

Specialized addition **SOSnews eXtra:**

## Internet of Things (IoT)

Everyone talks about IoT, SOS electronic has been doing it for 10 years



**PICO-iMX6** - A powerful basis for your digital signage



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**SC20** - And what is your IoT killer application for this beauty/beast?



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**SDP800** - Verified and Improved Differential Pressure Sensors



16



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## ADDITION SOSnews eXtra

Internet of Things



**Ivan Kozlay**  
head of purchasing department

## Let's Trust Each Other ... We Take It Personally

Dear readers, customers,

13 years ago when I moved from the position of the purchaser in the production company to the position of the purchaser in electronic components distributor SOS electronic, people used to say, "It's going to be easier, without stress, no big pressure on purchasers because there is no cessation of production on distributor's side and thus there are no losses, penalties ..."

How much greater was my surprise when after few weeks I found out that it's not like that...

All of your – our customers' - requests directed to purchasers through our sales department are processed personally, with empathy and often with enthusiasm, if we know that our solutions are part of the unique and interesting products. Therefore, we always try to meet your requirements in order to maintain smooth running of your production lines.

Sometimes you may receive the answer from us a little bit later than from the competitors, where they have automatic replies with price and deadlines set for each offer request in the system. We always try to find the optimal solution and have an individual approach to each customer and situation. We are therefore always very pleased if we know right from the beginning whether you need to have the goods as soon as possible regardless the higher cost or it can be delivered within few weeks. Ideally, we agree on a frame purchase order and we keep the goods in our stock depending on how you wish. Moreover, if you also tell us your idea about the price, we will work with our suppliers in order to get it.

I guess no one gets surprised when I say that everything is different today than 13 years ago or even 20-25 years ago when we started to simplify the access to electronic components in the Czech Republic, Slovakia and later in other countries. Thanks to the Internet, everybody can find and order goods for example from China e-shop at an incredibly low price, even with free shipping. The question is whether the same component will be there even after three months or two years when you will need it for your product again. Or if you will find the supplier, who, thanks to free shipping, no longer exists and a helpless person has no one to reach out to with their questions.

If you keep trusting us at least like you did before 20-25 years, we'll gladly be here for you for another 25 years – ready to cooperate on the phone, via email, web, skype, messenger or any communication media that you'll prefer in 25 years. The only thing we're not able to promise is that we'll still have fax at that time...

But maybe it will be some wireless device from your production to which you install innovative products from our offer. And perhaps your idea will shape the future. Sometimes you just need to dust off the old product. For example, add LoRaWAN module from IMST (page 6) to it and at that point it will become a modern IoT device. Have you ever thought about which of your products could get wireless? (By the way, did you know that LoRaje is also only "dusted off" communication technology from World War II? They did not know about Internet of Things back then though...)

With confidence in the fact that at least one of the products on the following pages will inspire you for the new solution, we bring you this edition of SOS News.

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# Latest news on SOS electronic



## Workshops continue also in 2017

From 28.03. to 06.04.2017 we started yet another series of our favourite workshops. This time, more than 100 developers have tried to work with MC60 module in 7 cities - Prague, Brno, Ostrava, Bratislava, Košice, Győri and Budapest. They learned about the most important steps for a successful and rapid development of GSM / LTE devices and gained practical experience in working with this module. More about this workshop can be found at [www.soselectronic.com/pizzaworkshop](http://www.soselectronic.com/pizzaworkshop).

## SOS' drop of blood

In March, we again decided to support a good thing and donated to those in need. In agreement with the National Transfusion Service, they sent their mobile blood collection team. After initial examination, NTS staff confirmed to us that a true and genuine blood circulates in our veins. So we handed in about 10 litres. Our reward was not only the sweet treat, but especially great feeling that we did a good thing.



## We're regularly training ourselves for you

The SOS electronic regularly holds meeting with business representatives from all 7 countries (Slovakia, Czech Republic, Hungary, Germany, Austria, Poland and Romania). The reason is the exchange of experience in dealing with various situations that the market brings but also trainings regarding new products and technologies so that we can help in designing the most optimal solutions for our customers. Trainings are provided directly by manufacturers. The last day of the meeting is dedicated to a workshop where our salesmen can try a mix of theory and practice.

## FLUKE training at customers

Trainings with manufacturers are conducted also throughout the year. One of the last ones was Fluke training. Karol Bielecki directly from Fluke practically performed a lot of interesting products and their use, such as vibrometer, thermal camera, current pliers and many others. Later on we also conducted a mini training together with customers in the Czech Republic and Hungary on these devices and measurement applications.



## Backstage information from SOS

Technical cheat sheets, backstage news, instant messages but especially openness. We have created a special channel on Facebook - [www.facebook.com/soselectronic.eu](http://www.facebook.com/soselectronic.eu), which is used for more jovial communication. In addition to background information on events within SOS, it also offers information and tools that cannot be found on our official web. So, are you going to join us? :)



## SSD APACER

# give us your feedback and it may be your

Thank you for reading our SOSnews. We will be pleased if you answer a few questions so we can improve our magazine for you. From you, who will fill out the following short survey, we will draw by a lot 5 winners of 2.5 "SSD drives APS25ABB128G-ATMW from Apacer on August 10th 2017.

The survey can be found at [www.soselectronic.com/sosnewsonline](http://www.soselectronic.com/sosnewsonline)

Tell us your opinion  
and **WIN!**

# Do you want to be informed about components availability?

## Use the watchdog



Or in other words – set the watchdog in our eshop.

How does it work? The principle is well known and simple. Mark the product that you want to watch. Select the number of pieces you are interested in and e-mail address to which you want the notification to be sent. Once our warehouse receives the product you are interested in, we will send you a notification email.

In case we have fewer pieces than you wished, you will receive an email while the watchdog is still set. Once our warehouse receives more pieces than you wish, you will receive a notification email and the watchdog turns off automatically.

Watchdog
✕

**Description:** UT-L16

**Ord.number:** 59927

**Quantity:**

**E-mail:**

Notification will be sent to this e-mail address.



CANCEL
SAVE

### Managing watchdogs

The service is available to anyone who has set up the account in our eshop. You can manage your watchdogs in your account in the Assortment section. You can see which products you are watching, or possibly turn the watchdog off. The number of watched products is not limited.

Watchdog

The list of items you have added to watchdog. We will send notification e-mail when the item is received in our stock.

	IMAGE	TYPE / KIND / DESCRIPTION	ORD.NUMBER	MANUFACTURER	IN STOCK	DETAILS:	PRICE/PC EXCL. VAT
<input type="checkbox"/>		<b>UT-L16</b> Measuring Lead 1,2m UNI-T	59927	UNI-T	in stock 26 pcs	10 pcs from 22.03.2017 liptak@sos.sk	1 pcs+ 9,3000 € 1 pcs+ 9,3000 € 5 pcs+ 8,8400 € 10 pcs+ 8,6500 € 50 pcs+ 8,1900 €
<input type="checkbox"/>		<b>TMA 0505</b> DC/DC module 1W 5VDC/5VDC 200mA SIP7 DC/DC Converters Isolated	5089	TRACOPOWER	in stock 5519 pcs	1 pcs from 19.04.2017 liptak@sos.sk	1 pcs+ 2,8600 € 10 pcs+ 2,6600 € 20 pcs+ 2,6100 € 80 pcs+ 2,4900 €

Action with selected items
REMOVE PRODUCTS FROM WATCHDOG



### Tracking undelivered goods

An interesting feature is certainly the possibility to set a watchdog on products that you have already ordered with us and they were still not received at our warehouse. This way you will be informed immediately in case you are impatiently waiting for some product. Just click on the blue icon of Watchdog on the right.

Open orders

Items being prepared in warehouse (0)
Non-delivered items (2)
Open orders (1)

In-Stock items
Item on request

	IMAGE	NAME / DESCRIPTION	ORD.NUMBER	YOUR ORDER NUMBER	DATE OF ORDER	PRICE PER UNIT	QUANTITY	TOTAL PRICE	IN STOCK	PENDING	DELIVERY DATE
<input type="checkbox"/>		<b>SLO51</b> RFID Reader/Writer 13,56MHz Hitare/NFC UART 38x58mm	121750	2017/04/14	14.04.2017	16,2000 €	40	648,0000 €	656	0	
<input type="checkbox"/>		<b>SLD40A</b> RFID Reader 13,56MHz Hitare/Destrea/NFC USB 72x57x15mm	125894	2017/04/14	14.04.2017	24,7029 €	10	247,0290 €	11	0	

**Adrián Lipták**  
online marketing specialist



## Did you know that...

### ... you can mark products with your own labels?

If you use other products' labelling in your company as we do, just associate your labels to our products. This way, your labels will appear on invoices, labels with products and you can use them while searching in our eshop.

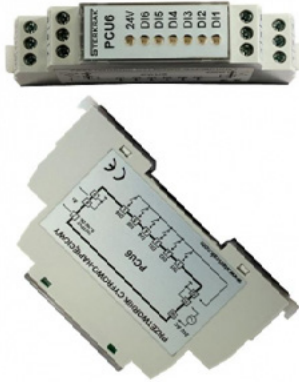
### ... you can make a list of your favourite items?

If you buy the same products repeatedly, create such a list and order faster. All items can be found on one page and you will avoid tedious searching through categories or search engine.

