FrontColour 10

FrontColour10

COLOUR METER FOR ON-LINE OPERATION

USER'S MANUAL

PC PROGRAM FOR WINDOWS 11/10/ 8/7 AND FUTURE VERSIONS 64 bit versions

Manual printed in Finland
PART #100196

2026-08

Copyright (c) 2026 Visilab
Signal Technologies Oy

Visilab Signal Technologies Oy
Address:
Sepäntie 4, Monninkylä
FI-07230 Askola
FINLAND

Tel.:
+358-45-635 4885
Y 0631208-0 ALV Rek.
VAT FI06312080

e-mail:
info@visilab.fi
AAA-rated
Mäntsälä Reg. 365.258

www.visilab.fi

Revision history

V1.00 3-1-2013 first production version
...
V2.15 revision for R5 systems
V2.29 for R6 systems and divided to FrontColour and FrontColourConfig programs

Contents

1. Introduction and Taking into Use.....4
Important Notices for Windows 7, 8, 10 , 11 Users.....4
1.2 System Requirements.....5
1.3 Style Issues.....5
2. Communications Page.....6
2. Reporting Page.....8
3. Colour System Setup Page.....9
4. Acquire Pages Fast and Slow.....11
6. Archives Page.....14
6.1 Data files.....14
7. Analog Signals Page.....16
8. Numeric Indicator Page.....18
9. Reflectance Calibration Page.....19
10. User-defined Reflectance Calibration Uploading Page.....20
11. Under the Hood Page.....21
12. Diagnostics Page.....22
13. Wavelength Calibration Page.....23
14. Wireless Bluetooth Communications.....25
15. OFF-LINE Use.....25
16. L*a*b* Display Page.....26
17. L*a*b* Fine Tune Page.....27
18. Error Message Dialogs.....28
18.1.1 Some of the Most Important Error Messages.....28
18.1.2 Incorrect Asynchronous Serial Port.....28
18.1.3 Incorrect Path or Nonexistent File.....28
18.1.4 User Interrupt or Nonexistent File.....29
18.1.5 Trying to Open a Nonexistent Settings File.....30
Index.....31

1. Introduction and Taking into Use

This document instructs you on how to use the **FrontColour** PC user interface with your colour meter **FrontColour 10.** Refer to the instrument's user's manual covering details on installing and using the meter itself. This software is not compatible with any other instruments at this writing and is specifically tailored for FrontColour derivatives.

This program has a number of features most useful for users of **FrontColour 10** colour meters. One can acquire real-time data from the meter and setup all features of the meter through the serial port / USB. The program is now divided into two separate programs. The **FrontColourConfig** is used mainly for configuring the meter and especially the analog outputs. The **FrontColour** program is for acquiring data but has some configuration capabilities too. The two programs very similar and have overlapping features.

The CIE colour system can be selected and set up before use. There are also some calibration tasks for checkups or actual calibrations. One page is reserved for the diagnostics. A printer connected to the PC can be used for documentation as well as reporting to HTML files. All acquired and downloaded data is saved into Visilab's traditional IRMA7 format files which are compatible with all spreadsheet programs (textual ASCII data). This program is a true multitasking system capable of performing simultaneously several tasks at the same time (with some natural limitations). The program has been made as simple as possible to be used reasonably. There are no menus at all (except some associated with the graphical displays) and everything you see is what you get. All actions are started by pressing buttons and meter status is indicated with various LEDs or numeric indicators. You are using a virtual instrument in your PC though there is a true instrument behind it producing the data and may even be wireless connected to your PC at a distance.

Regarding any settings in the meter made with the program, always first **Get** the parameters or settings, then **modify** and then **Update** to the meter. Editing some variable or parameter without this in mind may cause unexpected data to be sent to the meter causing the system to behave in an unexpected way. To avoid serious troubles in the system due to misuse, there are options for saving the current settings to ASCII text files for further archiving. This allows the user to reedit the faulty values and update to the meter to restore normal operation. Many update buttons have either a certifying question or a password protection to warn the user of what he is attempting to make. When the password is known a user has the permission to do whatever he likes.

There are two USB connections available to this instrument. One is only for service operations and for changing the baud rate of the communications and the other one is for regular use with this program. The service operations are entirely handled with some terminal program, like Atlink or AtlinkMini from Visilab and downloadable freely from the Visilab's website. Also the public domain no-cost **Putty** is usable among others. If the system is properly set up originally, you probably will not need these but it might be wise to have one of them installed in your computer.

Important Notices for Windows 7, 8, 10 , 11 Users

Before starting, it is important to make sure you have the administrator's rights in your PC to install programs, read, modify and write files etc. with full and widest possible rights. If not, ask your computer manager at the IT department to do this phase for you or switch the PC user to an administrator. It is possible that after a successful installation, you encounter strange error messages when files are tried to be saved to a hard disk. These problems are mostly ***due to insufficient file writing permissions*** . If it is about a data file saving when the data Acquisition is stopped, the system refuses to open a file for writing (a typical case of insufficient R/W rights). The same error may appear **if the intended folder does not exist** . Also, in the case of a folder at the end of a local network, for some reason is not anymore accessible, an error message will appear. You have as alternatives increasing the user rights or separately allowing full file rights to that particular folder you are trying to access. Thereafter you can use those folders without problems. You can also find another folder for file saving which is not limited in access (e.g. My Documents, My Folders etc.). Also, if right after starting the program, an error message appears, it is likely from a missing configuration file of the program itself. This is not dangerous at all since

you are about to set up the program features first and then to save the configuration. Stay calm even if error messages appear and try to logically induce where they come from, if ever possible. Always **continue** operation by pressing the **Continue** button.

The PC programs are installed as follows. Place the USB stick to a free USB receptacle and locate the program **setup.exe** for **FrontColour** or you can just start the **Visilab_installer.exe** which allows you to install the programs on the stick. Launch it and perform the installation accepting the selections, unless there is a reason to modify. Don't start any other installation sequence until the first one has been completed. You are ready to start working with this program. However, if this is the first time installation of any of Visilab LabVIEW software, you may have to restart the computer for the program items to be available. There may be other programs on the stick which are not listed in the Visilab_installer. Therefore we advise you to check the memory stick folder contents.

Locate the item in the Start -> Programs -> **FrontColour** and click it to start. You can also place a shortcut of this program on your Desktop to easier start it in the future. Refer to your operating system manuals for details. In the following we will go through all the features available in this software. When meeting any error messages and dialogs, refer to Chapter 11 for solving those cases. Setting up the **FrontColourConfig** program is similar.

1.2 System Requirements

This software operates in Windows 10/8/7 environments if you have at least 550 MB of memory available. Hard disk space of 800 MB is required for installation and starting the program. Archives will require more space. A 1.5 GHz processor is the minimum CPU requirement but higher is recommended for Windows 10 / 8 / 7 users. The minimum screen size required by this program is 743 x 1024 pixels. Smaller screens will lead to more cumbersome use of the program. Efficient use of multi-core computers is supported. The 32 bit versions available run fine in both 32 and 64 bit Windows. The 64 bit versions run **only** in 64 bit Windows. Check regularly the Visilab website **Downloads** page to get the latest version at no cost. We are continually upgrading the programs.

1.3 Style Issues

Most buttons at any page start some action and are not left pressed down except for a short moment (a few exceptions exist, see below). Many rectangular buttons are settings which are either left as pressed down or are later updated to reflect the status of the meter. The indicator lights are statuses read from the meter or generated by the program and can not be changed by the user directly. Typically, they have either a blue, grey or orange color. In some special cases, the color may be red to warn the user of some problem. You can always get a one-line description of every button, control and LED by moving your mouse cursor over it. There are some large buttons on several pages whose color when pressed down is bright yellow instead of the regular orange. They are left at their state until the user changes the settings. These buttons are used for example for acquiring data continuously. The purpose of this is to indicate the user to change himself the button's state. Some of these buttons have an indicator light at the left edge of the display to remind of their active use and not to leave them running while stopping the program.

There are also LEDs for other operations whose momentary operation may take a longer time to finish, like downloading a data series. The fields which the user can edit or change are with a white background. All other background colours indicate that the system will generate the data for display only.

Remember also the philosophy of the FrontColour series meters:

If some new setting or configuration is important, Save the configuration. Otherwise the meter will ignore any changes when restarted.

2. Communications Page

Before starting actual use of the program, you need to check the settings with white background (port and slave address). They need to be set before you can start communicating with the meter in **Connected** state. The **port** selection is highly important and refers to the serial port your meter is connected with in your PC. Use only ports COM1 - COM255 or ASRL1-255 depending on your system. There are USB to RS232 adapters available for Windows 10/8/7 operating system in case you do not have any RS232 ports in your PC. Incorrect port selection will cause error messages when you try to start using the software. Use the grey arrow down button at the right end of the selector to choose from the list of available ports (Refresh). This setting is saved but it is wise to check it. Refer to Figures 2. You can also use the Bluetooth wireless connection which is capable of operating within a range of 100 m in good conditions. The delivery will contain both the RS232-to USB and RS232-Bt-to Bt-to USB converters. They are all based at the USB end on the same USB interface chip which is very easy to install (FT232RL) simplifying things a lot. These guidelines affect the FrontColourConfig program as well.

The meter's **slave address** is highly important for proper working of the meter. The default address is **1** but you may have changed it for some reason (if several meters are supported in a private network for meters). The allowed range is 1…255. Zero is reserved for the program itself (master) and can not be used for slaves. Using an incorrect slave address will cause inoperable software with long delays between actions, messages like "No response" etc. If you have changed the address and can not remember it, you can set it as one and then Connect. Then you can go to the Under the Hood page and start the inquiry for slaves in the network. That inquiry will indicate which systems are connected and your meter should be there telling you its slave address. If you change the address of it, make a note of it clearly to avoid any future troubles. The baud rate setting is always 115200 for the FrontColour 10 meter in the first place. For FrontColour 10, the setting may changed to be either 9600 or 115200 bauds, depending on the initial setup of the meter itself. That depends on the length of the cables in delivery. Long cables prevent using the fast speed. The Bluetooth link allows the fast rate to be used if the cable length from the meter to the PS is not too long. The baud rate setting is made through the **Service USB port** at the side of the enclosure. Beside it there is another USB marked as **Comm's** and it can be used directly instead of the RS232-USB. Using this USB takes over the communications and the other one is not available. However, the USB cables are always very short. Try to keep the baud rate at 115200 if possible and change it to 9600 only if the system becomes nonresponsive with long cables.

To properly save all meter configuration and data files, it is recommended to set the two fields in this same box as well. The FrontColour file path is used for saving the library and meter configuration files in the future. The recommended path is **C:\FC10**. The data files generated during operation are saved into another directory whose path you can set in the lower dialog. The recommended path is **C:\FC10\DAT.** You can also use the small directory dialog buttons to the right to select and even create new paths. Leaving these folders undefined will soon lead to error messages and lost data. The optional control files should be saved to **C:\FC10\CTL.** You can always use some other folder arrangement as long as you have the full access permissions. Then, edit the folder names and Save the settings. Check to see that the folders really exist.

