

## Miniature Spectrometer

**ATP4001**

### Features

- Cooled detector down to 5°C;
- High performance-to-noise ratio
- Other parameters are similar to ATP4000;
- Spectral range: 200-1100 nm;
- Optical path structure: crossed C-T optical path;
- Detector: 2048 pixel CCD;
- Integration time: 1ms-130s
- Power supply: DC 5V@ <2A;
- Power interface: 3.5mm locomotive;
- ADC bit depth: 16 bits;
- ADC sampling rate: 2MHz;
- Optical input interface: SM905 optical fiber interface or free space input;
- Data output interface: USB2.0 or UART;
- 20-pin expansion interface;

### Application

- LED sorting machine;
- Environmental Science: Multi-parameter online water quality analyzer;
- Micro-volume, fast spectrophotometer;
- Spectral analysis, radiometric analysis, spectrophotometric analysis
- Fluorescence spectrophotometer;
- Life Science Research: Biomedical analyzer;
- Transmittance and absorbance detection;
- Reflectivity detection;
- LIBS;

### Description

ATP4001 is developed on the basis of ATP4000. The sensor is added with cooling technology, which can make CCD work in a set temperature environment. At the same time, it has the characteristics of high reliability, ultra-high speed, low cost, high cost performance, etc., and can be adapted to various environmental uses such as online testing. Micro-spectrometer.

ATP4001 Low Cost Spectrometer adopts a 3648-pixel cooled linear CCD. The CCD adopts semiconductor cooling technology. As long as the external environment of the spectrometer is between -25 degrees and 40 degrees, the CCD can work in a set constant temperature environment (as low as 5°C), so that ATP4001 has super high reliability, and the measurement results do not change with the ambient temperature. At the same time, the signal-to-noise ratio of ATP4001 is also improved, which is doubled compared with ATP4000. ATP4001 can adapt to the test of wavelength range of 200-1100nm, the exposure time of CCD detector can be controlled within 1ms, and customers can precisely control the signal-to-noise ratio of the spectrometer.

ATP4001 Spectrometer is an ideal choice for UV, visible and near-infrared spectroscopy applications. There are different slits, gratings, mirrors and filters to choose from. According to your needs, you can configure spectrometers suitable for different applications. The spectral range is from 200nm to 1050nm, and the spectral resolution can be selected between 0.5 and 4.0nm. Optosky can also provide customized options for OEM customers.

ATP4001 measurement tool provides the most advanced spectral analysis, which can receive the measured light input from SMA905 interface fiber or free space input, measure according to the set integration time, and output the measurement results through USB2.0 (high speed) or UART; suitable for biochemical analyzer, fluorescence spectrometer and LIBS, etc.

## 1. Parameter

Detector	
Type	Cooled linear array CCD, down to 5°C
Spectral range	200-1100 nm
Effective pixels	2048
Pixel size	14μm×200μm
Full range	~100 ke <sup>-</sup>
Sensitivity	130 Photon @400 nm; 60 Photon @ 600 nm
Dark noise	48.6 RMS @ 0 °C; 57.8 RMS @ 13°C (10s Integration)
Optical Parameters	
Wavelength range	200-400nm, 200-850nm , 200-1000 nm and other wavelength ranges are optional, different ranges can be customized
Resolution	0.1-4 nm (depending on slit, spectral range)
SNR	>300:1
Dynamic range	1300:1
Working temperature	0-40°C
Working humidity	< 90%RH
Optical path parameters	
Optical design	f/4 Crossed asymmetric C-T optical path
Focal length	40 mm for incidence / 60 mm for output
Incident slit width	5, 10, 25, 50, 100, 150, 200 μm optional, other sizes can be customized
Incident light interface	SMA905 fiber interface, free space
Electrical parameters	
Integration time	1 ms -130 second
Interface	USB 2.0
ADC bit depth	16 bit
Power supply	DC4.5 to 5.5 V (type @5V)
Working current	<2A
Storage temperature	-20°C to+70°C
Working temperature	0°C+50°C
Physical parameters	
Dimensions	102×720×34 mm <sup>3</sup>
Weight	0.5 kg

## 2. Electrical Pin-out

Table 1 Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Power Supply				
Operating voltage range	4.5	5	5.5	V
Operating current		170		mA
Logic Inputs				
High level input voltage	1.7	3.6		V
Low level input voltage	-0.3	1.0		V
Logic Output(3.3V LVTTL)				
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.

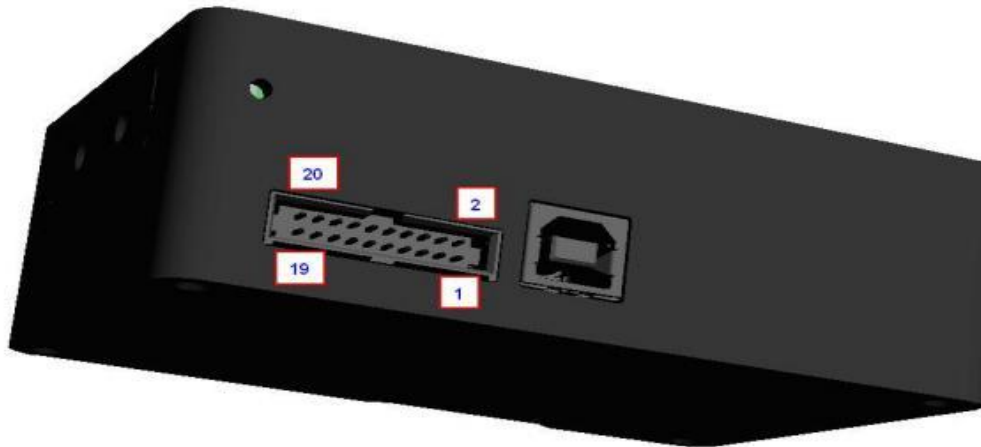


Table 2 Electrical Pin-Out

Pin#	Description	I/O	Function Description
1	VCC	/	Power Supply, 5V±0.5,
2	GND	/	Ground
3	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 Clock signal for communications to other SPI peripherals
11	SPI_MISO	Input	The SPI Clock signal for communications to other SPI peripherals
12	SPI_CS	Output	The SPI Clock 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.