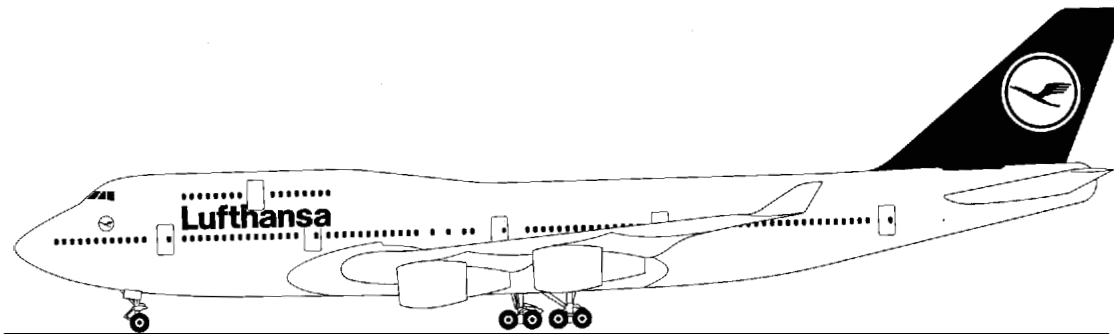




# **Lufthansa Technical Training**

## **Training Manual B 747-400**

### **ATA 23-30 ACCESS Maintenance Practiseses** ATA Spec. 104 Level 3



Book No:

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## **ATA 23-30 ACCESS MAINTENANCE PRACTICES**

## ACCESS



## MAINTENANCE PRACTICES INTRODUCTION

### General Description

ACCESS is a large system. To troubleshoot and maintain ACCESS, maintenance persons must be familiar with these maintenance practices:

- Monitor operation
- Test operation
- Program operation

### Monitor Operation

ACCESS line replaceable units (LRUs) continuously send system status data to the central management unit (CMU). The CMU sends system status data to the integrated display system (IDS), and the central maintenance computer system (CMCS). ACCESS failures show as:

- Flight deck effects. Failure of the passenger address controller (PAC), entertainment/service controller (ESC), cabin interphone controller (CIC) or CMU, show as a status message on the auxiliary EICAS display.
- CMCS messages.
- System status. Since ACCESS status data is sent to the IDS and CMCS, the same data can be shown on the CCTM display. Failure messages shown on the (CCTM) display contain more data than is shown in a CMCS message for the same failure.

### Test Operation

Use the CCTM to do a:

- All units test
- Subsystem test
- Lights test

The all units test and subsystem test show ACCESS failures on the CCTM display. Usual system operation stops until the test is complete.

The lights test makes lights controlled by ACCESS come on. Failure messages do not show for this test. Maintenance persons look at the lights to find a defective light or light circuit.

### Program Operation

ACCESS uses two types of software to operate. They are the:

- ACCESS configuration database. When some ACCESS LRUs are replaced, the ACCESS configuration database must be installed for the LRU to operate.
- Operational software. Some LRUs can get new operational software while the LRU is installed in the airplane. New operational software is installed to make an LRU operate better.



## **ACCESS MAINTENANCE PRACTICES**

- \* MONITOR OPERATION**
- \* TEST OPERATION**
- \* PROGRAM OPERATION**

## ACCESS



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### CMCS /IDS MONITOR OPERATION

#### Purpose

ACCESS line replaceable units (LRUs) do continuous tests to examine:

- Correct internal operation
- Correct LRU interface operation

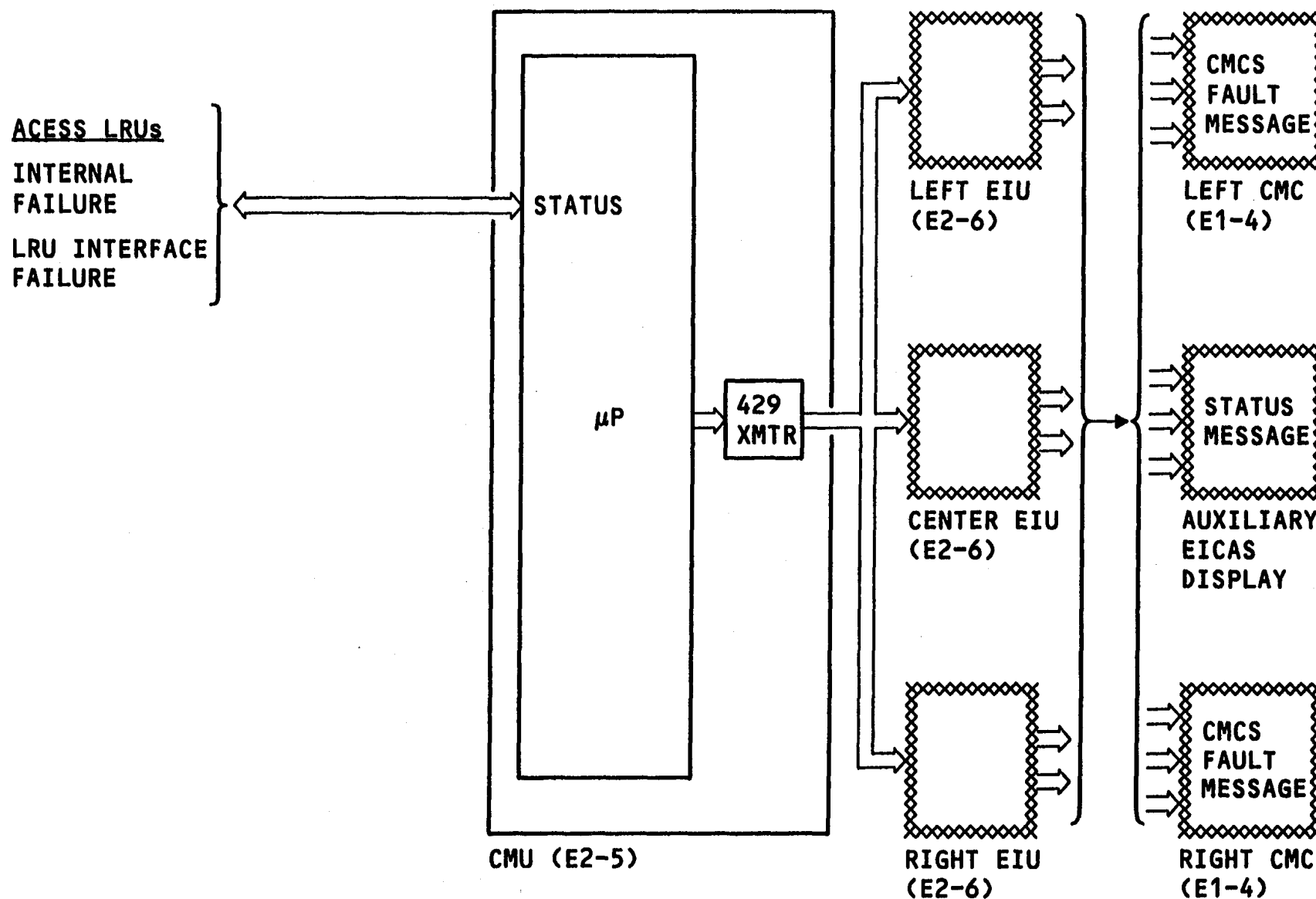
Failure data goes to the central maintenance computer system (CMCS) and integrated display system (IDS). Maintenance persons use this data to troubleshoot ACCESS.

#### General Description

The LRUs continuously monitor their memory, microprocessor operation, and power supply voltage levels. Also, many LRUs monitor their interface with other LRUs. If an LRU's interface with another LRU does not operate, then the LRU reports the interface as defective.

Internal failures and LRU interface failures go to the central management unit (CMU). The CMU sends failure data to the EFIS/EICAS interface units (EIUs). The EIUs:

- Show a status message when the passenger address controller (PAC), entertainment/service controller (ESC), cabin interphone controller (CIC), or CMU fails.
- Send fault data to the central maintenance computer system (CMCS) which shows fault messages.



**Figure 2 CMCS / IDS MONITOR OPERATION**



## CCTM PROCEDURES - SYSTEM STATUS CHECK

### General

The central management unit (CMU) continuously gets system status data from ACCESS LRUs. The CMU sends failure data to the central maintenance computer system (CMCS) and the integrated display system (IDS). Do a system status check to see failure data on the cabin configuration test module (CCTM) display.

### System Status Check

A system status check:

- Does not affect usual system operation.
- Can be done while the airplane is on the ground or in flight.

To do a system status check of ACCESS:

- Push the normal button on the CCTM. If the CCTM's display is empty, push the normal button two times. The first push makes the CCTM display come on, and the second push puts ACCESS in the normal mode.
- Push the enter button. Monitor the elapsed time on the CCTM display.

After 25 seconds, the CCTM shows:

- NO ERRORS TO REVIEW or
- The last failure found. Use the scroll up and scroll down buttons to see the other failures.

Push the normal button to go into the normal mode.



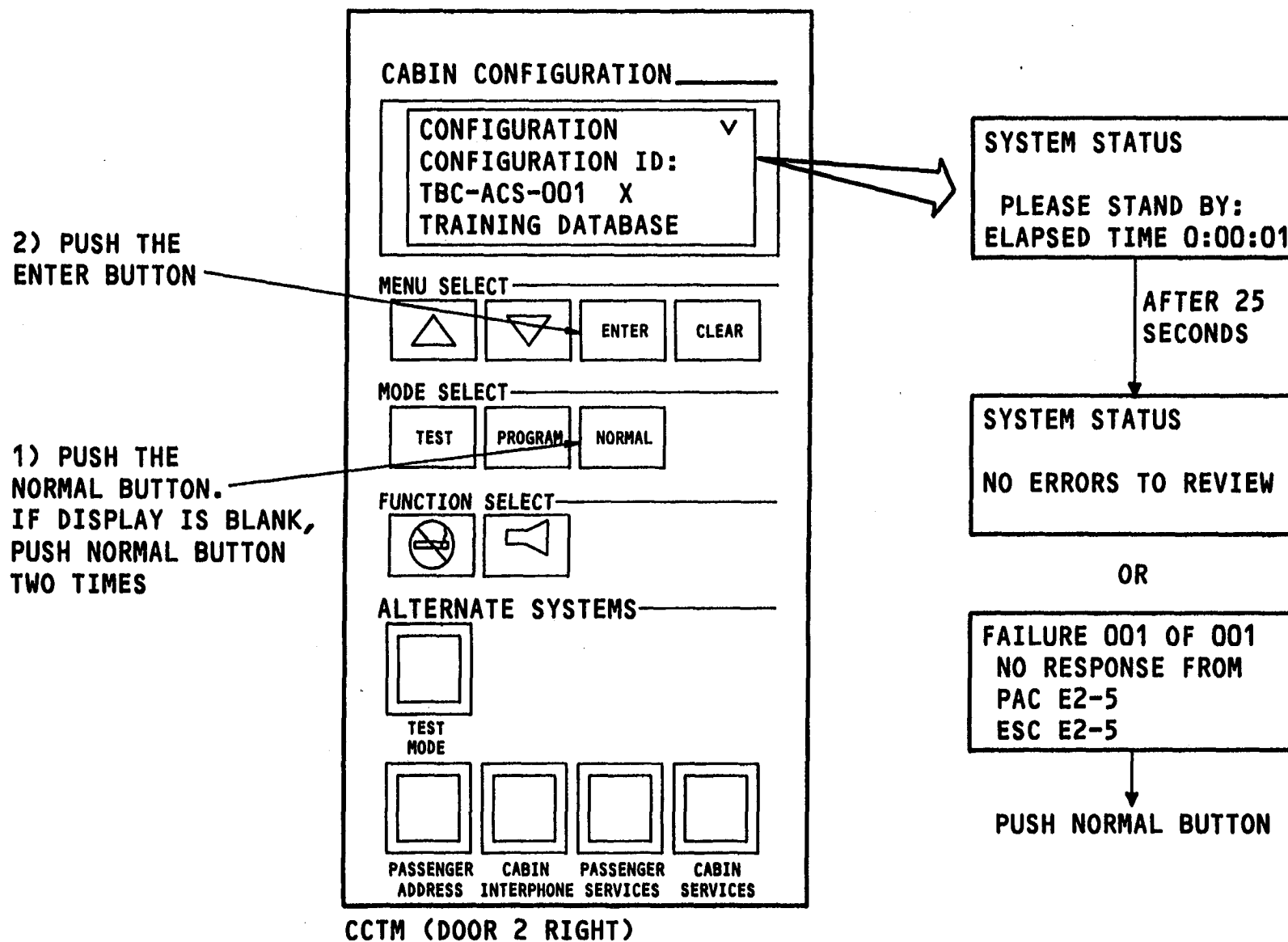


Figure 3 CCTM PROCEDURES - SYSTEM STATUS CHECK

## ACCESS



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### SYSTEM STATUS OPERATION

#### System Status

Use the cabin configuration test module (CCTM) keypad to start a system status check. The CCTM sends the system status command to the central management unit (CMU). For 25 seconds, the CMU gets status data from all ACCESS LRUs. During that time, failure data is stored in the CMU's volatile memory. After all LRUs report their status# the CCTM shows the number of failures found. Use the CCTM to see the fault messages.

#### System Status Limits

System status does not show lamp, speaker, digital passenger control unit or handset failures.

If more than one seat electronics unit (SEU) or overhead electronics unit (OEU) does not operate in a column, a system status check only shows the first failure found in the column.

System status only monitors the controller circuit (normal or alternate) that is selected in the entertainment/service controller (ESC), passenger address controller (PAC), and cabin interphone controller (CIC) at that time.

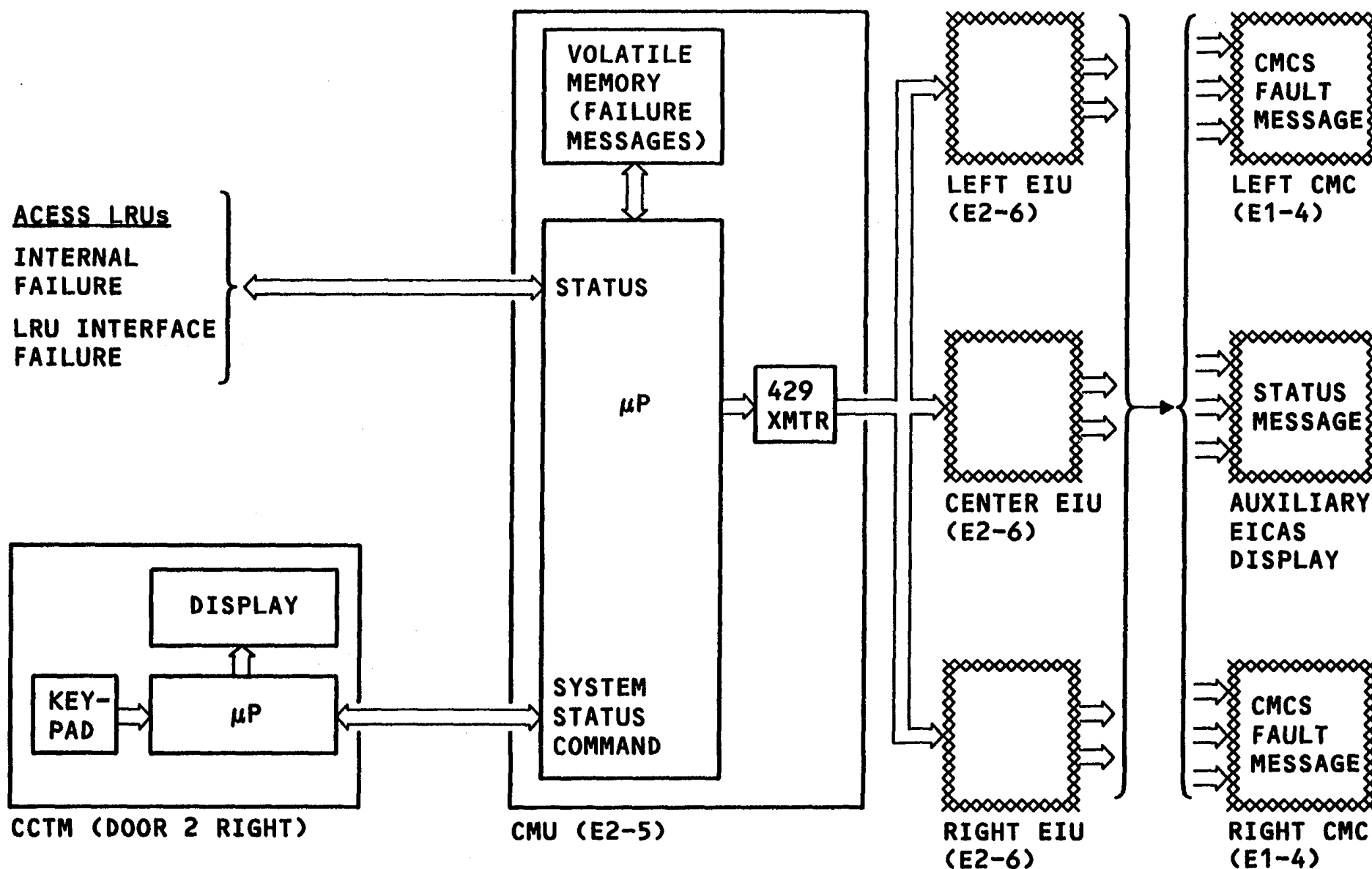


Figure 4 SYSTEM STATUS OPERATION

## ACCESS



### ACCESS TESTS - 1

#### Purpose

ACCESS tests help maintenance persons troubleshoot the system. Use the cabin configuration test module (CCTM) to start a test, and to see the failures found during test.

#### General Description

The system test menu shows test selections. To show the system test menu:

- Push the TEST MODE switch. The light inside the switch comes on and the central management unit (CMU) controls selection of the normal and alternate controller circuits.
- Push the TEST button. The system test menu is shown.
- Push the scroll up and scroll down buttons to select a test.