Pressing the "Save settings" key will save the settings in this box when starting the next session and you don't need to return to this point later. Some of the programs have automatic saving after first use so you don't need to worry about that either. Some program features are also saved but not all.

Note that while doing fast or Slow acquisition, this software **always** saves traditional IRMA7 data files to the data file path you have defined. **You don't have any possibility of turning it off.** This will save you a lot of headache as all of your data is saved in the future. The only discomfort you may have is that you have to clean up the data file directory occasionally to prevent it overflowing physical memory limits. The typical data file size is up to 20x30 kb for each run (4096 points).

Notice that changed settings are effective only after entering **Connect / Disconnect** first. The operations available in this software, except the Archives, are usable only if you have a colour meter connected to the serial port. If you want to use the Archives page only and have no connection to the meter, that is OK if you have ANY serial port available in your PC. Then you can select that port and go Connect and start working on the Archives page

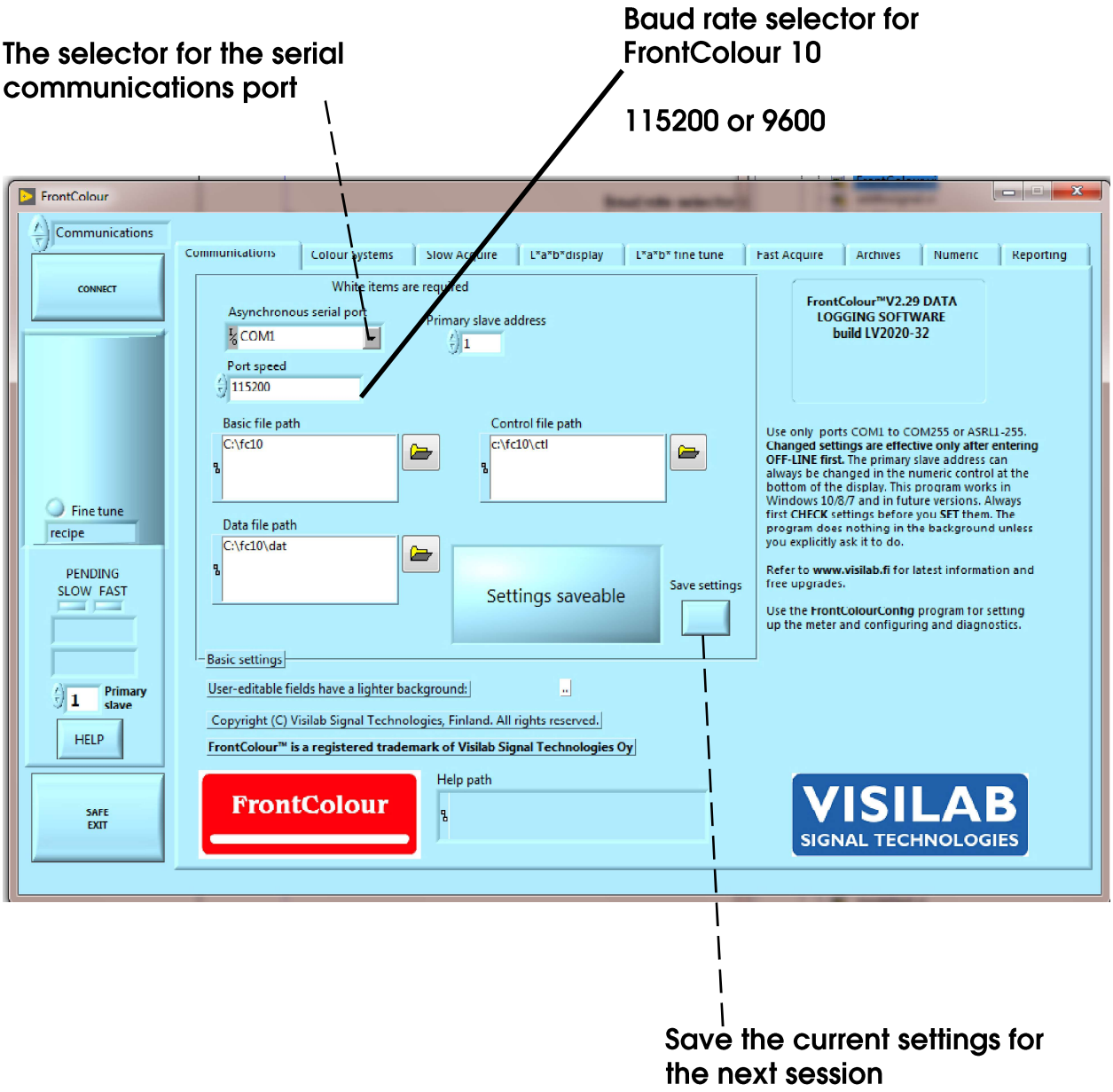


Figure 1. The Communications page, similar in both programs

only. Attempts of using any features or commands referring to the meter will fail and operation becomes sluggish as the commands fail at time-out after several attempts.

To start running the software, press the large button marked **"Connect"**. Pressing the same button (with name **"Disconnect"** at that time) again will return you to the same Communications page after a few seconds. However, you need to have all pending operations stopped before doing that (yellow lights at the left edge). You will soon realize that there is a cover on the left side of the screen preventing access to some buttons. When you go **Connect**, the cover disappears and you can use them.

If you attempt to start and run simultaneously both programs, you cannot use the same USB port.

2. Reporting Page

By pressing the sheet top you can select which task you wish to use. The reporting page allows you to select the specific features of the data files to be generated in addition to the standard ones and on how the reports are generated. See Figure 2. Use the Save control data button if you wish to generate colour variable data in separate single-value files to the control folder. The file formats available are for general-purpose data acquisition and analysis. Printing is made either to a HTML file with images or to the default printer or both. The files are dropped among the other data files. The Excel-file option makes the files more easily recognizable by the common spreadsheet programs.

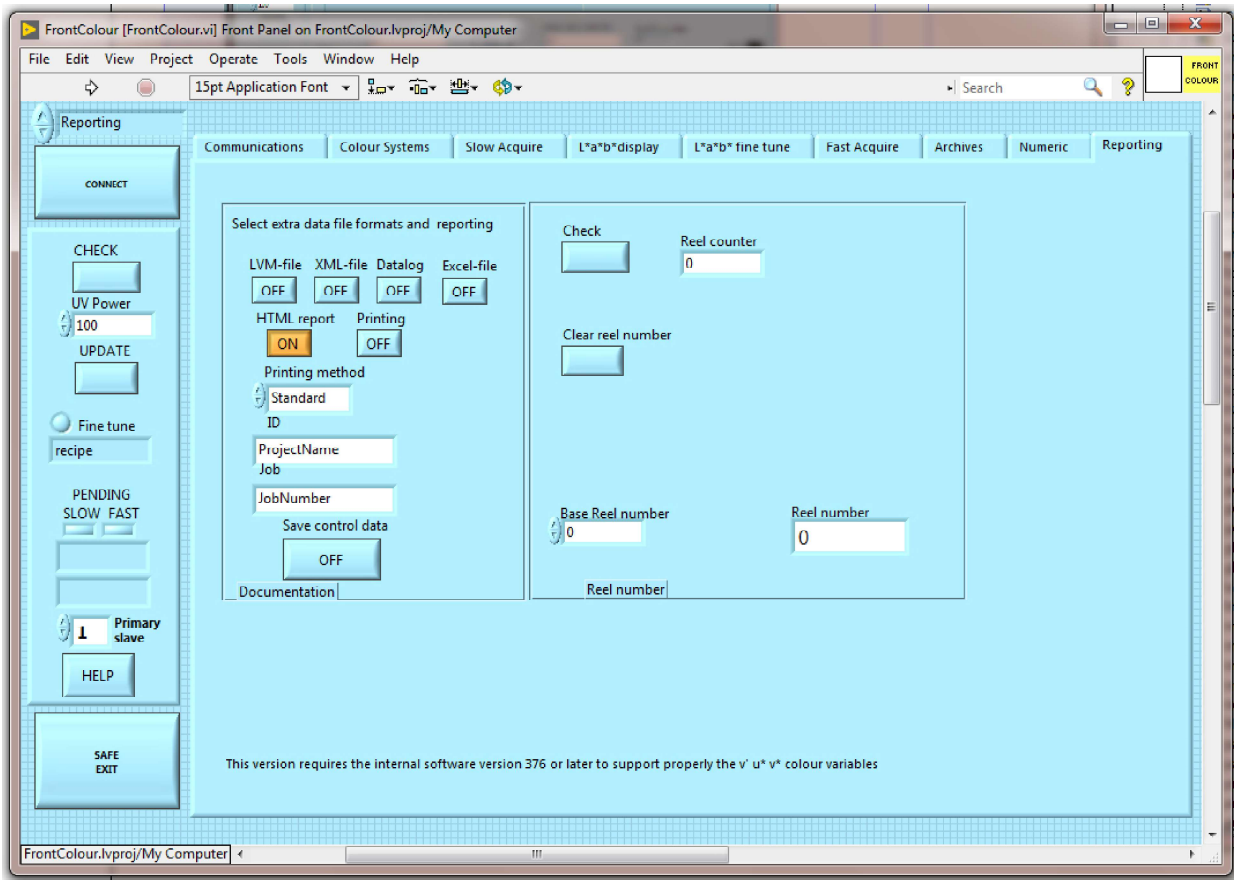


Figure 2. The Reporting page

On this page you have the option of setting the base count for the reel counter. If the reel counter input is connected to a physical reel change switch making a closing contact for at least one sec, this will automatically increment the reel count.

3. Colour System Setup Page

You can check the meter CIE colour configuration by selecting the Colour Systems page. There, you can press the "CHECK" key to see all most important information of your meter. **Always do this first when entering this page!** You can also see the meter's serial number. The button "Low power" reflects the powering status of the meter (**Normal / Stopped and energy saving**). If you wish to turn the meter into **Low power state**, press this button and then press the "**UPDATE**" key. See Figure 3.

The CHECK can always be used safely without activating anything. The UPDATE updates the meter with the settings visible on this page. **Think first before you press this one! Always first CHECK and perhaps, then UPDATE to make sure you do not change anything vital unintentionally.**

NOTE: Always CHECK first the settings before you UPDATE them . The program does nothing in the background unless you explicitly ask it to do.

There is now a button at the center for explicitly saving the meter's internal configuration. As the meter FrontColour 10 philosophy is to maintain the last saved configuration until explicitly modified and saved, this allows the user to save it with the FrontColour PC program. Note that the old configuration is really lost and the meter will behave in the present setup (calibration, timing etc.).

