VMS 5 U
User's Manual

Microphone preamplifier with phantom powering,
M/S matrix and headphone output,

with special input for Schoeps active Y-cable

Table of contents

Control layouts:

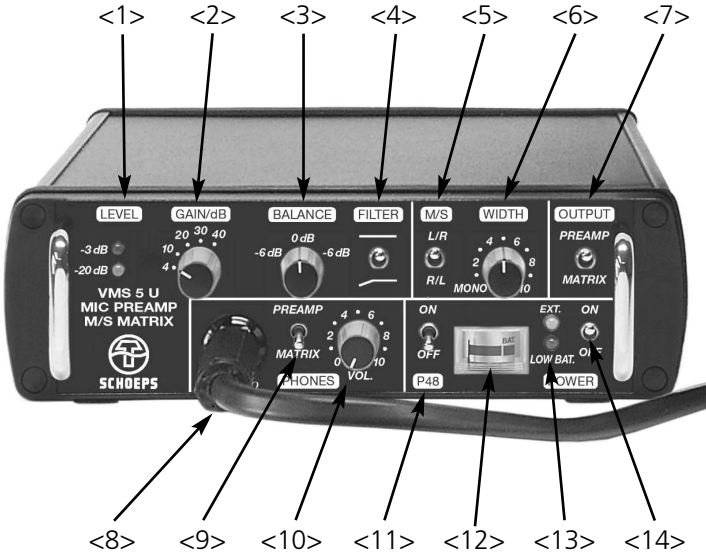
Front:

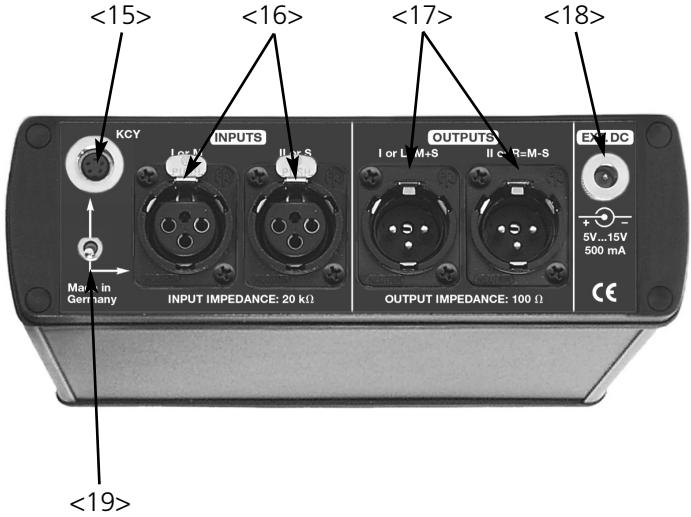
<1> Signal level indicators
<2> Preamp gain control
<3> Left/Right balance control
<4> Switch for low-cut filter
<5> Channel assignment switch (for M/S)
<6> Stereo width control (for M/S)
<7> Main output selector
<8> Headphone jack
<9> Headphone output selector
<10> Headphone level control
<11> Phantom power switch
<12> Battery level meter
<13> External power indicator (yellow); low-battery warning (red)
<14> On/Off switch

Rear, as seen from above*:

<15> Input for SCHOEPS active Y-cable
<16> Balanced XLR microphone inputs
<17> Balanced XLR line outputs
<18> Input for external power supply
<19> Input selector switch

* The connectors and labels on the rear of the VMS 5 U are "upside-down" with respect to the front of the unit. This simplifies its use, since the unit does not need to be turned around sideways to read the labels.


<1>
<2>
<3>
<4>
<5>
<6>
<7>
LEVEL
GAIN/dB
BALANCE
FILTER
M/S
WIDTH
OUTPUT
-3 dB
-20 dB
20 30 40
10
4
0 dB
-6 dB
-6 dB
L/R
R/L
4 6
2 8
MONO 10
PREAMP
MATRIX
VMS 5 U
MIC PREAMP
M/S MATRIX
SCHOEPS
PREAMP
MATRIX
4 6
2 8
0 10
VOL.
PHONES
ON
OFF
P48
EXT.
LOW BAT.
ON
POWER
<8>
<9>
<10>
<11>
<12>
<13>
<14>


<15>
<16>
<17>
<18>
KCY
INPUTS
I or L
II or S
OUTPUTS
I or L=M+S
II or R=M-S
EXT. DC
5V...15V
500 mA
Made in
Germany
INPUT IMPEDANCE: 20 kΩ
OUTPUT IMPEDANCE: 100 Ω
CE
<19>

The VMS 5 U is designed for indoor and outdoor professional recording applications. Its features include:

