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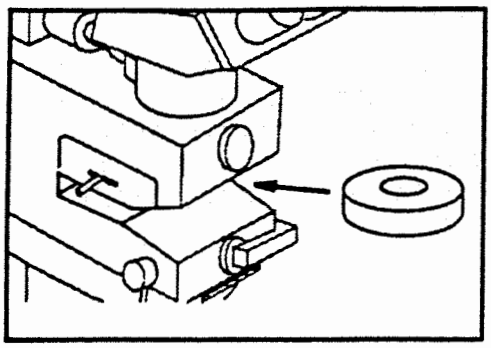
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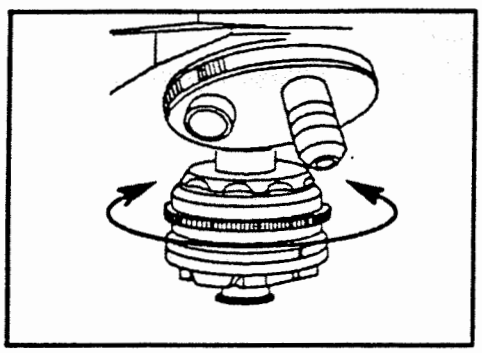
SLIDE-ON ATR ATTACHMENT

Installation & Alignment



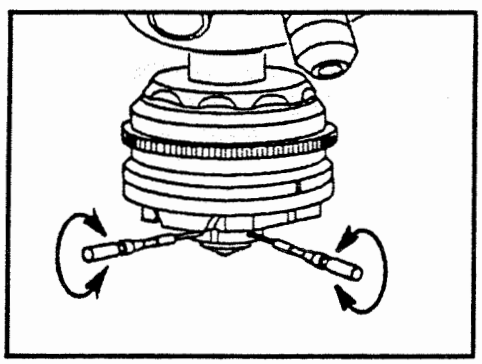
Install Upper Aperture

Install the 1.5mm aperture into the upper aperture position.



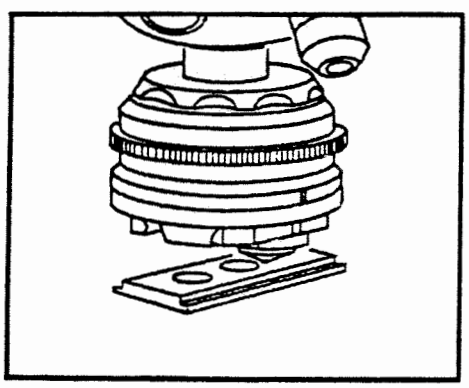
Adjust Compensation Ring

Rotate the compensation ring on the Reflachromat objective while monitoring the energy throughput in the infrared reflectance mode. Adjust the compensation ring to obtain maximum energy throughput. The compensation ring should now be at or close to zero.



Center Crystal

Using the three 0.050 hextools provided, center the crystal while monitoring the energy throughput in the infrared reflectance mode. Adjust the crystal for maximum energy throughput by loosening one screw and then tightening another.



Collect Gold Reference

Rotate the nosepiece so that the 15X Objective is in a non-sampling position.

Place Slide-On Attachment in the view mode by sliding it either to the right or left (it will *click* into place).

Rotate the nosepiece so that the 15X Objective is in the sampling position.

Focus on a gold mirror. Collect a reference singlebeam off of the mirror using the 1.5mm aperture in the upper aperture position.

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SLIDE-ON ATR ATTACHMENT

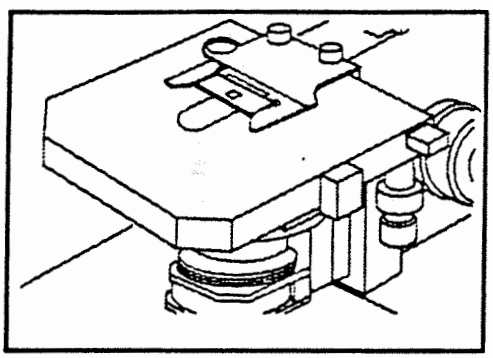
Analyzing Samples with the Slide-On ATR

Collect Sample Spectrum of ATR Crystal

Rotate the nosepiece so that the 15X Objective is in a non-sampling position.

Put the Slide-On Attachment into the ATR mode

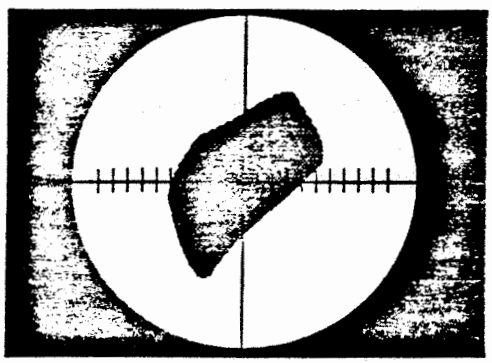
Rotate the nosepiece so that the 15X Objective is in the-sampling position.



Mount Sample

Place the sample to be analyzed onto a glass microscope slide or other suitable mount.

Place the glass slide on the microscope stage.



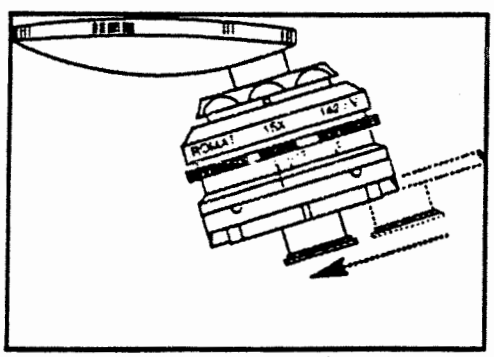
Focus on Sample

Rotate the nosepiece so that the 15X Objective is in a non-sampling position.

Place Slide-On Attachment in the view mode by sliding the crystal slider either to the right or left (it will *click* into place).

Rotate the nosepiece so that the 15X Objective is in the sampling position.

Center, and focus on the area of interest of the sample.



Put Slide-On In ATR Mode

Lower Stage.

Rotate the nosepiece so that the 15X Objective is in a non-sampling position.

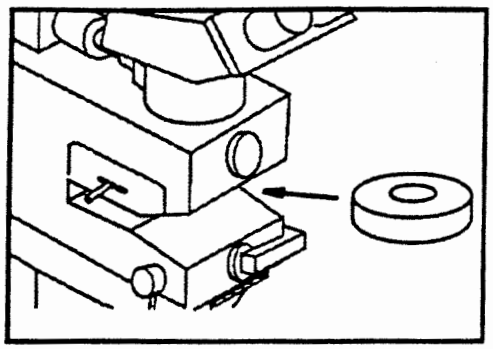
Place Slide-On Attachment in the ATR mode.

