OLYMPUS®

BHTU Clinical Laboratory Microscope

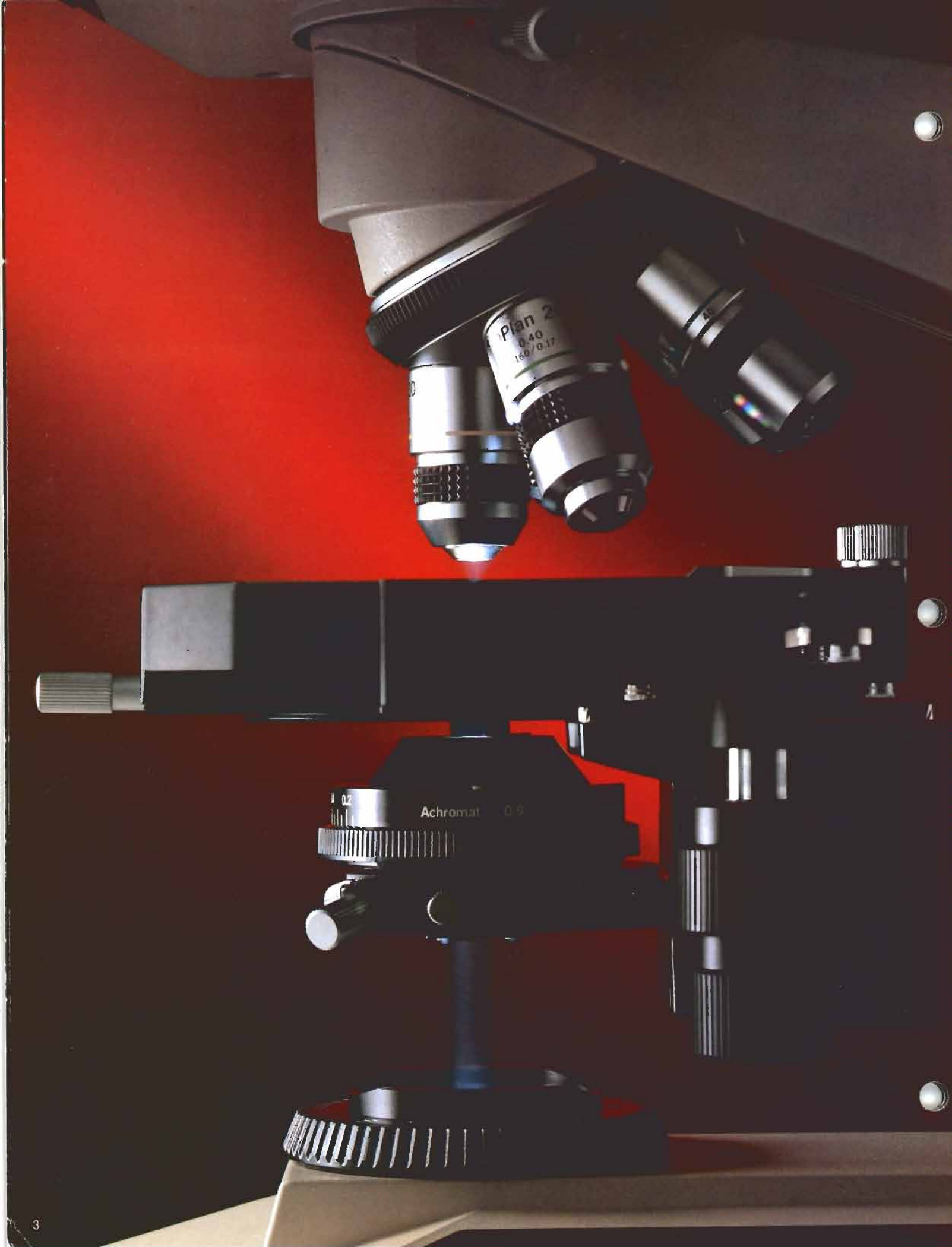
Top Performance at an Affordable Price

Antinuclear antibodies. Nuclear fluorescence of cultured fibroblasts stained with antinuclear antibodies. DPlan 40X. NFK3.3X. Courtesy: Professor Y. HAMASHIMA Kyoto Univ.

The Model BHTU microscope belongs to the new BH-2 Series, and like the other models in the series it is suitable for most applications in transmitted light microscopy. However, in designing this particular microscope, special care was taken to provide fatigue-free operation through long periods of use, and easy, rapid change of specimens—the most desired features for clinical laboratory use. The BHTU is available in either a binocular or a trinocular version, and there is a wide variety of accessories to cater to the most demanding user.

Mm-1 cell in culture medium. DAch 20XPL. NFK5X.

Squamous carcinoma cells in vaginal smear. Papanicolaou stain. DPlan 40X. NFK2.5X

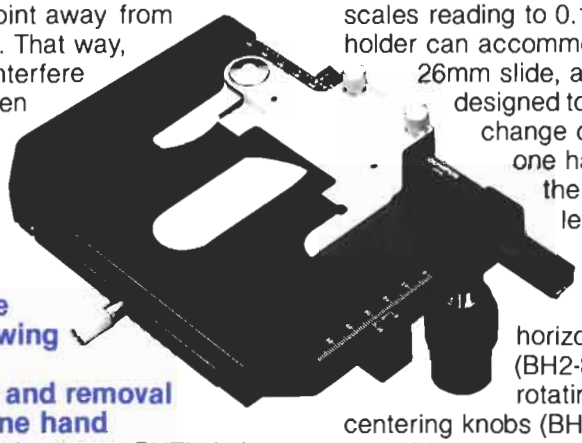

Plan
0.40
160/0.17
Achromat

Ergonomically designed stand, based on full understanding of operator requirements

The Model BHTU Stand is of modern square design and is extremely solid, durable and stable. All controls are ergonomically positioned to provide maximum ease of operation. The coaxial coarse and fine focusing adjustment knobs move smoothly and fit snugly into the hand of the operator. The substage, in the shape of a circular dovetail for increased stability and strength, is low positioned to minimize fatigue and simplify specimen change.

