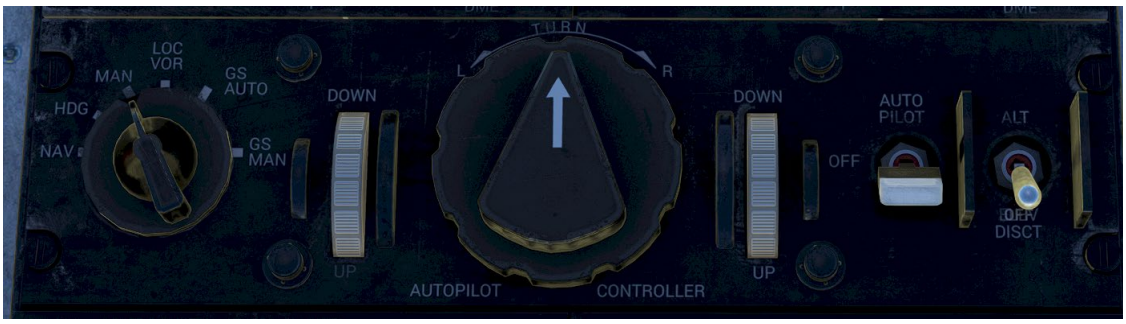
AH Boeing 707 Autopilot and Flight Director

Components

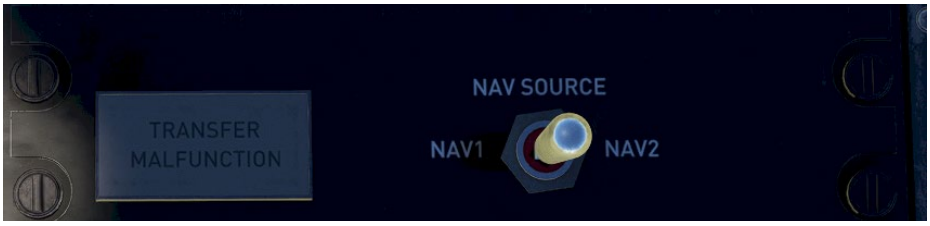
Autopilot Control Panel (Pedestal)



Flight Director Control Panel (Pedestal)

Yaw Damper Control Panel (Overhead)

Navigation Source (Pedestal)



AP & FD Mode Annunciators (Captain's front panel)

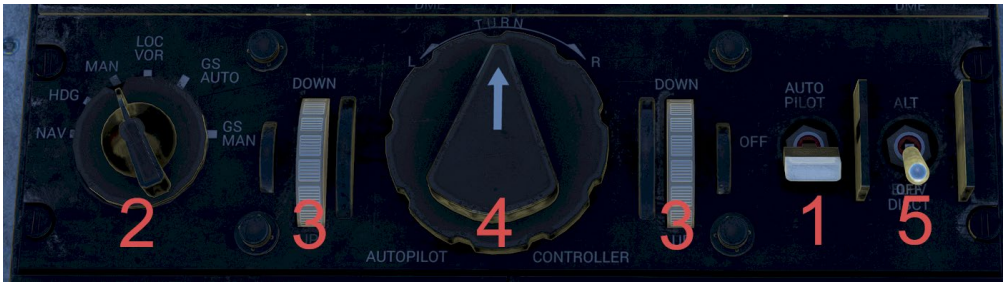
Compass Control Panel (Captain #1 and FO #2 – Overhead)

Preselected Altitude panel (Pedestal)

GPS or VOR/LOC selected

Operation

Autopilot Control



1) Autopilot engage switch

    a. Engages autopilot to flight controls. Yaw Damper must be ON before engagement.
    b. Magnetically held in AUTOPILOT when autopilot operating conditions and yaw damper active are satisfied.
    c. Must wait 4 secs before re-engagement.
    d. Automatically disengages when:
        i. AC Ess power lost.
        ii. Yaw Damper switch OFF.
        iii. Stab Trim manually operated for more than a second.
        iv. Active compass power OFF (see Compass Control Panel)

2) Autopilot mode control

    a. Nav:
        i. Autopilot intercepts and steers the Flight Plan active waypoint's track, providing GNS navigation mode shows GPS.
        ii. Before capturing the course, commands a 45 deg intercept angle relative to the active course.
        iii. Once captured, it does the same when CDI deviation is 3 dots or greater.
        iv. Maintains existing heading (level wings) if GPS signal is lost or invalid.

