

MBN71950 - June 22, 2016

Item # MBN71950 was discontinued on June 22, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

CERNA COMPONENTS: TRANS-ILLUMINATION

- Observe Thin *In Vitro* Samples with Transmitted Light
- Condensers and LEDs Provide Bright Trans-Illumination
- Brightfield, DIC, and Dodt Contrast are Fully Supported



[Hide Overview](#)

OVERVIEW

Features

- Trans-Illumination Modules Enable Brightfield Illumination, DIC Imaging, and Dodt Contrast
- Compatible with Air and Oil-Immersion Condensers from Nikon
- Illumination Provided by Our Visible and NIR LEDs
- Large Selection of DIC Components
 - Polarizers for Visible and NIR
 - Prisms for Objectives with 10X to 100X Magnification
 - Sliders for Plan Fluorite and Apochromatic Objectives
- Fixed Arms Incorporate Lens Tubes and Cage Systems Directly into Optical Path
- Requires 400 mm Tall Microscope Body (Item # CSB1400)

To aid in the study of thin *in vitro* samples, the Cerna platform fully supports the trans-illumination techniques of brightfield illumination, DIC imaging, and Dodt contrast. (These techniques are compared in the *Modalities* tab.) Our Illumination Kits for these techniques include Thorlabs' LEDs, which offer broadband illumination throughout the visible and into the IR regions of the spectrum. The light generated by

Cerna Application Support

Contact Us

Thorlabs has engineers, application specialists, and a sales team available to discuss the various Cerna options and to work with you to create a system that is optimized for your unique experimental requirements. If you would like to be contacted by a member of our team, please let us know by emailing ImagingSales@thorlabs.com.

Required Accessories for Trans-Illumination			
Imaging Modality	Brightfield	DIC	Dodt
Condenser			
Condenser	√	√	√
Focusing Module and Controller	√	√	√
Mounting Arm	√	√	√
Illumination Source			
Illumination Kit	√	√	√
LED Driver	√	√	√

these LEDs is collimated, propagated into a Trans-Illumination Module, then focused onto the sample using a condenser. We currently offer two air condensers and one oil-immersion condenser. If you are interested in other options, please contact us with your application requirements.

For customers who are interested in building their own trans-illumination setups, we recommend the CSA2000 Condenser Mounting Arm, which connects Nikon condensers to our Ø2" lens tubes and 60 mm cage systems. We also manufacture fixed arms that attach directly to the microscope body and place Ø1" lens tubes, Ø2" lens tubes, 30 mm cage systems, and 60 mm cage systems into the microscope's optical path. An example microscope that makes use of our fixed arms is pictured below.



Click to Enlarge
User-Built Cerna Microscope
with
Trans-Illumination Using Fixed
Arms

Required Accessories

Several components need to be purchased together to perform trans-illumination with a Cerna microscope. The table to the right outlines which components are needed for various imaging modalities.

In particular, please note that to perform DIC imaging, you must use our MBE74100 Six-Cube Epi-Illuminator and either the MBP71100 or MBP70100 Nosepiece. Our single-cube epi-illuminator module and other nosepieces are not compatible with DIC.

Trans-Illumination Module			
Brightfield Illumination / DIC Imaging Module	√	√	
Dodt Contrast Module			√
Dovetail Clamp (Item # WFA0150)	√	√	√
Additional Components			
400 mm Tall Microscope Body (Item # CSB1400)	√	√	√
Six-Cube Epi-Illuminator (Item # MBE74100)		√	
Objective Holder (Item # MBP71100 or MBP70100)		√	
Polarizers, Prisms, Sliders, and Analyzer		√	

Cerna Components	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
Overview	Microscope Body	Widefield Viewing	Epi-Illumination	Objectives and Objective Holders	Sample Holders	Motion Control	Trans-Illumination

[Hide Modalities](#)

MODALITIES

Cerna microscopes support several trans-illumination modalities: brightfield illumination, differential interference contrast (DIC) imaging, and Dodt gradient contrast imaging. Each of these methods requires different accessories and confers different advantages to the microscopist, as described below.

Brightfield Illumination

Brightfield illumination is the simplest method of trans-illumination. In this modality, light from an illumination source is collected by a condenser and passed through a sample, which is observed by its effect on the intensity of the transmitted light. Brightfield illumination microscopy requires an illumination source (i.e., our high-power LEDs) and a condenser to be attached to a Cerna microscope.

DIC Imaging

In differential interference contrast imaging, light transmitted through the sample is manipulated by a number of polarization optics. Light from the illumination source is polarized and then split into two orthogonally polarized beams before it reaches the sample. Small optical path length differences between the two beams cause interference when they are recombined, providing enhanced contrast for samples that would be transparent in basic brightfield illumination.

