PROFESSIONAL PORTABLE
MULTICHANNEL RECORDER

# SONOSAX
# SX-R4+

**USER MANUAL**
# HARDWARE DESCRIPTION

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**Audio equipment manufacturer**

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# 1  Introduction

Congratulation for purchasing your SONOSAX SX-R4+ professional portable multichannel recorder. Based on high technology design, it has been manufactured to deliver many years of outstanding performances.



As with all SONOSAX products, the SX-R4+ is build without any compromise in quality, using only the best components available and passes severe quality controls.

The information and instructions contained in this manual are necessary to ensure safe operation of your equipment and to maintain it in good operating condition; please read it carefully.

| NOTE | |
|---|---|
|  | This user manual covers all topics related to the hardware of the SX-R4+. For software, please refer to the online documentation on our website. |

## 1.1  Features

**Inputs / Outputs**

- 4x XLR-3F inputs, individually configurable as:
    - Analog Mic/Line levels, electronically balanced, phase reversal, 48V phantom, LF Cut and level control on front panel
    - Digital transformer balanced AES3 or AES42 with individual ASRC, phase reversal, LF Cut and level control on front panel
- 2x Line inputs, electronically balanced on TA-3M with level control on front panel
- 1x Line output on TA-3M as 2-channel analog unbalanced
- 4x AES3 balanced inputs with individual ASRC on 3M MDR 26-pin connector

**Performance**

- 135 dB (A-weighted) overall dynamic range from analog input to recorded file (114 dB dynamic range with USA version)
- 90 kHz overall frequency response @192k
- 40-bit processing
- 24-bit 44.1 / 48 / 48.048 / 88.2 / 96 / 176.4 / 192 kHz

**User Interface**

- Touch screen 2.4" TFT color display
- Configuration through WiFi dynamic web interface

**Powering**

- Removable 14.4V 48Wh Li-Ion smart battery

- External DC 9 to 18V on Hirose 4-pin, SMBUS capable, electrically isolated

- 12V regulated decoupled DC output to power peripherals equipments up to 7W

- Intelligent energy management with detailed on-screen informations

**Timecode**

- 0.5 PPM accuracy

- Independent in/out on 5-pin Lemo connector

- 23.976 / 24 / 25 / 29.97ND / 29.97D / 30 ND / 30D

**Mechanical**

- Machined aluminum housing

- Overall dimension: 200 x 50 x 144.5 mm (7.87" x 1.96" x 5.7")

- Weight: 910g / 2.0lbs without battery, 1.2kg / 2.64lbs with 48Wh battery

## 1.2    Safety Instructions

- ✔ Read all the safety and operation instructions before operating the SX-R4+ and its external power supply

- ✔ Keep the instructions for further reference

- ✔ Follow all warnings, notes and instructions in this operation manual

- ✔ Keep the SX-R4+ and its external power supply away from heat sources such as radiators or other devices that produce heat

- ✔ Connect the SX-R4+ only to the optional external power supply delivered by SONOSAX. Route power supply cords so that they are not likely to be walked on or pinched by items placed on or against them, paying particular attention to cords at plugs, inlets and the point where they exit the console. Keep power cords away from audio cords.

- ✔ Do not drop objects or spill liquids onto the SX-R4+ and its power supply

- ✔ The SX-R4+ and its external power supply should be serviced only by qualified service personal as your nearest SONOSAX authorized reseller

- ✔ Do not defeat the grounding or polarization of the SX-R4+ or its power supply

- ✔ To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture

- ✔ Internal settings must be executed by an authorized SONOSAX distributor or reseller. Damage due to manipulations inside the unit cancels the SONOSAX warranty immediately.

