

# Kemo®

MOODY  
**M**  
INTERNATIONAL  
CERTIFICATION

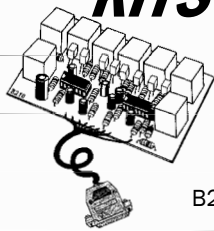


**2006/07**



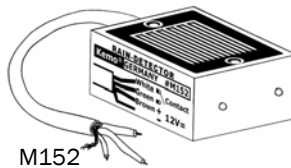
**For specialist dealers only!!!  
(Net prices, see last cover page)**

**KITS**



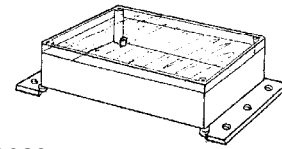
B210

**MODULES**



M152

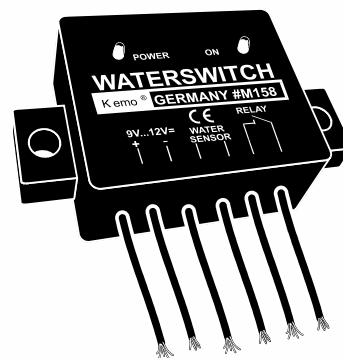
**CASES**



G089

## M158 Water Detector 9...12 V=

If the 2 sensor connections of the module come into contact with water, the built-in relay switches on. Sirens, other cutoff relays, etc. may be triggered with that. Operating voltage: 9...12 V=. Relay contact 1 x ON max. 3 A / 25 V. 2 LED displays: "POWER" and "ON". Dimensions: approx. 71 x 45 x 20 mm.



*Price group: 5*

New New New New New New New New

## Preface

Modern electronics signifies not only a fascinating hobby but also will be profitable with regard to profession. The company Kemo produces for the last 35 years interesting, instructive electronic kits, modules and devices. Due to our range of more than 350 different products we are an important manufacturer on this market. Our range of articles is continuously developed and modernized. All products have been developed in our company and carefully tested and checked before set into series production.

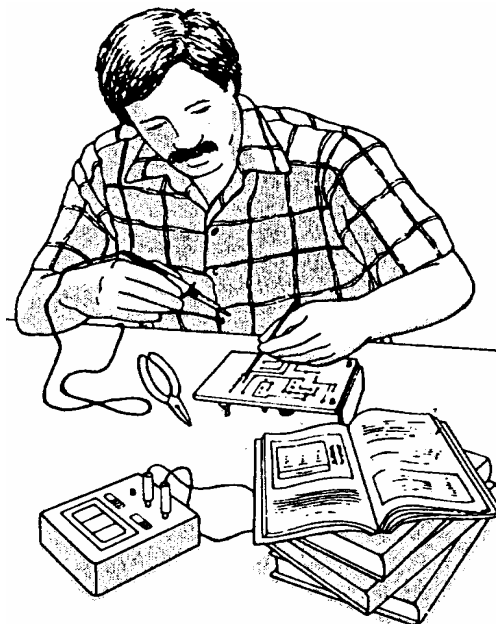
We also dispose of an own plastic injection moulding department for the production of plastic parts.

Multilingual descriptions are attached to the kits and modules. New developments are already supplied with descriptions in 8 different languages: German, English, French, Spanish, Dutch, Finnish, Portuguese and Russian.

If you wish to inform yourself about our products in advance, please visit our website: **[www.kemo-electronic.de](http://www.kemo-electronic.de)**

You will find detailed product information and answers to frequently asked questions there and you may download our software which is needed to operate some of our products free of charge.

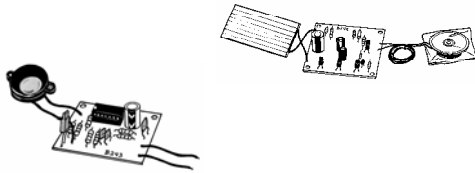
Klaus Kernchen + staff members of the company Kemo



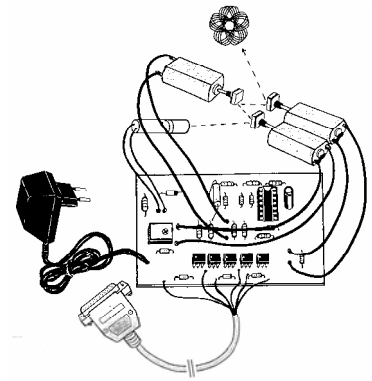
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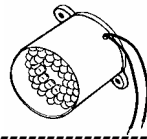
**Kits**



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**Modules**



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**Kits + modules for computer**  
Stepper motors suitable for  
the previous modules:

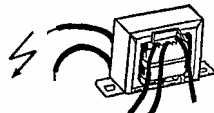


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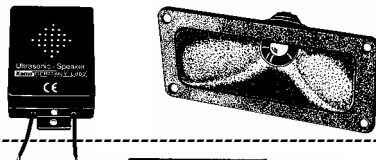


**Transformer**

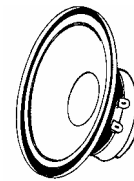


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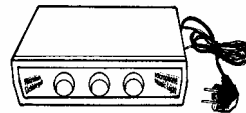
**Loudspeaker**



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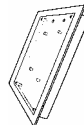


**Devices**

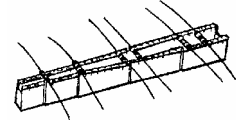


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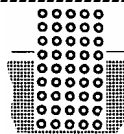
**Cases + plastic parts**  
**Accessories**



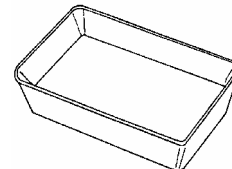
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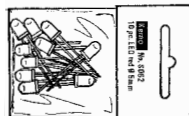
**Boards and accessories**



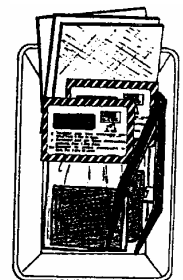
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**Assortments etc.**



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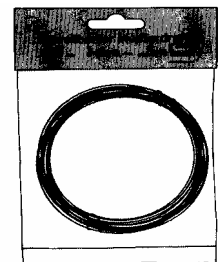


**Resistance wire**  
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**Silver copper wire**

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**Diverse**  
**Informations etc.**

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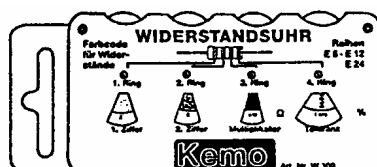


**Index A - Z**

85 - 87

**Index Product groups**

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## B003 Alternating flasher for 2 small lamps

4,5...16 V=, max. 100 mA

...makes the connected small lamps flash at an adjustable flashing speed. To be used as flasher or alternating flasher. For small lamps 6...16 V, max. 300 mA (as flasher) or 2 x max. 300 mA (as alternating flasher). Flashing speed: approx. 1...3 x per sec.

**Technical data:**

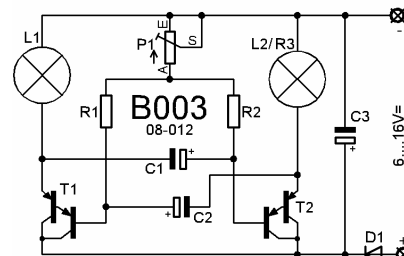
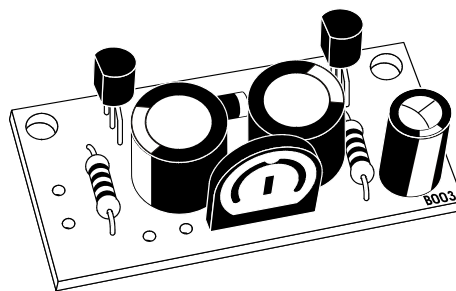
Operating voltage: 6...16 V=

Max. load: 0,3 A per output (2 outputs available)

Flashing speed: adjustable, approx. 1...3 times per second

Board dimensions: approx. 45 x 22 mm

Price group: 2  
Fitting case: G027



## B004 Noise switch / telephone-two-call device

This acoustic switch works with a microphone and a relay. Whenever there will be any kind of noise (e.g. ringing of a telephone, doorbell etc.), the relay will switch on, and if the noise stops, the relay will switch off. With the aid of this device you may activate in other rooms bells, lamps, etc. Ideal for persons with hearing problems, for rooms with high ambient noise levels, as acoustic alarm system etc. Operating voltage is 9 V=. The pick-up sensitivity is adjustable.

**Technical data:**

Operating voltage: 9 V=

Input current: max. 120 mA

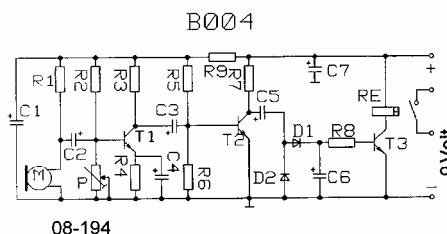
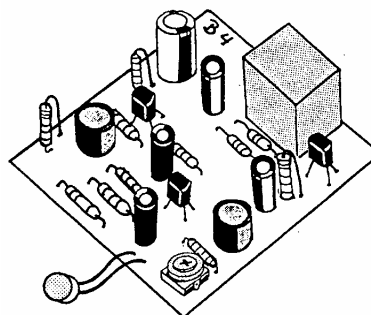
Sensitivity: adjustable

Microphone: sensitive FET-microphone

Relay contact: 1 x IN, max. 3 A

Board dimensions: approx. 55 x 45 mm

Price group: 6  
Fitting case: G027



## B005 Mosquito banisher, flea and tick banisher

...banishes through a high pitched whistling sound the annoying mosquitoes. For 9 V=. Flea and tick banisher: switchable to higher frequencies in order to shoo away vermins at dogs, cats, domestic animals, etc.

**Technical data:**

Operating voltage: 9 V=

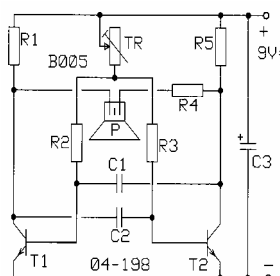
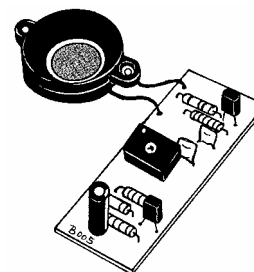
Input current: < 7 mA

Frequency: adjustable

Transducer: 1 piezo loudspeaker, enclosed

Board dimensions: approx. 20 x 55 mm

Price group: 3  
Fitting case: G01B



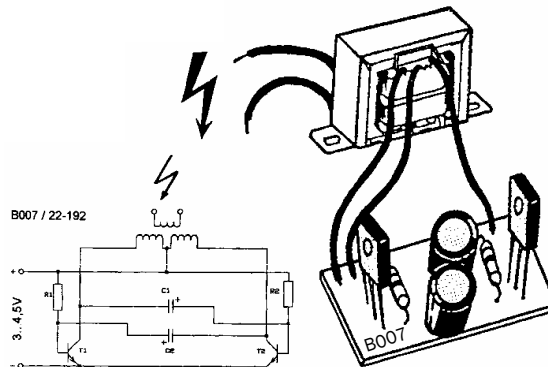
## B007 Electrostat apparatus

...produces from 3...4,5 V= battery voltage pulsating high-voltage pulses of approx. 80...500 V.  
Usage: As joke, for use in physical tests or in order to catch earthworms required for fishing.

**Technical data:**

Operating voltage: 3...4,5 V=  
Output pulse: 80...> 500 V  
Board dimensions: approx. 35 x 18 mm

Price group: 5  
Fitting case: G022



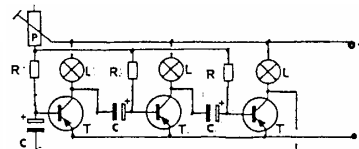
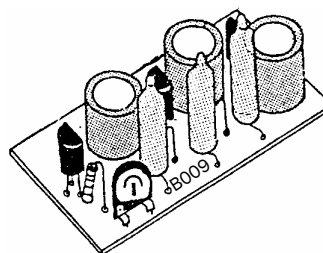
## B009 Mini running light

Running light with 3 small bulbs and adjustable running velocity. 9...12 Volt. Ideal for model construction, indication plates, illuminated pins, luminous bottles in your bar.

**Technical data:**

Operating voltage: 9...12 V=  
Input current: approx. 200 mA  
Running speed: adjustable  
Board dimensions: approx. 27 x 55 mm

Price group: 3  
Fitting case: G027



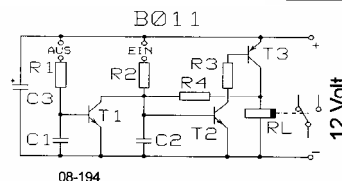
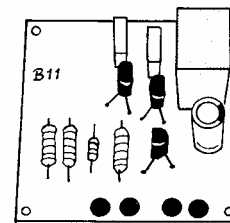
## B011 Sensor touch switch

Through soft touching of the sensors with the fingers, nose, etc. it is possible to connect and switch off devices (through a relay). Operating voltage: 12 V=. Ideal as secret switch (screw heads), as original bell, for use in hidden switches, etc.

**Technical data:**

Operating voltage: 12 V=  
Relay contacts: 1 x change over,  
max. 3 A capacity  
Board dimensions: approx. 55 x 44 mm

Price group: 5  
Fitting case: G027



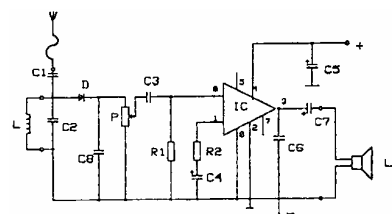
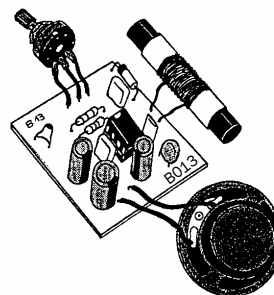
## B013 IC-Radio HF-MF-LF

An easy to mount radio with loudspeaker. It is possible to receive high, medium or long frequency. Operating mode: single-circuit. For 9 V=. Output: max. 1 Watt. Excellent sound!

**Technical data:**

Operating voltage: 9 V=  
Output power: approx. 1 W  
Loudspeaker impedance: 8 Ohm  
Wave range: HF, MF or LF  
Receiving method: single-circuit, AM  
Board dimensions: approx. 38 x 32 mm

Price group: 5  
Fitting case: G010



## B014 27 MHz transmitter 6 W

Measuring transmitter: approx. 25...30 MHz. AM + FM modulation. For 9...24 V. Max. power 6 W input with 24 V. Take into account to observe the legal regulations of telecommunication! In Germany the possession of this device is only allowed to persons holding a permission or to dealers.

Attention: Only radio amateurs who demonstrably have a licence are allowed to possess this kit (CCT-Law within the EEC)!

**Technical data:**

Transmitting frequency: approx. 25...30 MHz (adjustable)

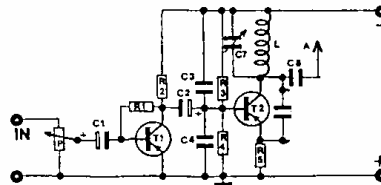
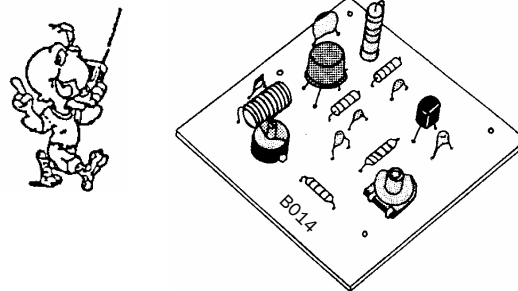
Operating voltage: approx. 9...24 V

Input power: max. 6 W

Modulation method: AM + FM

Board dimensions: approx. 50 x 50 mm

Price group: 5  
Fitting case: G01B



## B015 Fog horn, 5 W

...generates a deep, noisy sound similar to the fog-horns of ships. Operating voltage: 4,5...12 V=. Power: max. 5 W depending on the voltage. For 8 Ohm - loudspeakers.

**Technical data:**

Operating voltage: 4,5...12 V=

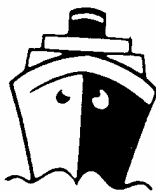
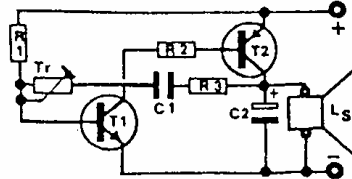
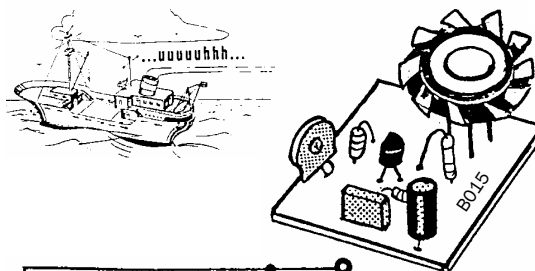
Frequency of tone: adjustable

Loudspeaker connection: 8 Ohm

Power: max. 5 W

Board dimensions: approx. 25 x 27 mm

Price group: 3  
Fitting case: G027



## B018 FM Oscillator 2 W

Adjustable: approx. 80...120 MHz. Operating voltage: 9...26 V=, max. 2 W input. Suitable for microphone or tape connector. In the EC the device may only be used by licensed radio amateurs. The use as bugging device (mini-spy) or private radio transmitter is prohibited and a punishable offence in many countries (e.g. Europe). Exceptions exist in the USA or international waters. The required coil is not enclosed. It is to be wound by using own material (bare wire).

This is an incomplete kit. An important component (coil) that is necessary for the function is missing. Therefore, design certificate, attestation of conformity or CE-marking, respectively, are not required.

**Technical data:**

Operating voltage: 9...26 V=

Input power: max. 2 W, depending on operating voltage

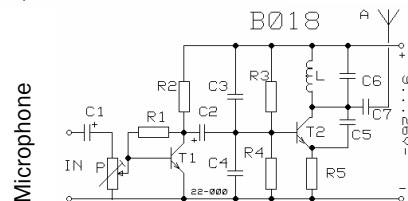
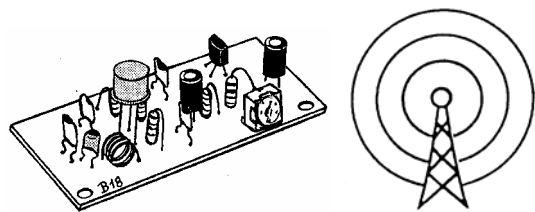
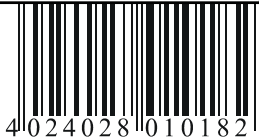
Transmitter frequency:

adjustable approx. 80...120 MHz

Modulation: FM

Board dimensions: approx. 45 x 20 mm

Price group: 4  
Fitting case: G027



## B022 6-Channel lighting console

Stereo lighting console with 2 microphones (2 x 3 channels). Each channel is adjustable individually. Lamps up to max. 500 W (220...240 V~) can be connected per channel. High input response! For discotheques, party rooms etc.

**Technical data:**

Operating voltage: 220...240 V~

Loading capacity: incandescent lamp load max. 500 W per channel

(= total loading capacity 3.000 W)

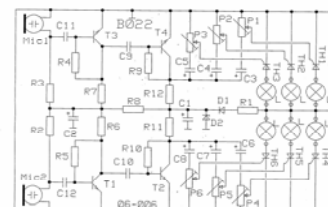
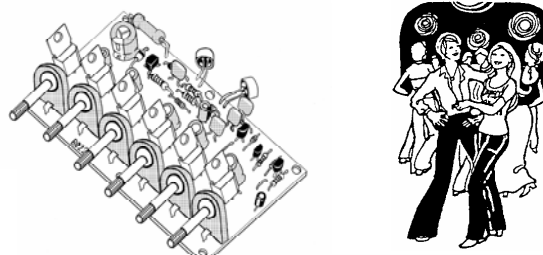
Controller: one controller per channel (total 6 pieces)

Control of lamps: half-wave control with thyristors

Signal pick-up (music) via 2 electret capacitor microphones

Board dimensions: approx. 105 x 55 mm

Price group: 9  
Fitting case: G086



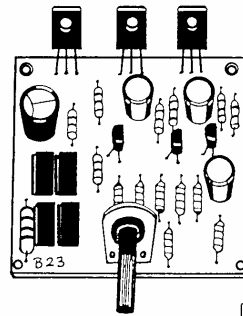
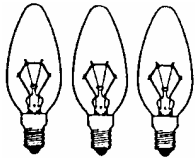
## B023 3-Channel running light 230 V~

The running velocity is adjustable. Each channel resist max. 500 Watt. It is possible to connect single-lamps, light strings, or lamp combinations. Usage: For light effects in discotheques, shops, etc.

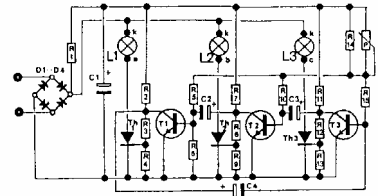
**Technical data:**

Operating voltage: 230 V~  
 Number of channels: 3  
 Max. load per channel: 500 W  
 Running speed: adjustable  
 Board dimensions: approx. 55 x 55 mm

Price group: 9  
 Fitting case: G081



230V~



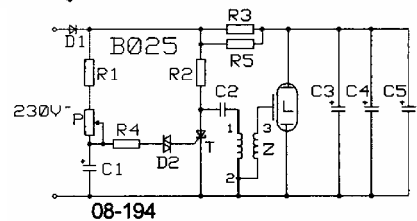
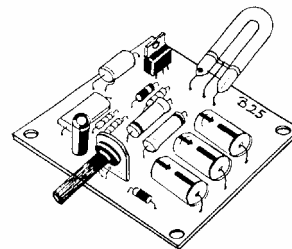
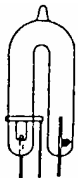
## B025 U-Stroboscope

Flashlight-stroboscope with U-flash tube and large charging capacitor for bright flashes. Adjustable speed: approx. 1...10 Hz. For 230 V~. Ideal as light-shows for discotheques, for special-effect photography, etc.

**Technical data:**

Operating voltage: 230 V~  
 Sequences of flashes: adjustable, approx. 1...10 Hz  
 Board dimensions: approx. 60 x 62 mm

Price group: 7  
 Fitting case: G089



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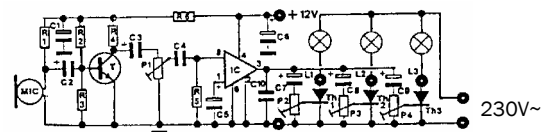
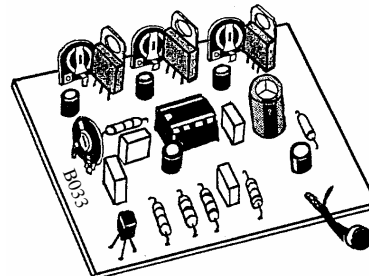
## B033 Microphone music light, 3 channel 230 V~...240 V~ + 12 V=

Music light with microphone. Therefore, there is no need of connection with an amplifier. Power: max. 1000 W per channel. Operating voltage: 230 V~...240 V~ and 12 V=.

**Technical data:**

Operating voltage: 12 V= and 230 V...240 V~ for the bulbs  
 Channels: 3, each is adjustable  
 Load: per channel 1000 W  
 Microphone: sensitive electret microphone  
 Board dimensions: approx. 66 x 60 mm

Price group: 7  
 Fitting case: G010



230V~

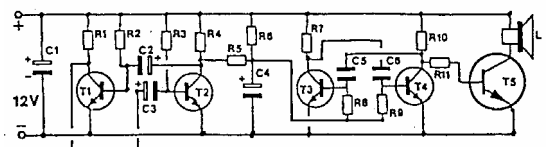
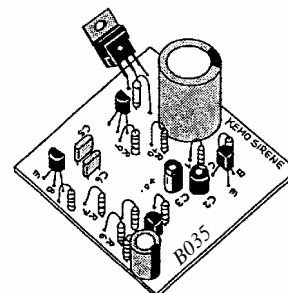
## B035 FBI siren 12 V=, 15 W

Audible electronic siren with a tone of the american police siren. Operating voltage: 12 V=. For loudspeaker 8...32 Ohm. Power 3...15 W, depending on the loudspeaker.

**Technical data:**

Operating voltage: 12 V=  
 For loudspeaker: 8...32 Ohm  
 Output power: max. 15 W (with 8 Ohm loudspeaker)  
 Sequence of tone: volume up and down, such as FBI sirens  
 Board dimensions: approx. 55 x 48 mm

Price group: 5  
 Fitting case: G010



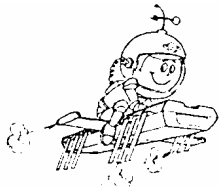
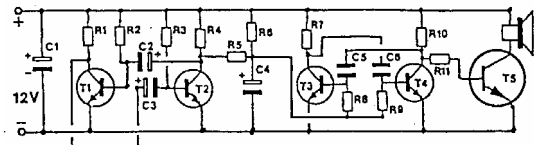
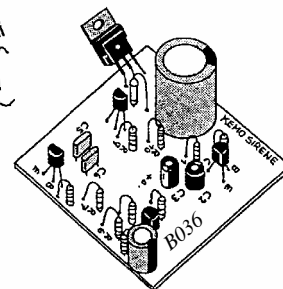
## B036 Space siren 12 V=, 15 W

Extremely audible, nerve-shattering siren sound with the attack alarm known from the movie "Star Wars". For loudspeaker from 8...32 Ohm. Power: 3...15 W, depending on the loudspeaker. UB: 12 V=, 0,3...1,2 A.

**Technical data:**

Operating voltage: 12 V=  
 Current capacity: max. 1,2 A with full power  
 Loudspeaker connection: 8...32 Ohm  
 Power: approx. 15 W with an 8 Ohm loudspeaker  
 The output power can, of course, be reduced (e.g. for miniature models)  
 Board dimensions: approx. 55 x 48 mm

Price group: 5  
 Fitting case: G010



## B037 Sensor number lock

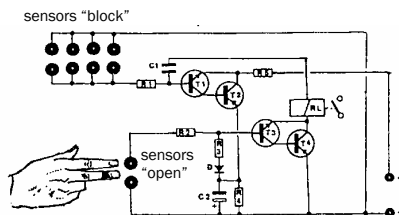
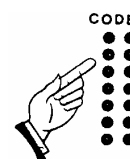
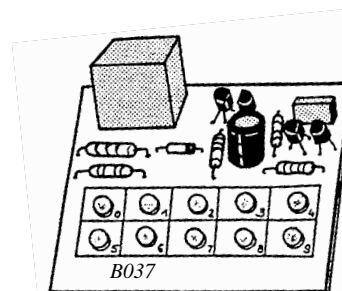
Electronic "sensor" number lock. Touching the correct numbers a relay will operate. In case that false numbers are touched, the lock will block automatically for some time. The number can be preset freely. Operating voltage: 12 V=.

Usage: For opening doors and gateways without keys, to switch machines and electronic devices, which should not be operated by unauthorized persons (through latching relay). For selfmade electric locks at safes and partition for valuables etc.

**Technical data:**

Operating voltage: 12 V=  
 Number of sensors: 10 pieces (numbers 0...9)  
 Load relay: approx. 5 A, 1 x change over  
 Board dimensions: approx. 60 x 50 mm

Price group: 5  
 Fitting case: G010



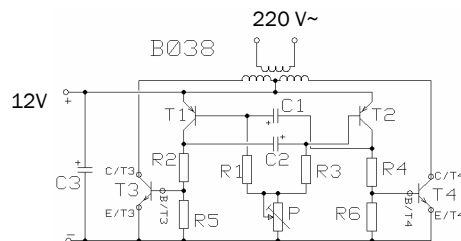
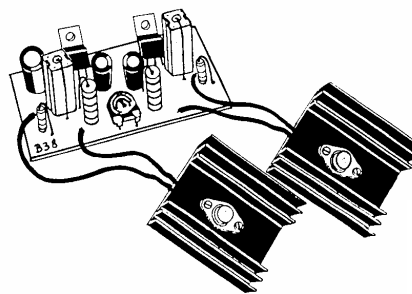
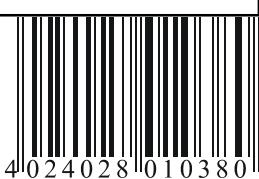
## B038 Voltage converter from 12 V= up to approx. 220 V~, max. 120 W (input) output power max. 60...70 W

Voltage converter for 12 V car-battery up to 220 V~ alternating voltage, approx. 50 Hz (adjustable). There is also necessary: 2 cooling elements approx. 10 x 15 x 4 cm (or similar) and one power transformer 220 V~ / 2 x 10 V, approx. 20...120 VA (transformer power should be twice as much as the desired output power). For output powers up to 40 W the Kemo-transformer TR01 is especially suitable.

**Technical data:**

Operating voltage: 12 V=  
 Power: max. 120 W input  
 Power output: max. approx. 40...70 W  
 Frequency: approx. 50 Hz, adjustable  
 Board dimensions: 54 x 30 mm

Price group: 5



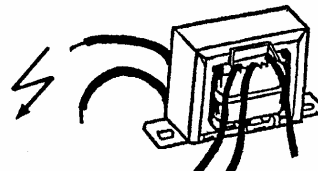
## TR01 Transformer for converter

This transformer is especially suitable for a push-pull DC-voltage converter of 12 V up to 230 V~. It can be used directly when working with our converter-kit B038. The maximal output power of this transformer is about 40/50 W.

Packed in a carton.

Dimensions: approx. 76 x 69 x 59 mm

Price group: 9





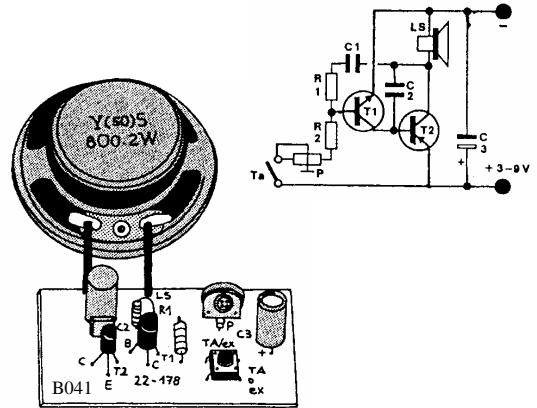
## B041 Sound generator morse-practice-set

Sound generator with loudspeaker and pushbutton as "Morse key". For 3...9 V= operating voltage. Pitch of sound can be adjusted. This especially audible sound generator can be used as practice set for Morse signals or as direct transmitter of coded communications realised through a longer cable, or it may be used as test buzzer, doorbell or as continuity checker for electrical wirings. The test current amounts < 15 µA, so that even high-ohmic connections can be measured.

**Technical data:**

Operating voltage: 3...9 V=  
Loudspeaker impedance: 8...50 Ohm  
(Loudspeaker enclosed)  
Board dimensions: approx. 27 x 55 mm

Price group: 5  
Fitting case: G02B



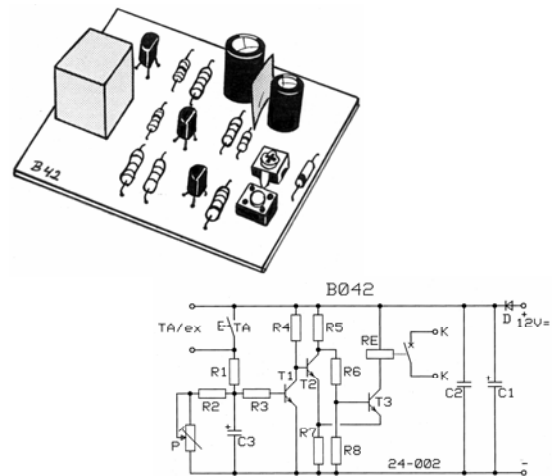
## B042 Time switch (short) approx. 2 sec...5 min.

After pressing the key the installed relay switches on for approx. 2 seconds up to approx. 5 minutes (adjustable) and then switches off again. Operating voltage: 12 V=. Relay contact: 1 x ON, max. 25 V, 3 A.

**Technical data:**

Operating voltage: approx. 12 V=  
Power consumption: approx. 40 mA  
Switching times: approx. 2 sec. ...5 min. adjustable  
Relay-breaking capacity: max. 3 A max. 25 V  
Board dimensions: approx. 54 x 44 mm

Price group: 5  
Fitting case: G024



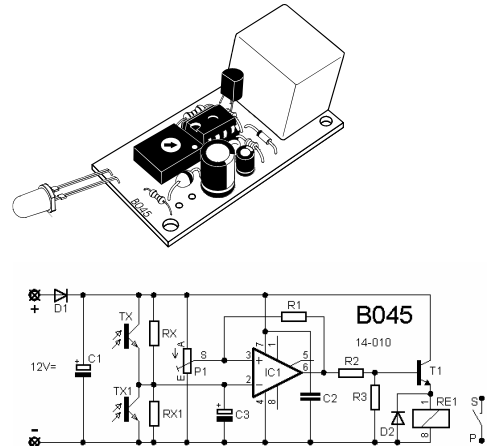
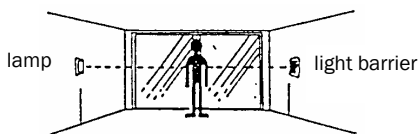
## B045 Light barrier 12 V=

...switches a relay on if there is light or darkness (shadow). Application: if the light ray of a lamp at doors, windows, etc. is interrupted by a person, the relay connects. May also be used as twilight switch.

**Technical data:**

Operating voltage: 12 V=  
Current consumption: < 100 mA  
Relay contact: 1 x ON max. 3 A max. 25 V  
Sensitivity: adjustable  
Designed for visible light  
Size of board: approx. 55,6 x 26,7 mm

Price group: 5  
Fitting case: G027



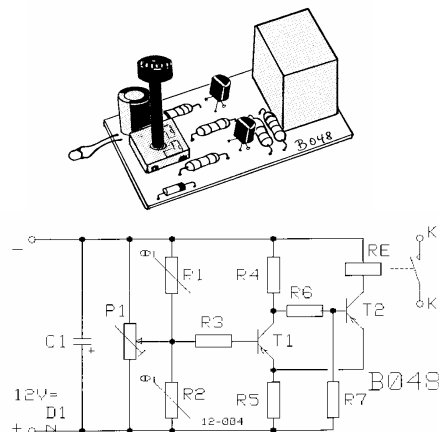
## B048 Temperature switch 12 V=

...switches according to a preset temperature a relay on or off. Ideal as thermostat, ice alarm, fire detector, etc. Temperature range: approx. - 30 °... + 150 °C. Relay contact: 3 A.

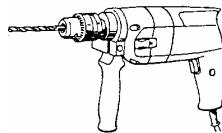
**Technical data:**

Operating voltage: 12...14 V=  
Current consumption: approx. 100 mA at maximum  
Temperature switching range: approx. -30 ... + 150 °C  
Relay contact: 1 x ON  
Contact capacity relay: max. 25 V, 3 A  
Board dimensions: approx. 54 x 28 mm

Price group: 5  
Fitting case: G024



# Kemo Electronic



## Kits

### B049 Power control 2600 VA 230 V~

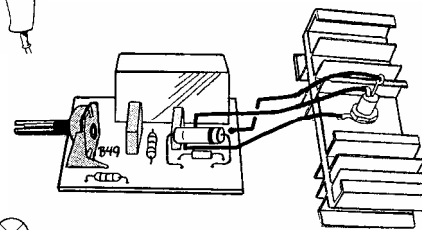
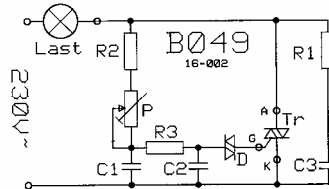
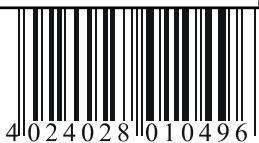
...controls steplessly glow lamps, heating devices, (e.g. soldering irons, heaters etc.) as well as motors (universal motors like drilling machines, keyhole saws, etc.). Max. power: 2600 VA. Max. temporary operating power: 3600 VA. There is also necessary a cooling element with min. dimensions: 10 x 10 x 3 cm.

**Technical data:**

Operating voltage: 180...240 V~  
 Range of control: approx. 0...95 %  
 Maximum load: 2600 VA  
 Board dimensions: approx. 56 x 25 mm



Price group: 6  
 Fitting case: G082



The cooling element is not included in this kit

### B051 Gas sensor - Spirits tester

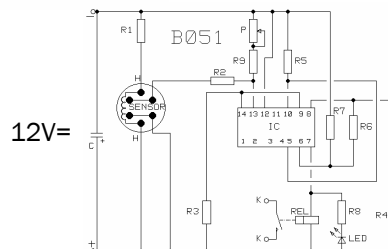
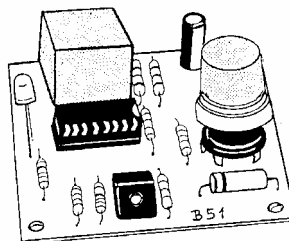
This instrument indicates gases such as alcohol, acetone, benzole, propane, carbon monoxide (contained in the smoke of fire). Perfect as alarm for gases + fire. Operating voltage: 12 V=, approx. 150 mA, indication: LED and relay (1 x ON 3 A).

**Technical data:**

Operating voltage: 12 V=  
 Relay: 1 x ON, 3 A  
 Board dimensions: approx. 55 x 45 mm



Price group: 7  
 Fitting case: G024

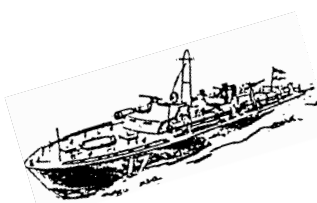


### B052 Destroyer siren

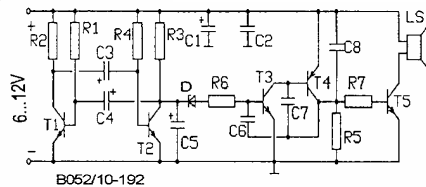
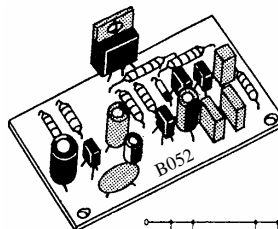
Warship siren "Clear decks for action". In rapid intervals sounds a shortly swelling tone: Uiiiit... Uiiiit... Power: 3...15 W, depending on the operating voltage. For 6...12 V=. For loudspeaker connection 8 Ohm.

**Technical data:**

Operating voltage: 6...12 V=  
 Output power: approx. 3...15 W  
 Loudspeaker power: 8 Ohm  
 Board dimensions: approx. 55 x 31 mm



Price group: 5  
 Fitting case: G027

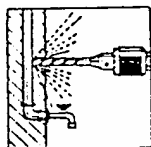
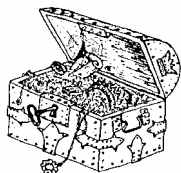


### B055 Metal searching device

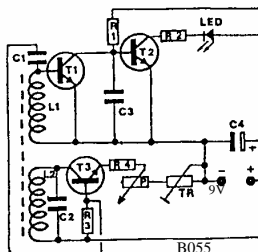
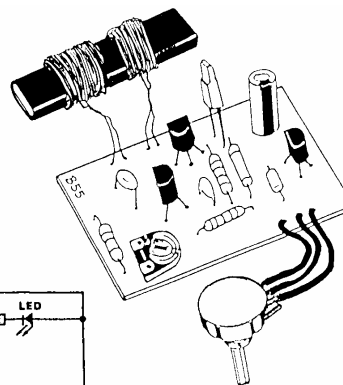
The device locates any metal element till a maximum of 60 mm in walls, floors, etc. Indication is realized through LED. The sensitivity is adjustable. With the help of the ferrite antenna exact locating is possible. Operating voltage: 9 V=.

