



Calibration Techniques

1 5

Future Focused







Brightness and Contrast Adjustment for individual Analog Inputs

- Direct Analog Connections
- Connections through PDC0100 Converter Box
- Changing the LUT from the LMM (try this first, it may be sufficient)
- Calibration Techniques using Radics



How brightness works



- The purposes of the brightness adjustment are:
 - To match real output of the luminance minimum (Lmin) to the lowest range of input signal (= 0).
 - To shift input level





How contrast works



- The purposes of the contrast adjustment are:
 - To match the actual value of luminance maximum (Lmax) to the highest range of input signal (= 255).
 - To gain input level







Adjustment of Direct Analog Inputs





Image Adjustments – Analog Input on LMM56800

- It is possible to adjust Brightness/Contrast for the Analog signal directly connected to LMM input ports.
 - Open the input to configure
 - Adjust Brightness/Contrast

| 10000 | 1000 | 800x600@60Hz 40MHz 26.4µs | |
|-------|------|---|---|
| | | Video input settings | |
| | | Brightness 450 1 Contrast 450 | |
| | | Timing parameters | |
| | | Horizontal position 4 7 👔 Vertical position 4 50 | |
| | | Frequency 🕴 100 🕈 Phase 🔰 35 | |
| | | ADC parameters Red gain 4.91 * Red offset 4.422 Green gain 4.91 * Green offset 4.515 Blue gain 4.84 * Blue offset 4.502 ADC calibration Testpattern | |
| | | Deinterlacing mode Static mesh | 0 |
| | | | |
| | | USB input | |

| Brightness | 50 | | Contrast | 50 | 1 |
|--|--------------|----------------|--|------------------------|---|
| Timing paramete | rs | | | | |
| Horizontal position | 47 | * | Vertical position | \$ 50 | 1 |
| | | | | | |
| Frequency Auto adjustment | ₹ 100 | 1 Test | Phase | 4 35 | 1 |
| Frequency Auto adjustment ADC parameters Red gain | ₽ 100 | t Test | Phase pattern Red offset | 4 35 | 1 |
| Frequency Auto adjustment ADC parameters Red gain Green gain | ↓ 100 | t Test t | Phase pattern Red offset Green offset | ¥ 35 ¥ 423 ¥ 515 | 1 |





PDC0100 Converter Box



Connecting PDC0100



- Connector locations
 - Inputs of the analog DVI converter



| Analog Signal Input | | | | | | |
|--|--|---|--|--|--|--|
| Analog signal input (via DVI-I connector) | | <rgb signal=""></rgb> Video level: 0,5 1.0 Vpp Sync level: TTL-compatible | | | | |
| RGB input, H/C-Sync input and V-Sync input | Via VGA (D-sub) connector (female), any polarity | <sog signal=""> Video level: 0,5 1.0 Vpp Sync level: 0,2 0.3 Vpp </sog> | | | | |
| Video Signal Input | Video Signal Input | | | | | |
| S-Video | Via S-VHS(mini-DIN) socket | Video level: 0,5 1.4 Vpp Sync level: 0,2 0.3 Vpp | | | | |
| Composite | Via CVBS(BNC) socket | PAL (625 Z / 50 Hz) NTSC (525 Z / 60 Hz) | | | | |



Connecting PDC0100



- Connector locations
 - Output of the analog DVI converter and power supply



| | | Connector Type | |
|---|-------------------------|----------------|----------------------------------|
| 1 | Power supply | 12 V DC | To AC/DC converter |
| 2 | Control unit connection | Ethernet | Not in use, Service Purpose Only |
| 3 | DVI-D Output | DVI-D | To LMM56800 |



Connecting PDC0100



- The analog DVI converter is set using a keypad.
 - Only connect the keypad using the supplied cable.

CAUTION

The analog DVI converter must not be connected to a network!

The RJ45 socket on the analog DVI converter and the keypad are used exclusively to connect these together using the network cable supplied with the keypad.

