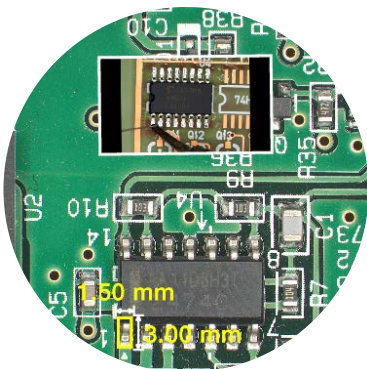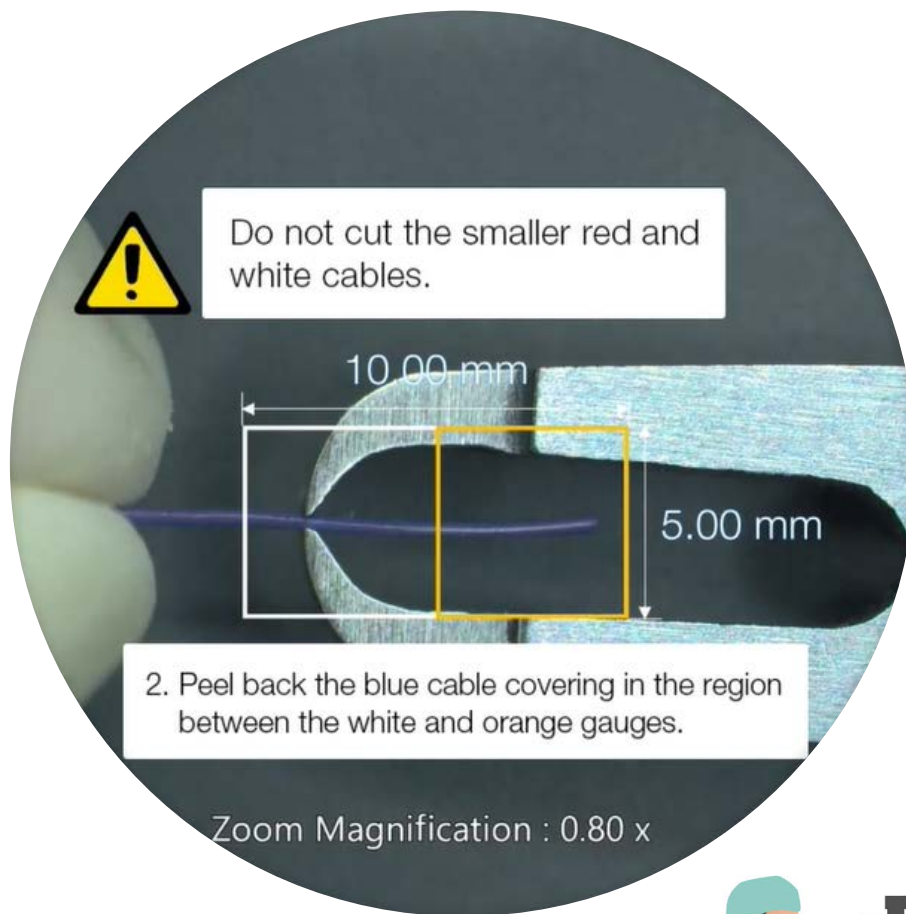# EVIDENT

Simplify Complex Microscope-Based Manufacturing Tasks

Transform How You Work

The AR1 microscope system enables you to overlay text and digital images over your microscope's field of view, making it easy for assemblers to follow directions, read notes, and even watch videos without removing their eyes from the oculars. The AR1 module works with Evident SZX series stereo microscopes, turning them into augmented reality tools that improve the speed and efficiency of your microscope-based manufacturing tasks as well as training new users.
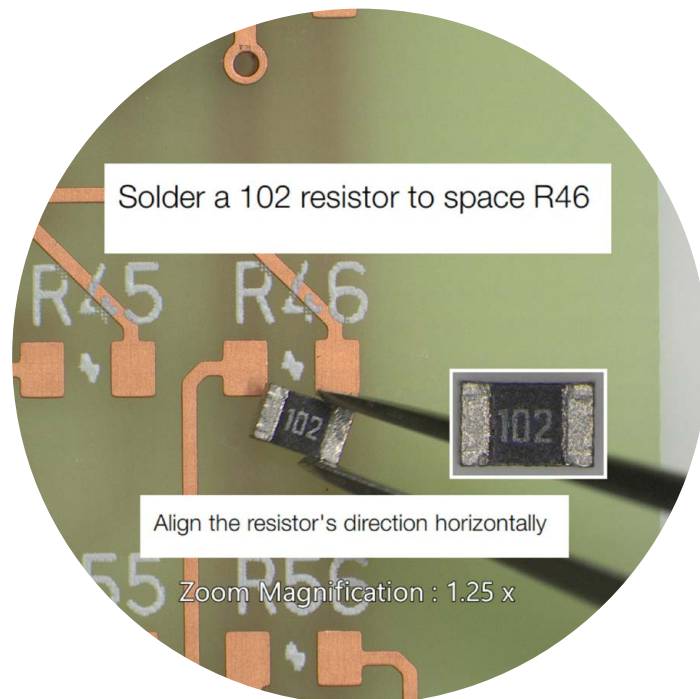

