USER'S MANUAL

PC PROGRAM FOR WINDOWS 10/8/7 AND FUTURE VERSIONS

Advanced Program

For All Models
V8

This program supports all infrared products of Visilab, like AK30, AK40, AK50, IRMA-7 moisture meters. The microwave sensor MK30R will work with this program nicely after selecting the model as AK30 in the initial configuration.

Note that the **Profibus DP** is no longer supported in the products made by Visilab. Existing stock is delivered with DP if they have it but new models will not equipped DP. Systems delivered with DP will function as long as your master is able to communicate. Visilab will maintain servicing and otherwise supporting all delivered systems.

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Revision History

V4.00 the production version released in April 2004.
V4.03 8-1-2004 the asynchronous port selection can now be saved with other parameters on the Configuration page. Math page and Network page added.
V4.06 Windows 98 support removed, postfilter for archived data added, text field for multiple slaves settings, new license file format and limited-time licenses, a cursor for frequency analysis calculator added, difference of two channels added to multiple slaves with data shown on histograms and archives pages, channel difference also as a postoperation on archives page, interrupt possibility added to memory bank downloads and library file uploads/downloads.
V4.10 The Numeric display page was added to both program versions, IRMA7Advanced and IRMA7Advanced -LE
V4.11 Selection of signals were added to histograms, archives and frequency analysis. You can now select any of the signals on Acquire page.
V4.12 renamed **Advanced**: Additions: Marker height is now adjustable and can be saved with other settings. Program is now model-sensitive and adjusts itself according to model selection of the primary slave. It also responds to the model selection made on Multiple slaves page. The Archives, Histograms and Frequency analysis pages have channel selectors for each of the Acquire page signals collected, including the stopped signals, if available at all. Autorun feature has been extended to Advanced program too. One can preconfigure either the Acquire or the Multiple slaves task, save the settings and put the program shortcut into Startup folder of the operating system. The program is then started automatically when the PC is booted up. The program starts data acquisition as configured earlier, after a delay of 30 seconds to make sure the slaves have all booted up too. All signals, measurement units and other features are now model sensitive. Select the product model on the Configuration page and on Multiple Slaves page. Incorrect model is not completely disastrous but may produce incompatible label and units. When referring to any other model instead of model A, may cause unexpected delays and messages, like: "No response". A global command: Force Packet Protocol is sent to all slaves always when the ON-LINE is made effective by pressing the button. Presumably, all slaves are in the packet protocol mode after a few seconds from this. The page order was revised to reflect better the practical use. The unit used is now written to every data file at the tailer text part. The unit can now be inquired in the Acquire page. A model sensitive cover is added to the Status page to prevent using incompatible commands and status requests. A help system is now available. Make sure you have some default HTML browser in your PC including some default PDF file reader. In practice, a PDF copy of this document is shown in a separate window. To activate help, press the F1 key. The stop key has been protected against untimely pressing while you are still ON-LINE. The postfiltering has fixed the phase shift caused by each filtering action to the signal. The filtering has been made more powerful. The Network page has now an indicator for the current Primary slave among the slaves detected. Reporting has been made model sensitive too. The file names created in Multiple slaves operation are now SAnnnn and SBnnnn.
V4.15 2-2-2005 The new LV run-time kernel V7.1.1 was taken into use. Simple scanner support is added to both Acquire and Multiple slaves.
V4.16 2-14-5 The high-speed serial port is taken into use.
V4.20 5-9-5 PENDING LED added for Histograms, Archives, Numeric display and Frequency analysis pages, active when any archive file is open. The Numeric page is PENDING while the Item counter is updated from the meter. New protocol commands are accepted and all earlier meters are selected as pre-2005 on the Config page. Support for BURST mode added with an item counter. Some LEDs added to various pages to reflect the inquired status.
V4.26 9-29-5 small enhancements, like checking of current calibration table to be shown on the bottom bar, when any operation alike is requested. Some text colours have been changed to reflect the idea that checking is recommended first.
V4.28 10-24-2005 The library is always saved irrespective of user's actions if the library is modified. Saving is done with a default library file name. The library contents is also kept even is the user goes OFF-LINE to the Configuration page. The calibration curve stored in the meter is now shown when

any kind of checking or changing of the index of the table in the meter is performed. File attributes from the original measurement are shown if the mouse cursor is moved over the filename of the retrieved archive file. This applies to all tasks, like Archives, Histograms, Frequency Analysis and Math pages. The information shows the starting and stopping times (if applicable) and other detail information of the data file.
V4.29 11-18-05 Burst mode items hidden from model A users, some buttons and display legends are rearranged, cylinder diameter library added to Frequency analysis calculator, Clear button is added to calibration.
V4.30 Composer V0.07, the mirror case is removed and the noise calculation is refined. Network page's data is now conserved during the session, independent on the ON-LINE button.
V4.31 HTML reports more complete with statistics and headers
V4.32 A small Composer bug fixed
V4.35 the delta value in Calibration/Adjust is now cleared when a new table is GET from the meter
V4.36 the Acquire interval is also saved. The delta value is cleared in Composer when a new table is generated to avoid unintentional application of false delta values.
V4.39 the Library page has now a Clear button for clearing a particular table in the library. The corresponding button on the Calibrations page was removed. The Library page has also an indicator of any changes made to the library contents residing in the PC end. Automatic adjustment of calibration offset is a new feature.
V4.40 FAST/SLOW button for Automatic adjust, different background colour for those controls which user can modify. Error message dialogs are explained in this document.
V4.41 the Zero data button added, bank info added to the bank download file name.
V4.42 Force packet commands added to a few critical places (Acquire etc.) when starting to avoid hangup if the meter has been turned off
V4.43 with total/dry percent methods added to Composer for generation and Calibration for conversion. Composer V0.08. The Standardization operation is moved to Reporting page.
V4.44 MATH archive file open indicator added
V4.45 lead/lag indicator added,
V4.47 Staircase postfilter added to Archives filtering
V4.49 Lowpower indicator added to Network, delay added to Acquire start when in LowPower up to 4.1s
V4.50 saved settings: Run-time filter, some channel colours in Acquire. The checking in Library on meter side has a single button only. The Autorun logic is made simpler and the button indicates the true logic. A delay added to Acquire start when in LowPower up to 4.1s
V4.52 average added to Multiple slaves task as an option to Delta
V4.52 small cosmetics for Vista
V4.54 larger buttons where important
V5.00 Full Vista compatible version, annotation to most graphs is now allowed. NT4 support is dropped.
V5.03 Alarm function has been extended to audible alarm and large LEDs. The level crossing indicator managing is now on the Reporting page.
V5.07 new compilation with a new kernel version 851, new VISA version 4.3
V5.15 New kernel version LV86, control file option added both for Acquire and Multiple slaves, control files are now available, minor cosmetic changes
V5.25 support for AK30 memory banks added, new kernel 2009SP2
V5.29 full support for AK30 memory banks
V5.33 Windows 2000 support dropped, a button added to Configuration page for checking validity of folders.
V5.48 small enhancements and new LV build version, new kernel. Histogram display dropped. Advanced LE program is obsolete and not supported. Reporting is now enhanced a little. The Acquire timing is now made very accurate both in small time scale and long term measurements. A companion program Profiler is published. It is very similar to this but with mainly scanner features stressed.
V5.57 Signal Quality and Diagnostics taken into use for model D meters
V5.58 added features to support the FrontColour product family

V5.75 multiple minor feature additions
V5.98 generated with LV2020, no significant changes
V6.00
V6.01 Support for two types of license file added.
V7 minor updates
V8 with support for Generation 5 insturments

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1. Introduction

This document instructs you on how to use the **Advanced** PC user interface program with your product. Refer to the instrument's own user's manual covering details the meter itself. The use of Profibus DP and its features will be explained in another document. For users of other models or products, read carefully this document but ignore such points which are not supported by your product (*like Keyboard mode, Profibus DP,* cooler etc). Select your product model at the first page (Configuration). All other products currently available from Visilab are supported by this software, including all old models too.

This program has a great number of features most useful for all users. It is more advanced than any of the **xxBasic** or **xxMini** programs possibly delivered with your meter. One can acquire real-time data from the meter, download memory banks and set up all features of the meters available through the serial port. A printer can be used for documentation as well as reporting to HTML files. All acquired and downloaded data is saved into the traditional **IRMA7** format which is compatible with all spreadsheet programs. In addition, one can save the same data into various formats for use with other software. This program is a true multitasking system capable of performing simultaneously several tasks at the same time. You can operate with the memory bank system and control it fully while at the same time acquiring e.g. real-time data for your quality control system. The program has been made as simple as possible to use it flexibly. There are no menus at all (except a few small ones 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. You are using a virtual instrument in your PC though there is a true instrument behind it producing the data at the other end of the communication cable.

1.1 Installation of the PC program

Important Notice for Windows 11/10/8/7 Users

Before starting, it is important to make sure you have administrator's rights in your PC to install programs, read and write files etc with full and widest possible rights. If not, ask your computer manager 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 rights. If it is about a data file saving when the data Acquisition is stopped, the system refuses to open a file for writing. You have as alternatives increasing the user rights or separately allowing full file rights to that particular folder you are trying to access. 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.

The PC program is installed as follows. The simplest way is to locate the small program Visilabinstaller.exe on the USB stick and start it. You will be presented with a selector for installing one program at a time. To install a particular program, you can also do it by locating the program **setup.exe** in any of the pertinent folders of the USB memory stick. Start it and perform the simple and quick installation. You are then ready to start working with this program. Locate the icon for the program **Advanced** and double-click it to start. A shortcut is created automatically onto your Desktop to easier locate it in the future. In the following we will shortly go through all the features available in this software. Most features are more or less trivial and do not require any deeper knowledge. To run the program, you need the license file sent to you separately. You may also use the temporary license file which usually resides on the CD. If you have not received the license file, inform Visilab and you will get it immediately. You can also contact your local dealer. The memory stick can be reused for any suitable purpose after this installation. Remember to make backup copies of the whole stick before you use it elsewhere. Your license file may also be included and you don't want it to be lost.

1.2 System Requirements

This software operates in Windows 10/8/7 environments if you have at least 750 MB of memory available. Hard disk space of 800 MB is required for installation and starting the program. Archives will most likely require more space. A 2000 MHz Pentium is the minimum CPU requirement but higher is recommended for quicker operation in various tasks. The minimum screen size required by this program is 1024 x 768 pixels. Smaller screens will lead to cumbersome use of the program and larger screens allow easier use of other programs at the same time.

1.3 Style Issues

All oval buttons at any page start some action and are not left pressed down except for a limited time. All rectangular buttons are settings which are either left as pressed down or are later updated by the program 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 grey or orange colour. In some special cases, the colour may be red to warn the user of some problem.

There are some large oval buttons at several pages whose colour when pressed down is bright yellow instead of the regular orange. They are also left at their state until the user changes them himself. These buttons are used, for example, for **watching** the status LEDs or the Autotimer status at the meter. This means polling data from the meter at regular time intervals. Also the two Acquisition operations have buttons like this. The purpose of this is to indicate the user to change himself the button's state or the operation. Each of these special buttons have an indicator light at the left edge of the display to remind of their use (a pending operation). There are also LEDs for other operations whose momentary operation may take a longer time to finish, like downloading a library. The Keyboard mode should be activated only when all these LEDs are off. Else, you will get a number of strange messages as other operations are still trying to communicate with the meter. When the Keyboard mode is in use, its own LED is lit and no other operation should be attempted at the same time. All products communicate with either the Packet protocol or as an ANSI terminal, these modes being completely incompatible. Models AK30 / MK30R are an exception to this as it does not have this feature. It has its own fixed keyboard and display for this purpose. It is always working in Packet protocol. Using the Keyboard mode is usually not required at all with all of Visilab's sensor products. Changing the slave address is the only task which may come into play.

Help

If you are in a trouble while using this program, try pressing the **F1** key (a function key) in your keyboard or click the square Help button on vertical bar . If you have a default HTML browser and a default PDF file reader available, this manual and many others are available for you.

Editing

The managing and editing of any items in the dialogs is as otherwise in Windows. You can press buttons, type in text fields etc. **The only remark at this point is that please, do not end editing by pressing the Enter key as you may have accidentally have some button selected.** This is rare but may cause unexpected reactions at times. Instead, click the cursor of the mouse to any other safe location on the program's panels to stop data entry or modification.

Cursor Tip Help

Most buttons and display items have a built-in short textual description the purpose or use of each. Just move the cursor over the item and quickly you will see the text which will soon disappear. The same applies to retrieved file names where you can see some attributes of the data in it. This may prove useful as the start and stop times and sampling interval are declared.

New Models

Many new product models manufactured by Visilab are supported by this program. You can use them just like they were a special kind of moisture meters with some minor specifific features.

2. Configuration Page

Before starting to use the program, you need to check the settings with **yellow background** (port, meter model and slave address). They need to be set before you can start communicating with the meter in **ON-LINE** 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 - COM64 or ASRL1-64 depending on your system. There are **USB to RS232 adapters** available for Windows 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 **arrow down button at the right end of the selector** to choose from the list of available ports. This setting is saved but it is wise if you do check it. Refer to Figure 2-1.

The product models have slightly differing sets of packet protocol commands. IRMA-7 model A has a small subset of all commands and most other models have the complete set except the level threshold commands specific for model A. Using features not intended for your meter cause no serious trouble but mostly incorrect settings are displayed and no true actions are taken. All the most important commands like data acquisition, library, material and memory banks are common to all models and function equally. If your model D meter has an old embedded software, some of the latest features may not work. You will soon find this out when visiting the Meter status page. Upgrading the software is recommended. To avoid any annoying surprises, inform the program, that you have an older version of internal software by pressing down the button "Old SW in meter". Note that model A is limited in features but all revisions work alike. Model D SW V1.57MDF or newer is required for full support. Upgrading is recommended. Contact Visilab or the nearest representative for details.

Stopping

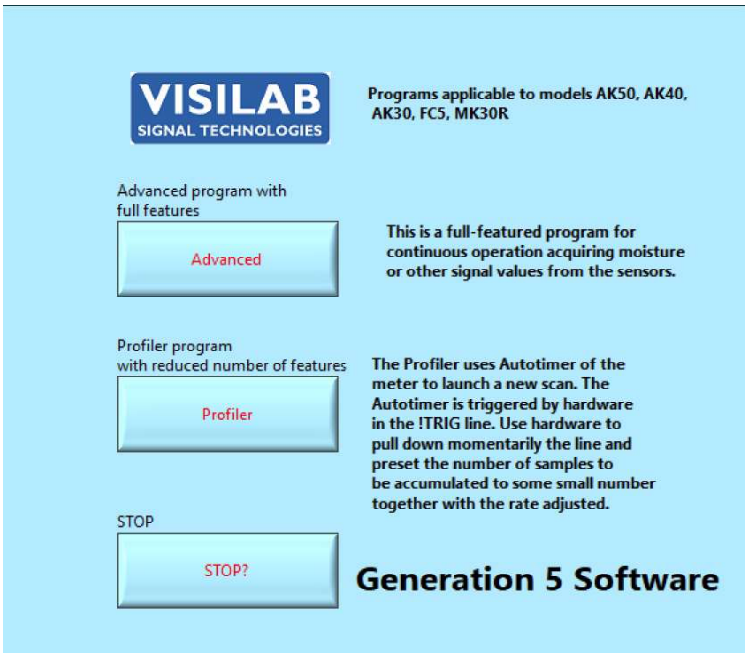
To stop working with this software, turn off any pending tasks on their corresponding pages. Go to OFF-LINE state and optionally, save all settings used. Press the SAFE EXIT button to stop. Untimely pressing of this button will lead only to a short tone signal. In **emergency**, you can stop this program without saving either data or settings by pressing the small button marked X at the top rightmost corner.

The meter's **slave address** is important for proper working of the communication. The default address is **1** but you may have changed it for some reason. 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 and messages like "No response" etc. If you have changed the address and can not remember it, go to Keyboard mode page and enter Keyboard mode. Restart the meter and press the space bar. Soon you should be able to go to the communication menu of the meter to check or set the address. Refer to the meter's User's Guide for details. Then, exit the Keyboard mode and you can then set the slave address at the Configuration page. An even more elegant and simple way of detecting perhaps several slaves attached to the local network is to use the **Network Explore task** (refer to Network page).

To properly save all library, meter configuration and data files, it is recommended to set the two fields in this same box as well. The file path is used for saving the library and meter configuration files in the future. The recommended path is **C:\IRMA7** or something like depending on the product you are using. 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:\IRMA7\DAT.** You can also use the small directory dialog buttons to the right to select and even create new paths. You can use any valid folder or directory names for these options. Just make sure they are both defined. Using the Windows' suggested **My Documents** folder is a good working place too with minimal accessibility problems which may be a nuisance in Windows. Create a few folders branching from this.

There is a control file folder required too, even if you are not using this feature. That is the folder where run-time control data files are saved. The suggested folder might be: **C:\IRMA7\CTL.** You can change it to anything more suitable for you.

Pressing the "Save settings" key will save the settings inside this box when starting the next session. Also, the most important settings on the Multiple slave page are saved.



Initial selectors for Advanced and Profiler programs

Notice that changed settings are effective only after entering **OFF-LINE** first. Most of the operations available in this software are usable only if you have a meter connected to the serial port. The exceptions are the **Archives, Histograms, Mathematics and Frequency analysis pages** which you can use without any meter connected to study retrieved data. This program works in Windows 10/ 8/7 and in future versions.

To start running the software, press the large button marked **"Connect"**. Pressing later on the same button (with name **"Disconnect"** at that time) again will return you to the same Configuration 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 at the bottom of the screen preventing access to some buttons and you can not see the selection display either. When you go ON-LINE, the cover disappears and you can use them. There is a small indicator on the Status page,

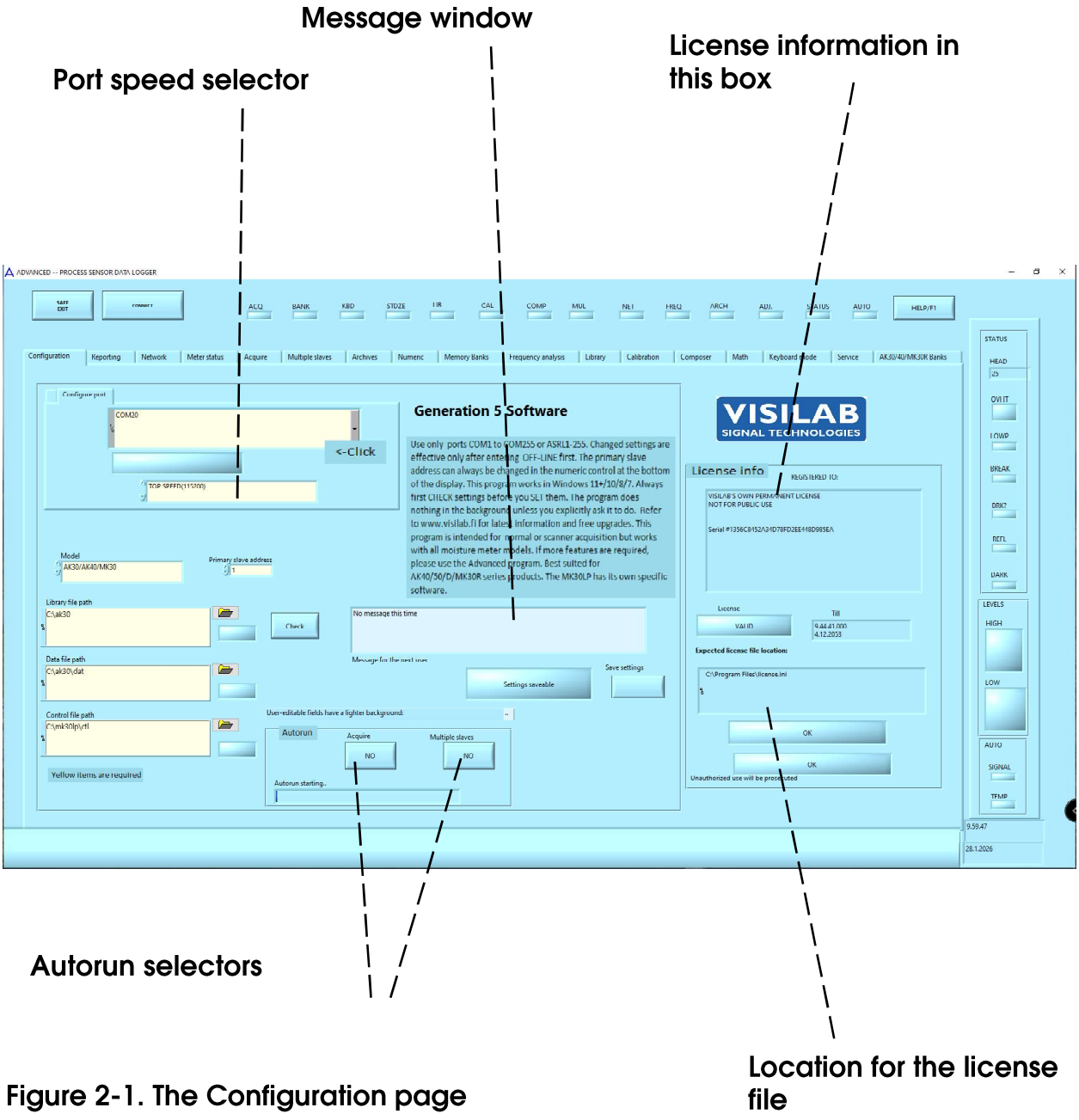


Figure 2-1. The Configuration page

"Settings saveable". It turns to orange colour and displays a text: "Settings locked" when you are accessing this page while in ON-LINE state. The settings are not saved.

NOTE: This software is a **licensed** product and a license file is required for operating it. Contact your dealer or Visilab directly to have it at a reasonable cost and lifetime upgrades at no cost. You will receive the license file which needs to be copied to the directory visible on this page to the right. If the license file has been found and its contents recognized, you can continue running the software. If not, the program will shut itself off in a few seconds. The license is mill-wide, so you can freely copy it within your company but not outside it. Licenses may also be of limited validity. After that time, the software will not start anymore and you need to buy the license to make it work again. Only demo licenses will expire soon. Current version supports both **license.ini** and the new **license.set** files. The earlier file may cause unexpected troubles in the new Windows. We can convert the old licenses to **.set** type at no cost.

There is a message window available for free use. The idea is to type in some message and save the settings. The next time anyone enters this page will see the message. One screenful of text is the maximum amount, no novels, please.

2.1 Note for Multi-slave Operation

As this software is capable of collecting data from many slaves in a network (RS485 LAN or RS232 LAN based on **LAN232** product), it can flexibly retrieve data from all of them and you can check the configurations of each while running the Multiple slave operation. One of the slaves is selected as the **Primary slave** and the rest of them are just slaves. The primary slave is used in all other pages of the program, except the Multiple slaves page. In other words, you can start data acquisition on the Multiple slaves page for any slaves and at the same time, you can select freely the primary slave and use any of the other tasks available with that particular slave with only natural restrictions. This means that you can acquire data simultaneously from up to nine slaves. The primary slave address is assigned at the bottom of the display. Do not change the address while you are already doing something with that slave (except the Multiple slaves page). Else you may get glitches in signals or other unwanted results. The Acquire task, when started, will use the same primary slave address until it is stopped. Then, you can change the slave and start again.

2.2 Autorun Feature

Refer to chapter 18 for information on how to use the **Autorun** feature. Please, do not turn it on before you know how to use it.

2.3.1 High-speed Serial Port

The present on-line moisture meters **AK50, IRMA-7 model D,** portable meters **AK30** / **MK30R** and process moisture meter **AK40** have a high-speed serial port for communications to a PC. The bit rate is 115200 bauds and gives an increase in data transmission in many situations compared to the NORMAL 9600 bauds. It means, you can get more samples per second. The price to be paid here is that you can no longer have up to 40 m long legs in the RS232 cable but up to 15 m/5m (at 115200 bauds). You can take the high-speed operation into use if your meter supports it. Check your meter's manuals to find out. If it doesn't, contact Visilab or your nearest dealer to send the meter for upgrading at a very low cost. We can make a quick checkup for the meter at the same time. Before taking into use the high-speed feature, read this manual first and prepare your system to operate normally with the **Normal speed**. Then you are ready to take the next step to high-speed and read the Appendix A.

3. Meter Status Page

You can quickly check the meter settings by selecting the Meter status page. There, you can press the "CHECK STATUS" key to see all information possible of your meter. The amount of data is limited for models AK30 / MK30R as their operation is mainly done with the built-in keyboard and the menu system. In that case this page has a set of covers. All other product models have a small cover over the small portion which is model AK30 specific.

You can see the meter's serial number at the leftmost corner showing the embedded software version too. This same box, marked as "Meter information", contains data which can be retrieved from all meter models. The button "Low power" reflects the powering status of the meter. If you wish to turn the meter into Low power state, press this button and then press "UPDATE SETTINGS" key. The following state is again an indication of the resulting meter status. The next button, "Beep", will cause an audible sound at the meter if it is equipped with a buzzer (some models have it always). Press it and then update. You should hear a short tone signal. The meter's optical head temperature is very important if it is installed into warm conditions. You can only read the temperature. The last two fields indicate the total usage of the meter in hours and the unit used in the meter itself. See Figures 3-1 to 3-3.

The second box is marked as "General". The signal gain can be either autoranging or locked and the button indicates the present status. The voltage output can be controlled to reproduce any of the signals available from the meter: Moisture, web temperature, head temperature expansion module or extra temperature or other signal names according to the product and model. You can switch between options by pressing the arrows at the left edge of this small window. The third field is the web temperature offset required sometimes if the thermometer has some drift in its reading. The next field is the meter's light source's frequency in Herz.

