

OEM/Designer Handbook:

Model CFM Continuously-Focusable Microscope System



Infinity Photo-Optical Company • 2530 Frontier Ave. • Boulder, CO 80301 • Telephone 303/440-4544 • Fax 303/440-4144

INFINITY Model CFM Continuously-Focusable Microscope

The CFM Continuously-Focusable Microscope was the first of Infinity's instruments to combine high close-in magnification with the ability to focus to infinity. Unlike its derivatives, such as the InfiniVar, Model CFM can be used not only in the video format, but in visual and photo modes as well. Since the CFM will acquire an image almost anywhere (except closer than 0.30 inches), it may well be the easiest to use microscope ever developed. Used properly, it will provide years of trouble free service.

NOTE: The CFM optical module is designed to be a SEALED UNIT. DO NOT attempt to take the CFM apart or to enter ANY PART of its optical assembly. The ONLY exception may be made if and when the T24/Clamp is exchanged for a Stereomicroscope Stand Adapter. ANY OTHER disassembly will AUTOMATICALLY VOID THE WARRANTY and may adversely affect image quality.

Description. Model CFM is composed of a unitized Optical Module with top Dovetail Interchanger and Imaging Tubes which dovetail into it. Adapters are available for many brands of DIN-standard binocular/trinocular tubes, in which case the standard dovetail socket is replaced by one suited for the binocular-trinocular tube. A Clamp with 1/4-20 mounting tap and two "outboard" M4 metric taps is included, secured around the module. Alternatively, any of several Stereomicroscope Stand Adapters can be exchanged with the Clamp and its inner T24 tube, so that the CFM can be mounted on all major brands of stereomicroscope stands [e.g., Bausch & Lomb (now Leica), Nikon, Olympus, Unitron, Will/Hund, etc.]. The CFM can therefore be mounted on almost any stand which provides adequately rigid support.

On the front of the CFM is an Objective Assembly which has standard microscope dimensions. Small fiber optic ring illuminators (c.21-22mm inside diameter) can be mounted around it. The larger outer dimension of the CFM front can directly accept 66mm fiber optic ring illuminators. The CFM requires no other adjustments or controls for effective use.

