



# DIGITAL ICP SIGNAL CONDITIONER

PRODUCT MANUAL | MODEL 485B39

# DIGITAL ICP SIGNAL CONDITIONER

MODEL 485B39

## PRODUCT SUPPORT

For answers to questions about this product, consult this manual or the accessory manual. For additional product support, contact The Modal Shop at 800.860.4867 or 513.351.9919, 9 a.m. to 5 p.m. EST. If it is more convenient, fax your questions or comments to The Modal Shop at 513.458.2172 or email our technical staff at [info@modalshop.com](mailto:info@modalshop.com).

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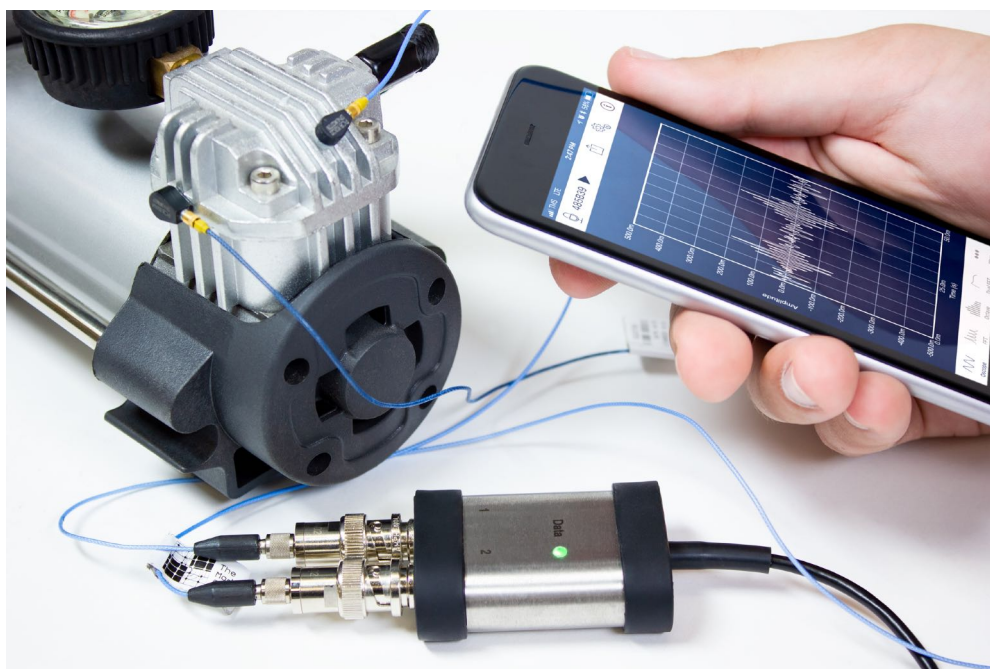
# 1. INTRODUCTION

The 485B39 is a 2-Channel ICP® (IEPE) sensor signal conditioner featuring 2 BNC inputs and a USB digital signal output. This pocket-sized, dual-channel unit provides constant current source to power common ICP dynamic sensors such as accelerometers, microphones, impact hammers, laser tachometers, etc. The device's digital streaming USB output follows the ubiquitous USB Class 1 audio format, making it truly plug & play and directly compatible with Smart Phones, tablets, and laptops running different operational systems such as Windows®, iOS®, Android™, Linux®, etc.

Plug & play connectivity is achieved via USB without any cumbersome setup or driver installation. The 485B39 powers ICP sensors while digitizing their signals: simply plug the unit into a USB port to view, record, or process signals from accelerometers, microphones, force sensors, and other ICP sensors.

Existing third party Windows, macOS®, Android, iOS, or Linux software can be used to record time waveforms or to perform overall RMS measurements, FFTs, and octave measurements. Developers and advanced users can also write applications for the 485B39 using popular programming tools such as MATLAB®, LabVIEW™, C#, and LabWindows™/CVI.

