

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Newport 4832-C* at our website: ***Click HERE***

4832-C Multi-Channel Optical Power Meter

Operator Manual

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Limited Warranty

Newport warrants that the products it manufactures and sells will be free from defects in materials and workmanship for a period of one year from the date of shipment. If any such product proves defective during the applicable warranty period, Newport, at its option, either will repair or replace the defective product with charge for parts or labor or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, the customer must notify Newport of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. In all cases the customer will be responsible for packaging and shipping the defective product back to the service center specified by Newport, with shipping charges prepaid. Newport shall pay for the return of the product to the customer if the shipment is within the continental United States; otherwise the customer shall be responsible for all shipping charges, insurance, duties, and taxes, if the product is returned to any other location.

This warranty shall not apply to any defect, failure, or damage caused by improper use or failure to observe proper operating procedures per the product specification or operators manual or improper or inadequate maintenance and care. Newport shall not be obligated to furnish service under this warranty 1) to repair damage resulting from attempts by personnel other than Newport's representatives to repair or service the product; 2) to repair damage resulting from improper use or connection to incompatible equipment; or 3) to repair damage resulting from operation outside of the operating or environmental specifications of the product.

NEWPORT'S LIABILITY FOR THE MERCHANTABILITY AND USE OF THE PRODUCT IS EXPRESSLY LIMITED TO ITS WARRANTY SET OUT ABOVE. THIS DISCLAIMER AND LIMITED WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL REPRESENTATIONS AND WARRANTIES EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, WHETHER ARISING FROM STATUTE, COMMON LAW, CUSTOM, OR OTHERWISE. THE REMEDY SET FORTH IN THIS DISCLAIMER AND WARRANTY SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE TO ANY PERSON. NEWPORT SHALL NOT BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT OR CAUSED BY THE DEFECT, FAILURE OR MALFUNCTION OF THIS PRODUCT, NOR ANY OTHER LOSSES OR INJURIES BASED ON WARRANTY, CONTRACT, NEGLIGENCE, OR OTHERWISE. BY ACCEPTING DELIVERY OF THIS PRODUCT, THE PURCHASER EXPRESSLY WAIVES ALL OTHER SUCH POSSIBLE WARRANTIES, LIABILITIES, AND REMEDIES. NEWPORT AND PURCHASER EXPRESSLY AGREE THAT THE SALE HEREUNDER IS FOR COMMERCIAL OR INDUSTRIAL USE ONLY AND NOT FOR CONSUMER USES AS DEFINED BY THE MANUSOM-MOSS WARRANTY ACT OR SIMILAR STATE CONSUMER WARRANTY ACT.

1996 Newport Corporation
Irvine, CA, USA
Part No. 21974-01, Rev A
IN-01961

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Newport®

EC DECLARATION OF CONFORMITY

MODEL 4832-C

We declare that the accompanying product, identified with the "CE" mark, meets the intent of the Electromagnetic Compatability Directive, 89/336/EEC and Low Voltage Directive 73/23/EEC.

Compliance was demonstrated to the following specifications:

EN50081-1 EMISSIONS:

Radiated and conducted emissions per EN55011, Group 1, Class A

EN50082-1 IMMUNITY:

Electrostatic Discharge per IEC 1000-4-2, severity level 3
Radiated Emission Immunity per IEC 1000-4-3, severity level 2
Fast Burst Transients per IEC 1000-4-4, severity level 3
Surge Immunity per IEC 1000 4-5, severity level 3

IEC SAFETY:

Safety requirements for electrical equipment specified in IEC 1010-1.

Alain Danielo

VP European Operations
Zone Industrielle
45340 Beaune-la-Rolande, France

Jeff Cannon

General Manager-Precision Systems
1791 Deere Avenue
Irvine, Ca. USA

BF-12951

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of Contents

Warranty ii

List of Figures v

List of Tables v

User and Instrument Safety vi

Section 1 — General Information 1

1.1 Introduction 1

1.2 System Overview 1

1.3 Available Options and Accessories 3

1.4 Specifications 3

1.4.1 Instrument Specifications 3

1.4.1.1 Physical Specifications 3

1.4.1.2 Electrical Specifications 4

1.4.1.3 Bandwidth Specifications 4

1.4.2 4832-C System Specifications 5

1.5 Maintenance 5

1.5.1 Cleaning Procedure 5

1.5.2 Recalibration Schedule 5

Section 2 — System Setup and Operation 7

2.1 Introduction 7

2.2 Unpacking and Inspection 7

2.3 Hardware Installation 7

2.3.1 Introduction 7

2.3.2 Setting the Base I/O Address 8

2.3.3 Setting the Interrupt 10

2.3.4 Installing the Plug-In Card 10

2.3.5 Connecting the Amplifier Box 10

2.3.6 Rack Mounting 10

2.3.7 Connecting the Detector(s) 10

2.4 Software Installation 12

2.4.1 Installing the DOS C Driver Software 12

2.4.2 Installing the Windows DLL Driver Software 12

2.4.3 Windows Terminal Emulator 13

2.4.4 Installing the LabVIEW Driver Software 13

2.4.5 Installing the Windows Executable 4832-C Virtual Instrument 13

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 3 — Computer Interfacing 15
3.1 Introduction 15
3.2 Software Driver Compatibility 15
3.3 Syntax Conventions 15
3.4 Function Prototypes for the C Language and Windows DLL 16
3.5 The C Language Parser Function 18
3.6 Making Fast A/D Acquisitions Using readRaw( ) and readRaw4( ) 19
3.7 Summary of Command/Query Set 20
3.8 GPIB-Type Command Description 22
3.9 SCPI-Type Command Description 45
Section 4 — LabVIEW Driver Library 47
4.1 Introduction 47
4.2 Driver Library Overview 47
4.3 Error Checking 48
4.4 Programming Precautions 49
4.5 LabVIEW Drivers for the 4832-C 50
4.5.1 A Generic Description of the 4832-C VIs 50
4.5.2 Description of the 4832-C Driver VIs 51
Section 5 — Factory Service 79
5.1 Introduction 79
5.2 Obtaining Service 79
Service Form 81
Appendix A: Performing Measurements 83
A.1 Introduction 83
A.2 Photodetector Considerations 83
A.2.1 Detector Calibration and Accuracy 83
A.2.2 Quantum Detector Temperature Effects 83
A.2.3 Ambient and Stray Light 84
A.3 Setting the Wavelength 84
A.4 Setting the Attenuator Mode 84
A.5 Performing Basic Measurements Using the Virtual Instrument 85
A.5.1 Power Measurements (W) 85
A.5.2 Logarithmic Power Measurements (dB and dBm) 86
A.5.2.1 Logarithmic Power Measurements Using Reference Powers (dB) 86
A.5.2.2 Logarithmic Power Measurements Using 1 mW Reference (dBm) 87
A.5.3 Relative Measurements 88
A.6 Common Measurement Errors 88

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix B: Helpful Hints **89**
B.1 Introduction 89
B.2 Variables that Affect the Acquisition Rate 89
B.2.1 Number of Active Channels: 89
B.2.2 Units of Measurement 89
B.2.3 Parser Function Call 89
B.2.4 Application Environment 90
B.3 Serial Interface Noise 90
B.4 White Noise on the Analog Output 90
B.5 Crosstalk Between Channels When One Channel Saturates 91
B.6 Ranging Times 91
Appendix C: Parser Errors **92**

List of Figures

1 – 4832-C Multi-Channel Power Meter Amplifier Box 1
2 – Base I/O Address Dip Switch Location on PC Plug-In Card 9
3 – Connecting a Detector with its Calibration Module 11
4 – Calibration Module Connector Port 11

List of Tables

1 – I/O Space in PC Compatible Computers 8
2 – Base Address Switch (SW2) Settings 9
3 – Command Summary Alphabetized by GPIB-Type Commands 20
4 – Command Summary Alphabetized by SCPI-Type Commands 45
5 – LabVIEW Driver Commands 51

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

User and Instrument Safety

Safety Nomenclature

The following safety terms are used in this manual:

The **WARNING** heading in this manual explains dangers that could result in personal injury or death.

The **CAUTION** heading in this manual explains hazards that could damage the instrument.

In addition, a **NOTES** heading gives information to the user that may be beneficial in the use of this instrument.

General Warnings and Cautions

The following general warning and cautions are applicable to this instrument:

WARNING

This instrument is intended for use by qualified personnel who recognize shock hazards and are familiar with safety precautions required to avoid possible injury. Read the instruction manual thoroughly before using, to become familiar with the instrument's operation and capabilities.

WARNING

The American National Safety Institute (ANSI) states that a shock hazard exists when probes or sensors are exposed to voltage levels greater than 42 VDC or 42 V peak AC. Do not exceed 42V between any portion of the Model 4832-C (or any attached detector) and earth ground, or a shock hazard will result.

CAUTION

There are no user serviceable parts inside the Model 4832-C amplifier box, or on the PC plug in card. Work performed by persons not authorized by Newport Corporation will void the warranty. For instructions on obtaining warranty repair or service please refer to section 5 of this manual.

CAUTION

Do not connect or disconnect the interface cable that connects the PC card with the amplifier box while the computer is on. It is possible to create a power surge, causing permanent damage to your computer.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1. General Information

1.1 Introduction

This section describes the features, options, accessories and specifications of the Model 4832-C Multi-Channel Optical Power Meter.

1.2 System Overview

Key Features

- Four channel, NIST traceable optical power measurements
- High speed data acquisition up to 4000 Hz for single channel with 12 bit resolution (using Microsoft C Library)
- 15 bit resolution at 15 Hz sampling rate
- Noise/bandwidth performance optimized for Newport's small and large area semiconductor detectors

The Model 4832-C Multi-Channel Optical Power Meter is a PC plug-in card based instrument designed to give high performance and throughput in multi-channel measurement applications using semiconductor detectors. A 4832-C Multi-Channel Optical Power Meter consists of the PC plug-in card, an interconnection cable, an amplifier box containing an amplifier for each channel and the analog to digital converters, and a detector with calibration module for each channel. The 4832-C amplifier box, shown in Figure 1 below, may be located as much as 30 feet from the PC, allowing the system's easy integration in manufacturing and assembly environments.

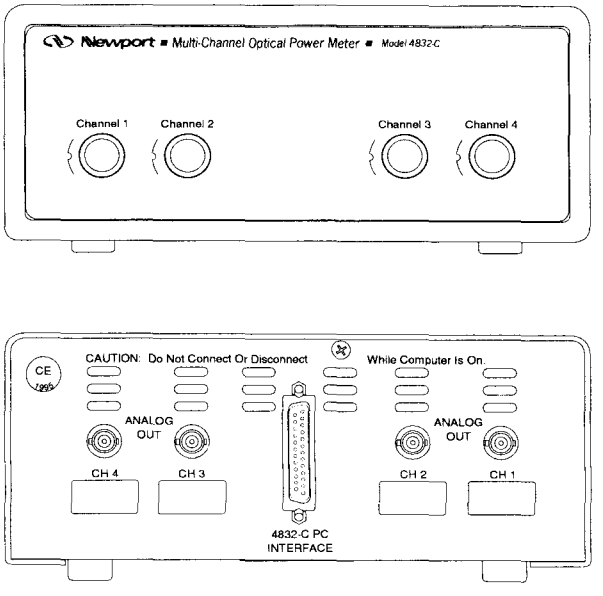


Figure 1. 4832-C Multi-Channel Power Meter Amplifier Box

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The Model 4832-C provides an exceptional combination of measurement accuracy and speed. This is accomplished by means of the unique distributed system architecture, which provides high speed communication with the PC backplane while protecting the sensitive analog measurements from the noisy PC environment. Dual A/D converters are provided so that measurements can be tailored to the speed and accuracy requirements of the application. A high performance processor on the PC plug-in card handles all of the instrument ranging and data acquisition overhead.

Measurement units of Watts, dBm, Amps, or direct A/D data may be selected. In alignment or scanning applications requiring high speed measurements, the direct A/D data and range information can be transferred directly to the PC, where further computations or conversion to dB or other units can be completed very quickly. System throughput is further optimized by using computers equipped with 486 or Pentium CPUs.

The 4832-C can be configured with one to a maximum of four channels, specified at time of purchase. Future channel expansions can be performed by Newport. The 4832-C is compatible with all of Newport's low power, 818 Series detectors. Each channel is optimized to the a specific detector, in order to maximize bandwidth and minimize noise.

Detectors connect to the 4832-C amplifier box through a calibration module, which plugs into the front of the amplifier box. The calibration module is factory programmed with responsivity data and other information which the system software can use to make accurate calibrated measurements. Calibration modules are ordered with the detectors at time of purchase and are labeled with the detector's model number and serial number. Detectors with calibration modules may be ordered by appending "/CM" to the detector model number.

EXAMPLE:	818-SL	(no calibration module)
	818-SL/CM	(with calibration module)

NOTE

Detectors without calibration modules are not compatible with the 4832-C. Using the incorrect calibration module will result in incorrectly calibrated readings. Always check to be sure that the detector and calibration module have the same serial number before using.

LabVIEW, DOS C, and Windows drivers are provided with the Model 4832-C. In addition, a executable virtual instrument is provided to allow the functions to be accessed from a convenient "front panel".

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.3 Available Options and Accessories

Model Number	Description
4832-SL	Preamplifier board for 818-UV/CM, 818-SL/CM, 818-F-SL, 818-ST/CM, 818-IG/CM, and 818-IS-1 detectors
4832-IR	Preamplifier board for 818-IR/CM and 818-F-IR detectors
4832-15	15 ft. cable assembly
4832-30	30 ft. cable assembly
4832-RACK	Rack mount kit (can be used to rack mount one or two 4832-C amplifier boxes)

1.4 Specifications

1.4.1 Instrument Specifications

1.4.1.1 Physical Specifications

Dimensions (W x H x D):	8.5 x 3.5 x 8.75 in (216 x 89 x 222 mm)	
Weight:	Amplifier Box PC Plug-in Board Cable, 15 foot	4 lb, 8 oz. (2.0 kg) 10 oz. (0.3 kg) 1 lb. 15 oz. (0.9 kg)
Enclosure:	Metal case, painted	
Connectors:	CAL MODULE Input Analog Output PC Interface	8-Pin Mini DIN BNC 25 Conductor, D-Type
Internal PC Interface:	16-bit ISA Bus	
Gain Ranges:	Up to 7 decades (Detector dependent)	
Operating Environment:	5°C to +40°C; < 80% RH noncondensing	
Storage Environment:	-20°C to +60°C; < 90% RH noncondensing	
Compatible Detectors:	Low-Power (Semiconductor) Family	

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.4.1.2 Electrical Specifications

Current Consumption from PC (Typical)	+5V:	1.0 A
	+12V:	125 mA
	–12V:	125 mA

Analog Output	
Full Scale Voltage:	0 – 2.5V into 1 M
Accuracy:	± 2.5%

Signal Range[1,2]	0	1	2	3	4	5	6
Full-Scale Current[3]	2.52 nA	25.2 nA	252 nA	2.52 µA	25.2 µA	252 µA	2.52 mA
A/D Resolution (12 Bit)	615 fA	6.15 pA	61.5 pA	615 pA	6.15 nA	61.5 nA	615 nA
A/D Resolution (15 Bit)	77 fA	0.77 pA	7.7 pA	77 pA	0.77 nA	7.7 nA	77 nA
Accuracy, Full-Scale[4] (Typical)	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Accuracy, Full-Scale[4] (Worst Case)	±0.6%	±0.4%	±0.4%	±0.4%	±0.4%	±0.4%	±0.4%
Ranging Time[5]	2 ms	2 ms	450 µs	200 µs	200 µs	200 µs	200 µs

Notes:
1. Listed signal ranges specify meter capability. Available signal ranges are detector dependent.
2. Maximum measurable signal is detector dependent. See detector saturation specifications in the Newport catalog.
3. Full scale current may vary due to auto-calibration compensation of DC offsets.
4. After 60 minute warm-up, followed by execution of the ***CAL?** or **CALCHAN_n?** command. See the description in the command section.
5. The ranging times specified refers to how long the 4832-C flags readings as being taken during a ranging condition. See the description for **RWS?** in the command section.

1.4.1.3 Bandwidth Specifications

Signal Range	0	1	2	3	4	5	6
System Analog Bandwidths (kHz, -3dB)							
818-UV/CM	0.4	0.4	1.8	7	16	25	30
818-SL/CM	0.7	0.7	3	12	31	100	65
818-F-SL/CM	0.7	0.7	3	9	26	70	115
818-IR/CM, 818-F-IR	N/A	N/A	1.5	4	16	55	160
818-IG/CM	0.6	0.6	3	11	38	140	280
818-ST/CM	0.6	0.6	3	9	22	72	110

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.4.2 4832-C System Specifications

Detector Model	818-UV/CM	818-SL/CM	818-F-SL	818-ST/CM	818-IR/CM 818-F-IR	818-IG/CM	818-IS-1
Detector material	Si	Si	Si	Si	Ge	InGaAs	Si/InGaAs
Diameter (cm)	1.13	1.13	0.3	1 × 1	0.3	0.3	NA
Wavelength Range (nm)	250-1100	400-1100	400-1100	400-1100	780-1800	800-1600	400-1600
Power range (dBm)	–83 to +23	–90 to +33	–90 to +3	–90 to +33	–70 to +33	–90 to +33	–70 to +23
Accuracy (%)[1] at λ (nm)	±2 270-1000	±2 400-1000	±2 400-1000	±2 400-1000	±3 780-1700	±3 800-1600	±2.5 400-1600
Linearity (%)	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5
NEP @ 1 Hz	4 pW/√Hz	2 pW/√Hz	150 fW/√Hz	100 fW/√Hz	4.5 pW/√Hz	300 fW/√Hz	10 pW/√Hz

Notes: 1 After 60 minute warm-up, followed by execution of the ***CAL?** or **CALCHAN_n?** command. See the description in the command section.

1.5 Maintenance

1.5.1 Cleaning Procedure

In cleaning this instrument, use only a mild soap and water solution on a damp cloth.

NOTE

Do not use acetone or other organic solvents (other than alcohol) on the Model 4832-C. Organic solvents attack the paint.

1.5.2 Recalibration Schedule

The 4832-C calibration accuracy is warranted for a period of 1 year. After 1 year, the meter should be returned to Newport Corporation for re-calibration and NIST traceability recertification. Newport detectors also require recalibration at one year intervals.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2. System Setup and Operation

2.1 Introduction

This section describes how to set up the Model 4832-C Multi-Channel Optical Power Meter with the host PC. It also describes the installation of the Windows executable 4832-C Virtual Instrument, which is an executable file that allows you to control the 4832-C by clicking on objects on the PC display in real time, much as you would use the front panel controls of a conventional power meter.

