

PIZZA page 5 workshop

Learn about components more practically

NEW loyalty program PREMIUM
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Quectel M95 page 7
SMS, voice, data and a simple usage

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panel feed through terminals in various sizes

Bolymin BEGV page 16
sufficient power to control your applications

The trend to shrink isolated DC/DC-converters may lead to thermal issues as the high power loss creates a challenge for dissipating heat and maintaining maximum component life.

TRACOPOWER offers miniaturized, isolated DC/DC-converters implementing new design technology with increased efficiency, optimized thermal management and the highest grade components to insure superior reliability for industrial and high performance applications.

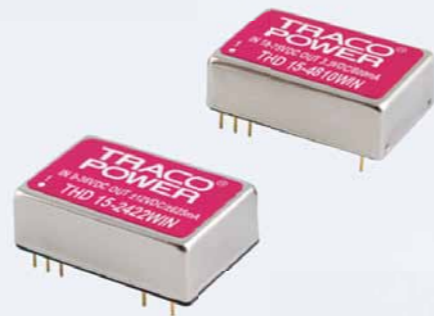
High Power Density DC/DC-Converters

- Single and dual output models
- Internal input Filter to meet EN55022 class A (THD-Series)
- Remote On/Off function
- I/O-isolation voltage 1500 VDC
- No minimum load required
- High efficiency of about 90 %
- Operation temperature up to 85 °C
- Approvals according IEC/UL60950-1

DIP-24 Package up to 15 Watt
 THD-15N Series 2:1 input voltage range
 THD-15WIN Series 4:1 input voltage range

1" x 1" Package up to 20 Watt
 THN-20 Series 2:1 input voltage range
 THN-20WI Series 4:1 input voltage range

2" x 1" Package up to 50 Watt
 TEN-40WIN Series 40 Watt, 4:1 input voltage range
 TEN-50 Series 50 Watt, 2:1 input voltage range



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Dear friends,

I got news from Yageo company, manufacturer of resistor represented by us. The news was: „It was introduced chip resistor 03015M. Samples are ready. „What is it? The answer is amazing. The size of the chip is 0.3 x 0.15mm! Even many of us thought that the passives with the size of 01005 end up miniaturization process. A few days later I read another article where Rohm has announced it is working on version 0201, 0.2mm x 0.1mm... Another report says that the emitting diodes were put to mass production and supply of single non-packaged chip types. Why? Of course, because they are dimensionally smaller than standard.

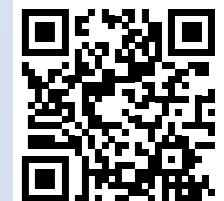
I remember that time, even as a developer, at my favorite timer 555. I knew its features and scheme by heart. Today, modern young developer does not even know it. He goes after the module, or a complex microcontroller with which it manages, through it or other one complex module communicate, find something ready for supplying and indication or switching. Well and what about those impulses? Of course it is generated by software. Maybe you're also asking similar questions with such thoughts. How is actually going to be the further development of electronics? Where will the miniaturization end up? With what technology parts will developers or distributor work in 1,2,5, 10 years? The answers to these question are related to all of us.

We are with you every day in a very close contact, so together with my colleagues we feel under what pressures you are lately - customers, developers to complete development as quickly as possible. I remember the time „last century" when me as a developer, I had one year to develop a board with an 8080 processor and additional peripherals... On the other hand, yesterday I was talking with customers - developers, who in the course of 3 days developed a fully graphical display with electronics module using the 4D Systems displays. That was the assignment that was given because the customer wanted to upgrade his equipment and he mastered it. Shortening of the life cycle of electronics automatically pushes to the shortening the development cycle. What does it mean for us? Specifically, increasing supply of complex modules, development kits is every year disproportionately larger than the standard components. This is obviously linked to the kind of complex, sophisticated delivery. We do not offer only goods, but also development kits, drivers, software versions, interfaces, buses, records of supplies, technical support, co-operation with producers. We see every day increasing number of questions and requests for our group of engineers who solve them for you with our suppliers. We have to adapt too.

In this spirit, we in our company access to the range selection, storage, marketing. As part of our new quote, which thought up our Romanian colleague, „SOS means Supplier Of Solutions,, we concentrate more strongly on selected brands, which cover common needs and trends in the development of electronics today. Thus, we have for you (almost) ready-made solutions to the above-mentioned power supply, control, indication, switching, communication, measurement, sensing physical parameters... and of course to have had development resources, technical support, samples. We continuously learn new interesting concepts such as „Energy harvesting, Smart Metering „ in terms of importance, but mainly from the terms of content and components. The reflection of this process are the specific steps within the company, but which are closely related to you. Prepare a new catalog, which after 10 previous editions of the content will look completely otherwise, in line with our strategy. There will not be in the first place to offer thousands of components, but we will offer solutions in it. Most of you have been looking on the web for components. We are changing some of the website - you can read about it in this issue of SOS news. We have you our customers stronger sorted according to your position in companies, needs and business applications to reach out you more in what you are interested in. We strengthened our engineering team - by the way each of them current or former developer - and with them working with producers. The symbol of it is called Pizzaworkshop, which was first time implemented with great success in Prague and Budapest and with which we continued from fall (once again apologize to all of you who were not there due to limited number). Let me invite you over the next few pages into our kitchen to show several news and interests. I believe that the trend of „SOS" will also be seen in reading, leafing through pages of our other SOS news. We want to be guarantee for you as a distributor and deliver positive surprises as technicians.

Ing. Jan Sesztak
 CEO of SOS electronic europe Group

Read your SOS news with phone
 This SOS news issue can be read through technological innovations - via QR codes.
 Each article contains a picture in which is encrypted web site address to this article.



- **Germany:** SOS electronic GmbH, Perchaer Weg 5, 82335 Berg, tel.: +49 8151 971 9380, fax: +49 8151 74 48 26, www.soselectronic.de
- **Poland:** SOS electronic, ul. Tatarkiewiczza 17, 92-753 Łódź, tel.: +48 42 648 45 76, fax: +48 42 648 45 76, www.soselectronic.pl
- **Romania:** SOS electronic, str. Icoanei nr. 84, bloc A, 020459 București, tel.: + 40 311 020 475, fax: +40 311 020 476, www.soselectronic.ro
- **Slovak Republic:** SOS electronic, s.r.o., Pri prachárni 16, 040 11 Košice, tel.: 055/786 04 15, fax: 055/786 04 45, www.soselectronic.sk.
- **Czech Republic:** SOS electronic, s.r.o., Hybešova 42, 602 00 Brno, tel.: 543 42 71 11, fax: 543 42 71 10, www.soselectronic.cz.
- **Hungary:** SOS electronic Kft., József Attila út 74. 3527 Miskolc, tel.: +36/46/501-380, fax: +36/46/501-389, www.soselectronic.hu.

We strengthen our team

Sárkány László - Sales manager



During my studies I focused on field of electronics and telecommunications. Later I work with industrial automation and manufacturing electronics. I became part of SOS electronic team as Sales manager in Hungary. Besides Hungarian I fluently speak three other languages - English, Swedish, Romanian. My hobbies include computer systems, robotics and electronic. In my free time I like to do sports, mainly basketball, cycling and running.

Timea Kuzmová - Database assistant



I graduated from High school in Filakovo focusing on information technology, and therefore I am glad that I work in a company with a technical focus. I worked at the logistic and expediture department and now spend most of time working on the marketing department as a database assistant for product managers. But I still spent some working time on expediture department. Since September I continue external study. In my free time I like reading and go hiking.