    b. Hdg:
        i. Autopilot follows selected heading indicated on Captain's HSI.

    c. Man:
        i. Airplane will roll wings level and maintain existing pitch.
        ii. - Autopilot holds current heading (wings levelled) or commands a left/right turn if turn controller is out of center position.
        iii. Pitch can be adjusted with pitch controller.

iv. - Mode selector will spring to MAN from any mode when turn controller is moved from center detent, or Navigation source switch is moved while in any other mode but Hdg.

d. Loc/Vor:
    i. Autopilot intercepts and steers selected VOR course/LOC track providing GNS navigation mode is VLOC and Navigation source switch is in NAV1 or NAV2 position.
    ii. Will maintain the current heading until capture of course/track.
    iii. Once captured, commands a 45 deg intercept angle relative to course/track when CDI deviation is 3 dots or greater.
    iv. Maintains existing heading (level wings) if radio signal is lost or invalid.

e. GS Auto:
    i. Automatic Approach mode.
    ii. Autopilot intercepts and steers active LOC track providing GNS navigation mode is VLOC and Navigation source switch is in NAV1 or NAV2 position and a valid Localizer frequency is tuned in the selected radio.
    iii. Will maintain existing heading until capture of course/track.
    iv. Once captured, commands a 45 deg intercept angle relative to LOC track when CDI deviation is 3 dots or greater.
    v. Captures glide slope from below at about 1 dot deviation.
    vi. Pitch controller and altitude hold are ineffective after glide slope capture.
    vii. Maintains existing heading (level wings) if radio signal is lost or LOC frequency is invalid.

f. GS Man:
    i. Manual Approach mode
    ii. Similar to GS Auto but in this case glide slope can be captured from above or below.
    iii. Pitch controller and altitude hold are ineffective after glide slope capture.

3) Pitch controller

a. Rotating controller up or down changes autopilot pitch angle.

b. Inoperative when ALT hold is selected, or after glide slope capture.

c. Can affect a maximum pitch up or down of about 30 degrees.

d. Commands towards neutral pitch angle when Preselected Altitude is captured, or Altitude Hold switch is set to ON.

4) Turn controller

a. Operative only in Man mode.

b. Rotating left or right results in a turn in that direction.

c. Supports 3 positions left and right plus neutral

d. Commanded bank angle is according to current position: increasing each side from neutral, 5-15-30 degrees aprox.

e. Will remain in any position.

f. If moved out of neutral, in other than Man mode, mode selector will spring back to Man.

5) Altitude Hold switch

a. Maintains altitude existing at time of engagement.

b. Trips to off at glide slope capture.

Flight Director Control

The Flight Director Modes are similar to Autopilot modes though they operate separately, meaning that each mode must be set independently of the one selected in the Ap control mode.

1) Flight Director mode control

a. Off:
   i. Removes command bars from view.

b. Hdg:
   i. Fd bars command to follow selected heading indicated on Captain's HSI.

c. Nav:
   i. FD bars command to intercept and steer the Flight Plan active waypoint's track, providing GNS navigation mode shows GPS .
   ii. Before capturing the course, they command a 45 deg intercept angle relative to the active course.
   iii. Once captured they do the same when CDI deviation is 3 dots or greater.
   iv. Command existing heading (level wings) if GPS signal is lost or invalid.

d. Vor/Loc:

i. FD bars command to intercept and steer selected VOR course/LOC track providing GNS navigation mode is VLOC and Navigation source switch is in NAV1 or NAV2 position.
ii. Command to maintain the current heading until capture of course/track.
iii. Once captured, command a 45 deg intercept angle relative to course/track when CDI deviation is 3 dots or greater.
iv. Command to maintain existing heading (level wings) if radio signal is lost or invalid.

e. Auto App:
   i. Automatic Approach mode.
   ii. Command to intercept and steer active LOC track providing GNS navigation mode is VLOC and Navigation source switch is in NAV1 or NAV2 position and a valid Localizer frequency is tuned in the selected radio.
   iii. Command to maintain existing heading until capture of course/track.
   iv. Once captured, command a 45 deg intercept angle relative to LOC track when CDI deviation is 3 dots or greater.
   v. Command to capture glide slope from below at about 1 dot deviation.
   vi. Pitch command and altitude hold are ineffective after glide slope capture.
   vii. Maintains existing heading (level wings) if radio signal is lost or LOC frequency is invalid.

f. GS Man:
   i. Manual Approach mode
   ii. Similar to GS Auto but in this case glide slope can be captured from above or below.
   iii. Pitch command and altitude hold are ineffective after glide slope capture.

