

Condenser Microphone CM16/CMPA

The condenser microphone consists of two pieces. The cylindrical preamplifier module with the 5-pole XLR connector (1 - CMPA) is connected to the microphone capsule (2 - CM16) via a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages.

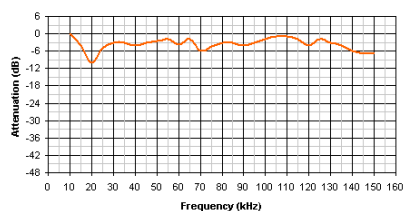


The integrated pre-amplifier has an internal compensation circuit that slightly boosts frequencies above 50 kHz.

Condenser Microphone Capsule CM16

The microphone capsule consists of a thin metalized polyester film and a metal back plate. Do not touch the diaphragm because its metalization could be destroyed. It is recommended to use the capsule always with the protective grid.

Due to its thin metalization, the diaphragm may deteriorate especially under humid conditions. It is therefore recommended to store the microphone in a dry place. Spare capsules are available on request and deteriorated diaphragms will be replaced by Avisoft Bioacoustics at a small fee. With some skill, it would also be possible to replace the membrane foil on your own (by releasing the screws on the back of the capsule).



Replacing the CM16 microphone capsule

Hold the preamplifier module (1) on its ribbed campling nut and turn the CM16 capsule anticlockwise to remove it from the preamplifier module. The protective grid can be removed by releasing the six M3 nuts. The new CM16 capsule can then be mounted in reverse order. To prevent electrostatic discharges that could potentially damage the preamplifier, one should first briefly connect the tip of the 2.5 mm screw of the new capsule to the metal housing of the preamplifier module before mounting it.

Condenser Microphone CM16/CMPA

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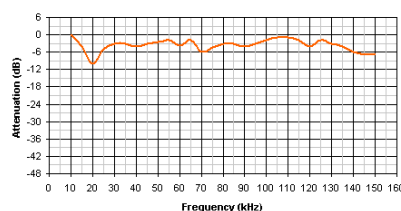


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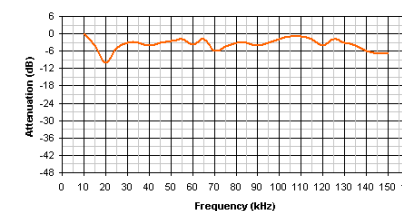


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Condenser Microphone CM16/CMPA-P48

The condenser microphone CMPA-P48/CM16 consists of three components. The microphone capsule CM16 (#1) is connected to the cylindric preamplifier module CMPA (#2) by means of a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages. The P48 polarization voltage supply unit (#3) provides the polarization voltage for the microphone capsule and the XLR-3 connector that allows to connect the microphone to a standard microphone input that supplies P48 phantom power at a current of up to 10mA. The CMPA module (#2) can be attached either directly to the polarization module (#3) or via the supplied 5-pole XLR extension cable.

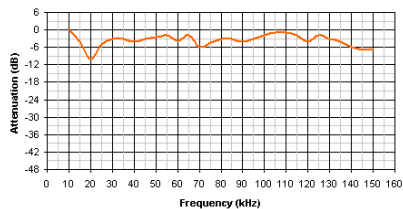


The polarization voltage generator may create a soft audible low-frequency rumble that can be removed by applying a 2 kHz high-pass filter to the recordings.

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Condenser Microphone CM16/CMPA-P48

The condenser microphone CMPA-P48/CM16 consists of three components. The microphone capsule CM16 (#1) is connected to the cylindric preamplifier module CMPA (#2) by means of a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages. The P48 polarization voltage supply unit (#3) provides the polarization voltage for the microphone capsule and the XLR-3 connector that allows to connect the microphone to a standard microphone input that supplies P48 phantom power at a current of up to 10mA. The CMPA module (#2) can be attached either directly to the polarization module (#3) or via the supplied 5-pole XLR extension cable.

