

Mini-Chrom™ Monochromators

UV-VIS-NIR



Small Size

Impressive Performance

For OEM and Research Applications

48 Standard Models

Custom Configurations for OEM's

Over 20,000 Sold!



Optometrics

A Dynasil Company

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Monochromators

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Introduction

The Mini-Chrom series of UV-VIS-NIR monochromators are low cost, high performance instruments designed for use in research, OEM system integration, quality control, and education. With over 20,000 units sold, the Mini-Chrom has been proven for reliable precision, and superior service life when integrated within sophisticated analytical and biomedical instrumentation such as clinical chemistry analyzers, HPCL detectors, industrial process analyzers, UV-VIS-NIR spectrophotometers and when used within laboratory research applications.

Throughput, resolution, stray light and power handling are comparable to many larger, more expensive monochromators. The Mini-Chrom is specifically designed to minimize astigmatic aberrations, enhancing instrument resolution. Each unit includes a set of fixed slits which can be easily changed to wider or narrower slits to optimize throughput or resolution for a particular application.

A variety of peripheral equipment is available that will increase the versatility of the Mini-Chrom in a laboratory environment, including a stepping motor controller, Silicon detector module, sample compartment, and tungsten halogen lamp module with power supply.

OEM DESIGN OPTIMIZATION

The huge success of the Mini-Chrom monochromator has been driven by several key factors, including:

1. Proven robust design
2. Tested for over one million scans
3. Can be easily optimized for specific applications with:
 - Custom optical coatings
 - Hundreds of available diffraction gratings
 - System integration design support
 - Custom scanning drive system support

Over 20,000 Mini-Chrom Monochromators have been sold!

Design and Operation

MONOCHROMATOR DESIGN AND OPERATION

Mini-Chroms are compact, in-line Fastie-Ebert monochromators with a 74 mm focal length, applicable for general spectroscopy or for integration within an OEM system. All incorporate one of a wide selection of diffraction gratings optimized from the UV to IR (ruled or holographic) and are also available with aluminum or gold coatings depending upon application. All Mini-Chrom monochromators include a set of fixed, interchangeable entrance and exit slits. Optional slit sets are available to optimize both resolution and throughput.

The compact Mini-Chrom provides spectral resolution comparable to that of many larger, more costly, conventional monochromators.

Mini-Chroms are available in four types: Standard, Digital, Scanning and Scanning Digital. The primary differences in the four types relate to how the wavelength is selected and displayed. Each type is available in several wavelength ranges from the ultraviolet to the near infrared.

OPERATION

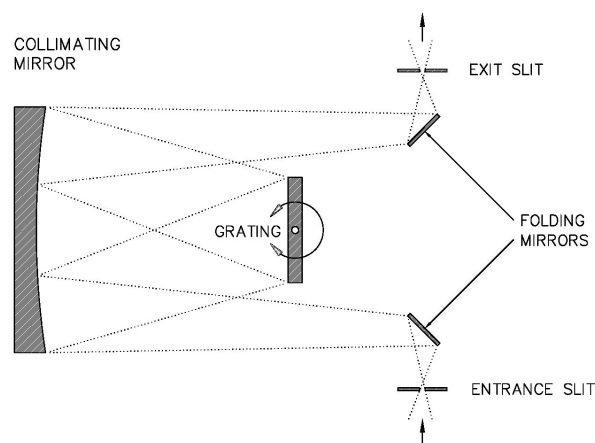
All Mini-Chroms are optically identical Fastie-Ebert in-line monochromators with an effective aperture of $f/3.9$ and 74 mm focal length. As shown in the optical diagram, input spectral radiation is focused at the entrance slit and reflected by a folding mirror onto a spherical collimating/focusing mirror. This mirror collimates the radiation and directs it onto the grating, where it is diffracted. Once separated into a spectrum, the radiation is directed back to the collimating/focusing mirror, after which a segment of the dispersed radiation is focused and then directed at the exit slit via a second folding mirror. The wavelength of monochromatic radiation exiting the instrument is dependent upon the angular position of the grating. A sine drive mechanism is used to rotate the grating, either manually or via a stepping motor, so that discrete wavelengths are sequentially focused at the exit slit in a linear fashion.

Optimal throughput and wavelength accuracy are attained only if the Mini-Chrom is operated under the following guidelines:

BEAM GEOMETRY AND ALIGNMENT

To ensure maximum wavelength accuracy and system throughput, the effective aperture of the input beam should be $f/3.9$ or greater. If the input radiation has a faster (less than $f/3.9$) effective aperture, the input folding mirror will be overfilled and stray light will increase significantly. In addition, the converging (input) beam must be normal (perpendicular) to the plane of the entrance slit. Failure to align the beam properly with the entrance slit will adversely affect throughput, resolution, and wavelength accuracy (see Systems & Accessories brochure for a pre-aligned visible source).

