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DSI

# ACQ16 USB Installation Manual

Model: PNM-P3P-USB16  
Manual: MU00153-001  
Revision 53



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# Contents

- System Overview** **5**
  - ACQ16 USB Acquisition Interface Unit ..... 5
  - System Configuration ..... 5
  - System Requirements ..... 6
  
- Configuring the System** **7**
  - System Description ..... 7
  - Initial Inspection ..... 7
  - Parts List ..... 7
  - Software Installation ..... 8
  - Installing the ACQ16 USB Acquisition Interface ..... 8
  - ACQ16 USB Connections ..... 8
    - USB Port Connector ..... 9
    - Auxiliary Connector (Preview Feature) ..... 9
    - Signal Input ..... 9
  
- Getting Started** **11**
  - Introduction ..... 11
  - Starting the P3 Plus Program ..... 11
  
- Calibration Dialog** **13**
  - Configuring the ACQ16 USB ..... 13
    - General Tab ..... 13
    - Configuration Tab ..... 16
    - Descriptions Tab ..... 18
  - Voltage View and Resetting ..... 19
    - Voltage View ..... 19
    - Reset ..... 20
  
- Appendix** **21**
  - Specifications ..... 21
  - Accessories / Replacement Parts ..... 22
  - Troubleshooting ..... 22
  - Interface Configuration ..... 22
  - Rack Mounting ..... 23
  
- Maintenance** **25**
  - Introduction ..... 25
  - Cleaning ..... 25
    - General ..... 25
  - Re-Certification of Performance ..... 25
  
- Declaration Electromagnetic Emissions/Immunity** **26**

Electromagnetic Emissions/Immunity Tables .....26

# Safety

This general safety information is for both user and service personnel. Specific **WARNINGS** and **CAUTIONS** will be found throughout the manual where applicable. Please refer to the Sécurité section for the French translation of this safety section.

## TERMS AND SYMBOLS IN THIS MANUAL AND ON THE EQUIPMENT



CAUTION, this symbol indicates paragraphs providing cautionary and detailed information about a specific part of the instrument. That part of the equipment is also marked with this symbol (See references to this symbol in the manual).



WARNING, risk of electric shock



AC, Alternating current



Equipotentiality / Chassis ground



OFF (connection to AC mains)



ON (connection to AC mains)

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### WARNING



**IF THIS INSTRUMENT IS OPERATED OR USED IN A MANNER NOT SPECIFIED, THE PROTECTION PROVIDED BY THE SYSTEM MAY BE IMPAIRED. DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS.**

# OPERATIONAL SAFETY CONSIDERATIONS

## POWER SOURCE

This instrument is intended to operate indoors from a power source that does not apply more than 250 volts RMS between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is required. If the unit is mounted in a permanent installation (i.e. rack-mounted), then the user **MUST** provide access to the power switch **OR** connect the instrument to a circuit with a user accessible breaker or power switch.

## PROPERLY GROUND THE INSTRUMENT

This instrument is grounded through the power cord. It is a Class 1 Device. Grounding reliability can only be achieved when the equipment is connected to a hospital grade receptacle. Use only the hospital grade power cord and connector specified for your instrument. Use only a power cord that is in good condition.

Upon loss of the protective-ground connection, all accessible conductive parts may render an electric shock.

## USE PROPER TEST LEADS AND CABLES

Test leads and/or interconnect cables may carry **HAZARDOUS** live voltages. They must be examined regularly for wear. Worn leads or cables should be replaced.

## USE THE PROPER FUSE

The instrument has internal fusing only and is not user serviceable.

## EMI/RFI

The amplifier has been tested to meet EMI/RFI susceptibility and radiation standards. However, the user should be aware of possible electromagnetic interactions between this device and other devices in the same area and correct the situation as needed.

## WARNINGS FOR AUTHORIZED SERVICE PERSONNEL

Dangerous voltages exist at several points in this instrument. To avoid personal injury, do not touch exposed connections or components while power is on. Disconnect power before removing protective panels, soldering, or replacing components.

# System Overview

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## ACQ16 USB Acquisition Interface Unit

The ACQ16 USB Acquisition Interface Unit is one of the available acquisition interfaces for the DSI/Ponemah software. An acquisition interface unit interfaces high-level analog signals into the P3 Plus system.

The P3 Plus software is designed for the user whose application demands flexibility along with accurate, continuous, non-interrupted data monitoring, recording, and analysis in a standardized environment. The Ponemah system combines specialized hardware and software, transforming your personal computer into a medical research workstation. This unique, comprehensive data recording tool can be used to provide you with continuous data storage and an analysis of the results of your experiments either as they occur, or during a subsequent replay. The Ponemah system is a 32-bit application designed for the Microsoft Windows™ operating system environment, delivering very efficient use of the computer.

The ACQ16 USB accepts any conditioned high level input (up to  $\pm 10V$  full scale), allowing the system to be easily configured for special application requirements. The ACQ16 USB is the interface between instrumentation signal conditioner modules and the system computer. The acquisition interface accepts the input from an expansive array of analog signals and converts the signal for use by the system computer. Any quality analog signal conditioning system, such as the 4600 or 6600 family of modules may be utilized.

The ACQ16 USB includes an embedded digital control board that communicates and transfers data over a USB connection with your PC. All that is needed on the PC is one available USB port. No additional hardware on the host PC is required.

<b>NOTE:</b>	It is recommended to use a USB 2.0 connection, but the ACQ16 USB will communicate using USB 1.1.
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## System Configuration

The ACQ16 USB is a sixteen-channel acquisition interface unit utilized by the Ponemah system. It has sixteen BNC input connectors for interconnection to instrumentation signal conditioning.

For detailed information on the Ponemah system or Analysis software modules, please refer to their specific Reference Manuals.

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## System Requirements

The system requirements for the ACQ16 USB are the same as the P3 Plus application with the following differences.

- Your choice of instrumentation signal conditioning modules and analysis modules.

