

# TANDBERG®

## Programmable FM Tuner 3001



### A truly remarkable FM tuner from Tandberg featuring

- A signal-to-noise ratio of 95 dB in mono and 92 dB in stereo.
- Overall performance specification way above its competitors.
- Electronic memory for 8 preset FM stations.
- 8 ganged tuned circuits at the FM front end.
- Pre-tuning system with 12-bit processor.
- New decoder design to eliminate beat notes.
- Extremely low distortion.
- Signal-strength tuning meter with auto range-switch.
- Switchable IF selectivity – wide, normal, narrow.

### Unparalleled Performance

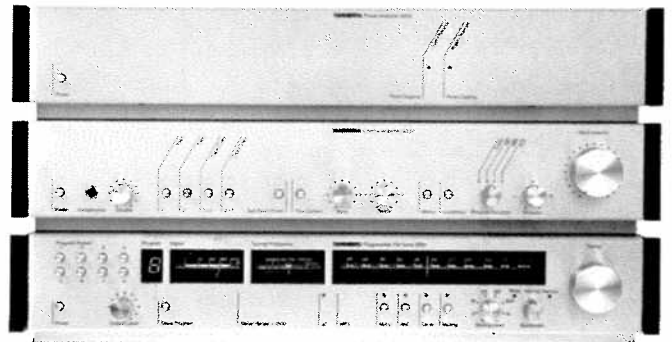
Tandberg "Series 3000" will excite the most demanding and critical Hi Fi enthusiast.

The picture shows from the bottom:

- Tandberg Programmable Tuner (TPT 3001),
- Tandberg Control Amplifier (TCA 3002), and
- Tandberg Power Amplifier (TPA 3003).

Tandberg Cassette Deck 3004 and Tandberg Monitor Loudspeaker 3005 represent two more elements in this matched system.

Separately, each of these units represents a new peak in audio quality. Together they make an integrated system whose specification is unbeatable.



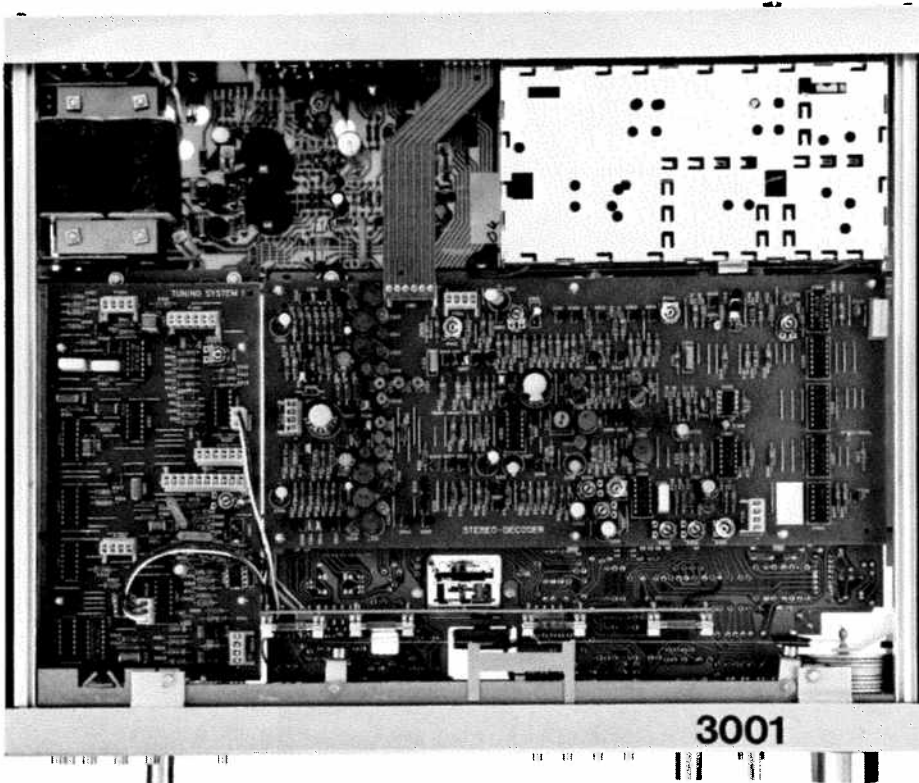
We set out to design and develop a system without compromise. A system engineered to maintain its performance through years of hard use.