**Technical data:**

Operating voltage: 9 V=  
 Sensitivity: adjustable  
 Detecting depth: max. 60 mm  
 Board dimensions: approx. 55 x 32 mm



Price group: 4  
 Fitting case: G01B



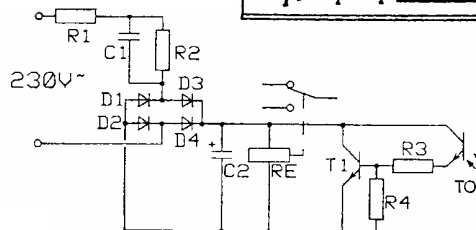
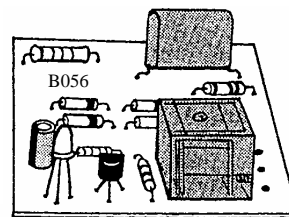
## B056 Twilight switch 230 V~

...switches loads up to 3 A 230 V~ (e.g. energy saving lamps) automatically at dusk via an installed relay and switches off again at dawn. The kit can also work the other way round: Switching off at dusk and connection at dawn.

**Technical data:**

Operating voltage: 230 Volt~  
 Load: max. 3 A  
 Light sensitivity: adjustable  
 Board dimensions: approx. 39 x 50 mm

Price group: 5  
 Fitting case: G010



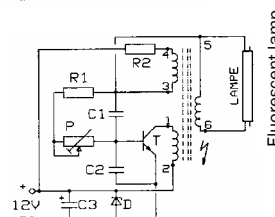
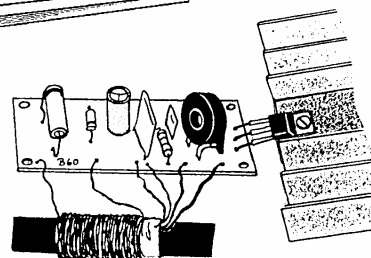
## B060 Fluorescent lamp voltage transformer

...with this set fluorescent lamps 8...40 W (ideal 18W) can be operated directly through a 12 V car battery. The light is as result of the high frequency without any flickering and considerably brighter than similar glowlamps. Ideal for weekend-houses, camping etc.

**Technical data:**

Operating voltage: 12 V=  
 Suitable fluorescent lamps: 8...40 W  
 Working frequency: > 1000 Hz  
 Brightness: adjustable  
 Board dimensions: approx. 50 x 21 mm

Price group: 5  
 Fitting case: G010



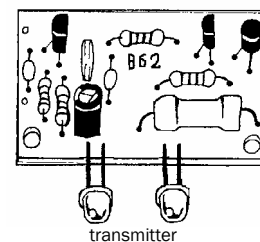
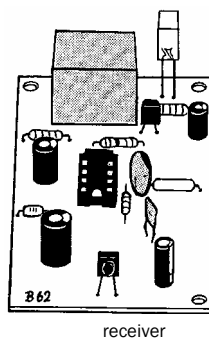
## B062 Infrared light barrier - range > 18 m -

Light barrier with invisible infrared light beam. Transmitter and receiver included! Operating voltage: transmitter 9 V=, receiver 12 V=, relay 1 x ON max. 3 A. Ideal for alarm systems, automatic animal picturing, remote control for garage doors, etc. With incorporated infrared filter for day operation!

**Technical data:**

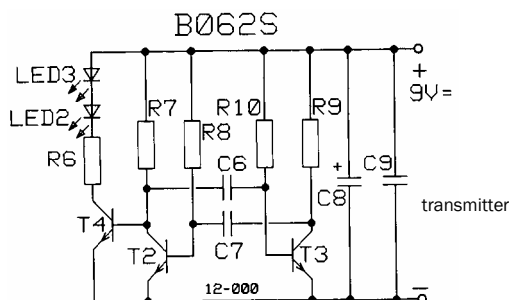
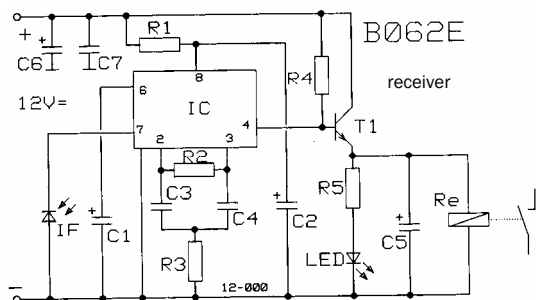
Operating voltage: 9 V= transmitter, 12 V= receiver  
 Transmitting power: adjustable  
 Relay contacts: 1 x ON, max. 3 A  
 Board dimensions receiver: approx. 55 x 44 mm  
 Board dimensions transmitter: approx. 23 x 45 mm

Price group: 9  
 Fitting case: G026  
 Fitting case: G027



Recommended tilted mirror if the infrared ray shall be deviated.

K002 Reflector Mirror see page 74.

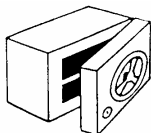


## B063 Digital number lock with super-flat foil keyboard!

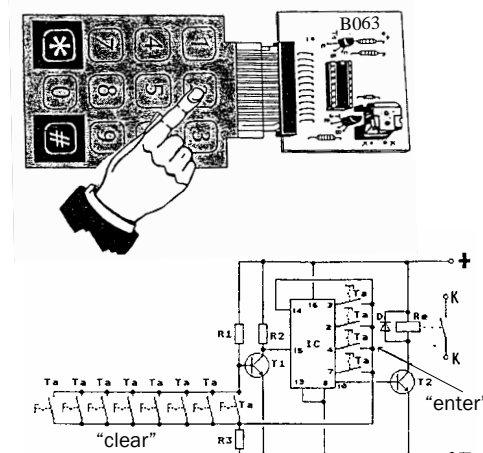
After typing in any four-figure number, the relay will pull up. The code number can be programmed freely and is easily changed. Relay contact: 1 x IN max. 5 A load. Operating voltage: 6 V=. Usage: As doorlock without using a key, to switch on devices (radio, TV sets, machines, etc.) which should not be operated by strangers. Even suitable for safe doors!

**Technical data:**

Operating voltage: 6 V=  
Relay contacts: 1 x IN, 5 A  
Order of figures: four-figure  
Board dimensions: approx. 55 x 55 mm



Price group: 7  
Fitting case: G010



## B065 Voltage transformer input: 6...12 V=, output: 12...30 V=, approx. 1,5...1 A

Electronic transformer for direct voltage. The altitude of the output voltage can be limited electronically. A heat sink approx. 8 x 8 x 2 cm is still necessary.

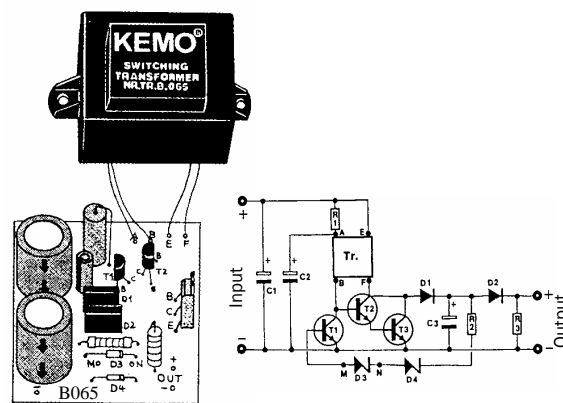
Application: for operation of appliances with a higher operating voltage (e.g.: power amplifiers, CB-radios) at a 6 V or 12 V car battery.

Output: for operation from 6 V to 12 V: approx. 1 A. At input 12 V and output 15...30 V between 1,5...1 A, the higher the output voltage, the less the current.

**Technical data:**

With input power 6 V:  
output 12 V= max. 1 A  
With input power 12 V:  
output 15...30 V=, max. 1,5...1 A  
Required cooling unit:  
8 x 8 x 2 cm or greater  
Board dimensions: approx. 55 x 55 mm

Price group: 8  
Fitting case: G010



## B069 Listening-stethoscope 9 V=

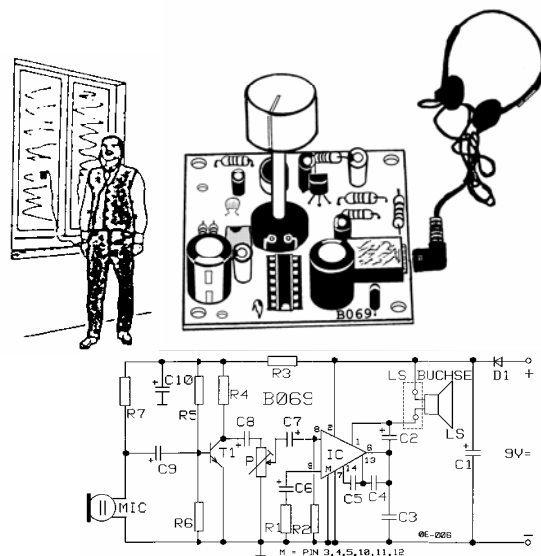
You are able to listen through thin walls, doors, windows, etc. Highly sensitive preamplifier with microphone capsule and headphone. To be used for observing animals (e.g. mice), as baby-alarm etc. UB: 9 V=.

Attention: It is prohibited on penalty to bug the conversations of other people as well as to eavesdrop on other flats through doors and windows!!!

**Technical data:**

Operating voltage: 9 V=  
Power consumption: < 100 mA  
Output power max. 0,5 W at 8 Ohm loudspeaker  
Board dimensions: approx. 57 x 57 mm

Price group: 8  
Fitting case: G081



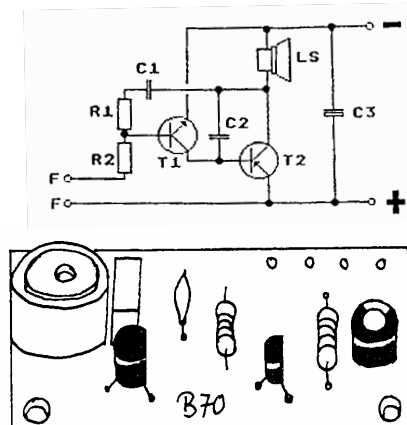
## B070 Water detector

...releases sonorous alarm in case of contact with water. This device will indicate water main burst, overflow washing-machines, full baths, etc. The sensor may be connected through a longer cable. Operating voltage: approx. 6...9 V=.

**Technical data:**

Operating voltage: 6...9 V=  
Alarm signal: acoustic (buzzer)  
Board dimensions: approx. 45 x 20 mm

Price group: 4  
Fitting case: G020



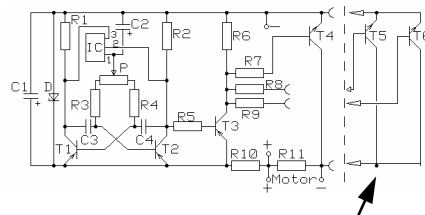
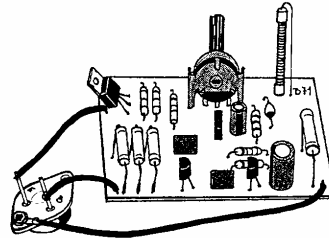
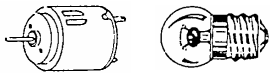
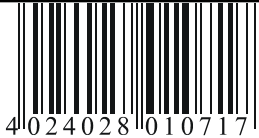
## B071 Dimmer 12...24 V= - 10/30 A speed regulator

Electronic d.c.-output regulator for incandescent lamps and motors up to max. 120 W (10 A). The power can be extended up to max. 360 W (30 A). When using operating voltages of 14...24 V=, it is necessary to buy 3 resistors (100 Ohm, 7 W) in addition.

**Technical data:**

Operating voltage: 12...24 V=  
 Max. load: 10 A (max. 30 A when enlarging the set with more transistors)  
 Load: ohmic and inductive (Lamps or motors)  
 Board dimensions: approx. 60 x 40 mm

Price group: 8  
 Fitting case: G010



Extender transistors for power up to max. 30A

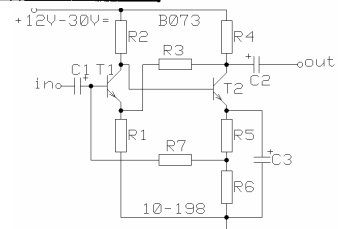
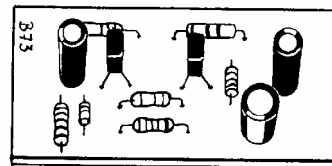
## B073 Pre-Amplifier, universal super wideband: approx. 10 Hz...150 kHz

2-step preamplifier for 12...30 V= operating voltage. Input: 2...20 mV, output: 200 mV...2 V. Application: pre-amplifier for high-power amplifier, headphones-amplifier, etc.

**Technical data:**

Operating voltage: 12...30 V=  
 Input sensitivity: approx. 2...20 mV  
 Output: approx. 200 mV...2 V  
 Structure: 2-stage  
 Board dimensions: approx. 32 x 55 mm

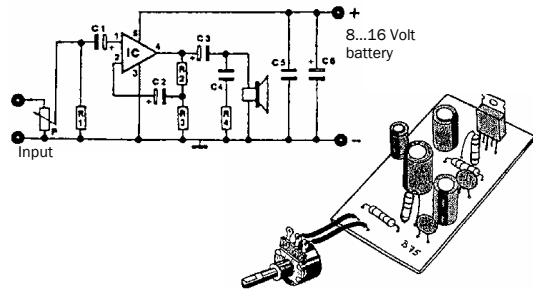
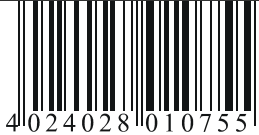
Price group: 3  
 Fitting case: G027



## B075 Amplifier 12 W

Hi-Fi amplifier, output: 4...12 W, depends on operating voltage and loudspeaker. Operating voltage: 8...16 V. For loudspeakers of 1,6...8 Ohm. Frequency range: approx. 40...20.000 Hz. Vi: 50 mV. Required cooling element: approx. 10 x 4 x 2 cm (cooling fin). Board dimensions: approx. 40 x 25 mm

Price group: 5  
 Fitting case: G010



## B077 Martin siren - german police siren 12 V= max. 15 W!

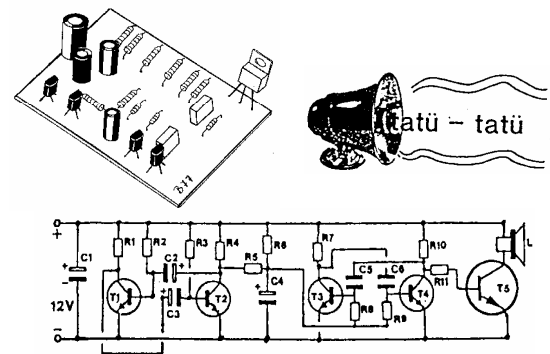
Especially high-powered siren with the tune similar to the german police siren: tatü...tatü...tatü. For loudspeaker connection: 8...16 Ohm.

- Forbidden to be used for road traffic -

**Technical data:**

Output power: max. 15 W  
 For loudspeaker: 8...16 Ohm  
 Operating voltage: 12 V=  
 Board dimensions: approx. 55 x 43 mm

Price group: 5  
 Fitting case: G082



## B078 Magnetizer 12 V=

This magnetic field device produces magnetic alternating currents. Investigations have shown that magnetic fields may bring relief to a great deal of diseases. Operating voltage: 12 V=.

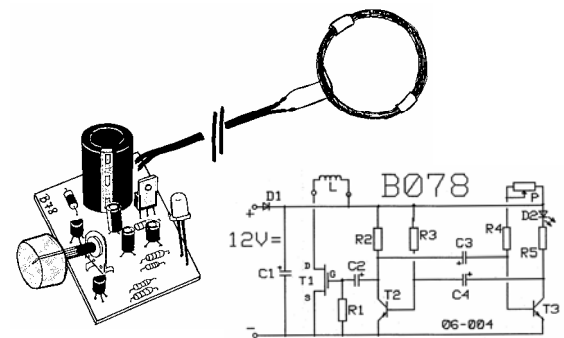
Rheumatism, migraine, headaches, troubled sleep, nervousness, disturbed circulation, scar pains, skin-diseases, altitude sickness, bronchial asthma, neuritis, etc.

Also well suitable for regeneration of the locomotor system of dogs (e.g. dachshund paralysis).

**Technical data:**

Operating voltage: 12 V=  
 Power consumption: approx. 300 mA  
 Magnetic field coil: approx. 90 mm Ø  
 Magnetic field: pulsating  
 Frequency: adjustable approx. 4...16 Hz  
 Board dimensions: approx. 54 x 44 mm

Price group: 6  
 Fitting case: G022



Only for animals, not for human beings!

## B079 Universal Ni-Cd-accumulator battery charger, 5 mA - 600 mA

Automatic accumulator battery charger for accumulators from 1,2...15 V. The charging voltage adjusts itself automatically. Automatic charging control indication with a luminous diode. Constant charging current, adjustable in 7 values: 5...600 mA. A transformer with an output voltage of approx. 18...20 V - 0.6 A is still necessary.

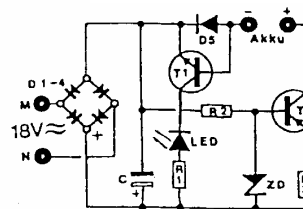
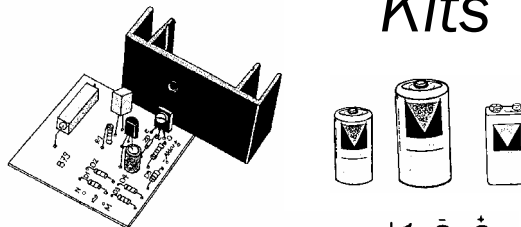
**Technical data:**

For accus from: 1,2...15 V  
Adaption of charging voltage: automatically  
Charging current: approx. 5 mA...600 mA  
Charging indication: through LED  
Required transformer: 18...20 V, 0,6 A  
Board dimensions: approx. 55 x 55 mm

Price group: 5  
Fitting case: G010



**B079 - PHASE-OUT PRODUCT!!!**  
Only available as long as stock lasts!



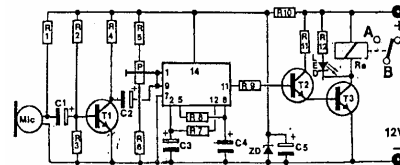
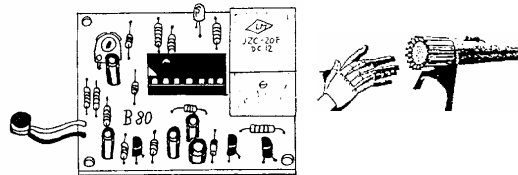
## B080 Clap switch

This acoustic switch switches on a relay whenever there is a noise like e.g. clapping of hands. If the clapping is repeated the relay will switch off. The sensitivity is adjustable. For 12 V= operating voltage. Usage: For switching on and off solely by "clapping" lamps or devices, as alarm system responding on noises, as party gag, etc.

**Technical data:**

Operating voltage: 12 V=  
Sensitivity: adjustable  
Contacts of the relay: 1 x change over, 3 A  
Board dimensions: approx. 56 x 45 mm

Price group: 7  
Fitting case: G027



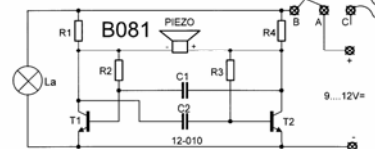
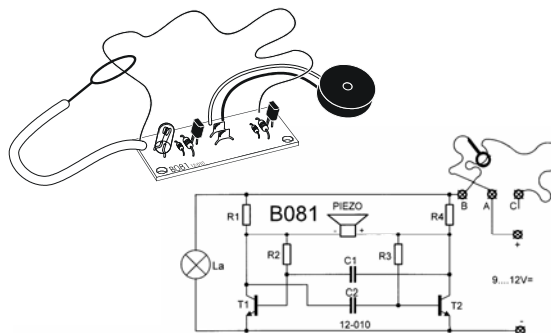
## B081 Deftness game

The matter is to pass a small wire loop through a thread wire with a lot of bends and obstacles. The person who touches the thread wire with the wire loop, will release an acoustic and optic signal. An interesting game for parties and for neverending evenings. Operating voltage: 9...12 V=.

**Technical data:**

Operating voltage: 9...12 V=  
Error indication: optical + acoustical  
Board dimensions: approx. 45 x 19 mm

Price group: 3  
Fitting case: G027



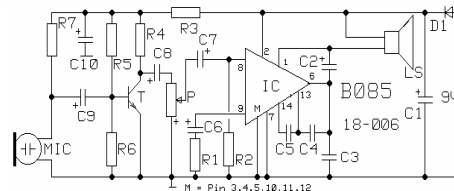
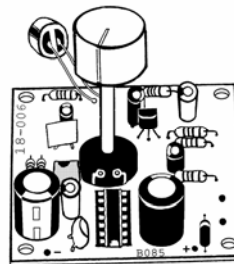
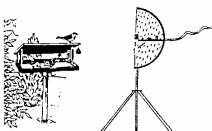
## B085 Parabolic-microphone

This highly sensitive microphone is able to receive after being fitted in a half-ball-shaped reflector (eg. a divided play ball) noises and words from more than some hundred meters. Ideal for observing animals, for detectives etc. For headphone connection 8 ohm. Operating voltage 9 V=.

**Technical data:**

Acoustic sensor:  
high-sensitive FET capacitor microphone  
Sensitivity: adjustable  
Operating voltage: 9 V=  
Power consumption: max. approx. 230 mA  
Board dimensions: approx. 56 x 56 mm

Price group: 6  
Fitting case: G081



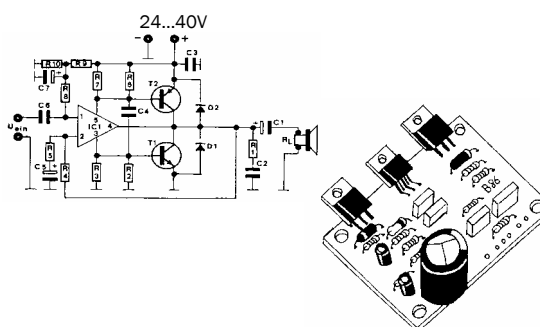
## B086 Amplifier 80 Watt

High quality power amplifier with IC. Operating voltage: 24...40 V. For loudspeaker 4...16 Ohm. F: approx. 20...20.000 Hz. Required cooling element: cooling fin with min. 2 kW (min. approx. 15 x 5 x 3 cm) and insulating material (3 x T0220), not included in the construction set!

**Technical data:**

Operating voltage: 24...40 V  
Loudspeaker connection: 4...16 Ohm  
Input sensitivity: approx. 500 mV  
Frequency characteristic: approx. 20...20.000 Hz  
Board dimensions: approx. 62 x 42 mm

Price group: 8



## B088 Mini traffic light

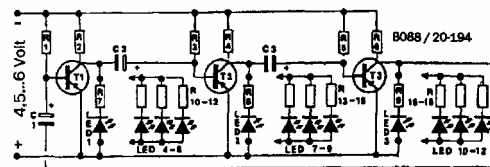
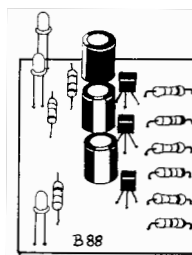
3 small light emitting diodes red-yellow-green will be lighted up in a slow sequence one after another. The control may also control a complete crossing with 4 traffic lights. The additional LED's are not included in the construction set.

**Technical data:**

Operating voltage: 4.5...6 V=  
 Switching: 3 (red-yellow-green)  
 Switching sequence: slowly  
 Board dimensions: approx. 43 x 34 mm

Price group: 4  
 Fitting case: G027

**B088 - PHASE-OUT PRODUCT!!!**  
 Only available as long as stock lasts!



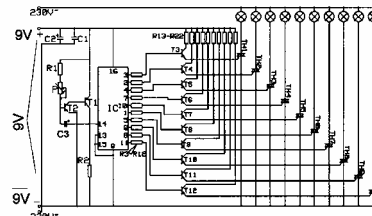
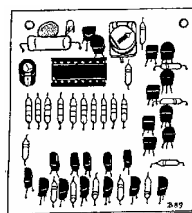
## B089 10-Channel running light 230 V~ + 9 V=

This digital 10-channel running light controls 10 different lamp outputs one after another and in regular intervals, lighting up the corresponding lamps one after another. For 230 V~ glow lamps, max. 100 W per output. The velocity is adjustable. The device works with fullwave control.

**Technical data:**

Operating voltage: 230 V~ + 9 V=  
 Power per channel:  
 max. 100 W glow lamp load  
 Running velocity: adjustable  
 Board dimensions: approx. 62 x 67 mm

Price group: 7  
 Fitting case: G081



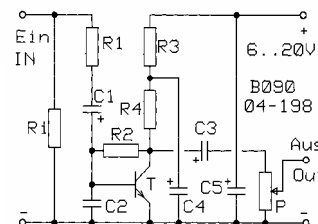
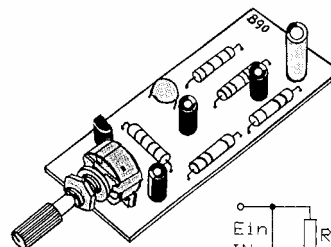
## B090 Microphone preamplifier

The input impedance is adjustable for any microphone from 4 up to 100 k Ohm. Input: approx. 2...40 mV. Output: max. 1.8 V pp. Amplification is adjustable. F: approx. 20...40.000 Hz. For 6...20 V=.

**Technical data:**

Input voltage: 2...40 mV  
 Output voltage: max. 1.8 Vpp  
 Frequency range: approx. 20...40.000 Hz  
 Operating voltage: 6...20 V=  
 Board dimensions: approx. 25 x 55 mm

Price group: 4



## B091 Kojak siren 12 V=, 15 W

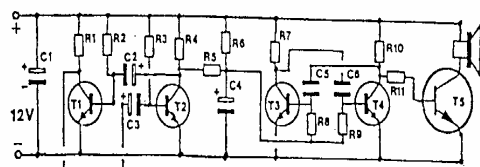
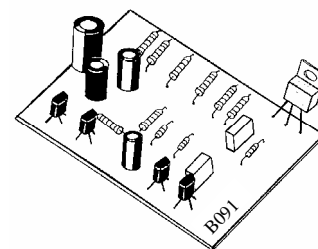
Especially audible siren, in rapid sequences rising up and reducing sound (like the one used in Kojak policecars). Due to the high operating frequency the sound will become extremely aggressive and widely audible! For loudspeakers from 8...32 Ohm.

- Forbidden to use in traffic! -

**Technical data:**

Operating voltage: 12 V=  
 Loudspeaker connection: 8...32 Ohm  
 Output power: max. 15 W  
 Power consumption: approx. 0.3...2 A,  
 depending on power  
 Board dimensions: approx. 55 x 43 mm

Price group: 5  
 Fitting case: G082



## B092 LED-alternating flasher

2 differently coloured light emitting diodes will flash alternately. Adjustable flashing velocity. Operating voltage: 6...12 V= (9 V battery). Usage: flashing adornments, name-plates, for miniature constructions etc.

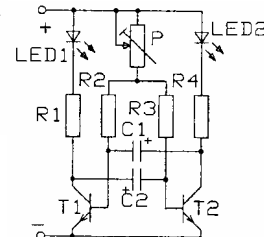
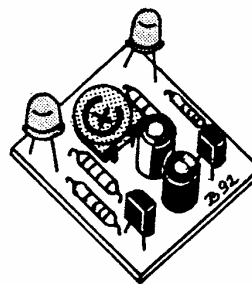
**Technical data:**

Operating voltage: 6...12 V=  
 Power consumption: approx. 20 mA  
 Flashing frequency: adjustable  
 Board dimensions: approx. 24 x 26 mm

Price group: 3  
 Fitting case: G01B



4 0 2 4 0 2 8 | 0 1 0 9 2 2



## B093 Electronic die

After pressing a key this digital die indicates depending on chance a number between 1...6. Indication takes place via LED's.

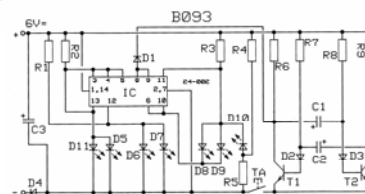
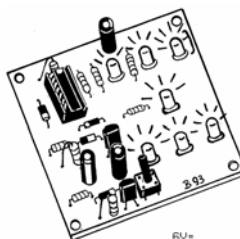
**Technical data:**

Operating voltage: 6 V battery or stabilized power supply  
 Current consumption: < 90 mA  
 Indication: Die numbers 1...6 via LEDs  
 Clock frequency: approx. 30 Hz  
 Board dimensions: approx. 55 x 55 mm

Price group: 5  
 Fitting case: G100



4 0 2 4 0 2 8 | 0 1 0 9 3 9



## B095 Marine diesel

...produces a very real noise of a running marine diesel engine. The diesel sound and the running speed are adjustable. For 12V, loudspeaker 4...8 Ohm.

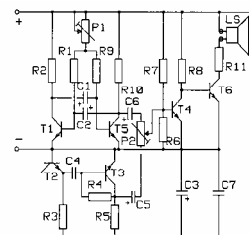
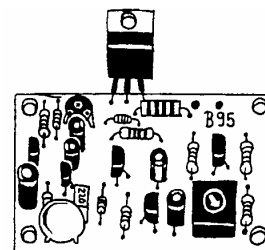
**Technical data:**

Operating voltage: 12 V=  
 Loudspeaker connection: 4...8 Ohm  
 Noises: adjustable  
 Board dimensions: approx. 55 x 46 mm

Price group: 5  
 Fitting case: G027



4 0 2 4 0 2 8 | 0 1 0 9 5 3



## B097 4-Channel running light 230 V~ + 12 V=

This digital 4-channel running light controls 4 different lamp outputs one after another and in regular intervals, lighting up the corresponding lamps one after another. For 230 V~ glow lamps, max. 100 W per output. The velocity is adjustable. The device works with fullwave control. UB: 12 V= and 230 V~.

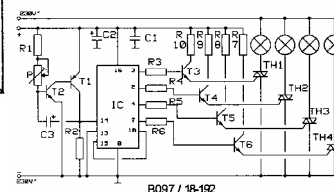
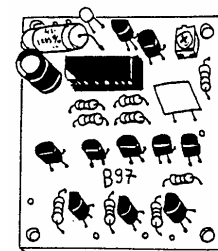
**Technical data:**

Operating voltage: 230 V~ + 12 V=  
 Power per channel:  
 max. 100 W bulb  
 Running speed: adjustable  
 Board dimensions:  
 approx. 58 x 44 mm

Price group: 6  
 Fitting case: G027



4 0 2 4 0 2 8 | 0 1 0 9 7 7



## B098 Interval switch

Pulse time: approx. 2...160 sec., pulse period: approx. 0,2...20 sec. adjustable. Operating voltage: 9...15 V=. The relay has a max. capacity of 3 A. Pulse indication through LED. Usage: interval switch for wiper/washer for cars, pulse switch for lamps, motors, etc. Pulse generator for alarm systems, etc.

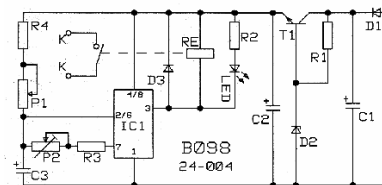
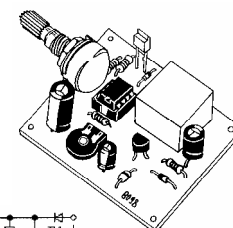
**Technical data:**

Operating voltage: 9...15 V=  
 Current consumption: approx. 60 mA  
 Relay contact: 1 x ON, max. 25 V, 3 A  
 Display: Visual functional test via LED  
 Clocking sequence: approx. 2...160 sec. adjustable  
 Cycle time: approx. 0,2...20 sec. adjustable  
 Board dimensions: approx. 55 x 45 mm

Price group: 7  
 Fitting case: G024



4 0 2 4 0 2 8 | 0 1 0 9 8 4





## B099 Special antenna amplifier 30...850 MHz

Wideband antenna amplifier, approx. 30...850 MHz. Operating voltage: 9...12 V=. Input and output impedance: 60 Ohm. Amplification max. 20 dB. No need of balancing. Especially suitable for amplification of weak television signals within VHF and UHF range as well as for amateurs receivers.

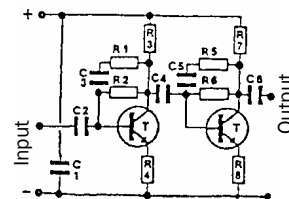
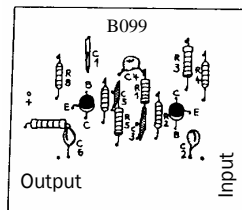
**Technical data:**

Operating voltage: 9...12 V=  
 Input and output impedance: 60...75 Ohm  
 Frequency range: approx. 30...850 MHz  
 Amplification: max. 20 dB  
 Board dimensions: approx. 55 x 55 mm

Price group: 5



**B099 - PHASE-OUT PRODUCT!!!**  
 Only available as long as stock lasts!



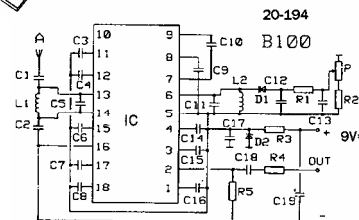
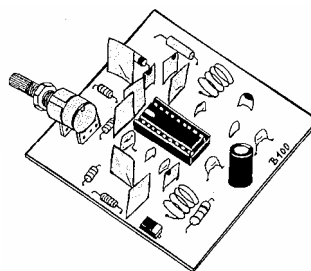
## B100 FM-Receiver 9 V=

High-quality FM-receiver with special-IC. There are hardly tuning necessity (2 coils to be wound). Extraordinary sensitive + selective! Output: approx. 40 mV for a final amplifier or earphone.

**Technical data:**

Operating voltage: 9 V=  
 Current capacity: < 10 mA  
 Output voltage: > 40 mV  
 Receiving range: FM  
 Board dimensions: approx. 55 x 55 mm

Price group: 6  
 Fitting case: G082



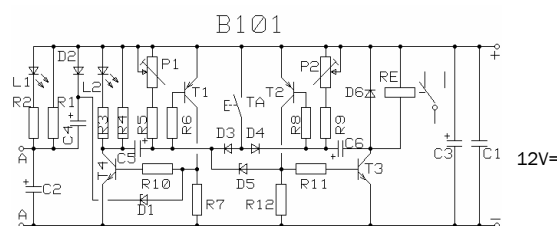
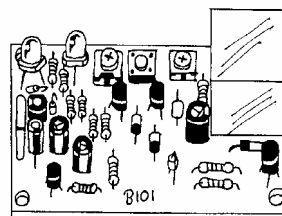
## B101 Universal alarm system for car, boat, house, garden, yard

Professional alarm unit for 12 Volt=. Connecting features: max. 20 rest contacts. Contact control and alarm indication via LED's. Adjustable rise-delay time and alarm duration: approx. 2...15 seconds and 8...30 seconds, in accordance with the police law.

**Technical data:**

Operating voltage: 12 V=  
 Rise-delay: adjustable  
 Alarm delay: adjustable  
 Alarm duration: approx. 8...30 sec.  
 Relay contact: 1 x change over, 5 A  
 Board dimensions: approx. 58 x 45 mm

Price group: 7  
 Fitting case: G028



Alarm contacts: A002, A003 and A004 page 75.

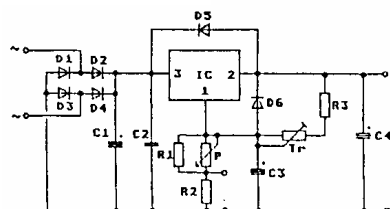
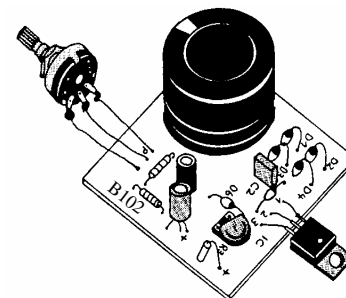
## B102 Power supply, approx. 1,2...30 V, max. 2A

Stabilized, electronically controllable power supply with power-IC. There is also necessary a transformer 24 V / 2 A and 1 cooling element with min. dimensions: 10 x 10 x 5 cm.

**Technical data:**

Output voltage: approx. 1,2...30 V, adjustable  
 Max. output current: approx. 2 A  
 Board dimensions: approx. 55 x 55 mm

Price group: 7



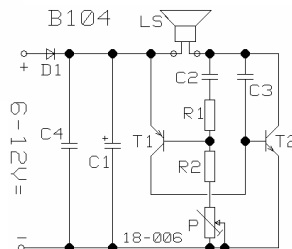
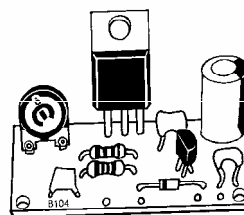
## B104 Ship siren

...produces a loud, deep sound of a siren, similar to that of big vessels. Suitable for model ships, alarm systems, as doorbell or the like. For 6...12 V=, loudspeaker socket 8 Ohm > 2 W.

**Technical data:**

Operating voltage: 6...12 V=  
 Current consumption: approx. 30 mA at 12 V=  
 and 8 Ohm loudspeaker  
 Loudspeaker socket: 8 Ohm / 5 W  
 Sound: low frequency (adjustable)  
 Board dimensions: approx. 45 x 18 mm

Price group: 4  
 Fitting case: G024



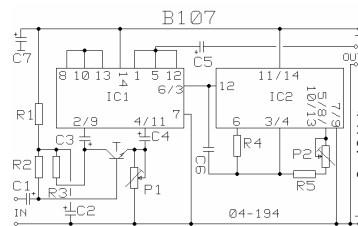
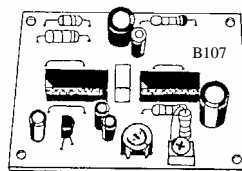
## B107 Robot-voice

...alters the introduced speech so that it sounds like the voice of a robot. Adjustable effects. The device should be connected between the microphone and amplifier (or tape recorder).

**Technical data:**

Operating voltage: 9...12 V=  
 Input: approx. 5 mV for microphone  
 Output: > 50 mV for amplifier input  
 Language alienation: adjustable  
 Board dimensions: approx. 55 x 45 mm

Price group: 5  
 Fitting case: G027



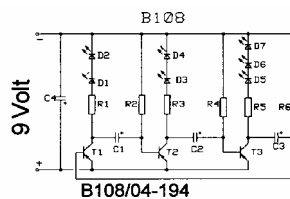
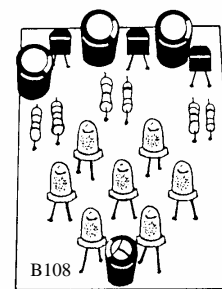
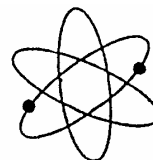
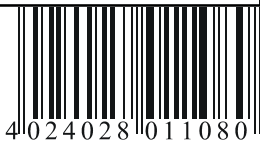
## B108 Atomium

Especially decorative device, 6 yellow LED's ("electrons") rotate one red LED ("atomic nucleus") optically. UB 9 V, ideal as adornment, identity disc, clothes-pin, etc.

**Technical data:**

Operating voltage: 9 V=  
 Light indication: 7 LED's, each 5 mm  
 Board dimensions: approx. 45 x 55 mm

Price group: 4  
 Fitting case: G021



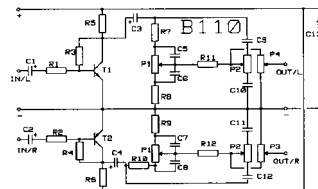
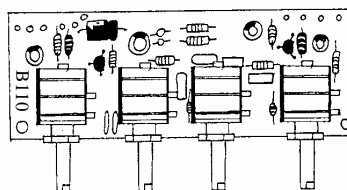
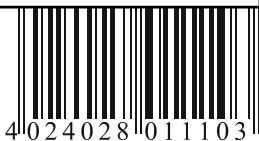
## B110 Stereo tone control

Separate treble-, and volume-control. This stereo-tone-control may be connected in front of the output-amplifier. Treble, bass, and volume are separately adjustable.