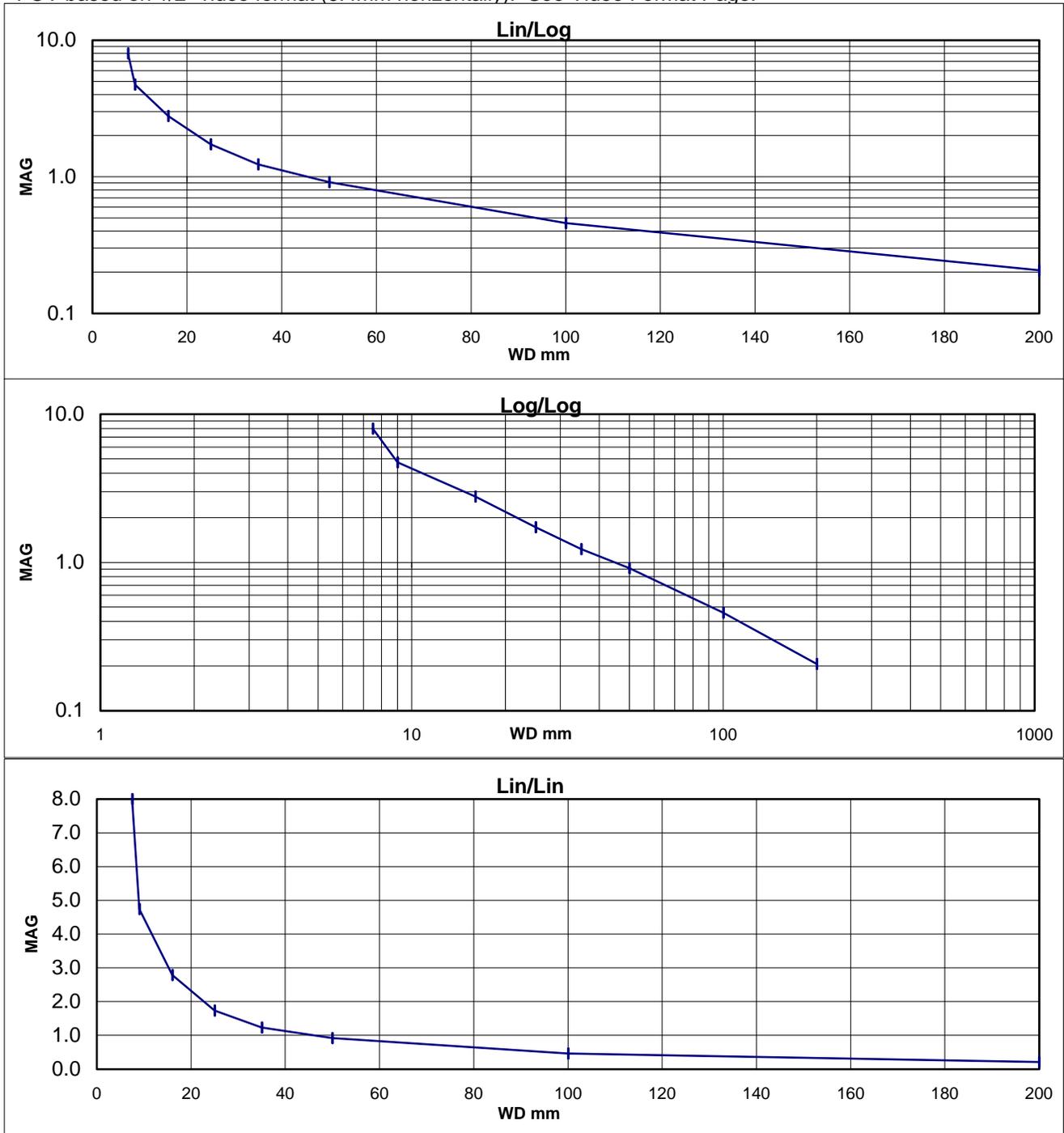
Operating Range. The CFM focuses continuously from infinity down to 0.30 inches (7.5mm) . By turning the knurled focusing ring 180°, the CFM's entire range can be covered.

Visual Use. The Visual Imaging Tube is inserted into the dovetail of the Optical Module and locked in place by the thumbscrew on the Optical Module. An appropriate microscope eyepiece can be inserted into the top of the Visual Imaging Tube and locked in place by the tube's thumbscrew. The range of primary visual magnification is 0.25x @ 6 inches (152mm) to 9x @ 0.30 inches (7.5mm). Primary magnification *times* eyepiece magnification equals total system magnification. For example, a 10x eyepiece yields up to 90x visually, whereas, a 20x eyepiece yields up to 180x visually. **CAUTION: The Visual Imaging Tube should NEVER be used as an extender.** This is because the Visual Imaging Tube contains a smooth bore to accept the eyepiece. The bore will cause severe internal reflections