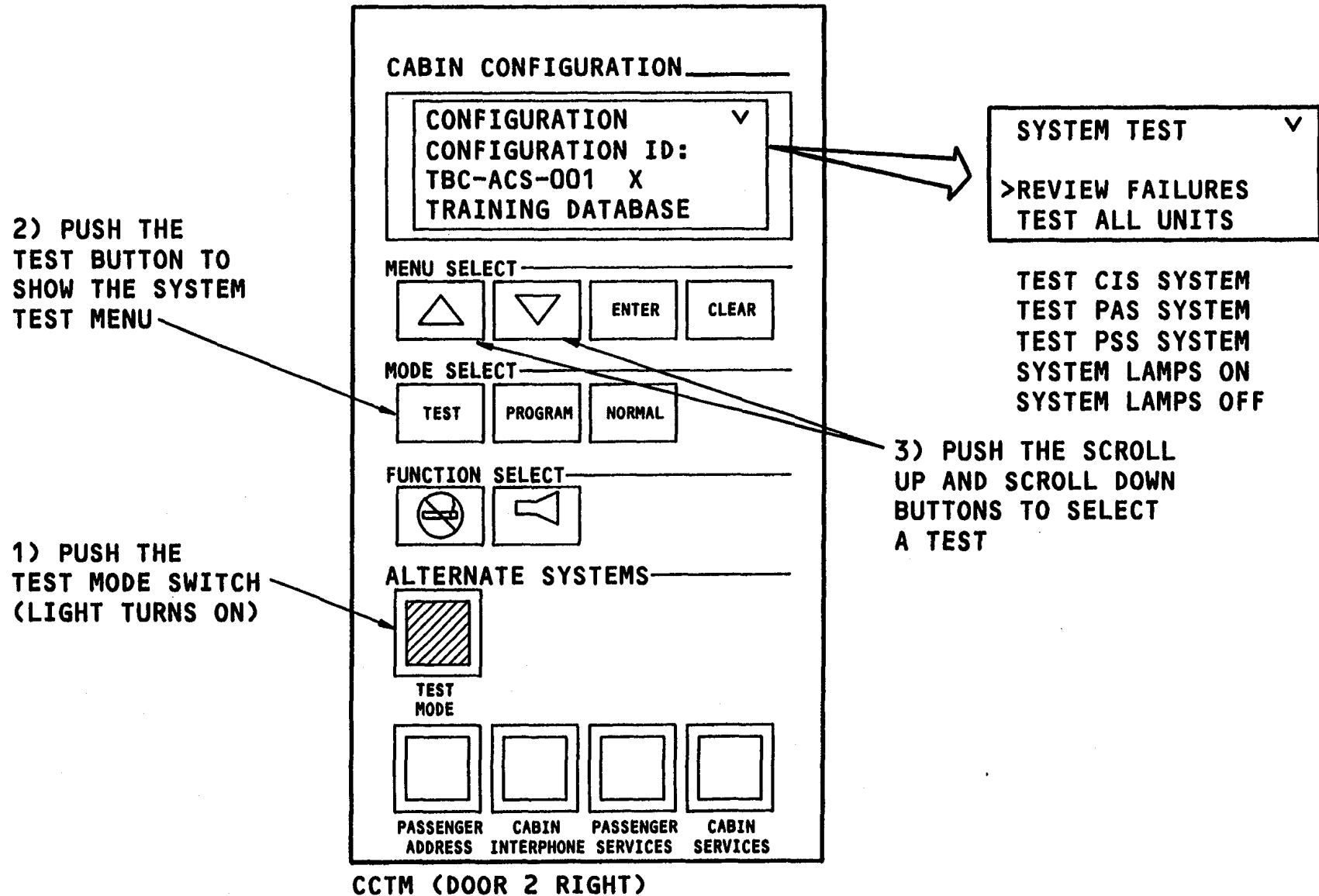


Figure 5 ACCESS TESTS - 1

## ACCESS



### ACCESS TESTS - 2

The system test menu shows seven test selections. The selections are:

- Review failures - shows the fault messages stored in the central management units (CMUs) volatile memory
- Test all units - tests all five subsystems of ACCESS
- Test CIS system - tests the cabin interphone system (CIS)
- Test PAS system - tests the passenger address system (PAS)
- Test PSS system - tests the passenger service, passenger entertainment (audio), and cabin lighting systems
- System lamps on - makes all master call lights, row call lights, and passenger information signs come on. Cabin lights and passenger reading lights do not come on as part of this test. Use the cabin system module (CSM) to make cabin lights and passenger reading lights come on
- System lamps off - makes all master call lights, row call lights and passenger information signs go off



## SYSTEM TEST MENU

<u>SELECTION</u>	<u>RESULT</u>
REVIEW FAILURES	REVIEW FAILURES FOUND DURING TEST
TEST ALL UNITS	TESTS PSS, PES AUDIO, CLS, CIS, PAS
TEST CIS SYSTEM	TESTS CIS ONLY
TEST PAS SYSTEM	TESTS PAS ONLY
TEST PSS SYSTEM	TEST PSS, PES AUDIO, CLS
SYSTEM LAMPS ON	THESE LIGHTS COME ON: <ul style="list-style-type: none"><li>- MASTER CALL LIGHTS</li><li>- ROW CALL LIGHTS</li><li>- PASS INFO SIGNS</li></ul>
SYSTEM LAMPS OFF	THESE LIGHTS GO OFF: <ul style="list-style-type: none"><li>- MASTER CALL LIGHTS</li><li>- ROW CALL LIGHTS</li><li>- PASS INFO SIGNS</li></ul>

Figure 6 ACCESS TESTS - 2

## ACCESS



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### TEST ALL UNITS - 1

#### General

Use the cabin configuration test module (CCTM) to start a test. The steps used to do any ACCESS test are the same. This example shows a test of all units.

#### Test All Units

To do a test of all units:

- Push the TEST MODE switch. A light in the switch comes on.
- Push the TEST button. The system test menu is shown.
- Push the scroll down button one time. TEST ALL UNITS is shown next to the prompt (>).
- Push the ENTER button. The test starts. The elapsed time shows in the CCTM display. The elapsed time increases until the test is complete.
- When the test is complete, the CCTM shows the number of failures found. In this case, there are two.



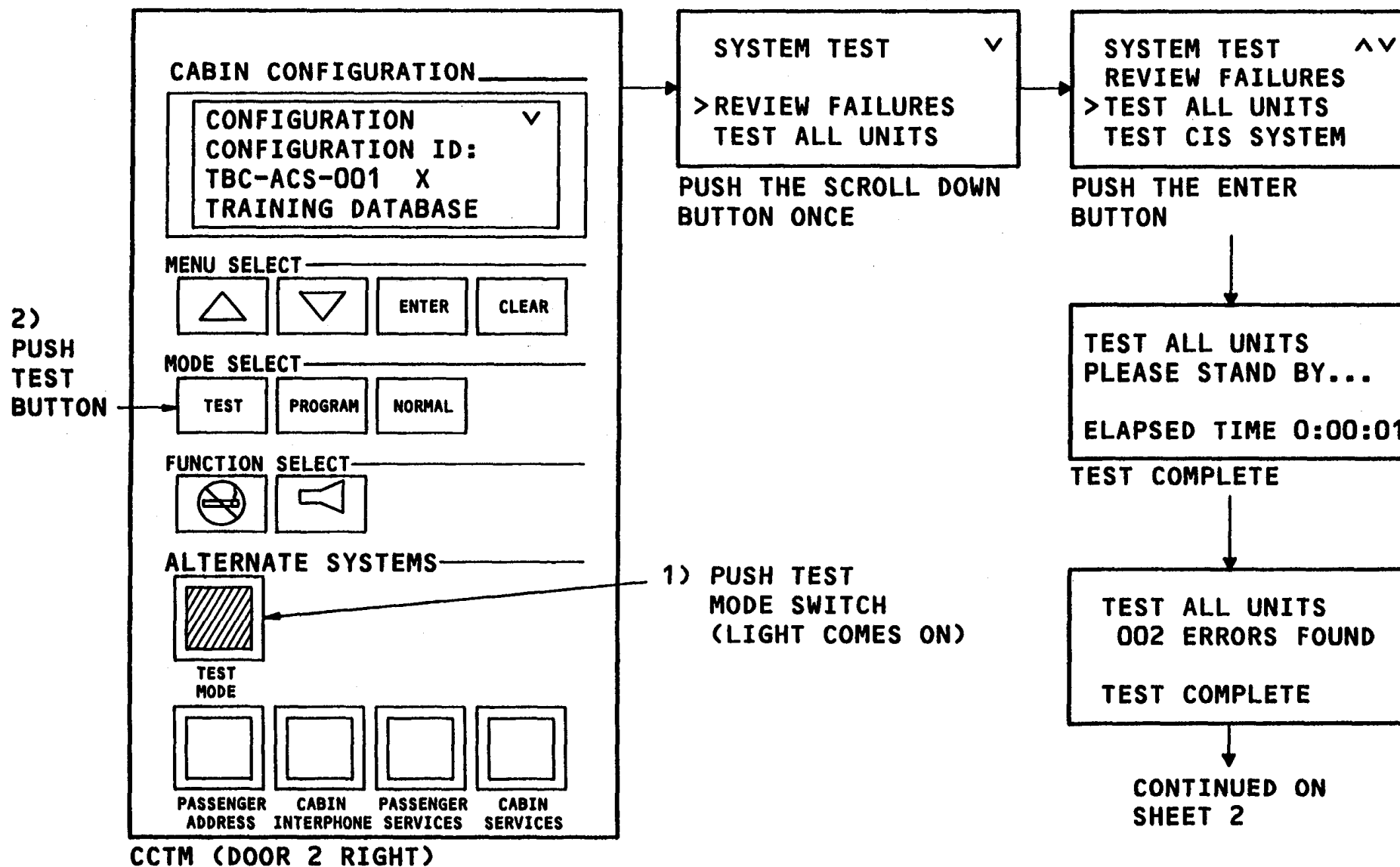


Figure 7 TEST ALL UNITS - 1

## ACCESS



## TEST ALL UNITS - 2

### General

At the end of a test, look at all failures found. Use the fault isolation manual (FIM) to troubleshoot and repair the failures.

### Review Failures

To look at the failures found at the end of a test:

- Push the TEST button. The system test menu shows. REVIEW FAILURES shows next to the prompt (>).
- Push the ENTER button. The last failure found shows first (failure two of two). Now look at the other failure.
- Push the scroll down button. Failure one of two shows. Push the scroll up button to go back to failure two of two, or
- Push the NORMAL button to go to the normal mode. The normal menu shows.
- Push the TEST MODE switch. The light inside the switch goes off.

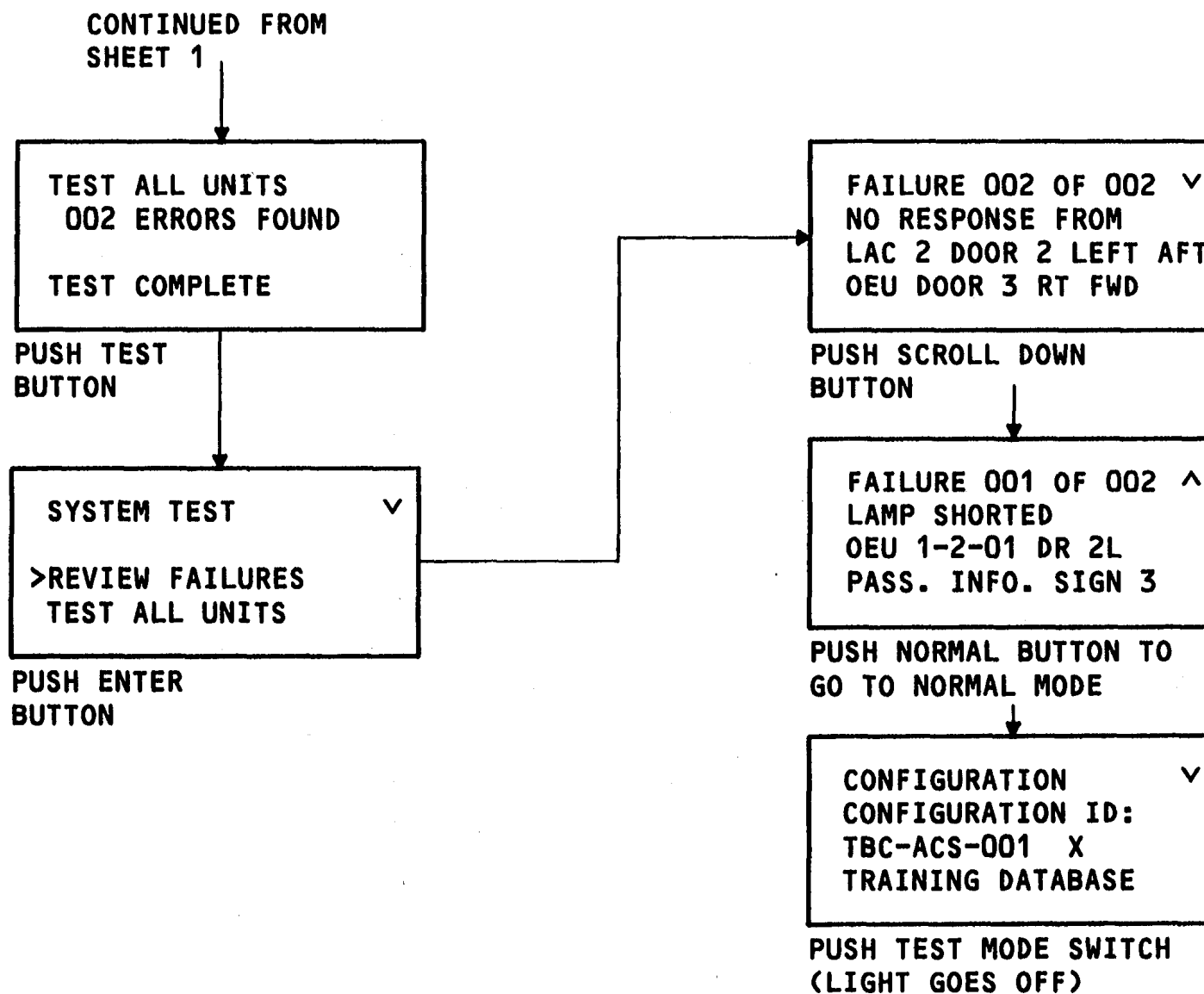


Figure 8 TEST ALL UNITS - 2



## SYSTEM LAMPS TEST - LAMPS ON -1

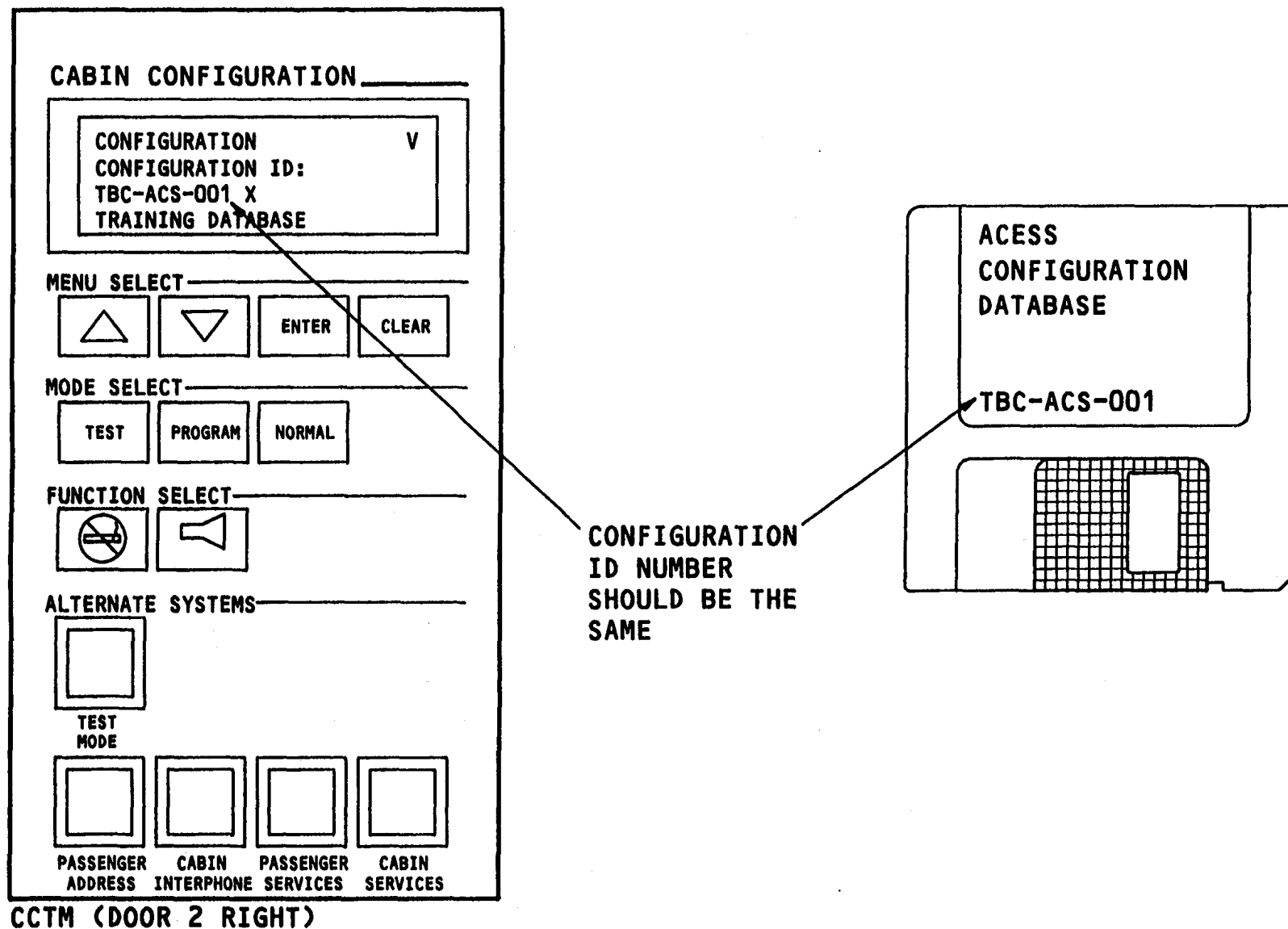
### General

This example shows a system lamps test. This test makes some of the lights controlled by ACCESS come on. Maintenance persons walk through the airplane to find lights that do not operate. This test does not make failure messages.

