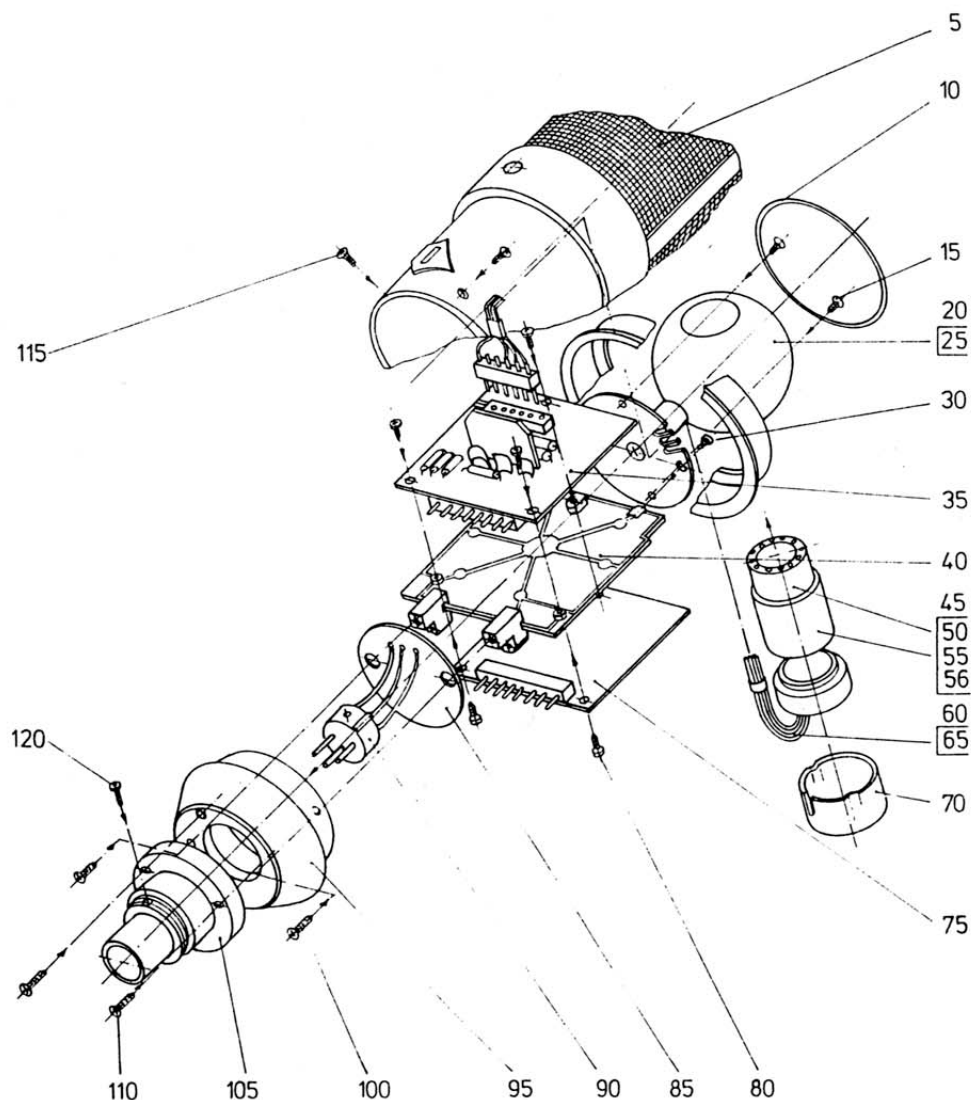
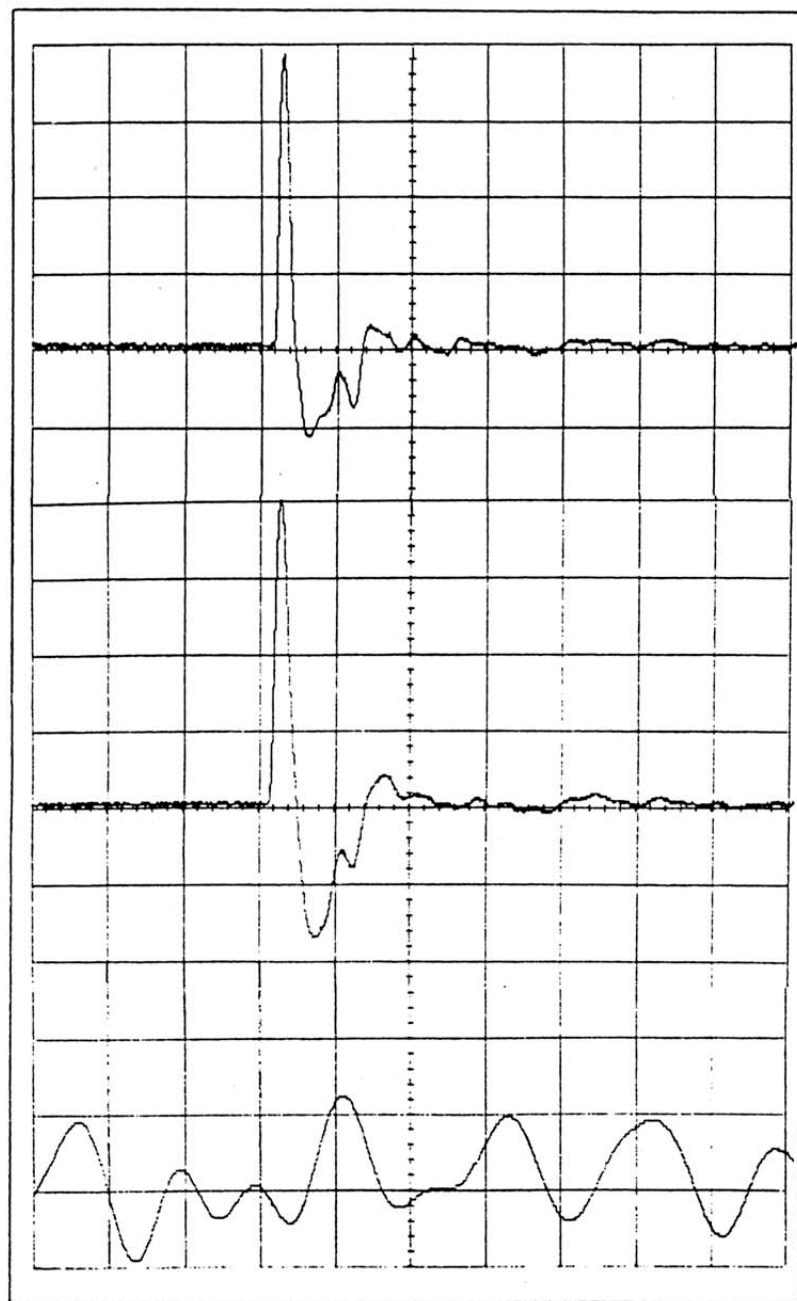


PHANTOM SPEISUNG	}	DIN 45596 +48V; 2.3 mA
PHANTOM POWERING		IEC 268-15 +48V; 2.3 mA

[illegible]



Pos. Pos.	Stck. Qty.	Ident-Nr. Ident-No.	Bezeichnung	Designation
			Oberfläche: schwarz matt	Surface: matt black
1	1	12230 90101	Schaltplan	circuit diagram
5	1	85709 09800	Gehäuserohr, vollständig	housing tube, complete
10	1	85707 00410	Dämpfungsring	damping ring
15	2	86838 00210	Senkschraube	counter sunk screw
20	1	82809 00981	Kapselhalterung, vollständig	capsule holder, complete
25	1	83473 00792	Kugelkörper, vollständig	sphere, complete
30	2	60091 20102	Zylinder-Innen-Sechskantschraube	hex socket-head screw
35	1	85340 06420	Montageplatte I, vollständig	mounting plate I, complete
40	1	89026 00290	Trennwand	isolating board
45	1	83459 00820	Aktive Mikrophonkapsel AK 33, vollständig	AK 33 active microphone capsule, complete
50	1	83459 00800	Mikrophonkapsel K 33, vollständig	K 33 microphone capsule, complete
55	1	89076 00300	Impedanzwandler, vollständig	impedance converter, complete
56	1	85709 09821	Wandlerrohr	converter housing
60	1	87314 01000	Anschlußstück, vollständig	connector piece, complete
65	1	83456 02870	Anschlußkabel, vollständig	connecting cable, complete
70	1	83458 02581	Abdeckkappe	connector cover
75	1	85340 06430	Montageplatte II, vollständig	mounting plate II, complete
80	6	60008 40060	Zylinderschraube	cylinder-head screw
85	1	85340 06450	Montageplatte III, vollständig	mounting plate III, complete
90	1	81604 01710	Steckereinsatz, vollständig	connector insert, complete
95	1	87815 02360	Gehäuseunterteil	housing bottom
100	2	60096 30010	Senkschraube	counter sunk screw
105	1	80525 01500	Bodenstück	socket
110	3	86838 00330	Linsensenkkopf-Kreuzschlitzschraube	sunk Philips screw
115	3	86838 00220	Linsensenkkopf-Kreuzschlitzschraube	sunk Philips screw
120	1	60008 40365	Zylinderschraube	cylinder-head screw



DATE: Aug 23/89

TIME: 14:10:23

CH1: 0.20V : 50µs

2.25 µm Nickelmembrane

10 µm Nickelmembrane

Gläserklirren
Clinking of glasses

50 µs/Div $\hat{=}$ 20 kHz

Abb. 5

Fig. 5

Impulsantworten des TLM 50 mit zwei verschiedenen Membranen

Transient response of the TLM 50 with two different membranes

GEORG NEUMANN GMBH

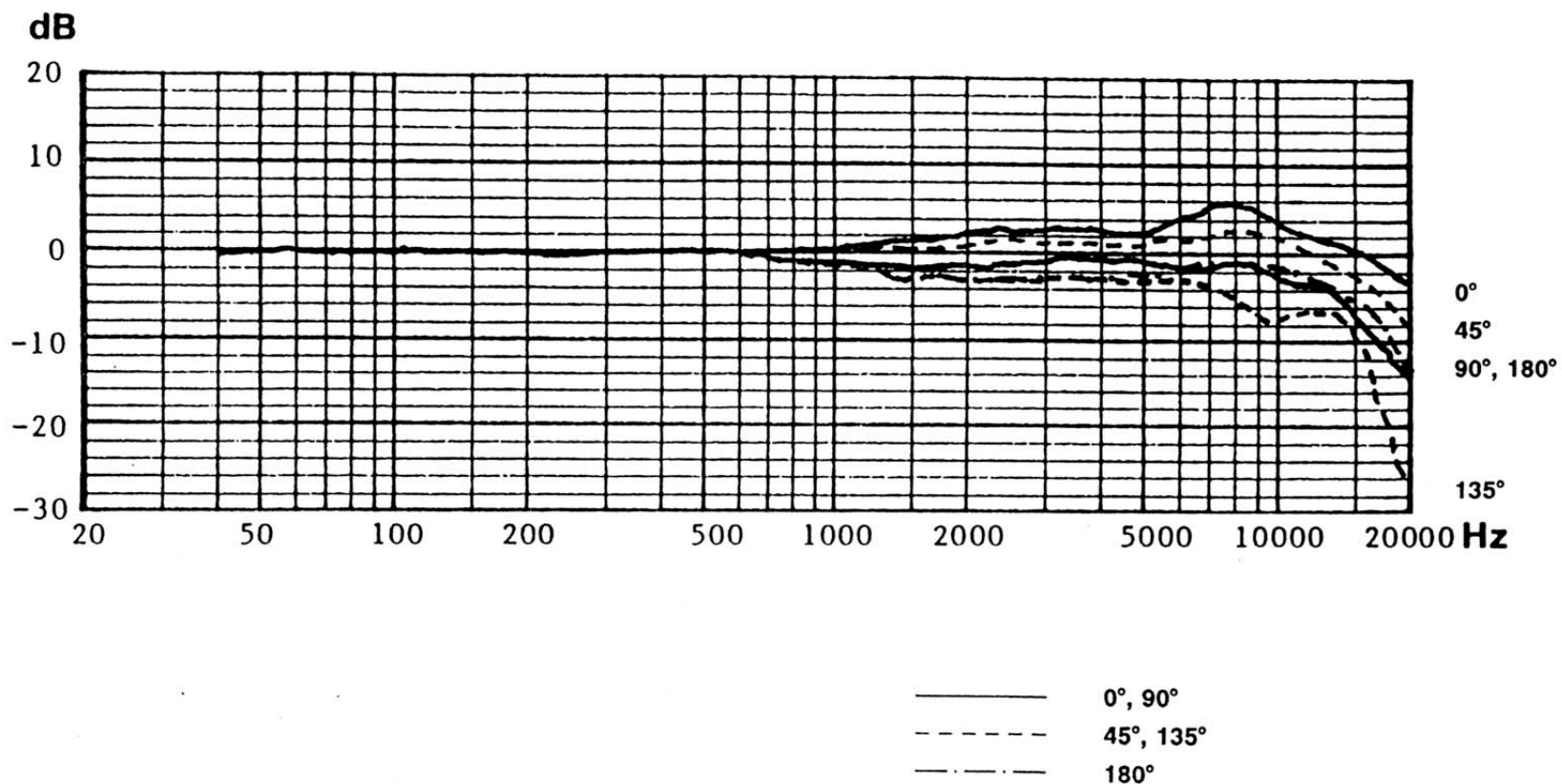


Abb. 7
Fig. 7

Frequenzgänge des Druck-Kondensatormikrophons TLM 50

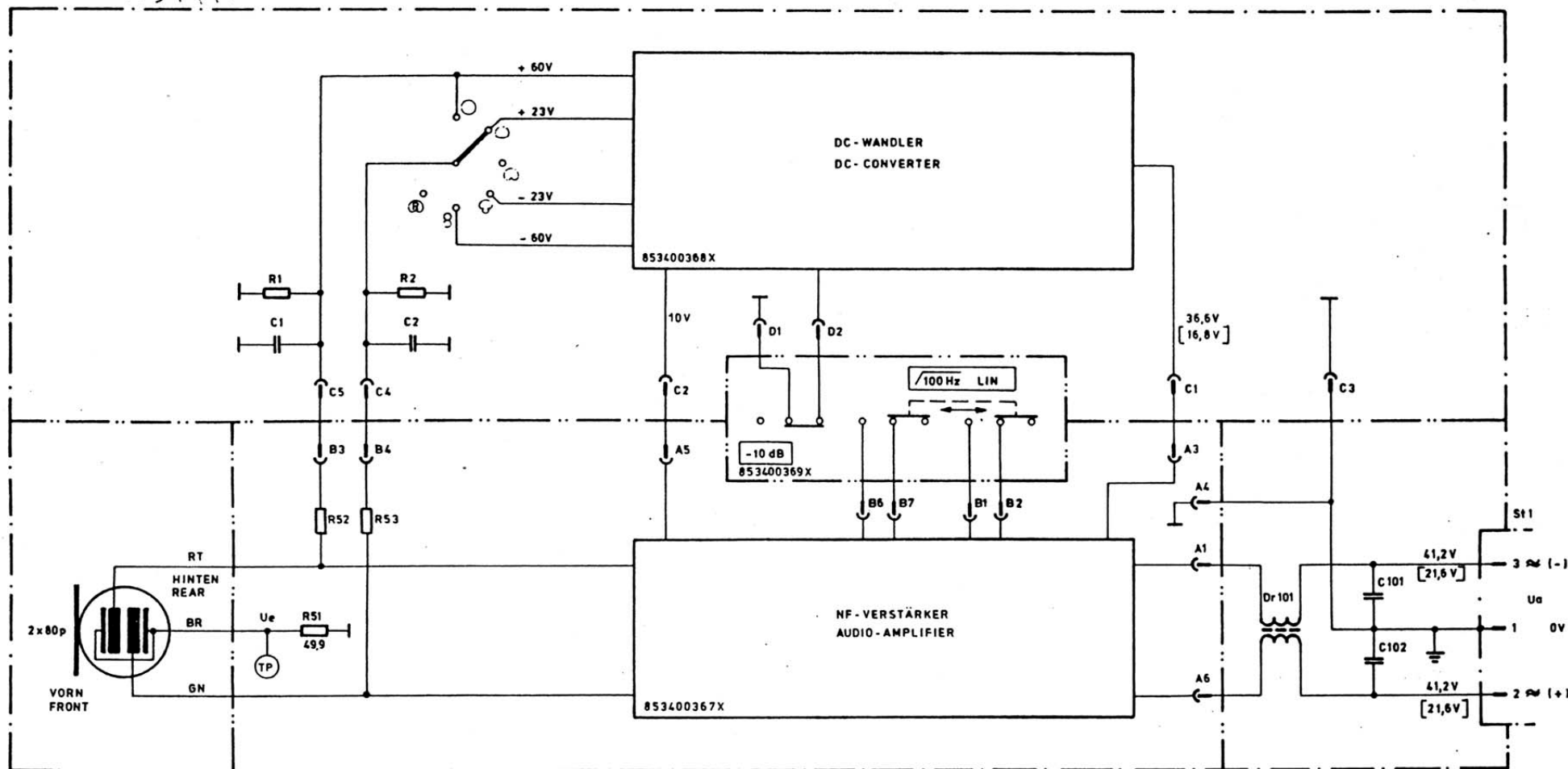
Response frequency characteristics of the TLM 50 pressure condenser microphone

GEORG NEUMANN GMBH

U12a 03

LM 394 H

Irrtümer und technische Änderungen vorbehalten



PHANTOMSPESUNG DIN 45596 48V, 2mA / [24V, 4mA]
PHANTOM-POWERING DIN 45596 48V, 2mA / [24V, 4mA]

(+) = POLARITÄT BEI DRUCKANSTIEG VOR DER VORDEREN MEMBRAN
POLARITY AT SUDDEN RISE OF SOUND PRESSURE BEFORE
THE FRONT DIAPHRAGM

VERSTÄRKUNG $\frac{U_o}{U_e} = -1,1\text{dB}$; $U_{e\text{MAX}}$ F. K_{GES} (THD) $\leq 0,5\%$ 2,16V_{RMS}
AMPLIFICATION $\frac{U_o}{U_e} = -1,1\text{dB}$; $U_{e\text{MAX}}$ F. K_{GES} (THD) $\leq 0,5\%$ 2,16V_{RMS}

KONDENSATOR MIKROPHON TLM 170
CONDENSER MICROPHONE TLM 170

1220890201

GEORG NEUMANN GMBH
BERLIN

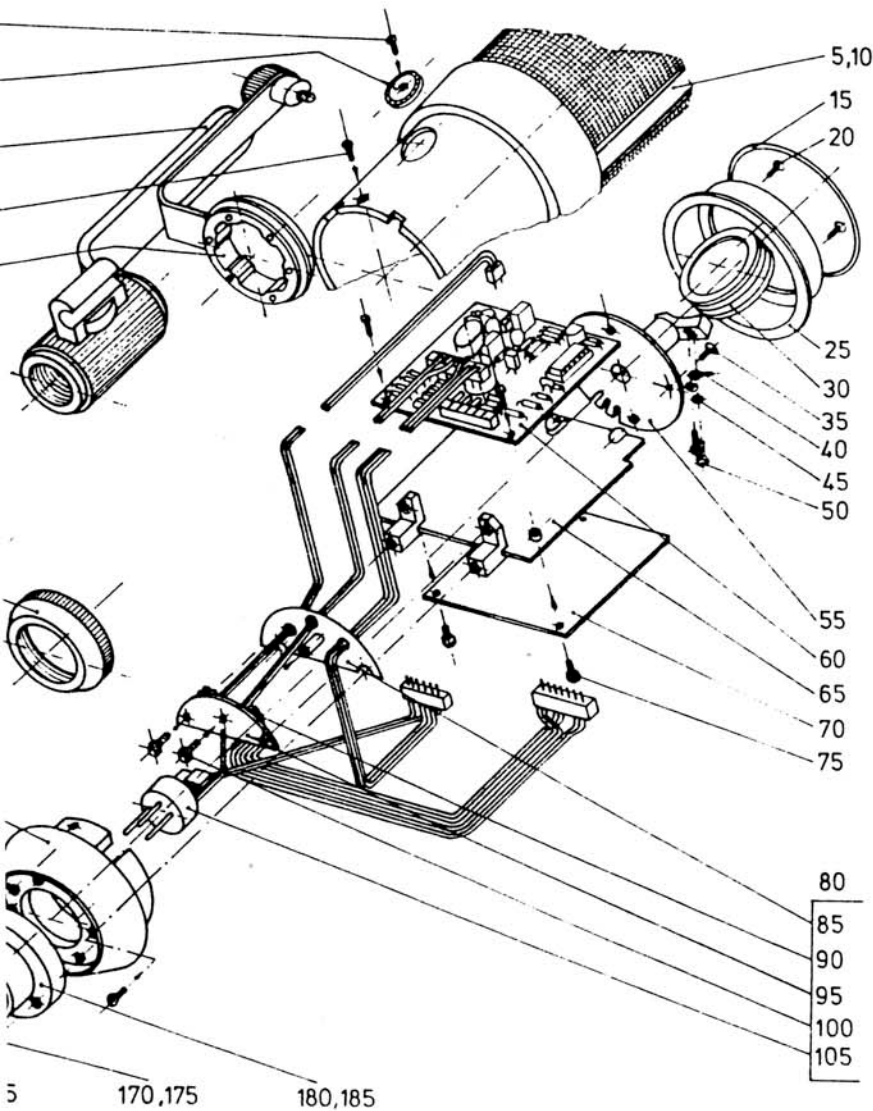
COLORS
RT RED
BR BRN
GN GRN

S11
AUF DIE STECKER
GESEHEN
PIN VIEW

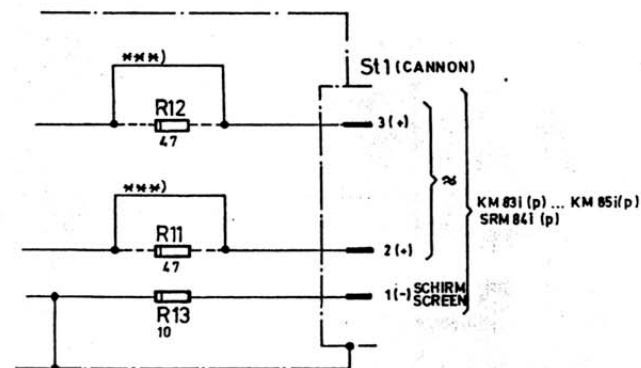
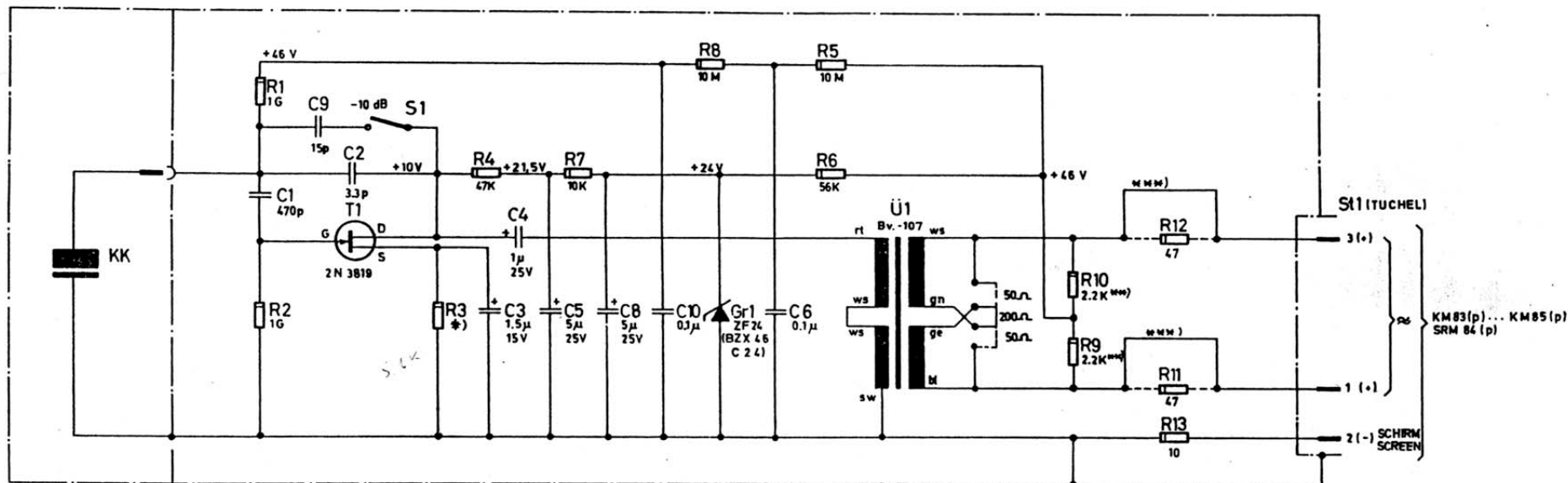
TP
MESSPUNKT
TEST POINT

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und wird gerichtlich verfolgt. (Urheberrechtsgesetz, Gesetz
gegen unlauteren Wettbewerb, B. G. B.).





Pos.	Stck.	Ident-Nr.	Bezeichnung	Designation
Pos.	Qty.	Ident-No.		
1	1	12208 90201	Schaltplan	circuit diagram
5	1	85709 08320	Gehäuserohr, vollst. schwarz-matt	housing tube, complete matt black
10	1	85709 08360	Gehäuserohr, vollst. nickelmatt	housing tube, complete satin nickel
15	1	85707 00410	Dämpfungsring	damping ring
20	2	86838 00210	Senkschraube, schwarz	counter sunk screw, black
25	1	85705 01840	Abschirmring	shielding ring
30	1	83459 00250	Kapsel, vollst.	capsule, complete
35	2	86838 00210	Senkschraube, schwarz	counter sunk screw, black
40	1	64149 60005	Lötöse	soldering lug
45	2	60013 70002	Federscheibe	spring washer
50	2	60008 40333	Zylinderschraube	cylinder-head screw
55	1	80017 00511	Kapselaufbau, vollst.	capsule mounting assembly, complete
60	1	85340 03681	Montageplatte II, vollst.	mounting plate II, complete
65	1	89026 00290	Trennwand	isolating board
70	1	85340 03670	Montageplatte I, vollst.	mounting plate I, complete
75	6	60008 40060	Zylinderschraube	cylinder-head screw
80	1	85340 03691	Montageplatte III, vollst.	mounting plate III, complete
85	1	80000 00410	Abschirmung, vollst.	shielding, complete
90	2	86808 00140	Subminiatur-Schiebeschalter	subminiature slide switch
95	1	85303 06283	Leiterplatte III	pc-board III
100	4	60008 40166	Zylinderschraube	cylinder-head screw
105	1	81604 01070	Steckereinsatz, vollst.	connector insert, complete
110	1	86838 00240	Linsensenkkopf-Kreuzschlitzschraube, schwarz-matt	sunk Philips screw, matt black
115	1	83468 01420	Drehknopf	rotary button
120	1	86813 00790	Einlegescheibe	inlay disc
125	1	85707 00400	Dämpfungsring	damping ring
130	1	80523 00420	Haltebügel, vollst. schwarz-matt	holding bracket, complete, matt black
135	1	80523 00410	Haltebügel, vollst. nickelmatt	holding bracket, complete, satin nickel
140	1	85705 01770	Gewinding, schwarz-matt	screw cap, matt black
145	1	85705 01780	Gewinding, nickelmatt	screw cap, satin nickel
150	1	87815 02360	Gehäuseunterteil, schwarz-matt	housing bottom, matt black
155	1	87815 02370	Gehäuseunterteil, nickelmatt	housing bottom, satin nickel
160	2	60096 30010	Senkschraube	counter sunk screw
165	1	85707 00010	Ring	Switchcraft ring
170	3	86838 00330	Linsensenkkopf-Kreuzschlitzschraube, schwarz-matt	sunk Philips screw, matt black
175	3	60096 60068	Linsensenkkopf-Kreuzschlitzschraube, nickelmatt	sunk Philips screw, satin nickel
180	1	80525 01500	Bodenstück, schwarz-matt	socket, matt black
185	1	80525 01520	Bodenstück, nickelmatt	socket, satin nickel
190	3	86838 00220	Linsensenkkopf-Kreuzschlitzschraube, schwarz-matt	sunk Philips screw, matt black
195	3	60096 60002	Linsensenkkopf-Kreuzschlitzschraube, nickelmatt	sunk Philips screw, satin nickel



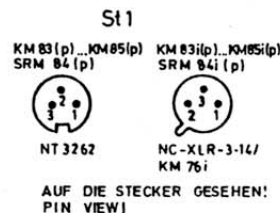
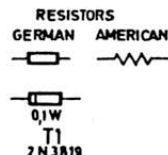
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BEI ERSATZTEILBESTELLUNG BITTE GERÄT-NR. UND POS.-ZAHLEN ANGEBEN!
FOR REPLACEMENT PLEASE ALWAYS GIVE SERIAL & PART NUMBER!

