

# MANLEY

LABORATORIES, INC.

## OWNER'S MANUAL



## REFERENCE TUBE MICROPHONES

REFERENCE CARDIOID | REFERENCE SILVER | REFERENCE GOLD



CONTENTS	PAGE
table of contents	3
introduction	4
Reference models	5
power supply	6
general	7
microphone controls	8
polar patterns	11
circuit topology	12
troubleshooting	13
servicing	14
specifications	15



## Thank you for selecting a Manley Reference Series Microphone!

This manual covers the Reference Cardioid, the Reference Silver, and the Reference Gold Microphones, all handcrafted at our factory in Chino, California USA. These designs are optimized for extremely wide frequency response and exceptionally accurate transient response, and all feature very open-weave stainless steel grilles for the capsule window for zero-loss acoustical transmission.

The sensitive gold sputtered capsules and tube electronics are housed in a finely-machined body which requires little to no maintenance. A double suspension system is employed in all three Reference Microphone models, minimizing mechanical interaction whilst recording.

The entire working “guts” of the microphone may be removed for servicing in one piece, and there is no need to remove the microphone body from the suspension. We also provide a very useful Manley swivel with each mic; its T-bar handle and locking clutch action require no tools, and allow the microphone’s fine-positioning to be adjusted with great precision.

The Manley Reference Cardioid microphone has a fixed cardioid pattern. The Manley Reference Silver microphone has two patterns: cardioid or omni-directional. The Manley Reference Gold has continuously variable polar patterns, ranging from omni through cardioid to figure of eight.

All three microphones are supplied with a separate power supply unit. See below to determine which of the two Manley PSUs your mic requires, based on its serial code prefix.

### **PSU1: Linear Power Supply (1990 - 2019)**

REFCARD  
REFCARDX  
REFCARDT  
REFGOLD  
REFSGOLD (Stereo)

### **PSU2: MANLEY POWER® SMPS\* (2020 onwards)**

MRAG  
REFCARD7P  
REFGOLD7P

*\*Switch Mode Power Supply*



### Reference Cardioid

The REF-C microphone, as it is commonly called, went into production in 1990. Its trademark black and red body makes it very recognizable. It has that “finished” sound right out of the box, making it the world’s #1 modern tube vocal microphone for top producers and voiceover artists alike. The center-fixed single-sided-active capsule features a 6 micron gold sputtered diaphragm based on the vintage U47. Known as the “just add talent” vocal mic, the REF-C also often finds itself in front of acoustic guitars, pianos, drums, and saxophones.



### Reference Silver

The Reference Silver is the newest microphone in the Manley stable, first going into production in 2017. This microphone is very distinctive with its silver, scale-like finish. The handmade capsule - made in America by David Josephson - features a 5 micron evaporated gold diaphragm based on the vintage C-37A. This microphone has an adjustable mechanical vent on the rear of the grille which changes the polar pattern from cardioid to omni. Its flat HF response makes it a real problem-solver for husky voices, brass, electric guitar cabinets, and drum overheads.



### Reference Gold

The Reference Gold microphone is our flagship microphone, first produced in 1990. Its very distinctive housing with impressive 24 karat gold-plated finish on a solid brass body confirms its quality and performance. It utilizes our own custom-designed 1” diaphragm capsule, handmade in America by David Josephson and based upon a classic CK-12 capsule. The 5 micron gold film exhibits inherently stable characteristics over years (unlike thinner diaphragms) while still maintaining the speed, “air”, and ultra-high frequency response for which this microphone is famous. Its precise nature and highly detailed response make this microphone very popular for strings, piano, orchestral work, and vocals.

# power supply

A separate and dedicated power supply unit (PSU) is required for each of the Manley microphones. The tube electronics which are the amplifying devices in the microphone require this separate high voltage source to power the B+ and heater supply. The PSU connects to the microphone through the dedicated multipin XLR cable provided. **DO NOT USE ANY OTHER CABLES FOR THIS PURPOSE.** It also has a 3 pin XLR output which provides the audio for your microphone preamplifier.

