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		4	15 October 2019
		5	11 April 2019
		6	15 October 2019
		7	15 October 2019
		8	15 October 2019
		9	11 April 2019
		10	11 April 2019
		11	11 April 2019
		12	11 April 2019
		13	11 April 2019
		14	11 April 2019
		15	11 April 2019
		16	11 April 2019
		17	11 April 2019
		18	11 April 2019
		19	11 April 2019
		20	11 April 2019
		21	11 April 2019
		22	11 April 2019
		23	11 April 2019
		24	07 October 2019
02.	PRECISION RNAV (P-RNAV) IMPLEMENTATION	25	11 April 2019
03.	STABILIZER TRIM INOPERATIVE/MALFUNCTION	26	11 April 2019
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06.	**CPDLC IMPLEMENTATION**	**30**	**23 January 2021**
		31	**23 January 2021**
		32	**23 January 2021**
		33	**23 January 2021**
		34	**23 January 2021**
		35	**23 January 2021**
		36	**23 January 2021**
		37	**23 January 2021**
		38	**23 January 2021**

01. ACARS/DATALINK IMPLEMENTATION

The ACARS/DATALINK system is a digital communication system integrated into the existing VHF radio system that provides for the transmission of digital data to and from aircraft.
These messages, referred to as uplinks and downlinks, facilitate two-way communication for applications such as digital ATIS, weather reports, delay reports, and free text messaging with airline Dispatch and Maintenance.

1. Introduction
The implementation consists of the installation of the following elements:

- Communications Management Unit CMU-900;
- Aircraft Personality Module APM-900;
- VDL Mode2 control panel;
- ACARS annunciation light at the overhead panel.

Digital communication is accomplished via the existing Multifunction Control and Display Units (MCDUs) and the CMU-900 ACARS/VDL Mode2 units and provides Aeronautical Telecommunication Network (ATN).
The CMU-900 system typically includes four software applications: The Airline Operational Control (AOC), Air Traffic Services (ATS), the Technical applications and CPDLC.

Message traffic is routed through the VDL Mode2 while the aircraft is in range of an available VHF ACARS station. The system is designed to provide ACARS communication functions via the VDL Mode2 where VHF coverage is available.
The data link system is intended for the following data link services:
- Datalink Automatic Terminal Information Services (D-ATIS) enabling the request and delivery of ATIS via datalink).

At present, the ACARS functions available for crews are a part of the AOC application:
- ACARS WEATHER REQUEST;
- ACARS AOC DEPARTURE REQUEST;
- FREE TEXT for messages to the appropriate recipient through the ACARS REPORTS pages.

2. List of acronyms

ACARS: Aircraft Communication Addressing and Reporting System

AOC: Airline Operational Control

APM: Aircraft Personality Module

ATIS: Automatic Terminal Information Services

ATN: Aeronautical Telecommunication Network

CMU: Communications Management Unit

CPDLC: Controller-Pilot Data Link Communications

D-ATIS: Data link Automatic Terminal Information Services

ERT: Estimated ramp time

ETD: Estimated time of departure

ETE: Estimated flight time Enroute

FOB: Current fuel on board

VDL: VHF Data Link

3. Controls and Indicators
ACARS MESSAGE CONTROL PANEL (on overhead panel):

1: “ACARS” Light/Push to Reset annunciator/pushbutton.
- Illuminated - indicates an incoming ACARS/CPDLC message in association with an aural warning “chime”;
- Push produces the reset of ACARS light.

4. Manual Data Entry
Entry of external data into ACARS data fields is accomplished by:
- Keying in alpha, numeric, or other required characters from the MCDU keypad. As data is keyed, it will appear in the scratchpad at the bottom of the display;
- Pushing the line select key adjacent to the field into which data is to be entered.

- Entry fields “boxes” ☐ indicate entry is required before the intended function for the page(s) is considered complete. On most pages these fields are required for the activation of the SEND select; “brackets” [ ] indicate entry is optional.
Selection of prefilled data (select list) is accomplished by toggling or scrolling through available options by repeatedly pressing the associated line select key.

When an asterisk ***** appears next to a line select key, it indicates a function (i.e. when the line is pushed an action is performed by the system or a report downlinked).

Menu line select keys are faded out if the menu/function is not accessible.

