REVISIONS		
REV	CN/ECN #	Date
A	CN083418ECN	27-MAR-2019
B	CN002684ECN	*12-APR-2019*

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TEXT FOR
LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope
and
LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope
with
Q-VUE™ 3D Assistant Visualization Operator's Manual

NOTES:
1. Inspect per Generic QIP Manual. (1)
2. Safety critical component.
3. This drawing contains a total of 1 Control Dimension Number. (0)
4. If only text is ordered, shrink wrap pages with cardboard backing.

BY	DATE		TITLE	
Gerard Scortino	14-Mar-2019	Alcon A Novartis Division	TEXT, MANUAL, OPER, LUXOR REVALIA	
CHECKED Troy Hinzman	14-Mar-2019			
APPROVED Asheesh Sah	14-Mar-2019	IRVINE, CA 92618-3818	DWG NO. **300027261-001**	REV **B**

LuxOR Revalia™

LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope
and
LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope with Q-VUE™ 3D Assistant Visualization

Operator's Manual

Alcon A Novartis Division

Manufacturer
Alcon Laboratories, Inc.
6201 South Freeway
Fort Worth, TX 76134-2099 USA
Made in USA with Global Materials

EC REP

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LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope Operator's Manual
8065000004 Rev B

Manual Revision Record

DATE	REVISION	CN NUMBER/DESCRIPTION
27-MAR-2019	A	CN083418ECN - Initial Release
12-APR-2019	B	CN002684ECN - Added warning on page 1.8, removed in tended use environments page 1.13, removed 8065753094 Manual, Oper, LX3 LED from accessories and parts.

IMPORTANT NOTE!

This manual is based on Software version 1.06 for systems with an LED Illuminator Module.

To determine the software used in your microscope, start the system and observe the initial splash screen display; the software version will momentarily appear in the lower-left corner of the display while the system is booting up. Alternatively, press the MENU button to bring up the Custom menu, then select About. The software version is displayed at the top of the screen.

This device complies with the requirements of RoHS.

The term LuxOR Revalia™ (LX3 LED) or LX3 used in this manual, refers to the LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope and LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope with Q-VUE™ 3D Assistant Visualization.

U.S. Federal Law restricts this device to sale by or on the order of a physician.

Table of Contents

Preface

This operator's manual is your written guide to the LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope and LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope with Q-VUE™ 3D Assistant Visualization, and considers all options available to the customer; therefore, when reading this manual, ignore the options which do not apply to your specific unit.

Please read the entire manual carefully before operating the instrument.

Recommended settings are given only as guidelines, and are not meant to restrict the surgeon; however, before trying other settings, the surgeon and support personnel should be experienced with the system and familiar with the new settings.

Equipment improvement is an on-going process and, as such, changes may be made to the equipment after this manual is printed.

Warnings, Cautions and Notes

Pay close attention to Warnings, Cautions, and Notes in this manual.

- A **WARNING** statement is written to protect individuals from bodily harm.
- A Caution statement, with the **CAUTION** heading centered above the text, is written to protect the instrument from damage.
- A **NOTE**: Written to bring attention to information.

Product Service

For product service, please contact Alcon's Technical Services Department at the number provided below.

Operators experiencing problems with the system should refer to the Operating Instructions and Troubleshooting sections of this manual. A problem which persists should be referred to the Alcon Technical Services Department or your local authorized service representative.

For optimum performance, it is the user's responsibility to schedule preventive maintenance service on the system and its accessories a minimum of one time per year. Additional preventive maintenance may be required based upon system use. Alcon's Field Service Engineers are trained and equipped to provide the highest quality of workmanship.

Safety performance should be verified by the user (e.g., qualified service personnel) at least once a year. Ground resistance, leakage current, and dielectric withstand voltage must be checked to appropriate national standard.

To avoid unnecessary shipping, please contact your Alcon Technical Services Department prior to return of any system or accessories. If return of the equipment is deemed necessary, a Return Material Authorization (RMA) will be issued with appropriate shipping instructions.

Technical Services Department

If you have questions, or want additional information, please contact your local Alcon representative or the Alcon Technical Services Department at:

Alcon Research, LLC.
15800 Alton Parkway
Irvine, California 92618-3818
Alcon Technical Services Department
(949) 753-1393
US Toll Free 800/832-7827
FAX (949) 505-6614

Limited Warranty

Alcon Laboratories, Inc., will repair or replace at its option, any system or accompanying accessories found to be defective in material and/or workmanship for a period of one (1) year from the date of initial installation. This warranty applies to the original purchaser of the system, when said system is properly installed, maintained, and operated in accordance with published instructions.

Alcon Laboratories shall not be obligated to provide services under this limited warranty for damage to or destruction of systems covered where such damage or destruction is (i) a result of or caused by fire or explosion of any origin, riot, civil commotion, aircraft, war, or any Act of God including, but not limited to lightning, windstorm, hail, flood, earthquake, or (ii) caused by customer's misuse or improper servicing of said systems. Bulbs, LED Modules, fuses, and knob/handle covers are not included in this warranty.

This warranty does not cover damage resulting from service repair or other alteration by any person other than an service personnel authorized by Alcon, and any warranties provided by Alcon with respect to this equipment shall become void and of no further force and effect if this equipment is serviced by anyone other than service personnel authorized by Alcon. In particular, Alcon shall have no obligation to replace, repair or credit customer's account for the cost of the equipment, which has been subject to service or other alteration by persons other than service personnel authorized by Alcon.

The express warranty above is the sole warranty obligation of Alcon, and the remedy provided above is in lieu of any and all other remedies. There are no other agreements, guarantees, or warranties - oral or written, express or implied - including without limitation warranty of merchantability or fitness for a particular purpose. Alcon shall have no liability whatsoever for any incidental or consequential damages arising out of any defect, improper use, or unauthorized service or repair.

WARNING!

Use of accessories other than those manufactured by Alcon may affect system performance and create potential hazards. If it is determined that an accessory not manufactured by Alcon has contributed to the malfunction of the equipment during the warranty period, service will be provided at prevailing hourly rates.

SECTION ONE - GENERAL INFORMATION

Introduction

Product Description

The LuxOR™ and LuxOR with Q-Vue™ Ophthalmic Microscopes are ophthalmic surgical instruments used for visualization and illumination of the eye during ophthalmic surgery.

Both are intended for low magnification visualization during ophthalmic surgical procedures, including cataract, retinal, and corneal.

The Q-Vue™ adds to the LuxOR™ platform a true stereo zero-degree side assistant scope.

Both systems incorporate ILLUMIN-i™ illumination technology that provides optimal red reflex and image detail. Both systems incorporate a surgical display for viewing microscope operational status and redundant controls.

The LuxOR™ Ophthalmic Microscope, is comprised of the following components:

- LIBERO-XY™ Communication System
- LIBERO-XY™ System Foot Control
- LuxOR™ Microscope Optics
- ILLUMIN-i® Technology
- E71 or LX3 Floor Stands
- Optional Q-VUE™ 3D Assistant Visualization System Upgrade

Intended Use(s)

The LuxOR™ Ophthalmic Microscope is designed for use in the operating room during ophthalmic surgeries such as: cataract, refractive, glaucoma, and plastic surgery

The LuxOR™ Ophthalmic Microscope is intended to assist the surgeon in viewing the eye during posterior and anterior ophthalmic surgery. This is accomplished by means of providing adjustable illumination, magnification and focus.

Indication(s) For Use

The LuxOR™ Ophthalmic Microscope including accessories, is indicated for use during surgery to provide a magnified view of the surgical field.

Contraindications

There are no known contraindications associated with this device.

Safety Notes On Use and Installation

- Be sure instrument is plugged into a power outlet with a properly connected earth ground, and use only a power cord designed for use with this equipment.
- Do not operate the equipment in an explosion-risk areas.
- Do not operate the equipment in the presence of flammable anesthetics or volatile solvents.
- Do not store or use the equipment in damp rooms, or expose the equipment to splashing, spraying, or dripping liquids.
- Do not place fluid-filled containers on top of equipment.
- Do not rebalance or re-equip the microscope when over the operating field.
- To avoid risk of pinching during articulating arm rotation, keep hands and fingers clear of the intersection between the articulating arm and floor stand.
- Do not use a mobile phone in the vicinity of the equipment due to the possibility that radio interference can cause equipment malfunction.
- Modifications and repairs on this equipment may only be performed by service personnel authorized by Alcon.
- The manufacturer will not accept any liability for damage caused by unauthorized persons tampering with the equipment; this will also forfeit any rights to warranty claims.
- Use this equipment only for the applications described.
- Only personnel who have undergone training and instruction should be allowed to use the equipment. It is the responsibility of the customer or institution to train and instruct staff using the equipment.
- Keep this operator’s manual accessible at all times.

Before Every Use of the Instrument

- Make sure the suspension system to which the LIBERO-XY™ system is attached is properly balanced in the use position.
- Make sure the suspension system to which the LIBERO-XY™ system is attached has no damaged casters (if applicable).
- Make sure all mechanical lock knobs are securely tightened.
- Make sure all optical components are securely attached to the LIBERO-XY™ system.
- Observe all warnings including warning labels, cautions, and notes.

WARNING!

For patient safety and ease of use it is important that before each surgery the articulating arm is balanced and its downward limit is adjusted.

LuxOR Revalia™ (LX3 LED) Microscope System Warnings

- Observe these and all other safety precautions for the LIBERO-XY™ system, as they still apply.

WARNINGS!

- **Prolonged exposure to the microscope light may be harmful to the eye. The maximum safe eye exposure at maximum level of illumination is 32 minutes. This time is cumulative. If the total eye exposure to light during surgery is expected to exceed 32 minutes, the light level should be reduced commensurately during the surgery. The light intensity percentage (%) readout on the display is for reference only.**
- **Never look at the sun through the microscope, binocular, eye piece, or objective lens.**

- When optics are not in use, proper action should be taken to prevent light from entering the eye unnecessarily.
  - Switch off or decrease the light.
  - Place a pledget on the cornea.
  - Obstruct the light with your hand.
  - Move the microscope from the surgical field.
  - Make sure ventilation openings of the LuxOR Revalia™ (LX3 LED) microscope module are not obstructed.
- Adequate ventilation is required for proper function.
- After continual use, the LED module and corresponding cartridge are hot to the touch.
- A light intensity of 50% or less is recommended for long procedures.
- LuxOR Revalia™ (LX3 LED) microscopes and LuxOR Revalia™ (LX3 LED) accessories are not made with Natural Rubber Latex.

WARNING!

It is normal for the Primary Control Panel to be very warm to the touch. The Host Module generates heat, and it is located inside the Primary Control Panel.

Footswitch

If required, the footswitch may be wiped with mild soap and water, or any germicidal solution that is compatible with the plastic parts.

WARNINGS!

- **If footswitch is used in wired configuration, route cable properly to avoid tripping.**
- **Footswitch battery can only be serviced or replaced by factory-trained service engineer.**

CAUTIONS

- **Do not clean footswitch using solvents, abrasives, or any cleaner that is not compatible with plastic parts made of LEXAN[i] EXL 9112. Damage may result.**
- **Do not clean rubber cover with alcohol; it will discolor the rubber.**
- **Never pick up or move the footswitch by the cable or joystick. This can cause irreparable damage.**
- **Do not drop or abuse the footswitch. This can cause irreparable damage.**

i. LEXAN[i] is a registered trademark of Sabic Innovative Plastics IP B.V

Phototoxicity

During exposure to light from the instrument, do not exceed the hazard reference values. For this instrument operated at 175 mm working distance, an exposure time of over 32 minutes at maximum output power may exceed the hazard reference value.

WARNING!

Prolonged exposure to the microscope light may be harmful to the eye. The maximum safe eye exposure at maximum level of illumination is 32 minutes. This time is cumulative. If the total eye exposure to light during surgery is expected to exceed 32 minutes, the light level should be reduced commensurately during the surgery. The light intensity percentage (%) readout on the display is for reference only.

Table 1-1 is intended to serve as a guideline and to make the surgeon aware of the potential hazard. The maximum exposure guidelines have been calculated when the main (oblique) beam and stereo coaxial (red reflex) illumination are both set to 100% intensity.

Calculations are based on the ISO-10936-2:2010 standard and the exposure limit value recommended in the standard. Compliance to ISO 10936-2:2010 is as a Group 2 instrument.

Table 1–1 Maximum Exposure Guidelines

LED Module/ Catalog number/ Sticker color	Microscope Illumination Setting	Maximum duration of aphakic exposure until hazard limit reached, minutes
Warm-white/ 8065753084	Red-reflex beams ON; main beam OFF	38.8
	Main beam ON; red-reflex beams OFF	43.0
	All three beams ON	38.8
Cool-white/ 8065753085	Red-reflex beams ON; main beam OFF	35.3
	Main beam ON; red-reflex beams OFF	32.8
	All three beams ON	32.8
Mixed-white/ 8065753086	Red-reflex beams ON; main beam OFF	38.8
	Main beam ON; red-reflex beams OFF	32.8
	All three beams ON	32.8

Special operating conditions should be applied when performing corneal transplantation. When considering corneal transplantation, different assumptions must be used when determining maximum light exposure limits. These worst case assumptions include:

- Completely unmoving eye (continuous radiation of the same region)
- Uninterrupted light exposure; e.g., no surgical instruments in the eye
- Pupils dilated to 7 mm
- Minimal refractive error (tiny focused spot on retina)
- Maximum eye transmittance

Given these assumptions, it is recommended that light exposure should not exceed the limits described in Table 1-2.

Table 1–2 Recommended Maximum Exposure (Minutes) for Corneal Transplantation

Illumination Level	Cool White LED Module			Warm White LED Module			Mixed White LED Module		
	Oblique Beam	Coaxial Beams	Oblique + Coaxial Beams	Oblique Beam	Coaxial Beams	Oblique + Coaxial Beams	Oblique Beam	Coaxial Beams	Oblique + Coaxial Beams
25%	117.0	86.7	86.7	127	105.8	105.8	117.0	105.8	105.8
50%	43.6	41.2	41.2	48.4	50.5	48.4	43.6	50.5	43.6
60%	30.9	31.0	30.9	35.1	37.8	35.1	30.9	37.8	30.9
65%	26.3	27.0	26.3	30.4	33.3	30.4	26.3	33.3	26.3
70%	21.8	23.1	21.8	25.6	28.8	25.6	21.8	28.8	21.8
80%	15.4	17.0	15.4	18.6	19.9	18.6	15.4	19.9	15.4
90%	10.9	12.4	10.9	13.6	14.0	13.6	10.9	14.0	10.9
100%	7.7	9.0	7.7	10.0	10.1	10.0	7.7	10.1	7.7

It is recommended that illumination levels be set to the minimum level necessary to perform the surgical procedure to minimize the risk of photoretinitis. Young children and persons with diseased eyes may be at a higher risk. The risk may also be increased if the patient has had any exposure to an intense visible light source during the previous 24 hours. This will apply particularly if the eye has been exposed to retinal photography.

The decision regarding the intensity of light level to use in any procedure shall be made on a case-by-case basis. In each case, the surgeon must make a risk-benefit judgment about the intensity of light to be used. Use of insufficient intensity may result in inadequate visualization, and can also result in adverse effects more serious than a retinal photic injury. Further, despite all efforts taken to minimize the risks of retinal damage from microscopes, damage may still occur. Retinal photic injury is a possible complication of the need to use bright light to clearly visualize ocular structures during delicate ophthalmic surgical procedures.

Warnings and Cautions

Pay close attention to Warnings and Cautions. A **WARNING** statement is written to protect individuals from bodily harm. A Caution statement, with the **CAUTION** heading centered above the text, is written to protect the instrument from damage. Many of these warnings and cautions are stated elsewhere in this manual; however, for reference they are repeated here. If additional information is required, please contact your local Alcon service representative, or the Technical Services Department.

There are no user-serviceable components inside the LuxOR™ microscope (except for the LED module) or footswitch . Refer all service issues to service personnel authorized by Alcon.

WARNINGS!

- **A qualified technician must perform a visual inspection of the following components every twelve months: • Warning Labels, • Power Cord, • Fuses.**
- **In case of a deficiency, do not use the system; call Alcon Technical Services.**
- **A qualified technician must check ground continuity and leakage current every twelve months to ensure they are within the limits of the applicable standards (for example: IEC60601-1). Values must be recorded, and if they are above the limits of the applicable standards, or 50% above initial measurement, do not use the system; call Alcon Technical Services.**
- **Battery access and service shall be done by service personnel authorized by Alcon.**
- **If the system is used at the 220V - 240V range in the United States or Canada, it should be used on a center-tapped, 240V single phase circuit.**
- **System isolation from mains is achieved through detachment of power cord. Turn OFF power switch and unplug the power cord from wall outlet to achieve isolation from mains.**
- **To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth (ground).**
- **Use of accessories and cables other than those provided may result in increased emissions or decreased immunity of the system. Portable and mobile RF communication equipment can affect this medical electrical equipment.**
- **Be sure all set screws applicable to the suspension system are securely tightened.**
- **Ensure thumb screws holding the LED module are securely tightened.**
- **Ensure screw securing binocular to microscope is securely tightened to prevent binocular from falling and causing personal injury and damage to the equipment.**
- **Burn hazard exists - do not remove LED module immediately after operation. Allow LED module to cool a minimum of 5 minutes.**

WARNINGS!

- **Ensure the Articulating Arm Safety Stop is adjusted so the bottom of the microscope or any accessories cannot contact the patient or user if the arm is lowered to its minimum height.**
- **Use of accessories other than those manufactured by Alcon may affect system performance and create potential hazards. If it is determined that an accessory not manufactured by Alcon has contributed to the malfunction of the equipment during the warranty period, service will be provided at prevailing hourly rates.**
- **In order to avoid foot injuries, be aware of the positions of all personnel when moving LX3 floor stand.**
- **To avoid risk of pinching, during articulating arm rotation keep hands and fingers clear of the intersection between the articulating arm and floor stand.**
- **Do not touch any open receptacle (footswitch, optical head, XY, video, accessory, power, etc.) or the bulb cartridge while in contact with the patient.**
- **Inspect knob and handle covers after each autoclave cycle to ensure material integrity. If indications of cracking or blistering, replace knob or handle cover.**
- **When using any sort of laser system or attachment, always follow the specific instructions for the laser device, including using protective filters and eyewear.**
- **The system should not be used adjacent to, or stacked with, other equipment; and that if adjacent to or stacked use is necessary, the system should be observed to verify normal operation in the configuration in which it will be used.**
- **MAGNETIC AND ELECTRICAL INTERFERENCE - Magnetic and electrical fields are capable of interfering with the proper performance of the device. For this reason make sure that all external devices operated in the vicinity of the device comply with the relevant EMC requirements. X-ray equipment, magnetic resonance tomography (MRT), nuclear magnetic resonance (NMR), or magnetic resonance imaging (MRI) devices are possible sources of interference as they may emit higher levels of electromagnetic radiation.**

Transport Warning

WARNING!

When transporting the unit in the facility, ensure that the articulating microscope arm is placed in the stowed and locked position over the microscope base as shown in the figure below, and protect the caster from forceful impact. If you need to transport your unit to an off-site location or have immediate concerns about your unit, contact Alcon Technical Support for assistance.

Figure 1–1 LuxOR Revalia™ (LX3 LED) System in Folded Transport Position

CAUTIONS

- **Modification of the equipment is NOT allowed without prior authorization from the manufacturer. If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe use of the equipment.**
- **Do not push or pull unit by the display, optical carrier, or binoculars. The unit should be pulled and not pushed using the handles on the floor stand, especially over elevator and door thresholds.**
- **Do not touch the bulb or LED's with bare hands as it will leave an oil residue that may shorten the life of the bulb or LED's respectively.**
- **Grounding reliability can only be achieved when equipment is connected to an equivalent receptacle marked Hospital Grade.**
- **Every time a new piece of equipment is added and cables are connected to the LX3 system, the system must be powered down prior to connecting cables, then powered back up.**

User Information – Environmental Considerations

The equipment that you have purchased requires the use of natural resources for its production and operation. This equipment may also contain hazardous substances which could have potential effect on the environment and human health if disposed of improperly.

In order to avoid the entry of any such substances into our environment, and to promote natural resource conservation, please install, maintain, and operate the equipment in accordance with the instructions. Information on the location of hazardous substances, resource consumption and emissions of the equipment can be found throughout this Operator's Manual. Please use the appropriate take-back systems. Such take-back systems reuse or recycle many of the materials in your end-of-life equipment in a beneficial way. Please contact your local Alcon office for assistance in take-back options through Alcon or other providers.

The crossed-bin symbol located on this equipment reminds you to use take-back systems, while also emphasizing the requirement to collect waste equipment separately, and not dispose of it as unsorted municipal waste. The Pb notation, if present, indicates that the labeled device contains greater than 0.004% lead.

If you need more information on the collection, reuse or recycle systems available to you, please contact your local or regional waste administration, or contact your local Alcon office for more information.

Accessory Equipment Warnings

Accessory equipment connected to or used with this equipment must be certified according to the respective IEC Standard (e.g., IEC 60950-1 for data processing equipment, and IEC 60601-1 for medical equipment). Anyone connecting additional equipment or otherwise causing a different system configuration than provided by Alcon is responsible for continued compliance to the requirements of System Standard IEC 60601-1. If in doubt, consult the Technical Services department or your local Alcon representative.

Follow local governing ordinances and recycling plans regarding disposal or recycling of device components and packaging.

Users should be aware of known RF sources, such as radio or TV stations and hand-held or mobile two-way radios, and consider them when installing a medical device or system.

Portable and mobile RF communications equipment such as cellular telephone can affect medical electrical equipment.

Be aware that adding accessories or components, or modifying the medical device or system, may degrade the EMI performance. Consult with qualified personnel regarding changes to the system configuration.

WARNINGS!

- **Alcon only sells accessories that are compatible with the LX3 microscope and with other qualified Alcon accessories.**
- **The use of accessories and cables other than those specified, with the exception of cables sold by the manufacturer of the system as replacement parts for internal components, may result in increased emissions or decreased immunity of the system.**
- **Ensure secure mechanical fit of all accessories prior to use.**
- **Use of LX3 microscope adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.**

EMC Statement

The LuxOR Revalia™ (LX3 LED) Microscope is designed to work in the Professional Healthcare facility environment.

It is important to install and use the equipment in accordance with the instructions in order to prevent harmful interference with other devices in the vicinity. If this equipment causes harmful interference to other devices (determined by turning equipment off and on), the user is encouraged to try to correct interference by one or more of the following measures:

- Reorient or relocate the other device(s).
- Increase the distance between the equipment.
- Connect this equipment into an outlet on a circuit different from that to which the other device(s) is connected.
- Consult the manufacturer or your Alcon field service engineer for help.

Table 1–3 Guidance and Manufacturer's Declaration - Electromagnetic Emissions

The LuxOR Revalia™ (LX3 LED) Microscope is Intended for use in the Electromagnetic Environment Specified Below. The Customer or the User of the System Should Assure That it is Used in Such an Environment.

