



**Elektroakustik**

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**C12**

Condenser Microphone

TELE  
FUN  
KEN

**Product Manual**

# What's In The Box

## **M 910 Power Supply**

Designed and built in America, the M 910 power supply features the traditional stylings of the original Austrian-made AKG units partnered with the improvements of modern component technology and circuit board design. A notable difference is that the modern M 910 has combined the power supply and the pattern selector box into one unit for improved functionality and easier transportation. These units are built well over-spec to ensure reliability and safe operation for decades. Each power supply is calibrated to the specific microphone system it comes with. They are burned in as a full system to ensure optimum performance and stable operation.

The M 910 is fully regulated to ensure consistent operation regardless of line voltage variations or location. The heater voltage circuit is designed to ramp up to optimal voltage over 20 seconds, which helps to extend the life of the vacuum tube. The M 910 features premium Neutrik connectors. While these connectors are not historically accurate, they are considered a superior connector when compared to the original Cannon and 5-pin DIN connectors.

## **M 810 Cable**

The M 810 features a historically accurate swivel stand mount connector on the microphone end and a premium Neutrik 7-pin XLR connector on the power supply end. It is designed to mate with original C12 microphones and will power vintage units that have been converted to self-bias operation. This cable is made by TELEFUNKEN technicians in the USA using Sommer SC-Octave Tube cable, which has been custom-designed for the connection of tube microphones. Manufactured in Germany, SC-Octave Tube cable provides high quality, linear transmission with high flexibility and 100% interference rejection. 10 meters (32.8 feet) in length.

## **M 751 Rycote Shock Mount**

The Rycote InVision USM is the best shock mount currently produced, both for functionality and isolation. Its unique, adjustable universal locking system can be quickly adjusted to securely fit a wide range of microphones. The USM utilizes specially designed clips made from robust Hytrel thermoplastic, designed to never sag or need rethreading. This indestructible, innovative design provides an additional 12 dB of isolation compared to conventional elastic shock mounts.



### FC10 Locking Flight Case

TELEFUNKEN Elektroakustik's microphone flight cases are designed with delicate capsules, vacuum tubes, and electronic components in mind. The shell is constructed of layered hardwoods wrapped in a durable, vintage-inspired Cordura fabric. The inside of the case has cavities for each component covered with a plush suede for safe storage. Dual combination locks and nickel trim provide an understated, classic look. The embroidered TELEFUNKEN diamond logo on the inside lid and metal name plate complete the package.

### WB10 Wooden Microphone Box

The microphone wooden boxes are custom-made in the USA of high quality solid white oak with a satin lacquer. The joint construction and materials cut no corners, featuring premium latch and hinge hardware and vintage-inspired internal fabrics, each carefully hand assembled. The outside of the box is finished with a TELEFUNKEN Diamond logo branded on the top face and metal name plate with the microphone model and serial number.

For a complete list of additional accessories and replacement parts for Diamond Series products, please visit <http://t-funk.com/shop>



# Quick Start Guide

1. Thread the included shock mount or stand mount cable connector on to a sturdy microphone stand. Double check that the stand is stable and properly balanced; falls from microphone stands can require costly repairs. It is recommended to use the shock mount instead of the stand mount to reduce mechanical vibration from transferring to the audio path via the stand.
2. Set the microphone into the shock mount and tighten until hand tight.
3. Insert the cable into the base of the microphone and begin threading it on. If you experience resistance, reverse the threading direction and make sure the connector is inserted correctly.
4. Plug the other end of the microphone cable into the included power supply. It is recommended that the power supply be at least 3 meters from the microphone while recording. Make sure the cable is kept close to the stand and ground to avoid tripping or knocking over the microphone.
5. Make sure the power supply is set to the correct mains voltage (115V or 230V). Plug the included power cable into the power supply, then into mains power.
6. Connect a standard 3-pin microphone cable (not included) to the power supply and then to your microphone preamplifier input.
7. Turn on the power supply. Let the system warm up for 10 minutes before use.

## Safety Warning

Vacuum tube microphones, their associated power supplies, and their cables carry potentially harmful voltages. Make sure all connections are made before powering on your microphone system. Do not open your microphone or power supply while it's powered on. If for whatever reason your Diamond Series microphone stops working, turn it off and contact an authorized TELEFUNKEN repair center.

## **Handling**

Handle your microphone, cable, and power supply with the utmost care. Remember that Diamond Series microphones are reverse engineered from vintage models, so most mechanical parts are custom machined and not cheaply or easily replaceable. If damage occurs or there is a change in operation, please contact TELEFUNKEN directly at [repairs@t-funk.com](mailto:repairs@t-funk.com).

