A330
TECHNICAL TRAINING MANUAL
T1+T2 Mechanical and Avionics A330 RR TRENT 700
23-COMMUNICATIONS

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It will not be updated.


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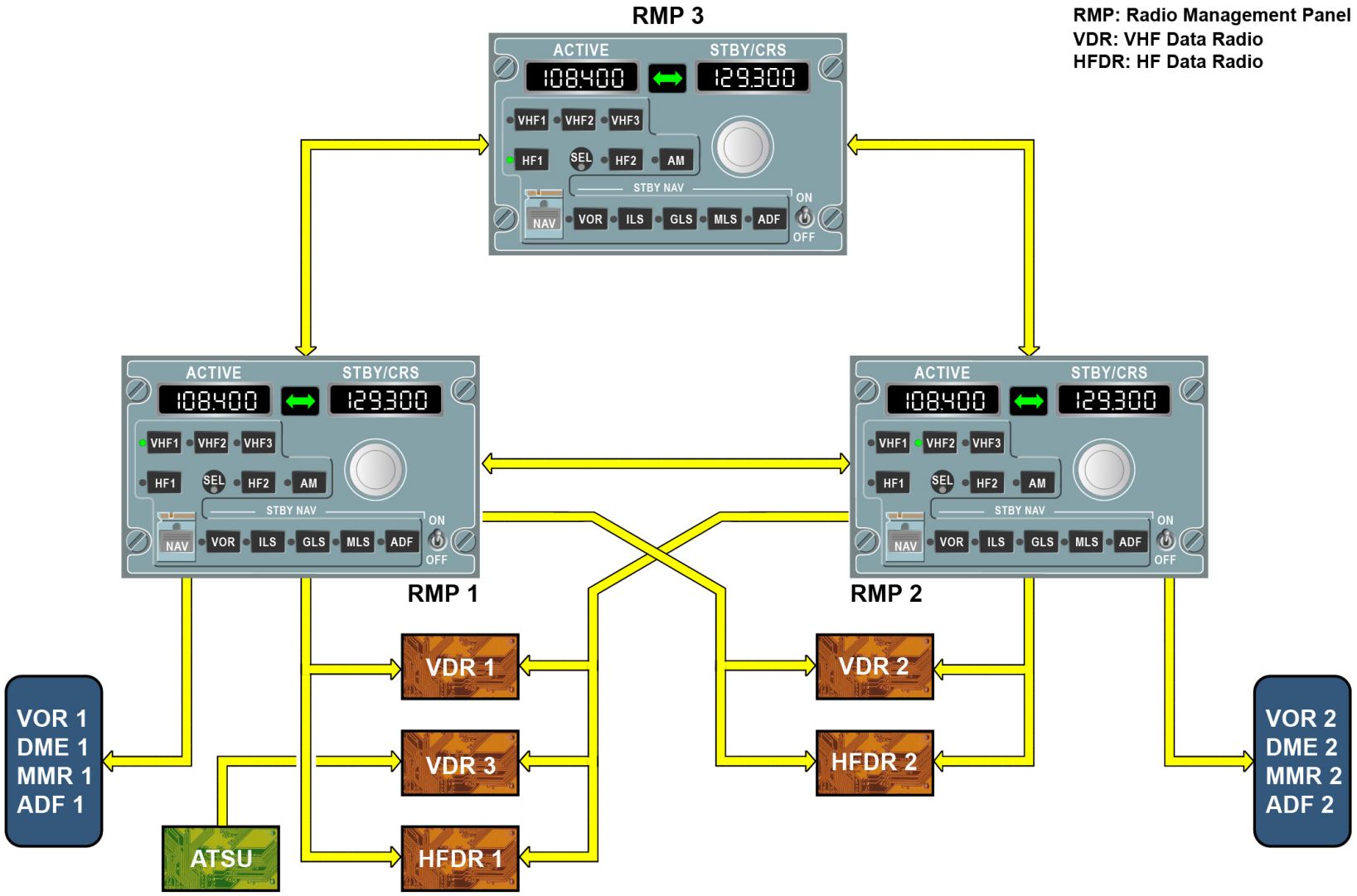
RADIO MANAGEMENT D/O

COMMUNICATION ARCHITECTURE

There are three Radio Management Panels (RMPs) used for frequency selection of the different HF and VHF transceivers. The architecture of the radio management system enables the three RMPs to permanently dialog between each other. Thus, each RMP can control any of the radio transceivers. If at least one RMP is available, all HF and VHF transceivers can be controlled. The RMP1 and RMP2 are directly connected to all the HF and VHF radio transceivers. The RMP3 is only connected to the RMP1 and RMP 2. Only the RMP 1 and RMP 2 can control the radio navigation systems in back-up mode when the Flight Management Guidance and Envelope Computers (FMGECs) have failed.
Each RMP is normally dedicated to controlling a particular radio:
- RMP 1 is dedicated to the VHF Data Radio transceiver 1 (VDR 1),
- RMP 2 is dedicated to VDR 2,
- RMP 3 is dedicated to VDR 3 and the two HF Data Radio transceivers, HFDR 1 and HFDR 2.

If an RMP takes control of a non-dedicated transceiver, the SELector light will come on white on this RMP and on the RMP dedicated to the selected transceiver.



COMMUNICATION ARCHITECTURE

RADIO MANAGEMENT D/O

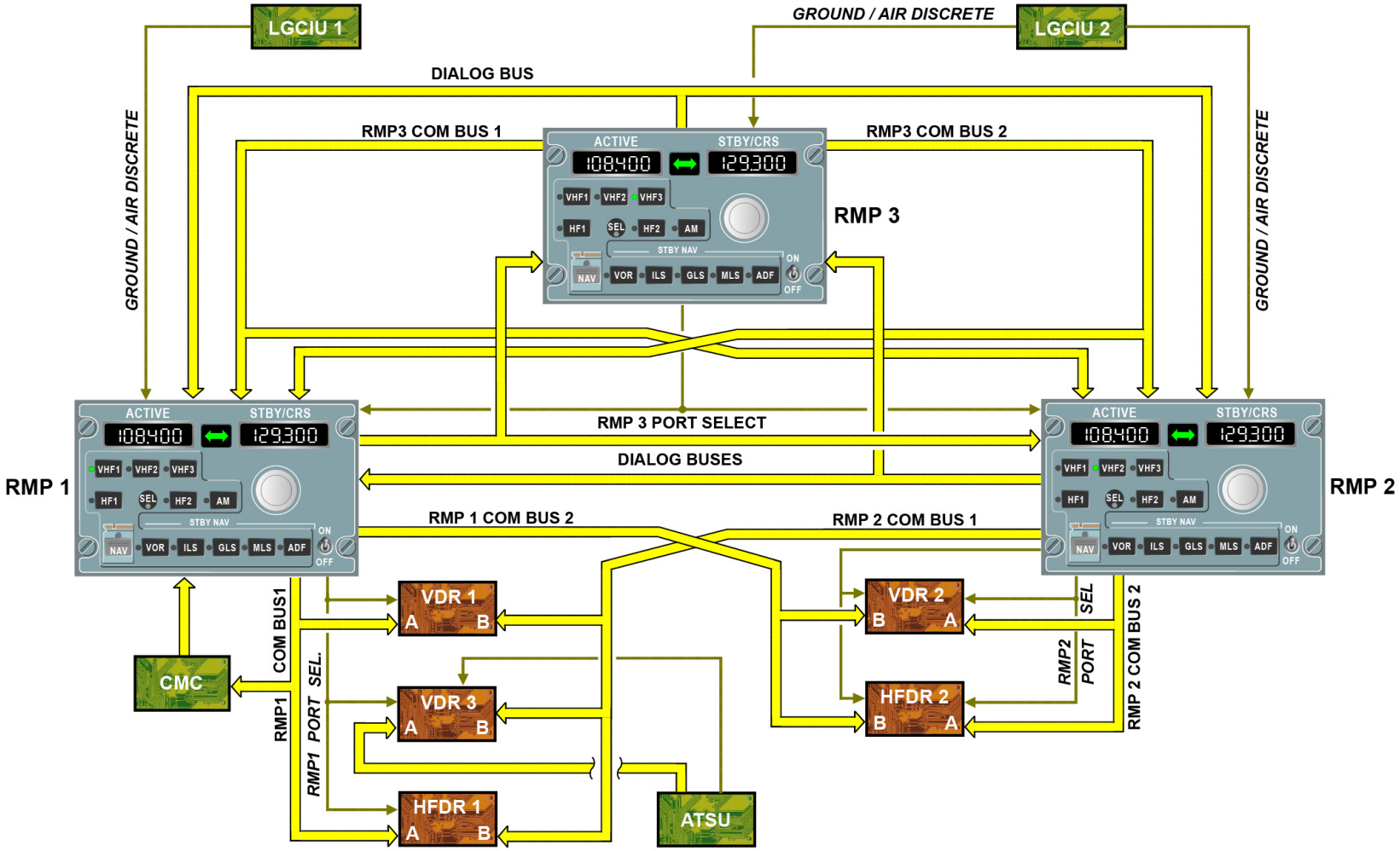
DESCRIPTION

RMP 1 and RMP 2 have two ARINC 429 data buses connected to the radio communication transceivers:
- COM BUS 1 delivers the VDR 1, VDR 3 and HFDR 1 frequencies,
- COM BUS 2 delivers the VDR 2 and HFDR 2 frequencies.

Three dialog buses make sure that the exchange of information between the three RMPs is done. Each RMP periodically transmits its context on its dialog bus. The RMP 3 controls the radio communication transceivers through dialog buses and RMP 1 and RMP 2. PORT SELECT DISCRETE lines determine which port (A or B) is active.

The RMP 1 is allocated to the VDR 1, the RMP 2 is allocated to the VDR 2 and the RMP 3 is allocated to VDR 3, HFDR 1 and HFDR 2. Each time the system operates in a different configuration, the SEL indicator on the involved RMPs comes on. The Air Traffic Service Unit (ATSU) controls VDR 3 frequencies through PORT A. The port select discrete is controlled by the ATSU.

The RMP 1 is connected to the Central Maintenance System (CMS) through the Central Maintenance Computer (CMC). The CMC sends the option status defined by means of the pin programming, to the RMPs. In order to increment the flight leg, the Landing Gear Control and Interface Unit (LGCIU) 1 is connected to RMP 1 and LGCIU 2 is connected to RMP 2 and RMP 3. In the event of RMP 1 failure, the RMP 3 becomes the main unit for BITE information. If only RMP 2 is available, communication with the CMC is lost.



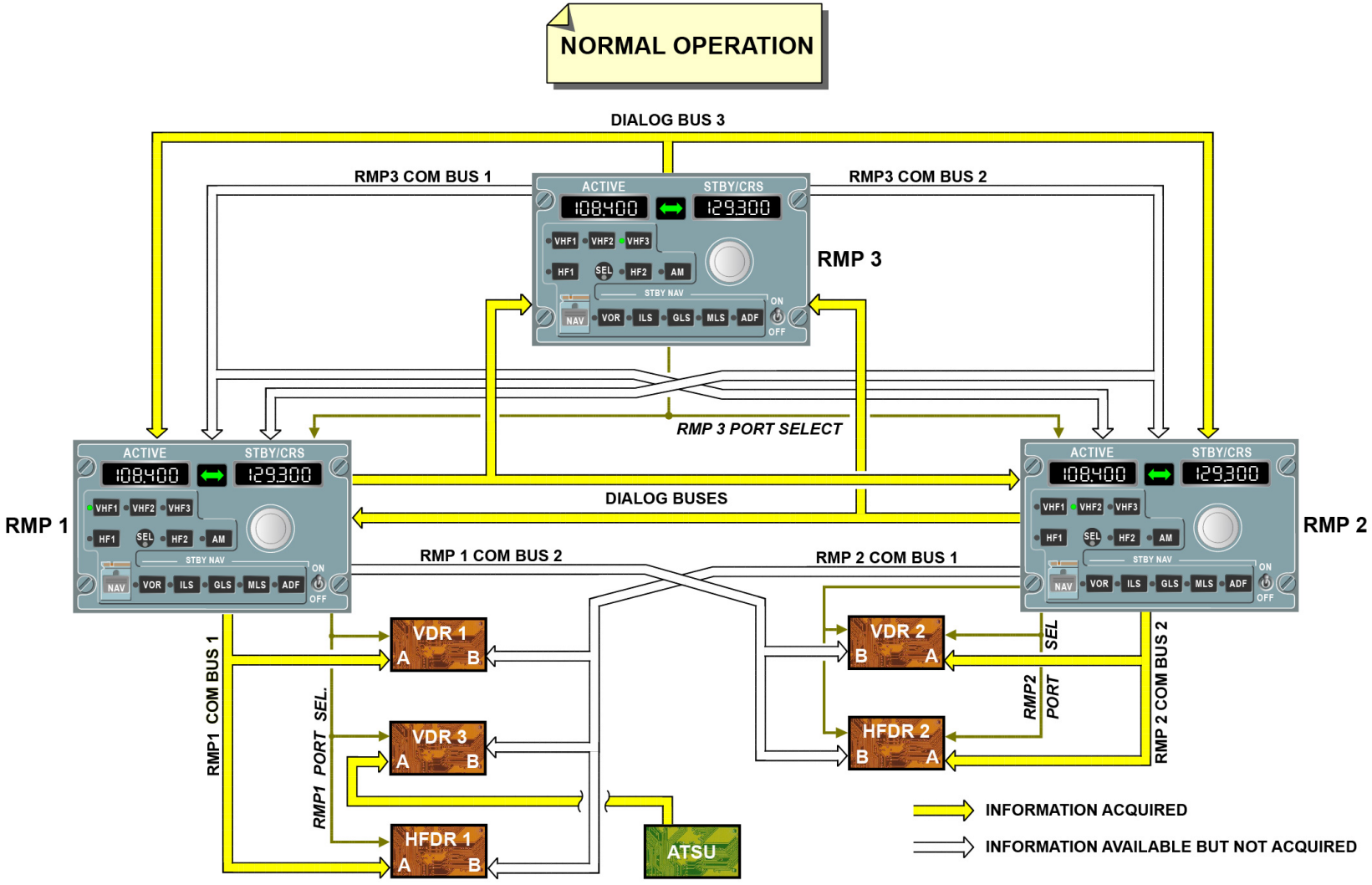
DESCRIPTION

RADIO MANAGEMENT D/O

OPERATION

NORMAL OPERATION

In normal configuration, the RMP 3 sends frequencies to the radio communication transceivers via its dialog buses and through RMP 1 and RMP 2. In normal operation, RMP 1 and RMP 2 send frequencies to PORT A radio communication transceivers (except for VDR3). ATSU is linked to the port A of the VDR3 for data mode and port B is used for voice mode.



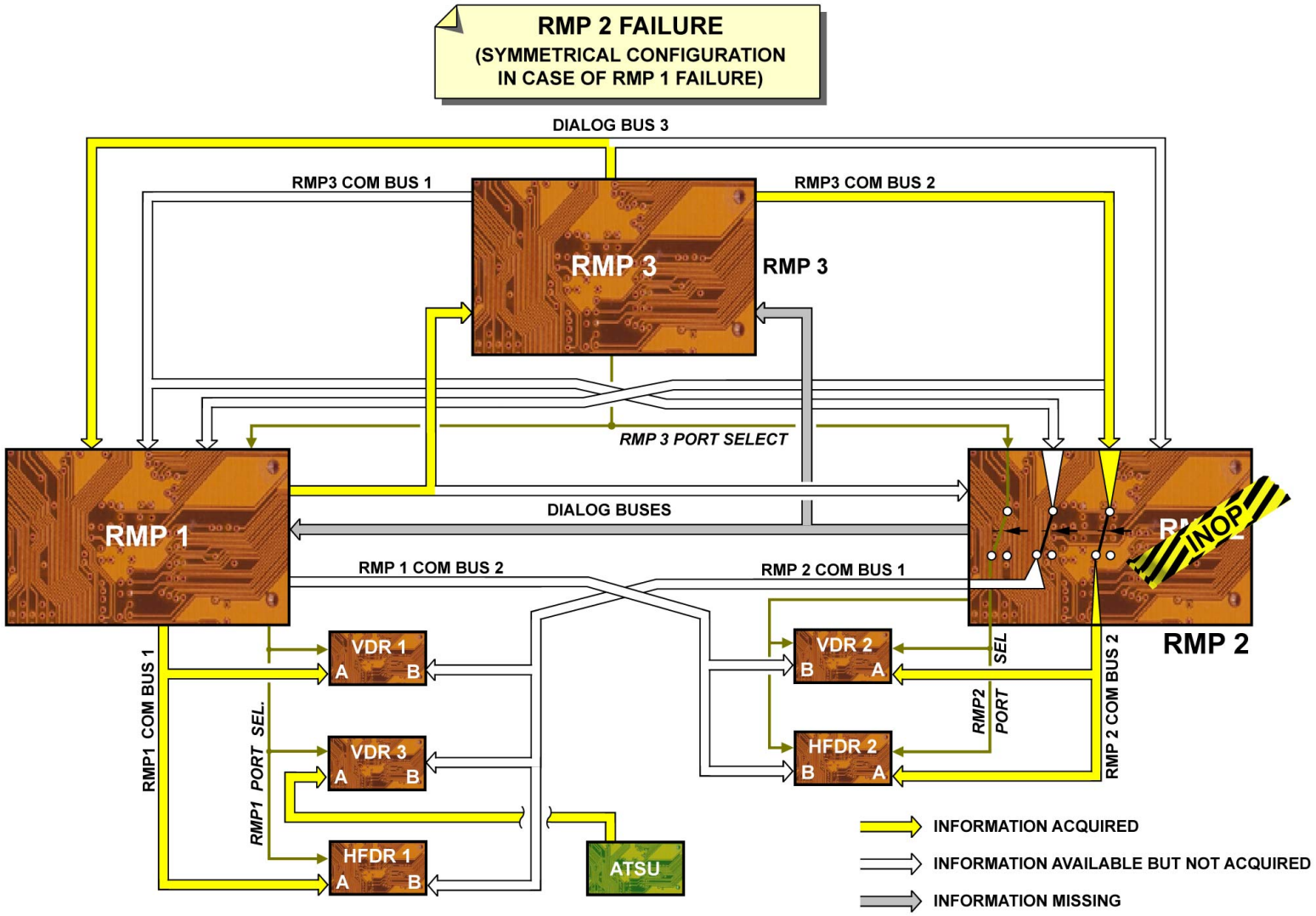
OPERATION - NORMAL OPERATION

RADIO MANAGEMENT D/O

OPERATION (continued)

RECONFIGURATION

In case of failure of one RMP, the other RMPs control all the radio communication transceivers via their dialog buses and through RMP 1 and RMP 2. When one RMP is defective, the displays become blank. Switching it (the display) OFF can let the control of the onside radio communication transceivers operate from the other RMPs.



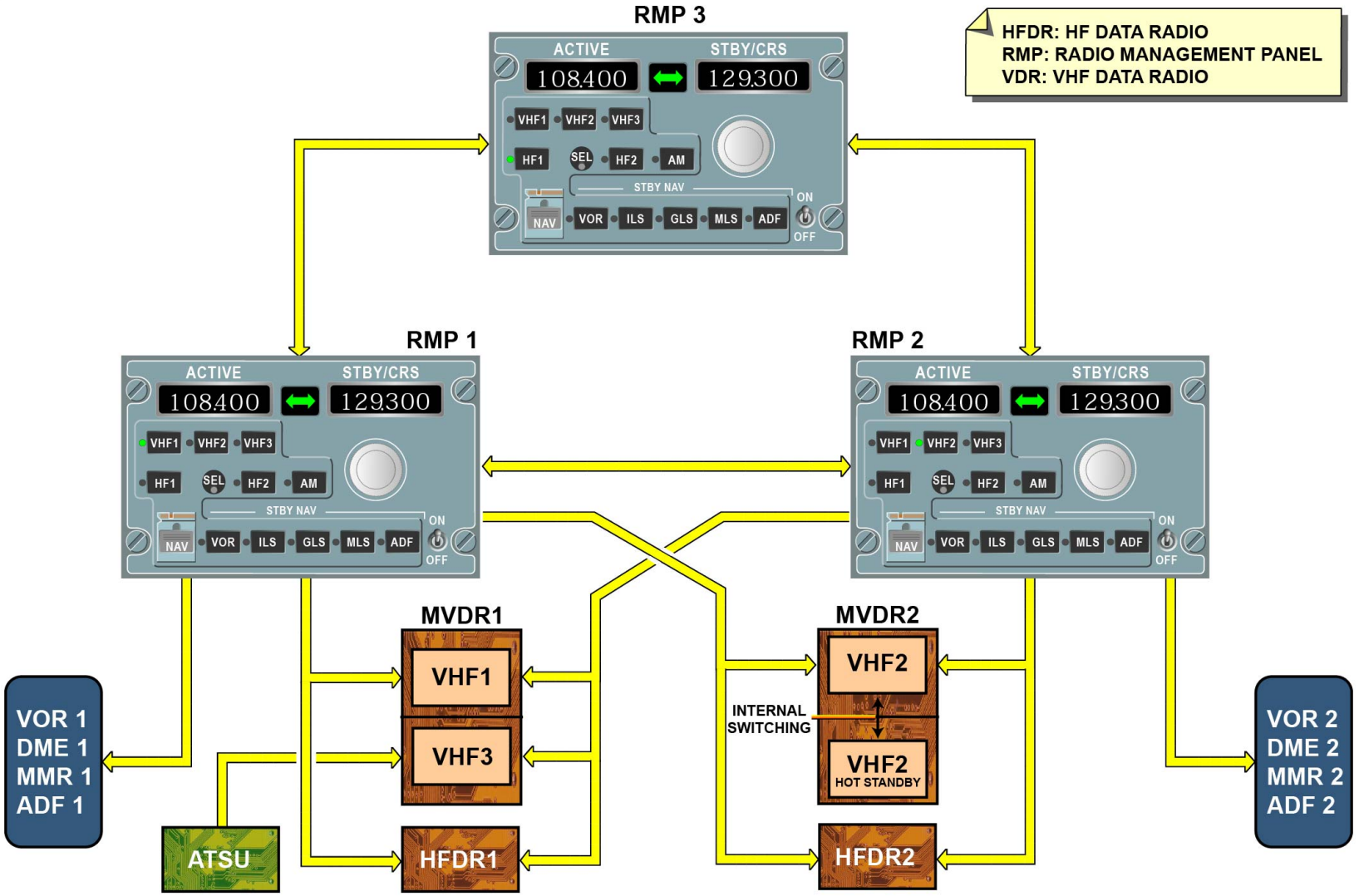
OPERATION - RECONFIGURATION

RADIO MANAGEMENT D/O (MVDR OPTION)

COMMUNICATION ARCHITECTURE

There are three Radio Management Panels (RMPs) used for frequency selection of the different HF and VHF transceivers. The architecture of the radio management system enables the three RMPs to permanently dialog between each other. Thus, each RMP can control any of the radio transceivers. If at least one RMP is available, all HF and VHF transceivers can be controlled. The RMP1 and RMP2 are directly connected to all the HF and VHF radio transceivers. The RMP3 is only connected to the RMP1 and RMP 2. Only the RMP 1 and RMP 2 can control the radio navigation systems in back-up mode when the Flight Management Guidance and Envelope Computers (FMGECs) have failed.
Each RMP is normally dedicated to controlling a particular radio:
- RMP 1 is dedicated to the VHF 1 transceiver in MVDR1,
- RMP 2 is dedicated to VHF 2 transceiver in MVDR2,
- RMP 3 is dedicated to VHF 3 transceiver in MVDR1 and the two HF Data Radio transceivers, HFDR 1 and HFDR 2.

If an RMP takes control of a non-dedicated transceiver, the SELector light will come on white on this RMP and on the RMP dedicated to the selected transceiver.
Note: MVDR1 includes VHF1 and VHF3 transceivers. MVDR2 includes VHF2 transceiver and a VHF2 Hot Standby transceiver. In case of failure of VHF2 transceiver, VHF2 Hot Standby transceiver takes over immediately and automatically.



COMMUNICATION ARCHITECTURE

RADIO MANAGEMENT D/O (MVDR OPTION)

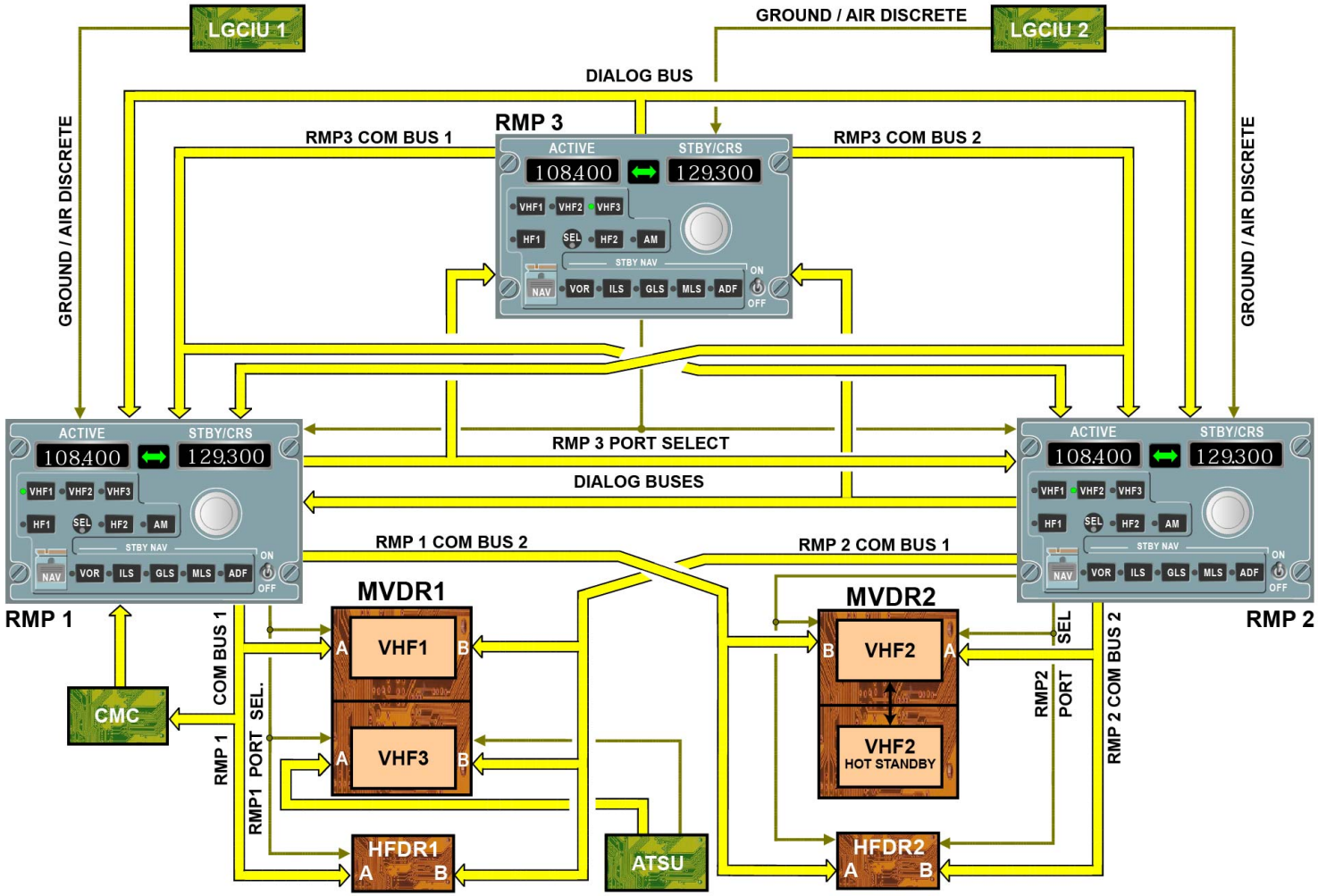
DESCRIPTION

RMP 1 and RMP 2 have two ARINC 429 data buses connected to the radio communication transceivers:
- COM BUS 1 delivers the VHF 1, VHF 3 and HFDR 1 frequencies,
- COM BUS 2 delivers the VHF 2 and HFDR 2 frequencies.

Three dialog buses make sure that the exchange of information between the three RMPs is done. Each RMP periodically transmits its context on its dialog bus. The RMP 3 controls the radio communication transceivers through dialog buses and RMP 1 and RMP 2. PORT SELECT DISCRETE lines determine which port (A or B) is active.

The RMP 1 is allocated to the VHF 1, the RMP 2 is allocated to the VHF 2 and the RMP 3 is allocated to VHF 3, HFDR 1 and HFDR 2. Each time the system operates in a different configuration, the SEL indicator on the involved RMPs comes on. The Air Traffic Service Unit (ATSU) controls VHF 3 frequencies through PORT A. The port select discrete is controlled by the ATSU.

The RMP 1 is connected to the Central Maintenance System (CMS) through the Central Maintenance Computer (CMC). The CMC sends the option status defined by means of the pin programming, to the RMPs. In order to increment the flight leg, the Landing Gear Control and Interface Unit (LGCIU) 1 is connected to RMP 1 and LGCIU 2 is connected to RMP 2 and RMP 3. In the event of RMP 1 failure, the RMP 3 becomes the main unit for BITE information. If only RMP 2 is available, communication with the CMC is lost.



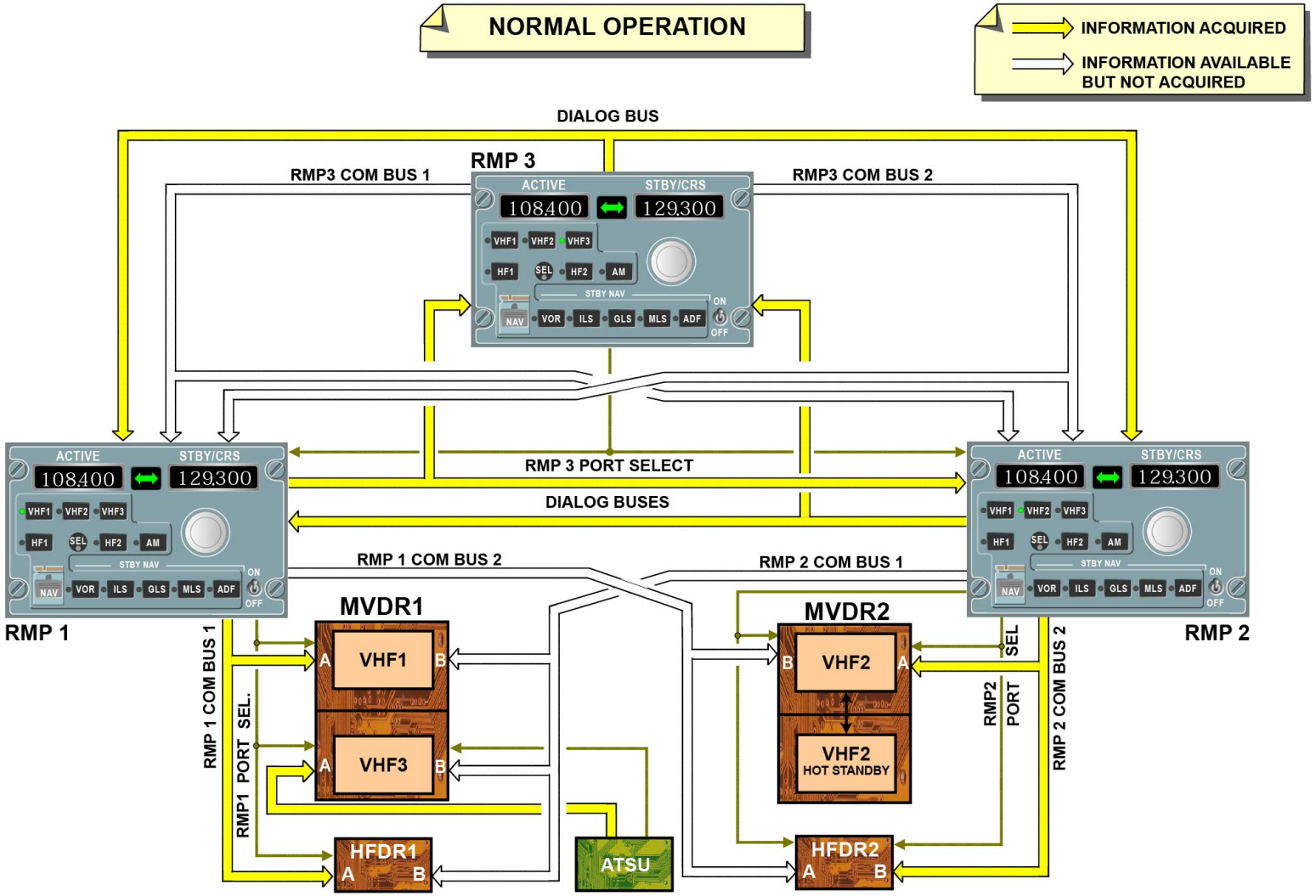
DESCRIPTION

RADIO MANAGEMENT D/O (MVDR OPTION)

OPERATION

NORMAL OPERATION

In normal configuration, the RMP 3 sends frequencies to the radio communication transceivers via its dialog buses and through RMP 1 and RMP 2. In normal operation, RMP 1 and RMP 2 send frequencies to PORT A radio communication transceivers (except for VHF3). ATSU is linked to the port A of the VHF3 for data mode and port B is used for voice mode.



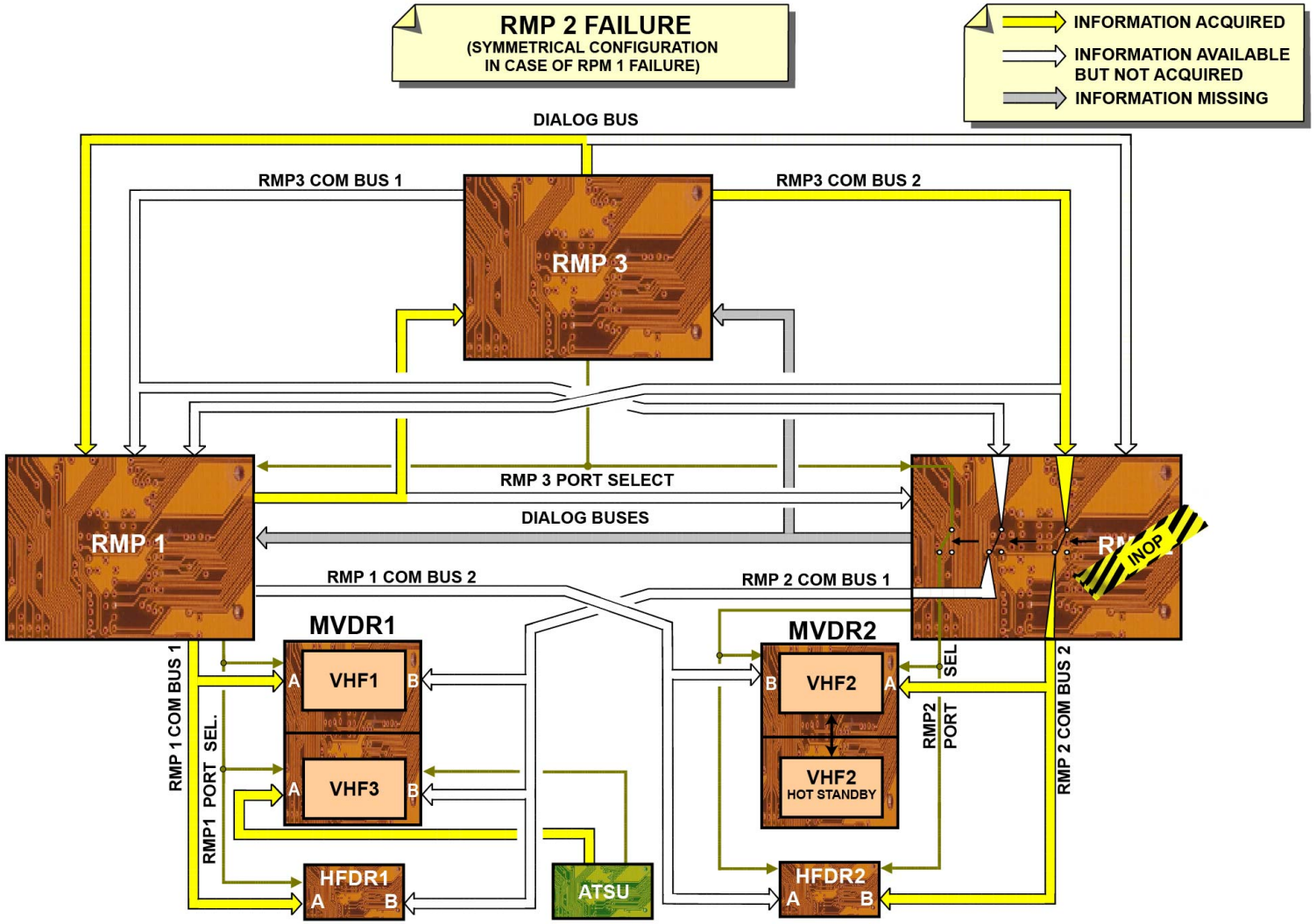
OPERATION - NORMAL OPERATION

RADIO MANAGEMENT D/O (MVDR OPTION)

OPERATION (continued)

RECONFIGURATION

In case of failure of one RMP, the other RMPs control all the radio communication transceivers via their dialog buses and through RMP 1 and RMP 2. When one RMP is defective, the displays become blank. Switching it (the display) OFF can let the control of the onside radio communication transceivers operate from the other RMPs.

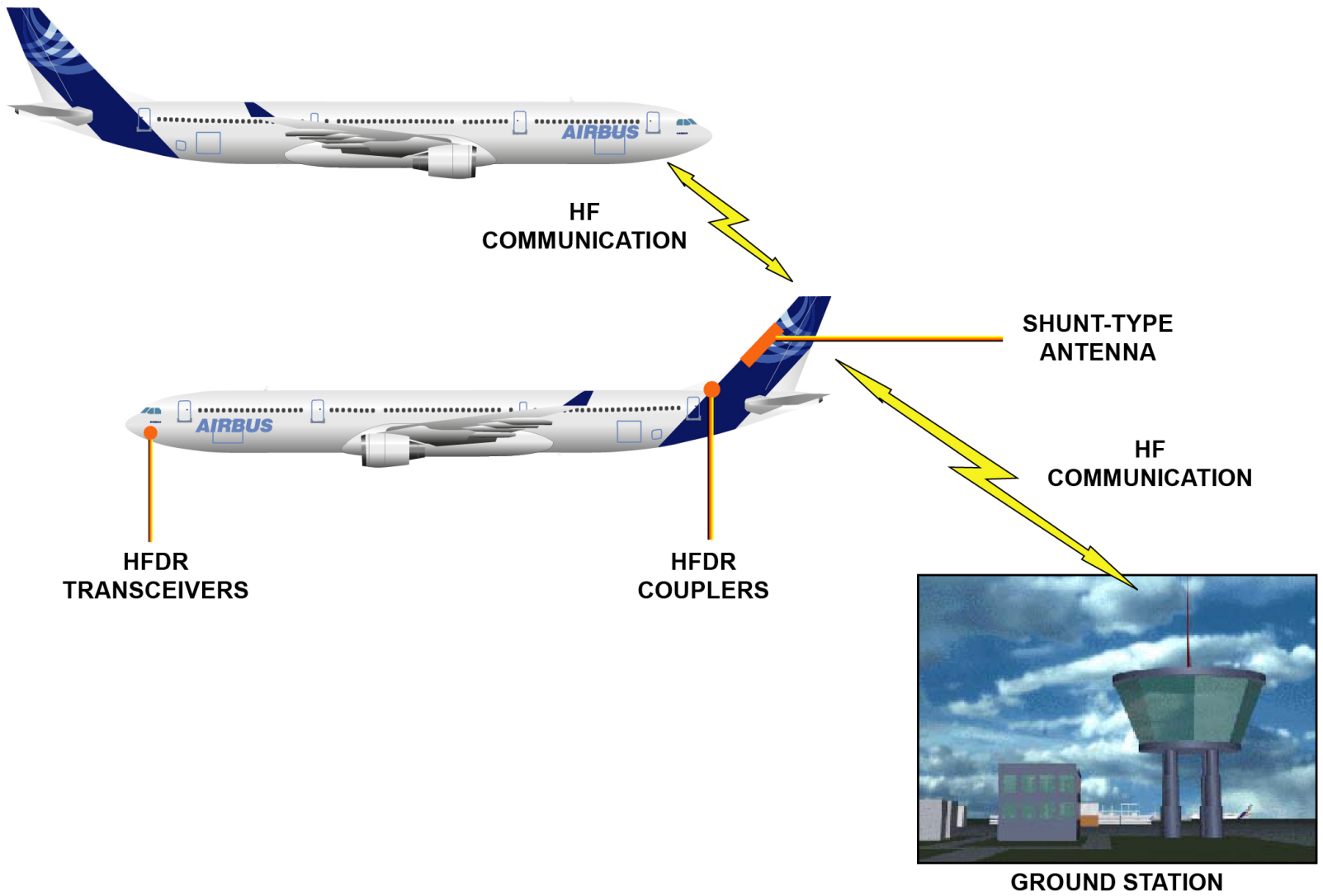


OPERATION - RECONFIGURATION

HF SYSTEM D/O

GENERAL

The High Frequency (HF) system allows long distance voice communications between A/C (in flight or on ground), or between the A/C and a ground station. The HF system is comprised of:
- 2 High Frequency Data Radio (HFDR) transceivers,
- 2 HFDR couplers,
- 1 shunt-type antenna.

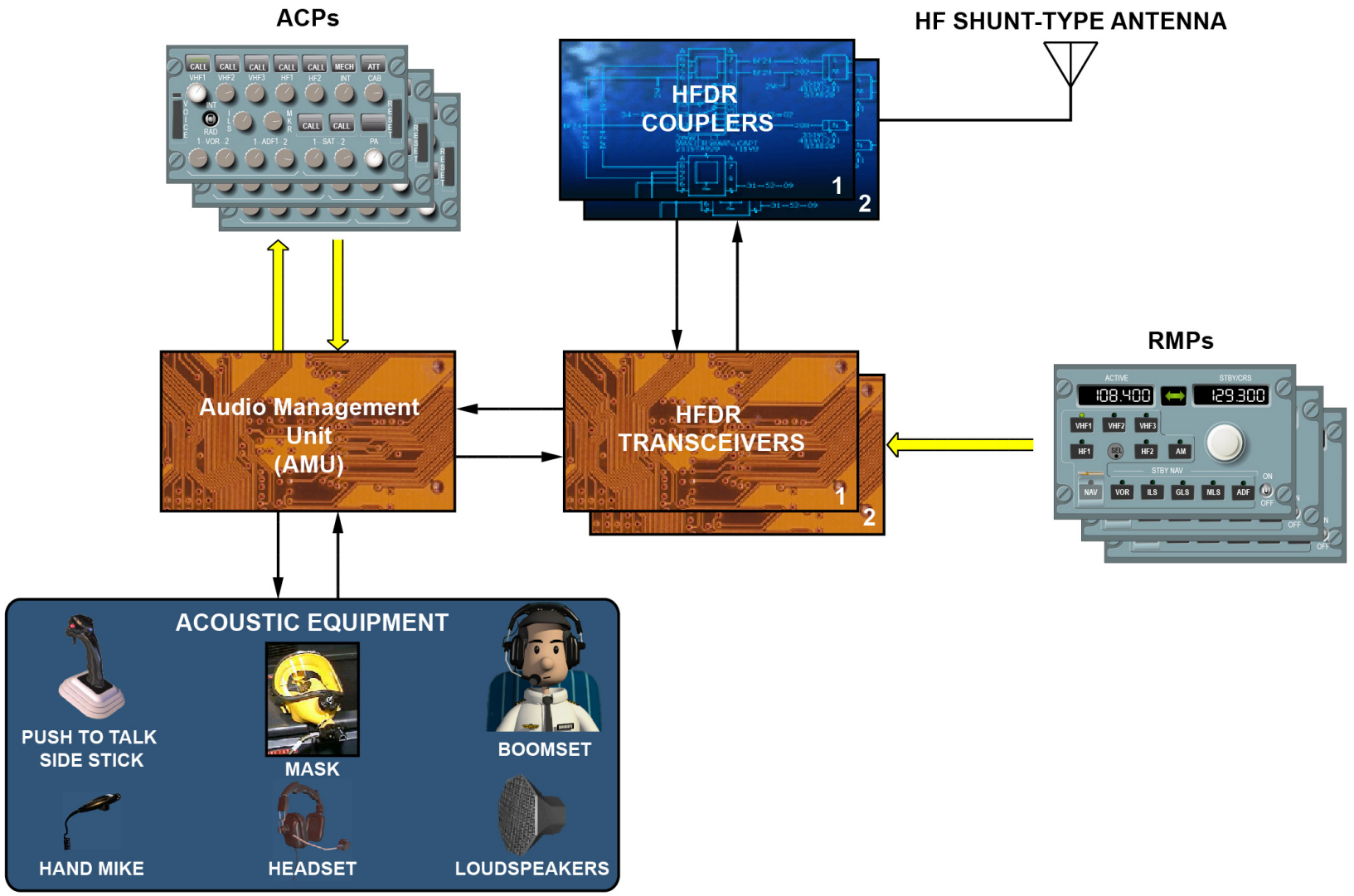


GENERAL

HF SYSTEM D/O

MAIN COMPONENTS OF THE HF SYSTEM

The main components of the HF system are:
- the HFDR 1/2 transceivers,
- the HFDR 1/2 coupler, which provides impedance matching between the HF shunt-type antenna and the transceiver,
- the HF shunt-type antenna,
- the Radio Management Panels (RMPs),
- the Audio Management Unit (AMU),
- the Audio Control Panels (ACPs),
- the acoustic equipment, which is composed of 2 side-stick radio selectors, 2 loudspeakers, 3 oxygen mask microphones, facilities for boomsets, headsets and hand microphones.



MAIN COMPONENTS OF THE HF SYSTEM

HF SYSTEM D/O

SYSTEM ARCHITECTURE

In the HF system, the RMPs are used for HF1 and HF2 frequency control.
The HFDR transceivers have 2 serial input ports:
- serial input port A,
- serial input port B.

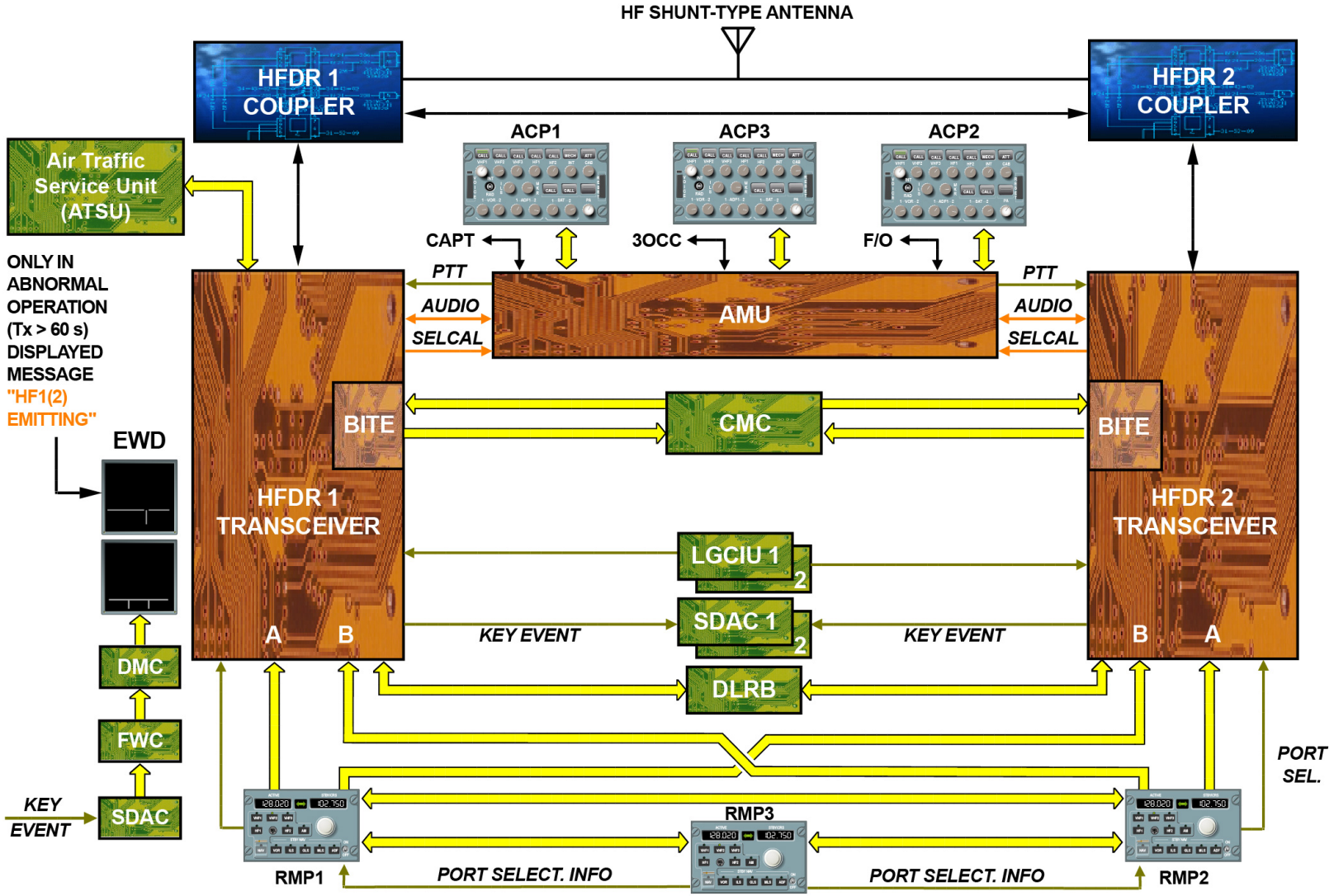
In normal conditions, both transceivers are tuned through port A from any RMP. The secondary port is dedicated to RMP2 when RMP1 and RMP3 have failed. RMP3 controls the radio communications transceivers through dialog buses, and RMP1 and RMP2. The port selection is performed through the PORT SELECTION information line.
The AMU acts as an interface between the users and the HF systems for transmission and reception of audio signals. The Push-to-Talk (PTT) key line is a ground signal sent to the transceiver through the AMU. The SELective CALling (SELCAL) system gives visual and aural indications to the flight crew, concerning calls received through the HF system.

NOTE: The SELCAL function is integrated in the AMU.

The ACPs are used for HF transmission or reception selection mode and control of the received audio signal levels through the AMU.
A BITE is integrated in the HF transceiver, for maintenance purposes. The BITE maintains 2-way communications with the Central the Maintenance Computer (CMC) through ARINC 429 buses. The BITE is used to detect and identify internal and external transceiver failures, to store maintenance data in a memory, to inform the external maintenance monitor, the CMC, and to execute tests.
Through the Landing Gear Control and Interface Unit (LGCIU) 1/2 a discrete ground signal is sent to the HF transceivers, when the A/C is in flight with L/G down or not. The LGCIU sends the flight/ground A/C status used by the HF BITE, in order to increment the fault memory, in case of failure of the CMC.

If the transmission lasts more than 1 minute, the "HF1 EMITTING" or "HF2 EMITTING" amber message is displayed on the EWD, through the System Data Acquisition Concentrator (SDAC) 1/2.
The HFDR 1 transceiver is connected to the Air Traffic Service Unit (ATSU) for direct exchange of data between the A/C and ground systems like A/C report or weather report.
The HFDR transceivers are also connected to the Data Loading Routing Box (DLRB), which is used to load the HFDR software.

NOTE: The DLRB / HFDR transceivers connection is optional on Aircraft.



SYSTEM ARCHITECTURE

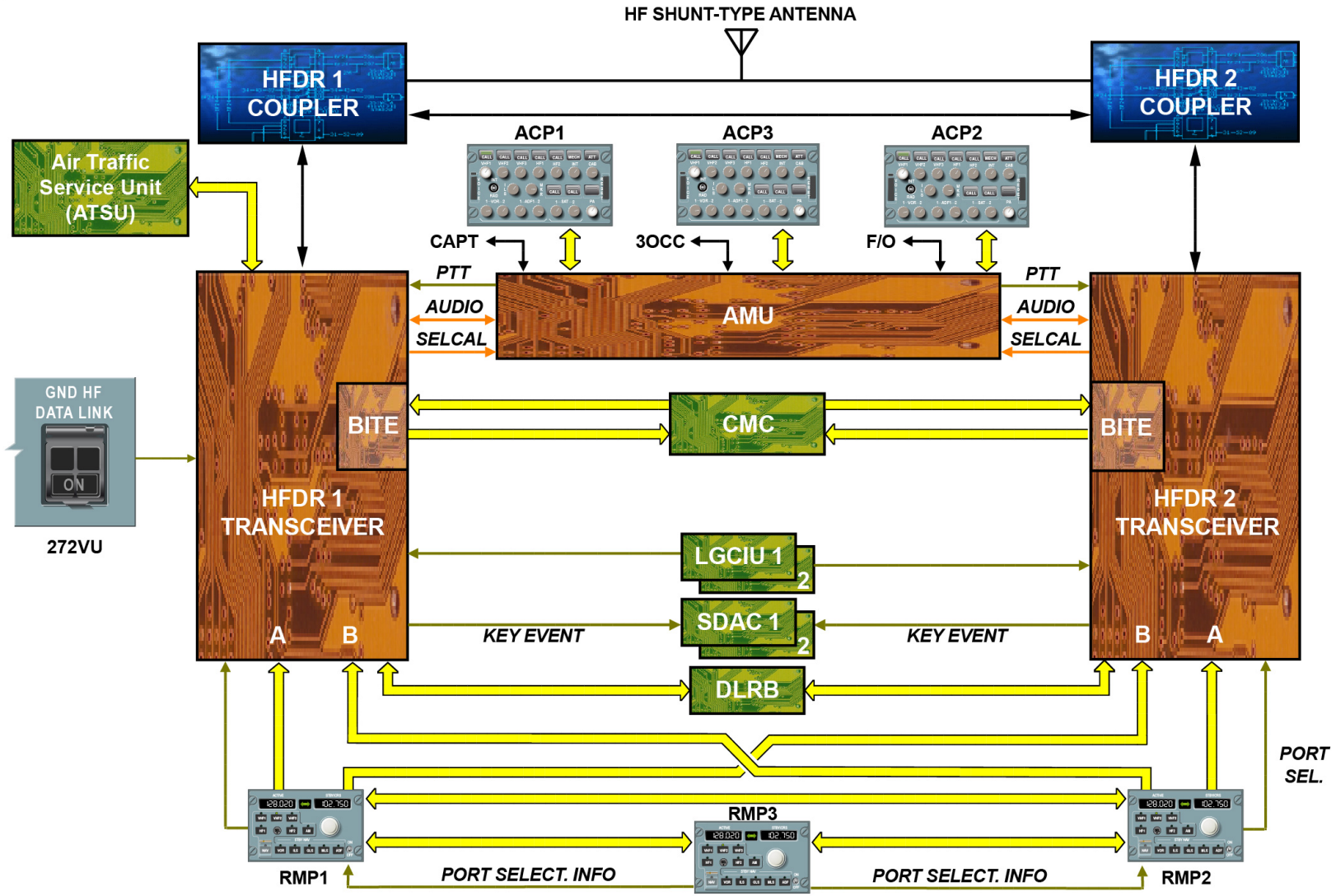
HF SYSTEM D/O

INTERFACE OF THE HFDR TRANSCEIVERS

The HFDR transceiver is linked to other systems through 3 types of lines:
- first, ARINC 429 buses with the RMPs, the CMC. The signal used is serial 32-bit word with a dedicated label.
For maintenance purposes, the HF BITE transmits failure messages with label 356 to the CMC. An ARINC 429 High Speed (HS) bus is used between the HFDR 1 and the ATSU.
- second, discrete lines, from or to systems, the electrical level used by the KEY EVENT, the PTT key line, the flight/ground status or the PORT SELECTION information is a ground/open circuit. DISABLE 1/ DISABLE 2: for a dual HF system installation.
HF transmission is inhibited on ground. A GND HF DATALINK P/BSW, located on the overhead panel, may override the inhibition. HF must not be used during refueling.
- third, analog lines are used for audio signals, side tone and the SELCAL information.

CHARACTERISTICS

The HF transceiver complies with the standard defined by ARINC 719.

