



STUDIO TECHNOLOGY OF WORLD WIDE FAME

EMT 938

Broadcast Disk Reproducer

Robust Tone Arm

Simple and Rational Operation

High Immunity to Vibrations with Effective
Shock Absorber System

Direct Drive with Quick Start

Three Speeds: 33, 45, 78 rpm

High-Quality Amplifiers





The EMT 938 Broadcast Disk Reproducer is an economical, robust phonograph turntable meeting professional standards. It is intended for recording studios, quality control applications, motion picture sound, record auditioning, and musical reviewing.

The EMT 938 Broadcast Disk Reproducer is suitable whenever professional requirements such as rapid starting, immunity to solid-borne vibrations, and highest reproduction quality are indispensable, and an economical, stable unit is to be employed.

Trouble-Free Tracking

Tone Arm

The proven EMT 929 Tone Arm is employed for record tracking. The arm is statically and dynamically balanced in all three dimensions, so that its center of gravity lies both on the vertical axis and on the axis of the horizontal bearing. As a result the tone arm is particularly insensitive to solid-borne disturbances and vibrations. Precision ball bearings and supple internal tone arm leads result in very low bearing friction. The tracking force of the stylus is produced by spring tension at the tone arm pivot and may be adjusted between 0 and 50 mN. A bayonet connector allows pickup cartridges to be exchanged easily.



The EMT 929 Tone Arm, complete with tone arm lift and tone arm mounting board

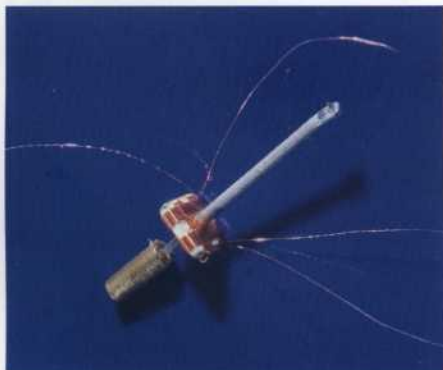
Pickup Cartridge



Dynamic cartridge with small effective mass at the stylus tip

In its basic version, the EMT 938 Broadcast Disk Reproducer is delivered with an empty pickup shell into which most commercially available pickup cartridges may be installed. The amplifier inputs are designed for magnetic pickup cartridges. However, a T Series dynamic pickup cartridge from EMT may be used instead of such units. In this case, an active pre-amplifier is inserted between the tone arm cable and the audio amplifier. The pre-amplifier is optimally designed for dynamic cartridges of the T Series and employs an extremely low-noise input stage. To facilitate finding a particular groove on the record, a magnifying lens is built into the pickup shell. T Series pickup cartridges and the EMT 929 Tone Arm are integrally matched. They are specifically designed for a tracking force of 25 mN*, which is conventionally used in broadcast studios.

*formerly: 2.5 p or 2.5 grams



Stylus cantilever with coils of the TSD 15 Pickup Cartridge (magnified X 4)



The empty EMT pickup shell

Operation

The mains power switch, speed selector switch, Start/Stop button, and button for the tone arm lift comprise the operating elements of the EMT 938 Broadcast Disk Reproducer. Both Start and Stop, i.e., run-up of the turntable platter and platter braking, are accomplished in less than 500 milliseconds. The unit can therefore be started precisely at any syllable in the groove.

To facilitate locating a desired point on the record (such as the beginning of the modulation, or a specific cueing point), the platter rim extends 2.4 cm beyond the edge of an LP, enabling the record platter to be turned back and forth by hand. A phone jack is provided for connecting stereo headphones.



SYNC.
The EMT 938 Broadcast Disk Reproducer is now equipped with a synchronization indicator, which illuminates as soon as the started turntable platter has reached the selected speed.

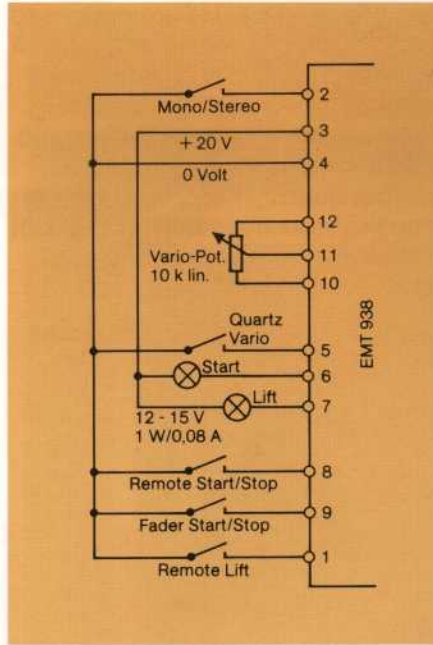
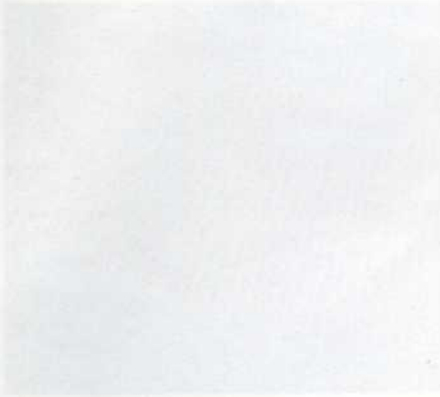
The front view shows the level controls of the audio amplifiers. The insertion of a pre-preamplifier for moving coil pickup cartridges is indicated by a coloured dot.



