CIRCUIT CELLAR ONLINE

THE MAGAZINE FOR COMPUTER APPLICATIONS

Circuit Cellar Online offers articles illustrating creative solutions and unique applications through complete projects, practical tutorials, and useful design techniques.

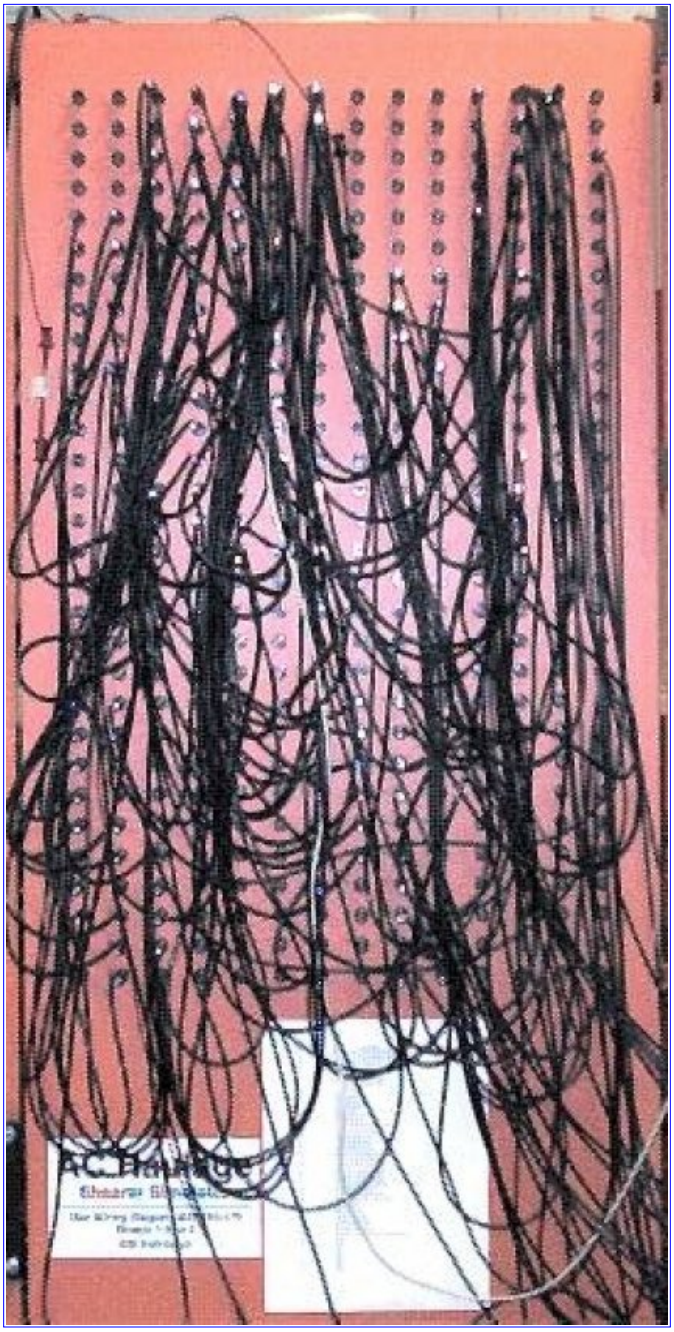
RESOURCE LINKS

A Guide to online information about:

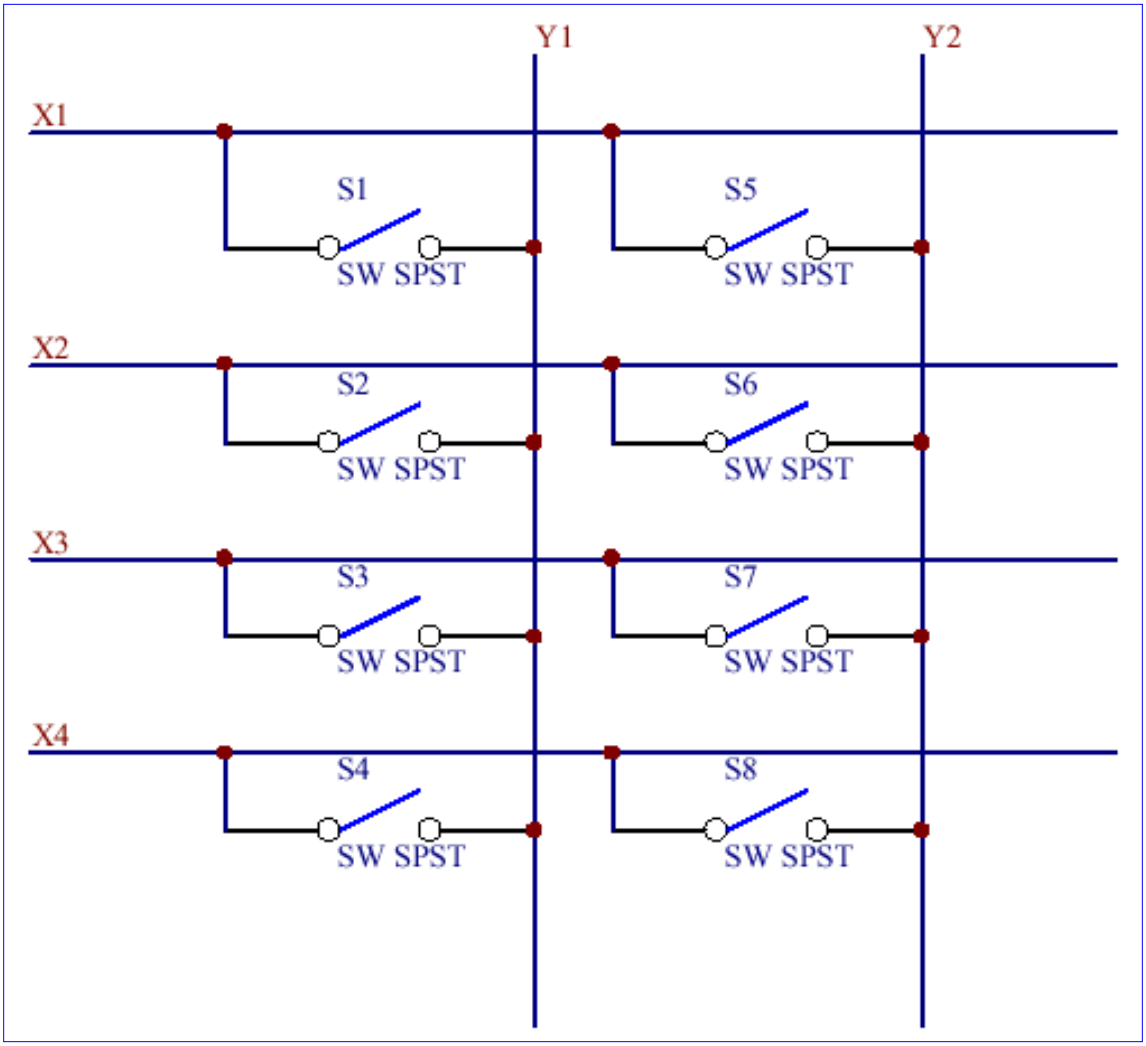
Relays

by Bob Paddock

This month, my topic is old-fashion heavy-metal relays. I inherited a project with a patch panel of wires that resembles the *Gordian Knot*. The first thing I decided that I wanted to do was to replace the patch panel with a cross-point switch.



A cross-point switch allows you to connect any x row to any y column. Shown below is a schematic of a 4 × 2 cross-point switch. I needed to handle currents as high as 10 A, and after the configuration was set up, it may be fixed for months at a time. I decided the best way to go was to use latching relays because they could be set and forgotten about just like the patch panel that I was replacing. My search for a latching relay resulted in this resource page.



If you think you have application for a 16 × 16 10-A cross-point switch, let me know, maybe I can convince the management to make it one of our standard products.