Rotate the nosepiece so that the 15X Objective is in the sampling position.

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SLIDE-ON ATR ATTACHMENT

Analyzing Samples with the Slide-On ATR



Collect Background

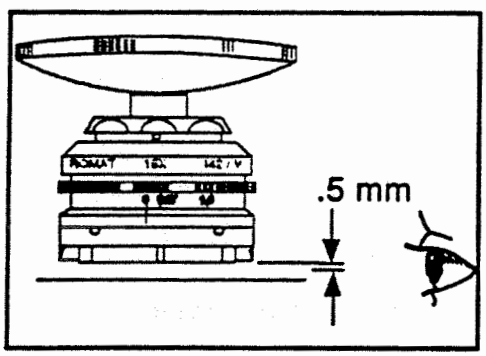
Install 1.5 mm aperture.

Collect singlebeam background.

Monitor Energy Thru ATR Crystal

Put the microscope into the IR/Reflectance mode.

Monitor the Energy through the ATR crystal.



Raise Stage

Using the coarse focus adjustment knob, raise the stage so that the sample is approximately 0.5 mm from the crystal.

Using the fine focus adjustment knob, continue raising the stage until you see the energy attenuated.

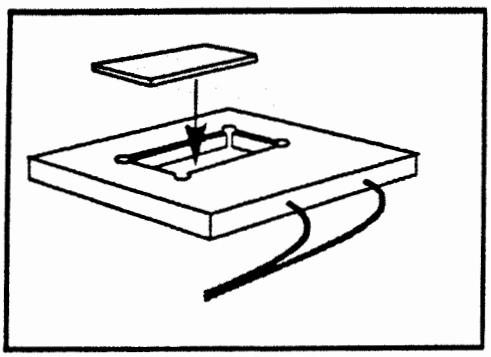
Collect Spectrum

Collect a singlebeam sample and ratio it to the previously collected background.

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SLIDE-ON ATR ATTACHMENT

Analyzing Samples Using the Contact Alert

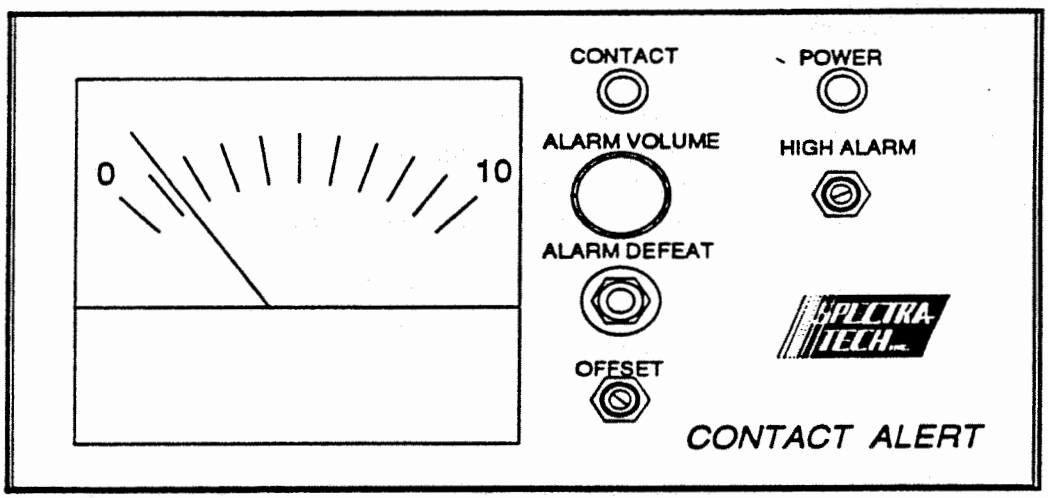


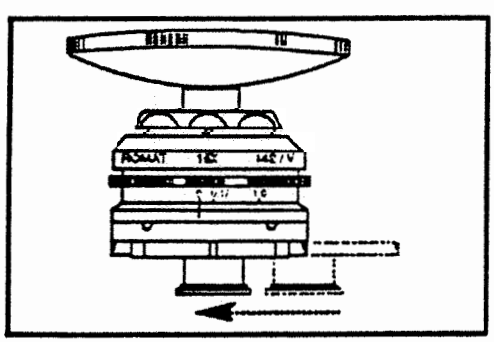
Mount sample

Place the sample to be analyzed onto one of the glass slides provided and place the glass slide onto the Sensor Plate of the Contact Alert system (see the Contact Alert manual for detailed information on this system). If the sample is larger than the 1x3 inch glass slide, place the glass slide onto the Sensor Plate first and then place the sample onto the glass slide.

Adjust Low Alarm Offset

The weight of the sample is sometimes sufficient to trigger the Low Alarm (Alarm LED lights, buzzer sounds and meter deflects). If the Low Alarm is triggered when the sample is mounted on the Sensor Plate, turn the Low Alarm Offset adjustment counter-clockwise until the alarm no longer triggers. This offset circuit can correct for samples weighing up to 50 grams.





Select ATR Mode

Rotate the nosepiece so that the 15X Objective is in a non-sampling position.

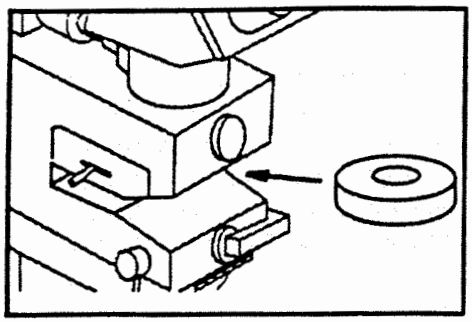
Select the ATR Mode by moving the Crystal Slider to the middle position.

Rotate the nosepiece so that the 15X Objective is in the sampling position.

