

## High-speed miniature spectrometer

## ATP2000SH

### Features

- Maximum spectral range: 200nm-1000nm
- Signal acquisition frame rate:  $\leq 4672$  fps
- Detector: Linear low noise CMOS
- Detector pixels: 2048 pixels
- Spectral resolution: 0.1-3 nm (depending on spectral range and slit width)
- Optical path structure: cross C-T
- Integration time: 0.2ms-60s
- 20-pin double-row programmable external expansion interface

### Application

- Industrial Measurement Sensors
- LED Spectrophotometer
- Fluorescence photometer
- biomedical analyzer
- Transmittance detection
- Reflectivity detection
- UV gas analyzer
- Multi-parameter water quality analyzer

### Description

ATP2000SH high-speed micro-spectrometer is a low-noise, high-performance, high-speed, miniature fiber optic spectrometer. Its sensor is a 2048 pixel CCD, the CCD signal acquisition frame rate can reach 4Kfps, and the spectral response range is 200-1000 nm.

ATP2000SH is very suitable for fast detection due to its high A/D converter frequency and high-speed data transmission. In the ATP2000SH memory chip, algorithms for improving performance, such as wavelength calibration coefficients and linear coefficients, are stably programmed. It outputs spectral data to PC via USB 2.0 or RS232 interface. ATP2000SH works with +5VDC power supply provided by USB.

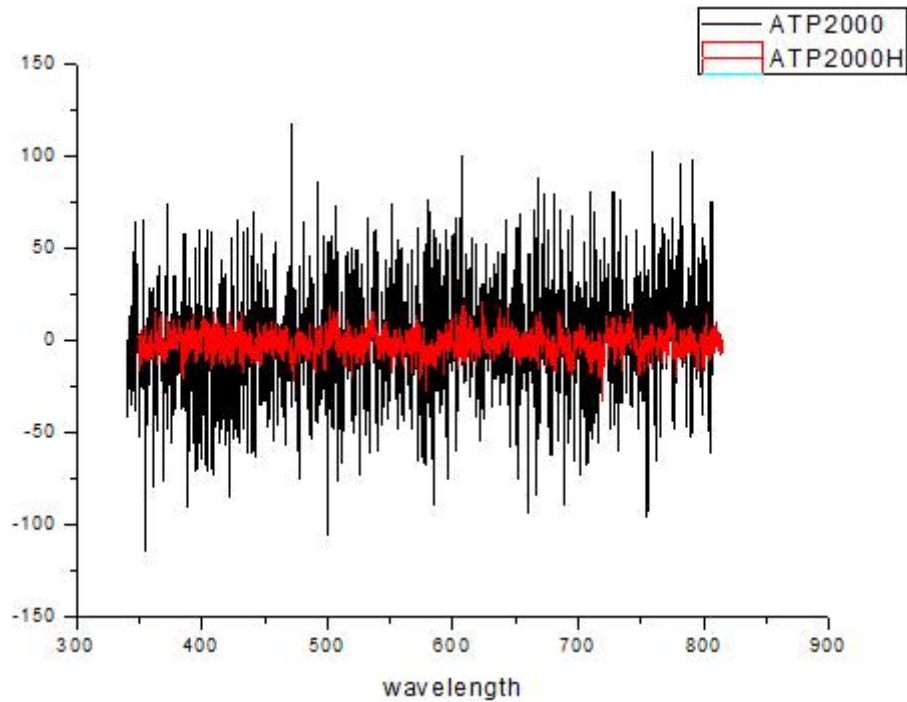
Model	Detector pixels	Whether cooling
ATP2000SH	2048pixels	No