# 2   Panels

## 2.1    Front Panel
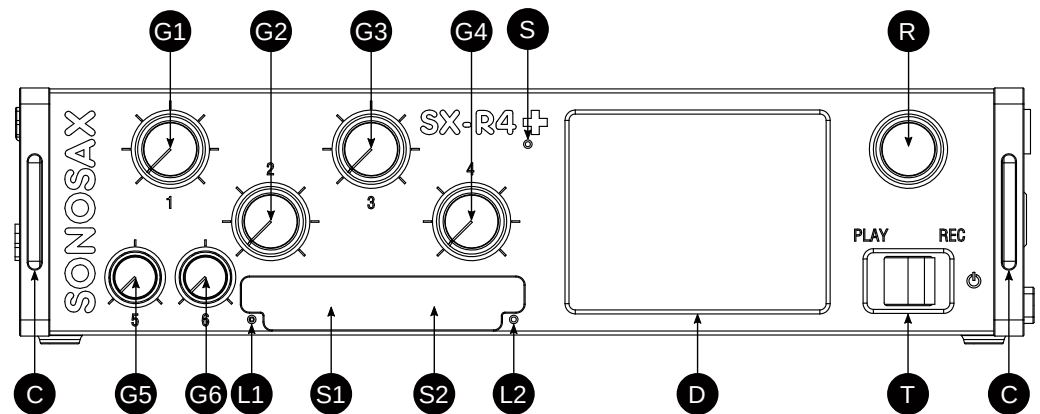


**G1 to G4**
- Rotary faders, can be configured to control input level or mix faders of XLR inputs
- Push-on switches, short and long press are programmable actions

**G5-G7**
Rotary faders controlling line inputs 5-6 with programmable push-lock switches

**C**
Cut-out for shoulder strap

**L1-L2**
SD Cards status LEDs

**S1-S2**
SD Cards slots under protection cover

**S**
Light sensor

**D**
Color TFT display with touch screen

**R**
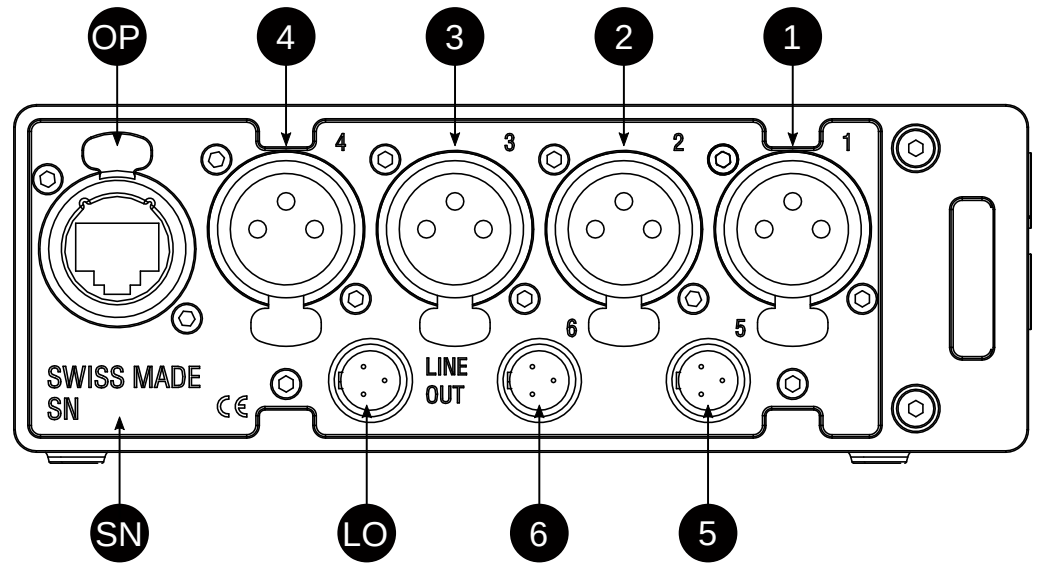Rotary encoder with programmable push-on switch. Primarily controls the headphones volume,