2) Pitch command

a. Rotating controller up or down changes commanded pitch angle.
   i. Calibrated in 5 degree increments from + 15 degrees through -10 degrees.
   ii. Inoperative if AL T HOLD is ON, or glide slope is captured.

3) Altitude Hold switch

a. Command bars respond in pitch to maintain the altitude at the moment of selection.
b. Trips off at glide slope capture.

AP & FD Mode Annunciators

Except AP and MDA, the rest of lights indicate a FD or AP active mode. AP modes, when AP is engaged, prevail over FD active modes.

1) AP light:
    a. Off: Autopilot disengaged.
    b. Green: Autopilot engaged and operative.

2) FMC light:
    a. Off: AP and FD Nav modes deselected or inoperative.
    b. Amber: AP or FD Nav mode armed.
    c. Green: AP or FD Nav mode captured.

3) V/L light:
    a. Off: AP or FD Vor/Loc modes deselected or inoperative.
    b. Amber: AP or FD Vor/Loc modes armed
    c. Green: AP or FD Vor/Loc modes captured.

4) G/S light:
    a. Off: AP or FD glide slope modes deselected or inoperative.
    b. Amber : AP or FD glide slope modes armed
    c. Green: AP or FD glide slope modes captured.

5) MDA light:
    a. Inoperative.

6) NAV warning light:
    a. Red: Current Vor/Loc/App modes are inoperative due to invalid frequencies, or Navigation Source different from NAV1/NAV2.
    b. Red: Current AP or FD Nav modes are inoperative due to invalid Flight Plan track, or no FP loaded, or Navigation source different from GNS GPS unit.

MS Flight Simulator Controls supported

TOGGLE AUTOPILOT MASTER	Turn Autopilot switch ON/OFF
TOGGLE YAW DAMPER	Turn Yaw Damper switch ON/OFF
TOGGLE DISENGAGE AUTOPILOT	Disengages Autopilot
TOGGLE AUTOPILOT HEADING HOLD	Turn AP and FD mode selectors into HDG mode. If AP already in HDG, it reverts to MAN mode.
AUTOPILOT NAV1 HOLD	GNS mode is GPS: Turn AP and FD mode selectors into NAV. GNS mode is VLOC and Navigation Source is NAV1/NAV2: Turn AP ms into LOCVOR and FD ms into VORLOC.
TOGGLE AUTOPILOT APPROACH HOLD	Turn AP ms into GS AUTO and FD ms into AUTO APP
TOGGLE AUTOPILOT ALTITUDE HOLD	Turn AP and FD ALT HOD switches ON/OFF
INCREASE AUTOPILOT REFERENCE ALTITUDE	Increase Preselected Altitude
DECREASE AUTOPILOT REFERENCE ALTITUDE	Decrease Preselected Altitude
INCREASE AUTOPILOT REFERENCE VS	Increase AP Pitch Controller
DECREASE AUTOPILOT REFERENCE VS	Decrease AP Pitch Controller
INCREASE AP PITCH HOLD REFERENCE	Increase FD Pitch Command
DECREASE AP PITCH HOLD REFERENCE	Decrease FD Pitch Command
INCREASE HEADING BUG	Increase Heading Bug in HSI gauges

DECREASE HEADING BUG	Decrease Heading Bug in HSI gauges

INCREASE VOR1 OBS	Increase Captain’s OBS course in HSI gauges when Navigation Source is NAV1/NAV2
DECREASE VOR1 OBS	Decrease Captain’s OBS course in HSI gauges when Navigation Source is NAV1/NAV2
INCREASE VOR2 OBS	Increase FO’s OBS course in HSI gauges when Navigation Source is NAV1/NAV2
DECREASE VOR2 OBS	Decrease FO’s OBS course in HSI gauges when Navigation Source is NAV1/NAV2