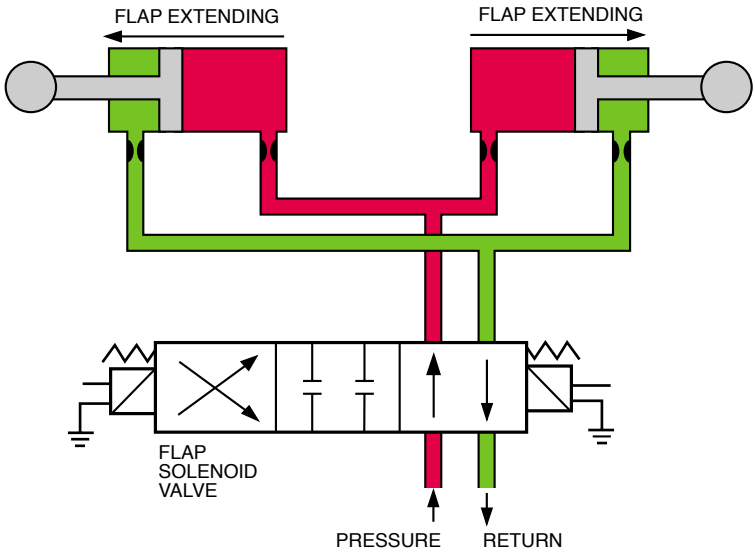
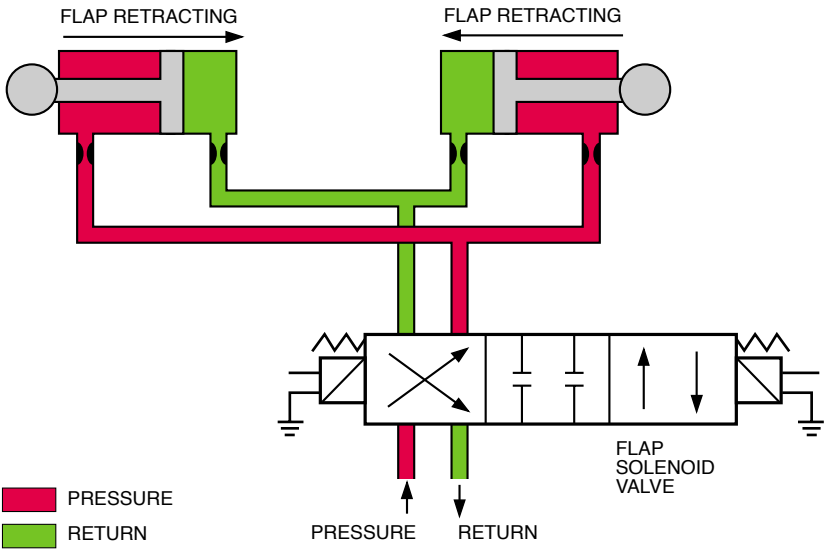
Flap System