*) ABGLEICHEN
SELECT

**) PAARWEISE AUF GLEICHEN WERT ($\leq 1\%$) AUSSUCHEN
SELECT IN PAIRS OF IDENTICAL VALUE ($\leq 1\%$)

**) DIESE BRÜCKE ENTFÄLLT BEI KM 83(p) ... KM 85(p), SRM 84p
REMOVE BRIDGE FOR KM 83(p) ... KM 85(p), SRM 84p



AUF DIE LÖTANSCHLÜSSE GESEHEN!
SOLDERING SIDE VIEW!

KONDENSATOR-MIKROPHON KM 83... KM 85, SRM 84
CONDENSER MICROPHONE KM 83... KM 85, SRM 84
KM 84 - 930 - 12

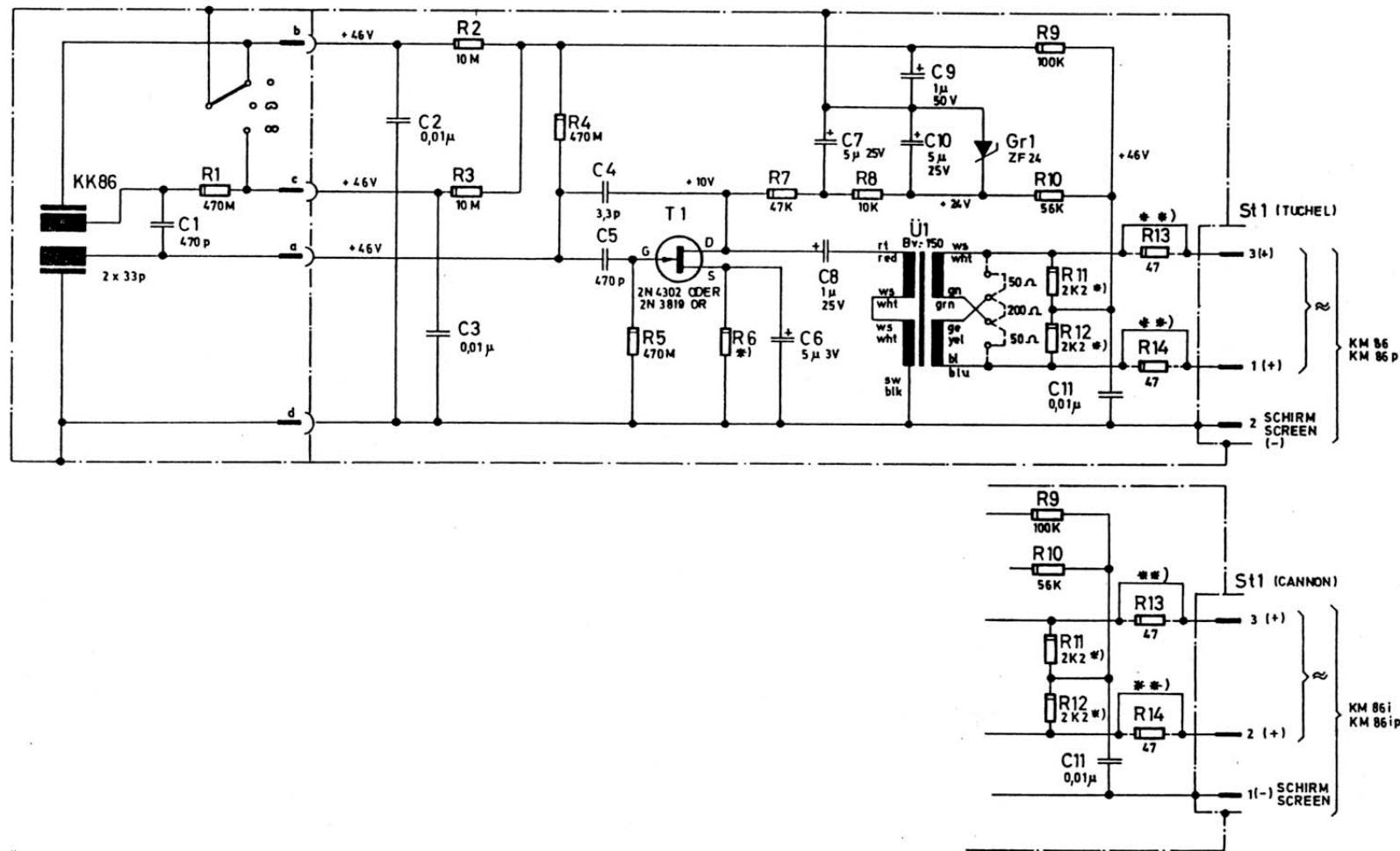


GEORG NEUMANN GMBH
ELECTROACUSTIC
BERLIN

2. 12.68 44.

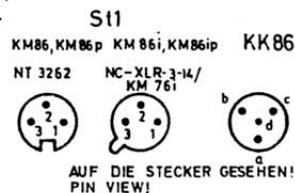
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* *) DIESE BRÜCKE ENTFÄLLT BEI KM 86 p, KM 86 ip
REMOVE BRIDGE FOR KM 86 p, KM 86 ip

BEI ERSATZTEILBESTELLUNG BITTE GERÄT-NR. U. POS.-ZAHLEN ANGEBEN!
FOR REPLACEMENT PLEASE ALWAYS GIVE SERIAL & PART No.!



T1
2N 3819 ODER
OR 2N 4302
D G S
AUF DIE LÖTANSCHLÜSSE
GESEHEN!
SOLDERING SIDE VIEW!

AUF DIE STECKER GESEHEN!
PIN VIEW!

RESISTORS
GERMAN AMERICAN

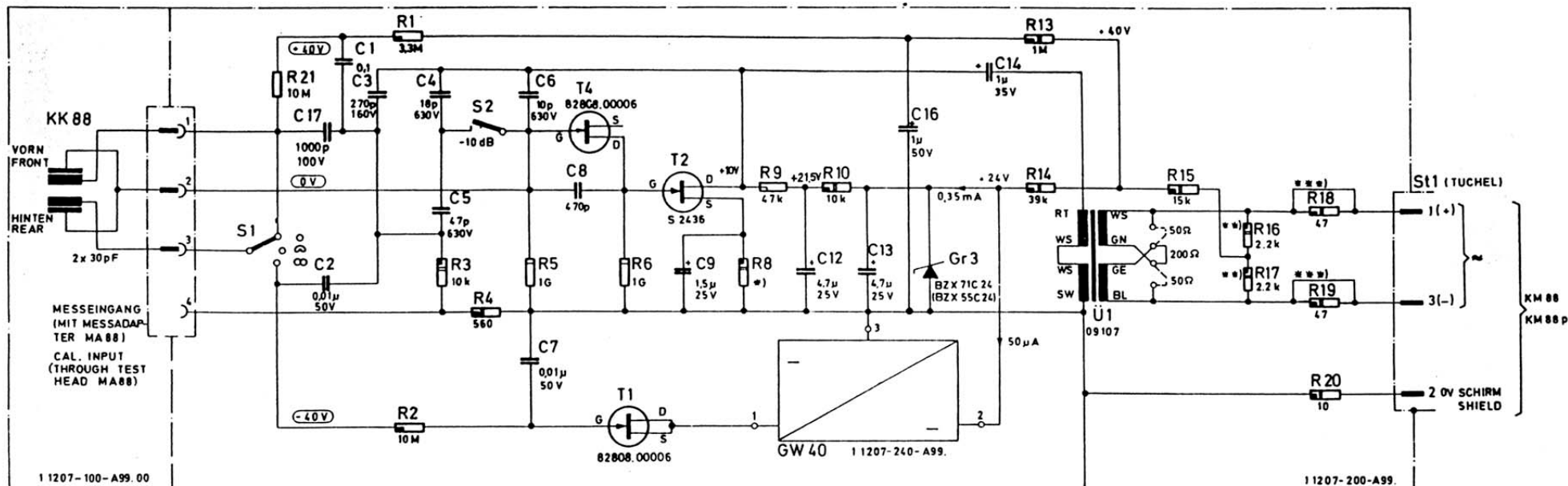
*) ABGLEICHEN
SELECT

0,1 W

KONDENSATOR – MIKROPHON KM 86
CONDENSER MICROPHONE KM 86
1 0243 - 930 - 02



GEORG NEUMANN GMBH
ELECTROACUSTIC
BERLIN



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BEI ERSATZTEILBESTELLUNG BITTE GERÄT-NR. UND POS.-ZAHLEN ANGEBEN!
FOR REPLACEMENT PLEASE ALWAYS GIVE SERIAL & PART NO.!

*) ABGLEICHEN
SELECT

* *) PAARWEISE AUF GLEICHEN WERT ($\approx 1\%$) AUSSUCHEN
SELECT IN PAIRS OF IDENTICAL VALUE ($\approx 1\%$)

* *) DIESE BRÜCKE ENTFÄLLT BEI TYP „p“ UND „ip“
REMOVE BRIDGE FOR TYPE „p“ AND „ip“

○ SPANNUNGSWERTE STATISCH GEMESSEN
VOLTAGES STATICALLY MEASURED

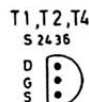
+10V SPANNUNGSWERTE GEMESSEN MIT INSTRUMENT 50k Ω /V
VOLTAGE MEASURED WITH INSTRUMENT 50k Ω /V

COLORS	
GERMAN	AMERICAN
RT	RED
WS	WHT
SW	BLK
GN	GRN
GE	YEL
BL	BLU

RESISTORS	
GERMAN	AMERICAN
0,125W	
0,05W	
0,3W	
0,1W	

PHANTOMSPESUNG DIN 45596
PHANTOM-POWERING DIN 45596
+48V 0,45mA

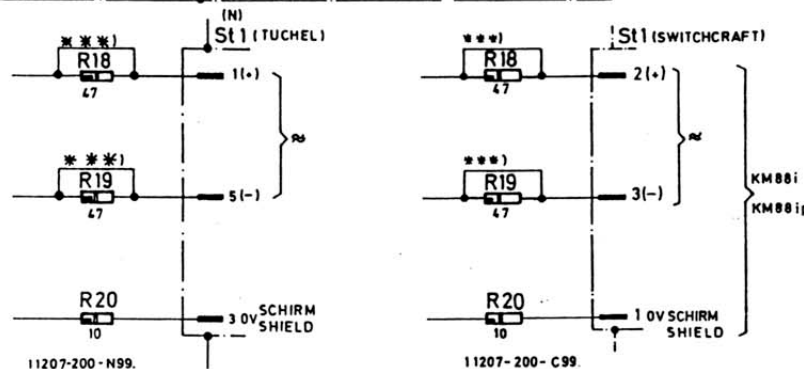
(*) = POLARITÄT BEI DRUCKANSTIEG VOR DER MEMBRAN
POLARITY AT SUDDEN RISE OF SOUND PRESSURE BEFORE THE DIAPHRAGM



AUF DIE TRANSISTORANSCHLÜSSE GESEHEN
TRANSISTOR LEADS VIEW



AUF DEN MIKROPHONVERSTÄRKER VON OBEN GESEHEN
MICROPHONE AMPLIFIER SEEN FROM ABOVE



KONDENSATOR MIKROPHON KM 88
CONDENSER MICROPHONE KM 88

1 1207-930-000.02

GEORG NEUMANN GMBH

BERLIN

19.7.74

KM 88 i



MINIATURE TRANSISTOR CONDENSER MICROPHONE KM 88 i

The Miniature Microphone KM 88 i is a successor to the well known KM 56 tube model. It is switchable to omni and cardioid patterns. Axis of maximum sensitivity is at the side at right angles to the microphone body. It is equipped with two nickel membrane capsules and therefore features the acoustical quality of its forerunner, the KM 56 model, which had won many friends in the recording, broadcasting, TV and film industries. It satisfies the oft-times voiced requirement for a vocal microphone in public address work which does not point at the soloist, but stands vertically, and which is less obtrusive than the KM 86 i model with its considerably larger head assembly. In its omni-directional position it is particularly well suited to round table discussions, while its cardioid characteristic suppresses unwanted sounds in film and TV studios, and often permits satisfactory recordings in acoustically unfavorable rooms and halls. A switch to reduce sensitivity at the amplifier input is also provided in this model.

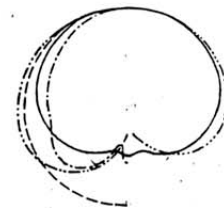
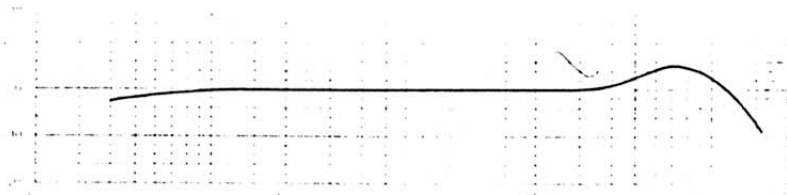
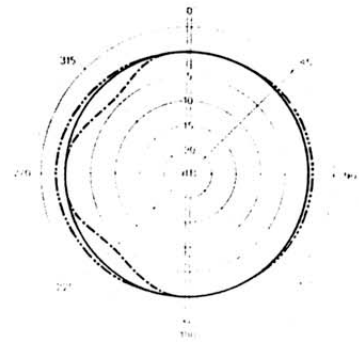
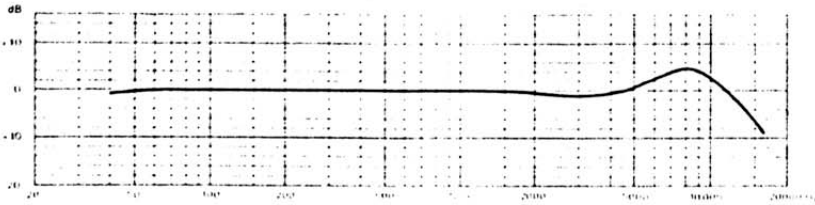
KM 88

Type „i“ for international applications.
Canon connectors equipped

Technical specifications KM 88 i

Acoustical operating principle	pressure gradient
Directional characteristic	omni, cardioid
Frequency range	40 ... 16 000 Hz
Sensitivity	approx. 0.7 mV/ μ bar (across 1000 Ω) - 41 dBm effective output level re 10 μ bar
EIA sensitivity (G_m)	- 140 dBm
Matching impedance	$\approx$ 1000 Ω / 250 Ω
Source impedance	200 Ω / 50 Ω
Capsule capacity	2 $\times$ approx. 30 pF
Self noise level (DIN 45 405)	approx. 28 dB (re 2×10^{-4} μ bar)
Weighted noise level (DIN 45 405)	$\leq$ 4 μ V peak value
SPL limit for 0.5 % THD at 40 Hz, 1 kHz and 5 kHz with sensitivity reduct.	200 μ bar $\triangleq$ 120 dB 650 μ bar $\triangleq$ 130 dB
Operating voltage	48 VDC + 6 V - 8 V
Current consumption	0.4 mA
Battery life	$\sim$ 200 hours
Weight	100 g (3 1/2 ozs)
Dimensions	7/8" dia. $\times$ 5 7/8" long

PA Larson



- - - - - 125 Hz
 1 kHz
 - - - - - 4 kHz
 - - - - - 8 kHz
 - - - - - 12.5 kHz
 Curves not shown are
 identical to the 1 kHz curve

Microphone cables for the KM 88i

IC 3 10 m (33 ft.) extension cable connects the microphone with its power supply. The SG 21 clamp is used as the microphone stand mount.

Power supplies for the KM 88i

N 451i AC power supply to power one microphone
 N 452i AC power supply to power one or two microphones
 N 45 k These central supplies may power up to 40 microphones.
 NK 48
 GW 2448
 SW 45i Powering branch-off for powering microphones from the N 45 k, NK 48 and GW 2448 supplies
 BS 45i Battery supply to power one microphone for more than 200 hours

Tuchel connector version

The KM 88i is also available equipped with Tuchel connector at its base. It then carries the designation KM 88.

Microphone cables for KM 88

KT 1 10 m (33 ft.) extension cable for connecting the microphone with its power supply.
 KT 2 10 m (33 ft.) cable with stand mount swivel for connecting the microphone with its power supply.

Power supplies for KM 88

N 451 AC power supply to power one microphone
 N 452 AC power supply to power one or two microphones
 N 45 k These central supplies may power up to 40 microphones.
 NK 48
 GW 2448
 SW 45 Powering branch-off for powering microphones from the N 45 k, NK 48 and GW 2448 supplies
 BS 45 Battery supply to power one microphone for more than 200 hours.

M. E. Egan

General

All Neumann Condenser Microphones are high-quality studio microphones. Because of the wide range of different characteristics available, an appropriate Neumann Microphone can be found for every application in the broadcasting, television, film and recording fields. The small size makes these microphones especially advantageous. All amplifiers are FET equipped. The microphones are available in two models: either with Amphenol-Tuchel connectors or with Switchcraft connectors. The KM 88i has nickel membranes. All other models have polyester (Mylar) membranes. The miniature microphones have the following characteristics:

KM 83i, KM 84i, and KM 85i

Externally, these three microphones are identical. All three capsules are interchangeable simply by screwing them onto the same amplifier. The KM 83i is omni-directional; the KM 84i and the KM 85i are both cardioids. The KM 85i incorporates a low frequency roll-off which reaches about 12 dB at 50 Hz. This microphone is therefore much less sensitive to low frequency interference which may be encountered outdoors or in public address applications, while at close talking range, the characteristic low frequency boost present in all pressure gradient transducers, is compensated. The "linear admittance" characteristic of the KM 84i and the KM 85i units provides for unaltered sound quality regardless of the direction from which the sound impinges on the microphone.

KM 86i

Two back-to-back, individual capsules permit the three directional characteristics - cardioid, figure 8 and omni - to be electrically selected by means of a switch located below the capsule head. The KM 86i is especially noteworthy in that it reproduces low frequencies equally well for all three directional characteristics even at a great distance from the sound source. High frequency response is virtually linear both in the diffuse as well as the free sound field. In contrast to the KM 83i, KM 84i, and KM 85i microphones, the "axis of maximum sensitivity" is at right angles to the microphone body.

KM 88i

In spite of the KM 88i's three-pattern switchability - cardioid, figure 8 and omni - it is notably small in its outside dimensions. The diameter is the same as the KM 83i, KM 84i and KM 85i. The capsule's dual membranes are metal with a thickness less than 1 μ m (0.04 mils). A slight boost in the upper part of the frequency range gives the sound quality produced with this microphone a special brilliance.

KMS 85i

The soloist microphone KMS 85i is especially designed for hand held closetalking applications. The direction of maximum sensitivity is in line with the axis of the microphone body. To make these microphones suitable for the desired applications they are equipped with an operational amplifier, with a multi-stage mechanical filter in front of the condenser capsule and with a dual wall housing. The microphone amplifier is contained in a tube with 21 mm diameter, onto which the

capsule is screwed. This tube is mounted within a larger tube (26 mm diameter) and is suspended by means of elastic elements. Noise commonly found in handheld applications can therefore not reach the capsule directly. To isolate also sound conducted through the cable the 3 pole-socket is connected with the amplifier through 3 flexible leads. The microphone is equipped with a cardioid capsule.

SRMi Condenser Stage Microphone

This SRMi condenser microphone is especially recommended for those applications where a floor stand microphone is needed but where one wishes the microphone itself to be as inconspicuous as possible, i.e., television and film studios, stages and speaker platforms. The microphone capsule is mounted on a thin, extendable connecting tube of the floor stand where the amplifier is located. The capsule can be adjusted in height above the floor from 1.20 m (48") to 1.50 m (60"). The available capsules have the same characteristics as the KM 83i, KM 84i, and the KM 85i condenser microphones. The SRMi is available therefore in three versions: The SRM 83i with omni-directional, the SRM 84i with cardioid, and the SRM 85i cardioid with drooping low frequency response characteristics. In the standard model, SRMi is delivered equipped with the KM 84 capsule.

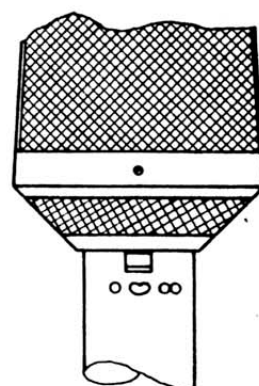
2.)

Directional Characteristic Switch (KM 86i, KM 88i)

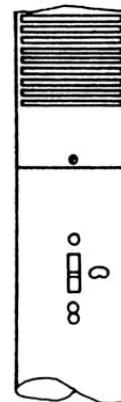
A switch is located on the front side of the microphones for setting the directional pattern for either omni, figure 8 or cardioid:

- for the KM 86i, this switch is located underneath the wire mesh cage.
- for the KM 88i, this switch is located on the upper third of the microphone housing. Because the switch is recessed into the housing, it is necessary to use a ball point pen or other sharp pointed instrument to operate the switch. The switch is recessed to protect it from accidental operation.

The directional symbols are engraved on the microphone housing. The front side of the microphone is that side on which the NEUMANN insignia is located.



KM 86i



KM 88i

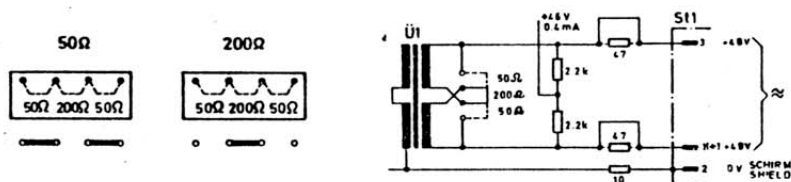
DIRECTIONAL CHARACTERISTIC SWITCH

Overload protection switch

On the back of the amplifier housing of all microphones (without KMS 85i) there is a 10 dB overload switch. This switch is recessed and, therefore, protected from accidental operation. These microphones can then tolerate sound pressure levels of up to 130 dB ($\hat{=}$ Pressure of 90 Pa)⁺⁾ without distortion.

Electrical Source Impedance

The KMS 85i has an electrical source impedance of 150 Ω . All the other microphones have an electrical source impedance of 200 Ω . This can be changed to 50 Ω by soldering connections on the output transformer. The input impedance of the following amplifier should be at least five times as great, i.e., = 1,000 Ω or 250 Ω respectively. Microphones are delivered normally connected for 200 Ω . Those microphones which have been connected at the factory for 50 Ω are designated with a red dot located on the bottom of the microphone next to the serial number. To change a microphone to 50 Ω after purchase, the microphone must first be opened.



CHANGE-OVER OF INTERNAL RESISTANCE

Disassembling of the microphones

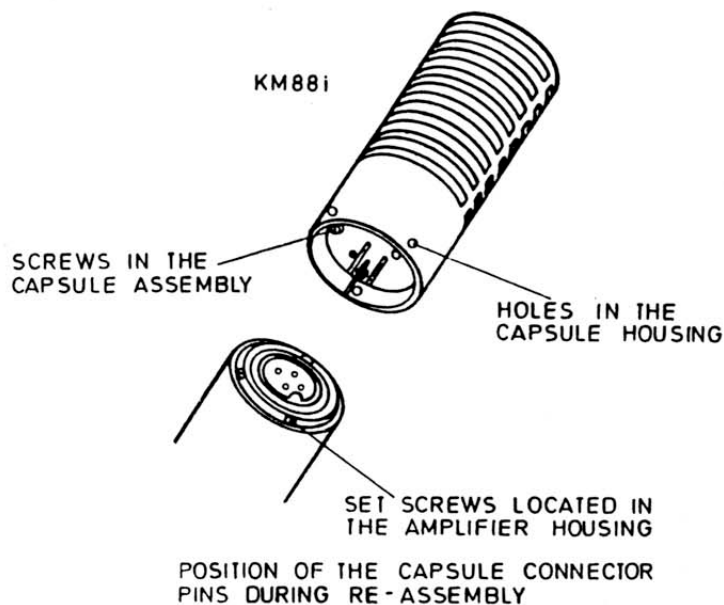
In order to do this with the KM 83i, KM 84i, KM 85i, and KM 86i microphones, first turn the three screws located on the lower part of the amplifier housing a few turns to the right (i.e. turning them into the housing). The connector with the amplifier can then be pulled downward and out of the housing. In so doing, it is necessary to slightly depress the overload switch lever. Should the removal of the amplifier prove difficult, attach a cable connector. After the amplifier has been removed, the bridge connections on the transformer can be changed as shown.

With the KM 88i microphone, first remove the capsule. This is done by screwing in the three screws located on the microphone head. The capsule can then easily be removed by simply lifting it straight up. After removing the capsule head, turn the three screws located on the bottom of the housing inward and pull the amplifier out the bottom of the housing. Re-assembly of the microphone is done in reverse order: i.e., the capsule is plugged in last. If the capsule is replaced first, the amplifier could bend the thin pins located on the capsule head.

Be careful that the capsule head is not misaligned when attempting to assemble it onto the housing. Be sure that the three holes at the bottom of the capsule head align with the three set screws in the top of the housing containing the amplifier and the screws holding the capsule assembly.

Also at the soloist microphone KMS 85i the wire-mesh-cage has to be removed after unscrewing the 4 upper screws. These screws have to be unscrewed counter-clockwise. The capsule becomes visible and can be exchanged after unscrewing counter-clockwise. After unscrewing the 3 lower screws the socket with the plug insert can be removed downward. Attention: Before entirely removing the socket the 3 leads coming from the microphone amplifier have to be removed from the contact pins by means of pincers. Now the 4 screws holding the upper elastic suspension are unscrewed and the inner tube containing the microphone amplifier can be removed upward. The inner tube itself can now be removed from the amplifier after turning the 3 screws located at the bottom of the amplifier inward (clockwise).

The assembling occurs in inverse sequence. Before mounting these sockets the amplifier connection leads are again by means of pincers to be plugged on the corresponding pins in the following configuration: the lead marked red on pin 2, the lead marked black on pin 1, the lead marked white on pin 3.