The next box marked "Status bytes", contains all 24 status bits explained in the meter's manual in more detail, reflecting various system features and settings. You can only read these indicators.

The following box has two buttons and an LED indicator. The CHECK STATUS can always be used safely without activating anything. The UPDATE SETTINGS updates the meter with the settings visible on this page. **Think first before you press this one! Always CHECK first and perhaps, then UPDATE to make sure you do not change anything vital unintentionally. Updating with the same settings as recently Checked does no harm.**

The lowest button on this page is used for getting the few most important status data to the seven status LEDs at the right edge at an interval of three seconds. If this key is not pressed down, you do not have the LEDs updated at all.

The last separate button on this page is the Force packet protocol. It forces the slave (or slaves) to switch to Packet protocol mode in case they were in the Keyboard mode.

NOTE: Always CHECK first the settings before you SET or UPDATE them. The program does nothing in the background unless you explicitly ask it to do. Incorrect model will cause some functions to return zero values or some actions are not started at all.

You can check and set the digital filtering on this page in its own task box. The web temperature signal can also have an extra filter if the signal is too noisy. If a really quiet signal is required, press down the "Run-Time Filter" button. It activates a heavy-duty digital filter affecting both primary and secondary signals acquired (moisture & web temperature or capacitances A and B, depending on model). It is useful in observing slow changes in quality control conditions. Of course, all fast events will be filtered away. The meter settings are always saved as usual but the Run-Time Filter is not saved for next session in this program.

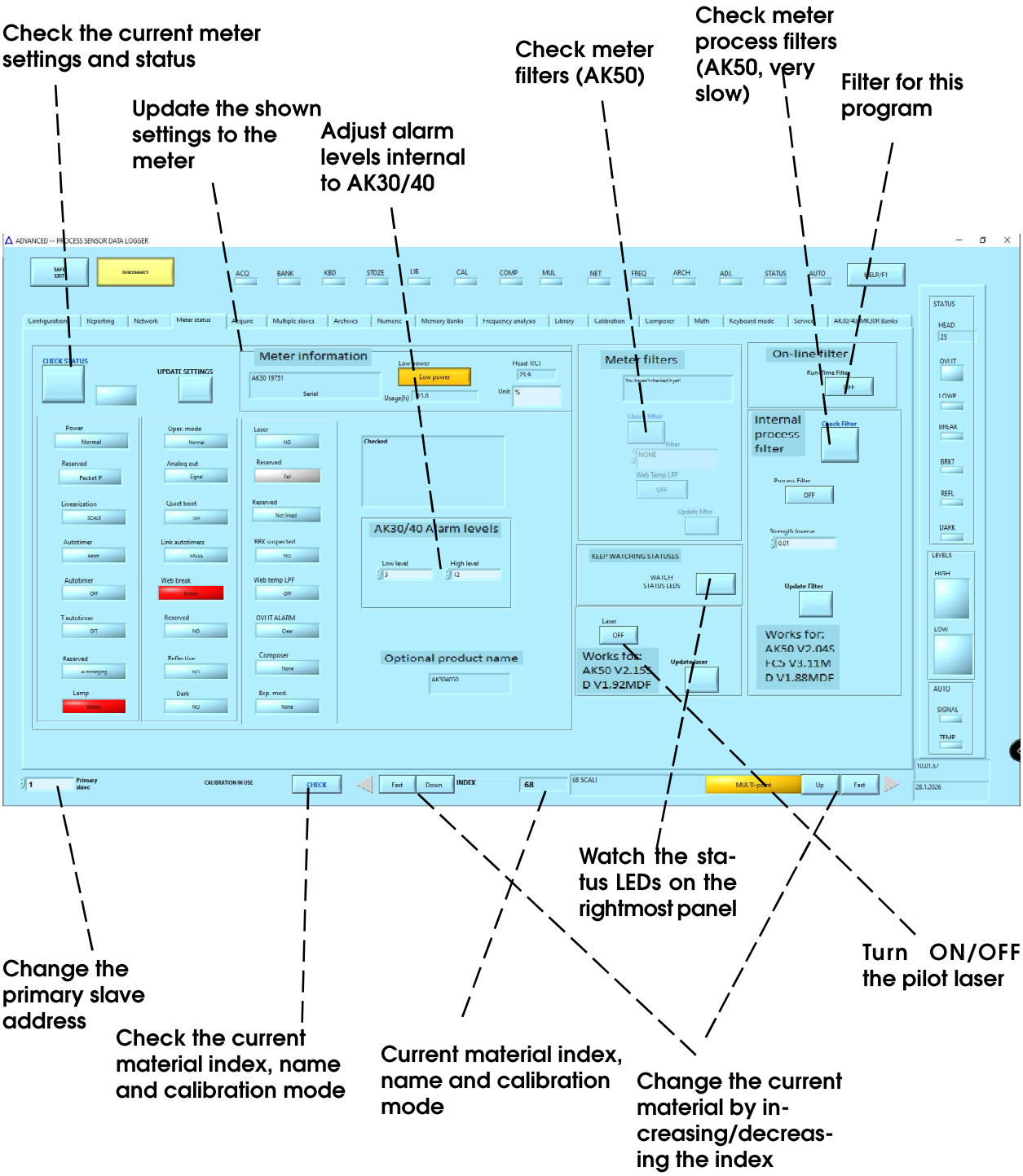
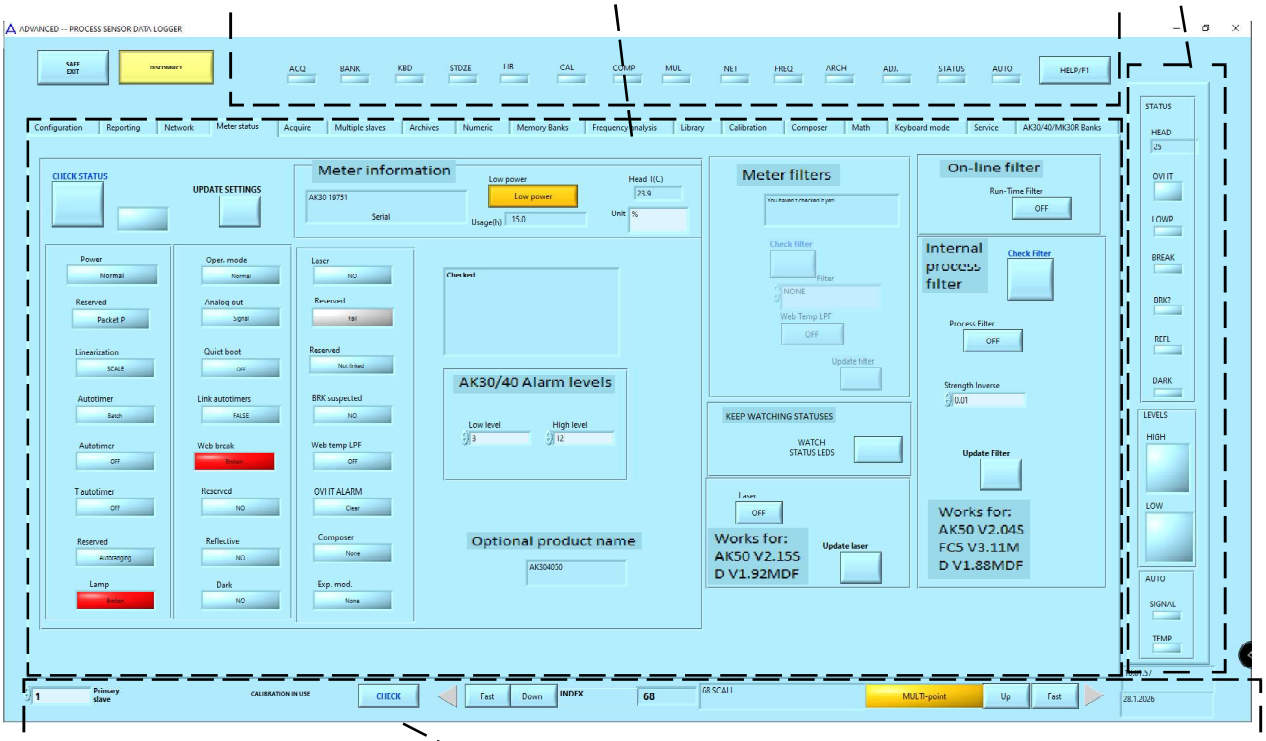


Figure 3-1. The Meter status page for checking the primary slave for all models (some features for AK30/AK40/MK30R, some only for AK50)

List of pending operations. Turn them off at each pertinent task page before going to off-line and stopping this program. Always visible.

Task pages, use the top line name selector to switch. Always visible.

Status light panel, controlled only by the two WATCHes. Always visible.



Selector area for calibration table and slave address. Always press Check first if you are uncertain. Always visible except in Keyboard mode or while you are on the Configuration page.

Figure 3-2. Program working areas

4. Acquire Page

To start measuring right away, we assume you have the meter ready and pointed at some target material. Go to Acquire page and press the large button, marked "OFF" to change it to "ON". This will start data retrieval from the primary slave meter if the connection is working correctly. Check the slave address at the bottom of the window to make sure. The graphic display shows the accumulating signal values with automatic scaling. The time scale shows the correct time taken from your computer. Refer to Figure 4-1. If nothing seems to happen and the program becomes sluggish, either the slave address is incorrect or (more likely), the meter is in Keyboard mode. This behavior applies for all other tasks as well. Stop the Acquire operation and check the address (Network page).

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 colours 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 make a great 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 very similar in features. This display does not have any cursors. The Memory banks display does and also the Archives and the Frequency analysis displays do. The cursors are used e.g. for determining the interval from which one calculates statistics of the signal or one can directly read the signal values on the curve.

The box at the top left corner (Selection) has six buttons in it. You have just tried the first one which starts/stops the data acquisition. You can select with the other buttons the signals you wish to measure. When pressed down, the corresponding data will be collected as soon as the acquisition is on. You can start/stop collecting them even in the middle of acquiring other channels. Note, that file saving is done only if at the time of stopping or when the 4096 samples have been collected, the corresponding channel button is pressed. Else the data is displayed only. The next large button to the right of these is for printing the display graphics. You do not have to print out everything unless you really want to. All data is **always** saved into IRMA7 file format readable with any spreadsheet program too. You can later retrieve the files on the Archives page.

The small number display at the rightmost top corner together with a small LED indicator is the total sample counter. It 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 to have the next set of 4096 points. This will continue forever until you explicitly stop the acquisition.

You can change the way data is acquired by adjusting the time interval (0.05 to 3600 seconds) at the center box' "Interval" control. Overloading will happen if you try to acquire too many signals at a too fast rate. It is not recommended to change the interval after starting acquisition. You can do it but in various cases you may meet unexpected delays as we have true rubberbanding of time in the acquisition. If, for some reason, sampling is delayed and the acquisition realizes that, it will start collecting data faster than the interval indicates. In the opposite case, it will pause until a proper time has passed to start acquisition again. This makes sure that after having a normal interval again, it has matched the number of samples taken and the time passed. The interval is saved along with other program settings.

You can also preset the number of samples to be taken. After having those samples, the acquisition stops automatically. Do this by pressing the button "**Predefined**" and set the number in the control "**Count**". Another way of controlling data acquisition is to make it conditional by pressing the button

"**Conditional**". Data is then acquired from the meter only when its Autotimer is on. Else, the data is replaced with zeros. This is useful for collecting data from a sheet feeder system or alike where the data acquisition can be triggered with an optical sensor causing the Autotimer to turn on for perhaps a few samples (Batch size, see later). Then the data you get on the screen is obtained from the sheets with zero filled gaps and with a true time scale. This is very useful for many processes and special measurements. The last two buttons in this box are **markers** for adding/subtracting an adjustable shift

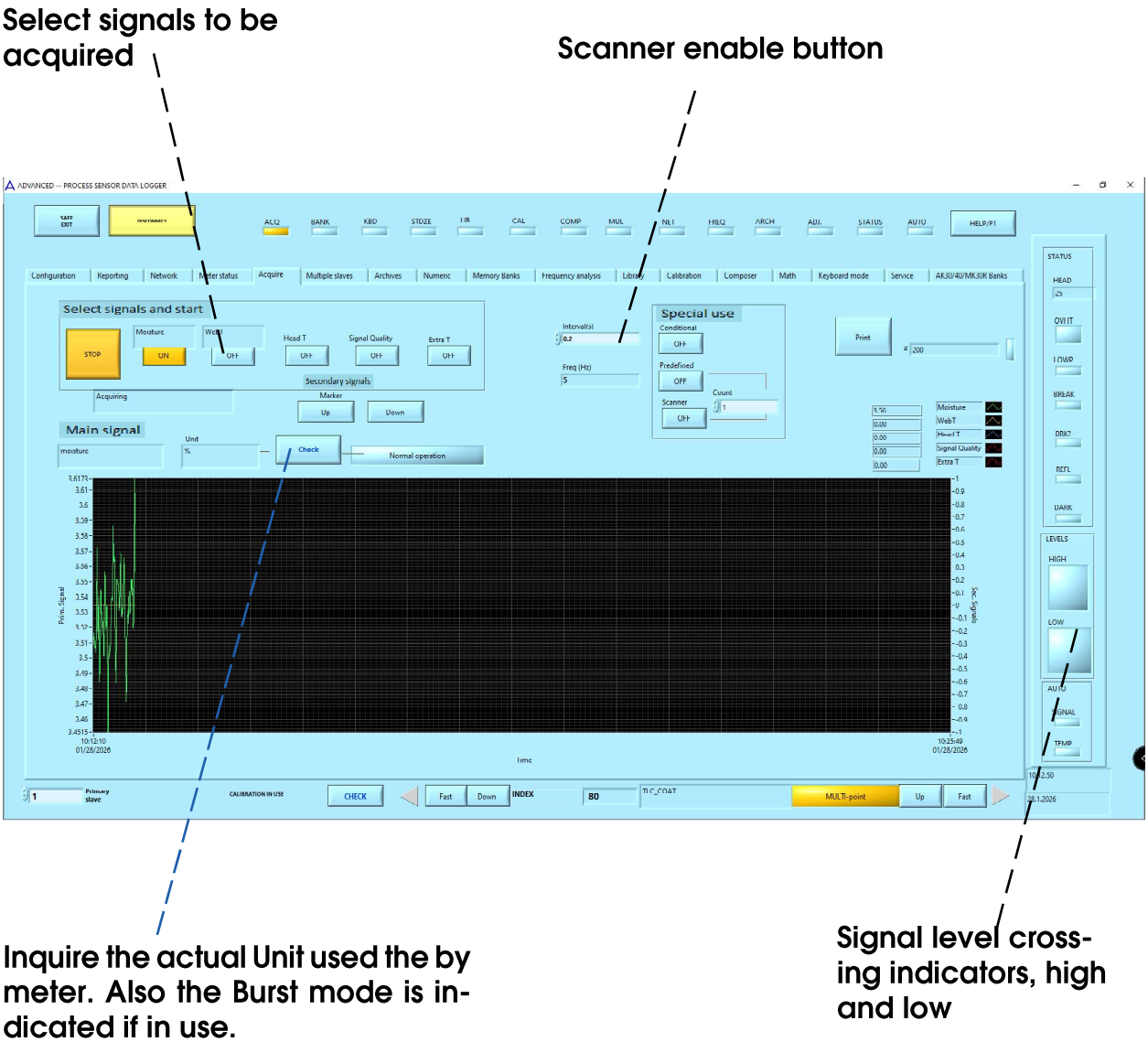


Figure 4-1. The Acquire page, data retrieved from the primary slave

to the signal. They are used for marking the beginning / stopping of some event or measuring point important to be recognized later when analyzing data. The marker height is adjustable on the Reporting page. The number fields besides this box are real-time values of each signal in corresponding order. A still more elegant way of measuring sheets or other discontinuous materials is to apply the Burst mode (refer to Memory banks) offering you the cleanliest signal.

You have a **scanner utility** in this task. It is used by connecting some sort of device for triggering the meter's Autotimer (a hardware input with TTL levels, falling edge sensitive). When the scanner frame starts to move, the device sends a short falling pulse to the input. The pulse width should be between 1 microsecond and one second. That will start the autotimer of the meter. The scanner portion of this task will wait and check the Autotimer frequently until it has started. Then the data acquisition is started. The number of points to be collected in one scan is set in the numeric control to the left of the Scanner button. It is the same control as for the Predefined and the same count is used there too. Configure the memory banks and the Autotimer on the memory banks page to acquire some 100 to 400 samples to the memory bank at the full speed to keep it on at least for a few seconds. Calculate the resulting timing to be sure that the Autotimer will turn itself off before the scan has actually ended. Else this utility will restart again. The idea is that for each scan, the meter will deliver a moisture profile and the program will hold it on the display until the next scan is started. You can stop the scanning by turning off the Acquire operation. The hardware for generating the pulse can be either an optical switch sensing the movement of the scanning head or the scanning frame control system may produce it. You can acquire other signals while scanning but that will slow down the acquisition and you will get fewer samples per scan. You can easily invent new ways for using this even if you don't have a scanner just by adding a sensor (optical or mechanical) to generate a trigger and measure a batch of samples. A machine using sheets (cutter, printer) could be the target.

As you can see, there is an LED indicator at the left edge (ACQ) which is lit when you have started this operation. It is there to remind you of a pending operation which should be properly stopped before stopping the program or going to the Keyboard mode. There are also some other operations which might interfere with this operation and therefore it is recommended to turn it off. **In principle, you can use most of the operations in this program simultaneously**. Of course, if you are uploading a new library to the meter, there is no sense in doing measurements at the same time as the calibration table in use may change. Glitches in signal may result even when the table is replaced with the same one.

Note that the settings in the program other than those mentioned at the Configuration page, are not saved for the next session, only the data is. If you want to keep the settings, keep the program running all the time. The buttons at the lower edge of the program display are used for checking/ setting the current material entry in the calibration library. You can step up in the index or step down, either one entry at a time or ten entries at a time. The resulting entry is displayed at the center with information pertaining to it. Of course, all data and settings located in the meters themselves are always saved in the meters themselves. The two most important channel colours are saved as well. There is a small indicator light at the top right corner (Lag) informing the user that the serial port may be a bit slow for the selected interval (orange light is predominant). Else, the light only blinks occasionally. If it is on continuously, stop the acquisition and increase the interval.

5. Memory Banks Page

Figure 5-1 shows you the looks of the Memory Banks page. The memory bank system is built into the meter capable of saving data at the fastest speed. Model D has five independent banks with 4096 + 5 X 1024 samples (Series + Bank1...Bank4). Model A has either one 4096 samples bank (Series) or four 1024 samples banks (Bank1...Bank4, independent of each other) which cover the same memory area with the Series.

You can always safely **CHECK** the memory bank settings (recommended). The "Bank settings" box has the buttons for **CHECKING** and **UPDATING**. You have four controls there for selecting the Banks, setting the sampling time interval and selecting the Autotimer mode (Continuous or Batch). Also the Batch size and Burst mode features can be set. The Continuous mode operates forever until explicitly stopped and Batch mode collects the preset number of samples into the meter and stops itself. **NOTE: Only the sample interval of all the features in this box can be retrieved and set in model A. Pressing the CHECK key will also retrieve the current number of available samples in the bank for all models**. The smallest interval is 0.0025 s for model D and 0.2 s for model A. For Caposito-DC, the smallest interval is 0.001 s. The graphic display resembles much the one in Acquire operation but has more options for adjustment. What applies here for model D applies for all other products and models too.

A Small hint

If the cursors are not visible, you can place them to the display center by locating the grey little buttons at the cursor controls having crosses at the center. By clicking there, you can select an option from the menu "Bring to center". Then, you can move horizontally the cursor by dragging the vertical line on the display.

The Autotimer can be started manually with the large button at the top right or with hardware (isolated TTL input at the interface connector). Stopping is done manually with the large button at the right or in Batch mode it will stop automatically.

You can control the use of this operation either manually in the box "Manual commands" or by using the "Macro commands". The manual commands consist of downloading data from the meter to the program memory and display. The data is automatically saved just as in Acquisition to IRMA7 data files and optional LVM, XML or Datalog files.

5.1 Manual Operation

Manual operation starts always by checking the settings to avoid any mistakes. After confirming the bank settings, press the UPDATE key if you have made any changes. You are almost prepared to start. If the window "Samples in bank" shows any nonzero reading, you probably have to clear the bank by pressing "Clear Bank" button. Press WATCH AUTO button to continuously see what is the state of the Autotimer. If it is on, you can turn it off by pressing the "Stop" button. The WATCH button stays ON as long as you want and it will update the sample number indicator to the right and the two indicator LEDs. One of them is right below this button and the other one is at the right edge bottom (SIGNAL). It will also update the TEMP indicator if the autotimers are linked. When these LEDs are lit, it means the corresponding autotimers are on. It is recommended to always keep the WATCH on when working with the memory banks.

The manual operation proceeds either by adding single samples to the selected memory bank by pressing the button "Add sample" or by starting the Autotimer with "Start". When the required number of samples have been collected, you can download the data by pressing the "Download" button. This will usually take several seconds and you can observe its progress with the blue bar at the center.

Data is automatically saved to a file but is still kept in the bank too. If you want to clear the bank for the next run, press "Clear Bank".

If you are interested in having the temperature autotimer data, press the button "Copy T to Bank4".. This will copy the 1024 samples long temperature bank to Bank4 and then clear the temperature bank. Select Bank4 as your current bank in the "Bank settings" box. Then you can download the data

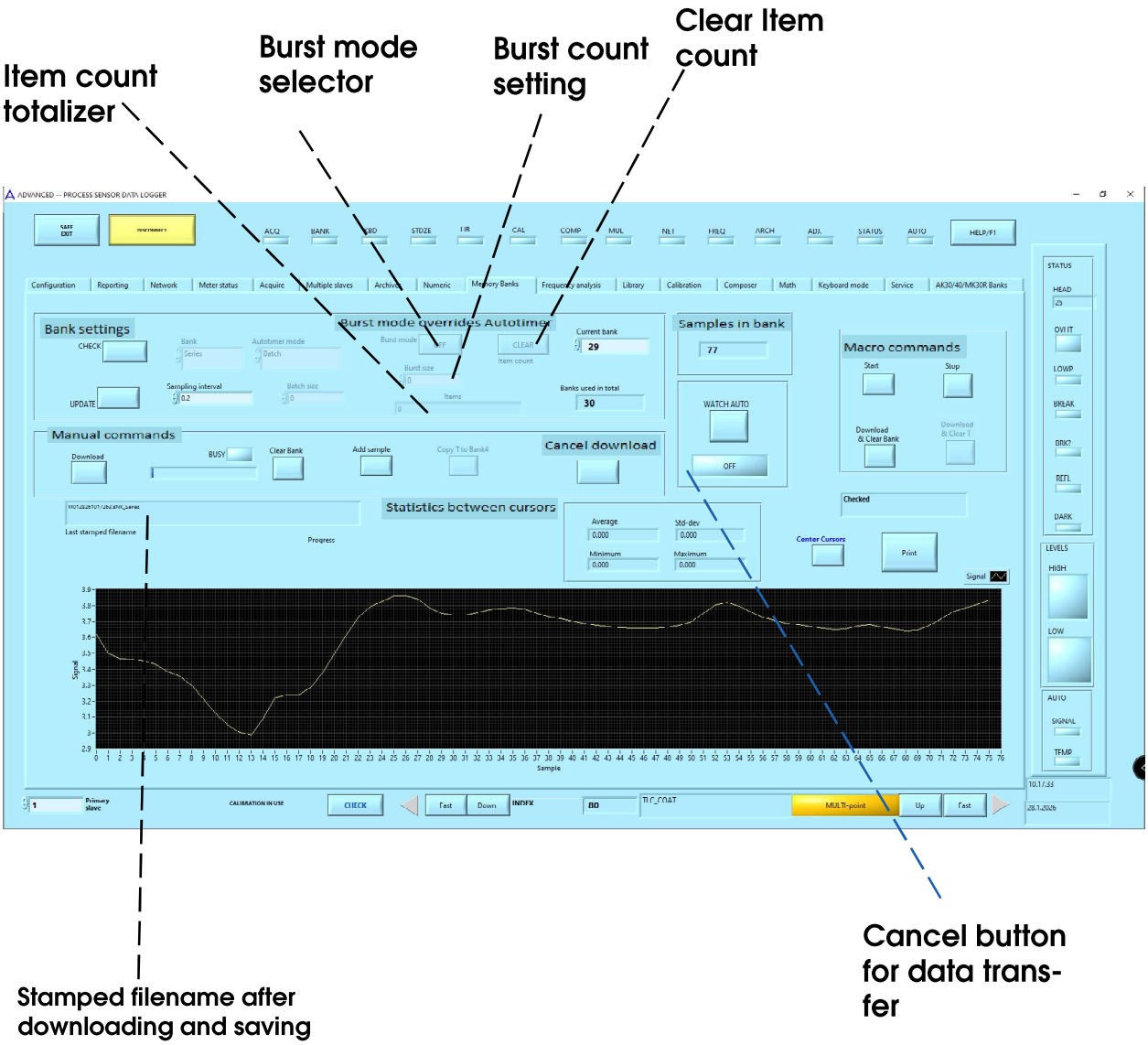


Figure 5-1. The Memory Banks page

as before. The temperature data is available only in model D and is taken at a rate of 16 Hz in latest models. In older meter revisions (Rev 1 and 2), the interval is one second unless the meters are equipped with a fresher software. In other products, the temperature can be either web temperature or head temperature, depending on model and available options.

