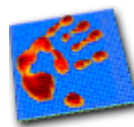


easy // *TOUCH*



easyANALYZER
Version 4.10

User Guide

Revision: 005
Date: 2020-03-31

Revision History

Rev.	Date	Author	Modifications
000	2014.03.06	T. Nüßle / A. Trica	Initial revision
001	2015.02.10	T. Nüßle	easyANALYZER 2.0
002	2015.08.18	T. Nüßle / C. Oswald	easyANALYZER 3.11
003	2017.04.11	T. Nüßle	easyANALYZER 3.50
004	2018.11.06	J.Sousa	easyANALYZER 4.00
005	2020.03.31	T. Grandl	easyANALYZER 4.10

Change History

easyANALYZER Version	Controller FW Version	
New Features on 3.11	All	<ul style="list-style-type: none"> • Auto enumeration of easyTOUCH devices at start and after mode changes • Check compatibility • Added Device Info
New Features on 3.11	from 3.1	<ul style="list-style-type: none"> • Added Reset function • Added Calibrate function • T-series easySETTINGS were growing
New Features	All	<ul style="list-style-type: none"> • Added a time slider as well as an option for to adjust the playback speed • Added Pins Test
New Features	from 3.1	<ul style="list-style-type: none"> • Additional Configuration Options
New Features	from 3.20	<ul style="list-style-type: none"> • Added Touch Report Painting
New Features	from 3.50	<ul style="list-style-type: none"> • Added Support for Changed USB Interface
New Features on 4.00	Please check 2- Supported Devices	<ul style="list-style-type: none"> • Complete rewrite of easyAnalyzer <ul style="list-style-type: none"> ○ New Graphical Interface ○ Touch Controllers <ul style="list-style-type: none"> ▪ Support for Iitek devices <ul style="list-style-type: none"> • ILI2315 • ILI2511 • ILI2510 ▪ Support for Atmel devices <ul style="list-style-type: none"> • T-series <ul style="list-style-type: none"> ○ mxt2952T2 (version \geq 1.1) • Support for DataModul devices <ul style="list-style-type: none"> • T-series (only for bridge version \geq3.20) <ul style="list-style-type: none"> ○ mxt640T ○ mxt2952T2 • U-series (only for bridge version \geq3.70) <ul style="list-style-type: none"> ○ mxt640U

<p>New Features on 4.10</p>	<p>Please check 2- Supported Devices</p>	<ul style="list-style-type: none"> • Added support for new Ilitek devices: <ul style="list-style-type: none"> ○ Ili251x core version 6.X.1.8/9 ○ Ili231X core version 5.X.0.D/E • Added support for new Atmel devices: <ul style="list-style-type: none"> ○ mXT2952TD • Added support for new Data Modul devices: <ul style="list-style-type: none"> ○ mXT2952TD ○ mXT2912TG • Added new operation mode support • Added possibility to save a frame from debug data • Show recording log file time interval: <ul style="list-style-type: none"> ○ After opening the log file, the Log Playback Time Interval must always be the recoding log file time interval • Renamed "Log" Toolbox to "Log Playback" • Renamed and inverted "only partial data" to "Show Max Size" in Diagnostic Toolbox: <ul style="list-style-type: none"> ○ Checkbox Show Max Size is switched off by default ○ On switched off the data in visualization window must be shown according the sensor configured dimensions ○ On switched on the data in visualization window must be shown according max sensor dimensions • Plug/Unplug Events to Device Manager • Improved Ilitek Article number format • Atmel devices article number is now listed (Sensor IC Firmware Revision)
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1 Introduction

The easyANALYZER application consists of a debug, analysis, log and settings toolset that permits the user to read/write new parameters, detect malfunctions and minimize the time spent during initial setup.

Even if the GUI is very intuitive, this document is an insight into the various functions and the typical usage.

Warning

The current tool is intended to be used as an auxiliary to read/write and debug only a small number of device parameters during the development or lifecycle of a device.

It is not intended:

- To be used as production tool.
- To replace any of the Official tools from the OEM.
- To be used without previous support from DATA MODUL.

For full support please contact DATA MODUL.