**Technical data:**

Operating voltage: 9...18 V=  
High frequency and bass:  
adjustable independently  
Board dimensions: approx. 115 x 38 mm

Price group: 8



18-192

## B111 LED-VU-METER - 11 LED's

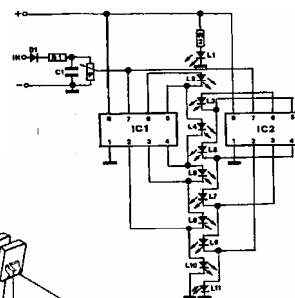
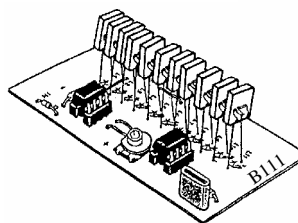
### LED volt- or amperemeter with 11 LED's

Almost inertialess measuring device with 11-LED-indication. Operating voltage: 12 V=. Ideal as volume indicator for amplifiers and cabinets, as volt- or amperemeter for mains supplies, etc.

**Technical data:**

Operating voltage: 12 V=  
Display: 11 LED's, light band  
Sensitivity: adjustable  
Board dimensions: approx. 92 x 46 mm

Price group: 6  
Fitting case: G010



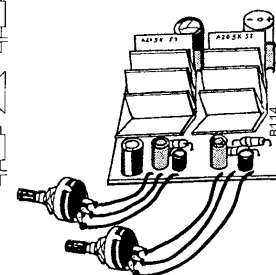
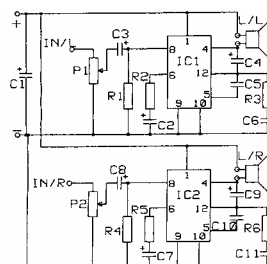
## B114 Stereo amplifier, 2 x 8 W

2 x 8 Watt - 6...15 V=, for loudspeaker 4...16 Ohm.

**Technical data:**

Operating voltage: 6...15 V=  
Loudspeaker connection: 4...16 Ohm  
Frequency response: 20...20.000 Hz  
Power: max. 2 x 8 W  
Board dimensions: approx. 54 x 63 mm

Price group: 7  
Fitting case: G010



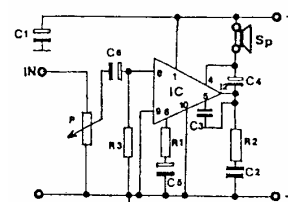
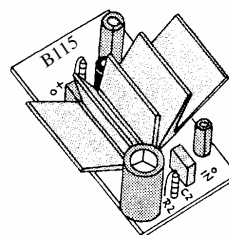
## B115 Amplifier 8 Watt

HiFi-amplifier with one IC. Operating voltage: 6...16 V= Sensitivity: approx. 160 mV, for loudspeakers 4...16 Ohm. Frequency range: 40...20.000 Hz.

**Technical data:**

Max. output power: 8 W  
Operating voltage: 6...16 V=  
Input sensitivity: approx. 160 mV  
Loudspeaker connection: 4...16 Ohm  
Frequency response: approx. 40...20.000 Hz  
Board dimensions: approx. 55 x 27 mm

Price group: 5  
Fitting case: G010



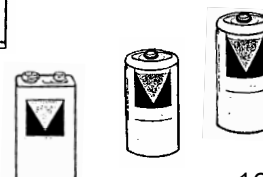
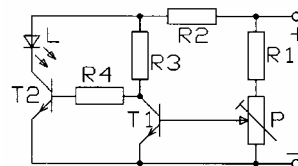
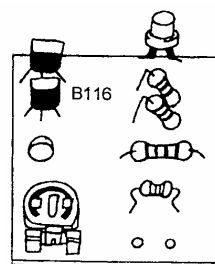
## B116 Battery guard 3...15 V=

...supervises batteries and accus between 3...15 Volt. LED indicator will light up whenever the voltage falls under the predetermined value. There is no need of any own operating voltage. Threshold voltage is adjustable. This device makes it possible to avoid the injurious full discharging of accus, etc.

**Technical data:**

Voltage control: 3...15 V=, adjustable  
Static current: approx. 1...3 mA  
Display: LED  
Board dimensions: approx. 27 x 20 mm

Price group: 3  
Fitting case: G061



## B119 Converter approx. 100...200 MHz

The converter makes it feasible to receive, for example, taxi radio, amateur radio, marine radio broadcasting, television sound, etc. through an ordinary FM-radio. The converter has simply to be placed within the antenna lead! It is necessary to observe the Postal Regulations!

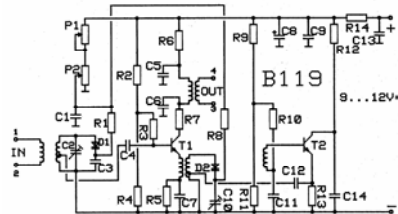
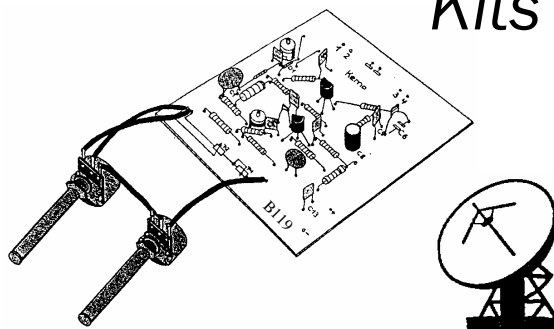
Attention: Only radio amateurs who demonstrably have a licence are allowed to possess this kit! (CCT-Law within the EEC).

Please consider, at any circumstances, before starting operation the corresponding legal regulations (telecommunication law). It is not allowed to listen these frequencies out of the radio range. The operation of the converter is solely permitted to those amateurs holding the respective licence.

**Technical data:**

Operating voltage: 9...12 V=  
Sensitivity: up to 0,8 µV at 10 dB S/N  
Board dimensions: approx. 85 x 95 mm

Price group: 8



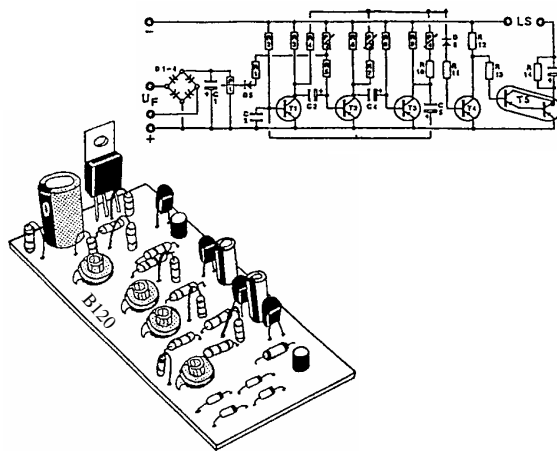
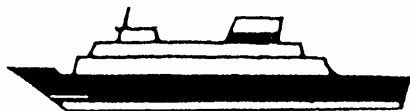
## B120 Ship super diesel 6...12 V=

...produces exceptionally original the rumbling noise of a super diesel motor. It could be adjusted independently: exhaust system noise, rumbling of the valves, running velocity. The running velocity could also be adjusted in function of the electro traction motor. For loudspeaker 4...8 Ohm, 7...10 W!

**Technical data:**

Operating voltage: 6...12 V=  
Loudspeaker connection: 4...8 Ohm  
Power: max. 7...10 W  
Noises: adjustable  
Board dimensions: approx. 70 x 35 mm

Price group: 7  
Fitting case: G010



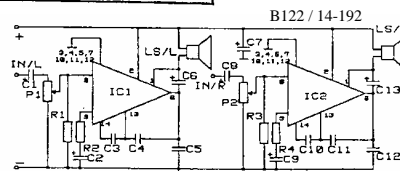
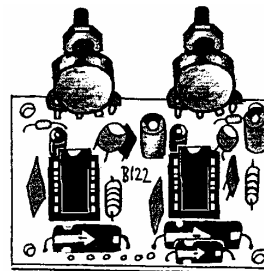
## B122 Stereo amplifier

2 x 2,5 W, 6...12 V=, for loudspeaker 8...16 Ohm

**Technical data:**

Operating voltage: 6...12 V=  
Frequency response: approx. 20...20.000 Hz  
Input sensitivity: approx. 100 mV  
Loudspeaker connection: 8...16 Ohm  
Output power: max. 2,5 W per channel  
Board dimensions: approx. 54 x 44 mm

Price group: 5  
Fitting case: G027



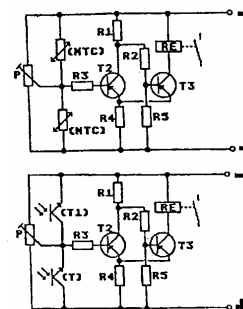
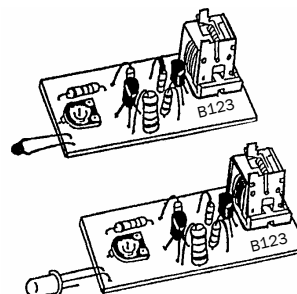
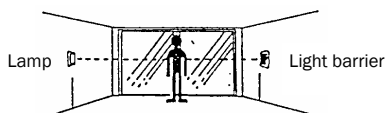
## B123 Combination kit: Light barrier - heat switch - twilight switch 12 V=

With this "combination construction set" you may optionally construct a light barrier, a heat switch (-40° C ... +100° C), ice alarm or a twilight switch. Operating voltage: 12 V=. The relay has a max. load of 6 A.

**Technical data:**

Operating voltage: 12 V=  
Current capacity: max. approx. 120 mA  
Relay: 1 x 0N, max. 6 A  
Switching threshold: adjustable  
Board dimensions: approx. 45 x 22 mm

Price group: 6  
Fitting case: G027



## B124 Stereo LED-volume indicator

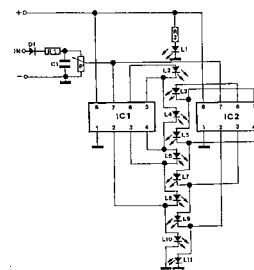
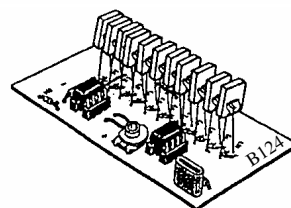
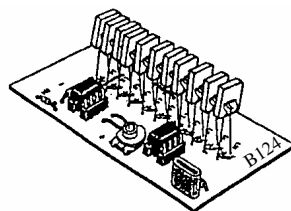
2 x 11 LED's

Almost inertialess volume indicator for amplifier units from 2...100 Watt. Indication is realised through 22 LED's (2 x 11 LED). Operating voltage: 12 V=. Easy connection with the loudspeakers.

**Technical data:**

Operating voltage: 12 V=  
Sensitivity: adjustable  
Display: 2 x 11 LED's  
Display type: light band  
Board dimensions: approx. 92 x 46 mm

Price group: 9



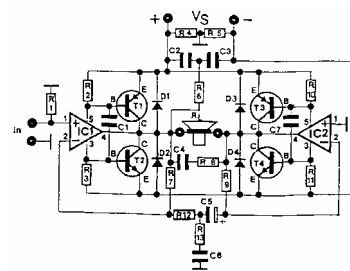
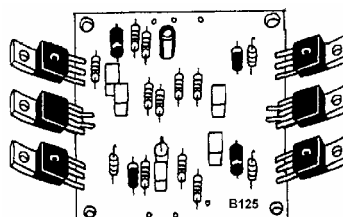
## B125 200 W Amplifier

High-power amplifier of top-class quality for loudspeaker from 4...16 Ohm. Operating voltage: 24...36 V, max. 5 A. F: 20...20.000 Hz. Required cooling element: cooling fin with min. dimensions 20 x 10 x 4 cm or greater (thermal resistance < 1 k/W). The cooling element and insulation material is not enclosed.

**Technical data:**

Operating voltage: max. 44 V (max. 5 A)  
Loudspeaker: 4...16 Ohm  
Frequency response: 20...20.000 Hz  
Input sensitivity: approx. 500 mV  
Board dimensions: approx. 56 x 51 mm

Price group: 10



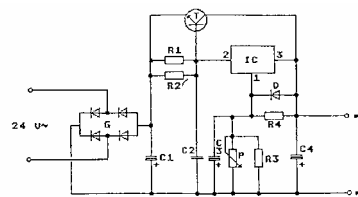
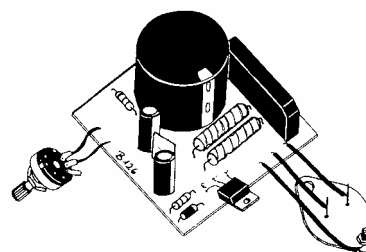
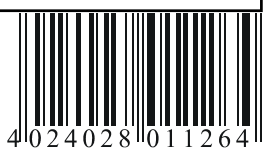
## B126 Power supply, approx. 1,2...30 V, max. 5A

Steplessly adjustable power supply with a power IC. Max. current consumption: 5 Ampere. There is also necessary a mains transformer 24 V 5 A and 2 cooling elements with min. dimensions: 15 x 10 x 7 cm and 5 x 10 x 3 cm (or similar).

**Technical data:**

Output voltage: adjustable approx. 1,2...30 V  
Output current: max. 5 A  
Input voltage: 24 V~ 5 A  
Board dimensions: approx. 55 x 55 mm

Price group: 9



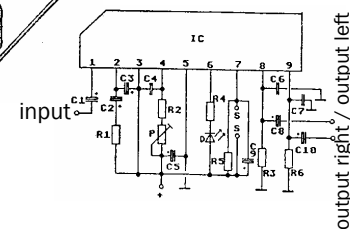
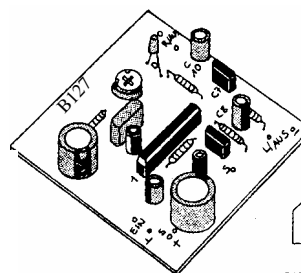
## B127 Stereo decoder

The decoder has simply to be connected at the A.F. output (e.g. loudspeaker connection) of a FM-radio. It is then possible to connect at the output of the decoder a stereo amplifier. Disconnectable, automatic switch-over mono-stereo when receiving the stereo signal. Stereo indication through LED.

**Technical data:**

Operating voltage: 4,5...12 V=  
Change over mono / stereo: automatically  
Stereo indication: through LED  
Board dimensions: approx. 70 x 70 mm

Price group: 4  
Fitting case: G010

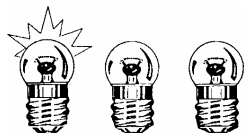


## B128 3-channel running light for glow lamps 6...24 V=

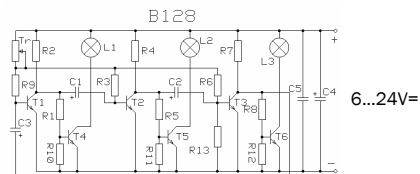
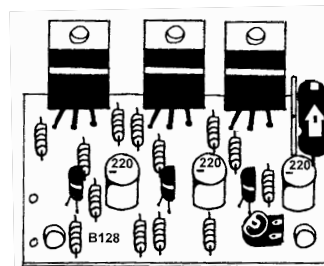
Adjustable running velocity, operating voltage depends on the voltage of the lamps connected. Each channel may be loaded max. 3 A.

**Technical data:**

Operating voltage: 6...24 V=  
Channels: 3  
Capacity: 3 A per channel  
Running velocity: adjustable approx. 1...10 Hz  
Board dimensions: approx. 65 x 45 mm



Price group: 6  
Fitting case: G010



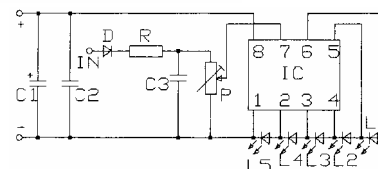
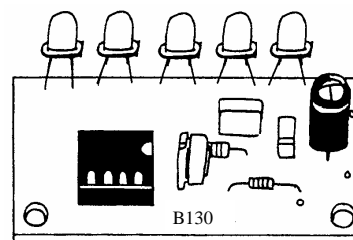
## B130 LED-Recording level indication, 5 LED's LED volt- and ammeter

Almost inertia-free measuring instrument with 5-LED-indication. Perfect as recording level indication for amplifiers or loudspeaker enclosures, as volt- or amperemeter etc. For 12 Volt=.

**Technical data:**

Operating voltage: 12 V=  
Indication: 5 LED's  
Indication method: light band  
Sensitivity: adjustable  
Board dimensions: approx. 44 x 23 mm

Price group: 4  
Fitting case: G026



Perfect as LED-voltmeter for cars!

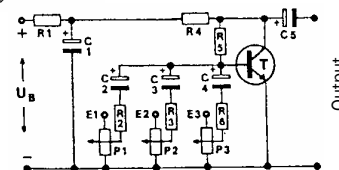
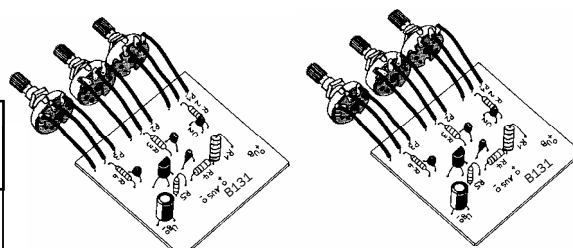
## B131 Stereo mixer unit

It is possible to mix up 3 stereo signals and to adjust each channel separately. Operating voltage: approx. 6...12 Volt=. Output: max. 3V. F: 20...20.000 Hz.

**Technical data:**

Operating voltage: 6...12 V=  
Inputs: 2 x 3  
Outputs: 2  
Frequency response: approx. 20...20.000 Hz  
Board dimensions: approx. 55 x 55 mm

Price group: 7  
Fitting case: G010



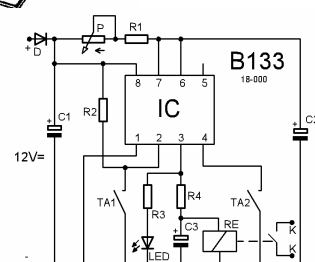
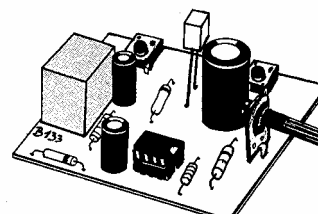
## B133 Precision timer

Adjustable time switch for switching operations from approx. 1 sec. to approx. 40 minutes. The device switches on after pressing the key and switches off again when the adjusted time has expired. The lapse of time may be interrupted any time with the reset key. Operating voltage: 12 V=. Rupturing capacity: max. 25 V 3 A.

**Technical data:**

Adjustable time: approx. 1 sec. to 10 min. or approx. 3 sec. to 40 min.  
Adjustment of time: with an adjustable regulator  
Operating voltage: 12 V=  
Current consumption: < 50 mA  
Rupturing capacity: max. 25 V, max. 3 A  
Switching contact: 1 x ON  
Board dimensions: approx. 54 x 44 mm

Price group: 6  
Fitting case: G024



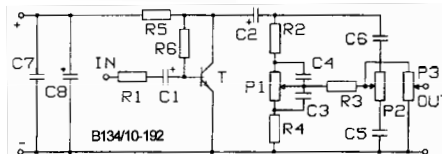
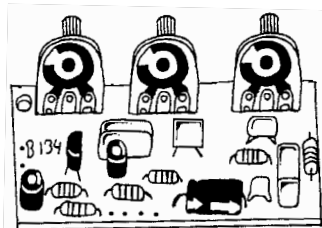
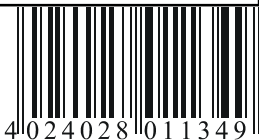
## B134 Mono sound controller separate treble, bass and volume regulation

This mono sound controller must be superposed to the mono final amplifier. Trebles, basses and volume are adjustable separately.

**Technical data:**

Operating voltage: 9...18 V=  
Current load: approx. 3 mA  
Controlling: approx. ± 15 dB  
Board dimensions: approx. 63 x 30 mm

Price group: 5  
Fitting case: G010



## B136 Electronic acupuncture

The electronic acupuncture may bring relief to many diseases. This kit works according to electronic acupuncture system. You will find enclosed an illustrated description for the treatment.

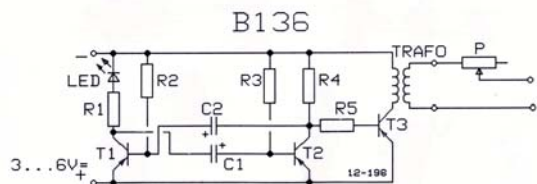
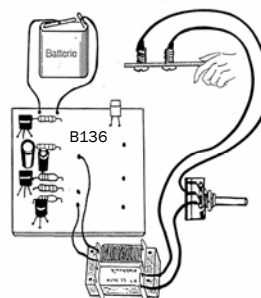
Operating voltage: 3...6 V=

Prof. Dr. Kazumi Masaki, University of Osaka, has found out that it is possible to replace the since millenium well-proven acupuncture needle by low-frequency undulated currents. 2 electrodes which have to be placed simply on the skin, substitute the often aching treatment with the needle. The electronic acupuncture is free of pain but effective, and may perhaps substitute medicine.

**Technical data:**

Operating voltage: 3...6 V=  
Power consumption: < 100 mA  
Output pulses: adjustable according to skin resistance in case of very low currents.  
Board dimensions: approx. 45 x 55 mm

Price group: 5



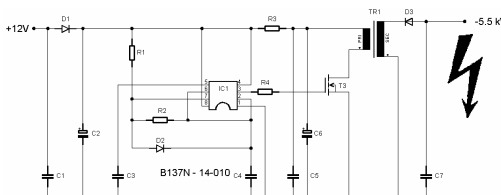
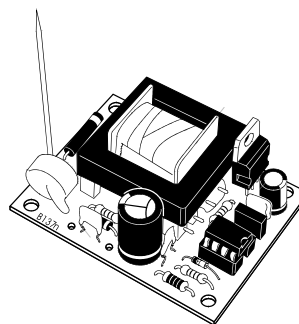
## B137N Ion generator ---Indoors health resort climate---

Input: 12 V=, output: 5...7 kVs. This ion-generator regenerates negatively loaded air particles (air-ions). By this, an air-regenerating effect as well as the binding of dust and bacteria will be achieved. A high share of negative air-ions is necessary for the general well being: it reduces troubled sleep, aggressiveness, headache, sensitivity to changes in the weather, lack of concentration, etc.

**Technical data:**

Operating voltage: 12 V= (stabilised power supply pack)  
Current consumption: approx. 30...50 mA  
Output voltage: static, approx. 5.000....7.000 V peak value  
Board dimensions: approx. 58 x 45 mm

Price group: 5  
Fitting case: G027



## B145 Electronic melody "It's a small world"

...plays for a long time the famous melody in an expressive high-quality sound. The melody will start through a push-button and stop automatically. Loudspeaker included.

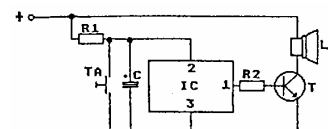
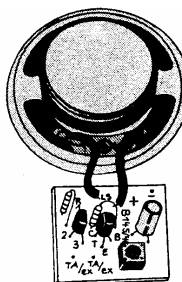
**Technical data:**

Operating voltage: 3 V=  
Loudspeaker: 8 Ohm  
Melody period: 64 notes  
Board dimensions: approx. 25 x 28 mm

Price group: 5  
Fitting case: G02B



**B145 - PHASE-OUT PRODUCT!!!  
Only available as long as stock lasts!**



## B146 Electronic melody "Coo Coo Waltz"

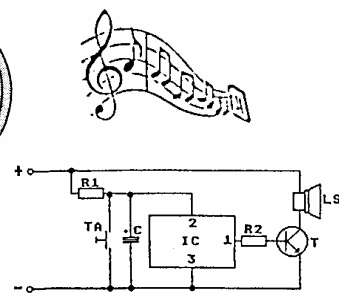
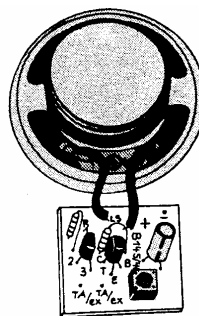
...plays for a long time the famous Waltz melody in an expressive high-quality sound. The melody will start through a push-button and stop automatically. Loudspeaker included.

**Technical data:**

Operating voltage: 3 V=  
Loudspeaker: 8 Ohm  
Melody period: 64 notes  
Board dimensions: approx. 25 x 28 mm

Price group: 5  
Fitting case: G02B

**B146 - PHASE-OUT PRODUCT!!!**  
Only available as long as stock lasts!



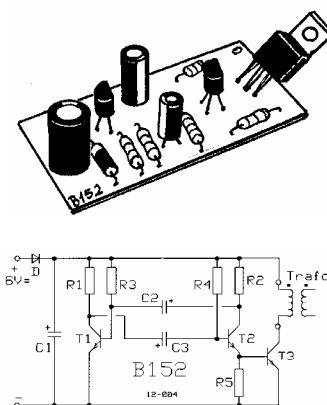
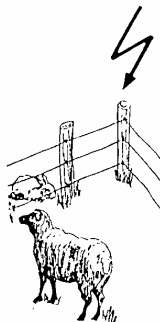
## B152 Electronic fence appliance

...produces a pulsatory high-voltage of > 3000 Volt out of 6 Volt. For small animal-electric fences, as protection against burglars (set the door handles under voltage etc.). Furthermore a standard power transformer 230 V~ / 12 V 1 A is necessary.

**Technical data:**

Operating voltage: 6 V=  
Average power consumption: approx. 100 mA on average, up to 1,5 A in pulse spikes  
Board dimensions: approx. 45 x 21 mm

Price group: 5  
Fitting case: G024



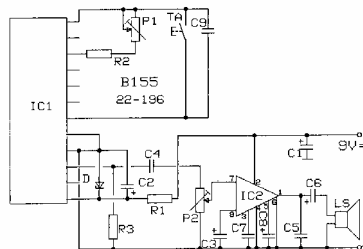
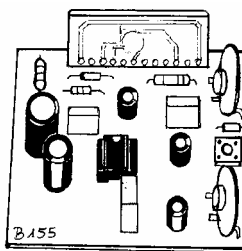
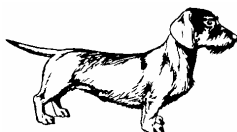
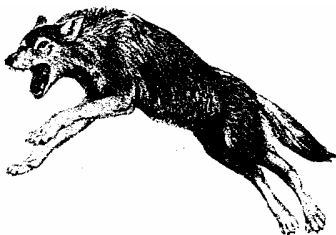
## B155 Electronic dog barking

Produces almost realistically and loudly the barking of a dog. For one loudspeaker 8 Ohm, > 1 W. Operating voltage 9 V=. The barking is stored on a special-voice-synthesizer-IC. The sound is adjustable, i.e. from "little yelper" to "big naughty dog".

**Technical data:**

Operating voltage: 9 V=  
Loudspeaker: 8 Ohm (not included)  
Board dimensions: approx. 55 x 55 mm

Price group: 6  
Fitting case: G082



## B156 FM-Receiver

**Also for police radio and aeronautical radio service approx. 108 - 132 MHz!**

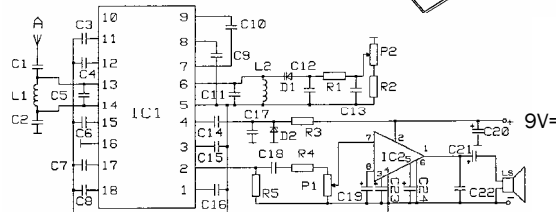
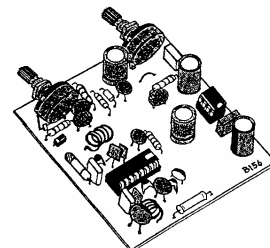
High-quality receiver with the IC TDA 7000. Excellent reception properties + selectivity. Loudspeaker connection 8 Ohm (1 W). Very simple construction, almost no alignments are necessary. Operating voltage 9 Volt approx. 88 - 108 MHz.

Licensed radio amateurs may extend the frequency area of this FM-receiver up to approx. 132 MHz.

**Technical data:**

Operating voltage: 9 V=, approx. 88 - 108 MHz  
LF-output power: approx. 1 W  
Loudspeaker connection: 8 Ohm  
Receiving range: FM  
Board dimensions: approx. 60 x 70 mm

Price group: 9  
Fitting case: G081





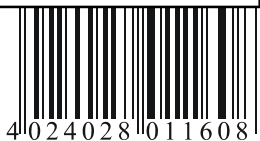
## B160 LED-VU-Meter - 30 LED's

Adjustable sensitivity. Application: control-display for amplifiers and loudspeakers, voltmeter or amperemeter, etc.

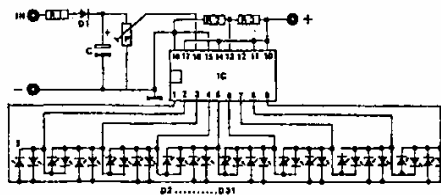
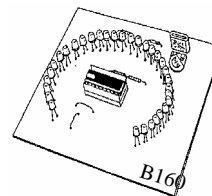
**Technical data:**

Operating voltage: 8...16 V  
 Input current: approx. 20 mA  
 Indication: luminous spot indication  
 Board dimensions: approx. 91 x 91 mm

Price group: 9



**B160 - PHASE-OUT PRODUCT!!!**  
 Only available as long as stock lasts!



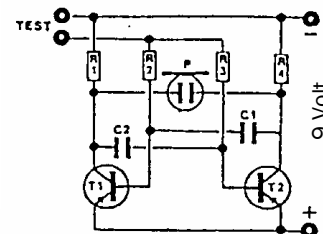
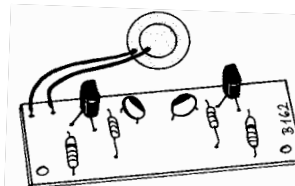
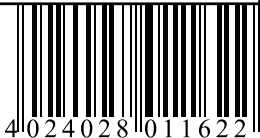
## B162 Continuity tester with piezo buzzer

For testing highly resistive and low impedance connections. An extremely low holding-wire current flows (< 10 µA). If the connection is conductive, the piezo buzzer hums. Also usable as rain indicator when the test probes contact water!

**Technical data:**

Operating voltage: 9 V=  
 Acoustical electrical transducer: piezo  
 Measuring current: < 10 µA  
 Board dimensions: approx. 19 x 55 mm

Price group: 3  
 Fitting case: G01B



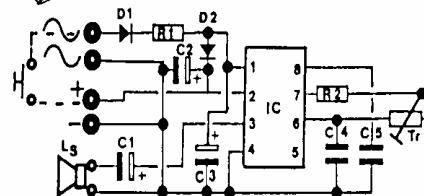
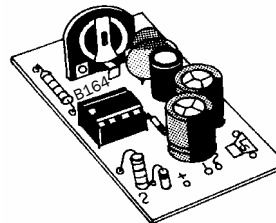
## B164 3-Tone gong 9 V=

Melodious, electronic 3-tone Gong with the Siemens IC SAB 600. Ideal as door-gong, identification signal, announcement of news etc. Operating voltage: 9 V=. For loudspeaker 8 Ohm. Released through a pushbutton or with a voltage 6...12 V coming from the doorbell system (DC or AC voltage).

**Technical data:**

Operating voltage: 9 V=  
 Loudspeaker: 8 Ohm  
 Board dimensions: approx. 55 x 27 mm

Price group: 7  
 Fitting case: G027



## B172 The little electro-technician

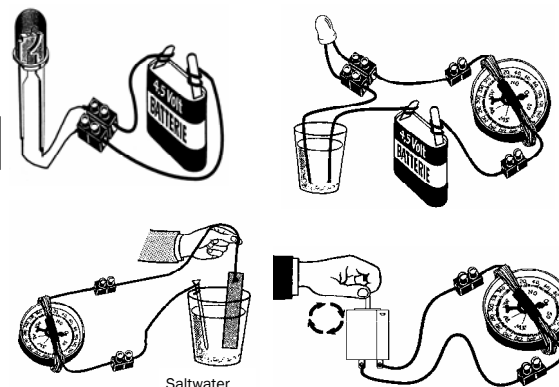
Easy instructional construction set for beginners from 8 years on. The cables are not soldered, solely screwed or twisted. The tests are described through figures and helpful descriptions. As current supply is been used a 4,5 V flat battery (not included). Among others there are to be made following tests:

- 1) ordinary circuit with small lamp
- 2) electromagnetism
- 3) current proof through compass needle
- 4) radio transmitter system Marconi
- 5) generator
- 6) selfmade battery etc.
- 7) test: of conductivity of water
- 8 + 9) LED tests

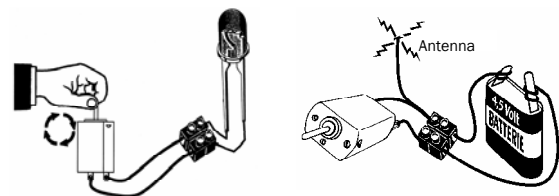
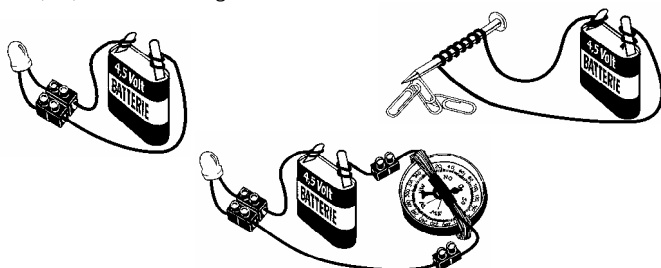
**Technical data:**

Operating voltage: 4,5 V battery (not included)  
 Wiring: through screw-type terminals and loose twisting  
 Mounting instructions: each with figure  
 Age: for beginners from 8 years on

Price group: 4



Items included: compass with coil as current indicator, small lamp, electro-motor, lustre terminals, litz, detailed mounting instruction.



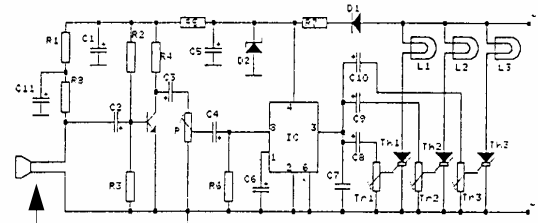
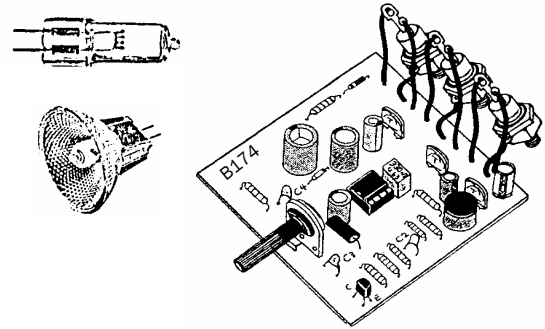
## B174 3 Channel microphone music light for halogen lamps 12 V~

At this light organ it is possible to connect up to 12 V halogen lamps till max. 300 Watt (100 W at each channel). Each channel is independently adjustable. To be used only at a 12 V-transformer (alternating voltage), not for d.c. voltage (accu).

**Technical data:**

Operating voltage: 12 V~  
 Alternating current (transformer)  
 Connecting possibilities: halogen- or glow lamps 12 V~  
 Load: max. 300 Watt (100 W per channel)  
 Channel adjustment: each channel separate adjustable  
 Sum adjustment: 1 compound control with shaft 6mm for knob  
 Board dimensions: approx. 67 x 60 mm

Price group: 6  
 Fitting case: G010



Microphone

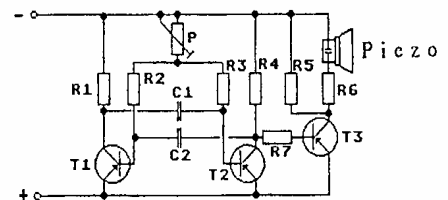
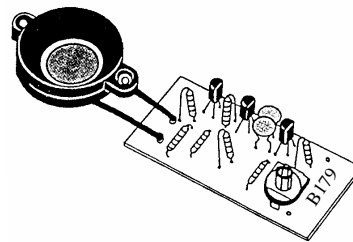
## B179 Ultrasonic dog whistle

This electronic ultrasonic whistle emits high-powered ultrasonic sounds which are widely audible for dogs. These high frequencies are mostly not to be heard for the human being, dogs can be drilled with it. The frequency is adjustable between approx. 8.000...25.000 Hz. A special piezo loudspeaker is included. Operating voltage: 9 V=. Indispensable for all dog-owner!

**Technical data:**

Operating voltage: 9 V=  
 Frequency: adjustable approx. 8 kHz...25 kHz  
 Sound converter: piezo with hemispherical membrane  
 Board dimensions: approx. 27 x 55 mm

Price group: 4  
 Fitting case: G027



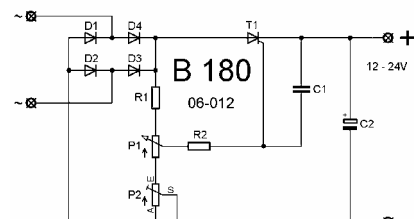
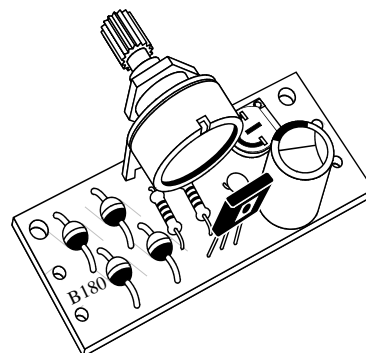
## B180 Speed control for mini-drilling machines 12...24 V

...for operation of miniature drilling machines with DC-motor at a transformer. The rectifier is already fitted, you need only a transformer with AC-voltage, voltage according to the drilling machine. For motors up to 3 A current input, voltage 12...24 V.

**Technical data:**

Operating voltage (transformer voltage): 12...24 V  
 alternating voltage (50...60 Hz)  
 Max. loading capacity: 3 amperes  
 Connectable loads: direct-current motors 12...24 V, max. 3 A power consumption  
 Possible control: approx. 0...90 %  
 Dimensions of the board: approx. 55 x 24 mm

Price group: 4  
 Fitting case: G027



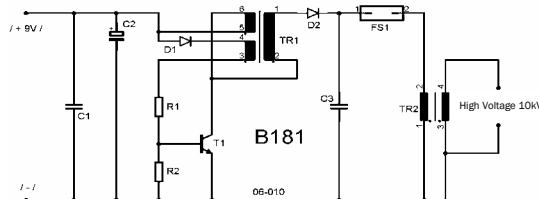
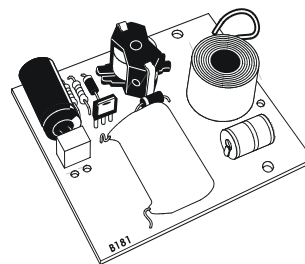
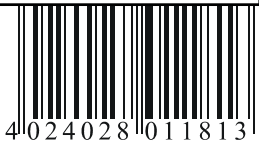
## B181 Paralyser 10.000 Volt - self defense

...produces high-voltage sparks of more than 10.000 V from a 9 V battery which may go through clothes, too. Ideal as self-defence weapon against wild animals etc. or may be used for physical laboratory experiments. In several countries (e.g. in the EU) the possession as a weapon is prohibited. A deterrent effect is already achieved through the sparks flashing over and the sparking crackle!

**Technical data:**

Operating voltage: 9 V=  
 Current consumption: approx. 160 mA  
 Output voltage: max. 10.000 V  
 Frequency of sparks: > 3 sparks per second  
 Dimensions of the board: approx. 65 x 56 mm

Price group: 9  
 Fitting case: G01B



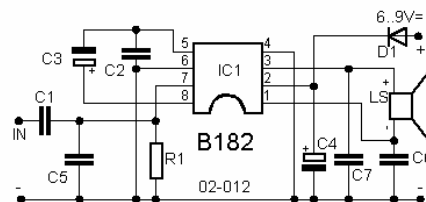
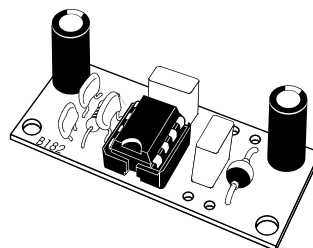
## B182 Amplifier 1 Watt

Small universal amplifier with a peak sound capacity of 2 Watt. Operating voltage: 6...9 V=. Input sensitivity: approx. 80 mV, loudspeaker connection: 8 ohm. Frequency range: approx. 20...25000 Hz.