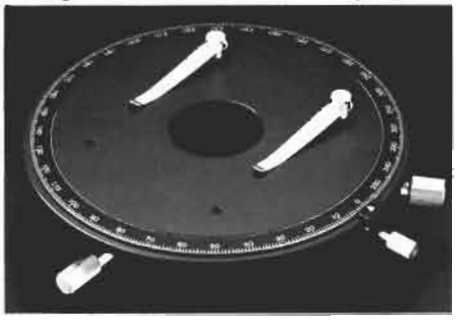
Inward facing nosepiece for easy, quick specimen change

The quintuple revolving nosepiece is positioned in such a way that the objectives point away from the observer. That way, it does not interfere with specimen change or specimen marking.



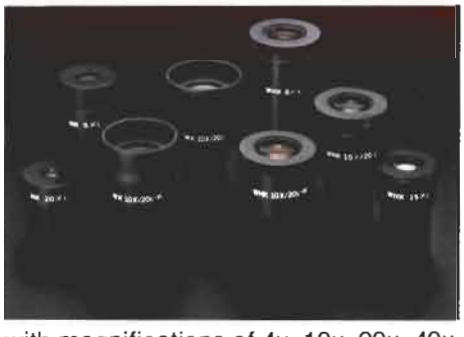
Easy-to-use stage, allowing specimen placement and removal with just one hand

The stage of the Model BHTU is interchangeable. The standard stage is square and rotating, with vertical coaxial control knobs on the right-hand side. The range of movement is 76mm in the X axis and 50mm in the Y axis, with vernier scales reading to 0.1mm. The slide holder can accommodate a 76mm × 26mm slide, and is uniquely designed to permit rapid interchange of slides with just one hand. In addition to the standard stage, a left-handed version (BH2-SVL-2), a square rotating stage with horizontal control knobs (BH2-SH), and a circular rotating stage with centering knobs (BH2-SRG) are also available. All stages are hard-coated.

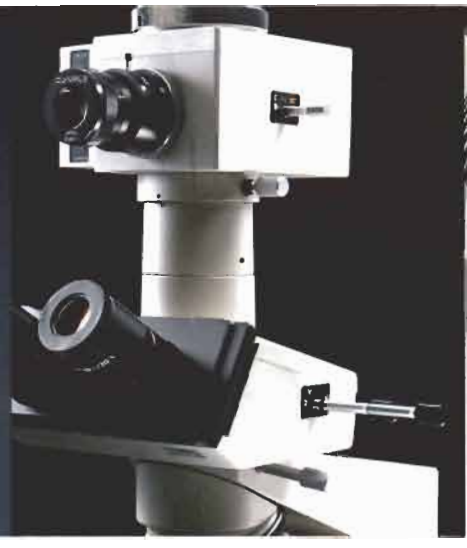


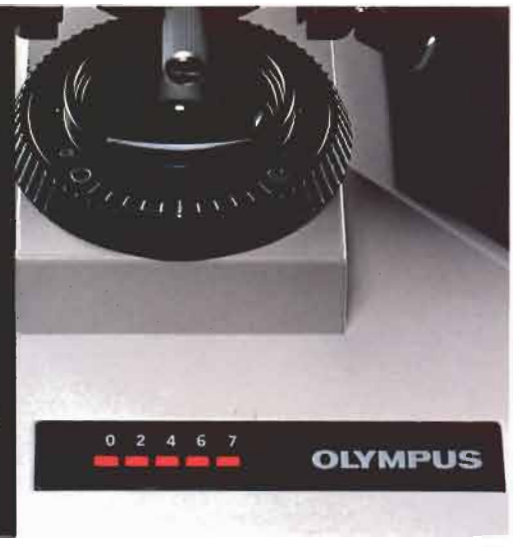
Superb optics assure optimum contrast and image clarity at all times

The Model BHTU comes equipped with a new series of objectives, known as the LB objectives, which feature the international 45mm parfocal distance system and which are corrected for a mechanical tube length of 160mm. Two types of standard objectives are available, D Achromats and D Plan Achromats,



with magnifications of 4x, 10x, 20x, 40x, and 100x. The standard eyepiece is the WK10x, also newly developed to match the LB objective series. It has a larger-than-normal field number of 20 and an eyepoint high enough for spectacle wearers. A WHK8x eyepiece is also available to provide magnification equivalent to a 10x eyepiece when using a 1.25x intermediate tube, such as reflected light fluorescence. The entire optical system is treated with a special coating that helps yield bright, high contrast images by reducing internal reflections within the system to an absolute minimum.



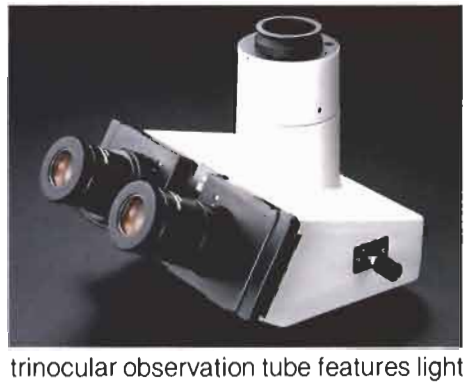


Illumination you can depend on, thanks to high quality condensers

The swing-out achromatic condenser, N.A. 0.90/0.16, with iris diaphragm is standard for trinocular versions and illuminates all objectives from 2x to 100x ideally for both observation and photomicrography. There is also an Abbe two-lens condenser, N.A. 1.25, with iris diaphragm to facilitate observation with 4x to 100x objectives and photomicrography with a 10x, or higher objective. Other types of condensers, such as darkfield condensers, are also available on request.

