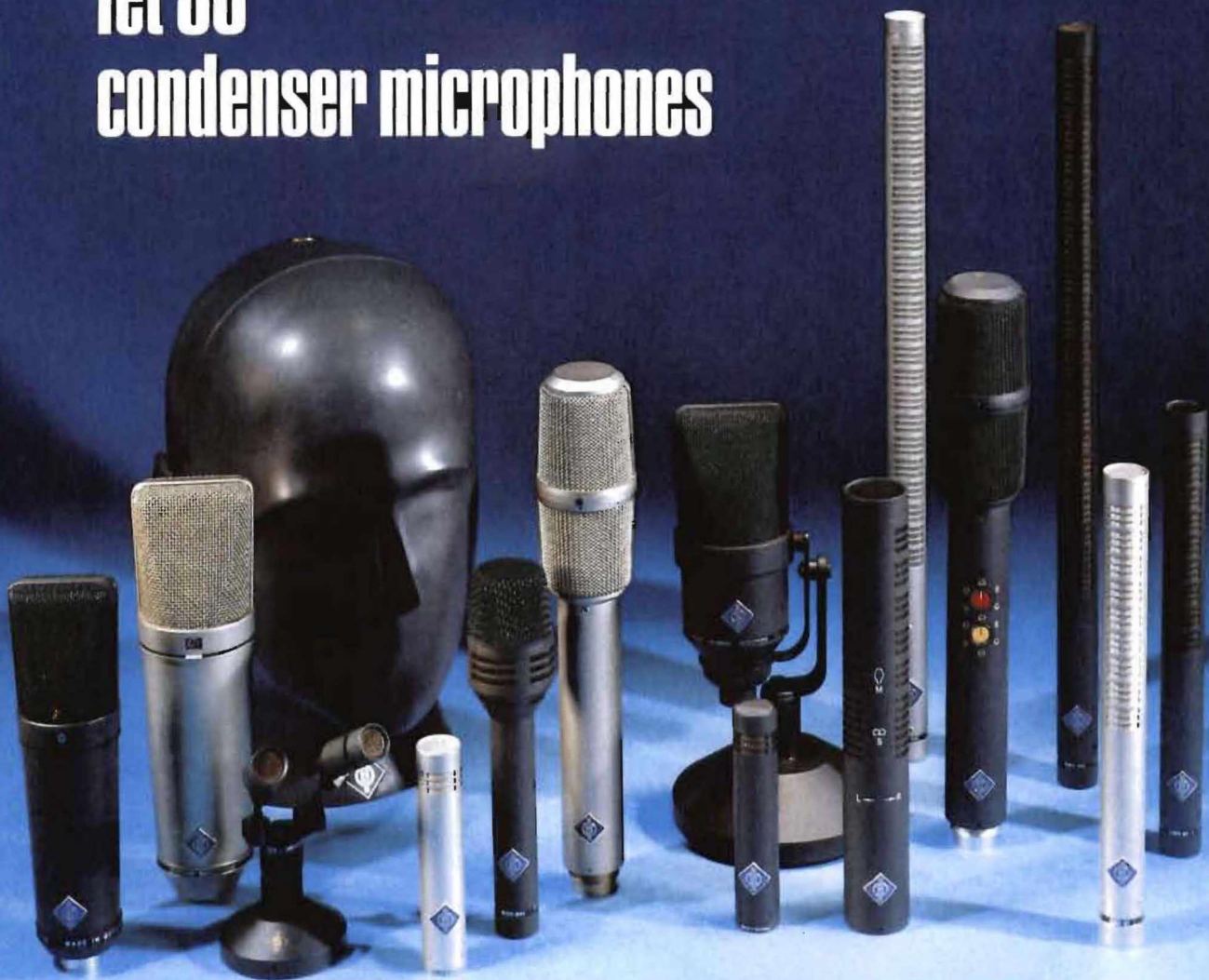


# Georg Neumann GmbH | Berlin



## fet 80<sup>®</sup> condenser microphones



### catalog 125

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# Miniature Condenser Microphones



**KM 84 i mt**

## **KM 83 i, KM 84 i, KM 85 i**

These miniature condenser microphones all have the same electronics, and are dimensionally identical but utilize three different interchangeable screw-on capsules.

The KM 83 i is an omni-directional unit, while the KM 84 i and KM 85 i are both cardioids; the KM 85 i incorporates a low frequency roll-off which reaches about 12 dB at 50 Hz. The KM 85 i is therefore much less sensitive to low frequency interference which may be encountered outdoors or in public address applications. The "linear admittance" characteristic of the KM 84 i and KM 85 i units provides for unaltered sound quality regardless of the direction from which the sound impinges on the microphone. Capsule extension tubes are available for special applications requiring particularly unobtrusive placement of the miniature microphones. The extension tubes screw into the microphone's preamplifier and accept the microphone capsule at the upper end (see Accessories, page 14).



**KMF 4 i**



### **KMF 4 i**

The KMF 4 i microphone consists of an amplifier unit and a miniature condenser microphone capsule with impedance converter connected by a cable. This capsule has a diameter of only 17 mm and may be located inconspicuously up to 5 m from its amplifier section. This creates new possibilities for the concealing of a studio quality condenser microphone for stage and television productions. By contrast to other microphones of this size, the capsule used here is a cardioid, so that the distance from the sound source may be greater than it would be for a pressure transducer.

