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VER.2

USER'S MANUAL

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I. GETTING STARTED

1.1. Introduction

When it comes to medical imaging, the ability to see the whole image is important. With a standard workstation configuration using an un-calibrated display, the user runs the risk of missing fine details. Missing fine details can represent a health risk to the patient, which may lead to a misdiagnosis or an expensive lawsuit. The problem is not the image or the practitioner's eye; it is the ability of the display to represent all information accurately.

EzCal ver.2 is a software solution which enables the user to modify display output to meet DICOM Part 14 GSDF and other key industry standards. After calibration your workstation will allow you to see the finest details of every image displayed. With EzCal ver.2 medical display calibration software installed on all of your computers, you are assured that no matter which image you are looking at, it will be the same on every display.

EzCal ver.2 is not only a DICOM calibration tool, but also a medical monitor QA application, that verifies the display's conformance to medical standards AAPM TG18, DIN 6868-57, DIN 6868-157, JESRA X-0093, IEC 62563-1, the New York State Primary Diagnostic Monitor (NYPDM and New York City PDM) Quality Assurance Program and performs acceptance and conformance tests for these standards.

This document provides details on installation and use of the EzCal ver.2 application.



About EzCal ver.2

EzCal ver.2 is a medical monitor quality assurance suite based on the medical standards NEMA DICOM part 14 GSDF, AAPM TG18, DIN 6868-57, DIN 6868-157, JESRA X-0093, IEC 62563-1, NYCPDM and NYPDM. The medical monitor QA tool performs calibration, acceptance test, conformance test and maintains consistency to all medical workstations. The use of this software enables healthcare.



EzCal ver.2 Features

- Calibration of all displays to DICOM part 14 GSDF, CIE L*, BT.709 and BT.1886 standard
- Update of video card LUT or display LUT for displays that comply with the DDC/CI standard
- Calibration of multi-head display systems
- White level and black level calibration
- Version 4 ICC profile generation
- Calibration to a certain color temperature and XY coordinates
- Verification of conformance to the major regulations: AAPM TG18, DIN 6868-57, DIN 6868-157, JESRA X-0093, IEC 62563-1 and the New York state Primary Diagnostic Monitor (PDM) Quality Assurance Program
- Automated QA - performing acceptance and conformance tests
- Scheduling conformance test automatically and reminders to perform tests
- Remote quality control
- Convenient and user-friendly calibration and QA reports
- Color measurement capability
- Diversified auto backup
- History log for comparing and checking results of calibrations
- Briggs, SMPTE, AAPM test patterns to visually check calibration results
- Wide OS compatibility, including Windows 8.1 and Mac OSX 10.9.4
- Many brands of photometer support
- License supports all users on the installed workstation



Upgrading from EzCal to EzCal ver.2

Can I install over EzCal? Do I need to uninstall EzCal first?

When EzCal ver.2 is installed on your machine, the old version is automatically uninstalled. This is one of the first steps of the install.

Do I have to purchase a new license for EzCal ver.2, or is there an upgrade license available?

To upgrade to EzCal ver.2 from your already purchased and activated version customers will have to purchase a special upgrade license and activate it as a regular EzCal ver.2 license.

What will happen to my previous settings? Will they still be saved?

Both EzCal and EzCal ver.2 use the same database to save their settings. After you update, all of your settings will still be available for you to use. The same goes for all of your scheduled tasks, history data, and all the constancy and acceptance tests that have been previously performed in the previous software version.

What about the remote service? Will it work the same?

No. You will need to register a new account on <http://remote.qbx.info> and synchronize it for the remote service to function (check [7.3. How to set up the EzCal ver.2 Remote Service](#)) . Remote data servers now work differently. All the data from the old remote server did not transfer completely to our new server. This means that you will have to synchronize EzCal first, input all the changes from the old remote, install the new EzCal ver.2, enter the remote settings, login with you details and synchronize with the new version.



1.2. Minimum system requirements

1.2.1. EzCal client is supported on the following operating systems

Windows:



- Win 7 (32-bit and 64-bit)
- Win 8 (32-bit and 64-bit)
- Win 10 (32-bit and 64-bit)

Processor: Pentium or AMD K7

Minimum RAM: 2GB

Minimum free space on hard disk: 150 MB.

Mac OS X



- 10.11 El Capitan
- 10.12 Sierra
- 10.13 High Sierra
- 10.14 Mojave
- 10.15 Catalina

Intel hardware is required.

Processor: Intel only. No PowerPC support.

Minimum RAM: 2GB

Minimum free space on hard disk: 150 M



1.2.2. EzCal Remote server is supported on the following operating systems:

- Windows hosts:



- Windows Server 2008 (32-bit and 64-bit)
- Windows Server 2012
- Windows 7 (32-bit and 64-bit)
- Windows 8 (32-bit and 64-bit)
- Windows 8.1 (32-bit and 64-bit)
- Windows 10 (32-bit and 64-bit)

- Mac OS X hosts:



- 10.11 El Capitan
- 10.12 Sierra
- 10.13 High Sierra
- 10.14 Mojave
- 10.15 Catalina

- Linux hosts (32-bit and 64-bit). Among others, this includes:

- Ubuntu

6.06 ("Dapper Drake"), 6.10 ("Edgy Eft"), 7.04 ("Feisty Fawn"), 7.10 ("Gutsy Gibbon"), 8.04 ("Hardy Heron"), 8.10 ("Intrepid Ibex"), 9.04 ("Jaunty Jackalope"), 9.10 ("Karmic Koala"), 10.04 ("Lucid Lynx"), 10.10 ("Maverick Meerkat), 11.04 ("Natty Narwhal"), 11.10 ("Oneiric Ocelot"), 12.04 ("Precise Pangolin"), 12.10 ("Quantal Quetzal"), 13.04 ("Raring Ringtail"), 13.10 ("Saucy Salamander"), 14.04 ("Trusty Tahr")



- Debian GNU/Linux 3.1 ("sarge"), 4.0 ("etch"), 5.0 ("lenny"), 6.0 ("squeeze"), 7.0 ("Wheezy")

- Oracle Enterprise Linux 4 and 5, Oracle Linux 6

- Redhat Enterprise Linux 4, 5 and 6

- Fedora Core 4 to 20

- Gentoo Linux

- SUSE Linux 9, 10 and 11, openSUSE 10.3, 11.0, 11.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.3, 13.1

- Mandriva 2007.1, 2008.0, 2009.1, 2010.0 and 2010.1

1.2.3. Your web browser should be one of the following:

- Mozilla Firefox, version 3.5 or higher
- Safari, version 4 or higher
- Google Chrome, version 3 or higher
- Internet Explorer 8 or higher



1.3. Hardware requirements

1.3.1. Displays and Graphic boards:

- All LCD, CRT Displays and Projectors
- All currently commercially available graphic boards

1.3.2. Displays with internal LUT:

- WIDE MX20N
- WIDE CX20N
- WIDE CX30N
- WIDE MX30N
- WIDE MX50N
- WIDE CX50N
- WIDE CW60N

- WIDE CW120N



1.4. Installation Procedure Overview

1.4.1. Pre-installation conditions:

In order to install the EzCal ver.2 client you must have Administrator privileges or the Administrator's password, if required when installing to the user profile.

Before installing EzCal ver.2 software in your system:

Power on the workstation with all display(s) attached that you intend to use.

Check if the screen settings are correctly configured:

Windows 7 and 8 – Go to Control panel -> Display -> Adjust resolution.

Windows 10 – Go to Settings -> System -> Display -> Resolution.

Mac OS X - System Preferences -> Displays and check "Default for display". If you want to change the resolution manually, in "Displays" hold down the Option/Alt key while at the same time pressing the "Scaled" button alongside "Resolution" to reveal the available screen resolutions for your monitor.

Ensure that the screen resolution is set to the native resolution of the display with color quality of 32 bit "True color" or higher.

Ensure that the correct graphics card display driver is installed.



Repeat these checks for each display attached to your system.

Your system is now ready to start the installation process.

IMPORTANT: Before starting the installation process, please make sure that the USB measurement device is NOT connected. The measurement device will be added later, after EzCal ver.2 is successfully installed.

EzCal ver.2 can be operated as a client only or as a client-server combination.

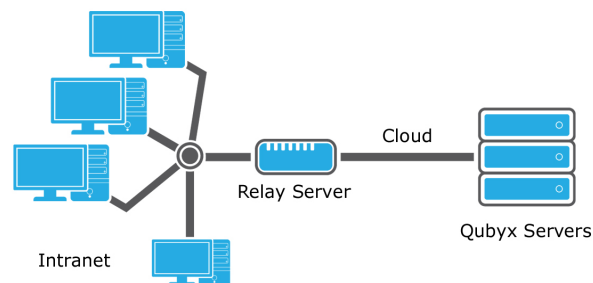
Complete installation consists of several components.

EzCal Client

EzCal ver.2 Client is the client application that runs on each of the workstations. It provides a number of actions that can be performed locally on the workstations, including calibrating the displays, viewing test patterns or performing full QA (Quality Assurance) and acceptance tests (QA tests available only in EzCal ver.2). Even when EzCal ver.2 Client is not connected to EzCal Remote Server it can still run all QA tasks on the workstation.

EzCal Remote Server

All EzCal ver.2 clients can be connected to EzCal Remote Server. No special license is required. QA managers can connect to EzCal Remote Server via internet/intranet connection and take full control over the performance of connected workstations from any location at any given time.

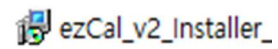




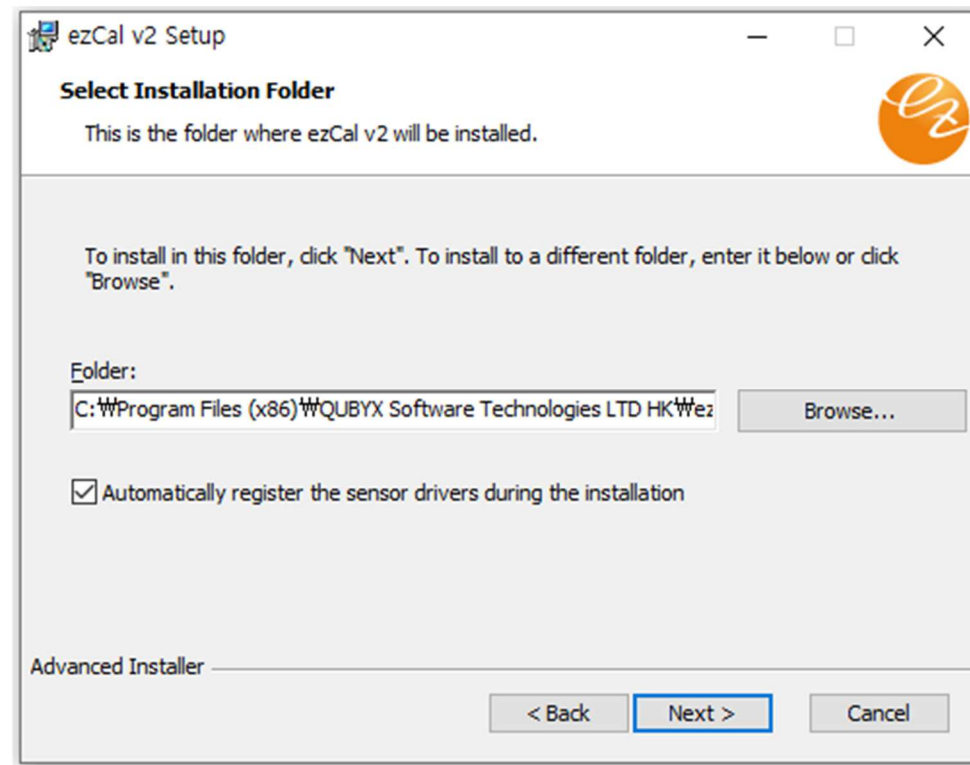
1.4.2. Installation

Windows 10:

