

Cooled NIR Spectrometer

ATP8000

Features:

- Detector: 512/1024-pixel InGaAs array
- Spectral range: 900-2500 nm (customizable sub-ranges)
- Cooling options: -15°C (standard) / -30°C (T3 series)
- Noise performance: Ultra-low noise correlated double sampling(CDS) circuit
- Resolution: Slit-dependent
- Integration time: 1 ms - 65 s
- CCD parameters: 256/512×1 pixel, 50/25×500 um
- Power supply: 5V DC±5%@<3A;
- Power Interfac: 2-pin connector with securing screws;
- ADC: 18-bit (16-bit effective output) @ 500 kHz;
- Optical Input Interfaces: SMA905 fiber optic or free-space;
- Data output: USB2.0 & UART;
- 20-pin expansion port

Applications:

- Food sorting;
- Wastewater testing;
- Water, protein, fat, fiber detection of crops;
- Paper sorting;
- On-line monitoring of traditional medicine production;
- Solar panel testing;

Description:

The ATP8000 series SWIR fiber optic spectrometers, developed by Optosky, operate in the near-infrared range with a maximum spectral coverage of 900-2500 nm (customizable). Featuring a 512-pixel thermoelectrically cooled (TEC) InGaAs linear array detector, the CCD is maintained at a user-defined constant temperature (down to -30°C), significantly reducing sensor noise and achieving a signal-to-noise ratio (SNR) 2× higher than competing products. This design ensures measurement reliability unaffected by ambient temperature fluctuations.

The ATP8000 integrates an ultra-low noise CCD signal correlated double sampling (CDS) circuit with <5 counts quantization noise (industry-leading). It supports SMA905 fiber or free-space optical input, outputs spectral data via USB 2.0/UART, and operates on a single +5V DC supply for seamless integration.

Model	Features
ATP8000	Spectral range: 900-2500 nm (Max. Bandwidth: 1550 nm)
ATP8000-T3	Deep cooling (-30°C), optimized for ultra-low noise applications



1 Model

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ATP8000-17	Standard cooling(-15°C); spectral range: 900-1700nm (Max. Bandwidth: 750nm)
ATP8000-25	Standard cooling (-15°C); Spectral range: 900-2500nm (Max. bandwidth: 1550nm)
ATP8000-T3-17	Deep cooling (-30°C); Spectral range: 900-1700nm (Max. bandwidth: 750nm)
ATP8000-T3-25	Deep cooling (-30°C); Spectral range: 900-2500nm (Max. bandwidth: 1550nm)

2 Technical Parameters

	Parameters	ATP8000	ATP8000-T3
Detector	Type	Cooled Linear Array InGaAs CCD Detector	
	Cooling temperature	-15°C	-30°C
	Effective pixels	512 (256/1024 pixels, configurable)	512
	Pixel size	25×250 μm	
	SNR	16 nV/e-	
	Dark noise	180μV RMS	
	Dynamic range	16666	
Optical parameters	Wavelength range	900-1700 nm (Max. bandwidth: 750 nm), 900-2500 nm (Max. bandwidth: 1550 nm)	
	Optical resolution	0.5-10 nm (Dependent on: Slit width, spectral range)	
	SNR	>2000:1	
	Dynamic range	> 15000:1	
	Optical Design	F/4 Crossed C-T	
	Slit Size	5/10/25/50/100/150/200 μm optional, other customized	
	Optical light input	SMA905, free space	
Electrical Parameters	Integration time	1 ms ~ 65 s	
	Frame rate	100fps, Typical (300 fps .MAX.)	
	Data output interface	USB2.0 (high speed)	
	ADC bits depth	18bit (output 16bit)	
	Power Supply	USB-powered, DC 5V±5%	
	Working current	<3A	
Physical Parameters	Temperature (operation)	-20°C to +50°C	
	Working humidity	< 90%RH (Non-condensing operation)	
	Dimensions	215×130×52 mm ³	
	Weight	1.8kg	

3 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	200	500	2000	mA
Logic Inputs(3.3V LVTTTL, Five-volt tolerant)				
High level input voltage	1.7		3.6	V
Low level input voltage	-0.3		1.0	V
Logic Output(3.3V LVTTTL)				
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.