The FrontColour10 meter is analyzing 20 variables. They are the primary **tristimulus values X, Y, Z, the chromaticity coordinates x,y,z , the CIE L*a*b*, Lu'v', L*u'v', Yellowness J, TAPPI brightness R457, CIE whiteness W, CIE Tint, colour difference dEx (for L*, a*, b*), chromaticity C* and hue H*** . A special **Primary reflectance data R(lambda)** is obtained too. Geometry is 0^{o} /45^{o} CIE 1964 10^{o} observer. **D65, A, C, D50, D55 or D75 illuminants** are selectable. The tristimulus values X,Y,Z are the most important and the CIE colour variables are all based on them and only on them. They represent the spectral reflectivity of the surface weighed with the human eye's response curves and the illuminator selected. Therefore, X is related to red, Y to green and Z to blue colours. As is well known, to observe by vision blue colour there is also some weighing for the red involved. This is not an instrumental feature but a mathematical construct specified in the standards and implemented in the analysis.

On this page you can do the following (refer to Figure 3):

1. Change the Illuminator used in the colour analysis. It does not modify the light source characteristics at all, only the way the analyses are made, according to the CIE standard's requirements. You have the options D65, D50, D55, D75 A, C

2. The UV excitation power. This power is uncalibrated but rather stable. The allowed range is 0..100. If 0 is used, the wavelength range 380 - 420 is blocked out from the analysis since no light is exciting the target for analysis.

3. You can edit the wavelength for the R(s) primary reflectance signal. That is a pinpointed reflectance at any allowed wavelength (380 - 760 nm). Using wider ranges may produce unwanted results.

4. You can test read any variable by first selecting it and then pressing the Get button.

5. You can set the target value for the L*a*b* variables by pressing the Target button. The dEx reading will indicate the colour difference from the current variables after that. This setting is not saved.

6. You are allowed to modify the gain and offset values associated for each variable to match your particular needs. Thereafter you are responsible for what you get. Note that if you change the primary tristimulus values' X,Y,Z coefficients, **they will affect all CIE variables** as their analysis is based on them entirely. It is best to check the X,Y,Z value validity first and make changes to those first. Then you may modify other variables if necessary. The editing is done as follows. First GET the offsets and gains by pressing the button for it. Then select the variable and press the EDIT button to modify either gain or offset. They are separate and have to be done separately. After editing, press the Stop edit button and then Update this variable button to save it to the meter. To make sure you made it right, after everything, press the **Get the offsets and gains button** and check that the readings are correct. You can press the Save to a file button to save all coefficients to a file for archiving. The meter's readings are immediately affected by the editing process.

7. Pilot lasers can be turned on/off by first setting the state needed and the pressing the Activate button. Do not leave on the lasers as they are powerful and may pose a risk of eye damage to persons who are not aware of them. These are used only for adjusting the working distance of the meter. Never look into the laser beams and even looking at the bright spots will wear out your eyes. Avoid reflections from glossy surfaces and objects as they may hit accidentally instruments or people.

8. On the left side you have the option for changing the same UV excitation power as before. This is for those who wish to modify it quickly while running the system. Note that this setting is not saved, it is only dynamically modified while running. The original setting is saved in the meter and is used when the meters starts from a power down. The regular power level is 50 % and the meter has been calibrated with that. If a different UV level is going to be used most of the time, perform the reflectance calibration with that level.

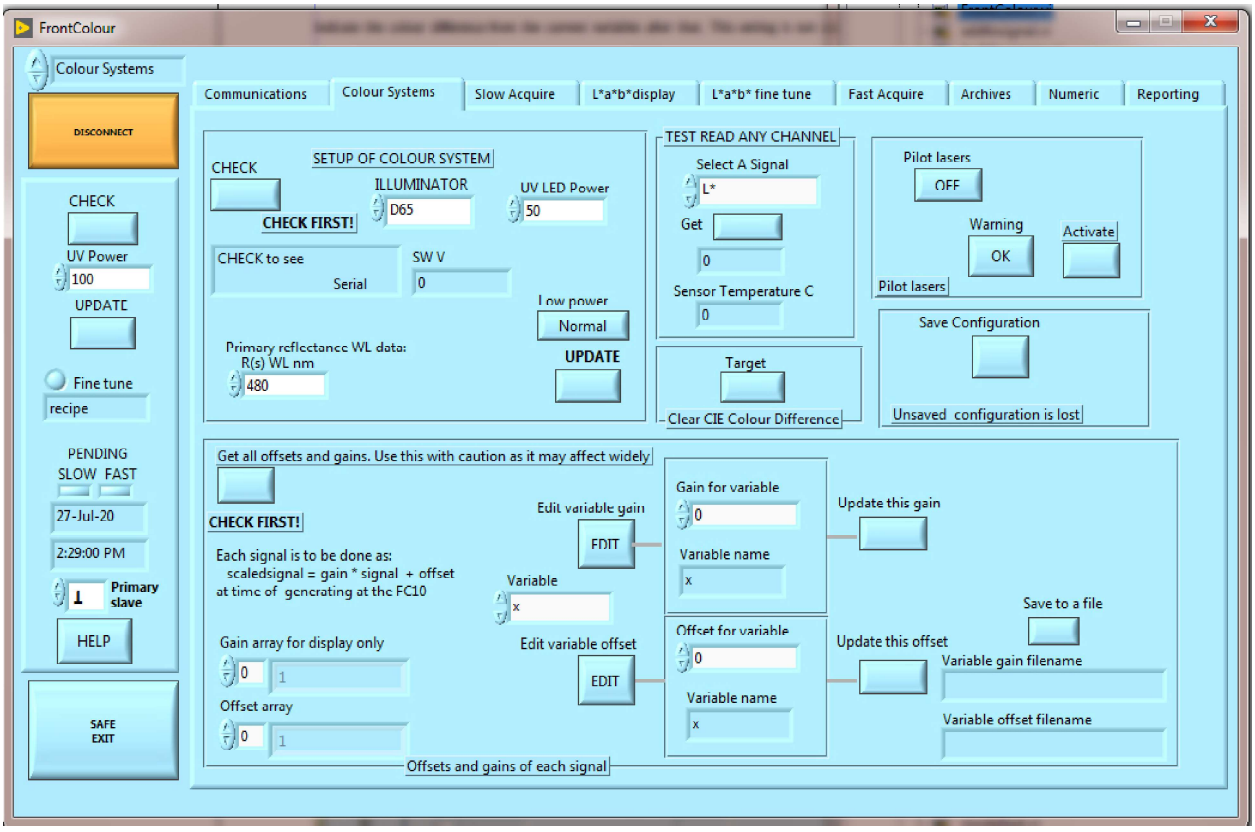


Figure 3. The colour systems page

4. Acquire Pages Fast and Slow

To start measuring right away, we assume you have the meter ready and pointed at some target surface. Go to the Acquire Fast or Slow page and press the large button, marked "START" to change it to "STOP". This will start data retrieval from the meter if the connection is working correctly. The graphic display shows the accumulating colour values with automatic scaling. The time scale shows the correct time taken from your computer. Refer to Figures 4 and 5.

You can work fine with the default settings without ever touching any adjustments of the display. If you are interested, explore the possibilities available by clicking either the right or left button of your mouse with the cursor over some display control. Learn the possibilities by reading what is in the help messages or in the dialogs to change the zooming, scales and colors of your display. If your display gets mixed up, do not be alarmed. You can always restart the software or try to restore it by studying the menus. There are some control buttons connected to the display only to allow a selection of settings. We are not going to any further details in this about them. This same applies to the other graphical displays which are similar in features. This display does not have any cursors.

The button at the right is for printing the display graphics if you have activated any printing option. You do not have to print everything unless you really want to. All data is always saved into IRMA7 file format readable with any spreadsheet program too. You can also later retrieve the files on the Archives page.

The small number display on top of each selection button is helpful. The rightmost number indicator shows the total number of samples acquired after the operation started. The LED indicates when data is actively inquired from the meter. From it, you can determine when the serial bus may be overloaded (LED lit all the time). That may cause slipping in time schedules (see below).

The Acquisition operation will stop after having 4096 samples taken. It will then save data to a file (or a set of files as configured on the Configuration page). Then, it will restart acquiring for the next 4096 points. This will continue forever until you explicitly stop the acquisition.

You can change the rate data is acquired by adjusting the time interval (0.5 to 32000 seconds, 1 sec minimum for the SLOW) at the box "Interval" control. Overloading will happen if you try to acquire too many signals at a too fast rate. Changing the interval needs restarting the acquisition to take effect.

As you can see, there are LED indicators at the left edge (FAST, SLOW) which are lit when you have started the operation. They are there to remind you of a pending operation which should be properly stopped before stopping the program. There are also some other operations which might interfere with this operation and therefore it is recommended to turn them off. In principle, you can use most of the operations in this program simultaneously.