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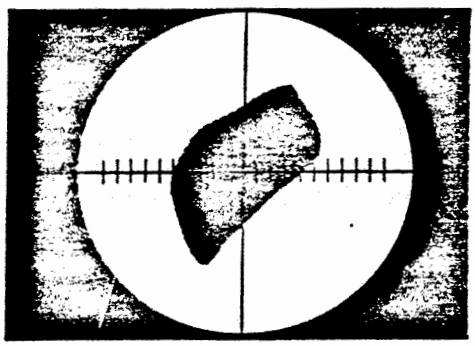
SLIDE-ON ATR ATTACHMENT

Analyzing Samples Using the Contact Alert



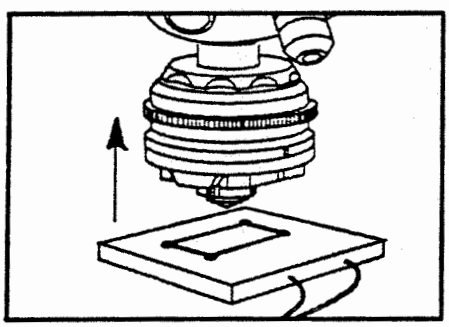
Collect Background

Select the desired aperture size for the analysis (1.5mm aperture recommended) and collect a singlebeam background.



Center sample

Select the view mode and use the x-y-z controls of the microscope to move the sample to the center of the viewed field.

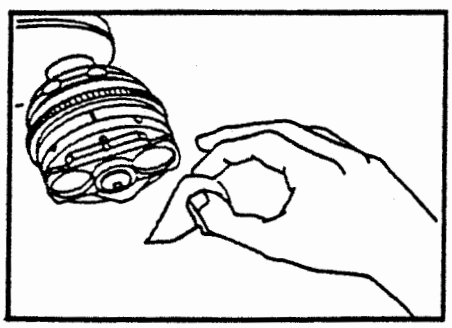


Establish Contact

Select the ATR mode and raise the stage using the coarse focus knob so that the sample is close to but no touching the ATR crystal. Continue raising the stage using the fine focus knob until contact is indicated by the audible and visual indicators on the Contact Alert Controller. Adjust the pressure between 5-9 for hard materials and 2-4 for elastomeric materials.

Collect Spectrum

Collect a singlebeam sample and ratio it to the previously collected background. Some experimentation may be necessary to find the optimum contact pressure. If the bands in the sample spectrum are weak, adjust the pressure and collect a new sample spectrum.



Clean the crystal

Rotate the nosepiece so that the ATR crystal is accessible. Wipe the crystal with lens tissue. Water or isoproponol may be used to clean the crystal. Avoid acetone and chlorinated solvents as these will attack the adhesive used to secure the crystal to the slider.

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Structure Overview

There are two base packages, The Analytical and the Advanced Analytical Microscope. The only difference is that the Analytical microscope (912A0202) comes with a single nosepiece, and the Advanced Analytical microscope (912A0198) comes with a four position nosepiece. All other items that would differentiate the packages are line item options.

1. The base package consists of the following,

A.A.M ..869-0047-009D	A.M. 869-0047-005D
4 position nosepiece	1 position nosepiece

BOTH Base Units Come with the Following:

(1) Analytical scope base unit	
(1) 1x2 inch travel stage with clip	(869-3000-628)
(1) scope mirror flipper	(869-0047-405)
(1) Power cord	
(1) Instruction manual,warranty card,registration	
(1) Mounting bracket, and purge tube with gasket	
(1) Tool kit which includes....	
(2) variable apertures (knife edge)	(869-0047-431)
(2) 1.5 mm alignment apertures	(869-3000-736)
(2) sample slides	(869-4006-713)
(1) roller knife	(869-0036-521)
(1) 12V 50W Halogen bulb	(869-4004-526)
(1) 100 micron alignment pinhole mounted on BaF2 window	(869-0047-408)
(1) 13mm gold mirror on slide	~~(869-7004-039)~~ 869-0047-431
(2) 13 x 2 mm NaCl windows	(869-7000-301)
(1) candle	no #
(1) 1/16 ball driver	(869-870-1-16)
(1) 1/32 ball driver	(869-870-3-32)
(4) 10-32 x 1 inch hardware	(869-0047-406)
~~(4) 10-32 x 1/2 beveled screws~~	~~(869-??????)~~

2. Several items are to be selected as OPTIONS, they include,

a. Binocular/Trinocular viewers (now including two eyepieces)
NEW NUMBERS----- Binoc. (869-0047-407) Trinoc. (869-0047-402)

b. Second AEM mounting bracket and hardware. (includes Detector switcher)
NEEDED TO INSTALL ANY OTHER (500-700) AEM. (840-124000)

c. Additional mounting bracket necessary to mount either of these units to a 800 system (840-037100). If the 800 system already has an AEM. THIS BRACKET IS STILL NECESSARY.

d. If a G.C. AEM (800 style) is to be mounted to the Analytical or Advanced Analytical Microscopes (840-124100) is required.

e. .25 mm MCTA is included in the 912#s (.25mm MCTB are available but not recommended unless specifically requested).

