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PRACTICAL APPLICATIONS OF TDS USING THE TECRON TEF 10 ANALYSER

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Time delay spectrometry has several practical advantages over conventional use of impulsive, broadband or FFT analysis techniques. They are as follows;

1) TDS enables measurements to be made in conditions of very poor signal to noise ratio. This enables testing sound levels to be low or ambient noise levels to be high. The use of narrow band filtering and low sweep rates gives potential noise rejection as high 90dB.

2) Time windowing, defined by the variable tracking filter offset enables the measurement to discriminate against events occuring outside the designated time zone. It is the nature of the Heyser transform that time resolution is the inverse of frequency resolution so that low frequency measurements require more space. However an acoustically damped area is not necessary.
eg. Time Resolution, $Tr = \frac{1}{Fr}$
For Fr = 100 Hz, Tr = 0.01s (or approximately 3 metres of reflection free space)
ie. Distance resolution, Dr = Tr.C (C = velocity of sound)
In other words the measurement of a sound source under anechoic conditions can be carried out in any environment, given sufficient space.

4) Speaker systems in particular are often subjected to high sound levels in order to obtain impulsive response measurements. This often results in non linear behaviour which reduces or even negates the data obtained. By using low level sweeps the Tecron will derive full impulse response and other time/phase related information under normal operating conditions.

The TEF 10 is a software based instrument and since its introduction many alternative programmes have been designed, for many applications relating to acoustics.
The possibility existed for its use to be extended to all forms of two part vibration measurement.

Currently available acoustic test programs include;
Time v Energy curves
Impulse response
Frequency v Energy curves
Time v Energy v Frequency (3D) Display
Group Delay (Rate of change of phase)
Nyquist display
Phase v Frequency curves .

In most cases, one measurement can be made and all other data viewed and displayed later, provided of course the initial set up parameters are not changed.
ie. Having obtained good time resolution one cannot later expect to extract full frequency data.

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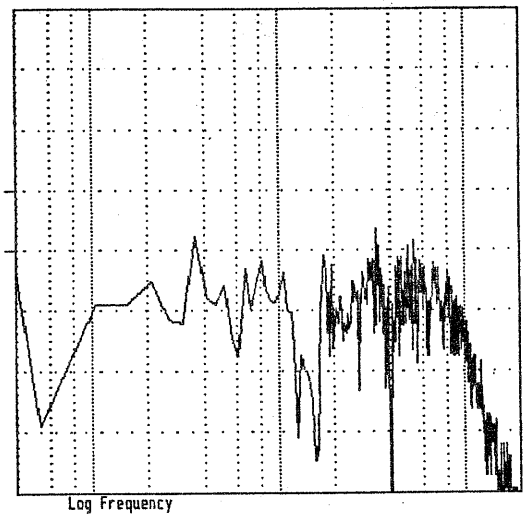
Several example displays are reproduced by example of a typical commercial studio monitor system, measured in situ.

Group Delay of EASTLAKE MONITORS
By A.S MUNRO
On 4.9.85
At GOOD EARTH STUDIOS LONDON



Vertical: 6dB/div with base of display at 55.0dB
0dB is located at .00002 Pascal.

Horizontal: 0.00Hz to 19998.10Hz
Log freq axis (2.7decades)

Resolution: 1.0918E+01 Meter & 3.1444E+01Hz

Time of test: 8434 microseconds, 2.8954E+00 Meter

Sweep Rate & Bandwidth: 988.73Hz/Sec & 3.1444E+01Hz

Input configuration: Channel 1 Balanced
with 36dB of input gain & 18dB of IF gain.

Remarks:

MEASUREMENT OF EXISTING MON SET UP BEFORE CHANGING EQ.

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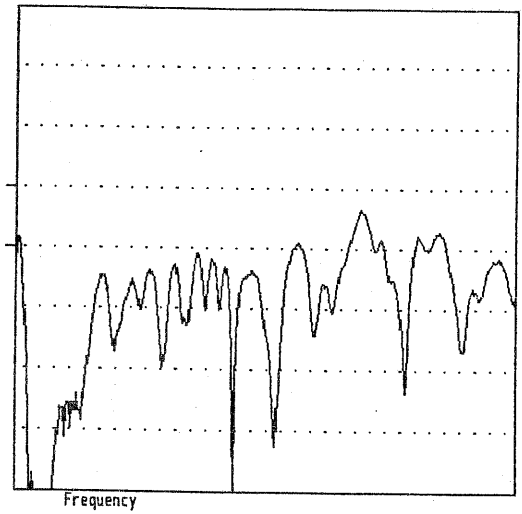
Mag. vs Hz (EFC) of EASTLAKE MONITORS
By A.S MUNRO
On 4.9.85
At GOOD EARTH STUDIOS LONDON



Vertical: 6dB/div with base of display at 55.0dB
0dB is located at .00002 Pascal.

Horizontal: 0.00Hz to 501.13Hz
scale: 137.01Hz/inch or 53.94Hz/cm.

Resolution: 3.4345E+01 Meter & 9.9962E+00Hz

Time of test: 8434 microseconds, 2.0954E+00 Meter

Sweep Rate & Bandwidth: 99.92Hz/Sec & 9.9962E+00Hz

Input configuration: Channel 1 Balanced
with 36dB of input gain & 18dB of IF gain.

Remarks:

LH MON ONLY. LF SWEEP WITH SM 76.
NOTE NOTCH FILTERS AT 217 & 258 HZ.ALLOW LF ROLL OFF ON SM 76.

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EASTLAKE MONITORS
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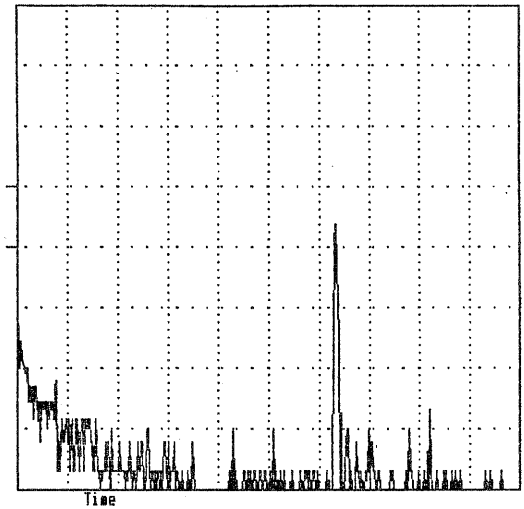

Vertical: 6dB/div with base of display at 37.0dB
0dB is located at .00002 Pascal.

Horizontal: 0 microseconds or 0 Meter to
13300 microseconds or 4.56627 Meter
scale: 1.2485E+00 Meter/inch or 4.9152E-01 Meter/cm.
3636 microseconds/inch or 1431 microseconds/cm.

Line Spacing: 33.3342 microseconds or 1.14442E-2 Meter
Line Width: 45.3345 microseconds or 1.55641E-2 Meter

Sweep rate: 5009.55Hz/Sec

Sweep range: 0.00Hz to 29999.30Hz

Window file name: A:HAMMING.W8T

Input configuration: Channel 1 Balanced
with 36dB of input gain & 18dB of IF gain.

Remarks:

MEASUREMENT OF EXISTING MON SET UP BEFORE CHANGING EQ.

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