

Swift M10L Series Microscope

Use and Care Manual

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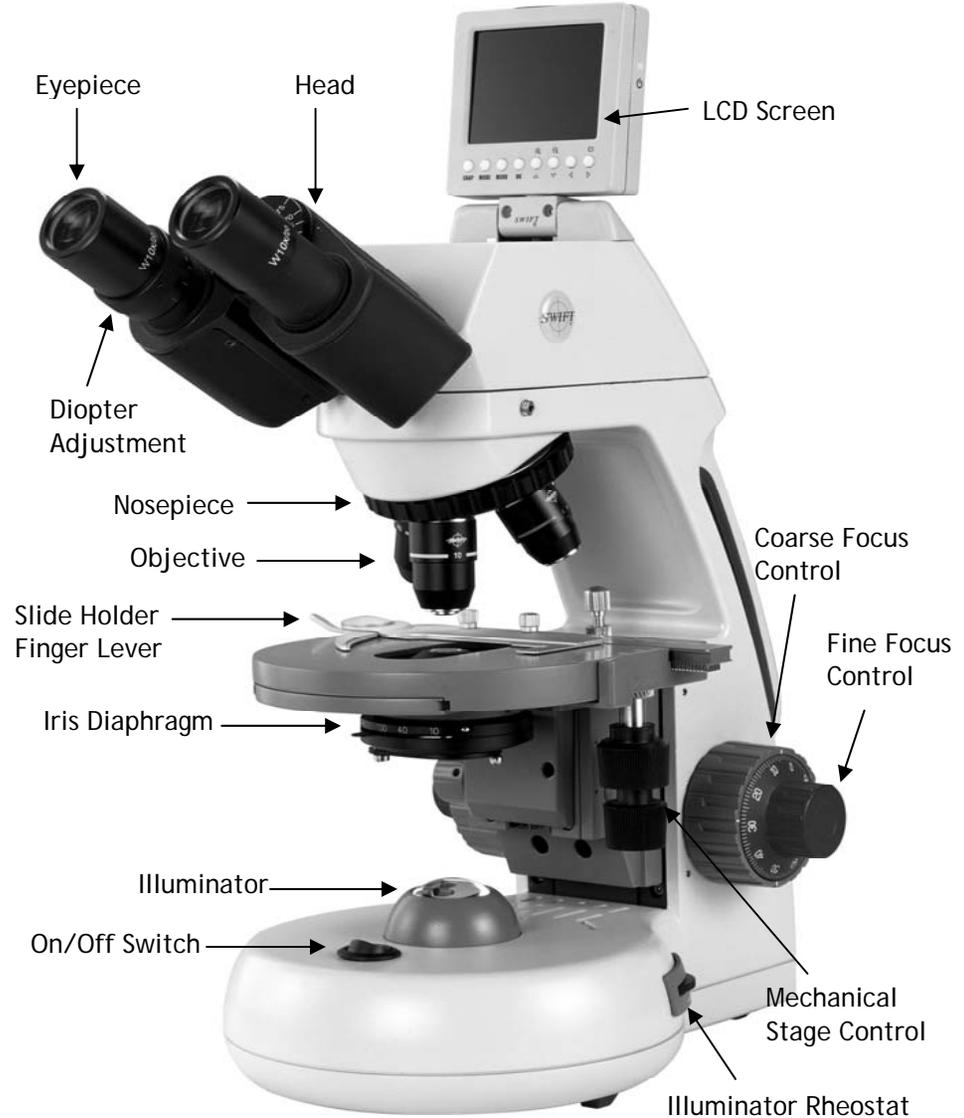
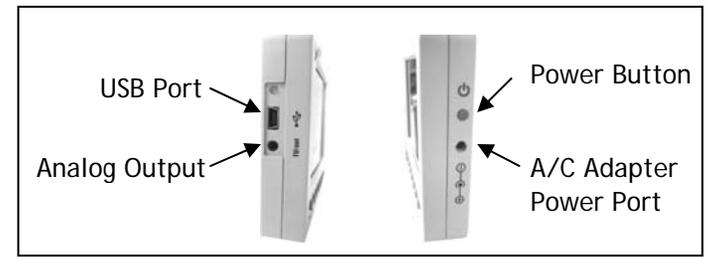
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SWIFT OPTICAL *Enduring Quality and Technical Excellence.*



SWIFT M10L SERIES

Your Swift M10L microscope is an instrument of precision, both optically and mechanically, that is designed to last a lifetime with a minimum amount of maintenance. It is built to the highest and most rigid optical and mechanical standards and has many built-in features to ensure durability and high performance in the hands of both student and professional users. The Swift M10L Series combines traditional microscopy with advanced technology. This microscope is equipped with superior optics offering bright clarity and crisp resolution, a built-in 5 Megapixel digital camera for capturing still images or streaming video, an internal SD card reader/writer to save captured images, and a built-in 3" LCD screen for shared viewing. The M10L also provides USB and Mini AV plug outputs for direct connection to a computer, TV monitor or video/LCD projectors.