Citation SII

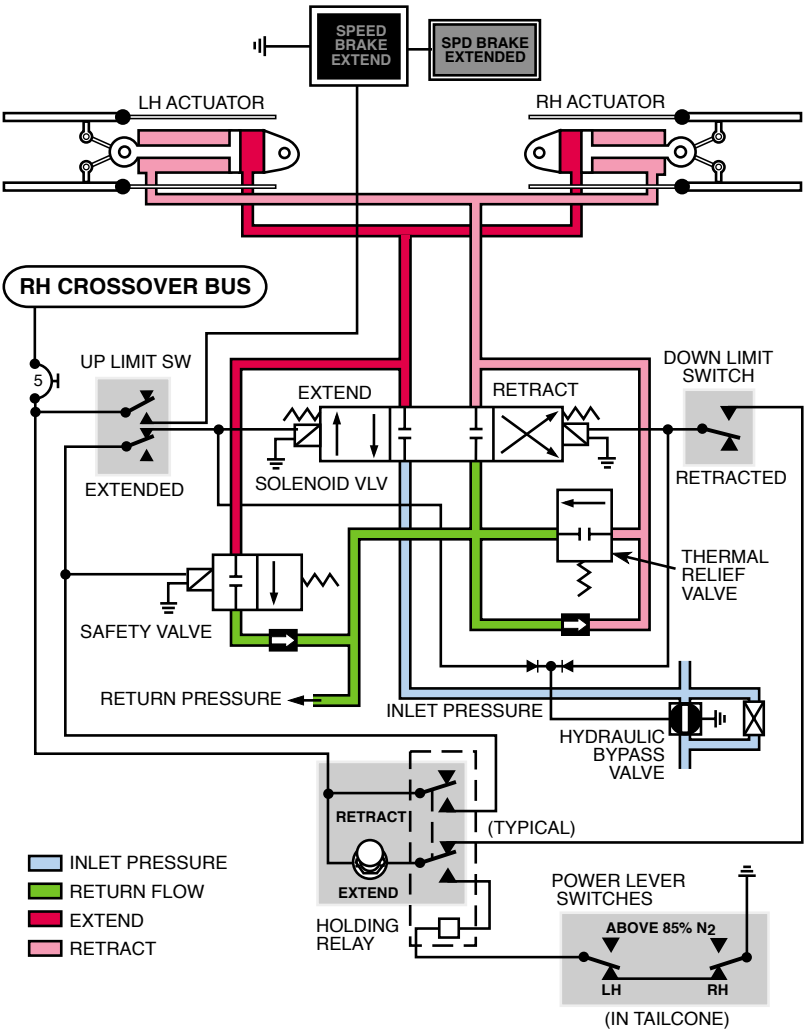
FLAPS EXTENDING



FLAPS RETRACTING



Speedbrakes



Primary Flight Controls

The mechanically controlled primary flight controls include the ailerons, elevators, and rudder. Pilot or autopilot inputs to the primary flight controls command the aircraft through the roll, pitch, and yaw axis.

Ailerons

Movement of either control wheel left or right from neutral transmits control inputs by cables to the aileron sector assembly. The aileron sector assembly, in turn, moves the ailerons through cables and aileron actuator assemblies.

Total aileron travel, stop to stop, is 21 ±1° up and 16 ±1° down (**Citation and Citation I**) or 19 ±1° up and 15 ±1° down (**Citation II and SII**).

Aileron Trim

Rotating the aileron trim wheel left or right from the neutral position mechanically positions the left aileron trim tab with cables connected to the tab's actuator. Trim tab movement is 20° up or down from neutral.

Elevators

Moving either control column forward or aft from neutral operates cables connected to the elevator bellcrank. Movement of the bellcrank operates the elevators. Total elevator movement, stop to stop, is 20 +.5/-1° up and 15 ±1° down.

Manual Pitch Trim

Rotating the elevator trim wheel forward or aft mechanically drives the elevator trim tab(s) through cables connected to the trim tab actuator(s). The **Citation, Citation I, and Citation II** have a single elevator trim tab on the right elevator. The **Citation SII** has a trim tab on both elevators. Pressing the pitch trim switch on the pilot's or copilot's control wheel drives the elevator trim tab(s) up or down through an electric motor connected to the control cables. On **Citation I units 550 and subsequent, Citation II units 162 and subsequent, and SII aircraft**, operation of the pilot's pitch trim switch overrides the copilot's switch.

If the system malfunctions, pressing the AP/TRIM DISC switch or using the manual elevator trim wheel overrides the electric pitch trim system.

Electric Pitch Trim System (CII)

On the **CII**, an electric motor permits acutation of the elevator trim tab through the following: a trim switch on the left side of the pilot's control wheel, an optional copilot's trim switch on the right side of the copilot's control wheel, or the autopilot trim system. The electric motor on the trim assemble engages whenever activation of one or more of the above occurs.

Electric Pitch Trim System (SII)

On the **SII**, a flap/elevator trim mixer system permits electrical actuation of the elevator trim control system. The mixer assembly actuates with one or more of the following inputs:

- trim switch on the control wheel selected up or down
- autopilot trim system
- flap movement in the range of 7° to 25°.

Manually trimming or momentarily pressing the AP/TRIM DISC switch overrides the flap-trim system.

A/P Trim Disconnect

The AP/TRIM disconnect switch on the pilot's and copilot's yoke electrically disables the electric trim if a malfunction in electric trim should occur. Pulling the 5 am PITCH TRIM CB on the left circuit breaker panel removes power from the electric trim motor.