Figure 5. The Slow Acquire page

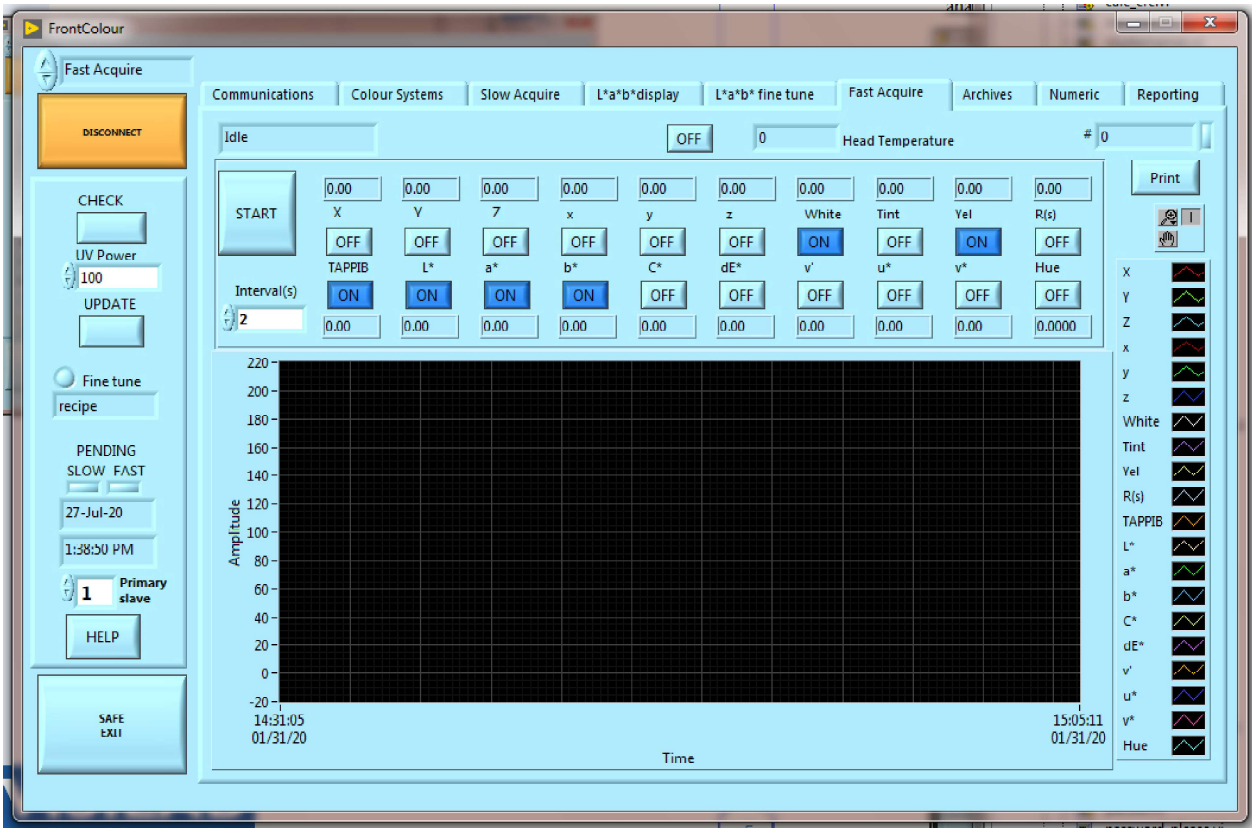


Figure 6. The Fast Acquire page

6. Archives Page

You can retrieve and display any old data files saved during program runs on this page, even while some other operation is running in the background. On this page you have six channel selectors, statistics displays for each channel, a graphical display and the Print button. By pressing one of the channel keys, you can retrieve any old data file as long as you know where it is and what is its name. The data is shown on the graphical display and the corresponding statistics are calculated automatically. You can move the cursors to proper points freely. The scaling is very much like on the Acquire or Memory Banks pages. In this way you can compare and study data and adjust the scaling to make it look best for printing. Refer to Figure 7. You can use the two cursors to calculate the statistics of the points lying between them. The values are indicated on the table to the right. In printing, these values are also included.

You can use the Center cursors button to locate them if missing. You can also modify the colours of each curve on this page just like on any other page to more clearly bring up the interesting ones. Moving the mouse cursor over the filename field will indicate the header and tailer information from the data file after reading the contents

The first two channels are actually fresh data from the Acquire operations SLOW and FAST.

6.1 Data files

When you run the Acquire Fast or Slow operations you will have files with names indicating the variable in question. The files always contain 4096 lines of data plus some header and tailer data pertinent to the measurement and meter. The file name consists of both date and time and some running numbers to make them unique.

In this way the program produces files whose names are unambiguous but recognizable. Needless to say but it is advised to clean up the data file directory of unnecessary files regularly. Make backup copies before removing them. It is a good bookkeeping method to use various folders for different measurement projects or higher level tasks to keep the data separate.

Annotation

It might be tempting to add some text into various graphs while studying either signals coming in or after being analyzed with various methods. You can do it. It is allowed on Archives graphs but not on the Acquire graphs. You can either write freely floating text or annotate certain data points into a curve. Right-click over the graph area and activate **Create annotation** option.

The Annotation name is the text becoming visible. Lock style has options: Free, Snap to All Plots and Snap to One Plot. Locked Plot is the resulting name of the plot selected. You can also tick in the boxes Hide arrow and Lock name if you wish. Try these out to see the effect. The annotation is visible in reporting too but is not saved otherwise. You can later move the annotation text to a better position by dragging it with the mouse. When you do not need the annotation anymore and want to clear it, right-click on the graph again and select Clear annotation or Clear All annotations.

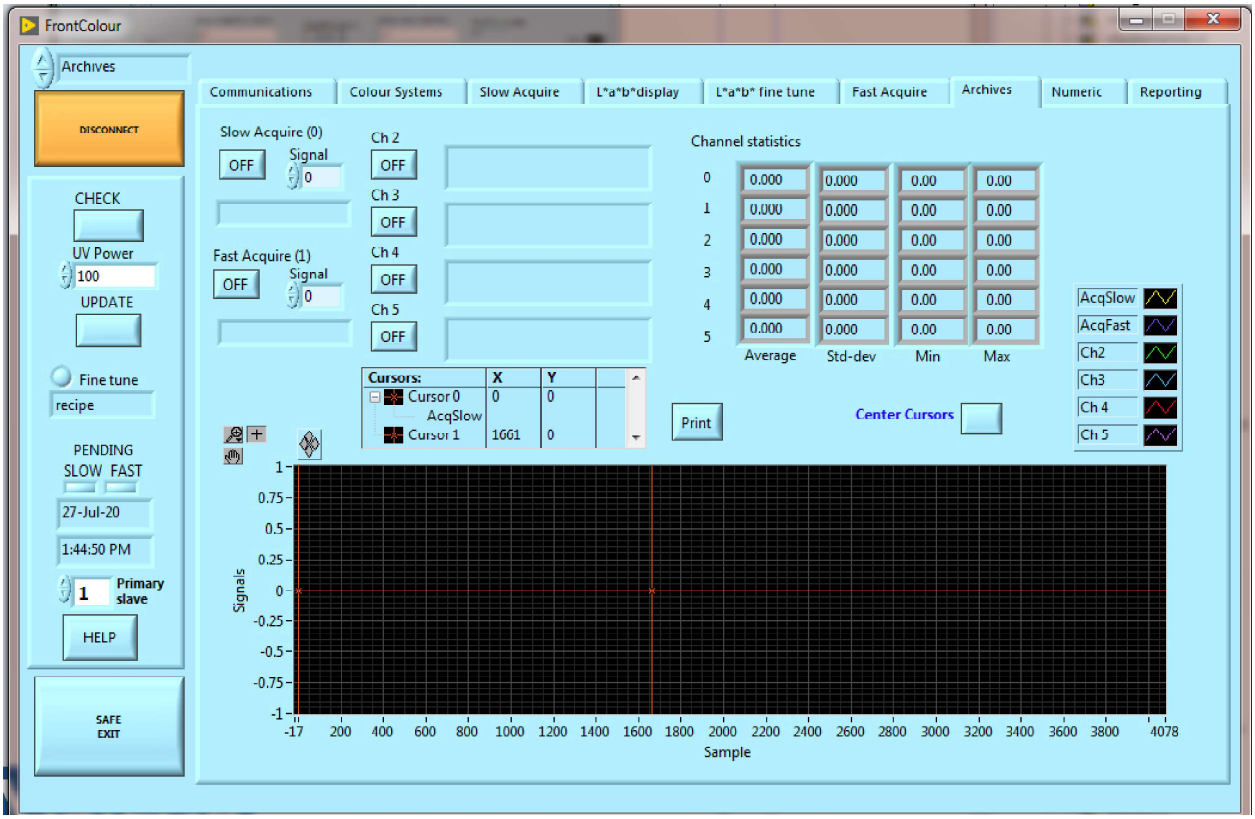


Figure 7. The Archives page

7. Analog Signals Page

This part (FrontColourConfig program only) allows you to feed in the scaling and offset data to exactly match the analog signal outputs to your requirements. Each one of the 20 output signals can be separately scaled in gain and an offset can be added to that. The purpose is to generate a voltage with the colour signal between 0 and 5 Volts for the voltage outputs and 0 to 2 Volts for the 4-20 mA output. The latter has also a voltage output with that range. Refer to Figure 8.

Since the variables to be output differ radically from each other regarding the numeric range, this option is very important. The settings are saved and usable anytime afterwards and one does not have to worry of the scaling if once made properly. Just note that the channel 1 for 4-20 mA has a voltage range for that as 0..2 Volts. The other three channels have it as 0..5 Volts. One can anytime select a new signal to be driven to the analog output.

The regular values for the signal ranges would be approximately the following:

1. X,Y,Z = 0.. 100.0 but may go up to 200 in very special situations

2. x,y,z = 0.. 1.0

3. TAPPI Brightness = 0.. 100 but may go to 150 if very high FWA content

4. Yellowness J = -100...+100

5. Whiteness W= 3000 ... +3000 but usually between -100...+100

6. Tint T = - 650 ... +900.0, usually between -100...+100

7. L* = 0.. 100 but may go to 120

8. a* = -500...+500 but usually between -100...+100

9. b* = -200...+200 but usually between -100...+100

10. Hue H = - 100 ..+100 but may obtain strange values

11. Chromaticity C* = 0..100 but may grow to higher values

12. dEx = 0.. 200 but may grow higher

13. R(s) = 0.. 100 but may grow to 150 in special conditions

14. u* = -500...+500 but usually between -100...+100

15. v* = -200...+200 but usually between -100...+100

16. v' = -200...+200 but usually between -100...+100

Note that high FWA contents may drive the blue end signals to high levels.

