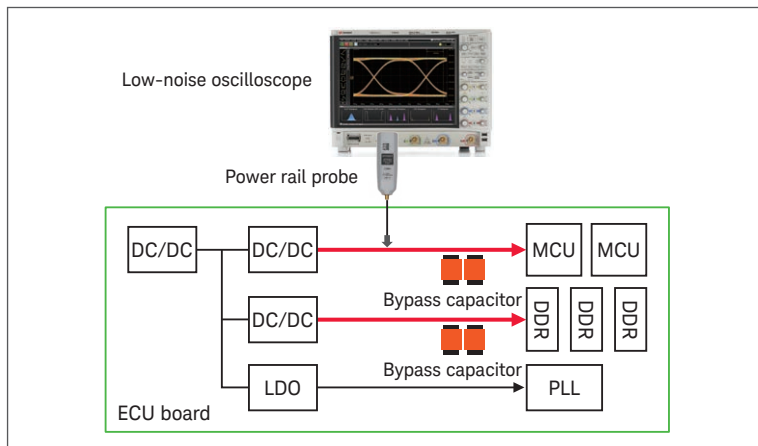


[ECU Testing]

Optimization of noise countermeasures through waveform analysis of DC power supply lines of on-board electronic components



Noise analysis and bypass capacitor optimization of DC power line using Infiniium S-series oscilloscope and N7020A power rail probe

Want to increase the reliability of ECU?

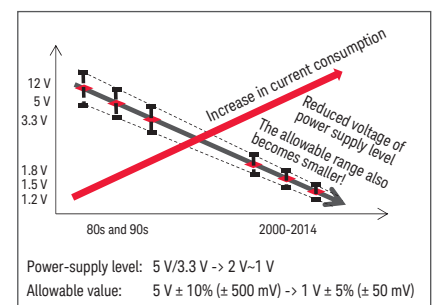
Want to observe the noise on power lines?
... so far, had given up on that.

Want to check the effectiveness of noise countermeasure parts such as bypass capacitor?

Yes, we can support you!

About 80% of system failures are related the power supply of on-board electronic components

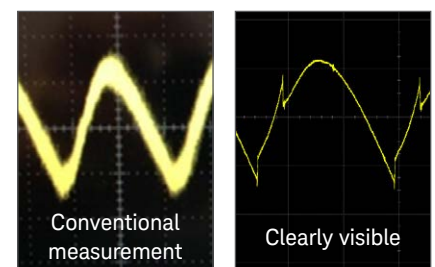
The range of allowable voltage will only decrease along with the reduction of voltage in line with the trend of low power consumption. Meanwhile, causes of power source noise are increasing due to a growing number of mounted electronic components, and major LSI manufacturers are saying that malfunction caused by a superimposed noise on a low-voltage driven power line has become a serious problem. In recent years, it has become necessary to have power supply noise evaluation of \pm several millivolts to several tens of millivolts full-stop.



A few millivolts are visible with an oscilloscope!

Have you given up on observing the power line noise with an oscilloscope?

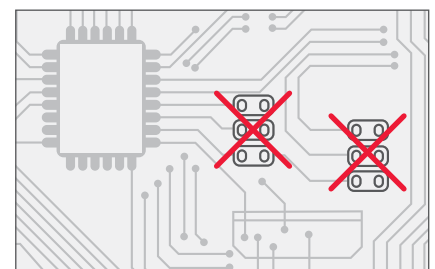
Keysight's N7020A power rail probe is specialized for observing power supply lines. Power supply waveform of several millivolts becomes clearly visible by combining it with the already low-noise S-series oscilloscope. This will also reveal very low noise that has been hidden by the noise.