Observation tubes feature constant tube length adjustment and assure bright image

Both the binocular and trinocular observation tubes have a visual angle of 30° to the horizontal for observation in the most comfortable position, and both can be rotated 360°. The eyepiece tubes are parallel and a diopter ring is provided on the left eyepiece tube for compensation of eye acuity. Interpupillary distance adjustment can be made from 56mm to 75mm without changing the mechanical tube length, thus maintaining objective parfocality independent of interpupillary distance. The



trinocular observation tube features light path selector prisms, which distribute the light coming through the objective in three ways: 100% observation; 20% observation/80% camera; 100% camera. The 100% camera option significantly increases the range of photomicrography, particularly for dark specimens in fluorescence or high power phase contrast microscopy.

Pre-centered illumination system eliminates cumbersome adjustments

The pre-centered Koehler type illumination system is built into the base. The light source is an easily replaceable Philips 6V 20W tungsten halogen lamp. The transformer and solid-state circuit for light control are contained within the microscope for greater compactness. The illumination voltage is indicated by an LED display. Not only is this more accurate and durable than previous mechanical meters, but it is also easy to read at low ambient light, thus simplifying accurate illumination voltage control. The variable field iris diaphragm is housed in the base.

Various accessories to suit your special needs

Special attachments include automatic and manual 35mm, 3 1/4" × 4 1/4" Polaroid® and 4" × 5" cameras, exposure meters, a multi-head attachment, an epi-fluorescence attachment (blue or green excitation) and simple polarized light accessory. Phase contrast attachments are also available.

Phase Contrast Attachment BH2-PC

A widely recognized means of enhancing image contrast for the observation of living or unstained specimens.

The phase contrast attachment is an essential tool for examining colorless transparent specimens or cell culture material. The objectives for phase contrast microscopy are achromats and are available in four types of contrast, positive low (PL), positive low low (PLL), negative high (NH) and negative medium (NM), permitting the selection of the contrast best suited to the characteristics of the material. Positive (dark) contrast is for the examination of cellular or nuclear material, while negative (bright) contrast is for the examination of low contrast specimens or the observation of cellular kinetics. Magnifications available are 10x, 20x, 40x and 100x for each contrast. The phase contrast turret condenser has individually centerable phase annuli, plus one open aperture and an aperture iris diaphragm for brightfield observation. The aperture iris diaphragm is designed to open automatically when a switch-over from brightfield to phase contrast is made.

Standard Outfits

		Module	BH2-PC				
			PA-2	PB-3	PB-4	PB-5	PB-6
Phase Contrast Turret Condenser* N.A. 1.25		BH2-PC	○	○	○	○	○
Centering Telescope		CT-5	○	○	○	○	○
Phase Contrast Objective Set	D Achromat	10X, 20X, 40X, 100X (oil), PL	○	○			
		10X, 20X, 40X, 100X (oil), PLL	○		○		
		10X, 20X, 40X, 100X (oil) NH	○			○	
		10X, 20X, 40X, 100X (oil) NM	○				○

*IF550 interference filter included.

Contrasts:
PL = POSITIVE LOW NH = NEGATIVE HIGH
PLL = POSITIVE LOW-LOW NM = NEGATIVE MEDIUM

Reflected Light Fluorescence Attachment (after PLOEM) BH-RFL-W

Reflected light fluorescence has become the most efficient method for research and routine work due to its numerous advantages over transmitted light fluorescence, particularly in immunofluorescence.

The reflected light fluorescence attachment BH-RFL-W greatly increases the versatility of the BHTU regarding diagnostic and screening procedures in the laboratory.
Two sets of Ploem-type dichroic mirror holders are available (B-G, B-O). Each mirror holder contains two dichroic mirror positions on a slider, to permit rapid change-over from one exciting wavelength to the other. This design is very convenient for the observation of double stained specimens.
In addition to the permanent barrier filters in the mirror holders 4 barrier filters on sliders, from O-530 to R-610 are provided. Our standard D Plan Achromat or D Achromat objectives can be used. A choice of illuminators is available, the 100W mercury vapor arc lamp for high intensity irradiation, or the 100W, 12V halogen lamp for routine screening of FITC stained specimens.

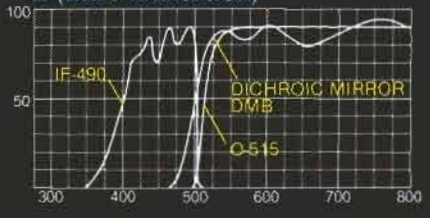
Standard Outfits

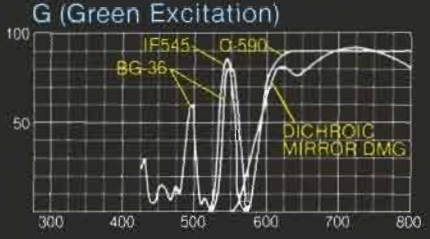
		Module	BH-RFL		
			W4	W5	W6
Vertical Fluorescence Illuminator		BH-RFA-W	○	○	○
Lamp Housing	Mercury*1	BH-LSRF-W	○	○	
	Halogen*2	BH-LSRH-W			○
Power Supply Unit	For 100W Mercury	BH-RFL-T	○	○	
	For 100W Halogen	TH-2			○
Dichroic Mirrors	B & G Excitation	BH-DMBG	○		
	B Excitation & "0"position	BH-DMBO		○	○
Barrier Filters	B Excitation	2OO-530-W	○	○	
		2OO-570-W	○	○	
		2OO-590-W	○	○	
	G Excitation	2OR-610-W	○		
Power Cord			○	○	
Grounding Wire			○	○	
Bottle of Silicon (50cc)			○	○	○
UV Protective Shade			○	○	○

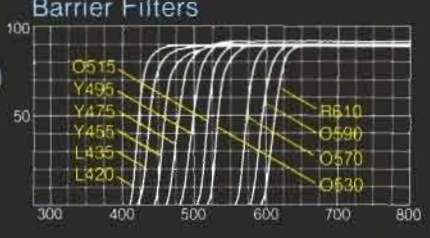
*1 *Two Osram HBO 100W mercury bulbs included.*
*2 *Two Philips 7023 12V 100W halogen bulbs included.*

Additional Accessories

For FITC stained specimens.
Set BH-RFL-W6







Simple Polarizing Attachment BH2-KP

This simple, low-cost attachment consists of an intermediate tube containing a filter analyzer, a filter polarizer, a compensator plate and a revolving stage. Polarized light microscopy has become increasingly popular in medicine, for example in the diagnosis of gout. For this type of application, it is now possible to perform polarized light observations with this attachment, without having to purchase more sophisticated polarized light accessories. As the objectives do not need to be strain-free, standard brightfield LB series objectives give excellent results.