Please view the P3 Plus Manual for system requirements.

For information on DSI/Ponemah products and services, check out our website at [www.datasci.com](http://www.datasci.com).



# Configuring the System

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## System Description

The ACQ16 USB permits continuous data acquisition at up to an aggregate 100,000 samples per second.

The Acquisition interface accepts up to sixteen inputs from standard instrumentation signal conditioning modules. The outputs from these modules are connected to the individual BNC input connectors on the acquisition interface front panel.



*Figure 1: Front Panel*

The internal AC power supply operates between 100-240VAC at 50/60Hz. The AC input rating is auto switching.

If you require assistance in configuring your system, contact our customer support department. You can also request assistance from our support department by contacting us through our web site at [www.datasci.com](http://www.datasci.com) or email us at [support@datasci.com](mailto:support@datasci.com).

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## Initial Inspection

Prior to attempting any electrical connections or operation, visually examine the unit for any damage.

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## Parts List

The following items comprise the system:

1. Acquisition Interface Unit Model ACQ16 USB
2. PNM-P3P-USB16 software on CD
3. CD with license file
4. P01989-1 USB software key
5. P02124-2 - USB interface cable (2 meters)
6. J02936 - BNC Cable set labeled 1-8
7. J02937 - BNC Cable set labeled 9-16

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## Software Installation

If you did not purchase a complete system with everything installed and tested, you will need to install the P3 Plus system software. For the Acquisition Interface to operate correctly, you must install the software onto the hard disk of the personal computer. The procedures are outlined in the Ponemah Physiology Platform reference manual.

For the ACQ16 USB Acquisition Interface Unit to operate, the user must select ACQ16 USB as the acquisition device. This is done by starting the P3 Plus application, selecting **Application Configuration** from the **Options** menu, selecting the **Acquisition Interface** tab, and selecting **ACQ16 USB**. View the **Interface Configuration** section for details.

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## Installing the ACQ16 USB Acquisition Interface

Steps to install the ACQ16 USB Acquisition Interface:

1. Connect the USB cable between the Acquisition Interface and a USB connector on the PC.
2. Turn on power to the Acquisition Interface unit.
3. When the **Welcome to the Found New Hardware Wizard** dialog appears asking if Windows can connect to Windows Update, select **No, not this time** and click on the **Next** button.
4. A bubble should appear in the lower right hand corner of the screen stating that new hardware was found and that it was the DSI Ponemah ACQ16 USB.
5. On the **Found New Hardware Wizard** dialog, select the **Install the software automatically (Recommended)** option, and click on the **Next** button.
6. After a few moments, the dialog should state that the wizard has finished installing the software for the ACQ16 USB.
7. A bubble should appear in the lower right hand corner of the screen stating that the new hardware is a USB Device.
8. Another bubble should appear stating the new hardware is installed and ready to use.

The hardware drivers are now installed and P3 Plus can be started.

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## ACQ16 USB Connections



*Figure 2: Rear Panel*

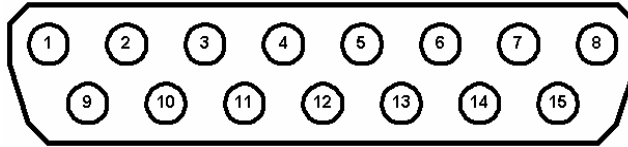
The Acquisition Interface has three rear panel connectors: a power connector, the USB Port connector, and the Auxiliary connector.

## USB Port Connector

The ACQ16 connects to the host computer via the USB 2.0 connector on the rear of the unit. The ACQ16 USB port is backward compatible with USB 1.1. However, only when connected to a USB 2.0 compatible computer, will the ACQ16 USB be able to download data to the computer at its maximum speed. A USB 1.0 connection is NOT recommended.

## Auxiliary Connector (Preview Feature)

This is a 15 pin male “D” subminiature connector. Below is an illustration of the connector and pin designations. It allows inputs and outputs of an event signal as defined by the software protocol.



Pin	Signal	Pin	Signal
1	Trigger In	9	Event Out
2	Reserved	10	Alarm Out
3	Reserved	11	Timer Out
4	Reserved	12	Reserved
5	Reserved	13	Reserved
6	Reserved	14	Reserved
7	Reserved	15	Ground
8	+5V		

*Aux. Port pin descriptions*

**Event Out** - If an event is triggered within P3 Plus, a TTL pulse will appear on this pin.

**Alarm Out** - If an alarm condition occurs, a pulse will appear on this pin. The pulse is a TTL level pulse that lasts for the duration of the alarm condition. The alarm condition duration is dependent on the logging rate set. The TTL pulse will last until a logged line of data is reached where the alarm condition does not occur.

**Timer Out** - If a timer reaches its final time, a TTL pulse will appear on this pin. For a Timer Up configuration, once the timer reaches the set value, the pulse will execute. For a Timer Down configuration, once the timer reaches zero, the pulse will execute.

**Trigger In** - If this pin is set to 0V, an external event (Event y) will be triggered in P3 Plus. The recommended time that the pin should be set to 0V is approximately 1 second.

## Signal Input

Signal input is accomplished via the sixteen BNC connectors on the front panel of the Acquisition Interface. The input circuit has a buffered fixed span of  $\pm 1.25$ ,  $\pm 2.5$ ,  $\pm 5$ , or  $\pm 10$  Volts full scale. These ranges are selectable using the P3 Plus software.

The ranges allow you to set up the ACQ16 USB for full-scale compatibility with most common signal conditioning systems.

# Getting Started

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## Introduction

Before turning on the Acquisition Interface power, be sure the line voltage is within the power supply specifications.

The power switch for the Acquisition Interface is located on the rear of the unit. A green light located on the front panel illuminates when power is ON.

The only operating control for the Acquisition Interface is the span settings in the P3 Plus software. These settings allow the user to set the module to be electrically compatible with the output signal from your signal conditioning modules. Consult your operation manuals for your signal conditioning system to confirm the output specifications.

