters the pressure vessel. While the airplane is on the ground, a left landing gear safety-switch-actuated solenoid valve in each flow control unit keeps the ambient air intake port closed, allowing only bleed air to be delivered into the pressure vessel. At lift-off, the safety valve closes and the ambient air shutoff solenoid valve in the left flow control unit opens; approximately 6 seconds later, the solenoid in the right flow control unit opens. Consequently, by increasing the volume of airflow into the pressure vessel in stages, excessive pressure bumps during takeoff are avoided.

An adjustable cabin pressurization controller is mounted in the pedestal. It commands modulation of the outflow valve. A dual-scale indicator dial is mounted in the center of the pressurization controller. The outer scale (CABIN ALT) indicates the cabin pressure altitude which the pressurization controller is set to maintain. The inner scale (ACFT ALT) indicates the maximum pressure altitude at which the

Raytheon Aircraft
Beech King Air[®] C90A
Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual
Supplement

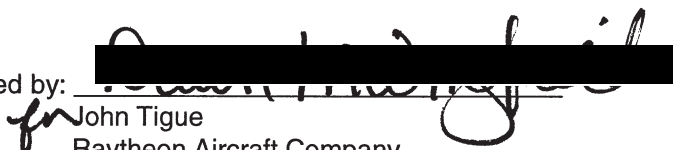
for the
Collins FCS-65H Automatic Flight Control System
with
Collins EFIS-84
(2-Tube System With Single Data Processor Unit)
Electronic Flight Instrument System
(EFIS)

*This Supplement is Applicable to the Following Manual(s):
90-590024-35 and 90-590024-69*

Airplane Serial Number: _____

Airplane Registration Number: _____

FAA Approved by: _____


John Tighe
Raytheon Aircraft Company
DOA-230339-CE

Raytheon Aircraft

LOG OF REVISIONS

Beech King Air® C90A

Pilot's Operating Handbook
and

FAA Approved Airplane Flight Manual Supplement

for the

Collins FCS-65H Automatic Flight Control System

with

Collins EFIS-84

(2-Tube System With Single Data Processor Unit) Electronic Flight Instrument System
(EFIS)

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0	1 thru 14	Original Issue	December, 1992	John Kennedy
1	1 and 2	Added effectivity on title page and autopilot information in Limitations.	January, 1994	A.C. Jackson
2	1 thru 14	Revised section heads, inspection time intervals, and shifted data.	April, 2002	

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SECTION I - GENERAL

The information in this supplement is FAA-approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (POH/AFM) when the airplane has been modified by installation of the Collins FCS-65H Automatic Flight Control System and Collins EFIS-84 (2-Tube System with Single Data Processor Unit) Electronic Flight Instrument System (EFIS) in accordance with Raytheon Aircraft-approved data.

The information in this supplement supersedes or adds to the basic POH/AFM only as set forth below. Users of the manual are advised to always refer to the supplement for possibly superseding information and placarding applicable to operation of the airplane.

The Collins Pilot's Guide for the EFIS-84 Electronic Flight Instrument System (2-Tube) No. 523-0777-066, dated November 30, 1992 or later revision, is available from Collins General Aviation Division, 400 Collins Road NE, Cedar Rapids, Iowa 52498. It is the responsibility of the owner/operator to maintain the appropriate pilot's guide in current status.

SECTION II - LIMITATIONS

1. Maximum speed limit for autopilot operation is unchanged from the airplane maximum airspeed limit (V_{MO}/M_{MO}).
2. Do not use autopilot below the following altitudes:
 - a. Approach - 200 feet above ground level.
 - b. Climb - 500 feet above ground level.
 - c. All other operations - 1000 feet above ground level.
3. Do not use autopilot or yaw damper during takeoff or landing.
4. Pilot must be seated at the controls with the seat belt fastened during autopilot operations.
5. Autopilot preflight check must be conducted and found satisfactory prior to each flight on which the autopilot is to be used.
6. Use of the VOR Approach mode is limited to an area within 10 nm of the VOR station.
7. The Collins Pilot's Guide for the EFIS-84 Electronic Flight Instrument System (2-Tube) No. 523-0777-066 dated November 30, 1992 or later revision, must be immediately available to the flight crew.
8. The copilot's attitude indicator and navigation instrument must be operational for takeoff.
9. The pilot's EADI and EHSI must be operational in NORMAL mode for takeoff.

