

Swift M² Microscope

Care and Use Manual

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Swift M² Microscope

The Swift M² is a versatile microscope designed for both Microscopic (high magnification, small field of view) and Macroscopic (low magnification, large field of view) applications. It is the first microscope ever developed with this unique dual-function, and specifically designed to withstand the rigors of classroom and field use. Our optical systems utilize high resolution optics, with a high quality infinity-corrected optical system that has precision matched objectives, binocular head and eyepieces.

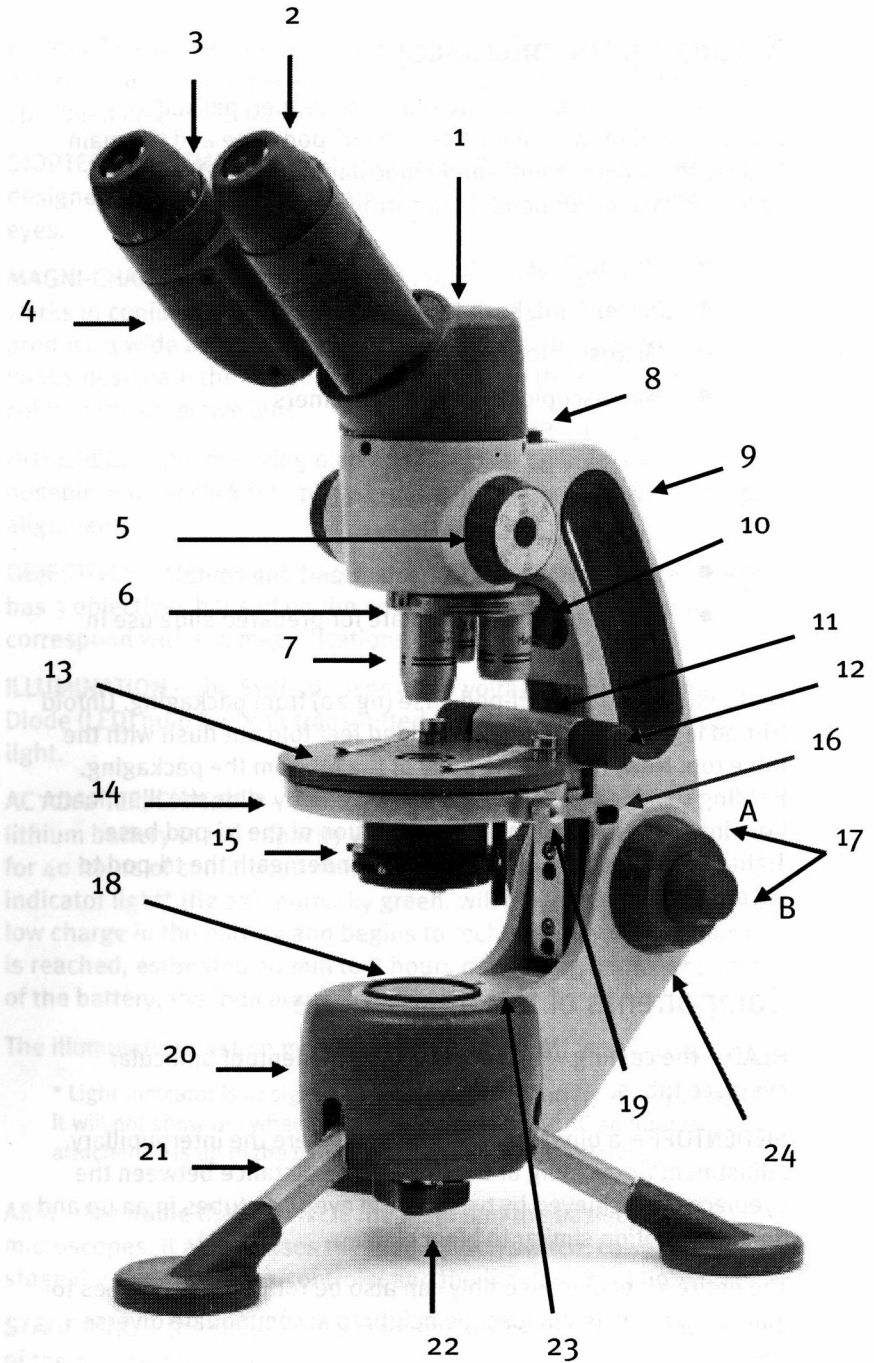
These fine optics, together with the innovative tri-pod base design and modular stage system, produce a rugged yet sophisticated instrument designed to perform for many years in a variety of environments and in numerous applications.

The M² is equipped with a unique objective system and adjustable stage that allows for changes in magnification and viewing mode. The microscope can be used along with the appropriate lighting and objective in the upper most position – or “micro” mode; or by lowering the stage to its lowest position into the “macro” mode.

