

# Datasheet

## Low Noise Micro Spectrometer

# ATP2000P

## FEATURES

- spectral region: 200-1100 nm
- Spectral resolution: 0.2-5 nm
- Optical configuration: crossed Czerny-Turner
- Linear low noise CMOS detector with 2048 pixel
- Integration times: 0.1ms-256s
- Supply voltage: DC 5V (USB Power)
- 16 bit, 2MHz A/D Converter
- Interface: USB2.0 (High speed)
- 20-pin connector for interfacing to external products

## APPLICATIONS

- LED spectrophotometer
- Fluorescence
- Biochemical analyzer
- Transmittance detection
- Reflectance detection

## GENERAL DESCRIPTION

ATP2000P micro spectrometer is a low noise high-performance, miniature fiber-optic Spectrometer. Its sensor is a 2048 pixel CCD which responds from 200-1100 nm.

ATP2000P is perfect for fast detection attribute to its high A/D converter frequency and the high speed data transmission. In ATP2000P memory chip, some algorithms to improve the performance are programmed solidly, such as wavelength calibration coefficients, linearity coefficients. It output the spectrum data to PC through USB 2.0 or RS232 interface. ATP2000P operates with a single +5VDC supply supplied from USB or duo-pin interface



## 1 Specifications

| Detector                  |                                                                 |
|---------------------------|-----------------------------------------------------------------|
| Type                      | Linear array detector                                           |
| Detectable range          | 200-1100 nm                                                     |
| Effective pixel           | 2048                                                            |
| Pixel dimension           | 14μm×200μm                                                      |
| Sensitivity               | 1300 V/(lx·s)                                                   |
| Dark noise                | 13 RMS @ 13 °C                                                  |
| Optical Parameter         |                                                                 |
| Wavelength range          | 200-1100 nm                                                     |
| Optical resolution        | 0.2-5 nm                                                        |
| Signal-to-noise           | >1800:1                                                         |
| Dynamic range             | 8.5 x 10 <sup>7</sup> (system); 2000:1 for a single acquisition |
| Stray light               | <0.05% at 600 nm; <0.09% at 435 nm                              |
| Working temperature       | -25-50 °C                                                       |
| Working humidity          | < 90%RH                                                         |
| Optical Configuration     |                                                                 |
| Optical Design            | f/4 crossed asymmetrical Czerny-Turner                          |
| Focal Distance            | 40 mm for incidence / 60 mm for output                          |
| Incidence slit            | 50 μm (25, 100 um are optional)                                 |
| Incident Interface        | SMA905 connector                                                |
| Electrical Parameter      |                                                                 |
| Integration time          | 0.1 ms - 256 second                                             |
| Interfaces                | USB 2.0                                                         |
| A/D conversion resolution | 16 bit                                                          |
| Supply voltage            | DC4.5 to 5.5 V (type @5V)                                       |
| Operating current         | 170mA@Typ.                                                      |
| Storage temperature       | -30°C to +70°C                                                  |
| Operating temperature     | -25-50 °C                                                       |
| Physics Parameter         |                                                                 |
| Dimension                 | 102×72×34 mm <sup>3</sup>                                       |
| weight                    | 0.2 kg                                                          |
| Sealing                   | Anti-sweat                                                      |