Optical Diagram



RESOLUTION

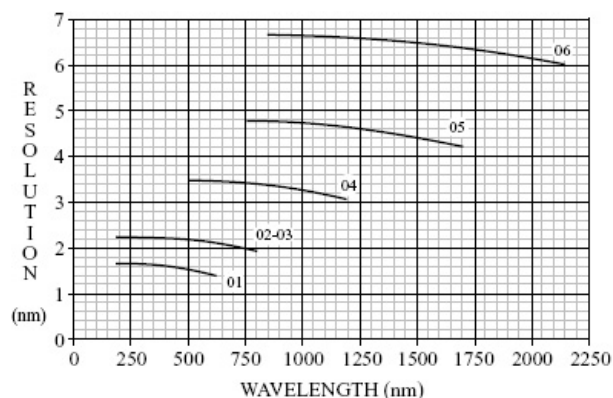
Resolution is a quantifiable indicator of the spectral purity of radiation exiting the monochromator. It is a function of the focal length of the monochromator, the dispersion of the grating and the width of the interchangeable entrance and exit slits.

Resolution is inversely proportional to slit width, i.e. as slit width decreases, resolution increases.

INTERCHANGEABLE SLITS

Changing the slit assemblies in any Mini-Chrom takes only a few seconds and no tools. The slit assembly consists of a precision slit photo etched in a black oxide coated brass disc, a slit spacer, slit cover and two banana plugs. The banana plugs allow the assembly to be easily inserted or removed while assuring alignment of the slit with the monochromator. Note: Slits should always be changed in pairs.

Monochromator resolution vs. wavelength by model number (using 300 μ slits)



Specifications

GENERAL SPECIFICATIONS - MONOCHROMATORS

| | |
|---|--|
| f Number | 3.9 |
| Focal Length | 74 mm |
| Grating | 2 cm square |
| Slits (interchangeable) | see page 11 |
| Stray Light: | |
| Models with holographic gratings ¹ | ≤ 0.003% |
| Models with ruled gratings ² | ≤ 0.02% |
| Wavelength Accuracy (as a % of wavelength) | ± 0.2% |
| Wavelength Reproducibility | ± 0.15% |
| Wavelength Readability | 0.2 nm |
| Dimensions | Type dependent |
| Beam Path | In Line |
| Damage Threshold | 100 Watt/cm ² , 2 J/cm ² , 100 nano sec. pulse |
| Operating Temperature | -20°C to +80°C |
| Options (see Accessories) | Interchangeable Slits |

Fiber Optic Cables
Gold Coated Optics
Second Order Blocking Filters
Calibration Filter
SMA Adapter

Wavelength accuracy is given as a percentage of wavelength. This means that, at 400 nm, the accuracy would be 400 nm ± 0.2% or 400 nm ± 0.8 nm. At 800 nm, the accuracy in the same Mini-Chrom would be 800 nm ± 0.2% or 800 nm ± 1.6 nm.

¹ measured 10 nm from 632.8 nm (HeNe laser line).

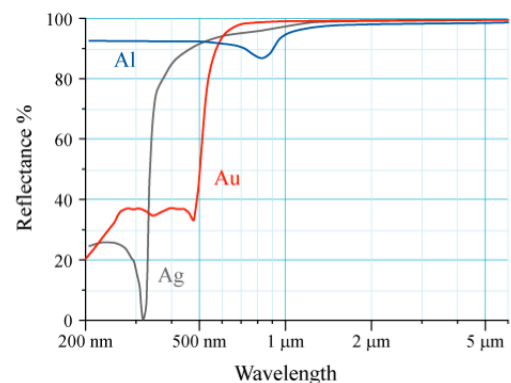
² measured 20 nm from 1265.6 nm (second order HeNe laser line).

Note: Specifications that apply only to a specific type of Mini-Chrom are listed following the description of each type.

OPTICAL COATINGS

All optical surfaces in the standard Mini-Chroms are coated with aluminum which has a high reflectance throughout the UV-VIS-NIR spectral range. Aluminum does, however, exhibit a decrease in reflectance at approximately 850 nm. If your application requires optimal efficiency above 625 nm, and does not require efficiency below 600 nm, an optional gold coating on all optical surfaces is available.