2.2 Unpacking and Inspection

All 4832-C meters are carefully assembled, tested and inspected before shipment. Upon receiving this instrument, check for any obvious signs of physical damage that may have occurred during shipment. Report any such damage to the shipping agent immediately. Be sure to keep the packing materials for the carrier's inspection. Also check to be sure that you have received the following:

1. This manual
2. PC plug-in card
3. Serial interface cable (15 or 30 feet, as ordered)
4. Amplifier box (One to four channels, installed and configured, as ordered)
5. Optical detectors, including manual and calibration data (as ordered)
6. Driver software. This software is contained on four 3.5" floppy disks in a pouch inside the manual and includes the following: Virtual Instruments for Windows, Terminal Emulator for Windows, Software Drivers and Utilities for DOS and Windows, and Instrument Drivers for LabVIEW 3.1.1 for Windows.

If you are missing any hardware, or have questions about what you have received, contact Newport. Please have your invoice number or PO number handy as a reference.

NOTE

Retain the original packing materials in case reshipment becomes necessary.

2.3 Hardware Installation

2.3.1 Introduction

The 4832-C communicates with the host PC by mapping itself into the host computer's I/O space. The base address, which can be set by means of a dipswitch on the plug-in card, is the first byte of an 8 byte contiguous block of addresses in the host PC I/O space. The host computer uses this block of addresses for all communication with the plug-in card. The 4832-C may not share I/O addresses with any other device. If you intend to install more than one 4832-C in your system, each plug-in card must have a unique address, and the addresses must be at least eight addresses apart. This section describes how to set the base address so that a conflict does not occur. The plug-in card should be properly configured before opening your PC or installing the card.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.3.2 Setting the Base I/O Address

Table 1 below shows how the I/O space in a PC compatible computer is generally allocated. Address blocks in bold can potentially be used for the plug-in card.

Base Addresses	Device	Base Addresses	Device
200-20F	Game I/O	**300-31F**	Prototype card
210-237	Not used	320-32F	XT hard disk
238-23F	Bus mouse	**330-377**	Not used
240-277	Not used	378-37F	Printer port 1
278-27F	Printer port 2	380-3AF	SDLC
280-2AF	Not used	3B0-3BF	Monochrome card/printer
2B0-2DF	EGA video	3C0-3CF	EGA
2E0-2E7	GPIB	3D0-3DF	CGA
2E8-2EF	Extra serial port	**3E0-3E7**	Not used
2F0-2F7	Not used	3E8-3EF	Extra serial port
2F8-2FF	Serial port 2	3F0-3F7	Disk drive controller
		3F8-3FF	Serial port 1

Table 1: I/O Space in PC Compatible Computers

A program has been provided to assist in verifying that an address block is not in use. To run the program from DOS, insert the disk labeled "Software Drivers and Utilities for DOS and Windows" in the a: (or b:) drive and type a:\util\addrchek (or b:\util\addrchek) and press enter. The program will check the default base address of 0x340, but the user can specify any base address by entering an address at the command line as a parameter (e.g. a:\util\addrchek 0x330). The program checks to see if any hardware responds at the address block given and will respond with at best a 90% probability that the address space is available.

NOTE:

This program should be run before the 4832-C plug-in card is installed since the program does not distinguish between the 4832-C and other hardware.

fax-222-6440

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The base I/O address for the plug-in card can be set by means of a dip switch on the plug-in card labeled SW2, as shown in Figure 2. Table 2 lists the switch settings that would be used for various recommended base addresses. The column headings give the switch positions and corresponding PC bus address lines. The body of the table gives the switch settings for each address. For each switch position, set the corresponding switch as shown on the silk-screen to the left of SW2: up for **0**, down for **1**.

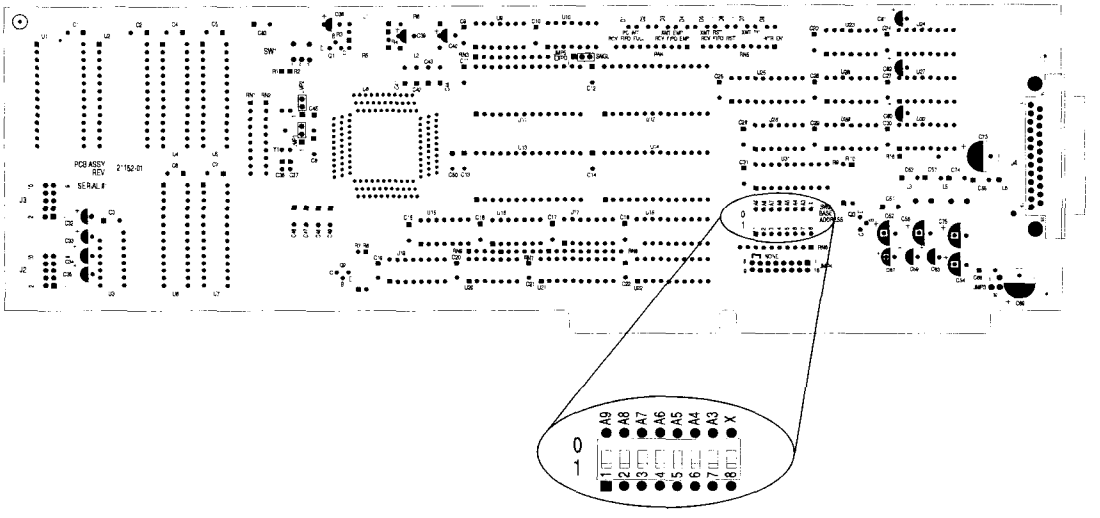


Figure 2. Base I/O Address Dip Switch Location on PC Plug-In Card

Base Address [hex]	1 (A9)	2 (A8)	3 (A7)	4 (A6)	5 (A5)	6 (A4)	7 (A3)
240	1	0	0	1	0	0	0
260	1	0	0	1	1	0	0
280	1	0	1	0	0	0	0
2A0	1	0	1	0	1	0	0
300	1	1	0	0	0	0	0
310	1	1	0	0	0	1	0
330	1	1	0	0	1	1	0
***340**	**1**	**1**	**0**	**1**	**0**	**0**	**0**

* Factory setting

Table 2: Base Address Switch (SW2) Settings

NOTE:

If the base address has been set to an address other than the default 0x340, newp4832.ini must be edited to reflect the correct address.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.3.3 Setting the Interrupt

The 4832-C has the hardware capability to interrupt the host processor to inform it that new data is ready. However at the time this manual was printed, the software implementation had not been completed. Therefore unless there is an update or additional instructions, it is recommended to leave the interrupts disabled. The 4832-C plug-in card is shipped with the interrupts disabled.

The initialization file **newp4832.ini**, on your driver diskette, sets by default the IRQ to zero, which specifies that the interrupts are not used.

2.3.4 Installing the Plug-In Card

1. Turn your computer off and open the cover. Keep the computer plugged in so that its chassis remains grounded.
2. Using static discharge precautions, insert the plug-in card in your PC using any open ISA slot. Do not use excessive force.
3. Screw the 4832-C plug-in card mounting bracket to the back panel of your computer.
4. Replace the cover on your computer. Do not turn the computer on yet. Proceed to the next section.

2.3.5 Connecting the Amplifier Box

The amplifier box should be connected to the plug-in card with the supplied cable. The supplied cable is a shielded twisted pair cable providing superior noise immunity. For this reason, standard cables should not be used.

CAUTION

Do not connect or disconnect the interface cable that connects the PC card with the amplifier box while the computer is on. It is possible to create a power surge, causing permanent damage to your computer.

2.3.6 Rack Mounting

The 4832-C may be rack mounted using a rack mount kit. This kit will accommodate one or two 4832-C amplifier boxes. The kit comes with detailed mounting instructions.

2.3.7 Connecting the Detector(s)

The 4832-C is compatible with any of Newport's low power series detectors. For maximum performance, amplifiers are matched to the characteristics of individual detector types. For this reason, detectors should only be used with amplifiers tuned for them. The back panel of the amplifier box is labeled with the correct detector types for each amplifier card. Also, detectors should be used with the correct calibration module, or calibration errors will result. Each calibration module and detector is serialized. Make sure that the serial number on the detector matches the serial number on the calibration module before using. To connect the detector to the amplifier box, first attach the correct calibration module to the BNC connector on the detector cable as shown in Figure 3. Then insert the calibration module into the front of the amplifier box as shown in Figure 4.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NOTE

Some Newport detectors do not have a BNC connection between the detector cable and the calibration module. In this case the calibration module is integrated into the DIN connector that plugs into the amplifier box.

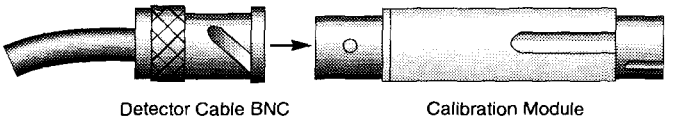


Figure 3. Connecting a Detector with its Calibration Module

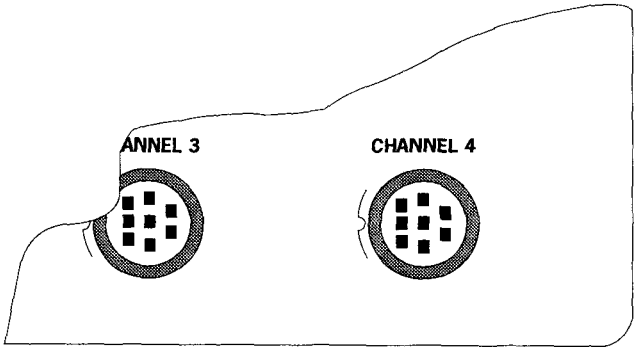


Figure 4. Calibration Module Connector Port

NOTE

The detector responsivity data contained in the calibration module is not continuously updated. Therefore, when you change the detector and calibration module attached to a 4832-C measurement channel, you must execute *RST, *CAL?, CALCHAN_n?, or INITCHAN_n? to direct the instrument to read the new calibration data from the calibration module. See the descriptions of the above commands in Section 3 for SCPI and LabVIEW equivalents.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.4 Software Installation

2.4.1 Installing the DOS C Driver Software

The "Software Drivers and Utilities for DOS and Windows" disk includes a number of files that have to be installed in your DOS C development environment. In the following description, we will assume a thorough knowledge of the C language.

The following files must either be installed in your working directory, or your paths must be set up properly:

1) **NP4832S.LIB, NP4832M.LIB, NP4832L.LIB**

   NP4832x.LIB is the C library in which the functions parse4832( ), readRaw( ), and readRaw4( ) reside.

   NP4832S.LIB is the library that was compiled in the small memory model, similarly NP4832M.LIB and NP4832L.LIB were compiled in the medium and large memory models, respectively.

   Copy the appropriate library file into your C language development environment path or specify some other path in your .MAK file.

2) **LIB4832.H**

   This is the declaration file that contains function prototypes and various pre-defined constants that must be included in your application program. Remember to specify the preprocessor *#include "lib4832.h"* directive and copy the file to the proper path.

3) **NEWP4832.INI**

   This .INI file contains the ISA bus base address, and the IRQ line for your 4832-C plug-in board. NEWP4832.INI must also be in your path, otherwise the initialization program will try to create one for you interactively from the DOS screen.

2.4.2 Installing the Windows DLL Driver Software

Two files are found on the "4832-C Software Drivers and Utilities for DOS and Windows" disk under the Windows directory:

1) **NP4832.DLL**

   This Dynamic Link Library contains functions necessary to communicate to the 4832-C board from a Windows environment. It is recommended that these reside in either the \Windows or \Windows\System directory.

2) **NP4832.LIB**

   This file is an import library made from NP4832.dll. An import library contains information that Windows uses to locate code in a dynamic-link library. The library included here is to ease your linking tasks. Link this library to your 'C' project the way you would any other library. You will then have easy access to all the functions that are a part of NP4832.dll.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.4.3 Windows Terminal Emulator

Included on the "4832-C Terminal Emulator for Windows" disk is a simple Windows terminal emulator. This program allows you to converse with the 4832-C board from a Windows environment. Installation of this program is the same as most typical Windows program installations. From the program manager choose FILE then RUN. Type a:\setup (or b:\setup). The installation disk will setup your Windows environment, create a program group and an icon. *It is important that before you attempt to install the Terminal Emulator that you close any other Windows programs that may be running.*

2.4.4 Installing the LabVIEW Driver Software

Find the disk labeled 4832-C LabVIEW Driver and install it into your 3.5" floppy drive. From the a: (or b:) DOS prompt run the installation program called INSTALL.BAT. This batch file will first create a "C:\4832-C.LLB" directory and then copy and inflate the self extracting file into this directory. The resulting file is the 4832-C LabVIEW library (.llb) that can stay in this directory, or if you choose you can move it to your working LabVIEW directory.

2.4.5 Installing the Windows Executable 4832-C Virtual Instrument

Find the disk labeled 4832-C Virtual Instrument and install it into your 3.5" floppy drive. From the a: (or b:) DOS prompt run the installation program called INSTALL.BAT. This batch file will first create a "C:\4832-C.vi" directory and then copy the appropriate files into this directory. The two resulting files are the Windows executable virtual instrument and a LabVIEW DLL which must stay in the directory with the virtual instrument file.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3. Computer Interfacing

3.1 Introduction

Although the 4832-C interfaces directly with the host computer through the PC ISA bus, its command set mimics that of Newport's GPIB compatible optical power meters, e.g., the 2832-C. In addition, the 4832-C supports SCPI (Standard Commands for Programmable Instruments) standard commands that are consistent with other optical power meters on the market. The programmer has the option of using the GPIB-type or the SCPI-type commands separately or commingled. Most programmers will, however, choose to use the command set with which they are more familiar.

Even though the 4832-C supports a subset of the GPIB commands from other Newport power meters and from the SCPI standard, it cannot completely comply to either GPIB or SCPI because of the status reporting system requirements of the IEEE 488.

3.2 Software Driver Compatibility

The DOS based C language drivers are available for Microsoft and Borland in the small, medium, and large memory models. The model size is designated by an S, M, or L at the end of the .LIB's file name. For example, NP4832M.LIB is the library for the medium model.

NOTE

The DOS C driver libraries are compatible with Microsoft C 6.0 and above, and with Borland C 3.0 and above.

A DLL and an import library can be found on the driver diskette for Windows 3.x and Windows 95 applications.

3.3 Syntax Conventions

The syntax for the command section in this manual will use the following notation:

<....> The characters inside the angled brackets represent the type of data that the commands require. These characters can also represent the return type of a response.

NOTE: Do not type the actual brackets with the command.

value — This is a numeric data type in form of either an integer or floating point number. The proper value type is explained for each command and query.

boolean — As a parameter for a command, this boolean may be either the integers 0, 1, or the ASCII character words OFF, ON (case insensitive).

As the response to a query, this boolean will be either the integers 0 or 1.

wsp — This stands for "white space" and can be a space or a tab.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

[....] These square brackets mean that the data inside is optional information that can be included in the command or query. In the case of a response, this data may optionally be returned and is usually dependent on the system configuration.

| This vertical bar stands for the EITHER-OR function. For example, [1|2|3|4] means 1 or 2 or 3 or 4, and not any two or more of the four choices simultaneously.

3.4 Function Prototypes for the C Language and Windows DLL

There are five functions that are available to the DOS C language and Windows DLL programmer. See the following two sections and the samples on the distribution diskette for additional explanation of these functions.

1) init4832()

Description: **This function must be called first** before any other function calls to the 4832-C. It reads the initialization file NEWP4832.INI and sets all the necessary global parameters which are required for the other functions to work.

Prototype: **int init4832(char *, 0);**

Return: **int**

This function returns an integer and will equal FAIL=0 if something went wrong during the initialization sequence. If the initialization was unsuccessful, the probability is high that the meter will not correctly communicate with the PC.

Arguments:

1) char *

This should point to the file name of the executable that calls this function. For example, if CONV4832.EXE calls this function at the beginning of the program, the function call should look like this:

if (init4832(argv[0], 0) == 0) return;

where argv[0] is defined in the main function **main(int argc, char *argv[ ])**.

2) 0

This parameter was implemented for debugging purposes during development and should have a zero passed into it. Anything except a zero will activate the debugging mode and will result in actions that are not documented in this manual.

2) parse4832()

Description: This function is the call to the 4832-C parser that supports all the GPIB-type and SCPI-type commands. Not used in Windows DLL.

Prototype: **int parse4832(char *line);**

Return: **int**

This function returns an integer that represents the error code. The same error code can also be found in the global variable **errorCode4832**. See the section in the appendix that lists the possible error codes.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Arguments: **char *line**

This points to the command string which may consist simply of a string of commands enclosed in double quotes. See the section which describes the parser function for more details.

3) readRaw()

Description: This function takes a reading of one channel in units of raw A/D counts.

Prototype: **char *readRaw(unsigned int baseAddr, unsigned char channel, char useStatus)**

Return: **char***

This function returns a pointer to a string which represents the reading.

Arguments:

1) **unsigned int baseAddr**

   This unsigned integer represents the base address of the 4832-C that will be communicated with.

2) **unsigned char channel**

   This unsigned character represents the detector channel number that will queried.

3) **char useStatus**

   This character enables or disables the use of the status information for the reading.

   A zero passed into this argument disables the use of the status.

   A one passed into this argument enables the use of the status.

4) readRaw4()

Description: This function takes a reading of all four channels in units of raw A/D counts.

Prototype: **char *readRaw4(unsigned int baseAddr, char useStatus)**

Return: **char***

This function returns a pointer to a string which represents the reading of all four channels.

Arguments:

1) **unsigned int baseAddr**

   This unsigned integer represents the base address of the 4832-C that will be communicated with.

2) **char useStatus**

   This character enables or disables the use of the status information for the reading.

A zero passed into this argument disables the use of the status.

A one passed into this argument enables the use of the status.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5) Command4832()

Description: This function is the call to the 4832-C parser that supports all the GPIB-Type and SCPI-Type commands. The function is used for Windows DLL only. The syntax is identical to the DOS function **parse4832()** described above. For an example on using this function, see the Terminal Emulator on the disk provided.

Prototype: int Command4832(char *Command, char *Response)

Return: **int**

This function returns 0 or error code

Arguments: **1.) char *Command**

Pointer to a string containing the command to send to the 4832-C board

2.) char *Response

Pointer to a string containing the response returned by the 4832-C board. If no response is available the string contains NULL.

3.5 The C Language Parser Function

The 4832-C parser function, **parse4832()**, translates the commands that are sent to it and then performs the appropriate actions, one command at a time. When multiple commands and/or queries are sent to the parser in a single command line (semicolon delimited), the parser performs the following tasks in sequential order:

1. The first command/query is parsed and sent to the 4832-C.
2. If the command was a query, the parser waits for the response and then writes this response to the global variable **returnString4832**, which is in string format.
3. Subsequent commands/queries are parsed one at a time and their responses, if any, are appended to **returnString4832**, semicolon delimited.

