

CHARACTERIZATION OF A WIDEBAND DIGITIZER FOR POWER MEASUREMENTS UP TO 1 MHz

Gert Rietveld, *Member, IEEE*⁽¹⁾, Dongsbeng Zhao, *Member, IEEE*⁽¹⁾, Charlotte Kramer⁽²⁾, Ernest Houtzager⁽¹⁾, Orla Kristensen⁽²⁾, Cyrille de Lefve^(2,3), and Torsten Lippert⁽²⁾

Abstract— A two-channel high-speed digitizer has been extensively characterized in the frequency range of 50 Hz to 1 MHz. The measurements involved ac flatness, phase, linearity, input impedance and the effects of dc offsets, temperature, and internal self-calibration routine. The digital anti-aliasing filter inside the digitizer negatively affects the ac flatness in the low-frequency region. An inverse compensation filter has been designed and applied which improves the frequency response with a factor 25 to 60 and makes it flat within 25 $\mu\text{V/V}$ up to 100 kHz and within 100 $\mu\text{V/V}$ up to 1 MHz. The phase difference between the two channels can be modeled by a constant time delay between the two channels, which for the 2 V_{pp} range equals (250 \pm 30) ps. The overall results of the characterization indicate that the digitizer can be applied in wideband power measurements under practical circumstances with ($k=1$) uncertainty contributions of not more than 70 $\mu\text{W/WA}$ and 400 $\mu\text{W/WA}$ at 10 kHz and 1 MHz respectively. This uncertainty excludes loading effects which are significant at frequencies above 100 kHz. At low frequencies up to three times lower uncertainties are achieved when the digitizer is calibrated at the signal level and temperature at which it is subsequently used.

Index Terms— digitizer, digital-analog conversion, wideband power, frequency response, phase measurement, digital filters, power measurement

I. INTRODUCTION

THE area of low frequency power measurements is expanding to higher frequencies since in applications as for example lighting and switched power supplies these higher frequencies are used in order to achieve better efficiency and lower losses. The heart of wideband commercial power meters consists of a fast digitizer combined with wideband voltage dividers and current shunts, used to convert the input voltage and current signals to the input voltage levels of the digitizer. For calibration of such power meters, a reference system is

needed where again a digitizer plays an important role.

As part of a European joint research project on "Power and Energy", a commercial wideband digitizer is extensively characterized for possible use in a reference system for power measurements up to 1 MHz. This paper describes the digitizer together with the characterization set-up and the evaluation results.

II. DIGITIZER

A commercially available digitizer, the National Instruments PXI-5922¹ two-channel high-speed digitizer [1], housed in a PXI-1033 chassis, was selected for evaluation as possible digitizer in wideband power measurements. The digitizer has two ranges, 2 V_{pp} and 10 V_{pp} , and can be operated at sampling rates from 50 kSa/s with 24-bit resolution up to 15 MSa/s with 16-bit resolution. Since the precise properties of the digitizer have been found to depend on the sampling rate, the major part of the characterization is performed at a limited number of sampling rate – frequency combinations. The combinations chosen are 100 kSa/s for frequencies up to 10 kHz, 1 MSa/s for frequencies between 10 kHz and 100 kHz, and 10 MSa/s for frequencies from 100 kHz up to 1 MHz. In this way, an oversampling ratio of at least 5 is reached over the complete measurement frequency range. For all measurements the input impedance is set to 1 M Ω , since the alternative 50 Ω setting would result in too high loading errors in the final application.

III. MEASUREMENT SET-UP

Measurement software has been developed providing simultaneous readout of the two digitizer channels. The software subsequently calculates the rms voltage and, using an FFT, the phase between the two channels. Further features of the software are determination of dc offsets in the current and voltage signals, calculation of the harmonics spectrum, and the possibility of using gain correction factors and phase offset correction. For sampling rates up to 1 MSa/s the sampling and calculations are performed continuously ("streaming mode"); at 10 MSa/s the samples are taken at certain intervals to allow for sufficient computation time of all signal parameters in between these intervals.

