



Digidata[®] 1550 Low-Noise Data Acquisition System

User Guide

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Introduction

The Digidata® 1550 Low-Noise Data Acquisition System is a high-resolution, low-noise digitizer intended for precision scientific applications. It is particularly designed for electrophysiology experiments, to send and receive signals from microelectrode amplifiers, and to interact with peripheral instruments such as solution changers and stimulators.

The Digidata 1550 digitizer has eight independent analog input channels at up to 500 kHz each, and has eight independent 16-bit analog outputs for arbitrary waveform generation. There are eight digital output lines, as well as TAG and START digital inputs.

The Digidata 1550 digitizer communicates with the host computer using USB 2.0.

The Digidata 1550 digitizer is a plug-and-play device, so it is automatically recognized by Windows. The Digidata 1550 digitizer is supported on Windows systems by AxoScope 10.4 (or higher) and by pCLAMP's Clampex 10.4. AxoScope is an easy-to-use, full-featured data acquisition program for Windows that is included with the Digidata 1550 digitizer.

The Digidata 1550 digitizer is contained within a rack-mount case, but it also has non-marking elastomeric feet for use on a desktop.

Components

- Digidata 1550 digitizer
- Power cord
- USB 2.0 cable
- CD-ROM with AxoScope 10.4 Software for Windows
- Printed Quick Start Guide

Minimum Computer Requirements

- PC with a 2 GHz CPU
- Windows XP
- 1.2 GB RAM available
- 500 MB hard disk
- 800 × 600 display system (small fonts)
- High-speed built-in USB 2 port

Recommended Computer System

- PC with a 2 GHz CPU (or faster)
- Windows 7 (32-bit or 64-bit)
- 2 GB RAM (or more)
- 2 GB hard disk (or more)
- 1024 × 768 display system (large or small fonts)
- 3 High-speed built-in USB 2 ports

Programming

The Digidata 1550 digitizer is supplied with the AxoScope 10.4 turnkey software for continuous data acquisition. No programming is required for use with this program, or with the pCLAMP 10.4 data acquisition software.

For third-party programming of the digitizer, see the Test Bed and File Support Pack files included in pCLAMP, or check the Molecular Devices website Support/Knowledge Base for downloads.

The following procedures install the new software and drivers parallel to previously installed hardware and software, allowing you to continue to use the earlier Digidata® 1200, 132x, or 1440A Series digitizers and earlier versions of AxoScope or pCLAMP software. However, if you no longer use older installed digitizers and corresponding software, uninstall them before you begin the following new installation procedure.

Installation involves procedures in the following order:

1. [Installing AxoScope or pCLAMP Software](#)
2. [Installing the pCLAMP Security Key \(pCLAMP Only\) on page 8](#)
3. [Installing the Digidata 1550 Digitizer on page 8](#)
4. [Configuring Software for Digidata 1550 Digitizer Use on page 8](#)

Installing AxoScope or pCLAMP Software



Note: Before installing the software from a CD-ROM, verify on the Molecular Devices support web site it contains the latest version. If you do not have the latest version, you can download it from the support web site www.moleculardevices.com/support.

Install the AxoScope 10.4 or pCLAMP 10.4 software, which includes the Digidata 1550 digitizer drivers. An AxoScope 10.4 software CD is included. If you have purchased the pCLAMP 10.4 software, install it instead of AxoScope 10.4 software.

1. Insert the AxoScope 10.4 or pCLAMP 10.4 software CD into your computer's CD-ROM drive.
2. The setup dialog is displayed automatically; if not, use Windows Explorer to open the CD directory and double-click the **AxoScope_10_4.exe**, or **pCLAMP_10_4.exe** file. The installation menu appears.
3. Follow the on-screen instruction to install the software.

Installing the pCLAMP Security Key (pCLAMP Only)

If you install pCLAMP software, insert the provided pCLAMP 10 security key (dongle) into any USB port on your computer. The dongle must be connected to a USB port on your computer for authorized pCLAMP Clampex 10.4 software use.

Installing the Digidata 1550 Digitizer



CAUTION! After the unit is powered on, the first time it is initialized by the pCLAMP software, the analog output channels send out a brief negative spike (~-10 V/25 ms and -5 V/270 ms). Make sure that the analog outputs are not connected to any equipment that can be damaged by such voltages during the startup period.

1. Connect the power cord to the wall, and then to the Digidata 1550 digitizer rear panel AC power input connector.
2. Attach the USB 2 cable to a USB 2.0 port on your computer, and then to the digitizer.
3. Switch on the power on the Digidata 1550 digitizer.
4. Let the Digidata 1550 digitizer warm up for one hour before performing experiments.
5. Windows automatically finds the new hardware and installs the drivers.
6. Configure AxoScope 10.4 or pCLAMP 10.4 software for use with the digitizer.

