



eyeMobil Microscope

Use and Maintenance Visual Guide





eyeMobil founders, Stan Pletcher and Sam Powdrill, with an early version of the EPIC microscope in 2014







Microscope Setup – parts

Bottom pole –
legs with pins

Middle pole

Water bladder
plate and
water bladder

Top pole

Extension Arm

Flex Arm

Battery

Top Mount

Microscope

Microscope Setup – parts



Bottom pole –
legs with pins

Middle pole

Water bladder
plate and
water bladder

Top pole

Extension Arm



Flex Arm

Battery

Top Mount

Microscope

Microscope Setup



Important to understand
how to setup from scratch



Microscope is packed in
order of putting it
together



Case is labeled to help
pack at end of mission



Pay attention to all caps,
covers – do not lose them

Layer 1




Layer 2



Layer 3





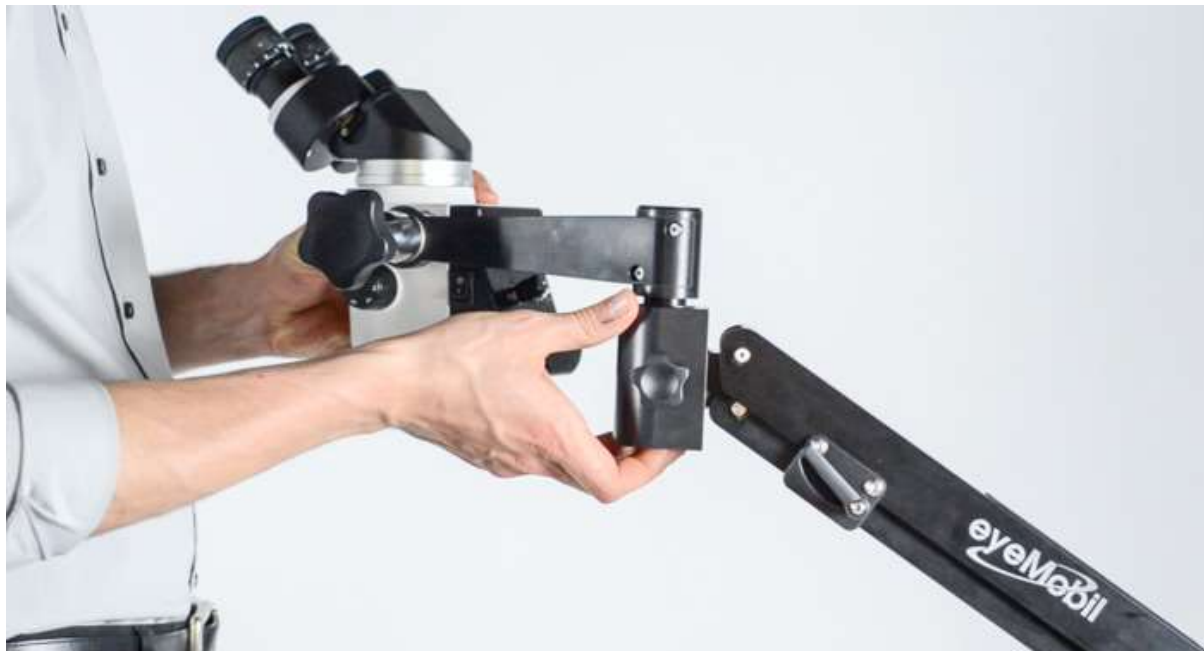
Layer 4



EPIC II Visual Setup Guide





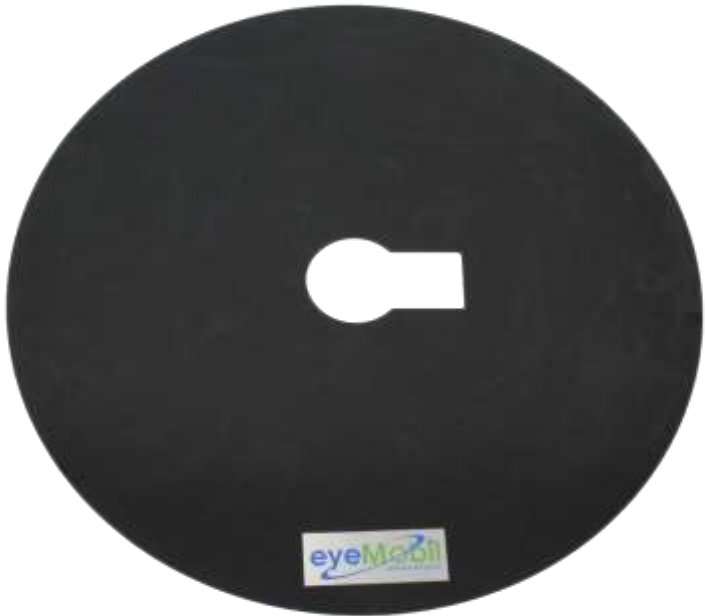


Adjustments

Flex Arm adjustment – 5 mm Allen key

- If arm is not holding weight (dropping too easily)
 - Counter clockwise to add tension
- If arm is too stiff (goes up too easily)
 - Clockwise to decrease tension
- If tension is close, can use small lock plate with lever to tighten

