



TECHSAVIATION *Training Center*

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Communications

Flight Interphone System

The flight interphone system lets the flight crew members in the flight deck communicate with each other. It also connects to the communication systems and ground crew members.

There are three independent systems, one for each flight crew station and the observer station. The captain system is shown on the graphic.

Switches on the Audio Control Panels (ACP) permit selection of the following types of audio:

- Communication transceivers
- Navigation receivers
- Cabin interphone
- Passenger address
- Flight interphone
- Satellite communication receiver transmitter.

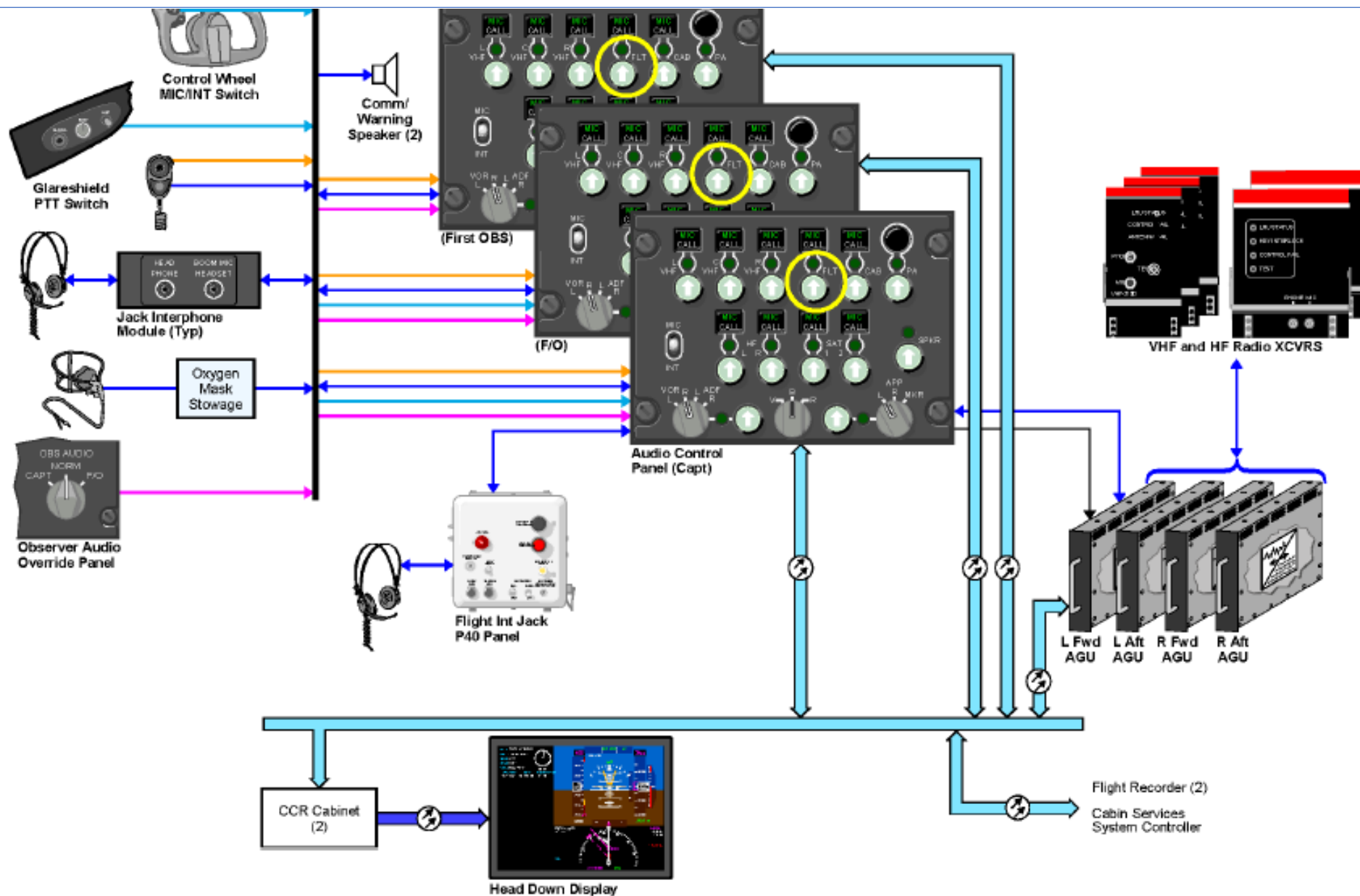
Hand microphones, boom microphones, or oxygen mask microphones are connected through the ACP to the Common Data Network (CDN).

From the CDN, the digital audio is sent through the Audio Gateway Units (AGU) to the radio transceivers, cabin services system controller, and the flight recorders.

There are microphone switches for the boom and oxygen mask microphones on each pilot glareshield and control wheel. The microphone switch on the ACP has the same function.

If the CDN fails, the left ACP is connected directly to the left AGU for backup purposes.

The observer audio selector is used if either the captain or first officer ACP fails. When the switch is put in the CAPT or F/O position, the observer ACP is connected to the captain or first officer PTT and audio.