Emissions Test	Compliance	Electromagnetic Environment-Guidance
RF emissions CISPR 11	Group 1	The LuxOR Revalia™ (LX3 LED) Microscope and Q-VUE™ Microscope use RF energy only for their internal function. Therefore, their RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The EMISSIONS characteristics of LuxOR Revalia™ (LX3 LED) Microscope make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) LuxOR Revalia™ (LX3 LED) Microscope might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ Flicker emissions IEC 61000-3-3	Complies	

Table 1–4 Guidance and Manufacturer's Declaration - Electromagnetic Immunity

The LuxOR Revalia™ (LX3 LED) Microscope is Intended for use in the Electromagnetic Environment Specified Below. The Customer or the User of the System Should Assure That it is Used in Such an Environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% Ut for 0.5 cycle at 8 Φ angles 0% 1 cycle 70 % UT for 25/30 cycles 0% for 250/300 cycles	0% Ut for 0.5 cycle at 8 Φ angles 0% 1 cycle 70 % UT for 25/30 cycles 0% for 250/300 cycles	Mains power quality should be that of a typical commercial or hospital environment. If the user of the LuxOR Revalia™ (LX3 LED) Microscope requires continued operation during power mains interruptions, it is recommended that the LuxOR Revalia™ Microscope be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m, 50/60 Hz	30 A/m, 50/60 Hz	Power frequency magnetic fields Should be at levels characteristic of a typical location in a typical commercial or hospital environment
NOTE: UT is the a.c mains voltage prior to application of the test level.			
Conducted RF IEC 61000-4-6	3 Vrms 150KHz to 80MHz 6 Vrms at ISM Frequencies	3 Vrms 150KHz to 80MHz 6 Vrms at ISM Frequencies	The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz	3V/m 80 MHz to 2.7 GHz	The dwell time should be at least 1 s and should be no less than the response time of the slowest responding function plus the setting time of the IMMUNITY test system.
Proximity Fields from RF wireless communication equipment IEC 61000-4-3	Frequency (MHz) / Level (V/m) 385 / 27 450 / 28 710, 745, 780 / 9 810, 870, 930 / 28 1720, 1845, 1970 / 28 2450 / 28 5240, 5500, 5785 / 9	Frequency (MHz) / Level (V/m) 385 / 27 450 / 28 710, 745, 780 / 9 810, 870, 930 / 28 1720, 1845, 1970 / 28 2450 / 28 5240, 5500, 5785 / 9	The IMMUNITY TEST LEVELS specified in the table were calculated using the following equation: $E=(6\sqrt{P})/d$ Where P is the maximum power in W, d is the minimum separation distance in m, and E is the Immunity Test Level in V/m. The factor of 6 is a compromise for a range of antenna factors, to simplify the test

WARNING!

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the LuxOR Revalia™ (LX3 LED) Microscope including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Equipment Contains Radio Transmitters

RF Radio Module (communication link with footswitch)

- Frequency or frequency band of transmission and reception: 2.405 – 2.480 GHz
- Type and frequency characteristics of the modulation: OQPSK (Offset quadrature phase-shift keying)
- Effective Radiated Power (ERP): 11.3 dBm (13.40 mW)

Wireless footswitch charger

- Frequency or frequency band of charging transmission and reception: 50 kHz
- Frequency or frequency band communication transmission: 115 kHz
- Type and frequency characteristics of the modulation and reception: FSK (Frequency Shift Keying)
- The Effective Radiated Power (ERP): -14.89 dBm (53.18 μW)

USA - Federal Communications Commission (FCC)

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION

Change or modifications made to this equipment (including antenna) not expressly approved by Alcon may void the FCC authorization to operate this equipment.

FCC Radiation Exposure Statement

WARNING!

To ensure that the radio transmitter complies with current FCC regulations limiting both maximum output RF power and human exposure to radio frequency radiation, a separate distance of at least 20 cm must be maintained between the unit's antenna and the body of the user and any nearby persons at all times, and unit's antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

Europe – Radio Equipment Directive (RED)

This device complies with the requirements of Radio Equipment Directive 2014/53/EU.

CAUTION

The radio equipment is intended to be used in all EU and AFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. Contact local Authority for procedure to follow.

Canada – Industry of Canada (IC)

This device complies with Industry Canada license-exempt RSS standards. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Canada - Industrie du Canada (IC)

*Cet appareil est conforme aux normes d'Industrie Canada RSS exemptes de licence. Son fonctionnement est soumis aux deux conditions suivantes: (1) Cet appareil ne doit pas provoquer d'interférences nuisibles, et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appare*il.

Transmitter Antenna:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Antenne d'émetteur:

En vertu de la réglementation de l'industrie du Canada, cet émetteur de radio ne peut être utilisé qu'avec un type d'antenne approuvé pour l'émetteur par Industrie Canada et seulement avec une valeur de gain inferieur ou égale au gain maximum approuvé par Industrie Canada. Pour réduire les risques potentiels d'interférence à autrui, le type d'antenne et son gain doivent être choisis de sorte que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas la valeur qui est nécessaire pour une communication réussi.

Exposure of Humans to RF Fields:

This device complies with RF exposure limits for humans as called out in RSS-102.

Exposition des personnes aux champs radioélectriques:

Cet appareil est conforme aux limites d'exposition RF pour les êtres humains comme elles le sont notifiées dans la norme RSS-102.

Japan

This device complies with Japanese Radio Law.

Summary of LuxOR Revalia™ (LX3 LED) Wireless Certifications

United States FCC ID: VMCNGPFSW1 Contains FCC ID: RI7XE61	Canada IC: 7345A-NGPFSW1 Contains IC: 5131A-XE61
Korea MSIP-CRI-TCS-XE61-24	Taiwan CCAB15LP4060T3 CCAB15LP4050T0
Europe CE Mark to MD and RED Directives	Australia
Japan R 209-J00129	Brazil ANATEL Agência Nacional de Telecomunicações 00169-12-02618 Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

Specifications

Table 1–5 Specifications

Dimensions - Microscope with Stand	Height: No greater than 183 cm (72 inches) Width Across Base: • No greater than 92 cm (36 inches) • No greater than 83.5 cm (33 inches) with casters turned inside base Depth: No greater than 125 cm (50 inches) with the arm folded and overall reach of minimum 125 cm (50 inches) from the center of the stand. Refer to,"Figure 1–2 Dimensions and swivel" on page 1.22 and,"Figure 1–4 Dimensions in folded position" on page 1.23.
Weight - Microscope with Stand and Accessories	Unpackaged: No greater than 304 kg (675 lb) Packaged: No greater than 409 kg (900 lb) Maximum weight that can be added to microscope including beam splitter, video camera, ORA SYSTEM™ Aberrometer: 10 kg (22 lb)
Environmental Limitations (operating)	Altitude: 3, 000 meters (9, 843 ft) Temperature: 10 °C to 35 °C (50 °F to 95 °F) Relative Humidity: 30% to 90% without condensation
Environmental Limitations (non-operating)	Altitude: 5, 600 meters (18, 373 ft) Temperature: -40 °C to 70 °C (-40 °F to 158 °F) Relative Humidity: 10% to 95% without condensation
Stability	Meets IEC 60601-1 placed on incline of 10 degrees from horizontal
Water Ingress	Meets IPX0 (microscope and floor stand); IPX6 (footswitch) as specified in IEC 60529
Footswitch	Dimension: 4.5" tall x 10.0" wide x 16.75" deep Weight: No greater than 4.0 kg (8.8 lb) Environmental: Construction of footswitch is water tight in compliance with IEC 60601-1
AC Electrical Requirements	Input Voltage and Current: 100-120 VAC, 6A, 50/60 Hz 220-240 VAC, 3A, 50/60 Hz
Protection Against Electrical Shock	Class I
Classification of All Applied Parts	N/A
Video Camera	Maximum recording time: Approximately 40 minutes

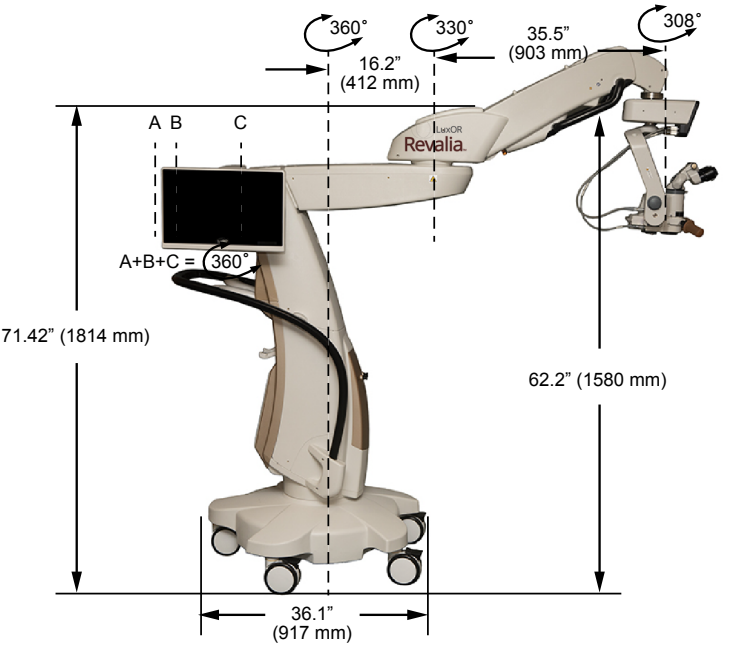


Figure 1–2 Dimensions and Swivel

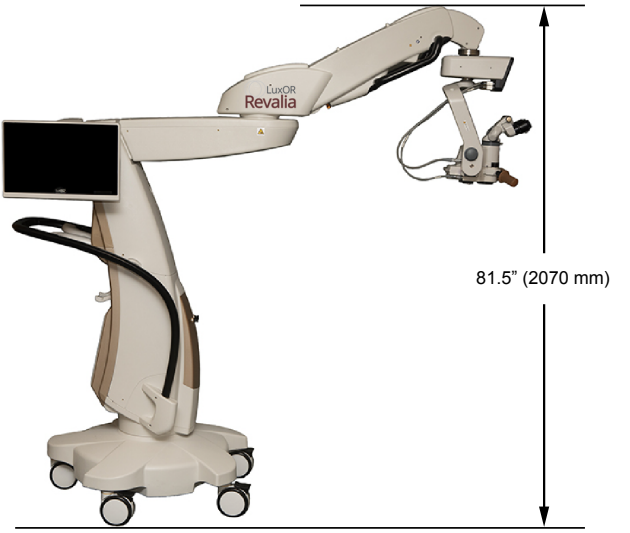


Figure 1–3 Height Dimensions

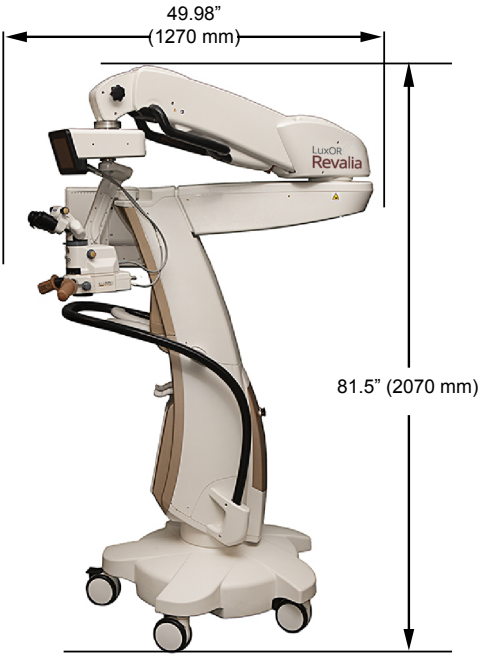


Figure 1–4 Dimensions in Folded Position

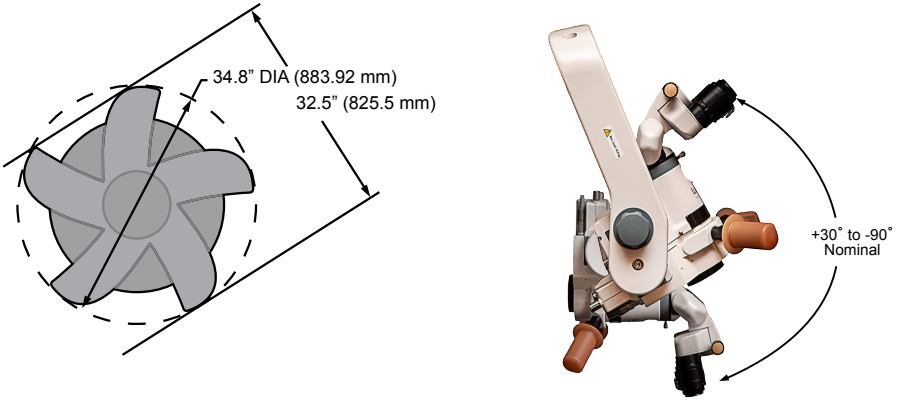


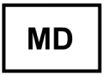
Figure 1–5 Base Foot Print and Microscope Tilt

Icons

Table 1–6 Icon Definitions

Icons That are Used on the System are Identified in This Chart. The Icons Shown on This Page are for Reference Only.

	Follow Instructions For Use (White Figure On Blue Background)	REF	Catalog Number
	Warning, Electricity (Black Symbols On Yellow Background)	GTIN	Global Trade Identification Number
	General Warning (Black Symbols On Yellow Background)	SN	Serial Number
	Caution: Surface Temperature Of Device Is Hot (Black Symbols On Yellow Background)	REV	Revision
	Caution: Pinch Hazard	EIN	Footswitch Electronic Identification Number
	Connector For Cabled Footswitch		Non-Ionizing Electromagnetic Radiation
	Ac Voltage		Date Of Manufacture YYYY-MM-DD
	On (Power)		Manufacturer
	Off (Power)		OSHA Recognized NRTL, TUV SUD America Mark, Providing Electrical Safety Certification To North American Requirements For Medical Devices.

	Earth Ground		CE Mark To MD and RED Directives
	Equipotential Ground Connection		Use Appropriate Take-Back System (See Environmental Considerations In This Manual) Pb Notation, If Present, Indicates Lead Content Greater Than 0.004%.
	Warning: For Continued Protection Against Risk Of Fire, Replace Only With Same Type And Rating Of Fuse.		Certification Mark For Japanese Radio Law
	Australian Rcm (Regulatory Compliance Mark)		Medical Device

Labels

NOTE: "The labels shown are for reference only and may not be the same revision as the actual labels on your system. Refer to the labels on your system for applicable system information."

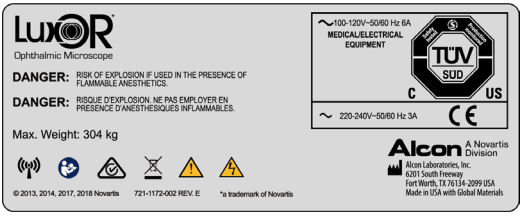


Figure 1–6 Floor Stand Name Plate

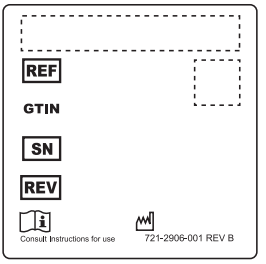


Figure 1–7 Floor Stand Serial Number Label

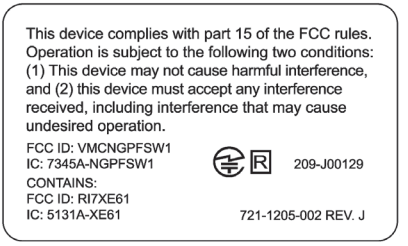


Figure 1–8 Floor Stand FCC and CE Label

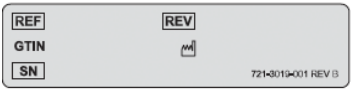


Figure 1–9 Optics Label

Figure 1–10 Microscope Max Load Label

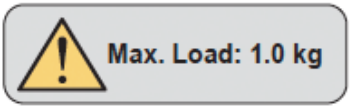


Figure 1–11 Storage Compartment Max Load Label

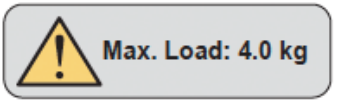


Figure 1–12 Footswitch Max Load Label

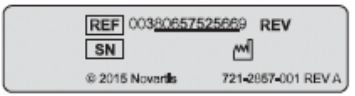


Figure 1–13 Footswitch Serial Number Label

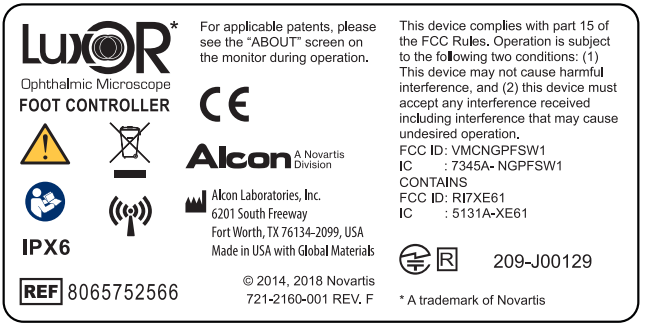


Figure 1–14 Footswitch Name Plate Label

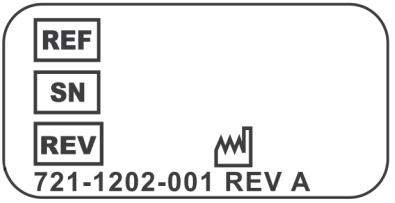


Figure 1–15 Endure Info Label

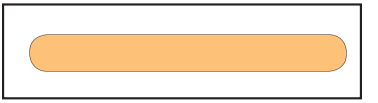


Figure 1–16 Warm White LED Module Label

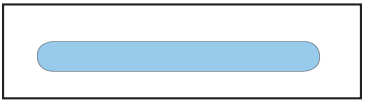


Figure 1–17 Cool White LED Module Label

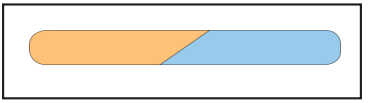


Figure 1–18 Mixed White LED Module Label

LuxOR Revalia™

Figure 1–19 LuxOR Revalia™ (LX3 LED) Cover Label Left

LuxOR Revalia™

Figure 1–20 LuxOR Revalia™ (LX3 LED) Cover Label Right

SECTION TWO - DESCRIPTION

System Description

The LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope System is comprised of the following components:

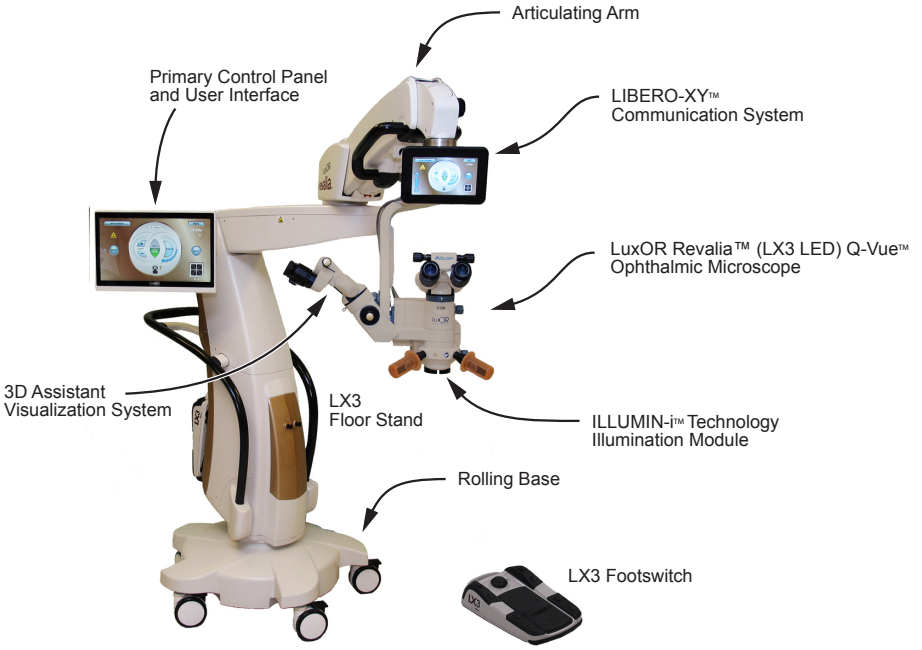


Figure 2–1 LuxOR Revalia™ (LX3 LED) With Q-VUE™ Ophthalmic Microscope System

The LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope System provides an X-Y coupling and control unit with a limited range of motion. A foot control is used in conjunction with the microscope system as a convenience to the surgeon. Users are provided options to control X-Y motion, focus, and magnification of the optical head, as well as the illumination functions of an illuminator module in LED light options.

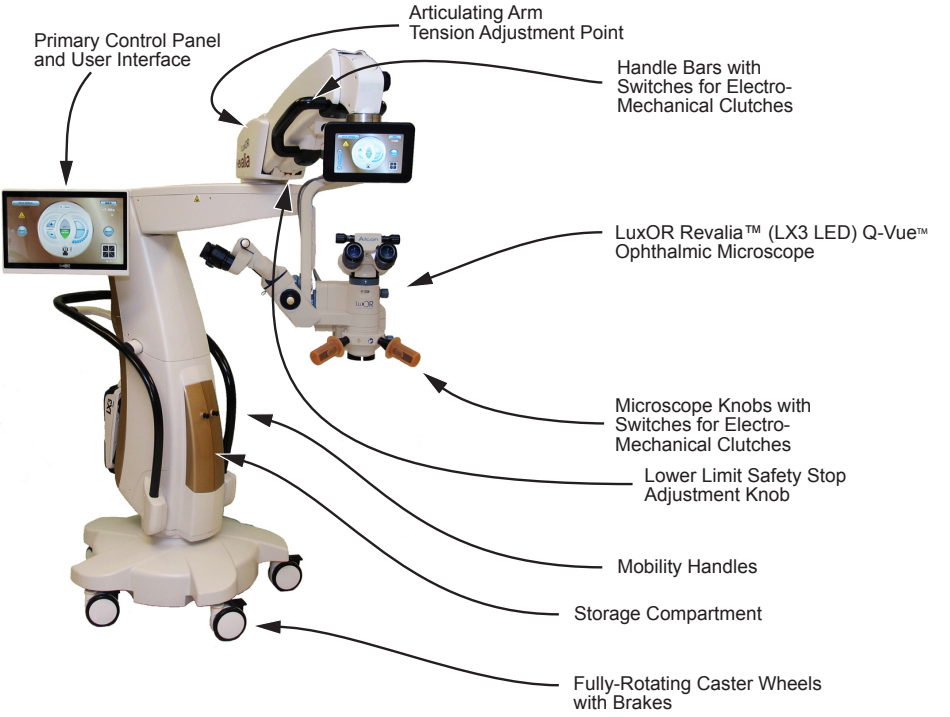


Figure 2–2 LuxOR Revalia™ (LX3 LED) With Q-VUE™ Ophthalmic Microscope System

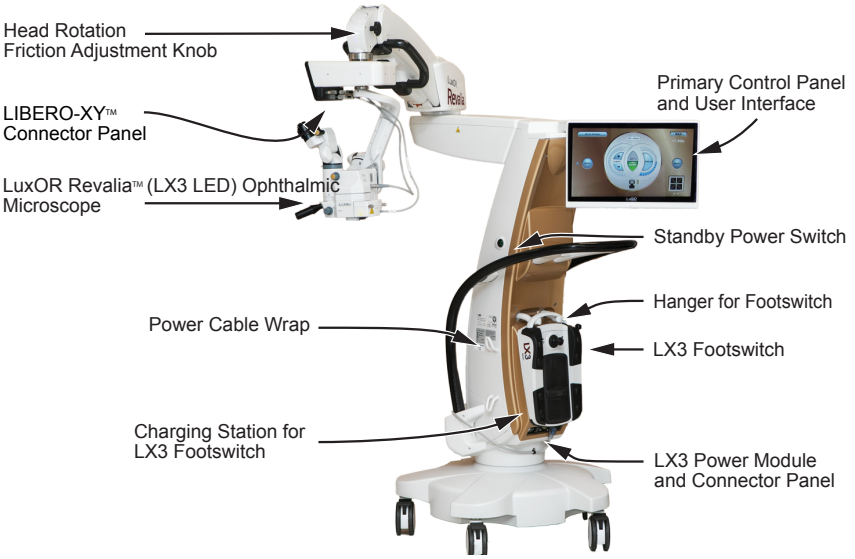


Figure 2–3 LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope System

Turning on the LuxOR Revalia™ (LX3 LED)

Press the ON/OFF switch at the base of floor stand to initiate power to the LuxOR Revalia™ (LX3 LED) System. Press the Standby Switch to activate the operating system, the Standby Switch will turn green. The system goes through a startup routine, then the Main screen appears on the Primary Control Panel.

