

DISTORTION MEASUREMENT SYSTEM



A distortion analyzer and oscillator simultaneously tuned in one fast and easy-to-use system.

- Use the .001% distortion oscillator for testing from 10 Hz to 110 kHz.
- Measure distortion down to .002% in less than 5 seconds.
- Fully automatic nulling eliminates balance controls.
- Measure ac voltage 30 μ V full scale to 300V full scale with 2% accuracy.
- Measure voltage or signal-to-noise ratios with 100 dB dynamic range.
- Measure power across 8 Ω .
- Differential input measures floating or balanced sources, reduces ground loop and noise pickup.
- Intermodulation Distortion Measurement capability and Automatic Set Level optionally available.



SOUND TECHNOLOGY

1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008
(408) 378-6540

MODEL 1700B Distortion Measurement System

- ★ Measure .002% distortion in less than 5 seconds.
- ★ Measure ac voltage with 2% accuracy.
- ★ Measure ratios with 100 dB dynamic range.
- ★ Measure power across 8Ω.
- ★ Ultra-low distortion 10 Hz to 110 kHz oscillator.

Replica of input signal, referenced to ground, always available at rear panel.

0.5% taut band meter monitors voltage, power, distortion or dB ratio.

Monitor the internal oscillator merely by pushing a button.

Tuning indicators help you when measuring distortion of an external source.

Selectable 18 dB per octave filters reject hum and high frequency noise.

Fast pushbutton operation lets you set level, measure voltage or power, then measure distortion — no range changing required.

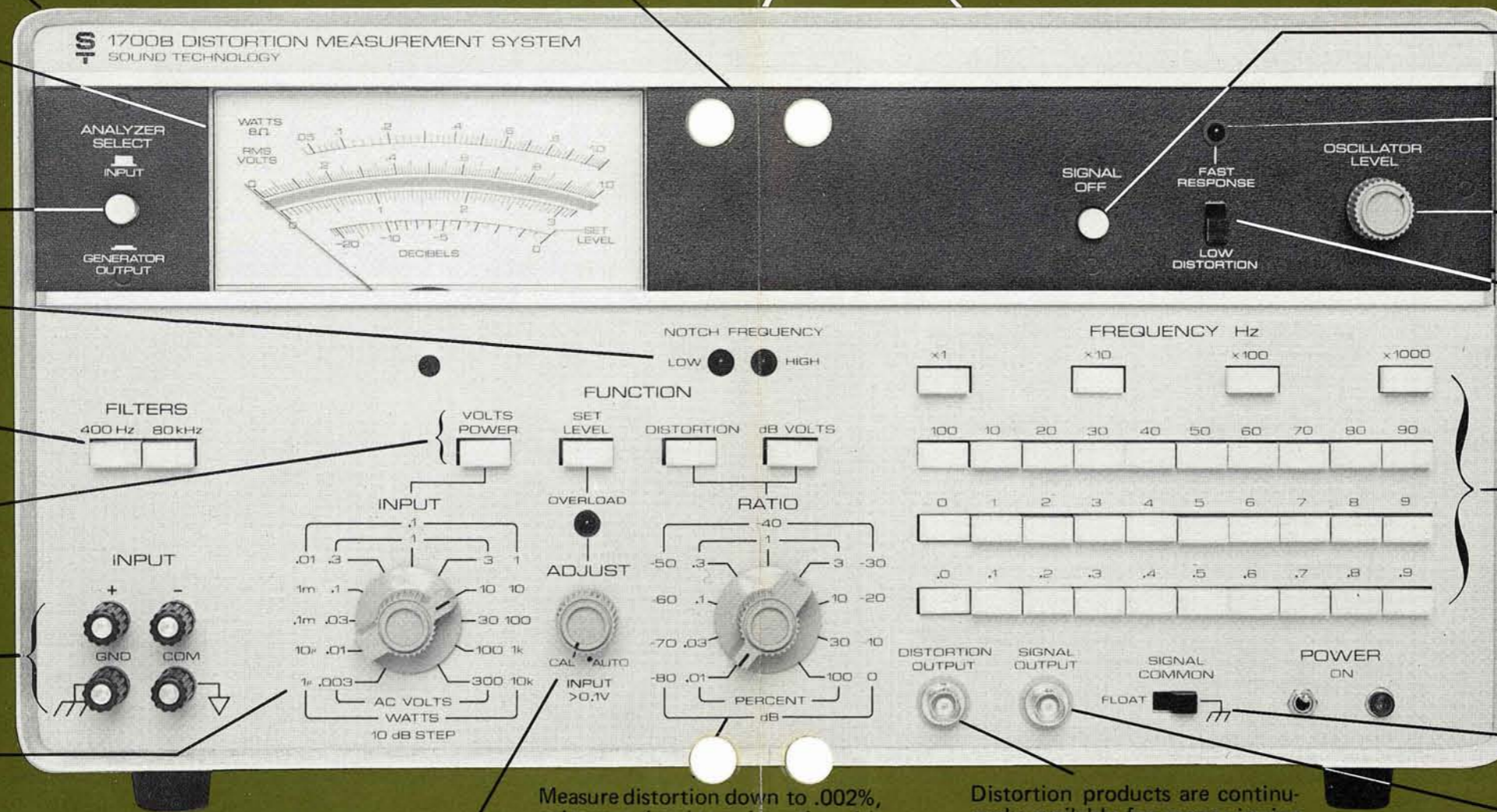
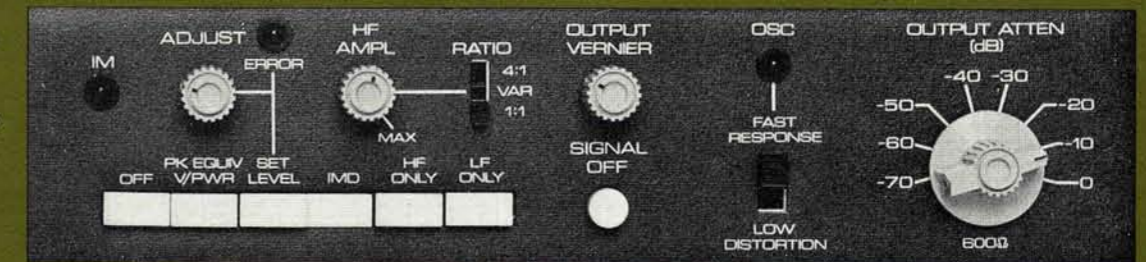
Differential Input lets you measure strapped amplifiers or amplifiers with floating outputs, breaks ground loops.