SECTION III - EMERGENCY PROCEDURES

AUTOPILOT MALFUNCTION/ELEVATOR TRIM RUNAWAY

If the airplane deviates unexpectedly from the planned flight path:

1. Control Wheel **HOLD FIRMLY, BE PREPARED TO ACCEPT CONTROL WHEEL FORCES**
2. AP YD/DISC TRIM Switch (Pilot's or Copilot's Control Wheel) **DEPRESS FULLY**
3. Flight Controls/Power Levers **AS REQUIRED TO RECOVER THE AIRPLANE**

NOTE

The maximum altitude lost during malfunction tests was:

Climb - 0 Feet
Cruise - 200 Feet
Descent - 200 Feet
Maneuvering - 200 Feet
Approach - 87 Feet
One-engine-inoperative Approach - 75 Feet

4. Elevator Trim Switch OFF
Continue flight using manual trim.
5. Autopilot DO NOT RE-ENGAGE

WARNING

In flight, do not overpower the autopilot. The trim will operate in the direction opposing the overpower force, which will result in large out-of-trim forces.

MANUAL AUTOPILOT DISENGAGEMENT

If necessary, the autopilot can be manually disengaged using any one of the following methods.

1. AP YD/DISC TRIM Switch (Pilot's or Copilot's Wheel) DEPRESS TO FIRST LEVEL
2. AP ENG Switch (APP Panel)(Yaw Damper Remains Engaged) PUSH
3. Pitch Trim Switch (Pilot's or Copilot's Wheel)(Yaw Damper Remains Engaged) ACTIVATE
4. Go-Around (GA) Switch, If Lateral Mode is Selected (Left Power Lever)(Yaw Damper Remains Engaged) ... ACTIVATE
5. AFCS or AP SERVO Circuit Breaker. PULL
6. Master Switch OFF
7. VG Fast Erect (Yaw Damper Remains Engaged) ON

AUTOMATIC AUTOPILOT DISENGAGEMENT

The following conditions will cause the autopilot to automatically disengage. Disengagement will normally be accompanied by an aural warning.

1. Electrical Power. MAJOR DEGRADATION, INTERRUPTION, OR LOSS
2. Vertical Gyro (ATT Flag on EADI) FAILURE
3. Roll Attitude MORE THAN 50°
4. Pitch Attitude GREATER THAN $\pm 40^\circ$
5. A/P FAIL Annunciator ILLUMINATED

ZERO TORQUE CONDITIONS

The autopilot monitors pitch and roll rates, and computes normal acceleration. Any one of the following conditions will cause the elevator and/or aileron autopilot servo torques to decrease to approximately zero torque until the monitored parameter returns to within limits. The autopilot will not disengage during the zero torque condition.

1. Pitch Rate GREATER THAN 4°/SECOND
2. Roll Rate GREATER THAN 10°/SECOND
3. Normal Acceleration GREATER THAN APPROXIMATELY 0.4G INCREMENT

AUTOPILOT FAILURE (A/P FAIL ANNUNCIATOR)

Illumination of the A/P FAIL annunciator upon attempted engagement or after engagement of the autopilot indicates a failure of the APC-65H computer or associated components monitored by the computer. The autopilot will not engage; or it will automatically disengage, and the aural warning will sound.

ELEVATOR TRIM FAILURE (A/P TRIM FAIL ANNUNCIATOR)

Illumination of the A/P TRIM FAIL annunciator indicates that the elevator trim servo is not responding to commands from the autopilot. The autopilot will not disengage, although electric trim will be disengaged automatically.