Katarína Rusinová - Sales agent



After studying at PHF EU in Kosice, I worked in Bratislava, where I was at the Headquarters of the Slovak Red Cross, provided the support for generous donors of blood. In 2004 I fulfilled a dream to see England, where I lived and worked three years as an interpreter. After returning, I worked five years in Vranov as a senior sales manager. Thanks to my mother, who is Romanian, I have the opportunity to communicate in her native language. In my free time I like reading, sewing for fun, I love flowers and working in the garden and also like to travel and learn about culture of other countries.

Katarína Gregorová - Accountant



After successfully graduating the high school focusing on mathematics and computer science, I decided to study the management of public administration at the University of P. J. Safarik in Kosice. In the summer I had exams in accounting, management and law. But the best school is opportunity to work on the economic department, where I am responsible for billing of invoices, insurance, asset management, payments and many other things. With this company I have literally grown up. Since fifteen years, I was helping out at the economic department, marketing, reception, purchasing.

Paulo Soares - Sales manager



I reinforced the SOS electronic team from the 1st July 2012 as Sales Manager for Germany and Austria. I came from a worldwide operating distributor of electronic components where I was responsible during the last 4 - 5 years for the Key customers (all EMS company) in South Germany. I have 12 years of sales experience in the electronic branch as a specialist in the field of radio and TV.

Eva Bobaková - Purchasing assistant



I come from Presov, where I studied and where I live at the moment. After graduating from the University of Presov, Faculty of Management, I worked as a sales assistant where I was responsible for customers mainly from Slovenia, Greece, Romania, Hungary and France. Electronics industry is very interesting and rapidly growing, so I am glad to continue work in this field. Currently I am working on the purchasing department as a purchaser. I speak fluently English. In my free time I like reading, doing sports or watching good movie.

LEARN MORE ABOUT COMPONENTS PRACTICALLY DURING PIZZA WORKSHOPS



Developers look-out! Do not try work out with the applications yourselves. Let's try programming and designing applications for modules, led directly by specialists from manufacturers.

According to the concept of „SOS = Supplier of Solutions” we will supply not only components but also added value in terms of practical technical training. From June 2012 we run regular training series called „Pizza Workshop”.

What is Pizza Workshop?

Pizza workshop is thematically focused training, where you can learn more about the practical properties of the different components and modules and get information directly from manufacturers. Learn the best practical use and try it right during the workshop yourselves on the particular modules.

Why Pizza Workshop?

The simple reason. We want you to feel comfortable, as a developer :) And so, these workshops will be held in the sign of comfort and a relaxed informal atmosphere. Casual dress, open discussion, rather than a formal lunch simply pizza and soft drinks ...

What to do to be a part of Pizza workshop?

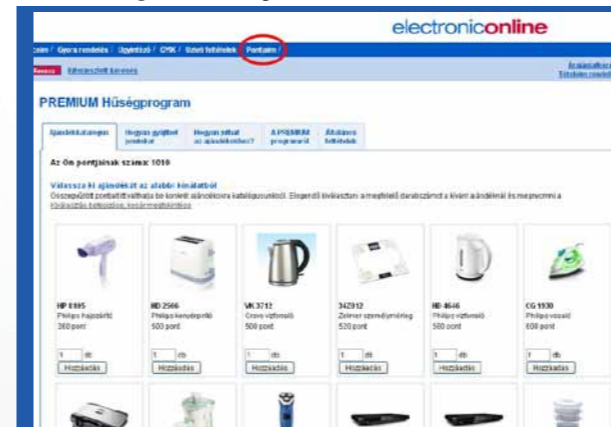
Just sign up via the online form. The exact schedule of workshops with detailed information can be found up to date at: www.soselectronic.com/pizzaworkshop.

The article with more information can be found at our website. Decode the link by QR code.



Get more in our new loyalty program PREMIUM!

Our company continues to grow thanks to you and your trust. We handle it and so we want say a big “thank you” in the form of a new program PREMIUM.



PREMIUM is a new loyalty program that automatically rewards your trust, you give us. It builds on the previous loyalty program, we've improved it to be even closer to you.

PREMIUM is one of the simplest loyalty programs on the market. You need no club cards, no promo codes, it does not require your effort in addition because it works automatically. You only need to use our Onlineshop and about everything else will take care PREMIUM itself.

So feel free to collect points. Duration of the program PREMIUM is not limited in time.

More about program PREMIUM at: www.soselectronic.de/premium
www.soselectronic.pl/premium
www.soselectronic.ro/premium

Improved page design with goods details

You may have already noticed that we changed our design of the goods details on our webpage. We tried to unify the site to make information easily available. We have therefore devised a tab system where you can find more information. The most important information is the most visible - except the photos there are also more about stock availability and price. They are shown on the right and highlight by colors as well as font size.

Tabs are underneath them. The quantity of tabs can be different - it depends on amount of product. Ideally, there are the following tabs:

- detail of goods
- technical specifications
- related goods / accessories
- alternatives
- articles about products

We are about to expand the number of pictures and PDF files, which are related to the product. We believe that this change will help you to decide about the right components for your applications.





Custom-fit coat – enclosures HAMMOND 1553 will fit into hand

We know that an enclosure for portable handheld devices must meet many requirements, like ergonomic design, sufficient protection, durability and a reliable grip. And last but not least - the enclosure should have dimensions appropriate to dimensions of a device. That's why we bring you new HAMMOND 1553A and 1553AA enclosures.

Advantages / Features:

1. ergonomic enclosures for hand held devices
2. over moulded soft sides for a reliable grip in a RAL 7012 grey colour
3. recessed top cover allowing to use a membrane keypad
4. made of ABS, RAL 7035 light grey or RAL 9011 black
5. PCB standoffs inside the enclosure

New soft-sided hand held enclosures belong to the 1553 series family. With dimensions 75x50x17mm (LxWxH) and 100x61x17 respectively, they are perfectly suitable for small portable devices. They have all convenient features of 1553 series – ergonomic design, a curved shape that fits comfortably into the hand and over-moulded soft side grips. The top cover is recessed to allow a membrane keypad to be flush mounted and PCB standoffs are moulded into the base. Enclosures are made of ABS and are available in light grey or black colour, both colours with grey sides. Manufacturer offers also modification and silk screening according to users' requirements.

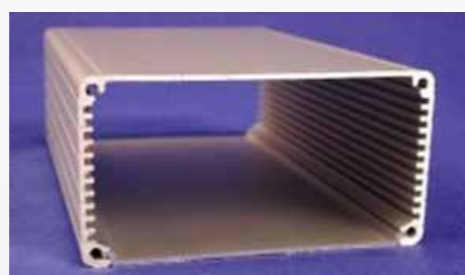


The article with more information can be found at our website. Decode the link by QR code.



Hammond 1455 – rugged aluminium enclosures for PCB

Rugged body from extruded aluminium enclosures with metal or plastic end panels. P.C. boards are mounted horizontally by sliding into internal slots extruded into the enclosure body.



Advantages / Features:

1. suitable for PCBs
2. internal slots for sliding PCB
3. rugged body constructed from extruded aluminum with a minimum thickness of .06" (1.5 mm)
4. clear or black colour
5. plastic or aluminium front panel with plastic frame

The article with more information can be found at our website. Decode the link by QR code.