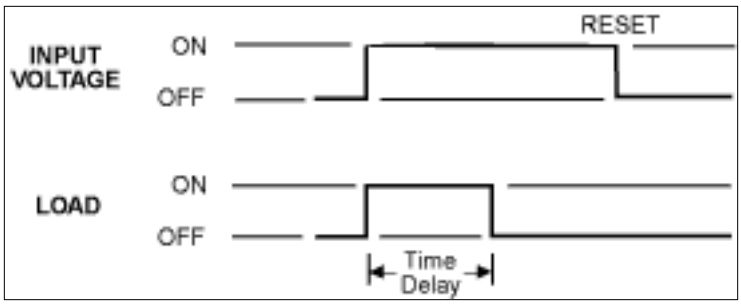
For designers of high-volume wireless manufacturing test systems, Agilent offers a new versatile family of electromechanical switches. Combining industry-leading isolation performance with long life and excellent repeatability, these switches safeguard your test platform from failures, recalibration, downtime, and lost production. By fully customizing the manufacturing and ordering process, Agilent allows you to pay for only the performance you need.

The N1810UL is an unterminated three-port, single-pole/double-throw switch. The N1810TL is a terminated three-port, single-pole/double-throw switch. The N1811TL is a terminated four-port, bypass switch. The N1812UL is an unterminated five-port switch. All switches have 50-ohm SMA RF connectors, and all terminations are nominally 50 ohms.

See http://www.chipcenter.com/TestandMeasurement/products_101-200/prod138.html for more information.

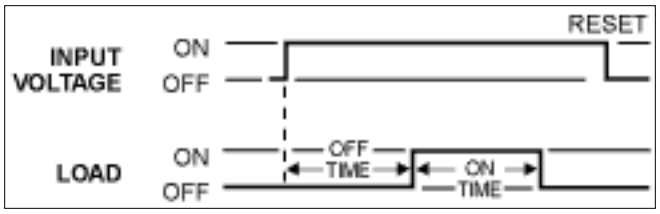
Airotronics builds specialty electronic timers and control based relays.

Timing Modes Defined



Often called Interval, Interval Delay, Delay on Energization with Instantaneous Transfer.

When power is applied to the input voltage terminals, the load is energized immediately and the time delay cycle starts. At the end of the delay period, the timer transfers back to its pre-power position. Removal and reapplication of the input voltage resets the timer.



Delayed Interval

Application of power to the input terminals starts the "off" time. When this time is complete, the load energizes for the "on" time. At the end of the "on" time, the load de-energizes and remains in this state until the input power is removed and reapplied to start a new timing cycle. Both time periods can be individually adjusted.

American Zettler, Inc., a Zettler Components Company.

American Zettler produces over 40 different types of relays to meet the many specific requirements of commercial and industrial applications.

You can download product drawing in AutoCAD [13 KB ±20%] or DXF format [8 KB ±20%] for your symbol library.

Other products: LCDs, LEDs, and transformers.

American Zettler offers a list of suggested equivalents of its own and other relay manufacturers' part numbers as a guideline for possible interchangeability.

American Zettler, Inc. has improved the design of the AZ8 and AZ942H relays so they can meet the difficult 6 kV lightning surge test outlined in IEEE 587. The relays can now withstand the positive and negative 1.2 × 50-µs, 6-kV unidirectional pulses and the 0.5-µs to 100-kHz, 6-kV ring wave from contact to coil. Additionally, the relays also have a 3-kV RMS dielectric strength rating from contact to coil.

This high-surge voltage withstand capability is desirable in any device that is connected to AC mains, such as white goods controllers, machine controls, and HVAC controllers.

Amperite manufactures time-delay relays, flashers, timing, and industrial controls. Examples of applications can be found here.

Aromat's is part of Matsushita Electric Works, Ltd. (MEW) in Osaka, Japan. They make a large spectrum of relays:

- Power relays
- Signal relays
- Automotive relays

• PhotoMOS relays

One gripe I have about their home page is that it is over 1010 KB—a real pain when all you have is a dial-up connection. I almost didn't include them here because I was tired of waiting for it to load.