The parse4832( ) function not only writes responses to the global variable **returnString4832,** but also sets another global variable called **errorCode4832. errorCode4832** is in integer format and represents any error that may have occurred during the parsing or execution sequence. See the appendix for a description of the possible errors.

Example: parse4832("auto_1 0;auto_2?;r_1?;r_2?")

Description: **parse4832()** is the call to the 4832-C parser. The argument is a string in double quote format with the commands separated by semicolons. In this example, the I/O base address defaults to [Board1] in the NEWP4832.INI file because no address is specified inside the quotation marks. The function itself returns an integer which signifies the error code. This same error code can also be found in the global variable **errorCode4832**.

auto_1 0 is a command that will not assert a response and is executed as soon as the parser receives it.

auto_2? is a query, designated by the question mark, and will return a response to the global variable **returnString4832**.

r_1? and **r_2?** are also queries that append the readings from channels one and two to **returnString4832**.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The response, **returnString4832,** from the above command line will have the following format with the individual responses semicolon delimited as shown below:

1;5.0000E-012;9.0000E-6

The programmer should check **errorCode4832** or the integer returned by parse4832( ) for any errors.

When calling the parser, the base address can optionally be included at the beginning of the string, separated from the command string by a comma.

Example: parse4832("0x340,auto_1 0;auto_2?;r_1?;r_2?")

In addition, if you have more than one 4832-C PC plug-in board in the system, the parser will use the address of the board that was last addressed. It is necessary however to include the comma preceding the command string, otherwise the parser will default to the address of [Board 1] in the NEWP4832.INI file.

Assuming [Board1] is at address 0x340 and [Board2] is at address 0x350, the following example will demonstrate this point. Noting the sequence of commands is critical in this demonstration.

Example:	parse4832("attn_1?")	This line addresses [Board1]
	parse4832("0x350,attn_1?")	This line addresses [Board2]
	parse4832(",attn_1?")	This line addresses [Board2]
	parse4832("attn_1?")	This line addresses [Board1]
	parse4832(",attn_1?")	This line addresses [Board1]

3.6 Making Fast A/D Acquisitions Using readRaw() and readRaw4()

Sending commands through the **parse4832()** parser is a relatively time consuming process. In order to achieve the maximum throughput of the 4832-C, we recommend using the direct function call to **readRaw()** for a single channel acquisition, or **readRaw4()** for a four channel acquisition. These two functions return a pointer to a character string which is the raw A/D data that can be used for relative or absolute measurements. Additionally the functions can also return the status of the reading identical to the format of the **RWS?** query.

The format of the readings returned by **readRaw()** is analogous to the format of **R_n?** and **RWS_n?** and is dependent on whether the status information is enabled or not. The following example will demonstrate this:

1234E5 equivalent to **R_n?**

0,1234E5 equivalent to **RWS_n?**

where 1234 is the Raw A/D Counts, and the 5 is the range.

The zero (0) before the comma in the second format is the status of the reading.

Similarly the format of the readings returned by **readRaw4()** is analogous to the format of **R?** and **RWS?** and is dependent on whether the status information is enabled or not. The following example will demonstrate this:

1234E5,1234E5,1234E5,1234E5 equivalent to **R_n?**

0,1234E5,0,1234E5,0,1234E5,0,1234E5 equivalent to **RWS_n?**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

When using the 12-bit A/D the full scale count equals 4095; and when using the 15-bit A/D, the full scale count equals 32,767.

To obtain an absolute reading from the raw data in units of amperes, the following equations should be used:

For the 12-bit A/D:

$$amp = (\text{Raw A/D Counts} / 4096) \times 10^{range} \times 2.5253E\text{-}09$$

For the 15-bit A/D:

$$amp = (\text{Raw A/D Counts} / 32768) \times 10^{range} \times 2.5253E\text{-}09$$

Raw A/D data can also be acquired using the **parse4832()** parser by sending the command **units_1 raw** and then taking readings by sending **r_1?**. But because the parser is being used when sending the query **r_1?**, there will be a speed reduction in the acquisition rate. In general, querying a reading through the parser can take up to twice as long as obtaining the raw data reading directly from the **readRaw()** function.

3.7 Summary of Command/Query Set

Table 3 below is a summary of the command set for the 4832-C. Notice that there are two columns of commands: GPIB-type commands and SCPI-type commands. Any one of the two commands will perform the same 4832-C operation.

The GPIB-type and SCPI-type commands are accessible by calling the parse4832( ) function in C and in the DLLs.

Table 3 - Command Summary Alphabetized by GPIB-Type Commands

GPIB-Type Commands	SCPI-Type Commands	Description
*CAL?	*CAL?	Calibration Query (4 channel)
*IDN?	*IDN?	Identification Query
*RST	*RST	Software Reset
*TST?	*TST?	System Test
*WAI	*WAI	Wait To Continue
ATTN_n<wsp><boolean>	INPut[1|2|3|4]:ATTenuation:STATe<wsp><boolean>	Attenuator Calibration Data Enable
ATTN_n?	INPut[1|2|3|4]:ATTenuation:STATe?	Attenuator Calibration Data Enable Query
ATTNSN_n?	INPut[1|2|3|4]:ATTenuation:SNUM?	Attenuator Serial Number Query
AUTO_n<wsp><boolean>	SENSe[1|2|3|4]:POWer:RANGe:AUTO<wsp><boolean>	Auto Ranging Enable
AUTO_n?	SENSe[1|2|3|4]:POWer:RANGe:AUTO?	Auto Ranging Enable Query
CALCHAN_n?	SENSe[1|2|3|4]:CORRection:COLLect:ZERO?	Calibrate Channel Query
CALDATE_n?	CALibration:DETector[1|2|3|4]:DATE?	Detector Calibration Date Query
CH?	INSTrument:CATalog?	Available Channel Query
DETMODEL_n?	INSTrument:DETector[1|2|3|4]:MODEL?	Detector Mode Query
DETSN_n?	INSTrument:DETector[1|2|3|4]:SNUM?	Detector Serial Number Query
FILTER_n<wsp><boolean>	SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]<wsp><boolean>	Filter Select

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

GPIB-Type Commands	SCPI-Type Commands	Description
FILTER_n?	SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]?	Filter Query
INITCHAN_n?	CALibration:DETector[1|2|3|4]:RESET?	Initializes the Channel
LAMBDA_n<wsp><value>	SENSe[1|2|3|4]:POWer: WAVElength<wsp><value>	Lambda Select
LAMBDA_n?	SENSe[1|2|3|4]:POWer:WAVElength?	Lambda Query
R?	READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)	Read Four Channels Query
R_n?	READ[1|2|3|4][:SCALar]:POWer[:DC]?	Read Single Channel Query
RANGE_n<wsp><value>	SENSe[1|2|3|4]:POWer[:DC]:RANGe [:UPPER]<wsp><value>	Manual Range Level Select
RANGE_n?	SENSe[1|2|3|4]:POWer[:DC]: RANGe[:UPPER]?	Manual Range Level Query
RESP_n?	CALibration:DETector [1|2|3|4]:RESPonsivity?	Responsivity Query
RUN	INITiate:CONTinuous<wsp>1(@1:4)	Start Four Channel Acquisition
RUN_n	INITiate[1|2|3|4]:CONTinuous<wsp>1	Start Single Channel Acquisition
RWS?	None	Read Four Channels with Status Query
RWS_n?	None	Read Single Channel with Status Query
SPREC<wsp><value>	SENSe[1|2|3|4]:POWer[:DC]: RESolution<wsp><value>	DC Sample Type Select
SPREC?	SENSe[1|2|3|4]:POWer[:DC]:RESolution?	DC Sample Type Query
STOP	INITiate:CONTinuous<wsp>0(@1:4)	Stop Four Channel Acquisition
STOP_n	INITiate[1|2|3|4]:CONTinuous<wsp>0	Stop Single Channel Acquisition
STOZERO_n	SENSe[1|2|3|4]:POWer[:DC]:REFerence	Store Zero Signal
UNITS_n<wsp><units>	SENSe[1|2|3|4]:POWer:UNIT<wsp><unit>	Units Select
UNITS_n?	SENSe[1|2|3|4]:POWer:UNIT?	Units Query
USRCAL_n<wsp><boolean>	CALibration:DETector[1|2|3|4]: USER:STATe<wsp><boolean>	User Calibration Enable
USRCAL_n?	CALibration:DETector [1|2|3|4]:USER:STATe?	User Calibration Enable Query
USRRESP_n<wsp><value>	CALibration:DETector[1|2|3|4]: USER:RESPonsivity<wsp><value>	User Responsivity Factor Select
USRRESP_n?	CALibration:DETector[1|2|3|4]:USER: RESPonsivity?	User Responsivity Factor Query
ZERO_n<wsp><boolean>	SENSe[1|2|3|4]:POWer[:DC]:REFerence: STATe<wsp><boolean>	Signal Zeroing Enable
ZERO_n?	SENSe[1|2|3|4]:POWer[:DC]: REFerence:STATe?	Signal Zeroing Enable Query
ZEROVAL_n?	SENSe[1|2|3|4]:POWer[:DC]: REFerence?<wsp>TOREF|2	Zero Signal Query

Note: n represents channels 1 - 4, or equivalently channels A - D.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.8 GPIB-Type Command Description

*CAL? Calibration Query

Syntax:	*CAL?
Parameters:	None
Description:	This routine performs an auto-calibration sequence on all channels. The auto-calibration sequence measures the amplifier offsets at all gain settings. These measurements are then stored and automatically subtracted from subsequent measurements. Acquisition is suspended during auto-calibration and no other commands will be processed until the auto-calibration sequence is complete. This command will not reinitialize any channel to its default parameters.
Returns:	<value>,<value>,<value>,<value> When the auto-calibration process is complete, a <value> is generated by all four channels indicating the status of each channel. <value> is bit mapped as follows: bit 0: channel registers, 0 = OK, 1 = failed bit 1: calibration module, 0 = OK, 1 = bad or missing bit 2: calibration module, 0 = OK, 1 = checksum error bit 3: calibration module, 0 = OK, 1 = wrong detector family
Related Commands:	CALCHAN_n?, INITCHAN_n?, *RST
SCPI Equivalent:	*CAL?
LabVIEW Comparable:	4832-C Channel Calibration.vi (This LabVIEW VI affects only one channel)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

*IDN? Identification Query

Syntax:	*IDN?
Parameters:	None
Description:	This query causes the 4832-C to return device identification information. The information returned is the manufacturer, the model, and the firmware version and date.
Returns:	<manufacturer>,<model>,<firmware version>,<firmware date> <manufacturer> is of type <string> using the no quotes format. The 4832-C always returns **NewportCorp**. <model> is of type <string> using the no quotes format. The 4832-C always returns **4832-C**. < firmware version > is of type <string> using the no quotes format. This text identifies the internal firmware version of the 4832-C. < firmware date > is of type <string> using the no quotes format. This text identifies the internal firmware revision date. Example: **NewportCorp,4832-C,1.4,062496**
Related Commands:	None
SCPI Equivalent:	*IDN?
LabVIEW Comparable:	4832-C Identify (*IDN?).vi

*RST Reset

Syntax:	*RST
Parameters:	None
Description:	This command sets the meter to the default configuration on all available channels and is detector dependent. The meter first reads the calibration module and then also performs an auto-calibration on all available channels.
Returns:	None
Related Commands:	*CAL?, *CALCHAN_n, INITCHAN_n?
SCPI Equivalent:	*RST
LabVIEW Comparable:	4832-C Reset.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

*TST? Self Test Query

Syntax: *TST?

Parameters: None

Description: As defined in the IEEE 488.2 standard, the ***TST?** command causes the device to return a result of a self-test, indicating whether or not the unit completed the self-test without any errors. The self test is only administered upon a reset or power up. The query does not initiate the self test and returns a bit mapped number which indicates the system status as specified below.

Returns: <value>

<value> is bit mapped as follows:

bit 0:	main registers,	0 = OK,	1 = failed
bit 1:	integrating A/D,	0 = OK,	1 = failed
bit 2:	successive approx A/D,	0 = OK,	1 = failed

Related Commands: None

SCPI Equivalent: *TST?

LabVIEW Comparable: 4832-C System Status?.vi

*WAI Wait to continue

Syntax: *WAI

Parameters: None

Description: The *WAI command causes the meter not to process any further commands until all active channels are done ranging or until the function times out in 15 seconds.

The ***WAI** command can only be canceled by a hard PC reset.

Related Commands: None

SCPI Equivalent: *WAI

LabVIEW Comparable: None

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ATTN_n Attenuator Calibration Data Enable

Syntax:	ATTN_n<wsp><boolean>
	where n is 1 - 4, or A - D
Parameters:	The parameter <boolean> is either 0 or 1.
<boolean> = 0	Detector responsivity data is used to calculate readings.
<boolean> = 1	Detector + attenuator responsivity data is used to calculate readings.
Description:	This command enables or disables the use of attenuator responsivity data. When enabled, the responsivity data collected with the attenuator attached to the detector is used when returning readings of watts and dBm. If disabled, responsivity data collected with the detector alone is used when returning readings of watts and dBm. This command will not be accepted if the detector's calibration module does not have attenuator data. This mode cannot be enabled if the user calibration mode is already enabled.
Related Commands:	ATTN_n?, ATTNSN_n?, LAMBDA_n, LAMBDA_n?, RESP_n?, USRCAL_n, USRCAL_n?, USRRESP_n, USRRESP_n?
SCPI Equivalent:	INPut[1|2|3|4]:ATTenuation:STATe<wsp><boolean>
LabVIEW Comparable:	4832-C Attenuator State.vi

ATTN_n? Attenuator Calibration Data Enable Query

Syntax:	ATTN_n?
	where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns a value showing whether or not the attenuator responsivity data will be used when calculating readings of watts and dBm. When the user calibration mode is enabled, this query will always return a 0.
Returns:	<boolean>
	<boolean> is a <value> which can be 0 or 1.
	0 = attenuator calibration data is disabled
	1 = attenuator calibration data is enabled.
Related Commands:	ATTN_n, ATTNSN_n?, LAMBDA_n, LAMBDA_n?, RESP_n?, USRCAL_n, USRCAL_n?, USRRESP_n, USRRESP_n?
SCPI Equivalent:	INPut[1|2|3|4]:ATTenuation:STATe?
LabVIEW Comparable:	4832-C Attenuator State?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ATTNSN_n? Attenuator Serial Number Query

Syntax:	ATTNSN_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the serial number of the attenuator that was calibrated with the attached detector. When using an attenuator, this serial number must match the serial number of the attenuator being used or readings in watts and dBm will be inaccurate. The attenuator usually has the same serial number as the detector.
Returns:	<attnSN> <attnSN> is of type <string> in the double quote format. If no attenuator serial number is available, the query returns an empty string.
Related Commands:	CALDATE_n?, DETMODEL_n?, DETSN_n?
SCPI Equivalent:	INPut[1|2|3|4]:ATTenuation:SNUM?
LabVIEW Comparable:	4832-C Attenuator Serial Number?.vi

AUTO_n Auto Ranging Enable

Syntax:	AUTO_n<wsp><boolean> where n is 1 - 4, or A - D
Parameters:	The parameter <boolean> is either 0 or 1.
<boolean> = 0	Manual ranging is enabled.
<boolean> = 1	Auto-ranging is enabled.
Description:	This command enables or disables auto ranging. When enabled, a signal range is automatically selected by the 4832-C to best suit the input signal. If disabled, the meter needs to be manually ranged.
Related Commands:	AUTO_n?, RANGE_n, RANGE_n?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer:RANGe:AUTO<wsp><boolean>
LabVIEW Comparable:	4832-C Auto-Ranging State.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

AUTO_n? Auto Ranging Enable Query

Syntax:	AUTO_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns a value showing whether the auto ranging feature is enabled or disabled.
Returns:	<boolean> <boolean> is a <value> which can be 0 or 1. 0 = auto-ranging is disabled 1 = auto-ranging is enabled.
Related Commands:	AUTO_n, RANGE_n, RANGE_n?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer:RANGe:AUTO?
LabVIEW Comparable:	4832-C Auto-Ranging State?.vi

CALCHAN_n? Calibrate Channel

Syntax:	CALCHAN_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This routine performs an auto-calibration sequence on the specified channel. The calibration sequence measures the amplifier offsets at all gain settings. These measurements are stored and subtracted from subsequent measurements. Acquisition is suspended during auto calibration and no other remote commands will be processed until the auto calibration sequence is complete.
Returns:	<value> <value> is generated when the auto-calibration is complete and is bit mapped as follows: bit 0: channel registers, 0 = OK, 1 = failed bit 1: calibration module, 0 = OK, 1 = bad or missing bit 2: calibration module, 0 = OK, 1 = checksum error bit 3: calibration module, 0 = OK, 1 = wrong detector family
Related Commands:	*CAL?, *RST, INITCHAN_n?
SCPI Equivalent:	SENSe[1|2|3|4]:CORRection:COLLect:ZERO SENSe[1|2|3|4]:CORRection:COLLect:ZERO?
LabVIEW Comparable:	4832-C Channel Calibration.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CALDATE_n? Calibration Date Query

Syntax:	CALDATE_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the calibration date of the detector as read from the calibration module attached to the specified channel of the 4832-C.
Returns:	<date> <date> is of type <string> in the double quote format.
Related Commands:	ATTNSN_n?, DETMODEL_n?, DETSN_n?
SCPI Equivalent:	CALibration:DETector[1|2|3|4]:DATE?
LabVIEW Comparable:	4832-C Detector Cal Date?.vi

CH? Available Channel Query

Syntax:	CH?
Parameters:	None
Description:	This query is used to see which channels are available to the meter. A channel is available if a calibration module was plugged into that channel on power-up and passed the self test.
Returns:	<channels> <channels> is of type <string> in the double quote format. The possible values of <string> are: "1" - only channel 1 is available "2" - only channel 2 is available, etc. "1234" - Channels 1 through 4 are available
Related Commands:	None
SCPI Equivalent:	INSTrument:CATalog?
LabVIEW Comparable:	4832-C Channel Status?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

DETMODEL_n? Detector Model Query

Syntax:	DETMODEL_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the model number of the detector that belongs to the calibration module attached to the specified channel.
Returns:	<model> <model> is of type <string> in the double quote format.
Related Commands:	ATTNSN_n?, CALDATE_n?, DETSN_n?
SCPI Equivalent:	INSTrument:DETector[1|2|3|4]:MODEL?
LabVIEW Comparable:	4832-C Detector Model?.vi

DETSN_n? Detector Serial Number Query

Syntax:	DETSN_n? where n is 1 - 4, or A - D
Parameter:	None
Description:	This query returns the serial number of the detector that belongs to the calibration module attached to the specified channel. This serial number must match the serial number of the detector attached to the 4832-C for the readings to be accurate.
Returns:	<detSN> <detSN> is of type <string> in the double quote format.
Related Commands:	ATTNSN_n?, CALDATE_n?
SCPI Equivalent:	INSTrument:DETector[1|2|3|4]:SNUM?
LabVIEW Comparable:	4832-C Detector Serial Number?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

FILTER_n 5 Hz Filter Select

Syntax:	FILTER_n<wsp><boolean>
	where n is 1 - 4, or A - D
Parameters:	The parameter <boolean> is an integer of 0 or 1.
<boolean> = 0	5Hz low pass analog filter is disabled.
<boolean> = 1	5Hz low pass analog filter is enabled.
Description:	This command selects a 5Hz analog filter to be used to condition readings taken from the detector. All detector signals are filtered to some extent even without the 5Hz analog filter feature. By enabling the 5Hz analog filter the signal is further filtered by a 5Hz low pass instead of the standard filter which is gain dependent.
Related Commands:	FILTER_n?
SCPI Equivalent:	SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]<wsp><boolean>
LabVIEW Comparable:	4832-C 5Hz Filter State.vi

FILTER_n? Filter Query

Syntax:	FILTER_n?
	where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the state of the 5Hz low pass filter for the specified channel.
Returns:	<boolean>
	<boolean> is a <value> which can be 0 or 1.
	0 = 5Hz analog low pass filter is disabled
	1 = 5Hz analog low pass filter is enabled.
Related Commands:	FILTER_n
SCPI Equivalent:	SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]?
LabVIEW Comparable:	4832-C 5Hz Filter State?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

INITCHAN_n? Initialize Channel

Syntax: INITCHAN_n?

where n is 1 - 4, or A - D

Parameters: None

Description: This command causes the 4832-C to reinitialize the specified channel. The process includes reading the calibration module, setting all parameters to default, and then performing an auto-calibration.

