K+K

Messtechnik GmbH

FXX

Visualization software and User Interface for K+K Measurement Devices

Release Notes

Version	Date	Author	Description
1.0	2018-10-11	Martin	Initial version
1.1	2019-02-15	Martin	Digital inputs, linear combinations
1.2	2019-05-09	Martin	Sensor support, double graphic window
1.3	2019-09-20	Martin	Multi source log files
1.4	2019-01-29	Martin	Frequency and sensor warnings, email notifications, big messages

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Contents

Introduction

FXX is a user interface for high-precision phase and frequency measuring devices from K + K Messtechnik GmbH. It has the following basic functions:

- Setting the operating options (e.g. mode, rate) of the K + K measuring instruments
- Visualization of measured data in real time as numerical values or as graphics
- Generation of log files on the PC for later analysis of the measured values.
- Client / server function for transmitting measured data to other PCs

The K + K measuring devices can be connected to the PC via several interfaces as USB, Ethernet, RS232 and CAN.

FXX is a multi-window interface. This means that any number of resizable and freely locatable windows can be used. For each graphics or text window, measurement data from one or more channels may be selected and stored in different forms, e.g. presented as a phase difference or as a frequency.

In addition, FXX is also a multi-source interface. This means that measured values from multiple sources can be processed and displayed simultaneously. A source is a connection to an FXE device, i.e. several devices can be connected at the same time. In addition, up to 4 different connections (users) with different measurement modes can be set up per device, in order to achieve e.g. to display different measuring rates or average values in different windows.

In addition to FXE devices, measuring devices with sensors (for example for temperature, humidity or voltage) can be defined as additional sources.

Each source can be individually assigned a colour and a name, so that windows can be recognized quickly. This also applies to the individual channels of each device, whereby a coloured square with the channel number is always displayed in the individual windows.

For all input channels, log files can be generated in several formats (e.g. phase, frequency etc.) and also in combination of several sources. Different file directories can be defined to ensure clarity even at high data rates and many simultaneous measurements. The names of source and channels are also found in the log files.

Typically, the FXX software receives measurement data from an FXE device via an interface, such as USB. It can also work as a server for other computers connected via Ethernet. The FXX software that works on these client computers defines as “Source” not a device or an interface, but the server with its IP address and port number. But it has the same functionality as if it were connected directly to the FXE device.

Requirements

A successful use of the FXX software depends on a correct connection of the K+K device. Thus, at least one interface connection, a reference signal (typically 10 MHz) and at least 1 signal on an input channel must be present (see also the hardware manual for the used K + K device).

User Interface and Windows

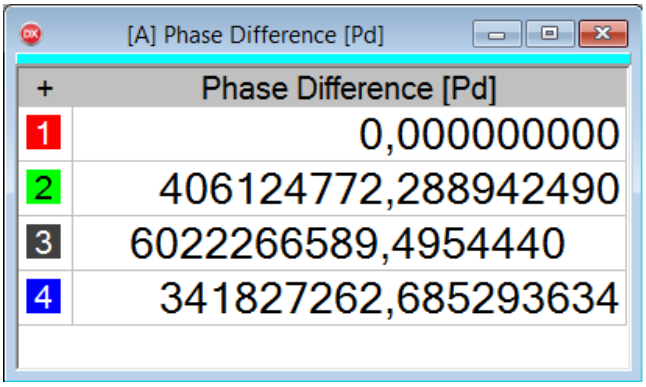
The FXX graphical user interface consists of the following elements:

- A menu bar to access all functions
- An info window for each source, i.e. every connection to a device / user
- Any number of text windows (numerical display of the measured values)
- Any number of graphics windows (curve display of the measured values)
- A status window for digital inputs if available
- A message window for status outputs and error messages

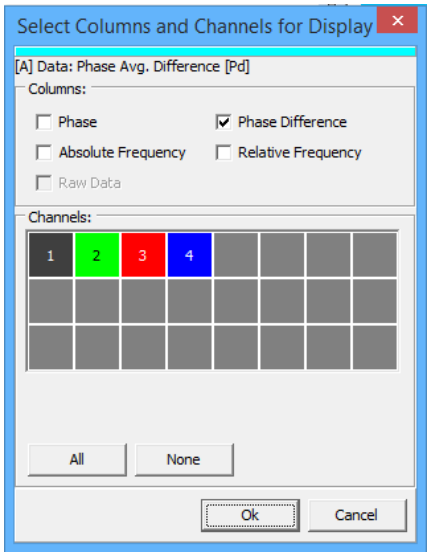
In text and graphics windows you can freely choose which channels of a source can be displayed.