Connect the Acquisition Interface to the USB port selected during installation using a standard USB cable (P/N P02124-2). If you have not already installed the P3 Plus software on your system, please refer to the **Ponemah Physiology Platform** reference manual for installation instructions.

Connect your input signals.

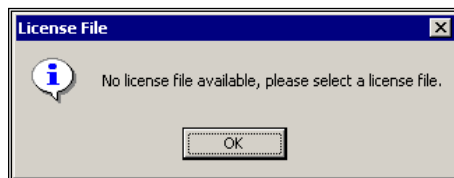
Once the inputs are connected, power up the Acquisition Interface, and start the P3 Plus application. You are now ready to begin recording data.

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## Starting the P3 Plus Program

After the software has been installed, start the system by double clicking on the **P3 Plus** icon on the desktop.

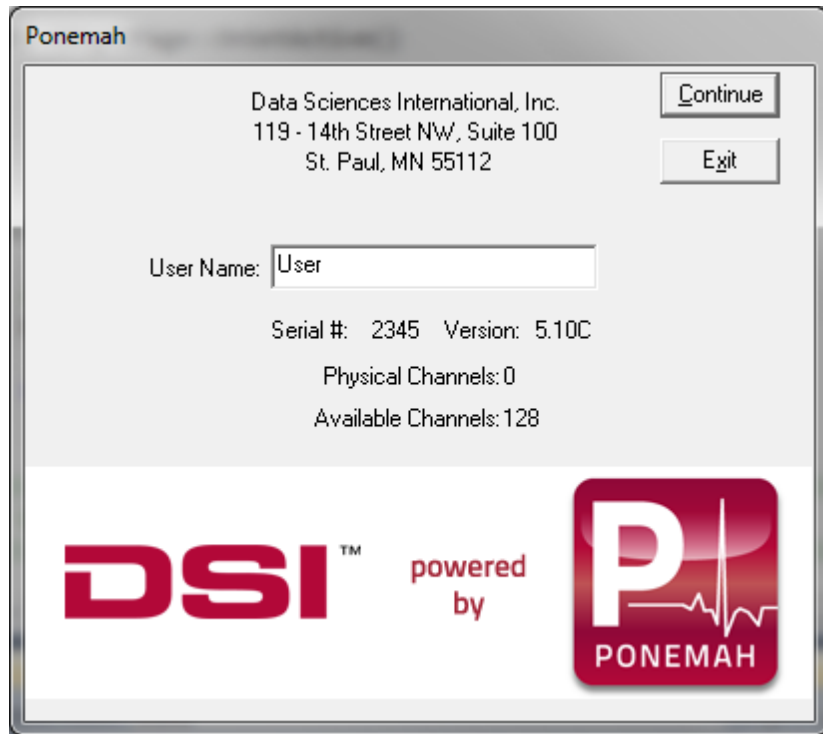
If the software has been installed correctly, the system will display a dialog that the application needs a license file.



*License File message*

After selecting the **OK** button, the user will be prompted to enter a license file. Insert the supplied license floppy disk, and select the license file from the floppy.

After the license has been loaded, the P3 Plus user name dialog will appear as displayed below.



*User Name Dialog*

The User Name that is entered will be recalled automatically the next time the system is started. The name entered here will be used on all printouts and audit logs for identification of the data collected.

After clicking on the **Continue** button, the Main Menu screen will be displayed. You are now ready to begin setting up, acquiring, and analyzing your input data.

The P3 Plus software includes a “default” test setup to help you get started. If a problem occurred during the installation, the system will report the error. See the Troubleshooting appendix at the end of your P3 Plus software manual for more information.

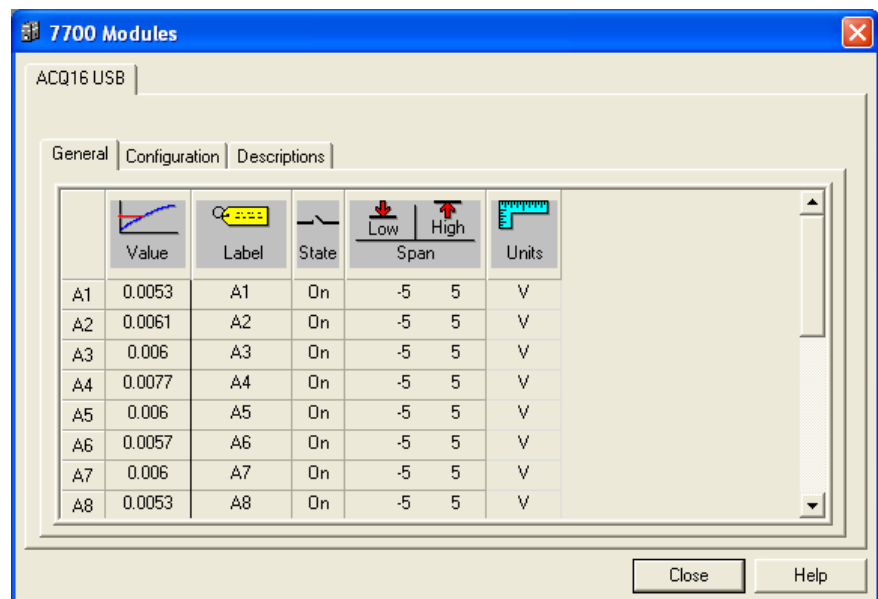
# Calibration Dialog

## Configuring the ACQ16 USB

A group of tabs appears when **7700 Amplifier Setup** is selected from the **Calibration** menu. This will include General, Configuration, and Descriptions tabs, which are accessed by their own tabs.

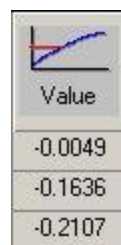
### General Tab

The General Tab allows the user to set up channel specific signal conditioner parameters. They include the channel Label, State, and Span.