**T**
Toggle Switch

→   Record

←   Playback

To power on unit, keep record pressed

## 2.2 Left Side Panel



**1 to 4** [XLR]
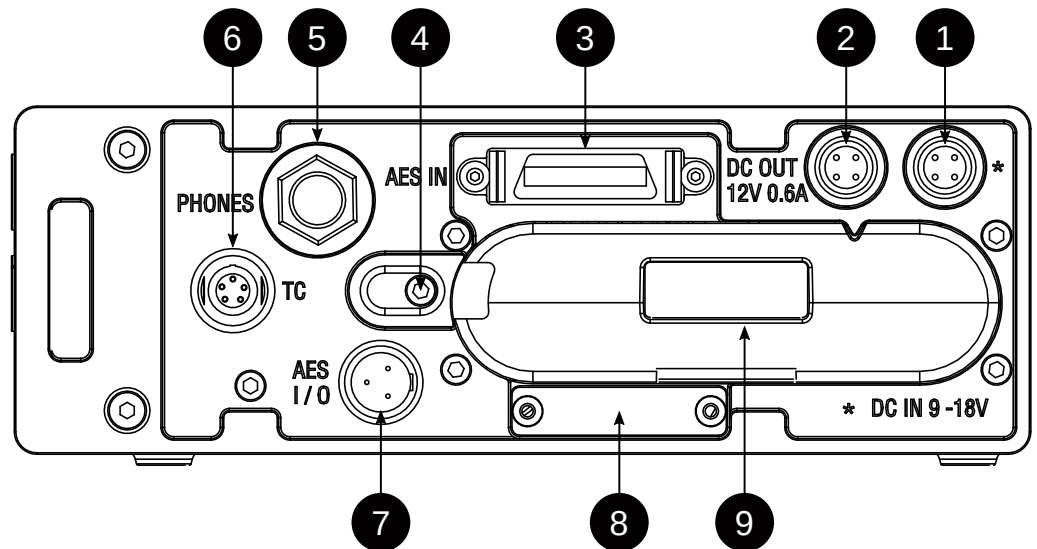Analog electronically balanced Mic/Line
Inputs 1 to 4

**5-6** [TA-3F (Mini-XLR)]
Analog electronically balanced Line
inputs

**OP**
Option Card Slot

**LO** [TA-3F (Mini-XLR)]
Unbalanced LINE OUT

**SN**
Serial Number engraving

## 2.3    Right Side Panel



**1** [ DC Input Hirose 4]
External power supply input, 9 to 18V
DC

**2** [DC Output Hirose 4]
Extern power supply output, 12V 0.6A

**3** [3M MDR 26-pin]
Multipin with 4x AES inputs and SX-R4+
command bus

**4**
Battery lock

**5** [Headset/Headphones 6.35mm jack]
1/4" stereo jack headphones output

**6** [Timecode Lemo 5-pin]
Unbalanced timecode input/output

**7** [TA-3F (Mini-XLR)]
AES3 ditial transformer balanced,
switchable as input or output

**8**
WiFi antenna

**9**
Battery enclosure (2050 series)
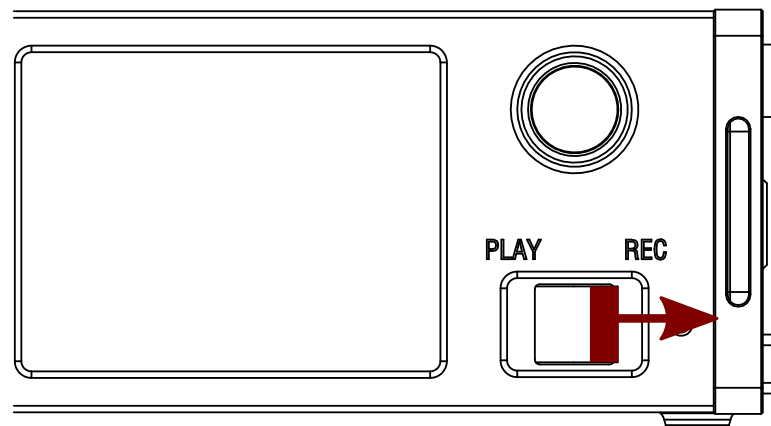
# 3  Powering

## 3.1    Power management

The SX-R4+ can be powered from a removable smart battery or from an external power source. The external power source can be a simple DC source or a smart battery.

The external power has always a higher priority than internal smart battery. The POWER menu of the SX-R4+ is used to configure the conditions to switch from external to internal.

The SX-R4+ provide also an external regulated DC output.

## 3.2    Powering on the SX-R4+

To power on the SX-R4+, press and hold the REC toggle until the splash screen appears.



## 3.3    Internal smart battery powering

The battery enclosure is designed for a standard 205x series smart battery having a nominal voltage from 10.8 to 14.4 volts.

