

User Manual

AOM Series Fiber coupled AOM & RF Drivers





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Revision Sheet

Release No.	Date	Author	Revision Description
V1.0	25/09/2021	SER	First version
V1.1			Second version
V1.2	11/06/2023	SER	Third version – highlight the critical RF power level
V1.3(.1)	21/07/2023	SER	Fourth version – highlight the max RF power for the
			various models

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1. General information

Please read this manual carefully. It describes the hazard the user might be exposed to while using the product. It also explains in details how to use the product in the safest and most efficient possible way. The safety of any system incorporating the product is the responsibility of the assembler of the system. Any actions taken by the user that is not clearly described in this user manual might present a risk and is the sole responsibility of said user.

This product is to be used in laboratory or industrial tasks, and only by personnel who have followed a training in laser hazard.

This product is an OEM device for system integration. It is designed for use as a component (or replacement) part and is thereby exempt from 21 CFR1040.10 and 1040.11 provisions. Make sure it is not put in operation before the machine in which it will be integrated has been declared to be compliant with the relevant requirements of the current directives :

- 2006/25/CE (following for example the regulation NF EN 60825-1) (Europe)
- 21 CFR1040.10 and 1040.11 provisions (USA)

1.1 Definitions

Caution : A "caution" is advised when dealing with hazardous situations, tasks or objects, to prevent harm or death and avoid material damage or failure.

Warning : A "warning" is given for potentially dangerous situation for people which cause them harm or lead to death

Note : A note is a complementary piece of advice that must be acknowledged by the user.

1.2 General warning

Caution

The compatible laser sources used with the AOM can deliver up to several Watts of coherent LASER radiation. <u>Always wear protective goggles</u> and observe the safety instructions provided by the laser diode supplier when using the AOM and/or AOM driver with your laser source.

WARNING

Do not try to open or remove the cover of the AOM or RF driver modules.





WARNING

Avoid all shocks and strains when handling the AOM

WARNING

Handle the fiber-optic cables with care as it is fragile. Do not bend or pinch it.

WARNING

Any settings or hardware tinkering that is not described in this user manual or in the usage recommendation may put the user or its environment at risk.

WARNING

The maintenance and servicing of the AOM should NOT be executed by the end user : only AeroDIODE is able to maintain the AOM.

2. Safety Instructions

2.1. AOM Safety instruction



WARNING

Not following the safety recommendations and the caution mentioned above can lead to eye damage.

2.2. **RF Driver Safety instruction**



Caution

Do not power up the signal output interface when it is open or shorted. Risk of permanent damage.

Caution

The product should be well grounded, otherwise the performance can be affected.

Caution

The product is sensitive to ESD.





2.3. Contact

If you have any question about the AOM module, please contact AeroDIODE : <u>www.aerodiode.com</u>

3. Package Content

The AOM modules comes with:

- 1 AOM module with 900 μ m fiber and 2* FC/APC fiber connectors.
- A USB Key with the current user manual in pdf

The Driver part comes with :

- An SMA-SMA cable to connect the Driver to the AOM
- A special cable with Banana plugs to connect to a benchtop power supply

4. Absolute Maximum Ratings

4.1. AOM

- Optical power (CW) : refer to the AOM model Datasheet
- Storage temperature -40 to +85°C
- Operating temperature 0 to +60°C
- **Caution** : Applying a maximum RF power (voltage) above the maximum efficiency can lead to AOM permanent damage. <u>As a first test level : a maximum RF power below</u> <u>2W must be securely set.</u>

CAUTION : The table below show the various typical and abolute max RF powers :

Model (wavelength/RF frequency)	Typical RF power (W)	Absolute Max RF power (W)
780 / 100 MHz	1	2.0
780 / 200 MHz	1,5	2.0
850 / 100 MHz	1.8	2.0
850 / 200 MHz	2.3	2.5
940 or 1064 / 100 MHz	1,8	2.0
940 or 1064 / 200 MHz	2,3	2,5
1310 / 1550 or 1650 / 80 MHz	2,3	2,5
1310 / 1550 or 1650 / 200 MHz	2,3	2,5





4.2. **RF Driver**

- Operating voltage: +25V
- Control signal levels from 0 to +5.5V
- Storage temperature -40 to +85°C
- Operating temperature 0 to +60°C

5. Installation

5.1. AOM installation

- 1. Wear safety Googles
- 2. Wear a proper and working ESD wrist strap;
- 3. **Caution :** Set the module on a heat dissipating surface (an optical table works fine). <u>Letting</u> the AOM in air with no dissipating surface leads to overheating and permanent damage.
- 4. The light can be inserted in any direction. The performance are the same (insertion loss, extinction ratio etc.)
- 5. **Caution** : when using another RF driver, The RF power shall not be set over the maximum diffraction efficiency level. A power over 2W can lead to a permanent damage. The RF power must be adjusted progressively <u>from 0 V up to the maximum diffraction level.</u>

5.2. **RF Driver installation**

The product is dissipated by conducting heat. The product shall be mounted on a metal structure using fixing screws. The mounting surface shall be flat with minimum size and thickness. A certain amount of space should be reserved around and above the product.