AVO actually stands for Amps, Volts and Ohms—three recognizable electrical terms. Hence, the tag line you see them using to promote AVO is: BRINGING RELIABILITY TO AMPS, VOLTS, OHMS.

AVO's product offering spans 28 distinct product groups with over 1000 specific products. Of specific intrest to us is their Advanced Digital Low Resistance Ohmmeter, which is good for measuring contact resistance (as well as their other relay test products).

Clare's doesn't make relays, but they do make several types of reed switches. The application notes that show how to properly solder the reed switches, is applicable to reed relays.

Reed switch application notes:

- Reed Switches Information
- Soldering Reed Switches

CCI is the parent company of some of the best know relay brands such as Midtex and Kilovac (high voltage), as well as Harman, Corcom, and Products Unlimited.

Coto Technology is a manufacturer of reed relays, solid-state relays, and dry-reed switches for the electronic industry.

Coto Technology has established itself as a market leader in the production quality and design innovation of reed relays and dry-reed switches.

Deutsch Relays, Inc. designs and manufactures hermetically sealed electro-mechanical relays, electronic timing relays, and relay mounting hardware. All Deutsch products are manufactured to meet or surpass military specifications. The company was first incorporated in 1938 under the name of Filtors, Inc., with the principal products being lubricating oil filters and diesel engine accessories.

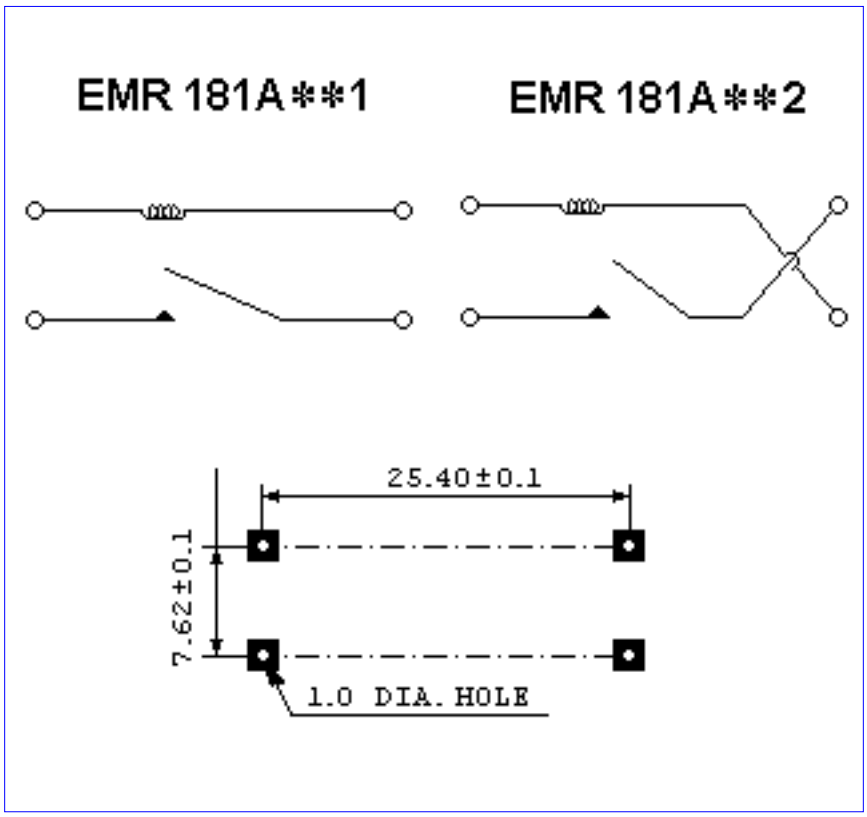
In the course of developing an engine speed control device in the early 1950's, a Filtor's engineer hit upon an idea for a new relay design in which the relay motor armature was enclosed by the motor coil. This design principle enabled the company to produce the smallest and lightest six-pole, double-throw hermetically sealed relay on the market.

Alas, I could not locate a datasheet for any product on the site, just "contact your rep." Some people still don't get it.

ECE makes power relays, minature relays, automotive relays, some specialty relays, and many other products. Two examples of their dozens of product lines are DIP switches and USB connectors.