Swift M10L Series

COMPONENTS OF THE MICROSCOPE

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

BASE - the platform of the instrument to which the arm is attached. The base stands on rubber feet and contains the illuminator assembly

COARSE FOCUS - the larger, outer knob of the focus control which facilitates rapid and heavy movement of the focusing mechanism. In order to prevent gear damage, the focus control is equipped with an upper limit stop that protects the high magnification objectives and slides.

COAXIAL CONTROLS - the focusing control mechanism moves the stage up and down to bring the specimen into focus. A coaxial focus control combines the coarse and fine focus mechanisms into one control with inner and outer knobs, which are located on both sides of the arm. This coaxial focus control incorporates a clutch mechanism which allows for slippage at the extreme ends of the focus range to prevent damage to the gears.

CONDENSER - 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. The standard condenser of the M10L Series has a Numerical Aperture of 1.25 with filter carrier and iris diaphragm. It is mounted in a sub-stage focusing assembly that can be raised or lowered for precise light control.

DIOPTRER ADJUSTMENT - designed to help compensate for the difference between the user's eyes and is located on the left eyepiece of the binocular head

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

FINE FOCUS - the smaller inner knobs of the focus control which allows for slow and subtle focusing movement to bring the specimen into sharp focus.

HEAD - the upper portion of the microscope which contains the refracting prisms and the eyepiece tubes which hold the eyepieces.

ILLUMINATION - the M10L Series uses a variable intensity 3 watt Light Emitting Diode (LED).

IRIS DIAPHRAGM - a multi-leaf round shaped device which is controlled by a lever. It is similar to a camera shutter, and is installed under the condenser. By moving the lever back and forth, the iris diaphragm opens and closes, increasing and decreasing the contrast of the specimen. If the image is "washed out" the iris diaphragm is opened too wide. If the image is too dark the iris is not open wide enough.

MONOCULAR - a microscope head with a single eyetube and eyepiece.

NOSEPIECE - the revolving turret that holds the objective lenses, permitting changes in magnification by rotating different powered objective lenses into the optical path. The nosepiece must "click" into place for the objectives to be in proper alignment.

OBJECTIVES - the optical systems which magnify the primary image of the instrument. Magnifications are typically 4X, 10X, 40X and 100X

SEIDENTOPF - 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.

STAGE - the table of the microscope where the slide is placed for viewing. This component moves upward and downward when the focusing knobs are turned. The stage of the M10L has a built-in mechanical stage with a below-stage ergonomic "X" and "Y" axis controls. A finger clip holds the slide securely and is designed to provide a slow return to provide protection to the specimen.

IMPORTANT TERMINOLOGY

DEPTH OF FOCUS - the ability of a lens to furnish a distinct image above and below the focal plane. Depth of focus decreases with the increase of numerical aperture or with the increase of magnification.

DIN - (Deutsche Industrial Normen *originally Deutsches Institut für Normung*). A German standard for the manufacturing of microscope lenses.

EYE POINT or EYE RELIEF - the distance from the eye lens of the eyepiece to your eye where a full field of view is seen.

FIELD OF VIEW - the area of the object that is seen when the image is observed. It may range in diameter from several millimeters to less than 0.1mm.

FOCAL LENGTH - parallel rays of light after refraction through a lens will be brought to a focus at the focal point. The distance from the optical center of the lens to the focal point is the focal length.

NUMERICAL APERTURE (NA) - a measure of an objective's light gathering capabilities. The concept may be compared to the F-stop in photographic lenses. Generally speaking, N.A. values of less than 1.00 are "Dry" objectives. Values of 1.00 or greater require oil as a medium. Please note that condensers are part of the optical system and are also assigned an N.A. value. That value must be at least as high as that of the highest objective used.

PARFOCAL - a term applied to objectives and eyepieces when practically no change in focus is needed when changing objectives. The objectives on your microscope are parfocalized at the factory so that only a slight adjustment of the fine focus knob is needed to maintain focus when switching magnification.

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 NA (Numerical Aperture) of the lens. For example, a 40X objective with NA 0.65 has a maximum resolving power of 650X, equal to 1000 times the NA. This rule of $NA \times 1000$ is true of all achromatic objectives.

WORKING DISTANCE - the distance from the lens of the objective to the cover slip on the slide, when the specimen is in focus.

USING THE SWIFT M10L SERIES MICROSCOPE

Once you have learned the terminology and purpose of each component of the microscope, use of the microscope is simple. By

following these steps, you will be able to begin studying specimens quickly and easily.

