The Model 1121A Audio Analyzer is an updated version of the Boonton Model 1121. The 1121A incorporates: selectable output impedances of 50, 150 and 600 ohms, 16 volt rms output, 0.3 millivolt full scale measurement range, and quasi-peak detection. It can be used as a direct replacement in all 1121 applications. The 1121A instrument automatically tunes and auto-ranges for maximum accuracy and resolution. Distortion, frequency response, AC and DC voltage measurements are a single keystroke away. The instrument is ideally suited for stimulus response applications because of an on-board low-distortion audio source. Internal control of the source and analyzer allows for swept measurements.
For the accurate measurement of complex waveforms and noise, the audio analyzer uses true RMS average or quasi-peak detection. Accurate distortion measurements can be made to -90 dB (0.003%) between 20 Hz and 20 kHz. Over the same frequency range, flatness measurements are possible to 0.05 dB (0.5%). The audio analyzer precision reciprocal counter gives fast and accurate characterization of audio frequencies.

- Low distortion audio source for testing systems, amplifiers, radio transceivers and components
- Non-volatile memory for instant recall of up to 99 complete front panel setups

### Frequency Measurement

<table>
<thead>
<tr>
<th>Range</th>
<th>5 Hz to 200 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td></td>
</tr>
<tr>
<td>0.001 Hz</td>
<td>5.000 Hz to 199.999 Hz</td>
</tr>
<tr>
<td>0.01 Hz</td>
<td>200.00 Hz to 1999.99 Hz</td>
</tr>
<tr>
<td>0.1 Hz</td>
<td>2.0000 kHz to 19.9999 kHz</td>
</tr>
<tr>
<td>1.0 Hz</td>
<td>20.000 kHz to 199.999 kHz</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Timebase accuracy + 1 count</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>5.0 mV (Frequency mode)</td>
</tr>
<tr>
<td></td>
<td>50.0 mV (Distortion &amp; SINAD modes)</td>
</tr>
</tbody>
</table>

### Timebase

<table>
<thead>
<tr>
<th>Type</th>
<th>10 MHz TCXO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>±1 ppm/yr</td>
</tr>
</tbody>
</table>

### AC Level Measurement

<table>
<thead>
<tr>
<th>Ranges (full scale)</th>
<th>300.0 V, 30.00 V, 3.000 V, 300.0 mV, 30.00 mV, 3.000 mV, and 0.3000 mV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overrange</td>
<td>33% except on 300 V range</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±1%, 50 Hz to 50 kHz</td>
</tr>
<tr>
<td></td>
<td>±2%, 10 Hz to 100 kHz</td>
</tr>
<tr>
<td></td>
<td>±3%, 10 Hz to 100 kHz</td>
</tr>
<tr>
<td></td>
<td>±4%, 10 Hz to 100 kHz</td>
</tr>
<tr>
<td></td>
<td>1 mV to 300 V, 0.5% typ.</td>
</tr>
<tr>
<td></td>
<td>1 mV to 300 V, 1.0% typ.</td>
</tr>
<tr>
<td></td>
<td>1 mV to 300 V, 1.5% typ.</td>
</tr>
<tr>
<td></td>
<td>0.3 mV to 300 V, 2.0% typ.</td>
</tr>
</tbody>
</table>

### DC Level Measurement

<table>
<thead>
<tr>
<th>Ranges (full scale)</th>
<th>300.0 V, 30.00 V, and 3.000 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overrange</td>
<td>33% except on 300 V range</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±1.0% or 6 mV whichever is greater</td>
</tr>
</tbody>
</table>

### Distortion Measurement

<table>
<thead>
<tr>
<th>Fundamental Frequency Range</th>
<th>10 Hz to 100 kHz usable to 140 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.00001 % for &lt;0.11000% THD</td>
</tr>
<tr>
<td></td>
<td>0.001 % for &lt;1.1 % THD</td>
</tr>
<tr>
<td></td>
<td>0.01 % for &lt;100% THD</td>
</tr>
<tr>
<td>Display Range</td>
<td>0.00001% to 100.0% (-140.00 to 0.00 dB)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 1 dB; 20 Hz to 20 kHz</td>
</tr>
<tr>
<td></td>
<td>± 2 dB; 10 Hz to 100 kHz</td>
</tr>
</tbody>
</table>