ACQ16 USB General Tab

### Value



This column continuously displays the current value that is on the input of the signal conditioner. This column is updated by the system once every second and cannot be updated by the user.

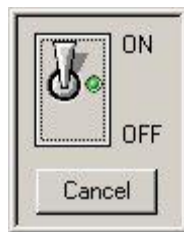
This column is useful in troubleshooting the signal conditioner input connection.

### **Label**



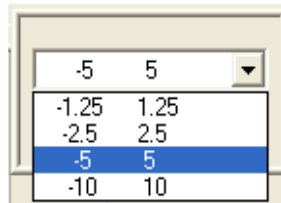
Label allows you to type in a logical name of up to 10 additional characters for a particular input channel. The chosen name will be saved and used to identify the input data throughout the system, such as in the dialog that displays input channel information. The default is the slot letter and channel number in slot.

### **State**



The State function will turn the sampling on or off for that channel, but the last value will continue to be displayed. It is recommended that this selection should always be left in the ON condition. To turn any channel on or off, set the analysis to DIS in the P3 Setup dialog. The default is ON.

### **Low High Span**



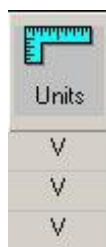
There is one span control that sets the maximum input of the signal conditioner. The span is symmetrical. Ranges available are  $\pm 1.25\text{V}$ ,  $\pm 2.5\text{V}$ ,  $\pm 5\text{V}$ , and  $\pm 10\text{V}$ . The Span defines the sensitivity or scale for each channel. This function sets the maximum and minimum values in user units that will be recorded.

**NOTE:** Span should be set AFTER High/Low Cal and High/Low Unit values are set in the Configuration tab.

The Span may be chosen to be any of the four selections within the valid range for that input. When Span is selected, a dialog box appears. Simply select the range desired. The actual value you enter may be considerably different since it will usually be in the units corresponding to your application. This will be defined by the calibration and unit set up in the Configuration tab. Refer to High/Low Cal and High/Low Unit setup for a sample setup. The default is  $\pm 5$ .



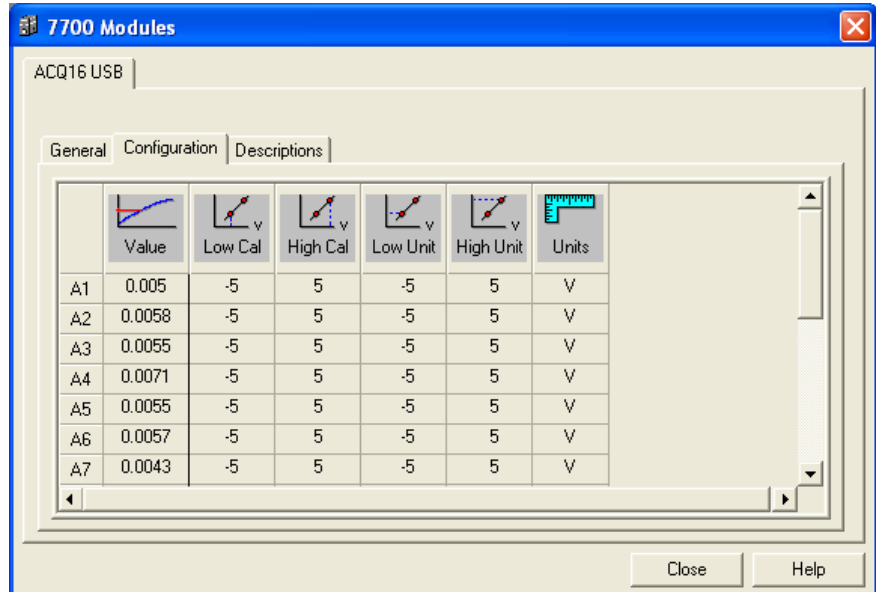
## **Units**



This column displays the units that have been set in the **Configuration** tab and cannot be changed in this tab. The Units have no effect on the channel and it is for documenting the Input units.

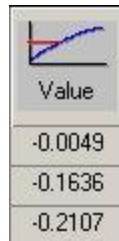
## Configuration Tab

To set up the actual signal input configuration, select the Configuration tab in the signal conditioner setup panel. The Configuration set up screen as shown below will be displayed.



ACQ16 USB Configuration Tab

### Value



This column continuously displays the current value that is on the input of the signal conditioner. This column is updated by the system once every second and cannot be updated by the user.

This column is useful in troubleshooting the signal conditioner input connection.

### Low Cal & High Cal



If you have available an input calibration signal (voltage), it can be used to calibrate the inputs. Double clicking on either the Low Cal or High Cal cell associated with the channel will open a dialog box as shown. This function allows a specific value to be entered that will be assigned to either the Low or High Cal. See Measure section for more information on this function and the use of the feature.

Additional setup information is needed to correctly scale the particular signal input. Since the input can be from a vast number of different sources, the specific input

Units, High Unit and Low Unit, of measure should be set up. This calibrates the channel to the actual user units and scaling. The system will now display, record, and perform analysis directly in your units of measure. System defaults are: -5 Low Cal = -5 Low Unit and +5 High Cal = +5 High Unit. Low and High Cal entries are actual voltage values. The same defaults are present in the High Cal function. Also see Low and High Units and Measure section.

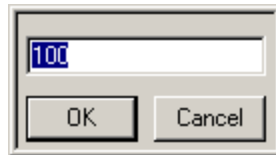
### Measure



In instances where there is offset on the input signal, the Measure function can compensate for this offset. The software can Measure a Low or High Cal value, and set that value to equal the entry in the Low or High Units cells.

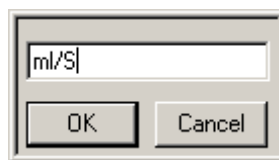
If you have available an input calibration signal (voltage), it can be used to calibrate the inputs. Double clicking on either the Low Cal or High Cal cell associated with the channel will open a Measure dialog box as shown here. This function allows you to manually enter a specific value that will be assigned to either the Low or High Cal, or, by clicking the Measure button accept an external voltage that will set the calibration of the signal conditioner channel to correspond to the external calibration signal. Measure will enter any value that is being read at that time.