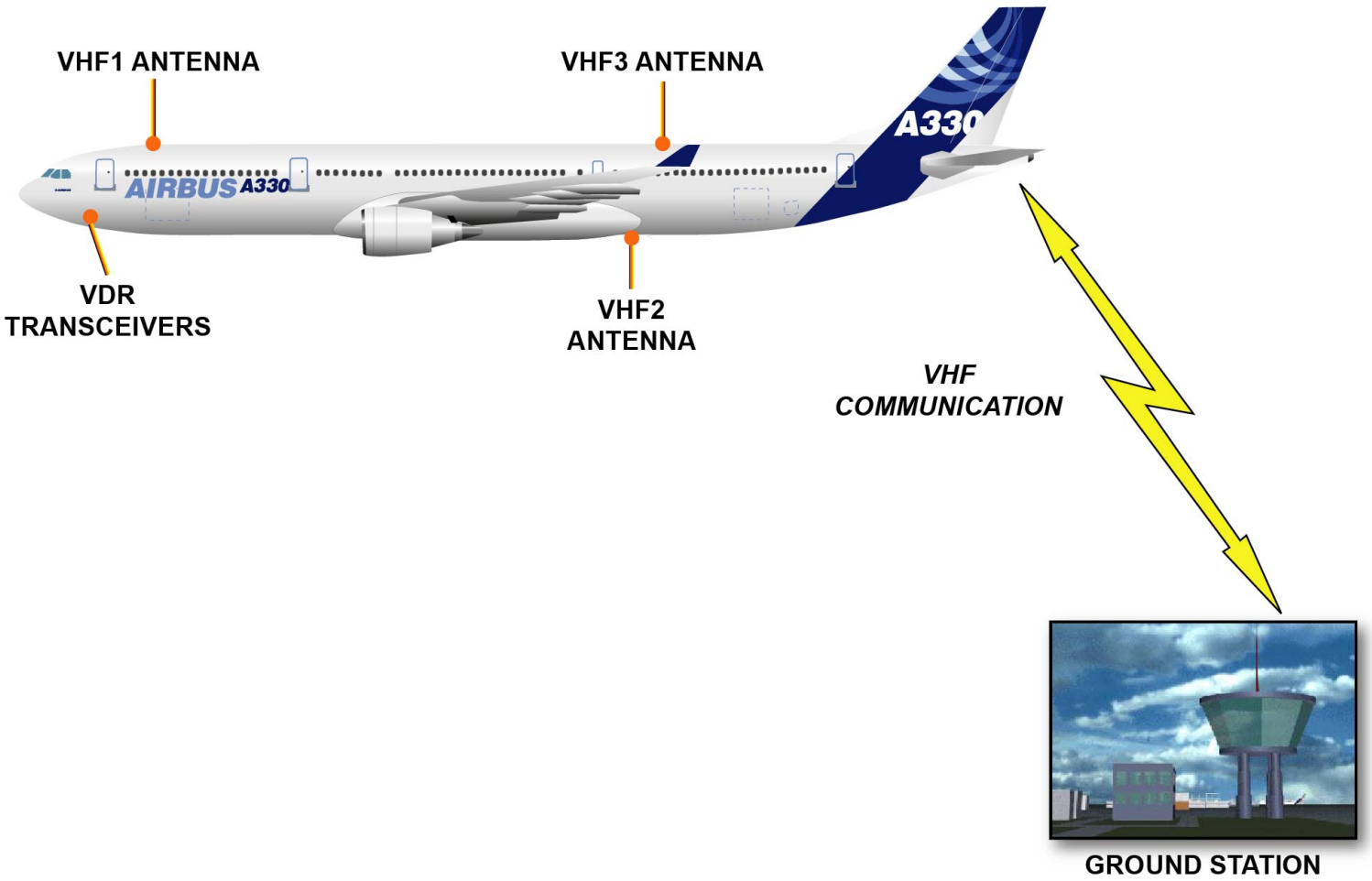


INTERFACE OF THE HFDR TRANSCEIVERS - CHARACTERISTICS

VHF D/O

GENERAL

The VHF system allows short distance voice communications between different A/C (in flight or on ground), or between the A/C and a ground station. The basic version is equipped with 3 VHF Data Radio (VDR) transceivers used for voice communications. The VHF system comprises:
- 3 VDR transceivers,
- 3 blade antennae.

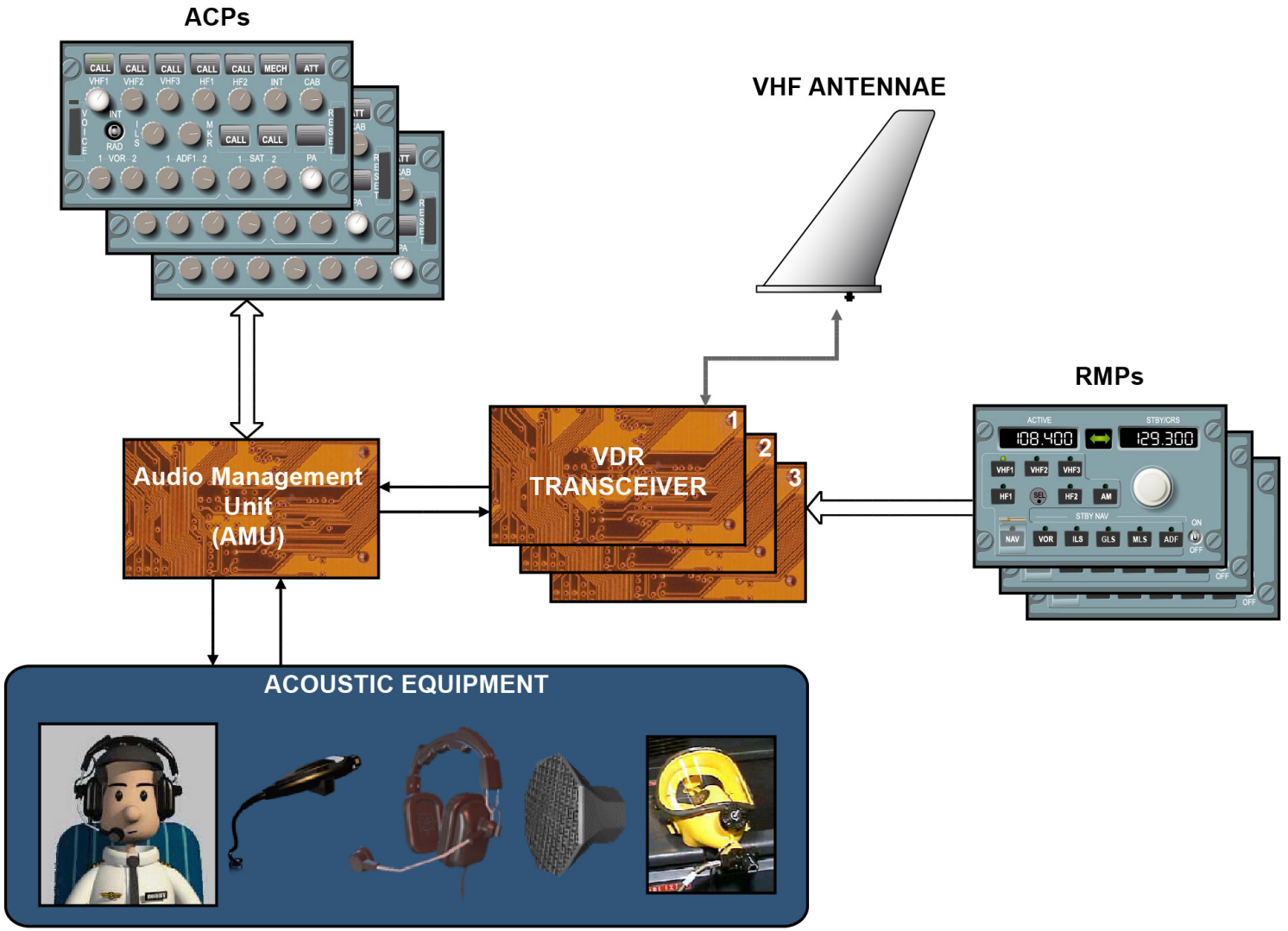


GENERAL

VHF D/O

MAIN COMPONENTS OF THE VHF SYSTEM

The main components of the VHF system are:
- the VDR 1/2/3 transceivers,
- the VHF antennae,
- the Radio Management Panels (RMPs),
- the Audio Management Unit (AMU),
- the Audio Control Panels (ACPs),
- the acoustic equipment, which is composed of 2 side-stick radio push to talk, 2 loudspeakers, 3 oxygen mask microphones, facilities for boomsets, headsets and microphones.



MAIN COMPONENTS OF THE VHF SYSTEM

VHF D/O

SYSTEM ARCHITECTURE

In the VHF system, the RMPs are used for VDR1, 2 and 3 frequency control. The VDR transceivers have 2 serial input ports: serial input port A and serial input port B. In normal conditions, the three transceivers are tuned through port A from any RMP. The secondary port is dedicated to RMP2 when RMP1 and RMP3 have failed. RMP3 controls the radio communication transceivers through dialog buses and RMP1 and RMP2.The port selection is performed through the PORT SELECTION information line.
The AMU acts as an interface between the users and the VHF systems for transmission and reception of audio signals. The Push-to-talk (PTT) key line is a ground signal sent to the transceivers through the AMU.
The ACPs are used for VHF transmission or reception selection mode and control of the received audio signal levels through the AMU.
The VDR transceiver is a type 1 BITE system.
From the Landing Gear Control and Interface Units (LGCIUs) a discrete ground signal is sent to the VDR transceivers, when the A/C is in flight with L/G down or not. The LGCIU sends the FLIGHT/GROUND A/C status used by the VDR BITE, in order to increment the flight leg.
If the transmission lasts more than 1 minute, the "VHF1 EMITTING", "VHF2 EMITTING" or "VHF3 EMITTING" amber message is displayed on the EWD, through the System Data Acquisition Concentrators (SDACs).

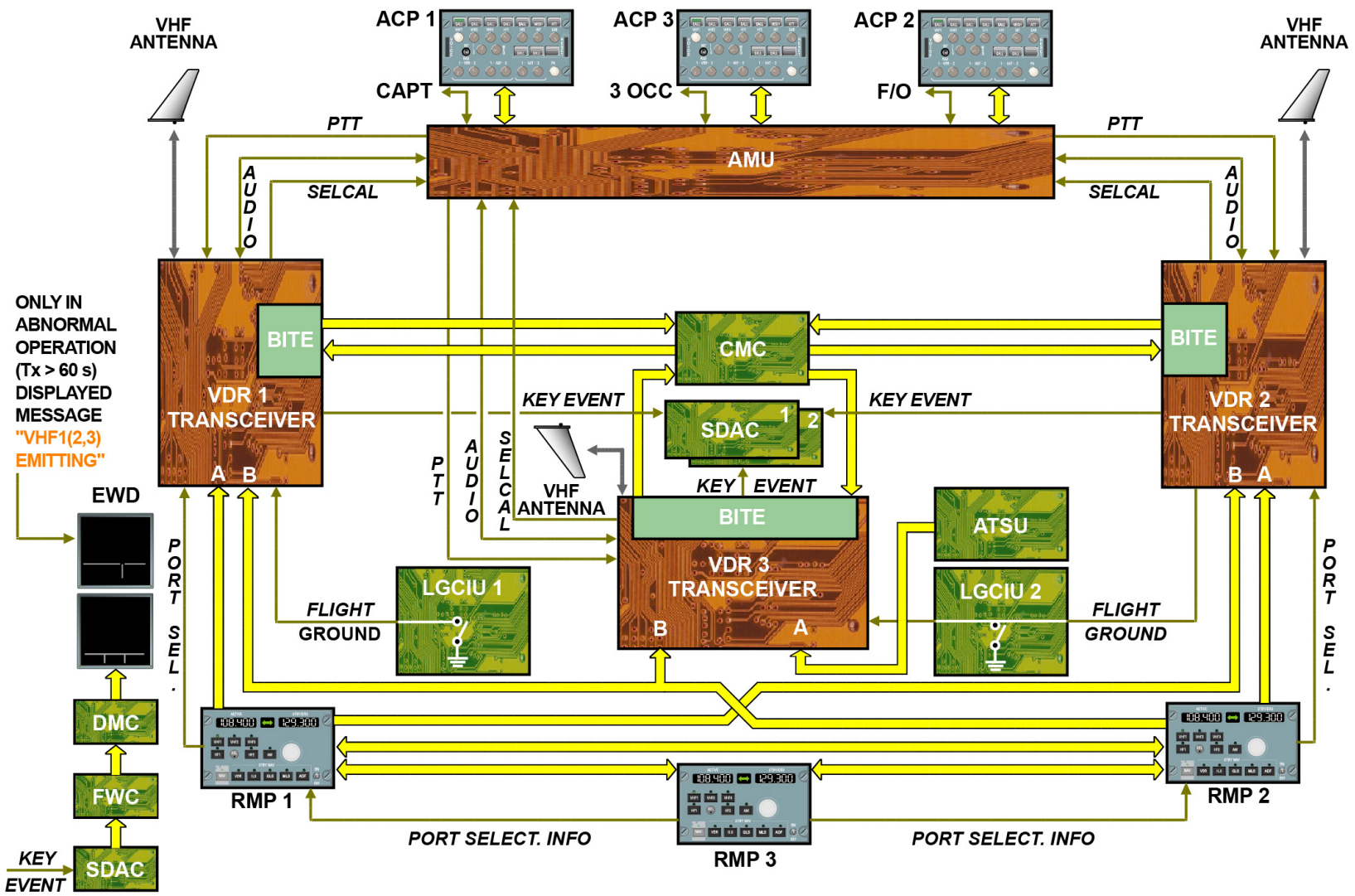
NOTE: Note: when a transmission lasts more than 30 seconds, the transceiver emits an aural warning during 5 seconds.

The VDR 3 transceiver is also connected to the Air Traffic Service Unit (ATSU) for direct exchange of data between the A/C and ground systems like A/C report or weather report. In normal operation, the VDR 3 transceiver is tuned by the ATSU.

SELCAL

The SELective CALling (SELCAL) system gives visual and aural indications to the flight crew, concerning calls received through the VHF system.

NOTE: Note: the SELCAL function is integrated in the AMU.



SYSTEM ARCHITECTURE - SELCAL

VHF D/O

INTERFACE OF THE VDR TRANSCEIVERS

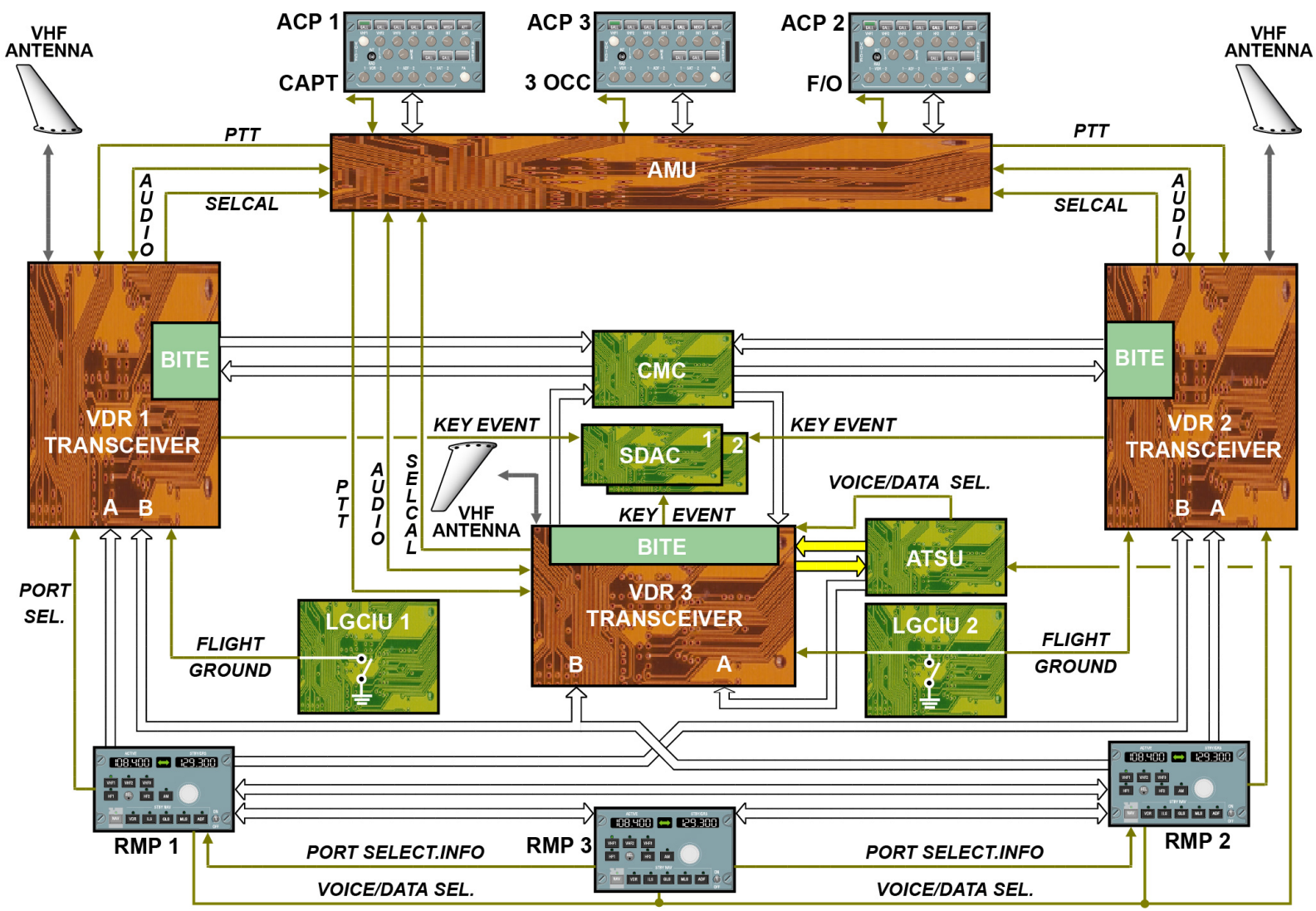
The VDR transceiver is linked to other systems through 3 types of lines:
- first, ARINC 429 buses with the RMPs (for tuning), and the Central Maintenance Computer (CMC) (for failure transmission or test).An ARINC 429 High Speed (HS) is used between VDR 3 and the ATSU.
- second, discrete lines, from or to systems, the electrical level used by the KEY EVENT, the PTT key line, the FLIGHT/ GROUND status or the PORT SELECTION information is a ground/open circuit.
- third, analog lines are used for audio signals, side tone and the SELCAL information.

DATA TRANSMISSION

Each VDR transceiver can operate in VOICE mode or DATA mode. In position 3 only, the VDR is active in DATA mode.
The ATSU sends data packages to the VDR 3 transceiver for modulation. The obtained VHF signal is then sent to the antenna for emission.
Upon receipt of VHF signals, the transceiver, when tuned on the selected frequency, transforms the signal into digital format, and transmits the data to the ATSU.
The ATSU automatically sets the VDR 3 transceiver into DATA mode by the VOICE/DATA selection discrete.
In abnormal operation, the switching between VOICE and DATA functions in the VDR 3 can be achieved by any RMP. In this case, the RMP sets the transceiver in VOICE mode via the VOICE/DATA selection information to the ATSU. Port B is then used for this operational mode.

CHARACTERISTICS

The VDR transceiver complies with ARINC 716 standards.

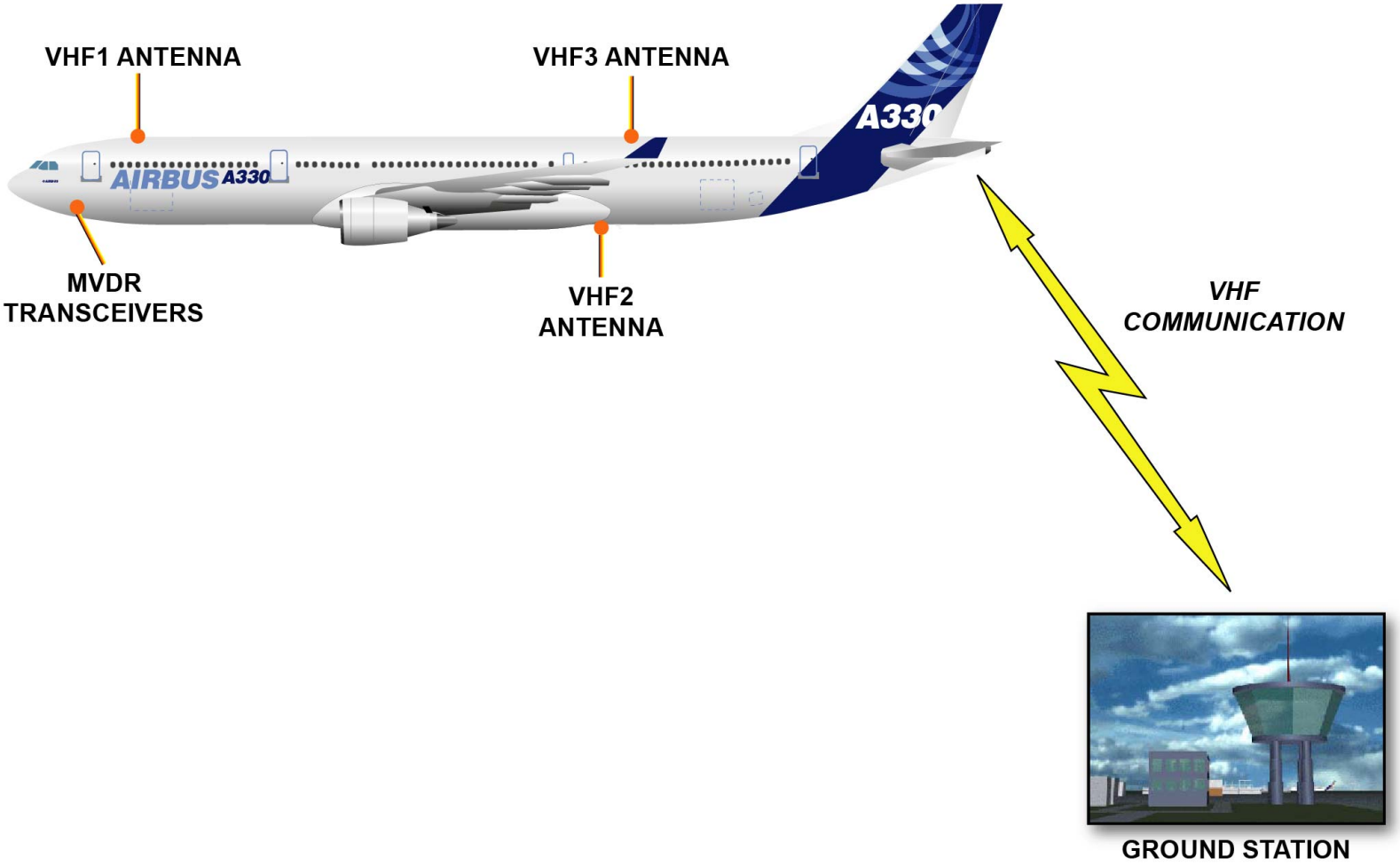


INTERFACE OF THE VDR TRANSCEIVERS - DATA TRANSMISSION & CHARACTERISTICS

VHF D/O (MVDR OPTION)

GENERAL

The VHF (Very High Frequency) system allows short distance voice communications between different A.C (in flight or on ground), or between the A.C and a ground station. The basic version is equipped with 2 Multiple VHF Data Radio (MVDR) transceivers used for voice and data communications.
The VHF system comprises:
- 3 MVDR. Each MVDR has 2 VHF transceivers,
- 3 blade antennas.

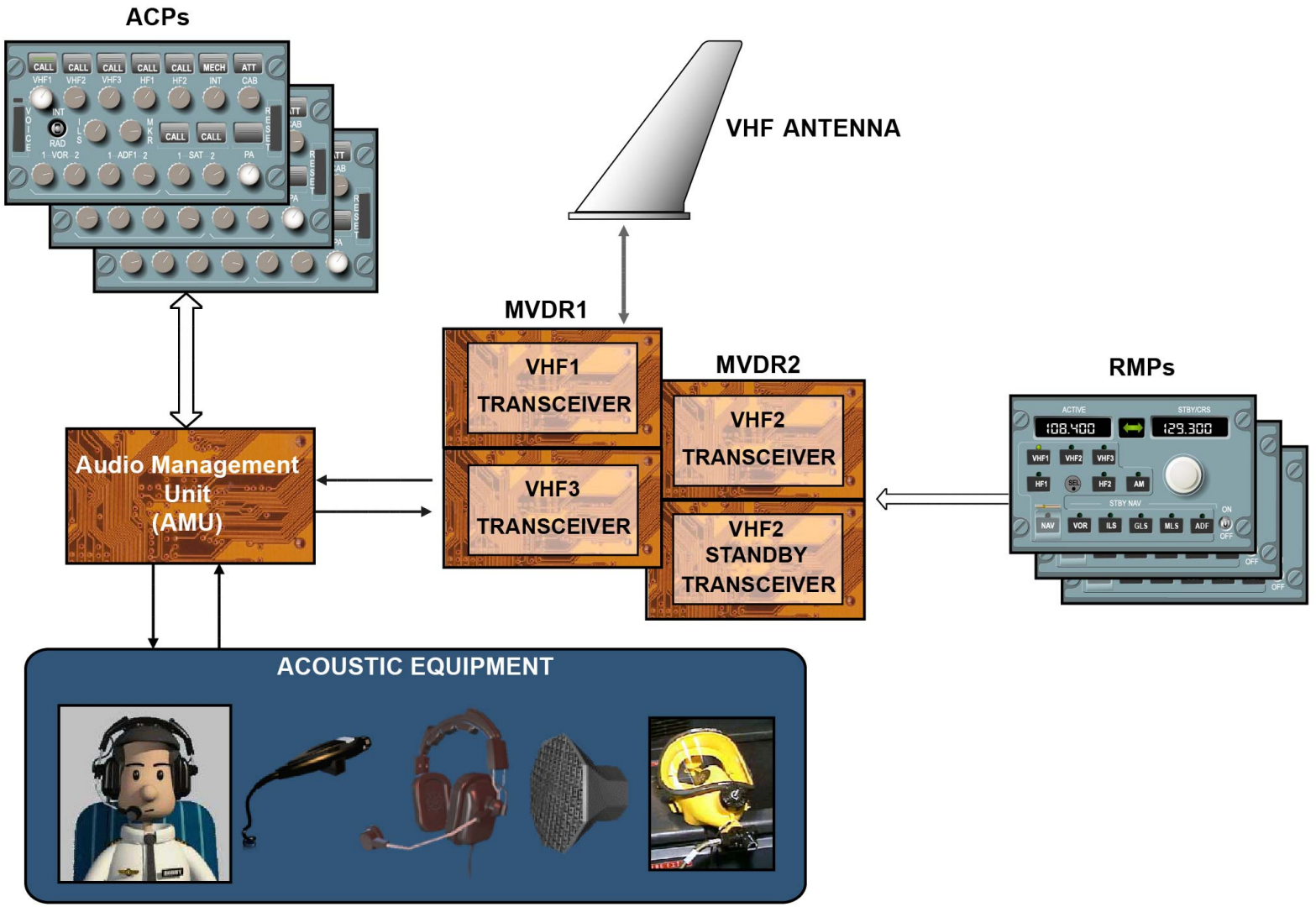


GENERAL

VHF D/O (MVDR OPTION)

MAIN COMPONENTS OF THE VHF SYSTEM

The main components of the VHF system are:
- The MVDRS,
- The VHF antennas,
- The Radio Management Panels (RMPs),
- The Audio Management Unit (AMU),
- The Audio Control Panels (ACPs),
- The acoustic equipment, which is composed of 2 side-stick radio push to talk, 2 loudspeakers, 3 oxygen mask microphones, facilities for boomsets, headsets and microphones.



MAIN COMPONENTS OF THE VHF SYSTEM

VHF D/O (MVDR OPTION)

SYSTEM ARCHITECTURE

The VHF system has 2 MVDRs (Multiple VHF Data Radio). Each MVDR includes 2 VHF transceivers:
- MVDR1 includes VHF1 and VHF3 transceivers,
- MVDR2 includes VHF2 transceiver and a VHF2 Hot Standby transceiver. In case of failure of VHF2 transceiver, VHF2 Hot Standby transceiver takes over immediately and automatically.

In the VHF system, the RMPs are used for VHF1, 2 and 3 frequency control. The VHF transceivers have 2 serial input ports: serial input port A and serial input port B. In normal conditions, the three transceivers are tuned through port A from any RMP.
The secondary port B is dedicated to:
- RMP2 when RMP1 and RMP3 have failed,
- RMP1 when RMP2 and RMP3 have failed.

RMP3 controls the radio communication transceivers through dialog buses and RMP1 and RMP2. The port selection is performed through the PORT SELECTION information line.
The AMU acts as an interface between the users and the VHF systems for transmission and reception of audio signals. The Push-to-talk (PTT) key line is a ground signal sent to the transceivers through the AMU.
The ACPs are used for VHF transmission or reception selection mode and control of the received audio signal levels through the AMU.
The VHF3 transceiver in MVDR1 is also connected to the Air Traffic Service Unit (ATSU) for direct exchange of data between the A.C and ground systems like A.C report or weather report. In normal operation, the VHF 3 transceiver is tuned by the ATSU.

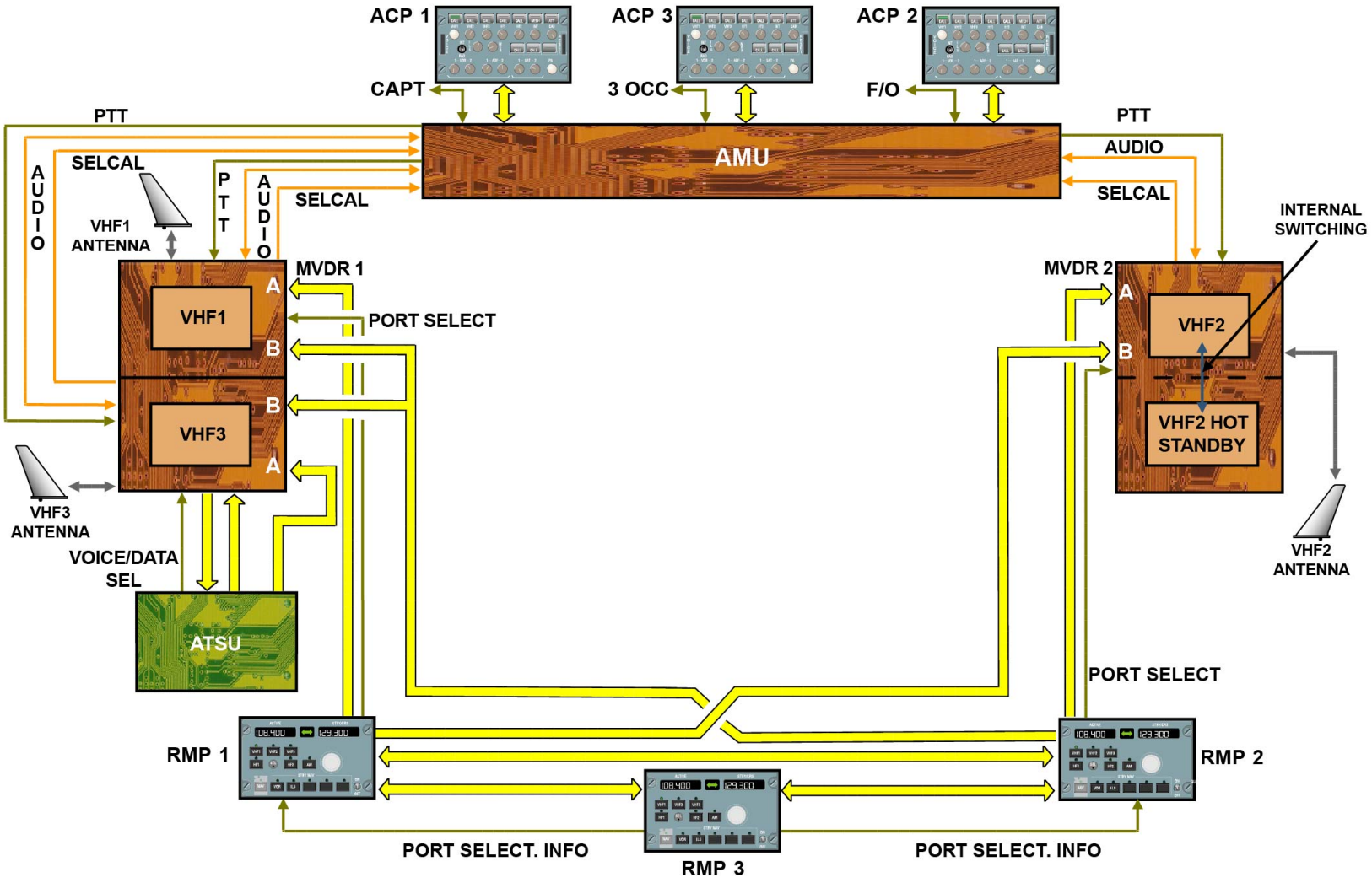
SELCAL

The SELective CALling (SELCAL) system gives visual and aural indications to the flight crew, concerning calls received through the VHF system.

NOTE: Note: the SELCAL function is integrated in the AMU.

DATA TRANSMISSION

Each MVDR transceiver can operate in VOICE mode or DATA mode. In MVDR1, only VHF 3 is active in DATA mode.
The ATSU sends data packages to the VHF 3 transceiver for modulation. The obtained VHF signal is then sent to the antenna for emission.
Upon receipt of VHF signals, the transceiver, when tuned on the selected frequency, transforms the signal into digital format, and transmits the data to the ATSU.
The ATSU automatically sets the VHF 3 transceiver into DATA mode by the VOICE/DATA selection discrete.
In abnormal operation, the switching between VOICE and DATA functions in the VHF 3 can be achieved by any RMP. In this case, the RMP sets the transceiver in VOICE mode via the VOICE/DATA selection information to the ATSU. Port B is then used for this operational mode for the tuning of VHF 3 frequency.



SYSTEM ARCHITECTURE - SELCAL & DATA TRANSMISSION

VHF D/O (MVDR OPTION)

INTERFACE OF THE MVDRS

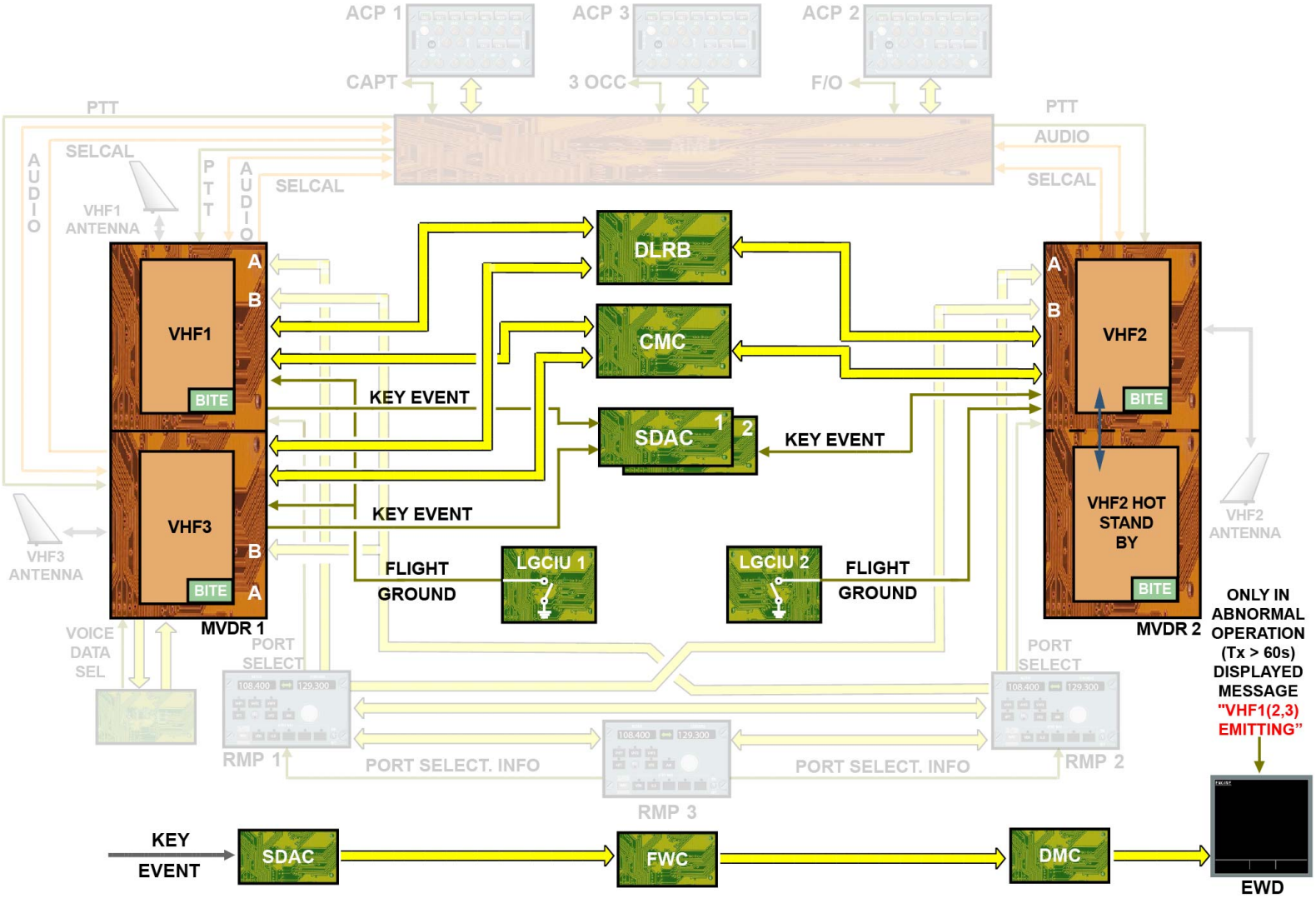
The VDR transceiver is linked to other systems through 3 types of lines:
- First, ARINC 429 buses with the RMPs (for tuning), and the Central Maintenance Computer (CMC) (for failure transmission or test).
An ARINC 429 High Speed (HS) is used between VHF 3 transceiver and the ATSU. An ARINC 429 High Speed (HS) is also used between the DLRB (Data Loading Routing Box) and the VHF transceivers.
- Second, discrete lines, from or to systems, the electrical level used by the KEY EVENT, the PTT key line, the FLIGHT/ GROUND status or the PORT SELECTION information is a ground/open circuit.
- Third, analog lines are used for audio signals, side tone and the SELCAL information.

CHARACTERISTICS

The VDR transceiver complies with ARINC 716 standards.
The MVDR transceiver are type 1 BITE system. They are connected to the Central Maintenance Computer (CMC) for failure transmission or interactive test.
From the Landing Gear Control and Interface Units (LGCIUs) a discrete ground signal is sent to the MVDR transceivers, when the A/C is in flight with L/G down or not. The LGCIU sends the FLIGHT/GROUND A/C status used by the MVDR BITE, in order to increment the flight leg.
If the transmission lasts more than 1 minute, the "VHF1 EMITTING", "VHF2 EMITTING" or "VHF3 EMITTING" amber message is displayed on the EWD, through the System Data Acquisition Concentrators (SDACs).

NOTE: Note: when a transmission lasts more than 30 seconds, the transceiver emits an aural warning during 5 seconds.

The MVDR transceivers are connected to the DLRB to allow the uploading of the MVDR software on ground.



INTERFACE OF THE MVDRS - CHARACTERISTICS

AUDIO MANAGEMENT D/O

AUDIO MANAGEMENT UNIT ARCHITECTURE

The objective of this topic is to describe the Audio Management Unit (AMU) architecture.

GENERAL

The AMU comprises:
- audio cards,
- three cockpit amplifier cards,
- a SELCAL/BITE card,
- a flight interphone card,
- an emergency function.

The audio cards are:
- the CAPT audio card,
- the F/O audio card,
- the 3rd occupant audio card,
- the optional 4th and 5th occupant audio cards.

The cockpit amplifier cards are:
- the CAPT amplifier,
- the F/O amplifier,
- the Emergency cockpit amplifier.

AUDIO CARD FUNCTIONS

The audio cards provide the following functions:
- the transmission, reception and volume adjustment for radio, interphone and passenger announcements,
- processing,
- ARINC transmission and reception,
- power supply.

COCKPIT AMPLIFIER CARDS

The cockpit amplifier cards ensure the amplification, through loudspeakers, for the audio signals from and to the CAPT and F/O. They also amplify warning signals from the Flight Warning Computers (FWCs) and the Enhanced Ground Proximity Warning System (EGPWS). The muting function is done by the cockpit amplifiers.

SELCAL CALL/BITE CARD

The SELCAL CALL/BITE card provides the following functions:
- the decoding of selective calls,
- comparison between the received code and the code setting on the SELCAL control panel,
- identification of discrete attendant calls and mechanic calls,
- transmission of calls to the FWC and to Audio Control Panels (ACPs) via the corresponding audio cards,
- call cancellation and system re-initialization after a call, when a reset action is performed,
- the BITE circuit generates a message which gives the installation status of certain equipment.

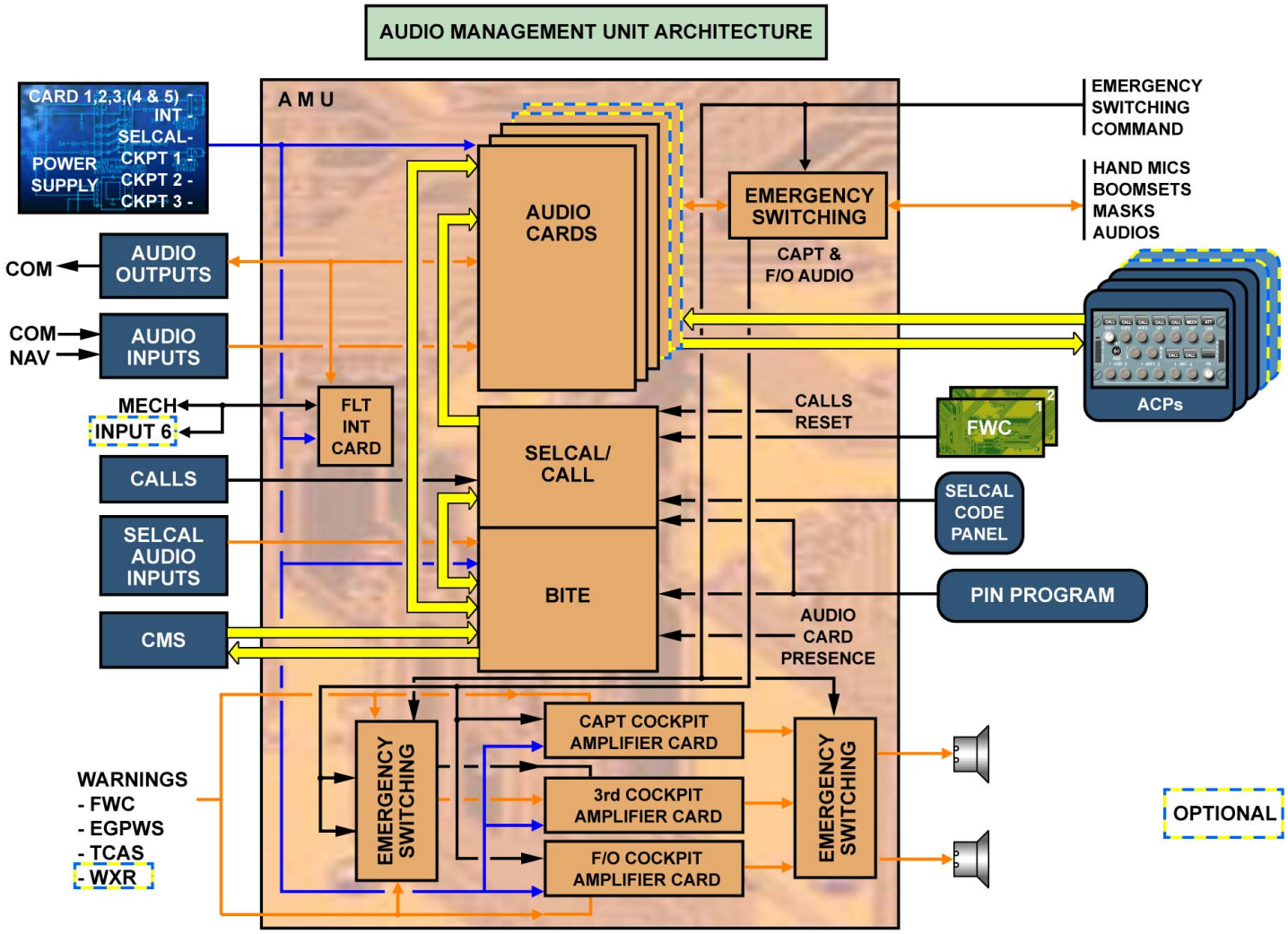
The SELCAL CALL/BITE card also decodes the pin-programming in order to send the options/status information to the audio cards, the ACPs and the Central Maintenance System (CMS).

FLIGHT INTERPHONE CARD

The flight interphone card provides audio links between the various crew stations in the cockpit, between the cockpit and the ground crew (external power control panel) and between the cockpit and the avionics compartment (INPUT 6).

EMERGENCY SWITCHING

The emergency switching allows acoustic equipment to be switched, from CAPT or F/O, to the 3rd occupant audio card. The emergency switching also switches the audio and warning signals to the 3rd occupant cockpit amplifier card.



AUDIO MANAGEMENT UNIT ARCHITECTURE - GENERAL ... EMERGENCY SWITCHING

AUDIO MANAGEMENT D/O

AUDIO SWITCHING D/O

The objective of this topic is to describe in detail the emergency AUDIO SWITCHING in case of CAPT or F/O audio channel failure.

GENERAL

In case of emergency, there are two ways to recover a failure of the CAPT or F/O audio channel:
- the automatic emergency mode,
- the manual emergency mode.

An audio switching selector, located on the center pedestal, is used in manual mode. When manual audio switching is done, "AUDIO SWITCHING" is displayed on the ECAM right memo.

AUDIO SWITCHING SELECTOR

In case of emergency, there are two emergency ways to recover a failure of the CAPT or F/O audio channel:
- the automatic emergency mode and,
- the manual emergency mode.

AUDIO SWITCHING D/O - GENERAL

AUDIO MANAGEMENT D/O

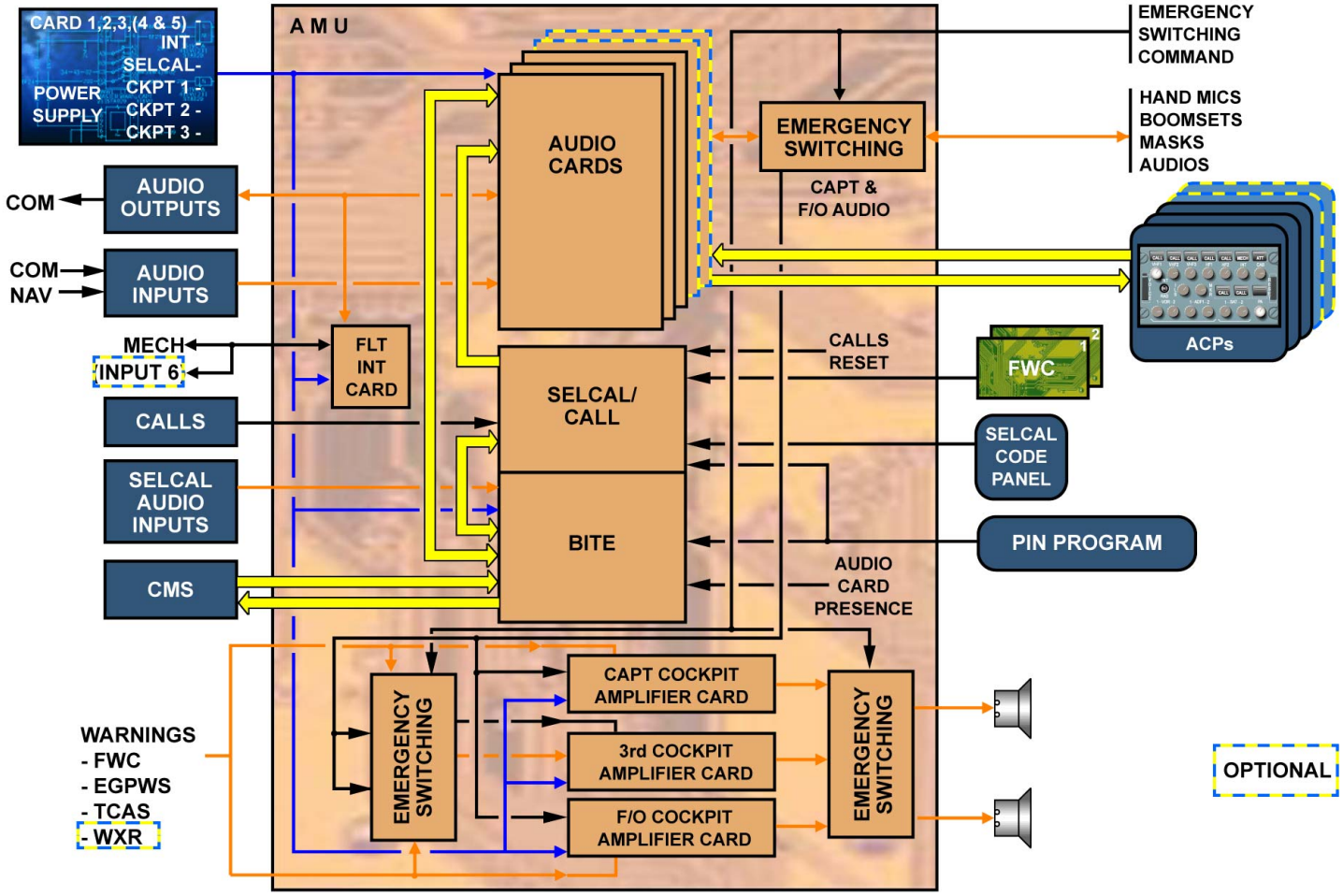
AUDIO SWITCHING D/O (continued)

AUTOMATIC EMERGENCY MODE

In case of failure of the ACP or ACP-AMU connection, the audio channel concerned, in the AMU, automatically switches to the automatic emergency mode. This mode does not affect the warning indication function.

This mode consists in defining a preprogramming configuration for the reception level controls and radio transmission selection, until the manual emergency mode is selected.

In case of failure of the DC Essential bus (401PP), an ECAM Message is triggered. The crew turns the switch (135 VU), to activate both relays and to supply Audio Card 1 or Audio Card 2 on the DC Normal Bus (101 PP).



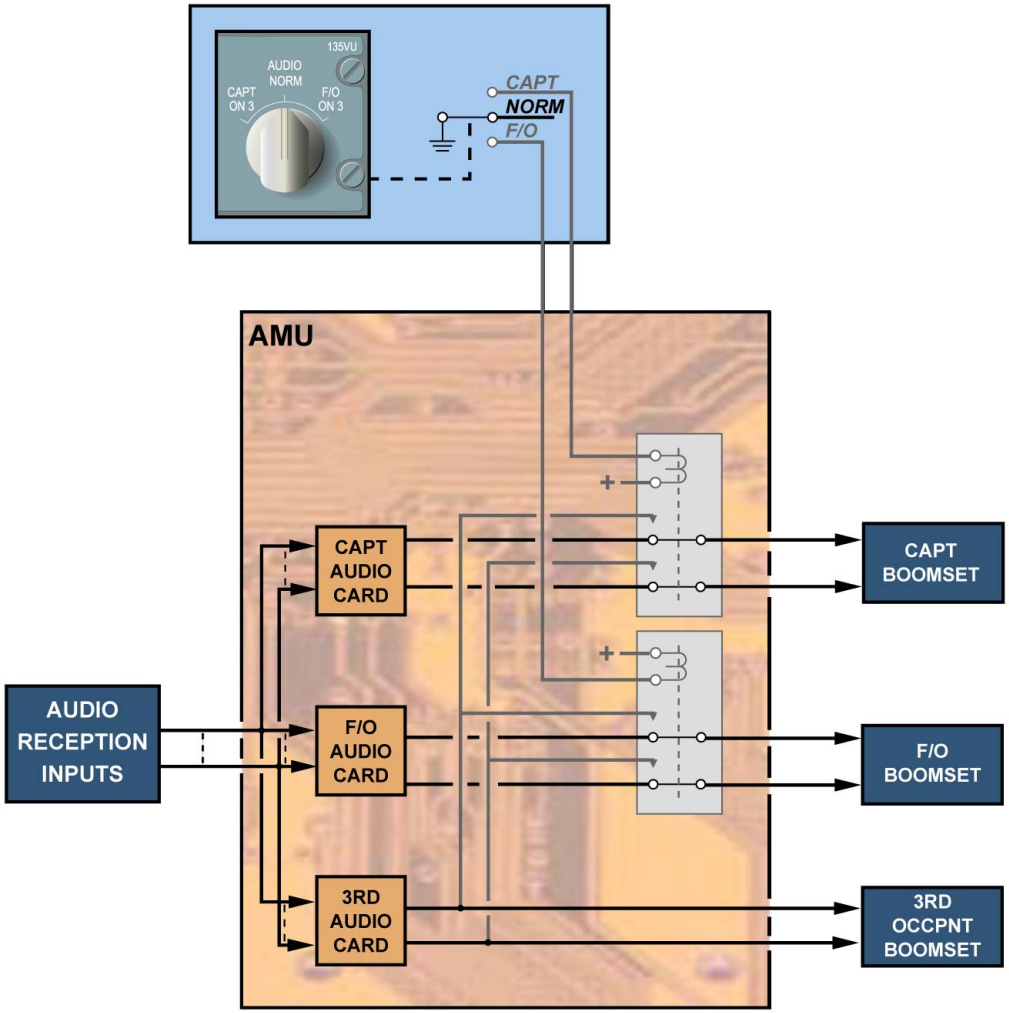
AUDIO SWITCHING D/O - AUTOMATIC EMERGENCY MODE

AUDIO MANAGEMENT D/O

AUDIO SWITCHING D/O (continued)

MANUAL EMERGENCY MODE 1 BOOMSET RECEPTION

In normal reception operation, each boomset is connected to its reception channel.
In reception, with a failure of the CAPT channel, setting the audio switching selector to the CAPT ON 3 position, switches the CAPT channel to the third occupant channel. The CAPT channel is in parallel with the 3rd occupant channel.
In reception, with a failure of the F/O channel, setting the audio switching selector to the F/O ON 3 position, switches the F/O channel to the third occupant channel. The F/O channel is in parallel with the 3rd occupant channel.



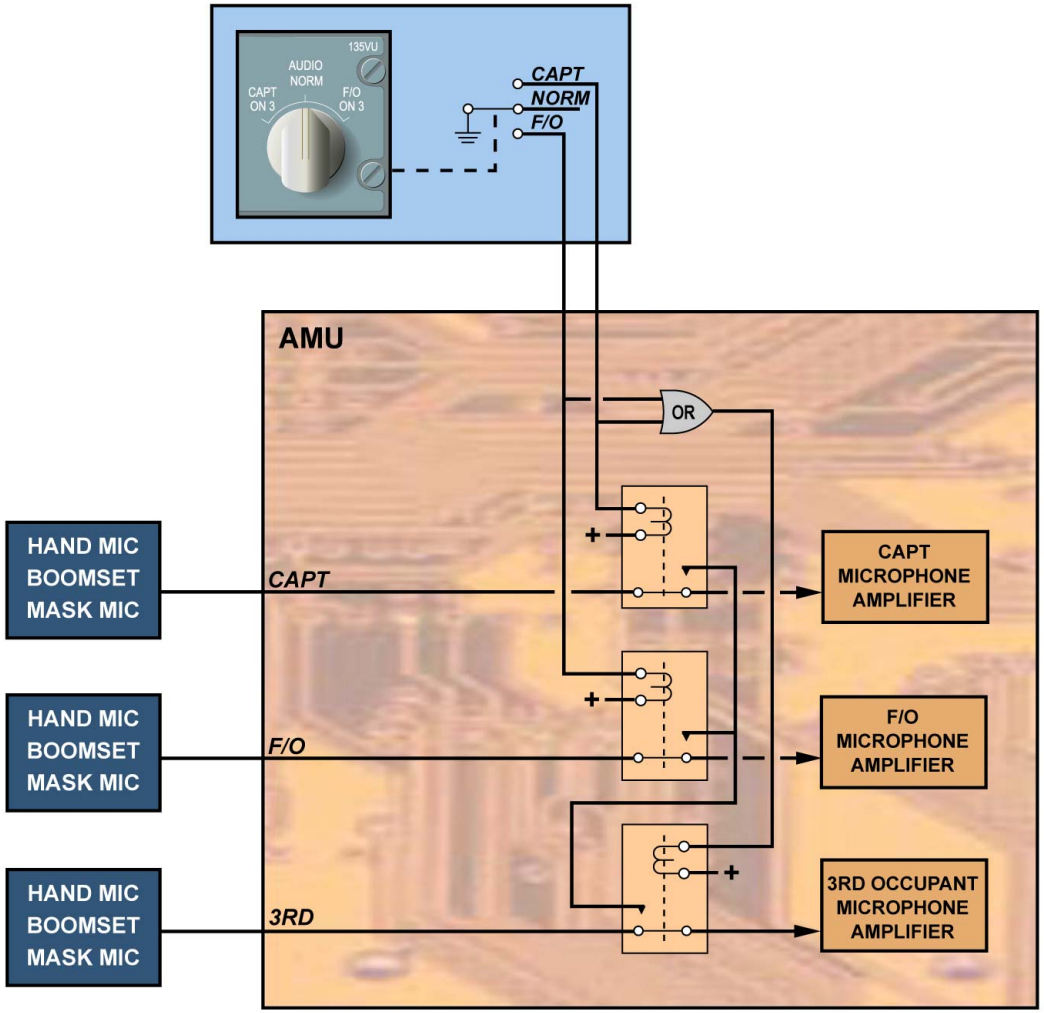
AUDIO SWITCHING D/O - MANUAL EMERGENCY MODE 1 BOOMSET RECEPTION

AUDIO MANAGEMENT D/O

AUDIO SWITCHING D/O (continued)

MANUAL EMERGENCY MODE 2 TRANSMISSION

In normal transmission operation, each channel is connected to its microphone amplifier.
In transmission mode with a failure of the CAPT channel, setting the audio switching selector to the CAPT ON 3 position, switches the CAPT microphone to the third occupant microphone amplifier. The microphone of the 3rd occupant is disconnected from the 3rd occupant microphone amplifier. The CAPT microphone is connected to the 3rd occupant microphone amplifier.
In transmission mode, with a failure of the F/O channel, setting the audio switching selector to the F/O ON 3 position, switches the F/O microphone to the 3rd occupant microphone amplifier. The microphone of the 3rd occupant is disconnected from the 3rd occupant microphone amplifier. The F/O microphone is connected to the 3rd occupant microphone amplifier.



