

## High-Sensitivity & High Resolution Miniature Micro Spectrometer

## ATP5020/ATP5040

### Feature:

- ✧ Detector: back-thinned CCD, cooled down to -20 °C
- ✧ CCD parameters: 2048×64pixel, 4096×64pixel
- ✧ Ultra-low noise CCD signal processing circuit
- ✧ Spectral range: 180-1150nm
- ✧ Spectral resolution: 0.1-2 nm(depend on spectral range, slit width)
- ✧ Optical path: crossed Czerny-Turner (C-T)
- ✧ Integration time: 2ms-130s
- ✧ power supply: DC 5V±10% @ <2.3A
- ✧ 18 bit, 570KHz A/D Converter
- ✧ Entrance connector: SMA905 connector or free space
- ✧ Output interface: high speed USB2.0 or UART
- ✧ 20 pins, dual rows programmable extension connector

### Application:

- ✧ Raman spectrometer
- ✧ Micro spectrophotometer,
- ✧ high speed spectrophotometer
- ✧ Spectral analysis /radiation spectrophotometer/  
spectrophotometric analysis
- ✧ Transmittance, absorbance, reflectance detection
- ✧ UV-, VIS-, shortwave NIR-Wavelength detection
- ✧ LIBS

### Description:

Optosky ATP5020/5040 Miniature Fiber Optic Spectrometer employs the ultra-high performance, 2048 x 64 pixel, semiconductor-cooled, back-thinned CCD array, down to -20°C. It greatly reduces sensor noise resulting in almost 2 times higher SNR than other competitors. It increases measuring reliability, and measuring results are not changed by temperature.

Optosky tailor-designs ultra-low noise CCD signal processing circuit inside, resulting in first-class quantitative noise that is lower than 3 counts.

ATP5020 is designed with SMA905 fiber optic entrance connector or free space, and it outputs spectrum data via USB2.0/UART

Item	Pixels	Cooled down to
<b>ATP5020</b>	2048pixels	-10°C
<b>ATP5040</b>	4096pixels	-10°C

