2.4. INSTRUMENT PANEL

Complete instruments and avionics for VFR and IFR are located on the instrument panel and on the center pedestal.

Two Primary Flight Displays (PFDs), two master warning and master caution lights/reset buttons, and two ICE caution and STALL warning lights are provided on the left and the right instrument panel section for the pilot and copilot. The central section of the instrument panel accommodates the two Display Control Panels (DCPs), the Multifunction Display (MFD), the Miscellaneous/Reversionary Panel, the Integrated Standby Instrument (ISI), the Radio Tuning Unit (RTU), and the annunciator panel. The Flight Guidance Panel (FGP) is installed on top of the central section.

Other installations on the instrument panel include two digital clocks on the left and right section and the ELT Control Panel on the left side.

Extending across the lower section of the instrument panel are installed various system controls, control panels, and gauges. These include environmental and bleed air control panels, alternate static air source control panel, landing gear and hydraulic system control panel, anti-ice systems control panel, systems test selector, master switches panel, fuel, engine, and propeller control panels, cabin pressurization control panel and cabin audio panels.

The external lights switches panel, the Control Display Unit (CDU), the Cursor Control Panel (CCP), the pitch and rudder trim control panel and the trim position indicators are located on the central control pedestal.

Additional instrumentation includes a magnetic compass mounted on the windshield divider. The internal lights control and dimming panel is located on the left side wall of the cockpit.
Figure 2.4-1. Typical Instrument Panel - Left Section
Figure 2.4-2. Typical Instrument Panel - Central Section
Figure 2.4-3. Typical Instrument Panel - Right Section

Rep. 180-MAN-0030-01102

Issued: May 22, 2006

Page 2.4-4

Rev. A0
Figure 2.4-4. Typical Control Pedestal
2.5. ANNUNCIATOR SYSTEM

The annunciator system provides visual indication of the condition of certain systems essential to the operation of the airplane. The annunciator system consists of an annunciator controller, sensors on the monitored systems, an annunciator display, two master warning light/reset buttons (WRN) and two master caution light/reset buttons (CAUT) directly in front of the pilot and copilot.

All the lamps housed in the annunciator panel, master warning and master caution indicators can be tested selecting the LAMP position on the SYS TEST panel, at the base of the central section of the instrument panel, and pressing the button. In addition, this test allows the check of the door open and door closed monitoring circuit, depending on the door condition at the time of the test.

The annunciator display is located in the central section of the instrument panel (see Figure 2.4-2). All of the individual function red-warning, amber-caution lights are dual-bulb, word readout type. The annunciator display table (on page 2.5-2) illustrates the function associated with each light.

When a system condition activates a red warning annunciation the red warning master lights will flash simultaneously. When a system condition activates an amber caution annunciation the amber caution master lights will light simultaneously. When the illuminated master light/reset button is pressed, the master light is turned off. However, as long as the condition exists, the warning or caution annunciation will remain lit.

Any subsequent activation of a red warning or an amber caution annunciator will trigger the corresponding master light again. The master light may be cancelled again by depressing the master light/reset button. If an event triggers a warning or a caution annunciation and the event is subsequently corrected, the display for the involved system will automatically extinguish.
### ANNUNCIATOR PANEL