Jacks for external connections are located on the rear side of the EMT 938 Broadcast Disk Reproducer. Printed legends identify the functions of the jacks.



Operation and Chassis



The minimum number of controls on the EMT 938 Broadcast Disk Reproducer makes operation simple and reliable. Many studios require additional capabilities, however, such as variable speed or remote starting. These functions are available as "wired options" at the remote control connector. Remote commands have the same priority as local control commands.

Connections for remote control and indication

Chassis and Suspension

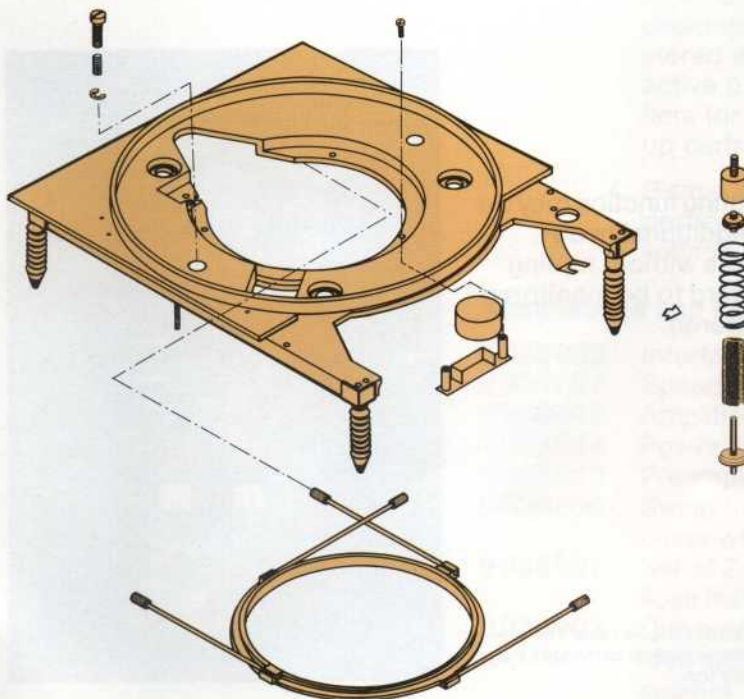
A professional turntable is expected to provide precise fade-ins from a record during running productions and broadcasts. A short run-up time consequently represents an important requirement for such a turntable. During run-up, however, considerable counterforces arise between the turntable platter and the chassis, leading to such effects as rotational oscillations around the axis of the platter.

While compensation for purely lateral or vertical moments can always be made by a dynamically balanced tone arm, this does not hold true for rotational moments because of the finite mass of the arm. The rotational oscillations could cause tracking disturbances and produce unpleasant wow and flutter effects, especially during the starting phase.

A particularly light turntable platter mounted in a heavy chassis represents one solution to this problem. Yet in order to construct the EMT 938 Broadcast Disk Reproducer as light and compact as possible, another technique is employed that has proved itself for years in the EMT 948 Broadcast Turntable.

By means of a special construction, the excitation of rotational oscillations is highly damped. A stiff ring is connected with two rods to the lower frame and with two further rods to the suspended chassis. The required isolation from mechanical and solid-borne vibrations is achieved by four coil springs, upon which the chassis is suspended. The chassis can therefore be dimensioned for lower mass, considerably reducing the total weight of the unit. This design is protected by the European patent 0017 004 and others.

The base of the EMT 938 Broadcast Disk Reproducer is designed to permit use on a table surface. The unit may be likewise mounted in a counter cutout or a console. The swiveled dust cover is constructed to allow easy removal.