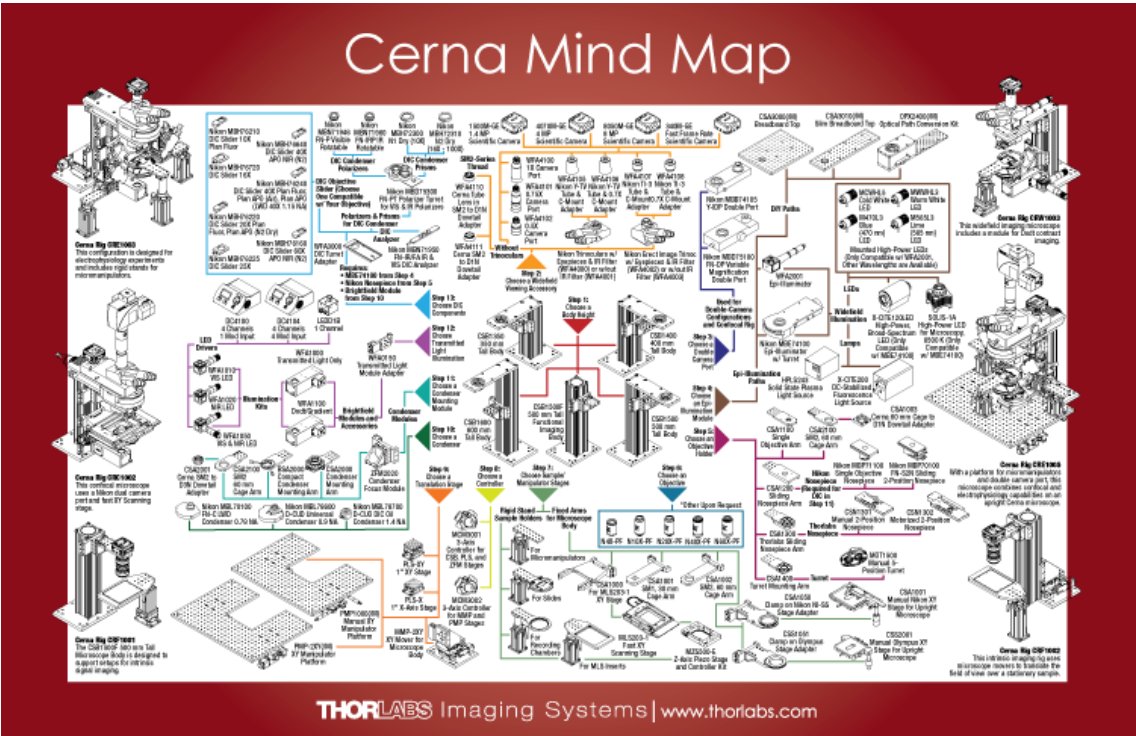
Dodt Contrast

Dodt contrast, which is also known as Dodt gradient contrast, uses an intensity gradient to illuminate the sample. This gradient, which is generated using a specially shaped aperture and diffuser, reduces the amount of stray light scattered by the sample. This reduction in stray light allows for the use of high-NA-oil-immersion objectives. Dodt contrast offers enhanced resolution as compared to basic brightfield illumination and allows thicker samples to be studied.

CERNA MIND MAP

The Cerna Series Mind Map is a visual tool for selecting the modules that make up a complete Cerna microscope. Created as a supplement to the information provided directly on our website, it lays out both the required and optional components in a single 11" x 17" printed sheet. We have designed it to be used as a flowchart, starting from the red arrow at the center of the document and following the steps in order.

Click [here](#) or on the image below to download a printable PDF (6 MB). The fixed arms sold on this page correspond to Step 8 in the mind map, while the other trans-illumination accessories correspond to Steps 11 - 14.



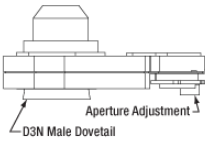
Condensers



- ▶ High Numerical Apertures of 0.78, 0.9, or 1.4
- ▶ Air and Oil Immersion Options
- ▶ Adjustable Diaphragm for Optimizing Illumination Conditions
- ▶ Other Nikon Condensers Available Upon Request

These condensers collect and focus the light from the Trans-Illumination Module onto the specimen. They feature large numerical aperture values for high image contrast and even illumination across the field of view. The MBL70100 and MBL78600 condensers are designed for use in air (i.e., they are "dry" condensers), while the MBL78700 is intended for oil immersion.

All three condensers offer an adjustable diaphragm aperture that is controlled by a side-located lever. This adjustable diaphragm is included so that you can tune the effective numerical aperture (NA) of the condenser to match the NA of your objective. For the brightest illumination, the NA of the condenser you purchase should be equal to or slightly smaller than that of the highest-NA objective you intend to use with your microscope. If the condenser's NA is too large, closing the diaphragm will help compensate, but the illumination intensity will not be as bright as for a condenser with a well-matched NA.



Click to Enlarge
Drawing of MBL70100
Condenser

Required Accessories

To mount the condenser to the Cerna microscope body, our Condenser Focusing Module and a Condenser Mounting Arm are required. Both are sold separately below.

Installation

Each condenser's housing includes a male D3N dovetail that mates to the Condenser Mounting Arm; a drawing of the MBL70100 condenser is shown as an example above. D3N is Thorlabs' designation for the dovetail used by the majority of Nikon condensers for upright microscopes.

Item #	MBL70100	MBL78600	MBL78700
Photo (Click to Enlarge)			
Air or Oil Immersion	Air	Air	Oil Immersion
Numerical Aperture (NA) ^a	0.78	0.9	1.4
Object Distance	8.2 mm	2.5 mm	1.6 mm
Recommended Objective Magnification	4X - 100X	2X - 100X	10X - 100X

- For the brightest possible illumination, the NA of your condenser should be equal to or slightly smaller than the NA of your objective.

Part Number	Description	Price	Availability
MBL70100	Nikon FN-C LWD Condenser, 0.78 NA	\$1,943.00	Lead Time
MBL78600	Nikon D-CUD Condenser, 0.9 NA	\$1,836.00	Lead Time
MBL78700	Nikon D-CUO DIC Oil Condenser, 1.4 NA	\$2,227.00	Lead Time

[Hide Condenser Focusing Module and Controller](#)

Condenser Focusing Module and Controller



- ▶ Motorized Condenser Adjustment with 1" of Fine Travel
- ▶ Dovetail Clamp Attaches Directly to Microscope Body
- ▶ Connects to Condenser Mounting Arm (Sold Separately Below)
- ▶ Requires 3-Axis Controller (Item # MCM3000)

The ZFM2020 Motorized Condenser Focusing Module provides 1" of fine focusing adjustment for a condenser in a Cerna system. This large motorized travel range simplifies the process of optimizing the illumination conditions at the sample.

Required Accessories

The ZFM2020 only provides translation and cannot hold a condenser directly. Hence, one of our Condenser Mounting Arms (sold below) is required to mount the condenser. In addition, the MCM3000 3-Axis Controller is required for translation of the condenser focusing module. It uses knobs to control up to three axes and offers an adjustable translation speed. For more details, please see the full web presentation for Cerna motion control.

Installation

The module is attached to the microscope body using the dovetail clamp on the rear, which is tightened into place using setscrews that accept a 3 mm balldriver or hex key. It also includes six M4 cap screws (3 mm hex) that secure the module to a Condenser Mounting Arm.

Part Number	Description	Price	Availability

ZFM2020	Motorized Condenser Focusing Module with 1" Travel	\$1,687.50	Today
MCM3000	3-Axis Controller	\$4,500.00	Lead Time

[Hide Condenser Mounting Arms](#)

Condenser Mounting Arms



- ▶ One Condenser Mounting Arm is Required to Attach Condenser to a Cerna Microscope
- ▶ Knobs Provide X and Y Adjustments of the Condenser in the Optical Path
- ▶ Connects to Condenser Focusing Module (Sold Above)

When combined with the ZFM2020 Condenser Focusing Module sold above, these Condenser Mounting Arms position a condenser in the optical path of a Cerna microscope. We offer two options. The compact BSA2000 Mounting Arm has a thickness of just 0.5" (13 mm), conserving space in the optical path for thicker components like our DIC accessories (sold below) and our MLS203-1 Fast XY Scanning Stage. In contrast, although the CSA2000 Mounting Arm has a thickness of 1.9" (47 mm), it was engineered to minimize crosstalk between the X and Y axes, enabling quicker and simpler optimization of the condenser's transverse position in the optical path. Each knob on the BSA2000 provides ±2.5 mm of positional adjustment, while each knob on the CSA2000 provides ±2 mm.