1. ELEV TRIM SwitchCHECK ON
(or cycle OFF, then ON, if ELEC TRIM OFF green annunciator is illuminated.)

If A/P TRIM FAIL annunciator remains illuminated:

2. Control Wheel HOLD FIRMLY - BE PREPARED TO ACCEPT PITCH FORCES
3. Autopilot DISENGAGE
4. Elevator Trim RETRIM MANUALLY
5. Autopilot DO NOT RE-ENGAGE

ENGINE FAILURE (AUTOPILOT ENGAGED)

1. Autopilot DISENGAGE
2. Engine Failure Procedures in EMERGENCY PROCEDURES Section of AFM COMPLETE
3. Trim Controls RETRIM AIRPLANE
4. Autopilot RE-ENGAGE, IF DESIRED
5. Rudder Trim MANUALLY ADJUST AS REQUIRED AFTER POWER AND CONFIGURATION CHANGES.

EFIS MALFUNCTION

If the EFIS displays are blank or abnormal, refer to alternate instruments for usable data. The copilot's instruments are approved as alternates to the pilot's instruments. Refer to EFIS MALFUNCTIONS in the ABNORMAL PROCEDURES section of this supplement.

SECTION IIIA - ABNORMAL PROCEDURES

EFIS MALFUNCTIONS

DISPLAY PROCESSOR UNIT (DPU) FAILURE

Display Processor Unit (DPU) failure is indicated by the red DPU FAIL flag on the EADI and EHSI or by the EADI and/or EHSI blanked and disabled.

1. Disengage autopilot.
2. Use alternate attitude and/or navigation instruments.

DISPLAY SELECT PANEL (DSP) FAILURE

Display Select Panel (DSP) failure is indicated by the red DSP flag on the EADI and EHSI.

1. Disengage autopilot if engaged.
2. Use alternate navigation instrument for navigation information.

NOTE

Failure of the DSP does not affect heading information displayed on the EHSI.

EADI FAILURE

1. If the EADI fails, select the composite switch to CMPST. A composite display will be presented on the operating tube.
2. Pull the appropriate circuit breaker for the affected indicator.

EHSI FAILURE

1. If the EHSI fails, select the composite switch to CMPST. A composite display will be presented on the operating tube.

2. Pull the appropriate circuit breaker for the affected indicator.

ATTITUDE FAILURE

Attitude failure is indicated by a red ATT flag on the EADI.

- Use copilot’s attitude indicator.

NOTE

The autopilot will disengage if it is selected ON.

HEADING FAILURE

Heading failure is indicated by a red HDG flag on the EHSI.

1. Use instrument displaying compass No. 2 data.
2. Monitor the affected unit for performance degradation. If a system component failure occurs, pull the appropriate circuit breaker.

SECTION IV - NORMAL PROCEDURES

BEFORE STARTING

EFIS

1. Battery Switch OFF
2. EFIS POWER Switch OFF
3. EFIS AUX POWERCHECK
 - a. ON-OFF-TESTHOLD TO TEST
for approximately 5 seconds (green AUX TEST annunciator will illuminate while the TEST switch is held.)
 - b. ON-OFF-TEST Switch RELEASE TO OFF

BEFORE TAXI

EFIS

1. EFIS POWER Switch ON
2. EFIS AUX POWER ON

BEFORE TAKEOFF (RUNUP)

Items marked with an "*" may be omitted at pilot’s discretion after the first flight of each day.

EFIS

1. EFISCHECK
 - a. EADI/EHSI Dim Control SET BRIGHTNESS LEVEL

NOTE

Tube brightness should not be set higher than that required for adequate visibility.

- * b. EFIS TEST PUSH AND HOLD
 The EADI and EHSI are checked using the EFIS TEST button on the EFIS power control panel located on the pedestal. Two levels of test may be accomplished, depending on how long the button is held down.
 Momentarily pressing the button results in:
 - 10° pitch up and 10° right roll indication on EADI.
 - 20° heading increase on EHSI.
 - Red TEST flag in upper left corner of EADI.