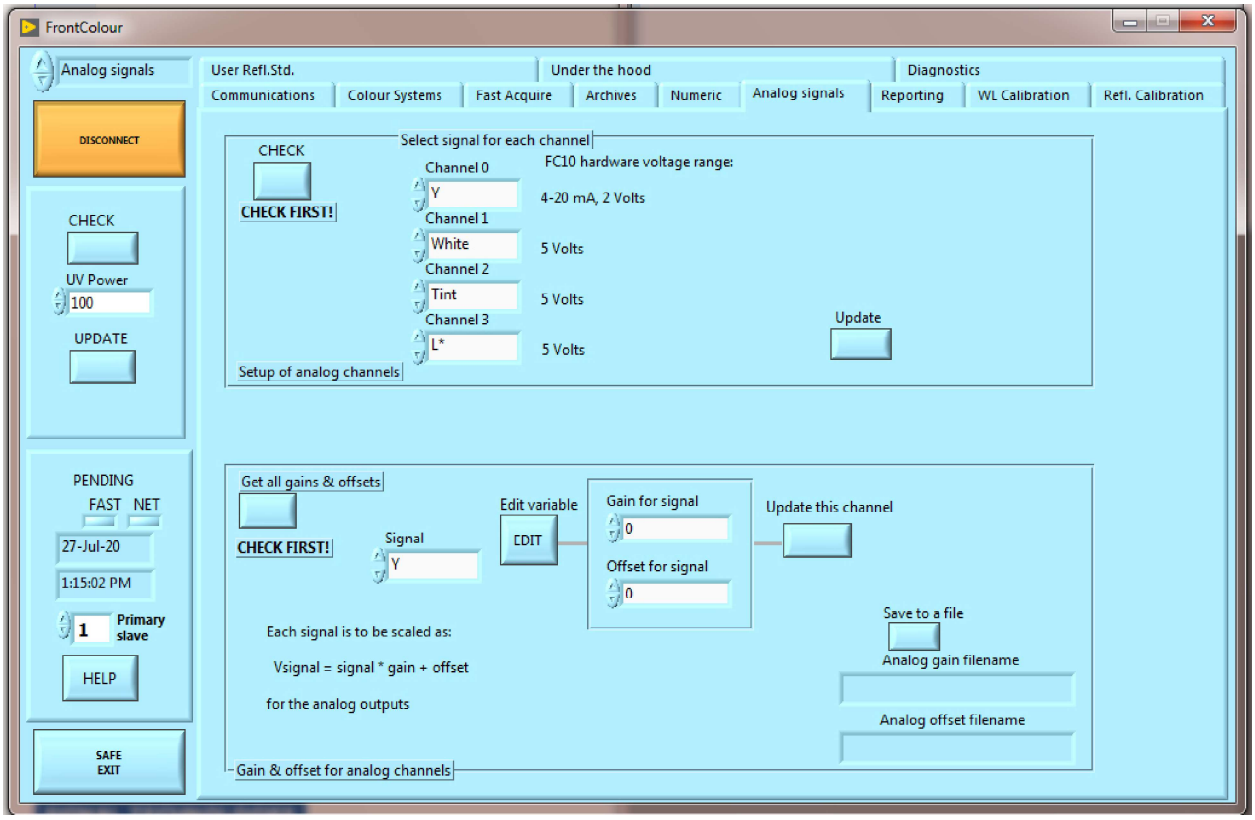


Figure 8. The Analog signals page

8. Numeric Indicator Page

When you are acquiring data on the Fast or Slow Acquire page with any rate, you can go to Numeric page and see the selected colour variable reading as big numbers. The same variable is shown as a curve below it. They are visible at a distance. Refer to Figure 9. If the Head temperature is acquired on the Fast page its value is shown here.

To clear the curve press the left mouse button and select Clear.



Figure 9. The Numerical display page

9. Reflectance Calibration Page

When you need a rechecking of the accuracy of this instrument, you can place the reflectance standard into its holder and place it under the meter. You can watch the X,Y,Z readings on the Fast or Slow acquisition graphs. The values should be rather close to the corresponding **neutral points** referring to the illuminator selected. Check our the literature for the neutral points for each illuminator. This is a quick check and further operations are required only if a significant deviation is found. Cleaning the optical windows may also be a solution to the problem instead of recalibration. See Figure 10. This is in FrontColourConfig program only.

The actual reflectance calibration is made by using the reflectance standard in its holder on the Reflectance Calibration page. Before starting anything, please stop any pending tasks and acquisitions. Check first the reflectance standard used. Make sure it corresponds to the one indicated. If not, change it and Update. You can also use your own reflectance standard as one of the options in this selector. Before being able to use that, you must have previously successfully completed the uploading operation on the UserRefl.Std. page.

Press the **Start Refl. Calibr**. button first. Make sure there is nothing under the meter at this point. It must be empty for the distance of 200 mm to avoid any unwanted reflections. Then press the **Black** button and wait until the program indicates Completed. This will take several seconds.

Then you are ready to place the standard under the meter snugly at the correct position. Wait for a few seconds and then press the **White** button. The operation will take several seconds and do not remove the standard before seeing the message Completed. Then you can press the button **Finish Refl. Calibration** to continue with normal operation. The new calibration spectra and all other pertinent data items are automatically saved in the meter.

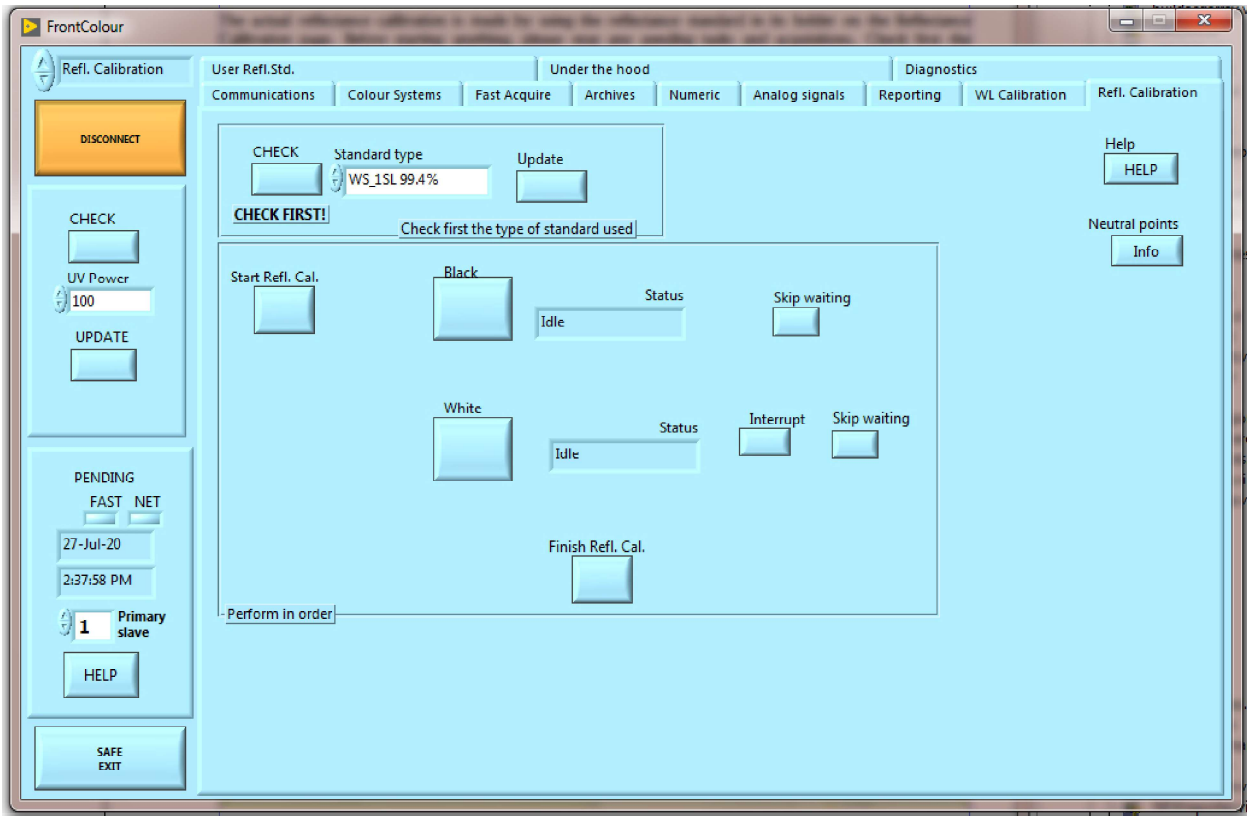


Figure 10. The Reflectance Calibration page

10. User-defined Reflectance Calibration Uploading Page

You can upload the spectral data of your own reflectance standard of choice. This is done on the pertinent page. You will need the spectral behavior of the standard at 1 nm separation from 350 nm to 849 nm. You may need to interpolate/extrapolate the data received from the manufacturer to create the table. Using a spreadsheet program is helpful at this point and then save the data in text format. The first two lines are for comments and the following lines contain one data point each ended with a comma. Extra lines at the end are not read. See Figure 10A. This is in FrontColourConfig program only.

On this page you press the button Read file and then you select the file. The file is then read, interpreted and displayed on the graph. If the curve looks strange, there is some formatting error. Refer to some sample spectral files for proper formatting. When correct, you can Upload the file to the meter. After one minute or so it is completed and you can press the Save User Refl. Std. to ensure that it stays there. There may be some checksums involved and if they are in contradiction, something has gone wrong. Check the format and repeat.

When everything is successful, you can use this new standard in addition to the regular options already in the meter.

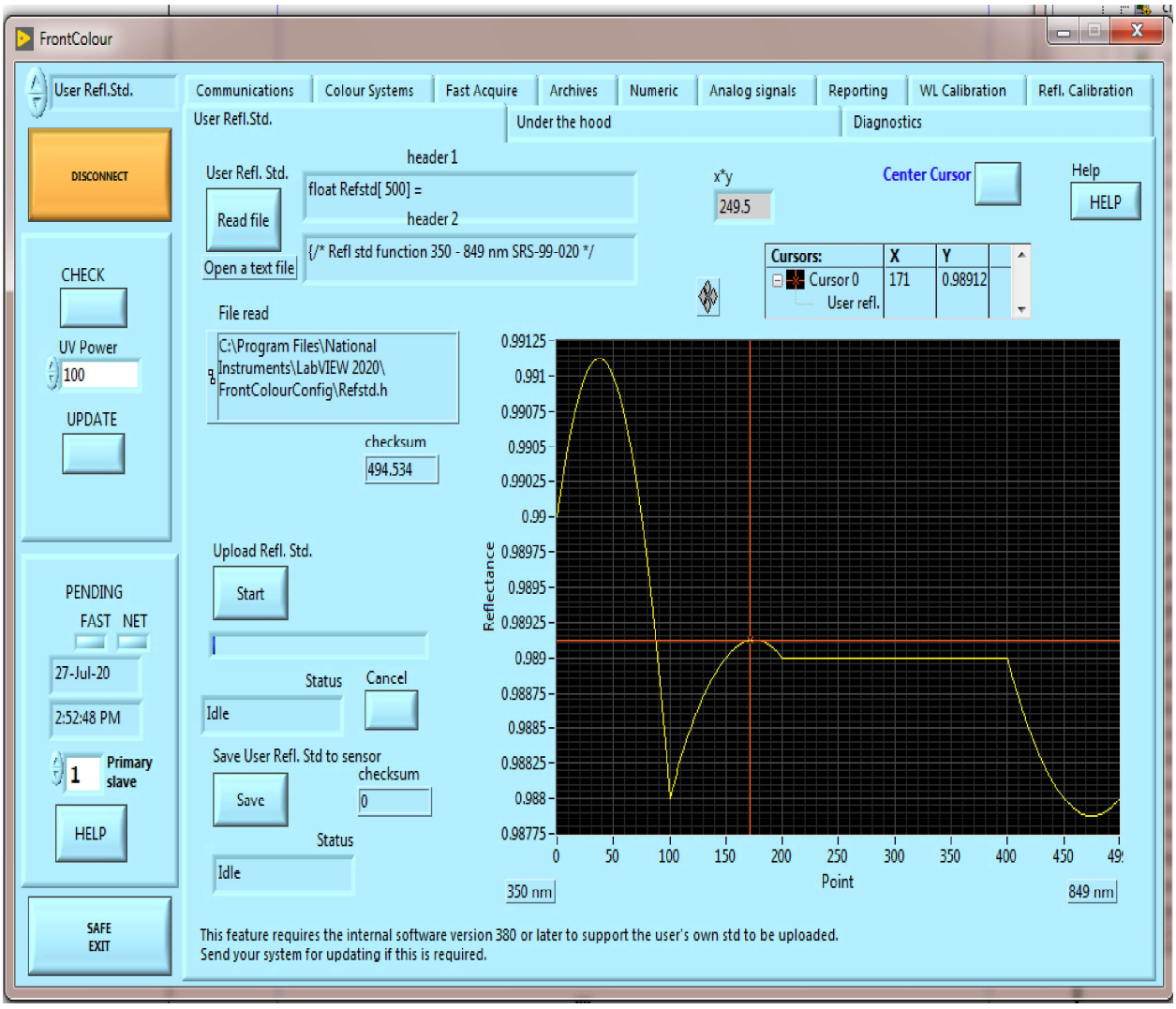


Figure 10A. The User-defined Reflectance Calibration upload page

11. Under the Hood Page

On this page you can check the operating mode of the meter if it is behaving oddly. You can stop it and restart it. When stopped, the lights do not come out of the meter but the motor is running. Total stopping is made by switching off the power. See Figure 11. This is in FrontColourConfig program only.