## PSU1: LINEAR POWER SUPPLY (PRE-2020)

### IEC Power Inlet

*(Voltage must be set for your country)*

### Fuse (5 x 10 mm)

250mA SLO-BLO - 120V

125mA SLO-BLO - 220V

Power Switch



6 PIN XLR  
to Microphone

3 PIN XLR  
to Mic Pre



Power Indicator LED

## PSU2: MANLEY POWER® SMPS

### IEC Power Inlet

*(Universal Voltage,  
90VAC - 240VAC,  
50~60 Hz)*

### 7 PIN XLR

to Microphone

### 3 PIN XLR

to Mic Pre

Power Switch / Indicator

*With an IEC power cable connected, this switch's LED will glow dimly to show that power is applied. When the switch is pressed to turn the unit on, it will glow bright red.*



Manley microphones will beat all others on grounds of sheer naturalness of sound without coloration or perceivable sonic signature. The designs are optimized for extremely wide frequency response and exceptionally accurate transient response. Visually impressive, our microphones inspire confidence in artists and producers.

We have chosen a very open weave stainless-steel grille for the capsule window for near zero-loss acoustical transmission. The open mesh design of the microphone allows all the highs to reach the capsule unimpaired and allows the engineer to choose if, when and how much pop screen is appropriate. Vocal “pops” may distort the capsule without a pop screen. Air movement and wind can overload a capacitor microphone capsule much easier than loud levels. We strongly recommend a good 2 layer nylon pop screen with these microphones on close vocals.

## Connections

Screw the supplied swivel mount into the rear side of the microphone shock mount as shown (*right*). Note: if used, the locking nut and O-rings (optional) should stay on the OUTSIDE of the shock mount, and can be adjusted as needed so that the swivel mount is securely fastened to the mic at whatever angle is desired.

Then, attach the other threaded side of the swivel mount securely to a stable mic stand and lay the cables so that people cannot trip over the cable or topple the stand. Connect the dedicated mic cable (supplied) between the PSU and the microphone. Connect a 3-pin XLR M-F cable (not supplied) to the 3-pin XLR output on the PSU to your mic preamplifier. If possible, use a short 3-pin XLR cable and a high quality microphone preamplifier (with the phantom power turned off) located near the microphone. This is usually the best for audio quality. Try to avoid running the microphone signal through a patch bay or extra connectors and wires.

Connect the power supply to the wall outlet using the supplied IEC power cable and turn on the supply. Let the microphone warm up for at least 5 minutes before using. Note: these microphones do not care about their orientation; as long as the capsule is facing in the desired direction, the microphone body can mount in any position (facing up, down, sideways, etc.).

*Notes on previous / older models: Older Manley Gold Mics had two connectors on the base of the microphone. The audio output was taken from the 3-pin XLR-M connector, and the 4-pin screw-on connector supplied the power from the PSU. The old Manley Stereo Gold Mic had a 4-pin power connector and a 5 or 6-pin XLR for the two channels of audio.*





## -10 dB Pad Switch, Reference Cardioid & Reference Gold

This tiny switch near the base of the microphone body reduces the signal by 10 dB. Rather than changing the capsule voltage or adding a resistor to the signal path, we chose a better technique: we alter the amount of negative feedback! While the tube circuit will handle any signal the capsule can deliver, the pad may be needed with some preamps. If you suspect that the mic is distorting, first try a different mic pre. The capsule is rated for 150 dB SPL, but wind or other air movement can collapse the diaphragm. We strongly recommend a good 2-layer pop filter to stop excessive air movement when recording close vocals.



## High Pass Filter Switch, Reference Silver

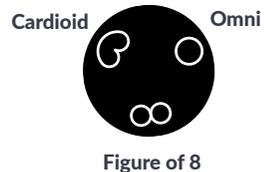
This switch activates a filter which is useful if trying to remove unwanted low frequency noise from a room caused by rumbling from traffic, HVAC, etc. Switching to this position  activates the high-pass filter\*. Switching to this position  means a flat frequency response.

