SCHOEPS Mikrofone

MSTC 64 Ug

ORTF-Stereomikrofon
ORTF Stereo Microphone

Bedienungsanleitung
User Guide - page 11

Dear Customer,

Congratulations on the purchase of your **SCHOEPS** MSTC 64 Ug ORTF stereo microphone. Below, we have provided some tips on how best to use your microphone, as well as some technical data.

This microphone consists of a T-shaped body with two built-in microphone amplifiers, and a matched pair of MK 4 cardioid capsules of the Colette modular system which are mounted 170 mm apart with an included angle of 110° (ORTF system). The stereophonic recording angle* is 95°.

This is probably the simplest stereo technique in general use. In almost any situation it produces an evenly-spread stereo image with good localization, often without the need for spot or ambient miking. Setup is particularly quick and simple since the capsule spacing and angles are fixed, with only a single stand and microphone cable required. Placement is relatively uncritical and the technique produces good results even in the hands of an inexperienced or hasty user.

The MSTC 64 accepts any 12 V or 48 V standardized phantom powering (for details see page 13), with the maximum sound pressure level being slightly reduced (ca. 4 dB) when powered by 12 V.

The two MK 4g capsules included with the MSTC 64g are a specially selected, matched pair.

Accessories (included):
polished wood case, SG 20 stand clamp

In many situations the use of an elastic suspension is advisable. Due to the weight of the MSTC, the A 20 S with its stiffer elastics should be used.

Accessories (optional):
B 5 D and BBG windscreens, A 20 S elastic suspension

MSTC 64 Ug wit B 5 D windscreens and A 20 S elastic suspension

MSTC 64 Ug with BBG windscreens and SG 20 stand clamp

MSTC 64 Ug wit BBG windscreens and Windjammer (fur-like overcoat) on an SG 20 stand clamp

* This is the range within which the sound sources should be placed, as "seen" by the microphone.

SCHOEPS GmbH · Spitalstr. 20 · D-76227 Karlsruhe (Durlach) · Tel: +49 721 943 20-0 · Fax: +49 721 943 2050
www.schoeps.de · mailbox@schoeps.de

Making recordings with the MSTC 64 Ug

When making stereo recordings, one of the essential aims is to reproduce the pickup area a (Fig. 4a) in an area spanning 60° during playback through loudspeakers (Fig. 4b). The crucial parameters for getting this just right are:

1. the directivity of the microphones used,
2. the angle w that the microphone axes cover together,
3. the distance d between the membranes of the microphone, and
4. the distance a of the microphone from the sound source.

In the case of ORTF stereo recordings, and accordingly when using the MSTC 64 Ug, the first three parameters are already known:

1. Pickup pattern: cardioid
2. Distance between microphones: 17cm
3. Angle ω between microphones: 110°

The only parameter left to determine is therefore the miking distance. Since the recording angle of the MSTC 64 Ug is known, the optimum distance to the sound source is also quite well defined, but there is a certain amount of leeway. The distance is ideal when it is about half the width b of the sound source (in fact, when it is precisely 46%).

Tab. 1
Ideal distance a of microphone to sound source as a function of the given width b of the sound source

b	a
2 m	0,9 m
3 m	1,4 m
4 m	1,8 m
5 m	2,3 m
6 m	2,7 m
7 m	3,2 m
10 m	4,6 m
15 m	6,9 m
20 m	9,2 m

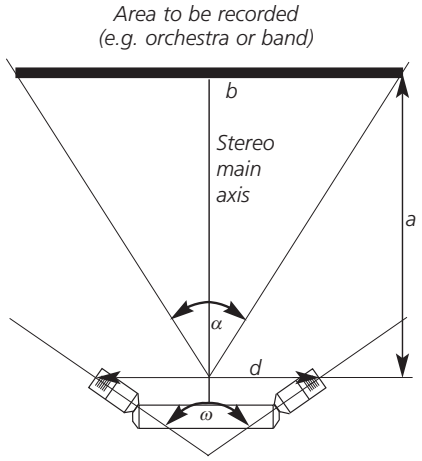

Fig. 4a
Recording angle α and axis angle ω. All sound sources should be located within the area covered by the recording angle.