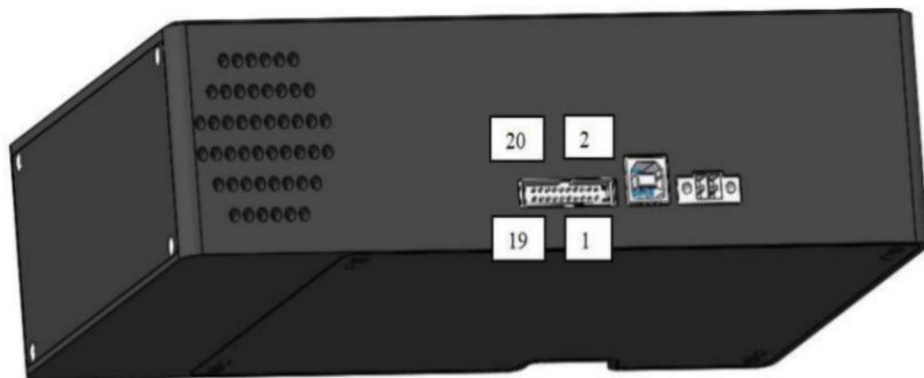


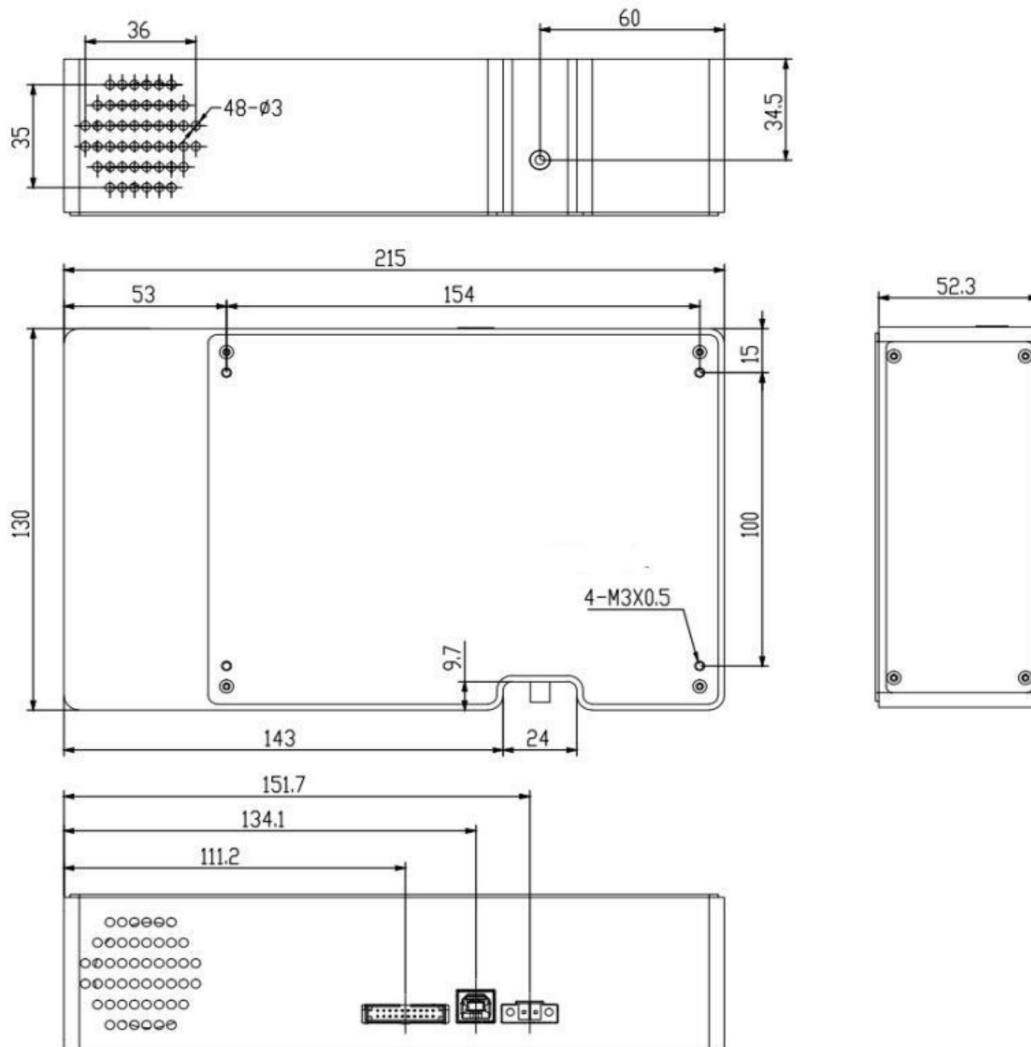
Table 2 Electrical Pin-Out

Pin#	Description	I/O	Function Description
1	VCC	/	Power Supply, $5V \pm 0.5$,
2	VCC	/	Power Supply, $5V \pm 0.5$,
3	GND	/	Ground
4	GND	/	Ground
5			
6			