#### WARNING - RED LIGHTS

<table>
<thead>
<tr>
<th>Light Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L FIRE</td>
<td>Fire in left engine compartment</td>
</tr>
<tr>
<td>R FIRE</td>
<td>Fire in right engine compartment</td>
</tr>
<tr>
<td>L OIL TEMP</td>
<td>Left engine oil overtemperature</td>
</tr>
<tr>
<td>R OIL TEMP</td>
<td>Right engine oil overtemperature</td>
</tr>
<tr>
<td>L OIL PRESS</td>
<td>Low oil pressure in left engine</td>
</tr>
<tr>
<td>R OIL PRESS</td>
<td>Low oil pressure in right engine</td>
</tr>
<tr>
<td>L BLEED TEMP</td>
<td>Left bleed air line overtemperature</td>
</tr>
<tr>
<td>R BLEED TEMP</td>
<td>Right bleed air line overtemperature</td>
</tr>
<tr>
<td>L MN WG OVHT</td>
<td>Left main wing anti-ice overheat</td>
</tr>
<tr>
<td>R MN WG OVHT</td>
<td>Right main wing anti-ice overheat</td>
</tr>
<tr>
<td>L FD WG OVHT</td>
<td>Left forward wing anti-ice overheat</td>
</tr>
<tr>
<td>R FD WG OVHT</td>
<td>Right forward wing anti-ice overheat</td>
</tr>
<tr>
<td>L WSHLD ZONE</td>
<td>Left windshield zone overheat</td>
</tr>
<tr>
<td>R WSHLD ZONE</td>
<td>Right windshield zone overheat</td>
</tr>
<tr>
<td>CAB PRESS</td>
<td>Cabin pressurization outside limits</td>
</tr>
<tr>
<td>STEER FAIL</td>
<td>Steering system failure</td>
</tr>
<tr>
<td>BAG DOOR</td>
<td>Baggage door open or not secure</td>
</tr>
<tr>
<td>CAB DOOR</td>
<td>Cabin door open or not secure</td>
</tr>
<tr>
<td>DUCT TEMP</td>
<td>Cabin air supply duct overtemperature</td>
</tr>
<tr>
<td>BAT OVHT</td>
<td>Battery overheat above 150°F</td>
</tr>
</tbody>
</table>
### ANNUNCIATOR PANEL (CONT.)

#### CAUTION - AMBER LIGHTS

<table>
<thead>
<tr>
<th>Light Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L F/W V INTRAN</td>
<td>Left fuel firewall shut off valve in transit</td>
</tr>
<tr>
<td>R F/W V INTRAN</td>
<td>Right fuel firewall shut off valve in transit</td>
</tr>
<tr>
<td>L F/W V CLSD</td>
<td>Left fuel firewall shut off valve closed</td>
</tr>
<tr>
<td>R F/W V CLSD</td>
<td>Right fuel firewall shut off valve closed</td>
</tr>
<tr>
<td>L FUEL PUMP</td>
<td>Left main fuel boost pump inoperative</td>
</tr>
<tr>
<td>R FUEL PUMP</td>
<td>Right main fuel boost pump inoperative</td>
</tr>
<tr>
<td>L FUEL PRESS</td>
<td>Left fuel pressure below minimum</td>
</tr>
<tr>
<td>R FUEL PRESS</td>
<td>Right fuel pressure below minimum</td>
</tr>
<tr>
<td>L FUEL FILTER</td>
<td>Left fuel filter obstructed</td>
</tr>
<tr>
<td>R FUEL FILTER</td>
<td>Right fuel filter obstructed</td>
</tr>
<tr>
<td>L LOW FUEL</td>
<td>Minimum fuel level in the left tank</td>
</tr>
<tr>
<td>R LOW FUEL</td>
<td>Minimum fuel level in the right tank</td>
</tr>
<tr>
<td>L GEN</td>
<td>Left DC generator inoperative</td>
</tr>
<tr>
<td>R GEN</td>
<td>Right DC generator inoperative</td>
</tr>
<tr>
<td>L PROP PITCH</td>
<td>Left propeller beyond low pitch stop</td>
</tr>
<tr>
<td>R PROP PITCH</td>
<td>Right propeller beyond low pitch stop</td>
</tr>
<tr>
<td>FUEL XFEED</td>
<td>Fuel crossfeed valve open</td>
</tr>
<tr>
<td>XFEED INTRAN</td>
<td>Fuel crossfeed valve in transit</td>
</tr>
<tr>
<td>BAT TEMP</td>
<td>Battery temperature above 120°F</td>
</tr>
<tr>
<td>BUS DISC</td>
<td>Electrical busses not interconnected</td>
</tr>
<tr>
<td>AVCS FAN FAIL</td>
<td>Failure of main avionics bay cooling fan</td>
</tr>
<tr>
<td>HYD PRESS</td>
<td>Hyd. pressure outside range or Hyd. System inoperative</td>
</tr>
<tr>
<td>EPU DRAIN</td>
<td>Emergency Power Unit OFF or EPU battery draining</td>
</tr>
<tr>
<td>FLAP SYNC</td>
<td>Flap synchronization failed</td>
</tr>
<tr>
<td>STALL FAIL</td>
<td>Stall warning system failure or angle of attack transducer heater inoperative</td>
</tr>
<tr>
<td>OIL COOLING</td>
<td>Forced engine oil cooling operating</td>
</tr>
<tr>
<td>AUTOFEATHER</td>
<td>Autofeather not armed</td>
</tr>
<tr>
<td>DOOR SEAL</td>
<td>Failure of cabin door sealing</td>
</tr>
<tr>
<td>L PITOT HTR</td>
<td>Left Pitot heating system OFF or inoperative</td>
</tr>
<tr>
<td>R PITOT HTR</td>
<td>Right Pitot heating system OFF or inoperative</td>
</tr>
</tbody>
</table>
2.6. AURAL WARNING SYSTEM

