



FEATURES
0–250 mA swept laser current (0.2 Hz to 5 Hz rates)
2A thermoelectric cooler controller
Preamps compatible with Si, InGaAs and InAs detectors to cover the wavelength range 0.4–3.8 μm
2f demodulator for second harmonic spectroscopy
Real time spectrum display and capture
Pressure and temperature sensor inputs
Portable and rugged enclosure
PC/USB with graphical user interface

**OVERVIEW**

The PCI-1DA is a benchtop DFB laser controller for recording direct absorption and second harmonic (2f) spectra for TDLAS (tunable diode laser absorption spectroscopy). It provides up to 250 mA of swept laser current, up to 2 amps thermoelectric cooler control, compatibility with Si, InGaAs and InAs detectors (0.4 to 3.8 μm), high-speed 16-bit data acquisition, and real-time spectrum display and storage. It is ideal for student labs, R&D and product development labs, and general spectroscopic measurements using tunable diode lasers.

Scans can be set up for single-sweep, or to repeat continuously, with multiple spectrum averaging for improved signal-to-noise ratio. Pressure and temperature sensor (thermistor and PRTD) inputs allow storage of environmental data along with the spectra for further processing to extract spectral line parameters such as line strengths and broadening coefficients. Designed as a rugged and general purpose laboratory system for acquisition of high resolution spectrum from tunable diode laser sources.

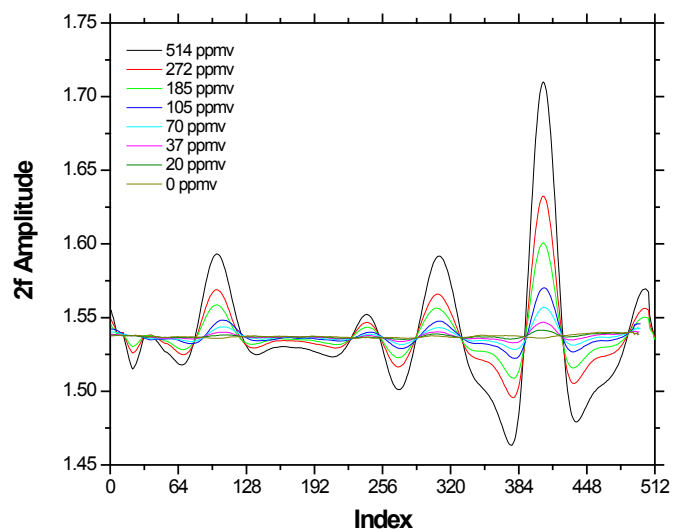
**GRAPHICAL INTERFACE**

Laser scan and spectrum acquisition parameters are defined via an easy-to-use GUI. Data can be saved to simple ASCII files compatible with Excel and most scientific analysis software. A built-in filtering routine allows effective acquisition time constants to be defined in software which eliminates the need for hardware time constant adjustments.

Multiple spectra can be “captured” into a separate plot window for useful visible analyses and experiment optimization, with each individual spectrum saved to its own disk file if desired.