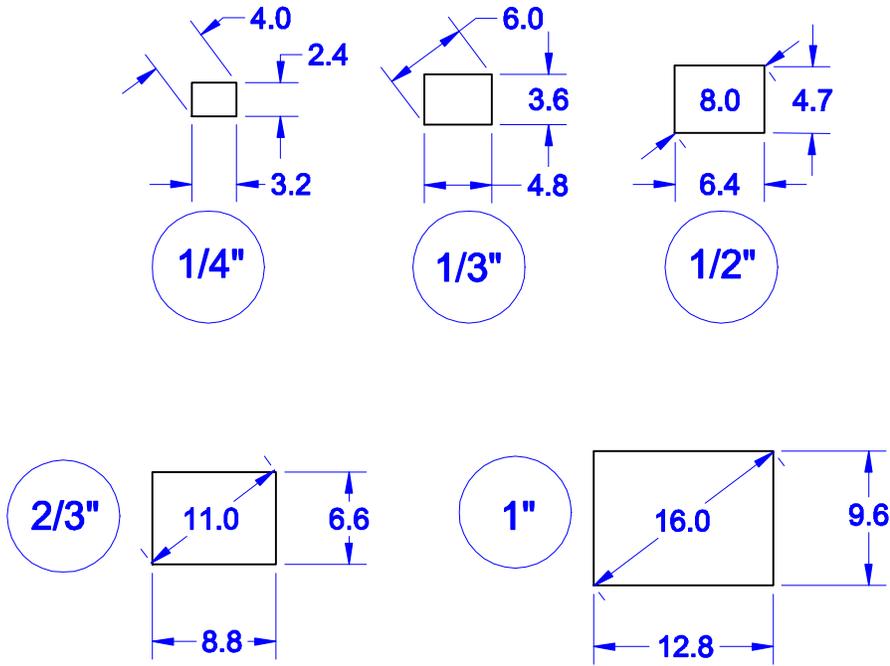
CFM OPTICAL DATA

CFM	WD mm	7.5	9	16	25	35	50	100	200
	Mag	8.0	4.7	2.8	1.7	1.2	0.9	0.5	0.2
	FOV	0.8	1.35	2.3	3.7	5.2	7	14	31

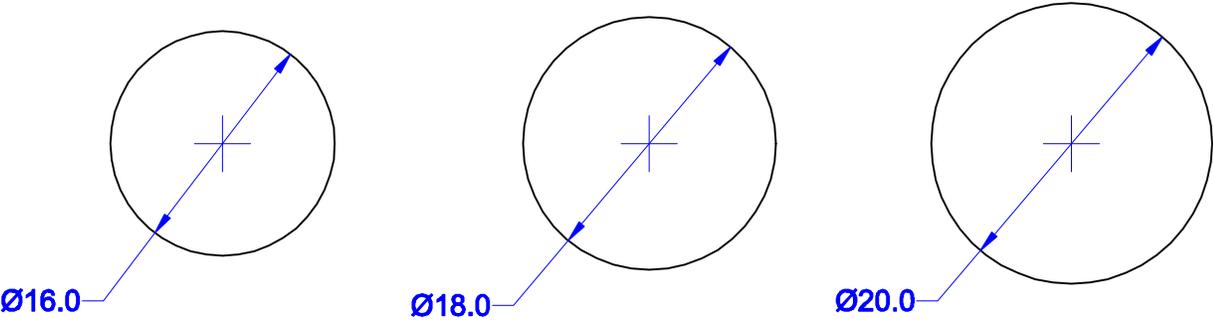
*FOV based on 1/2" video format (6.4mm horizontally). See Video Format Page.



Video Formats



Eyepiece Formats



All dimensions in mm.

unless an eyepiece is inside it. In any case, the tubelengths of the CFM are specific and extenders are not required. For special applications, please contact us.

Video Use. The CFM can be used for video observations by removing the Visual Imaging Tube and replacing it in the Optical Module's dovetail by the Video/Photo Tube. A C-mount adapter and video camera are then attached to the Video/Photo Tube. Video magnification is dependent on the size of the monitor used and the diagonal dimension of the video camera's sensor. For example, a video camera with 8mm diagonal will be amplified c.40 times on a 13-inch [$330\text{mm}/8\text{mm} =$ (rounded) 40x]. This aspect ratio factor is then multiplied times the primary magnification to obtain total on-monitor magnification. If a DL Tube is interfaced between camera and C-mount, all magnification ranges are doubled. If the CFM is to be used in both photo and video formats, the 2x Parfocal Doubler Photo/Video Tube (PD Tube) should be used in the Optical Module's dovetail in place of the standard Photo/Video Tube. Then, either a C-mount or T2 photo adapter can be used at its rear.