Do not cut the smaller red and white cables.

10.00 mm

5.00 mm

2. Peel back the blue cable covering in the region between the white and orange gauges.

Zoom Magnification : 0.80 x

Faster, More Efficient Assembly Process

Reduce the Risk of Human Error

During complex manufacturing tasks, the ability to project assembly instructions, procedure manuals, images, a digital reticle, measurement gauge, or notes into a microscope's field of view can help assemblers complete their work with fewer mistakes.

In a typical manufacturing setting, an assembler may need to repeatedly take their eyes away from the microscope to check assembly instructions or memorize these instructions before beginning their work. Both methods are inefficient and can result in errors. The AR1 system's projection technology enables directions for each step to be projected onto the sample as the user moves through the assembly. This can reduce the chance of memorization errors and enable the operator to remain more comfortable while they're working since they can stay focused on their task instead of repeatedly having to look away.

Solder a 102 resistor to space R46

Align the resistor's direction horizontally

Zoom Magnification : 1.25 x

Keep Your Manufacturing Line Moving

Simple-to-use AR1 software makes it easy for production engineers to quickly set up the program the operator will use during the assembly, making the system easy to onboard and integrate into your manufacturing process.

If an assembler encounters an issue during their work, the AR1 system can be used with third-party collaboration software—like Microsoft Teams—to enable an offsite manager or engineer to view the microscope's field of view to provide remote guidance. The offsite manager can guide the assembler through the issue in real time to overcome problems quickly and keep the manufacturing line moving. If anything needs to be documented, the system's image and video recording features make this fast and simple.

Get New Employees Up to Speed Fast

Efficiently Train Employees

Training employees on the manufacturing line can be time consuming and expensive. The AR1 system makes your training more efficient and flexible.

In a conventional training workflow, an on-site trainer instructs a new employee about each step of the assembly process and shows how components should look when they're properly assembled. The trainee must look away from the eyepieces to see what the trainer is talking about and then look back at the sample under their microscope. With the AR1 system, a user can receive training while they keep their eyes on the eyepieces, enabling them to stay focused.

Training without Travel

If trainers need to travel to different locations, this adds time and cost to the process. With the AR1 system, the trainer can conduct their work remotely without having to travel. This is more efficient and eliminates travel expenses, making it cost effective.