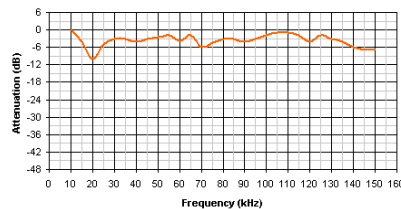


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Condenser Microphone CM16/CMPA-P48

The condenser microphone CMPA-P48/CM16 consists of three components. The microphone capsule CM16 (#1) is connected to the cylindric preamplifier module CMPA (#2) by means of a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages. The P48 polarization voltage supply unit (#3) provides the polarization voltage for the microphone capsule and the XLR-3 connector that allows to connect the microphone to a standard microphone input that supplies P48 phantom power at a current of up to 10mA. The CMPA module (#2) can be attached either directly to the polarization module (#3) or via the supplied 5-pole XLR extension cable.

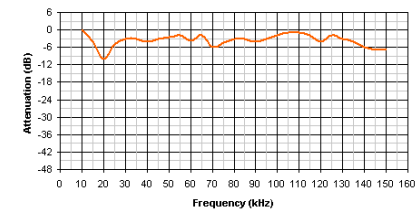


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Condenser Microphone CM16/CPMA-5V

The condenser microphone CM16/CPMA-5V consists of three components. The microphone capsule CM16 (#1) is connected to the cylindric preamplifier module CPGA (#2) by means of a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages. The polarization voltage supply and preamplifier unit (#3) provides the polarization voltage for the microphone capsule and includes an adjustable 40 dB preamplifier with a balanced output. The CPGA module (#2) can be attached either directly to the polarization module (#3) or via the supplied 5-pole XLR extension cable.

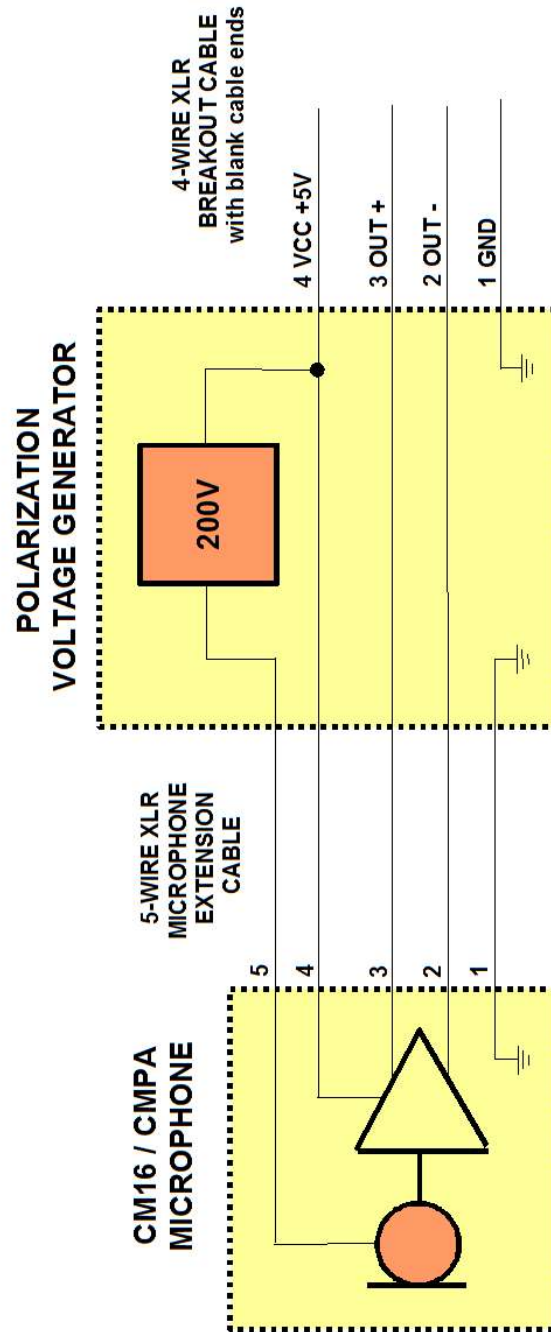
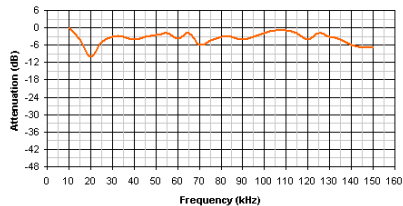


The integrated preamplifier has an internal compensation circuit that slightly boosts frequencies above 50 kHz.

