



Vibration Noise Measurement of Refrigerator/ Air Conditioner Compressor Using Agilent USB Data Acquisition Devices

Application Note



Introduction

Modern families are fond of having appliances that can provide cooling environment and yet, preferably those that can be operated quietly.

Household appliances, such as refrigerators and air conditioners, are electronic appliances that come with compressors. Because compressors operate in both on and off modes, this leads to vibration and noise.

It is important for manufacturers of household appliances to understand the overall structure of the product. This enables them to trace the source of this noise to improve the effective measurement and, ultimately, the product itself.

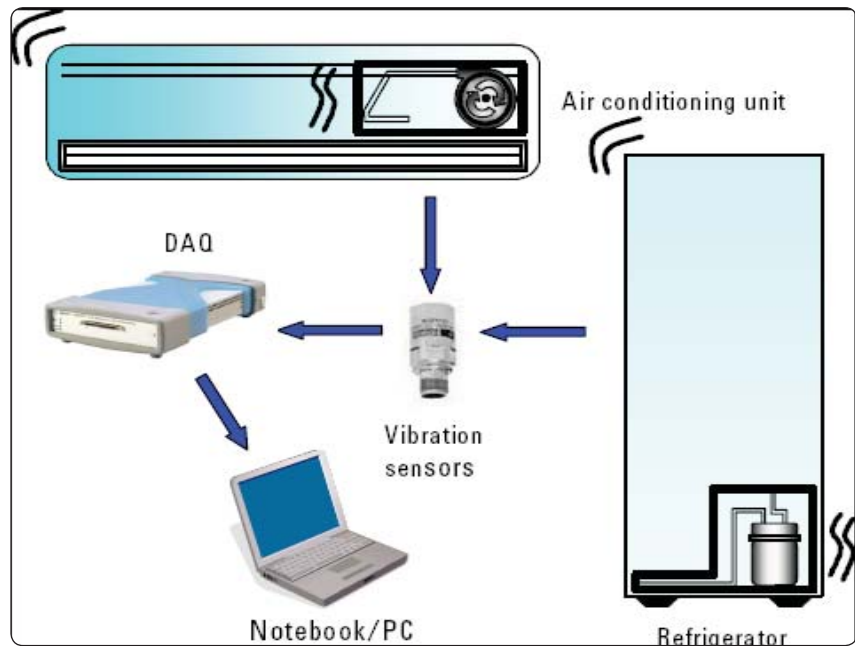


Figure 1. Set up for vibration measurement with DAQ

Measurement Setup

This application note describes the setup for measuring the vibration of the refrigerator/air conditioner during operation.

The components needed in this setup are as follows:

- Multi-channel USB data acquisition (DAQ) device
- Vibration sensors

Figure 1 illustrates the setup for vibration measurement using Agilent USB DAQ device.

When you use the refrigerator/air conditioner, the biggest problem encountered is when the compressor is in operation. The compressor produces humming sound in the range of 100 Hz to several kHz.

Several sensors are placed at different areas on the appliance. The magnitude of the vibration is measured and saved to the PC via the Agilent USB DAQ device for further analysis. Data is gathered to identify the source with the highest magnitude of vibration and noise.

Further tests can be performed with the available data, such as repositioning the compressor. This can be done by putting in more damping materials or restructuring the tubing attached to the compressor to minimize the noise and vibration originating from the compressor operation.

Conclusion

The Agilent USB DAQ device is a high-speed, inexpensive and simple-to-use device that can be used flexibly. It can be connected directly to the PC for various data collection.

With the data obtained using Agilent USB DAQ device, analysis can be performed easily to understand the characteristics of the noise source, leading to improvement in noise damping.

Related Agilent Literature

- *System Developer Guide-Using USB in the Test and Measurement Environment Application Note*, literature number 1465-12

Additional information is also available at www.agilent.com/find/U2300A or contact your nearest Agilent sales office or sales office or sales representative.



Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.



Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.



www.agilent.com/find/open
Agilent Open simplifies the process of connecting and programming test systems to help engineers design, validate and manufacture electronic products. Agilent offers open connectivity for a broad range of system-ready instruments, open industry software, PC-standard I/O and global support, which are combined to more easily integrate test system development.



www.lxistandard.org
LXI is the LAN-based successor to GPIB, providing faster, more efficient connectivity. Agilent is a founding member of the LXI consortium.

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance, onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to:

www.agilent.com/find/removealldoubt

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Americas

Canada	(877) 894-4414
Latin America	305 269 7500
United States	(800) 829-4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

Europe & Middle East

Austria	0820 87 44 11
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 € fixed network rates
Germany	01805 24 6333**
	**0.14€/minute
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland (French)	41 (21) 8113811(Opt 2)
Switzerland (German)	0800 80 53 53 (Opt 1)
United Kingdom	44 (0) 118 9276201

Other European Countries:

www.agilent.com/find/contactus

Revised: October 24, 2007

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2006, 2007, 2008
Printed in USA, February 13, 2008
5989-5774EN



Agilent Technologies