### Low Units & High Units



The user can select the units he wishes to display. Combined with Low Cal and High Cal, the user can set “x” value in Cal to equal “y” number of Units. Example: If 2.500V is entered in the High Cal and 100 was entered in High Units, then 2.500 V = 100 units. Also see Measure Function.

### Units



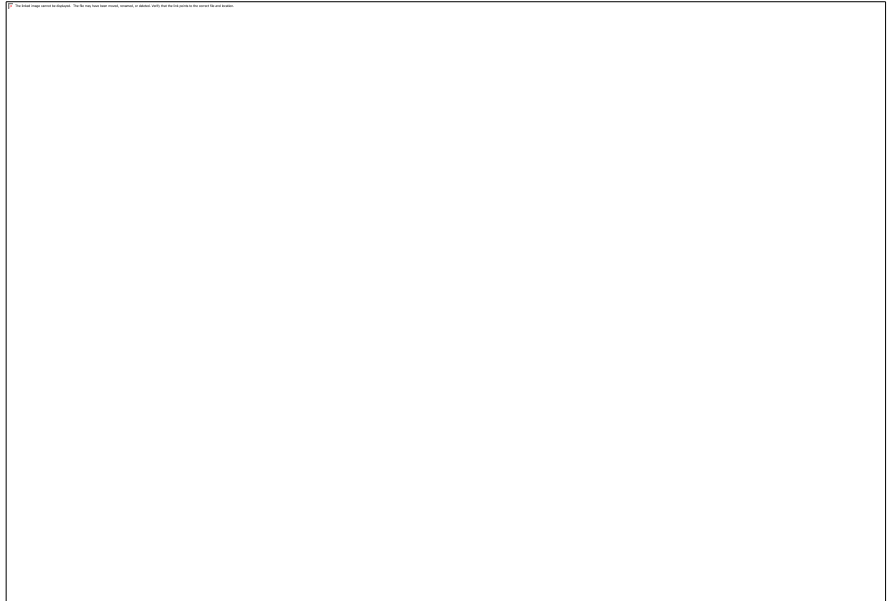
Units allow you to enter the actual engineering units being measured. The default is Volts (V), but this may be changed to any engineering units. The User Unit input field is limited to 9 characters.

Example: Suppose channel 4 is connected to a flow meter that outputs a voltage proportional to the blood flow. To record this, input A4 will be configured in Voltage Mode. Double clicking on the A4 Units cell will display a text box, allowing you to enter "ml/S".

## Descriptions Tab

The Descriptions tab allows the user to enter a text description for each input.

The Descriptions Menu allows you to enter text to further describe the parameters being recorded. This may include additional user information or test setup information. This information is stored with the test set up in a text file. It is not directly used as part of the signal conditioner configuration but is available for review or printing whenever desired. Double click on the text area, type in the information, and then click on the OK button. Below is a typical Description tab.



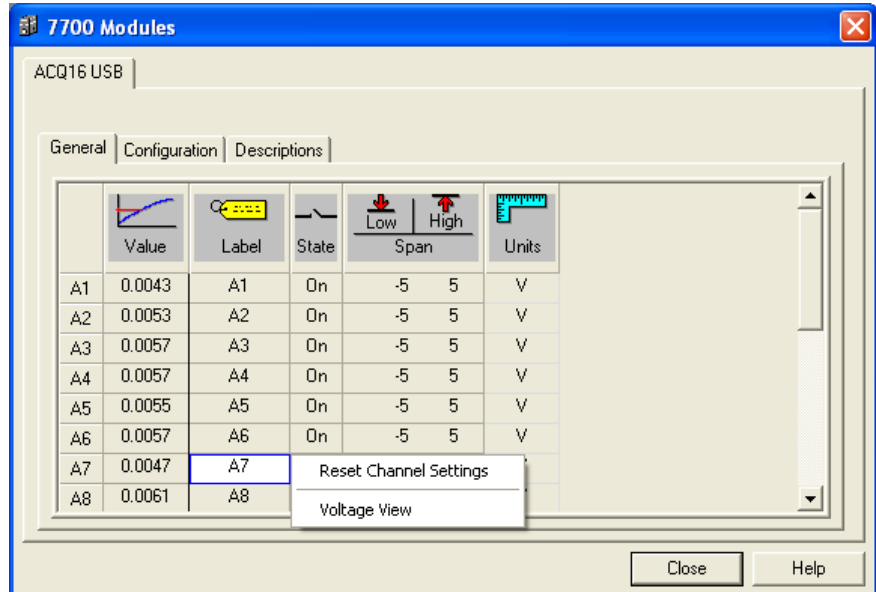
*ACQ16 USB Description Tab*

# Voltage View and Resetting

The ACQ16 USB has the capability of viewing its values for debugging purposes and also resetting each channel if a problem has occurred during setup.

