

Special Print from

# Sound & Recording

Producer, Engineer,  
Composer & Musician

[ Neumann TLM 67 ] **Test**

Large-diaphragm  
condenser microphone

## Neumann TLM 67

On the occasion of the 80th anniversary of the company, Neumann introduces a microphone which marries a glorious heritage to modern technology: Vintage sound with transistor technology – is it really possible?

TLM 67 – What's in a name? As in the case of Martin guitars, the letters indicate the type of construction and the numbers indicate the "style". "TLM" stands for "transformerless microphone", while the "magic" 67 refers to a coveted tube microphone classic, the U 67 – and in fact, the TLM 67 uses the very same K67 double-diaphragm capsule. In combining modern transformerless circuit technology with a classic capsule, the TLM 67 entertains multi-faceted relationships with present and past gems from Neumann's history.

Transistorized successors of the U 67 have already existed for four decades in the form of the U 87 and U 87A microphones, and true Neumann connoisseurs will argue that there had once been a transformerless version in the 1960s, namely the U 77 for the A-B powering system used at the time. However, the TLM 67 differs from the U 77 not only in terms of phantom powering. Like the TLM 49 introduced two years ago, Neumann's latest addition to the product line is equipped with a special circuit designed to lend the transistor mic a tube-like sound character.

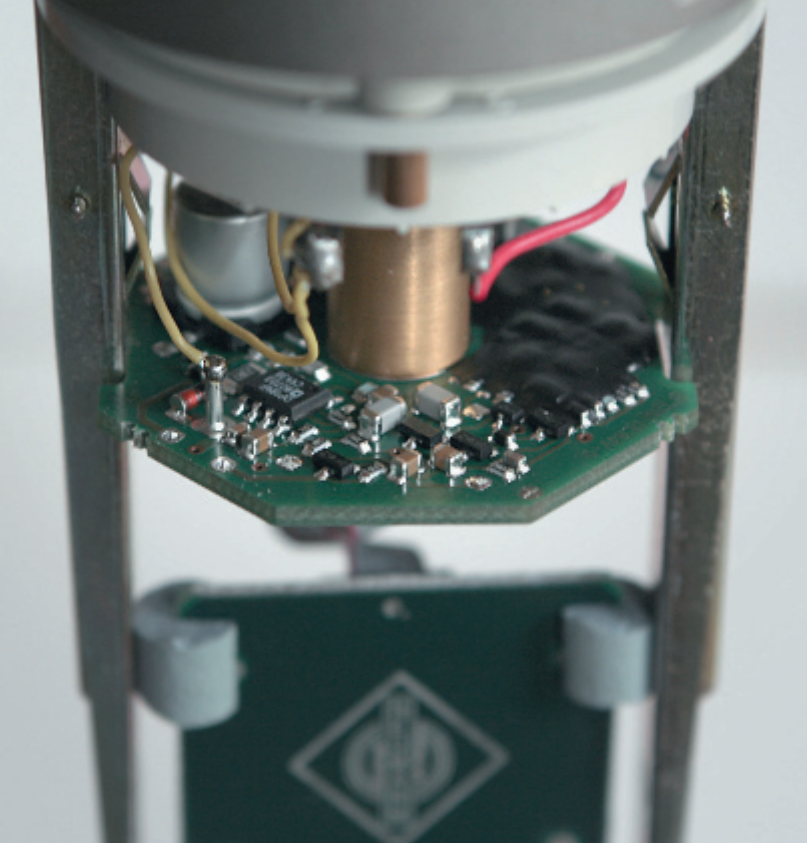
### Pearl-grey

The TLM 67 surprises with its unusual look. Unlike other Neumann mics, which are available in either matte nickel or black, the TLM 67 comes in an exclusive pearl-grey finish which, despite its newness, lends the mic a 1960s retro appearance. Of course, the fa-

