Device evaluation using the B2961/B2962A ultra low noise DC source

Keysight’s B2961A/B2962A 6.5 digit Low Noise Power Source is for applications requiring clean DC voltage and current sources.

Design engineers working in many different areas face ever-decreasing operating voltages and lower design margins, which necessitate higher precision power supplies and sources. Some of these applications include:

- Oscillator ICs (PLL, VCO, etc.) & Oscillation Devices
  For these devices frequency varies with applied DC voltage, so any voltage source noise strongly impacts device evaluation results.
- Analog-to-Digital Converter (ADC) ICs
  Decreasing power supply voltages and higher resolution requirements mandate a low noise voltage source at the ADC input during design evaluation.
- Sensing Devices & Transducers
  A low noise voltage source is required for the sensor interface and at the analog inputs of the peripheral circuitry.
- Energy Generating Devices & Circuits
  A battery monitoring circuit needs a clean voltage source to emulate the battery cell, which intrinsically generates very low noise.

The B2961A and B2962A are bipolar sources, so the polarity for voltage and current can be either positive or negative. They can source currents from 10 fA to 3 A (DC) or 10.5 A ( pulsed), and voltages from 100 nV to 210 V.

Ultra low noise filter option for B2961/62A

Using the High Current Ultra Low Noise Filter (HC-ULNF) or Ultra Low Noise Filter (ULNF) with the Keysight B2961A or B2962A allows ultra-clean voltage sourcing. This accessory reduces the noise level down to 10 µVrms (10 Hz to 20 MHz) for voltages and currents up to 21 V and 500 mA with HC-ULNF, 42 V and 105 mA with ULNF. Moreover, integrated remote sensing circuitry ensures that the output voltage remains true to the setting value.
Ultra-low noise filter performance

The noise density of the B2961A & B2962A using the HC-ULNF/ULNF is 1 nVrms/√Hz at 10 kHz. This satisfies the phase noise requirements for testing oscillators and oscillating devices such as VCOs, PLLs, etc. It also enables the testing and evaluation of ADC devices that require precise low-noise voltage supplies/sources for proper characterization.

Low noise filter option for B2961A/B2962A

Using the Low Noise Filter (LNF) with the Keysight B2961A/B2962A provides clean voltage sourcing equivalent to that of much costlier precision linear voltage/current source instruments. Best of all, you can use the instruments’ full output ranges (up to 210 V/105 mA, 21 V/ 1.5 A or 6 V/3 A) without sacrificing lower noise performance.

The LNF also supports 4-wire connections to allow sourcing and measurement far from the output terminals of the filter.

Keysight B2961A/B2962A low noise power source key specifications and characteristics

<table>
<thead>
<tr>
<th>Product Number</th>
<th>Option</th>
<th>Max output</th>
<th>Source Resolution</th>
<th>Noise1</th>
<th>0.1 to 10 Hz</th>
<th>10 to 20 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DC</td>
<td>Digit</td>
<td>Min Resolutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2961A</td>
<td>N1294A-020</td>
<td>21 V/500 mA</td>
<td>6 1/2</td>
<td>100 nV/1 nA</td>
<td>&lt; 5 μVpp/ &lt; 6 nApp</td>
<td>10 μVrms (1 nVrms/√Hz at 10 kHz)</td>
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<tr>
<td>B2962A</td>
<td>N1294A-021</td>
<td>42 V/105 mA</td>
<td>6 1/2</td>
<td>100 nA/10 pA</td>
<td>&lt; 5 μVpp/&lt; 60 pApp</td>
<td>10 μVrms (1 nVrms/√Hz at 10 kHz)</td>
</tr>
<tr>
<td></td>
<td>N1294A-022</td>
<td>210 V/3.03 A</td>
<td>6 1/2</td>
<td>100 nA/10 pA</td>
<td>&lt; 5 μVpp/&lt; 60 pApp</td>
<td>350 μVrms</td>
</tr>
</tbody>
</table>

1. Supplemental characteristics

B2961A/B2962A key features:

- 6.5 digit high resolution and wide bipolar range
- 10 μVrms ultra low noise
- Precision 10 kHz arbitrary waveform generation capability
- Programmable output resistance
- Time domain voltage/current waveform viewer

The B2900A series precision instruments

The B2900A series lines up products for both precision source and precision measurement.

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