### System Lamps Test

To do a system lamps test:

- Make sure that the PASSENGER SERVICES SYSTEM ON button is set (light in button is on) on any cabin system module (CSM).
- Push the TEST MODE switch on the cabin configuration test module (CCTM). A light in the switch comes on.
- Push the TEST button. The system test menu shows on the CCTM display.
- Push the scroll down button until SYSTEM LAMPS ON shows next to the prompt (>).
- Push the ENTER button. The test starts. ACCESS lights that are part of this test come on.
- Walk through the airplane and replace the defective lights.



**Figure 9 SYSTEM LAMPS TEST - LAMPS ON -1**

**ACCESS****SYSTEM LAMPS TEST LAMPS ON -2****System Lamps Test**

The lights that come on as part of this test are:

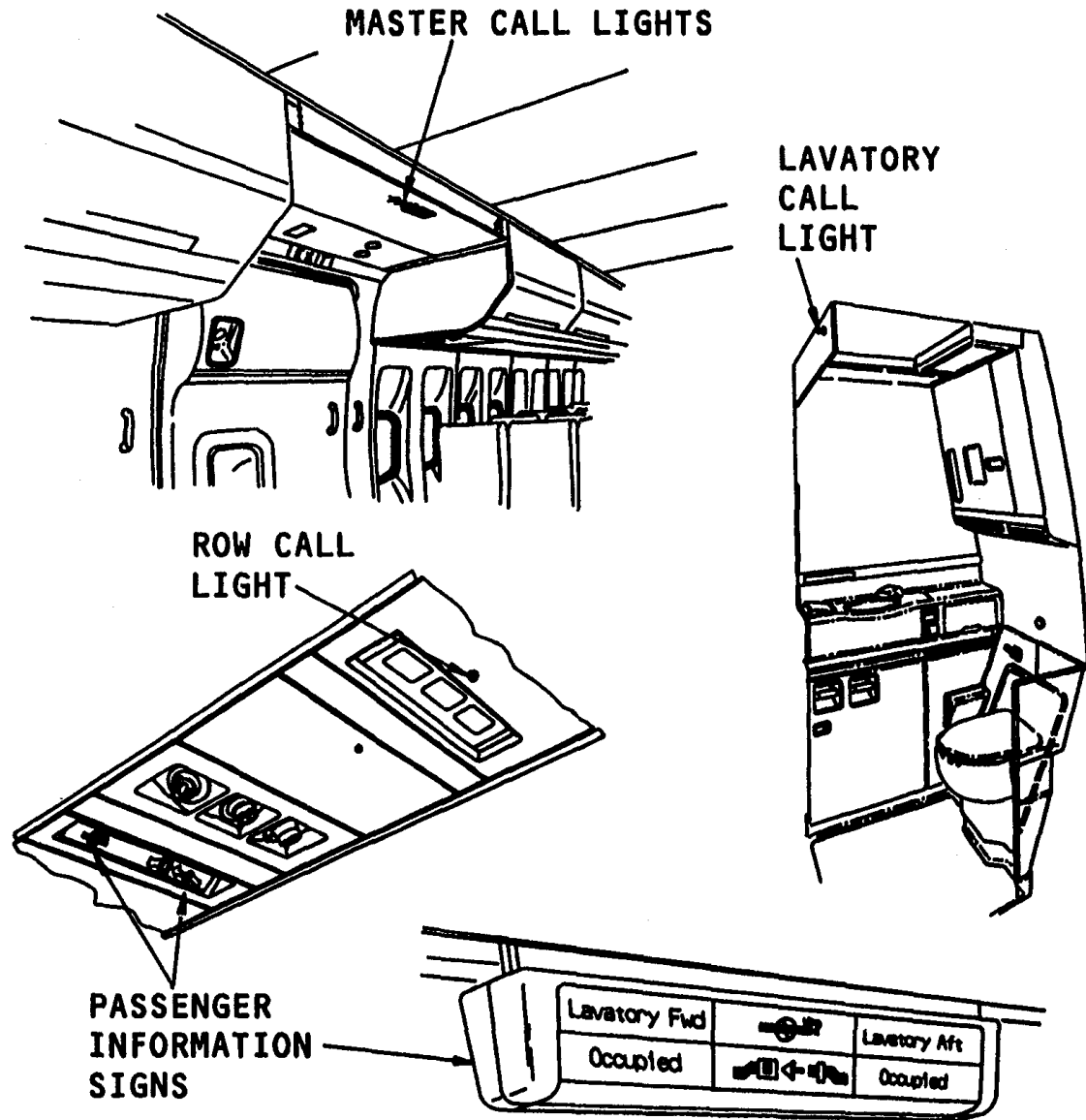
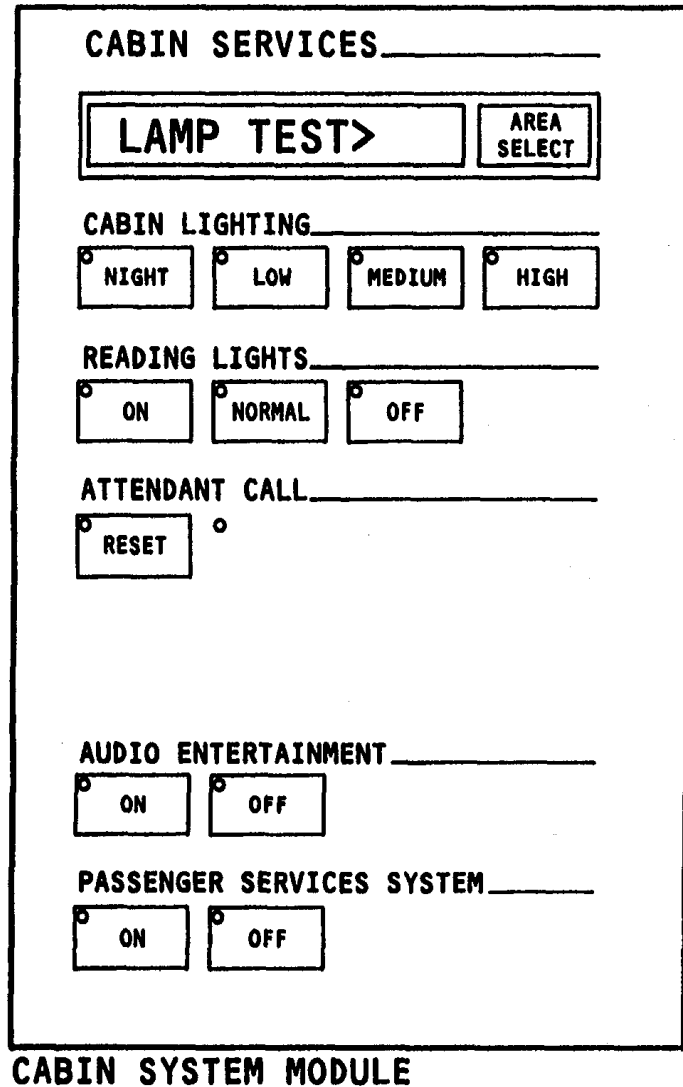
- Master call lights
- Row call lights
- Lavatory call lights
- Passenger information signs

**Cabin System Module Lamp Test**

During a system lamps test, maintenance persons can see if any lights on a cabin system modules (CSMs) front panel are defective. To see these lights come on:

- Push and hold the AREA SELECT button. Each row of lights comes on, one row at a time for one half second each.
- Release the AREA SELECT button.

Push and hold any button on the CSMs front panel to see if it operates. The button I operates correctly first the button 's light comes on.



**Figure 10 SYSTEM LAMPS TEST LAMPS ON -2**

## ACCESS



### SYSTEM LAMPS TEST - LAMPS OFF

#### General

Lights that come on as part of this test, stay on until maintenance persons use the cabin configuration test module (CCTM) to make the lights go off.

#### System Lamps Off

To make the lights go off:

- Push the scroll down button one time. SYSTEM LAMPS OFF shows next to the prompt (>).
- Push the ENTER button. ACCESS lights that come on as part of this test go off.
- Push the NORMAL button go to the normal mode.
- Push the TEST MODE switch. The light in the switch goes off.



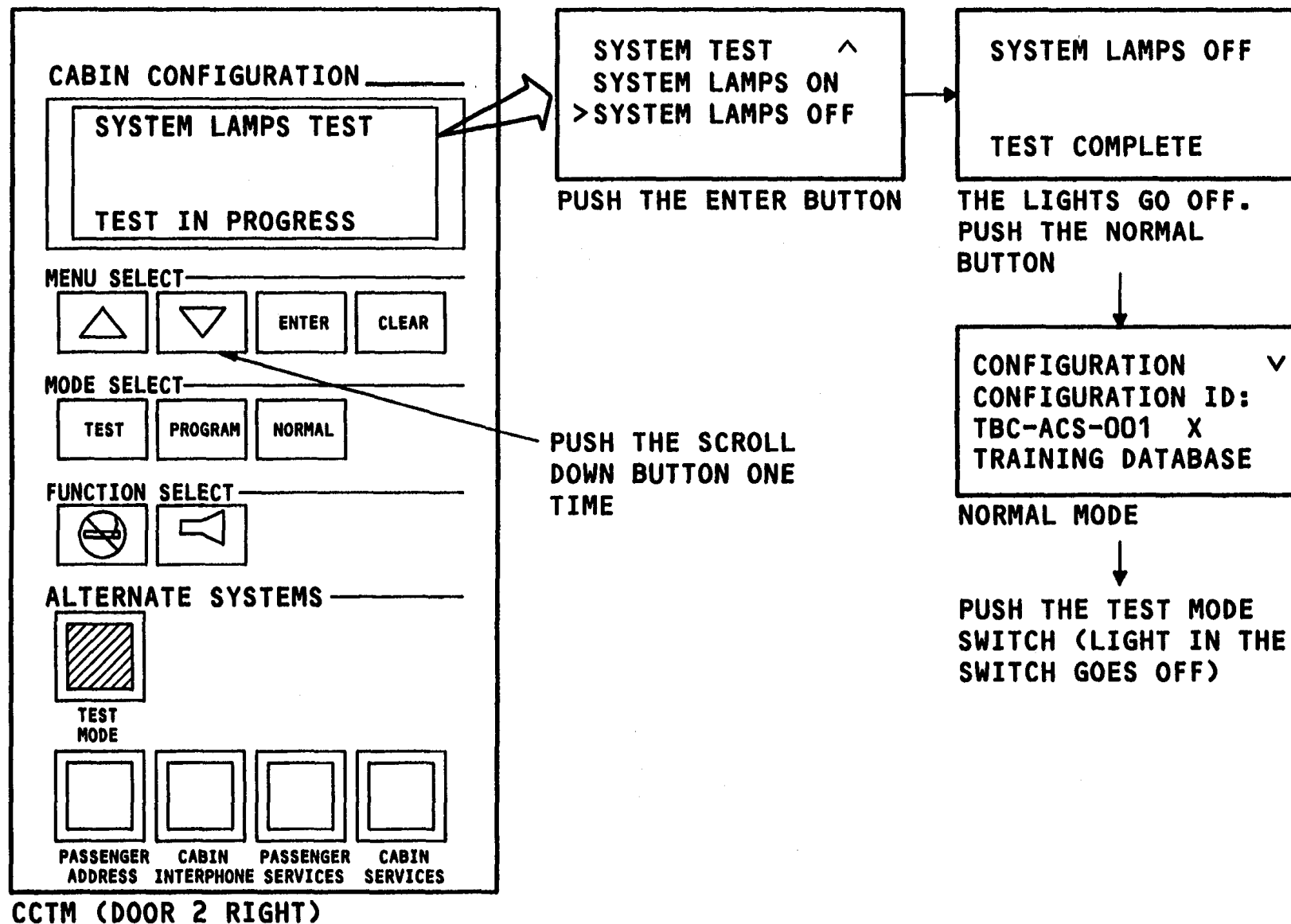


Figure 11 SYSTEM LAMPS TEST - LAMPS OFF

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### TEST OPERATION - 1

#### Purpose

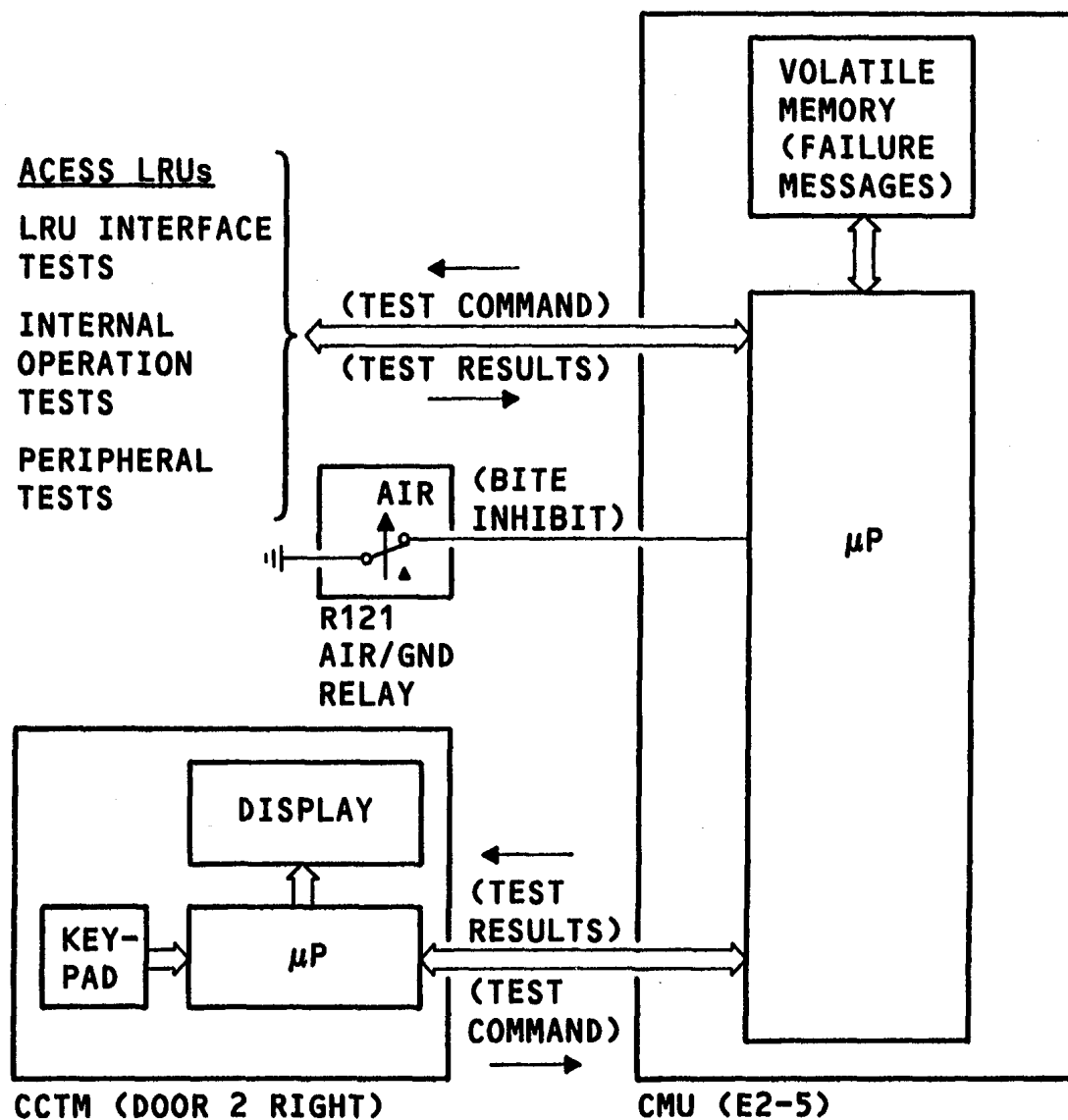
Use the TEST ALL UNITS selection on the cabin configuration test module (CCTM) to do these tests:

- LRU interface tests
- Internal operation test
- Peripheral test

#### Operation

Use the CCTM to start a test of all ACCESS units. The CCTM sends a test command to the central management unit (CMU) which sends the command to the ACCESS LRUs. The LRUs do LRU interface tests, internal operation tests and peripheral tests. Results of the tests go to the CMU. The CMU stores failures in a volatile memory. Use the CCTM to see the failures.

ACCESS tests are done when the airplane is on the ground only. Air/ground relay R121 sends a bite inhibit discrete to the CMU to prevent system test while in the air.



**Figure 12 TEST OPERATION - 1**

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### TEST OPERATION - 2

#### General

Use the cabin configuration test module (CCTM) to start a TEST ALL UNITS test of ACCESS. The tests done are:

- LRU interface tests
- Internal operation tests
- Peripheral tests

#### LRU Interface Tests

LRU interface tests between ACCESS LRUs are done continuously during usual system operation. When a test is started, the CMU stores a fault message for each interface failure found. Use the CCTM to see the interface failures.

#### Internal Operation Tests

During a test, each LRU checks its microprocessor operation, the validity of data stored in nonvolatile and random access memory, and power supply voltage levels.

The applicable LRUs test for shorted or open light outputs. Shorted or open outputs go off to prevent damage to the output circuitry. These outputs are then designated as failed.

During an all units test, the normal and alternate controller circuits in the ESC, CIC, and PAC are tested. The CMU controls switch of the controllers during test.

#### Peripheral Tests

Most of the peripherals (input/output devices) that connect to ACCESS LRUs are tested. During a test:

- The AEM sends a 500 hertz tone to all SEUs. The SEUs test the DPCUs pneumatic transducer impedance and sends failures to the ESC through the LAC.
- All configured lights for the I-OEUs and O-OEUs (except for ballast used for cabin lighting) come on and then go off, to test for an open or shorted output circuit.
- The LACs make all master call lights come on and then go off, to test for an open or shorted output circuit.
- The I-OEUs make a short tone. The tone goes to the speakers and is monitored. The I-OEUs test the speaker impedance and sends failures to the PAC. During the short tone, the PAC sends a command to the I-OEU to adjust the volume. This makes sure that the amplifier in the I-OEU operates correctly.
- I-OEUS monitor the voltage input from the PALCS to see if their output is in the correct range.
- The LACs test the cabin interphone handsets for an on or off hook condition. An off hook condition makes a failure message.