This microphone may be combined with the small MF 2 table stand and different SG 8.1 to 8.3 connecting pieces into a very attractive table top microphone. The microphone may also be suspended from its own cable either vertically or tilted, using the MNV 8 suspension (shown), making it easy to hide it in theatrical scenery.



### **KMS 84 i**

This is a cardioid fet-80 microphone especially designed to solve the difficult problems encountered in the pick-up of high level rock music. A multistage mechanical filter in front of the condenser capsule provides unprecedented protection against popping and other explosive sounds. This, together with the elastic suspension of the capsule, provides suppression of noise so commonly found in hand held applications with rock soloists. The low frequency sensitivity can be rolled off somewhat to compensate for proximity effect (bass rise) by means of a switch.



**KMS 84 i mt**

# Condenser Shotgun Microphones



A condenser shotgun microphone is particularly recommended for use under recording conditions where microphones cannot be positioned within the desired distance of the sound source or, with video recording, when the microphone should not appear on the picture.

## **KMR 81 i**

The KMR 81 i is a condenser shotgun microphone featuring excellent directional characteristics for its relatively compact dimensions and low weight. The KMR 81 i combines a high degree of sound rejection at its sides (similar to the hypercardioid: approx. 10 dB), with the high degree of front-to-back rejection of the super-cardioid, likewise 10 dB. This principle also makes the microphone largely insensitive to wind and popping noises.

## **KMR 82 i**

The NEUMANN KMR 82 i condenser shotgun microphone is characterized by its largely frequency-independent rejection of sound incident at an angle to the microphone's axis, by its low self-noise and its good transient behaviour. Its small dimensions and lightweight construction with a favourably placed centre of gravity are made for ease of handling. The directional characteristic of the microphone is lobe-shaped.



**KMR 81 i mt**



**KMR 82 i mt**





### RSM 190 i-System

The RSM 190 MS-stereo microphone is the heart of a stereo shotgun system with variable directional characteristics, combined with high directional efficiency. Two completely separate capsule assemblies – a short shotgun and a system, with its axis at a right angle and operating in a figure-8 characteristic – provide the middle and the side information. The *TLM* transformerless circuitry provides low impedance output signals which are insensitive to the length of any connected cable.

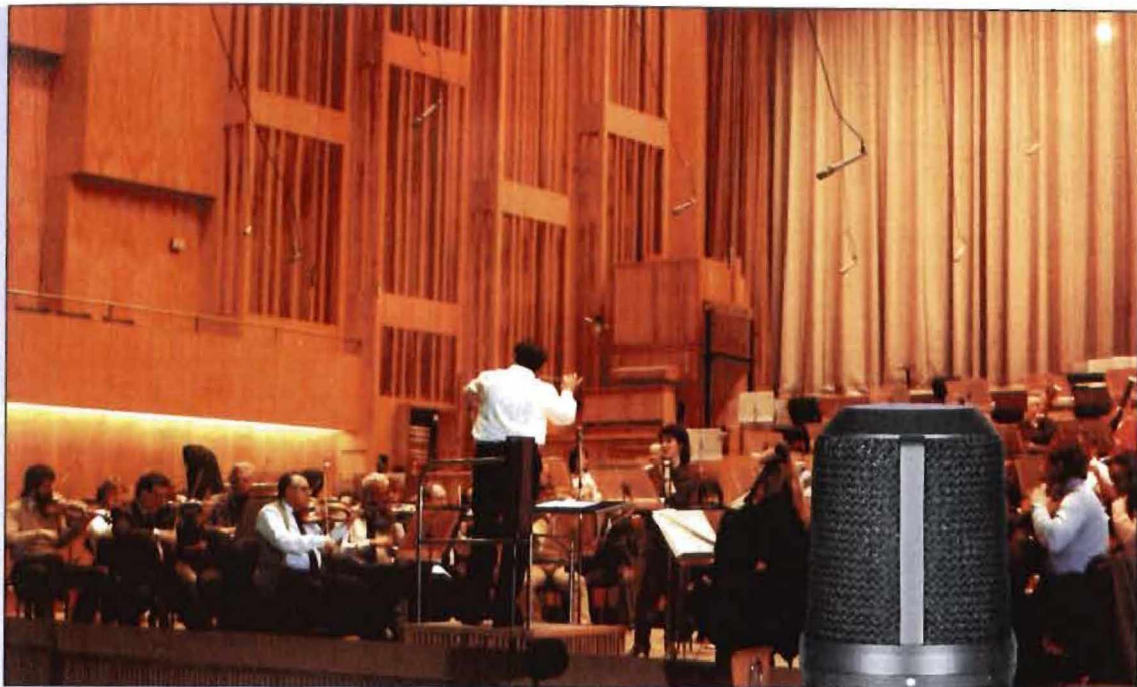
The separate MTX 190 i matrix amplifier enables gain adjustments of the side signal system relative to the middle system in six 3 dB steps. This changes the width of the stereo image. Thus the RSM 190 is the ideal microphone for stereophonic news gathering (ENG) outdoors in environments with high ambient noise levels as well as stereophonic motion picture and TV sound, concentrating or spreading the stereo image according to changes in the set. ➡➡