# Examples of your solutions...

## STERKRAK

### The digital-to-analog expansion module PCU6

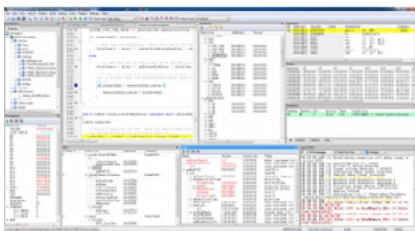


PCU6 module is used in automation systems to expand the number of digital inputs of PLC controllers.

By connecting the device to an analog input of the controller, we get the ability to read and monitor 6 digital inputs. By using precision electronic components, the output voltage of the module is stable in time, temperature and precisely maps the input states.

## Comsytec s.r.o.

### Blocks (EPS) | Embedded Plugin Suite for STM32



Embedded Plugin Suite is a plugin collection for embedded system development based on STM32 devices. The suite is plugin extension for Code:Blocks IDE. After installing required components you do not need bother with external configurations. Everything is managed inside the Code:Blocks. With wizard generated application you can start debugging with ONE click.

## CLE Automazioni

### RS485 Repeater



To regenerate the RS485 signal, increase the transmission distance, make star connections, isolate different sections of the bus. Your plant has an area of thousands of meters? With the RS485 repeater all problems are cleared.

## AMEX Research Corporation Technologies

### Educational Mini Robot Platform



The AMRobot is intended to build an educational mobile mini-robot with the capability to choose one of the three Types of drive/chassis system: two-wheeled (with a support ball), four-wheeled or tracked drive system (with two silicone tracks).

## Belektronik GmbH

### OEM Peltier Cooler/Heater



Plate cooler/heater to control the temperature of objects like sensors, printed circuit boards, experimental

setups etc. that can be connected directly to the surface. Air cooler/heater for precise controlling of the temperature of enclosed air volumes like incubators, cabinets or electronic enclosures, etc.

## Optin Kft.

### IRIS.base



The IRIS.base on-board unit is an essential part of a professional application, the ONGUARD security service. These two combined can be used for vehicle tracking, logistics, telemetrical or security.

## Hofmann, HL-RFIDTAG

### UHF RFID BAP wristband



UHF RFID battery-assisted wristband with the reading distance on wrist up to 8-9m/2W ERP.

The reading distance depend on BMI, Typee of reader, cables and antennas.

**Let know about your product to more than 200 000 people from your segment.**

**More information can be found at [www.ecubeportal.com](http://www.ecubeportal.com)**





# Latest articles to read...

## EA DOG displays - top-class classic

If you're searching for a thin display with a minimum power consumption and a very good legibility even in direct sunlight, then don't overlook the EA DOG series displays from Electronic Assembly.



**ELECTRONIC ASSEMBLY**



## Lantronix xPico110 Device Server for SMT assembly

The compact Lantronix xPico® 110 module is designed for easy and fast integration of the device with serial port with minimal engineering effort, making it easier to connect industrial machines to Ethernet.

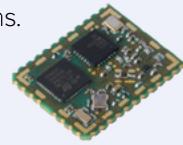


**LANTRONIX**



## Long range radio modules that last for years on a battery?

With the new LoRa modulation technology, many important barriers for low power long range radio communication were destroyed. This technology promises high range combined with low power consumption, which is ideal for IoT applications.



## Get maximum from limited power source

The LTC3127 features a ±4% accurate programmable average input current limit with a 200mA to 1000mA range, making it ideal for GSM modems or Supercapacitor chargers powered from sources with hard limits on output current.



**LINEAR TECHNOLOGY**



## Bluetooth + UHF RFID = HUR120BT

Because cables are out-dated and old-fashioned, it's time to use a wireless RFID UHF reader, the new HUR120BT. It is simple to use, it's affordable and what is very important – it is very reliable.



**TSS COMPANY**  
UHF RFID SOLUTIONS



## Kingbright KPG-0603 – create your own display

Probably the world's smallest SMT LED with a package size of 0.6x0.3x0.2 mm is so small that it can be used to create various symbols, pictograms and displays.



**Kingbright**



## Galileo goes live!

On 15 December 2016, Europe's satellite navigation system Galileo started offering its initial services to public authorities, businesses and citizens.



**QUECTEL**



## H05V-F, LiYY, LiYCY or LiFY? We'll advise you how to choose the right cable

Do you use common cables and you're not sure whether it's the right one for your application? Then this article is right for you.



**LAPP GROUP**



## Get inspired by TOP products of 2016

We were looking back at 2016 and now we're bringing you TOP 25 market-leading products in SOS electronic.



# PICO-iMX6 - a powerful basis for your digital signage

**PICO-iMX6 modules are members of compact, pin-compatible and long-term available platform with scalable performance optimized for digital signage, multimedia applications and panel computing.**



Modules come with 12 year longevity TechNexion commitment and revision control (4 years of active product development, 7 years of final product manufacture and 1 year of availability after the end of manufacture notice), which means that modules will be available until 2026 at least.

Moduly PICO-iMX6 can be combined with HobbitGL carrier board, LVDS expander board and 7" 1024x600 TFT LCD kit with resistive touch panel. PICO-iMX6 module combined with NymphGL carrier board provide HDMI for external display

and LVDS for internal TFT LCD panel like 7" 1024x600 TFT LCD panel kit with projective capacitive multi touch panel. Audio codec on both carrier boards provide Lin-eOut and MicIn. Gbit Ethernet and onboard Wi-Fi 802.11ac/Bluetooth LE 4.0 provide seamless connectivity to Internet or local network.

Customization of carrier board is supported by freely available schematics, design files, board files and BOM lists; but the use of HobbitGL and NymphGL is more cost-effective solution for a small or medium series.

PICO-iMX6 modules are based on NXP ARM Cortex-A9 i.MX6 1, 2, or 4 core application processor combined with 512MB/1GB DDR3 RAM and 4GB eMMC or microSD card slot. Capacity of RAM can be in-

creased up to 2GB and eMMC up to 64GB.

Modules have onboard Wi-Fi 802.11ac/Bluetooth LE 4.0 module (for commercial 0~60°C and extended -20~70°C temperature range), LVDS, HDMI, TTL RGB and MIPI DSI display interfaces, MIPI CSI camera interface, RGMII (Ethernet PHY IC is not included), x1 PCI-Express 2.0, SATA 2 (i.MX6 Quad only), USB Host, USB OTG, I2S, CAN, UART, SDIO, SPI, I2C, PWM and GPIO pins. Modules without Wi-Fi/Bluetooth are also available.



Modules use a closed format with the size of 36x40mm with three 70-pin expansion connectors on the bottom and U.FL antenna connector on the top. Provided heat sink is safely attached to module using the included screws, nuts and spacers.

Modules are manufactured for commercial 0~60°C, extended -20~70°C and industrial temperature range of -35~85°C. Certified extended and industrial range is also available, which means that each module is tested within this temperature range.

Modules come with source code (Linux kernel, u-boot, Android, Yocto Linux) and binary demo images (Android, Yocto Linux, Ubuntu Linux).

## Features

- ARM Cortex-A9, NXP i.MX6 Solo/DualLite/Quad 1GHz
- RAM: Solo - 512MB DDR3 RAM, Dual, Quad – 1GB DDR3 RAM (up to 2GB available)
- storage: 4GB eMMC, microSD slot (up to 64GB eMMC available)
- Wi-Fi 802.11ac/Bluetooth LE 4.0
- 1Gbit MAC, RGMII
- 1 x single channel 18/24 bit LVDS, 1 x HDMI version 1.4, 1 x 18/24 bit TTL RGB, 1 x dual lane MIPI DSI
- 1 x SATA 2 (i.MX6 Quad only)
- 1 x USB 2.0 Host, 1 x USB OTG
- 2 x I2S, 2 x CAN, 2 x UART, 1 x SDIO, 1 x SPI, 3 x I2C, 13 GPIO, 4 PWM

Order no.	Type	Description	Guide price
217561	PICO-DWARF-GL	PICO-DWARF carrier board with giga-bit LAN	76,80 €
217564	PICO-IMX6G205-R256-E04-BW	PICO I.MX6 ULTRALITE 528MHZ 256MB RAM 4GB EMMC Wi-Fi 802.11AC BT4.	52,80 €
225560	LVDS-EXPANDER	PICO HOBBIT LVDS EXPANSION BOARD	25,10 €





LANTRONIX®

**XPort PRO**

## A small computer in RJ45 form factor

Featuring a powerful 32-bit processor and plenty of RAM/Flash, the XPORT PRO is ready to solve problems in IoT world.



The XPort Pro is Lantronix' most powerful, self-contained embedded networking module. Footprint compatible with the popular XPort (RJ45 connector) and running either Linux or Evolution OS operating systems, the XPort Pro simplifies the design of devices requiring Ethernet connectivity to the network and allows you to deploy advanced applications on the edge device itself. The thumb-sized XPort Pro provides everything you need in a single embedded solution. It effortlessly handles demanding applications with the power of a high-speed, advanced architecture 32-bit processor. And with ample built-in memory, it allows virtually unlimited flexibility for customization and application enablement.

XPort Pro provides bullet-proof security by offering a variety of robust data encryption and authentication options. What's more, the option to run Linux with IPv6 built in, enables you to deploy custom applications and take advantage of the large

feature-libraries available for Linux developers. Critical agency certification has already been completed by Lantronix, reducing your test time and speeding time-to market.