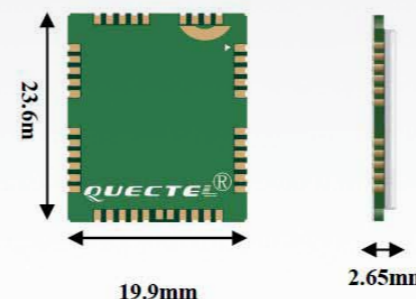


Order no.	Type	Description	Guide price
58253	1455K1201	AL enclosure with metal ends 120x78x43mm	13,40 €
54706	1455N1601	AL enclosure with metal ends 160x103x53mm	16,10 €
101619	1553AAGY	Enclosure ABS gray 75x50x17mm	5,50 €
80103	1553AGY	Enclosure ABS gray 100x61x17mm	6,00 €

Quectel M95 will provide you SMS, voice, data and a simple usage



Quectel launched on the market another quad-band GSM/GPRS module – M95. In an easily solderable LLC package offers M95 a reliable solution in a very compact size



Besides all features, which can be required from a modern GSM/GPRS module, provides M95 high performance at an extremely low power consumption. M95 has a built-in class AB audio amplifier, which further simplifies hardware design of a target device. The module is able to operate reliably at an extended temperature range from -40 to +85 °C. With embedded powerful internet service protocols, represents M95

a complete solution usable as an embedded module in many M2M applications. An advantage of the M95 module is also a very competitive price. For support of development is the M95 module also available on an adaptor board M95TE-A, which can be inserted into the development kit M10EVB-KIT.

Detailed information will provide you the M95 Hardware Design, M95 AT Commands set and the M95 datasheet. M95, as well as M95 on an adaptor board, are available from our stock. Guide price of the M95 module is 11-15 EUR. We'll let you know the exact price for your project upon request.

Advantages / Features:

1. high performance quad-band GSM/GPRS module
2. powerful internet services protocols, multiple sockets and IP addresses
3. extended temperature range -40 to +85 °C
4. low power consumption (0.9 mA @ DRX=5)
5. built-in class AB audio amplifier
6. easily solderable LLC package
7. dimensions only 19.9 x 23.6 x 2,65mm



Do you want to evaluate M95 module in your application?

Do you see a room for a mass usage of this module? We offer you a possibility to gain a development kit at convenient conditions.

Let us know at marketing@sosselectronic.com.

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
87750	M10EVB KIT	EVB KIT for M10, M12, M75 and M72 GSM module	31,30 €
119518	M95	Quad-Band GSM/GPRS SMT module, TCP/IP, 19.9x23.6x2.65mm	15,50 €
119519	M95TE-A	Dual-Band GSM/GPRS module on adaptor board	14,80 €

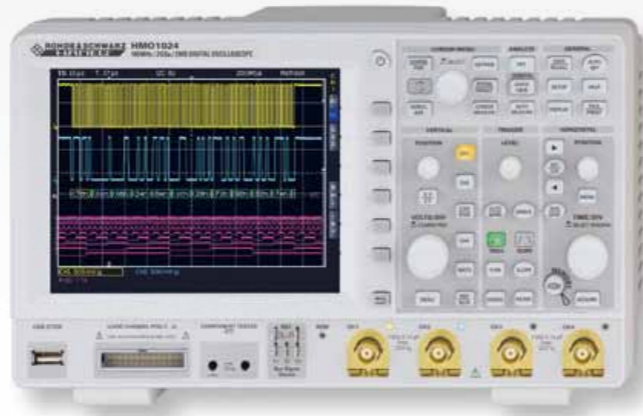
Did you notice the new Hameg / Rohde & Schwarz logo?



To increase awareness of HAMEG Instruments products, new instruments will carry a new dual logo.

Thanks to many satisfied customers, HAMEG Instruments achieved the double digit growth for the third consecutive year. The HAMEG portfolio is complementary to that of Rohde & Schwarz, and the R&S brand awareness outside of Europe is generally much higher than the HAMEG one. To be able to explore beyond the European market, where HAMEG attractive products are still under-represented today, HAMEG decided to use this new dual logo.

Hameg is also pleased to report, that their HMO1024 mixed-signal digital oscilloscope won the 1st place from readers of German magazine Elektronik, in the measuring and testing category.



The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
70856	HM 400	Oscilloscope analog 2-Channels 40MHz	660,00 €
103528	HMO 1024	Digital storage oscilloscope 4ch. 100MHz 2GSa/s 2MPts	1698,00 €
104754	HMO 1524	Digital storage oscilloscope 4ch. 150MHz 2GSa/s 2MPts	1980,00 €
103525	HMO 722	Digital storage oscilloscope 2ch. 70MHz 2GSa/s 2MPts	1 148,00 €

With the new UNI-T multimeter you can handle even SMT transistors



New UNI-T multimeter UT132D can serve you, besides usual measuring also for measuring of parameter, which usual multimeters don't handle – measuring of SMT transistors' Hfe.

Measuring of DC current gain of transistors we nowadays can find at many measuring device. However, much more rare is the possibility to measure this parameter even at SMT transistors, NPN and PNP types in a SOT-23 package. UNI-T UT132D is a quality measuring device with a well readable, sufficient

ly big display with a maximum value of 1999. With it you can measure all usual values and a capacity of condensators. A novelty is the included adapter for measuring of hfe of transistors, not only for classic with wire leads but also for SMT transistors. It enables to check the functionality and to roughly measure SMT transistors, what can be a big help at development or production of prototypes.



We offer you UNI-T multimeter UT 132D from our stock. Order number is 113033 and guide price is 13,90 EUR without VAT.

The article with more information can be found at our website. Decode the link by QR code. The article contains also related video.



Advantages / Features:

- compact universal multimeter
- hfe measuring also for smt SOT-23 transistors
- measuring of capacity
- test of diodes and acoustical continuity test
- data hold

SMT measuring tweezers again in stock



With multimeters VA 503 and VA 505B you don't have to catch the SMT components on the table anymore! Speed and comfort of measurement with these multimeters will probably amaze you.

Measuring of resistance, capacity, diode and conductivity test – those are the tasks, which SMT tweezers handle with easiness. Naturally, all this can be measured also with a usual multimeter, but with one condition – usually you'll need both hands for it and even so small SMT components have a tendency to jump out of measuring tips. At this process there is also an increased risk of damage to their sensitive soldering pads. VA 503 and VA 505B SMT measuring tweezers eliminate all these nuisances. You only need one hand for measuring and measuring tips are fixed against side shift, thus a measured component

practically cannot slip out of tweezers. From a user point of view, the main difference between VA 503 and VA 505B is, that the VA 505B can measure also in an automatic mode, when the device automatically chooses not only a measuring range but even recognizes a measured component type (R,C or Diode). VA 505B is also able to measure even very high capacitancies – up to 60mF (60 000uF). VA 503 has a maximum display value of 3999 and VA 505B – 5999. Measuring of diodes is at 1mA and a 2.8V open circuit voltage, what enables to measure also all kinds of usual LED diodes.

Advantages/Features:

- measuring of resistance and capacity
- measuring of capacity up to 60 000uF (VA 505B)
- measuring of diodes (@1ma)
- conductivity test (under 300hm)
- automatic component recognizing (VA 505B)
- manual and automatic range selection (VA 505B)
- 3999 / 5999 max. display value

Order no.	Type	Description	Guide price
59378	VA 503	PEN R/C/D meter for SMD	19,00 €
72150	VA 505B	PEN R/C/D Meter for SMD, Auto	31,00 €

The article with more information can be found at our website. Decode the link by QR code. The article contains also related video.