Service Interphone System

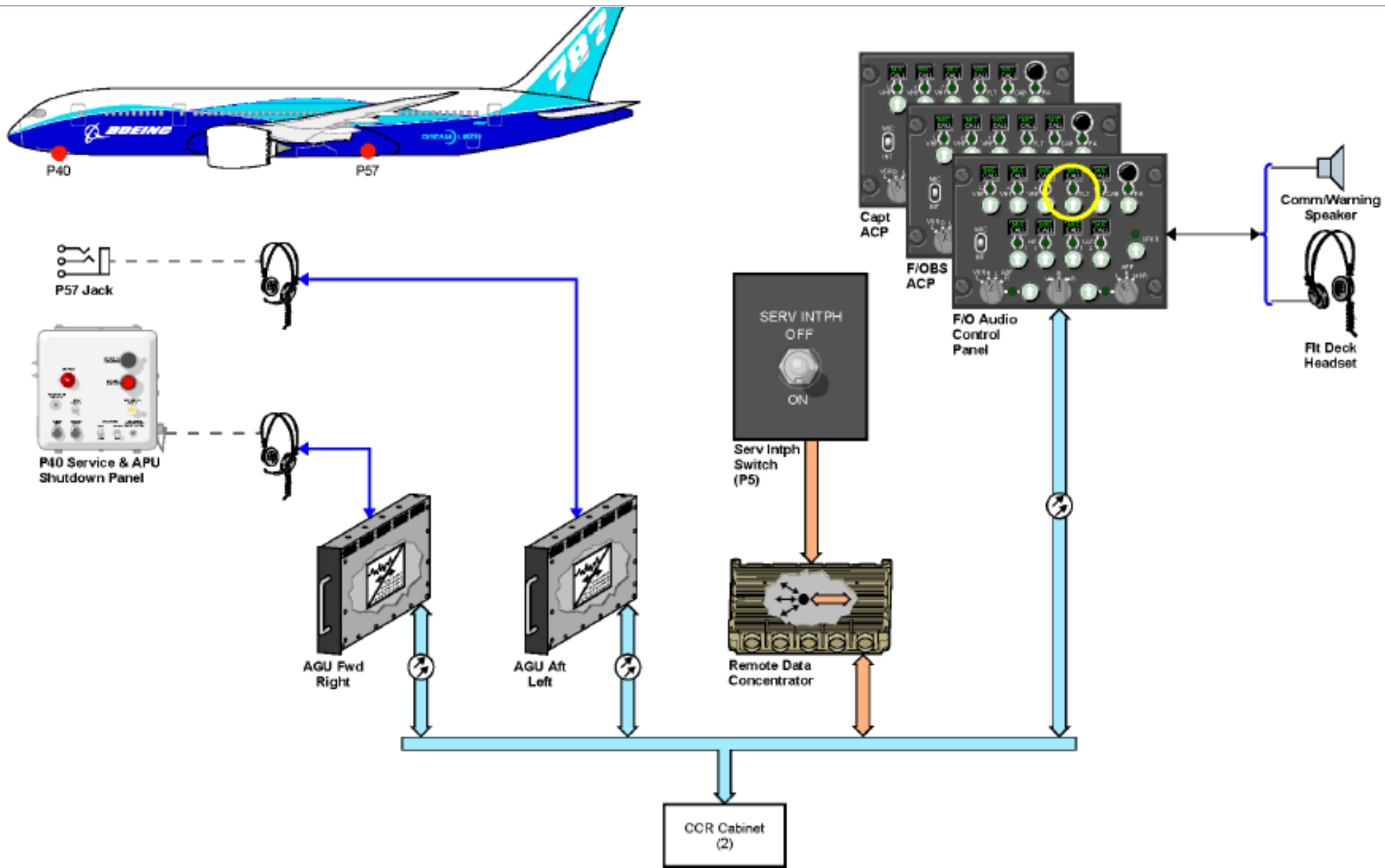
The service interphone system permits communication between the:

- Flight crew
- Ground crew
- Maintenance personnel.

There are service interphone jacks on the:

- P40 service and APU shutdown panel
- P57 panel (behind the main landing gear).

The service interphone switch on the P5 panel connects the service interphone and flight interphone.



Ground Crew Call System

The flight crew and ground crew use the ground crew call system to alert each other. The system supplies aural and visual indications in the flight deck and nose wheel well area.