**Technical data:**

Power: max. 2 W music power  
 Operating voltage: 6...9 V=  
 Current consumption: max. 380 mA  
 Frequency range: approx. 20...25000 Hz  
 Sensitivity: approx. 80 mV  
 Board dimensions: approx. 44,5 x 18 mm

Price group: 2  
 Fitting case: G027

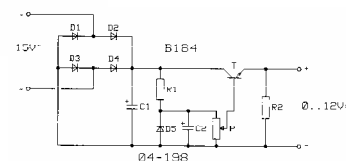
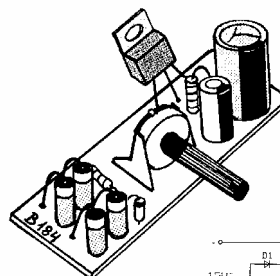
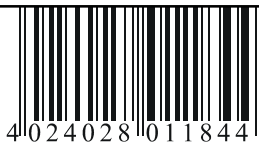


## B184 Power supply 0...12 V=, max. 0,8 A

Easy, electronically adjustable experimental power supply. Output voltage adjustable approx. 0 up to 12 V=. Power maximum: 800 mA. For operation is required: 1 mains transformer 15 V~, > 0,8 A and one cooling element with the minimum dimensions: approx. 30 x 70 x 15 mm or greater.

Board dimensions: approx. 22 x 63 mm

Price group: 2  
 Fitting case: G010

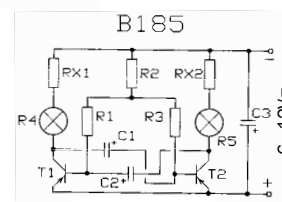
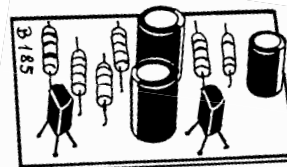


## B185 Flasher 6...12 V= max. 100 mA

Electronic flasher unit for glow lamps 6...12 V=, max. 100 mA. Also suitable as alternating flasher. Flashing frequency: approx. 1...3 x per second. Ideal for usage within miniature constructing! Together with the additional kit B197 "relay card" (not included in this kit) it is feasible to operate flashers with loads up to 3 Ampere current consumption!

Board dimensions: approx. 45 x 26 mm

Price group: 2  
 Fitting case: G027



**Available accessory:**

B197 Relay card 12 V=, page 27

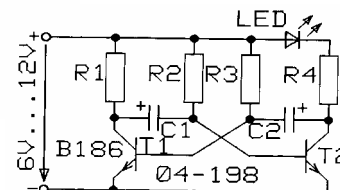
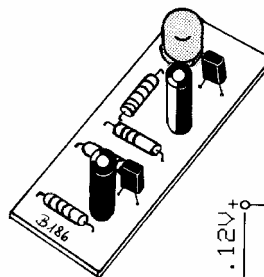


## B186 Jumbo LED flasher

Electronic flasher unit with a great  $\varnothing$  8 mm light emitting diode. Operating voltage: approx. 6...12 V=. Flashing frequency: approx. 60...120 x per minute. For decoration, models etc. Board dimensions: approx. 20 x 55 mm



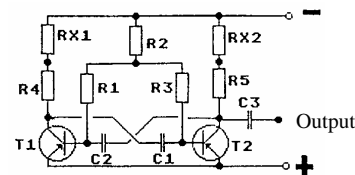
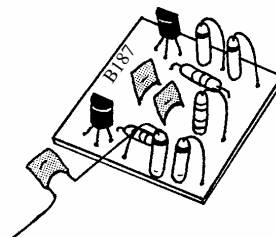
Price group: 2  
Fitting case: G027



## B187 Signal-Injector (test signal generator)

Universal square-wave sound generator with approx. 1000 Hz basic frequency and a great number of harmonic waves which lead up to FM-range. Operating voltage: 6...12 V. The signal can be listened through a highly ohmic earphone or could be amplified for loudspeakers through an amplifier. Ideal as repair equipment for radios and amplifiers, in order to feed a sound signal at various stages of the defect object. Board dimensions: approx. 25 x 24 mm

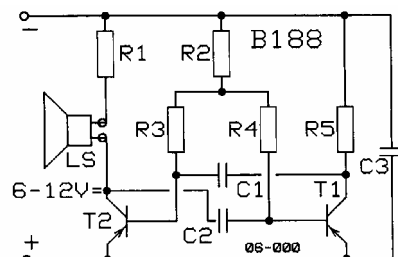
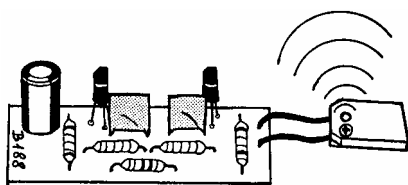
Price group: 2  
Fitting case: G01B



## B188 Mini signal horn 6...12 V=

With a mini-loudspeaker (approx. 14 x 11 mm) this device emits a tone of approx. 3000 Hz. Ideal for fitting it into miniature models, as signal unit, morse sound generator, etc. Of course, it is possible to connect a greater loudspeaker. Operating voltage: 6...12 Volt=. Board dimensions: approx. 44 x 16 mm

Price group: 2  
Fitting case: G027

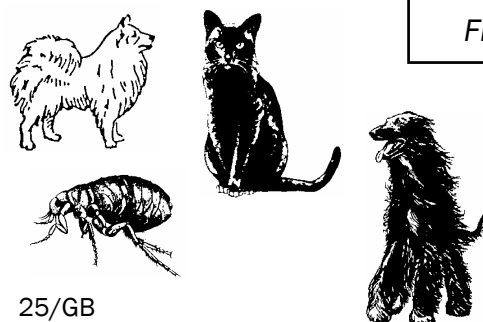
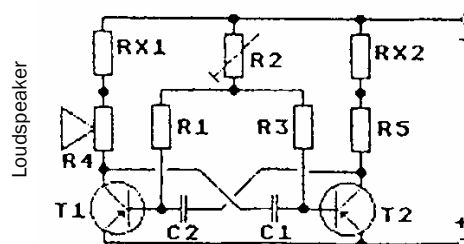
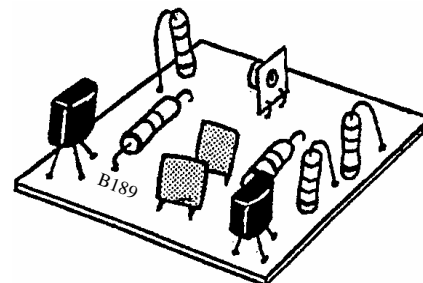


## B189 Anti-flea-generator for the cat- and dog-basket



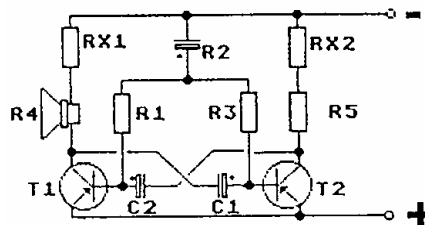
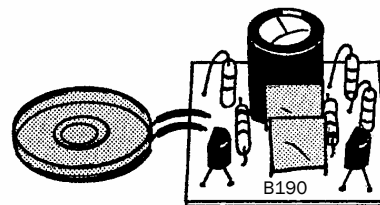
This generator produces ultrasonic sounds, which are adjustable within the range of approx. 8...35 kHz. It is said, that crawling and jumping parasites are banished through the ultrasonic sound. Frequency can be adjusted so that the domestic animal will not be disturbed. Operating voltage: 9 V=. As loudspeaker is required either a small treble loudspeaker 8 Ohm (no piezo!) or a dynamic 8 Ohm earphone. (Not enclosed in the kit). Board dimensions: approx. 25 x 24 mm

Price group: 2  
Fitting case: G01B



## B190 Mini alarm system

It is feasible to connect as much alarm contacts as desired. The contacts (not enclosed in the kit) have to be fixed at doors, windows, drawers, etc. which are to be protected. Whenever the alarm will be released, there will sound for approx. 2 seconds a cheeping, shortly swelling up and down tone. The sound is relatively silent, but will attract attention and could be increased through an additional amplifier. A mini-loudspeaker Ø 30 mm is enclosed. Operating voltage: 9...12 V=. Ideal as alarm unit for drawers, cupboards and for children's rooms.  
Board dimensions: ca. 25 x 24 mm



Price group: 2  
Fitting case: G01B

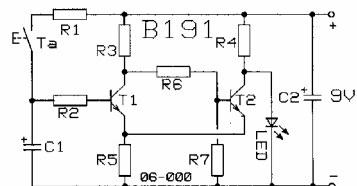
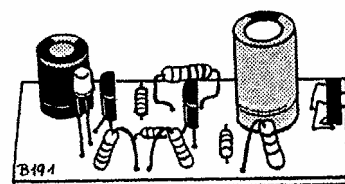
Alarm contacts A002, A003 and A004, page 75.



## B191 Mini timer 9 Volt=

Whenever the enclosed pushbutton will be pushed, the light emitting diode will light up for approx. 100...180 seconds. Usage. As timer for games (e.g. for chess) or for easy photographic and developing works. It is possible to make time adjustable, if a potentiometer 50 k lin. is connected (not enclosed in the kit). We offer as accessories our kit B 197 "Relay Card", through which it is made feasible to switch greater loads up to 3 A with the Mini-Timer. Operating voltage: 9 V=.

Board dimensions: approx. 56 x 16 mm



Price group: 2  
Fitting case: G027

Available accessory:  
B197 Relay card 12V=, page 27



## B192 Water level sensor 9 V=

Whenever two bare wires have contact with water, the light emitting diode will light up. The device is suitable to release alarm in case of overflowing rain barrels and gutters. Operating voltage: 9 V=. As accessories is available the kit "B 197 Relay Card", which could be connected with this kit and could switch through the relay contact other devices (e.g. pumps) up to current consumption of 3 A.

Technical data:

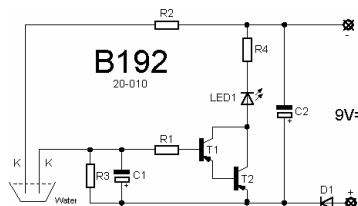
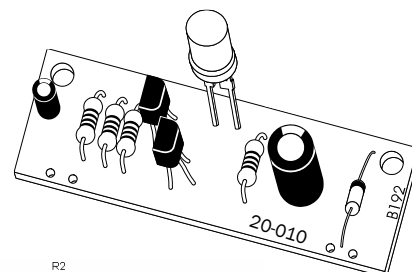
Operating voltage: 9 V=

Power consumption: rest (without water contact)

< 10 µA, LED shines: approx. 15 mA

Indication of water: via LED

Board dimensions: approx. 45 x 16 mm



Price group: 2  
Fitting case: G025

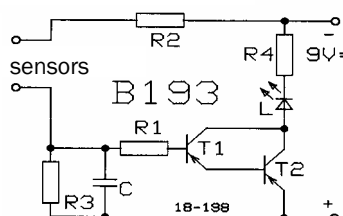
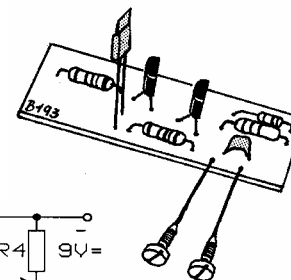
Available accessory:  
B197 Relay card 12 V=, page 27



## B193 Sensor switch 9 V=

Whenever the two screw heads will be touched with the fingers, this device will light up a light emitting diode. Operating voltage 9 V=. As accessories is available our kit "B197 relay card". If the relay card will be connected with the sensor switch, it is feasible to switch through the relay contact loads up to 3 A.

Board dimensions: approx. 45 x 15 mm



Price group: 2  
Fitting case: G027

Available accessory:  
B197 Relay card 12V=, page 27

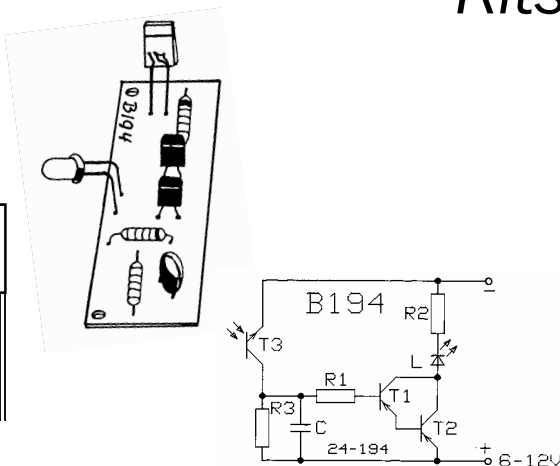
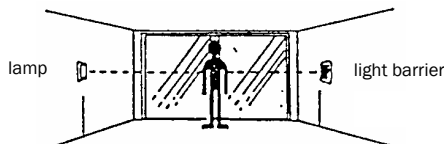


## B194 Light barrier

Whenever there is incidence of light onto the phototransistor, the light barrier will switch on a light emitting diode. As soon as the light beam will be interrupted, the LED will switch off. Operating voltage: 6...12 V=. As accessories is available kit "B197 Relay card". It is possible to connect it with the light barrier and to switch with the relay contact other loads up to 3 A. Board dimensions: approx. 45 x 15 mm

Available accessory:  
B197 Relay card 12 V=, page 27

Price group: 2  
Fitting case: G027

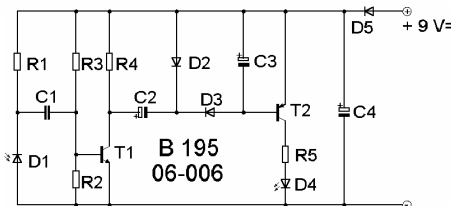
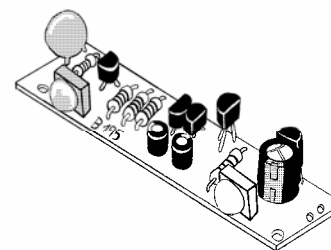


## B195 Infrared detector

With the aid of this circuitry it is made possible to carry out functional tests of infrared remote controls used in TV-sets and video devices, etc. Whenever there is radiation of infrared beams on the Special-Sensor, the LED will light up and indicate that the infrared remote control is operated. Operating voltage: 9 V=. As accessories is available our kit "B 197 Relay Card". This could be connected with the Infrared Detector and it is then possible to switch through the relay contact loads up to 3 A.

Technical data:  
Operating voltage: 9 V= (8...12 V)  
Current consumption without signal: < 200  $\mu$ A  
Current consumption with signal from a remote control: approx. 2...15 mA  
Range between remote control and infrared detector: approx. 2...10 cm, depending on the remote control  
Function display: via a light-emitting diode  
Board dimensions: approx. 17 x 59 mm

Price group: 2  
Fitting case: G027

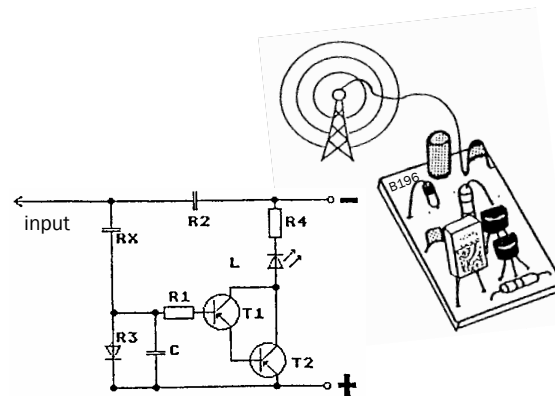
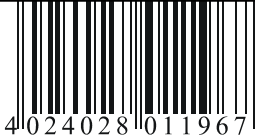


Available accessory:  
B197 Relay card 12 V=, page 27

## B196 Field-intensity indicator

With this indicator it is made possible to test if the transmitter of your remote control device, CB-radiotelephone device, radiotelephone, garage-door boy, etc. does really transmit. It is possible to test within the range of 10 MHz up to 100 MHz. Indication is realised through LED. The measuring device has simply to be connected with the antenna of your transmitter, there is no need of an interference in your transmitter! Operating voltage: 9 V=. Board dimensions: approx. 28 x 17 mm

Price group: 2  
Fitting case: G01B

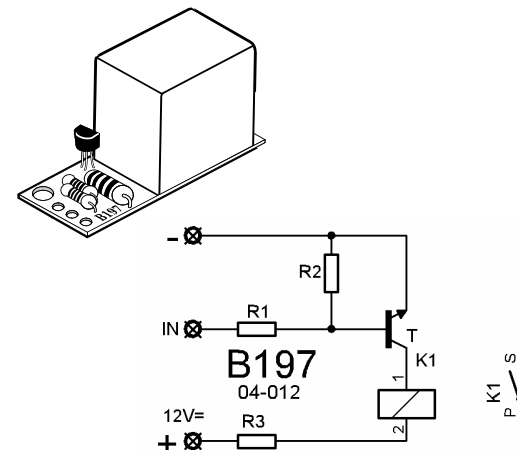


## B197 Relay card 12 V=

This relay card could be released with weak signals from approx. 5 mA upwards and will then switch a relay with a heavy current contact of 6/3 Ampere. Contact 1 x ON. Ideal as switching amplifier for other kits, which have solely a light emitting diode as output and should switch other devices and machines through the relay contact.

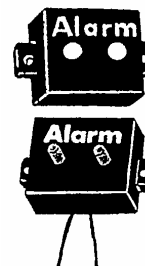
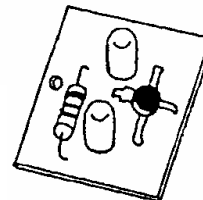
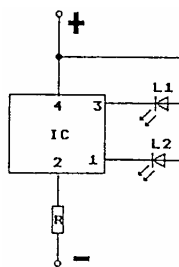
Technical data:  
Operating voltage: 12 V=  
Current consumption: < 80 mA  
Contact capacity: 3 A / 30 V  
Sensitivity: < 5 mA  
Board dimensions: approx. 44 x 18 mm

Price group: 2  
Fitting case: G027



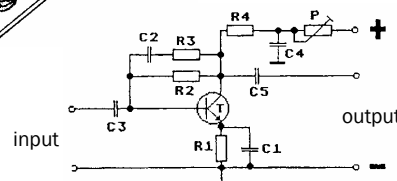
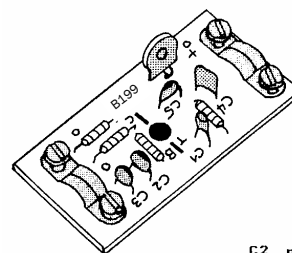
## B198 Alarm display

In this alarm display have been fitted 2 different coloured light emitting diodes, which flash alternatively in short sequences. For use in cars, weekend-houses, etc. in order to simulate an armed alarm set. Operating voltage: 9...12 V=  
Board dimensions: approx. 22 x 27 mm



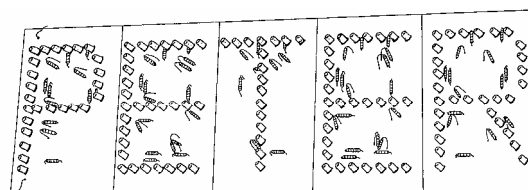
## B199 Antenna amplifier approx. 50...1.000 MHz

Single-stage antenna amplifier, with continuously adjustable amplification up to max. 15 dB. For any television range from channel 2 up to channel 65, extraordinary suitable for FM radio and cable television. Input and output impedance: 50...75 Ohm. There are prepared clamps for coaxial cable on the board. As required it is possible to connect two antenna amplifiers one after another. The total amplification will correspondingly increase. Operating voltage: 6...18 V.  
Board dimensions: approx. 26 x 52 mm



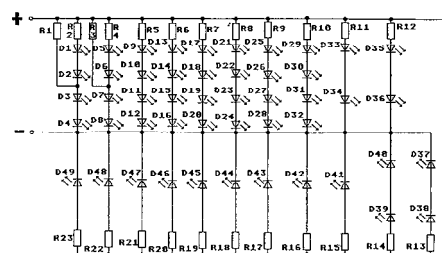
## B200 Luminous letters

With this kit it is made possible to mount any capital letter of the alphabet or any digit from 0...9. The concrete description of each letter and of each digit is been enclosed. The kit includes especially bright LED's. The printed wiring board could be equipped also with LED's of any other colour. Operating voltage: 12 V. Current consumption: approx. 100...300 mA, depending on the digit. Dimensions: approx. 90 x 65 mm. With each kit it is feasible to mount any digit and putting several kits together, you are capable to build luminous nameplates, signboards, house numbers etc.  
Board dimensions: approx. 92 x 67 mm



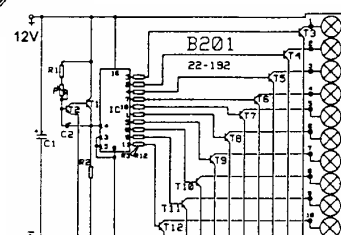
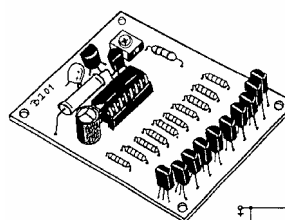
Example for letters put together!

Fitting letter control see B206, page 29.



## B201 Running light 10 channels 12 V= for small incandescent bulbs 12 V= max. 100 mA

Adjustable running speed. You may connect small incandescent bulbs or light emitting diodes (individually or in groups) up to a total output of 100 mA per channel.  
Use: Decorative illumination of paintings, toys, model systems (e.g. model airports for the landing area lighting), etc.  
Board dimensions: approx. 55 x 45 mm



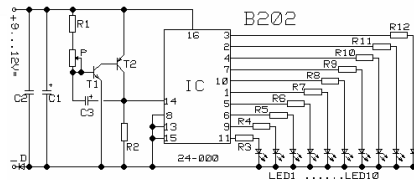
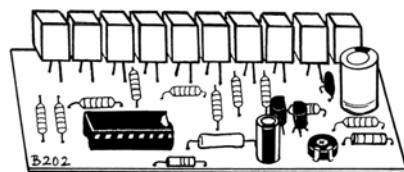
## B202 LED running light -10 channels-

Electronic running light with 10 light emitting diodes. Operating voltage: 9...12 V=, adjustable running velocity. For usage in decorations, warning advices etc.

**Technical data:**

Operating voltage: 9...12 V=  
 Current consumption: approx. 20 mA  
 Running speed: adjustable: approx. 1.5...4 sec. per passage  
 Board dimensions: approx. 106 x 34 mm

Price group: 5  
 Fitting case: G089



## B203 Power supply

approx. 1,2...18 V=, max. 10 A

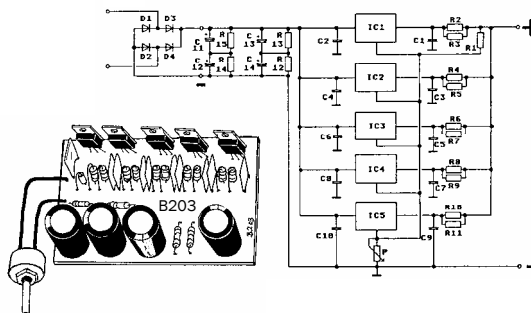
Electronical adjustable high-power supply. Adjustable from approx. 1.2V to 18 V. Max. output current: approx. 10 Ampere. This power supply works with 5 parallel connected adjustable voltage regulators type LM 317. 4 diodes 25 A are enclosed usable as rectifier.

The following is still required: 1 mains transformer 18 V 10 A, 1 cooling element approx. 15 x 10 x 2 cm, 2 cooling elements each approx. 5 x 5 x 2 cm or more.

**Technical data:**

Output voltage: approx. 1,2...18 V=, adjustable  
 Max. output current: approx. 10 A  
 Input voltage: 18 V, 10 A transformer  
 Board dimensions: approx. 85 x 45 mm

Price group: 9



## B204 Flash-LED 230 V~

Flash circuit with one red light emitting diode Ø 5 mm which can be operated directly at 230 V~.

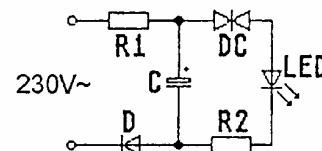
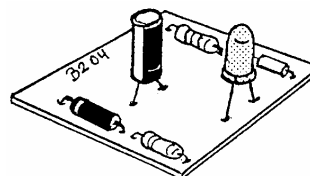
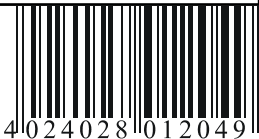
Flash frequency: 2 Hz

Usage: Control-lamp for devices and alarm systems, start control for machines etc.

**Technical data:**

Operating voltage: approx. 220...240 V~  
 Flash frequency: approx. 2 Hz  
 Board dimensions: approx. 25 x 23 mm

Price group: 2  
 Fitting case: G027



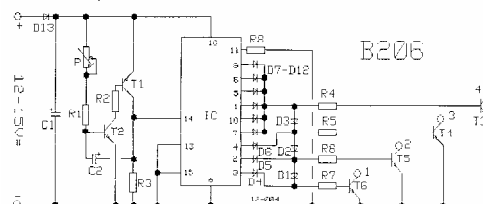
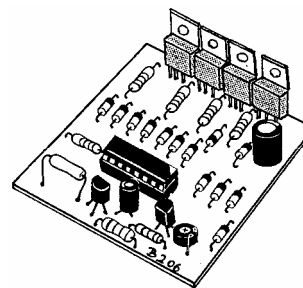
## B206 Luminous letter control

...switches luminous letters or lamp groups slowly one after another on, keeps all letters switched on for a while and switches off all letters at the same moment. Then, the process starts again. There are 4 connecting outputs at which in each case either 1 letter or one letter group could be connected (with a lot of letters or with a whole text). Operating voltage: 12...15 V=. Connecting outputs: 4, each max. 5 Ampere chargeable. The connecting velocity is adjustable. The control is especially suitable to be used with our LED-luminous letters Nr. B200.

**Technical data:**

Operating voltage: 12...15 V=  
 Switching outputs: 4  
 Loading capacity: max. 5 A per switching output  
 Clock frequency adjustable: approx. 0.5...1 Hz  
 After the 4th turn-on clock, all outputs still remain switched on for 6 clocks  
 Board dimensions: approx. 55 x 55 mm

Price group: 5  
 Fitting case: G085



The control is especially suitable to be used with our LED-luminous letters Nr. B200, page 28.



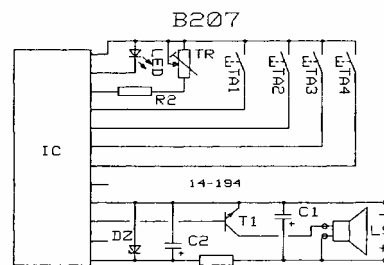
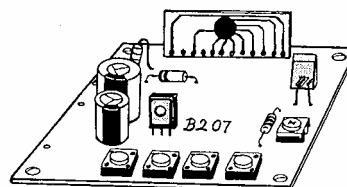
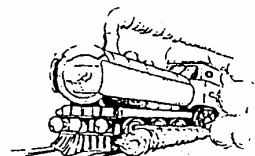
## B207 Steamer noise with steam whistle + steam bell

...produces very life-like the wheezing and hissing of a steamer. Furthermore a steam whistle and steam bell may resound. The noises can be released individually by means of a switch. The sound and speed of the noises are adjustable. Operating voltage: 4,5...6 V=. Loudspeaker connection: 8 Ohm, 1 Watt. Besides the single noises, it is also possible to play a program including all noises of a train arriving at the station: The train approaches, becomes louder, whistles and tinkles, enters the station vociferously, slows down and stops with a loud hissing.

**Technical data:**

Operating voltage: 4,5...6 V=  
Loudspeaker connection: 8 Ohm 1 Watt  
Board dimensions: approx. 55 x 44 mm

Price group: 6  
Fitting case: G027



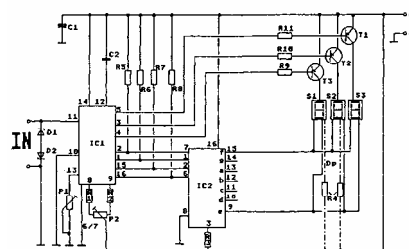
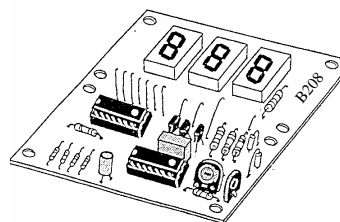
## B208 LED digital voltmeter

Electronic digital voltmeter of three places with LED digital indication (height: 13 mm). Operating voltage: 4,5...5,5 V=, max. 200 mA. Precision: max. 0,1 %, resolution: 0...999 mV. The measuring range may be extended up to max. 750 V by means of a prevoltage divider. It is possible to mount the indication unit separately from the energizing electronics.

**Technical data:**

Operating voltage: 4,5...5,5 V=, max. 200 mA  
Display: LED 13 mm, 3-digits  
Resolution: approx. 0...999m V  
Range: 0...max. 750 V,  
according to potential divider  
Board dimensions: approx. 70 x 70 mm

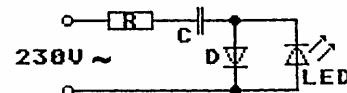
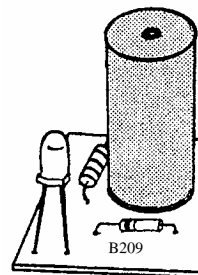
Price group: 8  
Fitting case: G02B



## B209 LED series printed circuit board 230 V~

LED signal lamp which can be directly operated at 230 V~. Use: signal lamp, operation indication for 230 V~ devices etc.  
Board dimensions: approx. 29 x 20 mm

Price group: 1  
Fitting case: G027



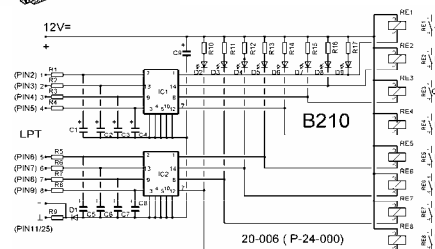
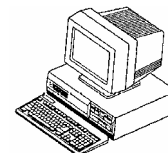
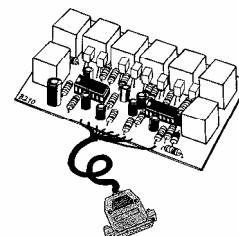
## B210 8-Channel-relay board

...for switching different appliances, lamps or motors by means of a computer program. The relay points can be loaded up to 3 A each at maximum. Operating voltage of the relay board: 12 V=. By means of the enclosed software it is possible to switch on and off up to 8 different appliances at different times. It is also possible to programme certain switching sequences (also for several days) or attractive effect lighting for stages and discotheques! The module has to be connected at the printer port of a standard PC. Diskette 3.5" is enclosed! With DOS-software from AT486 and WIN software from P100 on.

**Technical data:**

Operating voltage: 12 V= max. 0.8 A  
Channels: 8  
Relay contact: 1 x ON max. 3 A max. 25 V each  
(If higher voltages shall be switched, please follow the instructions in the enclosed printed matter no. M1003)  
Indication: each channel by 1 LED  
Delivered software: DOS + WIN  
Board dimensions: approx. 112 x 70 mm

Price group: 11  
Fitting case: G010



Diskette 3.5" is enclosed!

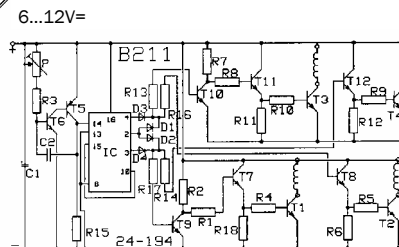
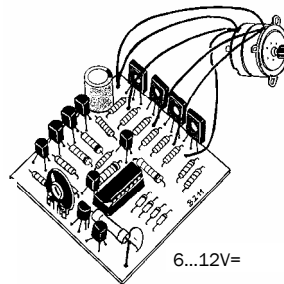
## B211 Stepper motor-control

A 6-branch stepper motor can be operated at this kit. The kit works without computer. For motors 6...12 V=, max. branch current 1.5 A. Adjustable impulse sequence approx. 15...240 per second. In order to switch over the sense of rotation of the motor, a switch 2 x change over is required (not included in the kit). The operating voltage depends on the motor which is used respectively (6...12 V=).

**Technical data:**

Operating voltage: 6...12 V=  
 Max. phase current: 1.5 A  
 For stepper motors: 6-phases  
 Impulse sequence: adjustable from approx. 15...240 Hz  
 Board dimensions: approx. 55 x 55 mm

Price group: 7



**Available stepper motors:**

**P5339** Mini-stepper motor "42 SPM-24 DJA"

**P5340** Mini-stepper motor "AEG S21/24A"

page 56.

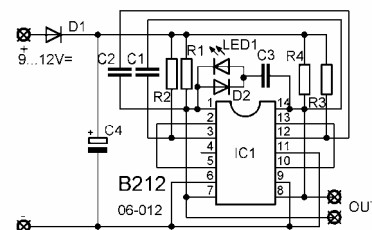
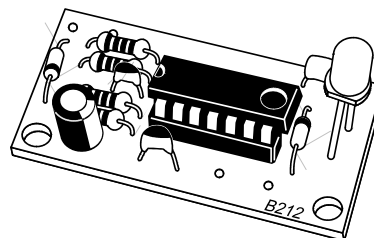
## B212 Decalcifier against calcification and corrosion in water pipes!

This device is not harmful to the environment, i. e. without chemicals and operates on a physical-inductive base. Easy to mount, no intervention into conduits! This module protects washing machines, dish washers, heating boilers etc. Operation with a plug power supply 9...12 V=. Current load: < 20 mA.

**Technical data:**

Operating voltage: 9...12 V DC voltage  
 Current consumption: < 20 mA  
 Equipment-on indicator: LED  
 Output: capacitive tension field  
 Size of board: approx. 45 x 22.5 mm

Price group: 3  
 Fitting case: G027



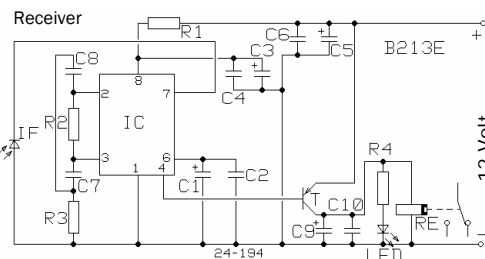
## B213 Infrared light barrier max. 50 m

With the enclosed optics and highly sensitive photodetector this light barrier has a max. range of up to 50 m! The infrared light ray is invisible for men. If the light ray between the transmitter and receiver is interrupted (if a person walks through it) the relay in the receiver switches.

**Technical data:**

Operating voltage receiver: 12 V=, approx. 100 mA  
 Board dimensions: approx. 56 x 45 mm  
 Operating voltage transmitter: 9...12 V=, approx. 70 mA  
 Relay contact: 1 x change over 3 A  
 Range: > 50 m  
 Ray of light: infrared, invisible for men  
 Board dimensions: approx. 17 x 55 mm

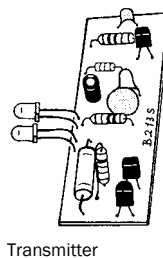
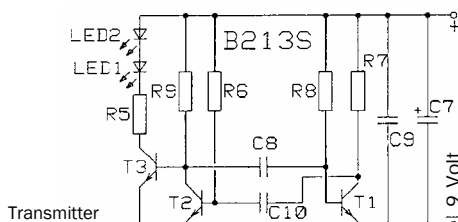
Price group: 10  
 Fitting cases: 2 x G027



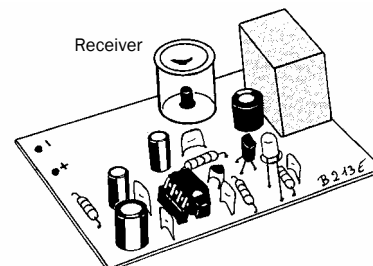
**Recommended tilted mirror**

**if the infrared ray shall be deviated.**

**K002 Reflector mirror, see page 74.**



Transmitter



Receiver

## B214 Ultrasonic proximity sensor

An LED lights up if a body approaches the ultrasonic sensors at a distance of 10...80 cm (depending on the size of the body). Use: parking-in assistance for cars in garages, alarm signal for persons or animals staying in a certain area. Operating voltage: 9...12 V=. The device works according to the same principle as the ultrasonic echo ranging of bats! This kit may be extended to relay operation with our relay board "B197" (not enclosed).

**Technical data:**

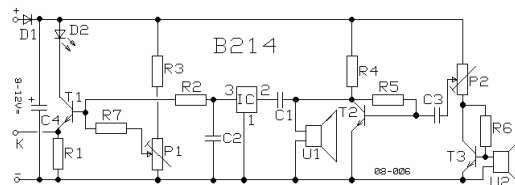
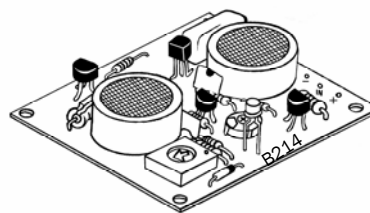
Operating voltage: 9...12 V=  
 Operating frequency: approx. 40 kHz  
 Range: approx. 10...80 cm, depending on the size of the body (approx. 0.01...0.5 m<sup>2</sup>)  
 Display: via a light-emitting diode  
 Current consumption: < 10 mA  
 Board dimensions: approx. 55 x 45 mm

**Price group: 5**  
**Fitting case: G023**



**Available accessory:**

**B197 Relay card 12 V=, page 27**



## B215 Mini-infrared light barrier 10 cm

Infrared-light barrier with transmitter and receiver and a range of approx. 10 cm. Application: for the model railway, entry holes for aviaries, beehives etc. With invisible infrared light ray. Operating voltage: 6...12 V=. The light-emitting diode extinguishes if the light barrier is interrupted.

As accessories the kit "B197 Relay card" is available in case other loads shall be switched via a relay.

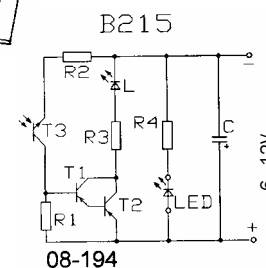
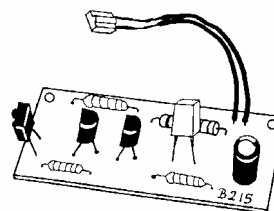
Board dimensions: approx. 44 x 15 mm

**Price group: 2**  
**Fitting case: G027**



**Available accessory:**

**B197 Relay card 12 V=, page 27.**



## B216N Infrared light barrier 5 m

With invisible infrared light ray and a range of max. 5m. If the light ray is interrupted (if a person walks through the light ray), this will be indicated by a flashing LED. Operating voltage: 12 V=. If other instruments shall be switched with the light ray (e.g. a siren), a relay (12 V > 600 Ohm) or the Kemo relay card B197 can be connected in addition (both not contained in this kit).

