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DIGITAL CINEMA

DIGITAL CINEMA SERVER Model SMS-2K-1

Maintenance Manual

Version 1.0

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**DTS Digital Cinema
9631 Topanga Canyon Place
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USA**

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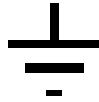
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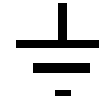
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WARNING!!



THIS DEVICE MUST BE GROUNDED.



IMPORTANT

Power requirements for electrical equipment vary from area to area. Please ensure that your Digital Cinema Server meets the power requirements in your area. If in doubt, consult a qualified electrician or your DTS Digital Cinema dealer.

AVIS

Le voltage peut différer d'un pays à l'autre. Il faut que le Digital Cinema Server soit ajuste au voltage du pays. LA SOURCE DE PUISSANCE DOIT AVOIR UN CONDUCTEUR CONNECTE A LA TERRE. Toutes réparations doivent être effectuées par une personne qualifiée. AFIN D'EVITER UN CHOC ELECTRIQUE, VEUILLEZ NE PAS ENLEVER LE CAPOT.

Digital Cinema Server Power Ratings

- AC Input: 100-240V~, 6-3A, 60-50Hz
- Maximum Power Consumption: 300W

WARNING: MULTIPLE SOURCES OF SUPPLY; DISCONNECT ALL SOURCES BEFORE SERVICING.

Digital Cinema Server Rack Mount and Thermal Information

- Maximum operating ambient temperature is 35°C.
- Never restrict the air flow through the devices' fan or vents.
- When installing equipment into a rack, distribute the units evenly. Otherwise hazardous conditions may be created by an uneven weight distribution.
- Connect the unit only to a properly rated supply circuit. Reliable earthing (grounding) of rack-mounted equipment should be maintained

PROTECTING YOURSELF AND THE Digital Cinema Server

Never touch the AC plug with wet hands.

Always disconnect the Digital Cinema Server from the power supply by pulling on the plug, not the cord.

Allow only a DTS Digital Cinema dealer or qualified professional engineer to repair or reassemble the Digital Cinema Server. Apart from voiding the warranty, unauthorized engineers might touch live internal parts and receive a serious electric shock.

Do not put, or allow anyone to put, any object, especially metal objects into the Digital Cinema Server.

Use only an AC power supply. Never use a DC power supply.

If water or any other liquid is spilled into or onto the Digital Cinema Server, disconnect the power and call your DTS Digital Cinema dealer.

Make sure the unit is well ventilated and away from direct sunlight. To avoid damage to internal circuitry, as well as the external finish, keep the Digital Cinema Server away from sources of direct heat (heater vents, stoves, radiators, etc.)

Avoid using flammable aerosols, etc. near the Digital Cinema Server. They may damage the surface and may ignite. Do not use denatured alcohol, paint thinner, or similar chemicals to clean the Digital Cinema Server. They will damage the finish.

Modification of this equipment is dangerous and can result in the functions of the Digital Cinema Server being impaired. *Never attempt to modify the equipment in any way.*

In order to ensure optimum performance of your Digital Cinema Server, select the setup location carefully and make sure the equipment is used properly. Avoid setting up the Digital Cinema Server in the following locations:

1. In a humid or dusty environment.
2. In a room with poor ventilation.
3. On a surface which is not level.
4. Inside a moving vehicle where it will be subject to vibration.
5. In an extremely hot or cold environment.

Removable Drives Warning

Removal of the hot swappable hard drives allows access to pins and traces supplying power to the hard drive backplane. These are considered as energy hazards.

REMOVAL OF HARD DRIVES MAY ONLY BE PERFORMED BY TRAINED SERVICE PERSONNEL.

With regards to the energy hazard warning and removable drives, **the equipment may only be used in a restricted access location** (not accessible to the general public).

CAUTION

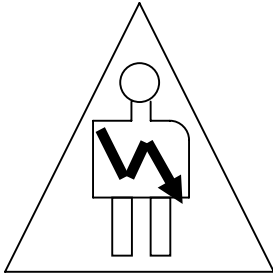
Battery is located on the motherboard.