5.2 Automatic Use

You can also use the Macro commands to make all of this easier. You can set as the current bank the longest one (Series). Clear the bank after updating its settings and you are ready to go. You start the data collection as before and stop it as before. You can download the data in the current bank by pressing the button "Download & Clear" This will also clear the memory bank to be ready for the next run. Data is displayed and saved as before. If you need the temperature data, press the button "Download & Clear T" to perform a similar operation. Note that if your current bank is Bank4, you can not perform the temperature macro before the "Download & Clear" macro as it will run over the signal data. Therefore, it is recommended to work in some other bank (like Series) to avoid this. The program will automatically switch the banks for a while to do its operations.

You have the option of interrupting the data transfer if you detect any problem with it, like a loosened cable has made it inoperable. Just press the Abort button and after a few seconds the fault is ignored. Also perfectly valid data transfers can be interrupted in this way. The resulting data is shown and saved, though.

On the display you have the downloaded data as a curve and two cursors in addition. If the cursors are not visible, click the grey buttons at the center having crosses on them. The opening menu has an option "Bring to center" and by selecting it you can see the corresponding cursor again. You can use the cursors to calculate statistics automatically. The results will be seen at the four numerical windows at the center. Grab the cursor at the vertical line and drag it to the desired position. The statistics are updated automatically. You can also change the scaling. The default vertical scaling is automatic. To change the scales, you have to right-click at the display to see a menu. There is an option "Autoscale Y" which you should change to unmarked. Then you can click at the top scale number to edit it and also at the bottom scale number. You can set them freely. If you get lost with this, turn on the "Autoscale Y" and start again. The same applies for the horizontal scale except it is set as fixed scaling to keep the number of samples at 4096 and the last sample number is then 4095. You can change this freely as well. There are also buttons for zooming in/out or for grabbing at the curve with a hand cursor. Feel free to learn how they behave. These methods above apply to all graphical displays available in this software.

If you wish to go OFF-LINE the data obtained in the Memory Banks page is not lost when you return back.

5.3 Burst Mode

There is a special operating mode available in current meters and sensors (except in model AK30 / MK30R), called **Burst mode**. It overrides the normal use of the meter and the Autotimer with the memory banks. The idea is to collect a burst of samples after receiving a trigger pulse from an external optical sensor causing turning on for the Autotimer. The samples are not put into any memory bank. Instead, the meter accumulates the Burst count of samples and calculates the average of these. This value is put into the current bank and offered as the moisture reading for all interfaces. The value remains the same until the next triggering event occurs. To make the Burst mode function correctly, turn on the mode and set the Burst count. The count should be selected according to the estimated number of samples the meter is able to measure while the sheet or piece is under the meter. Update the settings. As soon as the optical edge sensor detects an incoming

sheet, the actual sampling starts and stops after getting the preset count of points, the average is calculated and put into the bank. The same value is then given to all interfaces. The resulting curve in Acquire looks as stepwise changing and does not have any dips or peaks in values caused by the gaps between the sheets. There is also an item totalizer involved and it is shown optionally on the Numeric display page. Refer to the meter's User's Guide for more details. This mode has lots of special uses is piecewise webs. A good example is a printing machine which prints dark colours on the web or sheets and moisture measurement is not reliable on those areas. However, if you add an optical sensor for triggering, you can pinpoint to the exact position where moisture is reasonably acquired. By having just a few points there may be sufficient. Anyway, it is better than lots of nonsense values.

5.4 AK30 / MK30R Memory Banks

The portable meters AK30 and MK30R have a slightly different use and architecture of the memory banks. Thus there are two extra buttons on the page above for manipulating the selected bank to be downloaded to your PC. If you wish to download a greater number of banks of the 820 possibilities in the meter, you should go to page AK30 Memory Banks page which is shown below. You need to CHECK first the memory banks to see which are populated with useful data. You can select the two numeric controls the start and end bank numbers to be downloaded. All data is the copied to the PC and archived. The data is also shown as a curve for a moment. In this way, you can download ALL memory banks from the meter. When the memory bank gets full and the number of banks used is 820, you need to do this or else just clear the memory in the Service option of the meter's internal menu system (see AK30 user's guide). The data remains in the meter for many years if clearing is not done.

One important detail is the date of the capture. It can be seen in the tag window to the right as the second lowest line. If the meter's date and time have been set correctly at the start of each measuring session, this will label each measurement precisely.

6. Archives Page and Filtering

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 eight 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. While moving the cursor over the name of the retrieved file, you are displayed the file attributes indicating some useful information of the original measuring event. The actual 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. Note however, that the data files you can apply here are always the traditional IRMA7 data files. The IRMA7Basic (and all other xxBasic) data files are also fully compatible with the Advanced data files. You can not retrieve any of the LVM, XML, HTML or Datalog files as they are targeted for other Windows applications. Refer to Figures 6-1, 6-2 and 6-3.

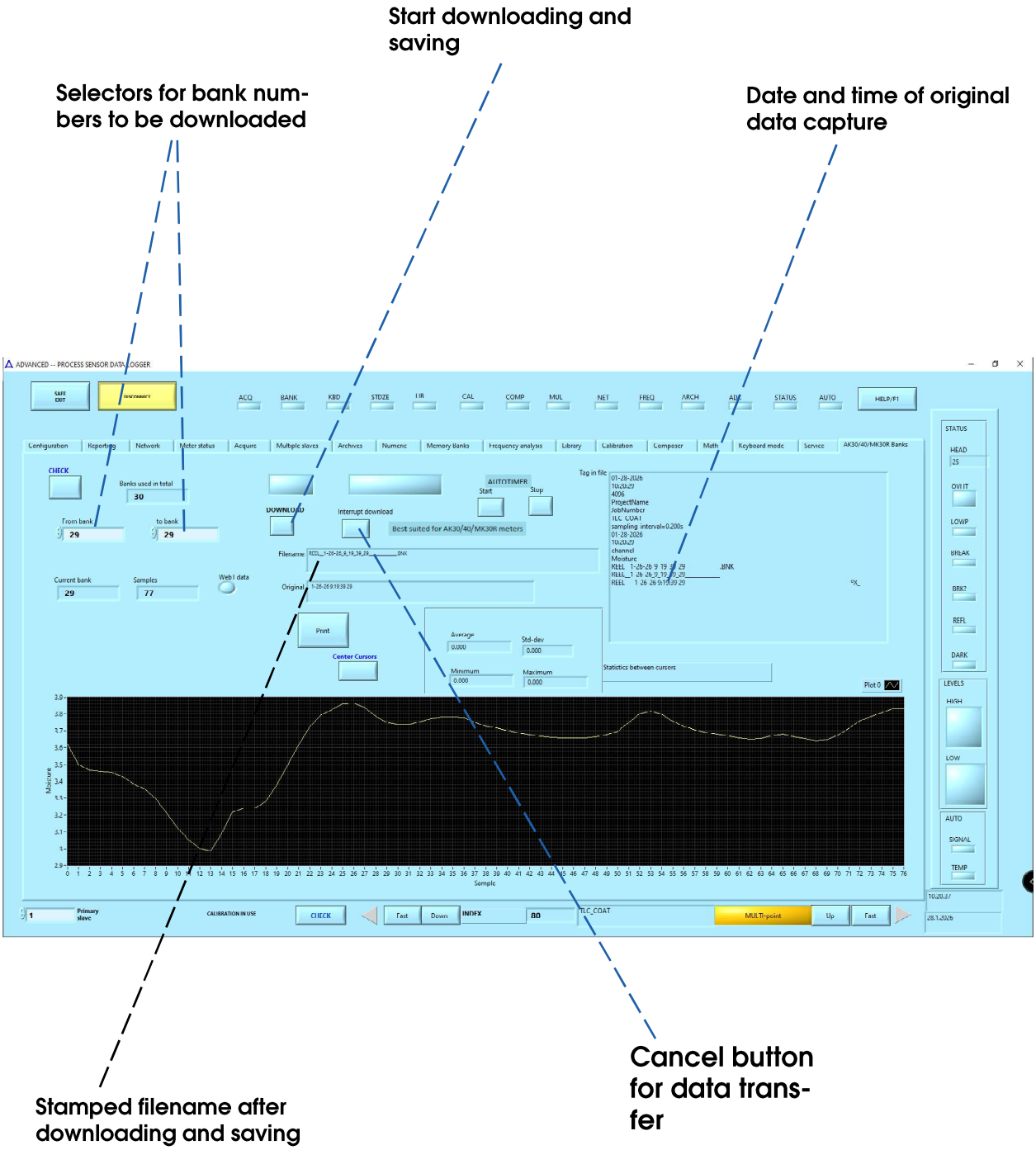


Figure 5-2. The AK30/MK30R Memory Banks page

6.1 Data files

When you run the Acquire or Multiple slaves operation and you have selected to have the LVM, XML and Datalog files you will have files with the following names. See below an example directory listing.

```
Data of last modify           size        file name
-------------------------------------------------------------
03-07-2023  11:31 AM            28,984 HT0307041130420.ACQ
03-07-2023  11:31 AM            65,612 HT0307041130420.ACQLOG
03-07-2023  11:31 AM            28,834 HT0307041130420.ACQXML
03-07-2023  11:31 AM            85,975 HTACQ0307041130420.LVM
03-07-2023  11:30 AM            28,899 M0307041130424.ACQ
03-07-2023  11:30 AM            65,536 M0307041130424.ACQLOG
03-07-2023  11:30 AM            28,758 M0307041130424.ACQXML
03-07-2023  11:30 AM            85,888 MACQ0307041130424.LVM
03-07-2023  11:30 AM            28,983 WT0307041130424.ACQ
03-07-2023  11:30 AM            65,612 WT0307041130424.ACQLOG
03-07-2023  11:30 AM            28,834 WT0307041130424.ACQXML
03-07-2023  11:30 AM            85,971 WTACQ0307041130424.LVM
03-07-2023  11:31 AM            28,908 XM0307041130421.ACQ
03-07-2023  11:31 AM            65,536 XM0307041130421.ACQLOG
03-07-2023  11:31 AM            28,758 XM0307041130421.ACQXML
03-07-2023  11:31 AM            85,896 XMACQ0307041130421.LVM
03-07-2023  11:30 AM            28,909 XT0307041130424.ACQ
03-07-2023  11:30 AM            65,536 XT0307041130424.ACQLOG
03-07-2023  11:30 AM            28,758 XT0307041130424.ACQXML
03-07-2023  11:30 AM            85,897 XTACQ0307041130424.LVM
03-07-2023  11:41 AM           651,785 M0307041140380.LVM
03-07-2023  11:41 AM            28,899 M0307041140381.BNK
03-07-2023  11:41 AM            65,536 M0307041140381.BNKLOG
03-07-2023  11:41 AM            28,758 M0307041140381.BNKXML
03-07-2023  11:43 AM            33,012 M0307041143274.SPE
03-07-2023  11:43 AM            69,649 M0307041143274.SPELOG
03-07-2023  11:43 AM            32,871 M0307041143274.SPEXML
03-07-2023  11:43 AM            90,000 MSPE0307041143275.LVM
03-07-2023  11:42 AM            29,926 T0307041141553.BNK
03-07-2023  11:42 AM            66,560 T0307041141553.BNKLOG
03-07-2023  11:42 AM            29,782 T0307041141553.BNKXML
03-07-2023  11:42 AM           707,202 T0307041141553.LVM
03-07-2023  11:42 AM                43 T0307041142163.BNK
03-07-2023  11:42 AM               123 T0307041142163.BNKLOG
03-07-2023  11:42 AM                86 T0307041142163.BNKXML
03-07-2023  11:42 AM               405 T0307041142163.LVM
-------------------------------------------------------------
```

You may get a large number of files in the worst case. Therefore, it is good to know how to recognize them. The file name coding consists of a set of letters, a date time numbering, and a file type coding. The key to codes are as follows.

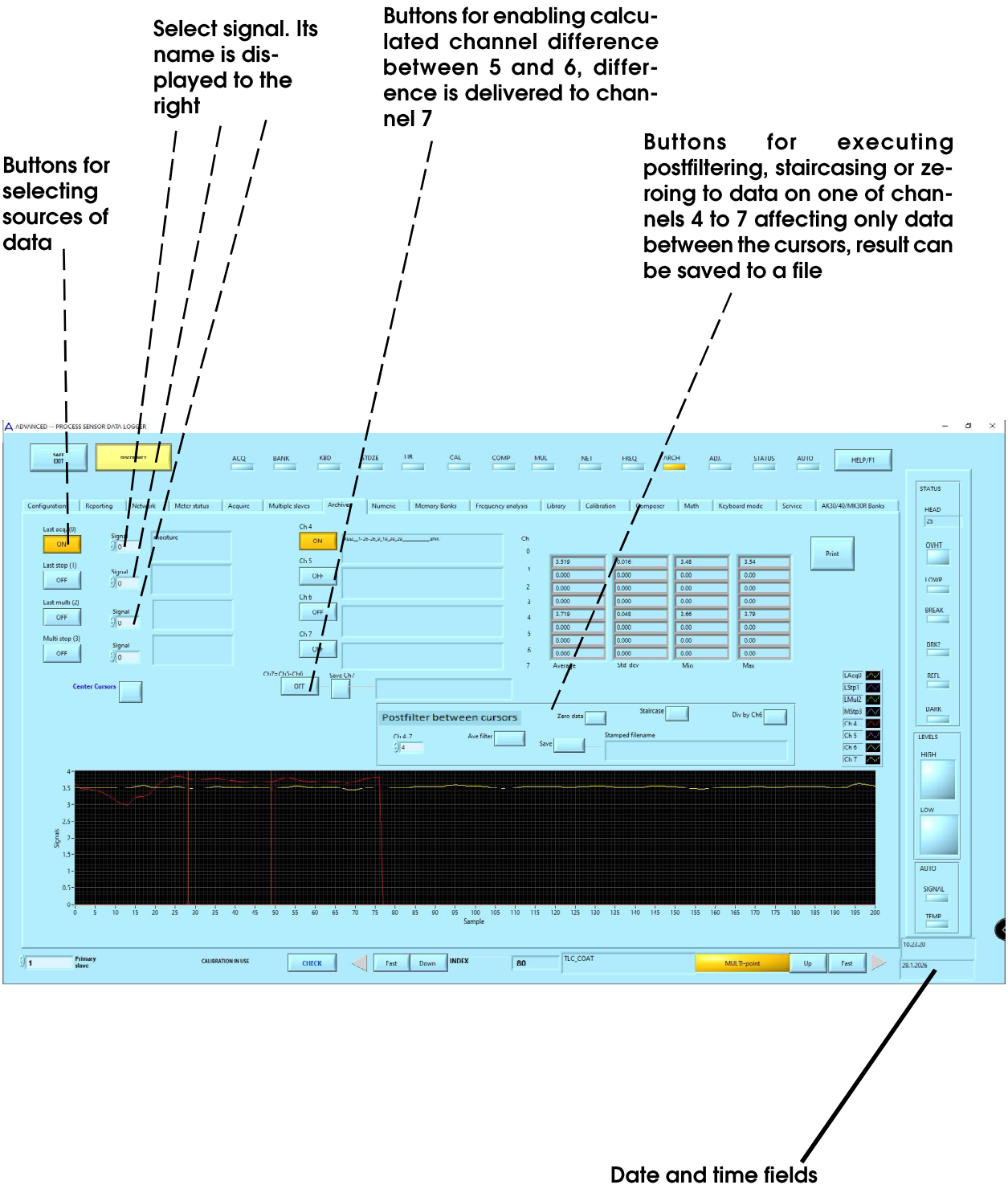


Figure 6-1. The Archives page

Code	signal
M	moisture
G	gloss
WT	web temperature
HT	head temperature
XM	expansion module
XT	extra temperature
C	capacitance
SA0...7	signal A, multi-slave operation, channel 0...7
SB0...7	signal B, multi-slave operation, channel 0...7
SM	shifted signal, Math operation
RM	restored signal, Math operation
D	channel difference from calculated, real-time or post operation

code	source
ACQ	acquired signal
BNK	memory bank download
SPE	spectrum signal
CNV	calculated, shifted or restored data

code	format
ACQ	IRMA7 format, ASCII data as text
BNK	IRMA7 format, ASCII data as text, padded with the name of the bank
SPE	IRMA7 format, ASCII data as text
LVM	LVM file format (not readable back in this program)
XML	XML format (not readable back in this program)
LOG	Datalog format (not readable back in this program)
HTML	Report in HTML, mainly pictures and text

Date time code key:

```
0307231141553
------              month, day and year
      ----          time in hours, minutes
          --        time in seconds
            -       a running random number
```

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 to e.g. CD's before removing them.

The channels available on the Archives page consist of Last Acquired, Last stopped Acquired, Last Multiple slaves and Last Multiple slaves stopped. The data is carried directly from the corresponding pages without any intermediate files. The Last signals are true real-time signals acquired and the stopped signals are those which are stopped either manually or otherwise. You also have a signal selector to the right of each of the corresponding channel buttons. You can select any of the available signals with the corresponding name to the right. If the signal is not acquired, it is not displayed though its name is. Nonexistent signals are replaced with zero arrays.

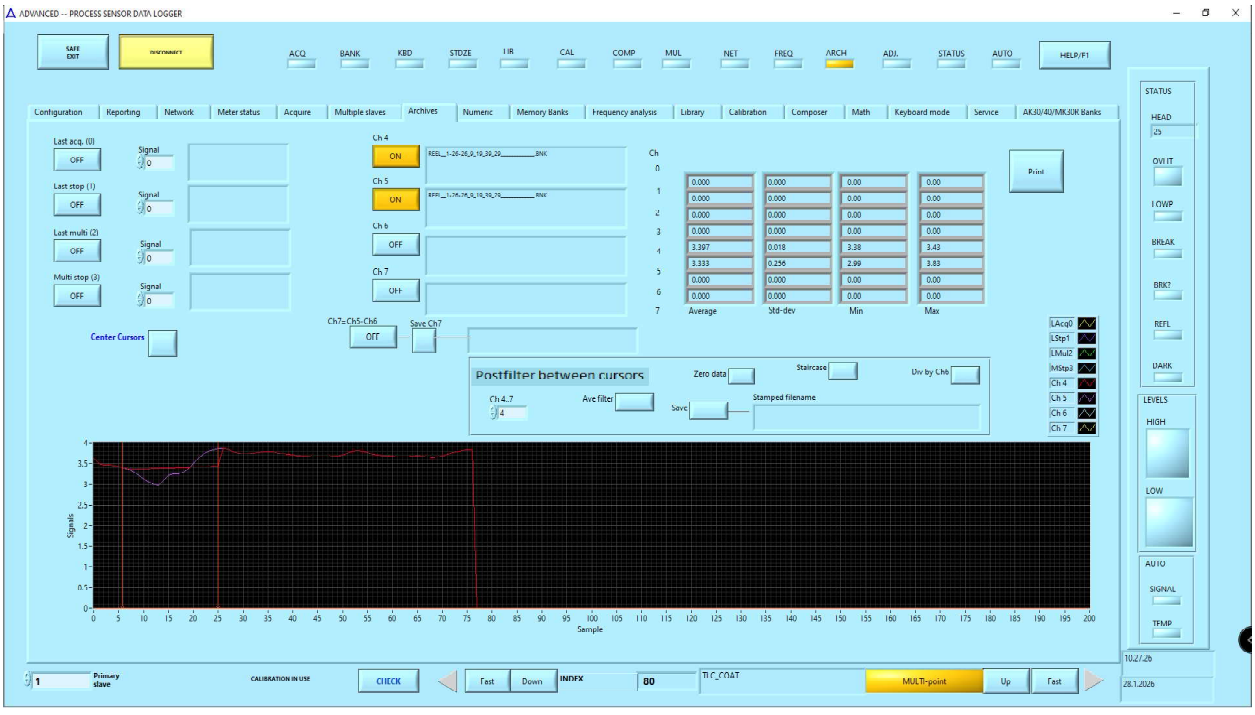


Figure 6-2. The Archives page with filtered data on channel 4. Filtering interval is defined by the two cursors. In this example the original data is shown on channel and the averageing filtering is done on channel 4 between the cursors

The first one is the real-time data which can be observed to progress all the time. You can select it from the original set of Moisture (or other primary signal, like gloss), Web temperature (or CAP B), Head temperature, Expansion module or Extra temperature with the small numerical selector. The second channel is the last stopped acquired signal. The third one is the selected channel from the Multiple slave operation and the fourth is the last stopped data from the Multiple slave operation. They both have numeric channel selectors besides the buttons. You can press the control without deactivating the channel button thus making it quicker to compare various data. You can apply channels 0...7 to both of them. As an extra feature, you can also use indices 8...15 for both of them to retrieve any of the corresponding web temperature or signal B channels. If no data appears, you have not selected that particular channel for data acquisition (see page Multiple slaves). Index 16 is left for the calculated channel difference obtained in Multiple slaves.

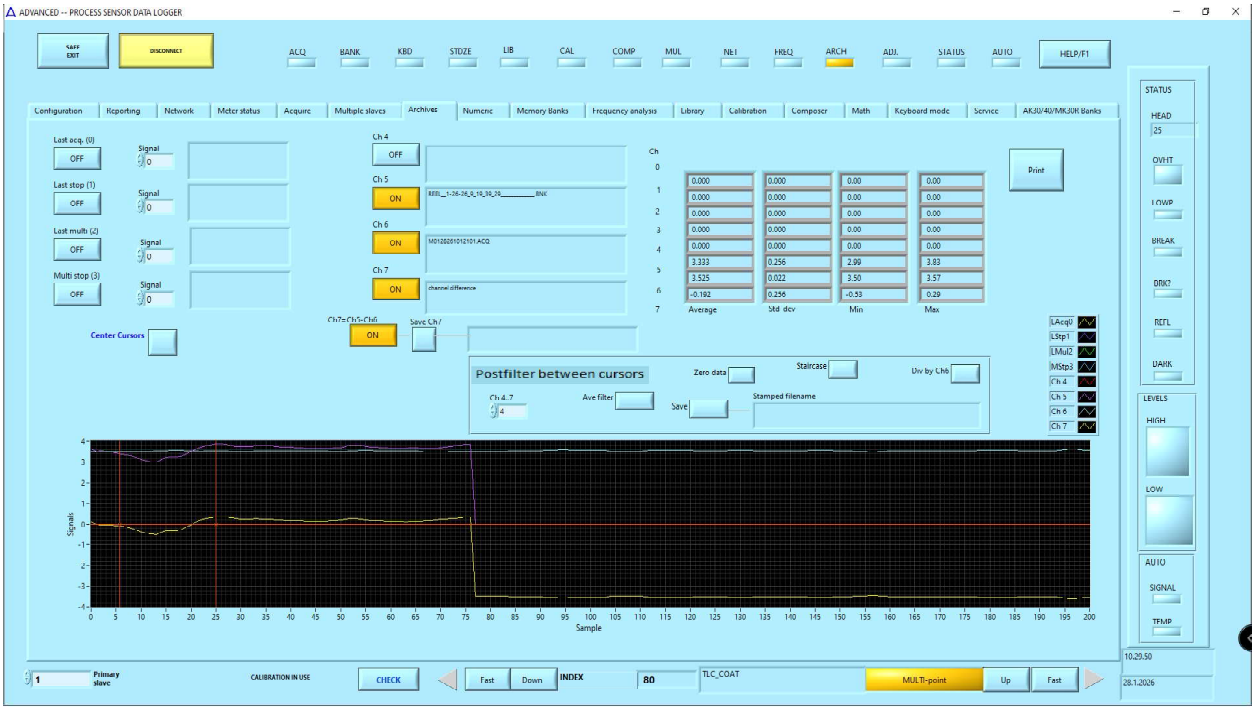


Figure 6-3. The Archives page with both channel difference and filtered data on channel 7. The difference is from data on channels 5 and 6.

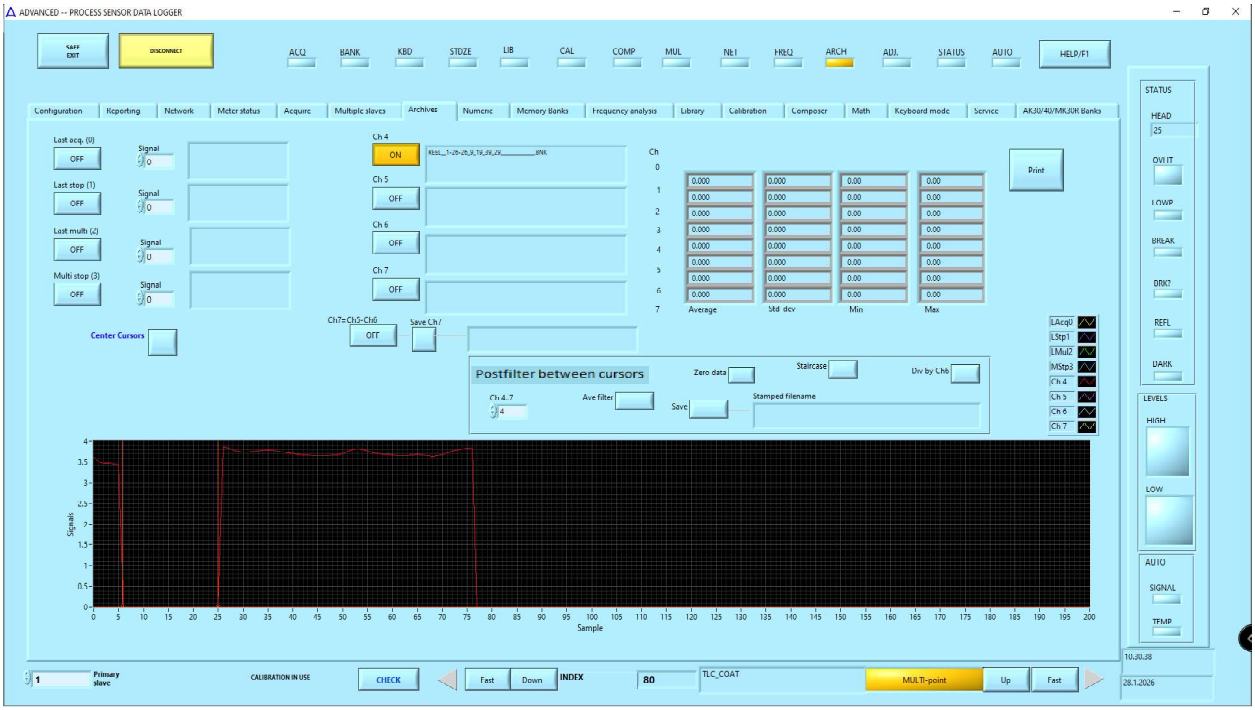


Figure 6-4. The Archives page with zeroed data on channel 4. The interval is defined by the two cursors.