The aural warning system provides generation of different aural tones in conjunction with particular events requiring the pilot to be alerted. The system consists of an electronically controlled unit that generates the following audible warnings:

<table>
<thead>
<tr>
<th>WARNING</th>
<th>TONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STALL</td>
<td>Priority 1. Downward sweeping frequency from 1280 Hz to 830 Hz, with a repetition rate of 2.0 seconds. The input control is from the stall warning computer when a prestall condition is detected.</td>
</tr>
<tr>
<td>OVERSPEED</td>
<td>Priority 2. Upward sweeping frequency from 1900 Hz to 3000 Hz, with a repetition rate of 1.5 seconds. The input control is from both the PFDs at speed above either 260 KIAS, for flight altitudes up to 30500 ft, or 0.7 indicated Mach above 30500 ft.</td>
</tr>
<tr>
<td>LOSS OF APPROACH</td>
<td>Priority 3. Upward sweeping frequency from 2100 Hz to 2800 Hz, with a repetition rate of 0.3 seconds. The input control is provided by both the DCUs when the CAT2 annunciation is active, on either or both PFDs, and either the FGC reports a FD flag. The LOSS OF APPROACH warning can be silenced, within 5 seconds from the activation, if the GA mode is selected or the APP mode is deselected.</td>
</tr>
</tbody>
</table>
| GEAR             | Priority 4. Steady 326 Hz frequency. Activated by inputs from power levers, flaps, landing gear and TEST/MUTE functions as follows:  
|                  | - the power on one or both of the engines is reduced below a setting sufficient to maintain flight while the landing gear is not locked down. The GEAR WARNING can be silenced by means of the GEAR MUTE switch on the right power lever; |

(cont.)
GEAR (cont.) – the flaps are lowered to the DN position and the landing gear is not locked down. The GEAR WARNING cannot be silenced and will continue until either the landing gear is extended or the flaps are retracted to the clean (UP) setting;

– the flaps are in MID position, the landing gear is not locked down and the left power lever is retarded approximately below the half travel position. The GEAR WARNING cannot be silenced and will continue until either the landing gear is extended or the flaps are retracted to the clean (UP) setting.

TRIM-IN-MOTION
Priority 5.
A clock-like tick resulting from short bursts of 1000 Hz (5 cycles), with a repetition rate of 0.3 seconds.
The input control is from the primary pitch trim actuator when in motion.

ENGINE EXCEEDANCE
Priority 6.
Steady 1400 Hz frequency lasting 0.5 seconds with 1 second repetition rate.
The input control is provided by the DCUs and EDCs when engine torque or ITT warning threshold is exceeded.

AUTOPilot DISCONNECT
Priority 7.
A 500 Hz frequency that fades to inaudible in 1.0 second.
The activation is provided by both the DCUs when the autopilot disengages.

ALTITUDE ALERT
Priority 8.
A 3000 Hz frequency with an approximate duration of 1 second that activates either 1000 ft before the preselected altitude is reached (acquisition mode) or when the flying altitude differs by ± 200 ft from the preselected value (deviation mode).
The input control is from the Cockpit Displays.
With the exception of the GEAR WARNING, the above output tones can be silenced only by removing and/or correcting the generating event.

The control inputs are prioritized such that if two or more inputs are activated, only the higher priority tone will be sounded. In the case where the GEAR WARNING tone is silenced the next priority tone would sound during the silenced period.

An exception is represented by the LOSS OF APPROACH WARNING which is interrupted by the activation of the AUTOPILOT DISCONNECT WARNING.

The aural warning box is fed from the essential bus through the AURAL WRN 3-ampere circuit breaker on the pilot circuit breaker panel.
2.7. MULTIFUNCTION DISPLAY

The Multifunction Display (MFD) is located in the central section of the instrument panel.