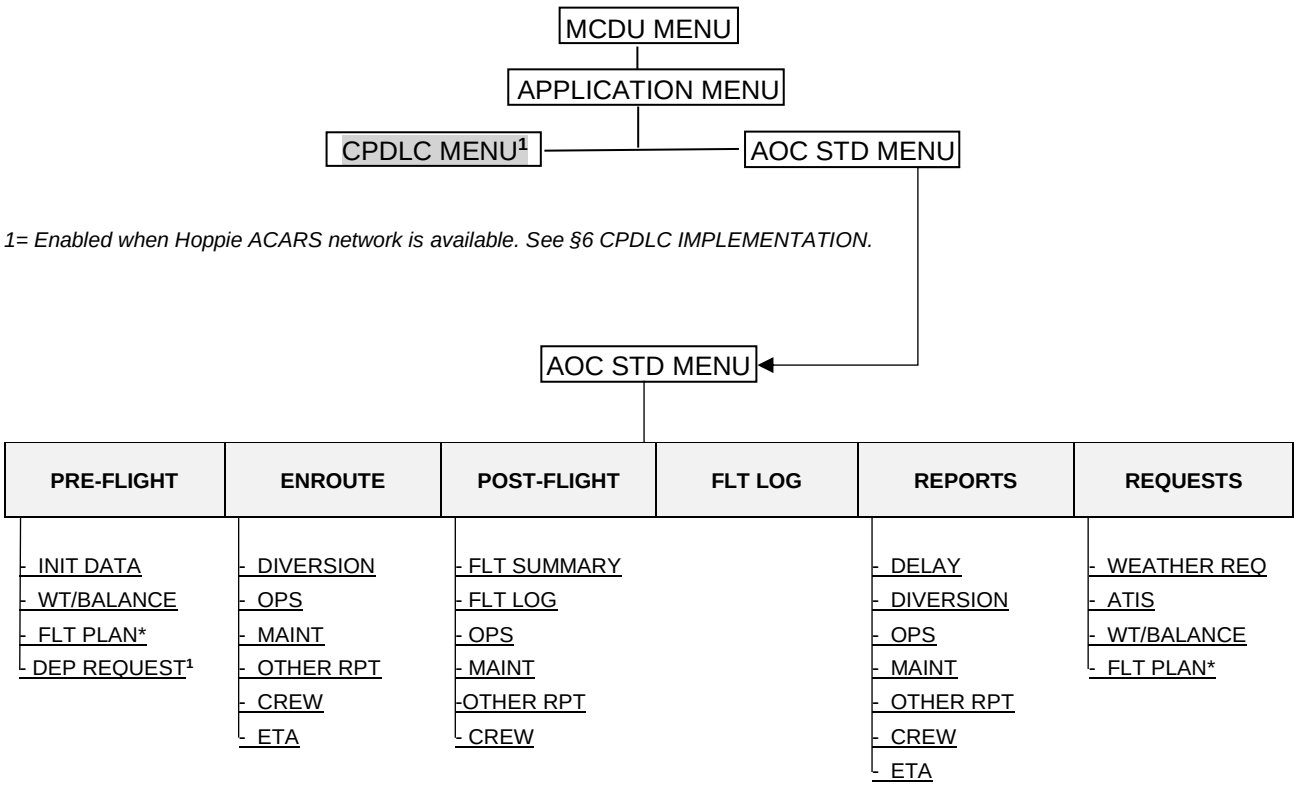
5. System description

ADVISORIES

ACARS is often used to alert the crew to specific events or conditions in the cockpit. It is also used to report any delay or divergence from the expected events in a flight leg. For these purposes, active and inactive advisories are displayed by the DLM/CMU-900 on all display pages. Active advisories alert the crew that a condition requires attention or that a function is available. Active advisories are displayed in the lower right-hand corner of the display, adjacent to Line Select 6R. When selected on the display (by pressing Line Select Key 6R), active advisories cause a specific function to be performed.

Inactive advisories are informational in nature, and there is no action required of the crew. Inactive advisories are displayed in the lower center of the display. They are listed in order of priority, from high to low. When more than one active or inactive advisory is activated simultaneously, only the highest priority active and inactive advisory is displayed. When the highest priority advisory is cleared, the next highest priority advisory is displayed. This continues until all advisories are cleared.

MENU TREE



1= Enabled when Hoppie ACARS network is available. See §6 CPDLC IMPLEMENTATION.

1= Enabled when Hoppie ACARS network is available. See §6 CPDLC IMPLEMENTATION.

6. System Operation

- select the "**MENU**" button to access the MCDU MENU.
- select the "**<ACARS**" line select key.

- select the "**AOC STD>**" line select key.

The **AOC MENU** page is the initial AOC application page. It provides six page selects.

CONTINUED

PRE-FLIGHT MENU PAGE

The "**<PREFLIGHT**" line select key is accessible when on the ground.
The **PRE-FLIGHT** menu page provides three page selects.

CONTINUED

INIT DATA MENU PAGE

- select the "**<INIT DATA**" line select key.

The **INIT DATA** page allows the operator to enter/review flight initialization information and/or downlink an INIT REQ* message.

- **FLT NUM** Flight number. Format: 1 - 4 alpha-numeric characters (flight number only, IATA flight code is optional AIRLINE ID field).
- **SCHED DATE** Flight schedule. Departure date. Format: 1 - 2 numeric characters from 1 to 31, left zero-filled.
- **ORIG STA** Flight departure (origination) station. Format: 3 - 4 alpha characters.

Default: Displays DEP STA (flight departure station) as received from broadcast bus, if available.

- **DES STA** Flight destination station. Format: 3 - 4 alpha characters. Default: displays DES STA as received from broadcast, if available.
- **ETD** Estimated time of departure. Format: hhmm (time: hour, minute).
- **ETE** Estimated flight time Enroute Format: hhmm (time: hour, minute).
- **AIRLINE ID** Airline identifier. Format: 2 alpha-numeric characters (IATA operator code).
- **ATS FLT ID** ATS flight identifier. Format: 2 - 7 alpha-numeric characters.
- **INIT REQ*** Selection queues an Automatic Initialization Request message for uplink INIT DATA and populate all mandatory fields.
- ***CLEAR** Select available only when INIT DATA page completed. Selection clears all INIT DATA fields to default empty state allowsing a new INIT REQ*.

The resources of information are available for some fields. Manually entered information has the highest priority, and broadcast information has the lowest priority. Selecting the INIT REQ* key results in downlinking the Automatic Initialization Request Message. If information has been manually entered into any of these fields, the data in succeeding Automatic Initialization Uplink Messages will not be used.

Preflight workflow:

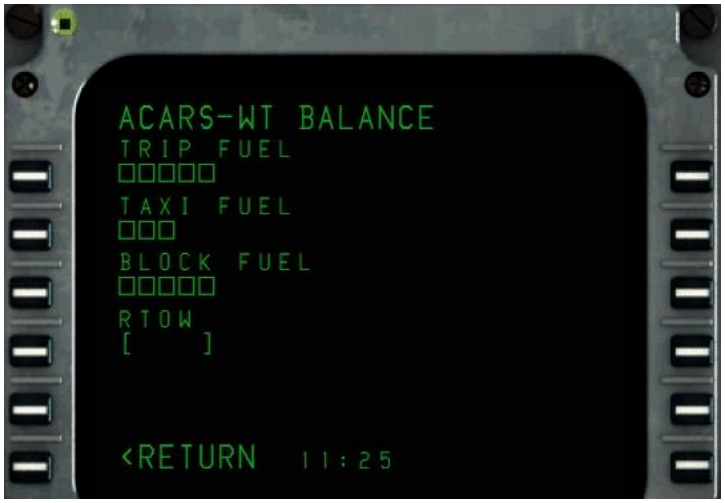
1) INIT-DATA PAGE: send INIT REQ*;
2) Receive PRELIMINAY WT/BALANCE uplink;
3) WT/BALANCE PAGE: send WT BALANCE FUEL docket;
4) Receive FINAL LOADSHEET uplink before departure.

CONTINUED

WT/BALANCE MENU PAGE

- select the "**WT/BALANCE>**" line select key.

The **WT/BALANCE** page allows the operator to enter/review fuel data to receive the FINAL loadsheet uplink before departure.



- **TRIP FUEL** Trip fuel. Format: nnnnn (kgs or lbs) (1 - 5 numeric characters).
- **TAXI FUEL** Taxi fuel. Format: nnn (kgs or lbs) (1 - 3 numeric characters).
- **BLOCK FUEL** Block fuel. Format: nnnnn (kgs or lbs) (1 - 5 numeric characters).
- **RTOW** Regulated Take Off Weight used for underload calculation. Format: nnnnn (kgs or lbs) (1 - 5 numeric character).

FTL PLAN* FUNCTION

- select the "**FTL PLAN***" line select key.