The product is powered by a DC of + 24V, and the power connector is supplied with a per-centric capacitor; The core of the heart capacitor is connected to the positive power supply, and the grounding sheet of the heart capacitor is connected to the negative pole of the power supply. The characteristic impedance of the product signal output port is 50 Ω .

The product receives both external pure analog and/or digital modulation.





The adjustment of RF output power is achieved by changing the resistance of a multi-turner : turn clockwise to increase the output power, turn counterclockwise to decrease the output power.

- 1. Make sure the RF Driver has the correct RF frequency required by the AOM model (model 1 : 100 MHz, model 2 : 200 MHz, model 3 : 80 MHz ; model 4 : 200 MHz).
- 2. Make sure the RF Driver model is the one you need (TTL input or Analog input).
- 3. Connect the RF driver to the AOM with the SMA cable. If you use the modular model RFAOM-TA-200, set the S1-S4 switch to the proper configuration (see below)
- 4. **Caution :** Place the module on a heat dissipating surface (an optical table works fine). Letting the RF driver in air with no dissipating surface leads to overheating and permanent damage.
- 5. Connect a 24V >0.5A power supply to the RF driver
- 6. **Caution** : The RF power shall not be set over the maximum diffraction efficiency level. A power over 2W rapidly leads to a permanent damage. The RF drivers power level (little screw) is normally set in a safe area allowing a correct diffraction efficiency. <u>If ever it is adjusted</u>, this must be done progressively from 0 V up to the maximum diffraction level.
- 7. Connect the trigger signal and make sure you apply the good electric signal :
 - TTL 5V-50 Ohm for standard RF-AOM-T-xxx model,
 - Analog 0-5V signal for RF-AOM-A-xxx
 - Any signal (0-5V or 0.1V) for the modular RFAOM-TA-200 model
- If you need to optimize the insertion loss, apply a small optical CW signal at the proper wavelength and apply a CW trigger signal to the RF Driver. Use a screwdriver (Ø 3mm – Multiturn) to adjust the RF power to get maximum optical power at the output of the AOM.







Figure 1 Example of integration of standard model (either RF_AOM-T-xxx or RF_AOM-A-xxx) at either 80, 100 or 200 MHz :



Figure 2 : Model RFAOM-TA-200 S1-S4 settings

RFAOM-TA-200 Configuration switch :

- S1 : Down : TTL high ; Up : TTL low input signal configuration setting
- S2 : Down : TTL mode active ; Up : TTL mode disabled
- S3 : Down : Analog input range : 0 -1V ; Up : Analog input range 0 5V.
- S4 : Down : Analog mode active ; Up : Analog mode disabled

6. Specifications





6.1. AOM Modules :

Model 1, 3, 5, 7 : Standard version – (ex model 7 : 1030/1064 nm)

Reference: 1064AOM-1	gy/Crystal : TeO2*				
SPECIFICATIONS	Unit	Min	Typ.	Maximum	Comments
Material			TeO2		
Wavelength (model 7)	nm	1000	1064	1090	Customizable
Max Average optical power	W			3	
Insertion loss (model 7)	dB	1	1.5	2.0	
Extinction ration (1 st order on/off)	dB	50			
Return loss (RF ON)	dB	40			
Rising time	ns		45	50	
Frequency	MHz		100		
Frequency shift	MHz		+/- 100		
RF Power	W		1.5	1.8	
Input Impedance	Ω		50		
Electrical input interface			SMA		
Fiber type		F	PM980		Customizable
Fiber length	m		1		Customizable
Pigtail termination		F	C/APC		Customizable
Working temperature	С°	-20		60	
Storage temperature	С°	-30		70	
Dimensions (without fiber boots)	mm	mm 60*25*12.5			
Mounting holes diameter	mm		3		

*: See our tutorial : fiber modulator

Model 2, 4, 6 8 : High speed version – (ex : model 8 : 1030/1064 nm)

Reference: 1064AOM-2		-	Technology/	Crystal : TeO2*	
SPECIFICATIONS	Unit	Min	Тур.	Maximum	Comments
Material			TeO2		
Wavelength (model 8)	nm	1000	1064	1090	Customizable
Max average optical power	W		2.5	3	
Insertion loss	dB	2.0	2.5	3.0	
Extinction ration (1 st order on/off)	dB	50			
Return Loss (RF ON)	dB	40			
Rising time	ns	8	9.5	10	
Frequency	MHz		200		
Frequency shift	MHz		+/- 200		
RF Power	W			2.5	
Input Impedance	Ω		50		
Electrical input interface			SMA		