Channels 4 - 7 are for retrieving saved files. Press the button and you will be asked to point out the file from a folder which you would like to open. When not needed anymore, press the channel button again and the file and its data disappear. **No changes are made to the file**. Channel 7 has double use. Regularly, it is used for retrieving files in the way channel 4 to 6 are. If you press first the button marked as Ch7=Ch5-Ch6, you will get a channel difference with the data of channels 5 and 6 subtracted from eachother. Pressing Save Ch7 will save the resulting data to a new stamped file.

You can move the two cursors to see the statistics of data between them, from all channels activated. The postfilter box contains buttons for filtering out the data on a selected channel between the cursors. This is used for cleaning up a signal if it has peaks from a web break or other interruptions or too high noise. Activate the channel by loading the data file, select the channel to

be filtered, press Ave filter button and press Save button to write a stamped file of this new data. You can repeat the filtering as many times as you like without saving. Move the cursors to a new position and execute the filter again. There is also a button marked as "Zero data" for setting all data values to zero between the cursors. The Staircase filter forms a kind of staircase to the signal values starting from the left cursor value and connecting it horizontally straight to the right cursor value.

The measurement unit used is added as a text field to the tail part of each data file, at the end of each calibration table name.

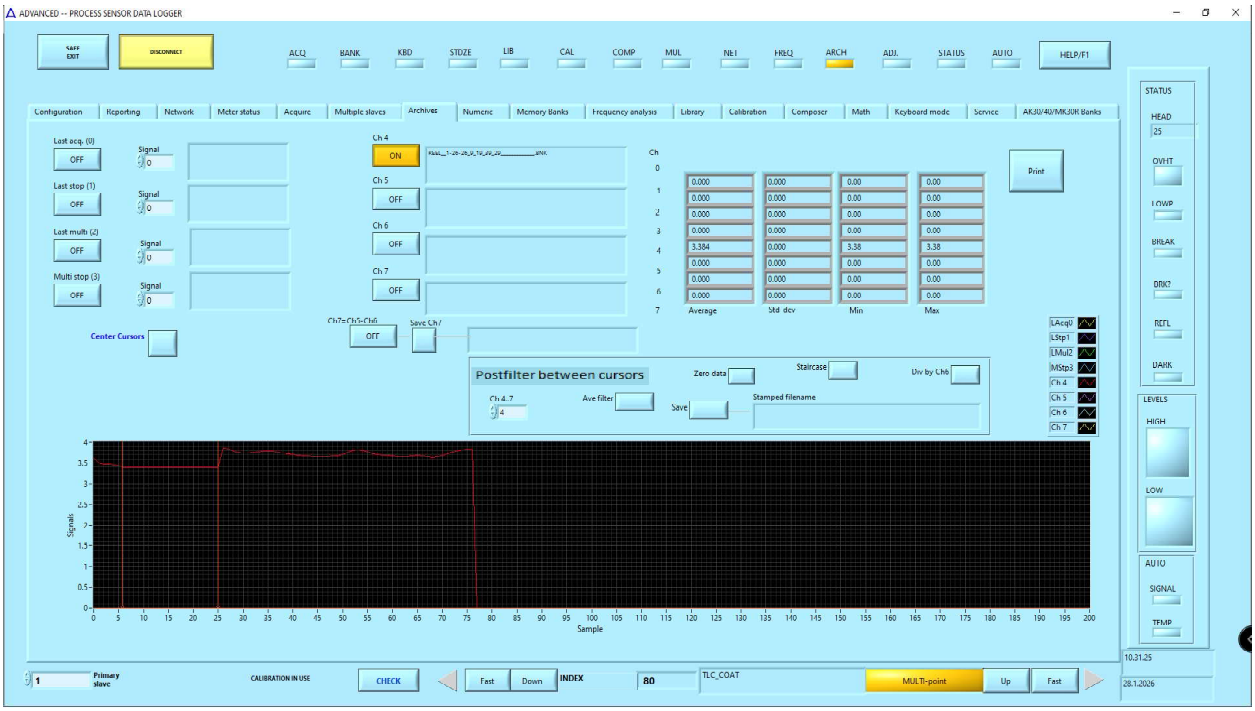


Figure 6-5. The Archives page with Staircased data on channel 4. The interval is defined by the two cursors.

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 all graphs except the **Acquire** and **Multiple Slaves** 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. A dialog will open:

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.

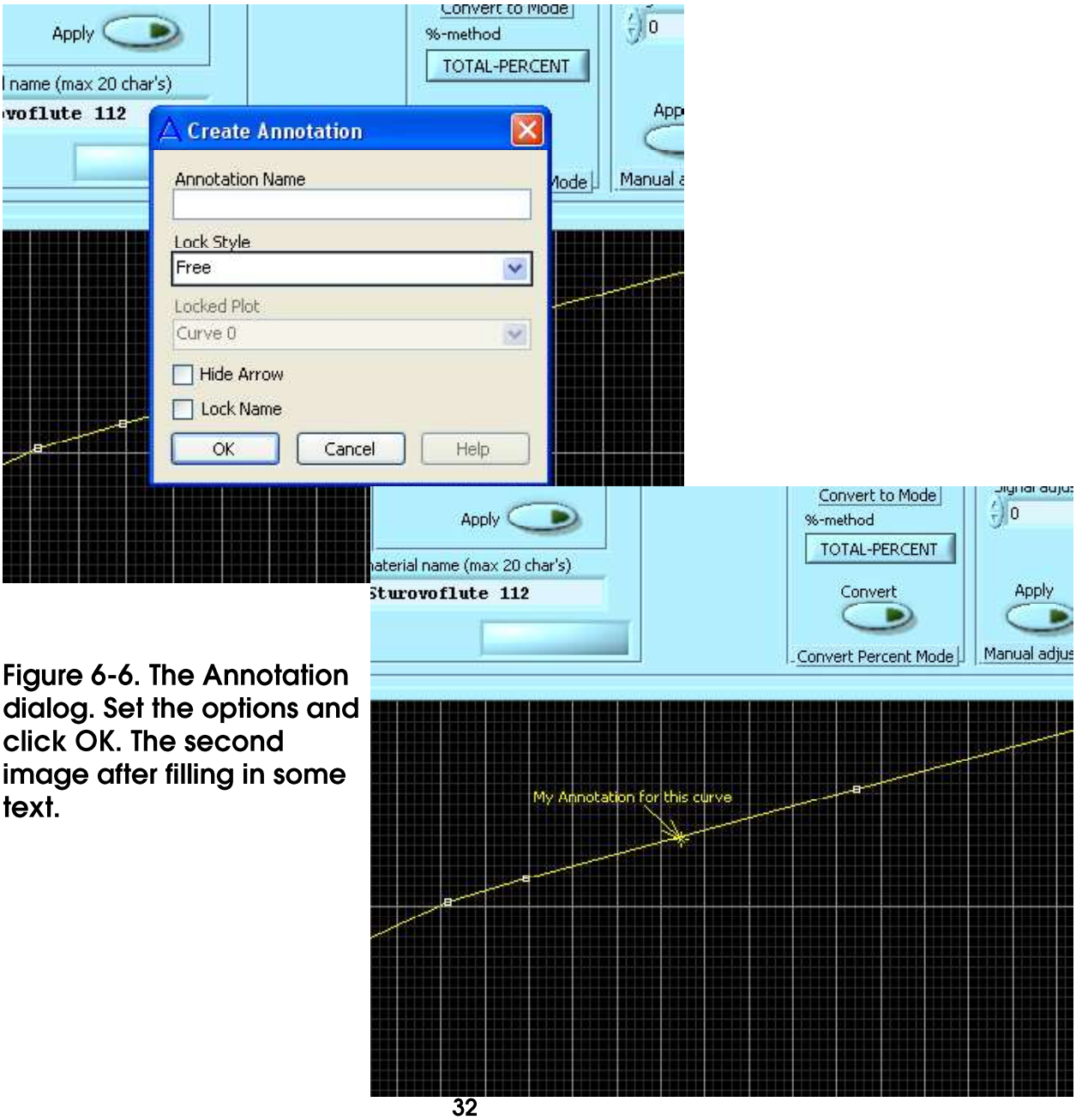


Figure 6-6. The Annotation dialog. Set the options and click OK. The second image after filling in some text.

7. Frequency Analysis Page

You can perform Fast Fourier Transform (FFT) to the signals you have acquired, either in real-time in the Acquire operation or use some data file. The system tries to recognize the time interval of the samples and uses that as the basic parameter for the transform. For mathematical background see literature about FFT and signal analysis. The spectrum analysis is used for recognizing any periodical phenomena in the signal having also a rather accurate quantitative capability. Extra peaks in the spectrum usually point to some faults in the paper machine or other production machine, like a damaged roller or faulty steam box. The peak frequency indicates the vibration source which can

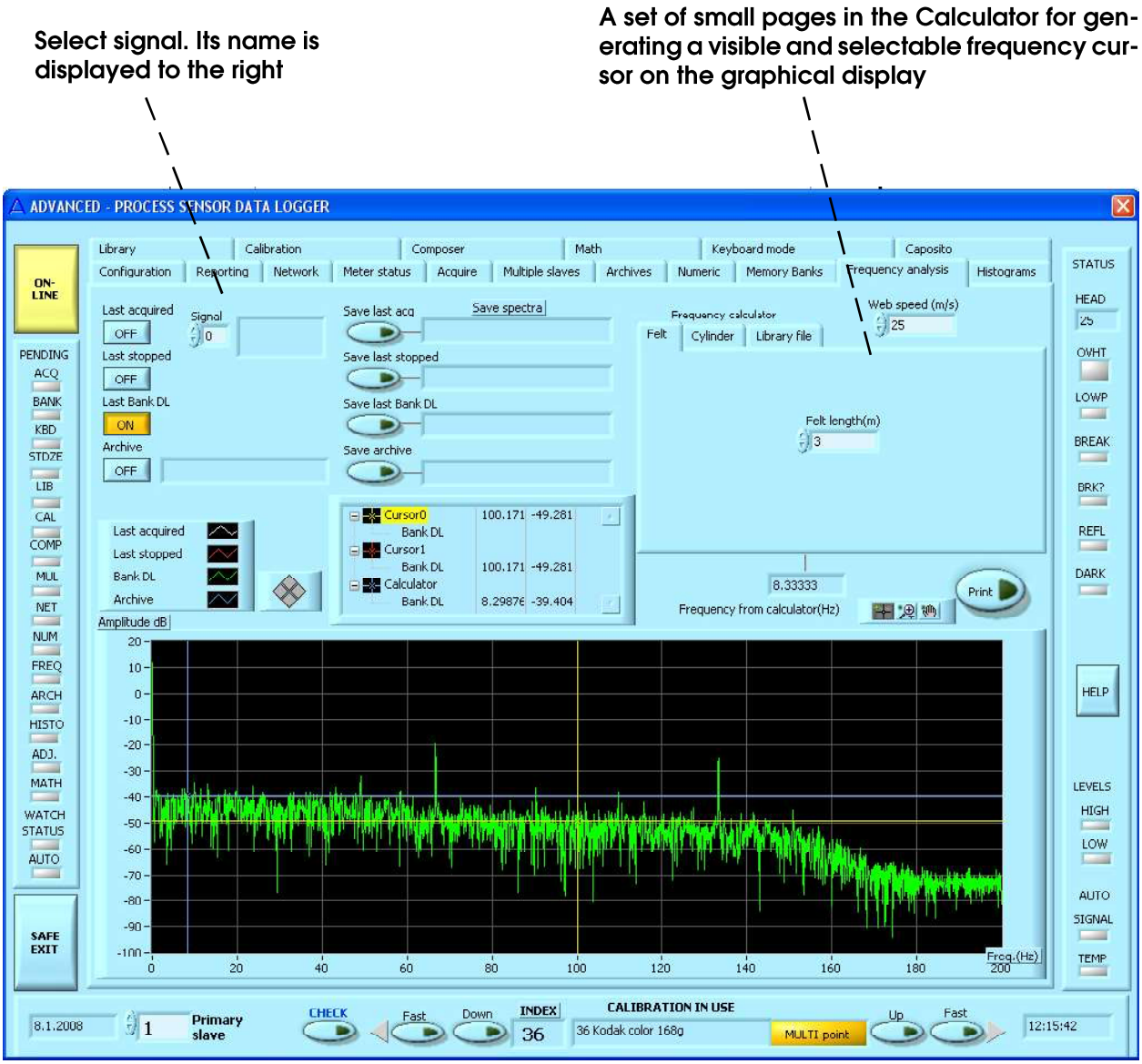


Figure 7-1. The Frequency Analysis page. The calculator uses the felt option page with the felt length defined and the web speed above it.

be calculated when web speed and other machine factors are known. The same principles apply for other phenomena, like a capacitive pressure sensor. See Figures 7-1, 7-2 and 7-3.

The signals are passed through a filter called Hamming to give a better peak resolution. The resulting power spectrum is displayed on the graphical display. You have two cursors there as before and can adjust the scales too.

The four channels available are either the last acquired data portion, last stopped acquired data, last bank download data or some archive file. The first channel is capable of updating the spectrum regularly as new data is acquired. You can select the signal from the original set of Moisture, Web temperature, Head temperature, Expansion module or Extra temperature or other signals corresponding to your sensor model with the small numerical selector. Note that the spectrum may look strange at the beginning. That is the result of padding the signal array with zeros when most of the signal is missing. When sufficiently data is available, you will get reliable spectra. The calculation is always based on having 4096 samples in the time series. Missing samples are always padded with zeros. This may cause inaccuracies in spectra if the actual number of data points is much lower. This fact is relevant when downloading data from the smaller banks (Bank1-4) with 1024 points. The errors

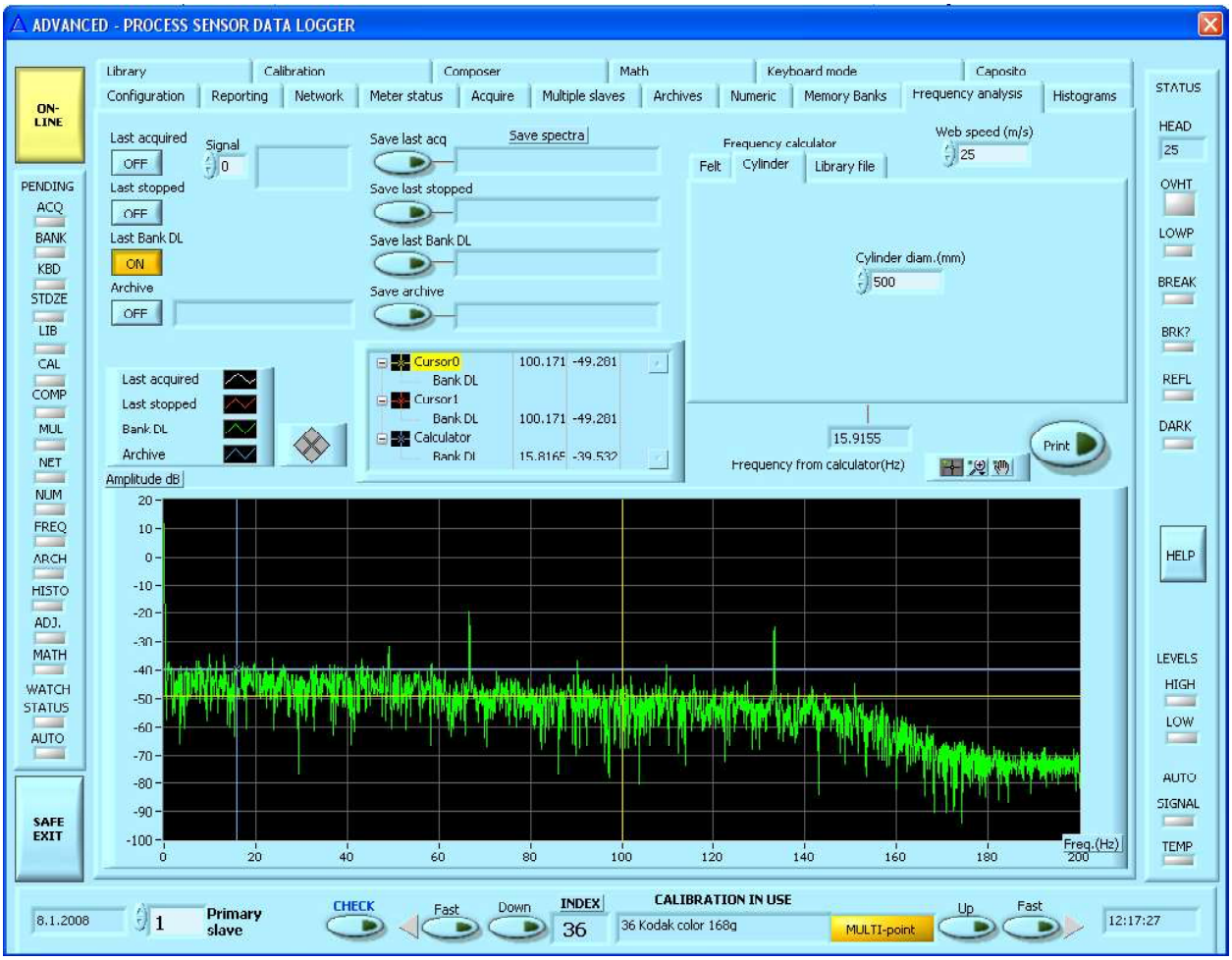


Figure 7-2. The Frequency Analysis page. The calculator uses the cylinder option page with the cylinder diameter defined and the web speed above it.

are not alarmingly large, though. For best accuracy, use the Series bank with 4096 points for frequency analysis. If you need to have a data file of the resulting spectrum, press the button to the right of the channel selectors at the corresponding position. **No automatic saving is done here.** Press the Print button if a report is needed.

You can calculate the frequency generated by a rotating roller or a closed-loop felt with the calculator on this page. Check the machine settings and you get the corresponding frequency. There is a cursor belonging to this calculator alone on the graphical display. You can select which one of the two frequencies is shown by the cursor. This makes life easier for fault diagnosis of a paper machine.

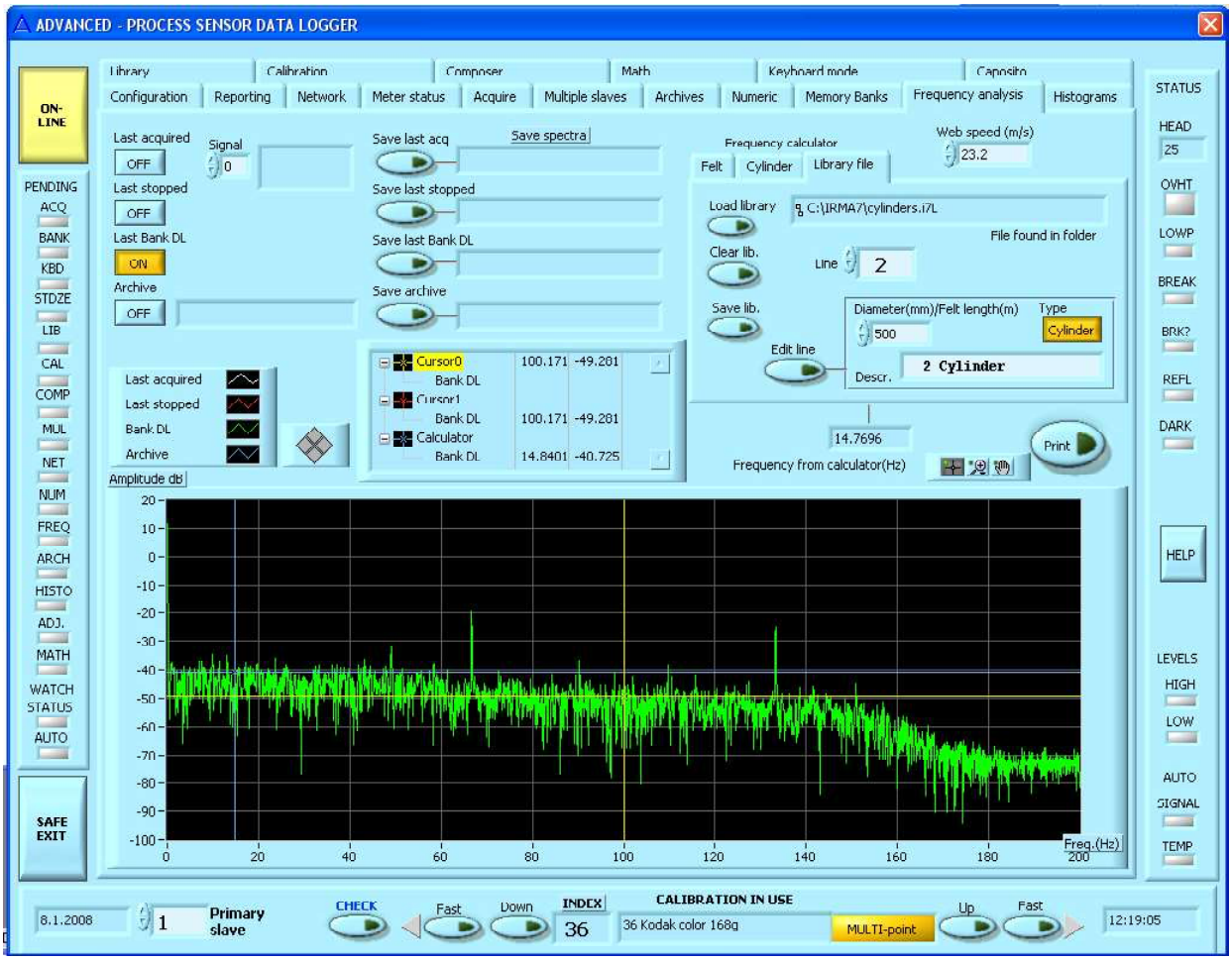


Figure 7-3. The Frequency Analysis page. The calculator uses the cylinder diameter library option page with the cylinder diameters or felt lengths defined and the web speed above it. The data can be edited and saved to a file. The maximum number of items is 100. Select the item to be either a felt or a cylinder. You can also give some descriptor to each line.

8. Multiple Slaves Page

This page is very similar to Acquire page. You can acquire data from up to eight meters and their web thermometers also with full assignment of each channel. The slave addresses are needed here to make a difference between the meters. The collected data may be made visible on Archives and Histograms pages.

The operating principle is the same as with the Acquire page. First, make your selections concerning the meters and press the large leftmost button to start collecting data. The time interval should also be checked before starting to acquire data. Do not offer too short intervals if you have several slaves and you wish to have both signals from each slave. The serial port at 9600 bauds can usually support about 10 to 15 samples/s. If you wish to have all eight channels with both signals (16 signals in all), the smallest working interval would likely be 0.65 s. If you change the speed to High Speed (38400 bauds), ALL of the slaves must be configured accordingly. They must be configured one at a time with the other slaves disconnected or via a separate serial port.

To assign a meter to a channel is done by scrolling the slave display. Press the small arrows up/down at the center of the page marked as **Channel 0..7**. You can assign channels 0 to 7 for any meter you have installed in your system. The channel number has nothing to do with the slave address. All the meters must have differing slave addresses, else there will be inevitable collisions. Needless to say, the whole network will not function in that case. You need first to separately make sure that each slave's address makes sense. A simple way of doing this is to adjust the slave address and then press the button Check. If the slave exists, you will get a meter serial number into the small window close to the address control. You can try out as much as you can until you find the correct slave. A list of each slave can be seen on the **Network page**. If you have managed to offer a nonexistent slave address, the text window will show: "No response" after a few seconds. You can select the same slave to more than one channel. When the channel has been verified to be correct, you can toggle the two buttons marked as "Signal A" and "Signal B" to indicate the status. That is also shown on a small LED indicator array to the right. The top row is channel 0 and the bottom row is channel 7 with corresponding markers for the signals A and B.

If the buttons are not pressed, the signals are not acquired. There are also small coloured squares for adjusting the curve colours. Clicking on them will open up a colour palette dialog with which you can create new colours or accept some existing colour to have a distinction between the signals. When you press the Check key for each slave you will also get the proper measurement unit used actually in that meter into the small window marked as Unit. If no checking is performed, the unit is obtained from the earlier saved settings or is left as "Check to see". It does not affect the data itself in any way.

You can assign each meter for a certain purpose and mark this with an editable text window below the serial number. This text will display the meter's mission in the future and is also added to the file tails. Save the settings at the end of your measurement session and these text fields will be saved too.

The box **Channel difference** can be used to generate a new signal from the acquired signals by calculating either a difference or an average between two signals, in real time. The signals can be selected in this box by indicating the channels and the corresponding signal type (signal A/signal B). The curve colours can be adjusted here too. When ready, press the corresponding ON/OFF button to ON to have the difference signal. Its data is automatically saved like any other signal. The file name is coded as **D** to indicate a calculated difference signal. The difference signal is shown on Archives page and Histograms page as well when you apply the index **16** for the selector.