LINE SENSE REED RELAY

- Low coil resistance.
- Less than 15-mA pull-in-current possible.
- Coil-contact isolation voltage up to 4250 V_{DC}/3000 V_{AC}.
- Wide operation current and low power consumption.
- A sealed metal outer case is used to prevent interference by magnetic fields and also to protect the coil during PCB assembly.
- This product of line sense reed relay are designed for use as telephone line busy detectors.



I know Teltone makes a similar product, but all I could get from their site was, "We are sorry, but the page you have requested has been changed. Please select from one of the links below: www.teltone.com (which is where I started from) or www.OfficeLink2000.com."

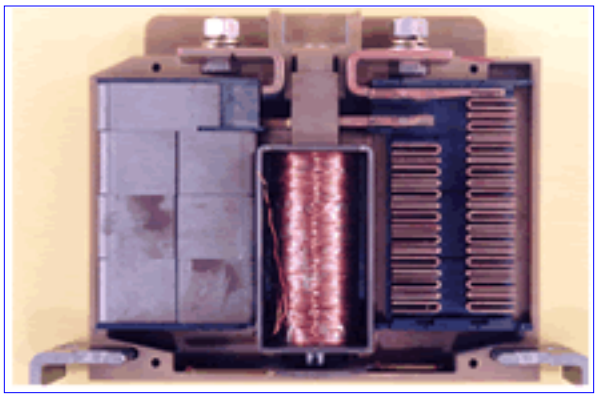
LEVEL SENSOR

- This ELS series is sensitive and a complete level sensor with float.
- It can be widely used for simple control function effectively in the level control.
- The screw thread M8 × 1.25 enables a quick and reliable mounting to the position you need.

Eaton Aerospace developed a broad range of relays over the last 60 years. Designs can be customized for the most hostile high power switching applications and are driven by size and weight.

Applications range from the latest commercial aircraft to the M1A2 main battle tank.

Whether gasket or hermetically sealed, Sarasota's relays are tailored to meet the exacting requirements of MIL-R-6106.



Sarasota developed a line of high-voltage, high-power contactors for aerospace applications. An innovative approach by ARC scientists led to a patented new method of controlling the arc and protecting contacts. A combination splitter plate and permanent

magnet approach achieves small package size and contains the high-voltage arc that is generated during switching.

Product information is available in PDF format on hermetically sealed relays, environmentally sealed relays, gasket sealed relays, unsealed relays, flat pack relays, generator contactors, remote-control circuit breakers, remote power controllers, and military part numbers.

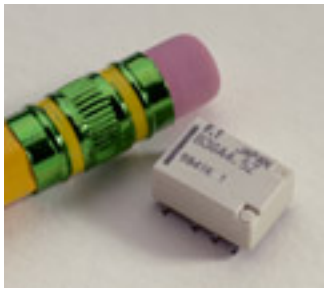
FUJITSU

New Relay Meets Challenges of 42v Automotive Systems

America's love affair with large sport utility vehicles, vans, and trucks is stronger than ever. Many of these vehicles are outfitted with luxury accessories and electronic controls inside the passenger compartment that demand high-power switching. That's why Fujitsu Takamisawa America, Inc. has released the FBR580 twin relay series with 42-V coils and 1.4-mm contact gaps.

The increasing amount of electronic controls found in today's automobiles means there's the potential for a lot of noise in the passenger compartment. My own van at times starts clicking relays for reasons beyond my comprehension. It's that sounds like a really bad rendition of *Stair-Way-To-Heaven*. Wonder if I can retrofit?