The 2054 model (~48Wh) fits the enclosure and is secured by the battery lock pin. A higher capacity battery can be used (~98Wh) but it has to be secured in the bag by a strap or other means.

| NOTE |
|------|
| The SX-R4+ does not charge the internal battery, it must be charged by its own specific charger. |

The following table list some compatible batteries and chargers

**Inspired Energy 2050 series**

| Model | Specification |
|-------|---------------|
| ND 2054 | 14.4V 3.4Ah 45Wh |
| NH 2054 | 14.4V 6.8Ah 98Wh (extended version) |
| NL 2054 | 14.4V 6.8Ah 97Wh (extended version , low temperature) |
| CH4000 | Single battery charger |

| CH5000 | Single battery calibrator |
| --- | --- |
| CH7000E<br>CH7000A<br>CH7000U | Single battery charger with Europeal/US/UK main adapter, solar, vehicle |
| CH4040 | Dual battery charger |
| CH5050 | Dual battery calibrator |

## 3.4    External powering

The SX-R4+ can be powered by a regulated DC source from 9 to 18 volts, such as a main adapter or an external battery pack such as lead acid or Li-Ion batteries. The DC source must be capable to supply at least 1.5A under 12VDC.

The average power consumption is 7 to 12W, depending on the configuration of the SX-R4+.

The DC input connector handles the SMBUS signals of external smart batteries.

## 3.5    External power output

A Hirose 4-pin connector supply a DC voltage to power peripheral equipments such as mic preamplifers or RF systems.

The output voltage is dependent of the input source:

- When powered by the internal battery, the output voltage is 12V (0.6A max)
- When powered by an external source, the output voltage is the input DC voltage

**RRC 2050 series**

| Model | Specification |
| --- | --- |
| RRC2054 | 15V 3.2Ah 48Wh |
| RRC2054-2 | 14.4V 6.9Ah 99Wh (extended version) |
| RRC-SMB-MBC | 50W desktop battery charger for RRC204x |

**AudioRoot eSMART series**

| Model | Specification |
| --- | --- |
| Li-49Wh | 14.4V 3.4Ah 49Wh |
| Li-98Wh | 14.4V 6.8Ah 98Wh (extended version) |
| ELC-SMB | Portable smart battery charger |
| MONO CHARGER | 1 bay desktop charer |
| DUAL CHARGER | 2 bay destop charger |
| QUAD CHARGER | 4 bay destop charger |