The M² is equipped with a variety of platforms for observation of specimens. They include optically clear collection containers that can hold live specimens, drop-in stage plates in black, white and diffused clear. A stage plate is included with an attached 1.20 N.A. condenser, for microscopic use. Each M² features a rechargeable LED, top and bottom illumination for cordless operation both in and outside the classroom.

Parts List

- 1 Head
- 2 Eyepiece
- 3 Diopter Adjustment
- 4 Siedentopf Binocular Head
- 5 Magni-Changer
- 6 Nosepiece
- 7 Objectives
- 8 Three-way Switch
- 9 Arm
- 10 LED Incident (top) Light
- 11 Stage Ring Housing
- 12 Stage Ring Housing Knobs
- 13 Microscopic Stage Plate
- 14 Stage Ring
- 15 Condenser
- 16 Stage Release Lever
- 17 Coaxial Controls
 - A – Coarse Focus
 - B – Fine Focus
- 18 LED Transmitted (bottom) Light
- 19 Stage Set Screw
- 20 Tri-pod Base
- 21 Tri-pod Legs
- 22 Base Set Screw
- 23 Battery Indicator Light
- 24 Charging Port (back of the microscope arm)



Setting up the microscope

The M² comes in a molded Styrofoam container, packed unassembled in two main parts – the tri-pod base and the main body with carrying handle and binocular head – with various accessories and components in surrounding compartments.

- Tri-pod Base
- Power Cord/Recharger
- Microscopic Stage Plate
- Macroscopic Collection Containers
 - 1 – Shallow Container
 - 1 – Deep Container
 - 1 – Vented Container Lid
 - 1 – Container Holder
- 2 Contrast Plates (one black and one white)
- 1 diffuse transparent plate for prepared slide use in macroscopic mode.

First remove separate tri-pod base (fig 20) from packaging. Unfold tri-pod legs, making sure the padded feet fold out flush with the table top. Now, remove the body of the M² from the packaging. Holding the microscope by the handle, gently slide the illuminator housing of the M² into the cut-out portion of the tri-pod base. Tighten the set screw (fig 22) located underneath the tri-pod to secure the base.

Components of the microscope

HEAD – the casting which contains the Siedentopf binocular eyepiece tubes.

SIEDENTOPF – a binocular head design where the interpupillary adjustment (increasing or decreasing the distance between the eyepieces) is achieved by twisting the eyepiece tubes in an up and down arc motion similar to binoculars.

The entire binocular assembly can also be rotated 180 degrees to gain an extra 2” in microscope height to accommodate diverse users.

EYEPIECES – the lenses closest to your eye when looking through a microscope. This optical element further magnifies the image of the specimen and is critical to the total magnification.

DIOPTER ADJUSTMENT – located on the left eyepiece of the M² and is designed to help compensate the difference between the user’s eyes.

MAGNI-CHANGER™ – an innovative magnification system that works in conjunction with the infinity-corrected objectives to produce a wide array of magnification options. The Magni-Changer knobs designate the various magnifications in the corresponding color to the objective lens.

NOSEPIECE – the revolving plate that houses the objectives. The nosepiece must click into place for the objectives to be in the proper alignment.

OBJECTIVES – the optical system used to magnify the image. The M² has 3 objectives housed on the nosepiece each color-coded to correspond with the magnifications on the Magni-Changer.

ILLUMINATION – the Swift M² uses a low voltage Light Emitting Diode (LED) bulb for both transmitted (bottom) and incident (top) light.

AC ADAPTER/CHARGER – the charger is designed to bring the lithium battery to full capacity within 8 hours of charging and allows for 40 hours of continuous use. While charging, the battery indicator light* (fig 23), normally green, will glow red as it detects a low charge in the battery and begins to recharge. Once full capacity is reached, estimated 20 min to 8 hours depending on the depletion of the battery, the indicator will turn to green.

The illumination system may be used while the M² is charging.

* Light indicator is designed to show when the battery is fully charged, it will not show red when battery is low unless the AC adapter is attached. It is up to the user to recharge at routine intervals.

ARM – the frame that connects the head and the base of the microscopes. It also houses the illumination switch, carry handle, stage ring, coaxial focus controls, and the incident (top) light.

STAGE RING – the stage ring is the circular ring located on the arm of the microscope that supports the stage options for the M².

STAGE RING HOUSING – the housing of the stage ring located closest to the arm of the microscope.

STAGE RING HOUSING KNOBS – the knobs on both sides of the stage ring housing that allow the operator to move the stage and stage ring from left to right.