XPORT Pro is finalist of EDN 20th annual Innovation Awards.

### Features and Specifications:

#### High performance 32-bit processor (ARM Core)

#### Onboard memory

- 8MB SDRAM/16MB Flash or 16MB SDRAM/16MB Flash

#### Serial Interface

- Software selectable data rates from 300 to 921kbps
- Characters: 7 or 8 data bits
- Parity: Odd, Even, None
- Stop Bits: 1 or 2
- Modem Control Signals: CTS, RTS, DTR/DCD
- Flow Control: XON/XOFF (software), CTS/RTS (hardware)

- Programmable IO: 3 PIO pins (software selectable)

#### Network Interface

- 10Base-T and 100Base-TX Link
- Connector: RJ45
- Protocols: TCP/IP, UDP/IP, ARP, ICMP, SNMPv2, TFTP, FTP, Telnet, DHCP, BOOTP, HTTP, SMTP, SSHv2, SSLv3, PPP, AutoIP, RSS and SYSLOG

#### Indicators (LED)

- Link & activity indicator

#### Security

- SSLv3 and SSHv2 Client & Server, Selectable 128/256/512/1024 Bit certificates
- Encryption: AES, 3DES and RC4
- Authentication: SHA-1, MD5, Base-64 User Access Lists

#### Software

- Windows 98/NT/2000/XP/Vista-Based DeviceInstaller™
- Com Port Redirector™
- Secure Com Port Redirector

#### Typical applications are:

- remote data loggers,
- measuring devices,
- traffic control,
- weather stations,
- portable devices



Order no.	Type	Description	Guide price
112658	XPP1002000-02R	XPORT PRO Evolution OS Networking Server RJ45 16MB SDRAM	71,35 €
112660	XPP1003000-02R	XPORT PRO Linux Networking Server RJ45 16MB SDRAM	71,85 €
112658	XPP1002000-02R	XPORT PRO Evolution OS Networking Server RJ45 16MB SDRAM	71,22 €



# And what is your IoT killer application for this beauty/beast?



**It is already here. Smartphones start to rule industrial applications. The most advanced IoT LTE module in the world has it all - LTE, BLE, WIFI, GNSS and Android OS.**

In Quectel's effort to build a smarter world, another module has been recently released in China where developers can develop almost any kind of middle/high-end application with this super module, the SC20 aka smart module. SC20 series comes in six variants: SC20-E, SC20-A, SC20-AU, SC20-J, SC20-CE and SC20-W. This makes it backward compatible with an existing EDGE and GSM/GPRS networks, ensuring that it can be connected even in remote areas devoid of 3G or LTE coverage.

SC20 series is Quectel's new generation of multi-mode smart LTE Cat.4 modules with built-in Android 5.1 Lollipop OS. It supports short-range wireless communication via Wi-Fi 802.11b/g/n and BT4.1 LE, and offers data rate up to 150Mbps. It is ideal for both industrial and consumer applications requiring the highest data-rate and high-speed Internet access. SC20 features multiple-input multiple-output (MIMO) technology, a cutting edge antenna technology capable of transmitting multiple data streams on multiple transmitters to

multiple receivers.

The module also combines high-speed wireless connectivity with embedded multi-constellation and high-sensitivity GPS+GLONASS+BeiDou receiver for positioning. A rich set of interfaces (such as LCD, Camera, Touch Panel, MIC, SPK, UART, USB, I2C) and abundant drivers.

For quick evaluation and to speed up your development, Quectel offers a complete Evaluation Board with SC20 module.

## Features

- OS Android 5.1 • LTE Version 3GPP E-UTRA Release 11 • bandwidth 1.4/3/5/10/15/20MHz • antenna DL MIMO 2x2, supports Rx-diversity • supply voltage 3.5V~ 4.2V, 3.8V Typ • operation temp. -40°C ~ +85°C

Order no.	Type	Description	Guide price
229882	SC20-E	Multi-Mode Smart Module SMD 40,5x40,5x2,8mm	135,05 €
230075	SC20-E EVB KIT	Evaluation Board for SC20 w/ Module	230,00 €



# Bar TFT - even an industrial display can be wide-angle



**The new family of Winstar TFT displays marked with "Bar" has a typical elongated shape as we know it, for example, from character displays.**

New "Bar" TFT have an ambition to replace character but mainly graphic displays that are typical for many industrial applications.

Technologically, these are still "common" TFT displays with all their pros and cons, and the only essential difference is in its shape (form factor), as their sides ration isn't 3:2 or so but approx. 2.5:1 to 4:1.

**Three sizes are currently available:**

- 5.2" WF52A (480x128 px)
- 4.6" WF46A (800x320 px)
- 3.9" WF39A (480x128 px)

WF52A is also available as a „COB" module for an easy migration from graphic to TFT display.

As can be seen, the 4.6" display has the

highest resolution and thus also the highest pixels density (DPI) from this series. That's why WF46A is also suitable for applications with high demands on quality (fine details) of the displayed content (pictures, etc.). All three models have 24 bit RGB interface (40 pin FFC connector).



Relatively higher brightness (350-500 Cd/m<sup>2</sup>) contributes to a universal use. WF52A is available without a touch panel and also with a resistive or capacitive touch panel.

## Features

- wide-angle "BAR" TFT displays • full-colour alternative for monochrome graphic displays • operating temperatures range -20 ... +70°C

Order no.	Type	Description	Guide price
226888	WF39ATIASDNN0	TFT-LCD 3,9" Module 480x128 + 8Bits	34,92 €
229074	WF46ATIATDNN0	TFT-LCD 4,6" Module 800x320 + 8Bits	51,83 €
229075	WF52ATLASDNN0	TFT-LCD 5,2" Module 480x128 + 8Bits	44,14 €
229078	WF52QTLBSDLBNN0	TFT-LCD 5,2" Module + Control Board SSD1963	64,19€

# Bridgetek CleO50 - more powerful Cleo35 module successor



**Bridgetek's CleO50 is simple to program, 5 inch Arduino display shield. It features 800x480 TFT display with 24-bit color depth and resistive touch screen. Same as the smaller CleO35 module, CleO50 is also CE and FCC certified.**



CleO50 adds 10/100Mbit/s Ethernet interface. Signals are connected to CN5, only a simple PCB with RJ45 jack with integrated magnetics is required to connect module to Ethernet.

CleO50 is based on Bridgetek's FT812 - Advanced Embedded Video Engine

(EVE2) and FT900-low power, performance-optimized 32-bit microcontroller.

FT812 controls display and senses 4-wire resistive touch panel. Touch screen HW engine can recognize touch tags and track touch movements.

To simplify the HMI design, FT812 pro-

vides drawing of widgets buttons, clocks, keys, gauges, text displays, progress bars, sliders, toggle switches, dials, gradients, etc. and animated functionalities such as displaying logo, calibration, spinner, screen saver and sketch. It supports mirroring and rotating of display and adjusting touch screen transformation matrix on the fly (CMD\_SETROTATE), bitmap rotating, scaling and translating.

Built-in sound synthesizer generates notification sounds, which are played through PWM audio output. CleO50 and CleO35 shares the same set of accessories: CleO-Camera, CleO-Speaker, CleO-RIO (connector board for attaching to Arduino) and NerO of course.

CleO50 is promoted as Arduino shield but it can also be used as a standalone product without Arduino compatible board.



## Features

- anti-aliased graphics for much finer image quality with no artifacts in raster images, objects are rendered with 1/16th of a pixel resolution
- module with panel mountable bezel ready for embedding
- 10/100Mbit/s ethernet interface
- CE and FCC certified

Order no.	Type	Description	Guide price
222703	CleO35A	Smart 3,5" TFT Display Shield for Arduino	76,60 €
229579	CleO50A	Smart 5" TFT Display Shield for Arduino and MikroBUS	124,40 €

# The Most Reliable Data Storage for Industries

**Apacer**  
Access the best

**Apacer SFD25A, SU120-25, SM210-25 and SM130-25 series 2.5 inch SSD offer solution for almost every application, even for the most demanding industrial and military environment.**

## SMART

Apacer provides SSDWidget, SMART software for Windows and Linux OS running on PC with x86 and x86-64 architecture processor for free. Next option for reading SMART attributes from SSD is open source Smartmontools, which is available for Linux and Windows.

## DRAM cache

SFD25A, SM210-25 and SM130-25 series have integrated DRAM as a write cache for improved performance and write data efficiency.

## Device Sleep Mode

DEVSLP allows SSD to enter into a mode with power consumption about 5 mW, which is one or two orders of magnitude less power than a traditional idle.

SFD25A series uses SLC flash technology to meet the most demanding industrial and military requirements. It provides storage capacities from 8 to 256GB.

SU120-25 series uses Apacer proprietary SLC-Lite technology. It utilizes MLC flash to simulate the performance and durability of SLC flash. This design

provides a cost-performance balance between SLC and MLC flash types, making SU120-25 an ideal alternative solution for mission-critical embedded and industrial applications.

SM210-25 series uses MLC flash technology. It offers storage capacities from 32GB to 512GB. 128GB model offers sustained read/write performance 510/380MB/s and 81K/79K random read/write 4K IOPs.