Configuring Software for Digidata 1550 Digitizer Use

This configuration procedure applies to AxoScope 10.4 and pCLAMP Clampex 10.4 software. By default the Demo digitizer mode is active.

1. Run AxoScope or Clampex by double-clicking on the icon on the Windows desktop.
2. Click **Configure > Digitizer** to open the **Digitizer** dialog, then click the **Change** button.

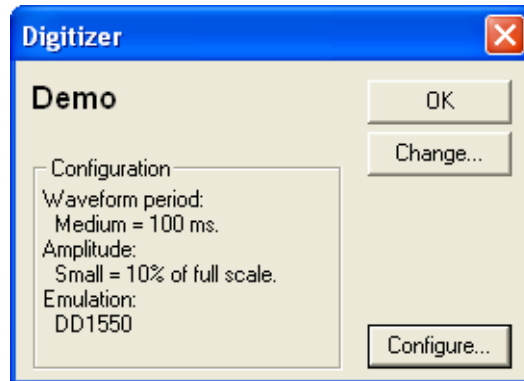


Figure 2-1: Example Digitizer Dialog.

3. In the **Change Digitizer** dialog select **Digidata 1550 Series** from the **Digitizer Type** list.

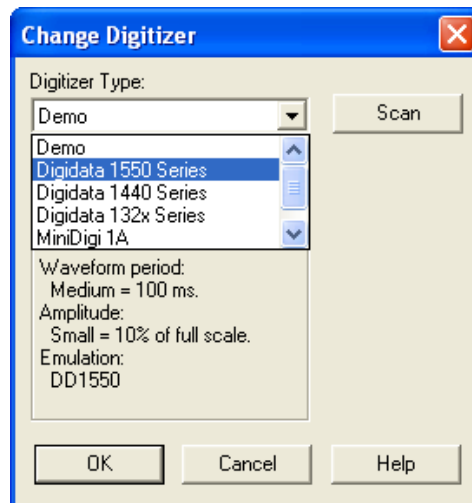


Figure 2-2: Digitizer Type Selection of Digidata 1550 digitizer

4. Click the **Scan** button to detect the digitizer. The **Configuration** message changes from **unavailable** to **listing the selected digitizer serial number and firmware version**, and the **OK** button enables.

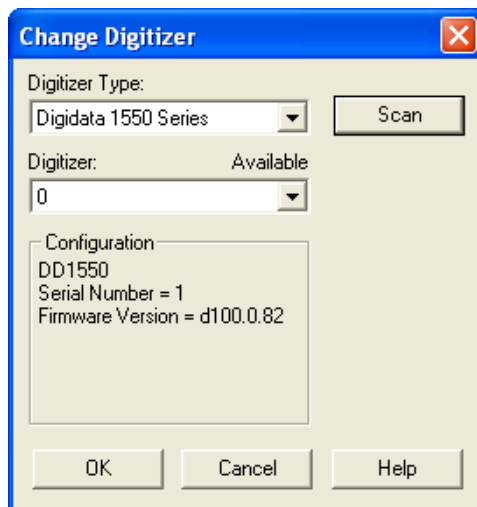


Figure 2-3: Configuration message changes after clicking **Scan**

5. Click **OK** to exit the **Change Digitizer** dialog.

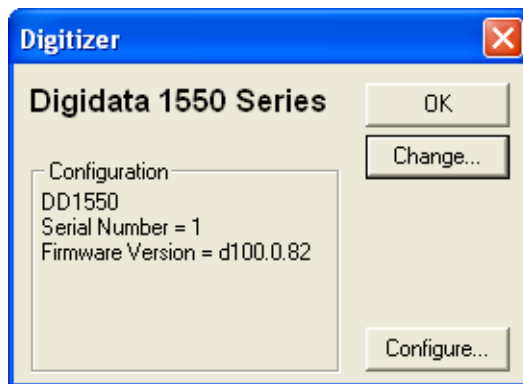


Figure 2-4: Digitizer dialog displaying active digitizer mode

The **Digitizer** dialog appears showing the currently active digitizer mode.

6. Click **OK** to exit the **Digitizer** dialog.

After the Digidata 1550 digitizer warms up (allow one hour), it is ready to perform experiments.

Interface Description

Front Panel

The following is the front panel description of the Digidata 1550 digitizer.