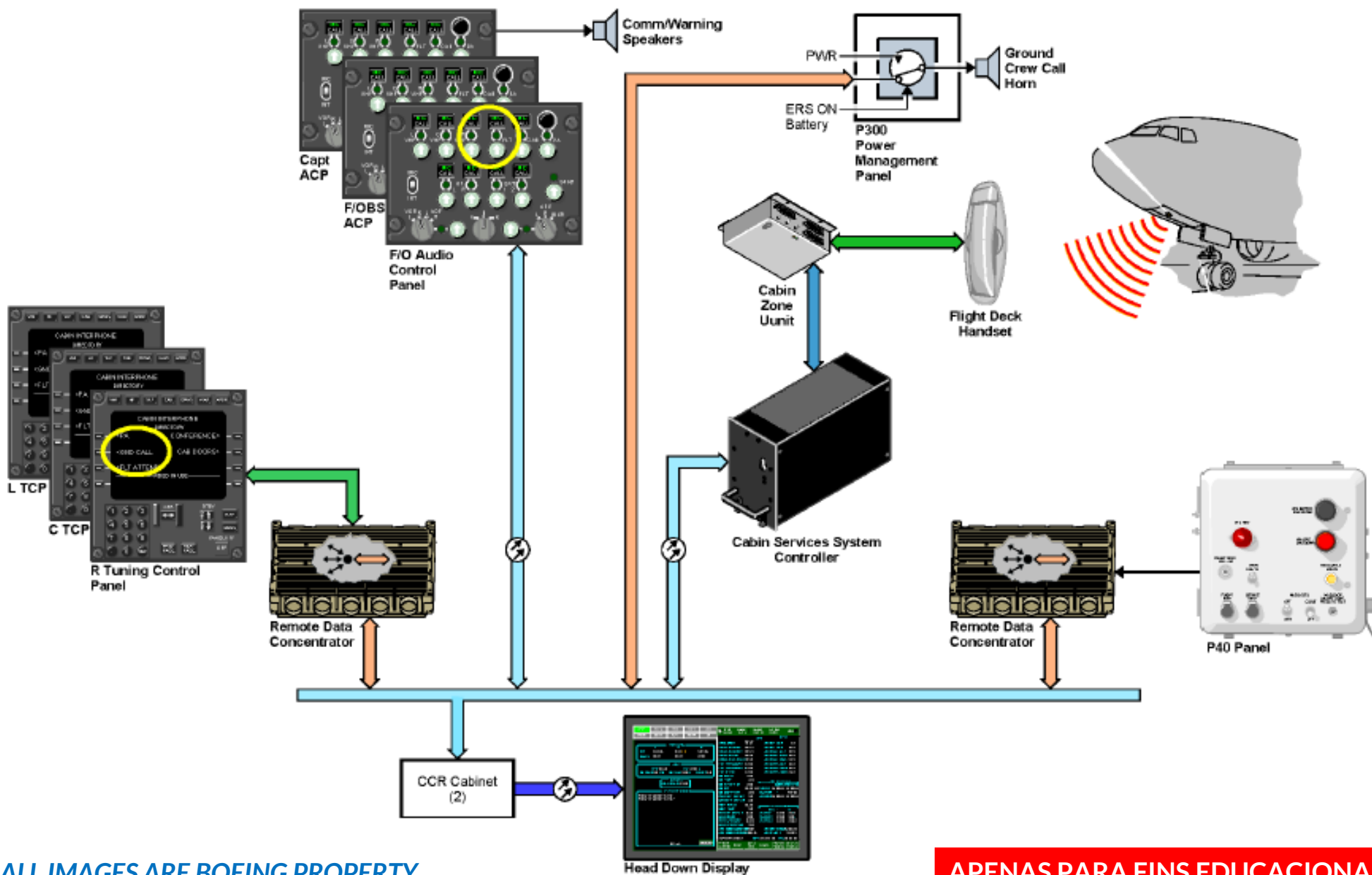
When the flight crew selects GRD CALL on the Tuning Control Panels (TCP), the ground call horn sounds for three seconds in the nose wheel well.

There is a flight deck call switch on the P40 service and APU shutdown panel. When the ground crew operates this switch:

- The audio control panels FLT call lights come on
- A message is shown on EICAS
- A chime sounds through the communication warning speakers.

The ground crew call horn also comes on when the airplane is on the ground and one of these occurs:

- There is an equipment cooling failure
- The Earth reference system is on battery power
- APU fire.



VHF Communication System

The Very High Frequency (VHF) communication system supplies line-of-sight voice and data communications from air-to-ground or air-to-air.

The VHF communication system has these components:

- VHF transceivers (3)
- VHF antennas (3)
- Tuning control panels (3).

The flight crew uses the Audio Control Panels (ACP) to select the VHF communication system.

The TCPs send tuning control inputs through the Remote Data Concentrators (RDC) and the Common Data Network (CDN) to the VHF transceivers.

The Communication Management Function (CMF) in the Common Computing Resource (CCR) cabinets also send the tuning control inputs to the VHF transceivers.