Standby Switch

A standby power switch is located half way up the right side panel.

- In Standby mode, the LuxOR Revalia™ (LX3 LED) Standby Switch is orange.
- In ON mode, the LuxOR Revalia™ (LX3 LED) Standby Switch is green when AC power is ON, or blinking green when on battery power (no AC power).
- In OFF mode, the LuxOR Revalia™ (LX3 LED) Standby Switch is dark when AC is not available and microscope is shut down.

During start up it is normal for LEDs to turn ON briefly as the system goes through self-calibration.

During normal operation, pressing the Standby Switch for at least two seconds displays the Shutdown Conformation Dialog.

If the Standby Switch is pressed and held for at least ten seconds the console is powered off without further user intervention.

Power Module

This connector panel is located at the bottom-front of the LuxOR Revalia™ (LX3 LED) floor stand.

The power module contains an AC power switch, AC power connector, and a fuse holder. The power module is located at the bottom of the floor stand.

- AC Power Connector - Power cord from AC power outlet connects here. A hospital grade power cord must be used.
- Primary AC Power Switch - Connects AC power to power supply.
- Fuse Door - Open the fuse door to gain access to the fuse holder. Contact Alcon Technical Services for the correct rating and size.

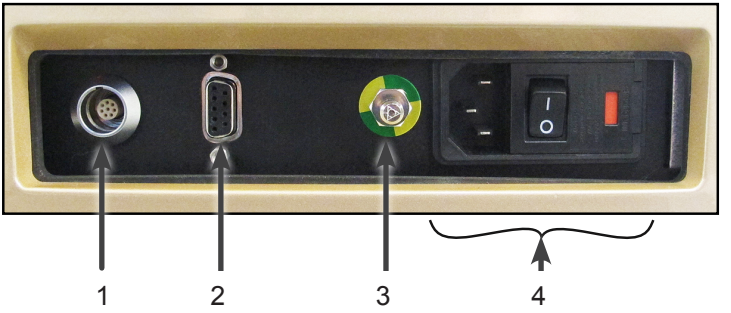


Figure 2–4 LuxOR Revalia™ (LX3 LED) Power Module and Connector Panel

Table 2–1 LuxOR Revalia™ (LX3 LED) Connector Panel

Item	Description
1	Connector for LX3 Footswitch when used in wired configuration.
2	Not used, cap must cover connector.
3	Equipotential pin. The Equipotential Ground pin may be used to provide a direct connection between the LuxOR Revalia™ system and the potential equalization bus-bar of the electrical installation. This pin/connector complies to the requirements of IEC/EN 60601-1.
4	Power module. • AC 3-prong input power connector. • Power ON/OFF switch. • Fuse door.

LIBERO-XY™ Connector Panel

This connector panel is located behind the LIBERO -XY™

The two connectors identified on the right are outputs to the ILLUMIN-i™ lamp and motor drivers. The first connector on the left is used for the optional BIOM** feature.

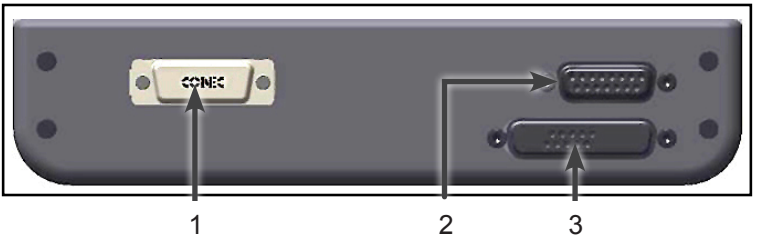


Figure 2–5 LIBERO-XY™ Connector Panel

Table 2–2 LIBERO-XY™ Connector Panel

Item	Description
1	This connector is used for the BIOM** feature when LX3 Footswitch is used to control the BIOM (keep covered when not in use). When adding BIOM, the system must be powered down prior to connecting cables, then powered back up.
2	Multi-pin connector output to motor driver.
3	Multi-pin connector output to illuminator lamp.

LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope

Theory of Operation

Designed as a fully-integrated ophthalmologic microscope system, the LuxOR Revalia™ (LX3 LED) System synchronizes with the precision optics of the LuxOR Revalia™ microscope.

The microscope features a motorized zoom barrel (4:1 with automatic reset) and focus drive (30 mm travel with automatic reset) which is controlled via the footswitch. It also features an integrated ILLUMIN-i™ Technology illumination module.

The optical system is configured with apochromatic Galilean type optics to provide superb and comfortable optical visual enhancement. The Q-VUE™ microscope incorporates a stereo, binocular assistant scope that takes no light from the surgeon. The Q-VUE™ microscope provides independent light paths for the surgeon and the assistant; essentially creating a separate microscope for teaching and vitreoretinal cases.

Different styles of binoculars can be outfitted to meet user requirements. Beam splitters, video attachments, side observation scopes, and other accessories can be adapted as well. The LuxOR Revalia™ (LX3 LED) microscope attached to the LuxOR Revalia™ (LX3 LED) floor stand creates a world-class surgical device with stability, safety, and productivity in mind.

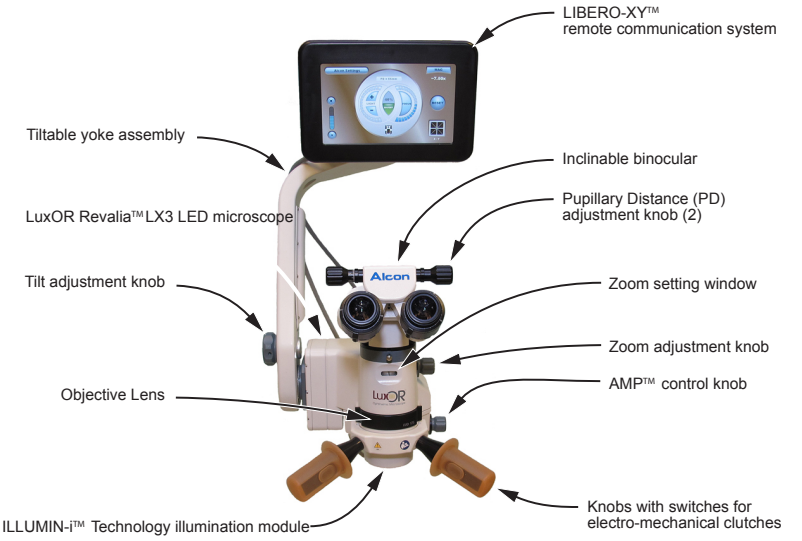


Figure 2–6 LuxOR Revalia™ Ophthalmic Microscope

LuxOR Revalia™ (LX3 LED) Microscope with Q-VUE™ 3D Assistant Visualization

Theory of Operation

The Q-VUE™ microscope is a true stereo co-observation system with independent 5-step magnification control *(Figure 2–7)*. This feature allows a co-observer to view the procedure from either side of the primary surgeon in true stereoscopic vision without light loss to the primary surgeon's view. This is, in essence, a complete separate integrated microscope sharing a common focal length objective lens and illumination system. The side scope can be rotated from the left or the right side by releasing the lock lever on the underside of the side scope.

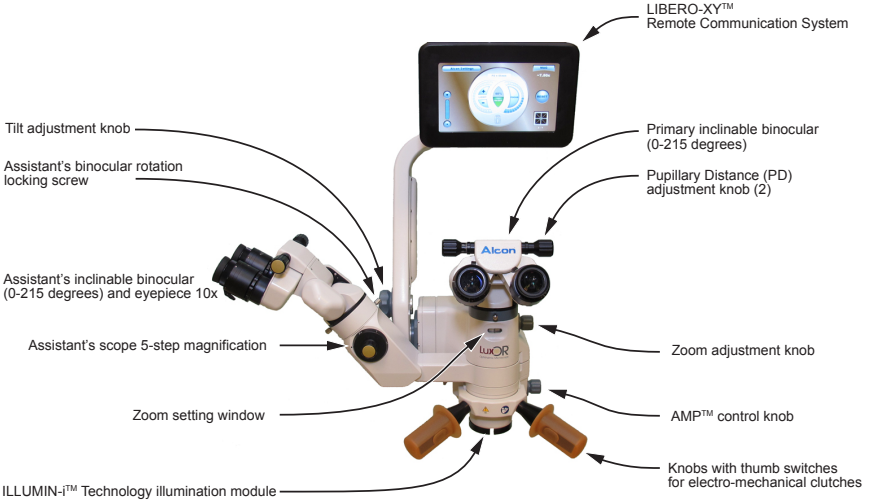


Figure 2–7 LuxOR Revalia™ With Q-VUE™ Microscope

AMP™ Control

The AMP™ control knob, located on the right side of the ILLUMIN-i™ Technology illumination system, is used to engage the AMP™ feature. Turn the knob counter-clockwise until there is an audible click; this removes all red reflex enhancing components of the ILLUMIN-i™ illumination system, allowing full light to return to the surgeon. This is primarily used for retinal procedures or procedures where red reflex is not desired.

Optics Accessories

Accessory components can be added onto the LuxOR Revalia™ (LX3 LED) microscope, and after stacking what can be many components, the articulating arm must be re-balanced in the use position to compensate for the added weight. Then, to avoid inadvertent patient contact during surgery, the lower limit safety stop must be adjusted. Both adjustments are described in section three of this manual.

The recommended component stacking arrangements are shown *(Figure 2–8)* and *(Figure 2–9)*.

NOTE: We do not advise stacking Cataract and Vitreous components together.

Recommended component stacking arrangement for cataract surgeon - MID is mounted above beam splitter/camera for best visual clarity through the microscope. In this configuration, the MID data is NOT captured in the video output.

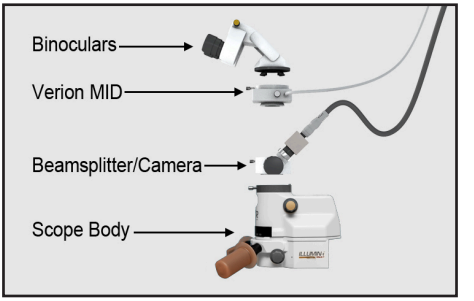


Figure 2–8 LuxOR Revalia™ Ophthalmic Microscope With Component Accessories Stacked in the Recommended Orders for Cataract use.

Recommended component stacking arrangement for vitreous surgeon - Beam-splitter/ camera is mounted below the inverter to avoid vignetting. In this configuration, the video output is NOT inverted.

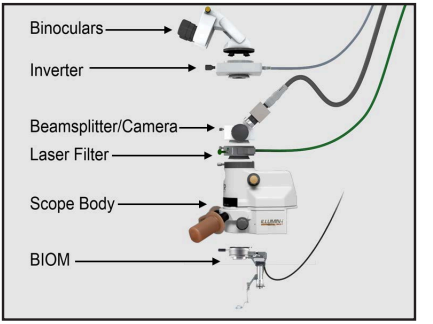


Figure 2–9 LuxOR Revalia™ Ophthalmic Microscope With Component Accessories Stacked in the Recommended Orders for Vitreous use.

The Footswitch

The LuxOR Revalia™ (LX3 LED) system operates with the LX3 Footswitch *(Figure 2–10)*. All functions of the microscope can be controlled with the footswitch (see, "Menu / Doctor Settings / Footswitch Tab" on page 2.33 of this manual for programming instructions).

The footswitch is water resistant, easy to care for, and operates in both wired and wireless configurations. The footswitch can be connected to the LuxOR Revalia™ (LX3 LED) floor stand at its lower input panel *(Figure 2–3)*and can be stored on the floor stand's footswitch hanger.

The LX3 Footswitch includes an optional tall joystick that replaces the standard short joystick. The optional tall joystick is intended to be actuated using the side of the foot.

If LX3 pairing is changed from one *Centurion™* system to another, the microscope footswitch should be paired by cradling it or by cabling it to the LX3 . Pairing with a *Centurion™* system is typically performed when an LuxOR Revalia™ (LX3 LED) or *Centurion™* system is initially set up for use in an OR, and not during surgery.

In the wireless configuration, the LX3 Footswitch can be hung from the floor stand's hanger where there is an integrated charging system; wireless battery charging commences once the LX3 Footswitch is hung from the hanger. The LX3 footswitch has two LED indicators, one showing battery charge level and the other confirming the wireless communication link.

Figure 2–10 Wireless LX3 Footswitch

Shown on left is the footswitch with tall joystick; on the right is the footswitch with short joystick.

Footswitch Hanger / Charging Station

When out of use, the footswitch hangs on the back of the floor stand. If used wirelessly, its internal battery is charged through the surface of the charging station. If wired to the LuxOR Revalia™ microscope, and system power is turned on, the footswitch battery is charged through the cable.

CAUTION

If the low battery indicator appears during microscope operation in wireless footswitch mode, turn the microscope off, then connect the LX3 Footswitch to the microscope with a cable. Turn the system on and continue operation while the footswitch battery is charging.

Charging Footswitch Battery

- The footswitch is capable of operating on battery power (when fully charged) for 10 complete surgical days.
- The battery is capable of being charged by the LuxOR Revalia™ (LX3 LED) microscope in less than 5 hours when charged through the wired connection.
- The battery is capable of being charged by the LuxOR Revalia™ (LX3 LED) microscope in less than 10 hours when charged through the wireless charger.
- Footswitch battery charging (for more details see tables below):
  - In wired configuration will only charge if LX3 is ON.
  - In wireless configuration will charge wirelessly as long as AC is connected or LX3 batteries are charged.

Table 2–3 Footswitch Charging Options

Status	Cabled Charging of Foot Switch Battery	Wireless Charging of Foot Switch Battery
AC Available, LuxOR Revalia™ (LX3 LED) ON	Yes	Yes
AC Available, LuxOR Revalia™ (LX3 LED) Standby	No	Yes
AC not available, LuxOR Revalia™ (LX3 LED) ON	Yes	Yes
AC not available, LuxOR Revalia™ (LX3 LED) OFF	No	Yes (if system batteries are charged)

To successfully charge wireless footswitch on cradle:

- Ensure the footswitch skin is flush with the console skin when cradled.
- There are no battery-related alerts.
- If footswitch is cabled and placed on the cradle, it will wirelessly charge when console is OFF.

Table 2–4 Battery Indicator Status

Visual Indicator for Battery Status	
Right LED State	**Description**
Solid green	Battery level >40%
Solid yellow	Battery level ≤40%
Blinking green	Charging when battery level >40%
Blinking yellow	Charging when battery level ≤40%
OFF	Takes priority over the previous four states when either of the following is true: • Footswitch is in a period of no activity, when in wireless mode. • Battery level is unknown, when in wireless or wired modes.

Figure 2–11 Foot Pedal Visual Indicators

Table 2–5 Battery Connection Status

Visual Indicator for LuxOR Revalia™ (LX3 LED) Connection Status	
Left LED State	**Description**
Solid blue	Footswitch in wireless or wired modes, and in communication with LuxOR Revalia™ (LX3 LED).
Momentarily blue	Confirmation of footswitch pairing with LuxOR Revalia™ (LX3 LED) when placed in cradle.
OFF	Takes priority over solid blue when any of the following is true: • Footswitch cradled in wireless mode (except when momentarily blue). • Footswitch in a period of no activity in wireless mode. • Footswitch in wireless or wired modes and not in communication with LuxOR Revalia™ (LX3 LED).

Footswitch Battery Charge Status Indicator

One of the following is displayed to the right of the footswitch button:

- If the footswitch battery is not low and not charging, a bar graph with 3 green segments.
- If the footswitch battery is low and not charging, a bar graph with 2 yellow segments.
- If the footswitch battery is critically low and not charging, a bar graph with 1 yellow segment.
- If the footswitch is not low and charging, a solid green bar graph with a lightning bolt icon.
- If the footswitch is low and charging, a solid yellow bar graph with a lightning bolt icon.
- If the footswitch is critically low and charging, a solid yellow bar graph with a lightning bolt icon.

Figure 2–12 Footswitch Charge Indicator

The LuxOR Revalia™ (LX3 LED) microscope incorporates technology that allows a specific channel of communication with a dedicated wireless LX3 Footswitch. The LX3 Footswitch uses radio frequency output and an IEEE 802.15.4 networking protocol at frequency band 2.4 GHz.

To keep the microscope system running properly, the communication link between the LX3 Footswitch and the LIBERO-XY™ system utilizes spread spectrum digital modulation to deter any interference from other equipment, even when other LX3 microscopes are being used in the same room.

The Electromechanical Clutches

The LuxOR Revalia™ (LX3 LED) floor stand is equipped with three electromechanical clutches designed to lock the microscope in the doctor's preferred position. One is between the rolling base and floor stand, one is between the floor stand and articulating arm, and the third locks the articulating arm's vertical movement *(Figure 2–1)*. There are two ways to release the electromechanical clutches *(Figure 2–13)*.

- Grab either of the articulating arm's handle bars and press the switch located inside the handle.
- Press any of the two switches in the microscope knobs. These are intended to operate under a sterilizable knob cover.

With the clutches released, the suspended microscope can be moved to its desired location. Release the switch to secure the microscope at that position.

WARNINGS!

- **To avoid possible injury or damage to the microscope, grip handles/knobs firmly when pressing switches to release the arm. If the articulating arm is out of balance, it can drift up or down when the arm is released.**
- **To avoid risk of pinching, during articulating arm rotation keep hands and fingers clear of the intersection between the articulating arm and floor stand.**

Switches for electromechanical clutches (1x2) under knob covers

Switches for electromechanical clutches (1x2) on inside of handle bars

Figure 2–13 Electronic Clutch Switches

Touch Screens

The main user interface is the LuxOR Revalia™ (LX3 LED) Primary Control Panel *(Figure 2–14)*; doctor selection and system controls through the MENU function are performed on this touchscreen. The LIBERO-XY™ Remote Communication System is driven by the LuxOR Revalia™ (LX3 LED) Primary Control Panel. Both screens allow the user to turn the light ON/OFF and adjust Light Intensity. Focus, Magnification, and X-Y position can be reset individually, or all can be reset along with Light Intensity by pressing the RESET button.

Shown below are the two touch screens with the main control screen displayed. The LuxOR Revalia™ (LX3 LED) Primary Control display is significantly larger than the LIBERO-XY™ display, and it also contains the MENU tools to program the system preferences for each individual surgeon. Programming instructions are described in the next section of this manual.

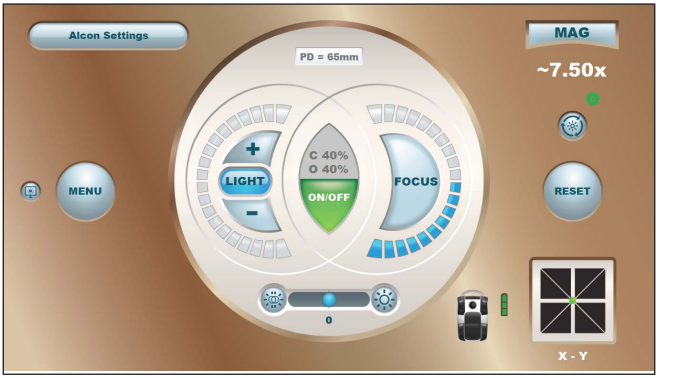


Figure 2–14 (LX3 LED) Primary Control Panel Display

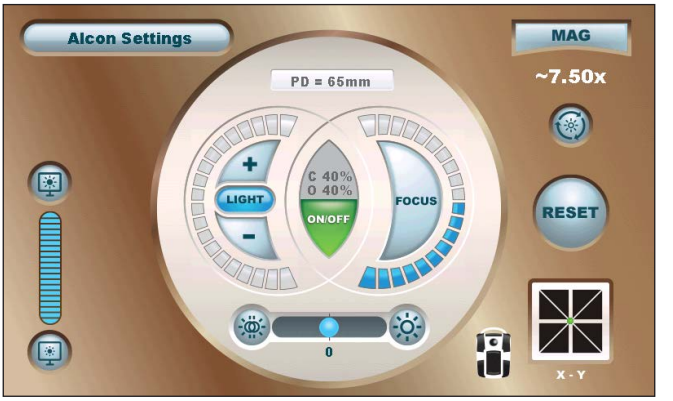


Figure 2–15 LIBERO-XY™ Communication System Display

There are three mutually exclusive screens, each of which occupies the entire display area: the Startup Screen, the Surgery Screen, and the Fault Screen.

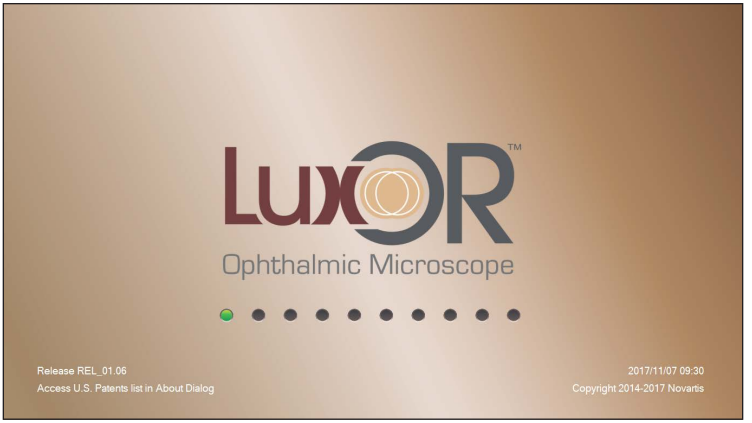


Figure 2–16 Startup Screen

System power-up is initiated when the Standby Switch is pressed. After some delay (during which the BIOS displays its splash screen) the Startup Screen is displayed.

During power-up the following are displayed on the Startup Screen:

- Software version formatted as “Release: REL_xx.xx”
- “Access U.S. Patents list in About Dialog”
- Current date and time in the format “yyyy/mm/dd hh:mm”
- “Copyright 2014-20xx Novartis” (where xx = year of software release)

The Main Screen on the Primary Control Panel

The large Primary Control Panel functions as the central hub for the entire microscope. All applications and submenus are accessed directly from its Surgery screen *(Figure 2–17)*and all vital signs of the microscope are seen on the Main screen.

Surgery Screen - LED Illuminator Module

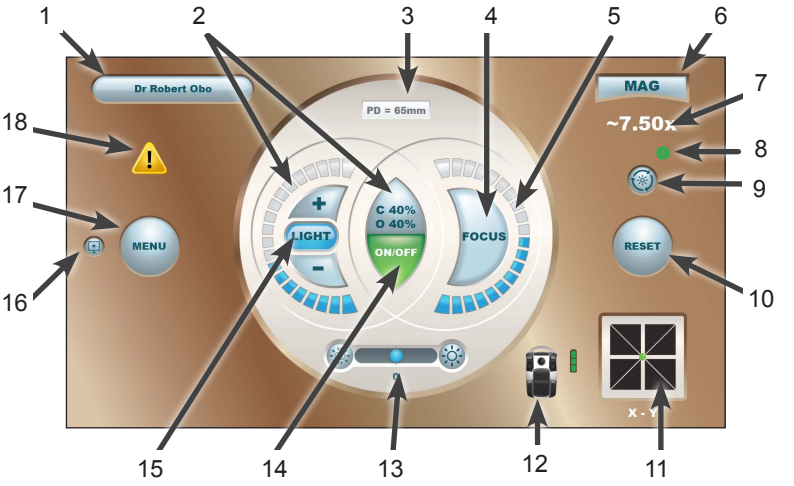


Figure 2–17 Surgery Screen {LED Illuminator Module}

Table 2–6 Surgery Screen Illuminator Module Functions

Item	Description
1	Doctor Button
2	Light Intensity
3	Pupillary Distance
4	Focus Reset
5	Focus Position
6	MAG Reset
7	MAG
8	Wireless Connection to *Centurion*™ Vision System
9	Light Preset
10	RESET All (Focus, MAG, X-Y Target, LIGHT Intensity)
11	X-Y Target and Reset
12	Footswitch and Battery Charge Status
13	Coaxial - Oblique Balance
14	Light ON/OFF
15	Illumination Control Mode Button
16	Screen Brightness
17	Menu
18	Alert notification

The LED Illuminator Module provides two sources of illumination supplied by light emitting diodes (LED's): Coaxial and Oblique. The Coaxial and Oblique illumination can be controlled separately or in tandem.