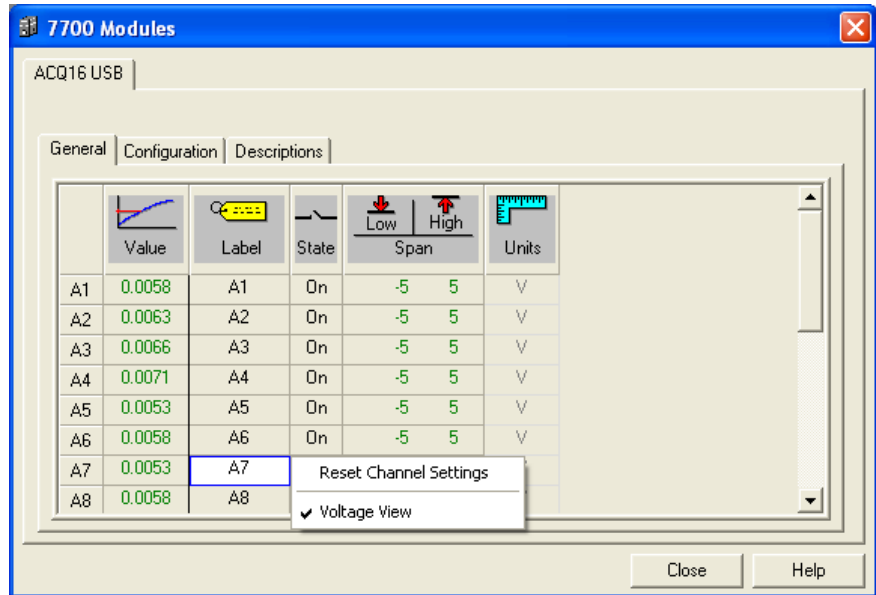
## Voltage View

This view allows the user to see the raw voltage that is being inputted into the channels. Right click on one of the channels (anywhere except for the Input Identifier or Value columns) and select **Voltage View**. Below is an example of the right click menu that will appear.



### Voltage View Menu

Once voltage view has been selected the values listed for **Value** and **Low/High Span** columns are listed in volts. Those columns values will change from black numbering to green numbering to notify the user that they are running in voltage view. Also, the **Units** column entry will change from black lettering to gray lettering. When voltage view has been set, the units of the values shown are in V. Shown below is an example of the **7700 Modules** dialog with voltage view set.



### *Voltage View*

To return back to normal view, select **Voltage View** again.

## Reset

This selection allows the user to reset the settings of the channel selected. When selected, the channel will reset all values back to the default settings. See the individual sections for the default values. When this selection is selected, a message box will appear asking if the channel should be reset. This allows the user to select **No** to cancel the resetting of the channel and **Yes** to reset the channel.

# Appendix

## Specifications

<b>Electrical</b>	
Line Voltage	Auto-switching 100-240VAC ( $\pm 10\%$ )
Line Frequency	50/60Hz
Maximum Current	1A @ 120VAC
Fuse	Internal, not serviceable
<b>Analog Inputs</b>	
Number Channels	16
Maximum Input Voltage	30V Peak
Spans	$\pm 1.25$ , $\pm 2.50$ , $\pm 5.00$ , and $\pm 10.00$
Input Impedance	100k $\Omega$
<b>Acquisition System</b>	
Maximum Aggregate Sample Rate	250k samples per second
Resolution	16 bits
Filter	1 pole, fixed @ 50kHz, $\pm 20\%$
Noise	$< \pm 0.25\%$ Full Scale
Offset	$< \pm 0.25\%$ Full Scale
Gain Error	$< \pm 0.25\%$ Full Scale
Bandwidth	Flat to $-1\%$ @ 5kHz, $-3\text{dB}$ @ 50kHz
<b>Auxiliary</b>	
Inputs	7 TTL level lines
Outputs	6 TTL level lines
<b>Environmental</b>	
Temperature: Non operating	$-20$ to $80^\circ\text{C}$
Temperature: Operating	$10$ to $40^\circ\text{C}$
Humidity	$30\%$ to $75\%$
Altitude	2000 meters max
<b>Physical</b>	
Dimensions: height	1.9 inches (48.26mm)
Dimensions: width	16.75 inches (425.45mm)
Dimensions: depth	11.75 inches (298.45mm)
Weight	6.45 pounds
Safety	

Pollution Degree	Pollution Degree2, equipment shall be stored or operated where no conductive pollution occurs
Installation Category	Category 2, designed and tested to withstand limited over voltages

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## Accessories / Replacement Parts

Hospital grade power cable with NEMA 5-15P plug cap (P02198) (supplied)

For North America 230V, a NEMA 6-15P plug cap may be required.

USB 2.0 Cable, 2 meters long (P02124-2) (supplied)

Input Cables J02936 (Ch1 - 8)

Input Cables J02937 (Ch9 - 16)

Note: Replace cables when subjected to deterioration or abuse

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## Troubleshooting

If the system displays the following message on startup, **Acquisition Unit Not Found**, then verify the following:

1. The Acquisition Interface is powered up, and the USB cable is connected to the personal computer.
2. Windows device driver needs to be functional. Check the device through the Hardware Devices menu.

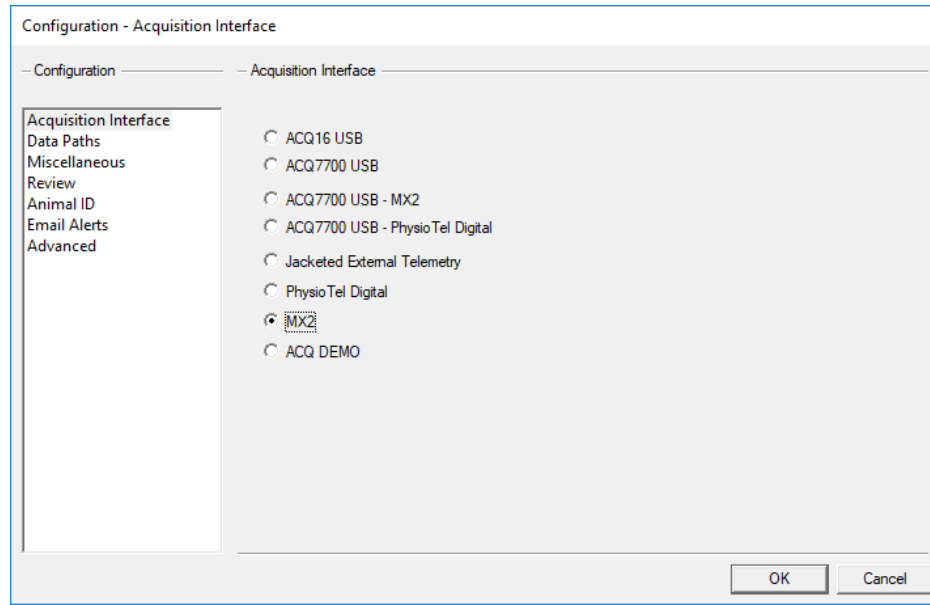
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## Interface Configuration

The configuration of the application interface is done within P3 Plus. Select **Application Configuration** from the **Options** menu and select the **Acquisition Interface** tab.