To support your development, we can lend you SU120-25 series 128GB model APS25H12128G-STM1W or SM210-25 series 128GB model APS25AFB128G-3BTMWT for testing with your HW. Both models support DEVSLP mode.



Order no.	Type	Description	Guide price
187314	APS25ABB128G-ATMWE	2,5" SSD SATA II 128G MLC -40...85°C	148,00€
233949	APS25AFB128G-3BTMWT	Industrial SATA 3.1 SSD 128 GB MLC 2,5" -40...85°C	146,00 €





# Euro is strengthening



**Euroclamp (aka Euro) is strengthening its position in SOS electronic portfolio. Terminal Blocks of the MV, MVE, MVS, ML and MI series are available in a huge amount of versions and sizes, therefore you'll certainly find a suitable type for you in here.**

A very frequent requirement for a simple and reliable connection of wires to a PCB is relevant since the world knows plated copper boards.

Euroclamp, focuses mainly on PCB terminal blocks, which is reflected in a wide offer. From our experience we can confirm a quality and reliability of these connectors. MV, MVS and MVE series, which are terminal blocks for PCB, belong to the most favourite ones. In order for you to easily find a suitable type, we bring you a few hints and explanations regarding their description.

Example: **MV153-5,08-V-L**

**1** - Nominal wire cross section – 1,5mm<sup>2</sup>

**5** - Class of pitch – class 5 contains 5mm, 5,08mm and double pitch

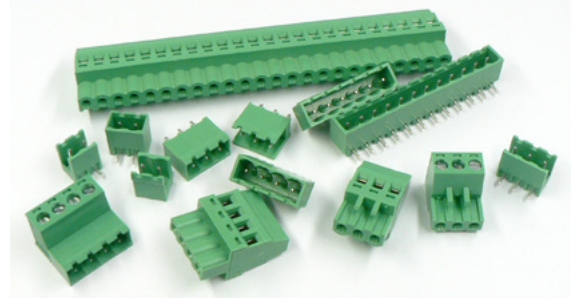
**3** - Number of poles

**5,08**- real pitch

**V** - vertical version – screwdriver vertical to PCB

**L** - stackable version, all other are modular (without L)

Body of connectors is made of a rigid self-extinguishing polyamide (UL94-V0) and the connector itself is made of nickel plated copper alloy. Basic color of these connectors is green (RAL6032) but upon order they're also available in other colors. A considerable advantage is also a wide range of operating temperatures of -40 to +130°C. Types with a wide pitch (for example 10mm) are physically the same with types with a half pitch (5mm), they



only differ in omitted pins and naturally the maximum allowed voltage is higher (750VAC).

## Features

- a comprehensive series of terminal blocks for PCB
- excellent price/ quality ratio
- 2-12 poles (modular- connectable to more poles)
- angled versions 35° resp. 45° are also available

Order no.	Type	Description	Guide price
50676	MBE152-5-V	PCB Terminal Block Modular P5 2,5mm <sup>2</sup> 24A 2P V	0,13 €
151428	MV258-5,08-H	PCB Terminal Block Modular P5,08 2,5mm <sup>2</sup> 16A 8P H	0,91 €
212903	MBES153-5,08-V-OG	PCB Terminal Block Modular P5,08 1,5mm <sup>2</sup> 17,5A 3P V Orange	0,20 €

# LTE Antenna for demanding applications

**More and more applications use LTE connection nowadays. To meet a strong market demand for LTE antennas, 2J released a 2JW0124, which is a high gain, universal antenna.**

2JW0124 is a connector mount, high gain multiband antenna, capable to cover 4G/LTE bands (699-960/1710-2690 MHz) and GNSS bands as well (GALILEO E1, GPS and GLONASS frequencies), thus perfectly suitable for tracking applications, where GPS coordinates should be transferred in real time to the cloud.

Based on customer feedback, the manufacturer has extended the offer of 2JW0124-C868b antenna, which is

tuned to the frequency of 868MHz instead of GSM band. This way it is better suited for the devices using this frequency. 2JW0124 is available in black and white.

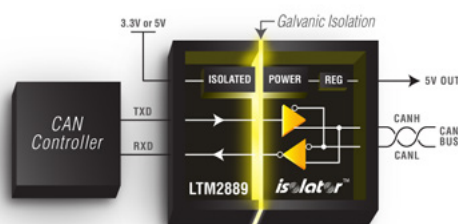


Order no.	Type	Description	Guide price
200022	2JW0124	LTE/GPS/GLONASS/GALILEO Blade Antenna with Swivel SMA M Ni	7,53 €
231283	2JW0124-C868BB	LTE/GPS/GLONASS/GALILEO Blade Antenna SMA M BK Brass	7,53 €

# Optimal solution for rugged CAN, CAN FD and DeviceNet



The LTM2889 is CAN (controller area network) and CAN FD (flexible data rate) compliant microModule transceiver and isolator. It breaks potentially dangerous ground loops and allows reliable communication through CAN bus in harsh environment.



LTM2889 provides 2,500VRMS of galvanic isolation,  $\pm 60V$  fault protection on CAN bus interface pins with respect to GND2, greater than  $30kV/\mu s$  common mode transient immunity, and  $\pm 25kV$  HBM ESD protection. In addition, the device features an extended  $\pm 36V$  common mode range to enable operation in environments with high common mode voltages created by electrical noise or ground potential differences

between nodes on the isolated side of the CAN bus.

The LTM2889 features an integrated, low EMI, DC/DC converter that powers the isolated transceiver and provides up to 0.75W of isolated power for CAN node components. Transition to shutdown mode brings pins connected to CAN bus and RX output to high imped-

ance state and current consumption drops to less than  $1\mu A$ .

The LTM2889 requires no external components and it is available in commercial, industrial and automotive temperature grades and is available in 15mm x 11.25mm x 3.42mm BGA package.

## Features

- isolated 4Mbps CAN FD Transceiver • 2500VRMS for 1 Minute Per UL1577
- no external components required • high bus fault voltage tolerance:  $\pm 60V$
- high common mode transient immunity:  $30kV/\mu s$  • variable slew rate driver with active symmetry • ambient operation from  $-40^{\circ}C$  to  $125^{\circ}C$

Order no.	Type	Description	Guide price
231136	LTM2889IY-3#PBF	Isolated CAN FD uModule Transceiver and Power	21,40 €
231137	LTM2889IY-5#PBF	Isolated CAN FD uModule Transceiver and Power	26,00 €



# FIS Gas Sensors and Modules



Years of experience with gas sensors and state-of-the-art manufacturing technology combined.

FIS Inc. is a Japanese company established in November 20, 1992. They have strong R&D department with 28 researchers/developers and a team of 30 Production technology/Quality specialists.

The most sensors are based on metal oxide semiconductor (MOS) technology. Sensor principle is based on the fact that conductivity of tin dioxide ( $SnO_2$ ) changes according to gas concentration changes. When compared to other sensor technologies MOS sensors excel in sensitivity, response time, long-term stability, cost and integrity. The disadvantage is lower selectivity. It means that the sensor is most sensitive to target gas but

it also has some degree of sensitivity to other gases.

Gas sensitive sensor element has to be heated to temperature which allows detection of target gas. Power consumed by heater element is dominant part of sensor power consumption. FIS is continually improving this technology in order to decrease power consumption. Commonly available SP (plate, 2x2mm) sensor series and a lower power consumption SB (bead, 0,3x0,5mm) sensor series will be gradually extended by MEMS (plate 0,1x0,1mm) and Ultra SB types (bead, 0,1x0,15mm) of sensors in the future. Typical power consumption is dropping from 400mW for SP series to



120mW for SB series to as low as 0,01mW for upcoming MEMS and Ultra SB sensors.

FIS manufactures sensors for different target gases; please see SP and SB gas sensors overview which also includes ozone ( $O_3$ ) sensor. No other company in the world offers ozone sensor based on MOS technology. Sensors themselves are not calibrated; it is up to customer to calibrate his end product. For customers who don't have the required equipment for calibration, FIS provides factory calibrated modules.

Order no.	Type	Description	Guide price
226164	A051020-AQ6A-02	$CO_2$ Sensor Module 400 to 3000ppm Out 0-5V	81,90 €
227947	FIS3001-00NC	$CO$ /Methane ( $CH_4$ ) Sensor Module 30 to 600ppm/100 to 5000ppm	49,47 €
227974	SB-12C-00	Methane ( $CH_4$ ) Sensor 100 to 5000ppm	18,80 €



# A truly universal TFT display – Uni TFT

**ELECTRONIC  
ASSEMBLY**

**Family of intelligent Uni TFT display modules from Electronic Assembly has ambitions to win the favour of everyone who wants to dedicate only a minimum time for development and to maximally speed up product launch.**

Intelligent displays or rather modules of intelligent displays which we know for example from company 4D Systems or FTDI have already won many fans. The new family of Uni TFT from Electronic Assembly can be put into this category. However, it's not just "another family" with similar features. Uni TFT brings other elements into this segment, which were missing here and with which Electronic Assembly has rich long-term experience. From all that we have, we could highlight mainly 7 interfaces on one module: USB, 2xSPI, 2x I2C a 2x RS232.