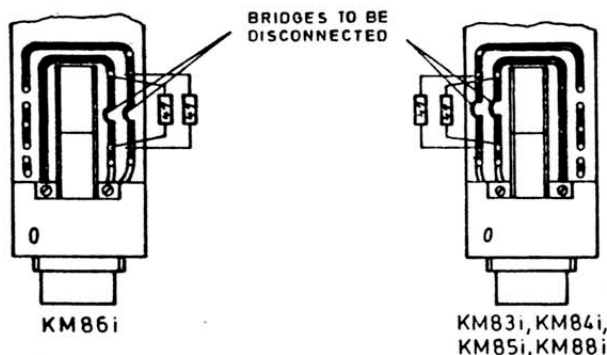
⁺⁾ 1 Pascal = 1 Pa = 10 μ bar

Built-in impedance network (PAD) (suffix "p")

For a given sound pressure, the output level of condenser microphones is some 10 to 20 dB higher than that of the usual dynamic microphones (150 - 250 Ω). For example, the sensitivity of the KM 83i to KM 85i series is 10 mV/Pa⁺⁾¹; for the KM 86i, it is 8 mV/Pa. The value for dynamic microphones on the other hand is 1 ... 2 mV/Pa. Many amplifier are designed only for dynamic microphones at their input. They can be easily overloaded if fed from a condenser microphone. Moreover, the input transformers to which the microphones are connected are often designed in such a way that they only operate properly with source impedance of 150 to 250 Ω . In order to adapt these miniature microphones for these operating conditions, they must first be changed to 50 Ω (see under 4.)

In order to increase the source impedance to 150 Ω , the microphone output leads must feed through two 47 Ω series resistors. These resistors are built into each of the microphones. However, they are each normally by-passed by a wire bridge. One need only to open these by pass bridges.

(NOTE: Check the model designation of your microphone. If it is followed by a "p" (e.g., KM 84ip), this change has already been made at the factory, and a blue dot follows the serial number to indicate 150 Ω .)



An exception is the microphone KMS 85i. Here only the 10 pF capacitor C 2 is exchanged against a 22 pF capacitor. This component can easily be found since it is the only one mounted on the rear of the printed circuit board directly below the capsule.

Polarity

The polarity of the microphone connections is in accordance with industry practice: That is, when there is an increase in the sound pressure at the front of the diaphragm, a positive voltage appears at PIN 2 of the Switchcraft connector.

Microphone cables

The following cables are available:

IC 3 - a 10 m (33') connection cable, without swivel mounting for connecting the microphone with the power supply. This cable may also be used as an extension cable.

⁺⁾¹ Pa=10 μ bar

The soloist microphone KMS can be screwed by means of the microphone's swivel mount MKV, all other miniature microphones by means of the microphone's swivel mount SG 21 to all kind of microphone stands with 3/8"-, 1/2"-, and 5/8"-27- thread. This applies when the cable IC 3 is used.

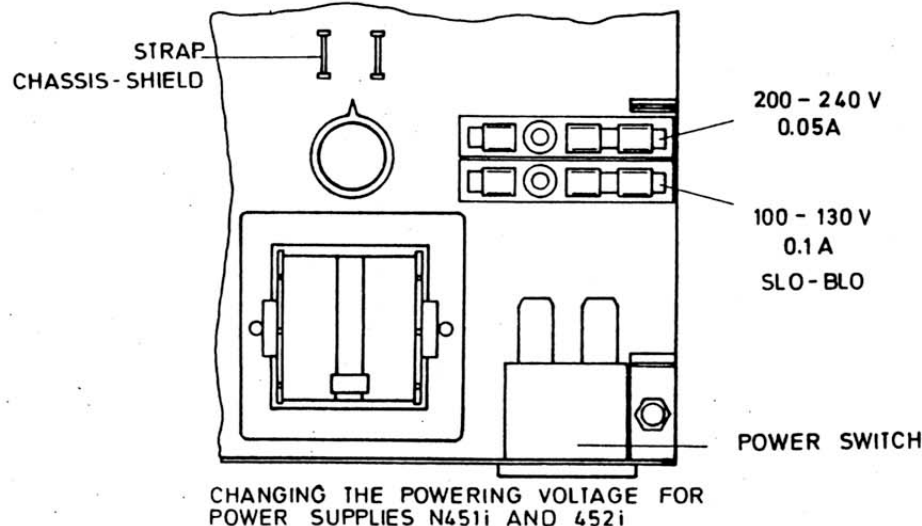
The maximum allowable cable length between microphone and power supply is approximately 200 m (660'). The cable capacity in greater cable lengths can influence the frequency response, and, in conjunction with the leakage reactance of the microphone transformer, can lead to a rise at the upper end of the frequency range.

9.) Operation with AC power supplies

Two portable power supplies - N 451i and N 452i are available. Type N 451i is for connection of one microphone. One or two microphones can be connected to the N 452i power supply.

The power supplies are connected to the power source by means of a permanently attached cord with the appropriate power connector. Units can also be supplied with three-conductor power cable with tinned ends. The conductor with the green-yellow insulation is ground. A tag is attached to the power cable showing type, serial number and AC power voltage setting.

If the power voltage is to be changed, the transformer primary can be changed merely by inserting the fuse in the appropriately labeled fuse holder. Provision is made for operation with 100 ... 130 V and 200 ... 240 V. The units are opened by removing the four screws located on the upper cover.



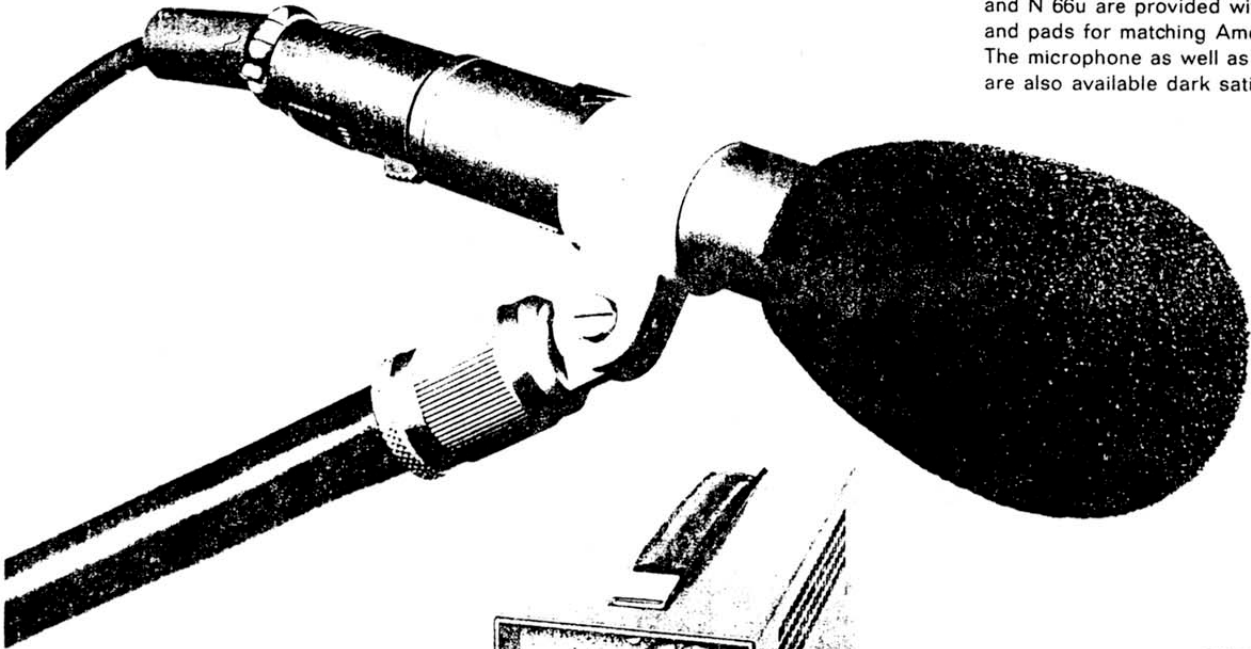
If a number of microphones are to be used, they can all be powered from a permanently wired central power supply. (see "Central Powering brochure" 10000-912-002. or 10000-912-004.).

The following central power supplies are available:

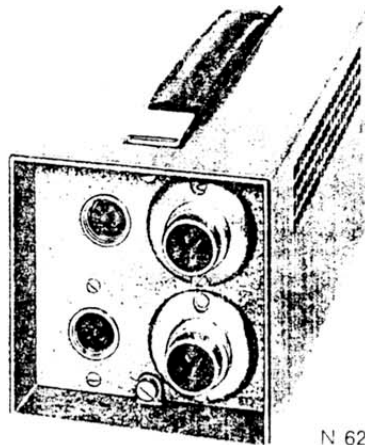
NK 48 a, Models A, B, D, E, and F plug-in printed circuit unit for building into consoles, as well as different cassette versions.

Special Models

The microphone is also available with a Cannon plug thus having the designation U 64us. The cable for this microphone is the UC 11. The power supplies N 6u, N 62u and N 66u are provided with Cannon plugs and pads for matching American amplifiers. The microphone as well as the accessories are also available dark satin finished.



U 64us, WNS 21, SG 21, UC 11



N 62

CONDENSER MINIATURE MICROPHONE U 64

The condenser microphone U 64 has the same acoustical characteristics as its close relative, the microphone KM 64. It differs, however, in its being equipped with a Nuovistor 7586. The Nuovistor is locally available everywhere and is easily interchangeable due to its plug-in socket. The small size of the Nuovistor made it possible to reduce the mounting length of the U 64 by $\frac{1}{2}$ ".

POWER SUPPLIES N 6, N 62, N 66, N 66k

The power supplies are to feed the condenser microphones U 64. The power supply N 6 is portable (measurements $8\frac{1}{16}" \times 3\frac{1}{8}" \times 4\frac{1}{2}"$) and feeds one microphone. The double power supply N 62 has the same measurements but can feed two microphones. The sixfold power supply N 66 (measurements: $19" \times 6\frac{1}{2}" \times 4\frac{1}{2}"$) is provided for six microphones. For the installation in plug-in shelves or mixing consoles the N 66k also for six microphones (measurements: $19" \times 6\frac{1}{2}" \times 4\frac{1}{2}"$) is available. At the multiple power supplies a short circuit in one supply circuit will have no influence on the others. The channel separation between the systems is ≥ 120 dB.

Technical Data

Directional Characteristic	cardioid
Frequency Response	40 to 18,000 cps
Output Level	app. 1.1 mV/ μ b
Noise Voltage	6 μ V Δ 29 dB re 2×10^{-4} μ b (DIN 45 405)
Switchable Sensitivity Reduction	app. 10 dB
Source Impedance	200/50 Ω
Maximum Sound Pressure for 0.5% Distortion at 40 cps, 1 kcps, and 5 kcps	200 μ b Δ 120 dB 650 μ b Δ 130 dB (with overload protection) (dB above 2×10^{-4} μ b)
Tube Complement	Nuovistor 7586
Dimensions	$\frac{53}{64}"$ diam.; $4\frac{7}{8}"$ lgth.
Weight	4.23 oz.

Microphone Cables UC 1 and UC 2

These five-conductor microphone cables connect the miniature microphone U 64 with the power supply. The UC 1 is an extension cable, the UC 2 has a swivel stand attachment with $\frac{5}{8}"$, $\frac{1}{2}"$, $\frac{5}{16}"$ -27 thread to be screwed on microphone stands.



U 64

Accessories

Table stands MF 1, T 60, T 6021
Elastic suspension EA 21
Microphone suspension Z 68 for inclining microphones hanging from the cable
Wind and close talking guards WNS 21, WS 21

Neumann Microphones



Neumann Microphone Studio Systems consist of the microphone of your choice, the appropriate power supply, suitable stand mount, microphone-to-power supply interconnect cable, AC cord, Cannon output connector. Power supplies come equipped with U.S. standard pilot lights, fuses, AC receptacles, and output transformers. Microphones may be used as far as 300 feet from their power supplies. For this purpose, additional interconnect cables are available in lengths of 25, 50 and 100 feet. Swivel suspensions and full elastic suspension units are equipped with U.S. standard microphone stand thread.

MODEL U-67 MICROPHONE SYSTEM

Represents the latest advances in microphone engineering design. Electronically switched directional characteristics: Cardioid, Figure-8 or omnidirectional. Perfectly linear frequency response (± 1 db to 15 kc), makes close miking possible without the sharp sound common to previous condenser microphones. Input circuit designed to provide flat response to 40 cps with sharp roll-off below, makes possible full-fidelity pick-up without necessity of elastic suspension, wind-screens or "popping" filters. Features separate "Voice-Music" switch to raise the roll-off starting point from 40 to 100 cps. Advantageous for speech in TV and film applications. Overload switch permits reduction of the capsule's sensitivity by approx. 14 db before the amplifier section. Current regulated filament supply permits wide variation in inter-connecting cable lengths without necessity for filament voltage adjustment. Callibrating input connection on power supply to test preamp with oscillator. Complete protection against RF interference. Service-free operation features gold-sputtered polyester foil diaphragm; plated circuits; completely encapsulated grid-components; Teflon tube socket. Disassembly without tools making tube change a matter of seconds. Frequency Range: 20-16,000 cps. Nominal Output Impedance: Switchable 30/50 ohms-150/250 ohms. Effective Output Levels: (Referred to 10 dyne/cm² S.P.L.) Omnidirectional, Figure-8, -59 dbm at 30/50 ohms, -52 dbm at 150/250 ohms; Cardioid, -55 dbm at 30/50 ohms, -48 dbm at 150/250 ohms. Distortion: Less than 0.5% rms total harmonic at 40, 1000 and 5,000 cps. Callibrating Input Impedance: 600 ohms unbalanced. Power Requirements: NU-67u Power Supply: 9 Watts, 110/127/220 volts AC, 50-60 cps. Dimensions: Mike, 2 1/4" dia., 7 1/4" long; Supply, 4" x 4" x 8 1/4". Weight: 5 lbs., total. Neumann Model U-67 Microphone System—Includes U-67 matte satin chrome Condenser Microphone, NU-67u gray hammer-tone Power Supply, 25 ft. microphone interconnect cable and swivel stand coupling, AC power cord, etc. **\$460.00** Net Each.

Neumann U-67 with Elastic Suspension—Add to Net. **\$14.00**

Neumann Model Z-67 Windscreen—For above system. **\$2.50** Net Each.

NEW MODEL U-64 LINEAR ADMITTANCE CARDIOID MICROPHONE SYSTEMS

Tiny new Neumann condenser microphone designed for mid-distance miking. Provides near-perfect cardioid pattern with uniform frequency response from angles as great as 135° off direct angle of incidence. Ideal for instrumental groups or orchestral sections. Axially addressed. Cannon XLR connectors throughout. Amplifier uses type 7586 nuvistor. Condenser element, vacuum gold-steamed Mylar with acoustical delay network. Frequency Range: 40-18,000 cps. Nominal Output Impedance: 30/50 ohms-150/250 ohms. Effective Output Level: -43 dbm re 10 dyne/cm². Overload Protection: Built-in, 10 db switchable. Harmonic Distortion: Less than 0.5% to 120 db S.P.L.; to 130 db S.P.L. with overload protection. Self Noise Level (DIN 45405): Less than 29 phn. Microphone Size: 1 1/4" dia. x 4" long. Matte satin chrome finish. Weight, 3 1/2 oz.

Neumann Model U-64 Microphone System—Includes one U-64 mike, N-6u power supply, UC-11 25-ft. cable, swivel stand coupling, mating XLR connector and AC cord. **\$360.00** Net Each.

Neumann Model U-64-2 Microphone System—Includes two U-64 mikes, N-62u dual power supply, two UC-11 25-ft. cables and swivel stand couplings, mating XLR connectors and AC cord. Net Each. **\$620.00**

Neumann Model U-64-6P Microphone System—Includes six U-64 mikes, N-66u six-way power supply, six UC-11 25-ft. cables and swivel stand couplings, mating XLR connectors and AC cord. Net Each. **\$1680.00**

Neumann Model U-64-6R Microphone System—Same as U-64-6P but with N-66k rack-mount power supply for permanently wired installations. Net Each. **\$1580.00**

*Registered DuPont trademark.

MODEL SM-2 MINIATURE STEREO MICROPHONE SYSTEM

This recent addition to the condenser microphone field consists of two separate and complete condenser mikes, and their respective preamplifiers, in a miniature housing. The two condenser capsules are mounted one above the other; top one is rotatable to permit M-8 stereo recording technique (intensity stereo). Each microphone may be individually switched to any field pattern: Non-directional, bi-directional, cardioid, or any of six intermediate patterns. Extreme balance provided between systems. Frequency Response: 40-15,000 cps. Output Impedance: Specify 50 or 250 ohms when ordering. Non-Linear Distortion: Less than 0.8% entire range to 110 db absolute. Size: Mike, 1 1/4" dia. x 8" long. Power Supply, 8 1/4" x 4" x 4 1/4". Weight: Mike, 9 1/2 oz.; Power Supply, 5 lbs.

Neumann Model SM-2 Stereo Microphone System—With NSM power supply, SC-2 interconnect cable, etc. **\$820.00** Net Each.

Neumann Model Z-43 Wind Screen—For above system. **\$46.00** Net Each.



U-67



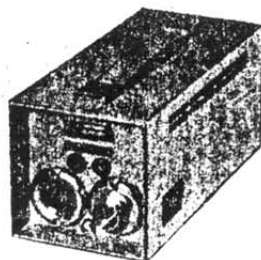
M-49b



U-64



SM-2



NU-67u Power Supply



Z-43 and Z-118 Windscreens

KM SERIES MINIATURE CONDENSER MICROPHONE SYSTEMS

Miniaturized microphones feature extremely smooth response, a wide dynamic range, absence of distortion and noise. Frequency Response: 40-15,000 cps. Output Impedance: 50 or 250 ohms; specify when ordering. Non-Linear Distortion: Less than 0.5%, entire range to 110 db absolute. Size: Mike, 1 1/4" dia. x 6" long (Model KM-56); power supply, 8 1/4" x 4" x 4 1/4". Weight: Mike, 4 oz.; power supply, 5 lbs.

Neumann Model KM-56 Miniature Microphone System—With NKM power supply, KC-2 interconnect cable, etc. Field pattern: Non-directional, bi-directional, cardioid (switchable). **\$460.00** Net Each.

Neumann Model KM-64 Miniature Microphone System—Same as KM-56, but cardioid pattern only. Length 4 1/4". Net. **\$435.00**

Neumann Model Z-118 Windscreen—Gauze-screened sphere 2 1/4" dia. Prevents low frequency wind noise and talking "pops" from interfering with recorder. Fits easily and quickly over all KM series mikes. Net Each. **\$17.50**

Neumann Model Z-28 Overload Protector—Miniature switch inserts between capsule and amplifier of KM-64 mike to restrict level fed to preamp when high intensity sound levels are to be recorded at close range. Switchable, straight through, 10 db and 18 db attenuation. Net Each. **\$62.00**

MODEL M-49b VARIABLE DIRECTIONAL MICROPHONE SYSTEMS

The standard of the German broadcasting industry; permits remote control of the directional characteristic. Smooth, continuous fader control selects non-directional, bi-directional, cardioid and any intermediate pattern. Slight roll-off below 40 cps prevents shock-noise interference. Rugged construction. Response and Distortion: 0.6%, 40-15,000 cps up to 110 db absolute. Size: Mike, 3" dia. x 6 1/4" long. Power Supply, 8 1/4" x 4" x 4 1/4". Weight: Mike, 1 1/4 lbs.; Power Supply, 5 1/2 lbs.

Neumann Model M-49b Microphone System—With NN-48h power supply, C-26 interconnect cable, MZ-49 sus- **\$495.00** pension, etc. Net Each.

Neumann Model M-50b Microphone System—Same as M-49b, but frequency sensitivity and the field pattern subtly modified to match room-sound characteristics of large halls. Net. **\$485.00**

FULL ELASTIC SUSPENSION UNITS

These units, uniquely designed to float the microphone in a rubber truss system, guard against impact noise, building noise, footsteps and similar noise sources.

Neumann Model Z-38 Suspension—For use with KM- **\$25.00** 64 or KM-56 microphones. Net Each.

Neumann Model Z-48 Suspension—For use with U-67 microphone system. Net Each. **\$32.50**



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highest standard is
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TELEFUNKEN

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the exclusive national distributors of TELEFUNKEN microphones
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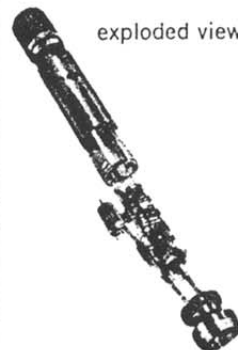
M 10 STEREOGRAPHIC TAPE RECORDER

M250 AND M251 CONDENSER MICROPHONES



The most advanced
stereophonic
tape recording console
available today.

meter panel optional
not shown



exploded view

POWER SUPPLY: 115 Volts, 60 Cycle, 350 Watts. • **SPEED:** 7 1/2 and 15 IPS. • **STARTING-TIME TO FULL SPEED:** 0.2 Sec. • **STOPPING DISTANCE IN WORKING MODE:** 1 1/2 inches. • **REWINDING-TIME 2400 FT.:** 1 1/2 Min. • **STOPPING-TIME FROM FULL SPEED REWIND:** 4 Sec. • **SPOOLS:** 10" NARTB, 1000M CCIR, RMA reels. • **WOW AND FLUTTER CONTENT (PEAK-TO-PEAK):** at 15 IPS 0.08%; at 7 1/2 IPS 0.15%. • **ELECTRONICS:** Plug-in amplifiers. • **HEADS:** Stereo, full track, half track; all are plug-in assemblies and may be changed within 30 secs. • **Built-in time-counter.** • **Tape-cutting mechanism and splicing bar.** • **All functions controlled by push-buttons and relays.**

These two microphones are of the most recent design and are built to specifications more rigorous than those of older models. The M250 has omnidirectional and cardioid pickup patterns. The M251 may be set for omnidirectional, cardioid and figure-eight patterns. Each of these microphones is supplied with its own individual frequency run.

FREQUENCY RESPONSE: 30 CPS-20 KCS • **SENSITIVITY:** At 1 KC 1.2mv /bar at an impedance of 200 ohms • **POWER CONNECTOR:** Standard American flat-pin receptacle • **OUTPUT CONNECTOR:** Cannon Type UA

M250 \$340.00

M251 \$355.00

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CALIBRATING STANDARD MICROPHONE MM 5

This acoustical calibrating standard microphone makes possible the accurate measurement of sound pressure. When being used in conjunction with a loudness contour filter and the appropriate indicating instrument it may also be used for determining loudness levels.

The microphone capsule is of the pressure type. Its dimensions are kept to a minimum and its diaphragm is of heat-stressed metal. The microphones' specified and calibrated performance is held to extremely close tolerances as a result of special techniques used in the construction.

Each microphone is individually calibrated, both by the comparison method (using a comparison standard calibrated by the PTB, the German Bureau of Standards) and by using the NEUMANN-Pistonphone type DK 2a. The microphone incorporates a switch by means of which the range of measurement may be shifted by 20 dB towards higher sound pressures.

Technical Data

Useable Frequency Range	20 to 40,000 cps
Frequency Response	less than ± 1 dB up to 16 kcps
Pressure Sensitivity	0.55 mV/ μ b (individually calibrated)
Noise Voltage	$\leq 5.5 \mu$ V ± 35 dB re $2 \times 10^{-4} \mu$ b (DIN 45405)
Sound Pressure Measurement Range (for less than 3% distortion factor)	up to 4500 μ b
Source Impedance	200/50 Ω
Load Impedance	1 k Ω
Tube Complement	AC 701 k
Dimensions	2 1/8" diam. x 16 1/8" long
Diam. of Diaphragm	1 1/8"
Weight	1.1 lbs.

POWER SUPPLY UNIT NMa

The type NMa power supply provides stabilized filament and plate voltages for the calibrating standard microphones. It is identical with the type NKMa but is fitted with an 8-contact receptacle.

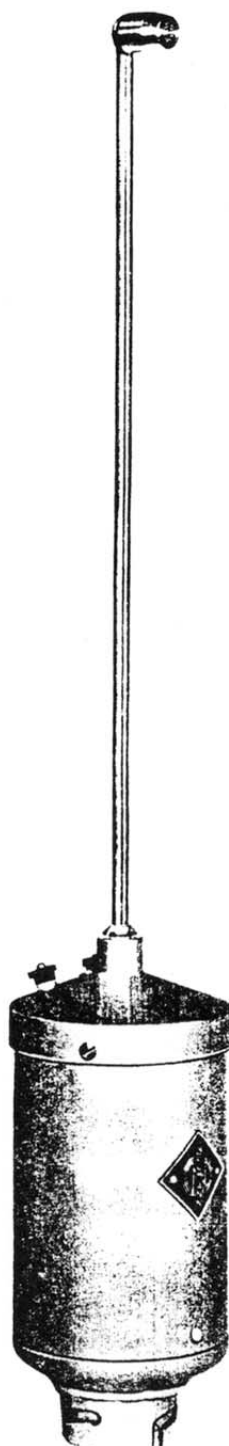
INTERCONNECTING CABLES

C 26 AND C 28s

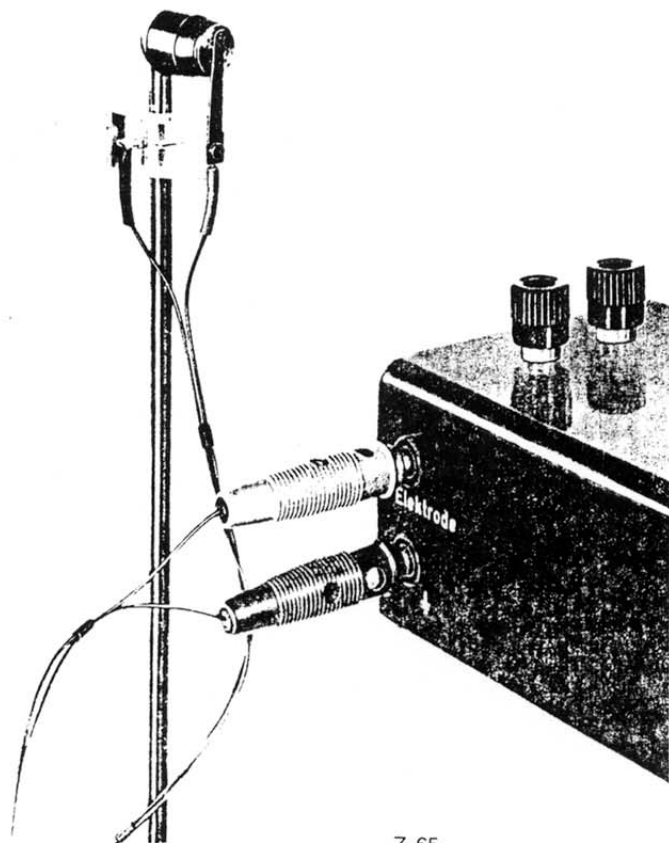
The C 26 and C 28s interconnecting cables are designed for use between MM 5 microphones and power supply. The C 28s cable is equipped with a special connector incorporating stand attachment with swivel joint. A 3/8", 1/2", 5/8"-27 thread permits mounting cable to microphone stands. Cable C 26 is intended as extension cable only.