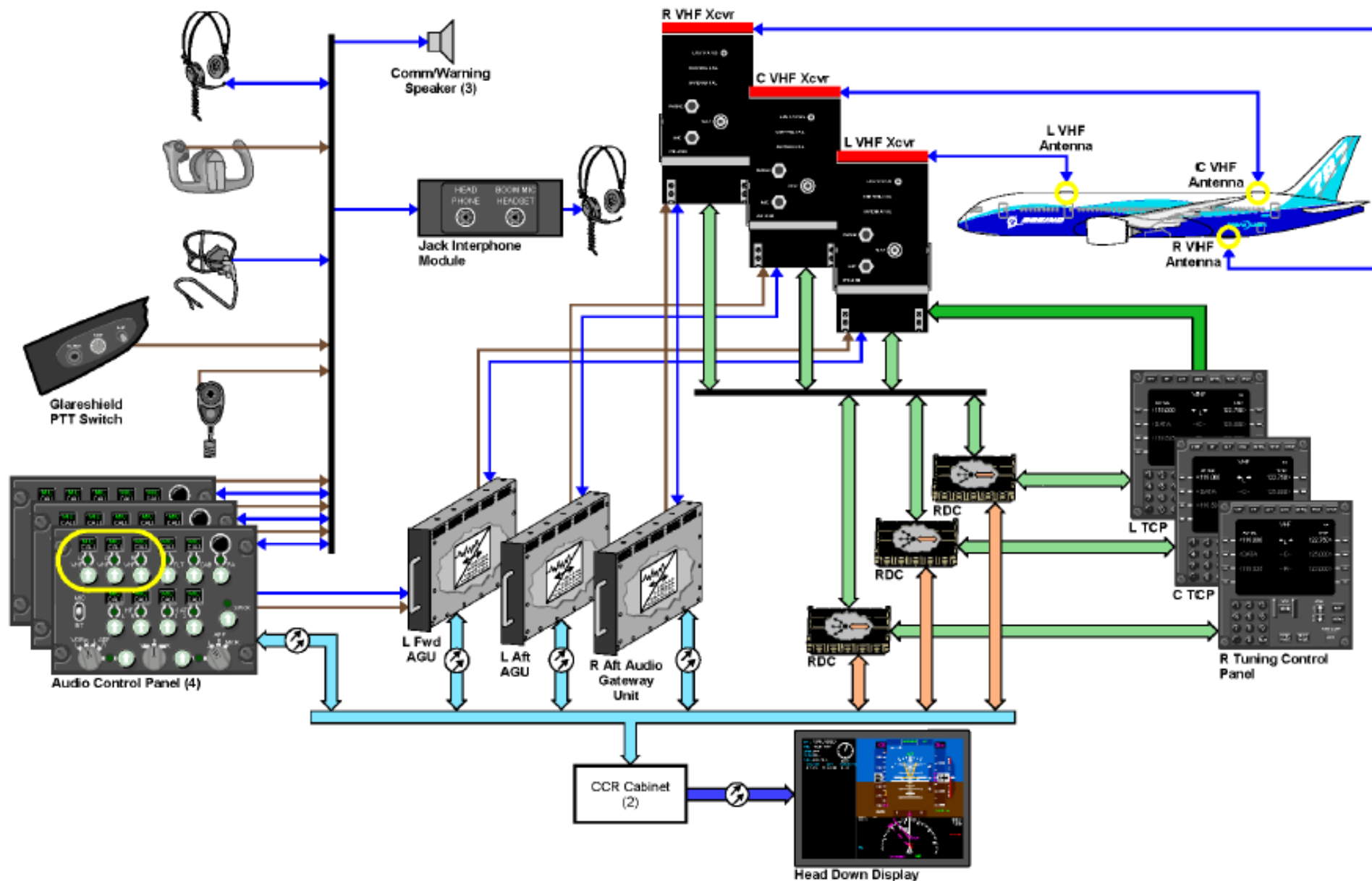
When the flight crew is transmitting, the Push-To-Talk (PTT) and audio signals go to the ACPs. The ACPs change the transmitted audio from an analog signal to a digital signal. This digital signal then goes to the Audio Gateway Units (AGU) through the CDN.

The AGUs change the audio back to an analog signal and send it to the VHF transceivers and then to the VHF antennas.

When a transmission is being received, the audio signal from the antennas and transceivers is changed from analog to digital in the AGUs. The AGUs send the digital signal to the ACPs through the CDN.

The ACPs then change the signal from digital to analog.

If the CDN fails, the left VHF transceiver gets a tuning control input directly from the left TCP and the left ACP has a direct input to the left forward AGU.



HF Communication System

The High Frequency (HF) communication system does these functions:

- Long-range voice communication
- Analog data communication
- HF Data Link (HFDL) operation.

These are the components of the high frequency (HF) communication system:

- HF communication transceivers (2)
- HF communication antenna couplers (2)
- HF communication antenna.

On the 787-8 the HF antenna is in the leading edge of the stabilizer and the antenna couplers are in the vertical stabilizer below the antenna.

On the 787-9 and 787-10 the HF antenna is beneath the vertical stabilizer dorsal fairing (at the base of the stabilizer) and the couplers are mounted in trays inside the dorsal fairing.

The antenna coupler matches the impedance of the antenna to that of the transceiver. The coupler tunes when the flight crew first keys the HF transceiver.

The flight crew uses the Audio Control Panels (ACP) to select the HF communication system.