# Stereo Condenser Microphones



The outputs of the "two microphones" are available either as mid-side (MS) information, or can be put through the transformerless plus and minus matrix to produce left-right (XY) stereo channels. The matrix amplifier has a built-in high-pass filter with a cutoff frequency of 40 Hz. This feature allows attenuation of frequencies below the usable frequency range. Included is a locking cable (KT 3) to interconnect the microphone with the matrix amplifier and a Y-shaped adapter cable (AC 20), which feeds the output signals of the matrix amplifier (5-pin) to two typical 3-pin A3M connectors with signal I and II. The RSM 190 i-System comes in an aluminium carrying case large enough to hold the microphone mounted inside the WK 81 windshield, plus additional accessories.



### SM 69 fet

The stereo condenser microphone, SM 69 fet, consists of two completely separate and independent microphone capsule systems mounted one above the other. The upper element may be rotated up to 270° with respect to the lower. This enables the user to apply the various intensity stereo recording techniques – such as MS or XY – without the danger of arrival time (phase) differences between the systems. Both microphone systems are remote controllable. They may be switched independently of each other in 9 steps to cardioid, figure 8 and omni patterns and six characteristics in between. The microphone may also be used as two mono units; for example, when two microphones with differing directional patterns are needed in the same place. Axis of maximum sensitivity is at right angles to the microphone body.



SM 69 fet mt

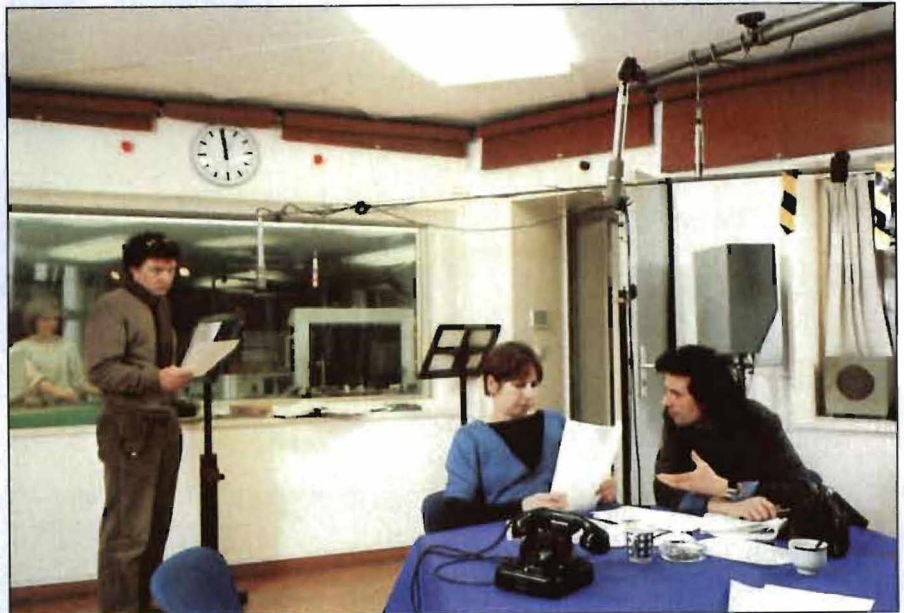
# Stereo Condenser Microphones



USM 69 i mt

## USM 69 i

The USM 69 i is a stereo microphone featuring built-in directional pattern selectors. Its acoustical characteristics are identical to those of the SM 69 fet stereo condenser microphone since the entire capsule configuration has been adopted from it in unchanged form. With the SM 69 fet the directional patterns are selected by remote control, whereas with the USM 69 i the directional patterns of the two systems are selected independently by using two rotary switches which are flushmounted in the microphone body. As a consequence, the USM 69 i may be operated using two standard 3-pole phantompowered microphone inputs. A built-in dc to dc converter generates the capsule bias required so that any of the polar patterns – omni, wide-angle cardioid, cardioid, hypercardioid and figure-8 – can be selected separately for either system. The two built-in impedance converting special-amplifiers give the USM 69 i 10 dB more head room (133 dB sound pressure level) than the SM 69 fet, thus providing the USM 69 i with a dynamic range of more than 110 dB (equivalent noise: approx. 20 dB). It can therefore pick up extremely loud sound sources at close proximity without difficulty.