### Input Voltage Range

| 50 mV to 300 V |

### Distortion Measurement Range (the higher of)

<table>
<thead>
<tr>
<th>10 Hz to 20 kHz, 80 kHz bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.010% (-80 dB); 350 mV to 300 V Input Voltage Range</td>
</tr>
<tr>
<td>0.032% (-70 dB); 200 mV to 350 mV Input Voltage Range</td>
</tr>
<tr>
<td>0.056% (-65 dB); 100 mV to 200 mV Input Voltage Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 Hz to 50 kHz, 220 kHz bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.020% (-74 dB); 200 mV to 300 V Input Voltage Range</td>
</tr>
<tr>
<td>0.056% (-65 dB); 100 mV to 200 mV Input Voltage Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 Hz to 50 kHz, 500 kHz bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.032% (-70 dB); 200 mV to 350 mV Input Voltage Range</td>
</tr>
<tr>
<td>0.056% (-65 dB); 100 mV to 200 mV Input Voltage Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50 kHz to 100 kHz, 500 kHz bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.056% (-65 dB); 100 mV to 300 V Input Voltage Range</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 Hz to 100 kHz, all bandwidths</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10% (-60 dB) (typical); 50 mV to 100 mV Input Voltage Range</td>
</tr>
</tbody>
</table>
1121A Audio Analyzer Specifications

SINAD Measurement

Fundamental Frequency Range

- 10 Hz to 100 kHz usable to 140 kHz tuned to the source frequency setting

Display Range

- 0.00 to 140.00 dB

Accuracy

- ±1 dB; 20 Hz to 20 kHz
- ±2 dB; 10 Hz to 100 kHz

Input Voltage Range

- 50 mV to 300 V

SINAD Measurement Range

- 10 Hz to 20 kHz, 80 kHz bandwidth
- 80 dB; 350 mV to 300 V Input Voltage Range
- 70 dB; 200 mV to 350 mV Input Voltage Range
- 65 dB; 100 mV to 200 mV Input Voltage Range

- 10 Hz to 50 kHz, 220 kHz bandwidth
- 74 dB; 200 mV to 300 V Input Voltage Range
- 65 dB; 100 mV to 200 mV Input Voltage Range

- 10 Hz to 50 kHz, 500 kHz bandwidth
- 70 dB; 200 mV to 300 V Input Voltage Range
- 65 dB; 100 mV to 200 mV Input Voltage Range

- 50 kHz to 100 kHz, 500 kHz bandwidth
- 65 dB; 100 mV to 300 V Input Voltage Range

- 10 Hz to 100 kHz, all bandwidths
- 60 dB (typical); 50 mV to 100 mV Input Voltage Range

S/N Measurement

Fundamental Frequency Range

- 10 Hz to 100 kHz usable to 140 kHz tuned to the source frequency setting

Display Range

- 0.00 to 140.00 dB

Accuracy

- ±1 dB

Input Voltage Range

- 50 mV to 300 V

Residual Noise* (the higher of)

- 85 dB or 10 µV; 80 kHz BW
- 85 dB or 20 µV; 220 kHz BW
- 85 dB or 40 µV; 500 kHz BW

Common Mode Rejection Ratio CMRR

- >70 dB
  - 20 Hz to 1 kHz, V in <3V
- >45 dB
  - 1 kHz to 20 kHz, V in <3V

Limits

- Common mode
  - < 4.25 V pk
  - 3.000 V range
  - < 42.5 V pk
  - 30.00 V range
  - < 425 V pk
  - 300.0 V range

Audio Filters

30 kHz Low-Pass Filter Accuracy

- 30 kHz ± 2 kHz. Rolloff: Third-order Butterworth; 60 dB/decade

80 kHz Low-Pass Filter Accuracy

- 80 kHz ± 4 kHz. Rolloff: Third-order Butterworth; 60 dB/decade

220 kHz Low-Pass Filter Accuracy

- 220 kHz ± 20 kHz. Rolloff: Third-order Butterworth; 60 dB/decade

Source Specifications

Frequency Range

- 10 Hz to 140 kHz

Resolution

- 0.001 Hz: 10.000 Hz to 199.999 Hz
- 0.01 Hz: 200.00 Hz to 1999.99 Hz
- 0.1 Hz: 2.0000 kHz to 19.9999 kHz
- 1.0 Hz: 20.000 kHz to 140.000 kHz

Accuracy

- 20 ppm + timebase accuracy + 1 count

Output Level

Range (open circuit)

- 0.01 mV to 16.0 Vrms

Resolution

- 0.01 mV: 0 mV to 30 mV
- 0.1 mV: 30 mV to 300 mV
- 1.0 mV: 300 mV to 3V
- 5.0 mV: 3V to 16V

Accuracy (0.6 mV to 16 V)

