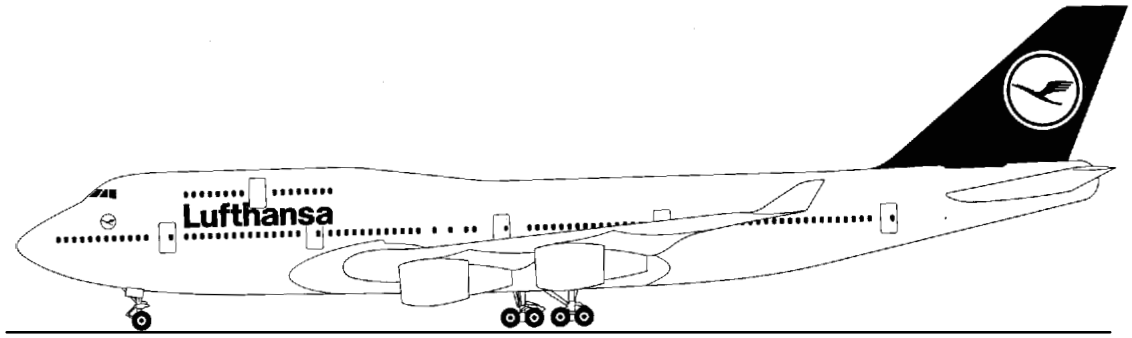
# Lufthansa Technical Training

# Training Manual B 747-400




## ATA 23-31
## PAS

ATA Spec. 104 Level 3

Book No:

Lufthansa
Technical Training GmbH
Lufthansa Base

Issue: DEC 2001
For Training Purposes Only

# Lufthansa Technical Training



**Lufthansa Technical Training GmbH**

**Lufthansa Base Frankfurt**

D-60546 Frankfurt/Main

Tel. +49 69 / 696 41 78

Fax +49 69 / 696 63 84

**Lufthansa Base Hamburg**

Weg beim Jäger 193

D-22335 Hamburg

Tel. +49 40 / 5070 24 13

Fax +49 40 / 5070 47 46

# ATA 23-31 PASSENGER ADDRESS SYSTEM

## PASSENGER ADDRESS SYSTEM - INTRODUCTION

The passenger address system (PAS) sends audio to speakers in the passenger cabin. Audio for announcements comes from the flight deck, flight attendants, and other sources.

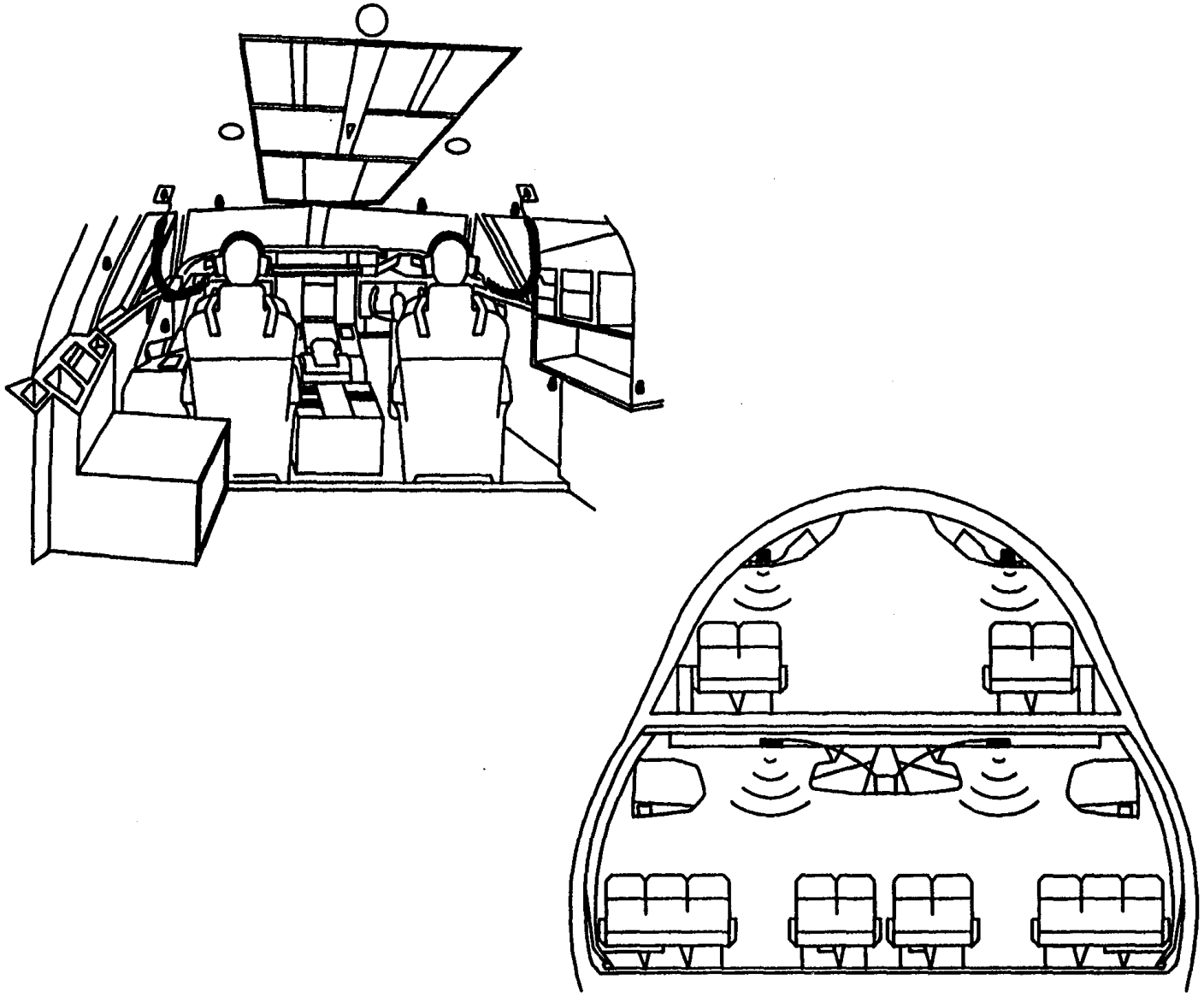


**Figure 1 PASSENGER ADDRESS SYSTEM - INTRODUCTION**

# PASSENGER ADDRESS SYSTEM

## Purpose

The passenger address system (PAS) sends these audio signals to the passenger cabin:

- Flight deck announcements (priority 1)
- Direct access announcements (priority 2A)
- Attendant announcements (priority 2B)
- Pre-recorded announcements (priority 3A)
- Video entertainment audio (priority 3B)
- Boarding music (priority 4)
- Chimes

## General

The main components of the PAS are the:

- Passenger address controller (PAC)
- Local area controllers (LACs)
- Inboard overhead electronics units (I-OEUs)
- I-OEU termination plugs
- Passenger address tape reproducer (PA T/R)
- Passenger address speakers
- Passenger address level control sensors (PALCSs)
- Central management unit (CMU)
- Cabin configuration test module (CCTM)
- Direct access speaker mute relays

The components/systems which interface with the PAS are:

- Video system control unit (VSCU)
- Cabin interphone controller (CIC)
- Entertainment/service controller (ESC)
- Entertainment tape reproducer
- Audio management unit (AMU)

## Operation

The passenger address controller receives inputs for announcements from:

- The audio management unit (AMU) for flight deck announcements.
- The local area controllers (LAC) for direct access announcements.
- The cabin interphone controller (CIC) for attendant announcements and attendant call chimes.
- The passenger address tape reproducer for pre-recorded announcements and boarding music.
- The video system control unit (VSCU) for video audio.
- The entertainment service controller (ESC) for generating passenger to attendant call chimes.

The PAC gets no smoking and fasten seat belt discretes to sound the lo chime.

Additional discrete inputs increase the PA volume level. An increase occurs when:

- The engines are running.
- The airplane is airborne. The airplane is flying at 15 knots below maximum velocity.
- A decompression of the passenger cabin occurs.

Announcements, chime and volume data go through the local area controllers to the inboard overhead electronics units (IOEUs). The I-OEUs amplify the audio and send it to the speakers.

The passenger address level control sensors provide automatic volume control.

An I-OEU termination plug on the last IOEU in a column provides a terminating load which matches the impedance of the transmission cable.

The CCTM provides a switch to select the normal or alternate controller circuit in the passenger address controller.

During direct access announcements the direct access speaker mute relays mute the speaker in the area of the direct access handset.

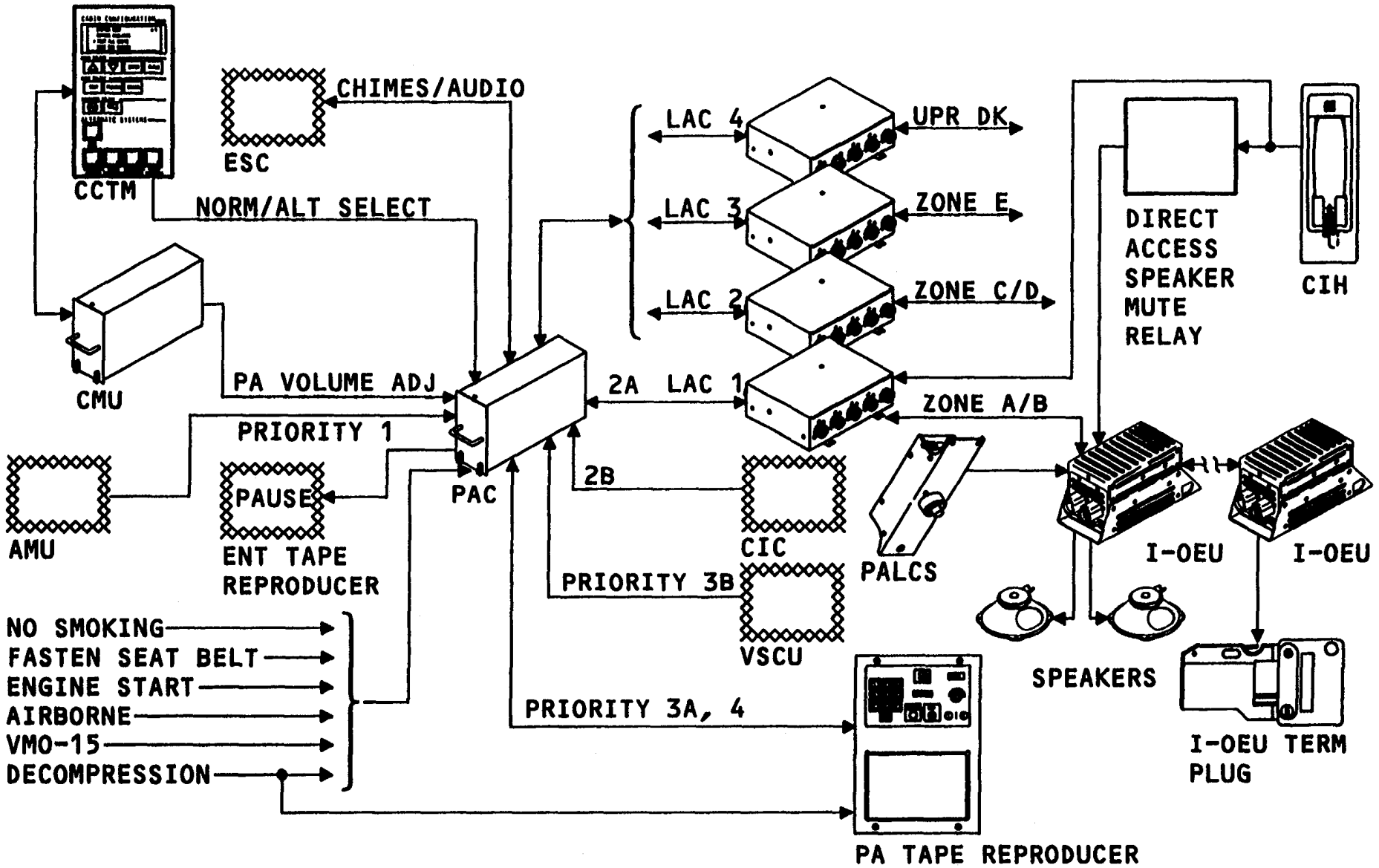



**Figure 2 PASSENGER ADDRESS SYSTEM**

## COMPONENT LOCATIONS - FLIGHT DECK

The PAS circuit breakers located in the flight deck are:

- PASS ADRS 1
- PASS ADRS 2
- PASS ADRS 3
- PASS ADRS 4

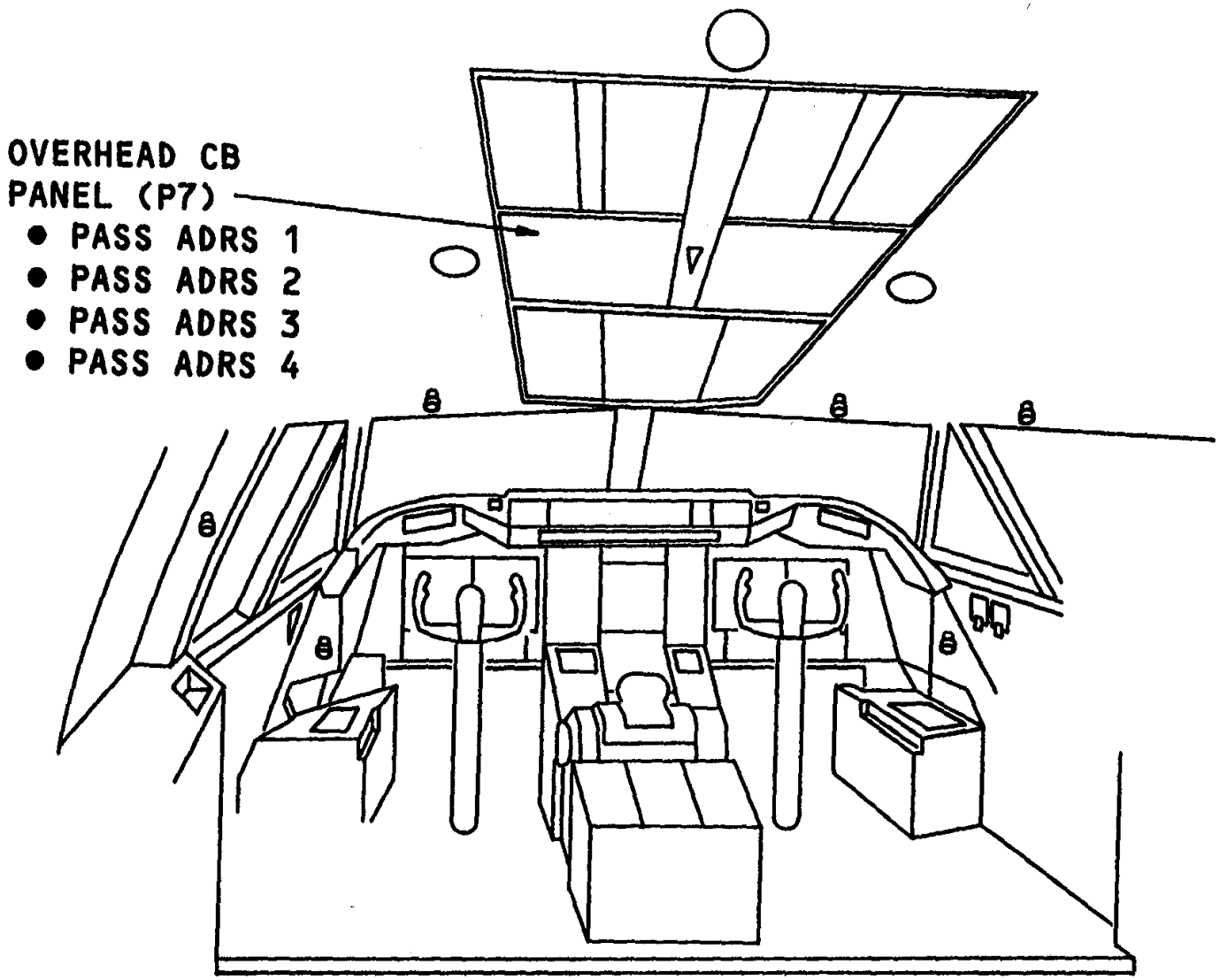



**Figure 3 COMPONENT LOCATIONS - FLIGHT DECK**

## COMPONENT LOCATIONS - MEC

The PAS components and components which interface with the PAS in the main equipment center are the:

- Passenger address controller (PAC)
- Central management unit (CMU)
- TAPE REPRO-AC circuit breaker
- ENT/SERV-AC circuit breaker

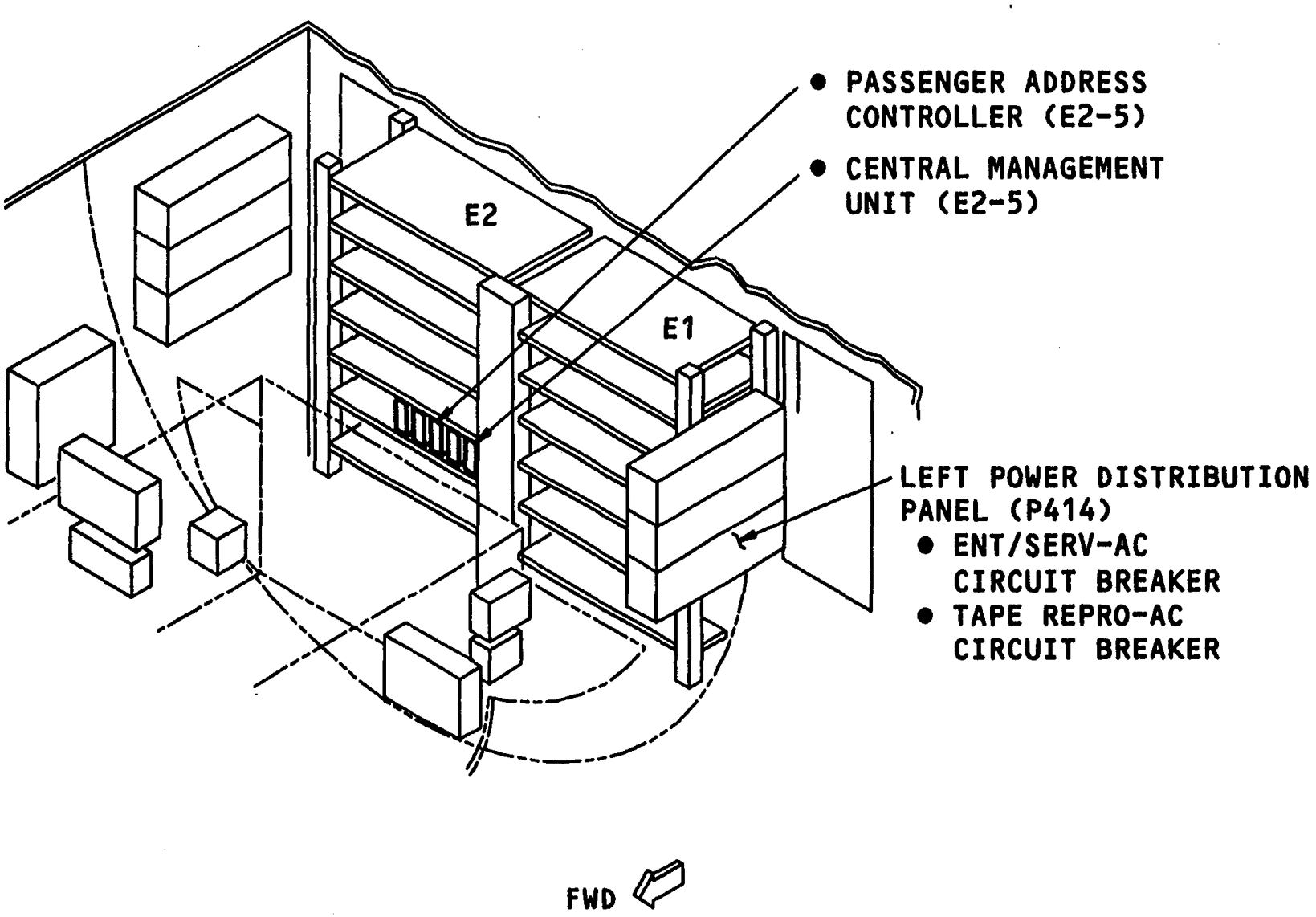



**Figure 4 COMPONENT LOCATIONS - MEC**

## COMPONENT LOCATIONS - CABIN - 1

The PAS components, and components which interface with the PAS, in the passenger cabin are:

- Local area controller-1
- Local area controller-2
- Local area controller-3
- Local area controller-4
- The cabin configuration test module
- The passenger address tape reproducer
- Direct access switches

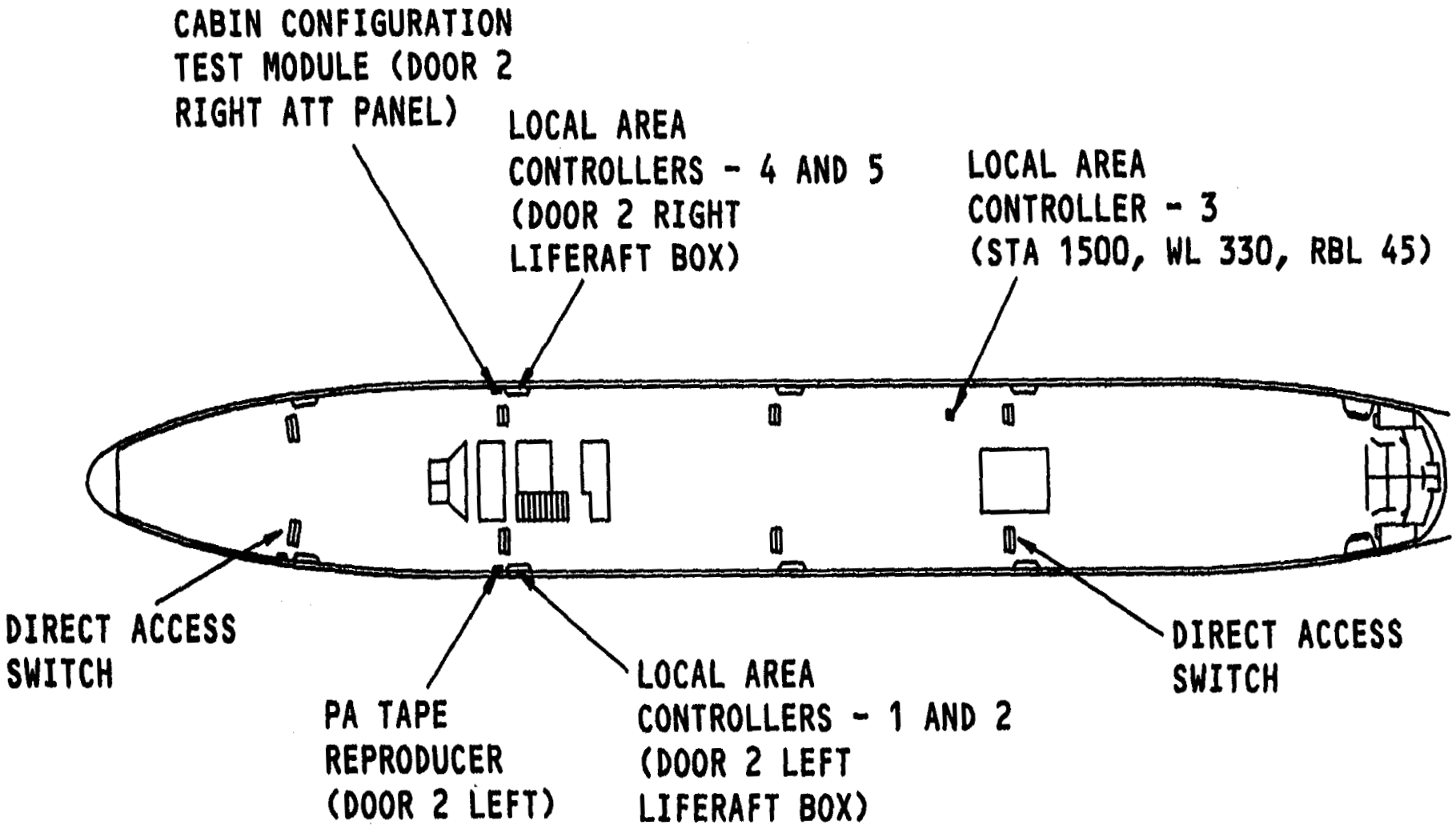



**Figure 5 COMPONENT LOCATIONS - CABIN - 1**

## COMPONENT LOCATIONS - CABIN - 2

The PAS components located in the passenger cabin are:

- Inboard overhead electronics units (IOEUs)
- Passenger address level control sensors (PALCS)
- Speakers
- Direct access speaker mute relays