Measure voltage or power from 10 Hz to 110 kHz. Accuracy on voltage is 2%.

Set 100% reference level on signals from 300V down to 0.1V. Automatic Set Level is optionally available. (See 1700B Option 003 data sheet.)

No manual nulling controls are required — the 1700B is always in auto-null, reaches a null in less than 5 seconds.

Optional Intermodulation Distortion Analyzer



Turn the oscillator off to measure signal-to-noise ratio without recabling.

Oscillator distortion is typically .001% in low-distortion mode.

Internal oscillator provides the test signal. Level adjusted with log pot.

Switch lets you choose ultra-low-distortion (less than 5 sec. settling time) or fast response operation.

Simultaneously select oscillator and analyzer frequency with fast-to-use pushbuttons. Range is 10Hz to 110 kHz

Switch isolates signal ground from chassis ground, breaks ground loops.

Oscillator output level variable from less than 1mV to 3V.

Measure distortion down to .002%, voltage or signal to noise ratios with 100 dB dynamic range, extend voltage measurement capability to 30μV full scale.

Distortion products are continuously available for scope viewing — even when the meter is reading input power.

Specifications

TOTAL HARMONIC DISTORTION MEASUREMENT

Fundamental Frequency Range: 10 Hz to 110 kHz in 4 overlapping ranges with 3 digit resolution. Distortion analyzer is tuned simultaneously with oscillator.

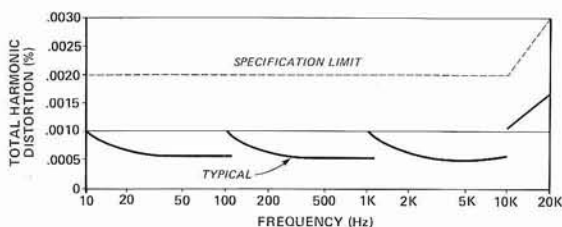
Input Voltage for 100% Set Level: 0.1V to 300V

Distortion Range: .01% to 100% full scale in 9 ranges

Distortion Measurement Accuracy Including Autonull Error for Harmonics to 300 kHz:

Fundamental Frequency	2nd through 5th Harmonic Accuracy
10 Hz - 20 kHz	±1 dB
20.1 kHz - 50 kHz	±2 dB
50.1 kHz - 110 kHz	±3 dB

Residual Distortion:



Above 20 kHz, residual distortion is .007% to 30 kHz, <.02% to 50 kHz, <.05% to 80 kHz, <.1% to 100 kHz.

