SWS62221 Spectral Sensor

General Description

NeoSpectra™ sensors are the most compact and the lowest cost Fourier Transform InfraRed (FT-IR) spectrometers on the market today. They deliver the same functionality as standard bench top FT-IR spectrometer instruments: quantification and identification of materials by measuring their spectral response. NeoSpectra's core technology is based on semiconductor Micro Electro Mechanical Systems (MEMS) microfabrication techniques promising unprecedented economies of scale.

The SWS62221 sensor determines the spectral content of the input light in NIR range (selectable options between 1,250 – 2,500 nm). The light is coupled via an optical fiber, and spectrum data are transferred to external host computer via USB cable.

Features

- Low cost embedded NIR spectral sensor solution
- Smallest FT-IR solution with a single photodetector
- Wide spectral ranges (λ: 1,250 – 2,500 nm)
- Designed for high volume production with economies of scale
- Fast, on-chip, data processing
- Alignment free optics
- User selectable resolutions
- Low power consumption
- Competitive performance

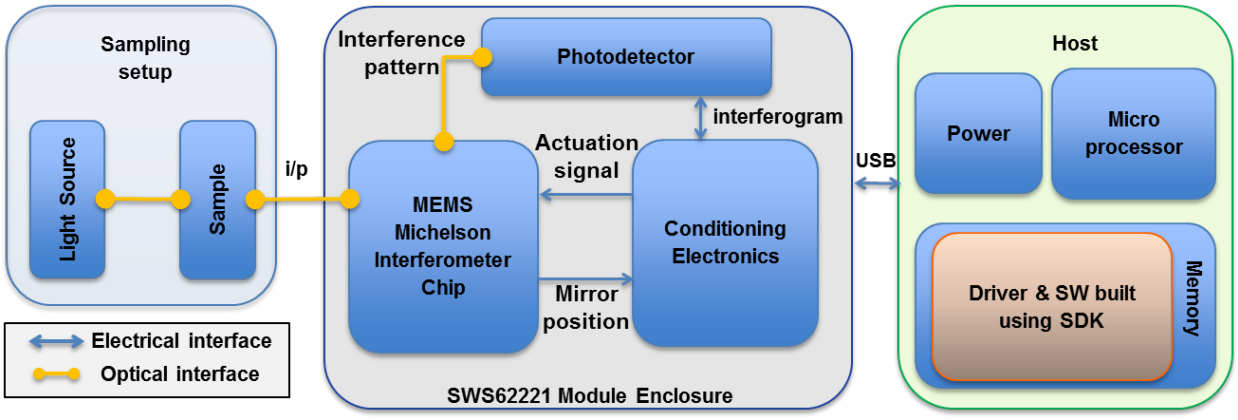
Applications

The SWS62221 is a spectral sensor that is designed to be used as an enabler of application specific spectroscopy solutions in different application areas and industries.

Typical application areas include:

- Food and agriculture
- Pharmaceutical
- Oil and gas
- Polymers
- Biotech
- Metals
- Industrial
- Chemicals

Block Diagram



Specifications

Parameter	Conditions	SWS62221-1.7	SWS62221-2.1	SWS62221-2.5	Units
Wavelength Range	PSD[a]> max PSD/10	1,250 - 1,700	1,300 - 2,100	1,350 - 2,500	nm
Resolution	At λ=1,550 nm, FWHM criterion	8 or 16			nm
		33.3 or 66.6			cm^{-1}
Typical SNR (rms)	2 s Scan time, Tx[b], resolution = 16 nm[c]	>3000:1 (@λ = 1,600 nm)	> 3000:1 (@λ = 1,950 nm)	3000:1 (@λ = 2,050 nm)	-
	2s Scan time, Rx[d], resolution = 16 nm[e]	>1,000:1 (@λ = 1,600 nm)	>1,000:1 (@λ = 1,950 nm)	1,000:1 (@λ = 2,050 nm)	-
Temperature	Operation	-5: 40[f]			°C
Wavelength Accuracy	@λ = 1,400 nm; temperature < 40°C	± 1.5			nm
Wavelength Repeatability	@λ = 1,400 nm; absorbance level = 0.5 A.U., Resolution: 16 nm	± 0.1			nm
Power Consumption	USB powered with 5 V supply	750			mW

Interfaces

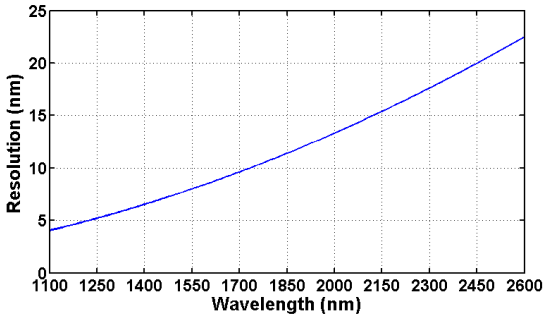
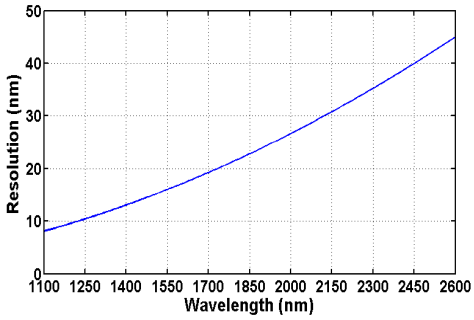
Electrical Interface	USB 2.0
Optical Interface	FCPC Multimode optical fiber, Core diameter >= 400 µm, NA = 0.22
Software Interface	Software: SpectroMOST Basic Edition & SDK Edition OS: Windows XP, Vista, 7, 8 , Linux Ubuntu 12.04, Linux Debian Machines: 32 & 64 bits

Typical Setups

	Transmission Setup (TX)	Reflection Setup (RX)
Typical Coupled Power Value within wavelength range	> 3 mW	> 100 µW

[a] PSD: Power Spectral Density – Single beam spectrum
[b] Tx: Typical transmission setup
[c] Performance varies linearly with resolution
[d] Rx: Typical reflection setup
[e] Performance varies linearly with resolution
[f] Can be extended to 70°C upon request

Specifications and parameters definitions

Parameter	Definition
Wavelength range	The wavelength range is defined as the range where the spectral data are is useful. The upper and lower wavelength limits are determined by the wavelength points where the power spectral density reaches one tenth of maximum power spectral density over the range.
Typical SNR	SNR is calculated from the root mean square noise (N_{rms}) , which is the standard deviation of 100 consecutive 100% lines at each wavelength.$SNR = 1/N_{rms}$
Resolution	Resolution is defined as the minimum spacing between two consecutive wavelength (Δλ) / wavenumber (Δv) points that can be fully resolved by the module. Two consecutive lines are fully resolved if separation > Full Width Half Maximum (FWHM) power density of either line. The resolution in wavenumber is constant across the spectral range. The relationship between the resolution in wavelength Δλ, and the resolution in wavenumber Δv is governed by $\Delta\lambda = \Delta v\, \lambda^2$.  (a)  (b) **Typical variation of wavelength resolution across the spectral range** **(a) Δλ = 8 nm (b) Δλ = 16nm**
Wavelength accuracy	Wavelength accuracy is the difference between the measured wavelength of a wavelength standard (e.g. liquid methylene chloride), and the nominal wavelength reported for that wavelength standard.

Revision History

Revision	Date	Description
1.0	6/22/15	Initial version

Contact Information

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