SDI Control Point
User Manual

March 2021 - Rev 1.2

KAYA INSTRUMENTS

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2 Revision History

Version	Date	Notes
1.0	04.11.2020	Initial release
1.1	20.12.2020	Minor corrections
1.2	01.03.2021	Added Genlock configuration in section 6.1

Table 1 - Revision History

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3 Overview

3.1 Introduction

This manual describes the usage of KAYA's SDI Control Point GUI. It is used to set up and operate SDI cameras and is currently available for both Windows and Linux; the document thoroughly covers the different screens and menus of SDI Control Point. Be sure to use the latest firmware and software to guarantee best results.

3.2 Disclaimer

It is important to note that some parameters might vary slightly compared to this document or may be absent entirely, subject to the active firmware capabilities: a firmware upgrade might be needed to support complete functionality set. Please feel free to contact our team over at support@kayainstruments.com with any questions that may arise.

Please Note that KAYA will provide no warranty for SDI Control Point. It is a free software published under GPLv3 that uses the QT framework by the QT Company and other open source components. The software's license as well as all other third-party software licenses used in SDI Control Point can be easily accessed via the Information Tab (6.8 for a detailed explanation). Users may redistribute the software under certain conditions as elaborated in the license.

SDI Control Point's source code can be found at github.com/KAYA-Instruments/SDI-Camera-GUI

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4 Connecting to the Device

The connect dialog will open immediately after Launching SDI Control Point:

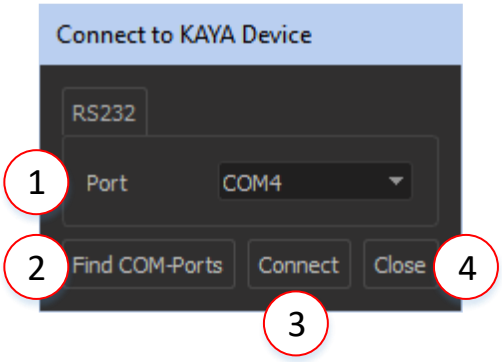

Figure 1 – Firmware update process

#	Description
1	COM-Port to which the device is connected. This will be “ttyUSBX” on Linux and “ComX” on Windows.
2	Add a new COM-Port to the Port list when connecting device after the GUI was launched,
3	Close the Connect Dialog. If a previous attempt to establish a connection to a device failed, this will close the GUI (since it is in disconnected state).
4	Connect to the device which is specified through the above mentioned settings

Table 2 – Connection screen GUI legend

5 General Navigation

5.1 Toolbar

After the connection was established, the main window will open. It has toolbar for general options and a sidebar to navigate through the sub pages of the GUI.

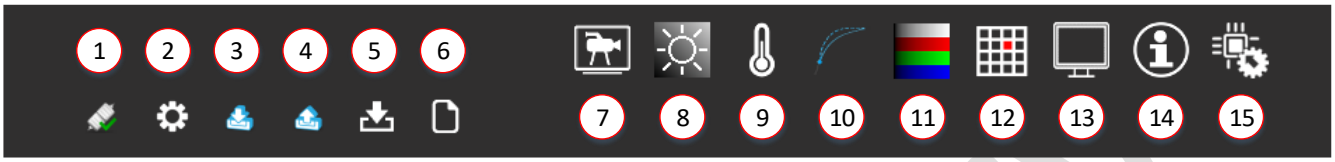

Figure 2 – GUI Toolbar and Sidebar

#	Description
1	Open the connect dialog (section 4)
2	Open the system settings dialog (section 5.2)
3	Load settings from camera to GUI
4	Save settings from GUI to camera for startup configuration
5	Save current system settings to disk.
6	Load settings from disk into GUI and transfer them to the device.
7	In-Out Tab: Configure exposure settings, video output and timecode features. (section 6.1)
8	Black Level Tab: Configure black levels and flare compensation. (section 6.2)
9	White Balance Tab: Configure white balance settings. (section 6.3)
10	Knee Function Tab: Configure the knee function. (section 6.4)
11	Lookup Table Tab: Configure the gamma correction lookup table. (section 6.5)
12	Defect Pixel Correction Tab: Setup the automatic defect pixel correction and create a defect pixel table. (section 6.6)
13	Output Tab: Configure the RGB to YcbCr matrix and fine tune the SDI output range.(section 6.7)
14	Info Tab: Show device and software information and change system settings. (section 6.8)
15	Update Tab: Perform device updates. (section 6.9)

Table 3 – GUI Toolbar and Sidebar legend

5.2 System Setting Dialog

The settings dialog is used to configure general device and GUI settings.

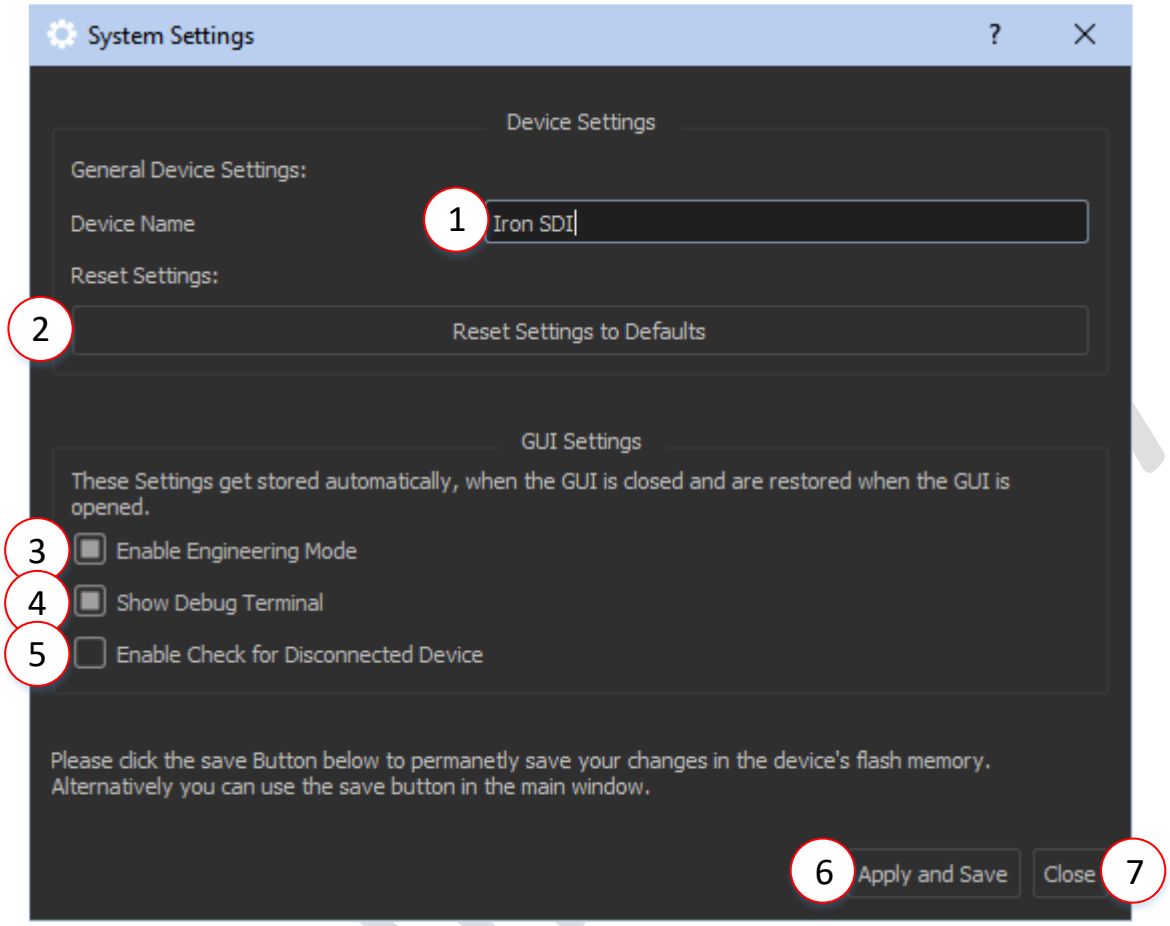

Figure 3 – System Setting

#	Description
1	Use this field to enter a new device name.
2	Use this to reset all settings to factory defaults. Please note that this will delete any changes made! These setting must
3	Enable the engineering mode to display additional GUI features.
4	Enable the Debug Terminal (see section 5.3).
5	Enable a periodic connection check. If enabled the GUI will ping the connected device every 2 seconds. If device connection is lost, a dialog will be displayed.
6	Apply all Settings and Save the settings permanently.
7	Close the settings dialog. Please note that this will delete any changes made! These setting must be saved separately before performing a full reset in order to be re-used later.

Table 4 – GUI System Setting legend

Notes:

1. The GUI Settings (4 and above) will be saved when the GUI is closed and are restored when it is opened again.

5.3 Debug Terminal

The Debug Terminal shows all commands which are send by the GUI. It can also be used to manually send commands to the device. By default the Debug Terminal opens as a docked widget of the main window. You can turn it into a stand-alone window by grabbing it and dragging it away from the main window.

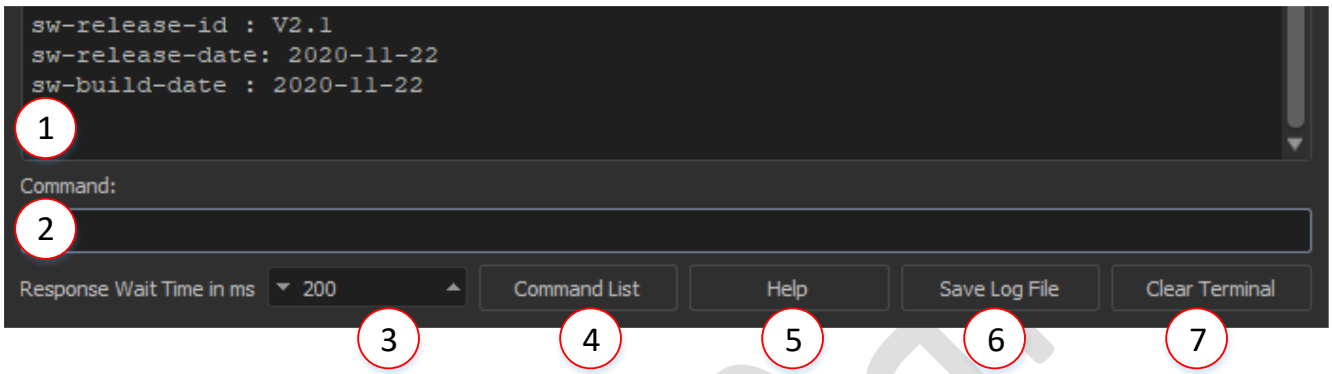

Figure 4 – Debug Terminal

#	Description
1	History of send / received commands. This window shows a maximum of 10,000 lines: older lines get deleted as soon as this limit is reached.
2	The command line can be used to enter commands .The command line features a command history which can be accessed by pressing the Up and Down keys while the command line is active. The command history can contain up to 100 commands and older commands are deleted as soon as this limit is reached. Copying and pasting a list of commands is also possible. Please make sure that that an appropriate command response wait time has been selected (see point 3).
3	Specify a maximal process time. For most commands the default of 200ms is sufficient. For long commands like storing the DPCC table or enabling Genlock the wait time must be increased or the device's answer won't be seen. If a script with multiple commands is run by pasting it into the command line a wait time which is long enough for the most time consuming command in the script is needed.
4	displays a full list of supported camera commands
5	Show the in-application help of the Debug Terminal.
6	Saves the current content of the Debug Terminal to a text file.
7	Clears the content of the Debug Terminal. Does not delete the command history.

Table 5 – Debug Terminal legend

6 The Tabs

Each tab focuses on a certain feature set of the device. Below is a list of all tabs currently available in the GUI.

6.1 In-Out Tab

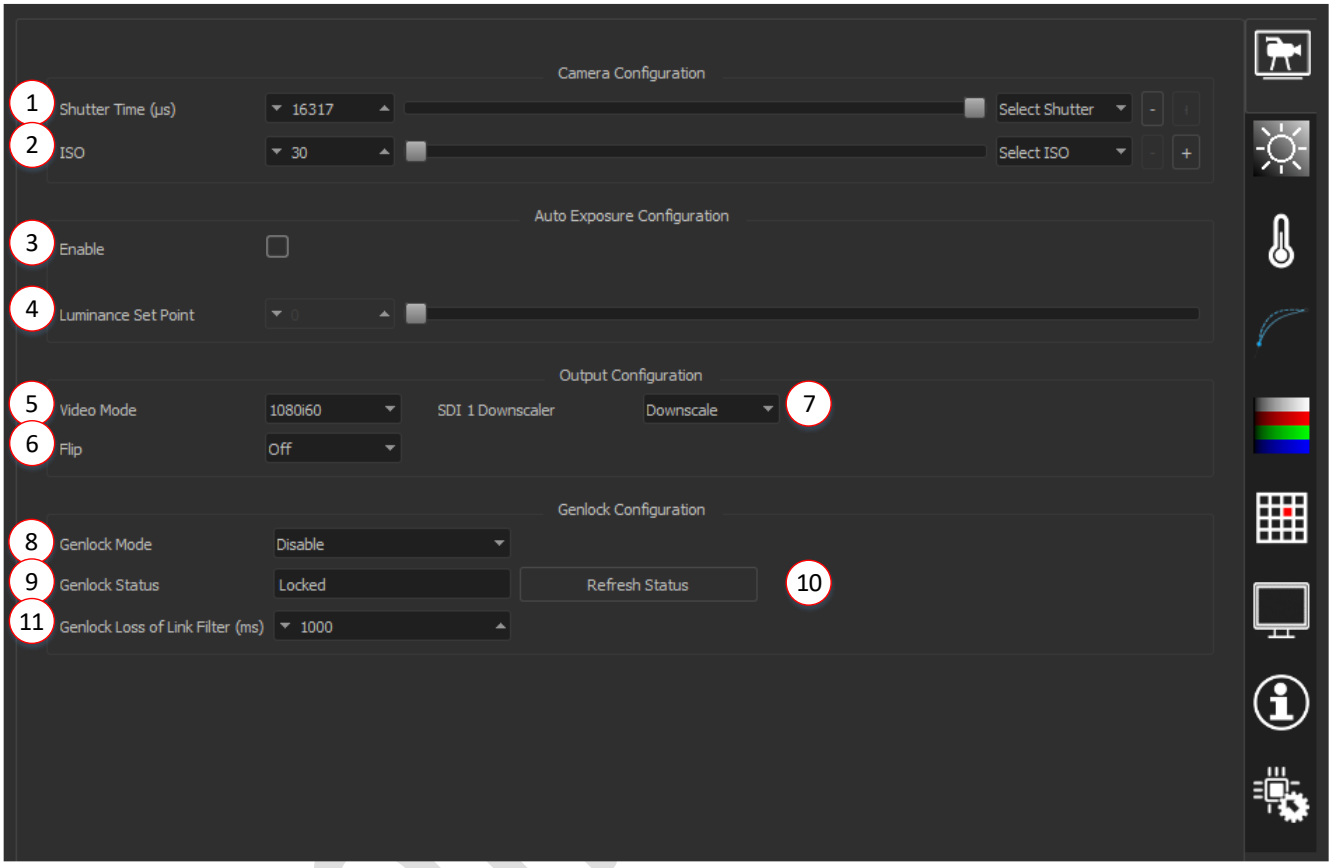

Figure 5 – In-Out tab

#	Description
1	Manually set the shutter time in microseconds. Can only be adjusted if auto exposure is disabled. The Combo Box and the "+" and "-" buttons to the right of the slider can be used to switch between common exposure time presets.
2	Manually set the sensor gain (ISO). High values will lead to a brighter image bat also more noise. Can only be adjusted if auto exposure is disabled. The Combo Box and the "+" and "-" buttons to the right of the slider can be used to switch between common ISO presets.
3	Enables auto exposure. This will automatically adjust shutter time, ISO and aperture (if available). Can be turned off to use manual settings (see 2 and 3). Elements 5 to 10 will show If enabled.
4	The luminance set point defines how bright the auto exposure will set the output image.
5	Set the video mode (resolution and timing).
6	Set the flip mode to mirror the image vertically, horizontally or both (rotate 180°).
7	Enable 4K to 2K downscaler and optional interlacer for the first SDI output. This option is only available for 4K cameras, see the cameras reference manual for more details.
8	The genlock mechanism is used to synchronize multiple cameras video signals. The combo box allows to choose between genlock available modes.
9	Displays the current genlock status of the device.
10	Sends a status command to the device and updates its status accordingly.
11	The loss-of-link (lol) timeout can be configured to prevent glitches in the unstable genlock signal.

Table 6 – In-Out tab legend

6.2 Black Level Tab

Figure 6 – Black Level tab

#	Description
1	Sensor black for all colors (only visible when “Engineering Mode” is enabled).
2	Sensor black for each component separate (only visible when “Engineering Mode” is enabled).
3	Flare compensation (defog) for all colors.
4	Flare compensation (defog) for each component separate.
5	Master black for all colors.
6	Master black for each component separate.

Table 7 – Black Level tab legend

6.3 White Balance Tab

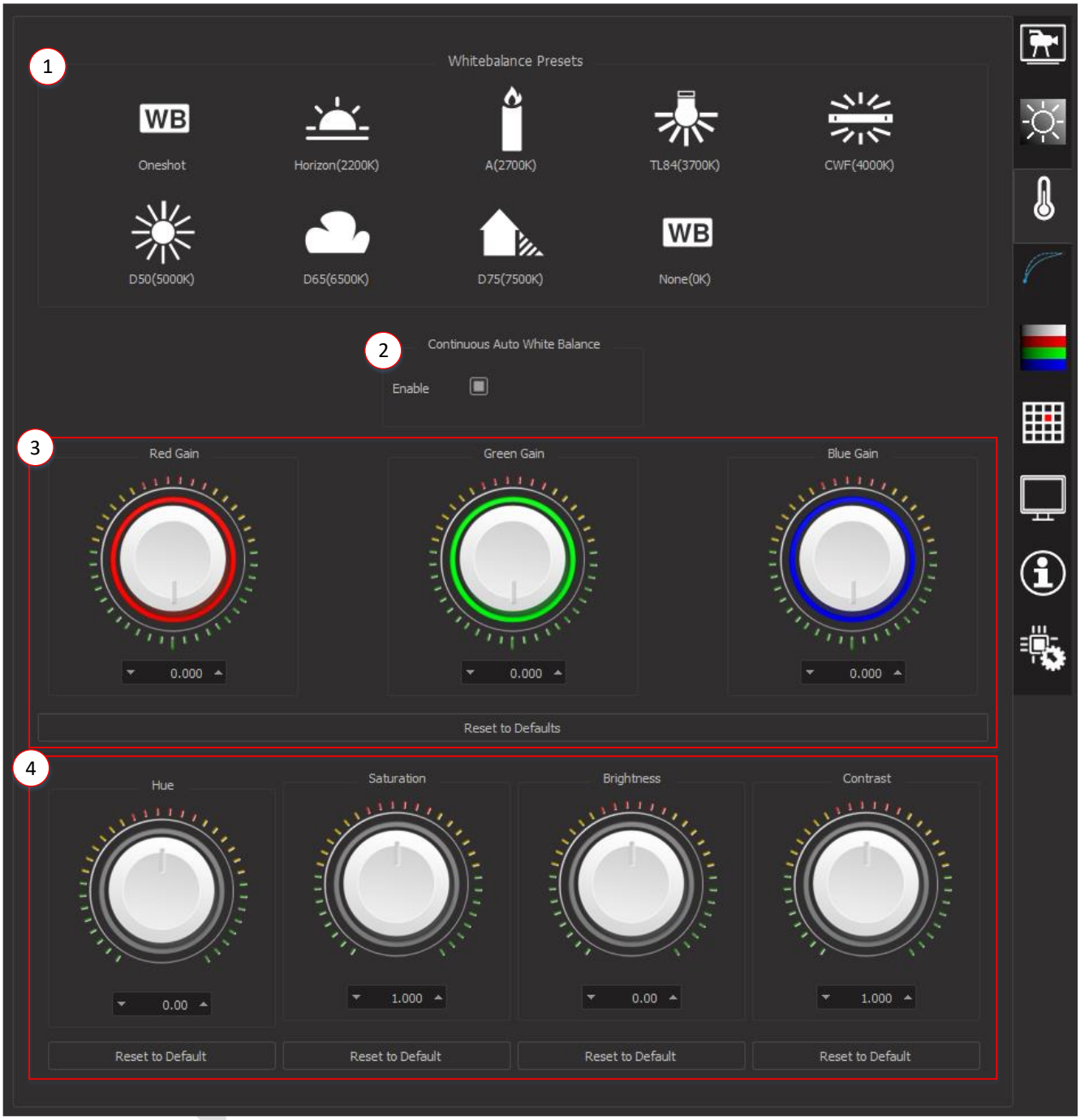

Figure 7 – White Balance tab

#	Description
1	White balance presets
2	Configure continuous automatic white balance (AWB). A higher speed means faster adjustment, but also a less fluid look of the AWB.
3	Manual red, green blue gain.
4	Post processing: Hue, Saturation, Brightness, Contrast

Table 8 – White Balance tab legend

6.4 Knee Function Tab

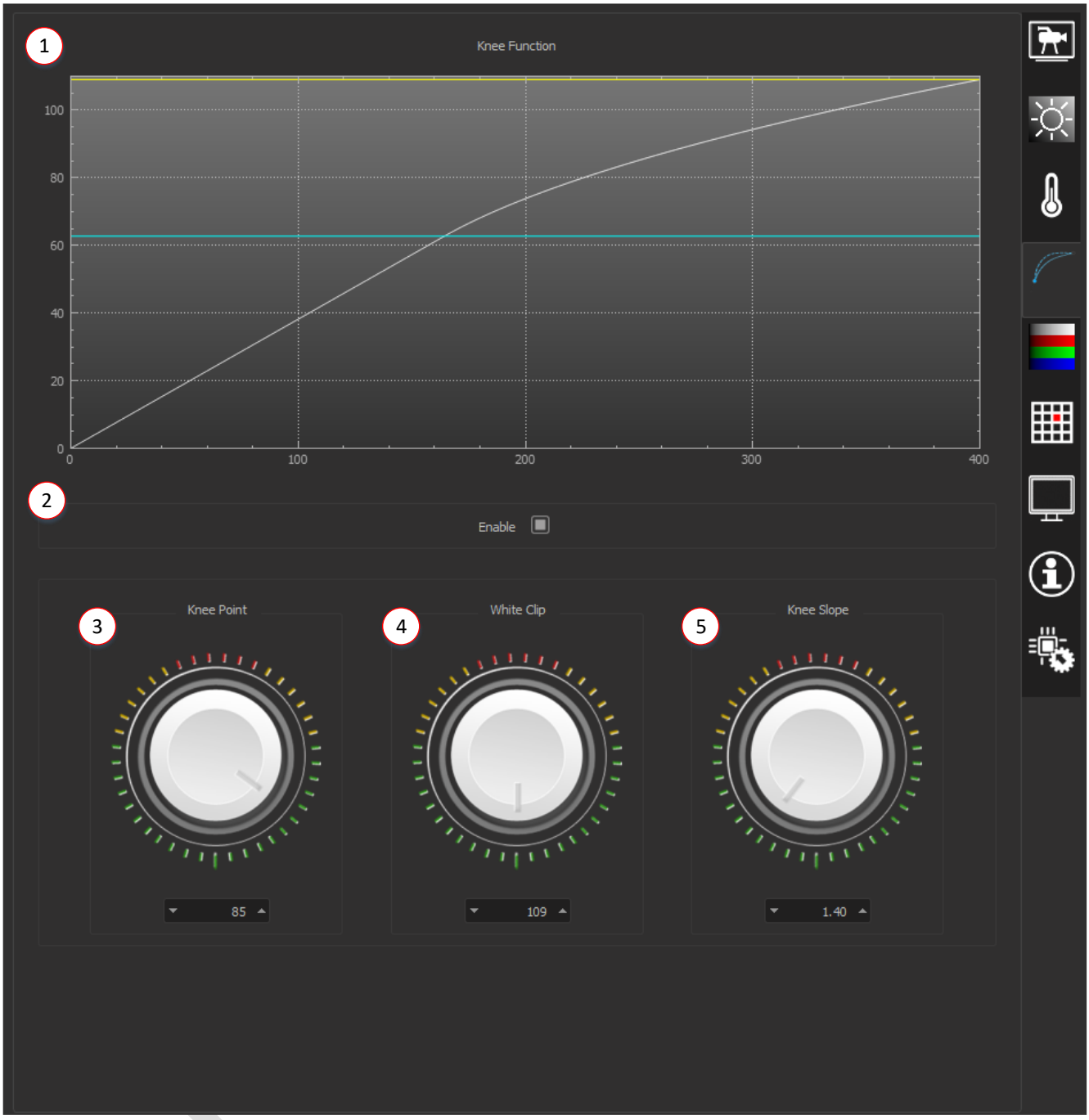

Figure 8 – Knee Function tab

#	Description
1	Graphical view of current knee settings.
2	Enable knee function.
3	Knee Point setting (point where the curve bends, indicated by the blue line in the plot).
4	White Clipping Point setting (maximum value of the knee function, indicated by the yellow line in the plot).
5	Knee Slope setting (angle of the first part of the knee function till the knee point).

Table 9 – Knee Function tab legend

6.5 Lookup Table Tab

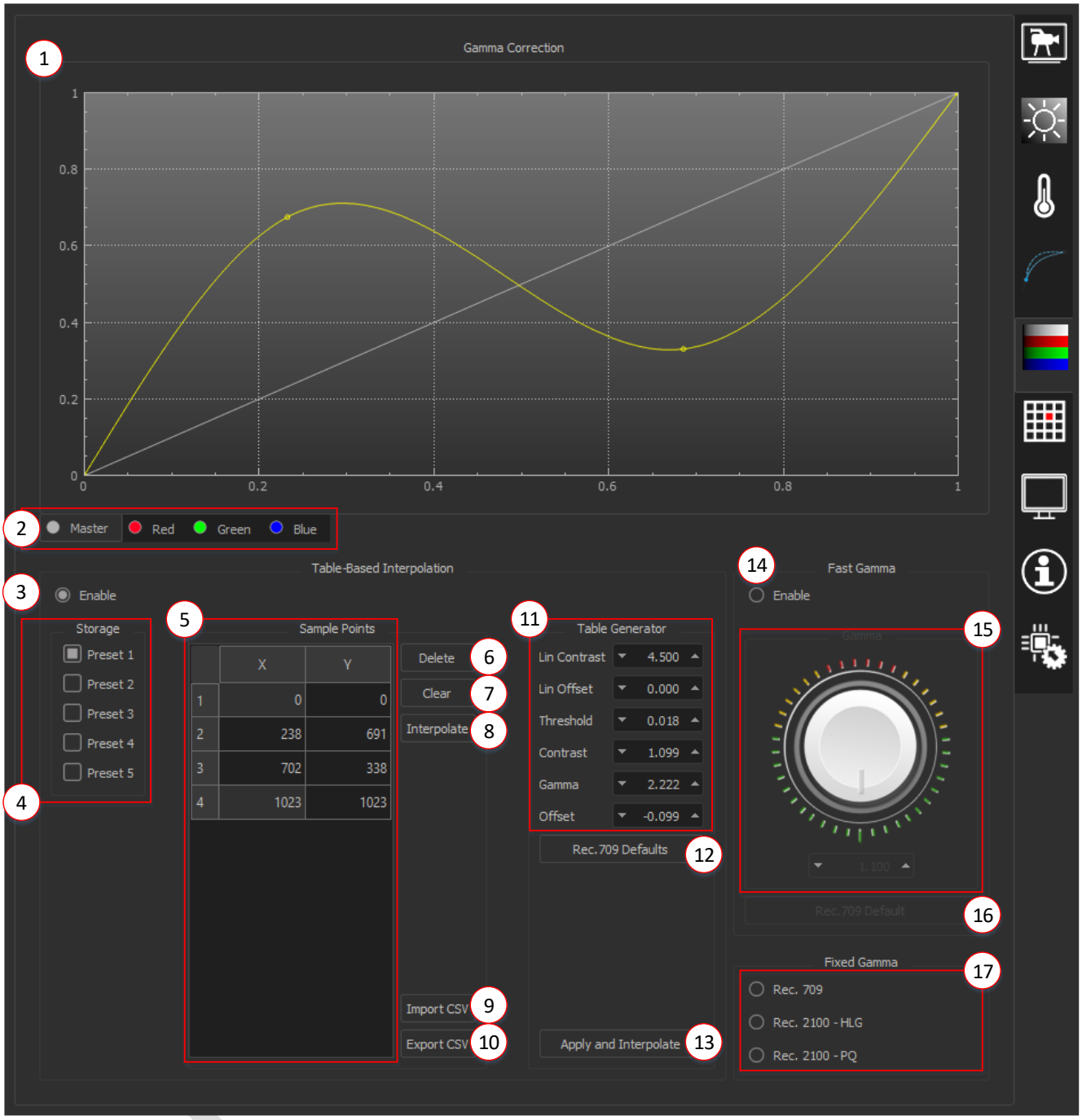

Figure 9 – Lookup Table tab

#	Description
1	Graphical representation of current gamma curve. Adding a new sample point is done by clicking on the plot (up to 24 points). Only possible in “Table-Based Interpolation” mode; “Fast Gamma” mode the will plot an un-editable preview of the gamma curve.
2	Gamma channel selection. The RGB curves will be overlain with the master curve to create to resulting RGB curves. The GUI will show the resulting curve with a darker color. In “Fast Gamma” mode, the channels cannot be separately and only “Master” will be shown.
3	Enables “Table-Based Interpolation” which allows for a fine adjustment of the gamma curve but is not ideal for real-time gamma changes.

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4	It is possible to store up to 5 different tables of sample points. The storage selector can be used to switch between them.
5	Table of all sample points for the selected curve and preset. Entries can be edited by double clicking a value.
6	Deletes the currently selected entry out of the table.
7	Clears all sample points from the table. This will create a linear de-gamma function for the currently selected curve and preset.
8	Calculates LUT tables for given sample points on the device. **This must be done to apply any changes.**
9	Loads a gamma curve from a file.
10	Saves the current gamma curve to file.
11	Fine tunes the parameters to generate a custom de-gamma curve. By default the parameters in this box are set to generate a standard REC.709 de-gamma curve.
12	Resets the REC.709 parameters to their defaults to restore the standard REC.709 de-gamma curve.
13	Calculates the de-gamma curve based on the given parameters for the currently selected curve and preset. This will also apply the curve on the device. Please note that to generate the default behavior, the Master curve should be set to REC.709 and the RGB curves should be linear.
14	Enables “Fast Gamma” mode which changes the gamma curve by varying only one parameter. In this mode you cannot set the RGB channels separately, but it is faster and thus can be used during production.
15	Changes the gamma value.
16	Sets the gamma value to REC.709 default.
17	Enables “Fixed Gamma” mode where the gamma curve is set to a fixed preset. REC.709, REC.2100 PQ or REC.2100 HLG can be selected.