The MFD consists of three major display areas: the Engine Indicating System (EIS) region permanently displayed across the upper part of the MFD (ref. to Paragraph 2.10.4) and the area below the engine indications which is divided into Lower and Upper Format windows. The content of both Format windows can be separately controlled by the pilot through the left and right select keys.

The BRT/DIM pushbutton allows the local control of the display brightness.

![Multifunction Display](image)

Figure 2.7-1. Multifunction Display
2.7.1 MFD SYSTEM PAGE

The MFD displays system data in the Lower Format window by pushing the SYS line-select-key; select any other Lower Format to remove the System Page (see Figure 2.7-1).

When the System Page is selected the following airplane systems information are displayed: Generator Load, Bus Voltage, Battery Temperature, Flap Position, Anti-ice System status, External Power connection and Landing Lights Door Open status.

Left and right generator amps, battery temperature and bus voltage parameters can be manually selected to remain visible, under the “SYS” annunciation, when the System Page is not displayed.

The parameter selection and deselection is made, on the System Page, through the line-select-key next to that parameter. When selected the parameter text shows in cyan.

When a System parameter goes out of the normal range the System Page is not in view, the parameter is displayed under the “SYS” annunciation which is highlighted with a haloed cyan box. When two or more abnormal conditions occur, only the parameter with the highest priority is displayed under the “SYS” annunciation.

![Multifunction Display - System Page](image-url)

Figure 2.7-2. Multifunction Display - System Page
2.8. SYSTEM TEST

A central test system allows checking the correct operation of some airplane systems. The SYS TEST selector, located on the lower section of the instrument panel, consists of a rotary knob with a central pushbutton. The rotary knob selects the system to be tested when rotated to the corresponding position while the springloaded pushbutton actuates the selected system test when pushed and held.

![System Test Selector Diagram]

**Figure 2.8-1. System Test Selector**

The following tests can be performed as per the selector position:

<table>
<thead>
<tr>
<th>SELECTOR</th>
<th>TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG EXCEED</td>
<td>Engine torque and ITT warning threshold exceedance test. The “Engine Exceedance” aural warning tone should be generated.</td>
</tr>
<tr>
<td>ANN</td>
<td>Battery and engine oil temperature annunciations test. The amber BAT TEMP and the red BAT OVHT, L OIL TEMP and R OIL TEMP lights on the annunciator panel should come on.</td>
</tr>
<tr>
<td>LAMP</td>
<td>Annunciator system test. The MASTER WARNING, the MASTER CAUTION and all of the annunciator panel lights should come on. The MASTER lights must be manually reset after the test.</td>
</tr>
</tbody>
</table>
**Description and Operation**

**System Test**

<table>
<thead>
<tr>
<th>SELECTOR</th>
<th>TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRE DET</strong></td>
<td>Engine fire warning system test. The continuity of both the right and the left engine fire detecting circuits will be checked: the L ENG FIRE and R ENG FIRE red warning lights should flash. If the optional fire extinguishing system is installed, the two lighted L and R ENG FIRE EXT pushbuttons, located each side of the Flight Guidance Panel, will flash too.</td>
</tr>
<tr>
<td><strong>FUEL QTY</strong></td>
<td>Fuel quantity indicating system test. The L and R LOW FUEL amber caution lights should illuminate.</td>
</tr>
<tr>
<td><strong>LDG GR</strong></td>
<td>Landing gear indicating system test. The UNSAFE red lights should illuminate and the gear warning tone should be activated.</td>
</tr>
<tr>
<td><strong>AVCS FAN</strong></td>
<td>Avionics Bay cooling fan test. The AVCS FAN FAIL amber light on the annunciator panel should come on after about 7 seconds from test selection.</td>
</tr>
<tr>
<td><strong>RAD ALT</strong></td>
<td>Radio Altimeter test. The Radio altitude readout of 50 feet should be displayed on the PFDs.</td>
</tr>
<tr>
<td><strong>OVSP WRN</strong></td>
<td>Overspeed warning test. The &quot;overspeed warning&quot; aural tone should be generated from the left side ADC first, then, after about 2 seconds, from the right side ADC.</td>
</tr>
<tr>
<td><strong>HYD</strong></td>
<td>Hydraulic power package and hydraulic pressure monitoring system test. The needle of the hydraulic pressure indicator should move to the 1300 PSI reading while the HYD PRESS amber caution light on the annunciator display should come on.</td>
</tr>
<tr>
<td><strong>STEER</strong></td>
<td>Steering system test. The STEER FAIL red warning light on the annunciator display should come on when the steering is engaged in either takeoff or taxi operating mode, and should go off by depressing the Master Switch (MSW) on the control wheel: at this point the steering mode indications (STEER T-O or STEER TAXI) on the PFDs, will also extinguish indicating that the steering is no more engaged.</td>
</tr>
</tbody>
</table>