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions

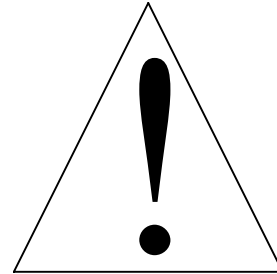
WARNING!!

To prevent fire or shock hazard, do not expose this appliance to rain or moisture

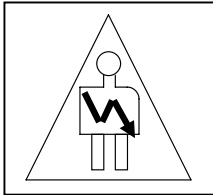


CAUTION

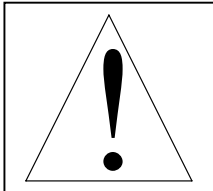
RISK OF ELECTRIC SHOCK
DO NOT OPEN



**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**



The lightning flash with the arrowhead symbol superimposed across a graphical representation of a person, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure; that may be of sufficient magnitude to constitute a risk of electric shock.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CE NOTICE

Marking by the symbol indicates compliance of the device to the EMC (Electromagnetic Compatibility) directive and to the Low Voltage directive of the European Community. Such a marking is indicative that this device meets or exceeds the following technical standard:

- EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment."

A "Declaration of Conformity" in accordance with the above standard has been made and is on file at Doremi Labs, Europe - Valbonne, France.

1 Introduction

1.1 Purpose

This document provides guidance for preventive maintenance operations applicable to the Digital Cinema Server.

1.2 Presentation

This document is structured according to the following sections:

- **Section 1:** Introduction – Overall presentation of the document
- **Section 2:** Digital Cinema Server Recommended Operating Conditions - Recommended operating conditions for the Digital Cinema Server
- **Section 3:** Maintenance Program – Presentation of each preventive maintenance task
- **Section 4:** Required Tools – Identification of required tools
- **Section 5:** Maintenance Tasks Procedure – Description of each maintenance task
- **Section 6:** Acronyms

2 Digital Cinema Server Recommended Operating Conditions

Listed below are the recommended operation conditions for the Digital Cinema Server:

1. AC power to Digital Cinema Server should be feed through UPS, $\geq 600\text{VA}$ per player, which provides a logical signal that shows the power failure.
2. To shutdown properly the Digital Cinema Server, do the following:
 - Go to “**Menu/Logout**” – click on “**Logout**”
 - Then, click on the “**Shutdown**” button
3. Ensure that AC ground lines are CE/UL rated (for ohm resistance) for Digital Cinema Server & projector power connections.
4. Ground voltage difference from cinema player to projector should not exceed 1Vac/dc to minimize ground current circulations through dual link HD-SDI lines (Measurement done between both chassis grounds with dual link & AES disconnected).
5. Ground voltage difference from cinema player to audio processor should not exceed 1Vac-dc to minimize ground current circulations through AES/EBU lines (Measurement done between both chassis grounds with dual link & AES disconnected).
6. Installation of cinema player in a typical protected rack enclosure to avoid physical shocks and vibrations during player/disk operation.
7. Ambient air temperature at front and rear of cinema player should not exceed 35°C (95°F) when operating,
8. Operating ambient humidity should be between 10% and 85% Non-Condensing.

3 Maintenance Program

Preventive maintenance tasks must be performed to ensure the proper function of the Digital Cinema Server throughout the years.