Table 10 – Lookup Table tab legend

6.6 Defect Pixel Correction Tab

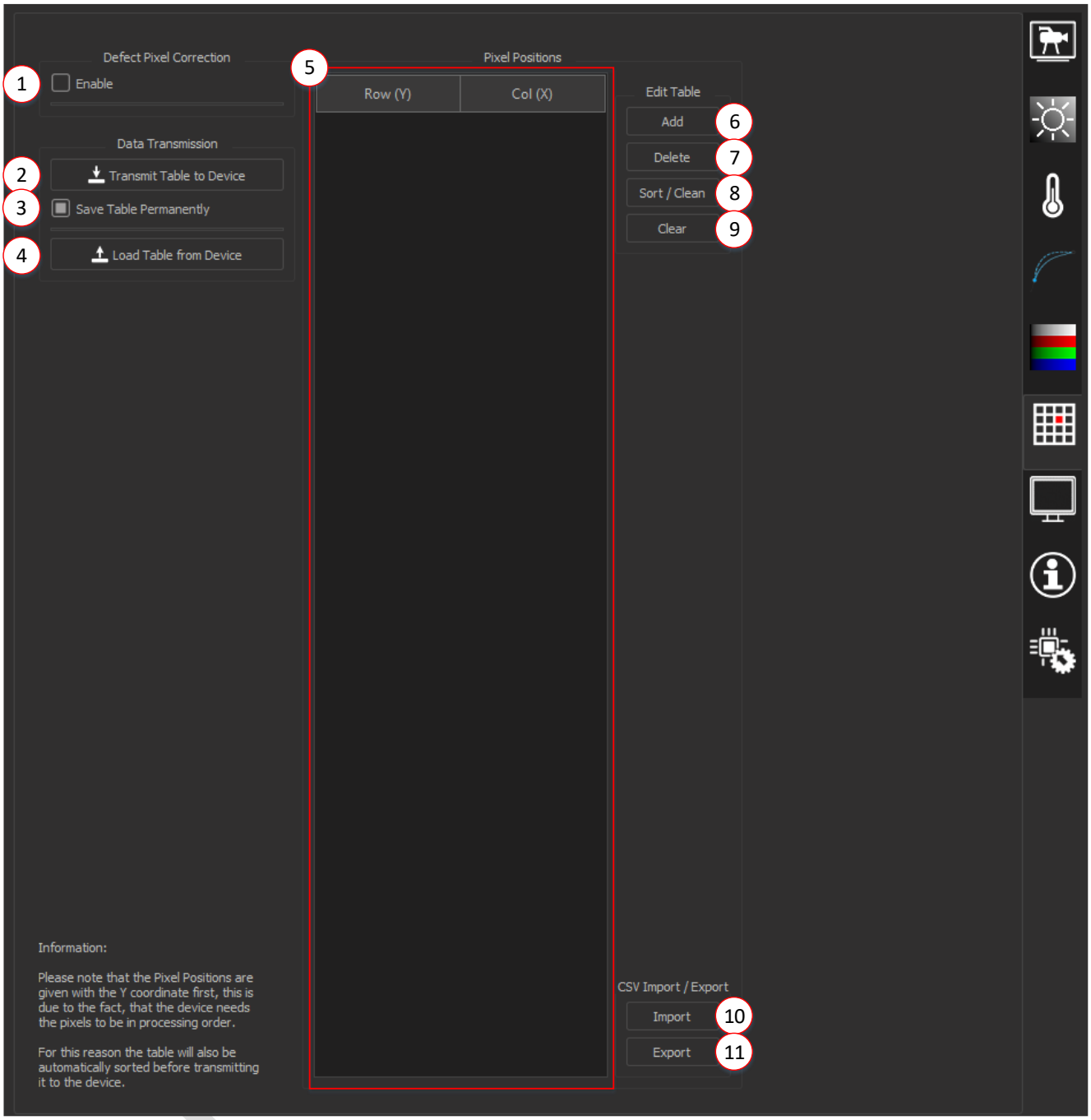

Figure 10 – Defect Pixel Correction tab (full version)

#	Description
1	Enables the defect pixel correction module.
2	Transmits the pixels entered in the table to the device. Pressing the button is necessary to apply changes to the table.
3	Stores the table in the permanent memory and will restore it after a power cycle. If the box is not checked the table will only be stored in the non-permanent memory and will be reset after a power cycle.
4	Loads the table from the device. This will always load from the permanent device memory!
5	Table of defect pixel positions. Double clicking a value will enable editing.
6	Adds a position to the table.

7	Deletes the selected position from the table.
8	Sorts the table and remove duplicates.
9	Deletes all positions from the table.
10	Imports a CSV file with the defect pixel table.
11	Exports a CSV file with the defect pixel table.