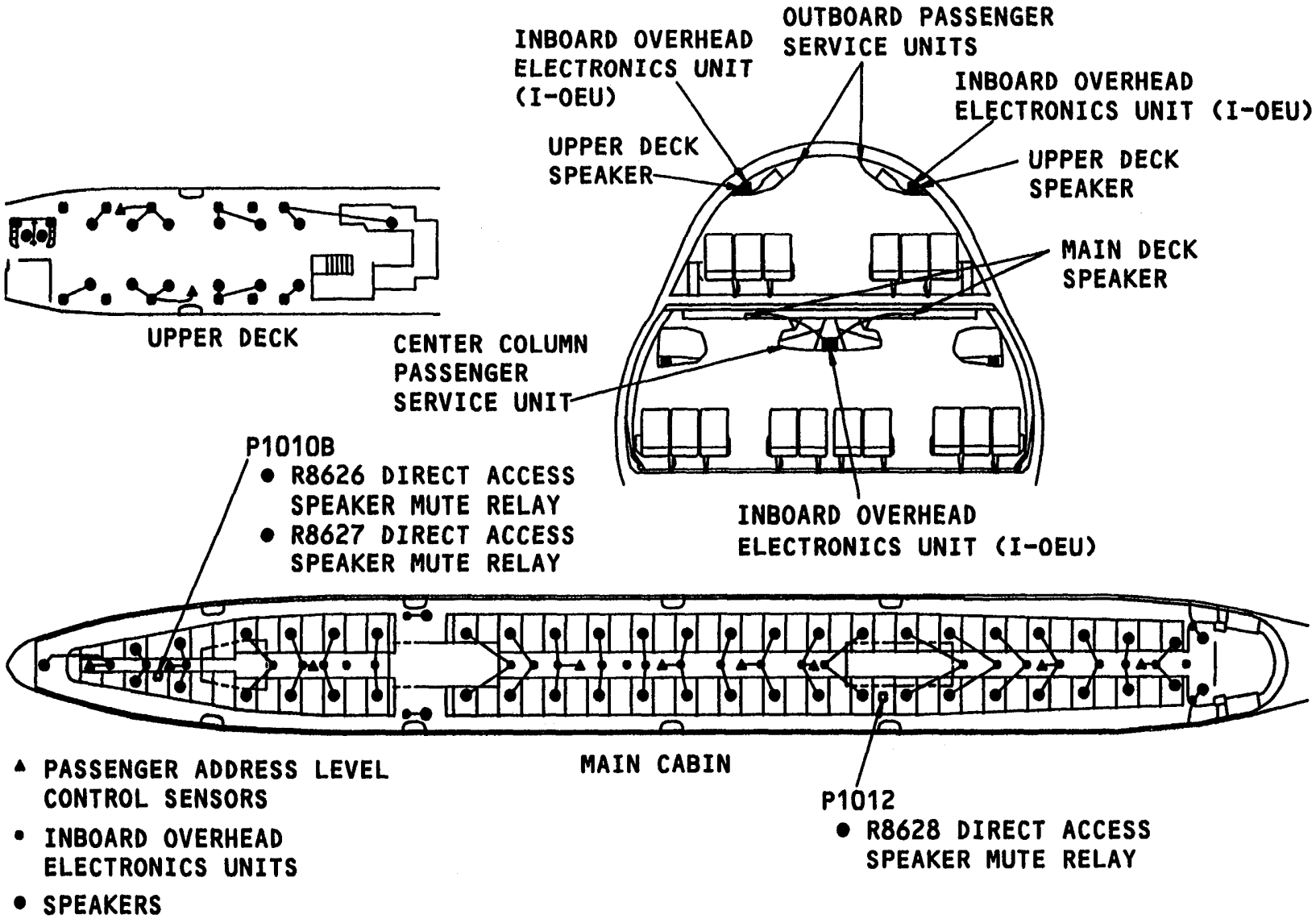
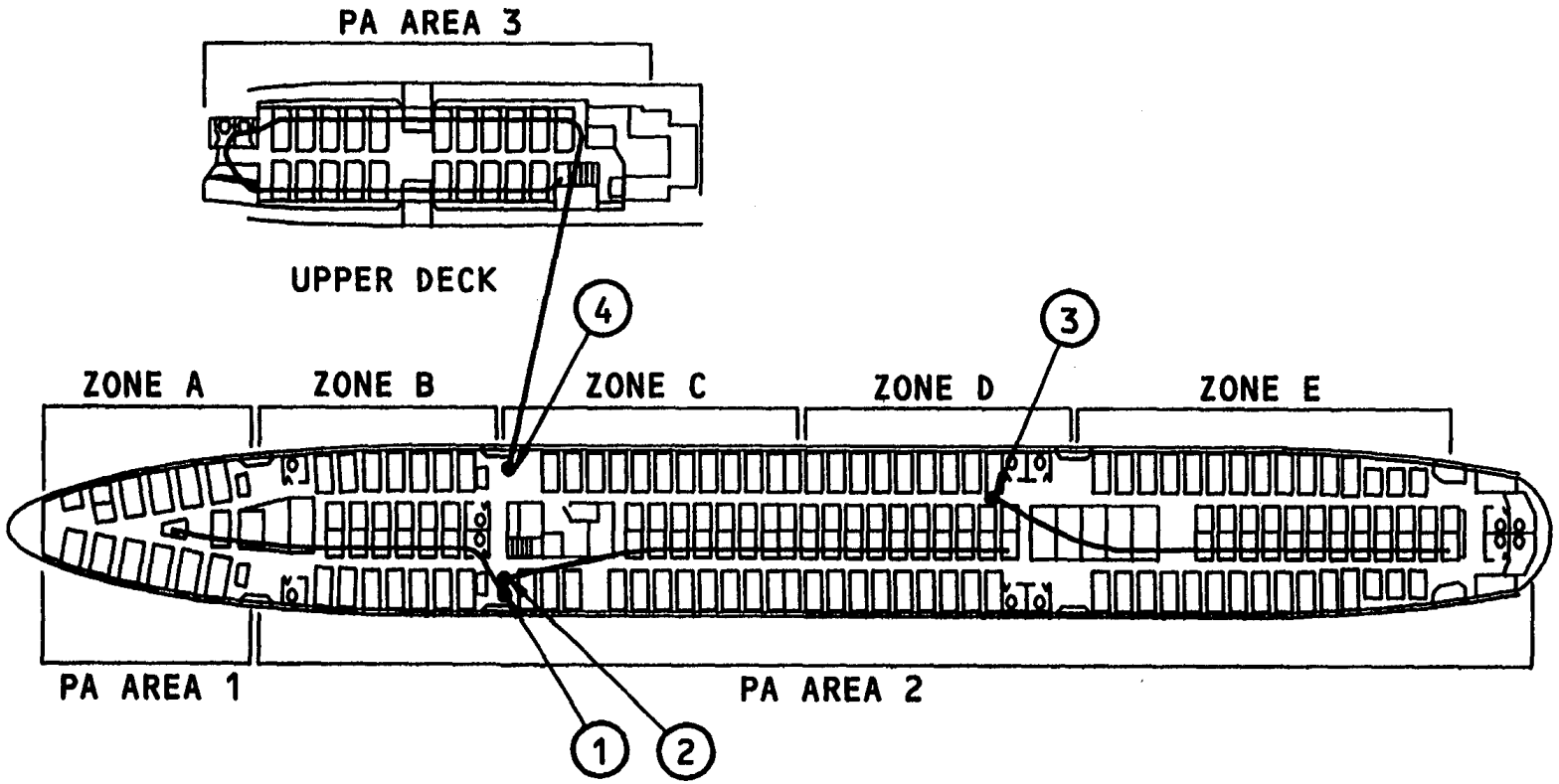



**Figure 6 COMPONENT LOCATIONS - CABIN - 2**

## AREAS FOR ANNOUNCEMENTS

There are 3 passenger address (PA) areas in the passenger cabin. The configuration program determines where the areas begin and end. A local area controller may supply announcements to one or two PA areas.

The graphic shows the local area controllers and columns of inboard overhead electronics units (I-OEUs) connected to them.




LAC - DATA OUTPUT TO I-OEU'S

(1) - LAC-1
(2) - LAC-2
(3) - LAC-3
(4) - LAC-4

**Figure 7 AREAS FOR ANNOUNCEMENTS**

# THIS PAGE INTENTIONALLY LEFT BLANK

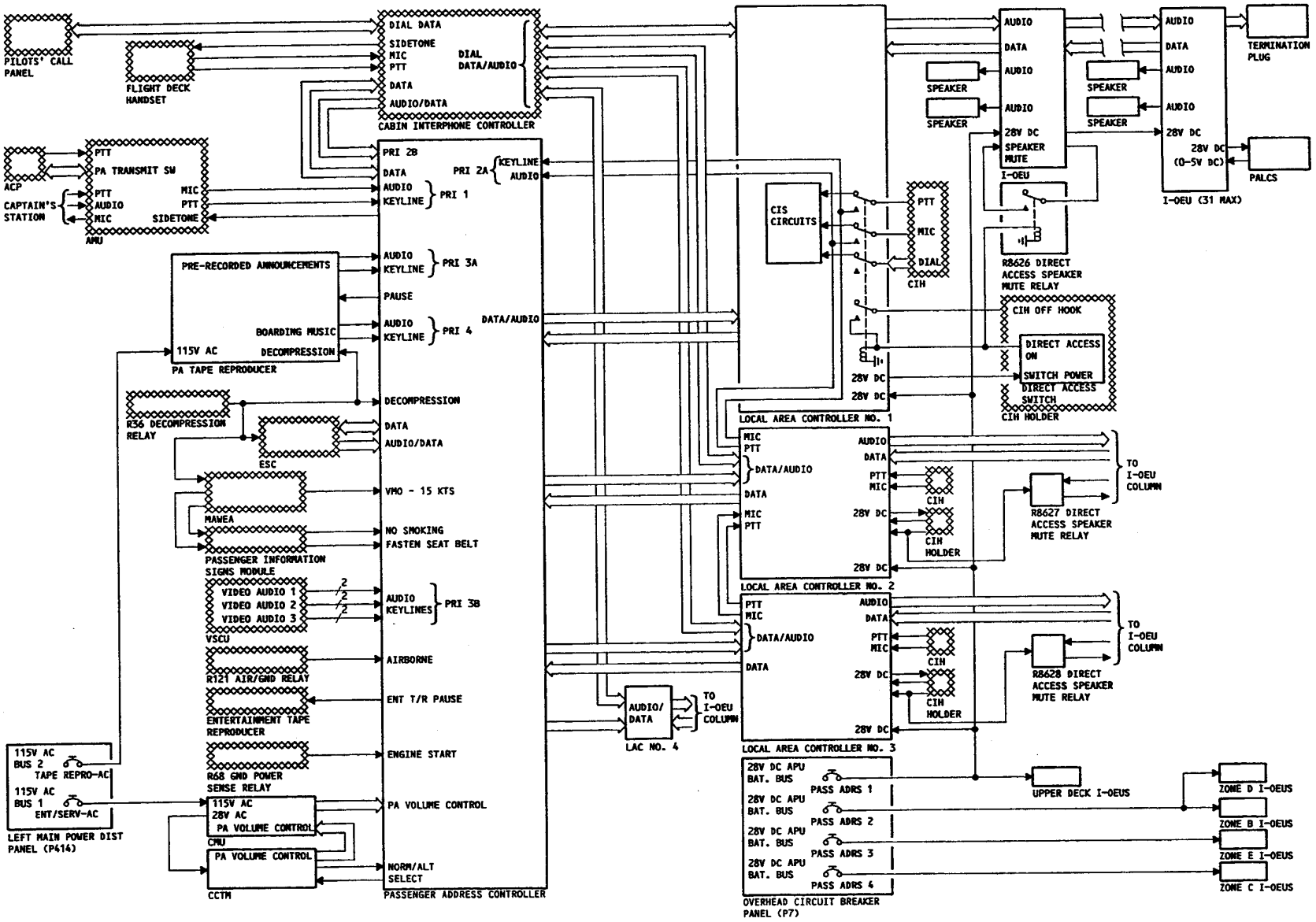



**Figure 8 PAS - INTERFACE DIAGRAM**

## POWER INTERFACE

The ENT/SERV-AC circuit breaker sends 115v ac from BUS 1 to the central management unit (CMU).

The cabin configuration test module (CCTM) gets 28v ac from the CMU.

The PA tape recorder gets 115v ac from Bus 2.

The PASS ADRS 1 circuit breaker sends 28v dc to:

- The passenger address controller (PAC)
- The zone A inboard-overhead electronics units (I-OEUs)
- Upper deck I-OEUs
- LAC 11 LAC 2 and LAC 3. The LACs send 28v dc to the handset holders at doors 1, 2 and 4 left.

The PASS ADRS 2 circuit breaker sends 28v dc to the:

- Zone B I-OEUs
- Zone D I-OEUs

The PASS ADRS 3 circuit breaker sends 28v dc to the zone E I-OEUs.

The PASS ADRS 4 circuit breaker sends 28v dc to the zone C I-OEUs.

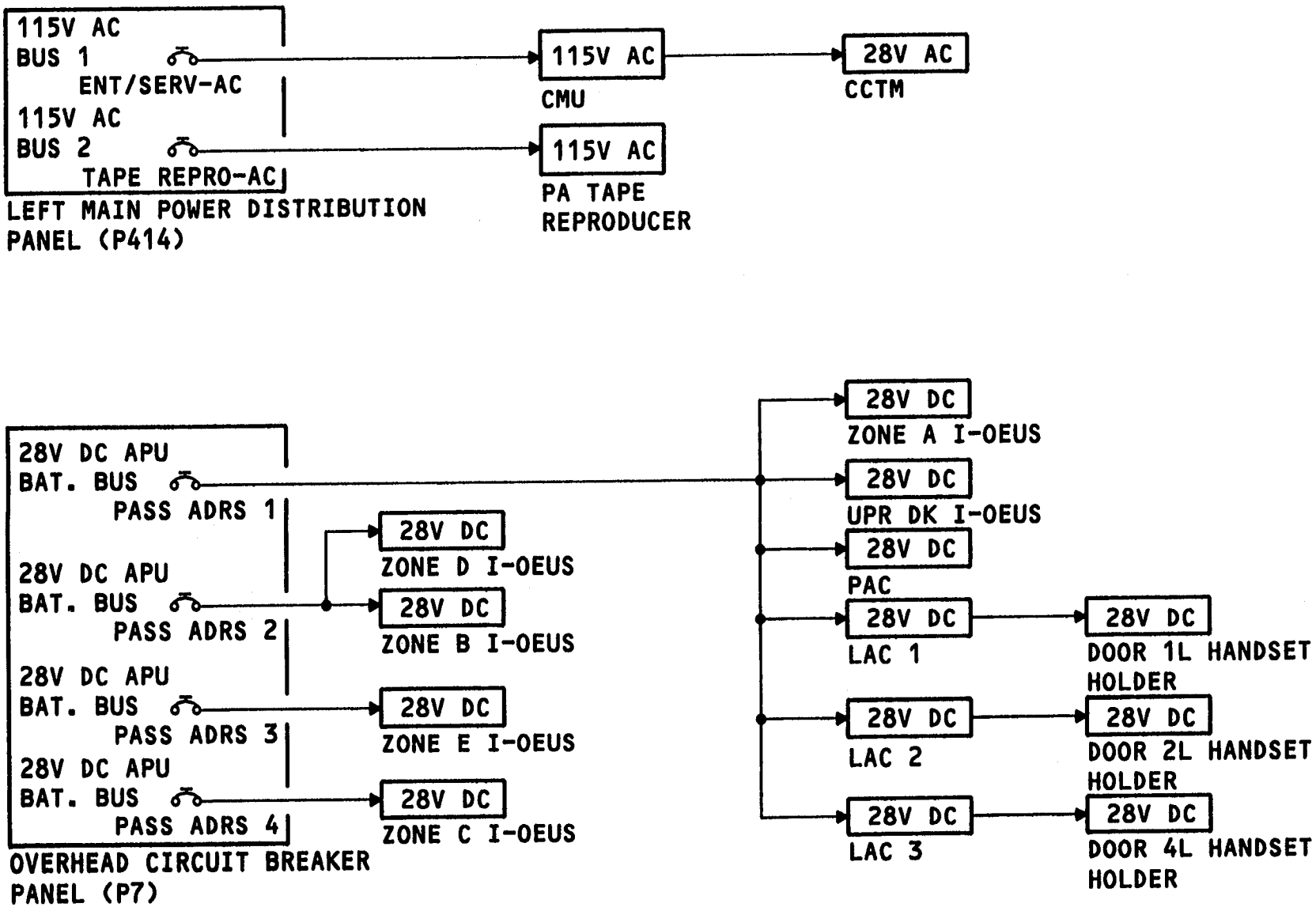



**Figure 9 POWER INTERFACE**

## ANNOUNCEMENT PRIORITY

The priority 1 input is from the flight interphone system.

The priority 2A input is from the cabin interphone system (CIS) through the direct access handsets.

The priority 2B input is from the CIS cabin interphone controller (CIC).

The priority A input is prerecorded announcement audio.

The priority 3B input is video audio.

The priority 4 input is boarding music audio.

| PRIORITY | INPUT |
|---|---|
| 1 | FLIGHT INTERPHONE |
| 2A | DIRECT ACCESS |
| 2B | CABIN INTERPHONE |
| 3A | PRE-RECORDED ANNOUNCEMENTS |
| 3B | VIDEO/AUDIO |
| 4 | BOARDING MUSIC |

**Figure 10 ANNOUNCEMENT PRIORITY**

## FLIGHT INTERPHONE INTERFACE

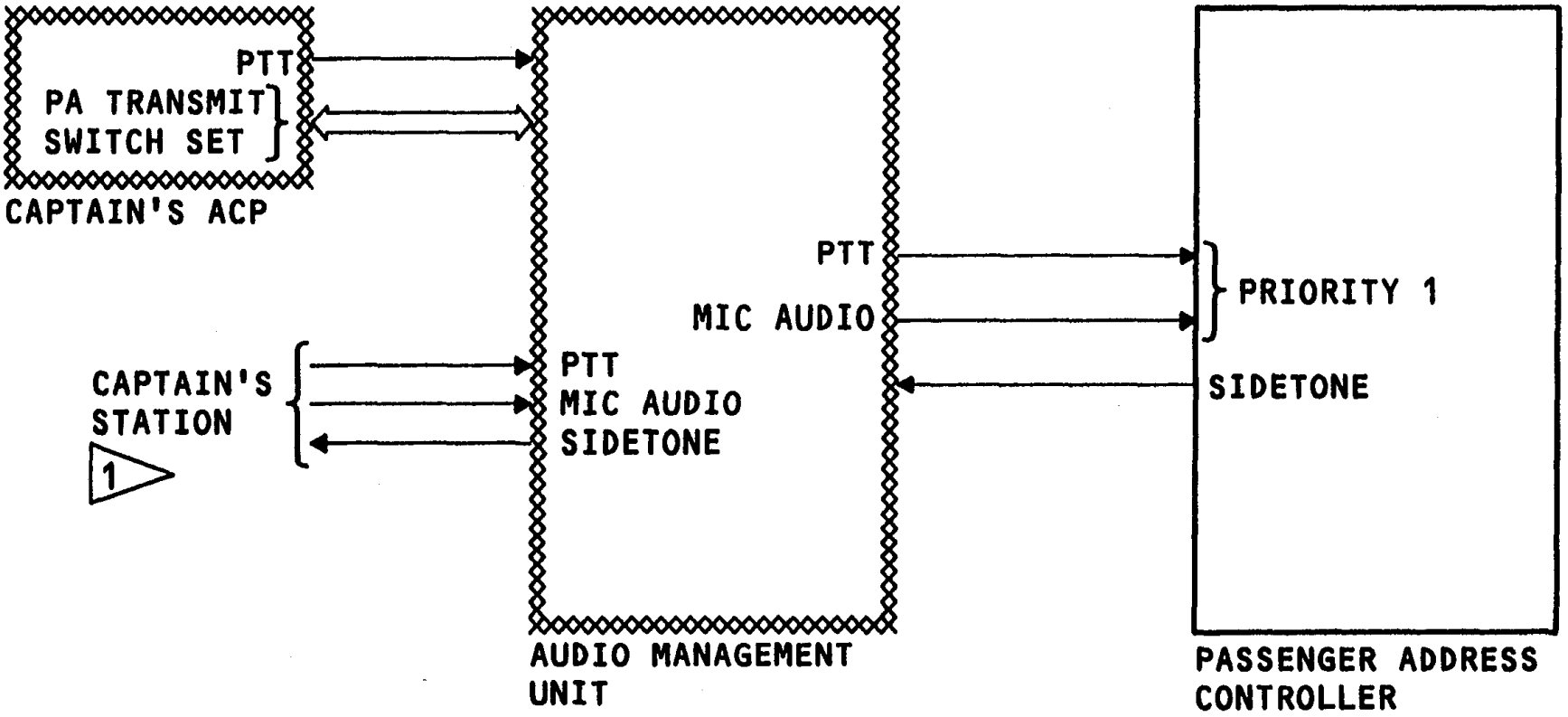
### General

The flight interphone system sends the priority 1 input to the passenger address controller (PAC).

### Operation

The audio management unit (AMU) sends mic audio and a push-to-talk (PTT) discrete to the PAC. Push the PA transmit switch on an audio control panel to select PA. Push a PTT switch to send a PTT discrete to the AMU.

Priority 1 PA announcements go to all PA areas. The PAC sends sidetone audio back to the AMU so that the flight crew can monitor their announcement.




1 CAPTAIN'S STATION SHOWN, OTHER STATIONS ARE IDENTICAL

**Figure 11 FLIGHT INTERPHONE INTERFACE**

## DIRECT ACCESS INTERFACE

The direct access switches are on the cabin interphone handset holders at doors 1, 2 and 4 left.

Push a direct access switch to send the DIRECT ACCESS ON signal to the appropriate local area controller (LAC) and direct access speaker mute relay.

The DIRECT ACCESS ON signal closes:

- A relay in the LAC. This relay sends the PTT and mic audio from the cabin interphone handset (CIH) to the PAC.
- The direct access speaker mute relays. These relays mute speakers near the CIH.

The passenger address controller (PAC) sends priority 2A (direct access) audio and data through the LACs to the I-OEUs as PA announcements.

Priority 2A PA announcements go to all PA areas.

During a priority 2A PA announcement the CIH OFF HOOK signal latches the relay in the LAC.

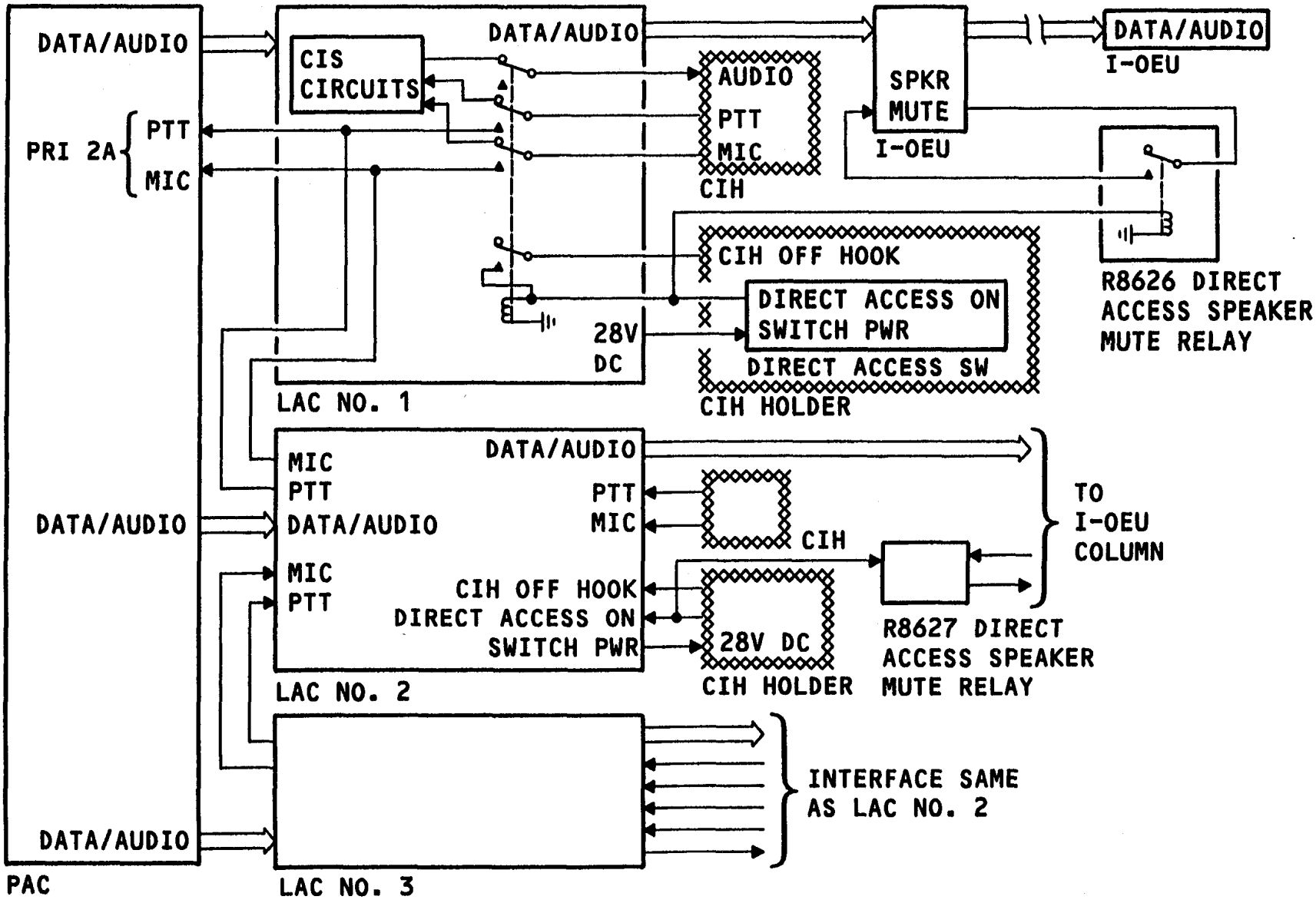



**Figure 12 DIRECT ACCESS INTERFACE**

## CABIN INTERPHONE SYSTEM INTERFACE

### General

The cabin interphone system sends the priority 2b input to the passenger address controller (PAC).

### Operation

The cabin interphone handsets (CIHs) send the local area controllers (LACs):

- - A PTT discrete
- Mic audio
- PA area dial data

The LAC:

- Converts the mic audio from analog to digital
- Multiplexes the PTT discrete, digital audio, and dial data
- Sends the multiplexed data to the cabin interphone controller (CIC)

When more than one cabin interphone handset attempts a PA announcement, the CIC examines the dial data, and determines which handset has priority.

The CIC sends the PAC:

- A PTT discrete
- Digital mic audio
- PA area dial data to determine which PA area or areas get the announcement

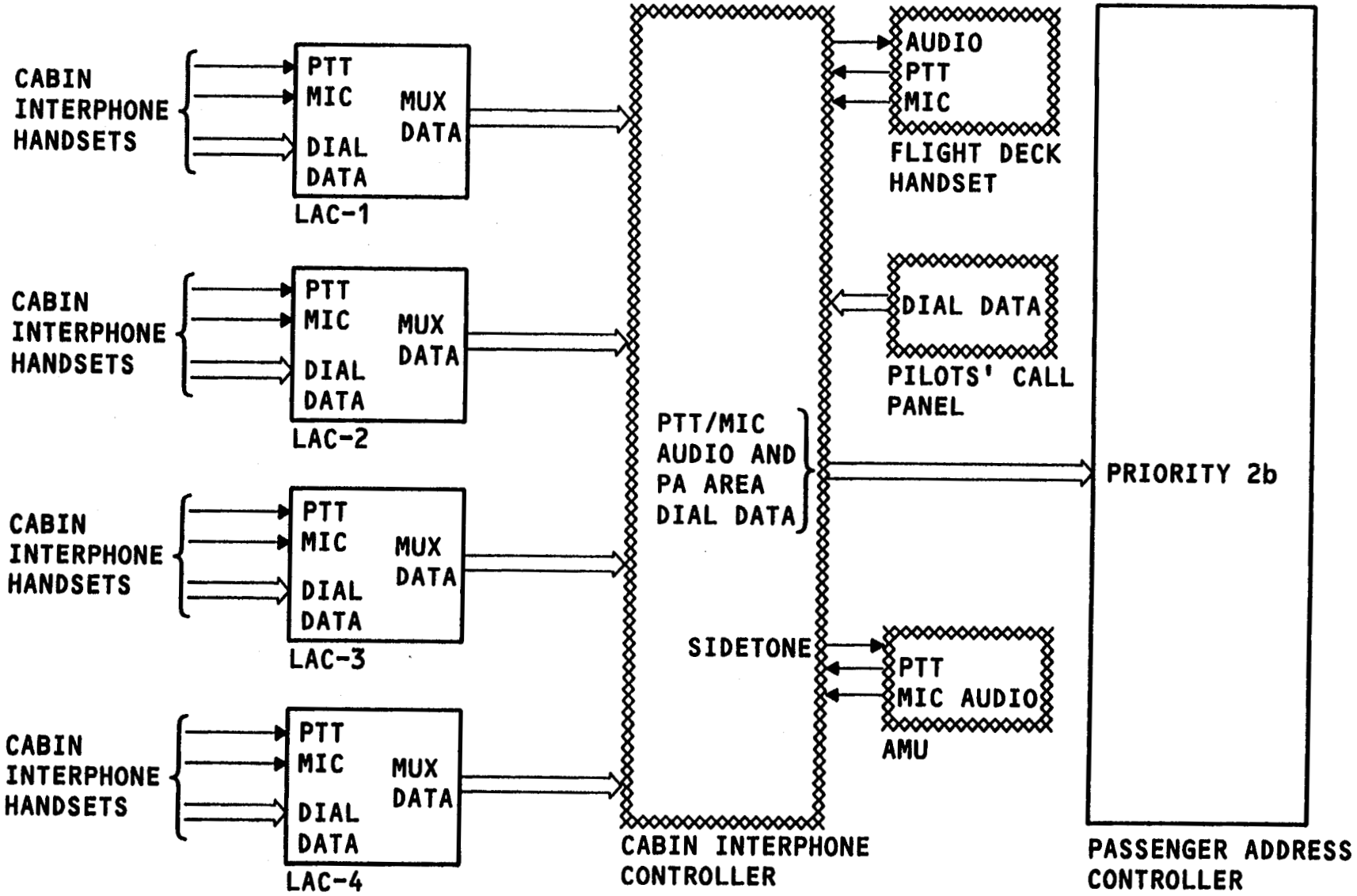



**Figure 13 CABIN INTERPHONE SYSTEM INTERFACE**

## BGM & PRE-REC. ANNOUNCEMENT INTERFACE

### General

The passenger address tape reproducer (PA T/R) sends the priority 3a prerecorded announcements, and priority 4, boarding music (BGM),

inputs to the passenger address controller (PAC).