Returns: <value>

<value> is generated when the auto-calibration is complete and is bit mapped as follows:

bit 0: channel registers, 0 = OK, 1 = failed
bit 1: calibration module, 0 = OK, 1 = bad or missing
bit 2: calibration module, 0 = OK, 1 = checksum error
bit 3: calibration module, 0 = OK, 1 = wrong detector family

Related Commands: *CAL?, CALCHAN_n?, *RST

SCPI Equivalent: CALibration:DETector[1|2|3|4]:RESET?

LabVIEW Comparable: 4832-C Channel Initialization.vi

LAMBDA_n Lambda Select

Syntax: LAMBDA_n<wsp><wavelength>

where n is 1 - 4, or A - D

Parameters: The parameter <wavelength> is of type <value> which rounds to an integer with a range that depends on the detector being used. The units of <wavelength> is nanometers and should correspond to the wavelength of the light source being measured.

Description: This command is used to specify the wavelength of light being measured. This will insure that the proper responsivity calibration point will be used when the 4832-C calculates measurement values.

Related Commands: ATTN_n, ATTN_n?, LAMBDA_n?, RESP_n?, USRCAL_n, USRCAL_n?, USRRESP_n, USRRESP_n?

SCPI Equivalent: SENSe[1|2|3|4]:POWer:WAVElength<wsp><value>

LabVIEW Comparable: 4832-C Wavelength Set.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

LAMBDA_n? Lambda Query

Syntax:	LAMBDA_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the wavelength that corresponds to the responsivity calibration point currently being used by the 4832-C in measurement calculation.
Returns:	<wavelength> <wavelength> is of type <value> and represents an integer. The units of <wavelength> is nanometers.
Related Commands:	ATTN_n, ATTN_n?, LAMBDA_n, RESP_n?, USRCAL_n, USRCAL_n?, USRRESP_n, USRRESP_n?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer:WAVElength?
LabVIEW Comparable:	4832-C Wavelength?.vi

R? Read All Four Channels Measurement Query

Syntax:	R?
Parameters:	None
Description:	This query returns the last valid measurements taken from all four channels, whether active or not. A valid reading is a reading that would return a status of 0 when using the **RWS?** query. See the description for **RWS?**. If a reading does not qualify as a valid reading or if the channel is not active, the response to this query will be 0.0000E+0. The units of the measurements are the units defined for the specified channel.
Returns:	<value>,<value>,<value>,<value> The format of <value> is UNITS dependent and takes on the following formats:
Amps and Watts:	Exponential format, e.g. 12345E-06
dBm:	Fixed point format, e.g. 12.345
RAW:	Integer format mixed with exponential power, e.g. 1234E5. See the description for **UNITS_n** for an explanation of raw data.
Related Commands:	R_n?, RWS?, RWS_n?, UNITS_n, UNITS_n?
SCPI Equivalent:	READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)
LabVIEW Comparable:	4832-C Read Amps? (4Chan).vi 4832-C Read dBm? (4Chan).vi 4832-C Read RawData? (4Chan).vi 4832-C Read Watts? (4Chan).vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

R_n? Read Single Channel Measurement Query

Syntax:	R_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the last valid measurement taken from the specified channel, whether active or not. A valid reading is a reading that would return a status of 0 when using the **RWS?** query. See the description for **RWS?**. If a reading does not qualify as a valid reading or if the channel is not active, the response to this query will be 0.0000E+0. The units of the measurements are the units defined for the specified channel.
Returns:	<value> The format of <value> is UNITS dependent and takes on the following formats:
Amps and Watts:	Exponential format, e.g. 12345E-06
dBm:	Fixed point format, e.g. 12.345
RAW:	Integer format mixed with exponential power, e.g. 1234E5. See the description for **UNITS_n** for an explanation of raw data.
Related Commands:	R?, RWS?, RWS_n?, UNITS_n, UNITS_n?
SCPI Equivalent:	READ[1|2|3|4][:SCALar]:POWer[:DC]?
LabVIEW Comparable:	4832-C Read Amps?.vi 4832-C Read dBm?.vi 4832-C Read RawData?.vi 4832-C Read Watts?.vi

RANGE_n Signal Range Select

Syntax:	RANGE_n<wsp><range> where n is 1 - 4, or A - D
Parameters:	The parameter <range> is of type <value>. The ranges available are detector dependent. Most detectors allow signal ranges 0 through 6, but the 818-IR and 818-F-IR allow only signal ranges 2 through 6.
Description:	This command is used to select a manual signal range. Sending this command will also disable the auto ranging mode. See the section entitled "Electrical Specifications" at the beginning of this manual for the signal range specification that corresponds to <range>.
Related Commands:	AUTO_n, AUTO_n?, RANGE_n?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:RANGe[:UPPER]<wsp><value>
LabVIEW Comparable:	4832-C Range Set.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

RANGE_n? Signal Range Query

Syntax:	RANGE_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns a value that represents the present signal range setting being used whether the meter is auto ranging or in manual ranging mode.
Returns:	<range> <range> is of type <value> and represents the gain level currently being used for either auto or manual ranging. See the section entitled "Electrical Specifications" at the beginning of this manual for the signal range specification that corresponds to <range>.
Related Commands:	AUTO_n, AUTO_n?, RANGE_n
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:RANGe[:UPPER]?
LabVIEW Comparable:	4832-C Range?.vi

RESP_n? Responsivity Query

Syntax:	RESP_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the responsivity value currently being used by the 4832-C in measurement calculation.
Returns:	<value> <value> represents a floating point number. The units of the responsivity <value> is amps/watt.
Related Commands:	ATTN_n, ATTN_n?, LAMBDA_n, LAMBDA_n?, USRCAL_n, USRCAL_n?, USRRESP_n, USRRESP_n?
SCPI Equivalent:	CALibration:DETector[1|2|3|4]:RESPonsivity?
LabVIEW Comparable:	4832-C Responsivity?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

RUN Start Acquisition on All Four Channels

Syntax:	RUN
Parameters:	None
Description:	This command initiates data acquisition on all channels that are available. Because the 4832-C operates only in a continuous acquisition mode, this command will initiate the continuous acquisition of readings on all available channels. The **STOP** command will terminate acquisition.
Related Commands:	RUN_n, STOP, STOP_n
SCPI Equivalent:	INITiate:CONTinuous<wsp>1(@1:4)
LabVIEW Comparable:	4832-C Acquisition Run/Stop.vi (This LabVIEW VI affects only one channel)

RUN_n Start Acquisition on Single Channel

Syntax:	RUN_n where n is 1 - 4, or A - D
Parameters:	None
Description:	This command initiates data acquisition on the specified channel. Because the 4832-C operates only in a continuous acquisition mode, this command will initiate the continuous acquisition of readings on the specified channel. The **STOP** command will terminate acquisition.
Related Commands:	RUN, STOP, STOP_n
SCPI Equivalent:	INITiate[1|2|3|4]:CONTinuous<wsp>1
LabVIEW Comparable:	4832-C Acquisition Run/Stop.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

RWS? Read Four Channel Measurements With Status Query

Syntax:	RWS?
Parameters:	None
Description:	This query returns the last measurements taken from all four channels, whether active or not. If a channel is not active, it will return a response of 4,0.0000E+0. The units of the measurements are the units defined individually for each channel.
Returns:	<status>,<value>,<status>,<value>,<status>,<value>,
	<status>,<value>
	<status> is an integer that represents the status of the returned value and is defined as follows:
	0 = OK
	1 = over range
	2 = saturated (Note: Saturation bit is not valid in raw data mode.)
	3 = ranging
	4 = channel not available
	5 = suspended
	The format of <value> is UNITS dependent and takes on the following formats:
Amps and Watts:	Exponential format, e.g. 12345E-06
dBm:	Fixed point format, e.g. 12.345
RAW:	Integer format mixed with exponential power, e.g. 1234E5. See the description for **UNITS_n** for an explanation of raw data.
Related Commands:	R?, R_n?, RWS_n?
SCPI Equivalent:	None
LabVIEW Comparable:	4832-C Read Amps? (4Chan).vi
	4832-C Read dBm? (4Chan).vi
	4832-C Read RawData? (4Chan).vi
	4832-C Read Watts? (4Chan).vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

RWS_n? Read Single Channel Measurement With Status Query

Syntax:	RWS_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the last measurement taken from the specified channel, whether active or not. If a channel is not active, it will return a response of 4,0.0000E+0. The units of the measurements are the units defined individually for each channel.
Returns:	<status>,<value> <status> is an integer that represents the status of the returned value and is defined as follows: 0 = OK 1 = over range 2 = saturated (Note: Saturation bit is not valid in raw data mode.) 3 = ranging 4 = channel not available 5 = suspended The format of <value> is UNITS dependent and takes on the following formats:
Amps and Watts:	Exponential format, e.g. 12345E-06
dBm:	Fixed point format, e.g. 12.345
RAW:	Integer format mixed with exponential power, e.g. 1234E5. See the description for **UNITS_n** for an explanation of raw data.
Related Commands:	R?, R_n?, RWS?, UNITS_n, UNITS_n?
SCPI Equivalent:	None
LabVIEW Comparable:	4832-C Read Amps?.vi 4832-C Read dBm?.vi 4832-C Read RawData?.vi 4832-C Read Watts?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SPREC Sample Precision Select

Syntax:	SPREC<wsp><prec>
Parameters:	The parameter <prec> is of type <value> with acceptable values of 4096 or 32768.
<value> = 4096	Specifies the use of the 12-bit A/D.
<value> = 32768	Specifies the use of the 15-bit A/D.
Description:	The 4832-C has a 32,768 count (15-bit) high precision integrating A/D and a 4,096 count (12-bit) successive approximation A/D. This command determines which of these A/Ds will be used for all four channels to acquire readings. This command affects the A/D sampling frequencies. When the 32,768 count integrating A/D is used, the acquisition rate is 15 Hz under most conditions. When the 4,096 count successive approximation A/D is used, the acquisition rate is a function of the number of channels that are being measured and the units of measurement.
Related Commands:	SPREC?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:RESolution<wsp><value>
LabVIEW Comparable:	4832-C Sample Precision Set.vi

SPREC? Sample Precision Query

Syntax:	SPREC?
Parameters:	None
Description:	This query returns a string that indicates whether the 32,768 count (15-bit) integrating A/D or the 4,096 count (12-bit) successive approximation A/D will be used for acquisitions on all available channels.
Returns:	<prec> <prec> is of type <value>. It is 32,768 if the 32,768 count (15-bit) integrating A/D is selected, and 4096 if the 4,096 count (12-bit) successive approximation A/D is selected.
Related Commands:	SPREC
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:RESolution?
LabVIEW Comparable:	4832-C Sample Precision?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

STOP Stop Acquisition on All Four Channels

Syntax:	STOP
Parameters:	None
Description:	This command terminates any acquisition of readings currently in progress on all four channels. If data is not being acquired on a channel then this command has no effect.
Related Commands:	RUN, RUN_n, STOP_n
SCPI Equivalent:	INITiate:CONTinuous<wsp>0(@1:4)
LabVIEW Comparable:	4832-C Acquisition Run/Stop.vi (This LabVIEW VI affects only one channel)

STOP_n Stop Acquisition on Single Channel

Syntax:	STOP_n where n is 1 - 4, or A - D
Parameters:	None
Description:	This command terminates any acquisition of readings currently in progress on the specified channel. If data is not being acquired on that channel the command has no effect.
Related Commands:	RUN, RUN_n, STOP
SCPI Equivalent:	INITiate[1|2|3|4]:CONTinuous<wsp>0
LabVIEW Comparable:	4832-C Acquisition Run/Stop.vi

STOZERO_n Store Zero Signal

Syntax:	STOZERO_n where n is 1 - 4, or A - D
Parameters:	None
Description:	This command takes the last reading and stores it as a zero reference value to be used when the zero mode is enabled. The units of the zero reference defaults to amperes. When the zero mode is enabled, the meter uses the following equation in calculating the reading: Resultant Reading = (Measurement - Zero Reference) where Zero Reference is the last measurement taken before the **STOZERO_n** command is sent.
Related Commands:	ZERO_n, ZERO_n?, ZEROVAL_n?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:REFerence
LabVIEW Comparable:	4832-C Zero Reference Set.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

UNITS_n Units Select

Syntax: UNITS_n<wsp><units>

where n is 1 - 4, or A - D

Parameters: <units> is of type <string>. All possible values of units are listed below:

"A" specifies amps

"W" specifies watts

"dBm" specifies dBm

"RAW" specifies raw A/D data

Description: Sets the units to be used for subsequent measurements. Once the units have been set for the specified channel, all new readings are given in the new units.

Use the "RAW" units to acquire data at the fastest possible rate while using the parser. See the section entitled **Making Fast Raw A/D Data Acquisitions** for details on how to make direct function calls to increase the data acquisition rate even more.

When "RAW" units is used, the data is in the form of raw A/D counts followed by an "E", and then the range. For example, 1234E5, where 1234 represents the raw reading in A/D counts and the 5 represents the range.

When using the 12-bit A/D the full scale A/D count equals 4095. When using the 15-bit A/D the full scale A/D count equals 32,767.

To obtain an absolute reading in units of amperes from the raw data, the following equations should be used:

For the 12-bit A/D:

$amp = (\text{Raw A/D Counts} / 4096) \times 10^{range} \times 2.5253E\text{-}09$

For the 15-bit A/D:

$amp = (\text{Raw A/D Counts} / 32768) \times 10^{range} \times 2.5253E\text{-}09$

For example when the 12-bit A/D is used, a reading of 1234E5 represents:

$amp = (1234 / 4096) \times 10^{5} \times 2.5253E\text{-}09 = 76.08E\text{-}6\ A$

Related Commands: UNITS_n?

SCPI Equivalent: SENSe[1|2|3|4]:POWer:UNIT<wsp><unit>

LabVIEW Comparable: Use the 4832-C Read VIs in the appropriate units.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

UNITS_n? Units Query

Syntax:	UNITS_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the units of readings currently being taken.
Returns:	<units> <units> is of type <string> in the double quote format. The possible values of units are: "A", "W", "dBm", or "RAW".
Related Commands:	UNITS_n
SCPI Equivalent:	SENSe[1|2|3|4]:POWer:UNIT?
LabVIEW Comparable:	None

USRCAL_n User Calibration Enable

Syntax:	USRCAL_n<wsp><boolean> where n is 1 - 4, or A - D
Parameters:	The parameter <boolean> is a <value> which can be 0 or 1.
<boolean> = 0	User calibration is disabled and the meter uses the calibration factor from the calibration module for calculating the readings in units of watts and dBm.
<boolean> = 1	User calibration is enabled and the meter uses the calibration factor determined by the **USRRESP_n** command.
Description:	This command enables or disables the use of a user defined calibration factor. If the mode is disabled, the meter uses the calibration factor from the calibration module for calculating the readings in units of watts and dBm. If the mode is enabled, the meter uses the calibration factor determined by **USRRESP_n**.
Related Commands:	ATTN_n, ATTN_n?, LAMBDA_n, LAMBDA_n?, RESP_n?, USRCAL_n?, USRRESP_n, USRRESP_n?
SCPI Equivalent:	CALibration:DETector[1|2|3|4]:USER:STATe<wsp><boolean>
LabVIEW Comparable:	4832-C Responsivity Source Set.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

USRCAL_n? User Calibration Enable Query

Syntax:	USRCAL_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns a value showing whether or not user calibration mode is enabled or disabled.
Returns:	<boolean> <boolean> is a <value> which can be 0 or 1. 0 = user calibration is disabled 1 = user calibration is enabled.
Related Commands:	ATTN_n, ATTN_n?, LAMBDA_n, LAMBDA_n?, RESP_n?, USRCAL_n, USRRESP_n, USRRESP_n?
SCPI Equivalent:	CALibration:DETector[1|2|3|4]:USER:STATe?
LabVIEW Comparable:	4832-C Responsivity Source?.vi

USRRESP_n User Responsivity Factor Select

Syntax:	USRRESP_n<wsp><value> where n is 1 - 4, or A - D
Parameters:	The parameter <value> has units of amps\watts.
Description:	This command is used to define the responsivity factor that will be used by the 4832-C in making measurement calculations in units of watts and dBm. This factor is used only when the user calibration mode is enabled by running the **USRCAL_n** command.
Related Commands:	ATTN_n, ATTN_n?, LAMBDA_n, LAMBDA_n?, RESP_n?, USRCAL_n, USRCAL_n?, USRRESP_n?
SCPI Equivalent:	CALibration:DETector[1|2|3|4]:USER:RESPonsivity <wsp><boolean>
LabVIEW Comparable:	4832-C User Responsivity Set.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

USRRESP_n? User Responsivity Factor Query

Syntax:	USRRESP_n? where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the user defined responsivity factor that will be used by the 4832-C in measurement calculation when the user calibration mode is enabled.
Returns:	<value> <value> represents a floating point number. The units of <value> match the responsivity units of detector in use.
Related Commands:	ATTN_n, ATTN_n?, LAMBDA_n, LAMBDA_n?, RESP_n?, USRCAL_n, USRCAL_n?, USRRESP_n
SCPI Equivalent:	CALibration:DETector[1|2|3|4]:USER:RESPonsivity?
LabVIEW Comparable:	4832-C User Responsivity?.vi

ZERO_n Signal Zeroing Enable

Syntax:	ZERO_n<wsp><boolean> where n is 1 - 4, or A - D
Parameters:	The parameter <boolean> is a <value> which can be 0 or 1.
<boolean> = 0	Readings are not adjusted by the stored zero reference.
<boolean> = 1	Readings are adjusted by the stored zero reference.
Description:	This command enables or disables the zero mode. Zeroing causes the stored zero reference (see **STOZERO_n** command) to be subtracted from incoming signal measurements before the meter returns a reading. When the zero mode is enabled, the meter uses the following equation in calculating the reading: Resultant Reading = (Measurement - Zero Reference) where Zero Reference is the last measurement taken before the **STOZERO_n** command is sent.
Related Commands:	STOZERO_n, ZERO_n?, ZEROVAL_n
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:REFerence:STATe <wsp><boolean>
LabVIEW Comparable:	4832-C Zero State.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ZERO_n? Signal Zeroing Enable Query

Syntax:	ZERO_n?
	where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns a value showing whether the zero mode is enabled or disabled.
Returns:	<boolean>
	<boolean> is a <value> which can be 0 or 1.
<boolean> = 0	ZERO mode is disabled.
<boolean> = 1	ZERO mode is enabled.
Related Commands:	STOZERO_n, ZERO_n, ZEROVAL_n
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:REFerence:STATe?
LabVIEW Comparable:	4832-C Zero State?.vi

ZEROVAL_n? Zero Signal Query

Syntax:	ZEROVAL_n?
	where n is 1 - 4, or A - D
Parameters:	None
Description:	This query returns the current value being used for zeroing when the zero mode is enabled. When the zero mode is enabled, the meter uses the following equation in calculating the reading:
	Resultant Reading = (Measurement - Zero Reference)
	where Zero Reference is the last measurement taken before the **STOZERO_n** command is sent.
Returns:	<zeroval>
	<zeroval> is of type <value> in exponential notation. The units of this value are in amperes.
Related Commands:	STOZERO_n, ZERO_n, ZERO_n?
SCPI Equivalent:	SENSe[1|2|3|4]:POWer[:DC]:REFerence?<wsp>TOREF|2
LabVIEW Comparable:	4832-C Zero Reference?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.9 SCPI-Type Command Description

The first column in Table 4 below is an alphabetized listing of the SCPI-Type commands. For an explanation of the commands, see the detailed description for the equivalent GPIB-Type commands which can be found in the previous section.

