



# User Manual

## CA10

### ProBus Current Adapter

## **CA10 ProBus Current Adapter User Manual**

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# Safety

Observe these instructions to keep the product operating in a correct and safe condition. Follow generally accepted safety procedures in addition to the precautions specified in this section. **The overall safety of any system incorporating this product is the responsibility of the assembler of the system.**

## Symbols

These symbols appear on the product or in its documentation to alert you to important safety considerations.



**CAUTION** of potential damage to product, or **WARNING** of potential bodily injury. Refer to the manual to protect against injury or damage. Do not proceed until conditions are fully understood and met.

## Precautions

**Use only as intended.** The product is intended to be used only with the compatible Teledyne LeCroy instruments. Using the product and/or the equipment it is connected to in a manner other than specified may impair the protection mechanisms.

**Do not apply a voltage to any input that exceeds the maximum rating of that input.** Refer to the body of the oscilloscope and the product page at [teledynelecroy.com](http://teledynelecroy.com) for detailed information.

**Use indoors only.** The accessory is intended for indoor use and should be operated in a clean, dry, environment. Do not use in wet/damp or explosive atmospheres.

**Keep product surfaces clean and dry.** See "Cleaning" for instructions.

**Do not operate with suspected failures.** Do not use the product if any part is damaged. Refer all maintenance to qualified service personnel.

# Introduction

The CA10 ProBus Current Adapter allows current transducers and transformers that output a voltage or current signal proportional to a measured current to be easily connected to an oscilloscope or motor drive analyzer. Specific information about the input device is programmed into the CA10, so that when the device is connected to the instrument it will correct for the transducer/transformer gain or attenuation and display the result in Amperes.

Using the CA10 with transducers/transformers saves the time (and errors) involved in manually entering scaling factors and units each time the device is connected to the instrument.



**CAUTION.** The secondary of a current transformer (CT), when unterminated, can generate hazardous open-circuit voltages when energized. These voltages could be dangerous to personnel and damage the oscilloscope. If the CA10 is used with an unterminated current transformer, you must install a suitably rated terminating resistor in the CA10 before energizing the CT. See [Customizing the CA10](#) for details.

## Standard Parts

CA10 is delivered with these parts. Contact us immediately if parts are missing.

| Part                           | P/N           | QTY |
|--------------------------------|---------------|-----|
| CA10                           | 924491-00     | 1   |
| Heat-shrink tubing (6" length) | 42A0000006098 | 1   |
| Removable labels (sheet of 20) | 42A0000006132 | 1   |
| Quick Start Guide              | 925590-00     | 1   |

## Compatibility

The CA10 current adapter is compatible with any Teledyne LeCroy HDO, MDA, WaveRunner, WavePro or WaveMaster Series oscilloscope that is equipped with the ProBus or ProBus2 interface and 64-bit MAUI (XStreamDSO) software version 7.8.x.x or greater.

## **Connecting the CA10**

### **Using the Heat-Shrink Tubing**

We highly recommend using the included heat-shrink tubing to semi-permanently attach the CA10 to the transducer/transformer for which it has been programmed. However, the heat-shrink tubing is not required, and the CA10 will function perfectly without it.

Cut the tubing into 1.5" length sleeves before using.

### **Connecting the CA10 to the Transducer/Transformer**

1. Slip one of the sleeves over the transducer/transformer's BNC output connector.



2. Connect the device to the CA10 BNC input connector.



- Slide up the sleeve so that it is flush to the body of the CA10 and completely covers the connector. Apply heat until the wrap snugly encases the connection.



- If desired, attach a removable label the front of the CA10 case and write the name and/or setup of the attached device.
- Connect the CA10 to a ProBus input on the instrument.



# Programming the CA10

When the CA10 is first connected to the instrument, you will be asked if you want to program it. Select **Yes** to display the CA10 dialog:



Enter all the device settings on the dialog, then select **Save to Adapter**.

In the future, the CA10 will update channel settings automatically as long as there is a program saved on it. The CA10 dialog will appear behind the input channel dialog whenever it is connected to the instrument, with the sensor name appearing next to the channel number on the tab.