Rudder

The rudder moves left or right 22° from neutral in response to rudder pedal and autopilot inputs to provide yaw control. Movement of the rudder pedals moves the rudder through cables and a bellcrank.

Rudder Trim

Rotating the rudder trim wheel left or right from neutral mechanically positions the servo-type rudder trim tab to reduce pedal forces. An indicator shows trim tab position NOSE L or NOSE R from neutral. The rudder trim tab also functions as a servo tab in that it moves in the opposite direction of rudder deflection.

Rudder/Aileron Interconnect (SII)

On the **SII**, the rudder system interconnects to the aileron system via an arrangement of springs and cable clamps. Movement of the rudder pedals moves the ailerons in proportion to the rudder position. This allows for an automatically coordinated turn. The system can be overriden by manual pilot input to the rudder pedals and control wheel when cross control is required (i.e., crosswind landing or sideslip).

Control Lock

With ailerons, elevator, and rudder in the neutral position and throttles in the cutoff position, pulling the CONTROL LOCK T-handle out locks the flight controls and throttles. With the control lock engaged, maximum nosewheel turning angle is 60°.

Rotating the CONTROL LOCK T-handle counterclockwise and then pushing it in releases the control lock.

Secondary Flight Controls

Secondary flight controls include:

- electrically controlled and electrically operated flaps, or
- electrically controlled and hydraulically operated flaps (**Citation SII only**)
- electrically controlled and hydraulically operated speedbrakes.

Flaps

The flaps extend partially to increase lift and fully to increase lift and drag.

On **Citation, Citation I, and Citation II**, the flaps are electrically controlled and electrically operated with a 0 to 40° range of travel. The FLAP handle has detents at the UP (0°), TO & APPR (15°) position, and LAND (40°) positions.

Moving the FLAP handle to extend or retract the flaps actuates a down or up microswitch. The appropriate switch closes and 28V DC power flows to the two flap motors. The motors, in turn, extend or retract the flaps mechanically through cables and bellcranks. Both flap motors are interconnected so that, if one motor fails, either motor can operate the flaps.

As the flaps move, a position system connected to the flap operating mechanism rotates a pointer assembly. When flap position equals the position selected with the FLAP handle, the pointer assembly de-actuates the switch to stop motor operation. If the position system fails, up and down limit switches stop motor operation when the flaps reach the retracted or fully extended position.

On the **Citation SII**, the flaps are electrically controlled and hydraulically operated with a 0 to 35° range of travel. The FLAP handle has detents at the UP (0°), T.O. (7°), T.O. & APPR (20°), and LAND (35°) positions. During flap operation between 7° and 25° (extension or retraction), the electric pitch trim system compensates for rapid pitch changes.

Moving the FLAP handle to extend or retract the flaps actuates a down or up microswitch respectively. The appropriate switch closes and 28V DC power flows to the hydraulic system bypass valve and the flap solenoid valve. The bypass valve closes, hydraulic pressure builds to 1,500 PSI, and the flap solenoid valve shifts to direct hydraulic pressure to the appropriate side of the flap actuators. Under pressure the flap actuators position the flaps through a bellcrank on each flap's inboard end. Pushrods transmit bellcrank movement to the remaining flap bellcranks.

When flaps reach the position selected with the FLAP handle, a preselect assembly connected to the flap actuation system opens the respective up or down switch. Then the flap solenoid valve closes, the hydraulic system bypass valve opens, and flap movement stops. When selected to UP (0°), the flap's up limit switch stops flap movement.

Speedbrakes

Placing the SPEED BRAKE switch in the EXTEND position supplies 28V DC to energize the hydraulic system bypass valve and the speedbrake solenoid valve. The bypass valve closes; hydraulic pressure builds to 1,500 PSI. When the solenoid valve energizes, it then shifts to route hydraulic pressure to the speedbrake actuators to extend the speedbrakes. When the speedbrakes reach the extended position, extend limit switches actuate to illuminate the SPEED BRAKE EXTEND or SPD BRAKE EXTENDED annunciator, close the solenoid valve, and open the bypass valve. When the solenoid valve closes it traps hydraulic fluid in the actuating system to hold the speedbrakes in the extended position.

If an electrical malfunction occurs with the speedbrakes extended, a safety valve opens to release hydraulic pressure to allow speedbrake blow down.

