

# Replacing Boards in MiVoice MX-ONE Media Gateways

OPERATIONAL DIRECTIONS



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# 1 INTRODUCTION

This document describes the procedures to replace boards in the MX-ONE that is equipped with, for example, MX-ONE Lite, MX-ONE Slim or MX-ONE Classic media gateways.

The reason for replacing a board can be either to repair a faulty unit, using an identical or equivalent unit, or to upgrade a unit to a later version. When a board is replaced to a newer version the cabling might have to be replaced also.

Device boards (that is, boards that are served by the media gateway switch) can be replaced with the supply power present. No power down is necessary.

This document is intended for customers with different kind of MX-ONE hardware. Therefore also hardware, which is not delivered for new installation, is documented.

# 2 PREREQUISITES

## 2.1 CONDITIONS

The following conditions must apply before this procedure can be completed:

- It has been established that there is a need to replace the hardware in question.
- This procedure is recommended to be performed at low traffic.
- The needed spare parts with the correct software content are available.
- An experienced technician is available on site.
- The technician has the adequate system privilege for the task to be performed.
- The location of the board is known.

The commands are normally entered in an mdsh shell.

In this procedure it is assumed that replacement is performed with equal hardware. In case new hardware with new building practice is to be used, for example, see installation instructions for *INSTALLING MIVOICE MX-ONE*.

If possible, backup the system before replacing any hardware, see operational directions for *ADMINISTRATOR USER'S GUIDE*.

## 3

## TOOLS

- VGA screen, USB keyboard
- Recovery Images
- USB media reader (for the Recovery Image)
- Grounding wrist strap (LYB 25001 or equivalent)
- LSA 126 11/8 Screwdriver (Torx T-8) for boards and the EMC cover
- LSA 126 11/20 Screwdriver (Torx T-20) for the EMC cover
- Board puller LTD 117 02
- Board puller tip LTD 117 12

## 4

## SAFETY

To ensure personal safety, see the description for *SAFETY*.

## 5

## PROCEDURE

Indicate to the system that service is being performed.

Before a device board is replaced ensure that the following condition applies:

- You wear a grounding wrist strap.

**Warning!** Whenever a server is to be replaced or the power supply is to be removed it is mandatory (if possible) to first make a proper **shutdown** of the server. If that is not obeyed the server hard disk is likely to be damaged.

## 6 EXECUTION

### 6.1 GENERAL

A grounding wrist strap must be worn when handling boards in the system.

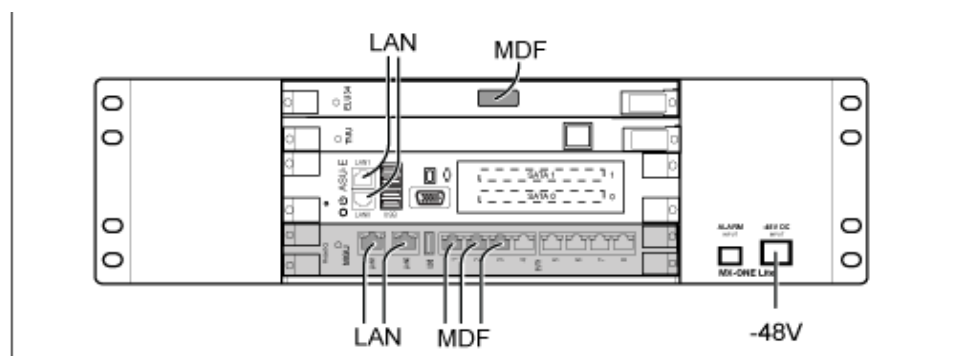
To remove a board first unscrew the Torx T-8 screws that holds the board to the subrack. To replace a board means that after insertion the new board should be fixed to the subrack by tightening the same screws.

Always when a board is inserted **be very careful** to align it properly mechanically. Press it into the subrack with an even pressure on the front cover, in order not to bend any pins in the backplane contacts.

**Note:** The lever at the lower end of the boards should only be used to release the board when it should be pulled out of the subrack. Do not use it for pressing in the board. (It may only be used to press in the board for the very final millimeters.)