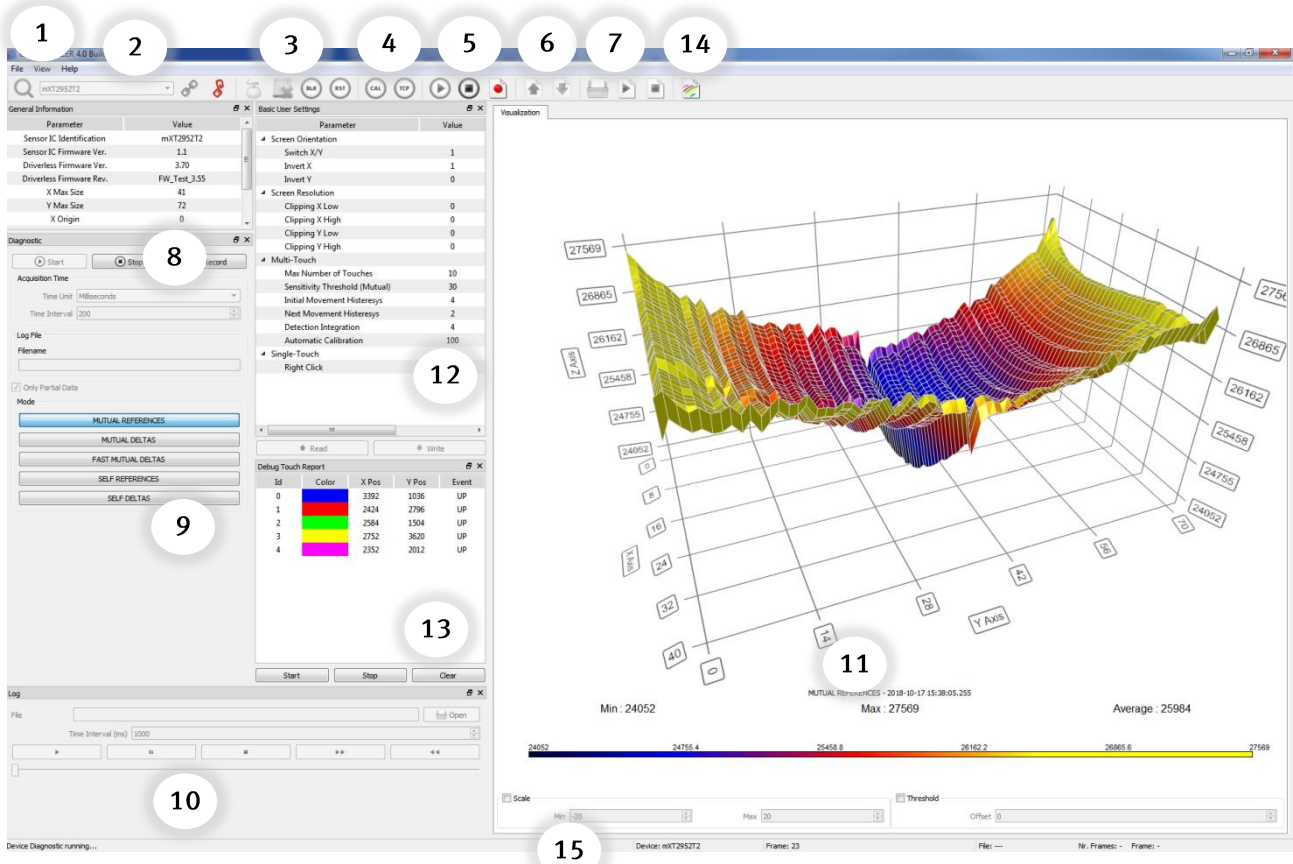
2 Supported Devices

2.1 Devices

Vendor	Controller	Firmware Version	Core Version	Interface
ATMEL	mxt2952T2 ¹	1.1 2.3	-	USB
ATMEL	mxt2952TD ¹	1.0		USB
DATA MODUL	mxt640T ²	>=3.2	-	USB
DATA MODUL	mxt2952T2 ²	>=3.2	-	USB
DATA MODUL	mxt640U ²	>=3.7	-	USB
DATA MODUL	mxt2952TD ₂	>=4.0	-	USB
DATA MODUL	mXT2912TG ₂	>=4.0	-	USB
ILITEK	Ili2315 ¹	5.0.0.0	5.X.0.5 5.X.0.C 5.X.0.D/E	USB
ILITEK	Ili2511 ¹	6.0.0.0	6.1.1.6 6.1.1.7 6.X.1.8 6.X.1.9	USB
ILITEK	Ili2510 ¹	6.0.0.0	6.1.1.6 6.1.1.7 6.X.1.8 6.X.1.9	USB

¹ Single Touch IC Controller. ² Touch IC Controller and Host IC.

3 User Interface - Description



1 Menu Bar

2 Search, Select, Connect and Disconnect

3 Operation Mode, Mass Storage Device, Jump To Bootloader and Reset

4 Calibrate, Tune Capacitance

5 Diagnostic Start, Stop and Record Log

6 Export/Import Settings

7 Open, Start and Stop Play Log File

8 Device General Information

9 Device Diagnostic

10 Device Log Playback Toolbox

11 Data Visualization

12 Device User Settings

13 Device Debug Touch Report

14 Finger Paint

15 Status Bar

3.1 Menu Bar

3.1.1 File

Exit

Close application.

3.1.2 View

Show or hide toolboxes.

3.1.3 Help

About

Show application information.

3.2 Search, Select, Connect and Disconnect



Search Devices

Search and enumerate all supported devices adding all of them to the drop-down list.

Please look at supported device table (2.1 Devices) to check if the device is currently supported by the current *easyANALYZER*.

If not please contact DATA MODUL for further support.



Select Device

Select a device from drop-down list for further usage. If there are multiple devices connected to the host system, please select the device you want to connect.



Connect with Device

Open connection with the current selected device.



Disconnect from Device

Close connection with the current connected device.

3.3 Operation Mode, Mass Storage, Reset and Calibrate



Enable/Disable Mass Storage Device

Depending on current state this button allows the user to enable or disable the Mass Storage Device.



Supported only in *DATA MODUL* devices.

Please look at supported device table (2.1 Devices).

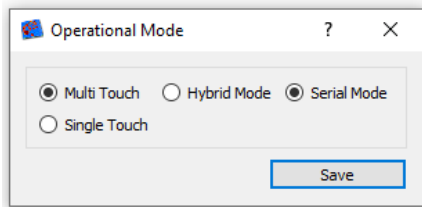


Single Touch / Multi Touch Mode

Depending on current mode the device will be registered as Single or Multi Touch device.