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Condenser Microphone CM16/CMPA40-5V

The condenser microphone CM16/CMPA40-5V consists of three components. The microphone capsule CM16 (#1) is connected to the cylindrical preamplifier module CMPA (#2) by means of a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages. The polarization voltage supply and preamplifier unit (#3) provides the polarization voltage for the microphone capsule and includes an adjustable 40 dB preamplifier with a balanced output. The CMPA module (#2) can be attached either directly to the polarization module (#3) or via the supplied 5-pole XLR extension cable.

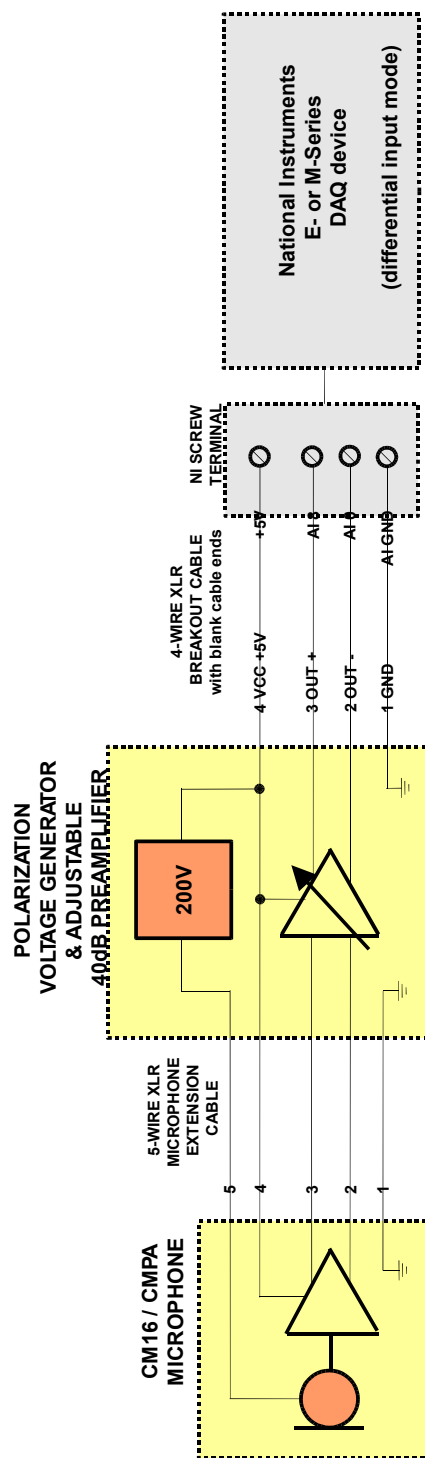
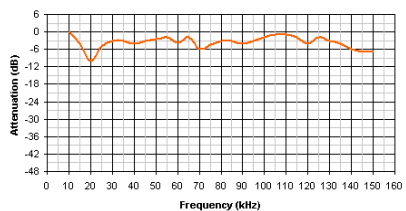


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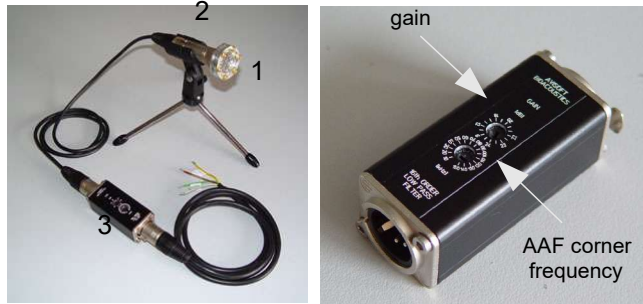