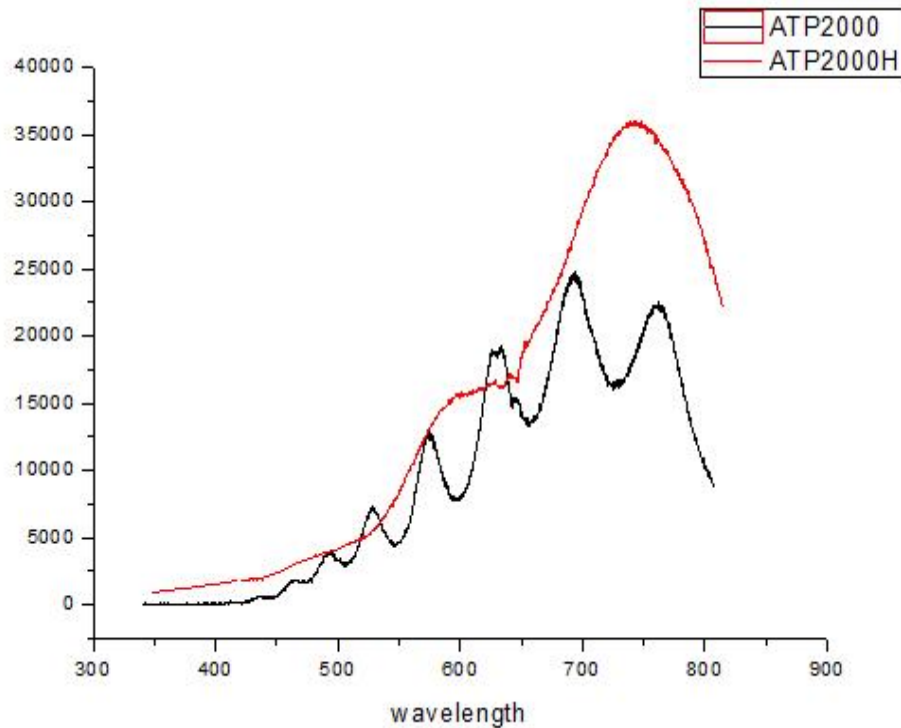
## 1. Performance

Detector	
Type	Linear image sensor CMOS
Spectral Response Range	200-1000nm
Effective Pixels	2048
Pixel size	14 $\mu$ m $\times$ 200 $\mu$ m
Effective photosensitive area length	28.672 mm
Sensitivity	1300 V/(lx·s)
Dark noise	13 RMS @ 13°C
Optical parameters	
Wavelength range	200-1100nm(depending on the specific needs)
Optical resolution	0.1-3nm (depending on slit, spectral range)
SNR	>450:1
Dynamic Range	8.5 x 10 <sup>7</sup> , 2000:1 (single acquisition)
Operating temperature	-25-50°C
Working humidity	< 90%RH
Optical path parameters	
Optical design	f/4 crossed asymmetrical CT light path
Focal length	40mm input/60mm output
Entrance slit width	50 $\mu$ m, other sizes can be customized
Incident light interface	SMA905 fiber optic interface
Electrical parameters	
Integration time	0.2ms -60s
Data output interface	USB 2.0(high speed)
ADC bit depth	16 bits
Power supply	DC4.5 to 5.5V(type @5V)
Working current	170mA
Storage temperature	-30°C to +70°C
Operating temperature	-25-50°C
Physical parameters	
Size	102x72x34 mm
Weight	0.2kg