Text Window

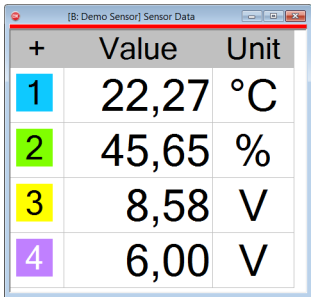
In a text window, one or more measured values are displayed in numerical form. By clicking on the coloured square showing the channel number, the display of the channel is switched off. If you hover over a square without clicking it, the name of the channel (that is also used in log files) will be displayed.



By clicking on the + symbol, a dialogue is opened enabling the selection of displayed channels and the use of several columns, e.g. for the parallel representation of frequency and phase in a window.

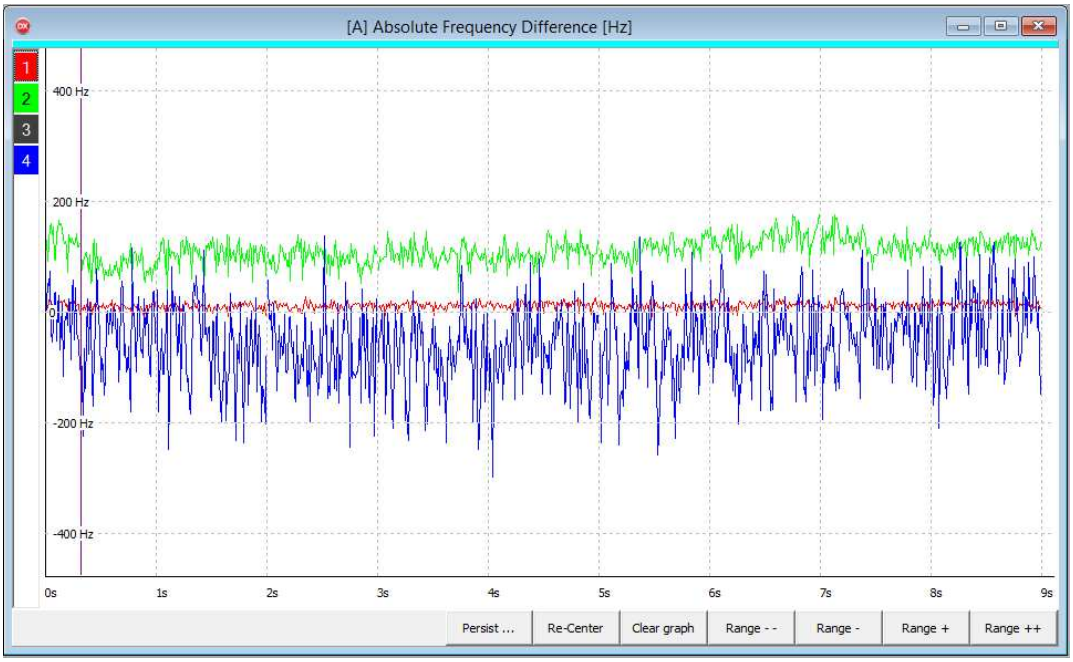


Text windows can also be defined for sensors and other measuring devices.



Graphic Window

In the graphic window, actively displayed channels are indicated by a coloured square with the channel number and channels not shown by a grey square. By clicking on the square, the representation of a channel can be switched on and off.



If a graphic window is selected, further operating options are displayed as buttons at the bottom of the window. These are:

Persist: Turn Persist mode on / off for individual channels. Persist mode does not overwrite old metrics in the graph, but preserves them. Over time, it becomes clear in which range the measured values fluctuate. As a result, noise and individual outliers can be detected very well.