To change the programming, open the CA10 dialog, then select **Edit** before modifying the settings. Use **Clear** to quickly clear the previous settings. These buttons are only active after a program has been saved.

Remember to **Save to Adapter** after reprogramming.

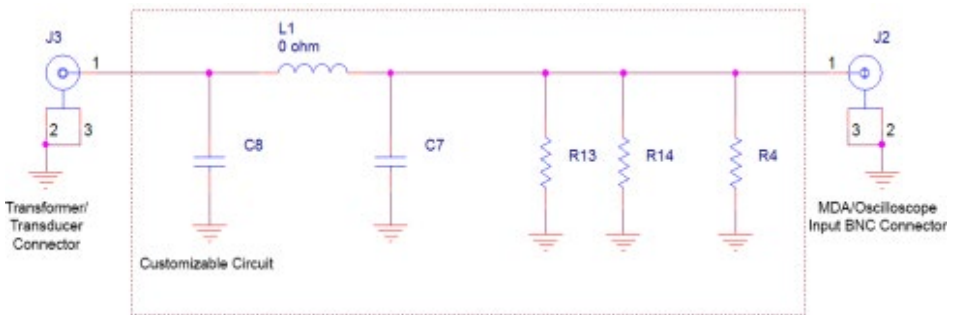
## Customizing the CA10

Current transducers with a voltage output proportional to a current input can directly drive the input impedance of the instrument: DC1M $\Omega$ , AC1M $\Omega$  or 50 $\Omega$ .

Bandwidth filters can be applied to the input channels via the CA10 programming interface: Full BW, 200MHz or 20MHz.

It is also possible to customize the CA10 through addition of shunt resistors and other bandwidth filtering components. Current transformers (CTs) output a current signal proportional to the turns ratio and require that a suitably rated R4, R13 and/or R14 terminating resistor be installed in the CA10 to provide a voltage output to the oscilloscope. It is the operator's responsibility to ensure that these resistors are suitably rated for the input current at J3 in the schematic below.

A schematic of the user-installable components is shown below. The CA10 comes from the factory with a 0 $\Omega$  (short) installed in the L1 location, and no components in the other locations shown.



## **Filter Components**

The locations C7, C8 and L1 can be used to create a filter to remove higher frequency noise that might be present at a current transducer or transformer output. The specific components that might be installed depends on the desired frequency response as well as the instrument and transducer impedance. Some possible combinations are shown below:

|                          |              |
|--------------------------|--------------|
| Oscilloscope termination | 1 M $\Omega$ |
| Source termination       | 50 $\Omega$  |
| -3dB FREQUENCY           | 1 MHz        |
| L1                       | 50 $\Omega$  |
| C7                       | 3 nF         |