1. Open the slide holder of the mechanical stage by pressing the slide holder finger lever, and carefully place the slide against the fixed side and back edge of the mechanical stage. Now slowly release the slide holder finger lever allowing the "finger" to hold the slide in place.
2. Align the specimen under the objective lens by using the adjustment knobs under the mechanical stage. The bottom knob moves the slide from right/left while the top knob adjusts the slide from front/back. These knobs allow for precise movement and scanning of the slide.
3. Rotate the nosepiece to place the lowest power objective (4XD) over the specimen. Be sure the objective "clicks" into position.

(If you do not have a Swift M10L with Binocular Head please omit step 4-5.)

4. Adjust the interpupillary distance of the Seidentopf binocular head for a comfortable view. Adjust the eyepiece tubes of the binocular head by moving the eyepiece tubes in an arc motion to the position where one perfect circle can be seen in the field of view.
5. For increased viewing comfort when using the Binocular Head, use the left eye diopter adjustment to compensate for the differences between the user's eyes. Set the adjustable left eye diopter at zero. Close your left eye and focus with your right eye only by using the coaxial focusing knobs. Now using your left eye only (close your right eye), adjust the diopter ring until a clear image is seen. Now the binocular head is set for you to observe the specimen.
6. While viewing through the eyepiece, rotate the coarse focus knob to bring the specimen into focus. This should be done slowly and carefully.
7. To adjust the contrast of the specimen, open the iris diaphragm to its largest aperture. If additional contrast is required to permit accurate viewing of the specimen, the diaphragm should be slowly closed until the details of the specimen are sharply defined. Be careful not to close the aperture too much, as you may be achieving a higher contrast, but the fine structure of the image may be destroyed. Reducing the aperture increases the contrast and depth of focus, but it also reduces resolution and

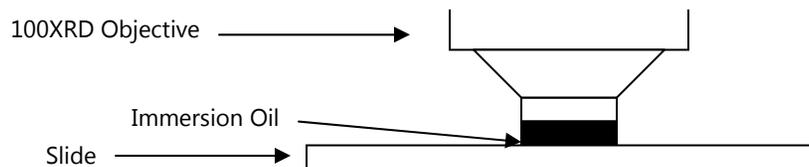
introduces diffraction. The aperture must be adjusted for each objective.

8. Next, use the fine focus control to refine the focus and provide the sharpest image.
9. Now you can rotate the nosepiece to higher magnification objectives. The objectives are parfocalized, meaning that once the lowest objective (4XD) is focused, only a slight turn of the fine focusing knob is required when changing to the 10XD, 40XRD and 100XRD objectives.

OIL IMMERSION

It is desirable to use immersion oil with the 100XRD objective. Oil generates a fine resolution and brightens the image viewed through the microscope. Place a tiny amount of oil (1 very small drop) onto the slide (between the slide and the objective tip) prior to focusing with the 100XRD objective. It is essential to thoroughly clean the objective tip after use. Please contact Swift Optical or your authorized Swift dealer for the appropriate immersion oil to use.

IMPORTANT: The working distances from the 100XRD and 40XRD objectives to the slide surface are very close. Even though the objectives are sealed to prevent oil contamination, it is a good practice to avoid dragging these objectives through an oiled slide.



PHASE CONTRAST

The phase contrast microscope reveals fine detail in transparent objects which possess very little contrast. Unstained living organisms and cells can be studied without danger of artifacts produced by killing, fixing or staining reagents. The M10L can be outfitted with a multi-phase system (MA10050) that includes a set of Plan Phase objectives and a special phase condenser carousel. Please refer to the detailed instruction sheet enclosed with each phase kit for proper use.

DIGITAL HEAD SPECIFICATIONS

Still Image Resolution- 5 MP Real/12 MP Interpolated

Memory- 8 MB Internal/ Up to 2 GB SD Card through expansion slot (not supplied)

Video Out- Analog to RCA with supplied cable (480 lines of resolution)

Battery- NP-40, 3.7V, 550 mAh, LI-ION. Built-in battery lasts up to 2 hours on continuous use with full charge

Digital Out- Through USB 2.0 to Swift Software at 640 x 480

Screen- Flip up 3' TFT Screen

Optical Head- Binocular with WF10X 20mm Eyepieces or Monocular with WF10X 18mm Eyepiece

LCD SCREEN

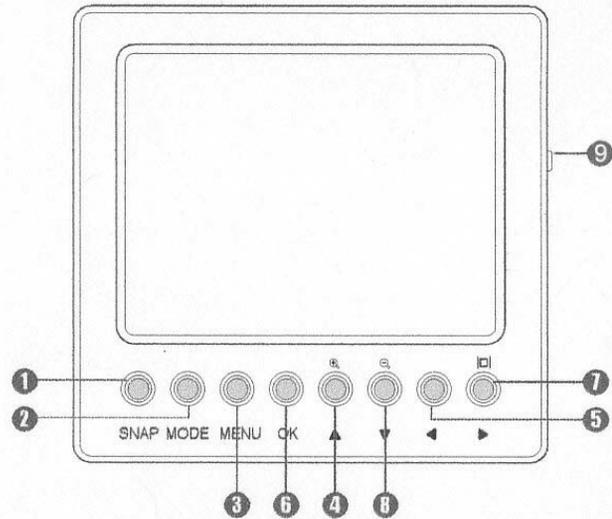
To use the built in LCD Screen, lift the screen back to bring the screen into the viewing position. The screen can also be slightly rotated right or left for easier viewing between multiple users.