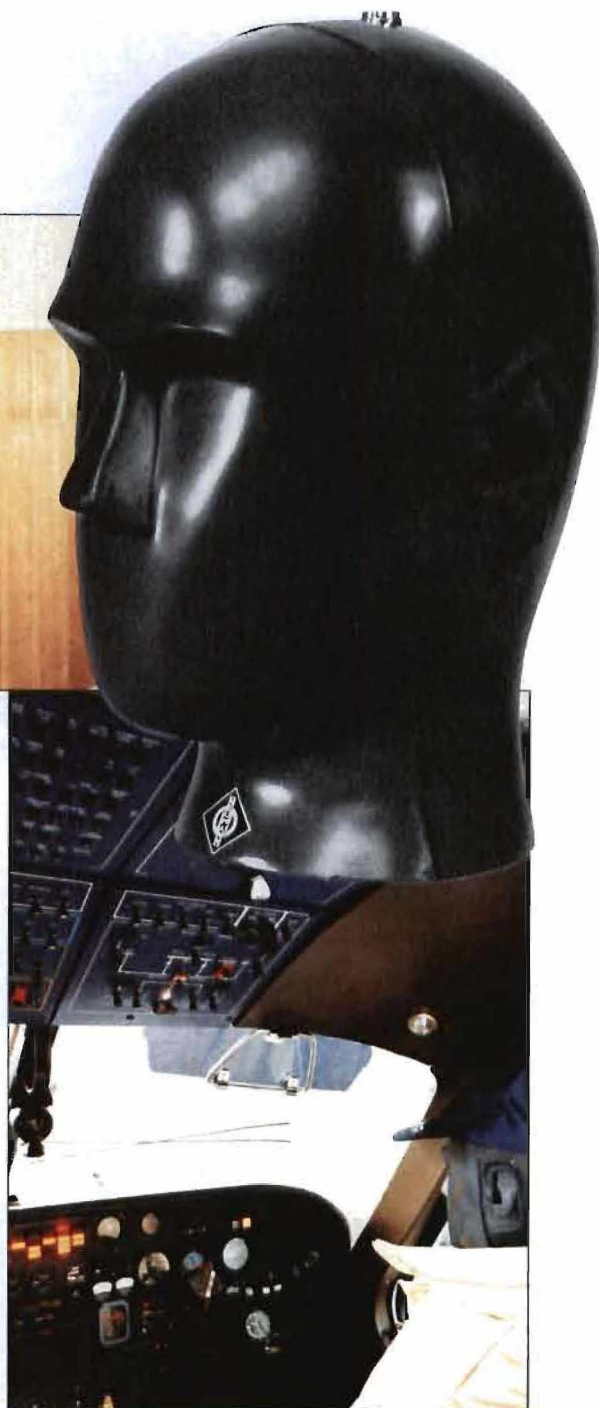


### KU 81 i

The dummy head is a replica of the human head, into which microphones have been positioned where the "ears" are normally located. Listening to the dummy head signal using high-quality headphones gives an impression very similar to that which the listener would have if he were located at the same place at which the dummy head is set up. The result is an illusion of the very presence at the place of the performance. When monitored through loudspeakers the sound impression is almost identical to the one produced by a conventional stereo microphone at the dummy head position. A more detailed reproduction of the room's depth is obtained in addition. This loudspeaker monitoring compatibility is one of the most important differences between the KU 81 i dummy head and its predecessor, the KU 80 i.

The KU 81 i dummy head is equally good for the production of impressive broadcast plays and musical recording with simultaneous acoustic ambience. The dummy head is also successfully used for the examination of the influence of noise on various work locations under precisely simulated conditions.

The KU 81 i comes with a two-channel mains/battery unit (see Electrical Accessories), connecting cables and a robust aluminium carrying case.



The KU 81 i as a "co-pilot" in a DORNIER 228

# Condenser Studio Microphones



## TLM 170 i

The TLM 170 i condenser studio microphone is provided with a transformerless circuitry. The direct, balanced signal output was achieved through the use of a completely new kind of electronic circuit, while maintaining a high degree of interference freedom and low current consumption. It has been possible to reduce significantly the self-noise level of the microphone compared to similar types. Five directional characteristics may be selected: omni, wide cardioid, cardioid, hypercardioid and figure-8. Excessive output levels, caused by high sound pressure levels, may be reduced by a 10 dB attenuation slide switch, while another switch rolls off frequencies below 100 Hz to eliminate low frequency interference. This microphone may be operated from the usual 48 V phantom powering circuits but will perform identically when operated from a 24 V phantom source as well, without the need for switchover. The TLM 170 i is equipped with a tiltable, elastically suspended mounting bracket, which isolates the microphone effectively against mechanical noise interference.



TLM 170 i mt



**U 87 Ai mt**

### **U 87 Ai**

The solid state condenser microphone model U 87 Ai is the electrically improved successor of the U 87 i, which is indeed the best known and most widely used of the fet-80 series. The dual membrane capsule uses evaporated gold on polyester film which has proven to be the most heat and aging resistant material. Three switches are provided beneath the capsule itself: for selecting the three directional characteristics, frequency response and sensitivity. Its high frequency response is practically linear even in its cardioid and figure-8 positions.

### **U 89 i**

The 89 i microphone, similar in shape but smaller than the U 87 Ai, is a studio microphone with switchable directional patterns. Its grille houses a dual-membrane capsule with a particularly linear frequency response for all polar patterns. A rotary switch beneath the grille permits selection of one of 5 directional patterns: besides the three usual ones – omni, cardioid, figure-8 – the intermediate positions "wide-angle cardioid" and "hypercardioid" are also available. This makes the U 89 i highly adaptable to both large instruments and wide sound sources and makes it suitable for distant pick-ups as well. The amplifier allows sound pressure levels of up to 134 dB to be reproduced without distortion. When the negative feedback in the first amplifier stage is switched by means of the "–6 dB" rotary switch, the boundary SPL is raised to 140 dB, more than the peak sound pressure level to be found right in front of a trumpet. A high-pass filter inserted ahead of the output transformer provides a roll-off in sensitivity at either 80 Hz or 160 Hz.