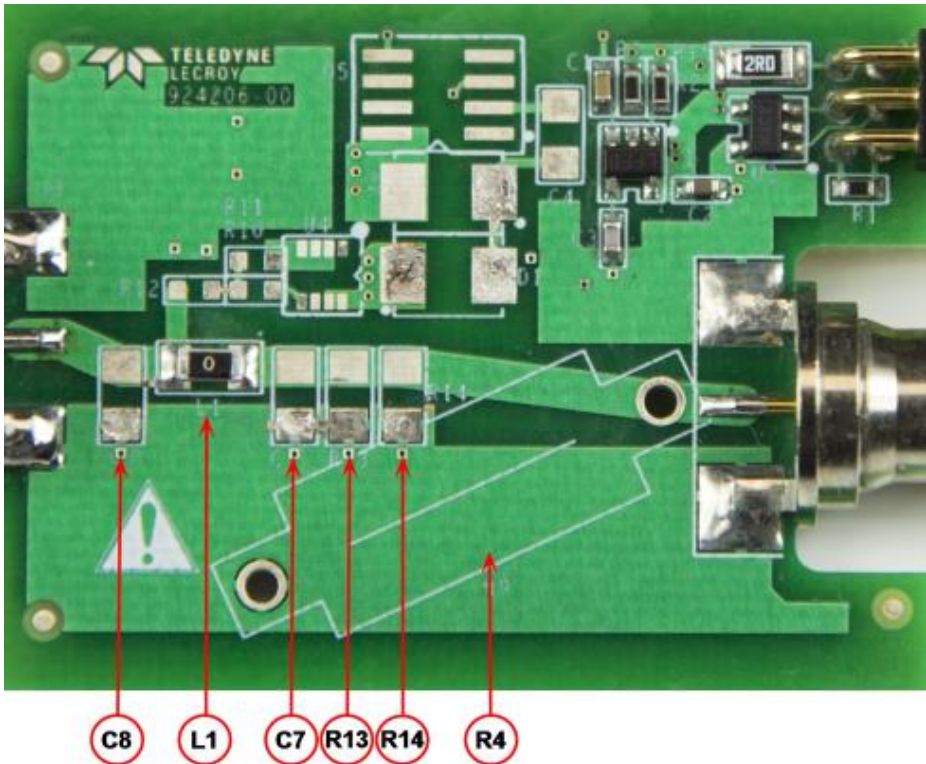
|                          |              |
|--------------------------|--------------|
| Oscilloscope termination | 1 M $\Omega$ |
| Source termination       | 50 $\Omega$  |
| -3dB FREQUENCY           | 10 MHz       |
| L1                       | 50 $\Omega$  |
| C7                       | 300 pF       |

|                          |             |
|--------------------------|-------------|
| Oscilloscope termination | 50 $\Omega$ |
| Source termination       | 50 $\Omega$ |
| -3dB FREQUENCY           | 1 MHz       |
| C7                       | 3300 pF     |
| L1                       | 15 $\mu$ H  |
| C8                       | 3300 pF     |

|                          |             |
|--------------------------|-------------|
| Oscilloscope termination | 50 $\Omega$ |
| Source termination       | 50 $\Omega$ |
| -3dB FREQUENCY           | 10 MHz      |
| C7                       | 330 pF      |
| L1                       | 1.5 $\mu$ H |
| C8                       | 330 pF      |

## Resistive Termination

The locations R13 and R14 can be used to install a specific value of termination resistance. These two locations will allow 1206 sized surface mount resistors to be installed. The location R4 is intended for a precision axial resistor and is particularly suited to small value precision resistors that might be required.

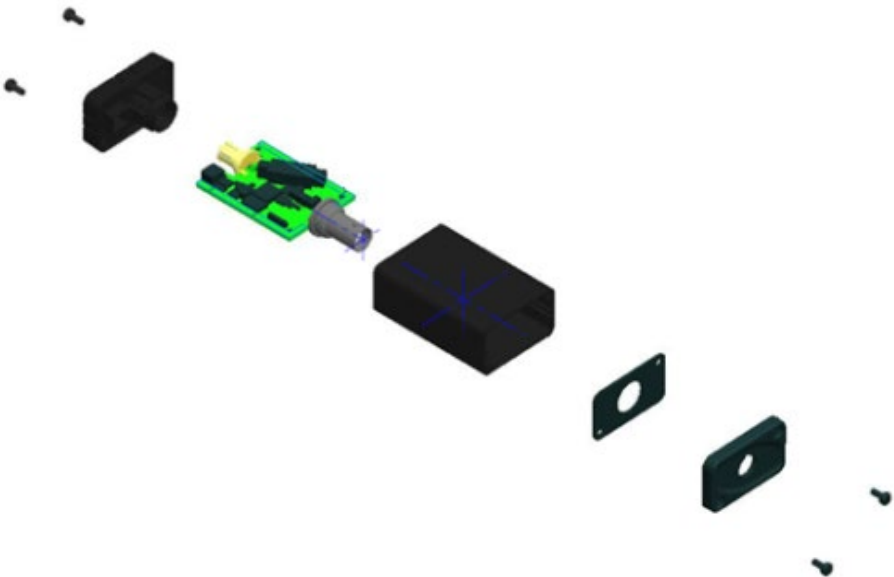


### Opening the CA10 Case

To open the CA10 case:

1. Remove the two screws on the connector end of the adapter (shown at bottom of the image below).
2. Remove the front face and pull out the PCA board.
3. After modifying the signal path components, replace all parts in the order shown.