Supported only in *DATA MODUL* devices:

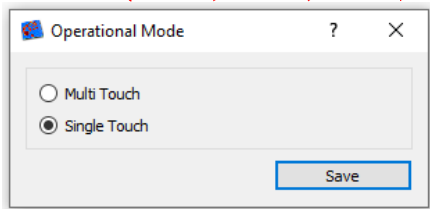


Mutli Touch (Serial Mode): In this mode, devices report all contact information in a series of packets. Each package contains information that describes a single physical contact. The device sends a separate packet for each simultaneous contact.

Mutli Touch (Hybrid Mode): In hybrid mode, the number of contacts that can be reported in a package is less than the maximum number of contacts that the device supports. For example, a Data Modul device that supports a maximum of 16 simultaneous physical contacts can set its top-level collection to report a maximum of 5 contacts in a package. If 16 contact points are currently valid, the device can divide them into 4 serial packets, each of which reports 5 contacts.

Please look at supported device table (2.1 Devices).

and ILITEK (*Ili2315, Ili2510, Ili2511*) devices:



Please look at supported device table (2.1 Devices).

Jump to Bootloader



Jump to bootloader is used to upgrade the device firmware.

Supported only in *DATA MODUL*.

Please look at supported device table (2.1 Devices).



Reset

Reset device.

3.4 Calibrate, Tune Capacitance

Calibrate



Recalibrates the sensor.

Supported only in *ATMEL* and *DATA MODUL* devices.

Please look at supported device table (2.1 Devices).

Tune Capacitance



Depending on current mode the device will be registered as Single or Multi Touch device.

Supported only in *ATMEL* and *DATA MODUL* devices.

Please look at supported device table (2.1 Devices).

3.5 Diagnostic Start, Stop and Record Log

Start live plot



Start displaying the diagnostic data of the connected device, depending on the Time Interval or debug data mode (*Please look at 3.9 – Device Diagnostic*).

Stop live plot



Stop displaying the diagnostic data of the live plot.

Start Log Recording





Create a log file and start recording the diagnostic data.

Stop Log Recording

Stop recording the diagnostic data from the currently shown live plot.

Note that the log file size can grow fast depending on the “Controller Max Size” (Please check 3.8 – General Device Information) and the “Time Interval” (Please check 3.9 – Device Diagnostic). Please record only what is necessary and check you have enough memory in the hard drive where the file is stored.

3.6 Export/Import Settings

Read or write all device settings in a single operation. DATA MODUL will provide all settings in the right format if any kind of performance change is requested by our customers.

! Use with caution, incorrect settings can negatively influence the performance. !



Export Settings

Read settings from current device and save them to the hard drive of the computer.



Import Settings

Write the settings from the hard drive of the computer to the selected current device.

Before writing new settings to the device be sure you read out the old settings and save them.

3.7 Open, Start and Stop Play Log File

Open Log File



Open a Log File from the hard drive.

The path of the opened file is shown in the status bar (Please look at 3.15 – Status Bar) and in the Device Log Toolbox. (Please look at 3.10 – Device Log)



Start Playing Log File

Start playing the opened Log File from frame 0.



Stop Playing Log File

Stop playing Log File.

3.8 Device General Information

It displays the general information about the device specific versions and physical dimensions. It can be used to identify what kind of firmware and settings is currently flashed on the device.

! Take in account that the parameters displayed can change according to device type or firmware version!

General Information	
Parameter	Value
Sensor IC Identification	mXT2952T2
Sensor IC Firmware Ver.	1.1
Driverless Firmware Ver.	3.70
Driverless Firmware Rev.	FW_Test_3.55
X Max Size	41
Y Max Size	72
X Origin	0
Y Origin	0
X Size	41
Y Size	71

3.8.1 Parameters

3.8.1.1 Atmel

Parameter	Description
Sensor IC Identification	Controller name
Sensor IC Firmware Version	Controller firmware version
X Max Size	Controller maximum physical X size
Y Max Size	Controller maximum physical Y size
X Origin	Controller defined X origin
Y Origin	Controller defined Y origin
X Size	Controller defined X size
Y Size	Controller defined Y size

3.8.1.2 Data Modul

Parameter	Description
Sensor IC Identification	Controller name
Sensor IC Firmware Version	Controller firmware version
Driverless Firmware Version	Driverless firmware version
Driverless Firmware Revision	Driverless firmware revision
X Max Size	Controller maximum physical X size
Y Max Size	Controller maximum physical Y size
X Origin	Controller defined X origin
Y Origin	Controller defined Y origin
X Size	Controller defined X size
Y Size	Controller defined Y size

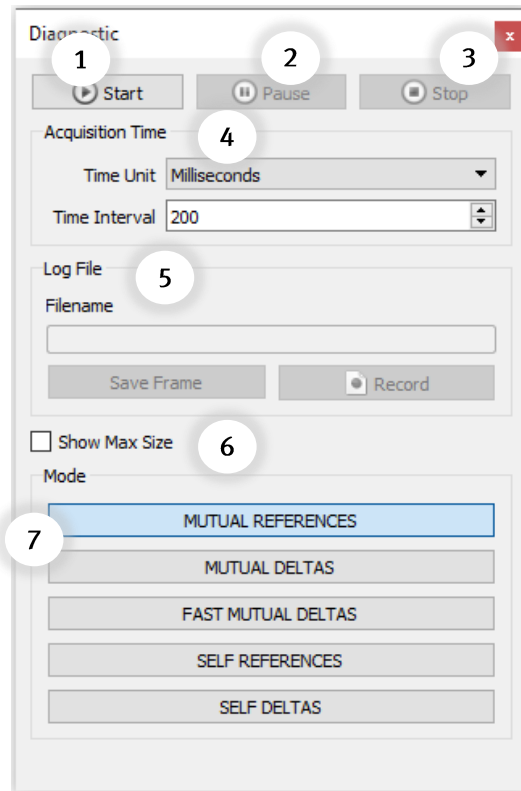
3.8.1.3 Ilitek

Parameter	Description
Sensor IC Identification	Controller name
Sensor IC Firmware Version	Controller firmware version
Sensor IC Firmware Revision	Controller firmware revision
Sensor IC Protocol Version	Controller protocol version
Sensor IC Core Version	Controller core version
X Size	Controller defined X size
Y Size	Controller defined Y size
X Resolution	Controller X screen resolution

3.9 Device Diagnostic

It shows the graphical visualization of different diagnostic data. It is possible to analyze in runtime the problems or see what is happening with different external constraints.

It is possible to record the data for later analysis.



1

Start displaying the diagnostic data of the connected device, depending on the Time Interval (4) or Mode (7). Information about the current frame can be found in the status bar (*Please look at 3.15 – Status Bar*).

2

Stop displaying the diagnostic data.

3

Create, start and stop log file recording the diagnostic data.

4

Data acquisition time.

Time Unit: defines the time unit used by the **Time Interval**.

Time Interval: defines the amount of time between acquisitions.

The minimum time is limited by the device capability to answer to the request.

5

Current log filename.

Only visible if it is recording.

6

Show Max Size is switched off by default. On switched off the data in visualization window will be shown according the sensor configured dimensions. On switched on the data in visualization window will be shown according maximum sensor dimensions.

The mode defines what kind of data will be requested from the device and displayed or recorded in the file.

The available modes can change according to the device or version.

3.9.1 Modes

3.9.1.1 Atmel

Mode	Description
MUTUAL DELTAS	Shows the difference of current measured capacitance to the reference capacitance. Used for visualizing the noise, signal, and setting up the sensitivity threshold.
MUTUAL REFERENCES	Shows the sensor reference capacitance without touches.
SELF DELTAS	Shows the difference of current measured self-capacitance to the reference self-capacitance. Used for visualizing the noise, signal, and setting up the sensitivity threshold.
SELF REFERENCES	Shows the sensor reference self-capacitance without touches.
FAST MUTUAL DELTAS	Shows the difference of current measured capacitance to the reference capacitance. Used for visualizing the noise, signal, and setting up the sensitivity threshold. The only difference to MUTUAL DELTAS is the smaller data acquisition time.
FAST MUTUAL REFERENCES	Shows the sensor reference capacitance without touches. The only difference to MUTUAL REFERENCES is the smaller data acquisition time.

3.9.1.2 Data Modul

Mode	Description
MUTUAL REFERENCES	Shows the sensor reference capacitance without touches.
MUTUAL DELTAS	Shows the difference of current measured capacitance to the reference capacitance. Used for visualizing the noise, signal, and setting up the sensitivity threshold.
FAST MUTUAL DELTAS	Shows the difference of current measured capacitance to the reference capacitance. Used for visualizing the noise, signal, and setting up the sensitivity threshold. The only difference to MUTUAL DELTAS is the smaller data acquisition time.
SELF DELTAS	Shows the difference of current measured self-capacitance to the reference self-capacitance. Used for visualizing the noise, signal, and setting up the sensitivity threshold.
SELF REFERENCES	Shows the sensor reference self-capacitance without touches.

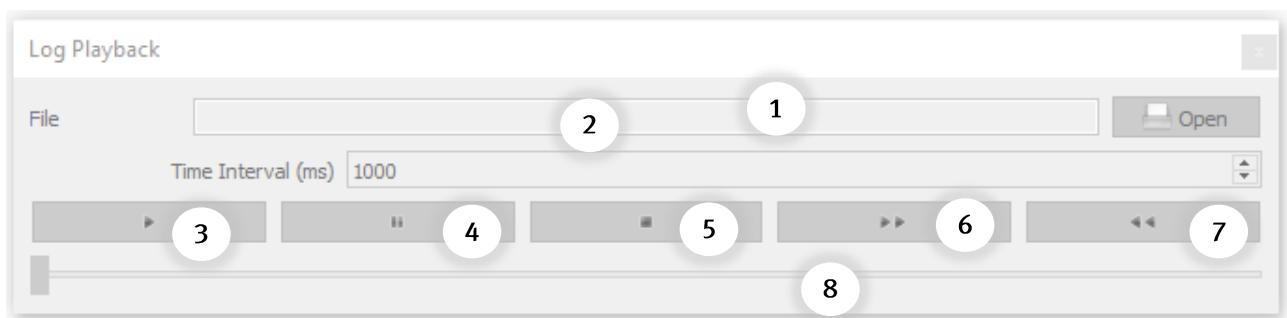
3.9.1.3 Iitek

Mode	Description
BG	Shows the current sensor background capacitance (reference).
RAW	Shows the current sensor measured raw capacitance.
BG - RAW	Difference between background capacitance and current measured capacitance.

3.10 Device Log

Using the log file during the malfunction of the system will help to analyze and provide solutions to problems in environments where external constraints could interfere with the sensor normal operation.