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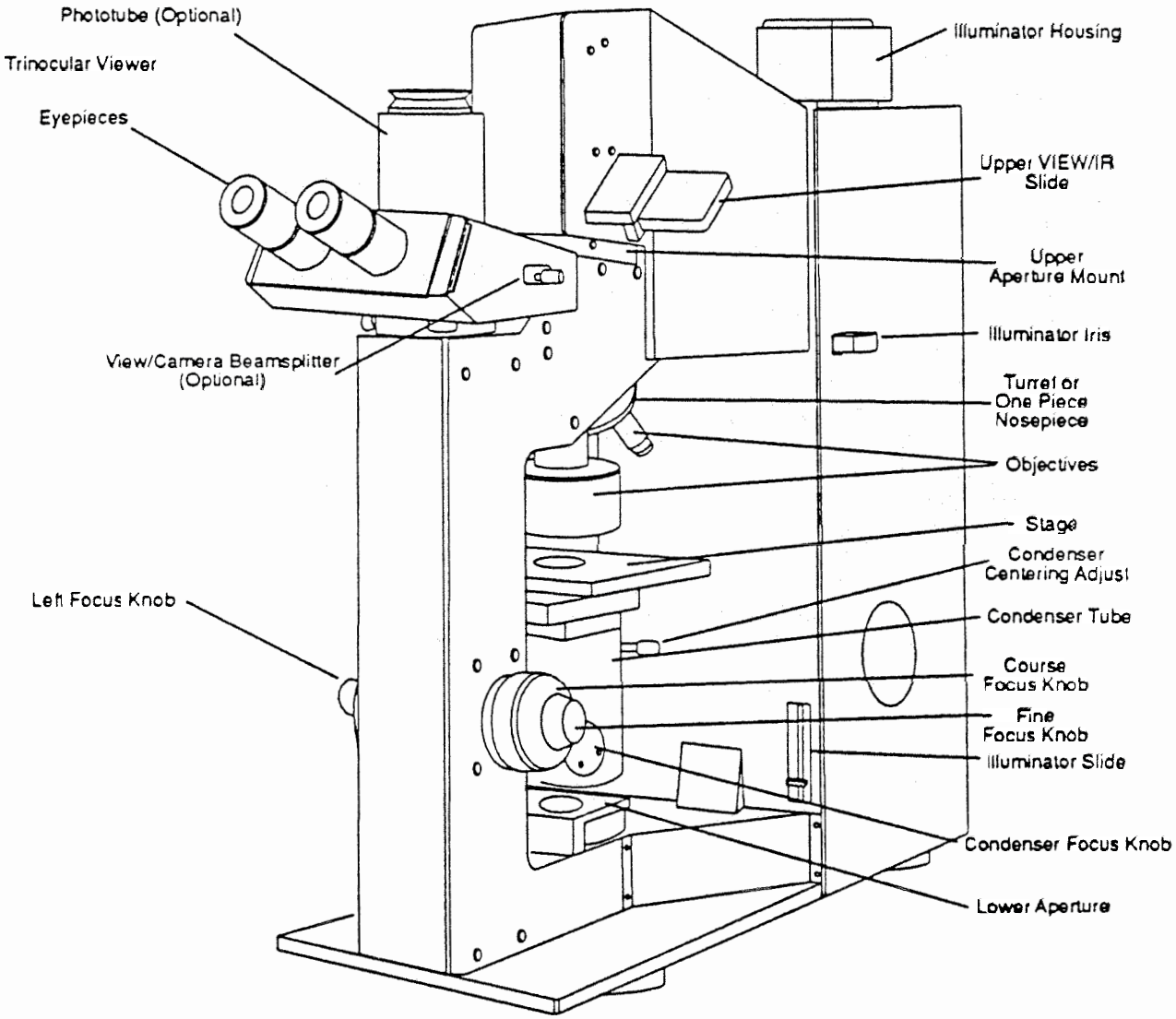
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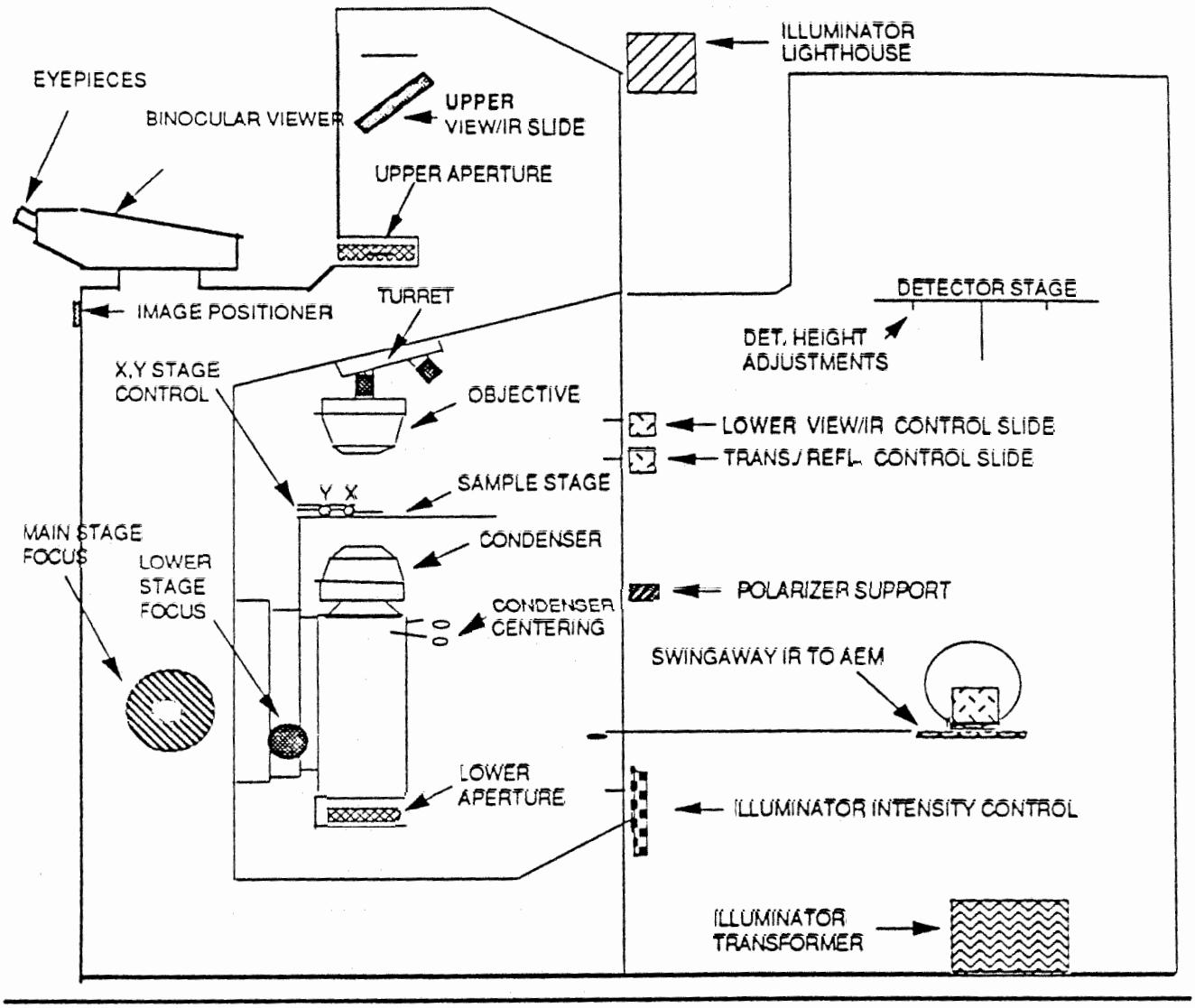
User Controls