Noise: If distortion products of the signal under analysis are significant, residual noise will be reduced by the average responding meter. Worst case noise (80 kHz filter in) is .0025% to 10 kHz, .003% to 20 kHz with the measured signal greater than 0.3 vrms. At lower signal levels the noise spec of the voltmeter applies.

Fundamental Rejection: > 100 dB

Input Impedance: 100 k Ω shunted by < 100 pf, balanced to ground

Distortion Output: At least 31.6 mV rms for full scale meter deflection. Output impedance is 1 k Ω .

Voltmeter AC Output: A ranged reproduction of the input signal is available on the rear panel.

Automatic Null: Operates on all distortion ranges. Automatic null time < 6 sec when used with internal oscillator.

Meter Response: Meter indication is proportional to average value of waveform.

Frequency Calibration Accuracy: Better than $\pm 2\%$ of selected frequency.

Common Mode Rejection: > 40 dB at 60 Hz with SET LEVEL ADJUST fully ccw, decreasing to 25 dB with control cw.

Maximum Common Mode Voltage: Not to exceed input voltage range setting or 1V, whichever is greater.

Input Filters:

Low Pass: 3 dB point at 80 kHz with 18 dB/octave rolloff. Normally used only with fundamental frequencies < 20 kHz.

High Pass: 3 dB point at 400 Hz with 18 dB/octave rolloff. 60 Hz rejection > 40 dB. Normally used only with fundamental frequencies > 400 Hz.

VOLTAGE/POWER MEASUREMENT

Frequency Range: 10 Hz - 110 kHz

Input Range: 3 mV to 300V full scale (1 μ w to 10 kw across 8 Ω) in 11 ranges. Full scale resolution can be extended to 30 μ V using RATIO switch.

Input Impedance: 100 k Ω shunted by < 100 pf, balanced to ground.

Voltage Accuracy: $\pm 2\%$ 20 Hz - 20 kHz,
 $\pm 5\%$ 10 Hz - 110 kHz

Extended Voltage Range Setup: To obtain sensitivities as high as 30 μ v full scale, select dB VOLTS, ADJUST control fully ccw, INPUT switch on .3V range.

Residual Noise: < 8 μ v with 80 kHz filter in,
< 15 μ v with 80 kHz filter out

Power: Power scale converts voltage reading to power across 8 Ω .

Common Mode Rejection: > 40 dB

Maximum Common Mode Voltage: Same as above

Voltmeter AC Output: Same as above

RATIO MEASUREMENT

Voltage measurement specifications apply with the following additions:

Input Voltage for 0 dB Set Reference: 0.1V to 300V

Accuracy: ± 0.2 dB 20 Hz - 20 kHz,
 ± 0.5 dB 10 Hz - 110 kHz

OSCILLATOR

Frequency Range: 10 Hz to 110 kHz in 4 overlapping ranges with 3 digit resolution. Oscillator is tuned simultaneously with distortion analyzer.

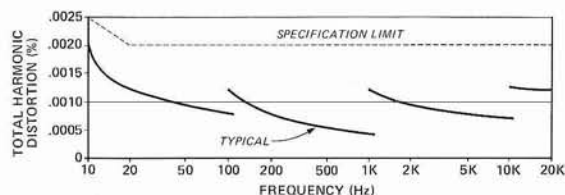
Frequency Accuracy: $\pm 2\%$ of setting

Frequency Response: Flat within 0.2 dB

Output Voltage: Variable 1 mV to 3V with single turn logarithmic pot

Output Impedance: Variable up to 625 Ω

Distortion in Low Distortion Mode:



Above 20 kHz, distortion is <.007% to 30 kHz, <.02% to 50 kHz, <.05% to 80 kHz, <.1% to 100 kHz.