– 48 Volt phantom powering
– Special input for SCHOEPS active Y-cable
– Switchable M/S matrix
– Frequency range: 20 Hz - 80 kHz (-3 dB)
– Headphone output, switchable (before or after the M/S matrix)
– Can be operated from internal batteries or external power
– Automatic "glitch-free" switchover to battery powering if the AC supply is interrupted
– Rechargeable batteries are automatically protected from extreme discharge
– Durable, high-quality switches and connectors (gold-plated contacts)
– Lightweight, robust all-metal housing

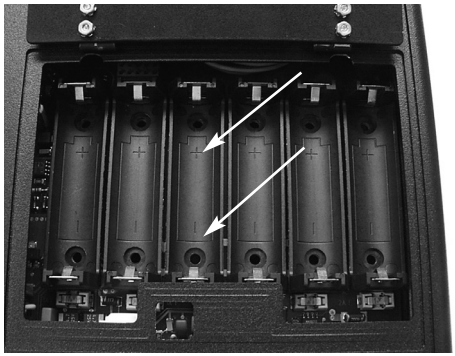
1. Inserting batteries

The VMS 5 U operates from six AA (LR 6) cells (included). Primary cells (preferably alkaline) can be used, or rechargeables such as NiCd or NiMH.

To insert batteries, turn the unit off and open the battery compartment on the underside by turning the slotted button in the lid (perhaps with the aid of a coin) one quarter turn in either direction.

Please note:

The orientation of the batteries is shown on the battery holders:



All batteries must go in the same direction!

Make sure that the battery contacts are kept clean. If necessary, clean the contacts with a pencil eraser.

After inserting batteries, close the battery compartment lid and lock it by turning the slotted button a quarter turn in either direction until it clicks into place.

When the unit is first turned on, there will be a four- to five-second delay before it is ready for use. This is necessary so that the unit can function reliably even with relatively low-powered AC supplies.

Watch the battery level with special care when using rechargeable batteries; as they lose their charge, their voltage will often drop off quite rapidly.

What happens if ...

... a battery is inserted the wrong way? The resulting voltage will be too low to operate the unit. If several batteries (cells) are put in backwards, an internal fuse may burn out and need replacing. An emergency replacement is provided within the unit. Both fuses (designated "2A F") are accessible within the battery compartment by using a pair of regular pliers; see the diagram on the lid of the battery compartment.

We recommend using alkaline batteries because they have the greatest capacity and the longest shelf life. Zinc-carbon batteries and rechargeable batteries (NiCd or NiMH) will not power the unit for as long a time (see "Specifications" at the end of this manual).

We strongly advise against mixing different types of batteries or batteries of differing "ages" together. Rechargeables should all be of the same type and capacity as one another; all batteries should be changed and/or charged together as a set. This is to avoid the risk of one or more cells (those of lower capacity) being too deeply discharged; even "sealed" alkaline cells can leak corrosive chemicals, while rechargeable batteries can undergo voltage reversal and be permanently damaged. Further, operation time would be reduced unnecessarily.

Though it may seem obvious that only new batteries in good condition should be used, we are obliged to warn against the use of weak or damaged batteries, to avoid harming the circuitry of the VMS 5 U.

What should be done if the unit does not work with a new set of batteries? Turn the unit off, then wait half a second and turn it back on.

If the "LOW BAT." LED lights briefly but then goes out, the batteries are simply too weak; the charge is enough to turn the unit on initially, but then an automatic shutoff takes effect.

Please note: If the unit is not used for a prolonged period, the batteries should be removed to prevent possible damage by leaking.

2. Battery level meter / LOW BAT

Powering with internal batteries / rechargeables

The battery level meter (<12> in the photo on page 3) shows the state of the internal batteries. At the start of a recording the needle should always be in the green zone of the meter. If it is

not, the batteries need to be changed, or recharged if they are NiCd/NiMH types. When running on internal batteries, the borderline between the red and green zones is at about 7 Volts; at this level the "LOW BAT" LED begins to flash. With high-capacity rechargeable batteries (1300 mAh) there should be approximately a 10-minute interval before the unit shuts itself off automatically.

External powering

When the unit is externally powered (and only then!) it is acceptable if the battery indicator <12> is in the red zone. It is calibrated for internal battery powering, and its reading will be offset slightly when external powering is used: the boundary between red and green will be at 7.5 Volts while the far end of the green region will be at 10 Volts. When the indicator is near the left end of the red region the unit will no longer function.

The "LOW BAT" LED <13> will begin to blink at around 7,5 Volts, but can be ignored with external powering.

3. Automatic shutoff

The unit will turn itself off if the voltage of the internal batteries falls beneath the limit of proper functioning. This avoids overly deep discharge of the batteries, which could otherwise lead to chemical leakage or, in the case of rechargeable batteries, life-shortening damage and possible cell reversal.

To turn the unit back on after an automatic shutoff, turn the power switch off and then on again, and/or replace the batteries as needed.

When the unit is powered externally, the automatic shutoff circuit is disabled so that a brief interruption in external power will not cause a prolonged shutdown in the absence of internal batteries. However, a minimum of 5.2 Volts (externally) must be supplied for the unit to continue operating.