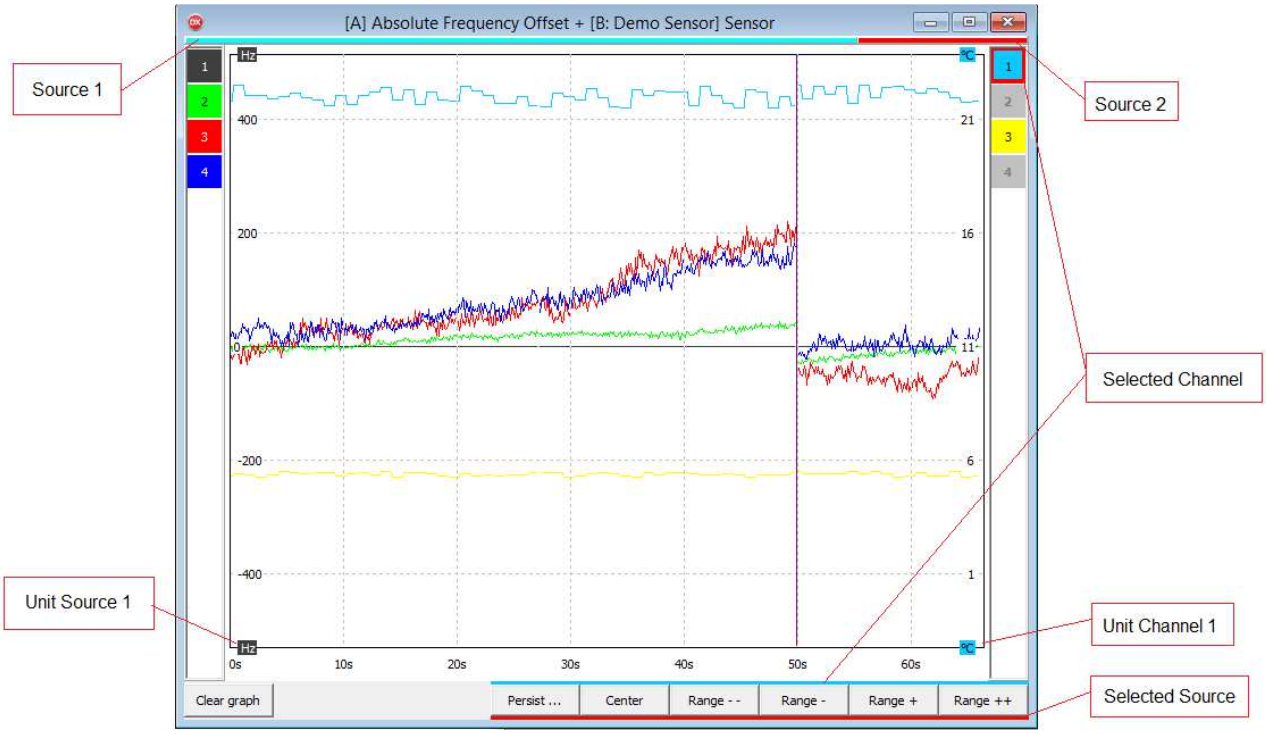
Re-Center: Resets all displayed curves to the zero line, if e.g. drift out of the visible range

Clear Graph: Clears the entire graphic and starts with a new rendering

Range: Enlarge / reduce the display area in 1-2-5 or 10-step increments.

Double Graphic

A double graphic can represent the data from two sources in a graphic window. The second source may be a sensor (e.g., for temperature or humidity), but also another FXE.



For the second source, the channel selection and scaling of this source is also shown on the right. Since there are devices that can provide different measures (such as temperature and humidity sensors), the scaling for each channel can also be set separately.

By clicking on a square with the channel number one of the channels of a source is selected; the Re-Center and Range buttons of the window and the right or left scaling then refer to this channel. Another click on the square switches the display of the channel off or on again.

The speed at which the graphic is drawn always corresponds to the rate of the first source (left). If the second source is slower, readings are repeated (horizontal bars); if it is faster, measured values are skipped. If both sources are FXE devices, the measurement rates of both sources must be the same.

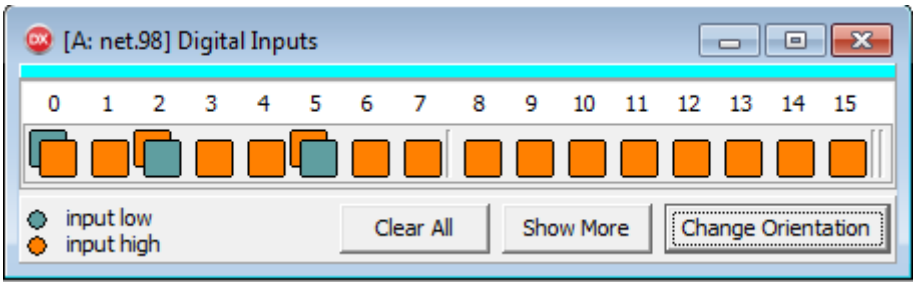
Linear Combinations

In addition to the measured values, linear combinations of these values can also be presented. A linear combination is the sum of all measured values multiplied by one linear factor each. This function is only available for frequency values; up to 2 linear combinations are possible. The factors are defined in the menu "Source / Linear Combinations".