Table 4 - Command Summary Alphabetized by SCPI-Type Commands

SCPI-Type Commands	GPIB-Type Commands	Description
*CAL?	*CAL?	Calibration Query (4 channel)
*IDN?	*IDN?	Identification Query
*RST	*RST	Software Reset
*TST?	*TST?	System Test
*WAI	*WAI	Wait To Continue
CALibration:DETector[1|2|3|4]:DATE?	CALDATE_n?	Detector Calibration Date Query
CALibration:DETector[1|2|3|4]:RESET?	INITCHAN_n?	Initializes the Channel
CALibration:DETector[1|2|3|4]: RESPonsivity?	RESP_n?	Responsivity Query
CALibration:DETector[1|2|3|4]:USER: RESPonsivity<wsp><value>	USRRESP_n<wsp><value>	User Responsivity Factor Select
CALibration:DETector[1|2|3|4]:USER: RESPonsivity?	USRRESP_n?	User Responsivity Factor Query
CALibration:DETector[1|2|3|4]: USER:STATe<wsp><boolean>	USRCAL_n<wsp><boolean>	User Calibration Enable
CALibration:DETector[1|2|3|4]: USER:STATe?	USRCAL_n?	User Calibration Enable Query
INITiate:CONTinuous<wsp>0(@1:4)	STOP	Stop Four Channel Acquisition
INITiate:CONTinuous<wsp>1(@1:4)	RUN	Start Four Channel Acquisition
INITiate[1|2|3|4]:CONTinuous<wsp>0	STOP_n	Stop Single Channel Acquisition
INITiate[1|2|3|4]:CONTinuous<wsp>1	RUN_n	Start Single Channel Acquisition
INPut[1|2|3|4]:ATTenuation:SNUM?	ATTNSN_n?	Attenuator Serial Number Query
INPut[1|2|3|4]:ATTenuation: STATe<wsp><boolean>	ATTN_n<wsp><boolean>	Attenuator Calibration Data Enable
INPut[1|2|3|4]:ATTenuation:STATe?	ATTN_n?	Attenuator Calibration Data Enable Query
INSTrument:CATalog?	CH?	Available Channel Query
INSTrument:DETector[1|2|3|4]:MODEL?	DETMODEL_n?	Detector Mode Query
INSTrument:DETector[1|2|3|4]:SNUM?	DETSN_n?	Detector Serial Number Query
None	RWS?	Read Four Channels with Status Query
None	RWS_n?	Read Single Channel with Status Query
READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)	R?	Read Four Channels Query
READ[1|2|3|4][:SCALar]:POWer[:DC]?	R_n?	Read Single Channel Query
SENSe[1|2|3|4]:CORRection:COLLect:ZERO?	CALCHAN_n?	Calibrate Channel Query
SENSe[1|2|3|4]:FILTer[:LPASs] [:STATe]<wsp><boolean>	FILTER_n<wsp><boolean>	Filter Select
SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]?	FILTER_n?	Filter Query

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SCPI-Type Commands	GPIB-Type Commands	Description
SENSe[1|2|3|4]:POWer:RANGe: AUTO<wsp><boolean>	AUTO_n<wsp><boolean>	Auto Ranging Enable
SENSe[1|2|3|4]:POWer:RANGe:AUTO?	AUTO_n?	Auto Ranging Enable Query
SENSe[1|2|3|4]:POWer:UNIT<wsp><unit>	UNITS_n<wsp><units>	Units Select
SENSe[1|2|3|4]:POWer:UNIT?	UNITS_n?	Units Query
SENSe[1|2|3|4]:POWer: WAVElength<wsp><value>	LAMBDA_n<wsp><value>	Lambda Select
SENSe[1|2|3|4]:POWer:WAVElength?	LAMBDA_n?	Lambda Query
SENSe[1|2|3|4]:POWer[:DC]:RANGe [:UPPER]<wsp><value>	RANGE_n<wsp><value>	Manual Range Level Select
SENSe[1|2|3|4]:POWer[:DC]:RANGe [:UPPER]?	RANGE_n?	Manual Range Level Query
SENSe[1|2|3|4]:POWer[:DC]:REFerence	STOZERO_n	Store Zero Signal
SENSe[1|2|3|4]:POWer[:DC]:REFerence: STATe<wsp><boolean>	ZERO_n<wsp><boolean>	Signal Zeroing Enable
SENSe[1|2|3|4]:POWer[:DC]: REFerence:STATe?	ZERO_n?	Signal Zeroing Enable Query
SENSe[1|2|3|4]:POWer[:DC]:REFerence? <wsp>TOREF|2	ZEROVAL_n?	Zero Signal Query
SENSe[1|2|3|4]:POWer[:DC]: RESolution<wsp><value>	SPREC<wsp><value>	DC Sample Type Select
SENSe[1|2|3|4]:POWer[:DC]:RESolution?	SPREC?	DC Sample Type Query

Note: n represents channels 1 - 4, or equivalently channels A - D.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4. LabVIEW Driver Library

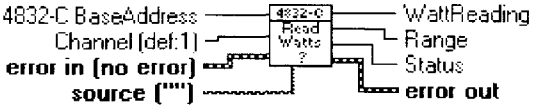
4.1 Introduction

The 4832-C LabVIEW Driver Library contains VIs for communicating with the 4832-C Multi-Channel Optical Power Meter in your LabVIEW applications. Included on a separate diskette is the 4832-C Virtual Instrument which may be used as a virtual front panel to take readings and to control the 4832-C. drv.llb

4.2 Driver Library Overview

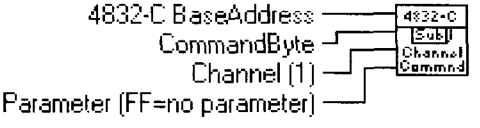
The 4832-C Driver Library consists of two types of VIs:

The first type of VI is saved in the top level of the 4832-C.llb library. These VIs are the actual driver VIs which you will use in your LabVIEW programs for communicating with the 4832-C. They have the general appearance as shown below for the 4832-C Read in Watts?.vi. The 4832-C base address is always in the upper left corner and is set at the factory default, hex 340. The error in, error out, and source are always on the bottom of the connector pane as shown below. For channel dependent commands, you must provide a channel number between 1 and 4, with the default being channel 1. All VIs that send and then read the response to a query terminate with a question mark (?) in their VI names and have a question mark on their connector pane icon.



4832-C Read Watts?.vi

The second type of VI in the library is considered a sub-VI for the above described driver VIs and operate on a more machine level with the 4832-C. They have the general appearance of the 4832-C Write Chan Command.vi as shown below. You will probably not use these VIs on a general basis, but they are available for the user who wants to write custom driver VIs.



4832-C Write Chan Command.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

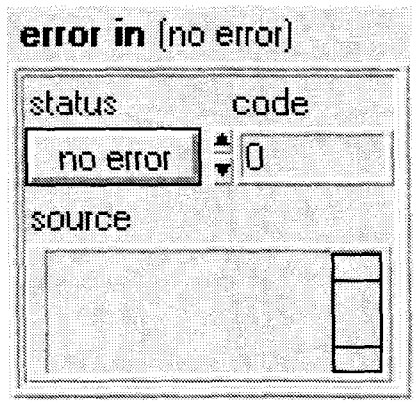
4.3 Error Checking

Most VIs in the library have error checking which determines whether a time-out occurred when reading the response to a query, or when the response exceeded a maximum number of bytes. Most VIs in the library will not execute any code if the status boolean in the "error in" cluster is true (error exists). The error checking scheme is similar to that of the VISA standard that was developed by LabVIEW for GPIB instrumentation. Below is a picture of the "error in" cluster provided by LabVIEW which consists of three members:

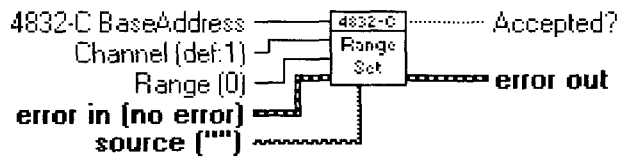
status - a boolean TRUE state indicates that an error has occurred

code - a number that designates the actual error that occurred

source - a string that identifies the VI in which the error occurred.



In addition to the error checking described above, most VIs that send a command to control a 4832-C parameter will first send the command and then subsequently query that parameter and check if the response equals the command. An example of this is the 4832-C Range Set.vi shown below.



4832-C Range Set.vi

A situation when the output boolean Accepted? becomes useful is the following scenario:

You are using an 818-IR detector which does not support signal ranges 0 and 1 because it has such a small shunt resistance. A Range 0 command is sent to that detector, but since the 4832-C will not accept that range, the output boolean Accepted? will be set FALSE. However this situation will NOT set an error in the error out cluster and it is the programmer's responsibility to check Accepted? if necessary.

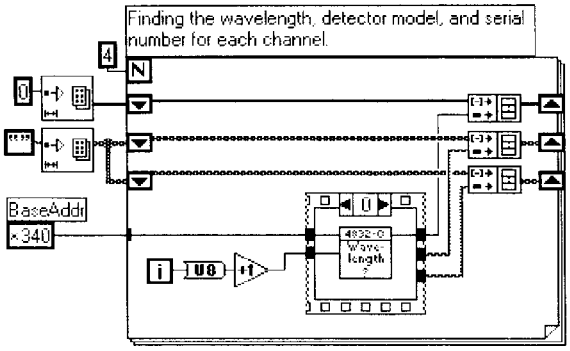
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.4 Programming Precautions

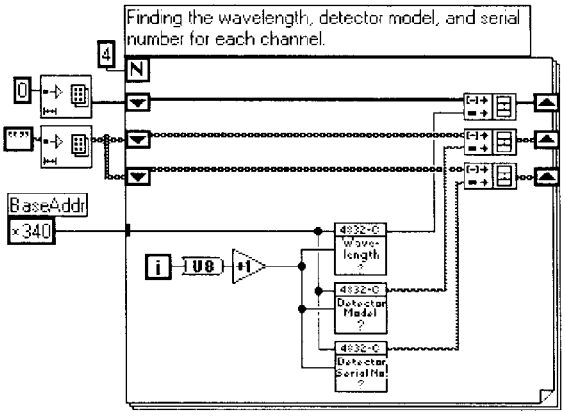
Care must be taken when using the 4832-C drivers, due to the way LabVIEW operates in a parallel processing/data flow architecture. It is possible for LabVIEW to start executing a second sub-VI before finishing the one it is presently executing. Therefore it is good practice to put the VIs in a sequence structure to avoid conflicts between two VIs.

Below are two examples of how to query, in a FOR-LOOP, the wavelength, detector model, and the serial number for all four channels. The first method is the correct method because the 4832-C sub-VIs are in a sequence structure and are guaranteed to finish executing before the next VI starts. The second method is not recommended and will intermittently give bad responses because there is no guarantee that one VI will finish executing before another starts.

CORRECT METHOD



WRONG METHOD



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

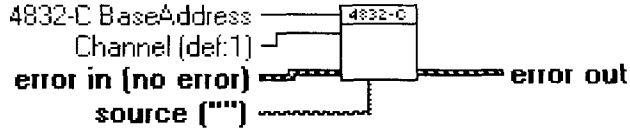
4.5 LabVIEW Drivers for the 4832-C

This section describes in detail each LabVIEW VI for the 4832-C. Most of these VIs operate similarly to their GPIB/SCPI counterparts, but many will have additional features that may not be implemented in the GPIB/SCPI versions. Listed with each VI is the GPIB and SCPI equivalent command.

4.5.1 A Generic Description of the 4832-C VIs

The following description of a generic 4832-C VI explains the inputs and outputs that are common to most VIs.

To avoid repeating the same information that is common to every VI, below is a description of the inputs and outputs which are identical to all VIs. However, VIs that are not channel dependent will not require the channel input.



Generic.vi

Inputs

4832-C BaseAddress	This numeric control specifies the ISA bus I/O address of the 4832-C plug-in board. The default is set to the factory default of hex 340. Representation: U16
Channel (def:1)	This numeric control specifies which channel will be affected by the VI. In general, most VIs address only one channel. The default is channel 1. Representation: U8
error in (no error)	This is the input error cluster that describes the error status before a VI executes. If error in indicates that an error occurred before a VI was called, most of the 4832-C VIs will not run, but will simply pass the error through to its error out cluster.
source ("")	This is the name of the VI that is calling the 4832-C VI. If an error occurs during the operation of a 4832-C VI, the name of the 4832-C VI will be appended to the value in source in the error out cluster.

Outputs

error out	This is the error output cluster that describes the error status after a VI executes. If an error occurred before a 4832-C VI is called, the 4832-C VI does not execute and error out is the same as error in. Otherwise, error out shows the error, if any, that occurred in the 4832-C VI.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.5.2 Description of the 4832-C Driver VIs

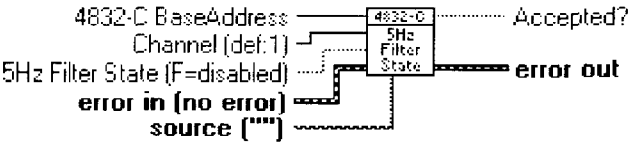
Table 5 below is an alpha-numeric listing of the driver VIs described in detail in this section:

Table 5 - LabVIEW Driver Commands

4832-C 5Hz Filter State.vi	4832-C Read dBm?.vi
4832-C 5Hz Filter State?.vi	4832-C Read RawData? (4Chan).vi
4832-C Acquisition Run/Stop.vi	4832-C Read RawData?.vi
4832-C Attenuator Serial Number?.vi	4832-C Read Watts? (4Chan).vi
4832-C Attenuator State.vi	4832-C Read Watts?.vi
4832-C Attenuator State?.vi	4832-C Reset.vi
4832-C Auto-Ranging State.vi	4832-C Responsivity Source Set.vi
4832-C Auto-Ranging State?.vi	4832-C Responsivity Source?.vi
4832-C Channel Calibration.vi	4832-C Responsivity?.vi
4832-C Channel Initialization.vi	4832-C Sample Precision Set.vi
4832-C Channel Status?.vi	4832-C Sample Precision?.vi
4832-C Detector Cal Date?.vi	4832-C System Status?.vi
4832-C Detector Model?.vi	4832-C User Responsivity Set.vi
4832-C Detector Serial Number?.vi	4832-C User Responsivity?.vi
4832-C Identify (*IDN?).vi	4832-C Wavelength Set.vi
4832-C Range Set.vi	4832-C Wavelength?.vi
4832-C Range?.vi	4832-C Zero Reference Set.vi
4832-C Read Amps? (4Chan).vi	4832-C Zero Reference?.vi
4832-C Read Amps?.vi	4832-C Zero State.vi
4832-C Read dBm? (4Chan).vi	4832-C Zero State?.vi

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C 5Hz Filter State.vi



4832-C 5Hz Filter State.vi

Description This VI enables/disables the 5Hz low-pass analog filter for the specified channel. '5Hz Filter State (F=disabled)' should be set TRUE to enable the 5Hz analog filter for the specified channel.

Inputs:

5Hz Filter State (F=disabled) — This input boolean turns the 5Hz low-pass analog filter on or off. A TRUE enables the filter and a FALSE disables the filter.

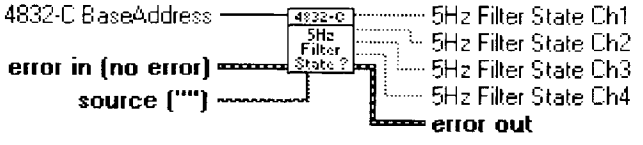
Outputs:

Accepted? — After the 5Hz Filter State command is sent, this VI then queries the state and sets this boolean TRUE if the response to the query matches the commanded state.

GPIB Equivalent FILTER_n<wsp><boolean>

SCPI Equivalent SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]

4832-C 5Hz Filter State?.vi



4832-C 5Hz Filter State?.vi

Description This VI queries the 5Hz low-pass analog filter state of all four channels. A true '5Hz Filter State ChX' boolean specifies that the 5Hz low-pass analog filter is enabled on the specified channel.

Outputs:

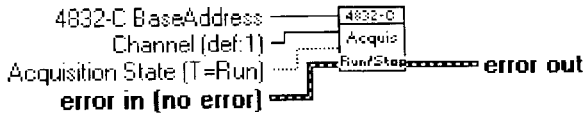
5Hz Filter State ChX — A TRUE '5Hz Filter State ChX' boolean specifies that the 5Hz low-pass analog filter is enabled on the specified channel.

GPIB Equivalent FILTER_n?