- ± 0.5% of setting + 0.05% of Range 10 Hz to 50 kHz; typ 0.3%
- ± 1.0% of setting + 0.05% of Range 50 kHz to 100 kHz; typ 0.6%
- ± 1.5% of setting + 0.1% of Range 100 kHz to 140 kHz; typ 1.0%

Flatness (30 mV to 8 V into 50 ohms, relative to 1 kHz)

- ± 0.5%: 10 Hz to 50 kHz
- ± 1.0%: 10 Hz to 100 kHz
- ± 1.5%: 10 Hz to 140 kHz

Distortion and Noise (the higher of)

- 0.01% (-80 dB) or 10 µV: 10 Hz to 20 kHz, 80 kHz BW
- 0.02% (-74 dB) or 10 µV: 20 kHz to 50 kHz, 220 kHz BW
- 0.032% (-70 dB) or 35 µV: 10 Hz to 50 kHz BW
- 0.056% (-65 dB) or 50 µV: 50 kHz to 100 kHz, 500 kHz BW
- 0.1% (-60 dB) or 50 µV: 100 kHz to 140 kHz, 500 kHz BW

Output Impedance

- 50 ohms ± 2%
- 150 ohms ± 1%
- 600 ohms ± 1%
### Supplemental Information

| Power Requirements       | 100, 120, 220 or 240 VAC  
|                         | 50 to 400 Hz, 100 VA  
| This instrument is designed for indoor use only |
| Operating Temperature    | 0° to 55°C  
| Weight                   | 25 lbs (11.3 kg)  
| Dimensions               | 17.75 in (45.1 cm) wide  
|                         | 5.85 in (14.9 cm) high  
|                         | 18 in (45.8 cm) deep  

### AC Measurement

| RMS Detector          | True RMS responding for signals with a crest factor of <3  
| Average Detector      | Average responding RMS calibrated  
| Quasi-peak Detector   | Meets CCIR recommendations 468-3, accuracy ± 6%  
| Bandwidth             | 5 Hz to 500 kHz  

### Rear Panel Connectors

| Monitor               | (600 ohm output impedance)  
| AC level, Frequency and S/N Modes | Provides a scaled output of input signal  
| Distortion and SINAD Modes | Provides a scaled output of input signal with the fundamental removed  
| SYNC                   | Provides TTL compatible output relative to the source oscillator frequency  
| X CLK                  | TTL compatible input for external 10 MHz counter reference. Automatic switching to external signal when present  
| X AXIS                 | 0 to 5 VDC signal corresponding to the source oscillator frequency or levels in the Sweep mode. 1000 ohm output impedance  
| Y AXIS                 | 0 to 5 VDC signal corresponding to the displayed measurement value and entered plot limits, 1000 ohm output impedance  
| PENUP                  | TTL compatible output for plotter pen control  
| IEEE-488 Bus          | Complies with IEEE-488. Implements AH1, SH1, T6, TE0, L4, LE0, SR1, RI1, PP0, DC1, DT1, C0 and E1  

### Frequency Measurement

| Technique | Reciprocal counting with 10 MHz time base  
| Source Oscillator | Simultaneous frequency and level changes (using IEEE-488 burst mode) <12 ms  
| Level Transition | <10 ms  

### Analyzer Measurement Speed

<table>
<thead>
<tr>
<th>First rdg</th>
<th>Measurement rate</th>
</tr>
</thead>
</table>
| Frequency | <1.0 sec  
| Level     | <1.0 sec  
| Distortion| <1.0 sec  
| SINAD     | <1.0 sec  
| S/N       | <2.0 sec |
|           | 4 rdgs/sec  
|           | 10 rdgs/sec  
|           | 8 rdgs/sec  
|           | 8 rdgs/sec  
|           | 1 rdgs/sec  

### Options

-01 Rear Panel Input/Output  
-11 400 Hz High Pass Filter  
-12 Psophometric (CCITT) Band-Pass Filter  
-13 CCIR Band-Pass Filter  
-15 A Weighting Filter  
-16 B Weighting Filter  
-17 C Weighting Filter  
-18 Audio Band-Pass Filter  
-19 C-Message Filter  

### Accessories

| Included | Spare input/output fuses, line fuses  
| Accessories Available | Rack-mounting kit ears only (gray) P/N 95004493A  
|                     | Rack-mounting kit with ears and handles (gray) P/N 95004494A  
|                     | Single binding post to BNC(M) P/N 95401801A  

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1121A Audio Analyzer
Specifications

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B/1121A/0423/EN
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