Page 2.8-2  Rev. A0
STALL Stall warning system test. A signal of "test request" is sent to the stall warning computer that simulates a failure of the angle of attack (AOA) transmitter: STALL FAIL amber light will illuminate then extinguish after 15 to 20 sec. Red STALL light will be illuminated and the aural warning horn activated. This test is inhibited in flight.

FLAPS Flaps system test. The timing circuitry, the electrical power feeding, the electrical contacts on the main wing outboard flap (MWOF) subsystem control, the FLAP SYNC amber caution light and the related driving unit are checked for correct operation and continuity. The FLAP SYNC light should illuminate and the FLAP annunciation on PFDs/MFD should become yellow, flashing for the first 5 seconds.

ICE DET Ice detector test. ICE amber light will illuminate and after few seconds will blink until one of the two ICE lighted pushbuttons is not pressed, then will extinguish.

MN WG A/I Main wing anti ice system test. After setting to the AUTO position the ANTI-ICE MAIN WING switches, pressing momentarily the test button, both green ON indications (left and right side of the “MW” legend) should be displayed on the MFD System Page after approximately 20 seconds. At the end of the test the ANTI-ICE MN WING switches should be reset to the OFF position.

FWD WG A/I Forward wing anti ice system test. After setting ON the ANTI-ICE FWD WING switches, depressing the test button a load increase of about 30 ÷ 40 Amps. on each generator should be read on the MFD System Page. At the end of the test the ANTI-ICE FWD WING switches should be reset to the OFF position.
2.28. FLIGHT INSTRUMENTS

2.28.1 ELECTRONIC FLIGHT INSTRUMENTS SYSTEM

The Electronic Flight Instruments System (EFIS) consists of:

– three Adaptive Flight Displays (AFD),
– two Display Control Panels (DCP),
– one Cursor Control Panel (CCP).

In normal operations the two AFDs on pilot’s and copilot’s side are configured as Primary Flight Displays (PFD) and the central AFD is configured as a Multifunction Display (MFD).

The PFD shows the basic T flight instruments including an HSI Rose, HSI Arc, or FMS Map. The MFD shows engine data on the top half of the display and an optional HSI Rose, optional HSI Arc as well as System Page or FMS Map on the bottom half.

The Air Data System supplies processed air data to the EFIS.

The Attitude and Heading Reference System supplies attitude and heading data.

Two Data Concentrator Units (DCU) and two Engine Data Concentrator Units (EDC) supply engine data.

Controls located on the AFDs, DCPs, and CCP provide EFIS control.

The EFIS is made up of a pilot’s side and a copilot’s side system. Each side is functionally and physically isolated from each other, and is capable of operating as a complete, independent system. The PFD/MFD switch on the REVERSIONARY/MISCELLANEOUS Panel allows to power down the failed AFD (Pilot’s PFD or MFD) and revert the remaining AFD to a composite format.
Figure 2.28-1. EFIS block diagram
ADAPTIVE FLIGHT DISPLAYS (PFD/MFD)

The two Primary Flight Displays on pilot’s and copilot’s side provides, on a single integrated display, the following information:

- Attitude
- Heading
- Airspeed
- Altitude
- Vertical speed
- FGS annunciations
- Navigation data

The Multifunction Display consists of three major displays areas:

- top section - Engine Indicating System (EIS) area,
- upper format - can display the checklist index or the FMS text,
- lower format - can display a full compass Rose HSI, or a partial compass Arc HSI, or the System Page or the FMS Map.

The Pilot’s PFD is powered by the Essential Avionics Bus through the DC/DC Converter 1 and the “L PFD” 10-ampere circuit breaker on the pilot’s C/B panel.

The Copilot’s PFD is powered by the Right Avionics Dual Feed Bus through the “R PFD” 10-ampere circuit breaker on the copilot’s C/B panel.

The Essential Bus supplies power to the MFD through the DC/DC Converter 2 and the “MFD” 10-ampere circuit breaker on the pilot’s C/B panel.