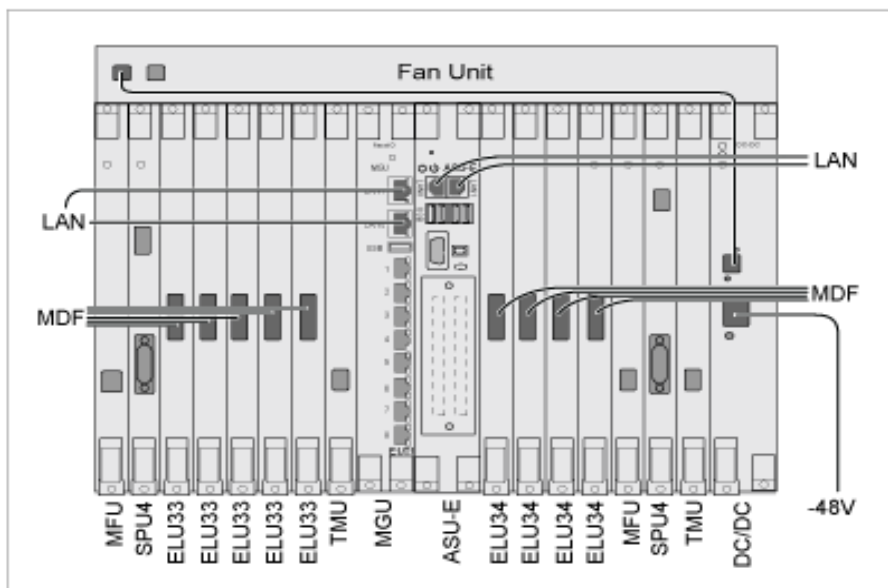
### 6.2 BOARDS AND CABLES

The following figure shows examples of media gateways used in the MX-ONE. The 3 U high MX-ONE Lite, with an installed ASU, is seen in Figure Figure



**Figure 1: MX-ONE Lite**

The MX-ONE Classic, equipped with an MGU board, in its 7 U high, 19 inch wide subrack is shown in Figure Figure .



**Figure 2: MX-ONE Classic**

Next picture shows the Media Gateway Classic, equipped with LSU-E and DSU boards, here mounted in two subracks, with a sample of possible circuit boards. See Figure 2.Figure

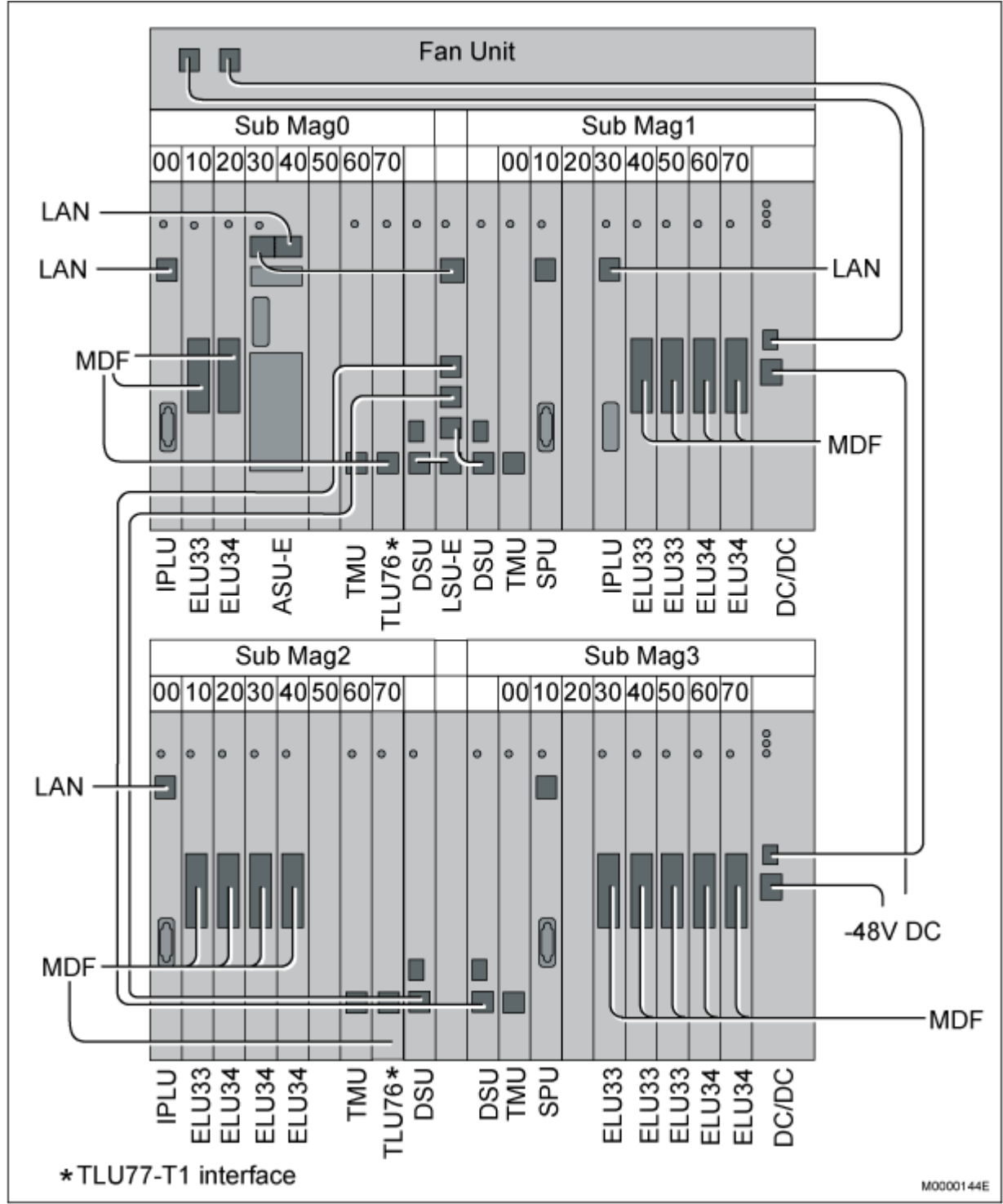


Figure 3: Media Gateway Classic (LSU-E)

## 6.3 REPLACING MITEL ASU LITE, ASU OR MITEL ASU-II

### 6.3.1 GENERAL

The Mitel Server Unit, Mitel ASU Lite, ASU or Mitel ASU-II should only be replaced as a last measure when it is not operational, for example, due to some hardware failure.