 The operation LED is located directly on the analog DVI converter. The 4key keypad is connected to the analog DVI converter via a network cable.







Image Adjustments – PDC0100

Main Manu> Brightness/contrast

| Menu | Function | Adjustment/range | Description |
|--|------------|--|---|
| Brightness/contrast | Brightness | 0 100 % | Set brightness Adapting the representation of darker picture areas. |
| Brightness / Contrast > Position / Zoom > Source > Auto functions > Canguage > | Contrast | 0 100 % | Set contrast Adapting the representation of brighter picture areas. |
| Others Servicelevel 2 Dynamic help for keypad function () | Color | 1, 2, 3, User 1: 9300° K 2: 7300° K 3: 6500° K (native) Default: 1 (6500° K) | Set the desired color temperature or hue |

Note:

The brightness/Contrast settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).





Changing the LUT from the LMM

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Configuring the Monitor LUT From your Service PC



- 1. Connect the LMM to the LS580W/LX600W
- 2. Open the "Input configuration" Sidebar of the LMM. Double click [A] or [B] to open output configuration.
- 3. Select LUT from the list. Confirm if selected LUT is applied to the monitor, Click "OK" to confirm.
- 4. If default is not preferred, recommend trying LUT #4



Please do not change "backlight brightness" adjustment, This may spoil the calibration accuracy.



LS580W LUT Choices

| No. | Gamma Model Type | Lum Min (cd/sqm) | Lum Max (cd/sqm) |
|-----|--------------------------|---------------------|---------------------|
| 1* | DICOM | 0.45 | 350 |
| 2 | Gamma Function 2.2 | 0.45 | 350 |
| 3 | DICOM | < 0.13 | 350 |
| 4 | Gamma Function 2.2 | < 0.13 | 350 |
| 5 | Native | < 0.13 | 350 |





Calibration Using RadiCS



Calibration - LS580W



Necessary equipments

| Item | Description |
|----------------------|---|
| PC/Workstation | OS requirements •Windows XP Professional Service Pack2 or later • Windows XP Professional x64 Edition Service Pack 2 • Windows Vista Service Pack2 or later • Windows 7 / Windows 7 Service Pack1 <u>PCI bus requirements</u> •PCI Express x16 lane port available for graphics card. |
| Graphics Card | Nvidia FX3700 Nvidia Quadro Q2000D (DVI) |
| Calibration Software | RadiCS Ver. 4.3.1 or later |
| Calibration Sensor | RadiCS UX1 Sensor (USB) or Advanced Serial Luminance Meter - ASLM (RS232C) |

UX1 Sensor

ASLM







Connection Diagram – UX1





RadiForce[®]

SURGICAL MONITOR SOLUTIONS

UX1 Sensor

USB connection





Calibration Procedure





Launch RadiCS in Advanced mode

From Windows Menu or Task Tray icon, start RadiCS software. Click "Advanced mode" to continue.







Input Password

Default password is "password".

Start Monitor Detection Process

"Monitor Detection" starts automatically. Follow the software instructions for setup.





