

Super Cost-effective NIR Spectrometer

ATP8600

Features

- Maximum operating spectral range:
900-1700nm (customized on demand within the range)
900-2600nm (customized on demand within the range)
- Ultra-low noise correlated double sampling circuit.
- Spectral resolution: related to the width of the incident slit.
- Integration time: 100 us- 10s (depends on detector).
- CCD pixels: 256, 512 pixels.
- Power supply: DC 5V.
- ADC bit depth: 16 bits.
- ADC sampling rate: 1MHz.
- Optical input interface: SM905, FC/PC optical fiber interface or auto input from space.
- Data output interface: Type-C and UART.
- 10-pin expansion interface.

Application

- FBGA fiber optic modem
- Laser wavelength monitoring
- Raman spectrometer
- Food sorting
- Wastewater testing
- Detection of moisture, protein, fat and fiber of crops
- Paper sorting
- Online monitoring of traditional Chinese medicine production
- Solar panel testing

Description

Micro spectrometer with small structure size. It uses a 256-pixel InGaAs linear array detector and integrates a reliable CCD installation and heat dissipation method to improve the measurement reliability of the ATP8600. At the same time, Optosky ATP8600 has specially customized an ultra-low noise CCD signal related double sampling processing circuit, which is the best in the industry.

ATP8600 can receive SMA905, FC/PC optical fiber input light or free space light, and output the measured spectral data through Type-C or UART port.

ATP8600 only requires a 5V DC power supply and can be directly powered by USB, which is very convenient for integration and use.

| Model | Description |
|---------------|---|
| ATP8600 | 900-1700nm, SMA905 interface |
| ATP8600-FC | 900-1700nm, FC/PC interface |
| ATP8600FBG-C | Signal demodulation for fiber optic sensors (C-wave segment), FC/PC interface |
| ATP8600FBG-L | Signal demodulation for fiber optic sensors (L-wave segment), FC/PC interface |
| ATP8600FBG-CL | Signal demodulation for fiber optic sensors (C+L-wave segment), FC/PC interface |
| ATP8600-17TC | 900-1700nm, detector cooling to - 15°C |
| ATP8600-25TC | 900-2500nm, detector cooling to - 15°C |



1. Performance parameters

| | Parameter | ATP8600 | ATP8600-17TC | ATP8600-25TC |
|-----------------------|----------------------------|--|--------------------------------|--|
| Detector | Detector type | High performance linear array InGaAs CCD | Cooled linear array InGaAs CCD | Linear array InGaAs CCD |
| | Cooling temperature | Uncooled | Cooled, -15°C | Cooled, -15°C |
| | Integration time | 1min | 10min | 100ms |
| | Spectral range | 900-1700nm | 900-1700nm | 900-2600nm |
| | Effective pixels | 256 | 512 | 512 |
| | Pixel size | 25μm×250μm | 12.5μm×500μm | 12.5μm×500μm |
| | Dynamic range | 14667 | 16667 | 16667 |
| Optical parameters | Wavelength range | 900-1700nm, different ranges can be customized | | 900-2600nm, different ranges can be customized |
| | Optical resolution | 4-30 nm (depending on slit, actual spectral range) | | |
| | Best wavelength resolution | 20 pm-100 pm | 15 pm-80 pm | 20 pm-100 pm |
| | SNR | >3000: 1 | >10000: 1 | >10000: 1 |
| | Optical design | F/4 crossed asymmetrical C-T | | |
| Electrical parameters | Data output interface | USB Type-C or UART | | |
| | ADC | 16 bits | 18 bits (output 16 bits) | |
| | Supply Voltage | 5VDC±5% | | |
| | Working current | <0.8A | <3.0A | <3.0A |
| | Storing temperature | -20°C to +70°C | | |
| | Working temperature | -10°C to +50°C | | |
| Physical | Size | 102×57.5×29mm | 152×67.5×42mm | |
| | Weight | 280g | 675g | |

2. Electrical Pin-out

| Parameter | Min | Typ | Max | Unit |
|--|------|-----|-----|------|
| Power Supply | | | | |
| Operating voltage range | 4.5 | 5 | 5.5 | V |
| Operating current | | 170 | | mA |
| Logic Inputs (3.3V LVTTTL, 5V compatible) | | | | |
| 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 10-pin male angled box header(2x5, 2.00 mm pitch) and Type-c type interface. The 10-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.



