



STUDIO TECHNOLOGY OF WORLD WIDE FAME

# EMT 948 Broadcast Turntable



- Simple operation with reverse cue
- Direct drive with quick start
- Robust tone arm with dynamic cartridge
- Effective shock absorbing system for damping solid-borne vibrations
- High-quality, versatile amplifiers





With the EMT 948 Broadcast Turntable, a unit has been developed that is intended for the severe 24-hour operation typical, for instance, in broadcasting studios. Special emphasis has been placed on achieving a robust, compact design, thus accommodating the turntable to the restricted space frequently encountered in such locations. For the same reason, the dust cover has been conceived to double as a shelf for records and covers.

The electronic circuitry is contained entirely on plug-in boards, so that possible servicing may be accomplished most simply and rapidly.

# Trouble-Free Tracking

## Tone Arm

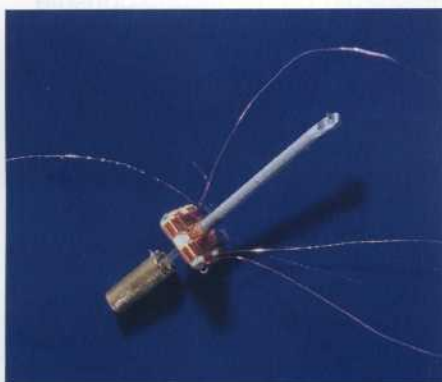
The EMT 929 Tone Arm, proven in years of demanding use, is employed for tracking the record. Statically and dynamically balanced in all three dimensions, this tone arm is particularly insensitive to solid-borne disturbances and vibrations. Precision ball bearings and supple internal tone arm leads afford the arm the required minimal bearing friction. The tracking force of the stylus tip is produced by spring tension at the tone arm axis 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 platform and tone arm mounting board



Dynamic cartridge with small effective mass at the stylus tip



Stylus cantilever with coils of the TSD 15 Pickup Cartridge (enlarged 4 times)

## Pickup Cartridge

Long service life, high immunity to disturbances, and excellent pickup characteristics are important requirements imposed on a professional turntable. Record imperfections and vibrations should not influence the reproduction. In contrast to the trend in consumer turntables toward reducing the stylus force as much as possible, therefore, radio stations throughout the world chiefly employ special pickup cartridges with the relatively high tracking force of 20 - 30 mN.

The T Series of dynamic pickup cartridges has been developed solely for this purpose. Because of stringent demands for quality and the reproducibility of measurement results even after the cartridge has been replaced, these pickup cartridges are constructed with a permanently mounted cantilever system and are individually adjusted and measured after manufacture or renewal. The measurement data are included with each delivery. The compliance and the effective transducer mass at the stylus tip are carefully matched to the recommended tracking force.

A distinguishing characteristic of the pickup cartridge is a magnifying lens (with sighting line) through which the stylus cantilever may be seen, enabling the tip to be set down visually in a lead-in or separating groove.

Three cartridges are available:

- TSD 15 for tracking conventional phonograph records (stereo)
- TMD 25 for tracking early monophonic records (microgroove, 25  $\mu$ m tip radius)
- TND 65 for tracking early monophonic records (standard groove, 65  $\mu$ m tip radius).

An empty headshell may be delivered for installing other pickup cartridges.

# Operation

In the conception of the EMT 948 Broadcast Turntable, particular emphasis has been placed on the use of few buttons and switches, making operation simple and reliable. Three buttons and a speed selector switch constitute the operating elements. One button issues the Start and Stop commands, a second button raises and lowers the tone arm, the third button (Reverse) rotates the turntable platter backwards at 33 1/3 rpm. By alternately pressing the Start and Reverse buttons, a desired point on a record may be quickly and accurately cued. Hand cueing is facilitated by holding the platter rim, which extends 24 mm beyond the edge of a 30 cm (12") LP.