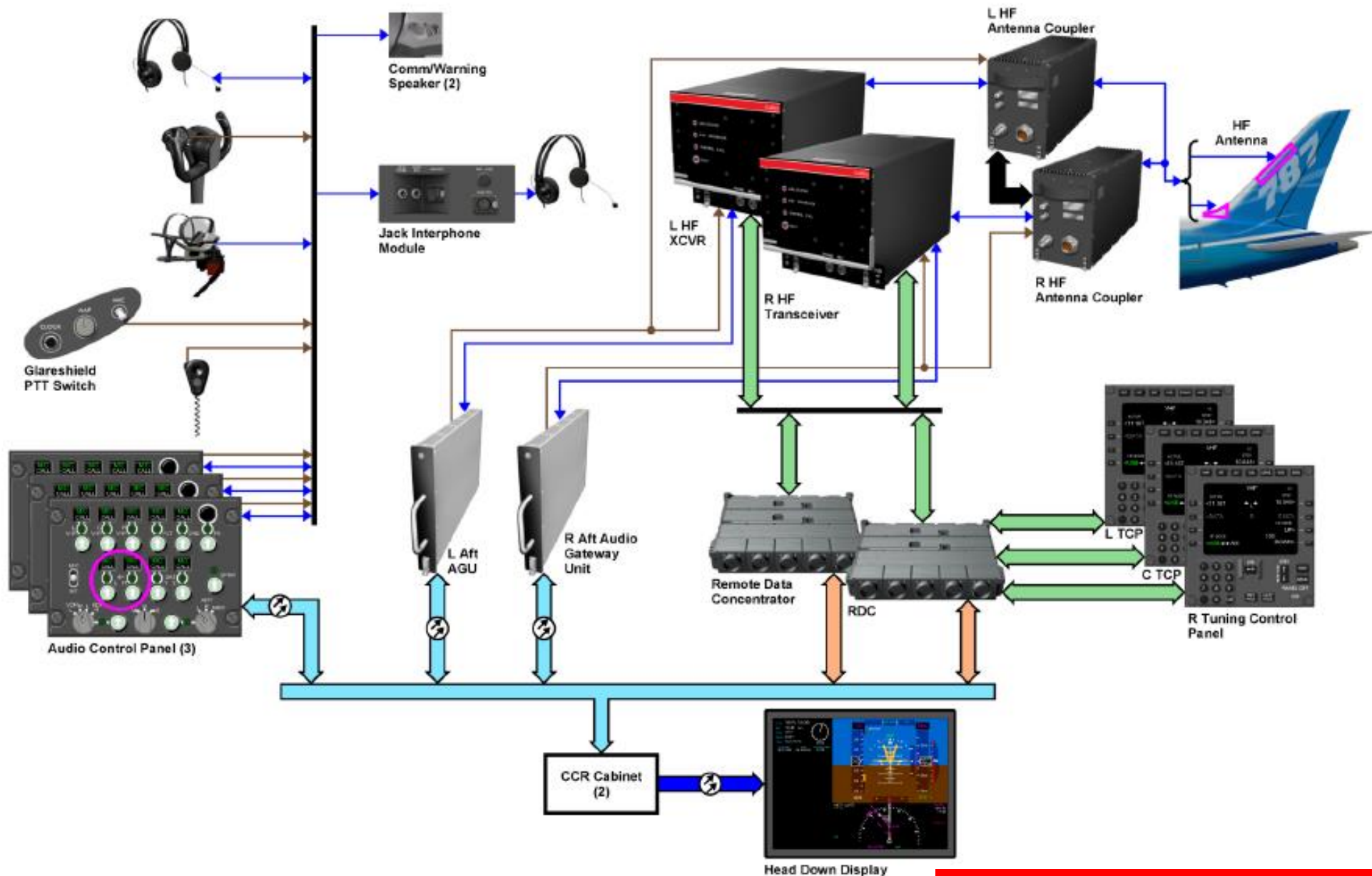
The Tuning Control Panels (TCP) send tuning control inputs through the Remote Data Concentrators (RDC) and the Common Data Network (CDN) to the HF transceivers.

The Push-To-Talk (PTT) and audio signals go to the ACPs. The ACPs send the signal to the Audio Gateway Units (AGU) through the CDN.

The AGUs send the audio signal to the HF transceivers. The HF transceivers send the signal through the HF antenna couplers to the antenna.

During receive operations, the signal from the antennas goes through the antenna couplers and the transceivers to the AGUs. The AGUs send the digital signal through the CDN.

For audio operation the ACPs then change the signal from digital to analog. For data operation the Data Communication Management Function (DCMF) uses the data.



Satellite Communication System

The Satellite Communication (SATCOM) system uses ground stations and satellites for worldwide voice and data communications.

The system is composed of the satellite network, the ground stations, and the airplane.

The satellite network relays radio signals between the airplane and the ground stations.

Each ground station is a fixed radio station that interfaces with ground communication networks and the airplane through the satellite.

The SATCOM system has these components:

- Satellite Receiver Transmitter (SRT)
- Diplexer Low Noise Amplifier (DLNA) module
- High Gain Antenna (HGA).

The flight crew uses the Audio Control Panels (ACP) to select the SATCOM system for use. The Tuning Control Panels (TCP) are used to control the SATCOM modes of operation.