Analyzing the log data helps to adjust the controller parameters to meet the expected requirements.



1

Open a Log File from the hard drive, the current file path is shown in the text box. Information about the number of frames and the current frame read from the log can be found in the status bar (*Please look at 3.15 – Status Bar*).

2

The time interval defines how fast the frames are displayed.

3

Start playing the opened Log File from frame 0.

4

Pause playing Log File.

It enables the possibility to use the Slider (8) to change the frame index or to use the buttons Next (6) and Previous (7).

5

Stop playing Log File.

6

Go to next frame.

It is only available when Log File is paused.

7

Go to previous frame.

It is only available when Log File is paused.

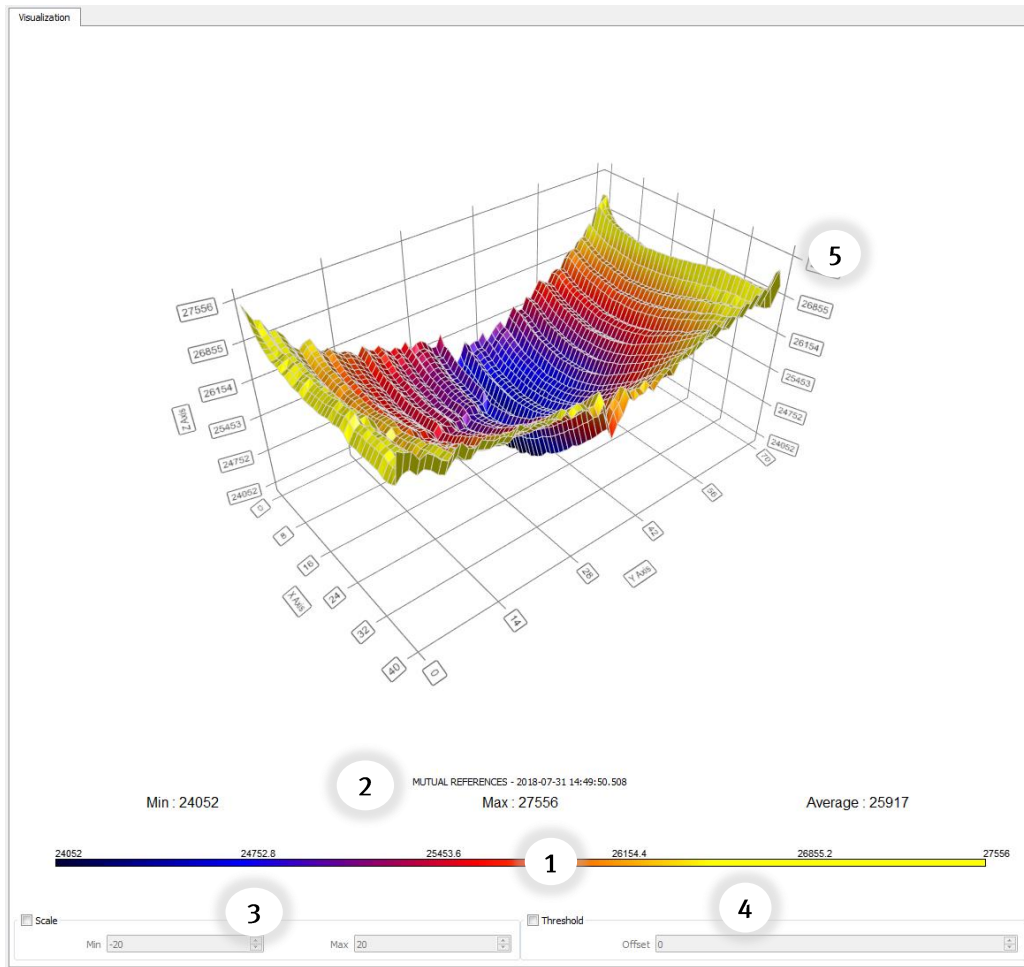
8

The slider shows the current frame index.

It can be used to change the frame index too, however only available when Log File is paused.

3.11 Data Visualization

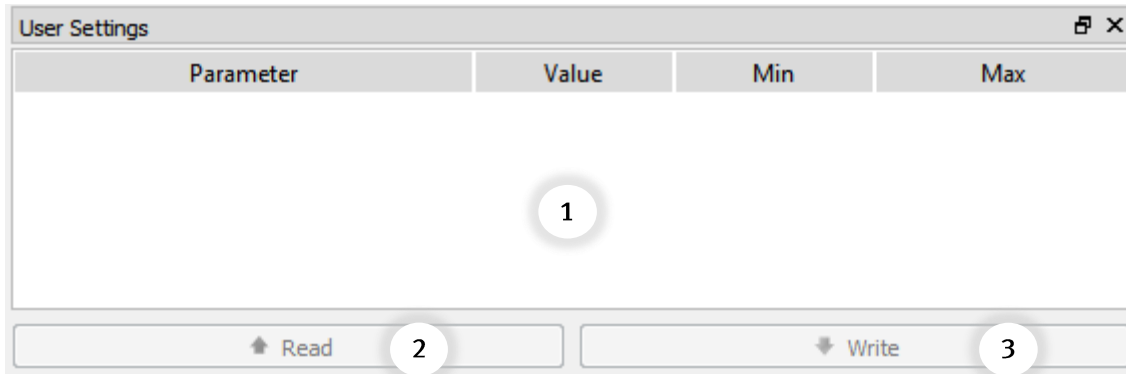
It provides a 3d graphical representation of data sets.