Below is an example of the **Application Configuration** dialog.



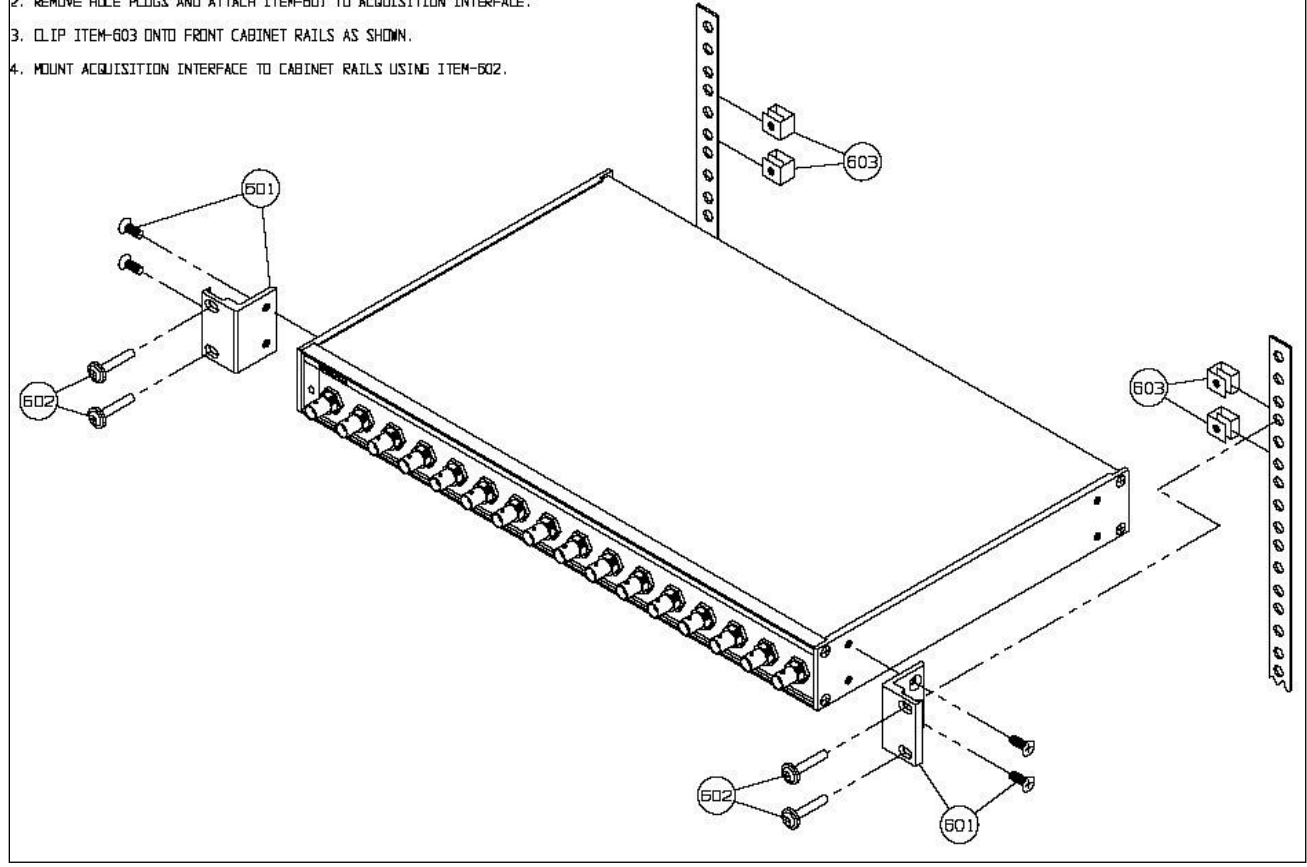


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## Rack Mounting

The diagram below displays how to assemble the rack mount kit.

1. REMOVE RUBBER MOUNTING FEET FROM UNDERSIDE OF ACQUISITION INTERFACE.
2. REMOVE HOLE PLUGS AND ATTACH ITEM-601 TO ACQUISITION INTERFACE.
3. CLIP ITEM-603 ONTO FRONT CABINET RAILS AS SHOWN.
4. MOUNT ACQUISITION INTERFACE TO CABINET RAILS USING ITEM-602.



# Maintenance

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## Introduction

This section describes routine maintenance procedures for the ACQ16 USB.

If the units needs repair, consult a Service Representative. Service and repair are available only from the factory.

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## Cleaning

### General

Clean the case when necessary as described below. If the ACQ16 USB is used in dirty or dusty environments, cleaning should be performed more frequently.

When necessary, power down the acquisition system and disconnect the power cord. Gently wipe the case with a damp rag and mild soap and water solution. Allow surfaces to dry thoroughly.

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## Re-Certification of Performance

For continued Safe Operation and verification of specifications, it is recommended that the ACQ16 USB be re-certified annually at the manufacturing facility.

# Declaration Electromagnetic Emissions/Immunity

## Electromagnetic Emissions/Immunity Tables

<b>Guidance and manufacturer's declaration – electromagnetic emissions</b>		
The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should assure that it is used in such an environment.		
<b>Emissions Test</b>	<b>Compliance</b>	<b>Electromagnetic environment - guidance</b>
RF emissions EN 55011	Group 1	The equipment uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions EN 55011	Class A	
Harmonic emissions EN 61000-3-2	Class A	
Voltage fluctuations / flicker emissions EN 61000-3-3	Complies	The equipment is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.

**Guidance and manufacturer's declaration - electromagnetic immunity**


The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should assure that it is used in such an environment.

