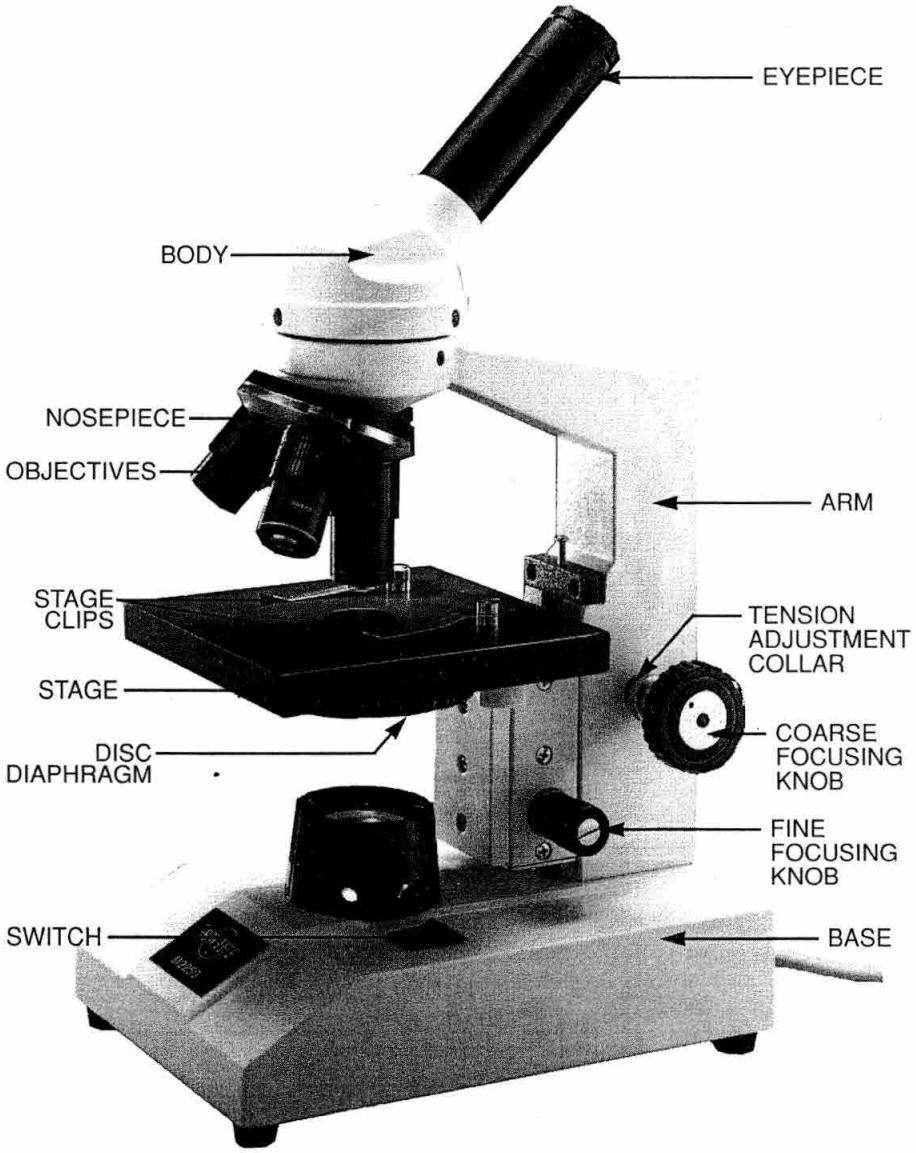
USE AND CARE OF YOUR SERIES M2250 MICROSCOPE

SWIFT®

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

www.Swiftoptical.com
877-967-9438


EYEPIECE
BODY
NOSEPIECE
OBJECTIVES
ARM
STAGE CLIPS
TENSION ADJUSTMENT COLLAR
STAGE
COARSE FOCUSING KNOB
DISC DIAPHRAGM
FINE FOCUSING KNOB
SWITCH
BASE

Each M2250 microscope is equipped at no additional cost, with a heavy-duty vinyl dust cover, which should be left on the microscope whenever the instrument is not in use.