Photo Use. The CFM is a true compound microscope and, as all other compound microscopes, cannot cover a field as large as the 35mm format (43mm diagonally). For example, a typical 10x widefield eyepiece has only an 18mm or 20mm field. Therefore, amplification is needed in order to spread the image over the entire 35mm format.

The simplest amplifier is a standard teleconverter (obtained from the SLR's manufacturer). For photo use, a standard T2 Photo Adapter is used on the Video/Photo Tube. The teleconverter (a 2x is best) is interfaced between the T2 adapter and SLR camera. The field of the 35mm camera will now be filled. Total on-film magnification is the primary magnification times teleconverter (2x). By this method, 0.5x to 18x can be continuously imaged within a 6 inch (152mm) to 0.30 inch (7.5mm) zero-in.

Better results are obtained when Infinity's own PD Tube (see above) is used in place of the standard Photo/Video Tube. The PD Tube has 2x factor which completely fills the 35mm format.

Finally, Infinity's Unipar Camera Adapter may be used with the Visual Imaging Tube (see drawing) if a reticle is desired to be superimposed onto the photo or video field. We will be pleased to advise, should this application be necessary.

Illumination. The CFM functions best when the object is as evenly and as brilliantly illuminated as possible. Intense lamps or fiber optic illuminators should be used. In general, 66mm diameter fiber optic ring illuminators are preferred for top-light applications. Diffuse flood lamps are not recommended.

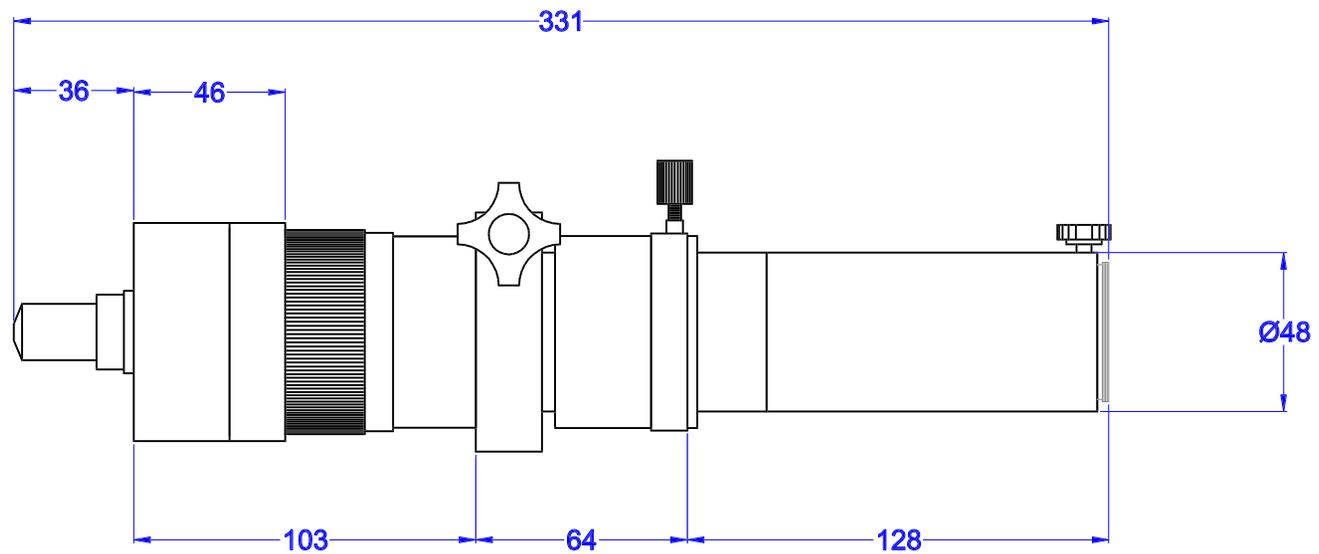
Stands. The CFM can be mounted on any heavy-duty stand or jig with 1/4-20 mounting screw, or secured by either or both of the two "outboard" M4 metric taps on the Clamp. If the Clamp and T24 Tube spacer are removed, a suitable Stereomicroscope Stand Adapter can be used instead.