Accessories for MM 5

Table stand M 70
Floor stand M 72



MM 5



Z 65



MK 24

MEASURING AID Z 65

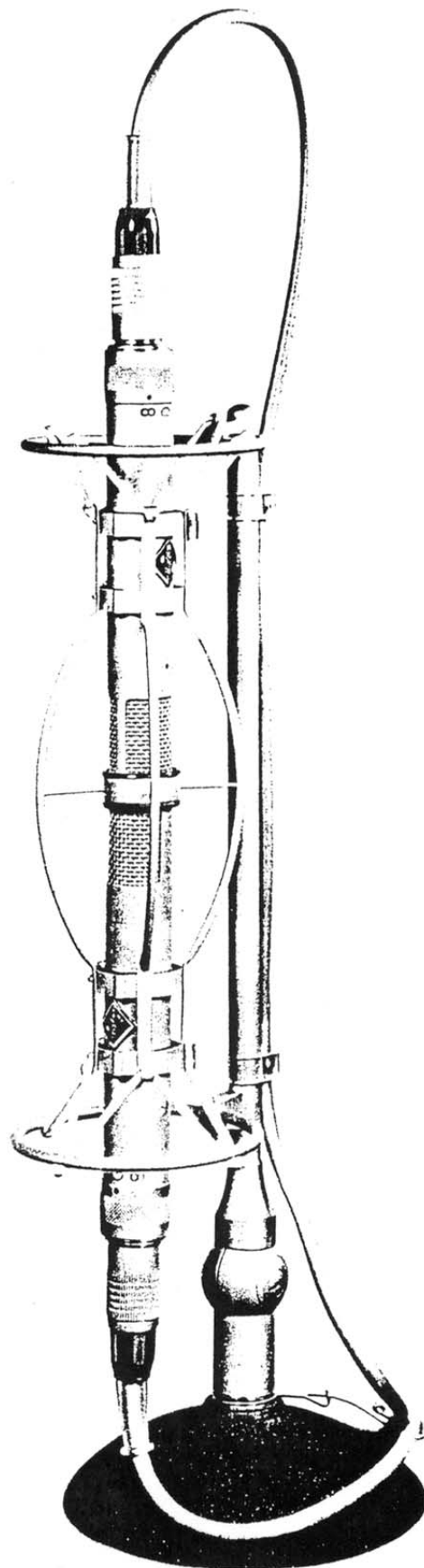
The perforated disk facing the diaphragm of the measuring microphone MM 5 is developed as an isolated measuring electrode. Via an additional contact spring audio frequency voltages can easily be led to the measuring electrode for checking the output level and its frequency response. The necessary polarising voltage is taken from the measuring box Z 65 which is set up for mains connection and provides connecting clamps for an audio generator.

CONDENSER CALIBRATING CAPSULE MK 24

For general acoustical measurements a calibrating capsule with a very low temperature coefficient was designed (≤ 0.018 dB/ $^{\circ}$ C) for -10° ... $+70^{\circ}$ C. The output voltage is approx. 6 mV/ μ b. The frequency range is 20...18000 cps. The capsule has a 0.91-60 thread.



WS 67



Z 74

STEREO SUSPENSION Z 74

To this suspension two microphones KM 56c can be applied in a way that they have the effect of one stereo microphone.

DOUBLE MOUNT Z 73

The double mount is to be screwed on a microphone stand to apply two microphones to it. To fasten the microphone cables two $\frac{5}{8}$ "-27 threaded studs are provided.

WIND AND CLOSE TALKING GUARDS

To avoid distortions resulting from close talking or the influence of wind there are wind and close talking guards made of open porous poly-urethane foam. These guards do not create undesired resonances and virtually influence the frequency response of the microphone only insignificantly (WNS 21 at 10 kcps approx. -1 dB). The following wind and close talking guards are available:

WNS 21 and WS 21 for miniature microphones with a diameter of 0.83"

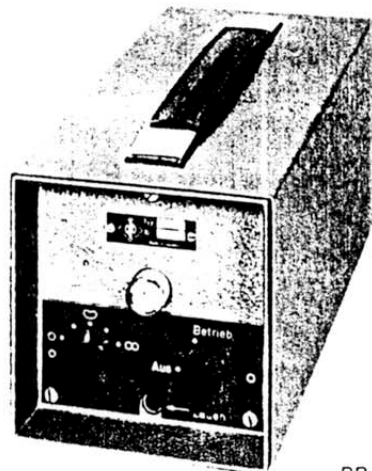
WS 30 for SM 2c and SM 23c

WS 67 for U 67 and M 269c

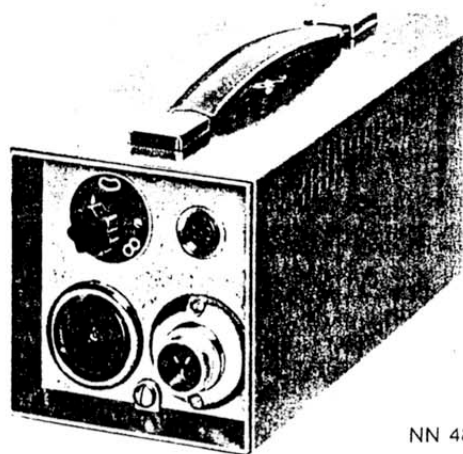
WS 9 for SRM 64



M 49c, MZ 49, C 26



BB 5



NN 48

MICROPHONE INTERCONNECT CABLES UC 5 AND UC 9, UC 7, AND UC 10

These six-conductor cables serve both to interconnect the U 67 microphone with its power supply as well as for extension purposes. The swivel part of the UC 9 cable is supplied with $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ "-27 standard threads for mounting on microphone stands and booms. In case of extreme radio frequency interference problems we recommend use of the RF-proof cable types UC 7 (without) and UC 10 (with stand coupling).

Special Models

Microphone and accessories are also available dark satin finished. The power supply NU 67i is provided with a 3-pole Cannon connector (modulation) and pad to match American amplifiers.

CONDENSER MICROPHONE M 49c

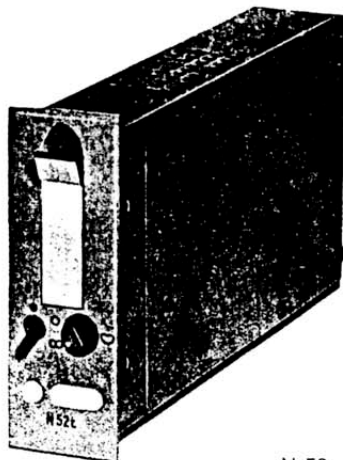
NEUMANN engineers have worked closely with the leading broadcasting engineers in the design of this microphone with the result that it is "tailor-made" for broadcasting applications. The M 49c is a pressure-gradient microphone mounting two gold sputtered diaphragm condenser systems back to back. Its high-feedback impedance matching amplifier is internally shock-mounted to eliminate shock noise, while a drop of the frequency response below 40 cycles also helps to maintain rumble- and shock-free operation. Its most enviable feature is the ability of the engineer to control its directional characteristic by means of a fader located on the power supply (which may be as much as 250 ft. from the microphone). All basic patterns, omni-directional, bi-directional and cardioid, and any intermediate position are possible (patented in many countries). With this remote control, the M 49c is ideally suited to be suspended in concert halls and auditoriums where the optimum directional pattern can be determined from the control room after the microphone has been hung in place.

Technical Data

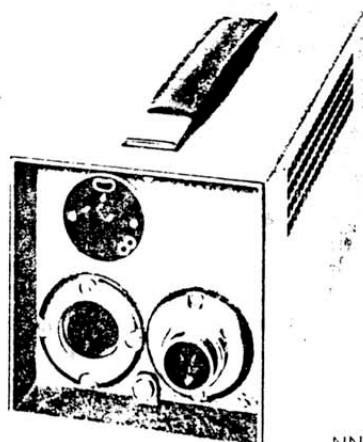
Frequency Response	35 to 15,000 cps
Directional Characteristics	omni-directional, cardioid, figure-8 (continuously variable)
Output Level	0.7 mV/ μ b
Noise Voltage	$\leq 4 \mu$ V $\pm$ 32 dB (dB re $2 \times 10^{-4} \mu$ b) (DIN 45 405)
Max. Sound Pressure for 0.5% distortion at 40 cps, 1kcps and 5 kcps	≥ 125 dB (dB re $2 \times 10^{-4} \mu$ b)
Source Impedance	200/50 Ω
Tube Complement	AC 701k
Dimensions	3 $\frac{1}{8}$ " dia. x 6 $\frac{3}{8}$ " lon.
Weight	1.8 lbs.

POWER SUPPLIES NN 48b AND N 52t

The NN 48b power supply is a portable unit which is designed to supply the M 49c microphone with all necessary operating voltages. Heater and plate voltages are stabilized and thus independent of line variations. The unit is additionally equipped with a fader for the remote control of the directional characteristics on the M 49c microphone and a receptacle for the



N 52t



NN 48b



M 269c, M 181, C 228s

connection of miniature-type condenser microphones. The power supply NN 48b is portable (measurements: 8.66" x 3.94" x 4.72"). The power supply N 52t is a plug-in type unit (size 1) provided for installation in plug-in shelves and mixing consoles.

Battery Supply BB 50

Where no AC mains is available the battery supply BB 50 (measurements: 8¹/₁₆" x 3¹/₁₆" x 4³/₄") can be used for the alimention of the microphone M 269c. By choice it can be supplied either with 4 DEAC accumulators SD 7 or 6 mono cells (with battery insert BB 50-010). A five-step switch allows the setting of the directional characteristics. Depending on the type of batteries used the BB-50 can operate 15...50 hours.

INTERCONNECTING CABLES C 26 AND C 28s

The C 26 and C 28s interconnecting cables are designed for use between M 49c microphones and power supply. The C 28s cable is equipped with a special connector incorporating stand attachment (7/8", 1/2" and 5/8"-27 thread) with swivel joint. Cable C 26 is intended as extension cable only. The cable is approx. 33 feet long.

Special Model

Microphone and accessories are also

available in dark satin finish.

Accessories for M 49c

Table stand M 70

Floor stand M 72

Microphone suspension MZ 49

Microphone suspension Z 68 for inclining microphones hanging from the cable

CONDENSER MICROPHONE M 269c

The M 269c microphone resembles in its appearance the U 67, however, differs from it by the Telefunken triode AC 701k and the stepless remote control of the 3 directional characteristics. The potentiometer is attached to the power supply. When operating with "cardioid" response curve, remote control need not be applied. The "cardioid" characteristic can permanently be fixed which results in a sensitivity increase of 3...4 dB; the equivalent noise level decreases to the same extent. The switches for compensation of the increase at the low frequency end at close-talking and for preattenuation are built-in, as they are in the U 67. The M 269c microphone is equipped with the 7-pole RF-proof standard coupling.

Special Model

Microphone and accessories are also available in dark satin finish.

Technical Data

Directional Characteristics	Omni-directional, Cardioid, Figure-8
Frequency Range	30 to 16,000 cps
Output Levels	
Omni-dir.	0.9 mV/ μ b
Cardioid	1.0 mV/ μ b (1.55 mV/ μ b)
Figure-8	1.1 mV/ μ b
Noise Voltage	$\leq 1.5 \mu$ V
Omni-dir.	± 26 dB re $2 \times 10^{-4} \mu$ b (DIN 45 405)
Cardioid	± 27 (24) dB re $2 \times 10^{-4} \mu$ b (DIN 45 405)
Figure-8	± 28 dB re $2 \times 10^{-4} \mu$ b (DIN 45 405)
Maximum Sound Pressure for 0.5% harmonic distortion at 40, 1000 and 5000 cps (with overload protection)	100 μ b ± 114 dB (dB re $2 \times 10^{-4} \mu$ b) 320 μ b ± 124 dB (dB re $2 \times 10^{-4} \mu$ b)
Switchable Sensitivity Reduction	approx. 10 dB
Tube Complement	AC 701k
Source Impedance	200/50 Ω
Load Impedance	1000/250 Ω

Power Supplies NN 48h and N 52t

These units are to feed the microphone M 269c. Heater and plate voltages are stabilized. A fader serves as continuously adjustable remote control of the directional characteristics. The power supply NN 48h is portable (measurements: $8\frac{1}{16}'' \times 3\frac{1}{16}'' \times 4\frac{1}{4}''$). The power supply N 52t is a plug-in type unit (size 1) for installation in plug-in shelves and mixing consoles.

Battery Supply BB 50h

Where no AC mains is available there is the battery supply unit BB 50h (measurements $8\frac{1}{16}'' \times 3\frac{1}{16}'' \times 4\frac{1}{4}''$) for the alimentation of the microphone M 269c. By choice it can be supplied either with 4 DEAC accumulators SD 7 or 6 mono cells (with battery insert BB 50-010). A five-step switch allows the setting of the directional characteristics. Depending on the type of batteries used the BB 50 can operate 15...50 hours.

Microphone Cables KC 5 and KC 9, KC 7, and C 228s

The six-conductor cable connects the microphone M 269c with the power supply. The KC 5 is an extension cable, the KC 9 has a swivel stand mount with $\frac{3}{8}''$, $\frac{1}{2}''$, $\frac{3}{4}''$ thread to be screwed on microphone stands if intense high frequency interferences are expected the use of the RF-proof cables KC 7 (without swivel stand mount) and C 228s (with swivel stand mount) is recommended. The cables are approx. 33 feet long.

Accessories for M 269c

Table stand M 270

Floor stand M 272

Elastic suspension Z 48

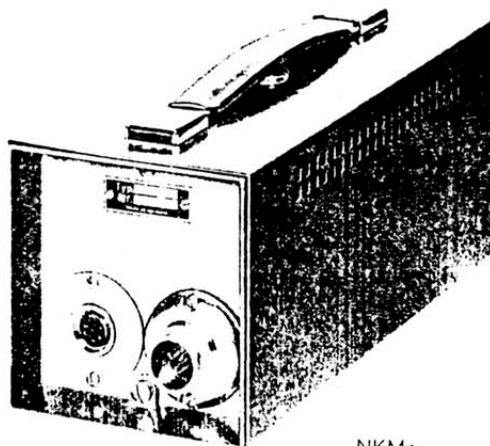
Microphone suspension Z 68 for declining microphones hanging on the cable

Wind and close talking guard WS 67

Adapter with goose-neck extension RF-proof Z 59

MINIATURE CONDENSER MICROPHONE KM 56c

The condenser microphone KM 56c belongs to a family of high quality miniature microphones which were developed to meet the special requirements of modern recording techniques. It is widely used in broadcasting, television, and film studios as well as in disc recording and high quality public address systems, since the directional characteristics omni-directional, cardioid, and figure-of-eight of this microphone can be altered by means of a switch. It is particularly useful where different types of recording problems are to be solved with one and the same microphone. Its small physical size enables it to be used unobtrusively. This makes it ideally suited for use in the centre of a round conference table, as an omni-directional microphone. As a cardioid microphone, the KM 56c is capable of rejecting unwanted noises from the back of film and television studios and thus can make first rate recordings even under acoustically unfavourable conditions.



NKMa



KM 56c

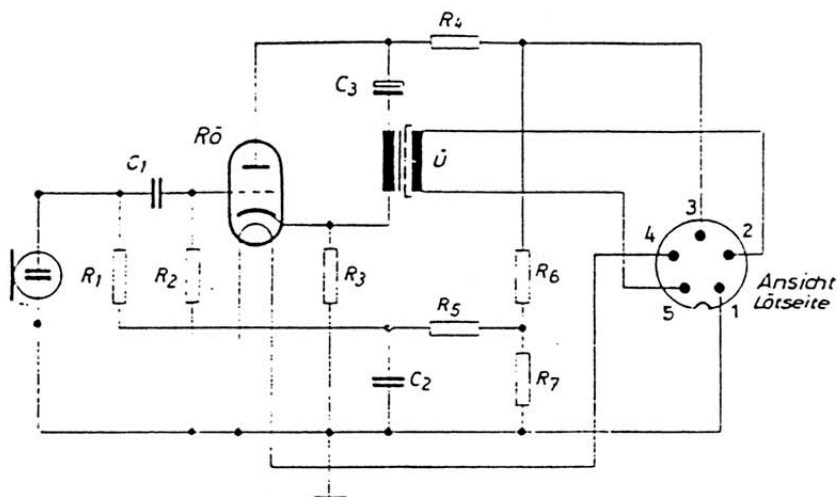
Technical Data

Frequency Response	40 to 15,000 cps
Directional Characteristics	omni-directional, cardioid (switchable)
Output Levels	0.8 mV μ b
Noise Voltage	5 μ V measured according to DIN 45405 $\pm$ 29 dB re $2 \times 10^{-4} \mu$ b
Maximum Sound Pressure for 0.5% Distortion at 40 cps, 1 kcps and 5 kcps	190 μ b $\pm$ 119 dB (dB re $2 \times 10^{-4} \mu$ b)
Source Impedance	200 50 Ω
Tube Complement	AC 701k
Dimensions	$1\frac{1}{4}''$ diam. x 6" long
Weight	4 oz.

MINIATURE CONDENSER MICROPHONE KM 63

The miniature microphone KM 63 is a pressure transducer with a polyester diaphragm giving omni-directional response. The frequency response is linear except for a slight intentional rise at the high frequency end. This microphone is, therefore, particularly suitable for capturing the overall effect of complex sound sources. The KM 63 is closely related to the KM 64, thus it can be converted to a cardioid-microphone by simply replacing the capsule. To avoid overloading the microphone amplifier when recording very loud solo instruments at close range, a 10 dB attenuator can be switched in between the capsule and the microphone valve. This enables the highest sound levels that are likely to be met in practice, to be recorded without distortion.

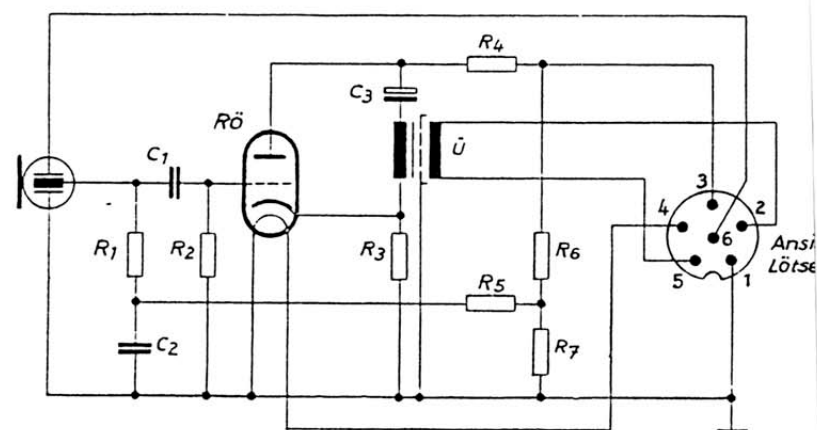
Schaltschema des Kondensatormikrofones CMV 563



Schaltteilliste:

R 1	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 2	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 3	Schichtwiderstand	1,5 k Ohm 0,25 W 5% TGL 46 16
R 4	Schichtwiderstand	47 k Ohm 0,5 W 5% TGL 46 16
R 5	Schichtwiderstand	5,6 M Ohm 0,25 W 10% TGL 46 16
R 6	Schichtwiderstand	1 M Ohm 0,25 W 5% TGL 46 16
R 7	Schichtwiderstand	2,2 M Ohm 0,25 W 5% TGL 46 16
C 1	Kunstfolien-Kondensator	1000 pF 125 V TGL 51 55
C 2	Duroplast-Kondensator	0,01 μ F 160 V TGL 92 91
C 3	Kleinst-Elektrolyt-Kondensator	1 μ F 150 V TGL 71 99
Ü	Mu-Metall-Übertrager	Bv-Ü 551
Rö	Röhre (rausch- und klingarm)	EC 92

Schaltschema des Kondensatormikrofones UM 57



Schaltteilliste

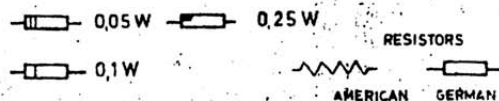
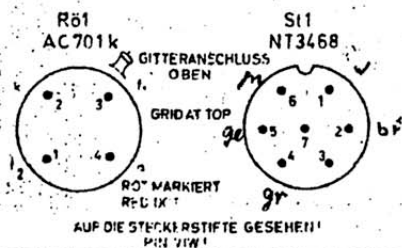
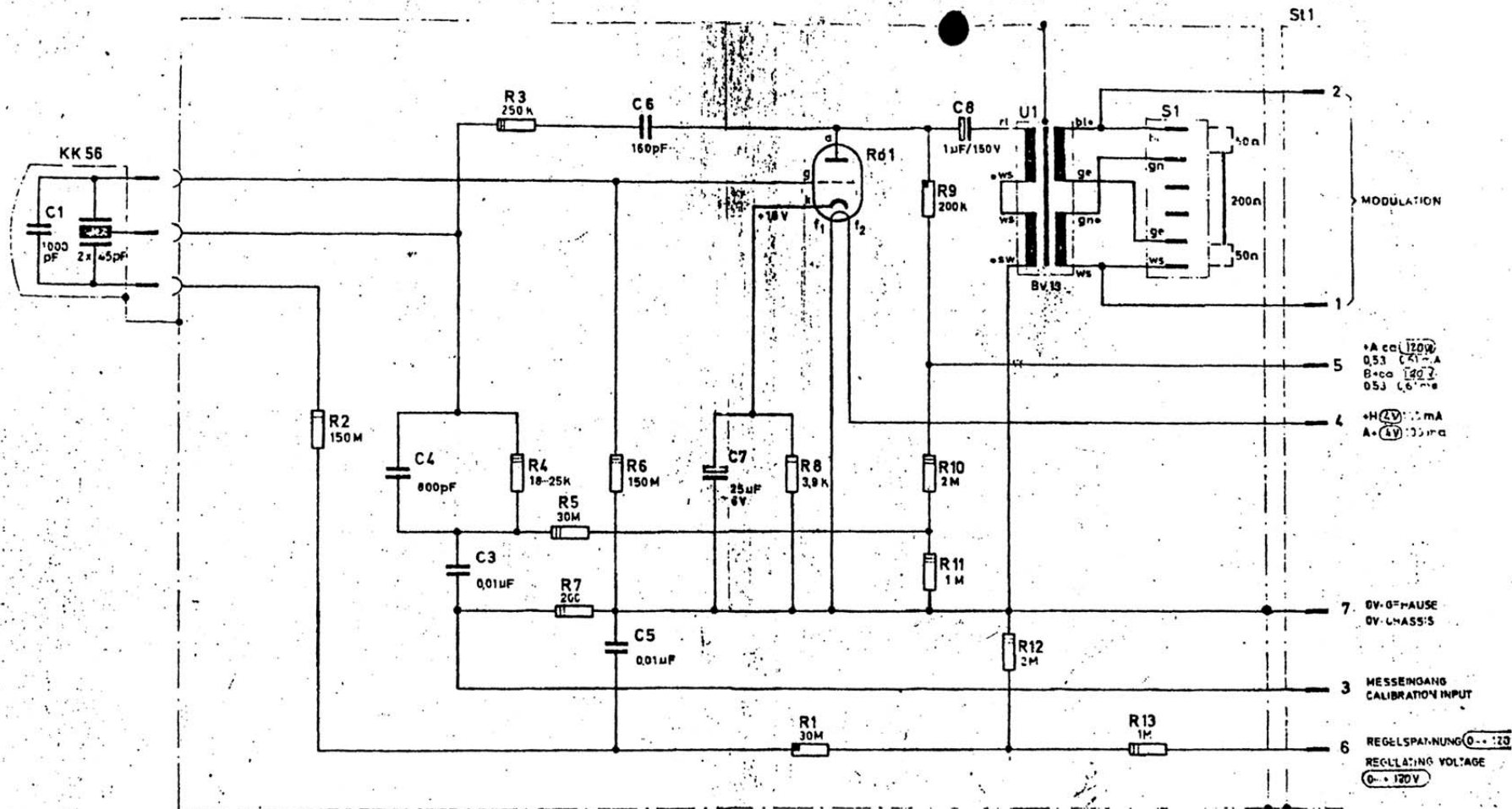
R 1	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 2	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 3	Schichtwiderstand	1,5 k Ohm 0,25 W 5% TGL 87 28
R 4	Schichtwiderstand	47 k Ohm 0,5 W 5% TGL 87 28
R 5	Schichtwiderstand	5,6 M Ohm 0,25 W 10% TGL 87 28
R 6	Schichtwiderstand	1 M Ohm 0,25 W 5% TGL 87 28
R 7	Schichtwiderstand	1 M Ohm 0,25 W 5% TGL 87 28
C 1	Kunststoffolie-Kondensator	1000 pF 125 V TGL 51 55
C 2	Polyester-Kondensator	0,01 μ F 250 V
C 3	Elektrolyt-Kondensator	1 μ F 150 V
Ü	Mu-Metall-Übertrager	Bv-Ü 551
Rö	Empfängerröhre (rausch- und klingarm)	EC 92 TGL 96 30

GEORG NEUMANN & CO
ELEKTROTECHNISCHES LABORATORIUM
6552 GEFELL VOGTL. FERNRUF 185



GEORG NEUMANN & CO
- MIKROFONE -
6552 GEFELL FERNRUF 262-264





GULTIG AB GERÄT Nr. 422
BEGINNING WITH SERIAL NO. 422

SPANNUNGSWERTE STÄTIG GEMESSEN!
STATICALLY MEASURED VOLTAGE!
BEI ERSETZTEILLOSSTELLUNG BITTE GERÄT-NR. O. POS. ZAHLEN ANGEBEN
FOR REPLACEMENTS PLEASE ALWAYS GIVE SERIAL & PART NUMBER

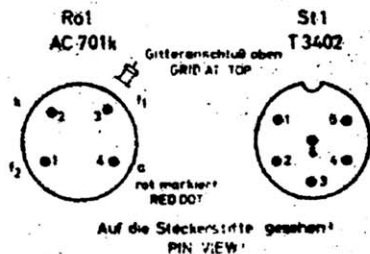
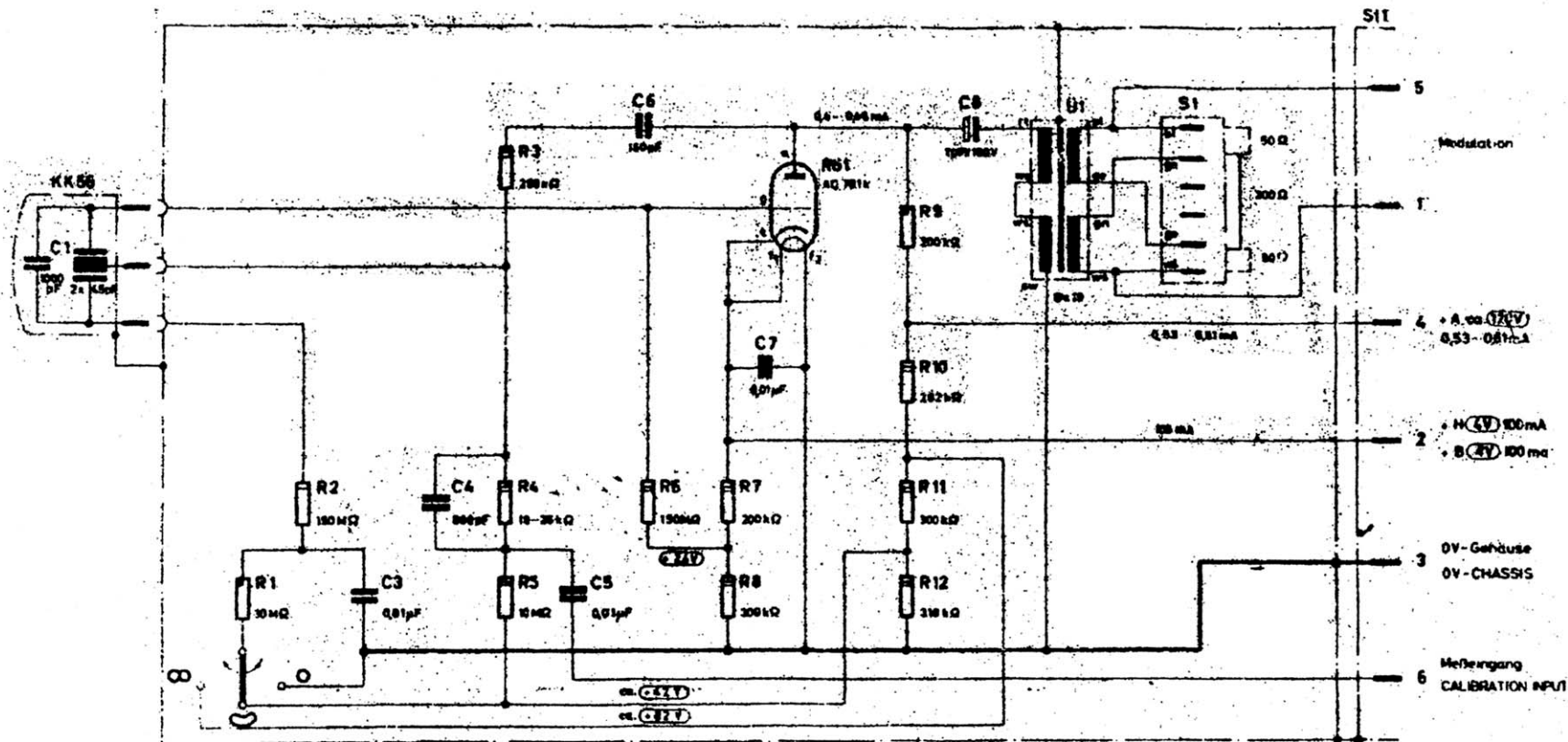
KONDENSATOR - KLEINMIKROPHON - KM 256 F
MINIATURE - CONDENSER-MICROPHONE - KM 256 F
KM 256 F-930-00



GEORG NEUMANN

Laboratorium für Elektroakustik G.m.b.H.