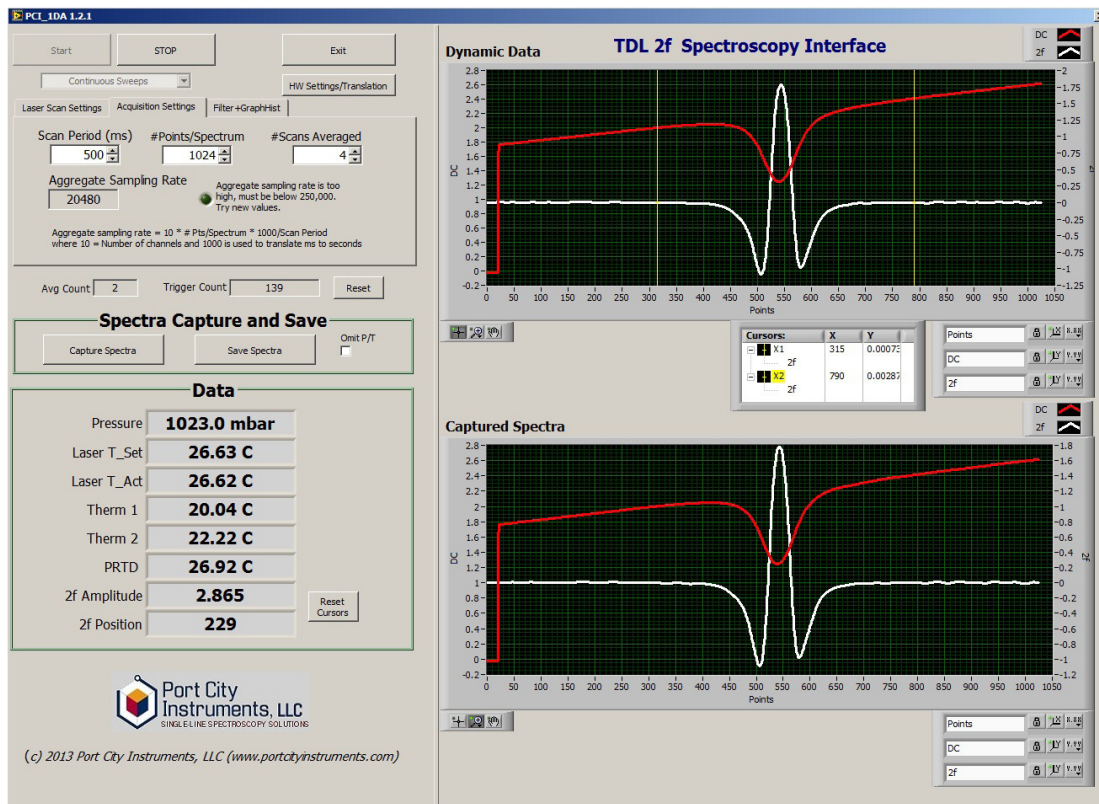
Laser sweep rates are adjustable over the 0.2 Hz to 5 Hz range (200 ms to 5 s per sweep) with an adjustable number of data points per spectrum. A high-speed (250 KHz), 16-bit analog I/O board provides sufficient dynamic range in the acquired spectra to record weak absorption signals in the direct transmission channel, and the second harmonic (2f) channel enables a further improvement in sensitivity (x10 to x100) for measuring extremely weak absorption lines that are not visible in the direct absorption spectrum.

Example Spectrum Sequence



Tabbed sections for setup of laser scans and timing

Pressure and temperature sensor display



Real-time spectrum display window

Spectrum capture window

A sequence of tabbed windows allow set up of laser scan parameters (starting and ending currents, sweep rate, number of points per spectrum, and number of spectra to average), spectrum filtering parameters, and conversion relationships for pressure, thermistor and PRTD inputs. All parameters are maintained in a configuration file so that they are retained when the control program is shut down and restarted.

Adjustable cursors allow monitoring of the amplitude of a specific feature in the 2f spectrum. These cursors can be adjusted at any time and the position and amplitude of the largest feature within the cursor boundaries is displayed on the Data block below the pressure and temperature values. Laser temperature (set point and actual) are also displayed. Front panel knobs on the control unit allow adjustment of the laser temperature, preamp gain, and the second harmonic gain to optimize the spectra for varying laser powers and signal amplitudes.

Plots can be manipulated to control autoscaling, colors and line widths, zooming and panning, etc. This is especially useful for zooming in on weak features in the "capture" window, and similar tasks which commonly occur when recording spectra in the laboratory. Ideal system for general TDLAS experiments, spectrum acquisition and storage, and as an experiment station in undergraduate and graduate chemistry and physics labs.

### SYSTEM CONTENTS

- Benchtop control unit
- Windows-compatible software
- USB cable for PC connection
- A/C power cable
- User Guide

### ORDERING INFORMATION

**Part Number:** PCI-1DA  
**Phone:** 866-456-2488  
 (M-F 8:30 am – 5:30 pm Eastern U.S.)  
**Email:** orders@portcityinstruments.com  
**Web:** www.portcityinstruments.com/products-ordering.php  
**Purchase Orders:** Contact us for details.  
 Visa/Mastercard/Amex/Discover  
 See website for current pricing.