*\*High-pass filter slope = 6dB/octave, 3dB down @ 55Hz*



## Pattern Select Control, Reference Gold

This control adjusts the desired polar pattern. Instead of providing 3 or 4 switchable pattern choices, the Manley Reference Gold Mic has a continuously rotatable potentiometer yielding an infinite number of patterns. For example, a setting between the “heart shaped” CARDIOID and FIGURE OF 8 will result in “SUPER-CARDIOID” and “HYPER-CARDIOID” patterns.



Remember that proximity effect is primarily affected by the polar pattern. Often with vocalists, one wants a certain amount of bass boost associated with certain mics and certain distances. Rather than just hoping that the CARDIOID setting will do the right thing, this time try adjusting the PATTERN SELECT CONTROL to “dial in” the amount of proximity effect for this particular vocal. More OMNI will give less proximity effect, while more FIGURE 8 will bring in more lows. In other words, while this is only true for close miking, the PATTERN SELECT can be an effective bass control.

**TIP:** You may notice that as the pattern becomes more FIGURE 8, certain air conditioning rumbles and room noise may exhibit reduced pick-up. Conversely, if you want more room sound, try moving the pattern select closer to OMNI.

Compared to many microphones, the Manley Reference Gold Microphones exhibit less proximity effect for a given close distance. We feel this is a clear advantage. Most engineers we consulted preferred the options of bass control from the console rather than the typical situation where a few inches of distance can make or break a take. We also chose to allow the frequency response of the Reference Mics to extend below 20 Hz. Some mics seem to have a low frequency resonance that can be desirable at times while boomy or tubby at other times. Our goal is “flat and natural” with the Reference Gold Mic.



### **Pattern Select Control, Reference Silver**

The Reference Silver Microphone offers two different pickup patterns, Cardioid and Omni. Changing the pattern is achieved by carefully inserting the supplied Pattern Adjust Key into the opening in the back of the grille and gently turning the screw. This adjusts the backplate vents, allowing the capsule to operate in two modes.

*(continued on next page)*

### Pattern Select Control, Reference Silver (continued)



Turning the screw clockwise closes the vent (omni) while turning counterclockwise opens it (cardioid). These patterns are marked on the control port as above. The Reference Silver mic achieves its directional response by subtracting sound that enters from the rear of the capsule, from the sound entering the front of the capsule. This allows us to tune a “null” value towards the rear, the response to sounds arriving from the rear may be reduced by 20 dB or more from response to sounds arriving from other directions.

The Reference Silver Mic allows the traditional omni and cardioid patterns to be selected repeatedly, and with some care it is possible to set the pattern control vent to produce “WIDE” or “SUBCARDIOID” patterns. However, the range from omni (full clockwise) to cardioid (counterclockwise 90 degrees to the stop) is not linear; subcardioid is achieved with the adjustment vent just slightly counterclockwise from omni. Results for intermediate patterns are not easily repeatable from microphone to microphone or if the adjustment is moved.



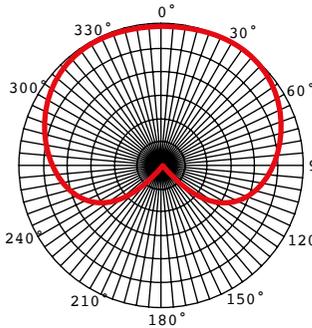
#### **CAUTION:**

**Adjust the Reference Silver microphone pattern ONLY when the microphone is disconnected and powered OFF. Only use the tool provided.**