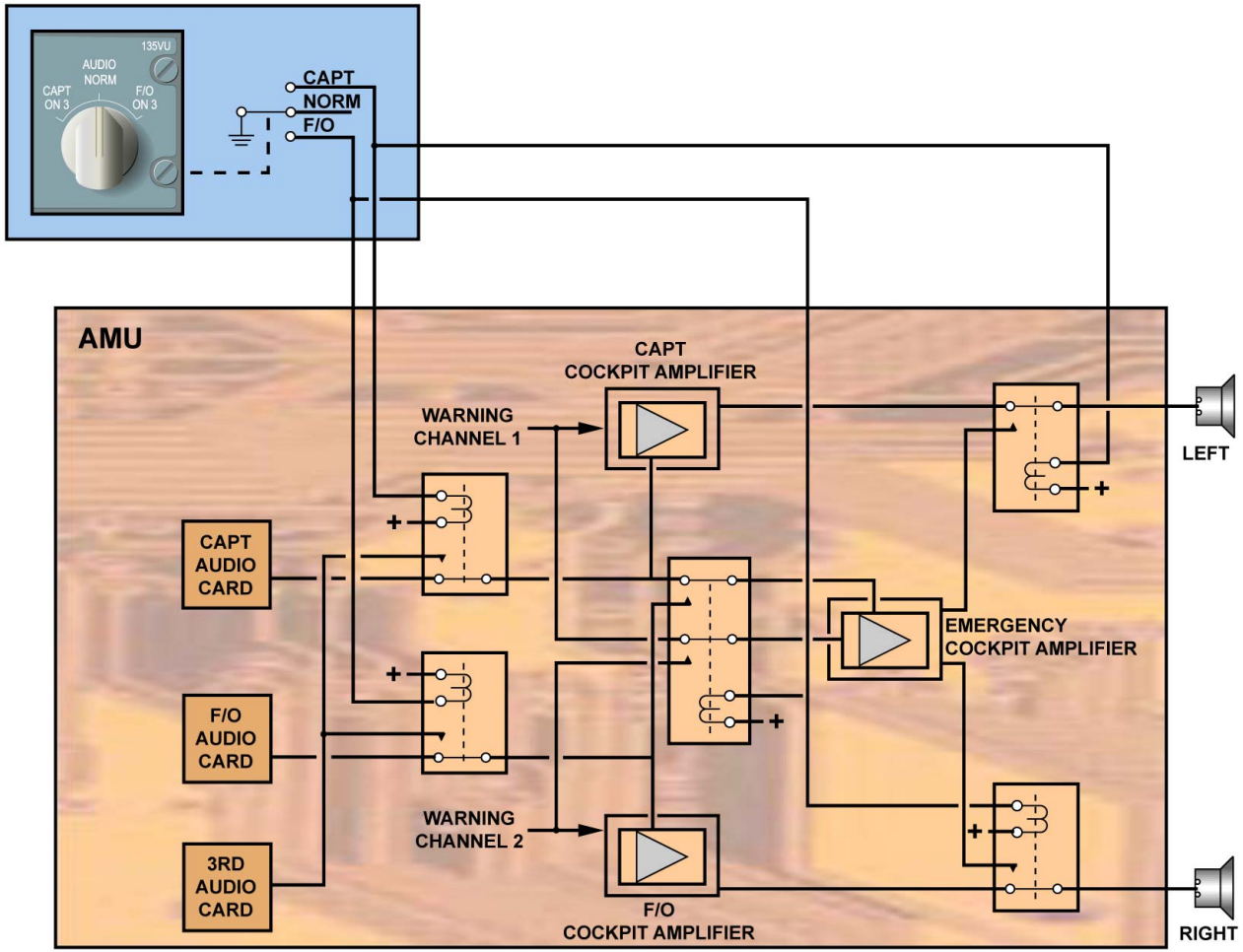
AUDIO SWITCHING D/O - MANUAL EMERGENCY MODE 2 TRANSMISSION

AUDIO MANAGEMENT D/O

AUDIO SWITCHING D/O (continued)

MANUAL EMERGENCY MODE 3 LOUDSPEAKERS

In normal operation, the CAPT audio card is connected to the left cockpit loudspeaker, through the CAPT cockpit amplifier. The F/O audio card is connected to the right cockpit loudspeaker, through the F/O cockpit amplifier. WARNING 1 is connected to CAPT cockpit amplifier. WARNING 2 is connected to F/O cockpit amplifier.
In case of a failure of the CAPT channel, setting the audio switching selector to the CAPT ON 3 position, switches the left cockpit loudspeaker to the emergency cockpit amplifier. WARNING 1 is connected to emergency cockpit amplifier. WARNING 2 is connected to F/O cockpit amplifier.
In case of a failure of the F/O channel, setting the AUDIO SWITCHING selector to the F/O ON 3 position, switches the right cockpit loudspeaker to the emergency cockpit amplifier. WARNING 1 is connected to CAPT cockpit amplifier. WARNING 2 is connected to emergency cockpit amplifier.



AUDIO SWITCHING D/O - MANUAL EMERGENCY MODE 3 LOUDSPEAKERS

AUDIO MANAGEMENT D/O

SELCAL/CALL D/O

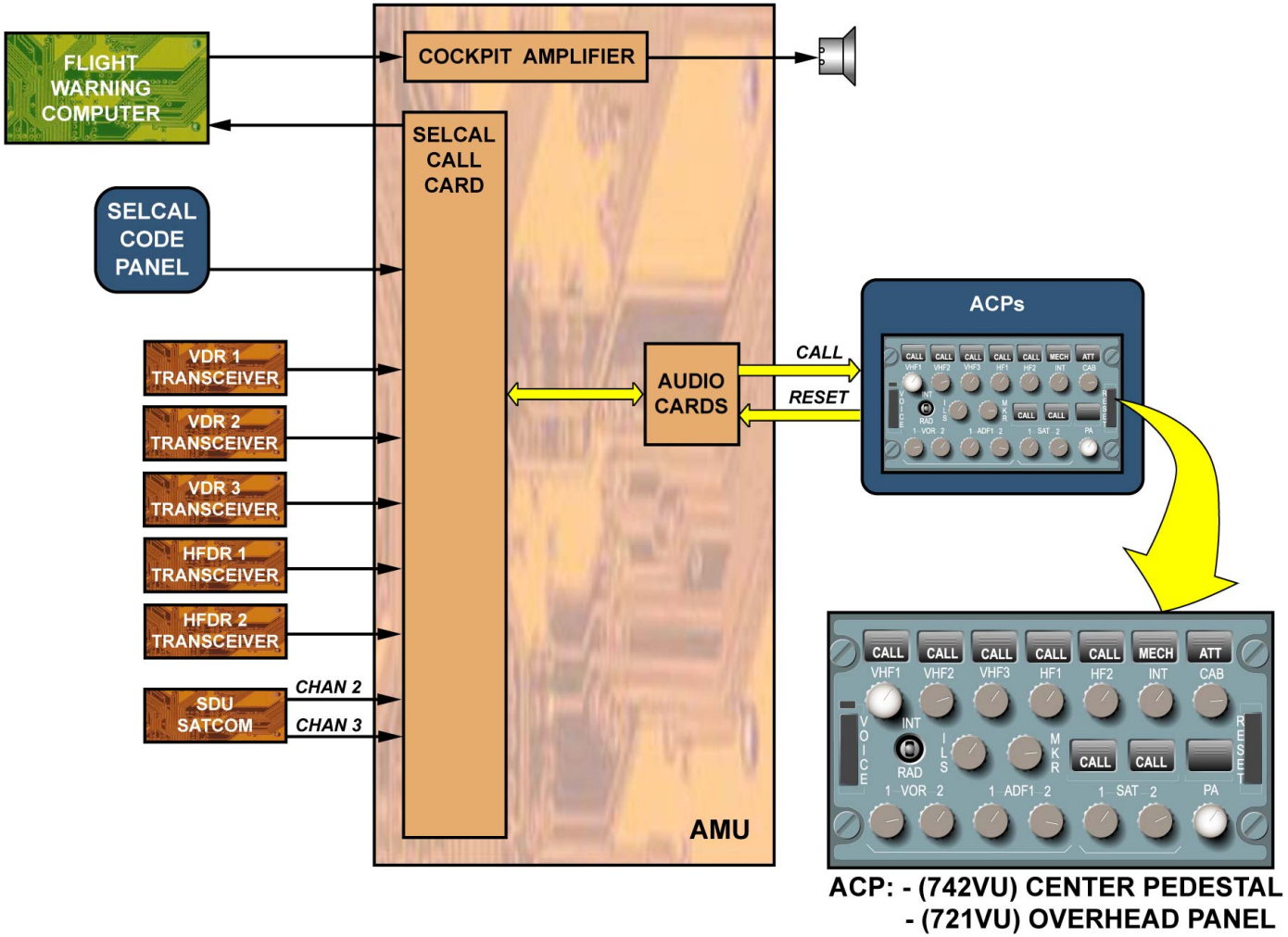
The objective of this topic is to describe in detail the SELCAL and CALL functions.

GENERAL

The SELCAL and CALL functions are performed in the AMU by the SELCAL/CALL card. This card receives SELCAL calls from the ground stations via the communication channels, a SELCAL code from the SELCAL code panel, CALLs from the ground crew and the attendant stations and provides visual and aural warnings. The SELCAL card also sends information about the pin programming options to the audio cards and the ACPs.

OPERATION

The SELCAL/CALL card has 7 inputs. These inputs are permanently scanned, and when a SELCAL signal is present, a comparison is made with the code programmed on the SELCAL code panel.
When the 2 codes agree, a message is sent to the various ACPs, via the related audio cards. On the ACPs, the CALL light, related to the communication channel used, flashes amber.
At the same time, data is sent to the FWCs.
The FWCs send an audio call buzzer to the loudspeakers, through the cockpit amplifier in the AMU.
The CALL is cancelled using the RESET key on one ACP, or by selecting the called channel and activating the Push To Talk (PTT).



SELCAL/CALL D/O - GENERAL & OPERATION

AUDIO MANAGEMENT D/O

SELCAL/CALL D/O (continued)

GROUND CALL

Two types of call may be received by the SELCAL CALL card:
- a ground call,
- a cabin attendant call.

When the COCKPIT CALL P/B, located on the EXTernal PoWeR control panel, is pressed a discrete signal is sent to the SELCAL CALL card and to the FWC. The FWC activates the buzzer signal and sends it to the cockpit amplifiers in the AMU to be broadcast through the loudspeakers.

The SELCAL card sends a signal through the various audio cards to the ACPs. The MECH legend flashes amber for 60 seconds on the ACPs. The visual call is automatically cancelled and the circuit is reinitialized after 60 seconds (According to company policy) or when the RESET P/B is pressed on any ACP. The automatic reset may be cancelled with the AMU pin programming.

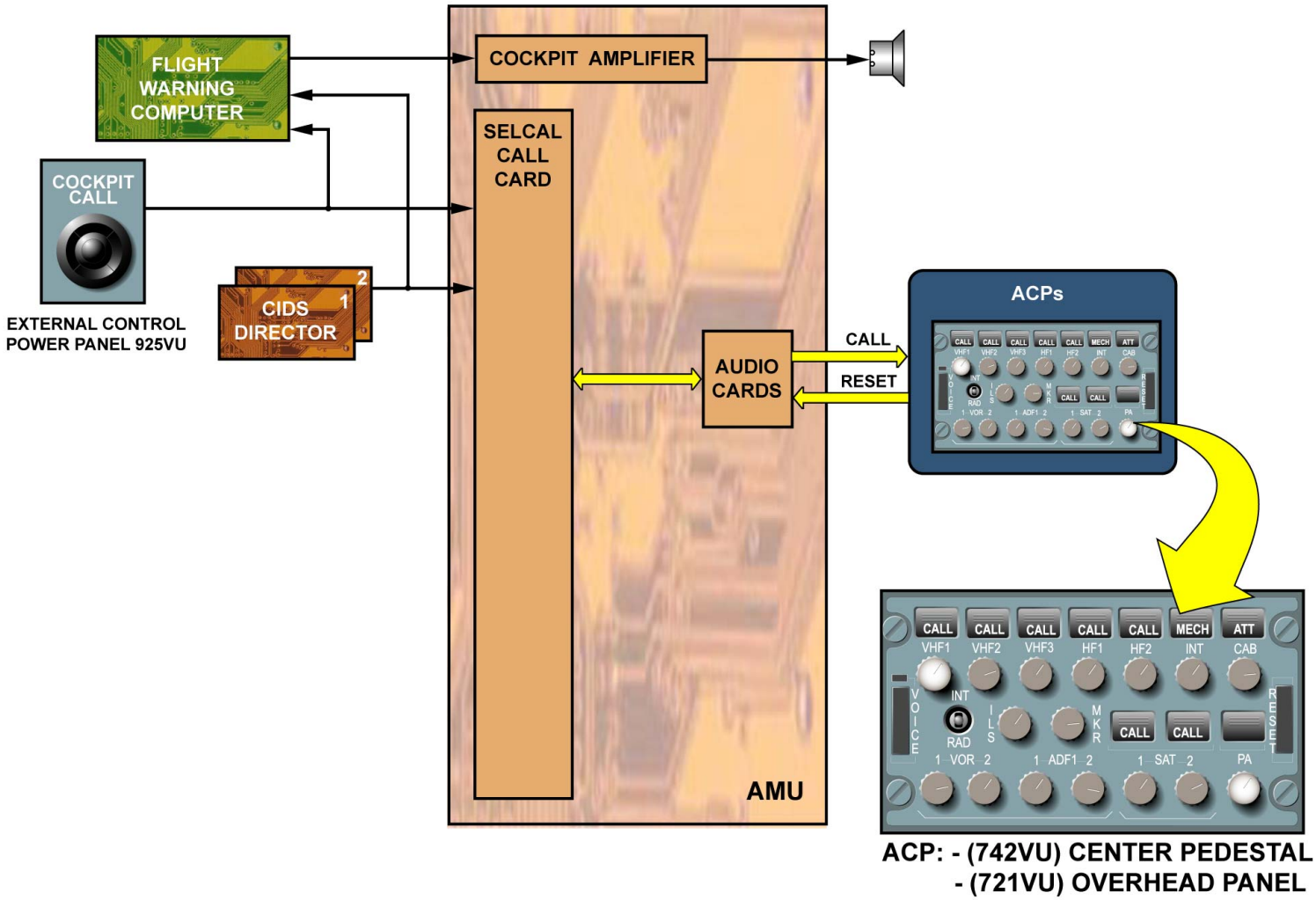
ATTENDANT CALL

When a call is made from a cabin attendant station, the Cabin Intercommunication Data System (CIDS) sends a discrete signal to the SELCAL/CALL card and to the FWC.

The FWC activates the buzzer signal and sends it to the cockpit amplifier in the AMU to be broadcast through the loudspeakers.

The SELCAL CALL card sends a signal through the various audio cards to the ACPs. The ATT legend flashes for 60 seconds on the ACPs. The visual call is automatically cancelled and the circuit reinitialized after 60 seconds or when the RESET P/B is pressed, on any ACP. Information is also sent to the CIDS for reinitialization.

The automatic reset may be cancelled with the AMU pin programming.



SELCAL/CALL D/O - GROUND CALL & ATTENDANT CALL

SATELLITE COMMUNICATION D/O

GENERAL

The SATCOM system provides satellite communication for cockpit and cabin. It supports DATA and VOICE communications.
The SATCOM system is composed of two subsystems: the avionics subsystem and the antenna subsystem.

AVIONICS SUBSYSTEM

The main components of the SATCOM avionics subsystem are:
- the Satellite Data Unit (SDU),
- the High Speed Data Unit (HSDU)
- the Radio Frequency Unit (RFU),
- the High Power Amplifier (HPA).

The SDU and RFU provide all essential services required to accommodate effective air/ground communications, via satellite, using the antenna and related RF components.
The SDU manages the RF link protocols on the satellite side and supplies the correct interface with the avionics subsystem for communication management.
The HPA boosts the signal to be transmitted to the satellite.
As an option, a new SDU which includes SDU, RFU and HPA functions and has Swift Broadband (SBB) capability can be installed.

ANTENNA SUBSYSTEM

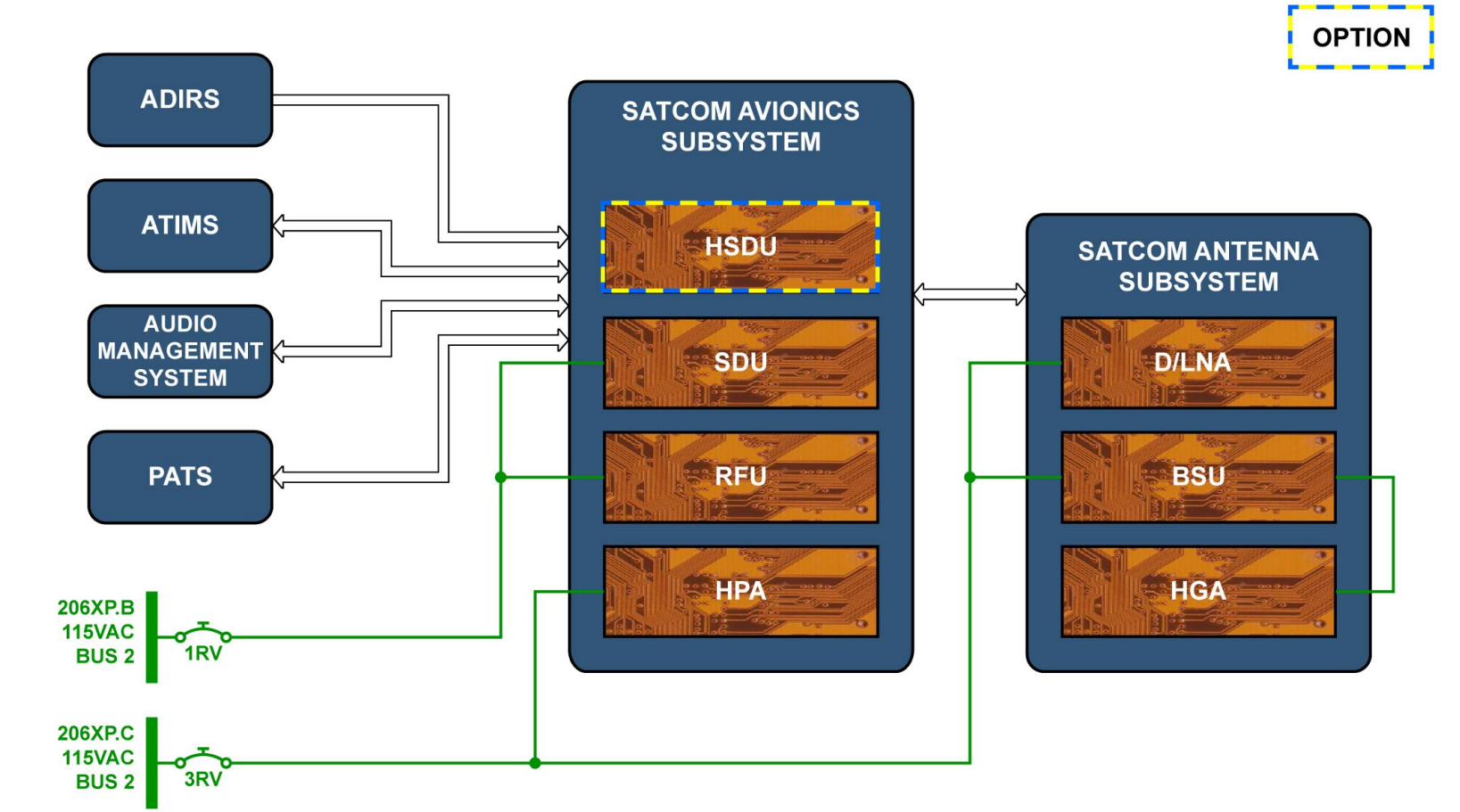
The main components of the SATCOM antenna subsystem are:
- the Diplexer/Low Noise Amplifier (D/LNA),
- the Beam Steering Unit (BSU),
- the High Gain Antenna (HGA).

The D/LNA provides segregation between transmitted and received signals and amplification of the received signal.
The BSU controls the pointing of the antenna.
The HGA transmits and receives L-band RF signals to and from the satellite the BSU is pointed at.

INTERFACES

The SATCOM avionics subsystem is mainly connected to:
- the Air Data/Inertial Reference System (ADIRS) for antenna control steering and Doppler correction,
- the Air Traffic and Information Management System (ATIMS) for cockpit data transmission,
- the audio management system for cockpit voice communication,
- the Passenger Air-to-ground Telephone System (PATS) for cabin fax/telephone capabilities.

The 115 VAC bus 2 electrically supplies all SATCOM elements. The SDU and RFU or HSDU are on the same circuit breaker: 1RV.The HPA, D/LNA and BSU are on the same circuit breaker: 3RV. The BSU supplies the HGA.



ADIRS: Air Data/Inertial Reference System
ATIMS: Air Traffic and Information Management System
PATS: Passenger Air-to-ground Telephone System

L-band radio frequencies:
Transmission: from 1.6255 GHz to 1.6605 GHz
Reception: from 1.5300 GHz to 1.5590 GHz

GENERAL - AVIONICS SUBSYSTEM ... INTERFACES

SATELLITE COMMUNICATION D/O

DESCRIPTION

The SDU is the main processing element of the SATCOM avionics. It controls and monitors the aircraft satellite communication:
- controlling timing functions,
- performing voice and data digitizing,
- performing coding/decoding functions,
- defining system protocols,
- providing other system interfacing.

SATELLITE DATA UNIT (SDU)

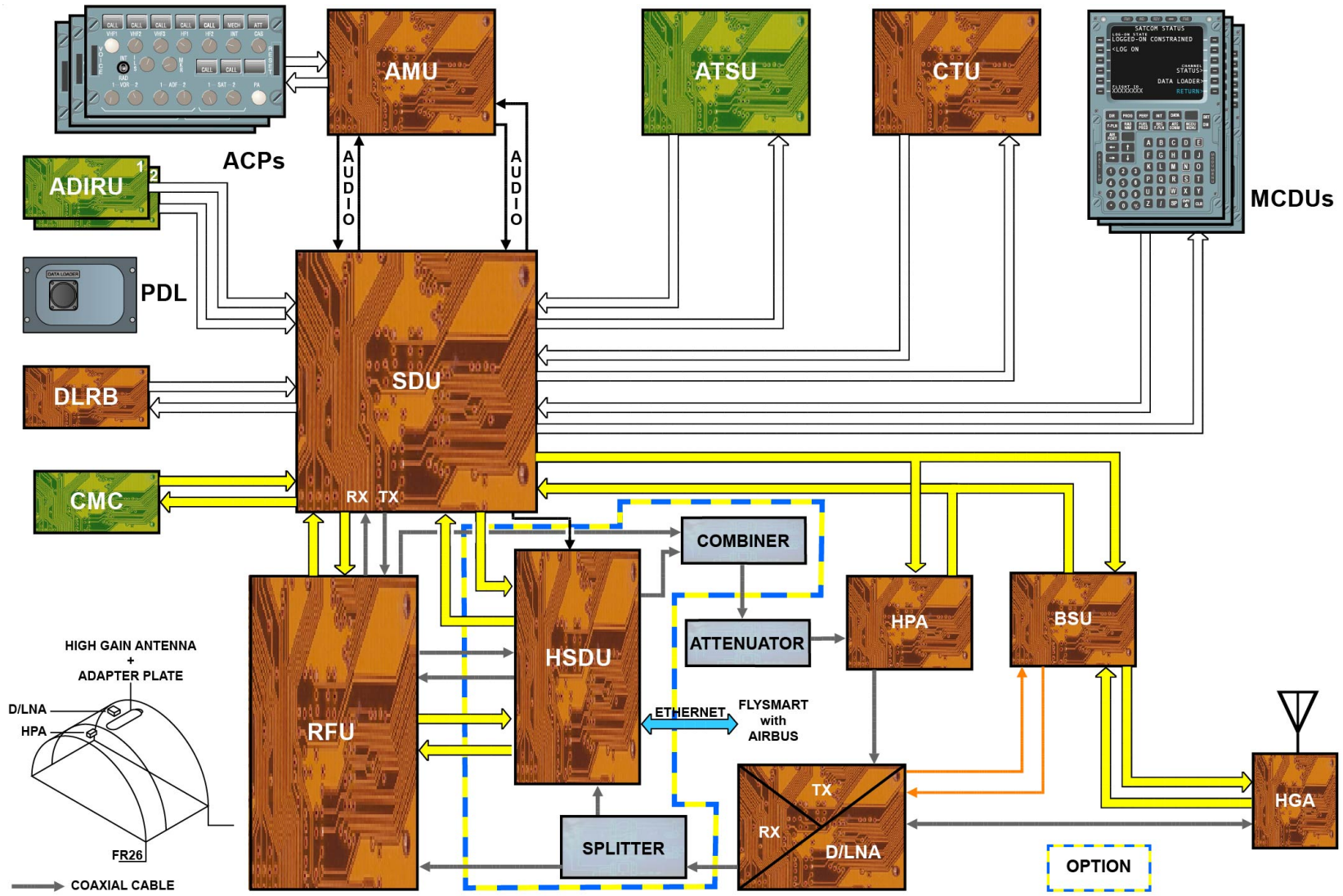
The SDU is connected to:
- the Audio Management Unit (AMU) for cockpit voice communication,
- the Air Traffic and Service Unit (ATSU) for system and maintenance data reports,
- the Cabin Telecommunication Unit (CTU) for cabin voice/data telecommunication with the ground,
- the MCDUs for control and monitoring of the SATCOM system,
- the Air Data/Inertial Reference Units (ADIRUs) to supply relative azimuth and relative elevation for optimum reception and transmission,
- the Portable Data Loader (PDL) through the Data Loading Routing Box (DLRB) for data loading of the Owner Requirement Table (ORT),
- the Central Maintenance Computer (CMC) for BITE information and system tests.

The SDU contains a maximum of 6 channels: 1 for ATSU, 2 for cockpit voice and 3 for cabin voice/data communications. It can be used for simultaneous full duplex operation.
As an option, a SAT-2100 SDU can be installed. This SDU is the core component of the SRT 2100 SATCOM which includes the functions of SDU, HPA, and RFU. With this option, the SDU also has a swift broadband function (and SWIFT64 as a backward capability).

The system can support multichannel voice, fax and data communication at all locations included in the INMARSAT global beam coverage (2 channels for voice and 1 channel for data).

HIGH SPEED DATA UNIT (HSDU) (OPTION)

Optionally, the HSDU splits/combines internally its RF reception/transmission with the SDU RF reception/transmission. It transmits and receives data for cabin internet based application (mail, web browsing,...).
The High speed SATCOM uses the HPA resources to transmit data to the satellite. The Swift64 services may differ according to the cabin.
The HSDU channels available and the services in use can be check on the MCDU. This information is available on the "HSD CHANNEL STATUS" page adjacent to the line key 5L.



DESCRIPTION - SATELLITE DATA UNIT (SDU) & HIGH SPEED DATA UNIT (HSDU) (OPTION)

SATELLITE COMMUNICATION D/O

DESCRIPTION (continued)

RADIO FREQUENCY UNIT (RFU)

The RFU converts intermediate frequency (IF) signals from SDU to L-band radio frequency signal for transmission to the satellite and vice-versa.
The transmission (Tx) signal is sent to the HPA through a variable attenuator, manually adjustable. The attenuator ensures a high quality signal transmission between RFU and HPA, following the quality of the signal, the HPA will determinate the transmission mode, data or voice. The reception (Rx) signal is received from the D/LNA.
Fault status information of the RFU is connected to the CMC via the SDU.

HIGH POWER AMPLIFIER (HPA)

The HPA is only used for signal transmission.
The high power amplifier amplifies the RFU-generated L-band signal to the appropriate power level required to maintain the air-to-ground communication link. The power level is permanently adjusted in order to minimize the satellite power consumption. The linear HPA provides the required 80 watts maximum power output.
To perform the power adjustment, the HPA receives beam information from the SDU.
Fault status information of the HPA is connected to CMC via the SDU.

DIPLEXER/LOW NOISE AMPLIFIER (D/LNA)

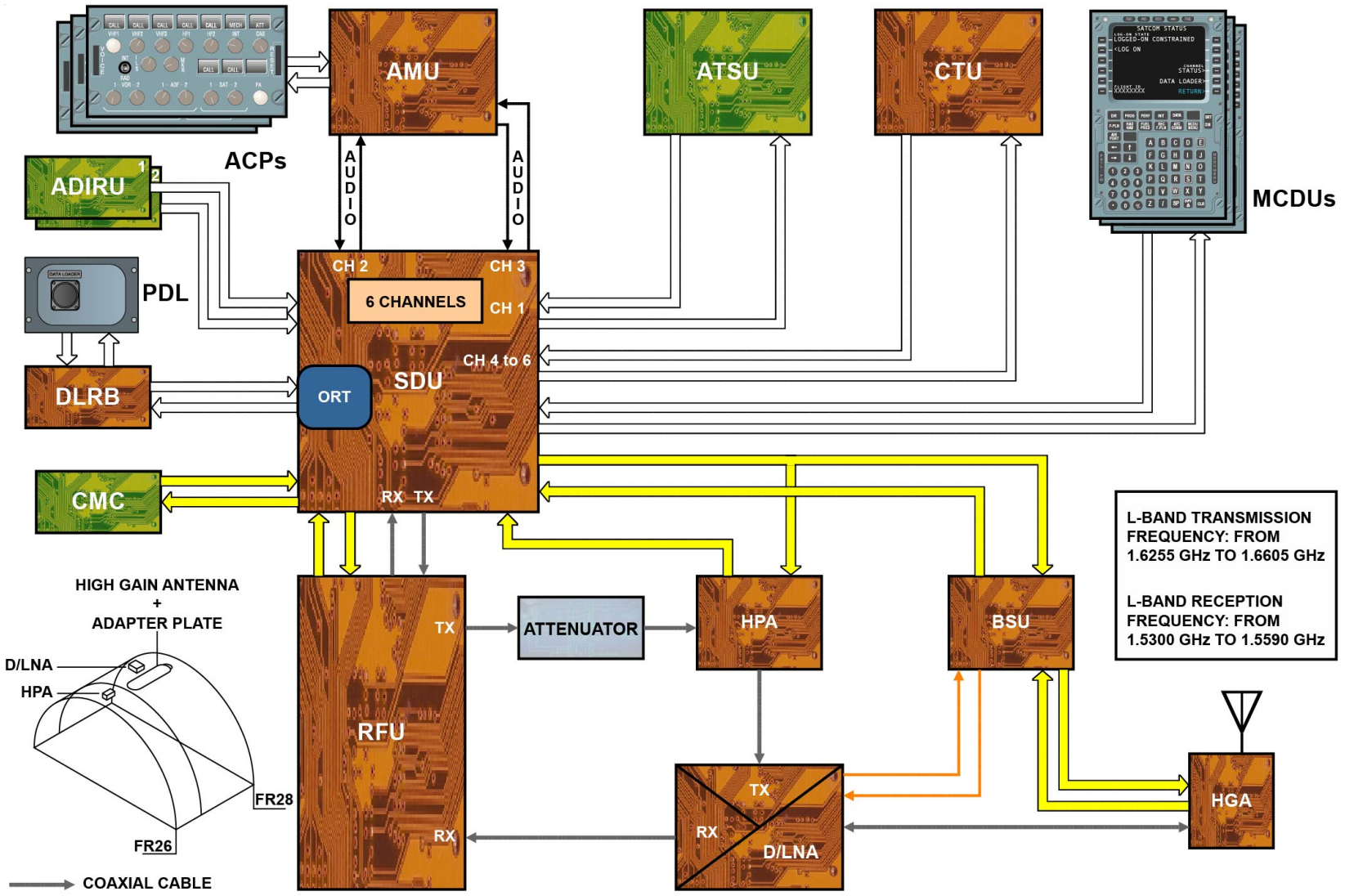
The Diplexer part segregates the Tx and Rx signals to allow duplex communications. It provides electrical isolation of the transmitted and received signals between the HPA and LNA.
In the chain of signal amplification, the LNA part provides the first stage of amplification and filtering of the Rx signal. After this process, the Rx signal is sent to the RFU.
The BITE of the D/LNA is performed by the BSU and SDU.

BEAM STEERING UNIT (BSU)

The BSU controls the pointing of the airborne antenna.
The BSU receives, from the SDU, aircraft azimuth and elevation and the satellite position.
It converts that data in order to control the electronic antenna to point its beam at the satellite.
The BITE of the BSU is performed by the SDU.

TOP-MOUNTED HIGH GAIN ANTENNA (HGA)

The HGA is top mounted with an adapter plate on the fuselage of the aircraft.
The HGA is an electronically steerable phased array. The BSU steer the antenna towards the satellite. It is linked to the HGA via an ARINC 429 bus.
Two bands are in use for simultaneous transmission and reception of satellite signals as a full duplex operation. The HGA sends to, and receives from, the D/LNA L-band radio frequencies through a coaxial cable.
The BITE of the HGA is performed by the SDU via BSU.



DESCRIPTION - RADIO FREQUENCY UNIT (RFU) ... TOP-MOUNTED HIGH GAIN ANTENNA (HGA)

SATELLITE COMMUNICATION D/O

OPERATION

Log-in is initiated by the SDU after selection of the log-on command on the MCDU SATCOM Menu.

LOG-IN PROCEDURE

PROGRAMMING

The SDU is programmed with two data tables. One is the ORT. It contains data about all ground stations in each satellite region and the order of preference in which they must be selected. The ORT is updated via the PDL.
The second table, called the system table, contains system management and control information including all ground station channel frequencies and identifications and satellite positions. Each system table has a version number assigned to it.
The SDU is also programmed with a technical address, which is the «telephone number» of the aircraft. This technical address will become part of all messages sent.

COMMUNICATION LINK ESTABLISHMENT

The SDU carries out an initial search to find the best way to communicate with the ground.
The SDU receives aircraft position and orientation information from ADIRU 1. If ADIRU 1 doesn't send the information, the SDU will take the information from ADIRU 2.
BSU receive azimuth and elevation to direct the antenna towards the satellite.
The BSU convert azimuth and elevation commands into signals to direct the antenna towards the selected satellite.
Following the ORT and the system table, the SDU will select one by one the possible satellite and ground station it can connect to.
Each ground station continuously broadcasts a channel to inform users of system status and configuration. It also carries the time and frequency information needed by the aircraft wishing to log onto the system.
The SDU checks the quality of the received signal of each ground station tested, measuring strength and/or bit error rate. At the end of this procedure, the SDU selects the ground station corresponding to the best quality signal.

COMMUNICATION LOG-ON

The received ground station sends an electronic bulletin board, which also contains system table information. The SDU compares the version number of its system table with the received one. According to the content of the updated system table, the SATCOM may re-select the satellite at this point.
The SDU indicates to this ground station it has an updated system table and it is listening to it. The ground station identifies the aircraft by its technical address and registers the aircraft as operational in that region. At this point, the SATCOM is considered to be logged onto the system.

CALLS

CALL INITIALIZATION FROM AIRCRAFT

When an airborne subscriber initiates a call, the SDU sends a call request signal to the ground station. When the ground station receives the call request, it assigns a channel to the aircraft. The call can then go through. The assigned channels are reserved for as long as the call is in progress. The sequence used to initiate the call is automatic and transparent to both the originator and the receiver of the call.

SIGNAL PROCESS

The SDU combines all the received data from the AMU, ATSU and CTU in an IF Tx signal and sends it to the RFU.
The RFU converts signals from the SDU to an L-band radio frequency signal.

The Tx signal follows the line to the antenna through the amplification chain to be transmitted to the satellite. The satellite will then route the signal to the ground station.
When the antenna receives information from the pointed satellite, the D/LNA will relay the Rx signal to the RFU. A conversion of the Rx L-band radio frequency signal is made into an IF Rx signal. The IF signal is sent to the SDU for demodulation and decoding. The SDU will then route the received signals to the concerned user.

REMARK

Calls initiated from the ground to a passenger are currently not allowed for safety reasons.

LOGON RENEWAL

If degradation or loss of the received signal is detected by the SDU after log on, the SDU will attempt to re-establish communication with its logged on ground station. If any signal is not received within 10 seconds, then the SDU will tune onto the next preferred ground station, referring to the ORT and the system table. During log on, renewal in the same satellite region, the flight information is not transmitted with the log on request.
If the channel of the next preferred ground station is not received within 10 seconds, the SDU will find itself logged off but will not transmit a log off request. Then the SDU will revert to a satellite search procedure.

COCKPIT VOICE

DIALING FEATURES

The use of the SATCOM cockpit voice facilities is made through the MCDU for dialing and the Audio Control Panel (ACP) for call establishment.
Two possibilities are offered to dial a number:
- pre-selected numbers, stored in the ORT and available under the DIRECTORY menu,
- manual dialing, using the scratchpad.

OUTGOING CALLS

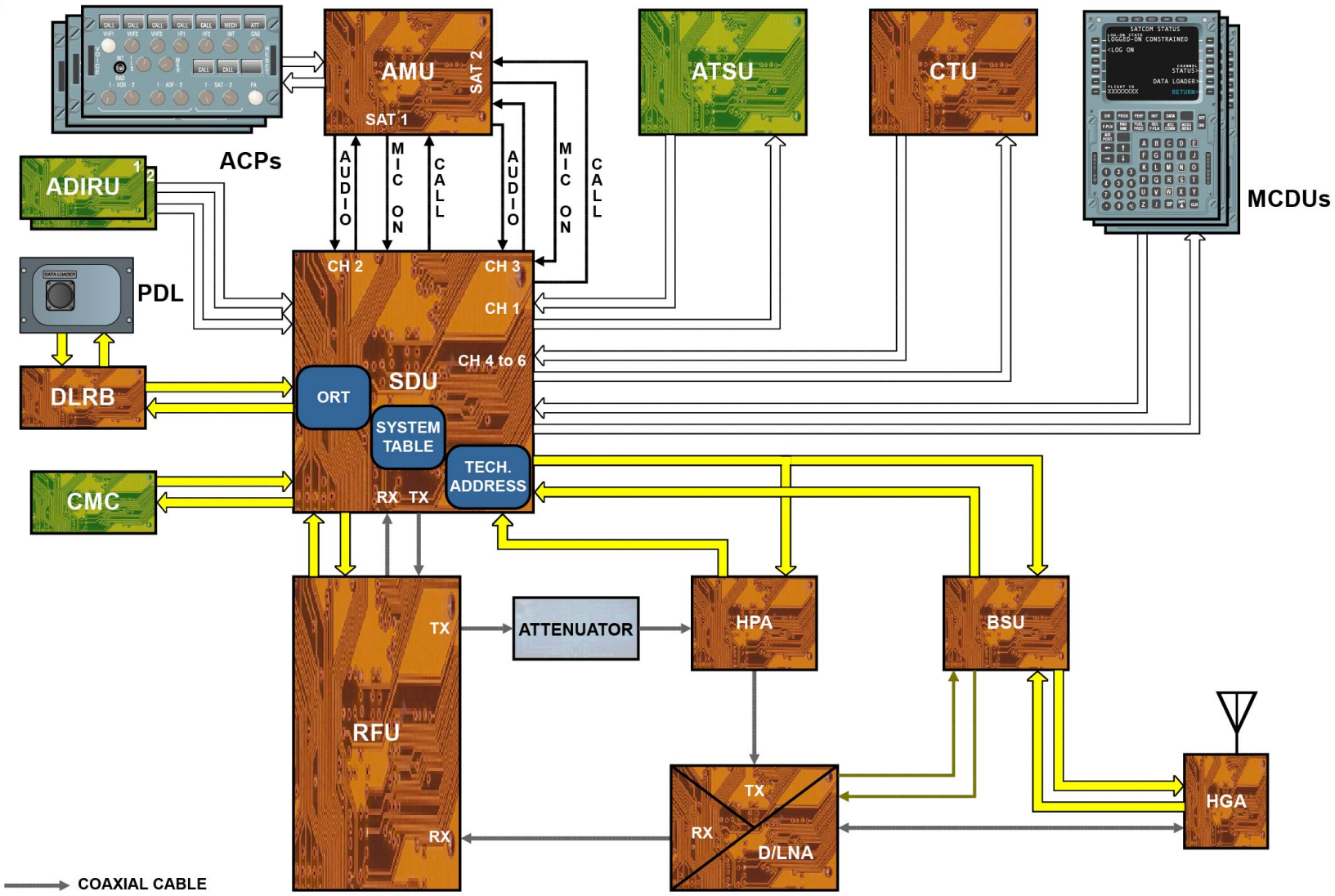
Once the dialing is completed, SAT 1 (or 2) ACP transmission and reception keys must be selected. Green lines will flash during the call establishment.
When the call is established, these green lines become steady and the CONNECTED indication is displayed next to the channel selected.

INCOMING CALLS

Incoming calls to the flight crew are annunciated by the SELCAL buzzer (except if flight phase inhibition) and, on the ACP, by the flashing of the CALL legend of the SAT1 (SAT2) transmission pushbutton switch. In addition, on the SATCOM MAIN MENU, GROUND TO AIR CALL is displayed upon the concerned channel (SAT1 or SAT2), with the associated priority.
To answer the call, select the SATCOM channel on the SAT1 (SAT2) on the ACP. The green line on the SAT1 (SAT2) reception pushbutton switch comes on (steady).

FAILURE MONITORING

The SDU is interfaced with the CMC for BITE purposes via an ARINC 429 bus.
The RFU, HPA and BSU can be tested through the SDU via ARINC 429 buses. The BSU also provides HGA and D/LNA status.
When a ground-to-air SATCOM call with high priority (1, 2 or 3) is set up, the Flight Warning Computer (FWC) generates the SATCOM ALERT memo on the ECAM.
The warning SATCOM FAULT is set up in case of SATCOM voice and data transmission failure.
The warning SATCOM VOICE FAULT is displayed in case of SATCOM voice transmission failure.



OPERATION - LOG-IN PROCEDURE ... FAILURE MONITORING

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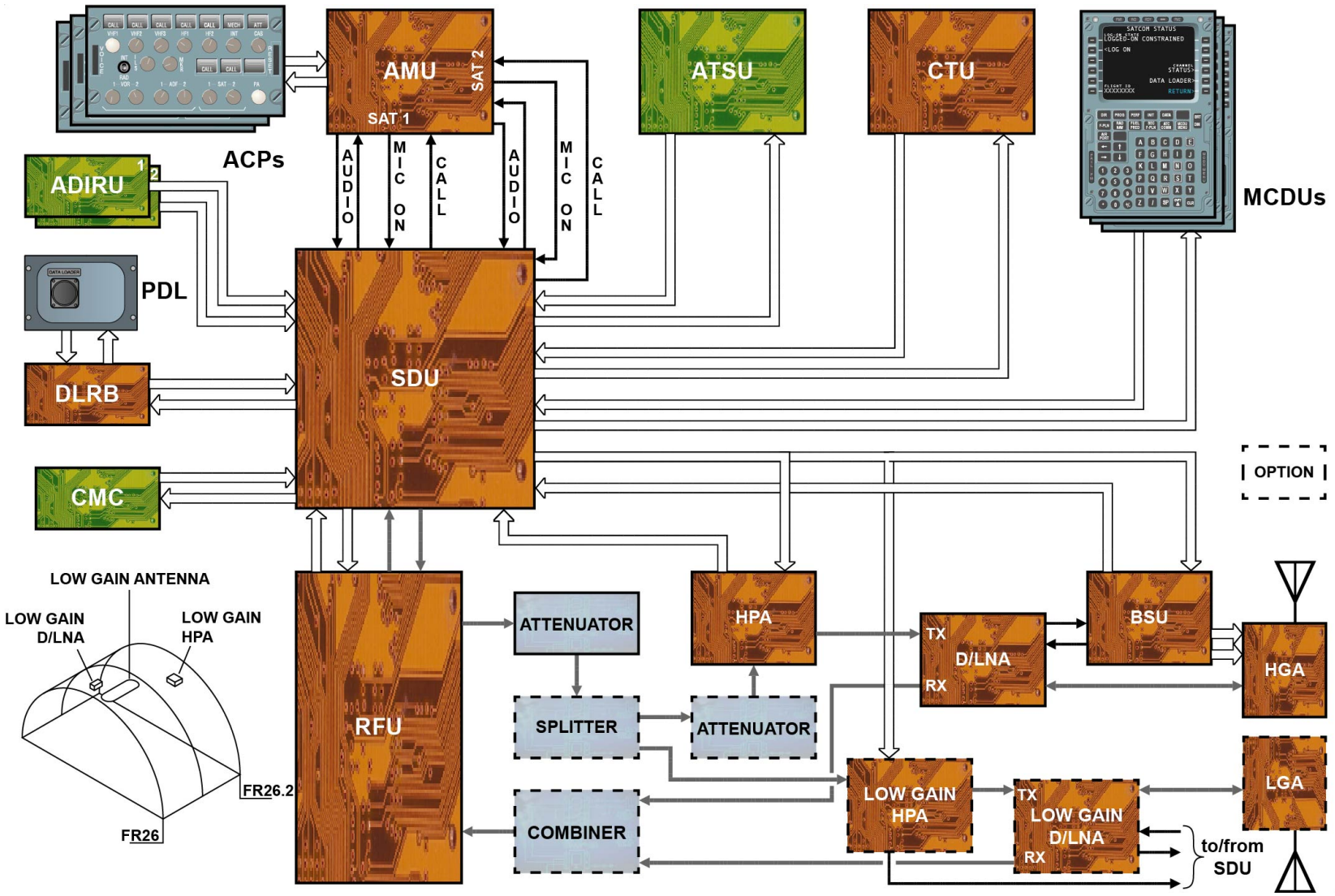
SATELLITE COMMUNICATION D/O

LOW GAIN ANTENNA (LGA) (OPTION)

On the basis of this architecture, a Low Gain Antenna (LGA) can be installed. The LGA system permits low rate transmission of data, in case of failure of the high gain antenna subsystem. This subsystem cannot ensure high rate data transmission or voice telecommunication.
The splitter is used to distribute the Tx signal to both the high gain system and the low gain system.
The combiner combines the Rx signals from the two D/LNAs before sending them to the RFU.
Note that the LGA doesn't need a BSU. The LGA is omnidirectional and non-adjustable.



LOW GAIN ANTENNA (LGA) (OPTION)

SPEECH COMMUNICATION SYSTEM COMPONENT LOCATION

SPEECH COMMUNICATION COMPONENT LOCATION

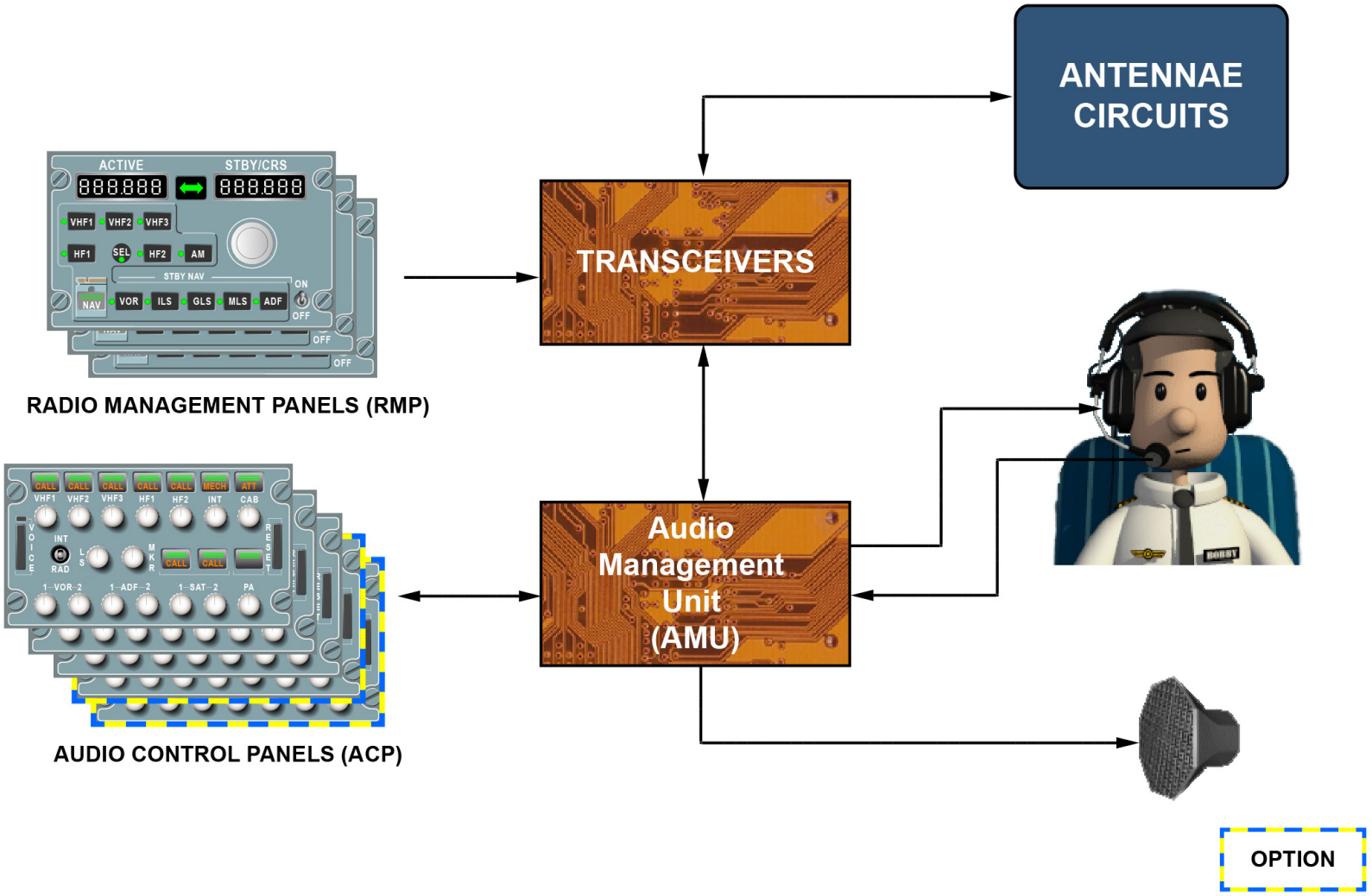
The speech communication includes the HF (High Frequency) and the VHF (Very High Frequency).
Each HF system includes:
- A transceiver in the avionics compartment,
- An antenna coupler below the root of the vertical stabilizer,
- A structural shunt-type antenna behind the leading edge of the vertical stabilizer. The antenna is common for the two HF systems.

Each VHF system (VHF 1, 2 and 3) includes:
- A transceiver in the avionics compartment,

NOTE: Depending on A.C configuration, the VHF system can have 3 VDRs (one for each VHF transceiver) or 2 MVDRs. Each MVDR has 2 VHF transceivers.

- A blade antenna outside on the fuselage.

These systems interface with the 3 ACPs (audio control panel) for audio control and the 3 RMPs (radio management panel) for frequency selection. These panels are installed on the pedestal (2) and on the overhead panel (1). They also interface with one AMU (audio management unit) installed on the 800VU. Two additional and optional ACPs can be installed (one in the cockpit for the fourth occupant seat if it is installed and one in the avionics compartment on the 800VU).



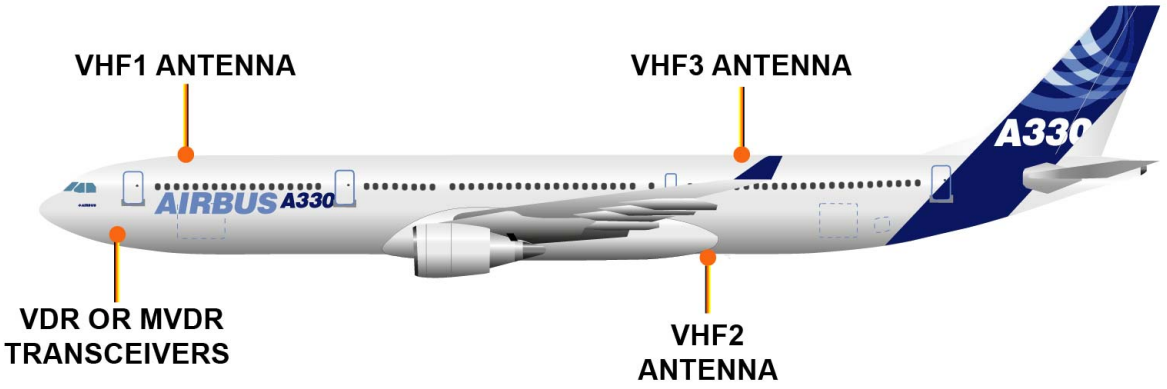
SPEECH COMMUNICATION COMPONENT LOCATION

SPEECH COMMUNICATION SYSTEM COMPONENT LOCATION

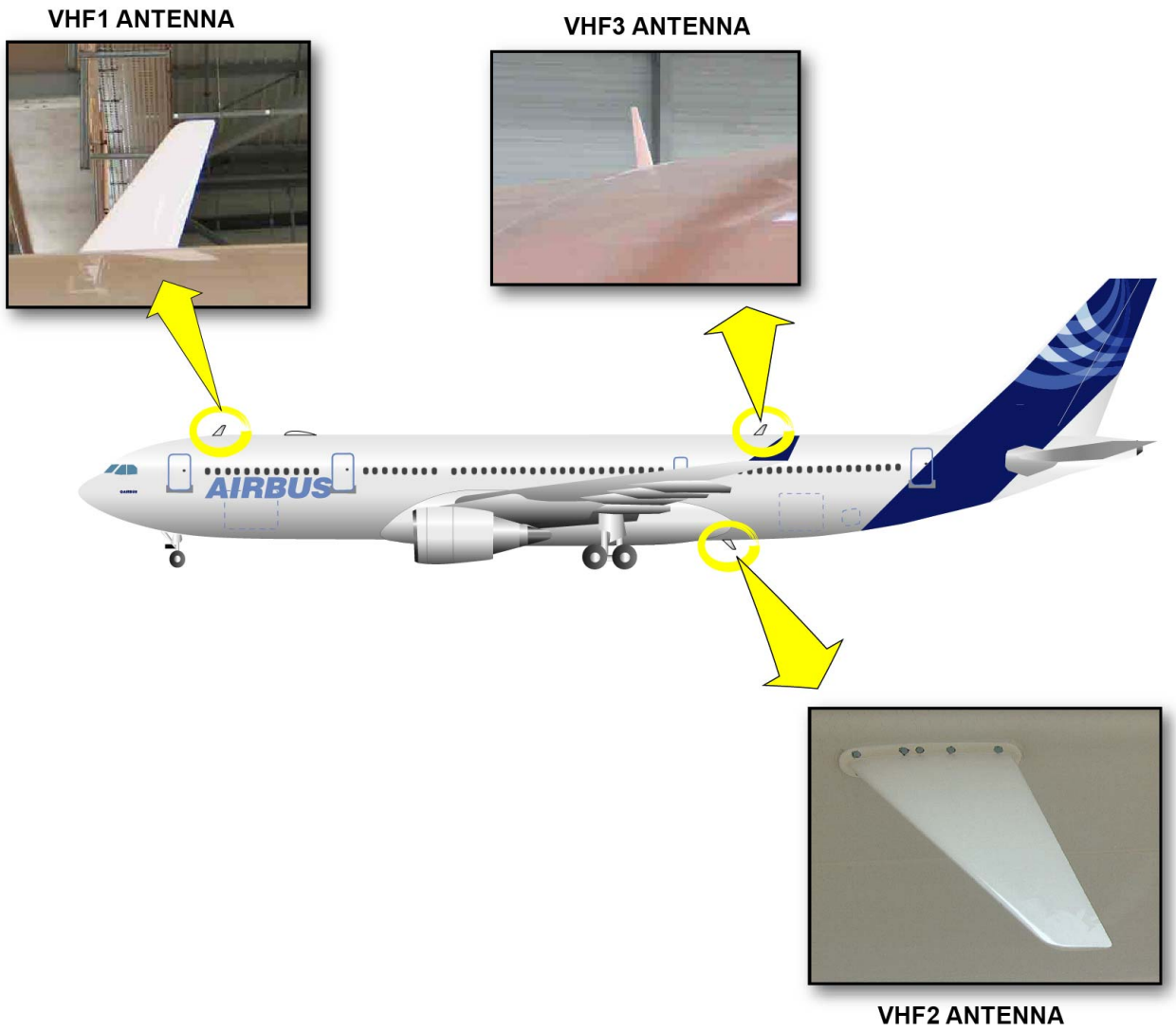
SPEECH COMMUNICATION COMPONENT LOCATION (continued)

VHF

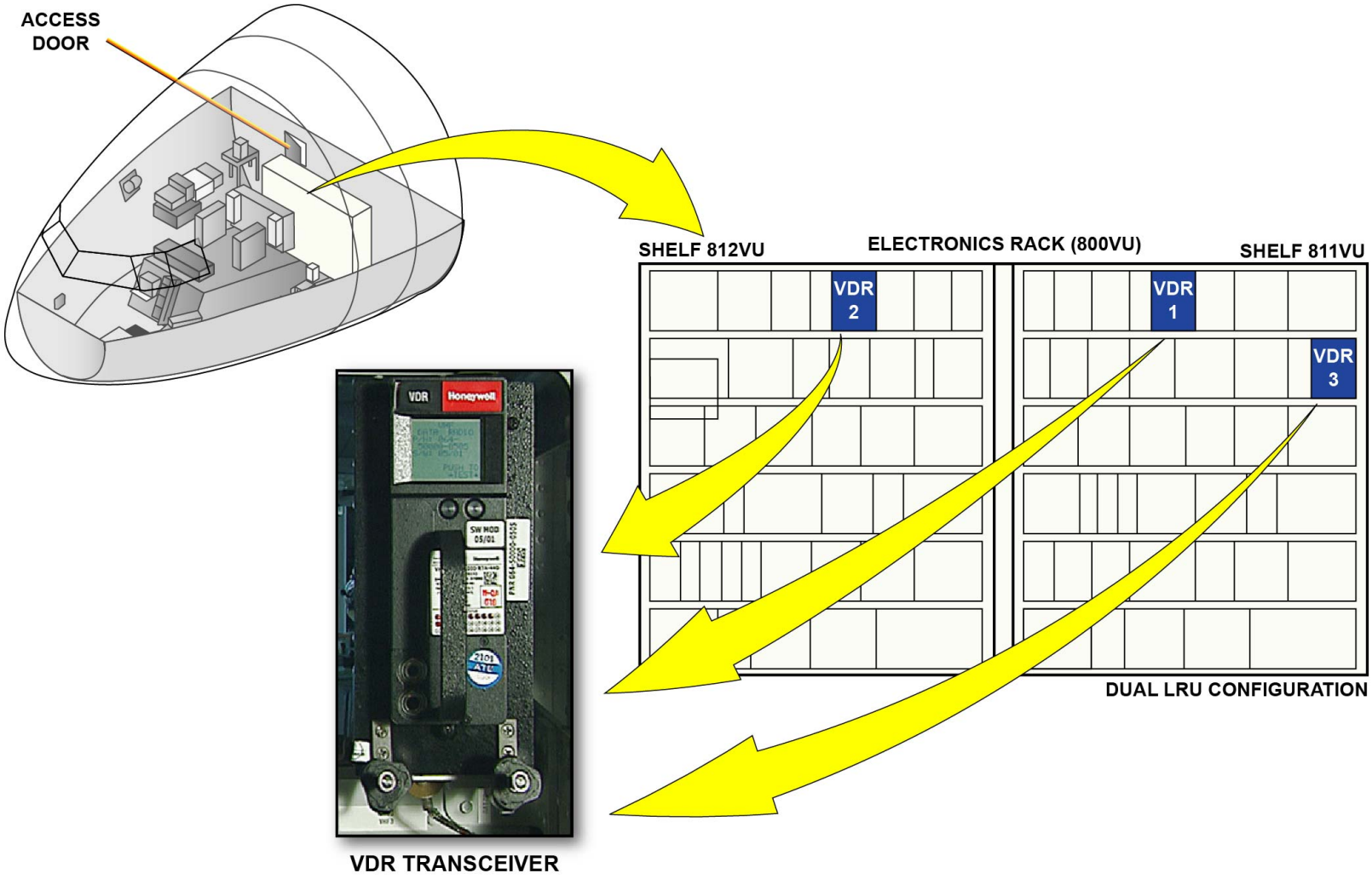
The VHF 1 AND VHF 3 antennae are installed on the top of the fuselage. The VHF 2 antenna is on the belly (behind the center wing on A330/).
Pictures of VHF1, VHF2 and VHF3.
The Video Data Radio (VDR) transceivers are on the electronics racks (800VU).