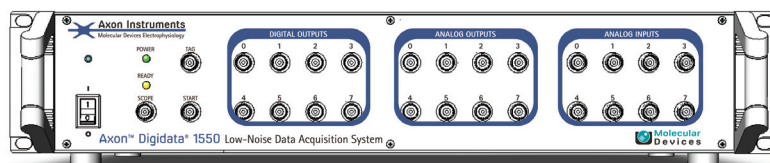


Figure 3-1: Front panel of the Digidata 1550 digitizer.

There is a single rocker-style **On/Off** switch.

There are two indicator lights: **POWER** and **READY**.

- When the digitizer is powered on, and the USB cable is connected to the computer, the green **POWER** light is continuously on.
- When the digitizer is recognized by the software and ready for use, the yellow **READY** light is continuously on.

The front panel connectors are all BNCs.

Analog Inputs

There are eight 16-bit single-ended analog input channels. The BNC shields for the Analog Inputs are connected to the Analog ground. All of these channels can be used simultaneously without any reduction in each channel's throughput. These input channels are typically used to digitize biological signals.

Analog Outputs

The front panel has eight 16-bit analog output channels. Each channel has an operational amplifier to buffer the output signal of the D/A converter. The eight analog output channels can be simultaneously used for waveform generation.

Digital Outputs

Digital Outputs 0–7 are on the front panel of the Digidata 1550 digitizer. These output levels can be set to high (+5 V) or low (0 V) TTL-level states. They can be used to trigger a wide variety of external devices.

Start and Tag Input Triggers

START and TAG are digital input triggers compatible with TTL-level signals.

- The START input is used to begin data acquisition from an external trigger source.
- The TAG input is used to automatically mark events (for example, perfusion ON) within the data.

Scope Output

The SCOPE output is a digital signal that reflects specific actions in Clampex and AxoScope, such as the beginning of an acquisition recording, sweep, event, or level. It is useful as an oscilloscope trigger, or to synchronize data acquisition with other devices.

Rear Panel

There are several connectors on the rear panel of the Digidata 1550 digitizer: four BNCs, one USB connector, one 25-pin connector, and one **AC POWER** input.

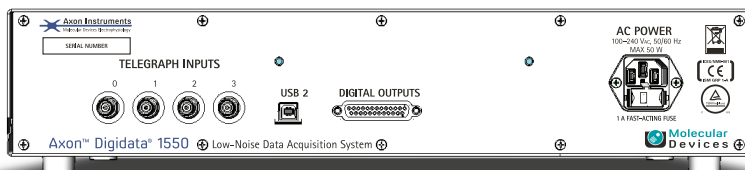


Figure 3-2: Rear panel of the Digidata 1550 digitizer.

Telegraph Inputs

The Digidata 1550 digitizer has a dedicated A/D converter that provides four telegraph input channels on the rear panel. These telegraph input channels provide gain, frequency, and capacitance values from manually-controlled amplifiers (for example, Axopatch 200B). These inputs are independent of the 8 analog input channels. Computer-controlled amplifiers (for example, MultiClamp 700A/B, Axoclamp 900A) use software signals instead of such hard-wired telegraph signals.

USB 2 Port

There is a single USB 2.0 type B female port on the rear panel for attaching a USB 2.0 cable to allow connection to the host computer's USB 2 port.

Digital Outputs

A DB 25-pin female connector is provided as an alternative way to access the software-controlled digital outputs.



Note: Only digital outputs 0–7 are supported in existing Molecular Devices software. See [Appendix A: Specifications on page 29](#) for pin definitions to make your own cable.

AC Power

There is a single AC power input connector on the rear panel for the supplied AC power line cord.

Maintenance and Troubleshooting

Perform only the maintenance described in this guide. Maintenance procedures other than those specified in this guide can be performed only by Molecular Devices service engineers. See [Contacting Support on page 26](#).

Before operating the instrument or performing maintenance operations, make sure that you are familiar with the safety information in this guide. See [Appendix C: Safety Guide on page 35](#).

The following topics describe maintenance and troubleshooting procedures that can be performed by users to ensure optimum operation of the instrument.

- [Functional Checkout](#)
- [Grounding and Minimizing Noise on page 21](#)
- [Replacing Fuses on page 22](#)
- [Troubleshooting Problems and Solutions on page 23](#)



WARNING! Service or maintenance procedures other than those specified in this guide can be performed only by trained service engineers. When service is required, contact a Molecular Devices service engineer.