Pressing and holding the button for 5 seconds or longer results in previous indications and:

- The sky/ground display disappears from EADI.
- The following red flags are displayed on the EADI: ATT, RA, DSP.
- The following red flags are displayed on the EHSI: HDG, DSP.

NOTE

The following additional red flags are displayed continually, assuming the receivers are not receiving a valid signal.

EADI: VOR/LOC

EHSI: VOR/LOC, GS, and Bearing Pointer Flags (if selected).

2. EFIS Composite switch. CMPST
(verify composite mode display on both EFD's.)
3. EFIS Composite switch. NORMAL

ELECTRIC ELEVATOR TRIM

1. Verify the ELEV TRIM is on.
2. Check operation of dual-element thumb switches as detailed in the POH/AFM.

WARNING

Operation of the electric trim system should occur only by movement of pairs of switches. Any movement of the elevator trim wheel while actuating only one switch denotes a system malfunction. If a malfunction of the electric trim system is indicated, electric trim must be disengaged and trim changes made with manual trim ONLY.

ALTITUDE ALERT CHECK

NOTE

The altitude alert system functions only on the pilot's altimeter.

1. Pilot's Baro Set Knob ADJUST FOR NEAREST 100-FOOT ALTIMETER READING.
2. Altitude Alerter/Preselector SET TO MATCH ALTIMETER READING.
3. Pilot's Baro Set Knob ADJUST TO INCREASE AND DECREASE ALTITUDE.

At 300 feet from initial altitude, ensure that:

- a. Aural warning sounds for approximately 2 seconds.
 - b. The ALT ALERT annunciators on the pilot's altimeter, copilot's instrument panel and the Altitude Alerter/Preselector panel illuminate.
4. Pilot's Baro Set Knob ADJUST TO FIELD ELEVATION SETTING.
 5. The ALT ALERT annunciators will extinguish at 300 feet from alert panel setting.

AUTOPILOT

1. Position pitch trim wheel to the takeoff position, turn the ELEV TRIM switch on and engage the autopilot. Check that YAW, A/P, and ALT ARM annunciators are illuminated.
2. With control wheel in the forward position and the autopilot engaged, operate pilot, then copilot pitch trim switches in both directions to ensure that the autopilot disengages. The yaw damper remains engaged.
3. Center the control wheel and engage the autopilot. Apply forward pressure on control wheel. Note that pitch trim travels nose up and white TRIM annunciator illuminates. Apply rearward pressure on control wheel. Note that pitch trim travels nose down.
4. Hold the control wheel and disengage the autopilot by depressing the AP YD/DISC TRIM button on the pilot's control wheel to the first level. Note that the YAW DIS and A/P DIS annunciators illuminate. Further depress the AP YD/DISC TRIM switch. Note that the ELEC TRIM OFF annunciator illuminates. Cycle the ELEV TRIM switch on the console, engage the autopilot, and repeat the check using the copilot's AP YD/DISC TRIM switch.
5. Engage yaw damper. Note that YAW annunciators are illuminated. Check for additional resistance to movement of rudder pedals. Disengage yaw damper.

6. Reset pitch trim to the takeoff position.
7. Move all primary flight controls through their full travel in both directions. Verify that controls move in the proper direction and no restrictions to free movement are present.

IN FLIGHT

EFIS OPERATION

In-flight operation of the EFIS is as described in the Collins Pilot's Guide.

AUTOPILOT OPERATION

1. Autopilot Engagement:

- AP ENG Button on APP PUSH
(Check A/P and YAW Annunciators Illuminated)

NOTE

If a TRIM or A/P FAIL annunciation is displayed on the APP and FCP, two pushes of the AP ENG button may be required to engage, one to clear any fault and one to engage.

2. Autopilot Disengagement:

- AP ENG or AP YD/TRIM DSC PUSH

NOTE

The AP YD/TRIM DSC button is a two-level switch. The first level disengages the autopilot and yaw damper. The second level disengages electric trim.

3. Yaw Damper

The yaw damper is automatically engaged when the autopilot is engaged. The yaw damper may be engaged without engaging the autopilot by pressing the YAW ENG button on the APP.

