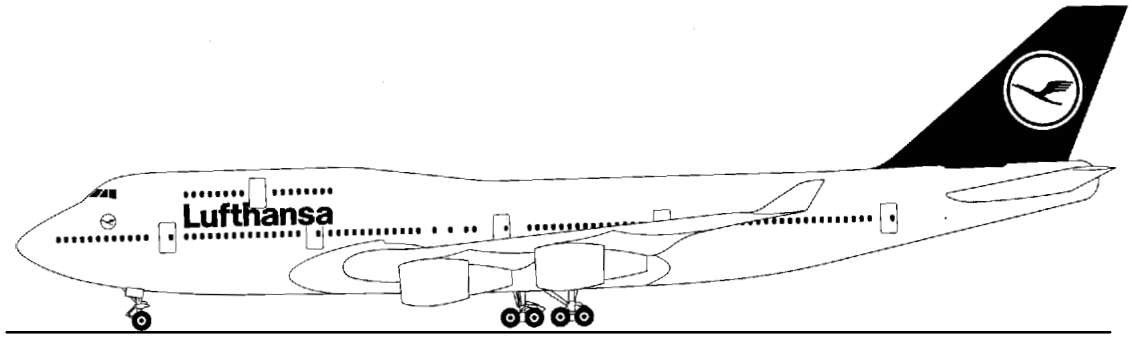
# Lufthansa Technical Training

# Training Manual B 747-400




## ATA 23-30
## ACESS INTRO

ATA Spec. 104 Level 3

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# ATA 23-30 ACESS INTRODUCTION

# ACESS - INTRODUCTION

## General

The advanced cabin entertainment/ service system (ACESS) is an integrated system that contains five subsystems. They are:

- Passenger address
- Cabin interphone
- Passenger entertainment (audio)
- Passenger service
- Cabin lighting

## Passenger Address System (PAS)

Cabin attendants and the flight crew use the PAS to communicate with passengers. The PA audio is transmitted to:

- Speakers in the passenger cabin
- Passenger headphones

## Cabin Interphone System (CIS)

Cabin attendants and the flight crew use the CIS to communicate with each other. They use handsets located in the passenger cabin and the flight deck.

## Passenger Entertainment (Audio) System (PES Audio)

The PES audio system sends entertainment audio to the passenger headphones.

## Passenger Service System (PSS)

Passengers use the PSS to control:

- Passenger reading lights
- Attendant call lights and chimes

The PSS also controls passenger information signs.

## Cabin Lighting System (CLS)

The CLS controls most of the lighting functions in the airplane. These include:

- Indirect ceiling lights
- Sidewall wash lights
- Night lights
- Direct ceiling lights

**NOTE:** CABIN LIGHTING IS AN ATA CHAPTER 33 SYSTEM AND IS NOT DISCUSSED FURTHER IN THIS LESSON.

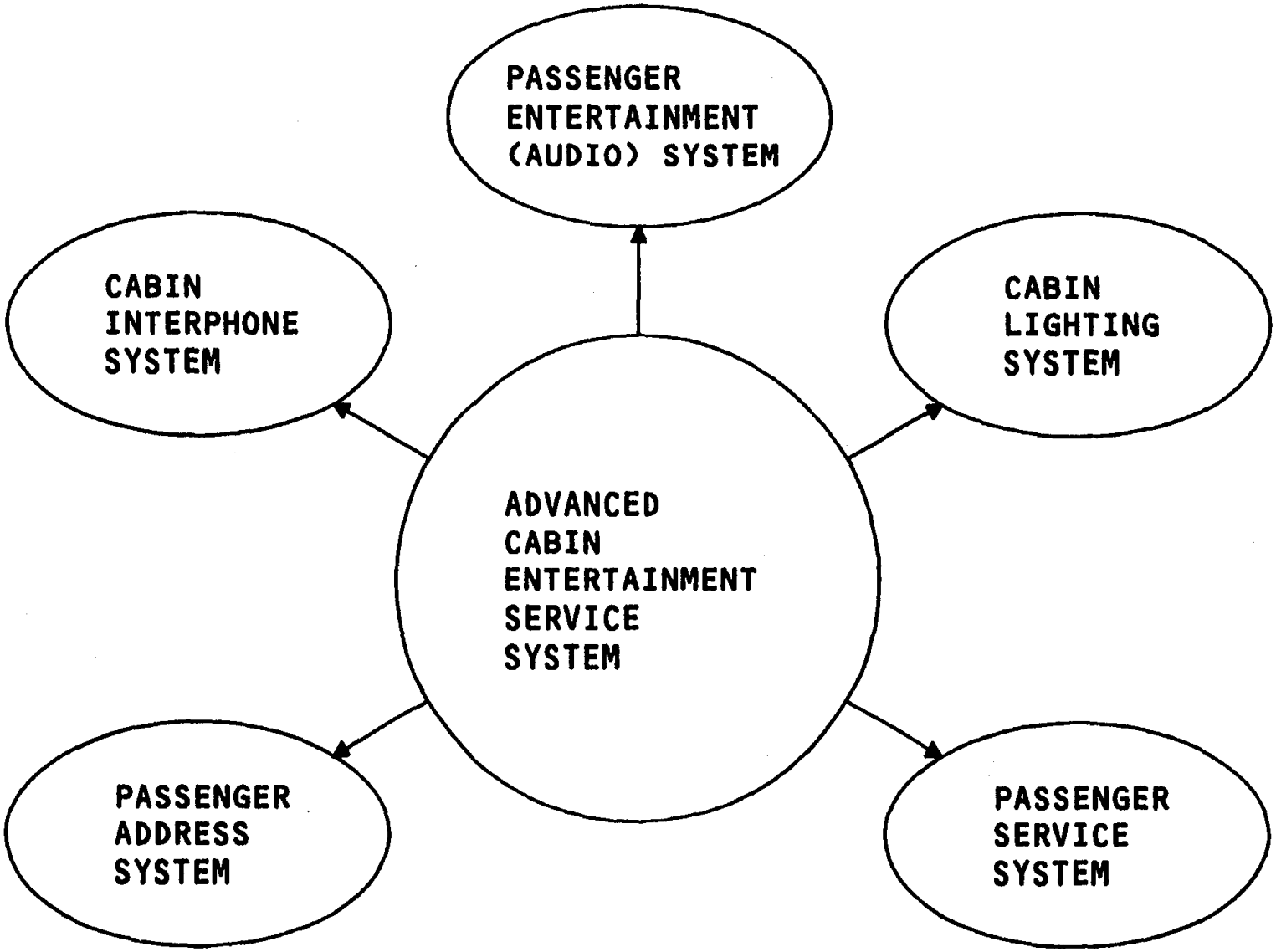



**Figure 1 ACESS - INTRODUCTION**

## ACESS SYSTEM

### General

Seventeen different types of line replaceable units (LRUs) are in the advanced cabin entertainment/service system (ACESS). They are:

- Central management unit (CMU)
- Cabin configuration test module (CCTM)
- Cabin interphone controller (CIC)
- Pilot's call panel (PCP)
- Flight deck handset (FDH)
- Passenger address controller (PAC)
- Entertainment/service controller (ESC)
- Audio entertainment multiplexer (AEM)
- Local area controllers (LAC)
- Cabin interphone handsets (CIH)
- Cabin system modules (CSM)
- Seat electronics units (SEU)
- Digital passenger control units (DPCU)
- Outboard overhead electronics units (O-OEUs)
- Inboard overhead electronics units (I-OEUs)
- Passenger address level control sensors (PALCS)
- Speakers

Three ACESS LRUs, called main controllers, control the ACESS subsystems. They are the:

- Passenger address controller (PAC). The PAC controls the passenger address system.
- Cabin interphone controller (CIC). The CIC controls the cabin interphone system.
- Entertainment/service controller (ESC). The ESC controls the passenger entertainment (audio), passenger service, and cabin lighting systems.