Before attempting to use your M2250 microscope, it is important that you familiarize yourself with the terminology of the science of microscopy and the purpose of each component of the microscope. By doing this you will be able to enjoy the microscope to its fullest extent.

COMPONENTS OF THE MICROSCOPE

BASE - the housing and platform of the instrument to which the arm is attached. The base stands on rubber feet and contains the illuminator assembly and cord (grounded). The bulb replacement part number is printed on the base cover.

ARM—the vertical column (attached to the base) which contains the stage, slide ways, coarse and fine adjusting knobs and mechanism.

STAGE—the platform (sometimes called the plain stage) on which the slide specimen is placed; as standard, it is equipped with locked-in stage clips and is drilled and tapped to accept a mechanical stage as an option.

BODY—the casting which contains the refracting prism and the monocular tube which holds the eyepiece (with set screw).

NOSEPIECE—the revolver that carries the objectives.

OBJECTIVES—the optical systems which magnify the primary image of the instrument—typically, magnifications are 4X, 10X, and 40X.

EYEPIECE—the upper optical element that further magnifies the primary image of the specimen and brings the light rays in focus at the eyepoint.

CONDENSER—the condenser is mounted in the stage and it is used in conjunction with a substage disc diaphragm which has a Numerical Aperture of 0.65. The function of the condenser is to provide full illumination to the specimen plane and to enhance the resolution and contrast of the object being viewed.

DISC DIAPHRAGM—the purpose of this important part is to provide the approximate aperture opening (it has five) for the

objective in use and to assist in reaching the best contrast in viewing the specimen.

COARSE (FAST) FOCUS CONTROL—This model is a stage focusing model and the stage moves up or down by means of a brass rack and steel pinion gearing. The movement is achieved by two large knobs on the sides of the arm. In order to prevent gear damage, the focus control is equipped with a slip clutch that allows slippage at both ends of the focusing range. The system is also furnished with a tension control to prevent "stage drift."
FINE FOCUS—the fine focus control knobs can be found on both sides of the arm and are of the lever and thimble type.

TERMINOLOGY

PARFOCAL—the proper focus adjustment when the instrument is manufactured; adjustment of one objective (normally starting with the 40x) will be the focus adjustment for all objectives (with only a fraction of fine adjustment needed).
WORKING DISTANCE—the distance from the lens of the objective to the cover slip on the slide, when the specimen is in focus.
FIELD OF VIEW—the actual circular area seen through the eyepiece.
EYE POINT or EYE RELIEF—the distance from the eyelens of the eyepiece to your eye where a full field of view is seen.
RESOLUTION or RESOLVING POWER—the ability of a lens to define the details of the specimen at a maximum magnification. This is governed by the N.A. (Numerical Aperture) of the lens. For example, a 40x objective with N.A. 0.65 has a maximum resolving power of 650x, equal to 1000 times the N.A. This rule of N.A. x 1000 is true of all achromatic objectives.
"COATED" LENS—in attempting to transmit light through glass, much of the light is lost through reflection. Coating a lens increases the light transmission by reducing or eliminating reflection, thus allowing more light to pass through.

USING YOUR SWIFT SERIES M2250 MICROSCOPE

Once you have learned the terminology and purpose of each component of the microscope, use of the microscope is simple and enjoyable. By following these easy steps, you will be able to begin studying the specimen quickly and easily:

1. Place the slide on the stage, and secure it under the slide clips.
   Be sure the specimen is directly over the opening in the stage.
2. Rotate the disc diaphragm to align the largest aperture with the opening in the stage.
3. Plug the power cord into a regular 120V wall outlet.
4. Rotate the nosepiece to place the lowest power objective over the specimen. Be sure the objective "clicks" into position.
5. While viewing through the eyepiece, rotate the focusing knobs to bring the specimen into focus. This should be done slowly and carefully.
   If the image of the specimen appears weak or pale, the disc diaphragm should be rotated to align the next smaller aperture with the opening in the stage. Each successively smaller aperture of the disc diaphragm will increase contrast in the specimen's image.
7. Now, the slide is moved to place the specimen directly into the center of the field of view.
8. Rotate the nosepiece to the highest power objective. A slight turn of the fine focusing knob may be required to bring the image of the specimen into sharp focus. Once the specimen is in focus with the highest power objective, it will be in focus with each lower power objective.