Placing the SPEED BRAKE switch in the RETRACT position supplies 28V DC power to shift the solenoid valve to the retract position and close the bypass valve. The hydraulic system pressurizes and hydraulic pressure flows through the solenoid valve to the speedbrake actuator retract ports to retract the speedbrakes. When the speedbrakes retract the SPEED BRAKE EXTEND or SPD BRAKE EXTENDED annunciator extinguishes, the bypass valve opens, and the solenoid valve closes to block hydraulic pressure to the actuators.

With the speedbrakes extended, advancing the throttles above 85% N2 automatically retracts the speedbrakes by releasing the SPEED BRAKE switch's holding relay. The switch then releases to the RETRACT position and the speedbrakes retract. Holding the switch in the EXTEND position holds the speedbrakes in the extended position with the throttles above the 85% N_2 position.

On **Citation and Citation I units 473 and subsequent, and previous aircraft with SB 27-9; Citation II units 232 and subsequent and previous aircraft with SB 550-27-4; and Citation SII aircraft**, the speedbrakes cannot be manually held in the extended position with the SPEED BRAKE switch when the throttles are above the 85% N_2 position.

Stall Warning

The installation of small stall strips on the inboard leading edge section of each wing provides stall warning. Under impending stall conditions, the strips disrupt airflow over the wings; this disturbed airflow buffets the elevator surfaces and alerts the pilots to the stall condition. The stall strips provide a warning at approximately V_{SI} + 10 and V_{SO} + 5 (landing).

Stick Shaker (CII, if installed; SII)

A stick shaker on the forward side of the pilot's control column warns of an impending stall. The stick shaker uses an electric motor with rotating weights to induce a vibration feel to the control column.

Primary Flight Controls

Power Source	Roll: Autopilot servo – LH Crossover bus, 115V AC bus Pitch: Trim switch – RH Crossover bus Yaw: Autopilot servo – LH Crossover bus, 115V AC bus
Control	Control wheel Rudder pedals Manual elevator trim wheel Aileron trim knob Switch Pitch trim AP ENGAGE YD ENGAGE AP TRIM disconnect GO AROUND button AP TCS (Touch Control Steering) (**except C0**)
Monitor	Indicators Aileron trim Yaw trim Pitch trim Stall warning Airframe buffet (**all aircraft**) Stick shaker (**SII**) Autopilot trim indicators (**C0 001 to 274**) Rudder Aileron Elevator AUTOPILOT OFF amber annunciator AP TORQUE amber annunciator

Primary Flight Controls (cont.)

Protection	Control wheel overrides autopilot aileron servo AP/TRIM disconnect switch or GO AROUND button disconnects both the autopilot and yaw damper. Electric pitch trim switch activation disengages autopilot but does not disengage the yaw damper due to override function in autopilot servo. Circuit breakers

NOTE: On **CII 162 and subsequent; SII**, the pilot's trim switch interrupts and overrides optional copilot's control wheel trim switch, if installed. Yaw damper engages automatically via autopilot or when YD ENGAGE switch is pressed.

Secondary Flight Controls

Flaps

Power Source	Main DC bus Main Hydraulic system (**SII**)
Control	Flap selector handle Flap/trim interconnect (**SII**)
Monitor	Flap position indicator HYD PRESS ON (**SII**) Trim wheel (**SII**)
Protection	Circuit breakers Blow up/trail capacity (**SII**)

Secondary Flight Controls (cont.)

Speedbrakes

Power Source	RH Crossover bus via RH Main DC bus Hydraulic system
Control	Speedbrake switch 85% N_2 microswitches
Monitor	Annunciators SPD BRAKE EXTEND HYD PRESS ON
Protection	Circuit breakers Safety valve Thermal relief valve Auto retract with throttles > 85% N_2

NOTE: On **C0; CI 001 to 472 with SB500 27-9, 473 and subsequent; CII 002 to 231 with SB550-27-4 and 232 and subsequent; SII**, speedbrakes retract automatically and cannot be extended at power settings above 85% N_2; speedbrakes cannot be manually held in the extended position with the speedbrake switch. On **C0; CI 001 to 572 without SB500 27-9; CII 002 to 231 without SB 550 27-4**, speedbrakes can be manually held in the EXTEND position with the speedbrake switch at power settings above 85% N_2.