When the test is complete, the CMU stores all failures found in volatile memory. All ACCESS LRUs reset as if in a power up condition.



## LRU INTERFACE TESTS

<u>LRU</u>	<u>COMMUNICATIONS TESTED</u>
CMU TO	ESC, PAC, CIC, CCTM
ESC TO	CMU, AEM, PAC, LACs
CIC TO	CMU, PAC, LACs, PCP
PAC TO	CMU, CIC, ESC, I-OEUs, PALCS
LACs TO	ESC, CSM, SEUs, I-OEUs, O-OEUs
SEUs TO	DPCUs

## INTERNAL OPERATION TESTS

EACH LRU PERFORMS AN INTERNAL TEST OF:

- \* MICRO-PROCESSOR OPERATION
- \* NONVOLATILE MEMORY
- \* RANDOM ACCESS MEMORY
- \* POWER SUPPLY

## PERIPHERAL TESTS

<u>LRU</u>	<u>PERIPHERALS TESTED</u>
SEU	DPCU PNEUMATIC TRANSDUCER
I-OEU/O-OEU	LAMPS
LAC	MASTER CALL LIGHTS
I-OEU	SPEAKERS
PAC	PALCS MEASUREMENTS
CIC	HANDSET OFF HOOK

Figure 13 TEST OPERATION - 2

## ACCESS



### LRU MEMORY

#### LRU Operational Software

All LRUs with microprocessors need operational software. operational software gives the microprocessor the instructions it needs to function.

A programmable read only memory (PROM) contains the operational software for these LRUs:

- Cabin system modules (CSMs)
- Pilots' call panel (PCP)
- Cabin configuration test module (CCTM)
- Outboard overhead electronics units (O-OEU)
- Inboard overhead electronics units (I-OEU)
- Seat electronics units (SEUs)
- Audio entertainment multiplexer (AEM)

An electrically erasable programmable read only memory (EEPROM) contains the operational software for these LRUs:

- Entertainment/service controller (ESC)
- Passenger address controller (PAC)
- Local area controller (CIC)
- Central management unit (CMU)

The PROM in these LRUs contains only the instructions necessary to let operational software be installed into its EEPROM. The EEPROM usually gets operational software in the shop. Maintenance persons can install operational software into an LRUs EEPROM with a software data loader. This is done on the airplane.

#### LRU Operational Software

The PROM in these LRUs contains only the instructions necessary to let operational software be installed into its EEPROM. The EEPROM usually gets operational software in the shop. Maintenance persons can install operational software into an LRUs EEPROM with a software data loader. This is done on the airplane.

#### ACCESS Configuration Database

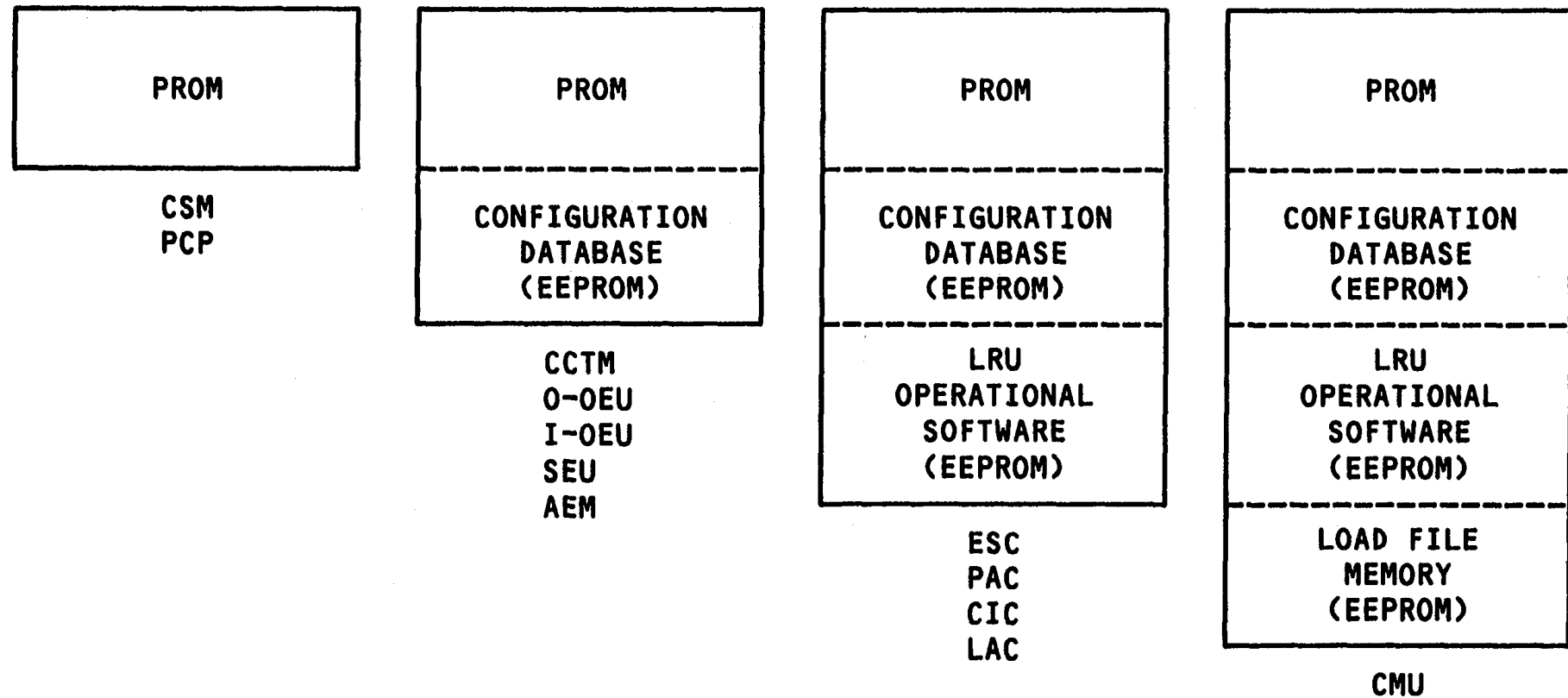
These LRUs contain part of the ACCESS configuration database in an EEPROM:

- CCTM
- O-OEU
- I- OEU
- SEU
- AEM
- ESC
- PAC
- CIC
- LAC
- CMU

#### Central Management Unit

The central management units load file memory (EEPROM), contains:

- The ACCESS configuration database, or
- One LRUs operational software



**Figure 14 LRU MEMORY ALLOCATION**

## ACCESS



### CMU MEMORY ALLOCATION

#### PROM

A programmable read only memory (PROM) in the central management unit (CMU) contains the instructions necessary to let operational software be installed into its EEPROM.

#### CMU Operational Software

An electrically erasable programmable read only memory (EEPROM) contains the CMU's operational software.

#### ACCESS Configuration Database

Another EEPROM contains the part of the ACCESS configuration database that the CMU needs to operate.

#### Load File Memory

The CMU's load file memory (EEPROM) contains:

- The entire ACCESS configuration database, or
- One LRUs operational software

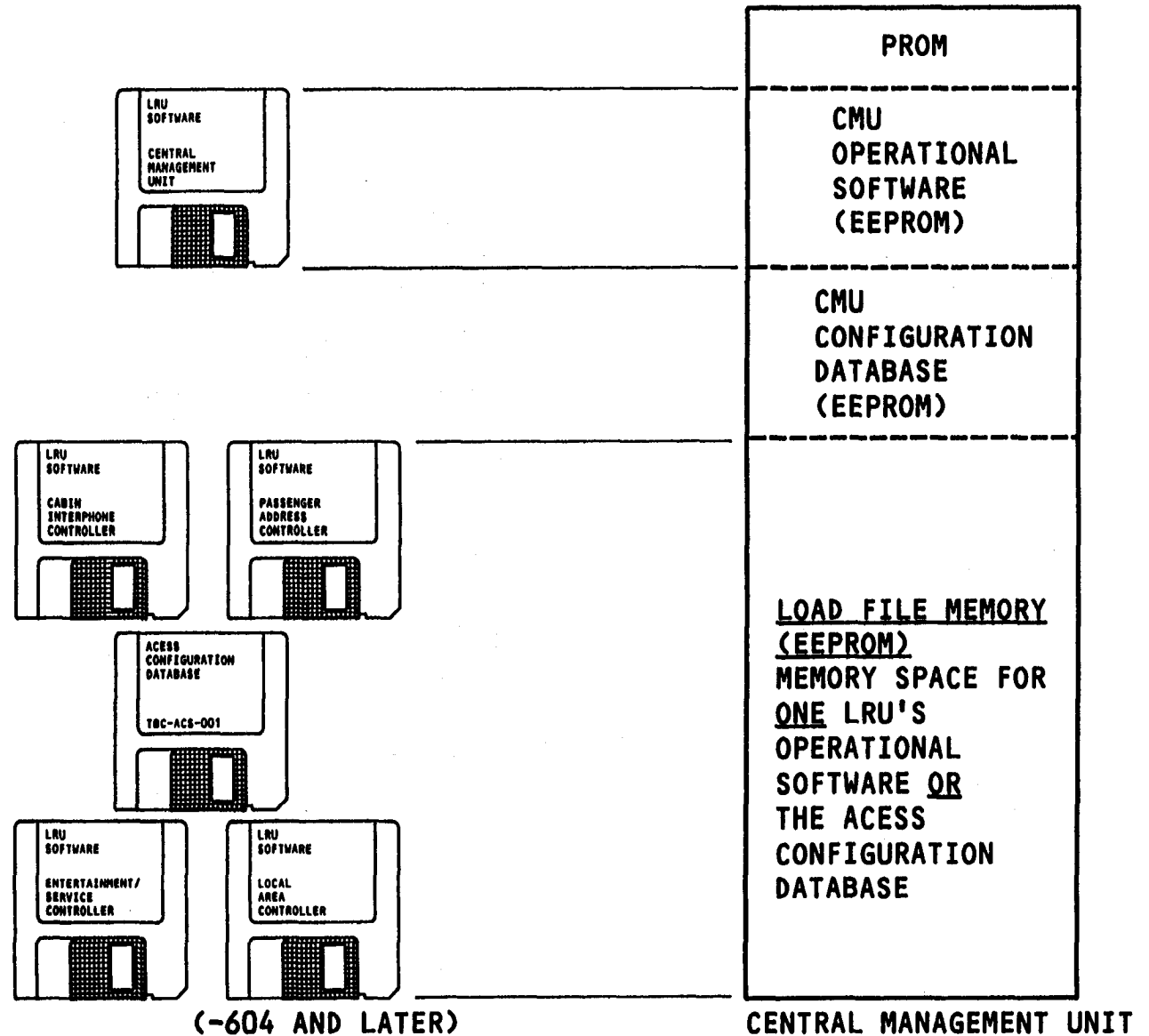
The CMU's load file memory usually contains the ACCESS configuration database. When LRU operational software is installed, the database is replaced.

LRU operational software is installed into the CMUs load file memory, so that the CMU can install the operational software into the correct LRU.

After the CMU installs the operational software into the correct LRU maintenance persons should replace the operational software contained in the load file memory with the ACCESS configuration database.

This lets the CMU install the ACCESS configuration database when an ACCESS LRU is replaced during maintenance.





**Figure 15 CMU MEMORY ALLOCATION**

## ACCESS



### ACCESS CONFIGURATION DATABASE

#### General

Many ACCESS LRUs need the ACCESS configuration database to operate. When an LRU is replaced, the ACCESS configuration database must be installed or the system cannot operate correctly.

The ACCESS configuration database must be installed into these LRUs when replaced:

- Central management unit (CMU)
- Cabin configuration test module (CCTM)
- Entertainment/service controller (ESC)
- Passenger address controller (PAC)
- Cabin interphone controller (CIC)
- Audio entertainment multiplexer (AEM)
- Inboard overhead electronics units (I-OEUs)
- Outboard overhead electronics units (O-OEUs)
- Seat electronics units (SEU)
- Local area controllers (LAC)

#### Install Database Into CMU

When the CMU is replaced, use the software data loader to install the ACCESS configuration database into the CMU's

- Configuration database memory
- Load file memory

The configuration database memory contains only the part of the database that the CMU needs to operate. The load file memory contains all of the ACCESS configuration database.

#### Install Database Into Other LRUs

When an LRU other than the CMU is replaced, use the cabin configuration test module (CCTM) to tell the CMU to install the database. The CMU sends the database to all ACCESS LRUs that need a database to operate. If an LRU already has the database in its memory (and it is the same as the database in the CMU), then the LRU does not install the database.

### ACCESS CONFIGURATION DATABASE

- \* MANY LRU'S NEED THE DATABASE TO OPERATE.
- \* EACH LRU HAS ITS PART OF THE DATABASE IN MEMORY.
- \* THE LOAD FILE MEMORY OF THE CMU CONTAINS ALL OF THE ACCESS CONFIGURATION DATABASE.
- \* IF THE CMU IS REPLACED, USE THE SOFTWARE DATA LOADER TO INSTALL THE DATABASE INTO THE CONFIGURATION DATABASE MEMORY AND LOAD FILE MEMORY IN THE CMU.
- \* IF AN LRU IS REPLACED, USE THE CCTM TO TELL THE CMU TO INSTALL THE DATABASE INTO THE LRU'S CONFIGURATION DATABASE MEMORY.

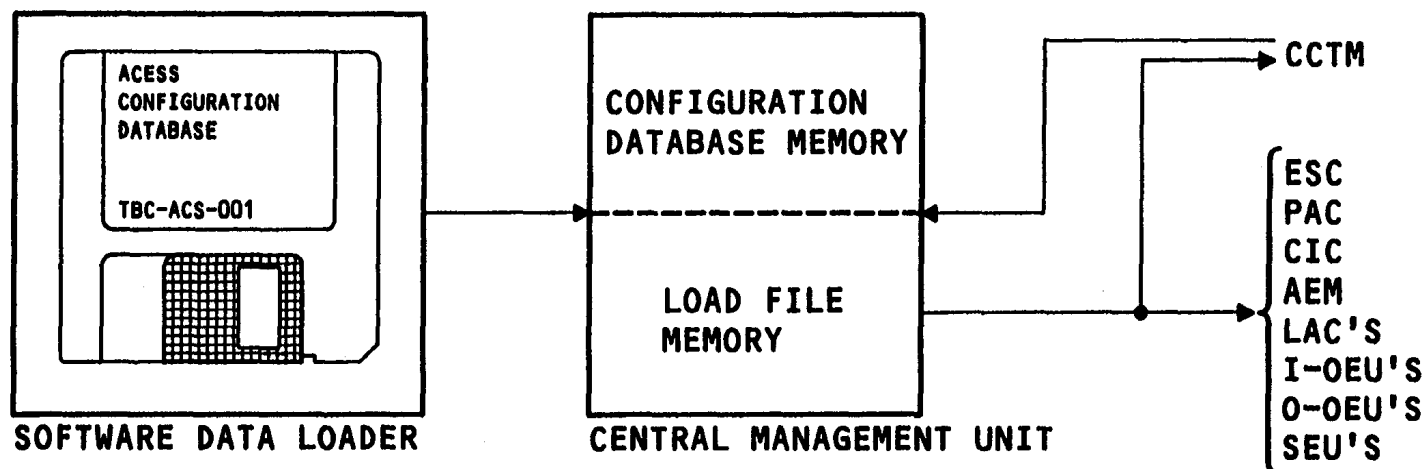


Figure 16 ACCESS CONFIGURATION DATABASE

## ACCESS



### INSTALL DATABASE INTO CMU

#### General

The ACCESS configuration database is installed in the central management unit (CMU) when:

- The database is changed, or
- The CMU has been replaced

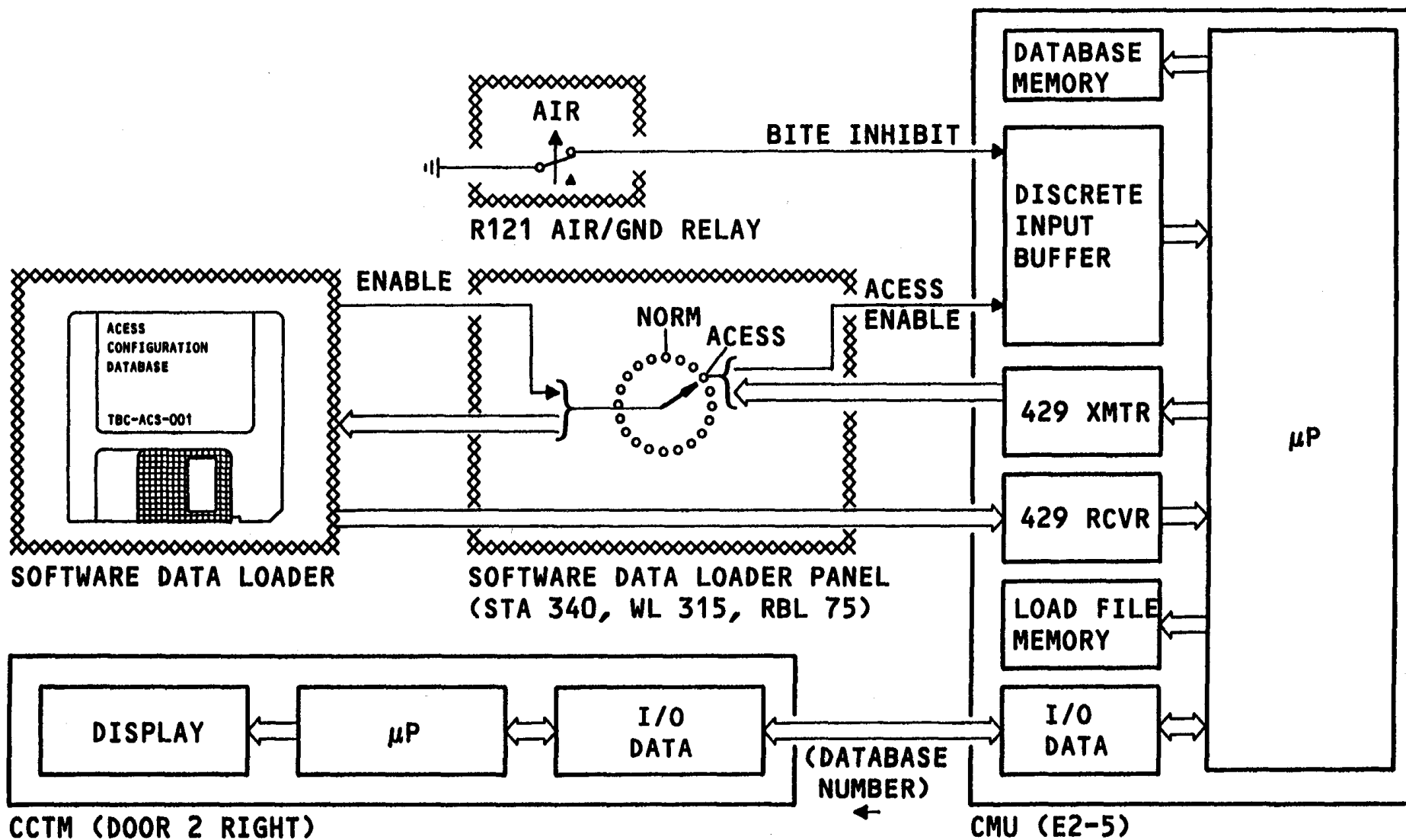
#### Install Database Into CMU

To install the ACCESS configuration database into the CMU:

- Set the software data loader panel switch to ACCESS. The software data loader sends an ACCESS enable discrete to the CMU. This lets the data loader interface with the CMU.
- Put the floppy disk into the software data loader.
- The software data loader sends ACCESS configuration data to the CMU. The CMU installs the part of the database that it needs in its database memory. It installs all of the ACCESS configuration database in its load file memory.