Please use caution when rotating the screen. It is not designed to be rotated 360 degrees.

An A/C adapter has been included with the microscope to provide constant power to the LCD screen and camera. The 4.2 volt A/C adapter power port is located on the right side of the LCD screen housing below the power button.

PLEASE NOTE: The LCD screen and camera can also be operated for approximately 2 hours by using the built-in rechargeable battery. The battery life icon is shown in the upper left corner of the LCD screen. (Please see battery charging section)

LCD SCREEN BUTTON FUNCTIONS



1. The **SNAP** button captures an image in the still image mode or starts/stops the capturing of a movie in video mode.
2. The **MODE** button will scroll through the three camera modes shown on the LCD screen (Still Image/Video/Playback).
3. The **MENU** button displays the setting choices for each of the three modes. Once inside the menu, you will notice two tabs. The selected tab will show a blue background. Each tab has several choices beneath it. You can switch back and forth between the two tabs by pressing the **LEFT** and **RIGHT** arrow buttons.
4. The **ZOOM/UP** button is used to zoom in while viewing a live or saved image. It can also be used to scroll up when viewing a zoomed image or navigate through menu options.
5. The **LEFT** button is used to navigate through a menu, cycle through saved images, scroll left when viewing a zoomed image and to exit a menu.
6. The **OK** button is used to confirm an action within the menu or to switch from zoom to scroll when viewing a zoomed image.
7. The **RIGHT** button is used to navigate to the right in a menu. It can also remove icons from view on the LCD Screen, switch off the LCD screen, scroll right when viewing a zoomed image and cycle through saved images.

8. The **ZOOM/DOWN** button can be used to zoom out while viewing a live or saved image. It can also be used to scroll down when viewing a zoomed image or navigate through menu options.
9. The **POWER** button can be used to turn the LCD screen and camera on and off.

OPERATING THE BUILT-IN CAMERA

1. Press the **POWER** button (9) on the right side of the LCD screen to turn the camera on. A Swift logo will briefly appear on the screen.
2. The camera will start in the default still image capture mode. Bring the specimen into focus and capture an image by pressing the **SNAP** button (1).
3. Press the **MODE** button (2) to cycle through the various camera modes:
 - A. Image capture 
 - B. Video capture 
 - C. Playback 

The icons shown above will be displayed in the upper right corner of the LCD Screen.

IMAGE CAPTURE MODE

This mode allows you to capture images and save them to the internal memory or an SD Card. When you are using the camera in image capture mode, you can use the zoom keys to zoom in (**ZOOM/UP**(4)) and zoom out (**ZOOM/DOWN**(8)) on the live image. You can click the **RIGHT**(7) button to hide the on-screen icons. Press **RIGHT**(7) again and the display will turn off. Note that in this mode, the camera is still operational and by pressing **SNAP**(1) an image can still be captured. The blue numbers in the lower right corner of the LCD screen indicate how many still images can be captured and saved to memory with the current image size and quality settings. Image quality (indicated by stars), picture size (indicated by white

number) icons are also displayed on the LCD screen as a quick reference, but will not appear on a captured image.

VIDEO CAPTURE MODE

This mode allows you to capture a video of what you see on the LCD screen. For instance: If you move the stage controls after starting the video mode, any movement will be seen on the LCD Screen.

In video capture mode, the **ZOOM** buttons (4 & 8) allow you to zoom in and out of the image displayed on the LCD Screen. You can click the **RIGHT** button (7) to hide the video icon. Clicking the right button a second time will blank out the LCD Screen. Please note that the camera is still operational and by pressing **SNAP** (1) a video can still be recorded. The remaining length of video that can be saved to memory and the video setting information is displayed in the lower right corner of the LCD screen, but will not appear on the captured video.

PLAYBACK MODE

“No image” will be displayed on the playback mode until an image or video is captured to internal memory or an SD Card is inserted and images are captured.