Reflectance vs. Wavelength of Aluminum and Gold Coated Optics



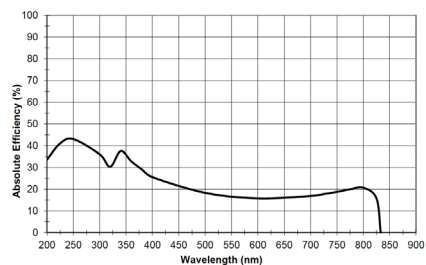
Models Available and Resolution

| MODEL | GRATING SPACING/BLAZE AND TYPE | LINEAR DISPERSION (nm/mm) | WAVELENGTH RANGE | RESOLUTION* (nm) FOR SLIT WIDTHS OF: | | | | | |
|-------|--------------------------------|---------------------------|------------------|--------------------------------------|-------|-------|-------|-------|------|
| | | | | 50 μ | 100 μ | 150 μ | 300 μ | 600 μ | 1 mm |
| 01 | 2400/250 nm Holographic | 5.34 | 190 - 650 nm | 0.3 | 0.5 | 0.8 | 1.6 | 3.2 | 5.3 |
| 02 | 1800/250 nm Holographic | 7.27 | 200 - 800 nm | 0.4 | 0.7 | 1.1 | 2.2 | 4.4 | 7.3 |
| 03 | 1800/500 nm Holographic | 7.16 | 300 - 800 nm | 0.4 | 0.7 | 1.1 | 2.2 | 4.3 | 7.2 |
| 04 | 1200/750 nm Ruled | 10.66 | 500 nm - 1.2 μ | 0.5 | 1.1 | 1.6 | 3.2 | 6.4 | 10.7 |
| 04V | 1200/500 nm Holographic | 10.66 | 420 nm - 1.15 μ | 0.5 | 1.1 | 1.6 | 3.2 | 6.4 | 10.7 |
| 05 | 830/1.2 μ Ruled | 15.42 | 750 nm - 1.7 μ | 0.8 | 1.5 | 2.3 | 4.6 | 9.3 | 15.4 |
| 05G | 830/1.2 μ Ruled | 15.42 | 750 nm - 1.7 μ | 0.8 | 1.5 | 2.3 | 4.6 | 9.3 | 15.4 |
| 06 | 600/1.6 μ Ruled | 21.73 | 850 nm - 2.2 μ | 1.1 | 2.2 | 3.3 | 6.5 | 13.0 | 21.7 |
| 06G | 600/1.6 μ Ruled | 21.73 | 850 nm - 2.2 μ | 1.1 | 2.2 | 3.3 | 6.5 | 13.0 | 21.7 |
| 07 | 1200/400 nm Ruled | 11.15 | 360 - 800 nm | 0.6 | 1.1 | 1.7 | 3.3 | 6.7 | 11.2 |
| 08 | 900/500 nm Ruled | 15.00 | 360 - 800 nm | 0.8 | 1.5 | 2.3 | 4.5 | 9.0 | 15.0 |
| 09 | 300/500 nm Ruled | 44.72 | 360 - 1.0 μ | 2.2 | 4.5 | 6.7 | 13.4 | 26.8 | 44.7 |

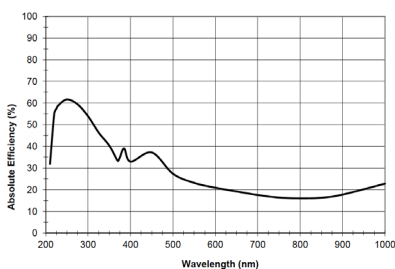
Resolution = (slit width) x (linear dispersion)