The small form factor, versatility, and powerful software options make the 485B39 the perfect tool for collecting, analyzing, and saving data on-the-go. Whether you are just learning about sensing, taking measurements on a daily basis, or simply want to add digital functionality to your existing sensors, the 485B39 makes a fine addition to your tool set. Typical applications include: general sound and vibration measurements (single or dual channel), binaural recordings, transmissibility studies, isolation studies, condition monitoring, resonance testing, correlation methods, sound and vibration laboratory experiments, quality control, etc.



## 2. SPECIFICATIONS

The 485B39 contains a regulated 24 VDC regulated power supply that provides constant current excitation for up to two individual sensor channels. The inputs utilize BNC connectors and are AC coupled only. Detailed specifications and drawing are below for reference: Notes:

| MODEL 485B39 SPECIFICATIONS                   |   |
|---|---|
| <b>PERFORMANCE</b>                            |   |
| Channel Count                                 | 2                                       |
| Voltage Range (nominal)                       | $\pm 10$ V pk <sup>[1]</sup>            |
| ADC Resolution                                | 24-bit <sup>[2]</sup>                   |
| Frequency Range ( $\pm 5$ %)                  | 0.8 Hz to 20.7 kHz                      |
| Sample Rate                                   | 48, 44.1, 32, 22.05, 16, 11.025, 8 kHz  |
| Antialiasing Lowpass Filter (-3 dB) at 48 kHz | 22.9 kHz <sup>[3]</sup>                 |
| AC High Pass Filter (-3 dB)                   | 1 Hz to 0.5 Hz <sup>[4]</sup>           |
| Digital Output Interface                      | USB class 1 audio                       |
| <b>ENVIRONMENTAL</b>                          |   |
| Temperature Range (Operating)                 | 14 °F to +176 °F (-10 °C to +80 °C)     |
| Temperature Range (Storage)                   | -40 °F to +176 °F (-40 °C to +80 °C)    |
| <b>ELECTRICAL</b>                             |   |
| Excitation Voltage (to sensor: $\pm 5$ %)     | 24 V DC                                 |
| Constant Current Excitation ( $\pm 5$ %)      | 4 mA                                    |
| DC Power (USB)                                | < 500 mW (5 V at 100 mA)                |
| Settling Time                                 | 1.5 s                                   |
| Electrical Isolation (case)                   | Grounded                                |
| Data / Power Indicator                        | Green LED                               |
| <b>MECHANICAL</b>                             |   |
| Housing Material                              | Stainless steel                         |
| Size (length x width x height)                | 2.36 x 1.54 x 0.75 in (60 x 39 x 19 mm) |
| Weight  | 4.4 oz (125 gram)                       |
| Sensor Inputs                                 | 2 BNC jacks                             |
| Digital Output                                | 11 in (28 cm) integral USB cable        |
| USB Connector                                 | Type A                                  |

Notes:

<sup>[1]</sup>  $\pm 8$  V pk, guaranteed

<sup>[2]</sup> 16-bit selectable by software

<sup>[3]</sup> Proportional to sample rate

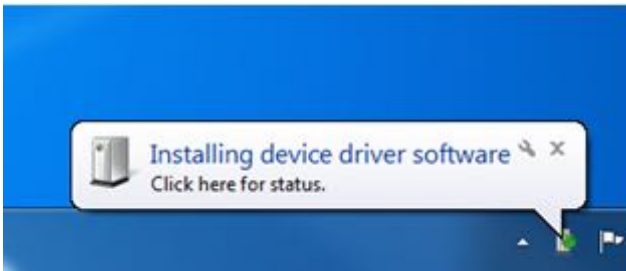
<sup>[4]</sup> Sample rate dependent (48 kHz to 8 kHz)