Table 11 – Defect Pixel Correction tab legend (full version)

6.7 Output Tab

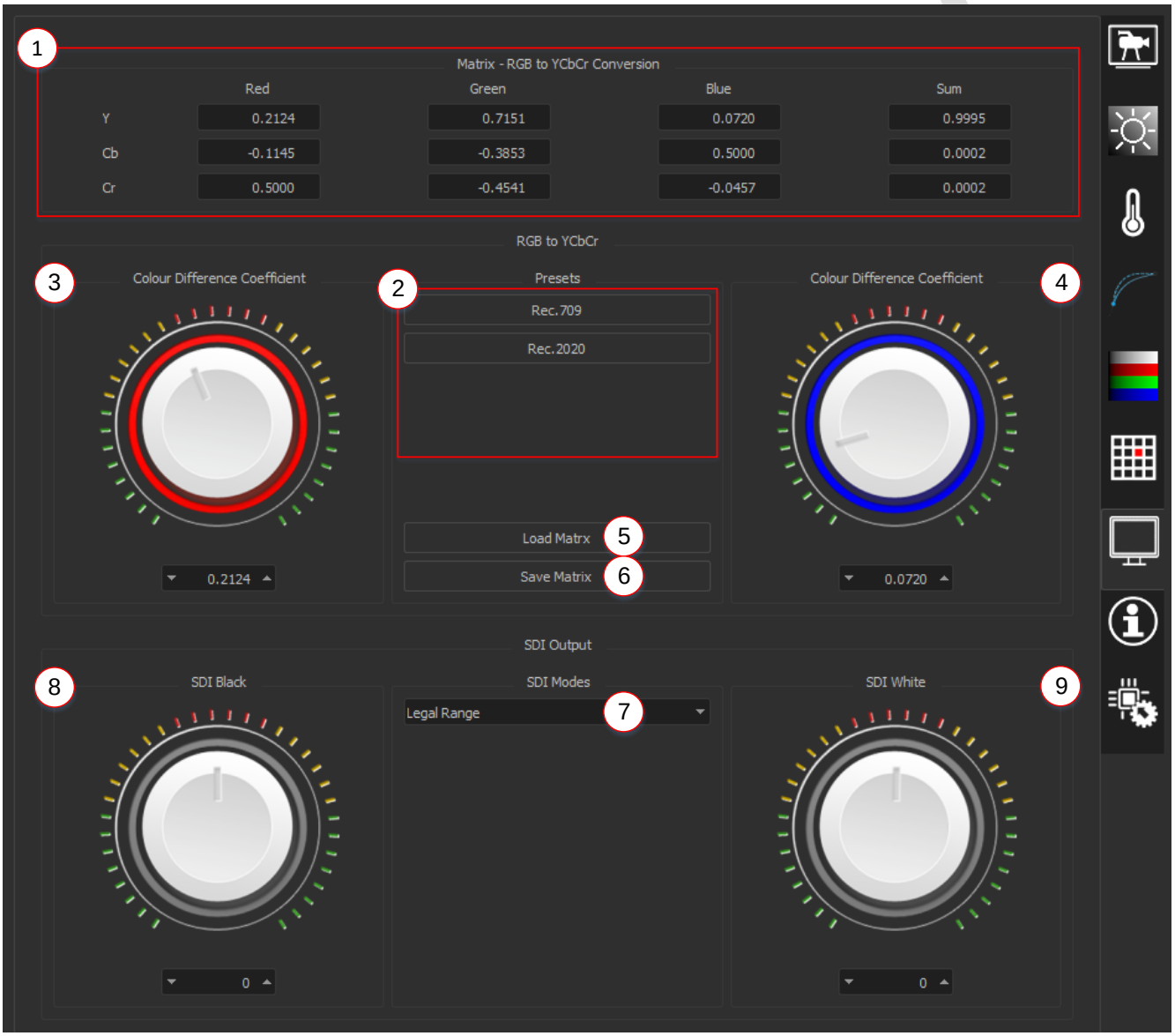

Figure 11 – Output tab

#	Description
1	Shows the values of current color conversion matrix. (engineering mode only)
2	Lists presets for color conversion. Default is Rec.709, Rec.2020 is usually used for UHD video\ HDR content. (eng. mode)
3	Fine tunes the matrix red balance. (engineering mode only)
4	Fine tunes the matrix blue balance. (engineering mode only)
5	Loads the color conversion matrix from a file. (engineering mode only)

6	Saves the color conversion matrix to a file.
7	Sets SDI output range to legal or extended. In legal range mode, the black and white levels can be fine-tuned (see below).
8	Sets SDI black level (extend dynamic).
9	Sets SDI while level (extend dynamic).