You can get the critical internal system parameters on the display for editing. After editing you may update them in the meter. **This is a critical task and great care should be used.**

You can also reload a saved configuration or perform a total factory settings operation. These may be used only in emergency. **Wavelength and reflection calibrations are required after these** . The recent analog scaling will be lost too. The parameters can be saved to a file whose name is then indicated in the small window. That can be archived for later reference.

The meter's low-pass filter can be set from FAST to MEDIUM or to SLOW. The MEDIUM is a rather slow filter and the SLOW is extremely slow with a very long response time.

If you have a local area network for sensors you may at times want to see which sensors are connected. Press the Explore button and then the program is inquiring for slaves with addresses starting from 1 up to 255 and when anything is found, it is listed here. Do not leave this operation on if you have found what you need. This operation is rather slow and will make operation of this program very sluggish.

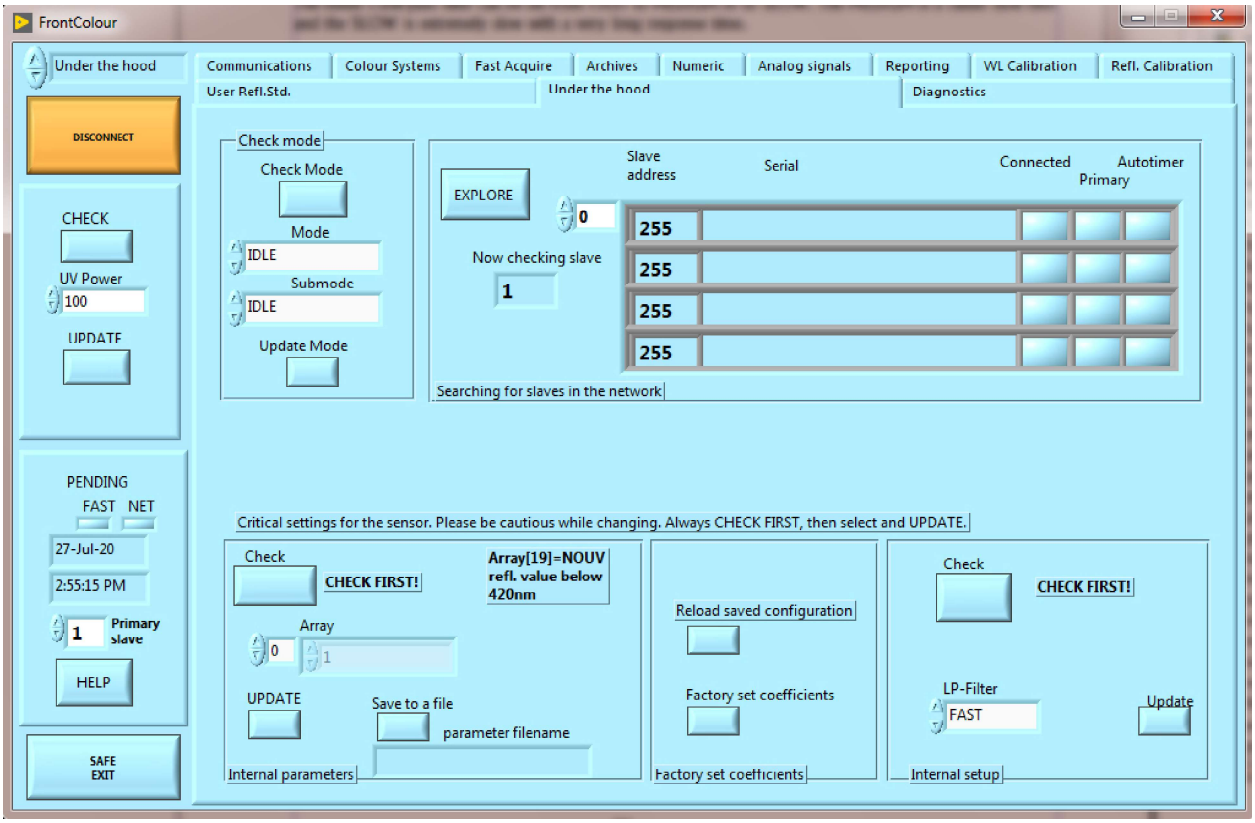


Figure 11. The Under the Hood page

12. Diagnostics Page

On this page you can start a diagnostics operation which is acquiring at a slow pace the current reflectance of the material under the meter by using the R(s) signal. Do not use the Fast acquisition at the same time with this since they will be in a contradiction with each other as they are using the same signal system. The beginning and stopping wavelengths can be set before starting. The result is shown as a graph and when the operation stops, the data is saved to a file. See Figure 12. This is in FrontColourConfig program only.

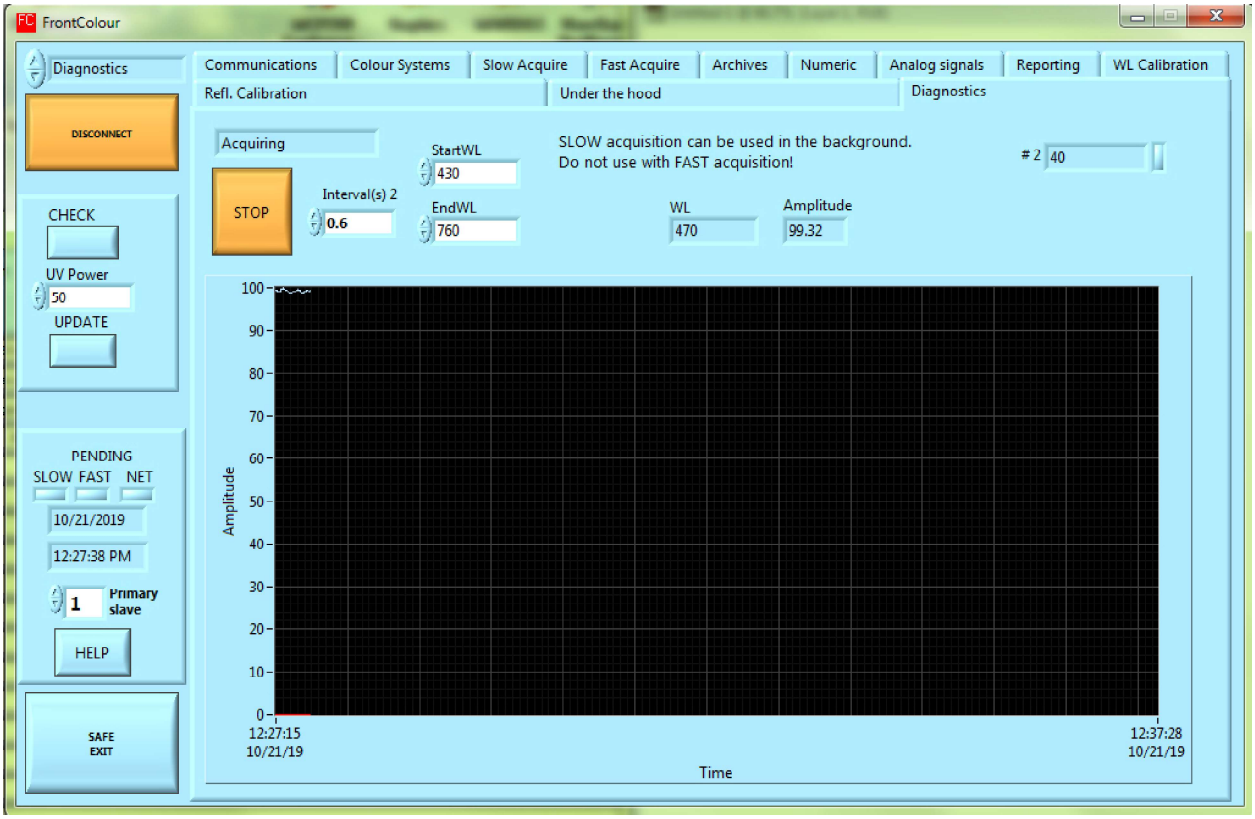


Figure 12. The Diagnostics page

13. Wavelength Calibration Page

If the meter is suspected to have an incorrect wavelength calibration for some reason, you can perform a complete WL calibration here. You will need a HgAr light source as is instructed in the User's Guide, mounted under the meter. Since the CCD spectrometer does not have any moving parts and is very sturdy, it is highly unlikely that a recalibration is required. See Figure 13. This is in FrontColourConfig program only.

The operation is started by pressing the **Get old parameters** button. This is important. You can use the Simulated spectrum before doing the real thing. But do not use the **Finish** button in that case, just Skip.

When the calibrator is in place, press the **Start WL calibration** button and wait for a few seconds. When the message Ready appears, you can remove the calibrator and press the **Download the spectrum** button. It will take some time for the 2048 point spectrum to be downloaded and displayed. If nothing sensible happens or some problem appears, you can press the **Skip waiting** button or **Interrupt** button and then **Skip/Cancel** button to cancel the operation with no changes. Then you can start from the beginning.

After a successful downloading you should see something appearing on the screen. The peaks may be outside the screen and only parts of them shown. You will need to modify the Raw gain and Raw offset and then press the **Refresh Graph** button, to start seeing the new calibration spectrum. Every time you change any of the coefficients, use the **Refresh** button.