### Operation

Controls on the front of the PA T/R select pre-recorded announcements or boarding music.

The PA T/R sends announcement audio and a keyline to the PAC as the priority 3a input.

The PA T/R sends boarding music audio and a keyline to the PAC as the priority 4 input.

The decompression relay sends a discrete to the PA T/R and PAC during cabin decompression.

The decompression discrete causes:

- The PA T/R to play the pre recorded announcement for decompression.
- The PAC to increase PA audio volume.

The PAC sends a pause discrete to the P/A tape reproducer during a higher priority PA announcement to all areas.

The PAC sends a pause discrete to the entertainment tape reproducer (ENT T/R) during any PA announcement to all areas.

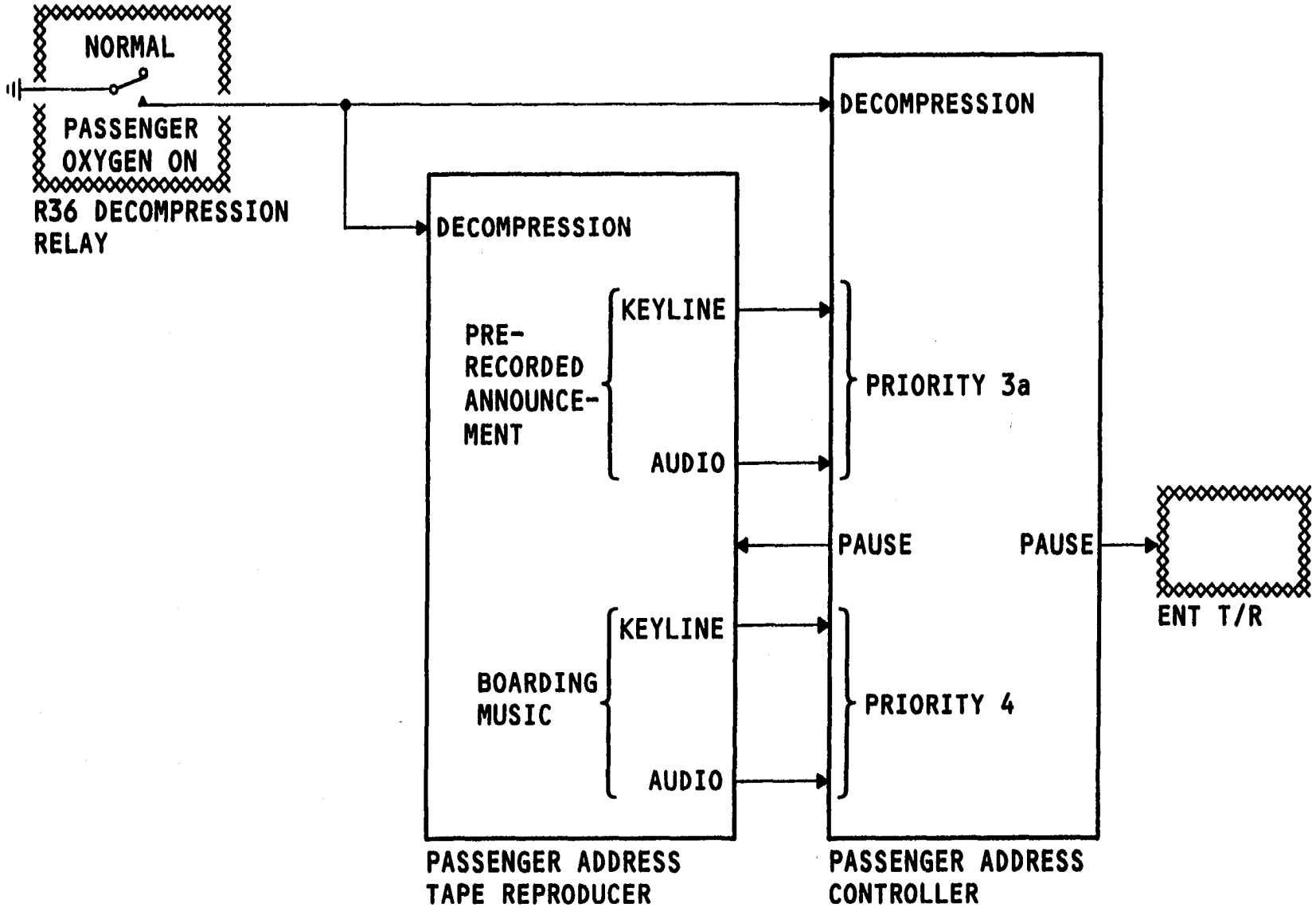



**Figure 14 BGM & PRE-REC. ANNOUNCEMENT INTERFACE**

## VIDEO ENTERTAINMENT SYSTEM INTERFACE

### General

The video entertainment system sends the priority 3b input to the passenger address controller (PAC).

### Operation

Video tape reproducers send video and audio to the video system control unit (VSCU). The VSCU:

- Sends up to three video audio outputs and their keylines to the PAC
- Lets any VSCU input go to any or all of the video audio outputs

Video audio 1 goes to PA area 1. Video audio 2 goes to PA area 2. Video audio 3 goes to PA area 3.

The configuration program determines which video audio output goes to PA area 4.

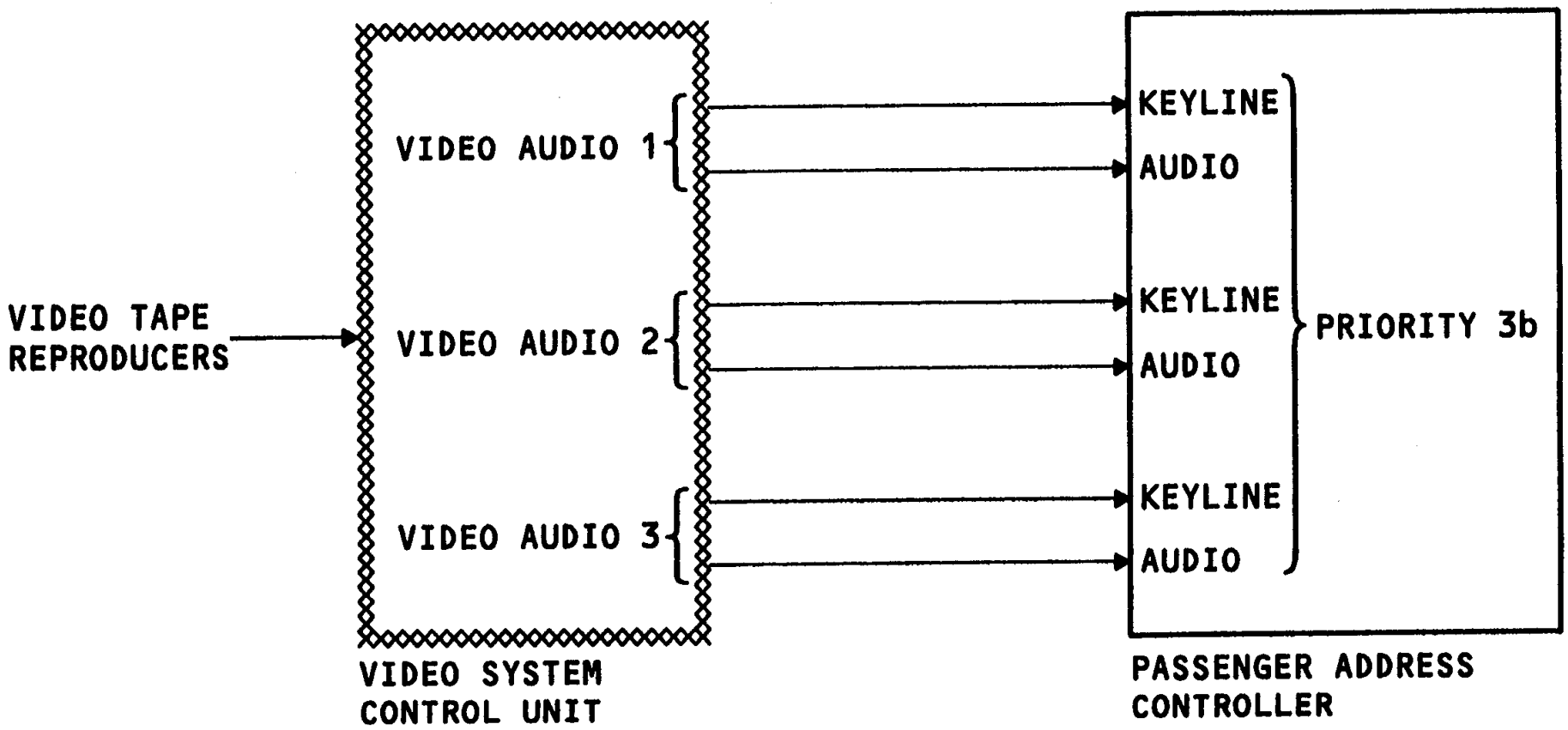



**Figure 15 VIDEO ENTERTAINMENT SYSTEM INTERFACE**

## PAC CHIME CONTROL INPUTS

### General

The passenger address controller (PAC) gets both discrete and digital data inputs to control chimes. Chimes are superimposed on PAS audio, therefore, there is no priority for chimes.

### Discrete Inputs

The passenger address controller (PAC) gets discrete inputs from the passenger information signs module to turn on a low chime when the no smoking or fasten seat belt sign turns on or off. The discretes also go to the entertainment/service controller to turn on the passenger information signs.

The PAC gets discrete inputs from the:

- Crew alerting card - Passenger information signs module

The no smoking discrete goes to the PAC when the no smoking switch (S1) on the passenger information signs module is ON or is in AUTO and any of the following conditions are true:

- The landing gear is down and locked
- The cabin altitude pressure is more than 10,000 feet.
- Decompression

The fasten seat belt discrete goes to the PAC when the fasten seat belts switch (S2) on the passenger information signs module is ON or in AUTO and any of the following conditions are true:

- The flaps are down
- The landing gear is down and locked
- The cabin altitude pressure is more than 10,000 feet
- The altitude is less than 10,300 feet.

### Data Inputs

The PAC gets data from the entertainment/service controller to sound a high chime for:

- Passenger-to-attendant calls
- Lavatory-to-attendant calls
- Smoke detected in a lavatory

The PAC gets data from the cabin interphone controller to sound a high/low chime fort

- Attendant-to-attendant calls
- Pilot-to-attendant calls

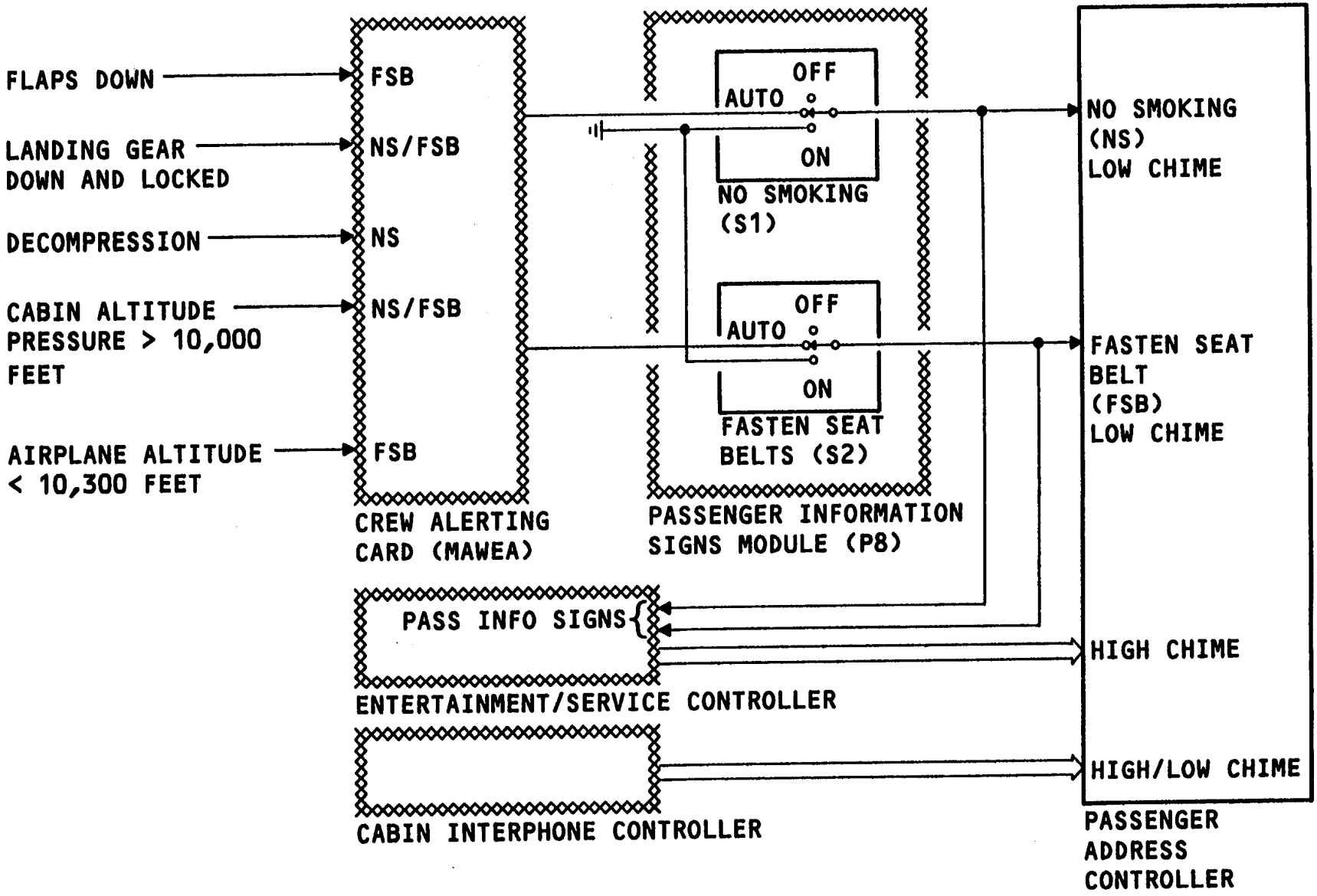



**Figure 16 PAC CHIME CONTROL INPUTS**

## PA AUDIO OUTPUT

### Operation

The passenger address controller (PAC) gets audio and push-to-talk inputs from various airplane systems. The priority circuits determine which input has the highest priority. The PAC changes the selected input from analog to digital and sends it to the local area controllers for distribution to the inboard overhead electronics units (I-OEUs). Each I-OEU changes the audio to analog, amplifies it, and sends the audio to the speakers. All I-OEUs have two amplifiers. Each amplifier has a dedicated speaker.

### PA Areas

The passenger address system lets PA announcements go to the entire passenger cabin, or to any of four PA areas,

### PA Override

PA announcements go to the entertainment/service controller to override audio in the passenger entertainment headsets.

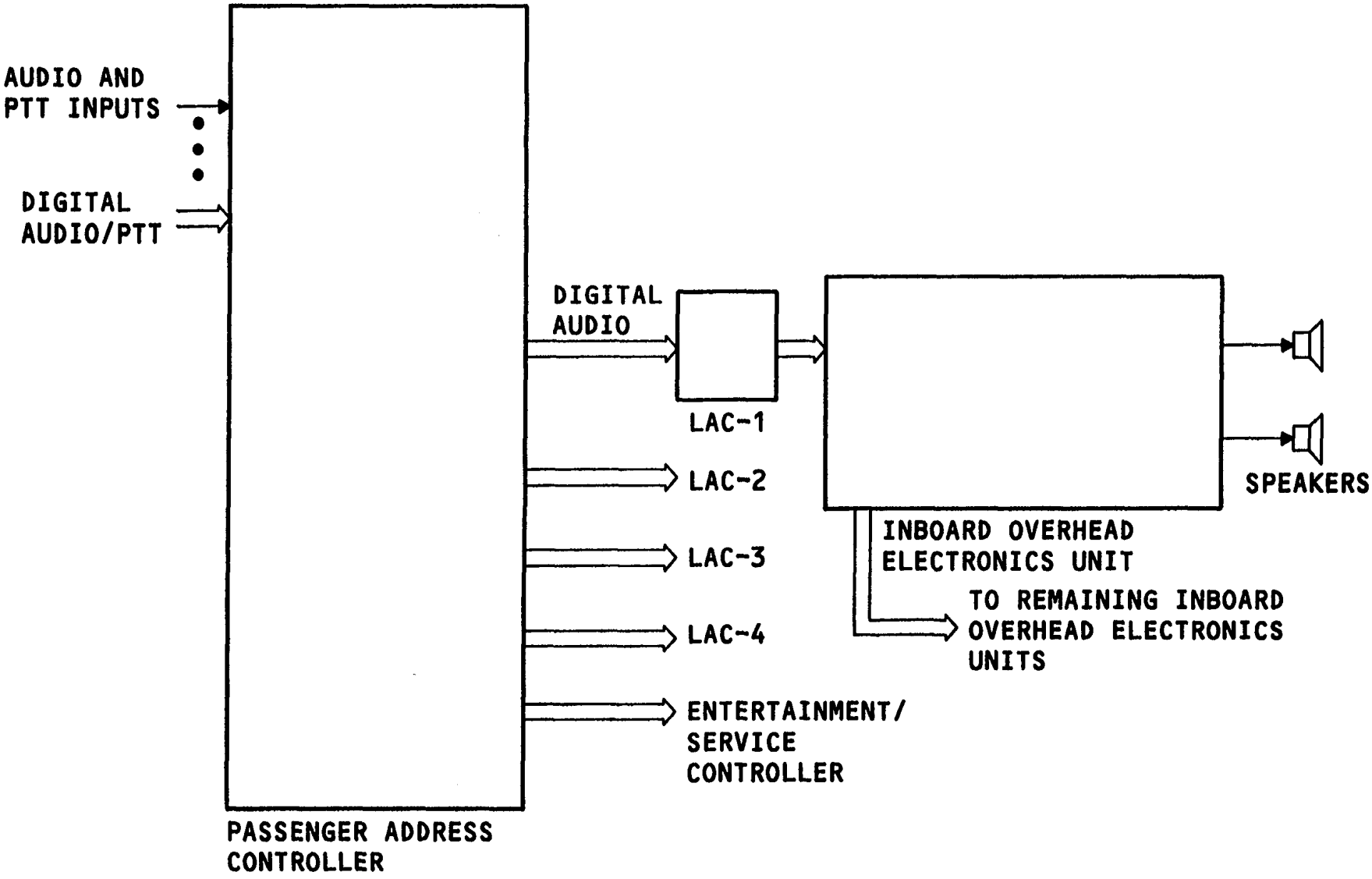



**Figure 17 PA AUDIO OUTPUT**

## AUDIO LEVEL CONTROL

### General

These four different methods adjust the audio level of passenger address announcements and chimes:

- Configuration program settings
- Cabin configuration test module (CCTM) adjustments
- Discrete inputs
- Passenger address level control sensor (PALCS) inputs

### Configuration Program Settings

The configuration database separates the passenger cabin into eleven separate areas for PA volume control. The program also sets a default level for each of the PA volume areas.

### Automatic Audio Level Control

Either the PALCS input or discrete inputs are used for automatic audio level control.

Discrete inputs increase or decrease the volume of all PA areas in 3 db increments, with airborne (0 db) as the reference if the PALCS are turned off.

**NOTE:** ON THE GROUND WITH ENGINES OFF, THE PA VOLUME LEVEL SETS TO -6DB.

The discrete inputs that control volume are:

- Engine on (-3 db). The GND PWR sense relay energizes when ground power is applied to the airplane. When an engine starts, the integrated drive generator (IDG) supplies power, and the GND PWR sense relay de-energizes. This provides an engine on (open) discrete to the passenger address controller.
- Airborne (0 db). The AIR/GND relay R121 sends an open discrete when the airplane is off the ground.
- Vmo-15 KTS (+3 db). Logic circuits in the modularized avionics warning electronics assembly (MAWEA) send a ground discrete when the airplane is within fifteen knots of the maximum operating velocity (Vmo).
- Decompression (+6 db). The decompression relay R36 sends a ground discrete when the oxygen lines in the passenger cabin are pressurized.

One PALCS is in each PA volume area. The sensor detects the ambient noise in a PA volume area, and sends the value to an inboard overhead electronics unit (IOEU). The I-OEU sends the data to the PAC through the local area controller. The PAC sends data back to each I-OEU in the PA volume area to adjust the output of the amplifiers.

The maximum amplifier output level under any condition is 5 watts.

### CCTM adjustments

Control on the CCTM let the volume level in any of the eleven PA volume areas increase above the default level. The volume can never go below the default level. When power is removed from the system, the PA volume settings return to their default levels.

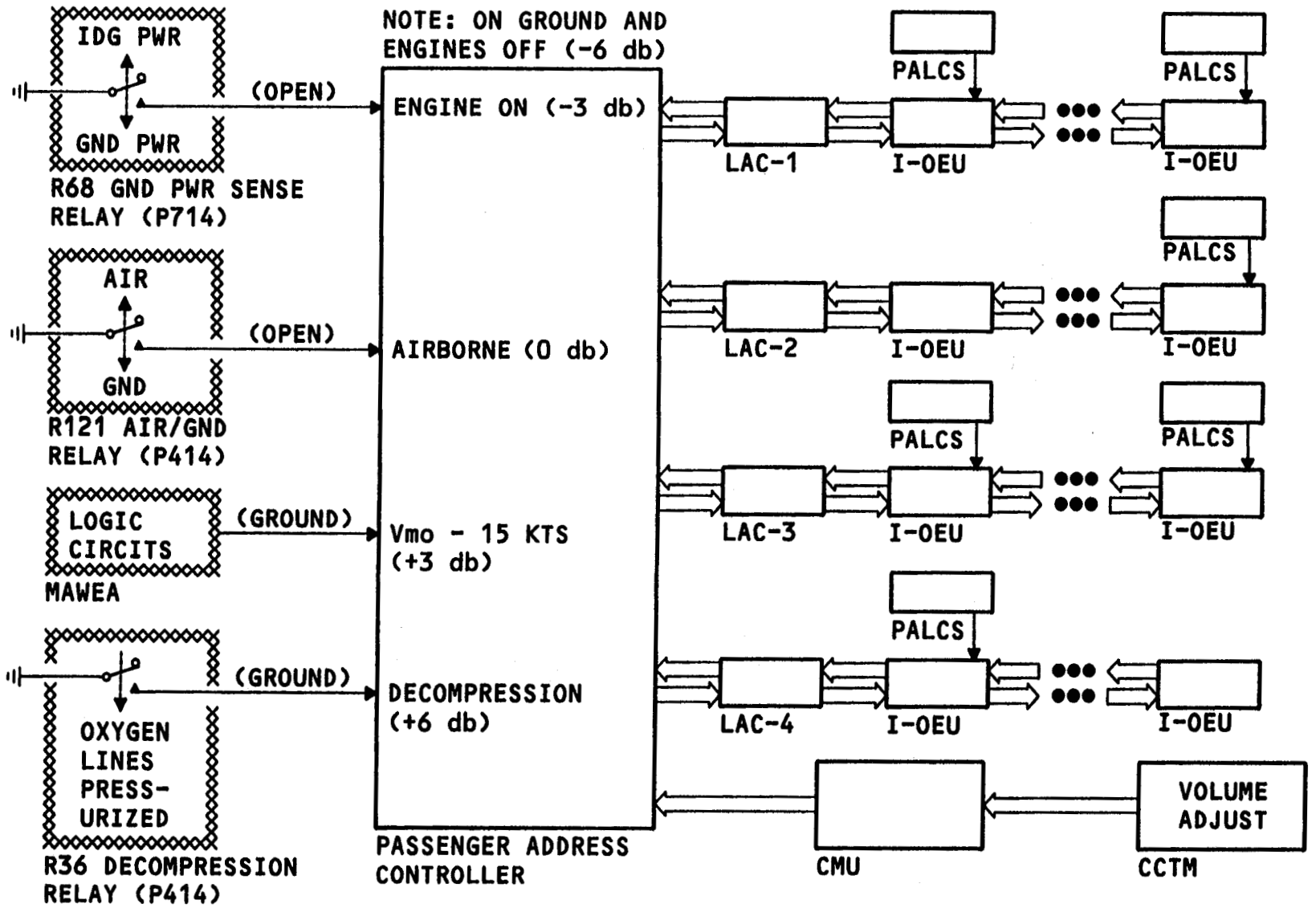



**Figure 18 AUDIO LEVEL CONTROL**

## AUDIO CONTROL PANEL

### Purpose

The audio control panel (ACP) gives the flight crew control of the flight interphone system. Controls on the ACP allow the flight interphone system to make passenger address announcements.

### Operation

To make a priority 1 passenger address announcement with the flight interphone system:

- Push the passenger address transmit switch. The white MIC light comes on.

The passenger address announcement goes to the entire passenger cabin and sidetone comes back to the flight interphone system.