A Fourth-Generation Signal Relay Arrives

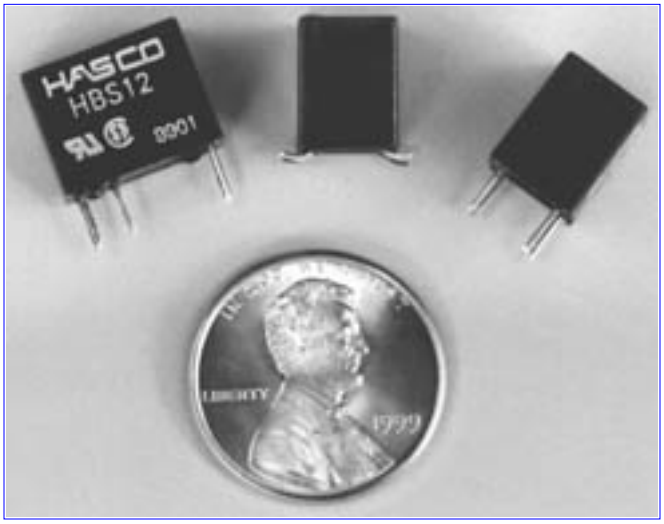


If you're a designer of next-generation communications equipment, Fujitsu Takamisawa announced the arrival of its new ultra miniature signal relay that meets the latest European standards (IEC61811-55) for fourth-generation signal relays.

Flame Retardant Relay Adhesive Studied

Fujitsu Takamisawa researchers studied the requirements for development of a flame-retardant adhesive for plastic sealed

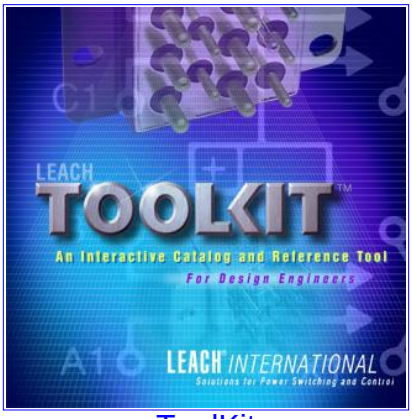
relays. Read this technical report to learn about this new development. In areas with little, if any, air flow like in a Coal Mine, the gases it sometimes generates while it burns can be just as important as how well the unit operates under normal conditions. Alas, this is not typically the kind of information you find in a datasheet, but it should be.



Hasco is a complete source for automotive, reed switches, electromechanical relays, reed switches, surface mount, SIP/DIP relays, 4 kV, and more.

LEACH® INTERNATIONAL
Solutions for Power Switching and Control

Leach International Corporation is a world leader in the design and manufacture of electrical switching and control devices for the aerospace and rail industries.



ToolKit

A interactive catalog and reference tool for design engineers called ToolKit has product information that can be search, along with specifications, photos, AutoCAD drawings, and reference information.