Functional Checkout

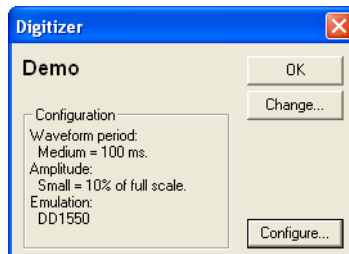
The Functional Checkout procedure provides step-by-step instructions to verify signals.

Step 1

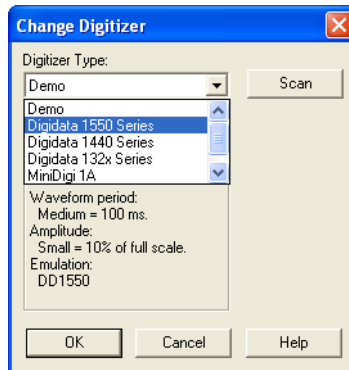
If you are able to configure the Digidata 1550 digitizer in the software, then the digitizer is properly installed in Windows.

To configure the digitizer for AxoScope or Clampex:

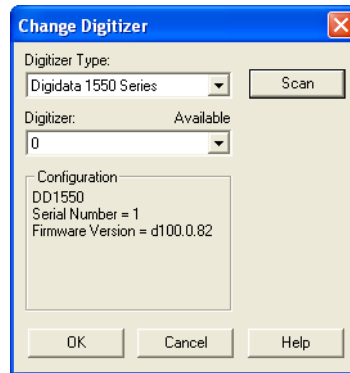
1. Click **Configure > Digitizer**.
2. If **Digidata 1550 Series** is not displayed:
 - ◆ Click the **Change** button.



- ◆ In the **Change Digitizer** dialog, select **Digidata 1550 Series** from the **Digitizer Type** list.



- ◆ Click the **Scan** button to detect the digitizer. The **Configuration** field should change to a **listing of** the serial number of the recognized digitizer and the firmware version, and the **OK** button enables.



- ◆ (pCLAMP Only) If the **Configuration** field shows **The security key is not present**, install the provided pCLAMP 10.4 dongle into the computer USB port.
 - ◆ Click **OK** to exit this dialog.
3. Click the **Configure** button.
 4. The **Configure Digidata 1550** dialog displays the serial number of the device and the firmware version.
 - ◆ The serial number should match the number on the barcode label of the unit.
 - ◆ The Power-on Holding Levels section is used to set the voltage on the Analog Out channels at the time that the Digidata 1550 Low-Noise Data Acquisition System is turned on. The initial Digital Out levels can also be set high or low by selecting the check boxes above the numbers corresponding to each digital output (selected means high, cleared means low). Attach an oscilloscope to each output to verify their levels, both prior to launching the software (AxoScope or Clampex) and after launching the software.

Step 2


Check that you have a USB 2.0 port in your computer.

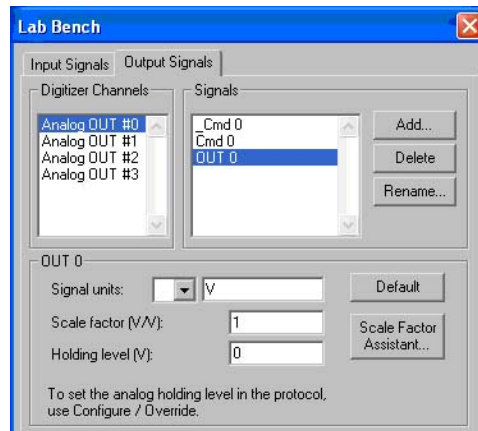
1. In Windows 7, right-click **Computer** and select **Properties**.
In Windows XP, right-click **My Computer** and select **Properties**.
2. Click **Device Manager**.
In Windows XP, click the **Hardware** tab and then click **Device Manager**.
3. Expand the **Universal Serial Bus** controllers tree.
4. If you do not have an entry for **USB 2**, then look for **Enhanced PCI to USB Host Controller**. “Enhanced” is a key word indicating a USB 2.0 controller.

Step 3

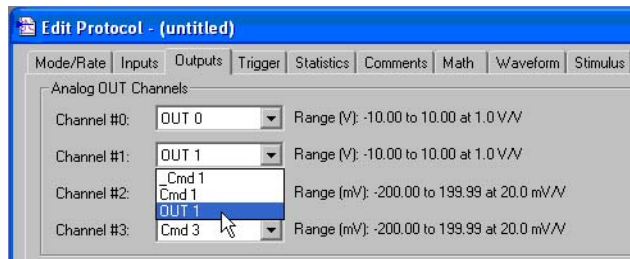
Verify analog and digital outputs.