Binocular/Trinocular Use. Binocular and/or Trinocular tubes from various manufacturers can be mounted on the Optical Module. Infinity makes dovetail adapters for Nikon, Olympus, Zeiss, Leitz/Leica, Unitron, Will/Hund--and other brands. When a trinocular tube is used, all top accessories made by that manufacturer will automatically be compatible with the CFM. The CFM's tubelength is matched for DIN-standard observation tubes. Other tubes can be used, and we will advise, accordingly.

Care and Cleaning. The CFM should be treated as the fine optical instrument it is. Care should be taken to keep dust and dirt off external lens surfaces. If the front objective should ever need cleaning,

use lens tissue moistened with an approved lens cleaner. **DO NOT USE SOLVENTS OF ANY KIND.** The CFM Optical Module should NEVER be opened. If contaminants enter the inner parts, consult your dealer or Infinity Photo-Optical about cleaning services.

Warranty Service and Questions. Specific details of the warranty are given in the limited warranty statement. In general, all parts and labor are guaranteed for five (5) years. Should the CFM become damaged or need service, return it to your authorized dealer with a letter explaining the problem. If you have additional questions, please do not hesitate to contact your dealer or Infinity Photo-Optical Company directly.



Notes:

1. Dimensions for mounting information only
2. Clamp drawing required.

ALL DIM ARE mm.
FOR REFERENCE
ONLY. SUBJECT TO
CHANGE.

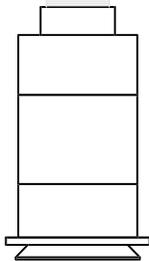
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CFM System w/Standard Eyepiece Holder

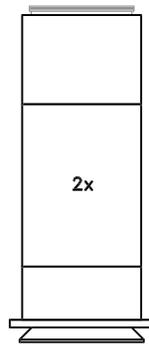
SIZE	FSCM NO.	DWG NO.	REV
B			
SCALE	NONE	Cfm-std	SHEET 1 OF 1

3/4/97

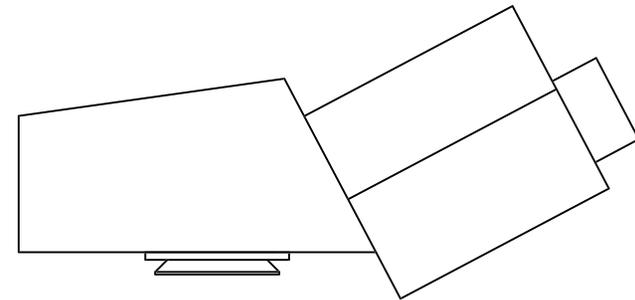
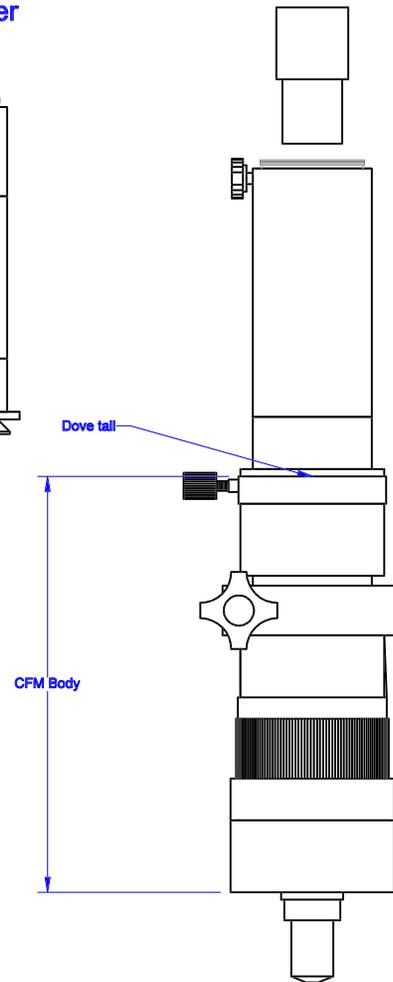
C-Mount
Video