Standard Grating Efficiency Curves

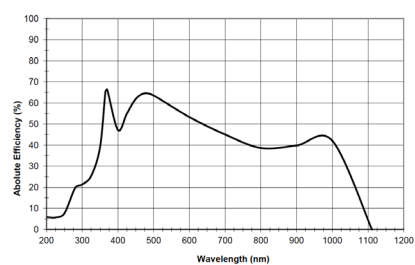
2400 Line UV Holographic



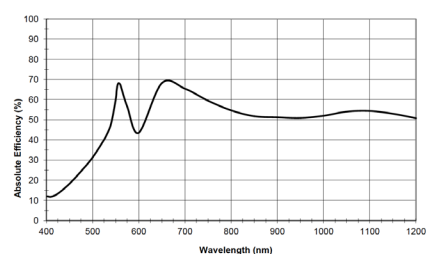
1800 Line UV Holographic



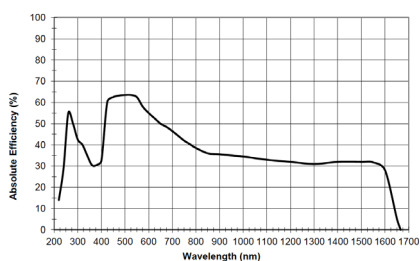
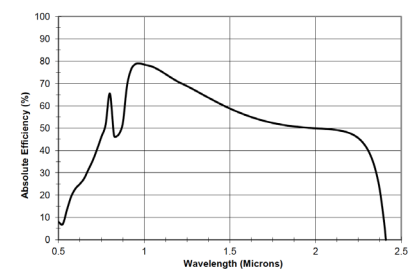
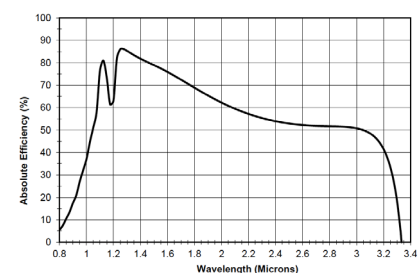
1800 Line VIS Holographic



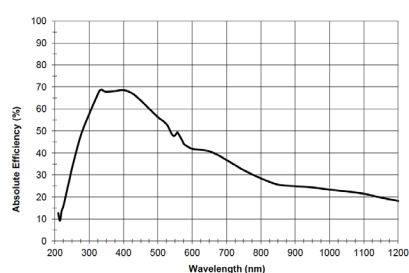
1200 Line 750 nm Ruled



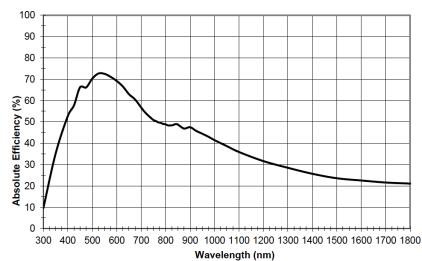
1200 Line VIS Holographic

830 Line 1.2 μ Ruled600 Line 1.6 μ Ruled

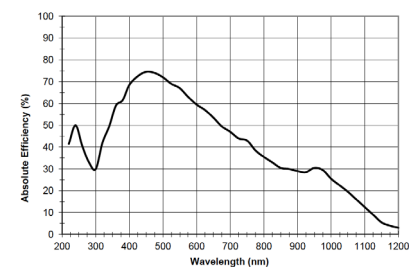
1200 Line 400 nm Ruled



900 Line 500 nm Ruled



300 Line 500 nm Ruled



Many custom gratings are available for system integration and application optimization.

Standard Mini-Chrom

The Standard Mini-Chrom (MC) is a manual unit which utilizes a micrometer for wavelength selection and readout. Turning the micrometer causes, via a precision sine bar drive, rotation of the diffraction grating which positions the desired wavelength at the exit slit.

Wavelength is read directly from the micrometer at 1 nm per division in models 01, 02, 03, and 04. Wavelength readout for near infra-red models (05 and 06) is 2 nm per division.

Standard Mini-Chroms are used in a variety of physics, chemistry, engineering and the life science applications that require a small yet high performance manually tuned monochromator for precision wavelength selection. Dimensions: 150 mm x 59 mm x 49 mm; Weight 0.5 Kg (1.1 lbs).

The addition of a reticle and comparator converts the Standard visible Mini-Chrom (model 03) to a hand held visual spectrograph. The unit (cat. no. 6-0109) can be used to identify the emission lines of various elements such as Hg and Na from a fluorescence or discharge lamp. Removal of the comparator and reticle converts the hand held spectrograph back to a standard Mini-Chrom for added versatility.



| CATALOG NO. | MODEL NO. | WAVELENGTH RANGE |
|-------------|-----------|--------------------|
| 6-0101 | MC1-01 | 190 - 650 nm |
| 6-0102 | MC1-02 | 200 - 800 nm |
| 6-0103 | MC1-03 | 300 - 800 nm |
| 6-0104 | MC1-04 | 500 nm - 1.2 μ |
| 6-0113 | MC1-04V | 420 nm - 1.15 m |
| 6-0105 | MC1-05 | 750 nm - 1.7 μ |
| 6-0107 | MC1-05G | 750 nm - 1.7 μ |
| 6-0106 | MC1-06 | 850 nm - 2.2 μ |
| 6-0108 | MC1-06G | 850 nm - 2.2 μ |
| 6-0110 | MC1-07 | 360 - 800 nm |
| 6-0111 | MC1-08 | 360 - 800 nm |
| 6-0112 | MC1-09 | 360 nm - 1.0 μ |

Models 05G and 06G utilize gold coated optics for superior reflectance in the NIR.