Before replacing the server a test should be done to reinstall the software from Safety Backup or from the Recovery Image.

Also, in BIOS mode, see if the disk or disks are detected or not. **Warning:** Do not change any BIOS settings!

In case of disk malfunction or uncertainty of its state, it is necessary to install the OS on the new unit to ensure that it runs on the same software as the rest of the system.

A new license file is needed because the hardware identity will be changed when a replacement board is used. This will result in an alarm 117.

In a running system a keyboard and monitor is connected to the local area network and with a software switch the user can select to which MX-ONE Service Node the unit is connected.

### 6.3.2 PREREQUISITES

#### 6.3.2.1 *Disk OK*

If disk content is OK all configurations are present and no software needs to be reinstalled.

#### 6.3.2.2 *Disk not OK*

A valid Safety Backup is needed when the Mitel ASU Lite, ASU or Mitel ASU-II of Server 1 is to be replaced. This backup must be restored to another MX-ONE Service Node. See the operational directions for *ADMINISTRATOR USER'S GUIDE*, section Backup and Restore.

The network configuration, which is asked for when the new board is starting, must be known.

The Linux operating system and the Telephony System application needs to be installed. For information, see the chapter on Using the Recovery Image in the operational directions for *ADMINISTRATOR USER'S GUIDE*.

### 6.3.3 EXECUTION

If needed, block all traffic to the media gateway controlled by this server. Shut down the OS. Replace the Mitel ASU Lite, ASU or Mitel ASU-II. Connect cables. The OS will start. The system will start. Answer questions. After repair the Server will be part of the multi Server system.

#### 6.3.3.1 *Remove Board*

Be very careful not to remove the server until it has been properly powered down, as described here.



1. Stop the system fault supervision.  
Key command *recoverymode -manual*.
  2. Block all traffic to the unit.  
Key command *block* with *-bpos* or *-equ*.  
If the ASU, Mitel ASU Lite or Mitel ASU-II is malfunctioning (not responding to commands) go to step 5.
  3. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
  4. Shutdown the Server.  
Root privilege is needed. Wait for the system to stop, which is indicated by the green LED or LEDs on the front of the server turning off.  
Key command *shutdown -h now*
  5. Note how the cables are connected on the front of the ASU, Mitel ASU Lite or Mitel ASU-II. Then remove them.
  6. Pull out the ASU, Mitel ASU Lite or Mitel ASU-II board.
- Note:** Only in the rare case when the server is completely unreachable and does not respond to commands, the server unit can be removed after system power down, that is, after removing the power to the subrack.

#### 6.3.3.2

#### *Handle faulty and spare Mitel ASU Lite, ASU or Mitel ASU-II boards*

##### **Remove/Reuse disk drives**

The ASU, Mitel ASU Lite or Mitel ASU-II board can be equipped with one or two (SSD or HDD) disks.

In case the disk drive is not faulty, it can be removed and reused on the replacement board.

##### **Reuse packing material**

The ASU, Mitel ASU Lite or Mitel ASU-II board must always be delivered in a dedicated Mitel ASU Lite, ASU or Mitel ASU-II packing box. Re-use the box, that you receive when you order a replacement ASU, Mitel ASU Lite or Mitel ASU-II board.

##### **Install disks on spare ASU Lite, ASU or ASU-II**

Install the removed disk or disks on the replacement ASU, Mitel ASU Lite or Mitel ASU-II board.

#### 6.3.3.3

#### *Insert Board*

1. Insert the replacement ASU, ASU Lite or ASU-II board in the subrack.
2. Reconnect all cables to their previous locations.
3. Check if the board has recovered from the data stored on disk. (For example, check */var/log/messages* and run some *mdsh print* command.)

##### **Disk OK**

Continue with step 9.

##### **Disk not OK**

If it has not recovered, use the Recovery Image on a bootable USB stick. Then, with a narrow stick (like a bent paper clip) push the concealed Reset button.