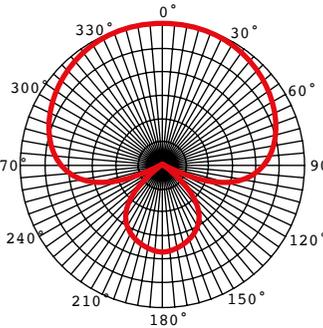


**The Pattern Adjust Key can be diligently stored on top of the PSU using its magical magnetic properties!**

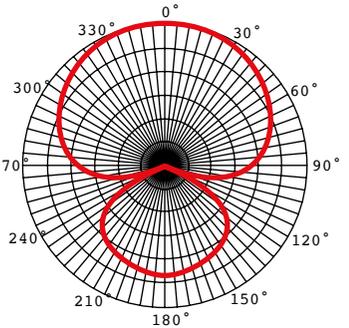
## Examples of Typical Polar Patterns



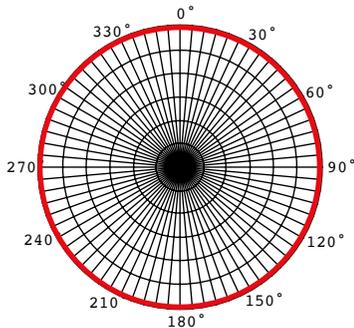
**Cardioid**



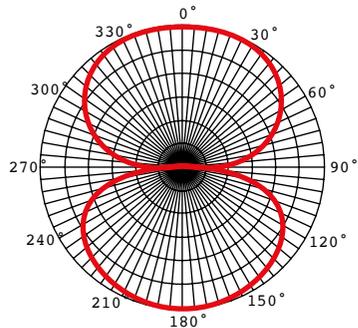
**Super-Cardioid**



**Hyper-Cardioid**



**Omni-Directional**



**Figure-Eight**

## circuit topology

The tube employed in the Reference Gold and Reference Cardioid is a dual-triode 12AX7, forming an entire gain-block. The tube used in the Reference Silver is a 5670 dual-triode. Both tube types are easily obtainable and user-replaceable, and are mounted in ceramic sockets inside the microphones.

Removing the two Philips screws at the base of the microphone body allows the complete microphone body & suspension to be removed so the tube may be replaced easily. There is no need to separate the body from the suspension system.

*(See page 14 for more information on tube replacement.)*

**Be very careful not to touch the thin gold capsule at the top of the assembly, as the diaphragm is very fragile - even a single fingerprint on the diaphragm can destroy it.**

The output of the tube stage is coupled through a custom built Manley IRON® output transformer of unparalleled quality and substantial physical size employing nickel laminations. The windings incorporate bi-filar winding technique for superior hum rejection. The finished transformer is then resin potted in a mu-metal enclosure.



**NO POWER, NO INDICATORS** - Check the IEC cable is plugged in firmly. The Switch Mode PSU may be in protection mode, try turning the PSU OFF, wait 2 minutes then switch on again. Check the fuse on the back panel. A blown fuse often looks black inside, and an open fuse measures OPEN on a multimeter. Try replacing the fuse with one of the same value and size. If it blows then prepare to send the unit back to the dealer or factory for repair. The fuse is a protection device and it should blow if there is a problem.

**LIGHTS, BUT NO SOUND** - This typically indicates a cabling problem. Check to ensure the XLR microphone cables you are using are not damaged. If the XLR and microphone preamp (and the rest of the signal path) are known to be good, the microphone capsule wire may be broken, or the tube may have gone bad.

**LEVELS SEEM TO BE WRONG, NO BOTTOM** - Most likely one of two scenarios. One, a partially broken cable. You would then be missing half the balanced signal and levels would be down approximately -6dB. Second possibility, the signal's polarity has been reversed somewhere. Try flipping the phase on your microphone preamp (if it has a phase switch), and see if that helps. Put on some headphones, close your eyes, and speak into the microphone from a distance of about one foot. Your voice should be full and clear with a solid low-end. With the phase reversed, this solidity goes away and your voice will sound like it is lacking bass.

**HUM** - This is most likely a ground loop. It is possible to use a "mains cheater" 3-pin to 2-pin adapter with its ground separated, or to remove the internal ground lift jumper on the PSU. See the SERVICING section of this manual (page 14) for this procedure.

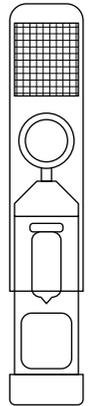
**BUZZ** - If the buzz goes away when you hold the microphone, this is most likely a faulty ground somewhere in the chain. Make sure all the philips screws holding the microphone body to the microphone base are tight. Older models might have loose set screws (grub screws) that hold and ground the connectors to the body system. These set screws for the connectors are located in the base of the mic. To access them, first remove the 2 (or 3 in very old mics) Philips flat head screws and slide the body up towards the capsule to reveal them (see page 14 for details on how to safely do this). Look in the holes and use a 1/16" hex allen key to loosen and tighten the set screws. Finally, a "buzz" might also be indicative of a bad / noisy tube - in that case, please refer to page 14.

