SPECTRO3-Scope:
Changes due to software update
from SPECTRO3-Scope V4.3 to 4.4

This manual summarises the changes that were made with the software update from **SPECTRO3 V4.3** to **V4.4**.

It is possible to update the software from V3.3 to V4.3. In this case, however, an intermediate step is required to save the data. The respective procedure is exactly described in the **"Firmware update SPECTRO3 V3.x to SPECTRO3 V4.x"** file.

A software update from V4.x to V4.4 can be performed quite easily.
All you need is the FirmwareLoader V1.1 and the firmware files for version 4.4.
The FirmwareLoader V1.1 can be found on the CD that is provided with the sensor or can be downloaded from our homepage.
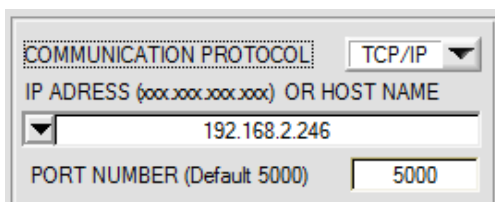The firmware files are available from your sensor supplier.
The respective procedure is exactly described in the **"Manual FirmwareLoader V1_1"** file.

Change 1:
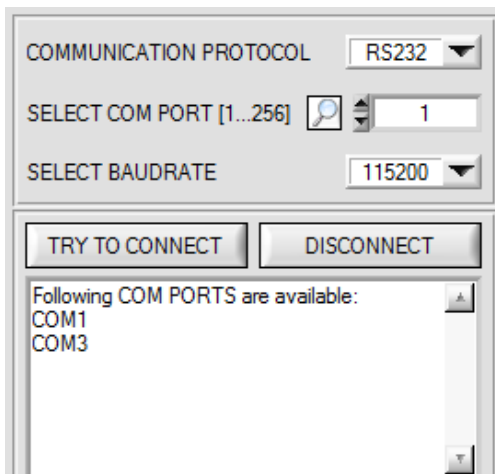
A click on the magnifier symbol in the **CONNECT** tab opens a list with all the possible **COM PORTS** in the display.

Change 2:

The **PORT NUMBER** for a TCP/IP connection as standard is pre-initialised as **5000**.

The **cab-4/ETH** RS232 to Ethernet adaptor now is available for communication of the sensor through a local network. With this adaptor a connection to the sensor can be established using the **TCP/IP** protocol.
Parameterisation of the **cab-4/ETH** adaptor (assigning of IP address, baudrate setting, ...) can be done with the **SensorFinder software** that is available free of charge on the internet.

In order to establish a connection through the adaptor, its IP address or HOST name must be entered in the input field **IP ADDRESS (xxx.xxx.xxx.xxx) OR HOST NAME**. The DROP DOWN menu (down arrow) shows the last 10 IP addresses that were used. An address from this list can be directly selected by clicking on the respective item. The DROP DOWN list is saved and is thus always available.
The **PORT NUMBER** for the network adaptor is set as **5000** and must not be changed.

Change 3:

Introduction of POWER MODE = DOUBLE:
If an application involves both very bright and very dark surfaces, and the sensor is set such that it is not in saturation at the bright surfaces, the dark surfaces frequently provide only a very low signal.
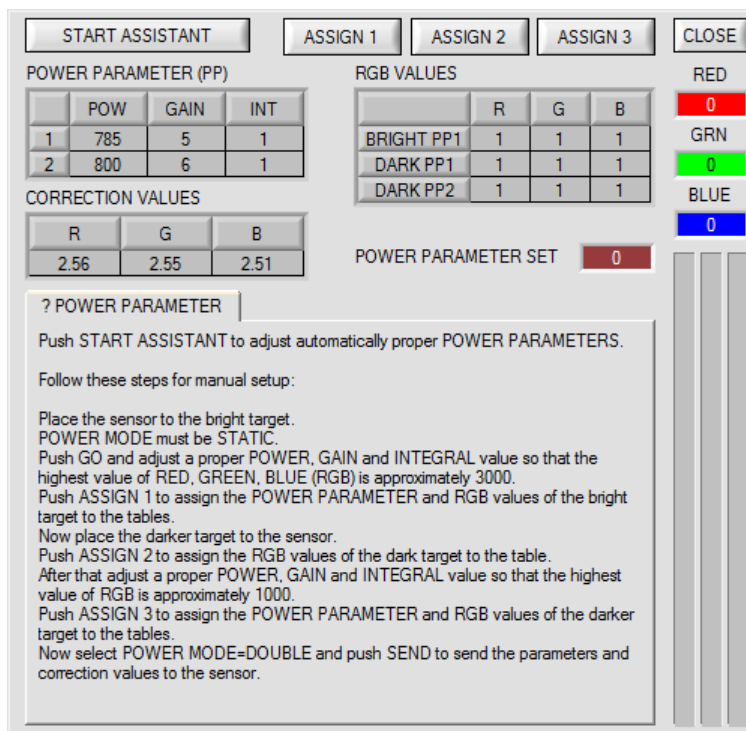Little variations with a very low signal lead to a large change in color space calculation. To minimise this effect, the sensor in **PMODE = DOUBLE** automatically switches back and forth between 2 **POWER PARAMETER sets**.
Set 2 must be parameterised such that the signal is maximally amplified.
When the signal is too high (saturation), it automatically switches to set 1.
The two parameter sets must be set at the sensor in advance.
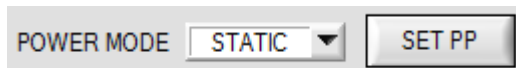
When you click on **SET PP** (Set Power Parameter) a window will open at the right side, where you can set two parameter sets. A parameter set is defined by **POWER, GAIN** and **INTEGRAL.**