Fiber type		F	Customizable		
Fiber length	m		Customizable		
Pigtail termination		F	Customizable		
Working temperature	С°	-20			
Storage temperature	С°	-30		70	
Dimensions (without fiber boots)	mm	67*23*15			
Mounting holes diameter	mm		2.5		

*: See our tutorial : fiber modulator

Model 9, 11, 13 : Standard version – (ex : model 11 : 1550 nm)

Reference: 1550AOM-1	Crystal : TeO2*				
SPECIFICATIONS	Unit	Min	Тур.	Maximum	Comments
Material			TeO2		
Wavelength (model 11)	nm	1520	1550	1580	Customizable
Average optical power handling	W			0.5	
Peak optical power handling	KW			0.5	
Insertion loss	dB	2.0	2.5	3.0	
Extinction ration (1 st order on/off)	dB	50	55		
Rising time	ns			50	
Frequency	MHz		80		
Frequency shift	MHz		+/- 80		
RF Power	W		2.5		
Input Impedance	Ω		50		
Electrical input interface			SMA		
Fiber type		P	M1550		Customizable
Fiber length	m		1		Customizable
Pigtail termination		F	C/APC		Customizable
Working temperature	°C	-20		60	
Storage temperature	°C	-30		70	
Dimensions (without fiber boots)	mm	60*25*12.5			
Mounting holes diameter	mm		3		

*: See our tutorial : fiber modulator

Model 10, 12, 14 : High speed version – (ex : model 14 : 1550 nm)

Reference: 1550AOM-2	-	Technology/	Crystal : TeO2*		
SPECIFICATIONS	Unit	Min	Тур.	Maximum	Comments
Material			TeO2		
Wavelength (model 14) :	nm	1520	1550	1580	Customizable
Average optical power handling	W			0.5	





Peak optical power handling	KW			0.5	
Insertion loss	dB	4.0	4.5	5.0	
Extinction ration (1 st order on/off)	dB	55	60		
Rising time	ns	8	9.5	10	
Frequency	MHz		200		
Frequency shift	MHz		+/- 200		
RF Power	W		3		
Input Impedance	Ω		50		
Electrical input interface			SMA		
Fiber type		Р	M1550		Customizable
Fiber length	m		1		Customizable
Pigtail termination		F	C/APC		Customizable
Working temperature	С°	-20		60	
Storage temperature	С°	-30		70	
Dimensions (without fiber boots)	mm	45*28*12			
Mounting holes diameter	mm		3		

*: See our tutorial : fiber modulator

6.2. **RF Drivers** :

Model 1 : Standard version for digital (TTL) Input trigger ; 3 RF models : 80, 100 or 200 MHz



Reference: RFAOM - T - 80, 100 or 200 (MHz)

SPECIFICATIONS	Unit	Min	Тур.	Maximum	Comments			
Output Frequency	MHz	80	or 100 or 2	00 MHz	Choose your version			
Output power	W	0.1	2.8	3	Adjustable with a screwdriver			
Impedance matching	Ohm		50					
Extinction ratio		>	>70 dB					
Synchro Input			Dig	gital (TTL)				
Synchro input interface			SMA					
RF to AOM interface			SMA					
Working voltage	V		24					
Dimensions	mm	mm 81*58.5*15						
Interhole distances /	mm		75*52.5 /	4				





Hole diameters

Model 2 : Standard version for analog (0-5V) input trigger ; 3 RF models : 80, 100 or 200 MHz



Reference: RFAOM - A - 80, 100 or 200 (MHz)

SPECIFICATIONS	Unit	Min	Тур.	Maximum	Comments					
Output Frequency	MHz	80	or 100 or 2	00 MHz	Choose your version					
Output power	W	0.1	2.8	3	Adjustable with a screwdriver					
Impedance matching	Ohm		50							
Extinction ratio		>	>30 dB							
Synchro Input			Ana	alog (0-5V)						
Synchro input interface			SMA							
RF to AOM interface			SMA							
Working voltage	V		24							
Dimensions	mm 81*58.5*15									
Interhole distances / Hole diameters	mm	mm 75*52.5 / 4								





Model 3 : Special version ; for AOMs with 200 MHz RF signal only



S4 : Analog mode active/inactive

Reference: RFAOM - TA - 200

SPECIFICATIONS	Unit	Min	Тур.	Maximum	Comments
Output Frequency	MHz		200 MH	Z	
Output power	W	0.1	2.8	3	Adjustable with a screwdriver
Impedance matching	Ohm		50		
Synchro Input		TTL (high	or low), Ana	log (0-1V) and	Analog (0-5V)
Extinction ratio (Analog mode / TTL mode)		30 c			
Synchro input interface			SMA		
RF to AOM interface			SMA		
Working voltage	V		24		
Dimensions	mm 103*54*20.5				
Interhole distances / Hole diameters	mm	mm 97*48 / 3.3			