| Itemator setup Select two the cicle of the test pattern is shown. <l< th=""><th>Cš Setup</th><th>Cos Setup</th></l<> | Cš Setup | Cos Setup |
|---|---|--|
| Select how the circle of the test pattern is shown independent(the circle is shown on eme monter screen) independent(the circle is shown on such of the several montor screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) independent(the circle is shown on the left alide of the monter screens) | Monitor setup | Monitor setup |
| Set to urb the circle of the test pattern is shown. <p< td=""><td></td><td></td></p<> | | |
| Independent (the circle is shown on are monitor screens) Wide View (the circle is shown on each of the several monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens) PbyP(the circle is shown on the right side of the monitor screens)< | Select how the circle of the test pattern is shown. | I Register this monitor |
| Out of View View View View View View View View | Independent(the circle is shown on one monitor screen) | Select a monitor name then click [Next]. The information of the selected monitor is input automatically. |
| Control Cont <td>◯ ◯ Wide View(the circle is shown over the several monitor screens)</td> <td>will appear for 3 seconds or the brightness will be changed temproarely on corresponding monitor.</td> | ◯ ◯ Wide View(the circle is shown over the several monitor screens) | will appear for 3 seconds or the brightness will be changed temproarely on corresponding monitor. |
| Pb/Pthe circle is shown on the left side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) Pb/Pthe circle is shown on the right side of the monitor screens) | Mirroring(the circle is shown on each of the several monitor screens) | EIZO LS560W HXB6001101 (DDC) Other Monitor |
| PbyP(the circle is shown on the right side of the monitor screens) | PbyP(the circle is shown on the left side of the monitor screens) | |
| Sack Nex> Fnish Cancel | PbyP(the circle is shown on the right side of the monitor screens) | |
| <pre><back next=""> Finish Cancel</back></pre> | | |
| Seck Next > Finish Cancel | | |
| Seck Next > Finish Cancel | | |
| <pre><back next=""> Finish Cancel</back></pre> | | |
| Sack Next > Finish Cancel | | |
| Sack Next > Finish Cancel | | |
| Sack Next > Finish Cancel | | |
| < Back Next > Finish Cancel < Back Next > Finish Cancel | | |
| < Back Next > Finish Cancel < Back Next > Finish Cancel | | |
| < Back Next > Finish Cancel < Back Next > Finish Cancel | | |
| | < Back Next > Finish C. | Cancel < Back Next > Finish Cancel |

Choose PbyP option

In accordance with what actually displayed on screen.

Choose LS580W name

Click "EIZO LS580W..." and Next to proceed.





| Setup | | | | × | cs Setup | | × | CS | Setup | |
|--|------------------------|-------------------------|---------------|---|---------------|---|--------|-----|---------------------|---------------|
| onitor setup | | | | | Monitor setup | | | Cor | impleted | |
| | | | | | | | | | | |
| Input the monitor information of | f the monitor. The ite | ems marked with "*" mus | st be filled. | | Select how th | ne circle of the test pattern is shown. | | s | Setup is completed. | |
| Monitor Type: | * Colo | r | - | | O | \odot Independent(the circle is shown on one monitor screen) | | | | |
| Manufacturer: Model Name: | * EIZC | C (W00 | | | | \odot Wide View(the circle is shown over the several monitor screens) | | | | |
| Serial Number(S/N): | * HXB | 86001101 | | | DD | Mirroring(the circle is shown on each of the several monitor screens) | | | | |
| Connect: Asset Number: | DDC | | | | | PhyP(the circle is shown on the left side of the monitor screens) | | | | |
| Installed on: | 8/20 | 6/2011 | | | | PbyP(the circle is shown on the right side of the monitor screens) | | | | |
| CAL Switch Mode1 Control Use(Comment): | | | • | | | | | | | |
| CAL Switch Mode2 Control Use(Comment): | _ | | • | | | | | | | |
| CAL Switch Mode3 Control Use(Comment): | | | | | | | | | | |
| CAL Switch Mode4 Control Use(Comment): | | | × | | | | | | | |
| CAL Switch Mode5 Control Use(Comment): | | | • | | | | | | | |
| | < Back | Next > | Finish Cancel | | | Sack Next > Finish | Cancel | | < Back Next > | Finish C ncel |

Click Next to continue

Please confirm basic monitor information is automatically loaded and grayed out.

Choose PbyP for the rest half of screen

Same procedure to define other side of screen. Choose an PbyP option as displayed on screen.