Compatibility with Custom Trans-Illumination

For users who wish to use trans-illumination sources from other manufacturers or to develop custom trans-illumination apparatuses (which can be held to the microscope body by our fixed arms), we recommend the CSA2000 mounting arm, which contains four 4-40 tapped holes for our 60 mm cage systems and internal SM2 (2.035"-40) threads for our Ø2" lens tubes.

Required Accessories

The mounting arm holds the condenser and provides coarse adjustment of the condenser in X and Y. To mount the condenser in the optical path of the microscope, the Condenser Focusing Module sold above is required.

Installation

As shown in the picture above, each condenser mounting arm contains six M4 counterbores that are spaced to mate with the bottom of the ZFM2020 Condenser Focusing Module. Each mounting arm also contains a female D3N dovetail that accepts any of the condensers sold above. D3N is Thorlabs' designation for the dovetail used by the majority of Nikon condensers for upright microscopes.

Part Number	Description	Price	Availability
BSA2000	Compact Condenser Mounting Arm with ±2.5 mm Travel in X and Y	\$678.00	Today
CSA2000	Condenser Mounting Arm with ±2 mm Travel in X and Y	\$678.00	Today

[Hide Illumination Kits](#)

Illumination Kits



- ▶ Provides Visible and/or NIR Illumination for Trans-Illumination Modalities
 - ▶ WFA1010: Visible Illumination Kit
 - ▶ WFA1020: NIR Illumination Kit
 - ▶ WFA1050: Visible and NIR Illumination Kit
- ▶ Connects to Trans-Illumination Module (Sold Below)
- ▶ Requires LED Driver (Sold Below)

Illumination Kits for Cerna microscopes integrate Thorlabs' LEDs with the Trans-Illumination Modules sold below. They consist of one or two LEDs attached to a DFM Filter Cube. We currently offer three versions: one for visible illumination (Item # WFA1010), one for NIR illumination (Item # WFA1020), and one that provides both (Item # WFA1050). All kits include lenses that collimate the output of the LEDs, and the WFA1050 additionally includes a dichroic mirror that combines the output of both LEDs.

In addition to the LEDs contained in these kits, we also offer a much wider range of mounted LEDs at wavelengths from 280 nm to 1550 nm, all of which are compatible with Cerna systems. For our full selection of mounted LEDs, please see their full web presentation.

Required Accessories

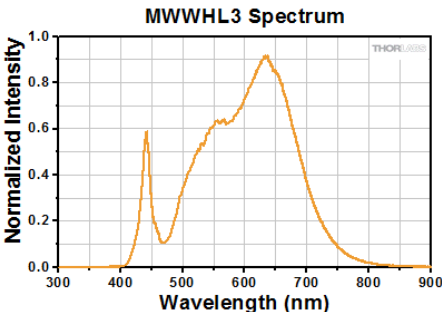
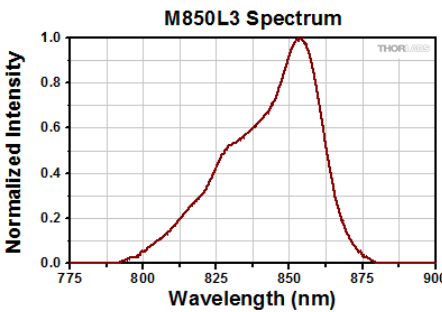
To provide current and intensity control for the LED, a suitable driver is required. A selection of popular drivers is sold below in the LED Drivers section. Mounting the LEDs to the Cerna microscope body requires a Trans-Illumination Module (sold separately below).

Installation

We recommend attaching the Illumination Kit to the Trans-Illumination Module after the trans-illumination module has been installed on the microscope body. For

details on that step, please see the Trans-Illumination Modules section below.

Our Trans-Illumination Modules are designed for use with ER025 cage rods (sold separately). These cage rods should be threaded into the 4-40 taps on the face of the filter cube through which the light exits. Next, slide the cage rods into the mating Ø6 mm holes on the trans-illumination module, gently pushing until the filter cube makes contact. Finally, secure the cage rods by tightening the button head cap screws on the trans-illumination module, which accept a 2.5 mm balldriver.

Illumination Type	Visible	NIR
Illumination Kit Item #'s	WFA1010 and WFA1050	WFA1020 and WFA1050
Included LED ^a	MWWHL3	M850L3
Nominal Wavelength	3000 K ^b	850 nm
Typical Power Output	550 mW	1100 mW
LED Spectrum		

- In addition to the LEDs contained in these kits, we also offer a much wider range of mounted LEDs at wavelengths from 280 nm to 1550 nm, all of which are compatible with Cerna systems. For our full selection of mounted LEDs, please see their full web presentation.
- Correlated Color Temperature

Part Number	Description	Price	Availability
WFA1010	Visible Illumination Kit	\$773.26	Today
WFA1020	NIR Illumination Kit	\$824.77	Today
WFA1050	Visible and NIR Illumination Kit	\$1,308.13	Today

[Hide LED Drivers](#)

LED Drivers

These drivers supply intensity control and current for Thorlabs' LEDs.



[Click to Enlarge](#)

LEDD1B Features

- ▶ Sufficient Current and Voltage to Drive *Most* of Thorlabs' LEDs
- ▶ Allows Intensity Modulation of a Single LED
- ▶ Very Compact Footprint: 60 mm x 73 mm x 104 mm (W x H x D)



[Click to Enlarge](#)

DC2200 Features

- ▶ Sufficient Current and Voltage to Drive *Any* of Thorlabs' LEDs
- ▶ Allows Intensity Modulation of a Single LED
- ▶ Provides Automated LED Current Control
- ▶ Touchscreen Display



[Click to Enlarge](#)

DC4100 Features

- ▶ Sufficient Current and Voltage to Drive *Most* of Thorlabs' LEDs
- ▶ Allows Intensity Modulation of 4 LEDs Together
- ▶ Provides Automated LED Current Control
- ▶ LCD Display



[Click to Enlarge](#)

DC4104 Features

- ▶ Sufficient Current and Voltage to Drive *Most* of Thorlabs' LEDs
- ▶ Allows Independent Intensity Modulation of 4 LEDs
- ▶ Provides Automated LED Current Control
- ▶ LCD Display