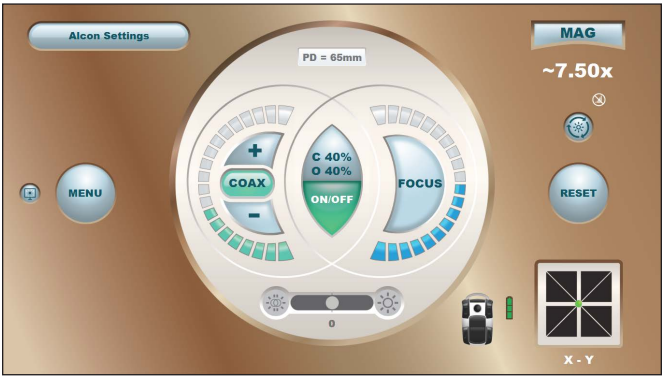


Figure 2–18 Coaxial Only Illumination, Balance is Greyed out (not Available)

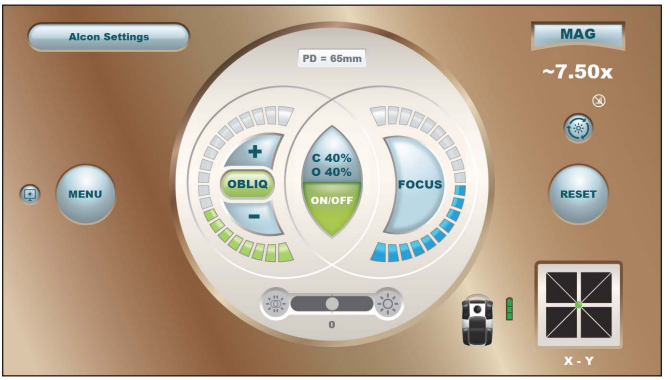


Figure 2–19 Oblique Only Illumination, Balance is Greyed out (not Available)

The light intensity value is displayed as a percentage 0-100%.
The Balance value is a number defined by the ratio of Coaxial (C) and Oblique (O) illumination, ie: C (Coaxial) 40% and O (Oblique) 40%.
The calculation is as follows:

- If Coaxial > Oblique then Balance = (Oblique/Coaxial - 1) *100
- If Coaxial < Oblique then Balance = (1 – Coaxial/Oblique) *100
- If Coaxial = Oblique then Balance = 0

NOTE: There is rounding which occurs during the calculation and display of Balance and illumination intensity values.

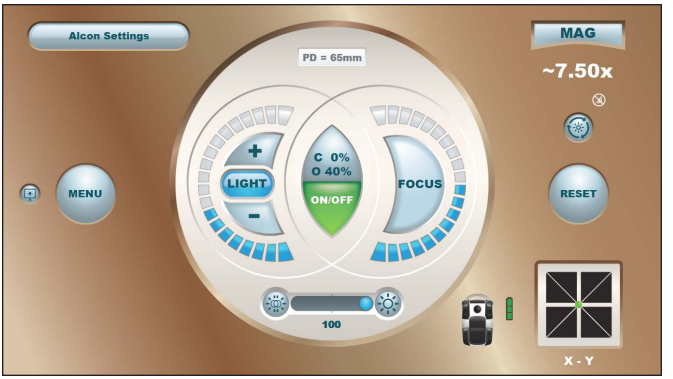


Figure 2–20 Coax and Oblique in Tandem, (“Light” Mode) Balance set to 100% Oblique

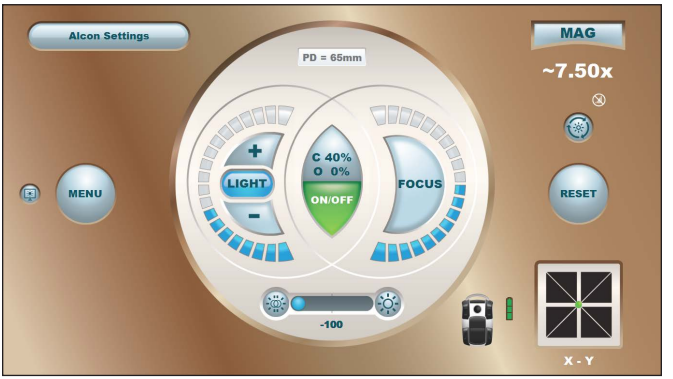


Figure 2–21 Coax and Oblique in Tandem, (“Light” Mode) Balance set to 100% Coax

Table 2–7 Balance Value Examples for LED Illumination

Balance	Description	Examples
0	Equal values of Coaxial and Oblique illumination.	C = 100%, O= 100% C = 30%, O= 30% C = 0%, O= 0%
-100	Only Coaxial illumination. Oblique illumination is set to 0% or Oblique LED is turned off.	C = 30%, O = 0% C = 30%, O = LED OFF C = 100%, O = 0%
+100	Only Oblique illumination. Coaxial illumination is set to 0% or Coaxial LED is turned off.	O = 50%, C = 0% O = 30%, C = LED OFF O= 100%, C = 0%
-25	Coaxial > Oblique	C = 50%, O = 37.5% C = 60%, O = 45%
+25	Coaxial < Oblique	C = 70% O = 52.5% C = 37.5%, O = 50% C = 45%, O = 60% C = 52.5% O = 70%

Table 2–8 Surgery Screen – LED Illuminator Module

Display Object	Description
Doctor Button	Displays the Current Doctor or Alcon Settings if there are no user-defined doctors. When pressed, displays the Select Doctor Dialog.
Alert Notification Button	Displayed upon a general alert. When pressed, opens the Alert Information Dialog. The button is removed when the Alert Information Dialog is closed by the user.
Menu Button	When pressed, displays the Custom Menu.
Pupillary Distance Readout	Readout in millimeters of the Current doctor's pupillary distance. This readout is set in the Doctor Settings Dialog – Optics Tab
Illumination Control Mode Button	Cycles through each of the illumination control modes with button text changing to reflect the current illumination control mode as follows: "COAX"= Coaxial Illumination Control Mode "OBLIQ"= Oblique Illumination Control Mode "LIGHT"= Concurrent Coaxial/Oblique Illumination Control Mode

(Table 2-8 Continued)	
Display Object	**Description**
Illumination Intensity Increase Button	Increases illumination intensity in 5% increments. **<u>Illumination Control Mode Button</u>** Illumination increase is dependent on the Illumination Control Mode Button selection: **COAX = Coaxial Illumination Control Mode** Increase Coaxial illumination whether Coaxial LED is on or off. **OBLIQ = Oblique Illumination Control Mode** Increase Oblique illumination whether Oblique LED is on or off. **LIGHT = Concurrent Coaxial/Oblique Illumination Control Mode** 2. If both Coaxial and Oblique LEDs are both on or both off then increase both Coaxial and Oblique illumination while maintaining the Balance number. (The larger of the Coaxial/Oblique value is increased by 5%.). 3. If the Oblique LED was off in the Oblique Illumination Control Mode (OBLIQ) then increase only the Coaxial illumination. 4. If the Coaxial LED was off in the Coaxial Illumination Control Mode (COAX) then increase only the Oblique illumination. 5. Illumination Balance Control activation cancels the solo increase of Coaxial or Oblique illumination in 2 and 3.

(Table 2-8 Continued)	
Display Object	**Description**
Illumination Intensity Decrease Button	Decreases illumination intensity in 5% increments. **Illumination Control Mode Button** Illumination decrease is dependent on the Illumination Control Mode Button selection: **COAX = Coaxial Illumination Control Mode** Decrease Coaxial illumination whether Coaxial LED is on or off. **OBLIQ = Oblique Illumination Control Mode** Decrease Oblique illumination whether Oblique LED is on or off. **LIGHT = Concurrent Coaxial/Oblique Illumination Control Mode** 1. If both Coaxial and Oblique LEDs are both on or both off then decrease both Coaxial and Oblique illumination while maintaining the Balance number. (The larger of the Coaxial/Oblique value is decreased by 5%.) 2. If the Oblique LED was off in the Oblique Illumination Control Mode (OBLIQ) then decrease only the Coaxial illumination. 3. If the Coaxial LED was off in the Coaxial Illumination Control Mode (COAX) then decrease only the Oblique illumination. 4. Illumination Balance Control activation cancels the solo decrease of Coaxial or Oblique illumination in 2 and 3.
Coaxial Illumination Intensity Numeric Readout	Prefixed with a C for Coaxial Displays Coaxial illumination intensity as a percentage. When Coaxial illumination is on the numeric readout is white. When Coaxial illumination is off the numeric readout is gray.
Oblique Illumination Intensity Numeric Readout	Prefixed with an O for Oblique Displays Oblique illumination intensity as a percentage. When Oblique illumination is on the numeric readout is white. When Oblique illumination is off the numeric readout is gray.

(Table 2-8 Continued)	
Display Object	**Description**
Illumination Intensity Bar Readout	The number of bars illuminated is indicative of the illumination intensity setting at approximately 5% per bar. When illumination is off none of the bars are illuminated. Illumination Control Mode Button Illumination readout is dependent on the Illumination Control Mode Button selection: **COAX = Coaxial Illumination Control Mode** Display Coaxial illumination intensity. **OBLIQ = Oblique Illumination Control Mode** Display Oblique illumination intensity. **LIGHT = Concurrent Coaxial/Oblique Illumination Control Mode** Display the larger of Coaxial or Oblique illumination intensity.
Illumination ON/OFF Button	Toggles illumination on and off. Illumination Control Mode Button Illumination toggle is dependent on the Illumination Control Mode Button selection: **COAX = Coaxial Illumination Control Mode** Toggle Coaxial illumination on and off. **OBLIQ = Oblique Illumination Control Mode** Toggle Oblique illumination on and off. **LIGHT = Concurrent Coaxial/Oblique Illumination Control Mode** 1. If both Coaxial and Oblique LEDs are both on or both off then toggle both Coaxial and Oblique illumination. 2. If the Oblique LED was off in Oblique Illumination Control Mode (OBLIQ) then toggle only the Coaxial illumination. 3. If the Coaxial LED was off in Coaxial Illumination Control Mode (COAX) then toggle only the Oblique illumination. 4. Illumination Balance Control activation cancels the solo toggle of Coaxial or Oblique illumination in 2 and 3.

(Table 2-8 Continued)	
Display Object	**Description**
Illumination Balance Control	The Illumination Balance Control comprises the Coaxial Balance Button, the Oblique Balance Button, Balance Slider, Balance Track Bar, and Balance Value Readout. **Balance and Illumination** • The center of the position setting of the Illumination Balance Control provides equal values of Coaxial and Oblique illumination and is set to equalize to the largest of either value. • Moving to the right of center decreases Coaxial illumination. • Moving to the left of center decrease Oblique illumination. **Illumination Control Mode Button** The Illumination Balance Control is dependent on the Illumination Control Mode Button selection: **COAX = Coaxial Illumination Control Mode** Illumination Balance Control is grayed out and does not allow user input. The Balance Slider position and Balance Value Readout reflect the Balance value as the Coaxial illumination is increased or decreased. **OBLIQ = Oblique Illumination Control Mode** Illumination Balance Control is grayed out and does not allow user input. The Balance Slider position and Balance Value Readout reflect the Balance value as the Oblique illumination is increased or decreased. **LIGHT = Concurrent Coaxial/Oblique Illumination Control Mode** Illumination Balance Control is active and allows user input.
Coaxial Balance Button	Adjusts the Balance value by -5 until the limit of -100 is reached.
Oblique Balance Button	Adjusts the Balance value by +5 until the limit of +100 is reached.

(Table 2-8 Continued)	
Display Object	**Description**
Balance Slider	The position of the Balance Slider reflects the Balance value: Center = 0 Left Limit = -100 Right Limit = +100 The Balance Slider can be dragged to adjust the Balance value in increments of 5.
Balance Track Bar	The Balance Track Bar represents the selection range of the Balance values between -100 and +100 with 0 at the center. When the Illumination Balance Control is active, then tapping on the Balance Track Bar moves the Balance Slider to the tapped position and sets the corresponding Balance value.
Balance Value Readout	Displays the Balance value in the range of -100 to +100.
Focus Reset Button	When pressed, resets the microscope focus to the Current Doctor's value set in the Doctor Settings Dialog – General Tab.
Focus Position Bar Readout	The number of bars illuminated is indicative of the focus position setting at 10% per bar. The focus position setting range, the vertical height of the microscope, is from -100% to +100%.
Footswitch Button	Displays the Doctor Settings Dialog with the Footswitch Tab open.
Footswitch Battery Charge Status Indicator	Displays the footswitch battery charge status.
Magnification Reset Button	When pressed, resets the magnification to the doctor's programmed settings.
Magnification Readout	Displays the true magnification value viewed by the doctor through the microscope.
Wireless Connectivity Indicator	Displays wireless connection status to the *Centurion*™ surgical system: off, paired, and connected.
Light Preset Button	Cycles through each of three saved settings of Coaxial and Oblique illumination: • Default • Preset 1 • Preset 2

(Table 2-8 Continued)	
Display Object	**Description**
Light Preset Readout	After pressing the Light Preset Button, displays the name of the selected preset for 5 seconds: “Default” “Preset 1” “Preset 2”
Reset All Button	Resets the illumination intensity, zoom (magnification), and focus to the Current Doctor’s default programmed settings in the Doctor Settings Dialog – General Tab. Resets the X-Y position (green dot on the X-Y Target Reset Control moves to the center position). Turns off the LED illumination if Doctor Setting Light Off on System Reset is set to Yes.
X-Y Target Reset Control	The X-Y Target Reset Control tracks the X-Y movement with a green dot. Pressing the X-Y Target Reset Control resets the microscope and green dot to the center position.
Panel PC Brightness Control Pop-up Button	When pressed, brings up the Panel PC Brightness Control. Selection State: This button is displayed and active when the Panel PC Brightness Control is not being displayed and any Panel PC Menu or Dialog is not being displayed. This button is displayed (fully or partially) but not active when any Panel PC Menu or Dialog is being displayed.
Panel PC Brightness Control	The Panel PC Brightness Control comprises the Panel PC Brightness Increase Button, the Panel PC Brightness Decrease Button, and the Panel PC Brightness Bar Readout which reflects the current Panel PC Brightness. Selection State: Panel PC Brightness Control is displayed and active for 5 seconds. The 5 seconds start again if the user presses the Increase or Decrease buttons on the Control. Pressing in a blank area on the Panel PC Surgery Screen results in removal of the Control from the display. This Control remains displayed (fully or partially and still limited to 5 seconds) but not active when any Panel PC Menu or Dialog is being displayed.
Panel PC Brightness Increase Button	Increases the Panel PC display brightness in 10% increments. Note that Panel PC display brightness is nonlinear.
Panel PC Brightness Decrease Button	Decreases the Panel PC display brightness in 10% increments. Note that Panel PC display brightness is nonlinear and minimum Panel PC display brightness is 10%.

(Table 2-8 Continued)	
Display Object	**Description**
Panel PC Brightness Bar Readout	The number of bars illuminated is indicative of the Panel PC display brightness.

Fault Screen

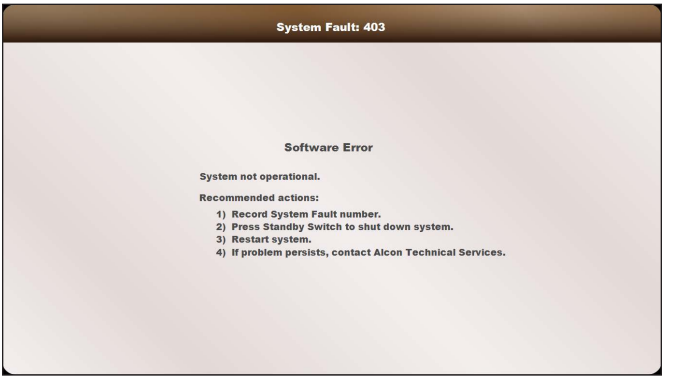


Figure 2–22 Fault Screen

The Fault Screen Title displays the System Fault Code, Figure 2–8 on page 2.8. The Body of the Fault Screen displays the name of the fault and the recommended actions.

When a video camera is installed and enabled, camera live video from an internal camera or external video source can be viewed in the lower-left corner of the Primary Control Panel.

Live video is enabled in the MENU/System Settings/General tab. Live video can also be displayed on an external monitor connected via the HD Out connector on the Primary Control Panel. For best performance the HD cable should be no longer than 20 feet.

WARNING!

It is normal for the Primary Control Panel to be very warm to the touch. The Host Module generates heat, and it is located inside the Primary Control Panel.

Current Doctor

To select a Surgeon with all of his preferences, press the Current Doctor button at the top of the screen. A list of Doctors appears *(Figure 2–23)* Select a doctor name on the list and press its button. The Main screen reappears with all the doctor's preferred settings. Doctors can be added and removed via the MENU/Manage Doctors feature.

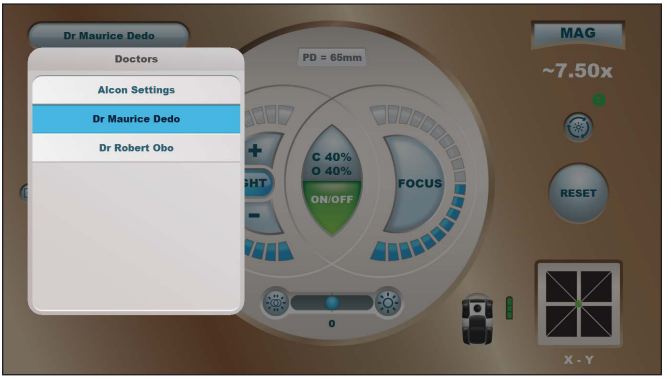


Figure 2–23 The Doctors List

Select a doctor name on the list and press its button. The Main screen reappears with the new doctor and his preferred settings.

General Warning

This yellow triangular button appears on the left side of the main screen and Libero when an issue occurs that can affect the performance of the microscope. Press the button on the main screen to read an explanatory message. Press the red X button to return to the main screen.

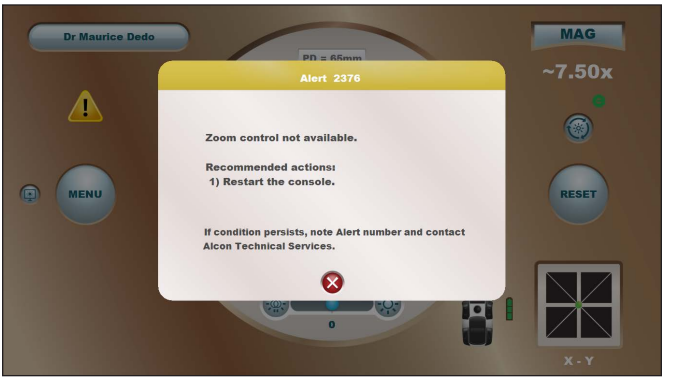


Figure 2–24 General Warning

This dialog tells the user of an issue that can affect the performance of the microscope.

MAG (Magnification)

This readout shows the true magnification viewed by the doctor through the microscope. The true magnification depends on the eyepiece, binocular, and lens objective in the LuxOR Revalia™ (LX3 LED) microscope, and the Zoom setting chosen by the doctor. Pressing this button resets magnification to the doctor's programmed settings. See,"Menu/Doctor Settings Optics Tab" on page 2.32 of the manual.

Wireless Connection to *Centurion*™ System

When this green icon appears it indicates that a *Centurion*™ Vision System is connected wirelessly to the LuxOR Revalia™ (LX3 LED) microscope. When a *Centurion*™ system is not connected wirelessly to the (LX3 LED), a black/gray wireless icon is in this place.

Focus

Pressing this button resets focus to the doctor's programmed settings.

Reset

Pressing the RESET button restores LuxOR Revalia™ (LX3 LED) microscope settings to the doctor's programmed settings (Light Intensity, X-Y, Focus, Zoom magnification).

X-Y Target

Through the course of a surgery the microscope may be moved in the X-Y horizontal plane with the footswitch joystick or MENU/Controls dialog. The X-Y target tracks this movement with a green dot. Pressing the X-Y target button resets the microscope and green dot to the center position.

Pupillary Distance

This is a readout in millimeters of the current doctor's pupillary distance (PD). This readout is set in the MENU/Doctor Settings/Optics tab.

Footswitch

Pressing this button brings up the dialog for Doctor Settings/General/Footswitch tab *(Figure 2–29)*.

Screen Brightness

Pressing this button brings up a light bar that can be adjusted up and down to increase and decrease the Primary Control Panel brightness. If no adjustments are made the light bar will collapse five seconds after appearing, or five seconds after its last adjustment.

Custom Menu

Pressing the MENU button brings up the Custom menu of selections that the user can pick to affect the operation of the microscope *(Figure 2–25)*.

- Doctor Settings - This is where the user can set all of the user preferences for the current doctor (General, Optics, Footswitch, Display and Reset). The settings cannot be changed when the current doctor is Alcon Settings. Attempting to save changes made in Alcon Settings prompts user to create a new doctor; otherwise, select or create a new doctor by pressing Manage Doctors and make changes to the new doctor.
- System Settings - The Camera and Verion are enabled (Installed) and disabled (Not Installed) in this screen.
- Manage Doctors - The user can add and remove doctors on this screen.
- Wireless Settings - Select Wireless Settings to set up the LX3 wireless Footswitch to communicate with the LX3 microscope, and for the microscope to communicate wirelessly with the *Centurion™* system.
- Controls - The user can use this control panel to make real-time adjustments to the microscope's viewing settings.
- View Events - The View Events dialog lists the date/time of events that may have compromised the performance of the LuxOR Revalia™ (LX3 LED) microscope.
- About - System software and hardware used in the microscope, along with its serial number and date of manufacture, are listed here.
- Shutdown - Open this window to safely turn off system power.

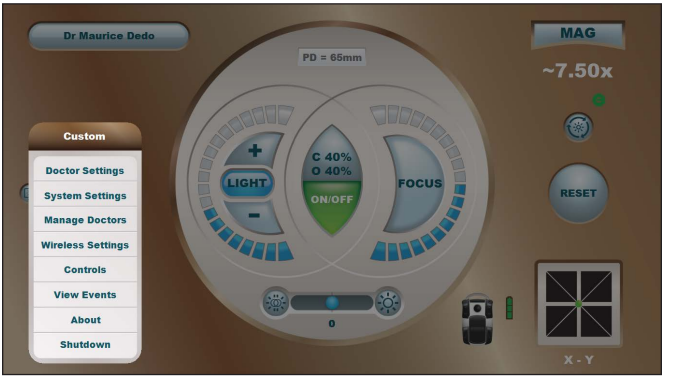


Figure 2–25 The Custom Menu

Pressing the MENU button brings up the Custom menu where the user can select items of interest that will affect the operation of the microscope, gain information about the microscope, and shut down the microscope.

Menu / Doctor Settings

The top selection in the Custom menu is Doctor Settings. Pressing the Doctor Settings button brings up the Doctor Settings/General tab dialog *(Figure 2–26)*. In addition, the Optics, Footswitch, Display, and Reset tabs can be selected from this dialog *(Figure 2–27)* and *(Figure 2–29)*. All of these doctor settings will be applied to the current doctor (except for Alcon Settings), and will become the doctor's default settings upon pressing the green check button.