Click Finish

Click Finish to complete monitor setup





| cs RadiCS | × |
|--|---------------------------------------|
| | Version 4.0.0 About Radics RadiCS® |
| Main Menu Monitor List Report Archive | Others ▼ |
| Monitor CAL Mode Calibration Target Image: EIZO LS560W HXB6001101 Image: LUT1 DICOM Part 14 GSDF [0.45cd/m^2-3 | Result - |
| | |
| | |
| | |
| | |
| | ⊘ Update |
| Acceptance Test | ncy Test Calibration |
| | Exit |

Top Screen of RadiCS in advanced mode

Detected LS580W is listed with serial number, and activated LUT





| cs RadiCS | | | × |
|----------------------------|--|-------------------------------|-----------|
| | | Version 4.0.0 About RadiCS | RadiCS® |
| Main Menu Monitor List | Report Archive | | Others ▼ |
| ▲ EIZO LS560W HXB6001101 | Item | Preset Value | Operation |
| ☑ LUT1 | Manufacturer | EIZO | |
| I LUT3 | Model Name | LS560W | |
| LUT4 | Serial Number(S/N) | HXB6001101 | |
| LUT5 | Monitor Type | Color | |
| | Connect | DDC | |
| | Asset Number | | Change |
| | Product Operating Time | 18H | |
| | Backlight Operating Time | 17H | |
| | Calibration | Hardware calibration | |
| | DUE | ✓ DUE | |
| | Calibration (Backlight Sensor) Data Creation | | Execute |
| | Keylock | - | |
| | Video Card | NVIDIA Quadro FX 3700 | |
| | Resolution | 3840x2160 @ 60Hz | |
| | Installed on | 08/26/2011 | Change |
| | | | |
| | | | |
| | | | |
| Identify Monitor Detection | | | |
| | | | Exit |

Monitor List

Detailed information about the monitor detected.





| | | | | Calibration Settings |
|----------------------------|-----------------|---|-----------------|--|
| RadiCS | | | | |
| A. | | | | Use the external sensor |
| | | Version 4.0.0 About Radics | RadiCS | Measurement Level |
| × | | | | O Low O Standard O High |
| Main Menu Monitor List | Report Arc | hive | Others ▼ | Clow Cotandard Ornigh |
| | 1 | | | Target |
| A EIZO LS5600V HXB6001101 | Item | Value | Operation | |
| LUT2 | CAL Mode | LUI1 | | Lmax: 300.00 cd/m^2 |
| LUT3 | Lamb | 0.00cd/m ² 2 | Change | I min: 0.45 od/m/2 Set I min as low as possible |
| LUT5 | Baseline Value | L'max=300.00cd/m^2, L'min=0.45cd/m^2, Lamb=0.00cd/m^2 | Change | |
| | Acceptance Test | Basic QC | Change | Color: OFF V K X: y: |
| | Constancy Test | Basic QC | Change | |
| | Use/Comment | | Change | Diselay Function |
| | | | | Display Function |
| | | | | DICOM Part 14 GSDF Lamb: 0.00cd/m ² Ambient Luminance |
| | | | | © CIE |
| | | | | © Evp 22 |
| | | | | |
| | | | | O Log Linear |
| | | | | © Linear |
| | | | | ⊘ Native |
| | | | | O User Definable |
| Identify Monitor Detection | | | | |
| | | | | Measure the results offer calibration |
| | | | Evit | |
| | | | Exit | Default OK Cancel |
| 1 | | | | |

Calibration Settings

LS580W has 5 LUTs = calibration memory banks. Click LUT and go to each Calibration settings. Calibration Target values can be configured as shown on the right screen.



In the event that an external photometer is not available, uncheck the box "use external sensor" to do basic adjustment with internal backlight sensor.