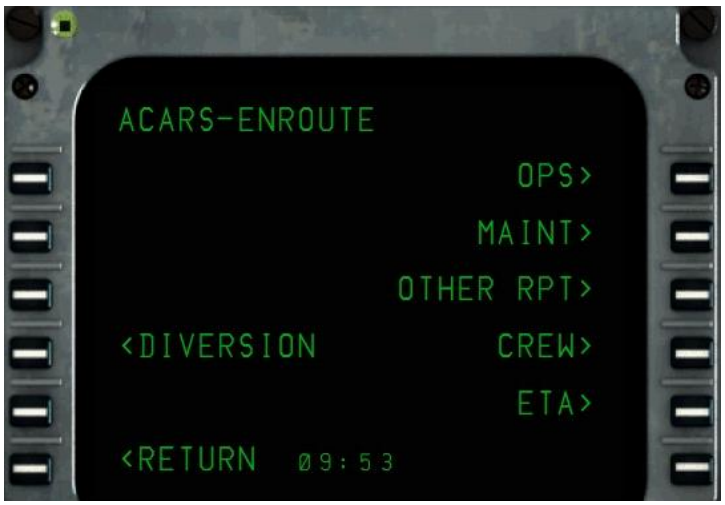
The **FTL PLAN*** function allows the operator to receive the OFP uplink.

The **FTL PLAN*** doesn't allows route uplink directly in AFMC system: manually insert or COROUTE load is required in FMGC system.

ENROUTE MENU PAGE

The "**<ENROUTE**" line selection key is accessible when airborne.

The **ENROUTE** menu page provides six page selects.



DIVERSION PAGE

- select the "**<DIVERSION**" line select key.

The **DIVERSION** page allows the operator to enter/review diversion information and downlink a Diversion Report.

- **ETA** Estimated arrival time. Format: hhmm (time: hour, minute). Manual entry only.
- **DIVERTING TO** Flight diversion station. Format: 3 - 4 alpha characters.
- **FOB** Current fuel on board. Format: nnn[.]n, (tons or lbs) (1 - 4 numeric characters, decimal is optional).
- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

OPS PAGE

- select the "**OPS>**" line select key.

The **OPS** page allows the operator to enter/review operational information and downlink an Operational Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

MAINT PAGE

- select the **"MAINT>"** line select key.

The **MAINT** page allows the operator to enter/review maintenance information and downlink a Maintenance Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

OTHER RPT PAGE

- select the **"OTHER RPT>"** line select key.

The **OTHER RPT** page allows the operator to enter/review other report information and downlink an Other Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

CREW PAGE

- select the **"CREW>"** line select key.

The **CREW** page allows the operator to enter/review crew information and downlink a Crew Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

ETA PAGE

- select the **"ETA>"** line select key.

The **ETA** page allows the operator to enter/review ETA information and downlink an ETA Report.

- **ETA** Estimated time of arrival. Format: hhmm (time: hours, minutes). Shows shared ETA parameter.
- **FOB** Current fuel on board. Format: nnn[.]n (tons or lbs) (1 - 4 numeric characters, decimal is optional).
- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

POST-FLIGHT MENU PAGE

The "**<POST-FLIGHT**" line select key is accessible when on the ground.
The **POST-FLIGHT** menu page provides six page selects.

FLT SUMMARY MENU PAGE

- select the "**<FLT SUMMARY**" line select key.

The **FLT SUMMARY** page allows the operator to enter/review flight summary information and/or downlink a Flight Summary Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

CONTINUED

FLT LOG MENU PAGE

- select the "**<FLT LOG**" line select key.

The **FLT LOG CURR** page allows the operator to enter/review current OOOI flight log.

Automatic time entry only, provided **INIT DATA** page has been completed.

- **TIME OUT** (Off Blocks) Parking brake released and GS > 3 Kts.
- **TIME OFF** (Off Ground) Take off.
- **TIME ON** (On Ground) Landing.
- **TIME IN** (On Blocks) Parking brake applied and engines off.
- **FUEL** manual fuel entry at TIME OUT/OFF/ON/IN. Format: nnn[.]n, (tons or lbs) (1 - 4 numeric characters, decimal is optional).

The **FLT LOG HIST** page accessible via **PREV PAGE** - **NEXT PAGE** function keys allows the operator to review latest 8 recorded OOOI logs.

OPS PAGE

- select the "**OPS>**" line select key.

The **OPS** page allows the operator to enter/review operational information and downlink an Operational Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

MAINT PAGE

- select the **"MAINT>"** line select key.

The **MAINT** page allows the operator to enter/review maintenance information and downlink a Maintenance Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

OTHER RPT PAGE

- select the **"OTHER RPT>"** line select key.

The **OTHER RPT** page allows the operator to enter/review other report information and downlink an Other Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

CREW PAGE

- select the **"CREW>"** line select key.

The **CREW** page allows the operator to enter/review crew information and downlink a Crew Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

FLT LOG MENU PAGE

- select the "**FLT LOG>**" line select key.

The **FLT LOG CURR** page allows the operator to enter/review current OOOI flight log.

Automatic time entry only, provided **INIT DATA** page has been completed.

- **TIME OUT** (Off Blocks) Parking brake released and GS > 3 Kts.
- **TIME OFF** (Off Ground) Take off.
- **TIME ON** (On Ground) Landing.
- **TIME IN** (On Blocks) Parking brake applied and engines off.
- **FUEL** manual fuel entry at TIME OUT/OFF/ON/IN. Format: nnn[.]n, (tons or lbs) (1 - 4 numeric characters, decimal is optional).

The **FLT LOG HIST** page accessible via **PREV PAGE** - **NEXT PAGE** function keys allows the operator to review latest 8 recorded OOOI logs.

REPORTS MENU PAGE

The **REPORTS** menu page provides seven page selects. This page is accessible from the **ENROUTE** or **AOC** MENU page.

DEPART DELAY PAGE

- select the "**<DELAY**" line select key.

The **DEPART DELAY** page allows the operator to enter/review departure delay information and downlink a Departure Delay Report.

- **ETD** Estimated departure time. Format: hhmm (time: hour, minute). Manual entry only.
- **EST TIME OFF** Estimated takeoff time. Format: hhmm (time: hour, minute). Shows ETO calculated as OUT time plus 20 minutes.
- **FOB** Current fuel on board. Format: nnn[.]n, (tons or lbs) (1 - 4 numeric characters, decimal is optional).
- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND** When ETD has been entered, SEND is displayed. Selection will disable the DEP DL Advisory and clears INITDATA - ETD, fills the system ETO parameter, clears the ETD, EST TIME OFF, and FOB manual entry, and queues a Departure Delay Report for downlinking.