Standard Outfits

	Module	BH2-KP
Intermediate Tube	BH2-KPA	○
Revolving Stage	BH2-SRG	○
Compensator Plate	AH-TP530	○

Swing-out Filter Holder BH2-FH

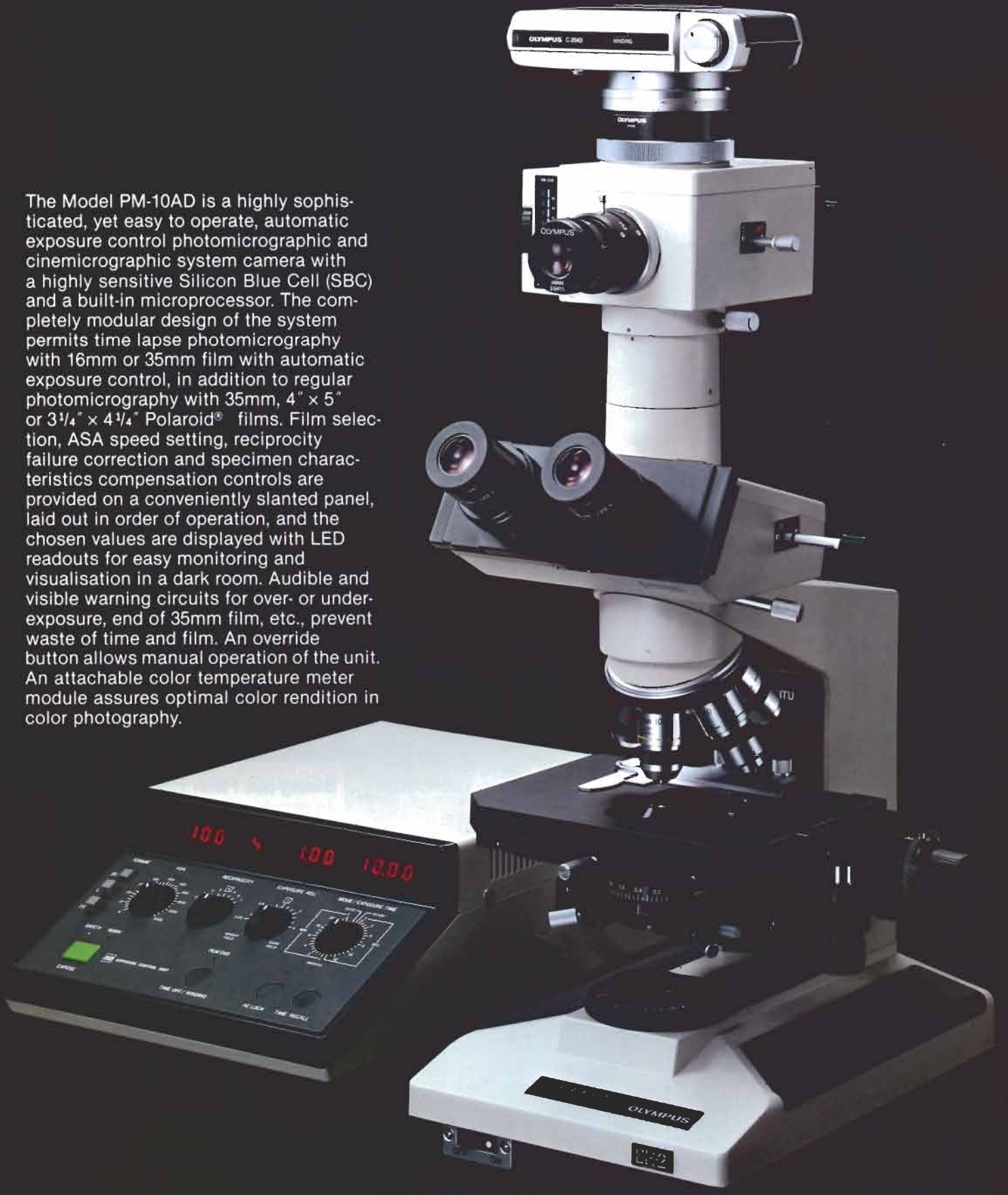
An easy-to-attach filter holder, the BH2-FH accepts up to 3 filters. It is especially useful when using more than one filter, as in photomicrography.

Drawing Attachment BH2-DA

This attachment facilitates drawing the magnified specimen details quickly and accurately while viewing through standard microscope observation tube.

Photomicrographic and Cinemicrographic System Camera PM-10AD

The Model PM-10AD is a highly sophisticated, yet easy to operate, automatic exposure control photomicrographic and cinemicrographic system camera with a highly sensitive Silicon Blue Cell (SBC) and a built-in microprocessor. The completely modular design of the system permits time lapse photomicrography with 16mm or 35mm film with automatic exposure control, in addition to regular photomicrography with 35mm, 4″ × 5″ or 3¼″ × 4¼″ Polaroid® films. Film selection, ASA speed setting, reciprocity failure correction and specimen characteristics compensation controls are provided on a conveniently slanted panel, laid out in order of operation, and the chosen values are displayed with LED readouts for easy monitoring and visualisation in a dark room. Audible and visible warning circuits for over- or under-exposure, end of 35mm film, etc., prevent waste of time and film. An override button allows manual operation of the unit. An attachable color temperature meter module assures optimal color rendition in color photography.