When the CMU gets the configuration database, it sends the database number to the cabin configuration test module (CCTM). The CCTM shows the number in its display.

The CMU cannot install the ACCESS configuration database when the airplane is in the air. Air/ground relay R121, sends a bite inhibit discrete to the CMU to stop this.



### Figure 17 INSTALL DATABASE INTO CMU

## ACCESS



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### CONFIGURATION ID NUMBER

#### Purpose

Maintenance persons should make sure that the ACCESS configuration database installed in the CMU is correct.

#### General Description

The floppy disk that contains the ACCESS configuration database, has a configuration identification configuration ID) number on its label.

The cabin configuration test module (CCTM) shows the configuration ID number of the ACCESS configuration database in the central management unit (CMU).

The configuration ID number in the CCTM display and on the floppy disk should be the same. The CMU has the correct ACCESS configuration database in its memory if the configuration ID numbers are the same.

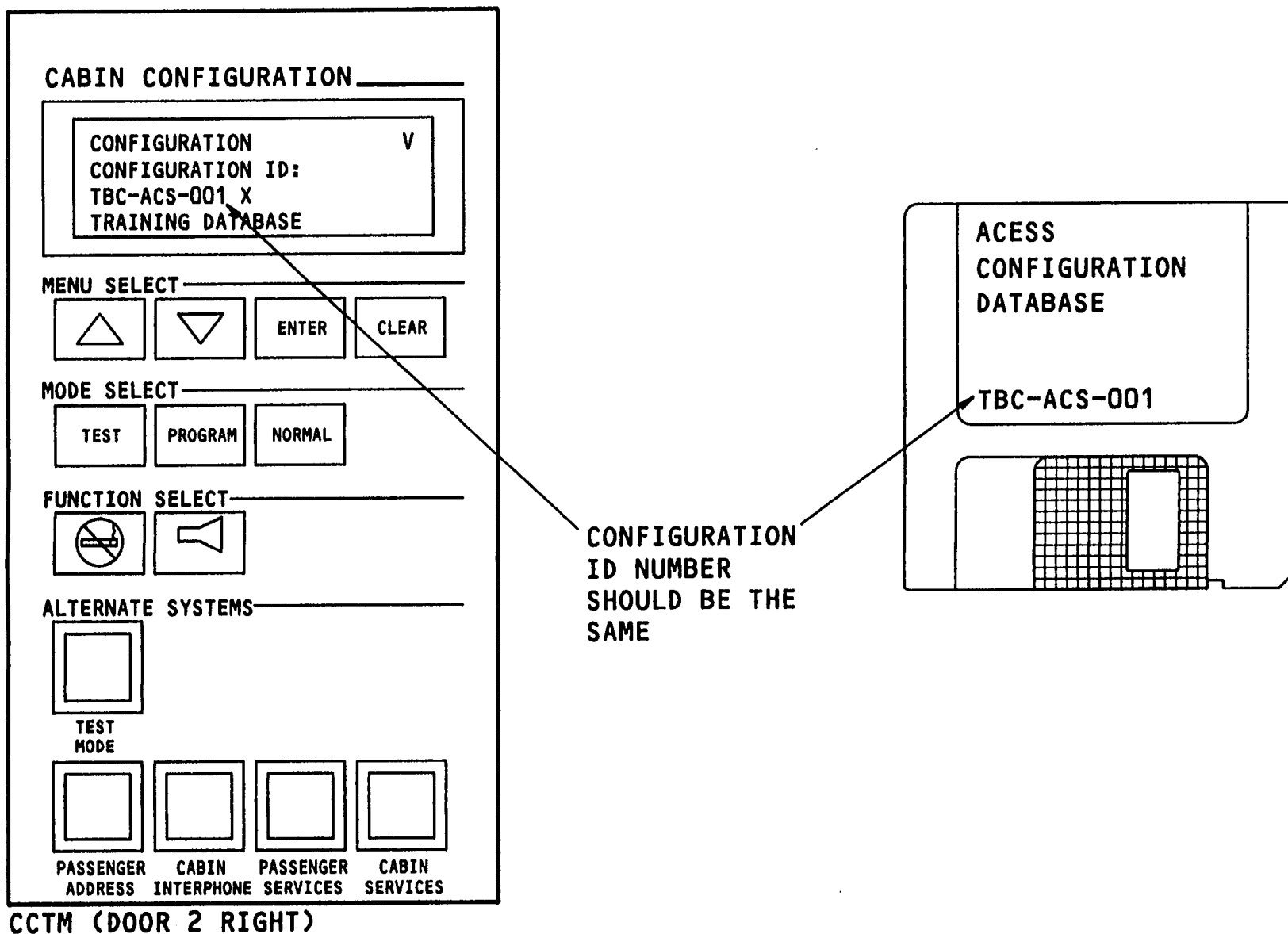


Figure 18 CONFIGURATION ID NUMBER

## ACCESS



### **CCTM PROCEDURES - INSTALL DATABASE - 1**

#### **General**

Use the cabin configuration test module (CCTM) to tell the central management unit (CMU) to install the database when:

- The database is changed, or
- An LRU is replaced, or
- An LRU is moved to a different location

#### **Install Database**

To install the ACCESS configuration database:

- Push the TEST MODE switch. A light in the switch goes on.
- Push the PROGRAM button. The display shows the PROGRAM ACCESS menu.
- Push the scroll down button one time. INSTALL DATABASE shows next to the prompt W.

Push the ENTER button. The CMU installs the database. The CCTM shows the elapsed time in its display. The elapsed time increases until all LRU's install the database.

When complete, the CCTM shows the number of failures found during the installation.



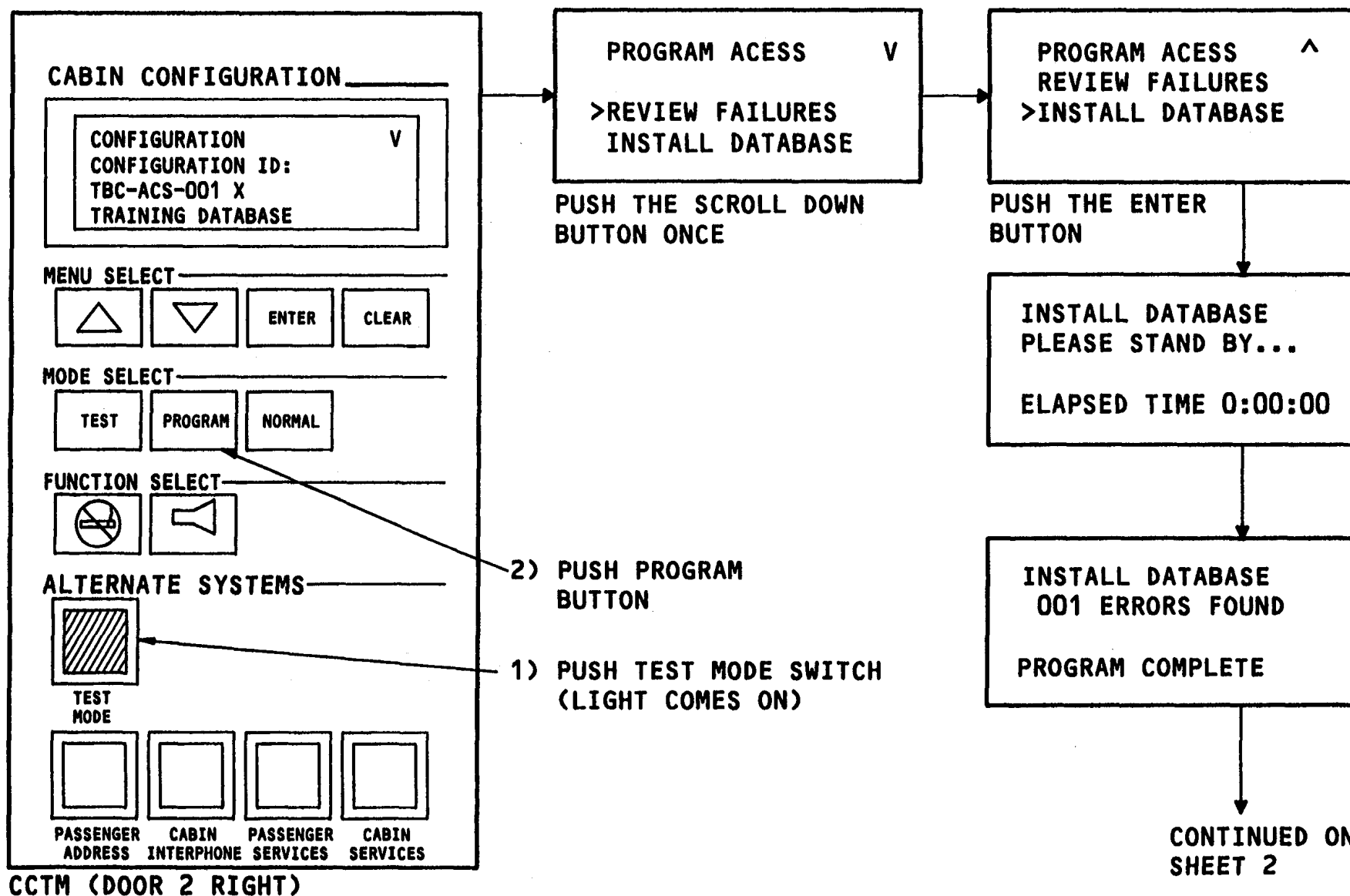


Figure 19 CCTM PROCEDURES - INSTALL DATABASE - 1

## ACCESS



## INSTALL DATABASE - 2

### General

After the installation of the database, review all failures found. Use the fault isolation manual (FIM) to troubleshoot and repair failures.

### Review Failures

To review failures:

- Push the PROGRAM button. The display shows the PROGRAM ACCESS menu. REVIEW FAILURES shows next to the prompt (>).
- Push the ENTER button. If no failures are found, the CCTM display shows NO ERRORS TO REVIEW. If failures are found, the display shows the number found.
- Push the NORMAL button. The normal menu is shown.
- Push the TEST MODE switch. A light in the switch goes off.

## ACCESS

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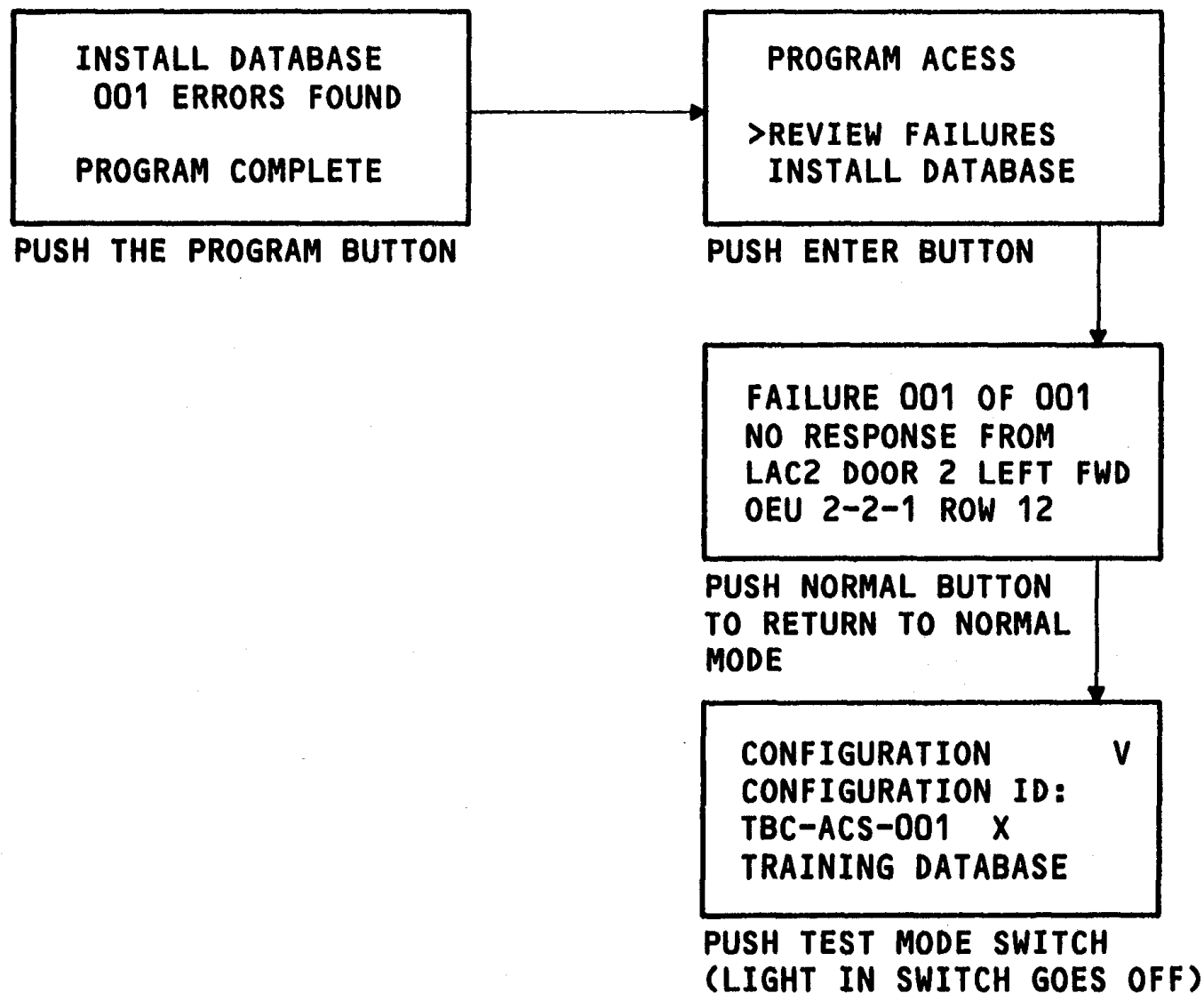


Figure 20 INSTALL DATABASE - 2

## ACCESS



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### INSTALL DATABASE INTO ACCESS LRU'S -1

Start the installation of the ACCESS configuration database at the cabin configuration test module (CCTM). Use the CCTM keypad to send an install database command to the central management unit (CMU). The database (in the CMUs load file memory) goes to the CCTM entertainment/service controller (ESC), passenger address controller (PAC), and cabin interphone controller (CIC). The CMU installs the database in the alternate controller circuits of the ESC, PAC, and CIC. The CMU switches the controllers to their normal circuits and installs the database. After the normal controller circuits install the database, the controllers send the database to the other LRUs. Installation of the database continues as follows:

- The CIC sends the database to the cabin interphone section of the local area controllers (LACs).
- The PAC sends the database through the LACs to the passenger address section of the inboard overhead electronics units (I-OEUs).
- The ESC sends the database to the audio entertainment multiplexer and to the section of the LACs that control passenger entertainment (audio), passenger service, and cabin lighting functions.
- The LACs program the seat electronics units (SEUs), and the passenger service/cabin lighting section of the inboard and outboard overhead electronics units (I-OEUs/OOEUs).

After the database is installed, any failures found go to the CMU's volatile memory. Use the CCTM to look at all fault messages.

Air/ground relay R121 sends a bite inhibit discrete to the CMU to stop installation of the database when the airplane is in flight.