Menu / Doctor Settings / General Tab

Opening this tab allows the user to set new default settings, except when current doctor is Alcon Settings. Making changes and then pressing the green check button stores the new default settings. If Alcon Settings is the selected doctor, pressing the green check button causes the Save Doctor As dialog to appear; the user can save the new default settings with a new doctor name. Light, Focus, and Zoom doctor settings are applied immediately after accepting changes.

- Light - The user can set the doctor's preferred illumination brightness with the Light adjustment, from 5% to 100%.
- Focus - The Focus adjustment is used to adjust focal clarity by changing the vertical height of the microscope, from 100% to –100%.
- Zoom - This setting determines the amount of zoom the doctor prefers when performing surgery. The Zoom setting does not affect focus.
- Focus Speed - Motor speed setting when adjusting focus.
- Zoom Speed - Motor speed setting when adjusting zoom.
- XY Speed - Motor speed setting when adjusting XY position.

Figure 2–26 Doctor Settings - General Tab

If Alcon Settings is the selected doctor, pressing the green check button causes the Save Doctor As dialog to appear; the user can save the new default settings with a new doctor name.

Menu/Doctor Settings Optics Tab

Selecting the Optics tab opens a screen where the user identifies the type of Eye Piece, Binocular, Lens Objective, and Camera Scene used in the microscope. These settings, along with the Magnification Coefficient, are used to calculate true magnification (for reference only). The Camera Scene setting can be toggled between Anterior and Posterior. Also, the current doctor's Pupillary Distance (PD) is input here and is displayed at the top of the Main screen.

Figure 2–27 Doctor Settings - Optics Tab

The true magnification (**M**) viewed by the doctor through the microscope and shown in the upper-right corner of the display screen (MAG, shown as an approximation (~) on the Primary Control Panel, but not on the small LIBERO-XY™ display screen), is derived through the formula **$M = f_t / f_o \times M_e \times A$**

Where: f_t - Focal length of binocular tube (f=180mm)
f_o - Focal length of objective lens (f=240mm [typically 175+65])
M_e - Magnifying power of eyepiece (typically 10x)
A - Magnification coefficient on body of scope (typically 1)

Thus: **$M = 180/240 \times 10 \times 1$**
$M = 7.5x$

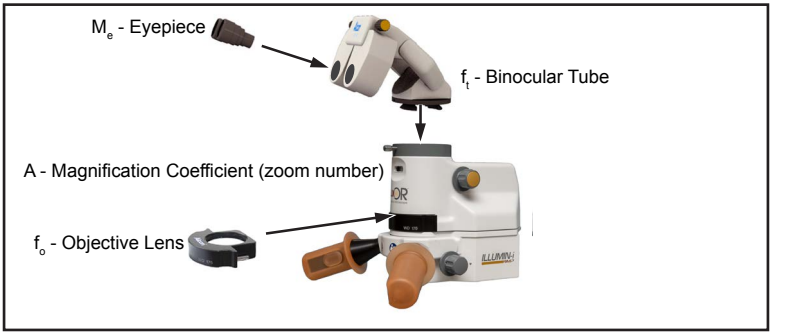


Figure 2–28 Formula **$M = f_t / f_o \times M_e \times A$**

Menu / Doctor Settings / Footswitch Tab

The footswitch contains twelve control switches. The current doctor can change the function of each switch for personal preference by pressing the number of the switch to be changed and selecting the desired function from a dialog that appears; press the green check button to accept the change.

Figure 2–29 Doctor Settings - Footswitch Tab

Menu / Doctor Settings / Display Tab

This tab allows the user to set the default display brightness of the Primary Control Panel and LIBERO-XY.

- Panel Brightness – The user can set the doctor's preferred Primary
- Control Panel brightness from 10% to 100%
- Libero Brightness – The user can set the doctor's preferred Libero brightness from 5% to 100%

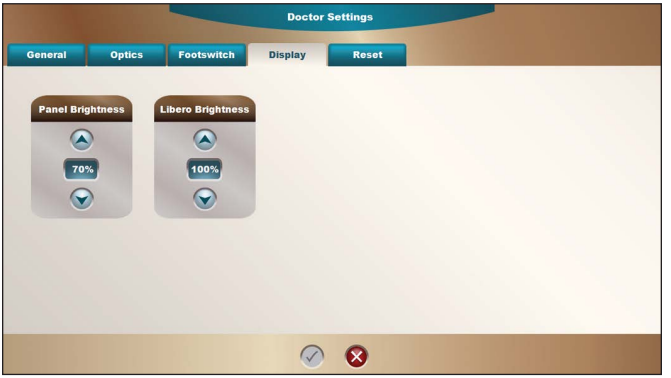


Figure 2–30 Doctor Settings - Display Tab

Menu / Doctor Settings / Reset Tab

On this tab, the user can configure whether the Light turns OFF or not when RESET is executed.

- Yes – Light turns off when RESET is executed.
- No – Light does not turn off and the light intensity is reset to the default value when RESET is executed.

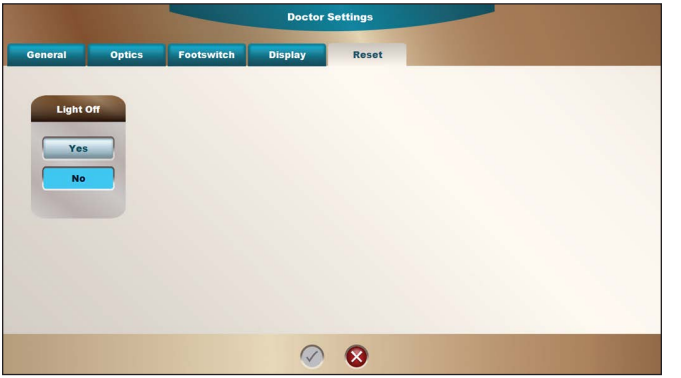


Figure 2–31 Doctor Settings - Reset Tab

Menu / System Settings / General Tab

The second selection in the Custom menu is System Settings. Pressing the System Settings button brings up the System Settings/General tab dialog *(Figure 2–32)*. The user can set the local Date and Time by pressing the Change button. A dialog appears where the settings can be changed to the local date and time. If a VideOverlay system is connected to the microscope, a Video Overlay ON/OFF button is pressed to enable or disable the VideOverlay feature. Upon installation, the Camera can be enabled by pressing the Installed button; the Camera Model dialog appears where the user can select the camera being used *(Figure 2–33)*.

Figure 2–32 System Settings - General Tab

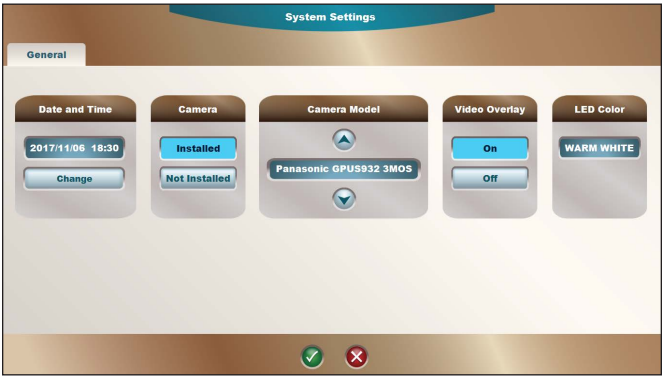


Figure 2–33 System Settings - General Tab/Camera Settings.

Pressing the Camera/Installed button brings up the Camera Model dialog where the installed camera can be selected with the up/down buttons. LED color dialog displays the LED Module currently installed in the system.

Menu / Manage Doctors

The user can add, rename, remove, back up, and restore doctors on the Manage Doctors dialog screen, accessed by pressing the MENU button and selecting *Manage Doctors*. When done with any of these procedures, press the red X button to return the main screen.

To create a new doctor name, press the *New Doctor* button. A keyboard appears where the user can type a new doctor name, then press the green check button to confirm. The LuxOR Revalia™ (LX3 LED) can support up to 200 doctor names.

To copy an existing doctor, select the name of the doctor to be copied and press *Copy Doctor* button. A keyboard appears where the user can type a new doctor name, then press the green check button to confirm.

To rename a doctor, press the name of the doctor to be changed and press the *Rename Doctor* button. A keyboard appears where the user can type the doctor's new name, then press the green check button to confirm.

To remove a doctor, select the name of the doctor to be removed and press the *Delete Doctor* button. A confirmation dialog appears; press the green check button to confirm the permanent deletion.

The Backup Doctors and Restore Doctors features require that a USB NTFS memory stick be inserted into the Primary Control Panel's USB connector.

To back up doctors from the LuxOR Revalia™ (LX3 LED) to a memory stick, press the *Backup Doctors* button; the Backup Doctors dialog appears. Press the *Backup All Doctors* button to save them all, or select one doctor name and press the *Backup Doctor* button. Press the red X button to return the Manage Doctors dialog screen.

To restore doctors to the LuxOR Revalia™ (LX3 LED) from a memory stick, press the *Restore Doctors* button; the Restore Doctors dialog screen appears with the memory stick's available doctors. Press the *Restore All Doctors* button to save them all, or select one doctor name and press the *Restore Doctor* button. Press the red X button to return the Manage Doctors screen.

Figure 2–34 Manage Doctors Dialog Screen

Menu/Wireless Settings

The Wireless Settings dialog is used to select settings that allow the LX3 wireless footswitch to communicate to the microscope, and the microscope to communicate wirelessly with the *Centurion*™ system. Note that after settings are changed, the wireless footswitch must be paired again.

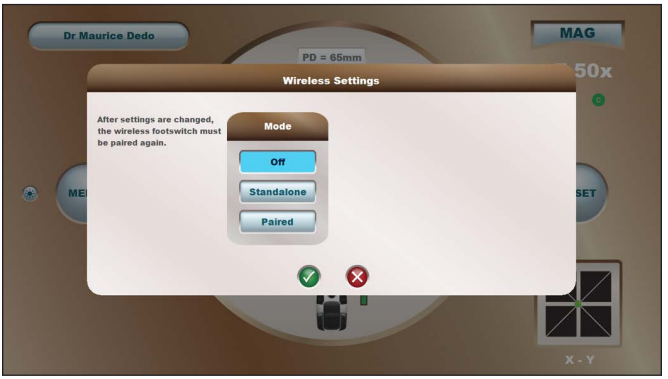


Figure 2–35 Wireless Settings Dialog

This dialog appears when the Mode selection is turned Off. The Channel and Region selections appear when Standalone is pressed *(Figure 2–36)*. When Paired is selected, the Pair with *Centurion*™ button occupies that space.

- Mode - These three Mode selections determine whether or not the microscope will be operated wirelessly.
  - OFF means that the footswitch will be tethered to the microscope with a cable, and no functions of the microscope will be operated wirelessly.
  - Standalone allows the user to set up the footswitch to operate wirelessly. The wireless footswitch must be selected before pairing the microscope with the *Centurion™* system.
  - Pressing Paired allows the user to set up the microscope to communicate wirelessly with the *Centurion™* system. To open wireless communication with the *Centurion™* system, press the Paired button, then press the Pair with *Centurion™* button. The Pairing dialog appears indicating that the user must "Complete the pairing procedure for *Centurion™* ." This dialog must remain while pairing is done on the *Centurion™* system.

Item	Off	Standalone	Paired
Tethered Footswitch	x	-	-
Wireless Footswitch	-	x	-
Wireless Microscope Communications	-	x	x

Figure 2–36 Wireless Settings Dialog

When the Standalone Mode button is selected, the Channel selection appears. The Channel and Region wireless settings only appear when the Standalone Mode is elected.

- *Channel* - Used to adjust the channel value up or down to select the best wireless signal quality in the operating room. The recommended channels are either E, O, or J because those frequencies are not typically used by other wireless devices. Hang the footswitch on the microscope's hanger when selecting the best channel.
- While searching for the best channel, the quality of each wireless signal is indicated with a bar graph of zero to five vertical bars, increasing in height, and color of the bars. Up to five green bars indicates high quality, and only a few yellow bars indicates low quality. Note that the channel quality indication is only displayed while searching for an alternate channel. The bar graph will disappear when the new channel has been saved by pressing the green check mark at bottom of dialog. This pairs the footswitch with the LuxOR Revalia™ (LX3 LED) microscope.
- Region - The Region setting establishes the transmit power level associated with a particular region (Japan, North America, World). The recommended region is Japan. (Japan is the weakest transmit power level and, thus, the least disruptive to other wireless equipment in the clinic.)

NOTE: The Region setting establishes the transmit power level associated with a particular region and should not be changed once established for the region of use. Please contact your Alcon Technical Service Representative for information regarding applicable restrictions.

Menu / Controls

This menu selection allows the user to perform many of the microscope adjustments normally done with the footswitch. In the case of a footswitch failure, the primary functions of the microscope can be controlled from this screen. If camera is installed on microscope, and MENU/System Settings/General/Camera is set to *Installed*, the *White Balance* button can be used prior to surgery to set the proper white balance for the Camera Scene chosen (Anterior or Posterior). If installed, the *Inverter ON/OFF* button is pressed to enable/disable the image inverter.

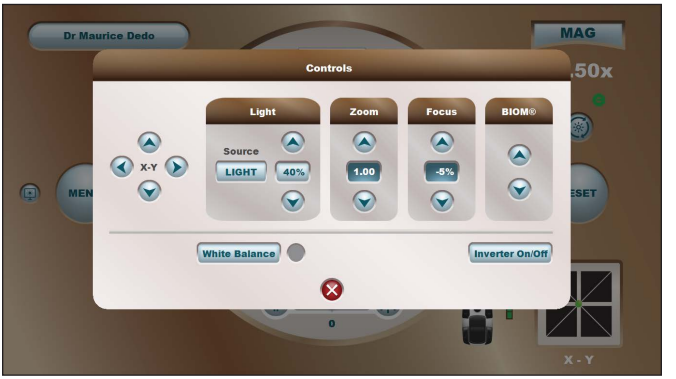


Figure 2–37 Controls Dialog

Menu / View Events

The View Events dialog lists the date/time of events that may have compromised the performance of the LuxOR Revalia™ (LX3 LED) microscope. This list of events can be helpful when speaking with an Alcon support representative. This dialog appears when the Menu/View Events button is pressed.

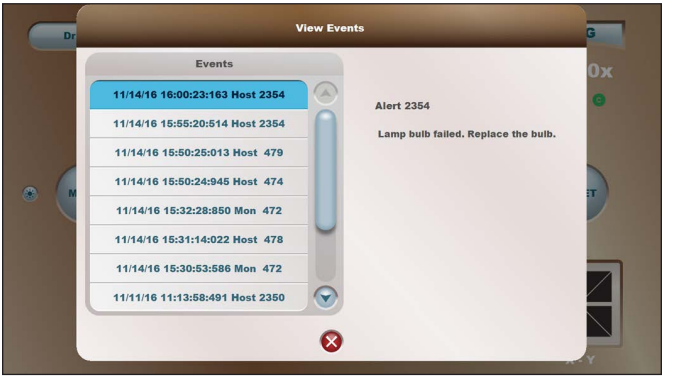


Figure 2–38 View Events Dialog

Menu / About

System software and hardware used in the microscope, along with its serial number and date of manufacture, are listed here. Press the Patents button to see Alcon patents on this product.

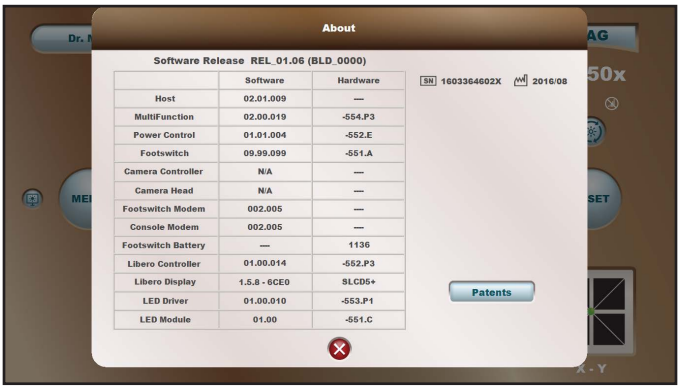


Figure 2–39 About Dialog

Menu / Shutdown

Open this window to safely turn system power OFF. Stop video recording, if in progress, before turning system power OFF. The user can press the red X button to cancel the shutdown and return to the main screen; or press the green check button to put the system into sleep mode, and turn the main power switch OFF to shut down the system.

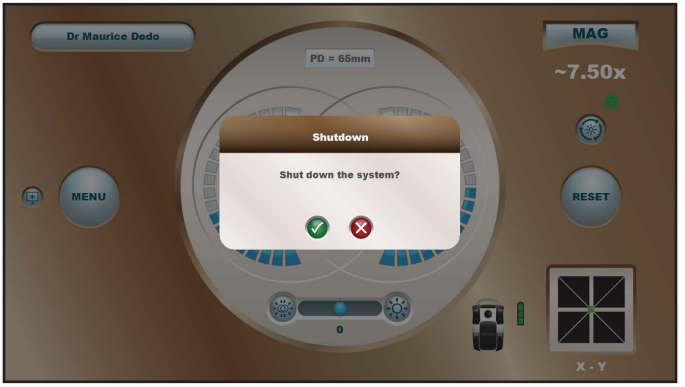


Figure 2–40 Shutdown Dialog

Light ON/OFF and Light Intensity

In the center of the main screen is the Light ON/OFF button *(Figure 2–41)*When the illuminator light on the ILLUMIN-i™ Technology is ON, the green LIGHT Intensity bars are illuminated and the light intensity % readout is white. The number of blue bars illuminated is indicative of the light intensity setting.

When the illuminator light on the ILLUMIN-i™ Technology is OFF, none of the green LIGHT Intensity bars are illuminated, and the light intensity % readout on the Primary Control Panel is gray. The light intensity % readout on the LIBERO-XY™ Communication System remains white, but displays 0% until turned on again when it returns to its last-used setting.

With the illuminator turned ON, pressing the + and – LIGHT Intensity buttons increases and decreases the light intensity in %5 increments. Pressing and holding one of the buttons rapidly increases or decreases the intensity.

If the lamp bulb or LED fails, is missing, or is not properly set into its port, the yellow General Warning button appears. Pressing the button brings up Alert 2354: Lamp bulb or LED failed. Replace the bulb.

Figure 2–41 Light Intensity

The illuminator is turned OFF in the left image, turned on at 5% intensity in the middle image, and turned ON at 65% intensity in the right image. The level of intensity is indicated by the number of blue bars illuminated in the left half of each image.

WARNING!

Prolonged exposure to the microscope light may be harmful to the eye. The maximum safe eye exposure at maximum level of illumination is 32 minutes. This time is cumulative. If the total eye exposure to light during surgery is expected to exceed 32 minutes, the light level should be reduced commensurately during the surgery. The light intensity percentage (%) readout on the display is for reference only.

Focus Setting

In the center of the main screen is the FOCUS button *(Figure 2–42)*. Focus can be set using the footswitch or pressing the buttons in the MENU/Controls dialog. The blue bars displayed indicate the relative position of focus; there is no percentage readout for the setting. Pressing the FOCUS button returns the microscope to the default focus setting for the current doctor.

Figure 2–42 Focus Setting

The focus setting is indicated by the number of blue bars illuminated in the right half of each image. The focus is set at -80% in the left image, 0% in the middle image, and 80% in the right image.

External Monitor

An external monitor can be connected to the HD port located on the Primary Control Panel. For best video performance, the HD cable should be no longer than 20 feet. Live video, along with the video overlay (if enabled), is displayed on the external monitor with a resolution of up to 1080p. When in Playback mode, video is not displayed on the external monitor.

NOTE: The external monitor must be plugged in and powered on before the LuxOR Revalia™ (LX3 LED) console is powered on; hot plugging is not recommended.

The following Monitor Configuration recommendations must be followed when connecting an external monitor to the HD Out connector on the Primary Control Panel.

Notes on Monitor Configuration

- Source Detection/Auto Source/Auto Input: Some monitors have a feature whereupon loss of input signal they automatically scan for a signal on all inputs. This feature must be disabled and the monitor configured such that when input signal is lost the monitor remains at the correct HD input. If this feature can't be disabled, and the console is powered on while the monitor is scanning for signal, the console may freeze at the power up screen (Alcon logo on a black background). In this scenario the console should be powered OFF using the Standby button and the user should wait for the monitor to stop scanning inputs (most monitors enter a power saving mode or turn OFF after a few scans). The console should then be powered on. In most situations during console boot up the monitor will turn on by itself. An alternate solution would be to use a different model or brand of monitor where this feature can be disabled.
- No Signal Power OFF: Some monitors have a feature whereupon loss of signal, after a configurable or fixed duration, the monitor either turns OFF or enters a power saving mode. This feature must be disabled and the monitor configured so that it remains turned on when the input signal is lost.
- Sleep Timer/OFF Timer/Auto Power OFF: Some monitors have a feature where after some time, either due to inactivity or unconditionally, the monitor powers off. This feature must be disabled so the monitor remains turned on until manually powered OFF.

The following power up sequence for the external monitor must be followed. If not powered up as written, the LuxOR Revalia™ (LX3 LED) console may not power up correctly, or the monitor may not function as expected.

Recommended Power up Sequence for External Monitor

1. First turn on the external monitor and ensure that it is set, and remains on the correct HD input.
2. After the external monitor has powered ON, turn ON the console.
3. Once the console is powered on, do not turn OFF the external monitor or remove and/or connect the HD cable; i.e., no hot-plugging. The console must be powered OFF first.

   3.1 Turn ON external monitor, then turn on console

   3.2 Turn OFF console, then turn OFF external monitor

Internal Camera

LuxOR Revalia™ (LX3 LED) microscopes configured with an internal camera support camera settings optimized for specific types of surgery. This can be set in the Doctor Settings/Optics tab. Set Camera Scene to Anterior or Posterior, then set the white balance (internal cameras only). Detailed instructions to calibrate white balance are in Section Nine of this manual (MENU/Controls).

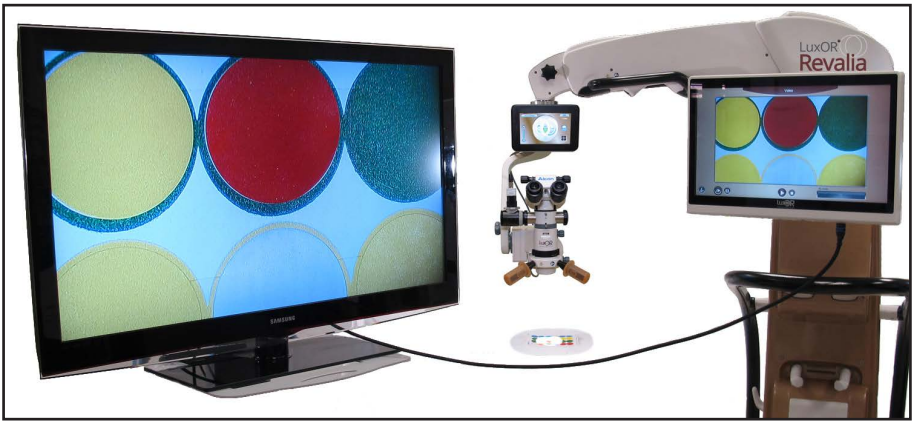


Figure 2–43 Internal Camera Configured With External Monitor

For an external monitor an HD cable must be connected between the Primary Control Panel and the monitor.

Internal and External Cameras and Monitors

The internal camera is an upgrade installed by Alcon tech service. There are two options: 1MOS and 3MOS.

The same camera with a different catalog number can be installed as an external video system by the user.

The cameras can be connected to an external monitor or to the Primary Control Panel *(Figure 2–44)*.

When an external monitor is connected to the Primary Control Panel with an HD cable, the physical construction of the HD cable is extremely important.

- HD cable lengths up to 20 feet require a minimum of 26 AWG conductors.
- HD cable lengths greater than 20 feet require a minimum of 24 AWG conductors (22 AWG preferred).
- HD boosters/equalizers can increase transmission distances up to maximum 35 feet (15-20 foot HD cable from the source to the booster/equalizer, and then run another 15-20 foot cable from the booster/equalizer to the display.