# 3. GETTING STARTED

## 3.1 Windows 7/8/10

**Step 1** Plug Model 485B39 into a USB port on your PC.

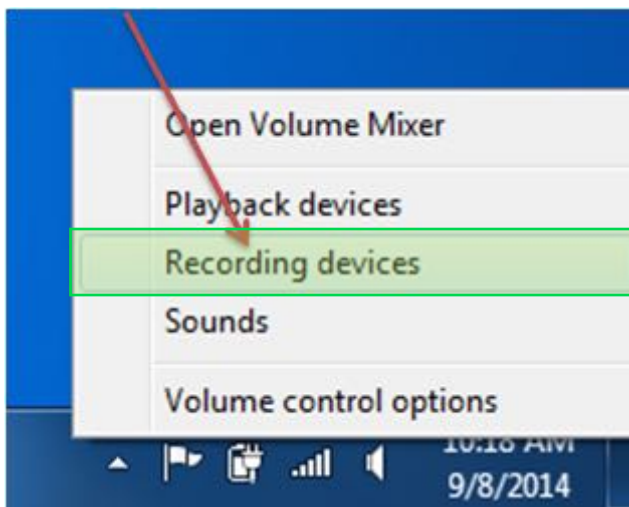
**Step 2** Windows should automatically detect and install the device drivers. A notification will populate in the lower right-hand corner. Sometimes the notification will not populate, so do not be concerned if you do not see the pop-up window. The drivers will still be installed automatically.



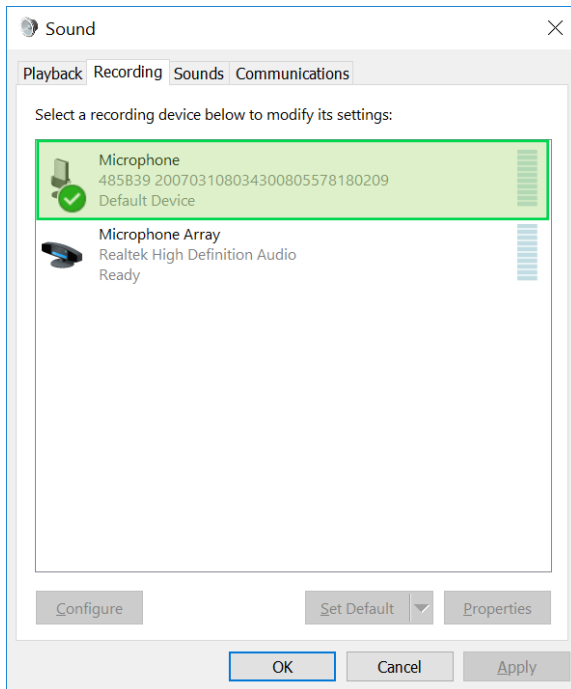
**Step 3** Right-click on the speaker icon in the notification tray.



**Step 4** Select "Recording Devices" from the menu.

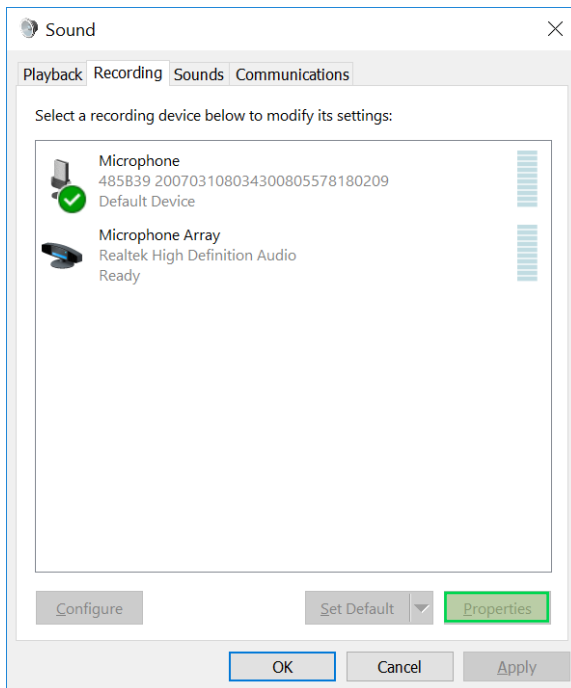


**Step 5** Clicking on “Recording Devices” will open up the Sound Menu. There will be a new “Microphone” there labeled “485B39 2XXXX...” where X will be numbers specific to your device.