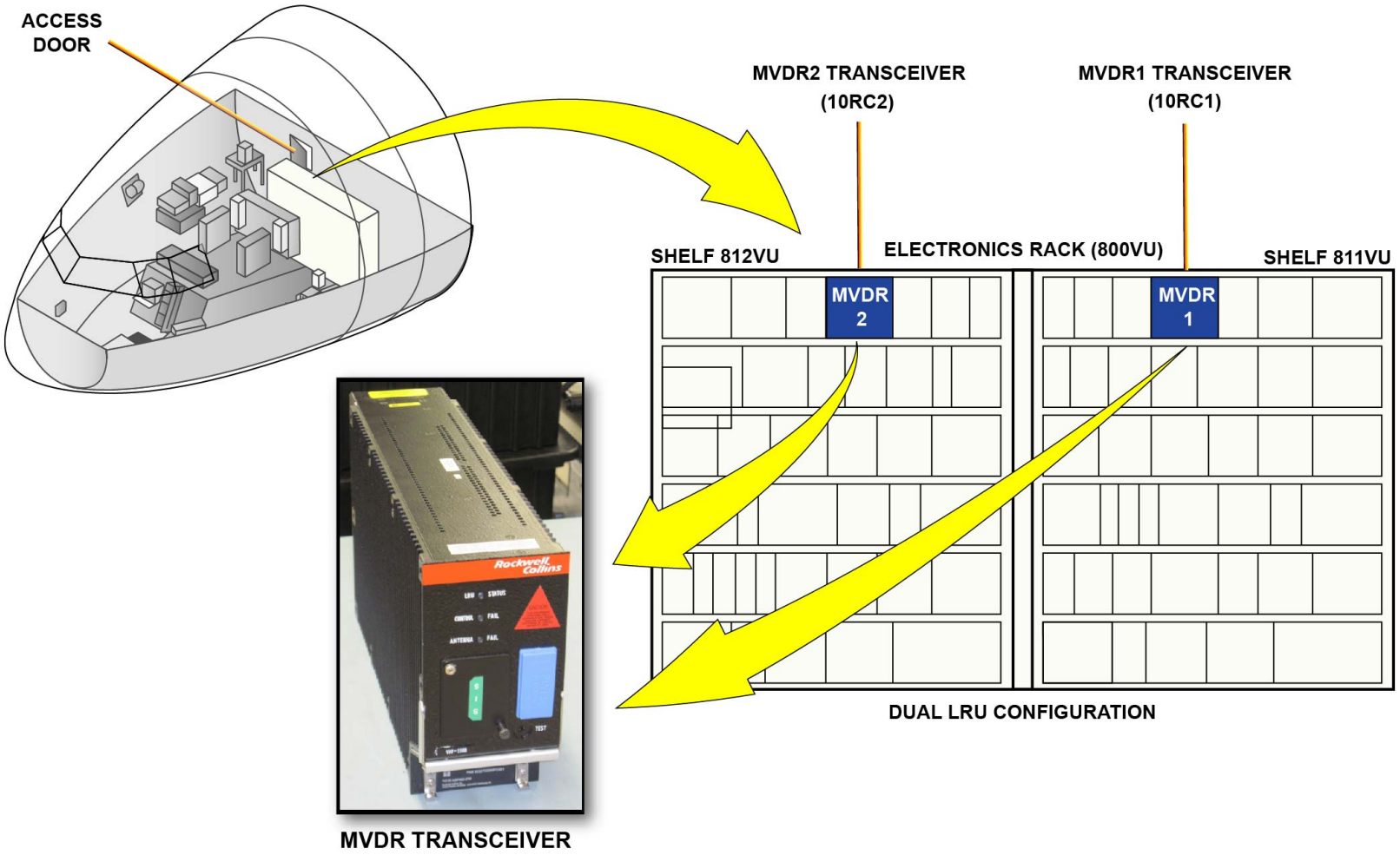
SPEECH COMMUNICATION COMPONENT LOCATION - VHF



SPEECH COMMUNICATION COMPONENT LOCATION - VHF



SPEECH COMMUNICATION COMPONENT LOCATION - VHF



SPEECH COMMUNICATION COMPONENT LOCATION - VHF

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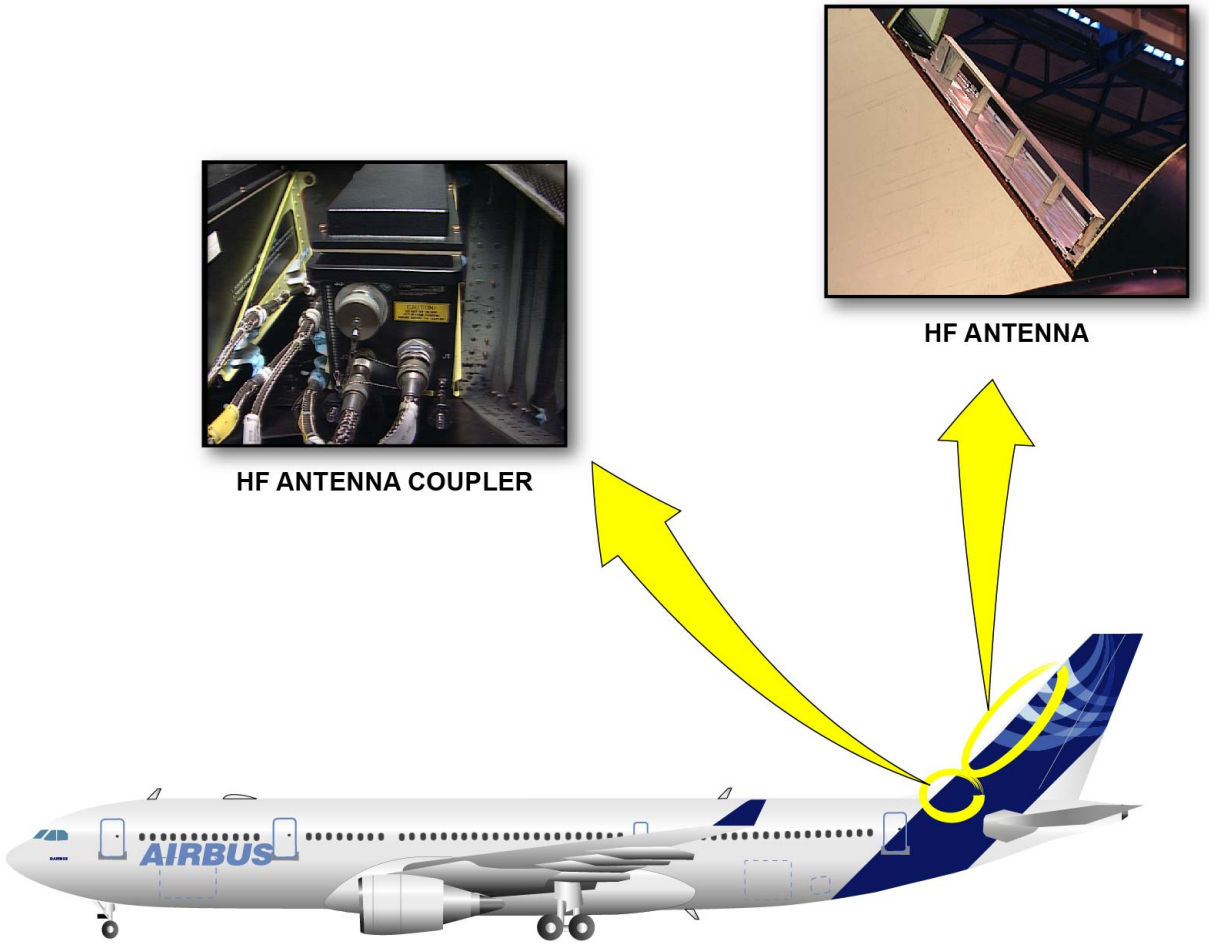
SPEECH COMMUNICATION SYSTEM COMPONENT LOCATION

SPEECH COMMUNICATION COMPONENT LOCATION (continued)

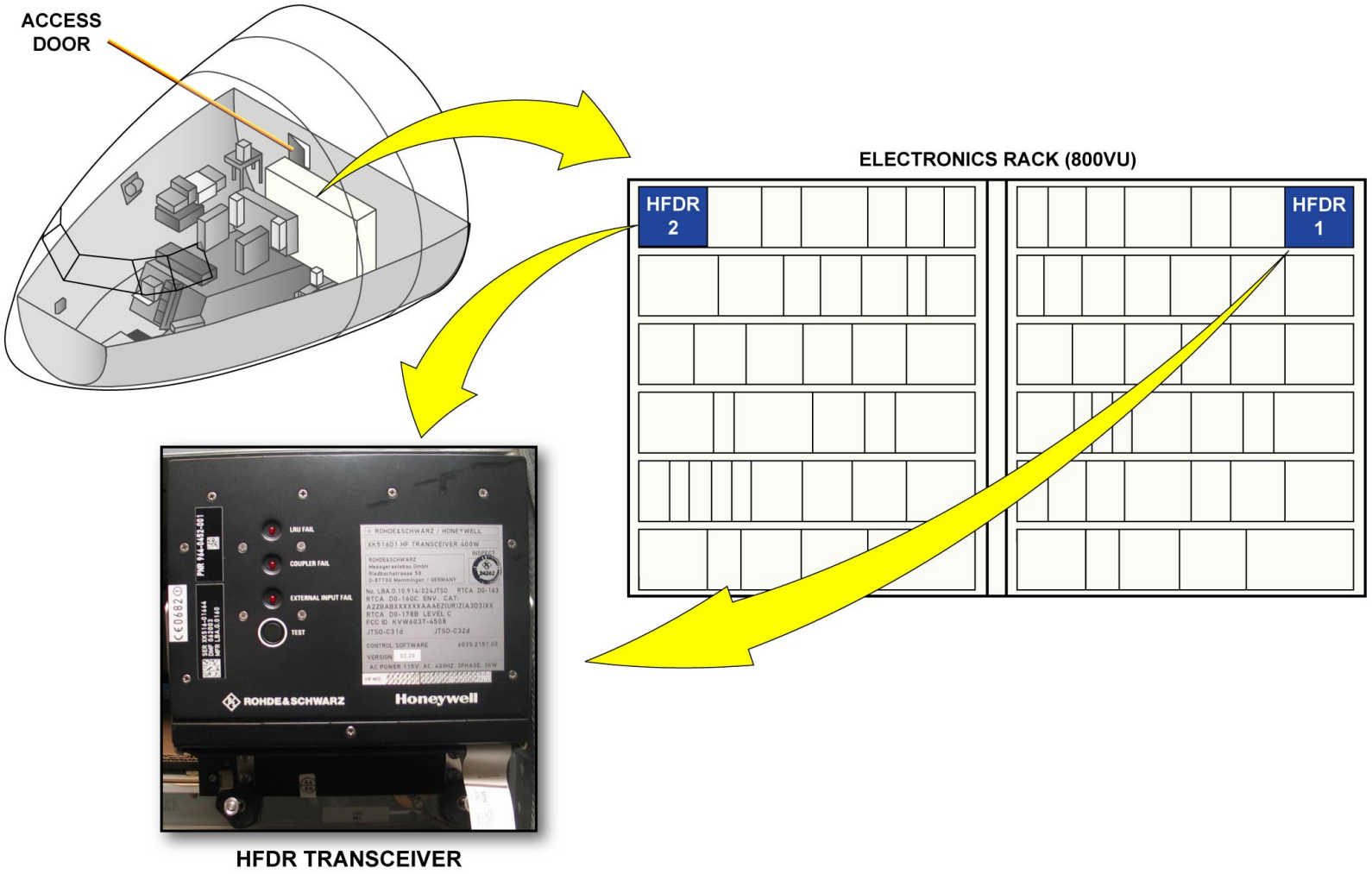
HF

The HF antenna is behind the vertical stabilizer.
To remove the antenna, you must first remove the vertical stabilizer leading-edge 322AL.
The two HF couplers are immediately below the antenna in the Trimmable Horizontal Stabilizer (THS) compartment. You can get access through the door 312 AR (THS compartment access door) and the vertical stabilizer access-panel 311AZ.
The HF antenna and the coupler are on the vertical stabilizer leading-edge.
The HF Transceivers (XCVR) is in the avionics bay on the 800 VU.

SPEECH COMMUNICATION COMPONENT LOCATION - HF



SPEECH COMMUNICATION COMPONENT LOCATION - HF



SPEECH COMMUNICATION COMPONENT LOCATION - HF

SPEECH COMMUNICATION SYSTEM COMPONENT LOCATION

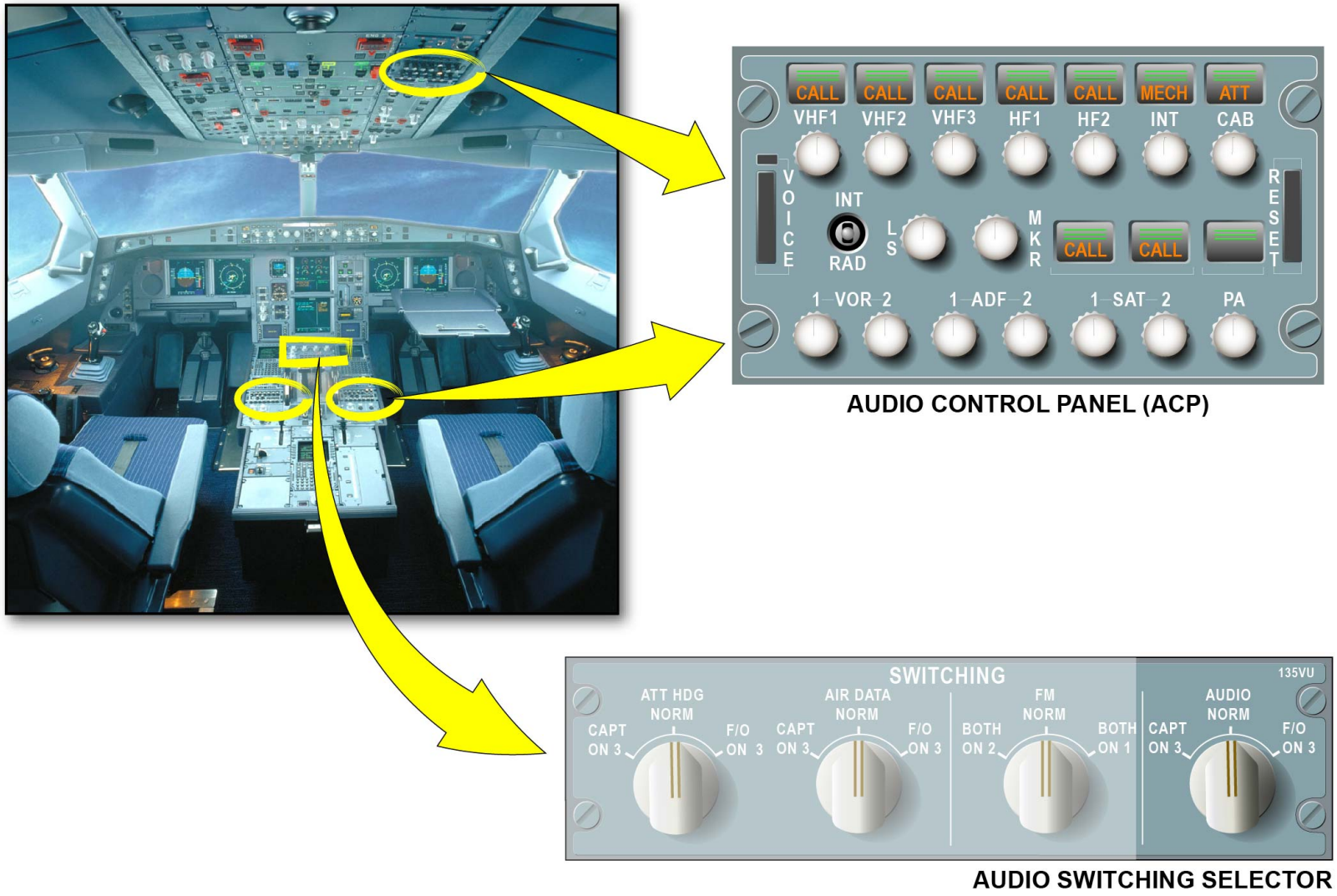
SPEECH COMMUNICATION COMPONENT LOCATION (continued)

CONTROL AND INDICATING

The Radio Management Panels (RMP) 1 and 2 are installed on the pedestal. The RMP3 is on the overhead panel.
The Audio Control Panels (ACPs) are installed near their related RMP and the Audio switching panel is on the forward part of the pedestal.
The call and evacuation panels are on the left hand side of the overhead panel.
The flight interphone jack for the ground mechanics is on the external power panel, behind the nose gear.

RADIO MANAGEMENT PANEL (RMP3 Example)

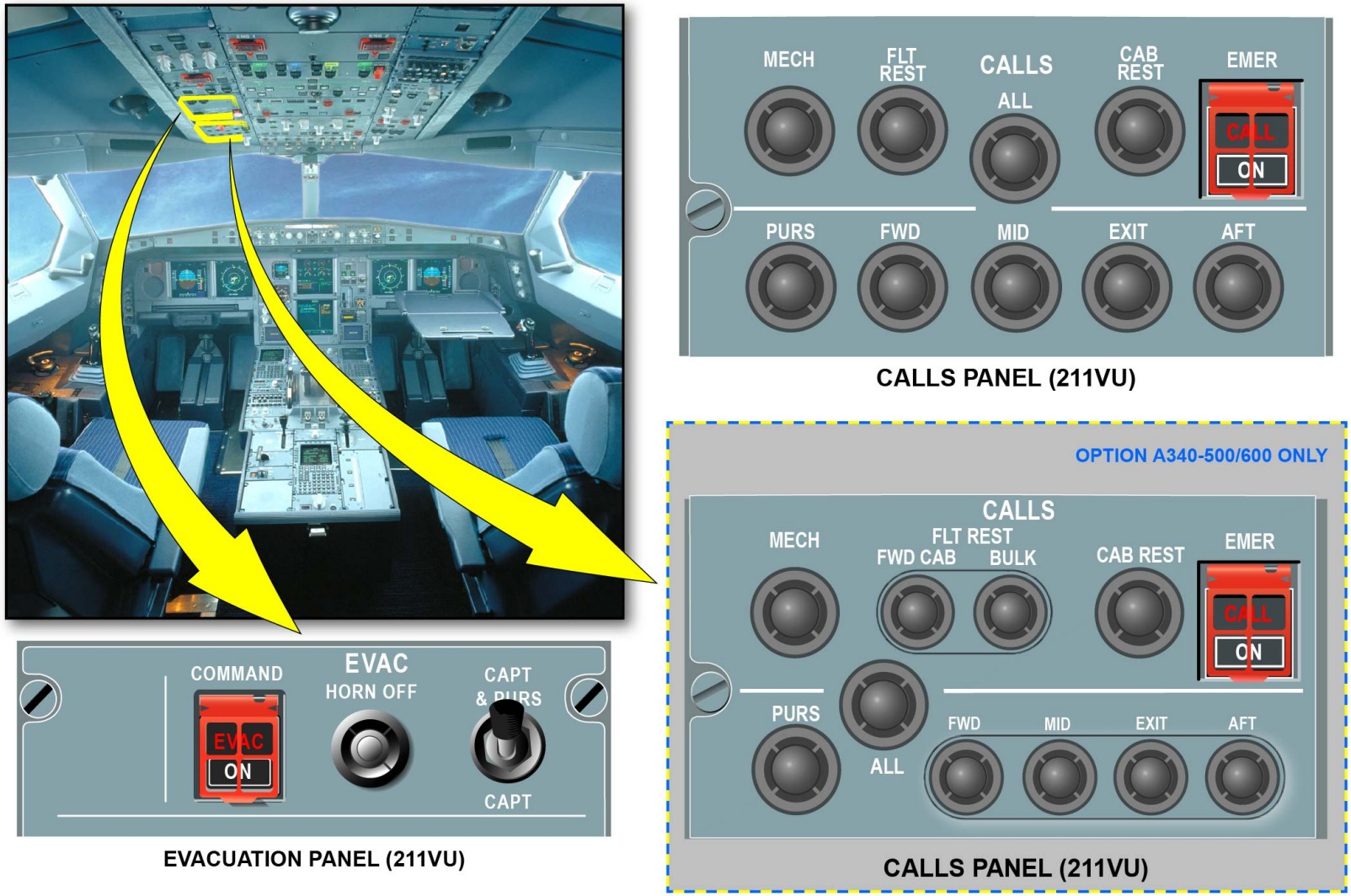
SPEECH COMMUNICATION COMPONENT LOCATION - CONTROL AND INDICATING



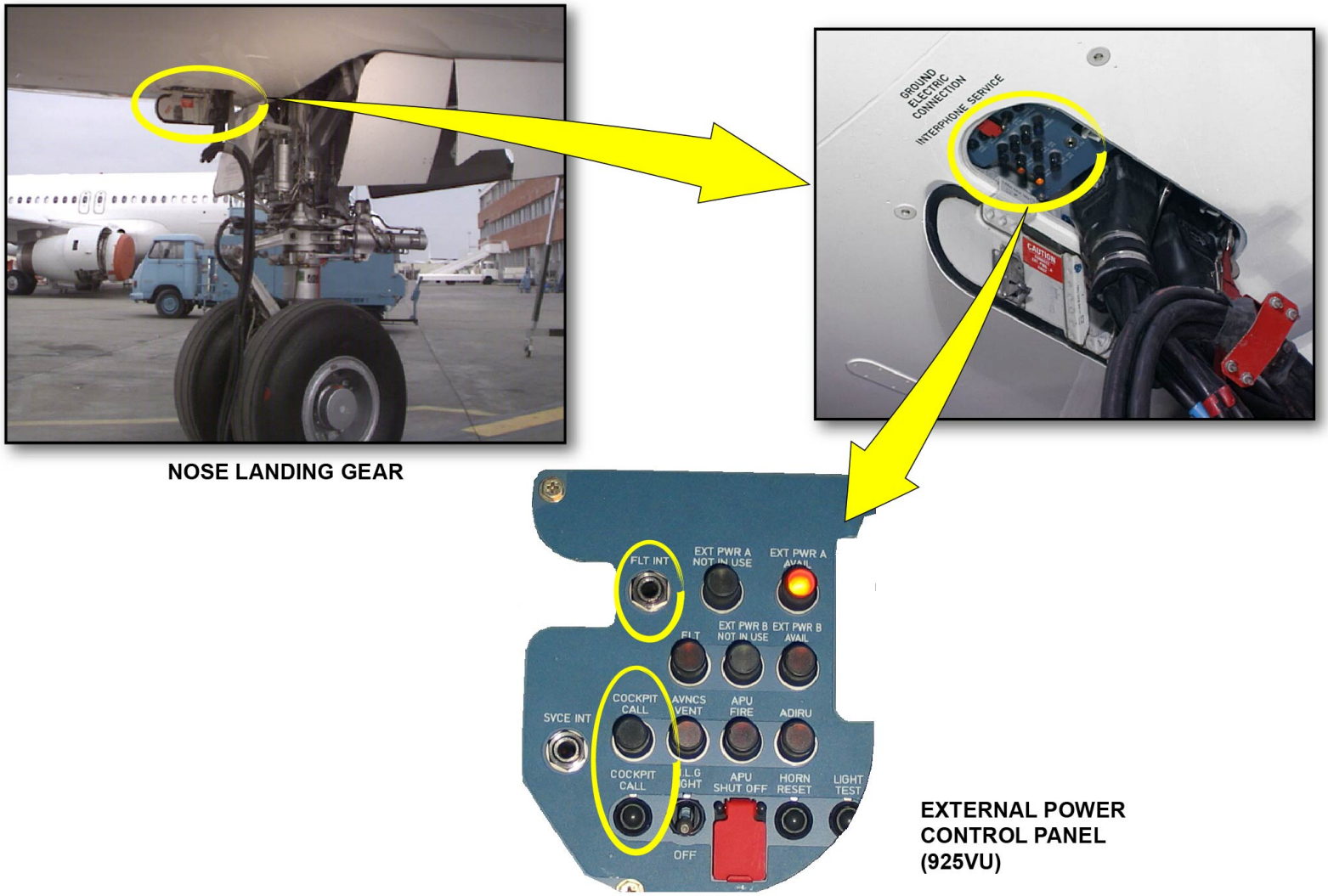
AUDIO CONTROL PANEL (ACP)

AUDIO SWITCHING SELECTOR

SPEECH COMMUNICATION COMPONENT LOCATION - CONTROL AND INDICATING



SPEECH COMMUNICATION COMPONENT LOCATION - CONTROL AND INDICATING



SPEECH COMMUNICATION COMPONENT LOCATION - CONTROL AND INDICATING

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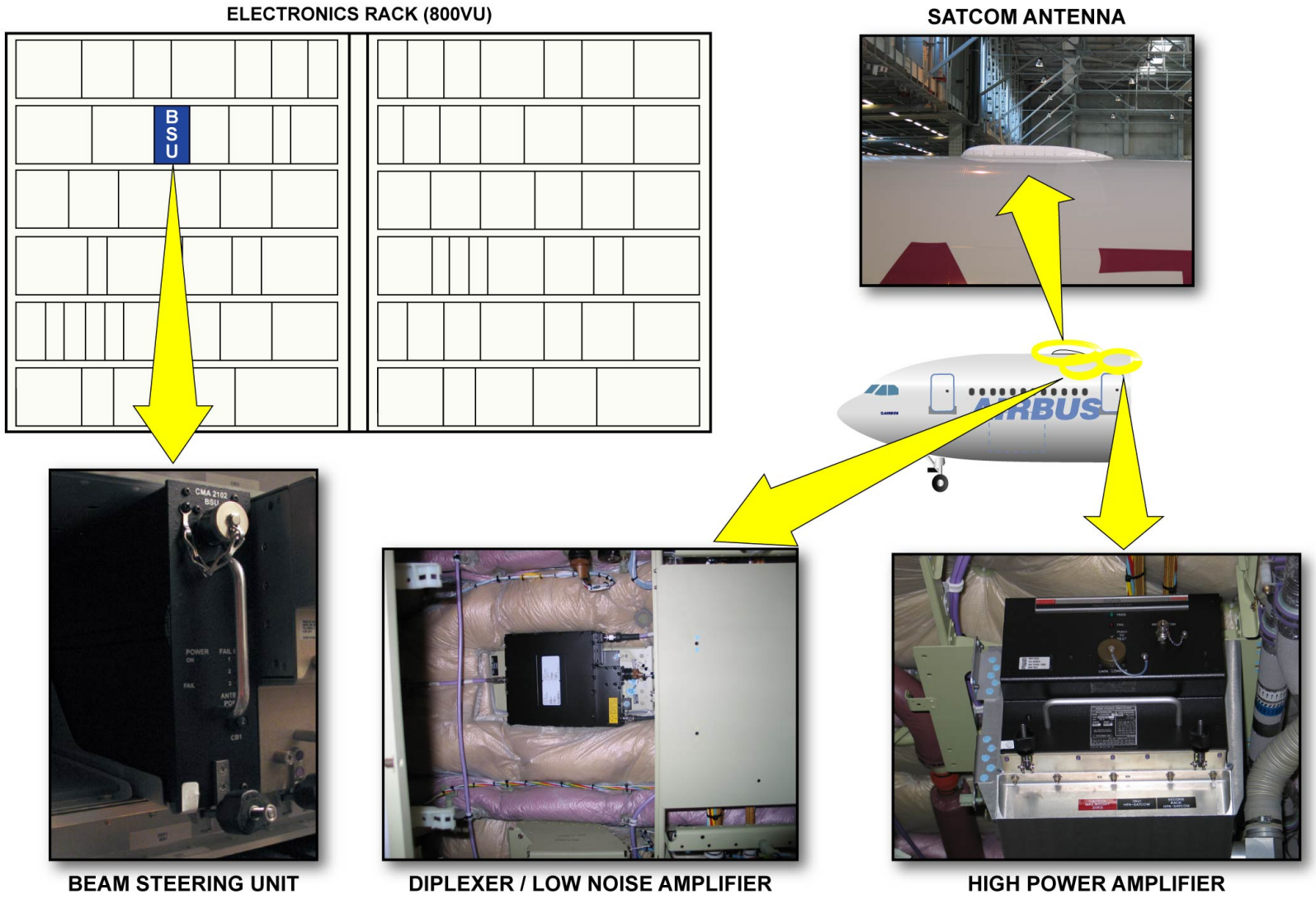
SPEECH COMMUNICATION SYSTEM COMPONENT LOCATION

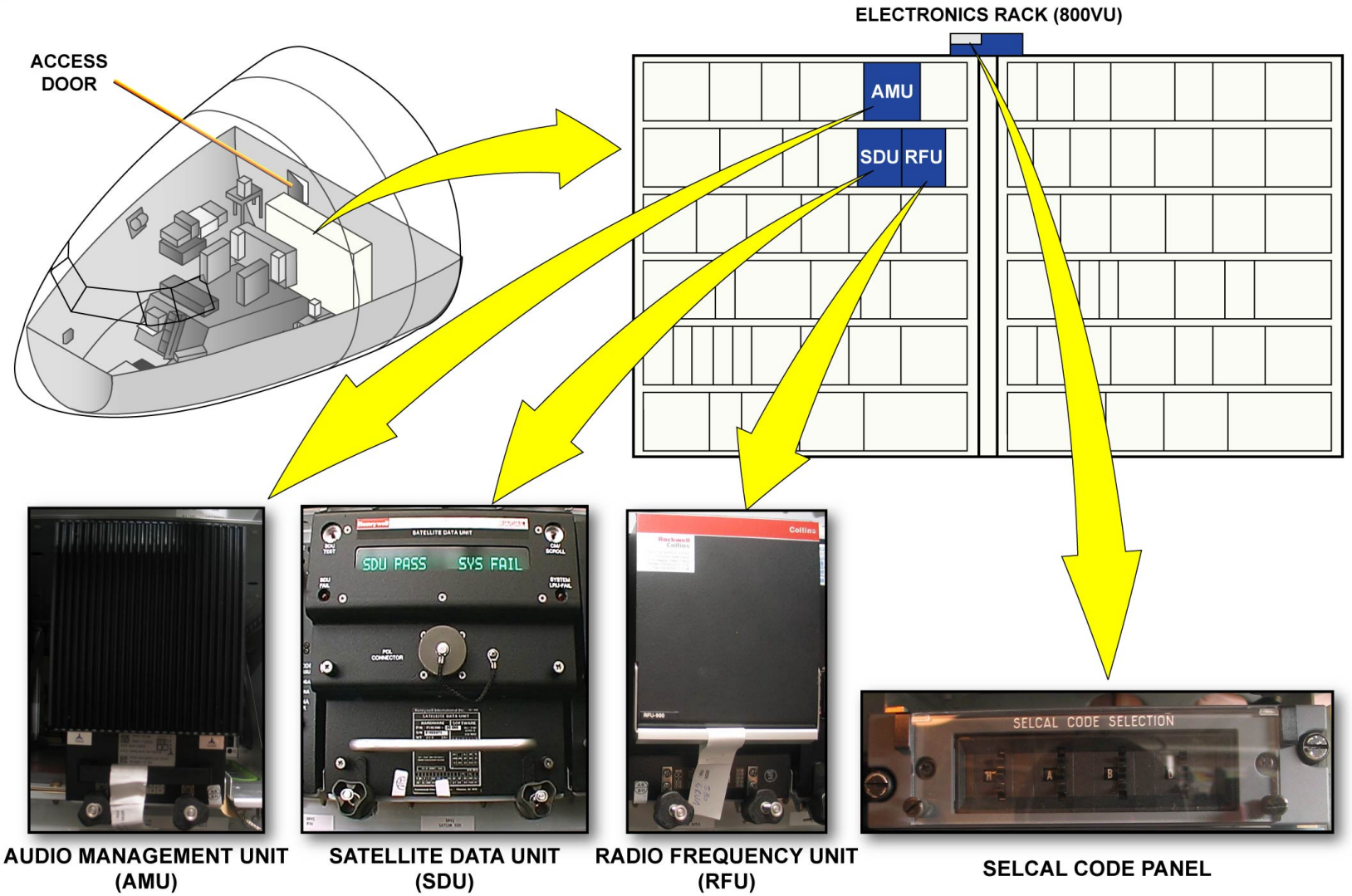
SPEECH COMMUNICATION COMPONENT LOCATION (continued)

SATCOM

The SATCOM subsystems High Power Amplifier (HPA) and Diplexer/Low Noise Amplifier (D/LNA) are installed in the cabin ceiling.
The Beam Steering Unit (BSU), Satellite Data Unit (SDU) and Radio Frequency Unit (RFU) are installed in the avionics bay electronics rack 800VU, near the Audio Management Unit (AMU). A High Speed Data Unit (HSDU) can be installed as an alternative to the RFU.
The Selective Calling (SELCAL) code panel, the AMU, the Satellite Data Unit (SDU) and the Radio Frequency Unit (RFU) are Line Replaceable Units (LRUs). They are installed on the 800VU in the avionics compartment.



SPEECH COMMUNICATION COMPONENT LOCATION - SATCOM



SPEECH COMMUNICATION COMPONENT LOCATION - SATCOM

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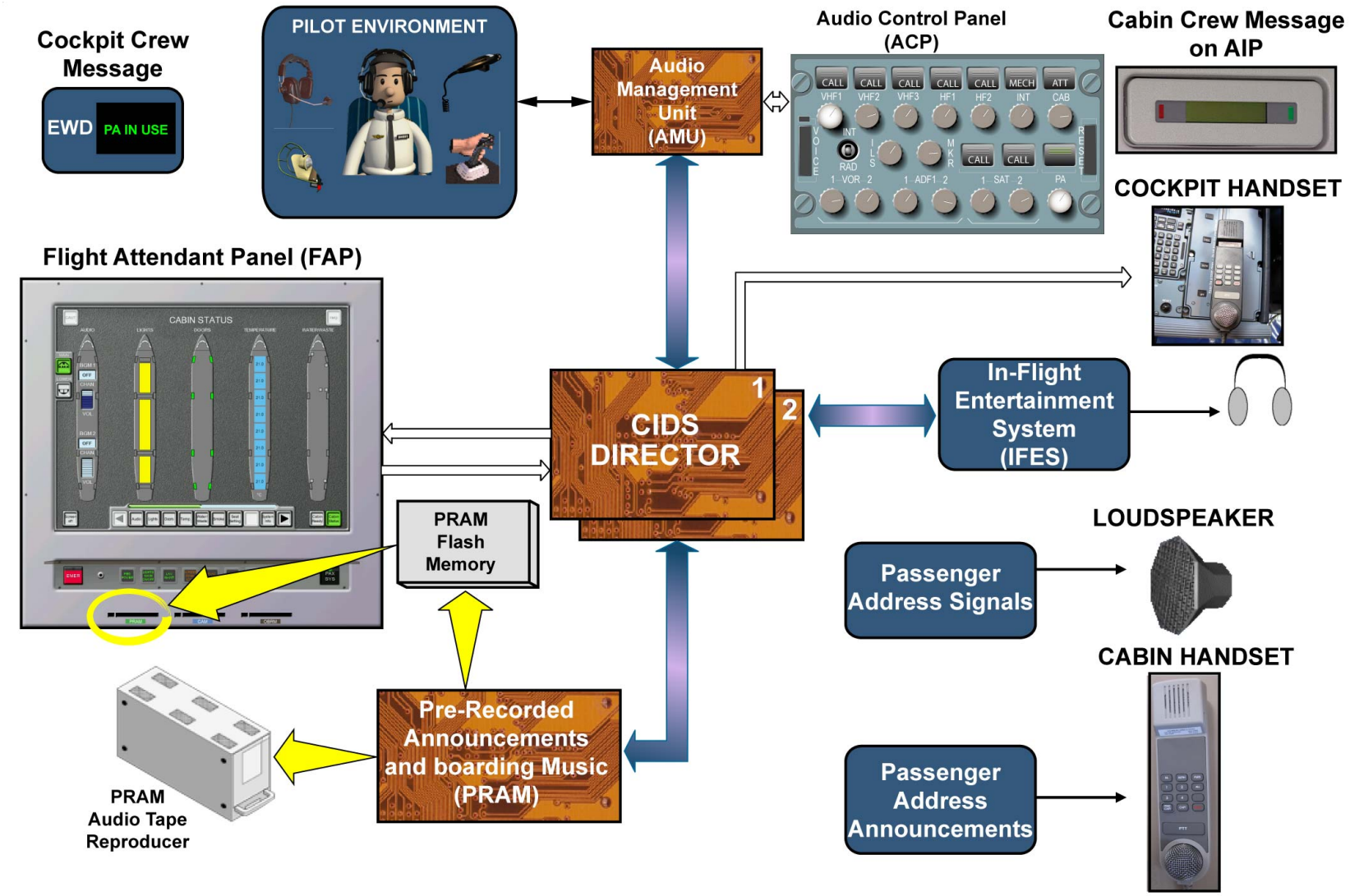
PASSENGER ADDRESS - CABIN AND SERVICE INTERPHONES FUNCTIONALITIES

PASSENGER ADDRESS SYSTEM

The Passenger Address (PA) system is one of the main functions of the CIDS. PA signals are broadcast from the cockpit or cabin crew stations through all the cabin loudspeakers. To make PA announcements, the cabin crew uses the cabin handsets. The quickest way to initiate a PA from the cockpit is to use the cockpit handset, directly connected to the Directors. The cockpit crew can also send a PA using the PA key on the ACP and the cockpit acoustic devices.
A Pre-Recorded Announcements and boarding Music (PRAM) sends pre-recorded announcements and boarding music to the Directors to be broadcast through the PA system. There are two types of PRAM, which have identical functions. It can be a flash memory type plugged into the FAP or an audio tape reproducer installed in the avionics bay. The PRAM, whatever its type, is controlled from the FAP.
Note that PA announcements are also broadcast to the passenger headsets via the IFES. In the event of a PA, the cabin crew is informed by messages on the AIPs and the cockpit crew by a message on the EWD.

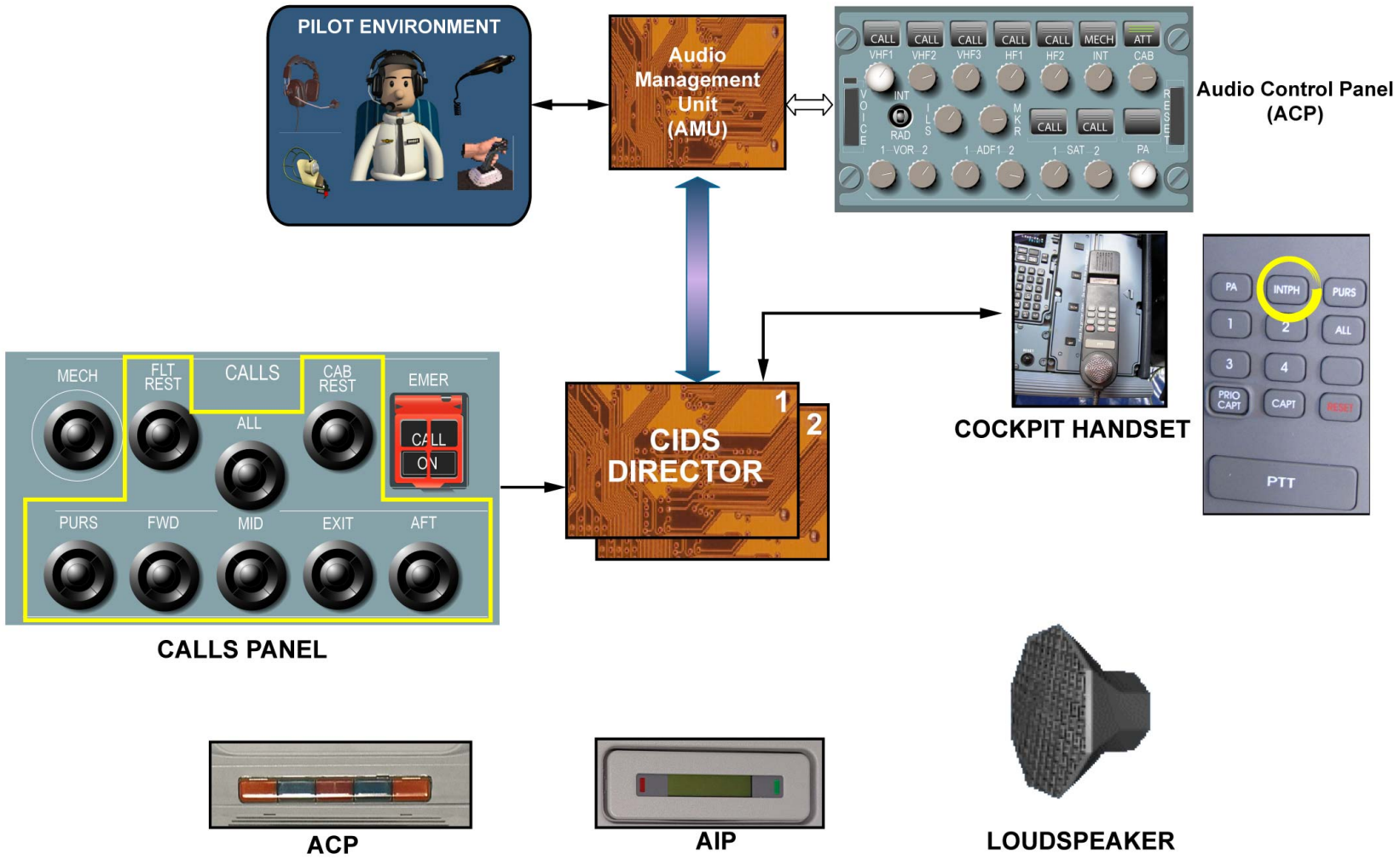


PASSENGER ADDRESS SYSTEM

PASSENGER ADDRESS - CABIN AND SERVICE INTERPHONES FUNCTIONALITIES

CABIN AND FLIGHT CREW INTERPHONE SYSTEM

The cabin and flight crew interphone system allows telephone communication between all cabin crew stations and the cockpit, via the cockpit handset or any cockpit acoustic device. The cabin crew can initiate a call to another cabin crew station or to the cockpit by dialing on the handset. To call the cabin crew from the cockpit, the overhead CALLS panel is used.
To speak to a cabin crew member from the cockpit, the CABin transmission key and the CABin reception key on the ACP are adjusted accordingly. In the cabin, the cabin crew is aware of a call by visual indication on the AIPs and ACPs, associated to the called station. Hi-lo chimes are also broadcast in the assigned zones through the cabin loudspeakers.

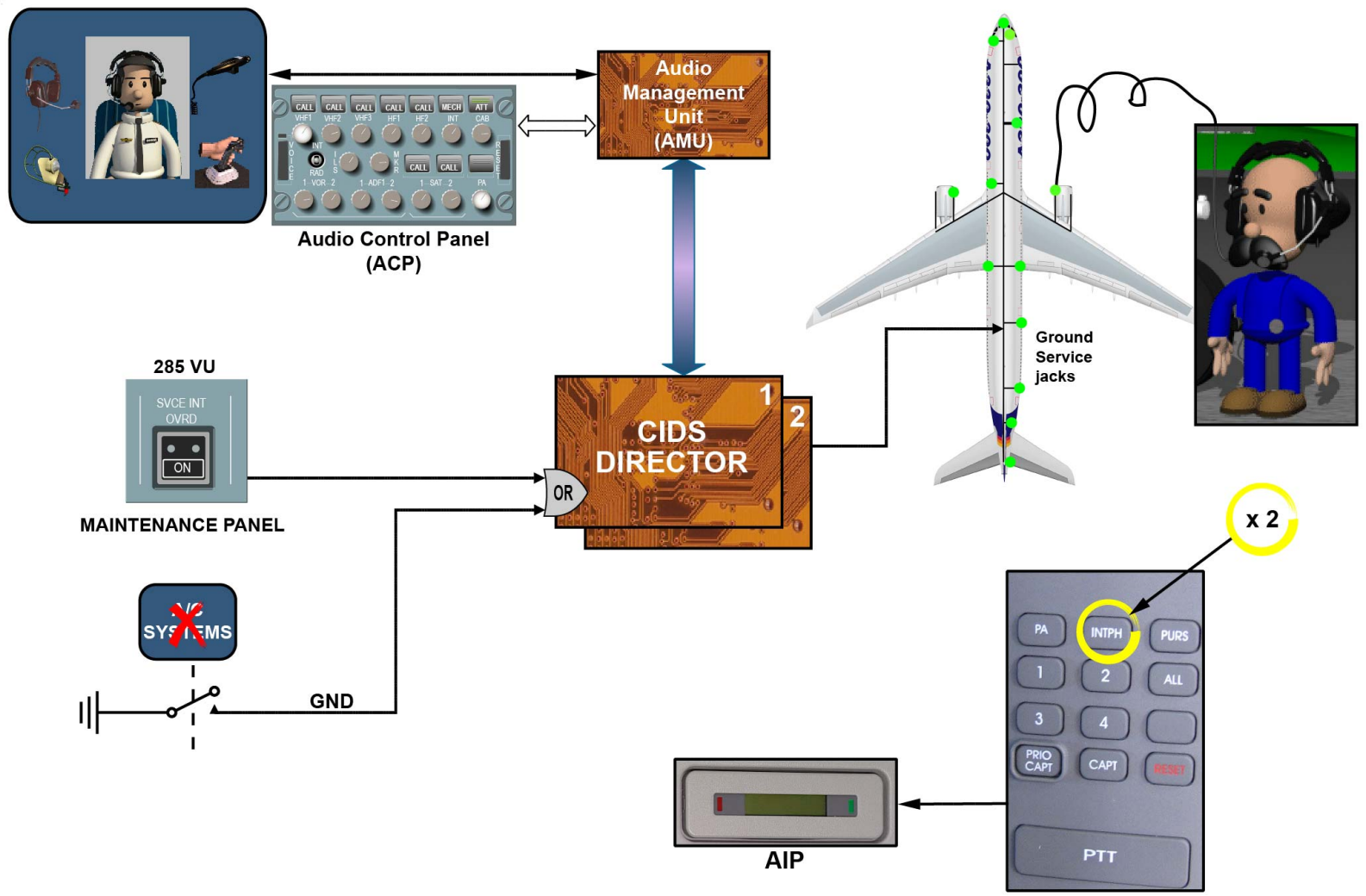


CABIN AND FLIGHT CREW INTERPHONE SYSTEM

PASSENGER ADDRESS - CABIN AND SERVICE INTERPHONES FUNCTIONALITIES

SERVICE INTERPHONE SYSTEM

The service interphone system enables voice communications, on ground only, between the cockpit, the cabin crew stations and the service interphone jacks located around and in the aircraft. In the cockpit, the CABin key on the ACP must be pressed. In the cabin, the cabin crew has to press twice on the INTerPHone key on the handset to activate the service interphone function.
A display on the AIPs in the cabin will indicate that the service interphone is in use. If on-ground information is not sent to the Directors, the SerViCE INTerphone OVerRiDe pushbutton has to be set to ON to force the service interphone to work.

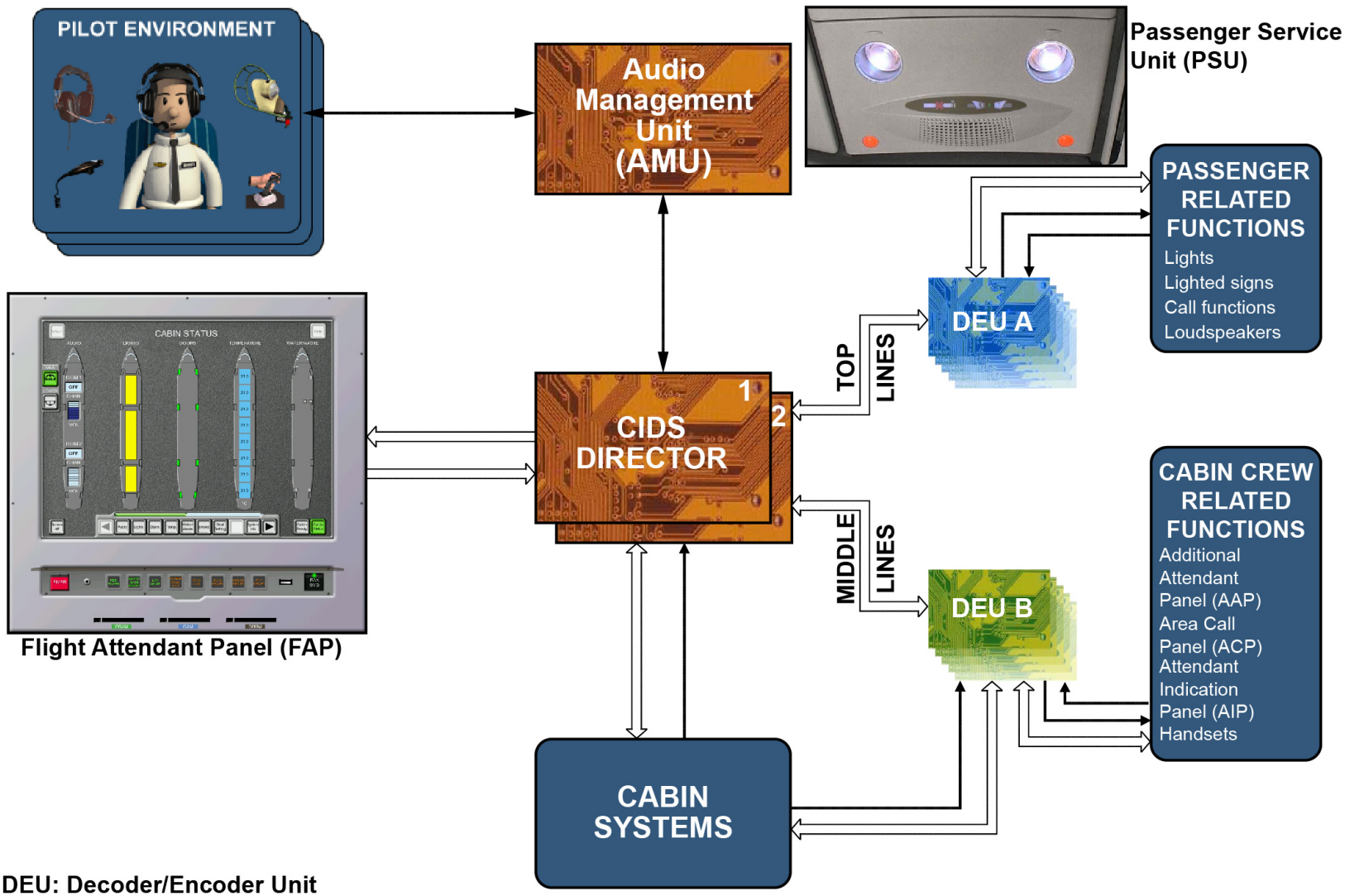


SERVICE INTERPHONE SYSTEM

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

GENERAL

The Cabin Intercommunication Data System (CIDS) is the cabin core system. It is designed to interface between cabin crew, cockpit crew and passengers.



GENERAL

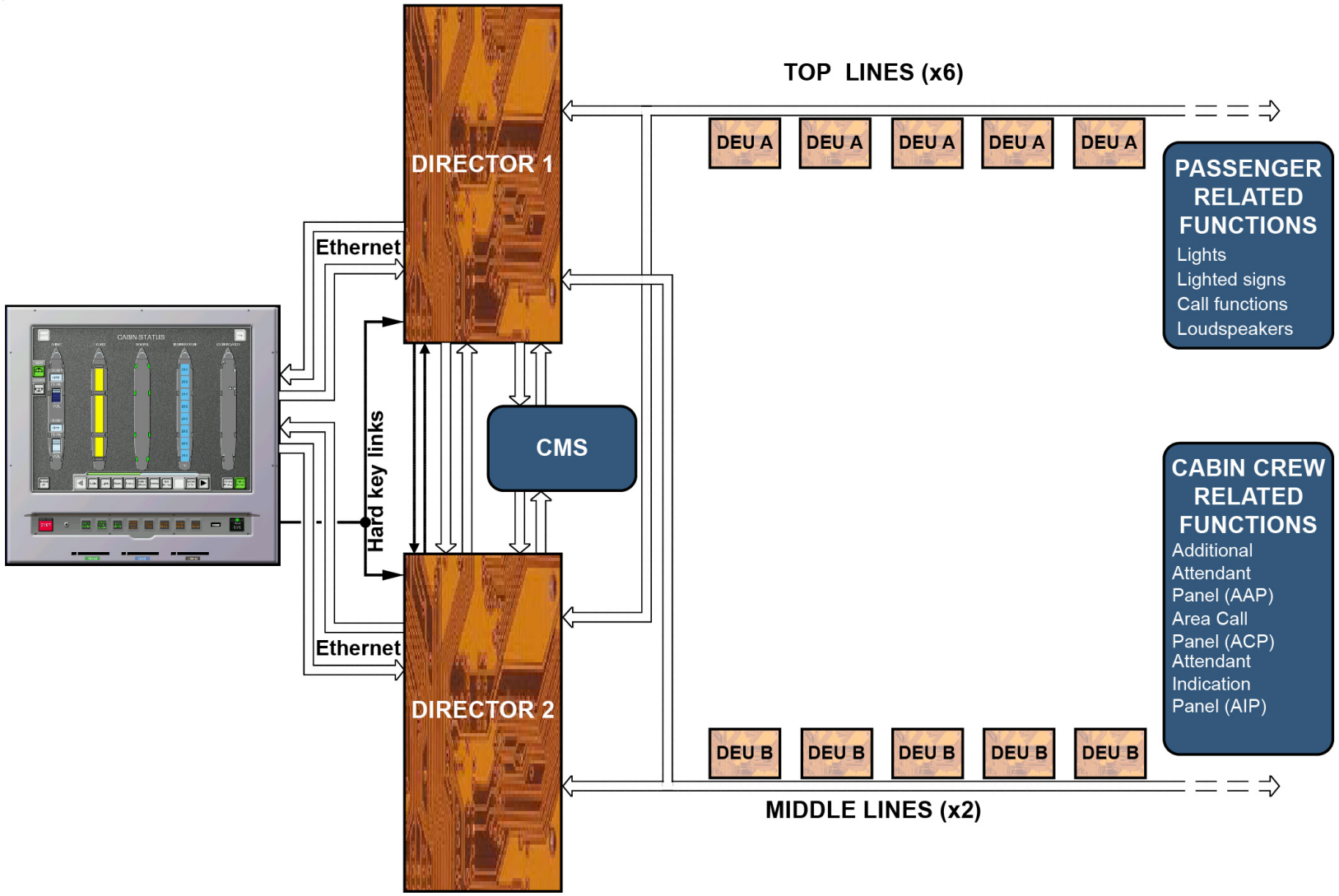
CABIN INTERCOMMUNICATION DATA SYSTEM D/O

GENERAL (continued)

DIRECTORS

The two Directors are the central control components of the CIDS. They are fully identical and have the same outputs and inputs.
They provide to each other their operational status through a discrete signal and data and failure information through ARINC 429 buses.
In normal operation, Director 1 is operative and Director 2 is in hot stand-by. This means that Director 2 receives and computes the same data as Director 1 but its outputs are disabled.
The Directors are linked with the Flight Attendant Panel (FAP) through two wire types:
- By Ethernet for data exchange,
- By discrete for each hard key.

System reconfiguration for the installation of options, cabin reconfiguration or CIDS expansion is limited to software database changes. These databases are the On Board Replaceable Module (OBRM) and the Cabin Assignment Module (CAM). They are downloaded from the FAP.
The CIDS is also designed to detect internal and external faults. The CIDS is a type 1 system. It is connected via the Directors to the Central Maintenance System (CMS) for maintenance purposes (BITE and tests).