Other benefits of Uni TFT:

- RTC (real time clock)
- 16 digital I/O pins, expandable to 128
- 4 analogue inputs, 12-bit
- analogue video input (NTSC/PAL)
- extremely fast rendering (50fps)

From programming point of view:

- direct support of bar graphs and pie charts
- vectorised character sets (fully scalable)
- object programming (including variables and calculations)
- support of common files: jpg, png, svg (even transparent) wav, mp3,...
- resistive or multi touch PCAP panel (working even through a 4mm glass)
- development environment for Windows

From the above mentioned it is clear that Uni TFT is ideal for industrial applications, where it's usually necessary to process various (measured) data and to control various peripherals. In these cases, Uni TFT has a chance to be-



come a main control core and HMI (human-machine interface) of the device.

Uni TFT family is still a „hot“ novelty. The first representative is the 5" module EA uniTFT050.

Uni TFT is supplied with a software package of USB drivers, uniSketch – design software, simulator, hardcopy tool and LCD terminal.

Order no.	Type	Description	Guide price
229845	QUICKUNITFT050C	EA uniTFT050-ATC Display+Quickstart-board+USB-cable	280,61 €

# Raychem RPG – when you need a really robust enclosure

**Raychem RPG**

**If you have a feeling that your device deserves a more rigid enclosure but ideally without substantial cost increase, you're at the right place.**



During the development of almost any device, sooner or later we face a question – "which enclosure should we use?".

Whether you go by any of the above mentioned methods, we have a very interesting family of robust aluminium enclosures aluEiN from company Raychem RPG for you. Series aluEiN contains 31 versions of various size – from a miniature one (5x4,5x3 cm) up to relatively large (60x31x18 cm).

Rigid construction of aluminium (AlSi12) enclosures is mainly determined by their

wall thickness of approx. min 4.5 mm. The great advantage of the thicker wall is that it easily enables to cut necessary threads, for example for reliable fastening of cable glands and similar.

Quality neoprene gasket sealing provides enclosures with IP 66 rating and withstands temperatures of -40 to +110°C. For a wider temperature range, it's possible to equip enclosures with a silicone sealing (-50 to +135°C) and optionally also in IP67, 68 rating, as well as certified for Ex/IECEx.

Enclosures are painted with a resistant polyester colour from inside, as well as from outside. The great advantage for many applications is an easy possibility of grounding, as there are threads and screws (M6/M4) for grounding as well as for assembly of components in the lid and the bottom of enclosure.

Screws closing the enclosure are made of stainless steel and as usual – openings for enclosure fixing are outside the enclosure sealing, so they will not affect tightness of the enclosure.

Order no.	Type	Description	Guide price
228953	RJ03	Aluminium Die-cast Enclosure 150x64x34mm Silver Grey aluEiN IP66	11,10 €
228954	RJ04	Aluminium Die-cast Enclosure 58x64x34mm Silver Grey aluEiN IP66	6,98 €
228964	RJ12	Aluminium Die-cast Enclosure 220x120x91mm Silver Grey aluEiN IP66	28,60 €



# SWISS Precision in Robust Metal Switches

**SCHURTER**  
ELECTRONIC COMPONENTS



## Momentary or Latching? Yes.

SOS electronic offers you a very interesting series of stainless steel switches from SCHURTER – the MSM. Panel mounting and vandal-proof. The preferred versions are 2-pole momentary switches, non illuminated or ring il-

luminated and the same applies for the switches in latching version.

The MSM LA pushbutton switches and MSMDP pushbuttons are available with mounting diameters of 19 and 22 mm. They are suited for the use in a tem-

perature range of -20 °C to +85 °C. With actuator travel about 4,5 mm, the latching pushbuttons are ideal for applications where increased feedback of the switching status is required. In the OFF state, the actuator position protrudes from the housing, while in the ON state it is recessed to the housing. This makes for user-friendly actuation and also prevents inadvertent switching. The actuator travel of momentary pushbuttons is about 1mm.

The sturdy stainless steel housing and actuator make the MSM LA latching action and MSM DP momentary action switches especially well-suited for the use in demanding industrial environment, or in applications that require protection against vandalism.

## Features

- switching voltage 250 V AC • switching current 12A(latching), 3A(momentary), 2-pole • LED illumination colors: red, green, blue • operating temperature -20 °C to +85 °C • protection rating IP 64, protection class IK 07

Order no.	Type	Description	Guide price
61965	1241.2800	Push-button on panel IP65 D=19mm 48Vdc/125mA	5,43 €
89890	1241.6624.1112000	Push Button Antivandal IP67 D19mm Green backlight	21,20 €
111032	1241.6624.1111000	Push Button Antivandal IP67 D19mm Red backlight	21,20 €

# HAMMOND 1455 aluminium enclosures – a wide range of sizes and shapes

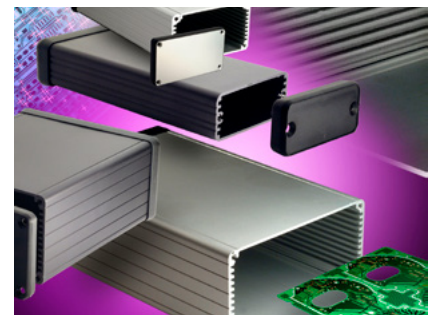
**HAMMOND  
MANUFACTURING**

## Perhaps the biggest family of aluminium enclosures from Hammond can be the right choice for you.

If you ever searched for an aluminium enclosure for your project, you've probably come across the Canadian producer Hammond mfg., producing a huge amount of enclosures in various versions and sizes. If you even took a closer look at Hammond's offer, whether on our website or on the website of the producer, probably you've also noticed an attractive series with inconspicuous name "1455", from which we keep a lot of types

directly in our stock. 1455 series simply looks well and it's also well-constructed as for mounting and fixing of PCB.

1455 series represents a wide family of various sizes and even shapes. Types that are 6 to 22cm long can be found here, in various widths and heights. They're also available with plastic or aluminium end panels while plastic ones are also provided in attractive colour versions from polycarbonate. Colour



open bezels are also available. The enclosure can have one of four elox (anodized) colours – natural, black, blue and newly also red one.

It is interesting that besides typically shaped types (for example Hammond 1455L), 1455 series offers even a quite differently looking group 1455A and 1455B with oval sides, available only with plastic end panels.

If you have a very "hot" application :-), then the solution can be the 1455 NHD version („heat dissipating“), with ribbons on its sides.

As it's well known, elox is one of the most durable surface treatments, because it's aluminium oxide made by electric oxidizing (anodizing). Resistance of surface treatment is based on the fact that the Al<sub>2</sub>O<sub>3</sub> (corundum) is a very hard and stable compound.

## Features

- aluminium enclosures with anodised surface treatment • transparent, black, blue and red colour • designed for the direct inserting of PCBs into slots • rigid aluminium construction with a minimum thickness of 1,5 mm

Order no.	Type	Description	Guide price
55731	1455J1202BK	Enclosure AL/PC 120x78x27mm Black plastic end panels	8,82 €
56098	1455C1201	Enclosure AL 120x54x23mm Natural metal end panels	10,00 €
60193	1455B1002	Enclosure AL/PC 100x72x19mm Natural plastic end panels	7,27 €

# Verified and Improved Differential Pressure Sensors

**SENSIRION**  
THE SENSOR COMPANY

**Sensirion SDP800 series sensors are the reliable solution for precise air flow measurement in most demanding but cost sensitive HVAC applications, such as VAV controllers, burners, heat recovery ventilation systems and filter monitoring.**

The SDP800 sensor series is the result of more than 15 years of experience in measuring the air flow to millions of HVAC systems, car engines and respiratory devices. It consequently utilizes the successful features of the SDP600 series and can easily be integrated due to its proven form factor.

#### SDP800 and 810 with I2C interface:

- continuous (2kHz update rate for differential pressure) and triggered measurement mode
- average of the measured values till read in continuous mode
- user selectable temperature compensation for both differential pressure and for mass flow
- sleep mode with current consumption 1uA max.

#### SDP806 and 816 with analog interface:

- pin selectable ratiometric (relative to supply voltage) analog voltage output (linear or square root)
- temperature compensation for mass flow.

While the SDP800 and 806 are designed for the direct connection to a pressure manifold via O-ring sealing, the SDP810 and 816 are designed for the tube connection.

Sensirion's EK-P5 evaluation kit provides



a straightforward and cost-effective option for testing the differential pressure sensors of the SDP800 series. There is no need to program microcontroller as the evaluation kit is connected directly to a PC.

Order no.	Type	Description	Guide price
232928	SDP810-500Pa	Differential Pressure Sensor -500...500 Pa Tube I2C	14,50 €
232937	EK-P5	Evaluation Kit for SDP8xx Sensors	57,00 €
232967	SDP800-125Pa	Diff Pressure Sensor -125...125Pa Port D4x4mm I2C	14,50 €

## Classical Ring Tongue Terminals



**SOS electronic brings you the selection of the most popular Ring Tongue Terminals from TE Connectivity with legendary logo: AMP. This selection contains elements of three main families - PIDG (Pre- Insulated Diamond Grip), PLASTI-GRIP , SOLISTRAND**



TE Connectivity's PIDG terminals are designed to have a high reliability even in the toughest conditions. They consist of a tinned copper or tinned phosphor bronze

body for spring spades, plus a copper and colored insulation sleeve fitted over a terminal barrel. Millions of AMP terminals & splices that are installed and connected for more than 20 years are the reward for rigorous testing in the research phase. PIDG can handle 300V.