Manuscript received June 7, 2010. This work was partially funded by the Dutch Ministry of Economic Affairs and the Danish Ministry of Science, Technology and Innovation. Additional funding was received from the European Community's Seventh Framework Program, ERA-NET Plus, under Grant Agreement No. 237297.

The authors are with:

(1) VSL, the Dutch National Metrology Institute, P.O. Box 654, 2600 AB Delft, The Netherlands. Corresponding author: Gert Rietveld; phone: +31 15 2609 500; fax: +31 15 2612 971; e-mail: gretveld@vsl.nl.

(2) Technical A/S, Mads Clausens Vej 12, 8600 Silkeborg, Denmark.

(3) on temporary leave from Université de Savoie - PolytechSavoie, BP 80439, 74944 Annecy le Vieux Cedex, France.

¹ The manufacturers and types of instrumentation mentioned in this paper do not indicate any preference by the authors, nor does it indicate that these are the best available for the application discussed.

Characterization Of A Wideband Digitizer For Power

Albert A Gayle



Characterization Of A Wideband Digitizer For Power:

As recognized, adventure as with ease as experience practically lesson, amusement, as without difficulty as settlement can be gotten by just checking out a book **Characterization Of A Wideband Digitizer For Power** along with it is not directly done, you could say yes even more roughly speaking this life, concerning the world.

We pay for you this proper as skillfully as simple pretentiousness to get those all. We provide Characterization Of A Wideband Digitizer For Power and numerous ebook collections from fictions to scientific research in any way. along with them is this Characterization Of A Wideband Digitizer For Power that can be your partner.

<https://py.bijouxmedusa.com/results/detail/fetch.php/routines%20ideas%20for%20creators%20%202165%20fitness%20routines%20ideas%20for%20small.pdf>

Table of Contents Characterization Of A Wideband Digitizer For Power

1. Understanding the eBook Characterization Of A Wideband Digitizer For Power
 - The Rise of Digital Reading Characterization Of A Wideband Digitizer For Power
 - Advantages of eBooks Over Traditional Books
2. Identifying Characterization Of A Wideband Digitizer For Power
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Characterization Of A Wideband Digitizer For Power
 - User-Friendly Interface
4. Exploring eBook Recommendations from Characterization Of A Wideband Digitizer For Power
 - Personalized Recommendations
 - Characterization Of A Wideband Digitizer For Power User Reviews and Ratings
 - Characterization Of A Wideband Digitizer For Power and Bestseller Lists

5. Accessing Characterization Of A Wideband Digitizer For Power Free and Paid eBooks
 - Characterization Of A Wideband Digitizer For Power Public Domain eBooks
 - Characterization Of A Wideband Digitizer For Power eBook Subscription Services
 - Characterization Of A Wideband Digitizer For Power Budget-Friendly Options
6. Navigating Characterization Of A Wideband Digitizer For Power eBook Formats
 - ePub, PDF, MOBI, and More
 - Characterization Of A Wideband Digitizer For Power Compatibility with Devices
 - Characterization Of A Wideband Digitizer For Power Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Characterization Of A Wideband Digitizer For Power
 - Highlighting and Note-Taking Characterization Of A Wideband Digitizer For Power
 - Interactive Elements Characterization Of A Wideband Digitizer For Power
8. Staying Engaged with Characterization Of A Wideband Digitizer For Power
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Characterization Of A Wideband Digitizer For Power
9. Balancing eBooks and Physical Books Characterization Of A Wideband Digitizer For Power
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Characterization Of A Wideband Digitizer For Power
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Characterization Of A Wideband Digitizer For Power
 - Setting Reading Goals Characterization Of A Wideband Digitizer For Power
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Characterization Of A Wideband Digitizer For Power
 - Fact-Checking eBook Content of Characterization Of A Wideband Digitizer For Power
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Characterization Of A Wideband Digitizer For Power Introduction