With AxoScope or Clampex:

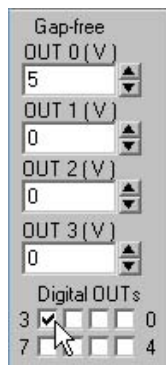
1.  Click the **Lab Bench** button (or click **Configure > Lab Bench**) and select the **Output Signals** tab. For each of the Digitizer Channels (for example, **Analog OUT #0**), select a matching **Signal** (for example, **OUT 0**), and configure that signal with unity scaling (for example, **Scale factor (V/V): 1**).



- Set up a protocol through the **Acquire > New Protocol** menu command, and then on the **Mode/Rate** tab, select the **Gap-free** mode. On the **Outputs** tab, for each of the **Analog OUT Channels**, select the matching signal (for example, **OUT 1**) from its list.



- Attach the digitizer's outputs to an oscilloscope or 10-bit digital volt meter (DVM).







- For each output signal, use the software's **Real Time Control** panel to change voltage levels. For analog outputs, either use the spinners, or type a value and press the **Enter** key. For digital outputs, click on the box corresponding to the digital bit to be tested. Verify the output signal levels on the oscilloscope or DVM.

Step 4

Verify analog inputs.

With AxoScope or Clampex:

-  Click the **Lab Bench** button (or click **Configure > Lab Bench**) and select the **Input Signal** tab. For each of the **Digitizer Channels** (for example, **Analog IN #0**), select a matching **Signal** (for example, **IN 0**), and configure that signal with unity scaling (for example, **Scale factor (V/V): 1**).
-  Click the **Edit Protocol** button (or click **Acquire > Edit Protocol**) and then, on the **Inputs** tab, for each of the **Analog IN Channels**, select the matching signal (for example, **IN 0**) from its list.
- Connect a BNC cable from the analog outputs to the analog inputs to be tested.
-  Click the **Record** button (or click **Acquire > Record**) to acquire data. For each analog output signal, use the software's **Real Time Control** panel to change voltage levels. Either use the spinners or type a value and then press **Enter**.
-  Click the **Last Recording** button (or click **File > Last Recording**) to open the data file. Verify the input signal levels using the cursors in the window. To display a subset of the signals, right-click on the data display area, select **Properties**, and go to the **Show/Hide** tab.

Grounding and Minimizing Noise

To avoid ground-loops, Molecular Devices recommends that you plug in the Digidata 1550 digitizer to the same power strip as the amplifier. Also, be aware that each Analog Input BNC on the Digidata 1550 digitizer is a single-ended input (all BNC shells are connected to signal ground).

When noise in the system occurs, the first step is diagnosis. Take all instruments out of their racks, and connect to one of them with only ONE BNC connection. Observe if the hum (50–60 Hz noise) is eliminated. Also observe if the hum is produced from headstage pickup by shielding the headstage and watching the magnitude of the hum.

If the hum is eliminated at this step, connect the second BNC cable. If the hum is now observed, there is probably a ground loop that is picking up an alternating magnetic field. Try to eliminate the source of the alternating magnetic field with a cheap transformer or an electric motor, such as found in a nearby fan or refrigerator. Try to rearrange the two BNC cables to determine if their positioning tells you anything about the source of the alternating field. High frequency components (20–50 kHz) might also appear if there is a ground loop. These can originate from the switching power supply of the computer, or from a monitor, and can be picked up in the analog signal inputs of the Digidata 1550 digitizer.

If removing the source of the alternating field is not possible, eliminate the ground loop by constructing one of the connections between the two instruments without a shield. Make this either with a naked unshielded wire, or with a BNC cable that has its shielding cut at one end. Make a break in the shielding away from the interface, near the connection on the instrument suspected of creating the ground loop.

Additionally, the quality of the AC power should also be checked. In particular, check for proper grounding of the outlets.

For users of Molecular Devices microelectrode amplifiers, more information regarding noise reduction procedures can be found in the user guides for the MultiClamp, Axopatch, and Axoclamp amplifiers.

Replacing Fuses



WARNING! High Voltage. Always turn the power switch off and disconnect the power cord from the main power source before performing any maintenance procedure that requires removal of any panel or cover or disassembly of any interior instrument component.

Fuses burn out occasionally and must be replaced.

If the instrument does not seem to be getting power after switching it on, check to see whether the supplied power cord is securely plugged into a functioning power outlet and to the AC input connector at the rear of the instrument.

If the power failed while the instrument was on, check that the power cord is not loose or disconnected and that power to the power outlet is functioning properly.