GENERAL - DIRECTORS

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

GENERAL (continued)

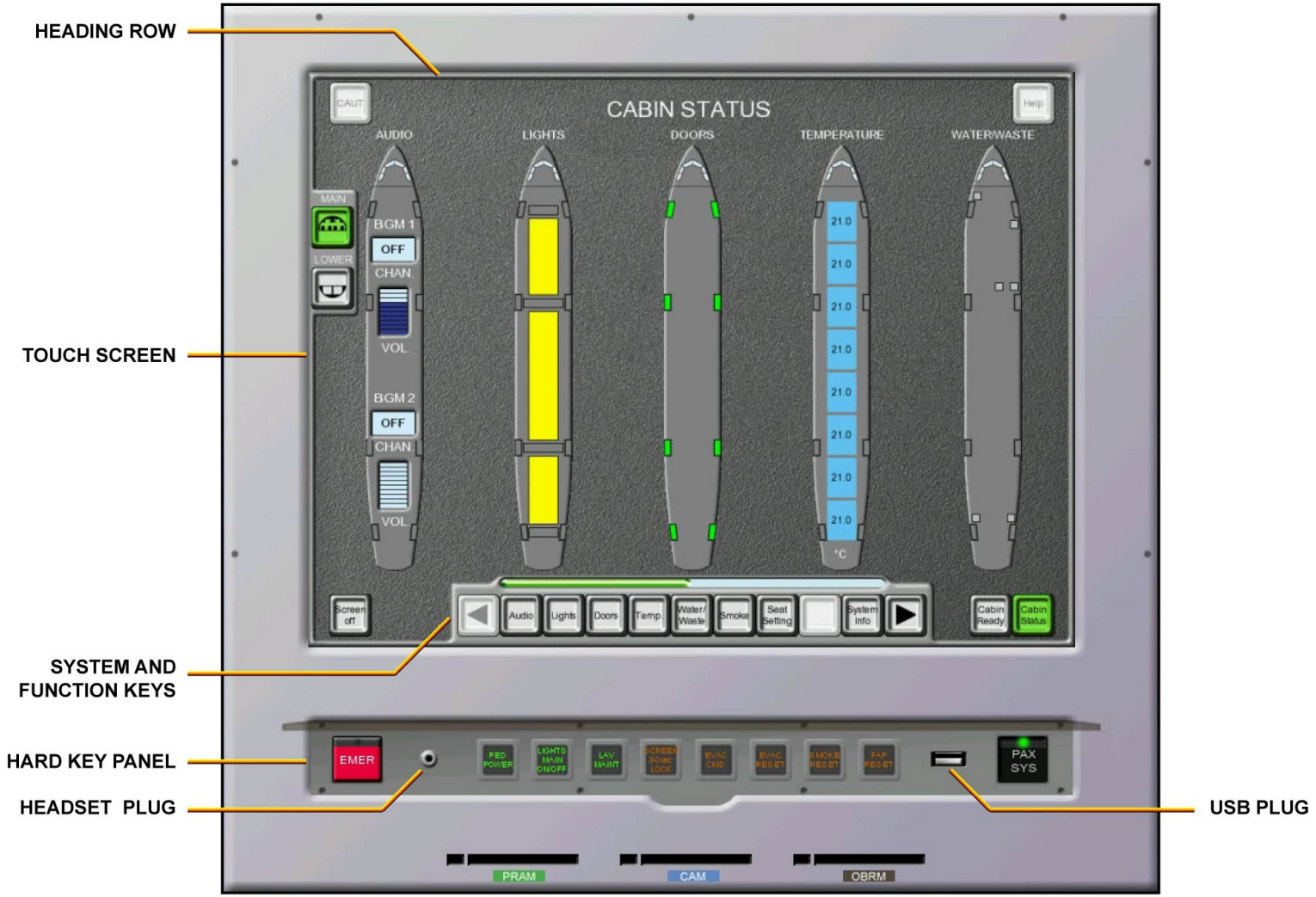
FLIGHT ATTENDANT PANEL

The FAP is used as the main user interface with the CIDS. It programs, controls and indicates the status of the CIDS and related cabin systems. It is made of a touch screen and a hard key panel.
The FAP display structure is made of different pages related to the different systems connected to the CIDS. The FAP has its own software to build the screens using data from the Directors.
On the top LH corner of the screen, the CAUtion button will turn from gray to amber in case of CIDS internal fault. A message related to this caution will be displayed on the heading row to indicate what to do (which page to select). Despite that, some system pages will come up automatically under failure detection.
The Screen Off button is located in the lower left corner of the touch screen. Pushing that button switches the screen off. The screen is also switched off if no input is made for more than 10 minutes. The screen is switched on again if you touch the screen or in case of an auto event.
The Cabin Status button on the bottom RH corner of the screen calls the CABIN STATUS page, which gives an overview of the cabin status; this concerns boarding music, cabin lights, doors, temperature and lavatories. This button will be green when the CABIN STATUS page is displayed or Grey if not.
At the bottom of the screen, the system and function keys are used for the navigation through the different pages.
The hard key panel is used for major functions, which have to operate independently from the FAP touch screen. The hard key panel contains all hard keys and some interfaces (USB and headset plugs) and is protected by a transparent cover.
The following hard keys are installed on the hard key panel:
- PED POWER to switch the Portable Electronic Device (PED) power on or off in all class seats,
- LIGHTS MAIN ON/OFF to switch the main cabin lights on or off (100% or 0%),
- LAV MAINT to switch lavatory lights on (100%) in relation to toilet door status (locked or unlocked),
- SCREEN 30 sec LOCK to lock the touch function of the screen (To clean the screen),
- EVAC CMD to initiate an emergency evacuation (if the purser is permitted to do this),
- EVAC RESET to reset the evacuation lights and audio alert,
- SMOKE RESET to reset the audio smoke alert,
- FAP RESET.

The following switches are installed on the hard key panel:
- EMER (light),
- PAX SYS to cut off the In-Flight Entertainment (IFE) system normally enabled at power-up.

The following interfaces are installed on the hard key panel:
- USB plug for PC connections,
- Headphone plug to listen to boarding music or pre-recorded announcements before broadcasting them.

On the lower part of the FAP panel, partly hidden by the lining, 3 flash card readers are installed. The OBRM contains the system software. The CAM contains the system properties and cabin layout information. The third flash card is optional and is used to store the Pre-Recorded Announcement and boarding music Module (PRAM) message.



GENERAL - FLIGHT ATTENDANT PANEL

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

GENERAL (continued)

PASSENGER SIDE

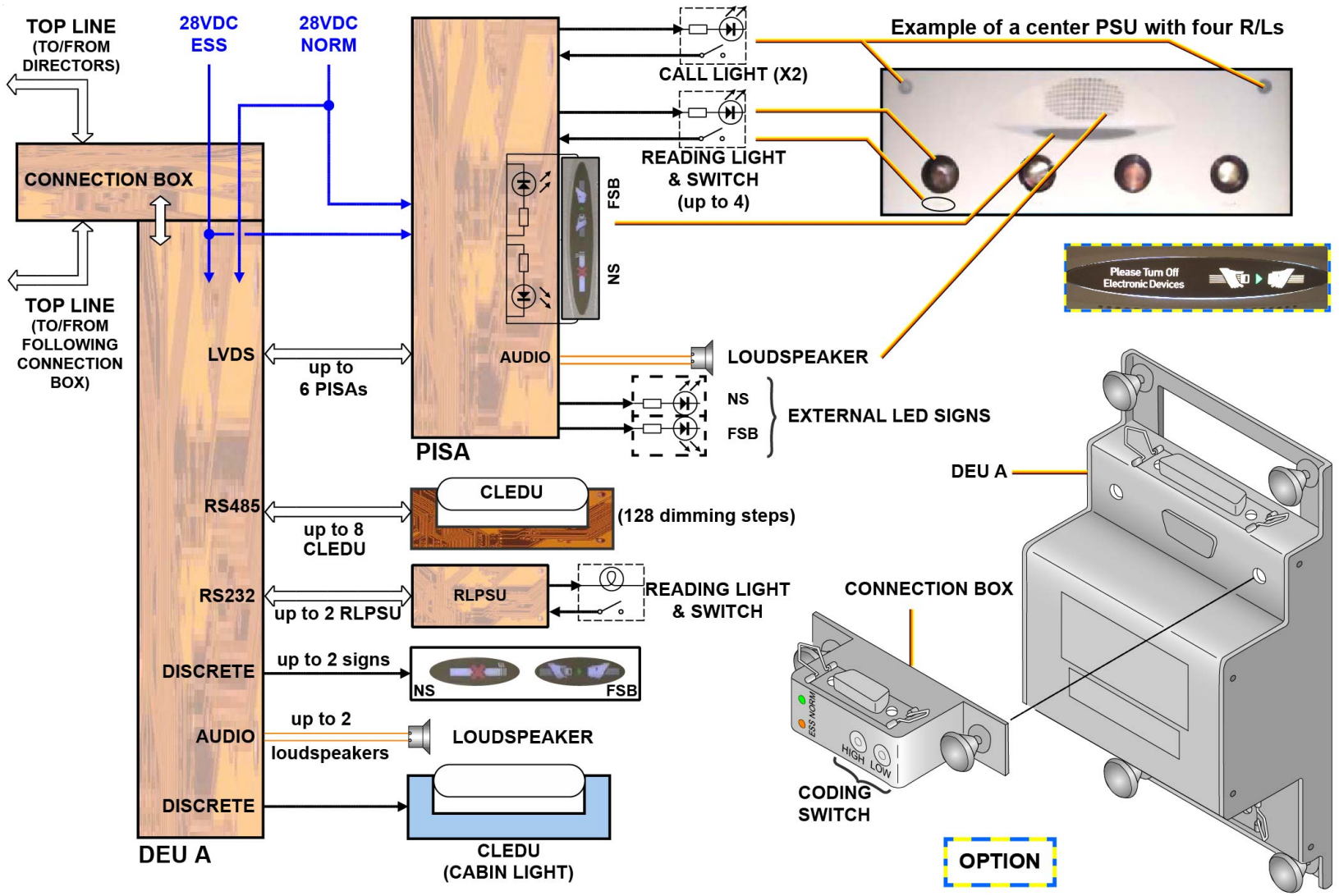
Top line data buses connect the CIDS Directors to type A Decoder/Encoder Units (DEUs) for passenger functions. Two top lines are installed along each aircraft side and two in the center of the aircraft, above the ceiling of the cabin. If lower deck facilities are installed, the top lines are extended to the lower deck.
Top lines are bi-directional serial high-speed data buses (4MB/sec). Each line is connected to the two Directors in parallel.
A failure of one top line disables all passenger functions on the DEUs connected to this top line.
The lines run through connection boxes. Each connection box is connected to a DEU A. It gives the DEU A its own address via the two coding switches.
Control commands and audio signals from the Director are decoded and transmitted to the respective connected equipment.

NOTE: Note that the last connection box on the top line includes a termination resistor for impedance matching.

Up to 63 type A DEUs can be installed in the cabin plus a maximum of 16 in the lower deck facilities. The CIDS uses each DEU A to control cabin illumination, signs, calls and cabin sounds according to cabin parameters programmed in the CAM.
The passenger functions are centralized in the Passenger Service Units (PSUs). They are connected to type A DEUs via a Passenger Interface and Supply Adapter (PISA). Up to 6 PISAs can be connected to each DEU A. The PISAs are installed in each PSU.
The PISAs are connected to the following equipment:
- Reading-light switches and reading lights,
- PAX call button and call light,
- Loudspeakers,
- No Smoking (NS), Fasten Seat Belt (FSB) and Return To Seat (RTS) signs Optionally and according to customer specific Layout, it is possible to replace the No Smoking Signs by No Mobile Signs (on PSU, or any illuminated sign in the cabin). In this case "Please Turn Off Electronic Devices" can be displayed.

The general illumination system has Cabin LED Units (CLEDU), which are installed in the ceiling panels and the stowage compartments. CLEDUs are connected directly to the DEU A through an RS485 bus. They control general cabin lighting gradually using 128 dimming steps.
For special applications, it is possible to connect directly to the type A DEUs all cabin-related components such as:
- R/Ls via a Reading Light Power Supply Unit (RLPSU),
- Signs,
- Loudspeakers,
- Classical ballast unit.

In normal mode, the service bus supplies 28VDC directly to the type A DEUs and to the PISAs. The system operates at full capacity.
In emergency mode, only the essential bus supplies 28VDC to the CIDS. In this configuration, the PISAs are supplied via the DEU A in order to activate FSB/NS signs.



GENERAL - PASSENGER SIDE

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

GENERAL (continued)

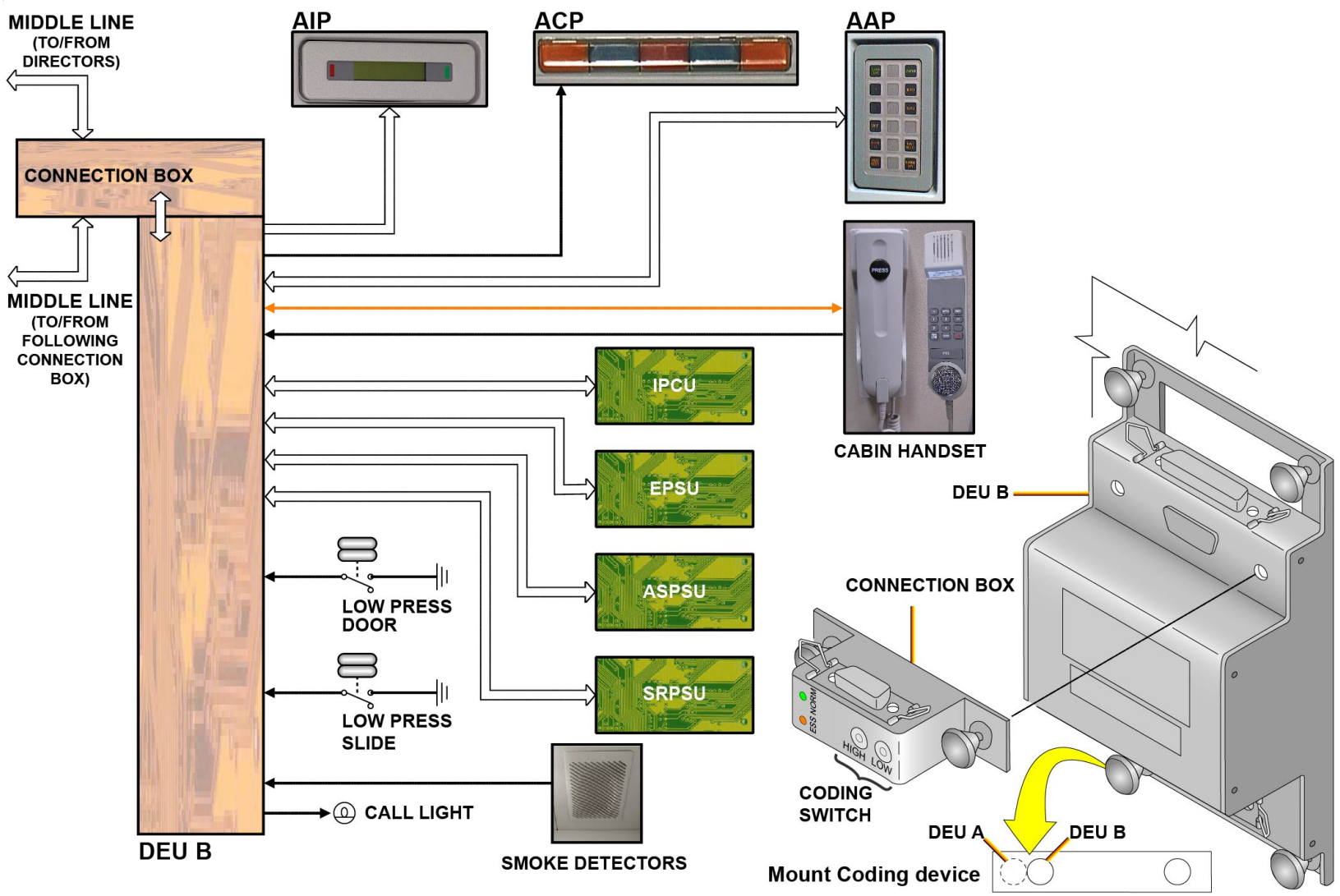
CABIN CREW SIDE

Middle line data buses connect the CIDS Directors to type B DEUs for cabin crew functions. One middle line is installed along each aircraft side, above the ceiling of the cabin. If lower deck facilities are installed, the middle lines are extended to the lower deck.
Middle lines are bi-directional serial high-speed data buses (4MB/sec).
Each line is connected to the two Directors in parallel.
A failure of one middle line disables all connected DEUs B.
The lines run through connection boxes. These connection boxes are physically the same as the ones connected to the top lines.
Each connection box is connected to a DEU B. It gives the DEU B its own address via the two coding switches.

NOTE: Note that the last connection box on the middle line includes a termination resistor for impedance matching.

A physical mount device helps the mechanics not to mount a DEU A in place of a DEU B and vice versa.
Up to 15 type B DEUs can be installed in the cabin. In case of a double deck operation, the number of type B DEUs is limited to 12 in the cabin and 12 in the lower deck.
The CIDS uses each DEU B to control the different devices needed by the cabin crew.
The Attendant Indication Panels (AIPs), located in the cabin crew stations, indicate (in written form) PA, interphone and other system information to the cabin crew.
The Area Call Panels (ACPs), located on the ceiling near the cabin crew stations, draw the cabin crew's attention by illuminated fields.
The Additional Attendant Panels (AAPs), located in cabin crew stations, control certain cabin functions instead of the FAP.
Each attendant station is equipped with a handset for passenger address and interphone functions.

The following equipment can also be connected:
- Ice Protection Control Unit (IPCU),
- Emergency Power Supply Unit (EPSU),
- Autonomous Standby Power Supply Unit (ASPSU),
- Slide Release Power Supply Unit (SRPSU),
- Slide and door sensors,
- Call light,
- Smoke detectors.



GENERAL - CABIN CREW SIDE

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

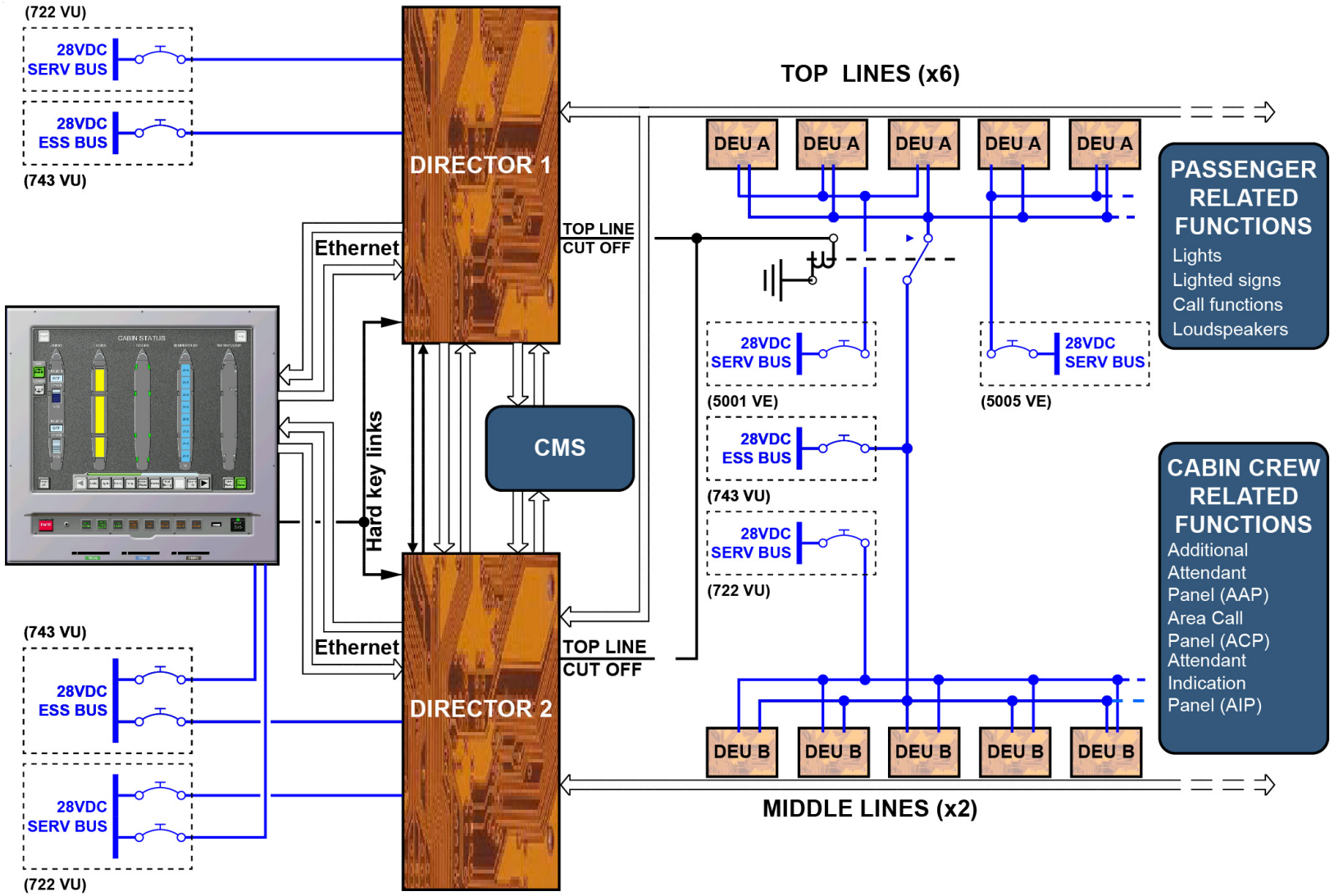
GENERAL (continued)

POWER SUPPLY

In normal mode, the service bus supplies all CIDS Directors and DEUs with 28VDC. The service bus is available on GND but is also the normal supply in flight.
The essential bus supplies power to the CIDS if the service bus is not available.
If the service bus is not available and the CIDS is in emergency mode, the power consumption is reduced to a minimum. Only the components that are needed for the minimum functions are supplied with electrical power.
The system operates in a downgraded capability mode. The remaining functions are:
- Passenger Address (PA),
- Cabin interphone,
- EVAC,
- Smoke indication.

The CABIN LIGHTS illumination is set to 100%.
The type A DEUs, which are connected to the top lines, are only supplied with power when an audio signal is present. If there is no audio signal, the active Director operates the top line cut-off relays to stop the power supply to the DEUs.
If a power interruption is longer than 5 sec., the CIDS software is reset and all the components of the system are set to the predefined status.
On ground reset is done through a total power-up test, lasting approximately 90 sec. In flight, a short power-up test will be done, lasting less than 20 sec.

NOTE: Note that the BITE and test functions are only active when the essential bus bar is also available.

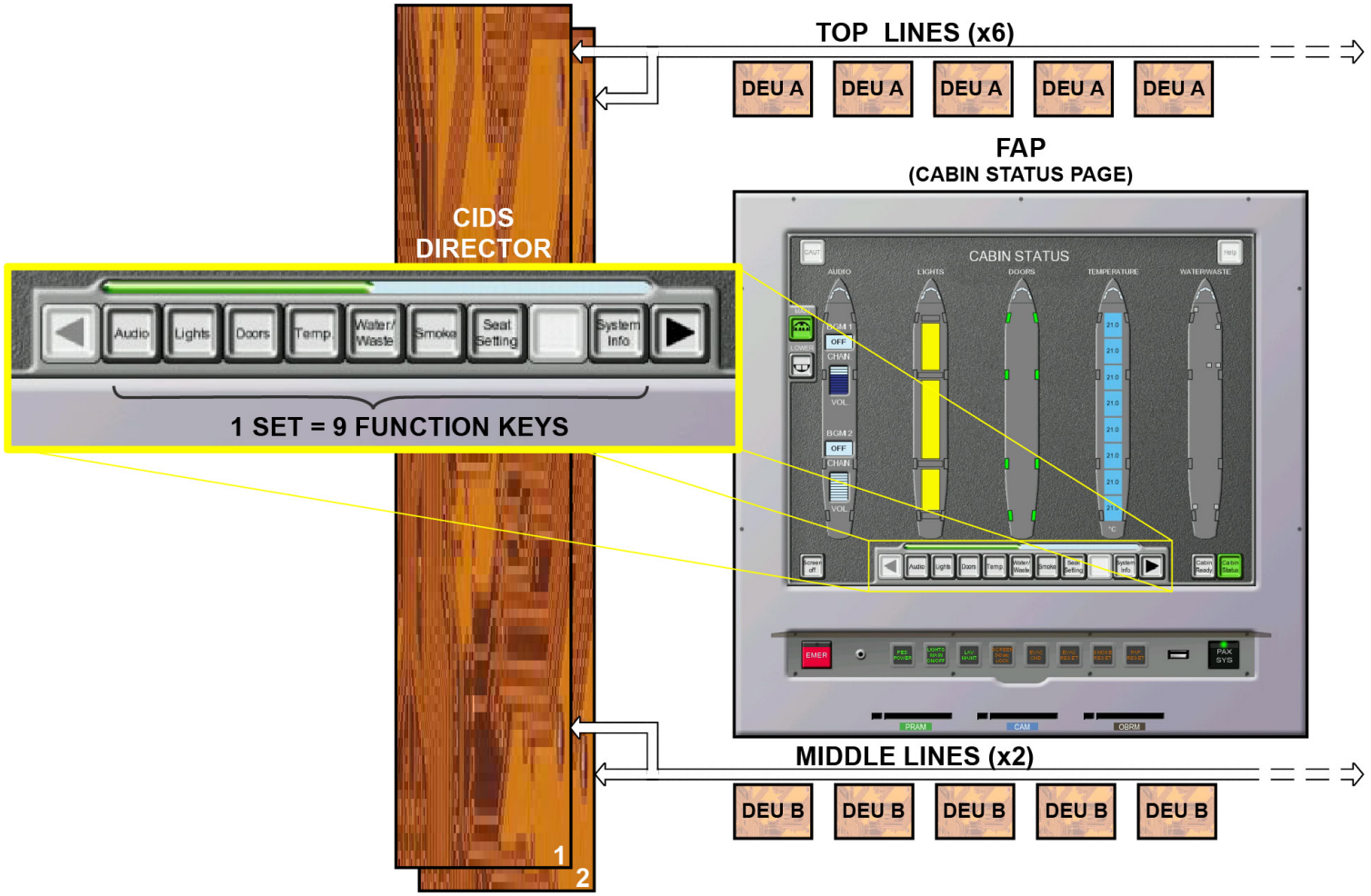


GENERAL - POWER SUPPLY

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

OPERATION

The main page, called CABIN STATUS page, helps the purser to have an overall status of the cabin. This page is displayed automatically at power-up.
This page allows direct access to the 5 system pages, AUDIO, CABIN LIGHTING, DOORS, CABIN TEMPERATURE and SMOKE pages via the aircraft symbols.
All system pages are selectable by the system and function keys at the bottom of the screen. There are different sets of system and function keys. A set has a maximum of nine keys.
The different system pages will be described with their related system or function.



OPERATION

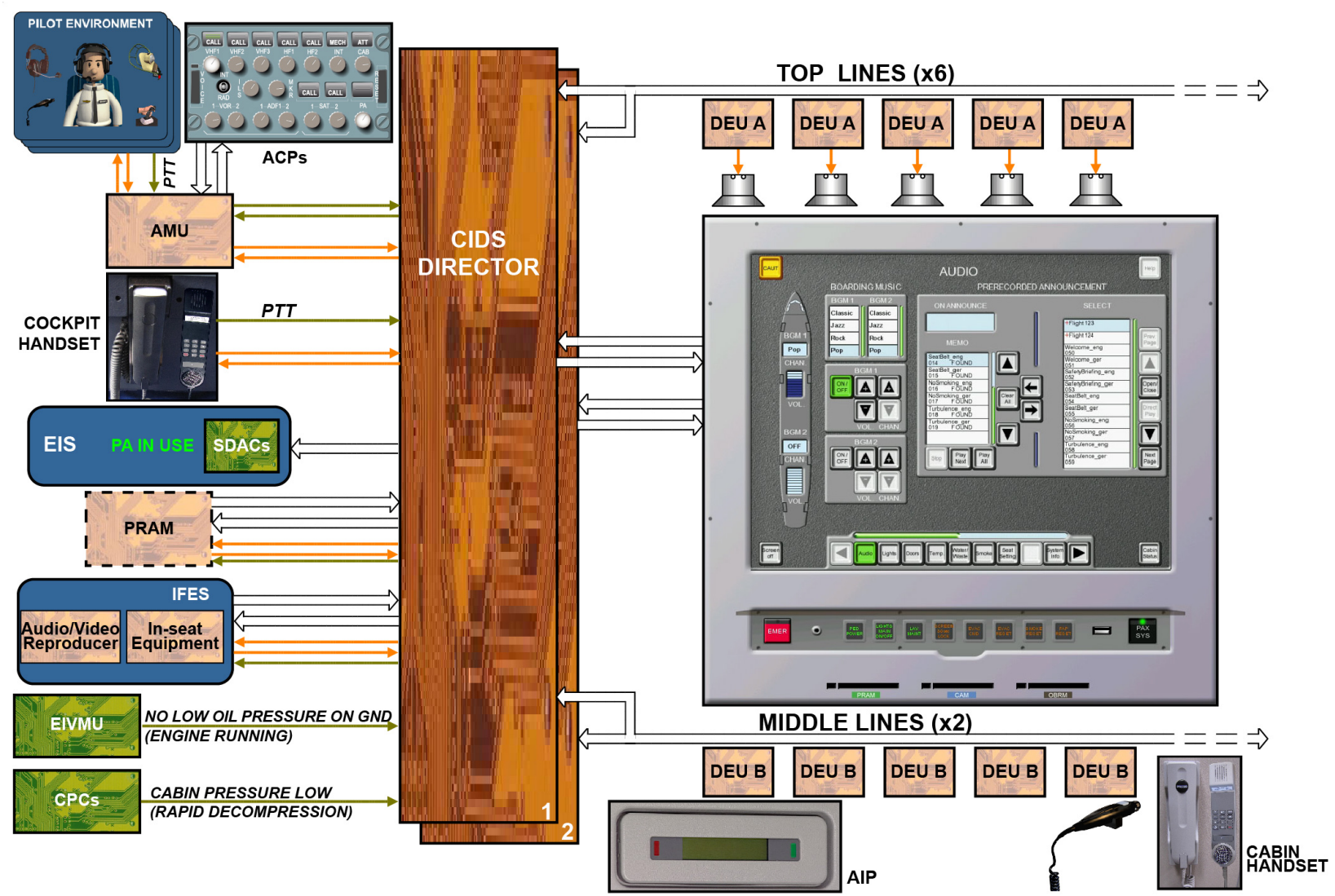
CABIN INTERCOMMUNICATION DATA SYSTEM D/O

OPERATION (continued)

PASSENGER ADDRESS AND BOARDING MUSIC

The passenger address system supplies the PA related announcements from the cockpit, the attendant stations, the PRAM and the IFE system to all assigned cabin loudspeakers.PA announcements are also transmitted through the passenger headset, if the IFE system is activated, in order to draw passenger attention.
Cockpit and cabin crew make PA announcements by using handsets. Basically, the cockpit handset has a Push To Talk (PTT) button only. Pushing this PTT button connects the handset to all loudspeakers. Optionally, it is possible to install a handset with an integrated keyboard. These functions are similar to the cabin crew handset.
The following functions are available:
- DIRECT PA: pushing the PTT button activates a link between the handset and all loudspeakers in the cabin and under-floor,
- PA ALL: pushing the PA button followed by the ALL and PTT buttons activates a link between the handset and all loudspeakers in the aircraft cabin,
- PA 1, 2 or 3: push the PA button followed by 1, 2 or 3 and the PTT button transmits the announcement to the corresponding zone.
Announcements can also be made to the crew rests (if installed).
Cockpit crew can also make PA announcements by using the acoustic devices and selecting the PA key on the ACP. The audio signal will then transit via the Audio Management Unit (AMU).
Optionally, an additional cabin hand microphone can be installed in the FWD area of the cabin (for DIRECT PA only).
When the PTT key is pressed, related to the direct PA function, the confirmation message "DIRECT PA/PA ALL IN USE" is displayed on all the AIPs and a high-lo chime is broadcast to all the cabin loudspeakers and passenger headsets. In the cockpit, the "PA IN USE" message is displayed on the left memo area of the ECAM EWD memo.

The function of the PRAM is to play pre-recorded messages. It also plays boarding music programs to the passengers through the aircraft PA system. It can be of the flashcard type, directly plugged into the FAP, or of the cassette or CD audio reproducer type connected with two ARINC 429 data buses to the CIDS Directors. The selection of pre-recorded announcements and/or boarding music is made on the AUDIO page of the FAP.
Depending on certain conditions, the PA level can be increased when engines are running or in case of rapid decompression.
The PA functions have priorities:
1- DIRECT PA,
2- All remaining PA functions.
The PA sources have the following priorities:
1- AMU,
2- Cockpit handset,
3- Purser station,
4- cabin crew handsets,
5- PRAM,
6- IFE system.
A source with higher PA priority interrupts a PA announcement from a source with lower priority. Only the announcement from the source with the higher priority is heard. However, there is an exception, if the lower priority source makes an announcement with a higher functional priority.



OPERATION - PASSENGER ADDRESS AND BOARDING MUSIC

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

OPERATION (continued)

INTERPHONE

The interphone systems will be used for the communication between cockpit crew, cabin crew and ground mechanics.
One or more links can be initialized at the same time. In conference mode, communication is possible between more than two interphone stations.
From the cockpit, interphone communications are initiated with the CALLS panel and via the equipment connected to the AMU (boomset, microphone and oxygen mask).
The following functions are available to call the cabin from the cockpit CALLS panel:
- EMER call (to call all cabin crew stations in emergency mode),
- ALL call (to call all cabin crew stations),
- PURS call (to call the purser),
- FWD call (to station at door 1),
- MID call (to station at door 2),
- EXIT call (to station at door 3),
- AFT call (to station at door 4).

When they are installed, it is also possible to call the crew rest stations.

NOTE: Note that, before initiating an interphone link with the cabin, the pilot must select the cabin transmission key and reception knob on the ACP.

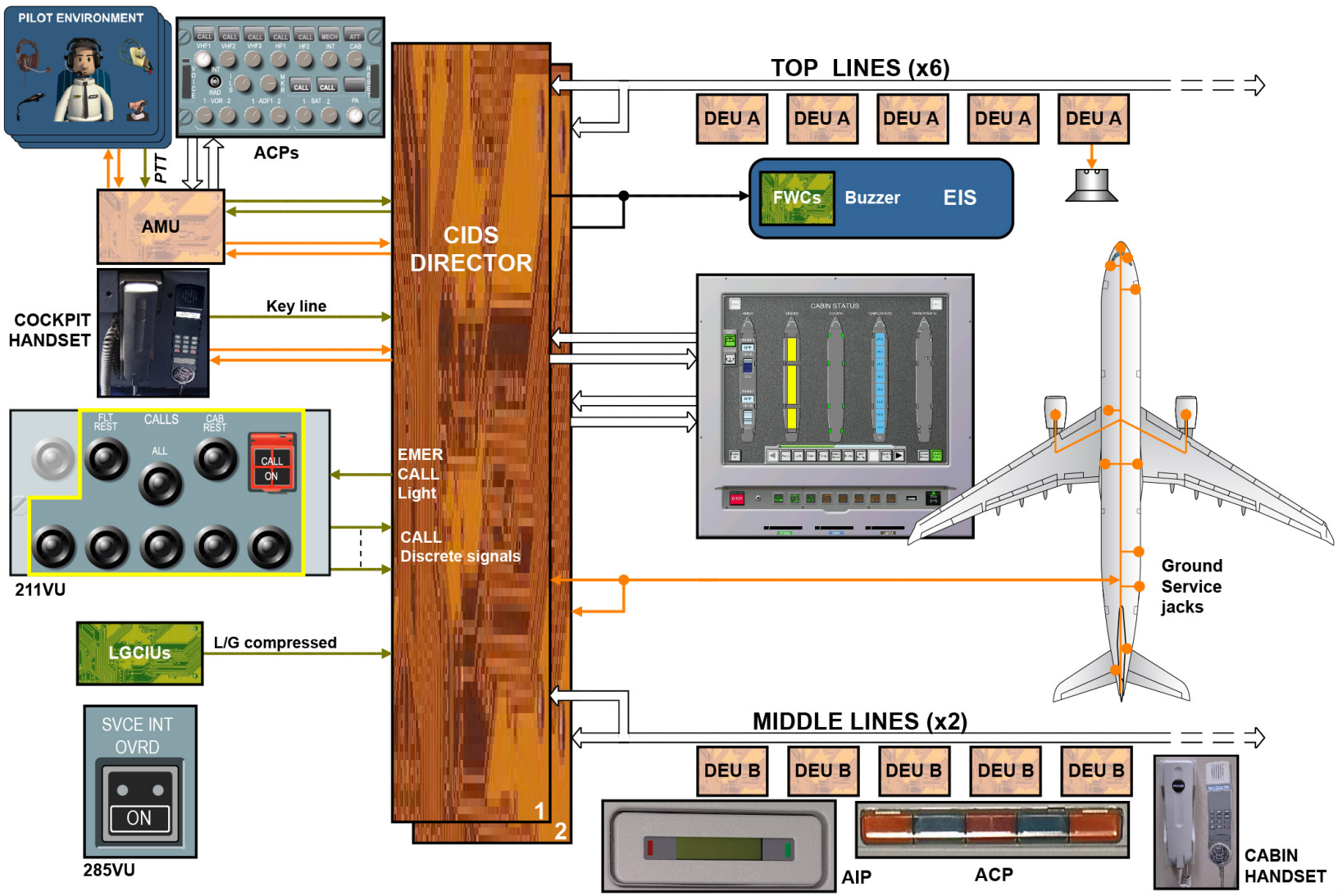
As an option, it is possible to supply the audio signal, from the interphone station in use, to the AMU. The cockpit crew can listen to the announcement as long as no link to the AMU is established. Side tone and cabin attendant messages can be listened to through the cockpit loudspeakers. This monitoring function is also available when using the cockpit handset equipped with the optional integrated keyboard.
Calls from the cabin are initiated with the cabin handset.
At the cabin level, the following interphone functions are available from each handset:
- PRIO CAPT (to call the cockpit in emergency mode),
- INTPH + CAPT (to call the cockpit in normal mode),
- INTPH + PURS (to call the purser),
- INTPH + ALL (to call all attendant stations in the cabin),
- INTPH + 1, 2, 3 or 4 (to call the corresponding cabin crew stations),
- INTPH + CREW REST + 1 (to call the Flight Crew Rest Compartment (FCRC) if installed),
- INTPH + CREW REST + 2 (to call the Lower Deck Mobile Crew Rest (LDMCR) if installed).

The functions have different priorities:
1- EMERGENCY CALL,
2- CALLS FROM COCKPIT,
3- ALL ATTENDANT CALL,
4- NORMAL CALL.

The sources have the following priorities:
1- AMU (cockpit),
2- Cockpit handset,
3- Cabin handsets.

A source with higher priority interrupts a link to an interphone station with a lower priority. A source with lower priority and a selected function with higher priority also interrupts an existing link.
In the cabin, a chime will be activated in the respective cabin area. If the call is assigned to the cockpit, the aural annunciation is done by the activation of the cockpit buzzer via the Flight Warning Computer (FWC). The FWC receives the respective signal from the active Director.
During the dial procedure, the dial information is displayed on the related AIP. After finishing the procedure the respective light segment in the ACP comes on and the related message is shown on the assigned AIP. The Directors will know each AIP and ACP location thanks to

the CAM data where the attendant station is situated, according to the connection box codes.
The reset function of an interphone on the handsets occurs after hanging up or after pushing the RESET button. This reset function is automatically activated after approximately 5 minutes, when no requested handset accepts the call.
In the cockpit, the emergency call indicator (for EMER CALL only) and the ATT light on the ACP are activated according to the initiated call.
The service interphone system enables voice communications, on ground only, between the cockpit, the cabin crew stations and the service interphone jacks located in and around the aircraft.
In the cockpit, the CABin key on the ACP must be pressed. In the cabin, the cabin crew has to press twice on the INTerPHone key on the handset to activate the service interphone function.
A display on the AIPs in the cabin will indicate that the service interphone is in use.
If Landing Gear Control and Interface Unit (LGCIU) on-ground information is not sent to the Directors, the SerViCE INTerphone OVerRiDe P/B has to be set to ON to force the service interphone to work.



OPERATION - INTERPHONE

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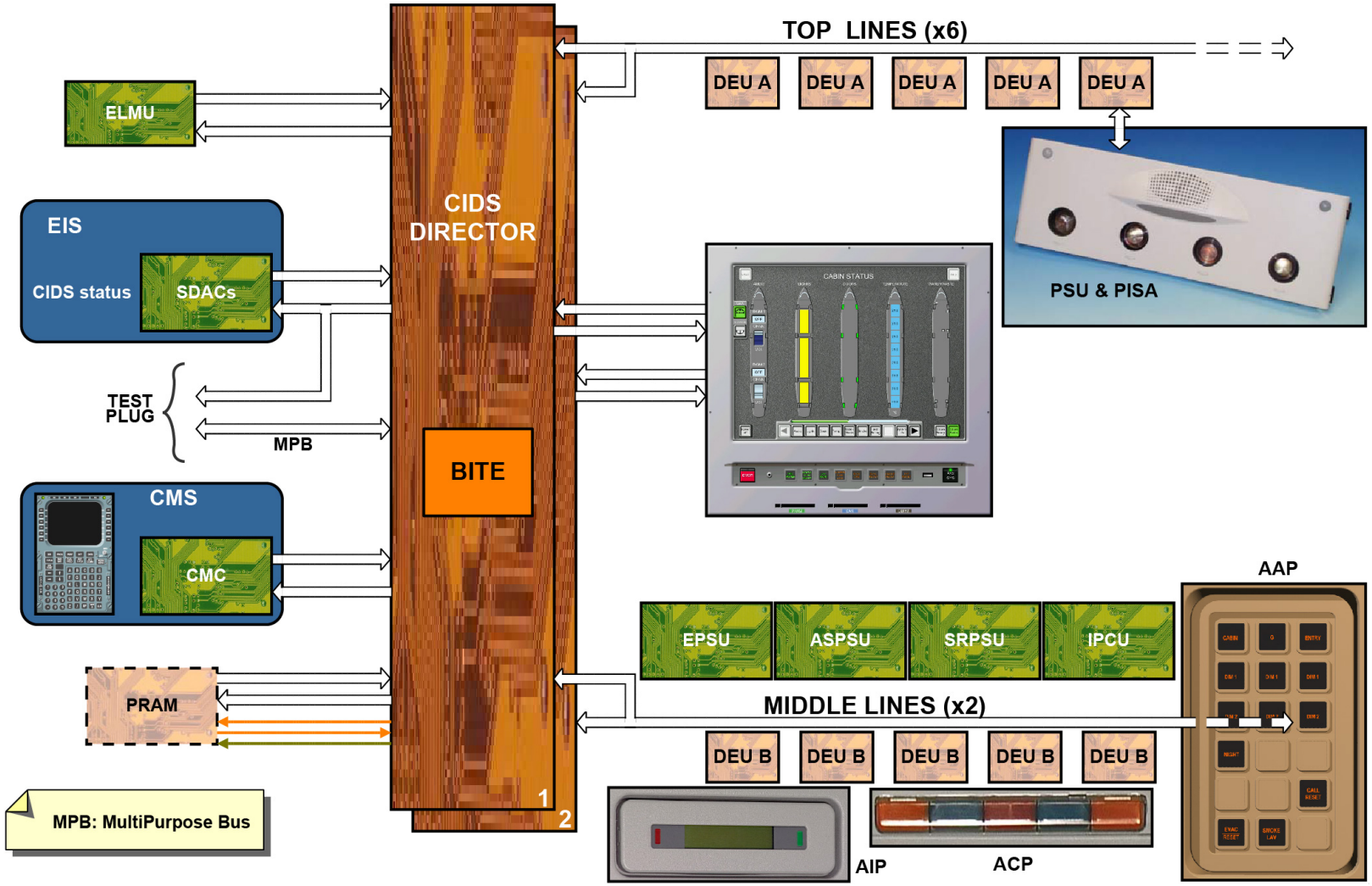
CABIN INTERCOMMUNICATION DATA SYSTEM D/O

OPERATION (continued)

MAINTENANCE

The CIDS is designed to continuously monitor its own performance and that of the connected equipment. Directors, FAP, DEUs, PISAs, AAPs and AIPs contain Built In Test Equipment(BITE) circuits.
The CIDS Directors store the detected faults in the CIDS units and the connected systems and send them to the CMC.
In the event of major faults, respective information is additionally sent to the Electronic Centralized Aircraft Monitoring (ECAM) display via the System Data Acquisition Concentrators (SDACs).
On ground, the MCDUs are used to dialogue with the CIDS via system report/test menus. This enables system configuration, Line Replaceable Unit (LRU) identification and tests to be done.
Some of the faults and test results are also sent to the FAP to be displayed on the related page.
The CIDS provides a Multi-Purpose Bus (MPB) for onboard monitoring in case of failure of the Central Maintenance Computer (CMC). Since the CIDS is a type 1 system, monitoring of the internal and external system status, conditions and activities can be done through the ARINC 429 bus. The bus is accessible via a test plug interface in the avionics compartment.



OPERATION - MAINTENANCE

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

CIDS PROGRAMMING

The CIDS is designed to be customizable. A system reconfiguration for the installation of options, cabin reconfiguration or CIDS expansion is limited to software database changes e.g. the OBRM and the CAM.
The OBRM defines in particular the operating software of the CIDS, but also all connections to this system and emergency functions.
The CAM defines the cabin layout. According to the program, the Directors will consider the various cabin features and options validated by the CAM software and will ensure the proper operation of the CIDS. This software is in the CAM A part. The CAM also has another essential role: it is to define all messages and page layouts of the FAP screen. It is known as CAM B. The CAM has 120.000 parameters to store all those items.
During the CIDS power-up, the Directors will compare the CAM and OBRM layout with their memories. If they find a difference, OBRM and CAM data will be downloaded. In the case of a total FAP failure combined with loss of the CAM and the OBRM flash cards, the CIDS will operate in restricted operating mode (BASIC functions active), thanks to the simplified operating software and cabin layout memory stored in the Directors.
The major CIDS programming functions available on ground via the FAP are:
- Layout change,
- Audio level adjustment,
- FAP set-up.

NOTE: Note that the FAP pages listed below are protected from inadvertent use by a password except for the FAP SET-UP page.

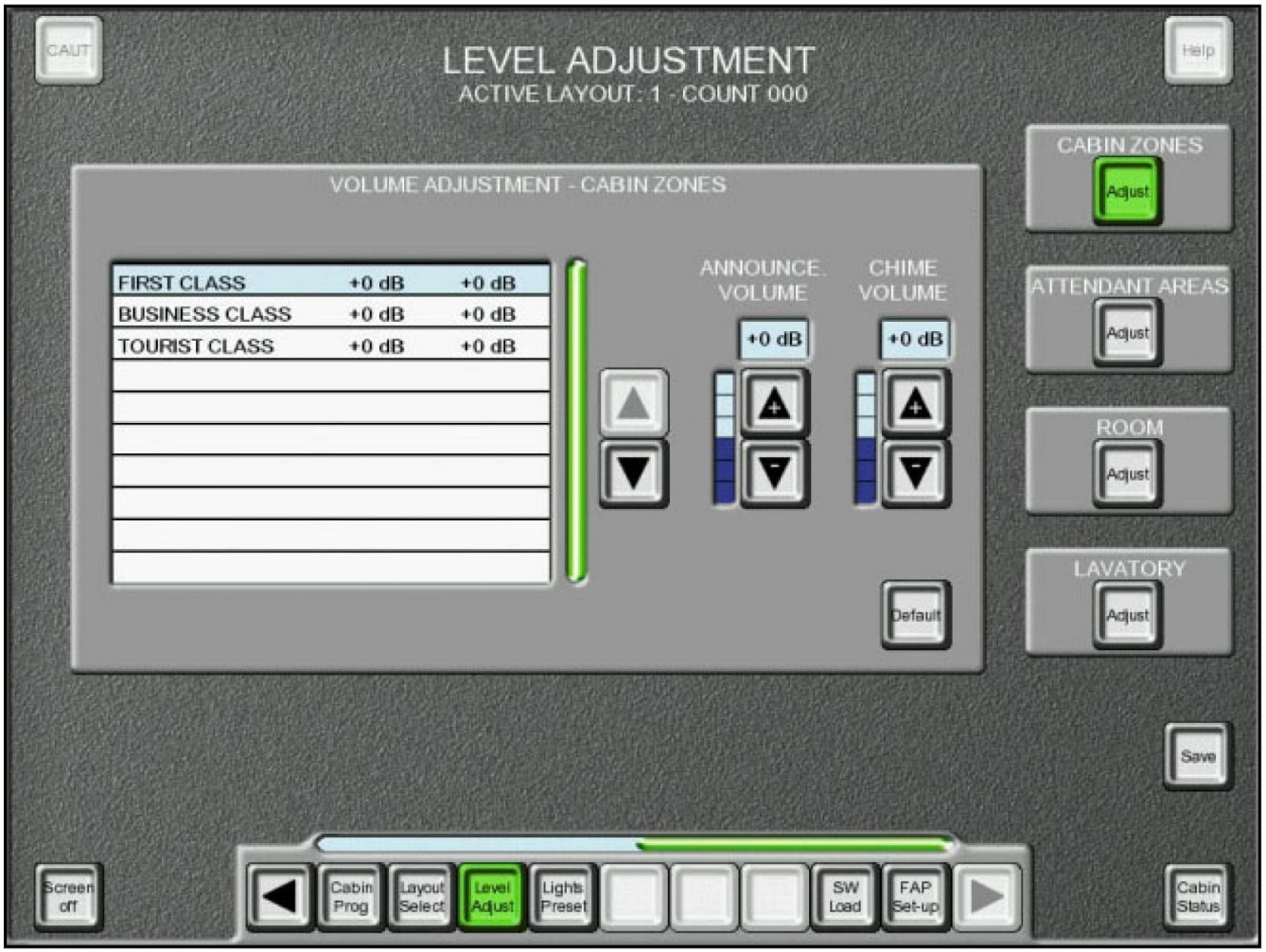
CIDS PROGRAMMING

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

CIDS PROGRAMMING (continued)

LEVEL ADJUSTMENT

The CIDS enables the volume of chimes and announcements to be changed in all defined cabin areas independently. To do so, the LEVEL ADJUSTMENT page has to be selected via the system and function keys on the bottom of the screen.
The area selection is made by pushing the related Adjust button. Then you can adjust announcement and chime volume in the selected area. The adjustment goes from -6 to +6 dB related to the nominal volume. The Default button resets all parameters to the CAM default values. To save the changes, push the Save button. Without saving the new entries, the previous settings remain valid after leaving the programming panel.



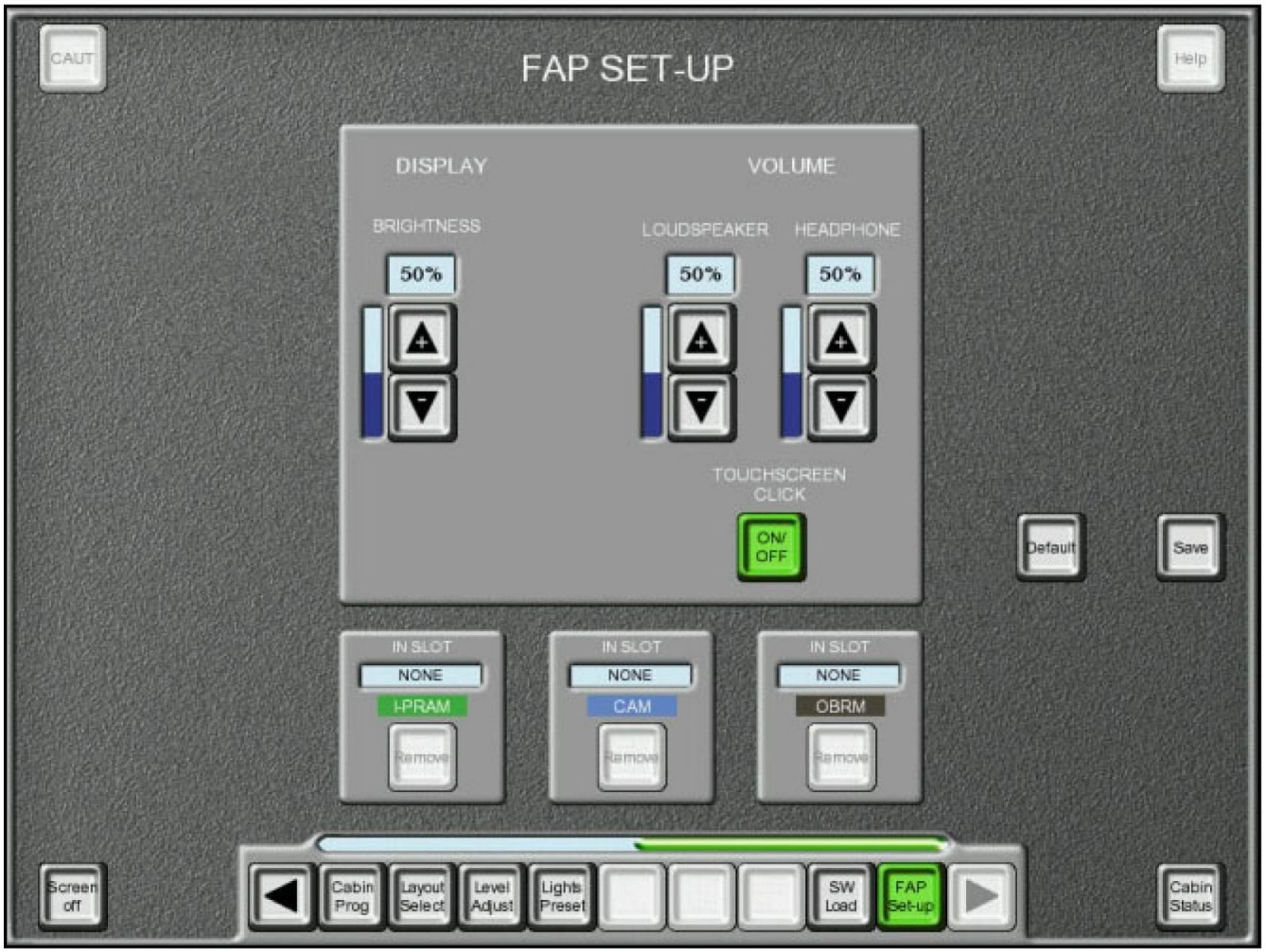
CIDS PROGRAMMING - LEVEL ADJUSTMENT

CABIN INTERCOMMUNICATION DATA SYSTEM D/O

CIDS PROGRAMMING (continued)

FAP SET-UP

The CIDS enables the brightness of the screen to be changed and the volume settings to be adjusted for the FAP internal loudspeaker and headphone. The FAP Set-Up page has to be selected via the system and function keys on the bottom of the screen.
The TOUCHSCREEN CLICK button makes the FAP emit a key click through the internal loudspeaker each time a function is selected. It becomes green when set to ON.
The Default button resets all the FAP Set-Up parameters to the CAM default values.
To save the changes, push the Save button. Without saving the new entries, the previous settings remain valid after leaving the programming panel.

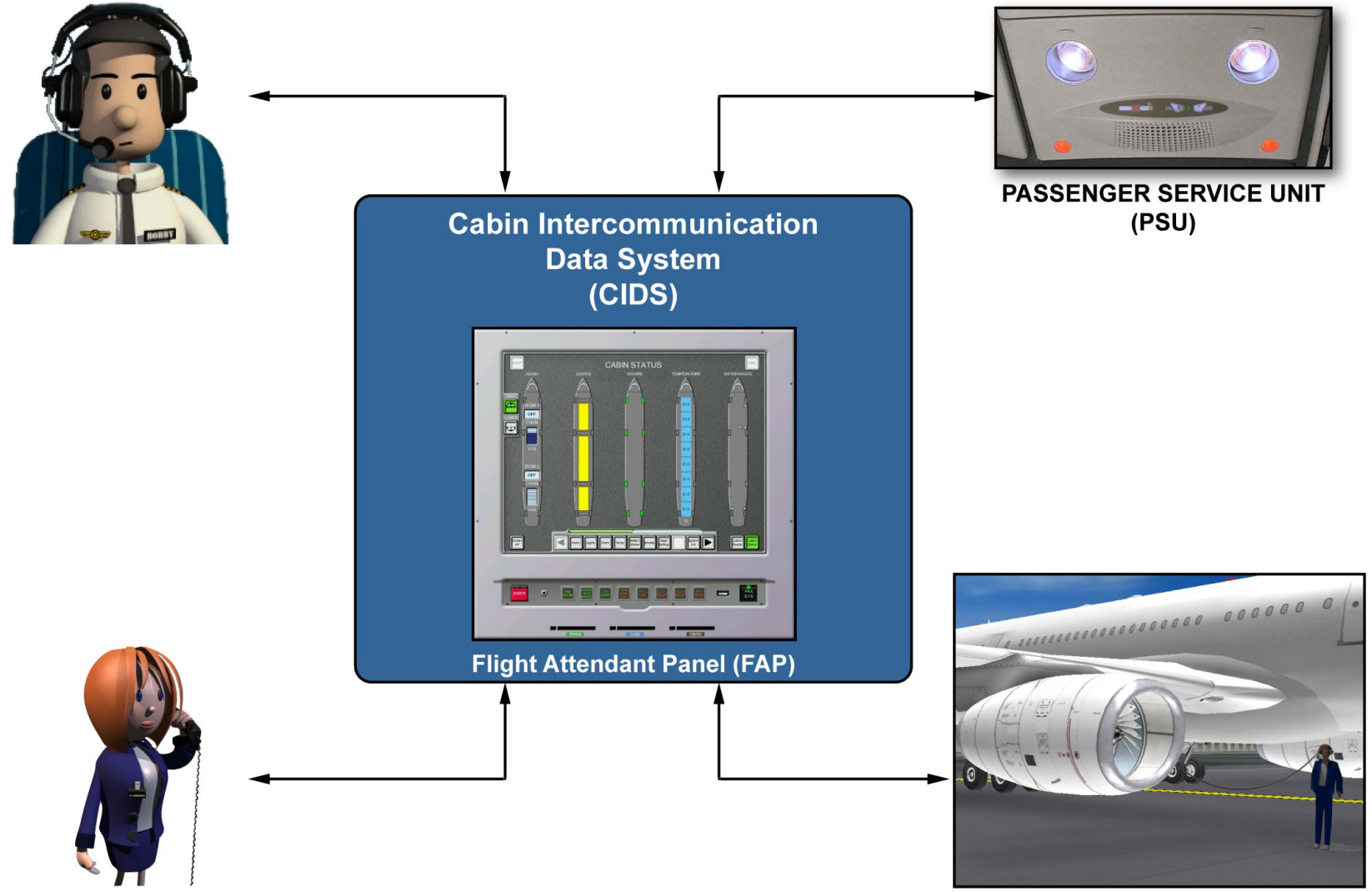


CIDS PROGRAMMING - FAP SET-UP

CIDS COMPONENT LOCATION

CIDS

The CIDS is the cabin core system. It is designed to be an interface between the cabin crew, the cockpit crew and the passengers. It also manages maintenance-related functions such as central-cabin maintenance service, system programming features, configuration data loading and service interphone.
The CIDS has one or more of these components:
- Director installed on the 800VU in the avionics compartment
- Decoder/Encoder Unit (DEU) type A installed above the ceiling in the cabin
- Decoder/Encoder Unit (DEU) type B installed above the ceiling in the cabin
- Passenger Interface and Supply Adapter (PISA) on each PSU
- Passenger service units
- Flight Attendant Panel (FAP)
- Cabin Assignment Module (CAM)
- On-Board Replaceable Module (OBRM)
- Integrated Prerecorded Announcement & Boarding Music (PRAM)
- Additional Attendant Panel (AAP)
- Attendant Indication Panel (AIP)
- Area Call Panel (ACP)
- Handset
- Loudspeaker
- Passenger call/reset pushbutton
- Passenger call light.