Digital Mini-Chrom

The Digital Mini-Chrom (DMC) is a manually operated monochromator that utilizes a digital counter for wavelength selection. Rotation of the dial causes, via a precision lead screw/sine bar mechanism, rotation of the diffraction grating which positions the selected wavelength at the exit slit.

Digital Mini-Chroms are used in a variety of applications that require a small yet high performance manually tuned monochromator. They are used in physics, chemistry, engineering and the life sciences applications where a low cost manually tuned device for precision wavelength selection is required.

The wavelength on all Digital Mini-Chroms can be selected and read to 0.2 nm. Wavelength is read directly in nanometers (nm) from a counter on models 01, 02, 03, 04 and 05. Near infrared model (06) requires the counter reading to be doubled. Dimensions: 139 mm x 59 mm x 49 mm; Weight: 0.7 Kg (1.5 lbs).



| CATALOG NO. | MODEL NO. | WAVELENGTH RANGE |
|-------------|-----------|--------------------|
| 6-0401 | DMC1-01 | 190 - 650 nm |
| 6-0402 | DMC1-02 | 200 - 800 nm |
| 6-0403 | DMC1-03 | 300 - 800 nm |
| 6-0404 | DMC1-04 | 500 nm - 1.2 μ |
| 6-0413 | DMC1-04V | 420 nm - 1.15 m |
| 6-0405 | DMC1-05 | 750 nm - 1.7 μ |
| 6-0406 | DMC1-05G | 750 nm - 1.7 μ |
| 6-0408 | DMC1-06 | 850 nm - 2.2 μ |
| 6-0409 | DMC1-06G | 850 nm - 2.2 μ |
| 6-0410 | DMC1-07 | 360 - 800 nm |
| 6-0411 | DMC1-08 | 360 - 800 nm |
| 6-0412 | DMC1-09 | 360 nm - 1.0 μ |

Models 05G and 06G utilize gold coated optics for superior reflectance in the NIR.

Scanning Digital Mini-Chrom

The Scanning Digital Mini-Chrom (SDMC) includes an integral stepping motor which can be controlled by a calibrated drive such as the Optometrics PCM-02 via a 15-pin connector. The SDMC is similar to the Digital Mini-Chrom in that it includes a four digit counter for visual wavelength readout and a dial for manual wavelength selection.

The wavelength on all Digital Mini-Chroms can be selected and read to 0.2 nm. Wavelength is read directly in nanometers (nm) from a counter on models 01, 02, 03, 04 and 05. For near infrared model (06), the four digit counter reading must be doubled, to 2 nm per division.

To prevent mechanical damage due to inadvertently exceeding wavelength limits, all Scanning Digital Mini-Chroms are supplied with dual photosensors that function as high and low limit switches are included for use in the motorized scanning mode. The Scanning Digital Mini-Chrom can be used for all applications that require the convenience of an integrated visual wavelength readout and manual wavelength tunability, as well as applications requiring computer controlled scanning to a selected wavelength or routine. Dimensions: 197 mm x 59 mm x 49 mm; Weight 0.9 Kg (1.9 lbs).



| CATALOG NO. | MODEL NO. | WAVELENGTH RANGE |
|-------------|-----------|---------------------|
| 6-0501 | SDMC1-01 | 190 - 650 nm |
| 6-0502 | SDMC1-02 | 200 - 800 nm |
| 6-0503 | SDMC1-03 | 300 - 800 nm |
| 6-0504 | SDMC1-04 | 500 nm - 1.2 μ |
| 6-0512 | SDMC1-04V | 420 nm - 1.15 μ |
| 6-0505 | SDMC1-05 | 750 nm - 1.7 μ |
| 6-0506 | SDMC1-05G | 750 nm - 1.7 μ |
| 6-0507 | SDMC1-06 | 850 nm - 2.2 μ |
| 6-0508 | SDMC1-06G | 850 nm - 2.2 μ |
| 6-0509 | SDMC1-07 | 360 - 800 nm |
| 6-0510 | SDMC1-08 | 360 - 800 nm |
| 6-0511 | SDMC1-09 | 360 nm - 1.0 μ |

Models 05G and 06G utilize gold coated optics for superior reflectance in the NIR.