- 1 Gradient bar provides a color scale permitting the identification of areas of interest in the 3d visualization graph.
If the Scale (3) is not enabled it changes automatic with the current data.
- 2 Current data type and timestamp.
Minimum, maximum and average value of current data.
- 3 The scale defines the maximum and minimum visible values in the graph. The maximum and minimum scale values are applied if Scale is enabled.
- 4 If enabled adds a threshold horizontal plane to the graph. The offset value can be changed in order to adjust the position of the plane.
- 5 3D graph data visualization.
By clicking and dragging on the graph, the view can be rotated.

3.12 Device User Settings

Device user settings will be loaded automatically in the table below after connecting with a specific device. The parameters value can be changed and written back to device using the button “Write” or read back from device using button “Read”.



1

Basic user settings:

“Parameter” – Name or description.

“Value” – Current value read from device or to be written to device.

“Min” – Lower limit value.

“Max” – Upper limit value.

“Parameter”, “Min”, “Max” cannot be changed.

2

Read basic user settings from device.

3

Write basic user settings to device.

3.12.1 User Settings

3.12.1.1 Atmel

Parameter	Description	Range	Typical Value
Screen Orientation			
Switch X/Y	Switches X and Y positions.	0 or 1	0
Invert X	Inverts X coordinates.	0 or 1	0
Invert Y	Inverts Y coordinates.	0 or 1	0
Screen Resolution			
Clipping X Low	This setting can be used to adjust the touch area (see appendix).	-128 to 127	0
Clipping X High	This setting can be used to adjust the touch area (see appendix).	-128 to 127	0
Clipping Y Low	This setting can be used to adjust the touch area (see appendix).	-128 to 127	0
Clipping Y High	This setting can be used to adjust the touch area (see appendix).	-128 to 127	0
Multi Touch			
Max Number of Touches	Defines the number of touches reported by the touch controller. Range: 1-10. In order to keep response time short, use the lowest possible value suitable for	0 to 10	10

your application.

In Single Touch Mode there is only one touch reported to the operating system.

Sensitivity Threshold (Mutual)	Sets the touch sensitivity threshold to the supplied value. (mutual sensing only).	0 to 255	30
Detection Integration	This setting is used to provide detection filtering. A counter is incremented each time a touch is detected. If the counter reaches the given limit, it will be reported as touch-event to the operating system. <i>It is very useful to suppress electrical noise.</i>	0(means 1) to 63 (0 and 1 means no integration)	3
Initial Movement Hysteresis	This setting is used to detect an initial movement. Setting this parameter with a high value will make the system less sensitive to non-desired small finger movements (avoiding cursor flickering). At the same time a larger finger movement will be necessary for starting the cursor to move.	0 to 255	2
Next Movement Hysteresis	This setting is used to detect further movement (after initial movement). Setting this parameter with a low value will increase the sensibility of the cursor in a movement.	0 to 255	2
Automatic Calibration	Defines the length of time a touch is held until it is considered as false and an automatic calibration is performed to compensate. This is useful to keep touchscreen operating when foreign objects (dirt, water drops) are located on the touch surface. After an automatic calibration the field-change at the position of the object is considered as normal, so no unexpected touch-events are generated anymore.	0 (infinite), 1 to 255 (in 200ms increments)	50

3.12.1.2 Data Modul

Parameter	Description	Range	Typical Value
Screen Orientation			
Switch X/Y	Switches X and Y positions.	0 or 1	0

Invert X	Inverts X coordinates.	0 or 1	0
Invert Y	Inverts Y coordinates.	0 or 1	0
Screen Resolution			
Clipping X Low	This setting can be used to adjust the touch area (see appendix 1).	-128 to 127	0
Clipping X High	This setting can be used to adjust the touch area (see appendix 1).	-128 to 127	0
Clipping Y Low	This setting can be used to adjust the touch area (see appendix 1).	-128 to 127	0
Clipping Y High	This setting can be used to adjust the touch area (see appendix 1).	-128 to 127	0
Multi Touch			
Max Number of Touches	Defines the number of touches reported by the touch controller. Range: 1-10. In order to keep response time short, use the lowest possible value suitable for your application.	0 to 10	10
	<i>In Single Touch Mode there is only one touch reported to the operating system.</i>		
Sensitivity Threshold (mutual)	Sets the touch sensitivity threshold to the supplied value. (mutual sensing only).	0 to 255	30
Detection Integration	This setting is used to provide detection filtering. A counter is incremented each time a touch is detected. If the counter reaches the given limit, it will be reported as touch-event to the operating system.	0(means 1) to 63 (0 and 1 means no integration)	3
	<i>It is very useful to suppress electrical noise.</i>		
Initial Movement Hysteresis	This setting is used to detect an initial movement. Setting this parameter with a high value will make the system less sensitive to non-desired small finger movements (avoiding cursor flickering). At the same time a larger finger movement will be necessary for starting the cursor to move.	0 to 255	2
Next Movement Hysteresis	This setting is used to detect further movement (after initial movement). Setting this parameter with a low value will increase the sensibility of the cursor in a movement.	0 to 255	2
Automatic Calibration	Defines the length of time a touch is held until it is considered as false and an automatic calibration is performed to	0 (infinite), 1 to 255 (in 200ms)	50

	compensate. This is useful to keep touchscreen operating when foreign objects (dirt, water drops) are located on the touch surface. After an automatic calibration the field-change at the position of the object is considered as normal, so no unexpected touch-events are generated anymore.	increments)	
Right Click	This setting can be used to enable right click (for Single Touch only).	0-1	1