EYEPIECE	OBJECTIVE	MAGNIFICATION	FIELD OF VIEW
W10	4x	40x	4.10 mm
W10x	10x	100x	1.65 mm
W10x	40x	400x	0.41 mm

PARTS AND ACCESSORIES

MA350, 4x Objective
MA351, 10x Objective
MA353, 40x Objective
MA226, W 10x Eyepiece
MA2201, 120V 20W Bulb
MA268, Stage clips

COMMON PROBLEMS IN MICROSCOPY

A. PROBLEM—image appears "washed out" or weak.
CORRECTION -
1. Rotate disc diaphragm to smaller aperture.
2. Objective lens is dirty. Clean as described under "Cleaning".
3. Eyepiece is dirty. Clean as described under "Cleaning".

B. PROBLEM—hairs or dust seem to be moving in the image.
CORRECTION—Disc diaphragm is at too small an aperture. Rotate to larger aperture.

C. PROBLEM—unable to bring specimen into focus with any objective.
CORRECTION—Eye lens of the eyepiece is partially unscrewed. Remove the eyepiece and screw the two sections together.

D. PROBLEM—image of the specimen goes out of focus all by itself.
CORRECTION—Use Swift wrench MT-202 to tighten the collar found on the spindle of the focus knobs.

E. PROBLEM — focusing knobs turn with difficulty even with tension-collar loosened.
CORRECTION—Microscope should be disassembled by qualified, authorized repairman, cleaned and relubricated.

CARE OF YOUR SWIFT SERIES M2250 MICROSCOPE

Swift Series M2250 microscopes are designed to function satisfactorily 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 surely 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, 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 should be necessary, this should only be done by a qualified, authorized repairman.

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

Your Swift Series M2250 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:

Swift Instruments, Inc.
Scientific Instrument Division
San Jose, CA 95112-4946
Fax (408) 292-7967
Tel (408) 293-2380 or
(800) 523-4544

LIFETIME WARRANTY

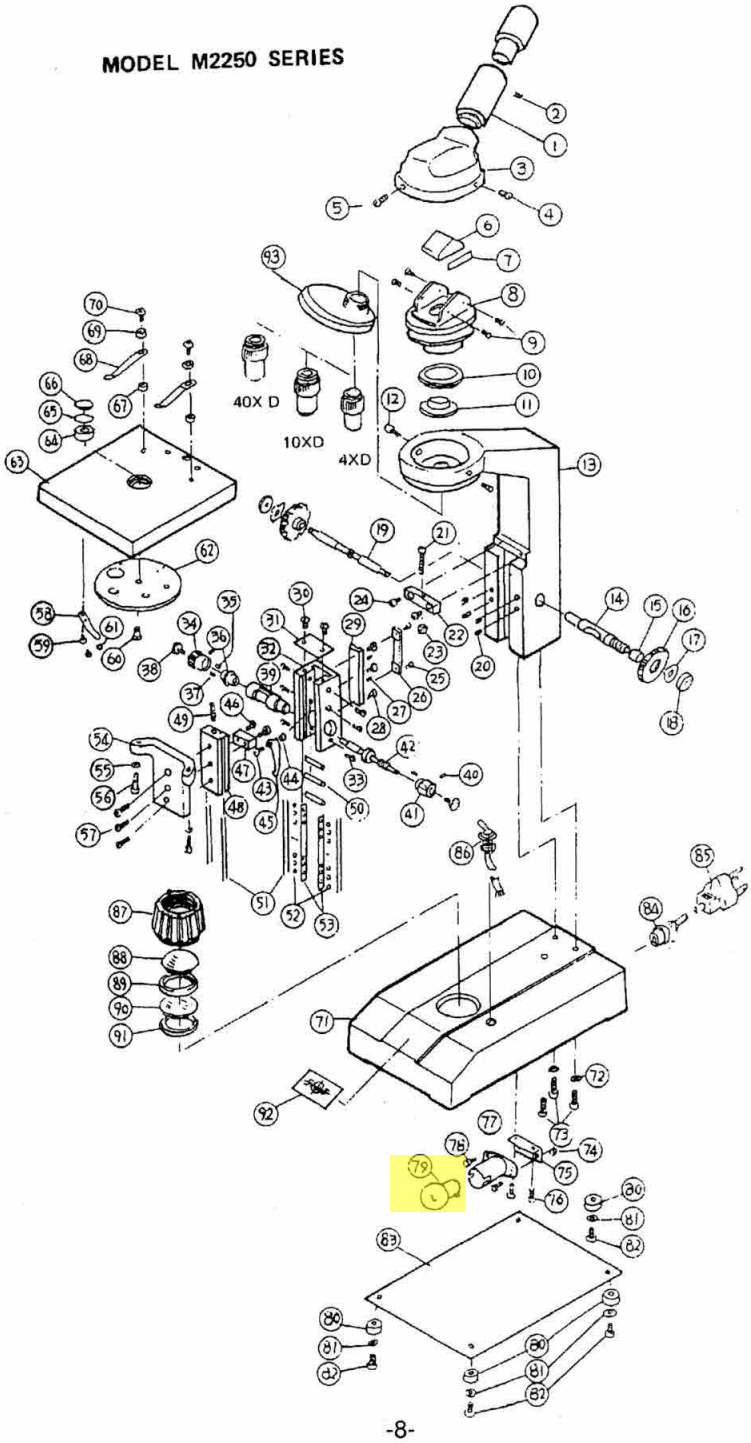
Subject to normal use, all Swift Microscopes and Scientific Products are warranted for their lifetime against defects in materials and workmanship. Damage resulting from repair by unauthorized parties or damage due to accident, alteration, misuse or abuse is not covered.