Such tasks must be performed periodically according to the maintenance program presented in the table below:

Part(s) involved	Task	Maintenance interval	Qualification of personnel	Duration
HDD Filter	- Clean (wash and dry) the HDD filter or replace it (if broken) by a new one provided by DTS Digital Cinema	2,500 to 5,000 operating hours (~ 3 to 6 months), depending on how dusty the environment is	Technician	5 to 10 minutes
HDD Trays, CPU and fans	- Dust removal in Hard Disk Drive Trays, CPU cooler and fans	5,000 operating hours (~ 6 months)	Technician	15 to 20 minutes
Fans	- Fans checking for rattling and noise	5,000 operating hours (~ 6 months)	Technician	10 to 20 minutes
Fans Shock Mounts	- Fan shock mounts status visual inspection	5,000 operating hours (~ 6 months)	Technician	10 minutes
Fans (2U rear panel fans and Dolphin fan)	- Recommended replacement of these three fans (based on information provided by the fans manufacturer)	50,000 operating hours (~ 5 years)	Technician	20 minutes
Dolphin board battery (*)	- Change the Dolphin board battery (*)	50,000 operating hours (~ 5 years)	Technician	10 minutes

Note: The durations provided above do not include the unit preparation time corresponding to paragraph 5.1.1. Such preparation is estimated at about 20 minutes.

THE TECHNICIAN SHOULD BE ACCREDITED BY DTS DIGITAL CINEMA. The corresponding maintenance procedures are provided in section 5.

(*) MAKE SURE TO APPLY THE PROCEDURE PROVIDED IN SECTION 5.2.2 FOR A PROPER DOLPHIN BOARD BATTERY REPLACEMENT, OTHERWISE YOU MIGHT LOSE THE SECURITY CLOCK TIME AND THE UNIT WILL NO LONGER BE ABLE TO PLAY ENCRYPTED MATERIAL. IF THIS HAPPENS, THE UNIT MUST BE RETURNED TO DTS DIGITAL CINEMA.

Recommendation:

DTS Digital Cinema recommends to keep proper and accurate records of each maintenance task performed (including at least date, operation(s) performed and technician name), in order NOT to miss a maintenance operation. DTS Digital Cinema is not responsible for maintenance tracking.

4 Required Tools

To be able to perform the procedure detailed in this section, the specific tools presented below will be required.

4.1 Screwdriver

A Phillips tip screwdriver is required to remove the Digital Cinema Server lid:



Figure 1: Phillips Tip Screwdriver

4.2 Pliers

In case fan shock mounts have to be replaced or correctly re-attached, pliers might be needed. Pliers example is presented below:



Figure 2: Pliers Example

4.3 Soft Brush

A soft brush will be required to remove the dust from concerned parts – to be used with the vacuum cleaner.



Figure 3: Soft Brush Example

4.4 *Small Vacuum Cleaner*

A small vacuum cleaner will be required to remove the dust from concerned parts – to be used with the soft brush presented above.



Figure 4: Small Vacuum Cleaner Example

5 Maintenance Tasks Procedure

Caution: Maintenance tasks should be performed by a technician accredited by DTS Digital Cinema.

5.1 Tasks Required each 5,000 Operating Hours

Each 5000 operating hours, the maintenance tasks procedure presented in this paragraph must be performed. Follow the steps detailed below.

5.1.1 Unit Preparation (estimated duration: 20 minutes)

For the following preventive maintenance tasks, the Digital Cinema Server unit has to be removed from its operating location and put in a safe area as presented below:

1. The power should be disconnected: power off the unit and unplug both power cables.

Note: You might have to disconnect other cables in order to put the unit in a proper place for this operation.

2. Remove the Digital Cinema Server from its rack and put it in a location (e.g. a desk) where you have room to perform the procedure.
3. The lid needs to be removed. Remove six screws with the Phillips tip screwdriver: two on each side and two on the rear panel of the chassis.