Scanning Mini-Chrom

The Scanning Mini-Chrom monochromator (SMC) is designed to be driven by stepping or servo controlled motors. No direct visual wavelength readout is provided. All models utilize a precision lead screw/sine bar mechanism to rotate the diffraction grating which sequentially positions the selected wavelength(s) at the exit slit. Rotation of the drive shaft in a clockwise direction proportionately increases the wavelength at the exit slit.

Scanning Mini-Chroms are used in applications requiring either single or repetitive scans of wavelength intervals or the sequential selection of discrete wavelengths. To prevent mechanical damage due to inadvertently exceeding wavelength limits, all Scanning Mini-Chroms are supplied with dual photosensors that function as high and low limit switches. Dimensions: 95 mm x 59 mm x 49 mm; Weight 0.45 Kg (1.0 lb).

ADDITIONAL SPECIFICATIONS

Drive Hysteresis. 3.6 deg typ., 14 deg max.



| CATALOG NO. | MODEL NO. | WAVELENGTH RANGE |
|-------------|-----------|---------------------|
| 6-0201 | SMC1-01 | 190 - 650 nm |
| 6-0202 | SMC1-02 | 200 - 800 nm |
| 6-0203 | SMC1-03 | 300 - 800 nm |
| 6-0204 | SMC1-04 | 500 nm - 1.2 μ |
| 6-0413 | SMC1-04V | 420 nm - 1.15 μ |
| 6-0205 | SMC1-05 | 750 nm - 1.7 μ |
| 6-0207 | SMC1-05G | 750 nm - 1.7 μ |
| 6-0206 | SMC1-06 | 850 nm - 2.2 μ |
| 6-0208 | SMC1-06G | 850 nm - 2.2 μ |
| 6-0209 | SMC1-07 | 360 - 800 nm |
| 6-0210 | SMC1-08 | 360 - 800 nm |
| 6-0211 | SMC1-09 | 360 nm - 1.0 μ |

Models 05G and 06G utilize gold coated optics for superior reflectance in the NIR.

Accessories

INTERCHANGEABLE SLIT SETS

Your choice of a pair of slits are included with each Mini-Chrom. Additional slit sets can be purchased to optimize resolution or throughput. Slits are available in 50¹, 100, 150, 300, 600 and 1000 micron widths, all 4 mm in height.

Changing the slit assemblies in any Mini-Chrom takes only a few seconds and no tools. The slit assembly consists of a precision slit photo etched in a black oxide coated brass disc, a slit spacer, slit cover and two banana plugs. The banana plugs allow the assembly to be easily inserted or removed while assuring alignment of the slit with the monochromator.

Note: ¹ available on request.

| CATALOG NO. | DIMENSIONS | ACCESSORY DESCRIPTION |
|---------------------|--------------|-----------------------|
| 6-9001 ¹ | 50 µ x 4mm | Slit Pair |
| 6-9002 | 100 µ x 4mm | Slit Pair |
| 6-9003 | 150 µ x 4mm | Slit Pair |
| 6-9004 | 300 µ x 4mm | Slit Pair |
| 6-9005 | 600 µ x 4mm | Slit Pair |
| 6-9006 | 1000 µ x 4mm | Slit Pair |

APERTURE ADAPTER

The Aperture Adapter(s) converts the entrance and/or exit slit ports to accept SMA 905 compatible optical fiber assemblies.



| CATALOG NO. | ACCESSORY DESCRIPTION |
|-------------|--------------------------------|
| 6-9200 | Monochromator Aperture Adapter |

HOLMIUM OXIDE CALIBRATION FILTER

Comprised of 2.5 mm thick holmium oxide filter glass mounted in a metal holder. A spectral scan showing calibration wavelengths from 350 nm to 800 nm is included. A comparison between the reference scan and the indicated wavelength takes only a few seconds.

| CATALOG NO. | ACCESSORY DESCRIPTION |
|-------------|---|
| 6-5000 | Holmium Oxide Calibration Filter and Reference Scan |

HIGHER ORDER BLOCKING FILTER SLIT ASSEMBLY

Required to block higher order ($\lambda/2$, $\lambda/3$, $\lambda/4$, etc.) radiation. Higher order blocking filters are Optometrics' Long Pass Cut-On filters mounted in an assembly which includes the monochromator slit. Plugs directly into the Mini-Chrom monochromator.



| CATALOG NO. | MINI-CHROM MODEL NO. | CUT-ON WAVELENGTH |
|-------------|----------------------|-------------------|
| 6-91XX | 01 | 375 nm |
| 6-92XX | 02 | 420 nm |
| 6-93XX | 03 | 420 nm |
| 6-94XX | 04 | 630 nm |
| 6-95XX | 05 | 1.2 µ |
| 6-96XX | 06 | 1.2 µ |

Assembly includes slit. Specify slit size by including the last two digits from slit set catalog numbers above. For example, a blocking filter assembly for a model 03 Mini-Chrom including a 600 µ slit is catalog no. 6-9305.