Automatic setting of parameter sets:
Pressing **START ASSISTANT** starts a menu guidance for automatically setting of the parameter sets.
Just follow the instructions.

Manual setting of parameter sets:
Set **POWER MODE=STATIC**.
Place the brightest surface before the sensor, and select suitable **POWER, GAIN** and **INTEGRAL** values so that the brightest channel is at approx. 3000 digits.
Then click on **ASSIGN 1** to write the power parameters to row 1 in the **PP** table.
The RGB values are written to the **RGB VALUES** table.
Now place the darkest surface before the sensor.
Click on **ASSIGN 2,** and the RGB values are written to the DARK PP1 row of the **RGB VALUES** table.
Now set **POWER, GAIN** and **INTEGRAL** such that the highest value is at approx. 1000.
Click on **ASSIGN 3** to write the power parameters to row 2 in the **PP** table, and the RGB values to the **RGB VALUES** table.
The correction values are calculated automatically and are written to the **CORRECTION VALUES** table.

INFO!
The power parameter sets only become active when you click on **SEND**!
The tables only are used to display the values. They cannot be edited.
The **POWER PARAMETER SET** display shows which parameter set the sensor currently uses.
When the display shows 0, the sensor operates with the settings in the **PARA1** tab.

PP SET:
This output field displays with which **POWER PARAMETER SET** the sensor is currently working. In **POWER MODE = STATIC** and **DYNAMIC** this value is always 0, i.e. the sensor operates with the values for **POWER, INTEGRAL** and **GAIN** which were set in the **PARA1** tab.
In **POWER MODE = DOUBLE**, **PP SET** is either 1 or 2.

When teaching a color via **TEACH DATA TO** the respective value for **PP SET** is also stored in the **TEACH TABLE**.

A color is then recognized in 2D mode, when **delta C** is less than **CTO** or **siTO** and **INT** or **M** lies in the intensity window that is defined by **INT ± ITO** or **M ± MTO**. In addition, the current power parameter set (**PP SET**) must match with the learned value PP.
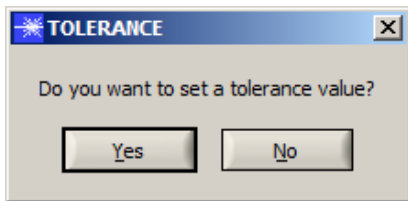
In 3D mode, a color is then recognized when the **delta C** is less than **TOL**. In addition, the current power parameter set (**PP SET**) must match with the learned value PP.

Change 4:
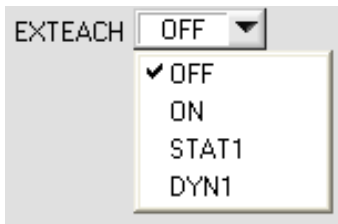
When **EXTEACH** is activated you will be asked whether the **TEACH TABLE** should be reset.
Depending on **EVALMODE** you also will be asked to set a color tolerance and an intensity tolerance.
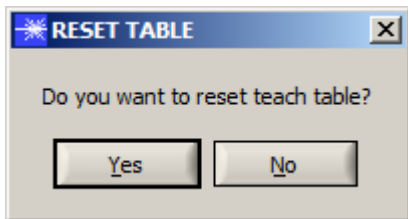
Change 5:

Introduction of **BINARY HI** and **BINARY LO**.
BINARY HI is the same as the familiar **BINARY** mode.
BINARY LO is the inverse bit pattern.