While running this operation, you can add **markers** to the selected signals to indicate some event. The marker height is adjustable on the Reporting page.

Pressing the Print button will send an image of the graph to the printer. Statistics and more information is printed on the Archives page. HTML reporting saves an image of the display for your personal reports.

You have a **scanner utility** in this task. It is used by connecting some sort of device for triggering one of the meter's Autotimer (a hardware input with TTL levels, falling edge sensitive). When the scanner frame starts to move, the device sends a short falling pulse to the input. The pulse width should be between one microsecond and one second. That will start the autotimer of the selected meter (triggering slave). The scanner portion of this task will wait and check the Autotimer frequently until it has started. Then the data acquisition is started. The number of points to be collected in one scan is set in the numeric control below the Scanner button. The lowest numeric control is for selecting the triggering slave address. Configure the memory banks and the Autotimer on the memory banks page to acquire some 100 to 400 samples to the memory bank at the full speed to keep it on at least for a few seconds. This will affect the triggering slave only. Calculate the resulting timing to be sure that the Autotimer will turn itself off before the scan has actually ended. Else this utility will restart again. The idea is that for each scan, the meters will deliver a moisture profile and the program will hold it on the display until the next scan is started. You can stop the scanning by turning off the Multiple slaves operation. The hardware for generating the pulse can be either an optical switch sensing the movement of the scanning head or the scanning frame control system may produce it. You can acquire other signals while scanning but that will slow down the acquisition and you will get fewer samples per scan. The other meters don't need to be on the moving scanner frame. You can get correlative data from a set of meters with this option. You can easily invent new creative ways for using this even if you don't have a scanner. There is a similar Lag indicator as on Acquire page for informing the user of a too tight time interval budget while retrieving data from slaves.

The settings on this page are saved for next session in this program if you press the **Save** button while exiting on the Configuration page. Return to Figure 8-1.

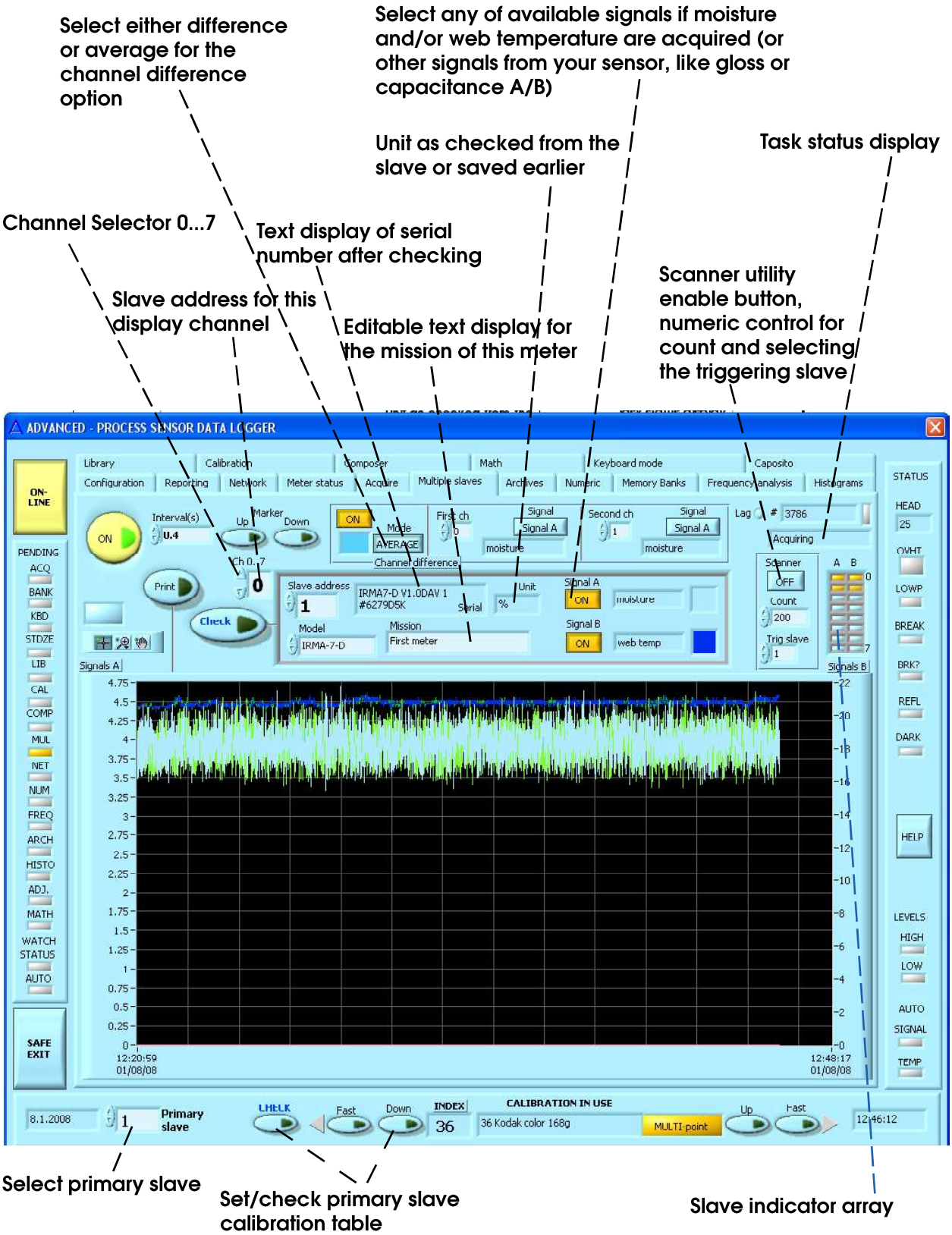


Figure 8-1. The Multiple slaves page with a sample signal from one meter. Change the signal colour by pressing the coloured square near the signal name.

9. Library Page

On the Library page you can download the calibration **library** from the meter, save it to a library file, load a library file to the program and upload the library to the meter. You can also upload and download single materials in the libraries. In this way, you can tailor the library in the meter (or some library file on disk) to match your requirements. The only way you can affect any material **entry** here is to change its name. You can finally print out the corresponding material entry in full with a graph seen on the screen. This may prove useful for your documentation. See Figure 9-1. The calibration residing in the meter can also be checked and displayed on the graph to the right.

To **download** the meter's library, press the button "DOWNLOAD". You can always do this safely, no harm is done to the meter. Then, the library is in the program's memory replacing the otherwise empty library generated at the time of starting the program. The library loaded or downloaded during a session is kept in memory until the program is stopped. You can save the library to a file by pressing the button "Save lib". The file format is ASCII text which means you can read the file into e.g. some spreadsheet program for further studying. Note, however, that the spreadsheet file formats are not in general compatible with this software. If you want to make any changes to the library file and return it back to the meter, care should be exercised and still there is a risk of damaging the file into unreadable state. Try to keep the file format as the original text format all the way. Old-fashioned plain ASCII text editors are more reliable in this respect.

Uploading a library to the meter is a critical operation as it will wipe away the old library in the meter. Unless you know exactly what you are doing you may destroy the library. It is advised to keep copies of the original library at safe locations to prevent any disaster. The same danger lies in uploading single material entries but the damage is not total. Be careful! You can check the current library name in the meter at any time in the box "Material in meter" (CHECK). No harm is done. If you wish to edit the name, do it in the text field and then send the new name to the meter by pressing SET. Uploading or Downloading a library file can be interrupted if any problems are found, by pressing the **Abort library transfer** button. The rest of the library entries are not transferred. If a library was to be downloaded, the rest of the entries are replaced with the earlier downloaded data or empty entries.

Uploading a material requires a little bit more mouse exercise. First, check the current material index in the meter by pressing the button CHECK right above the index counter window. As a result, the text field below, the index display and the calibration mode indicator are updated together with the library name in the meter. This is the entry you are using for the Acquire operation right now. If you change it, you had better not to do any measurements at the same time. Press the keys UP, FAST UP, DOWN, FAST DOWN besides the index counter display to find the material you are interested in. This will change the current table in the meter but it should not be important at this time.

Then, go to the box "Material in PC library" and click the arrows up and down right at the left edge of the index counter to find the other material entry in the PC library. The corresponding calibration curves are shown at the same time with some elementary information.

When ready with the selection, you can now either download a material from the meter by clicking the button DOWNLOAD above the word MATERIAL or upload a material entry to the meter by clicking the button UPLOAD under the same word. The data are all updated at once.

You can also clear a particular table in the library. Select the correct index and press the Clear button. That table can then be uploaded to the meter if necessary.

In this way you can do complete tailoring of any library. It is advised that you change a little their names to match the indices, if moved to another index. A recommended practise is to make a backup copy of a new library by saving it. If changes are made to a library, it is recommended to change its name too.

The loaded or downloaded library is in use only on the **Library page and Math page**. Any other page uses either the meter's library or single entries loaded from the meter, directly. If you download a library from a meter or open a library file, you will be asked for the file name to save this possibly important file, at the time when you are leaving the program.

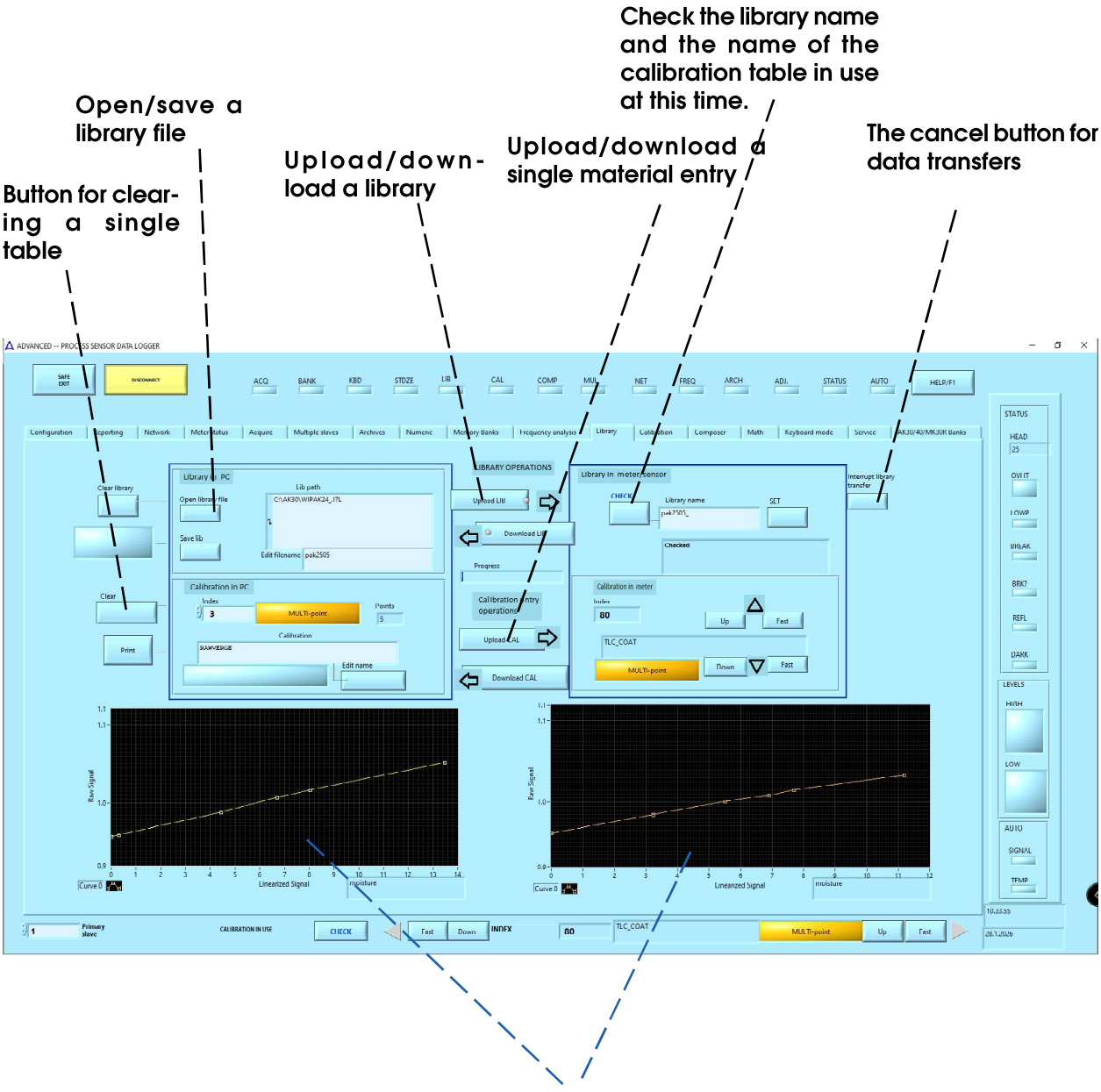


Figure 9-1. The Library page

10. Calibration Page

10.1 Regular Calibration Table Editing

Calibrations are usually made at field conditions with known samples or in laboratory conditions (for moisture samples: In a climate chamber and with a laboratory balance, an oven for drying samples is usually required). Refer to user's manual of your meter for more details of actually making the calibrations. This part of the program allows you to feed in the generated data and to take into use the new table. The calibrations consist of point pairs (**raw signal** and **signal**, maximum 10 of them). They form together a calibration curve. Of these number pairs, only a number of points is in use (marked "Points in use"), not necessarily all points fed in to the table. The rest of the points at the higher moisture can be left inactive. If you wish to use a calibration table for linearization, it is required to have 2 to 10 points in use. Deflection from this will cause invalid signal data. Refer to Figure 10-1. Note that raw signal means the nonlinear signal from the meter. It is usually scaled up with 100 to get more significant numbers into use. The QUICK calibration is usually applied for scaling. Sometimes (**not really recommended**) it is used to have a two-point calibration. That does not linearize anything, of course. Besides, it affects all library entries which are in **QUICK** mode. Thus we **strongly recommend** that you keep the QUICK only for scaling and use the actual table entries for calibration (=linearization and proper scaling, 2 - 10 points). To set up the coefficients of QUICK, you need to enter the numbers in the Keyboard mode as described in detail in the corresponding product's manual.

To edit a calibration, do the following:

☐ Select a suitable material with the buttons at the bottom edge of the program display (CHECK/UP/DOWN etc.). We assume you already have the calibration point data available.

☐ **Then, press the GET material button to copy the table from the meter to the program's memory for editing.** You will immediately see a curve (if it can be displayed at all) and the first data point in the box marked "Calibration of material".

☐ **Press the button "Edit" to start editing**. You can edit the name of this material and the number of points in use. The calibration mode can be set to reflect the use of the calibration table (MULTI = use the table, QUICK = do not use it). If the mode is left as QUICK, the table is not in use but, instead, the **QUICK calibration linear scaling** is used. That is not a linearization at all, as pointed out above. The Point selector goes from 1 to 10 and you can fill in any points in any order. Just click the small arrows at the left edge of this control. Do not leave any empty points when finished! Also, the raw signal/signal values must be increasing when the Point increases, else you will get a folded curve and the future signal values will be useless. Adjust the "Points in use" control to reflect the actual number of points to be used in the calibration.

☐ **Press again the Edit button to stop editing**. The curve is now displayed and you can make a check against the curve you have possibly obtained earlier in your calibration measurements.

☐ If you are happy with this, you can **Update** the calibration in the meter by pressing the UPDATE button. You are ready to use the new calibration after this.

If you are doing real-time calibration with the meter in a climate chamber and you have the sample in front of the meter properly placed, you can, in the Edit phase, get a signal from the meter by pressing the GET raw signal button. The obtained signal is displayed in the small window besides the

button. If you accept this signal for the current point, press the **Apply** button which **copies** the raw signal value to the signal field. Then you have to fill in the corresponding reading for the linearized signal (like the moisture value). Of course, these buttons are active only while editing.

10.2 Signal Adjustment

Sometimes it is required to do some offset adjustment to an existing calibration table or to fine tune some table just created (as in chapter 10.1 or in chapter 12), to make sure it has been done accurately. Do this as described below (see Figure 10-2 too), but, **first always do GET the table** from the meter to start with. This is important. You need to know the moisture of the sample or web under the meter to complete this.

Place a sample under the meter and after a few seconds, press the button **Check** in the box "Manual Adjust". You will see the corresponding signal value in the small numeric display under the Check button. If this needs some sort of correction as you happen to know the real linearized signal (=moisture value) value of this sample and know that the current table is otherwise correct, you can make an adjustment to the raw signal value (+/-offset). The amount of adjustment is usually very small

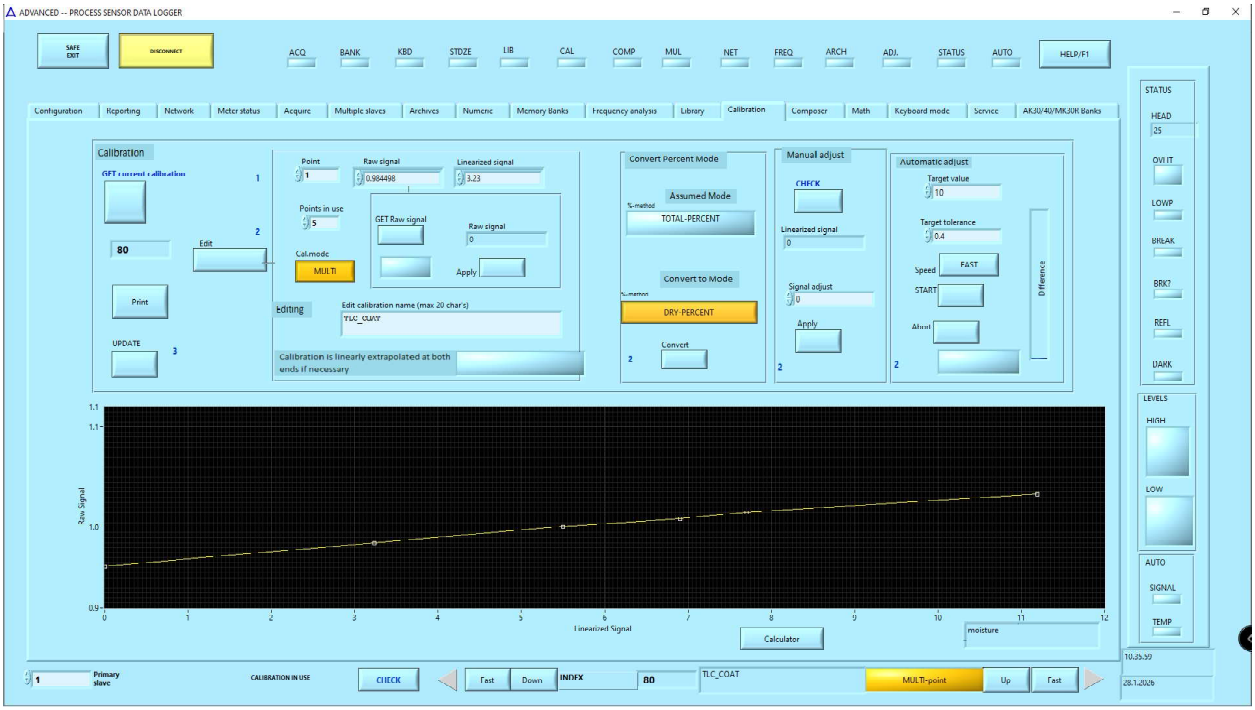


Figure 10-1. The Calibration page with an active table editing. Note the calculator button at the center for launching a simple calculator

and is done in the numeric control on top of the button **Apply**. Edit the number and then press the Apply button. The adjusted table is reflected in the curve immediately. Press the Check button a few times to see the new signal reading. Iterate this until you are happy with the result (close to your target value). The table is automatically updated to the meter while doing the adjustment and pressing the Apply button. Adjusting affects only **a single table in your library**. The delta value in Signal Adjust field is cleared every time a new table is downloaded from the meter with GET.

10.3 Automatic Fine Tuning

The box "Automatic Adjust" does the same thing as in the earlier chapter 10.2 but automatically, accurately and fast. Refer to chapter 10.2 for the idea and to Figure 10-3. The purpose is to generate an offset to the curve so that it slides up/down in the graph so that it gives the correct moisture reading (the target value).

To use the automatic feature, do the following.

- ☐ check and select the calibration table you want to adjust
- ☐ make sure the BURST mode is OFF, the digital filtering in the meter is MEDIUM, SLOW or SPECIAL. The Run-time filtering in this program should be turned off. The meter must not be in LowPower mode.
- ☐ GET the calibration table
- ☐ set the target value for the moisture
- ☐ set the target tolerance value unless you are happy with the default setting
- ☐ select either FAST (default) or SLOW for speed. FAST gives you quick operation but the result may be slightly inaccurate, especially if there is significant web noise. SLOW takes more samples for averaging them and is more reliable in bad conditions.
- ☐ press Enable to start the Automatic adjusting.
- ☐ the vertical bar display shows you when the difference to the target is getting small. The bar scale is 10 X the target tolerance.
- ☐ the task will end normally within some 10 seconds in FAST mode. If unsuccessful, it will stop operation eventually. You can stop the operation if you press the Abort button.

There is no need to do anything more after this. The table is already in the meter and you can start acquiring data using it. Do not use an unnecessarily tight tolerance as it may take a long time to reach the target. In good conditions you can achieve good results with tolerances like 0.002% but in field conditions, 0.2% is usually sufficient.

10.4 Method for Percent Calculation

There are two methods in general use, total percent (most usual) and dry percent (rare). In the first, the calculation is referred to the current total weight and in the latter it is referred to the dry weight. These methods differ quite a lot from each other in spite of their similarities. The percent readings are related to each other in the following ways:

ptotal = pdry * 100 /(pdry + 100)

and

pdry = ptotal * 100 / (100 - ptotal)

The relationship is very nonlinear. Since the IRMA-7 moisture meters are linear by nature when using the total percent method, using calibrations defined as dry percent for them, will result in highly nonlinear calibrations.

10.5 Conversion for Percent Method

On this page you can convert a calibration originally made with one method to another. GET the material from the meter, select the new mode from the lower button and press the Convert button. This will complete the conversion but it does not upload the new table to the meter. You have to do it yourself by pressing the Update button. Refer to Fig. 10-4. You can repeat this process back and forth as many times as you need after toggling the mode between conversions. Every time the material name is modified a little to indicate the current method. The material name is limited to 20 characters and this will limit soon.