In the text and graphics windows, the linear combinations are indicated by a circle icon.

Digital Inputs

The Digital Inputs window displays the status of the digital inputs (FDI inputs). Each square represents a digital input, its color indicates the currently read state, i. high or low. If the input level changes, the original status is displayed in a second square behind it. This makes it easy to see which input level has changed (two squares) and which ones have remained unchanged (one square).



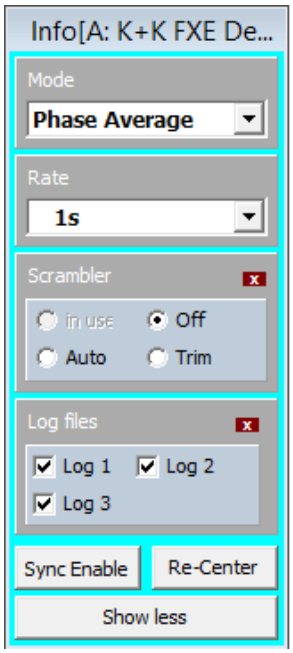
Clicking on a double square clears this change indicator, i.e. returns to a single square with the current status. Another click clears the appearance of this input from the list; this can be undone using the function "Show More".

With the function "Clear" all double squares are deleted. In addition, with "Change Orientation" you can choose between a horizontal and a vertical display.

In the menu under "Source / Digital Input Names" an individual name can be defined for each input, which will then be used in the list.

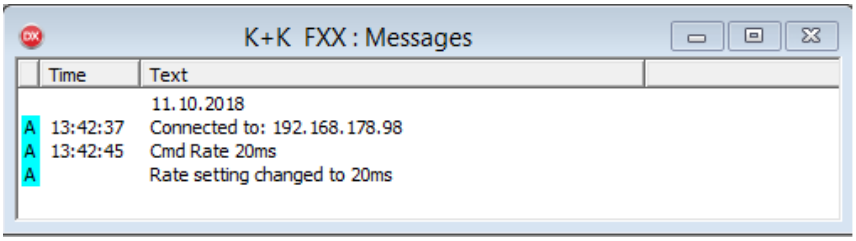
Info Window

The info window displays the status of a source (connection or device). The most important settings (e.g. measuring rate and mode) can be changed directly in the info window. In addition, there are optional scrambler, log file and debug settings that may not always be visible. They are activated with "Show All" and removed with the close cross. In addition, "Sync enable" activates the sync function of a device.



Message Window

The message window displays all status and error messages. Each source is marked with its colour. If the message window is activated, the messages can be saved with "Save-Message" and the window can be cleared with "Clear-Message".



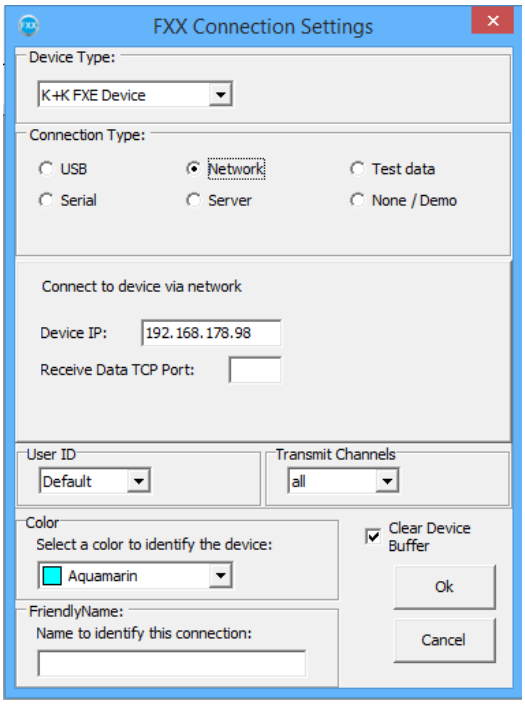
Errors, warnings and information are handled separately: by default, only errors are also output in a large window (big message window). This function can be enabled or disabled under "Options / Big Message Notifications ..".