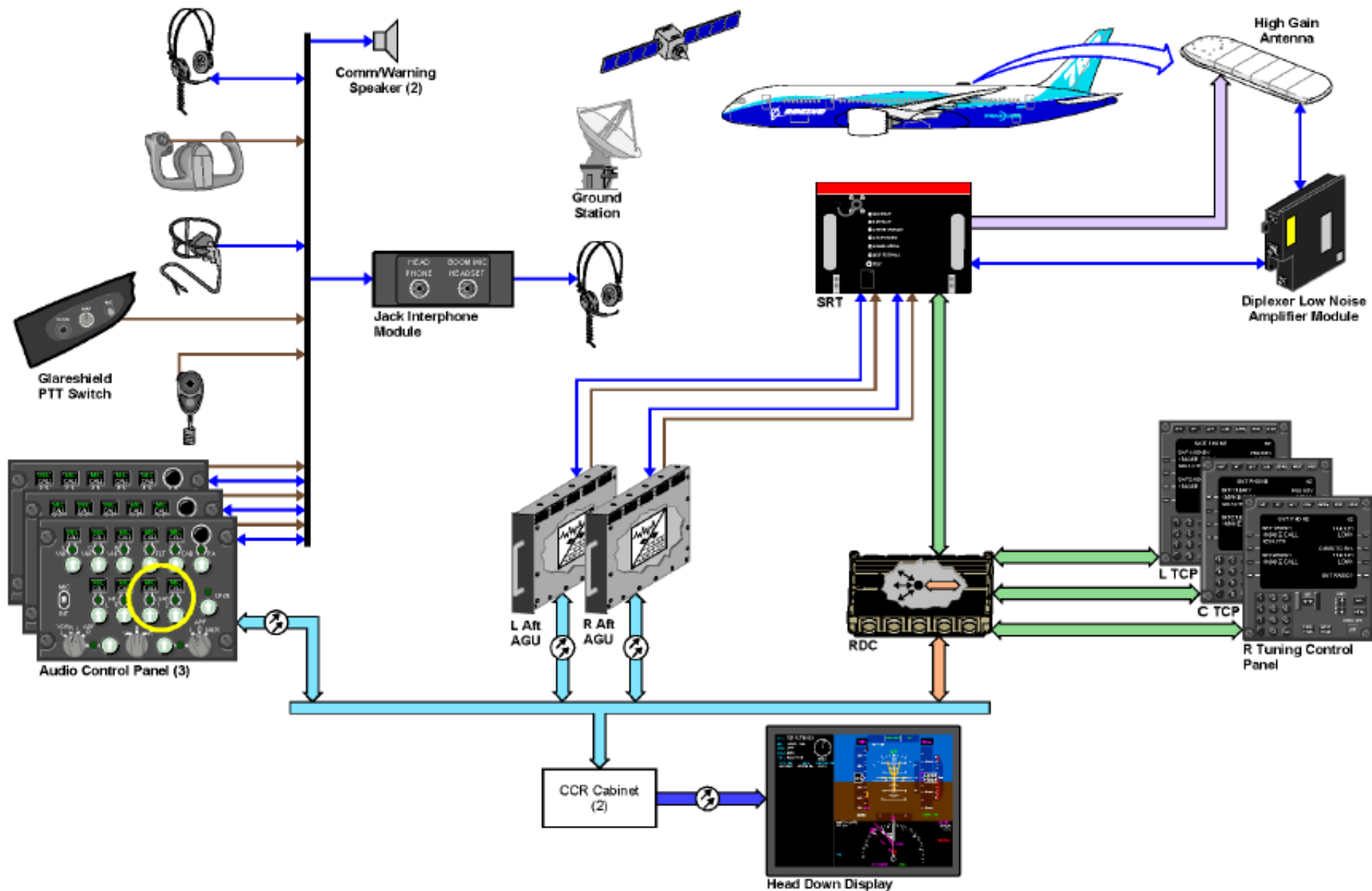
The ACPs send the audio signal to the Audio Gateway Units (AGU) through the Common Data Network (CDN).

The AGUs send the audio signal to the SRT. The SRT sends the signal through the DLNA module to the HGA.

During reception, the signal from the HGA is sent through the SRT directly to the AGUs. The AGUs send the digital signal to the ACPs through the CDN.

The ACPs then change the signal from digital to analog.

The SATCOM also interfaces with the Communication Management Function (CMF) in the Common Computing Resource (CCR) cabinets for transmission and reception of data messages.



Selective Calling System

The Selective Calling (SELCAL) system monitors all communication radios in the airplane. The system alerts the flight crew when it receives a ground call with the correct airplane code. This removes the need for continuous monitoring of the communication radios by the flight crew.