The connection scheme of the XLR-4 connector is as follows:

- pin 1 (black) : GND
- pin 2 (white) : OUT-
- pin 3 (green) : OUT+
- pin 4 (yellow) : +5VDC +-10% power supply

Condenser Microphone CM16/CMPA48AAF-5V

The condenser microphone CM16/CMPA48AAF-5V consists of three components. The microphone capsule CM16 (#1) is connected to the cylindrical preamplifier module CMPA (#2) by means of a 2.5 mm thread. This allows to replace the capsule easily. For proper operation, both this 2.5 mm thread and the 17 mm thread on the preamplifier module must be fastened. However, use only moderate forces in order to prevent mechanical damages. The polarization voltage supply and preamplifier unit (#3) provides the polarization voltage for the microphone capsule and includes an adjustable 24 dB preamplifier and anti-aliasing filter. The CMPA module (#2) can be attached either directly to the polarization module (#3) or via the supplied 5-pole XLR extension cable.

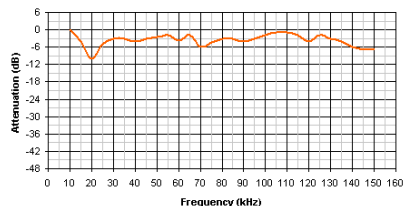


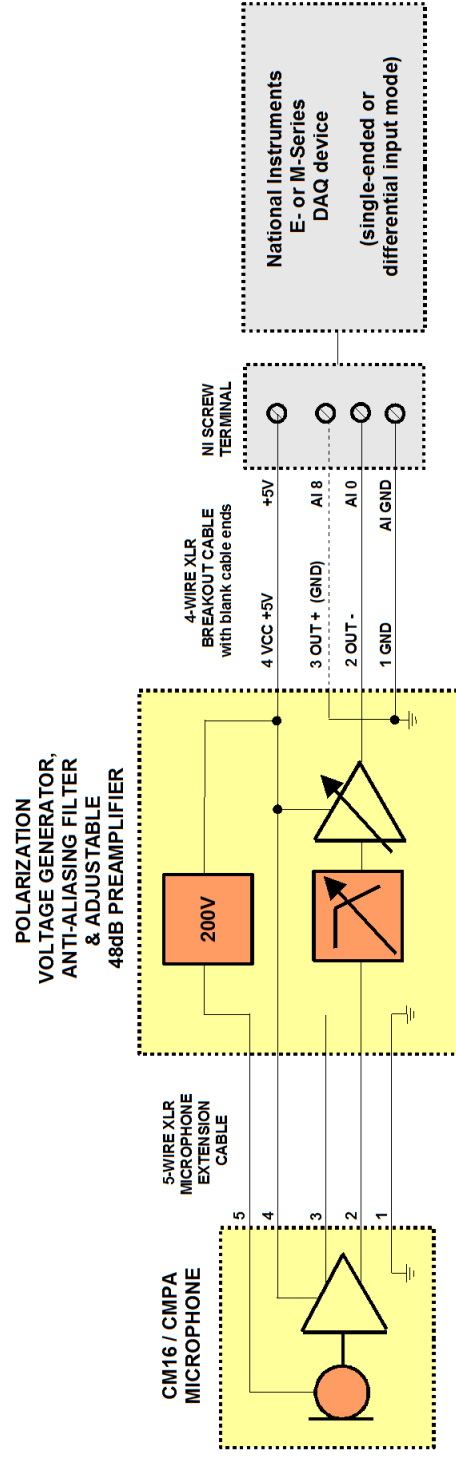
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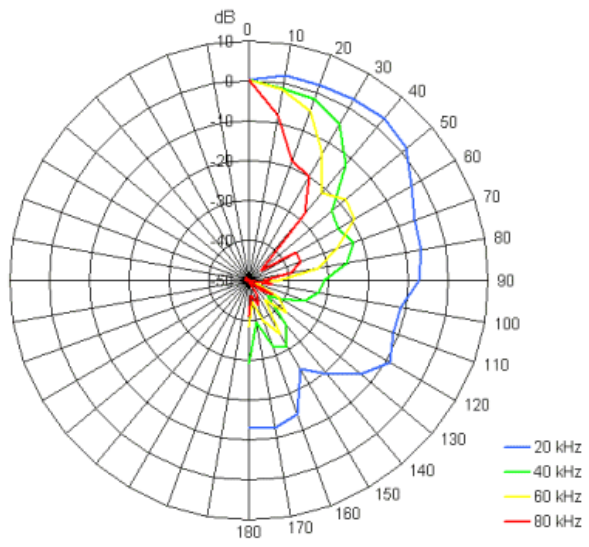
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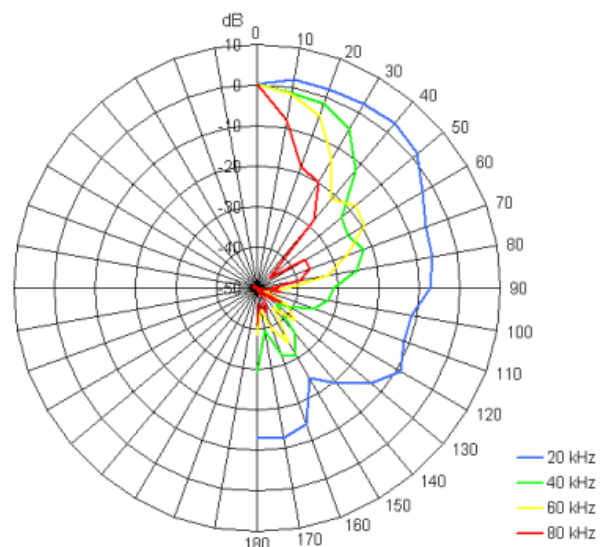