Stereo headphone jack  
additional pickup illumination (option)

Reverse

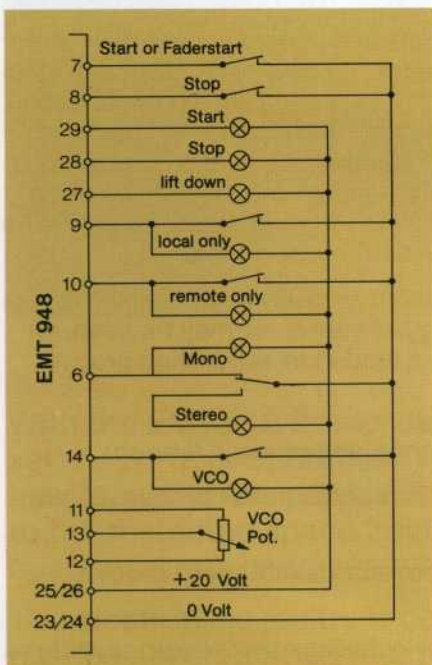
Start/Stop

Lift  
Lamp button (for pickup illumination option)

Speed

Volume control (for cue amplifier option)

SYNC.  
The EMT 948 Broadcast Turntable is now equipped with a synchronization indicator, which illuminates as soon as the started turntable platter has reached the selected speed.



In many studios, remote control of the units is indispensable, or special functions may be desired. Since these functions are generally required only by certain users, they are fed as "wired options" to the remote control connector.

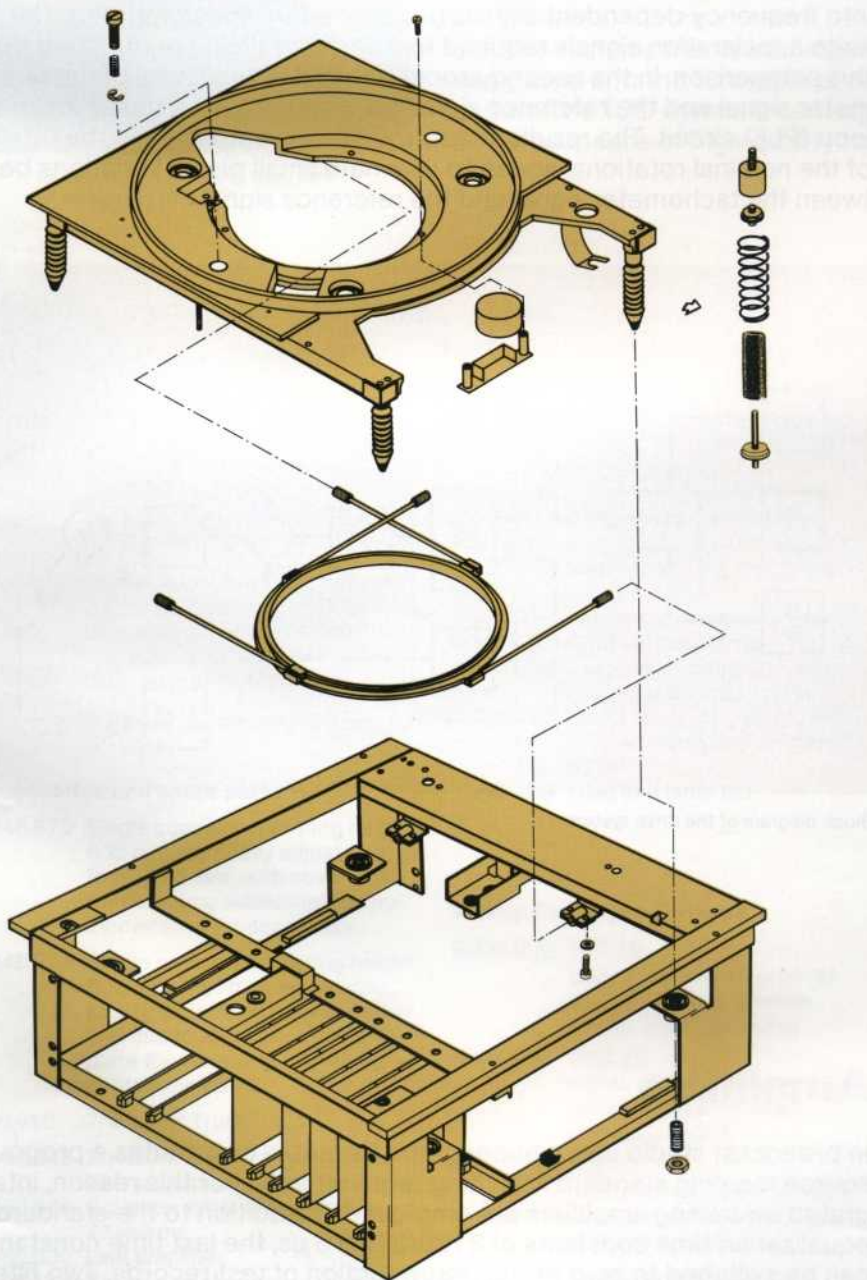
In addition to the remote control of Start and Stop, mono/stereo switching and the selection and control of the variable speed are principally utilized. The auxiliary contact of a channel fader on the mixing console may be connected for fader starting; either a normally open or normally closed contact may be employed.

