Optical Fiber Mode Scrambler/De-Speckler

Fiber Core, 50-400µm, 220 to 2000nm, CPR>22, IL<1dB, driver integrated

Return to the Webpage

The Optical Fiber Mode Scrambler/De-Speckler (FMSC) is engineered to scramble laser light modes in multimode fibers, eliminating modal interference without optical loss. As laser light propagates through a multimode fiber, the beam shape or mode field fluctuates with time and distance, causing signal instability. The FMSC resolves this by redistributing the mode field with modulation up to 10 kHz, ensuring a stable, homogeneous laser output – essential for applications requiring uniform beam quality. Ideal for measurement and sensor systems, the FMSC enhances accuracy despite environmental variations. In many fiber-coupled applications, reducing speckle is crucial, as modal noise can degrade performance. Our despeckler effectively removes unwanted modal noise, making it an excellent choice for fiber assemblies used in Life Sciences, Digital Laser Projection, Interferometry, Laser Beam Homogenization, Lithography, and Metrology.

The FMSC is a compact, plug-and-play unit that includes a driver and power supply.

Features

- All-In-One Plug-Play (Driver and Power Supply Included)
- Low Loss
- Low Cost
- High Stability
- High Reliability
- Wide Temperature Operation

Applications

- Test/Measurement
- Sensor Systems
- Instruments

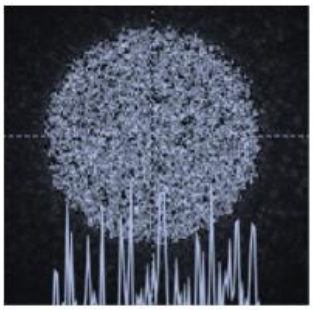
RoHS COMPLIANT

Specifications

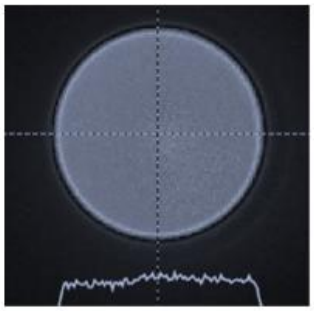
Parameter	Min	Typical	Max	Unit
Center Wavelength	220		2200	nm
Insertion Loss [1]	0.0	0.1	0.3	dB
Return Loss	50			dB
Scrambling Rate			10	kHz
Operating Temperature	-20		60	°C
Storage Temperature	-40		85	°C
Applying DC		5		V
Electrical Power		5		W

Notes:
[1] Without a connector, each connector adds 0.3dB

Near Field Measurement (400µm fiber @ 445nm)