In the playback mode, you can scroll through the images and video files you have captured by using the **LEFT** and **RIGHT** buttons. Click on the **ZOOM/UP** button(4) to play or pause a video file. Pressing the **OK** button(6) during playback will increase the speed of the playback (1x, 2x, 4x, and 8x speed). Pressing the **LEFT** button during playback will play the video backwards and pressing the **RIGHT** button will resume playing the video forwards. If you are viewing a saved still image, you can use the zoom keys to zoom in (**ZOOM/UP**(4)) and out (**ZOOM/DOWN**(8)) on the captured image. If you zoom in (**ZOOM/UP**(4)), you can press the **OK** button(6) and use the Arrow keys (4,5,7 and 8) to navigate around the image. Press the **OK** button (6) again and zoom out of the image (**ZOOM/DOWN**(8)) to return to the normal view.

A counter in the lower right corner of the LCD screen will display the order in which images or videos have been captured. The counter will increase as more images and videos are captured.

MENU FUNCTIONS

To access the camera’s setting menu, press the **MENU** button(3). Inside the menu for each of the three modes, you can manually set certain camera parameters such as the ISO, color, white balance, saturation, and sharpness as well as other camera functions. We suggest that you change these functions only when you are familiar with the basic operation of the camera.

Each menu has two tabs with options. The image capture, video capture, and playback modes have a unique tab. The setup tab in each of the three modes will have the same options. You can move between the two tabs by pressing the **RIGHT** (7) and **LEFT** (5) buttons. To navigate up or down in a menu, use the **UP** (4) or **DOWN** buttons (8). To select an option in a menu press **OK** (6). Once a choice is selected, press the **LEFT** (5) button to leave that screen. Depending where you are in a menu, you may need to press the **LEFT** button (5) up to three times to totally leave the menu screen

HELPFUL HINT: If you get into the menus and get lost and are unsure how to proceed, pressing the **MODE** button will let you escape.

The image capture, video capture, playback and setup menus are documented on the next page:

STILL IMAGE CAPTURE MENU

Setting	Default	Options				
Size	5M	12M		3M		
		8M		2M		
		5M		1.3M		
Quality	Fine	Fine				
		Standard				
		Economy				
Scene Mode	Auto	Auto		Portrait		
		Sport		Landscape		
		Night		Backlight		
EV	0	2	1	0	-1	-2
		1 2/3	2/3	- 1/3	-1 1/3	
		1 1/3	1/3	- 2/3	-1 2/3	
White Balance Balance	Auto	Auto		Tungsten		
		Daylight		Cloudy		
		Fluorescent				
ISO	Auto	Auto				
		100				
		200				
Color	Standard	Standard				
		Vivid				
		Sepia				
		Monochrome				
Saturation	Normal	High				
		Normal				
		Low				
Sharpness	Normal	High				
		Normal				
		Low				
Time Stamp	Off	Off				
		Date Only				
		Date & Time				

SIZE - Selects the megapixel size of still images. The M10's built-in camera has a maximum true resolution of 5 megapixels. The pixels of still images taken with the size setting above 5 megapixels will be interpolated (software will add pixels to the image to simulate a higher resolution).

QUALITY - Adjusts the quality of the images. The FINE setting will offer the best image quality, but will require more memory. The ECONOMY setting will require the lowest amount of memory, but the image may lose some clarity. The STANDARD is a compromise between image quality and required memory space.

SCENE MODE - Changes the camera's capture settings to preset values that best suit the type of subject that is being captured. For most microscopy purposes it is best to leave this setting on AUTO. Users capturing pictures of moving objects may use SPORT mode or phase contrast users may use MONOCHROME mode with improved results.

EV (exposure value) - represents the combination of aperture, shutter speed, and camera sensitivity. In AUTOMATIC mode, the camera will determine the optimal combination of aperture, shutter speed, and sensitivity for the best image.

WHITE BALANCE - Adjusts the white balance settings to the optimal setting for different shooting conditions. The AUTO setting is recommended.

ISO - Adjusts the shutter speed settings. AUTO is the preferred setting for most circumstances. The ISO setting can be manually increased to raise the shutter speed which reduces the potential for capturing blurred moving objects.

COLOR - The STANDARD setting captures colors normally. The VIVID setting emphasizes the contrast and color saturations to capture bold colors. The SEPIA setting captures in sepia tones. The MONOCHROME setting remaps colors so they fall within shades of a single color.

SATURATION - Adjusts the intensity of the color in an image. NORMAL is the default setting. The HIGH setting will artificially intensify color and the LOW setting will add a gray scale affect to the image.

SHARPNESS - Adjusts the clarity of details in a captured image. NORMAL is the default setting, but improved results may be achieved by trying different settings for a particular specimen.

TIME STAMP - The default setting is set to OFF. If desired, a date or date and time setting can be selected to display information on the LCD screen and captured image.