The three main controllers send data and/or audio to four local area controllers (LACs).

The LACs interface with other ACESS components in the passenger zones they are wired to. Each LAC sends data/audio to one or two passenger zones as follows:

- LAC 1 interfaces with zones A and B
- LAC 2 interfaces with zones C and D
- LAC 3 interfaces with zone E
- LAC 4 interfaces with the upper deck.

The LAC interfaces with:

- Cabin interphone handsets (CIHs)
- A cabin system module (CSM)
- Seat electronics units (SEUs)
- Outboard overhead electronics units (O-OEUs)
- Inboard overhead electronics units (I-OEUs)

### Cabin Interphone System

Cabin attendants and the flight crew use the cabin interphone system to communicate with each other.

An attendant picks up a cabin interphone handset (CIH) and pushes the dial code for another station. This causes the code to go through the local area controller (LAC) to the cabin interphone controller (CIC). The called station gets a high-low chime, and the attendants call light comes on. The passenger address system causes the chime to sound, and the passenger service system causes the call light to come on. The attendant at the called station picks up the handset, and the CIC connects the two stations.

Flight crew communication is the same, except:

- A flight deck handset (FDH) and pilots' call panel (PCP) are used in place of a CIH.
- The FDH and PCP interface directly with the CIC.

**Passenger Address System**

Cabin attendants and the flight crew use the passenger address system to communicate with the passengers.

The passenger address controller (PAC) gets audio from different sources. The PAC sends the audio through the LAC to the inboard overhead electronics units (I-OEUs). The I-OEUs connect to one or two speakers that transmit the audio to the passenger cabin.

Passenger address level control sensors (PALCS) measure the cabin noise level and send the information through I-OEUs to a LAC. The LAC sends commands to the I-OEUs. The I-OEUs adjust the passenger address volume in the area where the PALCS is located.

**Passenger Entertainment (Audio) System**

The passenger entertainment (audio) system (PES audio) sends entertainment audio to the passenger headphones.

The audio entertainment multiplexer (AEM) gets audio from an entertainment tape reproducer. The audio changes to digital audio and goes to the entertainment/service controller (ESC). The ESC sends the digital audio to the local area controllers (LACs). The LACs send the audio to the seat electronics units (SEUs). Passengers set channel and volume selections on a digital passenger control unit (DPCU). The SEU gets the selections from the DPCU, changes the digital audio to analog audio, and sends it to the headphone.

**Passenger Service System**

The passenger service system (PSS) controls:

- Passengers reading lights
- Passengers to attendant calls
- Passenger information signs

Passengers use digital passenger control units (DPCUs) to:

- Control reading lights
- Call attendants

Reading light on/off selection goes to the SEU and then to the LAC. The LAC sends the selection to an inboard or outboard overhead electronics unit (IOEU or O-OEU). The OEU makes the reading light go on or off.

Passenger to attendant call commands go to the SEU and then to the LAC. The LAC:

- Makes a master call light at the attendants station come on.
- Sends a call light command to the IOEUs or O-OEUs. The OEU makes the row call light above the seat come on.
- Sends a chime command to the ESC. The ESC sends the chime command to the passenger address system. The passenger address system sounds a high chime at the attendants station.

Discrete inputs to the ESC cause the passenger information signs to go on or off. The ESC sends a command through the LAC to the O-OEUs and I-OEUs. The OEUs make the passenger information signs go on or off.

**Cabin System Module**

Use the cabin system module (CSM) to control the:

- Passenger entertainment (audio) system
- Passenger service system
- Cabin lighting system

**Test**

The cabin configuration test module (CCTM) gives control of system test. Use the CCTM to start a test of a single ACESS subsystem or of all subsystems together. The CCTM sends a test command to the central management unit (CMU), to start the test. Test results go to the CMU and then to the CCTM. When the test finds a failure, the CCTM shows the failed component and its location.

**Monitor**

During normal operation, the CMU sends status information to the EFIS/EICAS interface units (EIUs). If a failure occurs, the EIUs:

- Generate a status message for main controller failures.
- Send failure information to the central maintenance computer system (CMCS). The CMCS shows CMCS fault messages.

**Program**

ACESS is programmed with two types of software. They are the:

- ACESS configuration database
- LRU operational software

The software is stored on floppy disks. To program ACESS, put the floppy disk into a software data loader. The software goes through the software data loader panel to the CMU. The CMU stores the software. Use the CCTM to command the CMU to program the other ACESS LRUs.

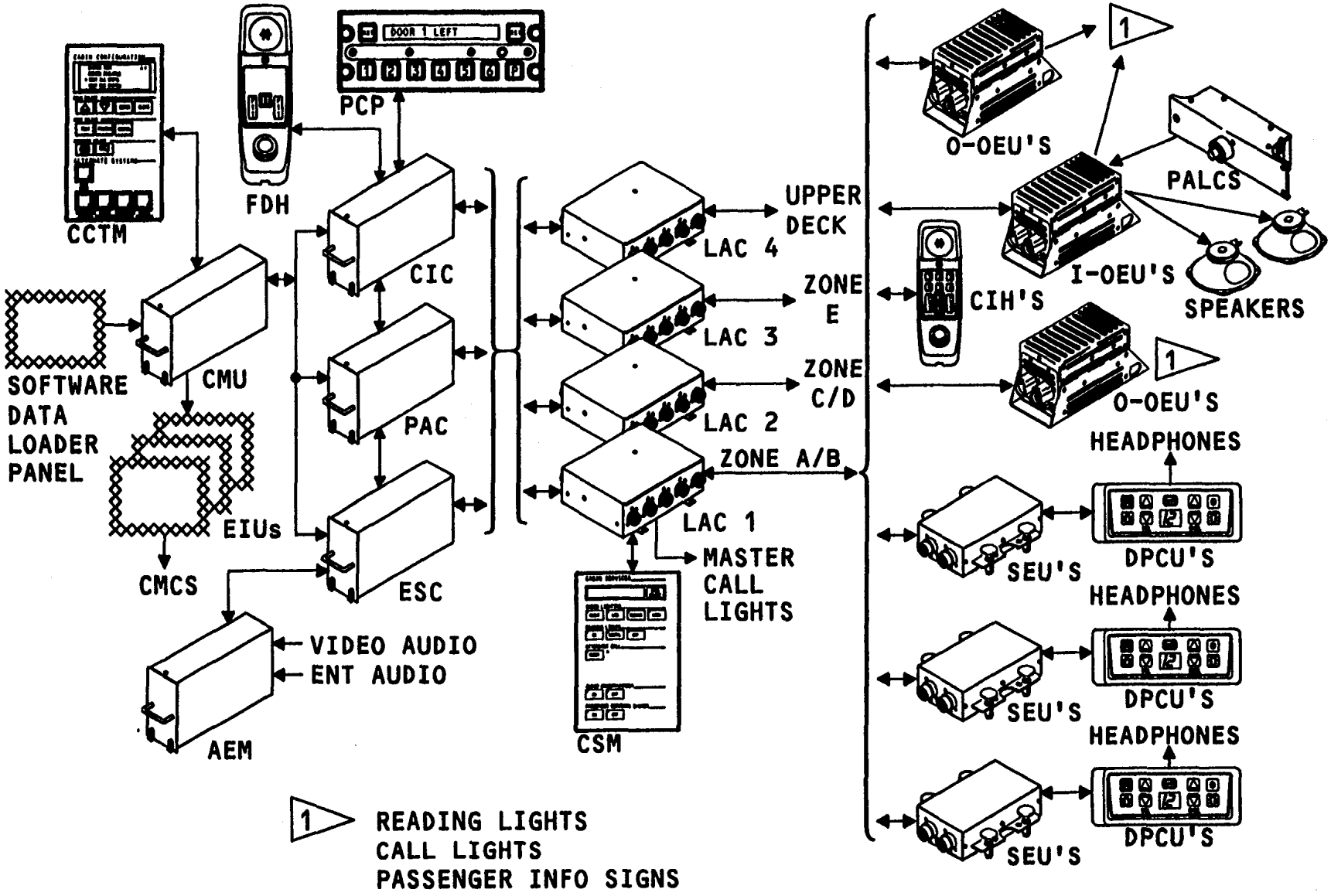



**Figure 2 ACESS SYSTEM**

## ACESS - COMPONENT LOCATIONS

The major ACESS components and their locations are:

- Local area controller (LAC) 1 and 2: Door 2 left overhead liferaft box
- Local area controller 3: STA 1500, WL 330, RBL 45
- Local area controller 4: Door 2 right overhead liferaft box
- Cabin configuration test module (CCTM): Door 2 right
- overhead electronics units (OEU): Ever other passenger service unit and In each lavatory
- Seat electronics units (SEU): Every seat group
- Cabin interphone controller (CIC): E2-5
- Passenger address controller (PAC): E2-5
- Entertainment/service controller (ESC): E2-5
- Central management unit (CMU): E2-5

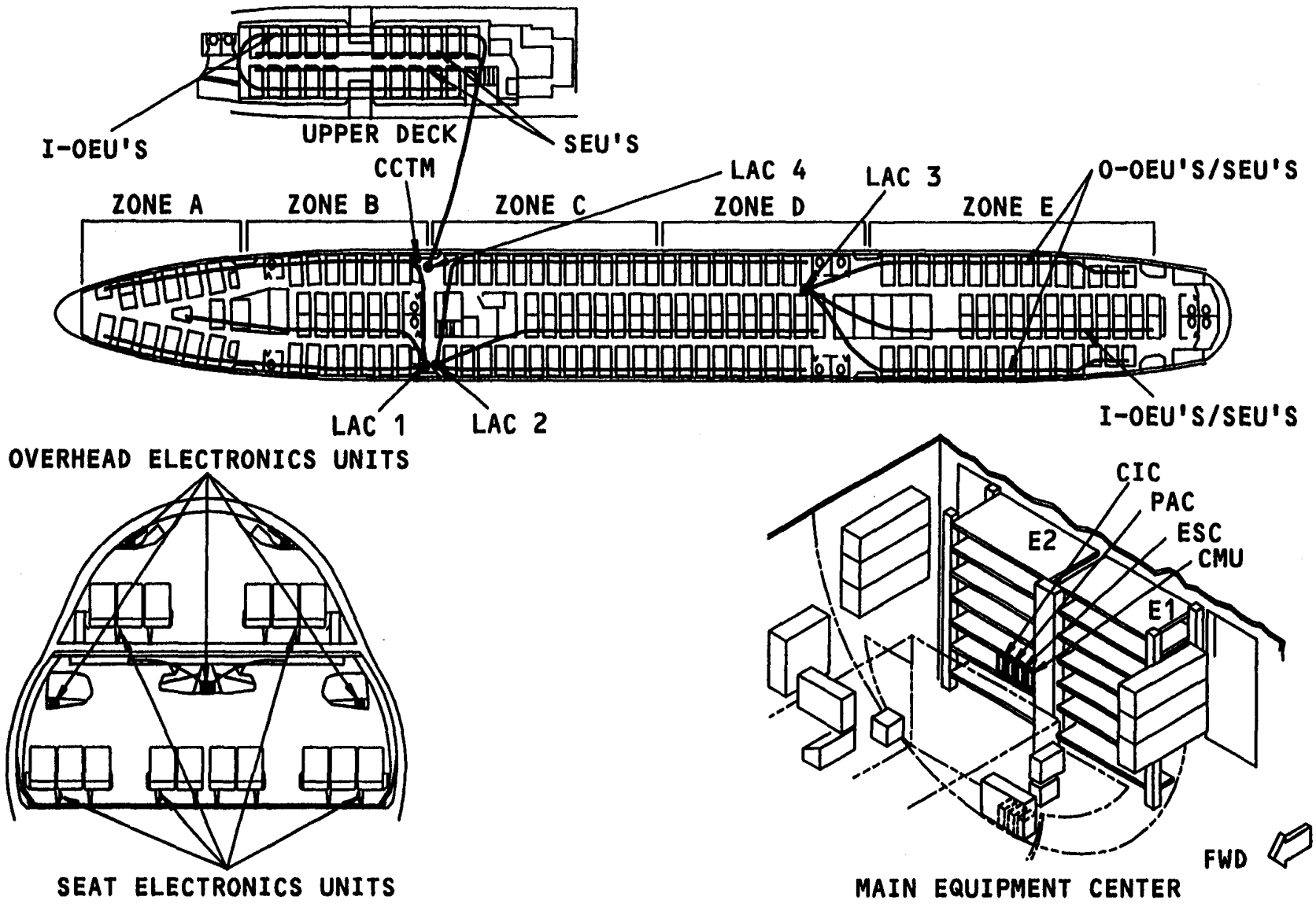



**Figure 3 ACESS - COMPONENT LOCATIONS**

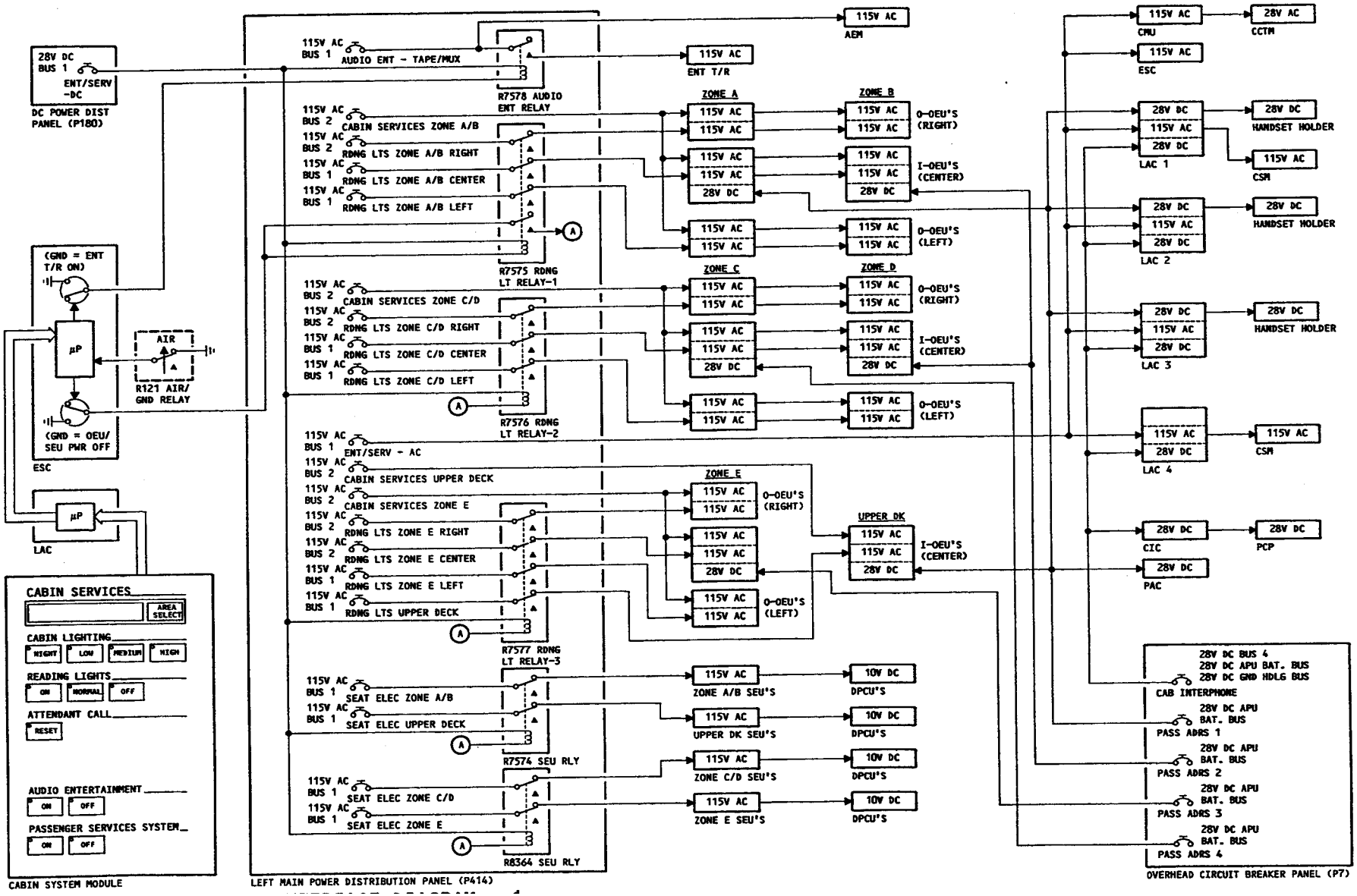



**Figure 4 ACESS - INTERFACE DIAGRAM - 1**

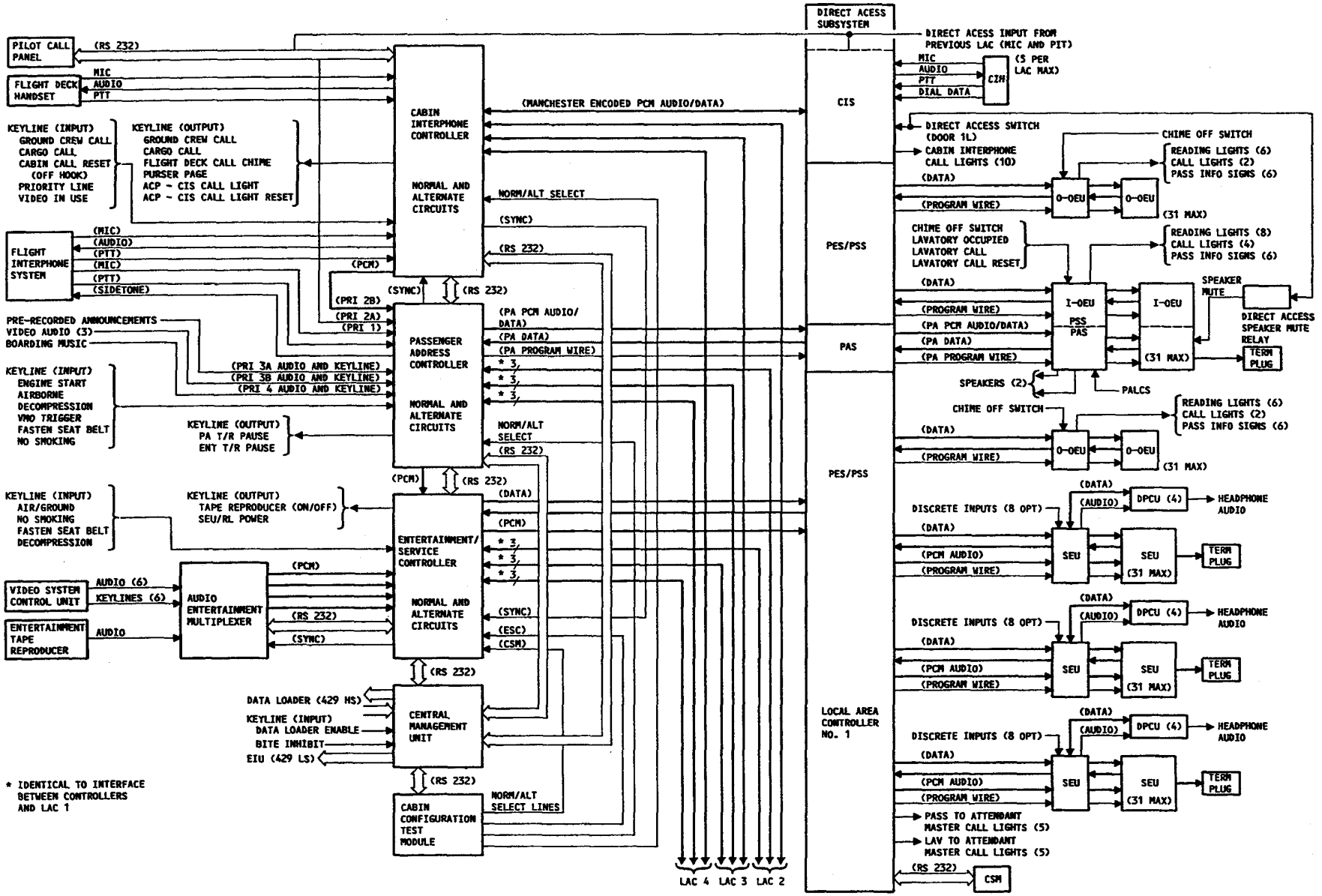



**Figure 5 ACESS - INTERFACE DIAGRAM - 2**

## ACESS CONFIGURATION DATABASE

### Purpose

The configuration database is software that controls the operation of ACESS. The database customizes ACESS for a particular airplane's cabin layout. Many ACESS components have a non-volatile memory which stores part of the configuration database. If an airline changes its passenger cabin layout, the configuration database must also change.