Figure 1 Spectrometer side view.

| Pin# | Description | I/O | Function Description |
|------|-------------|--------|-----------------------|
| 1 | VCC | / | Power Supply, 5V±0.5, |
| 2 | VCC | / | Ground |
| 3 | GND | / | Ground |
| 4 | GND | / | Ground |
| 5 | SPI_CLK | Output | LVTTL Output |
| 6 | SPI_MOS | Output | LVTTL Output |
| 7 | SPI_MISO | Input | LVTTL Input |
| 8 | SPI_CS | Output | LVTTL Output |
| 9 | UART_TX | Output | LVTTL Output |
| 10 | UART_RX | Input | LVTTL Input |

3. Overall dimensions and installation structure data

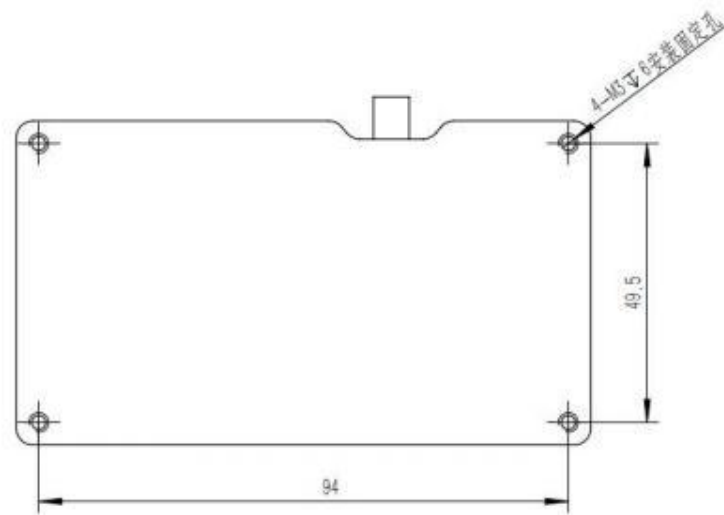


Figure 2 Mechanical dimension drawing (top view).

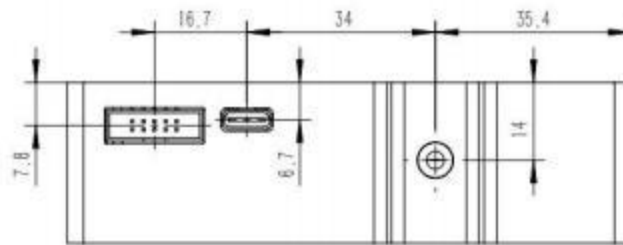


Figure 3 Mechanical dimension drawing (horizontal view).

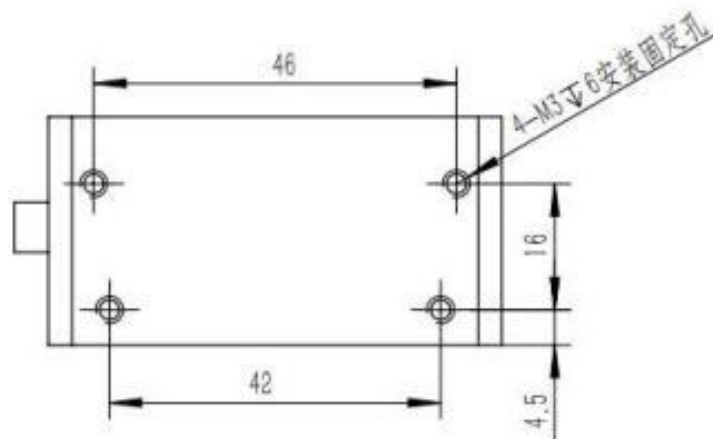


Figure 4 Mechanical dimension drawing (side view), 4 holes are fixing holes for installation and fixation.