**EXCESS NOISE, DISTORTION, SNAPS CRACKLES & POPS** - Most likely a tube; please refer to page 14.

## servicing

It is possible to remove the working "guts" from the microphone body in one operation to replace a tube. Please follow the procedure below, referring to the diagram on the right for details.

1. Turn the power supply off, disconnect it from the wall, and disconnect the supplied cable from the microphone. Allow 10 minutes for voltages to discharge.
2. Using a Phillips screwdriver, remove the two Phillips flat head screws and star washers on the microphone body that hold it to the base of the microphone.
3. Gently pull the base of the microphone out from inside the body. The guts of the microphone will come out as one assembly. Note: Only pull the insides out enough to expose the tube - DO NOT touch the delicate capsule!
4. Gently grasp the tube between your thumb and forefingers, and wiggle it out of the socket.
5. Taking care to align the pins properly, insert the new tube into the socket, and repeat these steps (again, CAREFULLY) to return the guts to the inside of the microphone with a gentle twisting motion. Make sure to properly tighten the screws at the base for a good chassis to ground connection!



**Internal Ground Lift:** This jumper is located on the rear PCB of the PSU. On earlier models it is a wire link (left photo), on later models it is a removable jumper (right photo) marked as JP1. If the circuit ground is required to be separated from the chassis to stop hum generated by an "earth loop", this link can be cut (or desoldered) or the jumper removed.



Wire link (Type 1 Linear PSU)



Jumper (Type 2 SMPS)



**Voltage Change (Linear PSU only):** The Type 1 PSU is a linear design and the power transformer must be configured for your country's voltage. **You will destroy the power transformer if you plug a PSU set to 120VAC into a 230VAC wall socket.** The serial # sticker indicates the voltage for which the unit was originally configured at the factory. To change the voltage, set the links on the PSU PCB as described on the AC Selector chart next to the links. This procedure will require a soldering iron. You will also need to change the fuse to the new required value (see page 15), and we recommend re-labeling the unit so that its operating voltage is clear to everyone.

*The Type 2 SMPS MANLEY POWER® power supply will work everywhere on earth. It does not need to be reconfigured for different countries' mains voltages (90-250VAC) and will operate on any mains frequency (50 or 60 Hz).*

## Reference Gold

**CAPSULE TYPE:** Dual Edge Terminated Large Diaphragm Capacitor (Condenser)

**POLAR PATTERNS:** Continuously Variable (omni through cardioid through Figure of 8)

**DIAPHRAGM SIZE:** 1 Inch; 1.25 Inch Overall

**DIAPHRAGM THICKNESS:** 5 Micron; Gold Sputtered

**FREQUENCY RESPONSE:** 10Hz-30kHz, AMP to 60kHz

**MAXIMUM INPUT SPL:** 150 dB SPL at Capsule

**SENSITIVITY:** 19mV/Pa

**AMPLIFIER TYPE:** 2 Triode Gain Block Lo Z Output

**ACTIVE COMPONENTS:** (1) 12AX7 Dual Triode Vacuum Tube

**OUTPUT TYPE :** Transformer Coupled, Manley IRON® 7227

**OUTPUT POLARITY:** Balanced XLR, Pin 2 Hot, Pin 3 Low

**AMPLIFIER DISTORTION:** Less Than 0.05 % THD+N BW

22-22 kHz (1kOhm Load, 1kHz -40dBV Output)