## **Storage**

When not in use, store your microphone in the included wooden box. It is not recommended to leave your microphone on a stand. Not only will dust degrade the response of the capsule over time, but this greatly increases the risk of a fall, which could result in required mechanical repair or cosmetic damage.

Properly coil your tube microphone cable when storing. Kinks left in the cable will expedite the deterioration of the conductors in the cable leading to shorts or opens in crucial contacts, and ultimately failure.

## **Cleaning**

To clean fingerprints and light grime from your microphone, wipe with a soft cloth damp with an ammonia-based glass cleaner as soon as possible. We use microfiber cloths, but any soft, lint-free cloth will do. Spray the cleaner onto the cloth first. Never spray any liquid directly onto your microphone.

To lubricate your threaded cable collar, apply a small amount of electronics cleaner/lubricant (we use DeoxIT Gold) with a cotton swab. Do not spray the lubricant directly into the cable connector.

Never attempt to clean your microphone capsule. This should only be performed by a reputable, trusted professional. It is recommended to contact to TELEFUNKEN to have this service performed.

If you have any questions regarding cleaning your microphone or having these services performed by a TELEFUNKEN technician, please contact [repairs@t-funk.com](mailto:repairs@t-funk.com).

# Diamond Series Overview

The Diamond Series features three primary microphone models that epitomize vintage vacuum tube microphone technology, which characterize and color the sounds of popular recorded music from the late 1940's through today. These three pillars of the vintage microphone world were selected to preserve their legacy not only because of their extremely high fidelity sonic abilities, but also because they exemplify the nearly gone culture of high quality manufacturing and hand-made workmanship.

The Diamond Series currently comprises of five microphones; three main models and two variants. They are the C12, ELA M 251E, ELA M 251T, TELEFUNKEN U47 and TELEFUNKEN U48. All of the parts for these microphones were reverse engineered and recreated exactly to the originals in order to manufacture new models and provide restoration parts for the vintage versions. The large majority of the parts are custom tooled and machined in the USA.

Every microphone is hand-built and assembled from the ground up and tested in the TELEFUNKEN facility located in South Windsor, Connecticut. Each microphone is individually wired point-to-point; no circuit boards to be found here. Every plastic is riveted by hand, and each assembly is tapped and screwed together by hand. Diamond Series microphones are produced in smaller production runs to achieve the finest attention to detail.

The dream of TELEFUNKEN Elektroakustik remains to preserve these iconic microphones and their history, and to develop new microphone technology that draws inspiration from them. TELEFUNKEN continues the tradition of producing high fidelity recording instruments to benefit the recording and performing world, and to continue to characterize music for generations to come.

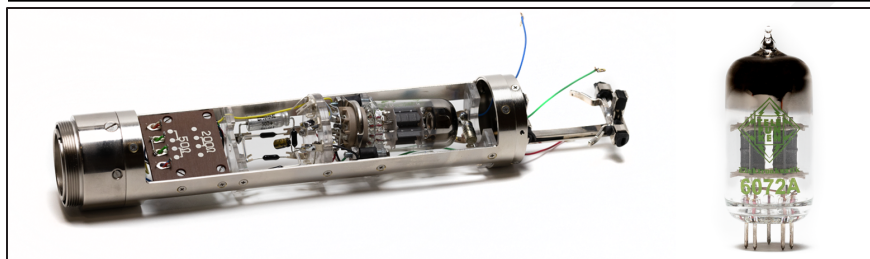


# Vacuum Tube Information

TELEFUNKEN Elektroakustik Diamond Series microphones feature vacuum tubes specially selected to properly mate electronically and sonically with each model. All tubes used are burned-in and tested for noise and gain prior to installation in South Windsor, CT. TELEFUNKEN maintains a large stock of vacuum tubes and replacements that have been tested specifically for microphone use are available directly.

Please visit [www.t-funk.com/shop/vacuum-tubes](http://www.t-funk.com/shop/vacuum-tubes) for more information.

## TELEFUNKEN 6072A



This new production 6072A is a low-noise, sonically balanced, dual-triode vacuum tube recommended for use in vintage and new production ELA M 251E, C12, TF51 and similar microphones. Screened TELEFUNKEN Elektroakustik, this tube is included in new ELA M 251E microphone systems.