To make a priority 2b passenger address announcement with the flight interphone system through the cabin interphone system:

- Push the CAB transmit switch; the white MIC light comes on.
- Dial the PA area for announcement on the PCP.
- Adjust the passenger address receiver volume control for the desired sidetone volume level.
- Push the spring-loaded PTT switch to the R/T position.
- Speak into the microphone.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

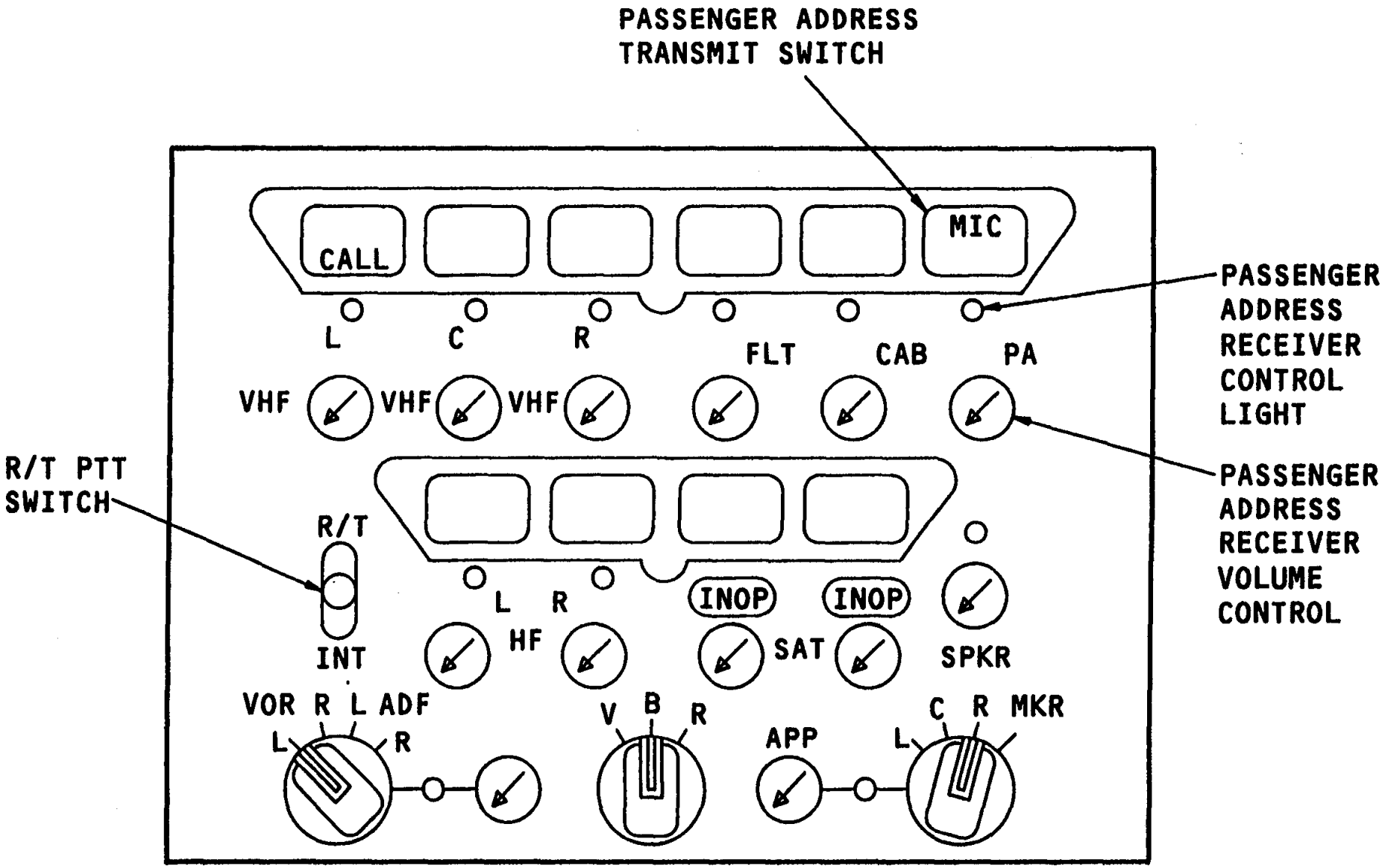



**Figure 19 AUDIO CONTROL PANEL**

## CAB INT HANDSET & DIRECT ACCESS SWITCH

### Cabin Interphone Handset

The cabin interphone handsets let the attendants make passenger address (PA) announcements in one or more PA areas.

The dial code buttons on the cabin interphone handset (CIH) let an attendant enter a dial code for a PA announcement in any PA area. A placard on the back of the handset lists dialing codes.

To make a PA announcement in PA area 1:

- Pick up the handset.
- Push dial code button 4 and then 1. If a PA announcement is already in progress in PA area 1,a busy 1 signal is heard in the earphone.
- Push and hold either of the push-to-talk buttons.
- Talk into the microphone.

No sidetone is heard in the earphone during the announcement.

The PA announcement goes to PA area 1 only. The PA announcement also goes to all passenger entertainment system headsets in area 1.

To end the PA announcement:

- Release the PTT button
- Push the reset button, or
- Hang up the cabin interphone handset.

other dial codes let the attendants make announcements into the different PA areas.

The flight deck handset lets the flight crew make PA announcements in one or more PA areas. There are no dial code buttons on the flight deck handset. The flight crew enters the dial code on the pilot's call panel.

### Direct Access Switch

The direct access switch gives the attendant a higher priority passenger address (PA) announcement than is normally available using a cabin interphone handset . This function is also useful as a backup mode to make PA announcements in case of some cabin interphone or PA faults.

Cabin interphone handsets normally connect to the cabin interphone controller through the local area controller. During a direct access PA announcement the cabin interphone handset connects directly to the passenger address controller.

Push the direct access switch to connect the cabin interphone handset directly to the passenger address controller.

To make a direct access PA announcement:

- Pick up the handset
- Push the direct access switch. A white light inside the switch turns on,
- Push and hold either of the push-to-talk buttons.
- Talk into the microphone.

The PA announcement is heard in the entire passenger cabin. There is no sidetone during PA announcements.

To end a direct access PA announcement:

- Release the push-to-talk button.
- Hang up the cabin interphone handset. The white light inside the direct access switch goes out.

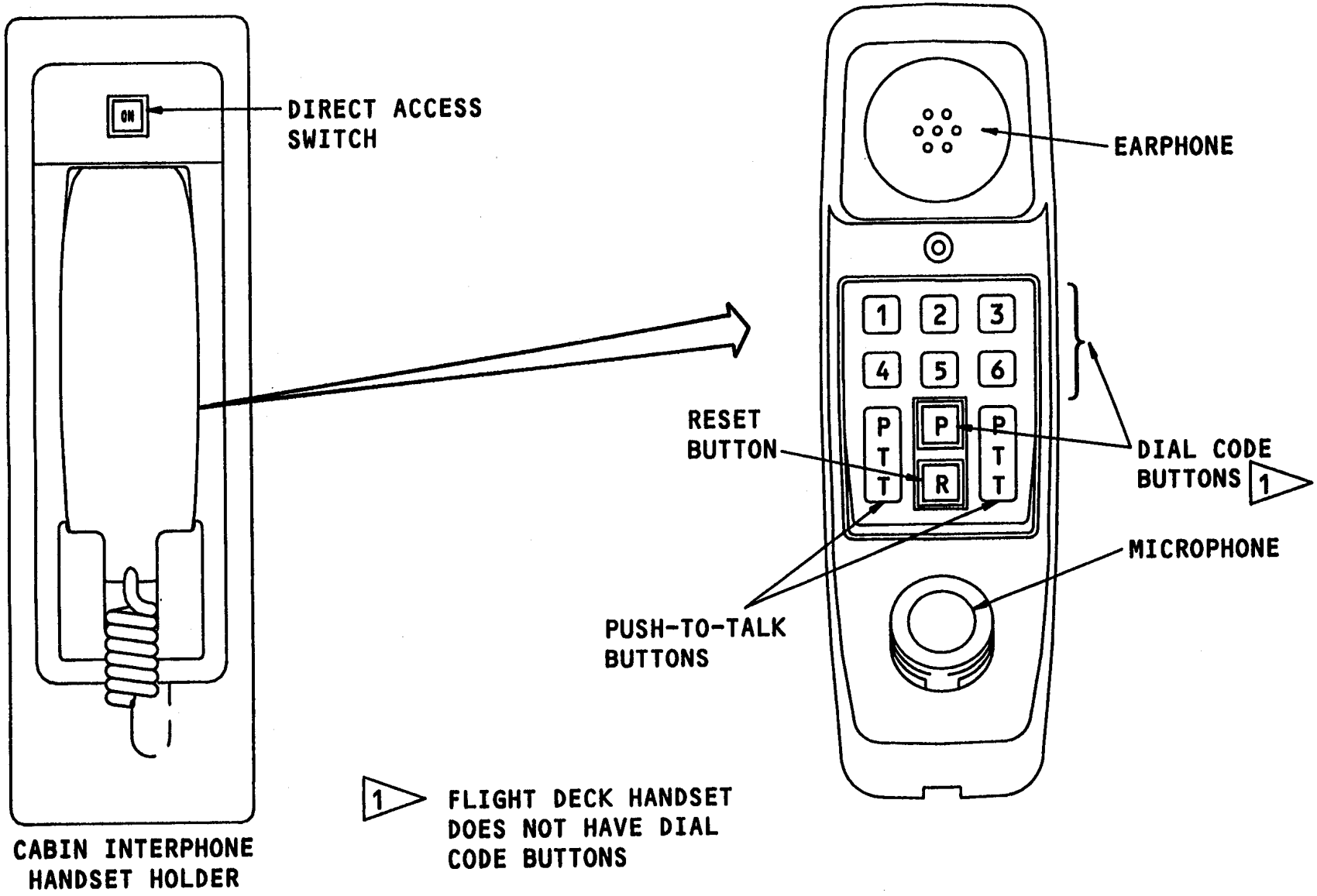



**Figure 20 CAB INT HANDSET & DIRECT ACCESS SWITCH**

## PILOTS' CALL PANEL

### Purpose

The pilots' call panel lets the flight crew enter a dial code for a PA announcement in any PA area.

### Operation

Operation of the pilots' call panel dial code buttons is the same as a cabin interphone handset. The LED display shows the PA area dialed.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

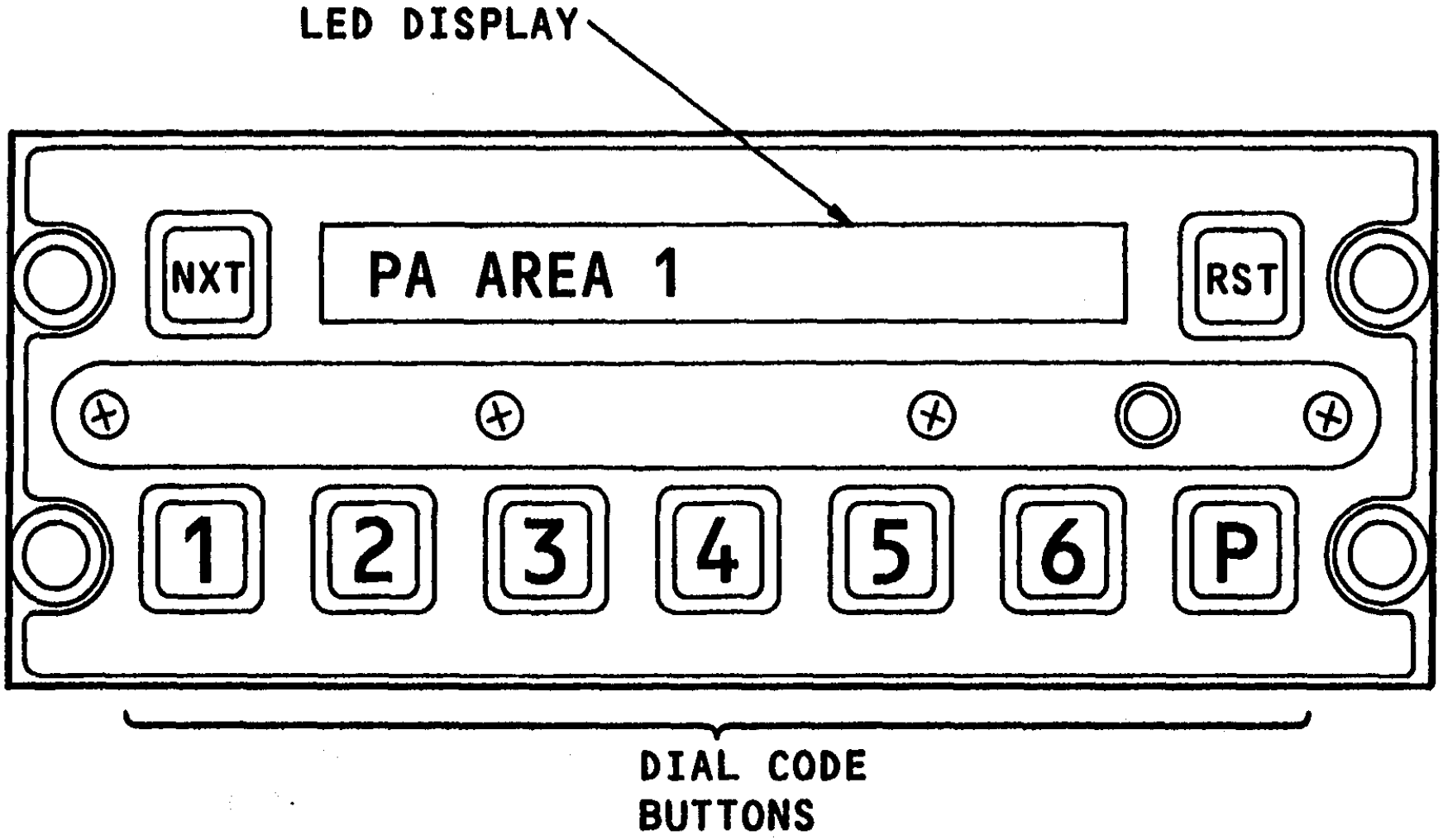



**Figure 21 PILOTS' CALL PANEL**

## TYPES OF CIS PA ANNOUNCEMENTS

### General

The cabin interphone system (CIS) gets inputs from the handsets and pilot's call panel for PA announcements. The cabin interphone system lets only the highest priority PA announcements go to the passenger address system. Priority depends on the dial code entered.

### Priority

The cabin interphone system processes three types of PA announcements. These are:

- Area announcements
- PA-all-area announcements
- Priority PA-all-area announcements

Area and PA-all-area announcements have the same level of priority They operate on a first-come, first-serve basis. If a PA announcement is in process in PA area 1 (dial code 41) and a PA all-area announcement (dial code 46) is attempted, a busy 1 signal sounds in the handset.

A priority PA-all-area announcement (dial code 4P) overrides both area and PA-all area announcements.

Multiple dial codes let PA announcements go to any number of PA areas. To select areas 1 and 21 enter dial codes 41 followed by 42. PA areas 1 and 2 will hear the announcement.

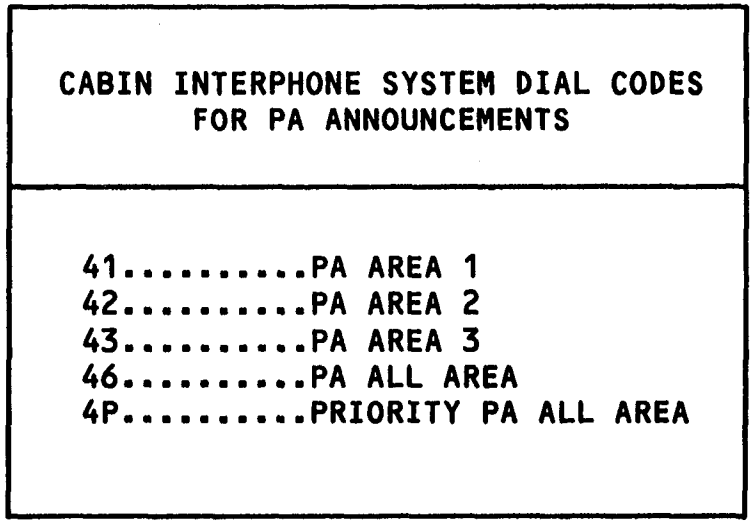



**Figure 22 TYPES OF CIS PA ANNOUNCEMENTS**

# PASSENGER ADDRESS TAPE REPRODUCER

## Purpose

The passenger address tape reproducer (PA T/R) sends pre-recorded announcements and boarding music to the passenger address controller.

## General Description

The PA T/R has a tape deck which plays announcement messages and music programs pre-recorded on a phillips-type cassette tape. The cassette tape stores up to 32 re-recorded messages on tracks 1 and . Boarding music is on tracks 3 and 4.

The PA T/R also has solid-state stored voice (SSSV) circuitry. The SSSV circuitry uses up to five programmable read-only memory (PROM) devices to store announcements. One PROM device stores a message 30 seconds long. Two or more devices may be used to store longer messages. The messages are electronically reproduced digitized voice data.

## Operation

The front panel has switches and indicators for control of the unit. All key switches including the markings START and STOP come on to show their locations on the control panel. An exception is the READY light, which is completely off when the tape deck is not ready for message or boarding music playback.

A tape access door gives access to the PA T/R's single cassette tape. To open the tape access door:

- Press the stop key
- Enter the two-digit code 90, 91, 92 or 93 (whichever is preset with the internal dip switch) on the keypad. As the code is entered, it shows on the numeric display.
- Press the MUSIC 1 key.

The numeric display resets to 0 and the tape access door unlocks and opens.

## Boarding Music

To start playback of boarding music, push the MUSIC 1 or MUSIC 2 key, then push the START key. The light inside the MUSIC key switch comes on brighter to show its status. The boarding music repeatedly plays back until stopped by the STOP key. Boarding music stops during a pre-recorded announcement, but continues when the announcement is over*

Press the other MUSIC key to playback the other boarding music track.

The volume control adjusts the volume level of the boarding music.

## Pre-Recorded announcements

To playback a pre-recorded announcement:

- Enter the desired message number (01 to 32 maximum) on the keypad. The numeric display shows the entered message number, or E if a number higher than 32 is entered. Press the STOP key and re-enter the message number to correct the error.
- The selected number shows on the display. When the message is located, the ready light comes on. Pressing START causes the message to be played. Pressing START immediately after selecting a message number causes the message to play automatically once it is located.
- The STOP key interrupts the message being played back and resets the display to "0".

## Automatic Emergency Message Playback

An emergency message (for cabin decompression) is stored in one or more PROM devices on the solid state stored voice (SSSV) circuit card. When a cabin decompression occurs:

- The emergency message plays back.
- No other playback function can activate.

The number of times the message plays back (1-8) is determined by a DIP switch on the side of the unit. Press the STOP key to interrupt the emergency message and reset the numeric display to show 0.

## Pause

When a pause discrete comes in, tape playback operation temporarily stops. Removing the pause discrete restarts the tape playback operation from where it was interrupted.

When a pause comes in during the emergency message playback, the message playback stops with no indication on the unit. Removing the pause discrete immediately restarts the message from where it was interrupted.

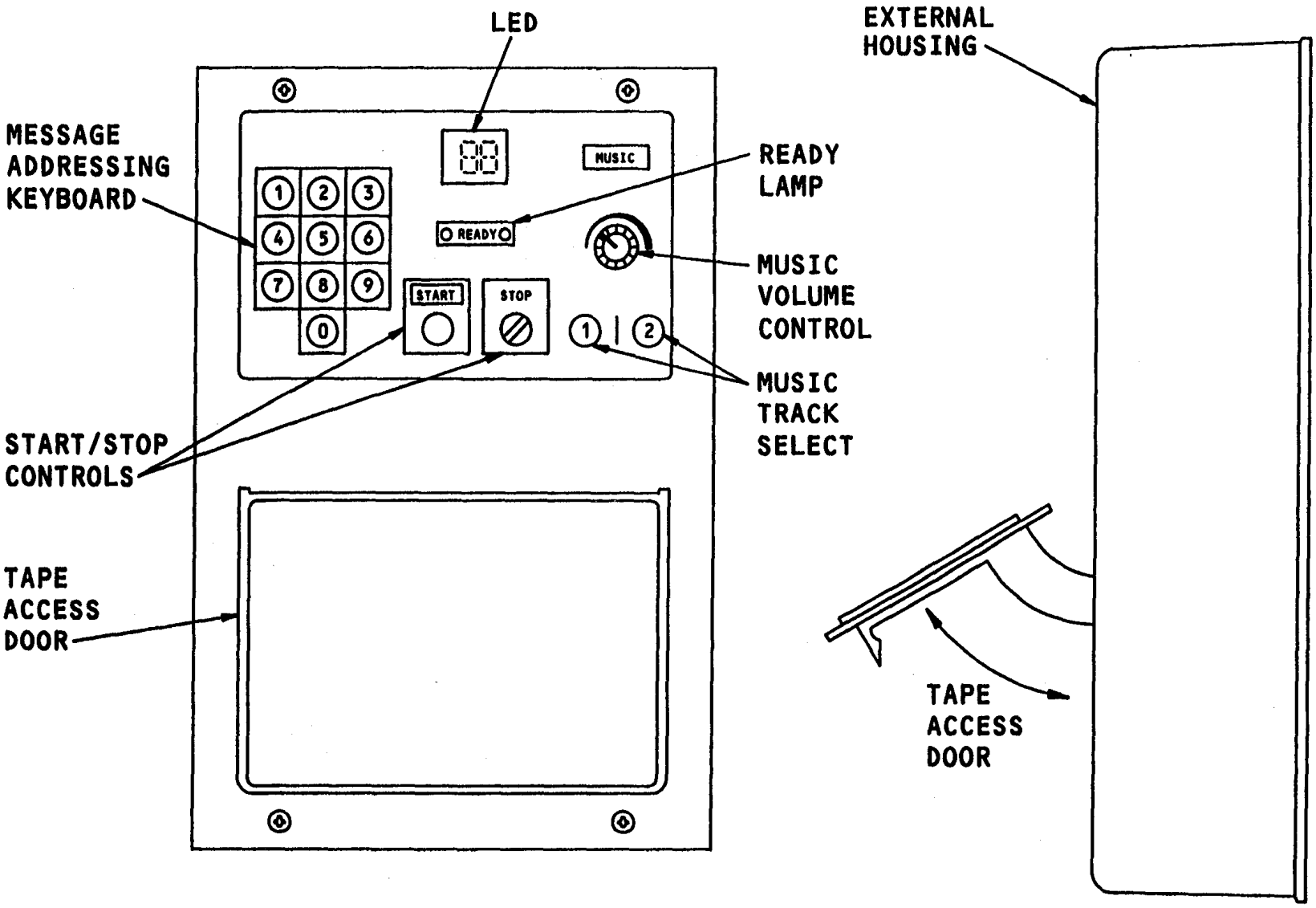



**Figure 23 PASSENGER ADDRESS TAPE REPRODUCER**

## VIDEO SYSTEM CONTROL UNIT

### General

The video system control unit (VSCU) is the central component for operation and control of passenger entertainment system (PES video.

Switches on the front of the unit control the PES video audio that goes to the passenger address system. The video audio goes to a selected PA area, or to all PA areas. The VSCU also adjusts the PA volume level.

### PA Controls

The video/audio source select switches control the selection of which video source goes to an area. Audio channel selection (primary/secondary audio channel) and volume controls are on both the PA SELECT and MANUAL OVERRIDE MODE sections of the VSCU.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

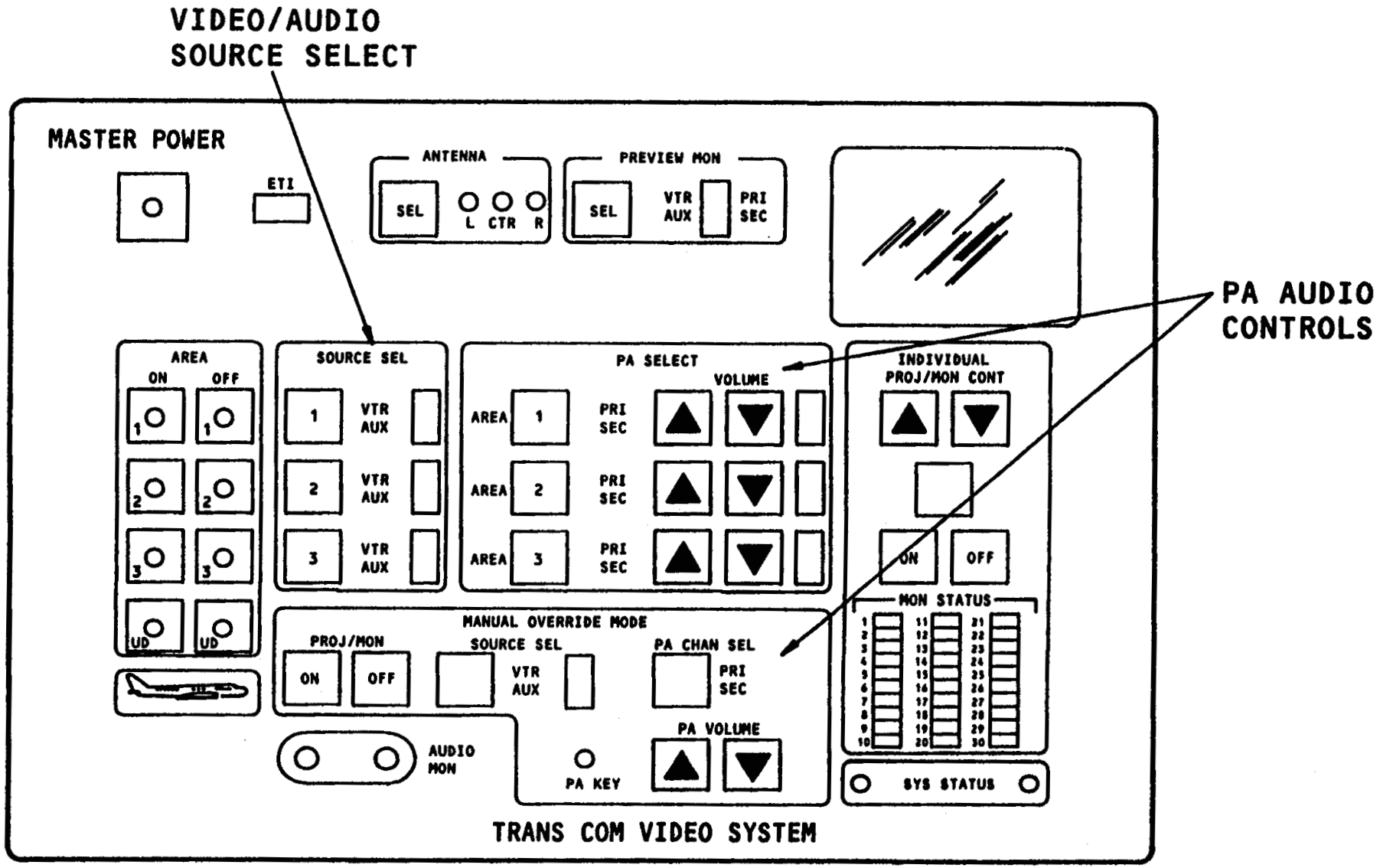



**Figure 24 VIDEO SYSTEM CONTROL UNIT**

# PASSENGER ADDRESS CONTROLLER

## Purpose

The passenger address controller (PAC):

- Accepts and stores configuration data from the central management unit.
- Sets priority for analog and digital audio inputs from various systems.
- Converts the highest priority analog audio input to digital audio.
- Accepts discretes and digital data inputs for chimes.
- Accepts discretes and digital inputs to adjust PA volume levels.
- Sends the digitized audio, chime data and PA volume data to the local area controllers for distribution to the inboard overhead electronics units.