Warranty service is provided by Swift Instruments, Inc. Defective Swift Instruments covered by the warranty will be repaired free of charge when they are returned, postpaid, to:

Swift Instruments, Inc.
1190 N. Fourth Street
San Jose, CA 95112

This warranty gives you specific legal rights, and you may also have other rights which vary state to state.

MODEL M2250 SERIES



Parts List

Parts #	*Description*	*Parts #*	*Description*
1	Eyepiece Tube	48	Fine Adjusting Guide
2	Screw	49	Spring
3	Prism Housing	50	Tension Adjusting Nut
4	Screw	51	Guide Steel Wire
5	Screw	52	Ball Bearing
6	Prism	53	Ball Spacer
7	Prism Washer	54	Stage Holder
8	Prism Mount	55	Spring Washer
9	Screw	56	Screw
10	Ring	57	Screw
11	Retainer Ring	58	Clips
12	Screw	59	Screw
13	Arm	60	Screw
14	Coarse Pinion Metal	61	Ball Bearing
15	Adjusting Pinion Tension	62	Disc Diaphragm
16	Coarse Adjusting Knob	63	Stage
17	Waving Washer	64	Condenser Holder
18	Knob Nut	65	Pressing Ring
19	Pinion	66	Condenser Lens (L)
20	Screw	67	Spacer
21	Screw	68	Clip
22	Rack Stop Block	69	Spacer
23	Nut	70	Screw
24	Screw	71	Base
25	Screw	72	Spring Washer
26	Rack	73	Screw
27	Pin	74	Terminal Ring
28	Screw	75	Socket Holder
29	Dovetail	76	Screw
30	Screw	77	Socket
31	Cover	78	Screw
32	Adjusting Block	79	Bulb
33	Screw	80	Rubber Foot
34	Fine Adjusting Knob (L)	81	Washer
35	Screw	82	Screw
36	Fine Adjusting Bushing	83	Bottom Plate
37	Pin	84	Clamp
38	Screw	85	UL Cord
39	Fine Adjusting Sleeve	86	Switch
40	Screw	87	Base Condenser Housing
41	Fine Adjusting Knob (R)	88	Base Condenser Lens
42	Fine Adjusting Lead Screw	89	Spacer Ring
		90	Base Condenser Filter
43	Screw	91	Retainer Ring
44	Washer	92	Swift Logo
45	Fine Adjusting Lever	93	Revolving Nosepiece
46	Lever		
47	Fine Adjusting Driving Block		

bulb is MA2201 120V 20 W