**NOTE:** The screws on the front case are installed with 2 in-lbs. torque.



## **Cleaning**

Clean only the exterior of the product using a soft cloth moistened with water or an alcohol solution. Do not use harsh chemicals or abrasive elements. Under no circumstances submerge the device or allow moisture to penetrate it.

## **Returning a Product for Service**

Contact your local Teledyne LeCroy service center for calibration or other service. If the product cannot be serviced on location, the service center will give you a Return Material Authorization (RMA) code and instruct you where to ship the product. All products returned to the factory must have an RMA.

Return shipments must be prepaid. Teledyne LeCroy cannot accept COD or Collect shipments. We recommend air freighting. Insure the item you're returning for at least the replacement cost.

1. Remove all accessories from the probe.
2. Pack the probe in its case. If possible, include all tips. Do not include the manual.
3. Pack the case in its original shipping box, or an equivalent carton with adequate padding to avoid damage in transit.
4. Mark the outside of the box with the shipping address given to you by Teledyne LeCroy. Be sure to add the following:  
ATTN:<RMA code assigned by Teledyne LeCroy>  
FRAGILE
5. **If returning a probe to a different country:** contact Teledyne LeCroy Service for instructions on completing your import/export documents.

Extended warranty, calibration and upgrade plans are available for purchase. Contact your Teledyne LeCroy sales representative to purchase a service plan.

## Technical Support

For a complete list of offices by country, including our sales & distribution partners, visit: [teledynelecroy.com/support/contact](http://teledynelecroy.com/support/contact)

Teledyne LeCroy  
700 Chestnut Ridge Road  
Chestnut Ridge, NY, 10977, USA

### US Service and Support:

Ph: 800-553-2769 / 845-425-2000

FAX: 845-578-5985

[customersupport@teledynelecroy.com](mailto:customersupport@teledynelecroy.com)

## Certifications

For the full list of current certifications, see the EC Declaration of Conformity shipped with your product.



The product is marked with this symbol to indicate that it complies with the applicable European Union requirements to Directives 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

For more information about proper disposal and recycling of your Teledyne LeCroy product, visit [teledynelecroy.com/recycle](http://teledynelecroy.com/recycle).

Unless otherwise specified, all materials and processes are compliant with RoHS Directive 2011/65/EU in its entirety, inclusive of any further amendments or modifications of said Directive.

## **Warranty**

THE WARRANTY BELOW REPLACES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. TELEDYNE LECROY SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT OR OTHERWISE. THE CUSTOMER IS RESPONSIBLE FOR THE TRANSPORTATION AND INSURANCE CHARGES FOR THE RETURN OF PRODUCTS TO THE SERVICE FACILITY. TELEDYNE LECROY WILL RETURN ALL PRODUCTS UNDER WARRANTY WITH TRANSPORT PREPAID.

The product is warranted for normal use and operation, within specifications, for a period of one year from shipment. Teledyne LeCroy will either repair or, at our option, replace any product returned to one of our authorized service centers within this period. However, in order to do this we must first examine the product and find that it is defective due to workmanship or materials and not due to misuse, neglect, accident, or abnormal conditions or operation.

Teledyne LeCroy shall not be responsible for any defect, damage, or failure caused by any of the following: a) attempted repairs or installations by personnel other than Teledyne LeCroy representatives, b) improper connection to incompatible equipment, or c) use of non-Teledyne LeCroy supplies. Furthermore, Teledyne LeCroy shall not be obligated to service a product that has been modified or integrated where the modification or integration increases the task duration or difficulty of servicing the product. Spare and replacement parts and repairs all have a 90-day warranty.

Products not made by Teledyne LeCroy are covered solely by the warranty of the original equipment manufacturer.



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