Along with the various display capabilities, the connections for a cue amplifier (option) are fed to the remote control connector.

Remote Control connections

# 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 reaction moments 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 dynamically balancing the tone arm, this does not hold true for rotational moments because of the finite mass of the arm. The rotational moments 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 broadcast turntable as light and compact as possible, another technique has been selected.

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

# Drive System and Amplifiers

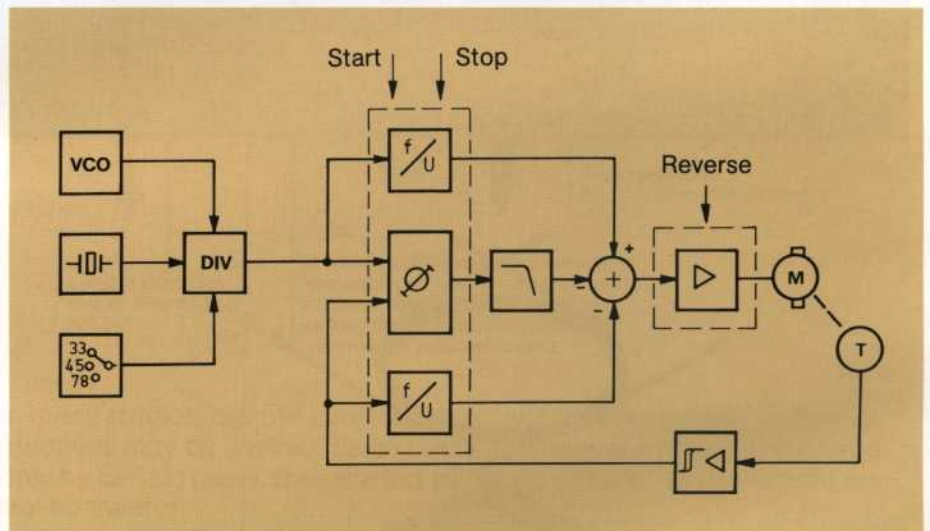
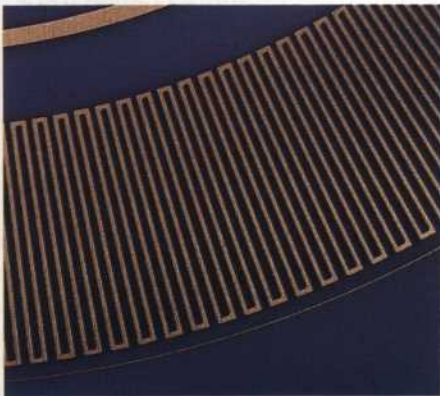
## Drive System

The EMT 948 Broadcast Turntable is equipped with a direct drive system, that is, the platter is rigidly connected to the rotor of the drive motor by a shaft. This rigid connection enables rapid acceleration of the platter for "quick starts".