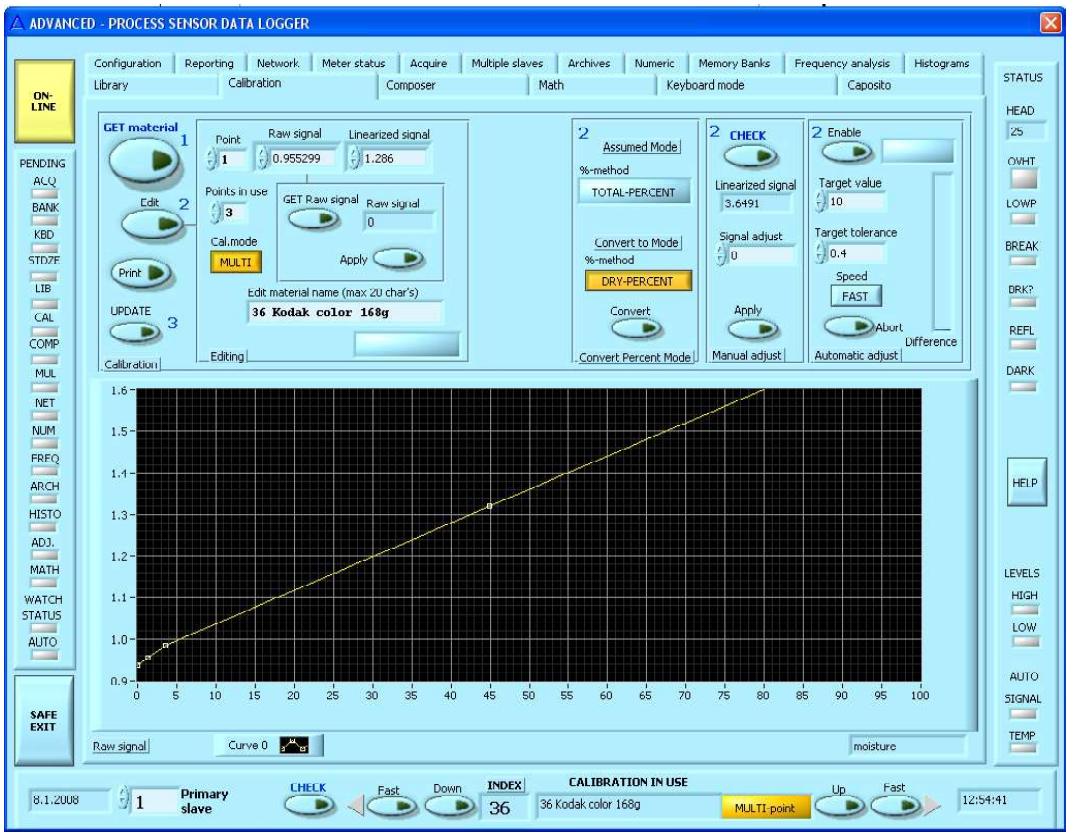


Figure 10-2. The Calibration page when doing manual adjusting

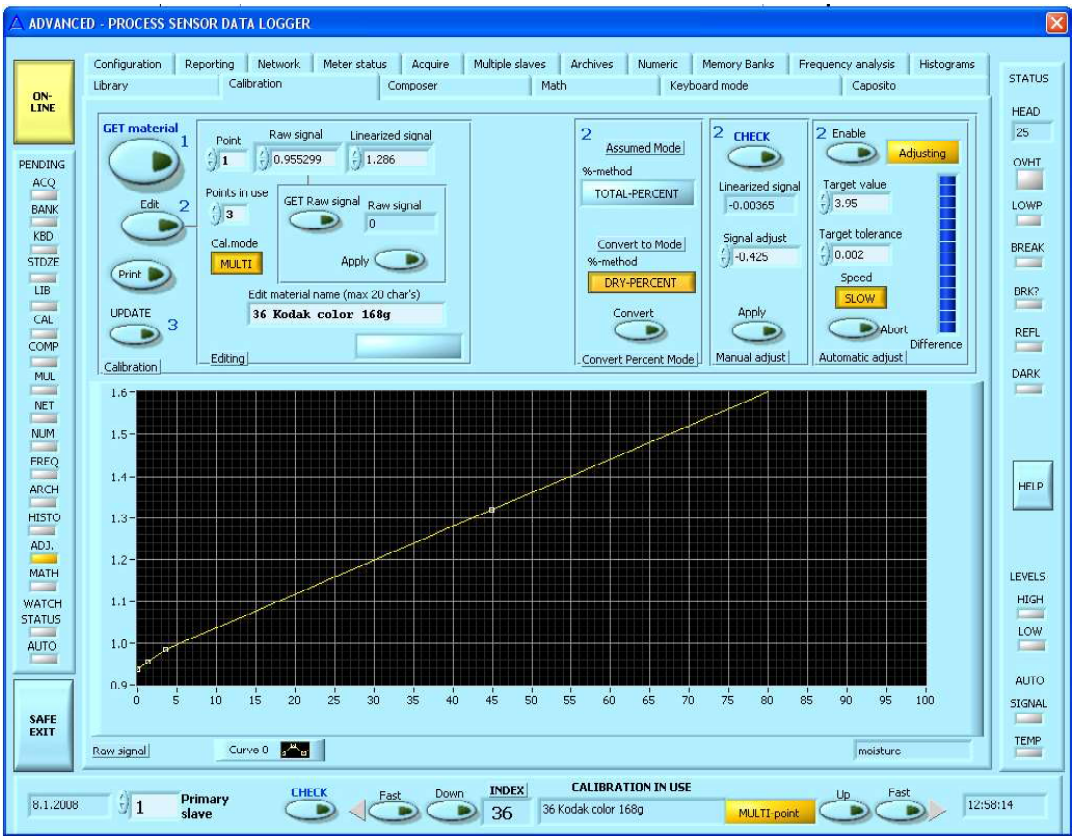


Figure 10-3. The Calibration page when doing Automatic adjusting

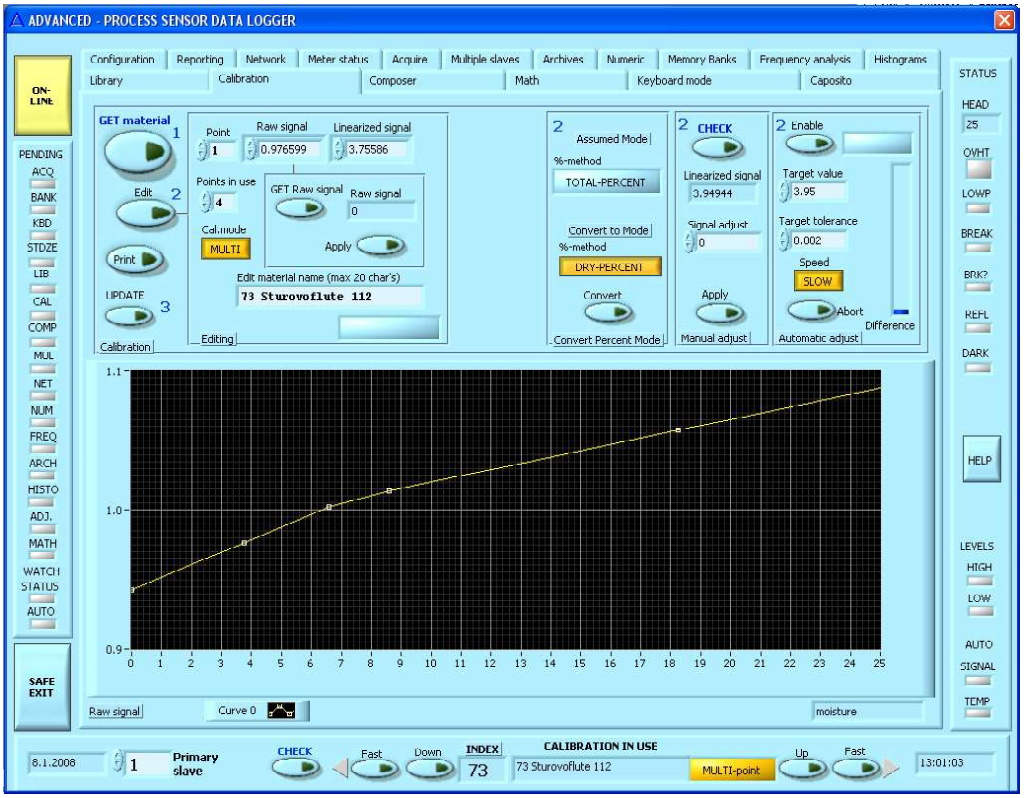


Figure 10-4. The dry percent method applied as a conversion to assumed total percent method table.

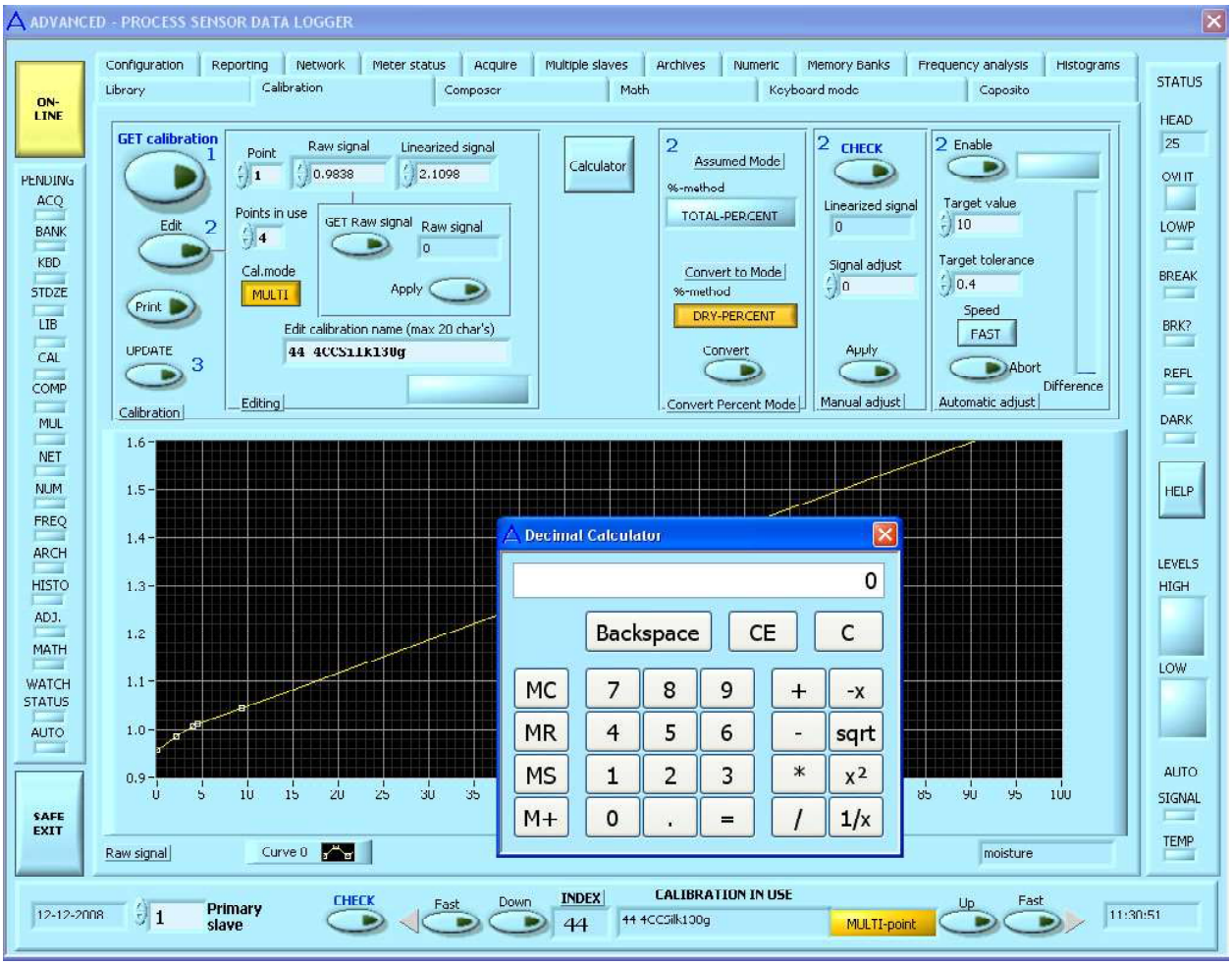


Figure 10-5. The calculator launched to assist in calculating some calibration-associated factors. This is rarely needed but is there always at hand. You can swap between the windows at will.

11. Keyboard Mode Page

The Keyboard mode page is very important for meter maintenance. It is not available for model AK30 / MK30R meters. If you suspect that the meter is in Keyboard mode, you can Enter Keyboard mode and Exit Keyboard mode to force it to stay in the Packet protocol. That may happen occasionally although you do not intentionally use the Keyboard mode at all. Only the AK50 series on-line meters will be able to be in the Keyboard mode.

The meters do it, for about 30 seconds while booting up. That is highly important as the meter may have an unknown slave address and if it would go to Packet protocol directly, it would be a tremendous task to find out the slave address. If the meter stays in the Keyboard mode for a short period of time when starting, one can connect any ANSI terminal to it and start communicating with the meter in spite of its incorrect slave address. Then it could be changed also in the Communications menu. **This is the only way to change the address!** After the bootup phase, the meter goes to the last mode it was turned off in, either the Packet protocol or the Keyboard mode. This is repeated every time the meter is booted up. You can use the Network page also to successfully find out the slave addresses in an easy way.

You can always Enter Keyboard mode independent of the previous history of the meter as long as you know its slave address (this is the Primary slave). In the Keyboard mode page you press the Enter Keyboard mode button and wait for a few seconds to see the meter's messages on the text screen. The mouse is not effective on the text display. Instead, you have to use the single-key (hot-key) commands listed in the user's manual. The text-based menu system is very simple and you can do here many of the tasks (except graphics and file saving) you have learned to do earlier. Some special meter settings are done here and can not be reached in the Packet protocol with any practical commands. Also, the built-in **Composer expert system** can be used through this interface. When finished with this, just click the Exit Keyboard mode button and wait for a few seconds. The KBD LED must be turned off before you can start doing anything else with the program. Refer to Figure 11-1.

If you do not know the slave address and you need to change it, Enter the Keyboard mode and turn off the meter. Then turn it on again and intercept the booting process by pressing the space bar. You will then see the text messages and are able to enter the menu system as before. Change the address and Exit Keyboard mode. If you are too slow in intercepting, there are no messages if the QUIET BOOT setting is YES. If you have a local RS232 or RS485 based network of meters, you absolutely need the QUIET BOOT to be set as YES, else the meters will force eachother to stay in the Keyboard mode forever by sending messages to the network. That would also mute the master of the network (PC). Refer to the user's manual for details.

Note

Do not be too hasty in expecting the system to recover from the Keyboard mode. This is especially important if any problems appear. There may have been some sort of packet protocol error just before you tried to enter it, like an invalid slave address or a slave has just booted up and is receiving commands without understanding them. That is because it is still in Keyboard mode and stays there. The program seems sluggish and nothing seems to work. Press the Exit keyboard mode button and wait for a minute or two. This is because the faulty slave's menu system is still responding to a number of commands and it will try to send back a lot of text. When it finally receives the latest command, it will rectify the situation itself and operation will continue in normal order.

The current program version sends a global command "Force to packet protocol" every time you go ON-LINE to make sure all slaves are in a controlled state. If your intention was to work with a slave already in Keyboard mode, do not be surprised by this.

Buttons for entering and exiting the Keyboard mode. They are required to be used in this order! You can do nothing else with this program while being in the keyboard mode.

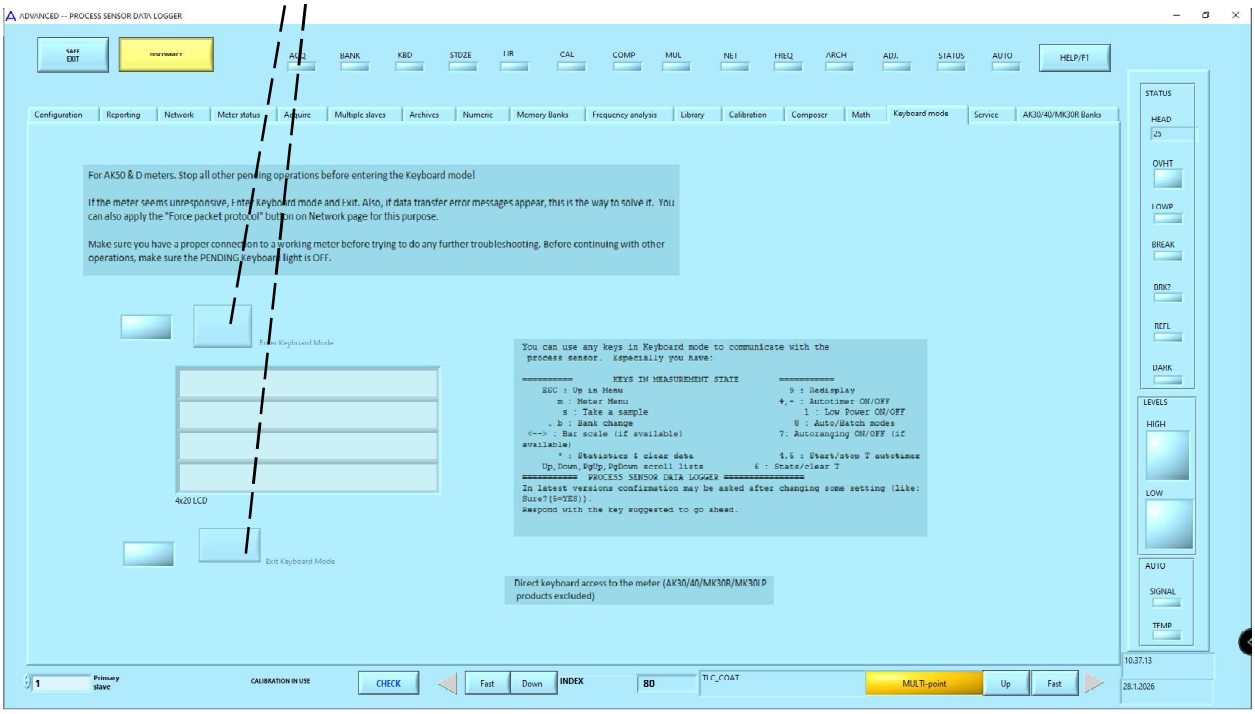


Figure 11-1. The Keyboard mode page

12. Composer Expert System

12.1 Introduction

The Composer Expert System is now available in this software. It has been available in IRMA-7 model D moisture meters for a few years. In this program it is still easier to use. Its features are similar to the regular system in the meter. One who has used it should have no problem in using this one. This feature applies only for moisture meters and has no use in other products. Note that this expert system is not practical for the microwave meters MK30R and MK30LP. They usually contain their internal toptions for the same purpose.

In a few seconds you can generate and start using a new calibration specific to your paper grade. The small tasks needed here are to be followed in a numerical order as marked with numbers. The process is done in the software first and then the new table is uploaded to the meter. Refer for details and definitions of terms to the Composer Expert system User's Guide. Those customers who do not yet have it, contact your representative. Refer to Figures 12-1, 12-2 and 12-3.

12.2 Preparation

The task starts by selecting first a suitable calibration table entry. Feed its index to the numeric control in the "Prepare" box and press the Clear button. The table is now prepared for a session with the expert.

12.3 Expert

In the Expert box you make decisions and selections concerning the paper grade you are going to measure. You can try out any fields here freely. Everything affects everything, so make sure that when you leave to the next box, all selections are valid. There are several numeric controls and displays and a few list selectors for you. The most important is the basis weight selector. The next important is the grade selector which is a list of most general grades. Click the arrows at its left edge to scroll the list up or down. If you do not find your grade at all, take the nearest equivalent or use GENERAL. If you grade contains gypsum, it is required to check the gypsum content control too. That window appears only for this grade. The next control in order is the Range center-% which, in fact, does not affect the resulting calibration at all but is used for estimating the web noise content. The numeric display "Caliper" indicates the estimated paper caliper. This may prove useful if you do not know the paper basis weight but its caliper. Then you can adjust the basis weight until you get the correct caliper.

You can also select the percent calculation method, either referring to total weight or to dry-weight. The total percent is the most usual and with IRMA-7 moisture meters, a linear behavior is resulting with most grades, especially above 8% of moisture. Note that the dry-% method will lead to highly nonlinear behavior. The method can be converted back to either one on the Calibration page.

The last important selection is the backing behind the web or sample. If you have sheet samples, a numerical control will appear and you can fill in the total number of sheets. The caliper is updated according to this.

You can always repeat all of these subtasks below if you feel you have not succeeded.

12.4 Generate

Press the button Generate to get a new calibration matching your grade. The table is still in the program's memory and is displayed on the graph.

12.5 Edit

You can edit all features of the new table (optional). Press the button Edit to start editing session of the calibration table. The possibilities are identical to those in the Calibration task. Press again the Edit button to stop editing. The table is still in the program's memory and is displayed on the graph.

12.6 Update

Press the button UPLOAD to copy the new calibration to the meter. You are ready to use it. Note that the new calibration table is now in the meter and in the Composer task. It has not been saved to disk. That should be done on the Library page by Downloading the whole library and saving it to a file.

12.7 Fine Tune

In this box you can manually fine tune the new calibration table to match exactly the moisture content of a sample you have put in front of the meter at the nominal working distance. You have to know the real moisture of the sample to finish this. Refer to Calibration page if you want to use a more sophisticated Automatic fine tuning.

First, you have to match the table indices (the new table entry and the current table entry in the meter). Press the button Match. Only after that you will be able to get the proper moisture value from the meter. Needless to say, but this will affect your regular quality control measurements possibly done in the background as you have to change the table.

Press a few times the button "Check reading" to get the corresponding moisture value. Put some small correction to the "Signal adjust" control and press Apply button. The signal is shifted a little and the resulting moisture value is retrieved. You can check the moisture value again for a few times to make sure. You can continue iterating like this until the moisture reading matches the nominal value of the sample. The calibration table is automatically updated in the meter in this process and pressing of the UPDATE button is not needed anymore. The delta value in Signal Adjust field is cleared every time a new table is generated.

In Fig. 12-4 we have a case for comparison showing the effect of using the dry percent method instead of the usual total percent method. Make a clear distinction for yourself about these methods.