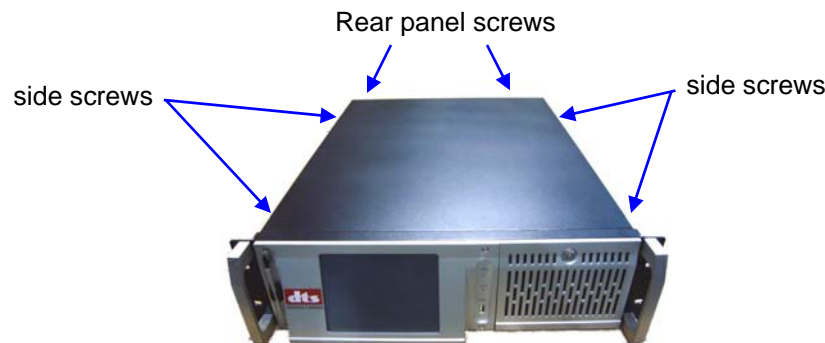


Figure 5: Digital Cinema Server - Lid Screws Location

When these screws are removed, slide the lid from the front side to the rear side of the Digital Cinema Server unit in order to remove it from the chassis, as shown on **Figure 6**:



Figure 6: Digital Cinema Server - Lid Removal

Note: Make sure to keep the six black screws in a secure location as they are needed to close the chassis at the end of this procedure.

5.1.2 Dust Removal

Using at the same time a soft brush and a small vacuum cleaner in order to remove the dust and have it stored in the vacuum cleaner, follow the procedure below:

1. Remove the dust from the CPU fan and from the 2U rear panel fans as illustrated below:

Vacuum cleaner nose

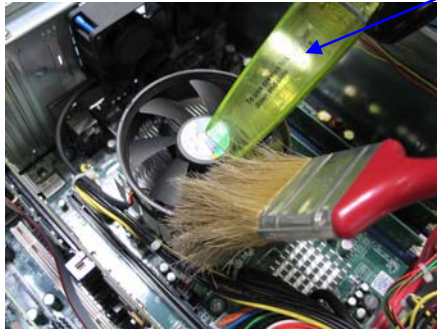


Figure 7: CPU Fan Dust Removal

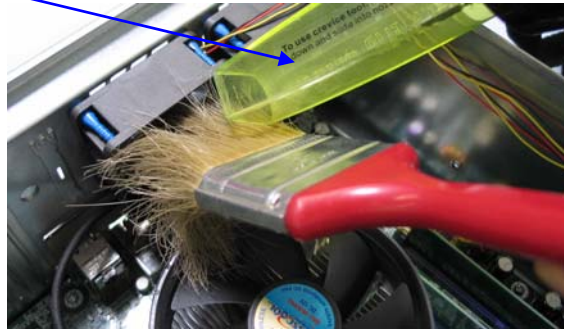


Figure 8: 2U Rear Panel Fans Dust Removal

2. Remove the dust from the 1U rear panel fan and the PSU big fan as illustrated below:



Figure 9: 1U Rear Panel Fans Cleaning



Figure 10: PSU Big Fan Cleaning

3. Remove the dust from the rear panel external PSU fan as illustrated below:



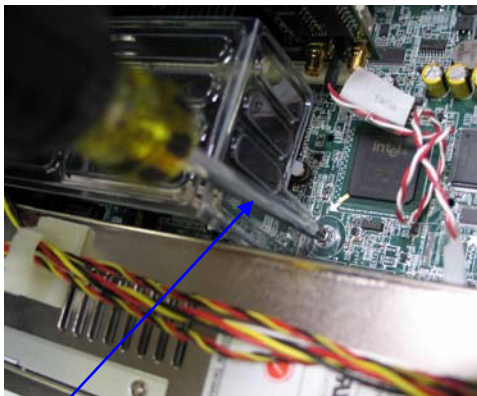
Figure 11: PSU External Fans Cleaning

4. Remove the dust from the Motherboard Northbridge heatsink (silver heatsink)

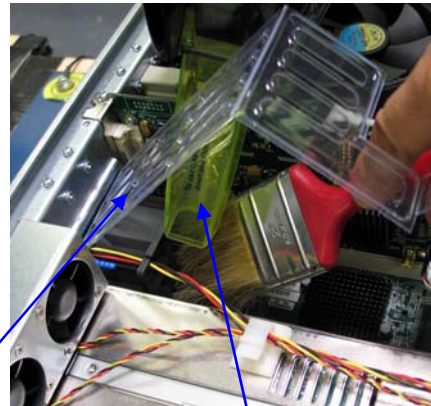


Figure 12: Motherboard Northbridge Heatsink Cleaning

Clean the Dolphin fan (that is mounted using a plastic tunnel): unscrew one leg of the plastic tunnel needs as presented below:



Screwdriver



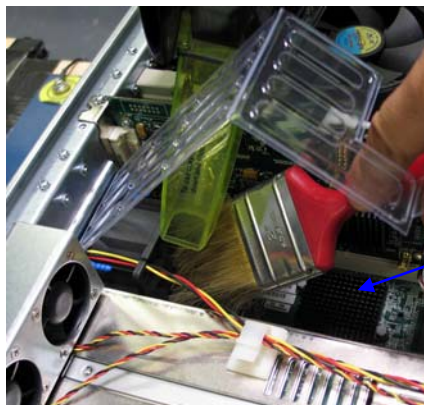
Plastic tunnel opened

Vacuum cleaner nose

Figure 13: Dolphin Tunnel Opening

Figure 14: Dolphin Fan Cleaning

5. Remove the dust from the Motherboard Southbridge heatsink (black heatsink):



Motherboard Southbridge heatsink location

Figure 15: Motherboard Southbridge Heatsink Location

6. Re-lock the plastic tunnel when the Dolphin fan and the Motherboard Southbridge heatsink are clean by putting back the screw previously removed as presented below:



Figure 16: Dolphin Tunnel Closing

7. Take the three hard disk drive enclosures out and clean the inside of the tray as illustrated below – **make sure to recall the order of the hard disk drives** (which one was on the top, which one was in the middle and which one was on the bottom) in order to put them back at the same location after cleaning.

Caution: Make sure to re-position each Hard Disk Drive in its previous place or otherwise the RAID might get corrupted.

To take the hard disk drive out, just press the blue button to release the handle and then pull the handle. When removed from the Digital Cinema Server, use the soft brush and the vacuum cleaner to remove the dust as presented below:



Figure 17: Hard Disk Drive Cleaning

- Remove the dust from the Hard Disk Drive front panel area as illustrated below:

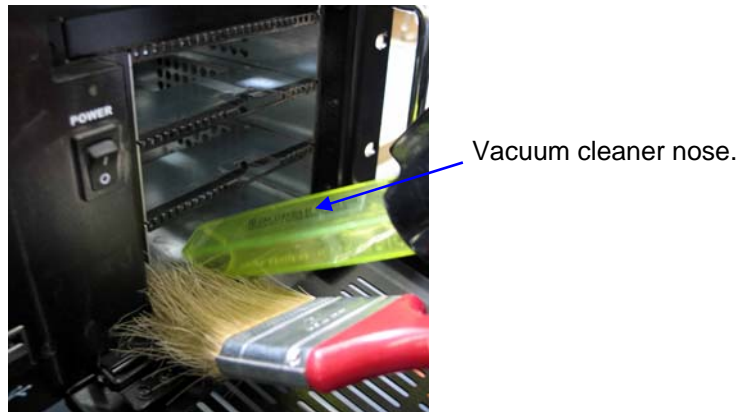


Figure 18: Hard Disk Drive Area Cleaning

5.1.3 2U Fans and Dolphin Fan Shock Mounts Visual Inspection

2U fans and Dolphin fan might be mounted on the rear panel using shock mounts (each shock mount replaces a screw) as presented below:

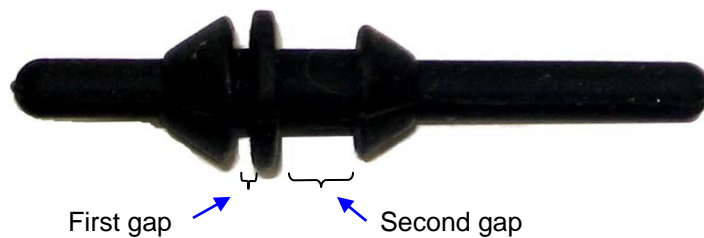


Figure 19: Fan Shock Mount

Check that the fans are properly shock-mounted by visual inspection only:

- by looking at the rear panel: you should NOT see any first shock mount gap - see picture (a) below - and
- by verifying from the top of the unit that the fans are parallel to the chassis, as presented in the picture (b) below:



(a)



(b)

Figure 20: 2U Fan Shock Mounts Visual Inspection – Correct Installation

Caution: Do NOT take out the fans from the shock mounts (visual inspection only).