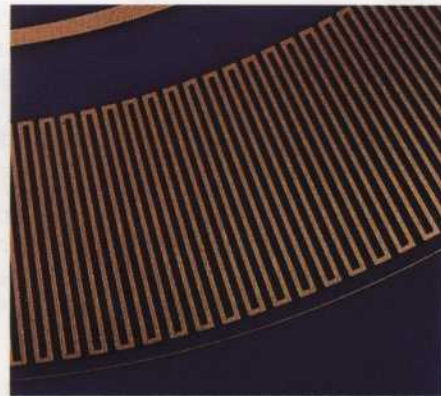


Drive System and Electronics

Drive System

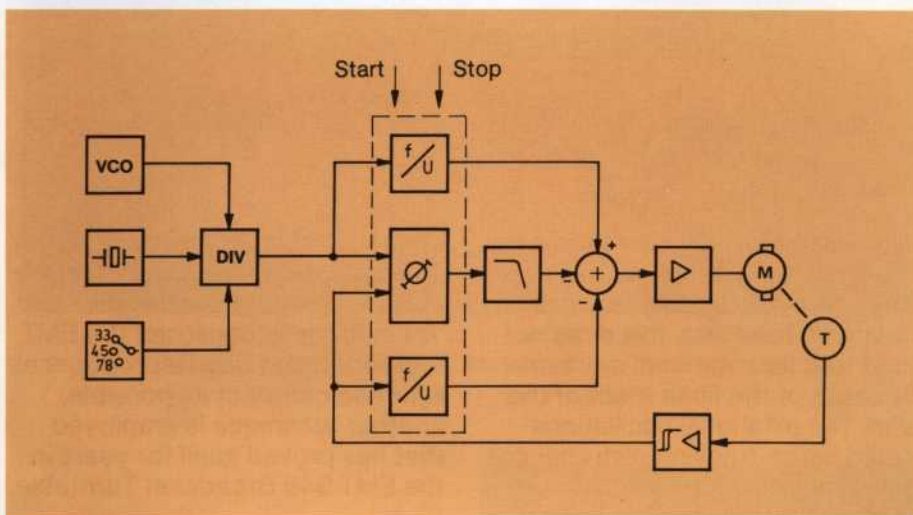
The direct drive system of the EMT 938 Broadcast Disk Reproducer is identical to that of the EMT 948 Broadcast Turntable. A robust motor provides the rapid acceleration necessary for quick starting (approx. 500 msec.). A controlled dc motor is employed with commuta-

tion provided by Hall generators to avoid brush or contact ring wear. A high-resolution tachometer magnetically senses the momentary speed of the turntable platter and delivers a sinewave signal to the control board. There, two comparison processes are performed with a reference signal from the oscillator.



Partial view of the tachometer disc

Block diagram of the drive system



In one process, the tachometer signal and reference signal are converted into frequency-dependent signals (f/u converter) and compared. The large acceleration signals required for Start and Stop are obtained from this comparison. In the second process, the relative phases of the tachometer signal and the reference signal are compared in a phase locked loop (PLL) circuit. The resultant control signal is employed in the range of the nominal rotational speed to eliminate small phase variations between the tachometer signal and the reference signal.

Electronics and Amplifiers

The audio amplifiers and control electronics are contained on three printed circuit boards. The necessary interconnections are made with cables that are clearly identified to prevent erroneous insertion.

The audio amplifiers contain filters, equalizer amplifiers with standard equalization (75/318/3180 μ sec.), as well as an output amplifier, which is adjusted to the desired nominal level. The audio signal appears on two three-pin XLR male connectors, but a muting circuit switches the signal on only when the turntable platter turns at nominal

speed. This muting function may be deactivated. Additional headphone amplifiers without muting enable the record to be monitored in mono and stereo.

The audio circuit board is shown here. The preamplifier for dynamic pickup cartridges may be clearly seen at the top.



Service and Delivery Program

The construction of the EMT 938 Broadcast Disk Reproducer allows the unit to be supported in a frame for quick and easy servicing. For this purpose, the audio amplifiers and control board are mounted on hinges and may be swung down during servicing as shown in the photo.



Delivery Program

Models

- 9938 120/... EMT 938 Broadcast Disk Reproducer, desktop model, 47 kOhm stereo amplifier and empty pickup shell.
- 9938 110/... EMT 938 Broadcast Disk Reproducer, desktop model, stereo amplifier with active pre-preamplifiers for TSD 15 pick-up cartridges.

/... Please indicate the desired mains voltage.