Part Identification



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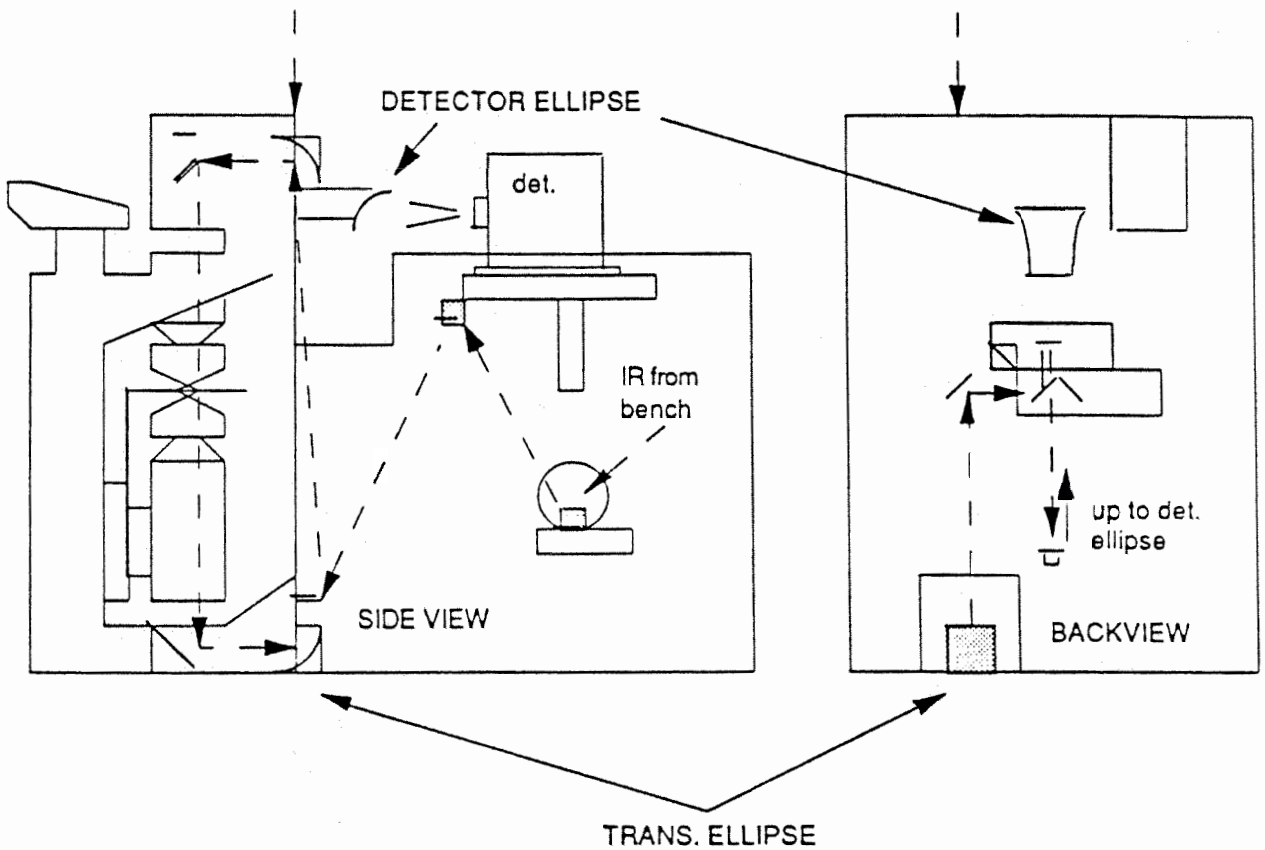
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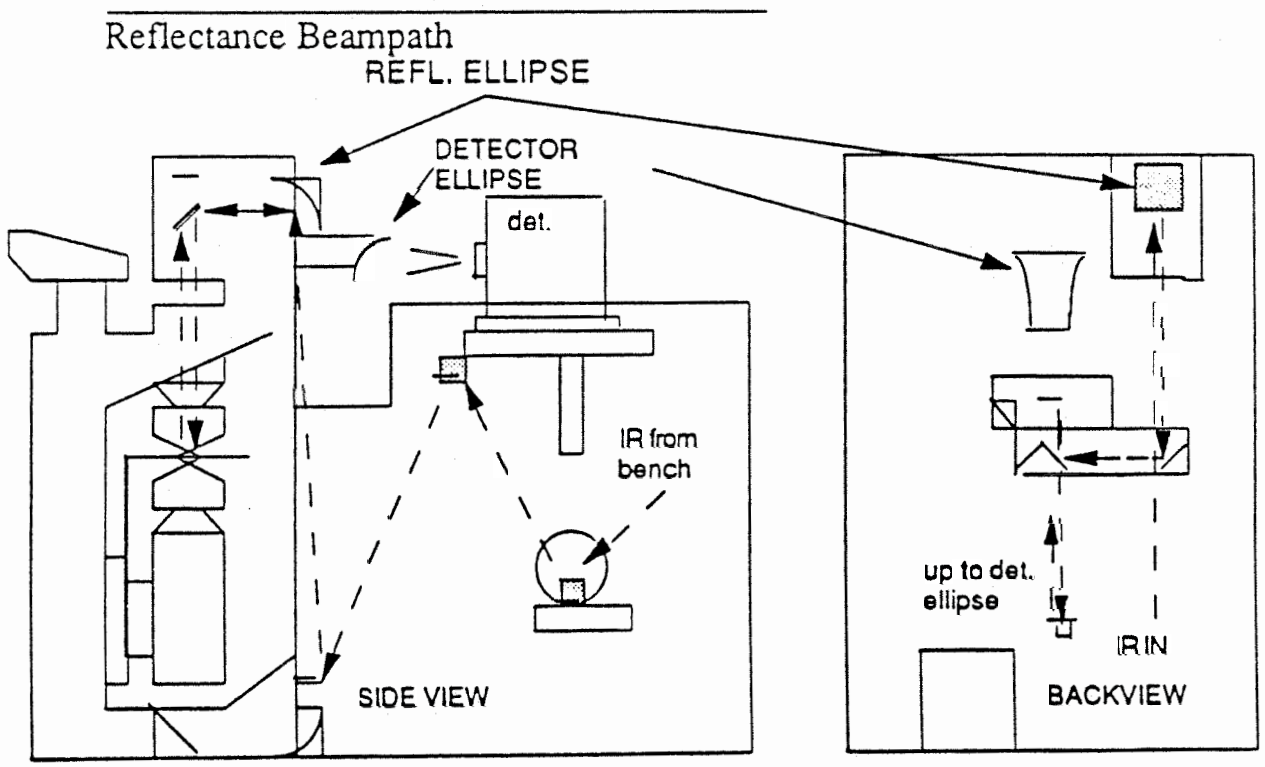
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Transmittance Beampath