4.Ordering guide

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

| Model | ATP8600 | ATP8600FBG-C | ATP8600FBG-L | ATP8600FBG-C L | ATR8600R M |
|------------------|---|--|--|--|---------------------------------|
| Description | Universal spectrometer | Signal demodulation for fiber sensors (C Band) | Signal demodulation for fiber sensors (L Band) | Signal demodulation for fiber optic sensors (C+L band) | Dedicated to Raman spectrometer |
| Wavelength Range | 900-1700 nm Customized (max. interval 750nm) | 1520-1570 nm | 1560nm-1630 nm | 1510-1600 nm | 200-2600 cm^{-1} |
| Resolution | 0.1-10nm | 20 pm | 20 pm | 40 pm | 15 cm^{-1} |
| Detector Type | Linear InGaAs | | | | |
| Slit Size | 5, 15, 25, 50, 100, 200, 300 μm , Customized | | | | |

5. Physical map



6. Measured spectrum

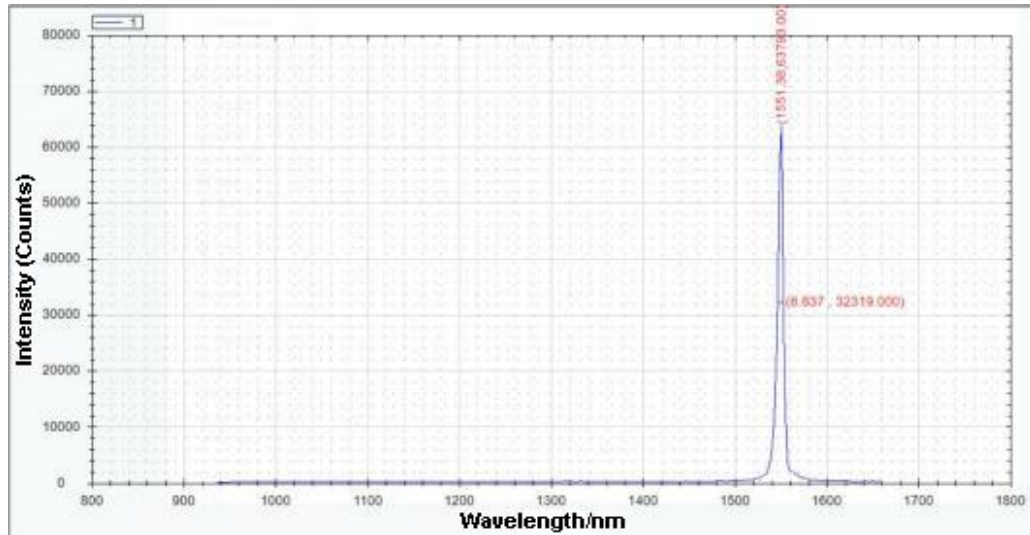


Figure 6 Spectrum measured by ATP8600, 940-1660nm, optical resolution 6.84nm.