SCPI Equivalent SENSe[1|2|3|4]:FILTer[:LPASs][:STATe]?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Acquisition Run/Stop.vi



4832-C Acquisition Run/Stop.vi

Description: This VI controls data acquisition to either continuously run or to stop.

Inputs:

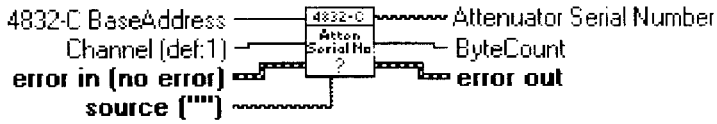
Acquisition State — A boolean TRUE forces the specified channel to continuously make data acquisitions (RUN). A FALSE stops data acquisition on the specified channel.

GPIB Equivalent — RUN_n and STOP_n

SCPI Equivalent — INITiate[1|2|3|4]:CONTinuous<wsp>1

INITiate[1|2|3|4]:CONTinuous<wsp>0

4832-C Attenuator Serial Number?



4832-C Attenuator Serial Number?.vi

Description: This VI queries the attenuator serial number. In most cases this serial number will match the detector's serial number.

Outputs:

Attenuator Serial Number — This output string is the serial number for the attenuator that is calibrated to this calibration module

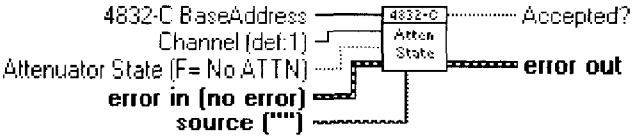
Byte Count — This numeric indicator specifies the number of ASCII characters that were returned by the query.

GPIB Equivalent — ATTNSN_n?

SCPI Equivalent — INPut[1|2|3|4]:ATTenuation:SNUM?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Attenuator State



4832-C Attenuator State.vi

Description: This VI enables/disables the use of the attenuator responsivity data that is stored in the calibration module for the specified channel. The responsivity data is used to calculate the readings in units of watts or dBm. When the Attenuator State is enabled, the OD3 optical attenuator should be attached to the front of the detector.

Inputs:

Attenuator State (F=No ATTN) — Set 'Attenuator State (F=No ATTN)' TRUE to use the attenuator responsivity data. This state should be enabled only when the OD3 attenuator is attached to the front of the detector.

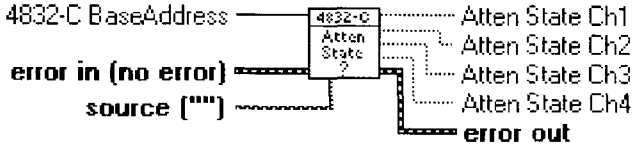
Outputs:

Accepted? — After the Attenuator State command is sent, this VI then queries the state and sets this boolean TRUE if the response to the query matches the commanded state.

GPIB Equivalent — ATTN_n<wsp><boolean>

SCPI Equivalent — INPut[1|2|3|4]:ATTenuation:STATe<wsp><boolean>

4832-C Attenuator State?



4832-C Attenuator State?.vi

Description: This VI queries the attenuator state of all four channels. When the Attenuator State is enabled, the OD3 optical attenuator should be attached to the front of the detector.

Outputs:

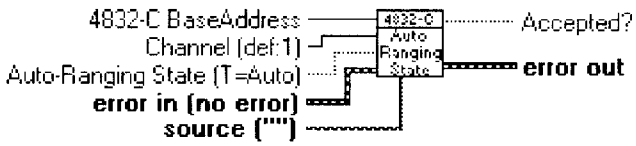
Atten State ChX — A TRUE 'Atten State ChX' boolean specifies that the attenuator data is being used to calculate the readings in units of watts or dBm.

GPIB Equivalent — ATTN_n?

SCPI Equivalent — INPut[1|2|3|4]:ATTenuation:STATe?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Auto-Ranging State



4832-C Auto-Ranging State.vi

Description: This VI sets the auto-ranging state for the specified channel. When the auto-ranging is enabled, the meter will automatically set the gain of the amplifier. If a range is manually set, the meter will disable the auto-ranging mode.

Inputs:

Auto-Ranging State (T=Auto) — Set 'Auto-Ranging State (T=Auto)' TRUE to force the 4832-C to automatically set the gain of the amplifier. A FALSE disables this the auto-ranging mode.

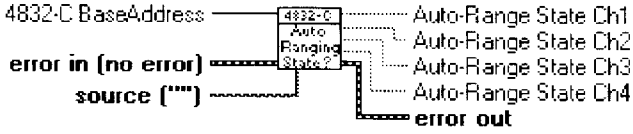
Outputs:

Accepted? — After the Auto-Ranging State command is sent, this VI then queries the state and sets this boolean TRUE if the response to the query matches the commanded state.

GPIB Equivalent — AUTO_n<wsp><boolean>

SCPI Equivalent — SENSe[1|2|3|4]:POWer:RANGe:AUTO<wsp><boolean>

4832-C Auto-Ranging State?



4832-C Auto-Ranging State?.vi

Description: This VI queries the auto-ranging state of all four channels.

Outputs:

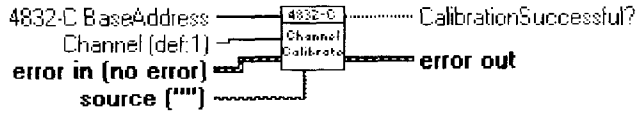
Auto-Range State ChX — A TRUE 'Auto-Range State ChX' boolean specifies that the auto-ranging capability of the meter is enabled.

GPIB Equivalent — AUTO_n?

SCPI Equivalent — SENSe[1|2|3|4]:POWer:RANGe:AUTO?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Channel Calibration



4832-C Channel Calibration.vi

Description:

This VI causes the specified channel to perform an auto-calibration which consists of measuring and thereafter subtracting the amplifier offsets from subsequent measurements.

The instrument does not read the calibration information from the calibration module. If the calibration module may have been changed, 4832-C Channel Initialization.VI should be used instead.

Outputs:

CalibrationSuccessful?

CalibrationSuccessful? is set TRUE when the auto-calibration process has successfully completed. Possible failures are:

* Channel registers failed
* Calibration module is bad or missing
* Calibration module checksum error
* Calibration module is from a wrong family of detectors

Run **4832-C Channel Status.vi** to determine what the failures are, if any.

NOTE

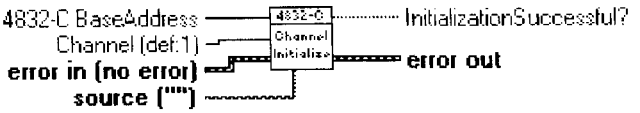
This command does not read the calibration module. Therefore, Calibration Successful? will reflect the state that existed the last time reset or channel initialization commands were executed.

GPIB Equivalent CALCHAN_n?

SCPI Equivalent SENSe[1|2|3|4]:CORRection:COLLect:ZERO?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Channel Initialization



4832-C Channel Initialization.vi

Description:

This VI causes the specified channel to reinitialize itself by reading the calibration module plugged in its input. Thereafter it also performs an auto-calibration by measuring the amplifier offsets. Run this VI when you change the detector and its calibration module.

NOTE

This command nulls amplifier offsets only. If ambient light or other detector offsets exist, they should be nulled separately by using the 4832-C Zero Reference Set and Zero State VIs.

Outputs:

InitializationSuccessful? 'InitializationSuccessful?' is set TRUE when the initialization process has successfully completed. Possible failures are:

* Channel registers failed
* Calibration module is bad or missing
* Calibration module checksum error
* Calibration module is from a wrong family of detectors

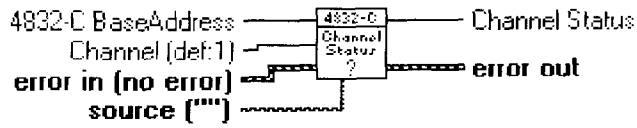
Run **4832-C Channel Status.vi** to determine what the failures are, if any.

GPIB Equivalent INITCHAN_n?

SCPI Equivalent CALibration:DETector[1|2|3|4]:RESET?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Channel Status?



4832-C Channel Status?.vi

Description: This VI queries the status of the specified channel. See the description for Channel Status below for details.

NOTE

This VI does not update the status byte. It returns the status reported by previous initialization commands.

Outputs:

Channel Status — This output (U8) is bit mapped as follows:

bit 0: channel registers, 0 = OK, 1 = failed

bit 1: calibration module, 0 = OK, 1 = bad or missing

bit 2: calibration module, 0 = OK, 1 = checksum error

bit 3: calibration module, 0 = OK, 1 = wrong detector family

GPIB Comparable CALCHAN_n? and INITCHAN_n?

SCPI Comparable SENSe[1|2|3|4]:CORRection:COLLect:ZERO? and CALibration:DETector[1|2|3|4]:RESET?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Detector Cal Date?



4832-C Detector Cal Date?.vi

Description: This VI queries the date on which the detector was calibrated at Newport. This information resides in the calibration module plugged in the specified channel.

NOTE

This command does not read the data from the calibration module. It reports the value that was stored in onboard memory during the most recent initialization.

Outputs:

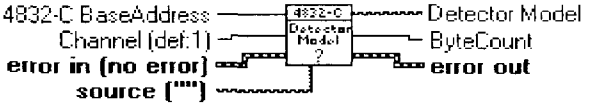
Detector Cal Date — This output string is the date on which the detector was calibrated at Newport.

Byte Count — This numeric indicator specifies the number of ASCII characters that were returned by the query.

GPIB Equivalent — CALDATE_n?

SCPI Equivalent — CALibration:DETector[1|2|3|4]:DATE?

4832-C Detector Model?



4832-C Detector Model?.vi

Description: This VI queries the detector model number as read from the calibration module plugged in the specified channel.

NOTE

This command does not read the data from the calibration module. It reports the value that was stored in onboard memory during the most recent initialization.

Outputs:

Detector Model — This output string returns the detector model.

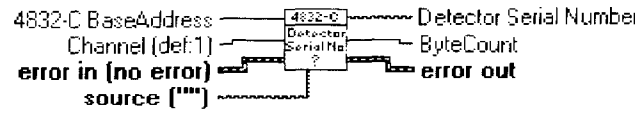
Byte Count — This numeric indicator specifies the number of ASCII characters that were returned by the query.

GPIB Equivalent — DETMODEL_n?

SCPI Equivalent — INSTrument:DETector[1|2|3|4]:MODEL?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Detector Serial Number?



4832-C Detector Serial Number?.vi

Description: This VI queries the detector's serial number as read from the calibration module plugged in the specified channel.

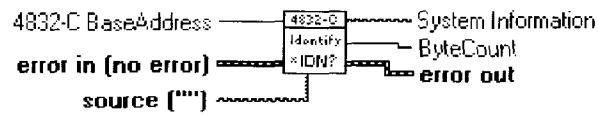
NOTE

This command does not read the data from the calibration module. It reports the value that was stored in onboard memory during the most recent initialization.

Outputs:

Detector Serial Number	This output string returns the detector's serial number.
Byte Count	This numeric indicator specifies the number of ASCII characters that were returned by the query.
GPIB Equivalent	DETSN_n?
SCPI Equivalent	INSTrument:DETector[1|2|3|4]:SNUM?

4832-C Identify (*IDN?)



4832-C Identify (*IDN?).vi

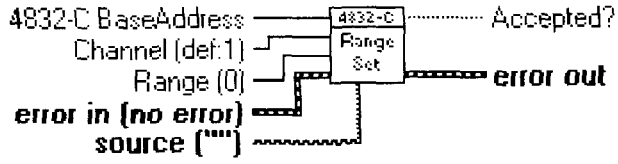
Description: This VI queries the 4832-C's device identification information. The information returned is: manufacturer, model, firmware version and date. This query is equivalent to a *IDN?

Outputs:

System Information	This output string returns the system information. e.g. NewportCorp,4832-C,1.0,022996
Byte Count	This numeric indicator specifies the number of ASCII characters that were returned by the query.
GPIB Equivalent	*IDN?
SCPI Equivalent	*IDN?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Range Set



4832-C Range Set.vi

Description: This VI sets the signal range for the specified channel. In addition, after this VI executes the specified channel is forced into the manual ranging mode.

Inputs:

Range (0) — This input sets the signal range for the specified channel. Ranges 0 through 6 are available for all detectors with the exception of the 818-IR and 818-F-IR which uses ranges 2 through 6.

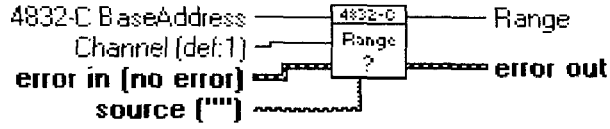
Outputs:

Accepted? — After the range command is sent, this VI then queries the range and sets this boolean TRUE if the response to the query matches the commanded range.

GPIB Equivalent — RANGE_n<wsp><value>

SCPI Equivalent — SENSe[1|2|3|4]:POWer:RANGe[:UPPER] <wsp><value>

4832-C Range?



4832-C Range?.vi

Description: This VI returns the present signal range setting being used whether the meter is auto-ranging or in manual ranging mode.

Outputs:

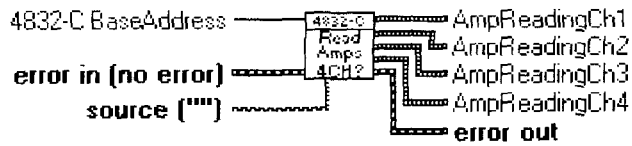
Range — This numeric output signifies the signal range which the specified channel is using.

GPIB Equivalent — RANGE_n?

SCPI Equivalent — SENSe[1|2|3|4]:POWer:RANGe[:UPPER]?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read Amps? (4 Chan)



4832-C Read Amps? (4 Chan).vi

Description:

This VI returns a reading in units of amperes for all four channels whether the channels are active or not. If there is no calibration module or preamplifier board in any of the four channels, this VI will return a reading of 0.0000E+0 for those inactive channels.

Outputs:

AmpReadingChX

This output cluster consists of three elements:

1) AmpReading - this is the amp reading in single precision floating point format.

2) Range - signal range when the reading was taken.

3) Status - this value represents the status of the reading as detailed below.

   0 = OK
   1 = over range
   2 = saturated
   3 = ranging
   4 = channel not available
   5 = suspended
   255 = ERROR

GPIB Equivalent

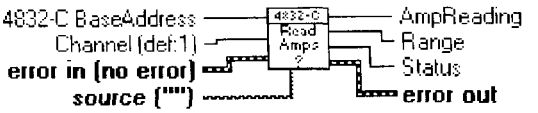
Similar to: R? and RWS?

SCPI Equivalent

Similar to: READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read Amps?



4832-C Read Amps?.vi

Description: This VI returns a reading in units of amperes for the specified channel whether the channel is active or not. If there is no calibration module or preamplifier board in the specified channel, this VI will return a reading of 0.0000E+0.

Outputs:

AmpReading — This is the amp reading in single precision floating point format.

Range — This numeric output signifies the signal range when the reading was taken.

Status — This value represents the status of the reading as detailed below.

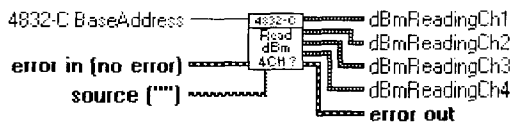
0 = OK
1 = over range
2 = saturated
3 = ranging
4 = channel not available
5 = suspended
255 = ERROR

GPIB Equivalent Similar to: R_n? and RWS_n?

SCPI Equivalent Similar to: READ[1|2|3|4][:SCALar]:POWer[:DC]?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read dBm? (4 Chan)



4832-C Read dBm? (4 Chan).vi

Description:

This VI returns a reading in units of dBm for all four channels whether the channels are active or not. The dBm reading is obtained by the following equation:

dBmReading = 10 * log(wattReading / 0.001).

If there is no calibration module or preamplifier board in any of the four channels, this VI will return a reading of 0.00 for those inactive channels.

Outputs:

AmpReadingChX

This output cluster consists of three elements:

1) dBmReading - this is the dBm reading in single precision floating point format.

2) Range - signal range when the reading was taken.

3) Status - this value represents the status of the reading as detailed below.

   0 = OK
   1 = over range
   2 = saturated
   3 = ranging
   4 = channel not available
   5 = suspended
   255 = ERROR

GPIB Equivalent

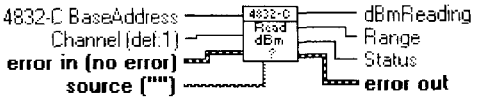
Similar to: R? and RWS?

SCPI Equivalent

Similar to: READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read dBm?



4832-C Read dBm?.vi

Description:

This VI returns a reading in units of dBm for the specified channel whether the channel is active or not. The dBm reading is obtained by the following equation:

dBmReading = 10 * log(wattReading / 0.001).

If there is no calibration module or preamplifier board in the specified channel, this VI will return a reading of 0.00.

Outputs:

dBmReading — This is the dBm reading in single precision floating point format.

Range — This numeric output signifies the signal range when the reading was taken.

Status — This value represents the status of the reading as detailed below.

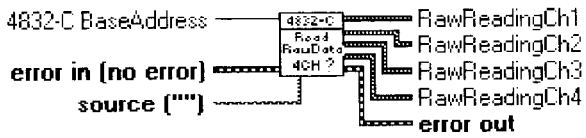
0 = OK
1 = over range
2 = saturated
3 = ranging
4 = channel not available
5 = suspended
255 = ERROR

GPIB Equivalent — Similar to: R_n? and RWS_n?

SCPI Equivalent — Similar to: READ[1|2|3|4][:SCALar]:POWer[:DC]?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read RawData? (4 Chan)



4832-C Read RawData? (4 Chan).vi

Description:

This VI returns a reading in raw A/D counts for all four channels whether the channels are active or not. If there is no calibration module or preamplifier board in any of the four channels, this VI will return a reading of 0 for those inactive channels.

Use this VI to acquire data at the fastest possible rate. This data is in the form of raw A/D counts which can be used for relative measurements. However, to preserve the range information, the raw data should be multiplied by 10^{range}. When using the 12-bit A/D the full scale count equals 4095; and when using the 15-bit A/D, the full scale count equals 32,767.

To obtain an absolute reading in units of amperes from the raw data, the following equations should be used:

For the 12-bit A/D:

amp = (Raw Reading / 4096) x (10^{range} x 2.5253E-09)

For the 15-bit A/D:

amp = (Raw Reading / 32768) x (10^{range} x 2.5253E-09)

Outputs:

RawReadingChX

This output cluster consists of three elements:

1) RawReading - this is the reading in raw A/D counts.
2) Range - signal range when the reading was taken.
3) Status - this value represents the status of the reading as detailed below.

   0 = OK

   1 = over range

   2 = saturated (Note: Saturation bit is not valid in raw data mode.)