## 2 Performance

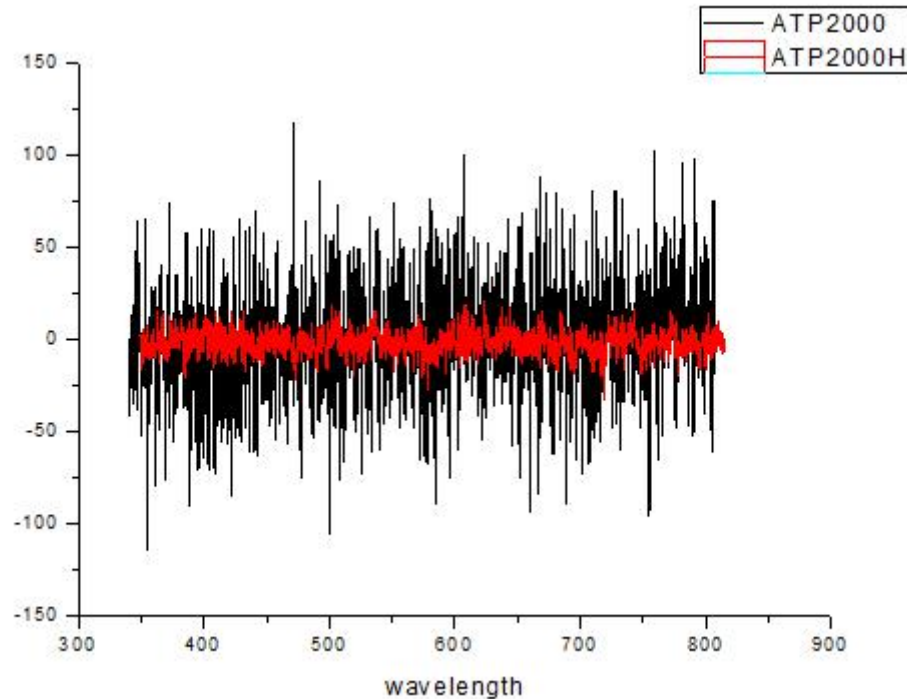


图 1 The noise of ATP2000P/ATP2000H (Red) vs ATP2000 (Black)

