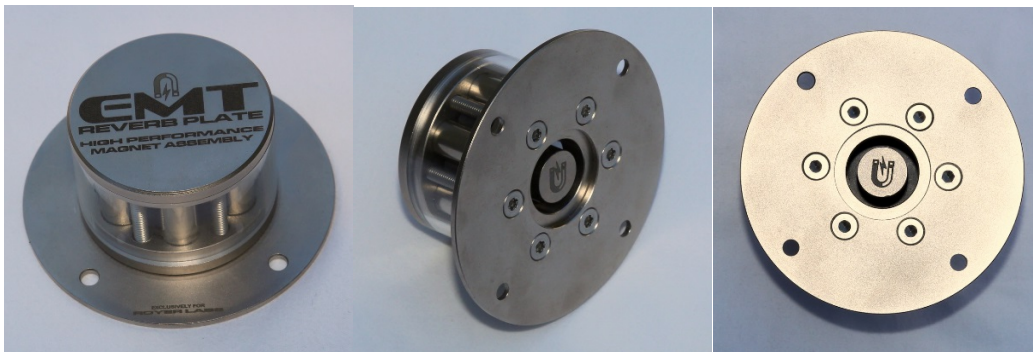


**EMT 140 Reverb Plate**  
*High-Performance*  
**Drive Coil Magnet Motor Assembly**  
Model 140NM

*The Model 140NM is the simplest performance upgrade for any EMT 140 reverb plate that will breathe new life into this venerable and iconic workhorse.*



Congratulations on your purchase of this 140NM high performance magnet assembly! It was carefully constructed of the finest materials and is a precision piece of engineering.



The Model 140NM magnetic motor assembly is an exact retrofit for all EMT 140 reverb plates. The flux gap is also consistent with the wide gap of the original magnet assembly, but the performance is superior to that of the stock unit.

A powerful neodymium magnetic array consisting of six grade 52 “super magnets” are arranged in a “turret” fashion between two precision machined pole pieces and form a powerful magnetic circuit for the driver-coil, in spite of the wide flux-gap.



The design is such that most of the magnetic force is concentrated within the flux gap while minimizing stray leakage that could magnetize the EMT’s steel reverberation plate.

The specially designed billet pole pieces concentrate a powerful magnetic field making it easier for the drive amplifier to energize the driver-coil. The result is a more responsive plate with better frequency response, lower distortion, and lower noise due to a reduced amplifier drive level. In essence, the plate will sound livelier.

The original magnet assembly for the EMT 140 reverberation plate consisted of an alnico motor made up of multiple components and offered up a very wide flux-gap for the driver-coil. Unlike a speaker, which has a very tight gap between the voice-coil and the north/south pole pieces for maximum efficiency, the EMT’s driver-coil gap is approximately 1/8<sup>th</sup> inch wide. The reason for such a wide flux gap is to compensate for variances in the driver coil alignment when tensioning the plate, plate movement, and to allow for temperature differentials that would cause alignment issues with a tighter gap arrangement. That coupled with a relatively weak magnetic structure set the performance limitations of the motor assembly.

## **Model 140NM Features**

Direct drop-in replacement for the original magnet assembly

- The 140NM is smaller and lighter than the original unit but offers greater performance.
- Improved transient response
- Improved frequency response
- Lower noise and reduced harmonic distortion
- Easy installation

This kit includes a full set of instructions, an acrylic centering disc and metric screw and washer set for proper installation.

## **Applications**

- Direct replacement for missing or damaged original magnet assemblies
- Replacement for weakened original alnico magnet assemblies
- Improved performance for existing EMT 140 reverberation plates.

## **Installation Guide**

*Installation is simple and straightforward but great care must be taken whenever the magnet motor assembly is handled, removed, or reinstalled otherwise severe damage to the driver-coil may result.*

### **CAUTION!**

Whenever handling the magnetic motor assembly exercise extreme care as to not allow dust, foreign material or ferrous particles (tramp iron) to enter the flux gap area of the assembly. The powerful magnetic structure makes it nearly impossible to remove such foreign material without great effort. Contamination of this type will cause interference with the free movement of the driver-coil and will result in distortion and severely compromised performance. Whenever the motor assembly is