**Technical data:**

Operating voltage: 12 V= stabilised  
 Current consumption: < 100 mA  
 Range: > 5 m  
 (with supplementary lens > 10 m, not enclosed)  
 Transmitting frequency: approx. 3,7 kHz  
 Board dimensions: approx. 58 x 45 mm

**Price group: 4**  
**Fitting case: G024**

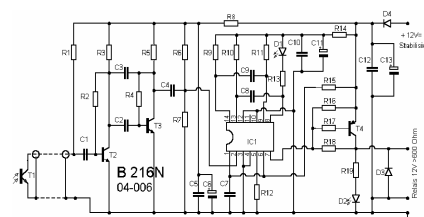
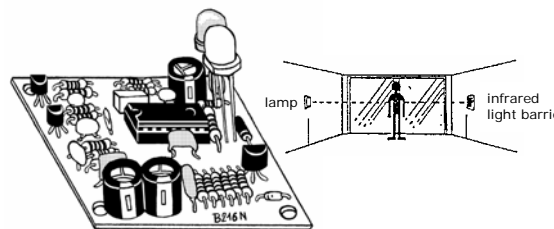


**Available accessory:**

**B197 Relay card 12 V=, page 27.**

**Recommended tilted mirror if the infrared ray shall be deviated.**

**K002 Reflector Mirror, see page 74.**



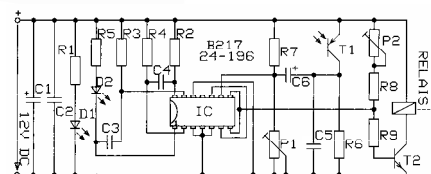
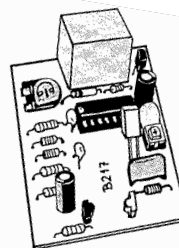
## B217 Smoke alarm 12 V=

This visual smoke alarm switches a relay if thick smoke gets between the installed infrared light barrier. Sirens, alarm lamps etc. may then be switched by means of the relay. Operating voltage: 12 V=, max. 150 mA.

**Technical data:**

Operating voltage: 12 V=  
 Operating system:  
 optical smoke recognition  
 Indication: via light-emitting diode  
 Relay contact: 12 V, 1 X ON  
 Board dimensions: approx. 59 x 45 mm

**Price group: 5**  
**Fitting case: G024**

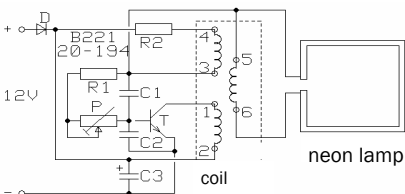


## B221 Neon decoration picture 12 V=

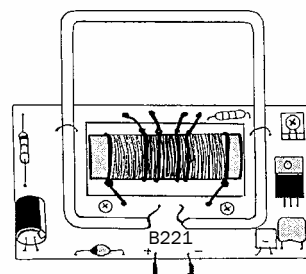
Coloured mini neon lamp with pertaining electronics for decoration purposes. Operating voltage for the finished neon picture 12 V=, approx. 300 mA. The neon lamp is supplied with approx. 1000 Volt high-voltage via the installed electronics.

**Technical data:**

Board dimensions, gold-plated:  
approx. 102 x 50 mm



Price group: 9  
Fitting case: G100



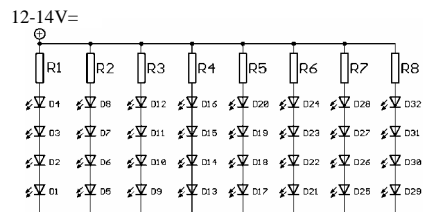
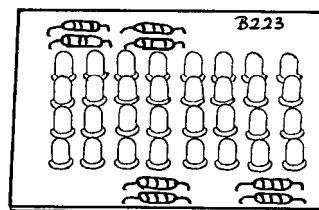
## B223 Infrared spotlight

With the infrared spotlight CCD- and video cameras may recognize objects also in complete darkness. The infrared light is invisible for men, CCD-cameras can see well with an infrared spotlight. Perfect for inconspicuous observation of entrances, drives etc. Operating voltage: 12...14 V= approx. 300mA. Range: approx. 5m.

**Technical data:**

Operating voltage: 12...14 V=  
Current consumption: approx. 300 mA  
Light frequency: approx. 870...950 nm  
Board dimensions: approx. 75 x 56 mm

Price group: 5  
Fitting case: G089



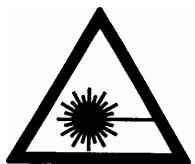
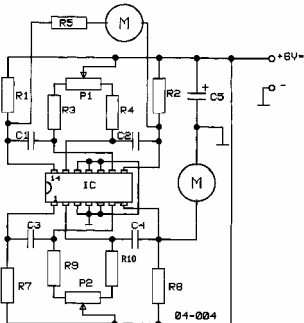
## B224 Laser show 6 V=

With this laser show many different figures can be projected to the wall by means of a laser. With 2 controllers you may regulate 2 reflecting motors via the installed electronics so that a lot of different figures can be shown. The necessary laser is not enclosed. The following are suitable as laser: laser pointer or laser modules which produce a laser point (without installed dispersing lens). Operating voltage for the laser show: 6 V=, max. 0,3 A.

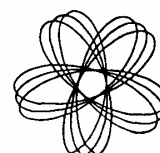
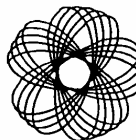
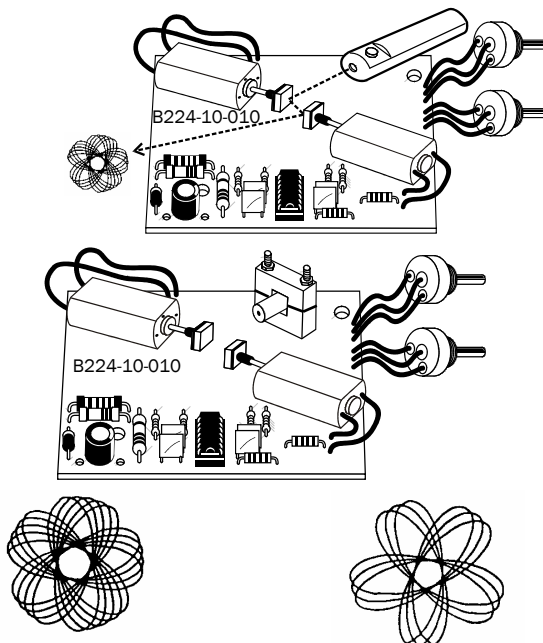
**Technical data:**

Operating voltage: 6 V=  
Current consumption: approx. 150 mA  
Reflecting motors: 2  
Board dimensions, gold-plated:  
approx. 100 x 75 mm

Price group: 9  
Fitting case: G010



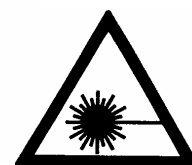
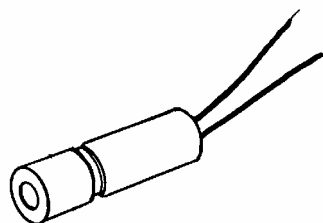
Attention! Laser beam!



## L005 Laser module for B224, B240 + M133

Operating voltage max. 3 V=. Output < 3,5 mW. Wavelength: approx. 650 nm (visible red laser light), laser class 3 A, length of the connecting line approx. 100 mm red (+) / white (-). Dimensions: Ø 8 mm, length 26 mm. Observe the laser regulations! Do not look directly into the beam - risk of retinal burns!!!

Price group: 11



Attention! Laser beam!

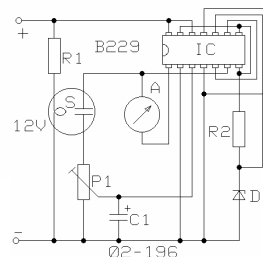
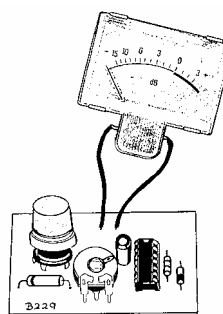
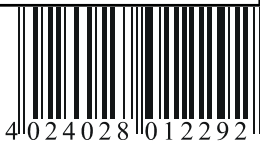
## B229 Clean-air measuring device

Changes of the clean-air are indicated with a measuring unit. Depending on the intensity, air contaminations through cigarette smoke, solvent vapours, exhaust gas, kitchen vapours, factory exhaust gas etc. are indicated by means of a measuring device. The device only indicates that the air quality has changed, it is not able to analyse the kind of air contamination (no chemical classification!). Operating voltage: 12 V= approx. 200 mA.

**Technical data:**

Operating voltage: 12 V=, approx. 200 mA  
Board dimensions: approx. 64 x 38 mm

**Price group: 9**  
**Fitting case: G010**

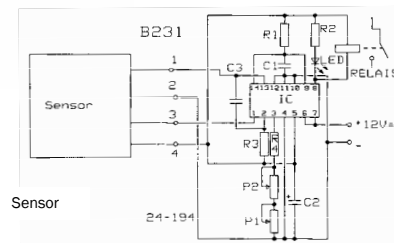
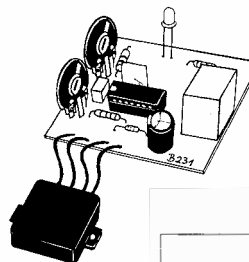


## B231 Electronic key

When holding the enclosed key pendant in front of the sensor (distance 5...15 mm), a relay switches on. Application: non-contact door opener to switch appliances etc. You may hide the sensor behind a nameplate or a door glass pane. In this case only "insiders" know, at which point you have to hold the key pendant in order to open the door. Operating voltage: 12 V= approx. 0.1 A. The key pendant does not require any battery! You may buy the substitute key pendant under order no. M131.

Board dimensions: approx. 55 x 46 mm

**Price group: 10**  
**Fitting case: G024**



You may buy the substitute key pendant under No. M131 page 60.

## B232 Infrared stopwatch

Infrared light barrier with stopwatch. For timekeeping at sporting events, etc. The following modes of operation are possible: Start by pushing the button and stop with the infrared light barrier. Start with the infrared light barrier and stop by pushing the button. Start with infrared, switch over the watch and stop with the same light barrier (for circuit). When buying the additional light barrier B232Z, it is also possible to start and stop with 2 light barriers (on a straight distance at the starting and finishing line). Watch: quartz watch with LCD display. Precision: < 30 minutes 1/100 sec., > 30 min. 1 sec.. For battery operation 2 x 9 V=, range max. 8m.

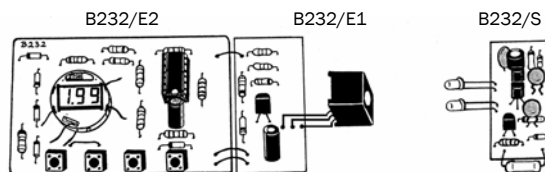
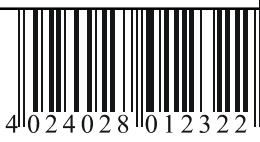
**Technical data:**

Operating voltage + current: transmitter: 9 V=, < 100mA, receiver with watch: 9 V= < 50 mA  
Range of the light barrier: approx. 8 m  
Display: < 30 min. resolution up to 1/100 sec., > 30 min. resolution 1 sec.

**Dimensions:**

Receiver board E1: approx. 54 x 25 mm  
Watch board E2: approx. 79 x 54 mm  
Transmitter board: approx. 54 x 28 mm

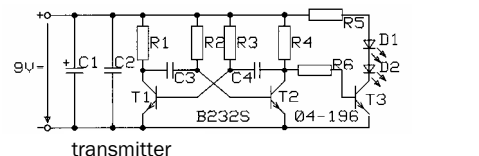
**Price group: 10**  
**Fitting case: G081**  
**Fitting case: G091**



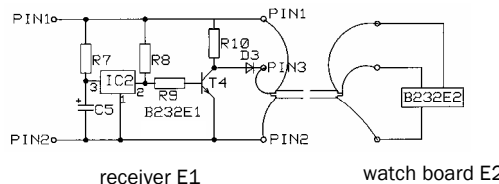
B232/E2

B232/E1

B232/S

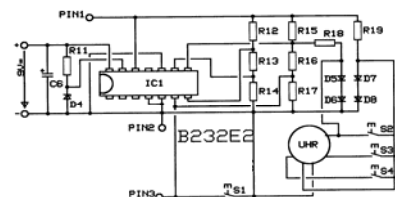


transmitter



receiver E1

watch board E2



watch board E2

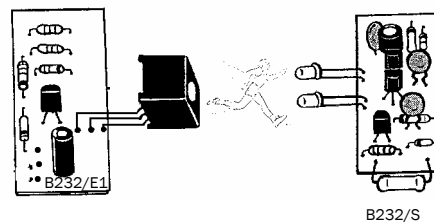
## B232Z Additional light barrier for infrared stopwatch

Additional light barrier to the kit "Infrared Stopwatch B232". By means of this extension it is possible to operate the infrared stopwatch B232 with 2 light barriers: 1 barrier each at the start and finish. Operating voltage: 9 V=.

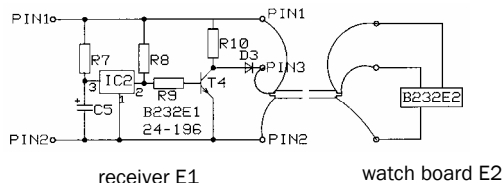
**Technical data:**

Operating voltage + current: transmitter: 9 V= < 100 mA  
Receiver: 9 V= < 20 mA  
Range of the light barrier: approx. 8 m  
Board dimension:  
Receiver: approx. 54 x 25 mm  
Transmitter: approx. 54 x 28 mm

**Price group: 7**  
**Fitting case: 2 x G081**

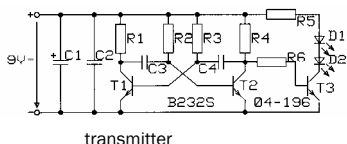


B232/S



receiver E1

watch board E2



transmitter

## B233 LED emergency light 6...15 V=/~

If the operating voltage for the LED-emergency light (transfo, power supply, battery) breaks down, the LED still luminesces > 15 minutes! During this time an Gold-Cap-Elca supplies the LED with current.

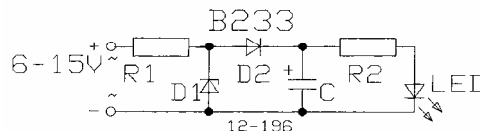
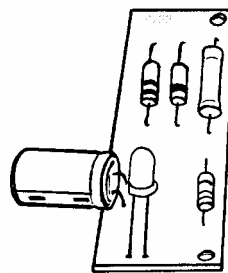
Use: marking of emergency exits, switches, locks etc. Operating voltage: 6...15 V direct current (DC) or alternating current (AC).

**Technical data:**

Operating voltage: 6...15 V=/~

Board dimensions: approx. 45 x 12 mm

Price group: K  
Fitting case: G023



## B235 Christmas tree

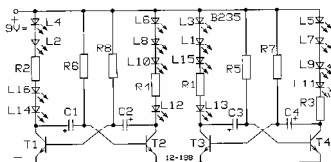
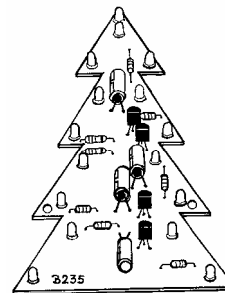
With 16 blinking LED's. For decoration purposes. Dimensions: approx. 10 x 7,5 cm. Operating voltage: 9 V=.

**Technical data:**

Operating voltage: 9 V=

Board dimensions: approx. 10 x 7,5 cm

Price group: 4  
Fitting case: G100



## B237 6-Melody generator

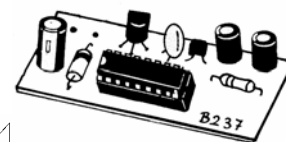
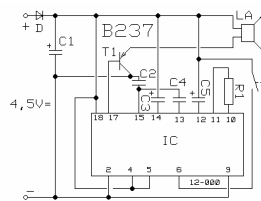
Every time after pressing the key, the melody generator plays one of the 6 stored melodies in succession. The melodies always play for about 15...25 seconds. Operating voltage: 3...4.5V=. Required loudspeaker: 4...8 Ohm. Use: doorbell, break signal, etc.

**Technical data:**

Operating voltage: 3...4,5 V=

Board dimensions: approx. 55 x 21,5 mm

Price group: K  
Fitting case: G024



## B239 Electronic wheel of fortune

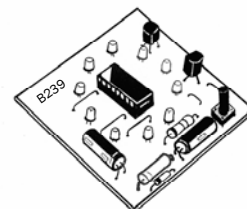
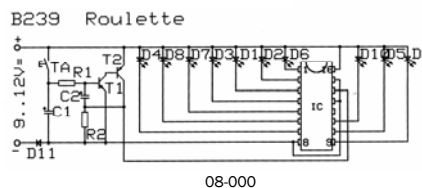
After releasing the push-button, the light signal rotates quickly at the 10 LED's, slows down and then stops at random at one of the LED's. During operation all LED's shine except that LED that just receives the signal. That's why the luminous board looks very decorative.

**Technical data:**

Operating voltage: 9...12 V=

Board dimensions: approx. 56 x 56 mm

Price group: 5  
Fitting case: G100



## B240 Computer laser show

Laser Show with 3 reflecting motors for triggering via a PC > 350 MHz (connection at the LPT 1 printer port). The enclosed software is intended for the operating system WIN 95...98. Laser is not enclosed (you may connect directly almost every spot laser 3 V < 50 mA available on the market). Larger lasers require an own power supply. Many different laser figures can be projected onto a wall and be stored in the computer. Operating voltage: 12 V = < 400 mA.

**Technical data:**

Motors: 3 individually controlled reflecting motors

Operating voltage: 12 V stabilised DC voltage

Power consumption: < 400 mA

Control: via an PC at the LPT1 printer port

Software: enclosed, for operating system WIN 95...98

Insulation: electrical separation between computer and laser control: 4 optocouplers

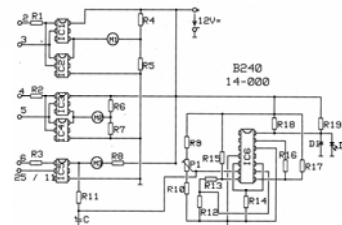
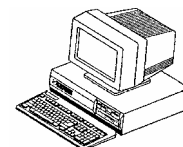
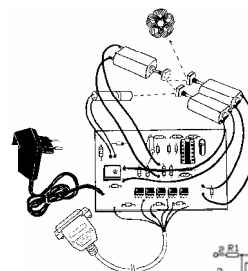
**Laser: not enclosed.** For spot lasers. Laser 3 V up to 50 mA may be operated directly at the circuit, larger lasers require an own power supply.

Board dimensions: approx. 100 x 60 mm

Price group: 11



Floppy disk included!



Available accessory: Laser module L005, see page 33!

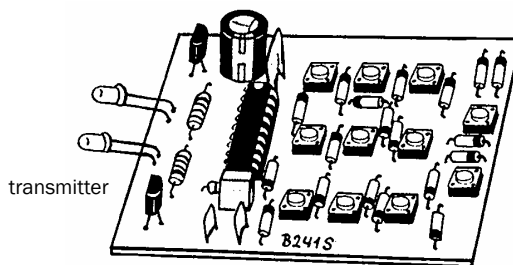
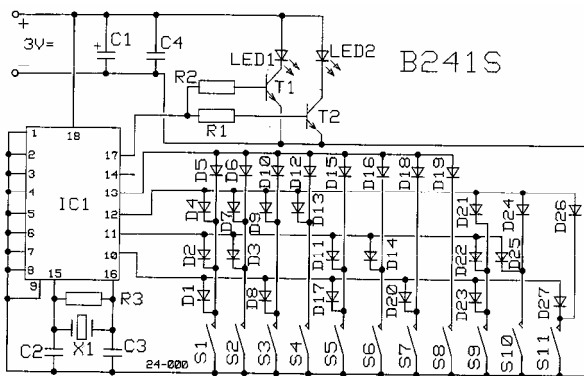
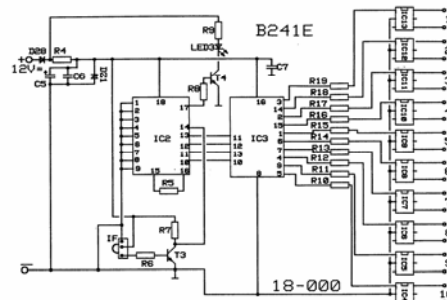
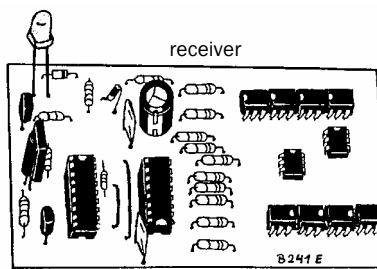
## B241 10-Channel infrared remote control

For switching 10 different applications via relay On or Off. 1 of the 10 different relays, respectively can be switched on or off each time. Transmitter: 3 V battery, receiver: 12 V. Range: approx. 5 m (with convergent lens approx. 10 m, does not belong to the scope of delivery). Max. rupturing capacity of the installed relay: 25 V 0,25 A AC or DC. If this capacity is not sufficient, stronger relays may be topped. 8 SMD diodes have to be soldered into the board.

**Technical data:**

Channels: 10, each with own relay output  
 Rupturing capacity: 0,25 A direct or alternating voltage per relay  
 Range: approx. 5 meters, when superposing a convergent lens at the receiver approx. 10 m (not part of the scope of delivery)  
 Operating voltage transmitter: 3 V=  
 Current consumption transmitter: < 20 mA in transmit mode  
 Operating voltage receiver: 12 V=  
 Current consumption: < 20 mA  
 Size of board receiver: approx. 55 x 75 mm  
 Size of board transmitter: approx. 105 x 55 mm

**Price group: 10**  
**Fitting case:**  
 G085 (receiver)  
 G080/241 (transmitter)



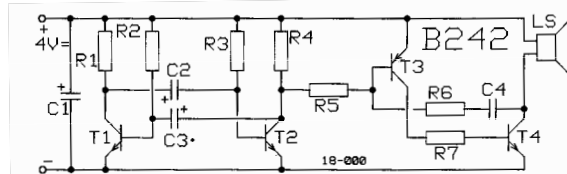
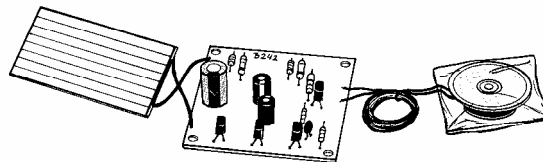
## B242 Solar mole and vole repellent

...drives away moles and voles with aggressive, pulsating and seismic oscillations underground. The operating voltage is drawn from a solar cell (enclosed) to be mounted above ground. It is also possible to operate the device with a battery or power supply (3 V). The transmission of oscillations in the earth takes place via a dynamic loudspeaker which has to be packed waterproof into a plastic bag (not enclosed) and dug in the ground. Range: 500...1.000 qm.

**Technical data:**

Operating voltage: 2,5...4,5 V  
 Enclosed solar cell: 3,4 V, 30 mA, 37 x 66 mm  
 Clock frequency: approx. 0,1...2 Hz, depending on the operating voltage (solar radiation at the solar cell)  
 Actual seismic frequency during the cycle: approx. 150 Hz  
 Board dimensions: approx. 54 x 43 mm

**Price group: 6**  
**Fitting case: G024**



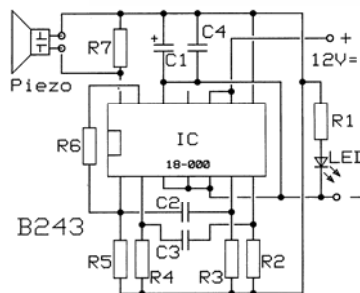
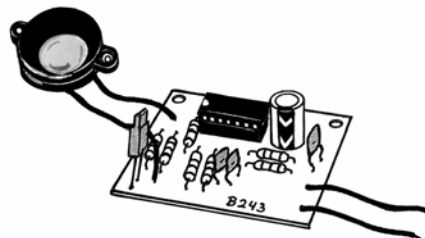
## B243 Marten and vermin repellent 12 V=

This device produces a high ultrasonic sound (approx. 23 kHz). Martens, mice, etc. find this sound extremely annoying and these animals will leave that place (most). Ideal for installation into cars (as protection against martens), in houses against mice, etc. Operating voltage: 12 V... 16 V=, approx. 50 mA.

**Technical data:**

Operating voltage: approx. 12...16 V=  
 Current consumption: < 0,05 A  
 Frequency: approx. 23 kHz  
 Loudspeaker: spherical piezoelectric loudspeaker Ø approx. 30 mm  
 Board dimensions: approx. 45 x 29 mm

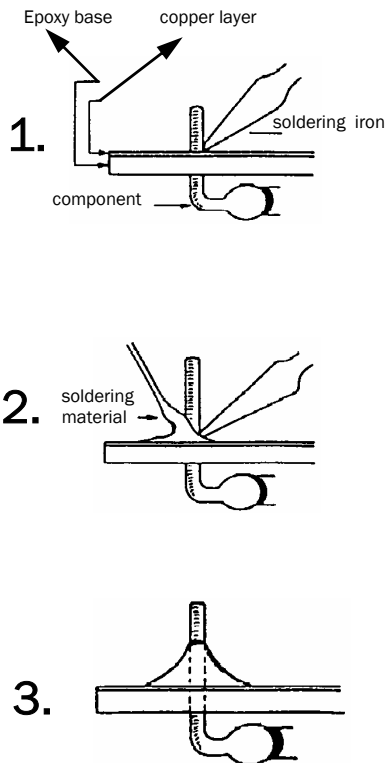
**Price group: 4**  
**Fitting case: G020**



## Assembly + Soldering:

The components have to be inserted into the board according to the assembly print. Depending on the basic grid distance of the borings on the board the components have to be mounted in horizontal or vertical position. When bending the leads of the components please pay attention that these will not be bent directly at the component! The components might be damaged in such a case! Hold the wires with pointed pliers and bend them directly at the pliers so that no lateral powers are transmitted into the interior of the component!

Soldering on the board may only be done with a modern electronic soldering copper (15...30 Watt) with a fine point and colophonium-containing electronic soldering tin! Do not use acidic flux! Before supplying the soldering tin, at first heat the soldering joint with the point of the soldering copper. Press the point slightly against the soldering joint so that the land for soldering on the board and the lead of the component are heated simultaneously. After approx. 1...2 seconds you may add the soldering tin without removing the soldering copper from the soldering joint in the meantime. The soldering tin must lead cleanly around the wire of the component and has to surround the wire cleanly without forming craters. Only then the soldering copper and then the soldering may be removed. Furthermore attention must be paid that no "soldering tin bridges" are made to the adjoining copper tracks and lands for soldering if these are not electrically connected with the soldering joint anyway. The whole soldering at one soldering joint should not exceed a period of 5 seconds at most, as otherwise the components may be destroyed. The most frequent mistakes during soldering are: "cold soldering joints" and "short circuits due to tin bridges or end of wires which were not cut off if these get into touch with an adjoining soldering joint". The soldering point must always be clean and free from scale and oxide. If this cannot be removed by simply wiping with a cloth, file the point once again and tin-plate it immediately again. However, this should only be done with simple copper points. The modern permanent soldering points merely have to be wiped with a humid cloth.



**1.** Epoxy base, copper layer, soldering iron, component

**2.** soldering material

**3.**

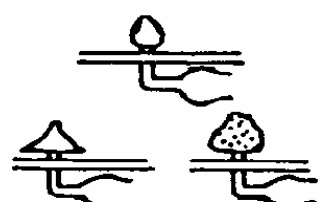
## Important! Correct soldering!

### Soldering

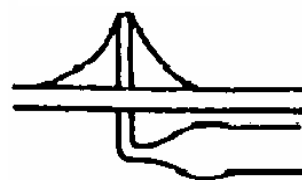
In order to solder the kits it is especially suitable to use a commercial 15...30W soldering iron and 60% solder tin. There should never be any soldering out of the edges of the soldering spot!

- 1) The conducting line and the wire lead of the kit have to be heated up at the same time.
- 2) The solder tin should then be melted at the soldering spot (not at the soldering iron!). The solder tin should flow evenly round the soldering spot.
- 3) Now, cut off the sticking out wire. That's how the finished soldering spot should look like!

**False**



**Correct**





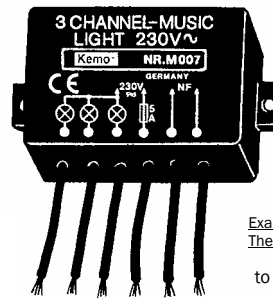
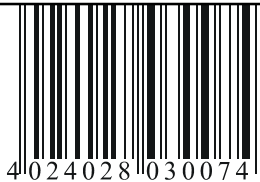
## M007 3-Channel music light

Music light with 3 pre-fixed channels. The module creates a special play of light full of life (with alternating effects). Power: 230 Volt~, 3 x 500 W max.

**Technical data:**

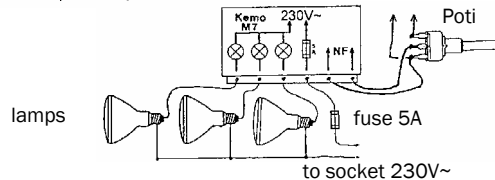
Operating voltage: 230 Volt~  
 Channels: 3, of that 1 pause channel  
 Power: max. 1500 W (per channel 500 W)  
 NF-sensitivity: approx. 2 Watt  
 Dimensions: approx. 70 x 45 x 20 mm

Price group: 7



Example of connection:  
 The shown accessories are not included!

to loudspeaker receptacle, e.g. radio



## M008 Flasher 230 V~

Electronic flasher unit for glow lamps up to max. 600 Watt, 230 Volt~. Slow flash period. 95% of brightness due to full-wave control. USAGE: advertising lights, alarm systems.

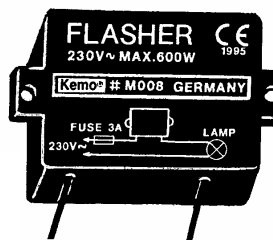
**Technical data:**

Operating voltage: 230 Volt~  
 Lamp connector: max. 600 Watt  
 Flash sequence: approx. 1...2 Hz  
 Dimensions: approx. 60 x 45 x 20 mm

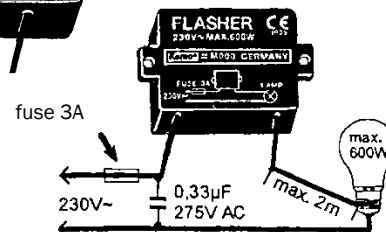
Price group: 5



**M008 - PHASE-OUT PRODUCT!!!**  
 Only available as long as stock lasts!



Example of connection:  
 The shown accessories are not included!



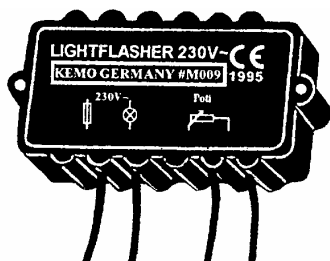
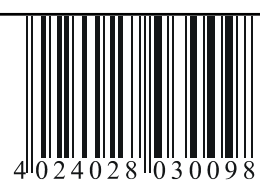
## M009 Light flasher 230 V~

...flashes glow lamps 230 V~ approx. 15...200 times per minute (adjustable). It is possible to connect 230 V~glow lamps up to max. 500 Watt. For operation, it is necessary to connect a potentiometer 100 k. Ideal for advertising or warning lamps, shop-window or party room decorations.

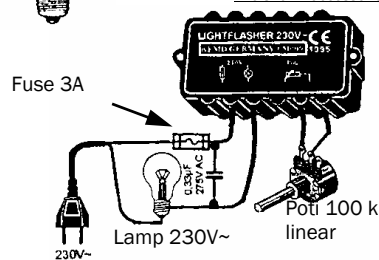
**Technical data:**

Operating voltage: 230 V~  
 Flash sequence:  
 adjustable approx. 15...200 x per minute  
 Adjusting: Potentiometer 100 k lin 1 W (not enclosed)  
 Load: Lamps 230 V~, max. 500 W  
 Dimensions: approx. 69 x 36 x 23 mm

Price group: 6



Example of connection:  
 The shown accessories are not included!



## M010 Alternating flasher 230 V~ 2 x 500 W max.

This 2-channel running light let flash alternately 2 lamps or lamp groups, approx.: 0,5 sec...1 sec. time.

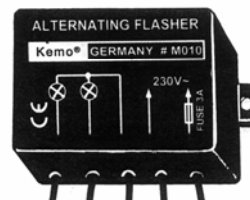
**Technical data:**

Operating voltage: 230...240 V~  
 Channels: 2  
 Power rating: max. 500 W per channel  
 Clock frequency: approx. 1...2 Hz  
 Dimensions: approx. 60 x 45 x 20 mm

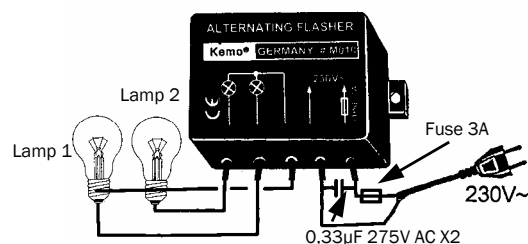
Price group: 7



**M010 - PHASE-OUT PRODUCT!!!**  
 Only available as long as stock lasts!



Example of connection:  
 The shown accessories are not included!



## M011N 4-Channel running light 230 V~

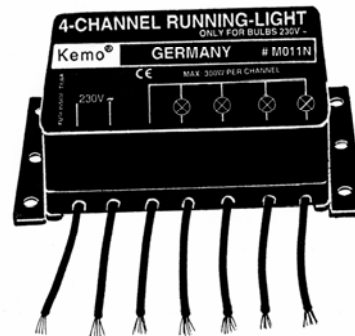
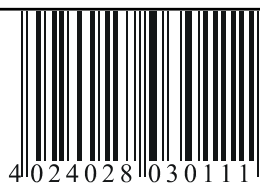
This running light makes 4 lamps or lamp groups light up one after the other at regular intervals and go out again. The running speed is adjustable: approx. 20...200 cycles per minute. For incandescent bulbs up to 300 Watt at maximum per channel (maximum total output: 1200 W). Depending on the connection, the module may be used for various applications. For luminous advertising in shop windows, for exhibition stands, in discotheques, for party rooms or light warning devices in danger zones.

**Technical data:**

Operating voltage: 230 Volt-  
Channels: 4  
Load per channel: max. 300 Watt  
Running speed: adjustable  
Dimensions: approx. 144 x 70 x 54 mm



Price group: 10



## M012 Motor and lamp controller

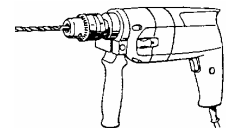
(Dimmer) 240 V~ / 110 V~, max. 1200 W / 600 W

...regulates incandescent lamps, heaters, hand drills, etc. via a potentiometer. Operating voltage: 110...240 V~. Max. admissible current: 6 amperes (3 A constant duty). At 230 V~ this corresponds to 1200 / 600 W and to 600 / 300 W at 110 V~. The following expansion module is available: M150. With it control may be done with control voltages or digital signals instead of the potentiometer.

**Technical data:**

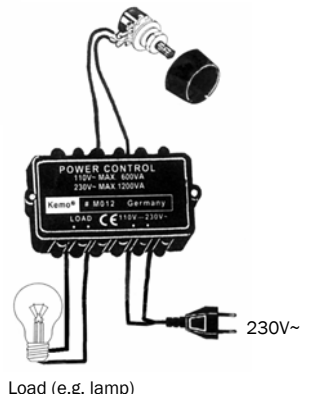
Admissible operating voltage: AC 110...240 V, 50...60 Hz  
Operating temperature range: approx. - 30 ° ...+ 60 °  
Max. admissible current: 6 A (constant duty: 3 A)  
At 110 V~ this corresponds to maximally 600 Watt or constant duty 300 Watt, respectively, or to maximally 1200 Watt or constant duty 600 Watt, respectively, at 230V~.  
Duty cycle: 100 % at 3 A or 20 % (max. 3 min.) at 6 A, respectively  
Control: via a firmly connected rotary potentiometer  
Loads: for ohmic or inductive loads  
Dimensions: approx. 61 x 35 x 23 mm

Price group: 7



Example of connection:

The shown accessories are not included!



**Available attachments:** auxiliary module M150 DC and Pulse Converter. When superposing this module, it is also possible to control the dimmer module M012 with control voltages (1...5 V= or 3...12 V= or 6...24 V=) or with TTL pulses (optionally in each case).

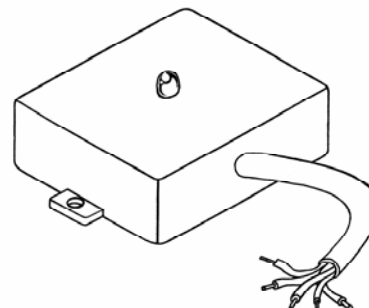
## M013 Twilight switch

This electronic twilight switch connects automatically by means of an installed relay lamps (e.g. energy saving lamps) or other consumers at nightfall and off again at daybreak. The module may also work the other way round: on at daybreak (for advertising displays, fountains etc.) and off at nightfall. Floating loads up to 3 A may be switched. Operating voltage: 220...240 V~.

**Technical data:**

Operating voltage: 210...240 V~  
Current consumption: < 40 mA  
Switching contact (floating): 1 x switch-over max. load 3A (resistive load) max. 1 A (inductive load)  
Turn-on brightness: approx. 10 Lux ± 50 %  
Turn-off brightness: approx. 60 Lux ± 50 %  
Delay in reaction: approx. 30 sec. ± 50 %  
Temperature range: approx. - 15°C...+ 40 °C  
Dimensions: approx. 70 x 60 x 22 mm (without fastening straps)

Price group: 6



## M015N Potential transformer, adjustable, max. 1,5 A, input: 6...28 V= output: 3...15 V=

The input voltage must be at least 3 V higher than the adjusted output voltage. The adjusted output voltage is stabilized or short circuit-proof. For operation of appliances with lower voltages at a 12 V or 24 V car battery or power supplies.

**Technical data:**

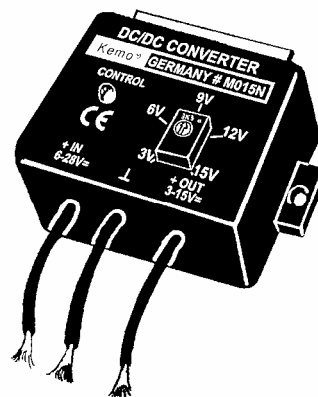
Input voltage: 6...28 V=  
Output voltage adjustable: 3...15 V (electronically stabilized)

Note: The input voltage must be at least 3 V higher than the adjusted output voltage  
Max. output current: 1,5 A  
Max. dissipation: approx. 3 W without heat sink, approx. 10 W with heat sink (not enclosed)  
Dimensions: approx. 59 x 56 x 25 mm (without lateral fastening straps)

Price group: 5



4 024 028 030 159



## M016 Loudspeaker separating filter 3-way 4...8 Ohm, max. 120 W

For one bass speaker, mid speaker and one till two tweeter. 4...8 Ohm, Separating frequency: approx. 800 / 5000 Hz, 6 dB.

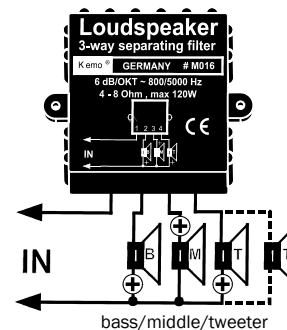
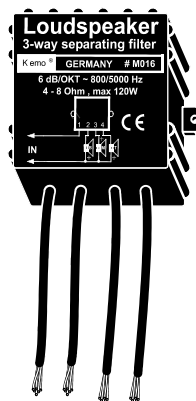
**Technical data:**

Max music load: 120 Watt  
Filter frequencies: approx. 800 / 5000 Hz  
Edge steepness: approx. 6 dB  
For loudspeaker: 4...8 Ohm  
Dimensions: approx. 67 x 65 x 37 mm

Price group: 3



4 024 028 030 166



bass/middle/tweeter

## M019 Automatic light switch 230 V~ time switch approx. 1 sec. to 30 min.

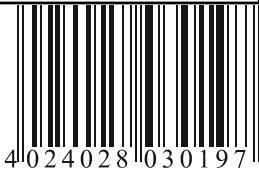
....connects other devices by means of the installed, potential-free relay point 1 x change over (max. 3 A) after key depression and disconnects them again automatically at the end of the adjusted time. The time lapse may be stopped at any time by pressing the second key. Use: automatic time switch for staircase lighting, for exposure devices, alarm devices, electric toys etc.