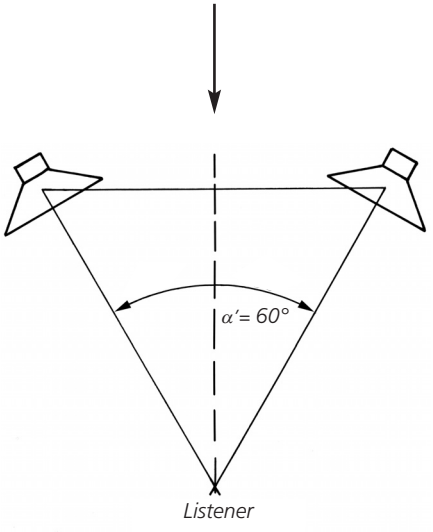

Fig. 4b
The recording angle α as shown in Fig. 4a is reproduced when played back through loudspeakers at an angle α' of 60°.

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Powering

The MSTC 64 Ug is electrically active and requires operating current. This will most often be supplied by the inputs of a mixer, preamplifier (such as the **SCHOEPS** VMS 5U shown on Fig. 1) or recorder that has suitable microphone powering built in. Otherwise, a stand-alone microphone power supply of proper type can be used.

Fig. 1
VMS 5 U microphone preamplifier

Like most modern, solid-state professional microphones, the CCM also uses a standardized powering scheme known as "phantom powering." Most recording equipment offers a 48-Volt supply for such microphones. Some equipment, however, provides a 12-Volt supply for phantom powering, or can readily be modified for such a supply. The SCHOEPS CCM compact microphones series can work with either voltage. The current remains the same for both options. The output level, i.e. maximum sound pressure level, is 6dB lower when running on a 12V phantom power supply.

Please note that the MSTC 64 is designed to work with standard 12-Volt or standard 48-Volt phantom powering. It is therefore no "12 - to - 48 Volt" microphone. Any input to which it is connected must implement one of those two standard phantom powering methods, which means that not only must the supply voltage meet the standard, but the resistors must be correct as well.
Our microphones are developed and tested with power supplies that conform to the requirements of this standard. Proper operation with non-standard power supplies cannot be guaranteed. Circuit arrangements that deviate from the standard can cause operational problems (i.e. distortion or even gaps in the signal), particularly at high sound pressure levels or in the presence of strong wind noise. Such problems may often seem to defy analysis until their real cause is discovered.

You can find out more about phantom power supplies below.

Phantom powering to standard DIN EN 61938

For a condenser microphone correct powering is essential. There have been various myths and misunderstandings about it. Authoritative information is contained in the standards documents, but few people have access to them which is why we are offering this detailed explanation.

Phantom powering is designed to be "invisible" and harmless to balanced microphones which were not specifically designed to use it; this includes most balanced, professional dynamic and ribbon microphones, as well as condenser microphones that use vacuum-tube circuitry. Exceptions are quite rare. The only likely cases in which standard phantom powering will endanger a balanced microphone (e.g. a ribbon) are if a microphone cable, connector or adapter is defective or wired in a non-standard way, such that one modulation lead of the microphone is shorted to ground at DC while the powering is on. If a microphone is connected to such a cable with the powering turned on, impulse current will flow through its coil or ribbon, possibly causing damage.

Fig. 1 shows the only valid 48 V and 12 V phantom powering circuit (abbreviations: P48 and P12) that can be realized with resistors as opposed to a center-tapped input transformer. This illustration is based on the international standard document EN 61938 of 1997.

The permissible tolerance of the feed resistor values as such is ±20%. However, the difference between the resistors of any one pair should be less than 0.4% (i.e. 27 Ohms for 48-Volt phantom powering with 6.8 kOhm). This close matching is necessary to maintain adequate impedance balance for the sake of common mode rejection. It also avoids the flow of

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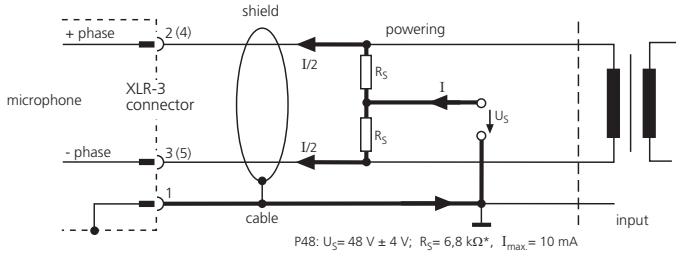

Fig. 2
input with transformer (or balanced, ungrounded transformerless input)

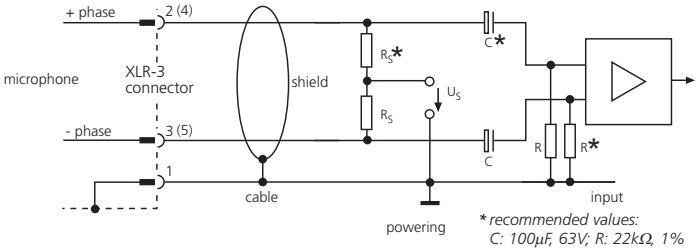

Fig. 3
balanced, ungrounded, transformerless input. Condensers must be inserted into the circuit and provision made for polarization resistors.

DC in an input transformer should one be present, which could lead to distortion or a reduced dynamic range.

A microphone designed for 48 V phantom powering could draw as much as 10 mA according to the standard; the SCHOEPS MSTC 64 Ug will draw about 4 mA. This falls well within the limit set by the prevailing standard. There are certain commercially available power supplies, preamplifiers, and mixing desks – mostly older, but some more recent – which fail to meet this standard and hence may not be able to power SCHOEPS microphones adequately.

If in doubt, equipment should be checked to verify its suitability for professional work with SCHOEPS microphones. On page 16 a method is described for checking a phantom supply quickly and easily.

For P12 the standard allows a current of 15 mA. The SCHOEPS CCM will draw 4 mA.

Fig. 2 shows a balanced but grounded amplifier input. In this case either a transformer (see Fig. 1) or additional capacitors have to be inserted into the audio line.

Unbalanced Operation

Our microphones are intended for balanced operation such as with the VMS 5 U preamplifier from SCHOEPS, which is why they should be operated with balanced inputs. Otherwise the vulnerability to interference would be increased. However some equipment only has unbalanced inputs in which case an unbalanced input should be balanced with a high-quality microphone input transformer. This will allow the signal leads from the microphone to be kept balanced, for best rejection of interference.

If such an arrangement is not possible, however, an MSTC 64 microphone may be operated in unbalanced mode by taking the signal from pin 2(4) via a coupling condenser with a value as shown in Fig. 2 above. The signal from pin 3(5) should be left unconnected; do not short it to

ground. This "unbalancing act" must occur between the power supply and the preamplifier input, however, since naturally all three pins of the microphone must still connect to its phantom or parallel power supply.

Simultaneous Connection to Multiple Inputs

If a microphone has to be connected to multiple inputs simultaneously, an active microphone splitter should be used in order to preserve the loading and powering conditions for the microphone, and to prevent interference.

Maximum Cable Length

With the MSTC 64, cable lengths of several hundred meters are possible. The practical limit depends on the electrical capacitance of the cable, which is sometimes an unknown quantity. The lower this capacitance is per unit length, the longer the cable can be. All **SCHOEPS** cables have very low capacitance (100 pF/m between the conductors).

The main risks with excessively long microphone cables are losses at high frequencies due to cable capacitance, reduced ability to handle very high sound pressure levels, and increased likelihood of picking up interference.

Hints on Avoiding Interference

Due to the wide dynamic range of studio microphones, the smallest signal amplitudes are in the microvolt range (1/1,000,000 Volt). Cable shielding and the grounding scheme of the preamp or mixer input are also crucial. A microphone can therefore never be expected to be immune to all possible disturbances in all circumstances, but the following suggestions can help to reduce possible noise induction:

1) Keep both the microphone and the cable away from sources of interference such as monitors, digital equipment (computers), RF emitters (mobile phones and other personal communication devices that emit radio frequency energy), power transformers, power lines, SCR dimmers, switching power supplies etc.
2) Use only high-quality cables with a high degree of shield coverage.
3) Keep all cables as short as possible.
4) Dress audio cables away from power cables. If they must cross, it should be at right angles.
5) At the preamp or mixer input, the shield of the microphone cable should connect to chassis ground in the shortest way possible. If necessary, this coupling can be capacitive.

Wind Noise and Windscreens

Air motion (wind or air currents due to heating or air conditioning systems) can cause noise that should always be dealt with. Even if it doesn't cause overload, it will detract from the clarity of sound. A wind or pop screen should be used, but should be chosen carefully to avoid changing the microphone's characteristics too much. Many screen types which are effective at reducing wind noise also have a tendency to reduce a microphone's directionality and/or its high-frequency response. Basket-type windscreens are generally more effective than foam-type windscreens when directional capsules are being used, and their main side effect is to create some unevenness in frequency response (see our main catalog for details).

Vibration

If noise from mechanical vibration enters a stand- or boom-mounted microphone, a shock mount (elastic suspension) should be used, and a loop of slack cable should be isolated and tied off so that it does not become another way for vibrations to reach the microphone. Unlike a wind screen, a shock mount will not affect the characteristics of a microphone. In many kinds of work it is well justified to use a shock mount "by default."

Overload

When dealing with problems of overload, it is useful to think of your recording equipment as a series of circuit stages. The goal is to find the first stage that is being overloaded, and to attenuate the signal at the input to that stage. Reducing the gain at any earlier stage would add unnecessary noise, while reducing it at a

later stage would not solve the problem.

A condenser microphone represents two circuit stages: the capsule and the amplifier. In practice, capsules are rarely overloaded except by explosions or very strong wind; the only sound pressure levels that could overload a **SCHOEPS** capsule are so extreme – ca. 150 dB SPL – that they would quickly damage human hearing. A properly powered **SCHOEPS** MSTC 64 can normally handle 130+ dB sound pressure levels, depending on the capsule type. Such levels rarely occur in unamplified sound, though their equivalents can be caused by wind when directional capsules are used, just as with the MSTC 64. In addition, proper powering should not be taken for granted; insufficient or incorrect microphone powering has proved to be the cause of many otherwise mysterious "overload" problems.

If wind and powering can be excluded as possible issues, however, overload is far more likely to occur in the input circuitry of mixers, preamps or recorders than in the microphone. This is true particularly with consumer audio equipment, though even today some professional equipment is still designed primarily for use with dynamic microphones or with earlier, less sensitive condenser microphones. If an input sensitivity control is available, it should be set low enough to avoid input overload, but not so low as to cause excess noise – though a few dB of extra hiss is preferable to the risk of hard clipping. Level meters and overload indicators don't generally detect input overload even in fully professional equipment; they operate only at later stages of the circuitry.

If overload occurs where powering, high sound pressure levels and wind are not the problem and an input sensitivity control cannot be turned down, the next logical step is to plug in a balanced resistive "pad" (attenuator) such as the **SCHOEPS** MDZ 10 or MDZ 20 at the preamp input. If the sound quality improves, leave the pad in place; as long as a microphone isn't being overloaded, it is always better to pad the preamp input than the microphone.

Low-frequency disturbances such as wind and solid-borne vibration may not be directly audible as such, but infrasonic noise can still cause overload in some stage of the signal chain. A windscreen then becomes the first line of defense. But low-frequency noise can also be effectively suppressed the active low-cut filters LC 60 or LC 120 which can be placed at the input of a phantom-powered preamp.

Overload which does not otherwise seem to make sense may actually be a symptom of incorrect or inadequate microphone powering. Powering systems and their requirements are discussed near the beginning of this manual on page 5.

The least expensive, most helpful troubleshooting tools are:

– a known good microphone cable
– a simple pop screen such as the **SCHOEPS** B 5 (or for outdoor recording, a wind screen such as the **SCHOEPS** W 5)
– a balanced, in-line resistive attenuator ("pad") such as the **SCHOEPS** MDZ 10 or MDZ 20
– an ordinary multimeter or the **SCHOEPS** PHS 48 phantom power tester

Care and Maintenance

Please take care to avoid placing the microphone in a dusty environment. Keep it in its case (e.g. the wood carrying case it comes with) when not in use, since any dust that gets inside the capsules can adversely affect their functioning. Dust can affect the microphone in the following way: In combination with humidity it can lead to condensation and thus popping and crackling noises (often described as "frying sounds").

What to do if ...
the microphone is noisy (clicks and pops) in high humidity?

– If the microphone is brought from the cold outdoors into a warm environment, snapping or clicking noises can result from the condensation of moisture. In such a case the

microphone should be given time to reach room temperature, and as a rule it will then perform flawlessly.

– Sometimes dirt can get into the contacts where the capsules are attached; this, too, can cause impulse noise. You can clean the contacts yourself by using compressed air (without lubricant) from an aerosol can. If that doesn't help, you can scrub them with a new, clean toothbrush dipped in isopropyl alcohol, holding the microphone so that the contacts face downward. Shake off any extra fluid; under no circumstances can it be allowed to flow into the amplifier! Be careful to wipe the contacts dry.

If this treatment does not eliminate the noise, it is possible that dirt has gotten inside the capsule itself – in which case the capsule must be sent back to the factory for cleaning. We strongly urge customers not to open a capsule or attempt to clean it themselves. Doing so would also void all warranties. Neither should the contact rings of a capsule be cleaned with any kind of liquid. Windscreens are recommended when microphones have to be used in dirty or dusty environments in order to avoid problems of the kind described above.

Technical Specifications

MSTC 64 Ug with a pair of MK 4g capsules (cardioids), measured on the axis of the capsules:

Recording angle+: ca. 95°
Frequency range: 40 Hz – 20 kHz
Sensitivity: 13 mV/Pa
Equivalent noise level, A-weighted*: 15 dB-A
Equivalent noise level, CCIR**: 24 dB
Signal-to-noise ratio, A-weighted*: 79 dB-A
Maximum SPL for 0.5% THD:
  at 48 V: 132 dB-SPL
  at 12 V: 128 dB-SPL
Output voltage at maximum SPL: 1V
Source impedance: 35 Ohm
Minimum recommended load: 600 Ohm
Powering: 12 V ± 1 V or 48 V ± 4 V phantom
Current consumption per channel:
  4 mA, independent of the supply voltage
Weight: ca. 230 g

\+ *This is the range within which the sound sources should be placed, as "seen" by the microphone.*

* *IEC 61672-1*

** *IEC 60268-1*

SCHOEPS GmbH · Spitalstr. 20 · D-76227 Karlsruhe (Durlach) · Tel: +49 721 943 20-0 · Fax: +49 721 943 2050
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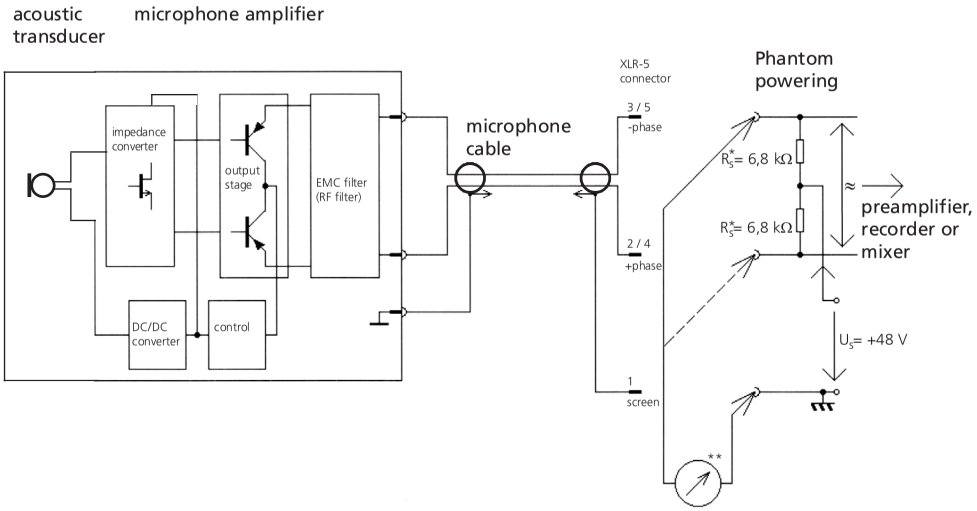
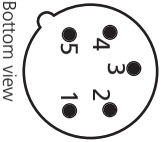


Pin assignment of the XLR-5 output connector:

Pin 1: screen (GND)
Pin 2: +phase left channel
Pin 3: –phase left channel
Pin 4: +phase right channel
Pin 5: –phase right channel



Bottom view
(as the pins are seen)

+Phase: An excursion of the diaphragm towards the back electrode (positive pressure phase) leads to a positive signal at this pin.

*matched pair; see page 11

** Here are three simple methods for verifying correct phantom powering. These measurements should be made at an unused input. Reduce the channel gain to protect loudspeakers, etc. If microphones are connected to other inputs at the same time, no substantial difference should occur in the results.

1. Measure the open-circuit voltage between ground (pin 1) and either pin 2(4) or pin 3(5) of the XLR input. Given the permitted tolerances, this voltage should be between 44 and 52 VDC for P48, and between 11 and 13 VDC for P12. Then, measure the short-circuit current between ground (pin 1) and either pin 2(4) or pin 3(5) of the XLR input. Given the permitted tolerances, this current should be between 5.9 and 8.5 mA DC for P48, and between 15 and 21 mA DC for P12.

Note: Well-designed phantom power supplies must tolerate at least a temporary short circuit without damage; an unbalanced connection (which is occasionally necessary) would cause the same current to be drawn. To be safe, however, don't leave the short circuit in place longer than necessary.

2) Measure the DC voltages on the modulation leads with a microphone connected, e.g. by opening the connector shell of the cable. The two voltages (from pin 2(4) and pin 3(5) to pin 1) must be identical. With an MSTC 64 U and a 48-Volt supply, they should be about 34 Volts (minimum = 30 Volts). For P12 this is 10.6 Volts (minimum 9.6 Volts).

3) For P48, use a **SCHOEPS** PHS 48 tester. Plug it in to the XLR input socket; if the LED glows and stays lit, all is well.

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SCHOEPS Mikrofone

Warranty

We guarantee our products for a period of twenty-four months, except for batteries. The guarantee period begins on the date of purchase.

Please provide your bill of sale in all cases as proof of guarantee; without it, repairs will be undertaken only at the owner's expense. We reserve the right to satisfy all warranty requirements regarding defects of workmanship or materials by means of repair or partial or complete replacement of the product, at our sole discretion.

Excluded from this guarantee are defects due to misuse (e.g. incorrect operation; mechanical damage), abuse or "Acts of God." This guarantee is nullified in the event of tampering by unauthorized persons or agencies.

To secure your rights under this guarantee, send the product with proof of purchase and a precise description of the malfunction, at your expense, either to **SCHOEPS** (if you are a customer in Germany), or to our representative (if you are a customer outside of Germany).

Prior to sending your defective product for repair, please contact your local dealer or distributor for instructions. In exceptional cases you can, by prior arrangement with **SCHOEPS**, send the product directly to us from a foreign country. However any return shipment must then be prepaid; this tends to cause delays, especially for non-warranty service. Full payment must be made before a repaired item can be returned to the customer.

This guarantee does not affect any contractual agreements which may exist between the buyer and seller of the equipment.

This guarantee is world-wide.

Declaration of Conformity – CE-Mark

The CE-mark guarantees that all products conform to relevant standards approved by the European Community. The products described in this User Guide comply with current, relevant standards when used with cables from **SCHOEPS**.

Relevant directives:
EMC Directive 2014/30/EU

Relevant standards:
EN 55 103-1, -2 and those which are referred to by them.We guarantee our products for a period of twen

Änderungen und Irrtümer vorbehalten.

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SCHOEPS GmbH
Spitalstr. 20
D-76227 Karlsruhe (Durlach)

Tel: +49 721 943 20-0
Fax: +49 721 943 2050

www.schoeps.de
mailbox@schoeps.de

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