## General Description

The PAC has two identical controller circuits (normal and alternate). One controller circuit does all the functions of the PAC. Only one controller circuit operates at a time. If there is a failure of the normal controller, the alternate controller performs the functions of the PAC when the alternate controller is manually selected on the cabin configuration test module.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

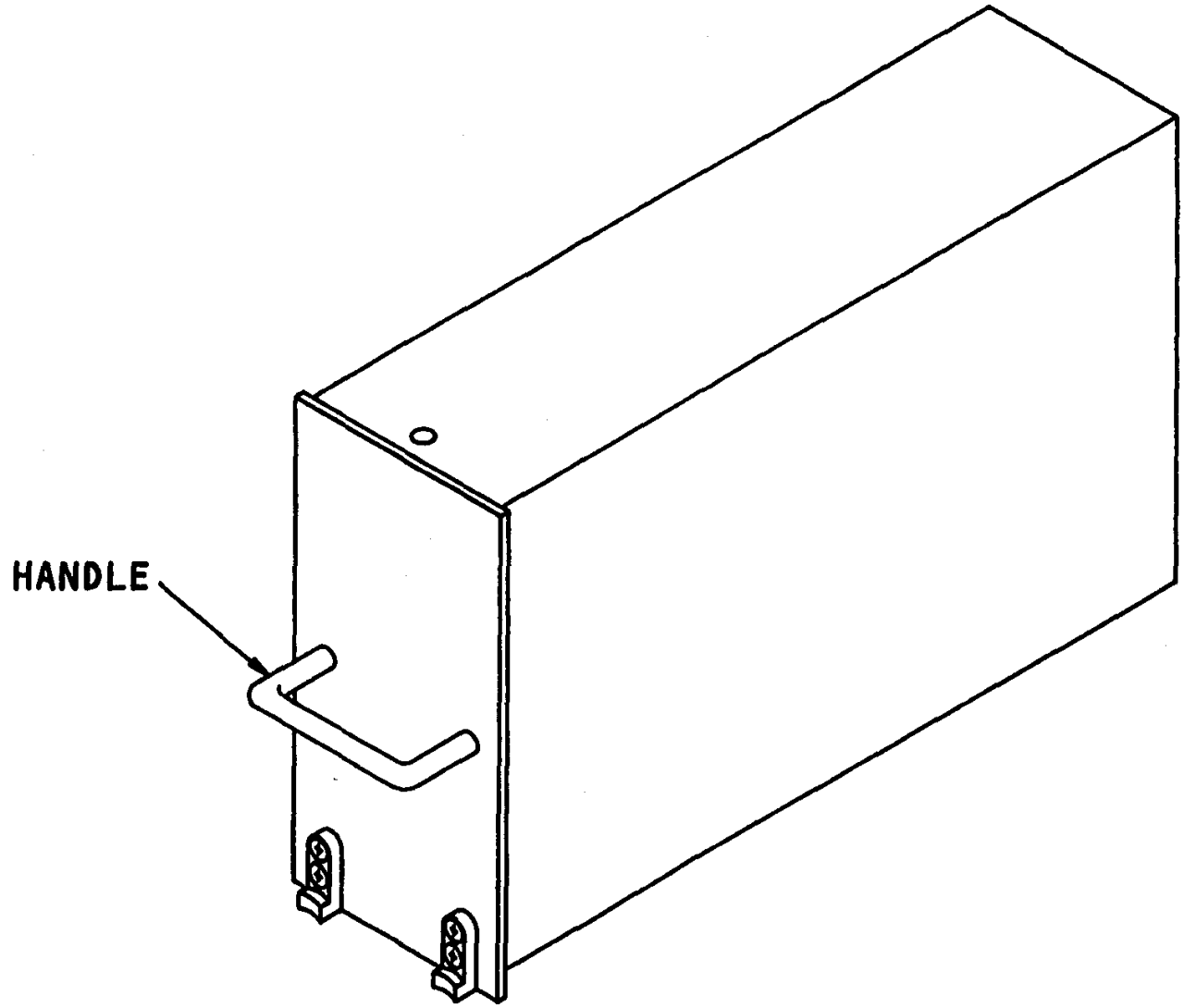



**Figure 25 PASSENGER ADDRESS CONTROLLER**

## LOCAL AREA CONTROLLER

### Purpose

The local area controller (LAC) gets digital inputs from the passenger address controller and sends the data to the inboard overhead electronics units.

### Characteristics

The LAC has three independent assemblies. one assembly does functions of the passenger address system, one does functions of the cabin interphone system, and one does functions of passenger entertainment, passenger service and cabin lighting systems.

The LAC also gets inputs from a cabin interphone handset and direct access switch. The LAC sends handset audio and push-to-talk signals directly to the passenger address controller when the direct access switch is pushed.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

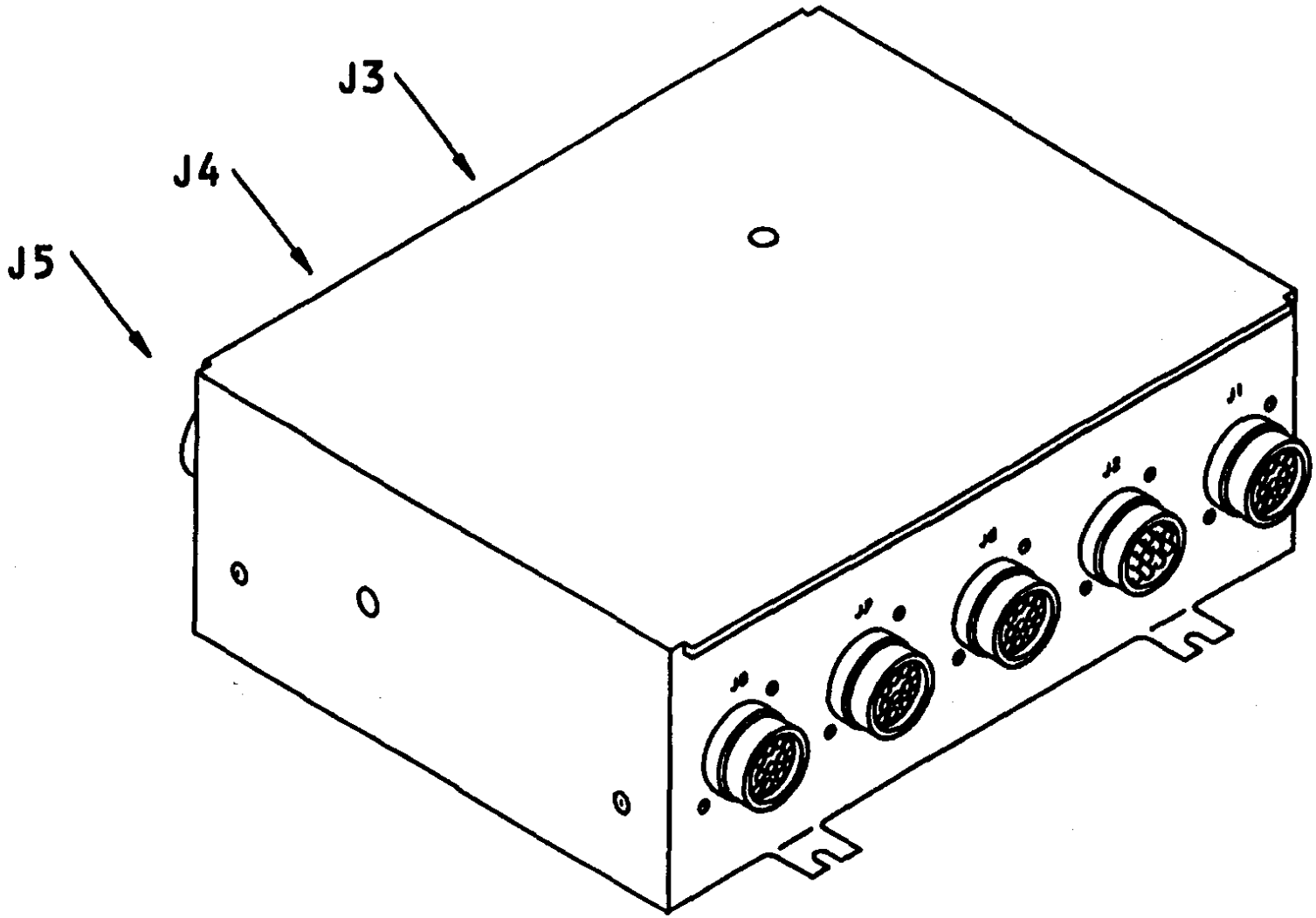



**Figure 26 LOCAL AREA CONTROLLER**

## INBOARD OVERHEAD ELECTRONICS UNIT

### Purpose

The inboard overhead electronics unit (IOEU):

- Gets multiplexed data from the passenger address controller (PAC), through the local area controller (LAC). This data is digital audio, area selection, chime annunciation and speaker output volume level information.
- Changes the digital audio to analog form.
- Decodes the area selection data and sends the selected channel to the proper PA speaker.
- Gets data from a passenger address level control sensor (PALCS) and sends the information through the LAC to the PAC.

### Characteristics

Each I-OEU has two independent subsystems which control functions of

the passenger address system and the passenger service/cabin lighting systems. only the passenger address functions are discussed here.

Each I-OEU has two separate PA amplifiers. Each PA amplifier delivers 5 watts (maximum) of audio into an 8-ohm speaker.

Each I-OEU also has a chime generation circuit to sound chimes over the PA speakers.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

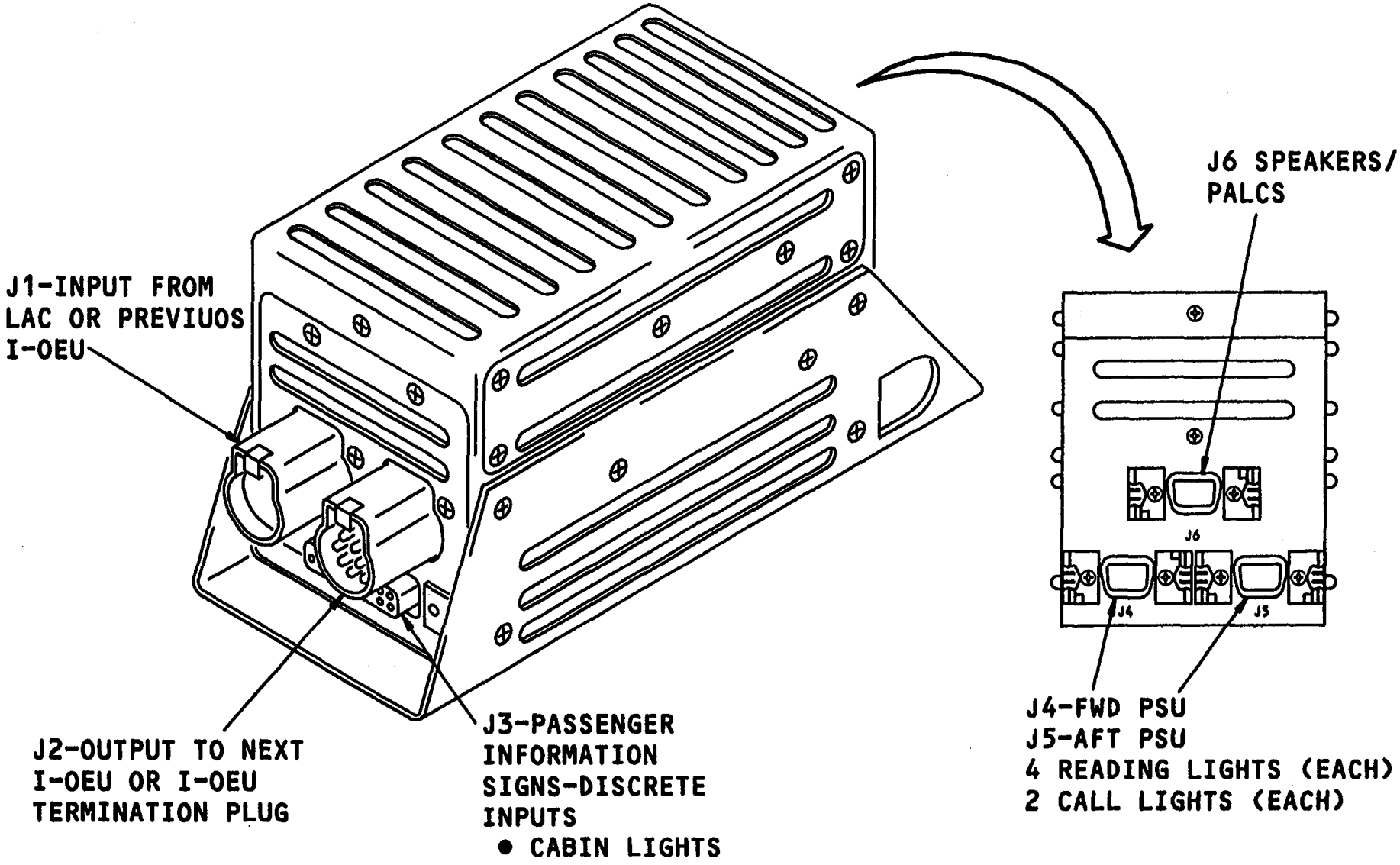



**Figure 27 INBOARD OVERHEAD ELECTRONICS UNIT**

## IOEU INSTALLATION

The inboard overhead electronics units (I-OEUs) are in approximately every other passenger service unit (PSU) panel.

Three latches hold the PSU panel in place. Push a rod into the holes in the face of the PSU panel to release the assembly. Lanyards limit the amount the PSU panel swings down. Three screws hold the I-OEU in place.

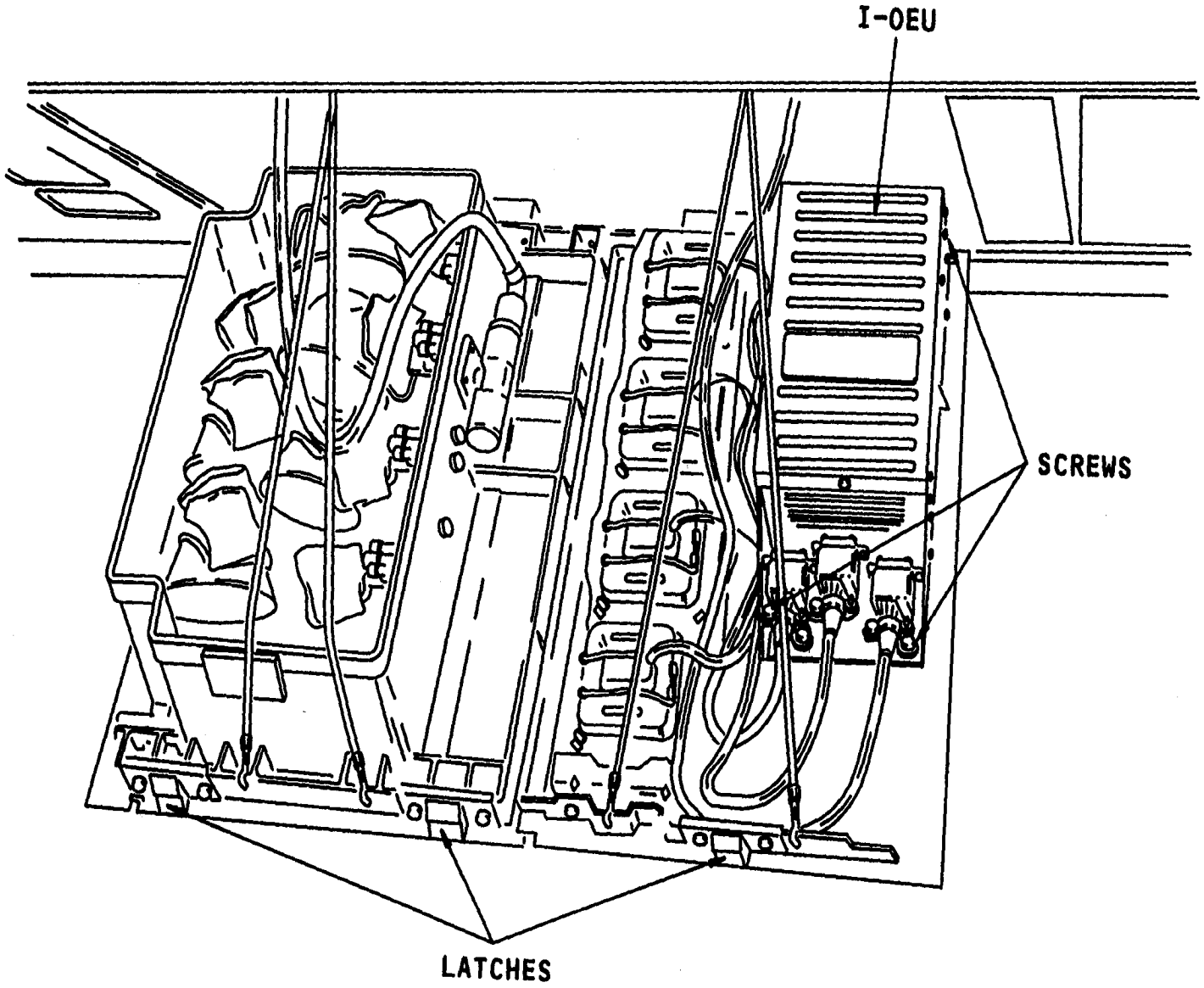



**Figure 28 IOEU INSTALLATION**

## I - OEU TERMINATION PLUG

The last I-OEU in a column has a termination plug connected to the J2 connector. The I-OEU termination plug contains a 75-ohm resistor which matches the characteristic impedance of the transmission cable.

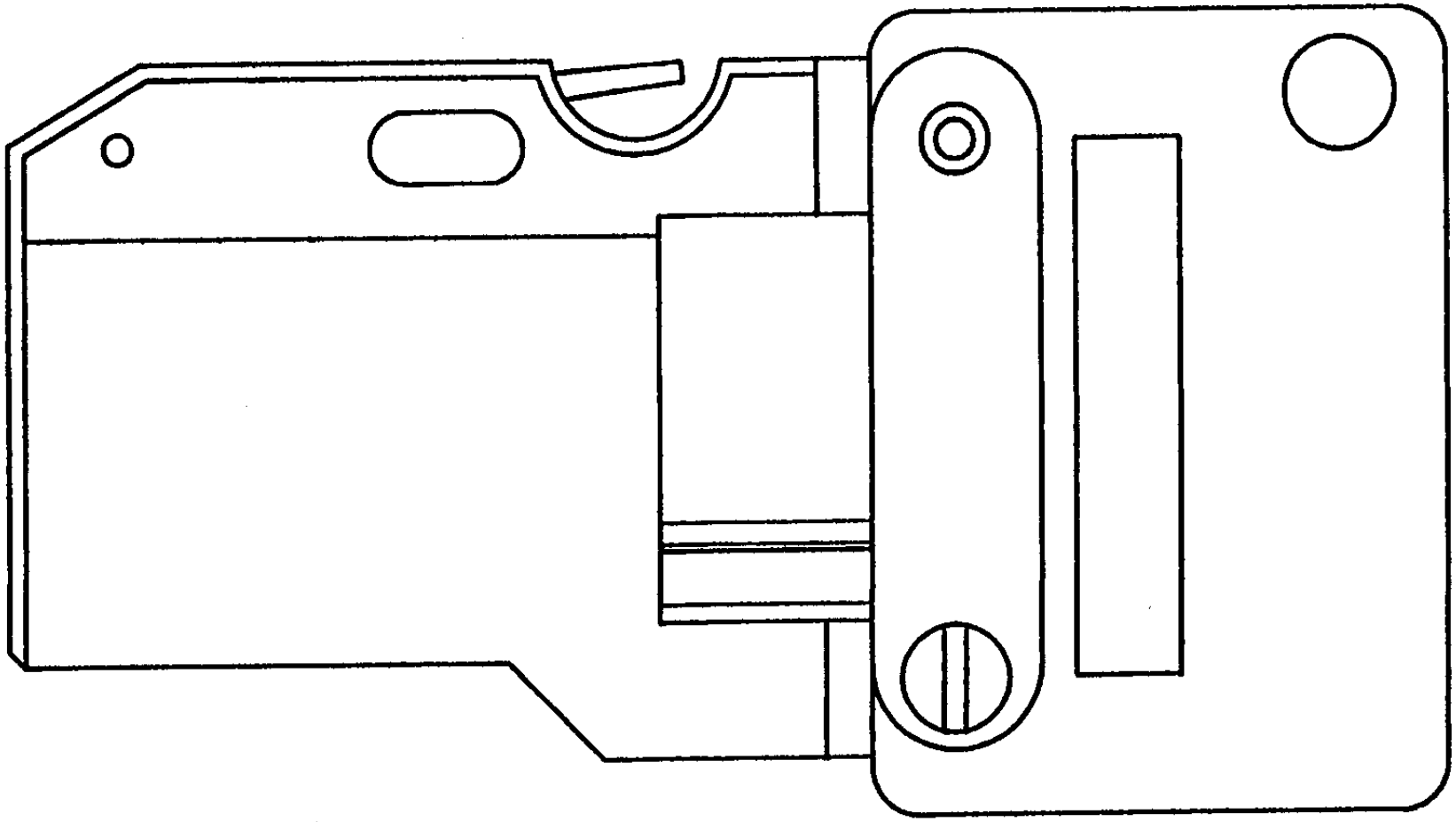


**Figure 29 I - OEU TERMINATION PLUG**

## SPEAKERS

### Purpose

The passenger address system speakers send audio to the passenger cabin the attendant stations and the lavatories.

### General

The speaker above an attendant's station mutes when a PA announcement comes from that attendant's station.

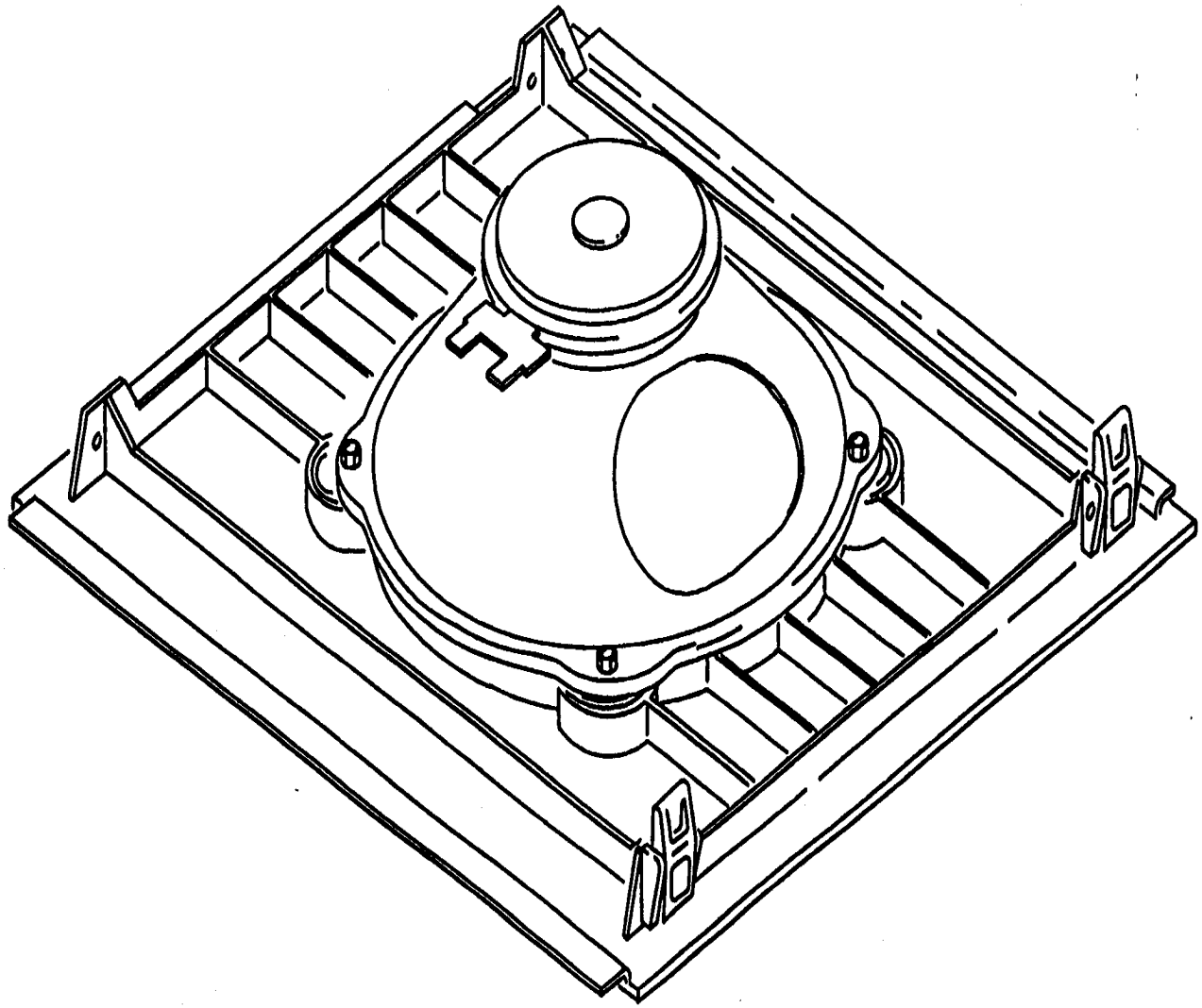


**Figure 30 SPEAKERS**

## SPEAKER INSTALLATION

Speakers are in speaker/emergency light, assemblies, which mount in the main deck ceiling panels above each aisle.

Two latches hold the speaker/emergency light assemblies in place. Push a rod into the two speaker grill holes farthest from the emergency light to release the assembly. Four nuts hold the speaker in place.

Speakers in the upper deck mount in the outboard passenger service units. The installation on is the same as the main deck speakers.

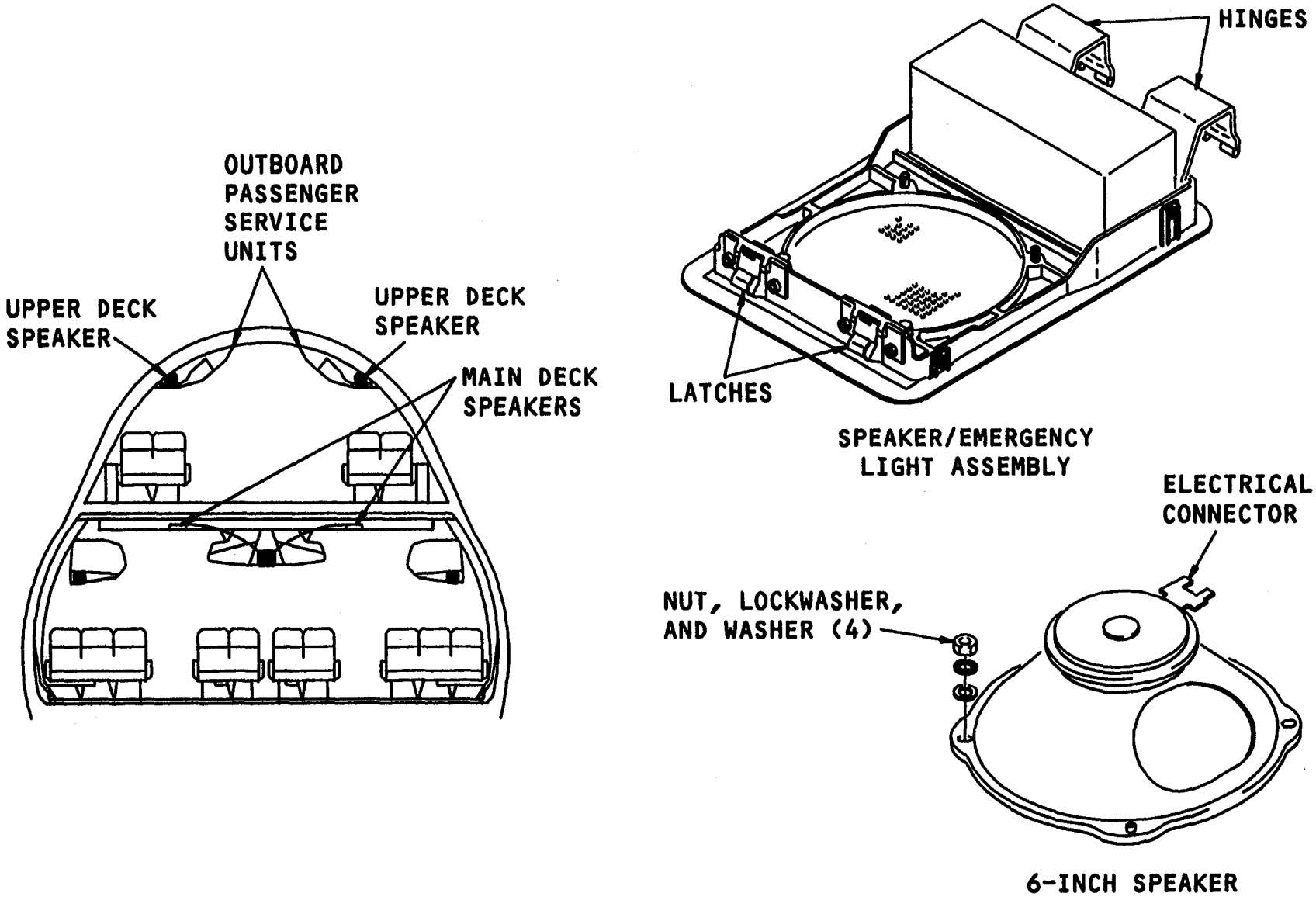



**Figure 31 SPEAKER INSTALLATION**

## PASSENGER ADDRESS LEVEL CONTROL SENSOR

The passenger address level control sensor (PALCS) detects the ambient noise level in the airplane's passenger cabin. The passenger address system (PAS) adjusts the PA volume level in response to inputs from the PALCS.