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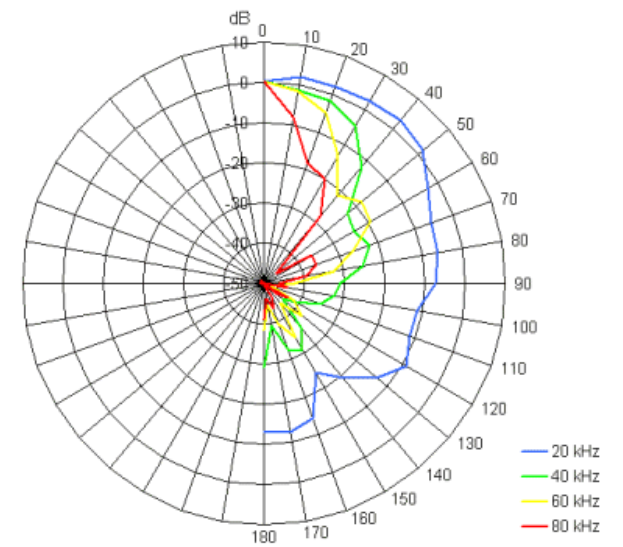
- pin 1 (black) : GND
- pin 2 (white) : OUT-
- pin 3 (green) : OUT+ (GND)
- pin 4 (yellow) : +5VDC +-10% power supply



Polar Diagram



Polar Diagram



Polar Diagram

USB-powered microphone heating HCM16

The HCM16 microphone heating module for the CM16/CMPA microphone can increase the temperature of the microphone capsule by about 10 Kelvin above the ambient temperature, which should prevent condensation under difficult environmental conditions, such as dew or rain.

The USB B connector can be connected either to a free USB port of the PC that is running the UltraSoundGate unit or alternatively to a separate USB power supply unit or battery.