LT3799 – create a LED driver with an active PFC



Isolated offline-flyback controller LT3799 enables to create a powerful LED driver with a minimum of external components, which is moreover compatible with common triac dimmers.

At the design of a new LED driver, we usually have to consider more factors like for example an output current stability, shortcut or open LED protection, efficiency, safety (isolated secondary circuit form the primary one), power factor correction, EMI, number of external components and other.

LT3799 meets all these requirements and offers another benefits, like for example a possibility to use a smaller transformer thanks to the use of critical conductivity mode, powerful external MOSFET driver, internal LDO regulator and also a very good output current regulation – typically +/-5%, moreover with no opto-isolator. A big bonus is the active power factor correction, thanks to which it reaches typical values of 0,96 (at 230V AC), thus meeting the most stringent requirements in this field, as well as IEC 61000-3-2 class C about harmonic currents emission. Excellent power factor is reached just thanks to it, that LT3799 knows immediate input voltage value and based on this value, it sets the input current limit (in a given cycle of the SMPS), proportionally to the immediate value of the input AC voltage. LT3799 works like a current source in every period of

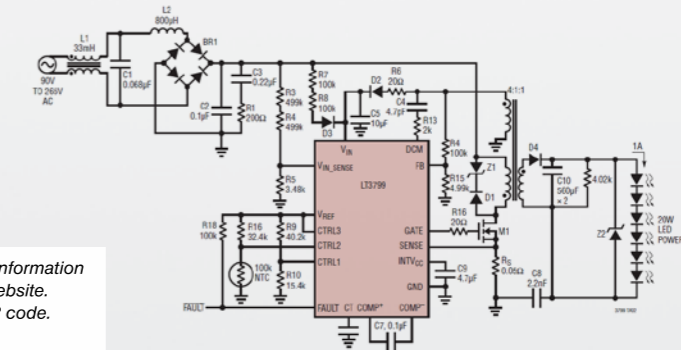
input voltage, that's why it is even possible to use classic triac regulators, which are often already a part of the buildings installation.

Advantages/Features:

- universal isolated offline flyback controller for LED drivers
- suitable for 4-100W+ power
- active power factor correction (PFC), 0.96/230V AC typically
- wide input voltage range, limited only by external components
- doesn't require an opto-isolator
- protection against open LED and shortcut



The article with more information can be found at our website. Decode the link by QR code.



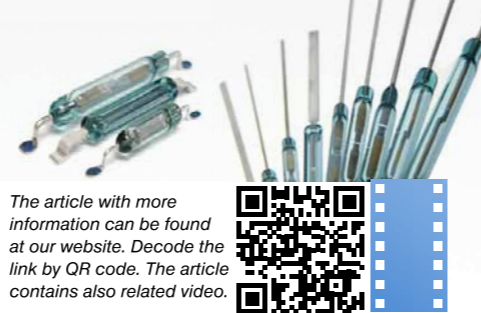
Wouldn't a reed switch suit to you?



Reed contacts feature many properties, by which they considerably outperforms standard switching technologies. Components from company Meder electronic belong to a top in this segment.

A reed switch operates on a principle of deformation of magnetically conductive blades in a magnetic field. It can be said, that the most of reed switches outstanding properties results from the fact, that the reeds themselves are small, light-weight and distant only few hundredth of millimeter (at small types). At the same time, they are hermetically sealed in a glass capsule in a vacuum, or more often - filled by an inert gas. Thanks to this construction, Meder electronic reed contacts (and on their basis produced reed relays and reed sensors) feature mainly these properties:

- ability to switch up to 10 000V (common types up to approx. 350V)
- ability to switch or carry extremely small signals (10nV)
- very short operating (switching) time (mS)
- very low parasitic capacitance, that's why they're able to transfer even HF signals up to 7 GHz with minimal signal loss
- long-term stable and low contact-on resistance (50 miliOhm)
- ability to work in an extreme temperature range (-55 to +200°C)
- reliable even in very demanding dusty, moisty or corrosive environment



Components with reed contacts can be divided to three basic groups - reed contacts, reed sensors and reed relays. Reed relays offer all above-mentioned features of reed contacts, thus being an ideal choice for example in a measurement equipment, HF/ audio/ video and other devices with small signals, at switching of high voltages and in many other applications. Small dimensions, very low power consumption of common relays (50-125 mW), extreme reliability and a relatively low price are another arguments for usage of components from company Meder electronic.

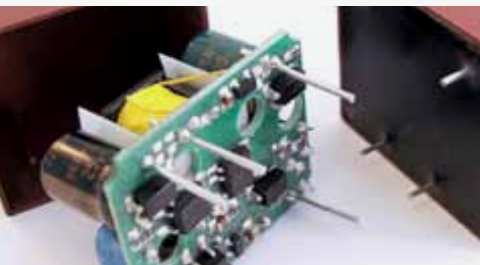
Order no.	Type	Description	Guide price
854	DIP 05-1A72-12L	Reed Relay DIP 5V 1A/200V 1a 500R	1,25 €
72039	KSK-1A52-2030	Reed Switch 1a 0,5A/250V 50W 21x2,75mm 2030	0,75 €
80103	LS02-1A66-PA-500W	Level Sensor 1a 0,5A/200V 10W vertically, oil,gasoline,brake fluid	6,60 €

Save energy and production costs with Myrra 47000 switch-mode



Series 47000, designed as a direct replacement of classic transformers brings more than you might expect.

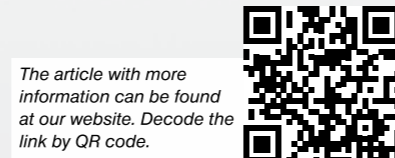
Myrra 47xxx SMPS overcome supersedes classic transformers by an overall efficiency, power as well as by a standby power consumption. With the same pinout as 1W EI30 transformers, it provides a 5W power, or up to 5,4W at some models. All this for the price comparable with a classic solution, but with smaller dimensions, without any additional components and without problems with cooling.



There are 4 main groups available:

- 2,5 and 5W with 1 regulated output, with 3,3 to 24V output voltage
- 3,2 and 5W (5,4W) with 1 non-regulated output, with 9 to 24V output voltage
- 3 to 5W with 2 regulated outputs with common "0" terminal
- 3 to 5W with 2 isolated outputs. Only output no.1 is regulated and from this output it's possible to take more power than from the output no. 2

47000 series power supplies feature a very low standby power consumption -only 200 mW or 300 mW respectively - at regulated types. With the 4000VAC isolation (input/output), they're ready for a class II - reinforced isolation . Operating ambient temperature is from -25°C to Ta, which can be found in a table at each type. To a simple usage also contributes a shortcut protection and a thermal shutdown with automatic recovery.