DIVERSION PAGE

- select the "**<DIVERSION**" line select key.

The **DIVERSION** page allows the operator to enter/review diversion information and downlink a Diversion Report.

- **ETA** Estimated arrival time. Format: hhmm (time: hour, minute). Manual entry only.
- **DIVERTING TO** Flight diversion station. Format: 3 - 4 alpha characters.
- **FOB** Current fuel on board. Format: nnn[.]n, (tons or lbs) (1 - 4 numeric characters, decimal is optional).
- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

OPS PAGE

- select the "**OPS>**" line select key.

The **OPS** page allows the operator to enter/review operational information and downlink an Operational Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

MAINT PAGE

- select the **"MAINT>"** line select key.

The **MAINT** page allows the operator to enter/review maintenance information and downlink a Maintenance Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

OTHER RPT PAGE

- select the **"OTHER RPT>"** line select key.

The **OTHER RPT** page allows the operator to enter/review other report information and downlink an Other Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

CREW PAGE

- select the **"CREW>"** line select key.

The **CREW** page allows the operator to enter/review crew information and downlink a Crew Report.

- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

ETA PAGE

- select the **"ETA>"** line select key.

The **ETA** page allows the operator to enter/review ETA information and downlink an ETA Report.

- **ETA** Estimated time of arrival. Format: hhmm (time: hours, minutes). Shows shared ETA parameter.
- **FOB** Current fuel on board. Format: nnn[.]n (tons or lbs) (1 - 4 numeric characters, decimal is optional).
- **EDIT** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Select available when free text is present. Selection clears all free text.
- **SEND*** Select is available when at least one line of free text has been entered. Selection queues message for downlinking.

REQUESTS MENU PAGE

- select the **"REQUESTS>"** line select key.
The **REQUESTS** page provides three page selects and one function call.

WEATHER REQ PAGE

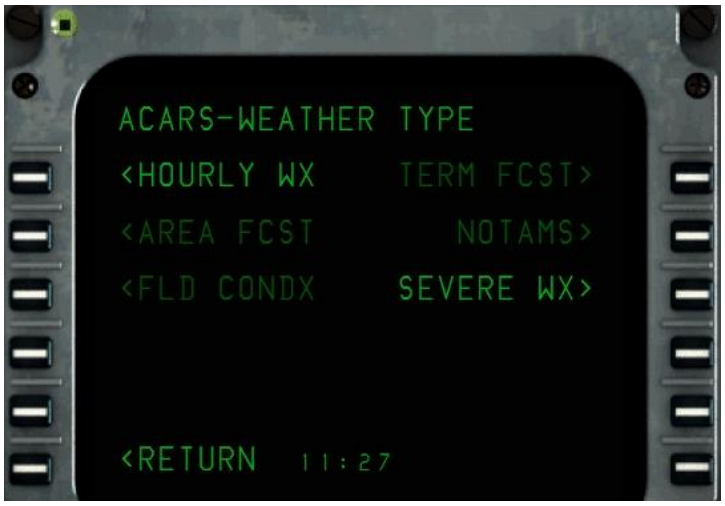
- select the **"<WEATHER REQ"** line select key.
The **WEATHER REQ** page allows the operator to enter/review weather information and downlink a Weather Request message. This page is not cleared after sending, allowing the operator to check the chosen weather periodically without having to reenter the desired stations.

- **HOURLY WX** The text displayed above **WEATHER TYPE** is the weather type selected from the **WEATHER TYPE** page.
- **WEATHER TYPE** Selection displays the **WEATHER TYPE** page. Hourly weather is automatically loaded at the beginning of a flight leg.
- **STA 1** First requested station. Format: 3 - 4 alpha characters.
- **STA 2** Second requested station. Format: 3 - 4 alpha characters.
- **STA 3** Third requested station. Format: 3 - 4 alpha characters.
- **SEND*** If STA 1 has been entered, then SEND is displayed and selection queues message for downlinking.

WEATHER REQ PAGE

- select the **"<WEATHER TYPE"** line select key:

The **WEATHER TYPE** page allows the operator to select the type of weather used on the WEATHER REQ page. This page is accessible from the WEATHER REQ page. Selection of any item on this page displays the WEATHER REQ page with the chosen weather shown above the WEATHER TYPE field.



NOTE

The only active selection at present are HOURLY WX and SEVERE WX.

- **HOURLY WX** Selection displays the WEATHER REQ page with HOURLY WX shown in the TYPE field.
- **SEVERE WX** Selection displays the WEATHER REQ page with SEVERE WX shown in the TYPE field.

❖ *Active Sky 3rd party software required.*

ATIS REQ PAGE

- select the **"<ATIS REQ"** line select key.

The **ATIS REQ** page allows the operator to enter/review weather information and downlink an ATIS Request message.

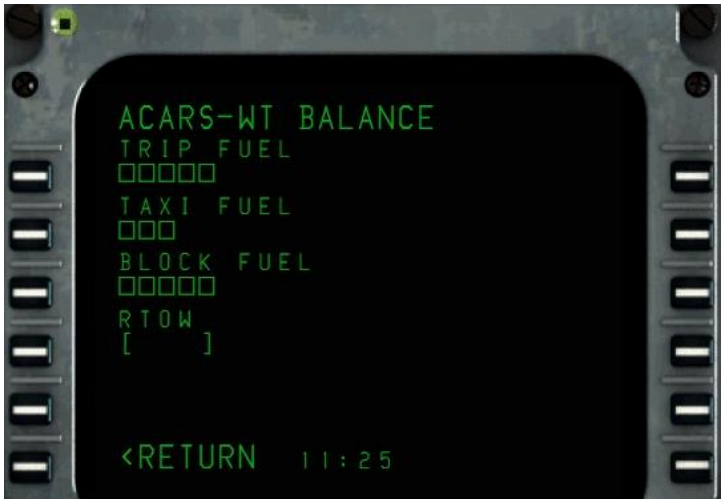
- **AIRPORT** Requested station. Format: 3 - 4 alpha characters.
- **SERVICE TYPE** Toggle ARRIVAL ATIS or DEPARTURE ATIS by pressing Line Select Key 2L.
- **SEND*** Select is available when a station has been entered. Selection queues message for downlinking.

- *Active Sky 3rd party software required. If using The reported runway(s) in use is calculated directly from Active Sky, and might not reflect preferential runway operations in force at the selected airport.*
- *If using IVAO/VATSIM as Data client, the WEATHER REQ is directly fetched from the corresponding network, or from Active Sky if not available.*

WT/BALANCE MENU PAGE

- select the "**WT/BALANCE>**" line select key.