**U 89 i mt**

Type		KM 83 i	KM 84 i KM 85 i	KMS 84 i	KMF 4 i	U 89 i	U 87 Ai	TLM 170 i	RSM 190	USM 69 i	SM 69 fet	KMR 81 i	KMR 82 i	KU 81 i
Directional patterns														
Acoustic operating principle		pressure transducer	pressure gradient transducer											pressure transducer
Frequency range	Hz	40– 20.000	40– 20.000	40– 16.000	40– 20.000	40– 18.000	40– 16.000	40– 18.000	40– 18.000	40– 16.000	40– 16.000	40– 18.000	40– 20.000	40– 16.000
Sensitivity re 1 Pa <sup>1)</sup>	mV/Pa	7	10 9	5	12	8	20/28/22	8	23	13	19	18	21	10
Source impedance (balanced and floating input required)	Ω	200	200	150	150	150	200	100	50	150	200	150	150	150
Equivalent loudness level due to inherent noise	DIN 45405 (1983) CCIR 468-1 (1976) dB	31	28 29	29	29	28	26/23/25	26	M 25 S 31	24	24	23	23	29
	DIN/IEC 651 (1981) dB-A	20	17 18	18	17	17	15/12/14	14	M 16 S 22	13	13	12	12	16
S/N ratio (A weighted) re 1 Pa at 1 kHz	dB	74	77 76	76	77	77	79/76/80	80	M 78 S 72	81	81	82	82	78
Max. SPL for less than 0.5% THD <sup>2)</sup>	without dB	123	120	138	132	134	117	140	134	132	123	128	128	130
	with pre attenuation	133	130	148	142	140	127	150	144	144	132	138	138	130
Total dynamic range of the microphone amplifier <sup>3)</sup>	dB	113	113 112	120	125	123	115	126	M 128 S 122	119	110	126	116	114
Power supply + 48 ± 4 Vdc	mA	0.4	0.4	0.5	0.9	0.8	0.8	2	2 x 1.9	2 x 0.7	0.8	0.7	0.7	2 x 0.7
Weight	g	80	80	210	20/105	400	500	625	300	510	465	145	250	2700
Dimensions:	diameter	21	21	21/40	17 x 38	46	56	60	30	30/48	30/48	21	21	180
	length	110	110	177	21 x 132	185	200	152	212	292.5	260	226	395	280