If these checks fail to remedy the loss of power, replace the fuses. If you do not have spare fuses, you can obtain them from Molecular Devices. For Digidata 1550 digitizer fuse specifications, see [AC Power on page 32](#).

The Digidata 1550 digitizer uses a pair of fuses located in a fuse carrier beneath the AC input connector ([Figure 4-1](#)).

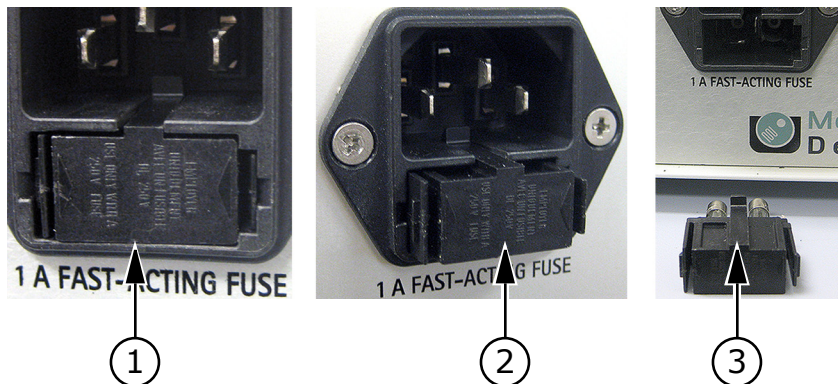


Figure 4-1: Digidata 1550 digitizer fuse carrier removal process

Item	Description
1	Digidata 1550 digitizer fuse carrier installed
2	Digidata 1550 digitizer fuse carrier released
3	Digidata 1550 digitizer fuse carrier removed

To replace the Digidata 1550 digitizer fuses:

1. Switch the power switch on the front of the instrument to the off position.
2. Unplug the power cord from the AC input connector.
3. Press the carrier-release side-tabs towards each other and then pull the fuse carrier to remove it from the instrument.
4. Gently pull the old fuses from the carrier by hand.
5. Gently place new fuses into the carrier by hand.
6. Replace the fuse carrier. The carrier-release side-tabs click when properly replaced.
7. Plug the power cord into the AC input connector.
8. Switch on power to the instrument.



Note: If the instrument still does not power on after changing the fuses, contact a Molecular Devices service engineer.

Troubleshooting Problems and Solutions

This section provides specific troubleshooting advice on possible problems and their solutions.

Before contacting Molecular Devices Technical Support regarding problems, please review this section to see if you can address the problem yourself. For more information, see [Contacting Support on page 26](#) for faster resolution of your problem.

Isolating the Problem

The first rule in troubleshooting the digitizer or your software is to isolate the problem.

1. It is best to simplify your software configuration by turning off all other programs. It might appear that there are no other programs running in the background, but this might not be the case. To see if other programs are running in the background, in Windows, click on an empty place on the desktop and then press **Ctrl+Alt+Del** (holding these three keys down at the same time) and then select **Task Manager**.
2. On the **Applications** tab, close all unnecessary programs. Note that virus checkers and automated Internet accesses can also affect system performance.

3. Disconnect all external instruments and test the digitizer/computer combination by itself.
4. Next, swap the unit with a known good unit to help determine whether the problem is with the digitizer or the computer.

Power Light on the Front Panel Off

Check the power supply to make sure that all cables are firmly attached, as well as the USB 2.0 cable to the computer.

Ready Light on the Front Panel Flashes Continually

The Digidata 1550 digitizer is in a problem state. Call Technical Support at Molecular Devices for a Work Order (WO) number before returning the unit for repairs.

Problems With Analog or Digital Outputs

Check the **Lab Bench** and protocol. Use a voltmeter or oscilloscope to examine the output signals.



Note: Oscilloscopes can potentially introduce unwanted ground loops and noise.

Problems With Analog or Digital Inputs

Check the **Lab Bench** and protocol. Connect a known signal source to an analog input, such as a signal generator, or even the digitizer's analog output, if you know it is working properly.

Screen Shows a Straight Line Instead of the Input Signal

- Check if all external connections are properly made.
- Swap BNC cables to check BNC cables for continuity problems.
- Make sure the USB cable is securely attached to both the computer and the interface box.

Screen Shows Different Signal Shape Than Expected

Verify that the acquisition software is not configured for a demo digitizer (**Configure > Digitizer**). Demo mode reproduces a command waveform (with added noise), or generates artificial spike trains. Also, check the software for any inappropriate filtering.