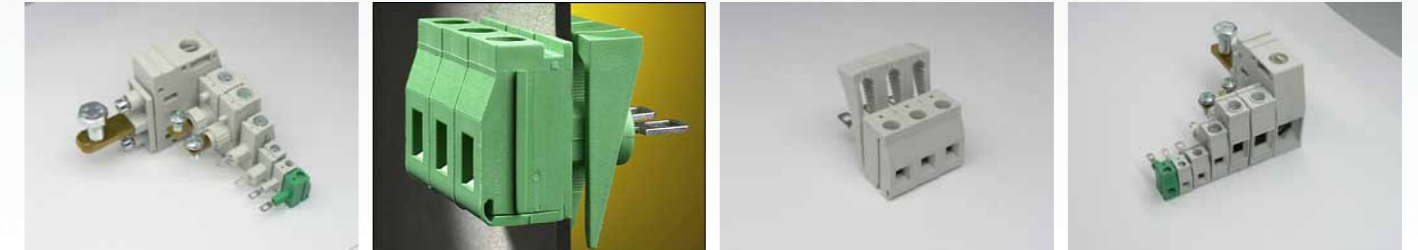
Order no.	Type	Description	Guide price
101291	47122 - 2,75W 5V	AC/DC module for DPS 85-265VAC/5,0VDC/550mA	5,80 €
101302	47246 - 4W 5+12V	AC/DC module for DPS 85-265VAC/5+12VDC/400+170mA	6,90 €

Panel feed-through terminals Euroclamp in sizes from XS to XXL

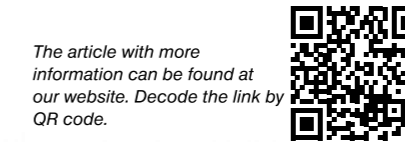


Panel feed-through terminal blocks Euroclamp MPT series enable to guide the desired signal through a housing panel. From a wide range of sizes, you can easily choose the right type for your application.

MPT series terminal blocks are universally usable, providing a possibility to connect a given device by solid or stranded wires. MPT are suitable for example as input and output terminals and in general everywhere, where it is desired to maintain a maximum connection flexibility of a device.



With a nominal voltage of 450-750V (depending on a type), they suit in all common applications. It is possible to compose terminal blocks of the same size into a row, thus creating a whole array of blocks with a big mechanical robustness and stability. Most of types are available with various rear terminals and also with various methods of mounting to a panel. A reliable mounting of terminal blocks is ensured by a retaining key (sold separately), nut or screws (included).



Advantages / Features:

1. universal panel feed-through terminal blocks
2. possibility to assemble them into rows
3. high current handling
4. for wires 2,5 - 50 mm²
5. more versions of terminals and

Order no.	Type	Description	Guide price
62999	MPT1612-GY	Panel terminal block 16mm2 P12,1 76A 1P -/M/L	0,82 €
57125	MPT275-GY	Panel terminal block 2,5mm2 P7,5 24A 1P -/M/L	0,25 €
57634	MPT410-GY	Panel terminal block 4mm2 P10 32A 1P -/M/L	0,25 €
63000	MPT610-GY	Panel terminal block 6mm2 P10 41A 1P -/M/L	0,50 €

Migrate to a new type of a SIM card connector Attend



New version of Attend connectors for SIM cards replaces the current one. To make it to you easier, we will keep in stock both types for some time.

It is the six-pin „push-push“ type 115A-ADA0-R02, which will replace the older almost identical type 115A-ADA0-R01. New type differs from the older one only in the width and a position of side mounting lugs, which are soldered on a PCB. Lugs of the new type are somewhat closer to the middle of the connector and they are narrower. The difference is probably best illustrated at the enclosed pictures. Both types also contain a switch for SIM card detection. Detailed information will provide you the 115A-ADA0-R02 and 115A-ADA0-R01 datasheets.

Advantages / Features:

1. 6-pole „push-push“ SIM card connector
2. SMD version
3. gold-plated SIM card contacts
4. convenient price
5. available directly from our stock



The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
81442	115A-ADA0-R02	SIM CARD HOLDER 6-PIN+2(Card Detect), Push-Push	11,30 €

Find out the modularity and variability of Phoenix enclosures



Phoenix DIN-rail enclosures meet the most stringent criteria and offer a wide variability of PCB placing.

Top quality is a main advantage of Phoenix Contact products. With over 80-year tradition and 11000 employees belongs Phoenix Contact among leading producers of electric contacts and industrial automation technologies. In a portfolio of Phoenix Contact products we can find products covering almost all industrial segments. Modular DIN rail enclosures have earned a big popularity. From many available types we added to our offer ME a BC series. They offer a very quick and simple assembly of devices into the

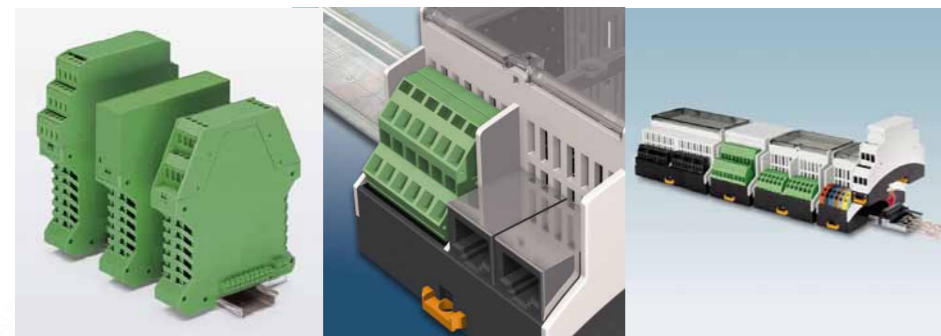
enclosure and a big variability. Both series can be equipped with a bus and connectors, what enables a simple interconnection of enclosures between each other, connection of power supply, data transmission etc. ME series enclosures are made of polyamide, BC series enclosures are made of polycarbonate and both materials meet UL 94-V0 – self-extinguishing.

The article with more information can be found at our website. Decode the link by QR code. The article contains also related video.



Advantages/ Features:

1. top quality
2. modularity and variability
3. possibility to use an interconnection bus
4. made of UL94-V0 class materials



Order no.	Type	Description	Guide price
115990	BC 35,6 UT HBUS BK	Housing Base DIN rail 35,6mm black	3,30 €
115991	BC 35,6 OT U11 KMGY	Upper part for housing BC35,6 depth 11mm, grey	2,40 €
115994	BC 35,6 DKL S TRANS	Transparent cover for housing BC35,6 grey	2,40 €



Create a relay interface module according to your needs

In our portfolio you can also find a DIN rail socket for the ultra slim relay Finder 34 series. It enables to use various relays thus to simply adapt an interface module to a given application.

From nowadays offer of relay interface modules, it is already no problem to choose a type meeting requirements of a given application. But if you need to change a configuration of a device, it is often convenient to change only a relay type. Series 93.01 socket enables this easily, because the protection and indication circuit is designed for a wider range of input voltages. This enables to use a 5V, 12V and 24V Finder relays 34.51 series. When using 93 series socket, it is even possible to use an AC voltage to supply a DC coil of a relay. Finder 34 series relays are ultra slim 6A relays with a sensitive DC coil. High 6kV isolation provides a safe disjunction of relay coil from contacts. Finder 34.x can be mounted directly to a PCB, via a PCB socket or to a DIN rail by means of the above mentioned socket.

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
53468	93.01.0.024	Screw terminal socket for relay F3451, 81	6,90€
51274	34.51.7.024.0010	Ultraslim PCB relay 24VDC 6A 1c 3350R	3,10€
47738	34.51.7.012.0010	Ultraslim PCB relay 12VDC 6A 1c 840R	3,00€

High quality for even better price



Fujitsu relays are known for their high reliability, excellent properties and a quality construction.