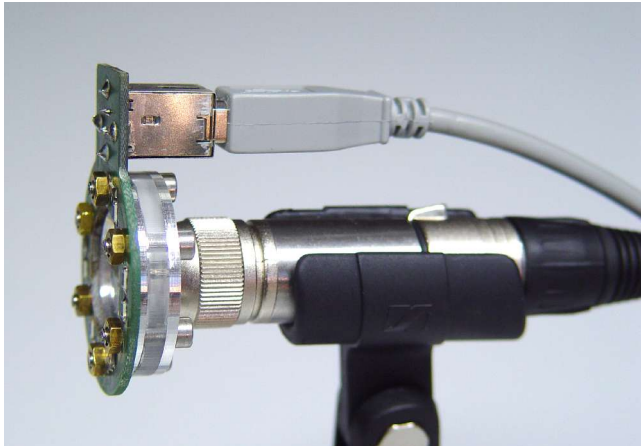
Installation

Mount the heating module to the CM16 microphone capsule in such a way that the resistor chips on it face outwards (see picture). The protective grid might be still inserted between the microphone capsule and the heating module. However, the efficiency (the thermal contact) would be better without the grid.

Under some circumstances, the USB cable connection between the heating module and the computer might cause electrical interferences that are caused by a ground loop. In this case, the ground connection to the heating module through the USB connector should be removed (USB pin 4). This can be achieved for instance by using a modified USB cable whose ground wire (USB pin #4, black) has been cut. The required ground connection to the computer would then be established exclusively through the microphone and the UltraSoundGate ground rail.

Specifications

Electric power requirements : 0.9 W (180 mA @ 5V)
Absolute maximum power: 3.0 W (330 mA @ 9V)
Maximum supply voltage: 9 V

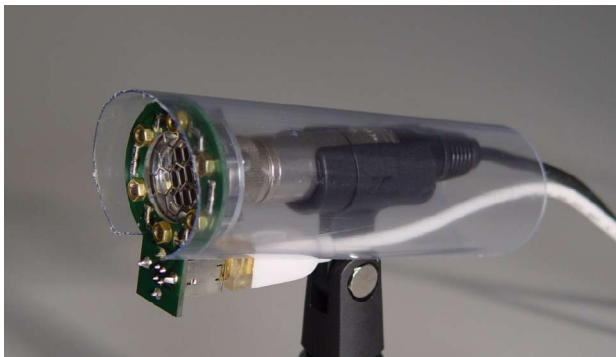


Rain Protection Tube

The supplied rain protection tube is intended for protecting the microphone and the XLR cable connector against direct rain.

Note that the installed tube will slightly affect the frequency response and the polar pattern of the microphone. This effect can be minimized by adjusting the tube in such a way that there is only a short canopy (about 10 mm) in front of the microphone capsule.

The rain protection tube for the CM16/CMPA microphone can also be combined with the microphone heating.



Refurbishing Kit for the Condenser Microphone Capsule CM16

The refurbishing kit allows to replace deteriorated diaphragms of the CM16 condenser microphone capsules. The supplied mounting frame enables a proper assembly. However, a moderate level of skill is required for this procedure.

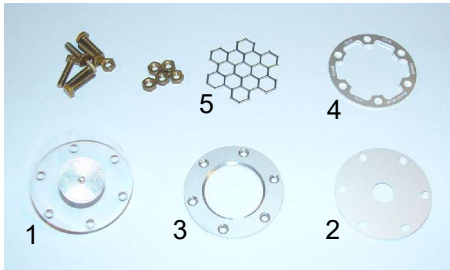
1. First remove the 6 nuts from the front of the CM16 capsule and remove the protective grid by using the supplied M3 nut driver.



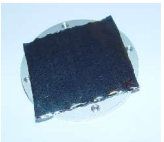
2. Remove the M3 screws from the back of the CM16 capsule.



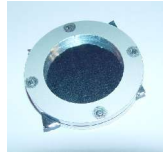
The capsule is now completely disassembled (except of the aluminum back plate that is still mounted on the acrylic disk). The old diaphragm foil can be thrown away.



