

# ColorTrack™ R/T



User Reference Guide  
For Windows® 



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#### Fresh Roast Systems ColorTrack R/T User Reference Guide

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# Color Track R/T

## User Reference

Version 1.0



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# Introduction

## ColorTrack R/T

### Technology

The technology of the ColorTrack R/T system is based on specific geometry of the laser and reflectivity. The laser is focused into the roasting chamber and gauges the color development in real time. Operating at 785nm which is the optimum range for the actini9c response of coffee, the ColorTrack laser offers the most desirable and precise results for determining the true color of roasted coffee and incredibly accurate and consistent results.



### Laser Reflectometer

The Color Track R/T system is an exclusive patented system designed to monitor and record realtime data generated during a coffee roast. It is unique in the fact that it not only records and tracks time and temperature data as in normal data logging system but also tracks color development of the roast on a realtime basis.

The system collects and records this information every one second from various sensors and stores the data automatically allowing both real time and post operation analysis. The ColorTrack Laser Reflectometer tracks color development and the other devices track and collect time and temperature data in the same manner. If you have the optional RH package, the system will also track and collect data on relative humidity.

This information is displayed in easy to read form using both graph and table views and allows you extensive options in exactly how you display the information including integrated graphing and overlay views allowing you to



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correlate all of the different variables in any given roast and provides a historical record. Each roast's data is saved in an individual file for future analysis and comparison which can be easily accessed through the Tracks panel. The system provides a very user friendly interface for quick and easy navigation.

The ColorTrack system is an invaluable tool in understanding your roasting operation. By providing automated realtime tracking and storage of all of your roasting variables you have the advantage of analyzing the effects of environmental variables and get the ability to make each and every roast both more consistent and develop profiles and procedures that guarantee the best consistency and quality in your product.



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# Getting Started

## Included in Your Package



### *Laser Reflectometer*

There are two styles of Laser Reflectometers although they are identical in operation and features. The laser included in your package depends on the type of mounting solution best fits your roaster. The laser includes a power transformer that will require a 110 VAC electrical outlet.



### *Thermocouple Monitoring Devices*

There are two options for thermocouple monitoring. Depending on the package you purchased your package will include either an Extech DA-15 or a National Instruments 9112A (NI-9112A). The Extech DA-15 requires a 9 Volt battery which is included in the package. The NI-9112A comes with a power transformer that requires a 110 VAC electrical outlet.

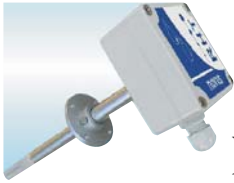


### *Data Acquisition Unit*

The system includes a data acquisition unit that allows the laser and other devices to capture, send and record data to your computer. This communication is handled by a National Instruments 6008 which is included with your laser package. Also included is a power transformer requiring a 110 VAC electrical outlet and a USB cord which you will be connecting directly to any USB receptacle on your computer.







### ***Relative Humidity Meter***

If you purchased the RH humidity meter option your package will include a Novus RH-100 relative humidity meter. The meter also includes a power transformer that will require a 110 VAC electrical outlet.

### ***System Software and Drivers***

There are a number of software programs and software drivers required for operation of the ColorTrack R/T system which can be found on the CD-ROM disk included in your package. If you purchased your computer as part of your package, the required software will be pre-installed for you. If you are using your own computer you may use the enclosed CD-ROM to install all of the necessary files.



You may also install all of the required software via any internet connection. It is recommended that you install from the internet from time to time as we are routinely updating the programs. To insure that you always have the latest ColorTrack R/T software and driver releases use the Internet installation procedure by first going to this address to download the National Instruments drivers:

[Http://www.freshroastsystems.com/NIDAQCore902.zip](http://www.freshroastsystems.com/NIDAQCore902.zip)

Download the file to your target computer, unzip the downloaded file and run setup.exe. Follow the instructions on screen and your software will be installed and/or updated. Once you have completed the installation of the National Instruments drivers you may then install the ColorTrack R/T program files by going to:

[Http://www.freshroastsystemsroaster.com/colortrackRTinstaller.zip](http://www.freshroastsystemsroaster.com/colortrackRTinstaller.zip).