The yaw damper may be disengaged by pressing the red AP YD/TRIM DSC button or by pressing the YAW ENG button on the APP. The yaw damper cannot be disengaged while the autopilot remains engaged.

Yaw damp remains engaged if the autopilot is disengaged by use of the AP ENG button on the APP.

4. Soft Ride (SR)

SR mode is used to reduce the autopilot response to turbulent conditions. The pilot may use SR mode at his discretion. SR is cancelled by APPR mode.

5. 1/2 Bank (1/2 ϕ)

In 1/2 Bank mode, the bank limit in HDG or NAV mode is reduced to approximately 1/2 the normal value. Capture of NAV or APPR mode clears the 1/2 Bank mode, if selected. After a NAV or APPR capture, 1/2 Bank mode may be reselected.

6. Turn Control

The turn control can be used to manually command an autopilot turn. The bank angle during the turn is proportional to the turn control displacement up to the bank limit of 30°. The autopilot may be engaged with the turn control out of its center detent, but the control must be returned to center before it is active again. Use of the turn control cancels any lateral mode selected, except APPR.

7. Vertical Control Switch

The vertical control switch can be used to incrementally adjust reference values for certain vertical modes selected on the flight control panel (FCP). During Pitch Hold mode, the vertical control switch can continuously adjust the pitch reference. If the vertical control switch is pushed and held, the Vertical mode will clear, the autopilot will enter Pitch Hold mode, and the pitch reference will increase or decrease 1 degree/second.

Each momentary actuation (up or down) commands the following adjustments.

MODE	INCREMENT
ALT	±25 Feet
IAS	±1 KIAS
VS	±200 FPM
Pitch Hold	±1/2 Degree
DSC	±200 FPM
CLIMB	±1 KIAS

FLIGHT DIRECTOR OPERATION

The flight director may be used with or without the autopilot engaged. If the autopilot is engaged, the flight director provides steering commands to the autopilot. All flight director modes, except Go-Around, are selected by pressing the appropriate mode select button on the FCP.

1. Heading Mode (HDG)
 - a. Set heading bug to desired heading on HSI.
 - b. Press HDG button. The flight director command bars will command a turn to capture and hold the selected heading. Bank angles are limited to ±25° during HDG mode.
2. Altitude Hold (ALT)
 - a. Maneuver airplane to desired altitude.
 - b. Press ALT button.
 - c. If a new barometric setting is input, the autopilot will automatically adjust to the new altitude.

To Change Altitude:

Incremental adjustments of ±25 feet can be made by each momentary actuation of the vertical control switch on the APP, or:

- d. CWS/Pitch SYNC Button PRESS AND HOLD
- e. Maneuver to desired altitude.
- f. CWS/Pitch SYNC Button RELEASE
- g. Flight director command will maintain new altitude.

3. Altitude Select (ALT SEL)

ALT SEL can be armed by pressing the ALT SEL button or by simply turning the altitude preselect knob.

- a. Altitude Preselect Controller. SET DESIRED ALTITUDE
- b. ALT ARM annunciates, indicating arming of the mode.
- c. Select a vertical mode to intercept preselected altitude.
- d. Altitude Capture Sequence VERIFY
 - 1) 1000 Feet Prior to selected Altitude ALT ALERT ANNUNCIATORS ON THE ALTITUDE PRESELECTOR, THE PILOT'S ALTIMETER AND COPILOT'S INSTRUMENT PANEL ILLUMINATE AND AN AURAL ALERT SOUNDS. ANNUNCIATORS EXTINGUISH 300 FEET PRIOR TO THE SELECTED ALTITUDE.
 - 2) At computed capture point ALT ARM AND VERTICAL MODE ANNUNCIATIONS EXTINGUISH AND ALTITUDE IS AUTOMATICALLY CAPTURED. ALT ILLUMINATES.

NOTE

Changing selected altitude on the ALTITUDE ALERTER/PRESELECTOR during altitude capture will automatically cancel ALT and rearm ALT SEL.