Eleven sensors are installed in the passenger cabin.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

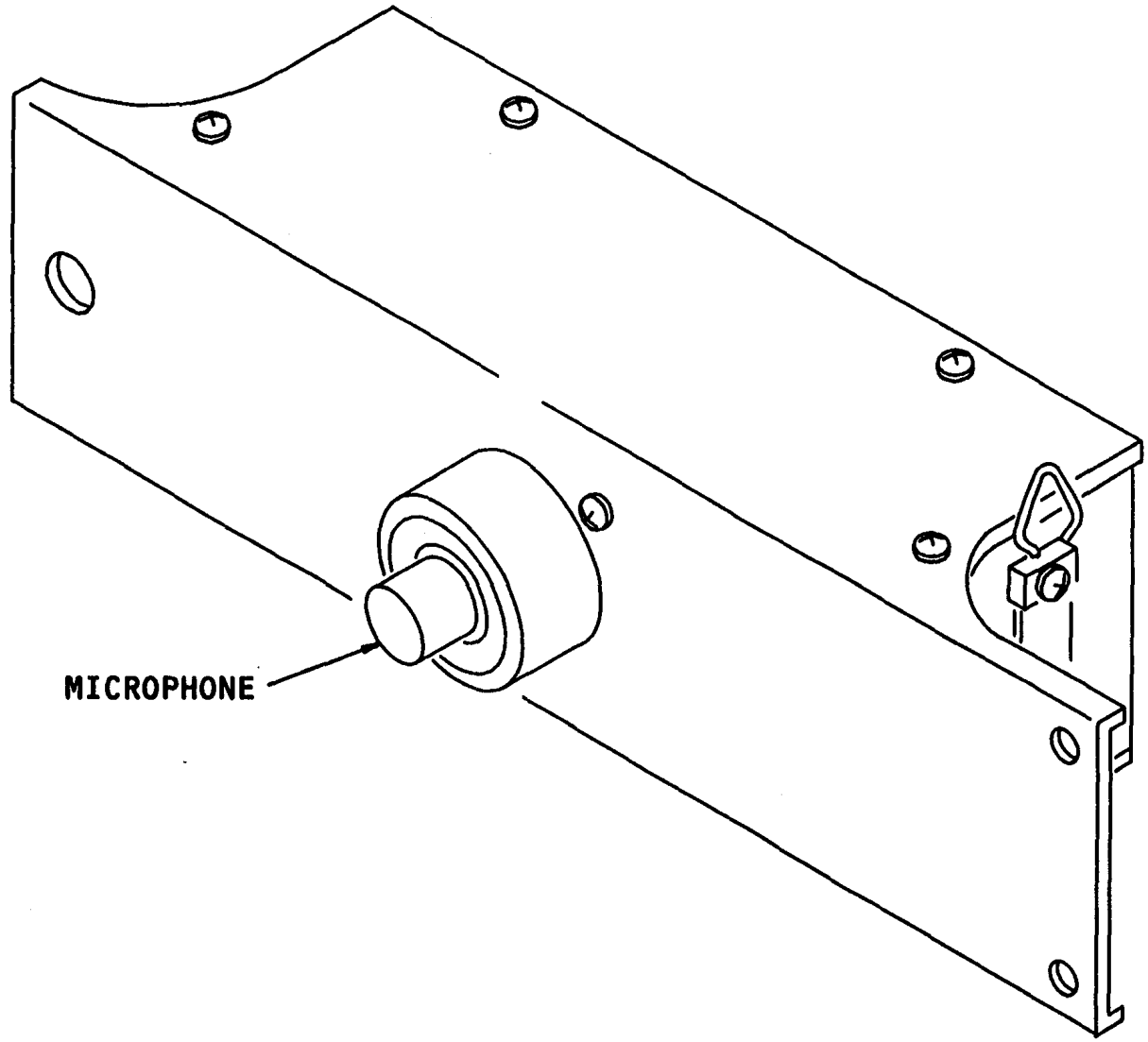



**Figure 32 PASSENGER ADDRESS LEVEL CONTROL SENSOR**

## PALCS INSTALLATION

Passenger  address level control sensors (PALCS? on the main deck are in the inboard passenger service units. PALCS on the upper deck are in the outboard passenger service units.

Each sensor mounts on a thin panel, which is held in place by a hinge on one side and a latch on the other side. The sensor attaches to the panel with three screws. Push a rod into the hole in the panel to release the assembly and gain access to the assembly. A lanyard limits the amount the assembly swings down.

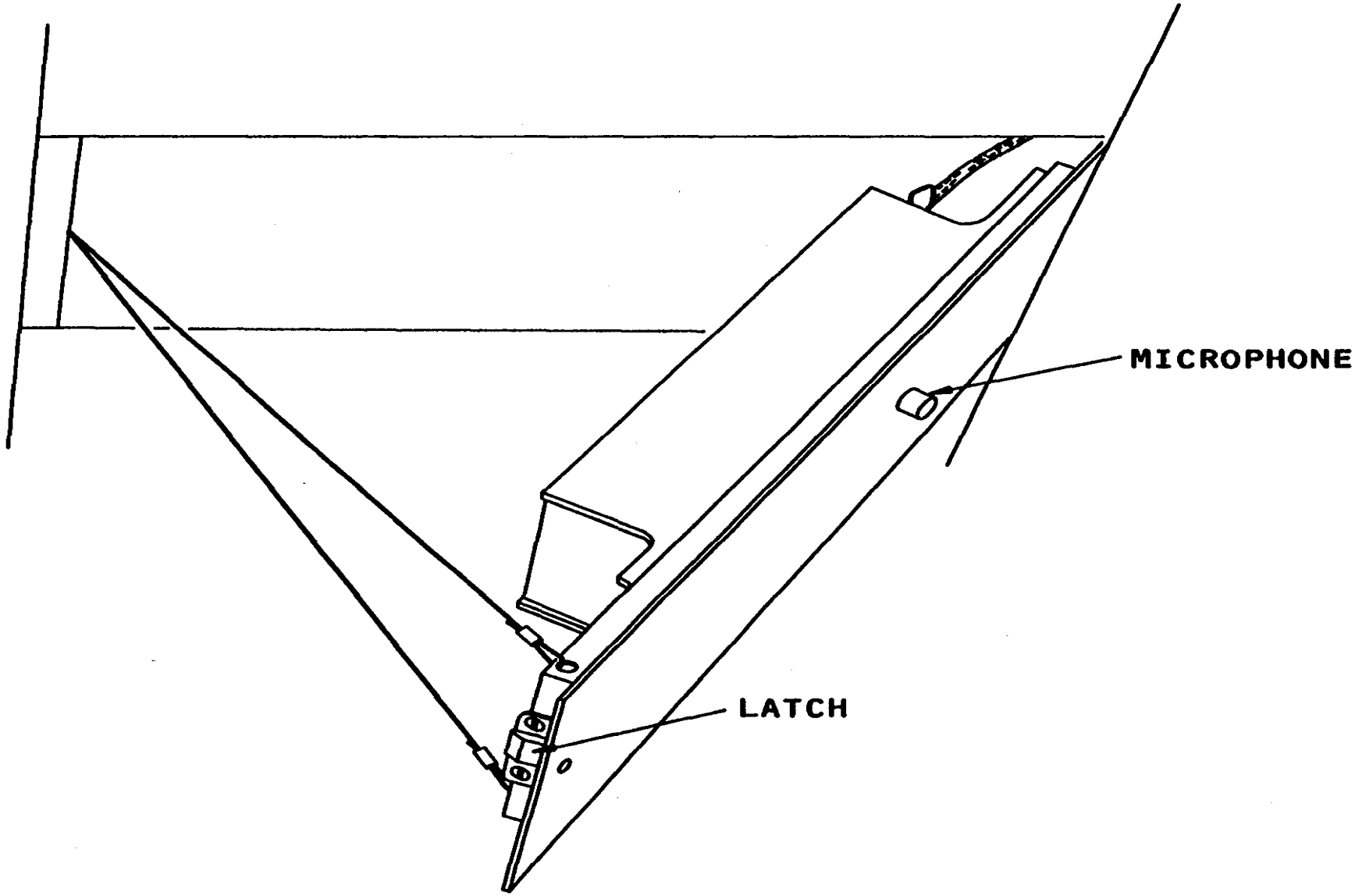



**Figure 33 PALCS INSTALLATION**

## CABIN CONFIGURATION TEST MODULE

### Purpose

The cabin configuration test module (CCTM) has these passenger address (PA) controls:

- A switch to change from the normal to the alternate controller circuit of the passenger address controller (PAC).
- Controls to start a self-test and a display to show the results.
- Controls to adjust the PA volume levels.

### Characteristics

The CCTM shows data on an liquid crystal display (LCD). The display has four lines with 20 characters in each line.

The switches on the front of the unit are for:

- Menu selections
- Mode selections
- Function selections
- Alternate systems selections

### Power

The CCTM gets 28v ac power from the central management unit (CMU).

### Display Symbols

The CCTM shows four lines of text, however, there is usually more than four lines of text available.

The symbols in the upper right corner of the display show that there is more text available. The scroll-up symbol means scroll the menu up for more text. The scroll-down symbol means scroll down for more text. If both symbols show at the same time, text is available in both directions.

The prompt symbol (left of the text) shows next to the selection that activates or clears with the menu select ENTER switch.

The first line of text does not move up or down. This line shows the mode selection, such as SYSTEM TEST.

The bottom three lines show possible selections in the present mode.

### Menu Select Switches

The scroll-up and scroll-down switches move the text on the display up or down.

The ENTER switch starts the command next to the prompt.

The CLEAR switch (used in the function select modes) sets the no smoking areas and PA volume levels to their default values.

### Mode Select Switches

Push the TEST switch to put the ACESS system in the test mode.

Push the PROGRAM switch to put the ACESS system in the ACESS program mode.

Push the NORMAL switch to return ACESS to its normal mode.

### Function Select Switches

The function select switches call up menus to change the configuration of:

- No smoking areas
- PA volume levels

### Alternate System Switches

The alternate system switches are alternate action switches with lights inside to show their status.

The PASSENGER ADDRESS switch is a manual selection of the alternate controller circuit in the passenger address controller. When normal is selected, a light in the switch is off. To select alternate, push the switch once and the light comes on.

**CAUTION:** STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (REF 20-41-02/201). CONTAINS DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

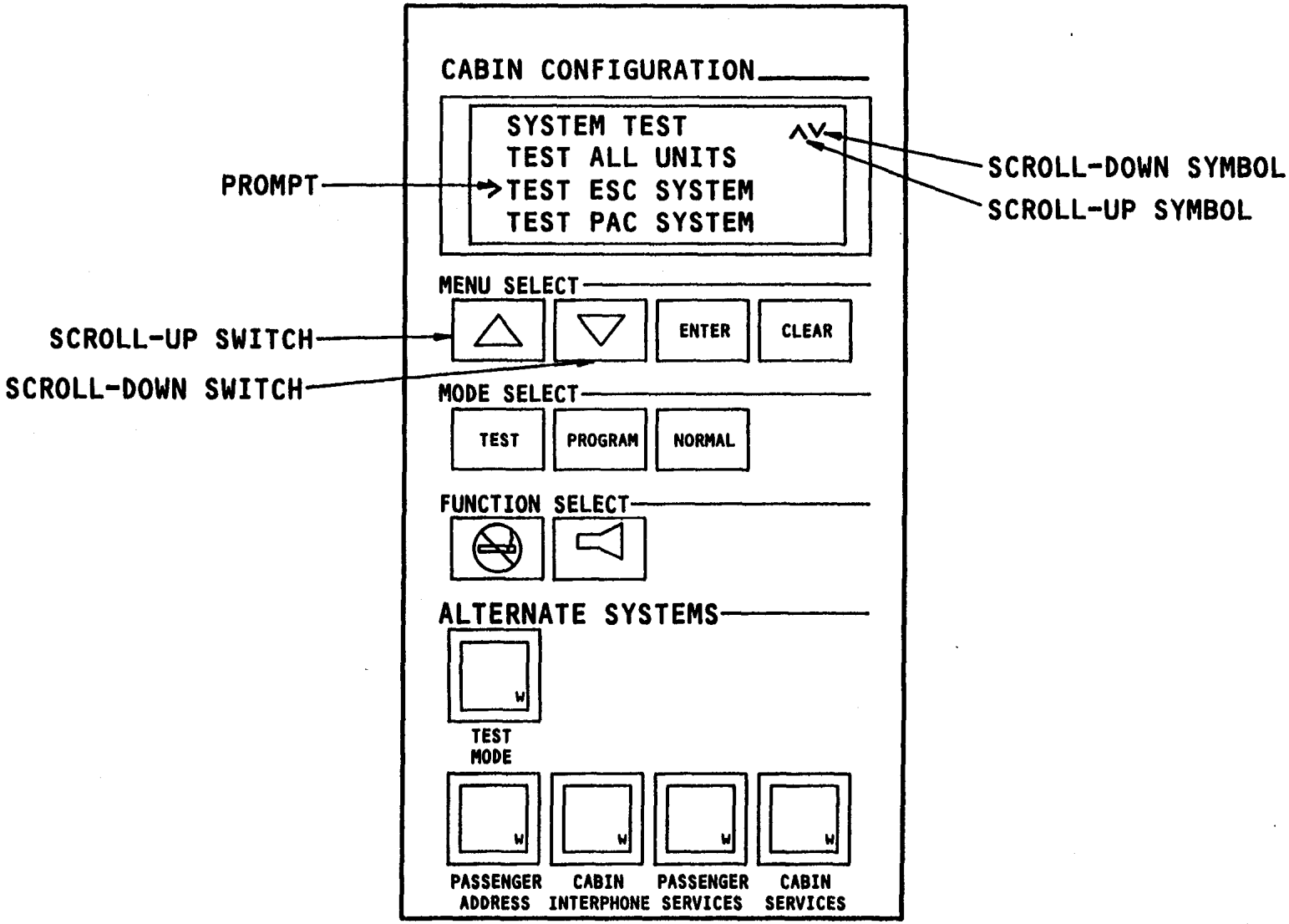



**Figure 34 CABIN CONFIGURATION TEST MODULE**

## PA FUNCTIONS MENU

### General Description

The PA functions menu on the cabin configuration test module (CCTM) has selections to:

- Increase the PA volume in a selected area.
- Monitor the passenger address level control sensor (PALCS) readings.
- Turn PAWS operation on or off.

### Operation

To access the PA functions menu:

- Push the PA function select button. The PA FUNCTIONS menu shows in the display.
- Push the scroll down button to view all possible selections.
- Push the ENTER button to select a specific PA function.

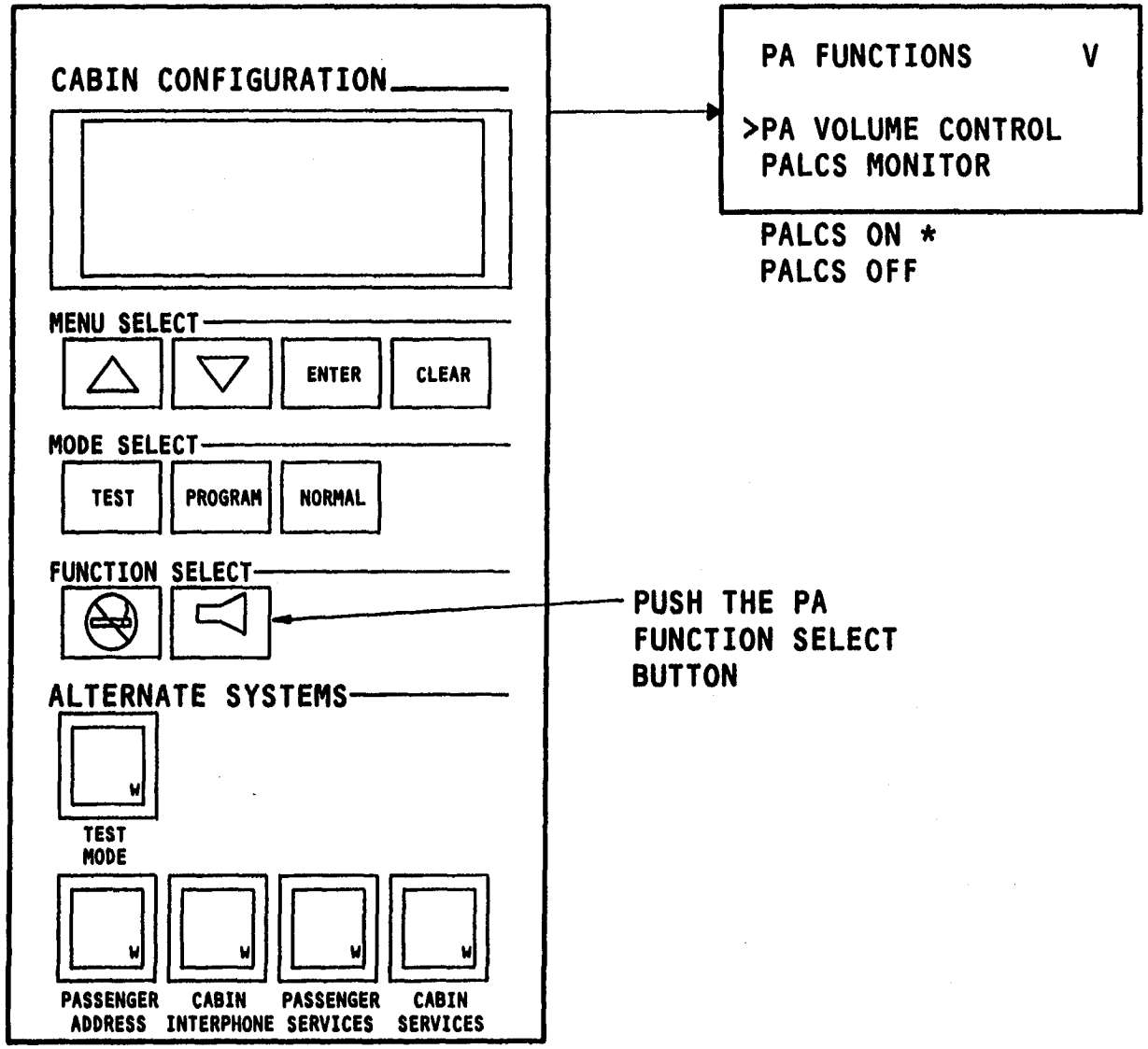



**Figure 35 PA FUNCTIONS MENU**

## PA VOLUME CONTROL FUNCTION - 1

### General

The passenger address speakers are divided into eleven speaker volume zones. The configuration program in the passenger address controller (PAC) assigns each speaker to a zone.

The configuration program also sets the bass volume level for each speaker volume zone.

The cabin configuration test module (CCTM) has controls to adjust the PA volume level in each speaker volume zone. The volume level can only increase from the level set by the configuration program.

Changes to volume levels store in random access memory (RAM) in the active passenger address controller circuit. The data stays in RAM until power is removed from the airplane.

When power is re-applied the PA volume levels in each zone are again at the level assigned by the configuration program.

### Operation

To adjust the PA volume in speaker volume zone A, follow these steps:

- Push the PA function select button. The PA FUNCTIONS menu shows.
- With PA VOLUME CONTROL next to the prompt, push ENTER.
- With VOLUME ZONE A next to the prompt, push ENTER. The current valve of VOLUME ZONE A is 00, which is the default value.
- To increase the current value, push the SCROLL UP button. The current value increases by one (+3dB).

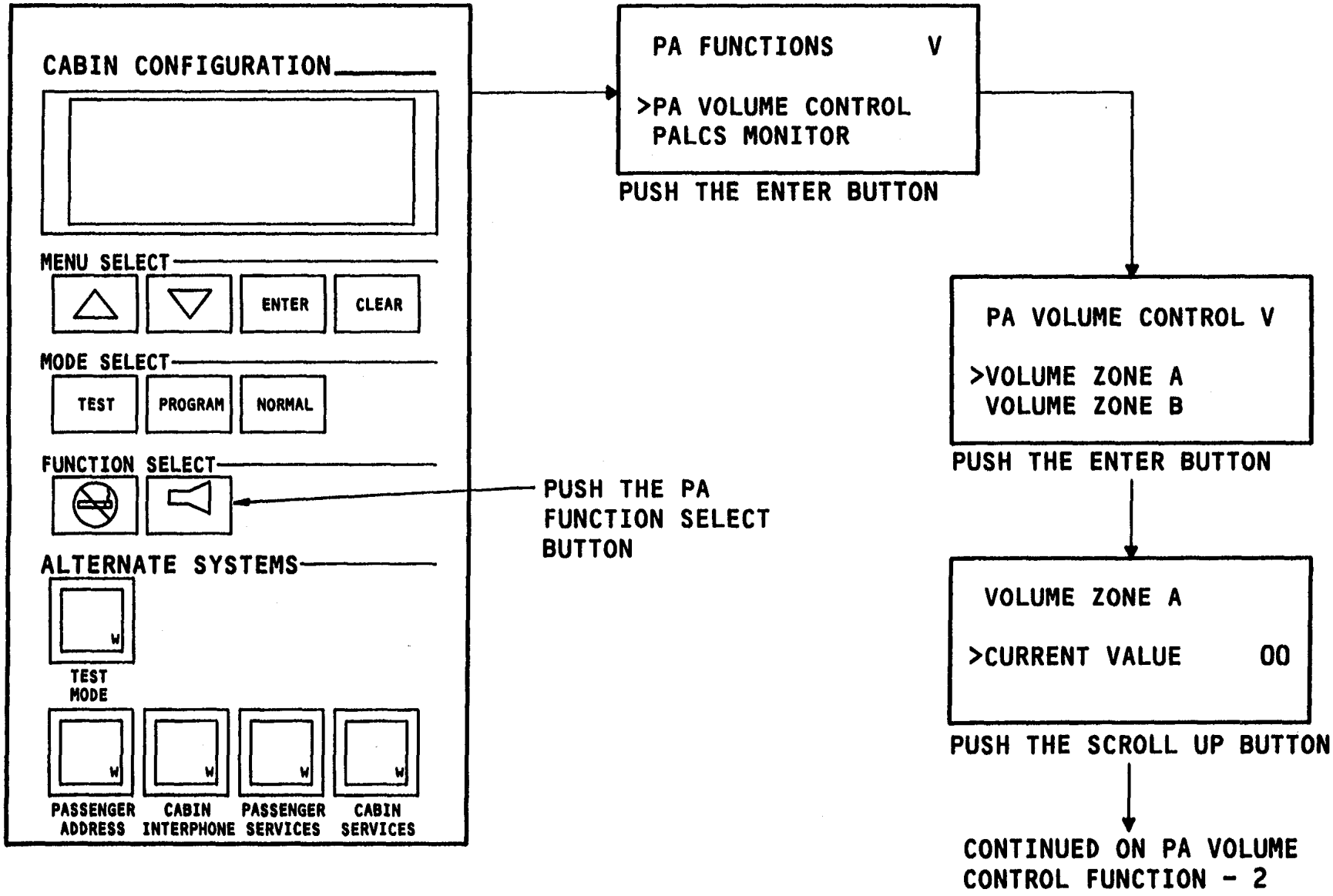



**Figure 36 PA VOLUME CONTROL FUNCTION - 1**

## PA VOLUME CONTROL FUNCTION -2

**Operation (continuous)**

- Push the ENTER button. The new configuration data goes to the central management unit for transfer to the normal or alternate controller circuit in the PAC. The volume level increases in speaker volume zone A by +3dB. The PA VOLUME CONTROL menu shows on the CCTM.
- Select another speaker volume zone and adjust its volume, or push the normal button to return to the normal mode.

**NOTE:** AFTER AN INCREASE IN VOLUME LEVEL IS DONE, A DECREASE IN VOLUME LEVEL TO A VALUE OTHER THAN THE 00 VALUE, REQUIRES THE OPERATOR TO CLEAR THE SETTING TO 00 AND THEN INCREASES TO THE DESIRED SETTING.

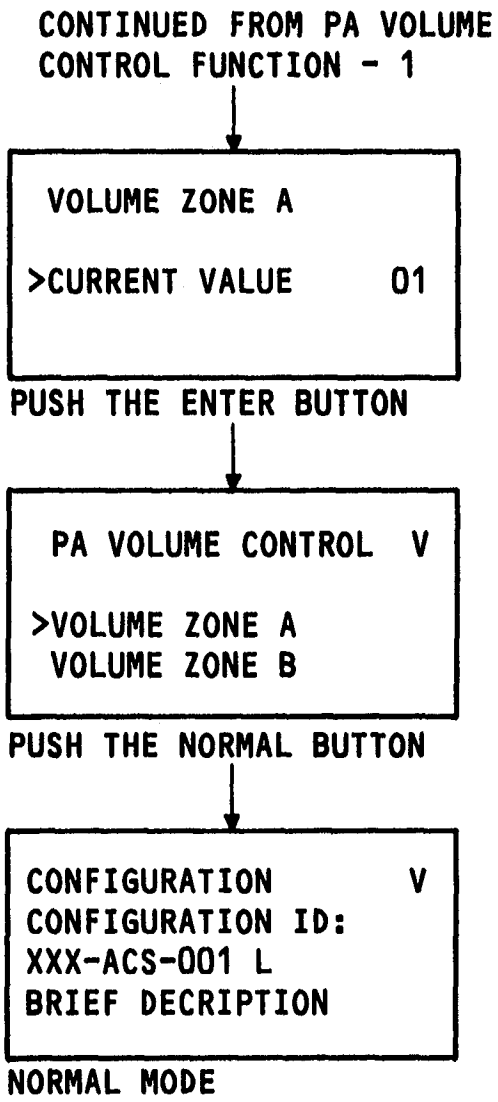



**Figure 37 PA VOLUME CONTROL FUNCTION -2**

## PALCS MONITOR FUNCTION - 1

### General Description

To assist in maintenance of the airplane# the cabin configuration test module (CCTM) has a passenger address level control sensor (PALCS) monitor. This function lets the operator read the PAWS voltage in a selected PAWS zone,

### Operation

To show the PAWS voltage:

- Push the PA function select button. The PA FUNCTIONS menu shows.
- Push the scroll down button until PAWS MONITOR is next to the prompt.
- Push ENTER. The CCTM shows the analog voltage measurement from the first PAWS zone.