If one shock mount is not properly attached, use your fingers to fix them as illustrated below:



Pull gently on the shock mounts
with your fingers

Figure 21: 2U Fan Shock Mounts Re-attachment Example

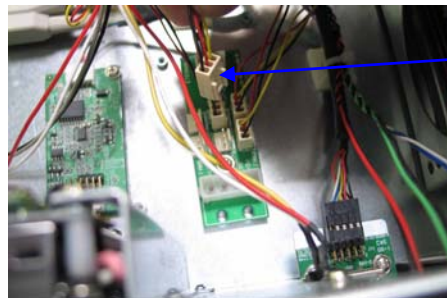
In case shock mounts need to be replaced, please refer to document called “Digital Cinema Server Fan Shock Mounts Installation Procedure” (document number D2K.DP.000223.DRM) to find additional guidance.

5.1.4 Noise from Fans and Rattling

Power on the unit while on the desk with the lid opened.

Listen to the noise (if any) coming from fans.

If such noise is coming from fans, the corresponding fan can be located by removing one by one the fan connectors. When the connector corresponding to the noisy fan is removed, the noise should stop.



One fan's connector
removed

Figure 22: Fan's Connector Removal

Then replace the fan with a fan having the same Part Number.

In this case, please refer to document called “Digital Cinema Server Fan Shock Mounts Installation Procedure” (document number D2K.DP.000223.DRM) to find additional guidance about how to shock mount new fans.

Note: If a fan rattles (or vibrates), you should replace it to avoid damage to the hard drives.

5.1.5 Lid Closing

When the previous steps are completed, the Digital Cinema Server lid can be closed by sliding it from the rear panel to the front side – Make sure there are no wires caught by the lid.

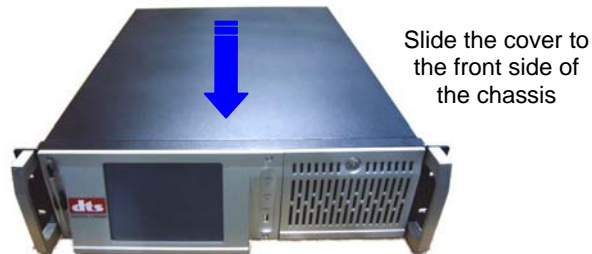


Figure 23: Digital Cinema Server - Lid Closing

Tighten the 6 black screws that were removed at the beginning of the procedure, as presented below:

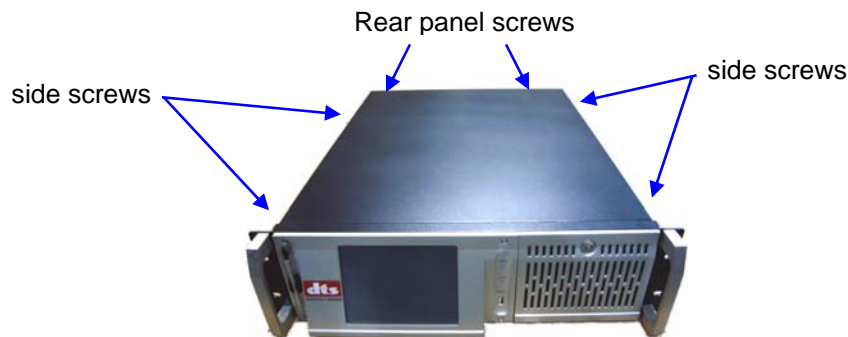


Figure 24: Digital Cinema Server - Lid Screws

Then the unit can be put back into its rack – if any – and connected to power.