The AR1 system also makes it possible to use video recordings to train new employees rather than a live trainer as instructions can be projected directly onto the sample through the microscope's field of view.
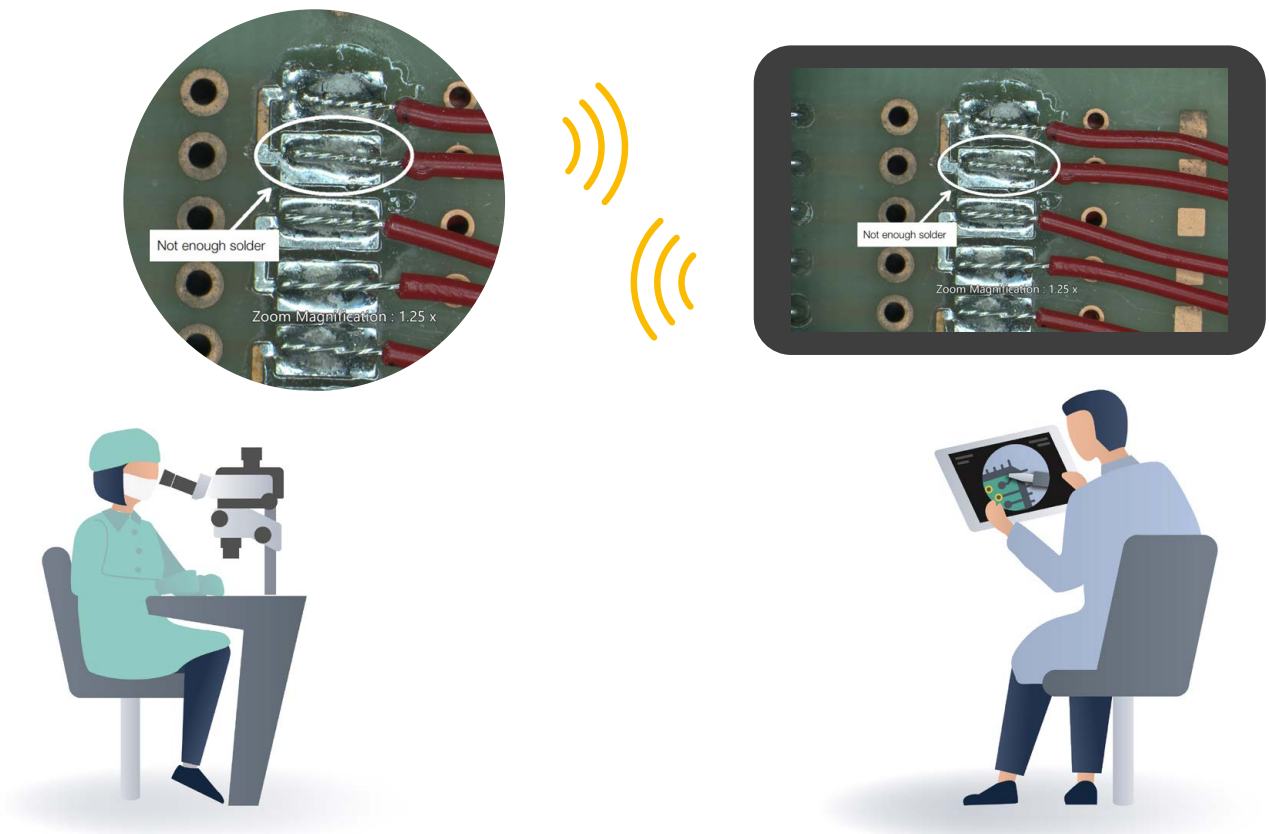
Works Seamlessly with Your Existing Stereo Microscopes

Minimal Effort and Cost to Onboard

With an easy-to-implement design, the AR1 system attaches easily to most SZX stereo microscopes. Simply replace the tilting trinocular, and the SZX-AR1 module mounts directly to the system.

Stay Comfortable while Working

Evident offers a variety of ergonomic components for stereo microscopes that enable you to remain comfortable while you work. The ergonomic tilting trinocular tube and eyepoint adjuster enable users to adjust the microscope so that they can maintain a comfortable, natural posture while they're working.

Tilting trinocular tube

Efficient Production and Training

The AR1 system improves the efficiency of your production line and user training.

Production line

Stay comfortable while you work. Ergonomic components enable you to adjust the tilt angle from 5 to 45 degrees and the eyepoint height within a 120 mm (4.7 in.) range.

The zoom magnification sensor tracks the magnification in the software, enabling you to set a defined magnification without taking your eyes away from the eyepieces to check.
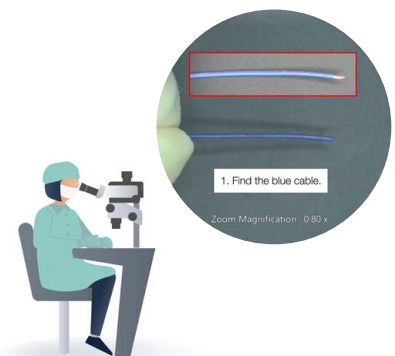

Preparation

Create an assembly manual using the AR1 software and use it on a PC that has the AR1 software installed.

Open and project the assembly manual into the microscope's field of view.

During assembly, you can keep your eyes in the eyepieces, reducing eye movement and errors caused by memorization mistakes.

Instructions are projected directly in the field of view. You can draw lines, arrows, rectangles, and add text to document what you see or get help from an offsite manager.
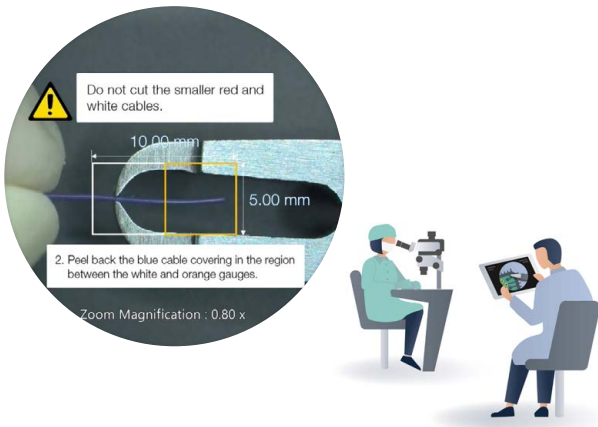
Project a zoom-linked digital gauge, reticle, and grid in the field of view, reducing the need for manual operations.
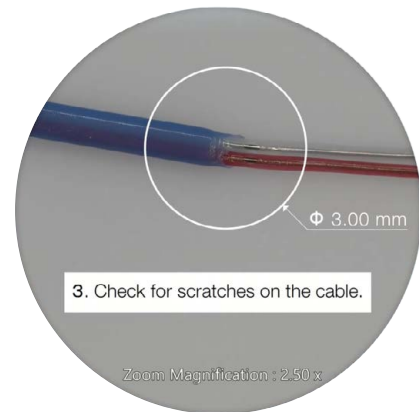
Assembly Process