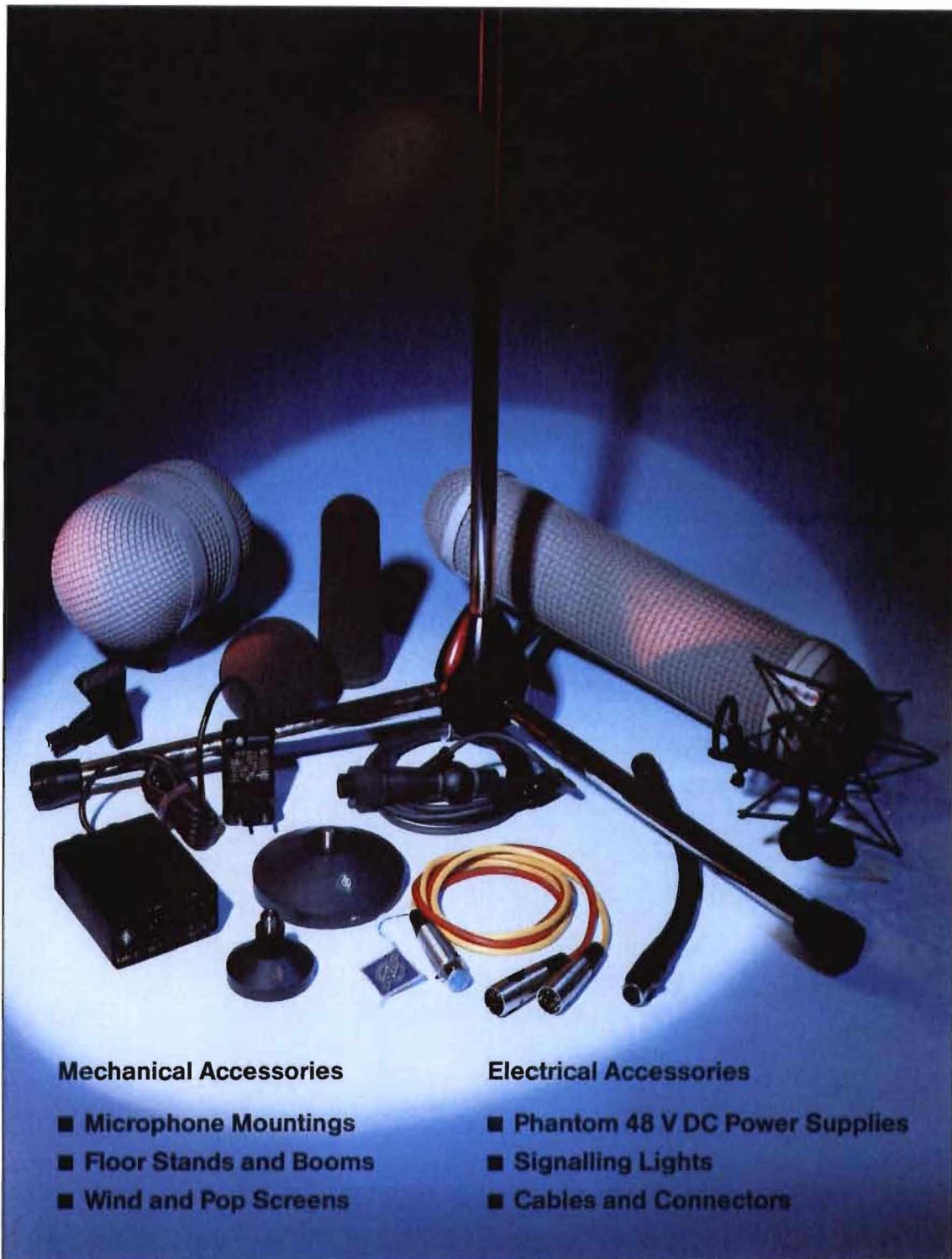
<sup>1)</sup> 1 Pa ≈ 94 dB SPL

<sup>2)</sup> THD of the microphone amplifier when an input level equivalent to the capsule output at the specified SPL is applied

<sup>3)</sup> Referred to IEC 179 weighted equivalent loudness level, with pre attenuation