Distortion in Fast Response Mode: <.05% 100 Hz - 50 kHz,
<.2% 20 Hz - 110 kHz

Hum and Noise: 100 dB below rated output

GENERAL

Dimensions: 17.2 inches wide, 8.7 inches high, 12 inches deep.

Power: 115V $\pm 10\%$, 50 to 60 Hz, 18W
220V optional at no charge

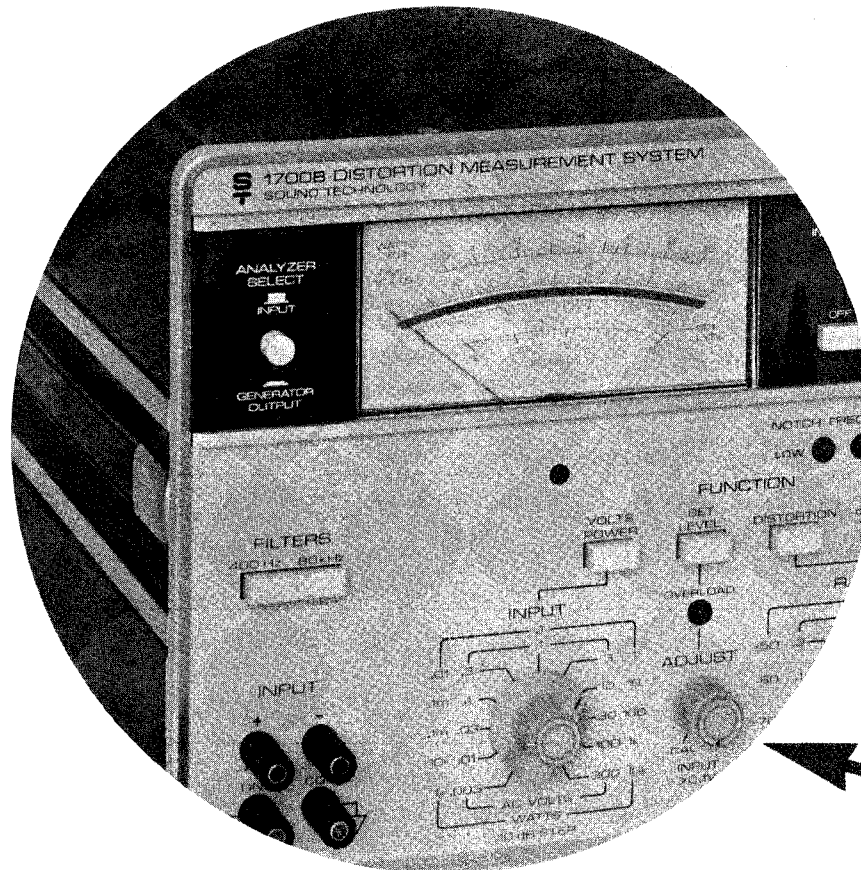
Weight: 16 lbs.

Shipping Weight: 21 lbs.

Data subject to change without notice.

DISTORTION MEASUREMENT SYSTEM

WITH AUTOMATIC SET LEVEL



NEVER TOUCH
THIS KNOB AGAIN

Your system will be even faster and easier to use with automatic set level.

AUTOMATIC SET LEVEL SIMPLIFIES:

- Distortion vs. Power or Voltage Measurements
- Distortion vs. Frequency Measurements
- IHF Sensitivity Measurements in Tuners
- Distortion at Clipping Measurement in Amplifiers
- Finding the 3% Distortion Level in Tape Recorders



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Specifications

Model 1700B specifications apply with the following additions:

Capture Range: 10 dB. INPUT switch must be set for meter reading in upper 2/3 scale in VOLTS/POWER function.