PD Doubler



Standard CFM w/ocular



Binocular head

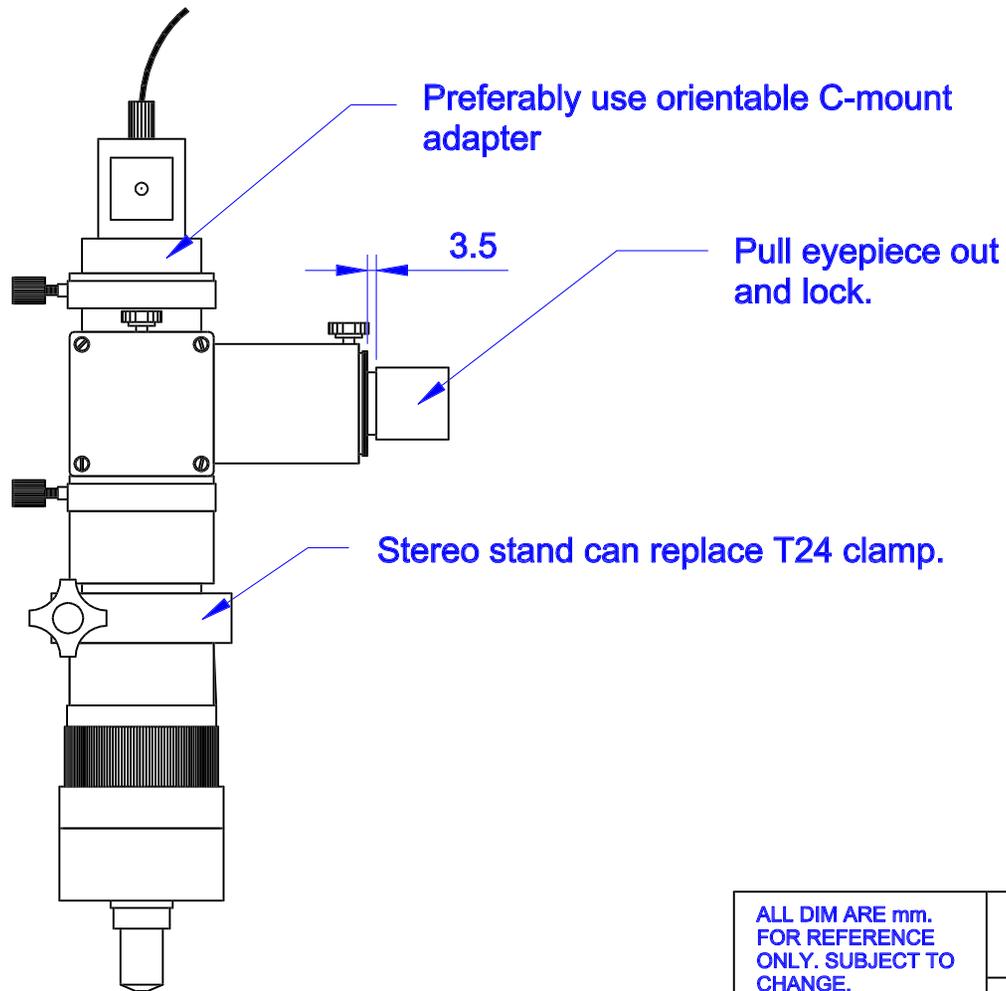
Each Imaging option is connected
by the dovetail to the CFM Body