### General Description

Some of the functions that the ACESS configuration database software controls are:

- Number of passenger address areas (1 to 4)
- Passenger address speaker volume levels
- Cabin interphone system dial codes Entertainment audio channel selections

There is more detail on these functions and others in the ACESS subsystem lessons.

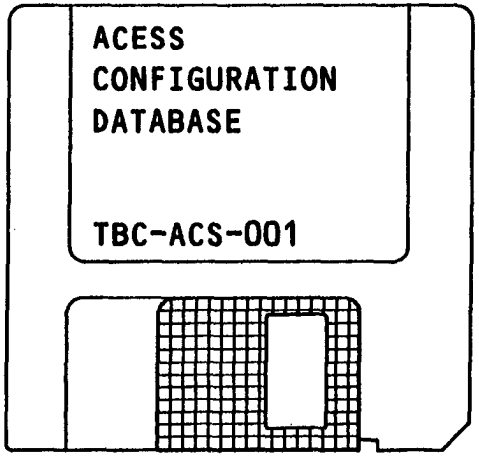



**Figure 6 ACESS CONFIGURATION DATABASE**

## AIRPLANE CONFIGURATION SYSTEM

### Purpose

The airplane configuration system (ACS) lets the airline make changes to the ACESS configuration database.

### General Description

ACS is a software program for use on an IBM (or compatible) personal computer.

When there is a change to the airplane's cabin layout, the airline's technical or engineering department must use ACS to change the ACESS configuration database. ACS puts the new configuration database onto a floppy disk. Maintenance persons then take the disk onto the airplane and install the database into ACESS.

Usually, line maintenance persons do not use ACS.