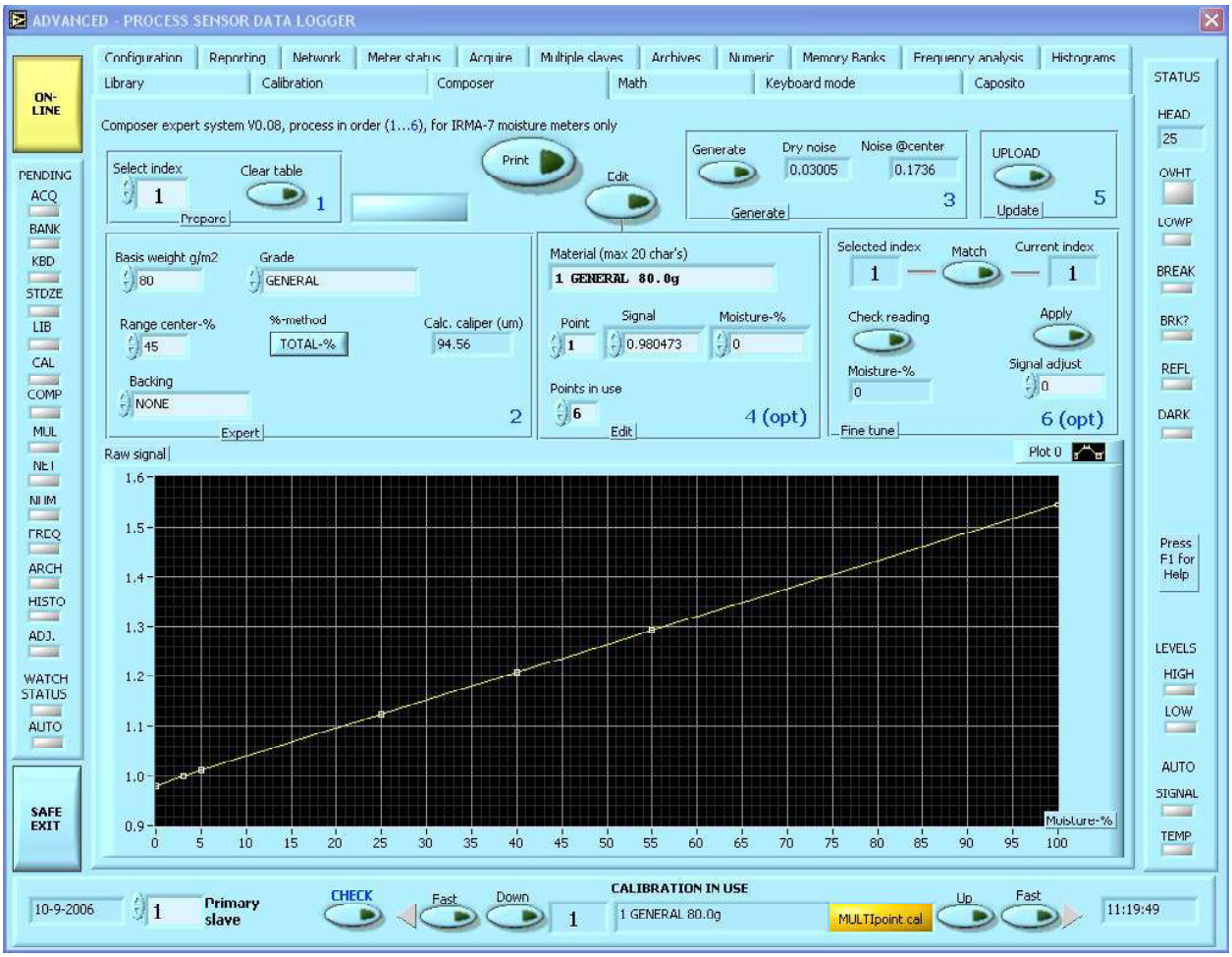


Figure 12-1. The Composer Expert System page, a typical general case

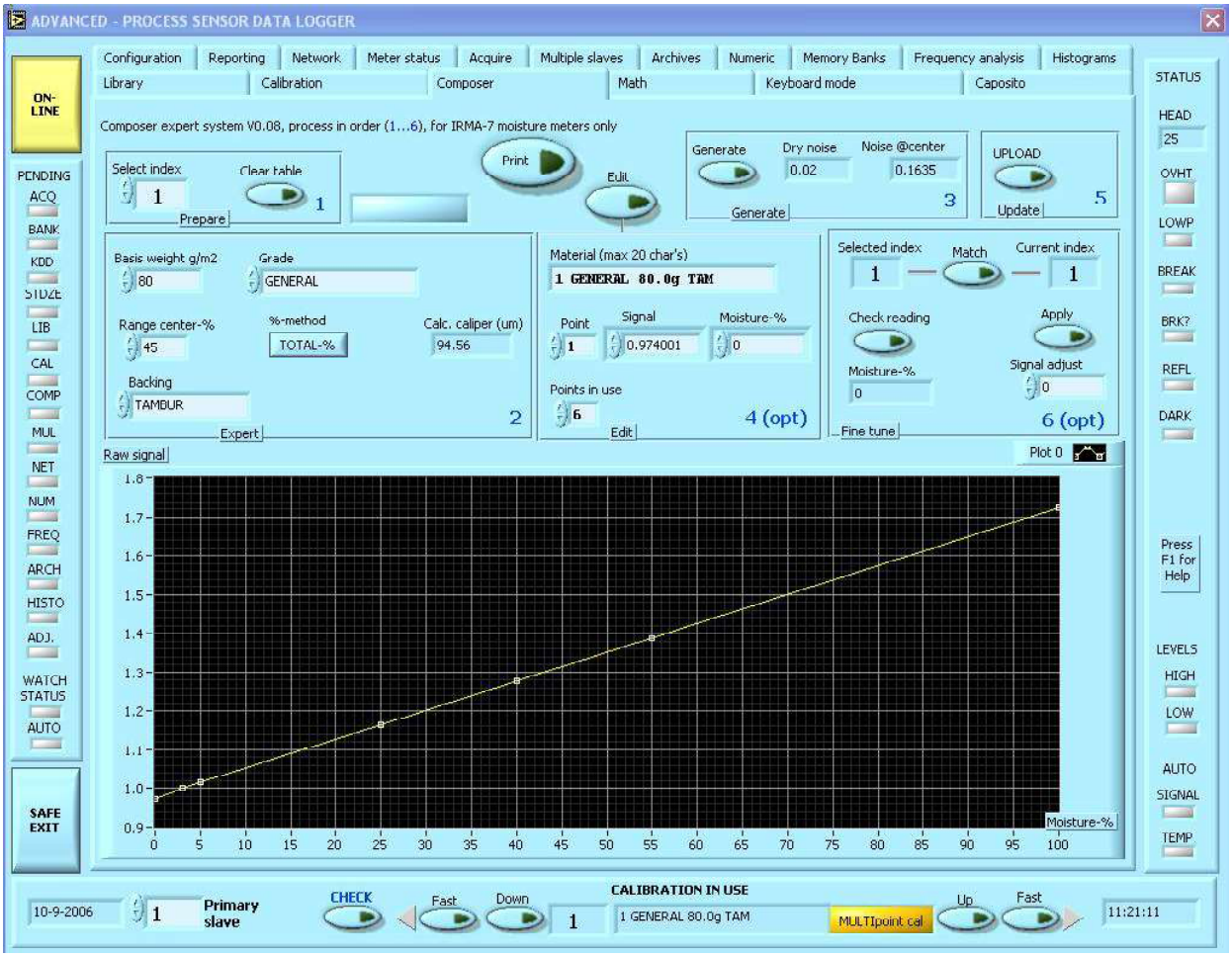


Figure 12-2. The Composer Expert System page, the tambur case

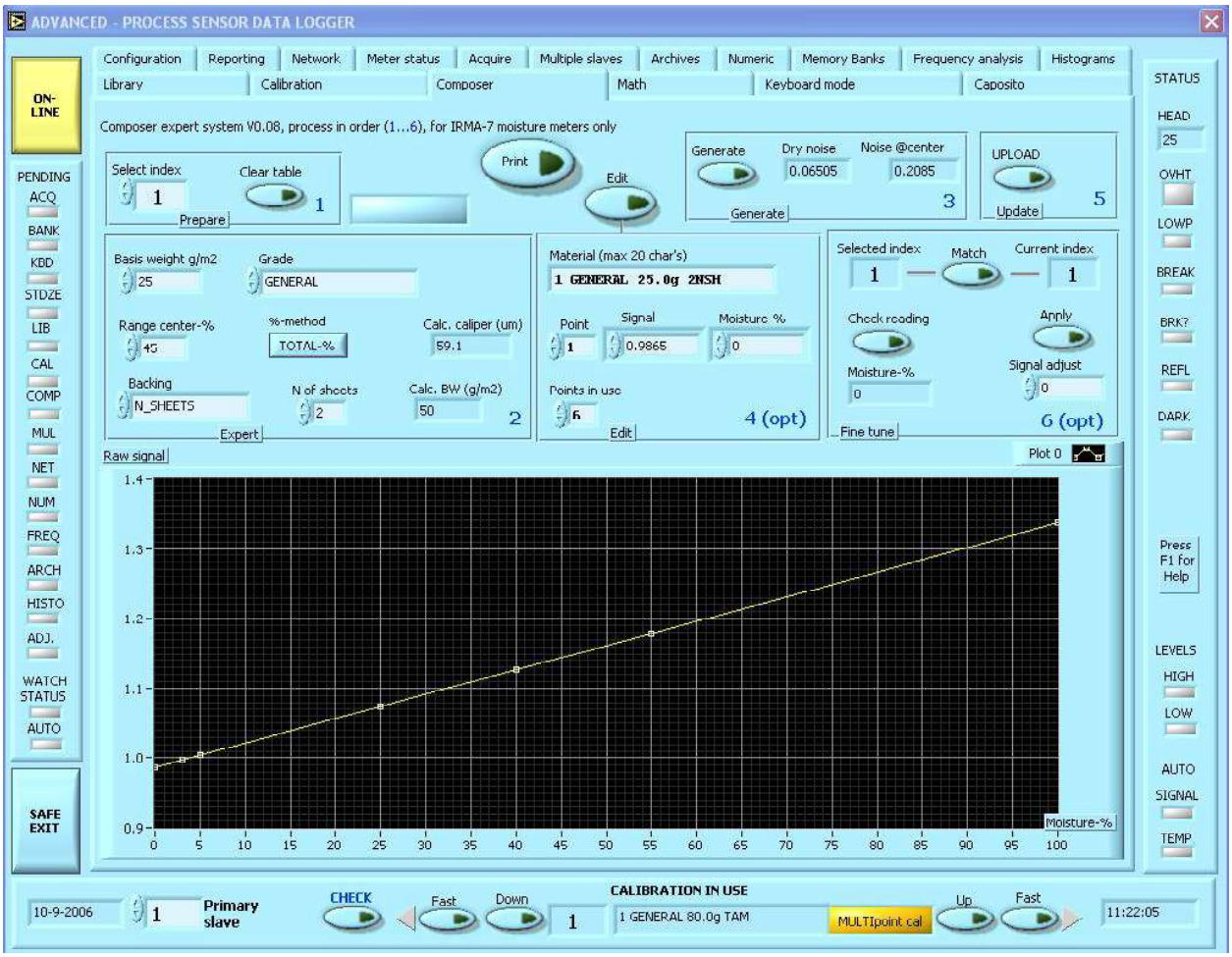


Figure 12-3. The Composer Expert System page, the sheet samples case

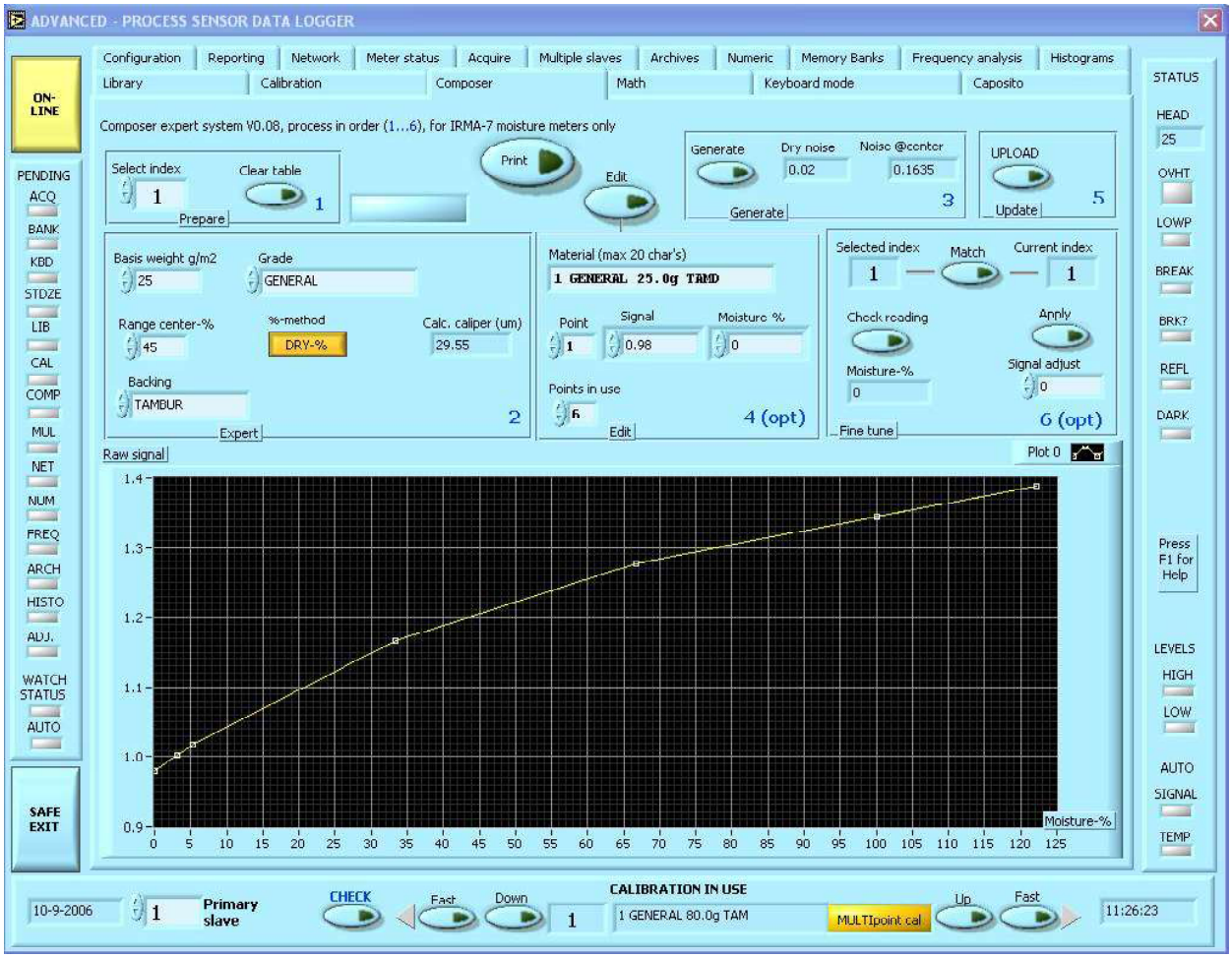


Figure 12-4. The Composer Expert System page, the tambur case in dry percent method. Notice the high nonlinearity of the calibration.

14. Mathematics Page

On this page you can convert earlier acquired signals to be recalibrated or having a shift in signal. The need may arise if measurements are done accidentally using an incorrect calibration. Shifting consists of scaling and adding an offset. Pure rescaling is useful when you have obtained the raw signal which is usually scaled up with 100.0 to get more significant figures. To make it a true raw signal, one has to rescale the data with 0.0100 or divide it by 100.

14.1 Restoring

Using the signal restoration is easy. First, load a library file from the hard disk or download the library from the meter in question. The same library is used in this task. If the original incorrect calibration used in measurements and the correct one are not in the same library, do some library manipulation first to let them reside in the same library. Then, return to the Math page again. Press the "Original file" button to select an archive file to be restored. The corresponding data is shown.

Press the "Restore" button to activate recalculation of the signal which is displayed also. Select the Old index used to match the original index and the New index to match the intended table. Material names are shown to avoid any mistakes. The restored signal data can be saved by pressing the "Save restored" button. The file name is stamped and shown. If there are any problems with the table entries, a small error LED is lit besides the problem source. Check the table. At least two points are required for the valid table and not two entries are allowed to have the same numeric value.

14.2 Shifting

If only a shift in signal is required instead of calibration change, use the "Shift" button after selecting the file. No library is required to be used in this case. Adjust the shift value with the small control window. You can watch the resulting signal and by pressing the "Save shifted" button, a new file is created with a stamped name shown. The shifting obeys the following general mathematics:

shifted = scaling * data + offset

No error checking is possible here and all responsibility lies at the user. Printed and optionally HTML reports can be generated from this page. Refer to Figures 14-1 and 14-2. No automatic saving is done here either. You have to press the Save buttons when ready.

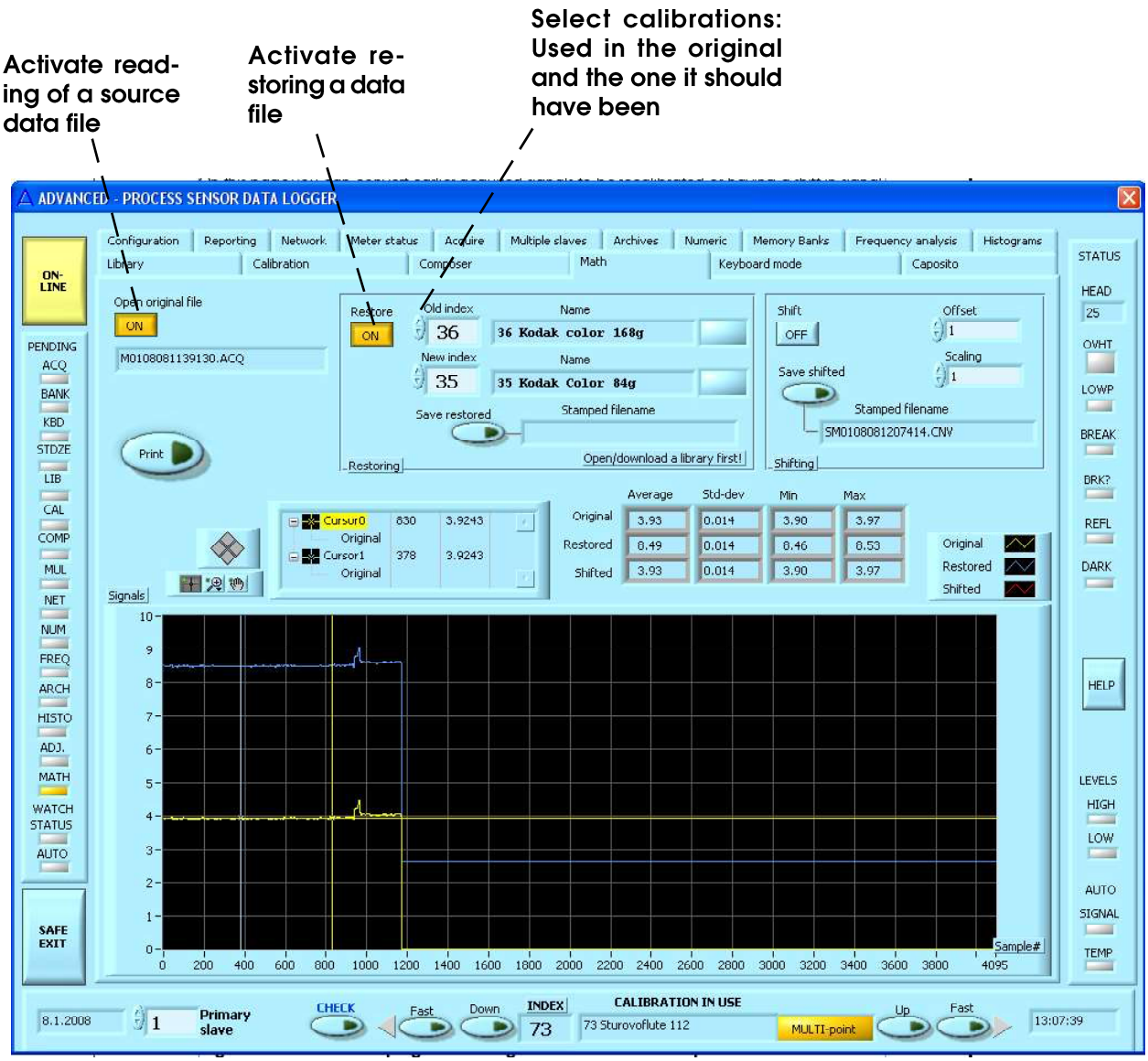


Figure 14-1. The Math page with a signal restoration example.

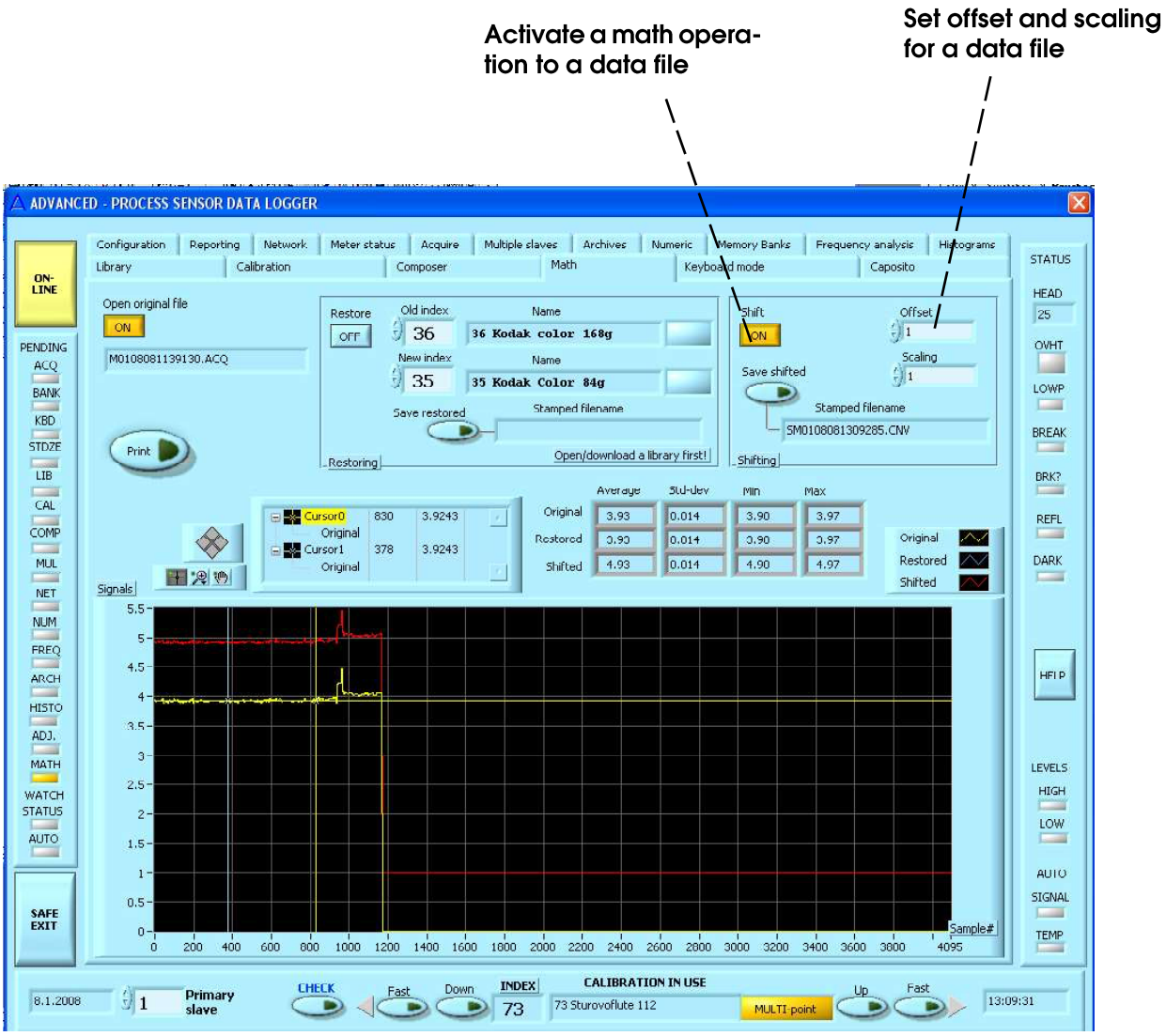


Figure 14-2. The Math page with a signal shifting example.

15. Network Page

When several meters are connected, situations arise where one or more of the meters seem to be inaccessible or their slave addresses may be unknown. On the Network page you can check the network status and find out the addresses. You can also send a few global commands which are very useful for various synchronized data acquisition tasks or maintenance.

The first button at the top of the box on the left is "Force packet protocol", see Figure 15-1. You can always use this button without exploring or before exploring if you suspect that any slave might not be in the packet protocol mode but in Keyboard mode instead. A single global command is sent to make sure everybody is listening. Note that overlapping addresses can not be resolved with the tools on Network page. The slave with the same address has to be disconnected and its address be set while differing from the others.

Before you can apply any of the other the commands, you have to Explore the available slaves to collect their addresses. Press the "Explore" button and wait until it has found all slaves connected. It will study all addresses from one to 255 and this will take a few minutes. You can interrupt this if you are sure all slaves are found already, by releasing the same button. The slaves are listed in the array



Figure 15-1. The Network page showing one slave found, which is the primary slave.

with a large yellow LED lit. An entry with a legal address 255 but an empty serial number and dark LED means simply an empty slot in the array. If more than 16 slaves are in the network, you can apply the numeric control at the left top corner to scroll and show the rest of the slaves. The current Primary slave is indicated here with a LED too. This collected data is valid during the session. Of course, it is not able to reflect any changes in the real world unless you Explore it again. The LowPower state of each slave is reflected in this array too.

You can match the calibration table indices in all slaves by pressing the button "Match indices". The index in the primary slave is used as the target. Using this button in regular quality control means, that you should have similar libraries in all meters in the network connected along the paper machine or process. All slaves have now the same calibration table number in use, irrespective of its contents.

Pressing "Start" and "Stop" buttons will start and stop the autotimers in **all slaves** having a small delay caused by the protocol. For most accurate triggering, use the hardwired triggering option available in all meters. The memory banks to be used are always the current memory bank of each meter. They have to be set up together with the sampling interval and optional Batch size for each meter. Select one meter at a time to be the primary slave and access its features on the Memory Banks page.

Similarly, you can command a single sample to be taken into each meter's memory bank by pressing the button "Sample".

To clear all current memory banks, press "Clear bank".

You can also set all slaves to Low Power mode or restore them to Normal mode with a single button press. Make the selection "Normal" or "Low Power" first with the square button and the press the oval button "Set Low Power".

Please, read also the note referring to the Keyboard mode page about slow recovery of slaves.

There is also a numeric control for limiting the search for slaves to some upper address value to prevent long lasting explorations halting the program from other useful work.

16. Reporting Page

16.1 Selections for Reporting

There are some optional settings on this page which are not saved. The buttons "LVM-file", "XML-file" and "Datalog" enable creation of data files in other formats in addition to the traditional IRMA7-files which themselves are quite useful for spreadsheet programs etc. The LVM format is typical for LabView-based systems. XML format is mostly for Active-X software and Datalog files are used for signal processing and datalogging. Note that this software **always** saves traditional IRMA7 data files to the data file path you have defined. If you have not defined a path for files, you will get error messages every time the program tries to save a file. **You don't have the possibility of turning it off.** This will save you a lot of headache as all of your primary data is saved. 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 about 30 kb for each run or each partial run in Acquire. Refer to Figure 16-1.

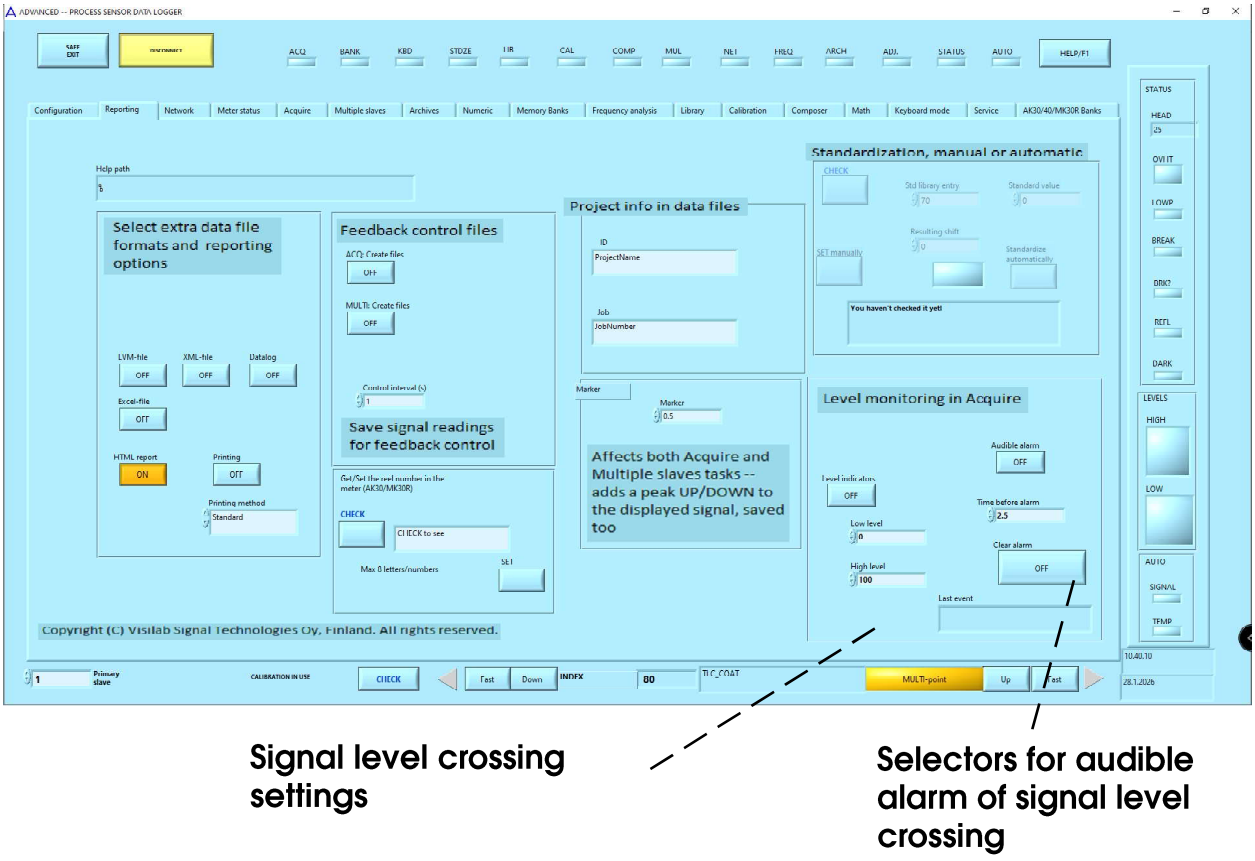


Figure 16-1. The Reporting page for selecting optional report formats

You can use the Printing method selector. You have the options of Standard, Postscript or Bitmap printing. Use the Standard by default as it usually works the best way in all environments. If your printer is fully Postscript compatible, you may take advantage of its greater graphical quality. If you meet any problems in printing, try to select another option or adjust the features of your printer. You can turn off the printing by selecting the Printing button. It is ON by default. You can use the HTML reporting by pressing HTML report ON. The resulting HTML and JPG files are saved among other data files.

You can also add two text lines to each data file indicating perhaps your intention with the measurement. Use the two text controls in the box "Project info in data files".

The marker which is available both in Acquire and Multiple slaves tasks, can be adjusted by height in the lowest left box "Marker". The default value is 0.5 units.

16.2 Standardization

The box called "Standardization, manual or automatic", is used for compensating against any drift in the signal reading caused by dirty optics or any other reason depending on the specific sensor model in use. For using it, you need a moisture standard whose measured moisture stays highly stable for many years. The standardization generates a shift to the signal to correct **all calibration tables** in the same way (internally, it does not reflect in the table's numeric values at all). Using a shift in the meter's moisture reading alone would not do it. You can perform the standardization manually or with an automatic algorithm. The same applies to other products not having moisture as the linearized signal. This operation is not functional for IRMA-7 model A meters.