### Fixed-bias vs Self-bias

The original 1950's C12 amplifier uses a fixed-bias design which requires applying a separate negative voltage to the grid of the 6072A triode. Varying this voltage changes the operating point of the tube, which impacts a number of characteristics including gain, sensitivity, and frequency response. It has long been a common modification to disconnect the bias voltage and add a cathode resistor and capacitor, effectively converting the amplifier to self-bias configuration. Self-bias is largely seen as an improvement over fixed-bias, as it's known to improve both the frequency response and headroom and requires a less complicated power supply. In self-bias, the cathode voltage is effectively set by the value of the cathode resistor and the current draw of the tube, while the negative grid voltage is left to naturally settle based on the specific tube's parameters. This configuration is found in vintage and new production ELA M 251E's and is standard in the TELEFUNKEN C12.



# C12 History

The C12 was introduced by AKG, or Akustische und Kino-Geräte (Acoustic and Film Equipment), in 1953. It was designed by AKG engineer Konrad Wolf to compete with the already-popular TELEFUNKEN U47. While both microphones feature a large diaphragm capsule, vacuum tube, and output transformer, little else is similar. Unlike the TELEFUNKEN U47, the C12 features nine remotely switchable polar patterns from an external switching box connected to the microphone's power supply. Initially intended for capturing classical performances and broadcast applications, it quickly found its way into the recording field. AKG's edge terminated CK12 capsule produced a more open and detailed sound compared to the TELEFUNKEN U47's mid-forward and present center-terminated M7 capsule.

The CK12 capsule is probably the most famous microphone capsule ever produced and was a major breakthrough in design at the time. Though many changes were made during the original production years, all true CK12's feature dual-backplates with edge-terminated diaphragms. Those changes include diaphragm materials and weights, as well as changes to the size of the chamber between the backplates. There were also changes to the output transformer used over the production run. Early versions have the V2148 transformer, while the later have the more famous Haufe T14/1 transformer, which in itself varied over the years. There have also been some minor cosmetic and mechanical changes to the microphone, including the shape and height of the headgrille, and variations in hardware, cable assembly, and power supply design.

When Telefunken stopped distributing the TELEFUNKEN U47 in 1958, AKG was contracted to develop a new flagship condenser microphone. AKG's design was the ELA M 251, essentially a modification of the C12. The C12, basically unchanged, was also re-branded as the Siemens SM203 and SM204. Though the 251 is based on the C12, there were many modifications made to the original design that account for the functional and sonic differences between the two models. A major change found in the 251 is the self-biasing of the vacuum tube, compared to the fixed-bias configuration found in the C12. With self-bias there is no calibration necessary when changing tubes and it is generally thought of as sounding more open and natural. It is a very common modification to convert AKG C12's to self-bias. The TELEFUNKEN Elektroakustik C12 is self-biased. Another difference is that the tube socket is inverted in the 251, making the high impedance line from capsule to tube grid significantly shorter.

The 251 and C12 both feature the CK12, but the capsules are polarized very differently in the two models. In the C12, the front membrane is always grounded, and the back membrane varies from 0 to 120 volts, whereas in the 251, both the front and back membranes vary between -60 and +60 volts. Though the overall range is identical, the difference in approach does account for a discrepancy in how the capsule transfers sound energy into an electrical signal. The polarizing network itself was also moved inside the microphone in the 251, with the switch now found on the front of the microphone. It is speculated that this was done to imitate the look of the TELEFUNKEN U47. The number of polar patterns was also reduced to three: Cardioid, Omnidirectional and Figure 8. There are also obvious differences in the mechanical assembly, body tube diameter and headgrille size and construction between the two microphones. The sonic differences between the 251 and the C12 can largely be attributed to the headgrille design, change in polarizing network, and change in tube bias, since they share the same capsule, tube, and output transformer.

It is generally estimated that approximately 2,000 C12's were made during AKG's 10-year production run from 1953 until 1963. In 1962, AKG released the C12A, which also featured a CK12 capsule but with a different tube, circuit, and transformer. The later version of the famed CK12 capsule is also found in early versions of the C 414 which was initially released in 1971. The modern "VR" version was released in 1994 as a replica of the original C12, but aside from the 6072A tube, it has little in common with the capsule, sound, or circuit of the original C12. A stereo version, the C24, was introduced in 1959 and stayed in production years after the C12 was discontinued.

The TELEFUNKEN Elektroakustik replica C12 features a historically accurate CK12 capsule, made by hand in South Windsor, CT, a 6072A vacuum tube in self-bias configuration, and a T14/1 output transformer made by the original European manufacturer, Haufe. The polar pattern box has been combined with the power supply into one unit. This does not affect the sound in any way, but greatly improves the functionality by limiting the number of interconnects, cabling, and equipment needed for operation. Mechanically, most parts found in the replica are compatible with vintage units though fit cannot be guaranteed due to subtle changes in the original design. While the original units feature a plated body with an engraved AKG logo, the TELEFUNKEN replica features a gray powder coated body and classic TELEFUNKEN Diamond badge.