Move forward and backward through the projected manual using buttons on the zoom magnification sensor or a third-party footswitch, so you can leave your hands on the microscope.

Record images and movies of the assembly process for analysis or record keeping.

Training

Stay comfortable while you work. Ergonomic components enable you to adjust the tilt angle from 5 to 45 degrees and the eyepoint height within a 120 mm (4.7 in.) range.

A trainer and trainee can be connected using a remote communication tool—like Microsoft Teams—reducing the need for the trainer to travel.
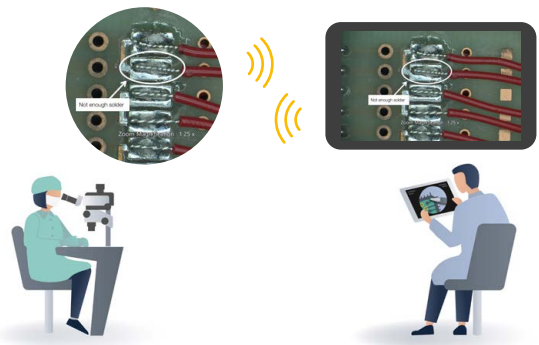
Preparation   **Training**

A trainer can use a digital pointer in the field of view to highlight the trainee's work and clearly explain how a component is assembled.

Not enough solder

Zoom Magnification : 1.25 x
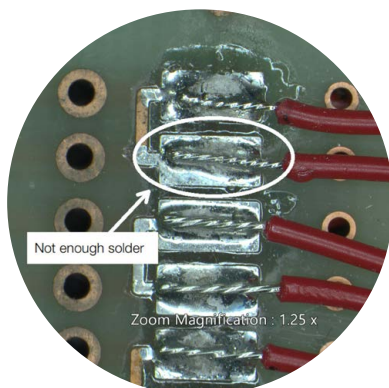
A self-training video can be projected in the field of view to reduce the teaching burden on the trainer.