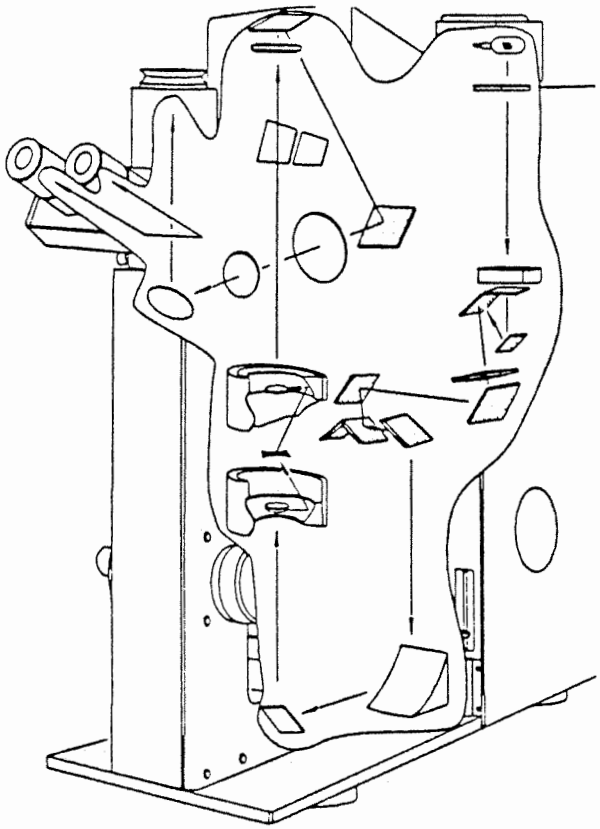
THIS IS KNOWN AS THE FIREWALL .....FIREWALL BACKVIEW



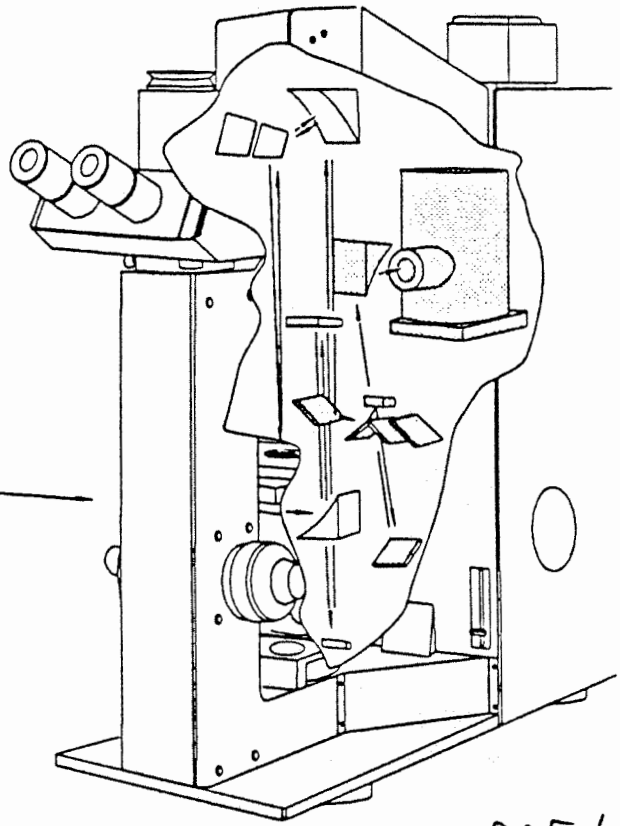
Reflectance Beampath



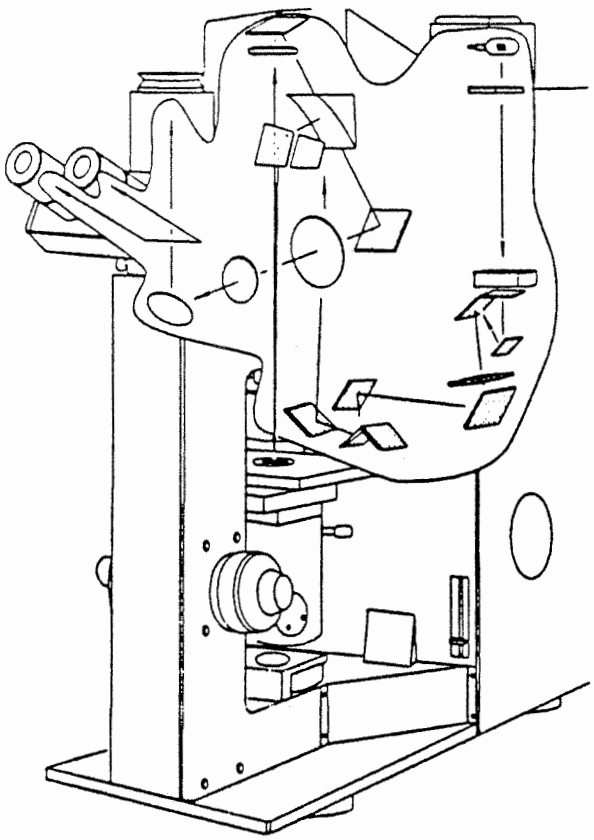
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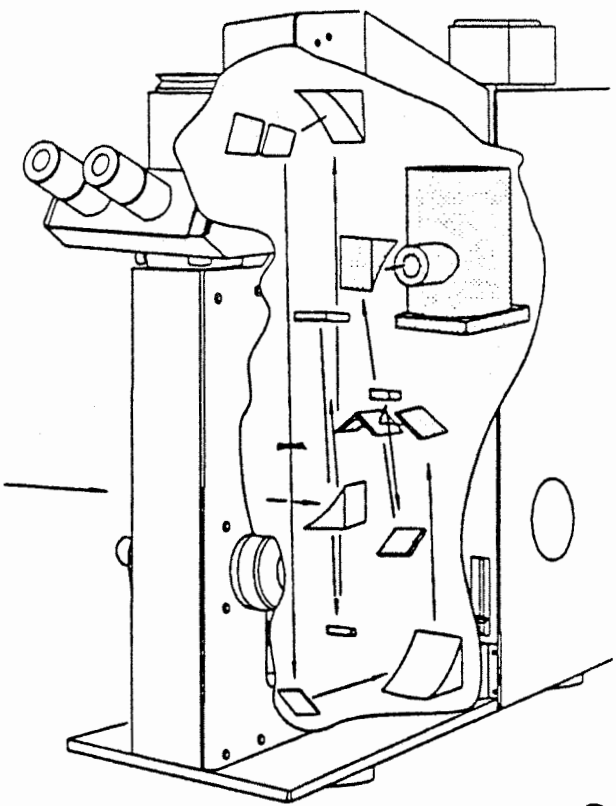
Viewing Transmission



IR Transmission REFL.