Follow the same download, unzip and installation as you did for the National Instruments drivers.

### ***Accessories and Options***

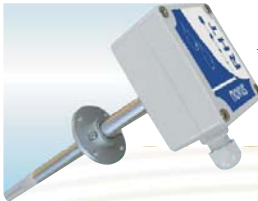
You will find an assortment of wires, cables and connectors in your package that

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are required for basic operation. The main cable is a multi wire cable that connects your thermocouple reader, laser reflectometer, the optional humidity meter and power via the NI 6008. You will also find a USB cable that will connect your NI 6008 to your computer.

### ***Computer/Monitor***

There are a number of computer options for ColorTrack R/T. Fresh Roast offers as assortment of all-in-one models including a touch screen. If you purchased a computer with your package all of the software will be pre-installed. Please refer to the User Reference that came with the computer as it relates to operation of the computer. If you did not purchase a computer with your system you will need to install the ColorTrack R/T and drivers manually. (See “*Installing your Software and Drivers*” section of this guide for more information).



### ***Relative Humidity Meter***

If you purchased the RH humidity meter option your package will include a Novus RH-100 relative humidity meter. The meter also includes a power transformer that will require a 110 VAC electrical outlet.

### ***Additional Options***

Wireless Devices - Not currently available.



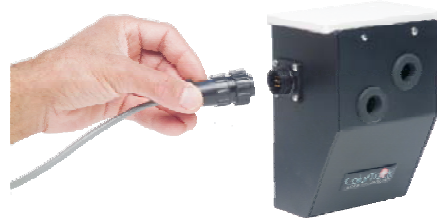
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# Laser Setup

## Setting Up the System

### *Installing the Hardware*

Installing the hardware involves a number of steps. The first step involves mounting your laser. Because each roaster is different there is no universal mounting solution and you are responsible for mounting your own laser and/or creating a bracket system to do so.



In creating your mounting system you need to take into account only the ability of the laser to “look” into the drum and see the beans. Most commonly this is done by mounting the laser in such a way that it points into the sight glass at its “clean point.” Virtually all roasters have a sight glass through which you can view the beans as they roast and a portion or all of the sight glass remains relatively clean due to scrubbing action of the green coffee. The “clean point” refers to the section of the sight glass that is clearest or the most scrubbed. This is where the laser should point for best results. In most cases, simple bar stock steel attached to an outside bolt on the roaster will create a simple and effective mounting solution.

Once you have determined where the laser can be positioned you can decide on your mounting and bracket solution. **The laser needs to be roughly 3-5 inches from the sight glass (3.00” is optimal) and must carry an angle (Preferably downward) of at least eight degrees.** You must create a bracket and mounting system that secures the laser at the desired distance and pointing at the correct portion of the sight glass or opening. You may also use a tripod or boom device if feasible but it must be sturdy enough to support the weight of the laser without moving.

Once you have created your mounting system, simply attach the laser to your bracket with the laser bracket included in your package. If you designed your bracket to take advantage of the adjustable nature of the bracket on the laser it



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will be far easier to adjust the distance if required.

### ***Targeting The Laser***

Once your laser is installed you should test and target the laser. Having attached all of the necessary cables you should be able to clearly see where it targets once power is applied. You will need a piece of white paper or simple white business card. The laser emits a beam in the form of a red dot that can be easily seen on any light colored surface. Connect your laser to power with the materials provided in your package. Once the power is on you can put your light colored paper or business card in front of the laser and you will see a red dot appear. Put the paper directly on the sight glass surface. You may find it easier to cut a piece of paper to the size of the sight glass and glue or tape it directly to the glass with an adhesive that can be easily removed from the glass afterwards such as rubber cement or common aerosol contact cement. Make sure your laser is properly targeted and then secure the laser in that position. Once you have targeted and tested your laser you are ready to install your software and test your entire monitor system.

### ***Installing the ColorTrack R/T Software***

If you purchased a computer with your system you are not required to install any software as it has been pre-installed for you. It is recommended that you start your system while connected to the internet from time to time as it will automatically check for any updates. If you are installing the software on your own computer or any computer not provided with your system you must install a number of different software programs and device drivers. If you purchased an integrated computer system with your ColorTrack product skip this step.