Specifications				
Item #	LEDD1B	DC2200	DC4100	DC4104
Number of LEDs	One	One	Up to Four	Up to Four
Current Output	1.2 A (Max)	10.0 A (Max)	1.0 A per Channel (Max)	1.0 A per Channel (Max)
Voltage Output	12 V (Max)	50.0 V (Max)	5 V (Max)	5 V (Max)
Modulation Frequency Using External Input	5 kHz (Max)	250 kHz (Max)	100 kHz (Max) (Simultaneous Across all Channels)	100 kHz (Max) (Independently Controlled Channels)
External Control Interface(s)	Analog (BNC)	USB 2.0 and Analog (SMA) (Includes SMA to BNC Cable)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (8-Pin)
Automated LED Configuration	No	Yes	Yes	Yes
Display	None	Touchscreen	LCD	LCD
Link to Full Web Presentation	Full Web Presentation	Full Web Presentation	Full Web Presentation	Full Web Presentation
Required Accessories	KPS101 Power Supply	None	DC4100-HUB Connector Hub	

Part Number	Description	Price	Availability
LEDD1B	T-Cube LED Driver, 1200 mA Max Drive Current (Power Supply Not Included)	\$293.00	Today
KPS101	15 V, 2.4 A Power Supply Unit for One K-Cube or T-Cube	\$25.71	Today
DC2200	High-Power 1-Channel LED Driver with Pulse Modulation, 10.0 A Max, 50.0 V Max	\$1,995.00	Today
DC4100	4-Channel LED Driver, 1 Modulation Input, 1 A, 5 V	\$2,580.00	Today
DC4104	Customer Inspired!4-Channel LED Driver, 4 Modulation Inputs, 1 A, 5 V	\$2,840.00	Today
DC4100-HUB	Single LED Connector Hub for DC4100	\$309.00	Today

[Hide Trans-Illumination Modules](#)

Trans-Illumination Modules



- ▶ WFA1000: Trans-Illumination Module for Brightfield Illumination and DIC Imaging
- ▶ WFA1100: Trans-Illumination Module for Dodt Contrast
- ▶ Modules Require WFA0150 Dovetail Clamp to Connect to Microscope Body

Trans-Illumination Modules direct the visible and/or NIR illumination generated by the Illumination Kits into the optical path of the Cerna microscope. The WFA1000 is used for brightfield illumination and DIC imaging, leaving open the possibility of upgrading a brightfield microscope to DIC later, while the WFA1100 is used for Dodt contrast. The WFA0150 Dovetail Clamp, sold separately, is required to connect the trans-illumination module to the microscope body.

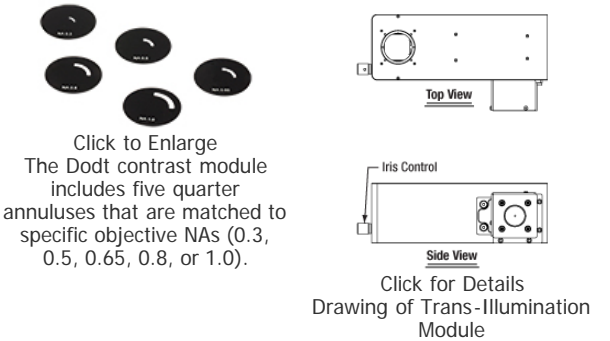
As shown in the drawing to the right, rotating the knob on the front of these modules opens and closes an integrated iris, which controls the intensity of the trans-illumination. Each module contains an optical port on the side that is designed to accept the Illumination Kits sold above. To generate the gradient required for Dodt contrast (see the *Modalities* tab above for details), the WFA1100 includes five tightly toleranced quarter annuluses (for objective NAs of 0.3, 0.5, 0.65, 0.8, and 1.0) as well as a diffuser.

Installation

The WFA0150 dovetail clamp includes an adapter plate that connects the trans-illumination module to the Cerna microscope body. First, attach the adapter plate to the trans-illumination module, using the seven M4 counterbores and two alignment pin holes in the center of the plate. It is important to use both of the alignment pins. Next, attach the adapter plate to the dovetail clamp, using the eight M4 x 0.7 tapped holes on the edges of the plate. Finally, connect the completed assembly to the bottom of the support rail. The dovetail clamp tightens using two setscrews that accept a 4 mm balldriver.

At this point, we recommend installing the Illumination Kit to the Trans-Illumination Module. For details on that step, please see the Illumination Kits section above.

Part Number	Description	Price	Availability
WFA1000	Brightfield Illumination / DIC Imaging Module	\$4,058.42	Today
WFA1100	Dodt Contrast Module	\$4,767.46	Today
WFA0150	Transmitted Light Module Dovetail Clamp	\$259.66	Today



Additional DIC Accessories: Polarizers, Prisms, Sliders, and Analyzer



The contrast enhancement offered by DIC imaging is generated by adding several additional optical components to the optical path. These components include a polarizer, two birefringent prisms (the second of which is held in a slider), and a second polarizer (known as an analyzer), which together manipulate the polarized transmitted light. In addition to these components, DIC imaging with Cerna microscopes requires the CSB1400 Microscope Body, which holds the condenser and trans-illumination module; the MBE74100 Six-Cube Epi-Illuminator, which holds the analyzer; and either the MBP71100 or MBP70100 Nosepiece, which holds the slider. Our 350 mm tall microscope body, single-cube epi-illuminator module, and other nosepieces are not compatible with DIC.

The process of selecting the polarizers, prisms, sliders, and analyzer is described in the following steps and summarized in the table below named "Required Additional DIC Accessories."

Step 1: Polarizer Turret and Turret Adapter

The MBD75300 DIC Polarizer Turret holds polarizers and prisms for DIC imaging. In a Cerna microscope, it is mounted to the WFA1000 Trans-Illumination Module (sold separately above) using the WFA3000 DIC Polarizer Turret Adapter. The MBD75300 turret, WFA1000 trans-illumination module, and the WFA3000 adapter are all mounted to the microscope body underneath the condenser. All of these components are required for DIC imaging.

Step 2: Polarizers and DIC Prisms

In DIC imaging, light passes through a polarizer and a DIC prism before reaching the sample. The MBN71946 Visible DIC Polarizer is intended for systems with the WFA1010 or WFA1050 Illumination Kits, while the MBN71960 IR DIC Polarizer is intended for systems with the WFA1020 or WFA1050 Illumination Kits. Choose the polarizer(s) that match the illumination kit you select above.

A DIC prism matched to the system's objective is also required. The MBH72300 DIC Prism is intended for use with a 10X objective, while the MBH72310 DIC Prism is intended for use with objectives from 16X to 100X.