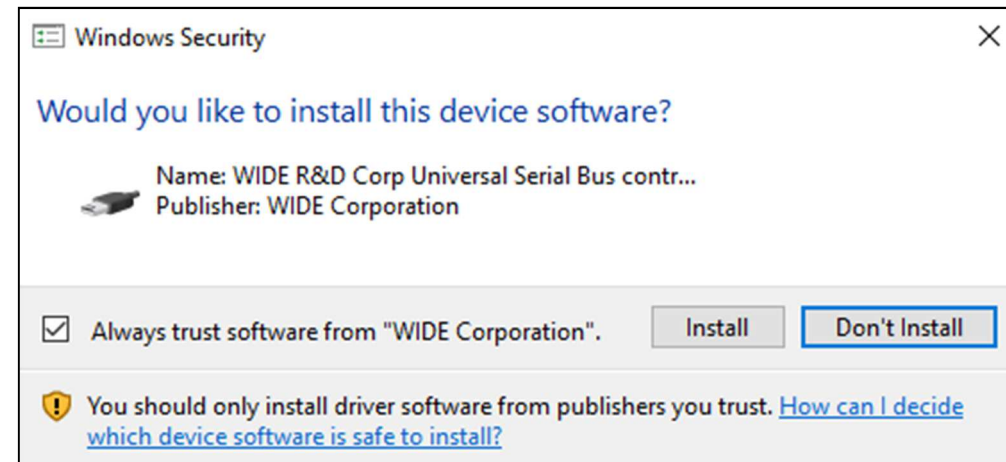
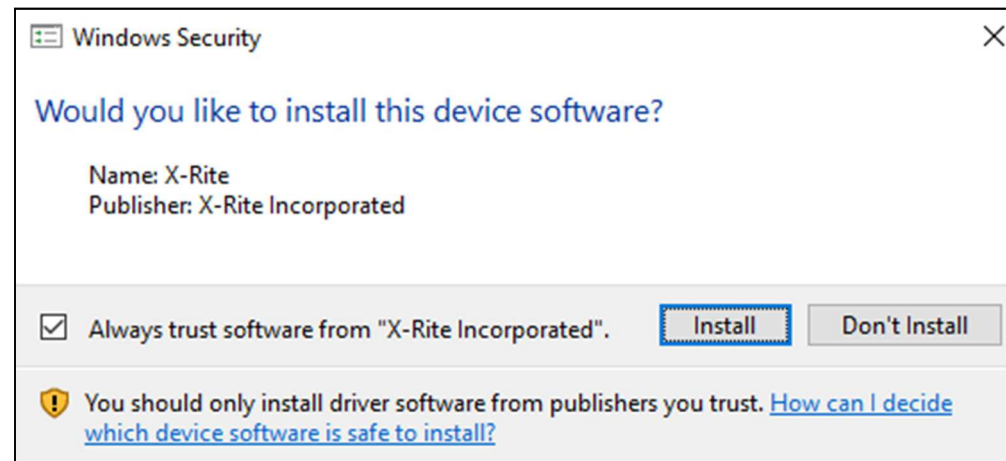
Double click on the installer:



Follow the instructions presented in the installer and click on the QUBYX software license agreement after reading it carefully.



If you don't want to install EzCal ver.2 into the default directory, browse your computer and choose another folder.

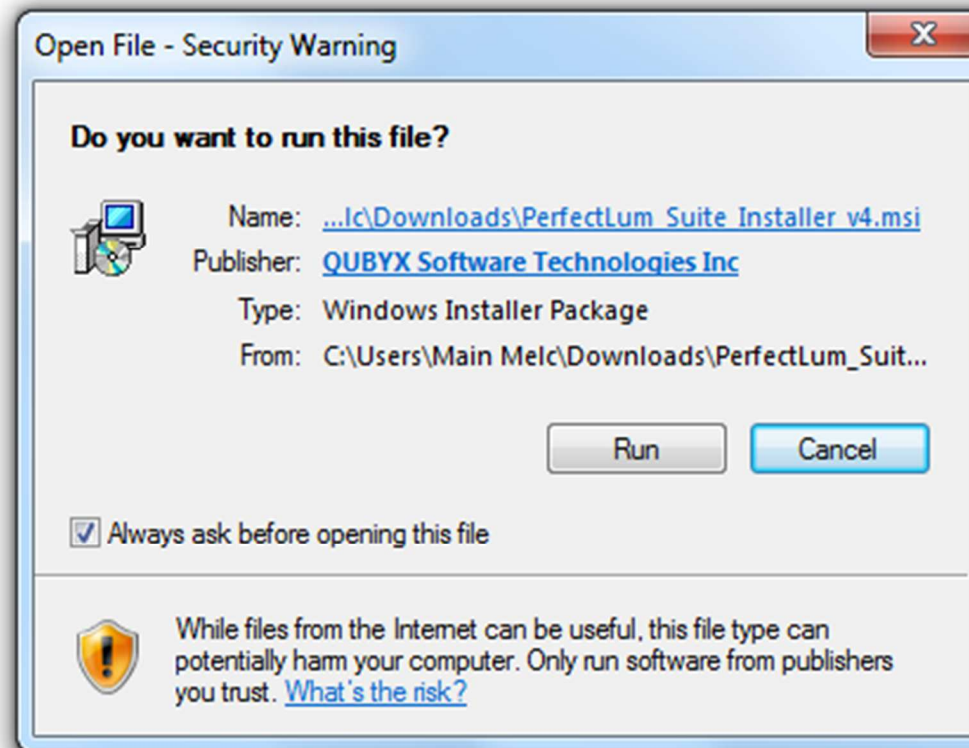


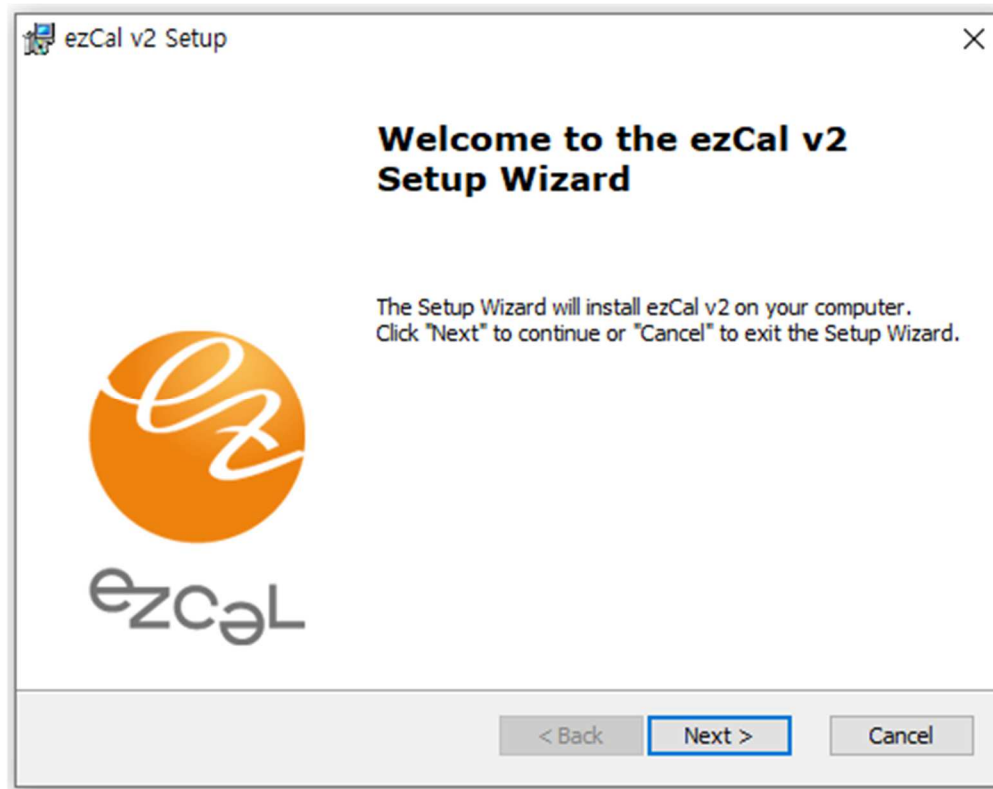
Windows Security will present a driver message a few times during the EzCal ver.2 installation. This is normal behavior, because drivers meant to support the measurement devices are being loaded. Please click the „Install“ button when prompted.



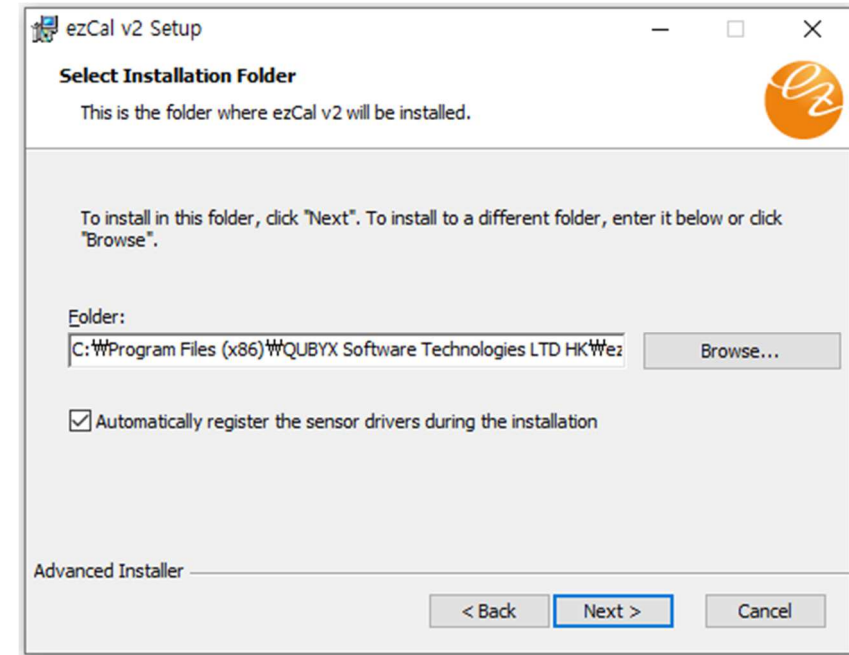
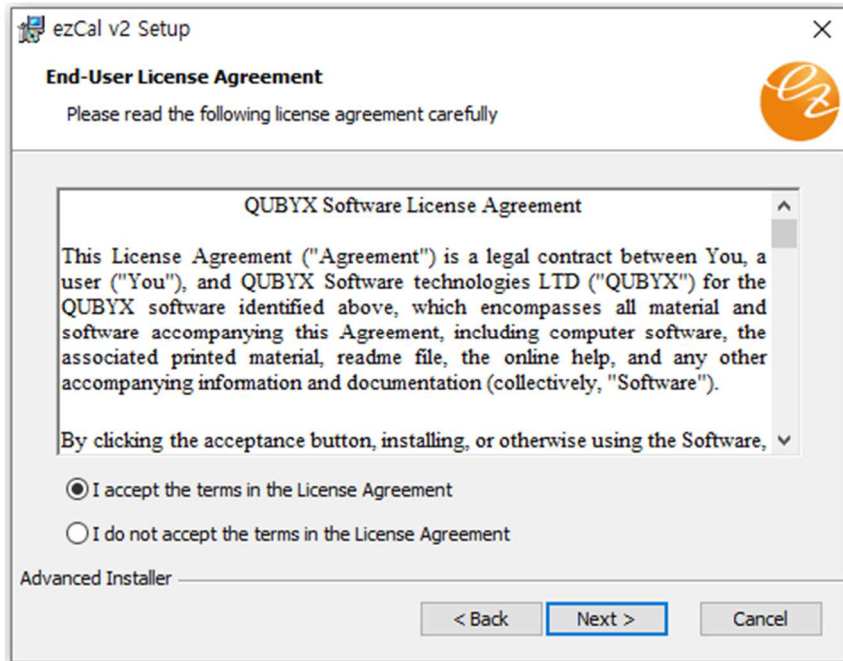
Windows 7/8:

Double-click on the installer:  ezCal_v2_Installer_

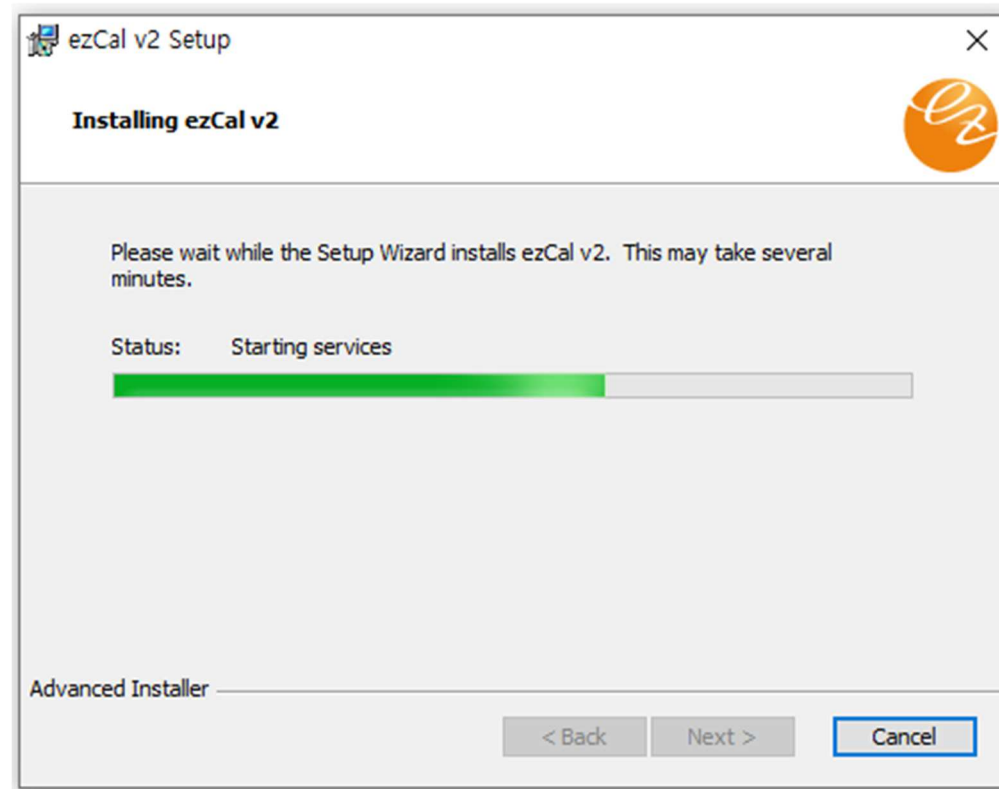




Follow the instructions presented in the installer and click on the QUBYX software license agreement after reading it carefully.