In this digital age, the convenience of accessing information at our fingertips has become a necessity. Whether its research papers, eBooks, or user manuals, PDF files have become the preferred format for sharing and reading documents. However, the cost associated with purchasing PDF files can sometimes be a barrier for many individuals and organizations. Thankfully, there are numerous websites and platforms that allow users to download free PDF files legally. In this article, we will explore some of the best platforms to download free PDFs. One of the most popular platforms to download free PDF files is Project Gutenberg. This online library offers over 60,000 free eBooks that are in the public domain. From classic literature to historical documents, Project Gutenberg provides a wide range of PDF files that can be downloaded and enjoyed on various devices. The website is user-friendly and allows users to search for specific titles or browse through different categories. Another reliable platform for downloading Characterization Of A Wideband Digitizer For Power free PDF files is Open Library. With its vast collection of over 1 million eBooks, Open Library has something for every reader. The website offers a seamless experience by providing options to borrow or download PDF files. Users simply need to create a free account to access this treasure trove of knowledge. Open Library also allows users to contribute by uploading and sharing their own PDF files, making it a collaborative platform for book enthusiasts. For those interested in academic resources, there are websites dedicated to providing free PDFs of research papers and scientific articles. One such website is Academia.edu, which allows researchers and scholars to share their work with a global audience. Users can download PDF files of research papers, theses, and dissertations covering a wide range of subjects. Academia.edu also provides a platform for discussions and networking within the academic community. When it comes to downloading Characterization Of A Wideband Digitizer For Power free PDF files of magazines, brochures, and catalogs, Issuu is a popular choice. This digital publishing platform hosts a vast collection of publications from around the world. Users can search for specific titles or explore various categories and genres. Issuu offers a seamless reading experience with its user-friendly interface and allows users to download PDF files for offline reading. Apart from dedicated platforms, search engines also play a crucial role in finding free PDF files. Google, for instance, has an advanced search feature that allows users to filter results by file type. By specifying the file type as "PDF," users can find websites that offer free PDF downloads on a specific topic. While downloading

Characterization Of A Wideband Digitizer For Power free PDF files is convenient, its important to note that copyright laws must be respected. Always ensure that the PDF files you download are legally available for free. Many authors and publishers voluntarily provide free PDF versions of their work, but its essential to be cautious and verify the authenticity of the source before downloading Characterization Of A Wideband Digitizer For Power. In conclusion, the internet offers numerous platforms and websites that allow users to download free PDF files legally. Whether its classic literature, research papers, or magazines, there is something for everyone. The platforms mentioned in this article, such as Project Gutenberg, Open Library, Academia.edu, and Issuu, provide access to a vast collection of PDF files. However, users should always be cautious and verify the legality of the source before downloading Characterization Of A Wideband Digitizer For Power any PDF files. With these platforms, the world of PDF downloads is just a click away.

FAQs About Characterization Of A Wideband Digitizer For Power Books

What is a Characterization Of A Wideband Digitizer For Power PDF? A PDF (Portable Document Format) is a file format developed by Adobe that preserves the layout and formatting of a document, regardless of the software, hardware, or operating system used to view or print it. **How do I create a Characterization Of A Wideband Digitizer For Power PDF?** There are several ways to create a PDF: Use software like Adobe Acrobat, Microsoft Word, or Google Docs, which often have built-in PDF creation tools. Print to PDF: Many applications and operating systems have a "Print to PDF" option that allows you to save a document as a PDF file instead of printing it on paper. Online converters: There are various online tools that can convert different file types to PDF. **How do I edit a Characterization Of A Wideband Digitizer For Power PDF?** Editing a PDF can be done with software like Adobe Acrobat, which allows direct editing of text, images, and other elements within the PDF. Some free tools, like PDFescape or Smallpdf, also offer basic editing capabilities. **How do I convert a Characterization Of A Wideband Digitizer For Power PDF to another file format?** There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobats export feature to convert PDFs to formats like Word, Excel, JPEG, etc. Software like Adobe Acrobat, Microsoft Word, or other PDF editors may have options to export or save PDFs in different formats. **How do I password-protect a Characterization Of A Wideband Digitizer For Power PDF?** Most PDF editing software allows you to add password protection. In Adobe Acrobat, for instance, you can go to "File" -> "Properties" -> "Security" to set a password to restrict access or editing capabilities. Are there any free alternatives to Adobe Acrobat for working with PDFs? Yes, there are many free alternatives for working with PDFs, such as: LibreOffice: Offers PDF editing features. PDFsam: Allows splitting, merging, and editing PDFs. Foxit Reader: Provides basic PDF viewing and editing capabilities. How do I compress a PDF file? You can use online tools like Smallpdf, ILovePDF, or