If you ever have saw opened a quality monitor, TV set, power source or other device using a relay, you could with a big likelihood find there a relay marked Fujitsu-Takamisawa. Fujitsu relays are a real synonym of reliability already for many decades. If you consider to use or you already have used Fujitsu relays in your devices, then we have for you an

another reason for their purchase in a form of lower prices of selected types, for 10 % at an average. Those are types JS-12NK, FTR-LY-CA012Y, FTR-LYCA024Y and NY-12W-K. JS-12NK relays can be shortly described as a mid-power 8/10A/250VAC relay with a high isolation. Rest 3 types are narrow 5mm relays with 5-6A/

250VAC contacts. All 4 types are environmentally friendly with cadmium-free contacts. To the trouble-free usage in modern devices also contributes their very low power consumption – all types have sensitive coils with a power consumption of only 120-220 mW depending on a type.

Advantages / Features:

1. reliable mid-power relay
2. cadmium-free contacts
3. sensitive coils with a low power consumption
4. convenient price
5. available directly from our stock

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
41317	NY-12 W-K-IE	Power relay 12V 5A 1a 1200R	2,00 €
51800	FTR-LY CA 012 Y	Power relay SLIM 12V 6A 1c 847R	2,10 €
51801	FTR-LY CA 024 Y	Power relay SLIM 24V 6A 1c 3388R	2,00 €
56061	JS-12N-K	Power relay 12V 10A 1c 660R without CdO	1,20 €

Connect the LED panels without soldering – with TE connectors



To connect wire leads to LED panels is easy, elegant and professional with poke-in connectors from TE Connectivity.

How to connect wire leads to PCB so that they had a reliable contact and didn't require hand soldering? We probably will get an idea of more possibilities by means of various terminals. But what a terminal or connector to use, so that it looked professionally, didn't act disturbing and had a low profile which doesn't shade LEDs?

Poke in connectors from TE Connectivity are designed specially for lighting purposes. They are available in an SMT as well as a THT version. Connection of wires themselves then requires only a simple insertion of a wire with a 7mm stripped part. For a simple strip length check, the connector has the strip length gage.

We offer you poke-in LED Lighting connectors from our stock. Order number is 73962 and guide price is 0,30 EUR without VAT.

Advantages/ Features:

1. connector for a professional connection of wire leads to PCB
2. for 18, 20 a 22 AWG wires, as well as 18 and 20 AWG stranded wires
3. gel-filled versions available for usage outdoor or in a moisture environment
4. low profile and rounded corners for minimizing of shading
5. redundant SMT pads for a maximal mechanical stability
6. white or black colour for polarity severance



The article with more information can be found at our website. Decode the link by QR code.



Precise and price-convenient measuring of AC current



With current transformers, you can measure AC current simply and with a sufficient accuracy, moreover with maintaining of a high safety level thanks to a galvanic isolation.

General purpose AC current measurement, overload and shortcut protection, load drop or shutdown detection and

Advantages / Features:

1. simple measuring with a galvanic isolation
2. no influence to a measured circuit
3. long lifetime
4. price-convenient solution

similar application require simple and reliable solution. Current transformers meet all these requirements and they add further bonuses like galvanic isolation, no intervention to a measured circuit and a convenient price.

As we know, one of AC current measurement methods is based on the usage of a current transformer. Perhaps the biggest advantage of this method is the fact, that a measuring circuit is galvanically isolated from a measured lead and at the same time, the transformer doesn't introduce any added load neither any influence.

Every current transformer is designed for a certain load, i.e. at a certain load it provides most accurate results. For example for the type AC-1050 it is 100 Ohms. In such a case is valid a transfer ration 1000:1, i.e. to the load flows a 10 mA current at a 10A current in a measured lead. Output of a current transformer can be connected to a panel meter, digital voltmeter, oscilloscope or an AD converter input.

Talema current transformers are top quality components with an outstanding quality / price ratio. Transformers are designed for soldering into a PCB. In our offer you can find more types, up to 100A maximum current.

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
80210	AC 1015	Current Transformer ID9,5mm 15A 1000:1	2,40 €
87010	AC 1050	Current Transformer ID14,6mm 50A 1000:1	2,40 €
7705	ASM10	Current Transformer ID5,0mm 1-10A	1,20 €
9337	ASM50	Current Transformer ID8,0mm 5-50A	2,45 €

Stronglink modules will provide you a highly secure RFID



Mifare and DESfire RFID modules from company Stronglink enable to use advanced RFID technologies while maintaining a very affordable price.

MIFARE ultralight, MIFARE 1k, MIFARE 4k and MIFARE DESfire are known technologies of RFID enabling to use various application, store various data and other functions. From this reason, they're largely used in admission systems, loyalty programs, goods tracking and many other segments. New 13,56 MHz Stronglink modules in our portfolio - SL025M, SL030, SL031, SL032, SL040 and SL040A enable to use these technologies and they are relatively easily applicable because of more reasons. Firstly, they are available in more versions with UART, I2C, RS232 as well as USB interface, they are certified and the producer provides an above-standard development support.

Usage of modules is also simplified by their low power consumption and a relatively very low-profile construction with the height of only few mm. An important factor - the price, also says in favor of Stronglink modules. For the development support, there are also available source code examples for various microcontroller families.

Do you want to evaluate RFID Stronglink modules in your application?

We offer you a possibility to gain modules at convenient conditions. If you see a room for a mass usage of these modules, let us know at marketing@soselectronic.com.

Advantages / Features:

1. universal 13,56MHz RFID modules
2. Mifare ultralight, 1K, 4K and DESfire
3. available versions with UART, I2C, RS232 and USB interfaces
4. above standard technical support
5. very affordable price
6. small dimensions and a low profile
7. CE and RoHS certification
8. low power consumption

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
114342	DESFIREEV18KISO	Mifare DESfire EV1 8kb ISO Card 13.56MHz	5,40 €
121750	SL031	RFID reader/writer module Mifare 13.56MHz, UART, 38x38mm	23,90 €
124100	SL032	RFID reader/wr. module Mifare/Desfire 13.56MHz,UART,46x46mm	26,90 €
125894	SL040A	RFID reader module Mifare/Desfire, USB, 72x57x15mm	32,90 €

Lantronix xPico - ethernet in the chip-sized module

New Lantronix xPico module brings a highly flexible network connectivity solution for virtually any serial interface device.

Előnyök/Jellemzők:

1. miniature embedded device server
2. extremely compact network solution for any serial interface device
3. eliminates the need of a costly SW and FW development
4. dimensions only 24 x 16.5 x 7.4mm
5. up to 921 kbps serial data rate
6. 256 kB SRAM/ 512 kB Flash
7. 256-bit AES encryption
8. extended temperature range -40 to +85°C
9. 3,3V interface (5V tolerant)
10. built-in web server with a 384 kB memory



With miniature dimensions smaller than a usual SD card, Lantronix xPico is suitable even for designs typically intended for chip solutions. The key difference with the xPico is that there is virtually no need to write a single line of code (FW), resulting to a much lower development cost and faster time to market. The xPico is based on the industry-proven Lantronix device server with a relatively very easy to integration to a target device. Built-in web-manager enables a quick and comfortable configuration. xPico is suitable for all devices, where it is physically necessary or convenient to use a module with miniature dimensions and a low profile. With the xPico you're free to place an RJ45 connector according to your demands. That's why it is possible to utilize the xPico even in space critical designs, where for example the Lantronix XPort wouldn't suit.