If you don't want to install EzCal ver.2 into the default directory, browse your computer and choose another one.



Windows will present a driver message a few times during the EzCal ver.2 installation. This is normal behavior, because drivers meant to support the measurement devices are being loaded. Please click „Install this driver anyway“ button when prompted.



1.4.3. Measurement Device Installation

Now that you have the software installed, it is time to install the measurement device. Plug the device into an unused USB port and refer to the following depending on which OS you have installed the software:

Windows 10

Vista and Windows 10 will automatically install your device driver. Wait until you receive the "Device driver software installed successfully" message, and jump ahead to the end of this section.





1.5. The Main Window

Preliminary Conditions:

Before using the software, make sure the following conditions are observed:

- ambient light should be constant;
- ambient light should be as low as possible;
- no direct light should reach the display.

The tasks included in the Main Window:

On the top center area of the interface you can notice a list of displays linked to the PC. EzCal ver.2 provides visual feedback to help identify your display in a multiple head situation. Double-clicking on the selected display icon will identify the selected screen.

The EzCal ver.2 interface has three main tabs in which work is done:

- **Calibration and QA** - initiate calibrations and QA tasks;
- **Scheduler** - manage your scheduled tasks;
- **History** - view history data;



In each of the above, there are buttons or lists of tasks that enable you to further access software functionalities.

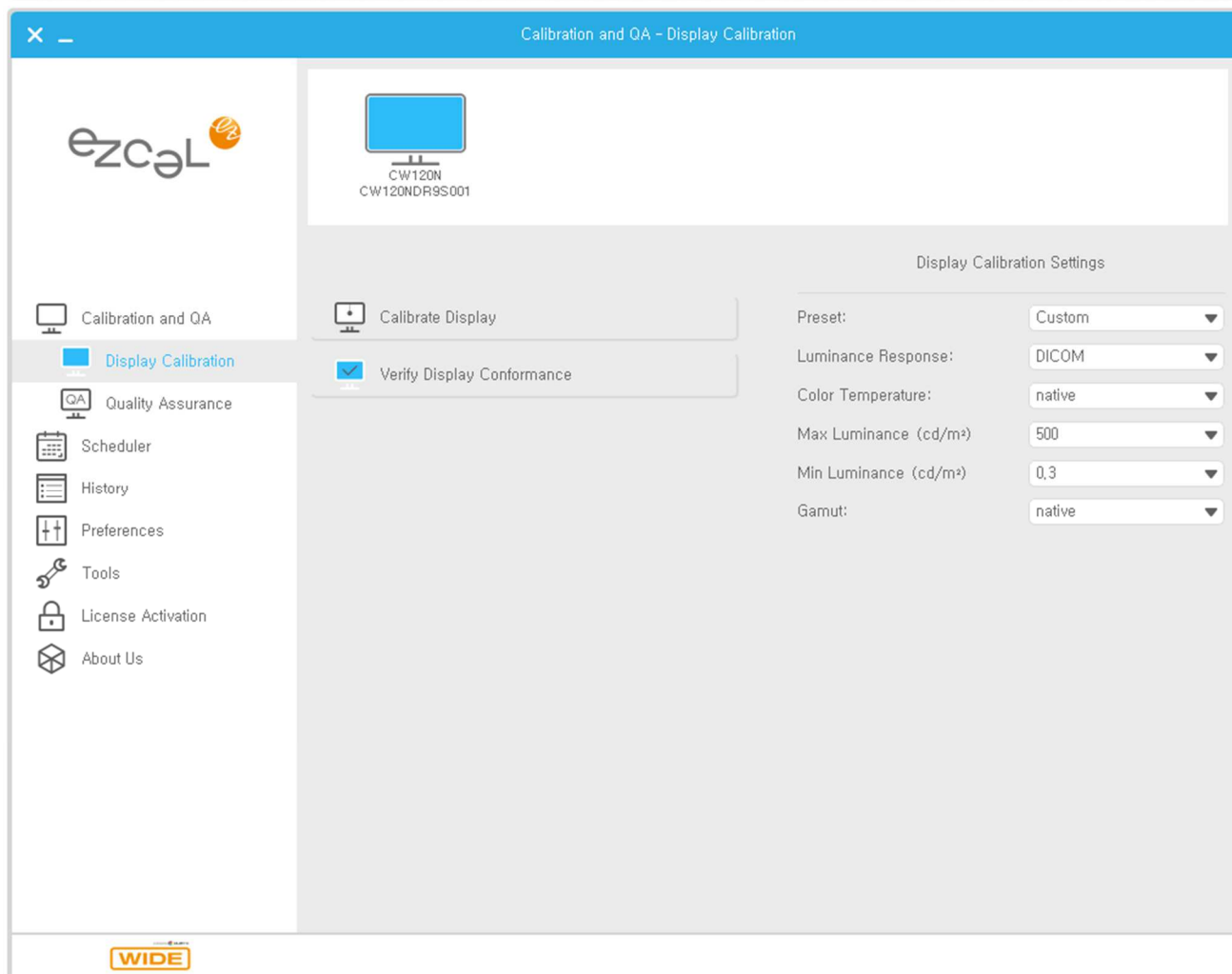
You can also find in the main interface:

- **Tools** - use the EzCal ver.2 available tools;

The search field enables you to filter task types, displays, dates and results.

- **License Activation** - register and activate the software;

- **About Us** - QUBYX Website and License Info.



1.5.1. Calibration and QA

Calibrate Display: this function allows you to calibrate your display. The software will adjust your monitor based on your selected preferences. First, select the display you want to calibrate from the left menu, and then click the “Calibrate Display” button.

IMPORTANT: Calibration should always be started on a warmed-up display. Warm-up time is specified by the display manufacturer (minimum 30 minutes).

Verify Display Conformance:

White Level Calibration: adjusts the white level of your display to the target luminance in candelas.

Create ICC Profile: creates a LUT - based ICC v4 profile of the display with the selected settings of the chromatic adaptation.



Calibration and QA - Display Calibration

ezCAL

CW120N
CW120NDR9S001

Display Calibration Settings

Calibration and QA

Display Calibration

Quality Assurance

Scheduler

History

Preferences

Tools

License Activation

About Us

Calibrate Display

Verify Display Conformance

Preset: Custom

Luminance Response: DICOM

Color Temperature: native

Max Luminance (cd/m²): 500

Min Luminance (cd/m²): 0,3

Gamut: native

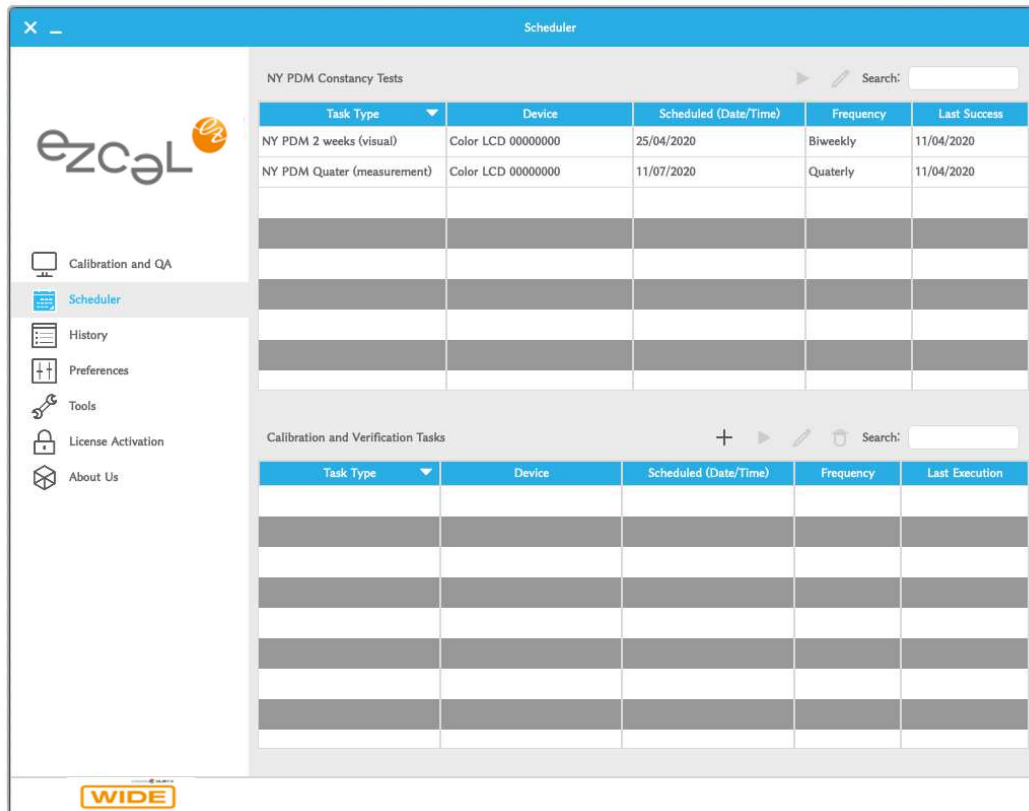
WIDE

Acceptance Test: this task allows you to perform an acceptance test according to one of the following regulations: AAPM TG18, JESRA X, DIN 6868-57, DIN 6868-157, IEC 62563-1, NYCPDM and NYPDM. The function automatically generates schedules for the corresponding conformance tests. You can view the threshold values for each regulation by clicking the "Show Thresholds" button in QA Settings.

If you have already performed the acceptance test(s), you can import it into EzCal with the help of the "Import Acceptance Values" Feature (see section 2.4.2).

Calibration Conformance: The function checks and validates the quality of the calibration and of the display ICC profile according to the preferences you have selected as Calibration targets.

White Level Conformance: verifies the display's luminance level.



The screenshot shows the 'Scheduler' window with a sidebar on the left containing navigation options: Calibration and QA, Scheduler, History, Preferences, Tools, License Activation, and About Us. The main area is divided into two sections:

NY PDM Constancy Tests

Task Type	Device	Scheduled (Date/Time)	Frequency	Last Success
NY PDM 2 weeks (visual)	Color LCD 00000000	25/04/2020	Biweekly	11/04/2020
NY PDM Quarter (measurement)	Color LCD 00000000	11/07/2020	Quarterly	11/04/2020

Calibration and Verification Tasks

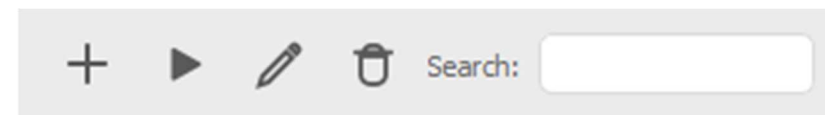
Task Type	Device	Scheduled (Date/Time)	Frequency	Last Execution

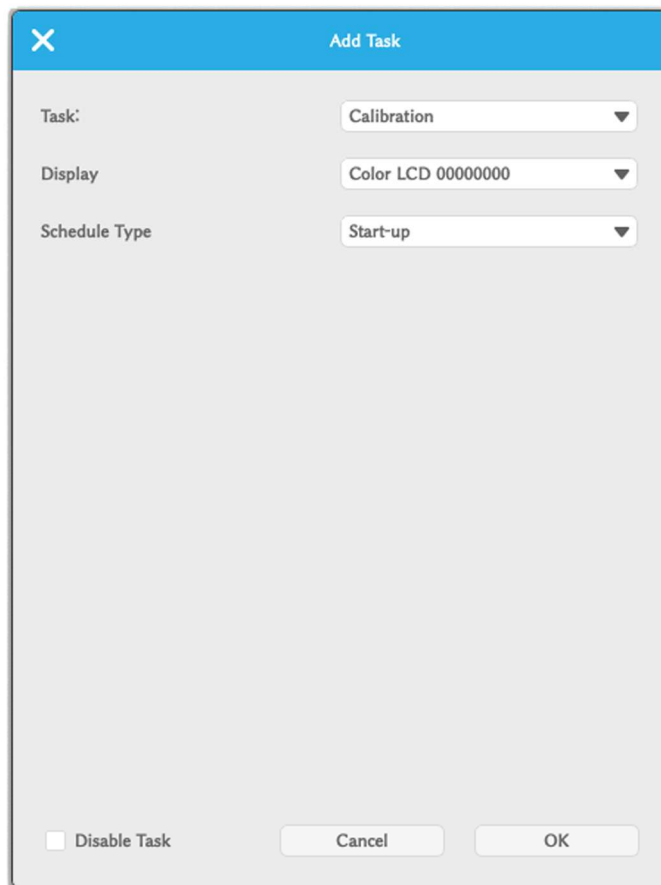
All listed above functions (except Create ICC Profile) can also be performed in the demo version, which will be available during 15 days.