Judge Tandberg "Series 3000" for yourself. It will give you the ultimate in sound reproduction.

## The new programmable FM tuner TPT 3001

The new analog tuner TPT 3001 is the result of long term development in the Tandberg labs. It is aimed at the professional market and its outstanding specification confirms that it is in a class of its own.

The unbelievable S/N performance has been made possible by an analog system.



*Inside view of TPT 3001 with stereo decoder board and tuning circuits.*

### FM Front End

The FM front end is an exciting new design. 8 ganged tuned circuits are used to obtain a startling performance. DC voltage controlled capacitance diodes are used as tuning elements and Dual-Gate MOSFETs are used in the RF stage and the mixer stage.

### Programming Unit

The TPT 3001 employs an ingenious tuning system. In addition to the main tuning stage, there is a stage which permits data on 8 pre-tuned FM stations to be stored in an electronic memory. This pre-tuning circuit is based on the voltage synthesis principle combined with a fast analog servo loop to achieve maximum S/N ratio and frequency stability.

### IF selectivity

The filter circuits can be switched to three different bandwidths. The filters consist of phase-linear block-filters and pure LC filters to combine high selectivity with extremely low distortion.

### Limiter

The limiter has exceptionally good AM suppression and interference rejection. Moreover the limiter guarantees a constant signal output over a very wide range of signal input level. The high definition of the signal meter range is also due to the excellence of the limiter circuit.

## Discrete Stereo Decoder Unit

Normally a stereo decoder consists of a circuit designed around a single IC with a few extra components for 19 kHz and 38 kHz filters and similar circuits. But all the known IC decoders have serious limitations where the total reproduction of a transmitted FM signal is concerned.

To avoid any compromise on this point we designed the Tandberg TPT 3001 Tuner with a discrete decoder. As a result the performance specification of this decoder is totally without equal. Beat notes which normally occur in the demodulating process of an FM signal simply do not exist in this design. Look at the performance figures below.

The beat notes in Figure A are typical of many decoders on the market today. In comparison Figure B shows the clean result from the discrete Tandberg decoder designed in CMOS technology.

Another unique feature in the design of this new decoder is the ANC circuit. With the aid of the ANC (automatic noise canceller) it is possible to

obtain a significant improvement in stereo S/N ratio by a reduction in channel separation as the antenna signal strength decreases. 50 dB quieting can be achieved even with an antenna signal of  $5 \mu\text{V}/75 \text{ ohms}$ !

Of course the channel separation is then reduced to about 10 dB, but the total sound picture which is reproduced represents a great improvement over the conventional reproduction system.

Summary of the main decoder features:

- Extremely low THD.
- Exceptionally good S/N ratio in mono and stereo.
- Unrivalled beat note rejection due to the special cancelling technique.
- Improved S/N ratio at low antenna signals by the use of an ANC circuit.
- Extremely accurate phase response related to a 7 order multiplex filter.

