Image Access

Bookeye® 3

Version R2

Setup and Assembly Manual

Introduction

Dear Customer,

We congratulate you on the acquisition of this innovative product from Image Access.

We at Image Access are proud of the work we do; it is the result of our extremely high standards of production and stringent quality control.

With the **Bookeye® 3**, Image Access offers an efficient Planetary Scanner which covers a wide scope of applications due to its versatility. Its integrated web based user interface makes all functions available in structured menus.

For this reason, we ask you to read all manuals of the **Bookeye® 3** attentively before starting to work with it. By doing so, you will avoid risks to the user, operation errors and you can control all functions from the beginning.

In addition please consider the following points:

- Damages to your unit may have occurred during shipping. Please check for damages immediately after delivery of the unit. Inform your supplier if damage has occurred.

- Read and ensure that you understand the safety notes. They were developed for your protection and safety as well as to protect the unit.

- Regular maintenance conserves the high quality and safety of the **Bookeye® 3** during the entire service life.

If you have any further questions, please feel free to contact your local dealer or Image Access directly. Our staff will be happy to help you.

We wish you success and complete satisfaction with your daily work with the **Bookeye® 3**.

Regards

Your Image Access Team

About this Manual

Setup and Assembly Manual

This **Setup and Assembly Manual** has been written for users and technical staff with some basic mechanical as well as software skills. Many resellers will offer on-site installation, therefore, some parts of the manual might be of minor interest to the reader. Nevertheless, Section B and Section C must be carefully read to guarantee maximum performance and quality of the product.

The access level at which these setup and adjustment processes are performed is called "Poweruser". This "Poweruser" level is password protected from access by the normal operator.

All manuals can be downloaded from our customer service portal at http://service.imageaccess.de. Be sure to always check for the latest versions of these manuals.

This manual is divided into four sections, A to D.

Section A   describes the hardware of the device. It includes unpacking and mechanical installation. These instructions must be followed carefully to ensure proper functionality, best possible quality, and performance of the device. This device is a precise optical instrument and should be handled accordingly.

Section B   describes the software setup. It includes the optical adjustments necessary after the setup. The section also describes the option installation procedure.

Section C   describes troubleshooting procedures and test scan generation.

Section D   shows all technical data and necessary declarations.

Version History

Version	Published in	Content/Changes/Supplements
A	February 2008	**First release.**
B	April 2008	Some modifications in graphics detail descriptions.
C	June 2008	A new type of gas springs is used with the glass plate. The gas springs are secured with locking springs. Detailed description in chapter A.2.3
D	August 2008	Some minor details in the assembling steps changed. New pictures added in chapter A.2.
E	January 2009	New: Chapter A.2.4 Setting the Initial Lamp Position. List of assembling material revised. Additional information in chapter **B.2 Mandatory Optical Adjustments** Renew of some screenshots of the user interface because of new firmware version.

NOTE:

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and radiate radio frequency energy and, if not installed and used in accordance with the operation manual, may cause harmful interference to radio communications.

Operation of these equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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A   Bookeye® 3 – Hardware

A.1   Content on Delivery

The Bookeye® 3 scanner is delivered in a wooden transport box.

Picture 1: Transport box

The transport box contains all components of the scanner. These are

- the two lamps,
- the camera neck,
- the glass plate,
- a cardboard box containing the camera head and the integrated short part of the camera neck,
- the accessory boxes and
- the reference folder with some test targets.

Please note: Keep the wooden transport box and the cardboard box for future use!
For warranty returns, the scanner **must be sent back in the original transport box** to avoid transport damages.

The crates and the inserts have been designed and tested to withstand all impacts, in accordance with the internationally recognized test procedure ISTA-1B for packages over 150lbs or 68kg. Details can be found at http://www.ista.org/Testing/Tests.htm.

This requires that the packaging instructions are followed precisely. One common mistake made is that additional parts are put in the side pockets formed between the crate and the PE- inserts. This space must be free of obstacles in any case; because in the case of an impact, the inserts will compress to 40% of their original size and the free space will be used up completely.

The two lamps and the camera neck are placed on a cardboard separator. They are held in position by foam rubber elements.

Lamps: (1) and (2)

Camera neck: (3)
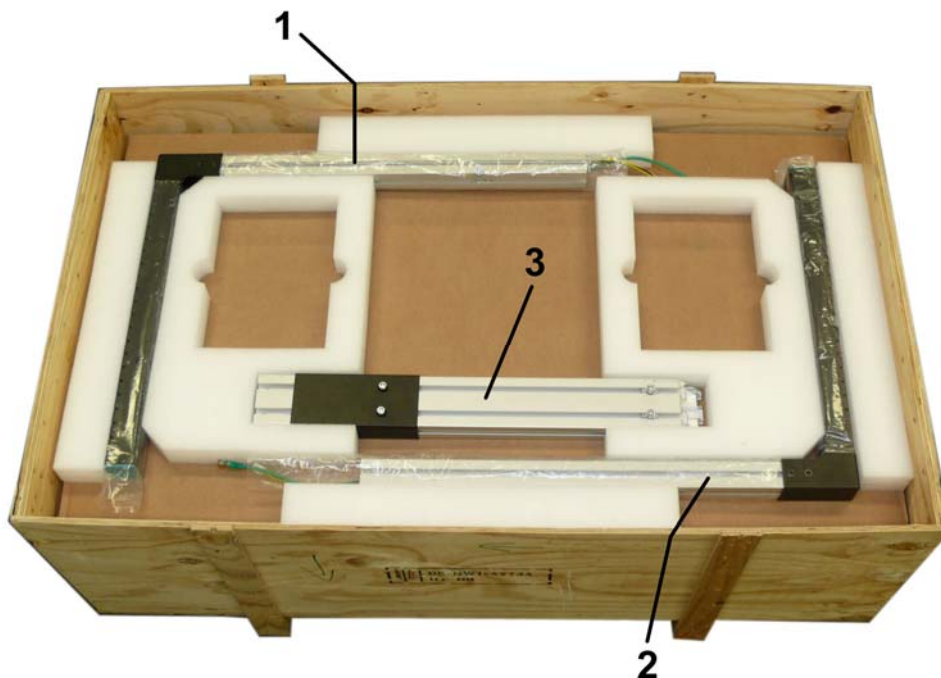
Picture 2: Lamps and camera neck on cardboard separator

After removing the cardboard separator, the reference folder (Picture 3, item 1) and the cardboard box with the camera head (Picture 3, item 2) are visible.

Picture 3: Cardboard separator removed, cardboard box (item 2) with camera head

Take the cardboard box (which contains the camera head) out of the transport box and remove the reference folder from the scanner

Picture 4: Camera transport box beside wooden transport box

In addition to the camera head, the transport box also contains two accessory boxes.
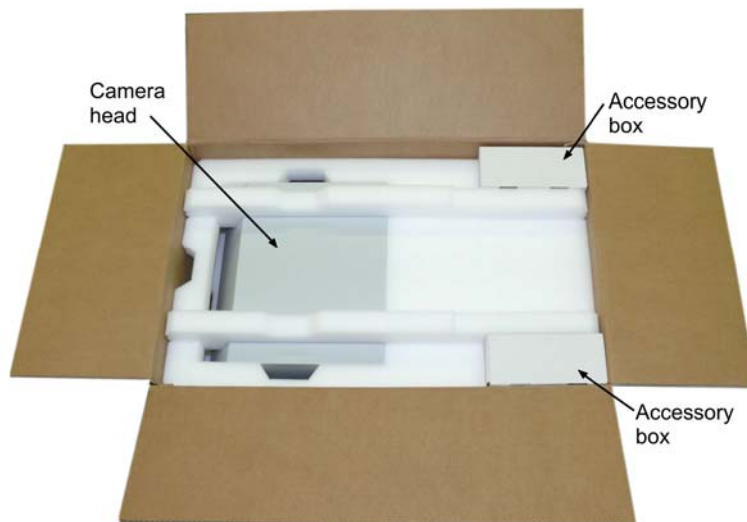
Picture 5: Contents of camera transport box

A.1.1 Tools and Assembling Material

The accessory boxes contain the assembly materials and some tools.

Tools:

1x Hexagon ball shaped head screwdriver, size 6 mm

1x Allen wrench, size 4 mm

1x Allen wrench, size 3 mm

1x Allen wrench, size 2.5 mm

Assembling material:

6x Allen screws, M4x10. Used to fix the cover of the scanner to the scanner's body.

8x Allen screws, M8x12, with plastic washers. Used to fix the lamps (4x) to the scanner housing, to fix the hinges to the lamps (2x), and to fix the green cover (2x).

2x Allen screws, M8x14; with metal washers. Used to fix camera head and camera neck.

10x Allen set screws, M8x8. Used to fix the camera neck at the scanner's body (8x) and to fix the neck to the camera head (2x).

4x Lens head Allen screws, M4x10. Used to fix the cover of the scanner to the scanner's body.

2x Hinges

2x Gas springs for the glass plate

A Recovery key

A network cable, a cross-over cable, and a power cable.

Micro fiber cleaning cloth for the book cradle and other surfaces.

Please note: Keep the transport boxes for future use! For warranty returns, the scanner must be sent back in the original transport box to avoid transport damages.

In the camera neck, four T-slot nuts are inserted.

Two T-slot nuts are used as counterparts to the screws which fix the camera head to the camera neck. The two T-slot nuts on the rear side are used as counterparts to the screws which fix the cover between camera head and neck.

A.1.2   Device Location

A.1.2.1   Environment

Choose a location that complies with the temperature and humidity specifications. Refer to chapter D.2 for detailed environmental specifications.

A.1.2.2   Ambient Light

The location should have a controlled ambient light situation. Light scenarios which should be avoided are direct sunlight, spotlight from light beams, light sources that cause sharp shadows on the scanning bed, high levels of ambient light and varying light conditions.

The Bookeye® 3 scanner is an open system with a built-in high quality light source. Open system means that the ambient light is added to the light seen by the camera.

The recommended location for the Bookeye® 3 scanner:

- Is not exposed to daylight.

- Is evenly illuminated from the ceiling with fluorescent lamps with electronic ballasts. The light intensity measured on the book cradles should be 300 lux or less.

- The light should not cause any shadows; therefore the variation of the intensity across the scan area should be kept below 20%.

If the fluorescent lamps are powered by non-electronic ballasts, they will produce a flicker twice the frequency of the main power supply (100Hz or 120Hz). If the intensity of this light becomes too high, vertical stripes of even distances of approx. 8-12 pixels will be visible on the scan.

Direct sunlight will vary over the day and will result in overexposed images. Sunlight can also produce sharp shadows.

Light beams from spotlights will also produce sharp shadows. In most cases, they emit a high level of infrared light. Infrared light is not visible to the human eye but to the camera. The light source of the Bookeye® 3 scanner itself has no infrared content at all. The advantage is that the scanner does not have an image quality degrading infrared filter. Too much infrared content will result in overexposure.

The Bookeye® 3 scanner has an integrated "White Balance" function. This function will compensate for any ambient light influences. Therefore, it is recommended that you execute the "White Balance" function when the ambient light scenario has changed.

A.1.2.3 Scanner Table

Place the device on a flat and solid base, preferable a solid table.

Please note: The load bearing capacity of the table must correspond to the device weight. The table should be build to hold **at least three times** the weight of the unit.

Also it should not shake or move to avoid image distortions. If the table is too weak it can be attached to a solid wall to stabilize it.

A.1.2.4 Power outlet

Ensure that the power outlet is always accessible when the scanner is placed at its working position.

This will help to separate the device from the power outlet in case of an emergency.

A.2   Assembling the Components

A.2.1   Assembling the Camera Head to the Neck

Take the camera head out of its transport box and place it on a suitable table.

Note: For the following steps, the camera head must be placed with the top side down on the table.

The cables coming out of the camera head must be inserted into the neck and must be guided through it.

One end of the neck and the end of the camera head element are cut at a corresponding angle.

Insert the cables at this end of the neck and push them forward carefully. The cables are protected by a flexible foam material tube.
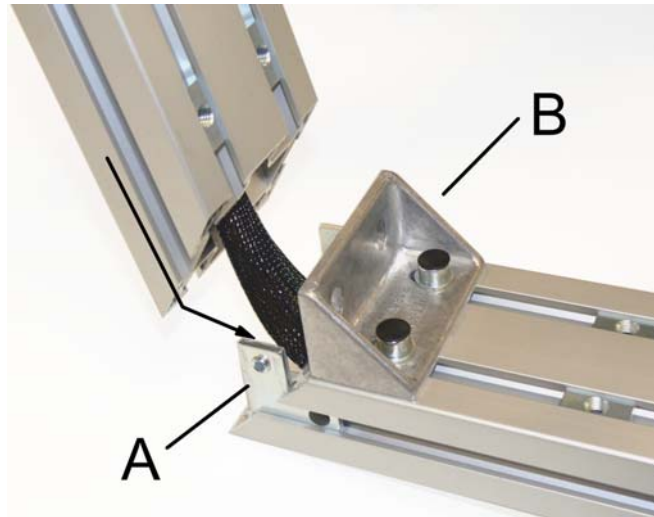
Picture 6: Attaching camera neck to camera head

When the cables have been pushed through from the upper side of the neck, position the neck over the fastening angles.

Place the T-slot nuts in the neck corresponding to the fastening brackets before fastening.

Before fastening the screws, check the alignment of the two neck elements to each other. There must not be a gap between the two neck elements.
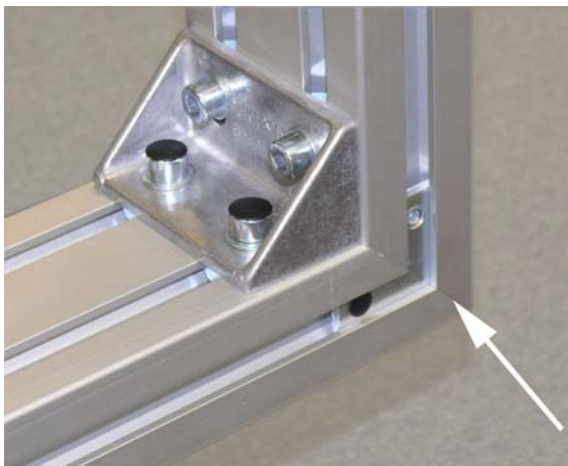
Picture 7: Check the alignment …
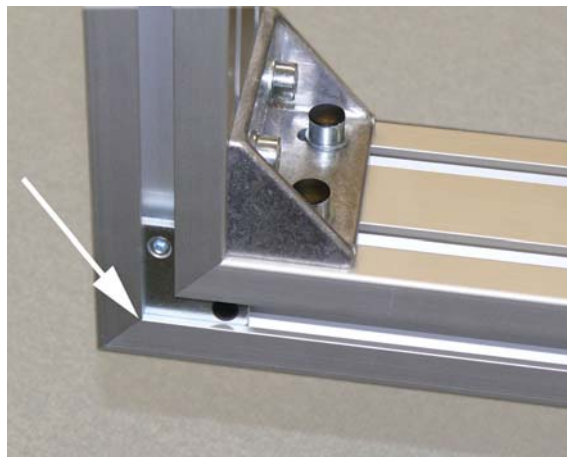
Picture 8: ... at both sides

To ensure a proper angle alignment between the short neck and the long neck it is necessary to fasten the screws in the given order.

At first fasten the two Allen set screws M8x8 in the fastening angles at position **A.**

Then continue with the two Allen screws M8x14, using a metal washer at each screw, in the fastening bracket (**B**).

Picture 9: Fastening at position A

Picture 10: Fastening at position B

Picture 11 shows both components fully assembled. Finally, place the green cover on the neck as shown below in the following pictures.