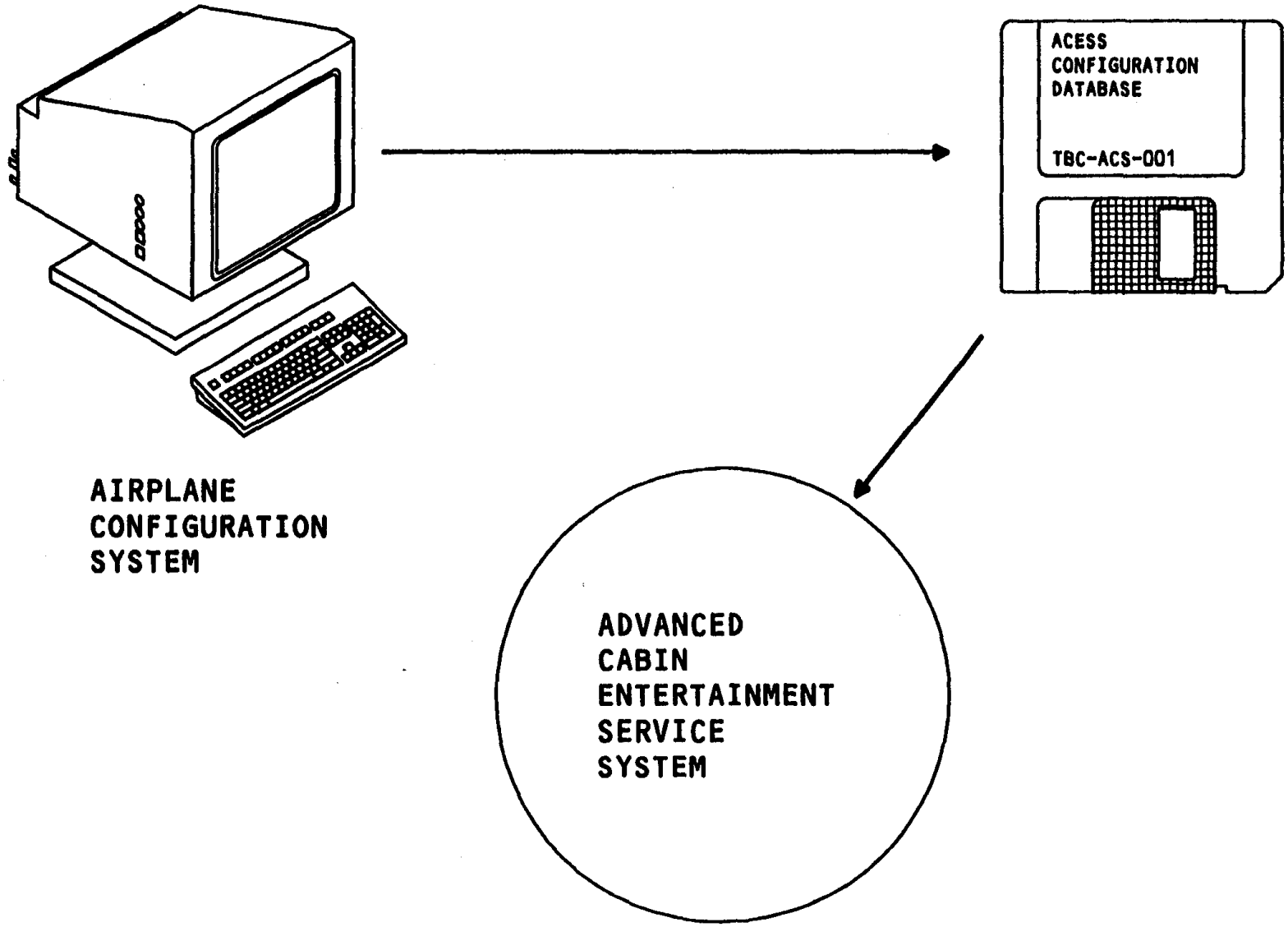
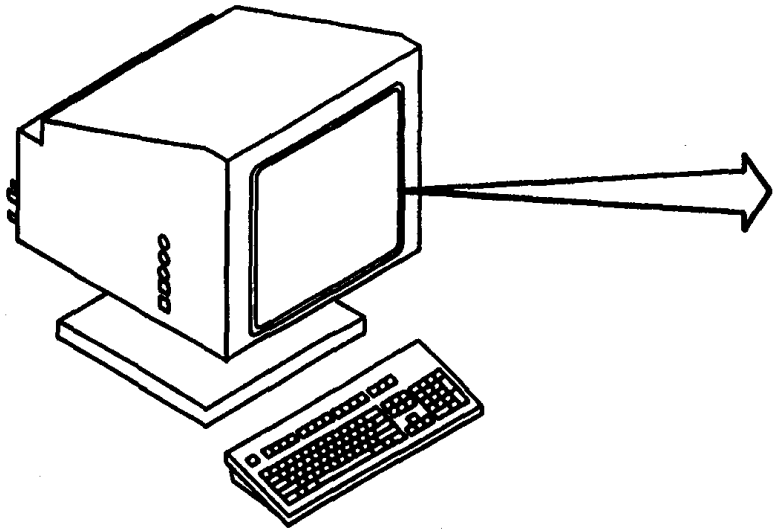



**Figure 7 AIRPLANE CONFIGURATION SYSTEM**

## ACS - MAIN MENU

The airplane configuration system (ACS) is a menu-driven system. It shows menus that list the available selections.

There are six selections available in the ACS main menu. Use the computer keyboard to enter your selection. In the example, number two (2) is selected. Push the return key to show the edit selected configuration menu.



AIRPLANE
CONFIGURATION
SYSTEM

```
AIRPLANE CONFIGURATION SYSTEM   Editing: TRAINING DATABASE

                    Main Menu

          1. Select a Configuration
          2. Edit Selected Configuration
          3. Save Working Configuration
          4. Print Selected Configuration
          5. Help
          6. Quit

                                                VERSION NO.
                                                ACS V012 L
                                                CMU 0888B
                                                CIC 0888B
                                                PAC 0888B
Please pick an entry from the menu:2            ESC 0888B
                                                LAC 0988C
                                                AEM 0988C
F1=Help, ESC=Return to Previous Menu
```

**Figure 8 ACS - MAIN MENU**

## ACS - EDIT CONFIGURATION MENU

There are nine (9) selections available in the edit configuration menu. Use the computer keyboard to enter your selection. In the example, number one (1) is selected. Push the return key to show the ACESS basic requirements menu.