Pre-insulated PLASTI-GRIP solderless terminals and splices are designed specifically to answer the need for inexpensive insulated electrical terminations. They can be used in almost every type of commercial applications. They have a good conductivity, high tensile strength and high resistance to corrosion. PLASTI-GRIP can handle 600V.

SOLISTRAND terminals and splices are specially designed for terminate solid, stranded, irregularly shaped conductors and any combinations of these. SOLISTRAND terminals are corrosion- and vibration resistant, resilience and tensile strength are the best on the market assuring customer's success. Products can withstand 170°C maximum and therefore

are suitable for all standard applications. And for all the selected items, we offer the original TE crimping tools, which guarantee the perfect crimp on terminals.



#### Features

- terminals are made of high-quality copper
- the body has serrations for maximum contact and tensile strength
- specific tooling dedicated for different volumes and / or circumstances is available
- insulation sleeves and the corresponding tooling are color-coded by wire-size for easier identification

Order no.	Type	Description	Guide price
84141	31890	Ring Tongue Terminal M4 AWG16-22 red	3,89 €
126236	34160	Terminal copper insulated AWG 16-14, blue	4,12 €
137712	34108	Ring Terminal M4 0,3-1,5mm <sup>2</sup> Cu/Sn	10,66 €

# Robust and reliable AC/DC converters for DIN rail from TRACO POWER

This new generation of DIN-rail power supplies combines most efficient circuit topology with optimized cost/performance ratio for industrial environments and for electric control cabinets.

The design is focused on the improvement of parameters and functions to provide highest reliability in a general range of applications. With a very high efficiency of up to 94.5%, this series is in the vanguard of industrial DIN-rail power supplies concerning reduced power loss. The high efficiency results in a low heat dissipation, which enables a reliable full load operation in the temperature range of -25 to +60°C without forced air cooling. The units are even certified for up to 70°C

with 20% output power de-rating. Over a period of minimum 4 seconds they can operate with a boost power of 150%. If boost time is exceeded, the units will switch off and automatically restart after about 10 seconds. The boost power facilitates the activation of stepper motors, solenoids or actuators. For such applications, the units also provide a true power back immunity and output over-voltage protection.

EMC Immunity is very high and satisfies

the standards for industrial applications (EN61000-6-2), meets emission standards for residential and commercial applications (EN61000-6-3). Furthermore, the outputs are radio-interference-suppressed, which impedes radiation at long output lines (antennas). This filter reduces the common mode current to the limits for telecommunication ports. The units operate with a high power factor of up to 99% by active power factor correction, which also keeps the input inrush current low.

The TIB series are available with a nominal power of 80, 120, 240 or 480 Watt (+50% boost power). The output voltage is adjustable from 23.5 to 28 VDC.



## Features

- very high efficiency, low heat dissipation • overboost mode, up to 150% of nominal power • very low EMI/EMC • Active PFC

Order no.	Type	Description	Guide price
231738	TIB120-124	AC/DC DIN Rail Power Supply 120W 23,5...28V/5A	93,90 €
231740	TIB480-124	AC/DC DIN Rail Power Supply 480W 23,5...28V/20A	174,00 €

# 4Duino – ready-to-use Arduino module with a display

4Duino is the right choice for the development of Arduino-based device with minimum hardware development effort.

Arduino – one of the most wide-spread platforms, ideal for starting with programming and IoT applications.

The 4Duino-24 from 4D Systems is the display module compatible with built-in 2.4" 240x320 resolution TFT LCD Display with Resistive Touch, and Wi-Fi capabilities, perfect for IoT (Internet of Things) Applications.

ATmega32U4 8-bit micro controller from Atmel is at the heart of 4Duino-24. The

same microcontroller is found on popular Arduino Leonardo. It is powered by the well-known feature-rich 4D Systems Picaso Graphics Processor. 4Duino-24 features the popular ESP8266 Wi-Fi module, enabling the 4Duino-24 to have many Wi-Fi capabilities right out of the box.

The 4Duino-24 also features an on-board microSD connector and headers in the layout of an Arduino, including

## Features

- Arduino compatible module with 2.4" display • powered by Picaso graphic processor and ATmega32U4 • on board ESP8266 WiFi module • onboard USB programming via Arduino IDE or 4D Workshop4 IDE easy usage of graphics (basic, extended and Visi Genie) • uSD card slot

Order no.	Type	Description	Guide price
226114	4Duino-24	Arduino 2.4" IDE Programmable Display Module RTP + WiFi	80,00 €



power pins (5V, 3.3V, GND and VIN), 20 digital IO pins, of which 7 can be used as PWM outputs and 12 pins have Analog input capabilities.

The Workshop4 IDE has new functionality added, and is now able to program the on board Atmel processor using the popular Arduino programming language, just like the popular Arduino IDE but with the added dimension of graphics – thanks to the 4D Systems Picaso GPU.





We can 100% feel your hard work. However we think that when working really hard, you shouldn't forget that we're only people with emotions and we want to have a good mood. Good mood makes the work way better. Articles in this column are about real components but they are written differently, in funnier way. And so, let's not forget: The more we smile, the nicer our lives will be.

## Industrial Ethernet plug-and-work



**Do you know the difference between son screaming at home at his father about Internet connection problem and father screaming in factory at his technological network administrator about industrial Ethernet connection problem?**

About 60 000 €. Maybe less. But maybe even more.  
(We calculate damages and lost profits)

And what needs to be done so that they don't scream?  
We let the son scream. He at least trains his vocal cords and communicates with parents.

But the advice we have for the father is to use industrial Ethernet devices from Hirschmann. For the beginning, for example unmanaged switches from Spider family. And why these?

1. Because of their robust design that guarantees maximum reliability and thus ensures smooth production processes
2. Because they are easy to work with - plug-and-work – it doesn't require IT skills, LEDs indicate the device status - for visualization check and IndustrialHiVision software is also available.
3. Because they are economically advantageous

The Spider family from Hirschmann includes more than 25 devices. Now we are bringing two simplest entry-level models to your attention:

**Spider 5TX** – 5 port 10/100BASE-TX

**Spider 8TX** – 8 port 10/100BASE-TX



### Features:

- 10/100BASE-TX, max TP cable length – 100m
- Power Supply 24VDC/max. 130mA
- DIN Rail mounting
- Operating Temperature Range from 0°C to +60°C
- Protection Class IP30



## Manually or lying down



**Yes, these are your options when you want to set time relay of 12.51 series from Finder producer.**

Italian producer accommodated less active installers that can now set, resp. program time relay also lying down. Of course, something for something – you need to have a computer but luckily it is something that almost any installer has in his pocket – a smartphone supporting NFC. So, how does it work and what needs to be done:

- Select the appropriate moment – it can be even in the middle of the night
- Choose a comfortable bed – empty one would be the best, so you don't get distracted by anything
- Put on a comfy clothes – even dungarees, but in that case we suggest covering the bed with polythene
- For the first time, you need to be able to connect to wi-fi from the bed so you can easily download free app FINDER Toolbox from the GooglePlay.

Lay comfortably down – the most well-known and used positions are these four:

- on the back
- on the belly
- on the side version L (on the left)
- on the side version R (on the right)

In case of using a polythene, you can use all four positions also with legs on the pillow

- The work itself is just a “game on the phone”
- Start the game FinderToolbox. Set when and for how long you want that thing to be on and save the settings.
- The most difficult phase of programming is about to get started. Get off the bed, come to the time relay and touch the actual time relay with your smartphone – that's when the settings will be transferred to relay

Time relay 12.51 looks like an ordinary time relay on a DIN rail with big nice display backlight – blue signs on white background that effectively shows the necessary information.

Relay also allows programming with joystick (thus manually). This mode is for those who cannot relax while working.

I've recently noticed in one electro shop that they offered also portable folding chairs!!! What is the logic behind this? It beggars belief.

### Main features:

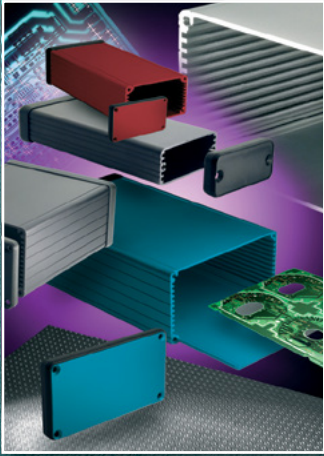
- It is programmed in two modes – daily or weekly
- It is programmed either in a “classic” way – manually, or “smart” way – using the wireless NFC technology (lying down)
- The shortest interval of connection is for 30 minutes
- Break make contact can withstand the contact of 16A (when connected, it is even 120A for 5ms)
- Maximum switching voltage 400VAC (nominal 250VAC)
- Maximum switching capacity 4000VA / 2000W
- Settings backed up by battery, battery life up to 6 years
- Free application FinderToolbox – it allows you to set the relay but also read current settings – edit and upload new settings







