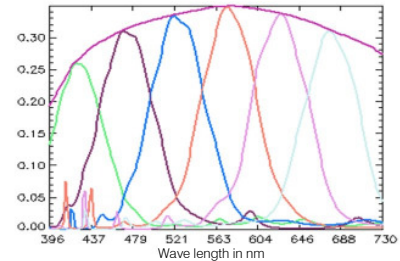
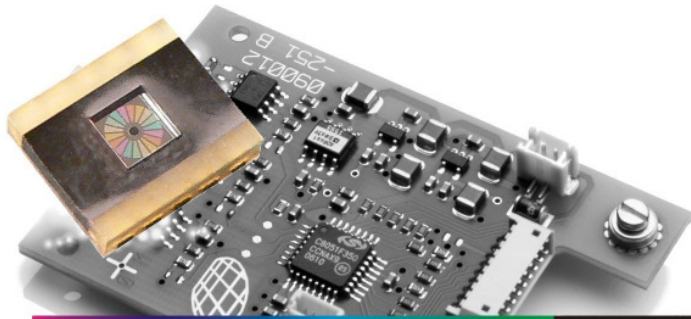


# Pre-announcement

## JENCOLOR Multiple Color Sensor Solutions for Spectral Measurement

Preliminary  
PRODUCT INFORMATION



**Fast color measurement and  
spectral analysis as handheld,  
standalone and in-line solution in  
emission, remission and transmission**

The Sensor IC MMCS6 is based on the well-proven technologies of the compact and price/performance-optimized JENCOLOR semiconductor sensors. With 7 spectral bands in the VIS range (380-780 nm), the sensor performs spectral analysis and color measurement.

A color is not evaluated on the colorimetric level, but at the radiometric level. This establishes the spectrum of a color, which is used to precisely calculate the chromaticity. This has the advantage that significantly more information is produced with respect to the color measurement.

This spectral sensor provides the advantage that metamerism effects are filtered out, which is not possible when using colorimetric sensors.

Light-sensitive detectors and on-chip interference filters are integrated within the Sensor IC MMCS6 in a compact SMD sensor housing. The sensor does not manifest any aging effects and has both long term and temperature stability.

The spectral bands of the Sensor IC MMCS6 are optimized to achieve high measuring accuracy irrespective of the quality of the light sources. The spectral approximation of the measured colors enables colors to be measured with a high degree of precision that cannot be achieved with the human eye. The sensor is suitable both for fast in-line measurements as well as rugged handheld applications.

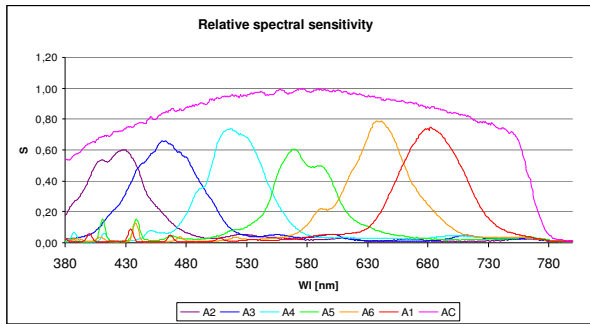
MAZeT develops and supplies application-specific and customized OEM hardware and software solutions based on the Sensor IC MMCS6 and modules.

### Highlights

- Color measurement based on spectral evaluation and selective spectral analysis
- Spectral value output
- Calibration in the Lab/Luv system
- High absolute accuracy  
e.g.  $\Delta E_{\text{mean}}=0.43$ ; RAL classic; LED white peak=450 nm & high repeat accuracy <0.5 %
- Low dark currents
- Signal input frequency >100 kHz
- SMD chip, 7x6x1.7 mm
- JENCOLOR software library, test boards and source development kits available
- Supplied as PCB, can be adapted to specific customer requirements

*Preliminary*  
Product Information  
**JENCOLOR Multiple Color Sensor Solutions for Spectral Measurement**

MAZeT offers diverse amplifier ICs, test boards and a software library with driver software and routines as OEM components for calculating and correcting systems and sensors, as well as for colorimetric and analytical purposes. Using simulation tools, the optical parameters, energy concept, amplifier variants, converters and measuring accuracy can be calculated before the design and test phases. Sensor boards and function/driver software (plug and play), adapted to the particular application, support the system and application tests, including correction and calibration. If required during the design phase, the form factor of the sensor boards can be optimized on an OEM basis or adapted with regards to the resolution, controller and interface. MAZeT supplies the entire colorimetric solution from a single source. This extends from the simulation, test, calibration and design to series production and support.