Water bladder stabilization



Water bladder management

- Will hold 6 gallons
 - (1 gallon = 8.34 pounds)
 - Total up to 50 pounds
- Stable with 4 – 5 gallons
- Consider adding 1 ounce of bleach total to reduce fungal growth
- When packing, drain completely
 - Consider packing water bladder separately



**WHAT TO DO IF YOU
FORGET YOUR
WATER BLADDER?**



BE CREATIVE!!



Stabilization Options





Stabilization Options



- **Water bladder replacement plates**
 - 7.4 pounds per plate
 - 6 plates = 44.4 pounds
- **Wall mount**
- **Traditional H mount**
 - 4 legs/4 casters
 - Weight of 35 pounds
- **Table mount**



Traditional H floor stand





Power Management

LED uses 1.4 amps

- Lithium Ion Battery is 23,000 mAh
- Lasts 10 hours
- Can charge battery during use

(33,000 mAh battery lasts up to 15 hours)





Power Management

Power using

- Battery
- Battery charger
- 12 V car battery
- Any 9V – 32V adapter with 5.5 barrel connector



Power Options

- Battery
- Battery charger
- 12 V car battery
- Any 9V – 32V adapter with 5.5 barrel connector



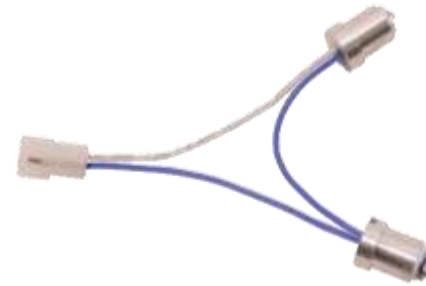
Lighting System

- Lighting system consists of 2 LEDs in serial and 1 chip driver
- LED is rated for 100,000 hours
 - Current dual LED system is wired in serial
 - parallel wiring is an option
- Chip driver is 1400 mA
 - 2100 mA chip available
 - Brighter
 - faster current draw



LED Replacement

- Tools/Supplies
 - Phillips screwdriver
 - LED replacement kit
 - 1.5 mm Allen key
 - Serial LED bulbs
 - 1400 mA and 2100 mA chips





LED Replacement

- Steps
 - Remove back
 - Remove bulbs with set screw
 - Replace bulbs +/- chip
 - Replace back



EPIC II Video

Lightest weight most portable video system



EPIC II Video

Lightest weight most portable video system

- HD resolution – 1080p to 4K
- Runs off battery only
- Lightweight – 3 pounds for all
- Voice control option
- Remote control options



Video Setup

- Beamsplitter
 - Use left side
- Video Adapter
 - Focus, Iris, X and Y adjustment
 - Angle towards you (due to size of binocular)
- Camera
 - Hook to C mount ring first
 - Must ensure proper ring or won't focus



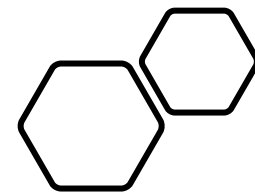
Video Setup

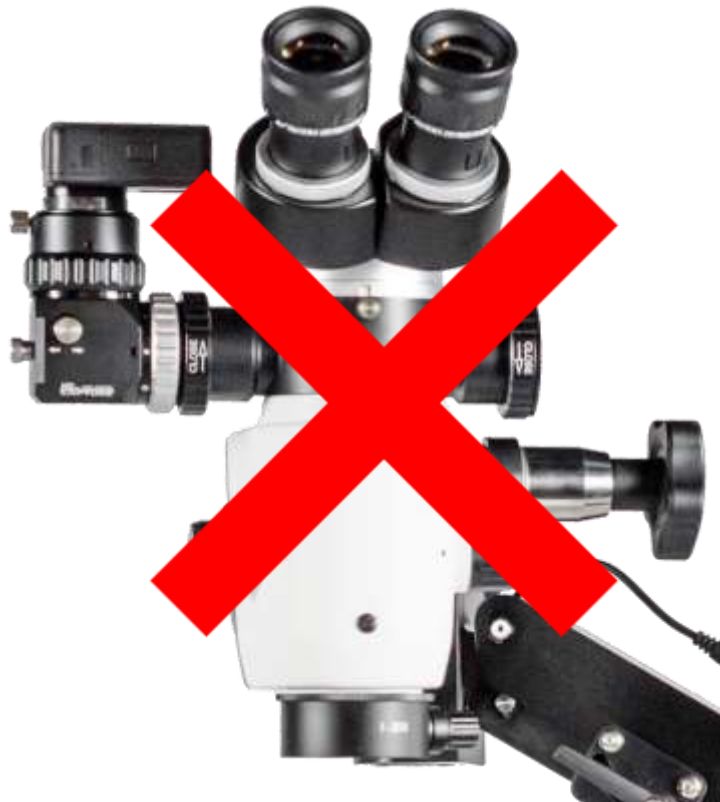
- Video Adapter
 - C Mount Ring
 - Focus, Iris, X and Y adjustment
 - Angle towards you (due to size of binocular)