VIDEO CAPTURE MENU

Setting	Default	Options	
Size	VGA	VGA	
		QVGA	
EV	+0.0	Selectable from -2 TO +2	
White Balance	Auto	Auto	Daylight
		Cloudy	Tungsten
		Fluorescent	

SIZE - Selects the pixel size of the video output. VGA for 640 x 480 or QVGA for 320 x 240

EV - (exposure value) - represents the combination of aperture, shutter speed, and camera sensitivity. The EV can be adjusted from -2 to +2.

WHITE BALANCE - Adjusts the white balance settings to the optimal setting for different shooting conditions. The AUTO setting is recommended.

PLAYBACK MENU

Setting	Default	Options
Delete	Next Menu	Single
		All
		Select
Copy To Card		
Slide Show	3 Sec.	3 Sec.
		5 Sec.
		10 Sec.
DPOF	Next Menu	Single
		All
Protect	Next Menu	Single
		All
		Select
Thumbnail	Execute	
Volume	8	Selectable 1-8

DELETE - Options to remove single or all captured images from memory.

COPY TO CARD - Copies all images stored in the microscope’s internal memory to a removable SD card.

SLIDE SHOW - Selects the length of time a picture is displayed during a slide show before it is replaced by another image.

DPOF - (Function disabled)

PROTECT - Adds or remove file protection to images to help prevent accidental deletion.

THUMBNAIL - Displays reduced size versions of saved images for quicker navigation through stored images.

VOLUME - (Function disabled)

SETUP MENU (ALL THREE MODES)

Setting	Default	Options	
Format	Next Menu	Cancel	
		Execute	
Beep	On	On	
		Off	
Language	English	English	French
		German	Italian
		Spanish	Portuguese
		Chinese	
Auto Off	3 Min	1 Min	3 Min
		5 Min	Off
Sys. Reset	Next Menu	Cancel	
		Execute	
Light Freq.	60 Hz	60Hz	
		50Hz	
TV Out	NTSC	NTSC	
		PAL	
Date Input	Next Menu	Off	
		Set	
USB	PC Cam	PC Cam	
		Disk Drive	

FORMAT - Select this option to reformat the internal or SD card memory and erase all of the saved data.

BEEP - (Function disabled)

LANGUAGE - Used to change the default ENGLISH setting to display menu information in another language.

AUTO OFF - Used to automatically turn the LCD screen off after a preset amount of time to conserve battery power. The default setting is 3 minutes, but can be set to OFF to disable this feature.

SYSTEM RESET - Used to reset all the settings to the factory default setting.

LIGHT FREQUENCY - This setting should be set to 60HZ for users in the United States.

TV OUTPUT - Used to select the proper regional video output. The NTSC setting should be selected for users in the United States.

DATE INPUT - Used to select the format of the date being displayed and to set the time and date.

USB - Used to change the way a computer detects and recognizes the M10's hardware when connected via the USB cable. The M10's internal memory will be detected as a flash drive when the DISK DRIVE setting is selected. To use the M10's camera with the Swiftcam II software the PC CAM setting must be selected. The PRINTER setting is disabled and will not function.

USING THE CAMERA WITH AN ANALOG IMAGING DEVICE

The analog cable that was included with the microscope can be used to connect the camera to a device that accepts an RCA video input. Simply plug the Mini A/V plug end of the cable into the left side of the microscope's LCD housing and the other end to an available RCA input on the analog imaging device. Make sure the correct video input mode is selected on the imaging device. **The microscope's LCD screen will not display a live image while the RCA cable is connected to the microscope's camera.**

* In order to ensure that the correct format is displayed, do the following: Click on Menu (3), then click on the Right (7) button to access the setup menu. Scroll down using the Down button (8) to ensure the light frequency is set to 60HZ and the TV Output is set to NTSC.

USING THE CAMERA WITH A COMPUTER

The microscope's LCD screen will not display a live image while the USB cord is connected to the microscope's camera. Power to the camera will be provided by the computer's USB port so it is not necessary to have the A/C adapter plugged in at the same time.

Detailed instructions on how to install and use the software is included on the Swiftcam Imaging II software CD. The instructions shown below will give users the basic steps to getting started with using the camera with a computer.

The Swiftcam II Imaging software must first be installed on a computer before a live camera image can be viewed on a computer. The minimum computer requirements to use the camera is having an available USB 2.0 port, 512MB of RAM, 1GHz CPU, 500MB free HD space and either Windows XP or Vista on the computer.

1. Press the power button on the right side of the LCD screen housing to turn on the LCD screen and camera.
2. Insert the mini USB end of the cable that was supplied with the microscope into the mini USB port on the left side of the LCD screen housing. Connect the other end of the USB cable to an available USB 2.0 port on a PC computer. The video signal that was being sent to the LCD screen will now be sent through the USB cable instead.
3. Install the Swiftcam II Imaging software on the PC computer you will be using with the microscope. The software should automatically detect and install the correct "Swift DV Camera" driver.

IMPORTANT: The next time you connect the M10 to a computer, make sure the USB cable is connected to the same USB port that was used during initial installation or the software driver will have to be re-installed).