4. External powering

The VMS 5 U can be powered by external batteries or AC power adapters through a socket on the back of the unit. The 5.5 mm/2.1 mm coaxial power plug is a commonly available part, and is found on AC power adapters of many kinds.

We generally recommend using the SCHOEPS mains adapter VMS 5 DC. If another type or external batteries are used, please note the following hints:

The voltage at the socket may be anywhere between 5.5 and 15.5 Volts DC.

Recommendation: voltage and current (approximate):

6 V, 500 mA
8 V, 400 mA
9 V, 350 mA
10 V, 300 mA
12 V, 300 mA
15 V, 250 mA

Note the polarity of the DC power connector: the positive pole of the power supply must be connected to the center contact of the external powering socket (<18> on page 3). The unit will not be harmed by reverse polarity, but will not operate; a protective diode will prevent current from flowing.

If a sufficient external DC voltage is connected to the external powering socket of the unit, the "EXT" LED (<13> on page 3) will light, even if the unit is turned off; it is strictly an indication of available powering, not of the unit's on/off status. In this mode of operation, any batteries inside the unit will neither be charged nor discharged.

If for any reason the external powering should drop below the minimum required voltage (e.g. loss or reduction of AC power), the unit will immediately switch over to battery power, assuming of course that batteries of sufficient voltage are in the unit; the yellow LED will then go out. This automatic switchover will occur without any disturbance in the audio signal.

The "LOW BAT" LED <13> will blink when the input voltage is less than or equal to about 7.5 Volts, but this can be ignored unless the battery indicator is at the low end of the red region.

The meter is calibrated with reference to internal batteries and will "under-read" slightly with external power sources.

If too high a voltage is applied to the external powering socket, the internal 0.5 A fast-blow fuse will burn out. It is accessible through the battery compartment; a spare fuse is provided within the unit. The locations of both the actual and the spare fuse are shown in the drawing on the inside of the battery compartment lid. A pair of regular pliers (not "needle-nose") can be used to facilitate changing the fuse.

By maintaining separate grounds for audio signals and for powering, the supply regulation circuitry of the VMS 5 U permits the sharing of a common power source with other equipment, without the risk of ground loops.

Notes on operation with an AC power supply

Any AC power supply that will deliver at least 7 V at 500 mA in actual use and an open-circuit voltage of no more than 16 V will be suitable. For example, the SCHOEPS AC power supply VMS 5 DC (input = 230 VAC, equipped with "Euro plug") delivers a stabilized 12 Volts DC.

Please note: Different countries use different AC voltages. Always make sure that your power supply is appropriate for the AC voltage where you are.

Notes on operation with external batteries

The batteries should have a nominal voltage of 6 to 12 Volts and a capacity of at least 500 mAh. A 6-Volt set of gelled lead-acid rechargeable batteries

with a capacity of 3.5 Ah can power the VMS 5 U for about 12 hours.

9-Volt transistor radio-type batteries have excessive internal resistance and insufficient capacity; they cannot be used.

Please note: When running on external batteries, during any longer pauses (or at the end of a recording) the unit should be switched off and the external batteries disconnected. Simply turning the unit off would not prevent draining the external batteries, since a residual current of about 40 mA is drawn from any external power source. And disconnecting the external power connector without switching the unit off would cause a switchover to any internal batteries, drawing the full operating current from them.

5. Connecting microphones

The VMS 5 U can be used with 48 Volt phantom powered microphones or with microphone capsules and the active Y-cable of the SCHOEPS "Colette" series. A switch (<19> on page 3) on the back of the unit selects one of these two types of inputs.

If the setting of this switch must be changed while the unit is in use, please lower the headphone volume level or remove your headphones temporarily.

Connecting 48-Volt phantom powered studio condenser microphones

For the highest-quality, lowest-noise recordings, use condenser microphones with a sensitivity of at least 8 mV/Pa.

Turn the unit off and connect the microphones to the inputs (<16> on page 3) on the back of the unit. The input selector switch <19> must be in its downward position (pointing to the words "Made in Germany"). The "P48" switch <11> must be in the "ON" position for phantom powered microphones. Then the unit can be powered on.

For ordinary stereo recordings (not M/S), channel I is usually the left channel while channel II is usually the right. For M/S recordings, the "mid" microphone (e.g. a forward-facing cardioid or supercardioid) should be connected to channel I, while the "side" (figure-8) microphone should connected to channel II.

Connecting SCHOEPS microphones with an active Y cable

If the recording environment is relatively free of interfering signals, it is also possible to use an unbalanced cable such as the SCHOEPS KCY 250/5I. An input for this type of cable is available on the back of the unit <15>.

To use this input, turn the unit off, attach the cable to the VMS 5 U and attach two SCHOEPS Colette-series capsules to the cable. The input selector switch <19> must be in the "KCY"

position. Now you can turn the unit on.