FIBER OPTIC CABLE

The standard fiber optic cable assembly plugs directly into the Mini-Chrom entrance or exit port, functionally replacing the standard air slit assembly. The cable is designed with a number of randomly stacked optical fibers creating a 4 mm tall and 1 mm wide illumination/collection aperture (slit) at the end which connects to the Mini-Chrom. At the opposite end of the fiber cable, the fiber optic bundle terminates in a 2.0 mm diameter random circular pattern mounted within either an SMA 905 connector, or a 4.57 mm diameter, 12.7 mm long stainless steel ferrule. The cable is 152 cm long.

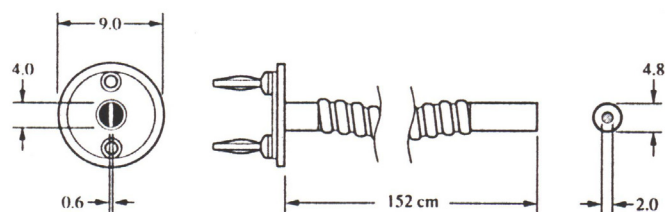
Alternate aperture (slit) widths are available. Optometrics also supplies these fiber optic cable assemblies preconfigured with a precision air slit placed over the illumination/collection aperture enabling higher spectral resolution and light throughput control. Optional aperture sizes are all 4 mm tall and include widths of 100, 150, 300, and 600 microns. Please specify your choice at time of order.

For applications below 400 nm, quartz fibers are available as special order items. Custom lengths are also available.

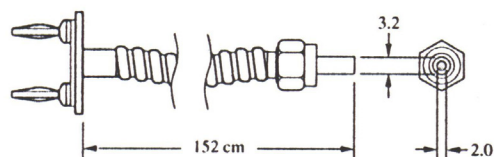
| CATALOG NO. | MINI-CHROM TO SMA | MINI-CHROM TO FERRULE | LENGTH |
|-----------------------|-------------------|-----------------------|--------|
| 7-2505 | | X | 5' |
| 7-2506 | X | | 5' |
| 7-2507 (fused silica) | | X | 2' |
| 7-2508 (fused silica) | X | | 2' |

Assembly includes slit. Specify slit size by including the last two digits from slit set catalog numbers above. For example, a blocking filter assembly for a model 03 Mini-Chrom including a 600 μ slit is catalog no. 6-9305.

Slit to Round Bundle
Stainless Steel Ferrule



Slit to SMA 905
Stainless Steel Connector



PCM-MOTOR CONTROLLER

The PCM-02 is a modular controller, ideally suited for driving the Optometrics line of Scanning Digital Monochromators. For more information contact sales at sales@optometrics.com

| CATALOG NO. | DESCRIPTION |
|-------------|---|
| 7-2002 | PCM-02 Stepping Motor Controller, 110V AC, 60 Hz. |
| 7-2003 | PCM-02 Stepping Motor Controller, 220V AC, 60 Hz. |

Beyond the Mini-Chrom™ - More about Optometrics

Optometrics is an ISO 9001:2008 certified, ITAR registered, “Lean” high volume optical components and optical sub-assembly manufacturing company committed to supplying its customers with high quality and cost competitive products and services. Operating out of a modern engineering and manufacturing facility purpose built for precision optical fabrication, system assembly and test, Optometrics’ technology portfolio enables key wavelength selection and thin film coating solutions within the many industries we serve.

Along with a broad offering of standard products, Optometrics provides collaborative design and development services to OEM manufacturers ranging from concept to high volume manufacturing. Our high standard of quality control is ensured through process discipline, a broad scope of metrological systems, and the use of modern statistical and Six Sigma methods. As an ISO 9001:2008 certified company, we ensure this highest level of quality at a consistent level.

Collaborative and logistical support

Optometrics has become a leading world-wide supplier of specialized optical products by successfully developing close working relationships with its customers. By understanding your unique supply chain requirements, Optometrics strives to operate as an efficient member of your engineering and manufacturing organization throughout all phases of your product development cycle.