M² STAGE SELECTIONS (INCLUDED)

COLLECTION CONTAINERS – optically clear containers are used for collecting and viewing specimen at a macroscopic level. Deep and shallow containers with ventilated optically clear lids come standard with the M².

CONTRAST PLATES – In black, white and diffused clear.

STAGE PLATE – the microscopic stage with a built-in 1.2 NA condenser, iris diaphragm, stage clips and swing out white filter.

IRIS DIAPHRAGM – is used to increase or decrease the transmitted (bottom) light.

CONDENSER – provides full illumination to the specimen plane and enhances the resolution and contrast of the object being viewed.

COAXIAL CONTROLS – the coaxial focusing system combines both the coarse and fine focus into one knob located on both sides of the microscope. The large gray knob is the coarse focus control and the smaller green knob is the fine focus control.

COARSE FOCUS – the coarse focus control knobs move the stage up or down to bring the specimen into focus.

FINE FOCUS – the fine focus control knobs bring the specimen into sharp focus.

BASE – the housing of the transmitted (bottom) light and platform of the instrument which extends from the bottom of the arm.

TRI-POD BASE – the tri-pod base attaches to the bottom of the M² with a set screw located underneath the tri-pod. Tri-pod legs fold out to ensure stable footing.

M² Overview

OBJECTIVES – the M² comes with a more advanced grouping of objectives than the typical 4X, 10X and 40X. To help achieve both Micro and Macro magnifications, the M² combines a 0.8X, 1.6X and 16X objective with the Magni-Changer to reach 5X to 400X. Each objective is labeled either Micro or Macro to help guide students' viewing. The color band on the objectives corresponds with the numbering system on the Magni-Changer.

GREEN band – 16X microscopic objective

BLUE band – 0.8X macroscopic objective

RED band – 1.6X macroscopic objective

MAGNI-CHANGER™ – provides multiple magnification ranges for the 3 color coded objectives. To view the various magnifications simply turn the Magni-Changer knobs (fig 5). The numbering system on the Magni-Changer is color coordinated with the color bands on the objectives. **GREEN** numbers represent the total Micro magnification while the **RED** and **BLUE** numbers represent the total Macro magnification.

BLUE – 5X, 6.6X, 10X, 15X and 20X

RED – 10X, 13.2X, 20X, 30X and 40X

GREEN – 100X, 132X, 200X, 300X and 400X

STAGE HEIGHT ADJUSTMENT – stage position is key to achieving Micro and Macro magnifications. The stage can be set at 2 levels –

MICROSCOPIC – the uppermost stage position

MACROSCOPIC – the lowermost stage position

For proper stage ring adjustment, press and hold the stage release lever (fig 16) and gently raise or lower the stage by guiding the stage ring housing (fig 11), located at the rear of the stage ring closest to the arm, past the release lever until the stage stops. Once the stage has reached the upper or lowermost position, release the stage lever. To ensure that the stage is locked into the Microscopic position, gently press down on the stage housing. If the stage begins to slide, gently press up on the stage housing to lock the stage into place.

Microscopic settings

Step 1: Turn the nosepiece placing the GREEN banded 16X Micro objective in the light path.

Step 2: Align the red dot on the right side of the stage ring housing (fig 11), located at the rear of the stage ring (fig 14) closest to the arm, with the red dot on the right side of the microscope arm near the coarse focus (fig 17A) knob. With the stage ring empty, press and hold the stage release lever (fig 16) and gently raise or lower the stage ring by guiding the stage ring housing until the red dots are aligned.

Step 3: Once the dots are aligned, release the lever and insert the microscopic stage plate (fig 13).

Step 4: To properly center the stage plate, align the solid black line on the front of the stage plate with the line in the front center of the stage ring. Once aligned, tighten the silver set screw (fig 19) on the right side of the stage ring to lock the stage plate in place.

Step 5: Align the black line at the rear of the stage plate with the line in the center of the stage ring housing by adjusting the stage ring housing knobs (fig 12) which move the stage left to right. This will ensure your specimen is in the direct light path.

Step 6: To finish setting your stage position, press and hold the stage release lever and gently raise the stage by guiding the stage ring housing past the stage release lever until it stops. To ensure that the stage is locked into position, gently press down on the stage ring housing. If the stage begins to slide, press up on the stage ring housing to lock into place.

Step 7: Place the slide on the stage securing it with the slide/stage clips. Be sure the specimen is directly over the opening in the stage.

Step 8: From the off position, turn the transmitted (bottom) light on by pressing the gray button (fig 8) located behind the binocular head twice. The indicator light (fig 23) on the base of the microscope will illuminate green to indicate that the light is on.

Step 9: Adjust the Siedentopf binocular head (fig 4) by moving the eyepiece tubes up and down in an arc like motion similar to adjusting binoculars.