Standard Outfits

Module		Photomicrography		
		PM-10		
		35AD-1	L1AD-1	L2AD-1
Automatic Exposure Body (Including connecting cable UYKK12)	PM-PBS	○	○	○
Automatic Exposure Control Unit	PM-CBAD	○	○	○
Power Cord (for PM-CBAD)	UYCP	○	○	○
Adapter for 35mm Camera Back	PM-D35A	○		
Adapter for Large Format Film Back	PM-DL-W		○	○
35mm Camera Back with Automatic Film Advance	C-35AD	○		
4"×5" Intermediate Adapter	PM-C4×5-W		○	
3¼"×4¼" Polaroid® Back	PM-CP-W			○
Color Temperature Compensation Filter	45LBD2	○	○	○
	45LBT	○	○	○
Neutral Density Filter	43ND6-W45	○	○	○
	43ND25-W45	○	○	○

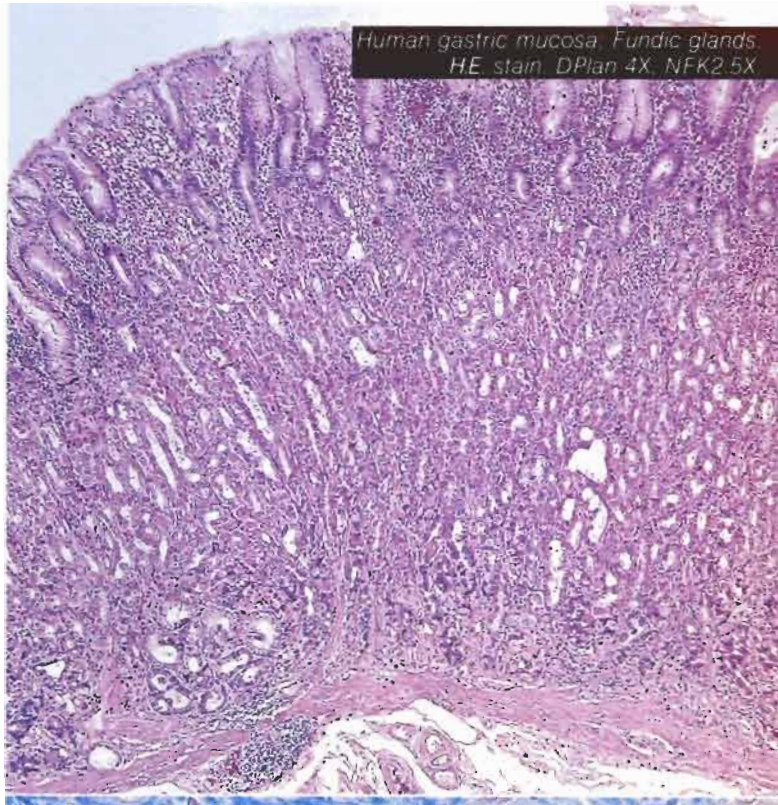
Optional accessories

PM-VTM: Turret Mask Focusing Telescope
PM-VS: Focusing Telescope
FT-36: Focusing Magnifier
PM-CTR: Color Temperature Module

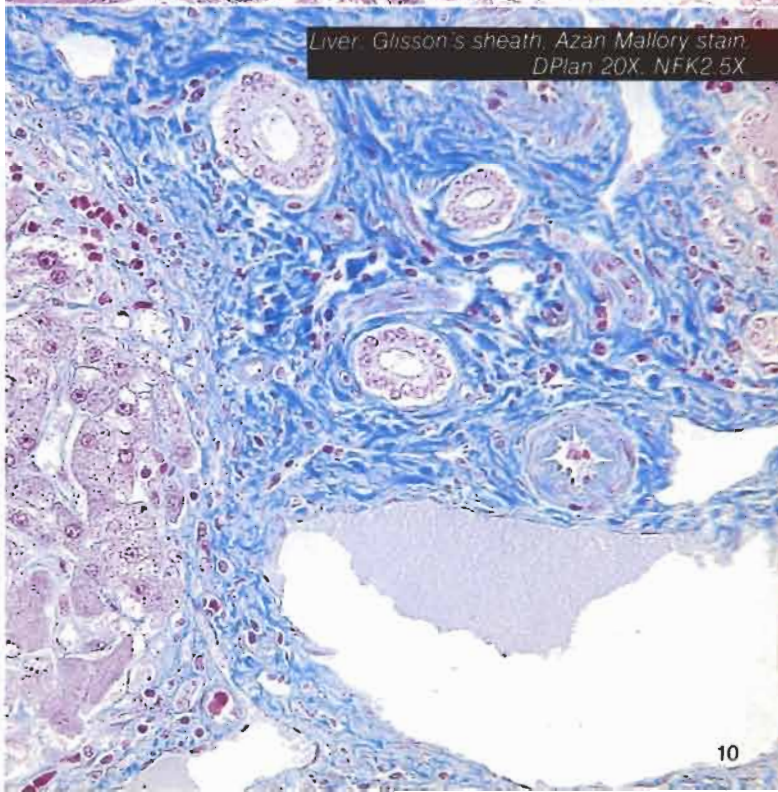
N.B.

•In photomicrography, camera focus is critical. However, when employing objectives with magnifications of 4X or lower, their considerable depth of focus makes accurate focusing through a normal eyepiece very difficult. This difficulty is solved by combined use of the focusing telescope (PM-VTM or PM-VS) or finder eyepiece and the focusing magnifier (FT-36).
For precise framing of the area to be photographed, both of the focusing telescopes have format outlines indicating 35mm, 4"×5" and 3¼"×4¼" frame sizes (in addition to 120 roll film in the PM-VS). Four different finder eyepieces are available for each frame size.

•In color photomicrography, faithful color reproduction largely depends upon whether the color temperature of the microscope illumination is adequately adjusted to that of the film in use. The color temperature module PM-CTR, an optional accessory, simplifies checking and adjustment of microscope illumination color temperature for optimal results.