# The Accessories Line



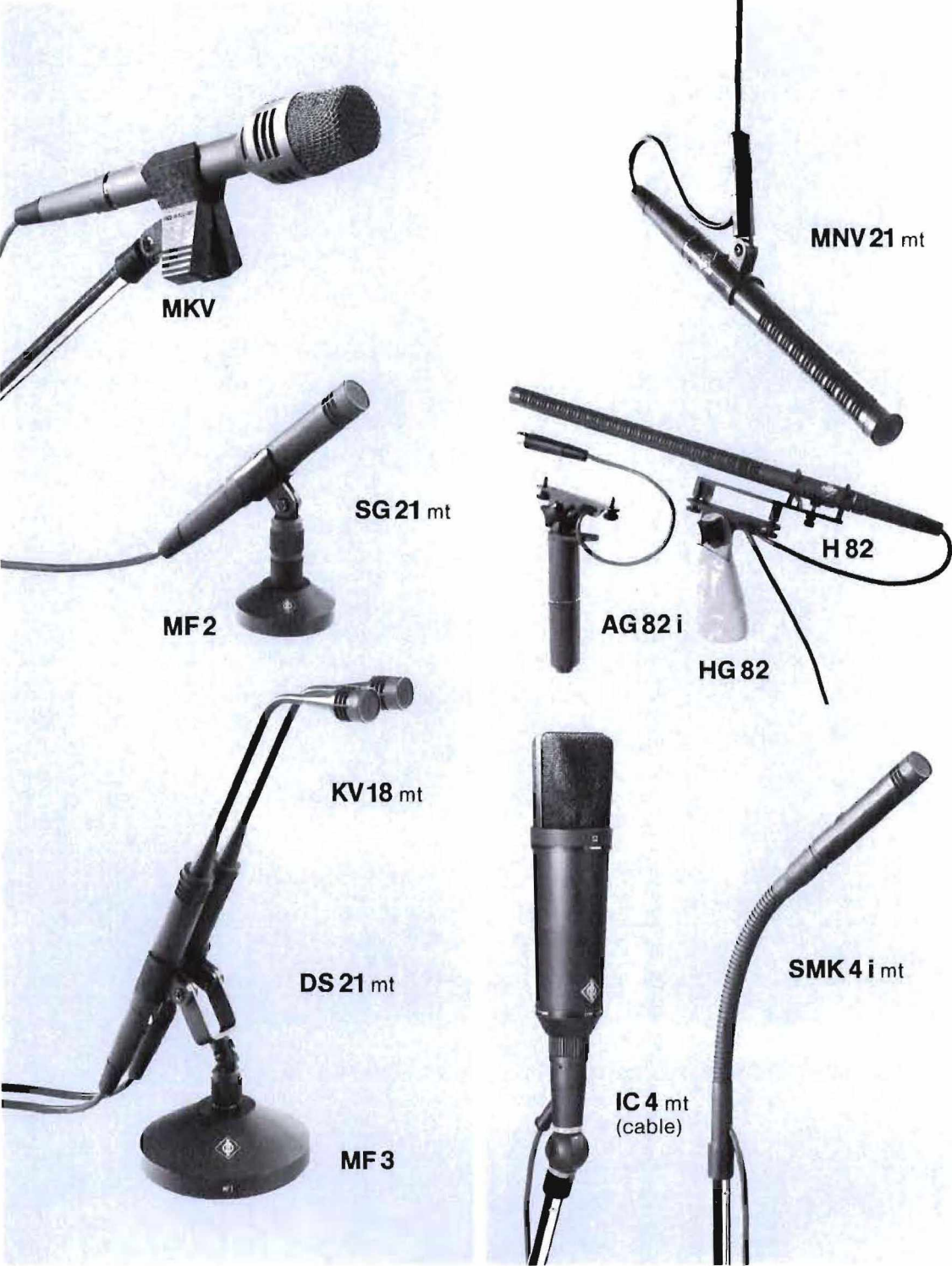
## Mechanical Accessories

- Microphone Mountings
- Floor Stands and Booms
- Wind and Pop Screens

## Electrical Accessories

- Phantom 48 V DC Power Supplies
- Signalling Lights
- Cables and Connectors

# Mechanical Accessories





### Microphone Mountings

MKV	Quick-release tilting clamp
SG 21	Swivel mount for KM mikes
DS 21	Dual microphone mount for 2 KM mikes
H 82	Mounting bracket for KMR mikes
HG 82	Handle
AG 82 i	Active handle
SG 82	Swivel mount
	} fitting H 82, EA 82, EA 30 B mt
SG 367*	Swivel mount for U 87 Ai mikes
SG 389*	Swivel mount for U 89 i mikes
SMK 4 i	Gooseneck with XLR 3 F connector, XLR 3 M cable and inside thread
AV 01	Locking interlink for KM mikes

### Elastic Suspensions

EA 30 A	for SM 69 fet and USM 69 i
EA 30 B mt	for RSM 190 (fitting into WK 81)
EA 170	for TLM 170 i
EA 21*	for all KM and KMR 81 i mikes
EA 82*	for KMR mikes (fitting into WK 81/82)
EA 89 i*	for U 89 i
Z 48*	for U 87 Ai
MNV 21	Auditorium hanger for all KM mikes
MNV 87	Auditorium hanger for cables with swivel mount

### Capsule Extension Tubes

for KM 83 i/84 i/85 i	
Straight:	KV 40*
Bent:	KV 18, KV 38*, KV 58* (20, 40, 60 cm)

### Table Stands

MF 2	∅ 60 mm with shock absorber
MF 3	∅ 110 mm

\*) not shown

# Mechanical Accessories



**MA** Telescoping "fishpole"  
 Type 005: Aluminium, 1.295/3.145 m, 1100 g  
 Type 006: Carbon- and glass fibre,  
 1.25/4.21 m, 500 g



**M 184**

Studio boom  
 Max. height 4.5 m  
 Max. extension 2.9 m  
 Weight 60 kg



**M 210**

Floor stand with  
 boom attachment  
 Height 0.9-1.6 m  
 Extension up to 0.7 m  
 Weight 5.5 kg



**M 31**

Tube shock mounted  
 Height 1.1-1.8 m  
 Weight 4 kg

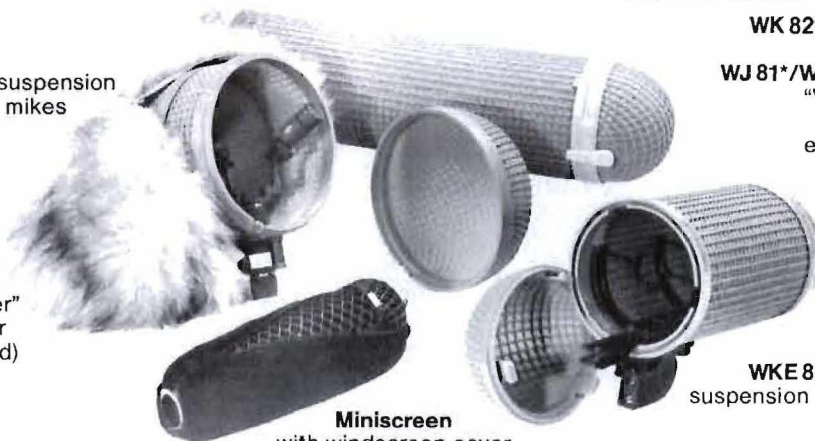




## Wind and Pop Screens

**WKE 4**  
with elastic suspension  
for 2 KMF 4 i mikes

**WJ 4**  
"Windjammer"  
(fur cover for  
extreme wind)



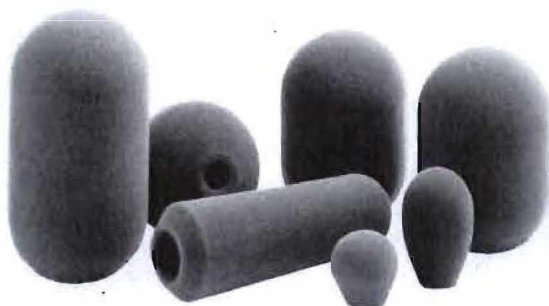
**Miniscreen**  
with windscreen cover  
for KMR 81i

**WK 81** for KMR 81i and RSM 190

**WK 82\*** for KMR 82 i

**WJ 81\*/WJ 82\*/WJ 84\***  
"Windjammer"  
(fur cover for  
extreme wind)

**WKE 84** with elastic  
suspension for KM mikes



- WNS 21** Pop screen for  
KM 83 i, 84 i, 85 i  
available in grey, blue, red,  
green, yellow
- WS 17** Wind screen for KMF 4 i
- WS 21** Wind screen for KM 83 i, 84 i,  
85 i
- WS 69** Wind screen for SM 69 fet and  
USM 69 i
- WS 81** Wind screen for KMR 81i
- WS 82** Wind screen for KMR 82 i
- WS 87** Wind screen für U 87 Ai
- WS 89** Wind screen for U 89 i
- WSR 30** Wind screen for RSM 190



Every KMR mike comes  
with a leather-made quiver  
and a wind screen



### Jewellers cases

Jewellers cases with insert and metal  
look are available for all microphones.