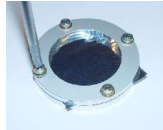
3. Place one of the supplied diaphragm foils onto the mounting ring with with the thread holes. The non-conductive side of the foil that is marked by a black cross should be on top. Handle the foil on its edges only.



4. Put the second mounting frame ring (the one without threads) onto the foil and align the mounting holes. Make sure that there are no wrinkles on the foil.



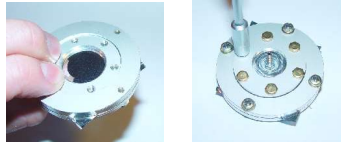
5. Fix the foil between the two rings by fastening the supplied screws.



6. Place the acrylic disk [1] onto the non-conductive (marked) side of the foil and add the aluminum disk [2]. The lowering of that disk must be outside. Align the mounting holes of the two disks.

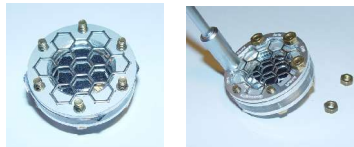


7. Turn the entire arrangement, add the aluminum ring [3] and align it to the holes of the two disks on the opposite side. First insert one screw from the back side and fasten it while applying a moderate tension to the diaphragm. Then add the other 5 screws one after another.



8. Push the newly mounted capsule down and pull it out of the mounting frame.

9. Center the protective grid [5] on the capsule and fasten it by the cover ring [4] using the 6 six nuts.



UltraSoundGate Charge Amplifier with adjustable Hi-Pass Filter

The UltraSoundGate Charge Amplifier can be used to connect a hydrophone directly to the an UltraSoundGate xx16x main unit. The integrated adjustable high-pass filter allows rejecting unwanted low-frequency noise.



The gain of the charge amplifier depends both on the nominal capacitance of the connected hydrophone and the selected input capacitance of the amplifier ($\text{Gain} = 20 \log(\text{capacitance of the hydrophone} / \text{selected input capacitance})$). A hydrophone capacitance of 3nF and an input capacitance of 1nF would provide a gain of approximately 10 dB. The alternate input capacitance of 100pF would rise the gain to 30 dB.

The black rotary knob selects the cut-off frequency of the high-pass filter. The filter attenuation is 6dB / octave below the selected cut-off frequency. The labels are valid for an input capacitance of 1nF. If the alternate 100pF setting has been selected, all frequency labels must be multiplied by factor 10.

High-pass cut-of frequencies and input impedances

| rotary switch setting | cut-off frequency at 1nF | cut-off frequency at 100 pF (*) | input impedance |
|-----------------------|--------------------------|---------------------------------|-----------------|
| 10 | 10 Hz | 100 Hz | 15 MOhm |
| 25 | 25 Hz | 250 Hz | 6.8 MOhm |
| 50 | 50 Hz | 500 Hz | 3,3 MOhm |
| 100 | 100 Hz | 1 kHz | 1.5 MOhm |
| 250 | 250 Hz | 2.5 kHz | 680 kOhm |
| 500 | 500 Hz | 5 kHz | 330 kOhm |
| 1k | 1 kHz | 10 kHz | 150 kOhm |
| 2.5k | 2.5 kHz | 25 kHz | 68 kOhm |
| 5k | 5 kHz | 50 kHz | 33 kOhm |
| 10k | 10 kHz | 100 kHz | 15 kOhm |
| 25k | 25 kHz | 250 kHz | 6.8 kOhm |
| 50k | 50 kHz | 500 kHz | 3.3 kOhm |

Care should be taken while connecting the hydrophone to the charge amplifier. Under some circumstances it is possible that the hydrophone or its cable have been electrostatically charged with high voltages (several thousands volts). These high voltages may damage the sensitive input stage of the amplifier (ESD). In order to maintain the maximum possible sound quality (low noise), there is no full ESD protection circuit at the amplifier input. Therefore, the hydrophone and its cable should be discharged before connecting them to the charge amplifier. This can be done by short-circuiting the hydrophone connector. Additionally, the amplifier should be switched off (either by disconnecting the amplifier from the USG main unit or by disconnecting the USG device from the PC) before connecting the hydrophone cable and the input impedance should be reduced by selecting a high cut-off frequency (greater than about 1 kHz). Once the hydrophone is connected to the amplifier, there is no further danger because any potential high voltages would be terminated by the internal resistors of the amplifier.