Picture 11: Camera neck assembled at camera head

→

Picture 12: Placing the cover on the neck

Fasten the cover with two Allen screws M8x12. Use plastic washers with the screws.
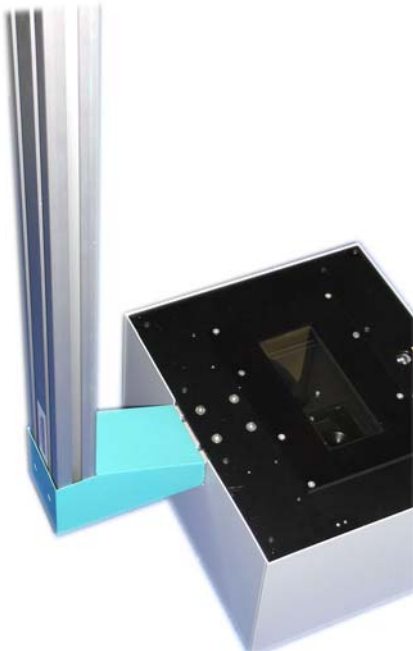
Picture 13: Cover in final position

→
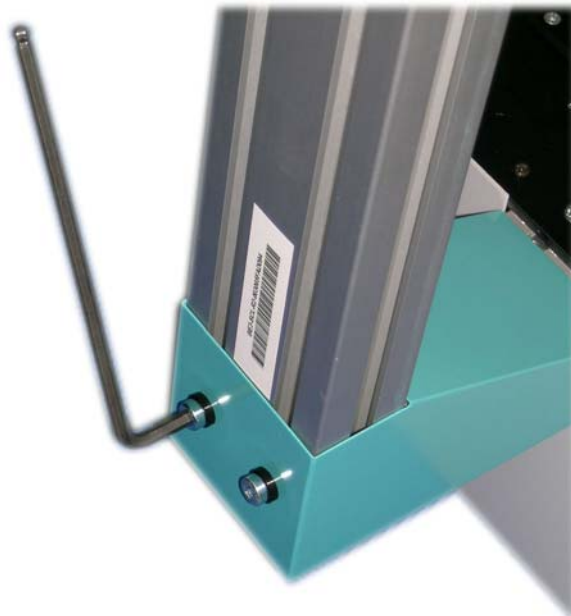
Picture 14: Fastening the screws

A.2.2　Assembling Lamps and Camera to the Body Element

Take the body element out of the transport box. Place it on a suitable stable surface. The bearing capacity of the table must exceed the total weight of the scanner.

The glass plate is fixed to the scanner with two Allen screws M8x12 for transporting.

Remove the Allen screws and keep them for later use.

Picture 15: Removing the transport screws

Lift the glass plate off and store it temporarily in a place where it cannot be broken. Storing it in the transport box is recommended.

Insert eight Allen set screws M8x8 into the fastening elements where the transport Allen screws were removed.

Pull the book cradle plates out of the body element.

Remove the countersunk socket screws between the book cradle drives. Use the 4 mm Allen wrench.

Picture 16: Removing the countersunk socket screw

Picture 17: Remove marked screws

Remove the four screws at the back of the housing between the openings for the lamps and the neck opening.

CAUTION!

Danger of injury!

Never put your fingers in the driving element openings.

Slide the body element cover approximately 300 mm (≈ 12 inch) to the front side. This will make the lamp holder brackets and the mounting brackets for the camera neck accessible.
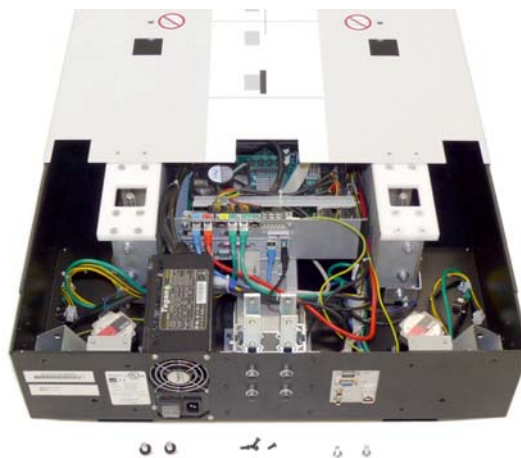
Picture 18: Body element cover opened

Insert the lamps into the lamp holder brackets in the body element. The lamps have pre-installed fixtures for the gas spring. The fixtures must be positioned at the inside near to the camera neck. Picture 19 shows the position of the fixture in the right lamp.

Note: The definition of "right side" and "left side" always refers to the normal operating position, i.e. from the front side of the scanner.
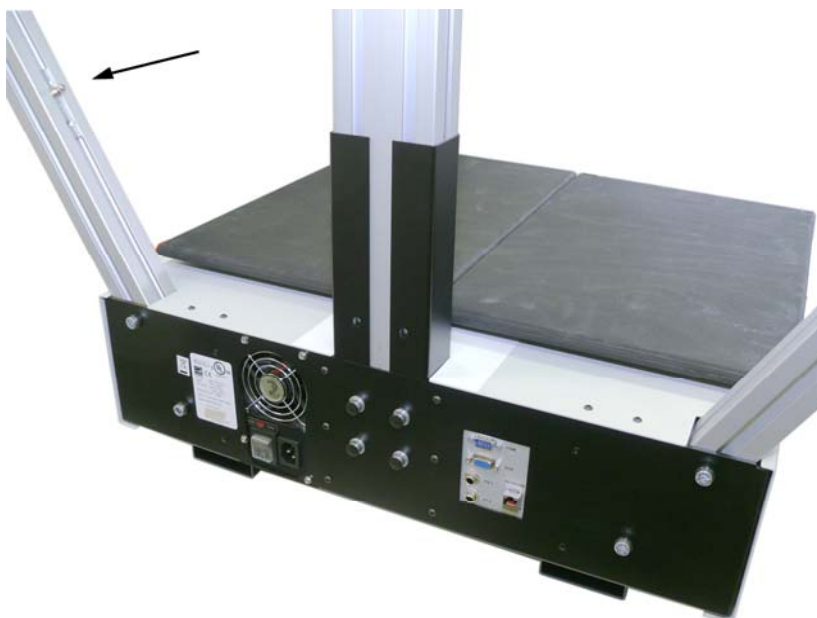
Picture 19: Position of gas spring fixture at right lamp

Fix each lamp with two Allen screws M8x12. Use a plastic washer with each screw.

Picture 20: Fixing the lamp

Connect the two lamp cables to the corresponding connector in the body element.

Before inserting the camera neck into the body element, slide the black cover over the neck. The open side of the cover must be placed to the back of the camera neck. Picture 19 shows the correct position of the cover on the camera neck.

The position of the T-slot nuts in the camera neck front side should match with the boreholes in the front of the black cover. They will be used later to hold the glass plate bearing.

Note: It is recommended to perform the next steps with two persons.

One person holds and positions the camera neck while the second person handles the cables.
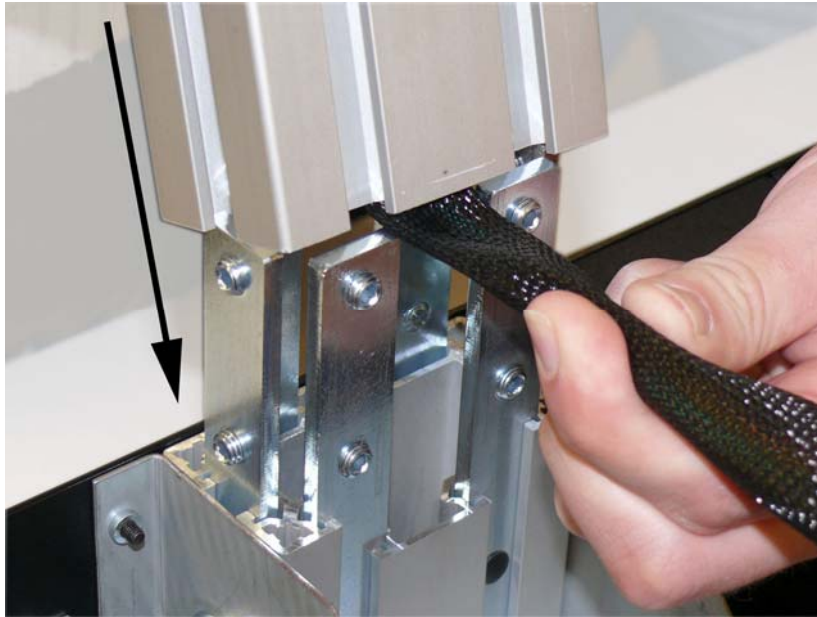
Picture 21: Camera neck assembly

Slide the complete camera neck over the mounting brackets in the body element. Press the flexible tube a little at the outside. Picture 21 shows how to guide the flexible tube with the cables between the mounting brackets.

It is recommended that a second person pulls the neck at the top with low force to the rear side (see Picture 22) of the scanner's body while fastening the neck with the Allen screws.

Picture 22: Neck assembly

Use the Allen set screw M8x8 to fasten the camera neck at the back, at the sides …

Picture 23: Screws at the rear side

…and at the front.

Picture 24: Screws at the front side

Connect the camera neck cables to the sockets at the connector board which is found directly in opposite to the fastening elements of the camera neck. The connectors are marked with colored labels. Always connect cables with matching colors.
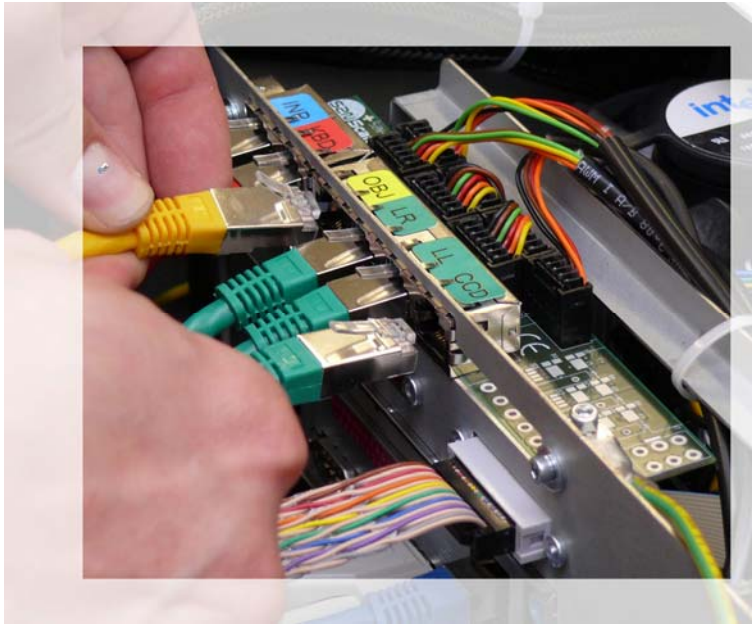
Picture 25: Connector board with camera neck cables

The connector for the flat ribbon cable has no colored label, but is easily identified by its characteristic form.
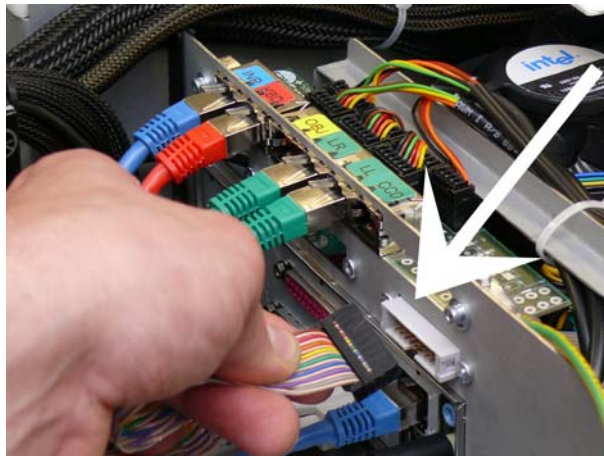
Picture 26: Connector of flat ribbon cable
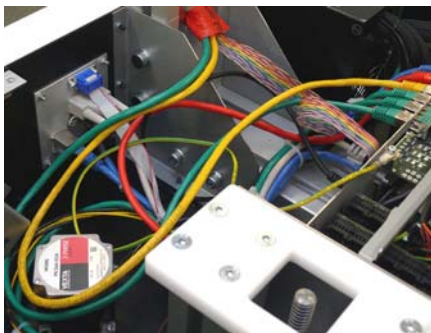
Check all connectors and cables for secure connection. It is recommended to position the cables in a loop as shown in the picture on the left.

Picture 27: Cable loop

Slide the body element cover slowly back on the body element.

Important: While moving the body cover back on the body element, watch the keyboard cable (item (1) in the picture below). Picture 28 shows how to hold the keyboard cable.
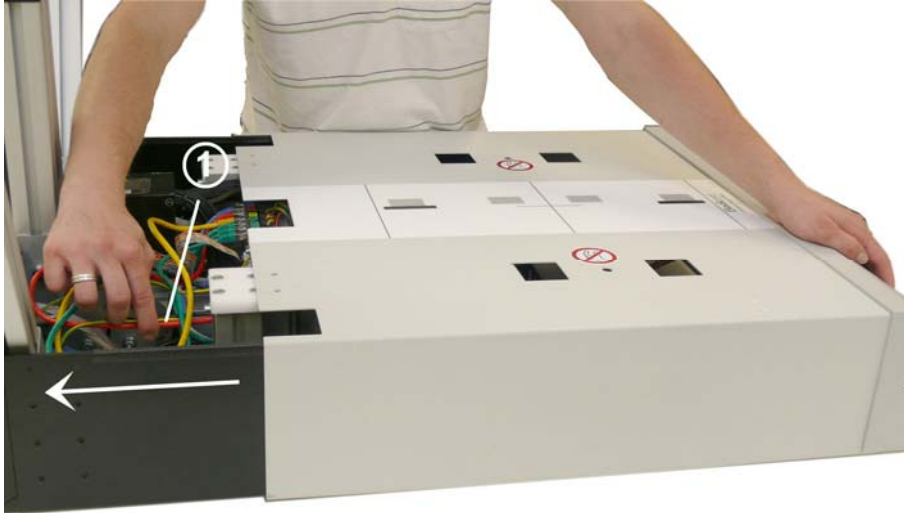
Picture 28: Keyboard cable while moving the body cover

Pull the keyboard cable carefully in arrow direction until the edge of the body cover reaches the edge of the power supply. Then release the cable and slide the body cover in its final position.

Picture 29: Body cover at edge of power supply

Insert the screws in the following order:

1. The two countersunk socket screws between the driving elements of the book cradles.

2. The four lens head screws at the back of the housing, between the lamps and the camera neck.

3. The six Allen screws at the bottom.

First, fasten the screws loosely. Check the position of the body element cover again and tighten all screws securely.

A.2.3   Assembling the Glass Plate

Insert the book cradle plates into the driving elements and place the foam rubber mats on the plates.

Connect the scanner to the mains power and switch it on with the main power switch. The main power switch is found on the rear side of the scanner, next to the power connector. The green **START** LED on the keyboard lights up. This signalizes that the scanner is in stand-by mode.

Press the green **START** button to start the scanner. When the start sequence is finished after approximately 30 seconds, the display shows: **READY TO SCAN**

The book cradle plates are controlled by the eight buttons in the middle of the keyboard field.
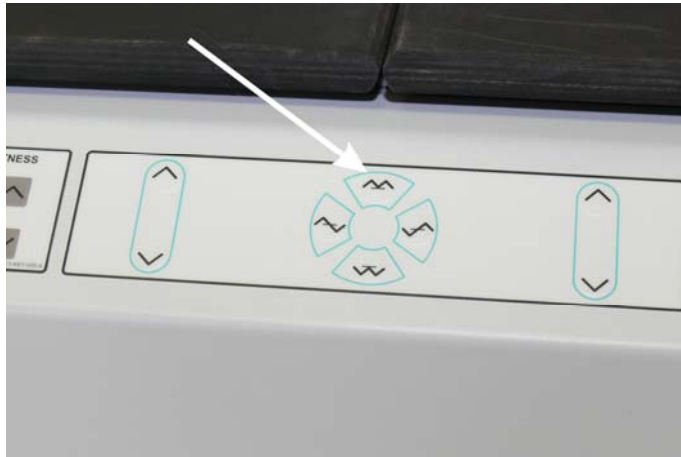
Picture 30: Book cradle controller

Press and hold the upper button with the double arrow to move both book cradle plates upwards simultaneously. At the upper end position, the book cradle motors stop automatically.

Place the glass plate on the book cradle plates. The position of the bearing in the middle of the glass plate must match with the boreholes in the black cover. Insert two Allen screws, M8x12, into the bearing and fix it to the camera neck.
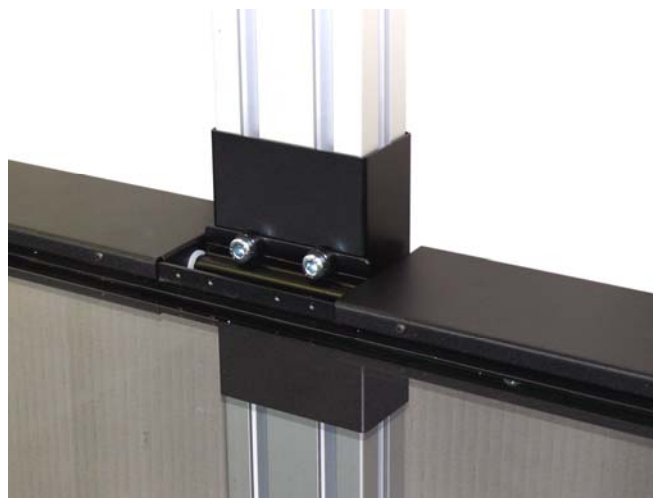
Picture 31: Bearing in the center of the glass plate

Place the T-slot nuts in each lamp at a position corresponding to the position of the axes at the right and left side of the glass plate.