In the event of a MFD failure, the PFD/MFD reversion switch, on the REVERSIONARY Panel, must be set to PFD to power down the MFD and display the composite format on both pilot’s and copilot’s PFDs.

In this situation, in addition to the normal PFD display format, Engine Indicating System (EIS) data are shown on the top section of the display and the System page is also available.

The SAT/ISA readouts are also added to the PFD in the lower right corner.

In the event of pilot’s PFD failure, the PFD/MFD reversion switch must be set to MFD to power down the pilots PFD and display the composite format on the MFD: copilot’s PFD remains in "normal format".
The MFD operation in composite format is identical to the PFD operation in composite format.

No reversion is deemed necessary if copilot's PFD fails.

Comparators are electronic comparisons of redundant systems data to ensure that the same informations are provided to the pilot's and copilot's systems within specified tolerances. If both sets of data do not agree a miscompare exists and a warning (Comparator Flag) is displayed on the PFD/MFD.

The comparator functions include:

- full time comparators for Attitude, Heading, Altitude, Airspeed and Radio Altitude;
- full time comparators for engine $N_1$, ITT, TORQUE and PROP;
- Comparators for ILS Localizer (LOC)/MLS Azimuth (MAZ), ILS GlideSlope (GS)/MLS Glide Path (MGP), and Flight Director commands (V-bars) when a Monitored Approach is being performed;
- Excessive LOC/MAZ and GS/MGP warning monitors when a Monitored Approach is being performed.

These functions are performed on raw data by each AFD when two independent valid sources are available, except for the following:

- comparators of ADC parameters are disabled after ADC reversion to a common source;
- AHC parameters comparator function is performed on the source data displayed to each side (pilot and copilot), not on the raw data;

Inputs for these functions are the selected AHS, NAV, ADC, FCS, FMS source informations, as well as the cross-talk busses.

A white "No-Comparator" flag is displayed on the PFD when a "compared parameter" is shown as valid, but no valid data is received from an installed second source to allow the comparator to work; when this flag comes into view, the display's ability to ensure the associated data integrity, based on data from independent sources, no longer exists, and increased pilot vigilance is recommended.

The No-Comparator Warning annunciators are removed when the miscompare condition no longer exists or if a common source of data is selected.
DISPLAY CONTROL PANEL

The Display Control Panel (DCP) contains knobs and switches that allow the pilot to select the barometric pressure correction, V-speed reference setting, navigation source selection, bearing source selection, weather radar control, and display range parameters.

The DCP includes the following controls:

- **BARO knob with PUSH STD switch**: is a rotary knob and pushbutton switch assembly that selects the baro-correction value and the standard barometric pressure correction.

- **DATA and MENU ADV knobs with PUSH SELECT switch**: is a rotary knob and pushbutton switch assembly that sets a value into the selected menu item on the PFD/MFD. Turn the PUSH MENU ADV switch to advance the menu window to the next item.

- **TILT knob with PUSH AUTO TILT switch**: is a rotary knob and pushbutton switch assembly that selects the radar antenna tilt angle value and turns the auto-tilt function ON or OFF.

- **RANGE knob**: is a rotary knob that selects the on-side display range value. The display range setting affects the navigation and hazard avoidance maps on the PFDs and MFD. Turn the RANGE knob to change the range setting.

- **REFS (references) button**: selects and deselects the REFS menu on the PFD. The REFS menu provides access to V-speeds, RA MIN and BARO MIN values.

- **NAV/BRG button**: is used to select and deselect the NAV SOURCE/BRG SOURCE menu on the PFD. The NAV SOURCE/BRG SOURCE menu provides access to the NAV source selection and the Bearing Pointer source selections.

- **RADAR button**: is used to select and deselect the RADAR menu on the PFD. The RADAR menu provides access to the Weather Radar mode selections.

- **GCS (Ground Clutter Suppression) button**: is used to select and deselect the Weather Radar GCS feature. The GCS feature reduces the intensity of ground returns in WX, WX+T and TURB modes, which assists in the interpretation of rainfall rates.

The pilot's side DCP is powered by the Essential Avionics Bus through the "L DCP" 3-ampere circuit breaker on the pilot's C/B panel, while the copilot's side DCP is powered by the Right Avionics Dual Feed Bus through the "R DCP" 3-ampere circuit breaker on the copilots C/B panel.
Figure 2.28-2. Display Control Panel
CURSOR CONTROL PANEL

The Cursor Control Panel (CCP) controls the MFD advanced features formats: E-charts (optional), enhanced maps (optional), Graphical Weather (optional), maintenance, diagnostics, and checklist pages.

The CCP includes the following controls:

- **MENU button**: opens and closes menus on the MFD. If a menu is already displayed on the MFD, the MENU button completely closes it. If no menu is presently displayed, a menu appears. The content of the menu depends on which format the MFD is in:
  a. If the MFD is in status format, the MFD STATUS MENU appears
  b. If the MFD is in chart format, the CHART MAIN INDEX appears.

- **ESC button**: by pushing the ESC button the MFD returns through previous levels of active menus, one level per push, until all menus are closed.

- **STAT button**: opens and closes the MFD’s STATUS page format. If the MFD is in STATUS page format, the STAT button returns the MFD to the last non-STATUS page format used. If the MFD is not in STATUS page format, the STAT button shows the most recently displayed STATUS page format. Status page formats include:
  a. DATABASE EFFECTIVITY
  b. CHART SUBSCRIPTION (optional)
  c. FCS DIAGNOSTICS
  d. MAINTENANCE MAIN MENU
  e. FILE SERVER CONFIGURATION (optional)

- **MENU ADV knob**: is used to position the focus indicator around the desired shortcut, menu item or alphanumeric entry field. The MENU ADV knob is also used to control and navigate a checklist.

- **PUSH SELECT button**: is used to select or shift between shortcuts, menu items, or alphanumeric characters highlighted by the focus indicator. The PUSH SELECT button is also used for checklist control.

- **MEM buttons**: each of the three MEM buttons can store or recall a split-display format configuration. Push a MEM button for more than three seconds to store the present combination of upper and lower formats and overlay states. Briefly push a MEM button to return to its stored split-display format.
– CHART button: is used to show the last viewed E-chart. When a new chart is selected, the orientation is set to the default orientation determined by the chart database. The first push of the ORIENTATION button rotates the chart 90 degrees. The second push rotates the chart back to its original orientation.

– ZOOM button: is used to show the area indicated by the pan indicator box at greater detail. The pan indicator box is a green box that is used to identify the area that will be zoomed when the zoom button is pushed. The pan indicator box shows on the E-chart format shows when the joystick is moved. Push the ZOOM button on the CCP to cycle the zoom level between values 1x, 4x. The Pan indicator times out after 2 seconds.

– The JOYSTICK is a multiple position switch used with the checklist pages. Move the joystick up and down to slew through the pages of a multiple paged checklist or menu. Also, when viewing charts with the zoom level at 1x, the joystick moves the pan/zoom window to the area of the chart to be viewed with the zoom. When zoomed in, operate the joystick to bring the area to be viewed into view.

– ORIENTATION button: the first push rotates the selected chart 90°, the second push returns the chart back to its original orientation.

The CCP is powered by the Essential Bus through the DC/DC Converter 2 and the “MFD CONT (CCP)” 3-ampere circuit breaker on the pilot’s C/B panel.

Figure 2.28-3. Cursor Control Panel
2.28.2 REVERSIONARY PANEL

The REVERSIONARY/MISCELLANEOUS Panel is a multifunction panel that provides selection of:

- alternate reversionary modes of operation on various avionics systems,
- AHRS operations,
- FMS on ground capability,
- VHF COMM1 Emergency Mode,
- optional systems (TCAS and TAWS) operations.

Figure 2.28-4. Reversionary / Miscellaneous Panel
2.28.3 RADIO TUNING UNIT (RTU)

The RTU-4200 Radio Tuning Unit (RTU), installed on the central section of the instrument panel, provides control of the operating frequency, active mode and self-test functions of the radios VHF communication, VOR/ILS/DME, ADF navigation and Mode-S Transponder. There are three methods of RTU radio tuning: direct tuning, recall tuning and tuning from the preset pages.

The RTU includes the following controls:

- **Line Select Keys:** the RTU has seven line select keys adjacent to the display. The functions performed by any specific line select key depends on the page format present on the display.
  
  Each line select key is continually monitored. When a key is pressed, only the function associated with that key is activated. A stuck line select key will disable only its associated function and cannot disable or affect the overall operation of the RTU. Pressing an unassigned line select key does not affect the operation of the RTU. Detection of the line select key is disabled when the tune knobs are rotated.