NOTE

ALT SEL mode is referenced to barometer-corrected altitude displayed on pilot's altimeter.

NOTE

If altitude varies more than 300 feet without resetting the Altitude Alerter/Preselector, the altitude visual and aural alerts will be activated.

4. Climb Mode (CLM)

The climb mode provides commands to capture and maintain a programmed cruise-climb airspeed schedule.

- a. CLM ButtonPRESS
 - b. Airspeed scheduling in CLM mode is 150 KIAS up to 10,000 feet, then decreasing 2 KIAS per 1000 feet above 10,000 feet.
 - c. Incremental changes of ± 1 knot in the climb speed profile can be made by each momentary actuation of the vertical control switch.
 - d. Pitch synchronization is not operative in CLM mode.
- ### 5. Descent Mode (DSC)
- a. DSC Mode Select ButtonPRESS
 - b. Descent mode will command a gradual descent to achieve and maintain an approximate 1500 fpm rate of sink.
 - c. Incremental changes of ± 200 fpm can be made by each momentary actuation of the vertical control switch.
 - d. Pitch synchronization is not operative in DSC mode.
- ### 6. Vertical Speed Hold (VS)
- a. Maneuver to desired vertical speed.
 - b. VS ButtonPRESS

To Change Vertical Speed:

Incremental changes of ± 200 fpm can be made by each momentary actuation of the vertical control switch, or;

- c. CWS/Pitch SYNC ButtonPUSH AND HOLD
 - d. Maneuver to desired new vertical speed.
 - e. CWS/Pitch SYNC ButtonRELEASE
 - f. Flight director command bars will synchronize to and maintain the new vertical speed.
- ### 7. Airspeed Hold (IAS)
- a. Maneuver to desired airspeed.
 - b. IAS ButtonPRESS

To Change Airspeed:

Incremental changes of ± 1 KIAS can be made by each momentary actuation of the vertical control switch, or;

- c. CWS/Pitch SYNC ButtonPRESS AND HOLD
 - d. Maneuver to desired airspeed.
 - e. CWS/Pitch SYNC ButtonRELEASE
 - f. Flight director command will maintain new airspeed.
- ### 8. Navigation Mode (NAV)
- a. NAV ReceiverTUNE TO DESIRED STATION FREQUENCY.
 - b. Course SelectorSET DESIRED COURSE ON EHSI.
 - c. Heading BugSET DESIRED INTERCEPT HEADING ON EHSI.
 - d. NAV ButtonPRESS
(FCP annunciates NAV ARM, and HDG is automatically selected if airplane is outside computed capture point.)
 - e. Upon CaptureHDG CANCELS, FCP ANNUNCIATES NAV, AND FLIGHT DIRECTOR COMMANDS TURN TO TRACK SELECTED COURSE.

NOTE

Approaching station passage, the autopilot will enter Dead-Reckoning (DR) mode. During the DR mode, course changes of less than 30° may be made using the course knob. Course changes of more than 30° must be accomplished using the HDG mode to set up a new NAV capture.

For optimum NAV mode operation, select intercept angle so the system maintains straight and level flight in the NAV ARM mode for a minimum of 30 seconds. Maximum recommended capture angles are 90° or less in NAV mode and 60° or less in APPR mode.

9. Approach Mode (APPR)

When making any coupled approach, primary flight instruments must be monitored by the pilot. Presence of a VOR/LOC/GS flag must be considered as a warning of system or signal failure.

a. VOR Approaches

NOTE

Use of the VOR Approach mode is limited to an area within 10 nm of the VOR station.

- 1) Navigation Receiver TUNE TO DESIRED STATION FREQUENCY.
- 2) Course Selector. SET DESIRED COURSE ON EHSI.
- 3) Heading Cursor SET DESIRED INTERCEPT HEADING ON EHSI.
- 4) APPR Button PRESS
(Mode selector annunciates APPR ARM.
HDG mode is automatically selected if the
airplane is outside computed capture point.)
- 5) At Computed Capture Point HDG MODE IS CANCELLED
AND FLIGHT CONTROL PANEL ANNUNCIATES
APPR. FLIGHT DIRECTOR COMMANDS A TURN TO
CAPTURE AND TRACK SELECTED COURSE.