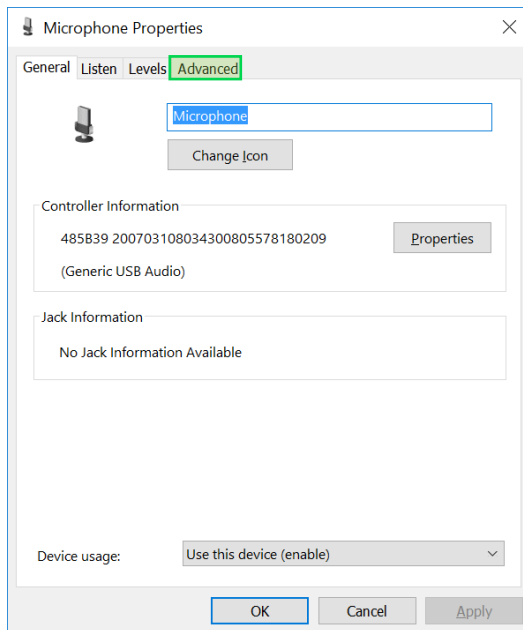


**Step 6** Click the device in the Sound Menu, which will highlight it. Then click the “Set Default” button near the bottom to set the sensor as the default recording device so that it will remain active. There should be a green check mark next to model 485B39 entry on the screen (If you have a sensor connected to the 485B39 you can tap the sensor at this point and there should be activity in the amplitude meter.)

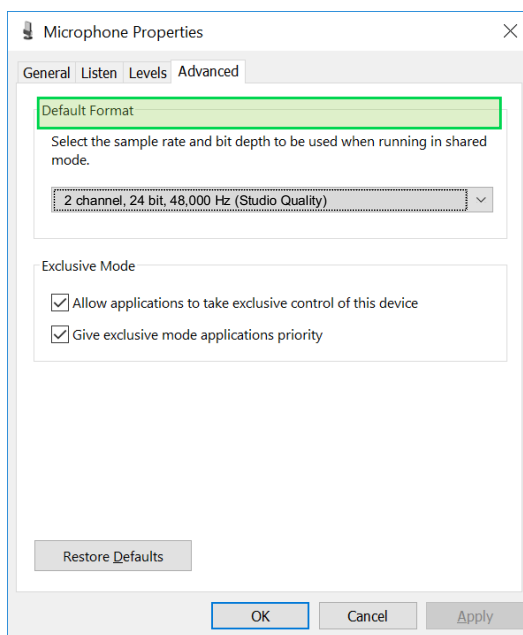
**Step 7** Next, click the “Properties” button next to the “Set Default” button.



**Step 8** Select the “Advanced” tab under Microphone Properties.



**Step 9** Select a sample rate of 48,000 Hz and 24 bit (Studio Quality).



**Step 10** Save these settings by clicking the “OK” button until the windows are all closed.

**Step 11** Open any software that allows the recording of vibration or sound.

**Step 12** Start collecting data.



## 3.2 iOS for iPad/iPhone

**Step 1** Using one of the following adapters from Apple, plug the 485B39 into your iOS device.

### Lightning to USB Camera Adaptor



MD821AM/A

MK0W2



### 30-pin to USB Adaptor



(Currently discontinued from Apple)