Picture 32: T-slot nut in corresponding position

Slide a hinge on each axis.

Fix each hinge to the lamp with an Allen screw M8x12.
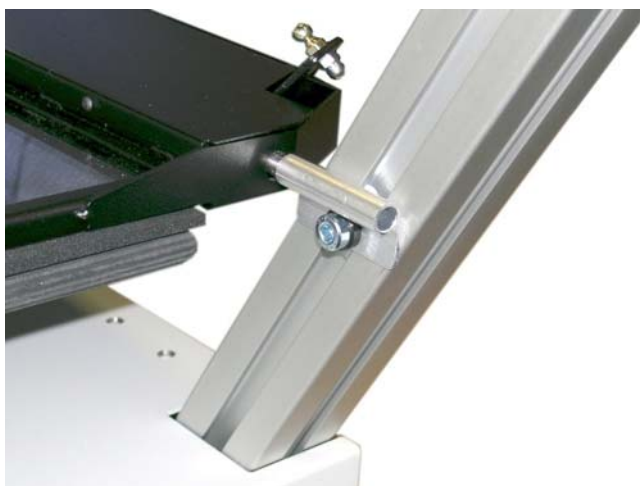
Picture 33: Hinge mounted at right lamp

Each gas spring has on its ends special locking springs inserted.

Important: The locking springs always must be removed before placing or removing the gas springs at the glass plate or on the pin at the lamps.

Picture 34: Position of locking springs

Picture 34 shows the position of the locking springs at the lamp and at the glass plate.

When the scanner is delivered, the gas springs are already mounted to the lamps. They only must be mounted to the glass plate.

To mount the gas springs to the glass plate, remove only the locking spring at the glass plate side of the gas spring.

At first turn the locking spring (**1.**) over the ball head of the gas spring. It needs a little force to move the spring over the ball head.

Then pull it out of the boreholes (**2.**).

Picture 35: Removing the locking spring

Open the glass plate completely, hold it in this position and click the gas spring onto the pin of the glass plate.
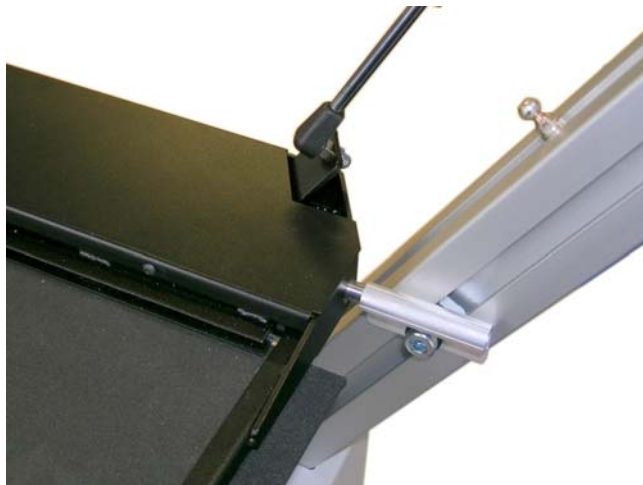
Picture 36: Gas spring mounted to glass plate

Repeat the procedure with the second gas spring.

Finally insert the locking springs at both gas springs.

Picture 37: Locking spring inserted

Picture 38: Locking spring locked

Picture 39: Gas spring completely mounted

The opening angle of the glass plate can be modified by moving the fixtures in the lamps.

Note: Modifying the opening angle of the glass plate should only be done with the help of a second person!

Open the glass plate completely. One person must hold the glass plate in this position while the second person opens the Allen set screw in the fixture slightly.

The opening angle can now be modified. When the glass plate opening angle is set to the desired position, the Allen set screws must be fastened securely.

A.2.4 Setting the Initial Lamp Position

The lamp position must be initialized after assembling the Bookeye® 3 scanner. The reason for this procedure is as follows:

The scanners lamps turn under software control and project a vertical beam of light onto the scanning surface. Both lamps and the CCD have to move perfectly synchronized to achieve the highest brightness level during the whole sweep.

The scanner's CCD motor and the lamp motors form an electronic gear that performs very complex movements under software control while scanning books and other objects that are not completely flat. This only works if the initial position after a power up cycle is in a known state.

Each lamp has a home position switch that acts as a reference. When a lamp is assembled into the scanner, the light beam position relative to the home position switch is unknown. To make known all positions of the above described electronic gear, the following initialization has to be executed.

All positions in the electronic gear are adjusted via software later but the initial adjustment must be made manually.

The initialization of the lamps is done in two steps.

- The first steps is the mechanical adjustment. For the mechanical adjustment the keys for book cradle control will be used.

- The second step is the electronic adjustment. The electronic adjustment will be controlled by the device firmware and runs fully automatically.

During the mechanical adjustment of the lamps the keyboard display shows some information.

Start the Bookeye® 3 scanner. After some internal tests have been performed, the display will show the message **READY TO SCAN.**

A.2.4.1 Performing the mechanical adjustment of the lamps

The keys for the book cradle control are located in the center of the keyboard, see figure below.
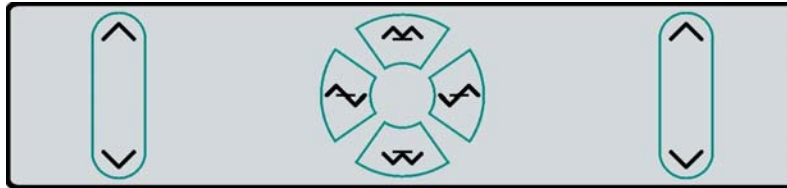
Figure 1: Book cradle control keys

To initialize the lamps, the scanner must be switched to the lamp initializing mode.

Press and hold the two keys in the middle of the book cradle control field and simultaneously press the green **START** button (Picture 40).
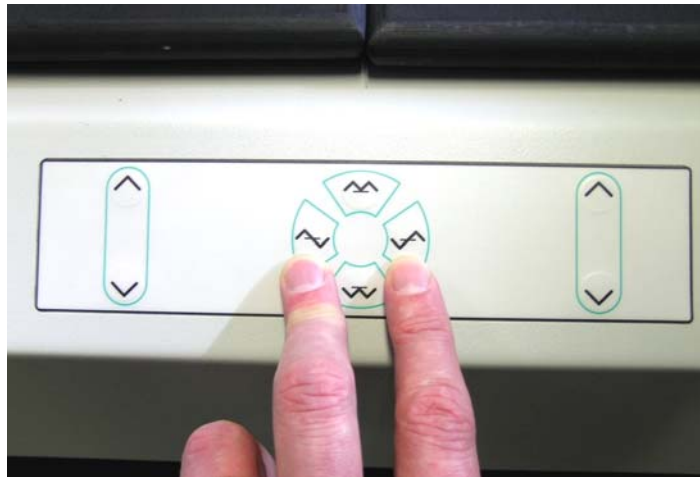
Picture 40: Press the keys simultaneously

The lamps light up and move to their start positions.

The display shows

Adjust the light beams
Read spec for more info!

The scanner plays the sound "Attention please!" to indicate that it is in the initialization mode.

Note: If no key is pressed for approx. 20 seconds the scanner ends the initialization mode automatically. The sound "OK" will be played and the display shows

Saving new positions

If the lamps are in their start positions, the maximum light level must be present at the left edge and the right edge of the book cradle respectively.

Picture 41: Lamps in start position

The position of the left lamp is changed by pressing the left up/down key of the keyboard. The position of the right lamp is adjusted accordingly with the right up/down key of the keyboard.
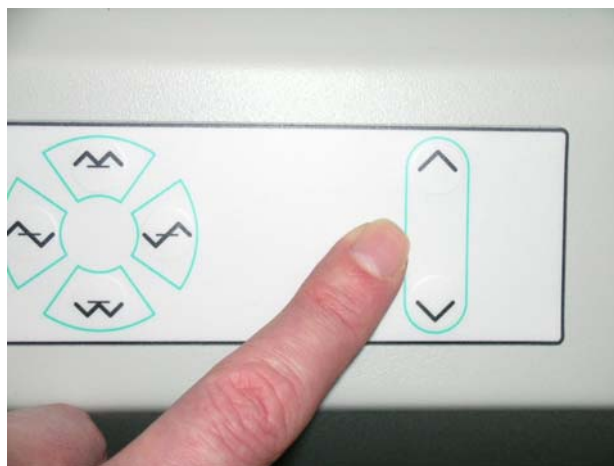
Picture 42: Up/down key on right side of keyboard

Press the keys to move the light beam on the book cradle. The upper key moves the light beam to inside of the book cradle, the lower key moves the light beam to the outside.

At the top of the lamp arm, the light beam is also visible. It is helpful to check the light beam at both positions to finally leave it in the correct position.

Light beam maximum
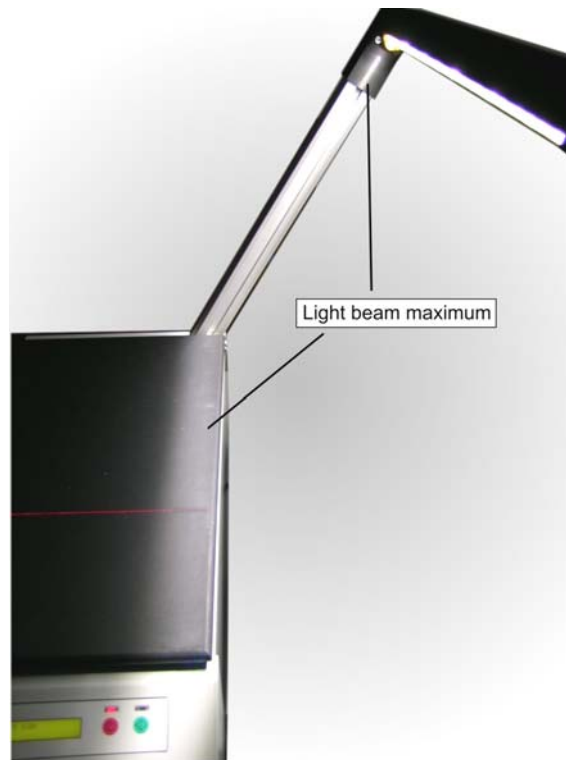
Picture 43: Light beam on right side of the book cradle

Light beam to much to the inside

Press the down key to move the light beam to the outside.

Light beam to much to the outside

Press the up key to move the light beam to the inside.

The above pictures show the right lamp. Corresponding steps must be performed for the left lamp.

The two screw head caps at the upper end of the lamp arm help to set the light beam to the best position.

Light beam adjusted in correct position
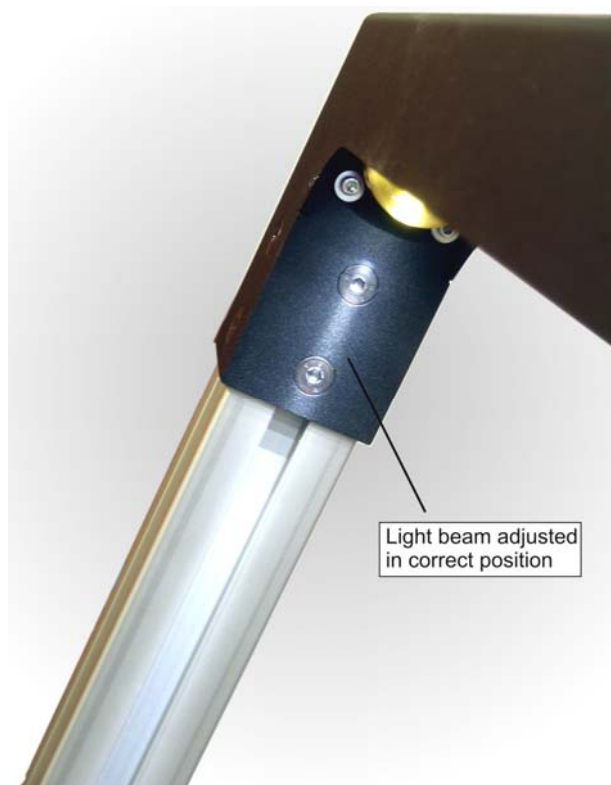
Picture 44: Light beam adjusted

A.2.4.2   Saving the lamp positions

Press the green **START** button to save both lamp positions.

The sound "OK" will be played and the display shows

Saving new positions

The lamp positions will also be saved automatically when the time out period has passed without any activity.

A.2.4.3   Leaving the initialization mode without saving

Press the red **STOP** button to leave the initialization mode. The lamp positions will not be saved.

A.2.4.4 Lamp position control mode

The position of the lamps and their maximum travel distance can easily be checked through the values shown in the keyboard display in this control mode.

The scanner must be in the "lamp initialization mode". To switch the scanner to the "lamp initialization mode", use the key combination as described in chapter A.2.4.1.
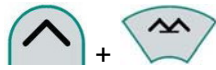
Press the left or right up key together with the cradles up key

or
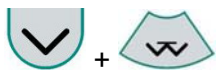
press the left or right down key together with the cradles down key

The display will change to the "lamp position control mode".

The display shows two values for each lamp:

SW: <value>
Shows the current rotation angle of the lamp, measured from the position of the reference switch. The position that activated the reference switch is defined as the zero point for the lamp movements.

ABS: <value>
Shows the angle the lamp has moved after pressing the button combination. It is assumed that the lamps have been manually adjusted to be optically straight as described in chapter A.2.4.1

With the key combination described above, the lamps will move at a higher speed than with the up key or down key only.

In this mode, the lamps can be moved to their maximum positions for testing purposes. The function of the home position switch and its position can also be tested in this mode.

NOTE: If the lamp is moved beyond its normal maximum position, the scanner plays the warning sound: **"Attention"**

This lamp position can not be saved for safety reasons.

This mode ends automatically after a short time-out period or directly after pressing the **STOP** button on the scanner keyboard.

The lamps must be able to freely move within an angle of +/- 45° before they touch their corresponding mechanical end position. The minimum requirement is that they move 45° in the direction of the scanning bed; a limitation in the other direction can be tolerated. If that limitation exists on one lamp, they can also be swapped to continue working with the scanner.

The reference switch position is also of importance. The switch should be activated shortly before the lamp is blocked. A distance of an angle of 2 – 4° is ideal, higher values are no concern, lower values must be corrected. The correction is done by bending the sheet metal piece that activates the switch.

B   Software Setup

B.1   Setup Network IP Address

After shipment or after a reset to factory defaults, the scanner will have the **default IP address 192.168.1.50**.

This IP address is most likely not a valid address in your local network, therefore the address has to be changed.

To perform this, a connection to the scanner must be established. First, note all network settings in your local PC. Then change the settings in your local PC to IP address 192.168.1.1 and subnet mask to 255.255.255.0.

Enter the IP of the scanner into your browser. The start screen of the scanner opens.
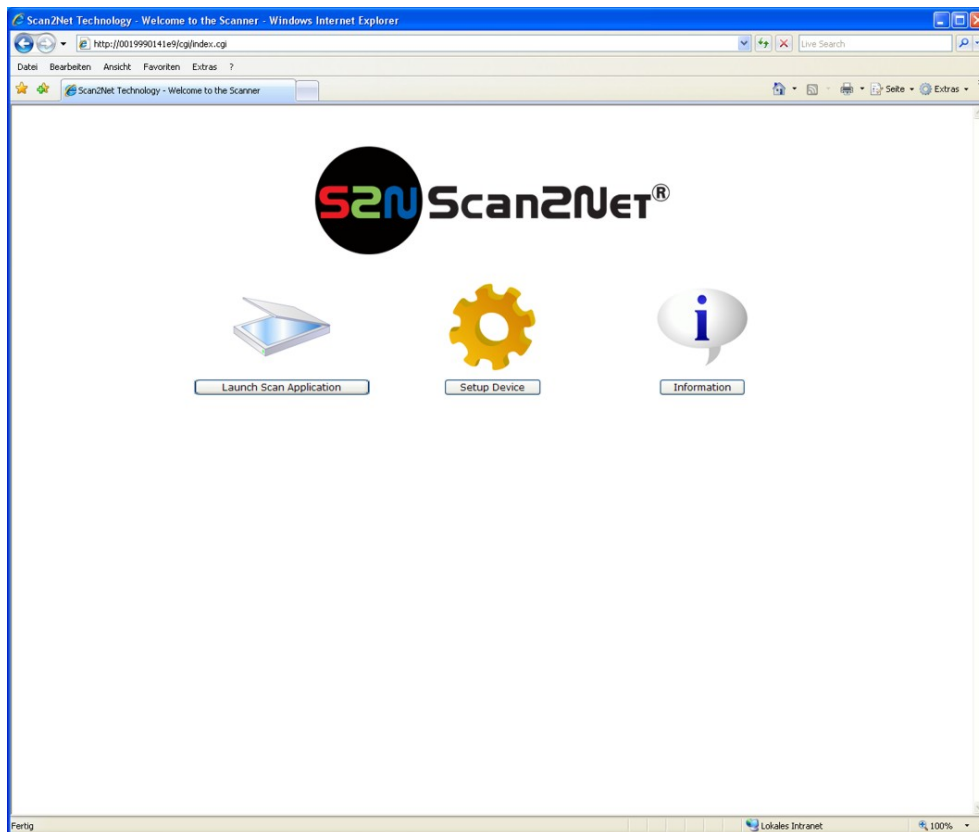
Picture 45: Start screen

In the start screen go to [Setup Device].