- Without Scrambler



- With Scrambler

Rev 05/03/26

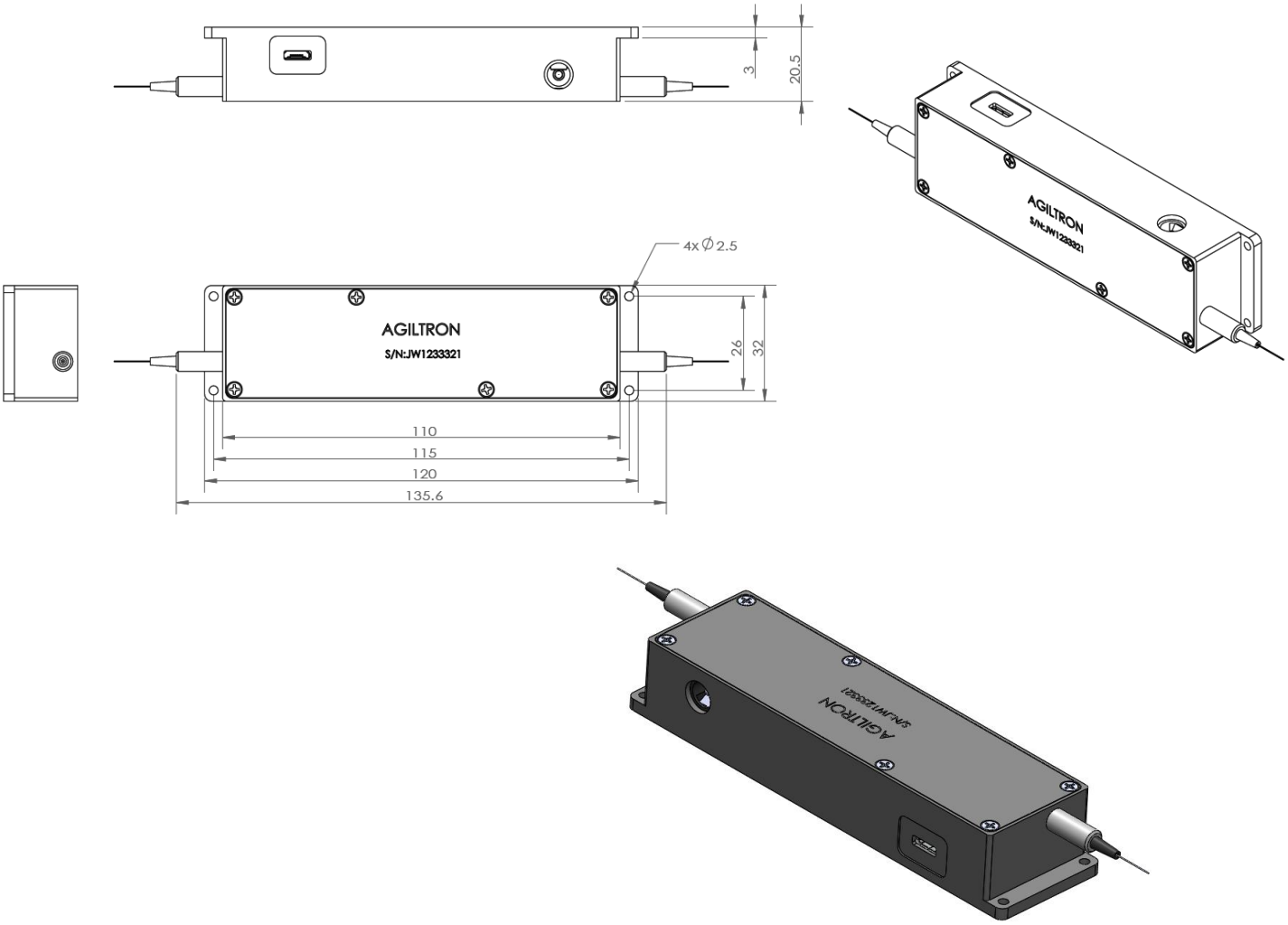
P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Optical Fiber Mode Scrambler/De-Speckler

Fiber Core, 50-400µm, 220 to 2000nm, CPR>22, IL<1dB, driver integrated

Mechanical Dimensions (mm)



Ordering Information (Part Number)

	☐	☐	1	2	☐	☐	☐
Prefix	**Fiber Type**	**Type**			**Fiber Protection**	**Fiber Length**	**Connector** [1]
FMSC-	105µm NA 0.22 = 1 200µm NA 0.22 = 2 400µm NA 0.22 = 4 600µm NA 0.22 = 7 Square 200x200µm NA 0.22 = 5 Square 400x400µm NA 0.22 = 6 Special = 0	Regular = 1 Special = 0			3mm = 1 Special = 0	0.5m = 5 1.0m = 1 2.0m = 2 Special = 0	None = 1 FC/PC = 2 SMA = 3 Special = 0

Red color for special order

[1]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

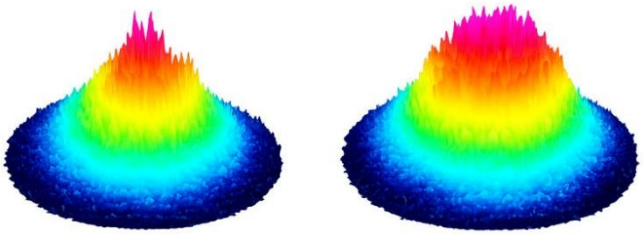
P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Optical Fiber Mode Scrambler/De-Speckler

Fiber Core, 50-400µm, 220 to 2000nm, CPR>22, IL<1dB, driver integrated

Beam spot before and after homogenization



Without Scrambler

With Scrambler

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Optical Fiber Mode Scrambler/De-Speckler

Fiber Core, 50-400μm, 220 to 2000nm, CPR>22, IL<1dB, driver integrated

GUI

Manual

1. When a 12-volt DC power supply is connected, the device will operate at its default frequency.
2. If you need to stop the device from working, you can disconnect the power supply or use the "STOP" button in the Windows GUI.
3. The device's default operating frequency is usually the optimal operating frequency, but customers can also adjust the default operating frequency themselves when using different wavelengths of light sources.