Zoom Magnification : 0.80 x

SZX-AR1 System : when combined with the SZX-ZB7

DP23-CU
Camera head

DP28-CU
Camera head

U-TV0.35XC-2 *9
0.35X C-Mount
Adapter

U-TV0.5XC-3
0.5X C-Mount
Adapter

U-TV0.63XC
0.63X C-Mount
Adapter

WHSZ10X-H
Eyepiece

SZX2-ARTTR
AR Tilting Trinocular tube

PC

Software *5

SZX2-EEPA *1
Extendable
Eyepoint
adjuster

LG-LSLED *7
LED light source

SZX- AS
AS unit

SZX2-ILLC10 *2
Coaxial reflected light illuminator

LG-DF
Dual flexible light
guide

LG-DI
Dual interlock light
guide

LG-KLADP
Socket for KL
light guide

LG-R66
Ring light guide

HLL301(×2)
Collector lens

SZX-ZB7
SZX7 zoom body

Zoom magnification
sensor *5

DFPL0.5X-4
DFPL0.75X-4
DFPLAPO1X-4
SZX-ACH1X
DFPLAPO1.25X
SZX-ACH1.25X-2 *3
DFPL1.5X-4
DFPL2X-4 *2
Objectives

SZ2-ET
Auxiliary
sleeve

LED FOUR-PART RING
ILLUMINATION SYSTEM

SZ-LW61 *8
White LED
illumination unit

SZX2-ILR66

SZX2-RHS

SZX2-ILLC
1/4 λ *4

SZX-LGR66
Ring light guide
adaptor for SZX

SZX-STF *3
Focusing adaptor
for ring mount

SZ2-CLGR
Six-point ring light guide

SZX2-FOF
Fine focusing unit

SZX2-FO
Focusing unit

SZ2-CLGSF
Flexible light guide

SZ2-LGHL
Light guide
holder

SZ2-CLS
Compact
light guide
illuminator

SZ2-LGCL
Collector lens

SZ2-CLGSI
Interlock light guide
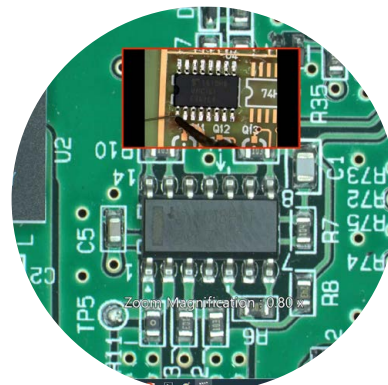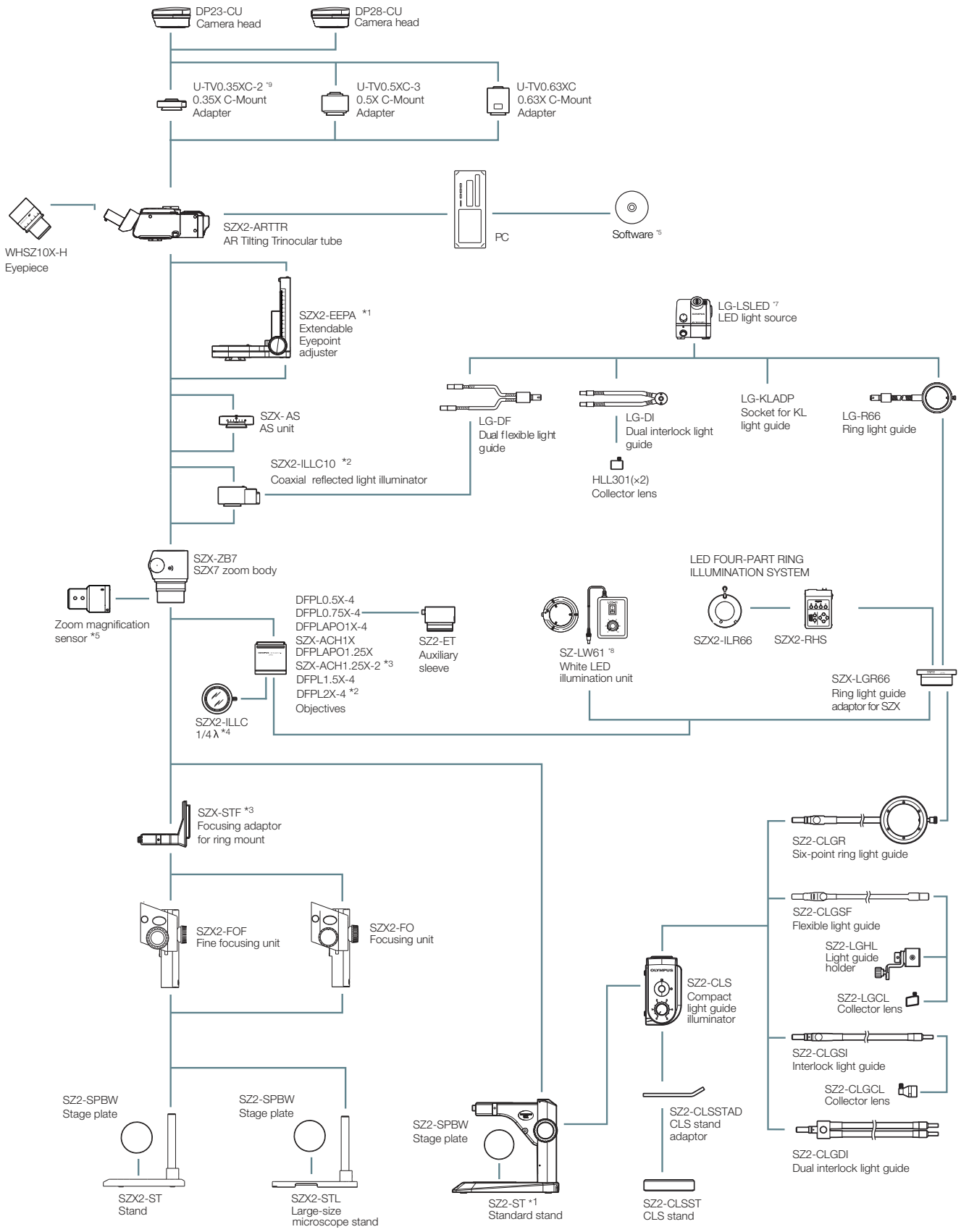
SZ2-LGCL
Collector lens

SZ2-SPBW
Stage plate

SZ2-SPBW
Stage plate

SZ2-SPBW
Stage plate

SZ2-CLSSTAD
CLS stand
adaptor

SZ2-CLGDI
Dual interlock light guide

SZX2-ST
Stand

SZX2-STL
Large-size
microscope stand

SZ2-ST *1
Standard stand

SZ2-CLSST
CLS stand

NOTES :
*1 SZX2-EEPA and SZ2-ST cannot be combined.
*2 SZX2-ILLC10 and DFPL2X-4 cannot be combined.
*3 SZX-ACH1.25X and SZX-STF cannot be combined.
*4 Attached to SZX2-ILLC10.