1.5.2. Scheduler

In the **Scheduler**, you can see automatically scheduled QA Constancy tasks (depending on the regulation you have selected). It is possible to postpone the scheduled tasks, add, edit or delete locally created tasks. Constancy test schedules that were created automatically by EzCal ver.2 software can not be deleted.


Also, schedules that were created from the system admin panel on the remote server can be edited and deleted only by the system admin.






In order to create a new task, click the "Add Task"  button and select the following options: type of task (Calibration, Calibration Conformance, Display Luminance Calibration, Display Luminance Conformance, Display Test Pattern), the display you want to perform the task on, schedule type (Start-up, Once, Daily, Weekly, Monthly, Quarterly, Semiannually, Annually) and the scheduled date and time.

You can also disable tasks - in this case you will not be notified about them by the task notifiicator. Just check the 'Disable Task' box.

To **EDIT** a task, select the task, click the "Edit"  button or double-click on the task.

To **DELETE** a task, select the task and click on the "Delete"  button.

To **LAUNCH** a new task instantly, select the task and click on the "Run"  button.
In the **SEARCH FIELD** you can filter task types, displays, dates and frequency.



1.6 Your first EzCal calibration

First select the display you want to calibrate from the menu on the left. After that, click the "Calibration" button. A Wizard will pop up and will guide you in order to customize the calibration process.

Please note that the Wizard will not pop up if you have opened the preferences before.

IMPORTANT: Calibration should always be started on a warmed-up display. Warm-up time is specified by the display manufacturer (minimum 30 minutes).

Select the calibration type by choosing between DICOM, Gamma, CIE L*, BT.709 and BT.1886.

If you want to calibrate the color of the display, check the "Adjust Color Temperature" box, select the predefined target value or enter your own value by choosing a "custom" option.

If you want to adjust the white level, check the "Set White Level" box and enter the target white level luminance in candelas.

After you customized the calibration settings, place the sensor on the display and start the calibration process. Make sure no ambient light reaches the sensor. After calibration is finished a report will pop up on the screen with the calibration results.



1.7. Your first QA Acceptance test

When you perform the first acceptance test a Wizard will pop up. The Wizard will prompt you to select the regulation and the display category. In addition, you have to fill in some information about the location of your workstation and the responsible person. Please note that the Wizard will not pop up if you have opened the preferences before.

The acceptance test consists of two parts: a measurement part and a set of visual tests. The exact tests are determined by the selected regulation. For measurement tests an on-screen or a handheld measurement device can be used. Please refer to the list of supported measurement devices for detailed information.

After the acceptance test was performed, associated Consistency QA Tasks are automatically scheduled.

II. PREFERENCES

2.1. Application Settings

2.1.1. Language

Set the language of the application. Supported languages: English, German, Korean.



2.1.2. Software Update

Check the "Update Software Automatically" box if you want the software to notify you about new software updates.

2.1.3. Password Protection

When you check the "Protect Settings by Password" box two fields will appear. Enter a password in the first field and repeat it in the second field.

IMPORTANT: Make sure you note down the password in a secured location for future use, since you can not recover it from the system.

Once the preferences are protected by a password, they can be changed only when the correct password is entered. If the wrong password is entered, the settings are visible, but can not be changed.

2.1.4. Export/Import Common Settings

Settings of the application can be exported into one file as backup or as "golden" settings. The same settings can be imported into the application from other machines to work with the same settings and to save time during installations.

To export the settings, click on the "Export" button and browse the directory to select the folder where you want to save the settings.

To import the settings, click on the "Import" button, browse for the .qbx settings file and click OK.

Please note that the "Display Settings" and the "Remote and Network Settings" will not be recovered. Display settings and serial numbers can differ from each other and the different remote and network settings can be set on different workstations.



2.1.5. Backup/Recover

This function will back up the entire database with all history data, settings and schedules. Click on the "Backup" button and browse the directory where you want to save the database. Click "Recover" and browse the .qbx database backup file to recover the database.

Please note that the "Display Settings" and the "Remote and Network Settings" will not be recovered. Display settings and serial numbers can differ from each other and the different remote and network settings can be set on different workstations.

Check the "Activate auto backup" box to have the software run an automatic backup every day, week or month. Select the directory where you want the database to be saved.

Note: If the path you've chosen for auto backup is changed (renamed or deleted folder) the path line will become selected with a red frame - choose a correct path for auto backup and save preferences.

2.2. Workstation Settings

2.2.1. Workstation Name

The workstation name is read automatically from the system. It can be overwritten to be personalized.

The workstation name can be changed and is used on the remote management server to identify your workstation among the others.

2.2.2. Ambient light



Ambient Light is the reflection of ambient light on the switched off display panel. Enter a value for ambient light in candelas if you know it, or click the "Measure Ambient Light" button to measure the reflection. During this process the software will switch off the backlight of the panel. You must place the sensor 15 cm away from the display facing the switched off panel. The software will measure the reflection of an ambient light on the display panel.

During the measurement process don't move the mouse and don't hit any keys as it will switch the display back on. Once the measurement is finished the display will be automatically switched back on.

2.2.3. Task Delay

Check the "Use Scheduler to remind me when Tasks are due" box to program the application to automatically remind you when a task is due. This function can also schedule start tasks automatically. Set the time between 5 and 60 minutes for the display to warm up after the system boot before starting any scheduled tasks.

2.2.4. Sleep Mode

Check the "Put display to Energy Saving Mode" box to put the display into an energy save mode for a set time period. In the energy save mode the backlight of the display is switched off to save energy and to extend backlight lifetime.

2.3. Calibration Settings

2.3.1. Calibration Type:



DICOM	Calibrates to NEMA DICOM Part 14 GSDF (Grayscale Display Function)
Gamma	Calibrates towards the gamma function. Enter a value for gamma. Typically Gamma 2.2 is used.
CIE L*	Calibrates to the Color Space Lab of the CIE (Commission Internationale d'Eclairage)
BT.709	Defines the image format parameters and values for HDTV, specifies the opto-electronic transfer characteristics at the source.
BT.1886	Specifies the reference electro-optical transfer function that the displays used in HDTV programme production should follow in order to facilitate consistent picture presentation.

2.3.2. Color Temperature:

Check the "Adjust Color Temperature" box to calibrate the color of the display and to adjust the display to reach target color temperature. You can enter the target color temperature in 3 different ways:

CIE Standard light source color presets	Standard lights between D50 and P93. D65 is the mostly used value and represents daylight.
Color Temperature	Enter a value for color temperature. Color temperature is less precise and doesn't represent a standard like CIE standards.



Advanced settings x and y value

Enter the x and y coordinates of the CIE xyY color space. The values are generally used to match any other device or film.

2.3.3. Gamut:

Check the "Adjust Gamut" box to include a Gamut calibration into the calibration process. Select the predefined color space or enter your own by clicking the "Advanced" button.

2.3.4. White Level:

Check the "Set White Level" box to adjust the white level luminance of the display to a certain value. Enter the target value in candelas into the field.

2.3.5. Black Level:

Check the "Set Black Level" box to adjust the black level luminance of the display to a certain value. Enter the target value in candelas into the field.

2.3.6. ICC/ICM Profile:

If you want to include an ICC Profile creation into the calibration process, check the "Create ICC/ICM Profile" box and select the necessary chromatic adaptation.



2.4. QA Settings

All information related to the Quality Assurance Regulations is entered in this section.

2.4.1. Regulation:

Select the Regulation you want to use and the Application Category.

Regulation	Category	Application
DIN 6868-57	Mammography	Mammography
	A	Diagnostic
	B	Reviewing
	Dental	Dental
DIN 6868-157	Projection Radiology	Projection Radiology
	Fluoroscopy	Fluoroscopy
	Computer Tomography	Computer Tomography
	Dental	Dental
	Mammography	Mammography



	Operation Room	Operation Room
AAPM TG18	Primary	Diagnostic
	Secondary	Reviewing
JESRA X-0093	Category 1	Diagnostic
	Category 2	Reviewing
IEC 62563-1	Diagnostic	Diagnostic
	Reviewing Monochrome	Reviewing
	Reviewing Color	Reviewing
NY PDM	Mammography	Mammography
	No Mammography	Diagnostic

Click the "Show Tests" button to see QA tests that are part of this regulation.

Click the "Show Thresholds" button to see the thresholds that will be applied during QA tests for this regulation and category.



2.4.2. Import Acceptance Values

Easily import all your previously performed QA tests into EzCal with the "Import Acceptance Values" feature. In order to use this function, please go to Calibration and QA -> Quality Assurance, select the desired regulation and click the "Import Acceptance Values" button.

Then select a display, date of the test and a name of a tester who performed the test. If the constancy tests have been passed, please set the dates they were performed and check the appropriate boxes. After you have entered the values measured in the imported test(s), click "OK" and wait until the confirmation message appears.



Calibration and QA - Quality Assurance

ezcəl

Acer X223HQ
LF080064200

Color LCD
00000000

Calibration and QA

Display Calibration

Quality Assurance

Scheduler

History

Preferences

Tools

License Activation

About Us

Perform Acceptance Test

Show And Start Constancy Test

Import Acceptance Values

Acceptance Test Settings

Regulation: NY PDM

Display Category: Mammography

Show Tests

Show Thresholds

Start daily tests automatically

Workstation Location

Facility:

Department:

Room:

Responsible Person:

Address:

City:

Email:

Phone Number:

WIDE

Calibration and QA - Quality Assurance

Import Acceptance Values

Display: Color LCD 00000000

Date of acceptance Test: 11/04/2020

Tester Name: John Greene

Last Constancy Test Execution:

Visual verification	BiWeekly	never
White Uniformity	BiWeekly	never
Black Uniformity	BiWeekly	never
Color Distortion	BiWeekly	never
Luminance Response	Quarterly	never
Luminance Response - DICOM Curve	Quarterly	never

Cancel OK

Calibration and QA

Display Calibration

Quality Assurance

Scheduler

History

Preferences

Tools

License Activation

About Us

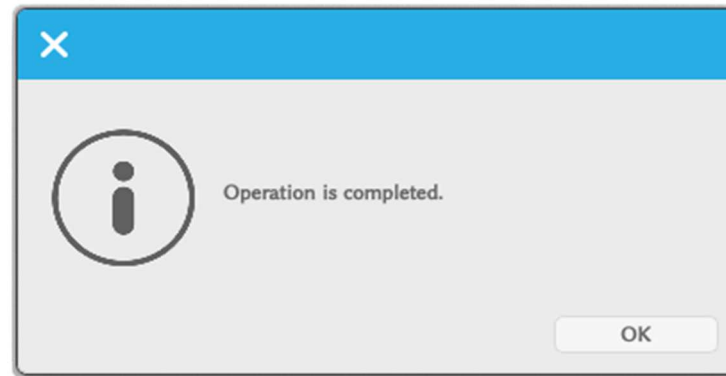
Acceptance Test Settings

NY PDM


Mammography

Show Thresholds

Station Location



In order to view a display report, you need to complete the following steps:

1. Open "History" in the EzCal interface;
2. Click the "Display QA Report"  button next to the search bar;
3. Select the display for which you want to get a report;
4. Set the time interval and click "OK".



A screenshot of a software dialog box with a blue header bar containing a close button (X). The dialog box has a light grey background and contains the following fields:

- Regulation: NYPDM
- Display Category: Mammography
- Date: from 11/04/2020 (dropdown menu)
- to 11/04/2020 (dropdown menu)
- Display(s): Color LCD (dropdown menu)

At the bottom of the dialog box, there are two buttons: "Cancel" on the left and "OK" on the right.

Now you will have a report with clear pass/fail indication of your test results.