4. After the software is installed, start the Swiftcam II Imaging program and click on the CAPTURE (camera) icon to view a live image.
5. The background balance setting will need to be adjusted to compensate for any uneven illumination light patterns. Place a slide on the stage. Use the mechanical stage controls to move the specimen out of the field of view so an empty/blank spot of the slide is being displayed. Click on the "Background Balance" adjustment box found on the bottom of the basic setting toolbar to smooth out the light pattern.
6. Use the mechanical stage controls to bring the specimen into the field of view and use the microscope's focusing controls to bring the specimen into focus.
7. Use the mouse pointer and hold the left mouse button while dragging the mouse to create a small box in an area of the image that should be displayed as a white color. (The size of

the box does not make a difference as long as it is only in an area that should be displayed as white). Click on the "White Balance" adjustment box found on the toolbar.

8. Click on the camera icon in the upper left corner of the screen to switch to the "Capture" toolbar. An image can be captured by clicking on the "Capture" box. A video clip can be recorded by clicking the "Record" box.
9. Captured Images and video clips can be viewed by selecting the "Swiftcam Imaging II" window found on the windows toolbar at the bottom of the computer screen.

ACCESSING THE INTERNAL MEMORY

The microscope's USB output is set to be detected by a computer as a camera device by default. The USB output setting can be changed to allow a computer access to the microscope's internal memory to transfer saved images.

To change the USB setting to hard drive mode:

Click on **MENU** (3), then click on **RIGHT** button (7) to access the Setup mode. Scroll down with the **DOWN** button (8) to view the USB setting. Click **OK** button to access to the USB choices. Scroll to the Disk Drive setting and press **OK** to select it. Press the **LEFT** button twice to exit the menu.

Insert the mini USB end of the cable that was supplied with the microscope into the mini USB port on the left side of the LCD screen housing. Connect the other end of the USB cable to an available USB 2.0 port on a PC computer. The computer will detect the microscope's internal memory as an external storage device which can be accessed from the computer's "My Computer" window.

SD CARD

Please ensure the camera is OFF before inserting or removing the SD card.

The M10's digital head has a built-in memory of 8MB. The SD Card Expansion Slot, found on top of the LCD screen housing, can be used to increase the amount of images that can be saved. The SD Card Expansion Slot is compatible with SD cards up to 2GB of memory.



The SD Card must be inserted into the slot in the orientation shown. Notice the orientation of the notch on the SD Card. It must match the picture shown above the slot on the LCD Screen. When the card is properly inserted in the top of the LCD Screen it will click into place and lock. To remove the card, push down gently on the top of the SD Card and it will unlock and can be removed.

BATTERY CHARGING

The internal rechargeable battery can be used to power the LCD screen and camera. It can be charged by using the 4.2 volt A/C adapter included with the microscope or by connecting it to a computer via the USB cable. The A/C adapter can charge the battery while the screen is powered on or off. When using a computer's USB port to charge the battery, the LCD screen must be turned off before the USB cable is connected. The LED indicator above the USB connection on the side on the LCD screen housing will be green if the battery is charging properly via USB. The LCD and camera will run for approximately 2 hours after a 2 1/2 hour charge.

CARE AND CLEANING

CLEANING - the front lens of the objectives (particularly the 40XRD and 100XRD) should be cleaned after use. First, brush with a soft, camel hair brush or blow off with air pressure from a rubber syringe to remove dust particles. Then, wipe gently with a soft lens tissue moistened with lens cleaning solution or distilled water, and dry immediately with a clean lens paper.

CAUTION - Objectives should never be disassembled by the user. If repairs or internal cleaning should be necessary, this should only be done by qualified, authorized Swift microscope repair technician.

The eyepiece(s) may be cleaned in the same manner as the objectives, except in most cases, lens cleaning solution will not be required. In most instances breathing on the eyepiece to moisten

the lens and wiping dry with a clean lens tissue is sufficient to clean the surface.

Lenses should never be wiped while dry as this will surely scratch or otherwise mar the surface of the glass.

The finish of the microscope is hard epoxy and is resistant to acids and reagents. Clean this surface with a damp cloth and mild detergent.

Periodically, the microscope should be disassembled, cleaned and lubricated. **This should be done only by a qualified, authorized Swift microscope repair technician.**

DUST COVER AND STORAGE - All microscopes should be protected from dust by a dust cover when not in use or in storage. A dust cover is the most cost-effective microscope insurance you can buy. Ensure that the storage space is tall enough to allow the microscope to be placed into the cabinet or onto a shelf without making undue contact with the eyepieces. Never store microscopes in cabinets containing chemicals, which may corrode your microscope. Also, be sure that the objectives are placed in the lowest possible position and the rotating head is turned inward and not protruding from the base. Microscopes with mechanical stages should be adjusted toward the center of the stage to prevent the moveable arms of the mechanical stage from being damaged during storage in the cabinet.