The **WT/BALANCE** page allows the operator to enter/review fuel data to receive the FINAL loadsheet uplink message before departure.



- **TRIP FUEL** Trip fuel. Format: nnnnn (kgs or lbs) (1 - 5 numeric characters).
- **TAXI FUEL** Taxi fuel. Format: nnn (kgs or lbs) (1 - 3 numeric characters).
- **BLOCK FUEL** Block fuel. Format: nnnnn (kgs or lbs) (1 - 5 numeric characters).
- **RTOW** Regulated Take Off Weight used for underload calculation. Format: nnnnn (kgs or lbs) (1 - 5 numeric character).

FTL PLAN* FUNCTION

- select the "**FTL PLAN***" line select key.

The **FTL PLAN*** function allows the operator to receive the OFP uplink.

The **FTL PLAN*** doesn't allows OFP uplink directly in AFMC system: manually insert or COROUTE load is required in FMGC system.

RCVD MSGS PAGE

- select the "**RCVD MSGS**" line select key.

The **RCVD MSGS** menu page allows the operator to review all uplink display messages and select an individual message for viewing. Twenty messages can be held in queue at one time. Any messages received after the queue is full will cause the oldest messages in the queue to be deleted to make room for the incoming messages. The message titles are displayed in order from newest to oldest.

Any message may be viewed by pressing the select button next to the message title displayed on the RCVD MSGS menu page.

A message may also be displayed by selecting the MESSAGE active advisory when available. The queue containing the messages is cleared when a new flight is started and the flight phase transitions to BEGIN.

Status

"NEW" - Message has not been viewed/acked.

"ACKED" - Message has been acknowledged when required.

"VIEWED" - Message has been viewed.

Message title
From the sublevel field up to the first <CR> or <LF> or 16 characters, whichever is less.
The **RCVD MSGS** Review page allows the operator to view an uplink display message. Any message may be viewed by pressing the select button next to the message title displayed on the RCVD MSGS menu page.

Example of viewed message
Title Message title.
Time UTC Time message was received.
Status Message status - NEW or VIEWED.
Pages Current page/total pages for message.
Text Displays the message text.

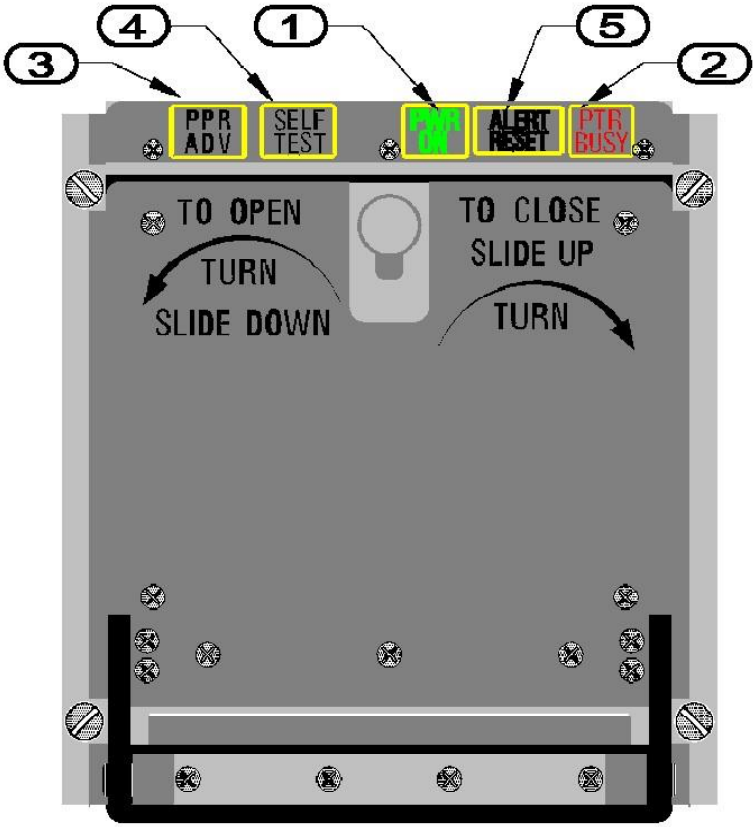
- *PRINT Select is available when a printer is connected and reporting its status as operating.
- *ACK Select is available only when a message is received that contains an ACK field and the message is NEW. When a message contains an ACK field the ground system is indicating that it wants confirmation of receipt of the message. Failure to ACK the message may cause the ground system to resend the message. Selection queues an RB-1 (Free Text Message Acknowledgement) downlink message, disables the ACK* select, and sets the message status to ACKED.

The queue of the last 20 received messages is displayed. Any message can be selected and reviewed.

Primary short-range voice communications are provided in the VHF range by tree independent radios. Radios VHF 1, 2 & 3 provides for selection of an active frequency and an inactive (preselected) frequency. Radio VHF 3, which is used for voice only as STBY VHF, by default is selected to "DATA". The VHF 3 antenna is located on the aft lower fuselage.

NOTE
VHF antenna located on the lower fuselage are susceptible to multipath interference from nearby structures or vehicles. This may disrupt VHF communications.

8. Multifunction thermal printer (Flight Deck near CM2 rear side container)



1 - "PWR ON" pushbutton.

- push (green illuminated): the printer is on and available.
- push again (green light off): the printer is off.

2 - "PTR BUSY" annunciator.

- amber illuminated: a message is being received.
- amber continuous flashing: after the message has been printed.

3 - "PPR ADV" pushbutton.

- push: produces paper advance as long as it is depressed.

4 - "SELF TEST" pushbutton.

- push: produces a test pattern as long as it is depressed.

5 - "ALERT RESET" pushbutton.

- push: - produces a reset of PTR BUSY pushbutton if flashing.
  - produces a reset of aural/visual functions if installed.

02. PRECISION RNAV (P-RNAV) IMPLEMENTATION

1. Background

Precision-RNAV is the natural progression from Basic RNAV which became mandatory in European and U.S. airspace in April 1998 for the enroute phase. Initial application is in the terminal area and P-RNAV track keeping accuracy equates to cross track accuracy of RNP 1 (±1NM).
P-RNAV Procedures are designed to a common set of design principles specific to RNAV equipped aircraft. These P-RNAV Procedures will replace the current multitude of overlay Procedures many of which are unsuitable for a wide range of aircraft types.
European States and U.S. have progressively introduced P-RNAV requirements for Terminal RNAV procedures. By April 2006, RNAV procedures in major European States and U.S. terminal airspace require P-RNAV. Conventional Terminal area procedures will continue to be provided. Basic RNAV will be limited to RNAV procedures above MSA that are designed according to enroute principles.