CIDS

CIDS COMPONENT LOCATION

FLIGHT ATTENDANT PANEL

The FAP is installed at the purser station.

NOTE: A second FAP (with less functions) can be installed at door 4 to have a better redundancy and to make cabin operations easier in the aft part of the cabin.

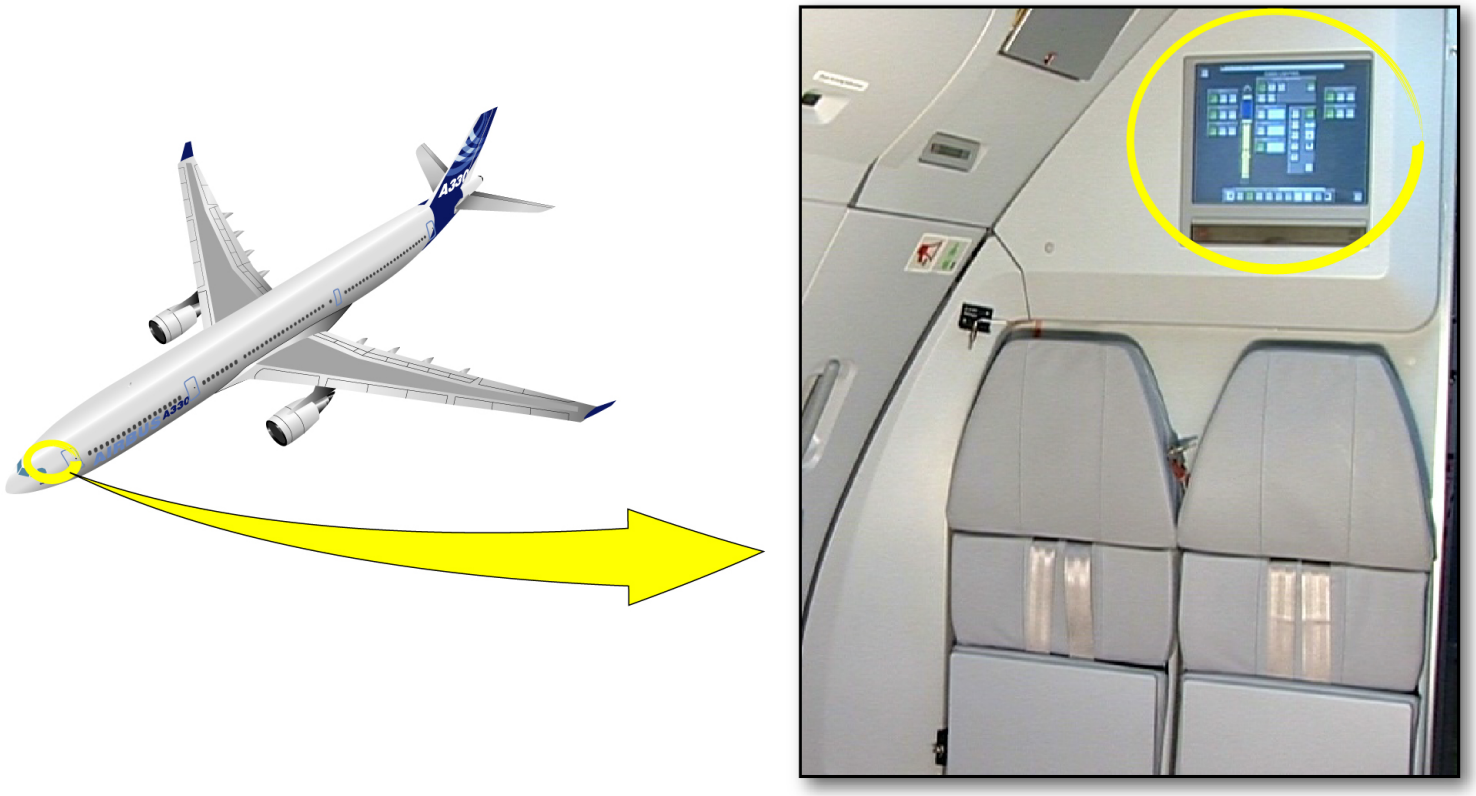
Each crew station has:
- a handset
- an AAP
- an AIP.

The ACPs are installed in the cabin ceiling near the attendant station.
They show:
- crew calls (steady or flashing pink signal)
- passenger call (steady blue signal)
- lavatory call (steady amber signal)
- lavatory smoke detection (flashing amber signal).

The DEUs type A and B are installed behind the cabin ceiling panels.
The number of DEUs changes in relation to the fuselage length and the cabin configuration.

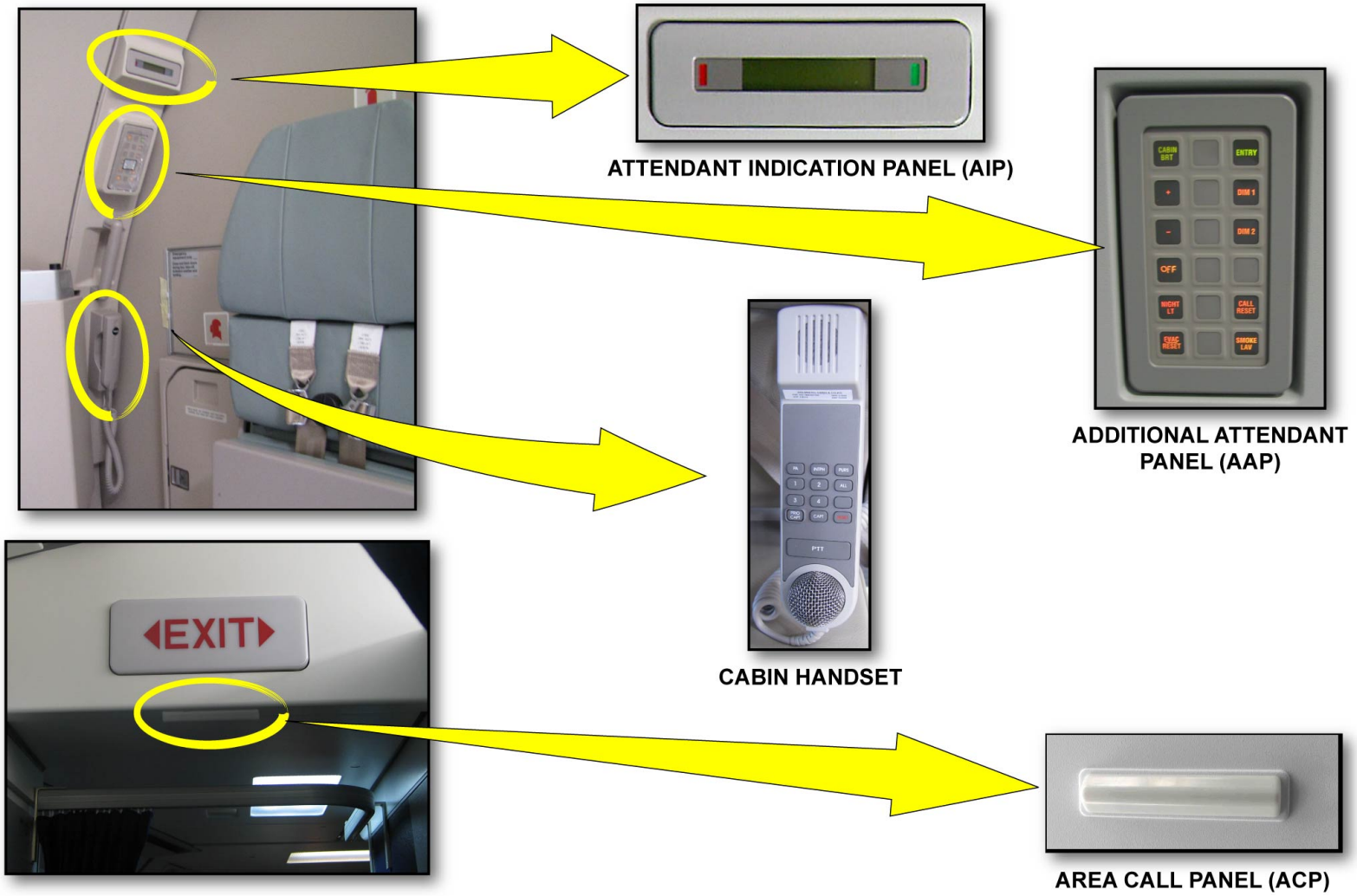
NOTE: The positions of the DEUs type A and B can change in relation to the aircraft accommodation.

The primary components of the CIDS are the DIRectors (DIRs).
These directors are on the rack 800VU in the avionics compartment.

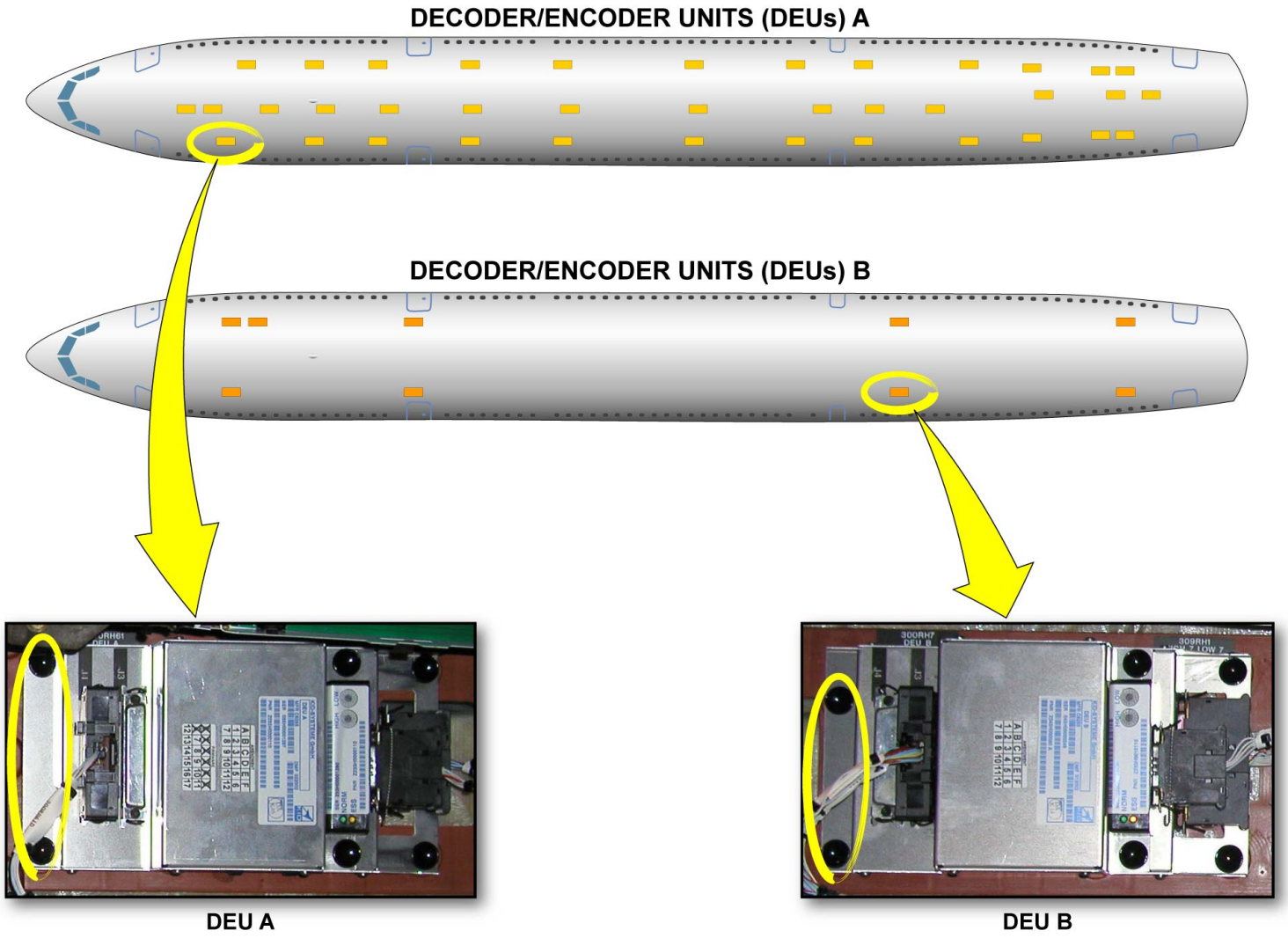


FLIGHT ATTENDANT PANEL (FAP)

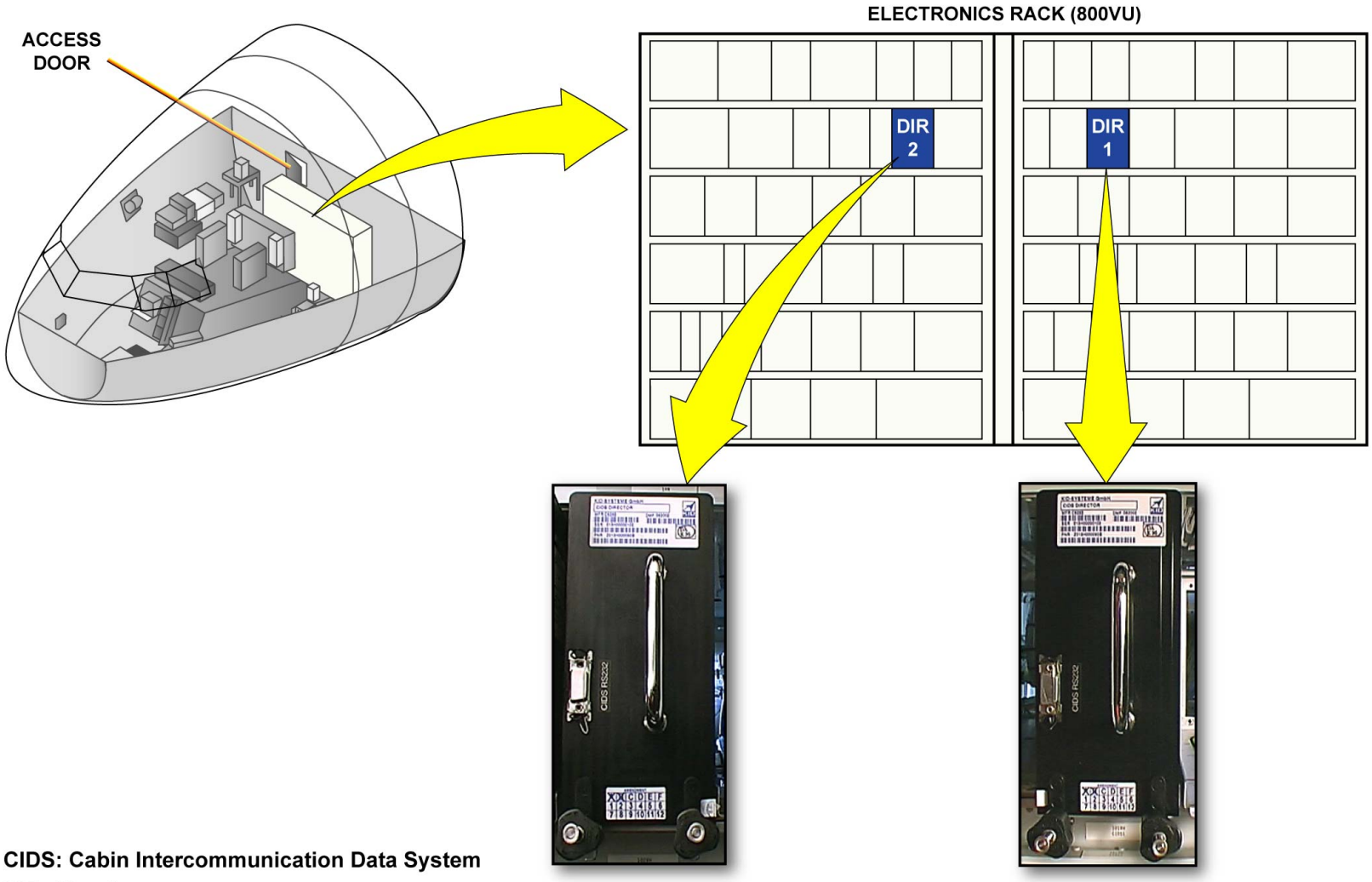
FLIGHT ATTENDANT PANEL



FLIGHT ATTENDANT PANEL



FLIGHT ATTENDANT PANEL



FLIGHT ATTENDANT PANEL

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EMERGENCY LOCATOR TRANSMITTER SYSTEM D/O(ELTA)

GENERAL

The Emergency Locator Transmitter (ELT) function is to transmit distress signals. It can be used in automatic mode installed on board the aircraft or manually when you use the ELT in portable mode. The ELT system transmits on 3 frequencies homing-signals for civil and military, and to satellite system. The battery-pack, installed in the ELT housing, supplies the power to operate the system. The satellite system transmits distress signal to a local user terminal, when it is in range. The local user terminal receives within a radius range of approximately 2.500 Km (1367 NM). When the local user terminal is not within the receiving range, the satellite system stores the distress signal until transmission is possible. The local user terminal automatically processes the distress signal to identify and show the position of the aircraft within a radius of approximately 1.8 Km (5900 ft). The processed data is transmitted to a mission control center. The mission control center sends the data to an applicable rescue coordination center, where search and rescue operations are started. The civil and military homing-signals are used to find the aircraft in the final stage of search and rescue operation.

NOTE: In technical documentation, the ELT is shown in ATA 25.

ELT DESCRIPTION

The ELT system is composed of:
- An emergency locator, installed in a bracket, held in position with two buckles and straps, with the interface in flight direction. The bracket is installed above a ceiling panel in the AFT utility area, between FRame 63 and FR67,
- An optional remote control panel, installed on the cockpit overhead panel,
- A ware harness is installed between the ELT and the Remote Control Unit (RCP),
- An external antenna, linked to the ELT which is installed on the upper external fuselage between FR66 and FR68,
- A mounting bracket.

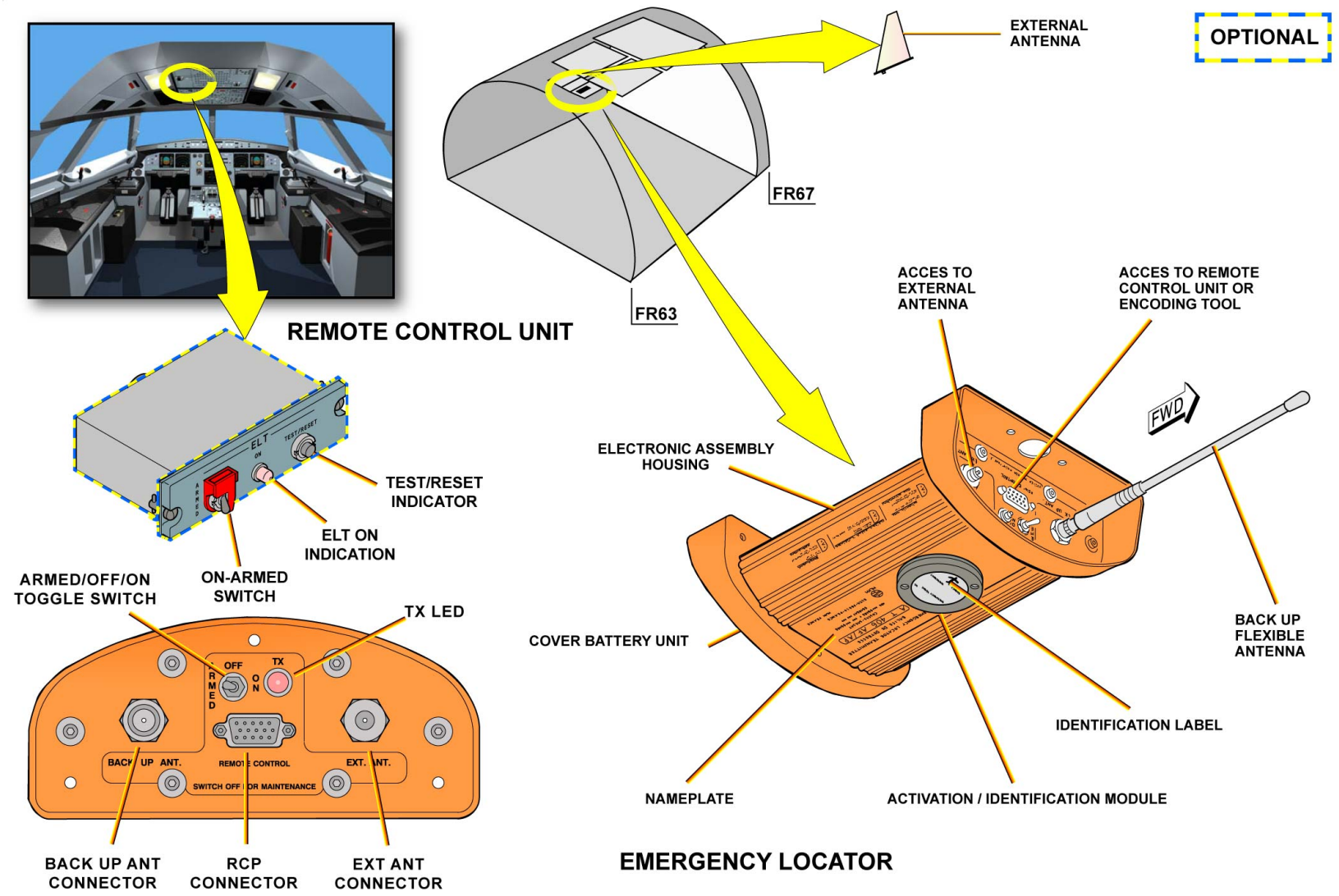
EMERGENCY LOCATOR TRANSMITTER

The ELT has an orange aluminum with two covers, including these following components:
- Placards attached to the housing (Identification, strap, instruction, type and battery),
- An electronic board,
- An interface,
- A not rechargeable battery pack (voltage 6v,capacity: 10.5 A/h)

The electronic board is installed in the front half (flight direction), and the battery-pack is installed in the rear half. The interface, on the front face of the housing includes:
- A remote control panel connector, to connect the remote control panel, programming and test equipment, an adapter cable and programming-dongle connector, and a maintenance-dongle, which has a maintenance identification data code programmed in its memory,
- Back up ANT and External ANT connectors to connect the antennae,
- A red indicator, to indicate a BITE test result or when ELT operates (TX LED),
- An ON/ARMED switch, to select desired mode.

REMOTE CONTROL PANEL (OPTIONAL)

The optional Remote Control Unit is installed on the cockpit overhead-panel.
The front panel of the remote control panel includes:
- An ARMED/OFF-SWITCH,
- TEST/RESET switch.
- An ON/TEST indicator.



GENERAL & ELT DESCRIPTION

EMERGENCY LOCATOR TRANSMITTER SYSTEM D/O(ELTA)

ELT OPERATION

EMERGENCY LOCATOR TRANSMITTER

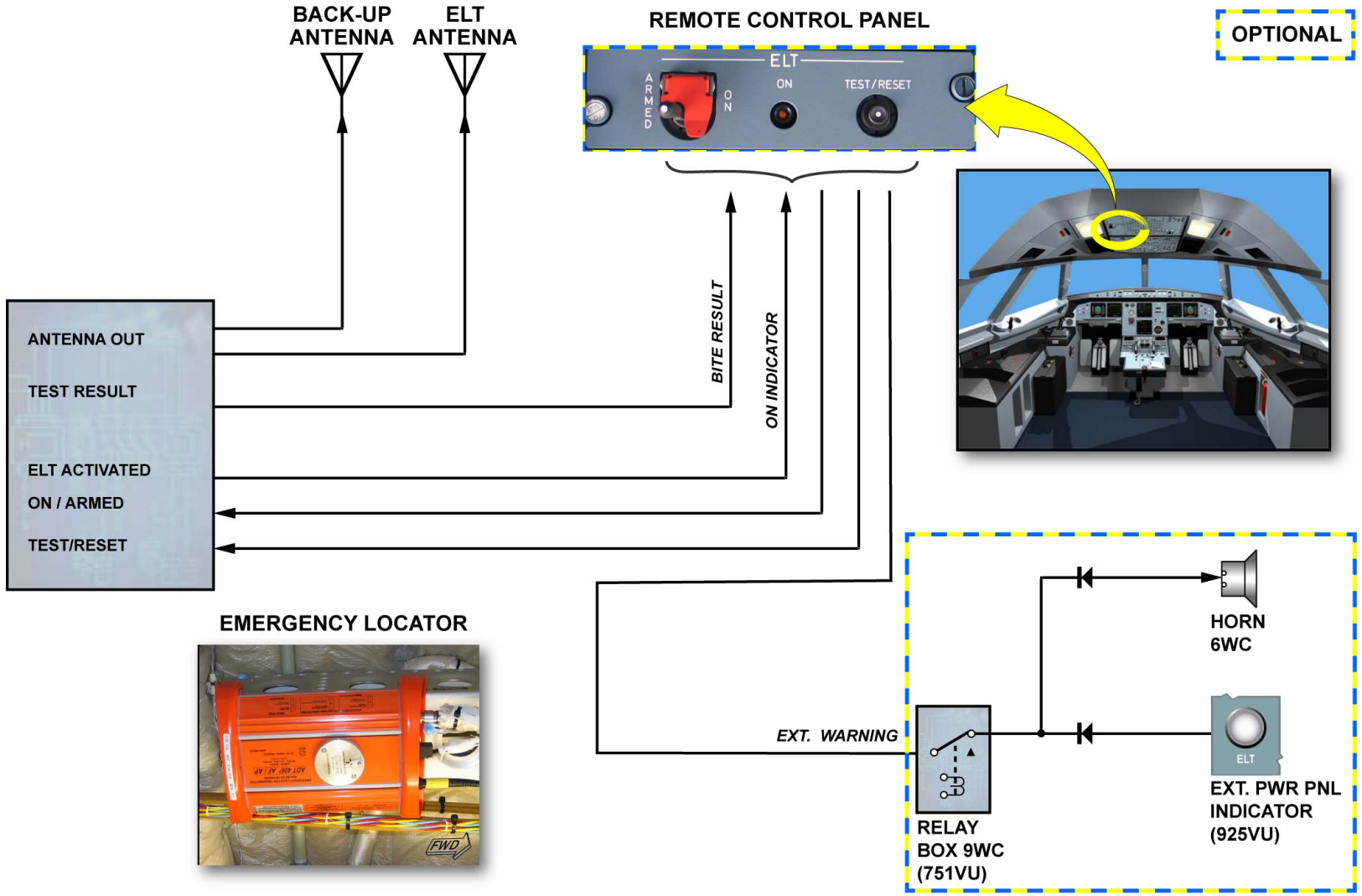
The ELT can be operated in automatic or manual mode. When you use the ELT in portable mode it is operated manually, this is done by removing the antenna and connects it to the ANT connection on the ELT. The ON/OFF/ARM switch, located on the front face of the ELT has three functions:
- the ARM position for automatic operation of the ELT. An automatic operation is triggered when the ELT is connected to its system in the A/C, and the G-switch detects an impact sufficient to start the transmission,
- the OFF position, when the ELT is connected to its system in the A/C and requires maintenance, and when the ELT is disconnected from its system and removed from the A/C, or to stop the transmission,
- set to the ON position for manual operation of the ELT. A manual operation occurs when the ELT is connected to its system in the A/C and the G-switch is not triggered, but a signal must be transmitted (aircraft out of operation, injured passengers/crew members), when the ELT is connected to its system in the A/C and you do a self-test (BITE). An accidental operation occurs when the ELT is connected to its system in the A/C, and the G-switch can automatically starts transmission without a real emergency (ie hard landing).

REMOTE CONTROL PANEL (OPTIONAL)

The optional remote control panel controls and indication are as follows:
The ON-ARMED switch with switch guard is set to the ARMED position for automatic operation of the ELT. The switch is kept in the ARMED position by a stop, which is part of the switch assembly. The ON-ARMED switch is set to the ON position for manual operation of the ELT. You must pull the switch to clear the stop, and then set it to the ON position. The TEST/RESET push button is set to the TEST/RESET position to stop accidental operation, or to do a BITE test. The ON/TEST indicator comes on when the ELT operates, or to indicate the BITE test result. When the ELT operates the ON/TEST indicator:
- flashes two times per second during military and civil transmission,
- and, one long flash during satellite transmission.

BITE TEST

This BITE test can be done by means of the ELT or the remote control panel. On the front face of the ELT, the BITE test is done by setting the ON/OFF/ARM switch to the ARM position, or on the remote control panel, by setting the TEST/RESET P/B to TEST/RESET position, then the following actions occur:
- the red indicator flashes one time, then comes on, and the buzzer operates, on the ELT,
- the ON/TEST indicator flashes one time, then comes on, on the remote control panel (Option),
- the ELT indicator comes on, on the external power panel (Option),,
- the mechanic call-horn operates in the nose-landing-gear well (Option),.



ELT OPERATION & BITE TEST

EMERGENCY LOCATOR TRANSMITTER SYSTEM D/O(THALES)

GENERAL

The Emergency Locator Transmitter (ELT) function is to transmit distress signals. It can be used in automatic mode installed on board the aircraft or manually when you use the ELT in portable mode. The ELT system transmits on 3 frequencies, homing-signals for civil and military, and to satellite system. The battery-pack, installed in the ELT housing, supplies the power to operate the system. The satellite system transmits distress signal to a local user terminal, when it is in range. The local user terminal receives within a radius range of approximately 2.500 Km (1367 NM). When the local user terminal is not within the receiving range, the satellite system stores the distress signal until transmission is possible. The local user terminal automatically processes the distress signal to identify and show the position of the aircraft within a radius of approximately 1.8 Km (5900 ft). The processed data is transmitted to a mission control center. The mission control center sends the data to an applicable rescue coordination center, where search and rescue operations are started. The civil and military homing-signals are used to find the aircraft in the final stage of search and rescue operation.

NOTE: In technical documentation, the ELT is shown in ATA 25.

ELT DESCRIPTION

The ELT system includes:
- an emergency locator, installed in a bracket, held in position with one retaining strap, with the interface in flight direction. The bracket is installed above a ceiling panel in the AFT utility area, between FRame 63 and FR67,
- a remote control panel, installed on the cockpit overhead panel,
- an adapter cable attached to the bracket, and programming-dongle connector directly connected to the remote control panel connector,
- an external antenna, connected to the ELT which is installed on the upper external fuselage between FR66 and FR68,
- a mounting bracket.

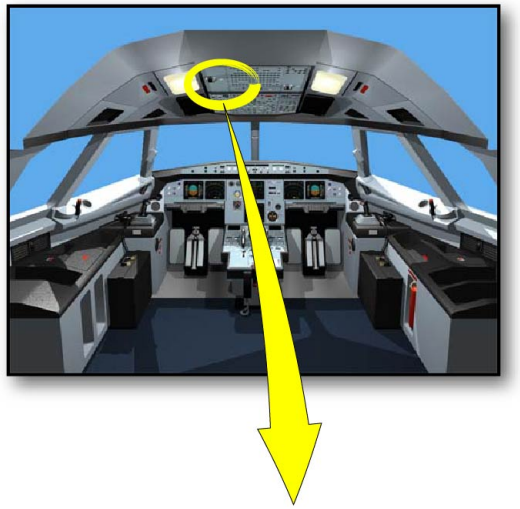
EMERGENCY LOCATOR TRANSMITTER

The ELT has a casing in two parts, base plate and housing, and includes these components:
- placards attached to the casing (Identification, strap, instruction, type and battery),
- an electronic board,
- an interface,

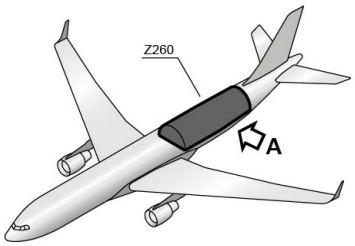
The interface, on the front face of the housing includes:
- a remote control panel connector, to connect the remote control panel, programming and test equipment, an adapter cable and programming-dongle connector, and a maintenance-dongle which has a maintenance identification data code programmed in its memory,
- an ANT connector, to connect the antenna,
- a red indicator, to indicate a BITE test result or when ELT operates,
- an ON/OFF/ARMED switch, to select desired mode.

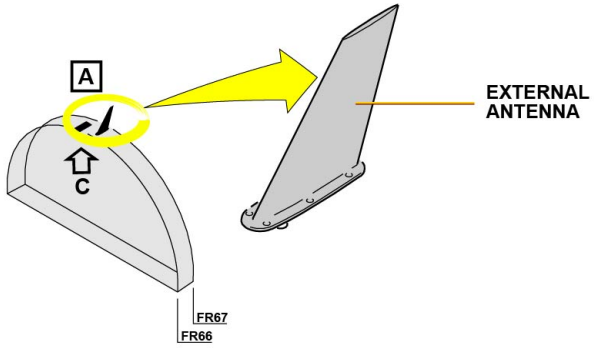
REMOTE CONTROL PANEL

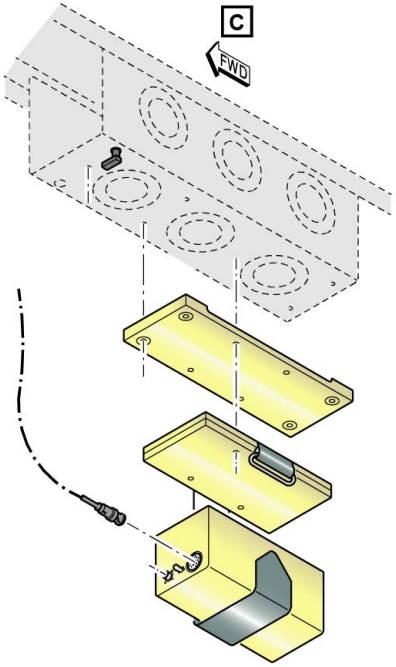
The front panel of the remote control panel includes:
- an ON-ARMED-TEST/RESET switch,
- an ON/TEST indicator.

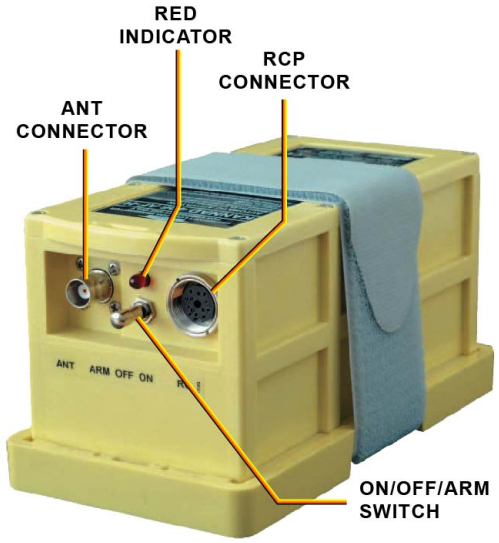


REMOTE CONTROL PANEL









EMERGENCY LOCATOR

GENERAL & ELT DESCRIPTION

EMERGENCY LOCATOR TRANSMITTER SYSTEM D/O(THALES)

ELT OPERATION

EMERGENCY LOCATOR TRANSMITTER

The ELT can operate in automatic or manual mode.
The ON/OFF/ARM switch, on the front face of the ELT has three functions:
- the ARM position for automatic operation of the ELT. An automatic operation starts when the ELT is connected to its system in the A/C, and the G-switch senses an impact sufficient to start transmission,
- the OFF position, when the ELT is connected to its system in the A/C and its maintenance is necessary, when the ELT is disconnected from its system and removed from the A/C, or to stop transmission,
- set to the ON position for manual operation of the ELT. A manual operation occurs when the ELT is connected to its system in the A/C and the G-switch is not triggered, but a signal must be transmitted (aircraft out of operation, injured passengers/crew members), when the ELT is connected to its system in the A/C and you do a self-test (BITE). An accidental operation occurs when the ELT is connected to its system in the A/C, and the G-switch starts transmission without a real emergency (hard landing).

REMOTE CONTROL PANEL

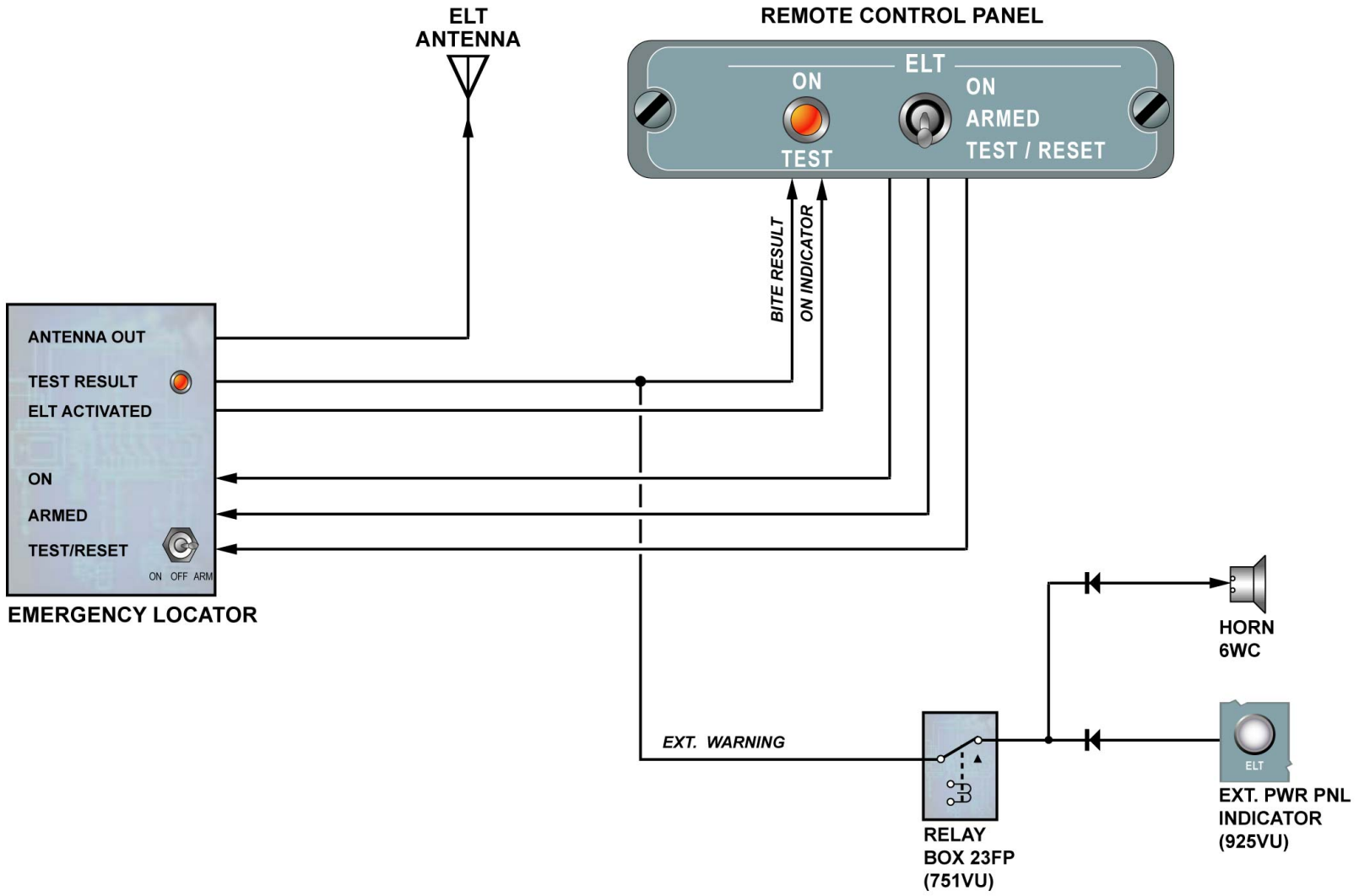
The remote control panel controls and indication are as follows:
The ON-ARMED-TEST/RESET switch is set to the ARMED position for automatic operation of the ELT. The switch is kept in the ARMED position by a stop, which is part of the switch assembly. The ON-ARMED-TEST/RESET switch is set to the ON position for manual operation of the ELT. You must pull the switch to clear the stop, and then set it to the ON position. The ON-ARMED-TEST/RESET switch is set to the TEST/RESET position to stop accidental operation, or to do a BITE test. The switch goes back automatically to the ARMED position after you have set it to the TEST/RESET position. The ON/TEST indicator comes on when the ELT operates, or to indicate the BITE test result. When the ELT operates the ON/TEST indicator:
- flashes two times per second during military and civil transmission,
- and, one long flash during satellite transmission.

BITE TEST

This BITE test can be done on the ELT or the remote control panel. The BITE test will start when:
- on the front face of the ELT, you set the ON/OFF/ARM switch to the ARM position, or
- on the remote control panel, you set the ON-ARMED-TEST/RESET switch to the TEST/RESET position when the ON/OFF/ARM switch on the ELT is in the ARM position.

The effects of this test will be:
- on the ELT, the red indicator flashes one time, and the buzzer operates for 5 seconds, then after 2 seconds the indicator shows the test result,
- on the remote control panel, the ON/TEST indicator flashes one time, then after 2 seconds, it shows the test result,
- on the external power panel, the ELT indicator comes on for 5 seconds,
- in the nose-landing-gear well, the mechanic call-horn operates for 5 seconds.

When the BITE test result is correct, a long flash of 3 seconds occurs.
When the BITE test result is incorrect, a number of short flashes occur.

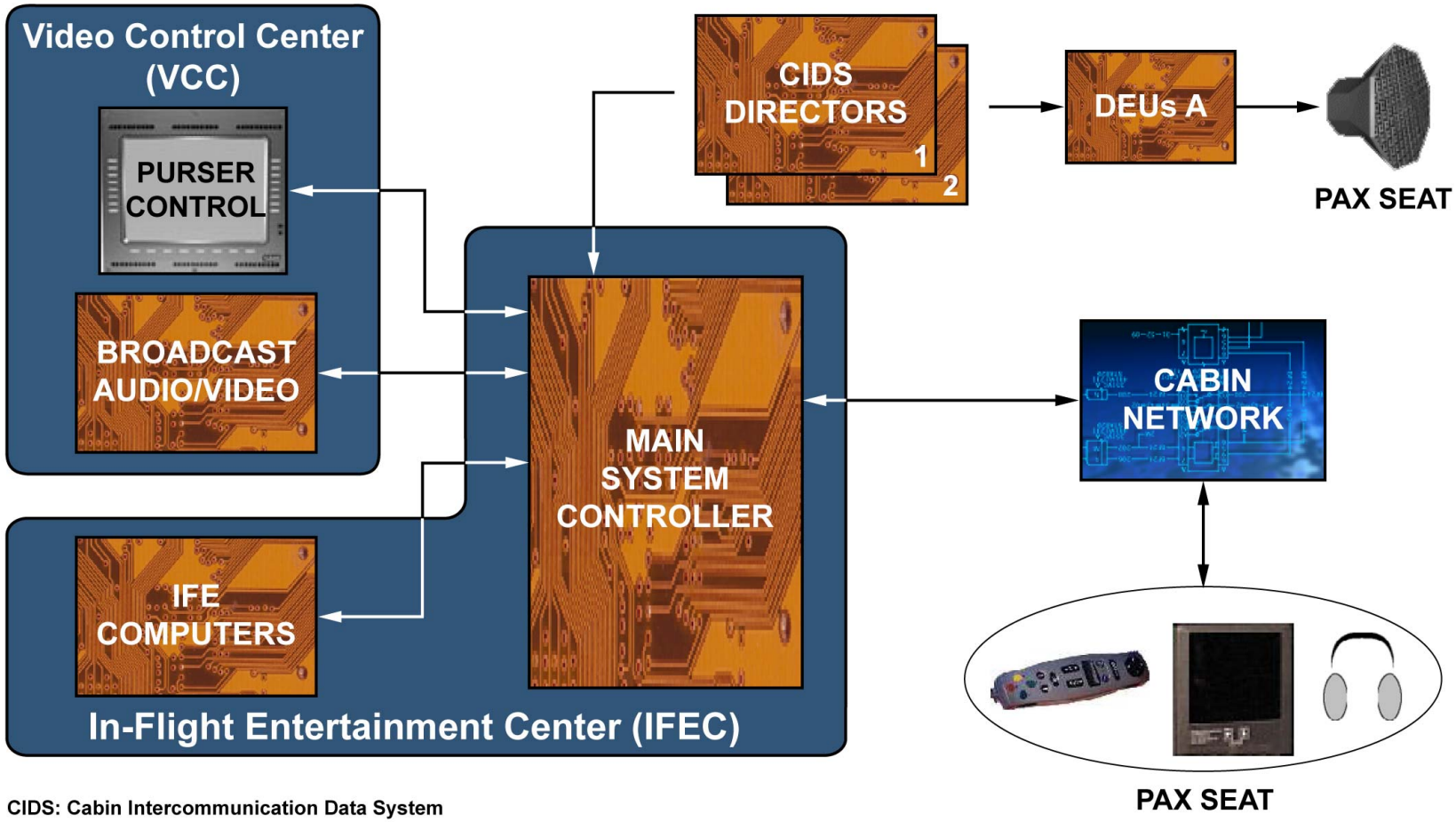


ELT OPERATION & BITE TEST

IFE SYSTEM GENERAL DESCRIPTION

IN-FLIGHT ENTERTAINMENT

The main system controller, which is the core unit of the system and acts as the major interface between other head equipment items and the cabin network.
The purser control, located in the Video Control Center (VCC), which is the only human machine interface, to control and monitor the operation of the entire In-Flight Entertainment (IFE) system. A second purser control can be installed in the aft galley area: It has the same functions as the one in the VCC.
The broadcast audio/video units, which are used mainly for Passenger Address (PA) issues, as well as for safety demonstrations through video display. These units can be used as a backup in the case of major IFE software failure.
The IFE computers, which are used for data source and storage of the audio and video on demand, storage of the IFE operating software and BITE.
The cabin network is dependant to the A/C cabin definition. This network is used to direct requests from passengers to the IFE system head-end computers, and to relay data to be routed to the passenger environment.
The CIDS is connected to the IFE system via the DIRECTORS and the main system controller.



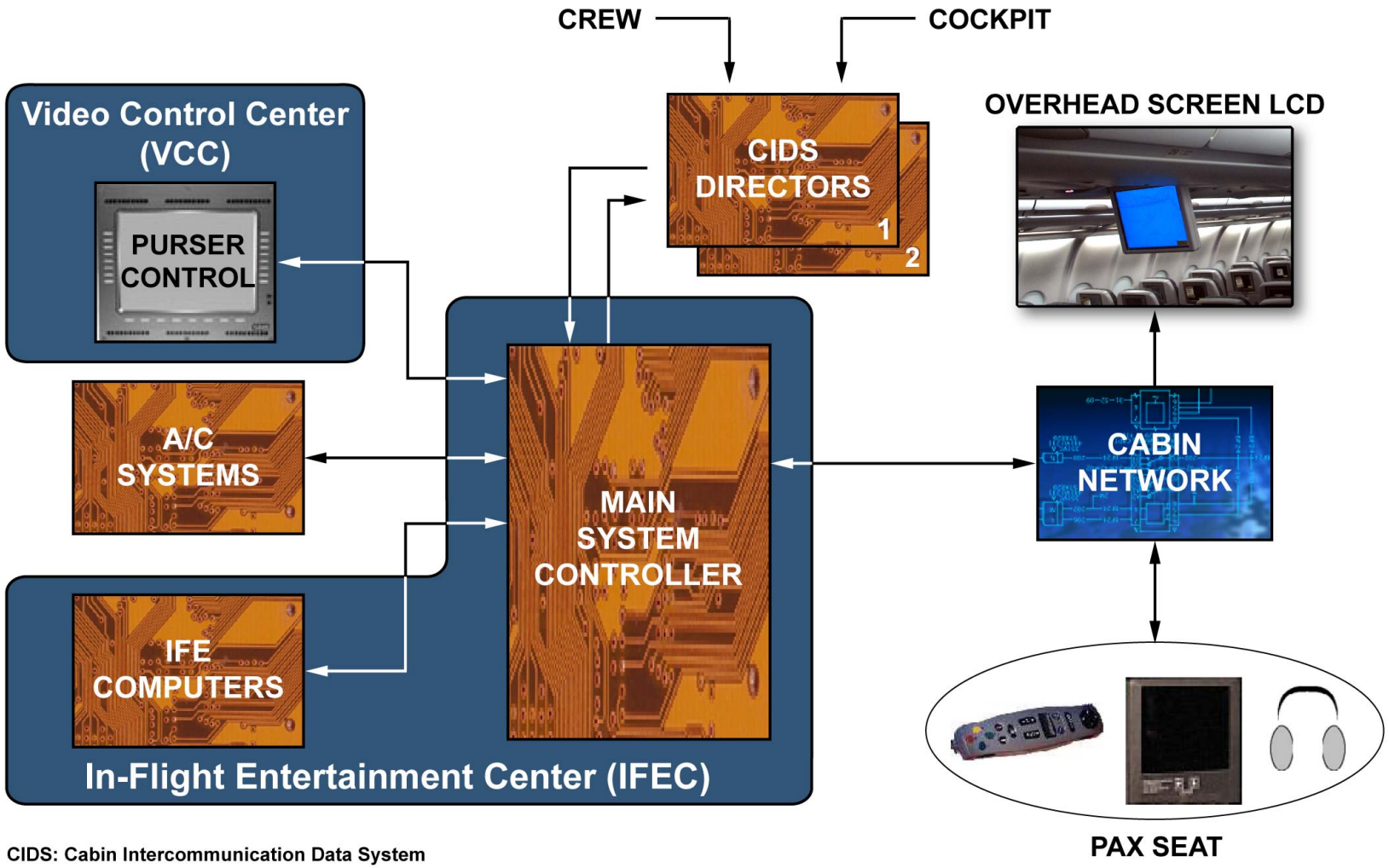
CIDS: Cabin Intercommunication Data System
DEU: Decoder/Encoder Unit
IFE: In-Flight Entertainment

IN-FLIGHT ENTERTAINMENT

IFE SYSTEM GENERAL DESCRIPTION

CIDS DIRECTORS

The CIDS directors are connected to IFE system via the main system controller. The main reasons are:
-During passenger announcement from the cabin or the cockpit, the main system controller will ensure proper audio transmission to each seat (headset).
-For audio or video broadcasts which originate from the VCC (i.e. safety demonstration video) or the In-Flight Entertainment Center (IFEC) (i.e. boarding music): the main system controller relays the message to the Cabin Intercommunication Data System (CIDS) for audio broadcast through the loudspeakers in the entire cabin or a specific cabin zone.
-During the use of controls at the seat level, individual passenger services orders will be relayed to the CIDS for appropriate action (i.e. attendant call, reading light activation).
Various A/C systems are connected to the main system controller to ensure operation in normal and abnormal situations (i.e. Landing Gear Control and Interface Unit (LGCIU) for ground or flight operating mode).

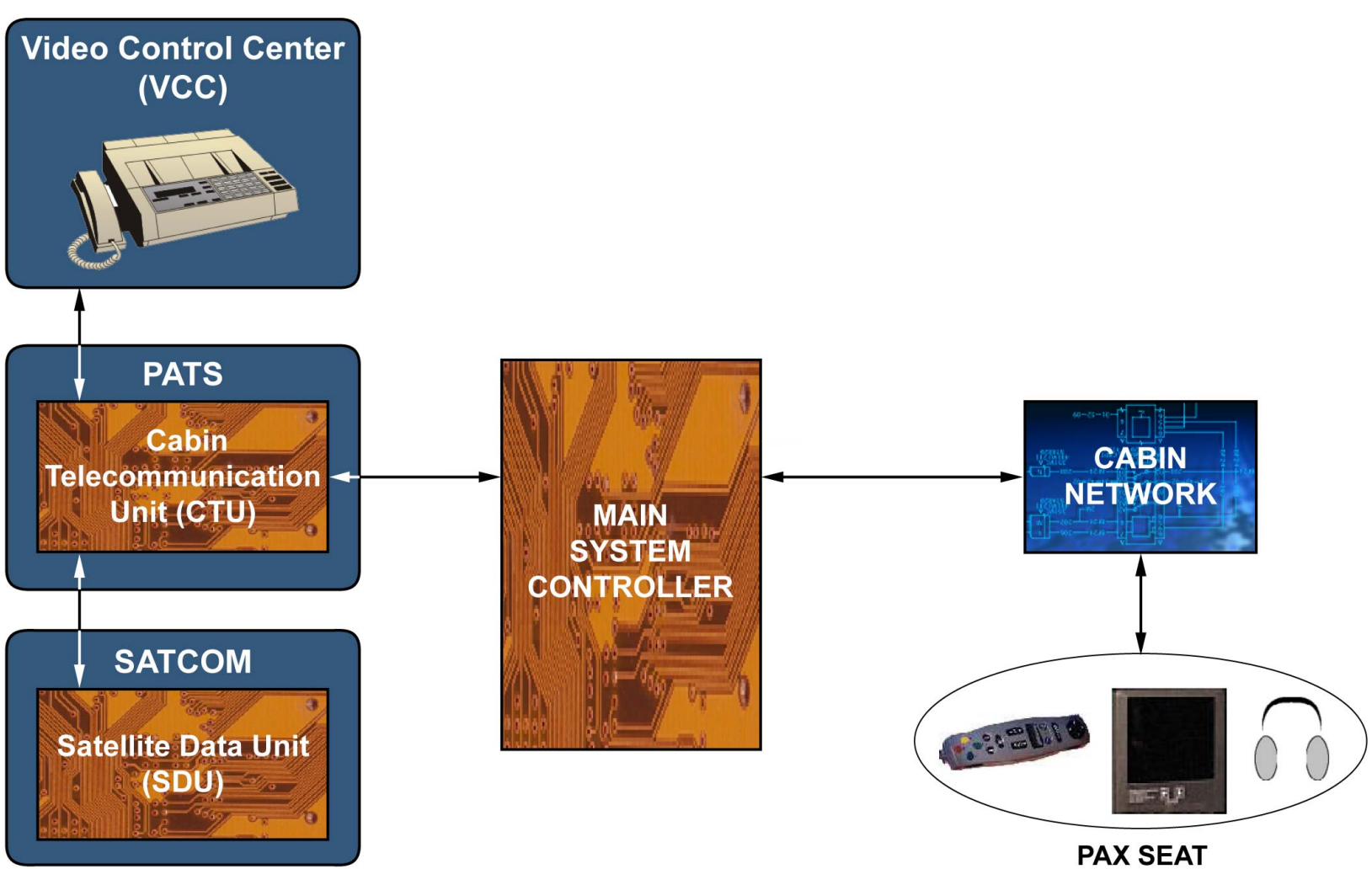


CIDS DIRECTORS

IFE SYSTEM GENERAL DESCRIPTION

PATS

The Passenger Air to ground Telephone System (PATS) is connected to the IFE system. It mainly exchanges voice and data with the main system controller and the SATCOM system. When air to ground communication is initialized, the main system controller ensures correct data exchange between the passenger seat (cabin network side) and the PATS.
The Cabin Telecommunication Unit (CTU) guarantees a correct formatting and data transmission/ reception package, as well as seamless voice communication. To achieve this transmission, only the SATCOM system is used. When data is transmitted from an A/C operating center, it is routed by the CTU to a printer, usually located in the VCC. The CTU has 30 channels fitted with a modem. It can process 29 simultaneous cabin communications (passenger side voice and/or data and one fax line from the telefax installed in the VCC).



PATS: Passenger Air-to-ground Telephone System
SATCOM: Satellite Communication

PATS

IN FLIGHT ENTERTAINMENT SYSTEM COMPONENT LOCATION

IFES COMPONENT LOCATION

The Purser Control is connected to the main system controller. The main system controller makes the interface between the core system and the passengers. It will manage cabin crew and passenger requests and answers, and interaction with other systems. The distribution is done through a cabin network to the passenger environment through Enhanced Area Disconnect Boxes (EADBs), Enhanced Floor Disconnect Boxes (EFDBs) and Digital Seat Electronic Boxes (DSEBs). The passengers use the Passenger Control Unit (PCU) to select the channel and the volume of the audio and video programs. It is also used to control the reading lights and to call the cabin attendant. Videos are broadcasted in the cabin on overhead Liquid Crystal Display (LCD) screens controlled through tapping units installed above the ceiling panels in the cabin. Tactile LCD screens can be installed on the armrest of the seat or on the back of the seat in front. They are controlled by the PCU installed on the seats. Passengers can access audio, video, interactive games and the web from their seats. This is offered through a menu displayed on the tactile screens and available immediately after In Flight Entertainment (IFE) system power-up. In-seat telephone facilities can be installed in the cabin. The In Flight Entertainment System (IFES) is connected to the Passenger Air-to-Ground Telephone System (PATS). The PCU is then used as a telephone handset.

The Purser Control, installed on the Video Control Center (VCC) in the cabin, gives the central control point for the system.

Passenger Entertainment System (PES) video shows prerecorded video:

- Through different DUs installed in the cabin,
- Through DSEB installed below the seat.

The lower part of the seat can include PED power outlets for laptop connection.