- 1: GND
- 2: positive signal output
- 3: negative signal output
- 4: +5V supply voltage (should not exceed 5.5V)
- 5: not connected

P48 Charge Amplifier with adjustable Hi-Pass Filter

The Avisoft Bioacoustics Charge Amplifier can be used to connect a passive hydrophone to any microphone input that supplies 48V phantom power at 10 mA. The integrated adjustable high-pass filter allows rejecting unwanted low-frequency noise.



The gain of the charge amplifier depends both on the nominal capacitance of the connected hydrophone and the selected input capacitance of the amplifier (Gain = 20 log (capacitance of the hydrophone / selected input capacitance)). A hydrophone capacitance of 3nF and an input capacitance of 1nF would provide a gain of approximately 10 dB. The alternate input capacitance of 100pF would rise the gain to 30 dB.

The black rotary knob selects the cut-off frequency of the high-pass filter. The filter attenuation is 6dB / octave below the selected cut-off frequency. The labels are valid for an input capacitance of 1nF. If the alternate 100pF setting has been selected, all frequency labels must be multiplied by factor 10.

High-pass cut-off frequencies and input impedances

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|-----------------------|--------------------------|---------------------------------|-----------------|
| 10 | 10 Hz | 100 Hz | 15 MOhm |
| 25 | 25 Hz | 250 Hz | 6.8 MOhm |
| 50 | 50 Hz | 500 Hz | 3.3 MOhm |
| 100 | 100 Hz | 1 kHz | 1.5 MOhm |
| 250 | 250 Hz | 2.5 kHz | 680 kOhm |
| 500 | 500 Hz | 5 kHz | 330 kOhm |
| 1k | 1 kHz | 10 kHz | 150 kOhm |
| 2.5k | 2.5 kHz | 25 kHz | 68 kOhm |
| 5k | 5 kHz | 50 kHz | 33 kOhm |
| 10k | 10 kHz | 100 kHz | 15 kOhm |
| 25k | 25 kHz | 250 kHz | 6.8 kOhm |
| 50k | 50 kHz | 500 kHz | 3.3 kOhm |

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UltraSoundGate 1/4" Mic Power Module with 7-pin LEMO 1B input connector

The 1/4" microphone power module allows to connect 1/4" (or 1/8") measurement microphones directly to the UltraSoundGate xx16x units, which can greatly simplify the use of measurement microphones in the field (otherwise a separate power supply module / conditioning amplifier would be required). It is powered from the UltraSoundGate base unit and includes a low-noise preamplifier and a switchable 15 kHz high pass filter.

Compatible 1/4" preamplifiers are for instance G.R.A.S. 26AC, B&K 2670 or Microtech Gefell MV 302.



Specifications

Input connector : female 7-pin LEMO 1B socket

Frequency range : 20 Hz ... 200 kHz

Gain : 30 dB

Inherent noise (20Hz-20kHz) : 0.5 μ V (-125 dBu)

Optional high-pass filter cut-off frequency : 15 kHz

Preamplifier supply voltage (LEMO pin 6): 28 V

Max preamplifier supply current available at pin 6: 1 mA

Polarization voltage (LEMO pin 3): 200 V (derived from the USG base unit)

Current drawn from the +5V USG base unit power supply rail (G.R.A.S. 26AC attached): 25 mA

Physical dimensions : 85 x 32 x 26 mm

Weight : 90 g

End-user Agreement

This a legal agreement between Avisoft Bioacoustics and the buyer. By operating this device and the accompanying software, the buyer accepts the terms of this agreement.

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