**AMPLIFIER NOISE:** Typically - 101 dBV "A Weighted"

**BODY:** 24 Karat Gold Over Machined Brass

**MIC WEIGHT:** 2lbs

## Reference Cardioid

**CAPSULE TYPE:** Center-fixed Large Diaphragm Capacitor (Condenser)

**POLAR PATTERNS:** Fixed Cardioid

**DIAPHRAGM SIZE:** 1 Inch; 1.25 Inch Overall

**DIAPHRAGM THICKNESS:** 6 Micron; Gold Sputtered

**FREQUENCY RESPONSE:** 10Hz-30kHz, AMP to 60kHz

**MAXIMUM INPUT SPL:** 150 dB SPL at Capsule

**SENSITIVITY:** 17mV/Pa

**AMPLIFIER TYPE:** 2 Triode Gain Block Lo Z Output

**ACTIVE COMPONENTS:** (1) 12AX7 Dual Triode Vacuum Tube

**OUTPUT TYPE :** Transformer Coupled, Manley IRON® 7227

**OUTPUT POLARITY:** Balanced XLR, Pin 2 Hot, Pin 3 Low

**AMPLIFIER DISTORTION:** Less Than 0.05 % THD+N BW

22-22 kHz (1kOhm Load, 1kHz -40dBV Output)

**AMPLIFIER NOISE:** Typically - 101 dBV "A Weighted"

**BODY:** Black Anodized Aluminum

**MIC WEIGHT:** 1.5lbs

## Reference Silver

**CAPSULE TYPE:** Large Diaphragm Capacitor (Condenser)

**POLAR PATTERNS:** Continuously Variable (omni through cardioid via port entry on rear)

**DIAPHRAGM SIZE:** 1 Inch; 1.25 Inch Overall

**DIAPHRAGM THICKNESS:** 5 Micron; Gold Sputtered

**FREQUENCY RESPONSE:** 10Hz-30kHz, AMP to 60kHz

**MAXIMUM INPUT SPL:** 150 dB SPL at Capsule

**SENSITIVITY:** 7mV/Pa

**AMPLIFIER TYPE:** 2 Triode Gain Block Lo Z Output

**ACTIVE COMPONENTS:** (1) 5670 Dual Triode Vacuum Tube

**OUTPUT TYPE :** Transformer Coupled, Manley IRON® 7227

**OUTPUT POLARITY:** Balanced XLR, Pin 2 Hot, Pin 3 Low

**AMPLIFIER DISTORTION:** Less Than 0.05 % THD+N BW

22-22 kHz (1kOhm Load, 1kHz -40dBV Output)

**AMPLIFIER NOISE:** Typically - 108 dBV "A Weighted"

**BODY:** Etched Silver Anodized Aluminum

**MIC WEIGHT:** 1.5lbs

## PSU Type 1 - Linear Power Supply (PRE-2019)

**POWER CONSUMPTION:** 8.3 Watts

**WEIGHT / DIMS:** 2.6 lbs / 5 x 3.3 x 8.3" (with handle)

**FUSE:** 250mA 100/120V SLO BLO, 125mA 220/240V

SLO BLO GLASS - 5mm x 10mm

**INPUT VOLTAGE:** Dedicated: 100, 120, 220, or 240VAC

## PSU Type 2 - Switch Mode Power Supply

**POWER CONSUMPTION:** 8 Watts

**WEIGHT / DIMS:** 2.35 lbs / 5 x 3.3 x 9.3" (with handle)

**FUSE:** 250VAC 2A SLO BLO CERAMIC - 5mm x 20mm

**INPUT VOLTAGE:** 90VAC to 250VAC (Universal)

**MAINS FREQUENCY (both PSU models):** 50 or 60Hz

# MANLEY

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Designed & Handcrafted in the USA by:

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For tech support or service, please fill out the Service form on our website:

[www.manley.com/service](http://www.manley.com/service)

Register your mic here to extend your warranty to a full five years:

[www.manley.com/register](http://www.manley.com/register)

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This manual provides general and technical information for use, installation, and operating instructions for Reference Tube Microphones. Manley Laboratories, Inc. reserves the right to make changes in specifications and other information contained in this publication without prior notice. Manley Laboratories, Inc. shall not be liable for errors contained herein or direct, indirect, incidental or consequential damages in connection with the furnishing, performance, or use of this material. No statement contained in this publication, including statements regarding suitability or performance of products shall be considered a warranty by Manley Laboratories, Inc. for any purpose or give rise to any liability of Manley Laboratories, Inc.

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