Human gastric mucosa. Fundic glands. H.E. stain. DPlan 4X. NFK2.5X

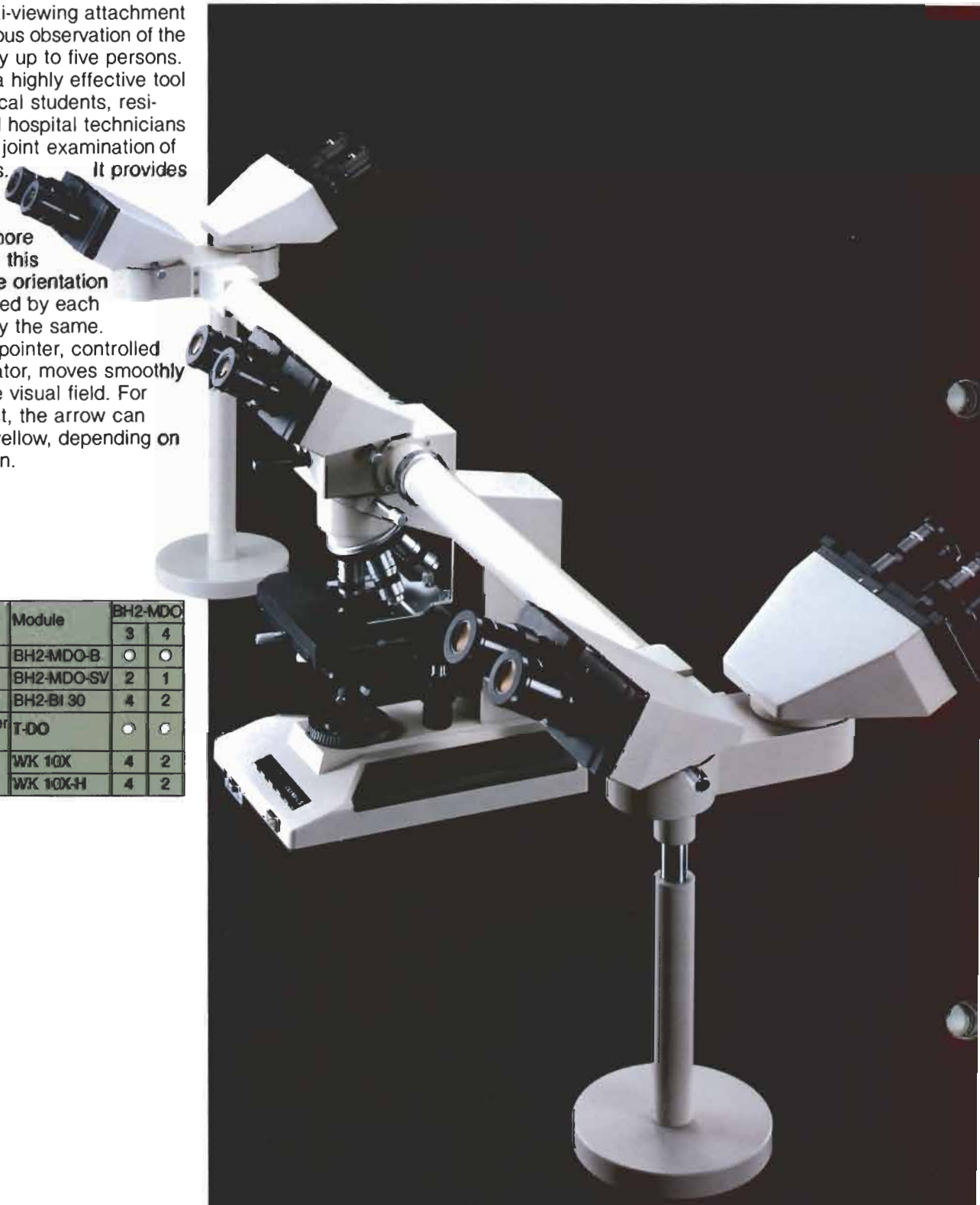


Liver. Glisson's sheath. Azan Mallory stain. DPlan 20X. NFK2.5X

Multi-Viewing Attachment BH2-MDO

An extremely effective teaching tool permitting simultaneous observation of the image in the same orientation by up to five people.