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
120675	XPC100100S-01	Device Server Extended Temp& AES Encryption sample	32,00 €
121785	XPC100100B-01	121785 XPC100100B-01 xPico Device Server Extended Temp AES Encr. Bulk	25,00€
121787	XPC100100K-01	121787 XPC100100K-01 xPico Device Server Module Dev Kit w/ Module	106,00 €

Print simply and without drivers from Apple iOS devices.



With the new device Lantronix xPrintServer you can print documents on your network printer from any Apple iOS mobile device.

Imagine, in your company you have a visit with some Apple mobile device like iPod, iPhone or iPod touch and your visitor from any reason needs to print some document. A problem is, that with a probability near to surety, in a given mobile device no drivers for your printer will be installed.

This problem is elegantly solved by a new device from company Lantronix - xPrintServer. It is a literally „plug 'n' play“ or „plug 'n' print“ network device. xPrintServer serves as an „interface“ between a mobile device and a printer. Apple iOS device communicates with a network through your company's WiFi and the xPrintServer sends data to a network printer through an ethernet cable.

In comparison to other common net devices, a configuration is unbelievably simple. Connect the xPrintServer into your LAN through an ethernet cable (to a router, switch, hub or any place in the network), power up the xPrintServer, and the xPrintServer will auto-discover and auto-provision all printers in the network. No other configuration is necessary, no applications or any other software. All that is necessary to do to print is to sign into you company's WiFi with a mobile device, open a desired web page, e-mail, photo etc. and choose the icon to open the native print menu. Then from the printer options menu, choose a printer through which you wish to print. Finally, select a number of copies and choose „Print“.



The article with more information can be found at our website. Decode the link by QR code. The article contains also related video.



Advantages / Features:

1. supports all devices with Apple iOS 4.2 or higher
2. no drivers or special SW necessary
3. extremely simple installation - „plug 'n' print“
4. automatically searches all available network printers, no configuration

Bolymin BEGV have a sufficient power to control your applications



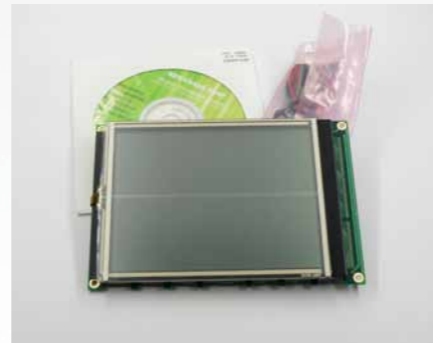
New display embedded modules BEGV64x from company Bolymin enable to add to your application a graphic output with and a control unit together with a communication interface – all integrated into a single module.



Advantages / Features:

1. universal display embedded modules
2. powerful 8-bit AVR ATMEGA644P processor
3. built-in in-system programmable 64 kB Flash/ 4 kB SRAM
4. built-in 128 kB EEPROM available through I2C
5. 1x RS232 and 1x isolated RS485/422/232
6. monochrome STN LCD display 320x240/240x128 px
7. built-in 4 wire resistive touch panel

Based on the ATmega644P AVR processor, provide BEGV643 and BEGV641 a relatively high performance at a low power consumption. Used AVR processor provides a higher power than necessary to control the display and module peripherals, that's why you have a considerable amount of CPU power/system resources freely available according to your application demands. In comparison to development from single components, when using these modules, it is eliminated the need for design of schematics and PCB of a control unit, display unit and a communication interface, power supply part as well as a necessary software. With a built-in in-system programmable 64kB Flash and 4kB SRAM, they provide a decent memory space even for relatively large applications. Another memory space is provided by external 2x 64 kB I2C CMOS EEPROM. BEGV643 has the 320x240 px display resolution and BEGV641 has 240x128 px.



The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
105181	BEGV641A3	ATMEGA644P Embedded System 240x128 Grey Positive LCM	112,00 €
103260	BEGV643A3	ATMEGA644P Embedded System 320x240 Grey Positive LCM	134,00 €

Wago 233 – connected by one click!



PCB terminal blocks Wago 233 provide a fast and reliable connection at production and also a very convenient way of installing for end users of your devices.

Perhaps the biggest advantage of Wago 233 terminal blocks is saving of space and a simple installation of wire leads. Pin spacing is only 2.5 mm and a simple pushing of a plastic lever is all that is necessary to insert of a lead. This way of installation is very simple and intuitive. That's why the Wago terminal blocks are very suitable even for products, where a user himself must connect leads, for example various security devices, controlling units etc. Usable are leads with a 0,08-0,5 mm² cross section. Upon order, we're able to deliver you even other versions and also models in an orange color (with 2.54 mm pin spacing).

Advantages / Features:

1. simple and intuitive installation of leads
2. saving of PCB space - 2,5mm pin spacing
3. for solid and stranded wire leads 0,08 – 0,5 mm²
4. available in more versions

The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
41898	233-202	PCB terminal strip 30° 2P/2pins 0,5mm ² 6A RM2,5 grey	0,75 €
112495	233-205	PCB terminal strip 30° 4P/2pins 0,5mm ² 6A RM2,5 grey	1,37 €
112126	233-204	PCB terminal strip 30° 5P/2pins 0,5mm ² 6A RM2,5 grey	2,00 €

Top quality solar panels with a 25-years performance guarantee



SolarWorld solar modules excel in efficiency and moreover the producer provides an above-standard guarantee of performance.



Company SolarWorld AG Group is a top German producer of solar (photovoltaic) panels. From the raw silicon, through silicon wafers, to the complete modules, SolarWorld produces all this on its automated production lines with a stringent quality control. A big advantage is the 25-year linear power guarantee – SolarWorld guarantees max. 0.7% degradation of the module performance p.a. for over 25 years. It is a considerable difference in comparison to a standard 2-stage guarantee, as you can see in the enclosed picture. SW80 modules use polycrystalline high efficiency cells. High performance of modules was confirmed also in independent tests, where SolarWorld modules provided 10-12% higher performance.

Currently, we offer you SW80 modules for a special price, directly from our stock. Order number is 101350 and guide price is 160 EUR without VAT.

The article with more information can be found at our website. Decode the link by QR code. The article contains also related video.



Linear performance guarantee*



Advantages / Features:

1. top quality 80W solar module 17.9V/ 4.49A
2. above-standard guarantee of performance
3. quality construction with a protection against condensed water build-up
4. possibility of mounting in a vertical and horizontal position
5. high performance confirmed in independent tests

Charge a USB device anywhere even without a PC



As today already many devices have the possibility to be powered or charged via USB port, we also react on this trend by adding a USB mains adapter to our offer. With such an adapter you can power or charge almost any USB device.

Advantages / Features:

1. switch-mode USB adapter with a high efficiency
2. conforms to 278/2009/EC regulation and CEC level V
3. input voltage 100 – 240V/50-60Hz
4. output voltage 5.2V
5. up to 1000 mA output current
6. universal usage

Adapter MW3NU10GS is a switched type with a high efficiency and its own power consumption of less than 0.30 Watt, conforming to regulation 278/2009/EC second stage (EuP, ErP), as well as CEC level V.