For ordinary stereo recordings (not M/S), the cable marked in red should carry the right channel signal; it should carry the signal from the "side" (figure-8) capsule in M/S recording.

6. Setting the preamp gain

When recording, the GAIN control <2> should be set as high as possible for the sake of a good signal-to-noise ratio. It is set correctly if the red LED of the signal level indicator <1> lights up only rarely and very briefly during the loudest passages to be recorded. Setting the gain any higher will pose a danger of overload distortion.

When using the VMS 5 U for dematrixing after recording, the GAIN control should be set to 4 or 10 dB again by observing the yellow and red LEDs.

Please note: Phantom power should be turned off when dematrixing after recording. Please remove headphones or turn the headphone volume control to its lowest setting when turning off phantom powering.

7. Balance setting

To compensate for a possible difference in the sensitivity of the microphones, the Balance knob <3> can be used to adjust the relative gain of the two channels. When microphones of equal sensitivity are used, the balance control should normally remain at its center detent setting.

In M/S recording, the Balance setting controls the ratio of mid to side signal and thus will affect the stereo image width and the maximum recording angle.

8. Signal level indicators

The two LEDs <1> serve as a rough indication of signal levels; they always indicate the higher level of the two channels. The yellow LED can and should be lit very frequently, but if the red LED is lit at all it should be seldom and only quite briefly.

9. Low-cut filter

A 20 Hz high-pass filter with a slope of 18 dB/octave is active at all times. It suppresses infrasonic interference, but is otherwise nearly inaudible in its effect.

An additional, "soft" low-cut filter (150 Hz, 6 dB/octave) can be activated by switching the "FILTER" toggle switch to the down position, in order to reduce wind and solid-borne noise even further, or to compensate for the bass boost which directional microphones exhibit when used close to sound sources ("proximity effect"). But this filter should be used only when needed since it has a distinctly audible effect.

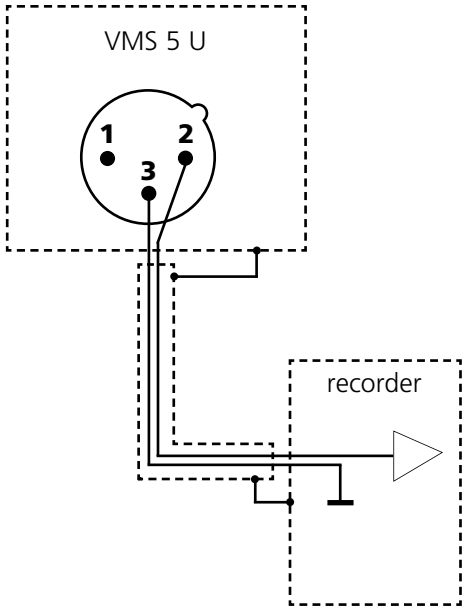
10. Connecting the outputs

For A/B, X/Y or ORTF recordings the task of the VMS 5 U is to amplify and filter the signals presented to its inputs, and to deliver the result to the outputs <17>. For this purpose the "Output" switch (<7> on page 3) must be in its "Preamp" setting.

For M/S recordings there are two possibilities. The M and S signals can be sent through the matrix and the resulting L and R signals recorded ("Output" switch in the "Matrix" position), or the M and S signals can be recorded directly, and dematrixed in subsequent playback (switch in the "Preamp" position). Dematrixed L and R signals can be monitored while the M and S signals are being recorded.

If possible, the equipment to which the main outputs of the VMS 5 U are connected should have balanced inputs for best possible rejection of hum and radio-frequency interference. Not all recorders offer balanced inputs, but with short cables (less than a few meters) this is generally not so critical. If you need to connect the output of the VMS 5 U to an unbalanced input, the best way is to connect pin 2 of the VMS 5 U's output to the "hot" contact of the input, while the shield of the cable to the recorder's inputs should be connected both to pin 1 and the housing of the XLR connector at the VMS 5 U's outputs.

With equipment whose circuit ground is not directly connected to its chassis ground, the risk of interference can be lessened by using shielded, two-conductor cable. As before, pin 2 of the VMS 5 U's output should be connected to the "hot" contact of the input, while the circuit ground will be carried by pin 3 of the output, and the cable shield will then merely connect the two component housings with one another.



Connecting the VMS 5 U to an unbalanced input

11. Connecting headphones

Any stereo headphones with an impedance of 32 to 2,000 Ohms can be connected to the headphone output of the VMS 5 U. Headphones with a miniature plug can be used with a commonly available adapter.

The headphone output is used for monitoring; a switch <9> selects either the unaltered "PREAMP" signals (e.g. for A/B, X/Y or ORTF-style recording) or the "MATRIX" outputs (left and right signals derived from an M/S recording setup).

Please note: When turning phantom power on or off, or when setting the input selector switch, please turn the headphone volume control to its minimum setting.

In the interest of hearing conservation, do not monitor at high sound levels. Prolonged listening through headphones at high levels can damage your hearing more severely than listening at what may seem like the equivalent level on loudspeakers.

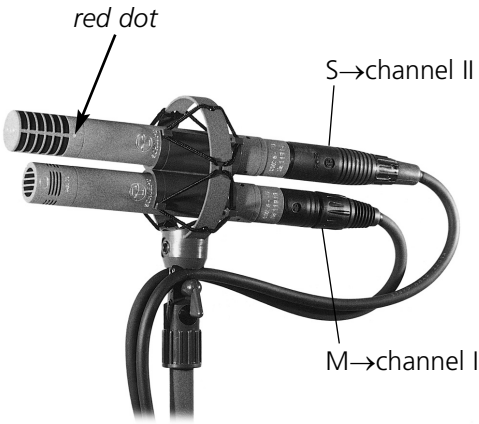
12. M/S recording / WIDTH

M/S is used primarily when recording sound for film or television, but is also useful for music recording. Its advantage is that the stereo image can be adjusted after the recording has been made, in post-production.

The principle of M/S: As with other stereo recording techniques (A/B, X/Y, ORTF, "Blumlein" etc.) two microphones are used, of which one (the "side" or "S" channel) must have a figure-8 directional pattern; the other microphone (the "mid" or "M" channel) may have any desired pattern. The two microphones are placed one directly above the other, but while the M-channel microphone is aimed at the sound source, the S-channel microphone is aimed 90° to the left (see illustration, top of page 12). Thus the two microphones do not directly pick up the left and right channel playback signals; instead, these signals are derived by means of a sum-and-difference matrix circuit such as the one in the VMS 5 U. The left channel playback signal is formed by adding M+S, while the right channel playback signal is formed by subtracting M-S. This works because the two lobes of a figure-8 microphone's pattern are in opposite polarity to one another.

The result is as if two "virtual microphones" had been aimed symmetrically with respect to the main axis of the actual M-channel microphone. The directional pattern of these "virtual microphones" depends on the actual pattern of the M-channel microphone as well as on the setting of the "WIDTH" control <6>, which determines the relative gain applied to the M and S signals fed into the matrix.

The "WIDTH" control sets the width of the stereophonic image. The useful



One possible way to set up an M/S microphone arrangement*:*
top: cardioid as M microphone
bottom: S microphone (figure-8)

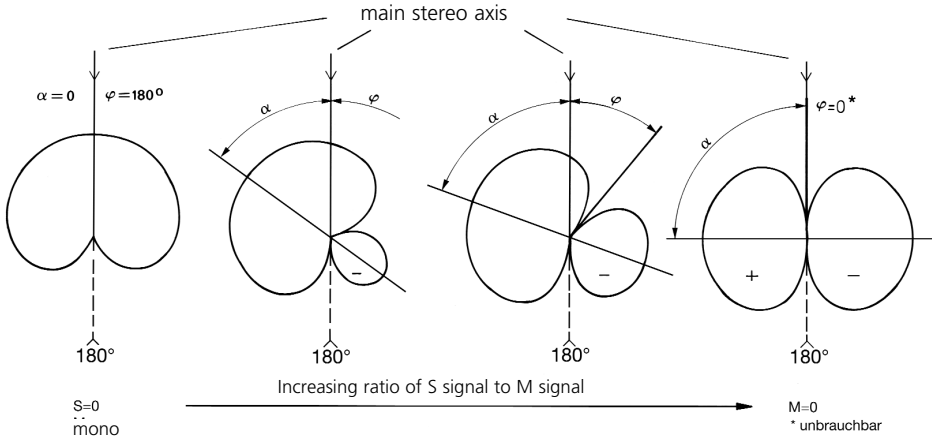
The MK 8 as viewed from the front, when the microphone is used horizontally as shown.

range of settings will depend on the type of microphone used for the M channel; the broader its directional pattern, the farther the "WIDTH" control can be turned up. This control also affects the recording angle – the widest arc, as viewed from the microphones' position, which may be picked up without creating ambiguity as to the location of sound sources. In general, the greater the directionality of the M-channel microphone, the narrower the recording angle will be (see the diagrams on the opposite page).

The farther the "WIDTH" control is turned up, the greater will be the angle between the "virtual microphones." The recording angle, on the other hand, will become narrower. Any sound sources located beyond that angle (near the edges) will be picked up out of phase, and will seem to jump over to the channel opposite from where they were in reality.

The optimal WIDTH control setting depends on the directional pattern of the microphone being used for the M channel, the relative sensitivity of the two microphones, and the recording environment. Setting "4" would be a suggested starting point.

In M/S recording, the WIDTH control and the balance setting both control the relationship of M to S, thus affecting the stereo image width and the recording angle as well. When using



"Virtual microphones" in an M/S recording, showing the left channel result (M+S) when a cardioid is used for the M-channel microphone

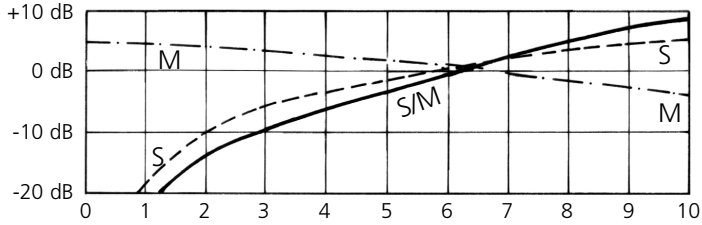
(unusable)

φ = one-half the recording angle,
α = one-half the angle between the two "virtual microphones"

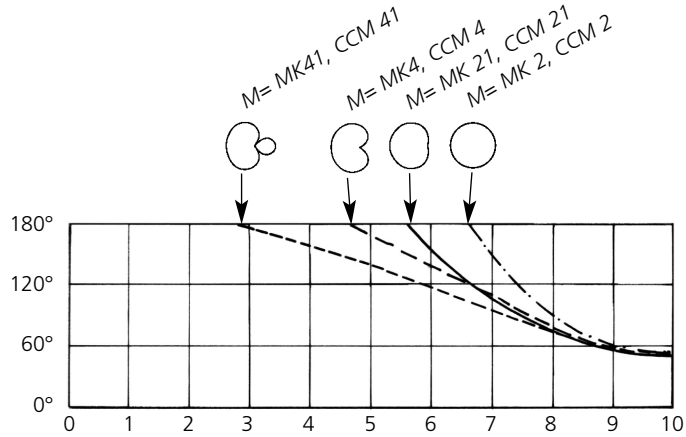
Extreme settings of the WIDTH control can lead to unexpected and possibly undesirable results. A sound source that is moving from left to right, for example, will normally be heard in a steadily decreasing degree in the left-channel output signal. But if that sound source crosses past the null in the polar diagram of the left-channel "virtual microphone" (see above), its presence in the left-channel output signal will begin to increase again. This will cause it to be located incorrectly within the stereo image. The signal will also be out of phase, which can cause further problems: in a Dolby Surround recording, for example, this sound source could be audible in the surround-channel loudspeakers.

microphones of equal sensitivity, the BALANCE knob should normally be at or near its center setting. If microphones of unequal sensitivity are used, the BALANCE control should be set so as to compensate for as much as possible of the difference; otherwise the WIDTH control may not offer a useful range of settings.

The BALANCE control is calibrated to the sensitivity of Schoeps microphones, with a cardioid as the "M" channel microphone of reference. When using a Schoeps super-cardioid for the "M" channel, the default setting of the BALANCE control would be 2 dB to the left of the normal center setting.



Effect of the WIDTH control on the gain applied to "M" and "S" signals



Effect of the WIDTH control on the recording angle, for various types of "M"-channel microphones

13. M/S dematrixing in post-production

If the M and S channels of an M/S recording are recorded directly, they can be dematrixed afterward by the VMS 5 U to produce left- and right-channel signals. The recorded signals can simply be fed into the inputs (with phantom power turned off!) and the OUTPUT switch set to the "MATRIX" position. The stereo image width can then be adjusted with the WIDTH control. Typically the GAIN knob <2> would be set to the 4 dB or 10 dB position.

This capability is especially valuable because monitoring a live recording over headphones may not allow the engineer to find an optimal setting for the stereo image width as it would be reproduced through loudspeakers.

In addition to experimenting with various width settings, it can sometimes be very useful to equalize the M and S channels separately. For example, boosting the frequencies below 100 Hz in the M channel prior to dematrixing can increase the sense of spaciousness in a recording without upsetting the accuracy of its overall stereo imaging (not recommended for LP recordings, or where there is excessive low-frequency noise or "room rumble").

14. M/S side inversion switch

Whenever a pair of microphones is suspended overhead, the sense of left and right can become reversed. In M/S recording with the "M/S side inversion switch" <5> the output channel assignments can be corrected if this should occur.

15. Technical Specifications

Inputs

Switchable between two XLR-3 sockets and a special input for the SCHOEPS KCY "active cable."

XLR inputs are balanced and transformerless; the 48 Volt phantom powering is switchable (for subsequent M/S dematrixing).

Input impedance: 20 kOhm

Recommended min imum sensitivity of microphones at XLR inputs: 8 mV/Pa

Maximum input level for <0.5% THD:
at 4 dB gain setting: 14 dBV ($5V_{rms}$)
at 20 dB gain setting: -2.2 dBV (780 mV_{rms})

Preamplifier gain settings: 4, 10, 20, 30 or 40 dB

Overall performance specifications of VMS 5 U with SCHOEPS CMC 64 (cardioid):

Equivalent noise level: 25,5 dB (CCIR, qps);
15 dB (A-weighted)

Maximum sound pressure level:
(at 4 or 10 dB gain): limited by CMC microphone amplifier to 132 dB
(at 20 dB gain): 130 dB
(at 30 dB gain): 120 dB
(at 40 dB gain): 109 dB

Level indicators: -20 dB, -3 dB

The "Balance" potentiometer permits compensation for differences in microphone sensitivity.

A polarity inversion switch permits rapid change of channel assignments in M/S recording.

Outputs

The outputs are impedance-balanced, transformerless and are switchable between the amplified microphone signals and the decoded M/S stereo signals.

Output impedance: 100 Ohm

Maximum output level for <0.5% THD:
18 dBV (8 V_{rms})

Recommended load impedance: 2 kOhm or greater

Headphone output

Switchable; either the amplified microphone signals (=left/right for A/B recordings, or mid/side for M/S) or the decoded M/S stereo signals can be monitored.

Headphone impedance: 32 - 2,000 Ohms

Headphone socket: ¼" stereo phone jack

Filters

An infrasonic filter (20 Hz, 18 dB/oct.) is permanently active. In addition, a low-cut filter (150 Hz, 6 dB/oct.) can be switched on.

The upper frequency limit is 80 kHz.

Powering

An internal filter/regulator circuit which generates and stabilizes the supply voltages permits a wide range of input voltages (5.5 V to 15.5 V).

Operation with internal batteries (possibly rechargeable)

Number and type of cells: 6 x AA (also called LR6)

Recommended primary cell type: Alkaline

Recommended rechargeable cell type: NiMH

A user-replaceable fuse protects against reversing the polarity of the batteries.

Battery life with alkaline cells: ca. 8.5 hours

Battery life with rechargeable batteries:
ca. 3 hours (700 mAh NiCd)
ca. 5 hours (1100 mAh NiMH)
ca. 5,5 hours (1300 mAh NiMH)

ca. 7 hours (1600 mAh NiMH)
ca. 12 hours (3400 mAh gelled lead acid battery (external))

A voltage indicator displays the battery voltage within the unit.

A warning LED will begin to blink if the voltage falls beneath a critical value (time remaining at that point with most higher-capacity rechargeable batteries: at least 10 minutes).

The unit will shut itself off automatically to help prevent damage from draining the batteries completely.

External powering

An appropriate AC power adapter is available (model VMS 5 DC). Other adapters offering a regulated output voltage of 6 Volts DC (at 500 mA) to 15 Volts DC (at 250 mA) can also be used. Under no circumstances should an open-circuit voltage of 16 V be exceeded; otherwise a fuse inside the VMS 5 U will blow. (See page 7.)

Coaxial socket, 5.5/2.1 mm diameter

Reverse polarity will not damage the unit, though it will not operate.

If external powering is present, any internal batteries are automatically disconnected (indicated by yellow LED "EXT."). This protects the batteries from being discharged unintentionally.

The battery voltage indicator displays the level of any external powering.

External powering with outboard rechargeable battery: nominal 6 – 12 V; we recommend gelled lead-acid batteries (6 V, 3400 mAh type = 12 hours of operation).

Parallel operation of a VMS 5 U along with one or more other pieces of equipment from a single power supply is generally possible, because of the internal voltage regulation.