Spectral sensitivity of the Multiple Color Sensor

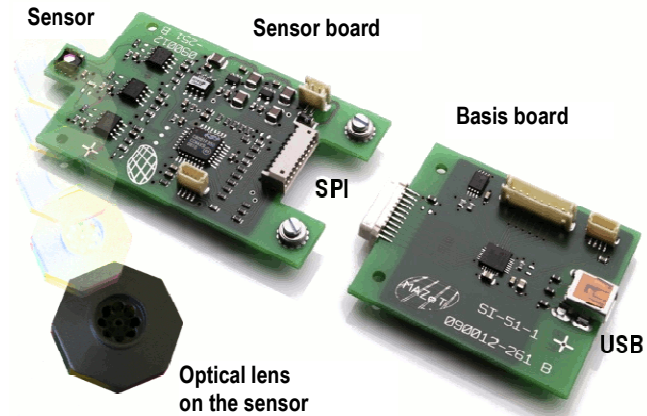
Spectral sensitivity	0.2...0.4A/W	$\lambda_{pA1} = 690 \text{ nm}$
Sensor area A1..A6/AC	0.31/0.07mm <sup>2</sup>	$\lambda_{pA2} = 430 \text{ nm}$
Sensor diameter	2mm	$\lambda_{pA3} = 470 \text{ nm}$
$\Delta\lambda(\lambda)$ spectral tolerance	< 1%* $\lambda$ nm	$\lambda_{pA4} = 520 \text{ nm}$
		$\lambda_{pA5} = 570 \text{ nm}$
		$\lambda_{pA6} = 640 \text{ nm}$
		$\lambda_{pAC} = 590 \text{ nm}$

Characteristic values of the Multiple Color Sensor

**MMCS Test and Design Components**

1. JENCOLOR SW Library

Components	Contents
Hardware-DLL	Driver interface(s)
CALL BACK functions	Reference hardware and library
Basic Library	Colorimetric functions
Advanced Library	Calibration, correction
Application Library	e.g. closed-loop control



2. Evaluation Boards

Component	Sensor board MMCS-HR8	Sensor board MTCS-HR11
Basis board	C8051F321 (8 bits, 25 MIPS), sensor interface: I2C, SPI, communication: USB	
Test software	USB driver, monitor program incl. Excel report, support of various functions such as calibration, test	
Amplification principle	Current-voltage conversion using the MAZeT MT104C (see 1.), discrete integration (summing)	Current-charge conversion using the TI DDC114, continuous integration ( $[I_{on}] = fA \cdot \mu A$ )
AD conversion/ $\mu C$	16 bit ADC in the $\mu C$ / C8051F065 (8 bits, 25 MIPS)	20 bits in the amplifier / STM32F101xB (32 bits, 40 DMIPS)
Measurement frequency	approx. 10,000 ... 20,000 SPS	approx. 1 ... 2,500 SPS
Interface	I2C, SPI, I/O, LED control, debug	
Accessories	LED board (for max. 4 LEDs), optical lens to maintain the measurement geometry 0° sensor / 45° LED illumination	

3. Sensor signal amplifier

Function	MT104Cx	MT108D
	4-channel amplifier with current-voltage conversion	
Trans-impedance	25 kOhm – 20 MOhm in 8 steps	250 kOhm – 25.6 MOhm in 8 steps
Input current	25 nA – 20 $\mu A$ in 8 steps	20 nA – 2.56 $\mu A$ in 8 steps
Operating frequency	6 kHz – 300 kHz in 8 steps	9 kHz - 155 kHz in 8 steps
Components on the chip	I/V converter, chip-programmable, power-down	I/V converter, S&H, MUX, power-down, can be programmed via I2C channel-by-channel
Output signal	Voltage (V1...V6, VC) = reference – (input current * trans-impedance)	Voltage (V1...V6, VC) = reference – (input current * trans-impedance) // S&H MUX

You can obtain additional information from our website at <http://www.JENCOLOR.de> or from our sales offices!