In addition a potentiometer 1 M lin. and 2 push-buttons for "Start" and "Stop" are necessary.

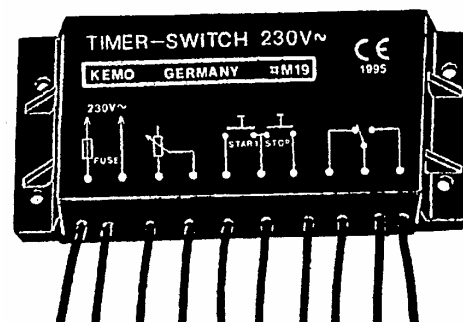
**Technical data:**

Operating voltage: 230 Volt~  
Max. breaking capacity: 3 A, 1 x change over  
Duration: approx. 1 sec....> 30 min.  
Dimensions: approx. 120 x 50 x 24 mm

Price group: 6



4 024 028 030 197



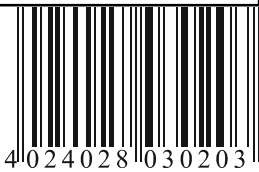
## M020 Voltage Transformer from 24 V= to 12 V= (13,8 V=), 1,1 A

With this module you may operate 12 V= devices at a 24 V= truck or marine engine battery. Maximum 1,1 A. Several modules may be connected in parallel if the power shall be increased, e.g. 2 modules do 2,2 A.

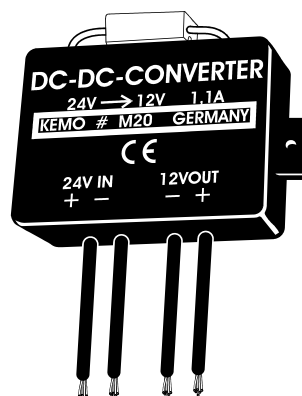
**Technical data:**

Input voltage: approx. 24...30 V  
Output voltage: approx. 13,8 V (for 12 V devices)  
Loading capacity: max. 1,1 A  
Temperature range: approx. - 15...+ 50 degree C  
Continuous power: 500 mA  
Max. power: 1,1 A (3 minutes)  
Several modules may be connected in parallel to increase the power.  
Dimensions: approx. 60 x 55 x 20 mm

Price group: 5



4 024 028 030 203



## M026 Solar power converter

This converter supplies by an input voltage of 0,9...3 V (max. 10 V) a controlled output voltage of approx. 15 V (variable). Max. power: 7 W. Efficiency: approx. 50...85 %. Usage: e.g. through 4 solar cells it is feasible to charge 12 V accus as well as to operate emergency transmitter, alarm systems, etc.

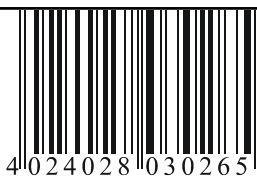
### Technical data:

Input voltage: 0,9...10 Volt  
 Max. output voltage: 15 Volt (switchable)  
 Max. power: 7 Watt  
 Efficiency: max. 50...85 %  
 Input and output: DC-voltage  
 Dimensions: approx. 56 x 53 x 27 mm

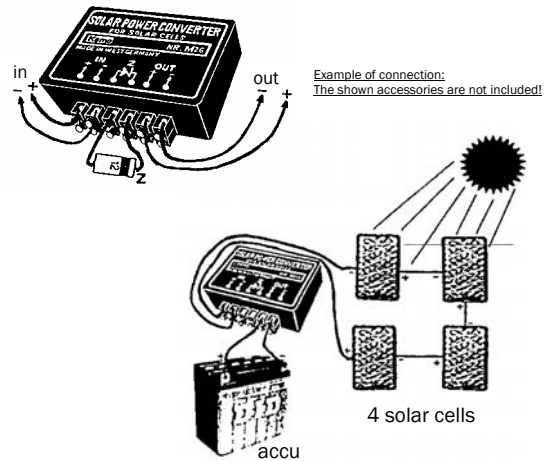
### Available accessory:

M139 Solar cell, see page 61.

Price group: 5



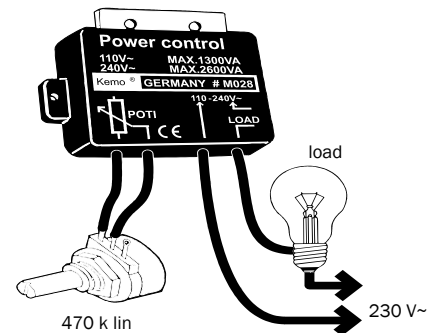
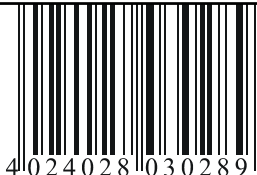
**M026 - PHASE-OUT PRODUCT!!!**  
 Only available as long as stock lasts!



## M028 Output regulator 110...240 V~ 2600 VA

Control of resistive + inductive loads (e.g. motors, heatings, incandescent lamps, etc., if they are phase-controllable). It is not possible to control: e.g. fluorescent lamps, motors with starting capacitor. Required potentiometer: 470 K lin (not attached). Operating voltage: 110...240 V~, max. current 12 A. At 110 V~ this corresponds to max. 1320 VA and to max. 2880 VA at 240 V~.

Price group: 7



Available attachments: auxiliary module M150 DC + Puls Converter, price group 7. When superposing this module, it also possible to control the dimmer module M028 with control voltages (1...5 V= or 3...12 V= or 6...24 V=) or with TTL pulses (optionally in each case), M150 see page 63.

## M029 Voltage converter

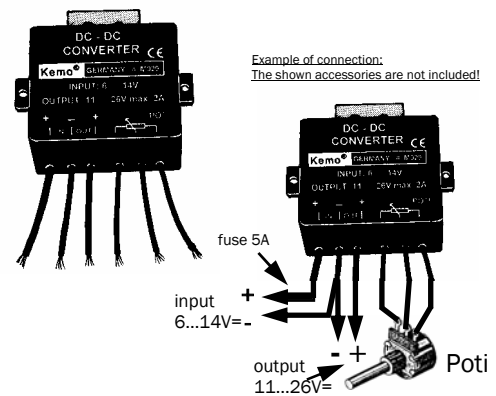
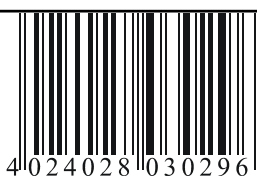
input: 6...14 V=, output: 11...26 V=

This electronically controllable DC voltage converter transforms a low input voltage in to a nearly twice as high output voltage. Max. output current: approx. 2 ampere. Output voltage decreases whenever there is a higher load. With the help of an additional potentiometer of 4,7 k lin. output voltage can be limited towards higher rates at input voltages of over 10 V.

### Technical data:

Input voltage: 6...14 V direct current  
 Output voltage: 11...26 V direct current (depending on load)  
 Output current: max. 2 A  
 Dimensions: approx. 82 x 72 x 25 mm

Price group: 9



## M031N Universal amplifier 3,5 W

4,5...12 Volt=, approx. 40...20.000 Hz. For loudspeaker 4...16 Ohm. Input sensitivity: < 80 mV.

### Technical data:

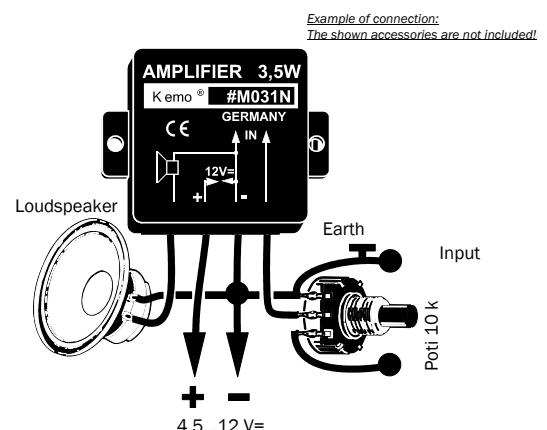
Output: max. 3,5 Watt music power  
 Operating voltage: 4,5...12 V=  
 Loudspeaker connection: 4...16 Ohm  
 Input sensitivity: < 80 mV  
 Frequency response: approx. 40...20.000 Hz  
 Dimensions: approx. 40 x 40 x 12 mm (without fixing straps)

Price group: 4



### Available accessory:

M040 Universal preamplifier, see page 43.



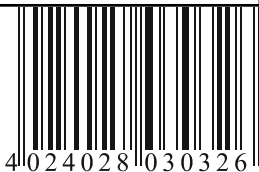
## M032 Universal amplifier 12 W

6...16 Volt, approx. 40...20.000 Hz. For loudspeaker 4...16 Ohm. Input sensitivity: approx. 80 mV. Musical power: max. 12 W.

**Technical data:**

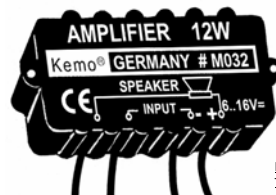
Operating voltage: 6...16 V=  
 Current consumption: max. 800 mA  
 Input sensitivity: < 80 mV  
 Loudspeaker connection: 4...16 Ohm  
 Music power: max. 12 W with 16V at a 4-Ohm loudspeaker  
 Frequency response: approx. 40...20.000 Hz  
 Dimensions: approx. 61 x 35 x 23 mm (without fixing straps)

Price group: 5

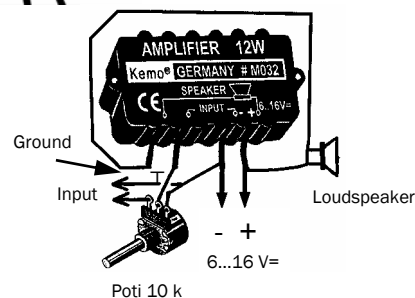


**Available accessory:**

M040 Universal preamplifier, see page 43.



Example of connection:  
The shown accessories are not included!



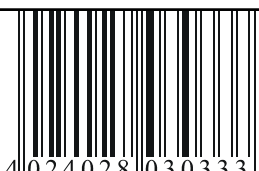
## M033 Universal amplifier 18 W

6...20 Volt, approx. 40...20.000 Hz. For loudspeaker 4...16 Ohm. Input sensitivity: approx. 80mV. Musical power: max. 18 W.

**Technical data:**

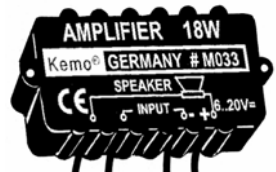
Operating voltage: 6...20 V=  
 Current consumption: max. 800 mA  
 Input sensitivity: < 80 mV  
 Loudspeaker connection: 4...16 Ohm  
 Music power: max. 18 W with 20V at a 4-Ohm loudspeaker  
 Frequency response: approx. 40...20.000 Hz  
 Dimensions: approx. 61 x 35 x 23 mm (without fixing straps)

Price group: 6

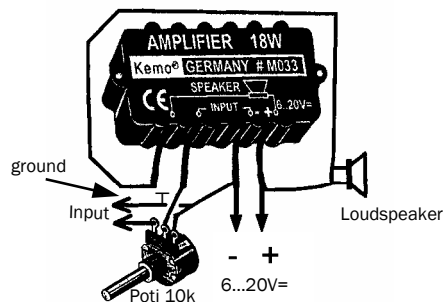


**Available accessory:**

M040 Universal preamplifier, see page 43.



Example of connection:  
The shown accessories are not included!



## M034 Power amplifier 40 W

6...16 Volt, for loudspeaker 4...8 Ohm, frequency range: approx. 20...25.000 Hz, sensitivity: approx. 500 mV.

**Technical data:**

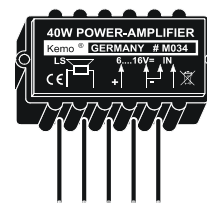
Musical power: max. 40 W at 4 Ohm loudspeaker load in case of an operating voltage of 16 V  
 Operating voltage: 6...16 V  
 Connectable loudspeakers: 4...8 Ohm  
 Sensitivity: < 500 mV  
 Frequency range: approx. 20...25.000 Hz  
 Dimensions: approx. 70 x 45 x 29 mm

Price group: 9

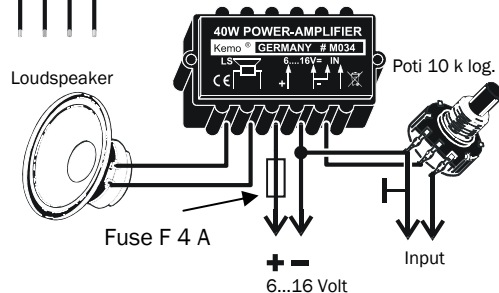


**Available accessory:**

M040 Universal preamplifier, see page 43.



Example of connection:  
The shown accessories are not included!



## M038 Converter from 24 V= to 12 V=, max. 3 A

...for operation of 12 Volt= devices at a 24 Volt= lorry or boat battery. Short circuit-proof, shock-proof module.

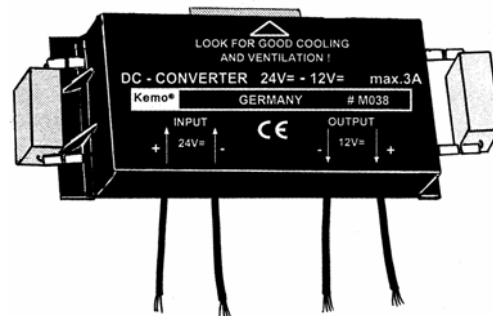
This power-potential transformer module has to be mounted on a heat sink or the like if the maximum power shall be drawn as continuous duty. The module is short circuit-proof and has a built-in thermal circuit breaker which disconnects in case of overheating.

Application: to operate larger car radios, CB radio equipment etc. at a 24 V lorry or bus battery.

**Technical data:**

Input voltage: 24...26 V  
 Output voltage: 12 V  
 Maximum current: 3 A (> 10 min. max. 2 A) with input voltage 24 V  
 Dimensions: approx. 137 x 62 x 25 mm

Price group: 6



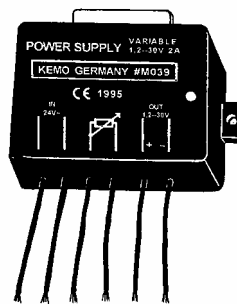
## M039 Power supply approx. 1,2...30 V=, 2 A

Steplessly adjustable, stabilized power supply with integrated rectifying + filtering. Adjustable in 2 stages: stage 1 : approx. 1,2V...12 V, stage 2 : approx. 12 V...30 V. For operation is required: 1 potentiometer 10k lin. 1 transformer 2 x 12 V 2 A, 1 switch 1 x change over 2 ampere 1 cooling element approx. 10 x 8 x 5 cm or larger.

### Technical data:

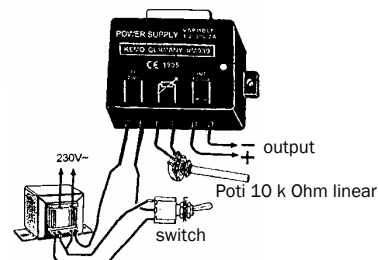
Operating voltage: approx. 2 x 12 V~, 2 A  
 Output voltage: approx. 1,2...30 V= adjustable  
 Max. current load: 2 Ampere  
 Required potentiometer: 10 k Ohm lin.  
 Dimensions: approx. 82 x 73 x 33 mm

Price group: 7



Example of connection:  
 The shown accessories are not included!

power transformer  
 input: 230 V~  
 output: 2 x 12 V~  
 max. 2 A



## M040 Universal preamplifier

...for microphones and diverse usages. Operating voltage: 9...24 V=. Frequency range: approx. 10 Hz...100 kHz. Input: approx. 2...50 mV. Output: approx. 200 mV to 1 V. This mini module is simply connected between a power amplifier (e.g. Kemo M032 12 Watt) and a weak signal source (e.g. microphones).

### Technical data:

Operating voltage: approx. 9...24 V=  
 Input voltage: approx. 2...50 mV  
 Output voltage: approx. 200 mV...1 V  
 Amplification: approx. 65 x at UB 9 V, approx. 80 x at UB 12 V,  
 approx. 100 x at UB 24 V  
 Current consumption: < 2 mA  
 Dimensions: approx. 30 x 25 x 15 mm

Price group: 4



output



input

9...24 V=

## M041 Noise-Filter

This high-capacity mains noise filter with ring core choke may be connected to the mains of the interfering or of the interfered device. Connection will be made through wires at the bottom of the module. Max. 20 A top, 240 V~, 6 A constant current.

### Technical data:

Operating voltage: max. 240 Volt~  
 Current load: max. 20 Ampere top  
 Constant current. 6 A  
 Interference elimination:  
 broadband with LC-filter  
 Dimensions: approx. 53 x 45 x 17 mm

Price group: 4



Input 240 V~

Output to device

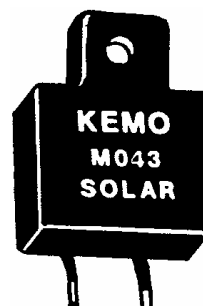
## M043 Solar discharge protection module

...prevents reverse current (discharge) between solar elements and accu, whenever the solar elements do not create much current because of inferior light conditions. Voltage loss merely approx. 0,35 V at 300 mA! Max. 1,5 A.

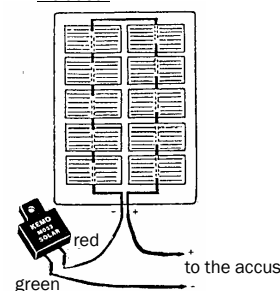
### Technical data:

Connection: cable connection  
 Max. current load: 1,5 Ampere  
 Dimensions: approx. 25 x 22 x 17 mm

Price group: 2



Example of connection:  
 The shown accessories are not included!



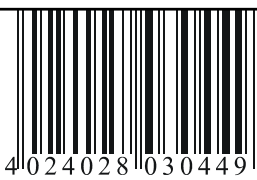
## M044 Fluorescent lamp voltage converter

...for direct connection of fluorescent lamps 8...18 Watt at a car battery 12 V. Ideal for camping, gardenhouses etc. Based on the high operating frequency and the low current consumption of the module at complete brightness the saving of energy is considerable compared to bulbs! The lamps may be connected without any series devices (choke, starter)!

**Technical data:**

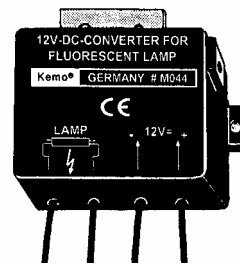
Operating voltage: 12...13,8V DC voltage  
 Current consumption: approx. 0,7...1,5 A (adjustable)  
 Output voltage: with no load > 600 V approx. 10...30 kHz  
 Dimensions: approx. 70 x 60 x 26 mm (without brackets + cooling angle)

Price group: 7



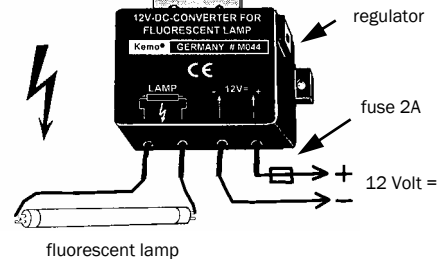
**Available accessories:**

**P1089 Neon lamp + P5656 Mini-fluorescent lamp, see page 44.**



Example of connection:  
The shown accessories are not included!

cooling angle



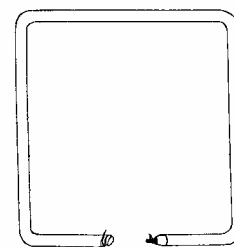
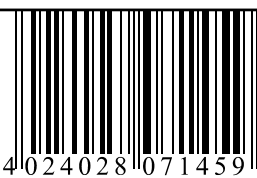
## P1089 Neon lamp

Perfect for neon pictures, decorative lighting in bars, etc. The lamp also works with our fluorescent lamp potential transformer M044 if it is adjusted to low power.

**Technical data:**

Operating voltage approx. > 1500 V  
 Dimensions: approx. 75 x 75 mm, Ø 4 mm

Price group: 5



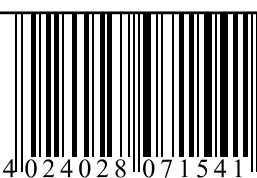
## P5656 Mini-fluorescent lamp

Bright, white light. May be operated at our module M044 with a dropping resistor 10 k 0,5 W. Up to 3 lamps may be connected in series with one common dropping resistor 10 k. The module must be adjusted in such a manner that the lamps just go on (not the full module power).

**Technical data:**

Starting voltage: approx. 500 V  
 Dimensions: approx. Ø 5,5 mm x 95 mm

Price group: J



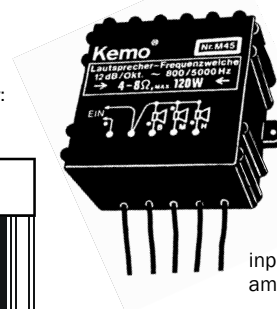
## M045 Cross-over network 3-ways, max. 120 W

For one bass speaker, mid speaker and one or two tweeter 4...8 ohm. Separating frequency: approx. 800 / 5000 Hz. The rate of change of the attenuation is 12 dB / octave.

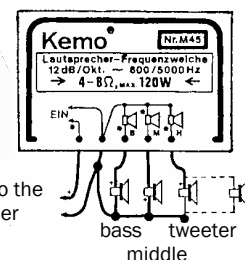
**Technical data:**

Type: 3-way separating filter  
 Max. power: 120 Watt  
 Speaker connection: 4...8 Ohm  
 Separating frequencies: 800 / 5000 Hz  
 Dimensions: approx. 67 x 65 x 37 mm

Price group: 4



Example of connection:  
The shown accessories are not included!



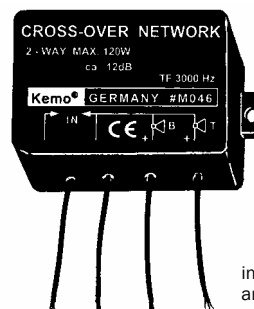
## M046 Cross-over network 2-way, 4...8 Ohm max. 120 W

Cross-over network, separating frequency: approx. 3000 Hz. 12 dB. Usage: For one bass speaker and mid range/tweeter or one wide range and one tweeter (dynamic or piezo).

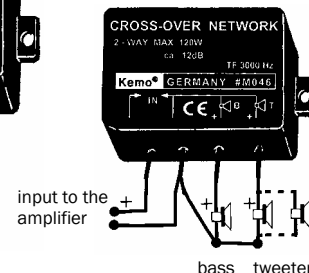
**Technical data:**

Max. load: 120 Watt  
 Separating frequency: approx. 3000 Hz, 12 dB  
 For loudspeaker: 4...8 Ohm  
 Dimensions: approx. 59 x 45 x 20 mm (without fixing straps)

Price group: 3



Example of connection:  
The shown accessories are not included!

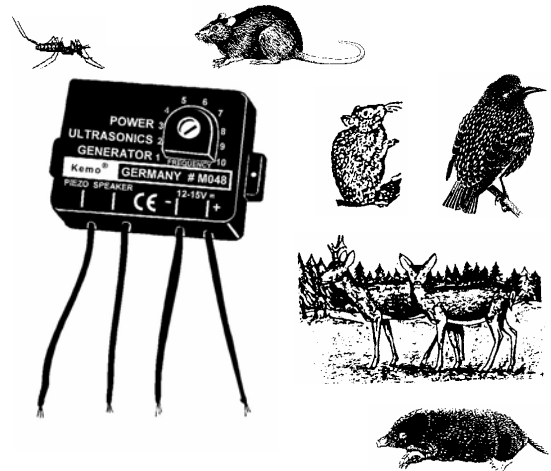


## M048 Ultrasonic generator

Through ultrasonic sounds it is possible to scare away animals and insects: e.g. rats, mice, martens, wild rabbits, mosquitoes. If mounted at the car, roe will be put to rout (decreased danger of accidents). The pulsating audio frequency is adjustable from approx. 10...40 kHz ( $\pm 20\%$ ). Operating voltage: 12...15 Volt $\pm$ . For connection of a piezo-treble loudspeaker. The module is an ideal aid to scare away destructive animals out of your pantry, kitchen, storehouses, garden, etc. Also to be used as dog whistle. There are some birds species which will be scared away out of your fruit trees.

**Technical data:**

Operating voltage: 12...15 V=  
 Current consumption: < 50 mA  
 Loudspeaker output: only for up to 5 piezo loudspeakers!  
 Audio frequency: adjustable approx. 10...40 kHz ( $\pm 20\%$ )  
 Dimensions: approx. 73 x 44 x 28 mm



**Recommended piezo-tweeter**

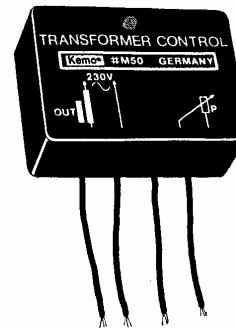
L001, L002 + P5123, see page 67.

## M050 Transformer control

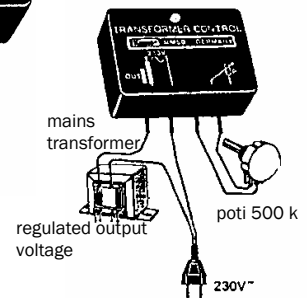
With this transformer voltage control module it is possible to regulate mains transformer 230 V~ (max. 400 W) at the input side (primary) in the power between approx. 5...95 %. Required potentiometer: 500 k. Usage: Construction of regulable high-power mains controls, a.c. voltage mains supplies, control of transformers for low-voltage halogen lamps, control of high-voltage transformers etc.

**Technical data:**

Operating voltage: 230 V~  
 Max. power: 400 Watt  
 Required potentiometer: 500 k linear  
 Dimensions: approx. 71 x 49 x 26 mm



Example of connection:  
 The shown accessories are not included!

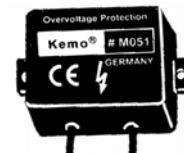


## M051 Lightning arrester

...is easily connected parallel to the current lead of your device and protects against dangerous overvoltage provoked by lightning flashes from the mains supply. Lightning overvoltage may also occur in a wide range of the mains, if the lightning has stricken.

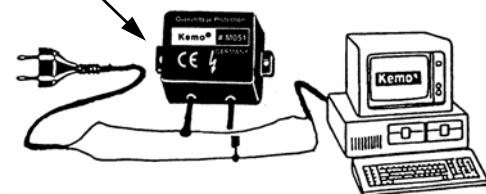
**Technical data:**

Max. permitted a.c. voltage: V/RMS: 360 V  
 Max. transient current: > 400 A  
 Observations: The peak voltage (crest voltage) is about 325 V in the ordinary 230 V~ mains  
 Dimensions: approx. 40 x 25 x 15 mm



lightning arrester

Example of connection:  
 The shown accessories are not included!

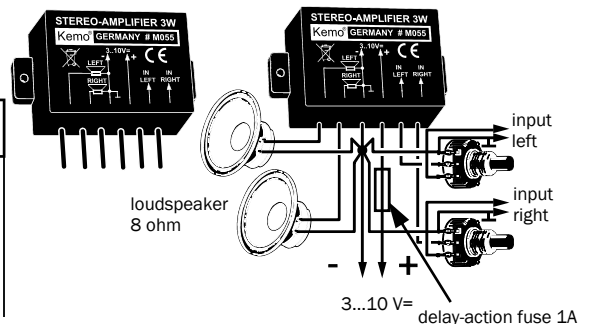


## M055 Stereo amplifier 3 W

Universal stereo amplifier with a wattage of max. 2 x 1.5 W musical power. UB: 3...10 V, F: approx. 20...20.000 Hz. Loudspeaker socket: 8...32 ohms. Sensitivity: < 100 mV.

**Technical data:**

Output power: max. 3 W musical power (2 x 1.5 W)  
 Operating voltage: 3...10 V  
 Loudspeaker socket: 8...32 ohms  
 Input sensitivity: < 100 mV  
 Frequency response: approx. 20...20.000 Hz  
 Dimensions: approx. 59 x 44 x 20 mm (without fixing straps)



**Available accessory:**

M040 Universal preamplifier, see page 43.



## M057 Accumulator charging module, automatic

Constant current charger for accumulators 1,2...18 V=. Reversible charging currents (depending on the accumulator): 0,01...1 A. The charging current adjusts automatically. A transformer is required, too, which has approx. 10 V more voltage than the accumulator. For all accumulators which may be charged with constant current: e.g. NiCd, NiMH, lead or gel accumulators. Not suitable for lithium ion accumulators!

**Technical data:**

Accumulators capable of being charged: 1,2...18 V

NiCd, NiMH, lead and gel accumulators,

not for lithium ion accumulators!

Charging current: constant charging current adjustable in

steps: approx. 10 - 20 - 50 - 100 - 200 - 500 - 1000 mA

Required transformer AC: always 10 V higher than the voltage

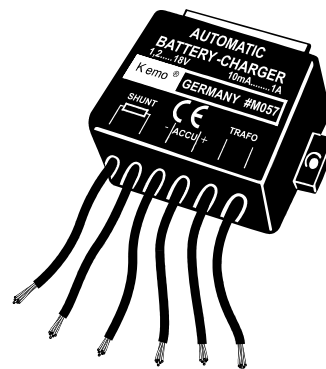
of the accumulator to be charged, max. 28 V. The maximum

output current of the transformer should be higher than the

desired charging current of the accumulator.

Dimensions: approx. 53 x 45 x 21 mm

Price group: 7



## M058N Microwave leakage tester

...indicates leakage radiation at microwave stoves, which flows out through door hinges, rubber sealings or screenings. Microwaves significate a form of high energy which goes through plastic, ceramics and also live tissue. An indispensable device for your health and environmental preservation! Operating voltage 9 V=, indication through LED!

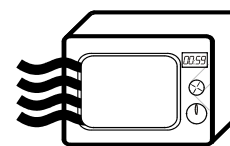
**Technical data:**

Operating voltage: 9 V=

Display: light-emitting diode

Dimensions: approx. 101 x 60 x 26 mm

Price group: 3



## M060 Universal car noise filter

Highly effective, sealed LC-noise filter for cars. The filter has to be placed within the current lead of the disturbing resp. of the disturbed device and will filter a great deal of the interferences. Max. 10 (20) Ampere; maximal operating voltage 48 Volt.

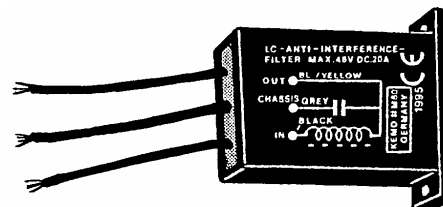
**Technical data:**

Operating voltage: max. 48 Volt

Current load: max. 10/20 Ampere

Dimensions: approx. 47 x 45 x 22 mm

Price group: 4



## M061 Alarm monitor

Small alarm monitor with 2 coloured LED's which quick and alternately flash in a special brightness. Operating voltage: 9...12 V=. Usage: For mounting in cars, window-sills etc. as visible deterrent against thieves. The monitor could be mounted without or in combination with an alarm system.

**Technical data:**

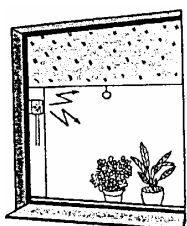
Operating voltage: 9...12 V direct-current voltage

Current consumption: approx. 28...40 mA

Flash period: approx. 3...6 x per second

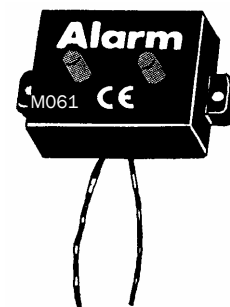
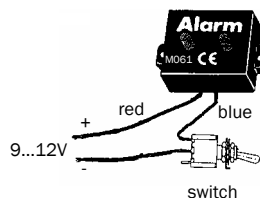
Dimensions: approx. 30 x 25 x 15 mm

Price group: 3



**Example of connection:**

The shown accessories are not included!



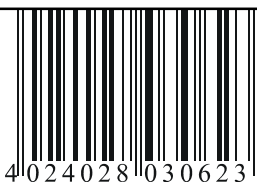
## M062 Mini-fence-high-voltage generator

...produces from a battery voltage of 9...12 Volt a pulsating, weak high-tension of approx. 1000 Volt. For electrically operated fences for small animals, as thief-protection etc.

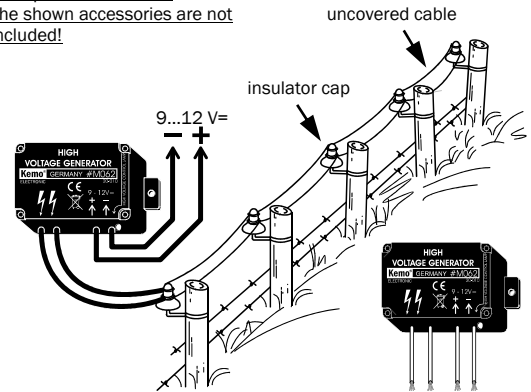
**Technical data:**

Operating voltage: 9...12 V=  
 Power consumption: approx. 40 mA  
 Output voltage: pulsating max. 1000 V / 0,5 joule  
 Pulse frequency: approx. 2 Hz (2 pulses per second)  
 High-voltage display: fluorescent lamp  
 Max. permissible high-voltage cable length: 100 m  
 Dimensions: approx. 72 x 50 x 42 mm (without fixing straps)

Price group: 7



**Example of connection:**  
 The shown accessories are not included!



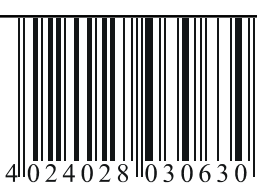
## M063 Dimmer 12 V~, 50 W (or 24...48 V~)

....controls continuously 12 V incandescent lamps (e.g. halogen lamps), 12 V heaters, motors (also direct current motors with added rectifier), etc.. Only to be operated at a 12 V~ transformer (50...60 Hz.), not suitable for DC voltage (accumulator)! It is also possible to control 24 V~ (linear potentiometer 2,2 k) or 48 V~ (linear potentiometer 4,7 k) by exchanging the potentiometer.

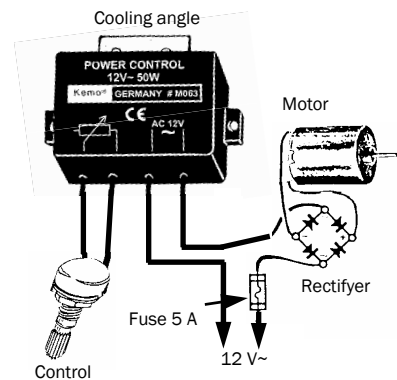
**Technical data:**

Operating voltage: 12 V~ (10...14 V~) alternating voltage 50...60 Hz (for normal iron core transformers only, not for electronic halogen transformers)  
 Working mode: phase control  
 Loading capacity: for ohmic or inductive loads such as lamps, motors, electromagnets etc. up to 50 W (4,5 A)  
 Dimensions: approx. 60 x 57 x 23 mm

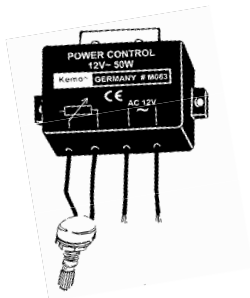
Price group: 7



**Example for connection of a dc motor with rectification**



**Example of connection:**  
 The shown accessories are not included!



## M065 Halogen music light for 12 V~ lamps

Sensitive music light for 12 V glow lamps or halogen lamps up to max. 50 W. For operating the device it is necessary to connect a potentiometer 1 k Ohm lin. in order to control sensitivity.

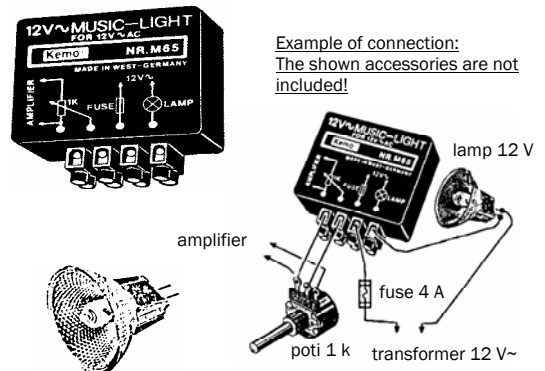
**Technical data:**

Operating voltage: 12 V~ (transformer)  
 Load: max. 50 W (lamps)  
 Adjustment: through external poti 1 k lin.  
 Connection: at the loudspeaker output of an amplifier or radio  
 Dimensions: approx. 53 x 57 x 28 mm

Price group: 5



**Example of connection:**  
 The shown accessories are not included!



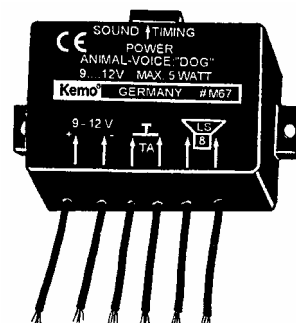
## M067 Electronic dog barking

With adjustable sound: similar to a "small dog" up to "big angry dog"!

A battery 9...12 Volt or a stabilised power unit with an output voltage of 9 or 12 Volt (direct voltage) are connected with the module. Please use sufficiently strong batteries or a power unit respectively as the module may have a max. current consumption of up to 400 mA! (The small 9 V (006P microdyne) transistor batteries are not suitable!)

Dimensions: approx. 60 x 50 x 20 mm

Price group: 6

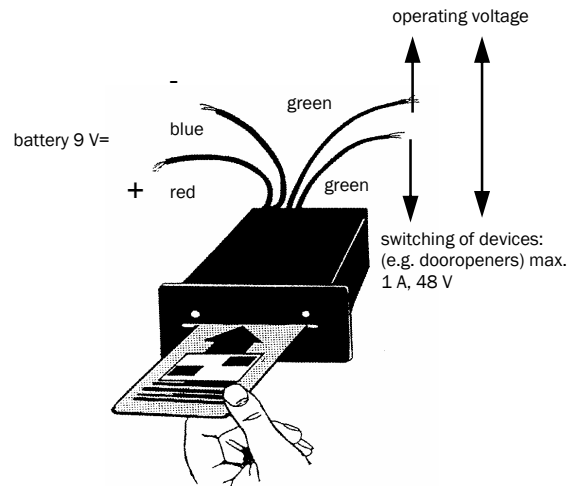


## M068 Electronic card switch

Whenever the corresponding card has been inserted into the card slot, the card switch will switch on. The card will be read optically by 4 infra-red read-heads and will solely react on the correct card. 3 cards are enclosed, coding can be changed. Operating voltage: 9 V=. Usage: switching of devices, machines, alarm systems, dooropener, etc. which should be feasible only for a special circle of persons. The lock has an installed relay by means of which it is possible to connect loads up to 1 A, 48 V.

**Technical data:**

Operating voltage: 9 V=  
 Output: relay contact 1 x ON, max. 1 A, 48 V  
 Operating mode:  
 optical with 4 infrared-reflex reading heads  
 Card dimensions:  
 approx. 85 x 54 mm (3 cards enclosed)  
 Module dimensions: approx. 80 x 35 x 70 mm



## M068-5 Substitutional cards for M068 electronic card switch (5 pieces)

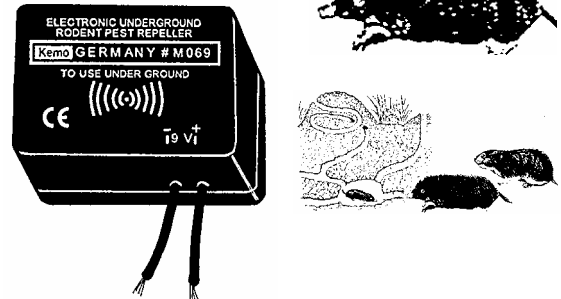


## M069 Electronic underground rodent pest repeller

This waterproof module emits in rapid intervals aggressive seismic oscillations, which are widely radiated underground and are mostly avoided by root voles, moles and similar rodents. The module has to be digged near the animal tunnels and is operated through a cable with operating voltage of 9 V. One module will be enough for approx. 1.000 m<sup>2</sup> of garden.