Menue

All controls and options can be accessed via the menu - even those that are available directly in the windows. The following description of the menu items refers to the case where only one source is used. If more than one source has been defined, an additional menu level is used to select the source. The following menu items are available in detail:

Source

Source / New Source..



Define a new source. This can be

- a FXE device,
- another user of an existing FXE device with another measurement mode or
- a sensor device for measuring temperature, voltage or similar

and is selected under „Device Type“.

The properties of the selected source have to be defined, i.e.

- Interface (USB, Network, Serial, Server)
- User ID (1..4)
- Transmit channels (1 .. maximum number of channels of a device)
- Colour (colour used to mark this source in the windows of the user interface)
- Name (name of the source, used in the window title and protocol)

See also "Description KK-DLL".

Source / Mode

Sets the measurement mode of the Source: Phase, Phase Average, Frequency, Frequency Average, Phase Difference, Phase Difference Average, Raw

Source / Rate

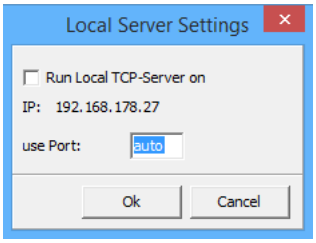
Defines the measuring rate: with FXE devices 1 ms .. 20 s, otherwise dependent on the device type

Source / Scrambler

Sets the scrambler mode: Off, Auto, Trim. When set to "in use", the scrambler is operated by another user and can not be changed.

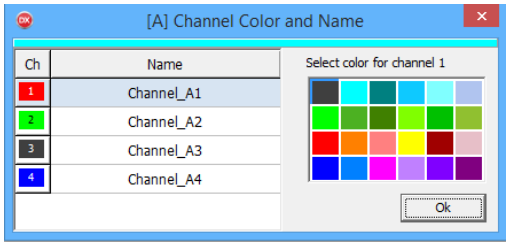
Show in Info Box: shows the scrambler settings in the info box

Source / Run Local Server..



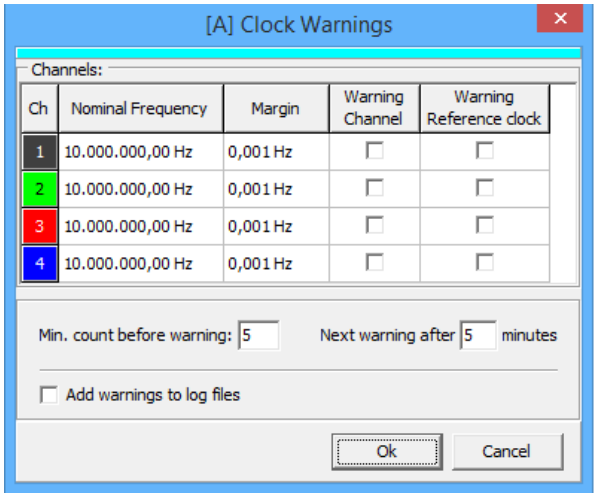
Turns on the server feature of the FXX software. This makes it possible to continuously transfer the read-in measurement data to one or more other PCs (clients). Clients must specify the IP address and port number of the server when defining their interface. The port number can be specified or assigned automatically.

Source / Channel Colors/Names..



Definition of colour and name for all channels of a source

Source / Clock Warnings..



Generate warnings when the measured frequencies or the reference clock leave a predetermined range. Since a reference clock deviation can't be measured directly, at least 2 input frequencies are monitored. If these show deviations at the same time, a reference clock warning is generated.

The sensitivity and frequency of a warning can be defined. The warnings can be written to the log file or sent as an email (see "Email Notification").

Source / Digital Input Names..

Definition of the names of the digital inputs (FDI inputs).

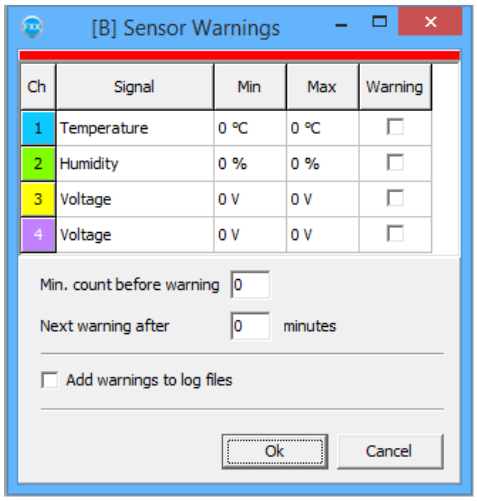
Source / Linear Combinations..