CAUTION

During a VOR approach, the flight control system automatically goes to DR (dead reckoning) mode if a VOR station is crossed. If the VOR approach being flown is one that crosses the VOR, the HDG mode should be used for station passage and to recapture the outbound course.

b. Localizer Approach (APPR)

- 1) Navigation Receiver TUNE TO DESIRED LOCALIZER FREQUENCY.
- 2) Course Selector. SET LOCALIZER FRONT COURSE ON EHSI.
- 3) Heading Bug SET DESIRED INTERCEPT HEADING ON EHSI.
- 4) Mode Selector APPR Button PRESS
(Mode selector annunciates APPR ARM, and HDG mode is automatically
selected if the airplane is outside the computed capture point.)
- 5) At Computed Capture Point HDG MODE IS CANCELLED AND MODE SELECTOR
ANNUNCIATES APPR. FLIGHT DIRECTOR COMMANDS
A TURN TO CAPTURE AND TRACK LOCALIZER BEAM.
- 6) Flight Control Panel SELECT VERTICAL FLIGHT DIRECTOR MODE, AS REQUIRED.

c. Back Course Approach (BC)

- 1) Navigation Receiver TUNE TO DESIRED LOCALIZER FREQUENCY.
- 2) Course Selector. SET LOCALIZER FRONT COURSE ON EHSI.
- 3) Heading Bug SET DESIRED INTERCEPT HEADING ON EHSI.
- 4) B/C Button PRESS
(Mode selector annunciates APPR ARM B/C, and HDG mode is automatically
selected if the airplane is outside the computed capture point.)
- 5) At Computed Capture Point HDG MODE IS CANCELLED AND MODE SELECTOR ANNUNCIATES
APPR B/C. FLIGHT DIRECTOR COMMANDS A TURN
TO CAPTURE AND TRACK LOCALIZER BACK COURSE.
- 6) Flight Control Panel SELECT VERTICAL FLIGHT DIRECTOR MODE, AS REQUIRED.

d. ILS Approach (APPR)

- 1) Navigation Receiver TUNE TO DESIRED ILS FREQUENCY.
- 2) Course Selector SET LOCALIZER FRONT COURSE ON EHSI.
- 3) Heading Bug SET DESIRED INTERCEPT HEADING ON EHSI.
- 4) APPR Button PRESS
(Mode selector annunciates APPR ARM, and HDG mode is automatically selected if the airplane is outside the computed localizer capture point.)
- 5) Mode Selector SELECT VERTICAL FLIGHT DIRECTOR MODE, AS REQUIRED, TO INTERCEPT GLIDESLOPE.
- 6) At Localizer Capture Point HDG MODE IS CANCELLED, AND MODE SELECTOR ANNUNCIATES APPR AND GS ARM. FLIGHT DIRECTOR COMMANDS A TURN TO CAPTURE AND TRACK LOCALIZER BEAM.
- 7) At Glideslope Capture Point VERTICAL MODE IS CANCELLED (EXCEPT ALT SEL ARM). MODE SELECTOR ANNUNCIATES GS AND APPR. FLIGHT DIRECTOR COMMANDS A PITCH CHANGE TO CAPTURE AND TRACK GLIDESLOPE.

NOTE

Glideslope capture will not occur until localizer has been captured.

10. Go-Around Mode (GA)

GA mode is activated by pushing the Go-Around switch on the left power lever. GA mode may be selected whenever a lateral mode is selected.

When GA mode is activated, the autopilot disengages, the disconnect aural warning sounds, and the flight director commands a wings-level, 7° nose-up attitude. GA is cancelled by autopilot engagement, the CWS/Pitch SYNC button, or other mode selections.

11. Attitude Hold, Roll Hold, Pitch Hold Modes

Attitude Hold mode is activated if the autopilot is engaged with no flight director modes selected. If no lateral mode is active, Roll Hold mode is active; likewise if no vertical mode is active, Pitch Hold mode is active.