DIC Slider Item #	Compatible Objectives
MBH76210	Nikon Plan Fluorite, 10X
MBH76720	Nikon, 16X
MBH76220	Nikon Plan Fluorite, 20X
MBH76225	Nikon, 25X
MBH76240	Nikon Plan Fluorite, 40X
MBH76640	Nikon APO NIR, 40X, Water Immersion
MBH76160	Nikon APO NIR, 60X, Water Immersion

Step 3: DIC Slider and DIC Analyzer

The light that is transmitted through the sample passes through a second DIC prism and another polarizer (held in an analyzer) before reaching the widefield viewing apparatus. This second prism is held in a DIC slider that is inserted into the MBP71100 or MBP70100 nosepiece. The DIC slider must match the system's objective; use the table to the right to select the correct slider. The MBN71950 analyzer is held in the MBE74100 six-cube epi-illuminator, and contains both visible and IR polarizers. A matched DIC slider and the DIC analyzer are both required for DIC imaging.

Required Additional DIC Accessories ^a						
Accessory	Polarizer Turret	Polarizer Turret Adapter	Lower Polarizer (Choose at Least One)	Lower DIC Prism (Choose at Least One)	DIC Slider	DIC Analyzer
Item #	MBD75300	WFA3000	MBN71946 Visible Polarizer MBN71960 IR Polarizer	MBN72300 for 10X Objectives MBN72310 for 16X - 100X Objectives	Choose at Least One from the Table Above	MBN71950

- In addition to the items in this table, DIC imaging requires the CSB1400 Microscope Body, the MBE74100 Six-Cube Epi-Illuminator, and either the MBP71100 or MBP70100 Nosepiece.

Part Number	Description	Price	Availability
MBD75300	Nikon FN-PT Polarizer Turret	\$1,346.00	Lead Time
WFA3000	DIC Polarizer Turret Adapter	\$206.67	Today
MBN71950	Nikon FN-IR/FA Visible and IR DIC Analyzer	\$1,268.00	Lead Time
MBN71946	Nikon FN-P Visible DIC Polarizer	\$1,346.00	Lead Time
MBN71960	Nikon FN-IRP IR DIC Polarizer	\$2,021.00	Lead Time
MBH72300	Nikon DIC Prism for 10X Objectives, N1 Dry Condenser	\$1,341.00	Lead Time
MBH72310	Nikon DIC Prism for 16X - 100X Objectives, N2 Dry Condenser	\$1,341.00	Lead Time
MBH76210	Nikon DIC Slider for Nikon Plan Fluorite 10X Objectives	\$825.00	Lead Time
MBH76720	Nikon DIC Slider for Nikon 16X Objectives	\$1,122.00	Lead Time
MBH76220	Nikon DIC Slider for Nikon Plan Fluorite 20X Objectives	\$825.00	Lead Time
MBH76225	Nikon DIC Slider for Nikon 25X Objectives	\$2,031.00	Lead Time
MBH76240	Nikon DIC Slider I for Nikon Plan Fluorite 40X Objectives	\$825.00	Lead Time
MBH76640	Nikon DIC Slider III for Nikon 40X APO NIR Water Objectives	\$1,122.00	Lead Time
MBH76160	Nikon DIC Slider I for Nikon 60X APO NIR Water Objectives	\$825.00	Lead Time

[Hide Fixed Arms for Custom Trans-Illumination Modules](#)

Fixed Arms for Custom Trans-Illumination Modules

Fixed arms use the linear dovetail on the Cerna microscope body to mount lens tubes and cage systems in the optical path. Because the linear dovetail spans the height of the support rail, these arms can be positioned anywhere along the body height, providing flexible positioning options and letting you design your own optical systems.

The CSA1001 has internal SM1 (1.035"-40) threads for Ø1" lens tubes and four 4-40 tapped holes on top and bottom for 30 mm cage systems, while the CSA1002 has internal SM2 (2.035"-40) threads for Ø2" lens tubes and four 4-40 tapped holes on top and bottom for 60 mm cage systems. They are tightened onto the support rail using setscrews that accept a 2.5 mm balldriver or hex key.

Item #	CSA1001	CSA1002
Photo (Click to Enlarge)		
Compatible Accessories	Ø1", SM1-Threaded Lens Tubes 30 mm Cage Systems	Ø2", SM2-Threaded Lens Tubes 60 mm Cage Systems

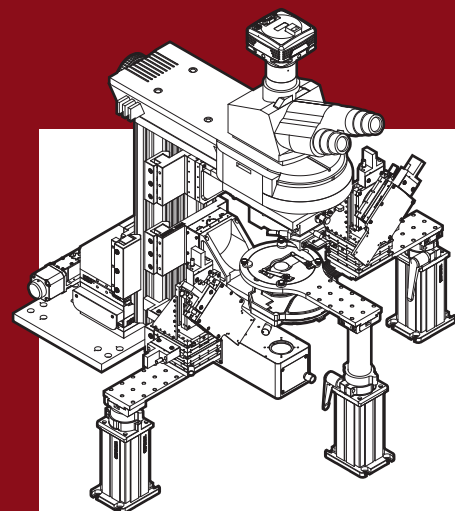


Click to Enlarge
User-Built Cerna Microscope with
Trans-Illumination Using Fixed Arms

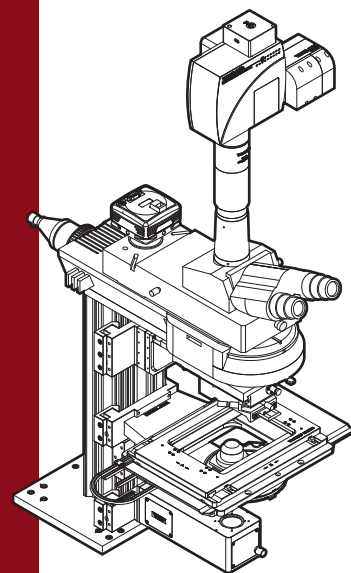
Part Number	Description	Price	Availability
CSA1001	Fixed Arm with Ø1", SM1-Threaded Hole and Taps for 30 mm Cage Systems	\$284.08	Today
CSA1002	Fixed Arm with Ø2", SM2-Threaded Hole and Taps for 60 mm Cage Systems	\$295.23	Today

Visit the *Cerna Components: Trans-Illumination* page for pricing and availability information:
https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=8569

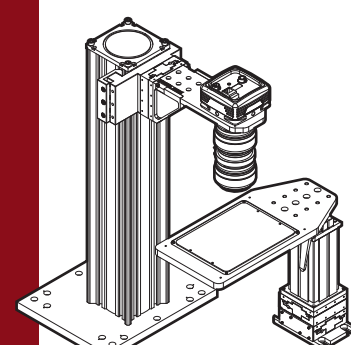
Cerna Series Microscopy Platform



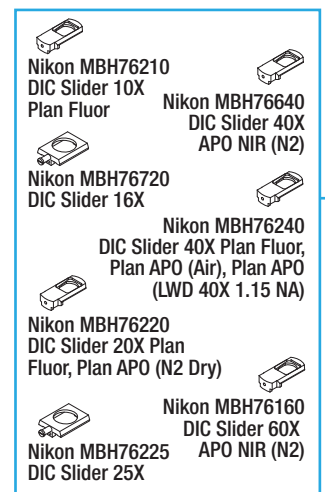
Cerna Rig CRE1003
This configuration is designed for electrophysiology experiments and includes rigid stands for micromanipulators.