Step 10: Set the diopter adjustment (fig 3) which is designed to help compensate the difference between the user's eyes. To adjust, first bring specimen into perfect focus with the right eye using the coaxial focusing knobs (fig 17), then twist the left eye diopter to the right or left for a matching clear image. No further adjustment to the diopter is needed until a new operator uses the scope.

Step 11: For additional focus adjustment, use the coarse focus adjustment knob until an image is seen then use fine focus to sharpen details.

Iris Diaphragm: An iris diaphragm is located under the stage which can be adjusted to increase or decrease the transmitted light just as in a standard compound microscope.

Magni-Changer™: Various magnifications can be obtained by turning the Magni-Changer knobs (fig 5). The numbering system on the Magni-Changer color coordinates with the color bands on the objectives. GREEN numbers represent the total Micro magnification. Simply choose the total magnification at which you wish to view the specimen and align it with the index arrow above the Magni-Changer.

The M² microscopic magnifications are:

100X, 132X, 200X, 300X and 400X

Removing the Stage Plate

Step 1: Press and hold the stage release lever (fig 16) and gently lower the stage by guiding the stage ring housing (fig 11) past the stage release lever, aligning the red dots on the right side of the microscope.

Step 2: Loosen the silver set screw (fig 19) on the right side of the stage ring, so the stage can move freely.

Step 3: Remove the stage plate and place in a secure location to protect the condenser housing.

Macroscopic settings

Step 1: Turn the nosepiece placing either the **BLUE** banded 0.8X or **RED** banded 1.6X Macro objective in the light path.

Step 2: With the stage ring (fig 14) empty, press and hold the stage release lever (fig 16) and gently lower the stage by guiding the stage ring housing (fig 11), located on the rear of the stage ring, past the release lever until it stops. Insert either, the deep* or shallow, collection container into the stage ring. Do not lock the set screw (fig 19) on the side of the stage ring; containers are designed to rotate.

*Raise the stage by adjusting the coarse focus control for the deep container to fit flush in the stage ring.

Step 3: From the off position, turn the incident (top) light on by pressing the gray button (fig 8) located behind the binocular head once. The indicator light (fig 23) on the base of the microscope will illuminate green to indicate that the light is on.

Step 4: Adjust the Siedentopf binocular head (fig 4) by moving the eyepiece tubes up and down in an arc like motion similar to adjusting binoculars.

Step 5: Set the dioptre adjustment (fig 3) which is designed to help compensate the difference between the user's eyes. To adjust, first bring specimen into perfect focus with the right eye using the coaxial focusing knobs (fig 17), then twist the left eye diopter to the right or left for a matching clear image. No further adjustment to the diopter is needed until a new operator uses the scope.

Step 6: For additional focus adjustment, use the coarse adjustment knob to raise or lower the stage until an image is seen and use fine focus to sharpen detail. For optimal viewing of macroscopic specimen the stage is designed to move from left to right using the adjustment knobs (fig 12) located on the side of the stage housing.

Magni-Changer™: Various magnifications can be obtained by turning the Magni-Changer knobs (fig 5). The numbering system on the Magni-Changer color coordinates with the color bands on the objectives. **RED** and **BLUE** numbers represent the total Macro magnification. Simply choose the total magnification at which you

wish to view the specimen and align it with the index arrow above the Magni-Changer.

The M² macroscopic magnifications are:

BLUE – 5X, 6.6X, 10X and 15X

RED – 10X, 13.2X, 20X, 30X and 40X

Care of Your Swift M² Microscope

The Swift M² microscopes are designed to function with minimum maintenance. Certain components should be cleaned frequently to insure ease of viewing.

The eyepiece and objective lenses should never be wiped while dry as this will scratch or otherwise mar the surface of the glass. These surfaces should first be brushed with a soft, camel hair brush or blown off with air pressure from a rubber syringe, to remove dust particles. In most instances, the lens may then be cleaned by moistening its surface with water, and then wiped with a good quality lens tissue folded several times and moistened.

CAUTION: Objectives should never be disassembled by the user. If repairs or internal cleaning are necessary, this should only be done by qualified, authorized repairman.

The microscope should be disassembled, cleaned and lubricated, periodically. This should be done only by a qualified, authorized repairman.

Your Swift M² microscope is designed and constructed for long term durability. Accessories are available to further enhance its use, and others are under development.

Information may be obtained from your authorized Swift dealer or by contacting Swift directly:



www.Swift-MicroscopeWorld.com
800-942-0528 Toll Free
760-438-0528 International
info@swift-microscopeworld.com

Swift Optical Instruments Inc.

11113 Landmark 35 Drive

San Antonio, Texas 78233

877-967-9438

fax 210-590-1104

www.swiftoptical.com