Choose the login level ☐ Poweruser ☐ using the default password "Poweruser".
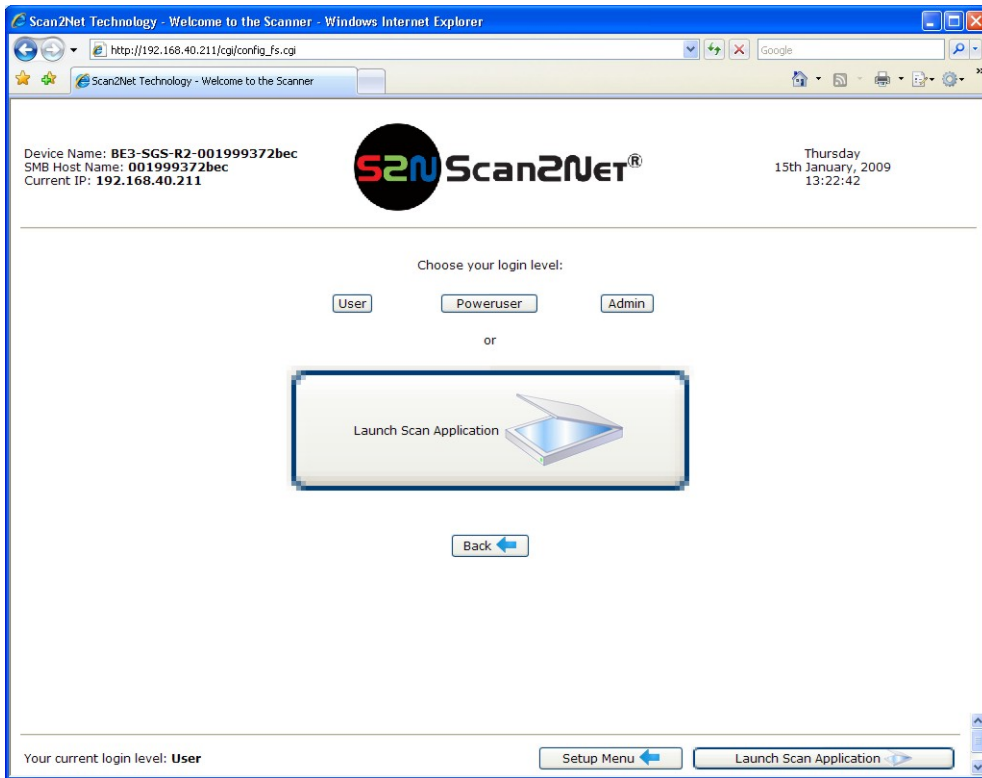
Picture 46: Login level screen

In the *Base Settings* section click at ☐ Network Configuration ☐.
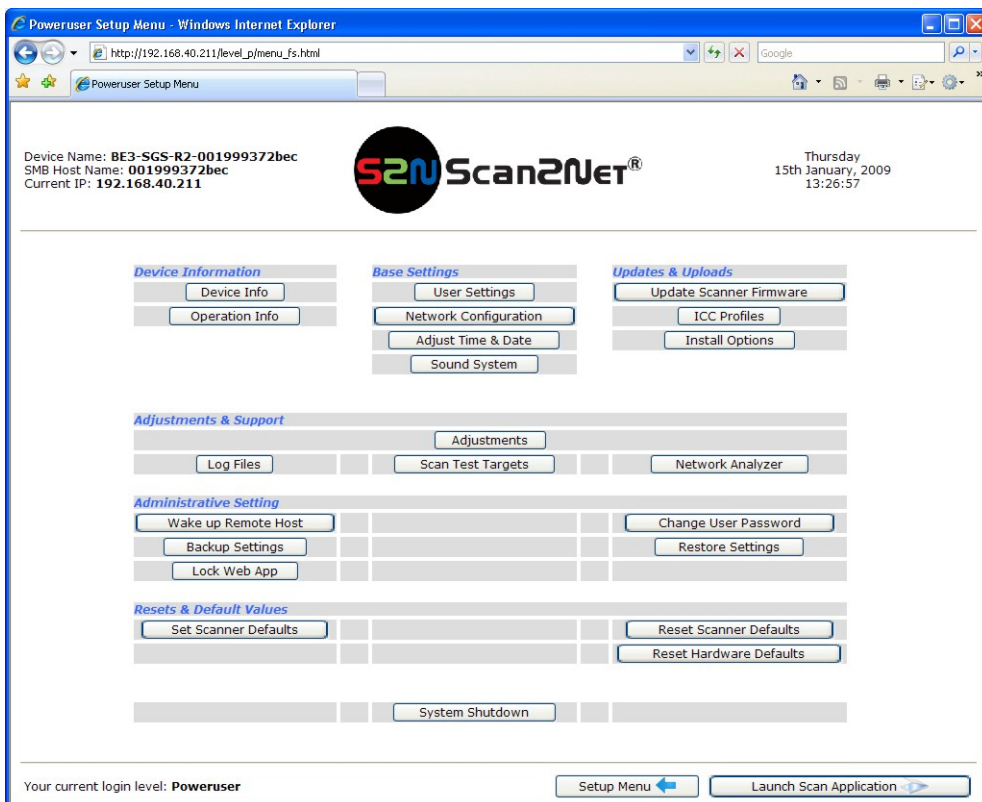
Picture 47: Poweruser Main Menu screen

Now change the IP address, subnet mask and gateway to a valid address or select DHCP to obtain an IP address automatically.
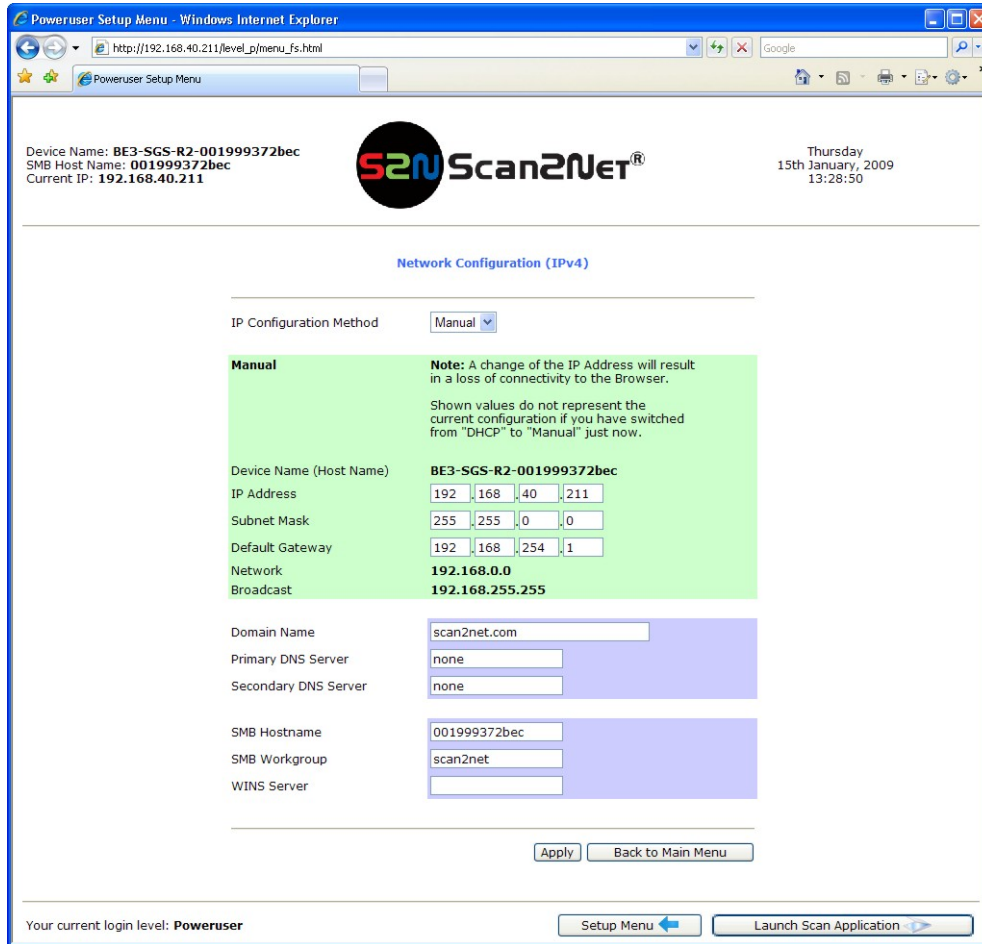
Picture 48: Network configuration screen

If the IP address has been changed, the device has to be powered down and up again.

Change the settings of your local PC back to the previous network settings. Enter the new IP address of the scanner and go to the "Poweruser" main menu again.

B.2   Mandatory Optical Adjustments

Whenever the device is setup for the first time, moved to a different location, cleaned or serviced and after a software update; some adjustments have to be performed to guarantee maximum quality and accuracy.

Access to these functions is only possible through the login level "Poweruser", default password "Poweruser". The person having access to this level can change the password and thereby limit access to normal operators.

The following functions use special test targets that were supplied with the scanner. Do not try to perform any of these adjustments without the proper test targets.

The Bookeye® 3 scanner is delivered with the following test targets:

—   White Reference Target 225x570

—   Line Reference Sheet LRS-200

Please ensure that adjustments are made following the sequence below.

1.   Perform the $\boxed{\text{Scan Start}}$ function. This will synchronize the CCD main drive motor with the lamp motors so that the CCD is centered along the horizontal axis and the lamp beams follow as precisely as possible.

2.   Execute the $\boxed{\text{Auto Focus}}$ function to establish a basic reference for the focus motor. This function should also be invoked any time the scanner seems to be out of focus.

3.   The next step is the $\boxed{\text{White Balance}}$ function. This calibrates the scanner's CCD and optics relative to the lamp light and the remaining ambient light. This function should be invoked if the brightness seems to have shifted, the ambient light situation has changed significantly or the images have horizontal stripes on them.

4.   The next step is the $\boxed{\text{Laser Check}}$ function. This function checks all properties of the laser line and will return overall skew and position of the laser line.

All adjustments described in chapter B.2 and its subchapters start from the main screen of the login level "Poweruser".

Start your browser software. Enter the IP address of the scanner in your browser to open the start menu.
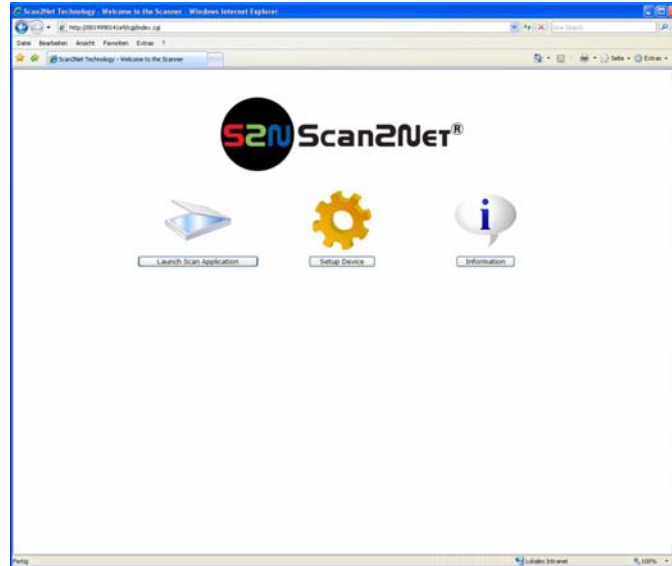
Picture 49: Scan2Net Start screen

In the start screen go to Setup Device .

Choose the login level Poweruser using the default password "Poweruser".

Picture 50: Buttons for login levels

The next screen shows the main menu screen.

Locate the section *Adjustments & Support* and go to Adjustments .
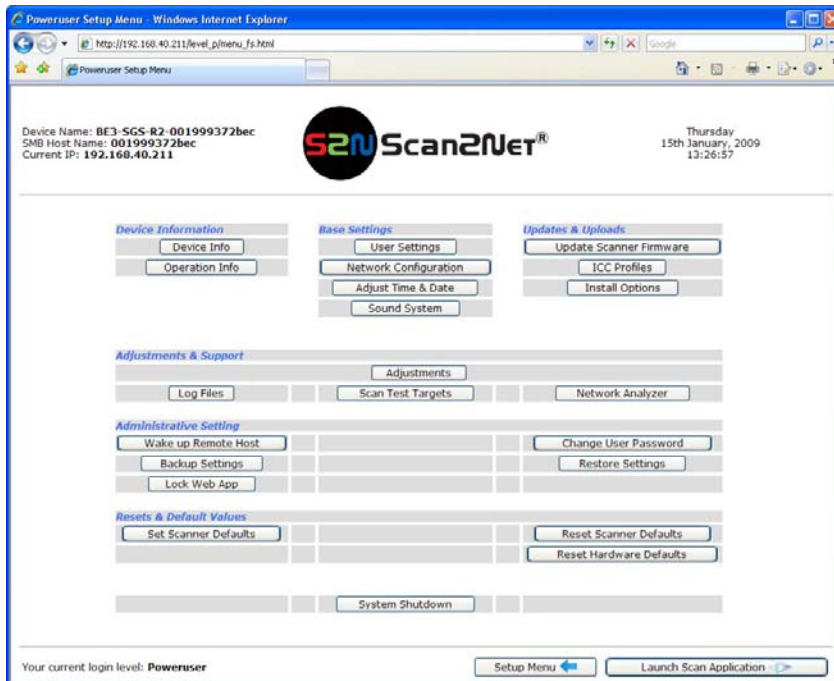
Picture 51: Poweruser Main Menu screen

Start in section *Focus & Scan Area Adjustments*. Select the appropriate menu items as described in the following paragraphs.
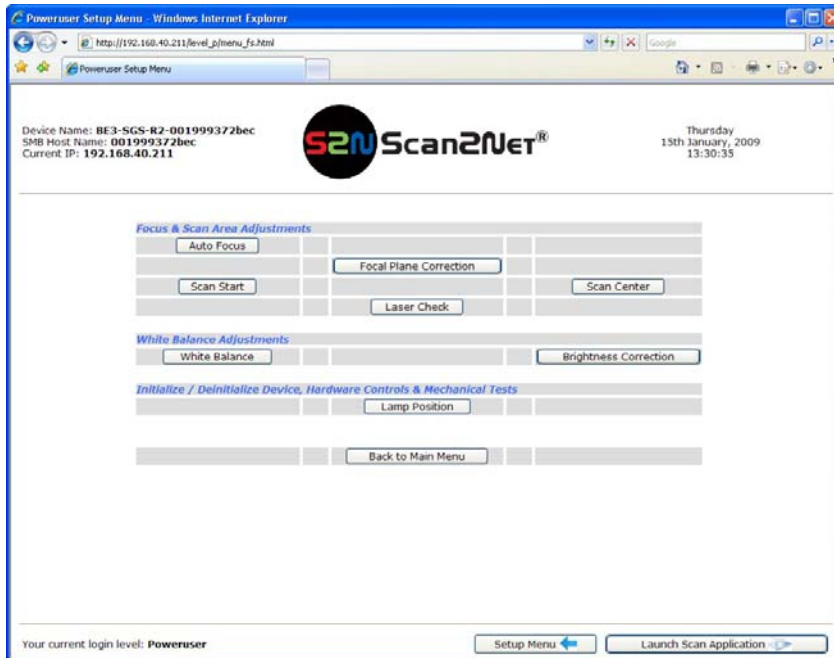
Picture 52: Adjustment & Support screen

B.2.1 Scan Start

This function adjusts the position of the CCD camera and the lamps relative to each other. The electronic gear mentioned previously is fine-tuned with this routine. The first test performed is the maximum turn of the lamps. The lamps will hit against their mechanical end position, which will produce an audible sound. This is necessary to check whether the lamps can be turned in and out far enough.