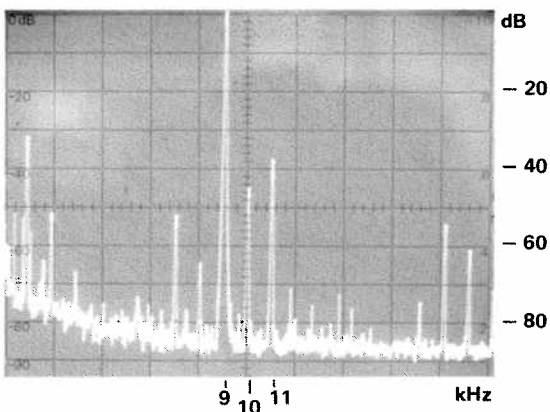


Fig. A

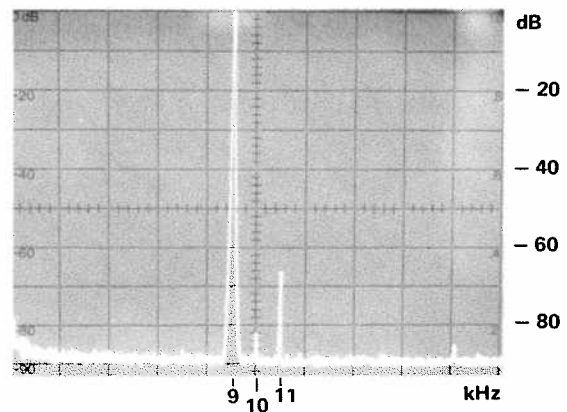


Fig. B

### Special features

**The signal meter** in the TPT 3001 has an exceptionally wide dynamic range. The meter indicates signal levels from  $0.3 \mu\text{V}/75 \text{ ohms}$  up to  $3000 \text{ mV}$  in two scale ranges. The LED indicator below the meter tells you which range is in use.

**The tuning frequency meter** serves two purposes. Primarily it is used in the tuning operation to ensure precise tuning. But when station data is being stored in the memory, the centre-tuning meter is automatically switched to show tuning frequency. The LED indicates that the meter is in the frequency mode.

**The Display** primarily shows the chosen pre-set program. But it also indicates when the storage function is activated.

**Muting Circuit.** 3 different muting circuits are used to provide totally smooth and noiseless tuning. The muting threshold can be adjusted from  $1 \mu\text{V}/75 \text{ ohms}$  up to  $3 \text{ mV}/75 \text{ ohms}$ .

**The Servo facility.** The Servo uses a type of frequency feedback system to lock the tuning to the exact position of a station after it is tuned in. However, to avoid any influence during the tuning operation the Servo is automatically disconnected when you touch the tuning knob.

**Signal Outputs.** In addition to the fixed signal output on the back panel the tuner is also provided with a variable output that can give up to  $2.5 \text{ V RMS}$  from a  $270 \text{ ohm}$  source with 100% modulation of the FM signal. The signal level can be regulated with an output level control.

## Tandberg Programable Tuner TPT 3001

<b>Power requirements:</b>	115/230 V $\pm$ 10%, 50/60 Hz
<b>Power consumption:</b>	20 W
<b>Outlets:</b>	Fixed Output, Variable Output, FM-Multipath and Detector Output
<b>Dimensions:</b>	Width: 17 1/8" (43.5 cm) Depth: 13 3/4" (35.0 cm) Height: 3 1/4" ( 8.3 cm) Weight: 15.3 lbs (7 kg)