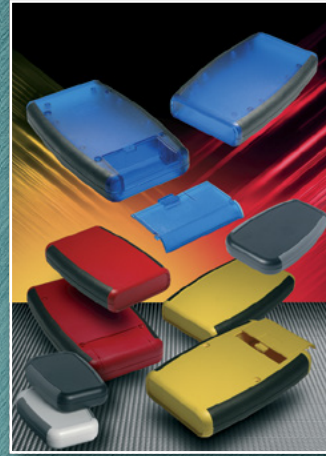
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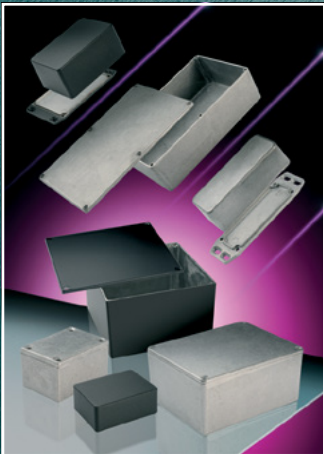
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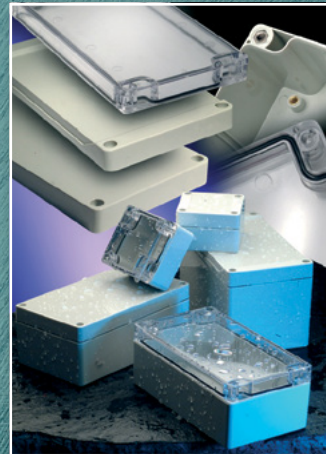
1553 watertight



1550 / 1590



1550Z / 1590Z IP66



1554 / 1555 IP66



1590 TRP-STP



1591 / 1591XX



1593 Pi and Arduino



1599 Tablet and 1553T



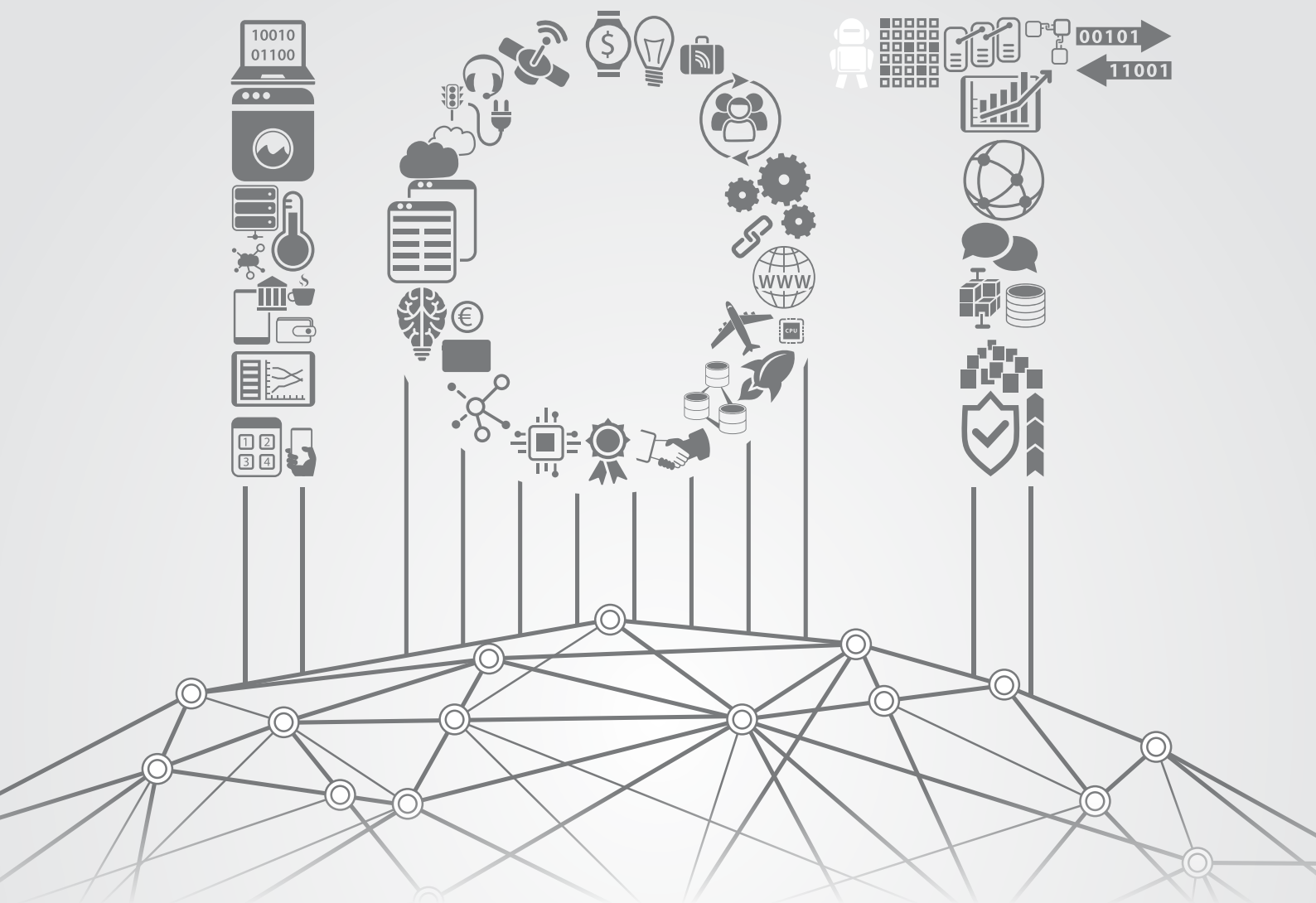
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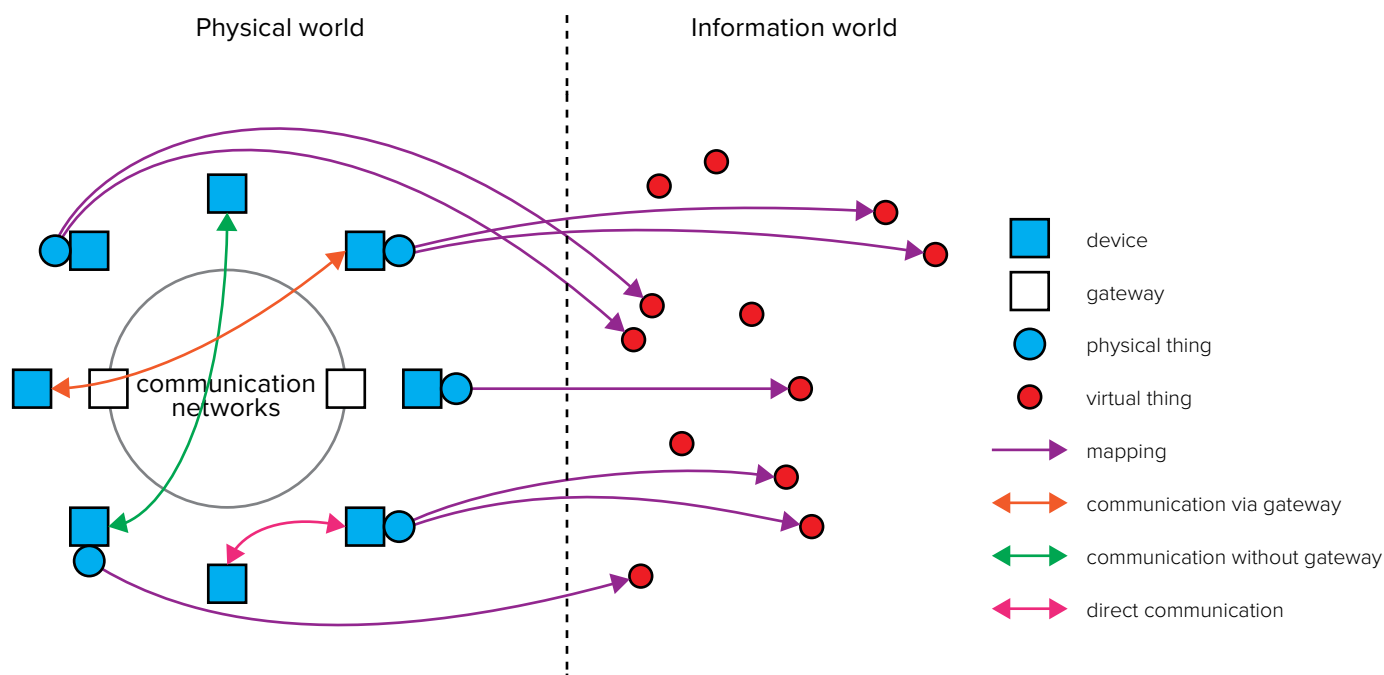




# IoT - Internet of things

Everyone talks about IoT, SOS electronic has been doing it for 10 years

*The term "internet" does not need to be explained to anyone today. Even a child is already able to use modern equipment connected to the Internet very intuitively. However, the term "Internet of Things" appears more and more often. So what actually is the "Internet of Things"?*



IoT scheme.