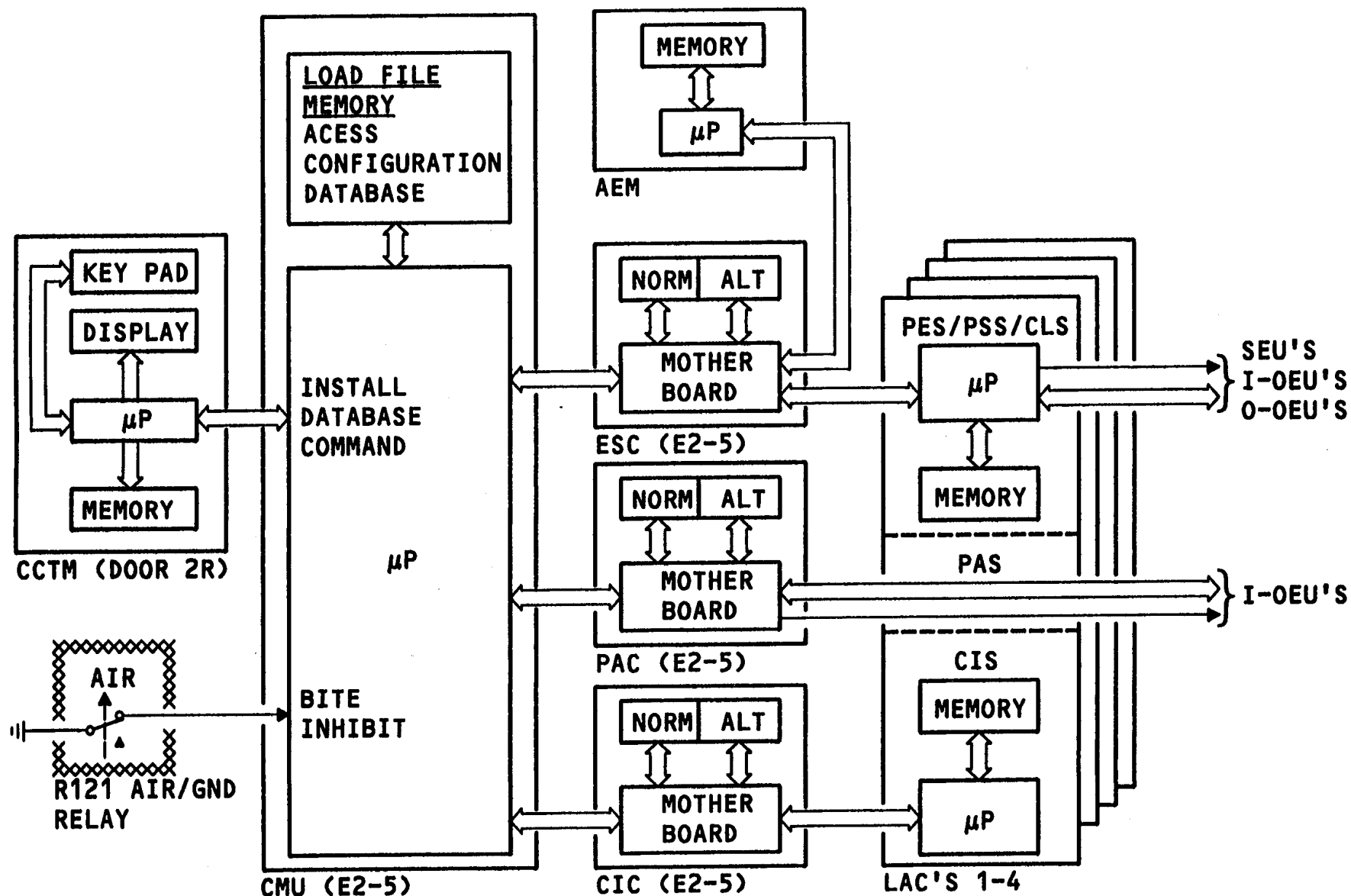


Figure 21 INSTALL DATABASE INTO ACCESS LRU'S -1



## INSTALL DATABASE INTO ACCESS LRU'S - 2

### General

The local area controllers (LACe) install the ACCESS configuration database into the:

- Inboard-overhead electronic unit (I-OEUs) (passenger service and cabin lighting sections only)
- Overhead-OEUs (O-OEUs)
- Seat electronic units (SEUs)

The passenger address controller (PAC) sends configuration data through the LAC to the passenger address section of the IOEUs.

Installation of the ACCESS configuration database into the I-OEUs O-OEUs and SEUs requires the use of a program wire.

### Program Wire

The LAC connects to all OEUs and SEUs with a:

- Data bus. The data bus connects to all SEUs and OEUs in parallel.
- Program wire The program wire connects to the first SEU/OEU in the column. The first SEU/OEU connects the program wire to the second SEU/OEU. This continues to all SEUs/OEUs in the column.

### Install Database Into SEUs and OEU

SEUs and OEUs install the database one LRU at a time. The first LRU in a column installs the database, followed by the second, and so on until all LRUs install the database. To do this, the LAC:

- Sets its program wire output to a logic one (high state).
- Sends configuration data to all SEUs and OEUs on a data bus.

Since the first LRU is the only one with a. high program wire, it is the only LRU that can install the configuration database. After the first LRU installs the database, it sends its status back to the LAC and sets its program wire output high.

The LAC:

- Gets the status data from the LRU to see if it correctly installed the database.
- Sets its program wire output low.
- Sends configuration data to the next LRU.

This continues until all the LRUs in each column install configuration data.

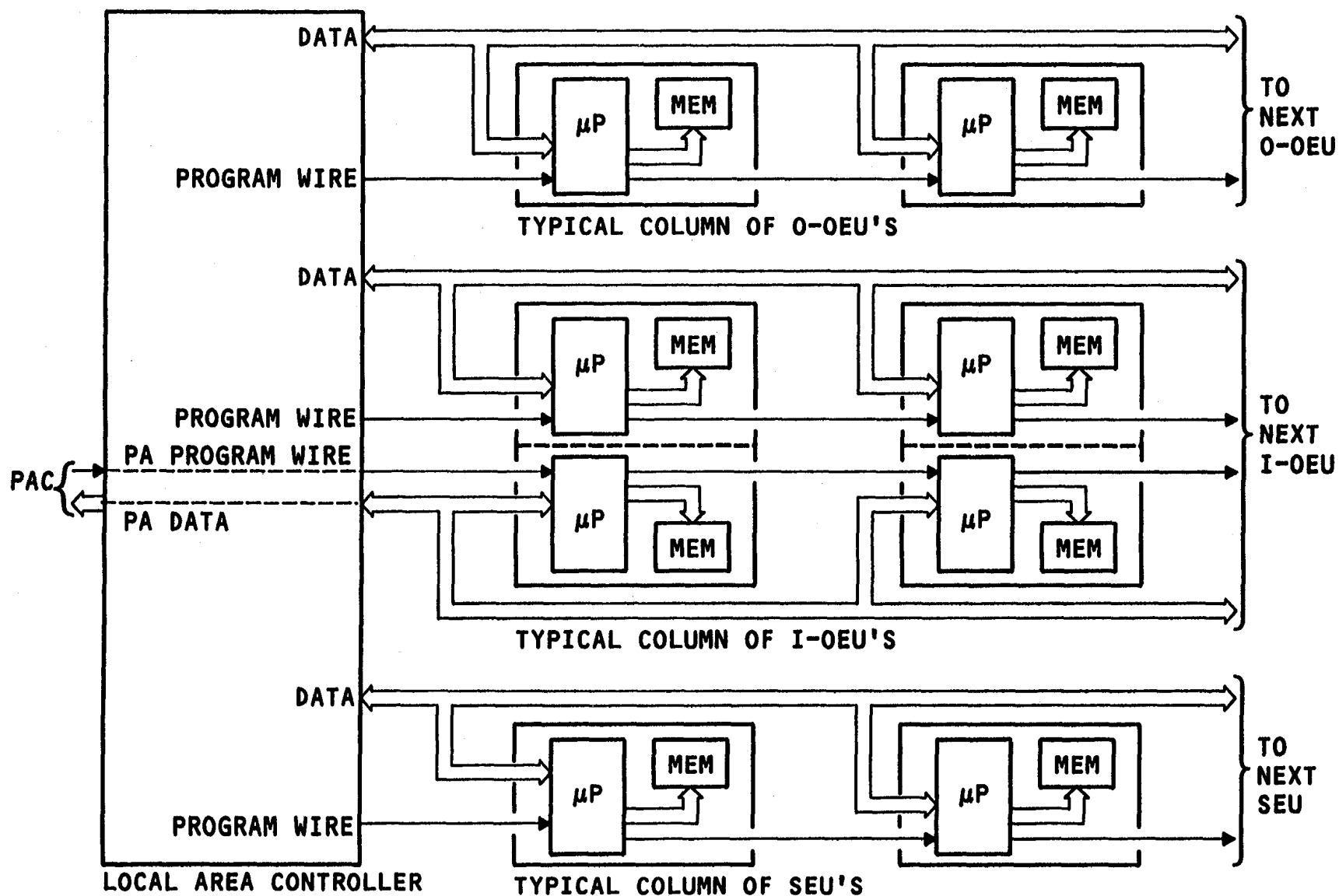


Figure 22 INSTALL DATABASE INTO ACCESS LRUS - 2



## INSTALL LRU OPERATIONAL SOFTWARE

### General

Each of these ACCESS LRUs must have LRU operational software in its memory:

- Central management unit (CMU)
- Cabin interphone controller (CIC)
- Passenger address controller (PAC)
- Entertainment/service controller (ESC)
- Local area controller (LAC)

The vendor first installs the LRU operational software. Therefore, all spares have LRU software installed. The vendor supplies new LRU software to enhance system operation, or to correct problems with the LRU software.

### Install LRU Operational Software

Installation of LRU operational software is the same as installation of the ACCESS configuration database.

To install any LRU's software put the floppy disk into a software data loader and install the LRU software from the disk into the CMU.

CMU software goes into the CMU's operational software EEPROM. Software for the other LRUs goes into the CMU's load file memory.

After the software is in the CMU, remove the floppy disk from the software data loader and put it away for future use.

LRU software in the CMU's load file memory must go to the applicable LRU's memory. To do this, do the program LRU command at the CCTM. The command goes to the CMU which then sends the LRU software to the applicable LRU.

**NOTE:** AFTER INSTALLATION OF THE LRU OPERATIONAL SOFTWARE, IT IS VERY IMPORTANT TO REPLACE THE LRU SOFTWARE IN THE CMU'S LOAD FILE MEMORY WITH THE ACCESS CONFIGURATION DATABASE. THEN USE THE INSTALL DATABASE COMMAND AT THE CCTM. THIS MAKES SURE THE ACCESS CONFIGURATION DATABASE IS IN THE LRU THAT JUST GOT THE NEW LRU OPERATIONAL SOFTWARE.





### ACCESS LRU SOFTWARE

- \* SPARES HAVE LRU SOFTWARE INSTALLED
- \* VENDOR SUPPLIES NEW LRU SOFTWARE FOR SYSTEM ENHANCEMENT OR TO CORRECT KNOWN PROBLEMS
- \* LRU SOFTWARE CAN BE INSTALLED IN THE AIRPLANE

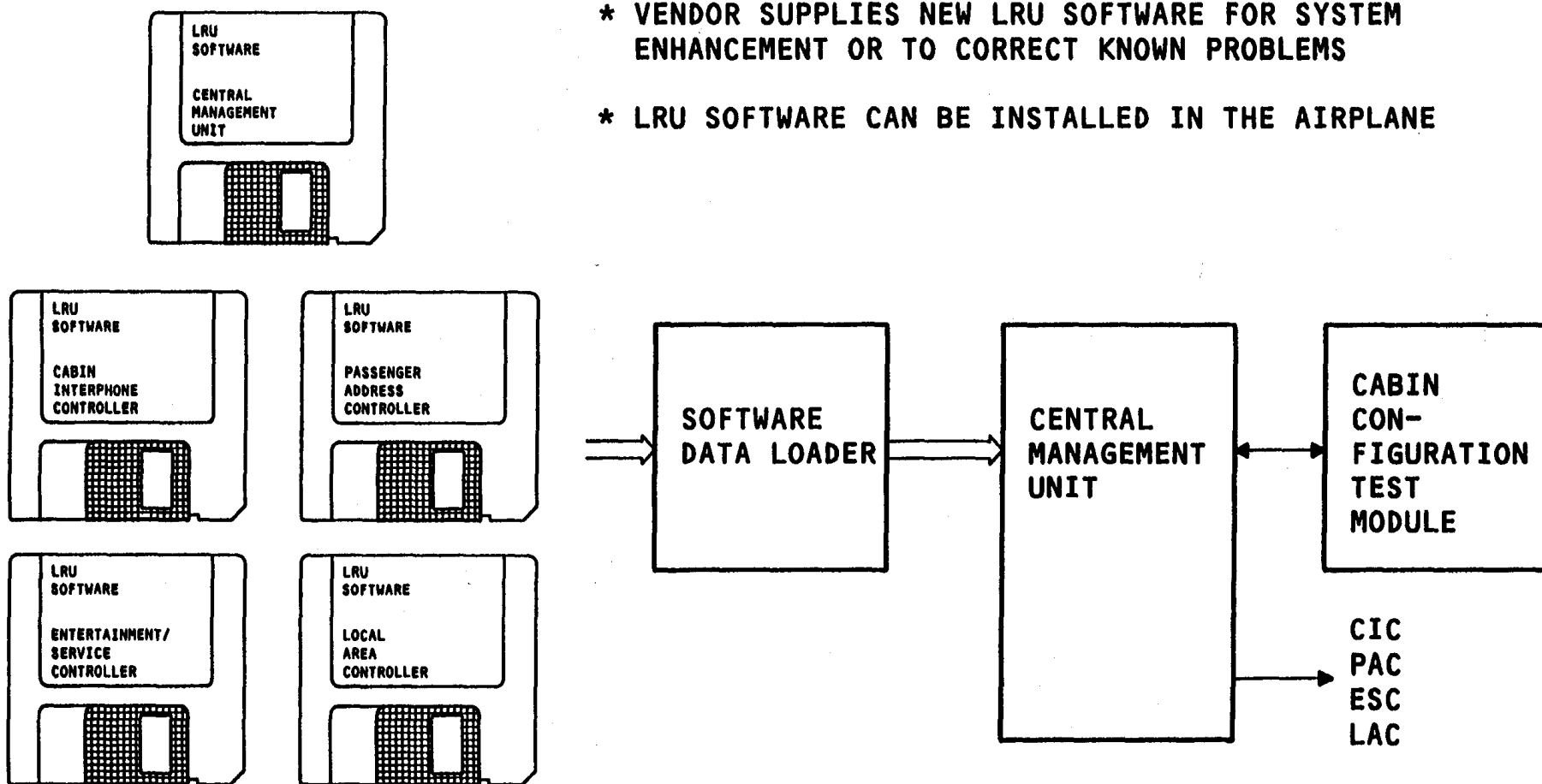


Figure 23 INSTALL LRU OPERATIONAL SOFTWARE

## ACCESS



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### INSTALL LRU SOFTWARE INTO CMU

#### Program CMU

To install LRU operational software into the central management unit (CMU):

- Put the software data loader panel switch into the ACCESS position. The software data loader sends an ACCESS enable discrete to the CMU to let communication between the data loader and the CMU occur.
- Put the floppy disk into the software data loader. The CMU sends a ready-to receive command through the software data loader panel switch to the software data loader.
- The software data loader sends the LRU software to the CMU. If the data loader sends CMU software, then the data goes into the CMU's EE-PROM. If the data loader sends any other LRU's software, then the data goes into the CMU's load file memory.

After CMU software installation, the CMU sends the software part number to the cabin configuration test module (CCTM). The CCTM shows this number in its display.

#### Inhibit

The air/ground relay R121 sends a bite inhibit discrete to the CMU when the airplane is in the air. This discrete prevents installation of LRU software.





## INSTALL LRU OPERATIONAL SOFTWARE

### General

Only one LRU's operational software is in the load file memory of the central management unit (CMU) at a time. Use the cabin configuration test module (CCTM) to tell the CMU to install the LRU software into the appropriate LRU. To see the type of software in the CMU, use the program menu on the CCTM display.

### Install LRU Operational Software

To install an LRU's operational software:

- Push the TEST MODE switch. The light in the switch comes on.
- Push the PROGRAM button. The PROGRAM ACCESS menu shows.
- Push the scroll down button one time. The PROGRAM XXX selection is next to the prompt (>) (XXX is the type of LRU software that is in the CMU's memory: CIC, PAC# ESC or LAC).
- Push the ENTER button. This installs the LRU software. The elapsed time shows in the CCTM display. The elapsed time continues to increase until the LRU software is in the LRU's memory.
- When this is complete, the CCTM shows the number of errors found during the installation. In this case, there are no errors.
- Push the NORMAL button to put ACCESS back into the normal mode. The normal menu shows.
- Push the TEST MODE switch. The light in the switch goes off.