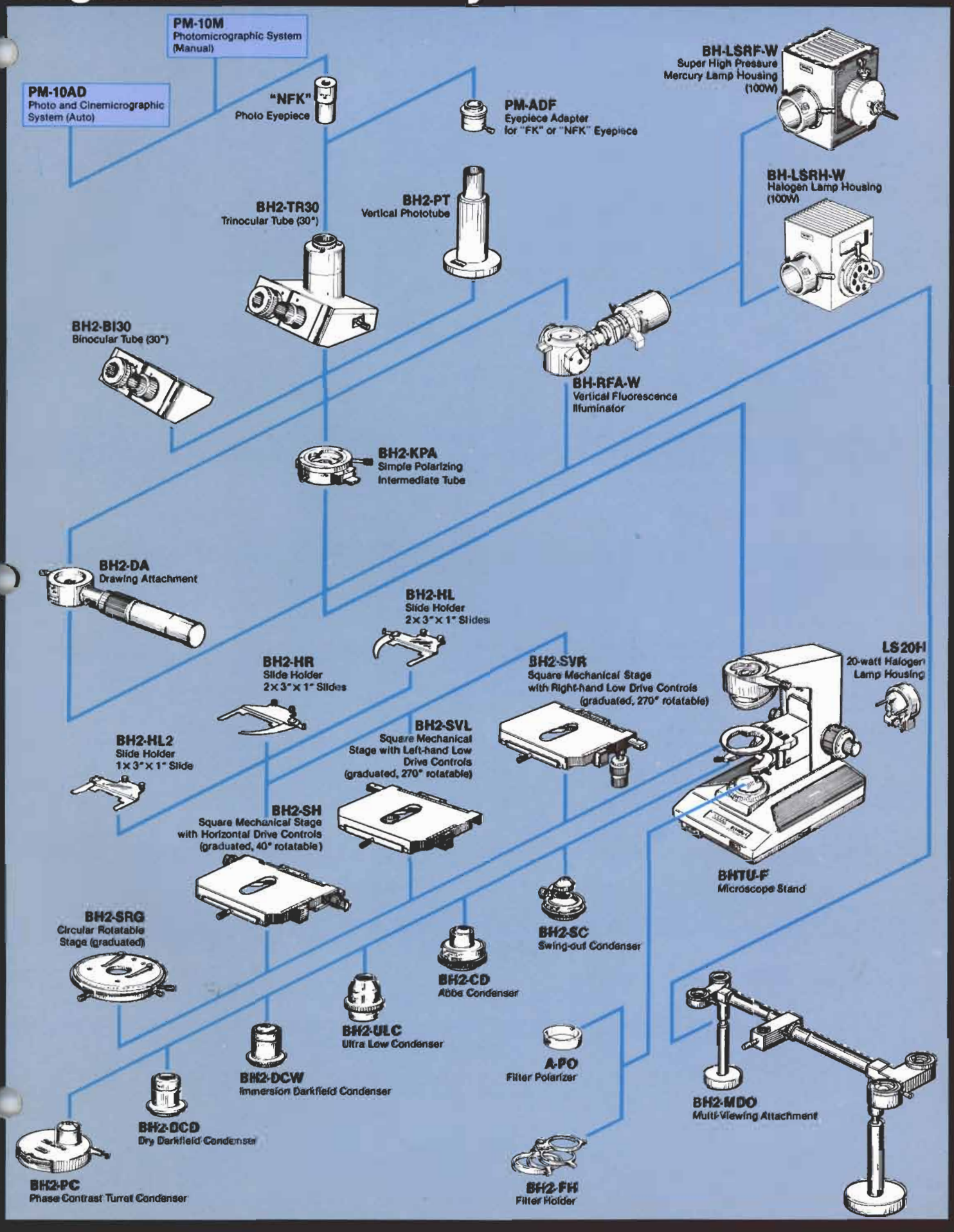
The Olympus multi-viewing attachment permits simultaneous observation of the same specimen by up to five persons. Accordingly, it is a highly effective tool for teaching medical students, residents, factory and hospital technicians as well as for the joint examination of difficult specimens. It provides images with completely even brightness, and, more than that, it offers this unique feature: the orientation of the image viewed by each observer is exactly the same. An arrow-shaped pointer, controlled by the main operator, moves smoothly to any point in the visual field. For maximum contrast, the arrow can appear green or yellow, depending on the specimen stain.



Standard Outfits

	Module	BH2-MDO	
		3	4
Multi-Viewing Body	BH2-MDO-B	○	○
Optical Relay Unit	BH2-MDO-SV	2	1
Binocular Tube	BH2-BI 30	4	2
Transformer for Pointer Illumination	T-DO	○	○
Widefield Eyepiece	WK 10X	4	2
	WK 10X-H	4	2

Diagram of the BHTU System



Data of LB Optics

Objective Series for Biological Use

	Magnification	Numerical Aperture	Working Distance mm	Focal Length mm	Cover Glass Thickness mm	Remarks	Order Designation
D Plan Achromatic Objectives							
D Plan	4X, dry	0.1	7.03	34.23	—		DPL 4X
	10X, dry	0.25	7.40	17.50	0.17		DPL 10X
	20X, dry	0.4	0.83	8.99	0.17	Spring-loaded	DPL 20X
	40X, dry	0.65	0.23	4.67	0.17	Spring-loaded	DPL 40X
	100X, oil	1.25	0.17	1.75	0.17	Spring-loaded	DPL 100X
D Achromatic Objectives							
D Ach	4X, dry	0.10	18.23	30.03	—		DA 4X
	10X, dry	0.25	7.18	16.90	0.17		DA 10X
	20X, dry	0.40	1.63	8.63	0.17	Spring-loaded	DA 20X
	40X, dry	0.65	0.60	4.58	0.17	Spring-loaded	DA 40X
	60X, dry	0.80	0.23	3.14	0.17	Spring-loaded	DA 60X
	100X, oil	1.30	0.20	1.90	0.17	Spring-loaded	DA 100X
S Plan Fluorite Objectives							
S Plan FL	1X, dry	0.04	2.2	137.86	—		SPLFL 1X
	2X, dry	0.08	5.5	73.42	—		SPLFL 2X
No Cover Objectives							
S Plan	40X, dry	0.70	0.45	4.19	—	Spring-loaded	NCSPL 40X
D Plan FL	60X, dry	0.95	0.14	3.05	—	Spring-loaded	NCDPLFL 60X
S Plan Apo	100X, oil	1.40	0.31	1.63	—	Iris diaphragm, Spring-loaded	NCSPLAPO 100X
Phase Contrast Objectives							
D Ach	10X, dry PL	0.25	7.18	16.90	0.17		PCDA 10XPL
	10X, dry PLL						PCDA 10XPLL
	10X, dry NH						PCDA 10XNH
	10X, dry NM						PCDA 10XNM
	20X, dry PL	0.40	1.63	8.63	0.17	Spring-loaded	PCDA 20XPL
	20X, dry PLL						PCDA 2XPLL
	20X, dry NH						PCDA 20XNH
	20X, dry NM						PCDA 20XNM
	40X, dry PL	0.65	0.60	4.58	0.17	Spring-loaded	PCDA 40XPL
	40X, dry PLL						PCDA 40XPLL
	40X, dry NH						PCDA 40XNH
	40X, dry NM						PCDA 40XNM
	100X, oil PL	1.30	0.20	1.90	0.17	Spring-loaded	PCDA 100XPL
	100X, oil PLL						PCDA 100XPLL
	100X, oil NH						PCDA 100XNH
	100X, oil NM						PCDA 100XNM

Eyepiece Series

	Field Number mmϕ	Eyepoint mm	Focal Length mm	Remarks
Widefield Eyepieces				
WK 10X	20	16.0	25.0	
WK 10X-H	20	16.0	25.0	Diopter adjustment −8 ~ +2
Micro-WK 10X	20	16.0	25.0	Built-in 10/100 micrometer disc
Cross-WK 10X	20	16.0	25.0	Built-in cross micrometer disc
WHK 8X	20	18.7	31.25	
WHK 8X-H	20	18.7	30.25	Diopter adjustment −8 ~ +2
WHK 10X	20	18.7	25.0	
WHK-10X-H	20	18.7	25.0	Diopter adjustment −8 ~ +2
Micro-WHK 10X	20	18.7	25.0	Built-in 10/100 micrometer disc
Cross-WHK 10X	20	18.7	25.0	Built-in cross micrometer disc
WHK 15X	14	15.7	16.7	
WHK 15X-H	14	15.5	16.5	Diopter adjustment −8 ~ +2
Compensating Eyepieces				
NK 5X	21	16.4	50.0	
NK 20X	10	10.5	12.5	
Cross-NK 5X	21	16.4	20.0	Built-in cross micrometer disc.

