A major challenge we face today is digitalization of industrial processes, extending machinery with low power, feature rich microcontroller-based electronics to collect sensor readings and forward data with LPWA communication channels to a Cloud Database in order to build up the "BIG DATA" - the knowledge base of the future, and the elementary food of Artificial Intelligence. A mass of sensor readings needs to be organized into central databases for future processing, so as to meet the expectations of Industry 4.0. The Internet of Things (IoT) provides the ecosystem to deal with this challenge.

As a component distributor Endrich Bauelemente Vertriebs GmbH is fully engaged in supporting IoT projects of its customers and developed an IoT Device family based on key components provided by its leading suppliers. As each and every customer require different mix of functions, the product family acts as a demonstration system and the E-IoT platform offers the following services:

▪ Hardware family based on „open source" concept, all schematics, design layout are available for free to our registered customers

▪ Free data collection and data visualization services to the users of the Endrich IoT concept, such as free access

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to the Endrich Cloud Database Service and the Endrich Data Visualization Gateway

▪ Free hardware and software guide available on a dedicated website of the platform at http://e-iot.info

Additional services:

▪ Key components to be used for IoT design are available at Endrich, amongst others sensors, microcontrollers, communication modules, aerials, lithium batteries and all commodities necessary for powering, tuning, filtering and protecting the finished product

▪ Modular, out of box IoT hardware board family is available as demonstration boards or as final solution

▪ Professional knowledgebase is available for the customers including software samples, connection diagrams, interfacing and circuit design support.

The hardware family is constantly developing, today there are several boards available:

Endrich IoT Board v052 offers all three major functions of IoT devices : sensing, controlling and communication. The board is battery powered, its operation is based on RISC-V micro-controller architecture and offers a low power wide area networking by using an NB-IoT/LTE-M/2G GSM modem.

E-IoT platform offers a variety of external sensor boards, which can be

All major IoT functions included : Sensor – Controller – GSM Communication

Sensors
Different sensors for environmental parameters
Ambient light, magnetic field, temperature, air pressure , vibration, noise, altitude, position

Controller
Controlling the sampling, and data transfer
Low power microcontrollers make it possible to collect sensors' data and to command the communication channel used for sending the results to cloud database.

Communication
Wireless LPWA communication
The communication channel used for sending the results to cloud database is usually based on a wireless technology such as a (low power) local (WiFi, Bt, ZigBee stb)., or wide area (NB-IoT, LTE-M, SigFox, LoRa) network. This board offers NB-IoT, LTE-M & 2G

DETAILED DOCUMENTATION AVAILABLE !

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www.endrich.com
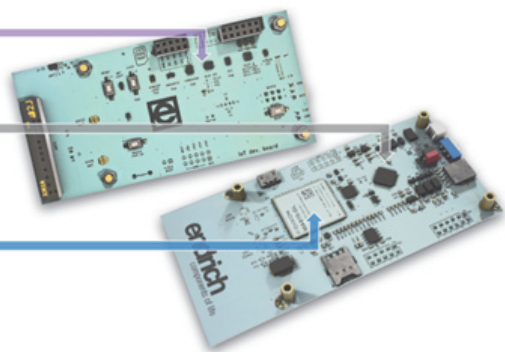
External sensor boards for E-IoT MCU board and 3rd party boards (Arduino etc..)

External sensor boards for E-IoT

I²C and SPI multi sensor boards
Ambient light, magnetic field, temperature, air pressure , vibration, noise, altitude, position * standard interface to E-IoT SBC Board and 3rd party MCU boards

CLS (color) Sensor board
Based on Everlight's RGBW low power, high sensitivity Color Light Sensor with I²C Interface. This sensor board extends the IOT devices' capability with sensing red, green, blue, white (RGBW) and infrared light.

Temperature sensor board
Based on Everlight's EMT34-1220-A/L906/TR8 Temperature Sensor (with built-in amplifier), this board offers an external thermometer for IoT applications.