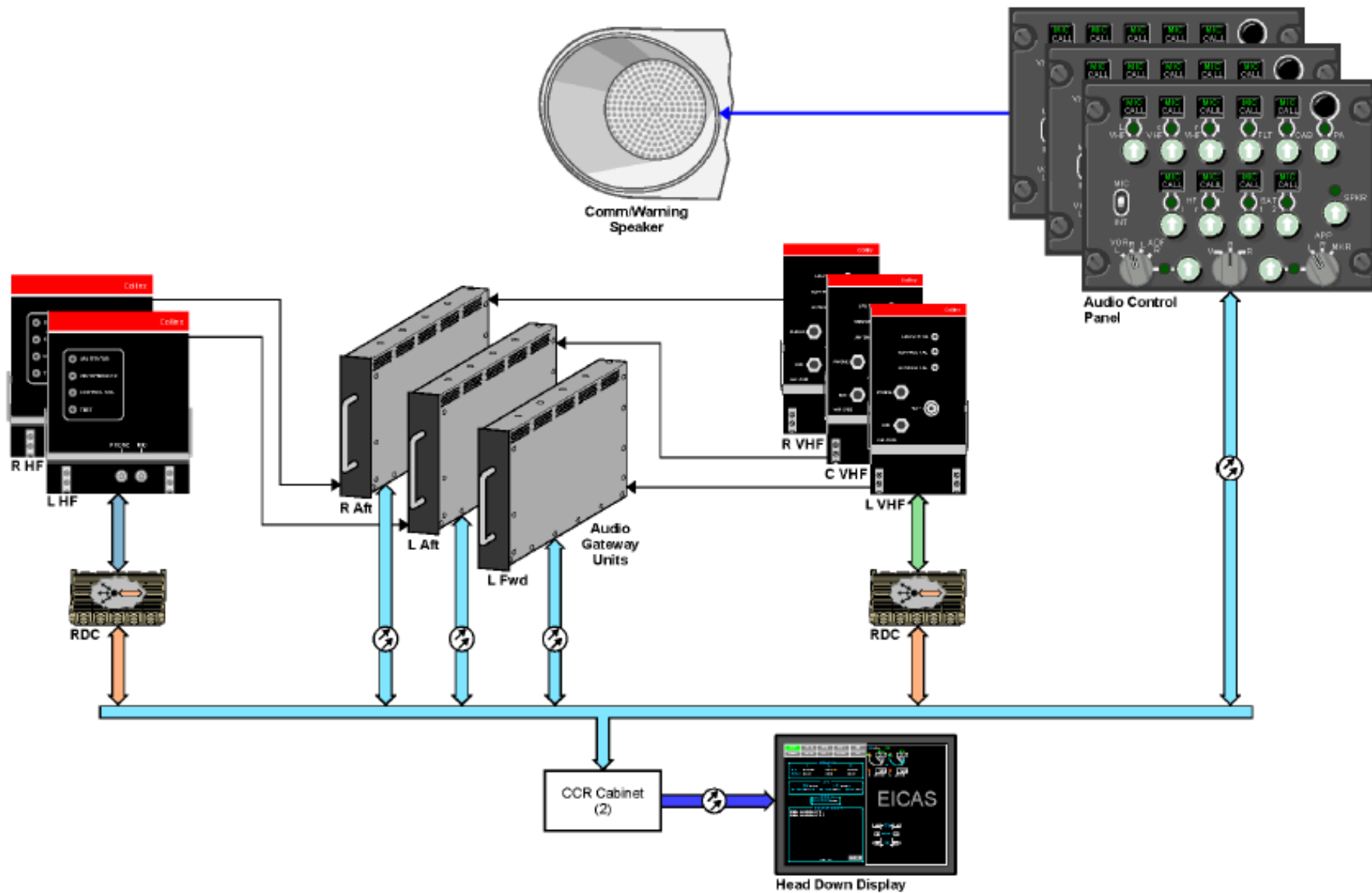
When an HF or VHF transceiver receives a transmission, the signal is decoded in the Audio Gateway Units (AGU) to determine if it is the airplane-specific code.

When an AGU detects the correct airplane code, it sends a signal to the Common Computing Resource (CCR) cabinets and the Audio Control Panels (ACP).

The ACPs will turn on the CALL light in the VHF or HF select switches.

The Display and Crew Alerting Function (DCAF) in the CCR cabinets will display an EICAS message. The DCAF also sends an alert aural message through the ACP to the comm/warning speakers, which causes the hi/lo chime to sound.

The flight crew pushes the appropriate select switch on the ACP to stop the indications and reset the system.



Communication Management Function

The Communication Management Function (CMF) provides communication control for the airplane air/ground data link function. The CMF software applications are in the Common Computing Resource (CCR) cabinets. The CMF operates automatically.

The CMF provides the datalink function for these systems:

- Flight management function
- Central Maintenance Computing Function (CMCF)
- Airplane Condition Monitoring Function (ACMF)
- EICAS maintenance displays
- Electronic Flight Bag (EFB)
- Cabin systems
- Engine Monitor Units (EMU)
- Cabin air conditioning and temperature controller.

The CMF uses:

- Center or right VHF system (default is center)
- Left or right HF systems (default is right)
- Satellite Communication (SATCOM) system.

The flight crew uses these components to interface with the CMF:

- Accept/cancel/reject switches on the P7 glareshield panels
- Multi-Function Displays (MFD)
- Multi-function Keypads (MFK)
- Electronic Flight Instrument System/Display Select Panels (EFIS/DSP)
- Cursor Control Devices (CCD).