   3 = ranging

   4 = channel not available

   5 = suspended

   255 = ERROR

GPIB Equivalent

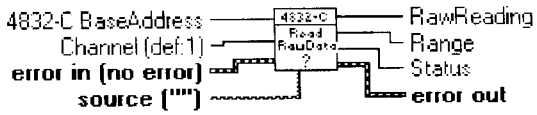
Similar to: R? and RWS?

SCPI Equivalent

Similar to: READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read RawData?



4832-C Read RawData?.vi

Description:

This VI returns a reading in raw A/D counts for the specified channel whether the channel is active or not. If there is no calibration module or preamplifier board in the specified channel, this VI will return a reading of 0.

Use this VI to acquire data at the fastest possible rate. This data is in the form of raw A/D counts which can be used for relative measurements. However, to preserve the range information, the raw data should be multiplied by 10^{range}. When using the 12-bit A/D the full scale count equals 4095; and when using the 15-bit A/D, the full scale count equals 32,767.

To obtain an absolute reading in units of amperes from the raw data, the following equations should be used:

For the 12-bit A/D:

amp = (Raw Reading / 4096) x (10^{range} x 2.5253E-09)

For the 15-bit A/D:

amp = (Raw Reading / 32768) x (10^{range} x 2.5253E-09)

Outputs:

RawReading — This is the reading in raw A/D counts.

Range — This numeric output signifies the signal range when the reading was taken.

Status — This value represents the status of the reading as detailed below.

0 = OK

1 = over range

2 = saturated (Note: Saturation bit is not valid in raw data mode.)

3 = ranging

4 = channel not available

5 = suspended

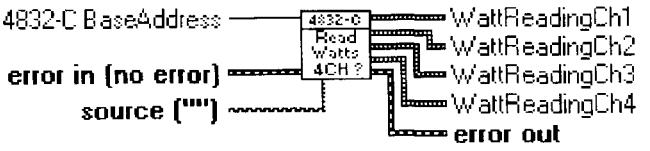
255 = ERROR

GPIB Equivalent — Similar to: R_n? and RWS_n?

SCPI Equivalent — Similar to: READ[1|2|3|4][:SCALar]:POWer[:DC]?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read Watts? (4 Chan)



4832-C Read Watts? (4 Chan).vi

Description: This VI returns a reading in units of watts for all four channels whether the channels are active or not. If there is no calibration module or preamplifier board in any of the four channels, this VI will return a reading of 0.0000E+0 for those inactive channels.

Outputs:

WattReadingChX

This output cluster consists of three elements:

1) WattReading - this is the watt reading in single precision floating point format.

2) Range - signal range when the reading was taken.

3) Status - this value represents the status of the reading as detailed below.

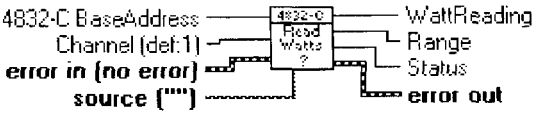
   0 = OK
   1 = over range
   2 = saturated
   3 = ranging
   4 = channel not available
   5 = suspended
   255 = ERROR

GPIB Equivalent Similar to: R? and RWS?

SCPI Equivalent Similar to: READ[:SCALar]:POWer[:DC]?<wsp>(@1:4)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Read Watts?



4832-C Read Watts?.vi

Description: This VI returns a reading in units of watts for the specified channel whether the channel is active or not. If there is no calibration module or preamplifier board in the specified channel, this VI will return a reading of 0.0000E+0.

Outputs:

WattReading — This is the watt reading in single precision floating point format.

Range — This numeric output signifies the signal range when the reading was taken.

Status — This value represents the status of the reading as detailed below.

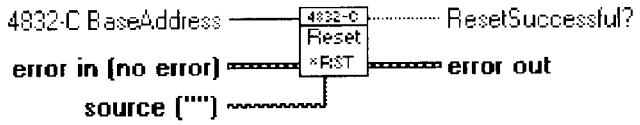
0 = OK
1 = over range
2 = saturated
3 = ranging
4 = channel not available
5 = suspended
255 = ERROR

GPIB Equivalent Similar to: R_n? and RWS_n?

SCPI Equivalent Similar to: READ[1|2|3|4][:SCALar]:POWer[:DC]?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Reset



4832-C Reset.vi

Description:

This VI causes the system to reset and configure all parameters back to their default settings. It also performs an auto-calibration on all available channels. If the reset is not successful, run **4832-C System Status.vi** to determine the cause of the problem.

Outputs:

ResetSuccessful?

ResetSuccessful? is set TRUE when the meter has finished auto-calibration process has successfully completed. The reset process takes about 10 seconds on a four channel system. Possible failures are:

* Channel registers failed
* Calibration module is bad or missing
* Calibration module checksum error
* Calibration module is from a wrong family of detectors

GPIB Equivalent

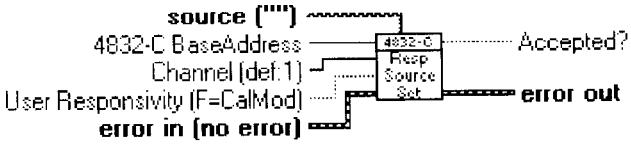
*RST

SCPI Equivalent

*RST

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Responsivity Source Set



4832-C Responsivity Source Set.vi

Description: This VI selects whether the responsivity source is the data in the calibration module, or a user selected value. The responsivity affects only readings taken in units of watts or dBm. Run **4832-C User Responsivity Set.vi** to set the actual value of the User Responsivity.

Inputs:

User Responsivity (F=CalMod) — FALSE selects the default source which is the responsivity data in the calibration module.

TRUE selects the User Responsivity which is determined by running **4832-C User Responsivity Set.vi**.

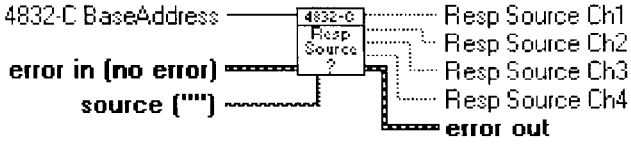
Outputs:

Accepted? — After this command is sent, this VI then queries the responsivity source and sets this boolean TRUE if the response to the query matches the commanded state.

GPIB Equivalent — USRCAL_n<wsp><boolean>

SCPI Equivalent — CALibration:DETector[1|2|3|4]:USER:STATe<wsp><boolean>

4832-C Responsivity Source?



4832-C Responsivity Source?.vi

Description: This VI queries the responsivity source of all four channels.

Outputs:

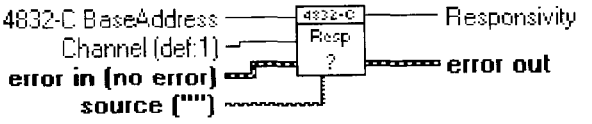
Resp Source ChX — A boolean TRUE specifies that the responsivity source is the user's responsivity. A FALSE boolean specifies that the calibration module data is used.

GPIB Equivalent — USRCAL_n?

SCPI Equivalent — CALibration:DETector[1|2|3|4]:USER:STATe?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Responsivity?



4832-C Responsivity?.vi

Description: This VI queries the responsivity value presently being used in units of amps/watt.

The responsivity affects only readings taken in units of watts or dBm.

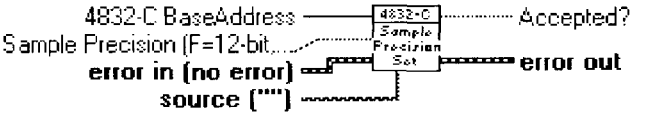
Outputs:

Responsivity — This output is the responsivity presently used in units of amps/watt. It is in single precision floating point format.

GPIB Equivalent — RESP_n?

SCPI Equivalent — CALibration:DETector[1|2|3|4]:RESPonsivity?

4832-C Sample Precision Set



4832-C Sample Precision Set.vi

Description: This VI selects which A/D will be used for making acquisitions. The system default uses the 12-bit A/D which provides a resolution of one part in 4096 and an acquisition rate in the kilohertz regime. The 15-bit A/D provides a resolution of one part in 32,768 and provides an acquisition rate of about 15 Hz.

Inputs:

Sample Precision (F=12-bit, T=15-bit) — FALSE selects the 12-bit A/D. TRUE selects the 15-bit A/D.

Outputs:

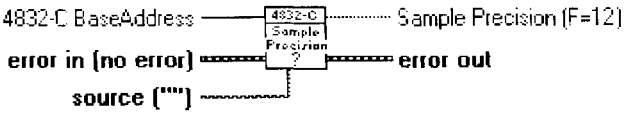
Accepted? — After this command is sent, this VI then queries the sample precision state and sets this boolean TRUE if the response to the query matches the commanded state.

GPIB Equivalent — SPREC<wsp><value>

SCPI Equivalent — SENSe[1|2|3|4]:POWer[:DC]:RESolution<wsp><value>

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Sample Precision?



4832-C Sample Precision?.vi

Description: This VI queries which A/D is being used in making acquisitions. The system default uses the 12-bit A/D which provides a resolution of one part in 4096 and an acquisition rate in the kilohertz regime. The 15-bit A/D provides a resolution of one part in 32,768 and provides an acquisition rate of about 15 Hz.

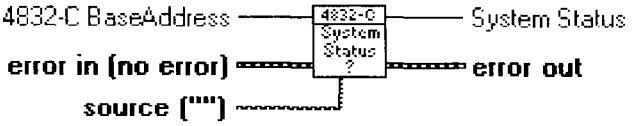
Outputs:

Sample Precision (F=12-bit, T=15-bit) — FALSE specifies that the 12-bit A/D is being used. TRUE specifies that the 15-bit A/D is being used.

GPIB Equivalent — SPREC?

SCPI Equivalent — SENSe[1|2|3|4]:POWer[:DC]:RESolution?

4832-C System Status



4832-C System Status?.vi

Description: This VI queries the system status of the 4832-C. See the description below for details.

Outputs:

System Status — This output (U8) is bit mapped as follows:

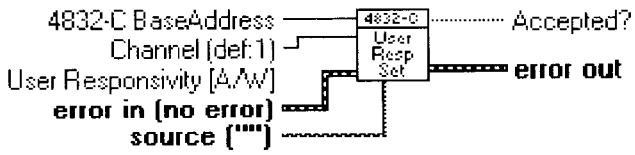
bit 0: main registers,	0 = OK, 1 = failed
bit 1: integrating A/D,	0 = OK, 1 = failed
bit 2: successive approx A/D,	0 = OK, 1 = failed

GPIB Equivalent — *TST?

SCPI Equivalent — *TST?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C User Responsivity Set



4832-C User Responsivity Set.vi

Description: This VI sets the value of the user responsivity. This user responsivity will be used for making watt or dBm measurements when the responsivity source is set to user responsivity by running **4832-C Responsivity Source Set.vi**. The responsivity affects only readings taken in units of watts or dBm.

Inputs:

User Responsivity [A/W] — This input should be a single precision floating point number in units of amps/watt. Default is 1.0000A/W.

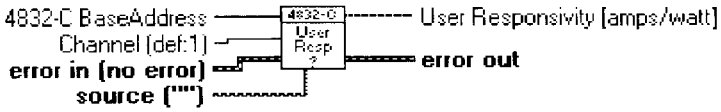
Outputs:

Accepted? — After this command is sent, this VI then queries the user responsivity and sets this boolean TRUE if the response to the query matches the commanded value.

GPIB Equivalent — USRRESP_n<wsp><value>

SCPI Equivalent — CALibration:DETector[1|2|3|4]:USER:RESPonsivity<wsp><value>

4832-C User Responsivity?



4832-C User Responsivity?.vi

Description: This VI queries the value of the user responsivity in units of amp/watt. This user responsivity will be used for making watt or dBm measurements when the responsivity source is set to user responsivity by running **4832-C Responsivity Source Set.vi**. The responsivity affects only readings taken in units of watts or dBm.

Outputs:

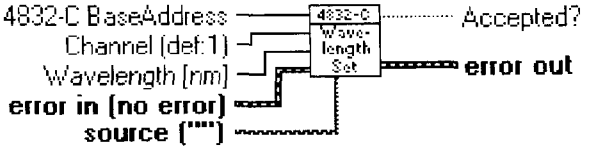
User Responsivity — This value is in units of amp/watt and is a single precision floating point number.

GPIB Equivalent — USRRESP_n?

SCPI Equivalent — CALibration:DETector[1|2|3|4]:USER:RESPonsivity?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Wavelength Set



4832-C Wavelength Set.vi

Description: This VI queries the wavelength of light being measured. This insures that the proper responsivity datum from the calibration module will be used when the 4832-C calculates a watt or dBm reading. The responsivity affects only readings taken in units of watts or dBm.

Inputs:

Wavelength [nm] — This input should be an unsigned 16-bit value in units of nanometers. The allowable wavelength range is detector type dependent. At power up the default is set to the smallest wavelength available for the specific detector.

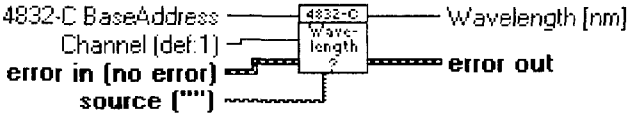
Outputs:

Accepted? — After this command is sent, this VI then queries the wavelength and sets this boolean TRUE if the response to the query matches the commanded value.

GPIB Equivalent — LAMBDA_n<wsp><value>

SCPI Equivalent — SENSe[1|2|3|4]:POWer:WAVElength<wsp><value>

4832-C Wavelength?



4832-C Wavelength?.vi

Description: This VI queries the wavelength of light being measured. This insures that the proper responsivity datum from the calibration module will be used when the 4832-C calculates a watt or dBm reading. The responsivity affects only readings taken in units of watts or dBm.

Outputs:

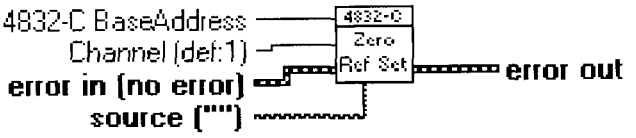
Wavelength [nm] — This is the present wavelength which determines the datum from the calibration module that is being used to make readings in units of watts or dBm. This number is in units of nanometers and is an unsigned 16-bit integer.

GPIB Equivalent — LAMBDA_n?

SCPI Equivalent — SENSe[1|2|3|4]:POWer:WAVElength?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Zero Reference Set



4832-C Zero Reference Set.vi

Description: Running this VI stores the last reading acquired as the reference level for subsequent readings when the ZERO mode is enabled. The default reference from system reset is 0.0000 amps. The ZERO mode is enabled by running **4832-C Zero State.vi**.

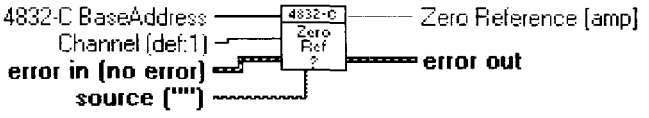
When the ZERO mode is enabled, subsequent readings are affected by the following equation:

Reading = (Measurement - Zero Reference).

GPIB Equivalent STOZERO_n

SCPI Equivalent SENSe[1|2|3|4]:POWer[:DC]:REFerence

4832-C Zero Reference?



4832-C Zero Reference?.vi

Description: This VI queries the zero reference value which is used when the ZERO mode is enabled. When the ZERO mode is enabled, subsequent readings are affected by the following equation:

Reading = (Measurement - Zero Reference).

Outputs:

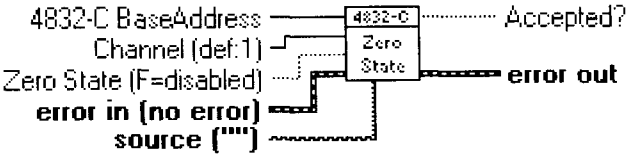
Zero Reference [amp] This is the present zero reference in units of amps and is in single precision floating point format.

GPIB Equivalent ZEROVAL_n?

SCPI Equivalent SENSe[1|2|3|4]:POWer[:DC]:REFerence?<wsp>TOREF|2

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4832-C Zero State



4832-C Zero State.vi

Description: This VI enables/disables the ZERO mode for the specified channel. This VI does not set the zero reference value. Run the Zero Reference Set VI to store a new zero reference value. The default reference from system reset is 0.0000 amps. When the ZERO mode is enabled, subsequent readings are affected by the following equation:

Reading = (Measurement - Zero Reference).

Inputs:

Zero State (F=disabled) — A TRUE boolean enables the ZERO mode (background signal subtraction). A FALSE boolean disables the ZERO mode.

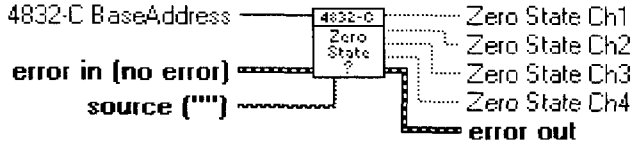
Outputs:

Accepted? — After this command is sent, this VI then queries the zero state and sets this boolean TRUE if the response to the query matches the commanded state.

GPIB Equivalent — ZERO_n<wsp><boolean>

SCPI Equivalent — SENSe[1|2|3|4]:POWer[:DC]:REFerence:STATe<wsp><boolean>

4832-C Zero State?



4832-C Zero State?.vi

Description: This VI queries the state of the ZERO mode for all four channels. When the ZERO mode is enabled, subsequent readings are affected by the following equation:

Reading = (Measurement - Zero Reference).

Outputs:

Zero State ChX — A TRUE boolean specifies that the ZERO mode is enabled. A FALSE specifies that the mode is disabled.

GPIB Equivalent — ZERO_n?

SCPI Equivalent — SENSe[1|2|3|4]:POWer[:DC]:REFerence:STATe?

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5. Factory Service

5.1 Introduction

This section contains information regarding obtaining factory service for the 4832-C Multi-Channel Optical Power Meter. The user should not attempt any maintenance or service of this instrument and/or accessories. Contact Newport Corporation or your Newport representative for assistance. The 4832-C contains no user serviceable parts. Its calibration accuracy is warranted for a period of 1 year.

5.2 Obtaining Service

To obtain information concerning factory service, contact Newport Corporation or your Newport representative. Please have the following information available:

1. Instrument model number (On front panel)
2. Instrument serial number (On rear panel)
3. Description of the problem.

If the instrument is to be returned to Newport Corporation, you will be given a Return Number, which you should reference in your shipping documents. Please fill out a copy of the service form, located on the following page, and have the information ready when contacting Newport Corporation. Return the completed service form with the instrument.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Service Form

Newport Corporation
U.S.A. Office: 714/863-3144
FAX: 714/253-1800

Name _____ RETURN AUTHORIZATION # _____

Company _____ (Please obtain prior to return of item)

Address _____ Date _____

_____ Phone Number _____

Country _____

P.O. Number _____

Item(s) Being Returned:

Model # _____ Serial # _____

Description _____

Reason for return of goods (please list any specific problems) _____

_____

List all control settings and describe problem _____

_____

_____

_____ (Attach additional sheets as necessary).

Show a block diagram of your measurement system including all instruments connected (whether power is turned on or not). Describe signal source. If source is a laser, describe output mode, peak power, pulse width, repetition rate and energy density.