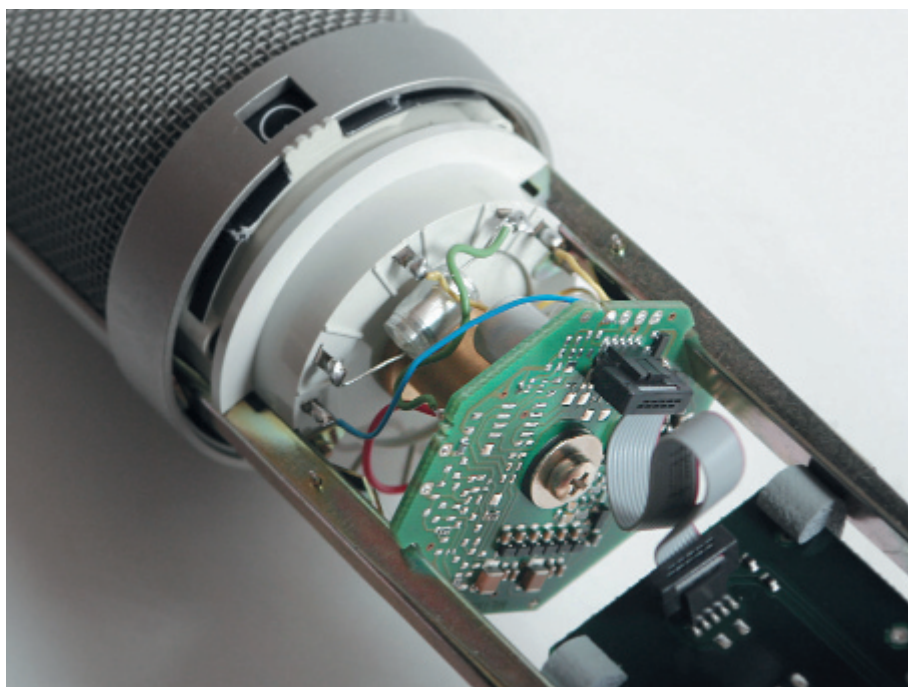


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Sound comparison of the entry-level Neumann TLM 103 and the new TLM 67, with acoustic guitar, triangle and a rap track. For the latter a backing track is available for you to hear the tracks in context.



The upper side of the TLM 67 circuit board with the sealed input stage and an operational amplifier.



The backside of the circuit board holds a modern CMOS DC/DC converter. Shown above: A fat polystyrene capacitor – just like in the good old days

miliar diamond shaped company logo adorns its front. However, in keeping with the anniversary, there is an additional gleaming bronze-colored commemorative badge depicting the company's founder Georg Neumann. This visual design, by the way, is to be retained beyond the anniversary year.

The TLM 67 comes in a stylish wooden box lined with durable foam rubber padding. Ho-

wever, a stand mount is not included with the standard version. This is a pity, since the appropriate SG 87 mount is priced at over 100 euros. For an additional 320 euros, the TLM 67 is available as a set with the matching EA 87 elastic suspension. For those who prefer a cheaper price, the mic also fits into the 20-euro no-name clamp suspensions which are available anywhere. Of course, the latter is not as well made or is as mechanically decoupled from vibrations as the Neumann original and when I see the mic in this cheap mount, I seem to see a frown on the company founder's face.

It is no coincidence that the TLM 67 uses the same accessories as the ever-popular U 87. The dimensions and silhouette are identical as is the Neumann-typical tapered, multi-layer microphone grille, which influences not only the microphone's appearance but also its sound. As with the U 87, sensitivity to pop noise is relatively low so that the microphone can be used without an external pop shield if addressed from medium distances. The TLM 67 also shares the basic features set of its famous predecessors, the U 67/77/87.

Three patterns can be selected: omnidirectional, cardioid and figure-8. Two additional switches activate a low-cut filter for close miking and/or a -10 dB pad for handling very loud signals without unpleasant distortion.

## Special features

Differences from historical or, in the case of the U 87, still existing predecessors become apparent once the microphone is opened. Instead of a large circuit board tightly packed with components, the TLM 67 is equipped with a small SMD-board surrounded by a good deal of imported air from the German capital. However, this "plain and simple" impression is deceptive! The SMD board is double sided and contains considerably more components than the tightly packed innards of its predecessors. Surface mount devices are just so much smaller than conventional through-the-hole components.

In addition to an impressive number of transistors, an operational amplifier from Analog Devices is used as well as a CMOS-based DC/DC converter which generates the high voltages required to polarize the capsule properly. Part of the board is sealed with black plastic, which not only protects the circuitry from competitors' curiosity, but also keeps moisture away from the extremely sensitive high-impedance area. Microphone experts will detect a Neumannesque attention to detail in the use of high-quality film capacitors at critical points in the signal path. For the most important of which Neumann has actually left the realm of surface mount devices. The connection between the capsule and the field effect transistor (FET) input stage is established by a "classic" through-

## Profile

**Directional characteristics:** Omnidirectional, cardioid and figure-8

**Maximum SPL:**

110/105/111 dB SPL at 0.5% THD

130/125/131 dB SPL at 5% THD

Self-noise: 16/11/17 dB-A

**Output impedance:** 50 ohms

**Manufacturer / distribution:**

Georg Neumann GmbH

**Internet:** [www.neumann.com](http://www.neumann.com)

**MSRP / Street price:**

€ 1,999 / approx.