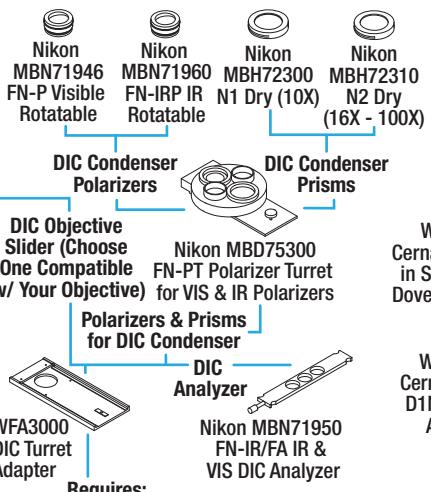
Cerna Rig CRC1002
This confocal microscope uses a Nikon dual camera port and fast XY Scanning stage.



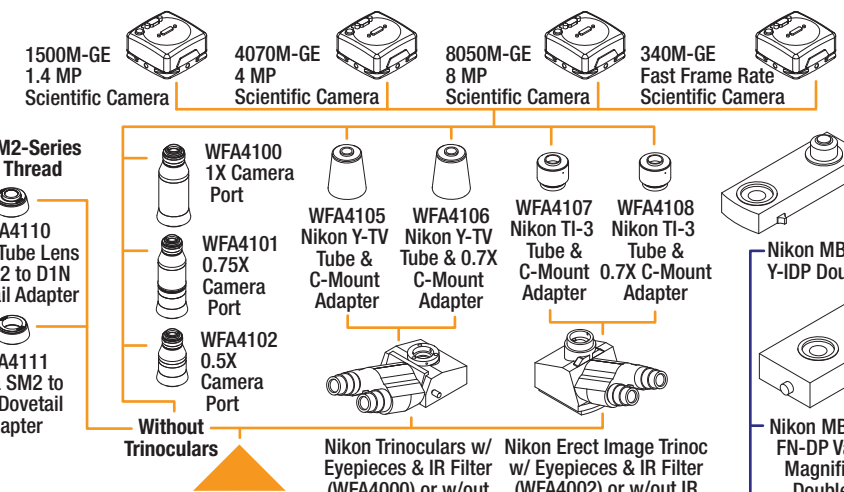
Cerna Rig CRF1001
The CSB1500F 500 mm Tall Microscope Body is designed to support setups for intrinsic signal imaging.



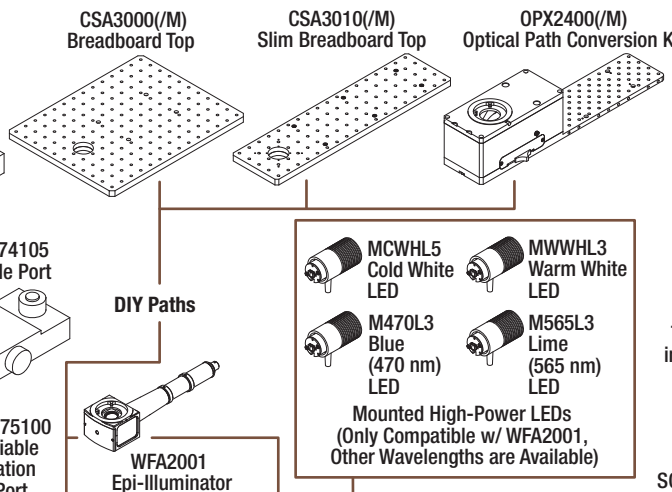
Nikon MBH76210 DIC Slider 10X Plan Fluor
Nikon MBH76640 DIC Slider 40X APO NIR (N2)
Nikon MBH76220 DIC Slider 16X
Nikon MBH76240 DIC Slider 40X Plan Fluor, Plan APO (Air), Plan APO (LWD 40X 1.15 NA)
Nikon MBH76220 DIC Slider 20X Plan Fluor, Plan APO (N2 Dry)
Nikon MBH76160 DIC Slider 60X APO NIR (N2)
Nikon MBH76225 DIC Slider 25X



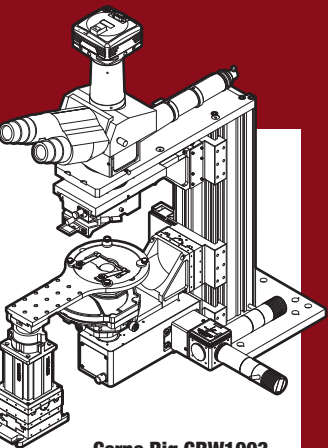
Nikon MBN71946 FN-P Visible Rotatable
Nikon MBN71960 FN-IRP IR Rotatable
Nikon MBH72300 N1 Dry (10X)
Nikon MBH72310 N2 Dry (16X - 100X)
DIC Condenser Polarizers
DIC Condenser Prisms
DIC Objective Slider (Choose One Compatible w/ Your Objective)
Nikon MBD75300 FN-PT Polarizer Turret for VIS & IR Polarizers
Polarizers & Prisms for DIC Condenser
DIC Analyzer
WFA3000 DIC Turret Adapter
Nikon MBN71950 FN-IR/FA IR & VIS DIC Analyzer



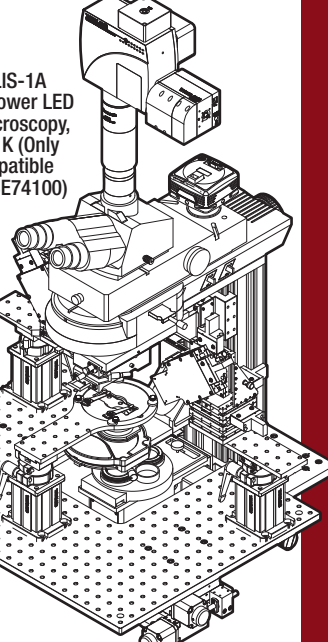
1500M-GE 1.4 MP Scientific Camera
4070M-GE 4 MP Scientific Camera
8050M-GE 8 MP Scientific Camera
340M-GE Fast Frame Rate Scientific Camera
WFA4100 1X Camera Port
WFA4101 0.75X Camera Port
WFA4102 0.5X Camera Port
WFA4105 Nikon Y-TV Tube & C-Mount Adapter
WFA4106 Nikon Y-TV Tube & 0.7X C-Mount Adapter
WFA4107 Nikon TI-3 Tube & C-Mount Adapter
WFA4108 Nikon TI-3 Tube & 0.7X C-Mount Adapter
Without Trinoculars
Step 2: Widefield Viewing Accessory
Nikon Trinoculars w/ Eyepieces & IR Filter (WFA4000) or w/out IR Filter (WFA4001)
Nikon Erect Image Trinoc w/ Eyepieces & IR Filter (WFA4002) or w/out IR Filter (WFA4003)