BERLIN



0,05 W
DIN 41398

0,1 W
DIN 41398

0,25 W
MIL-R10505

Spannungswerte statisch gemessen!
STATICALLY MEASURED VOLTAGE!

Bei Ersatzteilbestellung bitte Gerät-Nr u Pos Zahlen angeben
FOR REPLACEMENTS PLEASE ALWAYS GIVE SERIAL & PART NUMBER

Kondensator - Kleinmikrophon
KM 56

KM56-00-00-00 S

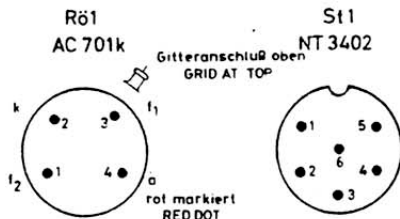
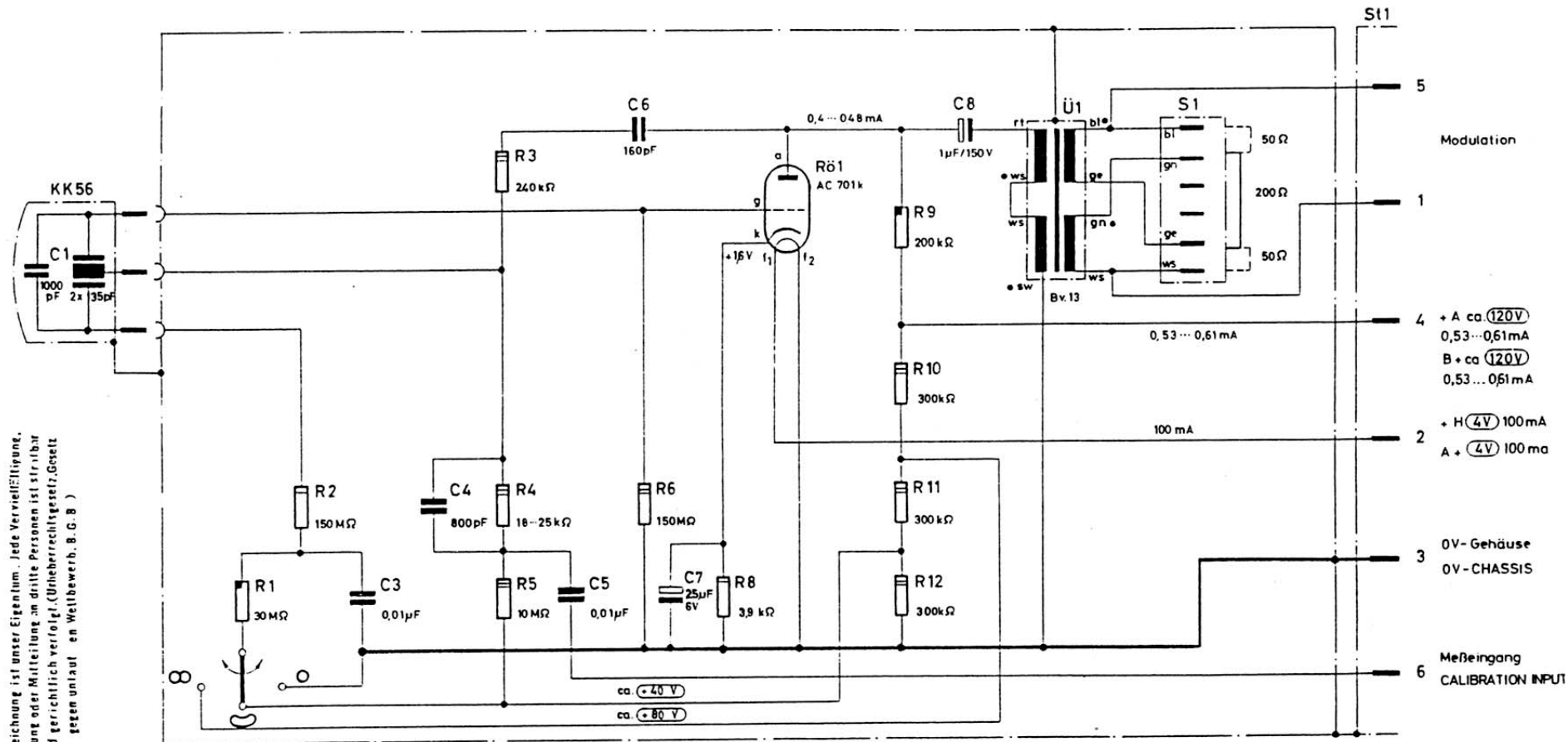
(Ab Gerät-Nr 1645)

BEGINNING WITH SERIAL NUMBER 16451

GEORG NEUMANN



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Auf die Steckerstifte gesehen!
PIN VIEW!

- 0,05 W
DIN 41398
- 0,1 W
DIN 41399
- 0,25 W
MIL-R10509

Spannungswerte statisch gemessen!
STATICALLY MEASURED VOLTAGE!

Bei Ersatzteilbestellung bitte Gerät-Nr. u. Pos. Zahlen angeben.
FOR REPLACEMENT PLEASE ALWAYS GIVE SERIAL & PART NUMBER.

RESISTORS
AMERICAN GERMAN

Kondensator-Kleinmikrophon
MINIATURE-CONDENSER-MICROPHONE
KM 56c

KM56c-930-01

(Ab Gerät - Nr. 3220)
(BEGINNING WITH SERIAL NUMBER 3220)

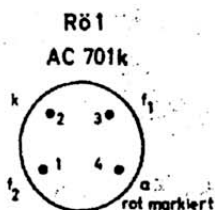
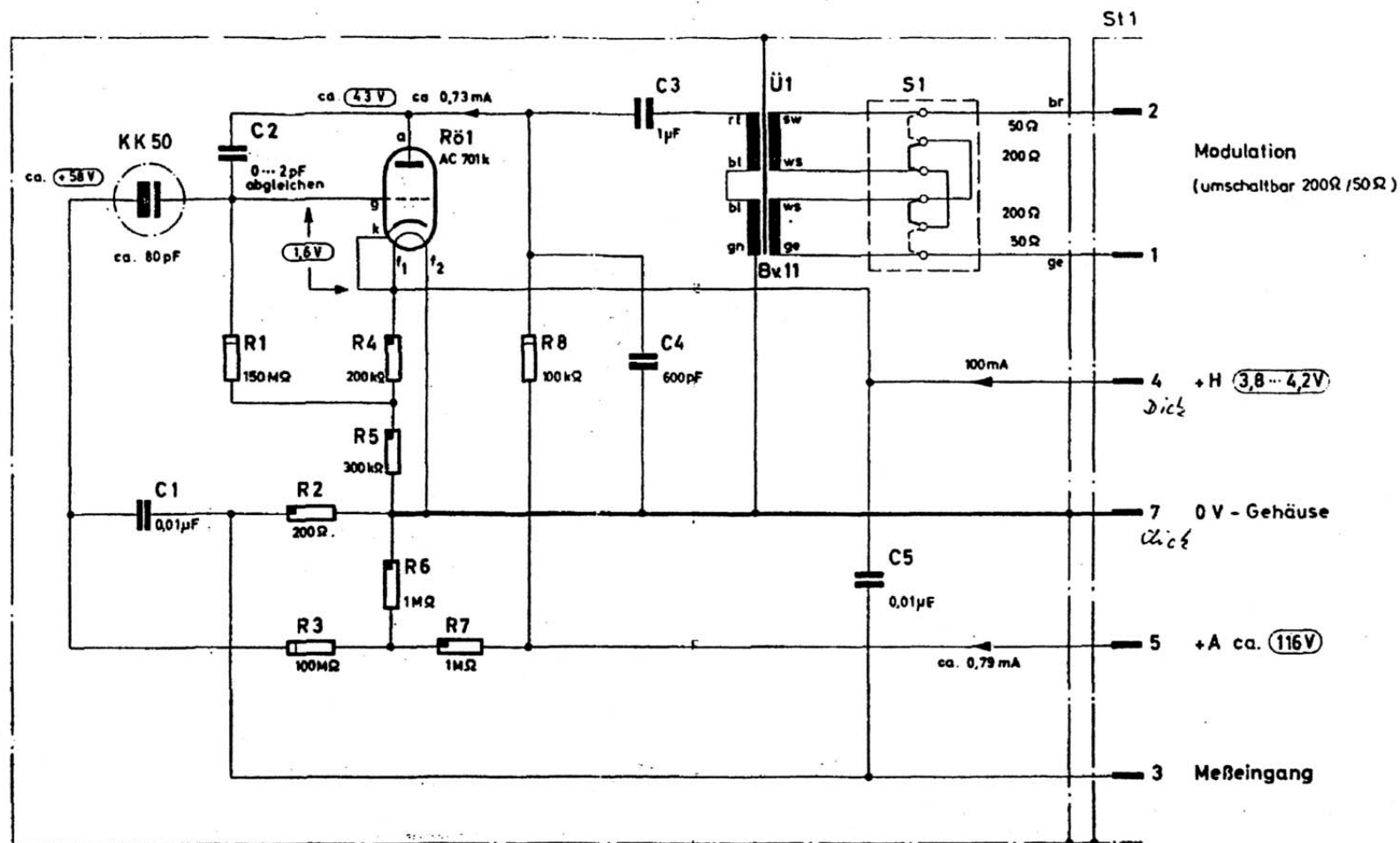


GEORG NEUMANN

Laboratorium für Elektrotechnik GmbH

BERLIN

16.9.1966



0,1 W
DIN 41399

0,25 W
DIN 41401

Spannungswerte statisch
gemessen.

Bei Ersatzteilbestellung bitte Gerät-Nr. u. Pos.-Zahlen angeben!

Kondensatormikrofon M 250b
M250b-00-00-00S

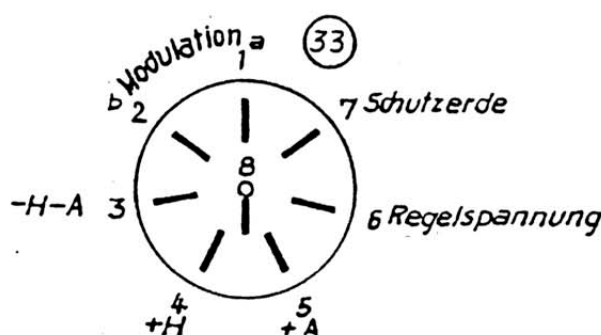
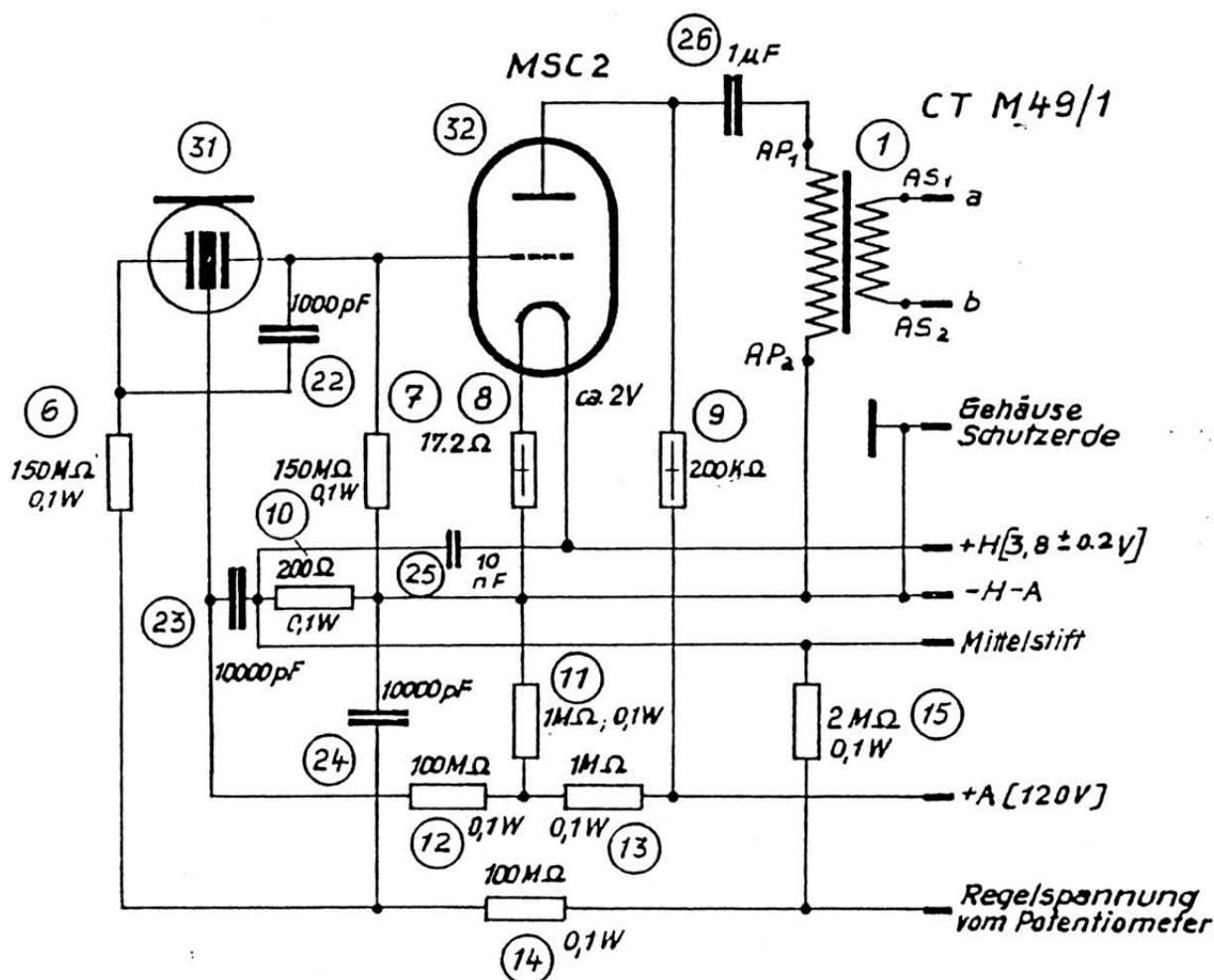


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Laboratorium für Elektroakustik GmbH.

BERLIN 20 10209

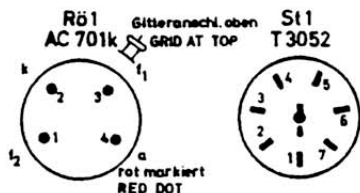
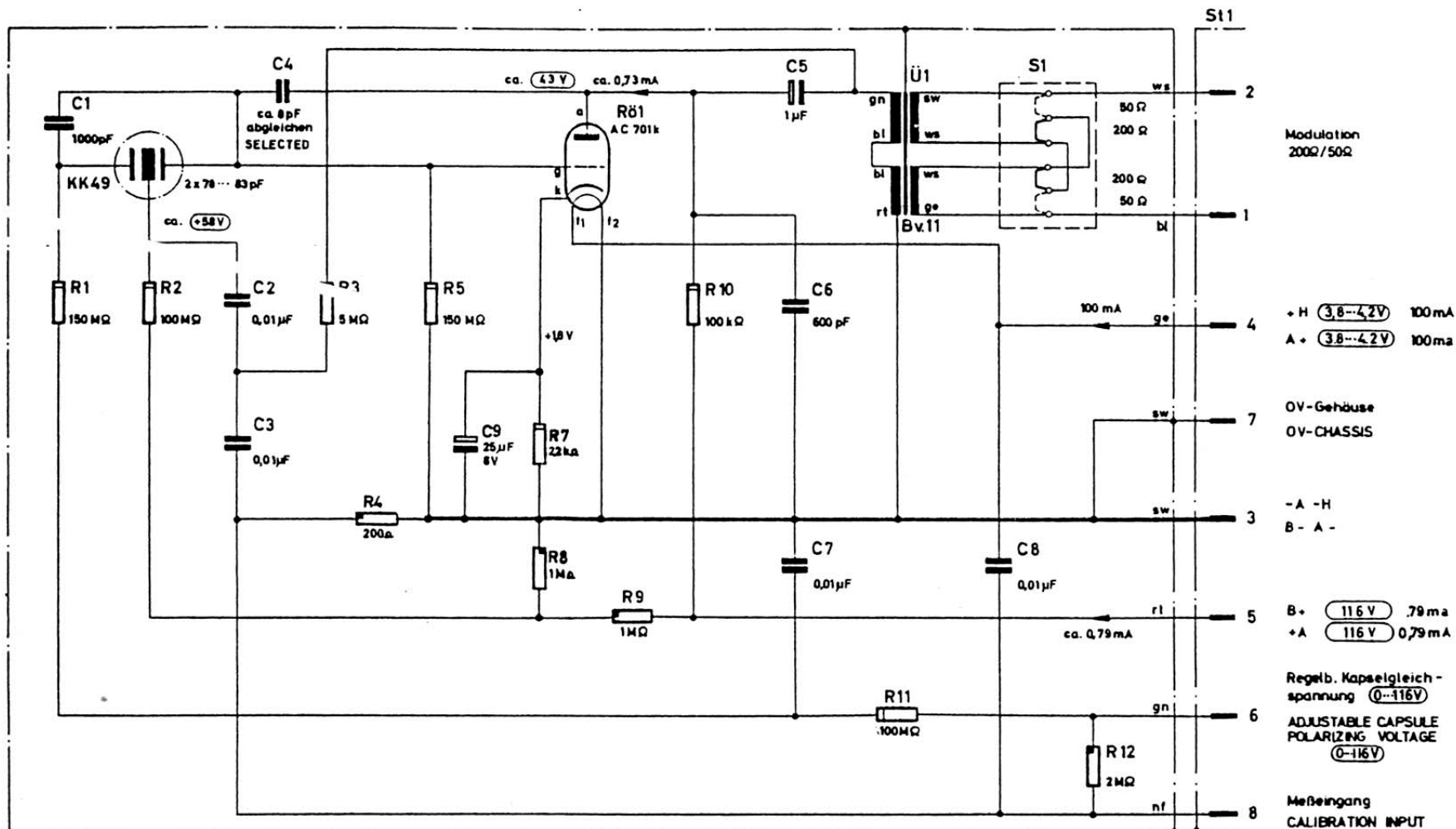
13.12.60
16.12.60



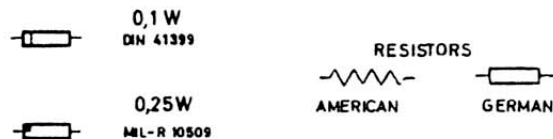
Gegen die Lötflächen des Steckers gesehen

Werkstoff:

 NWD R ZENTRALTECHNIK	Br. - Buch Nr.	Gez.	23.1.51	M	d	17.4.53	Fz.	A 367
	M49	Konstr.	7.7.51		c	5.8.52	Kr	A 342
		Gepr.	7.7.51		b	6.2.51	Kr	A 263
		Geseh.	8.2.50		a	21.12.50	Kr	A 253
		Index	Dat.		Name	Änderg.		
<i>Mikrofon mit veränderbarer Richtcharakteristik M49</i>				Zeichnung Nr.				
				S 536				
				Anz. d. Bl'		Blatt		



Auf die Steckerliste gesehen!
PIN VIEW!



Spannungswerte statisch gemessen!
STATICALLY MEASURED VOLTAGE!

Bei Ersatzteilbestellung bitte Gerät-Nr.u.Pos.Zahlen angeben.
FOR REPLACEMENTS PLEASE ALWAYS GIVE SERIAL & PART NUMBER.

Kondensatormikrophon
CONDENSER-MICROPHONE M49c
M49c-930-02

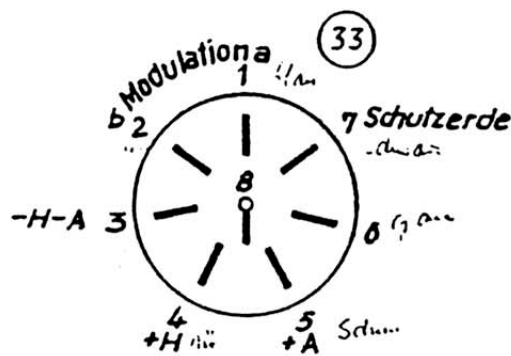
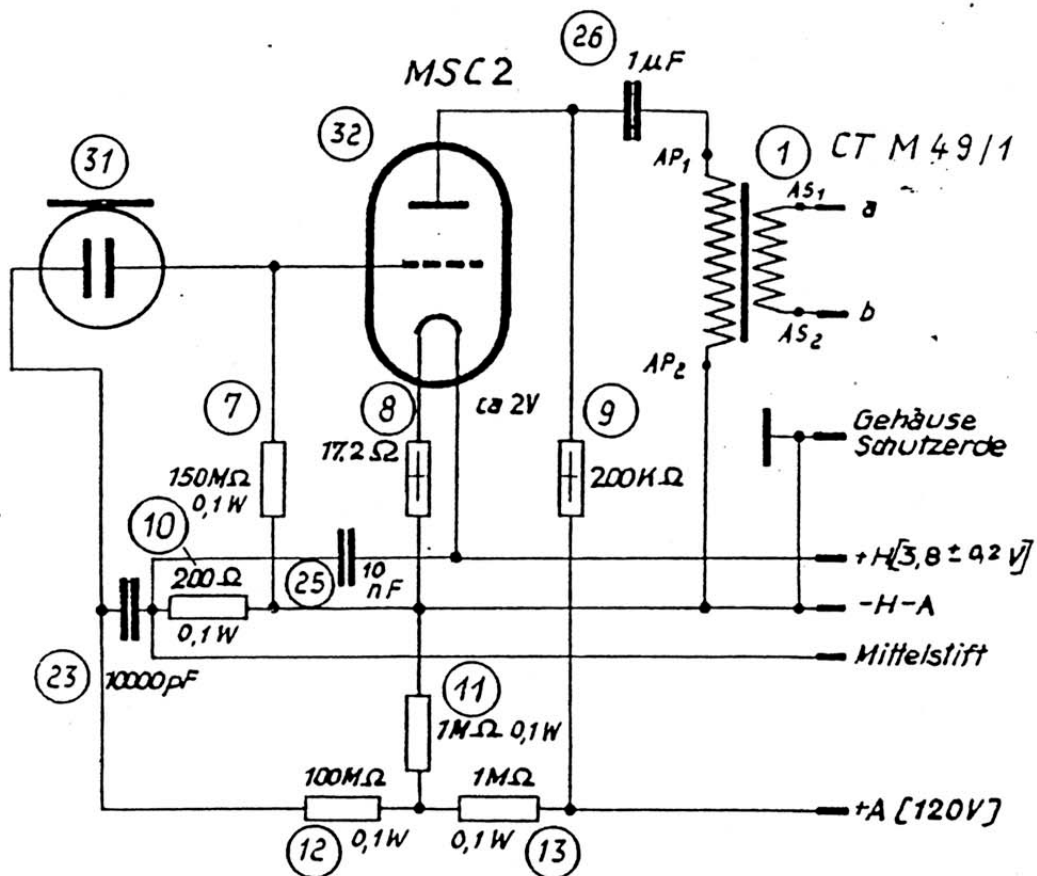
GÜLTIG AB GERÄT-NR. 2786
BEGINNING WITH SERIAL No 2786



GEORG NEUMANN

Laboratorium für Elektrotechnik GmbH

BERLIN



gegen die Lötflächen des Steckers gesehen

Werkstoff:



Br. - Buch Nr.	Gez.	23.7.57	M	c	5.11.52	kl.	A 352
M 50	Konstr.	7.2.57		b	7.8.52	K	A 343
	Gepr.	7.7.57		a	6.2.57	K	A 263
	Geseh.	1.2.50					
				Index	Dat.	Name	Änderg.
Mikrofon M50				Zeichnung Nr.			
				5713			