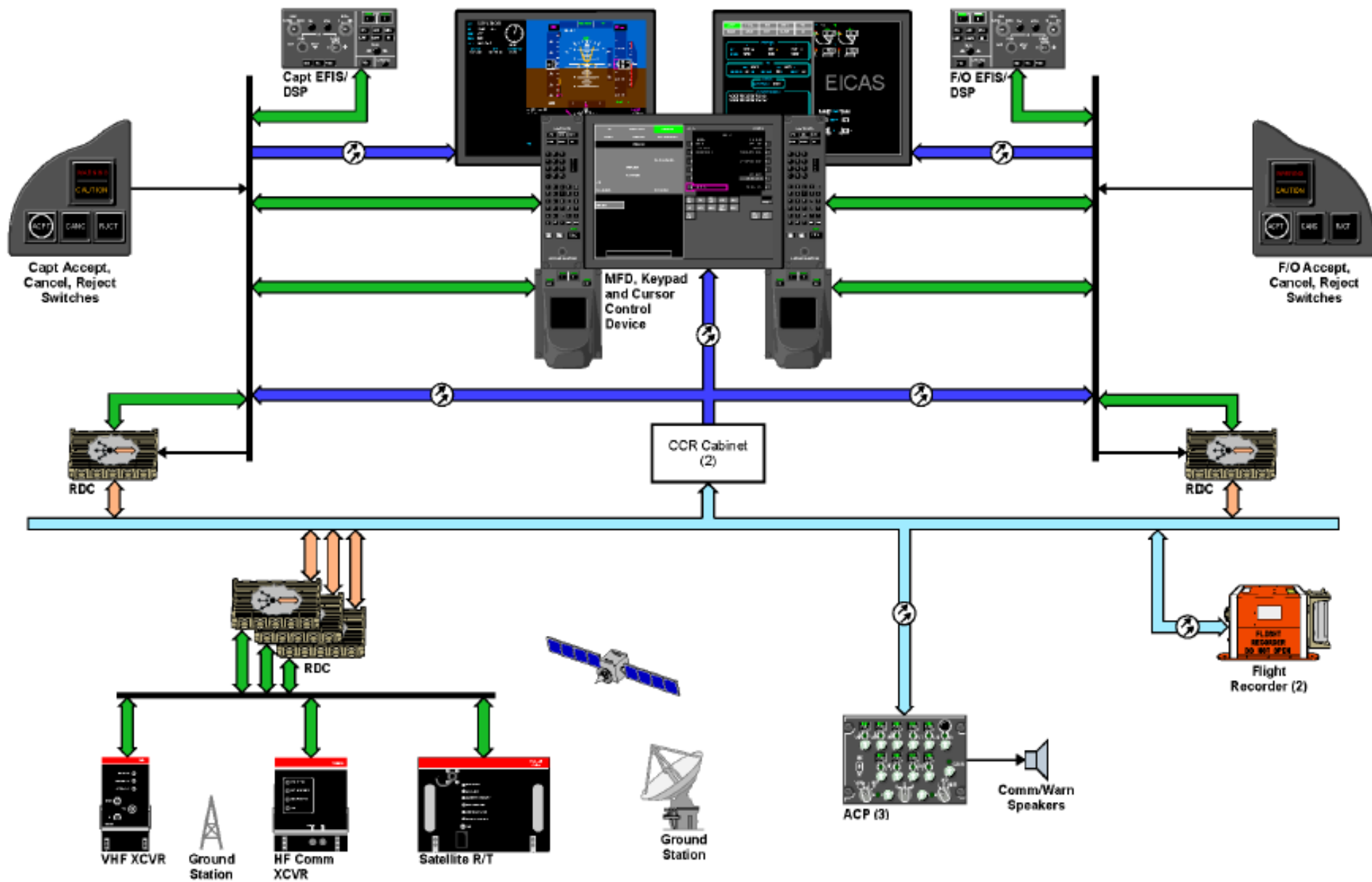
The accept/cancel/reject switches are used to take action on CMF messages that are displayed.

The MFKs are used to enter text and/or numerical data into the CMF message fields.

The EFIS/DSP is used to select the CMF on the MFDs.

The CCDs are used to select menu items, buttons, and text boxes on the CMF displays.

Uplinked Air Traffic Control (ATC) messages are shown on the Auxiliary Outboard (AOB) displays. They are accompanied by a chime from the communication/warning speakers and an EICAS message.



Emergency Locator Transmitter System

The Emergency Locator Transmitter (ELT) system operates to help locate an airplane in an emergency situation.

The ELT transmitter sends the radio frequency outputs to the blade antenna on the top of the airplane.

The ELT sends a swept tone on the VHF and UHF emergency channels, 121.5 and 243.0 MHz. It also sends digital data every 50 seconds on the 406 MHz channel. The ELT has an internal g-switch to activate the transmitter.

Satellites send the received signal to a ground station. The ground station uses the phase shift between the ELT and the satellite to find the approximate location of the ELT.

The ground station sends this data to the mission control center. The mission control center sends alert data to a rescue coordination center.

The ELT system has these components:

- Control panel
- Antenna
- Transmitter
- Aircraft Identification Module (AIM)
- Program switch module.

The program switch module and AIM provide airplane data to the ELT.

During ELT operation, the transmitter sends a signal to the Common Computing Resource (CCR) cabinets. The Display Crew Alerting System (DCAS) in the CCR cabinets shows an EICAS message.

The ELT control panel on the P5 overhead panel has a switch to arm the ELT. The switch can also turn the ELT on and off for testing.