**Note:** Running the Recovery Image will clear the disk memory.

- Perform the steps, as outlined in the operations directions for *Administrator User's Guide*, chapter Using the Recovery Image.
4. **Note:** For a true one Server system restore the Safety Backup and run the command **config\_restore**. In a multi-Server system the rest of the system is unmodified by the ASU, Mitel ASU Lite or Mitel ASU-II replacement.
  5. On the question if this is Server 1, *always* answer **No**. Now the Linux OS will start.
  6. A turn-key telephony system is installed from factory. The system will ask for the network configuration. Give the **own IP address (eth0)**, the **netmask**, the **default gateway**, then give the IP address, netmask, and default gateway to the second interface (used at redundancy), plus the **host name**, and the **domain name**. For reference, see the installation instructions for INSTALLING AND CONFIGURING MIVOICE MX-ONE, in the chapter Network and System Configuration.
  7. If another ASU, Mitel ASU Lite or Mitel ASU-II than for Server 1 has been replaced, on Server 1 log in as **mxone\_admin**. Key command **sudo -H /opt/eri\_sn/bin/ts\_conf\_install**. At the question on what action to perform, select **Repair LIM** and enter the (LIM) Server number and its IP address.
  8. If the ASU, Mitel ASU Lite or Mitel ASU-II of Server 1 has been replaced, on a Server, which has the Safety Backup installed, log in as **mxone\_admin**. Key command **sudo -H /opt/eri\_sn/bin/ts\_conf\_install**. At the question on what action to perform, select **Repair LIM** and enter the IP address of Server 1.  
  
A response will be given that the rest of the operation is to be performed from Server 1 and the command, which is to be taken on Server 1.
  9. Enable the fault supervision. Key command **recoverymode -system**.
  10. Add the new license file. See the description for Fault Code 117.

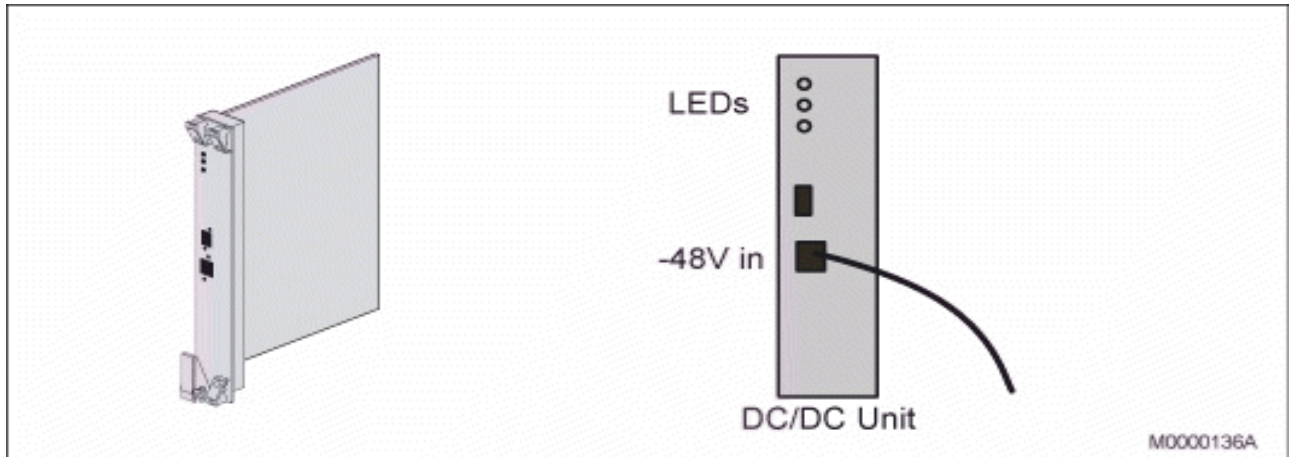
**Note:** If there is a fault in the repair LIM execution an error description will give advice. For example, the Secure Shell (SSH) operation might react on a lost key. Server 1 has ssh keys to all MX-ONE Service Nodes. In that case perform an su command to root. In the file `/.ssh/known_hosts` remove the line for the IP address to the replaced ASU, Mitel ASU Lite or Mitel ASU-II board.

The procedure is complete. Next, go to chapter 7 Termination on page 23.

## 6.4 REPLACING DC/DC UNIT

### 6.4.1 GENERAL

The DC/DC unit is located at the right-most position in each subrack of the 19" Classic cabinet.



The three front Light-Emitting Diodes (LEDs) indicates the functional state of the unit. The upper LED is unlit when the unit works correctly. It shows a red light when there is some error with any of the on-board generated voltages. These are +5 V, -5 V, +12 V, and -12 V. The middle LED indicates with a yellow light that the incoming -48 V is correct. The lower LED indicates with a green light that the +5 V to the back plane is correct.

For any Media Gateway, which contains any Mitel ASU Lite, ASU or Mitel ASU-II server boards in the subrack where the DC/DC unit sits, it is mandatory to shutdown the Mitel ASU Lite, ASU or Mitel ASU-II servers before changing the DC/DC power supply board. Use the command **shutdown -h** on each Mitel ASU Lite, ASU or Mitel ASU-II server in the subrack. Wait for the servers to come to halt before acting on the DC/DC unit.

If the DC/DC unit to be replaced is located in a Media Gateway subrack that contains no Mitel ASU Lite, ASU or Mitel ASU-II board, the DC/DC unit can be replaced without stopping the server.