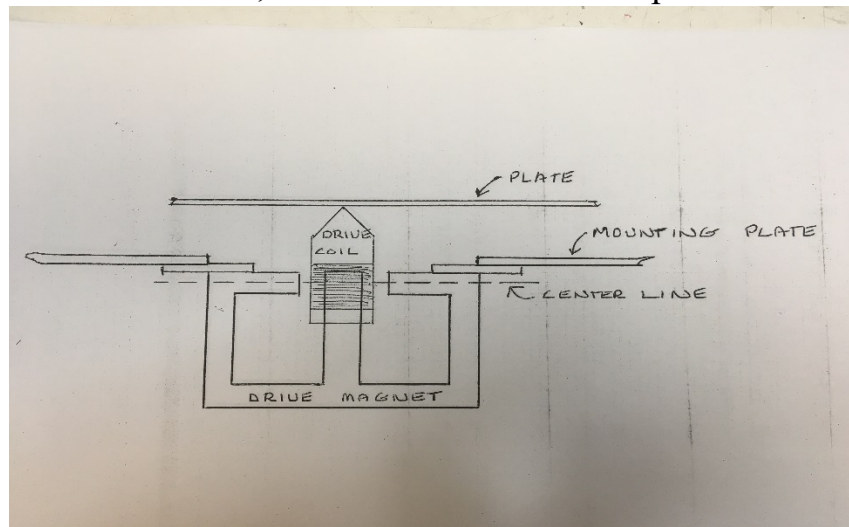
removed or handled place a piece of tape over the magnetic gap area to prevent contamination from entering the gap.

To gain access to the magnet motor assembly remove the left wooden side cover of the EMT (10mm bolts). This cover is quite heavy so have an assistant help with this task.

If the EMT is already tuned and functioning properly, simply remove the original magnet assembly by removing four screws that secure it to the mounting plate. To prevent the possibility of damaging the driver-coil its best to support this bulky assembly while removing the screws. Remove the unit by withdrawing straight back. Install the Model 140NM in its place and reinstall the four screws. Move the plate gently back and forth by hand to assure that the driver coil is properly aligned and does not rub at any point on the magnet assembly's pole pieces. It must move freely.

After installation of the Model 140NM the drive amplifier may need to be recalibrated as a result of the higher efficiency of the 140NM magnet assembly. This usually requires the drive amplifier's output to be lowered but not in all cases.

If the original magnet assembly is missing altogether, it is necessary to be certain that the driver-coil is perfectly centered in relation to the magnetic flux gap. This is accomplished with the aid of a "centering disc" used to align the mounting frame that supports the magnet assembly. This is supplied with your kit. Remove protective paper from the disk if necessary. This alignment procedure is also required whenever the plate is tensioned or tuned, and often when it is transported.



For optimum performance, it is important that the coil's windings sit at the proper depth within the magnetic gap. The mounting plate that supports the magnet assembly usually has a series of washers stacked one on top of the other that act as spacing shims. There are approximately six of these washers under each screw. These are used to move the mounting plate closer or farther away from the center of the windings on the driver-coil assembly. One of the easiest ways to determine the correct number of shims is to mount the magnet assembly and feed a tone into the plate and measure the level of the output signal. The exact frequency of the tone is not critical, however a 500HZ-1KHZ sign-wave works nicely. Then remove the entire assembly, including the magnet assembly because re-centering of the magnet and the driver coil will be required. Remove one or two of the washers from under each screw stud and re-assemble the mounting plate (an equal number of screws under each screw) and using the centering disc re-align the driver-coil within the mounting plate, then mount the magnet assembly.

Now apply the test tone again and measure the output signal. If the level drops, the plate must be moved back. If the signal increases, try removing another washer and repeat the experiment. With trial and error, you will find the optimum number of washers to use that will yield the greatest output level and best performance.

You can also view the coil and its position through the clear acrylic case of the 140NM assembly.

Once these adjustments are made and the magnet assembly is installed, tighten all the fasteners securely. No further adjustment is necessary, even if the magnet is removed in the future.

### **How It Works**

The heart of the Model 140NM is the efficient application of neodymium magnets and a two-piece flux system. The north and south flux poles are fashioned from solid billet machine grade steel. Six grade-52 neodymium magnets are arranged in a circular "turret" fashion, each 60-degrees apart, resulting in a very powerful flux at the gap flux area where the driver-coil windings are immersed. This flux is stronger than the original magnet even though the gap width remains wide.

## **Warranty**

The Model 140NM is guaranteed to be free from defects or imperfect workmanship for one-year. If a defect is found within the warranty period, the Model 140NM will be repaired or replaced at our option.

No other warranties are expressed or implied.

This device is manufactured entirely in the United States from materials locally and globally sourced.

This product is a co-partnership Between Rick Perrotta and Advanced Theoretical Concepts.

This and other custom shop products are available through Royer Labs, 2711 Empire Avenue, Burbank, California 91504 Tel. (818)847-0121