Note: You might have to reconnect all the cables that were disconnected at the beginning of this procedure.

5.2 Tasks Required each 50,000 Operating Hours

5.2.1 2U Rear Panel Fans Replacement

According to the fans manufacturer, it is recommended to replace the 2U rear panel fans each 50,000 operating hours (~ 5 years). Please refer to document called “Digital Cinema Server Fan Shock Mounts Installation Procedure” (document number D2K.DP.000223.DRM) to find additional guidance about how shock mounting new fans.

To replace the Dolphin fan, just remove its bracket and put a new bracket mounted with a new fan and the appropriate plastic tunnel.

5.2.2 Dolphin Battery Replacement

The battery shall be replaced every 50,000 operating hours (~ 5 years). Battery information is the following:

- Part Number: BAT12.5MM-LI-COIN (Battery 12.5mm Lithium Coin)
- Vendor Part Number: P033-ND
- Manufactured Part Number: CR1220

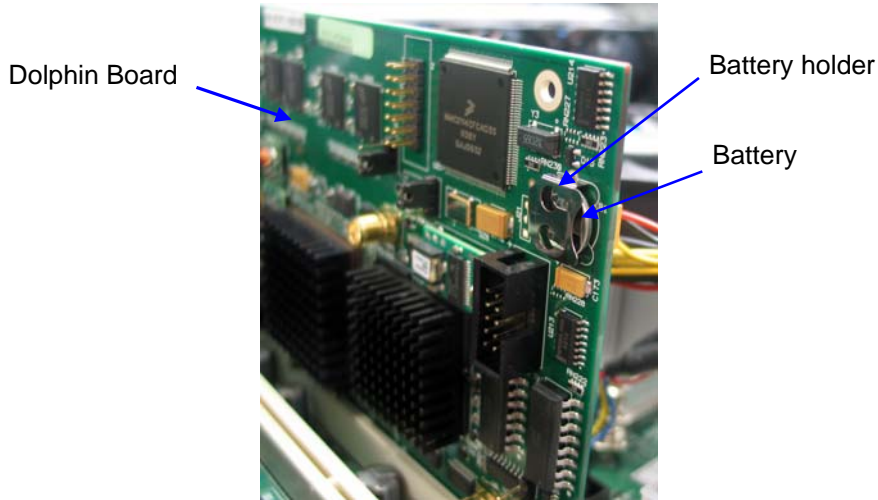


Figure 25: Dolphin Board – Battery Location

To replace the battery, please do the following:

1. Shut down the Digital Cinema Server hosting the Dolphin board
2. Make sure you have the new battery ready with you
3. The Digital Cinema Server lid should already be removed as it is recommended that several preventive maintenance tasks be performed at the same time – see paragraph 5.1.1.
4. You have **5 minutes to insert the new battery after having removed the old one** – otherwise the Security Clock time will be lost:
 - a. Remove the old battery from the Dolphin board battery holder with an isolated stick (**CAUTION**: Do NOT remove the Dolphin from the Digital Cinema Server to perform this operation – use only NON-Metallic tools to remove the battery. Plastic devices are recommended)

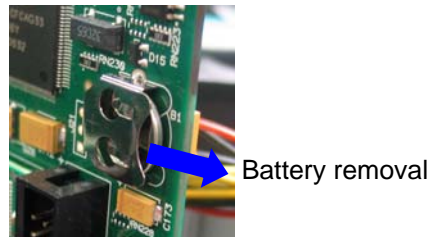


Figure 26: Dolphin Board – Battery Removal

- b. Insert the new battery inside the Dolphin board battery holder
5. Complete the other preventive maintenance tasks scheduled at the same time before putting the Digital Cinema Server lid back according to procedure provided in paragraph 5.1.5.

6 Acronyms

Term	Definition
PSU	Power Supply Unit
RAID	Redundant Array of Independent Disks
UPS	Uninterruptible Power Supply