**Warning!** Removing the DC/DC power unit will stop the operation of all boards in the subrack.

## 6.4.2 PREREQUISITES

A valid system dump is needed if the DC/DC unit to be replaced is located in a Media Gateway subrack, which is controlled by an ASU, Mitel ASU Lite or Mitel ASU-II MX-ONE Service Node in the same subrack.

In this case root privilege is needed to halt the MX-ONE Service Node.

## 6.4.3 EXECUTION

If the DC/DC unit is functional or if it is otherwise possible, perform a controlled power down of the subrack. First remove traffic, then shutdown all ASU, Mitel ASU Lite or Mitel ASU-II servers before replacing the DC/DC power unit.

If the DC/DC unit is not functional some or all boards in the subrack will be malfunctioning and a controlled power down procedure might be impossible.

### 6.4.3.1 *Remove Board*

For an **MX-ONE Classic with MGU** do:

1. Stop the system fault supervision.  
Key command *recoverymode -manual*.
2. Block all traffic to the unit.  
Key command *block* with *-bpos* or *-equ*.
3. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
4. Shutdown the media gateway. Use the command ***media\_gateway\_start -mgw -shutdown***.
5. For each ASU, Mitel ASU Lite or Mitel ASU-II board in the subrack (if any), do ***shutdown -h now***. Wait for the server to stop, which is indicated by the green light turned off on the front of the server board.
6. On the power distribution unit, if possible, and if this power circuit only powers the concerned DC/DC board, put the power circuit breaker in the Off position. All LEDs in the subrack will be turned off.
7. Remove any cables from the front of the DC/DC unit. Remove the DC/DC unit from the subrack.

For an **MX-ONE Classic with LSU-E** do:

1. Stop the system fault supervision.  
Key command *recoverymode -manual*.
2. If the DC/DC unit to be replaced is located in the upper subrack of a two-subrack media gateway remove the traffic from this media gateway. Key command ***block***. Use one of the options, *-bpos* or *-equ*.
3. If the DC/DC unit to be replaced is not located in the same subrack as the MX-ONE Service Node or any ASU, Mitel ASU Lite or Mitel ASU-II board, that is, it is located in the lower subrack of a two-subrack media gateway, remove the traffic from its subrack. Key command ***ls\_config block***. Use the options *-lim* and *-dsu 2,3*.
4. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
5. Shutdown the media gateway. Use the command ***media\_gateway\_start -mgw -shutdown***.
6. If the DC/DC unit is located in the same subrack as any Mitel ASU Lite, ASU or Mitel ASU-II board halt the OS on each ASU, Mitel ASU Lite or Mitel ASU-II board. As root, key command ***shutdown -h now***. Wait for the server to stop, which is indicated by the green light turned off on the front of the server board.
7. On the power distribution unit, if possible, and if this power circuit only powers the concerned DC/DC board, put the power circuit breaker in the Off position. All LEDs in the subrack will be turned off.
8. Remove the upper front power cable to the fan unit. Remove the lower front cable with the incoming -48 V power supply.
9. Pull out the DC/DC unit.

## 6.4.3.2

*Insert Board*

1. Replace the DC/DC unit with the spare unit.
2. Connect the upper front cable. Connect the lower, -48 V, front cable. Put the circuit breaker on the power distribution unit to the On position. The middle LED will go on with a yellow light. The lower LED will show a green light.
3. The OS system and the MX-ONE Service Node will start automatically and the media gateway will be operational. (It takes about 7 or 8 minutes depending on the size of the system).
4. Enable the fault supervision. Key command **recoverymode**. Use the option **-system**.
5. Verify that the DC/DC power supply unit is working properly. Its upper LED should be unlit, which indicates that the power to the back plane is correct.

The procedure is complete. Next, go to 7 Termination on page 23.