Rotational drive is provided by a controlled dc motor. Commutation is performed using Hall generators, thereby totally eliminating wear due to mechanical contact. A high-resolution tachometer generator 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 obtained from a highly stable quartz oscillator.

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.

Partial view of the tachometer disc



Block diagram of the drive system

## Amplifiers

In broadcast studio use, a phonograph turntable constitutes a program source meeting standard matching requirements. For this reason, integrated equalizing amplifiers are employed. In addition to the standard equalization time constants of 3180/318/75  $\mu$ s, the last time constant can be switched to zero for the reproduction of test records. Two filters are also included which sharply attenuate signals lying outside of the

# Amplifiers/Delivery Program



The Eurocard format is used for all electronic circuits.

corner frequencies of 30 Hz and 25 kHz as a preventative against disturbance frequencies. The maximum output level of +22 dB on a load of 200 Ohms reflects the trend toward higher recording levels and the resultant requirements for greater signal headroom.

In the standard version, the amplifier consists of two plug-in printed circuit boards, the stereo preamplifier with standard equalization and the stereo line amplifier. The line outputs are automatically muted when the platter is stopped and during Start run-up, as controlled by the motor speed. The function can be defeated with programming plugs.

A monitor output, mono and stereo, is provided for purposes such as cueing. Headphones or an external amplifier may be connected to the output.

A 10 W cue amplifier is available as an option, either with a level control integrated into the turntable or externally over the remote control connector. The TSD dynamic cartridge is matched "noiselessly" to the amplifier by means of high-quality transformers.

## Delivery Program

### Models

- 9 948 110 Turntable deck, stereo, with equalizer amplifier and EMT 929 Tone Arm for TSD 15 pickup cartridges
- 9 948 120 Turntable deck, stereo, with EMT 929 Tone Arm, TSD-G Pickup Shell, and 47 kOhm equalizer amplifier for magnetic pickup cartridges

**Please indicate desired mains voltage.**

### Accessories and spare parts

- 9 948 970 Single console, operating height 800 mm, vertically adjustable feet  $\pm 25$  mm, with cover plate for mounting additional control elements or loudspeakers
- 9 948 971 Single console, operating height 800 mm, vertically adjustable feet  $\pm 25$  mm, with cue amplifier and cue loudspeaker, cover plate for mounting additional control elements
- 948 910 Transport Trunk
- 7 950 038 Equalizer amplifier, stereo, for TSD pickup cartridges
- 7 950 088 Equalizer amplifier, stereo, 47 kohms
- 7 950 039 Line amplifier
- 7 948 105 Power amplifier board (motor)
- 7 948 106 Control board

- 7 948 107 Oscillator board
- 7 948 108 Interface board
- 7 948 209 Pushbutton board
- 7 948 110 Power supply board
- 7 950 037 Amplifier supply board
- 7 950 095 Extension board for servicing
- 9 220 000 Motor assembly, complete, without platter
- 7 950 010 Lift motor, complete, with lift
- 4 107 005 Cold-cathode lamp
- 7 948 030 Dust cover, complete, with angle bar and plexiglass
- 7 948 017 Lamp cover, complete, with side elements and extruded panel
- 7 948 100 Fuse and lamp set

### Pickup Cartridges T-Series

- 9 935 000 TSD 15  
stereo, for stereo grooves  
diamond, super fineline  
shape, 6  $\mu$ m tip radius
- 9 935 001 TMD 25  
mono, for microgrooves, dia-  
mond stylus with 25  $\mu$ m  
(1 mil) tip radius
- 9 935 002 TND 65  
mono, for standard grooves,  
diamond stylus with 65  $\mu$ m  
(2.5 mil) tip radius
- 9 935 007 Empty EMT pickup shell  
T-Series with accessories

### Additional versions

- 9 948. . . . .
- 1 Cue amplifier with level control, 6.3 mm stereo phone jack on control panel
- 1 Equalizer amplifier for TSD Pickup Cartridges
- 2 47 kOhm equalizer amplifier with TSD-G empty pickup shell for mounting magnetic cartridges
- 5 with additional cartridge illumination
- 6 with additional, simplified transport lock (e.g., for mobile vans)
- 7 with additional cartridge illumination and transport lock