€ 1,900 (without suspension)

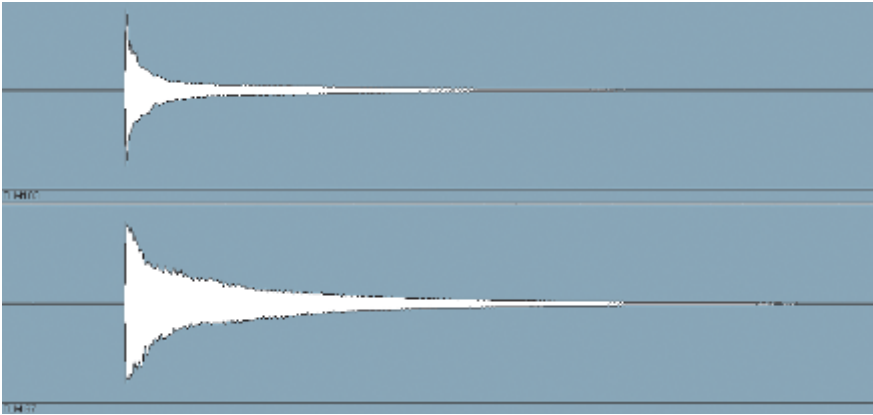
€ 2,320 / approx.

€ 2,150 (in set with EA 87)

+ full, well-balanced sound  
+ very low self-noise  
+ loudness gain through saturation  
+ responds well to EQ

- costly elastic suspension





**Simultaneous recordings of a triangle with matched peak levels: The TLM 67 appears considerably louder than the TLM 103.**



**A direct comparison of the TLM 67 and TLM 103: Test recordings with Sternradio rapper Sebastian Barth**

the-hole polystyrene capacitor – exactly the kind used in the 1960s for the U 67.

As mentioned above, the sound transducer is also a classic. It is the K67 capsule; previously used in the U 67 and U 87A as well as in several less familiar microphones such as the SM 69fet. The K67 has hence been in production, virtually unchanged, for almost 50 years. However, the handling of this capsule in the various microphone designs has not been so uniform. The K67 has a pronounced high frequency boost in the 10 kHz range. The circuit design of the U 67 compensated for this treble boost so that the end result is a linear frequency response – a technique similar to pre-emphasis and de-emphasis in tape recorders. Since many users desired a somewhat brighter sound, this compensation relaxed a little in subsequent years in the U 87 and U 87A microphones, so that a slight treble boost remained.

With the TLM 67, Neumann returns to the original approach: complete compensation. A glance at the nominal frequency response reveals that it is almost entirely linear in the core area of 40 Hz to 12,000 Hz and decreases gradually outside this range. In the context of today's recording technology this approach makes a lot of sense, perhaps more than ever before. In modern digital recording, high frequency losses, an everyday reality with analog tape recorders, no longer occur. Today many audio engineers struggle

with over-emphasized and harsh treble and a largely linear microphone is in fact soothing for overstrained ears.

The other modern malaise is the often-mentioned "digital coldness", meaning a sound is perceived as too clean and powerless. One of the most common causes of this is the absence of saturation in the digital domain made up of those artifacts we've come to love in the sound of recordings from the analog era (see also our special on saturation in S&R 09/2008). Today tube microphones are in high demand as an antidote to this "cold digital sound". On the other hand, there were

good reasons why tube technology disappeared from the scene for a long time: Tube mics are delicate, high maintenance, and require dedicated power supplies.

The new TLM 67 is designed to imitate that magic tube sound by means of cleverly devised semiconductor technology. How does this work? Well, the exact formula is presumably locked in a vault at the Berlin headquarters, however a glance at the data sheet provides valuable clues. The maximum sound pressure level (SPL) refers to the maximum level at which a microphone will operate with very little harmonic distortion. Usually 0.5% to-

**The soft saturation characteristic of the TLM 67 also works well for electric guitar.**



tal harmonic distortion (THD) is regarded as the threshold value. The TLM 67 reaches this threshold at a sound pressure level of 105 dB (in the cardioid setting) – which is unusually low. By comparison, the TLM 103's maximum pressure level is a whopping 138 dB SPL. The much lower maximum SPL figure of the TLM 67, of course, is no accident but rather part of its sound design. In order to emphasize this, Neumann specifies a second value, the maximum SPL at 5% THD, which the microphone reaches at 125 dB SPL – a value that lies in the range at which "conventional" microphones reach 0.5% distortion. What does this tell us? Well, while ordinary transistor electronics pass from squeaky clean to horribly distorted quite abruptly, the circuitry of the TLM 67 is deliberately designed for a slow and gradual rise in distortion.