Datasheet

7	Ext_trigger_in	Input	LVTTL input the trigger signal.Falling edge trigger collection.
8	LD_EN	Output	LVTTL output enable signal for LD.
9	NC	/	
10	NC	/	
11	GPIO0	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
12	GPIO1	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
13	GPIO2	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
14	GPIO3	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
15	GPIO4	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
16	GPIO5	Input /Output	General Purpose Software Programmable Digital Inputs/Outputs, LVTTL Logic.
17	VCC	/	3.3 V Power Output
18	GND	/	Ground
19	EXT_TX	Output	EXT UART Transmit signal LVTTL Logic
20	EXT_RX	Input	EXT UART Receive signal LVTTL Logic

4 Dimension diagrams



5 Main performance test report

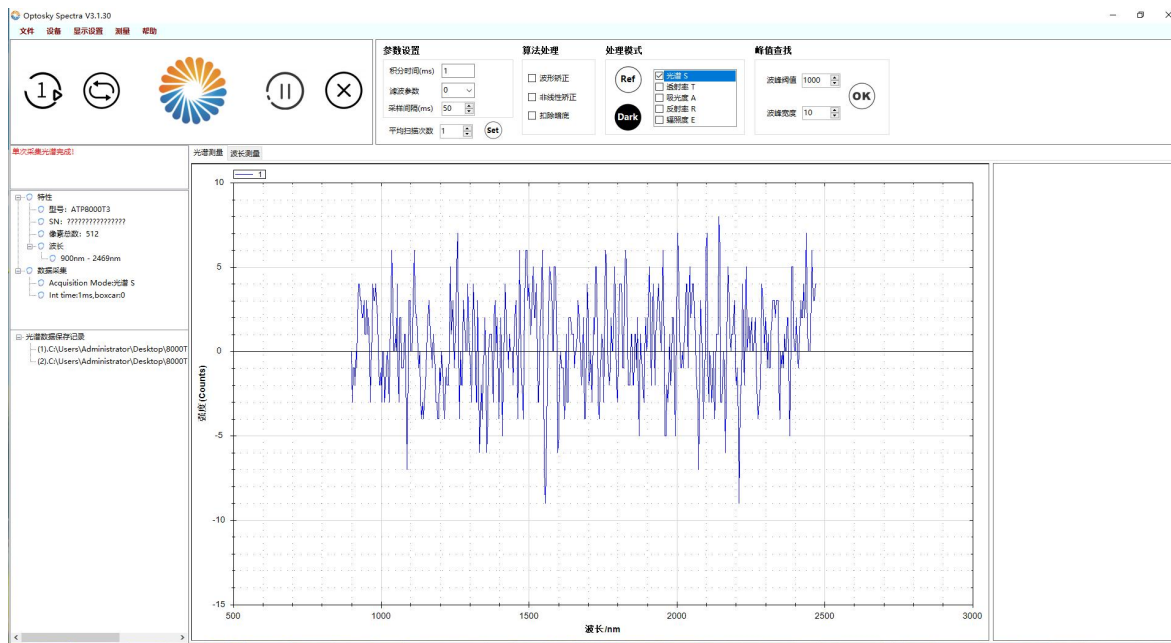


Fig.1 ATP8000T3 Dark Current Test

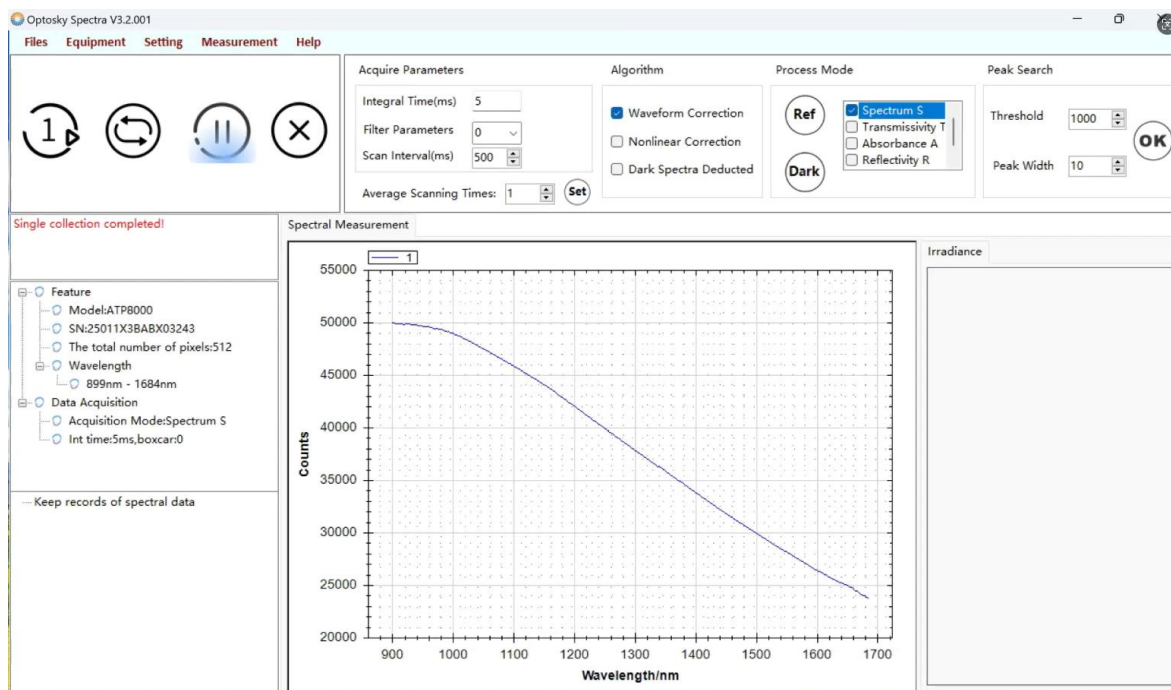


Fig.2 ATP8000 Waveform Calibration

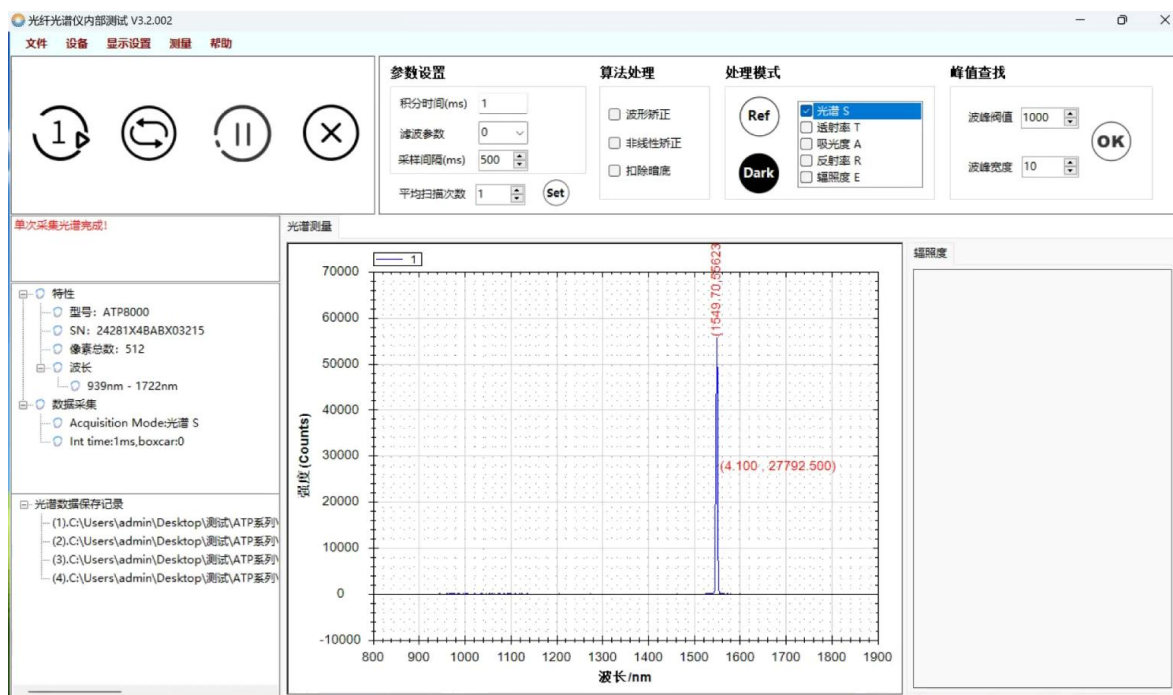


Fig.3 ATP8000 Resolution Test-4.10nm@1550nm

6 Accessories

Standard Accessories	
1	USB 2.0 data cable
2	5V standard adapter with power cord
Optional Accessories	
1	Near-infrared (NIR) fiber optic patch cable
2	Adjustable optical attenuator
3	Standard diffuse reflectance white plate
4	Integrating sphere holder for transmittance/reflectance measurements