Viewing Reflection



IR Reflection TRAN.

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Installation

Bench Prerequisites

When installing an Analytical Microscope or an Advanced Analytical Microscope on a new system installation, the optical bench and flipper mirror should be aligned properly and will need no additional alignment. The flipper mirror gets aligned with a test fixture in the final test process and all systems should be the same. For new system installs skip to **Where?** MOUNTING Steps to Bench section on P. 1-9

For installations of AM's and AAM's on existing systems there are a number of hardware and alignment prerequisites needed.

Hardware prerequisites

a The only systems supported as a standard bench (not an engineering special) are the 5 & 20 B series, 5 & 20 C series, 500 & 700 series, 800 series, 5 PC & 510P series systems. Any other systems not listed here must be done as an engineering special!

b The system must have an analog board to detector 2 cable ~~p/n's for all benches~~ See ~~Bo~~ Service Eng for Kit for all det cbl's & at the end of manual

c There must be a flipper mirror and proper flipper mirror cable. p/n's

d For systems with more than one Auxiliary Experiment Module an additional mounting bracket and purge baffle are needed. For 500&700 series, P/N 840-124000 includes the detector switcher box. The 800 requires the mounting bracket, but has enough detector ports.

Alignment Prerequisites

It's extremely important that the optical bench be aligned correctly and that the IR is co-linear about the laser because the center laser dot is used to align the flipper mirror. If the main bench is not aligned correctly, it will be extremely difficult if not impossible to align the AM or the AAM. It is highly recommended that the following checks be done before proceeding with the installation.

a To check the laser alignment use two alignment posts (p/n 015-725702) to be sure that the laser is exact at post #1 and #2 on B&C series benches. If it isn't, you must correct it before proceeding. See the bench illustration, next page.

b To make sure the IR is tracking the laser, place a business card at the focal point of the sample compartment. Note where the center laser dot occurs and block the laser. The image of the IR should be centered around the point where the center laser dot was before blocking the laser. If it's not obvious, unblock and block the laser as many times as necessary. It also helps to turn out the lights when trying to view the IR. Also check where the beam exits the sample compartment and at the detector focus. These may show a better image of the IR and also the laser focus. If it is not obvious that the IR and laser are co-linear, check all three positions to be sure.

NOTE- The IR image that is seen is only the IR that passes through the laser window of the beamsplitter. In order to use this method, the laser must be centered in the laser window.

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If the IR and laser are not co-linear, the front end optics are misaligned. Check and make sure the source and source mirror are positioned properly and that they are co-axial with the center laser dot. Also be sure that the source image is centered on all the mirrors and the backside of the aperture. It will be necessary to move the laser detector out of the way to see the center laser dot. Don't follow the wrong laser dot! After correcting the front end optics be sure to go back and check the IR and laser in the sample compartment and at the detector.

c Align the flipper mirror. The flipper mirror alignment is critical, so extreme care must be taken when installing or verifying the placement and proper alignment. Be sure to use two alignment posts at post hole #6 & #7 for proper alignment. See illustration on previous page. DO NOT USE JUST ONE POST AT #7! Make the proper adjustments to the flipper mirror, bolt it in place. Once the flipper mirror is in place and aligned properly you should never adjust it again.

Mounting the Scope to the Bench

B & C series and 5PC, 500 & 700 series all use the same procedure and hardware to mount the AAM to the optical bench. The 800 series uses a different set of hardware and procedure. See 800 Series Procedure, next page.

Small Systems Procedure

1. Locate mounting bracket and 10-32 HEX head mounting screws.

2. Place bracket on the right hand side of optical bench and install 4 screws to secure to optical bench. Be sure to use the two front sets of holes on the optical bench. **Part number?**

3. Make sure that the microscope body is at the same height as the optical bench and is level.

4. Using the beveled hex screws, attach the microscope to the mounting bracket

5. If there is another Auxiliary Experiment Module to go on the system, an additional mounting plate is needed to connect the AEM the right hand side of the AAM. Part number 840-124000 consists of the mounting bracket and the detector switcher box.

6. For systems with an additional AEM, mount the bracket the right hand side of the microscope body and then level the AEM to the rest of the system and bolt it together.

7. Connect the detector switcher box to the rear of the optical bench with the standard auxiliary detector cable and connect the 2 shorter cables one to the AAM and the other to the AEM. NOTE: Be sure that the switch is in the microscope position when using the microscope and vise versa. **Need illustration, part numbers**

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800 Series Procedure

Mounting of the AAM to an 800 series system is basically the same as the small system types with the exception of the mounting bracket. P/N 840-037100 is the bracket to be used to mount the AAM to the 800 optical bench or an AEM on the 800. P/N 840-124100 is the mounting bracket to mount an AEM to the right hand side of the AAM and also comes with the detector switcher box.

See Mark Mangold. Why?

1. Locate and mount the mounting bracket to the right hand side of the 800 optical bench or AEM.

2. Level the AAM to the optical bench and make sure both are at the same height.

3. Connect the AAM to the optical bench with the beveled HEX head screws.

4 The mirror (~~what mirror?~~) ~~is~~ prealigned in Madison. Do not adjust it!

AAM Assembly Procedure

1. Locate binocular or trinocular viewer and install on microscope body. To do this, unscrew the silver finger screw until the black shipping cap can be removed. You will need to pull it out at an angle toward the thumb screw while lifting up at the same time. Note the angle that the black shipping cap comes out at because this is the same angle that will be needed to install the viewer. Now install the viewer and tighten the silver finger screw. Do not over tighten this screw but make sure it is snug.

2. Note whether the microscope has a one place nosepiece or a four position turret. If the microscope has a one place nosepiece a glass objective will not be used because glass is totally absorbing to IR.

3. Locate the objective and condenser that were ordered with the system. The objective will look similar to the condenser, with the exception of the beveled brass ring on the condenser. See fig. 3-6 to 3-22 the difference **(Is this drawing in this manual?).** This could be the 15X fixed objective, 15X reflachromat objective, or the 32X reflachromat objective. If the microscope has a four position turret nosepiece, a glass objective may also be used. Keep in mind that this is only for viewing purposes and NOT for IR sampling.