Denote: PL = *Positive Low Contrast.* PLL = *Positive Low-Low Contrast.* NH = *Negative High Contrast.* NM = *Negative Meduim Contrast.*

Eyepiece Series

	Field Number mmϕ	Eyepoint mm	Focal Length mm	Remarks	
Finder Eyepieces					
35-WK 10X	20	16.0	25.0	With built-in 35mm mask	To be matched with WK 10X
P-WK 10X	20	16.0	25.0	With built-in 3¼" x 4¼" mask	
4 x 5-WK 10X	20	16.0	25.0	With built-in 4" x 5" mask	
35-WHK 10X	20	18.7	25.0	With built-in 35mm mask	To be matched with WHK 10X
P-WHK 10X	20	18.7	25.0	With built-in 3¼" x 4¼" mask	
4 x 5-WHK 10X	20	18.7	25.0	With built-in 4" x 5" mask	
Photo Eyepieces					
NFK 2.5X	23.0	—	—		
NFK 3.3X	18.4	—	—		
NFK 5X	12.4	—	—		
NFK 6.7X	8.8	—	—		

Condensers

	Numerical Aperture	Focal length mm	Aperture Iris Diaphragm	Remarks
Swing-out Condenser				
BH2-SC	0.90 (top element in) 0.16 (top element out)	12 220	●	2X ~ 100X,
Abbe Condenser				
BH2-CD	1.25	13.4	●	4X ~ 100X,
Ultra-low Condenser				
BH2-ULC	0.16	67.4	●	1X ~ 4X,
Phase Contrast Condenser				
BH2-PC	1.25	13.4	●	10X ~ 100X
Darkfield Condenser				
BH2-DCD, dry	0.92 ~ 0.8	11.8	—	10X ~ 40X
BH2-DCW, oil	1.4 ~ 1.2	7.65	—	10X ~ 100X

BHTU Standard Outfits

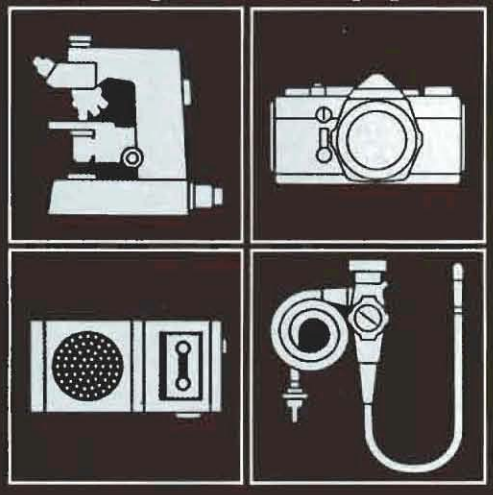
		Module	BHTU		
			111	112	312
Microscope Stand		BHTU-F	○	○	○
Observation Tube	Binocular, 30° Inclined	BH2-BI30	○	○	
	Trinocular, 30° Inclined	BH2-TR30			○
Mechanical Stage	Graduated	BH2-SVR	○	○	○
Condenser	Top Lens Swing-out/in	BH2-SC			○
	Abbe	BH2-CD	○	○	
Lamp Housing	20W Halogen	LS20H	○	○	○
Bulb	6V 20W Halogen	6V 20W HAL	2	2	2
Power Cord		UYCP	○	○	○
Objective	Achromat (D Ach)	4X	○		
		10X	○		
		40X	○		
		100X, oil	○		
	Plan Achromat (D Plan)	4X		○	○
		10X		○	○
		40X		○	○
		100X, oil		○	○
Eyepiece	Viewing, Widefield, HEP	WK 10X	2	2	2
	Photo	NFK 3.3X			○

***BHTU** W190 x D300 x H390mm (435mm high with trinocular tube).*

An unwavering will to remain
at the forefront of scientific discovery,
and an uncompromising commitment
to quality have made the name
of Olympus a synonym for high performance
and reliability all over the world.
From cameras and microcassette recorders,
to microscopes for various applications,
fiberscopes, and facsimiles,
Olympus has kept abreast
of the most advanced technologies
and discoveries, constantly striving
to develop products which meet the new
and more complex needs
of our rapidly changing society.
Precision engineering,
long experience
and R&D activities tuned to the requirements
of man in his search for a better life,
have earned Olympus its unparalleled position
in the medical profession, in the photographic industry,
in the laboratory and the classroom,
and in the eyes of all those who benefit
from the functionality, accuracy,
versatility and economy of its products.

Progress through Precision

Photographic,
Medical,
Microscopic,
Measuring & Audio Equipment



OLYMPUS

OLYMPUS OPTICAL CO., LTD.
San-Ei Building, 22-2, Nishi Shinjuku 1-chome, Shinjuku-ku, Tokyo, Japan
OLYMPUS OPTICAL CO. (EUROPA) GMBH.
Postfach 104908, Wendenstrasse 14-16, 2 Hamburg 1, West Germany
OLYMPUS CORPORATION OF AMERICA
4 Nevada Drive, New Hyde Park, N.Y. 11042, U.S.A.

As we are continually improving and developing our products, the equipment supplied may not agree in all details with the descriptions and/or illustrations shown in this catalog.

Printed in Japan M11E-0281S