Acceptance Test

Test Name	2015.04.29 Marc Leppia
Overall Image Quality 8.2.2 (a, b, c.1, e, g)	Passed
Overall Image Quality 8.2.2 (c.2)	Passed
Overall Image Quality 8.2.2 (d)	Passed
Image Geometry 8.2.7	Passed
Grayscale resolution 8.2.3	Passed
Color impression and uniformity 8.2.4, 8.2.5	Passed
Visibility of line structures in the test pattern TG18-LPH10 8.2.9	Passed
Visibility of line structures in the test pattern TG18-LPH50 8.2.9	Passed
Visibility of line structures in the test pattern TG18-LPH89 8.2.9	Passed
Visibility of line structures in the test pattern TG18-LPV10 8.2.9	Passed
Visibility of line structures in the test pattern TG18-LPV50 8.2.9	Passed
Visibility of line structures in the test pattern TG18-LPV89 8.2.9	Passed
Clinical Reference Images 8.2.8	Passed
Pixel Errors 8.2.6	Passed
Pixel Size 8.4-8.5	Passed
Display Resolution 8.4-8.5	Passed
Luminance Uniformity 8.3.6	Passed
MultiDisplay Uniformity 8.3.7	Passed
Maximum, minimum, veiling luminance and maximum luminance ratio 8.3.1, 8.3.2, 8.3.3, 8.3.5	Passed
Luminance response curve 8.3.8	Passed
Illumination 8.3.4	Passed

Note:

If you want to exclude the specific QA or Constancy tests data from the display report, you can click the right button on them in the "History tab" and select the "Disable" option.



2.4.3. Workstation Location:

The workstation location contains the information about the workstation used to perform the tasks (e.g. Display Calibration, QA). Please enter the information regarding your facility, department and room.

Note: this information will be displayed in reports.

2.4.4. Person Responsible:

The person responsible is the person who should be notified if something is wrong with the workstation. Please enter the information into the corresponding fields.

2.5. Remote and Network Settings:

Activate Remote Control for the workstation and connect it to the EzCal Remote Control server.

2.5.1. Enable Remote:

Enter the IP address or the server address like <https://remote.qbx.info> into the field "Server Address". Enter the username and the password of the EzCal Remote user account and click the "Enable Remote Management" button. When connection is established, a dialog will pop up, asking you to select the workgroup for this workstation. Select the workgroup and click 'Save' - then all the data (schedules, history and preferences) will be immediately synchronized with the remote server.

Note: Remote Admin account needs to be created first on EzCal Remote. In addition to this, you have to create a workgroup, a facility and user accounts on Remote Server in advance.



2.5.2. Remote Database Synchronization:

Select the time interval within which you want to synchronize the databases between the client and the server.

2.5.3. Your Proxy Server:

Check the "Use Proxy" box if you use a proxy server to access the internet. This action is required in order to access EzCal Remote Management server if you do not use it on the intranet and for activating software license automatically via internet.

Note: If the "Use Proxy" box is checked, the license activation will be performed using the given settings.

III. LICENSE AND LICENSING:

3.1. Remote License:

Remote license is included for FREE. You can connect and manage your displays with EzCal Remote server. The following features are also free: Calibration Conformance, White Level Conformance, Display Test Pattern, Measure color.

3.2. EzCal License:

EzCal ver.2 license is required to perform Calibration and White Level Calibration, QA Acceptance and Constancy tests for AAPM TG18, JESRA X, DIN 6868-57, DIN 6868-157, IEC 62563-1 and NY PDM regulations. In order to activate the license, click the "Add License"



button, enter the license code and your email address into the selected fields and click "Activate". The license will be activated if your workstation is connected to the internet. If it is not connected, go to <http://qubyx.com/index.php/register> from any other machine and enter the license code and the ID number from the workstation (visible in the license activation window). You will receive an unlock code. Enter this code into the activation window to activate and unlock the software.

IV. DISPLAY SETTINGS:

The displays connected to the workstation are visible in separate tabs. Select a display to adjust the settings for that specific display.

4.1. Ignore Display:

Check the "Exclude Display from Testing/Calibration" box if you do not want to perform any Quality Assurance tests or calibration on a specified display.

4.2. Calibration Upload:

Calibration upload will select the location where LUT (Look Up Table) will be saved and the exact communication channel that will be used to perform the action.

Note: Calibration upload is detected automatically for each display.



Calibration Upload	Look Up Table is saved in	Used communication channel
Graphics card	Graphics card	Graphics card
DDC/CI	Display	DDC/CI i2c channel
USB	Display	USB

4.3. Used Sensor:

Check the "Use Internal Sensor If Possible" box if your display has an internal Front Sensor and you want to use that sensor during calibrations.

Note: The sensor is detected automatically for each display. If this option is missing, that means your display has no Front Sensor available.

4.4. Display Model:

The software will read the model name of the display from its EDID. You can change the model name. The model name will be visible in calibration and QA reports.



4.5. Display Serial Number:

The software will read the serial number of the display from its EDID. You can change the serial number. The serial number will be visible in calibration and QA reports.

4.6. Display Manufacturer:

The software will read the name of the display manufacturer from its EDID. You can change the name. The manufacturer's name will be visible in calibration and QA reports.

4.7. Inventory Number:

You can set an inventory number for the display.

4.8. Type of Display:

Select the type of the display (Color or Gray). Depending on your choice, a different calibration algorithm and a different set of QA tests will be used for this display.

4.9. Display Technology:

Select if the display is a Flat screen, LCD or a CRT screen. Depending on your selection different thresholds in QA regulations will be applied.



4.10. Screen Size:

The software will read the diagonal size of the display automatically.

4.11. Resolution (h/v):

The software will read the horizontal and vertical resolution of the display automatically. The resolution will be documented in QA reports.

4.12. Backlight Stabilization:

Select if the display has integrated backlight stabilization that maintains the white level of the display constant over time. If the display has backlight stabilization the intervals for QA test will be longer.

4.13. Installation Date:

Enter the date when the display was installed.



V. REGISTRATION

5.1. Free and Additional Features:

EzCal has free and additional features. Free features are available as soon as you install EzCal. Additional features can be unlocked by buying the display calibration and QA license.

Free features	Additional features
Calibration Conformance	Display Calibration
White Level Conformance	White Level Calibration
Display Test Pattern	QA Acceptance Tests
Measure Color	QA Constancy Tests
Sync with remote	Create ICC Profiles
3D Gamut Viewer	
History and Reporting	
Task Scheduling	



There are two possibilities to access the licensing part: over Preferences or License section from the main window.

5.2. Licenses Functionality

Function	EzCal ver.2	EzCal ver.2 Demo Period	EzCal ver.2 Expired Demo Period
Calibrate Display	+	+	-
Hardware calibration and DDC/CI / USB / Serial usage	+	-	-
Adjust White Level	+	+	-
Verify calibration	+	+	+
Verify White Level	+	+	+
Generate Display ICC Profile	+	-	-
Adjust Gamut	+	-	-
Perform Acceptance Test	+	+	-
Perform Constancy Tests	+	-	-
Schedule QA Tasks	+	+	+
Edit Settings	+	+	+
Edit Calibration Settings	+	+	+
Edit QA Settings	+	+	+

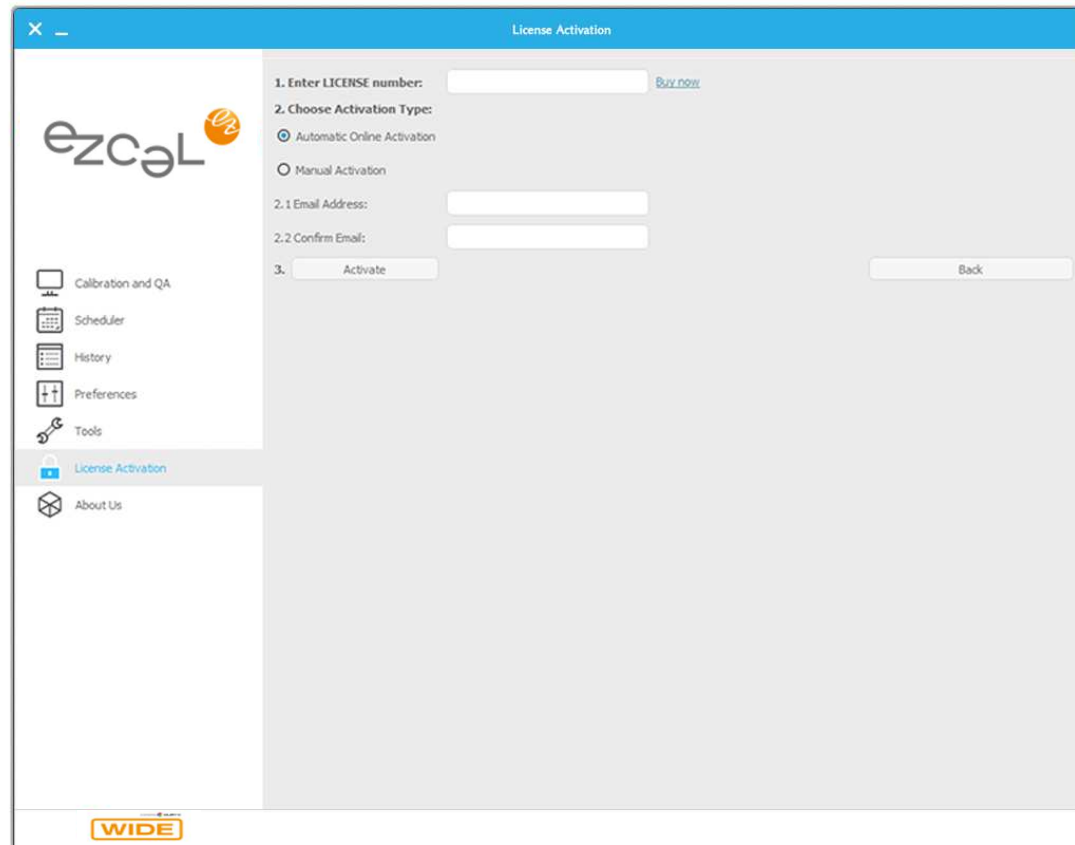


Measure Color	+	+	+
Display Test Pattern	+	+	+
Remote Control	+	+	+

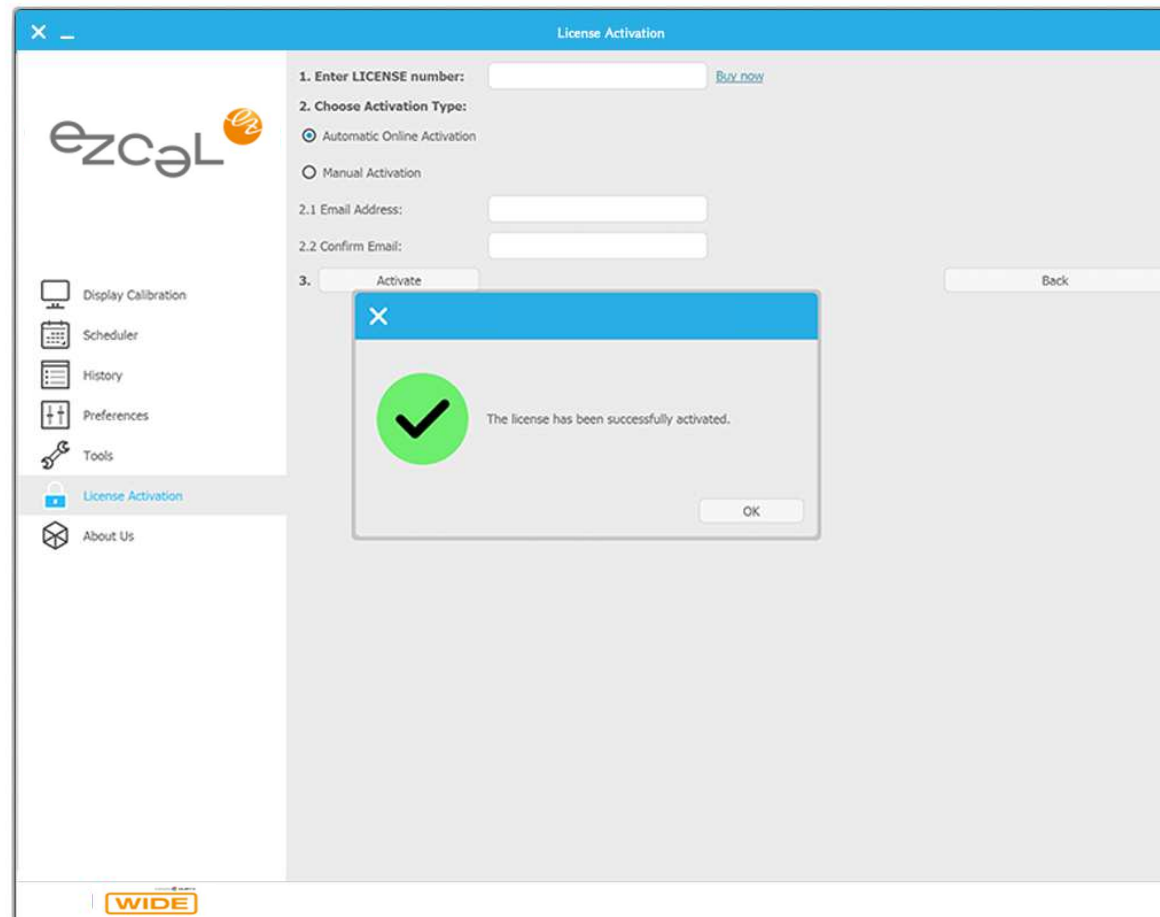
5.3. License Activation

To activate the Calibration and QA license, click the "License Activation" option in the main window.