Then the scanner scans the test target, finds the white to black change in the middle of the test target and takes this position as the optical middle. It is very important to move the test target against the neck and center it as precisely as possible. Any deviation of the test target in the horizontal direction from the ideal position will be present in all scans afterwards.

After the optical middle is established, the scanner moves its CCD camera to the newly found middle position. Both lamps are moved backward and forward to find the maximum brightness of the beam. When the position is found it is stored. This will override the previous manual setting. The manual setting was necessary to have at least some synchronized lights during the first step when the scanner tries to locate the optical middle.

To perform the function follow the steps 1) and 2) as described on the screen.

Picture 53: Scan Start adjust screen

Press the ⎡Next Step⎤ button.

After a short time, the scanner will return some measured values. The detailed values are only of interest for trained service technicians. As long as the results are all shown in green text, the device is properly calibrated.

An error is always shown in red text and usually comes with an explanatory remark.
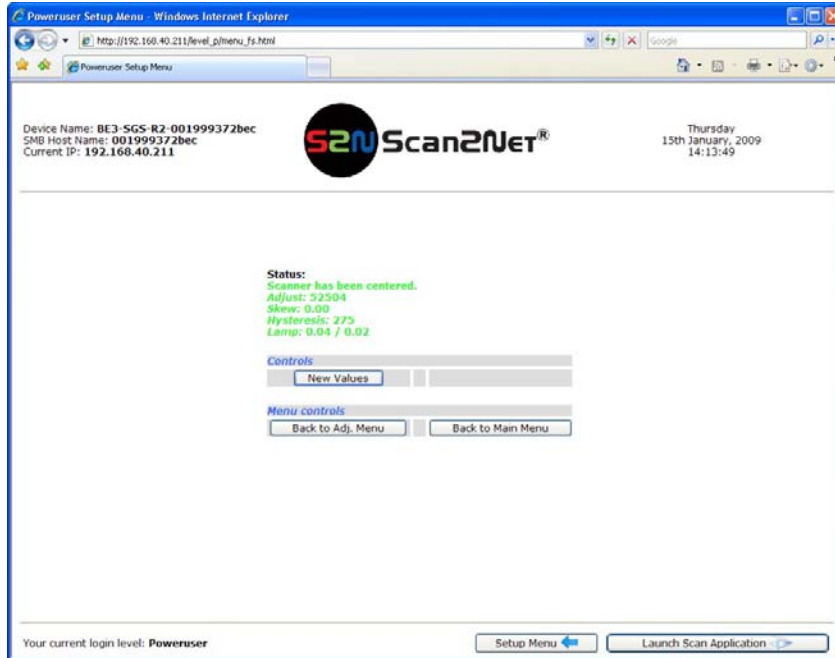
Picture 54: Scan Start results

1. Click the button ⸢New Values⸥ in the section ***Controls*** to repeat the measurement.

Or

2. Click the button ⸢Back to Adj. Menu⸥ in the section ***Menu controls*** to return to the adjustments menu (see Picture 52).

B.2.2 Auto Focus

This function automatically locates the lens position for the highest level of sharpness and best image quality.

First, select the current glass plate position.

This value measured with the selected glass plate position is the reference for all focus adjustments used later during e.g. book fold correction, folder mode scanning or fixed focus scanning.
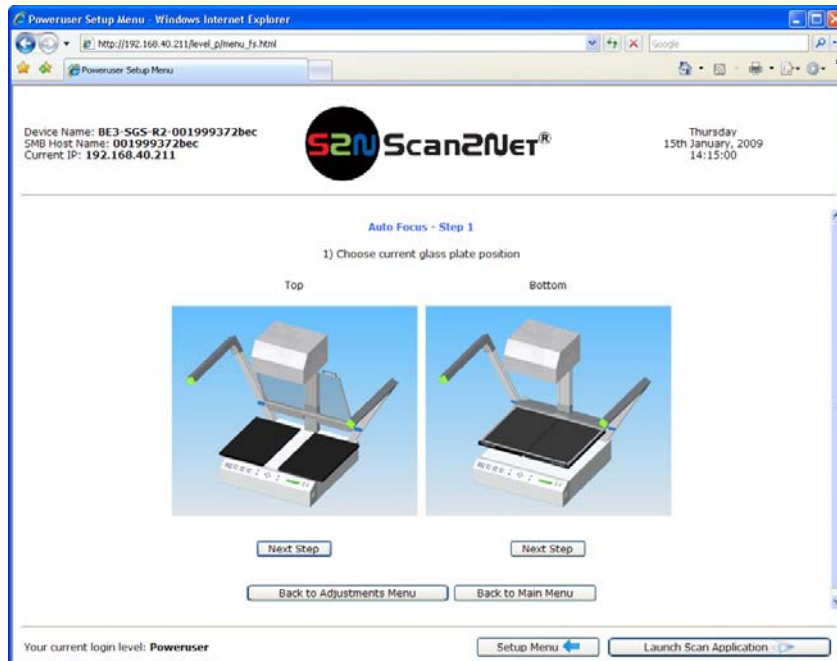
Picture 55: Available glass plate positions

Press the Next Step button below the picture corresponding to the selected glass plate position.

B.2.2.1 Auto Focus Measurement with Glass Plate Opened

Perform the measurement as follows:

1. Open the scanner's book cradle completely, as shown on the screen.

Note: The position of the book cradles is verified. If the book cradles are not in the lowest (home) position, a Retry button and a message are displayed on the screen instead of the Next Step button .

2. Press the Next Step button. The measurement starts.
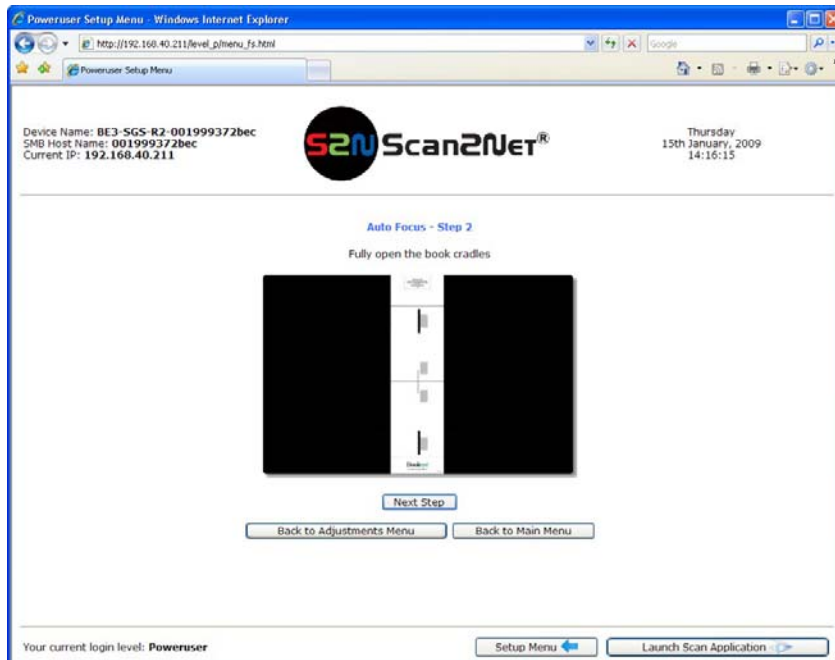
Picture 56: Auto Focus measurement with open glass plate

After the Autofocus function has completed, the results will be displayed. Values displayed in green indicate valid results. Any error will be shown in red text, followed by some explanatory remarks.

Note: It is normal that the measurement will return different values each time the measurement is repeated. The lens motor has a very high resolution and the best focal point has to be found in the already large focal range, therefore a variation of 50 – 100 in values is normal.
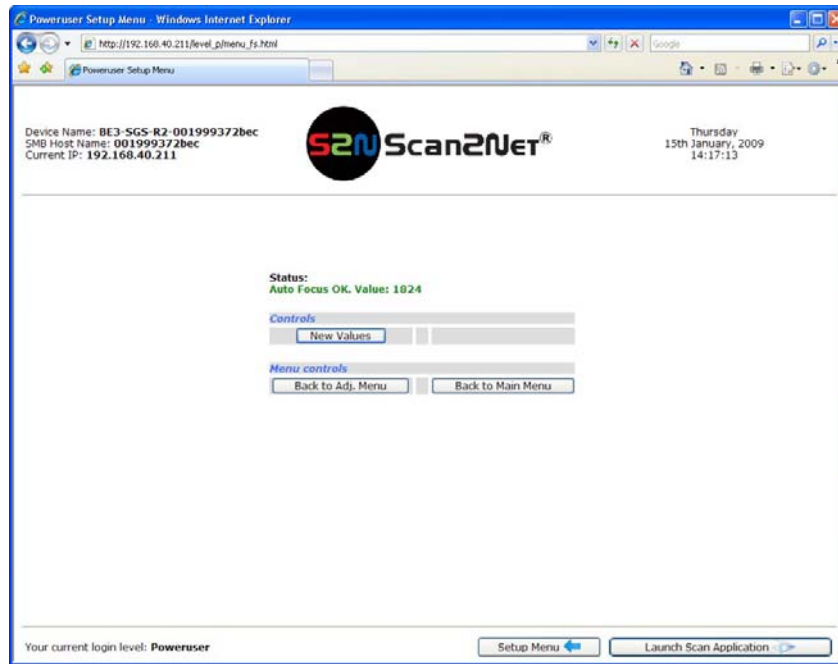
Picture 57: Auto Focus results

3. Click the button New Values in the section *Controls* to repeat the measurement.

Or

4. Click the button Back to Adj. Menu in the section *Menu controls* to return to the adjustments menu (see Picture 52).

B.2.2.2 Auto Focus Measurement with Glass Plate Closed

Perform the measurement as follows:

1. Close the book cradles.

2. Place the **Line Reference Sheet S2N LRS-200** on the scanner's book cradle as shown on the screen and align it as described.

3. Move the book cradles to the **upper** position. Close the glass plate.

Note: The position of the book cradles is verified. If the book cradles are not in the upper position a Retry button instead of the Next Step button and a message is displayed on the screen.
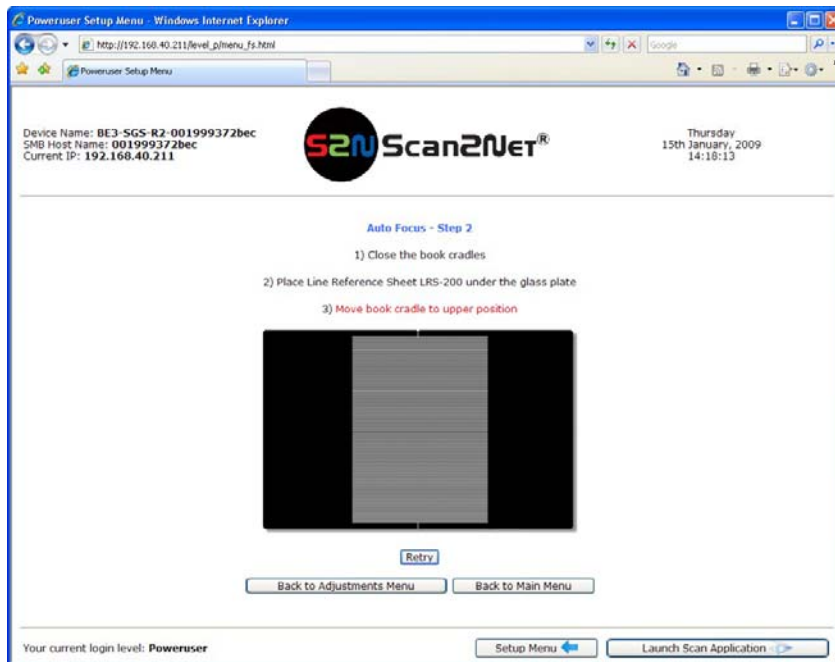
Picture 58: Information about book cradles position

After moving the book cradles to the upper position press the Retry button.

When the book cradles are in the upper position the screen shows the following:
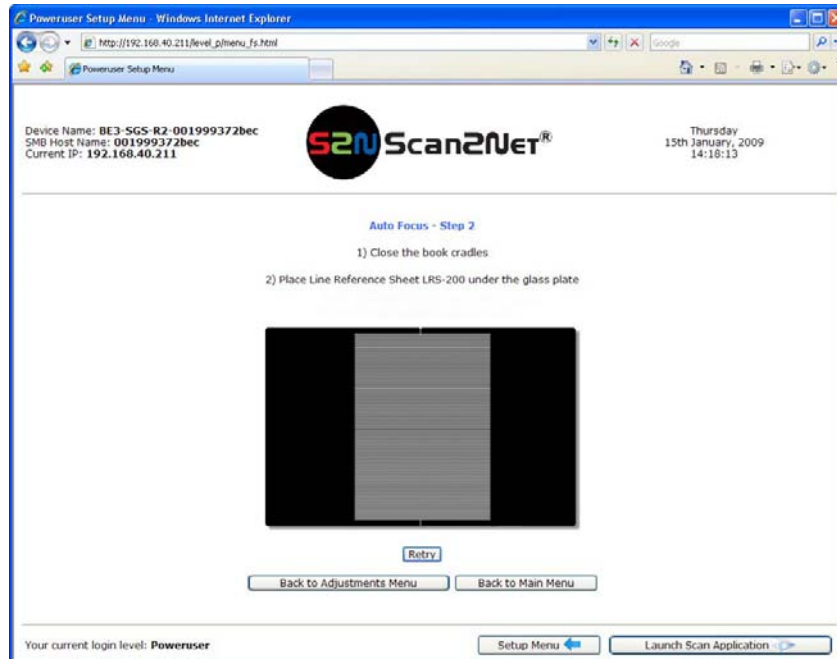
Picture 59: Auto focus measurement screen

4. Press the ⟦ Next Step ⟧ button The measurement starts.

After the Autofocus function has completed, the results will be displayed. Values displayed in green indicate valid results. Any error will be shown in red text, followed by some explanatory remarks.

Note: It is normal that the measurement will return different values each time the measurement is repeated. The lens motor has a very high resolution and the best focal point has to be found in the already large focal range, therefore a variation of 50 – 100 in values is normal.

5. Click the button ⟦ New Values ⟧ in the section *Controls* to repeat the measurement.

Or

6. Click the button ⟦ Back to Adj. Menu ⟧ in the section *Menu controls* to return to the adjustments menu (see Picture 52).

B.2.3   Scan Center

This function is fully manual.

The optical middle in the driving (horizontal) direction has already been corrected by adjusting the distance between the home position of the camera and the optical middle position.

In contrast, the vertical middle cannot be adjusted but is found at a certain pixel position on the CCD. If an individual scanner head is slightly tilted towards the front of the scanner, the camera's middle position also moves in the same direction and the scanner "sees" more area at the keyboard side of the scanning bed.

Since all scanners have some spare pixels that are not used, the middle can be adjusted by defining a certain number of pixels at the lower edge of the scanning bed which the scanner should ignore.

The input field only takes positive values, the unit is pixels.

Perform the function as follows:

1. Press the ⎡Scan Center⎤ button in the *Adjustments & Support* screen (Picture 52). Type in the offset value in pixels.
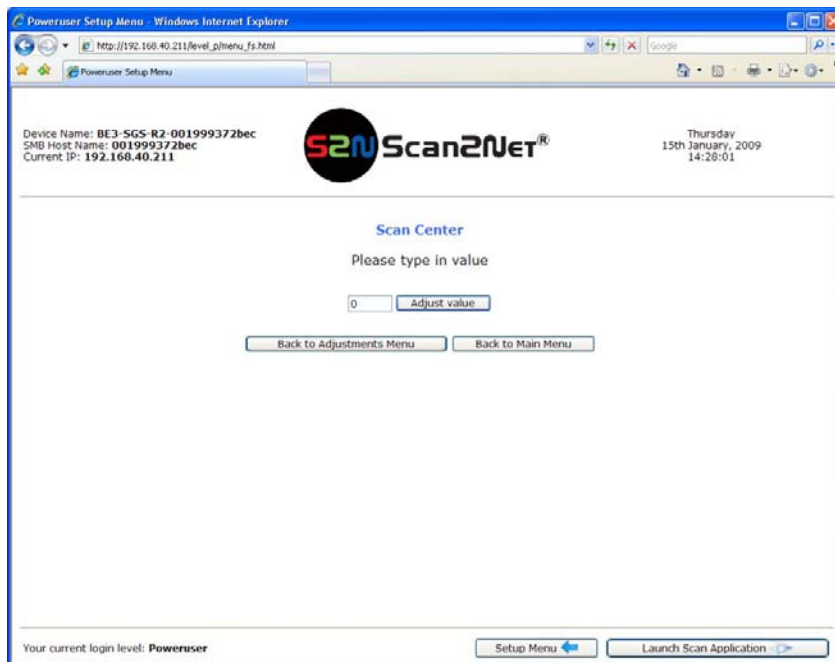
Picture 60: Scan Center screen

2. Press the ⎡Adjust value⎤ button to permanently store the value.

3. Click the button ⎡Back to Adjustment Menu⎤ to return to the adjustments menu.

B.2.4   White Balance

B.2.4.1   Some Basic Information

The white balance function is the most important function for consistent image quality. This is especially important in the type of open scanning environment present in planetary scanners.