**Step 2** Open any app that allows the recording of vibration or sound.

**Step 3** Start collecting data.

## 3.3 Android

**Step 1** Using the appropriate adaptor, plug the 485B39 into your Android device.

### USB 30-pin Male to Type A Female On-The-Go (OTG) Cable



### USB 2.0 Micro USB Male to Type A Female On-The-Go (OTG) Cable



### USB 3.0 Micro USB Male to Type A Female On-The-Go (OTG) Cable



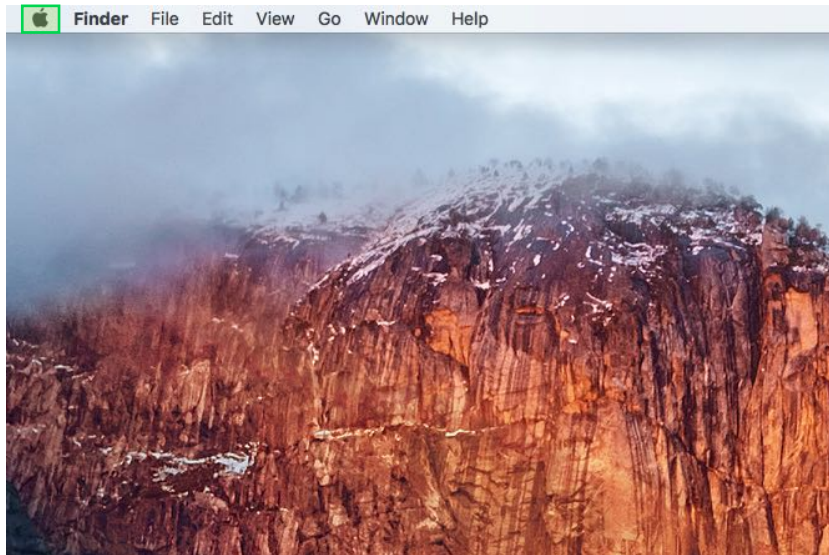
**Step 2** Open any app that allows the recording of vibration or sound.

**Step 3** Start collecting data.

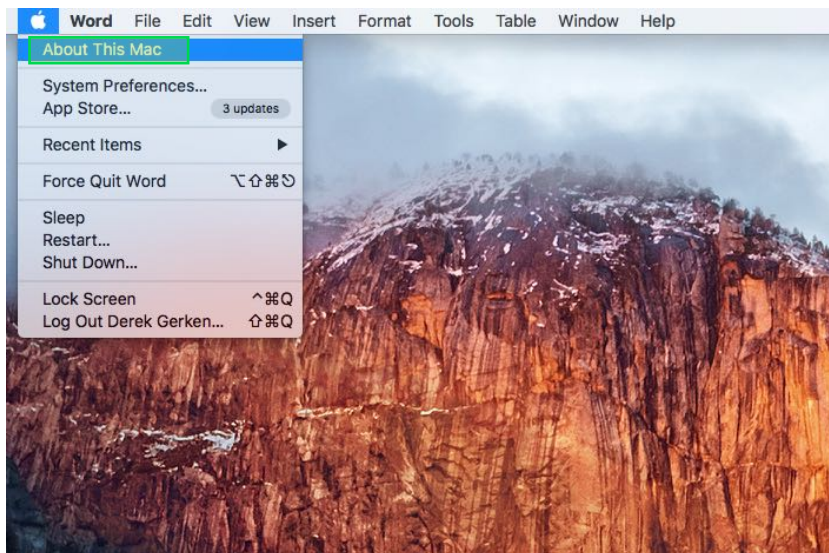
## 3.4 Mac OS X

**Step 1** Plug Model 485B39 into a USB port on the Mac.

**Step 2** Click on the Apple symbol in the navigation bar on the left.



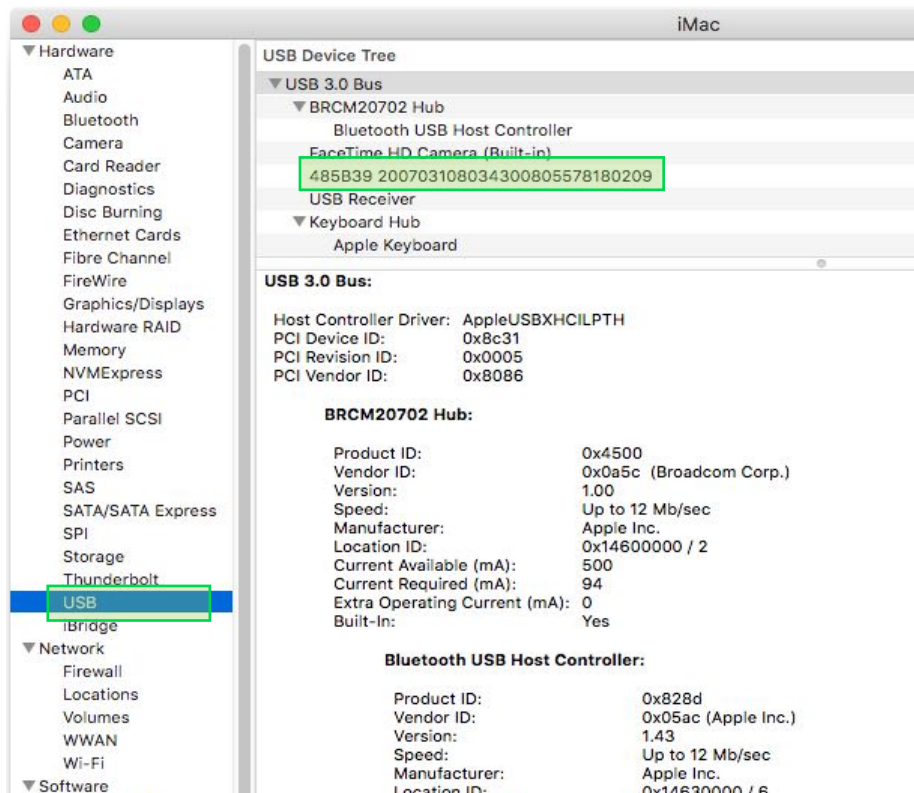
**Step 3** Select "About This Mac" from the drop-down menu.