After the tab opens, you have the options to either activate online automatically or manually.



1) For automatic online activation, just enter and repeat your email address, and click the "Activate" button.





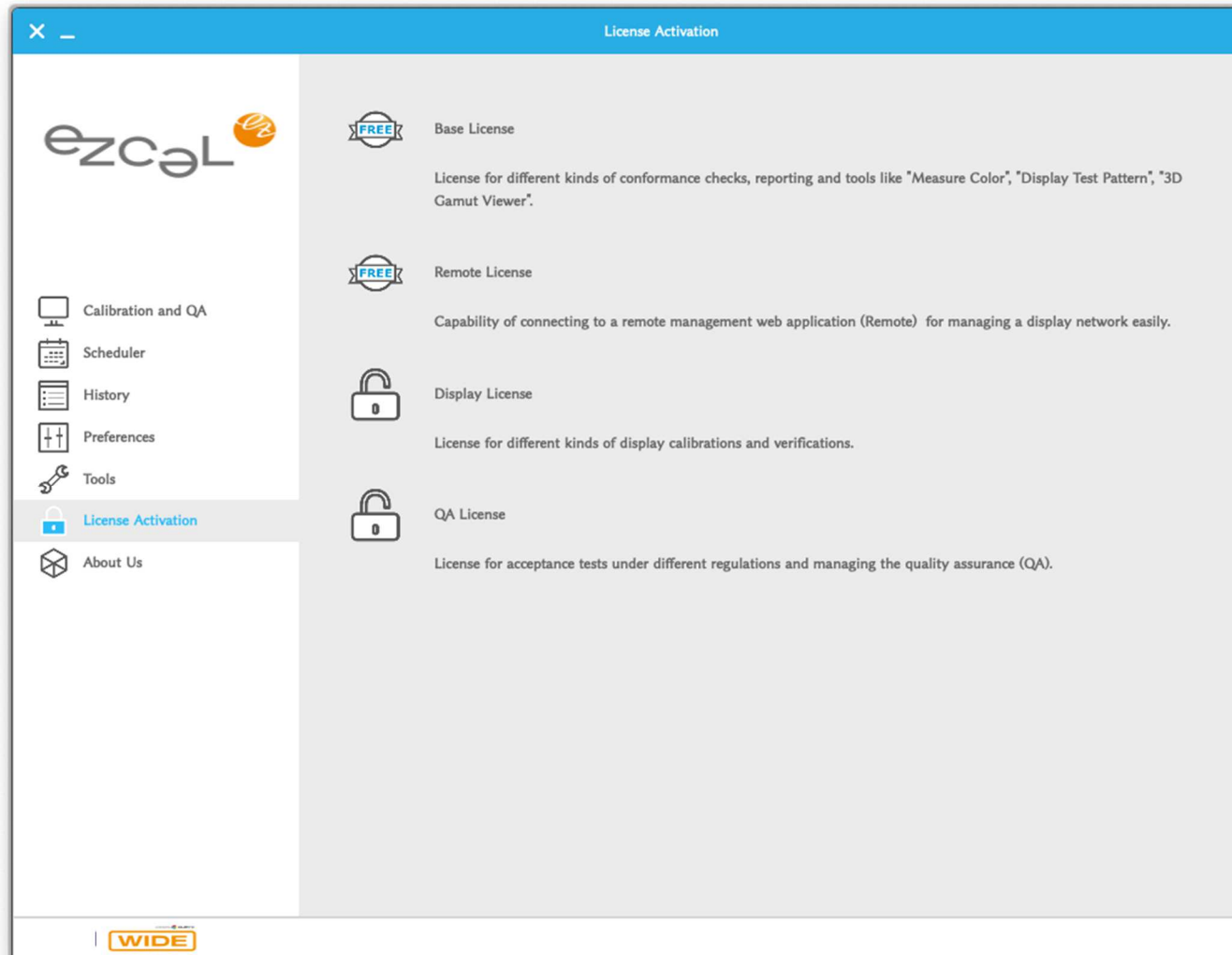
2) For manual activation, follow the link and fill out the form that you will find on the website. Enter the generated workstation ID that you see below into the corresponding field of the form. When you submit the form, an activation code will be sent to your email. Enter this code into the field below and click "Activate".

The screenshot shows a software window titled "License Activation" with a blue header bar. On the left is a sidebar menu with icons and labels for "Calibration and QA", "Scheduler", "History", "Preferences", "Tools", "License Activation" (highlighted), and "About Us". The main content area contains the following steps:

1. Enter LICENSE number: [text input field] [Buy now](#)
2. Choose Activation Type:
 - Automatic Online Activation
 - Manual Activation
 - 2.1. Go to the page using this link from any computer: <http://software-registration.org/>
 - 2.2. Enter the following ID on the website.
Generated workstation ID: [text input field containing "11CD-6CC3"]
 - 2.3 An activation code will be sent to your email. Copy that code and paste it here:
Activation code: [text input field]
3. [Activate] [Back]

At the bottom of the window, there is a "WIDE" logo.

After you finish the license activation, licenses in the License Activation section will be marked as active.





VI. EZCAL VERSION2 TOOLS

6.1. Display Test-Pattern

Select the display where you want the test pattern to be displayed and select the test pattern you want to display. Click "View and Check". For displaying a test image that is not in the list, but is available on the system, select "User Image" click View and Check, navigate to your image file and open it. Click on the test pattern or press the "Escape" button on your keyboard to close it.

6.2. 3-D Gamut Viewer

This function graphically displays the 3D gamuts of different profiles using the selected color spaces and rendering intents. It is possible to calculate the percentage of Gamut intersection of two profiles.

6.3. Measure Color

This function will open two windows. In the first window you can start measurement. Mix color and gray levels will be displayed in the second window where measurements are actually performed. First select the RGB color patch with sliders or by entering a number for RGB values. Then place the measurement device on the patch and start measuring. You can perform two measurements, the software will



compare them and will display color differences in Delta E with or without L (Luminance).

6.4. Notification

After a task is created, a EzCal Task Notification will pop up at the scheduled time, provided that the warm-up time has expired (see "Use Scheduler to remind me when Tasks are due"). Click the "Perform Scheduled Tasks" button to carry out a scheduled task or "Remind Me In" button to remind the user about the task later. You can also choose the time interval of getting a reminder in the combo box placed near. Closing this window means "Remind Me In" + value that is set in the combo box.

Note: For displays that have Front Sensors, measurement tasks that require no manual interruption (Display Calibration, Display Conformance, White Level Calibration, White Level Conformance and Create ICC Profile) will be started automatically and report will not be shown for the next task to start successfully.

6.5. Report

After each measurement and QA task you will get a report where you can check your result with more details and graphs, and a summary result (OK or Failed). Reports can also be exported as a .PDF file or printed.



VII. OTHER

7.1. Matching Multiple Displays

To achieve identical image reproduction on two or more displays connected to one workstation side by side, or several displays connected to different workstations, you will need to adjust such characteristics of the displays as color temperature, white level, and luminance response to the same level.

To match image reproduction on two or more displays, follow this procedure:

1. Make sure all displays are set to the same values over the display OSD. Especially important are the color pre-settings, brightness, and the contrast settings. Doing a factory reset on all displays can be helpful to make sure all of them start from a similar level.
2. Use only one measurement device. Measurement devices, unfortunately, still have considerable deviations when measuring color. So it is recommended to use the same device on all displays.
3. Identify the weakest display. If you want all displays to have the same white level, you need to know which of them has the lowest one and measure it. This white level will become the target value for all displays. It is important to have the same white level on displays that are connected to one workstation and installed side by side.
4. Set your target values for white level, color temperature and luminance response in EzCal Preferences.
5. Perform a display calibration with those same settings on each of your displays.

7.2. Read Me - mass installation of EzCal



Create your "master" settings file

Before performing a mass auto-installation you need to prepare your "master" settings file.

To do this just make ONE usual installation and set all needed configurations in preferences. (**Important:** Do not forget eventual proxy settings if they are used in your network).

Then go again to Preferences > Application and click "Export". The software will create the needed file for auto-configuration. The file extension is .qbxS - save the file in your preferred location.

Export/Import Common Settings:

To import settings please push the "Import" button and choose the path.

To export current settings please push the "Export" button and choose the directory.

Import

Export

Dateiname: Import_Settings_2011_08_18

Dateityp: Settings files (*.qbxS)

Installation

On every workstation you will need to:

1. Copy the EzCal ver.2 installer msi file and the "master" settings file (.qbxS file)
2. In console run installation in silent mode (you MUST have administrative rights):

```
msiexec /i [PATH to installer]EzCal_Installer.msi /quiet
```

or if you need specific installation path:



```
msiexec /i EzCal_Installer_v3.0.436.msi /qn INSTALLDIR=D:\Apps\Qubyx\EzCal
```

Warning: the installation will not be completely silent - a database will appear for a few seconds. Also the user might be asked to apply driver installation.

run auto configuration:

```
[PATH]ezcal.exe configure <PATH-to-Settings> [<PATH-to-Log>]
```

Examples:

```
"C:\Program Files\ezCAL\ezCAL.exe" configure default.qbxs
```

```
"C:\Program Files(x86)\EzCal\ezCAL.exe" configure default.qbxs d:\logs\p3log.log
```

```
"D:\Apps\ezCAL\ezCAL.exe" configure d:\tmp\default.qbxs d:\logs\p3log.log
```

run auto registration:

```
[PATH]ezCAL.exe registration <SERIAL> <MAIL> [<PATH-to-Log>]
```

Example:

```
"C:\Program Files\ezCAL\ezCAL.exe" registration 012XERT2ASDF admin@hospital.co.uk d:\logs\p3log.log
```

run auto remote enabling:

```
[PATH]ezCAL.exe remote <SERVER> <LOGIN> <PASSWORD> <GROUP_NAME> [<PATH-to-Log>]
```

Example:



`"C:\Program Files\ezCAL\ezCAL.exe" remote "http://remote.ezCAL.com" testuser testpassword "our group" d:\logs\p3log.log`

Notes:

<PATH-to-Log> - is an optional parameter in all commands


<GROUP_NAME> - is the name of a workgroup you want to connect your machine to. Case insensitive, but sensitive to the whitespaces

7.3. How to set up the EzCal Remote Service

1) Open your browser and go to <http://remote.qbx.info/login> Click the "Create Account" button.

LOGIN

[LOGIN](#) [REGISTER](#)

 Login

Remember Me

Login

[CREATE ACCOUNT](#) [FORGOT PASSWORD?](#)

HOME ABOUT US BLOG

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SERVER MODE: ONLINE

2) Proceed to fill in the registration form to create a Remote Management account.

REGISTER LOGIN REGISTER

Remote management


Complete this registration form to create a Remote Management account for your organization.

Personal Profile

Your personal profile information should be entered in English and without using diacritical characters (for example: ú, é, ñ)

Email address

The email address you enter will be your Remote ID. You will be asked for your Remote ID and password to access the Remote System and to add workstations to the Remote System.

 Register

I agree to the [terms and conditions](#).

HOME ABOUT US BLOG © 2020, Remote Display - Version: 1.0.2
SERVER MODE: ONLINE

3) After you have filled all the requested fields and agreed to the terms and conditions, click the “Register” button.

4) You will receive a message prompt informing you that an email was sent to your inbox for your remote account activation Proceed to check your inbox and activate your new EzCal ver.2 remote account.



Remote Display

Hello

You have successfully registered to our system. Please activate your account.