DIAGNOSTIC TESTING

The TEST button on the FCP can be used to perform a diagnostic test of the flight director or autopilot. Testing may be accomplished on the ground or during flight, as follows:

GROUND TESTING

1. Flight Control Panel (FCP) Test Button PRESS AND RELEASE
 - a. EADI TEST ANNUNCIATOR ILLUMINATED
 - b. FCP and Autopilot Annunciators ILLUMINATE BRIEFLY, THEN EXTINGUISH, EXCEPT FOR GA

NOTE

The GA annunciator indicates the computer is in the Ground Test mode. If other annunciators are illuminated, a fault is indicated. Report these to maintenance personnel. If additional diagnostic data on a malfunction is required while in the Ground Test mode:

- 1) HDG Button PRESS AND HOLD
Record displayed annunciators, then release.
- 2) ALT Button PRESS AND HOLD
Record displayed annunciators, then release.
- 3) IAS Button PRESS AND HOLD
Record displayed annunciators, then release.
2. Autopilot ENGAGE

NOTE

Normal engage annunciators will not illuminate on the FCP or the APP since they are used to indicate faults.

3. Airplane Servos..... CHECK
 - a. Aileron ENGAGED
 - b. Elevator ENGAGED
 - c. Rudder ENGAGED AND OSCILLATING
 - d. Elevator Trim ENGAGED AND RUNNING NOSE DOWN
4. Autopilot Engage Switch..... PUSH TO DISENGAGE
 - a. Aural warning will sound.
 - b. Elevator and elevator trim servos will disengage.
 - c. Rudder servo remains engaged and continues to oscillate.
5. FCP Test Button PRESS AND RELEASE
 - a. Rudder oscillations stop.
 - b. The rudder servo remains engaged and the YAW annunciator illuminated.
6. AP YD/DISC TRIM Switch DEPRESS TO FIRST LEVEL
(Check rudder servo disconnects and YAW annunciator extinguished.)
7. Elevator Trim..... SET FOR TAKEOFF

IN-FLIGHT TESTING

1. Test Button on FCP PUSH AND HOLD
2. FCP annunciators will flash, then display mode annunciations indicating a fault, if present. If no fault exists, the flashing sequence will repeat. Record any annunciations of faults.
3. Test Button on FCP RELEASE

SHUTDOWN AND SECURING

EFIS

1. EFIS AUX POWER..... OFF
2. EFIS POWER Switch OFF (before FUEL CUTOFF)

SECTION V - PERFORMANCE

No Change

SECTION VI - WEIGHT & BALANCE/EQUIPMENT LIST

No Change

SECTION VII - SYSTEMS DESCRIPTION

The Collins EFIS-84 EFIS (2-Tube) consists of two panel-mounted Electronic Flight Displays (EFD's), one pedestal-mounted Display Select Panel (DSP), one remote Display Processor Unit (DPU), one pedestal-mounted EFIS reversionary and power select panel. The system displays attitude and navigation information depending on the input data sources selected.

ANNUNCIATORS

Annunciation is displayed on the mode select panel and on the EFIS. Annunciation is color-keyed for better recognition of mode status with green or white for active condition, yellow for disengaged condition, and red for warning condition. When a mode annunciator is flashing, it indicates that signals used for that mode are not usable; EFIS modes flash briefly when selected.

EFIS SWITCHES

EFIS POWER

With airplane power on, the EFIS POWER switch applies power to the EADI/EHSI and Display Processor.

EFIS REVERSIONARY MODE

CMPST will select composite mode of operation on the EADI and EHSI. A composite format replaces the normal EADI and EHSI display.

SECTION VIII - HANDLING, SERVICING & MAINTENANCE

Fans are installed to aid in cooling of the Display Processor Unit (DPU-84) and the pilot's Electronic Flight Displays (EFD-84's). During each phase inspection and at any sign of abnormal equipment operation, verify these fans are operating properly. An avionics compartment fan is also installed.