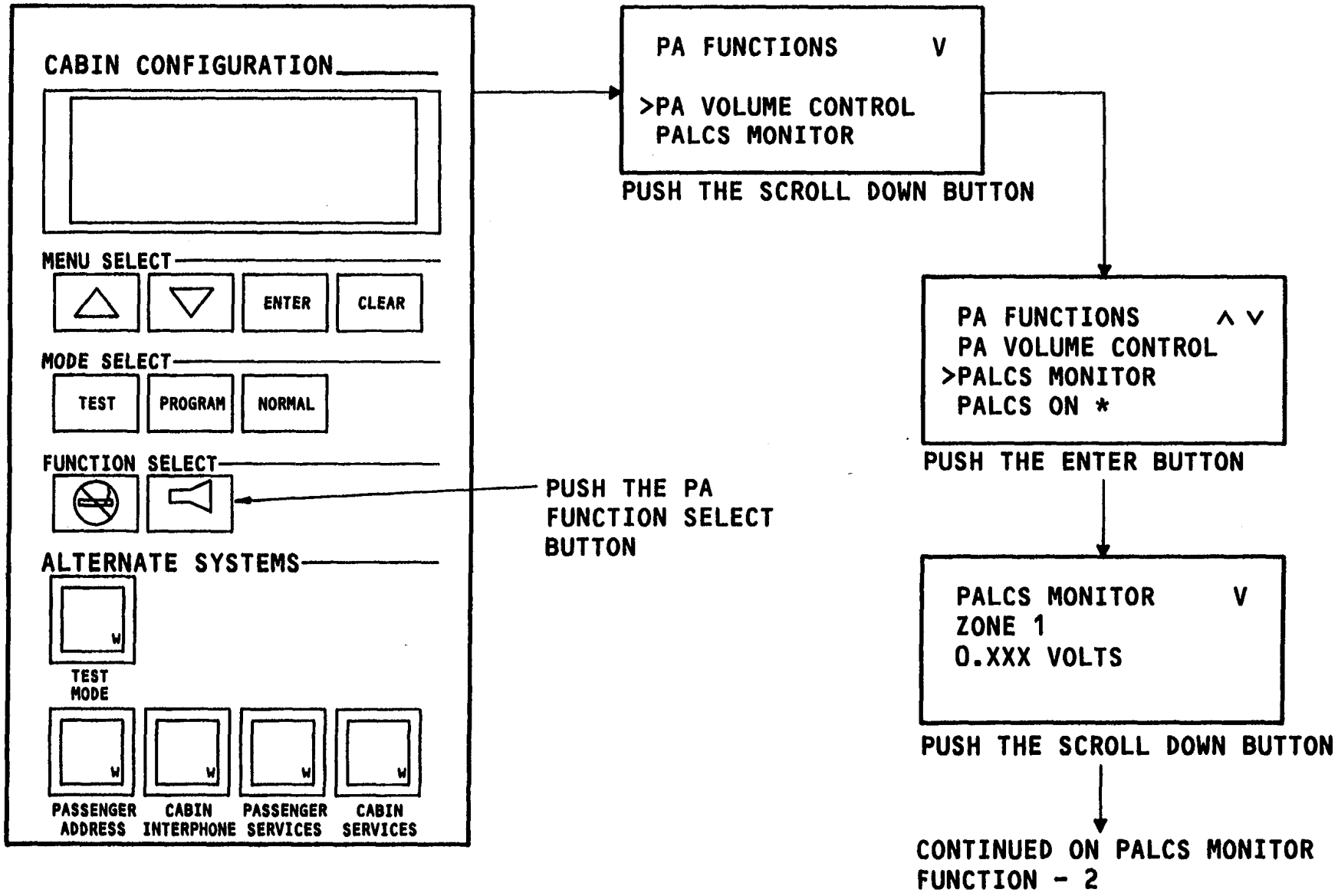



**Figure 38 PALCS MONITOR FUNCTION - 1**

## PALCS MONITOR FUNCTION - 2

**Operation (continuous)**

- Push the scroll up or scroll down buttons to scroll through the various PALCS zones and show their respective measurements.

When complete, push the NORMAL button to return to the normal mode.

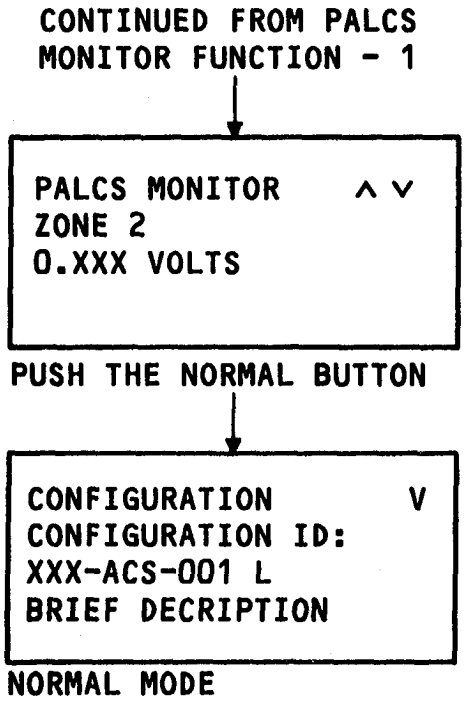



**Figure 39 PALCS MONITOR FUNCTION - 2**

## PALCS ON/OFF CONTROL

### General Description

The CCTM PA FUNCTIONS menu has a selection to turn passenger address level control sensor (PALCS) operation ON and OFF. When the PALCS go OFF, PA volume control is done with flight status discretes. When the PALCS are ON, PA volume initially sets to the cruise setting (IN AIR and then adjusts to match the ambient airplane noise level for each PALCS zone.

### Operation

To make the PALCS go on or off:

- Push the PA function select button. The PA FUNCTIONS menu shows.
- Push the scroll down button until PALCS ON or PALCS OFF-is next to the prompt.
- Push ENTER. An asterisk (*) shows next to the current system selection.
- Push NORMAL to return to the normal mode.

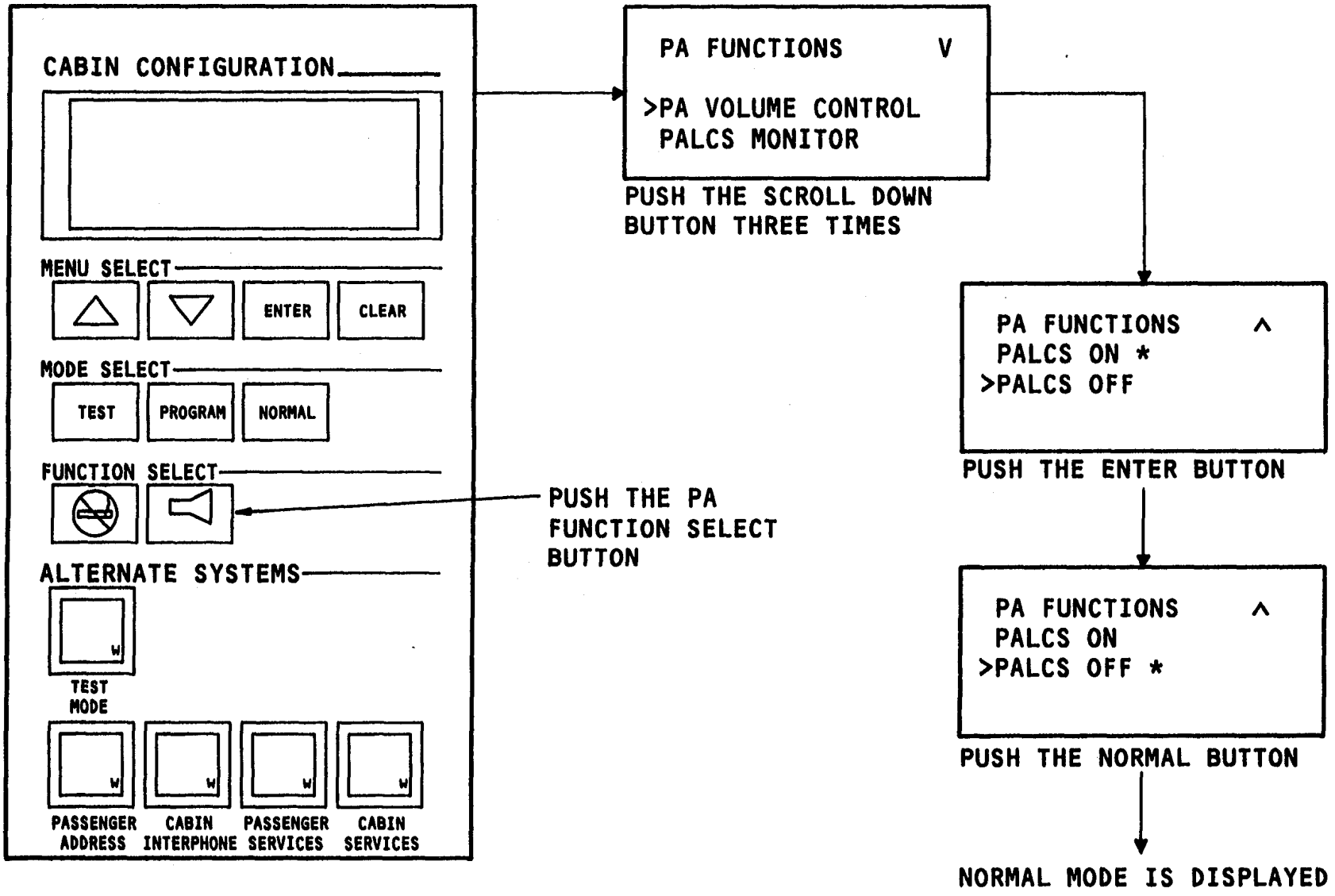



**Figure 40 PALCS ON/OFF CONTROL**

## CENTRAL MANAGEMENT UNIT

The CMU sends PA volume control and PALCS on/off commands from the cabin configuration test module (CCTM) to the passenger address controller.

Other functions of the central management unit (CMU) are to:

- Receive and store the ACESS configuration program.
- Send the ACESS configuration program to the ACESS subsystems.
- Send test commands to the ACESS subsystems.
- Collect the results of ACESS tests and send the results to the CCTM.
- Collect real-time fault status of the ACESS subsystems.,
- Send real-time ACESS status data to the EFIS/EICAS interface units (EIUs). Prom there, it goes to the central maintenance computers (CMCs).

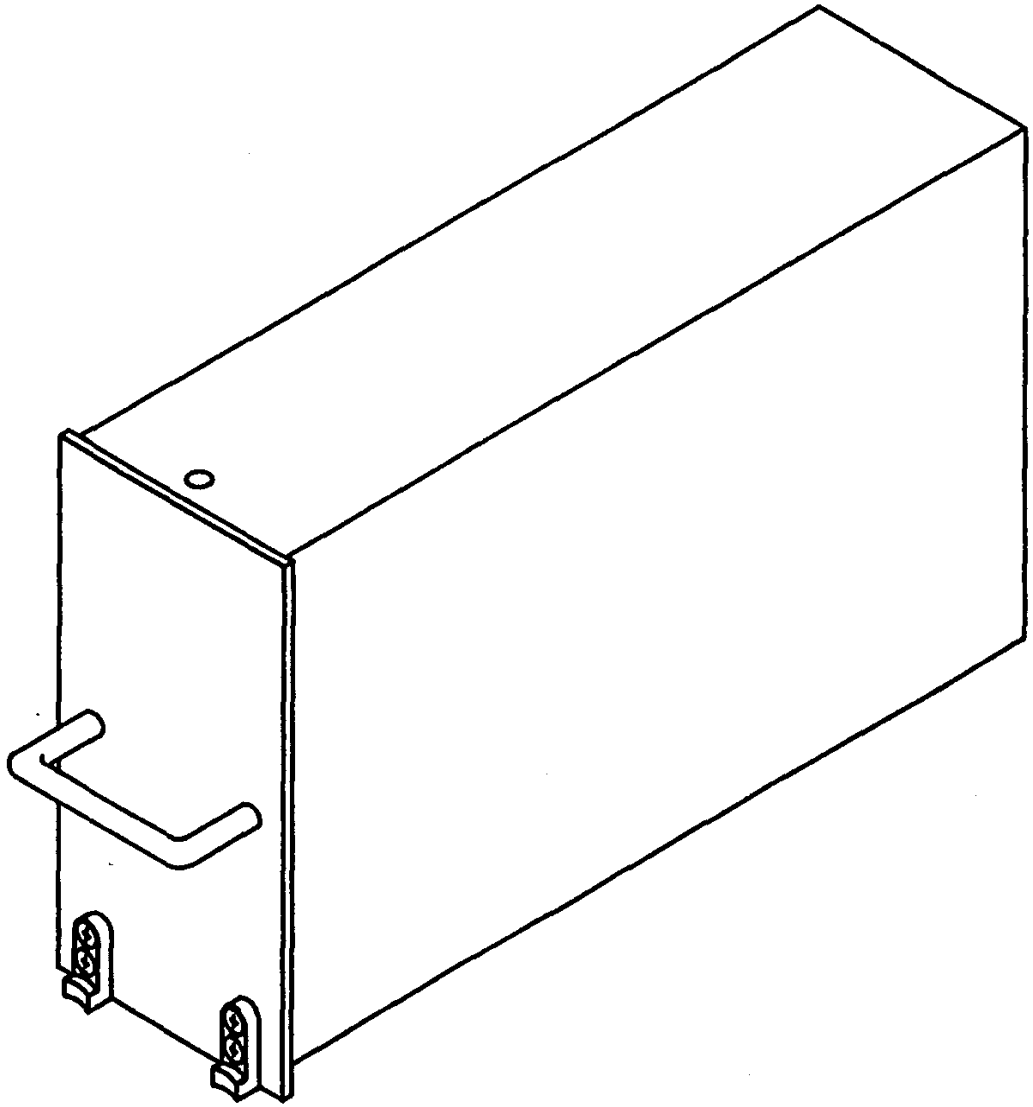


**Figure 41 CENTRAL MANAGEMENT UNIT**

# THIS PAGE INTENTIONALLY LEFT BLANK

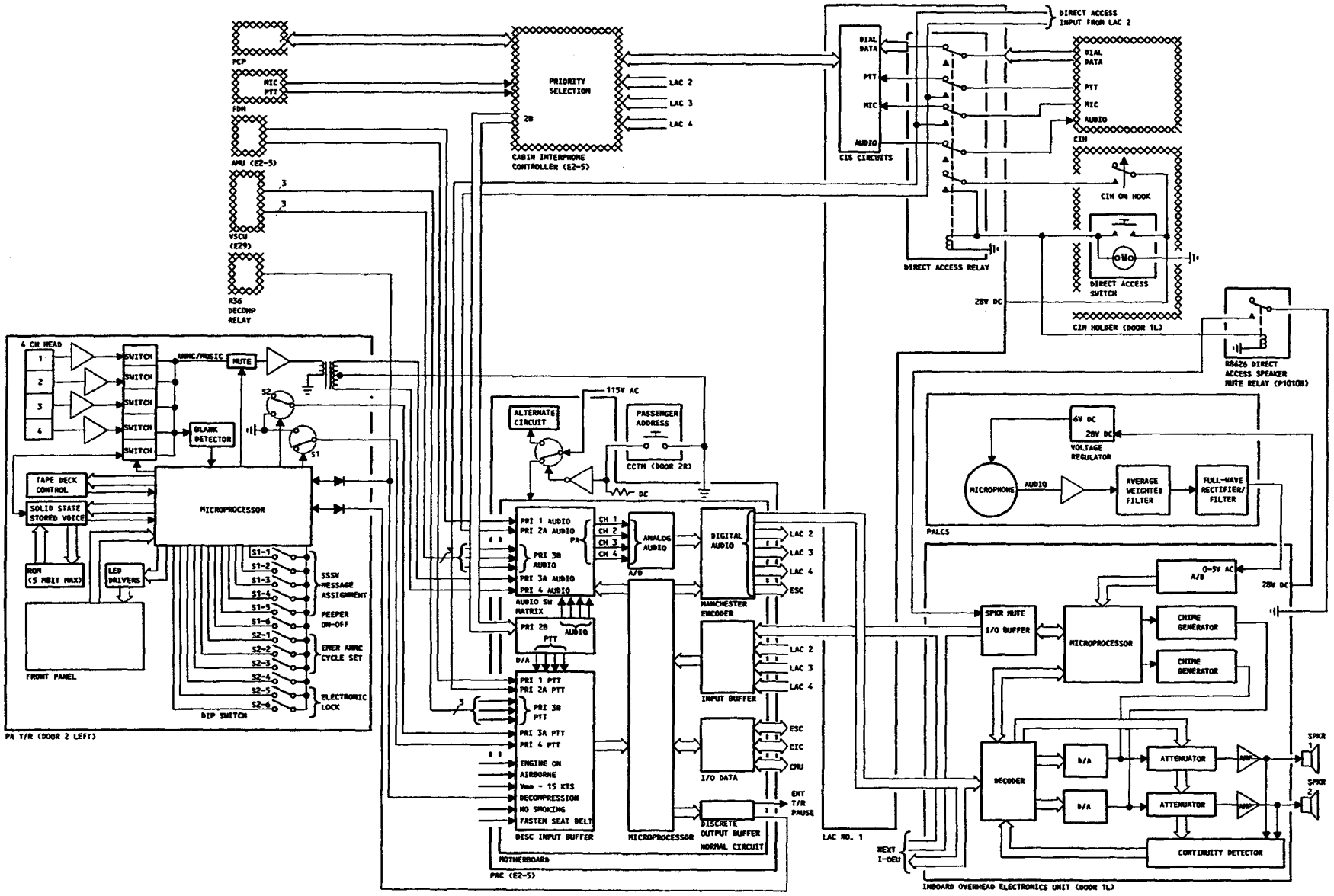



**Figure 42 PAS - SCHEMATIC DIAGRAM**

## PRIORITY 1 AND 2 OPERATION

### General

The flight interphone system sends priority 1 audio to the PAC.

Cabin interphone handsets send direct access (priority 2a) and cabin interphone system (priority 2b) audio to the PAC.

### Priority 1 PA Announcements

Use the PA transmit switch on the audio control panel (ACP) to make a PA announcement through the flight interphone system. When the MIC light for PA is on, push a PTT. The AMU then sends a PTT and audio from that flight interphone station to the PAC. This is priority 1 audio.

### Direct Access RA Announcements

The cabin interphone handset (CIH) holders at doors 1, 2 and 4 left have a direct access switch.

To make a direct access PA announcement, pick up the handset and push the direct access switch. 28v dc

from the local area controller (LAC) causes:

- The light in the switch to come on.
- The direct access speaker mute relay and a relay in the LAC to energize.
- 28v dc to go through the CIH on-hook switch to keep the relay in the LAC energized.

Mic audio and the PTT discrete go through the energized relay in the LAC to the PAC for priority 2a PA announcements. Dial data is not needed for direct access PA announcements.

When the CIH is in its holder, the CIH onhook switch opens and 28-volt dc is removed from the relay in the LAC. When the 28-volt dc is removed:

- The direct access speaker mute relay and a relay in the LAC de-energize
- The cabin interphone handset connects to cabin interphone system circuits in the LAC.
- The light in the direct access switch turns off.

### Cabin Interphone System PA Announcements

Attendants can use any cabin interphone handset to make PA announcements through the cabin interphone system (CIS). The flight crew can use the pilot call panel (PCP) with the flight deck handset (FDH) to make PA announcements through the CIS.

To make a CIS PA announcement, pick up a handset and enter the dial code for the PA area or areas for the announcement and push the PTT switch. Mic audio, the PTT discrete and dial data go to the local area controller (LAC).

The LAC:

- Changes the mic audio from analog to digital
- Multiplexes the digital audio, PTT discrete and the dial data
- Encodes the multiplexed data for transmission to the cabin interphone controller

The cabin interphone controller gets:

- Multiplexed data from LACs 11 21 3 and 4.
- Mic audio, a PTT discrete and dial data from the pilot call panel and flight deck handset.

The cabin interphone controller determines which inputs have the highest priority . Multiplexed data goes to the passenger address controller for priority 2b PA announcements.

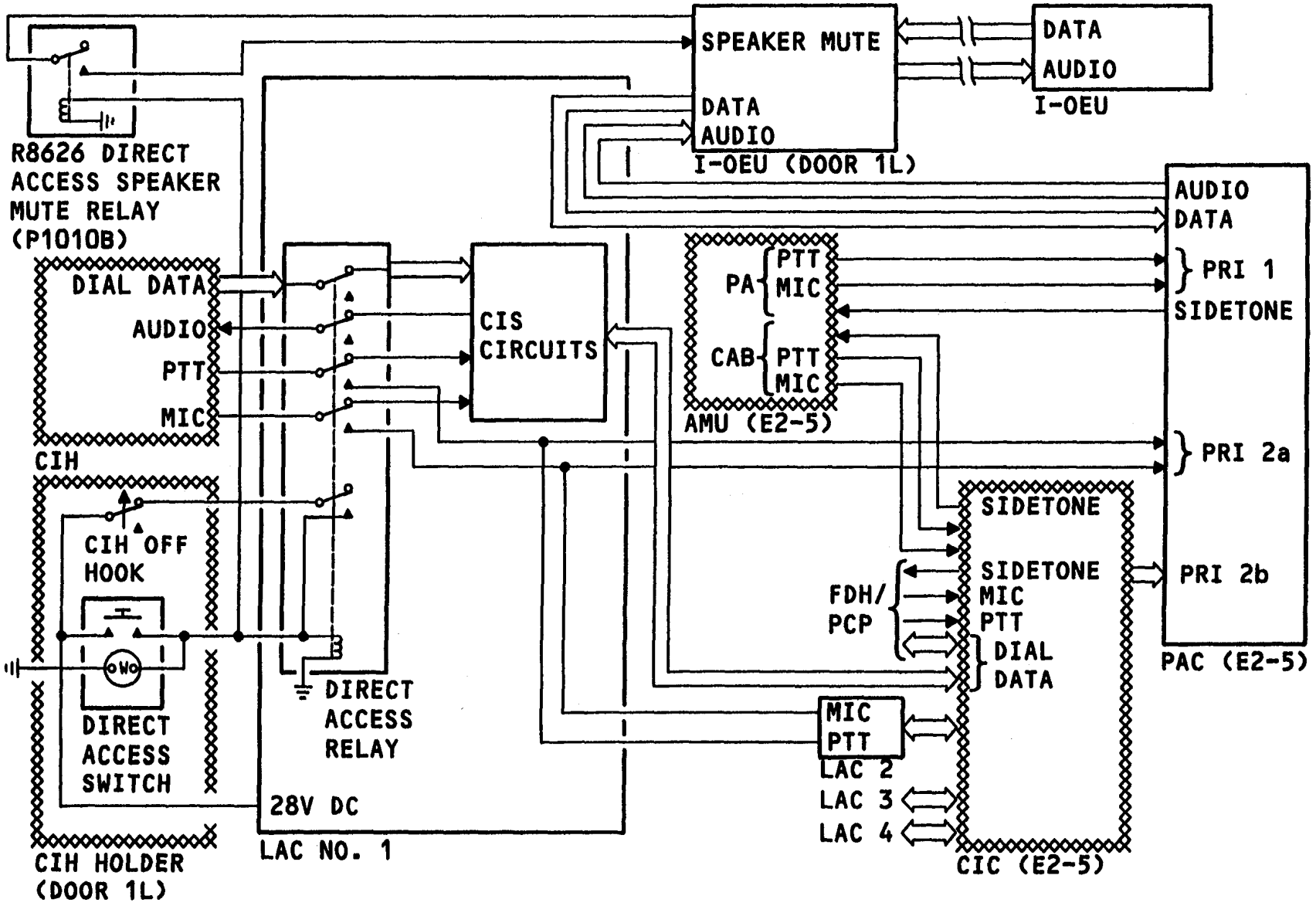



**Figure 43 PRIORITY 1 AND 2 OPERATION**

## PRIORITY 3A AND 4 OPERATION

### Purpose

The wall-mounted passenger address tape reproducer (PA T/R) sends announcements (priority 3a) and boarding music (priority 4) to the passenger address controller (PAC).

### General Description

The tape deck and control panel are a single unit. A microprocessor controls all functions of the tape reproducer. Dual-inline-package (DIP) mounted switches S1- through S1-6 and S2-1 through S2-6 program the microprocessor in accordance with-various airline requirements. If the BEEPER ON-OFF program switch (S1-6) is in the ON position, a beeper tone sounds each time a key is pushed. When power is first applied, the cassette rewinds.

### Announcements

Desired message number data (entered on the keyboard) goes to the microprocessor. The microprocessor fast forwards the tape deck to search for the selected message. An eight-second blank section is recorded between every message. As the tape moves forward, the read head sends audio to the blank detector, which counts the blank sections. When the proper number of blank sections are detected, the tape deck stops and the READY lamp comes on. Push the START button to cause the microprocessor to play the announcement and close a switch to allow audio from the proper head to go to the PAC. The microprocessor also sends a logic 1 to switch S1which sends a priority 3a keyline (ground) to the PAC.

### Boarding Music

Push the MUSIC 1 or MUSIC 2 key to start the playback of boarding music. The microprocessor closes the switch for track 3 or track 4 and sends a priority 4 keyline to the PAC. When a 20-second blank portion is detected at the end of the music program, the tape rewinds and the audio output is muted. Boarding music may be interrupted at any time with the STOP key.

### Emergency Announcement Operation

When a decompression of the passenger cabin occurs, a ground goes to the microprocessor, which enables the emergency mode. The microprocessor switches to a solid state stored voice (SSSV) circuit which stores an emergency message in read only memory (ROM). The microprocessor closes the switches that let the SSSV audio output and the priority 3a keyline go to the PAC. The announcement repeats one to eight times depending on programming of dip switches S2-1, S2-2 and S2-3.

### Pause

The PAC sends a PA T/R pause signal to the microprocessor whenever a higher priority announcement is made in the passenger cabin. The pause command ground) places the tape deck in the pause mode. The current music/announcement playback resumes when the higher priority announcement is complete and the ground goes away.

### Electronic Look

The dip switches S2-5 and S2-6 establish the two-digit code which opens the tape reproducer’s access door.