desktop software like Adobe Acrobat to compress PDF files without significant quality loss. Compression reduces the file size, making it easier to share and download. Can I fill out forms in a PDF file? Yes, most PDF viewers/editors like Adobe Acrobat, Preview (on Mac), or various online tools allow you to fill out forms in PDF files by selecting text fields and entering information. Are there any restrictions when working with PDFs? Some PDFs might have restrictions set by their creator, such as password protection, editing restrictions, or print restrictions. Breaking these restrictions might require specific software or tools, which may or may not be legal depending on the circumstances and local laws.

Find Characterization Of A Wideband Digitizer For Power :

[routines ideas for creators 2-2165](#) [fitness routines ideas for small 2-2452](#) [sustainable living blueprint for startups 2-47](#) [sustainable living beginners for startups 2-2070](#) [machine learning basics guide USA 2-1009](#) [remote jobs checklist for creators 2-899](#) [remote jobs checklist for 2-589](#) [TikTok marketing strategies for startups 2-271](#) [TikTok marketing strategies America 2-2368](#) [credit score improvement strategies America creators 2-171](#) [online business comparison for entrepreneurs 2-392](#) [online United States 2-768](#) [Instagram growth tutorial for entrepreneurs 2-708](#) [creators 2-707](#) [online business checklist for entrepreneurs 2-993](#) [online small business 2-39](#) [startup funding explained United States 2-1419](#) [case study for entrepreneurs 2-2047](#) [sustainable living case study for study for entrepreneurs 2-1944](#) [interview tips checklist USA 2-1954](#)
growth guide USA 2-1410 **career growth ideas USA 2-2588** **career growth computing best practices USA 2-2638** **cloud computing best practices 2-864** [real estate investing best practices USA 2-2418](#) [real estate](#)

Characterization Of A Wideband Digitizer For Power :

Yookoso Answer Keys | PDF | Languages | Foods 7. b. Answer Key for Workbook/Laboratory Manual. PART TWO LISTENING COMPREHENSION ... Answer Key for Workbook/Laboratory Manual. CHAPTER 6 REVIEW A. and B ... Instructor's Manual Answer Key for Workbook/Laboratory Manual (193.0K) V. Testing Program (187.0 ... Chapter 7. Instructor Resources. Instructor's Manual. Choose a Chapter, Chapter ... Yookoso Workbook Answer Key - Fill Online, Printable ... Fill Yookoso