# 4  Block diagram

## SX-R4+ (Simplified Blockdiagram)
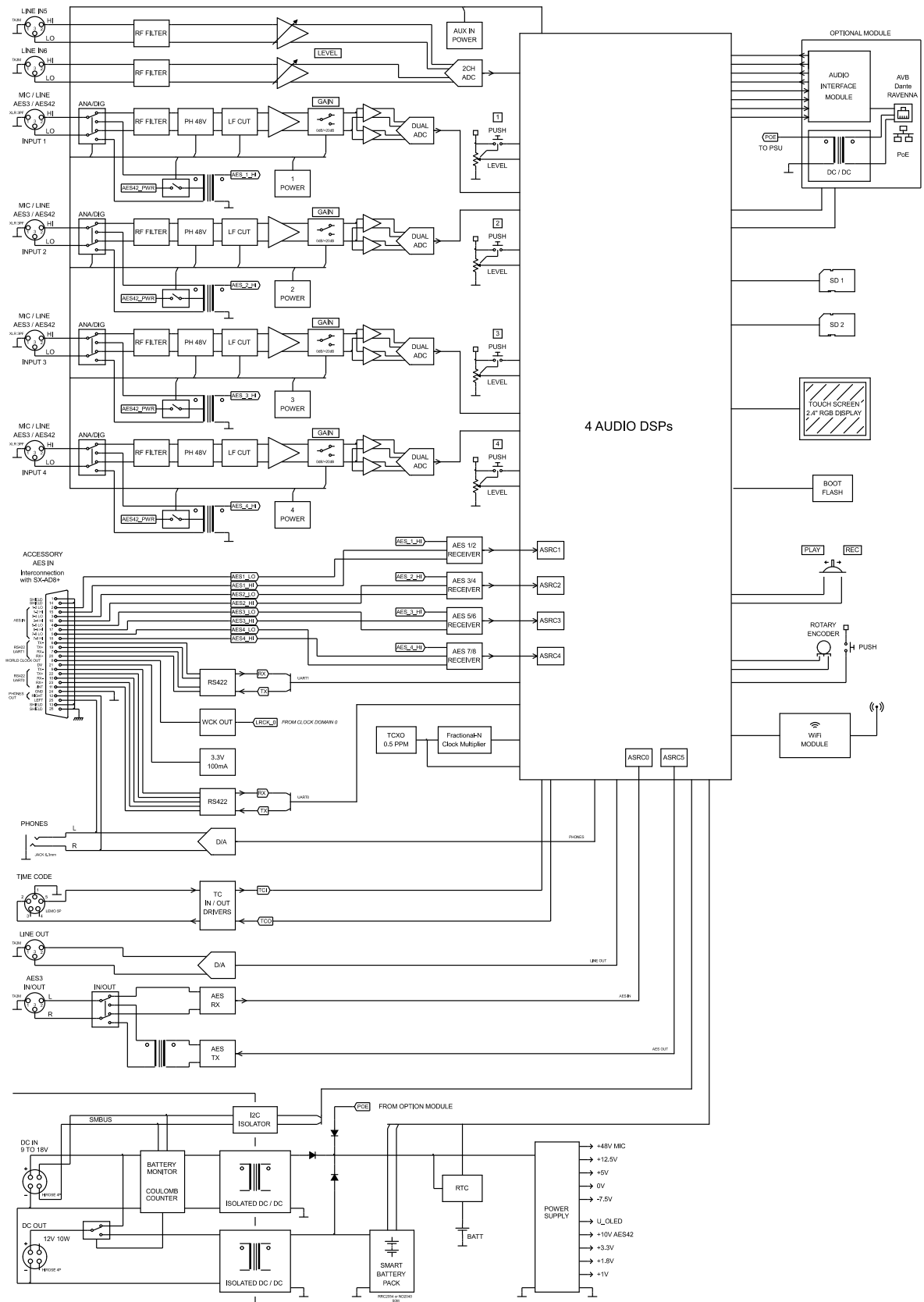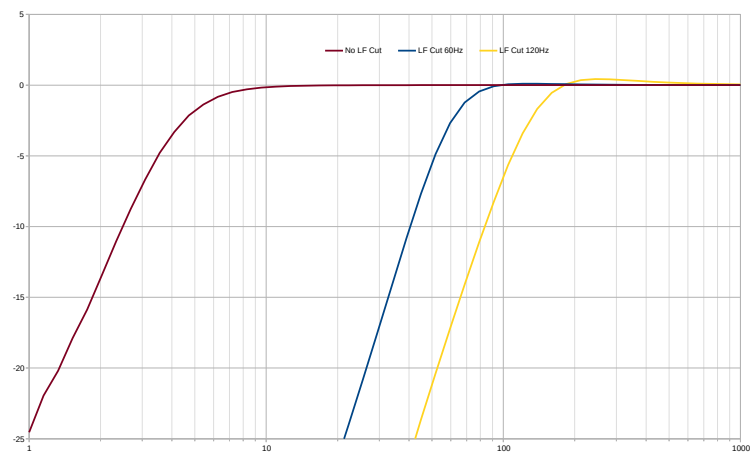
# 5 Performance Plots

## 5.1 Frequency Response Plot
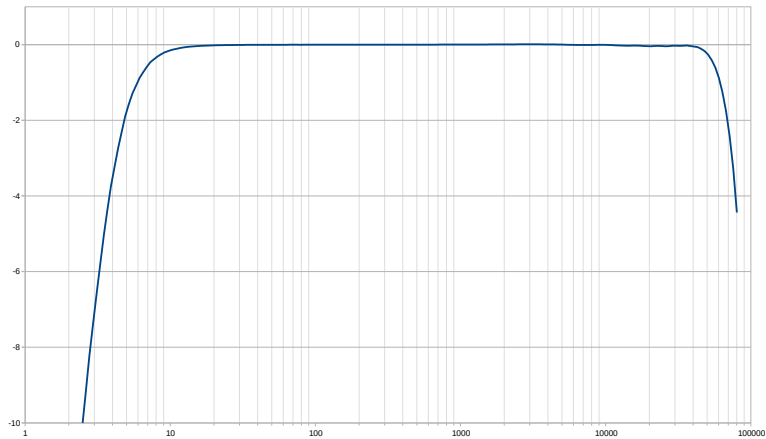


## 5.2 LF Cut filter Plot

# 6   Specifications

## 6.1     Analog Inputs

| | |
|---|---|
| Frequency Response | 2 Hz to 75kHz (-3 dB)<br>22 Hz to 22 kHz (+/- 0.1 dB)<br>192 kHz sample rate |
| THD + Noise | 0.0011% max (1 kHz, 22Hz-22kHz, +10dBu input) |
| Equivalent Input Noise | -112.5 dBu max (Gain 0dB, 22Hz-22kHz, 150 Ohms)<br>-126 dBu max (Gain +20dB, 22Hz-22kHz, 150 Ohms) |
| Maximum Input Level | +21 dBu (Gain 0dB)<br>1 dBu (Gain +20dB) |

