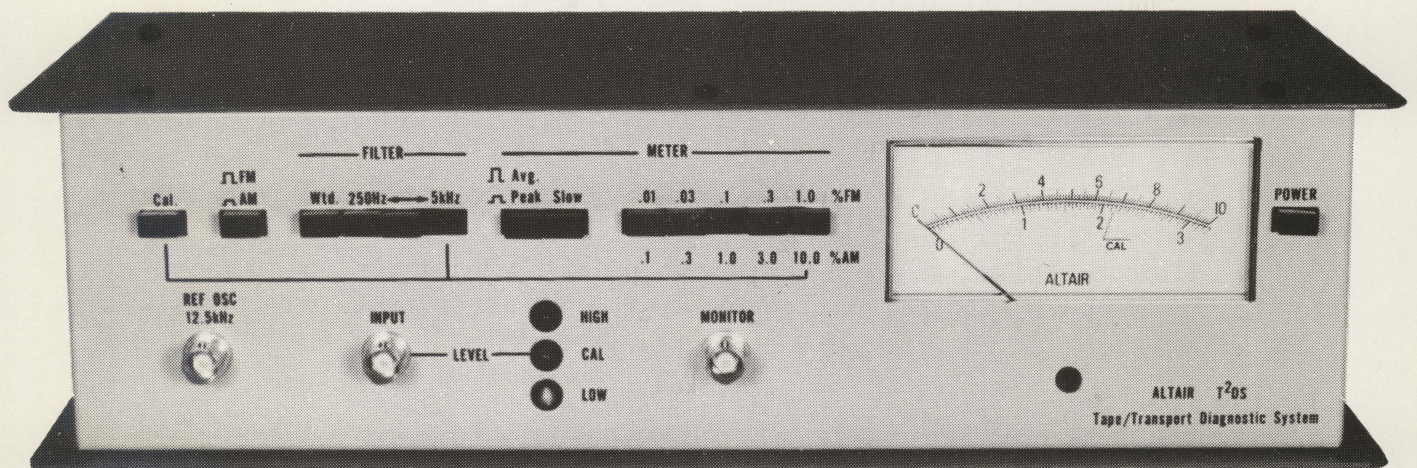


**T<sup>2</sup>DS**

**Tape/Transport Diagnostic System**



When professional tape recorders were first introduced thirty years ago, only rotating tape drive components were checked for proper operation. In fact, fifteen years elapsed before the audio industry even recognized that scrape flutter was very important for "clean" tape recordings. Unfortunately, an additional fifteen years passed before the introduction of an inexpensive flutter meter that will measure scrape flutter. But now, with the Altair T2DS, we can easily measure flutter over a frequency range 20 times wider than the NAB/IEC Standards permit.

But that is just the beginning. Now we can also test the amplitude performance of magnetic tape! Check for dropouts, bad slitting, poor tape-to-head contact, modulation noise, and even poor oxide mixing and coating. Even the smoothness and lubrication of the tape surface can be evaluated.

**THEORY OF OPERATION**

The magnetic recording process introduces errors not found in electronic circuits--AMPLITUDE and FREQUENCY modulations. When a pure tone is recorded and reproduced, extraneous sideband frequency components are added to the original signal by transport and tape imperfections, producing a fuzziness or lack of clarity.

The T2DS circuitry not only measures these sidebands, but it also identifies whether they are caused by speed changes or amplitude changes. (Not even a \$10,000 spectrum analyzer can do that!) By detecting "in-phase" and "quadrature" sideband components independently in the frequency band from .5 Hz to 5000 Hz (limited by the tape recorder's response cutoff at 18 kHz), the T2DS unit presents a more complete picture of recorder and tape composite performance.

To permit comparisons with current published flutter specifications, the T2DS also includes measurement modes equivalent to the standardized weighted and NAB/IEC measurements, but using the new reference frequency of 12500 Hz.

## SPECIFICATIONS

### Oscillator

- Crystal-controlled 12.5 kHz sine wave at -6 dBm (Note 1) with less than .001% residual FM and AM noise contribution in measurements.
- Calibrate modes provide digitally derived 150 Hz square wave frequency or amplitude modulation of the test signal for meter self test.

### Input Section

- Input signal is 12.5 kHz  $\pm$  1 kHz at -6 dBm (Note 1)
- LED signal level indicators for correct input level (Cal), High level, or Low level below muting threshold
- AM readings require nominal -6 dBm level  $\pm$  1 dB for accurate readings
- FM readings are accurate over an input range of -16 dBm to +14 dBm

### Measurement Bandwidth (FM and AM)

- Wideband measurement — .5 Hz to 5 kHz for combined rotational and scrape components
- Upper bandpass — 250 Hz to 5 kHz to isolate high frequency components
- Lower bandpass — .5 Hz to 250 Hz to isolate components due to rotating tape drive members
- Weighted — IEC/ANSI bandpass peaked at 4 Hz. (This mode is included primarily for verifying specifications.)

### Meter Section

- FM sensitivity — .01, .03, .1, .3, and 1% full scale
- AM sensitivity — .1, .3, 1, 3, and 10% full scale
- "Demod" output provides output signal after filters and meter range selection for oscilloscope, spectrum analyzer, and/or loudspeaker. Full scale meter deflection produces approximately .5V RMS.
- Meter characteristics — selectable for either full wave rectified, average responding, RMS calibrated or quasi-peak.
- "Slow" mode provides extra damping to slow erratic meter fluctuations.

### Power

- 120V 50 or 60 Hz at 10 watts (240V optional)

### Size

- 13.5 W x 3.75 H x 6.0 D (inches)

### Note 1

The test level of -6 dBm into 600 ohms (.4V RMS) is 10 dB below normal "0 VU" to avoid tape saturation of the test tone for 7.5 in/s recorders. Higher levels can be used at speeds above 7.5 in/s by raising the record level 10 dB and reducing the playback level sufficiently to light the "Cal" level indicator.

### Note 2

This instrument is intended for testing high-quality recording equipment to its operating limit. Slow-speed recorders such as cassette decks which cannot record and reproduce a 12.5 kHz tone with good signal stability may exceed the 10% range of the AM section. Other versions of the T2DS which use 6.25 kHz or 25 kHz signals are available.

### Note 3

Accurate speed or drift measurements can only be made with an accurate reference tape and a digital counter.