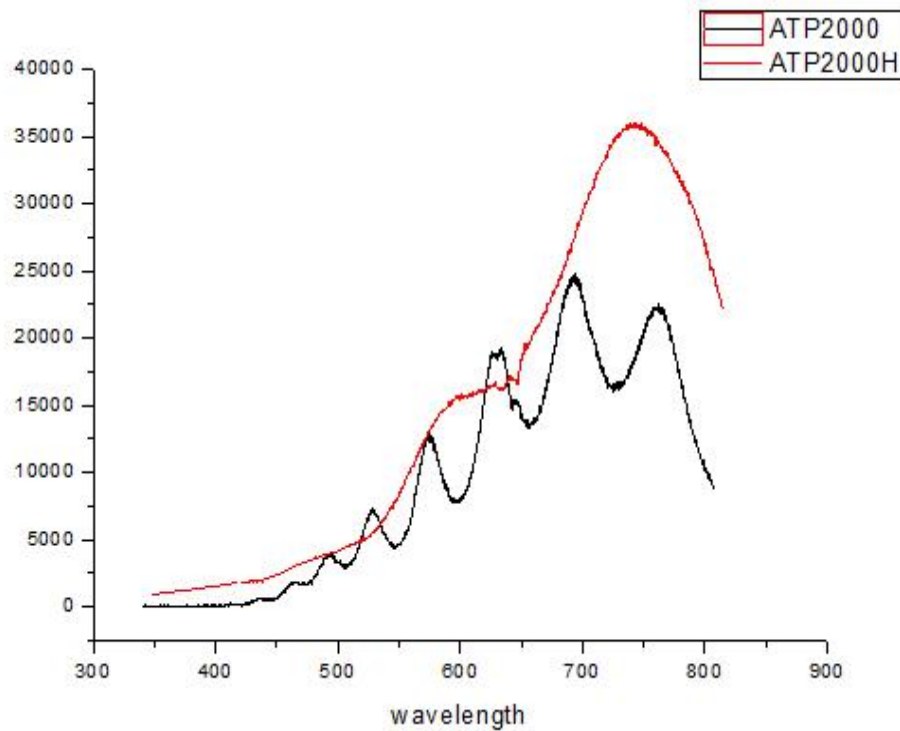
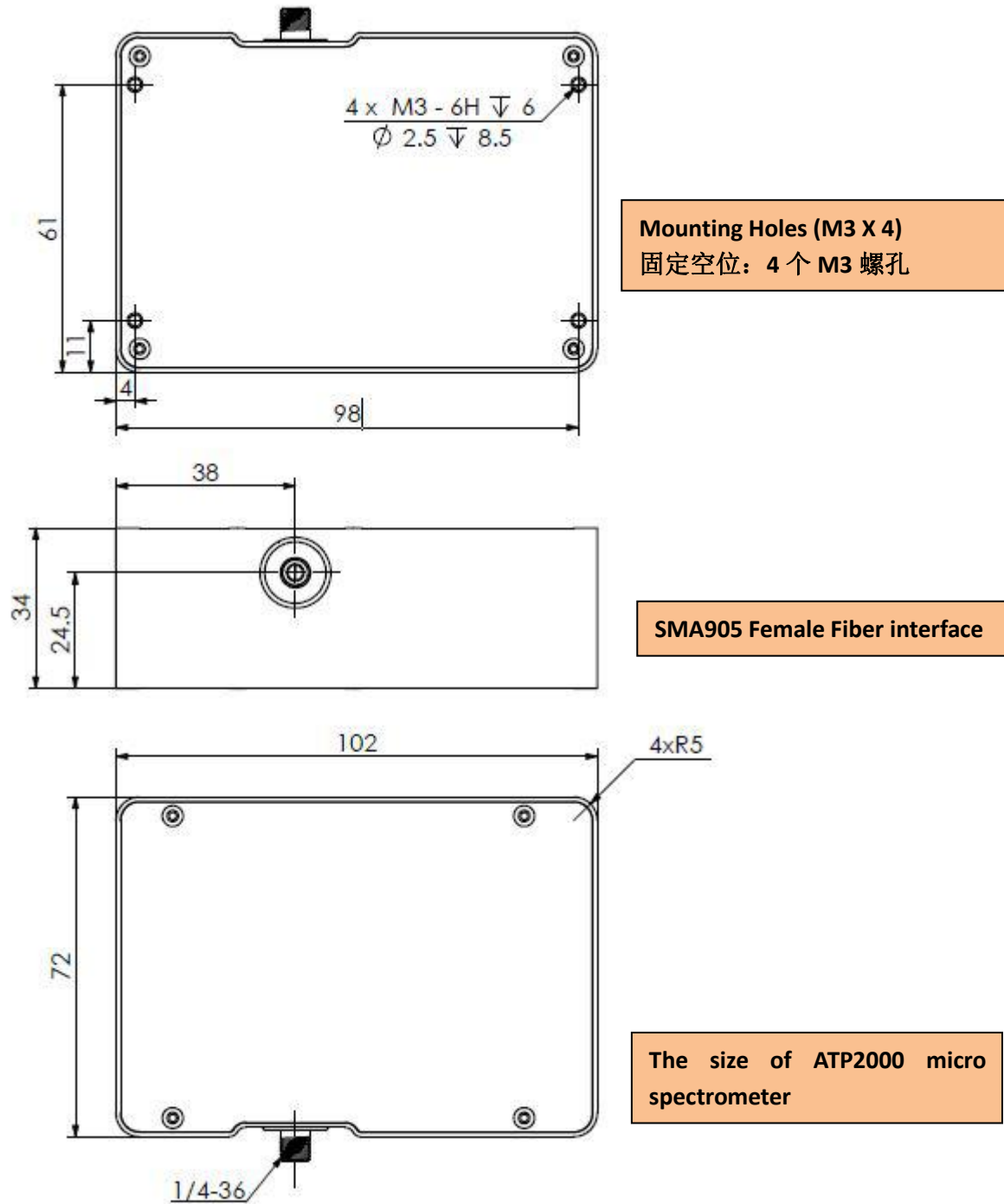


图 2 The sensitive of ATP2000P/ATP2000H (Red) vs ATP2000 (Black)

## 3 Mechanical Diagrams



## 4 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(3.3V LVTTL, 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 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.