# Technical Data

## Deck

Turntable diameter	33 cm
Turntable speeds	78 rpm 45 rpm 33 1/3 rpm
Speed Variation of VCO operation	± 25 %
Accuracy of turntable speed (quartz controlled)	max. ± 0.1 %
Run-up time at $T_{amb.} = 20^{\circ} C$	
Instantaneous start	max. 0.5 s

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. ± 0.075 %

Rumble referred to a peak velocity  $\dot{v} = 10 \text{ cm/s}$  at 1 kHz  
unweighted 50 dB  
weighted in accordance with DIN 45 539 70 dB

## Amplifier

Equalization DIN, NAB, IEC 75/318/3180  $\mu\text{s}$   
FLAT 0/318/3180  $\mu\text{s}$  changeable by internal plug

Frequency response 40 Hz to 15 kHz  
± 0.5 dB, 30 Hz approx. -3 dB, below 30 Hz approx.  
20 dB/octave roll-off, above 25 kHz approx. 12 dB/octave roll-off

Input voltage for dynamic cartridges (transformer coupling 1:7) 0.3 to 1.4 mV  
for magnetic HiFi-systems version with  $R_i = 47 \text{ kohms}$  2 to 10 mV

Overload margin of the input 20 dB above nominal level

Output voltage adjustable between 700 mV and 10 V (0 to +22 dB) into 200 ohms

Harmonic distortion 30 Hz to 12 kHz less than 0.1 % at +15 dB (4.4 V) into 200 ohms

Crosstalk suppression more than 55 dB, 30 Hz to 15 kHz

RMS S/N ratio, unweighted min. 75 dB

Peak S/N ratio, weighted min. 67 dB

Headphone output, mono unbalanced, adjustable

Headphone output, stereo unbalanced, adjustable

on a load of 200 ohms approx. 200 to 600 mV

on a load of 2 kohms approx. 500 to 1500 mV

Mono switching remote controllable

## General

Mains voltages 50 Hz or 60 Hz 100...120 V  
200...240 V

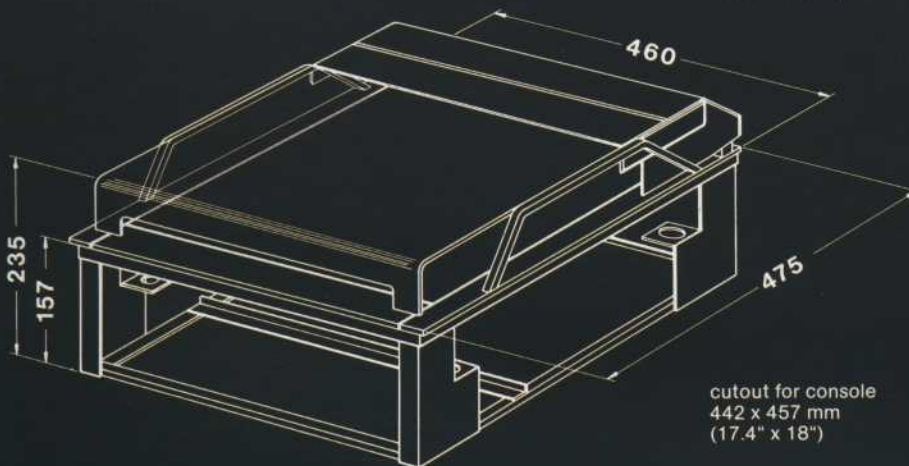
Power consumption max. approx. 85 VA  
normal approx. 40 VA

Dimensions 460 mm (18.1")  
475 mm (18.7")  
235 mm ( 9.3")  
157 mm ( 6.2")

Depth below panel max. height above console with open dust cover 470 mm (18.5")

Weight 26 kg (58 lbs.)

Subject to change!



EMT 948 in console version with built-in cue amplifier, additional cartridge illumination, and simplified transport lock that is of particular advantage in mobile van use



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