Change 6:

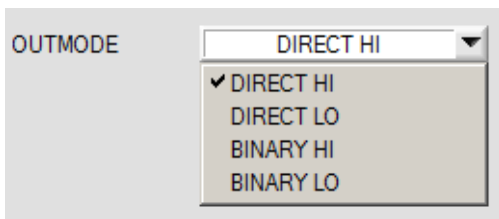|	X	Y	CTO	INT	ITO	
48	1	1	1	1	1	■
49	1	1	1	1	1	■
50	1	1	1	1	1	■
51	1	1	1	1	1	■
52	1	1	1	1	1	■
53	1	1	1	1	1	■
54	1	1	1	1	1	■
55	1	1	1	1	1	■
56	1	1	1	1	1	■
57	1	1	1	1	1	■
58	1	1	1	1	1	■
59	1	1	1	1	1	■
60	1	1	1	1	1	■
61	1	1	1	1	1	■
62	1	1	1	1	1	■
63	1	1	1	1	1	■

C-No:
0

GRP
3

The **TEACH TABLE** was extended to 64 entries.
Rows that cannot be directly provided at the outputs have a gray background.
The rows, however, can be used for forming groups.
Through the serial interface the detected **C-No:** can be read directly.

Change 7:

GEN

TEMP   0

SET ROW COLORS   MANUALLY ▼

SELECT ROW ▲ 0   ROW COLOR ■

ASSIGN TO ROW	RESET
SAVE TO FILE	GET FROM FILE
SAVE TO SENSOR	GET FROM SENSOR

	SPECIFICATION	
0	Color 0	■
1	Color 1	■
2	Color 2	■
3	....	■
4	....	■

With **SAVE TO SENSOR** and **GET FROM SENSOR** the **TABLE ATTRIBUTES** can now be saved to the sensor and loaded from the sensor.