<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment - guidance</b>
Electrostatic discharge (ESD) EN 61000-4-2	±6kV contact ±8kV air	Complies	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst EN 61000-4-4	±2kV for power supply lines ±1kV for input / output lines	Complies	Mains power quality should be that of a typical commercial or hospital environment.
Surge EN 61000-4-5	±1kV differential mode ±2kV common mode	Complies	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines EN 61000-4-11	<5% $U_t$ (>95% dip in $U_t$ ) for 0,5 cycle 40% $U_t$ (60% dip in $U_t$ ) for 5 cycles 70% $U_t$ (30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 sec	Complies	Mains power quality should be that of a typical commercial or hospital environment. If the user of the equipment requires continued operation during power mains interruptions, it is recommended that the equipment be powered from an uninterruptible power supply or a battery.
EN-61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE:  $U_t$  is the a.c. mains voltage prior to application of the test level.

**Guidance and manufacturer's declaration - electromagnetic immunity**

The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
<p>Conducted RF EN 61000-4-6</p> <p>Radiated RF EN 61000-4-3</p>	<p>3Vrms 150kHz to 80MHz</p> <p>3V/m 80MHz to 2,5GHz</p>	<p>3Vrms</p> <p>3V/m</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the equipment, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p><b>Recommended separation distance</b></p> $d = \left[ \frac{3,5}{10} \right] \sqrt{P}$ $d = \left[ \frac{3,5}{10} \right] \sqrt{P} \quad 80\text{MHz to } 800\text{MHz}$ $d = \left[ \frac{7}{10} \right] \sqrt{P} \quad 800\text{MHz to } 2,5\text{GHz}$ <p>Where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <math>d</math> is the distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

NOTE 1: At 80MHz and 800MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Field strengths from fixed transmitters, such as base stations for radio (cellular / cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the equipment.

Over the frequency range 150kHz to 80MHz, field strengths should be less than 10V/m.

# Sécurité

Cette information générale de sécurité est pour l'utilisateur et le personnel de service. Des AVERTISSEMENTS et les ATTENTIONS spécifiques seront trouvés dans tout le manuel là où il est applicable.

## LIMITES ET SYMBOLES DE CE MANUEL ET SUR L'ÉQUIPEMENT



ATTENTION, ce symbole indique des paragraphes fournissant des informations d'avertissement et détaillées au sujet d'une pièce spécifique de l'instrument. Qu'une partie de l'équipement est également identifiée par ce symbole (voir les références à ce symbole dans le manuel).



AVERTISSEMENT, risque de décharge électrique



C.A., courant alternative



La terre d'Equipotentiality/chassis



ETEINT (raccordement aux forces à C.A.)



EN MARCHE (raccordement aux forces à C.A.)

**Les produits de DSI/Ponemah ne sont pas "les dispositifs médicaux" prévus pour être employés pour les buts du diagnostic de la maladie ou d'autres conditions, ou dans le traitement, la réduction, ou la prévention de la maladie, ou pour être employés comme dispositif de soutien de la vie. L'utilisation des produits de DSI/Ponemah sont seulement pour les buts de conduire la recherche de la science de vie.**

### AVERTISSEMENT



**SI CET INSTRUMENT EST ACTIONNÉ OU UTILISÉ de quelque sorte NON INDIQUÉ, LA PROTECTION FOURNIE PAR LE SYSTÈME PEUT ÊTRE ALTÉRÉE. N'EMPLOYEZ PAS EN PRÉSENCE DES ANESTHÉSQUES INFLAMMABLES.**

# CONSIDÉRATIONS OPÉRATIONNELLES DE SÛRETÉ

## SOURCE D'ÉNERGIE

Cet instrument est prévu pour fonctionner à l'intérieur à partir d'une source d'énergie qui n'applique pas plus de 250 volts de RMS entre les conducteurs d'approvisionnement ou entre l'un ou l'autre conducteur d'approvisionnement et la terre. Une prise de terre protectrice par le conducteur de terre dans le câble électrique est exigée. Si l'unité est montée dans une installation permanente (c.-à-d. monté sur crémaillère), l'utilisateur DOIT permettre d'accéder à la commutateur de puissance OU relier l'instrument à un circuit avec un commutateur ou un disjoncteur accessibles à l'utilisateur.

## CORRECTEMENT RECTIFIER L'INSTRUMENT

Cet instrument est fondu par le cordon du secteur. C'est un dispositif de la classe 1. Fondre la fiabilité peut seulement être réalisé quand l'équipement est relié à un réceptacle de catégorie d'hôpital. Utilisez seulement le cordon de catégorie d'hôpital et le connecteur de secteur indiqués pour votre instrument. Employez seulement un cordon de secteur qui est en bon état.

Après la perte du raccordement du protecteur-terre, toutes les pièces conductrices accessibles peuvent rendre une décharge électrique.

## EMPLOYEZ LES FILS TEST ET LES CÂBLES APPROPRIÉS

Les fils test et/ou les câbles d'interconnexion peuvent porter des tensions de phase DANGEREUSES. Ils doivent être examinés régulièrement pour l'usage. Des fils ou les câbles usés devraient être remplacés.

## UTILISEZ LE FUSIBLE APPROPRIÉ

L'instrument a seulement des fusibles internes qui ne sont pas accessibles à l'utilisateur.

## EMI/RFI

L'amplificateur a été examiné pour répondre à des normes de susceptibilité et de rayonnement d'EMI/RFI. Cependant, l'utilisateur devrait se rendre compte des interactions électromagnétiques possibles entre ce dispositif et d'autres dispositifs dans le même secteur et corriger la situation si nécessaire.

## AVERTISSEMENTS POUR LE PERSONNEL DE SERVICE AUTORISÉ

Les tensions dangereuses existent à plusieurs points dans cet instrument. Pour éviter des blessures, ne touchez pas les raccordements ou les composants exposés tandis que le courant passe. Débranchez l'appareil avant d'enlever les panneaux protecteurs, souder, ou remplacer des composants.