After getting a good view of the new spectrum, the purpose is to match the two spectra on the left vertical scale. Mostly this is done by adjusting the offset A as the slope B nor the quadratic term C of the spectrometer most likely never changes. There is a calibration line crossing the screen and it should meet exactly the corresponding

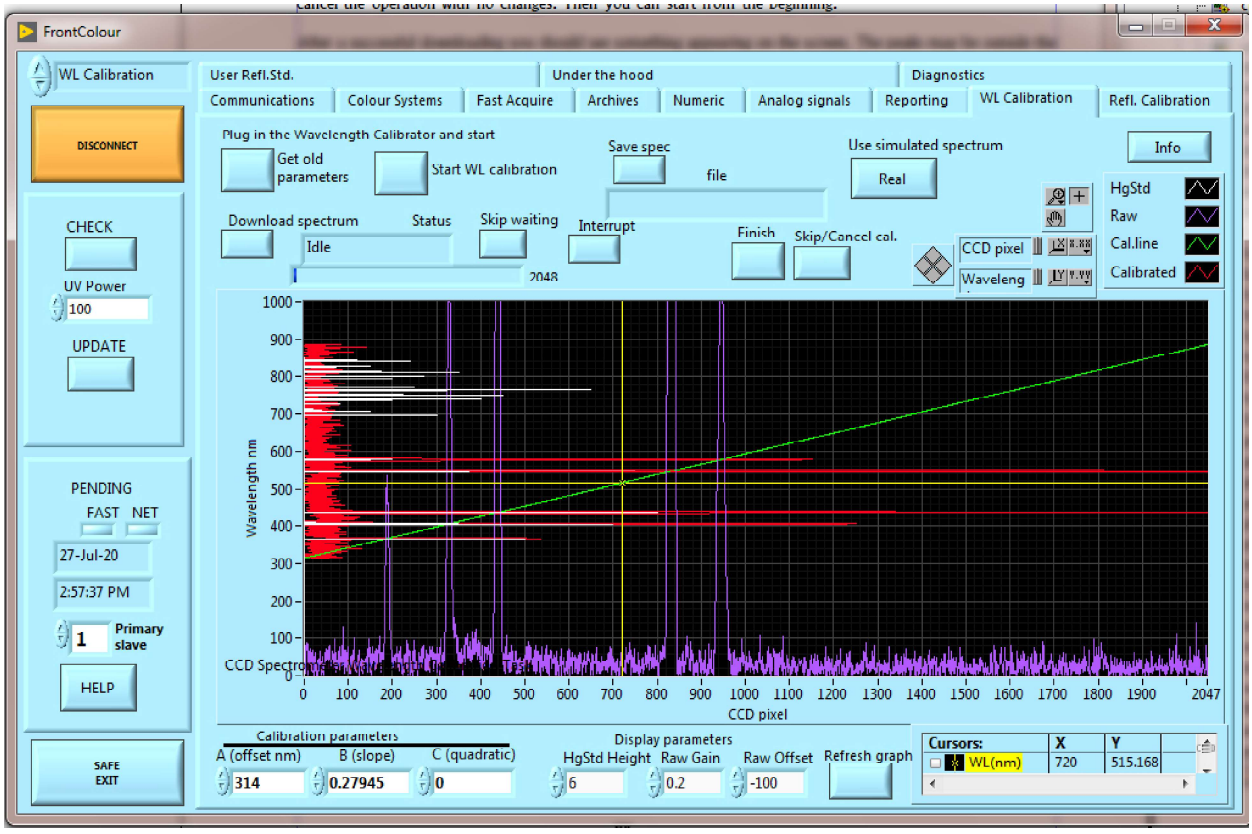


Figure 13. The WL Calibration page

peaks of the fixed HgAr spectrum (white colour) with the new spectrum (lilac). One can also use the new red spectrum on the vertical scale to match with the white one exactly. When this is achieved, the calibration coefficients are correct. At that point, press the **Finish** button. Note that some smaller peaks may not appear and this is no reason for alarm. We need only a few strong peaks for this.

If you know the correct coefficients and the system is showing incorrect ones after pressing the **Get old parameters** button, you can edit them and the press the Finish button to feed in the new coefficients. The same can be done on the Under the hood page.

14. Wireless Bluetooth Communications

The FrontColour software can utilize the wireless technology offered by Bluetooth. Your meter is equipped with a Bluetooth capability (standard in FrontColour). You can also use any Bluetooth add-on package that will offer a serial port capability to your PC.

Install the software that came with the PC Bluetooth USB dongle. Then plug in the dongle. The Windows system should indicate the newly created COMxx port name to be used with this program. The same applies to the RS232-USB converter plug which is using the same USB technology.

In FrontColour you can on the communications page select this new port name to be used in the program. When you plug in the Bt-USB module, it will automatically connect to the slave end of the Bt system assuming the PS is powered on. If not, then turn it on. If not connection is established, press the red button on the slave module and the on the PC side master module. The red blinking lights in the modules should stop blinking in a few seconds if they have found each other. They are factory set paired together and ignore all other Bt modules around. Now you can start using the program.

Keep the USB and the PS powered always if you wish the system to run continuously. The PC must not go to sleep in long sessions. The powering features can be set in Windows controls to keep the USB alive always, even if the PC goes to sleep.

If the link breaks, press again the master's red button. In most cases this is sufficient. If the link was broken while the program was running, stop the tasks and press Disconnect. Then press the red button again and when there is a link, press Connect to continue with your work. There is no need to remove the Bt-USB dongle at any point.

15. OFF-LINE Use

The FrontColour software is designed to be used with FrontColour colour meters. Without a meter connected to the PC and the program, delays, invalid data, ineffective commands etc. will appear on some of the pages if any UPDATES or alike are started. The Archives page still works without a meter for retrieving old data.

16. L*a*b* Display Page

While measuring with the Slow Acquire function one can display some particular values, like the CIE L*a*b*, Yellowness J, TAPPI brightness R457, CIE whiteness W, colour difference dEx (for L*, a*, b*). The corresponding buttons must be activated on the Slow Acquire page. While running, the small display will reproduce the current colour within the limits of the display and one can track the colour changing during operation, regarding the a* and b* coordinates. The preset target values are indicated and also some statistics.

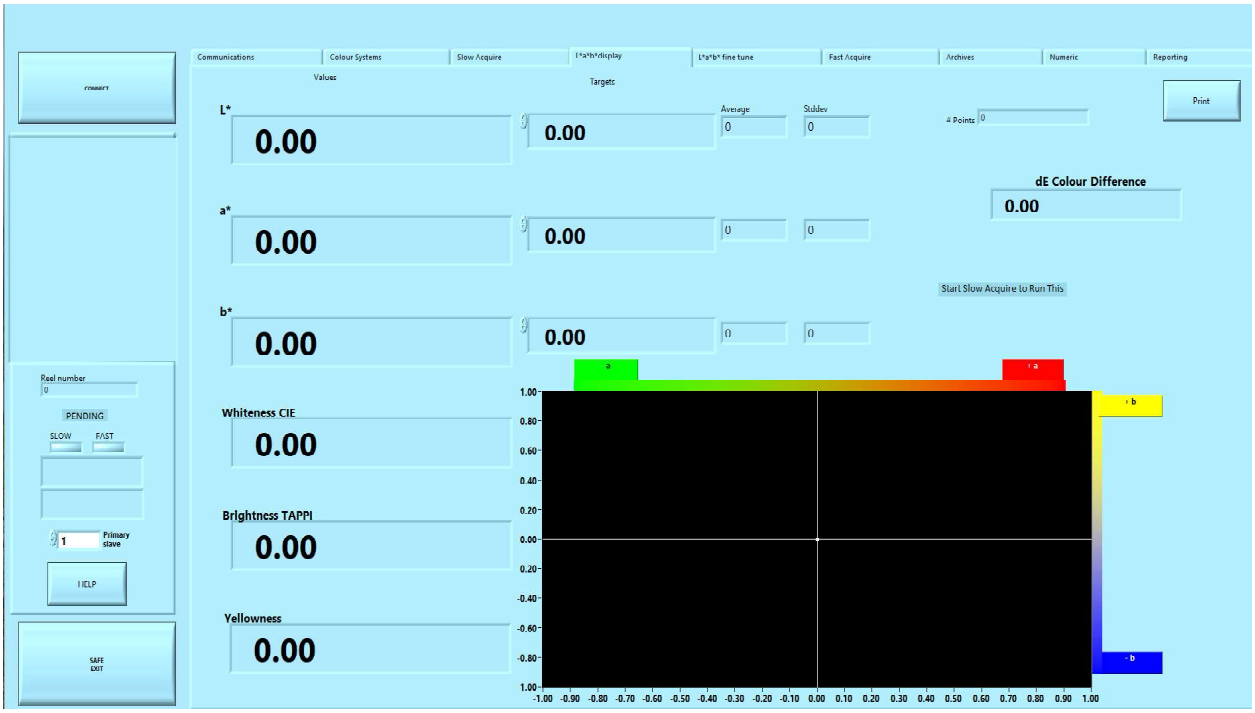


Figure 16. The L*a*b* Display Page

17. L*a*b* Fine Tune Page

The L*, a*, b* results can be fine tuned separately from all other variables for process control. There may for instance be reasons, internal to the colour laboratory, requiring small matching to some other instruments or colour tiles.

This page offers the best way to do it. Some may adjust the primary tristimulus values X, Y, Z. However, that is not the ideal weay of doing it as it will affect all other colour coordinates and variables directly. Also, it makes the meter invalid to CIE requirements as it is not calibrated anymore. The calibration always restores the highest accuracy and delivers the correct values for the X, Y, Z and the rest of variables. This page allows the adjustment of L*, a*, b* only without compromizing the meter.

One can edit the extra gain and offset for the L*, a*, b* each. Then it can be accepted for use by pressing the button. The adjustments can be saved to a text file after editing its name. It can later be restored by its name. One can have numerous fine tune files and they are recognized by their name in the list. One can press the button Check Files to see a list of fine tune files in the system.

By pressing the button **Enable Tune** to the ACTIVE state, the fine tune is in use when data flows in. It is active both in Slow and Fast Acquire. An indicator turns on at the left edge to remind that the L*, a*, b* readings are not exactly according to CIE but tuned.