CSA3000(M) Breadboard Top
CSA3010(M) Slim Breadboard Top
OPX2400(M) Optical Path Conversion Kit
Nikon MBB74105 Y-IDP Double Port
Nikon MBD75100 FN-DP Variable Magnification Double Port
DIY Paths
MCWHL5 Cold White LED
MWWHL3 Warm White LED
M470L3 Blue (470 nm) LED
M565L3 Lime (565 nm) LED
Mounted High-Power LEDs (Only Compatible w/ WFA2001, Other Wavelengths are Available)

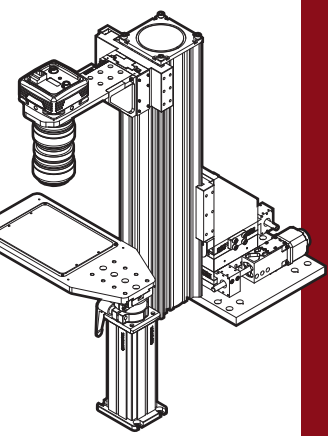


Cerna Rig CRW1003
This widefield imaging microscope includes a module for Dof contrast imaging.

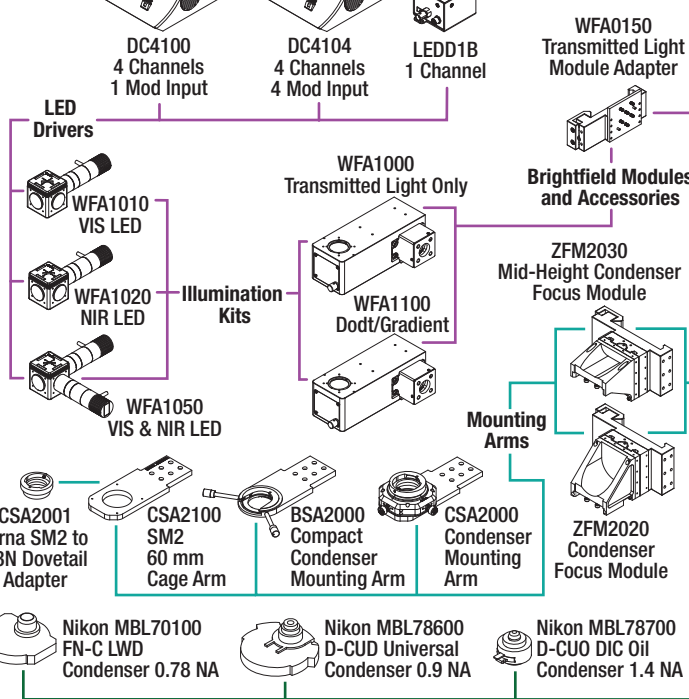


SOLIS-1A
High-Power LED for Microscopy, 6500 K (Only Compatible w/ MBE74100)
X-CITE120LED High-Power, Broad-Spectrum LED (Only Compatible w/ MBE74100)
X-CITE200 DC-Stabilized Fluorescence Light Source
HPLS243 Solid State Plasma Light Source
CSA1003 Cerna 60 mm Cage to D1N Dovetail Adapter
Nikon MBP71100 Single Objective Nosepiece
Nikon MBP70100 FN-S2N Sliding 2-Position Nosepiece
CSN1301 Manual 2-Position Nosepiece
CSN1302 Motorized 2-Position Nosepiece
MOT1500 Manual 5-Position Turret
PFM450E 450 µm Travel Piezo Stage

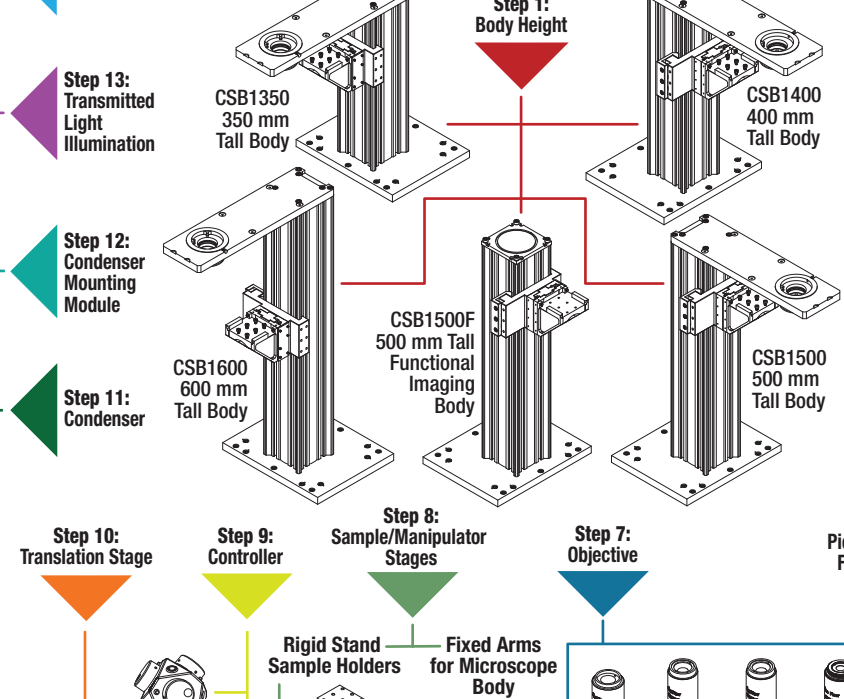
Cerna Rig CRE1005
With a platform for micromanipulators and double camera port, this microscope combines confocal and electrophysiology capabilities on an upright Cerna microscope.