Go Pro - C Mount Setup





Proper Video Adapter Setup

(Setup if using 0 – 180 binocular)

Video Recording Options



GoPro hooked
directly to HDMI
monitor

✓ microSD GoPro

GoPro hooked
using WiFi to
tablet or phone

✓ microSD GoPro

GoPro connected
directly to tablet
using capture
dongle and app

✓ microSD GoPro
Tablet memory
microSD in tablet

GoPro sent
wirelessly using
HDMI transmitter

✓ microSD GoPro
External HDMI recorder

Video Recording Option #1

GoPro hooked
directly to
HDMI monitor







Video Recording Option #2

GoPro hooked
using WiFi to
tablet or phone



Video Recording Option #3

GoPro connected
directly to tablet
using capture
dongle and app





Video Recording Option #4

GoPro sent
wirelessly using
HDMI transmitter



Video Recording Options – Pros



GoPro hooked
directly to HDMI
monitor

- ✓ No lag
- ✓ No pairing

GoPro hooked
using WiFi to
tablet or phone

- ✓ No cables
- ✓ Control from tablet

GoPro connected
directly to tablet
using capture
dongle and app

- ✓ No pairing
- ✓ Extra recording options

GoPro sent
wirelessly using
HDMI transmitter

- ✓ No lag
- ✓ No pairing
- ✓ Potential remote record

Video Monitoring Options

GoPro hooked
directly to HDMI
monitor

✓ No lag

GoPro hooked
using WiFi to
tablet or phone

✓ 300 ms lag

GoPro connected
directly to tablet
using capture
dongle and app

✓ 150 ms lag

GoPro sent
wirelessly using
HDMI transmitter

✓ No lag

Video Recording Options – Cons



GoPro hooked
directly to HDMI
monitor

✗ 2 extra cables

GoPro hooked
using WiFi to
tablet or phone

✗ Longest lag
✗ Pairing hassles

GoPro connected
directly to tablet
using capture
dongle and app

✗ Slight lag
✗ Can't charge tablet

GoPro sent
wirelessly using
HDMI transmitter

✗ 1 more cable

GoPro Camera control options



CAMERA
BUTTONS



VOICE CONTROL



WIFI APP
CONTROL



APP CONTROL

Tips for optimizing video

Use 1080p (not 4K)

Have extra microSD cards

- Suggest one per surgeon
- Use recommended cards
- (<https://gopro.com/help/articles/block/microSD-Card-Considerations>)

Recording limit is 4 Megabyte per section

Designate one circulator to control recording



Tablet Setup

1. Extend tablet holder
2. Screw into extension arm
3. Attach tablet
4. Tighten



Microscope Troubleshooting

No light seen

- Check LED cable to ensure it is plugged correctly
- Make sure battery has a charge
- Check Rheostat & On/Off switch
- Check USB plug to see if red light on



Check rheostat
and On/Off

Microscope Troubleshooting

No Light - Electrical causes

- Bad LED driver chip
- Bad LEDs
- Wiring failure

Microscope Troubleshooting

Out of Focus or blocked view

- Check if eyepieces fully pushed in
- Check if eyepieces are adjusted to 0 diopters
- Check if binocular is seated correctly
- Check if objective lens is smeared
- Take off binocular to look at distance target
- Look down barrel of microscope to see any visible blockages

Microscope Troubleshooting

Camera out of Focus

- Check focus ring on video adapter
- Check for black ring on camera along with video adapter C mount ring
- Check sensor of GoPro

EPIC II Surgeon's Stool



Cylinder Adjustments

Tools: Flat head Screwdriver



- Remove back and turn stool upside down
- Loosen nut (remove flat head end and use hex opening)
 - If stool drops too easily, adjust screw counterclockwise
 - If stool won't lower, adjust screw clockwise
- Retighten nut