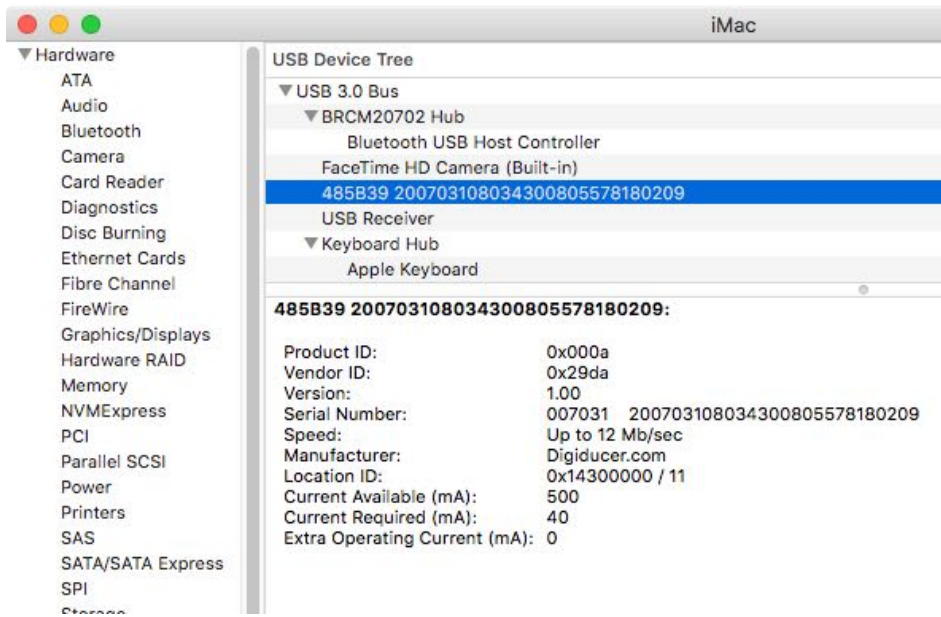


**Step 4** The "About This Mac" menu will pop up after being selected. Click the "System Report..." button which will give you more details about your computer. If running earlier versions than macOS High Sierra, there will be a "More info..." button that you need to click first before you can click a "System Report..." button.



**Step 5** On this menu, find USB under the "Hardware" list, and select it. On the right in the main window under "USB Device Tree" you should see your device as "485B39 20XXXX..." These X's represent certain characteristics of each device.)





**Step 6** Open any application of your choice that allows the recording of vibration or sound.

**Step 7** Start collecting data.

## 4. AVAILABLE SOFTWARE

Below is a short list of third-party software that can be used to collect and analyze data. For an updated list of applications, please check our web site or contact [techsupport@modalshop.com](mailto:techsupport@modalshop.com).