### Technical Data according to IHF-T-200, 1975 IEEE Std. 185, 1975

<b>Tuning range:</b>	87.5 – 108 MHz		
<b>Antenna impedance:</b>	75 ohms unbalanced		
	Wide Normal Narrow		
<b>Usable sensitivity</b> (measured with notch filter): Mono	0.65 $\mu$ V ( 7.5 dBf)	0.6 $\mu$ V ( 6.8 dBf)	0.7 $\mu$ V ( 8.2 dBf)
<b>50 dB quieting sensitivity:</b> Mono	1.0 $\mu$ V (11.25 dBf)	0.9 $\mu$ V (10.3 dBf)	0.8 $\mu$ V ( 9.3 dBf)
Stereo	11.0 $\mu$ V (32.1 dBf)	11.0 $\mu$ V (32.1 dBf)	11.0 $\mu$ V (32.1 dBf)
With noise filter ANC 10 dB channel separation:	5.0 $\mu$ V (25.2 dBf)	5.0 $\mu$ V (25.2 dBf)	5.0 $\mu$ V (25.2 dBf)
<b>Signal to noise ratio at 65 dBf, 0.5 mV:</b> Mono	95 dB	95 dB	95 dB
Stereo	82 dB	82 dB	82 dB
Signal to noise ratio at 85 dBf, 5 mV: Stereo	92 dB	92 dB	92 dB
<b>Muting threshold:</b> Mono	1 $\mu$ V – 3 mV	1 $\mu$ V – 3 mV	1 $\mu$ V – 3 mV
Muting hysteresis 3 dB	(11.25 – 81.0 dBf)	(11.25 – 81.0 dBf)	(11.25 – 81.0 dBf)
<b>Stereo threshold:</b>	5 $\mu$ V	5 $\mu$ V	5 $\mu$ V
Stereo hysteresis 3 dB:	(25.2 dBf)	(25.2 dBf)	(25.2 dBf)
<b>Frequency response</b> 30 Hz to 15 kHz: Mono	+0.2 dB –0.5 dB	+0.2 dB –0.5 dB	+0.2 dB –0.5 dB
Stereo	+0.2 dB –0.5 dB	+0.2 dB –0.5 dB	+0.2 dB –0.5 dB
<b>Distortion</b> at 50 dB quieting: Mono	< 0.1 %	0.2 %	0.9 %
Stereo	0.1 %	0.3 %	0.8 %
<b>Distortion</b> at 65 dBf: Mono	100 Hz 0.03 %	0.06 %	0.12 %
1 kHz 0.03 %	0.06 %	0.25 %	
6 kHz 0.03 %	0.055%	0.45 %	
10 kHz 0.025%	0.025%	0.035%	
<b>Distortion</b> at 65 dBf: Stereo	100 Hz 0.04 %	0.05 %	0.08 %
1 kHz 0.04 %	0.05 %	0.2 %	
6 kHz 0.1 %	0.25 %	1.0 %	
10 kHz 0.1 %	0.7 %	2.0 %	
<b>Intermodulation distortion:</b> Mono	< 0.1 %	0.15 %	0.5 %
14 kHz mod. 50%, 15 kHz mod. 50%			
Measured 1 kHz in % Stereo	< 0.1 %	0.15 %	0.8 %
<b>Capture ratio:</b>	0.4 dB	1 dB	3 dB
<b>Adjacent channel selectivity <math>\pm</math> 200 kHz:</b>	3 dB	12 dB	40 dB
<b>Alternate channel selectivity <math>\pm</math> 400 kHz:</b>	30 dB	90 dB	> 90 dB
<b>Spurious response ratio:</b>	> 135 dB	> 135 dB	> 135 dB
<b>Image response ratio:</b>	> 135 dB	> 135 dB	> 135 dB
<b>IF-response ratio, balanced:</b>	135 dB	135 dB	135 dB
<b>RF intermodulation:</b>	72 dB	72 dB	72 dB
<b>AM suppression ratio:</b>	> 70 dB	> 70 dB	> 70 dB
<b>Stereo separation:</b>	100 Hz 60 dB	60 dB	55 dB
1 kHz 70 dB	70 dB	60 dB	55 dB
6 kHz 60 dB	60 dB	50 dB	40 dB
10 kHz 50 dB	50 dB	45 dB	35 dB
<b>Subcarrier product ratio:</b>	95 dB	95 dB	95 dB
<b>19 kHz suppression:</b>	95 dB	95 dB	95 dB
<b>38 kHz suppression:</b>	> 120 dB	> 120 dB	> 120 dB
<b>Signal meter autorange I:</b>	0.3 $\mu$ V – 1000 $\mu$ V	0.3 $\mu$ V – 1000 $\mu$ V	0.3 $\mu$ V – 1000 $\mu$ V
<b>Signal meter autorange II:</b>	1.0 mV – 3000 mV	1.0 mV – 3000 mV	1.0 mV – 3000 mV

- Specifications are subject to change for further improvement without notice.

#### Optional Extras:

- Black acrylic side walls for freestanding units.
- Attachment sets for installation in 19 inch racks.

**TANDBERG**<sup>®</sup>  
The European Alternative

Tandberg A/S, Post Office Box 55, Bogerud,  
N-Oslo 6, Norway