2. Operating procedures

REQUIRED EQUIPMENT FOR P-RNAV OPERATIONS

Although minimum requirements are less strict, required equipment to conduct P-RNAV operations are:

- 2 FMC;
- 2 MCDU;
- 1 VOR/DME or GPS receivers for FMC updating;
- 2 Flight Directors;
- 2 ND.

Maximum certified PBN capability: **A1B1D2D3O2O3S1**.

LIMITATIONS

RNP flight operations are subject to GPS satellite availability and/or navaid coverage for the selected route.

When performing a RNAV procedure, specified speed limits (IAS) in FMS SPD mode must be accomplished by selecting FMS OVRD mode and manually entering the required speed (IAS) in FMGC.

THE FOLLOWING P-RNAV PROCEDURES CANNOT BE PERFORMED UNDER ANY CIRCUMSTANCES:

- P-RNAV AR containing legs RNP ≤ 0.3;
- P-RNAV AR containing RF Path Terminator legs.

03. STABILIZER TRIM INOPERATIVE/MALFUNCTION

The Primary and Alternate trim motors are each equipped with a thermal cut-off device which interrupts electrical current to the motor if that trim motor overheats. Repeated or continuous use of the trim motor may cause a thermal cut-off. After the motor cools, it will automatically restore trim function when the thermal cutoff resets. Because an overheat cutoff in one trim motor does not affect the functions of the other, if the alternate trim motor overheats, the primary trim system may be used to retrim the stabilizer; the reverse is also true.

However, if the flight crew uses the primary trim system repeatedly to resist a runaway in the alternate trim system, the primary motor could overheat, and the crew may be left with a runaway alternate trim if the primary trim thermal cutoff occurs. This action could also cause both trim motors to overheat, and result in a temporarily inoperative stabilizer. Also, if a runaway trim motor overheats and stops, it could again runaway once it has cooled and the thermal cutoff resets.

If the crew determines that the stabilizer is inoperative, and suspects that they may have a thermal cutoff, and if flight conditions permit, the Captain may delay the diversion to an alternate airfield long enough to allows for a cooling period/thermal reset. After a reset, the crew should refer to the caution below:

CAUTION

If a horizontal stabilizer trim system malfunction is encountered, complete the related Abnormal/Emergency Procedure.

Do not attempt additional actions beyond that contained in the Abnormal/Emergency Procedure Booklet. If completing the procedures do not result in an operable trim system, consider **landing at the nearest suitable airport**.

If an operable trim system is restored, the Captain should consider proceeding to an airport where suitable maintenance is available, or to the original destination based on such factors as distance, weather, etc.

Finally, flight crews are advised that excessive or prolonged testing of the trim system on the ground before departure may generate enough heat to produce a thermal cutoff during routine trimming shortly after takeoff.

04. FALSE LOCALIZER CAPTURES

Investigations have been conducted with aircraft and avionics manufactures after the publication of technical and safety information by Italian, United Kingdom, Canadian and Belgian Authorities on the subject matter.
At the present time, results of the investigations show that false Localizer captures may be commanded by Autoflight system, particularly on the last generation airplanes equipped with “digital” avionics and under specific conditions of radiated LOC signals. One possible cause of the anomaly is identified in the incompatibility, under specific circumstances, among the onboard ILS receivers, ground ILS equipment and autoflight loc capture criteria.
It may happen on some airports that high modulation levels of radiated signals be present when within Loc coverage between the 8 - 35 sector and particularly in the 8 - 12 azimuth and at a distance greater than 18 nm from threshold. The above conditions might cause the deviation output generated by the onboard Loc receiver, to decrease below the autoflight Loc capture threshold thus triggering a false Loc capture. Another possible cause of false Loc captures is identified in the FM radio broadcast interference with the ILS receivers.

In any case:
- The use of all available navigation information and cross-checking of the raw data will make the false capture evident.
- In order to minimize the possibility of such occurrences AUTOLAND (or ILS or VOR LOC) mode should be selected once the airplane is within 18 nm from threshold and within 8 of the inbound ILS course.
- In the event a false Loc capture is experienced, selected mode shall be disengaged and once the correct track has been regained re-armed again.

05. AUTOTHROTTLE DESIGN AND OPERATION

The autothrottle system (ATS) is designed to rapidly achieve commanded performance (fixed Engine Pressure Ratio (EPR) limit or selected speed). ATS authority limits are defined by a fixed low limit condition for minimum thrust, and the selected Thrust Rating Computer (TRC) EPR limit for maximum thrust. Autothrottle control originates in the Digital Flight Guidance Computer (DGFC), which uses present EPR, speed, and speed rate to provide servo signals to position the throttles, in response to pilot and autopilot commands. Accuracy and time requirements in the DFGC autothrottle control algorithm depend on several factors; a few of which are listed below:

Engine speed: engine spool-up rate varies with respect to engine speed, and generally increases at higher rpm. Incremental changes in throttle position are generally less effective, then, at lower rpm. The engine bleed switch at about 1.1 EPR reduces spool-up rate and throttle sensitivity below that point, and is one of the factors which sets the autothrottle low limit value. The thrust of the engine is also non-linear with respect to rpm. Incremental changes in rpm result in greater changes in thrust at higher rpm than at lower rpm.

Manual throttle positioning: A clutch mechanism permits manual positioning of either throttle lever during autothrottle operation. Manual position input signals are not sent to the DFGC. The DFGC will continue to monitor autothrottle requirements, and will update throttle servo commands when required. If the pilot has overridden the autothrottles by decreasing throttle position below the low limit, update servo commands will not be sent until a thrust increase is required (generally, as the target speed is approached). Once the throttles are released by the pilot, servo commands will again be followed by the throttles. Although the system is designed to avoid EPR overshoot, conditions can exist following manual throttle positioning wherein a brief overshoot in EPR occurs.

Speed Capture Algorithm: The DFGC speed capture algorithm uses speed, speed rate, and present EPR to generate throttle commands. The algorithm is particularly responsive to speed rate, and will use the full limits of autothrottle authority, if required, to avoid significant speed undershoot or overshoot. Protection i provided in the algorithm to avoid exceeding auxiliary trim system limits during level accelerations. This protection will effectively limit thrust during speed increases. Thrust protection during deceleration is intended to be provided by the autothrottle low limit protection, the resulting higher deceleration rates can reduce the smoothness and efficiency of the speed capture.