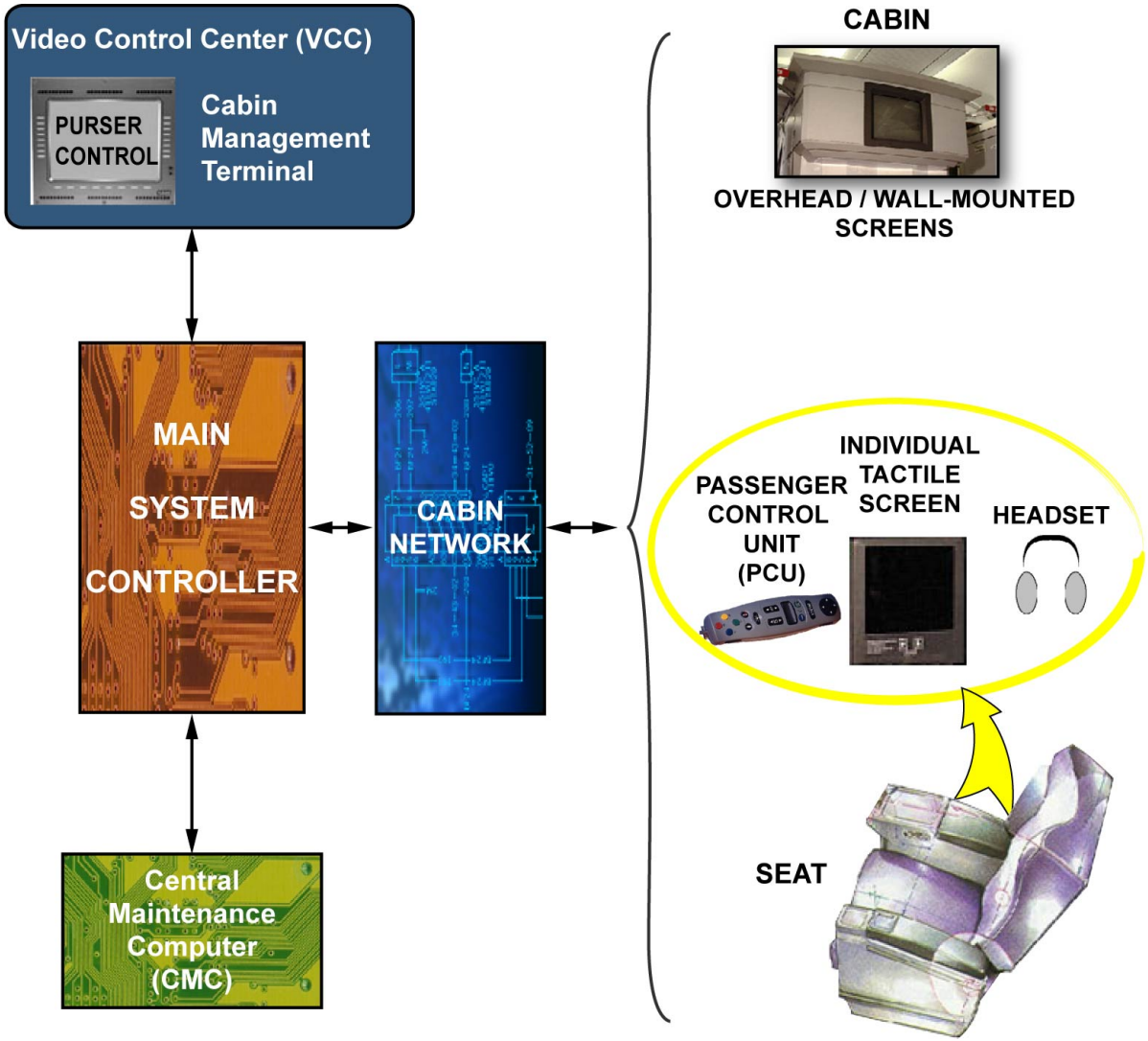
The different elements of the IFE in the cabin are connected by wirings through boxes:

- EADB (Enhanced Area Distribution Box) installed above some ceiling panels,
- EFDB (Enhanced Floor Disconnect Boxes) installed on the floor of the cabin below the carpet.

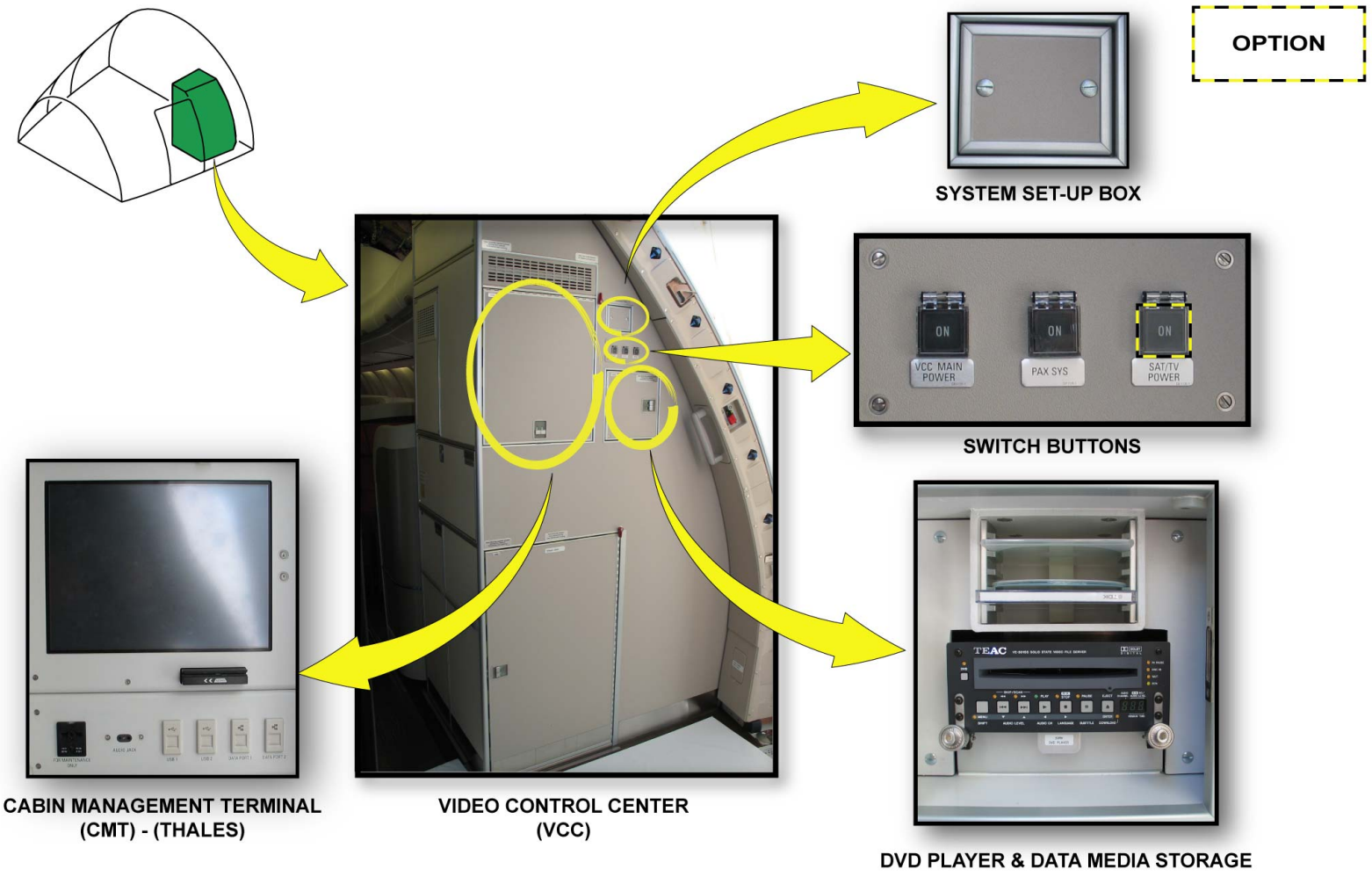
6 MCUs (Master Control Unit) are installed in the ceiling of the passenger compartment. They provide passengers in-seat power supply and they are part of ATA 25-21-34,

- TU (Tapping Units) installed above some ceiling panels.

The IFE rack is in the avionics bay, on right hand side.



IFES COMPONENT LOCATION



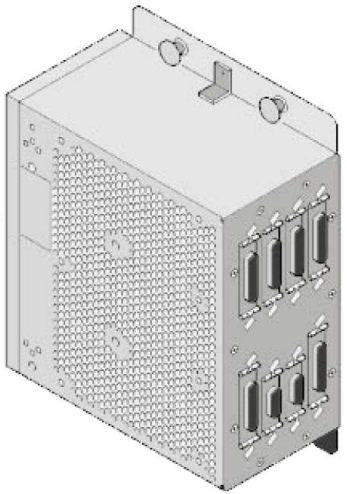
IFES COMPONENT LOCATION

SEAT DISPLAY UNIT
(BUSINESS CLASS)

OVERHEAD/WALL-MOUNTED
SCREEN

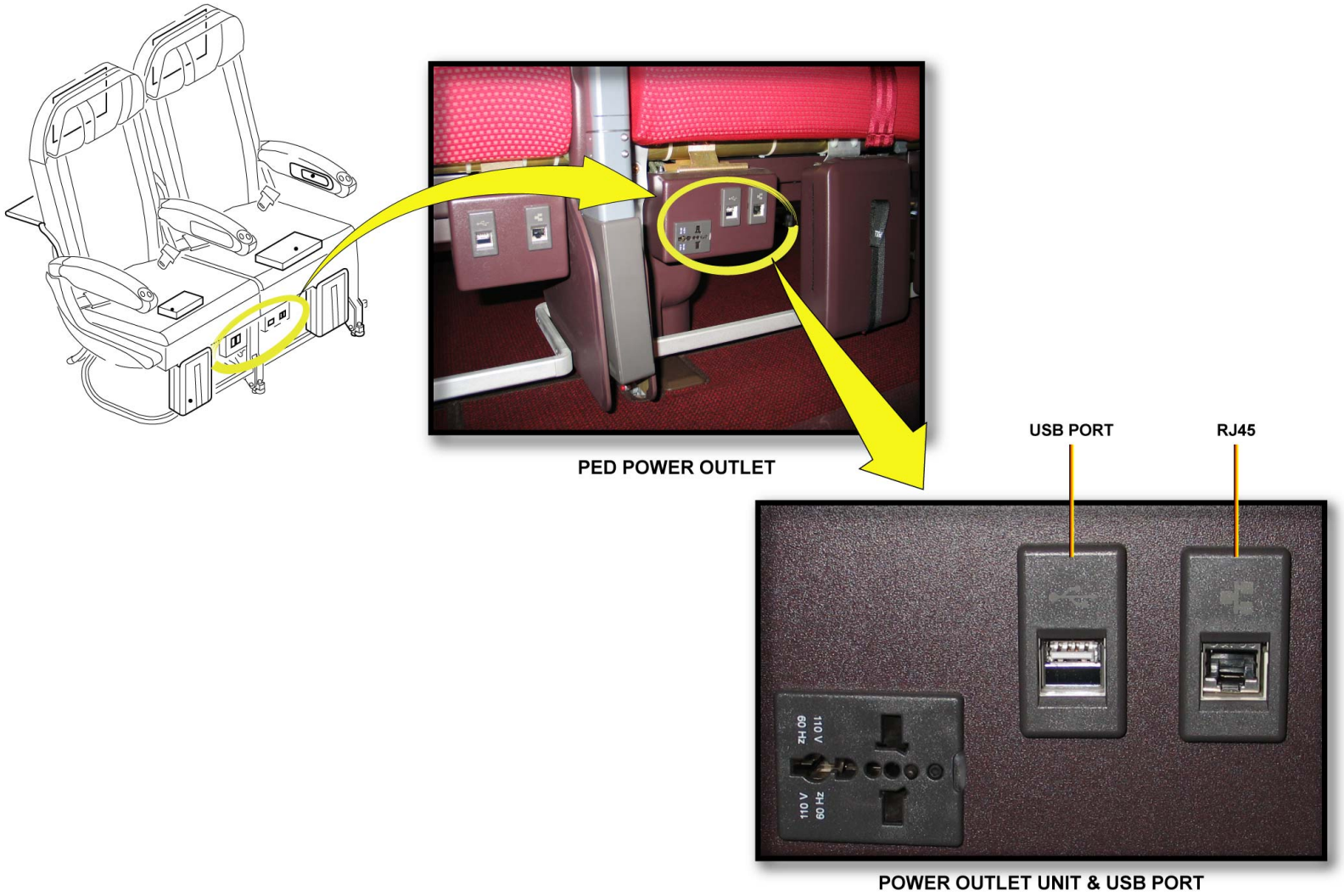
OVERHEAD LCD SCREEN

SEAT DISPLAY UNIT
(ECONOMY CLASS)

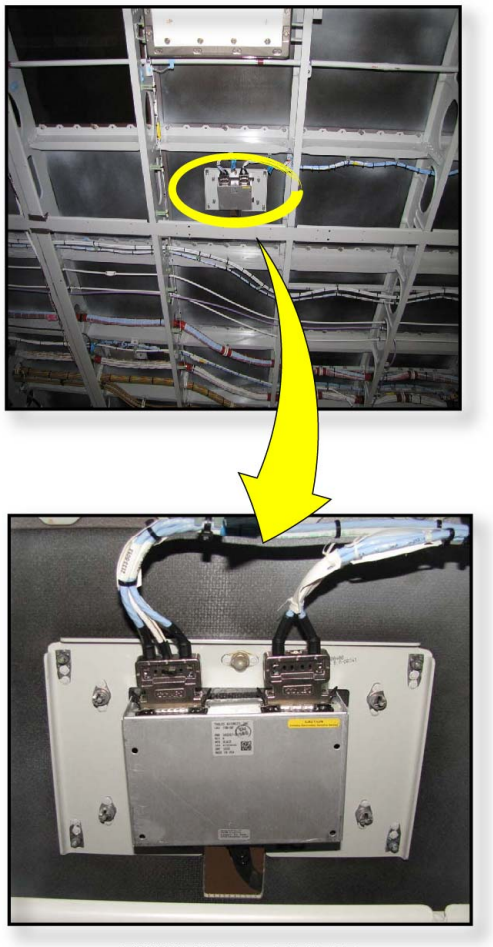


DIGITAL SEAT
ELECTRONIC BOX (DSEB)

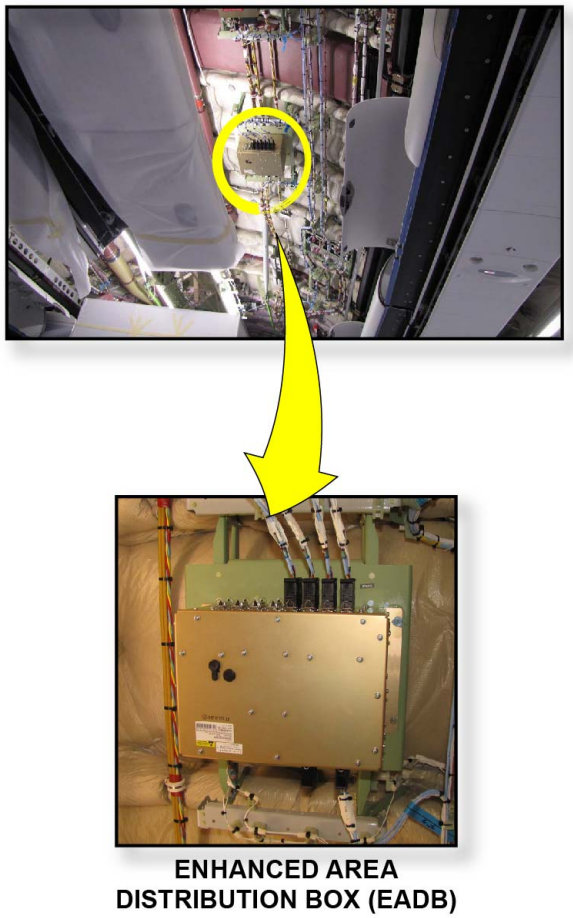
IFES COMPONENT LOCATION



IFES COMPONENT LOCATION

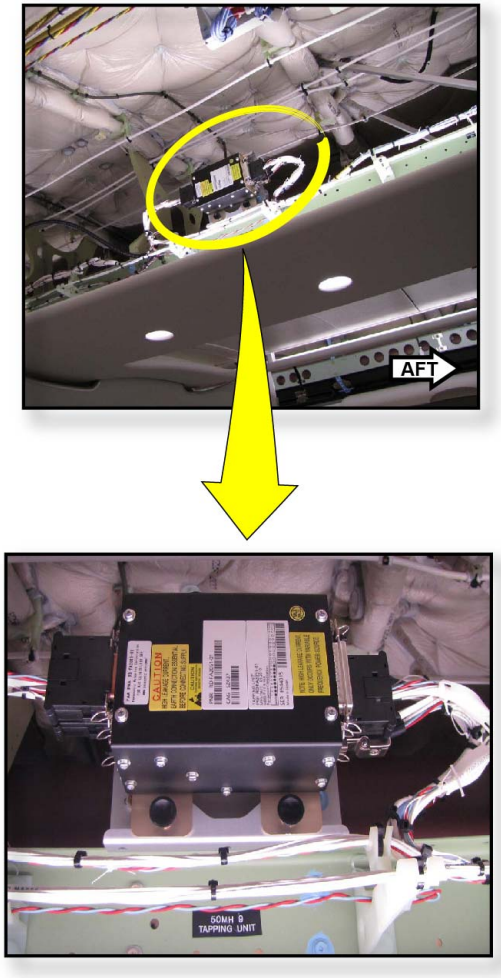


ENHANCED FLOOR
DISCONNECT BOX (EFDB)

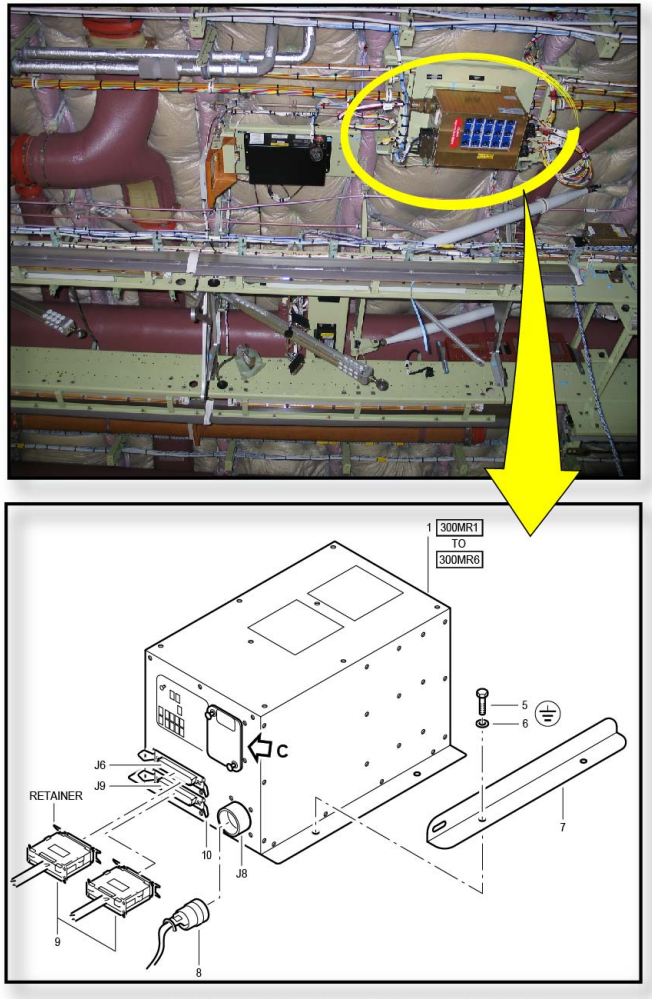


ENHANCED AREA
DISTRIBUTION BOX (EADB)

IFES COMPONENT LOCATION

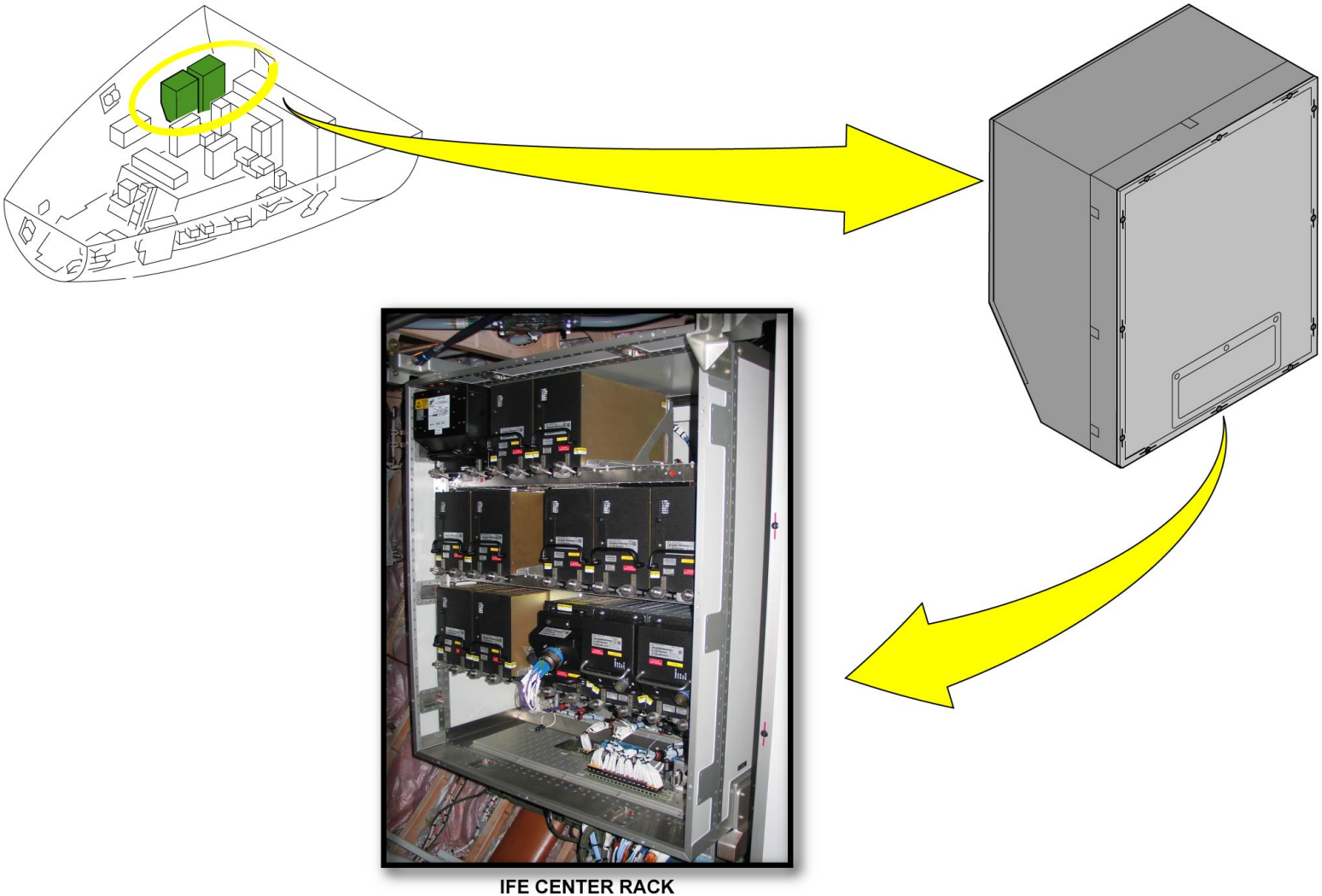


TAPPING UNIT (TU)



MASTER CONTROL UNIT (MCU)

IFES COMPONENT LOCATION



IFES COMPONENT LOCATION

COCKPIT VOICE RECORDING D/O

GENERAL

The objective of this topic is to describe in detail the principle and the architecture of the Cockpit Voice Recording (CVR) system.

PRINCIPLE

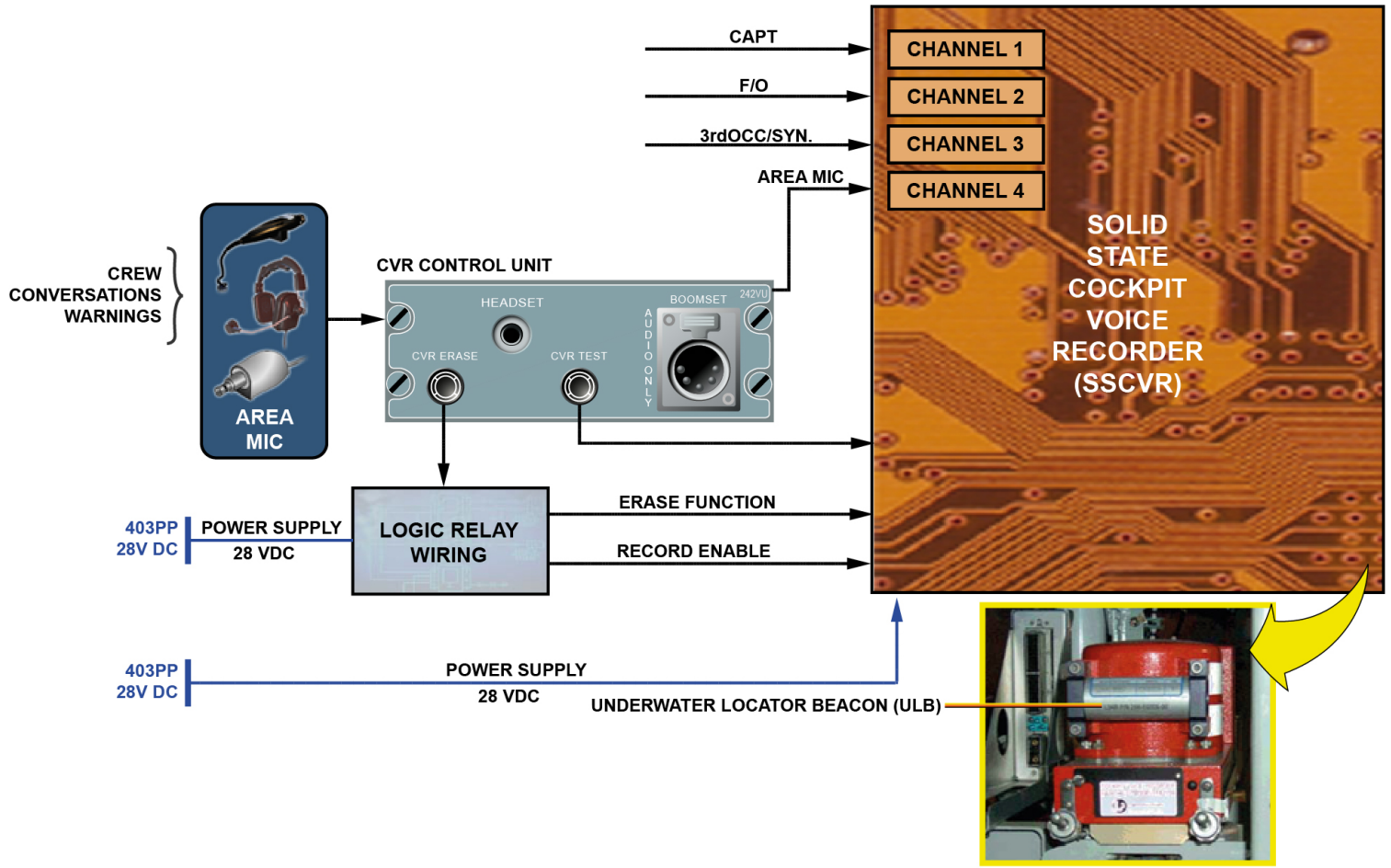
The Solid State Cockpit Voice Recorder (SSCVR) is designed to record crew conversations and communications on SOLID STATE MEMORIES, in flight or on ground, and to preserve them in case of an aircraft (A/C) accident.
The recordings are made in SOLID STATE MEMORIES which basically provide a 30-minute recording of continuous operation, or 2 hours with memory extension (+ 90 minutes). All data recorded 30 minutes or 2 hours before is automatically erased by the recording of new data. The memory board is located in a protected box.
The front face of the CVR includes an Underwater Locator Beacon (ULB). This ULB is supplied with a battery and is activated when it touches the water, in accordance with the last regulation the autonomy of the battery is extended from 30 to 90 days.

SYSTEM ARCHITECTURE

The CVR system consists of:
- A remote microphone to record direct conversations and warnings in the cockpit.
- A CVR control unit, located in the cockpit on the overhead panel. The CVR control unit provides power for the area microphone, filters and pre-amplifies the audio signals from the area microphone and allows the control and monitoring of the SSCVR through the ERASE and TEST P/Bs.
- An SSCVR, located in the aft pressurized equipment bay. The SSCVR records all the transmitted and received radio communications, the Passenger Address (PA) announcements, the flight interphone conversations between flight crew members, all the aural warnings and the direct conversations in the cockpit.

Other than the audio recording functions, the latest SSCVR known as "Step 2" also has these functions:
- Datalink recording,
- BITE,
- A429 clock acquisition,
- CVR status to the Flight Warning System (FWS).
- A logic relay wiring system, composed of relays, the function of which is to allow the power supply of the SSCVR for normal, test or erase operation, under specific conditions.

PRINCIPLE AND ARCHITECTURE OF THE COCKPIT VOICE RECORDING SYSTEM



GENERAL - PRINCIPLE & SYSTEM ARCHITECTURE

COCKPIT VOICE RECORDING D/O

OPERATION CONTROL AND INDICATING

The recording system consists of four channels.
- Channels 1, 2 and 3 have a narrow band and allow the recording of the audio signals from/to the CAPT, F/O and 3rd occupant via the Audio Management Unit (AMU).
- Channel 4 has a wide band and allows the recording of the crew conversations or warnings via the CVR control unit.
- The SSCVR is synchronized with the solid state flight data recorder by means of an audio signal corresponding to the Greenwich Mean Time (GMT) sent by the Flight Data Interface Unit (FDIU) to the audio system and received by the SSCVR on the third occupant channel.

A strap fitted on the rear connector of the AMU enables the selection between the Federal Aviation Authorities (FAA) and the Civil Aviation Authorities (CAA) recording options.
The FAA requires that all the transmitted or received communications be recorded. In transmission, the side tone only is recorded. The CAA requirements are almost the same as the FAA requirements, except that, in addition to the FAA requirements, the noises picked up by the boomset and oxygen mask microphone must be recorded, even when the Push To Talk (PTT) function is not activated.
Other than crew conversations and audio communications recording functions, the CVR also collects and records all necessary datalink communication messages directly from the Air Traffic Control (ATC) applications included in the Air Traffic Service Unit (ATSU).
The clock lets you know the accurate time of a communication and its duration.
It supplies the UTC in ARINC 429 format to the SSCVR.

POWER SUPPLY

To power the SSCVR, on ground or in flight, two modes are available: the automatic and the manual mode.

These two modes are conditioned by the logic relay wiring supplied with 28 VDC.
The SSCVR automatically receives 28 VDC, when the A/C is:
- On the ground, during the first 5 minutes of energization of the electrical network,
- On the ground, with a minimum of 1 engine in operation,
- In flight,
- On the ground, for a maximum of 5 minutes after the shutdown of the last engine.

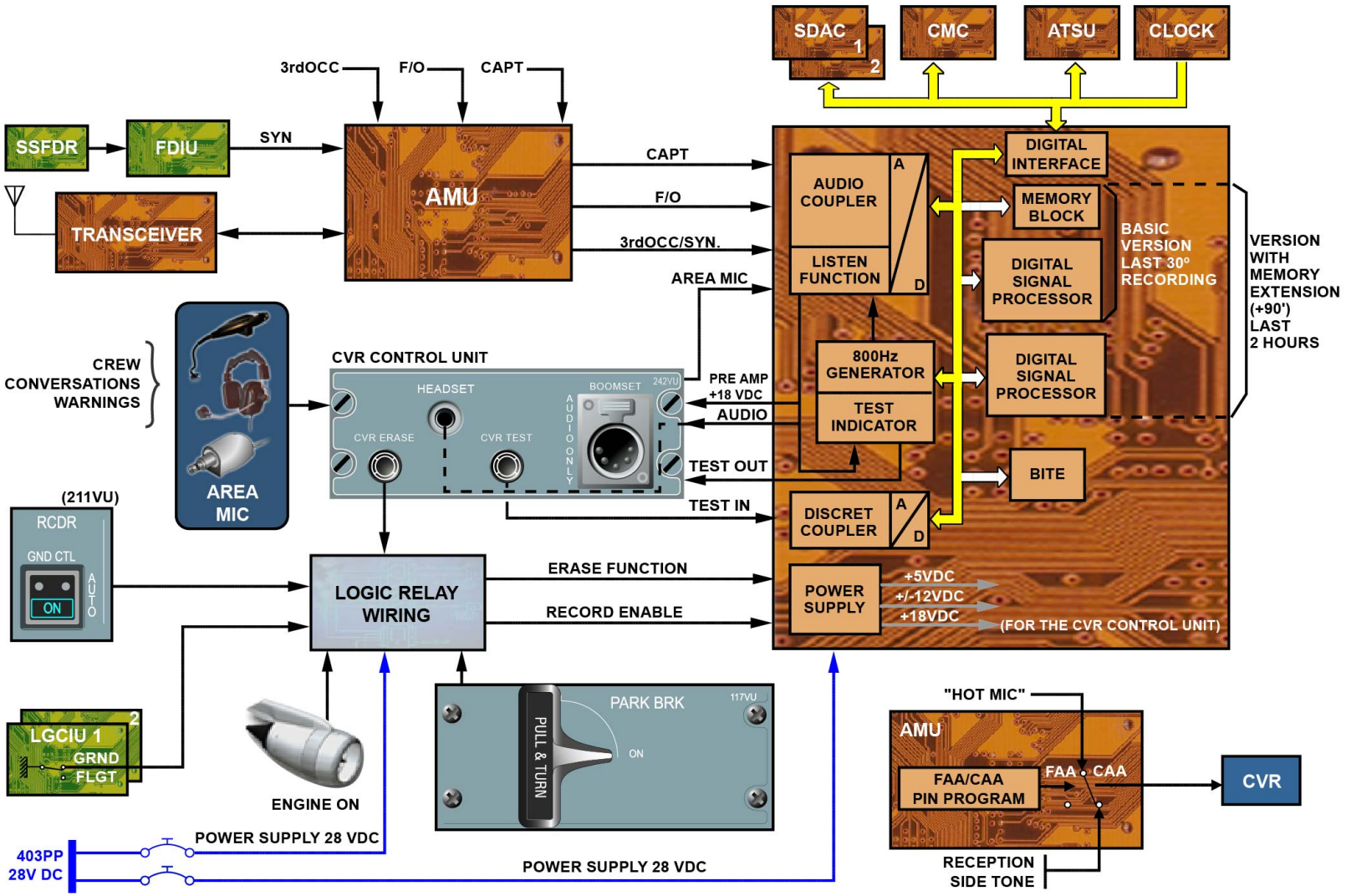
The manual selection of the power supply is done through the ReCorDeR GrouND ConTroL P/B. The manual selection of the SSCVR power supply, on ground only, is used to do tests of the SSCVR and make sure that it operates correctly, to record the checklist before one engine is started or to erase the SOLID STATE MEMORIES, if necessary.

TEST AND MONITORING

The test and monitoring functions are initiated from the CVR control unit. They can be done on ground or in flight.
The monitoring of the four channels is possible by connecting a headset on the front face of the CVR control unit. An 800 Hz tone is heard for 1 to 2 seconds.
The latest SSCVR includes TYPE 1 system BITE. A TEST can be done from the MCDU via the Central Maintenance System (CMS).
The status of the SSCVR is sent to the FWS through the SDACs by an ARINC 429 bus. "CVR SYSTEM FAULT" will be displayed if there are failures.

ERASE FUNCTION

The erase function is manually initiated from the CVR control unit by pressing the ERASE P/B for at least 2 seconds. The erase function is completed within 5 seconds of activation.
The PARKing BRAKE must be on, the Landing Gear (L/G) down and compressed.

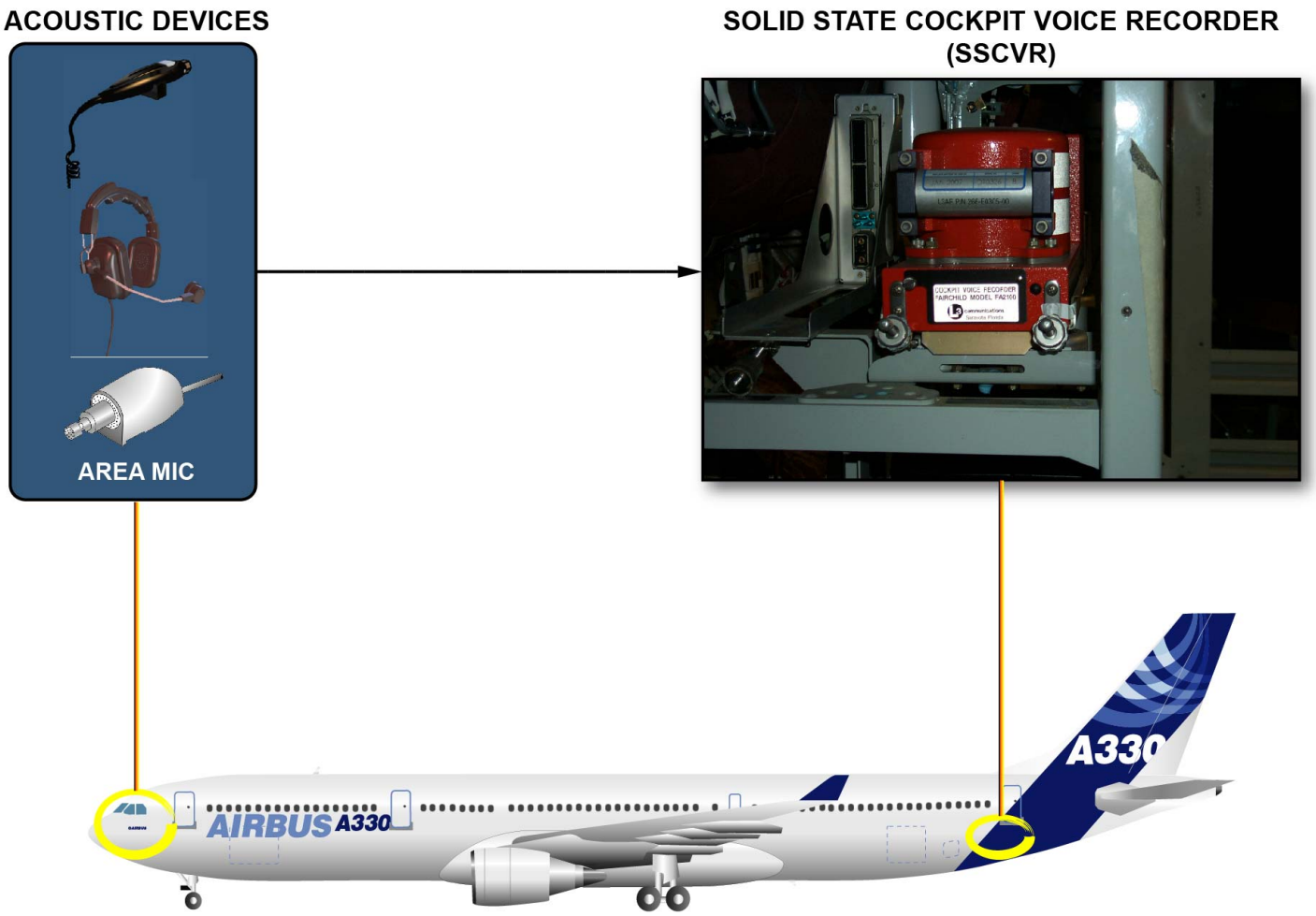


OPERATION CONTROL AND INDICATING - POWER SUPPLY ... ERASE FUNCTION

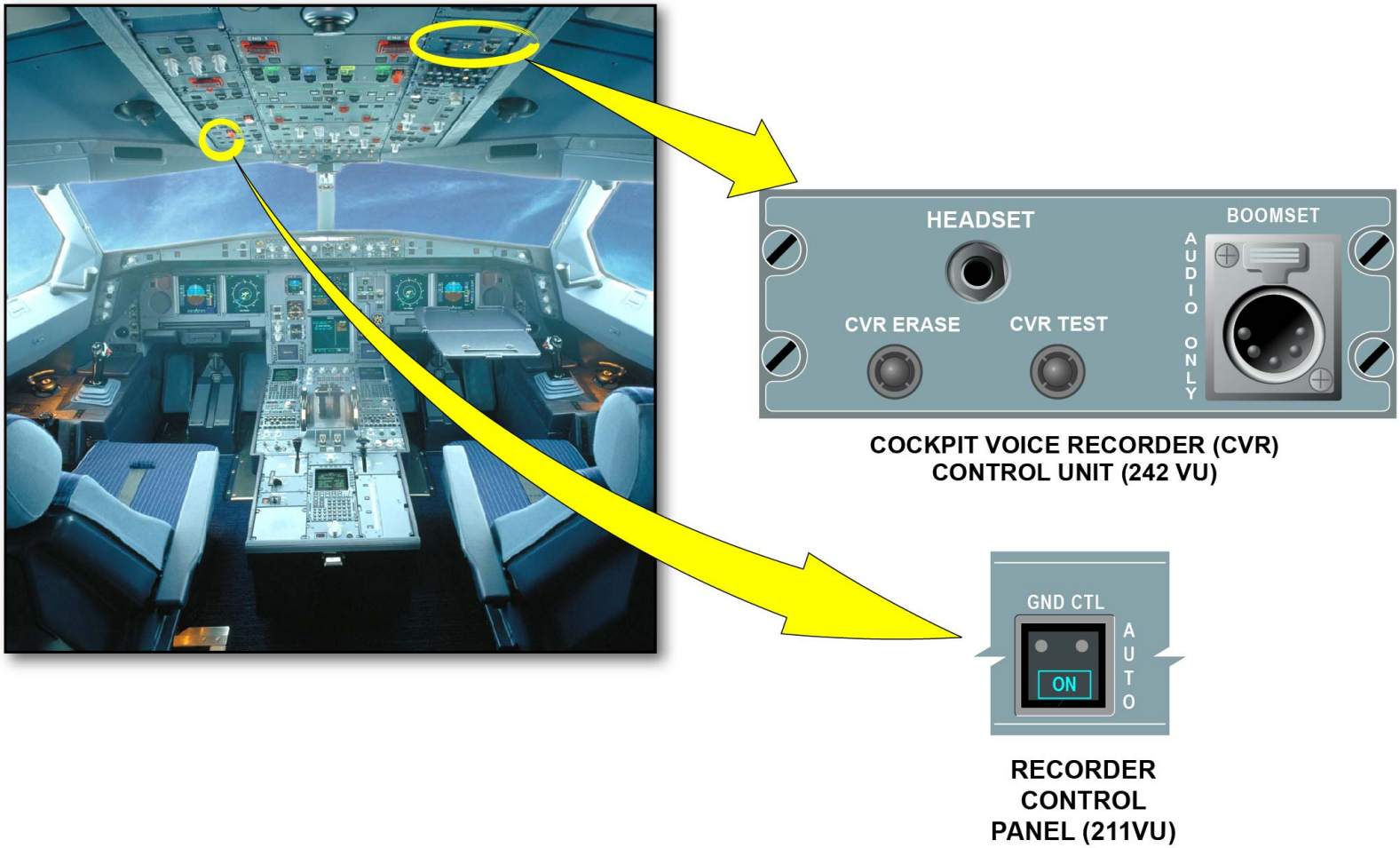
COCKPIT VOICE RECORDER SYSTEM COMPONENT LOCATION

SSCVR COMPONENT LOCATION

The Solid State Cockpit Voice Recorder (SSCVR) is in the aft pressurized zone, in the bulk compartment.
The area microphone is in the middle of the windshield, immediately below the overhead panel
For manual control on the ground, the Cockpit Voice Recorder (CVR) must be energized. To do this, press the ReCorDeR GrouND ConTroL P/BSW. There is a test P/B on the front face of the CVR control unit.



SSCVR COMPONENT LOCATION



SSCVR COMPONENT LOCATION

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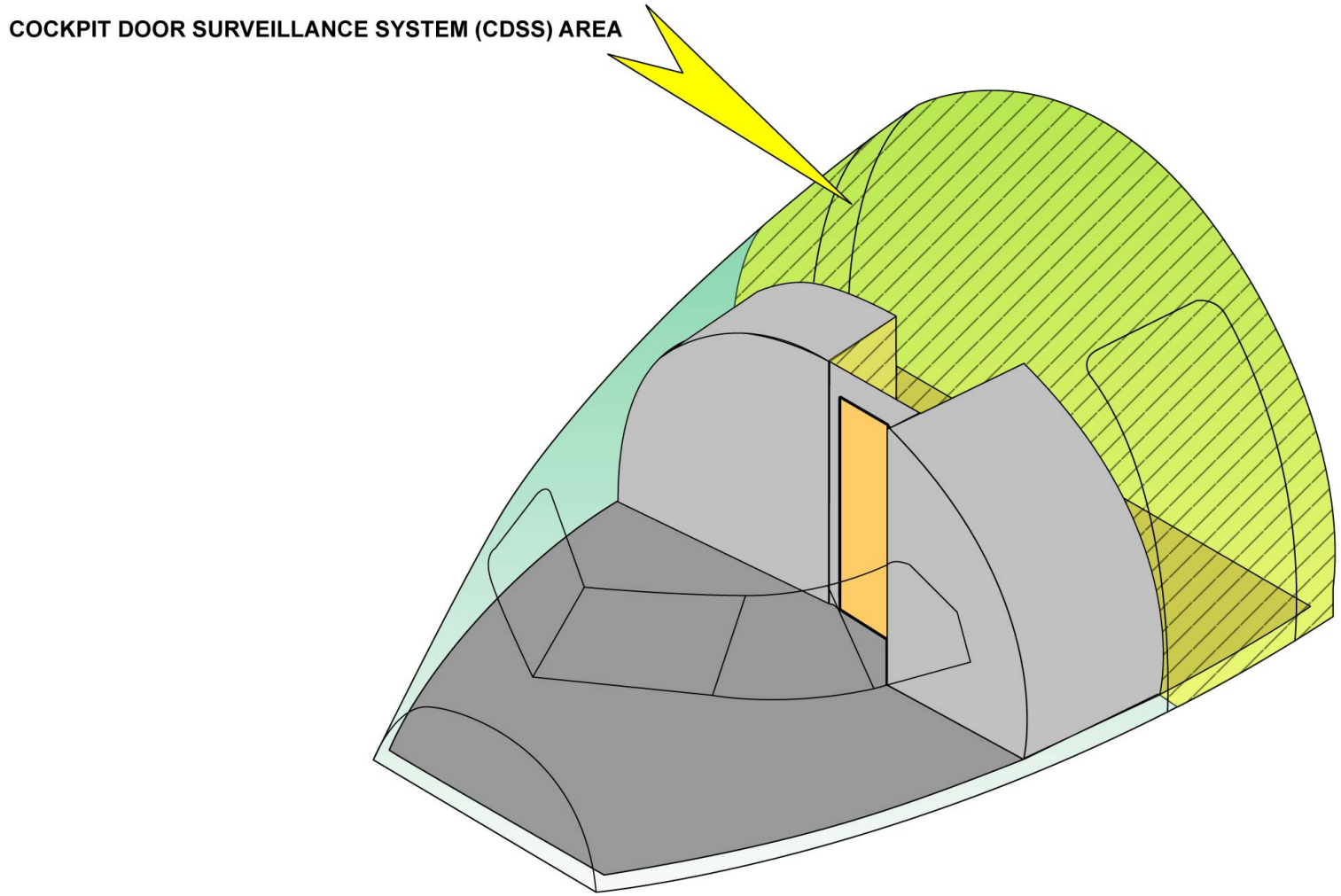
COCKPIT DOOR SURVEILLANCE SYSTEM D/O

GENERAL

The Cockpit Door Surveillance System (CDSS) is related to the Cockpit Door Locking System (CDLS) and uses cameras to prevent a hijacking attempt and protect the flight compartment against an intrusion. The CDSS images are displayed in the cockpit to let the flight crew identify a person in front of the cockpit door and to survey the hidden cross section in the door number 1 area.



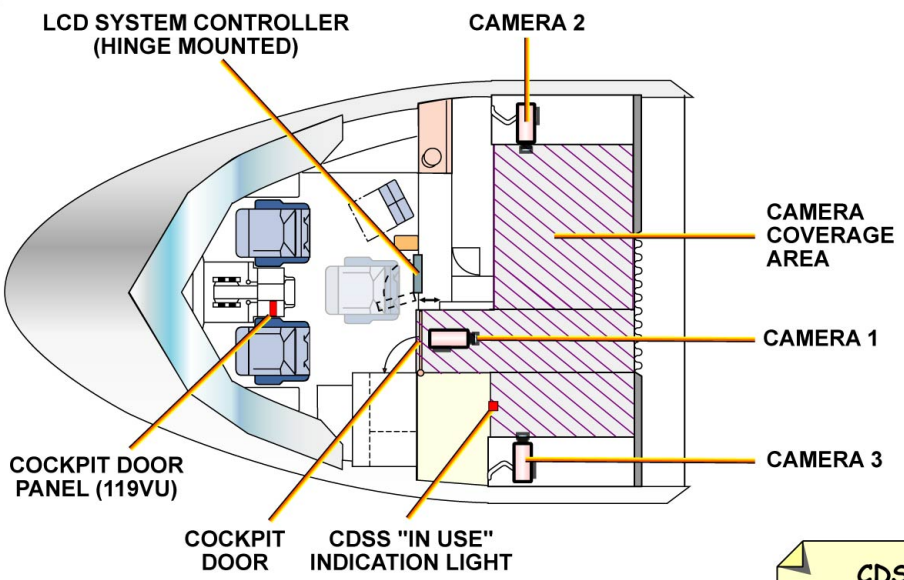
GENERAL

COCKPIT DOOR SURVEILLANCE SYSTEM D/O

SYSTEM CONFIGURATION

Two types of CDSS can be installed. The first configuration has the following components:
- 3 cameras installed in the ceiling panels in the cockpit entrance and the door 1 area,
- 1 LCD mounted on the rear cockpit wall, with a system controller,
- 1 COCKPIT DOOR VIDEO P/B installed on the overhead panel,
- 1 VIDEO P/B installed on the pedestal, and,
- 1 CDSS "IN USE" indication light, installed above the FAP on the left door 1 area.

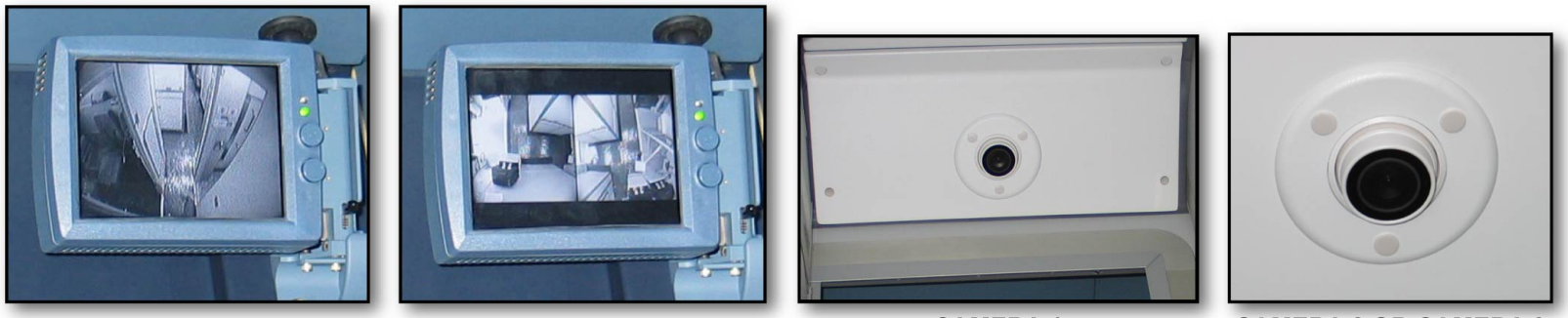
The second configuration has the following components:
- 3 cameras installed in the ceiling panels in the cockpit entrance and the door 1 area,
- 1 COCKPIT DOOR VIDEO P/B installed on the overhead panel,
- 1 CAMera SELection P/B,
- 1 CKPT ENTRY rotary switch installed on the pedestal, and,
- 1 system controller, installed in the avionics bay, to process and display images on the lower ECAM Display Unit (SD).



COCKPIT DOOR PANEL (119VU)

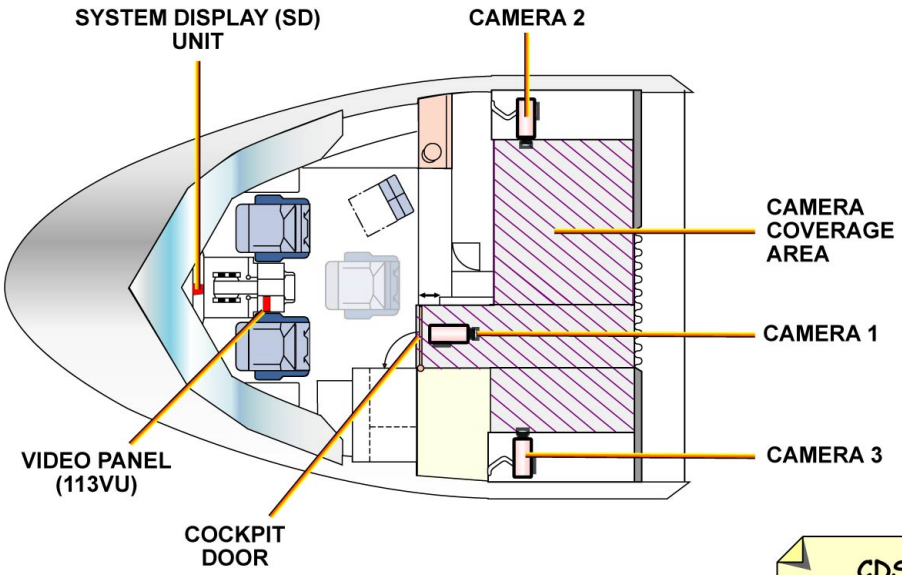
COCKPIT DOOR
VIDEO PANEL (271VU)

LCD SYSTEM CONTROLLER

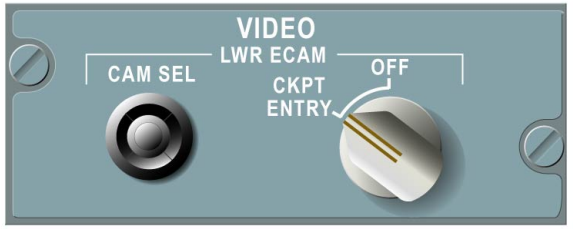


PICTURE FROM CAMERA 1 | PICTURES FROM CAMERAS 2 & 3 | CAMERA 1 | CAMERA 2 OR CAMERA 3

SYSTEM CONFIGURATION



CDSS configuration 2



VIDEO PANEL (113VU)

COCKPIT DOOR VIDEO PANEL (271VU)

SYSTEM DISPLAY (SD)

SYSTEM CONTROLLER

CAMERA 1

CAMERA 2 OR CAMERA 3

SYSTEM CONFIGURATION

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COCKPIT DOOR SURVEILLANCE SYSTEM D/O

SYSTEM DESCRIPTION - CONFIGURATION 1

CAMERAS

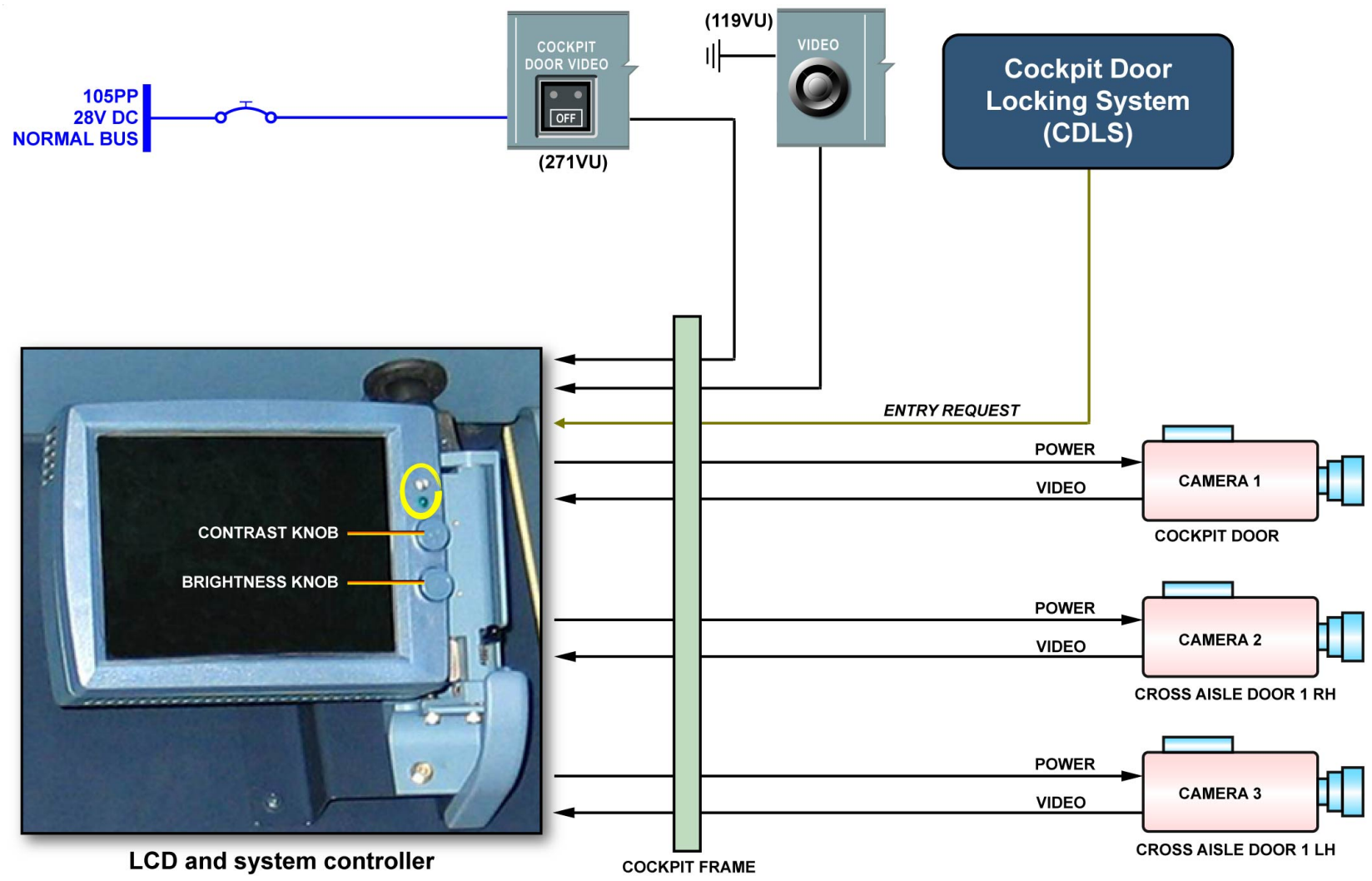
Each "NTSC video format" black and white video camera is hidden in a flight attendant working light housing and has an infrared light to get personal recognition. One video camera installed above the cockpit door helps you to get a clear personal recognition of the person requesting entrance to the cockpit. A second video camera installed in the ceiling of the RH door n°1 and a third one installed in the ceiling of the LH door n°1 let you recognize a person hidden behind the galley and the lavatory wall.