4. Install the objective in the nosepiece by threading it in a clockwise direction. When installing a reflachromat objective, be careful not to hold and turn it by the knurled silver ring. Hold it by the black ring at the top of the objective. The silver ring is for spherical correction and will misalign the secondary mirror if it is moved from the 0-0 position (this is the position where the red marks are aligned). If the microscope has a four position turret, there may be a glass objective with the system or another cassegrain objective. If there are two cassegrain objectives they must be mounted across from each other and not side by side because they will not fit due to the physical size of the cassegrain. The glass objectives can be installed in any position but will need an 18mm extension tube. The 18mm extension tube will allow the glass objectives to focus close to the same height as the cassegrain

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objectives. The glass objective and cassegrain will not focas at exactly the same height. They typically will be within a turn or two of the fine adjustment.

5. To install the condenser into the condenser tube, raise the main stage as high as it will go and lower the condenser stage as far as possible. Be sure to do this to minimize the chance of damaging the condenser or the condenser tube. Using the condenser centering screws, loosen the screws far enough as to allow the brass ring on the condenser to fit between the two centering screws and the spring loaded set screw on the front of the condenser tube. Tighten up the centering screws until some tension from the spring loaded set screw is felt. Do not worry that it is properly centered and aligned as this will be done later.

6. Locate the X-Y sample stage assembly and remove the actual X-Y stage from the sample stage plate using the silver finger screw located on the top of the stage assembly. Turn the stage over to view the hole on the edge of the right hand side. Inside is a spring loaded set screw used to fasten the sample stage plate to the sample stage mounting ring. Place the sample stage plate on the sample stage mounting ring with the set screw hole on the right hand side. Using a 3/32" allen wrench in the set screw hole, tighten the set screw until the spring loaded part of the set screw bottoms out and then back it off about one turn. This will allow the stage to be rotated if needed and will not bend the sample stage mounting ring. Reinstall the actual X-Y stage and tighten with the silver finger screw. The stage may be set up for right or left condense, depending on the set of holes used to mount the X-Y assembly.

7. Locate and install both of the eyepieces. One eyepiece will have a reticule (crosshairs) and must be installed in the right hand eye position of the viewer.

8. Install the AC line cord into the back of the microscope. As a precaution to eliminate ground loop problems, plug the AC line cord into the same AC outlet as the rest of the FT-IR system. If the system has a line conditioner, make sure that all peripherals and components are plugged into the conditioner.

9. Locate the 9 pin detector cable and the detector switcher box if the system has an additional AEM. On all new systems there will be a 9 pin external detector connector on the rear of the electronics module near the main bench AC line plug. Connect the 9 pin detector cable directly to the external detector connector on the main bench if the AAM is the only accessory. If the system has a microscope and another AEM, such as a GC interface, the detector switcher box is needed to be able to switch between the microscope and the GC detector. In this case there will be 2 additional 9 pin cables. One connects between the microscope and the detector switcher box and the other between the GC interface and the switcher. The main 9 pin cable is then connected between the detector switcher and the optical bench. **Need illustration**

Alignment of the Visual Optical Path

The object is to align the front end, or viewing, section of the microscope first and then make the IR path match. This will insure that the portion of the sample that is seen through the viewer is actually the portion of the sample that is being sampled by the IR. The following steps must be followed exactly and performed correctly to insure proper alignment.

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1. Slide both the upper and lower slide/view slides into the view position and the trans/refl slide to the trans position. Locate the illuminator intensity adjust slide and set to about the middle of the travel. Make sure that the illuminator iris is open, otherwise no light will be seen. If the microscope has a trinocular viewer, be sure the view/camera slide is pushed all the way in. **Need illustration** this is the on the TRIN

2. The reticule in the right eyepiece will be the reference that the rest of the visual optics will be aligned to. Rotate the right eyepiece so that the numbers are viewed in the horizontal plane. To focus the eyepiece, hold the bottom or inner tube in place with one hand so that the eyepiece does not rotate and turn the outer tube to adjust the focus. Look at the numbers on the reticule while turning the outer tube and find the best focus of the right eyepiece.

3. To focus the left eyepiece you need something to focus on. Included with all microscopes will be a 100 micron pinhole which makes a good focusing target. If the microscope has a four position nosepiece, select one of the glass objectives and by adjusting the course stage focus knob, bring the pinhole into focus. While looking at the flat surface next to the pinhole, adjust the left eyepiece for the best focus. Be sure to pick one or two of the lines or scratches to adjust the focus. This makes it much easier to achieve a good focus. If the microscope only has a cassegrain objective, this step will have to be done using the cassegrain and not the glass objective.

4. For microscopes with multiple eyepieces you need to make sure that the reflachromat objective is centered in the same visual point as the glass objective. If the system only has one objective or a one position nosepiece this step can be ignored. Focus the pinhole using the 10X glass objective and center it EXACTLY in the reticule with the X and Y stage. Rotate the nosepiece to the cassegrain position and refocus the pinhole with the fine stage focus knob, but do not adjust the X-Y stage. Note the position of the pinhole in reference to the reticule. If the pinhole image is in the same place the cassegrain is, then properly adjusted and you can proceed to the next step. If the images are not in the same position, then the cassegrain will need to be adjusted. Use the three cassegrain centering set screws to center the image on the reticule by "WALKING" it to the center. Be sure that all three set screws are tight when you are finished as they are all set screws not spring loaded. See fig.*** for set screw location.**(Is this drawing in this manual?)** fig 2 p. 1-22

NOTE: This stop can only be done with the reflachromat and not with the fixed objective.

NOTE: If the system has more than one glass objective, one must be selected to center the cassegrain on. It is not possible to center to more than one glass objective at a time. Also keep in mind that it is just the X-Y positioning that we are after, not the stage height focus. It is not possible to adjust for stage height, but it will be within a few turns of the fine stage focus knob.

5. With the introduction of the lower cost AM and AAM there is now a new type of objective. This objective is referred to as the 15X FIXED objective. They're set up as 160/0, 160/1, 160/2 **(what does this mesn?)**The 15X fixed objectives are set up for sampling with a fixed compensation not adjustable like the reflachromats. The most common objective will be set up with no compensation, The 160 is — the 1 is 12

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