4. Steps to adjust the operating frequency:
   A. Connect to the computer via Micro USB.
   B. Select the correct port and click "CONNECT".
   C. Enter the desired frequency in the FREQ field (adjustable range 1~10K Hz), then click "Start". The device will write this frequency to the motherboard, replacing the default frequency, and operate at the newly entered frequency. (Even without a computer connection, the device will operate at the newly set frequency as long as it is powered on.)
5. Control the device via command list:

Command/Echo /Comments

Baudrate: 115200-N-8-1

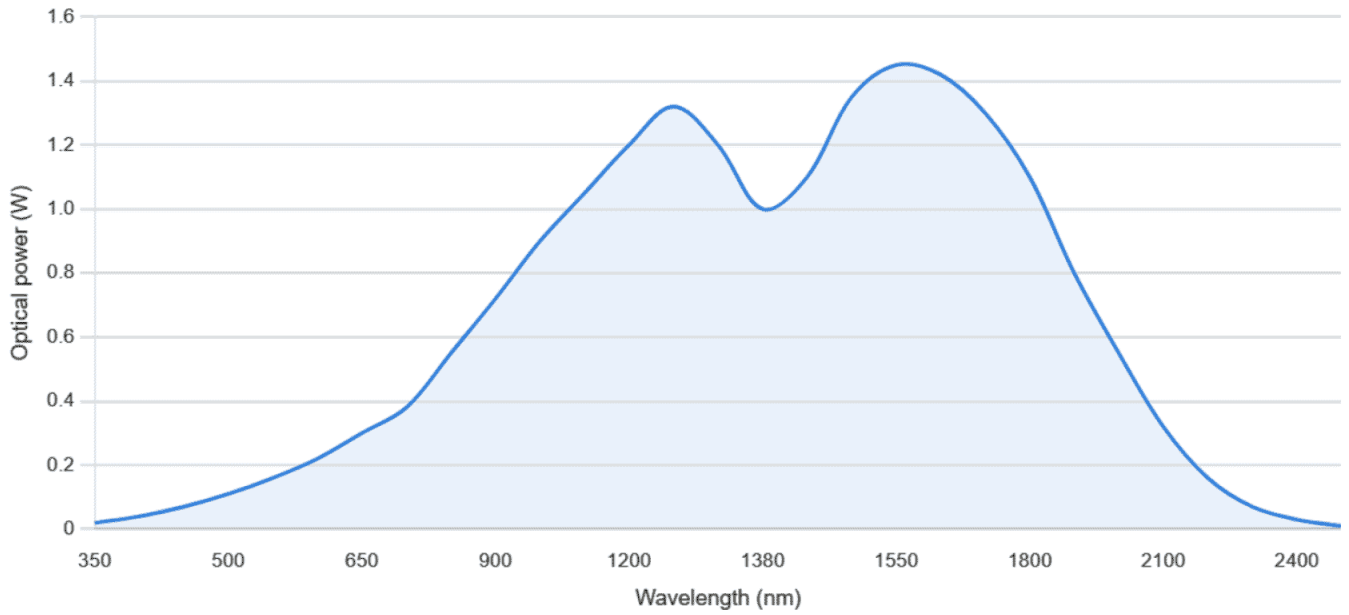
```
CMD:   0x01 0x02 0x00 0x00    /Check Version
Echo:  0x01 0x02 0x41 0x30

CMD:   0x01 0x12 0x00 0x00   /Stop Frequency
Echo:  0x01 0x12 0x00 0x00

CMD:   0x01 0x13 <FREQ High Byte> <FREQ Low Byte>     /Set Frequency
Echo:  0x01 0x13 <FREQ High Byte> <FREQ Low Byte>
```


Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Optical Fiber Mode Scrambler/De-Speckler

Fiber Core, 50-400µm, 220 to 2000nm, CPR>22, IL<1dB, driver integrated

Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.