The configuration must be tested at the site to ensure suitable performance.

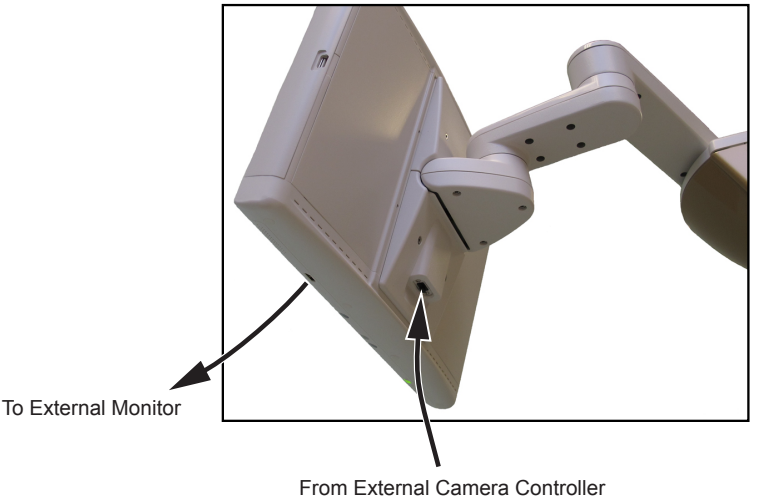


Figure 2–44 External Camera Controller to External Monitor Cable Connections.

SECTION THREE - OPERATING INSTRUCTIONS

This section gives instructions to set up the LuxOR Revalia™ (LX3 LED) system for use. In this section you will learn to set up each user's preferences and prepare for surgery. Instructions are also included to set up the articulating arm.

Setting Up the LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope

1. Verify all cables, binoculars, and accessories are properly attached to the LuxOR Revalia™ (LX3 LED) Ophthalmic Microscope.

CAUTION

Every time a new piece of equipment is added and cables are connected to the LX3 system, the system needs to be powered down prior to cable addition, and then powered back up.

2. Plug power cord into LX3 floor stand and into a grounded power source.
3. Remove the footswitch from floor stand hanger and gently place on floor. If using the LX3 Footswitch in wired configuration, connect it to LX3 floor stand with the provided cable. For the LX3 Footswitch in wireless configuration, verify it is set on floor within wireless range and properly linked with the LuxOR Revalia™ (LX3 LED) system.

Figure 3–1 Initial Splash Screen

4. Press the ON/OFF switch at the base of the floor stand to initiate power to the LuxOR Revalia™ (LX3 LED) system.
5. Press the illuminated Standby button on the side of the LX3 floor stand. The button turns from red to green, the system begins its start up routine, and the splash screen appears, *(Figure 3–1)*.

After the boot up routine the system enters its last-used settings on the Main screen of the LX3 Primary Control Panel, *(Figure 3–2)*. An abbreviated Main screen appears on the LIBERO-XY™ Communication System, *(Figure 3–3)*. The system is now ready for use.

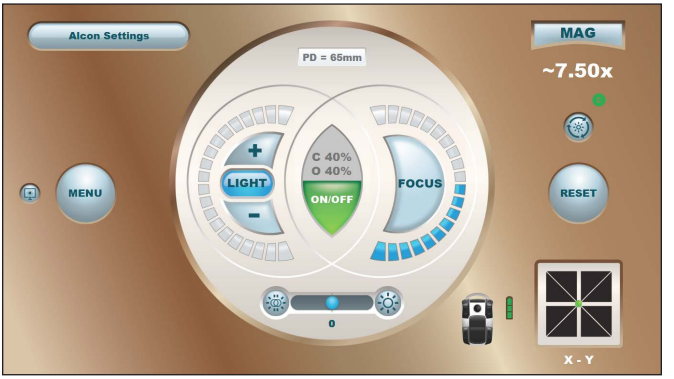


Figure 3–2 Main Screen on LX3 Primary Control Panel

Figure 3–3 Main Screen on LIBERO-XY™ Communication System

Using The Menu Button

1. **Menu** - On the LX3 Primary Control Panel, press the MENU button, *(Figure 3–2)*.The Custom menu appears in the lower-left corner, *(Figure 3–4)*.

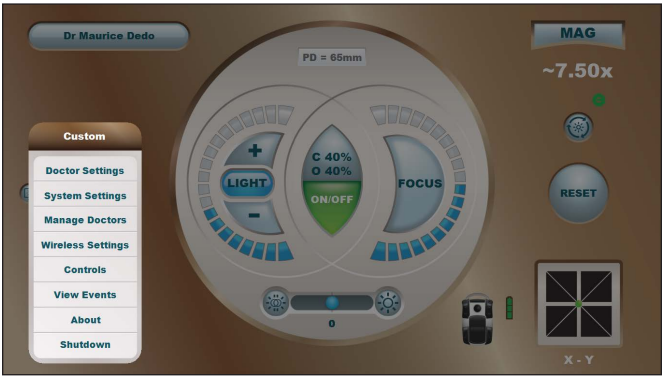


Figure 3–4 The Custom Menu

2. **Doctor Settings** - To access the current doctor's preferred settings, press the Doctor Settings button on the Custom menu, *(Figure 3–4)*. Select either the General Tab, *(Figure 3–5)* Optics Tab, *(Figure 3–6)* Footswitch Tab, *(Figure 3–7)* Display Tab, *(Figure 3–8)* or the Reset Tab, *(Figure 3–9)* and change the settings as desired, then press the green check button.

The system returns to the Main screen, and new settings for the current doctor will be activated the next time the doctor name is exited and re-entered.

Figure 3–5 Doctor Settings - General Tab

Figure 3–6 Doctor Settings - Optics Tab

Figure 3–7 Doctor Settings - Footswitch Tab

Figure 3–8 Doctor Settings - Display Tab

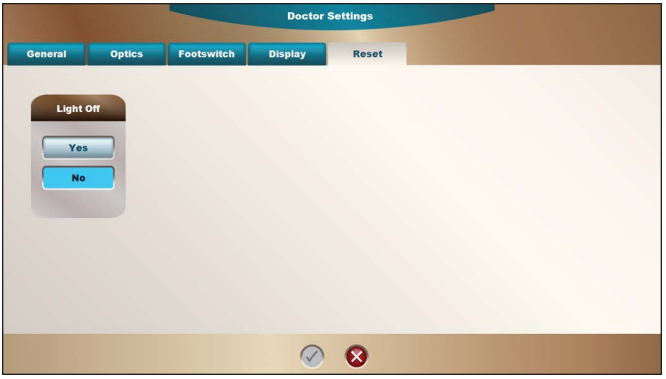


Figure 3–9 Doctor Settings - Reset Tab

3. **System Settings -** Use the MENU button, to access the System Settings button. The System Settings screen appears, *(Figure 3–10)*. The user can set the local Date and Time by pressing the Change button. A dialog appears where the settings can be changed to the local date and time. If a VideOverlay system is connected to the microscope, a Video Overlay ON/OFF button is pressed to enable or disable the VideOverlay feature.

Upon installation, the Camera can be enabled by pressing the Installed button; the Camera Model dialog appears where the user can select the camera being used, *(Figure 3–11)*.

Figure 3–10 System Settings - General Tab

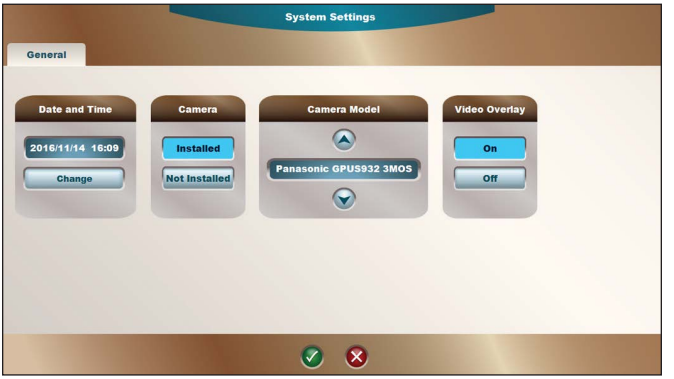


Figure 3–11 System Settings - General Tab/Camera Settings.

Pressing the Camera/Installed button brings up the Camera Model dialog where the installed camera can be selected with the up/down buttons.

4. **Manage Doctors -** Press Manage Doctors. The Manage Doctors dialog appears, *(Figure 3–12)*. The user can add, rename, and remove doctors on this screen. Doctors can also be backed up on, and restored from, a USB NTFS memory stick.
5. To copy an existing doctor, select the name of the doctor to be copied and press *Copy Doctor* button. A keyboard appears where the user can type a new doctor name, then press the green check button to confirm.
6. To create a new doctor name, on the Manage Doctors dialog press the New Doctor button. The keyboard appears to type the name of a new doctor, *(Figure 3–13)*.After typing the new doctor's name, press the green check button to return to the Main screen, *(Figure 3–14)*.

Figure 3–12 Manage Doctors Screen

Figure 3–13 Keyboard - New Doctor Name is Typed Into Text box

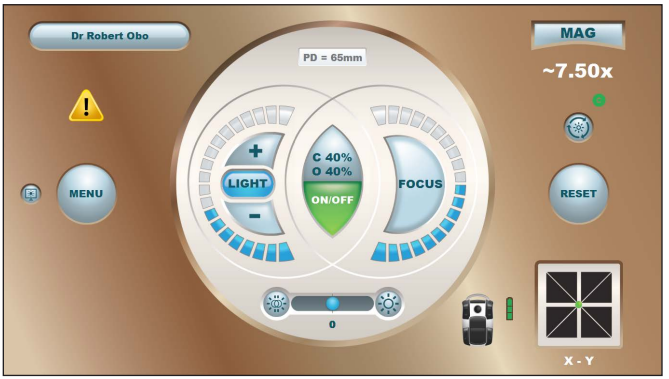


Figure 3–14 The Main Screen - Dr. Robert Obo Replaces Dr. Maurice Dedo

Video Overview

Alcon's LuxOR Revalia™ (LX3 LED) Microscope is capable of several video functions. It can display live video from an internal or external camera with video overlay from a *Centurion*™ surgical system. The surgery can be recorded onto a USB NTFS memory stick, and then the recorded video can be played back on the Primary Control Panel. The video can be displayed on a small or large (near full-screen) window. Live Video can be displayed on an external monitor via HD out.

1. **View Live Video** - To set up the microscope for video from an internal camera, press the MENU button, then select System Settings. Set Camera to Installed, then set Camera Model to Panasonic GPKH232 1MOS or Panasonic GPUS932 3MOS. Go back to Main screen. The screen now displays live video from an internal camera in a small window on the bottom-left corner of the display, *(Figure 3–15)*.
2. To set up the microscope for external video, press the MENU button, then select System Settings. Set Camera to Installed, then set Camera Model to Other (external). Go back to Main screen. The screen now displays live video from an external camera in a small window on the bottom-left corner of the display, *(Figure 3–15)*.

Figure 3–15 Live Video

The screen displays live video in a small window on the bottom-left corner of the display. Pressing the Expand button causes the image to fill the complete screen.

3. To view live video in a large format filling the screen, press the Expand button in the lower-right corner of the small display; the live video expands to fill the whole display, *(Figure 3–16)*.

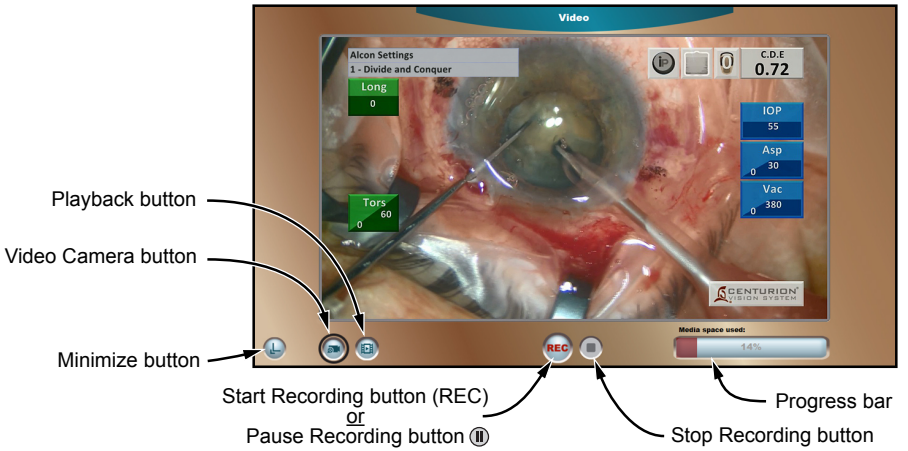


Figure 3–16 Live Video on Large Display

Pressing the Expand button on the small display window causes the live video to expand onto the whole display screen. Controls across the bottom of the screen are used to record the video onto a USB memory stick.

4. **Record Video onto NTFS-Formatted USB Memory Stick -** To save a video recording of the surgery, press the Video Camera icon button to begin the process, then insert a memory stick into the Primary Control Panel USB slot (8 GB minimum capacity). Based on the video content, 10 minutes of video uses approximately 1 GB of memory. Do not remove the memory stick while recording is in progress; loss of data or corruption of the memory stick may occur.

The recording screen has controls to start, pause, and stop recording, and a status bar indicating available space on the memory stick.

5. Press the *Start* button to start recording. Note that the button changes to pause and the Video Camera icon button turns red indicating that recording is in progress.
6. Return to the main screen by pressing the *Minimize* button in the lower-left corner. Note that a red circle is displayed in the lower-left corner of the small live video window to indicate recording is in progress.
7. Press the *Expand* button to display the recording window again. Recording can be paused and resumed as needed.
8. Press the *Stop Recording* icon button to stop recording; the Progress bar indicates progress of the video action. The file is saved when the *Stop Recording* button is pressed.

9. **Playback Recorded Video -**From the large video window press the Playback icon button to open the Playback screen, *(Figure 3–17)*. Videos recorded onto the memory stick are displayed in the right column. Select a video and press the Start button; the video is displayed on the screen and the Playback button icon turns blue. Controls are provided to Start, Pause, and Stop video playback, and to Reverse or move video Forward in 5% increments.

Double tapping the video display expands it to full screen. While in full screen playback mode, a single tap toggles between play and pause, and a double tap restores the video to normal size.

During playback the Progress bar shows progress through the video. Tap on the status bar to move to a desired location in the video.

Recorded videos on the memory stick can be renamed or deleted. Recorded videos can be viewed and edited on any computer with a media player/editor.

The LX3 provides the capability to overlay the *Centurion*™ system's surgical status in near-real time on live video. Follow instructions in the *Centurion*™ system and LX3 microscope operator's manuals to wirelessly pair the systems. To enable Video Overlay on the LX3, set Video Overlay to *On* in the System Settings dialog. The *Centurion*™ system's surgical status is now overlaid on the live video, and it will be included in the recorded video.

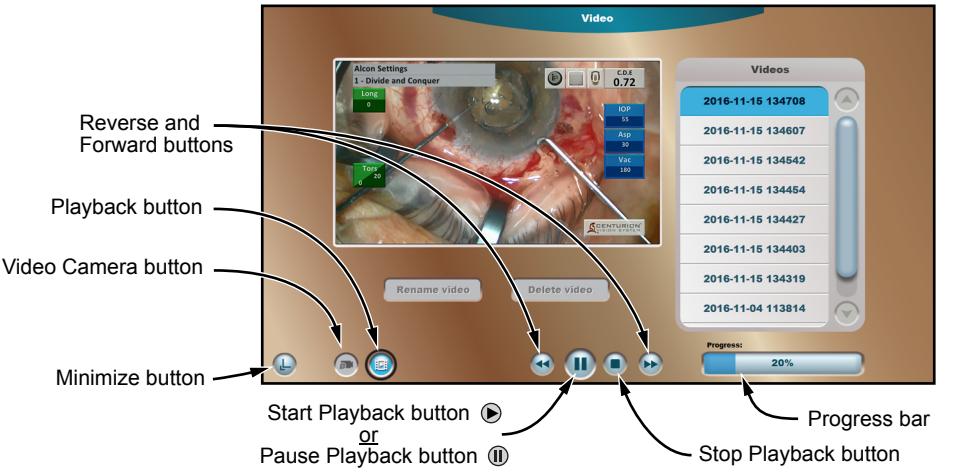


Figure 3–17 Video Playback

This window allows the user to play back recorded videos from a USB memory stick.

10. **Controls -** Press the MENU button, then the Controls button. The Controls dialog appears, *(Figure 3–18)*.

The user can use this control panel to make real-time adjustments to the microscope's viewing settings. These controls are also available through the footswitch's joystick and button switches. Press the red X button to exit the dialog and return to the Main screen.

NOTE: In the case of a footswitch failure, the primary functions of the microscope can be controlled from this screen.

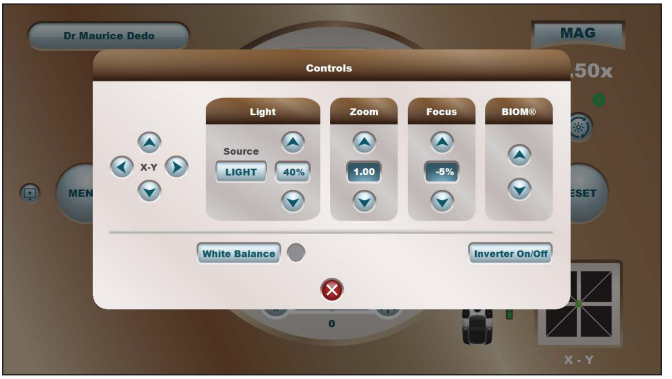


Figure 3–18 Controls Dialog

If camera is installed on microscope, and MENU/System Settings/General/Camera is set to *Installed*, the *White Balance* button can be used prior to surgery to set the proper white balance for the Camera Scene chosen (Anterior or Posterior).

Set White Balance

For more accurate rendition of colors in recorded video, a white balance calibration of the microscope's internal camera should be performed at the beginning of each day prior to surgery. White balance is adjusted based on ambient lighting, which can vary with the type of surgery performed (anterior or posterior). If both anterior and posterior surgeries are planned for the day, it is recommended to calibrate both of these scenes for each doctor scheduled for surgery.

1. Press the MENU button and then select *Doctor Settings*. Select the *Optics* tab and choose either Anterior or Posterior in the Camera Scene control. Save settings by pressing the green check button at the bottom of dialog.
2. Press the MENU button and select *Controls*.
3. Turn the LIGHT on and adjust its intensity to 50%. Place a pad of white gauze under the microscope and adjust its focus.
4. With a pad of gauze in the illuminated focal zone, press the *White Balance* button; the button turns gray while calibrating. White balance succeeds if the round indicator next to the button turns green. If it turns red, light intensity should be increased in increments of 5% and the process repeated until white balance calibration succeeds.

View Events

The View Events dialog lists the date/time of events that may have compromised the performance of the LX3 microscope. This list of events can be helpful when speaking with an Alcon support representative.

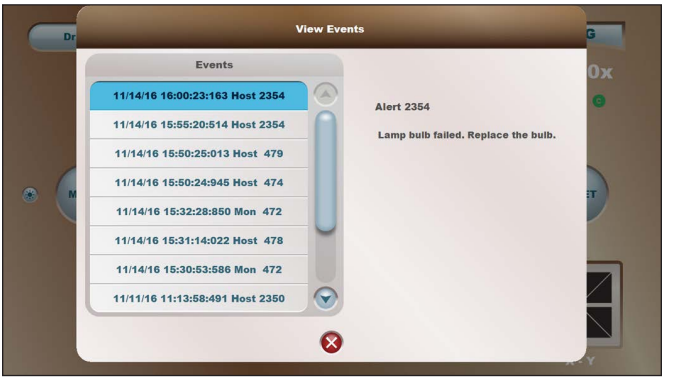


Figure 3–19 View Events Dialog

This dialog appears when the MENU/View Events button is pressed.

About

Access the About screen by, pressing the MENU button, then the About button. The About dialog appears, *(Figure 3–20)* System software and hardware used in the microscope, along with its serial number and date of manufacture, are listed here. Press the red X button to exit the dialog and return to the Main screen.

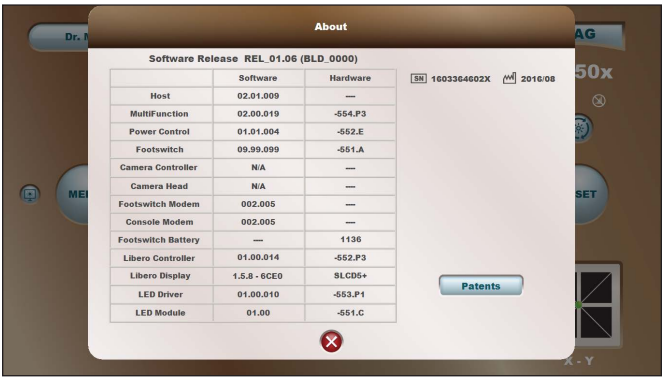


Figure 3–20 About

Shutdown

Access the Shutdown screen by, pressing the MENU button, then the Shutdown button. The Shutdown dialog appears, *(Figure 3–21)*. You can press the red X button to cancel the shutdown and return to the main screen; or you can press the green check button to put the system into sleep mode, then turn the main power switch OFF to shut down the system.

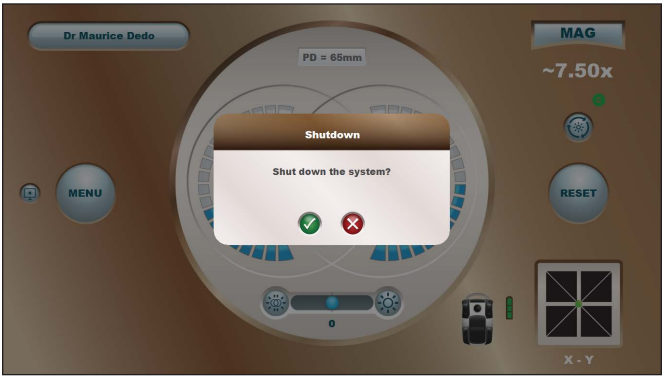


Figure 3–21 Shutdown

Prepare for Surgery

With system power turned OFF, perform the following.

- Make sure power cable is connected securely to the power receptacle.
- Make sure all component cables are properly connected and secure.
- Make sure the footswitch is properly set up and charged, or connected to the LX3 connector panel with a cable.
- Inspect and clean the optics and accessories.
- Check friction settings at all axis points and use knobs for corrections.
- Make sure locking screws are fastened securely.
- Verify correct diopter setting on binocular tube.
- Verify eyepiece PD setting.
- Equip the articulating arm with all of the necessary optics and accessories.

With system power turned ON, perform the following.

- Adjust the balance of the articulating arm (adjustment procedure follows).
- Adjust the articulating arm's downward limit (adjustment procedure follows).
- Verify the function of the electronic brakes.
- Select the desired surgeon profile, or prepare a new profile as described earlier in this section of the manual.
- Check optical image over its entire magnification range.
- Set preferred Illumination level.
- Set preferred AMP™ knob position.
- Using the footswitch, verify the proper function of the motorized focus, motorized zoom, light intensity, and joystick.
- If present, using the footswitch, verify proper function of the BIOM** and Inverter.
- When setting up for a case, the white balance must be set for anterior or posterior Camera Scene.

WARNINGS!

- For patient safety and ease of use it is important that before each surgery the articulating arm is balanced and its downward limit is adjusted.

- In case of any deficiency or concern with the microscope system or function, do NOT use the system. Contact the Alcon Technical Services Department at (949) 753-1393 or (800) 832-7827.

Balance the Articulating Arm

After adding or removing optics and component accessories (BIOM**, ORA, video camera, assistant's scope) onto or from the articulating arm, it must be balanced in the use position for ease of vertical movement.

WARNINGS!