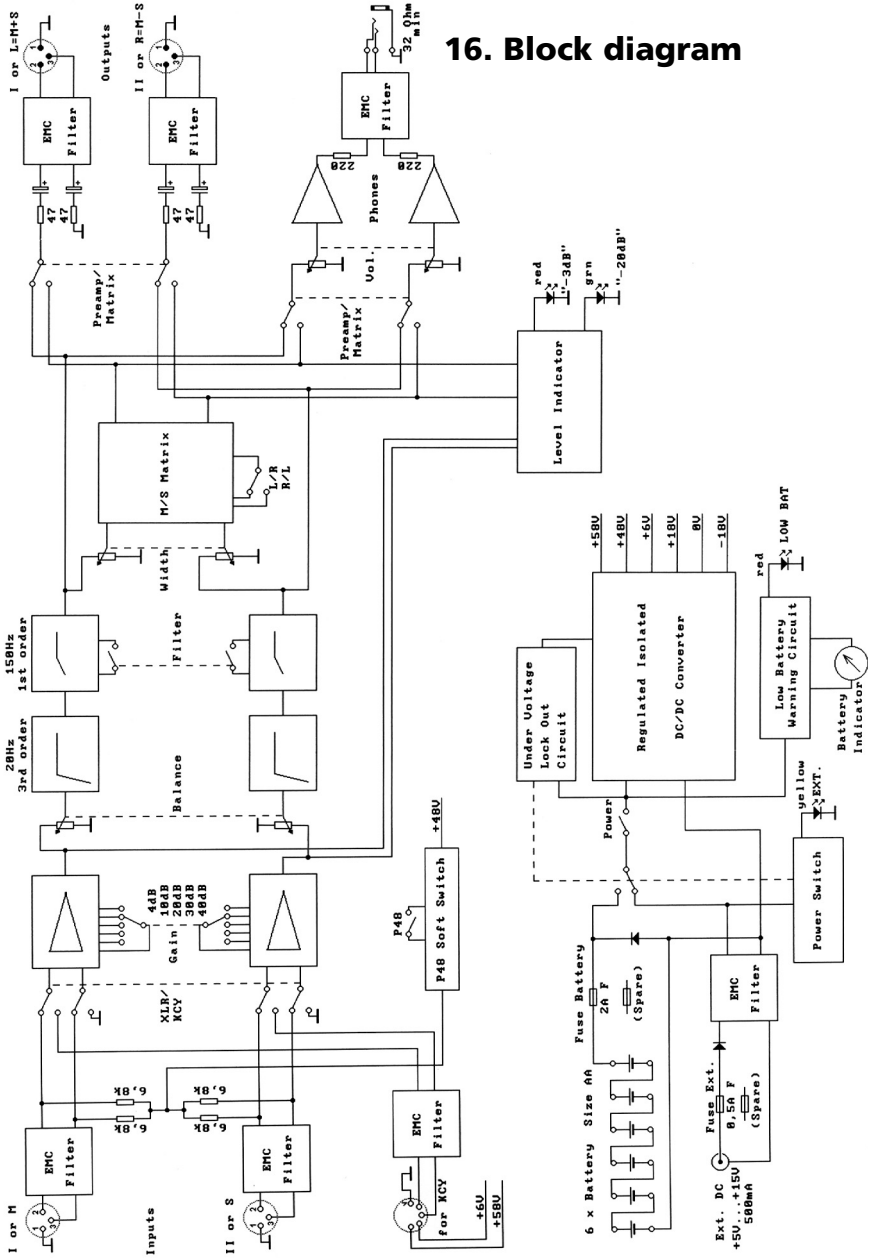
Robust, black aluminum case.

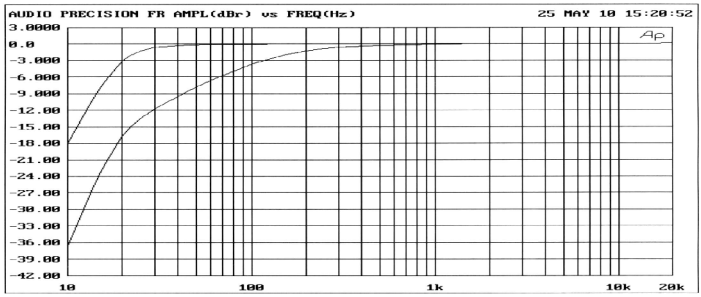
Overall measurements: (W × H × D):
162 mm × 60 mm × 172 mm
(approximately 6-2/3" × 2-1/3" × 6-3/4")

Weight (with batteries): 1.1 kg (approximately 2 lb. 7 oz.)

These specifications are subject to revision and correction without notice.

16. Block diagram





Frequency response curves: above: without low-cut filter; below: with low-cut filter

17. Important information

The VMS 5 U was designed for professional applications in indoor and outdoor recording, but should be used only in a dry place (e.g. not in the rain, since that could cause a hazardous condition for the user as a result of AC powering). Apart from that potential hazard there is also the risk of water damage to the unit itself.

Do not operate the unit in strong, direct sunlight because of the risk of overheating internal batteries. The allowable temperature range is -20° C to + 50° C.

The headphone volume levels which can be achieved with this unit can, with prolonged use, cause lasting damage to one's hearing. Please monitor only at the minimum necessary levels.

Cables: Use only shielded cable with at least 90% shield coverage. All SCHOEPS cables fullfill this requirement.

Declaration of conformity

For the VMS 5 U we herewith declare that it complies with the directive 89/336/EWG on EMC (electromagnetic compatibility) of the EC council.

This product is not subject to further directives.

For the judgement of this product in respect of EMC the following standards are applicable:
EN 55103–1, EN 55103–2

The manufacturer accepts full responsibility for this declaration.

18. Warranty

We guarantee our products for a period of twenty-four months, except for cables, batteries and cells (including rechargeable batteries and cells) and any other products of other manufacturers for which SCHOEPS is only the reseller; for these products the period of guarantee is six months. 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 unit, 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 unit with all included accessories and proof of purchase, 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).

In exceptional cases you can, by prior arrangement with SCHOEPS, send a unit directly to us from a foreign country. But since any return shipment to a foreign customer must be prepaid, this would be slower especially when the conditions for service under guarantee are not met; all payment must then be carried out before the repaired item could 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.

SCHOEPS

CE

Subject to change without notice
010102