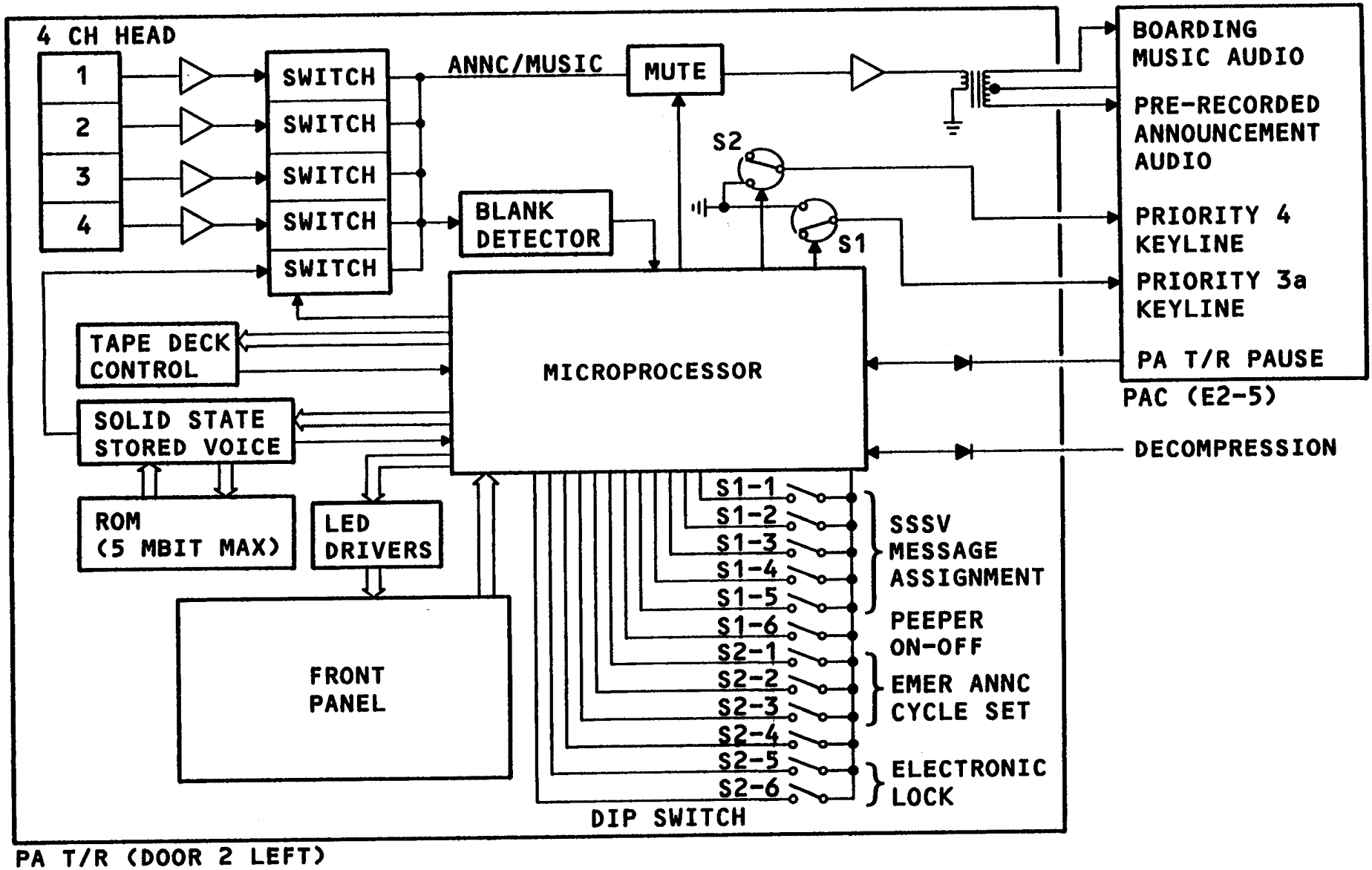



**Figure 44 PRIORITY 3a AND 4 OPERATION**

## PAC NORMAL & ALTERNATE CIRCUITS

The passenger address controller (PAC) has these two fully redundant controller circuits:

- Normal
- Alternate

Each circuit can do all PAC functions. All interfaces with the PAC connect in parallel to both circuits.

Normally, the passenger address switch on the cabin configuration test module (CCTM) is open. When it is open, it sends an open discrete to an inverter on the motherboard of the PAC (an open is a logic one). This sends a logic zero to switch S1- The switch sends 28v dc to the normal controller circuit.

When the passenger address switch closes, it sends a ground discrete from the PAC back to the PAC to an inverter on the motherboard (a ground is a logic zero). This sends a logic one to switch S1- The switch sends 28v dc to the alternate controller and removes power from the normal circuit. Thus, the alternate circuit now does all the PAC functions.

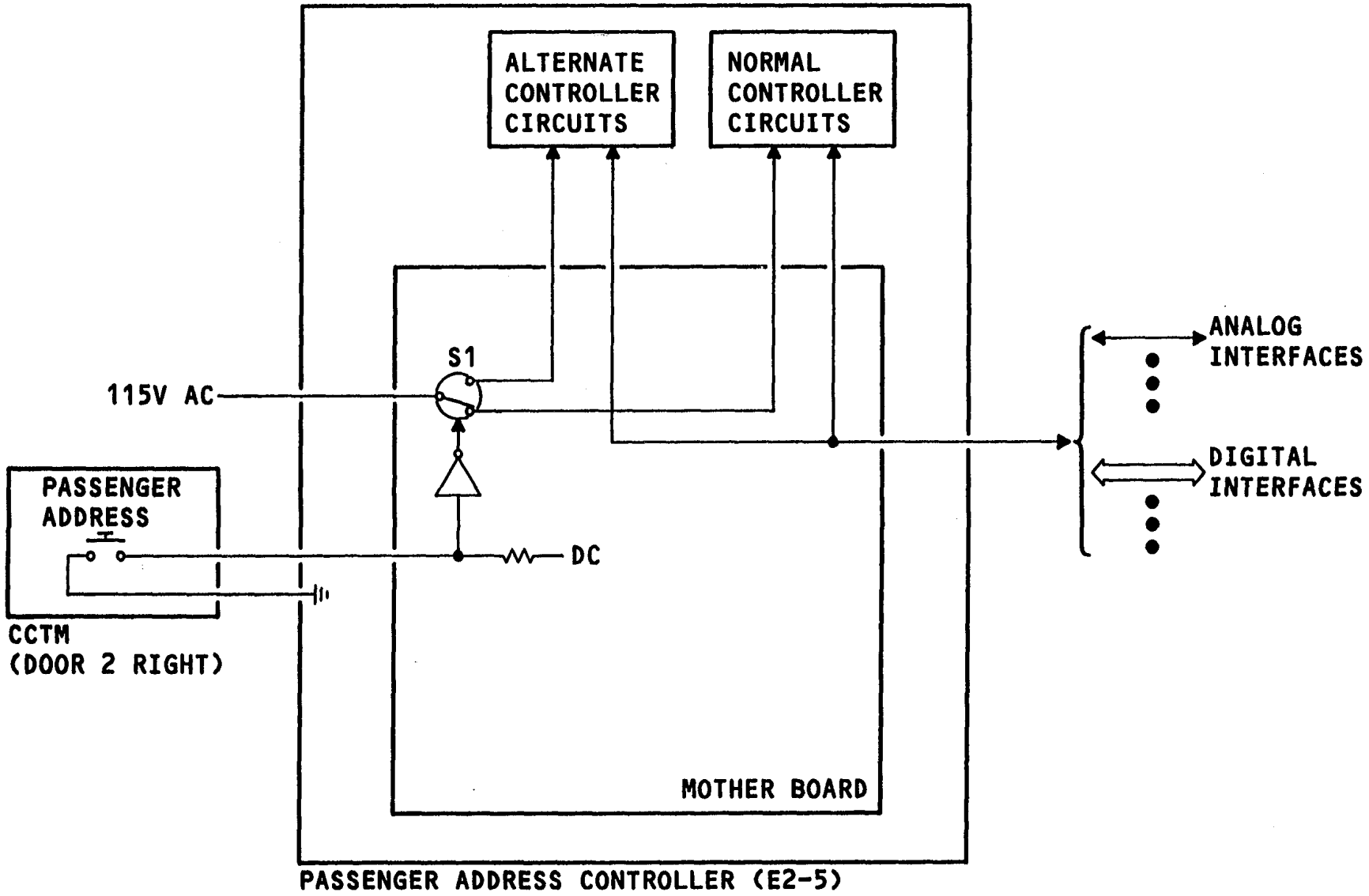



**Figure 45 PAC NORMAL & ALTERNATE CIRCUITS**

# PASSENGER ADDRESS CONTROLLER OPERATION

### PA Audio Inputs

All audio inputs to the PAC are analog, with the exception of priority 2b. Priority 2b inputs are from the cabin interphone system and are in a digital format. This input goes to a digital to analog converter where up to four channels of audio (one for each PA area) then go to the audio switching matrix. Based on PTT and keyline inputs, the audio switching matrix sends the highest priority audio to an analog to digital converter.

### PTT and Keyline Inputs

The discrete input buffer gets a PTT or keyline input any time a PA announcement is made. This information goes to the controller which determines which of the inputs is highest in priority. The controller then commands the audio switching matrix to send the highest priority audio input to the A/D converter.

### Audio Outputs

The A/D converter gets audio on one or more of its four PA channel inputs. If an announcement is for the entire airplane (priority 1, 2a, 3b or 4), then audio is present on all four PA channel inputs to the A/D converter. If the announcement is for PA area 1 only (priority 2b or 3a), then audio is present on PA channel 1. Audio to areas 2, 3, and 4, use channels 21 31 and 4 respectively.

The A/D converter changes the four channels of analog audio into a digital format and sends it to a Manchester encoder. The Manchester encoder transmits digital audio and other data (received from the controller) to a local area controller (LAC). The LAC then passes the digital audio/data to a column of inboard overhead electronics units (I-OEUs) which broadcast the PA announcement.

Data transmitted from the LAC includes:

- Area selection, which tells the (IOEUs). in each PA area when to broadcast a PA announcement
- Chime annunciation, which commands one or more (I-OEUs). to generate a chime
- Output level, for PA volume levels

The Manchester encoder also sends digital audio and area selection information to the entertainment/service controller (ESC). This lets the passenger entertainment system override entertainment audio in the passenger headphones while a PA announcement is made.

### Chime Annunciation

The PAC gets discrete and digital inputs which cause the PAC to generate a chime annunciation command.

A to chime command is generated anytime the no smoking or fasten seat belt signs are turned on or off. The PAC monitors two discrete inputs from the passenger signs module to determine this.

The entertainment/service controller (ESC) sends a Hi chime command on a digital bus to indicate a passenger or lavatory to attendant call.

The cabin interphone controller (CIC) sends a Hi-Lo chime command on a digital bus to indicate an attendant to attendant call.

### PA Volume Level

The PAC sends PA volume level commands to the I-OEUs to increase or decrease the volume level of PA announcements.

The PAC adjusts the PA volume with four separate methods.

- Default volume level.. The PAC stores a preset volume level in memory. This preset level can only change by modifying the configuration database and loading the modified database into the PAC.
- Passenger address level control sensor (PALCS). The PALCS provide a voltage to an I-OEU proportional to the noise level in the area where it's located. The I-OEU transmits this information to the PAC via a LAC. The PAC then generates commands to adjust the volume.
- Discrete inputs. When the PALCS are non-operational, PA volume control is provided by four basic flight status discrete inputs. Volume increases with the addition of each discrete starting with engine on, airborne, VMO-15 knots, and decompression. Note that decompression results in an immediate volume adjustment and overrides all PALCS control, resulting in a PA volume setting of +6dB over programmed default.
- Cabin configuration test module (CCTM) adjustments. The PA volume can be manually increased above the default level at the CCTM. The CCTM sends adjustment commands to the PAC via the central management unit (CMU).

**Discrete Outputs**

The PAC sends an ENT T/R pause discrete to the entertainment tape reproducer under these conditions:

- Priority 1 announcements
- Priority 2a announcements
- Priority 2b announcements if the announcement is broadcast in all PA areas
- Priority 3a announcements
- Priority 3b announcements if all three video entertainment system keylines are active

The PAC sends a PA T/R pause discrete to the prerecorded announcement tape reproducer under these conditions:

- Priority 1 announcements
- Priority 2a announcements
- Priority 2b announcements if the announcement is broadcast in all PA areas

During PA announcements a digital discrete goes to the cabin interphone controller. This causes the cabin interphone system to display PA IN USE on the pilots call panel (PCP).

**Norm/Alt Select Discrete**

Push the alternate systems passenger address switch on the CCTM to send the Norm/Alt select discrete to the PAC. This discrete causes power to be removed from the normal controller and power to be applied to the alternate controller. The alternate controller performs all functions of the PAC.

**CMU Interface**

The PAC gets fault status information from the I-OEUs. The PAC sends its own status along with the status of the I-OEUs and PALCS to the central management unit.

The PAC also interfaces with the CMU for program and test functions.

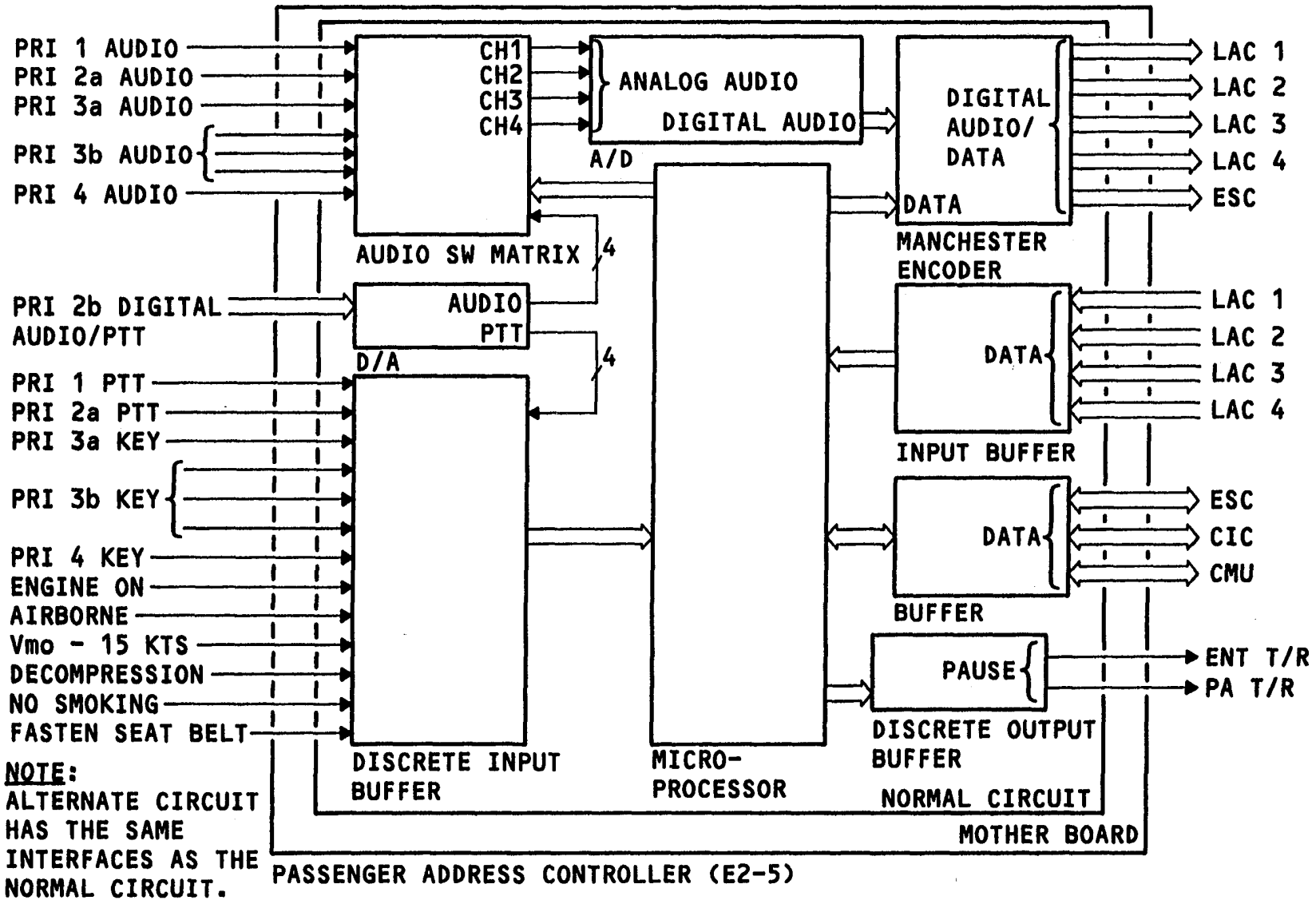



**Figure 46 PAC OPERATION**

## IOEU OPERATION

### PA Inputs

The inboard overhead electronic units (IOEUs) get data from the PA controller (PAC) via the local area controller (LAC). The data contains:

- Digital audio
- Area selection
- Chime annunciation
- Output level control

The passenger address level control sensors (PALCS) send an analog voltage that is proportional to the noise level in the area where the PALCS are installed.

The direct access speaker mute relay sends a discrete to the I-OEU to mute speakers during a direct access PA announcement.

### Level Control

The A/D converter gets an analog voltage from the PALCS. This voltage is proportional to the noise level in the area where the PALCS are installed.

The A/D converts the analog voltage to digital data. The data goes to the controller and is processed. The processed data goes to the PAC through the 1/0 buffer and LAC. The PAC uses the data for PA volume level control.

### Area Selection

The decoder gets area selection data from the LAC. The data is decoded and sent to the controller. If the IOEU is to be used for the PA announcement the controller will enable the audio data input to the D/A through the decoder.

### Audio Outputs

The I-OEUs get audio as digital data from the PAC via the LACs. The decoder sends the digital audio to the D/A when enabled by the controller. The digital audio converts to analog in the D/A and goes to the attenuator. The attenuator gets volume control data from the controller through the decoder and attenuates the audio. The attenuated audio goes to the ceiling speaker through the audio amplifier.

### Status Monitoring

The continuity detector monitors the audio output of the amplifier. The continuity detector sends digital data about the audio output to the controller through the decoder. The controller uses the data from the continuity detector to monitor the speaker interface.

### Chimes

The decoder gets chime commands and sends them to the controller. The controller enables the proper chime in the chime generator. The chime goes to the attenuator and output in the same way as audio.

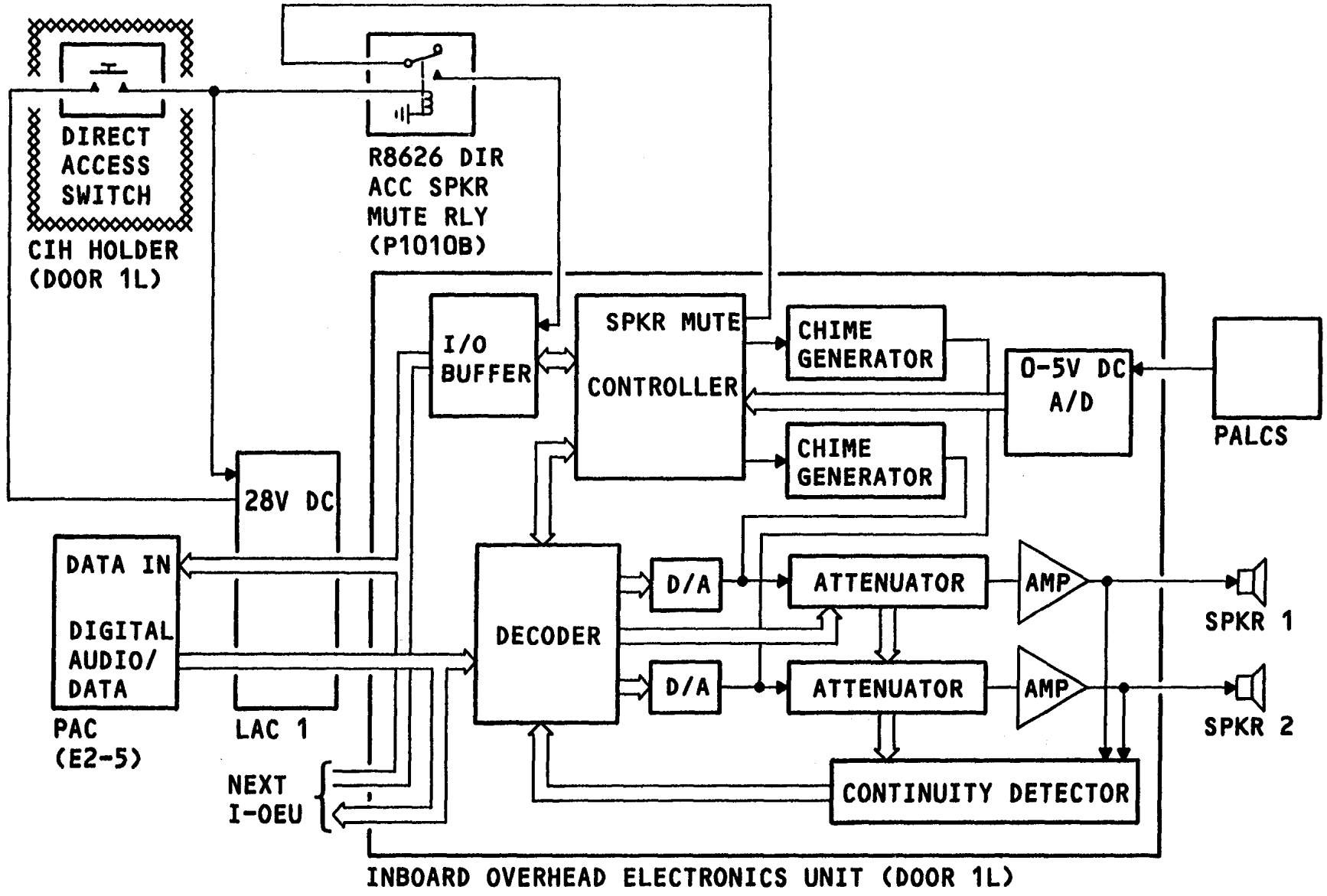



**Figure 47 IOEU OPERATION**

## PALCS OPERATION

### General

The passenger address level control sensor (PALCS) senses the ambient noise in the passenger cabin. The PAWS then sends a signal to the inboard overhead electronics unit (I-OEU). This signal is proportional to the ambient noise. The I-OEU converts the analog signal to digital and sends it to the PAC. The PAC adjusts the volume of the PA speakers. All PA amplifiers in the PA speaker zone where the PAWS is installed will automatically adjust to compensate for ambient noise.

### Operation

28-volt dc from the I-OEU goes to the voltage regulator, which sends out 6v dc for microphone excitation.

The microphone senses the ambient noise level. The audio signal (ambient noise) is pre-amplified and sent to an average weighted filter. The filter is a band pass filter which passes only those frequencies audible to the human ear. The signal is then amplified,

sent through a full-wave rectifier and filtered. The signal output is an analog voltage with a range of 0 to 5 volts.

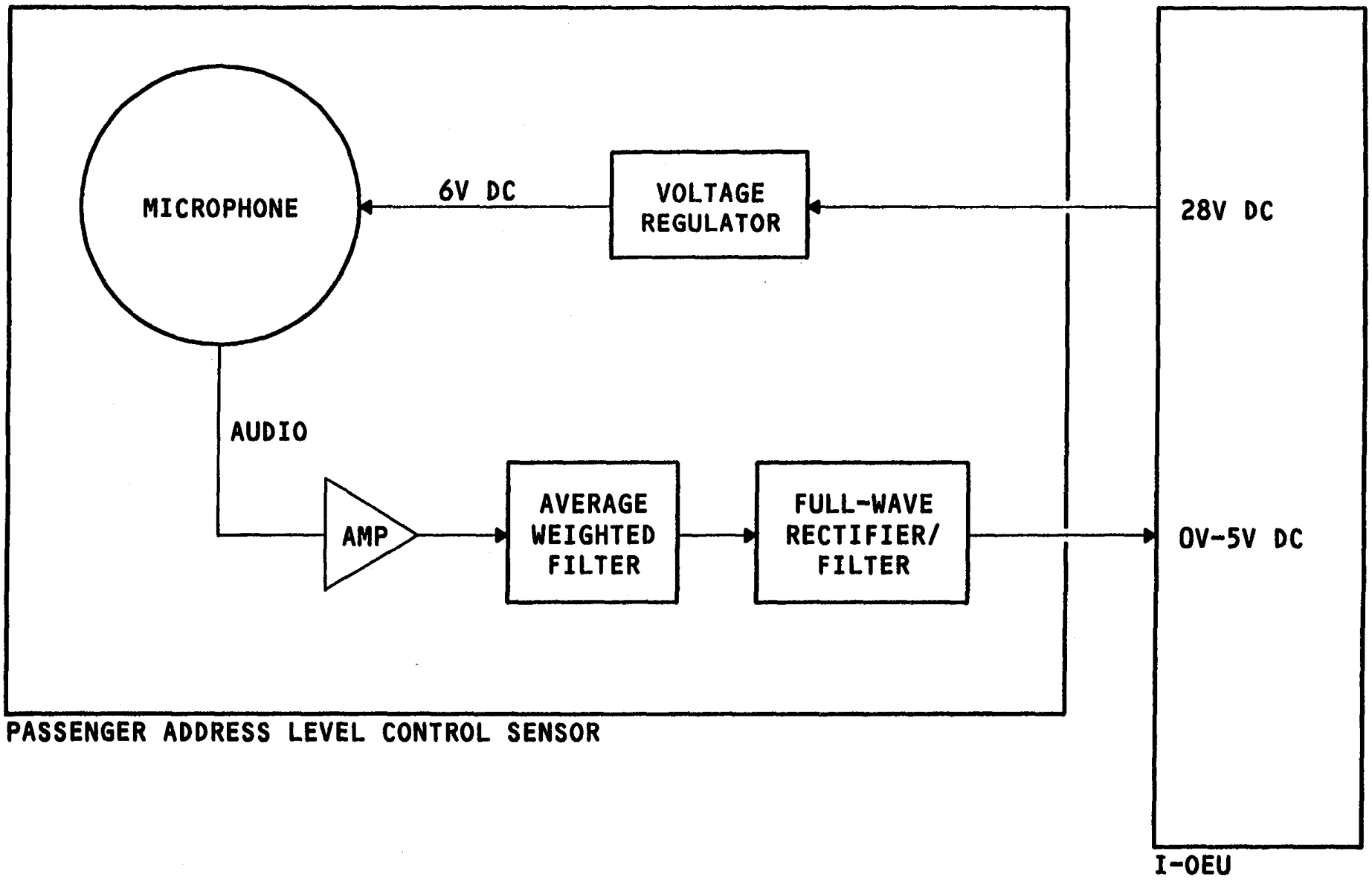



**Figure 48 PALCS OPERATION**

## PROGRAMMABLE FEATURES

The passenger address system (PAS) uses the ACESS configuration database to control some PAS functions.

All ACESS systems use part of the configuration database. For PAS, this database has data for:

- Installation of local area controllers (LACs), inboard overhead electronics units (I-OEUs), and speakers
- Speaker volume zone and definitions
- Speaker definition: inputs accepted, default volume levels
- PA area 4 inputs accepted
- Chime types and chime counts

Each speaker pair may be programmed such that it gets:

- No inputs
- Flight interphone inputs only
- Direct access and flight interphone inputs only
- All announcements to that area

All inputs are broadcast from all speakers during decompression. Chime inputs are independent from PA announcements.

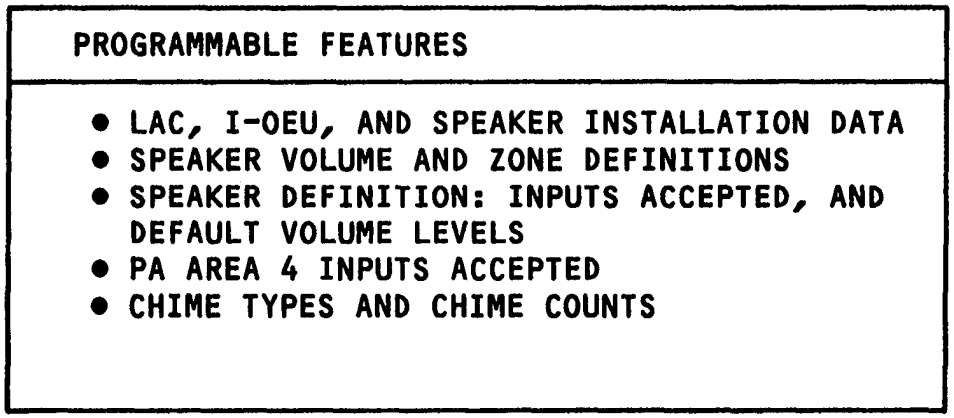



**Figure 49 PROGRAMMABLE FEATURES**

# TABLE OF CONTENTS

# TABLE OF FIGURES