Table 12 – Output tab legend

6.8 Info Tab

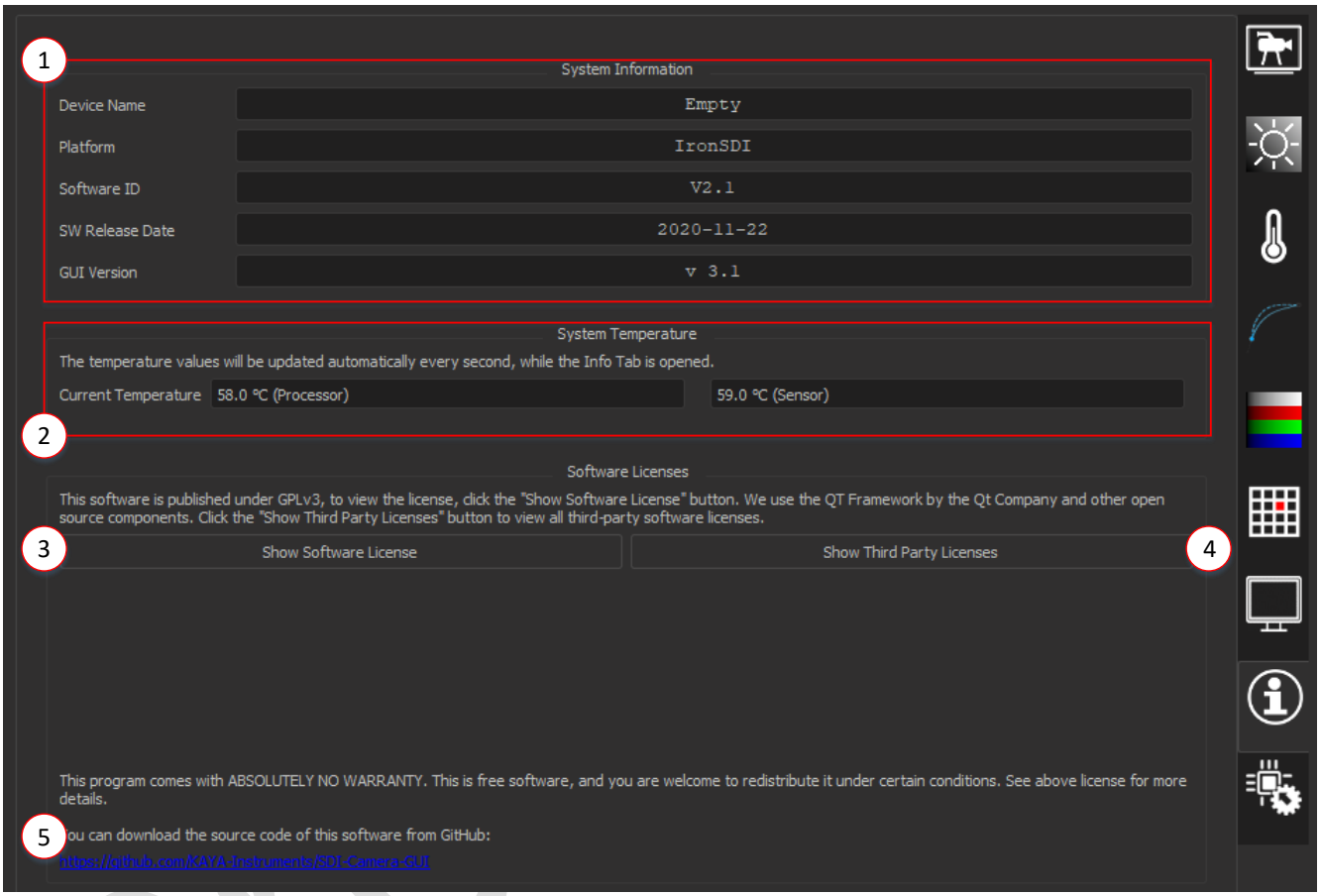

Figure 12 – Info tab

#	Description
1	General information about the connected device is shown in the system information box.
2	Information about the operating temperature of the device.
3	Shows the open source software license of the GUI software.
4	Shows the open source software licenses of third party software, which is used in the GUI.
5	Opens the GitLab page of the ProVideo GUI.

Table 13 – Info tab legend

6.9 Update Tab

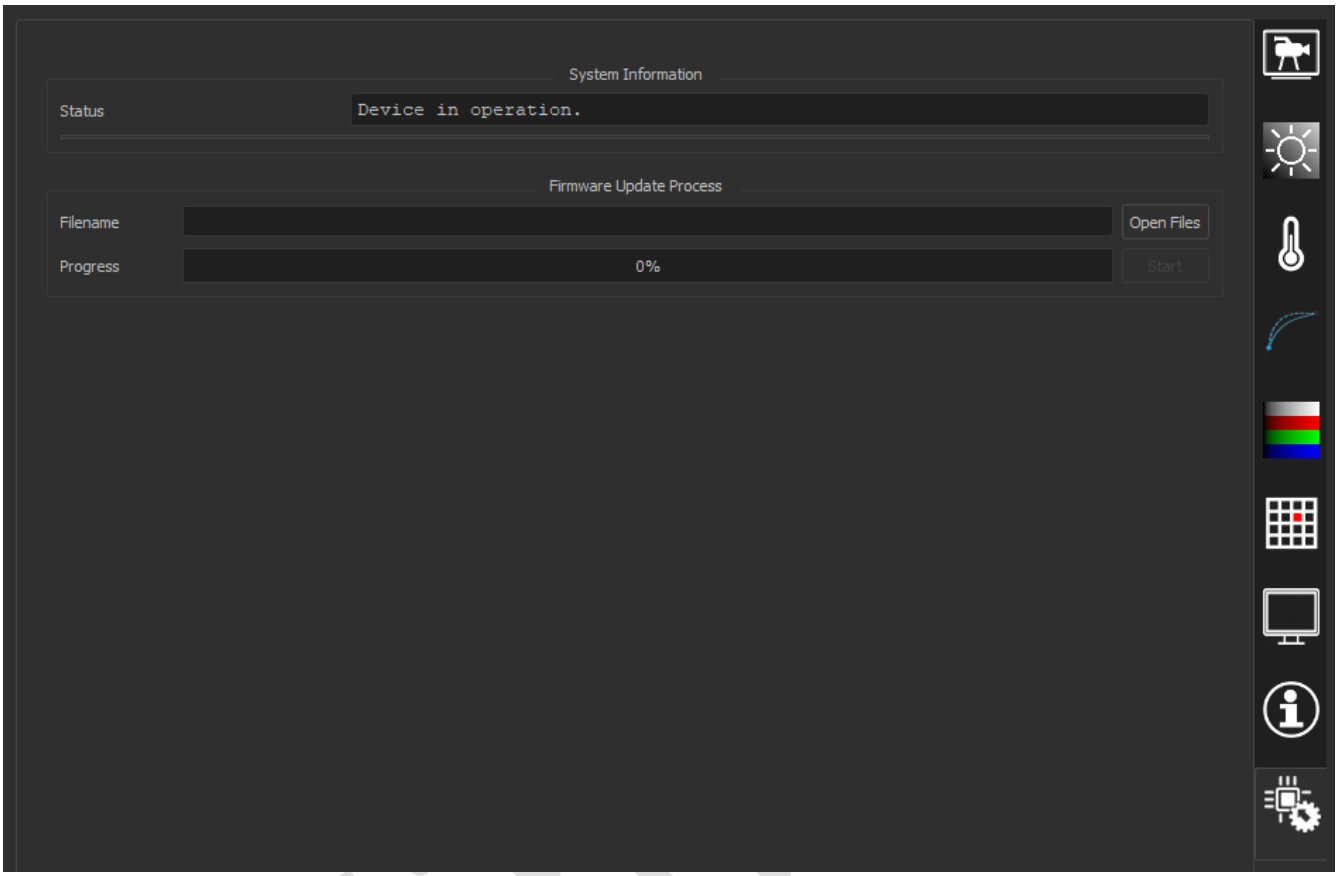

Figure 13 – Update tab

#	Description
1	Shows the current status of the device.
2	Shows information about the file which is currently being flashed to the device.
3	Opens a file open dialog. The GUI will automatically choose the correct update file and display its name in the "Filename" field, making direct file selection unnecessary. An Update can consist of more than one file, in that case the total amount of files will be shown to the left of the progress bar. Alternatively, it is possible to drag an update file from the file explorer to the Update Tab to load it.
4	Initiates the update process
5	Shows the current status.

Table 14 – Update tab legend

Notes:

1. During an update the "Start" button will change into the "Abort" button. Please note that aborting the update will leave the device in a non-functional state and re-running the update will be required to make the device operational again.