3.12.1.3 Ilitek

Parameter	Description	Range	Typical Value
Screen Orientation			
Switch X/Y	Switches X and Y positions.	0 or 1	0
Invert X	Inverts X coordinates.	0 or 1	0
Invert Y	Inverts Y coordinates.	0 or 1	0
Multi Touch			
Max Number of Touches	Defines the number of touches reported by the touch controller. Range: 1-10. In order to keep response time short, use the lowest possible value suitable for your application.	0 to 10	10
	<i>In Single Touch Mode there is only one touch reported to the operating system.</i>		
Sensitivity Threshold (mutual)	Sets the touch sensitivity threshold to the supplied value. (mutual sensing only).	Depends from the core version	-
Automatic Calibration	Defines if background automatic calibration is enabled or not.	0 or 1	1
Single Touch			
Right Click	This setting can be used to enable right click (for Single Touch only).	0-1	1

3.13 Device Debug Touch Report

It processes and displays the debug touch report information that comes directly from the touch controller. It can be used to analyze the touch identification, the coordinates (XY) and the type of event (UP/DOWN).

As shown below the table contains the numerical values and the touch area shows the movement in the sensor area.

! The maximum number of touch reports is limited to 10!



- 1 Touch Identification:
 - “Id” – Current touch ID.
 - “Color” – Current touch color shown in touch area.
 - “X Pos” – X position in screen.
 - “Y Pos” – Y position in screen.
 - “Event” – DOWN(Finger pressed)/UP(Finger released).
- 2 Start debug touch report information.
- 3 Stop debug touch report information.
- 4 Reset the current debug touch report information.
- 5 Touch Area.

3.13.1 Touch Report Colors

●	Finger 1
●	Finger 2
●	Finger 3
●	Finger 4
●	Finger 5
●	Finger 6
●	Finger 7
●	Finger 8
●	Finger 9

3.14 Finger Paint

It displays the input touch events from a digitizer or a mouse mapped by the operative system.



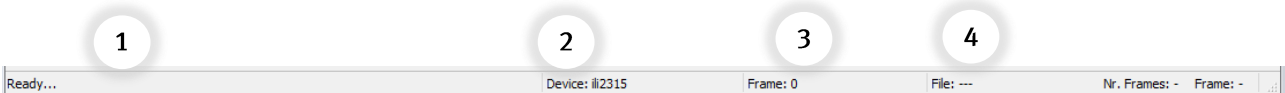
Start Finger Paint Tool

Opens a new window running the Finger Paint Tool. (as shown below)



1 Touch Paint Tool.

3.15 Status Bar



1 General status messages.

2 Current connected device.

3 Diagnostic information:
"Frame": current frame index.

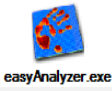







4 Device log file information:
"File": current file path.
"NrFrames": number of frames stored in the log file.
"Frames": current frame index.

4 User Interface – Usage

4.1 Basic Example

In case of problems a log shall be created with data containing the wrong behavior of the sensor. The device settings shall be read from the device too in order to have the same device configuration when analyzing or debugging the problem.

4.1.1 Step Instructions

Step	Description	Symbol
1	Start easyAnalyzer	
2	Search and enumerate host connected devices	
3	Select the desired device from the drop-down list	
4	Choose Diagnostic Mode. In the Diagnostic Toolbox the Mode can be selected in order to change the type of data to analyze or record in the log file. <i>Please check 3.9 Device Diagnostic/ 3.9.1 Modes.</i>	
5	Start live Plot	
6	Create and start Log File recording	
7	Touch on the Sensor	
8	Stop Log File recording	
9	Stop live Plot	
10	Save current Device Settings In order to prevent to not lose the current settings save it in the host.	
11	Send the Log File and Device Settings to your contact person for further assistance	

5 Known Issues

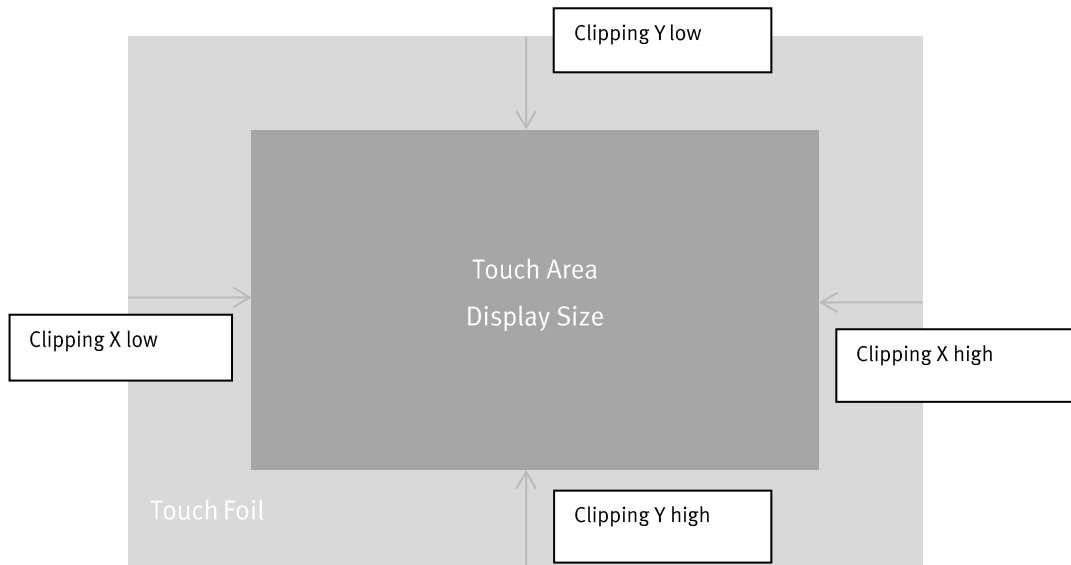
Version	Category	Description	Workaround
All	Operating System Driver	Connection Problems using NEC/Renesas USB 3.0 Host Controllers	NEC/Renesas uPD720200/uPD720200A USB 3.0 users, could have communication problems on USB 3.0 port. Please update drivers to version 2.1.16.0 or later. Older versions of the driver have a bug that prevents libusbx from accessing devices. uPD720201/uPD720202 users should use version 3.x (3.0.23 or later preferred).