Although all scanners have a function similar to the white balance, the light situation inside a flatbed scanner is much more controlled than with the Bookeye® family of scanners. A normal flatbed scanner has to be calibrated once in a while, maybe every couple of weeks. This is necessary to compensate for light degradation, accumulation of dust, loss of sensitivity of the CCD and other long term effects.

By contrast Bookeye® scanners have to be calibrated more than once a day if the ambient light situation changes significantly.

To be able to fully understand the results of a white balance, the following information is helpful:

The scanner has built in light sources of known and stable quality consisting of the most state-of-the-art white LEDs but generally receives some significant ambient light from the ceilings or windows of unknown intensity, color temperature and usually with some amount of flicker.

During the white balance measurement, all internal and external light sources are combined and illuminate the target. The intended target for this function is the **White Reference Target 225x570**, which has a very even, non-glossy and extremely white surface.

In the first step, the overall sensitivity of the scanner is adjusted in such a way that the brightest area results in an almost saturated output signal. This assures that the largest density range possible is used. After this adjustment is done, the uneven light distribution on the CCD caused by the imbalance of the lamps, the ambient light introduced, the imperfections of the lens and other factors; has to be compensated for. This measurement results in a correction function that has higher correction factors at the upper and lower edges of the scan bed and almost no correction in the vicinity of the brightest area.

If the above is understood, it is understandable that the quality of the test target is of utmost importance to the result of the white balance. The test target is a reflective one and reflects the light in a diffuse way. If the test target has dirt, wrinkles or anything on it visible to the human eye, the CCD will also see this and will overcompensate in these areas. Although the internal software has been programmed to eliminate these imperfections to a certain degree, it still leads to unreliable results if the target is not good enough.

If the target is good enough and ambient light level is not too high, the scanner will calibrate successfully. Calibration means that the "white" of the test target in the given illumination situation produces a "white" output in the digital domain. Consequently, all scans of white paper that has different properties than the test target results in brightness and possibly color shifts. Because the inexperienced user may become irritated if the "white" paper turns out to be lightly grayish and somewhat uneven; many competitors clamp the brighter pixels to fully white. This looks better but introduces artifacts, therefore this is only optional with a Bookeye®.

There are three ways to change the result of the white balance.

The first way is to use the Brightness Correction button in the white balance menu. This button changes the gains settings up to ± 2dB, while positive values make the scans look brighter.
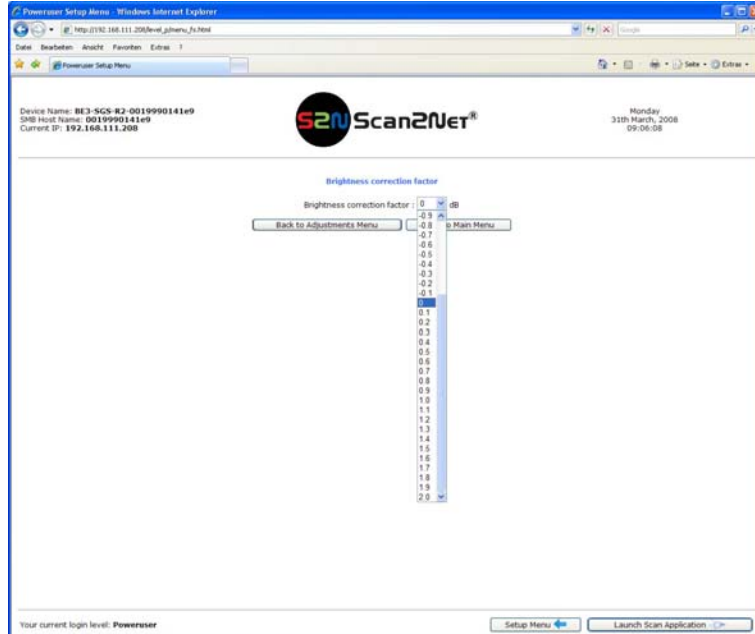
Picture 61: Brightness Correction Factor screen

The second way of changing the results is invoked if the individual R G B controls in the scanner application are used. They allow changing the color temperature of the original reference scan.
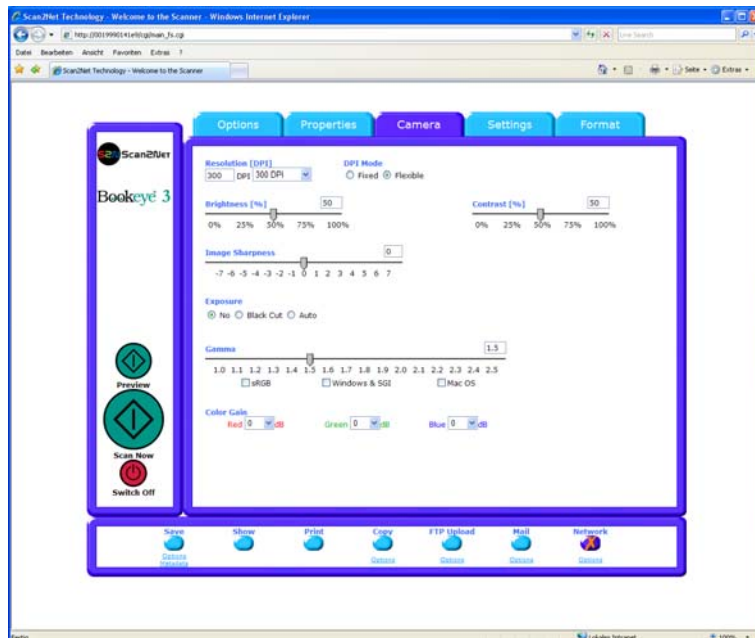
Picture 62: R G B controls

The third way is the easiest and most straightforward method. Change the target. If scanning newspaper is the goal, the white balance could be performed on a blank section of a newspaper page. This will turn all other scanned pages to white in the digital domain.

B.2.4.2   White Balance with Glass Plate opened

Start in the *Adjustments & Support* screen (Picture 52).

Perform the measurement as follows:

1. Find the section *White Balance Adjustments* and click the button ⬚White Balance⬚.
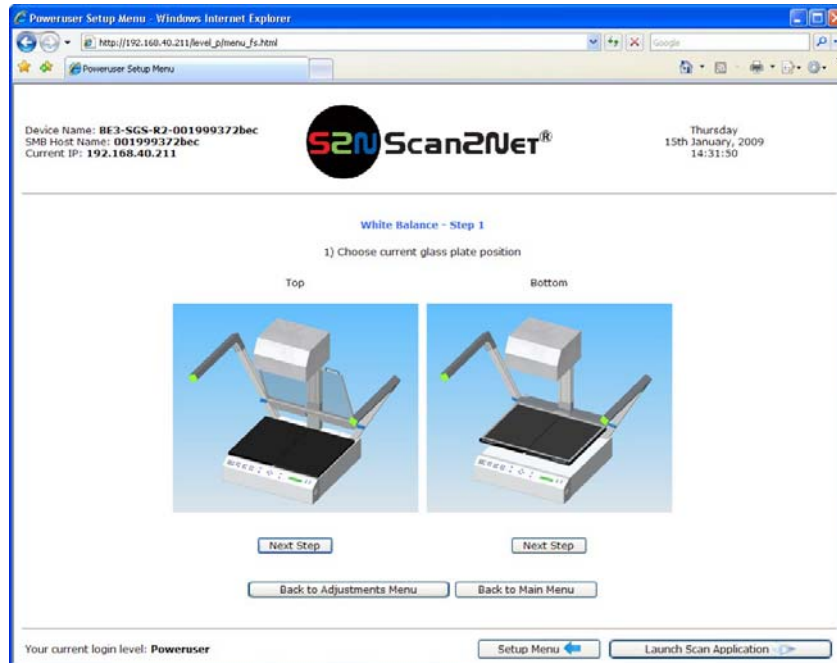
Picture 63: Glass plate positions for white balance

Press the ⬚Next Step⬚ button below the picture corresponding to the selected glass plate position.

2. Close the book cradles completely and move them to the **lowest** position.

Note: The position of the book cradles is verified. If the book cradles are not in the lowest (home) position, a ⬚Retry⬚ button and a message are displayed on the screen instead of the ⬚Next Step⬚ button.

After moving the book cradles to the lowest position press the ⬚Retry⬚ button.

3. Place the **White Reference Target 225x570** at the marked position.
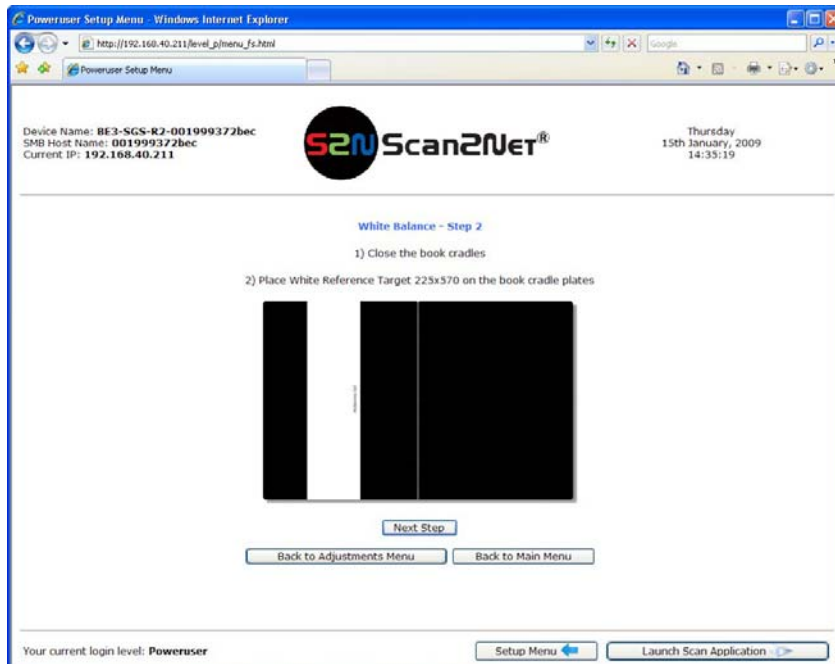
Picture 64: White Balance screen, glass plate opened

4. Press the Next Step button. The measurement starts.

After the Autofocus function has completed, the results will be displayed. Values displayed in green indicate valid results. Any error will be shown in red text, followed by some explanatory remarks.

5. Click the button Back to Adjustment Menu to return to the adjustments menu.

B.2.4.3 White Balance with Glass Plate closed

Start in the *Adjustments & Support* screen (Picture 52).

Perform the measurement as follows:

1. Find the section *White Balance Adjustments* and click the button White Balance .

Press the Next Step button below the picture corresponding to the selected glass plate position. Picture 63 shows the available positions of the glass plate.

2. Close the book cradles completely and move them to the **upper** position.

Note: The position of the book cradles is verified. If the book cradles are not in the upper position a Retry button and a message are displayed on the screen instead of the Next Step button.

After moving the book cradles to the upper position, press the Retry button.

3. Place the **White Reference Target 225x570** at the marked position.

Picture 65: White Balance screen, glass plate closed

4. Press the Next Step button.

After the Autofocus function has completed, the results will be displayed. Values displayed in green indicate valid results. Any error will be shown in red text, followed by some explanatory remarks.

5. Click the button Back to Adjustment Menu to return to the adjustments menu.

B.2.5 Laser Check

This function checks the integrity and position of the laser line. The function will return skew and relative position to its ideal values and is used to track potential misalignment.

Start in the *Adjustments & Support* screen (Picture 52).

Perform the measurement as follows:

1. Find the section *Focus & Scan Area Adjustments*. Press the Laser Check button.

Note: The position of the book cradles is verified. If the book cradles are not in the lowest (home) position a Retry button instead of the Next Step button and a message is displayed on the screen.

After moving the book cradles to the lower position press the Retry button.

2. Place the **White Reference Target 225x570** at the marked position.

Picture 66: Laser Check screen

3. Press the Next Step button. The measurement starts.

After the function has finished, the results will be displayed. As long as the displayed text is green, the result is ok. Any error will be shown in red followed by some explanatory remarks.
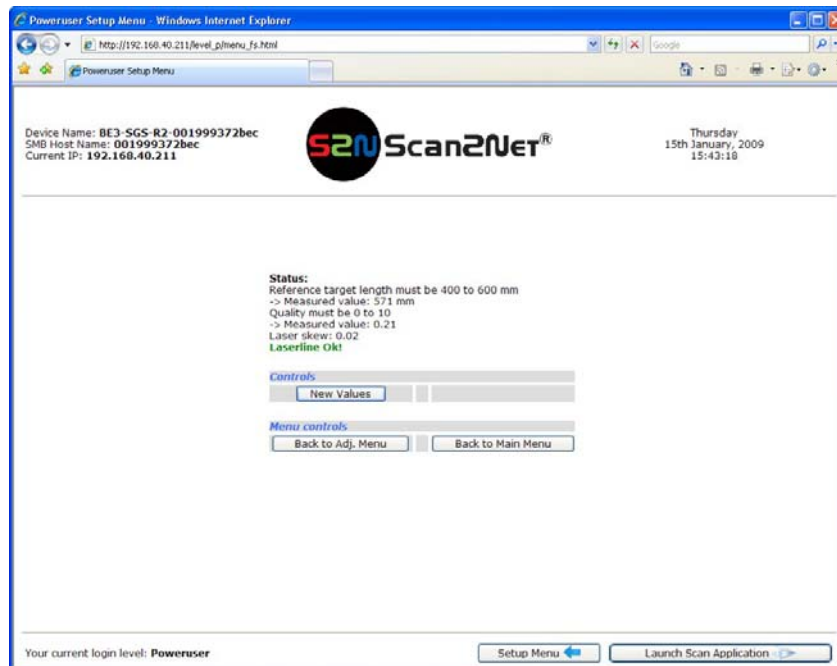
Picture 67: Laser check result

4. Click the button New Values in the section *Controls* to repeat the measurement.

Or

5. Click the button Back to Adj. Menu in the section *Menu controls* to return to the adjustments menu (see Picture 52).

At this point, all mandatory setup functions have been completed. Click the Scan2Net logo on top of the screen and go to Launch Scan Application **to start scanning.**

B.3 Options and Settings

The following options and software settings are optional and are not necessary for the basic operation of the device. Some of them provide more convenience for the operator while others are software options that can enhance image quality or perform other optional functions.

B.3.1 Time Server

Locate the section *Base Settings* in the Poweruser screen.

Click the button Adjust Time & Date to set various parameters.
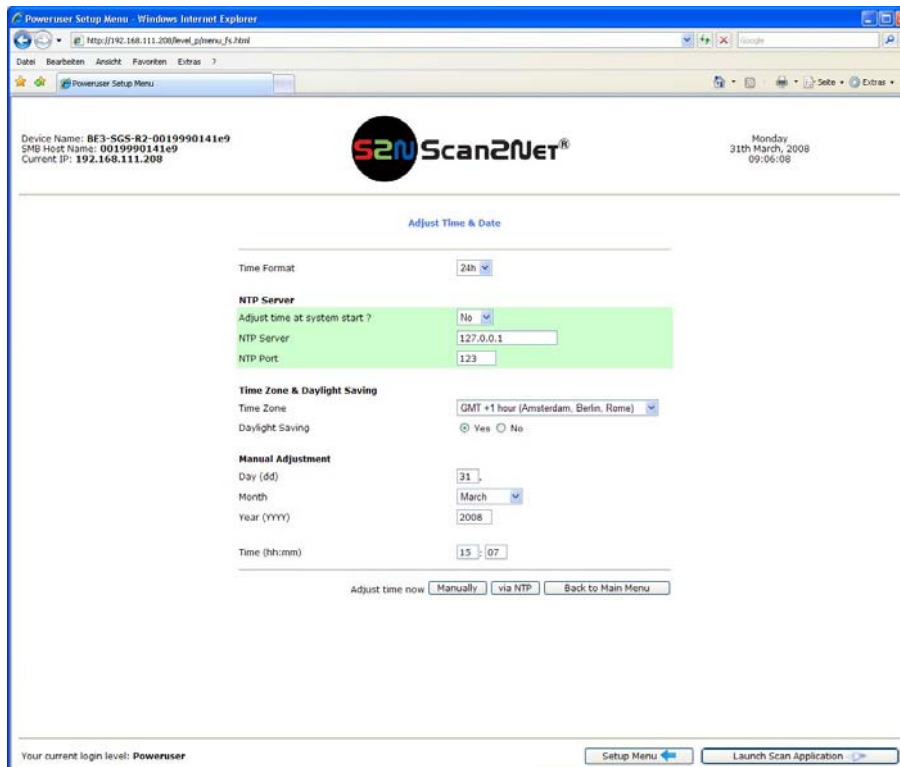
Picture 68: Adjust Time & Date screen

Select time format, time zone, daylight saving and time server IP address. Manually set time or let the system set it at every power up.