Definition of the factors for the two linear combinations LC1 and LC2 for frequency values. A linear combination is the sum of all measured values multiplied by one linear factor each. The linear combinations can be output as additional channels in the text and graphics windows or in log files.

Source / Nominal Frequencies..

For each channel, a nominal frequency is generated , e.g. used to calculate the frequency difference as offset. But it is also possible to specify the ideal nominal frequency.

Source / Sensor Warnings..



Generate warnings when a sensor falls below or exceeds a minimum or maximum value.

The sensitivity and frequency of a warning can be defined. The warnings can be written to the log file or sent as an email (see "Email Notification").

Source / Change Source..

Change properties of the selected source, same menu contents as “New Source”, see also "Description KK-DLL".

Source / Remove Source..

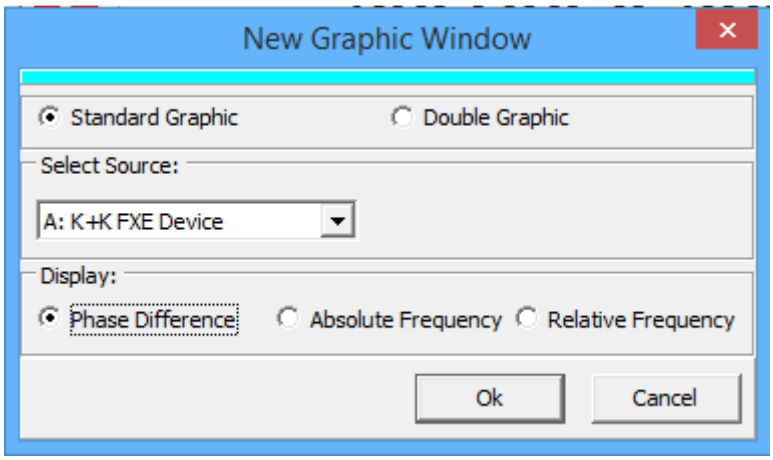
Deleting a source, closes all associated windows.

Window

The functions in the "Window" menu always refer to the actual selected window of the FXX interface. As a result not all functions are always available (e.g. "Clear Graph" with active text window)

Window / New Graph Window

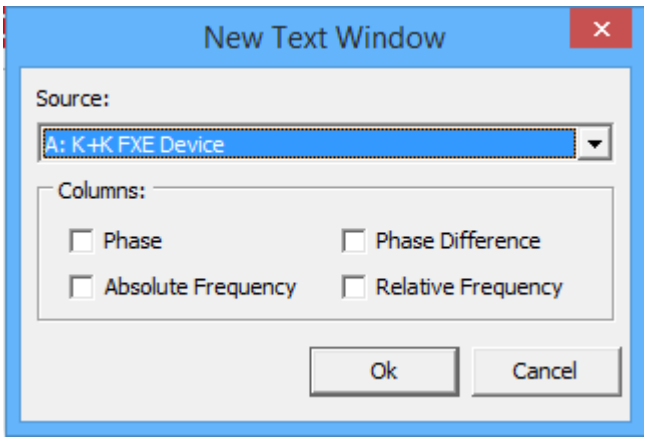
Creates a new window for displaying measurement data



You can display data from just one source (Standard Graphic, scale labels left) or from two sources (Double Graphic, scale labels left and right). FXE devices can choose between different forms of presentation (e.g., phase or frequency).

Window / New TextWindow

Creates a new window for displaying measurement data in text form with one or more columns.



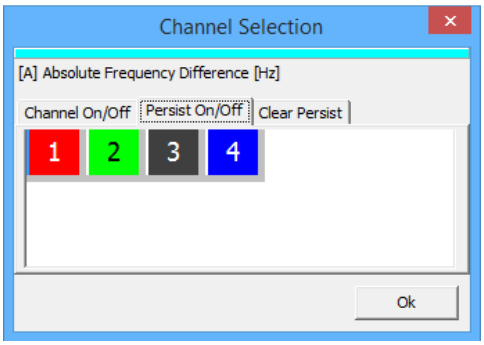
Window / Digital Inputs

Creates a new window for displaying the digital inputs of a FXE device.