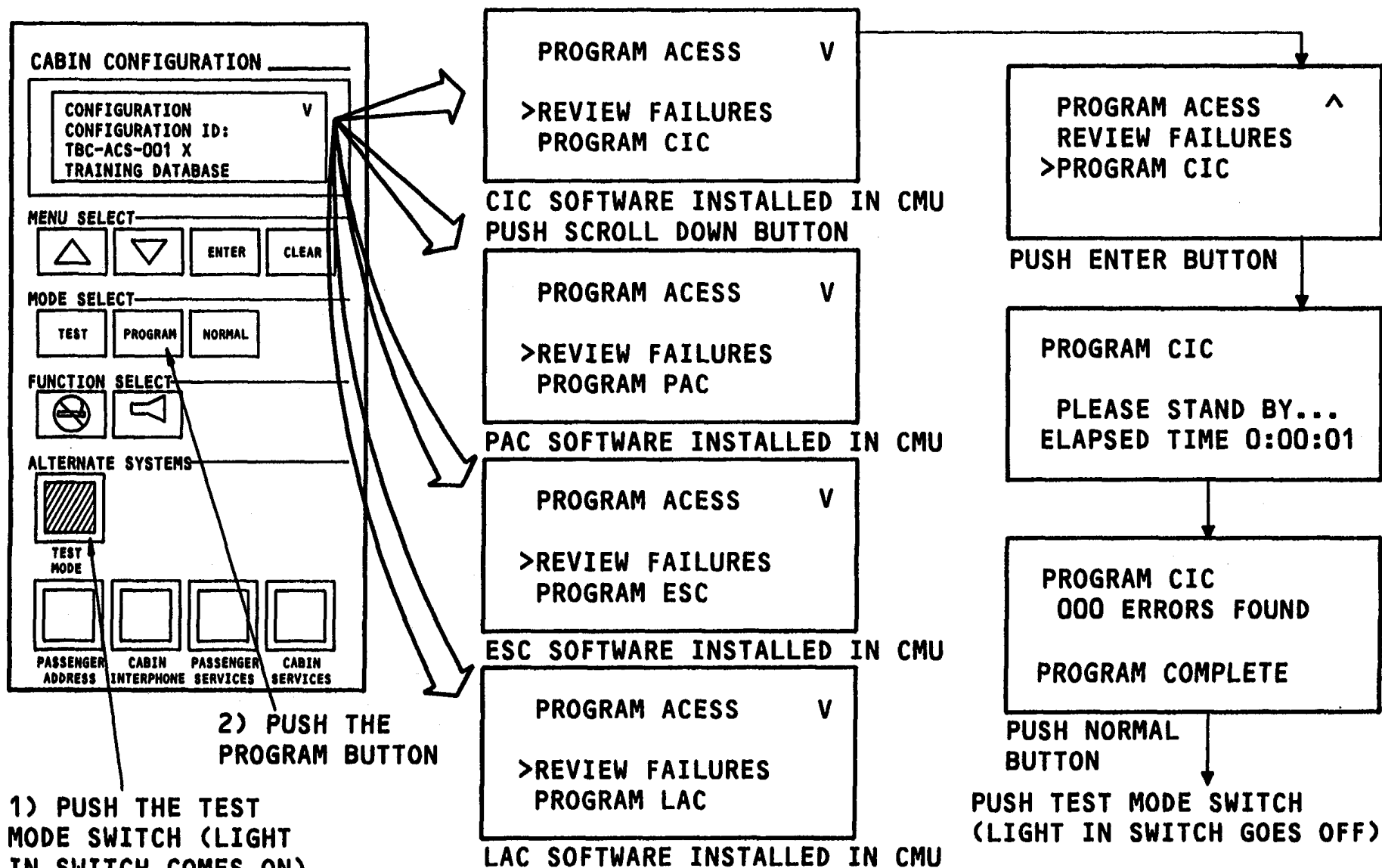


Figure 25 INSTALL LRU OPERATIONAL SOFTWARE

## ACCESS



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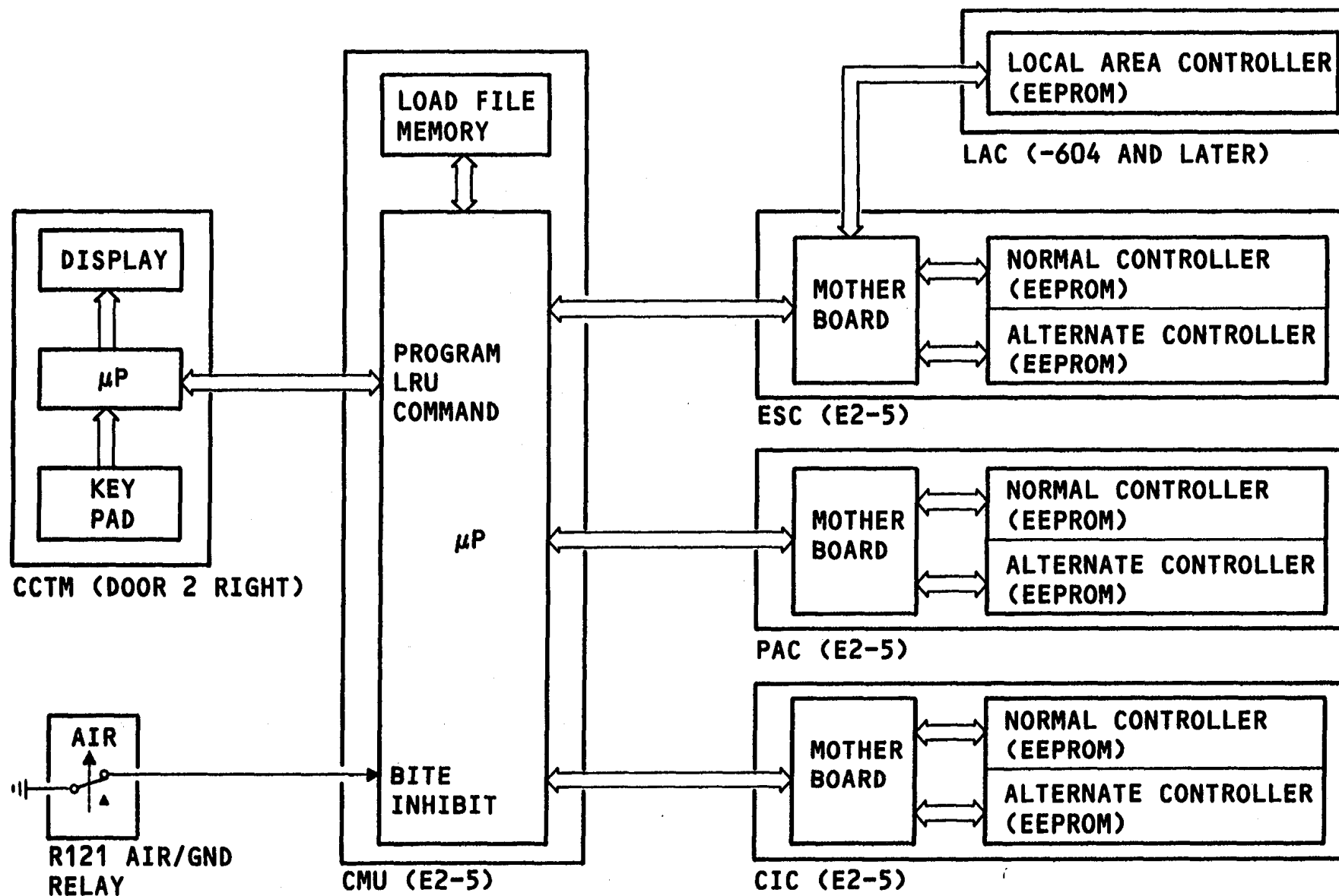
### INSTALL LRU SOFTWARE INTO LRUS

Installation of LRU operational software starts at the cabin configuration test module (CCTM). The operator uses the CCTM keypad to make a PROGRAM LRU command which goes to the central management unit (CMU). The LRU software, in the CMU's load file memory, goes to the appropriate LRU.

The CMU installs the LRU operational software into the alternate controller circuits first. The CMU then switches the controller to its normal circuit. The CMU then installs the software into the normal circuit.

When installation of LRU operational software is complete, the results go to the CMU. The CMU puts reported failures into volatile memory as fault messages. The operator can view each of the fault messages on the CCTM display one at a time.

Installation of LRU operational software can only occur with the airplane on the ground. Air/ground relay R121 sends a bite inhibit discrete to the CMU to prevent installation while the airplane is in the air.



**Figure 26 INSTALL LRU SOFTWARE INTO LRUS**

## ACCESS



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### **CCTM NORMAL MENU - 1**

ACCESS configuration database and LRU operational software data is available through the cabin configuration test module (CCTM) normal menu. Push the NORMAL button to show the normal menu,, unless it is on the display already. Push the scroll up and scroll down buttons to see the data.



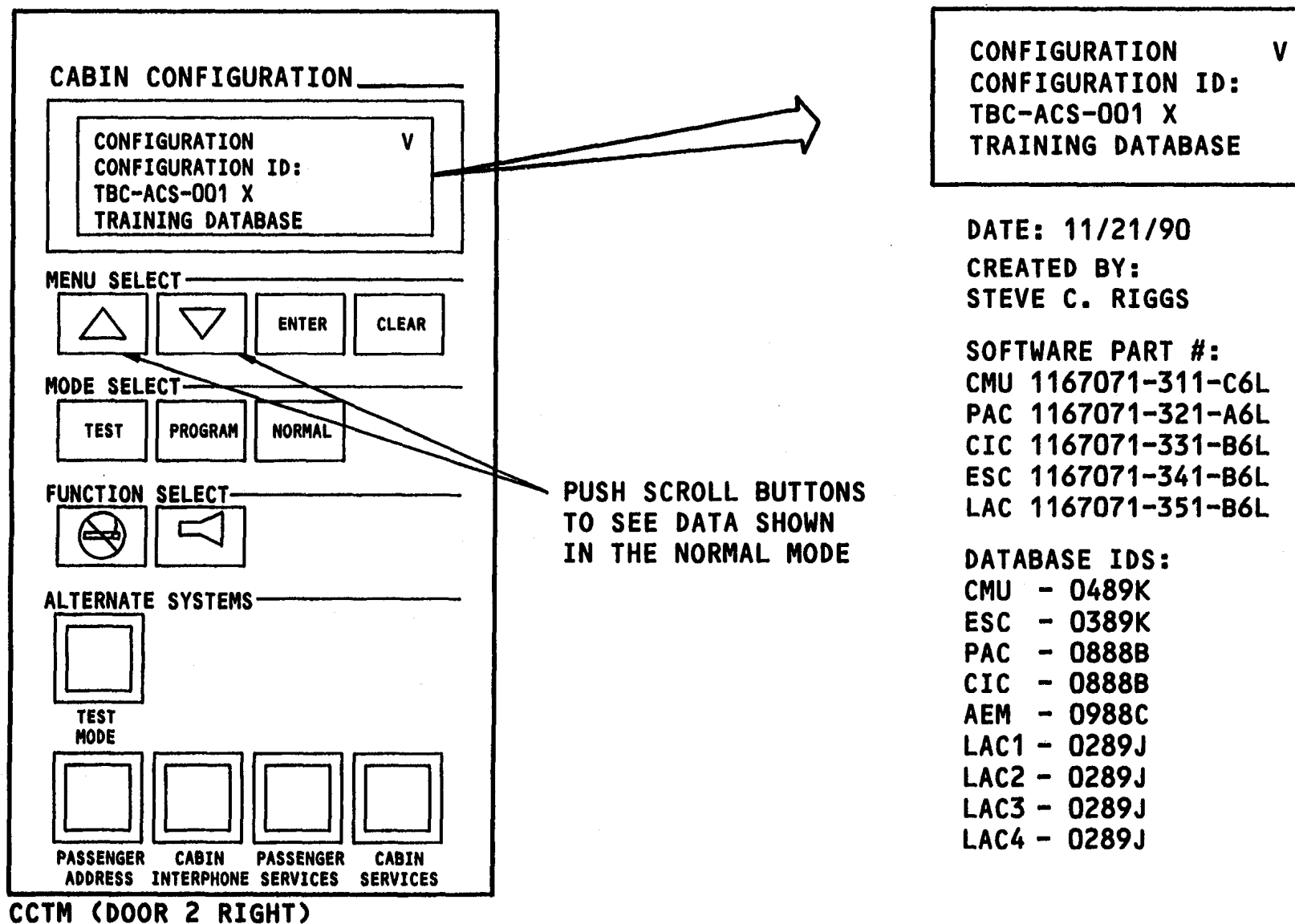


Figure 27 CCTM NORMAL MENU - 1

## ACCESS



### **CCTM NORMAL MENU - 2**

#### **General**

The CCTM display shows three types of data:

- ACCESS configuration database data
- LRU operational software part numbers
- Database identification numbers

#### **ACCESS Configuration Database Data**

When the ACCESS configuration database goes into the CMU's load file memory from the data loader, the CMU's own database memory also gets its part of the database. The CCTM shows data about the CMU's database memory. This data includes:

- The ACCESS configuration database number
- A brief description of the database
- The date that the database was created on the airplane configuration system (ACS)
- The person who created the database on ACS

#### **LRU Operational Software Part Numbers**

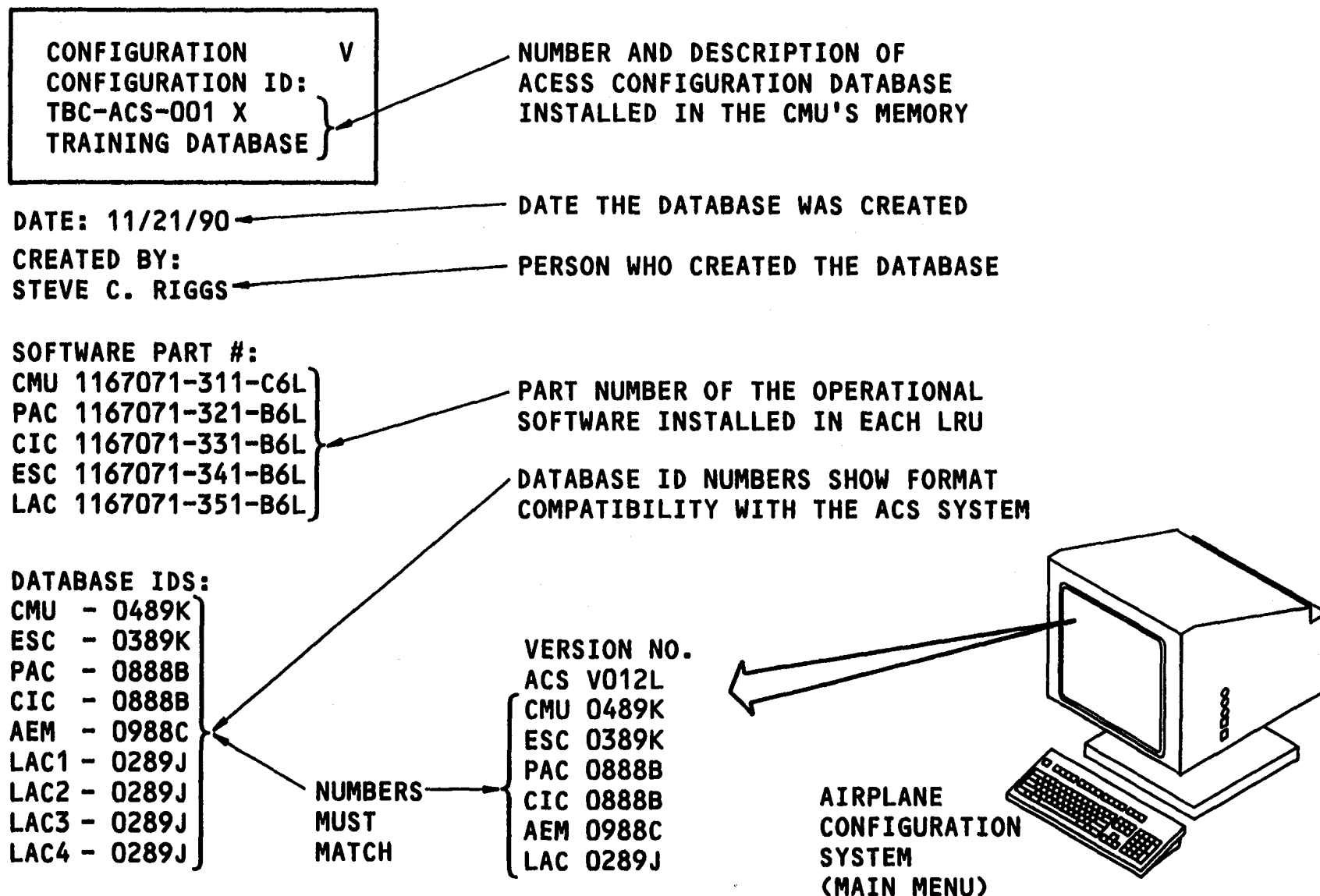
LRU operational software part numbers show the part number of the LRU operational software that is in each of the LRUs. This data comes from each LRU.

If configuration data does not come from one of the LRUs, its identifier shows as "UNKNOWN".

#### **Database Identification Numbers**

Database identification numbers come from the identified LRUs and show format compatibility of an LRU's PROM software to the ACS system. These numbers must be the same as the applicable "VERSION NO" fields in the ACS main menu.

**NOTE:** IF CONFIGURATION DATA DOES NOT COME FROM ONE OF THE LRUS, ITS IDENTIFIER SHOWS AS "UNKNOWN".



**Figure 28 CCTM NORMAL MENU - 2**

## ACCESS



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### REVIEW FAILURES AT CCTM - 1

Use the cabin configuration test module (CCTM) to start a test, program, or system status check. The central management unit (CMU) stores all failures found in its volatile memory. Use the CCTM to see the failures found.



**CABIN CONFIGURATION** \_\_\_\_\_

CONFIGURATION ID: V  
 TBC-ACS-001 X  
 TRAINING DATABASE

**MENU SELECT** \_\_\_\_\_

△

▽

ENTER

CLEAR

**MODE SELECT** \_\_\_\_\_

TEST

PROGRAM

NORMAL

**FUNCTION SELECT** \_\_\_\_\_

⊘

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**ALTERNATE SYSTEMS** \_\_\_\_\_

**TEST MODE**

PASSENGER  
ADDRESS
CABIN  
INTERPHONE
PASSENGER  
SERVICES
CABIN  
SERVICES

**USE THE CCTM TO REVIEW FAILURES  
FOUND DURING EACH OF THESE OPERATIONS:**

**\* TEST**

**TEST ALL UNITS**

**PLEASE STAND BY...  
ELAPSED TIME 0:00:45**

**\* PROGRAM**

**INSTALL DATABASE**

**PLEASE STAND BY...  
ELAPSED TIME 0:01:25**

**\* SYSTEM STATUS**

**SYSTEM STATUS**

**PLEASE STAND BY...  
ELAPSED TIME 0:00:13**

**CCTM (DOOR 2 RIGHT)**

**Figure 29 REVIEW FAILURES AT CCTM - 1**



## REVIEW FAILURES AT CCTM - 2

### General

After a test, program, or system status check, review all failures found.

### System Status Failures

After a system status check, the last failure found shows on the cabin configuration test module (CCTM display). Use the scroll up and scroll down buttons to see other failures if more than one is found.

### Test Failures

After a system test, the number of failures found is shown on the CCTM display. To see the failures:

- Push the TEST button. The system test menu is shown and REVIEW FAILURES is next to the prompt
- Push the ENTER button. The CCTM display shows the last failure found. Use the scroll up and scroll down buttons to see other failures if more than one failure is found.

### Program Failures

After the ACCESS configuration database is installed, the number of failures found shows on the CCTM display. To see the failures:

- Push the PROGRAM button.
- Push the ENTER button.
- Look at all failures.