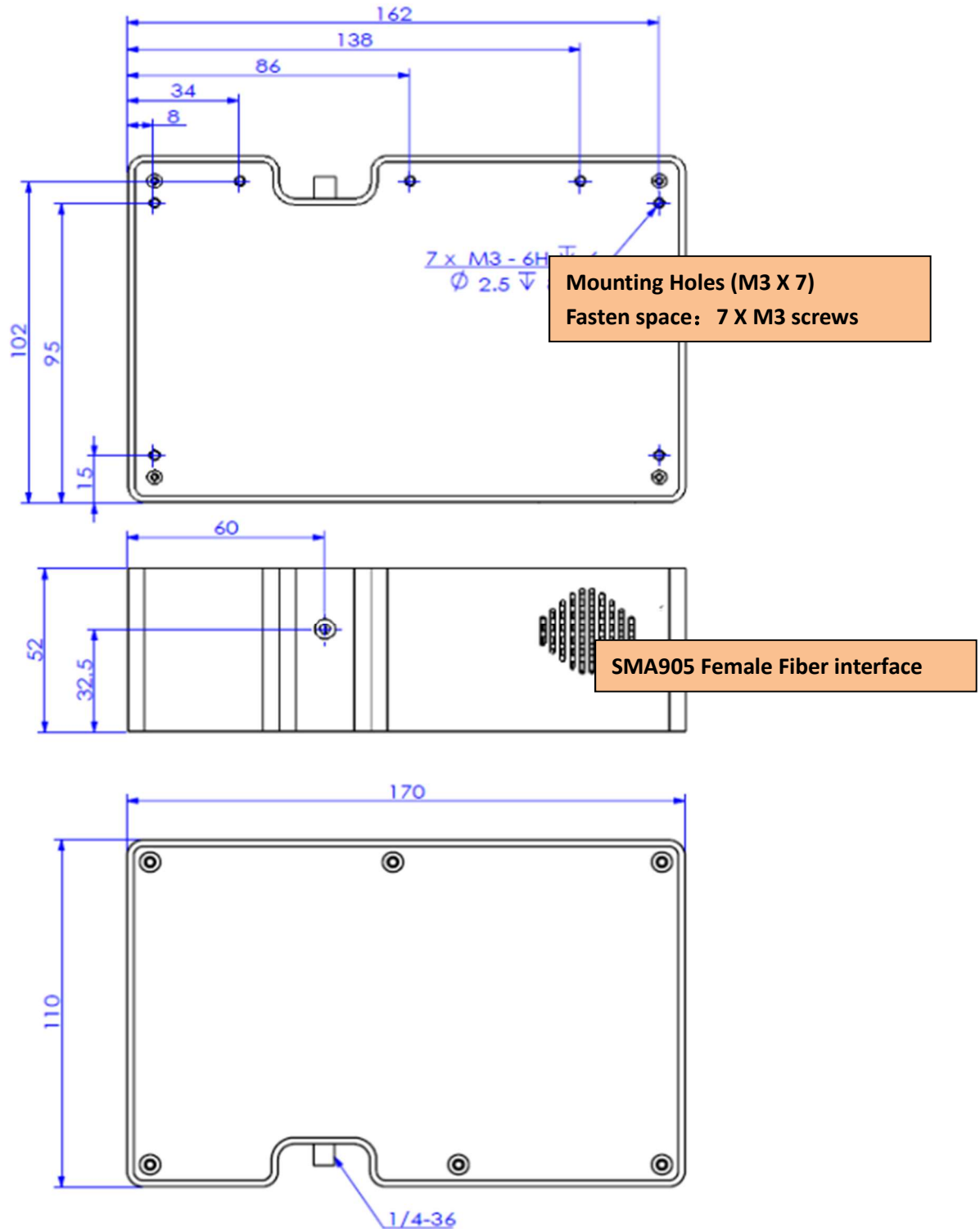


Product data information is current as of publication data. Products conform to specifications per the terms of Optosky Standard warranty.

## Performance parameters:

Detector	
Type	TE-cooled, back-thinned CCD array, cooled down to -20°C)
Spectral range	165-1180 nm
Effective pixels	2048×64pixel, 4096×64pixel
Pixel sizes	14×14μm, 7×200μm
Full range	~200 ke-
Sensitivity	6.5 uV/e-
Dark noise	6 e-
Optical parameters	
Wavelength range	180-1180 nm
resolution	0.02-2 nm (depend on slit, spectral range)
SNR	>8000:1
Dynamic range	10000: 1
Operating temperature	-10-40 °C
Operating humidity	< 85%RH
Optical parameters	
Optical path	f/4 crossed Czerny-Turner (C-T)
Focal	77.5 mm for incidence / 111.6 mm for output
Entrance slit width	5、10、25、50、100、150、200 μm (optional) Available in customized other widths
Entrance connector	SMA905 Fiber optic connector, free space
Electrical parameters	
Integration time	1 ms - 130 second
Data output port	USB 2.0
ADC in-depth	18 bit (Actual output 16bit)
Power supply	DC 5V±10%
Operating current	<2.3A
Storage temperature	-20°C to +70°C
Operating temperature	-10°C to +40°C
Physical parameters	
Size	170×110×52 mm <sup>3</sup>
Weight	1.3 kg
Sealing	Anti-sweat

## 2 Mechanical Diagrams



## 3 Electrical Pin-out

Table 1 Electrical Characteristics

Parameter	Min	Typ	Max	Unit
<b>Power Supply</b>				
Operating voltage range	4.5	5	5.5	V
Operating current	170	500	2000	mA
<b>Logic Inputs(3.3V LVTTL, Five-volt tolerant)</b>				
High level input voltage	1.7		3.6	V
Low level input voltage	-0.3		1.0	V
<b>Logic Output(3.3V LVTTL)</b>				
High level output voltage	2.4			V
Low level output voltage			0.4	V

The module is equipped with a 20-pin male angled box header(2x10, 2.00 mm pitch) and USB2.0 B type interface. The 20-pin connector is a Samtec part # STMM-110-02-L-D-RA connector. The mate to this is a Samtec part # TCSD-10-D-XX.XX-01-N.