**Technical data:**

Operating voltage: 9 Volt=  
 Input current: approx. 150 mA  
 Usage: underground  
 Dimensions: approx. 72 x 50 x 35 mm

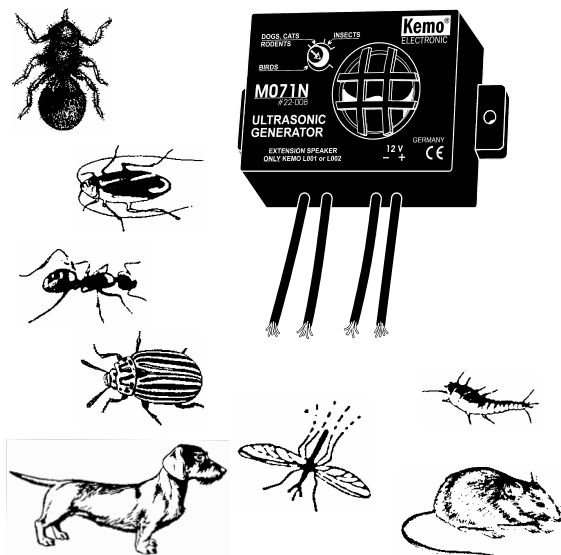


## M071N Ultrasonic vermin repellent

This ultrasonic generator produces pulsating and aggressive ultrasonic sounds like a siren which many animals perceive as extremely unpleasant and, therefore, try to avoid as far as possible. The generator should be used to keep away rodents, insects, crawling parasites, game and birds, etc.

**Technical data:**

Operating voltage: 12 V (10...13.8 V) DC voltage  
 Current consumption: < approx. 60 mA  
 Adjustable frequency: approx. 8...40 kHz (± 15 %)  
 Frequency deviation, approx. 2 x per second: approx. 2...3 kHz (automatic change of frequency, siren-like)  
 Sound pressure: max. 100 dB ± 15 %  
 Range: > 40 m with free field of vision  
 Loudspeaker's beam angle: max. 140 degrees  
 Connection of additional piezoelectric loudspeakers: max. 4 additional loudspeakers may be connected.  
 Please do only use the additional loudspeakers approved by Kemo: L001, L002, L003, P5123.  
 Functional display: blinking LED  
 Connection: via free cables  
 Dimensions: approx. 92 x 51 x 31 mm



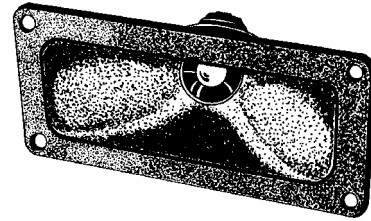
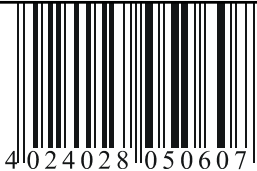
**Available accessories:**

L001, L002, L003 and P5123, see page 67.

## L001 Piezo-spherical cap-tweeter with flare

High-quality piezo-spherical cap-tweeter with flare approx. 65 x 145 mm, approx. 40 mm deep. Frequency range: approx. 2.500...45.000 Hz. This tweeter can be connected directly at the amplifier or at a diplexer. This tweeter has a vaulted aluminium spherical cap and no conical membrane (as usual with flare loudspeakers). Due to the aluminium spherical cap the acoustic pressure is not so strong as with comparable other piezo-tweeters. In return the loudspeaker has a very broad angle of radiation and a very good brilliant sound. Due to the aluminium spherical cap with its special radius of gyration and very low mobile mass the frequency response is very clean up to 45.000 Hz. Therefore this tweeter is especially suitable as ultrasonic loudspeaker for the control of parasites (against rodents, vermins etc.). Dimensions: approx. 65 x 145 mm.

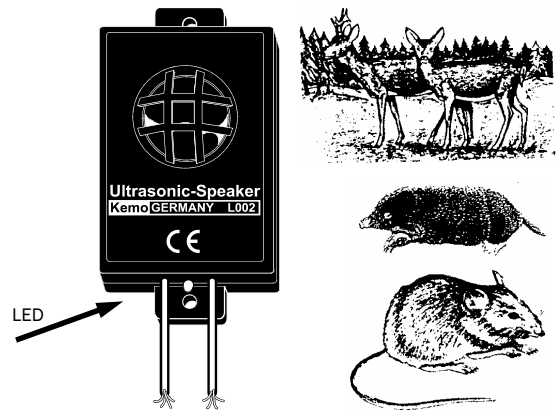
Price group: 3



## L002 Ultrasonic wall loudspeaker

Additional loudspeaker (Piezo) for our ultrasonic vermin scare No. M071N. An installed light emitting diode serves as operation indication. Range of transmission: approx. 6.000...45.000 Hz. Aluminium spherical cap membrane with a very broad angle of radiation. Suitable for mounting outside provided the loudspeaker will be installed protected from rain (e.g. under the roof ledge). The LED is loaded by the supplied ultrasonic wave frequency and thus does not require any additional operating voltage. Dimensions: approx. 72 x 50 x 28 mm (without fixing straps).

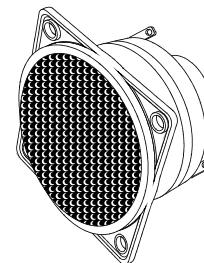
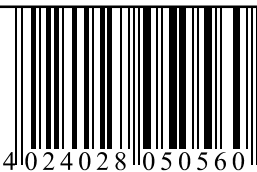
Price group: 5



## L003 Piezo-tweeter

Piezo-high tone loudspeaker with an installed transformer to increase the power. Concerning the technical Data this loudspeaker is indicated with a frequency response of approx. 5.000 ... 20.000 Hz, a top performance of 105 dB at a distance of 1 m. Our tests have shown that it also works very well in an ultrasonic-region of approx. 24.000 Hz. Due to the dynamic connection load 2 of these loudspeakers have to be connected in series (because of its little inner resistance 8 Ohm), and may then operate at our ultrasonic modules M048 and M071N. With this you have a very high output of radiation! Dimensions: approx. 63,5 x 63,5 mm, 50 mm deep.

Price group: 3



## M073 Motorbike alarm

...switches automatically a horn or a siren on, if the motorbike should be moved from a parking position to any other one. A waterproof and shakeproof sealed module. Also to be used to protect any other objects, which are not to be moved.

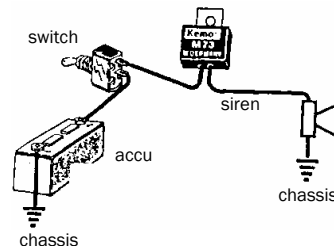
### Technical data:

Connection power: max. 1 Ampere  
Switching voltage: maximal 40 Volt  
Operating voltage:  
no need of own operating voltage  
Dimensions: approx. 18 x 15 x 12 mm  
(without fixing straps)

Price group: 3



Example of connection:  
The shown accessories are not included!



## M077 Flasher 5...12 V=, max. 1 A

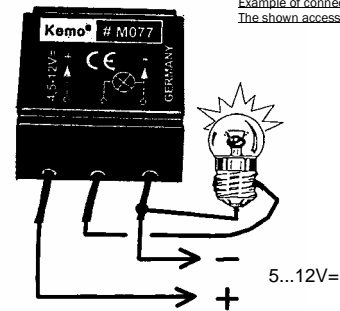
Electronic flashing device for glow lamps up to max. 1 Ampere current load. Operating voltage: 5...12 Volt DC voltage. Flashing period: approx. 2...4 Hz (approx. 120...240 flashing pulses per minute). Flashing / rest relation: approx. 50 : 50 %.

**Technical data:**

Operating voltage: 5...12 V=  
 (depending on the connected lamp)  
 Max. current of the lamp: 1 A  
 Flash period: approx. 2...4 Hz  
 (approx. 120...240 flash impulses per minute)  
 Dimensions: approx. 25 x 22 x 17 mm



Example of connection:  
 The shown accessories are not included!

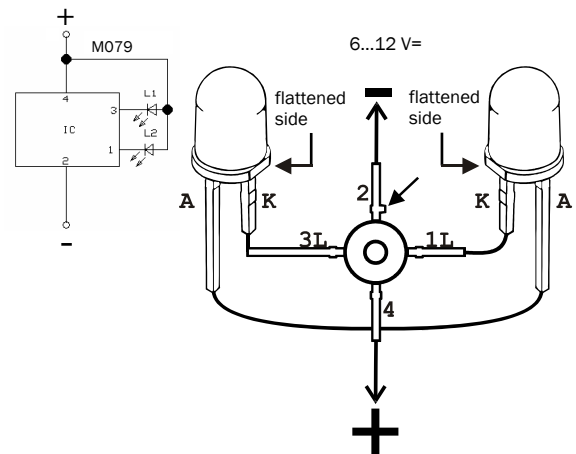


## M079 Flasher / alternating flasher for 1 to 10 LEDs at maximum

To be used as flasher or alternating flasher for light-emitting diodes. Operating voltage: 6...12 V=. Flash period: approx. 2...3 Hz (approx. 120...180 flashing pulses / min.). Secured against wrong connection, short circuit-proof, built-in current limiting for LEDs.

**Technical data:**

Operating voltage: 6...12 Volt  
 Output: 2 (alternating flasher)  
 Flash sequence: approx. 2...3 Hz  
 (approx. 120...180 flashing pulses per minute)  
 Flashing / rest relation: approx. 50 : 50 %  
 Dimensions: approx. 18 x 16 x 4 mm



## M080 Flasher / alternating flasher for small glow lamps 6...12 V=

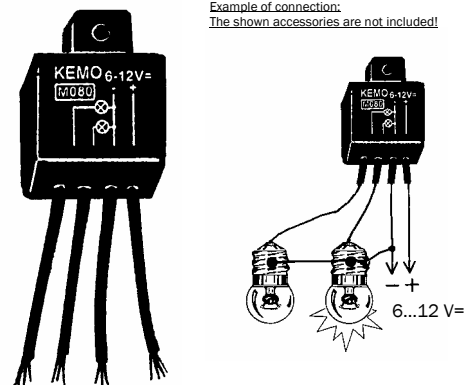
It is possible to connect small glow lamps up to a max. current load of 300 mA. Flashing frequency: approx. 2...3 Hz (approx. 120...180 flashing pulses per minute). Suitable as flasher or alternating flasher.

**Technical data:**

Operating voltage: 6...12 Volt=  
 Operating mode: flasher or alternating flasher  
 Output: 2 outputs each for max. 300 mA  
 Flash sequence:  
 approx. 2...3 Hz (120...180 x per minute)  
 Flashing / rest relation: approx. 50 : 50 %  
 Dimensions: approx. 18 x 15 x 12 mm  
 (without fixing straps)



Example of connection:  
 The shown accessories are not included!



## M082 DC Flasher 12...24 V=, max. 8 A

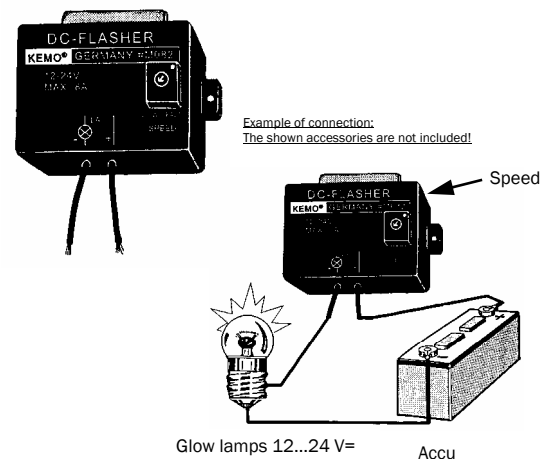
Power flasher for glow lamps 12...24 V=, maximum 8 A switching capacity. Simple 2-wire-connection. For direct current (accu or power supply). Flashing sequences: approx. 12...50 times per minute adjustable.

**Technical data:**

Operating voltage: 12...24 Volt=  
 Switching voltage: max. 8 A  
 Flash sequence: approx. 12...50 times x per minute  
 Dimensions: approx. 71 x 55 x 28 mm



Example of connection:  
 The shown accessories are not included!



## M083 Accu-charging regulator 12 V=

This module supervises the charging state of a 12 V car accu and starts charging automatically, whenever there is a drop of voltage. With full accus the module will switch off and supervise the accu. Suitable for accus placed in alarm systems, weekend-houses, caravans etc. in order to keep accus constantly charged without the risk of overcharging. Also suitable as charging regulator for solar surfaces. Charging current maximum 1,5 A. Short circuit and reverse current proof. Automatic charging interruption with accu voltage of approx. 13,8...14,2 V.

### Technical data:

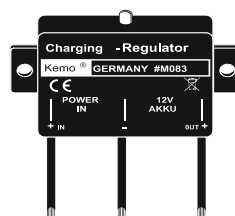
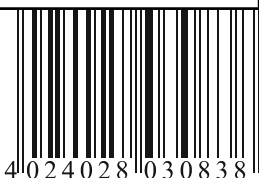
Input voltage: 16...20 V= (solar panel or power supply)

Output: regulated for charging a 12 V accumulator to max. 13,8...14,2 V

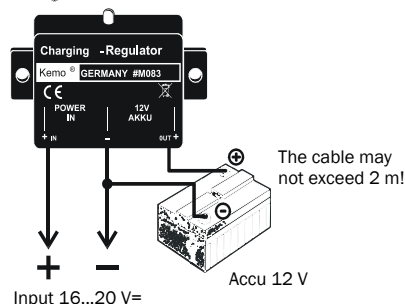
Output current: 0...1,5 A depending on the charging state of the accumulator

Dimensions: approx. 59 x 46 x 20 mm (without fixing straps)

Price group: 5



Example of connection:  
The shown accessories are not included!



## M084 Telephone voltage protection

This module has to be connected parallel to the telephone leads. It is an efficient protection for you and for your valuable telephone unit against overvoltages as happening during lightnings, static chargings, too high external voltages from the neighbourhood, etc. which may penetrate your telephone socket. It is possible that high voltages of more than (>) approx. 120 V are deflected. Impulse circuit capacity up to 40 Ampere! This module has no Postal permission and should be used exclusively like a great deal of other telephone accessories within private telephone units without public exchange connection.

### Technical data:

Connection: 2 leads, parallel to the phone leads

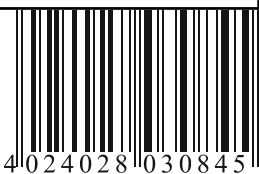
Shunt conductance: > approx. 120 V

Impuls current-carrying capacity:

max. 40 A / 0,5 seconds

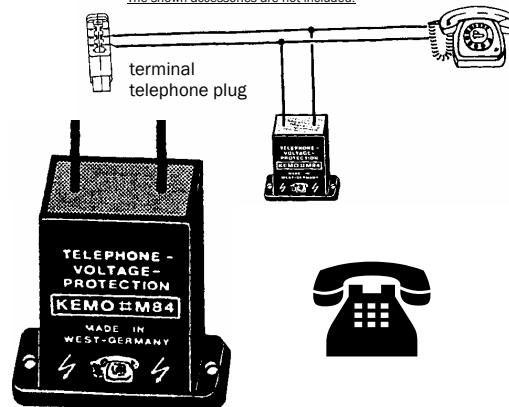
Dimensions: approx. 47 x 45 x 22 mm

Price group: 3



**M084 - PHASE-OUT PRODUCT!!!**  
Only available as long as stock lasts!

Example of connection:  
The shown accessories are not included!



## M085 Infrared detector

With the aid of this "Infrared Detector" it is made possible to carry out functional tests with infrared remote control units, infrared transmitters in light barriers, etc. This module consists of an infrared receiver which indicates through switching on a light emitting diode, if the remote control on test emits infrared radiation. Suitable for most of the remote controls and transmitters. An indispensable test equipment for radio and TV workshops and also for hobbyists.

### Technical data:

Operating voltage: 9 V=

Sensitivity:

reacts on almost every infrared remote control

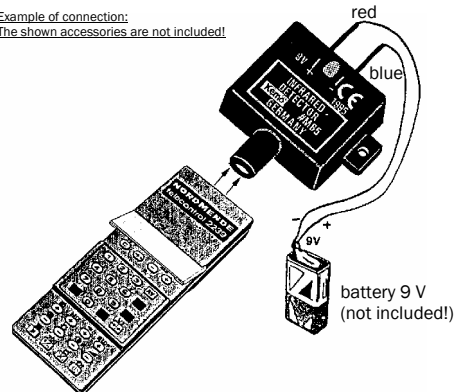
Display: indication with built-in LED

Dimensions: approx. 30 x 40 x 17 mm

Price group: 4



Example of connection:  
The shown accessories are not included!



## M087 LED tester

With the aid of this test module it is made possible to carry out tests with all kinds of light emitting diodes in order to check function, brightness, colour and polarity. The LED's could be tested optionally with following currents: approx. 1 mA, 2,5 mA, 5 mA, 10 mA, 20 mA and 50 mA. It is feasible to insert into the test contacts brand-new LED's as well as soldered out LED's with residual soldering tin at the connecting pins. In order to facilitate selection of LED's of equal brightness, there have been placed two test sockets with the same currents (10 mA) side by side. Necessary: battery 9 V.

### Technical data:

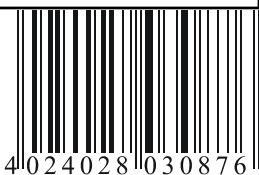
Operating voltage: 9 V battery

LED-connection: contact eyes

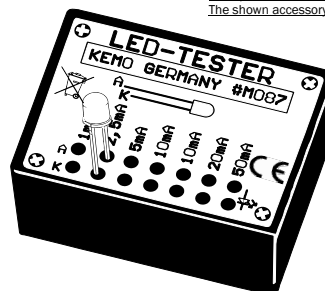
LED-testing currents: optional 1, 2,5, 5, 10, 20, 50 mA

Dimensions: approx. 58 x 44 x 27 mm

Price group: 4

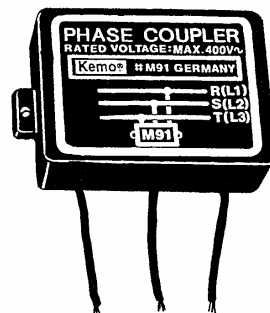


Example of connection:  
The shown accessory is not included!



## M091 Phase coupler for wireless intercom

Depending on the size of the flat and the circumstances of the mains (several phases) it is probable that there are limitations of talk-out range or transmitting quality. Through the mounting of a phase coupler into the switch cabinet (solely mounted through an electronic expert), it is possible to achieve a considerable improvement of the talk-out range and of the transmitting quality. For 110...400 Volt~ 50...60 Hz  
Dimensions: approx. 60 x 45 x 20 mm



Price group: 3

**M091 - PHASE-OUT PRODUCT!!!**  
Only available as long as stock lasts!



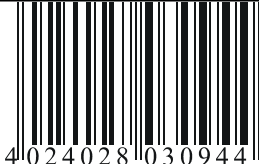
## M094 Marten-repeller 12...15 V=

...produces intensively pulsating ultrasonic sounds which are found by martens and similar rodents especially unbearable, and therefore is capable to scare away these animals. This "Marten Repeller" includes 4 small ultrasonic loudspeakers to achieve a profitable radiation of the ultrasonic sound. The frequency is adjustable (approx. 10...40 kHz,  $\pm 20\%$ ). Indication of operation through light emitting diode. Operating voltage: 12...15 V=. Usage: This module is able to scare away martens from the engine compartment of cars and lorries, place where these animals use to gnaw at cables and other plastic parts! Or to be used in pantries, in the cellar or attic!

### Technical data:

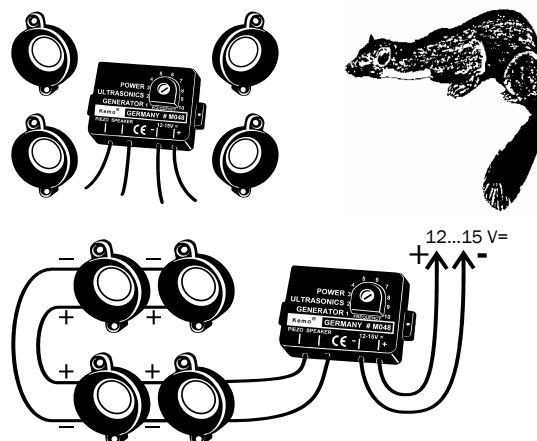
Operating voltage: 12...15 V=  
Current consumption: at 12 V < 0,05 A  
Loudspeaker output: only for piezo loudspeakers  
Audio frequency: adjustable approx. 10...40 kHz ( $\pm 20\%$ )  
Dimensions module: approx. 73 x 44 x 28 mm  
Dimensions piezo loudspeaker: approx.  $\varnothing$  30 mm x 13 mm

Price group: 8



### Available accessories:

L001, L002, L003 and P5123,  
see page 67.



## M100N Anti marten devices for motor vehicles

...produces aggressive ultrasonic sounds not audible to men which martens find extremely annoying and so try to avoid them, if possible. To be mounted in the engine compartment of motor vehicles. 12 V= approx. 2 mA, approx. 23 kHz.

Ultrasonic marten repellent for use in cars, houses and lofts. Produces enormously loud and pulsating ultrasonic sounds. Operating voltage: 11...15 V=, average power consumption < 2 mA, frequency: approx. 23 kHz. Angle of radiation with a special spherical surface tweeter with about 140 degrees, max. approx. 100 dB  $\pm 20\%$ .

### Technical data:

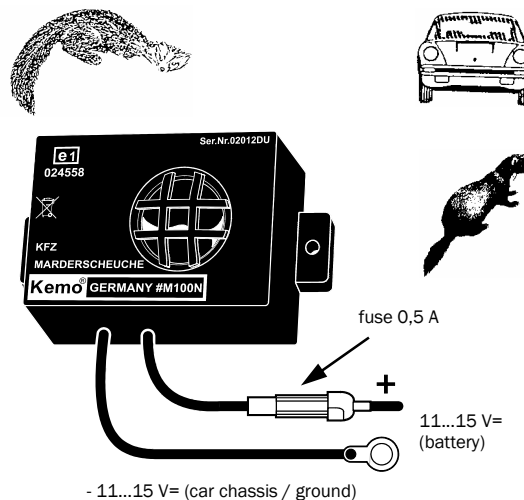
Dimensions: approx. 72 x 50 x 29 mm  
(without fixing straps)

Price group: 7



### Available accessory:

M020 Voltage transformer from 24 V= to 12 V= (13,8 V=), 1,1 A, see page 40.



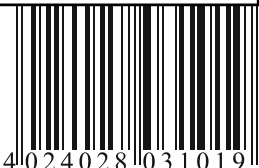
## M101 Decalcifier against calcification and corrosion in water pipes!

This module is not harmful to the environment, i.e. without chemicals and operates on a physical-inductive base. Easy to mount, no intervention into conduits! This module protects washing machines, dish washers, heating boilers etc. Operating voltage: 230 V~.

### Technical data:

Operating voltage: AC 230 V~ (firmly connected via the enclosed plug power supply)  
Current consumption: < 3 W  
Dimensions (without power supply): approx. 67 x 68 x 40 mm

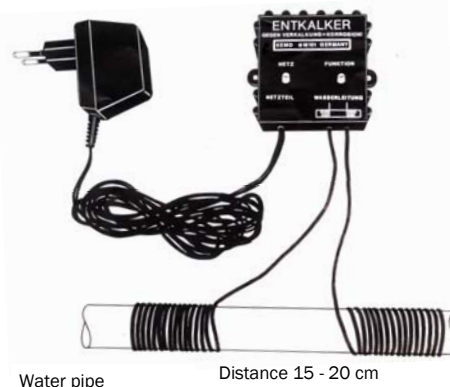
Price group: 10



Plug power supply is included!



Only for indoor use!



Example of connection:  
The shown accessories are not included!

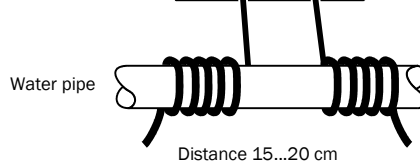
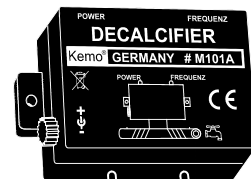
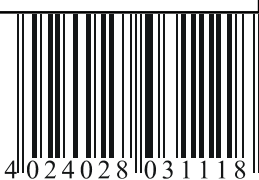
## M101A Decalcifier against calcification and corrosion in water pipes!

This module is not harmful to the environment, i.e. without chemicals and operates on a physical-inductive base. Easy to mount, no intervention into conduits! This module protects washing machines, boilers etc. Operation with a plug power supply 6...15 V=. Current load: < 130 mA (Plug power supply is not included!).

**Technical data:**

Operating voltage: 6...15 V=  
 Current consumption: < 130 mA  
 Alternating field frequency: < 2000 Hz  
 Oscillation transmission: with 2 cables which have to be coiled up helically on the water pipe (approx. 3...10 turns each).  
 Dimensions: approx. 74 x 55 x 28 mm, without fixing straps.

Price group: 4



Plug power supply is not included!

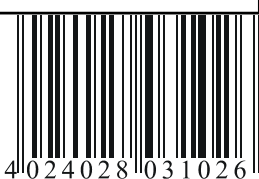
## M102 Second accumulator charger 6...24 V=

For lead accumulators 6 to 24 V. With this accumulator separating filter 2 accumulators are charged separately at one source of charging current (vehicle generator, solar systems, windmills, chargers etc). For charging currents up to 8 A at maximum (for a short time 20 A). The charging current distributes in such a manner that an empty accumulator will be charged more than an accumulator that is almost charged. It is perfect for motor caravans if one accumulator operates the television, radio etc. and the second accumulator must remain charged in order to start the motor. Or for weekend cottages if one accumulator used for the alarm system must not be emptied.

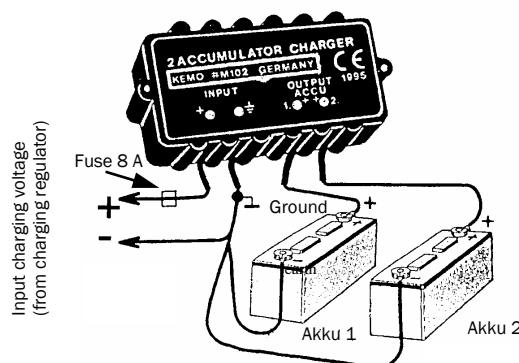
**Technical data:**

Accumulators to be connected: 2 each of the same voltage 6...24 V=  
 Max. charging current: 8 A  
 (for a short time 20 A for 5 seconds at maximum)  
 Dimensions: approx. 61 x 35 x 23 mm

Price group: 5



Example of connection:  
 The shown accessories are not included!



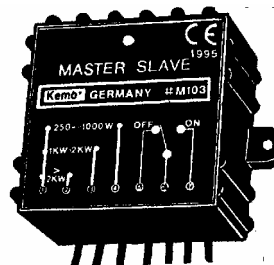
## M103 Master-slave 230 V~

...connects or disconnects automatically another load with a potential-free contact upon starting a machine, lamp etc. The module is simply looped in a lead of the electric mains of the machine. Consequently, it is not necessary to intervene in the machine. Suitable for consumers of 230 V alternating voltage or 410 V three-phase current. For consumers 250...4000 W. The switching contact (1 x switch over) may be loaded with max. 10 A. Use: Automatic connection of a vacuum cleaner when switching on a machine, automatic safety-cutoff when starting another machine, delayed (approx. 0.5 sec.) automatic connection of a second machine if the house fuse blows in case of simultaneous connection.

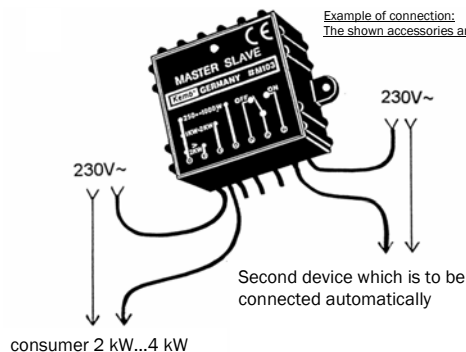
**Technical data:**

Voltage: 230 V~/410 V AC  
 Contact: 1 x switch over , max. 10 A  
 Dimensions: approx. 65 x 67 x 37 mm

Price group: 7



Example of connection:  
 The shown accessories are not included!





## Kits and modules for computers

With the modules M104 to M110, M112, M117 and the kit B210 "Relay Card" and B240 "Computer Laser Show" we have developed a series of interesting kits and modules which can be operated at normal standard AT-computers. The kits and modules can be operated at all kinds of PCs from type '286 till the Pentium computer. Each kit or module includes the software in form of a 3,5" diskette. The printer connection at the PC "LPT1" or "LPT2" serves as interface between the computer and the module or the kit. You may for example control d.c. motors (M107) or stepper motors (M106, M109) with these modules. It is possible to control up to 4 motors with the computer program and so you may for example program the motions of a robot. Or you may program the trains of your model railway. You may also program the water pumps of a fountain in such a manner that the water fountains rise to the rhythm of the music.

### M104 4-Channel computer switch

...for switching up to 4 different appliances, lamps or motors by means of a computer program. Consumers with operating voltages of 6...24 V=, max. 2 A direct current can be controlled. By means of the enclosed software it is possible to switch on and off appliances at certain times, specific switching sequences (also for several days) can be programmed, running light effects etc.! Connect the module at the printer port of a standard PC. A floppy disk containing an MS-DOS and WINDOWS program, respectively, is enclosed.

#### Technical data:

Connection: at the printer port of the computer at the LPT1 port with built-in 25-pole SB-D plug

Switching outputs: via a built-in 25-pole SUB-D socket board

Channels: 4

Loading capacity per channel: 6...24 V = max. 2 A total current connected simultaneously.

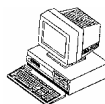
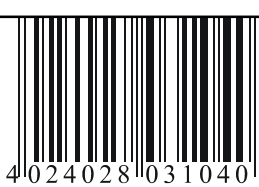
Triggering: via the enclosed PC software MS-DOS or WIN XX or XP. The extensive software allows many different triggerings, triggering programs that can be saved, switch clock functions, etc.

Display: indication of the switching condition via 4 built-in LEDs

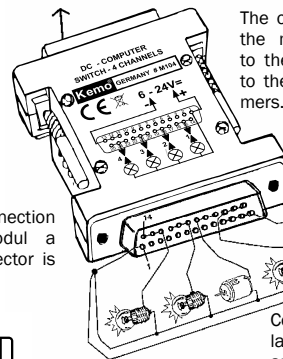
Separation PC / load: via 4 optocouplers

Dimensions: approx. 73 x 56 x 30 mm

Price group: 10



LPT1-Port Computer



The operating voltage of the modul corresponds to the operating voltage to the connected consumers.

fuse 2 A

6...24 Volt

For the connection to the modul a fitting connector is needed.

Consumers like lamps, motors, appliances etc.



### M106 Step motor-interface 4 pin

...for controlling a 4-lane step motor (bipolar) 3...17 V, max. 2 A. A double power pack (split power supply) is required for the current supply. For connection to a standard AT-PC from type '486 on. The motor may either be controlled by hand with the computer keyboard or via a program with an automatic program flow which has been written before. By means of an interface switch (M108) it is possible to operate up to 4 step motors at the same time via individual step motor interfaces respectively. Software DOS + Windows (98, NT, 2000, XP) (diskette 3,5" is enclosed).

#### Technical data:

Operating voltage: 4...18 V split power supply.

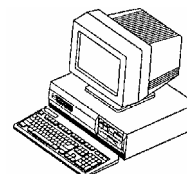
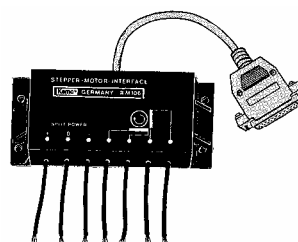
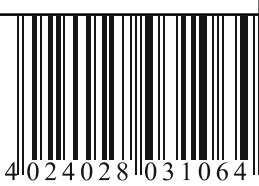
Double DC voltage, dependent on the connected motor (always 1 V more than the motor requires).

Motor connection: 1 bipolar stepper motor 4 connections 3...17 V max. 2 A

Connector: 25 poles for connection to the PC printer port LPT1

Dimensions: approx. 120 x 50 x 24 mm

Price group: 10



Disc 3,5" is enclosed!

Fitting 4-fold interface switch: M108, see page 55.

Available accessories (see page 56):

P5108 Stepper motor „Berger RDM57“

P5110 Mini-stepper motor „RDM37“

P5111 Stepper motor „AEG S026/48-4 pin“

P5111-15 Stepper motor „AEG S026/48-4 pin“

P5337 Mini-stepper motor „AEG S021/24“

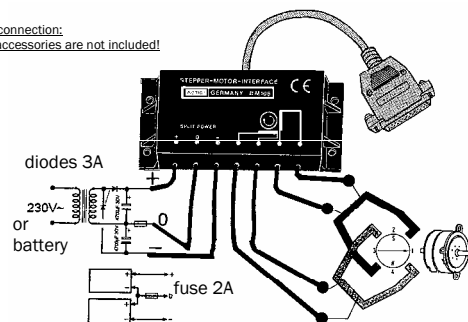
P5338 Stepper motor „SAIA 10 Ohm“

P5341 Micro-stepper motor, oval mounting plate

P5342 Micro-stepper motor, rectangular mounting plate



Example of connection:  
The shown accessories are not included!



### M107 DC-motor-interface

...for controlling a direct-voltage motor (DC battery motor with brushes at the collector) 5...24 V, max. 2 A. A double power pack (split power supply) is required for the current supply. For connection to a standard AT-PC from type '286 on. The motor may either be controlled by hand with the computer keyboard (number of revolutions, running direction) or via a program with an automatic program flow which has been written before. By means of an interface switch (M108) it is possible to operate up to 4 motors at the same time via individual interface modules respectively. Thus complex motions at robots, model railroads etc. can be programmed. Dimensions: approx. 60 x 45 x 21 mm

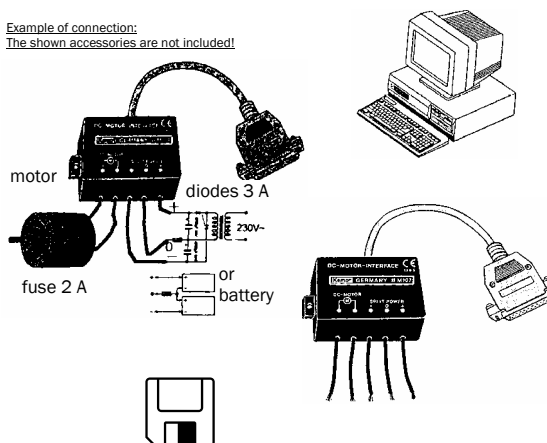
Disc 3,5" is enclosed!

Fitting 4-fold interface switch: M108, see page 55.

Price group: 9



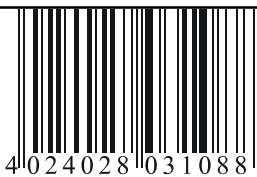
Example of connection:  
The shown accessories are not included!



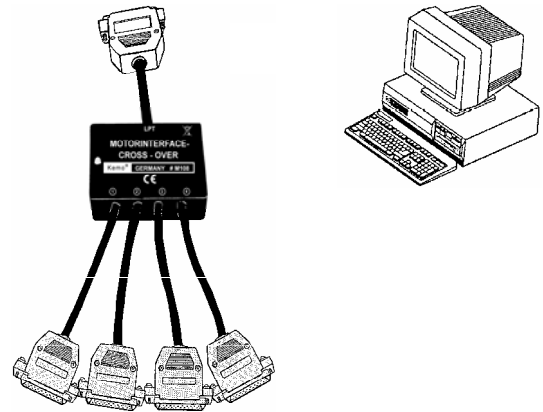
## M108 4-fold Interface switch

By means of this interface switch one may operate 2, 3 or 4 motor interface modules with one motor each at one computer simultaneously. Thus it is possible to operate up to 4 motors at the same time and to programme complex motions, e.g. for robots, machines, model railroads etc. Dimensions: approx. 72 x 50 x 22 mm

Price group: 9



This interface switch is suitable for our motor interface modules: M106, M107 + M109, see pages 57, 58.



## M109 Stepper motor-interface 6 Pin

...for controlling a 6-lane step motor (unipolar) 4...18 V, max. 2 ampere. For connection to a standard AT-PC from type '486 on. The interface requires a simple operating voltage (no split power supply). The motor may either be controlled by hand with the computer keyboard or via a program with an automatic program flow which has been written before. By means of an interface switch (M108) it is possible to operate up to 4 step motors at the same time via individual step motor interfaces respectively.

### Technical data:

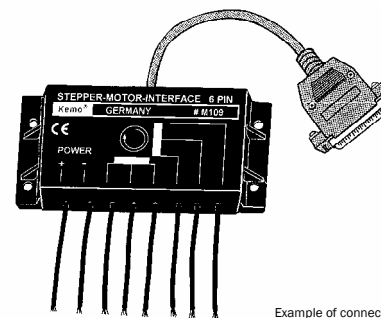
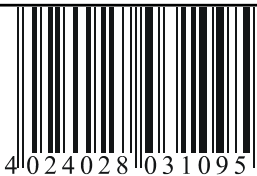
Operating voltage: approx. 5...18 V DC voltage, depending on the connected motor (in any case 1 V more than the motor requires)

Motor connection: 1 unipolar stepper motor 6 connections 4...17 V max. 2 A

Connector: 25 poles for connection to the PC printer port LPT1

Dimensions: approx. 120 x 50 x 24 mm

Price group: 10



Example of connection:  
The shown accessories are not included!

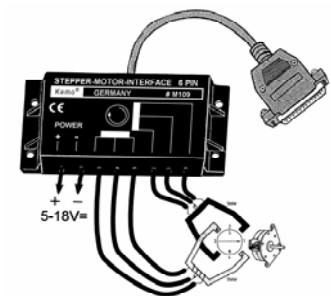
Disc 3,5" is enclosed.

Fitting 4-fold interface switch: M108. see page 55.

### Available stepper motors (see page 56):

P5339 Mini-stepper motor "42SPM-24DJA"

P5340 Mini-stepper motor „AEG S21/24A“



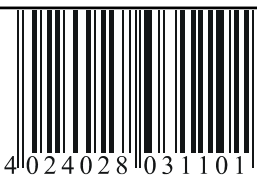
The operating voltage depends on the used motor 5...18V=.

## M110 Stepper motor-driver 6 pin

A stepper motor (unipolar) with 6 connections can be operated at this module. It is possible to change the direction of rotation of the motor. The number of revolutions of the motor can also be adjusted from approx. 2...1000 Hz (impulse sequence). For motors from 5...12 volt, max. 2 A. The operating voltage of the module depends on the operating voltage of the motor (5...12 volt). Furthermore a potentiometer 1 M linear and a switch 2 x change over are necessary for operation. These parts are not included. The module works without computer and can only control the direction of rotation and the number of revolutions of the motor. A controlled program flow is not possible!

Dimensions: approx. 120 x 50 x 24 mm

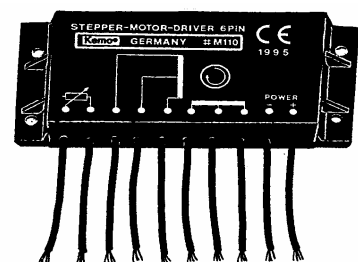
Price group: 10



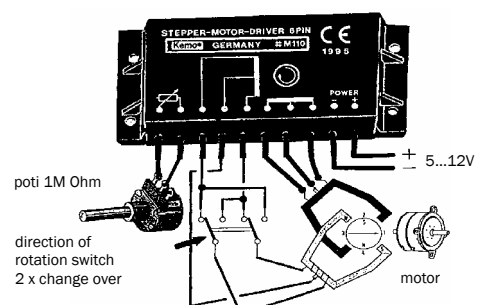
### Available stepper motors (see page 56):

P5339 Mini-stepper motor "42SPM-24DJA"

P5340 Mini-stepper motor „AEG S21/24A“

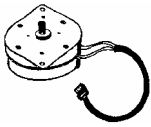


Example of connection:  
The shown accessories are not included!