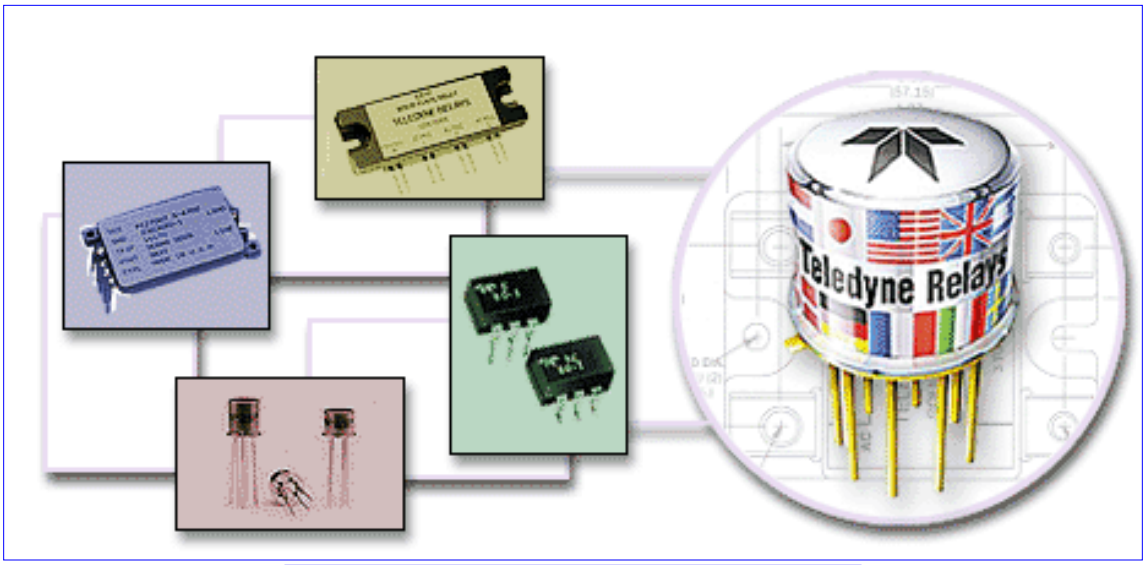
The MDI Company

Mercury Displacement Industries Incorporated, better known in the industry as MDI, was incorporated in Michigan in 1975. The primary product line is switch gear components including mercury type contactors, tilt switches, and liquid level float controls.

Contactors are rated from 30 to 100 A. Commonly used applications for these contactors include various heating, lighting, and many other industrial applications including high-voltage ultraviolet type loads. The contacts are encased in hermetically sealed stainless steel tubes to provide reliable switching for millions of operations. All basic units are UL, CSA, CE, and TUV approved.

The liquid level floats are manufactured with mechanical or mercury switches. The float material is high impact polystyrene for normal alarm, sump pump, or water applications. For sewage, 1 or 2 H.P. or high temperature (105°C (221°F)) requirements, Acrylonitrile Butadiene Styrene (ABS) float material is provided.

HAMLIN, a BREED Technologies company is recognized throughout the world as a leading supplier of quality electronic components. As one of the largest reed switch producers in the world, HAMLIN offers unmatched expertise in applying reed switch technology to the development of advanced sensors used in automotive, industrial, consumer, and electronic applications.



TELEDYNE
RELAYS

RF120

DPDT Magnetic Latching R.F. Centigrid Relay
5-, 6-, 9-, 12-, 18-, and 26.5-V coil versions

The RF120 series relay is an ultra-miniature, hermetically sealed, magnetic-latching relay featuring extremely low inter-contact capacitance for exceptional RF performance over the full UHF spectrum. Its 0.100' grid spaced terminals and symmetrical design allow ease in PCB layout.

Teledyne Relays has been manufacturing ultra-miniature electromechanical and solid-state switching products since 1963. Aerospace relays and commercial or industrial relays are available.

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magnecraft & struthers-dunn

Magnecraft & Struthers-Dunn offers both industrial and Milspec relays.

OMRON

Omron claimes to be #1 in relays, making a wide range of low-signal, power PCB, general-purpose, and solid-state relays.

In April of 1999, AMP Incorporated was acquired by Tyco to became Tyco Electronics Corporation. Somewhere along the way, the popular line of Potter-and-Brumfield relays was absorbed into this mega-corp. Unfortunately I could not locate any direct links to anything resembling a catalog that covered such relays. The best I could do was use search, which brought up many hits, one at a time.

Schrack is well known for their relays, but I was unable to find any information about them on their web site, other than the fact that they manufactured and sold them.

If you need to control high current, then Square D probably has what you need.

NEC and World Products Inc. provide high-quality reliable electromechanical relays. These relays and switches are used in communications, computers, home electronic systems, and automotive modules.

NEC and World Products have been working together for over twenty-five years to provide customers high-quality, reliable electromechanical relays. The relays are organized into two categories: miniature signal relays and miniature power relays. The two types are offered in different styles and contact configurations, with some signal relays being offered in surface mount design.

- Usually handle 100 µA to 2 A
- Commonly used in low-current applications such as telephone equipment, line cards, and modems
- Surface mount available

New Telecom Miniature Signal Relays

- Usually handle 1 A to 35 A
- Typically used in high-current applications such as motor control and industrial uses
- Quiet and high-temperature options available

New Miniature Power Relays

Stop by the
Circuit Cellar News Sever
and join some of the interesting discussion,
or start one of your own.
See you there...

If you would like to add any information on this topic or request a specific topic to be covered, contact Bob Paddock.

Circuit Cellar provides up to date information for engineers, www.circuitcellar.com for more information and additional articles.