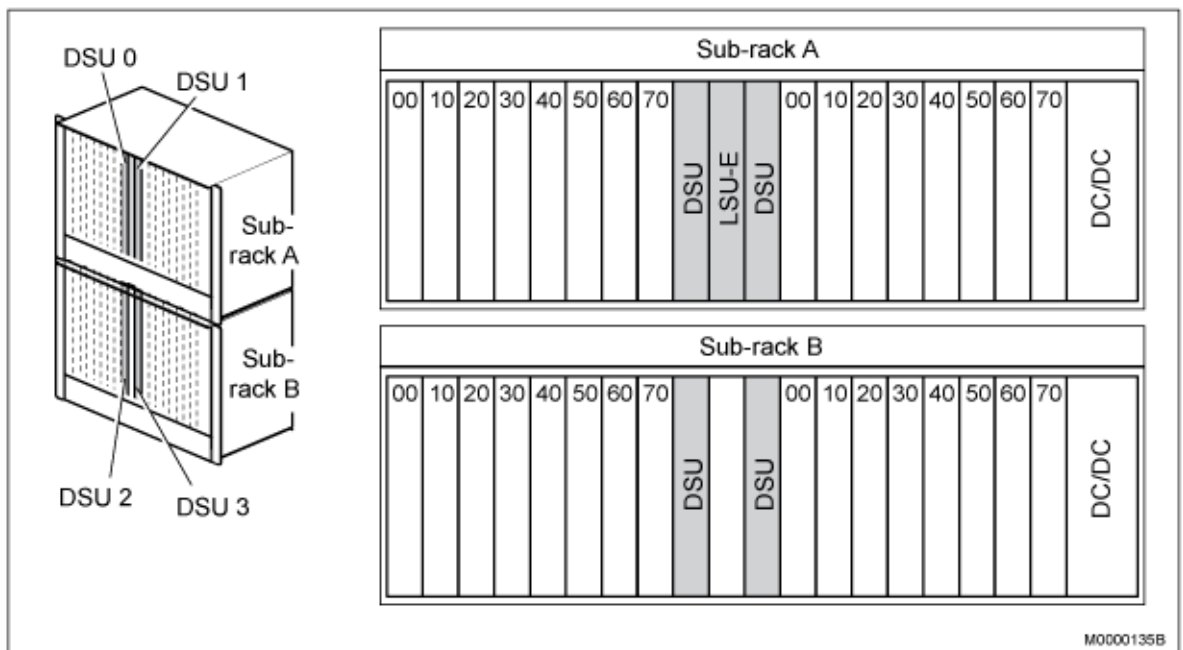
## 6.5

## REPLACING DSU

## 6.5.1

## GENERAL

There is one DSU in each half subrack of the Media Gateway Classic that has an LSU-E.



**Figure 4: Media Gateway Classic with LSU-E, DSU**

In the event that a DSU board is expected to be faulty all boards in its part of the subrack will be malfunctioning. In this case the communication with the device boards and the DSU will be uncertain and probably impossible. Then it is therefore unnecessary to attempt to manually block the DSU.

## 6.5.2 PREREQUISITES

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## 6.5.3 EXECUTION

### 6.5.3.1 *Remove Board*

1. At a DSU fault situation check the state of the LSU and DSU boards of the LIM. Key command ***ls\_config\_info***.
2. At an upgrade of a working media gateway, block the DSU from new traffic. Key command ***ls\_config\_block -dsu -mgw***.
3. Has all traffic ceased? When the traffic has ceased continue with the next step. Key command ***switch\_connection\_list***.
4. Disconnect the cable, which comes from the LSU-E, from the front of the DSU.
5. Pull out the board.

### 6.5.3.2 *Insert Board*

1. Replace the DSU board with the spare board.
2. Reconnect the front cables to their earlier positions.
3. If the DSU was manually blocked put it back in operation. Key command ***ls\_config\_deblock***.
4. Check that the boards in the subrack, which is controlled by the DSU, are seen as active. Key command ***board\_list -lim***.

The procedure is complete. Next, go to 7 Termination on page 23.

## 6.6 REPLACING ELU

### 6.6.1 GENERAL

There are various Extension Line Units (ELUs) in the system. For example, the ELU31 is used for DECT, ELU33 for digital extensions, and the ELU34 for analog extensions.

### 6.6.2 PREREQUISITES

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### 6.6.3 EXECUTION

1. Block the board from traffic.  
Key command ***block -bpos***.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.

Key command *switch\_connection\_list*.

3. Note how the cables are connected on the ELU front. Then remove them.
4. Replace the ELU board with the spare board.
5. Reconnect cables to the ELU in their previous positions.
6. Activate the ELU. Wait for the LED on the front of the board to turn green.

Key command *board\_restart -bpos*

7. Unblock the board.

Key command *deblock -bpos*.

8. Check the state of the ELU board.

Key command *board\_list*. Use the option *-bpos* or *-lim*.

9. Test the board function by setting up a call.
10. The procedure is complete.

Next, go to 7 Termination on page 23.

## 6.7 REPLACING IPLU

### 6.7.1 GENERAL

The IPLU is a device board that handles media communication for the IP phones and connects the media gateway to the IP network. It cannot be used together with the MGU board.

**Note:** The failing IPLU could be replaced by MGU2 (or Media Server), if all IPLUs are removed.

### 6.7.2 PREREQUISITES

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### 6.7.3 EXECUTION

1. Block the board.  
Key command *block -bpos*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Note how the cables are connected on the IPLU front. Then remove them.
4. Replace the IPLU board with the spare board.
5. Reconnect cables to the IPLU in their previous positions.
6. Activate the IPLU. Wait for the LED on the front of the board to turn green.  
Key command *board\_restart -bpos*
7. Unblock the board.  
Key command *deblock -bpos*.

8. Check the state of the IPLU board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
9. Test the board function by setting up a call.
10. The procedure is complete.  
Next, go to 7 Termination on page 23.

## 6.8 REPLACING LSU-E

### 6.8.1 GENERAL

The LIM Switch Unit Ethernet (LSU-E) provides the Media Gateway Classic with a non blocking time switch and distributes software signals to and from the device boards through the DSU boards. When the LSU-E is blocked for replacement the whole media gateway is inoperative.