- a) Windows
  - SpectraPLUS-SC by Pioneer Hill Software LLC – [www.spectraplus.com](http://www.spectraplus.com)
- b) iOS
  - SignalScope X – Faber Acoustical – [www.faberacoustical.com](http://www.faberacoustical.com)
  - SignalScope Pro 2018 – [www.faberacoustical.com](http://www.faberacoustical.com)
- c) Android
  - Vib.Cloud by iTnnovate – [www.vib.cloud](http://www.vib.cloud)
- d) Development Environments
  - MATLAB® – [www.mathworks.com](http://www.mathworks.com)
  - NI LabVIEW™ and NI LabWindows™/CVI – [www.ni.com](http://www.ni.com)

## 5. SERVICE

Because of the sophisticated nature of digital instrumentation, field repair is typically NOT recommended and may void any warranty. If factory service is required, return the 485B39 according to the “Return Procedure” stated below. A repair and/or replacement quotation will be provided prior to servicing. Before returning the unit, please consult a factory applications engineer concerning the situation as certain problems can often be corrected with simple on-site procedures.

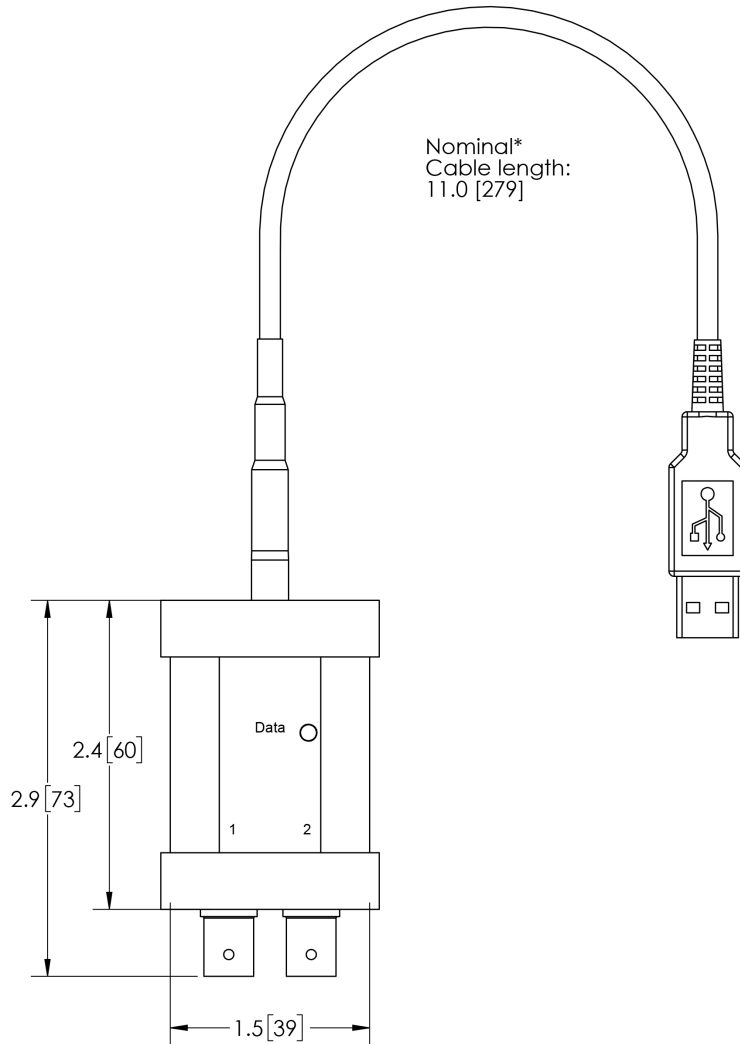
## 6. RETURN PROCEDURE

To expedite returned instrumentation, contact The Modal Shop for a **RETURN MATERIAL AUTHORIZATION (RMA) NUMBER**. Please have information available such as serial number and date of purchasing. Also, to insure efficient service, provide a written description of the symptoms and problems with the equipment to a local sales representative or distributor, or contact The Modal Shop if none are located in your area.

Customers outside the U.S. should consult their local distributor for information on returning equipment. For exceptions, please contact the International Sales department at The Modal Shop to request shipping instructions and an RMA. For assistance, please call 513.351.9919, or email at [info@modalshop.com](mailto:info@modalshop.com) or visit our web site at [www.modalshop.com](http://www.modalshop.com).

# 7. PRODUCT DRAWING

Model 485B39



Dimensions in inches [mm]



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