\*) not shown

# Electrical Accessories

## V442 (A) Isolation Amplifier

It is an important feature of the microphone isolation amplifier that it provides electrical isolation of the inputs against one another as well as against the outputs, to which the operating ground of a mixing console may be connected.

This measure is necessary to prevent possible voltage differences between the microphones and the electronic musical equipment used by musicians.

The 48 V phantom powering required by condenser microphones is generated separately for each input. Each of these inputs may be switched to mike or line level.

There are four identical outputs associated with each input.

Available Versions:

- V442 portable, rugged instrument case; outputs at D3M Switchcraft connectors.
- V442 A 19"-version for rack mounting; outputs at 30-pole male multi-connector strips. Inputs additional at a rear 30-pole female multiconnector strip.

Special versions on request.



## Phantom 48 VDC Power Supplies

The new N 48 i-2 mains power supply unit is suitable for the phantom powering of one or two microphones at 48 V and a maximum current of 6 mA per channel. The microphones are connected to two XLR box-mounted receptacles (3F).

The output signals are routed DC-free to two XLR box-mounted receptacles (3M). This enables unsymmetrical inputs to be used without any circuit modifications or the use of a transformer, in addition to the symmetrical arrangements usual in studio operation.

A separate plug-in mains unit and a newly developed converter circuit of the hybrid type – also used with the battery-operated models – result in extremely compact dimensions.

The new BS 48 i and BS 48 i-2 battery units require only one 9 V battery type IEC 6 F 22 to deliver same output data as the mains power supply unit. The two-channel battery unit is provided with two 5-pin XLR box-mounted receptacles.

Both battery power units are supplied with self-adhesive rubber feet and a self-adhesive belt fastener made of leather.



N 48 i-2



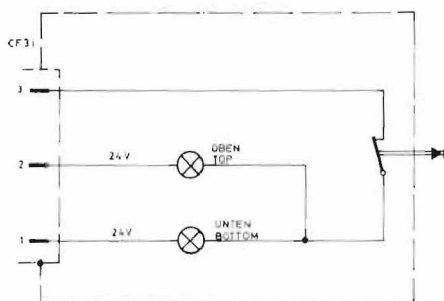
BS 48 i

## CF3 i and CF35 i Signalling Lights

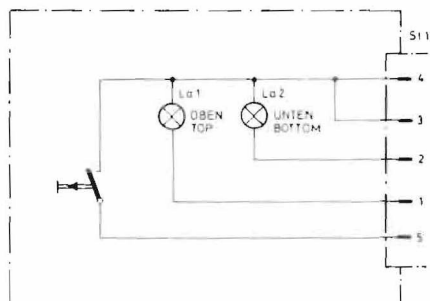
Light signalling units are available for communication between the control room and the recording studio which allow two separate colored light signals to be given. These units have an answer back button which opens the circuit as in the CF3 i, so that all lamps are turned off. The CF35 i provides an additional lamp, for instance in the control room, which can be switched on by means of the answer-back button. The light signalling units are equipped with 24 volt lamps. The top signal is red, the bottom one green.

### Standard circuits

#### CF3 i



#### CF35 i



The signalling light may be fastened to any microphone stand by means of the Z24 clamp.



**Z24 mt**

**CF3 i mt**

# Electrical Accessories



Cabel	Standard length	Connectors	Application
IC 3 (mt)	10 m	① (mt) + ②	KM, KMR, KMS, KU, U 87 Ai/89 i, TLM
IC 4 (mt)	10 m	⑫ (mt) + ②	U 87 Ai/89 i, TLM
IC 5 (mt)	10 m	③ (mt) + ④	USM 69 i
IC 6 (mt)	10 m	⑬ (mt) + ④	USM 69 i
LC 1	2.5/5 m	⑩ only „mt“	KMF 4 i
KT 3	5/20/30 m	⑦ + ⑨ only „mt“	RSM 190/MTX 190 i
KT 4	10 m	⑭ + ⑨ only „mt“	RSM 190/MTX 190 i
SC 1 (mt)	10 m	③ (mt) + ⑥	SM 69 fet
SC 6 (mt)	10 m	⑩ (mt) + ⑥	SM 69 fet
AC 20	1 m	③ + 2 x ②	USM 69 i, MTX 190 i, BS 48 i-2
AC 21	1 m	④ + 2 x ①	Input of BS 48 i-2

⑧ Available cable material: 3-pole, 7-pole, 11-pole, all with double cage screen, triaxial cable

All shown connectors are separately available.