In 2010, Abracon introduced a low cost, lab-grade, Ultra-Low-Noise, Power Supply Module; specifically targeted to aid design & test engineers with noise-sensitive measurements such as phase noise, jitter, harmonic distortion, signal-to-noise-ratio, RF Spectrum, etc. This module is offered with a Universal AC-DC adapter providing global functionality with 110VAC to 240VAC input; configured at either 50Hz or 60Hz cycles. This capability ensures that design & test engineers working in multiple geographies can correlate their results, eliminating uncertainty related to cleanliness of the bias voltage itself. Further, this module offers four individual and isolated bias ports, +1.8V, +2.5V, +3.3V & +5.0V to accommodate industry standard logic levels; while simultaneously sourcing 200mA of current per channel.

In addition to the usability of this power source in a lab environment, multiple Abracon customers have taken advantage of this solution in production test environment by including the ABPSM-ULN-A module as part of the test rack. This approach significantly reduced uncertainties & erroneous results in production test environment, when making noise sensitive measurements.

The key attribute of this solution is the exceptional Noise Density it offers. As shown below, this module offers sub 400nV/√Hz Noise density @ 1Hz offset, reducing to < 15nV/√Hz @ 1kHz offset; unmatched by most power supply solutions in the market today.

Abracon currently characterizes all of its oscillator products for phase noise and rms jitter performance, utilizing the ABPSM-ULN-A module as the power source. With the superior noise density of this power supply module, the phase noise and rms jitter performance of a given oscillator is comparable to the same measurement conducted using the world renowned E5052B Signal Source Analyzer’s front panel power ports.
In the example shown, an Ultra-Low-Noise, 3rd Overtone Crystal based Voltage Controlled Oscillator (VCXO), Abracon part# ABLNO-V-100.000MHz was characterized for phase noise and jitter, while being biased with three different scenarios:

1. Front Panel Power Port#1 of E5052B SSA ...[+3.3V]
2. ABPSM-ULN-A Power Supply Module ...[+3.3V]
3. E3631 Tripple Channel Power Supply ...[+3.3V]

Respectively, the control port of this VCXO was biased in the following manner:

1. Front Panel Power Port#2 of E5052B SSA ...[+1.8V]
2. ABPSM-ULN-A Power Supply Module ...[+1.8V]
3. E3631 Tripple Channel Power Supply ...[+1.8V]

As is evident from the results shown below, the measured phase noise performance of the ABLNO-V-100.000MHz VCXO is 10dB to 30dB worse close to the carrier (10Hz to 1kHz offset), while being measured with E3631 Power supply vs. ABPSM-ULN-A. Further, these results do not converge until about 23kHz offset from the carrier. Lastly, the measured VCXO phase noise with ABPSM-ULN-A is within 2dB of the noise measured using E5052B power ports for bias and Vcontrol.

These results clearly support Abracon’s claim that for noise sensitive measurements, ABPSM-ULN-A module is the best low-cost, AC-to-DC power supply available in the market.