Nominal output voltage is 5.2V and current loadability current-carrying capacity up to 1000 mA. It is an invaluable helper for supplying or charging of various portable devices, which support this function (for example some mobile phones, GPS navigations, mp3 and mp4 players,...). Advantage of such a device is that because of supplying or charging of a small portable device you don't have to switch-on a PC or notebook with a substantially higher power consumption.

We offer you Adapter MW3NU10GS from our stock. Order number is 110398 and guide price is 3,50 EUR without VAT.



The article with more information can be found at our website. Decode the link by QR code.



Ready to use solution for secure control with Aurel modules



Secure authentication and a simple utilization are the key features of components RX-4MHCS series from company Aurel. Using the KeeLoq technology from company Microchip, they represent a complete solution for a remote control and authentication.

Advantages / Features:

1. universal display embedded modules
2. powerful 8-bit AVR ATMEGA644P processor
3. built-in in-system programmable 64 kB Flash/ 4 kB SRAM
4. built-in 128 kB EEPROM available through I2C
5. 1x RS232 and 1x isolated RS485/422/232
6. monochrome STN LCD display 320x240/240x128 px
7. built-in 4 wire resistive touch panel

Company Aurel with rich experience in the field of RF data transfer and production of thick-film technology circuits has incorporated into their products a modern technology KeeLoq (HCS). This way a whole line of products for a secure control (RKE-remote keyless entry) in the 433,92 MHz band arised. Low power consumption, high sensitivity and a high security thanks to a 64 bit crypting key (unique in every device) used to generate a 32-bit hopping code, provide an immediately usable solution for control of locks, gates and any other devices, where concurrently with the control function itself, we also need an authentication.

A receiving element is the RX-4MHCS module available in versions RX-4MHCS, RX-4MHCS/F (both with 4 output channels settable into a monostable- as well as bistable mode) and RX-4MHCS-4B (4-bit output, 12 channels). A great plus is a wide range of operating temperatures, enabling an outdoor use - after building into an appropriate enclosure. Receiving modules are also available as ready-made PCBs with 4 output relays, readily usable without any soldering or other HW development.

Transmitting elements are keyfobs with 1-12 push-buttons. On stock we keep 1-4 button versions, upon request we're able to provide you a 6- and 12 -button version too. Receiving modules are able to operate with up to 10 keyfobs.



The article with more information can be found at our website. Decode the link by QR code. The article contains also related video.



Order no.	Type	Description	Guide price
50294	HCS-TX-3 (codeaurel)	Keyfob 3-ch. AM 433.92MHz transmitter with KEELOQ® HCS301	13,00 €
60729	RX-4MHCS	Receiver 433.92MHz with KEELOQ® decoder, 4-channel	13,45 €

Supercapacitors instead of batteries?

Double layer electrolytic capacitors already enable to replace backup batteries in many applications.

Modern high-capacity double layer capacitors feature a very high energy/volume ratio, compared to usual electrolytic capacitors. Their capacity is so high, that they are able to replace backup batteries in many designs. One of the biggest advantages of capacitors in comparison to batteries is their long lifetime, because their electrodes don't undergo degradation neither after many thousands of cycles.

In our offer, you can find small "coin-type" double layer capacitors suitable for backup power supply of memories. For example a capacitor with a 1F (1000mF=1 000 000 uF) capacity charged at 5V can store energy of 12.5 Joules ($E = 1/2 * C * U^2$), what is 12.5 Wattseconds. This energy is in most cases sufficient to ensure a safe backup of memories at a voltage dropout. This can be very useful for example for a safe write of data to EEPROM and a safe switch off of a device.

Advantages / Features:

1. capacitors able to replace a backup batteries
2. high reliability
3. much longer lifetime, compared to batteries



The article with more information can be found at our website. Decode the link by QR code.



Order no.	Type	Description	Guide price
31803	GOLDCAP 5,5V 0,1 F	Electrolytic Capacitor 13,5x7,5mm RM5	1,20 €
31804	GOLDCAP 5,5V 0,22 F	Electrolytic Capacitor 13,5x7,5mm RM5	1,20€
31806	GOLDCAP 5,5V 0,47 F	Electrolytic Capacitor 21,5x7,5mm RM5	6,80 €
31807	GOLDCAP 5,5V 1 F	Electrolytic Capacitor 21,5x7,5mm RM5	2,40 €

M-Bus to Ethernet communication interface - EthMbus-5

Advantages / Features:

1. Connection of 5 M-Bus slave devices
2. 100/10 Mbps ethernet
3. TCP or UDP telegram transfer
4. Simple web interface for configuration
5. Wide range of a DC and AC power supply
6. Protections, fuses and filters ensuring a high imunity of a whole interface to surges and disturbances
7. Versions of modules with an RS232/RS485 to M-Bus interface



Usage

The interface module is used in industry and building automation for data acquisition from heat consumption meters, flow meters, power consumption meters etc. It supports a connection of 1 to 5 M-Bus slave devices and a bus with devices connected can reach up to a few hundreds of meters length, depending on a connection quality, communication speed and additional protections. Connection of the interface module with a PC application can be realized by a virtual COM port, or directly through a TCP/IP connection. Connection through a virtual serial port is suitable for older programs, suitable only for a serial communication interface. Configuration of the interface module is possible via a password protected web interface.

Main Features

A construction of the interface module is based on practical experience from implementing of communication interfaces in an industrial environment. In order to reach a high reliability and immunity, the module has an above-standard protection against

overvoltage. M-Bus port is resistant to a continuous shortcut, overload and it contains a filter increasing the resistance of communication to disturbances. M-Bus port is galvanic isolated from power supply, as well as from an Ethernet interface, to ensure a high overvoltage immunity and it prevents ground loops creation. A range of a DC and AC power supply has a wide range and the power supply port has an overvoltage protection, as well as a self-resettable PTC current fuse. The module is in a robust aluminium enclosure, with a possibility of mounting to a 35mm DIN rail. For a simple assembly and replacement is the connection of leads realized by plug-in connectors.

Operation statuses are indicated by six LEDs for a quick detection of an actual module status, its work and an indication of possible communication errors. The „overload/short“ LED diode differs two basic M-bus link error statuses. A shortcut is indicated by a continuous light and an overload by blinking.

Main specification of the EthMbus-5 interface module

Amount of M-Bus devices to be connected	1 to 5 SLAVE devices
Transfer rate	300 - 9600 bps
Overvoltage protection	M-Bus port, power supply
Current fuse	M-Bus port, power supply
Galvanic isolation of the M-Bus port-u	from power supply, from Ethernet
Power supply voltage	DC 10-33V, AC 12-24V
Power consumption	1,7 to 3W depending on a load
Operating temperature	-40°C to 60°C
Dimensions	33 x 57 x 106mm

Quality guarantee, references

- EMC certification in an accredited laboratory, for an industrial environment with a more stringent immunity testing.
- Precise design and construction based on a long-term practical experience and a long-term operation of a big amount of interface modules in demanding conditions at customers from Czech Republic and Slovakia.
- Every interface passes during a production a series of electric tests and by a final functional test.

Producer: Juraj Čaplický - Elektronika

Address: Bôrická cesta 103, Žilina 010 01, Slovakia

Web: www.prevodniky.sk

E-mail: office@prevodniky.sk



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We want to introduce to you in this article the modern M-Bus to Ethernet interface module. Ethernet connectivity is realized by means of a well-proven favourite Lantronix Xport module. This module is intended for all application, where it is necessary to add a reliable Ethernet (LAN) connectivity with minimum development costs.

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