## 2. Spectrometer performance (to be updated)

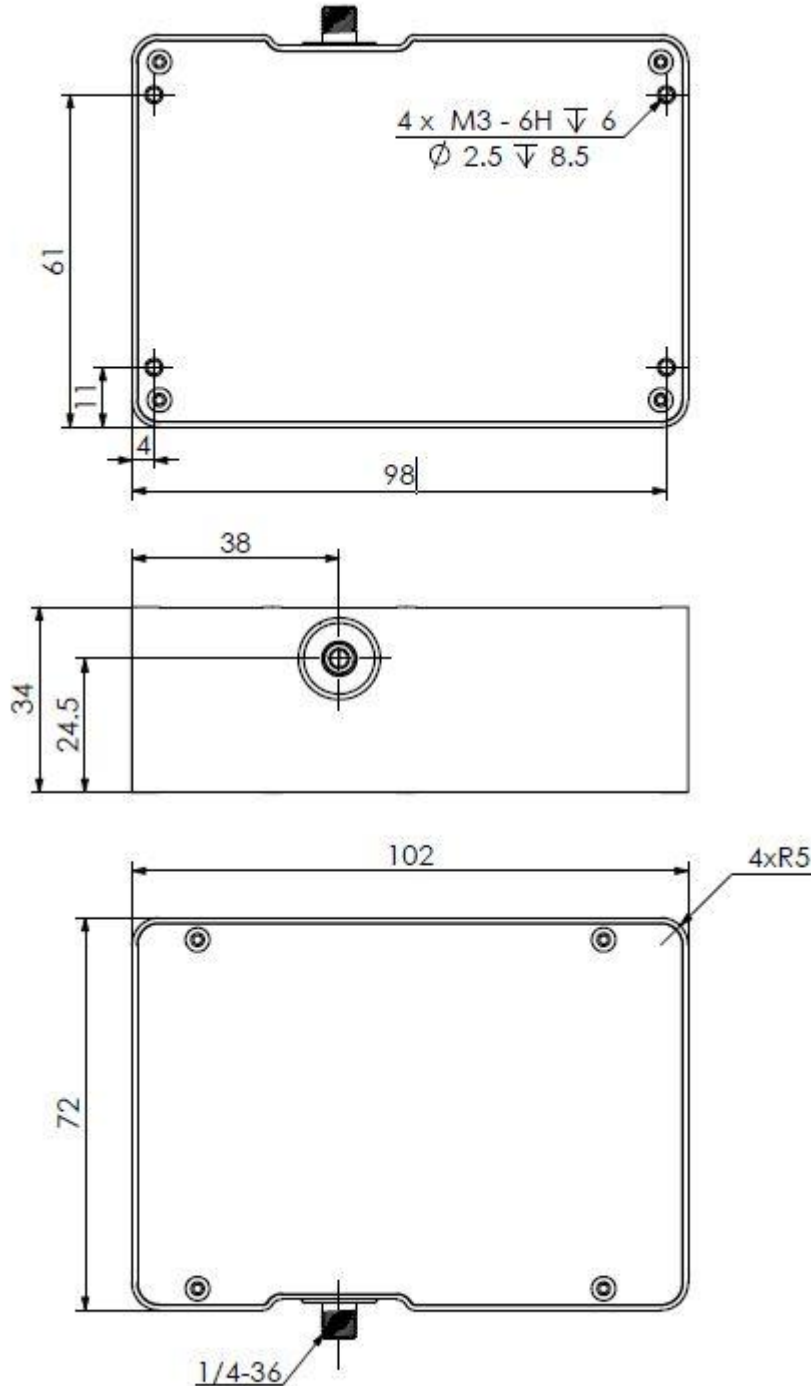


The noise of ATP2000P/ATP2000H (Red) vs ATP2000 (Black)



The sensitive of ATP2000P/ATP2000H (Red) vs ATP2000 (Black)

## 3. Mechanical structure



## 4. Electronic 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		mA
<b>Logic Inputs(3.3V LVTTTL, 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 LVTTTL)</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.

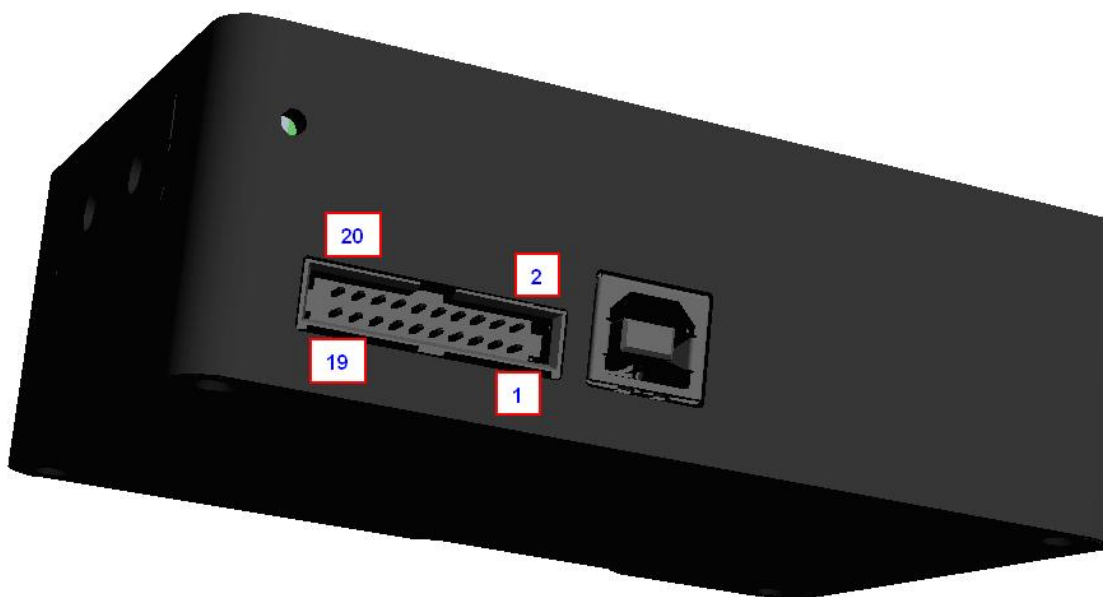


Table 2 Electrical Pin-Out

Pin#	Description	I/O	Function Description
1	VCC	/	Power Supply, $5V \pm 0.5$ ,
2	GND	/	Ground
3	RS232_TX	Output	RS232 Transmit signal
4	RS232_RX	Input	RS232 Receive signal
5	Lamp_En	Output	LVTTL output the lamp enable signal.
6	Continuous_strobe	Output	LVTTL output the continues strobe signal.
7	Ext_trigger_in	Input	LVTTL input the trigger signal.
8	Single_strobe	Output	LVTTL output the single strobe signal.
9	SPI_SCK	Output	The SPI Clock signal for communications to other SPI peripherals
10	SPI_MOSI	Output	The SPI Master Out Slave In (MOSI) signal for communications to other SPI peripherals
11	SPI_MISO	Input	The SPI Master In Slave Out (MISO) signal for communications to other SPI peripherals
12	SPI_CS	Output	The SPI Chip/Device Select signal for communications to other SPI peripherals
13	GPIO0	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
14	GPIO1	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
15	GPIO2	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
16	GPIO3	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
17	GPIO4	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
18	GPIO5	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
19	GPIO6	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
20	GPIO7	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.