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[inches] AND ARE FOR
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CFM System

Date:	SIZE B	FSCM NO.	DWG NO.	REV
Modified: 8.29.96	SCALE	NONE	CFM System	SHEET 1 OF

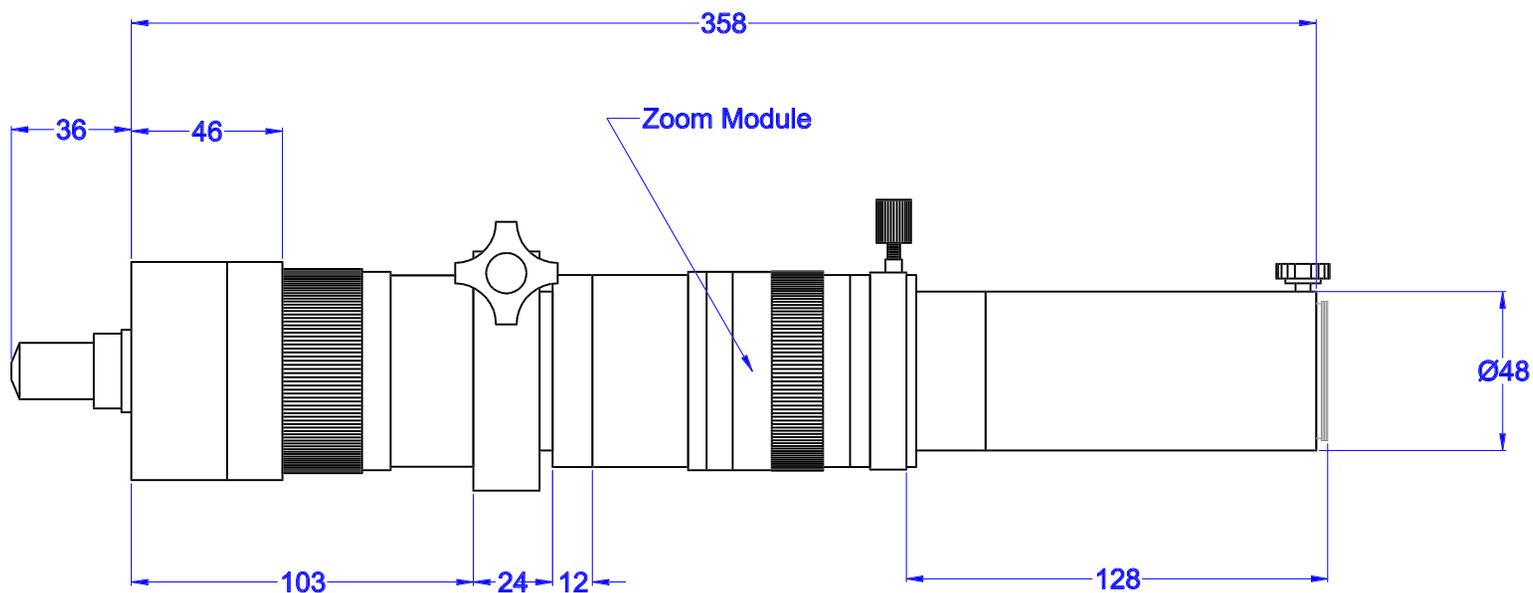


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CFM w/ Mirror Diverter

SIZE B	FSCM NO.	DWG NO.	REV
3/4/97	SCALE NONE	SHEET 1 OF 1	



Notes:

To utilize Zoom Module Conversion Kit:

1. Loosen all set screws by using supplied 2-56 Allen wrench.
2. Interface rear lens assembly between 12mm spacer and Zoom Module.
3. Lock assembly by using 2-56 Allen wrench to set screws.

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CFM System w/Zoom Module

SIZE B	FSCM NO.	DWG NO.	REV
9/18/97	SCALE NONE	CFM-ZOOM	SHEET 1 OF 1