Revered for its smooth and airy frequency response, if there were ever a microphone that was the epitome of classic, hi-fidelity sound, it would be the C12. While it is a fantastic choice for all types of instruments, the C12 lends itself especially well to drum overheads, acoustic guitar, and vocals. Its silky top end provides plenty of air without sounding harsh or artificial. Its midrange speaks clearly and articulately, capturing the source with a natural presence. Its low end is tight and focused, perfectly balanced with the rest of the frequency range. The TELEFUNKEN C12 builds upon the original design with the implementation of cathode self-biasing operation, a configuration which is quieter and more consistent than the original fixed-bias configuration.

### CK12 Capsule

Our historically accurate replica CK12 capsule is made in limited quantity in the USA. This edge-terminated, dual diaphragm design is considered one of the truly best sounding capsules ever created.

### 6072A Vacuum Tube

This new production, TELEFUNKEN Elektroakustik-screened 6072A dual triode vacuum tube is electronically and sonically tested and burned-in in the USA. They are hand-selected for use in the C12 and provide stellar, vintage-correct performance.

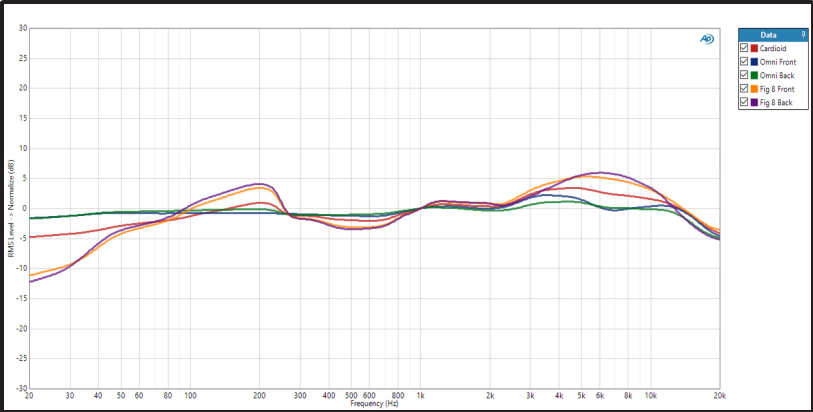
### Haufe T14/1 Transformer

This output transformer is made to vintage specification by the original European manufacturer, Haufe, exclusively for us. The T14/1 provides a sonically pleasing tonality with excellent low frequency clarity.



# Technical Specifications

| Specification                  | C12                                                              |
|--------------------------------|------------------------------------------------------------------|
| Type                           | Vacuum Tube Condenser                                            |
| Polar Pattern                  | 9-Pattern Variable including Cardioid, Omnidirectional, Figure-8 |
| Frequency Range                | 20 Hz - 20 kHz, $\pm 3$ dB                                       |
| Power Source                   | External Power Supply                                            |
| Capsule                        | TELEFUNKEN CK12 – Edge Terminated Large Diaphragm                |
| Tube                           | TELEFUNKEN 6072A                                                 |
| Transformer                    | Haufe T14/1                                                      |
| Sensitivity                    | 10 mV/Pa $\pm 1$ dB                                              |
| THD at 1 kHz, 1 Pa (Amplifier) | < 0.25%                                                          |
| Output Impedance               | 200 $\Omega$                                                     |
| Maximum SPL (for 1% THD)       | 130 dB                                                           |
| S/N Ratio                      | 85 dBA                                                           |
| Self-Noise (Amplifier)         | 9 dBA                                                            |
| Dimensions                     | 250 mm L x 42.5 mm Dia                                           |
| Weight                         | 567 g                                                            |



# System Configurations

| System              | C12 | C12 Stereo Set |
|---------------------|-----|----------------|
| M 910 Power Supply  | X   |                |
| M 910S Power Supply |     | X              |
| M 810 Cable         | X   | 2X             |
| WB10 Wooden Box     | X   | 2X             |
| M 751 Shock Mount   | X   | 2X             |
| FC10 Flight Case    | X   |                |
| FC10S Flight Case   |     | X              |

## Stereo Sets

Like all TELEFUNKEN Elektroakustik tube microphone Stereo Sets, the C12 Stereo Set includes two meticulously matched microphones and a dual power supply in a premium flight case. The American-made power supply is capable of powering both microphones at the same time and controls the polar patterns of both microphones. This system is capable of all common stereo recording techniques including XY, ORTF, Spaced Pair, Blumlein, and Mid-Side. The included carrying case easily holds both sets of microphones, cables, and accessories. All critical components, including the capsules, tubes and transformers, are hand-selected and tested for matched gain and frequency response. These sets offer the user the knowledge and comfort that the tools they are using will give identical responses for the most critical stereo recording.