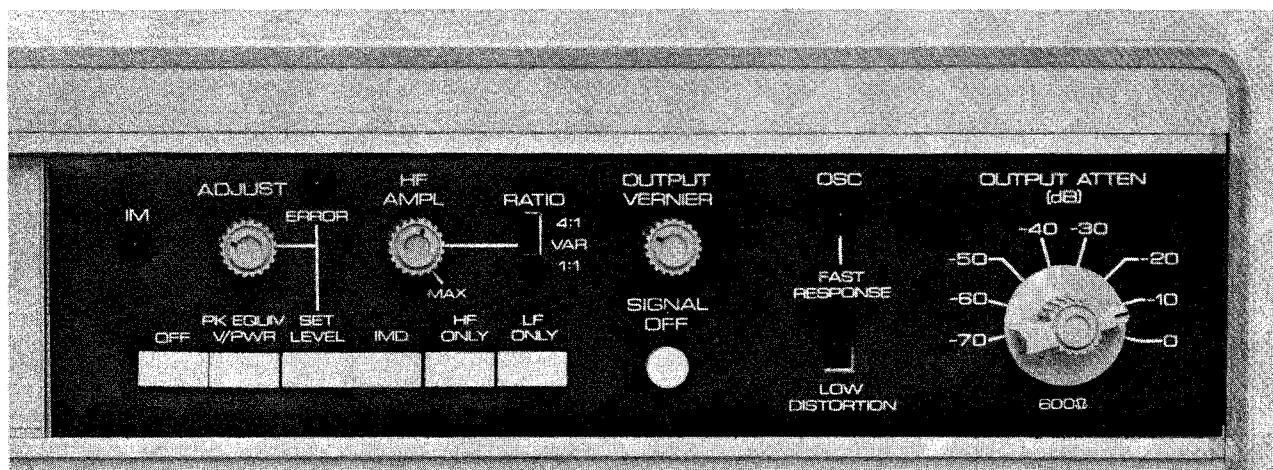
Harmonic Accuracy: Add to 1700B specification

Fundamental Frequency	2nd through 5th Harmonic Accuracy
10 Hz - 20 kHz	± .2 dB
20.1 kHz - 50 kHz	± .5 dB
50.1 kHz - 110 kHz	± 1 dB

Noise: (worst case with 80 kHz filter in) .007% to 20 kHz with the measured signal greater than 0.3 vrms. Noise decreases to the standard 1700B specification as input voltage approaches full scale. Automatic Set Level can be disabled to reduce noise for high resolution readings.

All prices f.o.b. Campbell, California – data subject to change without notice.

INTERMODULATION DISTORTION ANALYZER



*Measure total harmonic distortion and intermodulation distortion
with one instrument —*

THIS OPTION FITS RIGHT IN THE 1700B DISTORTION MEASUREMENT SYSTEM

- Measures Intermodulation Distortion down to .0025%.
- 70 dB Output Attenuator tracks 1700B Input Switch for rapid measurements, works when measuring THD, too.
- Available with automatic set level to cover between 10 dB steps for even faster operation.
- 4:1 and 1:1 ratios are switch selectable. No HF or LF adjustment required.
- Continuously adjustable LF:HF ratio lets you choose the ratio you want using the 1700B meter.
- Measures peak equivalent single-tone voltage or power.



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Specifications

MEASUREMENT SECTION

All 1700B specifications and performance features are retained with the following additions.

Intermodulation Distortion Ranges: 0.01% to 100% full scale in 9 ranges.

Residual Intermodulation Distortion and Noise: $< 0.0025\%$ with internal generators set at 4:1 for input signals greater than 0.3V (10 mw across 8Ω). $< 0.004\%$ for input signals 0.1V to 0.3V.

Intermodulation Distortion Accuracy: $\pm 2\%$ full scale.

Peak Equivalent Single Tone RMS Voltage Accuracy: $\pm 2\%$ full scale.

GENERATOR SECTION

Output attenuator and vernier control the single tone sine-wave oscillator output as well as the intermodulation distortion generator output. All 1700B oscillator specifications apply except output level control is via the attenuator and output impedance is 600Ω .

Output Voltage: 1mV to 3V open circuit, peak equivalent single tone RMS.

Output Attenuator: 70 dB in 10 dB steps, accurate within ± 0.1 dB.

Output Vernier: > 10 dB range, continuously adjustable.

Output Impedance: $600\Omega \pm 1\%$.

Low Frequency Generator: 50 or 60 Hz synchronized with power line. Total Harmonic Distortion $< 0.1\%$.

High Frequency Generator: 7 kHz $\pm 1\%$.

LF/HF Ratio: Switch selectable 4:1 $\pm 1\%$ or 1:1 $\pm 2\%$. Continuously variable from 1:1 to $> 100:1$ with HF amplitude control.

GENERAL

Weight: Adds 5 lbs. to 1700B weight.

Data subject to change without notice.