Teollinen Internet – Ratkaisut ja tekniikat

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About Arrow
The Arrow Family

From Sensor to Sunset

COMPONENTS
INTELLIGENT SYSTEMS
SUSTAINABLE TECHNOLOGY SOLUTIONS
SYSTEMS INTEGRATION
ENTERPRISE COMPUTING SOLUTIONS
Join Today & Get Arrow Certified

Join today for access to all of the time and money-saving benefits of the Arrow Certification Program:

- A chance to win a share of $1M in flash funding.
- Access to powerful IBM IoT analytics and security services.
- Exclusive savings on product components.
- Access to time-saving design tools, expert advice and more.

*Note: To be eligible for Arrow Certification, you must have an electronic component in your product, and have launched (or plan to launch) an Indiegogo campaign.*
Hassle Free Shipping: Now Serving with Incoterms DDP

Arrow now offers Delivered Duty Paid DDP. This new feature allows you to focus on designing and building, while we handle all the paperwork.
lot
IoT building blocks – Key areas

1. Devices - Sensors and Actuators
2. Connectivity
3. Cloud, Analytics, Integration
4. Security
5. User Experience
6. New business models
Älä säädä jos et mittaa.
Älä mittaa jos et säädä
IOT security
Right security level

Choice of security level

- More power to break security
- New findings

Today

End of Life for device
Wireless
Scaling up in performance and mobility

- IoT gateways
- Connected cars
- Surveillance cameras
- Smartphones
- Digital signage

**LTE Cat-1 and above**
Delivering scalable performance and seamless mobility for high-performance IoT use cases

Scaling down in complexity and power

- Industrial handhelds
- Wearables
- Vending machines
- Parking meters
- Sensors
- Utility meters
- Agriculture monitors
- Asset trackers
- Health monitors
- Security systems
- Industrial sensors
- City infrastructures
- Lighting / HVAC controllers

**eMTC’ Cat-M1**
Optimizing for the broadest range of IoT applications with high-reliability and lower latencies

**NB-IoT’ Cat-NB1**
Providing extreme optimizations for low cost/power, low-throughput, delay-tolerant IoT use cases
Applies to LTE IoT and 5G NR-based IoT evolution – potential for 3GPP Rel-16

**Grant-free uplink**
Resource Spread Multiple Access (RSMA)

- Asynchronous, non-orthogonal, contention-based access
- For sporadic uplink of small data bursts common for IoT
- Further increases device density and network efficiency

**Mesh networking**
Multi-hop mesh with WAN management

- For low-power devices with challenging placements
- Especially uplink data relayed via nearby devices
- Expands on LTE Device-to-Device (D2D)
The Complete Package So You Can Move Fast

- ARM Cortex-M4 processing power
- 200 m range integrated Antenna
- Bluetooth 4.2 compliant
  - supported by Simplicity Studio
- Passive components reduce BOM
Sensors
Sensirion SCD30 CO2, RH and T sensor – Basic technology

CO₂ molecules (5)
Detector (4)
Optical filter (2)

Light source (3)
Sample chamber (1)
Sensor details

I2c connection to host, with interrupt signal

<table>
<thead>
<tr>
<th>Item</th>
<th>Sensor</th>
<th>Sensor Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temperature</td>
<td>5°C to +50°C ± 0.3°C Accuracy, 1 second acquisition rate</td>
</tr>
<tr>
<td>2</td>
<td>Relative Humidity</td>
<td>5% to 95% RH, 2% accuracy, 1 second acquisition rate</td>
</tr>
<tr>
<td>3</td>
<td>Motion</td>
<td>Interrupt driven, response &lt;0.5 seconds</td>
</tr>
<tr>
<td>4</td>
<td>Ambient Light Level</td>
<td>1 second acquisition rate</td>
</tr>
<tr>
<td>5</td>
<td>Microphone</td>
<td>Analog audio and interrupt driven option, response &lt;0.5 seconds</td>
</tr>
<tr>
<td>6</td>
<td>VOC</td>
<td>0-1187ppb, 60 second acquisition rate</td>
</tr>
<tr>
<td>7</td>
<td>CO2</td>
<td>400-8192ppm, 60 second acquisition rate, (an equivalent CO2 measurement based on total VOC concentrations)</td>
</tr>
</tbody>
</table>
World’s First Battery Free, µC Free, Sensor Tag
VL53L1X

> state-of-the-art, Time-of-Flight (ToF) sensor

> It is the fastest miniature ToF sensor on the market with accurate ranging up to 4 meters and fast ranging frequency up to 50 Hz

  > 4.9x2.5x1.56 mm

  > Emitter: 940 nm invisible laser (Class1)

  > SPAD (single photon avalanche diode) receiving array with integrated lens

  > Low-power microcontroller running advanced digital firmware

  > Typical full field-of-view (FoV): 27 °

  > Programmable region-of-interest (ROI) size on the receiving array, allowing the sensor FoV to be reduced

  > Programmable ROI position on the receiving array, providing multizone operation control from the host
T9602
Humidity & Temperature Sensor

Features
- Fully calibrated & temperature compensated
- Water resistant (IP67 certified)
- Digital or analogue output (I2C or PDM)
- Optional wire length (1M or 1.8M Cable)
- Precision & accuracy (±2%RH, ±0.3°C, 14 bit)
- Low current consumption
- Reliable in harsh environments
- Different mounting options
- Over-moulded electronics
- Standard JST connector
- Specifications as ChipCap2

Benefits
- Quick install
- Low cost (no transmitter electronics)
- Low cost (No control electronics)
- Accurate calibrated sensor
- ‘Ready to go’ solution

Applications
- OEM ventilation Installations
- Dehumidifiers – fixed and mobile
- Bathroom ventilator
- Residential ventilator
- Small air handling plant
- Air to air heat exchangers
- Harsh environment humidity (agriculture)
- Industrial
- Food & beverage
• HVC-P2 Demo
Solution architecture

- Easy to maintain
- Easy to deploy
- Easy to scale

Wireless Sensor Nodes + Gateway