Noise Introduced When Data Digitized

- Verify that the acquisition software is not configured for a demo digitizer (**Configure > Digitizer**). Demo mode reproduces a command waveform with added noise (or generates artificial spike trains).
- If noise is added to the signal on the analog input, make sure that all cables are routed away from switching power supplies, power cords, monitors, or any other major sources of noise.
- Check for proper ground connections. See [Grounding and Minimizing Noise on page 21](#) for more information on proper grounding practices.

Digitizer does not work properly

Digitizer does not work at all, it locks up the computer when doing certain operations, or it exhibits other strange behavior.

- Double check that you are using a USB 2.0 braided shielded cable. Improper shielding can lead to USB communication problems that manifest in a variety of odd behaviors, ranging from minor to severe.
- Reset the digitizer by turning it off and then back on. Then restart the computer.
- For Windows, reset the Windows registry digitizer settings back to the manufacturer defaults (**Start > All Programs > Molecular Devices > pCLAMP 10.4 > Reset to Program Defaults**).
- Clear relevant registry items one at a time. Try items such as Digitizers, Clampex, AxoScope, pCLAMP 10.4, and Common Settings. However, note that for application program items, while any customized window settings will be lost, signal names and protocols are preserved.



Note: After clearing the registry, you must reconfigure the digitizer and any Telegraphed instrument.

- Run a check on the computer's hard disk file structure and RAM.
- Call Technical Support if the problem persists.

Data throughput problems

- If decreasing the number of analog input channels or the sampling rate improves performance, you likely have a data throughput problem. Verify that the digitizer is connected to a high-speed USB 2.0 port on your computer. See [Installing the Digidata 1550 Digitizer on page 8](#). If the digitizer is connected to a USB hub, remove any other devices connected to the hub, or bypass the hub.
- Try the digitizer on a faster computer. CPU speed is only one part of the equation. Other relevant components include hard disk speed, RAM speed, and front-side bus speed.
- To improve data-throughput related acquisition performance problems in Clampex or AxoScope, try the following:
 - ◆ In **Configure > Lab Book Options**, select **Never log any events**.
 - ◆ In **Configure > Program Options**, select **Disable screen saver during data acquisition**.

Contacting Support

Check the Support section of the Molecular Devices website at www.moleculardevices.com/support where you will find a link to our on-line Knowledge Base that contains product-specific questions and answers to many common issues.

Before you call

To help us to more quickly identify possible problems and known conflicts, before you call Molecular Devices Technical Support, be ready to provide the following information:

1. What is the model and serial number of the digitizer? The serial number is on a small barcode sticker on the digitizer's back panel.
2. What is the computer environment? To find the system specifications in Windows 7, right-click **Computer**, and select **Properties**.

In Windows XP, right-click **My Computer**, and select **Properties**. The details appear under the **General** tab.

- ◆ The computer brand and model (for example, Dell Dimension 8300).
 - ◆ The CPU speed (for example, 3.2 GHz).
 - ◆ Total installed RAM (for example, 512 MB).
 - ◆ The specific operating system installed (for example, Windows XP Pro SP3 32-bit).
3. The specific software name and version of the software running the digitizer. For example, Clampex 10.4.0.1. Click **Help > About Clampex**.
 4. If you can reproduce a problem by following a series of steps, please write them down so that we can follow your exact steps.
 5. Email a copy of the protocol(s) and data file(s) that illustrate your problem. This helps in understanding and duplicating your problem.

Clampex users:

1. Connect **Analog Out 0** to **Analog In 0**.
2. Run an **Episodic** mode protocol with a waveform specified.
3. Click the **View Only** button. Do you see the waveform?

Contact Molecular Devices Technical Support at support@moldev.com or 1-800-635-5577 (USA only); elsewhere, contact your local representative.

Specifications

This section lists electrical requirements, instrument dimensions, and space requirements for the Digidata 1550 Low-Noise Data Acquisition System.

Analog Inputs

Table A-1: Analog Inputs

Input Name	Description
Number of channels	8
Type of channels	single-ended
Resolution	16-bit, 1 in 65536
Sample rates per channel	1 kHz to 500 kHz
Input range	-10.000 V to +10.000 V
Input resistance (DC)	>1 M Ω
Gain value	1
Digitization noise	< ± 1 mV Avg (p-p)
Crosstalk noise	< ± 1 mV Avg (p-p)

Analog Outputs

Table A-2: Analog Outputs

Output Name	Description
Number of channels	8
Resolution	16-bit
Sample rates per channel	1 Hz to 500 kHz
Output range	-10.000 V to +10.000 V
Output impedance (DC)	< 0.5 Ω

Table A-2: Analog Outputs (cont'd)

Output Name	Description
Output short circuit to signal ground	±25 mA

Digital Inputs

Table A-3: Digital Inputs

Input Name	Description
Input type	5V nominal, >4V high threshold
START trigger	rising-edge sensitive
TAG trigger	rising-edge sensitive

Digital Outputs

Table A-4: Digital Outputs

Output Name	Description
Number of bits	16 (8 supported in software)
Output driver	advanced CMOS
(AC) compatible output current	±4 mA
SCOPE trigger	shared bit

A DB 25-pin female connector is provided with pin assignments as listed in [Table A-5: Pin Assignments](#).