To install the software on your computer you must install the software drivers for your all of your connected devices as well as the ColorTrack R/T application software. In your package you will find either a memory stick or CD-ROM which contain all of the programs you will need.

The first step is to install the National Instruments drivers. Insert the CD-ROM or memory stick in your computer and access it. There are two folders on the media, one is labeled National Instruments and the other ColorTrack. Open the National Instruments folder and double click on the Setup program (setup.exe). Follow the

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on-screen instructions and reboot when completed. Once you have installed the National Instruments drivers you can then install the ColorTrack R/T software. Open the ColorTrack folder and run the Setup program (setup.exe). Once completed, reboot again and all of the required software should be installed.

*NOTE: If you are, or need to, re-install the programs and/or drivers for any reason you must first uninstall any old or previous versions. To do this, use the Windows Control Panel and use the Uninstall feature for Software/Programs.*

### ***Installing the ColorTrack R/T Software From the Internet***

You may also install the software from the internet via the Fresh Roast Systems server. To install the NI drivers go to this link:

Http://

Download the file, unzip it and run the Setup program. Once you have finished installing the National Instruments drivers go to the application software link and download the application software here:

Http://

Repeat the unzip and installation process with the ColorTrack application software. When you have completed both of these downloads and installs you are ready to continue.

### ***Testing The System***

To test your system, make sure all of your cables are properly connected and start the ColorTrack R/T software on your computer. Once the software is started it should display the current temperature and color of the drum which should be roughly 85-90. You are now ready to set up and test the rest of your system.



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# System Setup

## Connecting The Devices

After you have mounted, targeted and tested your laser you are ready to test the rest of the system. If you have already connected all of your devices you can skip the next step and go directly to testing.

## Cables and Connectors

To complete the system setup you must connect all of your devices. Connect your thermocouples from your roaster to the thermocouple reader and apply power. Next make sure any other devices are connected and powered up. Once you have connected all of the devices, plug the USB cable from the National Instruments 6008 into a USB port on your computer. The system should be ready for a complete test and full operation.

## Testing the System

Having connected all of your devices and installed all the required software the program will then be installed into the Start menu and onto your Windows desktop where it can be easily accessed.

Once the program is started and running it should immediately begin reading data from the probes and devices which will be displayed in the second row of panels below the Start button on your computer screen. These values are simply for display and will not be recorded until you begin a roast. Make sure that all of the values are being displayed and that all of the devices are working properly.

Assuming you have not yet roasted all of the values should be relatively normal and within ambient conditions. For example, the temperature reading on your screen should be somewhere near or at room temperature as should relative humidity if you are using the RH-100 humidity meter. Likewise, as there is no coffee in the roaster the laser should be displaying what it sees as the color of the drum. This should be very dark with a value of around 85-90 (with 100 being black). It is also recommended that you start the drum moving if possible to make absolutely sure the laser is reading. You should see the value displayed fluctuate slightly once the drum starts to turn as the laser is seeing different parts of the



drum.



# Basic Operation

## Roast Monitoring

### Starting a Roast

The process to start a roast is as follows:

1. Click new Track to create a new track
2. Fill out information in the details section as described below
3. Click the Start button (it will turn red with a time of 0:00.0). The system will now be waiting for the beans to drop into the roaster. The system detects this by reading the color of the beans. Once the color of the beans drops below a preset value (default ColorTrack reading of 80).
4. Drop the beans into the roaster. This will start the clock as the roasting process initiates.
5. When the beans are finished roasting and have been dropped from the roaster the system will detect the corresponding change in color and stop recording the roast. The system will then automatically save the roast with the name of the roast from the details section and also the current date/time information.
6. (Optional) The user may choose to click the timer on the right side which the customer may choose to time the crack length. Clicking on the button again stops the timer. Right-clicking resets the timer.