LED REPLACEMENT

The Swift M10L is equipped with a 3 watt LED illumination system. The life of the LED may vary depending on use and intensity. To prolong the life of the LED, you should always turn off the unit when not in use.

It is important that you only use a Swift replacement LED because it is integrated onto a circuit board. This LED has been tested and approved for life span, color temperature and brightness. Please call the Swift Optical Parts Department at (877) 967-9438 for replacement parts information.

Make sure the microscope is unplugged before replacing the LED.

1. Remove the eyepiece(s) from the head if they are not secured in place so they do not accidentally fall out of the microscope. Remove any slide that may be on the stage.

2. Carefully turn the microscope on its side. Remove the 4 screws on the bottom of the microscope. Remove the base cover to access the LED.
3. The LED is integrated onto a circuit board. This LED circuit board is held into the illuminator housing by a black ring. Unscrew this black ring from the illuminator housing to remove the LED circuit board.
4. Unplug the LED's power wire from the circuit board attached to the base cover.
5. Carefully cut the cable tie that bundles the electrical component wiring together. (Using a cutter tool with a thin cutting tip will help prevent damage to wiring insulation while cutting the cable tie). Replacing the cable tie is not necessary, but will help prevent pinching wires while re-installing the base plate.
6. Reverse steps 1-4 to install the new LED.

COMMON PROBLEMS IN MICROSCOPY

If you have a problem, you may be able to correct it yourself. Here are a few common problems and easy solutions you may want to try before calling for service:

CAUTION - Never disassemble electrical, mechanical or optical components. This servicing should only be done by an authorized Swift technician. The Limited Lifetime Warranty will be null and void if disassembled by any unauthorized repair person.

- A. **PROBLEM** : The LCD screen powers on, then the screen turns blank.

CORRECTION :

1. The LCD screen will not operate when there is insufficient battery power. Recharge the battery or plug in the A/C adapter.
2. The camera may be connected to a computer's USB port. The LCD screen will automatically turn off. The USB port is designed to automatically override the LCD screen video output when a USB cable is connected. Unplug the USB cable from the USB port and the video image will appear on the LCD screen.

- B. **PROBLEM** : The LCD screen turns off while displaying an image

CORRECTION :

1. The AUTO OFF TIMER is set to shut off the screen to conserve power. Go to the Setup Menu and change the AUTO OFF setting to OFF.

- C. **PROBLEM** : Illumination "hot spots" and uneven brightness in the field of view

CORRECTION :

1. The swing-out diffusing filter below the condenser should be placed in the light path
2. Check to see if the Abbe condenser is positioned correctly
3. Check to see if the objective has been rotated completely into the proper position.

- D. **PROBLEM** : Image appears "washed out" or weak

CORRECTION :

1. Slowly close the iris diaphragm.
2. Objective lens is dirty. See "Care and Cleaning" Section
3. Eyepiece is dirty. See "Care and Cleaning" Section

- E. **PROBLEM** - Hairs or dust seem to be moving in the image

CORRECTION - The iris diaphragm is not open wide enough. Slowly open the iris diaphragm to increase the size of the opening allowing for additional illumination.

- F. **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.

- G. **PROBLEM** - Image of the specimen goes out of the focus all by itself.

CORRECTION - Tighten the focusing tension control collar found on the spindle near the right coarse focus knob.

- H. **PROBLEM** - Focusing knobs turn with difficulty even with tension-collar loosened.

CORRECTION - Microscope should be disassembled by qualified, authorized Swift repair technician, cleaned and re-lubricated.

SWIFT OPTICAL INSTRUMENTS, INC. LIMITED LIFETIME WARRANTY

The Swift Optical Instruments, Inc. Limited Lifetime Warranty assures that the microscope is guaranteed against defects in material and workmanship for the life of the product. Electrical components are covered for five years; video components are covered for one year after purchase. Normal wear, routine maintenance, light bulbs, damage resulting from repair by unauthorized parties, accident, alteration, shipping, misuse or abuse is not covered. Warranty service is provided by Swift Optical Instruments, Inc.'s authorized technicians. Determination of warranty is at the technician's discretion.

Defective products covered by the warranty will be repaired free of charge when they are returned, postpaid, to:

Swift Optical Instruments Inc.
Attn: Warranty Repair
11113 Landmark 35 Drive
San Antonio, TX 78233

For all warranty repairs or service requests, please call our Repair Department at (877) 967-9438 before anything is shipped. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

*For customers living outside the United States, Swift Optical Instruments, Inc. will provide standard warranty service. However, inbound & outbound shipping cost is the responsibility of the consumer.

Swift Optical Instruments, Inc. • (877) 967-9438 •
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