*5 Attached to SZX2-ARTTR.
*6 Product performance cannot be guaranteed if units other than
those listed in this system chart are combined.
*7 Different LED light sources are available in different regions.

*8 Not available in some areas.
*9 Ghosting may appear at the edges of images when
they're captured using the U-TVO.35XC camera adaptor
combined with the SZX-Z7B or SZX2-ZB10 zoom bodies
and the extendable eyepoint adjuster is set to a height of
100 mm or more.

SZX-AR1 System : when combined with the SZX2-ZB10

DP23-CU
Camera head

DP28-CU
Camera head

U-TV0.35XC-2 *7
0.35X C-Mount
Adapter

U-TV0.5XC-3
0.5X C-Mount
Adapter

U-TV0.63XC
0.63X C-Mount
Adapter

WHSZ10X-H
Eyepiece

SZX2-ARTTR
AR Tilting Trinocular tube

PC

Software *2

SZX2-EEPA
Extendable
Eyepoint
adjuster

LG-DFI
Dual combination
light guide

LG-LSLED *5
LED light source

HLL301(×2)
Collector lens

LG-DI
Dual interlock light
guide

LG-R66
Ring light guide

SZX2-ILLC10 *1
Coaxial reflected light illuminator

LG-DF
Dual flexible light
guide

SZX-LGR66
Ring light guide
adaptor for SZX

LG-KLADP
Socket for KL light
guide

SZX2-ZB10
SZX10 zoom body

Zoom magnification
sensor *2

DFPL0.5X-4
DFPL0.75X-4
DFPLAPO1X-4
SZX-ACH1X
DFPLAPO1.25X
SZX-ACH1.25X-2
DFPL1.5X-4
DFPL2X-4 *1
Objectives

SZX2-ILLC
1/4λ *3

SZ-LW61 *6
White LED
illumination unit

SZX2-ILR66   SZX-2-RHS

LED FOUR-PART RING
ILLUMINATION SYSTEM

SZX2-FOF
Fine focusing unit

SZX2-FO
Focusing unit

SZ2-SPBW
Stage plate

SZX2-ST
Stand

SZ2-SPBW
Stage plate

SZX2-STL
Large-size
microscope stand

NOTES :
*1 SZX2-ILLC10 and DFPL2X-4 cannot be combined.
*2 Attached to SZX2-ARTTR.
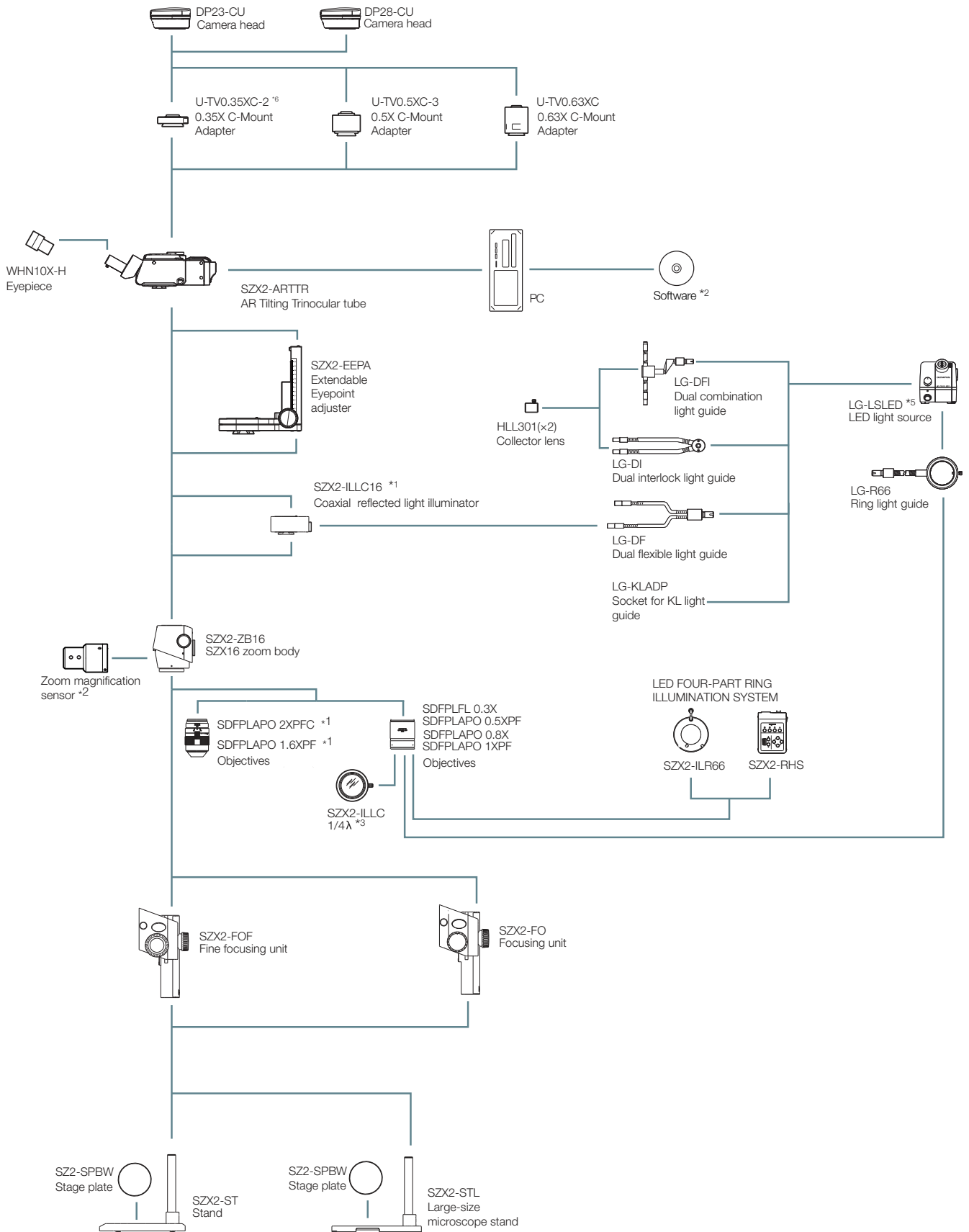*3 Attached to SZX2-ILLC10.