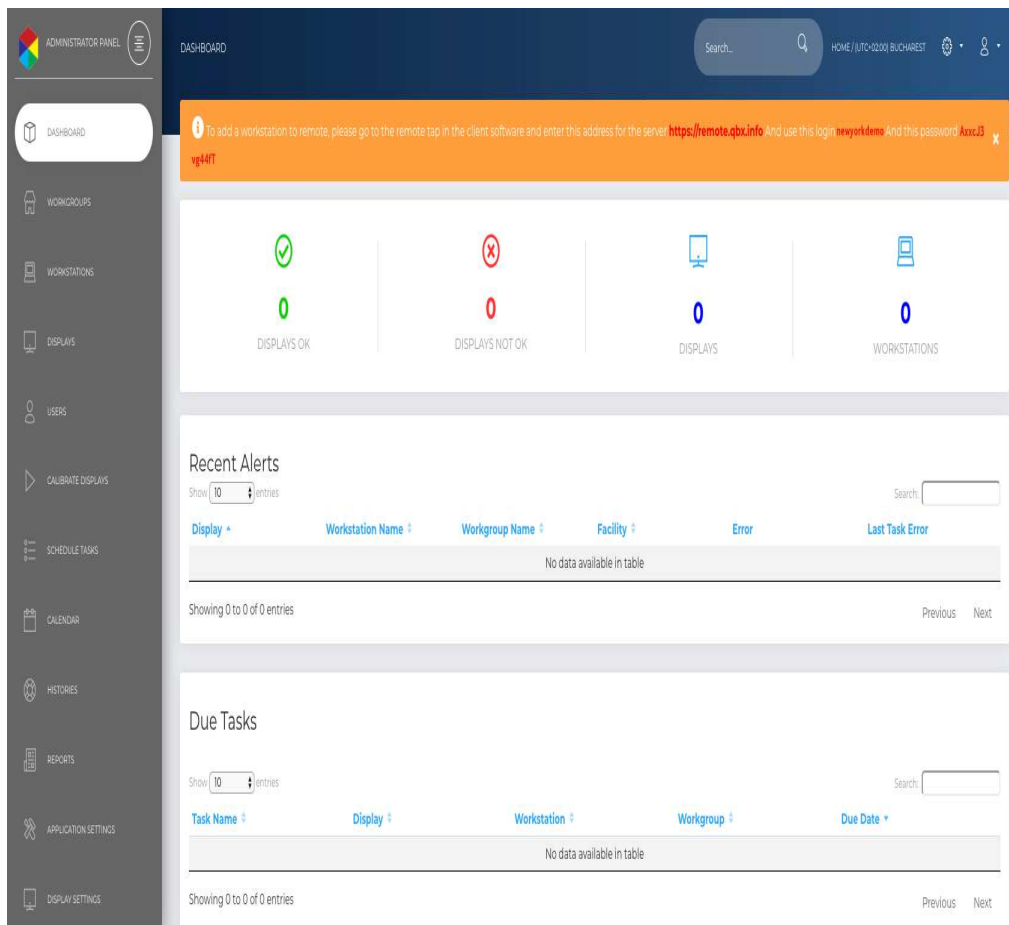
Thank you for using our application!

[Click here](#)

Thanks,
Remote Display





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5) After you have successfully activated your new remote account you will be prompted to the account dashboard in a new browser tab.



ADMINISTRATOR PANEL | DASHBOARD | Search... | HOME / AUTO-0200 BUCHAREST

Notification: To add a workstation to remote, please go to the remote tab in the client software and enter this address for the server: <https://remote.qbx.info> And use this login: **evyorkdemo** and this password: **Azxcz3**

 0 DISPLAYS OK	 0 DISPLAYS NOT OK	 0 DISPLAYS	 0 WORKSTATIONS
---	---	--	--

Recent Alerts
Show 10 entries | Search:

Display	Workstation Name	Workgroup Name	Facility	Error	Last Task Error
No data available in table					

Showing 0 to 0 of 0 entries | Previous | Next

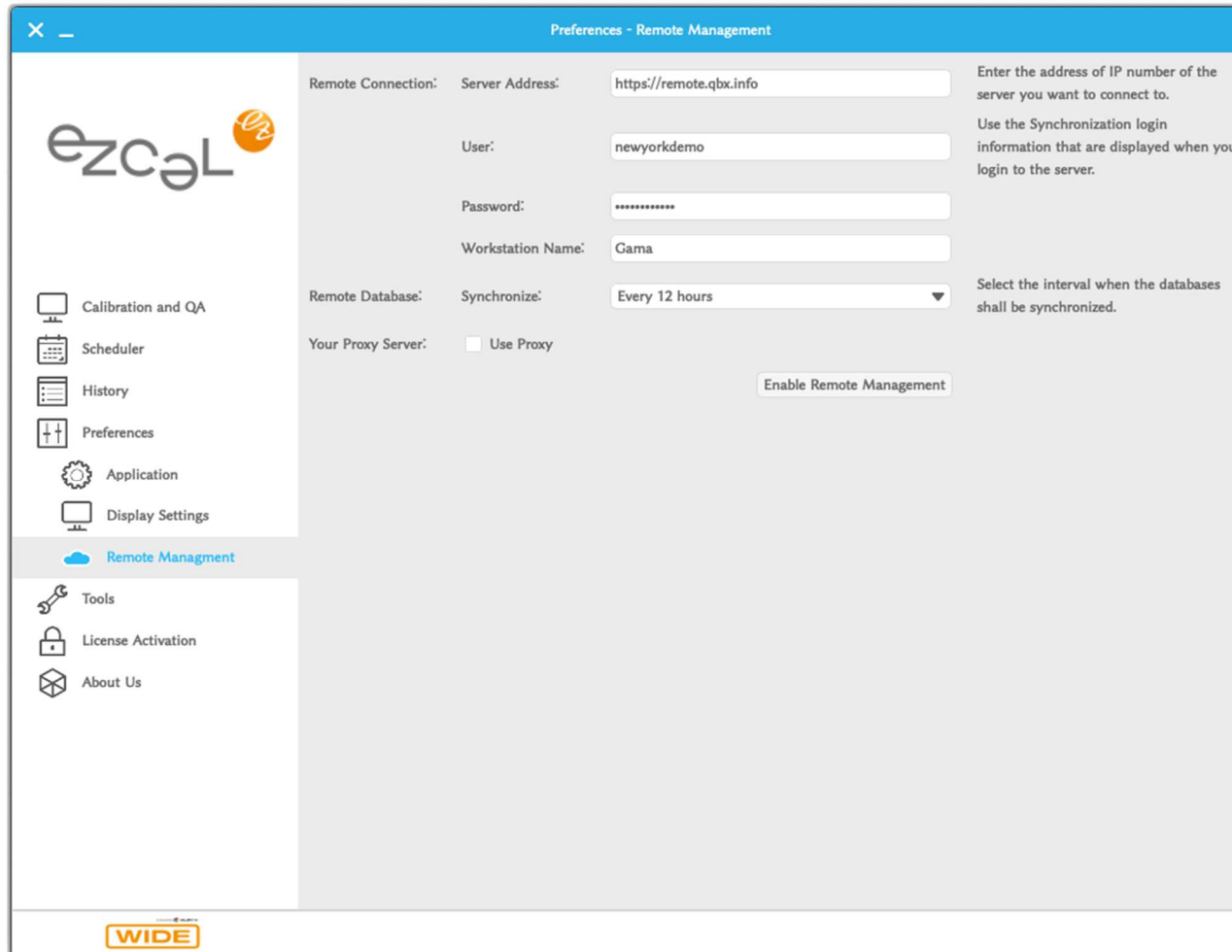
Due Tasks
Show 10 entries | Search:

Task Name	Display	Workstation	Workgroup	Due Date
No data available in table				

Showing 0 to 0 of 0 entries | Previous | Next

6) At the top side of the dashboard you will receive a notification with your synchronization username and password that are to be put inside the EzCal ver.2 client software. You will also receive this information in your email inbox.

7) In EzCal ver.2, go to Preferences -> Remote Management. Enter your synchronization login information that you received earlier and click the "Enable Remote Management" button.



8) Congratulations, you have set up the EzCal ver.2 Remote Service.



7.4. EzCal Remote: System Administrator Guide

EzCal Remote: Native Linux installation

OVERVIEW

The following will instruct how to install and configure the new EzCal Remote System Administration on native Linux.

SYSTEM REQUIREMENTS

- ★ OS: Linux
- ★ Install composer
- ★ Install git
- ★ Install and configure mysql database
- ★ Install and configure nginx or apache server

INSTALLING EZCAL REMOTE

- ★ Download source code from git:

```
git remote add origin https://dev.qubyx:5ntVFFPiJGdiW@gitlab.com/quantum-spectra/remote.git
```

```
git pull origin master
```

- ★ Copy and edit .env file



```
cp .env.production .env
```

Then change the site_url, database connection

- ★ Create and set permission for cache & storage folder

```
mkdir -p bootstrap/cache
```

```
chmod -R 777 bootstrap/cache
```

```
rm -rf storage/*
```

```
mkdir -p storage/app
```

```
mkdir -p storage/framework/sessions
```

```
mkdir -p storage/framework/views
```

```
mkdir -p storage/framework/cache
```

```
mkdir -p storage/logs
```

```
chmod -R 777 storage
```

- ★ Create installed file (because we already modify .env)

```
touch storage/installed
```

- ★ Run composer update to download the packages

```
composer update
```

- ★ Run database migration



php artisan cache:clear

php artisan config:cache

php artisan migrate

7.5. Acronyms

DICOM	Digital Imaging and Communications in Medicine
GSDP	Gray Scale Display Function
CIE	Commission Internationale d'Eclairage
BT	Broadcasting service (television)
NEMA	National Electrical Manufacturers Association
AAPM	American Association of Physicists in Medicine
DIN	Deutsches Institut für Normung
IEC	International Electrotechnical Commission
NY PDM	the New York state Primary Diagnostic Monitor (PDM) Quality Assurance Program
JESRA	Japanese Engineering Standards of Radiological Apparatus
LUT	Look Up Table
DDL	Digital Driving Levels
JND	Just-Noticeable Difference
OSD	On Screen Display



7.6. QUBYX SOFTWARE LICENSE AGREEMENT

IMPORTANT - READ CAREFULLY:

This License Agreement ("Agreement") is a legal contract between You, a user ("You"), and QUBYX Software Technologies Limited (HK), ("QUBYX") for the QUBYX software identified above, which encompasses all material and software accompanying this Agreement, including computer software, associated printed material, readme file, online help, and any other accompanying information and documentation (collectively "Software").

By clicking the acceptance button, installing, or otherwise using the Software, You are consenting to be bound by the terms of this Agreement. If You do not agree to all the terms of this Agreement, QUBYX is not willing to license the Software to You. If You do not agree to be bound by the terms of this Agreement, click the button that indicates that You do not accept its terms, do not install, copy, or otherwise use the Software, and contact QUBYX for instructions on how to return the unused Software.

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ii) No other Use

Except as expressly permitted in Section 1(a) above, You may not disclose, distribute, modify, make or have made any copies of the Software, in whole or in part, nor sell, rent, lease, license or lend the Software without prior written authorization of QUBYX.



iii) Multiple installation / Single Use at the time

The Software may be used by You on one single personal computer or workstation at the time. Specifically, You may install the Software on more than one computer at Your premises or at Your home at a time, however, the use of the Software must always be connected with the use of the dongle provided by QUBYX. You are not permitted to circumvent the protection given by the dongle. Furthermore, it is not allowed to use the Software or to network the Software to multiple computers or terminals without first obtaining an expanded license from QUBYX to cover such additional users and computers. QUBYX may replace the dongle by any other means of protection without previous announcement.

2. Use of LUT (Look Up Table) and profiles

a) The Software is licensed for use only as follows:

(i) to create LUTs and profiles on a specific input or output device that You own or otherwise possess and for which they were created ("Your Device"). You may make these LUTs and profiles available to third parties only under circumstances in which the third party will be optimizing images that have been created on or will be output on Your Device, provided that Your Device continues to be owned by You or in Your possession at such time that a profile is made available to such third party; or

(ii) to create LUTs and profiles by using reference characteristic data which are publicly and without consideration provided by professional or trade associations like standardization institutes to be used for their intended purpose.

b) No Distribution of generic LUTs and profiles



This Agreement does not grant You the right to distribute or embed created LUTs and profiles, also not under Your private label, into any software, devices or consumables like Computer Displays, Digital cameras, Printers, Projectors, paper that You manufacture, market or distribute to third parties. If You wish to create LUTs and profiles for this purpose, You will need a separate license for each device. With regard to generic LUTs and profiles created by non-profit organizations like the ECI, QUBYX is however prepared to permit to embed such LUTs and profiles into any software, devices or consumables to be distributed commercially by an agreement on a case by case basis. For information on a separate license You may contact support@qubyx.com.

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You agree that QUBYX may, on a non-exclusive basis, use for any purpose, in any media now known or hereafter devised, all suggestions, improvements, and any other information, ideas, concepts, know-how, works of authorship, and inventions (including corrections to problems with the Software, whether written or oral) (collectively, "Improvements") developed by You during the term of this Agreement. You will promptly notify QUBYX of all such Improvements without any duty of accounting or other compensation by QUBYX.