Note: The default image name contains current time and date, therefore synchronizing the internal clock is recommended.

B.3.2   Sound Control

Locate the section *Base Settings* in the Poweruser screen and go to Sound System .
The volume can be adjusted and other sound files can be uploaded.

Picture 69: S2N Sound System screen

A sound file can be assigned to various action items. The assigned sound will be played every time the condition occurs. The default setting can be overwritten by selecting the appropriate WAV file and then moving it over by pressing the ← button.
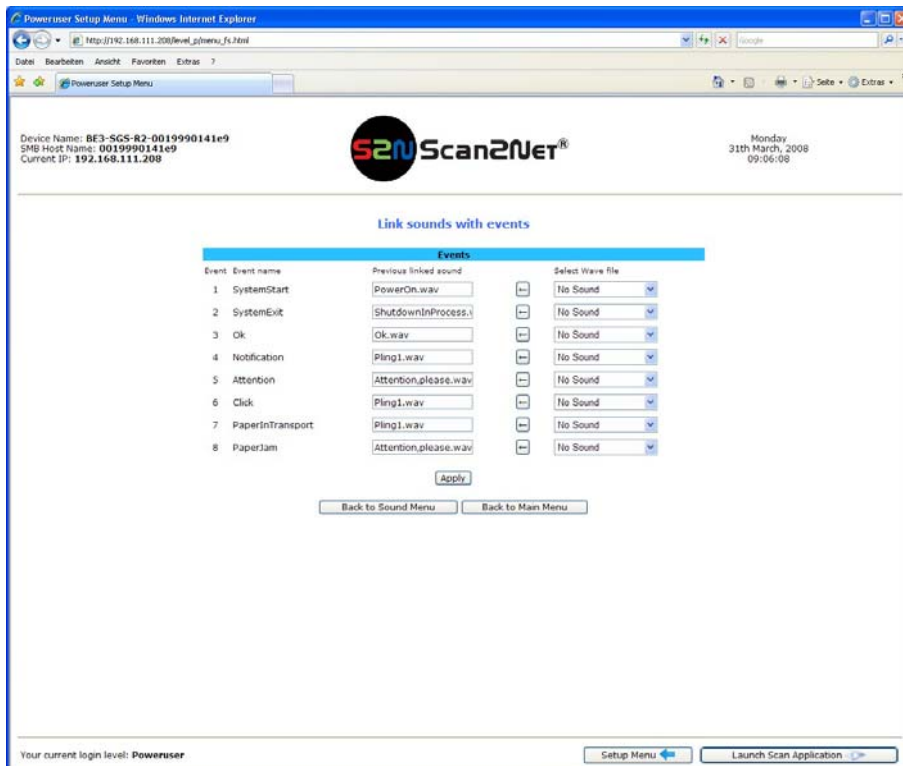
Picture 70: Link Sounds to Events screen

B.3.3   Firmware Update

Locate the section *Updates & Uploads* and go to Update Scanner Firmware .

Select the "Post update behavior" of the scanner from the list.
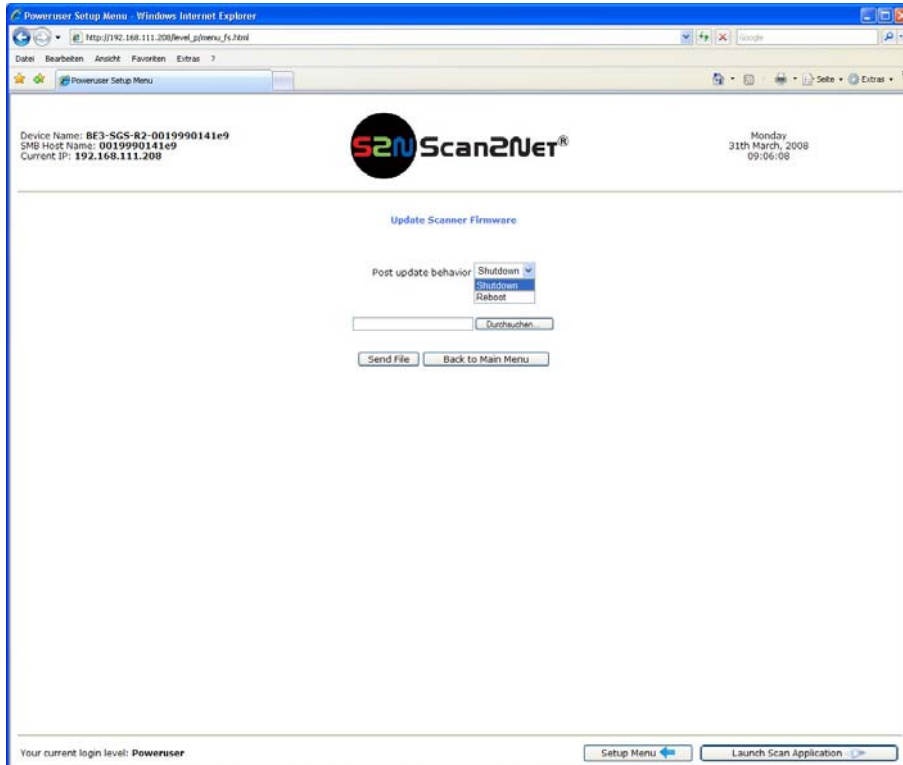
Picture 71: Update Scanner firmware screen

Browse and select the previously downloaded firmware update file.

The appropriate firmware can be downloaded from the Image Access Customer Service Portal at http://service.imageaccess.de.

B.3.4 Install Options

Locate the section *Updates & Uploads* and go to Install Options .

All option keys displayed in green are valid and installed. A new key must be entered completely without blanks or spaces followed by the Apply button. If the key text does not turn green, the key is invalid or does not belong to this specific scanner or option.

Note: Option keys are valid only for one option on a specific scanner denoted by its serial number.
If a key is accidentally deleted it can always be obtained again at the Image Access Customer Service Portal http://service.imageaccess.de without extra cost.
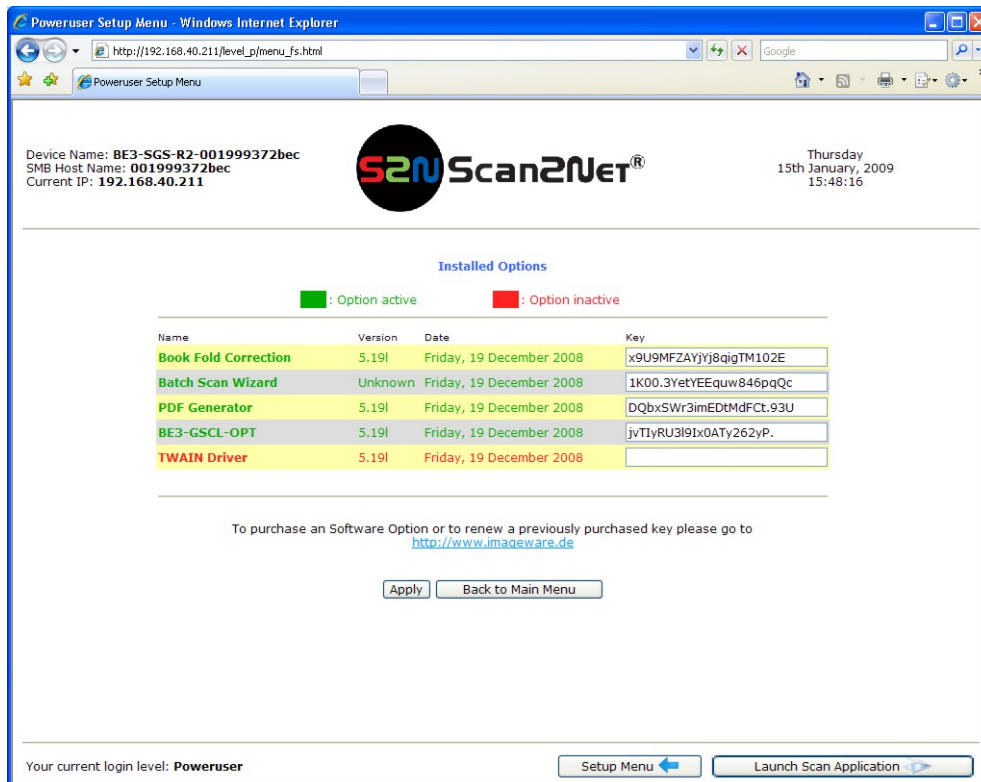
Picture 72: Install Option screen

B.3.5   Install ICC Profiles

Locate the section *Updates & Uploads* and go to ICC Profiles .

Picture 73: ICC Profile screen

Select either Printer Profiles or Scanner Profile .

In the next screen, browse for a new ICC profile and select it. It will replace the previous file.

C   Tests and Troubleshooting

C.1   Network Performance Test

It is sometimes desirable to check network performance if the scanner seems to be operating slowly. The scanner itself has a gigabit network interface and can transfer data at a sustained rate of almost 100Mbytes per second. This is far more than most standard PCs can handle and comes very close to the maximum bandwidth of the gigabit network.

If the scanner runs in a 100Mbit networks it is already slowed down significantly, particularly if the file sizes are large. Sometimes the network's response times are poor because routers and/or switches with slow performance are used, or the topology of the network is not optimal.

This analyzer checks the response time between the scanner and any arbitrary IP address in the network. In most cases, the IP address would be the one from the PC operating the scanner, but FTP links can also be checked via this function.

Perform the test as follows:

Locate the section *Adjustments & Support* and go to Network Analyzer .

Go to Perform Speed Test .
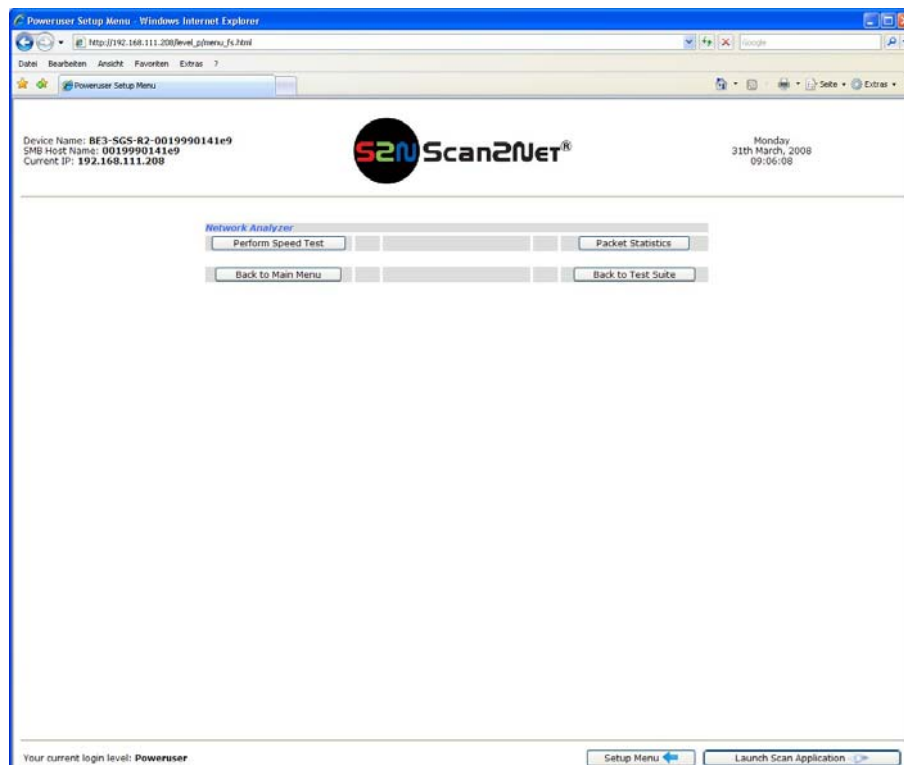
Picture 74: Perform Speed Test screen

Type in a valid IP address in the same network and subnet.
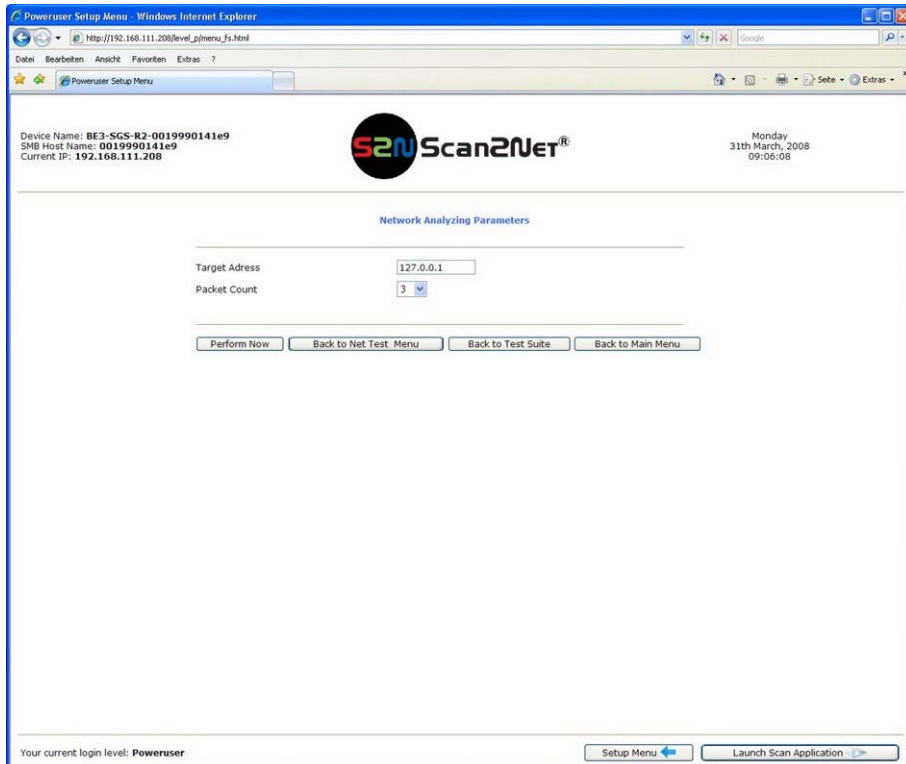
Picture 75: Network Analyzer Parameters screen

Check the results in the following screen. Single digit millisecond response times are good, the example shown is from a well structured gigabit network.

Picture 76: Network Analyzer Result screen

C.2 Scan Test Targets

The scanner has a function for scanning specific test targets. If one of the test targets is scanned, all image parameters are set to a known state to enable a remote system to analyze the quality of the scanner. One or more CSTT test targets are included in the initial scanner shipment. They are used to troubleshoot various types of image quality problems. Any time Image Access support is contacted, you will be asked to provide a test scan of the CSTT target.

Image Access is the first vendor that has established a portal with an Image Quality Server online 24 hours at 7 days a week. The Image Quality Server can be reached at http://service.imageaccess.de. The server automatically analyzes color tracking, white and black points, geometric distortions, resolution and many more parameters and displays them in an easy to understand form. A time stamped certificate can be printed out to document the scanner's quality level at any given time.

C.2.1 Scan CSTT Test Target

Locate the section *Adjustments & Support*, go to Scan Test Targets and click the button Scan CSTT Test Target .