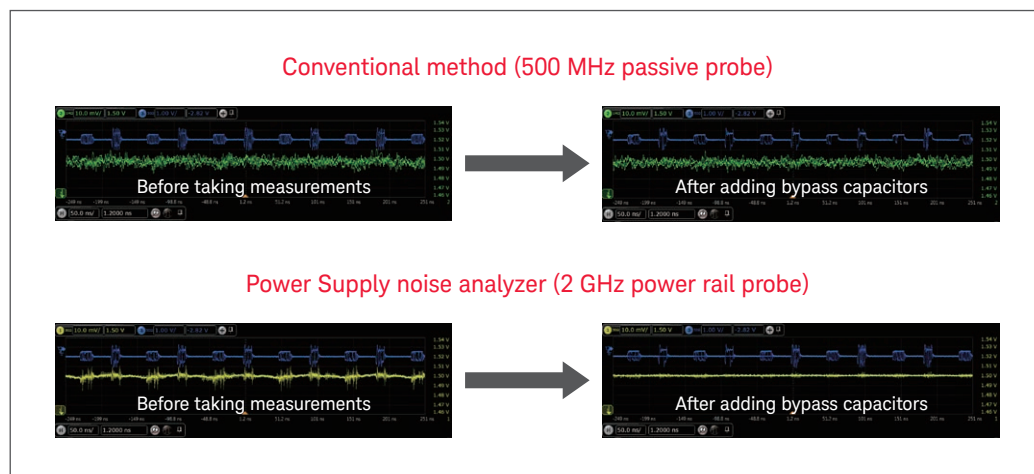
Supporting cost reduction by optimizing bypass capacitors

Do not randomly place bypass capacitors just to solve noise issues. It is important to place the minimum necessary number of bypass capacitors with the appropriate capacity at the appropriate locations.

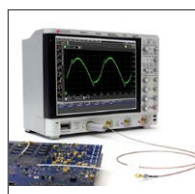
If the cause of unstable operation is hidden behind the noise floor of the measuring instrument, the effect of the countermeasure parts cannot be checked, and the designer might have to rely just on intuition to minimize or avoid such problems. A reliable design and test solution is better than intuition, and a low-noise measurement environment allows you to visualize the waveform at issue and the effect of the measurement.



Case study: Checking the effectiveness of bypass capacitor installation

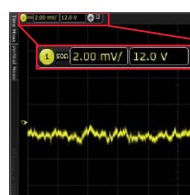


Bypass capacitors were added to reduce the noise of the power supply of DDR memory due to unstable operation of the DDR memory. Conventional measurement methods could not provide any information on whether countermeasures helped reduce noise from read/write operations. With the power supply noise analyzer, the positive effects of the countermeasures could be confirmed.



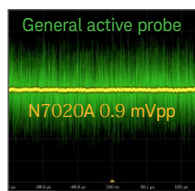
Achieve low noise performance with oscilloscope

The Infiniium S-series oscilloscope is equipped with a 10-bit AD converter. It provides the best-in-class low noise floor in the 2 to 2.5 GHz band model.



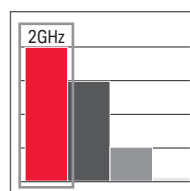
Offsetting ± 24 V on the probe side

A measurement example of 12 V @ 2 mV/div. The device allows observation with a scale magnified up to ± 24 V.



Creating a 1 mVpp noise floor

The device exposes even very low noise at the 1 mV level without letting it get buried, by combining a power rail probe specialized for observing the power line.



Wideband measurement up to 2 GHz

The device covers up to 2 GHz, which is wider than the conventional active and passive probes. It captures high-frequency noise in a wide area.



Can be soldered to a bypass capacitor

Power rail probe accessories that can be connected directly to mounted bypass capacitors are also available.



50 kΩ DC loading

The N7020A power rail probe helps to minimize or even prevent DC voltage drop. It helps achieve more accurate noise measurement.

Typical Configuration

Model Number	Description
DSOS204A	Infiniium S-series oscilloscope, 2 GHz, 4 ch
N7020A	Power rail probe, 2 GHz

Related Document

Pub. Number	
5992-0455JAJP	Power supply noise analyzer, Brochure

Support / Contact:

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus



This information is subject to change without notice.
 © Keysight Technologies, 2017
 Published in Japan, January 13, 2017
 5992-2096ENN
 0000-00DEP
www.keysight.com