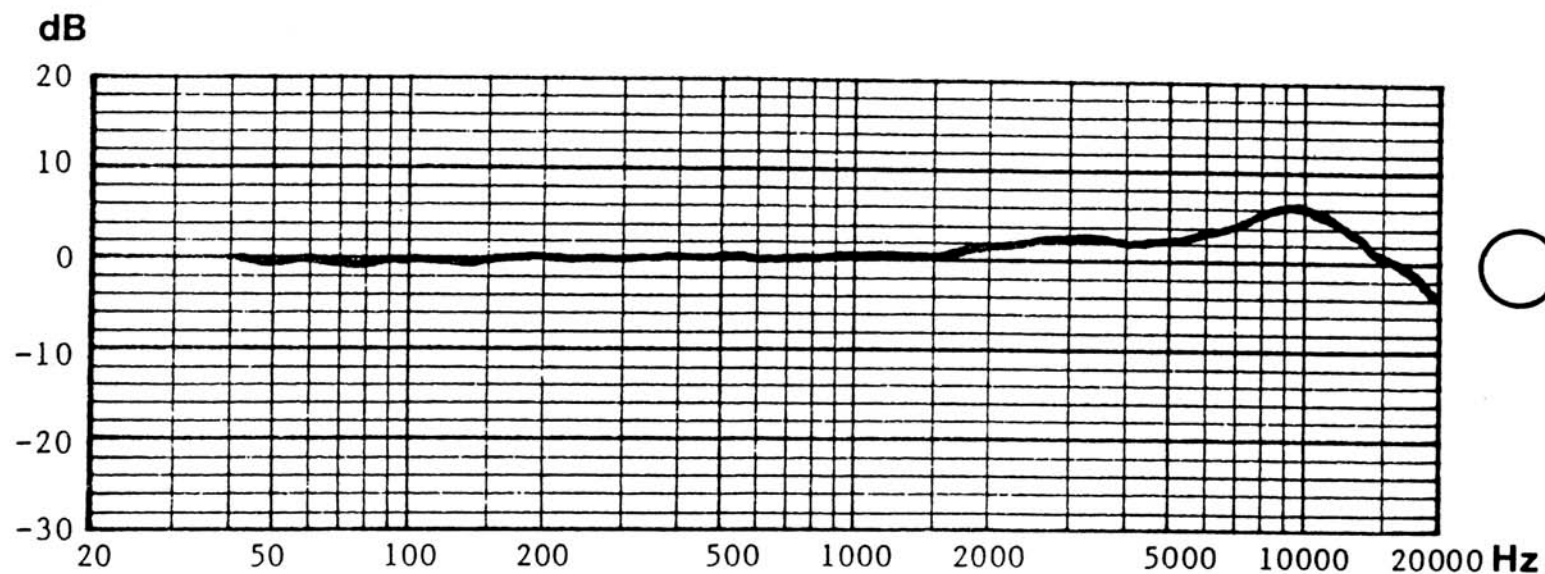


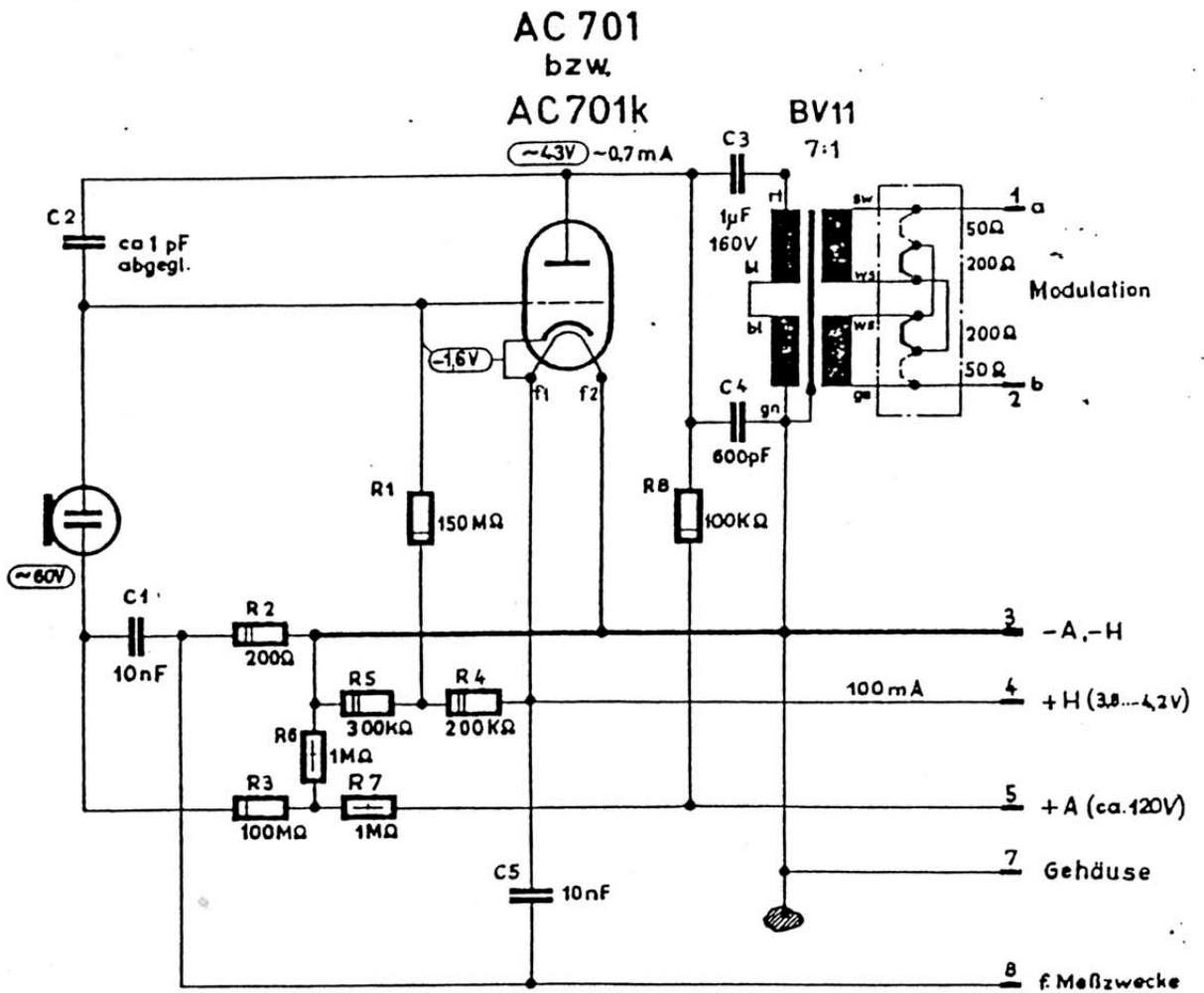
Abb.4

0°-Frequenzgang des Röhrenmikrophons M 50

Fig. 4

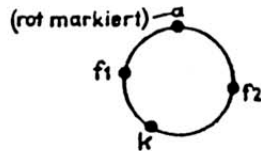
0°-Frequency response of the M 50 tube microphone

GEORG NEUMANN GMBH



**AC 701
AC 701k**

Gitteranschluß oben



Auf den Röhrenfuß gesehen

T 3052



Auf die Steckerstifte
gesehen

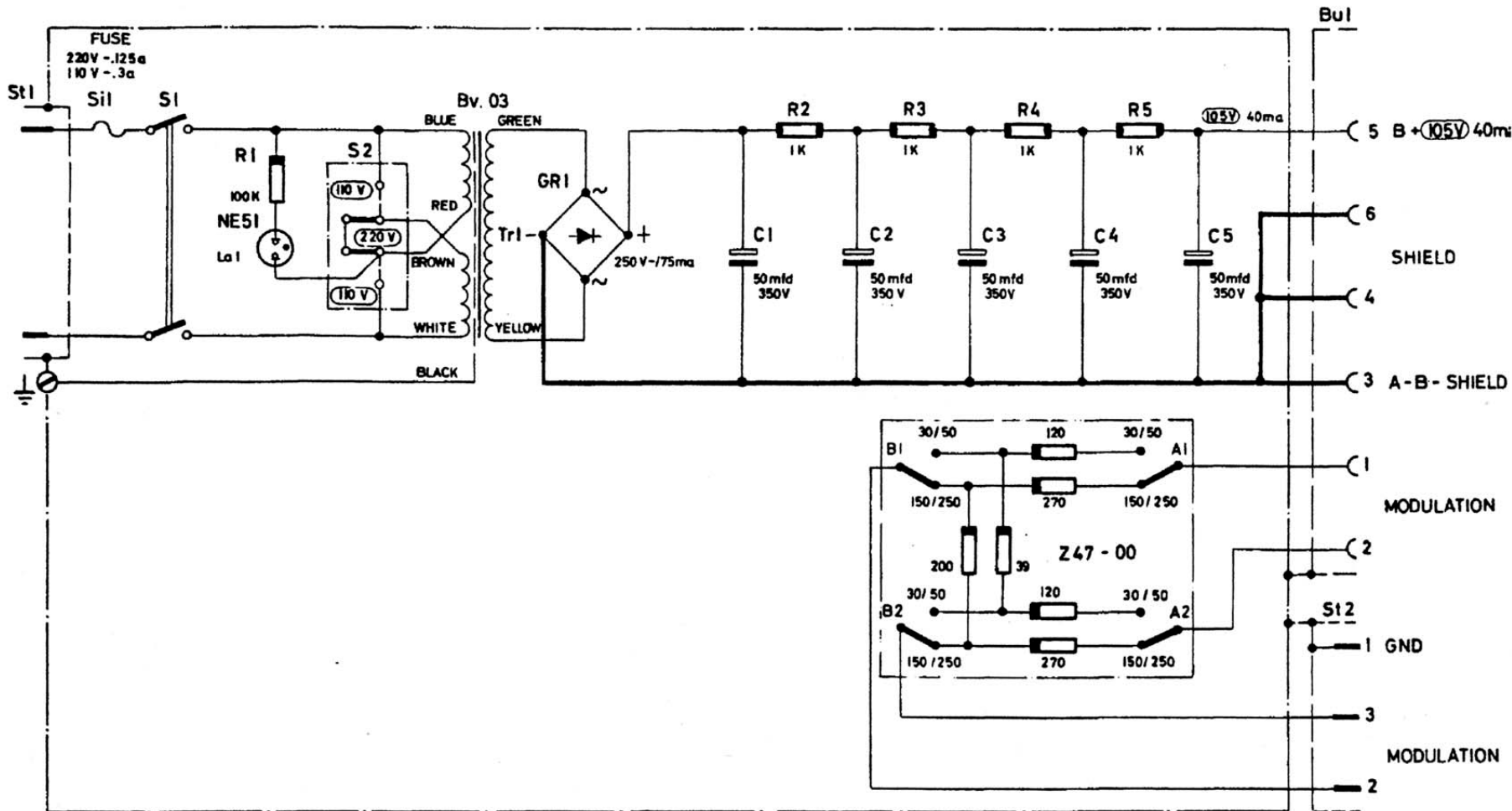
Alle Spannungswerte
statisch gemessen

Werkstoff:

Entspricht M50b/3-S(4) der Fa. G. Neumann

IRT	Br.-Buch Nr.	Gez.	1.12.58	M				
	M50b	Konstr.						
		Gepr.	1.12.58					
		Geseh.						
	Kapazitives Druckmikrofon M50b				Index	Dat.	Name	Anderg.
				Zeichnung Nr.				
				S 1189				
				Anz. d. Bl.				Blatt

POWER



Bu 1
T 3040

St 2
CANNON XLR 3-32

.5W
MIL - R10509

2W
DIN 41413

VOLTAGES

RESISTORS

AMERICAN GERMAN

FOR REPLACEMENTS ALWAYS GIVE SERIAL & PART NUMBER
NGu - 00 - 00 - 00 S

POWER SUPPLY
NGu

GOTHAM AUDIO CORPORATION

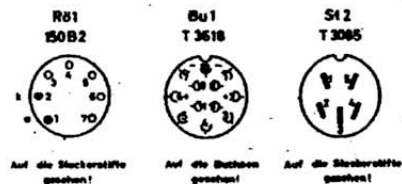
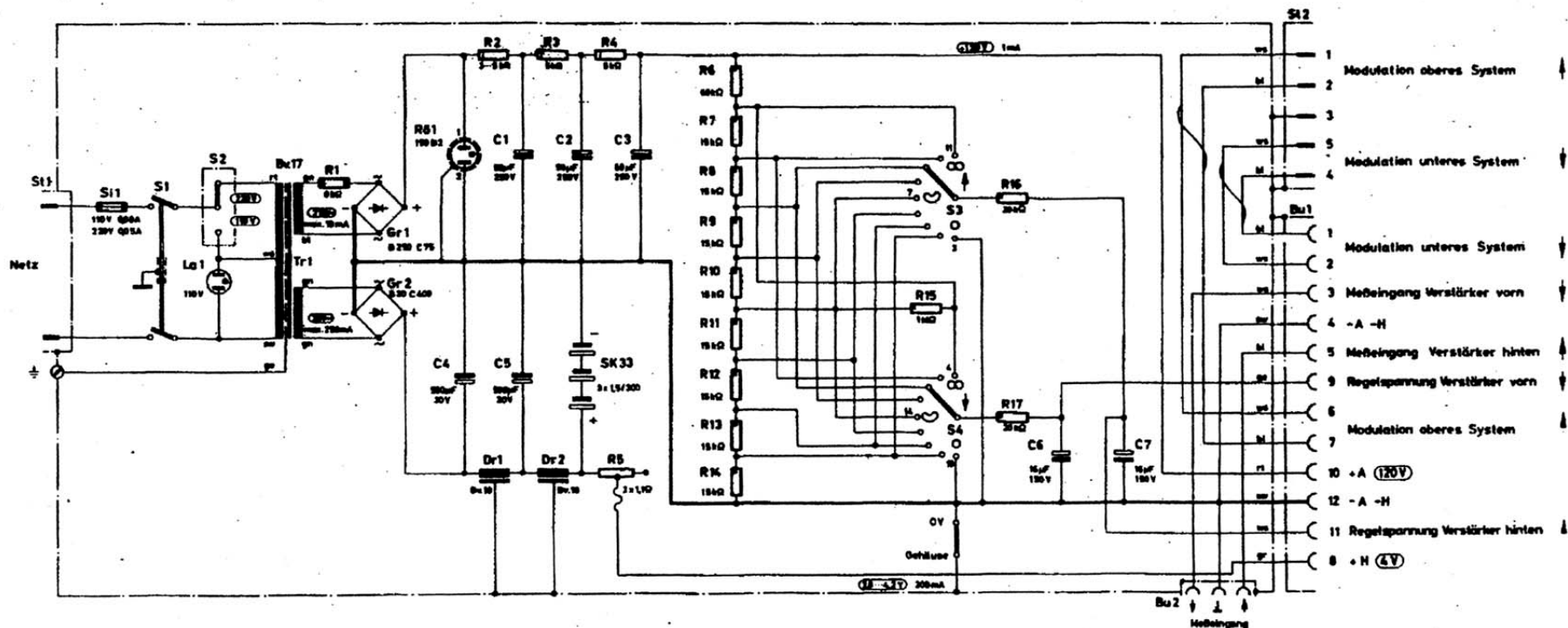
2 WEST 46 STREET, NEW YORK 36, N.Y. COLUMBUS 5-4111



SOCKET VIEW



PIN VIEW



Bei Ersatzteilbestellung bitte Gerät - Nr. u. Pos. Zahlen angeben!

Netzgerät NSM
NSM-00-00-00S

GEORG NEUMANN
Laborium für Elektrotechnik GmbH
BERLIN

STEREO CONDENSER MICROPHONES SM 2c AND SM 23c

The SM 2c and SM 23c are members of the NEUMANN high quality condenser microphone family and a marvel of precision and miniaturization. Designed to operate in the "M-S" or "Intensity" stereo recording manner these microphones actually consist of two separate and non-interacting double-condenser systems in the same miniature case. Both microphone systems are independent, allowing the microphones to be used for any application where two microphones of unequal directional characteristics are required. They can also serve as regular and emergency microphones in one for recording speeches or other events where extra operational security is needed.

In the SM 2c and SM 23c, two condenser capsules are mounted one above the other, with the lower fixed and facing the NEUMANN name plate. The upper element can be turned by means of a coin slot on top of the unit through an arc of 270 degrees. Each of the capsules has its own impedance matching amplifier. Both capsules and amplifiers are located in the same case with signal separation greater than 45 dB. Two remote control switches located on the double power supply permit for the SM 2c the individual adjustment of each capsule to any of the three basic directional patterns as well as six intermediate ones.

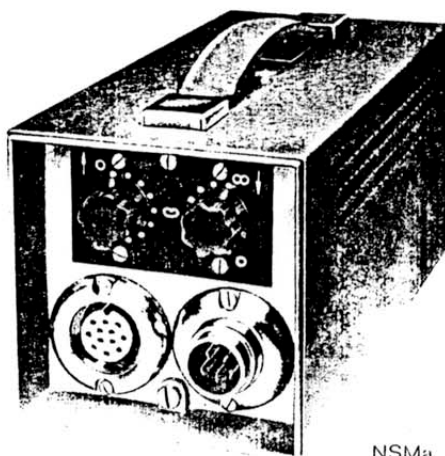
The difference between the SM 2c and the SM 23c is that the SM 23c may be operated with a double power supply as well as via an adapter Z 10 (Z 11) by means of two single power supplies or two battery supplies. The SM 2c, however, can be operated with one double power supply only.

Technical Data

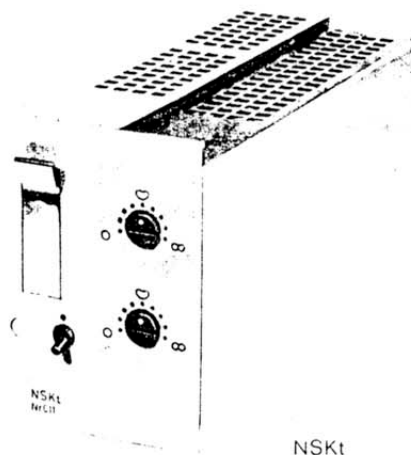
Frequency Response	40 to 15,000 cps
Directional Characteristics	omni-directional, cardioid, figure-of-8 (remote controlled)
Output Levels	1.0 mV/dyne/cm ²
Noise Voltage	$\leq 5 \mu V \pm 28$ dB re $2 \times 10^{-4} \mu b$ (DIN 45405)
Maximum Sound Pressure for 0.5% distortion at 40 cps, 1 kcps and 5 kcps	$\geq 245 \mu b \pm 121$ dB (dB re $2 \times 10^{-4} \mu b$)
Source Impedance	200 50 Ω
Tube Complement	2 x AC 701 k
Dimensions	1 1/8" diam. x 8" long
Weight	1.1 lb.

DOUBLE CONDENSER MICROPHONE SM 69

The double condenser microphone SM 69 is a high quality studio microphone for stereophonic recordings. It has been developed for the various types of intensity techniques. As the SM 69 consists of two completely independent microphones in one unit, it may be used for single channel recordings whenever two microphones with different directional characteristics are



NSMa



NSKt

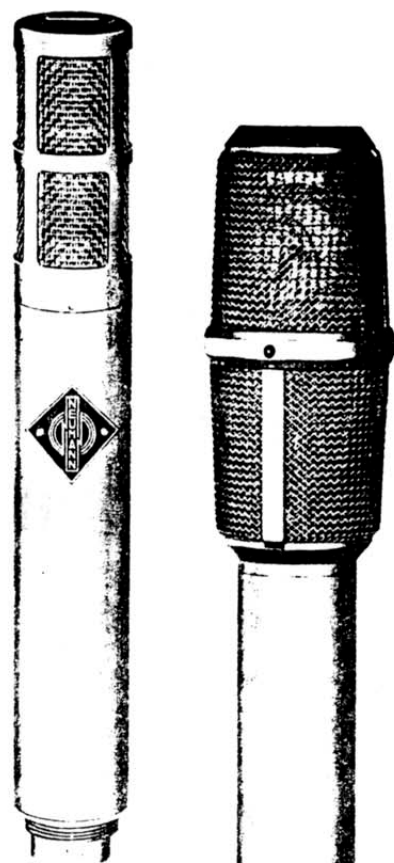
needed in one particular position.

The double microphone SM 69 consists of a capsule head containing two microphone capsules which are mounted closely one above the other and are rotatable, and the amplifier section containing two complete microphone amplifiers.

The microphone connections are brought out so as to enable it to be fed either from a double power supply unit or from two separate single power supply units.

Technical Data

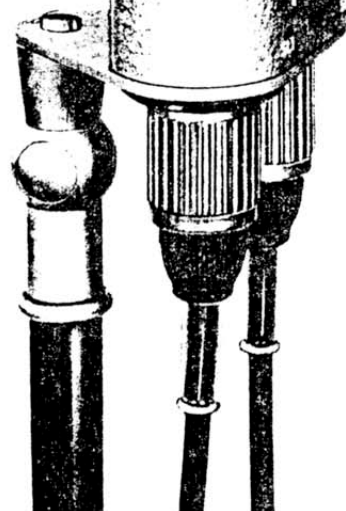
Directional Characteristics	omni-directional, cardioid, figure-of-8 (remote controlled)
Output Level	app. 1.5 mV μb
Weighted Noise Voltage	$3.5 \mu V \pm 22$ dB re $2 \times 10^{-4} \mu b$ (DIN 45405)
Channel Separation	45 dB
Source Impedance	200/50 Ω
Maximum Sound Pressure for 0.5% distortion at 40 cps, 1 kcps, and 5 kcps	166 $\mu b \pm 118$ dB (dB above $2 \times 10^{-4} \mu b$)
Tube Complement	2 x AC 701 k
Dimensions	1 3/16" Φ and 1 1/8" Φ ; length 10"
Weight	approx. 1 lb.



SM 2c, SM 23c

SM 69, Z 11-90,

2 x KC 5



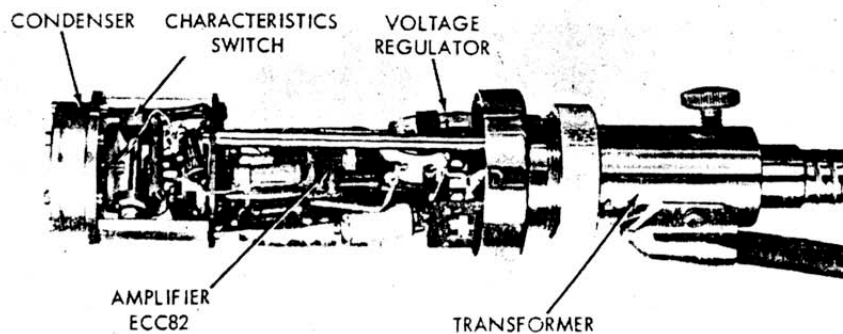


Fig. 10. Internal view of Teladi condenser microphone. (Courtesy Durant Sound Company)

and plate form a capacitor¹ having a value of a few micromicrofarads. A d.c. voltage, between 100 and 200 volts, is applied through several megohms resistance to the diaphragm, causing the capacitor to charge. Sound waves striking the diaphragm cause it to move very slightly toward and away from the plate, thus changing the capacitance. The ability of a capacitance to store current (accept a charge) varies with the value of the capacitance. When the diaphragm moves toward the plate, the capacitance is increased, resulting in current flow toward the capacitance. The current flows through the large resistor R_1 , producing an a.c. voltage across R_1 . Conversely, when the diaphragm moves away from the plate, the capacitance is decreased, resulting in current flow away from the capacitance. Current again flows through R_1 but in the opposite direction, producing an a.c. voltage of opposite polarity across R_1 . The a.c. voltages resulting from the movements of the diaphragm are fed to the grid of a tube enclosed in the microphone. The tube serves as an amplifier and to isolate the capacitor from the following circuitry. (The capacitor has extremely high impedance, and if it is to work properly it must work into a very high load resistance. The tube supplies such a load. On the other hand, the output of

the tube has suitably low impedance so that the signal may be fed without losses to the next stage.)

A power supply is required to provide a high d.c. voltage to the microphone element as well as to supply the current required by the tube in the microphone housing. The power supply is connected by cable to the microphone. The principal disadvantage of the condenser microphone, is its need for a relatively bulky and cumbersome power unit that must go wherever the microphone goes. However, it is possible to operate the microphone at a considerable distance from the power supply, so that the former does have some independence of movement.

Figure 10 is an internal photo of a condenser microphone, and Fig. 11 shows internal and external views of another condenser microphone and its associated power supply; note that there are two condenser elements for stereo use.

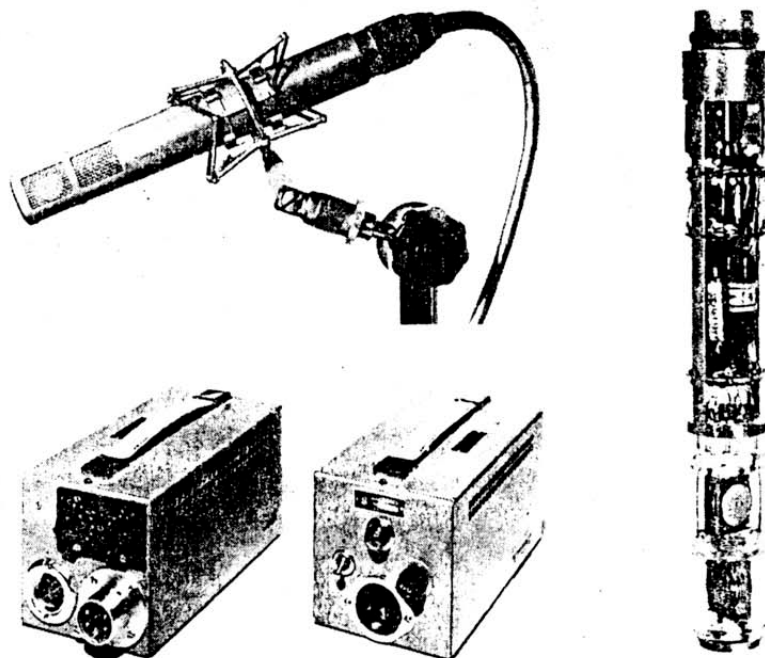


Fig. 11. (A) Internal and (B) external views of Telefunken SM-2 stereo condenser microphone and (C) power supply. (Courtesy Gotham Audio Sales Co. Inc.)