Pick-up Cartridges T-Series

- 9935 007 Pickup cartridge shell TSD-G (for 9938 120)
- 7938 023 Preamplifier for pick-up cartridges TSD 15, TMD 15 or TND 65
- 9935 000 Pickup cartridge, stereo TSD 15 (for 9938 110)
- 9935 001 Pickup cartridge, mono TMD 25 (for 9938 110)
- 9938 002 Pickup cartridge, mono TND 65 (for 9938 110)

Accessories and spare parts

- 7938 020 Interface/Oscillator
- 7825 097 Speed Control
- 7938 022 Amplifier Board
- 7938 024 Power Supply
- 7938 023 Preamplifier
- 9938 900 Swing-open dust cover with support
- 9938 901 Set of Z-brackets for flush installation
- 9938 903 Cue amplifier with loud speaker in cabinet

Technical Data

Deck

Turntable diameter	33 cm
Turntable speeds	78 rpm 45 rpm 33 1/3rpm
Accuracy of turntable speed (quartz controlled)	max. $\pm 0.1\%$
Speed variation with VCO operation	$\pm 25\%$
Run-up time at $T_{amb} = 20^\circ C$	
Quick start	max. 200 msec.
Wow and flutter at 33 1/3 rpm measured with EMT 424, weighted in accordance with DIN 45 507/IEC (ANSI S 4.3 - 1971)	max. $\pm 0.075\%$
Rumble measured in accordance with DIN 45 539 with test record DIN 45 544	
unweighted	min. 50 dB
weighted	min. 70 dB

Amplifier

Equalization	DIN, NAB, IEC	75/318/3180 μ sec.
Frequency response	40 Hz to 15 kHz ± 0.5 dB 30 Hz approx. -3 dB below 30 Hz approx. 20 dB/octave rolloff above 25 kHz approx. 12 dB/octave rolloff	
Input voltage for magnetic hi-fi cartridges (version with $R_i = 47$ kOhms)	2 to 10 mV	
for dynamic cartridges (with active impedance transformer, gain = 17 dB)	0.3 to 1.4 mV	
Overload margin of the input	20 dB above nominal level	
Output voltage	+6 dB (1.55 V) max. 10 V ($\hat{=}$ +22 dB), on 200 Ohms	

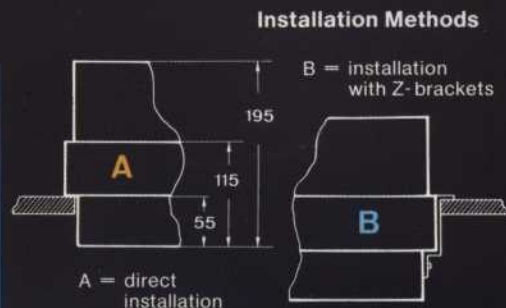
Harmonic distortion	max. 0.2 %, 30 Hz to 12 kHz, at +15 dB (4.4 V) on 200 Ohms
Crosstalk suppression	min. 50 dB, 30 Hz to 15 kHz
Signal-to-noise ratio rms, unweighted peak, weighted in accordance with CCIR 468-2	min. 70 dB min. 64 dB
Mono switching	remote controllable
Headphone outputs mono and stereo, on 200 Ohms	0.5 to 2 V, unbalanced

General

Switchable for mains voltage of	50 Hz or 60 Hz	100 to 120 V 200 to 240 V
Power consumption		max. approx. 85 VA normally approx. 40 VA
Dimensions		500 x 440 x 195 mm (19.7" x 17.3" x 7.7") (W x D x H)
Table cutout		see diagram below
Weight		approx. 25 kg (55.12 lbs.)
		Subject to change!

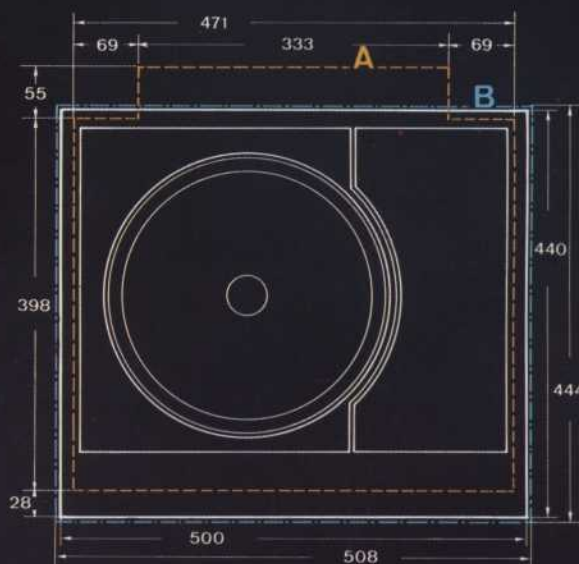


The photo shows the EMT 938 Broadcast Disk Reproducer with dust cover removed, installed using method B at the right.



Direct insertion into a cutout (method A) is shown on the front page.

Dimensions



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