Changing the Active LUT



- Go to the "Others" tab
 - If black is not black enough, switch to LUT3, no calibration needed
 - If need to calibrate or change gamma curve to gamma 2.2 for example, do the following
 - 1. Choose LUT5
 - 2. Go back to monitor list
 - 3. Uncheck box 1, then check box 5



| Monitor List | Report Archive | | Others ▼ |
|--------------|------------------------|-------------------|---------------------------------------|
| | ltem | Preset Valu | Configuration |
| | Manufacturer | EIZO | QC Guideline |
| | Model Name | R22 | Manual Measurement/Pattern Indication |
| | Serial Number(S/N) | 20817064 | Backlight Meter/Status Analyzer |
| | Monitor Type | Color | Video Source Input/LUT Selection |
| | Connect | USB | Extract Calibration Data |
| | Asset Number | kens | Temperature |
| | Product Operating Time | 3973H | Backlight/ISS |
| | Calibration | Hardware calibrat | ion |
| | Keylock | OFF | Change |
| | Video Card | Intel(R) HD Graph | ics Family |
| | Resolution | 1600x1200 @ 60H | Hz |
| | Installed on | 10/22/2012 | Change |
| | | | |
| | | | |
| | | | |
| | | | |
| etection | | | |





 If a 2.2 gamma curve is requested, select the Exp box.

- Uncheck use external meter if UX1 sensor is not available or if acrylic protection glass is used. UX1 will not work through acrylic
- Then perform calibration

| Calibration Settings | | | | | |
|--|--|--|--|--|--|
| ✓ Use the external sensor | | | | | |
| Measurement Level | | | | | |
| ○ Low | | | | | |
| Target | | | | | |
| Lmax: 300 cd/m^2 | | | | | |
| Lmin: 0.29 cd/m^2 Set Lmin as low as possible | | | | | |
| Color: 7500 V K X: 9: | | | | | |
| Display Function | | | | | |
| DICOM Part 14 GSDF Lamb: 0.00cd/m ² | | | | | |
| © CIE | | | | | |
| Exp 2.2 | | | | | |
| 🗇 Log Linear | | | | | |
| © Linear | | | | | |
| © Native | | | | | |
| | | | | | |
| Measure the results after calibration | | | | | |
| Default OK Cancel | | | | | |





| s RadiCS | | X |
|------------------------|---|---------------------------------------|
| | | Version 4.0.0 About RadiCS RadiCS® |
| Main Menu Moni | tor List Report Archive | Others V |
| Monitor | CAL Mode Calibration Target | Result |
| EIZO LS560W HXB6001101 | DICOM Part 14 GSDF [0.45cd/m ^A | 2-3 |
| Acceptance Test | Daily Test | Onstancy Test |
| | | Exit |

Execute Calibration

Please connect EIZO sensor (UX1) Click "calibration" to start calibration





| Calibration | × |
|------------------------------------|----|
| The software proceeds calibration. | |
| EIZO service | - |
| | ОК |



Input Tester Name

For calibration record, Tester name must be input. Click OK to proceed.

Execute Measurement

Measurement pattern appear on screen with black background. Ensure EIZO sensor is connected, and click Proceed to continue.







| cs Calibration | |
|-------------------------|--------|
| Proceeding calibration. | |
| | |
| | |
| | Cancel |

Measurement and Calibration

It normally take 3 - 5 min. for the software complete the calibration.









Calibration Results

Once calibration completed, software shows the calibration result. Review the result and Exit the calibration. LS580W may require turn on/off to activate the calibration result.







| cs RadiCS | | | × |
|---|--------------------|-------------------------------------|----------------------|
| | | Version 4.0.0 About RadiCS | RadiCS® |
| Main Menu Monito | Lis Report Archive | | Others 🔻 |
| Search Condition | | | Search |
| EIZO MX210 35266118 EIZO MX240W 21270098 EIZO MX240W 31067061 EIZO MX240W 31067061 EIZO MX240W 31094061 EIZO MX240W 31094061 EIZO MX240W 31094061 | • | | |
| | | | Number of Record : 2 |
| 08/26/2011 09:56 Calibration | | EIZO service EIZO LS560W HXB6001101 | LUT1 |
| сакралон тагре | | | |
| Old Version | | | Report |
| | | | Exit |

Calibration Results

Go to "Report Archive" and select the monitor, then calibration history will be listed in the below field.

Click to open the calibration result.









Close RadiCS software

Click "Exit" to close the application. Please note that the RadiCS software process will still be on the task tray after exit.