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10. General

- a) The material laws of France shall govern the interpretation and enforcement of this Agreement. If You are in North America, the material laws of the State of New York shall govern the interpretation and enforcement of this Agreement.
- b) If any term or provision of this Agreement or application thereof to any person or circumstances shall to any extent be invalid or unenforceable, the remainder of this Agreement, or the application of such term or provision to persons or circumstances other than that which is held to be unenforceable or invalid, shall not be affected thereby, and each such term and provision shall be valid and be enforced to the full extent permitted by law.
- c) This Agreement constitutes the entire understanding of the parties with respect to the Software and supersedes all prior and contemporaneous agreements, understandings, representations, warranties, promises and other communications of any kind, whether written or oral, between the parties with respect to the Software. No alteration, modification, variation or waiver of this Agreement, or any of the provisions hereof shall be effective unless executed by both parties in writing.



7.7. Caution & Warning about Cybersecurity

Recently, as network-based medical devices and medical information systems increase, and cutting-edge technologies such as artificial intelligence and big data are rapidly introduced into various related systems inside and outside medical institutions, sensitive personal information including patient information is being collected and distributed.

Therefore, it is necessary to note that:

1. Medical device cybersecurity violations can cause minor and short-term inconveniences without temporary user discomfort or medical intervention.
2. Medical device cybersecurity breaches may result in temporary and minor injury to users, and medical interventions may be required.



EZCAL ver.2 FAQs

What sensors can I use with EzCal?

EzCal is compatible with a variety of measurement devices.

Colorimeters:

- X-Rite Eye-One display
- X-Rite Eye-One display 2
- X-Rite Eye-One display OEM
- X-Rite Monaco OPTIX XR
- X-Rite DTP 94
- X-Rite Sequel Gamma 3
- X-Rite Sequel Chroma 4
- X-Rite Sequel Chroma 5
- Datacolor Spyder3
- Datacolor Spyder4
- Datacolor Spyder5
- Konica Minolta CA210
- Konica Minolta CS1000
- VeriLUM Sensor by Image Smiths

Spectral photometers:

- X-Rite Eye-One Pro
- X-Rite Eye-One Monitor
- PhotoResearch PR 670
- IBA dosimetry / Wellhoefer LX Chroma



- JETI specbos 1001
- JETI specbos 2001
- JETI specbos 2101
- JETI specbos 4001

Spot luminance meters:

- IBA dosimetry / Wellhoefer LX Plus
- IBA dosimetry / Wellhoefer LX Can
- Pehamed CD mon
- Pehamed CD LUX
- Pehamed CD Lux plus
- Gossen Mavospot



What displays can I calibrate with EzCal?

EzCal ver.2 can calibrate nearly any display (commercial, medical or laptop).

What OS is EzCal compatible with? Can I use it on Mac?

EzCal ver.2 can be used on Windows 7, 8 and 10; and Macintosh OS X from 10.11 to 10.15.

Do I have to reboot after installing?

It is not required, but can be helpful for sensor driver installation.

How do I activate the software after I buy the license?

To activate your license, you need to register it either automatically, if a workstation is connected to the Internet, or manually, if it is not.



Automatic:

Press "License activation" in the main window and select "Registration/Activation". In the window that opens, enter your serial number, choose automatic activation type, and enter your email address. Click "Activate" to complete the registration. Please note that automatic activation is possible only if your machine is connected to the Internet.

Manual:

Go to www.qubyx.com/ click Register on the top right and fill out the form. Enter the serial number provided above, the generated workstation ID, and user information.

To get the generated workstation ID the form requires, open the "Registration/Activation" window in the software and select manual activation type. The software will provide a generated workstation ID.

When the filled out form is submitted, you will receive an activation code by email. Enter this code into the corresponding field in the "Registration/Activation" window of the software and click "Activate"

How do I upgrade from EzCal to EzCal ver.2?

While EzCal ver.2 is installed on your machine, the old version is automatically uninstalled. This is one of the first steps of the install.

Do I have to purchase a new license for EzCal ver.2, or is there an upgrade license available?

To upgrade to EzCal ver.2 from your already purchased and activated version of EzCal customers will have to purchase a special upgrade license and activate it as a regular EzCal ver.2 license.

Purchase your upgrade license here: <https://qubyx.com/shop/>

The EzCal license must be installed on the same computer.

What will happen to my previous settings? Will they still be saved?



After you update, all of your settings will still be available for you to use. The same goes for all of your scheduled tasks, history data, and all the constancy and acceptance tests that have been previously performed in the old software version.

What about my history data? Will it be saved?

Yes, all history data from EzCal will be saved and is still available in EzCal ver.2.

Will the remote service work the same as before?

You will need to register a new account on <http://remote.qbx.info> and synchronize it for the remote service to function. Install the new EzCal ver.2, enter the remote settings, login with you details and synchronize with the new version.

I need to calibrate the display to a high luminance level, e.g. 500 cd/m2. Can I do that with EzCal?

EzCal ver.2 does not have any restrictions as to the highest possible luminance level. This depends on the capabilities of your display (maximum luminance is normally stated in display specifications). If your display is capable of reproducing 500 cd/m², EzCal can calibrate it to this level.

Target luminance level can be defined in Display Calibration Settings > Set Max Luminance.

Can I compare "before" and "after" calibration to see the results?

In EzCal ver.2 you can check the calibration effect visually using test patterns. After you have successfully calibrated the display, go to Tools > Display Test Pattern in the EzCal ver.2 main window. There you can choose one of the test patterns or any other image from your PC. Click "View and Check" to view the test image, and in the top right-hand corner you will see a button to switch off and switch on the calibration. If you want to check the effect not on the test image, but just in general, use the EzCal LUT Loader tray icon (bottom right-hand corner). Right-click on it and you will see the name of your display(s) with a tick (this means that calibration LUT is applied on a display). Left-click on the display name to un-apply the calibration LUT and to apply it again.



I've lost my EzCal ver.2 preferences password, how do I restore or reset it?

To reset your password, you need to close LUT loader and EzCal applications first. Then go to C:\programdata\qubyx\perfectlum and delete the full database file called storage.db. **Please note: all history data and settings will be lost.**

I'm getting an error message "LUT upload failed" during the calibration process.

Verify if the graphic card you are using has an LUT (Look Up Table). If you are using a laptop with a 2nd display connected, you may not be able to calibrate the external display, as laptop graphic cards usually have only one LUT. In this case select the external display in single display mode (you can do that in your OS settings or video card settings).

I'm getting an error message "sensor not found".

Verify if the sensor is connected correctly to the machine and if the USB port is active. Eventually change the port to test. Reboot the computer, and if you are still getting the error message, contact support(at)qubyx(dot)com for help on sensor installation.

I need to customize standard QA procedures to my needs. Can I do that in PL 4?

You can create a personalized QA procedure in EzCal ver.2 in Regulations Manager.

To open Regulations Manager, go to Calibration and QA -> Quality Assurance, select QA settings tab -> Regulation -> Regulation Manager.

When the regulation manager window pops up:

1. Choose what default regulation (AAPM, DIN, JESRA) and classification (primary, secondary) will your regulation be based on. Pick the name for your regulation and click "Continue" button;
2. In the next pop up window (Regulation Editor) select steps that will be included in your regulation by checking/unchecking boxes. Then select frequency of constancy tests for each step. If you select "none" frequency, the step will not be included in constancy tests;



3. Select if the acceptance test will be mandatory for your regulation by checking/unchecking the corresponding box. If the box is unchecked, constancy tests will be already scheduled in the scheduler tab, if you check it - you need to pass acceptance test first;
4. To edit thresholds for your regulation, press the "Parameter Editor" button. In the pop up window double click on a value to edit it and press "enter" to save it;
5. Press "Save" to save your regulation and close the regulation editor.

Back in the main window of regulation manager there are four more options:

- "Open User Regulation to Edit" - enabled once you have created/imported at least one regulation. Choose this option to edit one of your regulations;
- "Export User Regulation" - enabled once you have created/imported at least one regulation. Allows exporting your regulation to a separate file;
- "Import User Regulation(s)" - choose this option to import one or more user regulations;
- "Delete User Regulation" - enabled when at least one user regulation is available. Choose it to delete one of the regulations you created or imported.

Can I use free Remote Management with the demo version of EzCal ver.2? Or is it available only with the licensed version?

You can use fully functional free Remote Management with the demo version of EzCal ver.2. When the demo version expires, you will still have access to your administrator account and history, but will not be able to perform any calibrations or QA.

Is it possible to extend the EzCal evaluation period?

Our 15-day free demo gives you a taste of EzCal and time to evaluate if it's right for you. However, we understand that everyone gets busy and sometimes 15 days are not enough, so we allow a one-time extension so you can continue evaluating the product. After your demo period expires and you want to request more time, please do not hesitate to mail us at sales (at) qubyx.com. When you receive an extension code from us, please run EzCal, click "License" in the main window and select "Registration/Activation". In the window that opens, enter the extension code, choose automatic activation type, and enter your email address. Click "Activate". Done!



PERFECTLUM & DELL UP3216Q

Can I use PerfectLum & Dell UP3216Q for all diagnostic purposes?

According to the FDA clearance for the bundle, "The DELL UltraSharp UP3216Q with QUBYX PerfectLum is intended to be used in displaying and viewing of digital images, for review and analysis by trained medical practitioners.

These devices must not be used in primary image diagnosis in mammography.
The device cannot be used for a life-support system."

More information in the FDA database:

[Dell Up3216q With Qubyx Perfectlum Bundle K162196](#)

Dell Up3017 With Qubyx Perfectlum Bundle K171229
Dell U3014 With Qubyx Perfectlum Bundle K131601
Dell Ultrasharp U3011 W/Qubyx Perfectlum Bundle K111385

I already have a Dell UP3216Q. Can I just buy PerfectLum, calibrate my display and use it for diagnostics?

Technically, you can do it - the quality of the image will be sufficient. Legally, however, only the bundles provided by QUBYX have FDA 510(k) clearance.

Can I buy PerfectLum & Dell UP3216Q locally in the USA?

Yes, please contact us at sales (at) qubyx.com for further information.



BUYING QUBYX PRODUCTS

How can I buy a QUBYX product?

You can do it online in our e-shop or contact us at sales(at)qubyx(dot)com and request a quote if you need one.

Is it safe to buy QUBYX products online?

The shop on our website is safe to use and designed to protect your credit card information and other data you enter. Please note that we cannot guarantee the same security on any other website that might offer our products for sale.

I have bought software on the QUBYX website. How and when will I receive the serial number?

You will receive a serial number by email within 24 hours after the payment is confirmed.

I have bought hardware in the QUBYX shop. How and when will I receive them delivered?

We will ship your hardware as soon as the payment is confirmed, provided that the hardware is in stock. The time of shipping depends on your location.

I have received a quote and want to proceed with the purchase. What do I do?

You should send us your PO (placed order). We will send you the invoice with the due payment date stated. Payment conditions are discussed individually.



Do I get any discount on group orders?

Yes, we offer a flexible discount scheme that depends on the volume of your order. For specific pricing details, please contact our sales department at sales @qubyx.com

PARTNERING WITH QUBYX

Do you work with resellers and distributors, or do you only sell your products directly?

We are willing to work with resellers and distributors in various areas and offer them a discount scheme.

I would like to become a reseller of QUBYX products. What is the procedure?

Fill out the form at our Become a Reseller page or email us at sales(at)qubyx(dot)com. We will discuss the details and sign an agreement if both parties are willing to cooperate on its terms.

Do you grant exclusivity to resellers/distributors?

We do not grant any exclusivity to the resellers.

We are display manufacturers and would like to add calibration software to our displays. Do you take up such projects?

Yes, we are willing to cooperate with display manufacturers and can offer customized solutions for them. Please contact us at sales(at)qubyx(dot)com to discuss your project.



I would like to obtain the right to sell QUBYX products under my branding. Is that possible?

We can offer you OEM products (license-only or complete package, branded to your needs). Please contact us at sales(at)qubyx(dot)com to discuss the details.

MORE

Can a standard display (non-medical grade / Consumer display) be calibrated to suit DICOM GSDF Part 14 curve as per the different ambient luminance value?

Yes, you can calibrate any display to DICOM GSDF Part 14 with EzCal. EzCal does also take the ambient light into account.

Do we need any special type of monitor for this application?

No, you can use any display.

Does EzCal ver.2 generate LUT as per deviation during calibration (which the end-user must incorporate into their image viewing software)?

The correction LUT is applied on the graphics board or into the monitor. You can apply other specific LUT's inside your application.

How does EzCal ver.2 manage the impact of ambient light?

At the beginning of the calibration the software will measure the veiling glare. The veiling glare value will be used as an offset during the calibration.



Does EzCal ver.2 support the VeriLUM grey scale photometer which I have already?

Yes, see supported measuring devices in EzCal software manual

Is this software free or I have to buy?

Software may be purchased online at: <https://qubyx.com/shop/>

Can the software be purchased and downloaded online?

Software may be purchased online at <https://qubyx.com/shop/>

You will receive a license number and a download link once your purchase is completed by email.