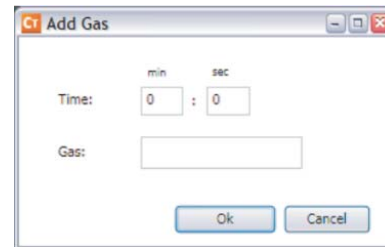
### Manual Start/Stop

The process to start a roast is as follows:

1. Click new Track to create a new

### Adding Gas/Air during a Roast

The user may choose to add gas and air values to be recorded during a roast. If the user has a manual gas or manual airflow controls, the user may also choose to record these values into the roast. This information is optional and will not affect the system if they are not added. The user can click the “Add Air” and “Add Gas” buttons at



the bottom of the screen to add these values. Once the button has been clicked a screen will popup showing the current time of the roast. If the user types in a value, then that value will be entered corresponding to the time that is displayed.

For example, if the user clicks the “Add Gas” button at time 5:30 of the roast a screen the popup screen will show 5:30 as the time. Once the user adds a value for the gas and hits enter that value will be reflected in the Chart showing the gas was added at time 5:30 at the value the user entered.

Changing previously added Gas/Air values during the roast can also be done. The user can choose to change the time value in the popup window and the system will go back and replace all the values which corresponded to a particular time and value.

For example, if the user had added 50 units of gas from time 1:00 to 2:00, then the user may type in 1:00 as the time and 60 units of gas. When the user hits the enter button the system will go back to 1:00 and change it's value to 60. It will do the same for 1:01, 1:02, 1:03, etc until it sees a change in gas value which happens at 2:00. Therefore, all the values of 50 between 1:00 and 2:00 will be changed to 60.

### Changing Details

The user can change any of the details as shown in the screenshot above. The “RoastName” will be used as the name of the file along with the current date/time.



(Example: Kenya2009-04 12:12:59.xml). The user may also click on the detail name and change the name of the detail itself. For example, the user can click on “Batch Number” and change the name to “My Batch” with the exception of any field who's background is gray.



Also, the user may choose to add new rows to the details section if the currently set details are not sufficient for recording all the information required by the user. By clicking the “Add” button the user can add new rows and populate them with new information. The user may also choose to remove rows by clicking the “Remove” button.

## The Table View

When the user clicks on the Table tab, the user will be able to see the graph in tabular format. If the user chooses to add a baseline roast, the system will display the standard recording columns on the left of the table but it will also display the baseline columns on the right side of the table.



## File Operations

### Opening a File

To open a file double-click on the panel with the small graph icon in the Tracks panel. That file will then be highlighted. It will quickly load the file and all its details into the system. The “Start” button will turn red and show the roast time of the roast.

To navigate through the systems directory structure the user can click the “Up One Level” button to change the directory up one level. Also the user can choose



to click a directory in order to open a specific directory. We recommend organizing your roasts into a directory structure to improve the performance of the system.

### Search

The user may also type a few characters into the search field and the system will attempt to match that text from the roast information displayed in the panels.



# Advanced Options

## Changing the Laser Settings

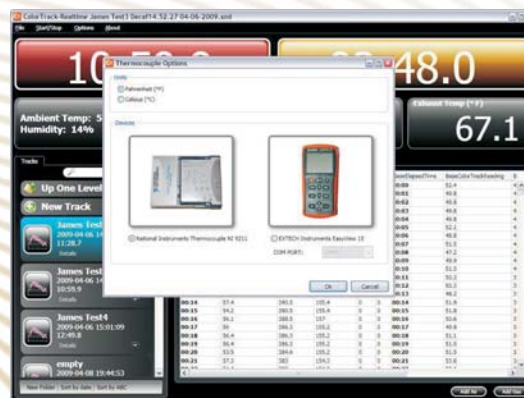
To change the laser calibration settings the user may choose to replace the default values. The Desired values will be used to change the actual readings that are taken by the Color Track laser.



The “Start/Stop Trigger” is the ColorTrack laser value at which the system will begin and end the roast.

## Changing the Thermocouple Settings

To change the units of the system from Fahrenheit to Celsius simply click the desired units in the window. The user may also click the type of thermocouple device they are using to read temperature data.



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# Technical Support

## *Telephone Support*

408-550-2860

## *Email Support*

[info@freshroastsystems.com](mailto:info@freshroastsystems.com)