¹ Use of the word "condenser" has practically disappeared from serious electronic literature, partially as a result of instruction manuals for the armed services. Navy brass maintains that a condenser is a device in which steam is reduced to water, and does not permit use of the word in electronic manuals to describe the device which has the property of capacitance—a capacitor. Only place where condenser is used acceptably is to describe this particular type of microphone. This may explain Audio's consistent use of "capacitor," although a sentence like "This capacitor has a capacitance of 82 μf " may sound strange. "Capacity" is often used incorrectly where "capacitance" is meant, but should only refer to ability of a container to hold a specified amount, or in a phrase like "... power handling capacity. . . ." The device which has the property of inductance is correctly called an inductor. Ed.

impedance

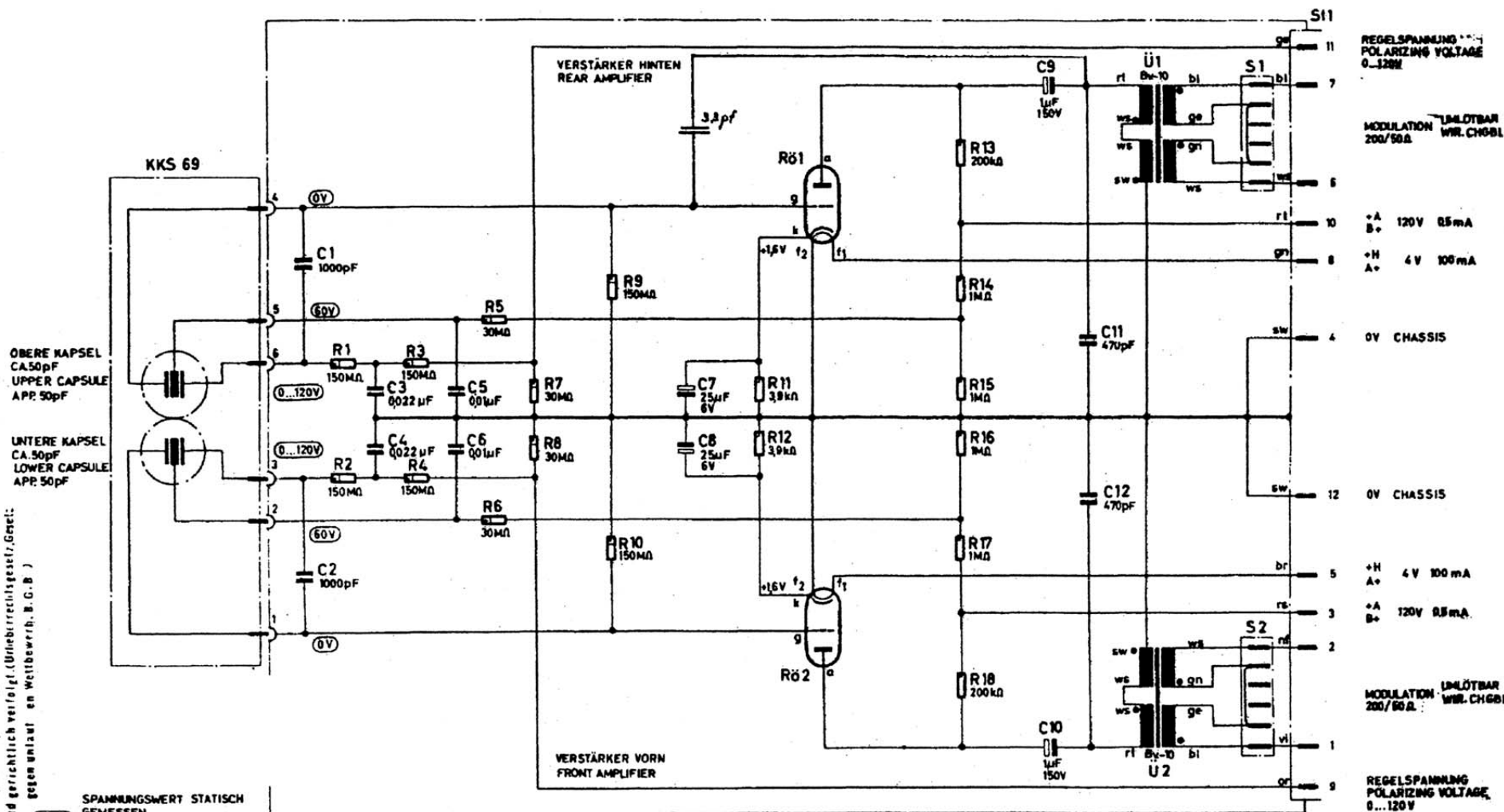
Dynamic and ribbon microphones are low-impedance devices. This signifies that they produce, in relative terms, high signal current and low signal voltage. But the tape recorders in common use employ voltage amplifiers rather than current amplifiers. Therefore it is of little value that the microphone turns out a relatively large current.

Accordingly, it is necessary to step up the voltage produced by the microphone, which is done by a miniature transformer within the microphone housing. This results not only in a higher output voltage but also in a higher output impedance. Unfortunately, as the output impedance goes up, the microphone becomes more susceptible to treble losses caused by capacitance across the output. The principal source of such capacitance is the cable leading from the microphone to the tape recorder.

The so-called high-impedance microphones of the dynamic and ribbon type usually have an impedance in the range of 10,000 to 50,000 ohms; 25,000 ohms is typical. Hence one cannot use much more than 10 to 15 feet of microphone cable without endangering treble response. The microphone manufacturer can provide exact information as to permissible cable length for his units. Obviously, the use of low-capacitance cable will permit one to maximize the length.

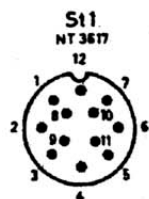
To permit long runs of microphone cable, many dynamic and ribbon microphones employ only a limited step-up of voltage and concomitantly have a low output impedance. The values most commonly encountered are 30, 50, 100, 150, 200, 250, and 600 ohms. These output

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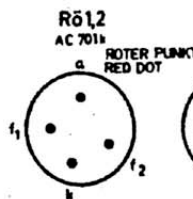


SPANNUNGSWERT STATISCH
GEMESSEN
VOLTAGES STATICALLY
MEASURED

UMSCHALTUNG 200/50 AUF 50
CHANGING OVER FROM 200.0 TO 50.0



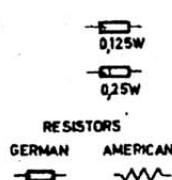
AUF DIE STECKER
GESEHEN
PIN VIEW



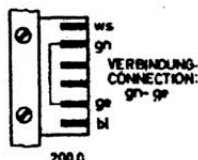
GITTERANSCHLOßEN
GRID AT THE TOP
AUF DIE LÖTANSCHL.
GESEHEN
SOLDERING SIDE VIEW



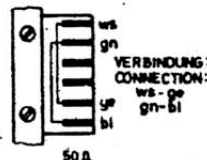
AUF DIE BUCHSEN
GESEHEN
SOCKET VIEW



RESISTORS
GERMAN AMERICAN



VERBINDUNG:
CONNECTION:
gn - sp



VERBINDUNG:
CONNECTION:
ws - gn
ws - bl

BEI ERSATZTEILBESTELLUNG BITTE GERÄT-NR. U POS.ZAHLEN
ANGEBEN!
FOR REPLACEMENT ALWAYS GIVE SERIAL & PART NUMBER!

GÜLTIG AB GERÄT-NR 1078
BEGINNING WITH SERIAL No 078

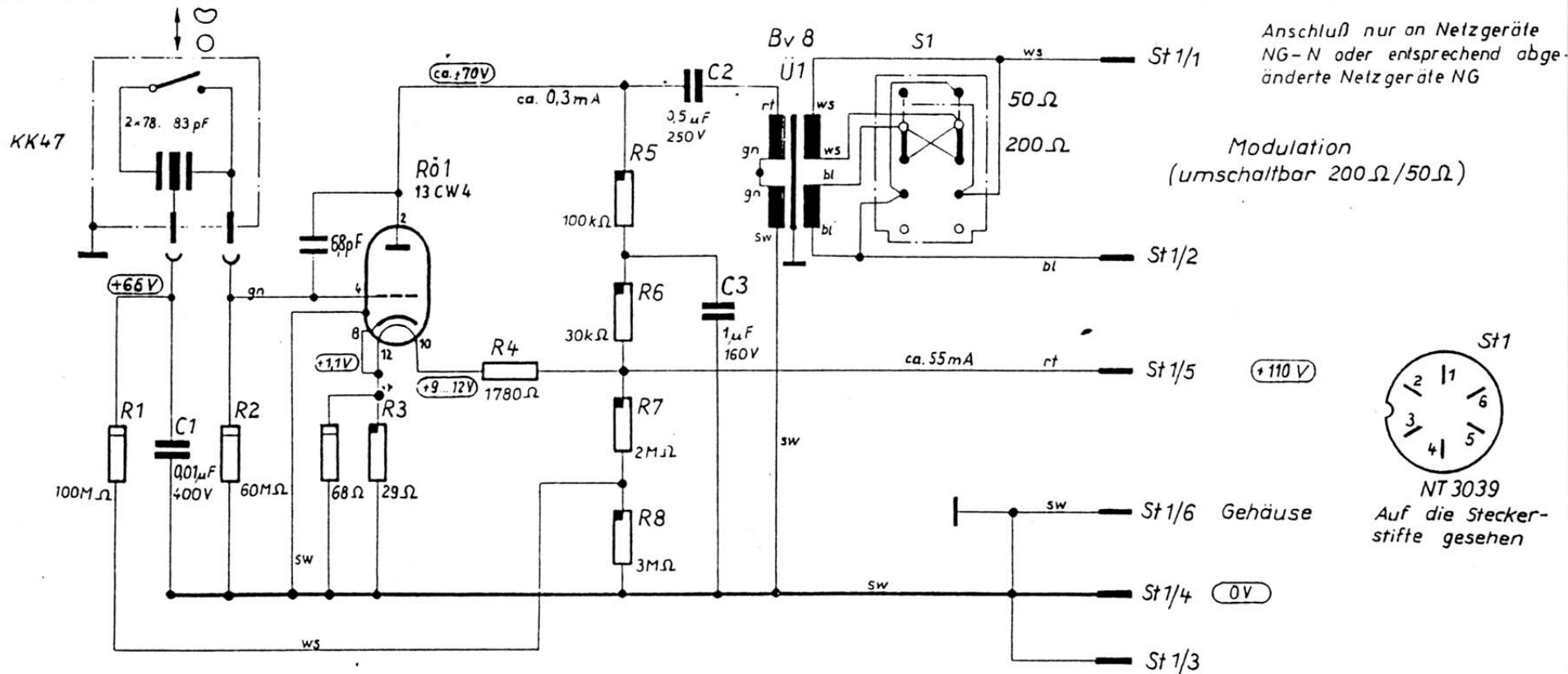
STEREO-KONDENSATORMIKROPHON SM69
STEREO CONDENSER MICROPHONE SM69
SM69 - 930 - 01



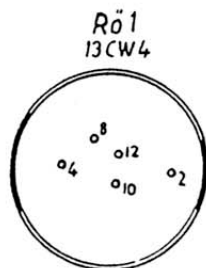
GEORG NEUMANN

Laboratorium für Elektrophonie GmbH

BERLIN



Alle Spannungswerte statisch gemessen



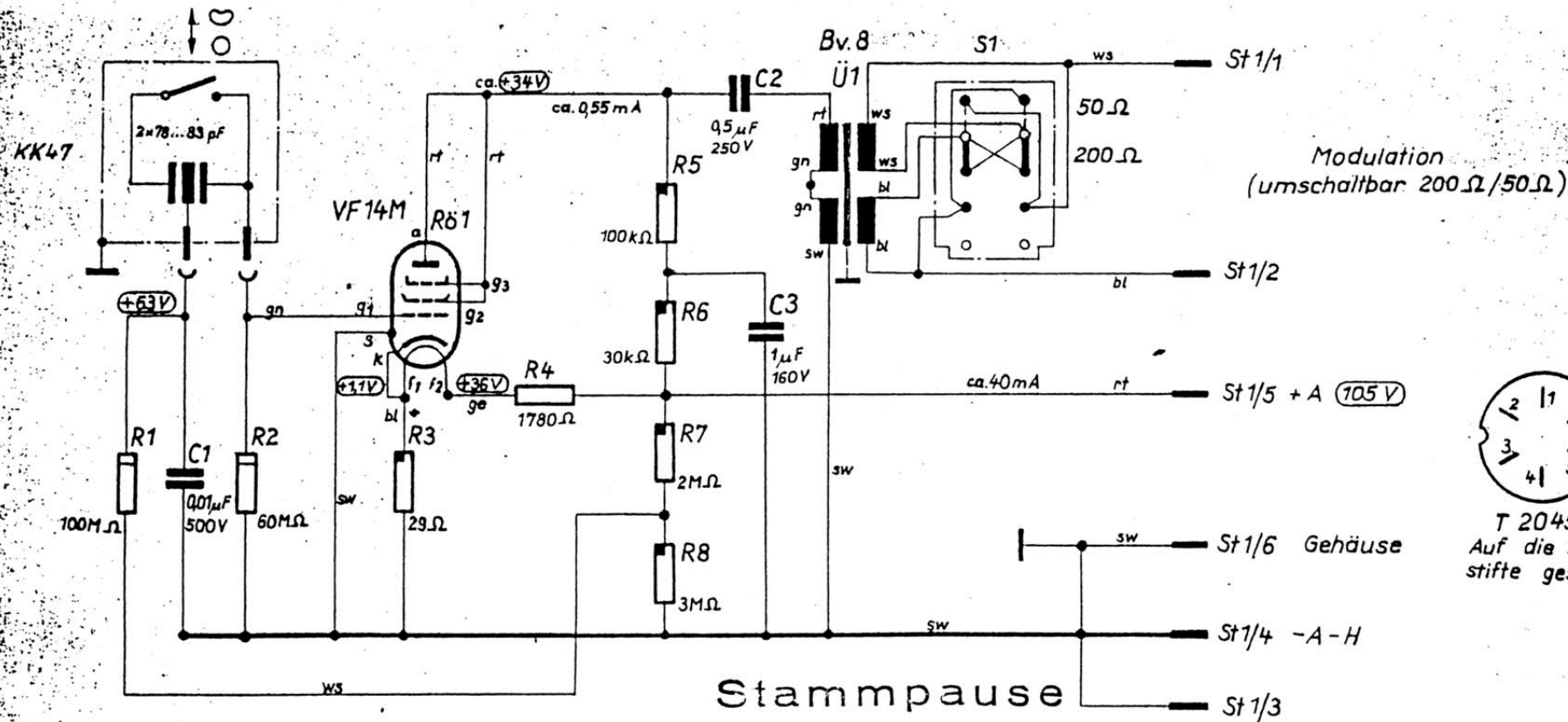
Auf den Röhrenfuß gesehen

0.25 W
nach MIL

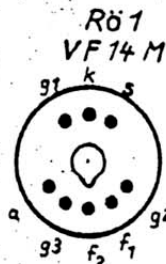
0.1 W
DIN 41399

Bei Ersatzteilbestellung Gerät-Nr. u. Pos.-Zahlen angeben!

Die Zeichnung ist unser Eigentum. Jede Vervielfältigung, Verwertung oder Mitteilung an dritte Personen ist strafbar und wird gerichtlich verfolgt. (Urheberrechtsgesetz, Gesetz gegen unlauteren Wettbewerb, B. G. B.)			Stück.	Werkstoff	Maßstab	Georg Neumann Laboratorium für Elektroakustik G.m.b.H. Berlin SW 61 Segitzdamm 2	
				—	—		
			Rohgewicht		Fertiggewicht		
			Ersatz für: U47-00-00-005				
1967	Tag	Name	Kondensatormikrophon U47-N			U47-N-930-00	
gezeichnet	16. 2.	Wz.					
geprüft							
gesehen							
			Ersatz für			Fehlende Maße siehe	
			Ersetzt durch				



○ Alle Spannungswerte statisch gemessen



Auf dem Röhrenfuß gesehen

$\text{---} 0,25 \text{ W}$
nach MIL

$\text{---} 0,1 \text{ W}$
nach DIN 41399

Bei Ersatzteilbestellung Gerät-Nr. u. Pos.-Zahlen angeben!

Die Zeichnung ist unser Eigentum. Jede Vervielfältigung, Verwertung oder Mitteilung an dritte Personen ist strafbar und wird gerichtlich verfolgt. (Urheberrechtsgesetz, Gesetz gegen unlauteren Wettbewerb, B.G.B.)

	Tag	Name
gezeichnet	28. 1. 59	J. B.
geprüft	6. 2. 59	J. B.
gesehen	6. 2. 59	L. K. U.

Stück	Werkstoff	Maßstab
	—	—
Rohgewicht		Fertiggewicht

Georg Neumann
Laboratorium für Elektroakustik G.m.b.H.
Berlin SW 61
Segitzdamm 2

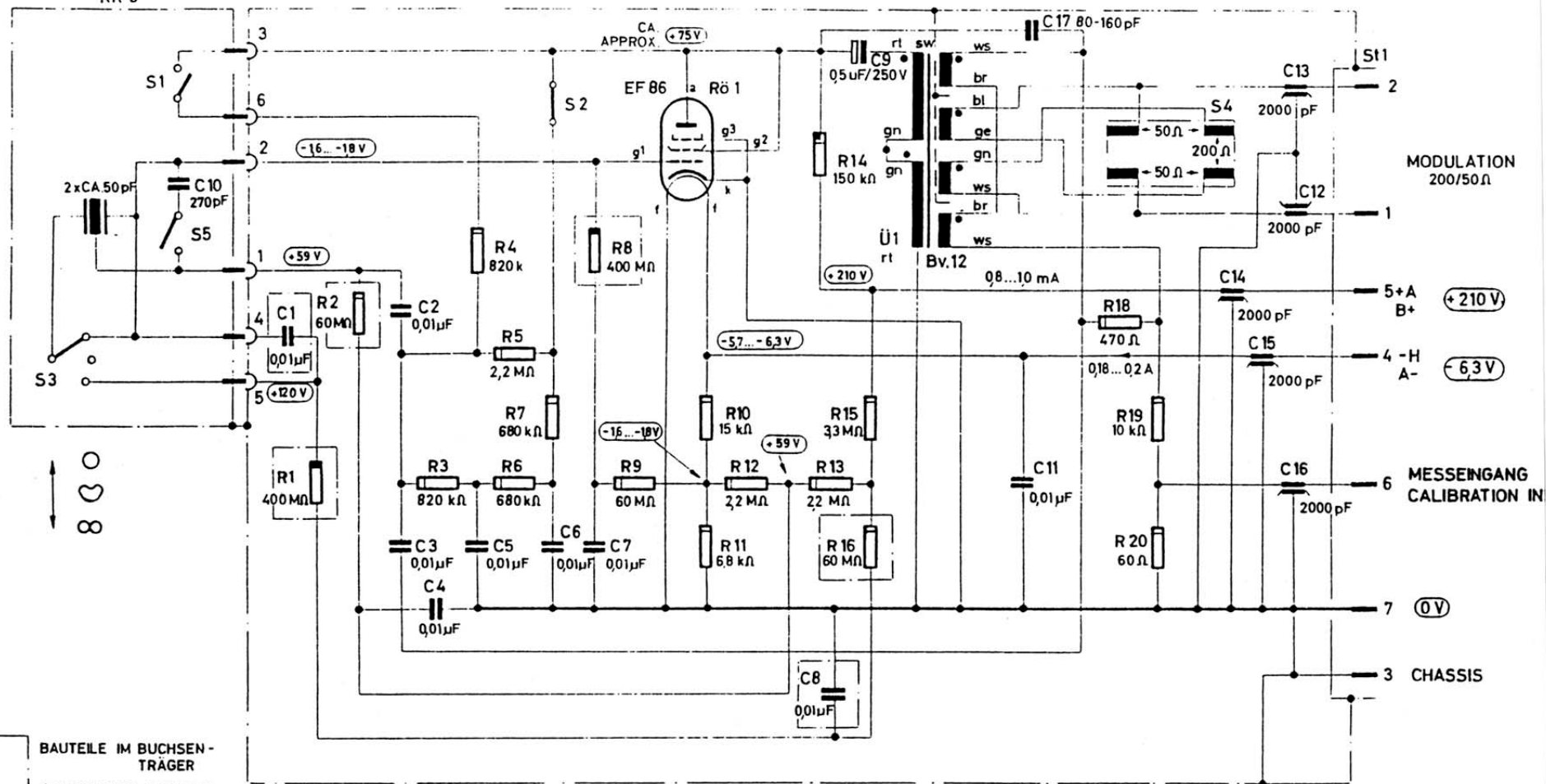
Kondensatormikrophon
U47

U47-00-00-00 S

Ersatz für	Fehlende Maße siehe
Ersetzt durch	

20 10201

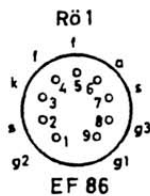
KK 67



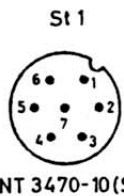
BAUTEILE IM BUCHSEN-
TRÄGER
COMPONENTS ENCASED

SPANNUNGSWERTE STATISCH GEMESSEN
STATICALLY MEASURED VOLTAGES

GÜLTIG AB GERÄT NR. 343
BEGINNING WITH SERIAL & PART NUMBER 343



EF 86



NT 3470-10 (SPEC.)

AUF DIE STECKER GESEHEN
PIN VIEW

- 0,1 W
DIN 41399
- 0,25 W
DIN 41401
- 0,5 W
DIN 41402

RESISTORS
GERMAN AMERICAN

KONDENSATOR-MIKROPHON U67
CONDENSER MICROPHONE U67
U 67-930-01

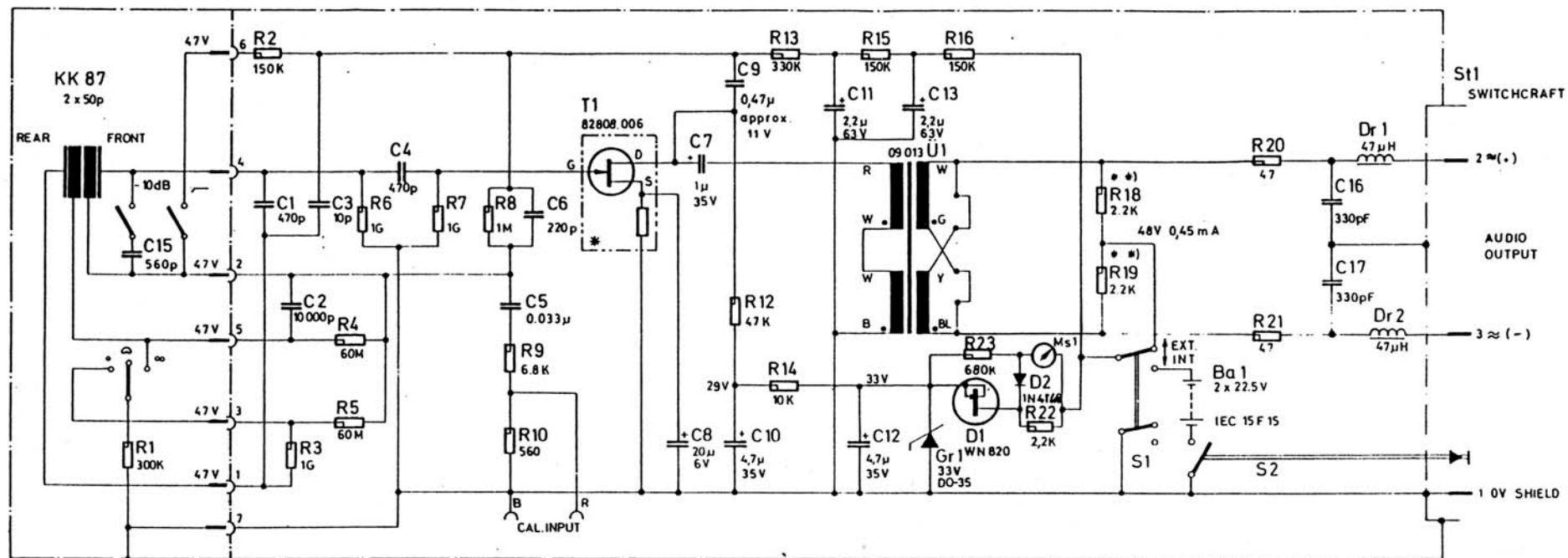


GEORG NEUMANN

Laboratorium für Elektroakustik GmbH

BERLIN

BEI ERSATZTEILBESTELLUNG GERÄT NR. UND
POS.-ZAHLEN ANGEBEN
FOR REPLACEMENT ALWAYS GIVE SERIAL & PART NUMBER



PHANTOM - POWERING DIN 45 596
+ 48V 0,45 mA

(+) POLARITY FOR SUDDEN RISE OF SOUND PRESSURE
IN FRONT OF THE DIAPHRAGM

*) SELECTED

**) SELECTED IN PAIRS OF IDENTICAL VALUE ($\leq 1\%$)

RESISTORS

GERMAN AMERICAN

0.125W

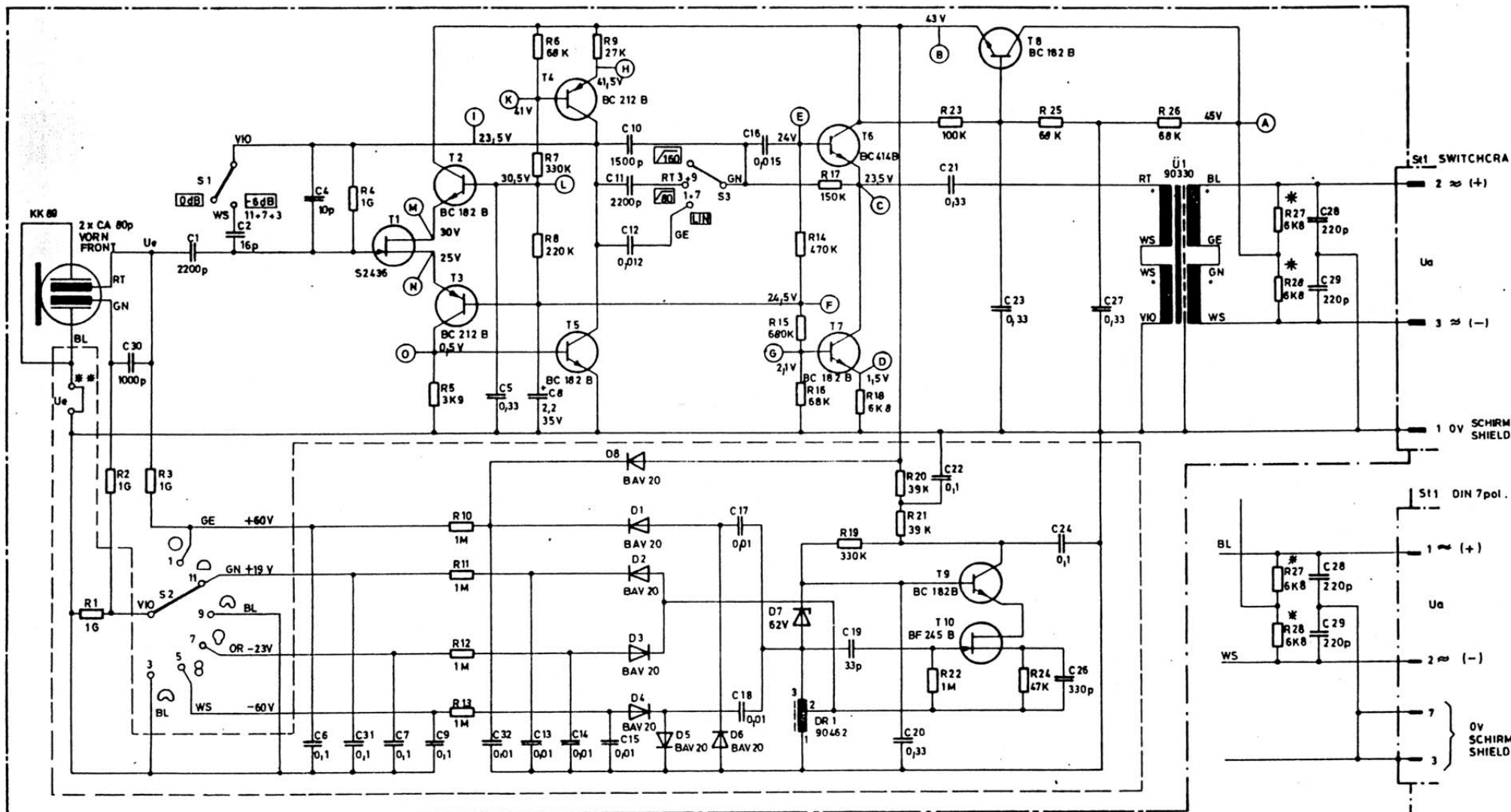


CONDENSER MICROPHONE U 87 ip

1 0241 - 930 - G00.20

GEORG NEUMANN GMBH

BERLIN



PHANTOMSPESUNG DIN 45 596 + 48V; 0,7 mA
PHANTOM-POWERING DIN 45 596 + 48V; 0,7 mA

(+) = POLARITÄT BEI DRUCKANSTIEG VOR DER MEMBRAN.
POLARITY AT SUDDEN RISE OF SOUND PRESSURE
BEFORE THE DIAPHRAGM.