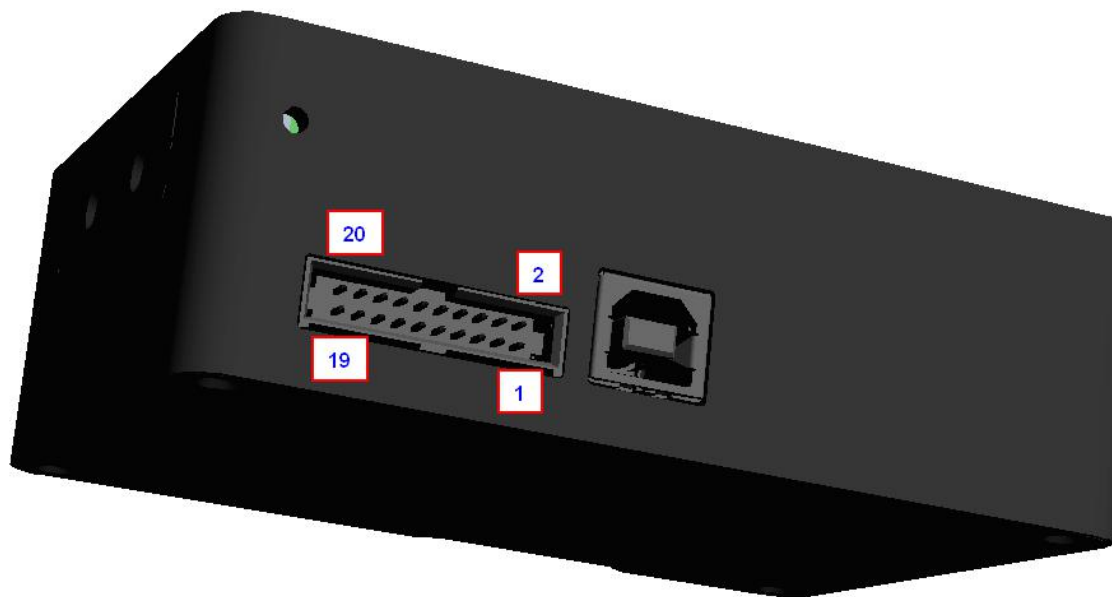


Table 2 Electrical Pin-Out

| Pin# | Description | I/O    | Function Description                 |
|------|-------------|--------|--------------------------------------|
| 1    | VCC         | /      | Power Supply, 5V $\pm$ 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.            |

## 5 Order Guide

Order number Rules:

| Model    | Spectral region  |                 | Slit width |  |
|----------|------------------|-----------------|------------|--|
| ATP2000P | Short wavelength | Long wavelength | Slit width |  |

For example:

What to buy ATP2000P, spectral region: 200-850nm, slit width is 50 um, then the order no is:

**ATP2000P-200-850-050**

| Order No              | Spectral region | Slit  |  |
|-----------------------|-----------------|-------|--|
| ATP2000P-200-400-###  | 200~400         | 10 μm |  |
| ATP2000P-200-850-###  | 200~850         | 25 μm |  |
| ATP2000P-200-1100-### | 200~1000        | 50 μm |  |

|                       |          |                 |  |
|-----------------------|----------|-----------------|--|
| ATP2000P-340-850-###  | 340~850  | 100 μm          |  |
| ATP2000P-600-1100-### | 600~1100 | 200 μm          |  |
| ATP2000P-###-###-###  | Other    | Other: _____ μm |  |

## 6 Derivation

| PN       | Description                  |
|----------|------------------------------|
| ATP2000  | Basic type                   |
| ATP2000P | The high performance version |
| ATP2000H | High speed to 1Kpfs          |

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