Change 8:
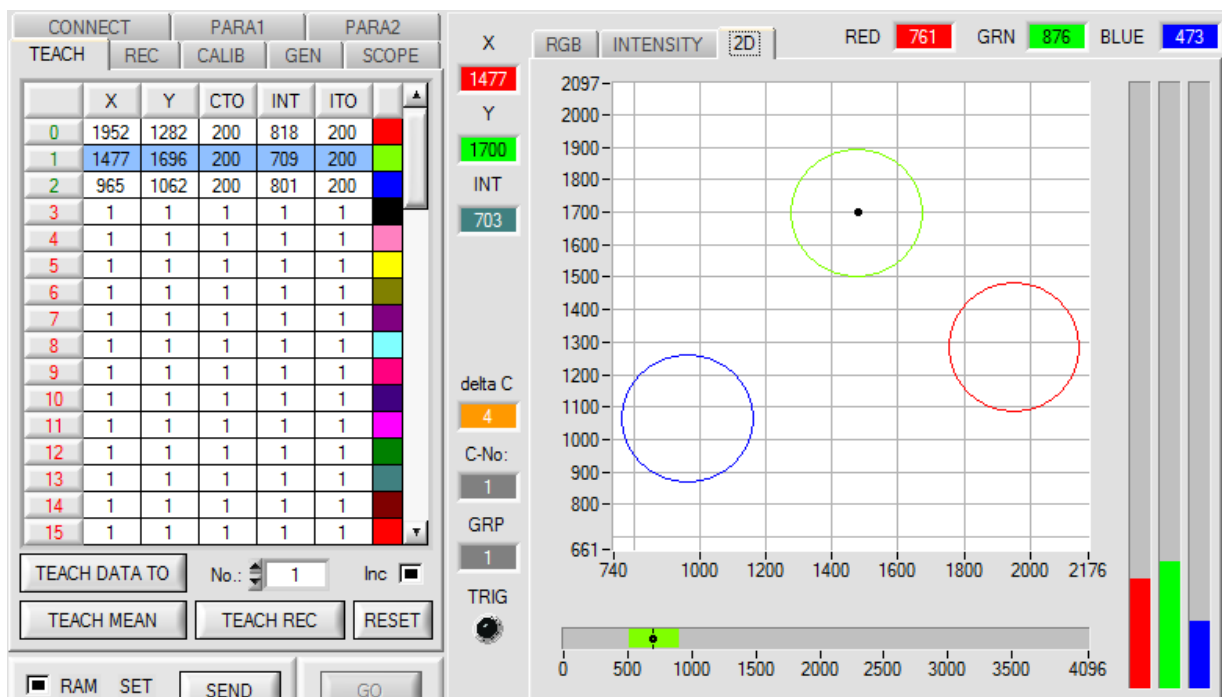
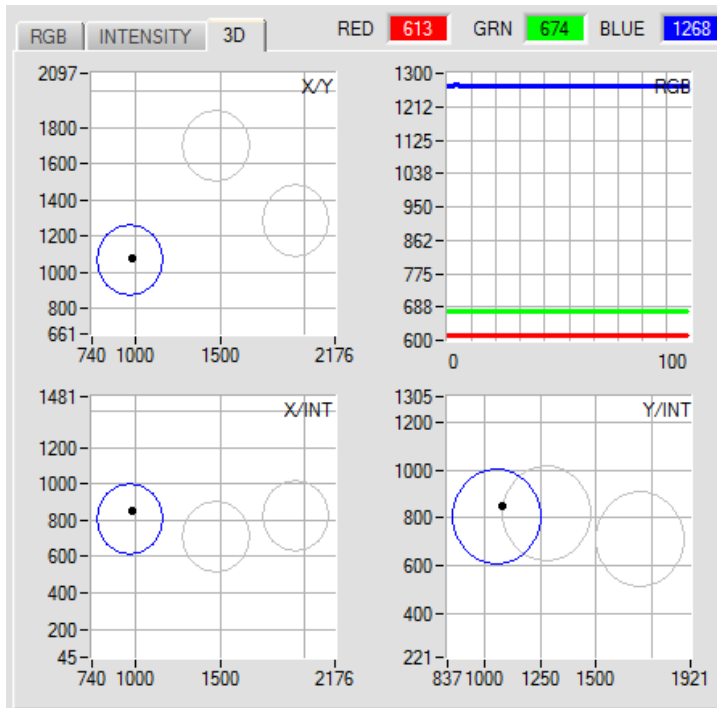|	X	Y	CTO	INT	ITO	
0	1952	1282	200	818	200	🟥
1	1477	1696	200	709	200	🟩
2	965	1062	200	801	200	🟦
3	1	1	1	1	1	⬛
4	1	1	1	1	1	🟪
5	1	1	1	1	1	🟨
6	1	1	1	1	1	🟫

A color hit now also is shown in the table.
The corresponding row has a blue background.

Change 9:

In 2D evaluation mode the tolerance window for the intensity set under No.: is displayed in the corresponding row color.
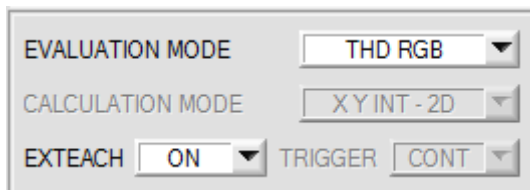
Change 10:

If you double-click with the left mouse button, all the circles will be shown in gray, and only the circle of the detected color will be shown in color.
With a single mouse click you can return to the normal view.

Change 11:

Extension of **THD RGB**.
If a teach mode is selected under **EXTEACH,** the switching thresholds for red, green, and blue can be taught through IN0.
As long as IN0=HI, a maximum and a minimum is determined for every channel.
The **MIN-MAX** values that are found for the channels **RED GRN BLUE** are displayed in the **RGB** tab.

The respective switching threshold is calculated with **THD=(Max+Min)/2** and thus lies exactly in the middle of the determined Max-Min values.
With a click on GET the determined thresholds are displayed in the teach table.

With **EXTEACH=ON** the switching thresholds are saved in the sensor's EEPROM.
With **EXTEACH=STAT1** the switching thresholds are saved in the sensor's RAM.
With **EXTEACH=DYN1** the sensor first regulates itself, then starts the **MIN-MAX** search, and finally saves the switching thresholds in the RAM.

In addition the channel that has the biggest delta between **MIN** and **MAX** now is determined with external teaching. This channel then not only is provided at its respective output (**OUT0**, **OUT1** or **OUT2**), but additionally at **OUT3 and inversely at OUT4**.