Where is the Measurement Being Performed?

(factory, controlled laboratory, out-of-doors, etc.) _____

What power line voltage is used? _____ Variation? _____

Frequency? _____ Ambient Temperature? _____

Variation? _____ °F. Rel. Humidity? _____ Other? _____

Any additional information. (If special modifications have been made by the user, please describe below).

_____

_____

_____

_____

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix A: Performing Measurements

A.1 Introduction

This section contains detailed information on how to make various optical power measurements with the 4832-C.

A.2 Photodetector Considerations

This section describes detector and attenuator characteristics, optical and electrical considerations, and environmental influences on optical measurements. In general, the accuracy of measurements with the model 4832-C is limited by the accuracy of the detector calibration. Making accurate measurements of optical power is, however, also dependent on properly setting up the power meter, controlling temperature and illumination conditions, and understanding the factors that affect power measurements.

A.2.1 Detector Calibration and Accuracy

Newport Corporation calibrates its detectors using secondary standards directly traceable to the United States National Institute of Science and Technology (NIST). The details and accuracy of the calibration procedure vary with each detector model, but a detailed description of the calibration results is provided with each individually calibrated detector.

In general, detector calibration accuracy ranges from 2% to 7% in absolute terms and varies with wavelength. Each detector will have some variation in the response over different sections of its surface. Therefore, for the most reproducible measurements, light should illuminate the detector as uniformly as possible over 80% of the detector's active area.

CAUTION

Avoid focusing a light source onto the detector surface. Inaccurate readings and possible detector damage may result. Consult your detector manual for information on detector saturation and damage thresholds.

NIST traceability requires that detectors be calibrated at one year intervals. As individual detector responses change with time, especially in the ultraviolet spectral range, recalibration is necessary to assure the accuracy of the measurement. The same detector should always be used for measurements which are to be directly compared, in order to obtain reproducible results.

A.2.2 Quantum Detector Temperature Effects

Semiconductor based photodiode detectors, such as Newport's Low Power series, are significantly affected by temperature. At the extreme long wavelength end of their spectrum, these quantum detectors typically lose sensitivity with increasing temperature due to a shift in the bandgap energy. However, the detector shunt resistance decreases exponentially with temperature. This causes an increase in offsets and noise

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

at the output of the detector amplifier. The offset may be removed by zeroing the power meter, but since the offset depends on the detector and amplifier temperature, any change in temperature will cause further drift in the offset. Also, the increased noise which is present at higher temperatures cannot be nulled out. These shunt resistance related effects bound the accuracy of measurements that can be made with a given detector.

A.2.3 Ambient and Stray Light

Ambient and stray light striking the detector will be measured by the power meter, and thus should be taken into account when making sensitive measurements. This signal can be nulled by zeroing the meter, but in practice it is best to remove the ambient light sources as much as possible. This is because the ambient light level will fluctuate as people move around the room. The ambient light may be largely eliminated by means of baffles, apertures, or by simply turning the room lights off. Narrow bandpass filters or cutoff filters may also be used to attenuate the broadband ambient light while allowing the desired signal through.

A.3 Setting the Wavelength

In order to obtain accurate optical power measurements, it is necessary to set the calibration wavelength to the wavelength of light incident on the photodetector. The wavelength may be set by means of the lambda_n command. The power meter will not power up with the same wavelength as it was set to when the instrument was powered down. At power up the wavelength always defaults to the lowest wavelength available to the specific detector.

NOTE

Different detectors are sensitive over different wavelength ranges. See the appropriate detector manual and calibration data to determine the range of wavelengths available for the detector being used. The responsivities stored in the calibration module span only the wavelength range appropriate for the detector and are specific to that detector.

A.4 Setting the Attenuator Mode

Many Newport detectors are provided with calibrated optical attenuators. These attenuators allow for power measurements at levels that would normally saturate the detector. Since the optical attenuator lowers the light level reaching the detector, a different set of calibration data must be used to convert the detected photocurrent to measured power. When the attenuator is being used, it is critical to make sure that the correct data set is being used, or large errors will result. The 4832-C instruction sets include instructions to use the calibration data set that includes the effect of the attenuator. There are also commands to query the instrument to find out which data set is being used.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NOTE

The characteristics of each attenuator and detector are slightly different, and are individually calibrated for that reason. Therefore it is critical to use ONLY the detectors and attenuators with serial numbers matching the calibration module being used.

NOTE

The information encoded inside the calibration module is read only on power up or system reset. If you change the detector attached to any channel of the Model 4832-C, you must reset the system or initialize the appropriate channel to ensure that the correct responsivity data will be used.

A.5 Performing Basic Measurements Using the Virtual Instrument

This section describes the various basic measurements that may be made with the 4832-C. Descriptions of measurement procedures assume that you are controlling the 4832-C by means of the 4832-C virtual instrument, which is described in section 2.4.5. Analogous commands for controlling the instrument may be found in the various driver libraries, described in sections 3 and 4 :

A.5.1 Power Measurements (W)

The 4832-C's most basic measurement mode is in units of Watts. Power measurement may be made with background correction, by using the ZERO function. The following equation illustrates this relationship:

Watts reading = Net Applied Power

=(I-Iz)/R

where

I = detector input current

Iz = detector background current defined when the ZERO button was pressed

R = responsivity of the detector (or detector with attenuator) in A/W

To make Watts measurements, proceed as follows:

a. Select the channel to be used for the measurement by clicking on the Edit Channel button until the channel you want to use is highlighted.

b. Select the Watts mode by clicking on the UNITS button until the W annunciator in the display area is lit.

c. Select the proper wavelength by clicking on the button with the λ on it and entering the wavelength in nm.

d. Select autoranging mode by clicking on the AUTO button so that the AUTO annunciator is lit.

e. Block the light to be measured, and click on the ZERO button to background correct. If the ZERO annunciator is not lit, press ZERO again so that it is.

f. Unblock the light to be measured and read the optical power from the display area.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A.5.2 Logarithmic Power Measurements (dB and dBm)

The 4832-C can make logarithmic power measurements referenced to any power level (dB), or to 1 mW (dBm).

NOTE

Log measurements should be made on the lowest possible gain range (without over ranging). Readings near the bottom of a gain range can cause significant errors due to roundoff and calculation errors. When in doubt, use auto range.

NOTE

When making log measurements with background correction, the signal after subtraction of the stored offset power level may be negative. In this case, OL will be displayed since the log of a negative number is not defined. This display will clear once the signal becomes positive.

A.5.2.1 Logarithmic Power Measurements Using Reference Powers (dB)

The dB measurement mode displays the absolute value of 10 times the logarithm (base 10) of the input power, referenced to a power level which was stored by clicking on the SREF button. The following equation illustrates this relationship:

dB reading = 10*log(Net Applied Power/Reference Power)

=10*log[((I-Iz)/R)/Reference Power]

where

I = detector input current

Iz = detector background current defined when the ZERO button was pressed

R = responsivity of the detector in A/W (or detector with attenuator)

To make dB measurements with background correction, proceed as follows:

a. Select the channel to be used for the measurement by clicking on the Edit Channel button until the channel you want to use is highlighted.

b. Select the dB mode by clicking on the UNITS button until the dB annunciator in the display area is lit.

c. Select the proper wavelength by clicking on the button with the λ on it and entering the wavelength in nm.

d. Select autoranging mode by clicking on the AUTO button so that the AUTO annunciator is lit.

e. Block the light to be measured, and click on the ZERO button to background correct. If the ZERO annunciator is not lit, press ZERO again so that it is.

f. Illuminate the detector with the optical signal to be used as the reference light level and click on the SREF button.

g. Unblock the light to be measured and read the optical power in decibels referred to the reference light level from the display area.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NOTE

When making log measurements with background correction, the signal after subtraction of the stored offset power level may be negative. In this case, OL will be displayed since the log of a negative number is not defined. This display will clear once the signal becomes positive.

A.5.2.2 Logarithmic Power Measurements Using 1 mW Reference (dBm)

The dBm measurement mode displays the absolute value of 10 times the logarithm (base 10) of the input power, referenced to 1 mW. The following equation illustrates this relationship:

dBm reading = 10*log(Net Applied Power/1 mW)

=10*log[((I-Iz)/R)/1 mW]

where

I = detector input current

Iz = detector background current defined when the ZERO button was pressed

R = responsivity of the detector in A/W (or detector with attenuator)

To make dBm measurements with background correction, proceed as follows:

a. Select the channel to be used for the measurement by clicking on the Edit Channel button until the channel you want to use is highlighted.

b. Select the dBm mode by clicking on the UNITS button until the dBm annunciator in the display area is lit.

c. Select the proper wavelength by clicking on the button with the λ on it and entering the wavelength in nm.

d. Select autoranging mode by clicking on the AUTO button so that the AUTO annunciator is lit.

e. Block the light to be measured, and click on the ZERO button to background correct. If the ZERO annunciator is not lit, press ZERO again so that it is.

f. Unblock the light to be measured and read the optical power in decibels referred to 1 mW from the display area.

NOTE

When making log measurements with background correction, the signal after subtraction of the stored offset power level may be negative. In this case, OL will be displayed since the log of a negative number is not defined. This display will clear once the signal becomes positive.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A.5.3 Relative Measurements

The relative mode displays the optical power normalized to a stored reference. The following equation illustrates this relationship:

REL reading = Net Applied Power/Reference Power

=((I-Iz)/R)/Reference Power

where

I = detector input current

Iz = detector background current defined when the ZERO button was pressed

R = responsivity of the detector in A/W (or detector with attenuator)

To make REL measurements with background correction, proceed as follows:

a. Select the channel to be used for the measurement by clicking on the Edit Channel button until the channel you want to use is highlighted.

b. Select the REL mode by clicking on the UNITS button until the REL annunciator in the display area is lit.

c. Select the proper wavelength by clicking on the button with the λ on it and entering the wavelength in nm.

d. Select autoranging mode by clicking on the AUTO button so that the AUTO annunciator is lit.

e. Block the light to be measured, and click on the ZERO button to background correct. If the ZERO annunciator is not lit, press ZERO again so that it is.

f. Unblock the light to be measured and read the relative optical power referred to the stored reference from the display area.

A.6 Common Measurement Errors

The most common sources of optical power measurement errors are listed below:

Type of Error	What should be done?
Radiometry	Check that all of the light is actually hitting the detector.
Ambient light	Check that the ambient light has been properly zeroed before making measurements. Eliminate ambient light as much as possible
Wavelength Calibration	Check that the proper wavelength has been set.
Detector Saturation	Check that the optical power density remains below the detector's saturation threshold.
Meter Configuration	Check that the meter was powered up or reset with the correct calibration module installed. Check that the attenuator mode reflects the presence or absence of the attenuator. Make sure that the attenuator serial number matches the calibration module and detector in use.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix B: Helpful Hints

B.1 Introduction

This section discusses some of the characteristics and idiosyncrasies of the 4832-C and can be used to some extent as a troubleshooting guide.

B.2 Variables that Affect the Acquisition Rate

The acquisition rate of the 4832-C is dependent on numerous variables, some of which are listed below:

B.2.1 Number of Active Channels

As the number of active channels that are taking acquisitions increases, the meter will require more time to process the data. If you want to optimize the acquisition rate of one channel, it is best to stop acquisition of the other channels. When all four channels are active, the microcontroller on the PC plug-in board has to sequentially switch between the four channels and initiate an A/D conversion for each channel. All these A/D conversions take a significant amount of time that can be avoided if you are interested in fast acquisition of only one channel.

B.2.2 Units of Measurement

The units of measurement also has a significant influence on the acquisition rate. The following paragraphs are sequenced in the order that the microcontroller performs its operations on an A/D acquisition.

The microcontroller on the PC plug-in board acquires the data from the A/Ds in raw counts relative to a full scale voltage. This raw data is then messaged using integer arithmetic with a few factors which include the amplifier offsets that were measured during the autocal process, a factor that accounts for the gain of the amplifier, and the scaling relative to full scale. At this point if the units of measurement were "RAW", the microcontroller would be done and it would send the reading to the PC.

If the units of measurement were amps, the microcontroller would make an additional calculation using floating point arithmetic to calculate the reading in units of amps. Since floating point arithmetic is slower than integer arithmetic, the reading will take considerably longer to process.

If the units of measurement were watts, the microcontroller would have to perform one more floating point calculation. The earlier result in units of amps must now be divided by the responsivity of the detector using again floating point arithmetic. As you can see, the process to get to units of watts is quite time consuming.

B.2.3 Parser Function Call

As discussed in the section entitled "Making Fast Raw A/D Data Acquisitions", the call to the parser function, parse4832( ), is slower than the call to either readRaw( ) or readRaw4( ). If acquisition rate is more important than the units of measurement, use the direct readRaw( ) function calls. You can later convert the raw A/D data into units of amps and then into watts by using the equations listed in the **UNITS_n** description in the command set section.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

B.2.4 Application Environment

The application environment has a significant influence on the data acquisition rate.

The 4832-C's specified single-channel data acquisition rate of 4000 Hz, has been measured using the medium model library compiled with Microsoft C. Performance may vary between compilers.

Also, when operating the 4832-C in MS Windows, there can be a significant reduction in the acquisition rate due to other applications running in the background and the inherent latencies involved in Windows.

B.3 Serial Interface Noise

When monitoring any one of the analog outputs of the 4832-C amplifier box with an oscilloscope, you will notice small level digital noise riding on the analog signal. This digital noise comes from the serial interface that connects the amplifier box to the PC plug-in board.

However, this digital noise does not affect the readings because the A/Ds are making their acquisitions during the time when the serial bus is not active. In other words, the acquisition occurs between the digital noise spikes.

If you want to monitor the analog signal without the digital noise as a distraction, the serial interface can be put to sleep by sending the **STOP** command. Sending the **STOP** command causes the microcontroller on the PC plug-in board to turn the serial interface off until a command or query is sent that involves communication with the amplifier box.

B.4 White Noise on the Analog Output

Because the 4832-C has a high analog bandwidth, the white noise amplitude can be in the order of 120mVp-p in the highest gain, Range 0. Range 0 is especially noisy because it has an additional voltage gain of X10 over the pure transimpedence of Range 1. Range 0 is unique in that respect because it is the only range that uses voltage amplification. In other words, if Range 0 has a noise amplitude of 120mVp-p, then Range 1 would have approximately 12mVp-p of white noise.

The noise can be minimized by enabling the 5Hz low-pass filter by using the command, **FILTER_n 1**. Although enabling the 5Hz filter reduces the noise, keep in mind that the bandwidth is reduced to 5Hz and that this situation should be used for making measurements of steady state optical signals or of signals where you are only concerned with the average DC component.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

B.5 Crosstalk Between Channels When One Channel Saturates

Depending on how quickly your optical signal increases in amplitude, it is possible for one of the channels to saturate its amplifier and cause a small amount of crosstalk into the other channels. This crosstalk is typically worse when the signal causing the saturation is periodic.

A typical scenario is when you have a chopper modulating the optical signal. As the chopper rotates from the blocked position to the open position, the meter may have to range up many decades. At the instant when the chopper let the light through, the amplifier probably saturated because the meter was in a high gain. Because ranging takes from between 200 microseconds to 2 milliseconds, depending on the destination range, the amplifier will be saturated for a short time and consequently induce a small effect on the other channels.

One way to avoid crosstalk from a periodic signal is to put the channel in manual ranging mode. Select the range that is appropriate for the highest optical intensity.

B.6 Ranging Times

When the 4832-C changes ranges due to a change in input light level, it flags the data by means of the ranging bit (see description of RWS? for more details) to indicate that the output has not settled. The amount of time this flag is asserted depends on the new range. See Ranging Times listed in Electrical Specifications table as shown in Section 1.4.1.2 for a listing of the ranging time for each range.

NOTE

If the light input changes by more than 2 decades the 4832-C must range twice, resulting in the addition of the two ranging times. For instance, if the meter ranges from range 0 to range 2 the ranging bit will be asserted for 4ms total. The analog output may be saturated during this interval.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix C: Parser Errors

-102, ERR_SYNTAX

Occurs when an error in the command structure or parameter type is detected. Some typical causes are:

Using the wrong parameter type.

Using ASCII characters outside of a string constant that are not defined by the command language syntax.

Missing or too many parameters.

Using a number as a command mnemonic.

The above list is not exhaustive but gives the basic idea of some typical causes.

-222, ERR_OUT_OF_RANGE

This error will occur if a parameter is out of a valid range or not in the set of valid parameters for a given command.

-1223, ERR_INSTRUMENT_ID_FAIL

This error occurs when the instrument identification query failed. This error is related to error -1236.

-1236, ERR_INTERPRET_RESPONSE

Occurs when the response from the meter does not satisfy the rules of the communication protocol. When this error occurs, there is either corrupted data in the FIFOs or the microcontroller on the PC Plug-in Board did not correctly respond to a query.

-1240, ERR_INSTRUMENT_TIMEOUT

This error occurs when the meter exceeds the maximum allowable time to respond to a query. When this error occurs, it means that the microcontroller on the PC Plug-in Board probably did not understand the query given to it by the software drivers.

-1300, ERR_INSTRUMENT_SPECIFIC

This error will capture additional problems which are not covered by the rest on this list.

-9999, ERR_INITIALIZATION_FAIL

This error occurs when the meter does not initialize properly. Possible causes are a malfunctioning amplifier box or PC Plug-in Board.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

WORLDWIDE HEADQUARTERS
NEWPORT CORPORATION
1791 Deere Avenue
Irvine, CA 92606

(In U.S.): 800-222-6440
Tel: 714-863-3144
Fax: 714-253-1680

INTERNET
tech@newport.com

BELGIUM
Tel: 016-402927
Fax: 016-402227

CANADA
Tel: 905-567-0390
Fax: 905-567-0392

FRANCE
Tel: 33-1 60 91 68 68
Fax: 33-1 60 91 68 69

GERMANY
Tel: 49-6151-3621-0
Fax: 49-6151-3621-50

ITALY
Tel: 39-2-924-5518
Fax: 39-2-923-2448

JAPAN
Tel: 81-3-5379-0261
Fax: 81-3-3225-9012

NETHERLANDS
Tel: 030-6592111
Fax: 030-6570242

SWITZERLAND
Tel: 41-1-740-2283
Fax: 41-1-740-2503

TAIWAN
Tel: 886-2-506 2366
Fax: 886-2-507 9268

UNITED KINGDOM
Tel: 44-1635-521-757
Fax: 44-1635-521-348

Newport®

Visit Newport Online at: **http://www.newport.com**

P/N 21974-01, Rev. A
Printed in the USA on recycled paper

Newport Corporation, Irvine, California, has been certified compliant with ISO 9002 by the British Standards Institution.

Certificate No.: FM 27207

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP