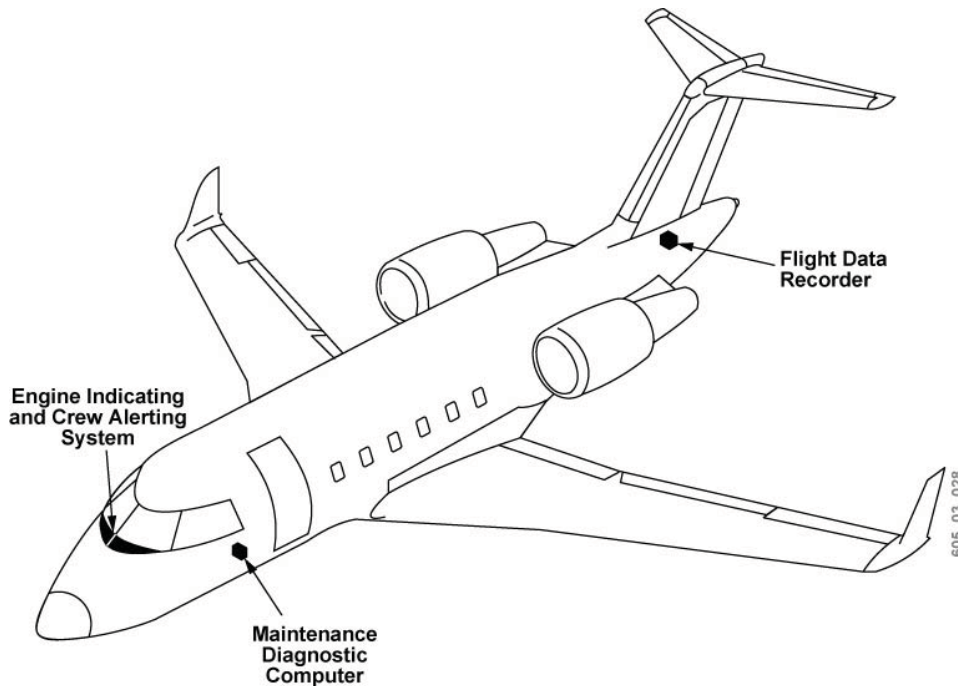


Bombardier Challenger 605 - Aural & Visual Warning System

GENERAL

Aural and visual warnings include those components that integrate information into an independent display system. This provides the crew with flight and operational information as well as visual and aural alerts of malfunctions and/or operational changes. Additionally, data is provided to the flight data recorder (FDR) and the maintenance diagnostic computer (MDC). This chapter provides details on the following:

- Engine indication and crew alerting system (EICAS);
- Flight data recording; and
- Maintenance diagnostics.



Aural/Visual Warnings
Figure 03-10-1

ENGINE INDICATION AND CREW ALERTING SYSTEM

General Description

The engine indication and crew alerting system (EICAS) processes inputs from aircraft systems to provide visual information and aural alerts to the crew.

In general terms, the function of EICAS is to:

- Process and display engine parameters and related information;
- Process and display system parameters and related information;
- Provide a graphical depiction of certain airframe systems for the purpose of in-flight health monitoring;
- Process and provide visual and aural alerts to the crew;
- Provide aural warning when the aircraft is not in proper takeoff configuration; and
- Process information for the flight data recorder.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

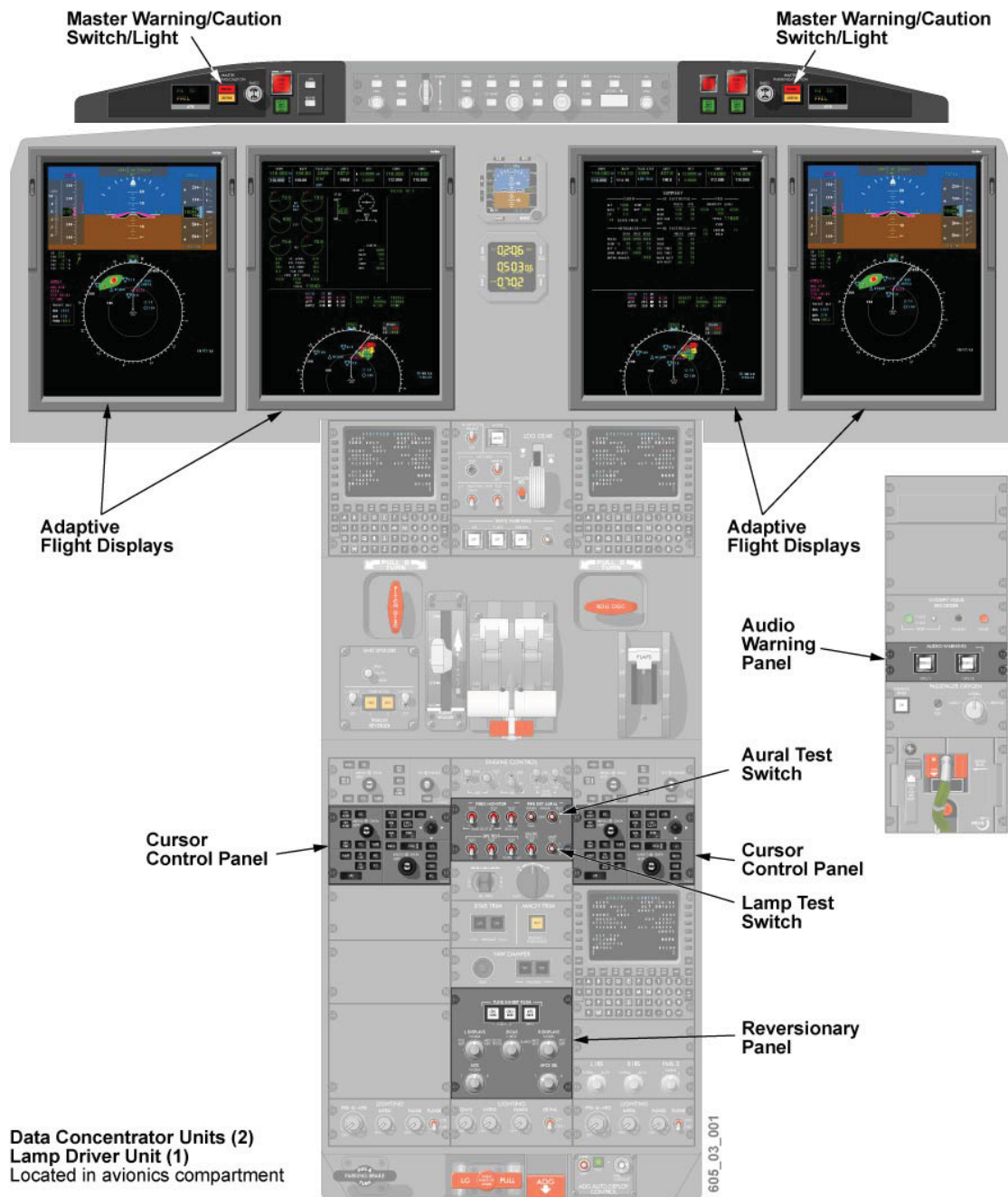
Components

EICAS includes those components that receive, process and display information. The EICAS components also provide audio signals to the audio system for voice and aural annunciations and operating and flight parameter data to the flight data recorder. Major components and controls include:

- Four adaptive flight displays;
- Two data concentrator units;
- One lamp driver unit;
- Two cursor control panels;
- One reversionary control panel;
- Two master warning/caution switch/lights;
- One audio warning panel; and
- One miscellaneous test panel.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Aural/Visual Warning Control Panels
Figure 03-10-2

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Adaptive Flight Displays

The four liquid-crystal adaptive flight displays (AFDs) are used as part of the electronic flight instrument (EFIS) and EICAS systems. The outer AFDs are normally configured as primary flight displays (PFDs) while the inner AFDs are configured as multifunction displays (MFDs). EICAS information is normally presented on the left MFD, however, it can also be displayed on the right MFD. Under certain conditions the EICAS information can also be presented on the PFDs.



Adaptive Flight Displays
Figure 03-10-3

Data Concentrator Units

The aircraft is equipped with two independently operating data concentrator units (DCUs). The DCUs, located in the avionics compartment, contain the processing software required for the operation of the adaptive flight displays. The AFDs render EICAS displays based on inputs from the DCUs. The software also contains the equations that define the crew alerting function of the EICAS. These crew alerting functions include the voice and aural tones and annunciations produced by the audio system.

The DCUs process flight and operating parameter data for transfer and storage to the flight data recorder. The DCUs also process and transfer fault data for the maintenance diagnostic computer.

The DCUs receive information from the major systems and subsystems including:

- Bleed Air;
- Air conditioning;
- Ice and Rain;
- Electrical Power;
- Fire Protection;
- Flight Controls;
- Fuel;
- Hydraulics;
- Landing Gear;
- Lights;

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

- Oxygen;
- Engine;
- Auxiliary Power Unit;
- Doors; and
- Avionic Systems.

Lamp Driver Unit

The dual-channel lamp driver unit (LDU) is used to power individual panel and glareshield lights when commanded by the data concentrator units. When the DCU generates an EICAS warning or caution message, the LDU causes the glareshield MASTER WARNING/CAUTION switch/lights to flash, and turns on any associated panel lights.

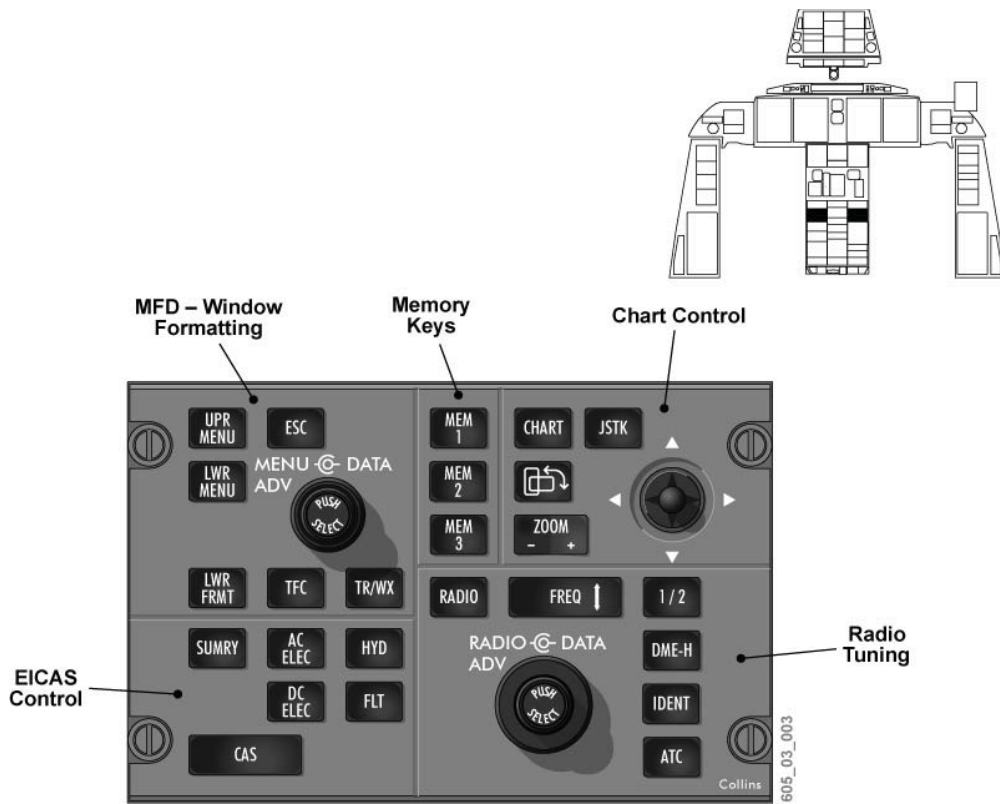
Cursor Control Panel

Each pilot is provided with a cursor control panel (CCP), located on the center pedestal. Each CCP is the pilot's main interface to control information presented on the on-side MFD.

The CCP can be divided into 5 functional and visually identifiable sections as described below:

- MFD window formatting – allows selection of navigation formats, display and control of on-screen menus and to enable overlays;
- Memory keys – allows the crew to save specific display formats to memory for quick access;
- Chart control – displays charts from the optional chart system;
- EICAS control – enables the display of synoptic, SUMMARY pages and controls the display of crew alerting messages; and
- Radio tuning – controls communications and navigation radio tuning.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



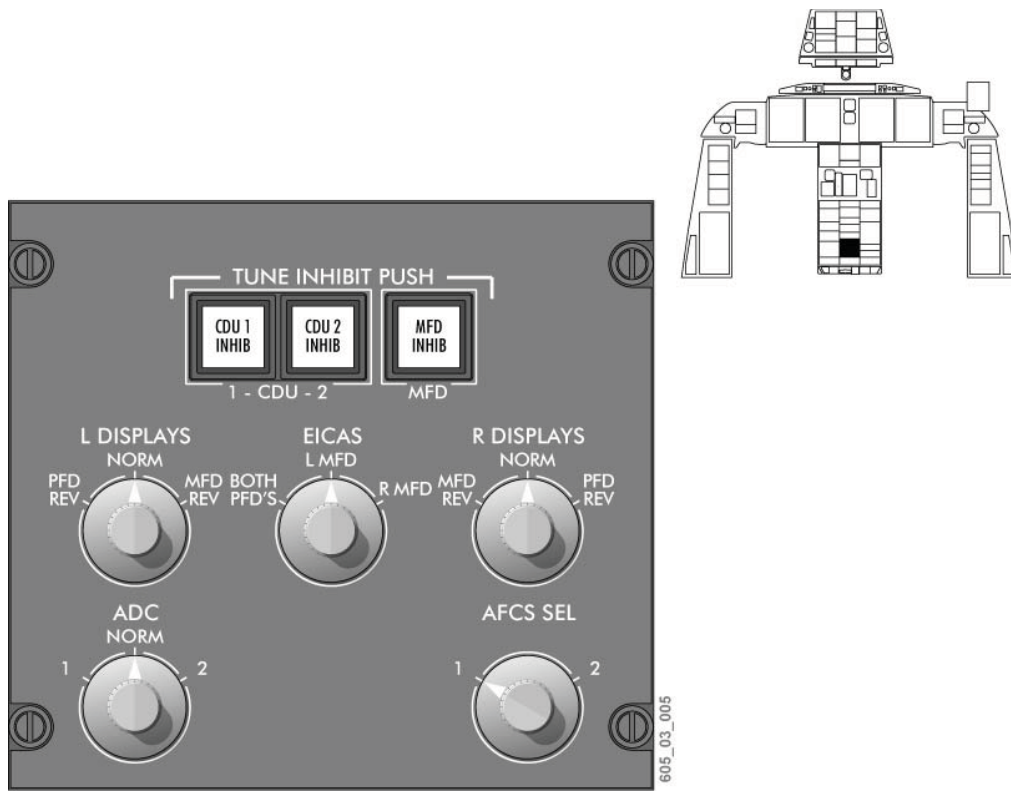
Cursor Control Panel
Figure 03-10-4

Reversionary Control Panel

The multipurpose reversionary control panel, located on the center pedestal, includes several rotary selectors and switch/lights. The functions are as follows:

- TUNE INHIBIT PUSH switch/lights – used to inhibit the tuning functions of a CDU or MFD (see Chapter 6, Communications)
- L(R) DISPLAYS selector – used to control the reversionary functions of the left (right) PFD and MFD
- EICAS selector – used to control the location of the displayed EICAS information
- ADC selector – used to define the source of air data information (see Chapter 11, Flight Instruments)
- AFCS SEL selector – used to define source of autoflight commands (see Chapter 4, Automatic Flight Control System)

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Reversionary Control Panel
Figure 03-10-5

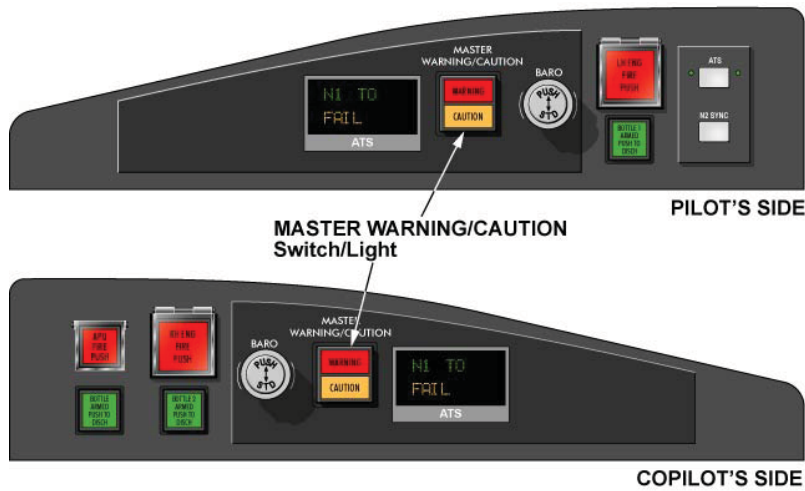
Master Warning/Caution Switch/lights

The MASTER WARNING/CAUTION switch/lights are installed on the left and right glareshield panels.

The red master warning lights are associated with red warning messages. The amber master caution lights are associated with amber caution messages.

Pressing either left or right switch/light will extinguish the flashing red or amber light.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



MASTER WARNING/CAUTION Switch/Lights
Figure 03-10-6

Audio Warning Panel

The AUDIO WARNING panel, located on the copilot side console, includes two switch/lights (DCU 1 (2)), used to disable and silence EICAS aural warnings.

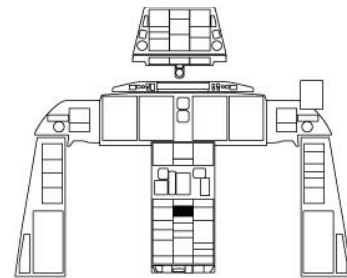


AUDIO WARNING Panel
Figure 03-10-7

Miscellaneous Test Panel

The miscellaneous test panel, located on the center pedestal, includes control switches for testing the EICAS aural warning and flight deck panel lamp functions. The AURAL WARN TEST switch is used to test the audio outputs of the DCUs, while the LAMP TEST switch is used to check operation of panel switch/lights.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Miscellaneous Test Panel
Figure 03-10-8

EICAS Presentation

Engine indicating and crew alerting (EICAS) information can be presented on one or more displays and display windows. The following titled pages are available:

- EICAS page (full format);
- EICAS page (compressed);
- Synoptic pages; and
- SUMMARY page.

EICAS Page - Full Format

The EICAS page, in full format, is available for display on the upper window of the MFDs, and is the main page showing engine and system parameters and crew alerting messages. It can be shown on either the left or right MFD, when the display is operating in a split window configuration.

Normally, only one MFD is configured to display the EICAS page. The EICAS selector switch, located on the reversionary control panel, includes selectable L MFD and R MFD positions. Normally, the switch is selected to the L MFD position, which locks the EICAS page on the left MFD, preventing any other format selection on the upper window.

The EICAS page, when displayed in full format, is divided into three vertical columns with radio tuning functions shown in a horizontal block above. EICAS information is presented as follows:

- Left column: engine parameters and related indications;
- Center column: system data such as trim, APU, spoiler position, etc; and
- Right column: crew alerting messages.

Engine indications are presented in circular gauge format and as digital readouts, and include:

- N_1 speed gauge;
- N_1 takeoff thrust setting;
- Interturbine temperature (ITT) gauge;
- N_2 speed gauge;
- Fuel flow;

Bombardier Challenger 605 - Aural & Visual Warning System

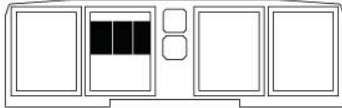
ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

- Oil pressure;
- Oil temperature;
- Fan vibration; and
- Fuel quantity (individual tank and total)

Additional information is presented, as required, in the form of annunciations shown in the center of the three circular gauges (N₁, ITT, N₂). This information includes thrust reverser status, automatic performance reserve operation, hot start annunciation and core vibration annunciations.

Systems represented by graphical display and/or digital readout on the center column include:

- Horizontal stabilizer trim;
- Aileron trim;
- Rudder trim;
- Landing gear position;
- Flap position;
- Spoiler position;
- Pressurization data (cabin altitude, rate of climb/descent, differential pressure);
- Cabin temperature;
- Crew oxygen bottle pressure; and
- Auxiliary power unit EGT and RPM.



EICAS Page
Figure 03-10-9

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

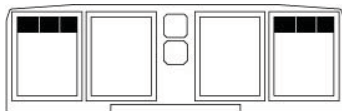
EICAS Page - Compressed Format

The EICAS page, in compressed format, is used when the crew needs to place EICAS, flight and navigation data on a single display, i.e, in the event of a single or multiple display failure.

In reversionary operation, a subset of the EICAS information is made available in the compressed display mode. This operation is enabled by using the L (R) DISPLAYS and EICAS selectors on the reversionary control panel.

When the compressed format is enabled, the EICAS information is automatically reconfigured to fit in the available display space as follows:

- Radio tuning data and functions are removed from the top of the display;
- Only N₁ remains available as a circular gauge – all other engine data is shown as a numerical readout only;
- Pressurization data, cabin temperature and crew oxygen bottle pressure are removed from the system data column – all other system data remain in view. Includes trim, gear, flap, spoiler position and APU RPM and EGT;
- Total fuel quantity remains in view, but individual tank quantity is removed; and
- Crew alerting messages remain available on the right side of the display.



EICAS Page – Compressed
Figure 03-10-10

EICAS Synoptic Pages

Synoptic pages are available as a page overlay, and are normally viewed on the lower window of a MFD. Each EICAS synoptic page allows the crew to view a dynamic representation of the:

- AC electrical system;
- DC electrical system;
- Hydraulic system; and
- Flight control system.

Synoptic pages are selectable on the lower window of the MFD by buttons on the cursor control panels (CCP). The buttons are labelled according to the system being represented: AC ELEC, DC ELEC, HYD, FLT.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Synoptic pages can also be shown on the upper window of an MFD that is not configured as an EICAS page. This feature can only be selected from the upper window main menu of the MFD, which is not available when the EICAS page is locked on the MFD. Locking the EICAS page on a particular MFD is a function of the EICAS selector on the reversionary control panel.

The synoptic pages include digital readouts, colored flow lines, component outlines and system messages. Specific colors are used to depict normal, precautionary and maximum system limits as follows:

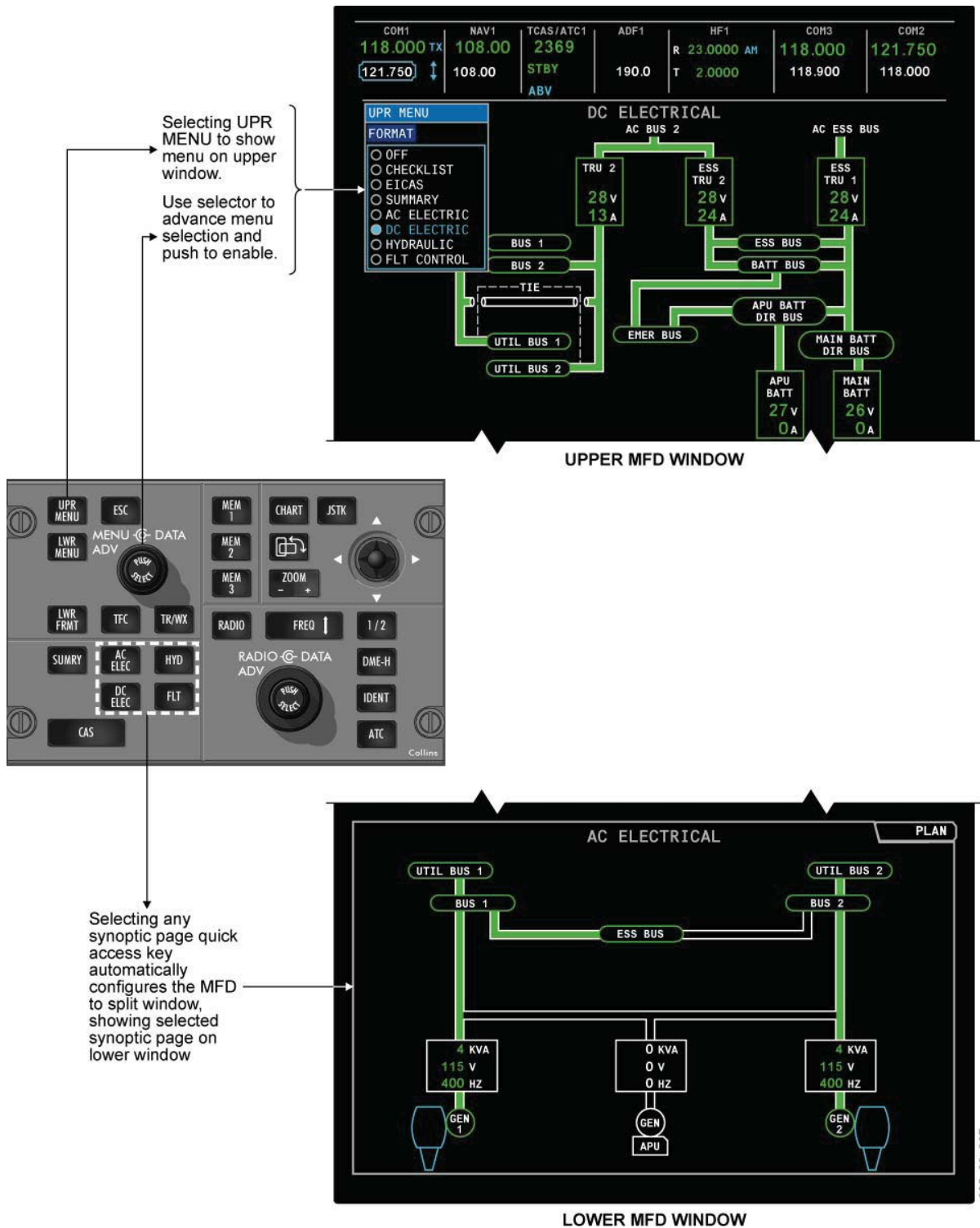
- Indicator is green; normal range;
- Indicator turns amber; precautionary range; and
- Indicator turns red; limits exceeded.

Specific colors are used to depict the flow lines as follows:

- Black, indicates no flow;
- Amber, indicates below normal values;
- Green, indicates normal value; and
- Red, indicates exceeding normal values.

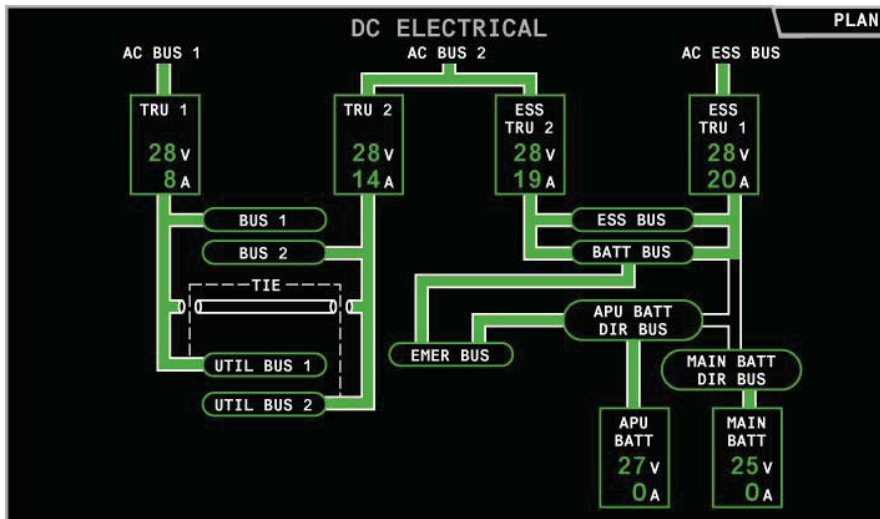
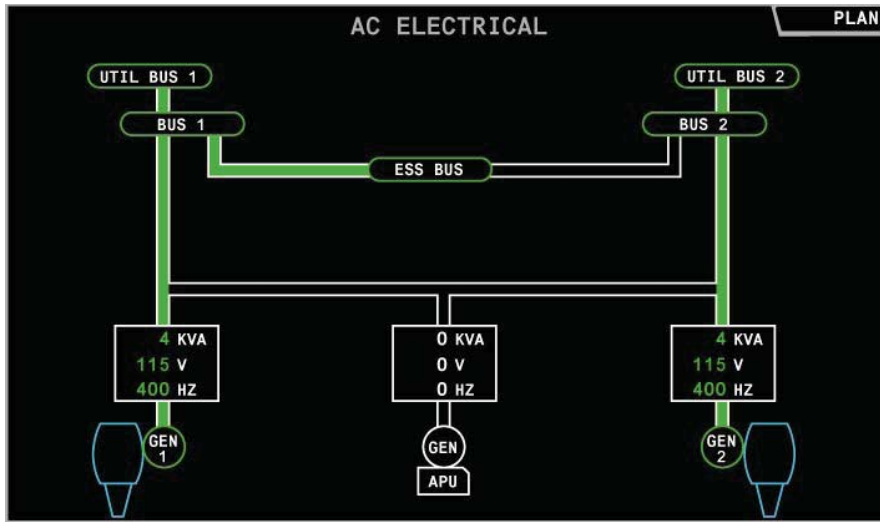
When a synoptic page is being shown, a tab, located in the right corner of the synoptic page, identifies which navigation format is being displayed. Selection of the quick access button for the synoptic page being displayed causes the page to be removed and replaced with the previously selected format (as identified by the tab).

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Synoptic Page Selection (1 of 3)
 Figure 03-10-11

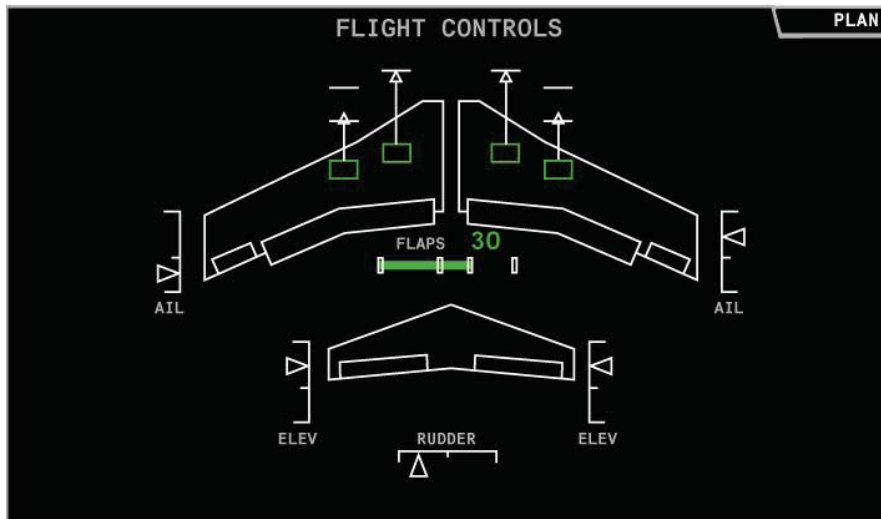
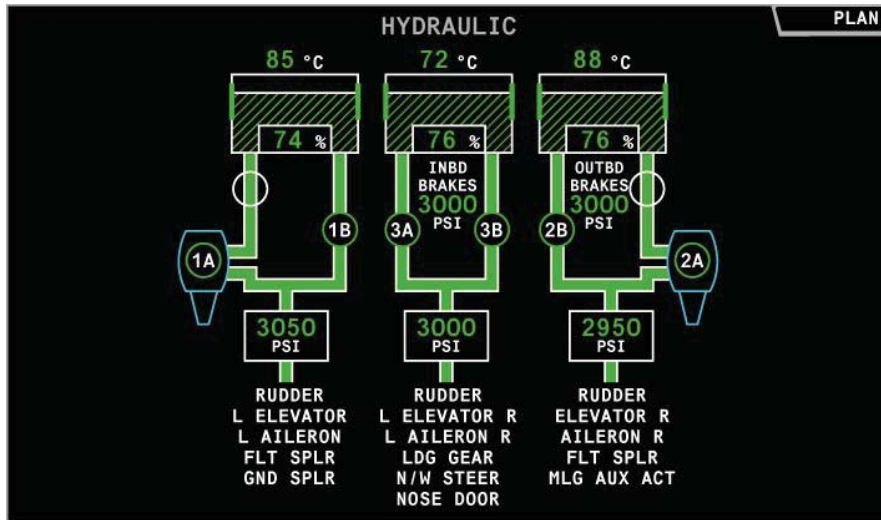
ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



605_03_012

Synoptic Pages (2 of 3)
Figure 03-10-12

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Synoptic Pages (3 of 3)
Figure 03-10-13

EICAS SUMMARY Page

The EICAS SUMMARY page is selectable by the SUMRY button on the CCP. The SUMMARY page is presented as an overlay on the lower window of the MFD. If required, the SUMMARY page can also be shown on the upper window of the MFD not currently configured to show the EICAS page. This function can be selected from the upper window menu when enabled.

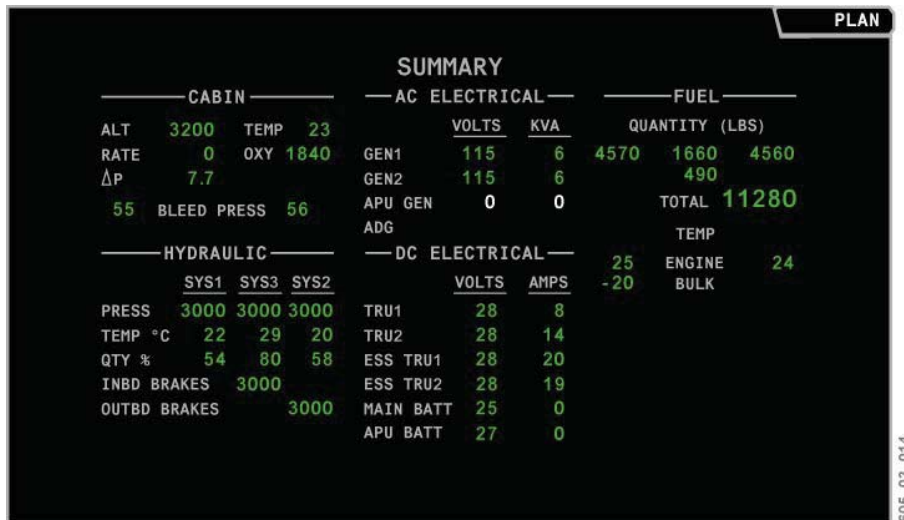
The SUMMARY page can also be presented on the lower part of the PFD when the display is configured to a compressed format.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

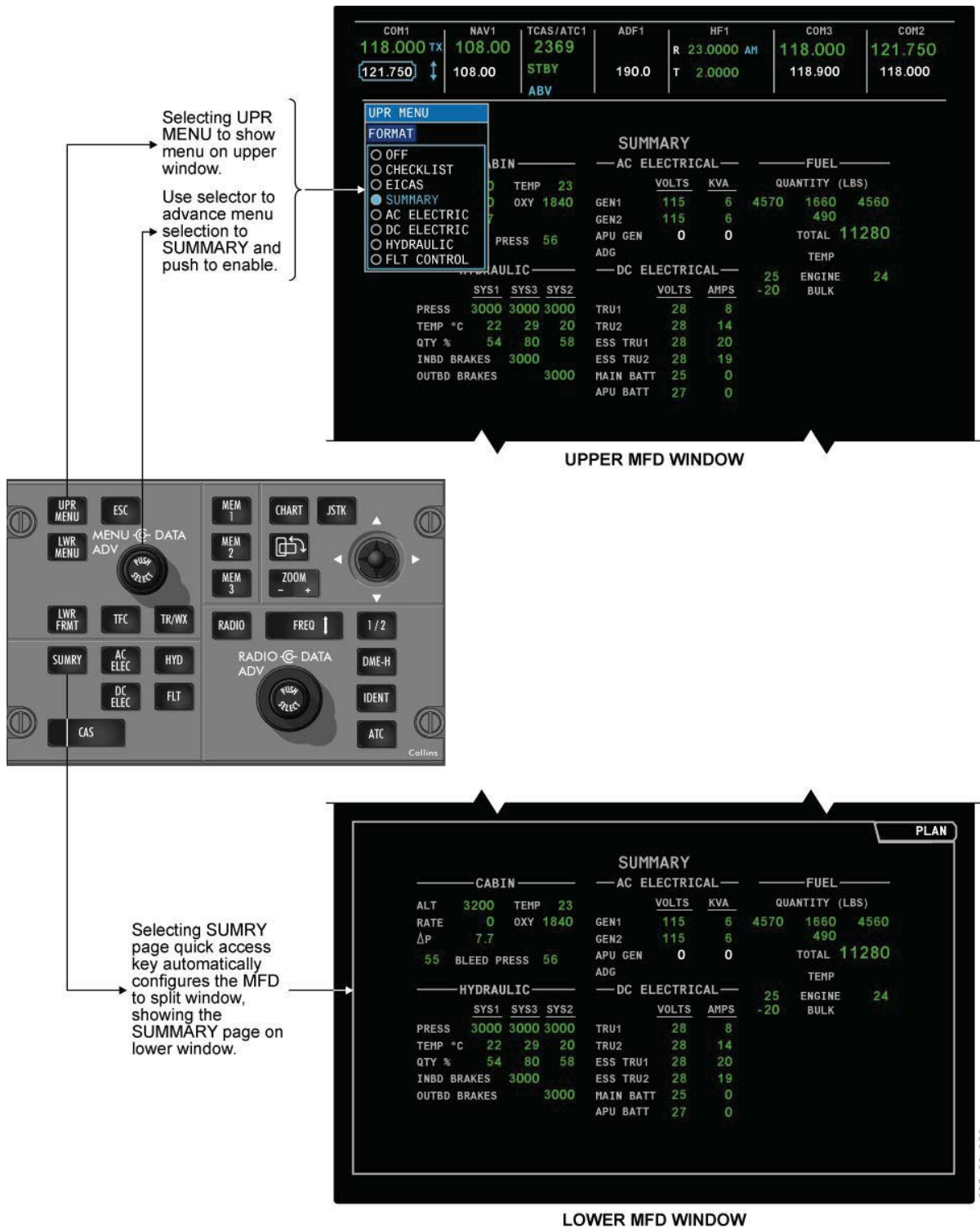
The SUMMARY page collects key information, normally displayed on the synoptic pages, and displays it as digital readouts under 5 titled columns as follows:

- CABIN – includes data on cabin altitude, rate, delta-pressure, temperature, crew oxygen bottle pressure, bleed pressure;
- HYDRAULIC – includes pressure, temperature and reservoir quantity for all three systems, as well as inboard and outboard brake pressures;
- AC ELECTRICAL – includes voltage and load for all aircraft generators;
- DC ELECTRICAL – includes voltage and load for all transformer rectifier units; and
- FUEL – includes individual and total tank quantity, bulk and engine fuel temperatures.



SUMMARY Page Layout (1 of 2)
Figure 03-10-14

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Selecting UPR MENU to show menu on upper window.

Use selector to advance menu selection to SUMMARY and push to enable.

Selecting SUMRY page quick access key automatically configures the MFD to split window, showing the SUMMARY page on lower window.

SUMMARY Page Layout (2 of 2)
Figure 03-10-15

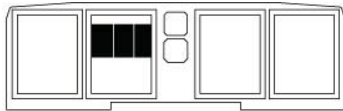
ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Crew Alerting System

The crew alerting system (CAS) is used to alert the crew of a malfunction or an operational change to a system. This is done by visual and aural cues. Crew alerting messages are grouped into four categories:

- Warning messages;
- Caution messages;
- Advisory messages; and
- Status messages.

Messages are displayed in groups according to their category. They are also prioritized within each group by order of occurrence. The most recent asserted message always appears on the top of the respective category list.



Crew Alerting Messages
Figure 03-10-16

Warning Messages

Warning messages are the most urgent of the four categories, and are used to indicate that immediate crew action is required. They are red in color, and are always displayed at the top of the CAS message list. Warning messages are accompanied by:

- A triple warning chime;
- Flashing warning light, located on the MASTER WARNING/CAUTION switch/lights; and
- Aural alert, tone and/or voice message.

Depending on the message, a corresponding panel switch/light can also be shown in red. Additionally, corresponding indications can also be displayed on the synoptic page or EFIS display.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Pressing either MASTER WARNING/CAUTION switch/light:

- Extinguishes the flashing MASTER WARNING switch/lights;
- Silences the triple warning chime;
- Silences any associated aural alert, tone and voice message (only if the alert audio is cancellable); and
- Resets the CAS system to allow the annunciation of additional warning messages.



Warning Messages
Figure 03-10-17

Caution Messages

Caution messages are second in order of importance, and are used to indicate that crew attention is required. They are shown in amber, and are found directly below any warning messages that may be displayed. Caution messages are accompanied by:

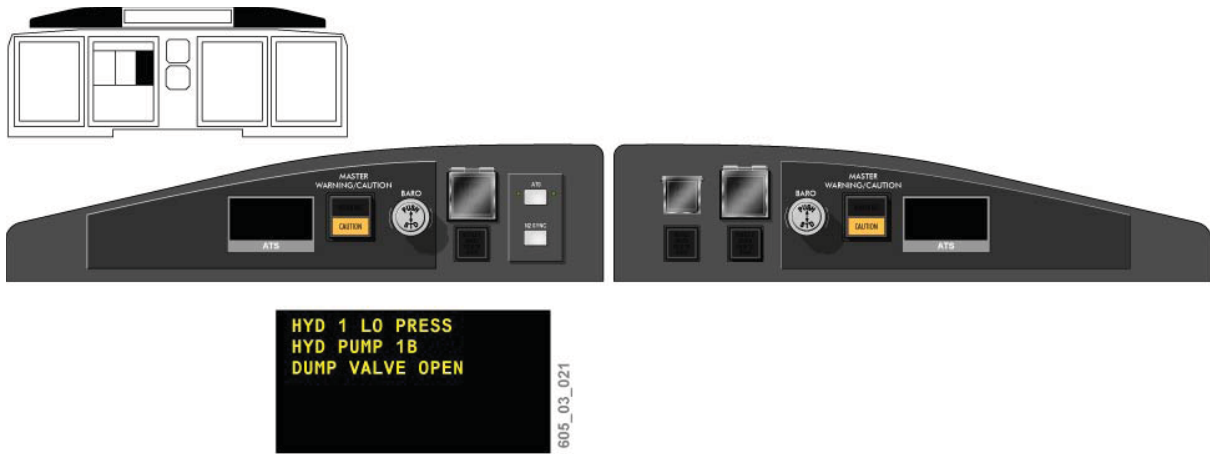
- A single warning chime; and
- Flashing caution light, located on the MASTER WARNING/CAUTION switch/lights.

Depending on the message, a corresponding panel switch/light may also be shown in amber. Additionally, corresponding indications can also be displayed on the synoptic page or EFIS display.

Pressing either MASTER WARNING/CAUTION switch/light:

- Extinguishes the flashing MASTER CAUTION switch/lights;
- Silences the single warning chime; and
- Resets the CAS system to allow the annunciation of additional caution messages.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Caution Messages
Figure 03-10-18

Advisory Messages

Green advisory messages are next in order of priority, and are shown below the caution messages. Advisory messages are used to advise of:

- Aircraft configuration for a particular phase of flight;
- Successful system test;
- Confirmation of shut-off valve (SOV) closure; and/or
- Receipt of SELCAL communications.

Depending on the message, a corresponding panel switch/light may also be shown in green. Additional indications can also be displayed on the EICAS page or related synoptic page.

Status Messages

White status messages appear directly below any advisory messages that may be present. Status messages are used to:

- Provide status of a specific system that has been manually or automatically activated; and/or
- Identify a low-priority system failure.

Depending on the message, a corresponding panel switch/light may also be shown in white. Additional indications can also be displayed on a related synoptic page or EFIS display.

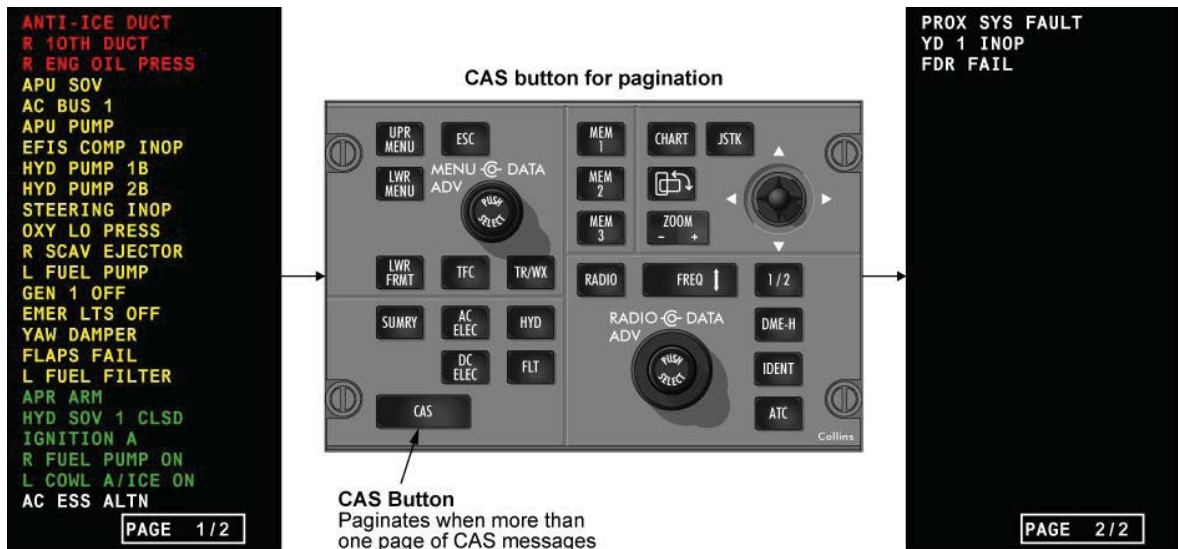
ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Advisory/Status Messages
Figure 03-10-19

CAS Message Pagination

It is possible to have more than one page of CAS messages. The CAS message block includes sufficient space to display 25 messages when the full EICAS page is located on the upper window of the MFD. This is reduced to 11 messages when EICAS is shown in the compressed format. A boxed page number is shown at the bottom of the CAS message list when more than one page of messages exist. The CAS button, located on the cursor control panel, is used to view the next page of messages. Continued selection of the CAS button moves the display forward, or returns the display to the first page of messages.



Crew Alerting Message Pagination
Figure 03-10-20

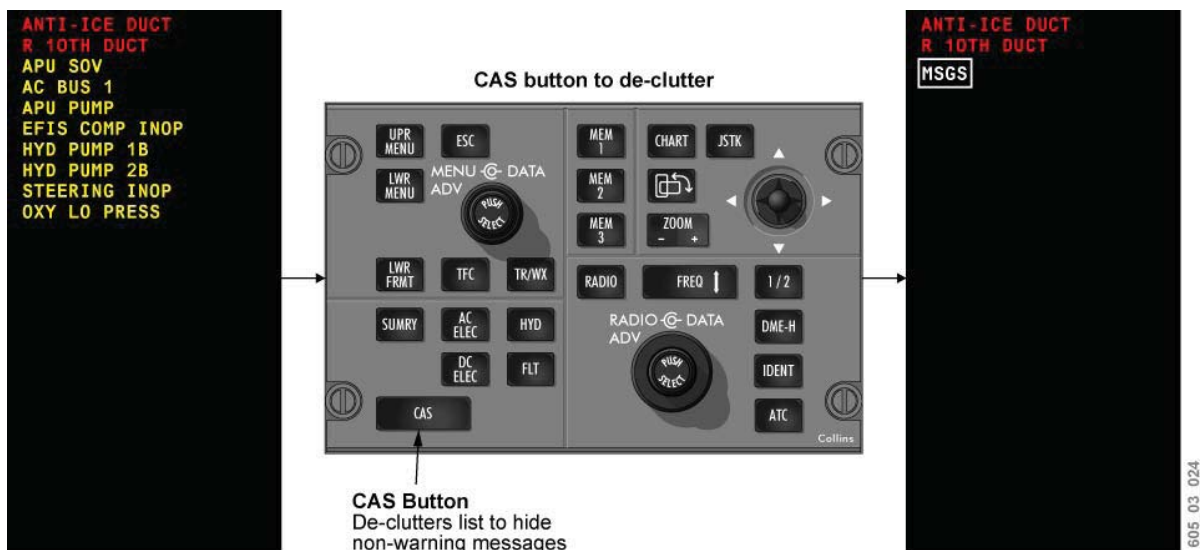
ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

CAS Message De-Clutter

The CAS button can also be used to de-clutter the EICAS message stack, should a large number of messages be shown. When selected, the CAS message stack is removed from view and replaced with a white MSGS icon, indicating that CAS messages are being hidden. Warning messages, however, cannot be hidden and always remain in view.

The CAS message stack can be viewed by reselecting the CAS button. On ground, the de-cluttering function can only be carried out when both engines are running. In the air, the function can be carried out at any time, regardless of engine operation. The decluttering function does not cause any new messages to be hidden. Rather, new messages are displayed on initial occurrence as normal.

Should the CAS function of both DCUs fail, a red X is displayed across the full CAS message block.



Crew Alerting Message De-Clutter
Figure 03-10-21

EICAS Comparator Monitoring

All of the EICAS warning and caution messages and accompanying aural alerts, issued by one DCU, are compared with the results of the other DCU. An EICAS status message of CAS MISCOMP is displayed, should the two DCUs disagree for a particular message or aural alert.

Each DCU continually cross-checks engine data processed by the other DCU. A caution message of EICAS COMP INOP is displayed, should either DCU circuitry lose this ability to cross check engine data.

Takeoff Configuration Warning

Certain warning messages are triggered by the DCUs, should a takeoff be commenced when the aircraft is not in the proper takeoff configuration. The takeoff configuration warning function is armed on the ground when both thrust levers of both engines are advanced above 70% N₁. The takeoff configuration warning condition is accompanied by a voice warning, EICAS takeoff configuration warning message and flashing MASTER WARNING/CAUTION switch/lights.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

The following table defines the conditions for a takeoff configuration warning annunciation. The warning is automatically removed when the configuration error is corrected.

Takeoff Configuration Warnings

CONDITION	VOICE WARNING	EICAS MESSAGE
AUTOPILOT ENGAGED	"CONFIG AUTOPILOT"	CONFIG AP
FLAPS NOT SET FOR TAKEOFF	"CONFIG FLAPS"	CONFIG FLAPS
ALL SPOILERS NOT IN TAKEOFF POSITION	"CONFIG SPOILERS"	CONFIG SPOILERS
HORIZONTAL STAB NOT IN TAKEOFF RANGE	"CONFIG TRIM"	CONFIG STAB
PARKING BRAKE SET	"CONFIG BRAKES"	PARKING BRAKE

Inhibited EICAS Caution Messages

During the takeoff and landing phases of flight, the DCUs inhibit the display of certain EICAS messages that may be distracting to the flight crew. Generally, these are messages that do not require immediate crew action during takeoff and landing.

Message Inhibit – Takeoff

During takeoff, the DCUs inhibit caution messages that are not considered critical. The takeoff phase, for the purpose of caution message inhibiting, occurs when the following conditions are set:

- Aircraft is on the ground;
- Both engines are operating above 79% N_1 ; and
- Aircraft airspeed has transitioned from below 80 knots to above 80 knots.

The DCUs remove the takeoff inhibit conditions, permitting the display of any caution message, when one of the following conditions are set:

- Aircraft has climbed above 400 feet of radio altitude;
- Both engines are operating below 79% N_1 ; or
- 30 seconds since takeoff inhibit conditions were set.

Not all caution messages are inhibited during takeoff. Some messages relate to systems or conditions that may require pilot attention during takeoff. See the following table for a list of caution messages that will not be inhibited.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Caution Messages Remaining Available During Takeoff

System	Message
Power Plant	APR CMD SET
	APR INOP
	L (R) REV UNLOCKED
Fuel	L (R) FUEL LO PRESS
Flight Controls	ELEVATOR SPLIT
	GND SPLRS DEPLOY
Landing Gear	A/SKID INBD (OUTBD)
	INBD (OUTBD) BRAKE PRESS
Instruments	EFIS COMP MON
	L PITOT TUBE HEAT

Message Inhibit – Landing

- During the approach to landing, the DCUs inhibit the display of certain caution messages that are not considered critical. The landing phase, for the purpose of caution message inhibiting, occurs when the following conditions are set:
- Aircraft is in the air;
- Any landing gear is down and locked; and
- Aircraft altitude has transitioned from >200 ft to <200 ft radio altitude.

The DCUs remove the landing inhibit conditions, permitting the display of any caution message, when one of the following conditions are set:

- Radio altitude returns to above 200 feet radio altitude;
- 30 seconds after aircraft has transitioned from air to ground (WOW); or
- 90 seconds since landing inhibit conditions were set.

Not all caution messages are inhibited during landing. Some messages relate to systems or conditions that may require pilot attention during landing. See the following table for a list of EICAS caution messages that will not be inhibited.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Caution Messages Remaining Available During Landing

System	Message
Power Plant	APR INOP
	APR CMD SET
	L (R) REV UNLOCKED
Fuel	L (R) REV UNSAFE
	L (R) FUEL LO PRESS
	FUEL IMBALANCE
Hydraulics	HYD 3 LO PRESS
Flight Controls	ELEVATOR SPLIT
	FLAPS FAIL
	FLT SPLRS
	FLT SPLRS DEPLOY
	GND SPLRS
	GND SPLRS DEPLOY
	GND SPLRS NOT ARMED
	STAB TRIM
Fire Protection	APU BTL LO
	ENG BTL 1 (2) LO
Landing Gear	A/SKID INBD (OUTBD)
	INBD (OUTBD) BRAKE PRESS
	STEERING INOP
	WOW INPUT (OUTPUT)
	PROX SYS
Autopilot	AP PITCH TRIM
	AP TRIM IS LWD (RWD) (ND) (NU)
Instruments	EFIS COMP MON
	L PITOT TUBE HEAT

Aural Alerts

EICAS aural alerts are initiated by the DCU, processed by the audio integrating system, and played through the flight deck speakers. There are two categories of aural alerts: aural tones and voice messages. While two aural tones may be heard simultaneously, two voice messages cannot. Some aural alerts may be silenced by pressing the MASTER WARNING/CAUTION switch/lights. The table that follows identifies the aural alerts produced by the EICAS.

Bombardier Challenger 605 - Aural & Visual Warning System

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

Aural Tones and Alerts

TONE	ASSOCIATED WITH
WARBLER	STALL
FIRE BELL	FIRE WARNING
CLACKER	V _{MO} /M _{MO} , FLAP OVERSPEED
CLACKER "DRUM ROLL"	EXCESSIVE STAB TRIM MOVEMENT
CAVALRY CHARGE	AUTOPILOT DISCONNECT
HORN	ANY GEAR NOT DOWN
C-CHORD	ALTITUDE ALERT
DOUBLE C-CHORD	VERTICAL TRACK ALERT
TRIPLE CHIME (WARNING)	WARNING MESSAGE
SINGLE CHIME (CAUTION)	CAUTION MESSAGE
"VOICE MESSAGE"	EICAS WARNINGS, TAWS

Several aural alerts cannot be silenced by pressing the MASTER WARNING/CAUTION switch/light. They can only be silenced when the related situation is corrected or otherwise acknowledged. These aural alerts include:

- Stall warning;
- Terrain avoidance warnings (TAWS);
- Overspeed;
- Trim clacker;
- Takeoff configuration warnings;
- Autopilot cavalry charge;
- Landing gear horn;
- Altitude alert C-chord;
- Vertical track alert; and
- SELCAL – this aural is sounded twice, then silenced.

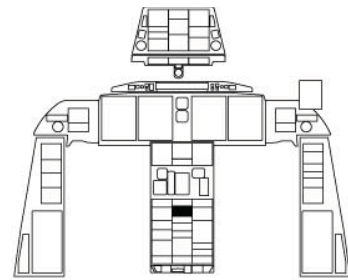
Aural Warning Testing

The AURAL WARN TEST switch, located on the miscellaneous panel, is used to test the audio outputs of the DCUs. The switch is spring-loaded to the neutral position, and must be held in the 1 or 2 position to enable the test to operate. While held in either position, the aural and voice warnings are sounded sequentially.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Miscellaneous Panel
Figure 03-10-22

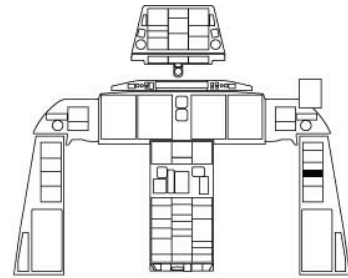


Aural Warning Disable

An aural warning disable panel, located on the copilot's side console, includes two guarded switch/lights, one for each DCU. The switches are used to disable the aural warning function of a DCU should it become inoperative, thereby preventing false aural alerts. The terrain awareness warning system (TAWS) and traffic collision avoidance system (TCAS) aural warnings cannot be disabled by this function.



AUDIO WARNING Panel
Figure 03-10-23



Reversionary Control

Reversionary control includes automatic and manually-operated reversion functions, to ensure that EICAS data continually remains available to the crew.

The automatic reversionary function monitors the operation of the MFD on which the EICAS page is shown. Should this MFD fail, the system automatically reconfigures the opposite MFD to show the EICAS page.

The crew can also manually manage display configuration via the EICAS selector and the L (R) DISPLAYS selectors on the reversionary control panel.

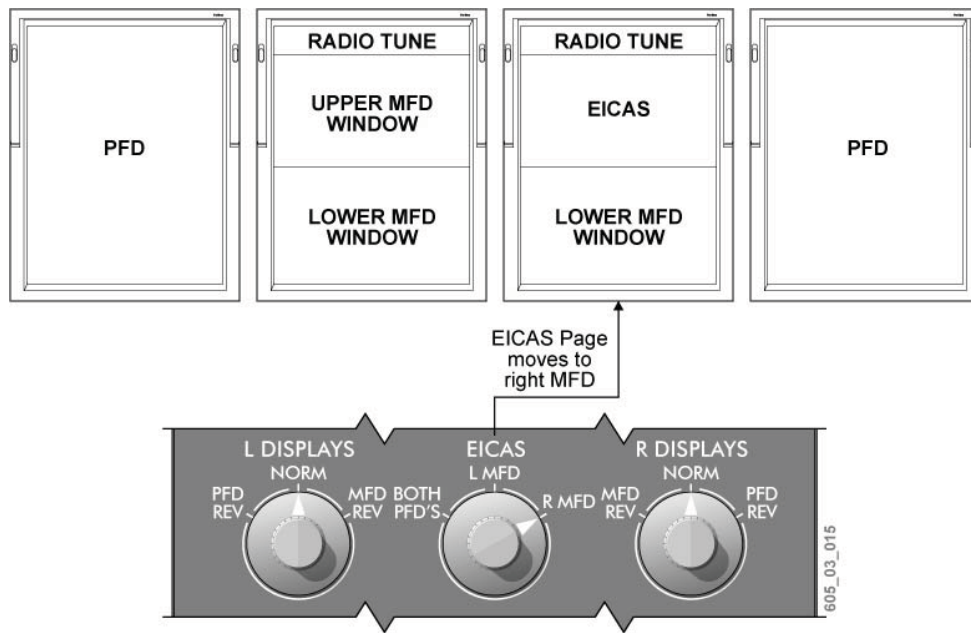
ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

EICAS Selector

The EICAS selector positions are; BOTH PFD's, L MFD and R MFD. The selector is normally in the L MFD position. This locks the left MFD into a split window configuration, placing the EICAS page in the upper window.

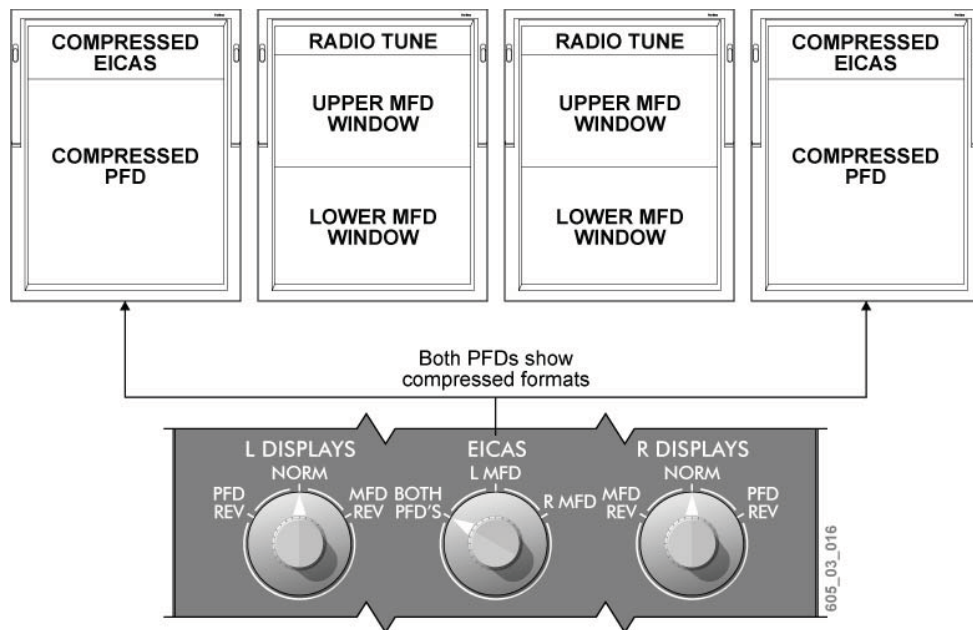
Similarly, if the selector is moved to the R MFD position, the right MFD is locked into a split window configuration, with the EICAS page in the upper window.

Placing the selector to the BOTH PFD's position causes any display, currently configured as a PFD, to include EICAS data. As a result, the display shows flight, navigation and EICAS data in a compressed format.



EICAS Selector moved to Right MFD
Figure 03-10-24

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



EICAS Selector moved to BOTH PFD's
Figure 03-10-25

L (R) DISPLAYS Selector

L DISPLAYS and R DISPLAYS selectors are used to control the basic configuration of the associated PFD and MFD. Selector positions are; NORM, MFD REV and PFD REV. Each selector is typically left in the NORM position, causing the on-side outboard display to operate as a PFD, and the inboard display to operate as an MFD.

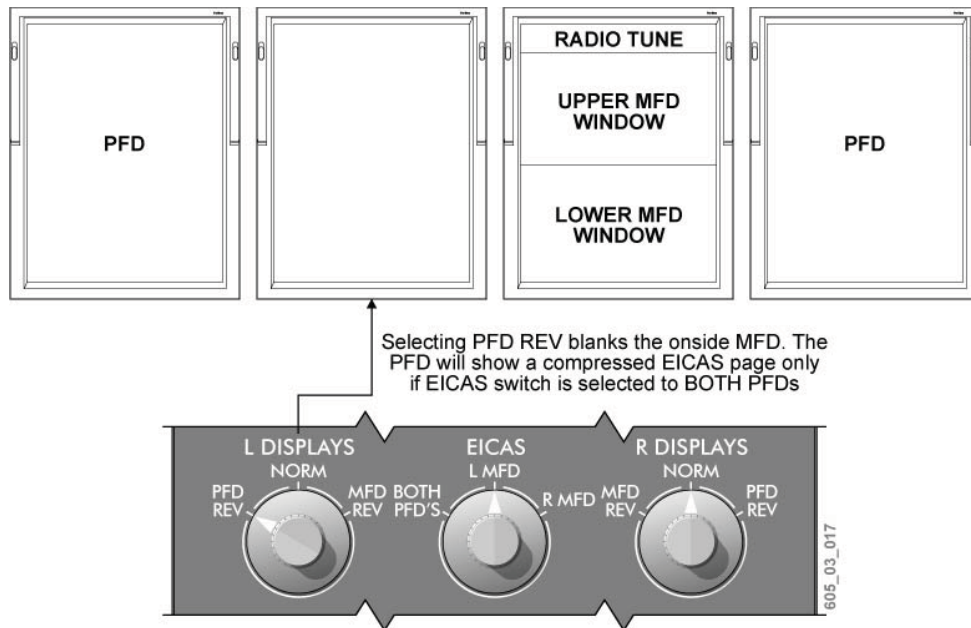
MFD REV and PFD REV positions on each selector are used in the event of a display failure. To better understand the functions of these positions, the selector should be thought of as a pointer, pointing to the functioning display.

For example, should the onside PFD fail, the selector would be moved to the MFD REV position, pointing to the functional display. Likewise, should the onside MFD fail, the selector would be moved to the PFD REV position, again pointing to the functional display.

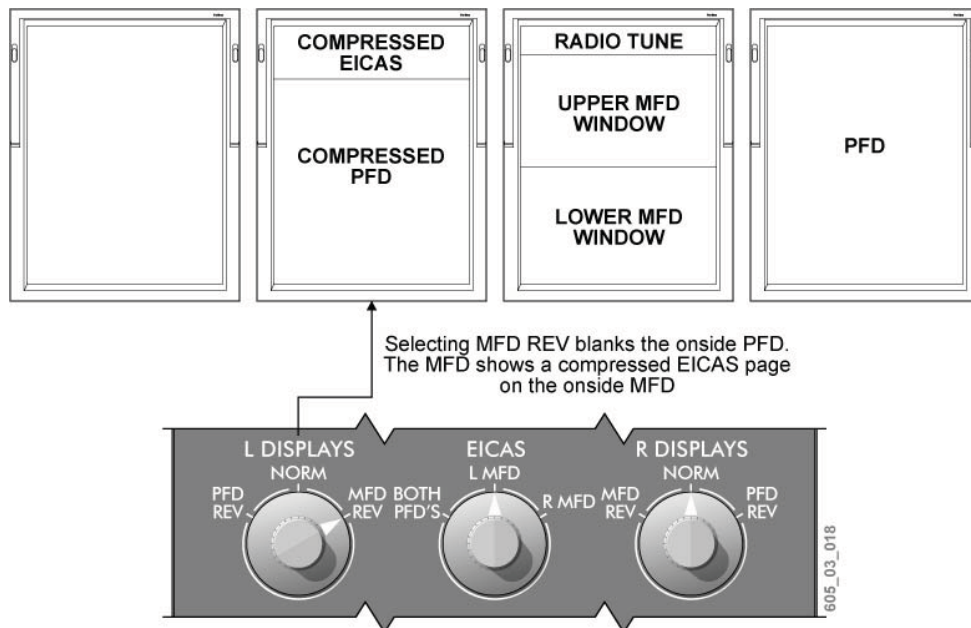
What will be shown on the display following a reversionary selection is dependant on where the EICAS page is being presented. If the EICAS is being shown on the onside MFD, moving the DISPLAYS selector to the MFD REV position will cause the display to revert to the compressed configuration, showing PFD and EICAS data on the same display. If the MFD REV position is selected for the display not showing EICAS, the MFD display will not be affected.

Similarly, if the PFD REV is selected when EICAS is shown on the onside MFD, the PFD will show a compressed configuration. If the PFD REV position is selected when the EICAS is shown on the opposite MFD, the PFD display will not be affected.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



Displays Selector – PFD REV Selected
Figure 03-10-26



Displays Selector – MFD REV Selected
Figure 03-10-27

Maintenance Diagnostic Computer

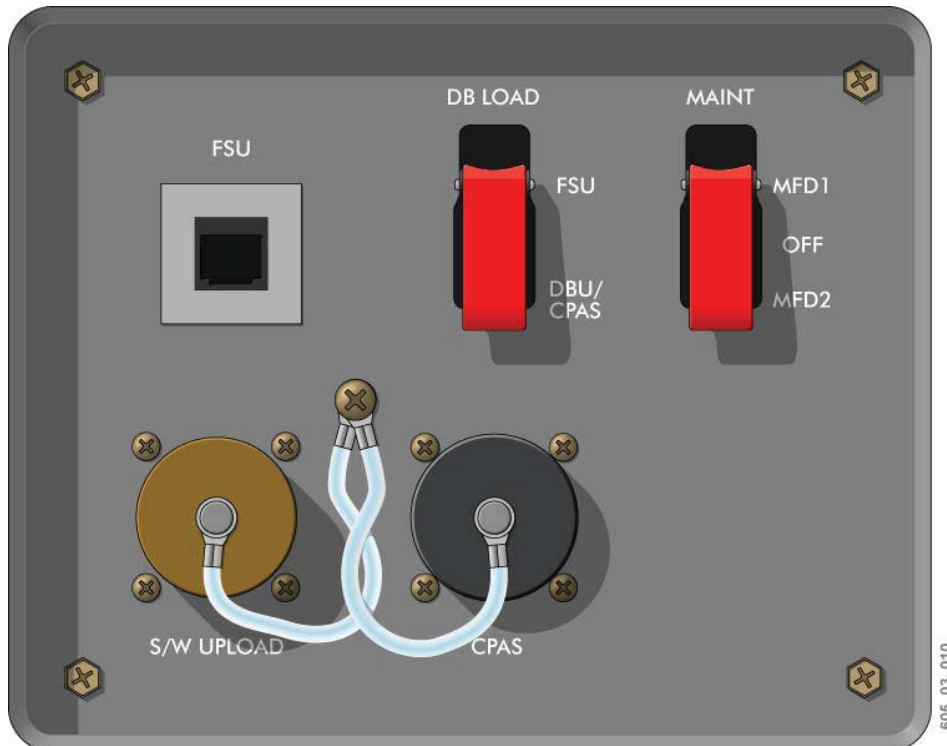
The maintenance diagnostic computer (MDC) is used to record avionics and system diagnostic data. The computer also records exceedances for several engine parameters, including N_1 , N_2 , ITT, oil temperature, oil pressure and engine vibration.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)

The MDC continuously records fault and engine trend monitoring data. This data may be viewed by maintenance personnel on one of the multifunction displays. It may also be downloaded to a maintenance facility computer for analysis.

An exceedance event occurs when a parameter exceeds a specified threshold level. Maintenance personnel can retrieve the information for use in engine trend analysis, significant event recording, and for avionics/aircraft system failure detection.

The MDC page menu is available on the flight deck by selection of a red guarded switch on circuit breaker panel number one (CBP 1). Data can be displayed on MFD 1 or MFD 2, as determined by switch selection. Instructions on MDC data presentation are displayed on the selected MFD.



Maintenance Diagnostic Computer Switch
Figure 03-10-28

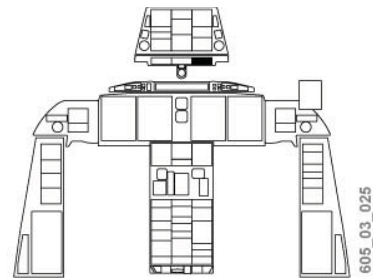
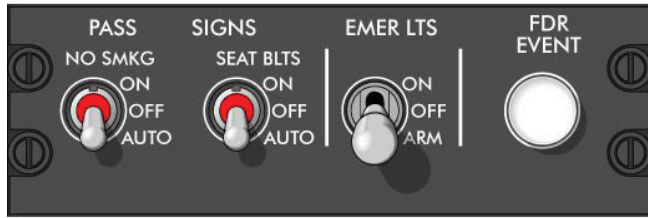
Flight Data Recorder

The flight data recorder (FDR), located in the aft equipment bay, records aircraft flight parameters. The FDR system includes a digital FDR, an underwater locator device (ULD) and a triaxial accelerometer (see Chapter 8, Emergency Equipment).

The FDR records the last 25 hours of flight data in a solid-state memory. The FDR is specially constructed to survive the shock of an aircraft crash. It is automatically turned on when the right engine start switch is pushed.

When the FDR EVENT switch, located on the PASS SIGNS and EMER LTS panel, is pushed, the DCUs place a marker into the FDR memory for quick data retrieval of the recorded event. A green advisory message FDR EVENT is then displayed on EICAS.

ENGINE INDICATION AND CREW ALERTING SYSTEM (CONT'D)



FDR EVENT Switch
Figure 03-10-29

EICAS MESSAGES

The table that follows shows the EICAS messages related to this chapter:

MESSAGE	MEANING
EICAS COMP INOP	EICAS comparator inoperative (N ₁ , N ₂ or ITT data comparison not active).
FDR EVENT	FDR EVENT marker switch pushed and FDR installed.
CAS MISCAMP	Valid XTALK labels from another DCU are available, and a miscompare for any warning, caution, or aural messages exists for more than 20 seconds.
DCU 1 (2) AURAL INOP	DCU 1 (2) aural warning card fault/fault detection, or DCU 1 (2) AUDIO WARNING DISABLE switch/light input open.
DCU 1 (2) INOP	DCU 1 (2) fault detected.
FDR FAIL	Indicates flight data recorder failure.

Bombardier Challenger 605 - Aural & Visual Warning System

POWER SUPPLY AND CIRCUIT BREAKER SUMMARY

SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
EICAS	Lamp Driver Units	EICAS L LDU	DC BUS 1	1	H5	
		EICAS R LDU	DC BATT	2	Q3	
	DCU 1	EICAS DCU 1 (CH-A, CH-B)	DC ESS	4	C12-13	
		EICAS DCU 1 (CH-A, CH-B)	DC BATT	2	Q9-10	
	DCU 2	EICAS DCU 2 (CH-A, CH-B)	BATT DIRECT BUS	6	B2	
	Master Warning/Caution	PBA PWR 1	DC BATT	2	Q6	
		PBA PWR 1	DC BUS 1	1	H6	
		PBA PWR 2	DC BATT	2	Q7	
		PBA PWR 2	DC BUS 1	1	H7	
	Flight Data Recorder	Flight Data Recorder/Remote Data Concentrator	FDR CONT/RCD	DC BATT	1	Q3
Flight Data Recorder		FDR PWR	AC ESS	3	C3	
Crew Force System		CREW FORCE SYS	DC BUS 1	1	F9	Post SB 605-31-001