- All optical components must be connected to the microscope (BIOM**[2], ORA, video camera, assistant's scope) prior to balancing the articulating arm. The maximum weight for accessories that can be added to the microscope is 22 pounds. The maximum weight of the complete optical head plus all accessories, is 40 pounds.
- To avoid possible injury or damage to the microscope, grip handles/knobs firmly when pressing electronic brake switches to release the arm. If the articulating arm is out of balance, it can drift up or down when the arm is released.
- To avoid risk of pinching, during articulating arm rotation keep hands and fingers clear of the intersection between the articulating arm and floor stand.

1. Press and hold a switch for the electromechanical clutches and move the articulating arm to the middle of its vertical range.
2. While holding the switch and maintaining a firm hold on the handle, make note of the direction the microscope tends to drift, up or down. Release the switch to secure the arm in place.
3. Insert the large hex wrench into the articulating arm tension adjustment bolt in the shoulder of the articulating arm, Figure 3–22 on page 3.16. Turn the hex bolt CW or CCW as instructed below:
   - If the arm tends to rise, it has too much tension; therefore, the adjustment bolt must be turned counter-clockwise (CCW) to release the tension.
   - If the arm tends to fall, it has too little tension; therefore, the adjustment bolt must be turned clockwise (CW) to increase the tension.

This adjustment procedure may need to be repeated several times until the arm no longer drifts up or down.

Figure 3–22 Arm Balance - Use hex Wrench to Balance the Articulating arm.

Set the Lower Limit Safety Stop

To avoid inadvertent patient contact during surgery, adjust the articulating arm's lower limit safety stop adjustment knob so that the bottom of the microscope/accessories cannot contact the patient when the arm is lowered to its minimum height.

1. Turn the lower limit safety stop adjustment knob fully counter-clockwise until it stops, *(Figure 3–23)*.
2. Press and hold a switch for the electromechanical clutches and move the articulating arm to the lowest desired position. Release the brake.
3. Turn the adjustment knob clockwise until the knob meets resistance. This should set the arm's lowest vertical limit.
4. Press and hold a switch for the electromechanical clutches and move the arm up, then all the way down to confirm the lower limit adjustment is correct.

WARNING!

To avoid injury to the patient, it is important to ensure that the height of the microscope body and accessories is set above patient level by adjusting the lower limit safety stop. Verify that this safety stop is adjusted so that the bottom of the microscope or any accessories cannot contact the patient if the arm is lowered to its minimum height.

Figure 3–23 Lower Arm Limit - Turning the Lower Limit Safety Stop Adjustment Knob.

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SECTION FOUR - CARE AND MAINTENANCE

General Cleaning and Protection

External microscope lens surfaces of optical components (eyepieces, objectives) should be cleaned on a regular basis:

- Remove dust with a squeeze blower, pressurized air, or a grease-free brush.
- Low Profile Eye cup shall withstand wiping with a dry or damp cloth with a mild detergent solution, and/or a germicidal wipe solution, and/or alcohol.
- Clean lenses with lens cleaning tissue and cleaning solutions specifically formulated for cleaning lenses. Using non compatible cleaning solutions can wear out the performance of optics and can potentially degrade the performance, functionality.

CAUTION

When cleaning, do not apply excess pressure on the microscope lenses.

Non-optical surfaces (skins, wheels, footswitch) must be cleaned as required:

- All non-glass components can be cleaned using a sterile, lint-free wipe moistened with sterile 70% isopropyl alcohol (IPA) solution.

Prevent dust from accumulating on the microscope:

- Always cover microscope with a dust cover when not in use.
- Always store unused components in dust free cases.
- Unless deemed necessary, do not remove objective lens, binoculars, or other components from the optical system. Dust can accumulate on internal surfaces of these items if they are removed from the microscope.

CAUTION

When cleaning the LED module skins while it is not installed on the microscope, do not touch the LED's or Printed Circuit Board. Also ensure the cleaning fluid does not get onto the PCBA, LED's or electronic components

Transport and Storage

WARNING!

When transporting the unit in the facility, ensure that the articulating microscope arm is placed in the stowed and locked position over the microscope base as shown in the figure below, and protect the caster from forceful impact. If you need to transport your unit to an off-site location or have immediate concerns about your unit, contact Alcon Technical Services for assistance.

Figure 4–1 LuxOR Revalia™ (LX3 LED) System in Folded Transport Position

Cleaning/Sterilization of Reusable Knob Covers

Knob covers, located on either side of the illumination module, slide on and off the knobs. Similar covers are available for the zoom adjustment knob and AMP™ control knob.

NOTE: Alcon microscope knob covers are not made with natural rubber latex or dried natural rubber.

The following cleaning and sterilization instructions provide a method for effectively cleaning and sterilizing the microscope system knob covers per EN ISO 17664. Due to the potential for Toxic Anterior Segment Syndrome (TASS), Alcon does not recommend the use of enzymatic cleaners and detergents. If, however, local jurisdictions mandate their use relative to ophthalmic instruments, the materials of construction are compatible with both, up to a pH of 11.3, when the enzymatic chemicals and detergents are completely rinsed/neutralized immediately after cleaning/processing.

Thoroughly clean the knob covers before initial use and IMMEDIATELY AFTER each subsequent use. Both manual cleaning and automated wash procedures are presented.

WARNINGS!

- **If a knob cover is received in a defective condition, do not use. Notify Alcon immediately.**
- **Knob covers are provided as non-sterile units and must be cleaned and sterilized prior to use.**
- **Before each use, the knob covers should be inspected for damage (cracking, blistering, tearing). If a knob cover is damaged, it should be discarded and replaced. Use of damaged knob covers may result in serious permanent patient injury.**
- **The knob covers are to be used only with approved Alcon microscope systems.**
- **Be sure the knob covers are dry before attaching to the microscope system.**
- **Never immerse the knob covers in liquid after autoclaving; allow them to air cool prior to use.**
- **If a knob cover is suspected of being contaminated with prions, it should be destroyed and replaced.**

Manual Cleaning Procedure

1. Remove knob covers from module immediately after use.
2. Promptly clean any visible debris using sterile lint-free wipes moistened with 70% IPA. Alternately, distilled water may be used initially with lint-free wipes, and then followed by sterile lint-free wipes moistened with 70% IPA.
3. Dry the knob covers using clean lint free wipes, and then store the knob covers with the open end facing downward.
4. Wrap or place in a sterilization tray to prevent damage and maintain cleanliness prior to sterilization.

Automated Wash Procedure

In the event use of an automated process is required, perform all of the following steps to process the knob covers. The temperatures and cycle parameters below will not cause damage to the product.

WARNINGS!

- **Due to the potential for accumulation of particulate and bioburden residues in the washer water reservoirs, it is the surgical facility's responsibility to properly maintain the equipment and their associated filters to ensure the introduction of contaminant-free solutions onto the knob covers.**
- **Make certain the covers are secured with open end facing downwards and do not overlap.**
- **Do not wash the covers with non-ophthalmic instruments.**

Required materials:

- Detergent with pH range of 8.5 to 9.5
- Organic acid neutralizer with pH range of 3.0-2.6
- Adaptors, springs, or equivalent devices to maintain knob cover positioning during wash cycling

1. Manually clean knob covers immediately after each surgical procedure before using an automated washer.
2. Prepare washer with multi-purpose injector. The circulation rate of the automated washer should be at least 106 gallons (401 liters) of water per minute.

NOTE: Use de-ionized water only.

3. Set detergent and neutralizer dispensers as recommended by detergent and washer manufacturer.

4. Program washer to have the following automated cycle:
   - Main wash at 55 °C for 10 minutes (dispense detergent as recommended by detergent and washer manufacturer)
   - Set neutralizer for a minimum of 1.5 minutes (dispense neutralizer as recommended by detergent and washer manufacturer)
   - Rinse for 5 minutes at 22-27 °C, and then drain
   - Repeat rinse for 5 minutes at 22-27 °C, and then drain
   - Final Rinse at 70 °C for 1.5 minutes, and then drain
   - Dry at 100 °C until all surfaces are visibly dry (typically about 30 minutes)
   - Additional rinsing steps will not alter effectiveness of validated cycle.
5. Place knob covers into automated washer wire mesh basket. To prevent residual water buildup in knob covers, use stainless steel springs, plastic baskets, or similar corrosion-resistant devices to hold them in place so they remain open-end facing downward for the duration of the cleaning cycle, as shown in *(Figure 4–2)*.

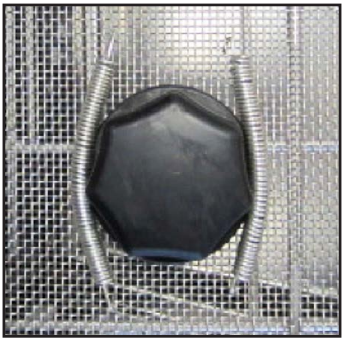

Figure 4–2 Knob Cover Held cup-side-down With Stainless Steel Springs in Wire Mesh Basket

6. Start the wash program. When the wash program is complete, allow the knob covers to cool before handling.

Sterilization Procedure

The knob covers included with this microscope can be sterilized using conventional autoclaves.

WARNINGS!

- **Inspect knob covers after each autoclave cycle to ensure material integrity. If there are signs of cracking or blistering, replace knob cover.**
- **Due to the potential for accumulation of particulate and bioburden residues in the washer water reservoirs, it is the surgical facility's responsibility to properly maintain the equipment and their associated filters to ensure the introduction of contaminant-free solutions onto the knob covers.**
- **Place knob covers with the open end facing downward during sterilization and cooling to prevent potential condensation from pooling inside the covers.**

Sterilize the knob covers using a steam sterilization cycle. The sterilization settings provided in *(Table 4–1)* have been validated by Alcon Laboratories, Inc. as being capable of sterilizing the instruments for re-use. It remains the responsibility of the processor to ensure that the processing as actually performed using equipment, materials, and personnel in the facility will provide clean sterile covers. This requires verification and routine monitoring of the process. Likewise, any deviation by the processor from the instructions should be properly evaluated for effectiveness and potential adverse consequences. Please refer to nationally recognized standards or to your facility's standard procedures.

Table 4–1 Sterilization Settings

STERILIZER TYPE	PULSES	SAMPLE CONFIGURATION	TEMPERATURE	MINIMUM EXPOSURE TIME
Gravity Displacement	N/A	Wrapped	132° C (270 °F)	15 Minutes
Gravity Displacement	N/A	Unwrapped	132° C (270 °F)	10 Minutes
Pulsing Pre-vacuum	4	Unwrapped	132° C (270 °F)	4 Minutes
Pulsing Pre-vacuum	4	Wrapped	135° C (275 °F)	3 Minutes
Pulsing Pre-vacuum	4	Wrapped	134° C (273 °F)*	3 Minutes

* Validated at 134 °C to accommodate European Community/HTM2010 requirements for a 134 °C cycle of 3 minute duration

References:
ISO 17664: Sterilization of medical devices - Information to be provided by the manufacturer for the processing of resterilizable medical devices.
EN ISO 17665: Sterilization of Health Care Products - Moist Heat - Part 1: Requirements for the development, validation and routine control of a sterilization process for medical devices.

Removing and Replacing LED Illuminator Modules

The LED modules are available in various color temperature options (“Table 6–1 Accessories and parts” on page 6.2

Figure 4–3 LED Module Color Temperature Options

1. Turn illuminator OFF (alternatively turn microscope power OFF). Allow LED module to cool for a minimum of five minutes.

> ***WARNING!***
>
> **Burn hazard exists — do not remove LED module immediately after operation. Allow LED module to cool a minimum of 5 minutes.**

2. After cooling for at least five minutes, holding the LED module with one hand, loosen the two locking knobs by turning counter-clockwise until they are loose slide the LED module straight out, *(Figure 4–4)*.

CAUTION

Do not touch the LED’s or printed circuit board with bare hands as it will negatively impact system performance.

3. Without touching face of the LED module, slide desired LED module into microscope, tighten the two knobs at the back of the module by turning clockwise to secure the module to the microscope.
4. During installation it is normal for LEDs to turn on briefly as the system goes through self-calibration.

> ***WARNING!***
>
> **Ensure thumb screws holding the LED module are securely tightened.**

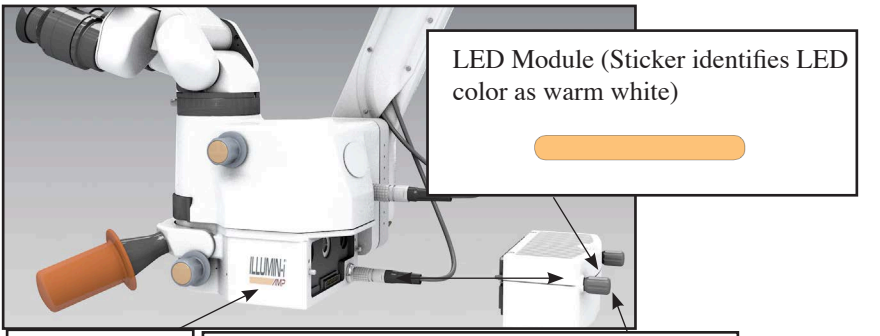

Figure 4–4 Replacement of LED Module Cartridge

Fuse Replacement

1. Turn the primary AC power switch OFF. It is located inside power entry module of LX3 floor stand on the power module. Unplug power cord from power module.
2. Insert a flat surfaced instrument along the left side of the power module fuse door. Pressing the flat instrument to the right against the fuse door, pull out to release door.

CAUTION

The fuse door must be pressed gently to ensure it does not break.

3. With fuse door open, grasp the fuse holder and pull it out from the power module.
4. Gently remove and replace fuses. Contact Alcon Technical Services for the correct rating and size.
5. Reinsert fuse holder into power module and shut the fuse door.
6. Plug power cord into power module *(Table 4–1)* for temperature and time settings. After sterilization, allow knob covers to cool with open end facing downward.

SECTION FIVE - TROUBLESHOOTING

Introduction

A general troubleshooting guide of observed conditions that addresses observations/ symptoms and what the operator can do to try and solve the issue is found in *(Figure 5–1)* and *(Table 5–1)* with examples of events that are presented as aids to rapid location of failed or malfunctioning parts or components in the LuxOR Revalia™ microscope. In all cases, should the corrective actions not provide the desired result, call Alcon Technical Services.

NOTE: The microscope can be powered off at any time by pressing and holding the Standby power button on the side of the LX3 floor stand for at least ten seconds.

Advisories

The system communicates through the display of system advisories—alerts and faults—based on the severity of the event. Each advisory is represented with an event code that, if needed, can be used in communications with Technical Services personnel.

Alert

An alert is a message to the user. The Alert may require user intervention, or it may be for information purposes only.

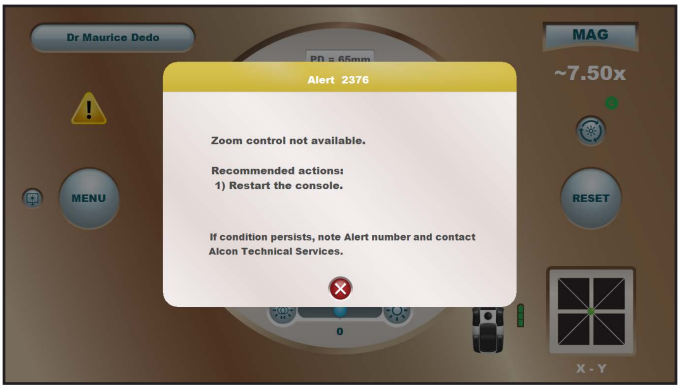

Figure 5–1 Alert Screen - Showing an Example of an Alert Dialog.

Fault

Faults are the result of an exceptional condition resulting from an event or a hardware issue that renders the software unable to carry out a requested service, or one that results in unacceptable risk.

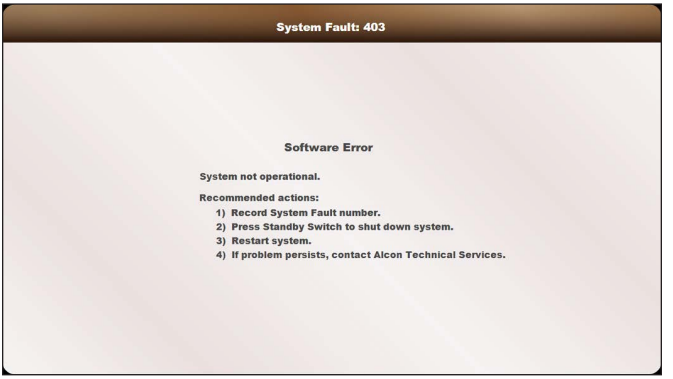

Figure 5–2 Fault Screen - Showing an Example of a Fault Dialog.

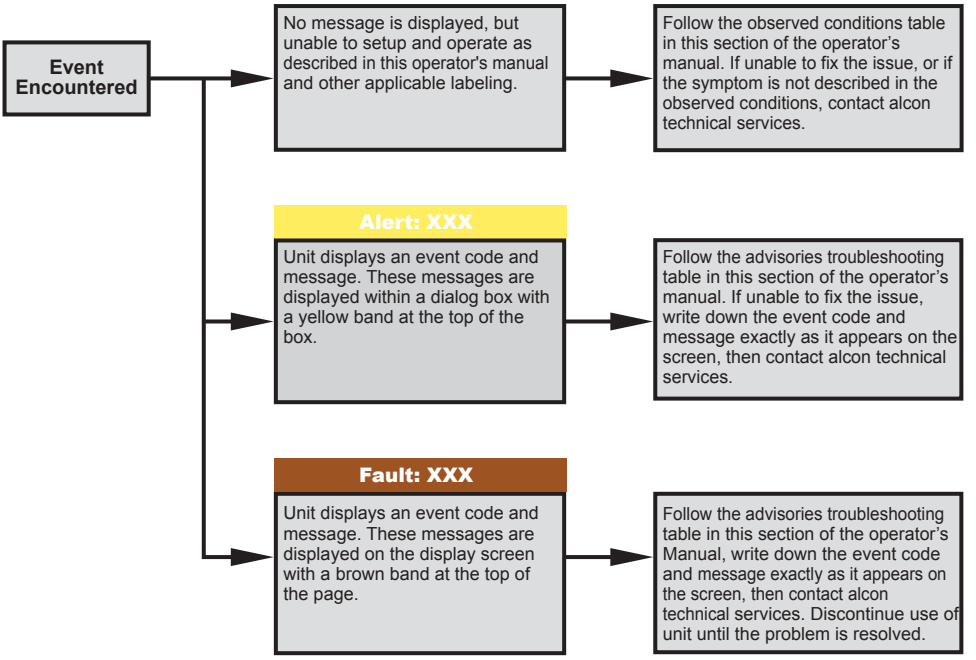

Figure 5–3 Troubleshooting Guide

When an Event is encountered, refer to Table 5-1 first.

Table 5–1 Observed Conditions

Listed in this table are observed conditions that may be presented to the user. The observed Symptom is followed by the Probable Cause and its Corrective Action.(s).

OBSERVED CONDITIONS		
SYMPTOM	**PROBABLE CAUSE**	**CORRECTIVE ACTION(S)**
System does not power-up.	1. Turn main power switch near power cord to on position. 2. Replace power fuse near power cord	1. Main power switch in off position. 2. Blown power fuse.
Cabled footswitch not responding properly.	1. Disconnect and reconnect footswitch cable connector. 2. Disconnect and reconnect footswitch cable connector. 3. Replace footswitch.	1. Footswitch connector not seated properly. 2. Floor stand malfunction. 3. Faulty footswitch.
Wireless footswitch not responding properly.	1. Connect footswitch to floor stand with cable. 2. Replace footswitch.	1. Wireless communications not working properly. 2. Faulty footswitch.
Wireless footswitch - “please install footswitch” advisory is displayed.	1. Hang footswitch onto footswitch hooks on the rear of the unit for greater than 5 seconds then remove.	1. Footswitch has not been “paired” with the console.

Table 5–2 EVENT CODES

Listed in this table are advisories shown on the primary control panel when the system detects an event. The event codes are separated between alerts and faults.

ADVISORIES			
Event Code	**Event Type**	**Detail**	**Message to User**
Footswitch Mechanism			
301	Alert	Mechanism time-out error. Note: this alert is generated by the host based on 1) absence of communication.	Footswitch not available.
303	Alert	Mechanism software error.	Footswitch not available.
345	Alert	Power control mechanism time-out.	Footswitch not available.
346	Alert	Power control mechanism range error.	Footswitch not available.
349	Alert	Mfio subsystem fault.	Footswitch not available.
358	Alert	Footswitch charger proximity sensor error.	Unable to charge cradled footswitch. Try attaching the cable to charge the footswitch.
359	Alert	Footswitch charger voltage out of range.	Unable to charge cradled footswitch. Try attaching the cable to charge the footswitch.
360	Alert	Footswitch battery low.	Footswitch battery is low.
361	Alert	Footswitch battery critically low. Note: this advisory is generated by the host based on real-time status.	"Footswitch battery is critically low. Footswitch functionality may be lost unexpectedly. Recommended actions: 1) Connect footswitch cable to console. 2) Cradle the footswitch after surgical cases have been completed. 3) If condition persists, note advisory number and contact alcon technical services. See the about dialog for alcon technical services contact information."
362	Alert	Incompatible software version	Footswitch version not supported
363	Alert	Communication time-out (console not hearing from footswitch)	Footswitch communication lost
367	Alert	Accelerometer failure	Footswitch failure detected
368	Alert	Software error	Footswitch failure detected
369	Alert	Footswitch modem failure	Footswitch wireless operation unavailable.
371	Alert	Watchdog time-out	Footswitch failure detected
378	Alert	Wireless data out of range (received by footswitch)	Footswitch failure detected
379	Alert	Can communication time-out (footswitch not hearing from console)	Footswitch failure detected
380	Alert	Can data out of range (received by footswitch)	Footswitch failure detected
381	Alert	Battery communication error (during wireless operation)	Footswitch failure detected

(Table 5-2 Continued)

ADVISORIES

Event Code	Event Type	Detail	Message to User
Footswitch Mechanism			
382	Alert	Battery failure (during wireless operation)	Footswitch failure detected
383	Alert	Pairing failed (pairing handshake over wireless failed)	Footswitch pairing failed. Please re-cradle the footswitch to try again.
384	Alert	Footswitch recovered from critical error.	N/a
385	Alert	Footswitch recovered from communicator software error.	N/a
386	Alert	Footswitch pairing data corrupt	N/a
387	Alert	Footswitch battery communication error (during cabled operation)	Footswitch wireless operation unavailable.
388	Alert	Footswitch battery failure (during cabled operation).	Footswitch wireless operation unavailable.
Host			
401	Fault	Subsystem network error.	Subsystem network error.
403	Fault	Loss of communication with host	Loss of communication with host
404	Fault	Corrupt or missing file	Corrupt or missing file
405	Fault	Incompatible software version	Incompatible software version
406	Fault	Incompatible subsystem version	Incompatible subsystem version
407	Fault	Subsystem version verification time-out	Subsystem version verification time-out
408	Fault	Subsystemnetworkbadcrc	Subsystemnetworkbadcrc
409	Fault	Subsystemnetwork commandrangeerror	Subsystemnetwork commandrangeerror
410	Fault	Subsystemnetwork hoststatusrangeerror	Subsystemnetwork hoststatusrangeerror
412	Fault	Subsystemnetwork commandtim eout	Subsystemnetwork commandtimeout
431	Warning	Unexpected loss of a/c power.	"Ac power lost. Continuing on battery power. Surgical functionality is not available. Recommended actions: restore ac power as soon as possible to reactivate surgical functionality."
432	Warning	Battery voltage low while operating on battery power.	“Backup power unavailable. System will shut down in 30 seconds. Recommended actions: if in surgery, stabilize the eye then restore ac power and restart system.”
433	Warning	Battery temperature out of range while operating on battery power.	"Backup power depleted. System will shut down in 30 seconds. Recommended actions: 1) if in surgery, stabilize the eye then restore ac power and restart system."
468	Alert	Software error when reading a doctor file.	Doctor file unavailable.
469	Alert	Crc verification failed.	Doctor file corrupted.
470	Alert	Invalid doctor file format.	Doctor file invalid.
472	Alert	Abnormal termination of host application detected at startup.	N/a

(Table 5-2 Continued)

ADVISORIES

Event Code	Event Type	Detail	Message to User
473	Alert	Libero error	Libero communication error.
474	Alert	Camera version error	The firmware installed on the camera is incorrect. Some camera functions may not operate correctly.
475	Alert	Camera communications error	Camera communication error. Check camera connections and restart the console.
477	Alert	Windows write filter is disabled.	Windows write filter is disabled.
478	Alert	Keyboard filter has been disabled.	Keyboard filter has been disabled.
479	Alert	Camera head version error	The firmware installed on the camera head is incorrect. Some camera functions may not operate correctly.
480	Alert	Video subsystem error	A problem with the video subsystem was detected. Some video recording or display functions may not operate correctly.
481	Alert	Video recording stopped because the disk is full	Video recording was stopped because the disk is full. Exchange removable media.
482	Alert	Video recording stopped – file size limit reached	Video recording was stopped because the file size limit for the media in use was reached. Exchange removable media.
483	Alert	External monitor change	An external monitor was attached or detached. Video will be synchronized following the next system power cycle.
484	Alert	Video format changed	The camera settings appear to have been modified. Changes will be synchronized following the next power cycle.
485	Alert	No media present	Insert recording media in the usb port on the side of the primary control panel.
486	Alert	Media removed while recording	The removable drive was removed while recording, resulting in corruption of recorded content. Replace the drive and restart recording.
487	Alert	Media removed while playing	The removable drive was removed while playing video. Reconnect the drive and restart playback.
488	Alert	Corrupt playback file	The file selected for playback is corrupt.
489	Alert	Corrupt archive	The doctor file(s) cannot be restored due to a media error.
490	Alert	Number of doctors selected for restore exceeds the maximum allowed	The number of doctors selected to be restored exceeds the maximum allowed on the system.
491	Alert	Error while archiving doctor(s)	The doctor file(s) cannot be archived due to a media error.