* PAARWEISE AUF GLEICHEN WERT ($\leq 0,4\%$) AUSSUCHEN!
SELECT IN PAIRS OF IDENTICAL VALUE ($\leq 0,4\%$)

** EINSEISENMÖGLICHKEIT FÜR VERSTÄRKERPRÜFUNG.
INPUT FOR AMPLIFIER TEST.

BEI ERSATZTEILBESTELLUNG BITTE GERÄT-NR. U. POS.-
ZAHLEN ANGEBEN!
FOR REPLACEMENT PLEASE ALWAYS GIVE SERIAL & PART-
NUMBER!

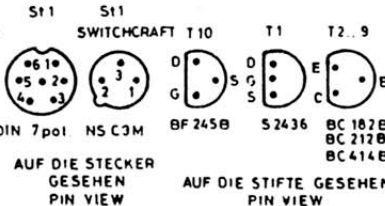
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Verwertung oder Mitteilung an dritte Personen ist strafbar
und wird gerichtlich verfolgt. (Urheberrechtsgesetz, Gesetz
gegen unlauteren Wettbewerb, BGB).

SPANNUNGEN MIT VOLTMESSER $R_i \geq 10M \Omega$ GEMESSEN
MEASURING INSTRUMENT $R_i \geq 10M \Omega$

$U_{eMAX} \approx 1,2V$; $U_{aMAX} \approx 1V$ $\Delta 135dB$ SPL F. K_{GES} (THD) $\leq 0,5\%$ (S1=0dB); $U_a/U_e \approx -1,6dB$

COLORS
GERMAN AMERICAN

RT RED
WS WHT
SW BLK
BL BLU
GE YEL
GN GRN
VIO VIO



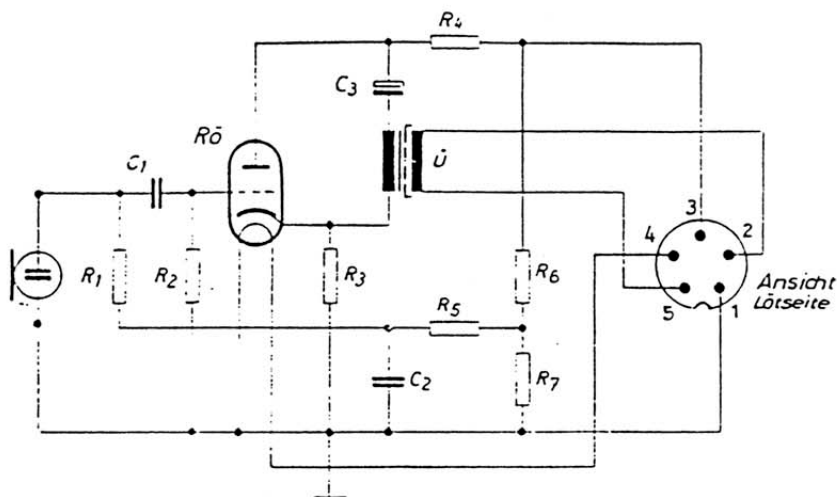
KONDENSATOR-MIKROPHON U 89
CONDENSER MICROPHONE U 89

1 1247 901 02.5

GEORG NEUMANN GMBH

BERLIN

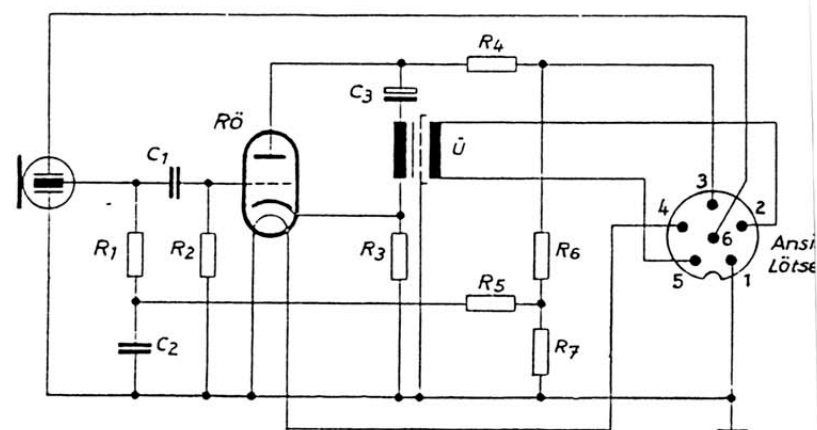
Schaltschema des Kondensatormikrofones CMV 563



Schaltteilliste:

R 1	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 2	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 3	Schichtwiderstand	1,5 k Ohm 0,25 W 5% TGL 46 16
R 4	Schichtwiderstand	47 k Ohm 0,5 W 5% TGL 46 16
R 5	Schichtwiderstand	5,6 M Ohm 0,25 W 10% TGL 46 16
R 6	Schichtwiderstand	1 M Ohm 0,25 W 5% TGL 46 16
R 7	Schichtwiderstand	2,2 M Ohm 0,25 W 5% TGL 46 16
C 1	Kunstfolien-Kondensator	1000 pF 125 V TGL 51 55
C 2	Duroplast-Kondensator	0,01 μ F 160 V TGL 92 91
C 3	Kleinst-Elektrolyt-Kondensator	1 μ F 150 V TGL 71 99
Ü	Mu-Metall-Übertrager	Bv-Ü 551
Rö	Röhre (rausch- und klingarm)	EC 92

Schaltschema des Kondensatormikrofones UM 57



Schaltteilliste

R 1	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 2	Höchstohmwiderstand	220 M Ohm 20% HWK IV
R 3	Schichtwiderstand	1,5 k Ohm 0,25 W 5% TGL 87 28
R 4	Schichtwiderstand	47 k Ohm 0,5 W 5% TGL 87 28
R 5	Schichtwiderstand	5,6 M Ohm 0,25 W 10% TGL 87 28
R 6	Schichtwiderstand	1 M Ohm 0,25 W 5% TGL 87 28
R 7	Schichtwiderstand	1 M Ohm 0,25 W 5% TGL 87 28
C 1	Kunststoffolie-Kondensator	1000 pF 125 V TGL 51 55
C 2	Polyester-Kondensator	0,01 μ F 250 V
C 3	Elektrolyt-Kondensator	1 μ F 150 V
Ü	Mu-Metall-Übertrager	Bv-Ü 551
Rö	Empfängerröhre (rausch- und klingarm)	EC 92 TGL 96 30

GEORG NEUMANN & CO
ELEKTROTECHNISCHES LABORATORIUM
6552 GEFELL VOGTL. FERNRUF 185



GEORG NEUMANN & CO
- MIKROFONE -
6552 GEFELL FERNRUF 262-264



TYPE			De- scription	Year first built	CAPSULE				AMPLIFIER					OTHER
Neu- mann	Ger- man Radio	Tele- fun- ken			Type	Prin- ciple of Op- eration	Material of Dia- phragm	Year first built	Polar Pattern	Method of Pattern Switch- ing	Number of Switch- es	Tube/ Transis- tor	Power Supply	

Abbreviations used:

K omni
N cardioid
A figure-of-eight

D pressure transducer
DG pressure gradient transducer

T low-frequency roll-off
H high-frequency roll-off

U polar pattern can be changed
at microphone

FS polar pattern can be changed
by remote control (switch)

FP polar pattern can be changed
by remote control (variable re-
sistor)

Übersicht der von NEUMANN gebauten Mikrophone und Mikrofonkapseln

10000 82203 April 1992

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spei- sungs- art	
CM 3	M 1-2	—	Mikrophon- kapsel	1927	CM 3	D	PVC/G	1927	K	—	—	—	—	Schraubkapsel, Torpedokopf für CMV 3
CMV 3	M 1-1	—	Mikrophon- verstärker	1930	—	—	—	—	—	—	—	RE 084k	100 V 4 V	Neumann-Flasche, Torpedokopf
CM 5	M 1-2a	ElaMZ 026/2	Mikrophon- kapsel	1930	CM 5	D	PVC/G	1930	K	—	—	—	—	Schraubkapsel, Torpedokopf für CMV 3
M 48	B-M 48	—	Mikrophon- kapsel	1953	M 48 (KK 53)	D	Alu	1953	K	—	—	—	—	Schraubkapsel, Torpedokopf f. CMV 3 + U 47
CMV 3a	M 1-1a	—	Mikrophon- verstärker	1932	—	—	—	—	—	—	—	RE 084k	100 V 4 V	Neumann-Flasche, Bajonett
CM 8	M 7	ElaMZ 032/2	Mikrophon- kapsel	1932	CM 8	DG	PVC/G	1932	N	—	—	—	—	für CMV 3a mit Bajonettfassung
CM 7	M 8	ElaMZ 031/2	Mikrophon- kapsel	1932	CM 7	DG	PVC/G	1932	A	—	—	—	—	
CM 9	M 9	—	Mikrophon- kapsel	1932	CM 9	D	PVC/G	1932	K	—	—	—	—	
Sonderanfertigung für Siemens			Siemens- kapsel	1937 1942	Rel. mph 9	D	Alu	1937	K	—	—	—	—	„Bahnkapsel“
					Rel. mph 19	D	Alu	1942	K	—	—	—	—	

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spel- sungs- art	
U 47	-	-	Standard- mikrophon	1949- 1947-	M 7	DG	PVC/G	1932	K,N	U	1	VF 14	105 V	CM 8 und CM 5- Kapseln aus CMV 3a verwendbar
			Standard- mikrophon	-1965	M 7	DG	Pe/G	1960	K,N	U	1	VF 14	105 V	Membrane aus Poly- ester, geschraubt
												Nuvistor 13 CW4	105 V	Ersatz für VF 14
MM 2	-	-	Meß- mikrophon	1949- 1954	MM 2	D	Alu	1949	K	-	-	VF 14	105 V	Abgesetzte Kapsel von Verstärker mittels star- rem Rohr. Eichkurve
M 49	-	-	Standard- mikrophon	1951- 1974	M 7 M 7	DG DG	PVC/ Pe/G	1932 1960	K..N..A K..N..A	FP	-	MSC 2, AC 701	120 V 4 V	Verstärker entwickelt mit NWDR
M 50	-	-	Standard- mikrophon	1951- 1971	KK 50 KK 53 KK 83	D D D	PVC/G Alu Pe/G	1951 ab 54 ab 65	K K K	-	-	MSC 2 AC 701 AC 701	120 V 4 V	Siehe M 49
KM 53	M 153	-	Klein- mikrophon	1953- 1968	KK 53	D	Alu	1953	K, mit Z 29 Pegel- dämpfg.	-	-	AC 701	120 V 4 V	1. Kondensatormikro- phon mit Ø 21 mm. Entwickelt mit NWDR

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- fun- ken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spel- sungs- art	
KM 54	M 154	—	Klein- mikrophon	1954- 1969	KK 54	DG	Ni	1955	N, mit Z 29 Pegel- dämpfg.	—	—	AC 701		
					KK 64 KK 84	DG	Pe/G	1964		—	—	—	120 V 4 V	Ersatz für KK 54, Kapseladapter
MM 3	—	—	Meß- mikrophon	1954- 1966	MM 3	DG	Alu	1954	K	—	—	AC 701	120 V 4 V	Eichkurve. Siehe MM2 Substit.+Pistonphon. Meß
KM 56	M 156	—	Klein- mikrophon	1955- 1970	KK 56, ..KK 88	DG	Ni	1955	K,N,A m. Z 29/56	U	1	AC 701	120 V 4 V	0,7 µm Nickelmembran
U 48	—	—	Standard- mikrophon	1957- 1965	M 7	DG	PVC/G	1932	N,A	U	1			siehe U 47
SM 2	—	—	Stereo- mikrophon	1957- 1966	KK 56	DG	Ni	1955	K..N..A	FS (9)	2	AC 701	120 V 4 V	1. Kondensator-Stereo- mikrophon
TM 53	—	—	Mikrophon- verstärker mit Kapsel	1957- 1958	TM 53	D	Alu	1957	K	—	—	AC 701	120 V 4 V	Für Fa. Sennheiser, Richtrohr
MM 5	—	—	Meß- mikrophon	1959- 1970	MM 5	D	Ni	1959	K	—	—	AC 701	120 V 4 V	S. MM2+MM3. 1. Meß- mikr. m. Eichgitter Z 68
KM 253	—	—	Klein- mikrophon	1960- 1967	KK 53	D	Alu	1953	K, mit Z 29 Pd.	—	—	AC 701	120 V 4 V	HF-dichtes Steck- system

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- belts- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spel- sungs- art	
KM 254	—	—	Klein- mikrophon	1960- 1969	KK 54	DG	Ni	1955	N; mit Z 29 Pegel- dämpfg.	—	—	AC 701	120 V 4 V	HF-dichtes Steck- system
					KK 84	DG	Pe/G	1964		—	—		120 V 4 V	Ersatz für KK 54
U 67	—	—	Standard- mikrophon	1960- 1971	K 67	DG	Pe/G	1960	K,N,A -10 dB, T	U	3	EF 86	210 V 6,3 V	
M 249	—	—	Standard- mikrophon	1961- 1974	M 7	DG	PVC/ Pe/G	1932	K,N	FP	—	AC 701	120 V 4 V	HF-dichtes Steck- system
M 250	—	—	Standard- mikrophon	1961- 1971	KK 53.. KK 83	D D	Alu Pe/G	1954 1965	K K K	— — —	— — —	MSC 2 AC 701 AC 701	120 V 4 V	
KM 256	—	—	Klein- mikrophon	1961- 1970	KK 56, ..KK 88	DG	Ni	1955	K,N,A m. Z 29 Pd.	U	1	AC 701	120 V 4 V	
SM 23	—	—	Stereo- mikrophon	1961- 1966	KK 56, ..KK 88	DG	Ni	1955	K,N,A m. Z29/SM2 Pd.	FS (9)	—	AC 701	120 V 4 V	
M 269	—	—	Standard- mikrophon	1962- 1973	K 67	DG	Pe/G	1960	K..N..A -10 dB, T	U/FP	3	AC 701	120 V 4 V	U 67 für Rundfunk
SM 69	M 206	—	Stereo- mikrophon	1964- 1973	K 67	DG	Pe/G	1960	K..N..A	FS (9)	—	AC 701	120 V 4 V	

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spel- sungs- art	
KM 63	-	-	Klein- mikrophon	1964- 1971	KK 63 später KK 83	D	Pe/G	1964	K	-	1	AC 701	120 V 4 V	Kreuzschlitzkapsel, Verstärker paßt für KK 84, KK 85
KM 64	-	-	Klein- mikrophon	1964- 1971	KK 64 später KK 84	DG	Pe/G	1964	N	-	1	AC 701	120 V 4 V	siehe KM 63, auch für KK 83, KK 85
KM 65	-	-	Klein- mikrophon	1964- 1971	KK 65 später KK 85	DG T	Pe/G	1965	N	-	1	AC 701	120 V 4 V	siehe KM 63, auch für KK 83, KK 85
U 64, ns, u	-	-	Klein- mikrophon	1964- 1971	KK 64 später KK 84	DG	Pe/G	1964	N	-	1	7586	-	Nuvistor, für USA. 1. Mikrophon mit Cannonstecker (XLR)
SRM 64	-	-	Standrohr- mikrophon	1964- 1971	KK 64 später KK 84	DG	Pe/G	1964	N	-	-	AC 701	120 V 4 V	Abgesetzte Kapsel vom Verstärker
KM 64P	-	-	Pult- mikrophon	1965- 1968	KK 64 später KK 84	DG	Pe/G	1964	N	-	-	-	120 V 4 V	Abgesetzte Kapsel vom Verstärker, schwenkbar
KTM	-	-	Klein- mikrophon	1965- 1966	KK 64 später KK 84	DG	Pe/G	1964	N	-	-	Fet	T 12	Ø 24 mm. Anfang der Fet 70 Serie, trafoles.

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spei- lungs- art	
KM 66	-	-	Klein- mikrophon	1966	KK 64 später KK 84	DG	Pe/G	1964	K,N,A	U	1	AC 701	120 V 4 V	
KM 74	M 174	-	Klein- mikrophon	1966	KK 64 später KK 84	DG	Pe/G	1964	N	-	-	Fet	T 12	Nachfolger von KTM, Ø 21 mm
KM 73	M 173	-	Klein- mikrophon	1966	KK 63 später KK 83	D	Pe/G	1964	N	-	-	Fet	T 12	
KM 75	-	-	Klein- mikrophon	1966	KK 65 später KK 85	DG T	Pe/G	1965	N	-	-	Fet	T 12	
KM 83 (I) (mt)	-	-	Klein- mikrophon	1966	KK 63 später KK 83	D	Pe/G	1964	K -10 dB	-	1	Fet	P 48	
KM 84 (I) (mt)	-	-	Klein- mikrophon	1966	KK 64 später KK 84	DG	Pe/G	1964	N -10 dB	-	1	Fet	P 48	Anfang der fet 80 Serie der "I" + "mt"-Ausfüh- rung. Verstärker paßt für KK 84, KK 85, KK 83
KM 85 (i) (mt)	-	-	Klein- mikrophon	1966	KK 65 später KK 85	DG T	Pe/G	1965	N -10 dB	-	-	Fet	P 48	

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spei- lungs- art	
KML	–	–	Lavallier- mikrophon	1966- 1975	KK 65 später KK 85	DG	Pe/G	1965	N	–	–	Fet	spez. + P 48	Zum Umhängen
M 367	–	–	Standard- mikrophon	1966- 1976	K 67	DG	Pe/G	1960	K,N,A –10 dB, T	U	3	AC 701	120 V 4 V	Für Frankreich, mit Sogliestecksystem
U 87 (I) (mt)	–	–	Standard- mikrophon	1967- 1986	K 87	DG	Pe/G	1967	K,N,A –10 dB, T	U	3	Fet	P 48	Batteriefach 2 x 22,5 V Nachfolger für U 67
KM 76	–	–	Klein- mikrophon	1967	siehe KK 84				K,N,A –10 dB	U	2	Fet	T 12	
U 77	–	–	Standard- mikrophon	1968	K 67	DG	Pe/G	1960	K,N,A –10 dB, T	U	3	Fet	T 12	Batteriefach 9 V
		M 280 K	Klein- mikrophon	1968	siehe KK 83				K	–	–	Fet	P 48	Sonderanfertigung für Telefunken M 28. Mikrophonrohr Streckmetall statt Schlitzen
		M 280 N	Klein- mikrophon	1968	siehe KK 84				N	–	–	Fet	P 48	
KM 86 (I) (mt)	M 286		Klein- mikrophon	1968	siehe KK 84				K,N,A –10 dB	U	2	Fet	P 48	
KMA, KMA- S7	–	–	Ansteck- mikrophon	1969- 1985	KMA	D	NI	1969	K	–	–	Fet	P 48 indiv.	Betrieb auch an Sender der Fa. Beyer + Senn- helser

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spel- sungs- art	
U 47 fet (I) (mt)	-	-	Standard- mikrophon	1969- 1986	siehe KK 47				SN, -10 dB, T	-	2	Fet	P 48	Nachfolger von U 47
KM 88 (I) (mt)	-	-	Klein- mikrophon	1969- 1986	KK 56.. KK 88	DG	Ni	1955	K,N,A -10 dB	U	2	Fet	P 48	DC/DC-Wandler
MK 24	-	-	Meßmikro- phonkapsel	1969- 1974	MK 24	D	NiFe	1969	K	-	-	Fet	200 V	Ø 1" Sonderanfertigung für Hewlett Packart
MK 12	-	-	Meßmikro- phonkapsel	1970- 1974	MK 12	D	NiFe	1970	K	-	-	Fet	200 V	siehe MK 24, Ø 1/2" Membran: Permenorm
SM 69 fet	-	-	Stereo- mikrophon	1970	K 67	DG	Pe/G	1960	K..N..A	FS (9)	-	Fet	P48 2x + spez.	Spezialstromversor- gung NS 69, CU 48
U 397	-	-	Standard- mikrophon	1971	K 67	DG	Pe/G	1960	K,N,A -10 dB, T	U	3	Fet	- 9 V	- 9 V Phantomspel- sung für Frankreich, trafolos
SRM 83	-	-	Standrohr- mikrophon	1971	siehe KK 83				K	-	-	Fet	P 48	Siehe SRM 64
SRM 84	-	-	Standrohr- mikrophon	1971	siehe KK 84				N	-	-	Fet	P 48	
SRM 85	-	-	Standrohr- mikrophon	1971	siehe KK 85				N	-	-	Fet	P 48	

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezeich- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spei- lungs- art	
KMS 85 (i) (mt)	—	—	Solisten- mikrophon	1971	siehe KK 84				N	—	—	Fet	P 48	popgeschützt, körperschallisoliert
KU 80 (i) mt	—	—	Kunstkopf	1973	siehe KK 83				Außenohr -10 dB	—	1	Fet	P 48 2 x	für kopfbezogene Stereoaufnahmen, nur "mt"
QM 69	—	—	Quadro- mikrophon	1974	K 67	DG	Pe/G	1960	4 x N	—	—	Fet	P 48 4 x	4 x Niere, 4 Verstär- ker
U 497	—	—	Standard- mikrophon	1975	M 7	DG	Pe/G	1960	K,N,A -10 dB, T	U	3	Fet	P 12	für Frankreich, DC/DC-Wandler
KMS 84 (i) (mt)	—	—	Solisten- mikrophon	1977	siehe KK 84				-10 dB, T	—	2	Fet	P 48	Nachfolger von KMS 85, austausch- bare Körbe, farbig
KMR 82 (i) (mt)	—	—	Richtrohr- mikrophon	1978	KK 82	DG, Interfer	Pe/G	1978	Ke,T,H	—	2	Fet	P 48	
USM 69 (i) (mt)	—	—	Stereo- mikrophon	1979	K 67	DG	Pe/G	1960	K,N,A BN,HN	U	2	Fet	P 48 2 x	DC/DC-Wandler
U 89 (i) (mt)	—	—	Standard- mikrophon	1980	K 89	DG	Pe/G	1979	K,BN,N, HN,A, - 6 dB, T	U	3	Fet	P 48	DC/DC-Wandler

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezelch- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spel- sungs- art	
KMF 4 i, mt	—	—	Klein- mikrophon	1982- 1988	KK 4	DG	Pe/G	1982	N, -10 dB, T	—	2	Fet	P 48	Nur mt-Ausführung, Kapsel v. Verstärker abgesetzt, Ø 17 mm
KU 81 i	—	—	Kunstkopf	1982	siehe KK 83				Außenohr -10 dB, T	—	2	Fet	P 48 2 x	Diffusfeldentzerrt
KMR 81 (i) (mt)	—	—	Richtrohr- mikrophon	1983	KK 81	DG, Interfer	Pe/G	1982	Ke,T, -10 dB, T	—	2	Fet	P 48	AES 1982
TLM170 (i) (mt)	—	—	Standard- mikrophon	1983	K 89	DG	Pe/G	1979	K,BN,N, HN,A,Re, -10 dB, T	U	3	Fet	P 48 P 24	AES 1983, Jubiläum Gotham, patentierte Schaltung, DC/DC, trafolos
U 87 A (i) (mt)	—	—	Standard- mikrophon	1986	K 67	DG	Pe/G	1967	K,N,A, -10 dB, T	U	3	Fet	P 48	Ohne Batteriefach, DC/DC-Wandler
RSM190 System i, mt	—	—	Stereo- Richtrohr- mikrophon	1987	KK 190 MS	DG, Interfer	Pe/G	1987	Ke, A MTX	FS (6)	2	Hybrid	P 48 2 x	MS-Mikrophon + Matrixbox MS, XY. Pegel der Acht ein- stellbar, nur mt
RSM191 System	—	—	Stereo- Richtrohr- mikrophon	1988	KK 190 MS	DG, Interfer	Pe/G	1987	Ke, A MTX	FS (6)	3 (4)	Hybrid	P 48 2 x	s. RSM190. MS, XY, links, rechts schalt- bar,T, intern -10 dB, Batteriefach 9 V

TYP			BEZEICH- NUNG	BAU- JAHR	MIKROPHONKAPSEL				VERSTÄRKER					SONSTIGES
Neu- mann	Rund- funk	Tele- funken			Bezelch- nung	Ar- beits- prinzip	Mem- bran	Bau- jahr	Richt- charak- teristik sonstige schaltb. Funktion	Art der Char.- Um- schal- tung	Anzahl der Schal- ter	Röhre/ Halb- leiter	Spei- sungs- art	
KM 100 System	—	—	Variables Klein- mikrophon- System	1988	AK 30 AK 31 AK 40 AK 43 AK 45 AK 50	D D DG DG DG T DG	Pe/G	1988	K K N BN N HN -10 dB	—	1	Hybrid	P 48	Austauschbare Aktive Kapseln
GFM132	—	—	Grenz- flächen- mikrophon	1990	K 32	D	Pe/G	1990	HK, -10 dB	—	1	Hybrid	P 48	Gleicher Freifeld- und Diffusfeldfrequenz- gang
TLM 50	—	—	Druck- mikrophon	1990	K 33	D	Ni	1990	K, -10 dB, T	—	2	Hybrid	P 48	Druckkapsel in Kugel 40 mm Ø
KMS140 KMS150	—	—	Solisten-/ Hand- mikrophon	1991	AK 40 AK 50	DG	Pe/G	1991	N,HN, -10 dB, T	—	2	Hybrid	P 48	Popschutz, griff- unempfindlich
KFM100	—	—	Kugel- flächen- mikrophon	1992	AK 34 wie K 32	D	Pe/G	1990	K	—	—	Hybrid	P 48	Gleicher Freifeld- und Diffusfeldfrequenz- gang. Äquivalenz- mikrophon
KU 100	—	—	Kunstkopf	1992	siehe KK 83				Außenohr -10 dB, T	-	2	Hybrid	P 48 Batterie- Netz.	Diffusfeldentzerrt. Interne Speisung. Meßausgänge

ABKÜRZUNGEN

A	Acht
Alu	Aluminium
BN	Breite Niere
D	Druckempfänger
DC/DC	Wandler für Ladespannung im Mikrofon
DG	Druckgradientenempfänger
FS (6)	Fernumschaltbar mit Schalter, 6 Stellungen
FS (9)	Fernumschaltbar mit Schalter, 9 Stellungen
FP	Fernumschaltbar mit Poti
H	Höhenabfall
HK	Halbkugel
HN	Hyperniere
I	XLR Stecksystem (Switchcraft)
(i)	mit XLR Stecksystem (Switchcraft) oder Binder bzw. Tuchelstecksystem
Interfer	Interferenzprinzip
K	Kugel
Ke	Keule
Mkr.	Mikrofon
MS	Mitte-Seite Intensitätsstereophonie
mt	Schwarzmatte Oberfläche
(mt)	Schwarzmatte oder nickelmatte Oberfläche
N	Niere
Ni	Nickel
NiFe	Nickel/Eisen
ns	Nuvistor
Op.	Operationsverstärker
P 12	Phantomspelsung 12 V
P 24	Phantomspelsung 24 V DIN 45596
P 48	Phantomspelsung 48 V DIN 45596
Pe/G	Polyester, goldbedampft
PVC/G	PVC, goldbedampft
Re	Remote
SN	Superniere
T	Tiefenabfall
T 12	Tonaderspelsung 12 V DIN 45595
U	mechanisch/elektrisch am Mikrofon umschaltbar
Verst.	Verstärker
XY	Links-rechts Intensitätsstereophonie
Z	Zubehör