Approach Idle: To improve engine spool-up characteristic during approaches, a feature is provided which increases engine idle rpm whenever the landing gear handle is down. This increase is independent of throttle position, and will slightly change the relationship between throttle position and EPR when the landing gear is lowered.

TRC Selection: Autothrottle authority limits during increasing thrust conditions are set by the selected mode of the TRC. Should conditions described above result in brief thrust overshoots, that overshoot will be based on the selected TRC mode. Maximum (Go-around) EPR overshoots will not normally occur during operational speed and thrust transients in the CR of CL modes. Brief EPR overshoots beyond the Go--around rating can occur, however, when certain conditions are met (primarily, manual throttle retards during decelerations and configuration changes), and the TRC is set in GA.

Flap Position: The drag increase associated with flap extension, particularly beyond 15 degrees, will lead to higher deceleration rates without changes in EPR. As the speed approaches the target speed, the requirement for thrust increase to arrest the deceleration is higher. This additional requirement, when couplet with other factors mentioned above, can result in a brief EPR overshoot when operating in the autothrottle speed select mode. This effect will be stronger at lower gross weights.
During most operational flight conditions, ATR EPR Select and Speed Control modes are adequate to smoothly control thrust and speed, without the necessity for manual throttle intervention. There are times, however, when the flight crew has a legitimate need to reduce thrust to an absolute minimum, for example, when ATC constraints result in a high, close-in approach. The following guidelines should help in preventing EPR overshoot during these occurrences:
1. Avoid having the TR in the GA mode while manually overriding the autothrottles.
2. When manually overriding the autothrottles, anticipate thrust increase requirements (lead the airspeed capture) by repositioning the throttles to approximately the low limit position as the target airspeed is approached, remember, the autothrottles will not start driving the throttles on their own until the need for a

thrust increase is sensed. During high deceleration rates caused by flap and gear extension at light weights, increase the lead requirements somewhat, by increasing throttles at a higher speed (15 to 20 knots is usually sufficient).

3. Whenever possible, avoid having to manually override the autothrottles. Anticipate speed reduction requirements, make smooth rather than abrupt speed changes, and let the autothrottles do their job.

4. When prolonged autothrottle override is required, for example during engine related emergency procedures, disconnect the ATS, and control thrust manually. As autothrottle servo control is shared by both throttles, unanticipated ATS throttle advances can occur during split throttle operation, after the pilot releases the throttles.

06. CPDLC IMPLEMENTATION

1. Introduction

Controller-Pilot Data Link Communications (CPDLC) is defined as an ICAO compliant Aeronautical Telecommunication Network (ATN) based on data communications services that facilitates the exchange of direct controller-pilot communication and aeronautical information between aircraft and ground systems.
The CPDLC system moves a subset of controller-pilot voice messages to data messages, while retaining the current operational requirement for voice as primary means of communication.

2. List of acronyms

ACARS: Aircraft Communication Addressing and Reporting System

AOC: Airline Operational Control

APM: Aircraft Personality Module

ATIS: Automatic Terminal Information Services

ATN: Aeronautical Telecommunication Network

CMU: Communications Management Unit

CPDLC: Controller-Pilot Data Link Communications

D-ATIS: Data link Automatic Terminal Information Services

ERT: Estimated ramp time

ETD: Estimated time of departure

ETE: Estimated flight time Enroute

FOB: Current fuel on board

3. Controls and Indicators

ACARS MESSAGE CONTROL PANEL (on overhead panel):

1: “ACARS” Light/Push to Reset annunciator/pushbutton.
- Illuminated - indicates an incoming ACARS/CPDLC message in association with an aural warning “chime”;
- Push produces the reset of ACARS light.

4. Manual Data Entry

Entry of external data into CPDLC data fields is accomplished by:
- Keying in alpha, numeric, or other required characters from the MCDU keypad. As data is keyed, it will appear in the scratchpad at the bottom of the display;
- Pushing the line select key adjacent to the field into which data is to be entered.
- Entry fields "boxes" ☐ indicate entry is required before the intended function for the page(s) is considered complete. On most pages these fields are required for the activation of the SEND select; "brackets" [ ] indicate entry is optional.

Selection of prefilled data (select list) is accomplished by toggling or scrolling through available options by repeatedly pressing the associated line select key.

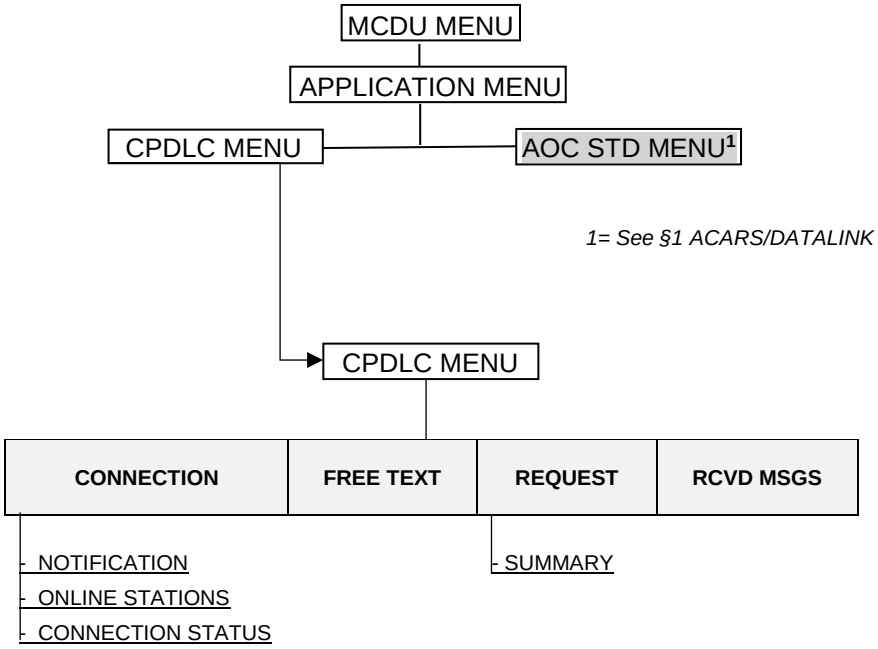
When an asterisk ***** appears next to a line select key, it indicates a function (i.e. when the line is pushed an action is performed by the system or a report downlinked).

Menu line select keys are faded out if the menu/function is not accessible.