Window / Messages

Opens the message window

Window / Channels



Channel selection for text / graphic windows. For graphics window additionally: persist function

Window / Clear Graph, Range - - , - , + , ++ , Clear Message, Save Message

Same function as the button operation in the active window

Action

Action / Sync Enable

Unlocks the device's sync function so that it can be synchronized with other devices through an external signal

Action / Re-Center

Sets the measured phase difference in the FXE device to 0.

Action / Clear Buffer

Clears the data buffer in the K+K device

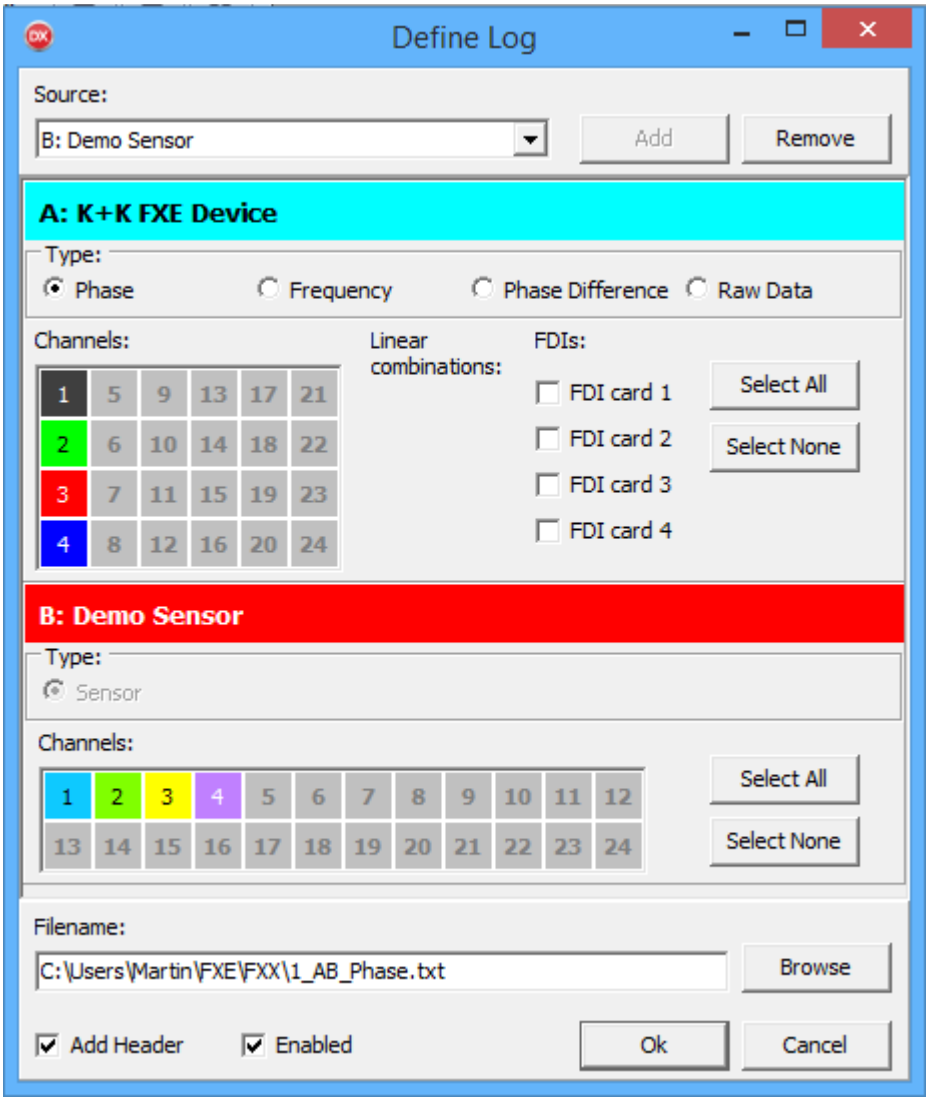
Action / Version

Output of software, firmware, FPGA version ect. in the message window

Logging

Logging / New Log File..

Definition of the format of a new measurement data log file. Measured values from one or more sources can be recorded. All defined log files are listed in the logging menu and can be switched on and off, changed or deleted.



The selection of channels is possible separately for each source.