What cannot be seen from the data sheet is that this distortion is of a subjectively pleasing quality. The harmonics generated are primarily even-order, and the distortion spectrum decays rapidly toward the higher frequencies. The sound, thus, does not seem distorted in the sense of scratchy, but rather appears harmonically enriched.

## In Use

This takes us directly to the realm of subjectivity. How does the TLM 67 perform in recording applications? In direct comparison with the entry-level Neumann TLM 103, the difference in sound is obvious. The TLM 67 seems rounder and fuller with softer highs. Nevertheless, it has a good presence probably aided not least by the added harmonics. The mid-frequencies of the TLM 67, in particular, sound stronger and more prominent than those of the TLM 103. Although the frequency response of the TLM 67 is in fact largely linear and free of resonance, the microphone does not sound dull or neutral in the sense of colorless. The saturation-friendly electronics always give it a slightly smoky flavor.

Whether one finds this sound coloration "tube-like" is a matter of interpretation. After all, tube microphones can sound very different depending on their circuit design and the state of maintenance. In comparison to a more neutral representative such as a well-maintained U 67, the TLM 67 exhibits stron-

ger "smoky" coloration. This is also confirmed by the data. The maximum SPL of the historic predecessor is around 10 dB higher than that of the TLM 67.

Of course, there is a rationale behind this. Whereas in the 1960s engineers desired a microphone as neutral as possible and tube technology was employed not for its sound but for lack of alternatives, today's audio engineers lust for the very artifacts that previous generations failed to eliminate no matter how hard they tried. However, back then it was not just the microphone itself but the whole recording chain which produced this kind of sound. Hence, a modern microphone with deliberate sound coloration, such as the TLM 67, faces challenges very different from those of its historic predecessor. The TLM 67, if you will, provides as much sound coloration as an entire 1960s recording chain consisting of a tube microphone, a transformer-equipped preamp and a tape machine. Nevertheless, the TLM 67 is not a gadget but a serious tool for today's recording techniques. This claim is underscored not least by the careful compensation for the capsule's high frequency boost. With such a linear frequency response, the TLM 67 may initially seem unspectacular on many sources. However, this too is a design choice. As in the case of the U 67, it is left to the audio engineer to decide where and how much to emphasize or cut frequencies via EQ.

In this approach, the microphone supplies the raw material that the audio or mixing engineer purposefully shapes and refines. This permits one and the same microphone to be used on a wide variety of sources. The TLM 67, in fact, provides a wide sound spectrum ranging from full bass frequencies to rich mids and smooth highs. The TLM 67 may not be the microphone to end all microphones – what a dreadful thought! – but it sure will provide all you'll need to tailor the sound to your liking.

Like most microphones with a linear frequency response, the TLM 67 responds very well to EQ processing. If you take the simple acoustic guitar sound comparison for instance, you'll find it relatively easy to equalize the TLM 67 file so as to reproduce the more open, modern sound of the TLM 103. By contrast, it is much harder to make the TLM 103 recording sound like the TLM 67.

Moreover, the saturation effects of the TLM 67 result in a gain of perceived loudness particularly when it comes to percussive material. A test recording with a triangle turned out very informative (see sound samples), for the triangle produces a very sharp transient. The triangle was recorded simultaneously with the TLM 67 and the TLM 103 and both mics were at the same distance from the source. The initial attack in the TLM 103 recording is much more pronounced than in the TLM 67 recording, which rounds off the transient softly. At matched peak levels the TLM 67 recording appears much louder than the TLM103 recording – without any compression artifacts.

To a smaller extent, such loudness gains are also evident with less transient-rich material such as vocals or acoustic guitar. The TLM 67 also performs well in front of a guitar amplifier, as long as its volume is kept at a reasonable level. I particularly liked it in combination with clean Fender amplifiers, since here too, the incisive, percussive attack is pleasantly rounded off which greatly facilitates integration into the mix.

## Conclusion

With the TLM 67, Neumann succeeds in combining historic roots with modern concepts – an adequate finish for the anniversary year! The TLM 67 is not, and certainly does not attempt to be, a copy of the U 67 using transistor technology. Instead, it is a carefully constructed microphone in its own right, which, despite its vintage feel, is designed to meet modern requirements. In addition to retro sound coloration and loudness gains through deliberate saturation effects, it also offers very practical advantages such as operation without a power supply and a self-noise much lower than a tube mic is likely to achieve. Still, a microphone is ultimately assessed primarily in terms of its sound. And in this regard, the TLM 67 should convince even diehard purists who claim that a modern transformerless transistor microphone must sound cold and lifeless. The TLM 67 proves the opposite!