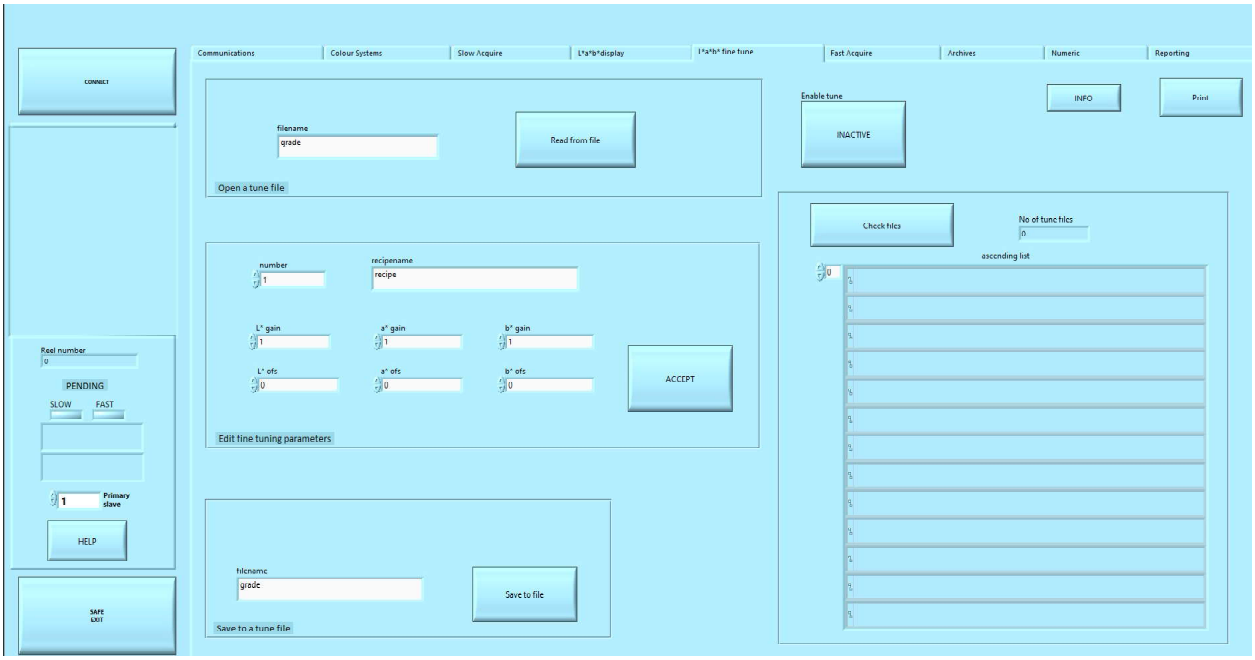


Figure 17. The L*a*b* Fine Tune Page

18. Error Message Dialogs

18.1.1 Some of the Most Important Error Messages

While starting or using the software you may encounter the following error situations. Below we explain how to proceed at that time.

18.1.2 Incorrect Asynchronous Serial Port

This is the most common error caused by selecting a serial port which does not exist or is already reserved for some other application. Press the Continue button and check the port. Then, try again. Refer to Fig. 16-1.

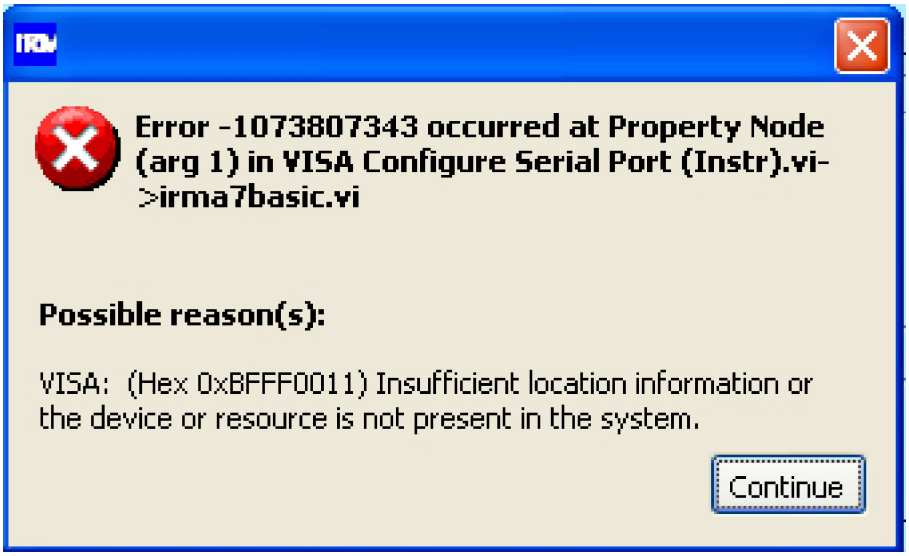


Figure 18-1. The case of incorrect serial port (a VISA-related message)

18.1.3 Incorrect Path or Nonexistent File

This is the direct result of not defining and setting a sensible path for data files. Press Continue and check what you have done on the Configuration page. Save settings when happy with them to avoid this to happen again. Refer to Fig. 16-2.

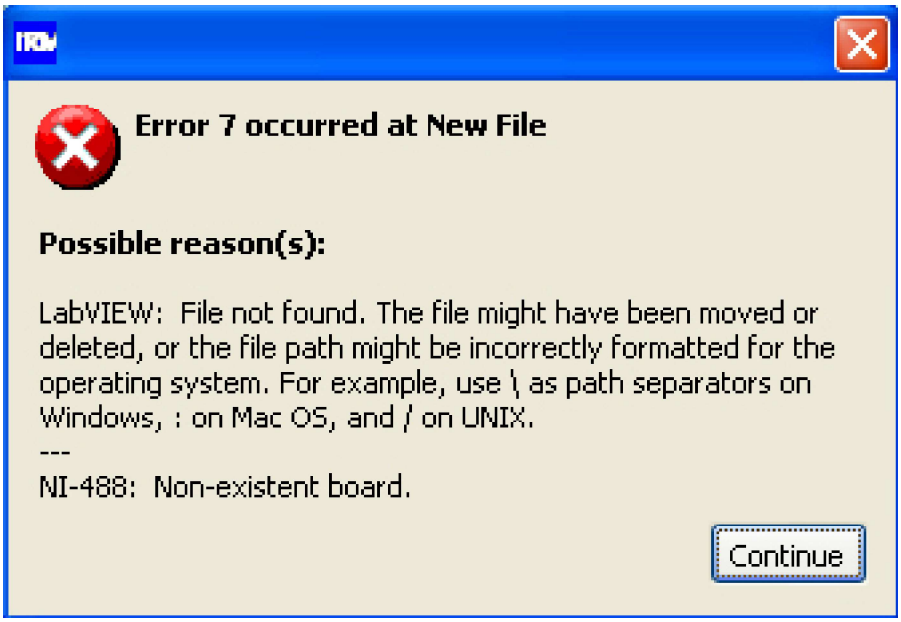


Figure 18-2. The case of nonexistent path or file

18.1.4 User Interrupt or Nonexistent File

This is the direct result of canceling retrieval of any data file to, for example, the Archives page. Press Continue and press again the file name button to clear it. This might also happen if you tried to access a file via network but met some access restriction. Refer to Fig. 16-3.

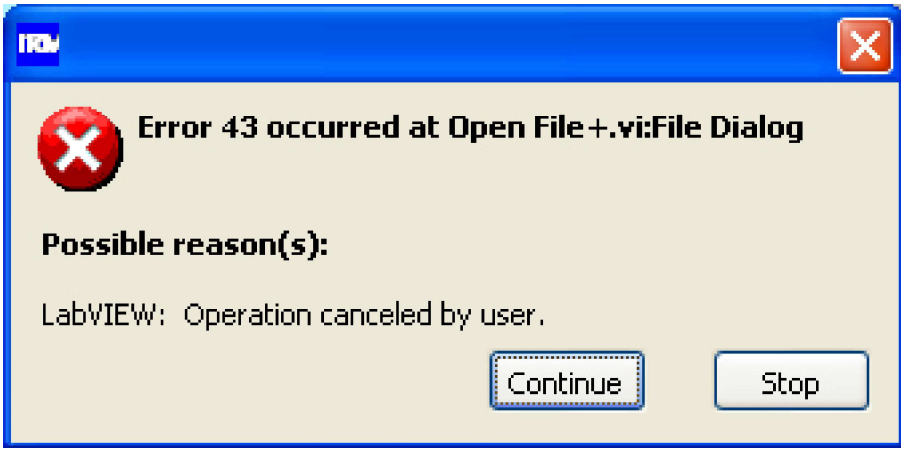


Figure 18-3. The case of User interrupt when accessing a file

18.1.5 Trying to Open a Nonexistent Settings File

This is the result of not finding any file containing the basic settings of this program (of type "ini") . Press Continue and check all program settings. Then, on the Configuration page, press the Save settings button. The error message will not be displayed again after this. Refer to Fig. 16-4.

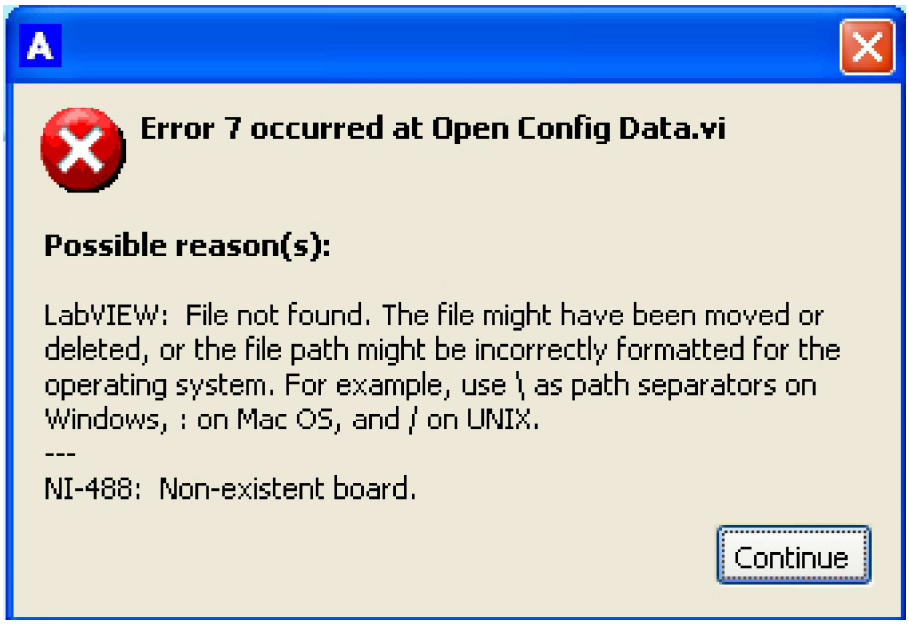


Figure 18-4. The case of nonexistent settings file (.ini file)

Index

Symbols

15. OFF-LINE Use 25
7. Analog Signals Page 16

A

Acquire Page 11
Annotation 14
Archives Page 14

C

CHECK STATUS 9
Clear annotation 14
Comm's 6
Configuration Page 6, 8
Configuring the High-speed Serial Port 28

D

Data files 14
data files 6

I

Important Notices for Windows 7, 8, 10 , 11 Users 4
Incorrect Asynchronous Serial Port 28
Incorrect Path or Nonexistent File 28
Interval 11
Introduction and Taking into Use 4
IRMA7BASIC 4

K

Keyboard Mode Page 18

M

Meter Status Page 9

O

OFF-LINE Use 25
ON-LINE 6
oval buttons 5
Overloading 11

S

Save settings 6
serial port 6
Service USB port 6
slave address 6
Some of the Most Important Error Messages 28
Style Issues 5

System Requirements 5

T

traditional IRMA7 data files 6
Trying to Open a Nonexistent Settings File 30

U

UPDATE SETTINGS 9
User Interrupt or Nonexistent File 29

W

Wireless Bluetooth Communications 25