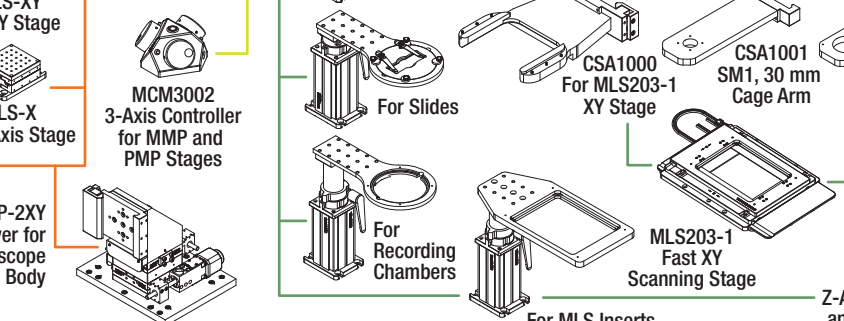
Cerna Rig CRF1002
This intrinsic imaging rig uses microscope movers to translate the field of view over a stationary sample.



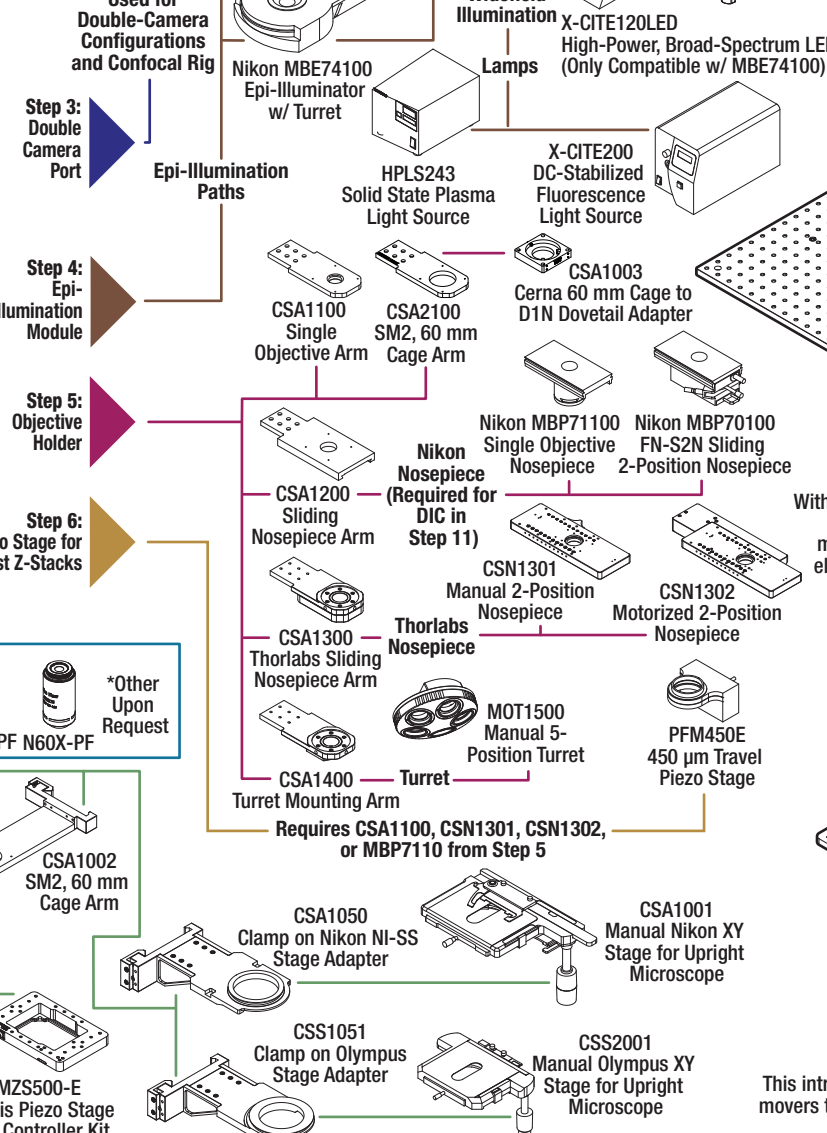
LED Drivers
WFA1010 VIS LED
WFA1020 NIR LED
WFA1050 VIS & NIR LED
DC4100 4 Channels 1 Mod Input
DC4104 4 Channels 4 Mod Input
LEDD1B 1 Channel
WFA0150 Transmitted Light Module Adapter
Brightfield Modules and Accessories
WFA1000 Transmitted Light Only
WFA1100 Dodt/Gradient
ZFM2030 Mid-Height Condenser Focus Module
ZFM2020 Condenser Focus Module
Mounting Arms
CSA2001 Cerna SM2 to D3N Dovetail Adapter
CSA2100 SM2 60 mm Cage Arm
BSA2000 Compact Condenser Mounting Arm
CSA2000 Condenser Mounting Arm
Nikon MBL70100 FN-C LWD Condenser 0.78 NA
Nikon MBL78600 D-CUD Universal Condenser 0.9 NA
Nikon MBL78700 D-CUD DIC Oil Condenser 1.4 NA



CSB1350 350 mm Tall Body
CSB1400 400 mm Tall Body
CSB1500F 500 mm Tall Functional Imaging Body
CSB1600 600 mm Tall Body
Step 1: Body Height
Step 2: Widefield Viewing Accessory
Step 3: Double Camera Port
Step 4: Epi-Illumination Module
Step 5: Objective Holder
Step 6: Piezo Stage for Fast Z-Stacks
Step 7: Objective
Step 8: Sample/Manipulator Stages
Step 9: Controller
Step 10: Translation Stage
Step 11: Condenser
Step 12: Condenser Mounting Module
Step 13: Transmitted Light Illumination
Step 14: DIC Components



MCM3001 3-Axis Controller for CSB, PLS, and ZFM Stages
MCM3002 3-Axis Controller for MMP and PMP Stages
PLS-XY 1" XY Stage
PLS-X 1" X-Axis Stage
MMP-2XY XY Mover for Microscope Body
PMP-2XY(M) XY Manipulator Platform
PMP1000(M) Manual XY Manipulator Platform



Nikon Trinoculars w/ Eyepieces & IR Filter (WFA4000) or w/out IR Filter (WFA4001)
Nikon Erect Image Trinoc w/ Eyepieces & IR Filter (WFA4002) or w/out IR Filter (WFA4003)
WFA4100 1X Camera Port
WFA4101 0.75X Camera Port
WFA4102 0.5X Camera Port
WFA4105 Nikon Y-TV Tube & C-Mount Adapter
WFA4106 Nikon Y-TV Tube & 0.7X C-Mount Adapter
WFA4107 Nikon TI-3 Tube & C-Mount Adapter
WFA4108 Nikon TI-3 Tube & 0.7X C-Mount Adapter
Without Trinoculars
Step 2: Widefield Viewing Accessory
Nikon Trinoculars w/ Eyepieces & IR Filter (WFA4000) or w/out IR Filter (WFA4001)
Nikon Erect Image Trinoc w/ Eyepieces & IR Filter (WFA4002) or w/out IR Filter (WFA4003)