Picture 77: Scan Test Target screen

Place the CSTT test targets on the scanner as displayed.
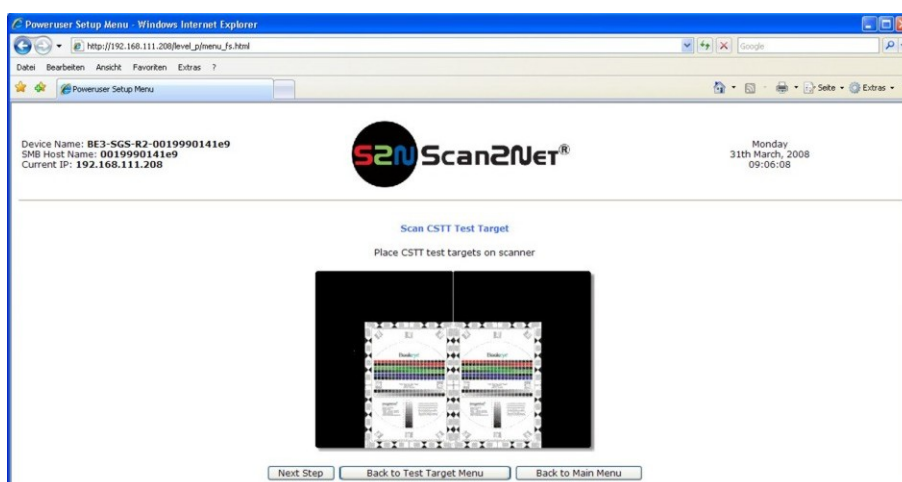
Picture 78: CSTT Test Target screen

Press the Next Step button and follow the instructions.

C.2.2 Scan IT8 Test Target

The test scan of a standard IT8 test target is used to generate an ICC profile for the specific scanner. The scan can be provided to the Image Access Customer Service Portal at http://service.imageaccess.de and the system will generate an ICC profile. This profile can then be uploaded into the scanner.

Locate the section *Adjustments & Support*, go to Scan Test Targets and click the button Scan IT8 Test Target .

Picture 79: Scan Test Target screen

Place the IT8 test targets on the scanner as displayed.
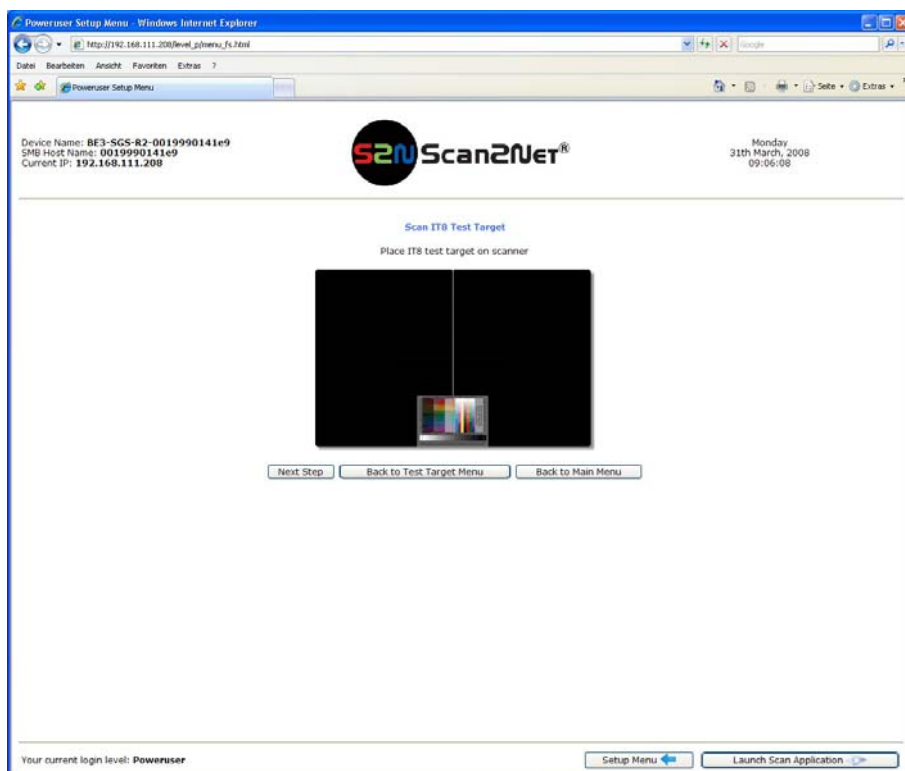
Picture 80: IT8 Test Target screen

Press the Next Step button and follow the instructions.

C.3   Recovery Function

The recovery function resets all parameters of the device to factory defaults after a fatal system breakdown.

The recovery key is necessary to invoke the recovery procedure. The key is delivered with every device. It is marked with the label **Recovery**.

Important: The recovery function resets the IP address to the factory default value of 192.168.1.50. If the scanner had a different IP address, it will be necessary to use the cross over cable and change the network settings on the local computer.

C.3.1   Important Notes before recovering to Factory Defaults

Write down the values for IP address, subnet mask and gateway of the device before starting the recovery sequence.

The recovering to factory defaults described in the following should **only** be executed after a fatal system breakdown!

After recovering to factory default, **all firmware updates** have to be executed! Make sure an update file is available on the local computer.

After recovering to the factory defaults, **all adjustment procedures** described in the previous sections have to be executed again!

C.3.2   How to recover to factory defaults

1. Power down the device.

2. Plug the recovery key into the serial port at the rear panel of the device.

3. Power the device up via the start button.

Picture 81: Connectors on rear panel

4. When the recovery key is found in the serial port, the recovery sequence is automatically executed. All viable system data will be restored and necessary repair steps will be taken without the need of any user interaction.

Important: **Do not switch off the device at any time during the recovery procedure!**

Note: The recovery sequence can last up to **four minutes**. While the recovery sequence is running, **no message** will be displayed.

5. When the recovery sequence has finished the device will power down automatically.

6. Unplug the recovery key after the device has powered down.

7. Power up the device and launch the scan application in your browser.

 The IP address of the device will have the factory default value: 192.168.1.50

8. Change the network parameters to the values which were used before running the recovery sequence.

 Select $\boxed{\text{Setup Device}}$ ➜ $\boxed{\text{Poweruser}}$. Locate the section *Base Settings* and click the button $\boxed{\text{Network}}$. Enter the values for IP address, subnet mask, and default gateway.

 Click the $\boxed{\text{Apply}}$ button. Confirm the following message by clicking the $\boxed{\text{OK}}$ button.

 In the next screen click the $\boxed{\text{Reboot}}$ button.

 Reconnect to the device using the new IP address.

9. Select $\boxed{\text{Setup Device}}$ ➜ $\boxed{\text{Poweruser}}$. Locate the section *Updates & Uploads* and click the button $\boxed{\text{Update Firmware}}$. Perform a firmware update.

10. After the firmware update all software adjustments for the device must be performed.

 Select $\boxed{\text{Setup Device}}$ ➜ $\boxed{\text{Poweruser}}$. Locate the section *Adjustments & Support* and click the button $\boxed{\text{Adjustments}}$. Perform the adjustments by clicking the appropriate buttons.

C.4 Troubleshooting Matrix

Problem	Possible cause	Action
Green start button does not light up.	No power	Check main outlet, power cord, power-on switch on the back of the device.
Start button does not power up the device.	Connector failure, software glitch …	Switch power off for at least 10 seconds. Retry after green start button lights up again.
Stop button does not power down the device.	Internal software hangs, application hangs …	End all applications and retry. If problem persists, press the **start button** for at least 10 seconds. Power up again.

Problem	Possible cause	Action
Image is darker than expected.	The target used for white balance is much brighter than the scanning target.	Go to the White Balance function and modify the Brightness Correction setting.
Image is brighter than expected.	The target is much brighter than the target used for white balance.	Go to the White Balance function and modify the Brightness Correction setting.
Image is darker on one side than on the other side.	The electronics gear is out of sync.	Exercise the Scan Start procedure.
Image shows a color shift towards red (tint)	The target used for white balance is more blue than the scanning target.	Go to the RGB adjustments and lower the gain on red.
Image shows a color shift towards blue (tint)	The target used for white balance is more red than the scanning target.	Go to the RGB adjustments and lower the gain on blue.
Image shows a color shift towards red (tint)	The scanner receives significant amounts of infrared light (sun or spot lights) not visible to the human eye.	Change position, close blinds, dim down or shut off any bright spot lights.
Image shows areas that are overexposed and too bright.	The scanner receives too much ambient light from a point source like sunlight, spotlight etc.	Change position, close blinds, dim down or shut off any bright spot lights.

Problem	Possible cause	Action
Image has unevenly spaced vertical stripes or streaks.	The electronics gear is out of sync.	Exercise the Scan Start procedure.
Image has evenly spaced vertical stripes or streaks.	50/60Hz interference from fluorescent ceiling lights.	Change position, dim down or shut off some lamps, change ceiling lights to electronic ballasts.
Image has horizontal stripes or streaks.	Improper white balance.	Exercise the White Balance procedure.

Problem	Possible cause	Action
Scanning two A4 (letter) pages perfectly centered in A3 (double letter) format cuts of one side of the scan.	The scanner's optical middle (in the horizontal direction) is lost or misaligned.	Exercise the Scan Start procedure.
A small portion of the lower side of the target is missing in the image.	The scanner's optical center (in the vertical direction) is lost or misaligned.	Go to the Scan Center function and lower the value.
The image shows an extra small portion on the lower side of the target	The scanner's optical center (in the vertical direction) is lost or misaligned.	Go to the Scan Center function and raise the value.

Problem	Possible cause	Action
The image is out of focus on a flat target with significant contrast, book cradles in their lowest position and flat mode scanning.	The reference focal point is lost or misaligned.	Exercise the Autofocus procedure.

C.5 Error Codes

The scanner does report error conditions on the built-in display and through the API. Some errors are only sent to the API.

GREEN problem description: A green problem description signals that operation of the scanner is still possible, although the error will have an effect on the behavior or quality of the scanner.

RED problem description: If a red problem description occurs, the device will be stopped and further scanning is inhibited.

Error #	Error message shown in the display	Error message sent to application	Problem description
1		Scanner in use.	An attempt to access the scanner was made from a different application.
2		Invalid session ID.	An attempt to access the scanner with an invalid session ID was made.
4	USER BREAK	Stop button pressed.	The stop button was pressed during the operation.
5	E05 S2N BOARD	S2N board failure	The S2N board is either not found or found defective. Make sure board is sitting correctly on the motherboard.
8		User timeout	The function ended because of a time out
9		Warming up	The device is still warming up and cannot be used.
10		Invalid setting value.	The value sent to the device is invalid.
11		Setting does not exist.	The settings does not exist.
12		Invalid user docsize.	The size of the user format is invalid.
14		Invalid resolution or color mode.	Either the resolution or the color mode is invalid.
15	E15 DOCUMENT PICKING	Document picking error.	The parameters that specify the document picking area are invalid.
20	E20 MOTOR 1/1 (CCD DRV) SWITCH PERM. OPEN	Motor 1 / PCI 1 (CCD drive): End switch permanently open.	The home position switch is permanently open. The mechanics of the corresponding motor could be blocked or disconnected or the switch/cable is defective.

Error #	Error message shown in the display	Error message sent to application	Problem description
21	E21 MOTOR 1/1 (CCD DRV) SWITCH PERM. CLOSED	Motor 1 / PCI 1 (CCD drive): End switch permanently closed.	The home position switch is permanently closed. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
22	E22 MOTOR 2/1 (L. LAMP) SWITCH PERM. OPEN	Motor 2 / PCI 1 (Left lamp): End switch permanently open.	The home position switch is permanently open. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
23	E22 MOTOR 2/1 (L. LAMP) SWITCH PERM. CLOSED	Motor 2 / PCI 1 (Left lamp): End switch permanently closed.	The home position switch is permanently closed. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
24	E24 MOTOR 3/1 (R. LAMP) SWITCH PERM. OPEN	Motor 3 / PCI 1 (Right lamp): End switch permanently open.	The home position switch is permanently open. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
25	E24 MOTOR 3/1 (R. LAMP) SWITCH PERM. CLOSED	Motor 3 / PCI 1 (Right lamp): End switch permanently closed.	The home position switch is permanently closed. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
26	E26 MOTOR 4/1 (LENS) SWITCH PERM. OPEN	Motor 4 / PCI 1 (Lens): End switch permanently open.	The home position switch is permanently open. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
27	E27 MOTOR 4/1 (FOCUS) SWITCH PERM. CLOSED	Motor 4 / PCI 1 (Lens): End switch permanently closed.	The home position switch is permanently closed. The mechanics of the corresponding motor could be blocked or the switch/cable is defective.
30		File format not supported.	The specified file format is not supported or it is invalid in combination with the color mode.

Error #	Error message shown in the display	Error message sent to application	Problem description
55	E55 WRONG S2N HW CCD PORTS	Wrong S2N board detected (not enough CCD ports)	The S2N board found is not the right one for this device. Error can occur after a repair/exchange. Exchange with correct board.
56	E56 WRONG S2N HW REVISION NOT OK	Wrong S2N Board detected (Revision not OK)	The S2N board found is not the right one for this device. Error can occur after a repair/exchange. Exchange with correct board.
60	E60 CAMERA	General camera error.	General error on the CCD camera board. Check power, cables and S2N-PCI board.
61	E61 CAM N.LOADED CAMERA 1	Load camera 1 failed.	Initializing of camera 1 failed. Check power, cables and S2N-PCI board.
62	E62 CAM N.LOADED CAMERA 2	Load camera 2 failed.	Initializing of camera 2 failed. Check power, cables and S2N-PCI board.
63	E63 CAM N.LOADED CAMERA 3	Load camera 3 failed.	Initializing of camera 3 failed. Check power, cables and S2N-PCI board.
64	E64 CAM DATA BUS CAMERA 1	Camera 1 data bus error.	Test data transfer to camera failed. Check cables / connectors to camera 1 and S2N-PCI board.
65	E65 CAM DATA BUS CAMERA 2	Camera 2 data bus error.	Test data transfer to camera failed. Check cables / connectors to camera 2 and S2N-PCI board.
66	E66 CAM DATA BUS CAMERA 3	Camera 3 data bus error.	Test data transfer to camera failed. Check cables / connectors to camera 3 and S2N-PCI board.
67	E67 ADC ERROR CAMERA 1	Camera 1 adc error.	Test data transfer through analog digital converter failed. Check cables / connectors to camera 1.
68	E68 ADC ERROR CAMERA 2	Camera 2 adc error.	Test data transfer through analog digital converter failed. Check cables / connectors to camera 2.
69	E69 ADC ERROR CAMERA 3	Camera 3 adc error.	Test data transfer through analog digital converter failed. Check cables / connectors to camera 3.
75		General keyboard error	General keyboard error. Check keyboard and cables.
99		Internal error.	The firmware has detected an internal error of unknown cause.

Error #	Warning shown in the display	Warning sent to application	Problem description
144		Light level is low	The light level is found to be low during the white balance function.
146	W146 LEFT LAMP BLOCKED	Left lamp blocked.	The left lamps travel range is blocked.
147	W146 RIGHT LAMP BLOCKED	Right lamp blocked.	The right lamps travel range is blocked.
160		No white balance data	No white balance data was found. Perform white balance.
180		Deskew failed	The deskew function failed. Reposition document.

D   Technical Data

D.1   Scanner Specifications

Scan Area

Maximum Scan Area [pixel]	7560 x 6442 pixels
Maximum Scan Area [mm]	640 x 520 mm
Optical Resolution	400 x 600 dpi
Resolution	150 – 600 dpi

Luminosity

Scanning	4500 LUX
Stand-by, idle	0 LUX (lamps off)

Lamps:

High Power White LED	UV- and IR-radiation free
Lifetime	50.000 hours on-time

Book Cradle:

Maximum load / book cradle plate	15 kg

D.2   Ambient Conditions

Operating Temperature	+5 to +40° Celsius
Storage Temperature	0 to +60° Celsius
Relative Humidity	20 to 80% (non condensing)
Ambient luminance	≥ 300 Lux
Noise Level	< 50 dB(A) (Operating)
	< 30 dB(A) (Stand-by)

D.3 Electrical Specifications

This device is Energy Star compliant.

Voltage	110–240 VAC
Frequency	50/60 Hz

Power Consumption

Stand-by	6 W
Self-test mode	135 W
Stand-by, operational, lamps off	90 W
Operating	260 W
Pre-Scan	130 W

Moving the book cradle (lamps off)

Both plates simultaneously	128 W
Single plate	108 W

D.4   Dimensions and Weight

Scanner outer dimensions (without lamps)	1065 x 670 x 700 mm (H x W x D)
	41,9 x 26,4 x 27,6 inch
Scanner outer dimensions (lamps attached)	1065 x 1270 x 700 mm (H x W x D)
	41,9 x 50 x 27,6 inch
Total weight of scanner, ready to use	65 kg / 143 lbs
Dimensions Transport Box (contains main body, camera head in separate box, lamps, camera neck, test target folder, assembly material, tools and cables)	580 x 1400 x 860 mm (H x W x D) 22,8 x 55,1 x 33,9 inch
Weight Transport Box:	29 kg / 63,8 lbs
Total shipping weight	107,5 kg / 236,5 lbs