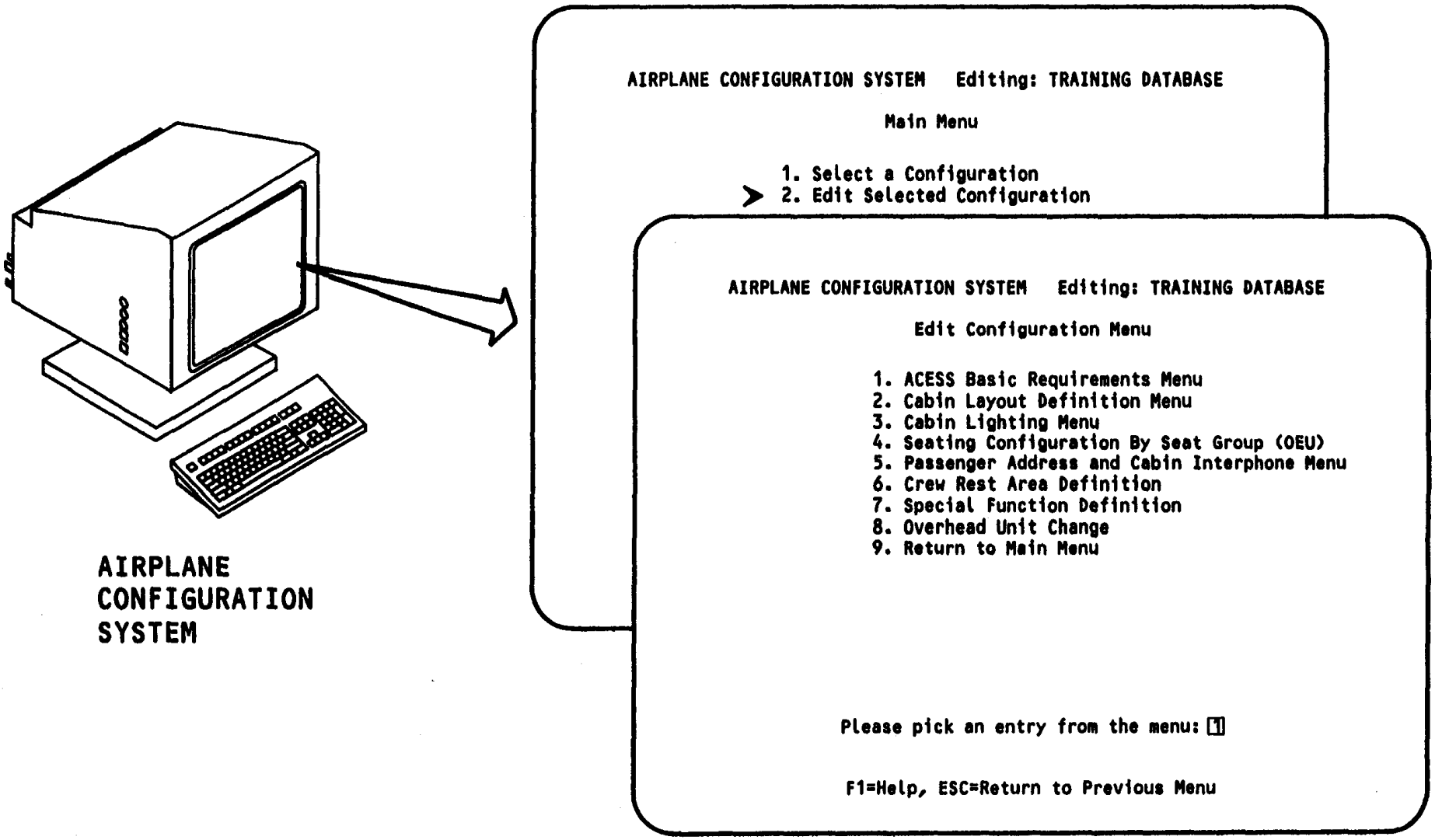



**Figure 9 ACS - EDIT CONFIGURATION MENU**

## ACS - BASIC REQUIREMENTS MENU

The ACESS basic requirements menu has eight selections. Use the computer keyboard to enter your selection. In the example, number one (1) is selected. Push the return key to show the equipment list and configuration summary menu.

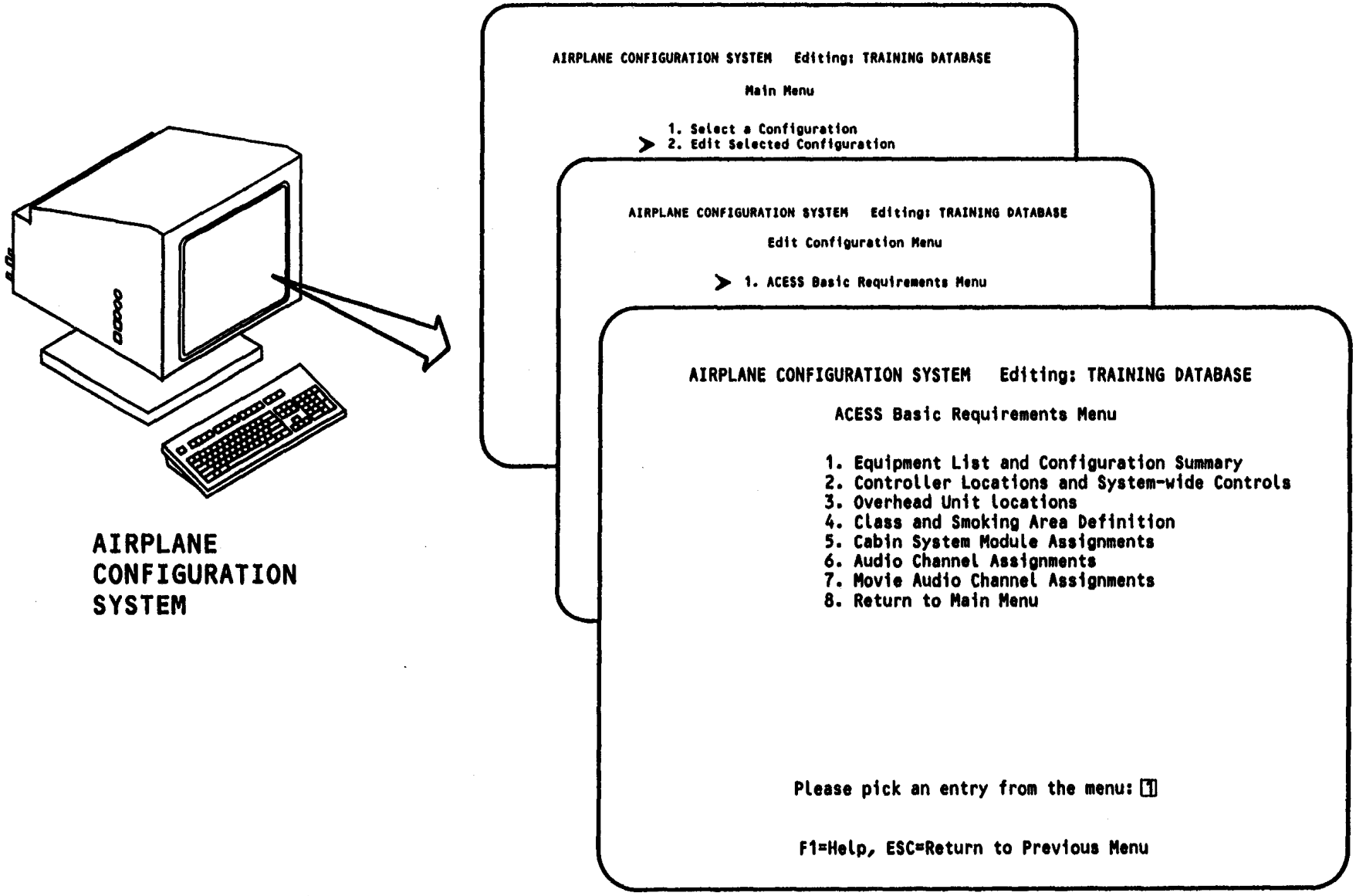


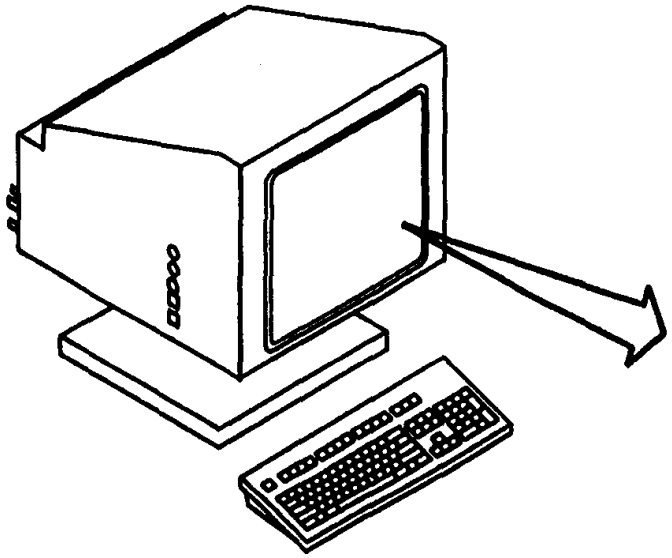

**Figure 10 ACS - BASIC REQUIREMENTS MENU**

## EQUIPMENT LIST AND CONFIGURATION SUMMARY

The equipment list and configuration summary menu is shown. This menu shows the number of:

- Local area controllers (LACs) installed
- Cabin system modules (CSMs) installed
- Galley panels installed (galley panels are not used at this time)
- Seat electronics units (SEUs) and overhead electronics units (I-OEUs and OOEUs) installed in each column for each LAC
- Passenger address area assigned to each LAC

For example, if a cabin system module is added to your airplane, then the ACESS configuration database should change to reflect this.