Ambient light sensor board
Based on Everlight's ALS-DPDIC17-78C/L749/TR8 Digital Ambient Light Sensor, this board offers an extension to IoT Devices to provide capability of sensing ambient light in a spectrum which is close to the human eye's response, with a maximum resolution of 0.0033Lux / count and a maximum detectable illumination of 83000Lux

DETAILED DOCUMENTATION AVAILABLE !
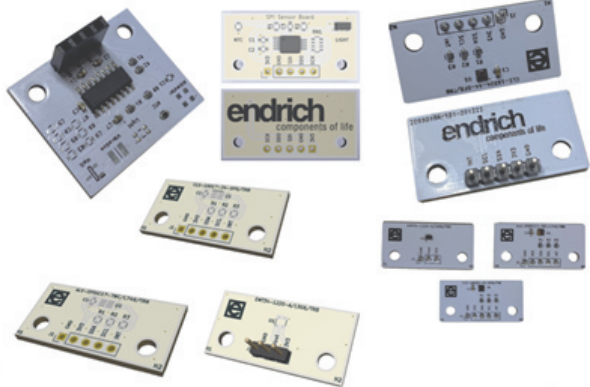
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connected to the mainboard (E-IoT SBC or other MCUs) via standard interfaces such as I²C or SPI or proprietary interfaces like the Endrich Long Distance I²C port, which supports extended range up to 50 meters.

As new feature to extend the E-IoT platform, we introduced display solutions in a form of external boards based on different display standards such as pmOLED or TFT. These boards can be connected to either E-IoT SBC board or 3rd party MCU boards (Arduino,

External display boards for E-IoT SBC and 3rd party MCUs (Arduino etc..)

Display boards

pmOLED display board with I²C & SPI interface

This extension board offers basic visualization capability to E-IoT SBC and 3d party MCU boards based on Raystar's REX012864DWPP3N00F00 0.96" white pmOLED display with 128X64 pixels dot matrix organization. User can select by jumper, between using I²C or SPI interface to connect to SBC/MCU board.

TFT based display board with SPI interface
(Preliminary, more for custom- designs)

This extension board offers basic visualization capability to E-IoT SBC and 3d party MCU boards based on Raystar's RFJ240L-AYW-DNN 2.4" color TFT with the resolution of 320X240 pixels.

ALL DOCUMENTATION AVAILABLE !

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Data visualization

Vibration
Vibration sensor VS1/2
Detecting vibration : signaling of machines' running, detecting of motor start, monitoring motor run, rain, intrusion & anti vandalism detection

Altitude / air pressure
Air pressure sensor for altitude measuring
Detecting altitude by measuring air pressure

FAN speed measurement
Tacho signal detection – measuring RPM
Measuring rotation speed with 4 wire cooling fan

Intensity of ambient light
ALS sensor detecting in the sensitivity area (spectrum) of human eye
Detecting light and dark condition, measuring visible light intensity

GPS coordinates
GNSS coordinates (localization)
Providing device's physical location – device tracking0

Temperature sensor
Ambient and forced temperature measurement
Different sensors for ambient temperature and forced temperature

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ESP32, Raspberry etc.) via standard interfaces.

Sensor readings are stored in a customer specific dedicated area of **Endrich Cloud Database System** and can be visualized through **Endrich Visualization Gateway**, a special website made for each E-IoT SBC boards and customer devices.
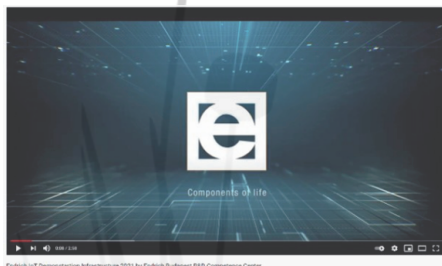
More information about the Endrich IoT Ecosystem, its open source hardware platform, the dedicated software services and free code samples for the embedded software can be found at http://e-iot.info
A video about the award winning E-IOT platform, the Endrich IoT EcoSystem is available on the https://www.youtube.com/watch?v=OcH 8h1u43Egl link or by scanning the QR Code.

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