### 6.8.2 PREREQUISITES

Root privilege is needed to set IP addresses on the replacement LSU-E.  
Knowledge of the network addresses for the board.  
V.24 access to the replacement board.

### 6.8.3 EXECUTION

1. Block the board.  
Key command *block -lim*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Note how the cables are connected on the LSU-E front. Then remove them.
4. Replace the LSU-E board with the spare board.
5. Set the network addresses (eth0-ip, def\_route, nfs\_server).  
See the operational directions for *CONFIGURING THE LSU-E*.
6. Reconnect cables to the LSU-E in their previous positions.
7. The board will be activated by the system.
8. Unblock the board.  
Key command *deblock -bpos*.
9. Verify that the LSU-E can communicate with the device boards.  
Key command *board\_list -lim*.
10. The procedure is complete.  
Next, go to 7 Termination on page 23.



## 6.9 REPLACING MFU

### 6.9.1 GENERAL

The MFU is a board with senders and receivers for multi-frequency signaling.

**Note:** The failing MFU should be replaced by MGU2, if possible.

### 6.9.2 PREREQUISITES

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### 6.9.3 EXECUTION

Replace the board by blocking, replacing, and unblocking the device.

1. Block the board.  
Key command *block -bpos*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Replace the MFU board with the spare board.
4. Activate the MFU.  
Key command *board\_restart -bpos*
5. Unblock the board.  
Key command *deblock -bpos*.
6. Check the state of the MFU board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
7. Test the board function by setting up a call.
8. The procedure is complete.  
Next, go to 7 Termination on page 23.

## 6.10 REPLACING MGU

### 6.10.1 GENERAL

The Media Gateway Unit (MGU) comprises resources for board communication in the subrack, RTP, and ISDN handling. All traffic in the media gateway where the MGU is located will stop while the board is being replaced.

**Note:** The failing MGU could also be replaced by two MGU2 (or a Media Server).

### 6.10.2 PREREQUISITES

Root privilege is needed to set IP addresses on the replacement MGU.

Knowledge of the MGU network addresses. The IP address of one of the MGU control ports must be known.

## 6.10.3

## EXECUTION

Perform the following steps:

1. Block the traffic to the media gateway, where the MGU is located. Use the command *block*. Use one of the options *-bpos*, *-equ*, or *-lim*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Stop the system fault supervision.  
Key command *recoverymode -manual*.
4. Shut down the MGU.  
*media\_gateway\_start -mgw -shutdown*
5. Disconnect all cables connected to the unit. Remove it from the cabinet.
6. Insert the replacement MGU. Secure it to the cabinet. Wait with reinstalling the LAN-cables. The unit will start.
7. Connect a terminal to the USB port at the front of the MGU.
8. Set the IP address of the control port on LAN 0. The other network address or addresses (the media port, and if network redundancy is used, the control and media port of LAN 1) are set by the system. For information, see the installation instructions for *INSTALLING AND CONFIGURING MIVOICE MX-ONE*, in the chapter MGU Setup.

**Note:** This step can preferably be done before the unit is inserted into the subrack.

9. Connect the previously removed cables.
10. Send a 'ping' to the Service Node controlling this MGU, to verify the connection between Service Node and MGU.
11. Disconnect the USB port.
12. Check that the MGU is working. Use the commands  
*media\_gateway\_config -status* and *board\_list* with option *-bpos* or *-lim*.
13. Check that the MGU's eth2 IP address is working, and the ARP cache updated, by sending a 'ping' to that address.

**Note:** The 'ping' may take some time (up to 20-30 seconds), and may have to be repeated.

14. Enable fault supervision  
*recoverymode -system*

The procedure is complete. Next, go to 7 Termination on page 23.

## 6.11

## REPLACING MGU2

## 6.11.1

## GENERAL

The Media Gateway Unit (MGU2) comprises resources for board communication in the subrack, RTP, and ISDN handling. All traffic in the media gateway where the MGU2 is located will stop while the board is being replaced.

## 6.11.2

## PREREQUISITES

Root privilege is needed to set IP addresses on the replacement MGU2.

Knowledge of the MGU2 network addresses. The IP address of one of the MGU control ports must be known.

## 6.11.3

## EXECUTION

Perform the following steps:

1. Block the traffic to the media gateway, where the MGU2 is located. Use the command *block*. Use one of the options *-bpos*, *-equ*, or *-lim*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Stop the system fault supervision.  
Key command *recoverymode -manual*.
4. Shut down the MGU2.  
*media\_gateway\_start -mgw -shutdown*
5. Disconnect all cables connected to the unit. Remove it from the cabinet.
6. Insert the replacement MGU2. Secure it to the cabinet. Wait with reinstalling the LAN-cables. The unit will start.
7. Connect a terminal to the USB port at the front of the MGU2.
8. Set the IP address of the control port on LAN 0. The other network address or addresses (the media port, and if network redundancy is used, the control and media port of LAN 1) are set by the system. For information, see the installation instructions for *INSTALLING AND CONFIGURING MIVOICE MX-ONE*, in the chapter MGU2 Setup.