Table A-5: Pin Assignments

Pin number	Digital Output
1	0
2	2
3	4
4	6
5	N/C
6	Analog ground

Table A-5: Pin Assignments (cont'd)

Pin number	Digital Output
7	Analog ground
8	8
9	10
10	12
11	Internal Use (or 14)
12	Analog ground
13	Analog ground
14	1
15	3
16	5
17	7
18	Analog ground
19	Analog ground
20	Analog ground
21	9
22	11
23	Internal Use (or 13)
24	Scope Output (or 15) ¹
25	Analog ground

1. Pin 24 is configured as the front panel SCOPE output, using the hardware's 16th digital bit (15).

Telegraph Inputs

Table A-6: Telegraph Inputs

Input Name	Description
Number of channels	4
Sample rates per channel	40 kHz
Input range	± 10.0 V

AC Power

The AC Power is supplied from a single AC input connector on the rear panel for the supplied AC power line cord.

Table A-7: AC Power

Voltage	Description
Voltage input rating for 1550	100 V–240 V AC, 50/60 Hz 50 W Max.
Replaceable fuse type	Cartridge, fast acting
Fuse dimensions	6.3 mm x 35 mm
Fuse rating	1.0 Ampere, 250 V

Operational and Environmental

Table A-8: Operational and Environmental Specifications

Specification	Measurement
Weight	3.6 kg
Dimensions (H x W x D)	109 mm x 483 mm x 363 mm
Mains Power Input	100 – 240 VAC, 50/60 Hz, Max. 50 W
Mains Voltage Fluctuations	Not to exceed 10% of nominal supply voltage
Equipment Class	1
Pollution Degree	2
Installation Category	2
Operating Environment	Indoor Use Only
Altitude	Not to exceed 2000m
Operating temperature:	15 to 30 °C (59 to 86 °F)
Humidity	<80% RH at 25 °C (77 °F)
Ingress Protection:	IP20

Electromagnetic Compatibility (EMC)

REGULATORY INFORMATION FOR CANADA (ICES/NMB-001:2006)

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

ISM EQUIPMENT CLASSIFICATION (Group 1, Class A)

This equipment is designated as scientific equipment for laboratory use that intentionally generate and/or use conductively coupled radio-frequency energy for internal functioning, and are suitable for use in all establishments, other than domestic and those directly connected to a low voltage power supply network which supply buildings used for domestic purposes.

INFORMATION FOR THE USER (FCC NOTICE)

This equipment has been tested and found to comply with the limits for non-consumer ISM equipment, pursuant to part 18 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a non-residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment.

This section provides information on the use of precautions to follow before operating the Digidata 1550 Low-Noise Data Acquisition System, the location of safety labels on the instrument, and a key to understanding safety label icons.



WARNING! If the Digidata 1550 Low-Noise Data Acquisition System is used in a manner not specified by Molecular Devices, the protection provided by the equipment may be impaired.



WARNING! The Digidata 1550 Low-Noise Data Acquisition System digitizer is an Equipment Class 1 product that relies on protective earth grounding for safe operation. Any interruption of the protective earth ground conductor, inside or outside the instrument, or disconnection of the protective earth ground terminal, may result in personal injury.







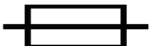


WARNING! Do not position the equipment so that it is difficult to disconnect the device.

Instrument Safety Labels

Safety labels are located on the instrument. Each Safety label consists of a:

- Signal Word panel, which implies a particular level of observation or action (for example, CAUTION or WARNING). If a safety label encompasses multiple hazards, the Signal Word corresponding to the greatest hazard is used.
- Message panel, which explains the hazard and any user action required.
- Safety Alert symbol, which indicates the type of potential personal safety hazard.

Symbol	Indication
	Indicates that product documentation needs to be consulted
	Indicates Alternating Current
	Indicates power on
	Indicates power off
	Indicates the location of the Protective Earth Ground Terminal
	Indicates that you must not discard this electrical/electronic product in domestic household waste
	Indicates fuse

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Check our website for a current listing of worldwide distributors.

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