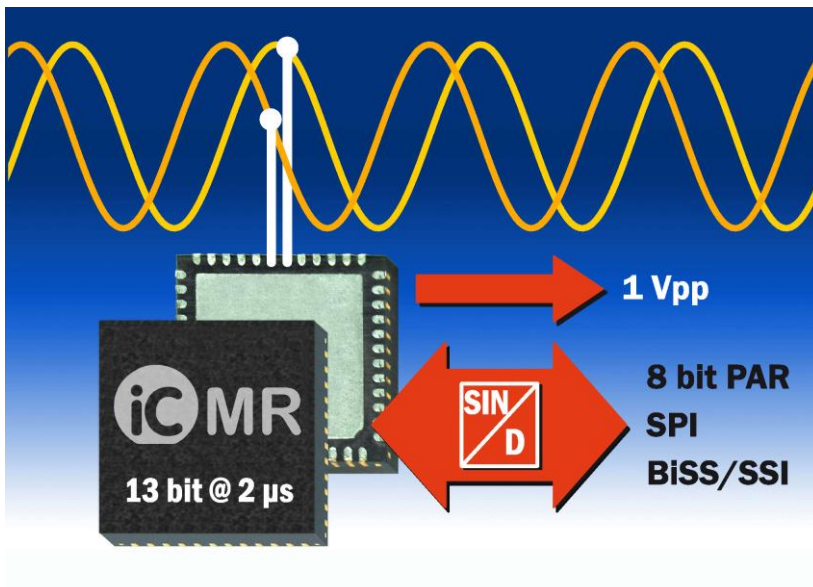


## Interface IC for Sine/Cosine Encoders With Safety Functions For Fast Drive Controls

### Fast 13-bit Sine-to-Digital Converter With Condition Monitoring For Linear and Rotational Encoders

For the fast and safe position acquisition with sine/cosine encoders and linear systems iC-MR provides the complete position sensor and encoder interface in a “system-on-chip” solution. The intrinsically safe differential sine/cosine transmission of the position information can take place now at signal frequencies of up to 500 kHz from the transmitter to the receiver.

The circuitry contains serial and parallel MCU interfaces and the complete analog front end for signal conditioning, a 13-bit sample & hold SAR tangent converter with a latency of only 2  $\mu$ s, diagnostic functions for monitoring the sine/cosine signals in real time, as well as a 1V output driver for a differential sin/cos output at 100  $\Omega$ .



Product photo iC-MR in QFN48 7mm x 7mm package

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A combined singleturn/multiturn period counter with a length of up to 50 bit supports the real time processing in the drive controller even at high input frequencies of the sine/cosine signals.

Additional safety functions in the iC-MR monitor the sine/cosine input signal level, detect a short-circuit and wire breakage, monitor the control range if supplying an external encoder LED or an MR sensor measuring bridge, monitor a motor temperature sensor, and finally secure the data transmission through a life counter as well as by an extended CRC generation. The measurement of the motor temperature, for example through a KTY sensing element, occurs through an adjustable 12-bit A/D converter featuring range monitoring and thereby supports an active condition monitoring through the drive controller.

For sensor-sided applications, inside a magnetic or an optical encoder, differential or referenced sensor signals of a few millivolt up generated by MR sensor bridges or photo sensors for example, can be amplified and conditioned in offset, amplitude and phase. A regulated current output maintains the adjusted measuring accuracy during operation by readjusting the supply of the LED light source or the magnetic sensor bridge. The compensation of temperature and aging effects occurs automatically, if necessary.

For digital encoder applications iC-MR has a BiSS/SSI interface and initializes itself through an external I<sup>2</sup>C EEPROM, or alternatively, the connected micro controller configures and controls the component via the serial SPI or the parallel 8-bit interface.

Typical applications for the sensor and control side applicable iC-MR are:

- Interface module for the connection of sine/cosine encoders in drive controls and automation systems
- Sine/cosine motor encoders with safety functions and condition monitoring for motors or complete drives
- Optical or magnetic absolute position encoders with BiSS/SSI output or for field bus systems

The iC-MR is supplied in a 48-pole QFN package, which only takes up 7 x 7 mm space of the board. With a supply of +5 V the component works in an operating temperature range from -40 to +110 degrees Celsius.

For the evaluation there is a demo board ready for operation, which is supplied and configured via an USB adapter from the PC. A GUI thereby helps to carry out the desired settings. For the support of production tools a component DLL is available as well.

Further information on the encoder interface iC is available at:

<http://www.ichaus.de/MR>

## **About iC-Haus**

iC-Haus GmbH is a leading, independent German manufacturer of standard iCs (ASSP) and customized ASiC semiconductor solutions with worldwide representation. The company has been active in the design, production, and sales of application-specific iCs for industrial, automotive, and medical applications for 30 years now.

The iC-Haus cell libraries in CMOS, bipolar, and BCD technologies are specifically suited to realize the design of sensor, laser/opto, and actuator ASiCs, amongst others. The iCs are assembled in standard plastic packages or using the iC-Haus chip-on-board technology to manufacture complete microsystems, multichip modules, and optoBGA/QFN in conjunction with sensors.

Further information is available at <http://www.ichaus.com>.

### **If you have any queries, please contact:**

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