5. System description

For the CPDLC MENU enabling, Hoppie ACARS network must be configured with the appropriate Logon Code, and enabled for ACARS and CPDLC first (Additional Options - Simulator Options). This also enables the DEP REQUEST page under AOC STD MENU – PRE-FLIGHT.

MENU TREE



6. System Operation

- select the "**MENU**" button to access the MCDU MENU.
- select the "**<ACARS**" line select key.

- select the "**<CPDLC**" line select key.

The **CPDLC** page is the initial application page. It provides four page selects.

CONTINUED

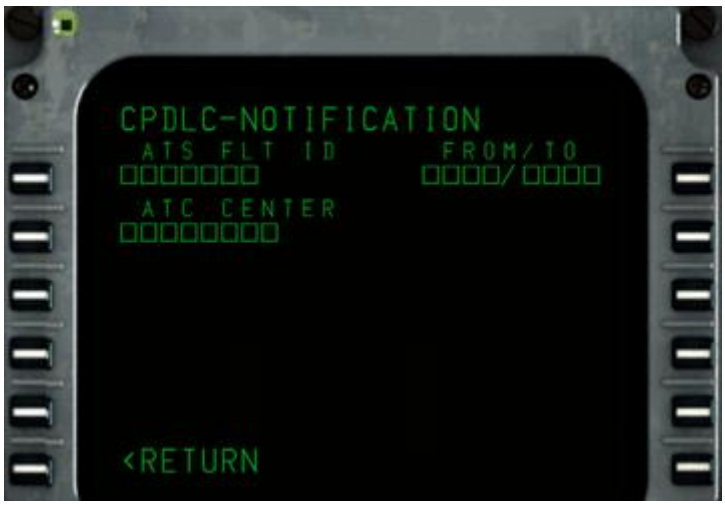
CONNECTION MENU PAGE

The **CONNECTION** menu page provides three page selects.

NOTIFICATION MENU PAGE

- select the "**<NOTIFICATION**" line select key.

The **NOTIFICATION** page allows the operator to send the CPDLC logon request to the ATC unit.



- **ATS FLT ID** ATS ICAO Flight number. Format: 1 - 7 alpha-numeric.
- **ATC CENTER** ATC CPDLC ID code. Format: 1 - 8 alpha-numeric.
- **FROM/TO** City pair. Format: 4 / 4 alpha characters.

Default: Displays DEP/DEST as received from broadcast bus, if available.

The resources of information are available for some fields. Manually entered information has the highest priority, and broadcast information has the lowest priority.

NOTIFY* line select key available upon full data entry.

ONLINE STATIONS MENU PAGE

- If CPDLC ID stations are present, the ONLINE STATIONS MENU PAGE is available.
- select the "**ONLINE STATIONS>**" line select key.

The **ONLINE STATIONS** page provides a list of all CPDLC connected ATC units for the selected Data Client provider (IVAO/VATSIM) within a range of 250nm from aircraft position.

CONNECTION STATUS MENU PAGE

- select the "**CONNECTION STATUS>**" line select key.

The **CONNECTION STATUS** page allows the operator to verify the connection status (CONNECTED/NOT CONNECTED).
Select DISCONNECT* line select key to disconnect from CPDLC.

FREE TEXT MENU PAGE

- select the "**FREE TEXT>**" line select key.

The **FREE TEXT** page allows the operator to send a CPDLC free text message to the ATC unit.

CONTINUED

- **EDIT>** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- ***CLEAR TEXT** Selection clears all free text.
- **SEND*** Queues message for downlinking.

REQUEST MENU PAGE

- select the "**REQUEST>**" line select key.
The **REQUEST** page allows the operator to send a CPDLC downlink pre-formatted request to the ATC unit.

- **DIR TO** Requested FIX/NAVAID direct to. Format: 1 - 5 alpha-numeric.
- **HEADING** Requested heading. Format: 1 - 3 numeric.
- **FL/ALT** Requested FL/Altitude. Format: 1 - 5 numeric.
- **SPD/MACH** Requested speed/mach number. Format: 1 - 4 numeric.
- **DUE TO** Toggle NIL, PERFORMANCE or WEATHER by pressing Line Select Key 4L.
- **DUE TO** Toggle NIL, PERFORMANCE or WEATHER by pressing Line Select Key 4R.

SUMMARY MENU PAGE

- select the "**SUMMARY>**" line select key.
The **SUMMARY** page allows the operator to review and SEND* the CPDLC REQUEST.

RCVD MSGS MENU PAGE

- select the "**RCVD MSGS>**" line select key.

The **RCVD MSGS** menu page allows the operator to review all uplink CPDLC messages and select an individual message for viewing and downlink a reply.
Any message may be viewed by pressing the select button next to the message title displayed on the RCVD MSGS menu page. CPDLC messages take priority over other pages and are automatically displayed.

CONTINUED

When a CPDLC MESSAGE is received the message is in “OPEN” status until a downlink reply is given:
- ***UNABLE** Unable to comply.
- **WILCO*** Will comply.
- **STBY*** Stand-by.

A CONNECTION TIMEOUT error is generated and the message status set to “CLOSED” if the uplink CPDLC message is not answered within 120 seconds.

DEP REQUEST MENU PAGE

When Hoppie enabled for CPDLC and ACARS, an additional DEP REQUEST menu page is available under ACARS - AOC STD MENU - PRE-FLIGHT.

DEPART REQUEST MENU PAGE

- select the “**<DEP REQUEST**” line select key.

The **DEPART REQUEST** menu page allows the operator to uplink a departure clearance request to the appropriate ATC unit.

CONTINUED

- **ORIG/DEST** City pair. Format: 4 / 4 alpha characters.
Default: Displays DEP/DEST as received from broadcast bus, if available.
- **GATE** Parking gate. Format: 1 - 6 alpha-numeric.
- **ATS FLT ID** ATS ICAO Flight number. Format: 1 - 7 alpha-numeric.
Default: Displays DEP/DEST as received from broadcast bus, if available.
- **ATIS** Atis information on board. Format: 1 alpha character.
- **EDIT>** Displays Edit Free Text page. Text may be manually entered via MCDU keyboard.
- **A/C TYPE** City pair. Format: 4 alpha-numeric.
Default: Displays A/C TYPE as received from broadcast bus, if available.
- **RECIPIENT** ATC CPDLC ID code. Format: 1 - 4 alpha-numeric.

The resources of information are available for some fields. Manually entered information has the highest priority, and broadcast information has the lowest priority.

SEND* line select key available upon full data entry.

7. Contingency Procedures

Under certain situations CPDLC may go into a NO COMM status. If the system remains in an extended NO COMM state, the flight crews should revert to voice communications.