# Warranty

TELEFUNKEN Elektroakustik warrants that any capsules and tubes used in their microphones are free from defects in material and workmanship for the period of ninety (90) days from the original date of purchase, and agree to replace any capsule or tube which, under normal installation and use, disclose such defect. This is provided that the complete microphone is delivered to TELEFUNKEN Elektroakustik intact for examination and provided that such examination discloses, in the judgment of TELEFUNKEN Elektroakustik, that the tube or capsule is indeed defective. Upon replacement, TELEFUNKEN Elektroakustik will provide an additional 90-day limited warranty on the new capsule or tube.

This warranty does not extend to any capsule or tube which appears to have been misused, altered, neglected, damaged, or stored in any manner that adversely affects it, or used in violation of instructions furnished by us. This limited warranty shall be void and of no further force or effect whatsoever if the microphone is repaired or modified by any person other than an authorized representative of TELEFUNKEN Elektroakustik. This warranty shall not apply to any defect, failure, or damage caused in whole or in part from attempts by personnel other than TELEFUNKEN Elektroakustik's to open, repair, or service the microphone; nor to damage to a unit which has been modified by persons other than TELEFUNKEN Elektroakustik personnel.

Please visit [www.t-funk.com/warranty](http://www.t-funk.com/warranty) to register your microphone.



**Warranty Registration**

**CE RoHS**

In compliance with the following requirements:  
EMC Directive: 2014/30/EU (EN 55013 applied)  
Low Voltage Directive: 2014/35/EU (EN 60065 applied)  
RoHS2 Directive: 2011/65/EU

# Repairs & Service

Repairs on new TELEFUNKEN Elektroakustik microphones are covered under a limited warranty plan and repair costs will be determined based upon the date of purchase and the date in which the warranty was registered. Repairs & Service covered under the warranty plan are done at no charge for labor, parts and service.

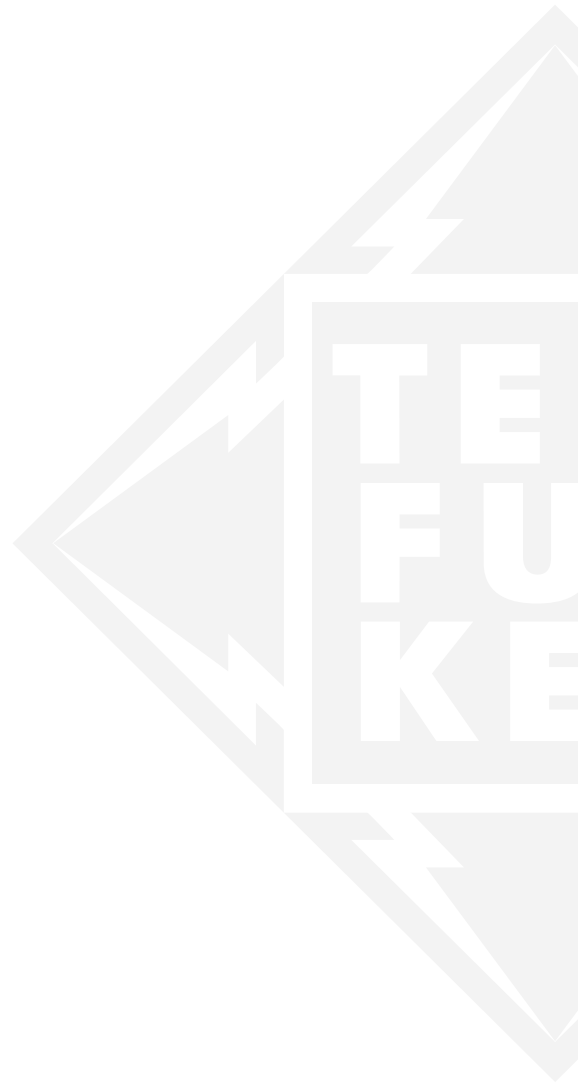
Please visit [www.t-funk.com/repairs](http://www.t-funk.com/repairs) for microphone repair information.



**Microphone Repair Form**

**Diamond Series** | 13







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