(Table 5-2 Continued)

ADVISORIES			
Event Code	**Event Type**	**Detail**	**Message to User**
Power Control Mechanism			
1101	Alert	"Mechanism time out error. Note: this alert is generated by the host based on 1) absence of communication."	Power control mechanism error.
1103	Alert	Mechanism software error.	Power control mechanism error.
1149	Alert	Mfio subsystem fault.	Power control mechanism error.
1150	Alert	Battery is missing, disconnected or discharged (open or shorted cells).	Backup power service needed.
1151	Alert	"Battery is low and recharging. Note: this alert occurs only at system startup."	Backup power temporarily unavailable.
1153	Alert	Battery temperature out of range while operating on battery.	Backup power unavailable. System will shut down immediately if ac power is lost.
1154	Alert	Battery temperature out of range while operating on ac power.	Backup power unavailable.
1155	Alert	Battery current sensor bad.	Backup power unavailable.
1156	Alert	Battery load is bad or battery voltage is too low to use load.	N/a
1157	Alert	Battery charger bad.	Backup power unavailable.
1162	Alert	Smi panel pc excessive current	Verion not available.
1165	Alert	Camera excessive current	Camera not available.
1168	Alert	Lamp excessive current	Lamp not available.
1171	Alert	Motor driver excessive current	Motor driver not available.
1177	Alert	Wireless footswitch excessive current	Wireless footswitch not available.
1178	Alert	Power distribution time out	Battery backup not available.
1179	Alert	Power distribution range error	Battery backup not available.
1180	Alert	Power distribution fault	Battery backup not available.
1181	Alert	Brake 24v out of range	Brakes are unavailable.
1182	Alert	Brake over current	Brakes are unavailable.
1183	Alert	Brake arm vertical solenoid open	Brakes are unavailable. Vertical arm solenoid is open.
1184	Alert	Brake arm rotary solenoid open	Brakes are unavailable. Rotary arm solenoid is open
1185	Alert	Brake lower rotary solenoid open	Brakes are unavailable. Lower rotary solenoid is open
1186	Alert	Excessive brake hold time.	Engage the articulating arm brake release and retry.
1187	Alert	24V out of range	24V out of range.
1188	Alert	12V out of range	12V out of range.

(Table 5-2 Continued)

ADVISORIES

Event Code	Event Type	Detail	Message to User
Malfunction Subsystem			
2201	Alert	"Subsystem time out error. Note: this alert is generated by the host based on absence of communication."	Microscope not available.
2202	Alert	Subsystem fault	Microscope not available.
2203	Alert	Subsystem software error.	Microscope not available.
2204	Alert	"1.2V supply out of range. 3.3V supply out of range. 5.0V supply out of range. Auxiliary reference out of range"	Microscope not available.
2215	Alert	"Incompatible hardware. Note: this fault occurs only at system startup."	Microscope not available.
Microscope Mechanism			
2301	Alert	"Mechanism time-out error. Note: this alert is generated by the host based on 1) absence of communication"	Microscope not available.
2303	Alert	Mechanism software error.	Microscope not available.
2304	Alert	Motor driver reference out of range	Microscope not available.
2307	Alert	Enhanced libero time out error.	Microscope not available.
2308	Alert	Enhanced libero status range error.	Microscope not available.
2309	Alert	Led driver status range error	Led not available
2311	Alert	Enhanced libero software error.	Microscope not available.
2312	Alert	Enhanced libero multifunction command range error.	Microscope not available.
2314	Alert	Enhanced libero multifunction time out error.	Microscope not available.
2315	Alert	Enhanced libero 3.3V range error.	Microscope not available.
2316	Alert	Enhanced libero 5.0V range error.	Microscope not available.
2317	Alert	Enhanced libero 24v range error.	Microscope not available.
2318	Alert	Enhanced libero 12v range error.	Microscope not available.
2342	Alert	Footswitch mechanism time out.	Microscope not available.
2343	Alert	Footswitch mechanism range error.	Microscope not available.
2345	Alert	Power control mechanism time out.	Microscope not available.
2346	Alert	Power control mechanism range error	Microscope not available.
2349	Alert	Multifunction subsystem mechanism fault.	Microscope not available.
2350	Alert	X actuator impeded	X actuator impeded.
2351	Alert	Y actuator impeded	Y actuator impeded.
2352	Alert	Focus actuator impeded	Focus actuator impeded.
2353	Alert	Zoom actuator impeded	Zoom actuator impeded.

(Table 5-2 Continued)

ADVISORIES			
Event Code	**Event Type**	**Detail**	**Message to User**
2354	Alert	Lamp bulb failure	Lamp bulb failed. Replace the bulb.
2355	Alert	Lamp fan failure	Lamp fan failed.
2360	Alert	Enhanced libero x actuator calibration failure.	"X actuator failure detected, x positioning not available. Recommended actions: 1) perform a reset. 2) Restart the console."
2361	Alert	Enhanced libero x actuator left limit switch failure.	"X actuator failure detected. Recommended actions: 1) retry x positioning. 2) Restart the console."
2362	Alert	Enhanced libero x actuator right limit switch failure.	Same as above.
2363	Alert	Enhanced libero x actuator motor stalled.	"X actuator motor stalled. Recommended actions: 1) retry x positioning. 2) Restart the console."
2370	Alert	Enhanced libero y actuator calibration failure.	"X actuator failure detected, y positioning not available. Recommended actions: 1) perform a reset. 2) Restart the console.
2371	Alert	Enhanced libero y actuator left limit switch failure.	Y actuator failure detected. Recommended actions: 1) Retry y positioning. 2) Restart the console.
2372	Alert	Enhanced libero y actuator right limit switch failure.	Y actuator failure detected. Recommended actions: 1) Retry y positioning. 2) Restart the console.
2373	Alert	Enhanced libero y actuator motor stalled.	Y actuator motor stalled. Recommended actions: 1) Retry y positioning. 2) Restart the console.
2374	Alert	Enhanced libero lamp voltage range error	Lamp not available. Recommended actions: 1) Restart the console.
2375	Alert	Enhanced libero focus zoom motor driver faulted	Focus and zoom control not available. Recommended actions: 1) Restart the console.
2376	Alert	Zoom calibration failure	Zoom control not available. Recommended actions: 1) Restart the console.
2380	Alert	Led driver software error	Led not available.
2381	Alert	Led driver multifunction time out (enhanced libero did not hear from multifunction)	Led not available.
2382	Alert	Led driver multifunction command range error	Led not available.
2383	Alert	Led driver 24v range error	Led not available.
2384	Alert	Led driver 3.3V range error	Led not available.
2385	Alert	Led driver 2.048V reference voltage range error	Led not available.

(Table 5-2 Continued)

ADVISORIES			
Event Code	**Event Type**	**Detail**	**Message to User**
2386	Alert	Led temperature is critically high.	Led temperature is critically high.
2387	Alert	Led driver board temperature is critically high.	Led driver board temperature is critically high.
2388	Alert	Led driver failure	Led not available.
2389	Alert	Led driver communications time out	Led not available.
2390	Alert	Led module disconnected	Led module disconnected.
2391	Alert	Led eeprom data crc mismatch	Led module failure. Replace the module."
2392	Alert	Led eeprom data out of range	Led module failure. Replace the module."
2393	Alert	Led eeprom access failed	Led module failure. Replace the module."
2394	Alert	Led temperature above normal	Led module temperature is abnormally high.
2395	Alert	Led driver board temperature above normal	Led driver temperature is abnormally high.
2396	Alert	Coaxial led failed	Coaxial led failure.
2397	Alert	Oblique led failed	Oblique led failure.
2398	Alert	Coaxial led life span over	Coaxial led passed its lifespan. Replace led module soon.
2399	Alert	Oblique led life span over	Oblique led passed its lifespan. Replace led module soon.
Wireless Mechanism			
2401	Alert	"Mechanism time out error. Note: this alert is generated by the host based on 1) absence of communication"	Wireless not available.
2403	Alert	Mechanism software error.	Wireless not available.
2404	Alert	Modem error	Wireless not available.
2405	Alert	Corrupt eeprom	Wireless not available.
2449	Alert	Multifunction subsystem mechanism fault.	Same as above.
2450	Alert	Channel conflict with Centurion	Wireless channel conflict with Centurion
2451	Alert	Channel conflict with microscope	Wireless channel conflict with microscope
2452	Alert	Unpaired from Centurion	Wireless unpaired from Centurion

SECTION SIX - ACCESSORIES AND PARTS

Introduction

This section of the operator's manual contains references for Alcon-approved accessories and replacement parts. The lists are not comprehensive of all accessories; please contact your local Alcon representative for the latest accessories. Use of non-approved accessories is not recommended.

For additional information, please contact the Alcon Sales Department.

Phone:	Write:
(800) 862-5266 or	Alcon Laboratories, Inc.
(817) 293-0450	6201 South Freeway
Ask for Customer Service	Fort Worth, TX. 76134-2099

INTERNATIONAL: Please contact your local Alcon Sales Office.

Table 6–1 Accessories and Parts

Catalog Number	Description
LX3 Catalog Items	
8065753073	LED Luxor™ 175 mm, LX3
8065753072	LED Q-Vue™ 175 mm, LX3
8065753071	LED Q-Vue™ , 200 mm, LX3
8065753095	Stand, LX3 LED
8065752566	Footswitch, LX3
8065753082	Luxor™ /Q-Vue, LED, Small Parts Kit
8065000004	Manual, Oper, Revalia (LX3 LED)
Other Items	
8065750448	Microscope Front Activating Doctor Protection Filter
8065752296	Binocular Assistant Kit - (50/50 Beam Splitter, Binocular Co-Observation Tube, Binocular Straight With Eyepiece)
8065752298	Video Package, 1Mos/Ccd HD, Ce
8065752299	Video Package, 3Mos/Ccd HD, Ul & Ce
8065752965	Video 1 Mos Without Beam Splitter
8065752306	Binocular, Inclinable, 0-215 Degrees With 10X Eyepiece
8065753084	Warm White, LED Module
8065753085	Cool White, LED Module
8065753086	Mixed White, LED Module
8065752311	Knob Cover Small
8065752312	Knob Cover Large
8065752313	Dust Cover
8065752314	Beam Splitter 80/20
8065752315	Binocular Co-Observation Tube
8065752317	Beam Splitter, 50/50
8065752364	Endure Eyecup, Soft, For 10X
8065752366	Medicapture Foot Switch
8065752387	Video Adapter, Pro, F=50 mm HD

Catalog Number	Description
8065752389	WD=175 mm Objective For Luxor™ Microscope
8065752391	WD=200 mm Objective For Luxor™ Microscope
8065752546	Medicapture Video Recording System
8065752549	Video Cable 4M, 1Mos/Ccd HD, Ul & Ce
8065752550	Video Cable 10M, 3Mos/Ccd HD, Ul & Ce
8065752551	Video Cable 15M, 1Mos/Ccd HD, Ul & Ce
8065752552	Video Package, 1Mos/Ccd Hd, Ul
8065752907	Video Package, 3Mos HD Internal
8065752906	Video Package, 1Mos HD Internal
8065752571	Advanced Surgical Display Kit
8065752316	Straight Binocular
8065752983	Low Profile Eyecups
8065752990	Leica Binocular Adaptor
Upgrade Kits	
8065753021	Knob Cover LX3ENH (Qty 6) used with 8065752564 and 8065752565
8065752963	Rear Arm Display Upgrade Kit
8065753092	LED Upgrade Kit For Halogen Luxor™ and Q-Vue™
8065753096	LED Libero X-Y Upgrade Kit

Video Camera Installation (External Video Package Installation Only)

1. Remove the binoculars from the LuxOR Revalia™ (LX3 LED) microscope, by first unscrewing the locking thumbscrew and lifting the binocular upward, *(Figure 6–1)*.

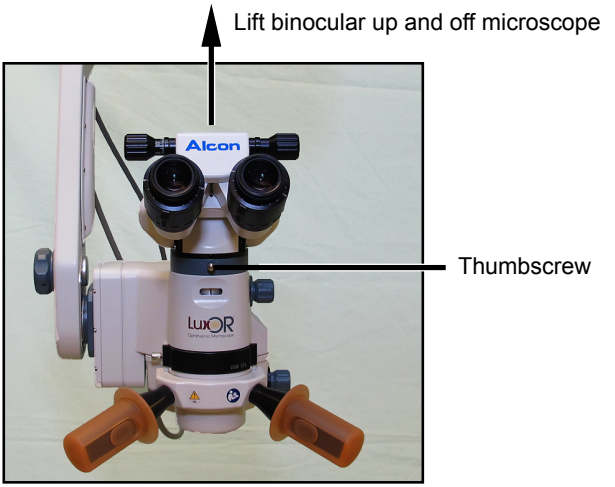

Figure 6–1 Removing the Binoculars

2. Install the beam splitter, 8065752314 (part of each of the video systems) on top of the microscope. Tighten the locking thumbscrew securely, *(Figure 6–2)*.

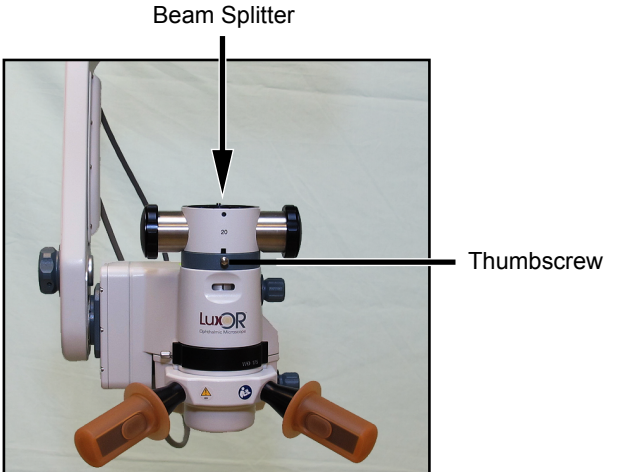

Figure 6–2 Installing the Beam Splitter

3. Place the binocular on top of the beam splitter and tighten beam splitter locking thumbscrew securely, *(Figure 6–3)*.

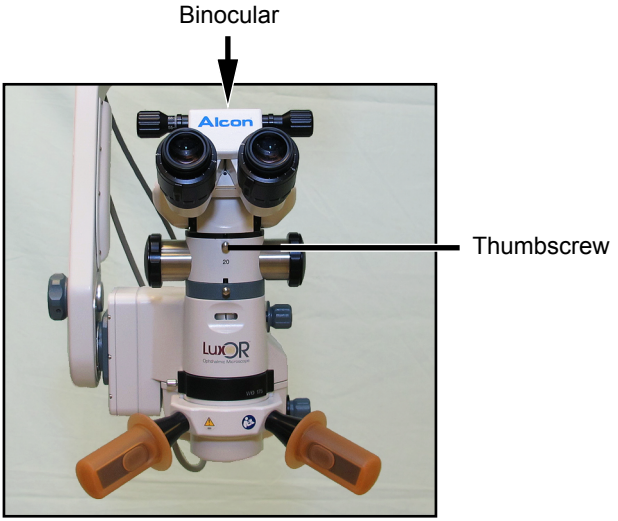

Figure 6–3 Replacing the Binoculars

4. Remove the port cover on the doctor's preferred side of the beam splitter by unscrewing the lock ring. Insert the video adapter firmly and tighten down with the lock ring, *(Figure 6–4)*.

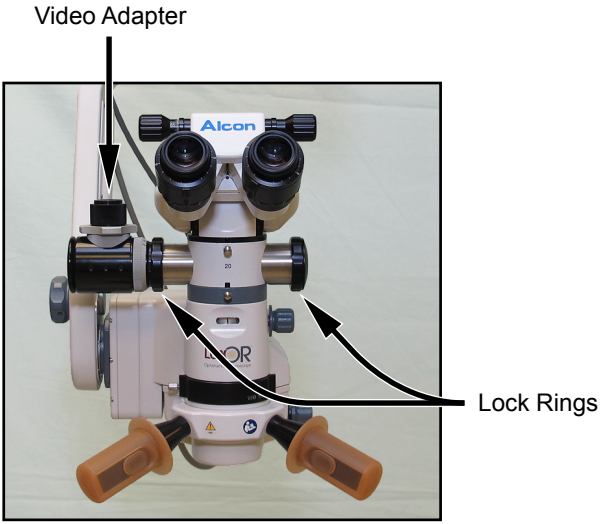

Figure 6–4 Installing the Video Adapter

5. Firmly thread video camera on to top of video adapter, *(Figure 6–5)*.

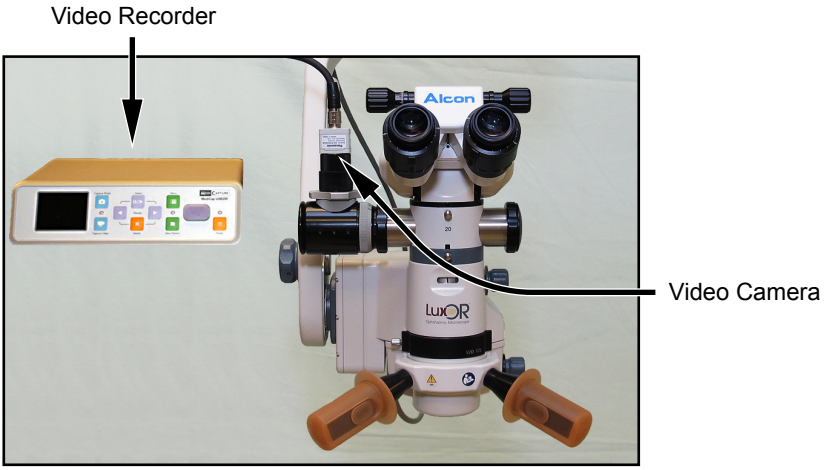

Figure 6–5 Installing the Video Camera and Recorder

6. Select your configuration from *Figures 6-6 through 6-9*, and make the required connections to the peripheral devices.

Figure 6–6 Panasonic 1MOS/CCD HD Camera Controller to Monitor

Figure 6–7 Panasonic 1MOS/CCD HD Camera Controller to MediCapture Video Recording Device to Monitor.

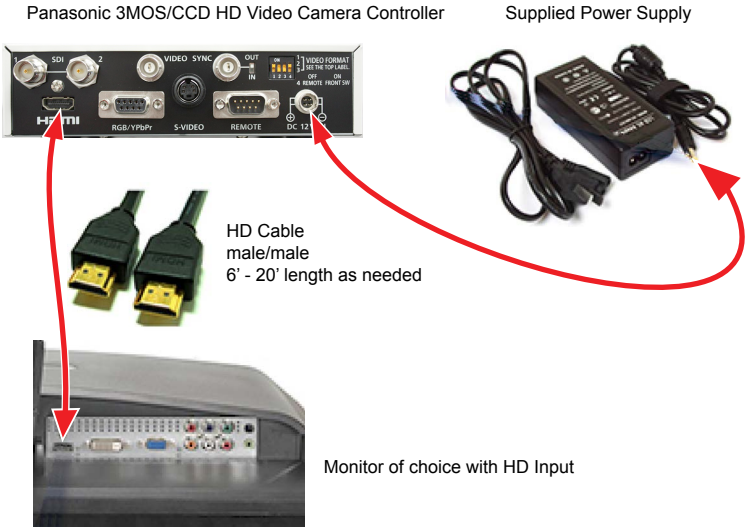

Figure 6–8 Panasonic 3MOS/CCD HD Camera Controller to Monitor

Figure 6–9 Panasonic 3MOS/CCD HD Camera Controller to MediCapture Video Recording Device to Monitor

Fine tune the image

7. Follow these instructions to fine tune the image using the controls in, *(Figure 6–10)*.

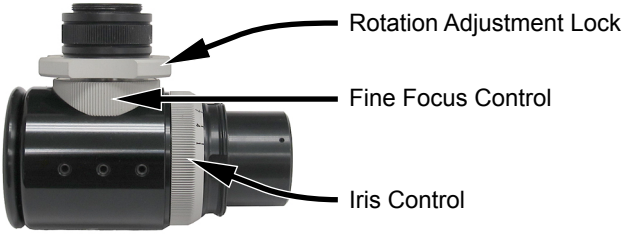

Figure 6–10 Video Adapter Adjustments

Focus the Camera

8. Set microscope eyepieces at 0 diopters or to your visual correction if spectacles are not worn.
9. Set microscope to high magnification and, looking at a fixed target, focus microscope on target.
10. Open iris control and turn fine focus control until video image is in sharp focus. Verify that microscope is still in focus.

Center the Image

11. If image shown on monitor is not centered, make horizontal and vertical adjustments with 2 mm Allen wrench, *(Figure 6–11)*.

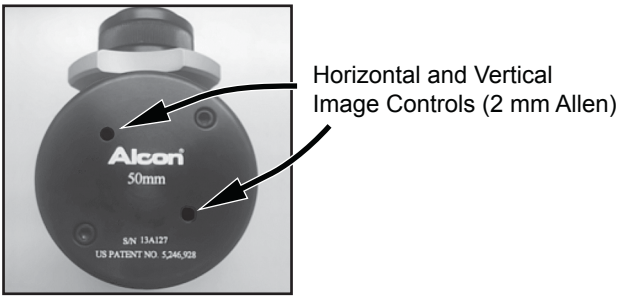

Figure 6–11 Horizontal and Vertical Image Adjustments on Monitor

Adjust the Iris

12. Turn Iris control open or closed until desired video image brightness and depth of field is achieved. For 3-Chip Cameras with a black balance function, close the iris prior to black balancing.

NOTE: White balance is adjusted on the Primary Control panel (MENU / Controls) for internal video, but for an external video system it must be performed per manufacturer's user manual.

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SECTION SEVEN - INDEX

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