- ISO 9001:2008 certified
- ITAR registered
- Experience, infrastructure, and capability to commercialize in high-volume

The many support services we offer include:

- Extensive inventory of stock items
- Fast delivery of custom items
- Higher level pre-aligned assemblies
- Customer matched test protocols
- Kanban stocking arrangements
- Consignment stocking arrangements
- Specialized packaging, marking, and bar coding services

Metrology and characterization

Optometrics is equipped with the necessary physical, environmental, and spectral attribute metrology tools, including environmental heat and humidity cycling chambers, cosmetic inspection stations, single and dual beam spectrophotometers, FTIR spectrophotometer, advanced Zygo interferometric testing, and nanometer level Atomic Force Microscopy. Additional

customized in-process and final inspection metrology tools and equipment have been manufactured and tailored to the unique needs of our manufacturing processes.

Testing & Metrology

- Advanced interferometric surface characterization
- Tactile surface measurements
- Accelerated lifetime testing
- Thermal cycling
- Humidity cycling
- Atomic force microscopy
- Optical microscopy
- Single & dual beam spectrophotometers
- FTIR spectrophotometers
- Cosmetic inspection stations

Additional Core Technology Areas

Diffraction Gratings - Standard and Custom

Optometrics operates several modern master diffraction grating production laboratories, designing both interferometrically controlled classically ruled and holographically recorded replication masters which optimize our OEM customers’ instrument performance. This unique capability, combined with existing production exceeding 1,000 precision diffraction gratings per day, has positioned Optometrics as a premier supply source of many forms of high quality and low cost replica diffraction gratings worldwide.

Optometrics maintains one of the largest master diffraction grating inventories, enabling production and supply of a wide variety of reflective and transmissive components with very short lead times.

- Interferometrically Controlled Ruling
- Planar and Concave
- Surface relief Holographic
- Blazed
- Reflection
- Transmission

Critical Surface Replication

Optometrics provides superior optical surface replication know-how and capacity for manufacturing application optimized planar, spherical, and aspherical reflective, diffractive, and transmissive optical components. This refined technology has been adapted for affordable high volume critical surface replication to achieve high surface figure accuracy, nanometer range surface feature duplication, and low RMS surface roughness.

Optometrics provides a collaborative service to prove, optimize, and produce in volume, high precision replicated surfaces on a wide variety of substrate materials.

Optical Replication

- Critical Planar and Curved Mirror Surfaces
- Diffraction Gratings
 - Planar, Concave, Convex
 - Reflection, Transmission

Precision Thin Film Coatings

From their production facility in Massachusetts, and corporate affiliated manufacturing locations in Ithaca and Rochester New York, Optometrics provides innovative thin film coating solutions from a mix of more than 30 vacuum deposition chambers. Deposition technologies include advanced IAD “hard films”, thermal evaporation, as well as magnetron sputtering. Capacity exceeds 500,000 ft² per year. Optometrics offers custom build-to-print dielectric and dichroic optical coatings and component supply, and a broad selection of standard off-the-shelf products. End product size ranges from millimeters to meters, and may be flat, curved, or flexible films depending on coating type.

Optical Coatings

- | | | |
|-------------------|-------------------|--------------------|
| • Dielectric | • Dichroic | • Beamsplitter |
| • Bandpass | • Longpass | • Shortpass |
| • Patterned | • Neutral Density | • Laser Protection |
| • Hot Mirrors | • Cold Mirrors | • Reflective |
| • Anti-reflective | • Enhanced | • Protected |
| • Color Corrected | • Oleophobic | • Hydrophobic |

Substrate Materials

- Glasses
- Plastics
- Metals
- Ceramics

Patterned Coatings and Infrared Wire Grid Polarizers

Leveraging expertise from within Optometrics’ holographic diffraction grating production laboratories and precision thin film deposition processes, micro fabrication of photo lithographically patterned optical coatings on glass substrates enables innovative solutions for optical system designers. Precise control over the shape and size of optically coated and non-coated surface areas permits the manufacture of specialty optical components such as polka-dot broad spectral band beamsplitters, resolution test targets for machine vision, field imaging, and microscopy applications. Optometrics offers a standard line of broadband polka-dot beamsplitters with a near constant reflection to transmission ratios. Additionally, a similar process is used for producing high extinction ratio IR Wire Grid Polarizers.

Patterned Coatings

- Polka Dot Beamsplitter
- Masked
- Custom Reticle

Infrared Polarizers

- Wire Grid
- High Power
- Ruled or Holographic
- CaF₂, BaF₂, ZnSe, KRS-5, Ge

Let us know what you need!

Call or email today at:

978-772-1700

sales@optometrics.com



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