SYSTEM STATUS FAILURES

FAILURE 001 OF 001  
NO RESPONSE FROM  
PAC E2-5  
ESC E2-5

TEST FAILURES

TEST ALL UNITS  
002 ERRORS FOUND  
TEST COMPLETE

PUSH TEST BUTTON

SYSTEM TEST V

>REVIEW FAILURES  
TEST ALL UNITS

PUSH ENTER BUTTON

FAILURE 002 OF 002 V  
NO RESPONSE FROM  
LAC2 DOOR 2 LEFT AFT  
OEU 2-1-4 ROW 37

PUSH SCROLL BUTTONS TO  
REVIEW FAILURES

PROGRAM FAILURES

PROGRAM ACCESS  
003 ERRORS FOUND  
PROGRAM COMPLETE

PUSH PROGRAM BUTTON

PROGRAM ACCESS V

>REVIEW FAILURES  
INSTALL DATABASE

PUSH ENTER BUTTON

FAILURE 003 OF 003 V  
PROGRAM NEEDED  
ESC E2-5

PUSH SCROLL BUTTONS TO  
REVIEW FAILURES

Figure 30 REVIEW FAILURES AT CCTM - 2

## ACCESS



### FAILURE MESSAGES

If there are no failures in the central management unit (CMU) memory, then the cabin configuration test module (CCTM) shows NO ERRORS TO REVIEW in its display.

If there are failures stored in the CMU's memory, then the CCTM shows the failure messages in this format:

XXX - The number of the failure shown (the last failure found shows first).

ZZZ - The total number of failures found.

Failure description - Describes the failure found.

Unit that finds failure - The name of the LRU that found the failure.

Defective unit - This shows the name of the defective component, or it shows a failure in the interface between the unit that found the failure and the unit that is shown as defective.



**CABIN CONFIGURATION** \_\_\_\_\_

NO ERRORS TO REVIEW

**MENU SELECT** \_\_\_\_\_

△

▽

ENTER

CLEAR

**MODE SELECT** \_\_\_\_\_

TEST

PROGRAM

NORMAL

**FUNCTION SELECT** \_\_\_\_\_

⊘

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**ALTERNATE SYSTEMS** \_\_\_\_\_

▨

TEST  
MODE

PASSENGER  
ADDRESS

CABIN  
INTERPHONE

PASSENGER  
SERVICES

CABIN  
SERVICES

**CABIN CONFIGURATION** \_\_\_\_\_

FAILURE XXX OF ZZZ  
FAILURE DESCRIPTION  
UNIT THAT FINDS FAILURE  
DEFECTIVE UNIT

**MENU SELECT** \_\_\_\_\_

△

▽

ENTER

CLEAR

**MODE SELECT** \_\_\_\_\_

TEST

PROGRAM

NORMAL

**FUNCTION SELECT** \_\_\_\_\_

⊘

🔊

**ALTERNATE SYSTEMS** \_\_\_\_\_

▨

TEST  
MODE

PASSENGER  
ADDRESS

CABIN  
INTERPHONE

PASSENGER  
SERVICES

CABIN  
SERVICES

**Figure 31 FAILURE MESSAGES**



## PROGRAM FAILURES

### General

This graphic gives four examples of program failures. Refer to the fault isolation manual for a complete list of program failures.

#### Failure 001 of 004

This failure shows that the unit on line 3 of the CCTM (LAC2) cannot get or send data to the unit shown on line 4 of the CCTM (OEU 2-1-4). The LAC is located at door 2 left aft. The OEU is located at row 37. The numbers 2-1-4 mean that the OEU is connected to LAC2, column 1, the 4th OEU in that column.

#### Failure 002 of 004

This failure shows that the unit on line 3 of the CCTM (LAW reports that the program line input to the unit shown on line 4 of the CCTM (OEU 1-2-7) is defective. The LAC is located at door 2 left forward. The OEU is located at row 5. The numbers 1-2-7 mean that the OEU is connected to LAC1, column 2, the 7th OEU in that column.

#### Failure 993 of 004

This failure shows that the unit on line 3 of the CCTM (ESC) needs LRU operational software. The ESC is located on the E2-5 shelf.

#### Failure 004 of 001

This failure shows that the unit on line 3 of the CCTM (PAC) needs the ACCESS configuration database. The PAC is located on the E2-5 shelf.



FAILURE XXX OF ZZZ  
FAILURE DESCRIPTION  
UNIT THAT FINDS FAILURE  
DEFECTIVE UNIT

FAILURE 001 OF 004  
NO RESPONSE FROM  
LAC2 DOOR 2 LEFT AFT  
OEU 2-1-4 ROW 37

FAILURE 002 OF 004  
PROGRAM LINE ERROR  
LAC1 DOOR 2 LEFT FWD  
OEU 1-2-7 ROW 5

FAILURE 003 OF 004  
PROGRAM NEEDED  
ESC E2-5

FAILURE 004 OF 004  
DATABASE NEEDED  
PAC E2-5

Figure 32 PROGRAM FAILURES



## TEST FAILURES

### General

This graphic gives six examples of test failures. Refer to the fault isolation manual for a complete list of test failures.

#### Failure 001 of 006

This failure shows that the unit on line 3 of the CCTM (ESC) cannot get or send data to the unit shown on line 4 of the CCTM (LAC2). The ESC is located on the E25 shelf. The LAC is located at door 2 left aft.

#### Failure 002 of 006

This failure shows that the unit on line 3 of the CCTM (PAC) cannot get or send data to the column of I-OEUs connected to the unit shown on line 4 of the CCTM (LAW).

#### Failure 003 of 006

This failure shows that the unit on line 3 of the CCTM (SEU) cannot get or send data to the unit shown on line 4 of the CCTM (DPCU). The SEU is located at row 22 column 1. The DPCU is located at row 22 seat A.

#### Failure 004 of 006

This failure shows that the unit on line 3 of the CCTM (OEU 1-2-14) reports the PALCS connected to that OEU does not operate. The OEU is located at row 2. The OEU is connected to LAC1, column 2, the 14th OEU in that column.

#### Failure 005 of 006

This failure shows that the unit on line 3 of the CCTM (LAC2) reports that the handset #3 connection to that LAC is off hook. The handset's dial code is 13. That's the dial code for the handset located at door 3 left.

#### Failure 006 of 006

This failure shows that the unit on line 3 of the CCTM (OEU 1-3-10) reports that the light connected to the OEUs row call light 2 output is open. The OEU is located at row 4. The OEU is connected to LAC1, column 3, the 10th OEU in that column.



FAILURE XXX OF ZZZ  
FAILURE DESCRIPTION  
UNIT THAT FINDS FAILURE  
DEFECTIVE UNIT

FAILURE 001 OF 006  
NO RESPONSE FROM  
ESC E2-5  
LAC2 DOOR 2 LEFT AFT

FAILURE 002 OF 006  
COLUMN FAULT  
PAC E2-5  
LAC1 DOOR 2 LEFT FWD

FAILURE 003 OF 006  
NO RESPONSE FROM  
SEU ROW 22 COLUMN 1  
PCU ROW 22 SEAT A

FAILURE 004 OF 006  
PALCS FAIL  
OEU 1-2-14 ROW 2

FAILURE 005 OF 006  
HANDSET OFF HOOK  
LAC2 DOOR 2 LEFT AFT  
H/S #3 DIALCODE 13

FAILURE 006 OF 006  
LAMP OPEN  
OEU 1-3-10 ROW 4  
ROW CALL LIGHT 2

Figure 33 TEST FAILURES

## ACCESS



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### **ACCESS INTERIOR CONFIGURATION LAYOUT-1**

An ACCESS interior configuration layout drawing goes with the airplane at delivery. The drawing shows the location of many ACCESS components.

The cabin configuration test module (CCTM) shows failure messages in its display. The failure message shows a defective components location. Compare the location shown on the CCTM display with the location shown on the drawing. This cross-reference gives maintenance persons more data about a defective components location.

# ACCESS



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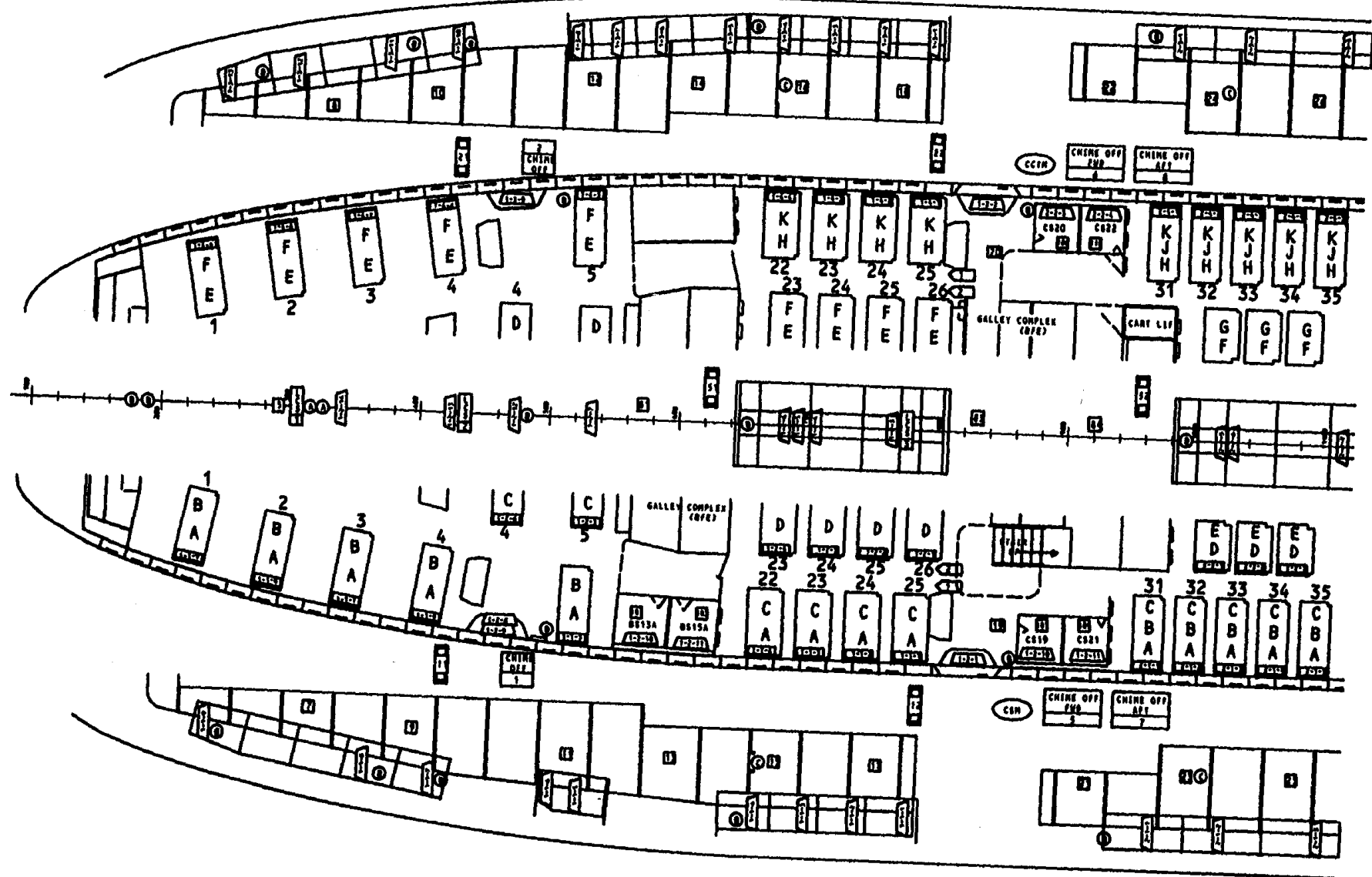


Figure 34 ACCESS INTERIOR CONFIGURATION LAYOUT-1



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## **ACCESS INTERIOR CONFIGURATION LAYOUT - 2**

This graphic shows the symbols used in the ACCESS interior configuration layout drawing. The symbols show the location of these components:

- Seat electronics units
- Overhead electronics units
- Passenger address level control sensors
- Chime off switches
- Passenger information signs
- Speakers
- Cabin configuration test module
- Cabin system modules
- Cabin interphone handsets





A-B-C

## SEAT ELECTRONICS UNIT

A = LOCAL AREA CONTROLLER NUMBER  
 B = SEAT COLUMN NUMBER  
 C = SEAT ELECTRONIC UNIT NUMBER  
 IN SEAT COLUMN

D-E-F

## OVERHEAD ELECTRONICS UNIT

D = LOCAL AREA CONTROLLER NUMBER  
 E = COLUMN NUMBER  
 F = OVERHEAD ELECTRONIC UNIT NUMBER  
 IN COLUMN

L  
C  
S  
N

## PASSENGER ADDRESS LEVEL CONTROL SENSOR

N = SENSOR NUMBER

## CHIME OFF SWITCHES

CHIME  
OFF  
N

N = CHIME OFF SWITCH ID NUMBER

CHIME OFF  
FWD  
NCHIME OFF  
AFT  
N

## PASSENGER INFORMATION SIGNS

- (A) LAVATORY OCCUPIED
- (B) NO SMOKING/FASTEN SEAT BELT
- (C) LAVATORY OCCUPIED  
NO SMOKING/FASTEN SEAT BELT
- (D) FASTEN SEAT BELT

N

## SPEAKER

N = SPEAKER NUMBER

CCTM

## CABIN CONFIGURATION TEST MODULE

CSM

## CABIN SYSTEM MODULE

□  
N  
□

## CABIN INTERPHONE HANDSET

N = DIAL CODE

Figure 35 ACCESS INTERIOR CONFIGURATION LAYOUT - 2

## ACCESS



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### FLIGHT DECK EFFECTS AND CMCS MESSAGES

#### Flight Deck Effects

The maintenance related flight deck effects for the ACCESS system are:

- ACCESS MGT UNIT (status) - Shows a failure of the central management unit (CMU).
- PASS ADDRESS (status) - Shows a failure of the passenger address controller's (PAC's) normal or alternate circuits.
- CABIN INTERPHONE (status) - Shows a failure of the cabin interphone controller's (CIC's) normal or alternate circuits.
- PASS SERVICES (status) - Shows a failure of the entertainment/service controller's (ESC's) normal or alternate circuits.

#### CMCS Messages

There is an active CMC program pin that inhibits all CMCS messages related to ACCESS.

#### LRU Internal Fault Messages

This CMCS fault message shows when an LRU detects internal faults and reports them directly to the CMCS or EIUs:

- ACCESS CENTRAL MANAGEMENT UNIT FAIL

#### LRU Faults Reported by Other LRUs

These CMCS fault messages show when an LRU reports another component's status or when an LRU that monitors other components detects and reports a fault or condition of those components to the CMCS or EIUs:

- ACCESS ENTERTAINMENT SERVICE CONTROLLER FAIL
- ACCESS PASSENGER ADDRESS CONTROLLER FAIL
- ACCESS CABIN INTERPHONE CONTROLLER FAIL
- ACCESS AUDIO ENTERTAINMENT MUX FAIL
- ACCESS LOCAL AREA CONTROLLER X FAIL
- ACCESS CABIN SYSTEM MODULE Z FAIL
- ACCESS CABIN CONFIGURATION TEST MODULE FAIL
- ACCESS PILOTS CALL PANEL FAIL
- ACCESS PA LEVEL CONTROL SENSOR LAC X FAIL

#### Interface Fault Message

The CMC has logic to monitor the combination of interface faults reported to the CMCS. This logic determines the messages that show. The CMCS fault messages associated with interface faults are:

- ACCESS LAC X SEU FAIL
- ACCESS LAC X OEU FAIL
- PAC/CIC INTERFACE FAIL
- PAC/ESC INTERFACE FAIL
- CMU/PAC INTERFACE FAIL
- CMU/CIC INTERFACE FAIL
- CMU/ESC INTERFACE FAIL
- EIU-Y FAIL OR ACCESS CMU--EIU-Y BUS FAIL
- ACCESS CMU FAIL OR ACCESS CMU OUTPUT BUS FAIL

**NOTE:** X = 11 21 3 OR 4.

Y = left, right or center

Z = 1 or 2

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<u>FLIGHT DECK EFFECT</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
ACCESS MGT UNIT	STATUS	CMU HAS A FAILURE
PASS ADDRESS	STATUS	PAC HAS A FAILURE - NORMAL OR ALTERNATE CIRCUIT
CABIN INTERPHONE	STATUS	CIC HAS A FAILURE - NORMAL OR ALTERNATE CIRCUIT
PASS SERVICES	STATUS	ESC HAS A FAILURE - NORMAL OR ALTERNATE CIRCUIT

CMCS MESSAGES

## LRU INTERNAL FAULT MESSAGES:

ACCESS CENTRAL MANAGEMENT UNIT FAIL

## LRU FAULTS REPORTED BY OTHER LRUs:

ACCESS ENTERTAINMENT SERVICE CONTROLLER FAIL  
 ACCESS PASSENGER ADDRESS CONTROLLER FAIL  
 ACCESS CABIN INTERPHONE CONTROLLER FAIL  
 ACCESS AUDIO ENTERTAINMENT MUX FAIL  
 ACCESS LOCAL AREA CONTROLLER FAIL  
 ACCESS CABIN SYSTEM MODULE Z FAIL  
 ACCESS CABIN CONFIGURATION TEST MODULE FAIL  
 ACCESS PILOTS CALL PANEL  
 ACCESS PA LEVEL CONTROL SENSOR LAC X FAIL

## INTERFACE FAULT MESSAGES:

ACCESS LAC X SEU FAIL  
 ACCESS LAC X OEU FAIL  
 PAC/CIC INTERFACE FAIL  
 PAC/ESC INTERFACE FAIL  
 CMU/PAC INTERFACE FAIL  
 CMU/CIC INTERFACE FAIL  
 CMU/ESC INTERFACE FAIL  
 EIU-Y OR ACCESS CMU ~ EIU-Y  
 BUS FAIL  
 ACCESS CMU FAIL OR ACCESS CMU OUTPUT  
 BUS FAIL

NOTE: X = 1, 2, 3 OR 4

Y = LEFT, CENTER OR RIGHT

Z = 1 OR 2

Figure 36 FLIGHT DECK EFFECTS AND CMCS MESSAGES



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