*4 Product performance cannot be guaranteed if units other than
   those listed in this system chart are combined.

*5 Several LED light sources are offered in some regions.
*6 Not available in some areas.
*7 Ghosting may appear on the edges of images captured with the camera when the
   camera adapter U-TV0.35XC is combined with the zoom microscope body SZX-Z7B or
   SZX2-ZB10 and the extendable eyepoint adjuster function is being used at a height of 100mm or more.

SZX-AR1 System : when combined with the SZX2-ZB16

DP23-CU
Camera head

DP28-CU
Camera head

U-TV0.35XC-2 *6
0.35X C-Mount
Adapter

U-TV0.5XC-3
0.5X C-Mount
Adapter

U-TV0.63XC
0.63X C-Mount
Adapter

WHN10X-H
Eyepiece

SZX2-ARTTR
AR Tilting Trinocular tube

PC

Software *2

SZX2-EEPA
Extendable
Eyepoint
adjuster

HLL301(×2)
Collector lens

LG-DFI
Dual combination
light guide

LG-LSLED *5
LED light source

SZX2-ILLC16 *1
Coaxial reflected light illuminator

LG-DI
Dual interlock light guide

LG-R66
Ring light guide

LG-DF
Dual flexible light guide

LG-KLADP
Socket for KL light
guide

SZX2-ZB16
SZX16 zoom body

Zoom magnification
sensor *2

SDFPLAPO 2XPFC *1
SDFPLAPO 1.6XPF *1
Objectives

SDFPLFL 0.3X
SDFPLAPO 0.5XPF
SDFPLAPO 0.8X
SDFPLAPO 1XPF
Objectives

LED FOUR-PART RING
ILLUMINATION SYSTEM

SZX2-ILLC
1/4λ *3

SZX2-ILR66   SZX2-RHS

SZX2-FOF
Fine focusing unit

SZX2-FO
Focusing unit

SZ2-SPBW
Stage plate

SZ2-SPBW
Stage plate

SZX2-ST
Stand

SZX2-STL
Large-size
microscope stand

NOTES :
*1 SZX2-ILLC16 and SDFPLAPO 1.6XPF / 2XPFC cannot be combined.
*2 Attached to SZX2-ARTTR.
*3 Attached to SZX2-ILLC16.
*4 Product performance cannot be guaranteed if units other than those
   listed in this system chart are combined.