AIRPLANE CONFIGURATION SYSTEM

AIRPLANE CONFIGURATION SYSTEM  Editing: TRAINING DATABASE

Equipment List and Configuration Summary

| LAC Installed (Y/N) | Cabin System Module number | Galley Panel number | Number of SEU by Column for each LAC 1/L | 2/LC | 3/RC | 4/R | Number of OEU by Column for each LAC 1 | 2 | 3 | PA Area Controlled by the LAC (only SEU) 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LAC# 1: Y | 1 | 0 | 9 | 6 | 0 | 10 | 8 | 14 | 12 | 1 | 2 |
| LAC# 2: Y | 0 | 0 | 18 | 16 | 0 | 18 | 12 | 18 | 12 | 2 | 5 |
| LAC# 3: Y | 0 | 0 | 16 | 15 | 0 | 16 | 8 | 22 | 9 | 3 | 3 |
| LAC# 4: Y | 2 | 0 | 0 | 9 | 11 | 0 | 0 | 14 | 0 | 4 | 4 |
| LAC# 5: N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Number of speakers on airplane: 80
Highest speaker ID number: 180
Number of Speaker Volume zones: 11
Highest Chime Mute Switch ID number: 12
Number of Seating Areas: 4
Number of PA Areas: 4
Number of Lavatory areas: 7
Highest number seat row: 67

F1=Help, F2=Restore Original, F10=Save, ESC=Quit

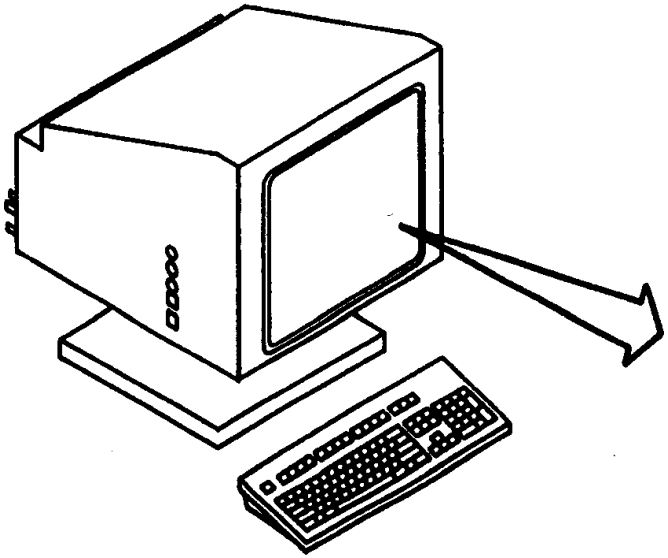
**Figure 11 EQUIPMENT LIST AND CONFIG. SUMMARY**

## AUDIO CHANNEL ASSIGNMENTS

Use the audio channel assignments menu to set the entertainment tape reproducer (ENT T/R) input that goes to the passenger headphones for each digital passenger control unit (DPCU) channel selection.

For example, the audio channel assignments in this graphic give these selections:

- Select DPCU channel one to hear ENT T/R input number one (monaural).
- Select DPCU channel five to hear ENT T/R input numbers seven and nine (stereo pair).
- Select DPCU channel six to hear ENT T/R input number nine (monaural).



AIRPLANE CONFIGURATION SYSTEM

AIRPLANE CONFIGURATION SYSTEM  Editing: TRAINING DATABASE

Audio Channel Assignments

| DPCU Channel | Stereo/ Mono | Input 1 | Input 2 | DPCU Channel | Stereo/ Mono | Input 1 | Input 2 |
|---|---|---|---|---|---|---|---|
| 1 | M | 1 | | 2 | M | 2 | |
| 3 | S | 3 | 5 | 4 | M | 4 | |
| 5 | S | 7 | 9 | 6 | S | 8 | 10 |
| 7 | M | 11 | | 8 | M | 12 | |
| 9 | M | 6 | | 10 | | | |
| 11 | | | | 12 | | | |
| 13 | | | | 14 | | | |
| 15 | | | | 16 | | | |
| 17 | | | | 18 | | | |

F1=Help, F2=Restore Original, F10=Save, ESC=Quit

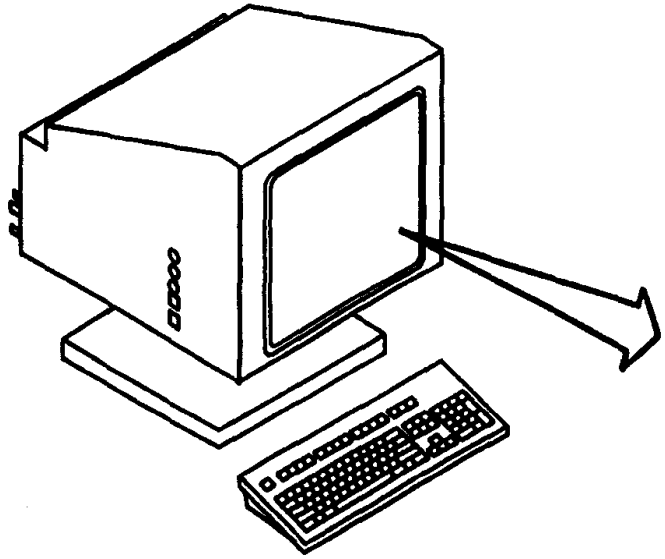
**Figure 12 AUDIO CHANNEL ASSIGNMENTS**

## SAVE WORKING CONFIGURATION MENU

Use the save working configuration menu to save changes to the ACESS configuration database.

Use selection one (1) of this menu to save the database in ACS format. This saves the ACESS configuration database on the PC's hard disk.

Use selection two (2) of this menu to save the database in ACS format and in the data loader format. This saves the ACESS configuration database on the PC's hard disk and on a floppy disk. The floppy disk is formatted for use with a software data loader.