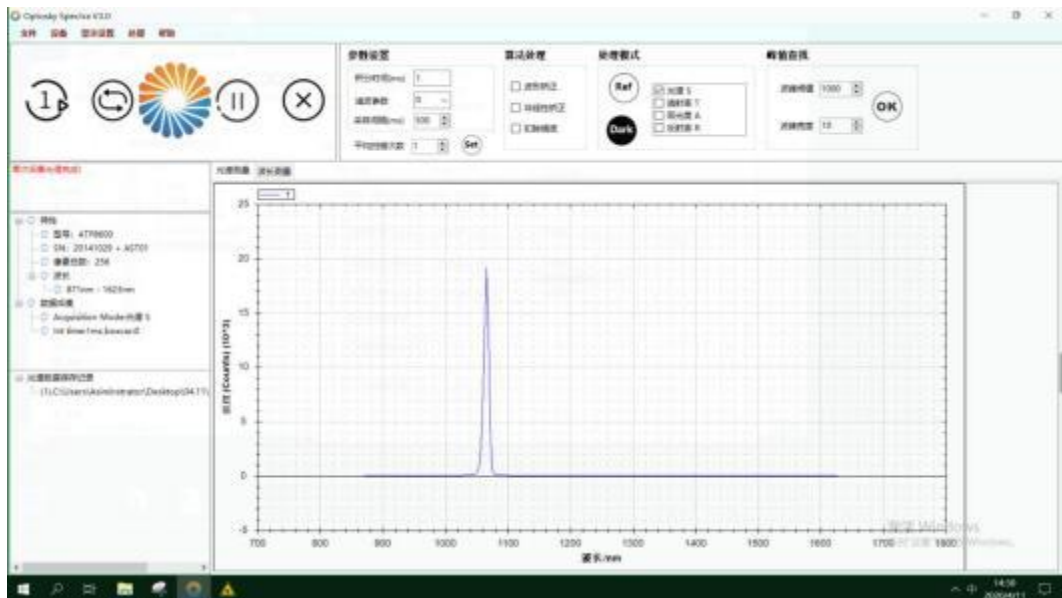


Figure 7 ATP8600 test spectrum of 1064nm laser.

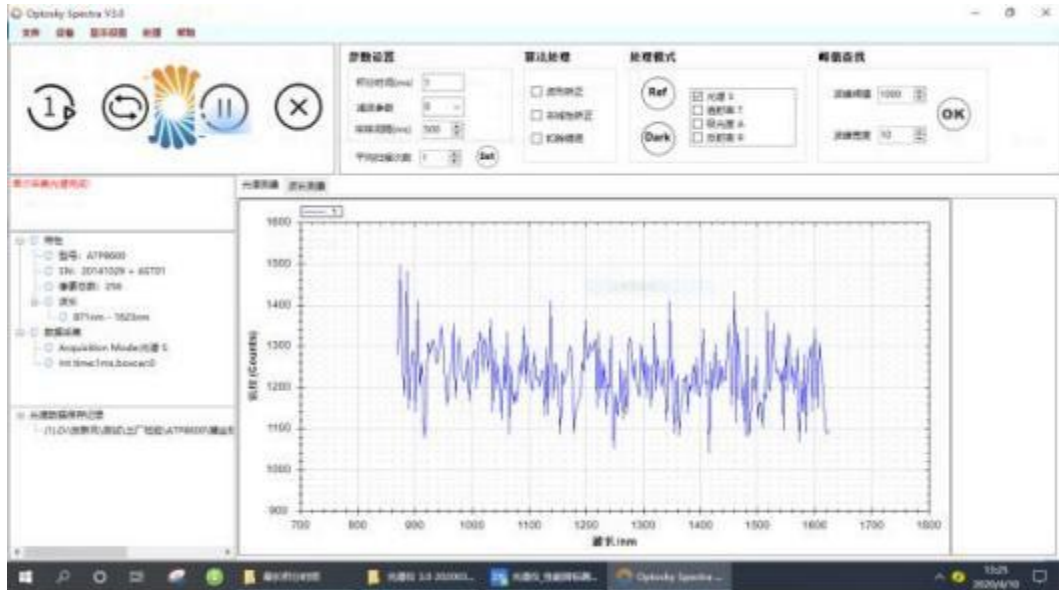


Figure 8 Dark current and noise test of ATP8600. At 1ms integration time, the dark current is about 1230 counts and the peak-to-peak noise is about 320 counts.