**The term “Internet of Things” (IoT) has been already used for some time and has appeared for the first time at the turn of the millennium. This is a mutual, mostly wireless, connection to more devices that communicate with each other via Internet or their own network. The device must communicate with other devices and be capable of capturing, collecting data, controlling or processing the data. So, we can briefly say that it is a network of sensors, actuators and control systems that are interconnected to achieve greater efficiency, safety or comfort compared to the state before deploying them.**

### What are the wireless data transmission options in IoT?

Communication is through devices or gateways. The most used solution is gateway communication. They can communicate often through multiple interfaces. There is a large selection of technologies for wireless communication. An important parameter for choice is bandwidth, data transfer speed, processing demand, energy consumption, and security. In today's wireless technology, the following are mainly used:

- **GSM** (Telemetry, SMART City, remote control, data collection of medium quantity)
- **LTE** (Telemetry, SMART City, remote control, data collection of higher quantity)
- **Bluetooth** (Home Automation - SMART Home)
- **Wifi** (Home Automation - SMART Home)
- **Lora / LoRaWAN** (Telemetry, Energy Meters, Sensor Data Transmission, SMART City)
- **Sigfox** (Telemetry, Energy Meters, Sensor Data Transmission)

### 2G (GSM & GPRS) / 3G

GSM technology is referred as the second-generation wireless telephone technology. In short as 2G. It is digi-

tal and serves for the transmission of voice data and sms. It uses 900MHz and 1800MHz radio frequency band for data transmission. Kind of extension of 2G network is GPRS, also referred to as 2.5, which also offers the ability to transfer data based on IP and WAP protocols. However, the transmission speed is relatively low (about 20kbps). 3G is the 3rd generation of mobile technologies. The task is to transfer both voice and data (emails, messages). 3G mobile technologies work in the 2.1 GHz radio frequency band and allow the use of more services as fast transmission using the 3G HSDPA (High Speed Download PACKET Access), the theoretical maximum of which is 14.4 Mbit / s.

**Advantages:** high coverage, large number of operators, low cost of data transfer, roaming data transfer free of charge within the EU, reliable technology.

**Disadvantages:** High energy consumption, low transmission speed, more demanding communication with modules.

**Producers:** Quectel

**QUECTEL**

## 4G (LTE)

Today it is the latest technology for mobile networks. This is the technology of the fourth generation of mobile technologies, which we also call LTE (Long Term Evolution). It is designed for high-speed internet on mobile networks. It's up to 10 times faster than the 2G and 3G networks. Frequency band for Europe is 700-2600Mhz with a transmission speed of 70-250Mbps.

**Advantages:** high transmission speed, fast network building and deployment, roaming data transfer free of charge within the EU, reliable technology, perspective frequency band.

**Disadvantages:** high energy consumption, so far higher price of modules.

**Producers:** Quectel



## Bluetooth

Bluetooth technology is designed for wireless communication of multiple short-range electronic devices. Since 1994, this technology has evolved and currently uses version 4. 2. It operates in the frequency band from 2,402GHz to 2,483GHz. This version enables access of Smart Devices to the Internet without the need for additional equipment. The highest transfer speed is 24Mbps.

At the beginning of 2017, the Bluetooth 5 version was launched, declaring several times higher transmission speed and range.

**Advantages:** Lower consumption, ability to communicate directly with smartphones, advanced technology.

**Disadvantages:** short range, paid license, use of overloaded 2.4Ghz frequency band, incompatibility of versions.

**Producers:** Fujitsu, Rayson




## WiFi

WiFi Technology (Wireless Fidelity) is a wireless technology that uses radio waves in WLANs to transfer. It uses a bandwidth of 2.4 and 5 GHz for transmission with a transmission speed up to 150Mbps. At present, WiFi is the most widely used wireless data transfer technology. The basic element of the network is so-called an access point or hotspot that sends a signal that the computer is capable of recognizing and processing.

**Advantages:** high transmission speed, advanced technology, high security.

**Disadvantages:** high energy consumption, point-point topology.

**Producers:** Lantronix, Wiznet, Espressif





## LoRa

LoRa is a very reliable wireless technology that serves to transfer a small amount of data over a long distance. The basic element of this technology is the modulation of spectrum spread, making LoRa resistant to interference. Another advantage of this technology is two-way communication and especially low energy consumption. The base device (base) is capable of covering in a short time a large area. The range transmission depends on the barriers in the territory such as settlement of the territory or its landscape. For data transmission in Europe is used 868Mhz frequency band.

**Advantages:** low power consumption, long range, high resistance to interference.

**Disadvantages:** low transmission speed.

**Producers:** IMST, HopeRF




## LoRaWAN

LoRaWAN specifies the Low Power Wide Area Network (LPWAN) communication protocol and network architecture for the IoT system. It provides device-gateway-server system of communication. The gateway communicates with the server via a standard IP connection and end device uses single-hop wireless communication with gateway. End-device communication is usually bi-directional. Mostly the star architecture is used because longer battery life. Extending the life of the battery and end device, as well as maximizing total network capacity is secured by network server that manages data transfer and an RF channel separately for each end device via Adaptive Data Rate Scheme (ADR). The frequency band 868 MHz is used for transmission and the data speed is in range 0.25 kb / s to 50 kb / s.

Since data security is also important, several data encryption is standard - network and application security, and security on the device. The endpoint has assigned unique 64-bit identifier and two 128-bit keys that are encrypted by AES.

**Advantages:** low consumption, long range, worldwide standard, existence of public operators.

**Disadvantages:** charging data transfer to operators, complicated parameter settings.

**Producers:** IMST





**SigFox**

SigFox is a technology for wireless transmission of low amount of data. IoT devices can communicate over relatively large distances (up to 50km in terrain and 10km in built-up area). Data transfer is reliable and secure. The encoding is implemented on the application layer using AES128 and 16-bit authentication. IoT devices using this technology are typically characterized by low power consumption, so the battery can last for more than 10 years. Sigfox is highly resistant to interference. For data transfer is used 868Mhz frequency band at a speed of 100bps. The signal is sent by the device and all the base stations around can receive signal, decode it and then send it to the server. The data is then sent to the application. The message is authenticated using the unique private key assigned to that device.

**Advantages:** low power consumption, long range, high coverage, roaming data transfer without extra charges.

**Disadvantages:** charge for data transfer by operator, one way communication.

**Producers:** Radiocraft



**NB-IoT**

NarrowBand IoT (NB-IoT) is a new technology that uses the LPWAN network. It allows you to connect a large number of devices through already existing frequencies. Transmission speed is 250kbps. Not yet in operation. It should be launched during 2018-2019.

**Advantages:** Low consumption, roaming data transfer without extra charges, fast networking.

**Disadvantages:** new technology.

**Producers:** Quectel



Wifi and Bluetooth (Local Area Network) technologies are highly advanced protocols that are mostly used to communicate with personal devices. 2G / 3G / 4G (Cellular Network) are mobile technologies that are suitable for the high throughput of a large number of access devices with the need for an energy source. The best features for creating a connection are Lora, LoraWan and Sigfox. They are designed to send small amount of data over large distances in a variety of environments.

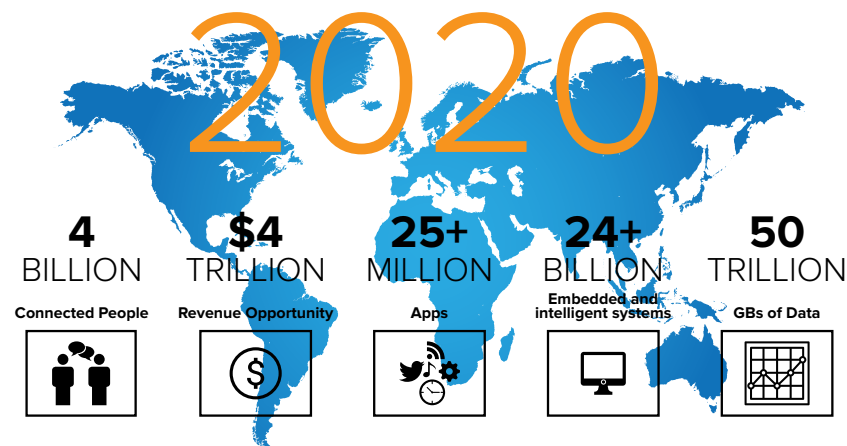
**What will IOT bring us?**

IoT will hit many areas of everyday life, such as intelligent households, public lighting, but will mainly be in the field of electrotechnics, healthcare or the automotive industry. According to recent surveys it is estimated that by 2020 more than 30 billion devices will be involved in the IoT network. What is already anticipated is that IPv6 will be used instead of the current IPv4. Despite the fact that the Internet of Things has occurred to be more than two years ago, SOS electronic has been cooperating with leading producers of wireless technologies such as Lantronix, Wiznet, Quectel, Fujitsu and many more for almost decade. The full range of IoT products can be found at: [www.soselectronic.com/communication-modules](http://www.soselectronic.com/communication-modules).



Technology	Frequency band	Bandwidth	Transmission speed	Maximum range	Standard
Bluetooth	2,4GHz	1MHz	around 1 Mbps	10-100m	proprietary
Wifi	2,4GHz, 5GHz	40MHz	54 Mbps	10-100m	IEEE 802.11
GSM/GPRS (2G)	900/1800MHz	200kHz	172 kbps	10-15km	ETSI
3G	900-2100MHz	5MHz	384 kbps	5-10km	3GPP
LTE (4G)	450-2600MHz	1,4MHz	0,2-1 Mb/s	5-11km	3GPP
LoRa	pod 1 GHz	125/250kHz	0,25-50kb/s	5-15km	LoRa Alliance
LoRaWAN	pod 1 GHz	125/250kHz	0,25-50kb/s	5-15km	LoRa Alliance
Sigfox	pod 1 GHz	100Hz	100b/s	10-50km	proprietary
NB-IoT	800MHz	200kHz	20-200kb/s	5-15km	3GPP

Comparison table.



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