LCD

The pivoting hinge 6.4" LCD with system controller lets the flight crew view the pictures from the cameras. Pictures from the camera 1 are displayed as a full screen whereas pictures from cameras 2 and 3 are displayed as a split screen, LH side for the camera 2 and RH side for the camera 3. On the front face of the LCD, the green LED comes on when the system is operating and this LED flashes when a failure occurs in the system. The white LED is a light sensor, which automatically controls the brightness on the LCD screen.

CONTROL

The CKPT DOOR VIDEO P/B sets the CDSS on or off. The VIDEO P/B lets the flight crew select the picture from camera 1, or from the cameras 2 and 3. It also lets the flight crew put the system into the standby/power save mode (blank screen) when it is pushed and held for two seconds. The LCD also goes into this mode if the system gets no signal from the VIDEO P/B or the CDLS for one minute. If the CDSS receives an entry request discrete from the CDLS, the LCD automatically comes on (if the LCD was on the standby/power save mode) and shows the picture from the camera 1. The CDSS "IN USE" indication light comes on when a camera is selected.



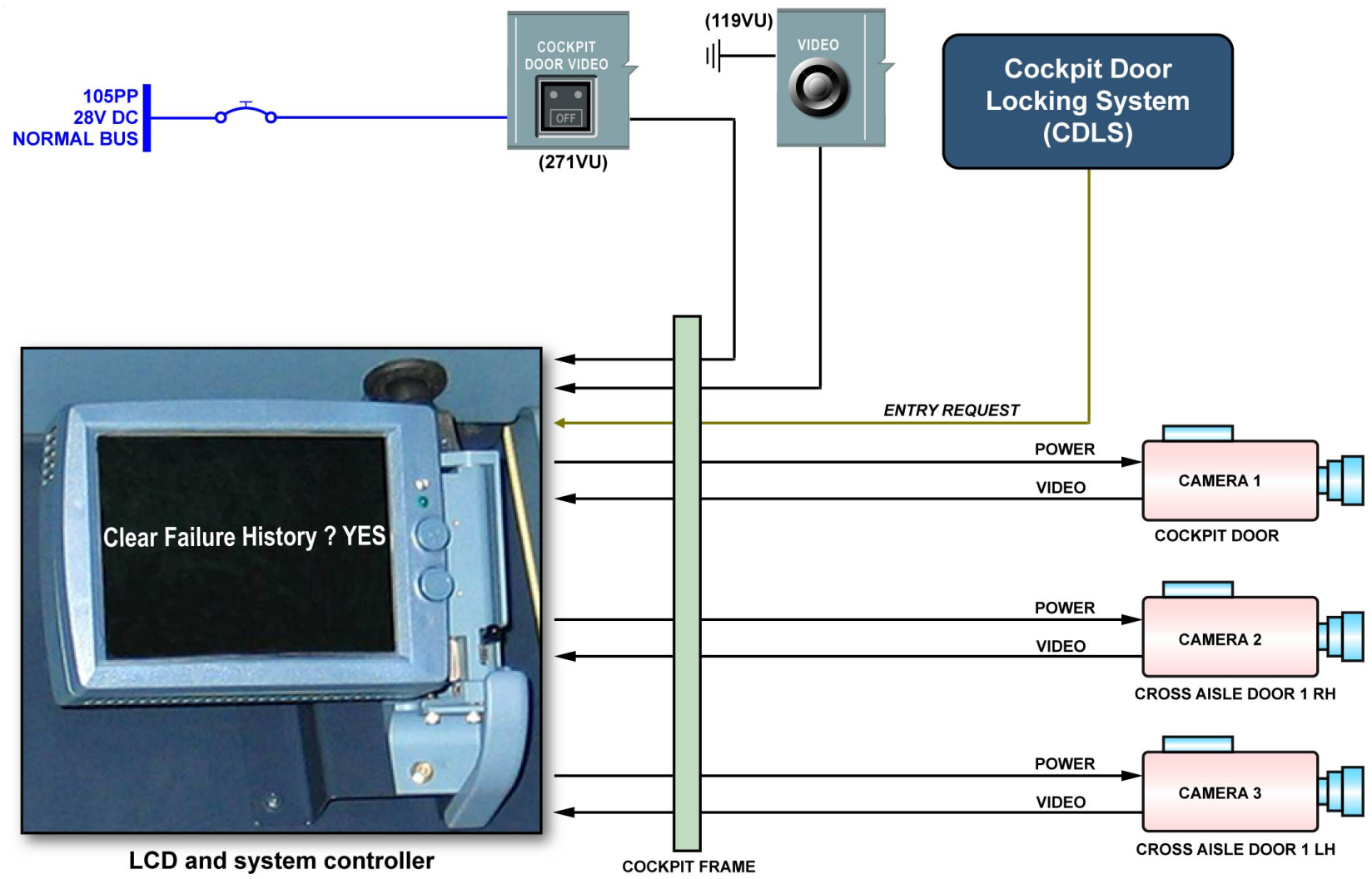
SYSTEM DESCRIPTION - CONFIGURATION 1 - CAMERAS ... CONTROL

COCKPIT DOOR SURVEILLANCE SYSTEM D/O

SYSTEM DESCRIPTION - CONFIGURATION 1 (continued)

BITE

When a failure is detected in the CDSS, a message is shown on the LCD monitor in white text and the green LED is flashing. A failure history can be displayed on the LCD for 60 seconds by pushing the VIDEO P/B for more than 10 seconds. To delete the failure history memory the CDSS must be reset. To reset the CDSS:
- push the COCKPIT DOOR VIDEO P/B off then on and push and hold the VIDEO P/B for 5 seconds,
- after 5 seconds the message "CLEAR FAILURE HISTORY ? YES" appears on the LCD screen,
- push VIDEO P/B and wait for 15 seconds.



SYSTEM DESCRIPTION - CONFIGURATION 1 - BITE

COCKPIT DOOR SURVEILLANCE SYSTEM D/O

SYSTEM DESCRIPTION - CONFIGURATION 2

CAMERAS

Each "NTSC video format" black and white video camera is hidden in a flight attendant working light housing and has an infrared light to get better personal recognition. One video camera installed above the cockpit door helps you to get a clear personal recognition of the person requesting entrance to the cockpit. A second video camera installed in the ceiling of the RH door n°1 and a third one installed in the ceiling of the LH door n°1 let you recognize a person hidden behind the galley and the lavatory wall. The pictures from the cameras are displayed on the SD. The pictures from the camera 1 are displayed as a full screen whereas pictures from cameras 2 and 3 are displayed as a split screen, LH side for the camera 2 and RH side for the camera 3.

SYSTEM CONTROLLER

The system controller is supplied by 115V AC through the COCKPIT DOOR VIDEO P/B, and gives 12V DC electrical power to energize the cameras. The system controller receives input signals from the cameras and also monitors the status of the CDSS. It processes the signal from the cameras and gives a video feed signal to the SD.

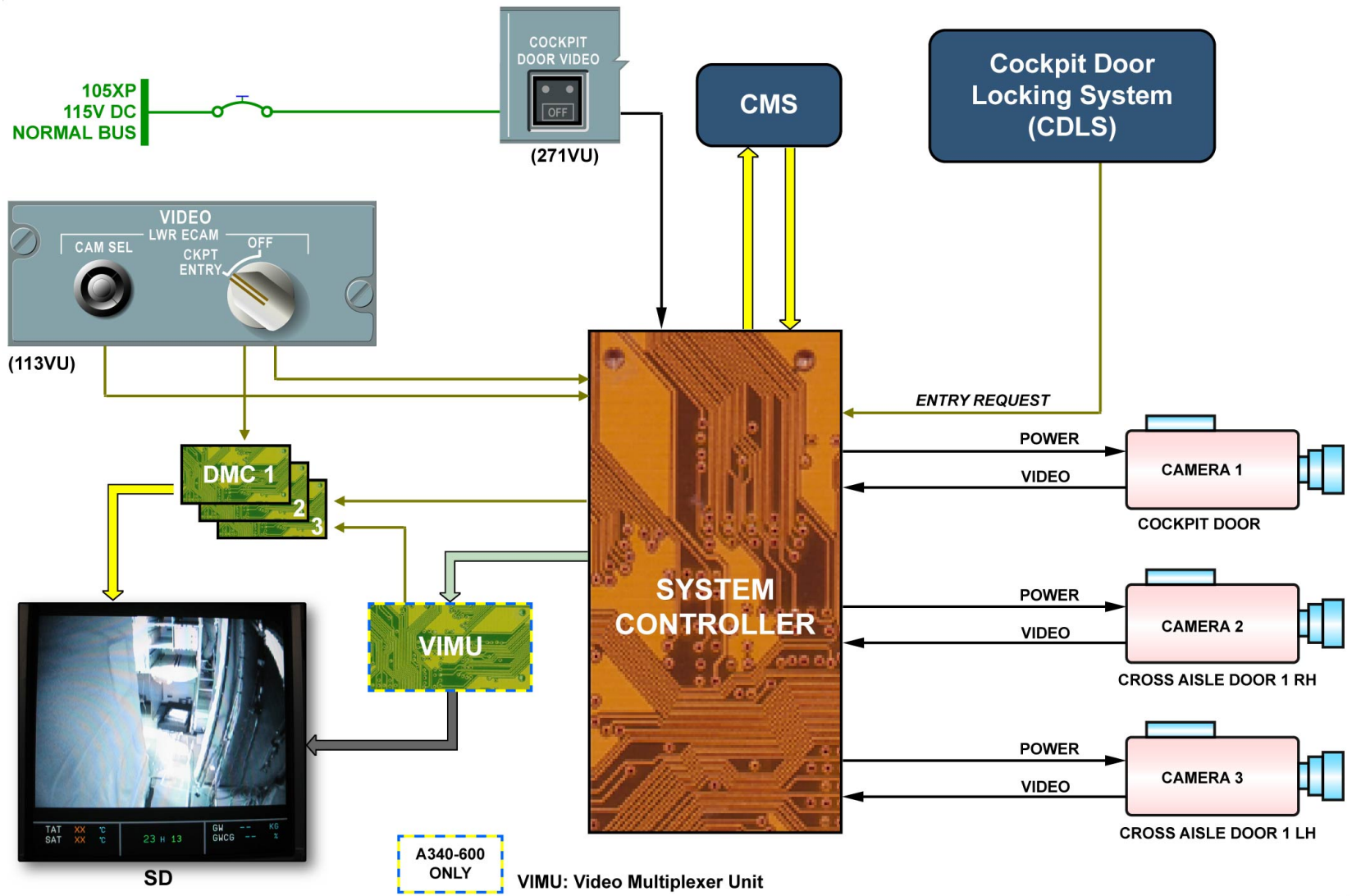
NOTE: On A340-600, the Video Multiplexer Unit (VIMU) is fitted if both TACS (Taxiing Aid Camera System) and CDSS are installed. The VIMU enables the video pictures from the CDSS or the TACS to be displayed on the SD.

CONTROL

The CKPT DOOR VIDEO P/B sets the CDSS on or off. The CAM SEL P/B lets the flight crew select the picture from camera 1, or from the cameras 2 and 3 on the SD unit. The LoWeR ECAM CKPT ENTRY rotary switch has two positions: CKPT ENTRY and OFF. A signal is sent to the Display Management Computers (DMCs) and to the system controller when the LWR ECAM rotary switch is set to the CKPT ENTRY position. If the CDSS receives an entry request discrete from the CDLS, the pictures from camera 1 are automatically displayed on the SD unit (if the LWR ECAM rotary switch is set to the CKPT ENTRY position).

BITE

If a failure occurs in the CDSS, the related message is displayed on the SD unit. The detected failure is stored in the system controller and the failure is also sent to the Central Maintenance System (CMS) through the ARINC 426 data bus.

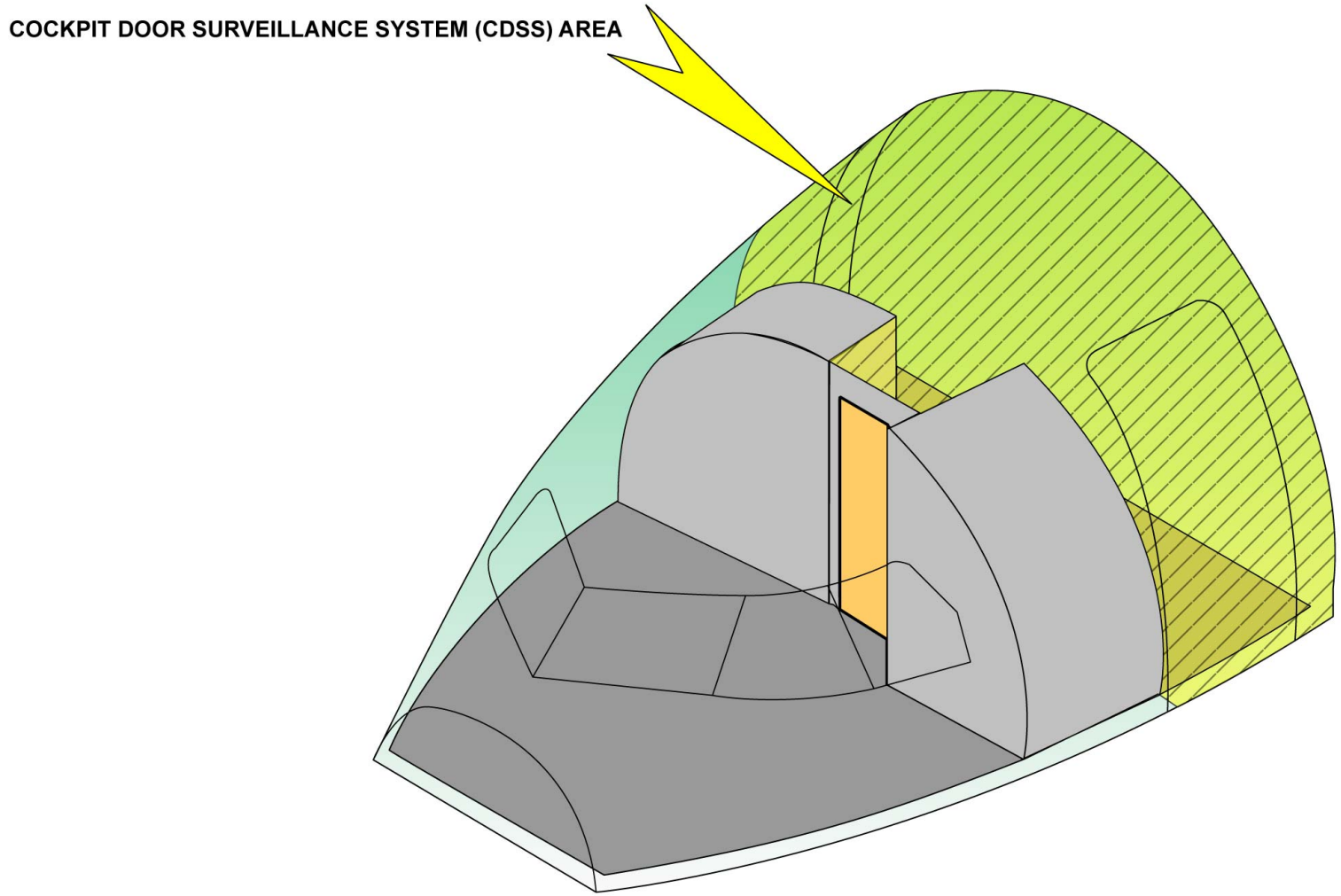


SYSTEM DESCRIPTION - CONFIGURATION 2 - CAMERAS ... BITE

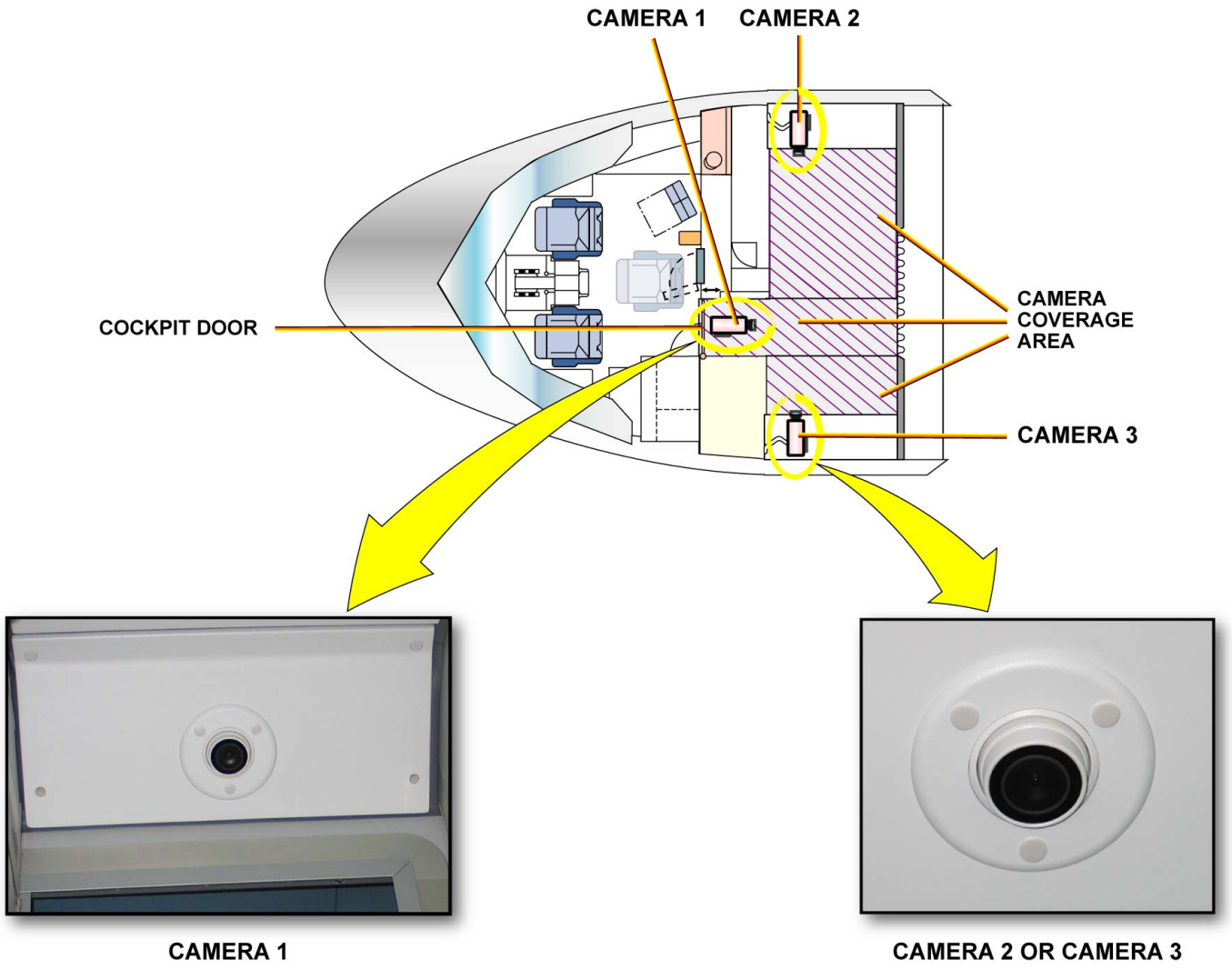
COCKPIT DOOR SURVEILLANCE SYSTEM COMPONENT LOCATION

CDSS COMPONENT LOCATION

The crew can identify persons who ask to have access to the cockpit.
Three cameras are installed in the ceiling panels in the cockpit entrance and the door 1 area.



CDSS COMPONENT LOCATION



CDSS COMPONENT LOCATION

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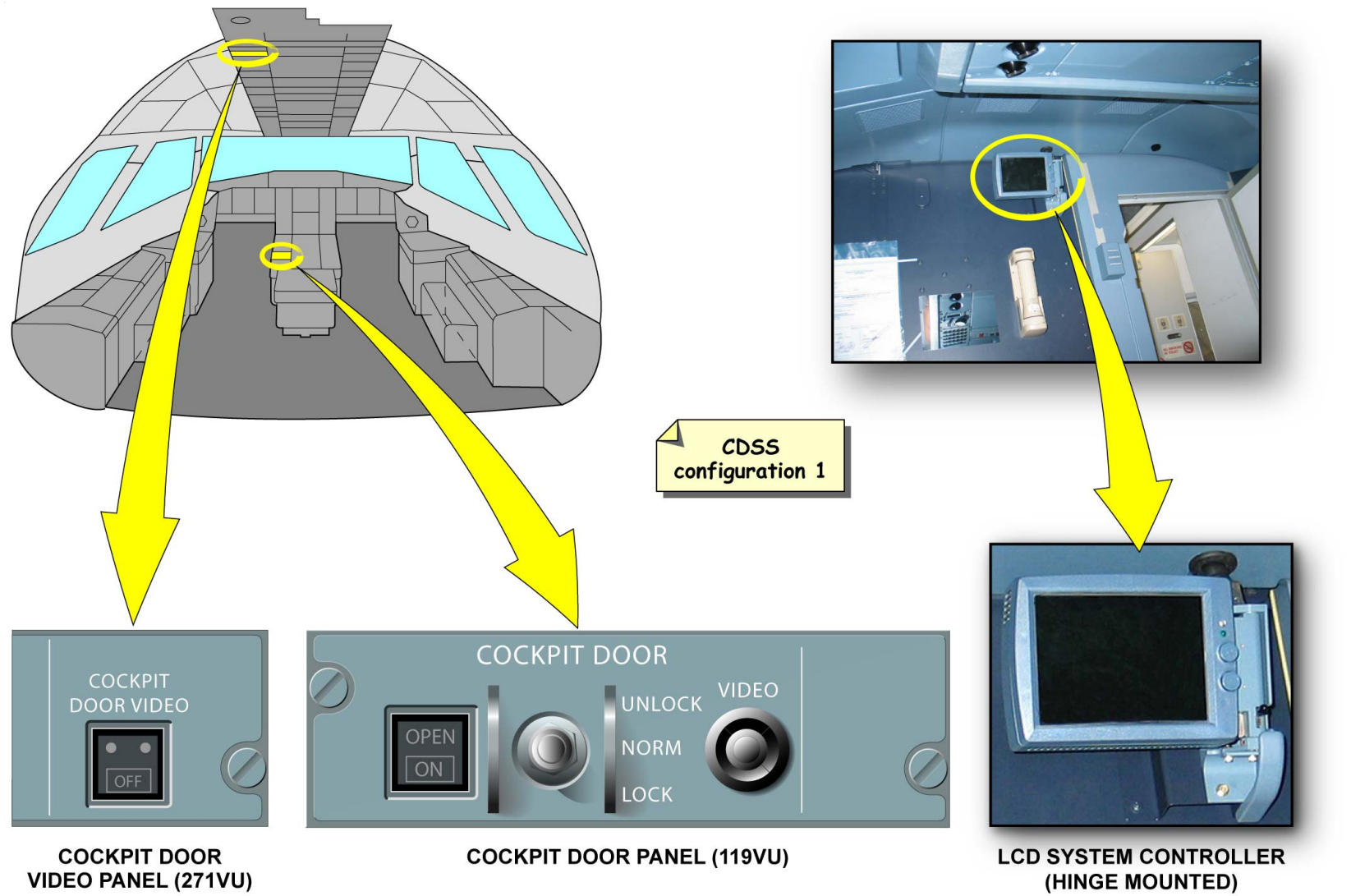
COCKPIT DOOR SURVEILLANCE SYSTEM COMPONENT LOCATION

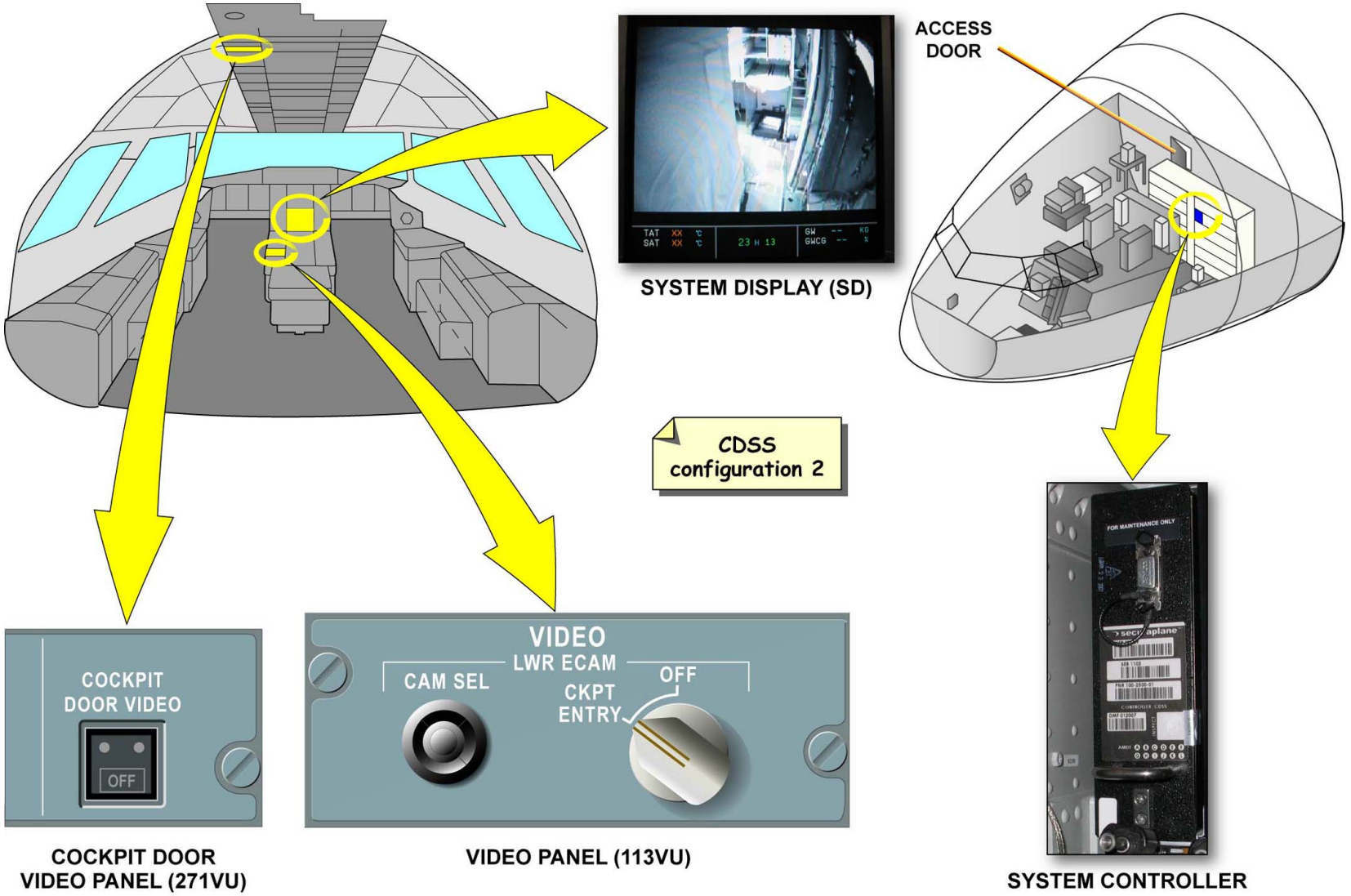
CONFIGURATIONS

According to your aircraft configuration, the CDSS has either:
- 1 LCD attached to the rear cockpit wall, with a system controller
- 1 COCKPIT DOOR VIDEO P/B installed on the overhead panel
- 1 VIDEO P/B installed on the pedestal, and
- 1 CDSS "IN USE" indication light, installed above the FAP on the left door 1 area.

In another configuration, the CDSS includes these components:
- 1 CKPT DOOR VIDEO P/B installed on the overhead panel
- 1 CAMERA SELECTION P/B installed on the pedestal
- 1 CKPT ENTRY rotary switch installed on the pedestal, and
- 1 system controller, installed in the avionics bay (800VU), to process and display images on the lower ECAM Display Unit (SD).



CONFIGURATIONS



CONFIGURATIONS

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COMMUNICATION SYSTEM CONTROL AND INDICATING (2/3)

RADIO COMMUNICATION OVERVIEW (2/3)

GROUND MECHANICAL CALL AND FLIGHT/SERVICE INTERPHONE

EVAC FUNCTION

CALL FUNCTION

COCKPIT VOICE RECORDER (CVR) (2)

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COMMUNICATIONS SYSTEM LINE MAINTENANCE

SYSTEM OVERVIEW

The use of the radio system on the Long Range aircraft is extremely important for the safe operation of the aircraft. While taxiing and towing, communication is necessary with the tower to safely move the aircraft. Basic system description and procedures will enable the student to understand system interconnection and correctly operate the systems by selecting frequencies and setting transmission and reception modes. In addition, the use of the service interphone communications will also be explained. The panels and equipment that will be explained is as follows:
- Audio Control Panel (ACP),
- Radio Management Panel (RMP),
- Audio Management Unit (AMU),
- radio transceivers,
- acoustic equipment that includes: boomsets, hand mikes, and handsets.

RMP FREQUENCY SELECTION

The RMP is the digital tuning head for the communications transceivers. They are located in the center pedestal and in the overhead panel for the 3rd observer seat. The panels have an over center ON/OFF switch. When the ON/OFF switch is switched to the ON position, two frequencies that were previously selected appear in the ACTIVE and STandBY windows. To operate the transceiver, you might have to select a new frequency on one of the Very High Frequency (VHF) or High Frequency (HF) transceivers. To do this, you must select the transceiver that you wish to transmit on. To select the radio, the related radio P/B must be pushed on the RMP. The related green Light Emitting Diode (LED) will come on.

ACP TRANSMISSION MODE SELECTION

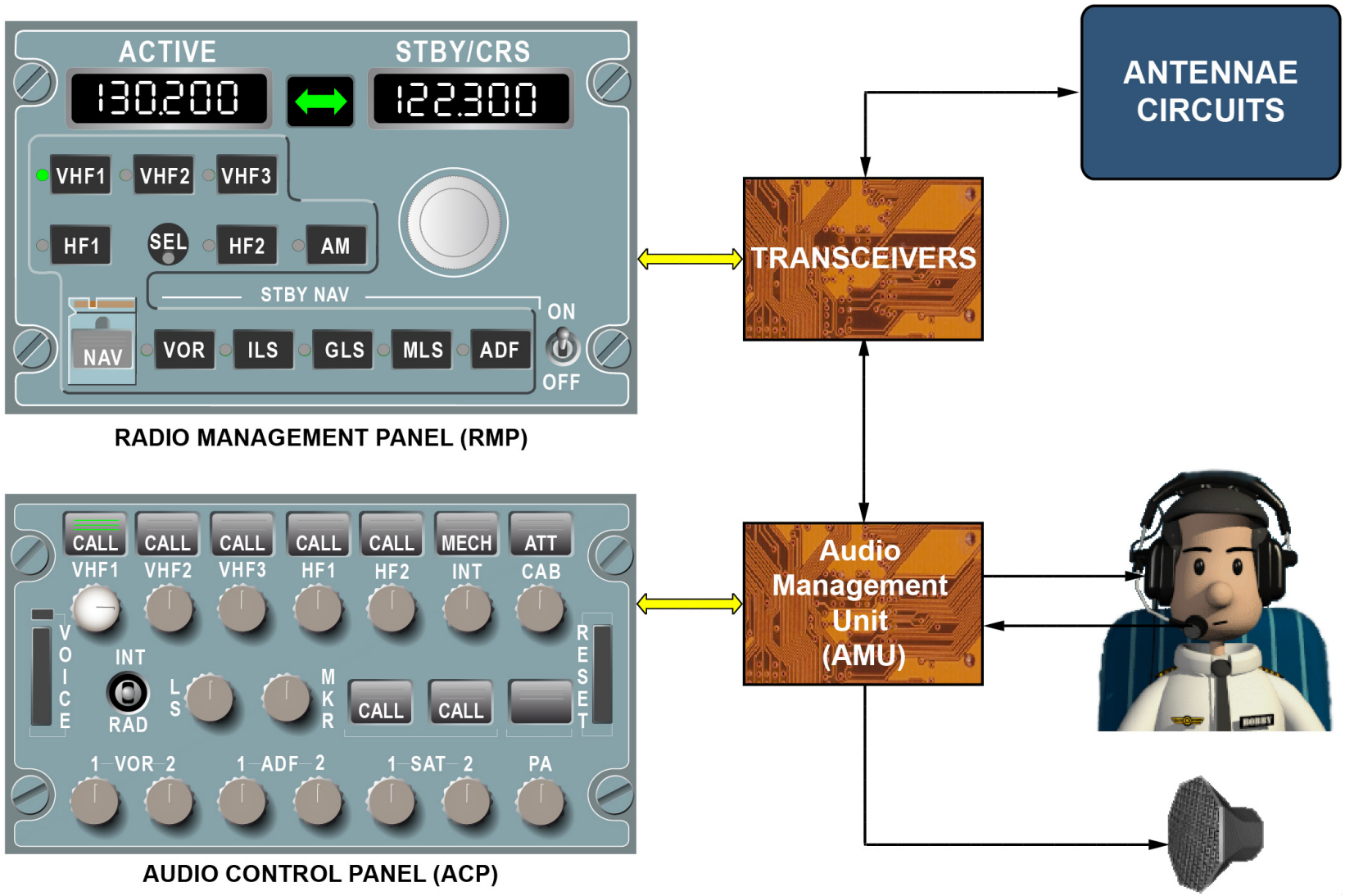
To connect one of the acoustical devices (microphone) to the transmission line, the related transmission key must be selected on the ACP. When the transmission key is pressed (green light on) you are ready to transmit. This selection can be disabled when you select another transceiver or when you press the lighted P/B again. Only one transmit key can be selected at a time.

ACP RECEPTION MODE SELECTION

In order to listen on the selected transceiver, you must operate the ACP. On the ACP, the reception knobs allows connection of the headsets / acoustic equipment to the transceiver reception via the AMU. To select a transceiver, the related reception knob must be released out. The reception knob comes on white. To adjust the reception volume level, the selected reception knob must be turned. Communications can now be established.

ACP OPERATION

When one of the Push-to-Talk (PTT) switches is depressed, the hand mike is connected, and in this case, the VHF 1 transceiver transmits. The boomset mike is connected when a PTT is pressed in on the ACP or on the side stick. On the ACP, several reception knobs can be selected simultaneously. If the reception knob is pressed in again, the receiver is disconnected and the white light goes off.



SYSTEM OVERVIEW - RMP FREQUENCY SELECTION ... ACP OPERATION

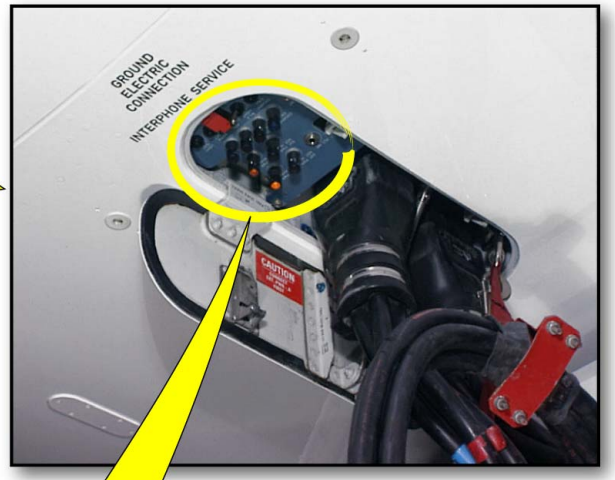
COMMUNICATIONS SYSTEM LINE MAINTENANCE

SYSTEM OVERVIEW (continued)

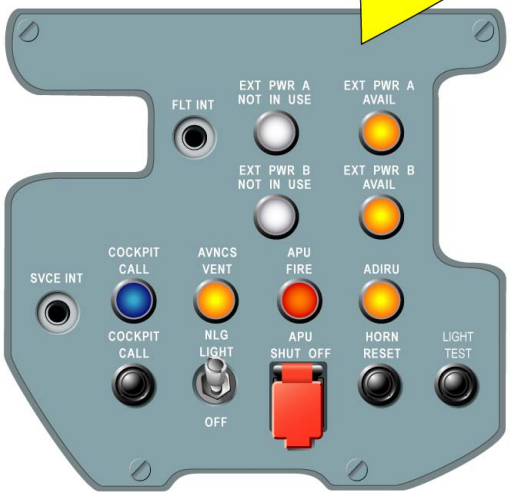
FLIGHT INTERPHONE SYSTEM OPERATION

Flight interphone selection is necessary for voice communications between flight crewmembers and for ground handling, taxiing and towing. This control is done using the ACP. If the flight crew needs to maintain the contact and communicate with the mechanic, the flight crew can push the MECHanic P/B on the CALLS panel on the overhead. The flight interphone can also act as a transceiver. Selection of the INTerphone transmission key lights the green bars, indicating that the flight interphone is ready to operate. Pressing and releasing the INT reception knob causes the knob to come on and adjusts the interphone audio level. The INTerphone/RADio selector switch must be in the INT position. The INT position gives a permanent use of the flight interphone without any further reaction and whatever radio key selected. The INT/RAD switch is a 3-position switch with INT being a stable position. The RAD selection connects the pre-selected channel to transmit. The RAD position is a momentary contact, and is spring loaded to the center position. This position acts like the selection of the hand microphone pushbutton or the PTT trigger on the side-stick.

NOSE LANDING GEAR

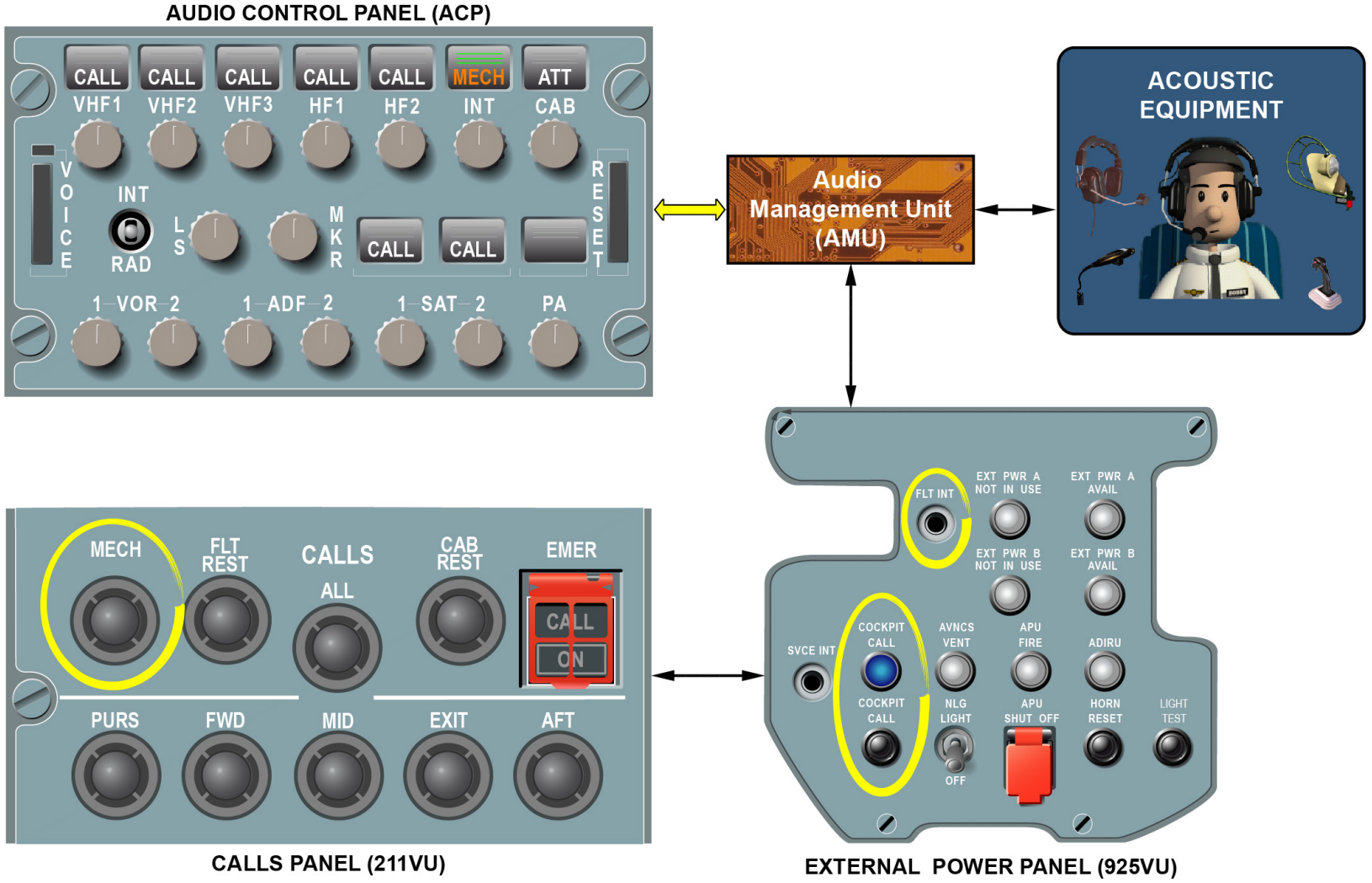


During storm conditions or when there is atmospheric electrical activity, it is recommended to remove/disconnect headsets.



EXTERNAL POWER CONTROL PANEL (925VU)

SYSTEM OVERVIEW - FLIGHT INTERPHONE SYSTEM OPERATION



SYSTEM OVERVIEW - FLIGHT INTERPHONE SYSTEM OPERATION

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COMMUNICATIONS SYSTEM LINE MAINTENANCE

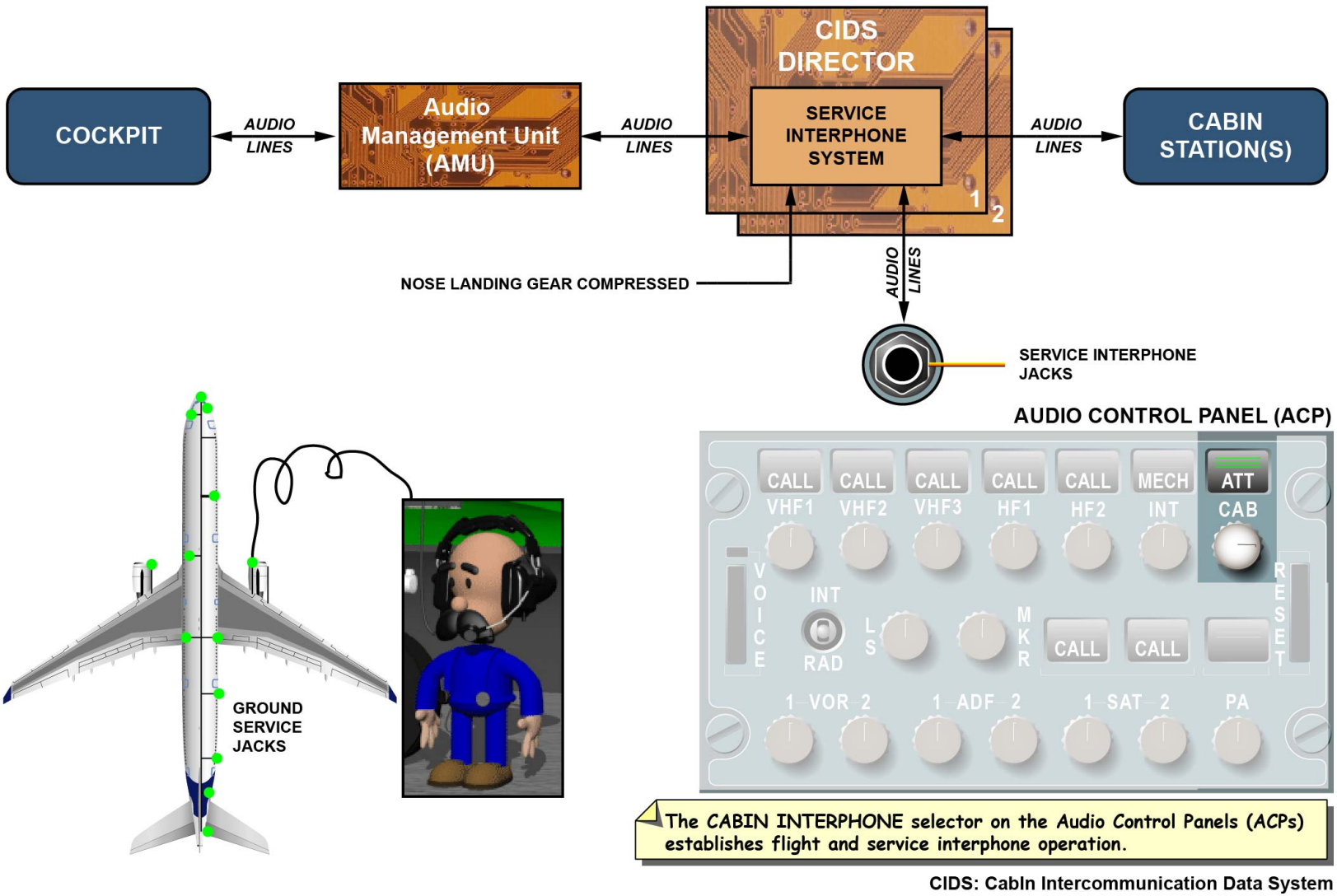
SYSTEM OVERVIEW (continued)

SERVICE INTERPHONE SYSTEM OPERATION

The service interphone system has several service interphone jacks installed around the aircraft to make easier communications between maintenance personnel during troubleshooting, and between maintenance and flight crew when doing coordinated tasks; i.e. manual start valve operation.
The audio lines from the cockpit, cabin and interphone jacks are routed to the amplifiers through the amplifiers in the Cabin Intercommunication and Data System (CIDS) directors. The system is integrated in the CIDS directors. There are 2 modes to connect the jacks to the service interphone. The automatic mode on ground only with the landing gear down and compressed OR the external power contactor connected. The other mode is mentioned in the MAINTENANCE TIPS section.

SERVICE AND FLIGHT INTERPHONE OPERATION

Selecting the CAB INT transmission key and reception knob on the ACP makes a connection between the service and the flight interphone.



CIDS: CabIn Intercommunication Data System

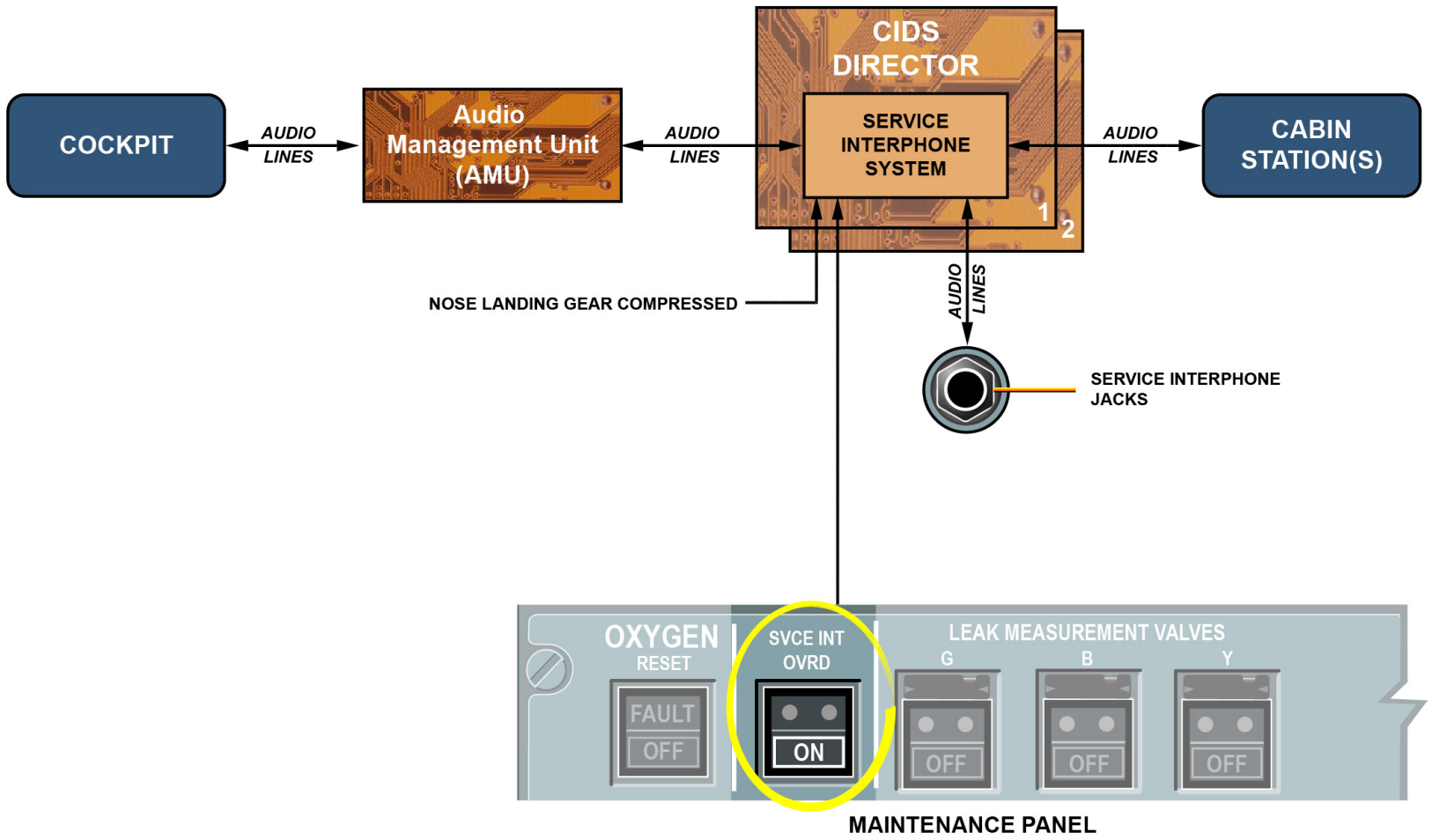
SYSTEM OVERVIEW - SERVICE INTERPHONE SYSTEM OPERATION & SERVICE AND FLIGHT INTERPHONE OPERATION

COMMUNICATIONS SYSTEM LINE MAINTENANCE

MAINTENANCE TIPS

SERVICE INTERPHONE INOPERATIVE ON THE GROUND

On ground, the service interphone is automatically selected on. In flight, the service interphone system is automatically selected off. The reason is to remove/stop potential static noise generated and amplified through the AMU, due to the length of wires acting as antennae, in the audio system. For maintenance tasks on ground and depending on the aircraft maintenance configuration, the service interphone can be lost. To restore the service interphone function, the SerViCE INTerphone OVeRriDe P/BSW must be switched to 'ON'. The guarded SVCE INT OVRD P/BSW is located on the cockpit overhead maintenance panel.



CIDS: CabIn Intercommunication Data System

MAINTENANCE TIPS - SERVICE INTERPHONE INOPERATIVE ON THE GROUND

COMMUNICATIONS SYSTEM LINE MAINTENANCE

MAINTENANCE TIPS (continued)

CABIN & SERVICE INTERPHONE OPERATION

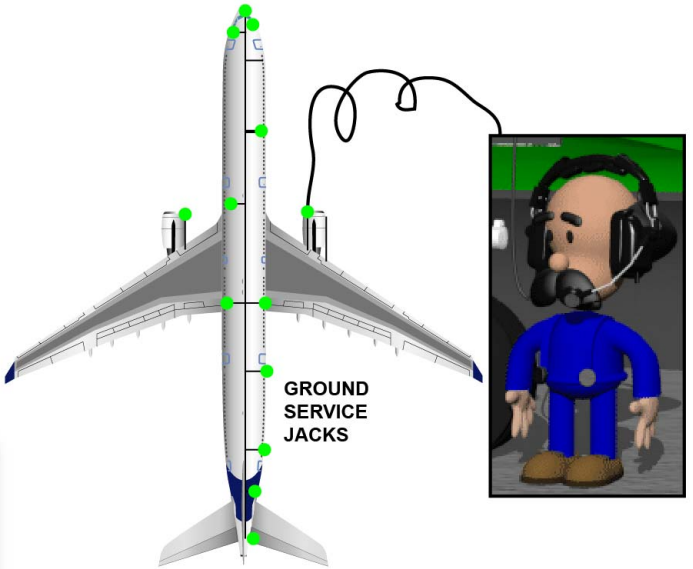
Pressing the INT key twice, on the attendant handset, activates the service interphone function. A display, on the Attendant Indicating Panel (AIP), indicates that the service interphone is in use.

MAINTENANCE AREA JACK

SERVICE INTERPHONE JACK

PUSH TWICE ON
INTPH KEY

CABIN HANDSET



ATTENDANT INDICATION PANEL

MAINTENANCE TIPS - CABIN & SERVICE INTERPHONE OPERATION

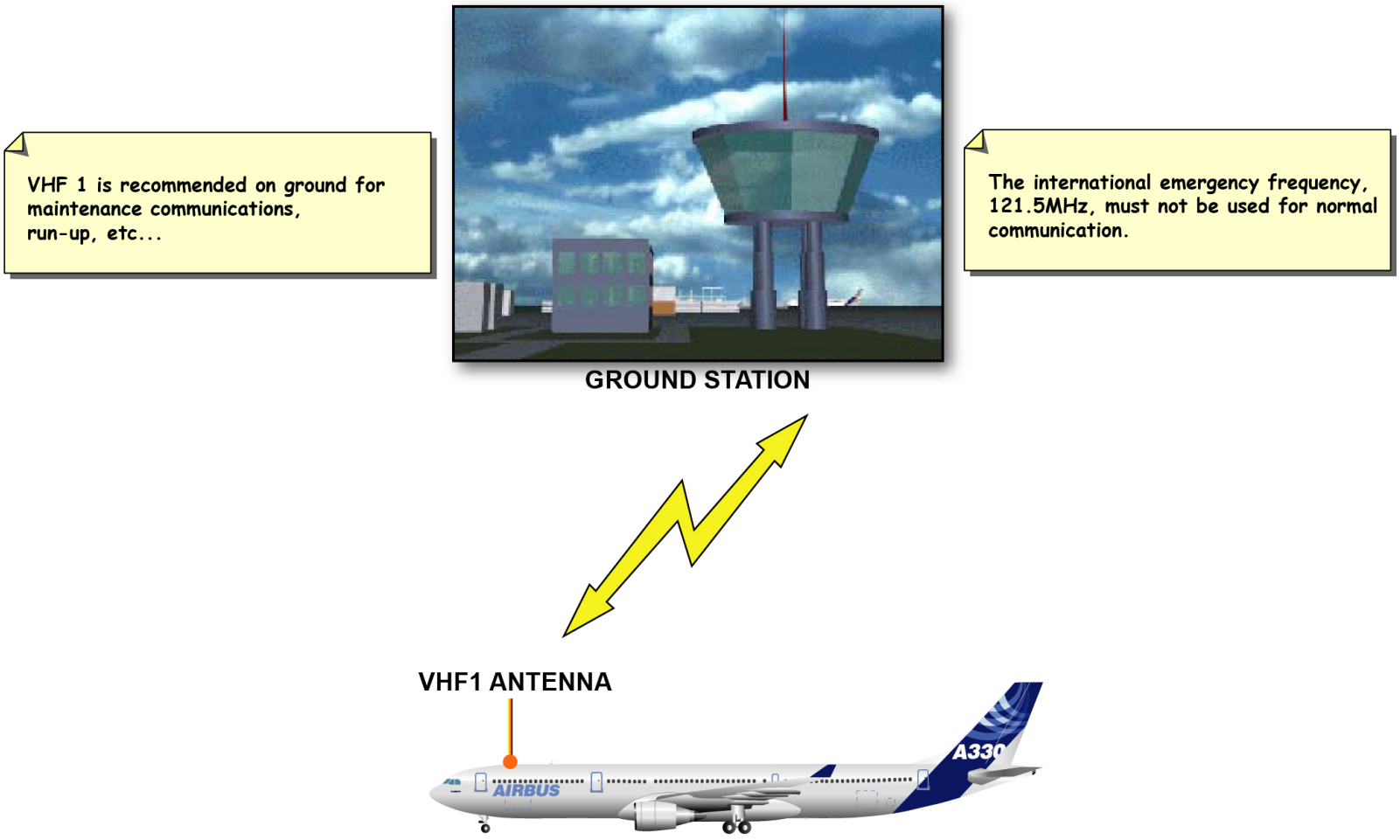
COMMUNICATIONS SYSTEM LINE MAINTENANCE

MAINTENANCE TIPS (continued)

VHF COMMUNICATION ON BATTERIES ONLY

With the aircraft only supplied by batteries, of the three VHF systems, only the VHF 1 transceiver, CAPT ACP 1 and CAPT RMP 1 can operate. Moreover, as the VHF1 antenna is installed above the cockpit and due to the size of the Long Range aircraft, it is recommended to use this system on ground for line of sight transmission.

NOTE: Note: The international emergency frequency, 121.5 MHz, must not be used for normal communication.



MAINTENANCE TIPS - VHF COMMUNICATION ON BATTERIES ONLY