*5 Several LED light sources are offered in some regions.
*6 Ghosting may appear at the edges of images when they're captured using the U-TVO.35XC
   camera adaptor combined with the SZX-Z7B or SZX2-ZB10 zoom bodies and the extendable
   eyepoint adjuster is set to a height of 100 mm or more.

Specifications

Hardware

AR tilting trinocular tube SZX2-ARTTR	Angle of observation tube: 5 to 45 degrees
	Interpupillary distance adjustment range: 57 to 80 mm
	Equipped with eyepiece clamping knob
	Light-path switching mechanism: None
	Magnification of eyepiece: 1.25X, magnification of camera: 1X
	Functions of buttons on the front panel: AR image brightness adjustment (7 levels) and AR image ON/OFF
	Input connectors: HDMI x 1, USB 2.0 (Type-C) x 1, DC jack x 1
	Drive voltage: AC 100–240 V (AC adaptor)
	Maximum power consumption: 10 W
Zoom magnification sensor	**Main Functions:**
	(a) Get the zoom magnification (at click position only)
	(b) Forward and backward the slides created on software
	Output connector: USB 2.0 (Type-C)
Operating environment	Ambient temperature: 10 to 35 °C (50 to 95 °F)
	Relative humidity: 0 to 85%
	Supply voltage fluctuation: ±10%
	Pollution degree: 2 (in accordance with IEC60664-1)
	Installation/overvoltage category: II (in accordance with IEC60664-1)
	Tilt of stand: ±3° or less
Conditions for safety standards	Indoor use
	Altitude: Max. 2000 meters (6562 ft)
	Temperature: 5 to 40 °C (41 to 104 °F)
	Relative humidity: 20 to 80% (31 °C (87.8 °F) or less) (without condensation)
	If over 31 °C (87.8 °F), the relative humidity in the operating environment is decreased linearly through 70% at 34 °C (93.2 °F), 60% at 37 °C (98.6 °F), and to 50% at 40 °C (104 °F).
Operating method	Do not move the product while in use
	Storage after use is not assumed
Relocation and transportation method	Repack the product with packing materials before transportation
	Users are not authorized to relocate the instrument

Software

Camera control function	Exposure control: Switching between Auto and Manual
	ISO sensitivity adjustment: ISO100, 200, 400
	White balance adjustment function: Equipped (one-touch adjustment)
Acquisition function	**Snapshot acquisition**
	Save format: BMP, JPEG, PNG
	Resolution: DP23: 3088 × 2076, DP28 :4104 × 2174
	The camera image can be saved with the AR image simultaneously
	Recording
	File saving formats: mp4, mov; Video codec: H264
	Audio format: MP3; Audio codec: mp3
	Resolution: DP23: 1920 × 1080 (camera image range: 1600 × 1080), DP28: 1920 × 1080 (camera image range: 1920 × 1080)
	The video cannot be recorded out of the camera image range
	The camera image can be saved with the AR image simultaneously
	The recording time is approximately one hour
Barcode function	The SZX-AR1 software can generate a QR code linked to the procedure.
	The QR code can be scanned with a barcode reader to recall the procedure in the eyepiece field of view.
	Compatible barcode reader
	COM communication is available
	A QR code can be loaded
	Output barcode: QR code
Software language	English, Japanese, Chinese, German, Spanish, Portuguese, French

PC requirements

· The PC used with this system should conform to IEC/EN60950-1 or IEC/EN62368-1
· The system requirements for the PC used with this system are listed below; even if the PC is used in the recommended operating environment, it does not guarantee that all functions will work on all commercially available PCs.

OS	Windows 10 Pro (64-bit), Windows 10 pro for Workstation (64-bit)
	Windows 10 version: 2004, 21H1
	Windows 10 IoT Enterprise LTSC 2019 (combined with a DP23 or a DP28)
OS language	English, Japanese
Processor	10th Gen Intel® Core™ i5 or later (or equivalent) (Recommended core: 4 or more, clock frequency: 3.2 GHz)
Memory	8 GB or more
Storage capacity to install software	1 GB or more
Graphic controller	Intel UHD Graphics 630 or higher
Monitor resolution	1366 × 768 or higher
USB interface	USB 2.0 Type-A x1 (for connecting to the AR tilting trinocular tube)
	USB 2.0 Type-A x1 (for the zoom magnification sensor)
	USB 3.1 Type-A x1 (for a DP23 and a DP28 camera)
Monitor interface	HDMI x1 (for connecting to the AR tilting trinocular tube)
	HDMI 1.4 or more
	HDMI connector: Type-A