- **IDENT Key:** pressing this key initiates the command for the active Transponder to transmit the aircraft identifier. This key has no effect if pressed from the cross-side radio tuning inoperative page, configuration error page, menu page, or any display page under these pages in the hierarchy.

- **DME-H Key:** pressing this key toggles the DME hold function on the controlled DME channel. This key has no effect if pressed from the cross-side radio tuning inoperative page, configuration error page, menu page, or any display page under these pages in the hierarchy.

![Radio Tuning Unit typical layout](image-url)
– 1/2 Key: pressing the 1/2 key displays the cross-side top-level page. Pressing the 1/2 key again returns the display to the on-side display page that was present before. Operation of the 1/2 key is disabled if the configuration error page, menu page, or any page under these pages in the hierarchy is displayed, except for radio main and radio diagnostics pages.

– Concentric Tune: two-tier concentric knob assembly is used for the tune function in order to perform the frequency/channel select functions. Subsystem functions controlled by the tune knobs include active frequency/channel selection, preset frequency/channel selection, channel numbers in the preset field, page scrolling and configuration codes.

– BRT Control: the BRT control in the upper right hand corner of the front panel is used to control the primary LCD brightness. When the RTU is controlled from the external dimming source, the BRT control acts as a secondary, or trim control for the LCD brightness.

When the rocker switch labeled CDU/RTU, on the REVERSIONARY Panel, is not actuated (neutral position, no led lighted), both the CDU and RTU can provide tuning of the Radio Communication, Navigation and Transponder systems. In case the RTU fails or loses radios tuning capability, switching to the CDU position, the radios tuning capability is provided only by the CDU and the RTU is switched off. A led near the CDU position label turns on to confirm the selected position.

The Radio Tuning Unit is powered by the Essential Avionics Bus, through the RTU 3-ampere circuit breaker on the pilot’s C/B panel.
2.28.4 CONTROL DISPLAY UNIT (CDU)

The CDU-3000 Control Display Unit (CDU), installed on the Central Control Pedestal, is a shared user interface that provides control and display functions for the Flight Management System as well as Radio Communication, Navigation and Mode-S Transponder Systems. The CDU includes a dedicated tuning section, allowing selection of radio frequencies for the COM, NAV, ADF and Transponder codes. These functions include frequency/channel/code select, mode select, self-test select and Flight Identification.

The CDU has a color display to show the FMS-related information and function modes. The top line of the CDU display shows a title/mode and the current page number and total number of pages as applicable for each display mode. Below the title/mode line, there are six data lines and six label lines to show data for a given display page. The two bottom lines on the display are used for the scratchpad and message lines. Many of the display pages are configured to show two columns of information, which allows the use of the line select keys on both sides of the display to select, copy, or transfer displayed data.

Figure 2.28-6. Control Display Unit controls and display
The line select keys around the display are used to select modes and copy or transfer displayed information. The function keys are used to directly select many of the radio tuning, FMS functions and display modes. The CDU also has a full alphanumeric keypad for entering data. All operations that entail entering data for operating functions are done through the use of a scratchpad entry system. Flight plan data, performance data, or data for other CDU operations, is entered directly into the scratchpad with the keypad, or by pushing a line select key to copy data shown on a display line to the scratchpad. From the scratchpad, data is transferred to the appropriate data line by pushing the line select key for the entry position.

Operating modes are selected directly by pushing the appropriate function key, or by pushing a line select key adjacent to an item in a menu shown on the display. Some functions are alternately switched on and off with sequential pushes of the associated line select key or a function key.

When the rocker switch labeled CDU/RTU, on the REVERSIONARY Panel, is not actuated (neutral position, no led lighted), both the CDU and RTU can provide tuning of the Radio Communication, Navigation and Transponder systems.

In case the CDU fails or loses radio tuning capability, switching to the RTU position, the radios tuning capability is provided only by the RTUU and the CDU is switched off.
A led near the RTU position label turn on to confirm the selected position.

In case of CDU failure, the RTU loses normal full tuning capability of the cross-side radios. The message CROSS-SIDE RADIO TUNING INOPERATIVE shows in yellow on the RTU when cross-side tuning capability is lost.

The Control Display Unit is powered by the Left Avionics Supply Bus through the CDU 3-ampere circuit breaker on the pilot’s C/B panel.