Option "Add Header Lines": Insert additional headers in the log file

Option "Enabled": Switch logging of this log file on/off

Logging / Show in Info Box

Shows the settings for measuring data log files in the info box. There the logs can be switched on/off directly. The number of the log file in the info box corresponds to the number in the file list in the "Logging" menu.

Logging / Root Folder..

Defines the folder in which the measurement data log files are stored

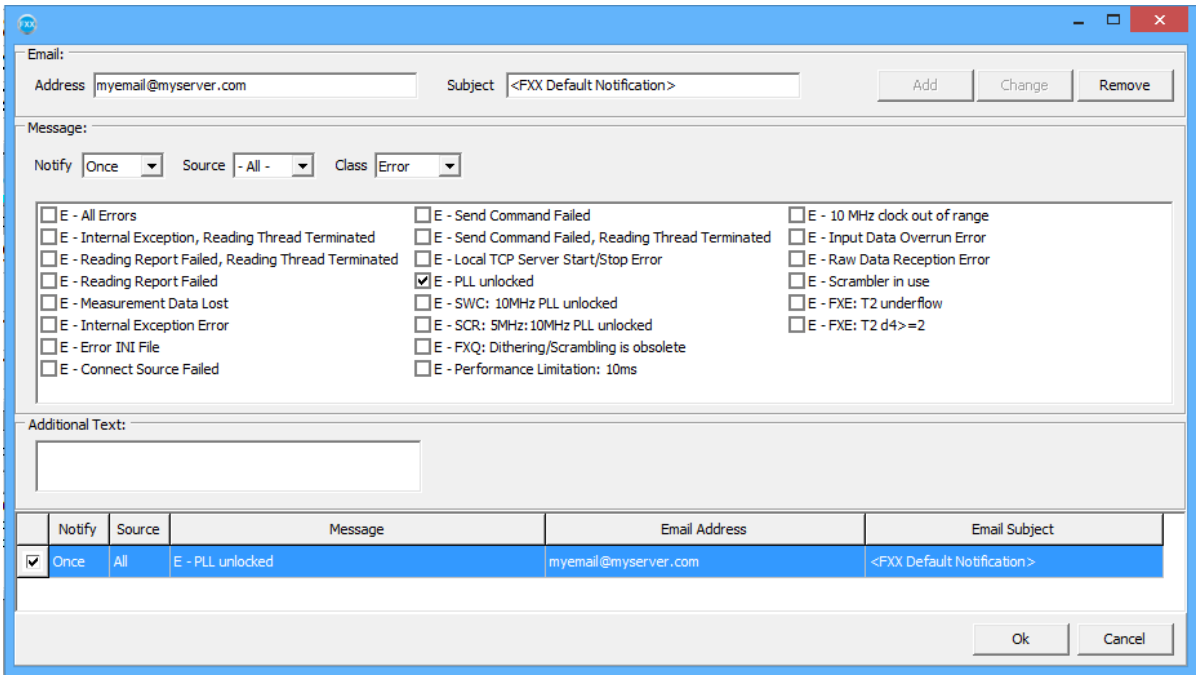
Logging / Debug Files ..

Enable / disable an interface debug log with additional options (reports, lowlevel) or a software debug log

Options

Selection of decimal separator, units, start conditions etc.

Options / Email Notification..



Definition of warnings or error messages to be sent by email. For this purpose, several messages can be defined and entered with "Add" in a list. The message definitions contain:

Address: destination address

Subject: Subject of the email, automatically generated (with host, source and message) or individually specified

Notify: Sending the message on each occurrence or once

Source: Source that reports the warning or error

Class: Error, Warning or Info. For a class, all messages or any selection of possible messages can be defined

Additional Text: Individual additional text that is inserted in the message.

Options / Config Email Server..

Definition of the email server from which the emails defined under "Email Notifications" will be sent.

The default is the K + K server, i.e. the sender of the emails is "info@kplusk-messtechnik.de".

However, another server can be defined. This will require host name, port number, authentication and password.

Options / Big Message Notifications..

Enable or disable messages for output in the "big message" window. Enabled messages are not only output in the message window, but also in a large font in a central window (big message). Error messages are enabled by default, warnings and info messages are disbaled.

These settings can be changed here. The message list contains all messages that have occurred, as well as all messages that deviate from the default setting.

Help

Help / Info

Help / Manual..