Workbook Answer Key, Edit online. Sign, fax and ... ANSWER KEY CHAPTER 7 Download : Books Workbook Answer Key Chapter 7 BOOKS WORKBOOK ANSWER. Yookoso Workbook Answers - Fill Online ... The purpose of Yookoso workbook answers is to provide guidance and assistance to students using the Yookoso! An Invitation to Contemporary Japanese textbook. japanese workbook answers - Answer Key for... View Lecture Slides - japanese workbook answers from JPS 101 at Syracuse University. Answer Key for Workbook/Laboratory Manual This is the answer key for ... Yookoso 1 Lab Manual Answer Key View Lab - Yookoso 1 Lab Manual Answer Key from JPN 1130 at University of Florida. Answer Key for Workbook/Laboratory Manual This is the answer key for the ... Get Yookoso Workbook Answer Key Complete Yookoso Workbook Answer Key online with US Legal Forms. Easily fill out PDF blank, edit, and sign them. Save or instantly send your ready ... Thoughts on the Yookoso series? : r/LearnJapanese The activities in the textbook have no answers and the workbook answers are only available in the teachers book. The textbook content itself is ... Instructor's Manual Yookoso! - Mheducation Chapter 7: Nature and Culture. 32. Answer Key for Student Edition Listening ... Answer Key to the Workbook/Laboratory Manual. 102. Do You Remember? 102. Meet Kaya: An American Girl (American Girl Collection) The American Girls Collection welcomes a new character: Kaya, a member of the Nez Perce tribe. Billed as the "first" American Girl, Kaya's story takes place in ... Meet Kaya: An American Girl (American Girl Collection) Reading age. 8 - 10 years · Book 1 of 6. American Girl · Print length. 70 pages · Language. English · Grade level. 3 - 4 · Dimensions. 6.25 x 0.5 x 8.75 inches. American Girl: Kaya Series by Janet Beeler Shaw Set in the Pacific Northwest, 1764, the series follows Kaya (short for Kaya'aton'my), a daring and adventurous Nimípuu (Nez Perce). American Girl series: Meet Kaya: An American Girl - by Janet Beeler Shaw Kaya dreams of racing her beautiful mare Steps High. Her father warns her that the horse isn't ready, but when a pesky boy insults Steps High, Kaya accepts ... American Girl: Kaya Book Series Authors: Janet Beeler Shaw, Emma Carlson Berne, Dottie Raymer. Related Series ... Meet Kaya - Book #1 of the American Girl: Kaya. Meet Kaya. Janet Beeler Shaw. Meet Kaya: An American Girl by Janet Beeler Shaw It's hard for Kaya not to boast about her beautiful, spirited Appaloosa mare, Steps High. Kaya wants to be one of the very best horsewomen in the village. Meet Kaya American Girl by Shaw Janet Meet Kaya: An American Girl (American Girl Collection) by Shaw, Janet Beeler and a great selection of related books, art and collectibles available now at ... Meet Kaya : An American Girl by Janet Beeler Shaw (2002, ... Product Information. Kaya dreams of racing her beautiful mare Steps High. Her father warns her that the horse isn't ready, but when a pesky boy insults ... Meet Kaya : An American Girl by Janet Beeler Shaw ... The American Girl Collection: Meet Kaya : An American Girl by Janet Beeler Shaw... ; Quantity. 1 available ; Item Number. 164610470906 ; Publisher. Turtleback. American Girl: Kaya Series in Order by Janet Beeler Shaw Kaya wants to be one of the very best horsewomen in the village. ... The first book in the American Girl: Kaya series, Meet Kaya, was published in September 2002. The Depression Cure: The 6-Step Program to Beat ... The Depression Cure: The 6-Step Program to Beat Depression without Drugs [Stephen S. Ilardi] on Amazon.com. *FREE*

shipping on qualifying offers. SAMHSA's National Helpline Jun 9, 2023 — Created for family members of people with alcohol abuse or drug abuse problems. Answers questions about substance abuse, its symptoms, different ... The Depression Cure by Stephen S. Ilardi, PhD Based on the highly effective, proven Therapeutic Lifestyle Change (TLC) program: a practical plan for natural ways to treat depression — without medication. Therapeutic Lifestyle Change (TLC): TLC Home Our research has demonstrated that TLC is an effective treatment for depression, with over 70% of patients experiencing a favorable response, as measured by ... The Depression Cure: The 6-Step Program to Beat ... Stephen Ilardi received his Ph.D. in clinical psychology from Duke University, and has spent the past two decades as an active researcher, university professor, ... The Depression Cure: The 6-Step Program to Beat ... Stephen Ilardi sheds light on our current predicament and reminds us that our bodies were never designed for the sleep-deprived, poorly nourished, frenzied pace ... Review of The depression cure: The 6-step program to ... by D Webster · 2010 — Reviews the book, The Depression Cure: The 6-Step Program to Beat Depression without Drugs by Stephen S. Ilardi (see record 2009-04238-000). The 6-Step Program to Beat Depression without Drugs The Depression Cure: The 6-Step Program to Beat Depression without Drugs - Kindle edition by Ilardi, Stephen S.. Download it once and read it on your Kindle ... How to beat depression - without drugs | Health & wellbeing Jul 19, 2010 — Dr Steve Ilardi is slim and enthusiastic, with intense eyes. The clinical psychologist is 4,400 miles away, in Kansas, and we are chatting ... 6 Steps to Beating Depression Many people struggling with depression feel stuck, unsure of what to do or how to move forward. Counseling, medication, and mental health programs are not.