AIRPLANE
CONFIGURATION
SYSTEM

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AIRPLANE CONFIGURATION SYSTEM   Editing: TRAINING DATABASE

              Save Working Configuration menu


       1. Save in ACS format
       2. Save in ACS format and Data Loader format
       3. Return to Main Menu


       Enter your choice. 1 or 2 or 3: [2]
Do you want to change Configuration ID? (Y/N) [Y]


Enter new configuration: [TBC-ACS-001          ]
Enter brief description: [TRAINING DATABASE    ]
Enter your name        : [STEVE R.             ]
Enter the date         : [11/21/90             ]




              F1=Help, ESC=Return to Previous Menu
```

**Figure 13 SAVE WORKING CONFIGURATION MENU**

## INSTALL ACESS CONFIGURATION DATABASE

After the ACESS configuration database is saved on a floppy disk, take the floppy disk to the airplane and install the database into the ACESS system. Use a software data loader to do this.

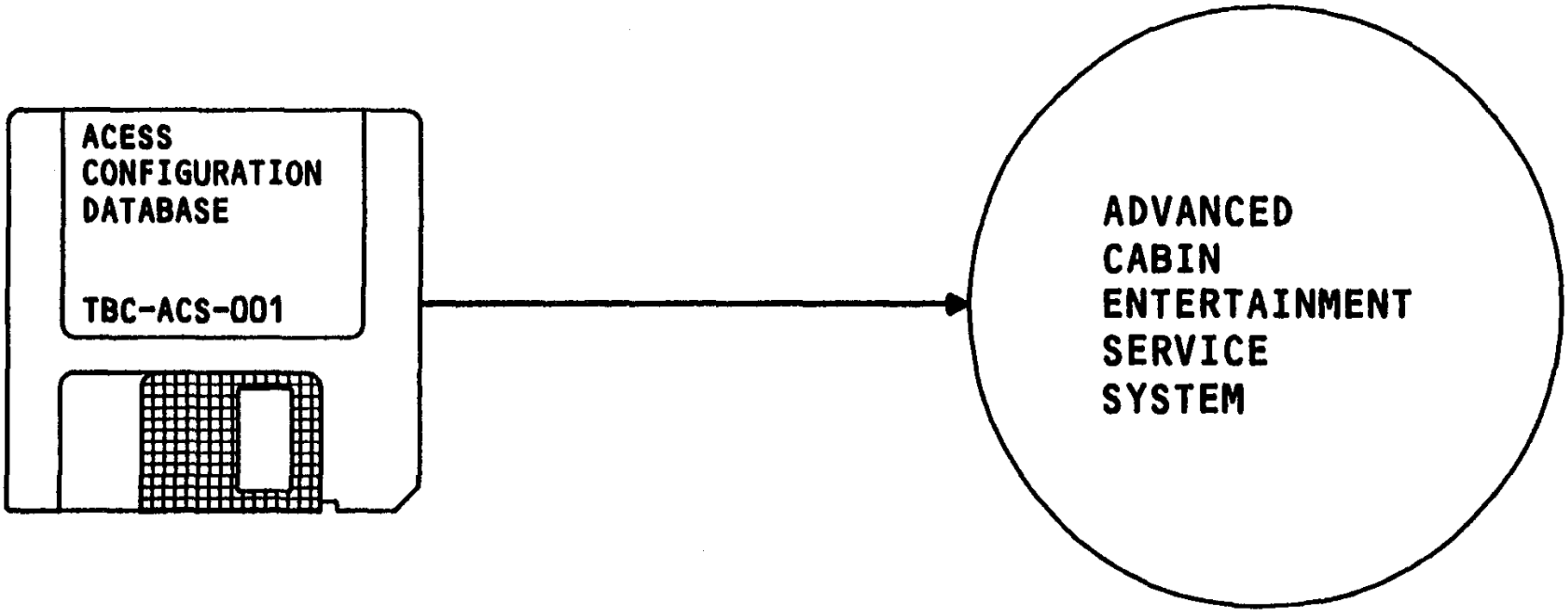



**Figure 14 INSTALL ACESS CONFIGURATION DATABASE**

## LRU OPERATIONAL SOFTWARE

### General

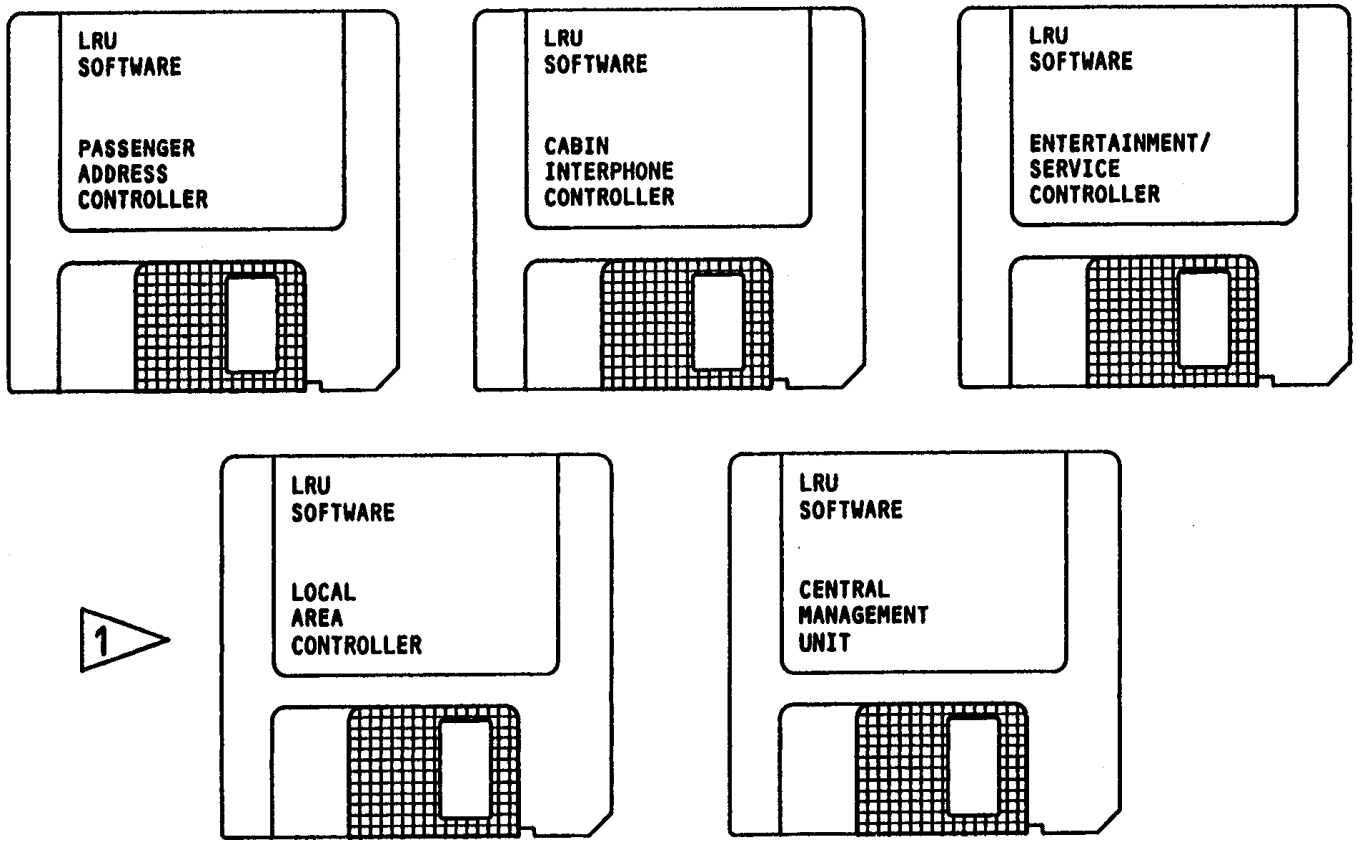
IRU operational software is software that controls an LRUs operation. If an IRUs operation needs to change, then that LRUs operational software must change. The ACESS vendor changes an LRUs operational software to:

- Correct an LRU's problems
- Give an IRU more functions

### General Description

The vendor sends the airline a floppy disk that contains the changed IRU operational software. Maintenance persons use a software data loader, on the airplane, to install IRU operational software into these LRUs:

- Passenger address controller
- Cabin interphone controller
- Entertainment/service controller
- Central management unit
- Local area controller (Boeing part number S220U004-604 and later)




1 LAC PART NUMBER S220U004-604 AND LATER

**Figure 15 LRU OPERATIONAL SOFTWARE**

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# TABLE OF FIGURES