6 Appendix

Adjust the touch area to a smaller display:

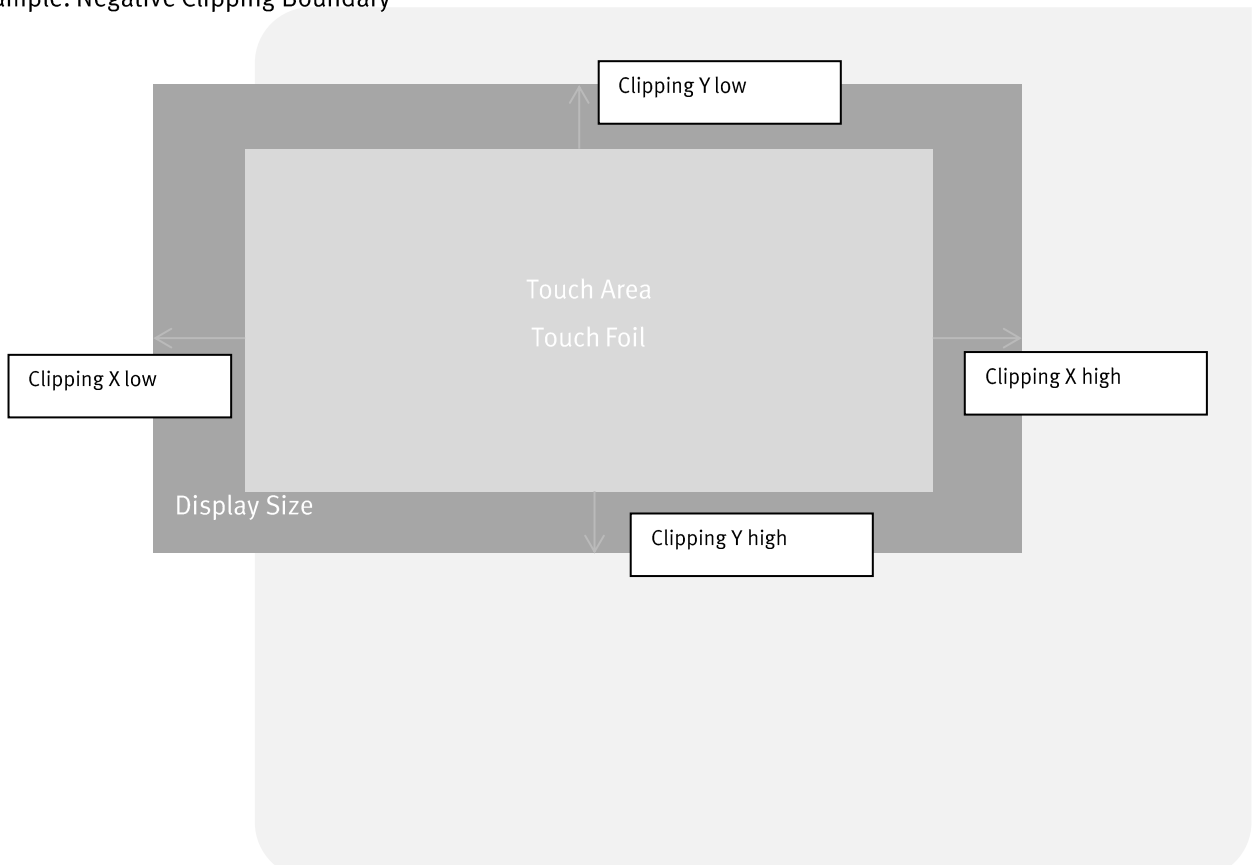
The settings (Clipping X low Clipping X high, Clipping Y low, Clipping Y high) in maxtouch.txt can be used to set up a clipping boundary. These fields allow settings in the range from -50 to 50. The maximum clipping value allows a clipping boundary one eighth of the touch screen height or width. Positive values (0 to 50) increase the size of the clipping boundary. Below you can find an example to adjust a bigger touch area to a smaller display:

Example: Positive Clipping Boundary



Negative values (-1 to -50) are used for negative clipping boundary. For example to adjust a smaller touch area to a bigger display:

Example: Negative Clipping Boundary



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