16.3 Manual Standardization

Turn off any pending operations before standardizing. Standardization affects all tables in the library but does not make changes to them. Place the moisture standard under the meter. Press the button CHECK to get the current information of standardization. The first numerical window shows and allows you to edit the index of the material used for standardization. By default, the table is **70**. The next field contains the reading of the moisture standard when originally measured with this meter. It should not be changed unless for a reason. The third field is the Resulting shift which is modified in the process. Make it zero and press the SET button besides it. The meter has now the same information you do. Change the current material entry to #70 with the controls at the bottom of the display. Go to the Acquire page and start acquiring moisture data. Go to the Archives page and enable the channel zero for getting the real-time acquired data. You can adjust the cursors to get the statistics of the data. After having enough of data to have a representative average of it, stop these operations after making a note of the average moisture value. **Subtract** the **new average** from the **original value.** Place this value to the shift field and press the button SET. Your meter has now a proper correction shift. Similar order of work is done for other products. The Manual standardization too is protected with a critical setting dialog to make sure you know what you are doing

16.4 Automatic Standardization

Place the moisture standard under the meter and press the button "Standardize". It will take some 15 s to complete and the resulting shift is automatically shown in the numerical display. Refer to user's manual for details. Avoid misuse. This operation does not apply for models AK30 / MK30R as they contain their own menu-operated similar functions. They have own internal standardization accessible through its keyboard and display. The Automatic standardization is protected with a critical setting dialog to make sure you know what you are doing.

16.5 Level Monitoring

The signal level crossing indicators can be enabled on this page. When the signal is acquired through using the **Acquire** page, the signal is checked for each sample. If the reading is higher than the high level, the HIGH lamp is lit on the right edge of the window, until the next sample arrives. Corresponding operation is done when it is lower than the low level (LOW light). These settings are saved on the Configuration page. Note that the Multiple Slaves page does not have this feature.

16.6 Audible Alarm

The signal level crossing indicators just mentioned can be connected to an audible alarm and to a specific LED on the Numeric page. There is an additional adjustable delay for preventing single noise peaks from causing alarm. Only a persistent alarm condition will cause an alarm. The time delay is in seconds with 0.1s increments. The numeric control is marked as **Time before alarm**. To turn on the alarm, first set the level thresholds, high and low, in this same box. Then, turn on watching the level crossing and turn on the alarm. The Acquire task must be running, of course, for any event to take place at all. When either the HIGH or LOW levels have been crossed and been active for at least the delay time, an alarm is set. It sends a tone signal to the PC speakers and turns on a red big LED on the Numeric page. There are two buttons for clearing the alarm. One is in this same box and another is on the Numeric page. If the alarm conditions stays, clearing it will help only momentarily. It is the user job to see what has actually caused the alarm. The text display below these indicate the time of last alarm event.

16.7 Control Files

One can produce data files at regular time intervals saved with just a simple group of data. These data points can be used in a production machine feedback control system as a simple means of data transport. To use this feature, either in Acquire task or in Multiple Slaves task or both at the same time, one needs to select the Control file path on Configuration page. The control files are created there and are each available immediately after creation. Select a valid path or folder for it. It can be in another computer accessed via network.

On this page you select which task will create the files and at which time interval. Do not make the interval too small since file creation in Windows is not a fast operation, especially if the folder is elsewhere. The files are named with the familiar date and time stamp plus other information making them always unique. The contents of the file are in ASCII form readable with almost any general program, containing the latest moisture value.

17. Numeric Display Page

Sometimes the need arises for having a large high-contrast display which can be seen at a long distance. For example, the paper mill's operators often need it while adjusting the machine or they do their usual machine supervision drills. The Numeric Display page allows one to select any of the acquired data channels and display its latest value at a pace of one reading per second. The channel can be reselected anytime. The display's one decimal accuracy is available if the reading's whole part does not exceed 99. If higher readings are required, disable the decimal.

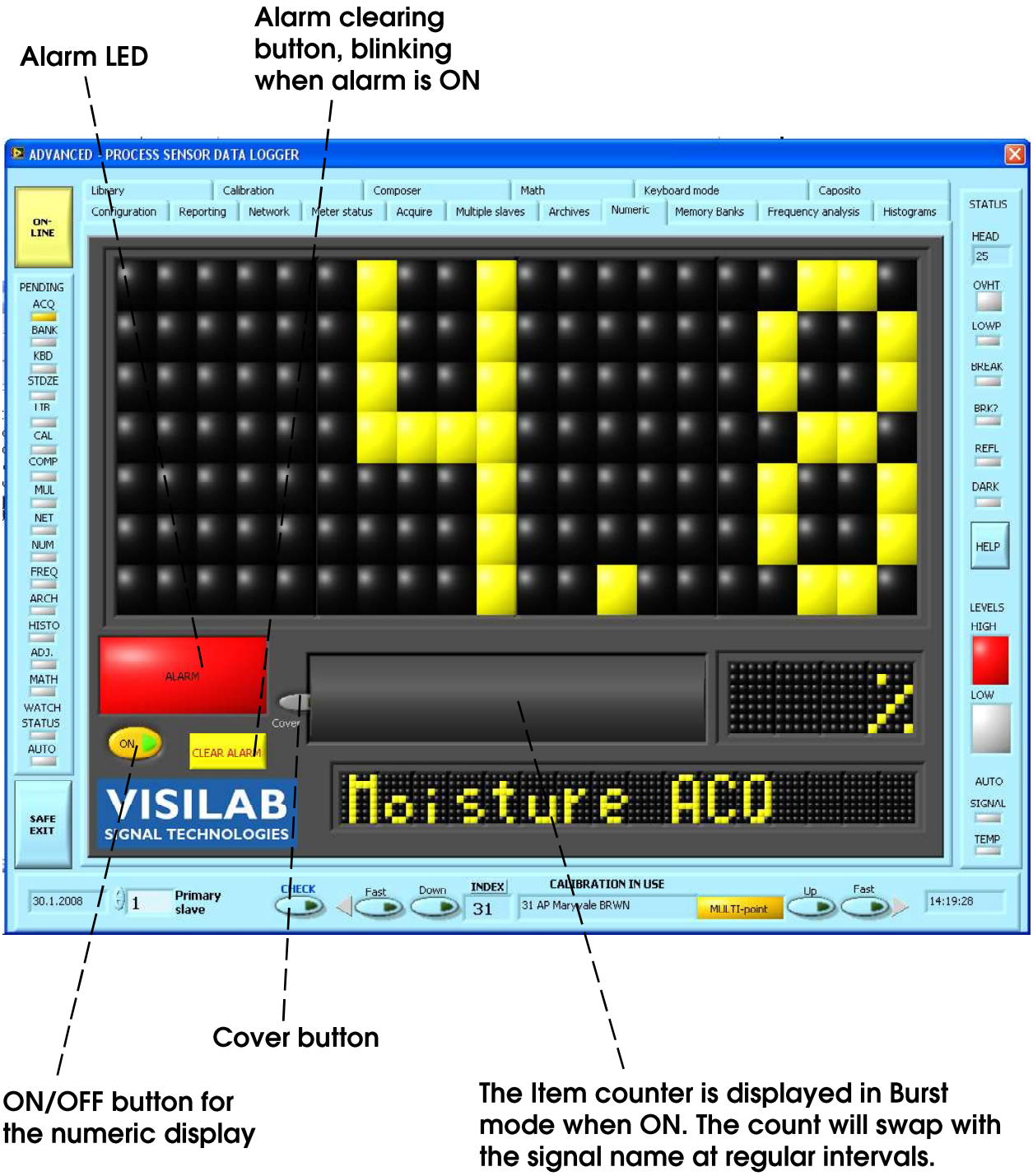


Figure 17-1. The Numeric Display page for showing the selected data channel

When stopping the program, it is **not** necessary to end this feature from working. Before you can do any setup on this page, you need to click on the small button edge at the left edge of the small black cover. It acts as a simple lock and opens and closes it. You can select the signal, select either one decimal or no decimals for the reading and you can bypass the regular measurement unit by pressing the small button. You can edit your own private unit for this measurement or even show a four-letter message. See Figure 17-1.

The available channels are as follows:

0...7: Moisture from *Multiple Slaves* page, channels 0..7 (signal A or any other primary signal according to model)

8...15: Web temperature from *Multiple Slaves* page, channels 8...15 (signal B or any other secondary signal according to model)

16: Difference channel from *Multiple Slaves* page, channel 16

17: Primary signal from *Acquire page* (model dependent)

18: Web temperature from *Acquire page* (or any other secondary signal according to model)

19: Head temperature from *Acquire page*

20: Extra temperature from *Acquire page*

21: Signal Quality variable from *Acquire page*

You can experiment with the buttons here, no harm is done in any case.

18. Autorun

This program can be put into the Startup folder of the Windows system so that it will start itself automatically the next time it is booted. Before booting it, start it manually first and prepare all settings. Do some testing to make sure it does exactly what you wish. The program starts as usual. Make sure you have the license file at its disposal to start correctly. You will see the Configuration page (Fig. 18-1).

The important points here are the two buttons "Autorun Acquire" and "Autorun Multiple". One of them has to be pressed down before saving the settings and leaving the program for it to start itself automatically. Do not leave both of them pressed. It is not likely that you wish both tasks to be done

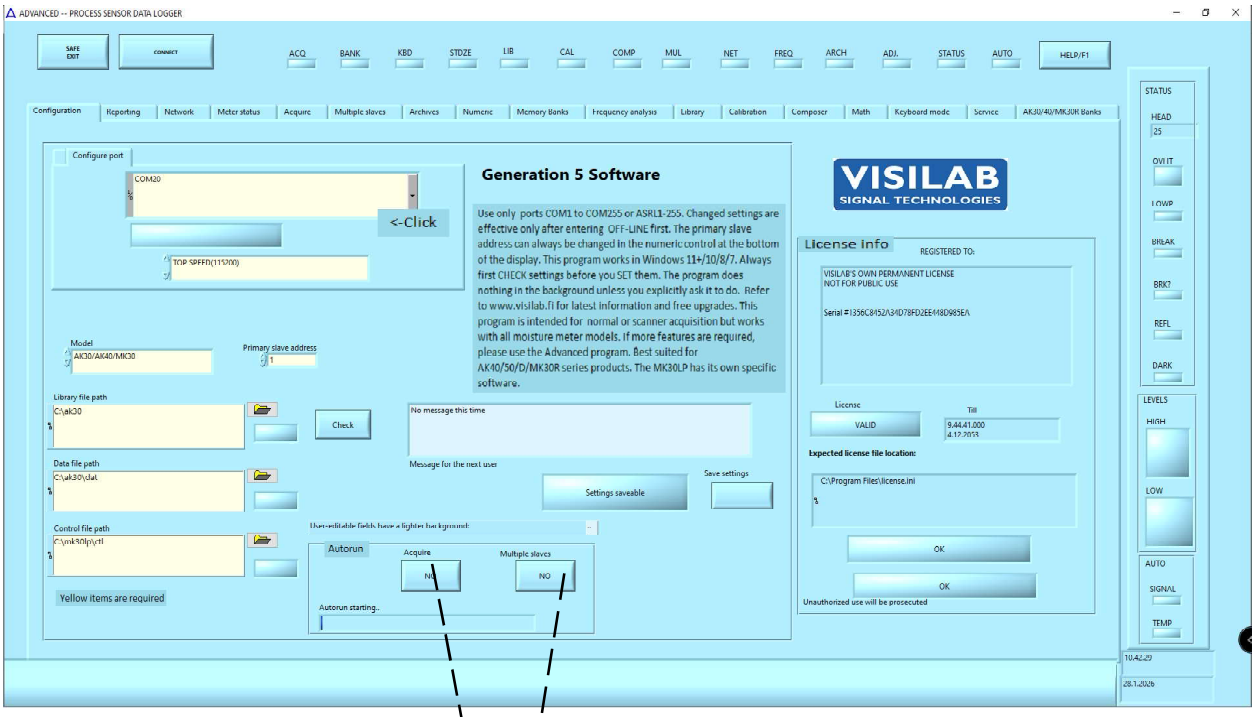


Figure 18-1. The Configuration page with buttons for the Autorun feature.

at the same time, automatically, unless you **really** want it. Go to the corresponding page "Multiple slaves" or "Acquire" to check all pertinent settings. Check that the acquisition really works in your way. Leave the settings as is but turn off the acquisition. Check the buttons on the Configuration page, save the settings and exit. The next time the program is started, it will start running the selected acquisition task after a delay of some 30 seconds. This is to make sure that the meters have booted up and are presumably in packet protocol mode, not in keyboard mode anymore, even if there was a power breakage in between.

You can always interfere with the program after the 30 s delay and starting of acquisition. The program behaves as normal after that. If the numerical display page is required, turn it on and use it as usual.

The main purpose of this program is to collect data in unmanned conditions automatically. The meters and sensors of Visilab are independent and operate automatically too and are always ready to deliver data via any digital interface after bootup.

19. Service Page

The Service page allows access to some low level things and for redirecting the analog outputs.

The first box is a meter diagnostics task. By pressing once the DIAGNOSE button, a sequence of commands is started and some data is inquired from the meter. The purpose is to decide if the meter is somehow outside of its internal operating parameters or otherwise in too difficult conditions. In case of dirty windows, it can detect that too. The Signal Quality variable contains some critical information of the meter packed together. When the meter is installed, the setting should be checked and the button **Initialize** should be pressed. When exiting the program, the settings should be saved. Then also the Initial value is saved and one can compare the meter operation against it in the future. If something is not allright, it will be indicated here and the big LED to the right will turn on in red colour. An explanation will be presented below it of the cause of the fault.

The box below this allows one to check the present selection of the analog outputs and also to change them. Edit the selection and then press update. The web thermometer offset can be modified here too. Overheat alarm situation can be cleared too.

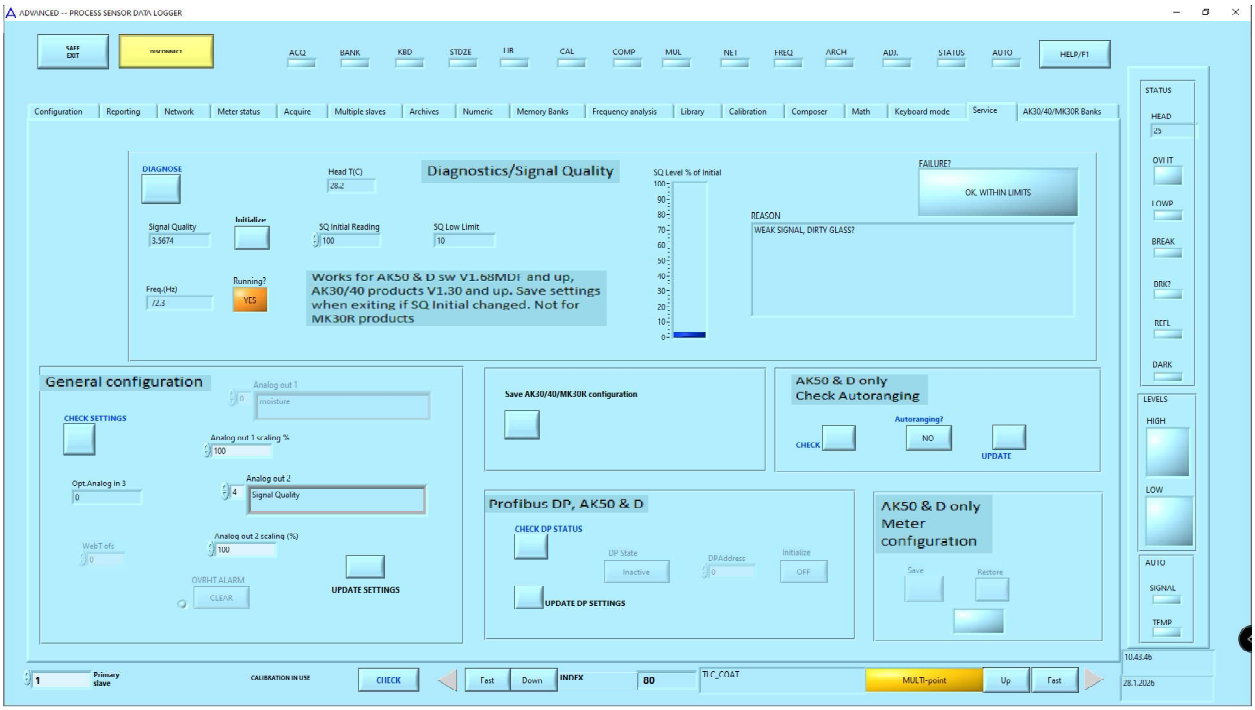


Figure 19-1. The Service page

The next box marked as "Profibus DP", has a button for making the fieldbus connection active or inactive. The DP slave address is by default 3 but can be changed here. When any changes are made, it is required that you press the "Initialize" button and update. Make the changes first and after updating them, **do the initialization**.

The last box has two buttons for downloading the meter's internal configuration data which are highly important for proper operation. You can Download and save it by pressing "Save". No harm is ever done with this one. Using the "Restore" key is critical and is protected against careless use. It will read a configuration file (type .CFG) saved earlier by you and upload it to the meter. That will replace the meter's settings. If the settings are incorrect, your meter will not work properly anymore and you need to find the correct configuration file to restore it to working condition. It is wise to save the meter configuration occasionally to make sure that you have current settings available if some meter crashing occurs. **The purpose of restoring the configuration is to get the meter running again after having some sort of misuse, serious crash or damage.**

20. OFF-LINE Use

The Advanced software is designed to be used with any of the products we currently have in production. Without a meter connected to the PC and the program, delays, invalid data, ineffective commands etc. will appear on some of the pages. The only pages which can be used effectively, are: **Archives, Frequency analysis, Mathematics and Histograms**. This applies as well to using the software with any other "legal" instruments. When using these pages, refer only to existing data files, not to any meter signals.

21. Note for Users

This being a new version of software, it is recognized the need of having user feedback. If you ever meet any bugs or problems with this software, check first our web site to see if the latest version available there has this bug fixed. You can then download that version. Else, you can report all problems to us at **info@visilab.fi**. Thank you for your cooperation.

22. Appendix A, High-Speed Serial Port

22.1.1 Configuring the High-speed Serial Port

The fast serial port is taken into use in the following way. Note carefully, if your meters to be connected are to be operated with this software simultaneously (Multiple slaves task), **it is required that all of the meters are configured either as High-speed or Normal but not mixed**. This makes life simpler and hard-to solve problems are avoided. This applies only to AK50 / model D on-line meters. Other meters have their integrated baud rate selections in their menus.

First, connect the meter alone into the PC and start the software as before. If you have the LAN232 sensor networking module in use, disconnect it and connect the meter's serial cable directly to the PC. Make sure you can find the meter in the Network task. Enter to the Keyboard mode and go to the meter's internal menu system. This applies to all products and models involved. Go to (m=Menu, 8=Comm's) Communications submenu and you will see the following text or something very similar:

```
LAN Settings:
1=Slave node(1):1
2=Master node(0):0
7=Quiet boot:Y
9=Speed:9600
```

Note: If your meter does not have the lowest line at all, your meter is not capable of operating at high speed. Press '9' to change the speed to 38400 (HIGH SPEED), 115200 (TOP SPEED) or back to 9600 (NORMAL). Exit this menu by pressing ESC as usual. You will se the following text:

```
Changing the speed...
Prepare PC SW and
LAN232 etc.
Press a key...
```

Press some key, like the space bar and Exit the Keyboard mode with the corresponding button. Your meter is now prepared for the high speed but your program is not. Turn off the power from the meter for a few seconds to let it restart. Go OFF-LINE and on the Configuration page (Fig. 1) press the Port speed button to change it to High speed. Save the settings and you are ready to apply the new high-speed communications. Go to Network page to find the meter. From now on, you are working with the fast communications. If you have other meters which require the same configuration, repeat the earlier steps from the Normal speed operation to high-speed operation, one meter at a time. If you have the LAN232 sensor networking module in use, toggle its Normal/High-speed switch to High-speed and turn off its power for a few seconds to let it restart. You are now ready to operate your whole network of sensors at the high speed. Remember! No mixed speeds in the network!

If you need to go back to the Normal speed, repeat the steps above but go into the Normal settings. You should not get into trouble as your meters are either in the Normal speed or the High-speed state.

23. Appendix B, Error Message Dialogs

23.1.1 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.

23.1.2 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. 23-1.

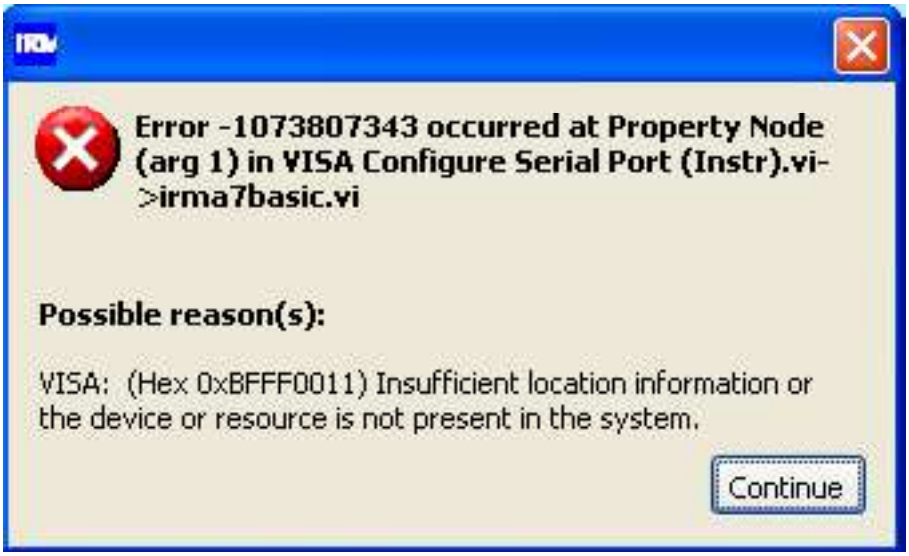


Figure 23-1. The case of incorrect serial port (a VISA-related message)

23.1.3 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. 23-2.



Figure 23-2. The case of nonexistent path or file

23.3.4 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. 23-3.



Figure 23-3. The case of User interrupt when accessing a file

23.1.5 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. 23-4.



Figure 23-4. The case of nonexistent settings file (.ini file)

23.1.6 Trying to Open a Nonexistent License File

This is the result of not finding a valid license file (of name "license.ini") and is shown on the Configuration page. The program will close soon after this and you should try to catch the location where it expects to find the license file. Refer to Fig. 23-5. Copy the license file to that particular location and try again. The error message will not be displayed again after this. However, if your license is of limited time category, the only way to solve this is to get a proper valid license file from the manufacturer.

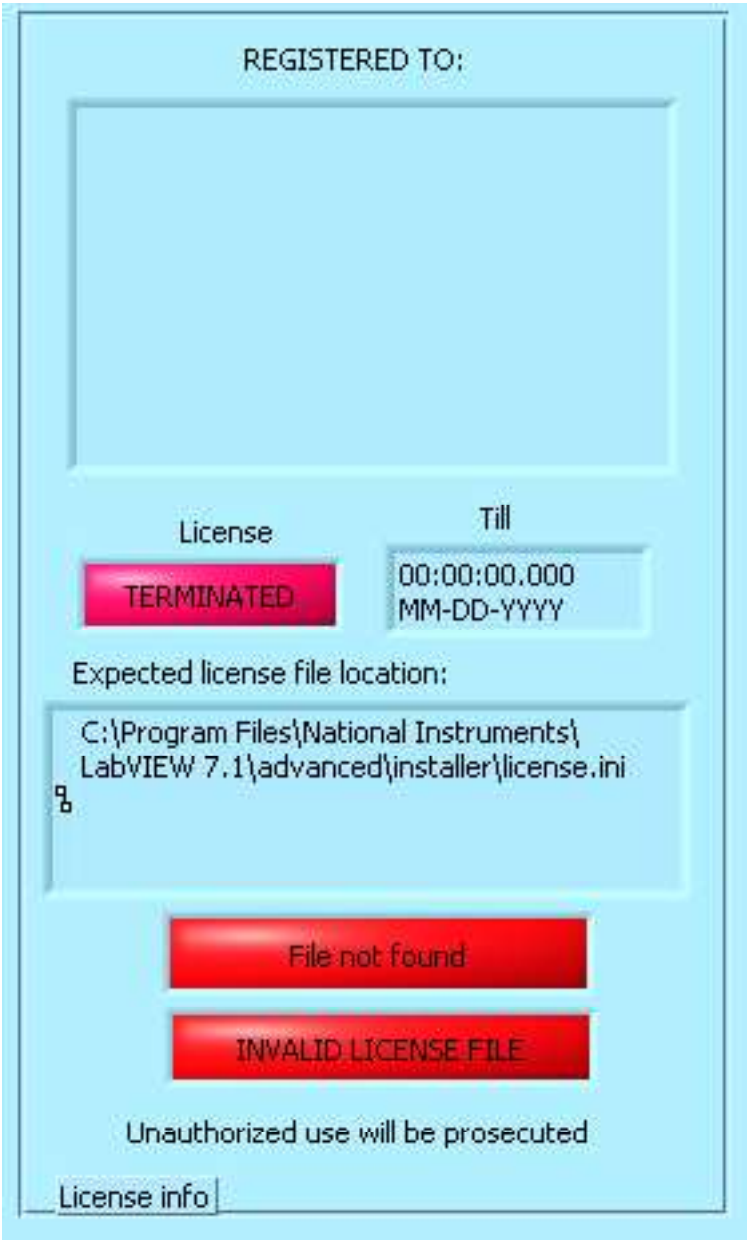


Figure 23-5. The case of nonexistent license file (license.ini)

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