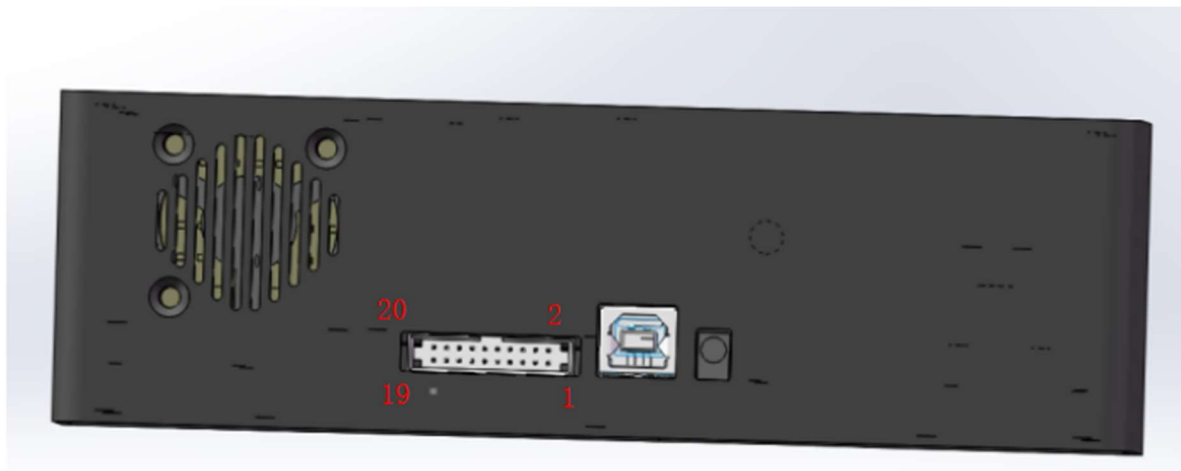


Table 2 Electrical Pin-Out

Pin#	Description	I/O	Function Description
1	VCC	/	Power Supply, 5V±0.5,
2	GND	/	Ground
3	UART_TX	Output	UART Transmit signal
4	UART_RX	Input	UART Receive signal
5	LD_Control	Output	LVTTTL output the LD enable signal.
6	NC	/	Remained to define.
7	LD_Trigger_in	Input	LVTTTL output the LD trigger signal.
8	NC	/	Remained to define.
9	LD_TX	Output	LD UART Transmit signal
10	NC	/	Remained to define.
11	LD_RX	Input	LD UART Receive signal
12	NC	/	Remained to define.
13	GPIO0	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
14	GPIO1	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
15	GPIO2	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
16	GPIO3	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
17	GPIO4	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
18	GPIO5	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
19	GPIO6	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.
20	GPIO7	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTTL Logic.

## 4 Order Guide

Order number Rules:

Model	Spectral region		Slit width	
ATP5020	Short wavelength	Long wavelength	Slit width	

For example:

What to buy ATP5020, spectral region: 200-850nm, slit width is 50  $\mu\text{m}$ , then the order no is:

**ATP5020-200-850-050**

Order No	Spectral region	Slit	
ATP5020-200-400-###	200~400	10 $\mu\text{m}$	
ATP5020-200-850-###	200~850	25 $\mu\text{m}$	
ATP5020-200-1100-###	200~1000	50 $\mu\text{m}$	
ATP5020-340-850-###	340~850	100 $\mu\text{m}$	
ATP5020-600-1100-###	600~1100	200 $\mu\text{m}$	
ATP5020-###-###-###	Other	Other: _____ $\mu\text{m}$	