## 6.2     Low Frequency Cut Filter

| | |
|---|---|
| Frequency Response | Third order, 60 or 120 Hz<br>See LF Cut filter Plot |

## 6.3     Digital Domain

| | |
|---|---|
| Sampling Frequency | 48 kHz, 96 kHz, 192 kHz |
| A/D | 2x 24-bit per channel<br>40-bit processing |
| A/D Dynamic Range | 135.5 dB, A-weighted (Gain 0dB)<br>129.5 dB, A-weighted (Gain +20dB) |
| Output Bit Depth | 24-bit |
| Outputs | 4x AES3 transformer balanced outputs on 3M MDR 26-pin |

## 6.4     Power

| | |
|---|---|
| Input Voltage | 9-18V DC on locking  DC Input Hirose 4 |
| Power consumption, all input enabled | 6.0 W |

## 6.5     Mechanical

| | |
|---|---|
| Size (H x W x D) | 200 x 50 x 144.5 mm<br>7.87 x 1.96 x 5.7 '' |
| Weight | 850 g<br>1.9 lbs |

# 7   Connector Pin Assignments
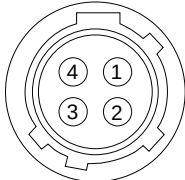
## 7.1   XLR

| | |
|---|---|
|  | 1      ground<br>2      signal (+)<br>3      Signal (-) |
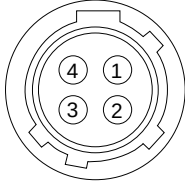
## 7.2   TA-3F (Mini-XLR)

| | |
|---|---|
|  | 1      ground<br>2      signal (+)<br>3      signal (-) |

## 7.3    DC Input Hirose 4

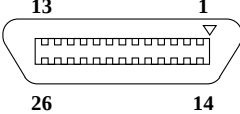| | |
|---|---|
|  | 1      ground (-)<br>2      SMBUS SDA<br>3      SMBUS SCL<br>4      DC input (+) |

## 7.4   DC Output Hirose 4

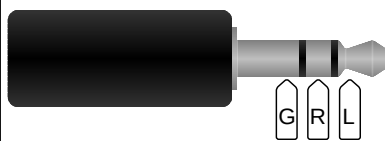| | |
|---|---|
|  | 1      ground (-)<br>2      not connected<br>3      not connected<br>4      DC input (+) |

## 7.5   3M MDR 26-pin

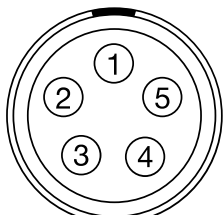| | |
|---|---|
|  | 1      Ground (AES 1-2)<br>2      AES 1-2 (-)<br>3      AES 3-4 (-)<br>4      AES 5-6 (-)<br>5      AES 7-8 (-)<br>6      RS422 UART 1 TX (-)<br>7      RS422 UART 1 RX (-)<br>8      Word clock output<br>9      RS422 UART 0 TX (-)<br>10    RS422 UART 0 RX (-)<br>11    Reserved, do not connect<br>12    Headphones Right<br>13    Ground (AES 5-6)<br>14    Ground (AES 2-4)<br>15    AES 1-2 (+)<br>16    AES 3-4 (+) |

| | | |
|---|---|---|
| | 17 | AES 5-6 (+) |
| | 18 | AES 7-8 (+) |
| | 19 | RS422 UART 1 RX (+) |
| | 20 | RS422 UART 1 RX (+) |
| | 21 | DV +3.3V |
| | 22 | RS422 UART 0 TX (+) |
| | 23 | RS422 UART 0 RX (+) |
| | 24 | Headphones ground |
| | 25 | Headphones Left |
| | 26 | Ground (AES7-8) |

## 7.6    Headset/Headphones 6.35mm jack

| | | |
|---|---|---|
| | G | ground |
| | M | Microphone (optional) |
| | R | headphones right |
| | L | headphones left |

## 7.7    Timecode Lemo 5-pin

| | | |
|---|---|---|
| | 1 | ground |
| | 2 | Timecode input |
| | 3 | Not connected |
| | 4 | Not connected |
| | 5 | Timecode output |

## 7.8