**Note:** This step can preferably be done before the unit is inserted into the subrack.

9. Connect the previously removed cables.
10. Send a 'ping' to the Service Node controlling this MGU, to verify the connection between Service Node and MGU.
11. Disconnect the USB port.
12. Check that the MGU is working. Use the commands  
*media\_gateway\_config -status* and *board\_list* with option *-bpos* or *-lim*.
13. Check that the MGU's eth2 IP address is working, and the ARP cache updated, by sending a 'ping' to that address.

**Note:** The 'ping' may take some time (up to 20-30 seconds), and may have to be repeated.

14. Enable fault supervision  
*recoverymode -system*

The procedure is complete. Next, go to 7 Termination on page 23.

## 6.12 REPLACING SPU4

### 6.12.1 GENERAL

The SPU4 is a signal processing unit used for DTMF tone handling, and recorded voice announcements.

**Note:** The failing SPU4 (DTMF32) should be replaced by MGU2 (or Media Server), if possible.

### 6.12.2 PREREQUISITES

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### 6.12.3 EXECUTION

1. Block the board.  
Key command *block -bpos*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Replace the SPU4 board with the spare board.
4. Activate the SPU4. Wait for the LED on the front of the board to turn green.  
Key command *board\_restart -bpos*
5. Unblock the board.  
Key command *deblock -bpos*.
6. Check the state of the SPU4 board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
7. Test the board function by setting up a call.
8. The procedure is complete.  
Next, go to 7 Termination on page 23.

## 6.13 REPLACING TLU

### 6.13.1 GENERAL

The Trunk Line Unit (TLU) can be of different types. For example, TLU75, TLU82, and TLU83 are analog trunks, and TLU76 and TLU77 are digital trunks.

If the TLU-board, which is to be replaced, receives the external synchronization, the system will move the synchronization to an other TLU-board when the board is removed. If there is only one trunk line all external traffic will be lost.

### 6.13.2 PREREQUISITES

-

### 6.13.3

## EXECUTION

1. Block the board.  
Key command *block -bpos* or *-lim*.
2. Has all traffic ceased? When the traffic has ceased or when it is considered appropriate (in the one trunk line case) continue with the next step.  
Key command *switch\_connection\_list*.
3. Note how the cables are connected on the front of the TLU. Then remove them.
4. Replace the TLU board with the spare board.
5. Reconnect all cables to their previous locations.
6. Activate the TLU. Wait for the LED on the front of the board to turn green.  
Key command *board\_restart -bpos*
7. Unblock the board.  
Key command *deblock -bpos*.
8. Check the state of the SPU4 board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
9. If needed, perform a re-synchronization of the LIM.  
Key command *trsp\_synchronization -resync -mgw*.
10. Check the state of the TLU board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
11. The procedure is complete.  
Next, go to 7 Termination on page 23.

## 6.14

## REPLACING TMU

### 6.14.1

## GENERAL

The TMU is a common resource for tone handling.

**Note:** The failing TMU should be replaced by MGU2 (or Media Server), if possible.

### 6.14.2

## PREREQUISITES

-

### 6.14.3

## EXECUTION

1. Block the board.  
Key command *block -bpos*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Replace the TMU board with the spare board.

4. Activate the TMU. Wait for the LED on the front of the board to turn green. At start-up it alternates between red and green.  
Key command *board\_restart -bpos*
5. Unblock the board.  
Key command *deblock -bpos*.
6. Check the state of the TMU board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
7. Test the board function by setting up a call.
8. The procedure is complete.  
Next, go to 7 Termination on page 23.

## 6.15 REPLACING VSU1

### 6.15.1 GENERAL

The VSU1 is a voice server unit, which is used for recorded voice announcements.

**Note:** The failing VSU1 should be replaced by MGU2 (or Media Server), if possible.

### 6.15.2 PREREQUISITES

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### 6.15.3 EXECUTION

1. Block the board.  
Key command *block -bpos*.
2. Has all traffic ceased? When the traffic has ceased continue with the next step.  
Key command *switch\_connection\_list*.
3. Replace the VSU1 board with the spare VSU1 board, or preferably with an MGU2. (See the section Replacing MGU2).
4. Activate the VSU1.  
Key command *board\_restart -bpos*
5. Unblock the board.  
Key command *deblock -bpos*.
6. Check the state of the VSU1 board.  
Key command *board\_list*. Use the option *-bpos* or *-lim*.
7. Test the board function by recording a message and then listen to the message. See the installation instructions for *RECORDED VOICE ANNOUNCEMENT*.
8. The procedure is complete.  
Next, go to 7 Termination on page 23.

## 7

## TERMINATION

Conclude the replacement procedure by clearing the possible alarms that were generated for the unit, which was replaced.

- Key command ***alarm*** to erase (reset) alarms in the alarm log.
- Verify that no new alarms have been generated for the unit. Key command ***alarm*** to print (list) alarms in the alarm log.

Replace any mechanical parts that have been removed in the replacement procedure.