# Kemo Electronic Stepper motors suitable for the previous modules:

## P5108 Stepper motor "Berger RDM57"

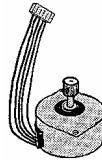


Approx. 24 steps / rotation, bipolar, 4 connections, approx. 30 Ohm per winding. Operating voltage approx. 10 V / 345 mA. Dimensions without axis Ø approx. 57 x 26 mm, axis Ø approx. 5 x 7 mm.



Price group: I 4 024 028 040851

## P5339 Mini-stepper motor "42 SPM-24 DJA"

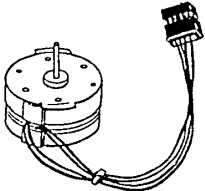


Approx. 48 steps / rotation, unipolar, 5 connections, approx. 85 Ohm per winding. Operating voltage approx. 24 V / 282 mA. Dimensions without axis Ø approx. 45 x 23 mm, axis Ø approx. 2 x 15 mm.



Price group: H 4 024 028 040981

## P5110 Mini-stepper motor "RDM37"

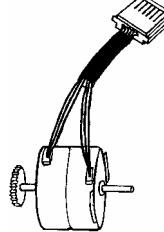


Approx. 40 steps / rotation, bipolar, 4 connections, approx. 30 Ohm per winding. Operating voltage: approx. 7.5 V / 0,25 A. Dimensions without axis Ø approx. 35 x 22 mm, axis Ø 1 x 10 mm.



Price group: H 4 024 028 040974

## P5340 Mini-stepper motor "AEG S21/24A"

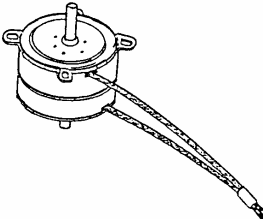


Approx. 24 steps / revolution, unipolar, 6 connections, approx. 56 Ohms per winding. Operating voltage 6...12 V. Dimensions: approx. 35 x 25 mm Ø, 2 driving axles: 1 x approx. 2 x 8 mm Ø and 1 gearwheel approx. 15 mm Ø. 28



Price group: I 4 024 028 043005

## P5111 Stepper motor "AEG S026/48-4 pin"

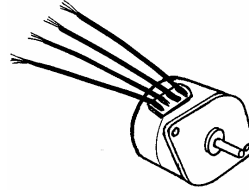


Approx. 48 steps / rotation, bipolar, 4 connections, approx. 5 Ohm per winding. Operating voltage approx. 5 V / 1 A. Dimensions without axis Ø approx. 66 x 37 mm, axis Ø approx. 5 x 11 mm.



Price group: I 4 024 028 040998

## P5341 Micro-stepper motor, oval mounting plate

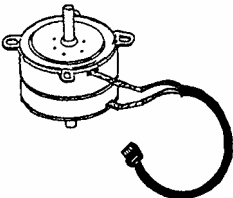


Approx. 20 steps / revolution, bipolar, 4 connections, approx. 15 Ohm per winding. Operating voltage 3...4,5 V, approx. 300 mA. Dimensions (without axle) approx. 20 x 15 mm Ø, axle approx. 1,5 x 4 mm.



Price group: H 4 024 028 042992

## P5111-15 Stepper motor "AEG S026/48-4 pin"

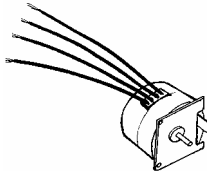


Approx. 48 steps / rotation, bipolar, 4 connections, approx. 15 Ohm per winding. Operating voltage approx. 10 V / 0,65 A. Dimensions without axis Ø approx. 66 x 37 mm, axis Ø approx. 5 x 11 mm.



Price group: I 4 024 028 041117

## P5342 Micro-stepper motor, rectangular mounting plate

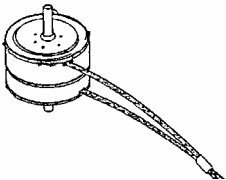


Approx. 20 steps / revolution, bipolar, 4 connections, approx. 15 Ohm per winding. Operating voltage 3...4,5 V, approx. 300 mA. Dimensions (without axle) approx. 20 x 15 mm Ø, axle approx. 1,5 x 4 mm.



Price group: H 4 024 028 042985

## P5337 Mini-stepper motor "AEG S021/24"

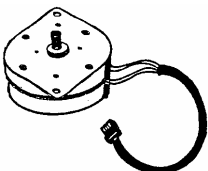


Approx. 24 steps / rotation, bipolar, 4 connections, approx. 8 Ohm per winding. Operating voltage approx. 5 V / 0,625 A. Dimensions without axis Ø approx. 35 x 25 mm, axis Ø approx. 1 x 10 mm.



Price group: H 4 024 028 040899

## P5338 Stepper motor "SAIA 10 Ohm"



Very strong stepper motor, bipolar! Approx. 48 steps / rotation. 4 connections, approx. 10 Ohm per winding. Operating voltage approx. 5 V / 500 mA. Dimensions without axis Ø approx. 57 x 26 mm, axis Ø approx. 3 x 7 mm.



Price group: J 4 024 028 040967

## M111 Marten shock for motor vehicles

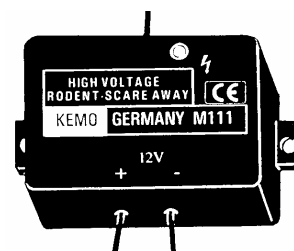
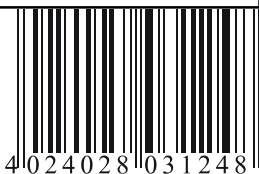
Chases away rodents through high-voltage shocks!  
(Electric fence principle)

Operating voltage: 12 V car battery (< 2 watt). Output voltage: approx. 400..700 V. By means of this you may "charge" contact plates, metal grids, etc. in the engine compartment which have been fixed insulated. Upon contact the marten gets an electric shock and runs away. (It will not be killed).

Dimensions: approx. 70 x 44 x 20 mm

Price group: 6

**M111 - PHASE-OUT PRODUCT!!!**  
Only available as long as stock lasts!



## M112 Stop-watch for PC - with infrared light barrier

Mobile infrared light barrier for sporting events for chronometry via a computer. The infrared receiver has to be connected directly at the LPT1-port of the printer. The receiver is constructed in large-scale integrated power-saving technique and draws its operating voltage directly from the computer via the LPT1-printer port (approx. 9 mA). The infrared transmitter has an installed 6 V battery power supply which lasts at least 12 hours continuous operation. Together with a portable laptop-computer (not included) the system can be used everywhere.

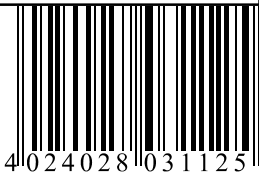
Technical data:

Range: > 5 meters

Indication of time: 00:00:00.000

hours      minutes      seconds      seconds up to 3 places after the decimal

Price group: 14



Software: floppy disc included (3,5" floppydisc) with evaluation program

Computer: 486, 50 MHz, 4 MB RAM

System requirement: operating system from WIN 3.1x or WIN 95

Operating voltage transmitter: 6 V (installed battery)

Operating voltage receiver: 5 V, approx. 9 mA, is drawn from the computer.

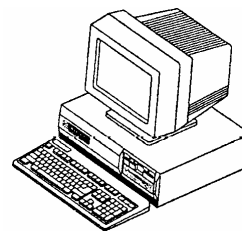
Fastening: The transmitter and receiver have embedded tapped bushes by means of which the devices can be mounted on supports, mounting angles etc.

Dimensions receiver: approx. 72 x 50 x 41 mm

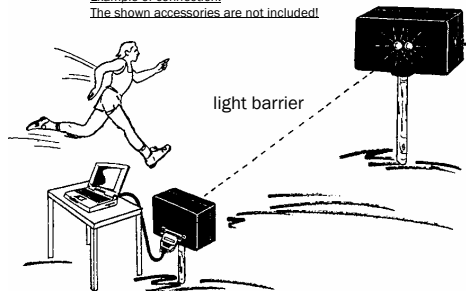
Dimensions transmitter: approx. 120 x 70 x 40 mm

The included software only works with older computers < 300 MHz and WIN 9XX.

Floppy disc included!



Example of connection:  
The shown accessories are not included!



## M113N Time switch 12...15 V=, approx. 2 sec. up to 10 (~30) min.

...switches other devices on after pressing the key and switches them off again automatically by means of the installed relay point 1 x ON (max. 3 A) when the adjusted time has expired. The lapse of time may be interrupted any time with the second key. Use: exposure devices, charging sets, toys, machines, illumination, etc. 2 push-buttons firmware required in addition for operation as well as a potentiometer 500 k lin. for periods exceeding 10 minutes.

Technical data:

Operating voltage: 12...15 V=

Current consumption: approx. 20 mA / 80 mA (relay off / on)

Adjustable time: approx. 2 sec. to 10 min., with an external potentiometer 500 k lin. up to ~ 30 minutes (± 30 %)

Connection: via cable outlets at the module

Displays: 2 (1 x LED operating voltage, 1 x LED relay "ON")

Dimensions: approx. 60 x 45 x 20 mm

Relay point: 1 x ON, max. 3 A max 25 V (The installed relay point may also switch up to 230 V~, but in this case the safety regulations of VDE like protection against accidental contact, etc. have to be observed)

Dimensions: approx. 60 x 45 x 20 mm

Dimensions: approx. 60 x 45 x 20 mm

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Dimensions: approx. 60 x 45 x 20 mm

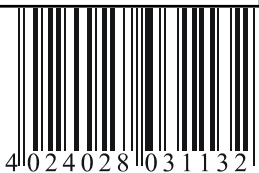
Dimensions: approx. 60 x 45 x 20 mm

Dimensions: approx. 60 x 45 x 20 mm

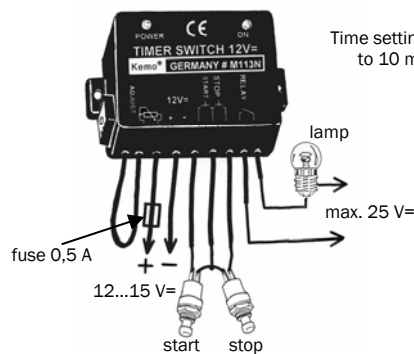
Dimensions: approx. 60 x 45 x 20 mm

Dimensions: approx. 60 x 45 x 20 mm

Price group: 5



Example of connection:  
The shown accessories are not included!



Time setting approx. 2 sec. to 10 min. (± 30 %).

## M114N Flasher, slow 230 V~ / 110 V~

Flasher with adjustable flash period: approx. 0.6...9 seconds turn-on time. Turn-off time approx. 50 % of the turn-on time, respectively. Built-in fuse: T 1,6 A. For electric light bulbs 15...300 Watt, 230 V~ (15...150 W at 110 V~). Use: billboards, model lighthouse etc.

Technical data:

Operating voltage: 110...240 V AC

Rupturing capacity: for electric light bulbs 110 V up to max. 150 W at 110 V~ operating voltage, or for electric light bulbs 230 V max. 300 W at 230 V~ operating voltage

Minimum load: 15 W

Safety fuse: installed 1,6 A delay-action

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

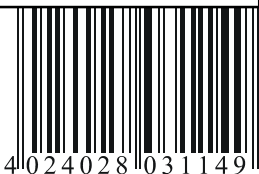
Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

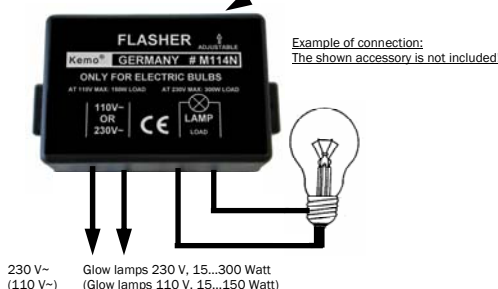
Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Flash period: approx. 0.6...9 seconds on-transition time adjustable), disconnecting time approx. 50 % of the on-transition time.

Price group: 6



Safety fuse in the module      flashing speed



Example of connection:  
The shown accessory is not included!

## M115N Marten defence for motor vehicles

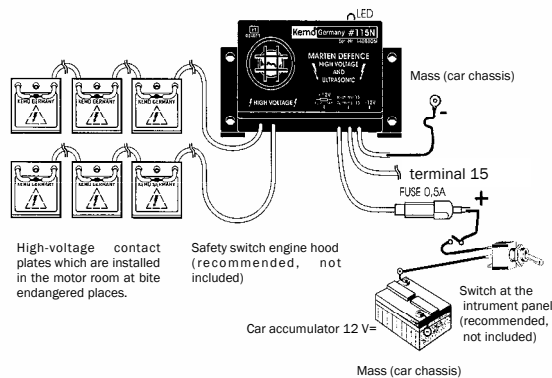
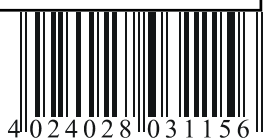
12...15 V=

...chases away martens by means of small high-voltage plates charged electrically to approx. 200...300 V= through electric shock in the engine compartment of the vehicle (only weak current pulses that chase the marten away, but do not kill it) and through strong, aggressively pulsating ultrasonic sounds. Extremely low power consumption (< 0,005 A), switches the battery voltage of < 11.5 V automatically off (does not discharge the battery completely, if vehicles are being parked for quite some time).

**Technical data:**

- Operating voltage: 12...15 V= (car battery)
- Average power consumption: < 5 mA
- Automatic shutoff: if the battery voltage decreases to < 11.5 V (± 5 %)
- Output voltage: approx. 200...300 V =
- Ultrasonic frequency: approx. 22 kHz ± 10 %
- Acoustic pressure: max. approx. 100 dB ± 15 %
- Angle of radiation ultrasonics: approx. 150 degree
- Loudspeaker: special ceramic piezoelectric loudspeaker with spherical membrane of aluminium
- Temperature range: approx. - 40...+ 80 degree C
- Functional display: flashing LED (approx. every 5...12 sec.)
- Dimensions basic instrument: approx. 46 x 73 x 145 mm (H x W x D)
- Cable length high-voltage cable: 2 x approx. 1.9 m (± 10 %)
- Fuse in the fuse holder: 500 mA
- High-voltage contact plates: 6 pieces, approx. 40 x 40 x 1.5 mm each

Price group: 15



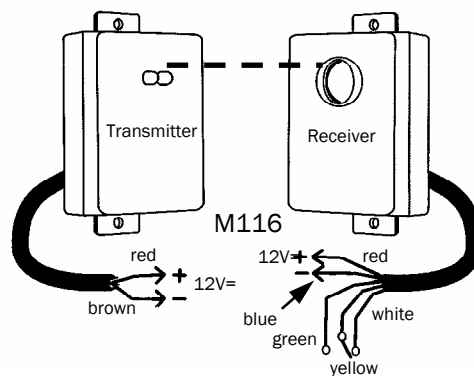
## M116 Infrared light barrier approx. 30 m

The light barrier works with infrared light rays invisible to man. Range (maximum distance between transmitter and receiver): approx. 30 meters. If the light ray is interrupted, a relay switches on (1 x switch-over, max. load 1 A). Operating voltage transmitter: 12 V (approx. 10 mA), receiver: 12 V (approx. 10...50 mA).

**Technical data:**

- Operating voltage transmitter: 12 V=, approx. 10 mA
- Operating voltage receiver: 12 V=, approx. 10...50 mA
- Breaking capacity relay: max. 1 A / 24 V
- Range: max. 30 m
- Dimensions transmitter: approx. 73 x 50 x 27 mm
- Dimensions receiver: approx. 73 x 50 x 27 mm

Price group: 12



Recommended tilted mirror if the infrared ray shall be deviated. K002 Reflector mirror, see page 74.

## M117 Alarm module for computers alarm for house and home, for connection to a computer

This module is to be connected with a PC, from 286 on. 6 alarm circles can be connected. By means of the enclosed software, the alarm circles may be activated individually at different times. The time of alarm, number of contact operates for triggering alarm etc. may be adjusted or counted individually. The time of the alarm release and of the alarm circle is indicated. It is possible to connect working or rest contacts. Installed pulse amplifier for up to 100 m long cables towards the alarm contact. Excellent automatic unwanted signal blanking against perturbing radiation. Alarm output via a switching transistor for direct triggering of a relay or siren 6...12 V, max. 0,5 A.

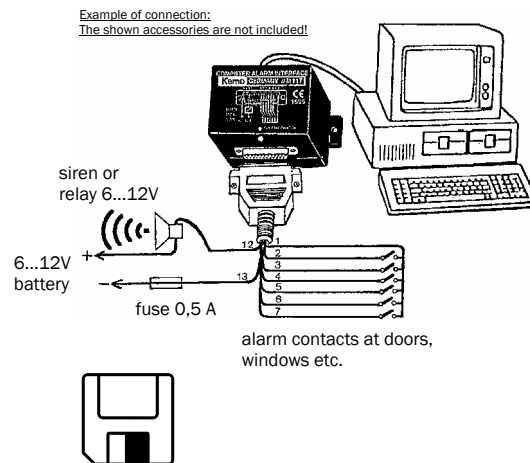
Dimensions: approx. 70 x 55 x 35 mm

Price group: 14



Floppy disc 3,5" is enclosed.

Alarm contacts: A002, A003 and A004 page 75.

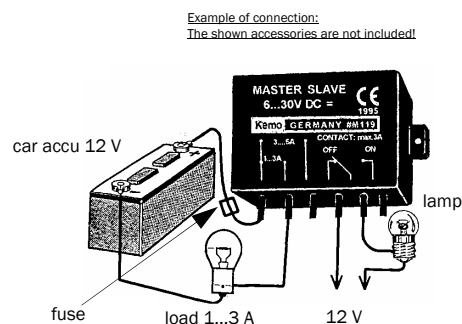


## M119 Master-slave 6...30 V DC

"Current conduction switch", connects or disconnects automatically another device when starting a direct-current device. For example, the radio is disconnected automatically when switching on the CB-radio equipment in the car. Or the amplifier of the radio equipment is connected automatically when the CB-radio transmits. Or the outdoor illumination of a motor caravan is disconnected automatically when switching on the indoor lighting. May also be used for controlling whether lamps at a vehicle light (control of current conduction). The module simply has to be connected in series with the power lead of the device (6...30 V=) and connects and disconnects other devices via a potential-free over contact (1 x change over, max. 3 A). The module reacts on currents between approx. 1...5 A. Internal resistance: approx. 0,12 Ohm (currents 1...3 A) or 0,05 Ohm (currents 3...5 A).

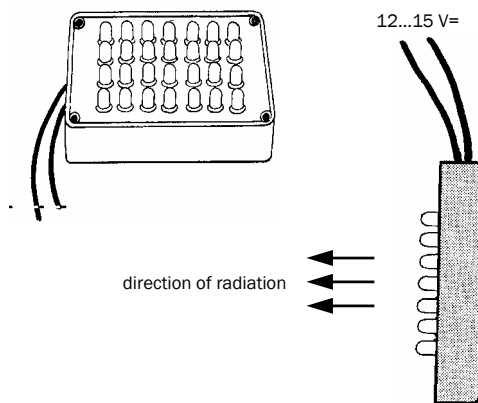
Dimensions: approx. 60 x 45 x 20 mm

Price group: 5



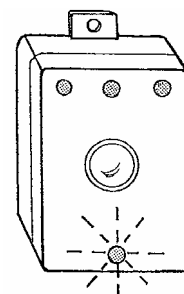
## M120 Infrared spotlight 12...15 V= for CCD-cameras

With the infrared spotlight CCD-cameras may recognize objects also in complete darkness. The infrared light is invisible for men, CCD-cameras can see well with an infrared spotlight. Perfect for inconspicuous observation of entrances, drives etc. Operating voltage: 12...15 V=, < 300 mA. Range: max. 5 m.  
Dimensions: approx. 72 x 50 x 18 mm



## M121 CCD-camera-dummy

CCD-camera "dummy" with lens system and 3 infrared spotlight LED dummies. A red LED operating indication is installed. 2 x round cells UM3 are necessary for operation. This camera dummy shall fake a real monitoring camera and thus it shall prevent shoplifting, attacks etc.  
Dimensions: approx. 90 x 50 x 33 mm

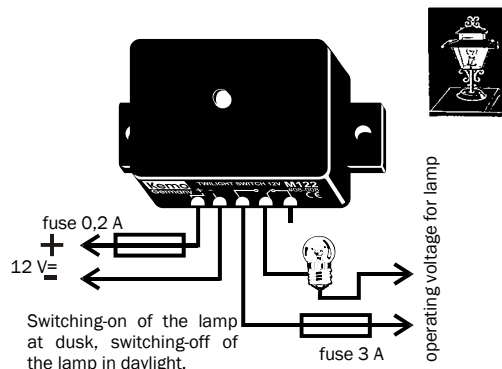


## M122 Twilight switch 12 V=

...switches on e.g. lamps at nightfall and off again at daybreak. Operating voltage 12 V= (for weekend cottages, sailing yachts, caravans etc.). Distribution output: relay 1 x change over, max. 3 A.

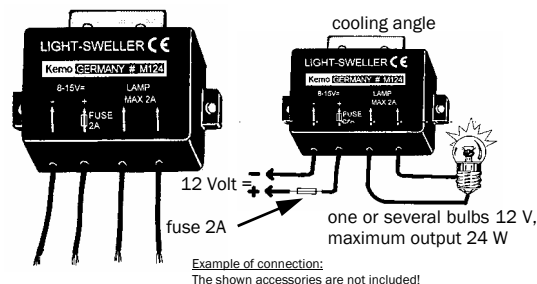
### Technical data:

Operating voltage: 12 V DC voltage (11...14 V)  
Power consumption: approx. 2 mA / 35 mA (relay on / off)  
Relay contact: 1 x switch-over, loading capacity max. 25 V 3 A  
Operating temperature range: approx. - 15...+ 50 degree C  
Luminous intensity switching-on: approx. 25 lux ± 20 %  
Luminous intensity switching-off: approx. 45 lux ± 20 %  
Switching delay: approx. 3...4 seconds  
The sensitivity of the luminous intensity may be changed by partially covering the sensor mechanically.  
Dimensions: approx. 72 x 50 x 27 mm



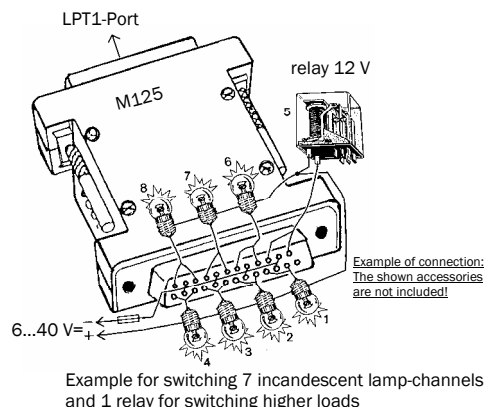
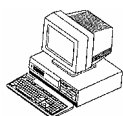
## M124 Light sweller 12 V=, max. 24 W

This light sweller regulates incandescent lamps (halogen lamps, too) slowly from "dark" to "light" and back again in continuously recurring succession. (Like a flasher, apart from the fact that the lamps do not blink but slowly become light and dark again). Swelling sequence: approx. every 5...8 sec. Operating voltage: 8...15 V=, max. lamp load: 2 A.  
Dimensions: approx. 60 x 45 x 20 mm



## M125 Relay module 8-channel for PC's from 486 upwards

Relay module for switching up to 8 different appliances, lamps or motors according to a computer program (software is enclosed). The installed solid-state-relays may switch voltages up to 40 V and loads up to 0,4 A (DC) or 0,2 A (AC). Higher loads must be switched via auxiliary relays. The module is operated at the printer port LPT1. Scope of delivery M125: 1 relay module M125 / 1 software disc "8 channel computer switch".  
Dimensions: approx. 73 x 56 x 29 mm



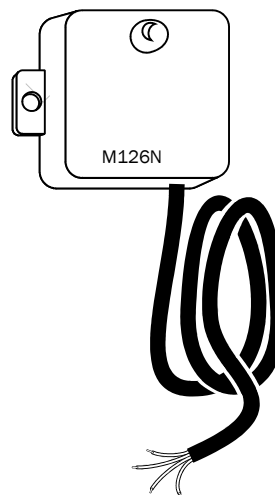
## M126N Electronic key 12 V=

When holding the enclosed transponder key pendant in front of the module (distance approx. 3...6 mm), a relay switches on. Application: Contactless door opener to switch appliances etc. The module may also be hidden behind nameplates, too. Operating voltage: 12 V= 0,03 A. The key does not need a battery! Substitute transponder keys may be ordered under order no. M131. All keys lock in the same manner (cannot be programmed individually).

### Technical data:

Operating voltage: 12 V= stabilised  
 Current consumption: < 30 mA  
 Transponder frequency: approx 128 kHz  
 Switching distance: in case of Kemo transponder key M131 approx. 3...6 mm, in case of mini-transponder key E55XX or TK55XX approx. 2 mm  
 Relay contact: 1 x ON max. 25 V, 0,2 A AC or DC (solid-state-relay R-on: max. 12 Ohm)  
 Turn-on pulse length: approx. 2 sec. (after removing the transponder key the relay remains switched on for 2 sec.)  
 Operating temperature range: approx. - 20...+ 40 degree C  
 Dimensions of the module: approx. 40 x 40 x 12 mm (without fastening straps)

Price group: 12



Available accessories: M131, E55XX + TK55XX.

## M131 Electronic spare key ring for M126N + B231

No battery necessary!  
 Dimensions key ring: Ø approx. 35 mm

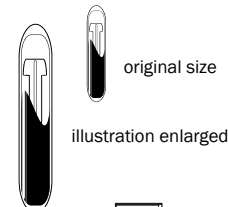
Price group: 3



## E55XX Transponder key - GLAS -

Substitute transponder key for the electronic lock "Kemo no. M126N", frequency: approx. 125...128 kHz, switching distance: approx. 1...2 mm. Hold the black tip of the glass tube in the centre of the switching surface of the switching module M126N to trigger switching.  
 Dimensions: approx. Ø 2 x 12 mm

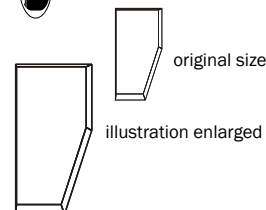
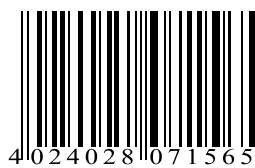
Price group: 3



## TK55XX Transponder key - PLAST -

Substitute transponder key for the electronic lock "Kemo no. M126N", frequency: approx. 125...128 kHz, switching distance: approx. 2...5 mm. Please hold the black tip of the plastic part in the centre of the switching surface of the switching module M126N to trigger switching.  
 Dimensions: approx. 12 x 6 x 3 mm

Price group: 3



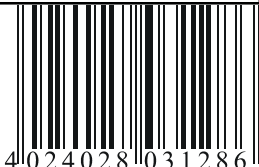
## M128 HF-Detector (Mini Spy Finder)

By means of this searching device bugging devices which are active in the room, computer or telephone can be located. Thus it is possible to find hidden bugging devices (bugs, mini spys). The device responds to bugging devices with transmitting frequencies of 100 kHz...2.2 GHz with transmitter powers usual for bugs. Display: 1 x LED for the turn-on control, 1 LED for indication of receipt from one transmitter (the closer you get to the transmitter, the faster this LED flashes). A 9V compound battery is necessary for operation.

### Technical data:

Operating voltage: 9 V compound battery  
 Current consumption: < 10 mA  
 Reception frequency: approx. 0,1 MHz ... 2,2 GHz  
 Display: light-emitting diode display  
 Dimensions: approx. 101 x 60 x 26 mm

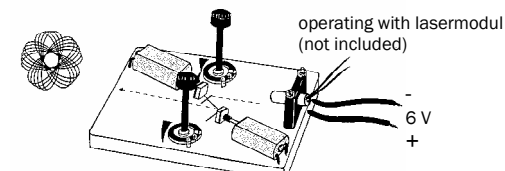
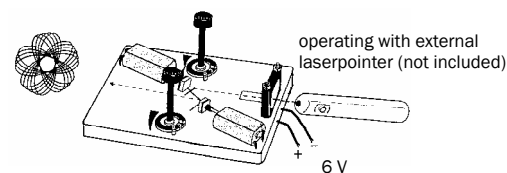
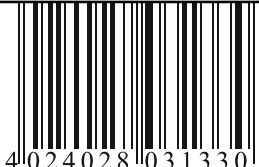
Price group: 10



## M133 Laser-show

With this laser show many different figures can be projected to the wall by means of a laser. With 2 controllers you may regulate 2 reflecting motors via the installed electronics so that a lot of different figures can be shown. The necessary laser is not enclosed. The following are suitable as laser: laser pointer or laser modules which produce a laser point (without installed dispersing lens). Operating voltage for the laser show: 6 V=, max. 0,3 A.  
 Dimensions: approx. 120 x 70 x 40 mm

Price group: 7



Fitting laser-module: L005, see page 33.



Attention! Laser

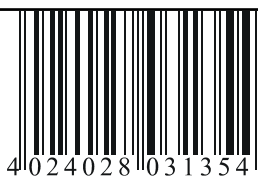
## M135 Light barrier 4 m

Ready assembled infrared light barrier with transmitter and receiver. Range: more than 4 metres. If the infrared light ray is interrupted (if a person walks through), a relay switches for approx. 0,5...7 seconds (adjustable). Thus it is possible to switch on a bell, counter or lamp or the like for this period. Operating voltage: 12 V= relay point 1 x ON max. 3 A 25 V.

**Technical data:**

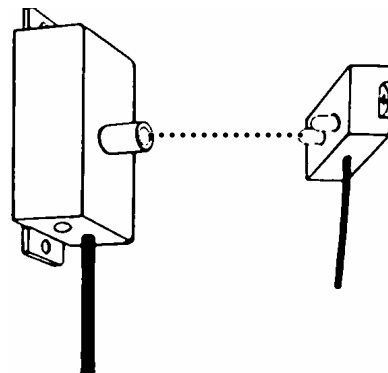
Operating voltage: 12 V=  
 Relaycontact: 1 x ON max. 3 A 25 V  
 Dimensions transmitter: approx. 40 x 25 x 21 mm (with fixing straps)  
 Dimensions receiver: approx. 91 x 40 x 47 mm (with fixing straps)

Price group: 10



Recommended tilted mirror, if the infrared ray shall be deviated.

K002 Reflector mirror, see page 74.

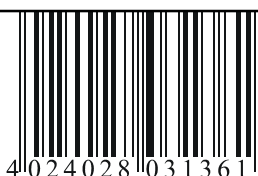


## M136 LED-Signal lamp red, 12 V=

Signal lamp equipped with 39 very bright red LED's. Potted electronics for rough use in industry, machine halls or for the discotheque at home, medical practice etc. Fastening: surface with 2 screw loops. Operating voltage: 12 V=, < 150 mA, when using the enclosed protective resistor also for 24 V=.

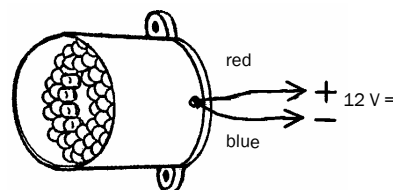
Dimensions: approx. Ø 51 mm, 51 mm long

Price group: 6



Available accessory:

When adding the Flasher M077, the LED signal lamp flashes (only for 12 V= operating voltage, module M077 is not enclosed). For M077 see page 50.



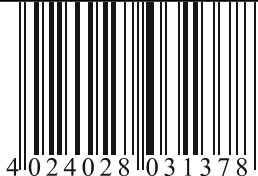
## M137 LED-Signal lamp, green 12 V=

Signal lamp equipped with 39 green LED's. Potted electronics for rough use in industry, machine halls or for the discotheque at home, medical practice etc.

Fastening: surface with 2 screw loops. Operating voltage: 12 V=, < 150 mA, when using the enclosed protective resistor also for 24 V=.

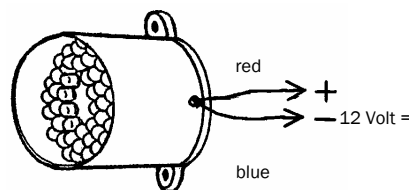
Dimensions: approx. Ø 51 mm, 51 mm long

Price group: 6



Available accessory:

When adding the Flasher M077, the LED signal lamp flashes (only for 12 V= operating voltage, module M077 is not enclosed). For M077 see page 50.

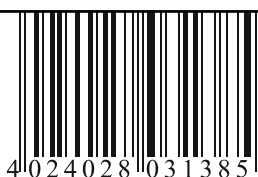


## M138 LED-Signal lamp, yellow 12 V=

Signal lamp equipped with 39 yellow LED's. Potted electronics for rough use in industry, machine halls or for the discotheque at home, medical practice etc. Fastening: surface with 2 screw loops. Operating voltage: 12 V=, < 150 mA, when using the enclosed protective resistor also for 24 V=.

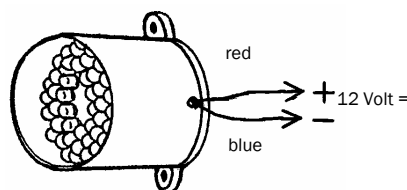
Dimensions: approx. Ø 51 mm, 51 mm long

Price group: 6



Available accessory:

When adding the Flasher M077, the LED signal lamp flashes (only for 12 V= operating voltage, module M077 is not enclosed). For M077 see page 50.

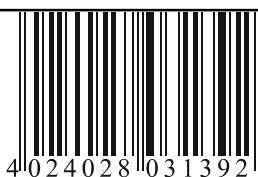


## M139 Solar cell

Nominal power: approx. 0,5 V 800 mA. Peak power: approx. 0,6 V (open-circuit voltage) > 2 amperes (max. short circuit current on illumination with a halogen lamp). High-quality "crystalline" solar cell, enclosed in a case which can be stringed. Several cells can be interconnected to solar collectors with higher electric tension.

Dimensions: approx. 75 x 75 mm (with fixing straps)

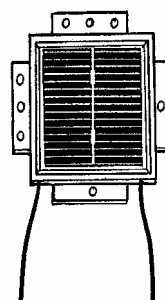
Price group: K



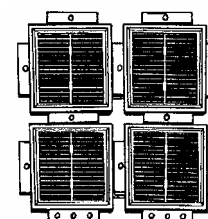
Available accessories:

Solar cell voltage transformer M026. Produces an output voltage of max. 15 V (adjustable) from an input voltage of 0,9...15 V, for M026 see page 41.

Solar motor no. P046 (0,5...2 V). Dimensions: approx. 16 x 30 mm. Already rotates with 1 solar cell only! P046 - see page 62.



Example of connection you can build. The shown accessories are not included!

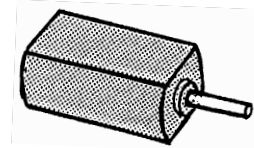




## P046 Solar motor for M139 Solar cell

Available accessories for M139: Solar motor no. P046 (0,5...2 V). Already rotates with 1 solar cell only!  
Dimensions: approx. 16 x 30 mm, without axle

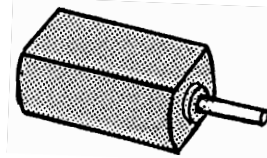
Price group: 1



## P055 Electric motor

Operating voltage: 0,5...15 V.  
Dimensions: approx. 37 x 20 mm, without axle

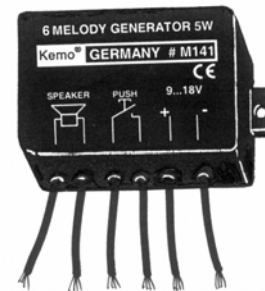
Price group: 1



## M141 Melody generator 5 W

After pressing the key, this melody generator plays one of 6 different melodies in succession. Playing time: about 10...15 seconds each time. Operating voltage: 9...18 V=. Loudspeaker connection: 4...8 Ohm. Application: break signal, doorbell, alarm signal, etc. Max. output approx. 5W.  
Dimensions: approx. 60 x 45 x 20 mm

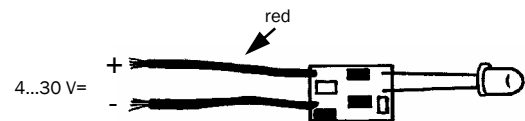
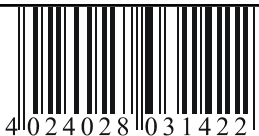
Price group: 6



## M142 LED-Constant current 4...30 V=

This LED with soldered constant current electronics may be connected at any voltage between 4...30 V=. The LED always shines with almost constant brightness and has a current consumption of approx. 15 mA. An additional protective resistor is not required. The supplied LED can be exchanged for any other LED. It is also possible to connect several LED's in series.  
Dimensions of the board: approx. 10 x 13 mm

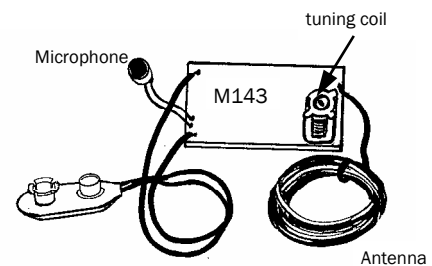
Price group: 1



## M143 FM Test transmitter

Mini-transmitting component adjustable to a frequency between 88...108 MHz. Operating voltage: 9 V battery. The microphone is built-in.  
**Important information:** Any possession of this transmitter is prohibited and punishable within the member states of the European Union as well in the area of the states to the agreement on the European Economic Zone as well as in many other countries, too. The transmitter may only be sold for export to countries or areas where this transmitter is not prohibited. (Perhaps on vessels in international waters, exotic vacation spots, USA).  
Dimensions: approx. 30 x 17 x 12 mm

Price group: 5  
Fitting case: G027

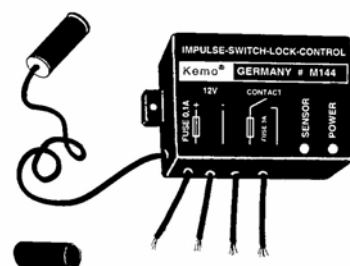


## M144 Impulse switch-lock control

for locks, doors and central lockings in motor vehicles

A small magnet has to be fixed at the lock mechanism or door. If the magnet approaches the sensing device (reed contact) of the acknowledgement transmitter, a relay picks up once for a moment (pulse duration approx. 0,5...1,5 sec.). By means of the relay point it is then possible to switch on the horn, flasher lamps or the like for a while. Operating voltage: 12 V= (11 V...15 V), current consumption < 9 mA. Relay point: 1 x ON, max. 25 V 3 A.  
Dimensions: approx. 71 x 45 x 22 mm

Price group: 6



## M148N Battery guard 12 V=

This accumulator saver protects your car battery from total discharge by switching off consumers such as ice boxes, heaters, radios + television sets, etc. in time. It switches on again automatically after return of the normal voltage. Reversible switching voltages (off-on) : 10,5 V / 11,3 V - 11,7 V / 12,5 V - 13 V / 13,8 V; each  $\pm 0,2$  V, max. 8 A.

### Technical data:

Cutoff voltage / restarting voltage, reversible: off: 10,5 V on: 11,3 V or off: 11,7 V on: 12,5 V or off: 13 V on: 13,8 V, each  $\pm 0,2$  V

Max. power rating: 8 A

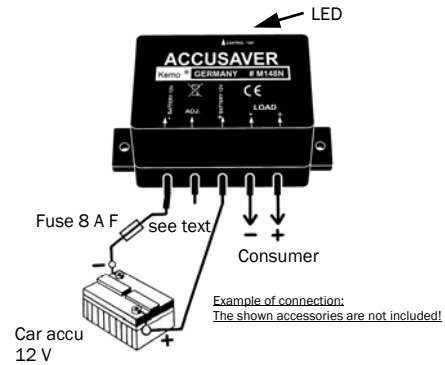
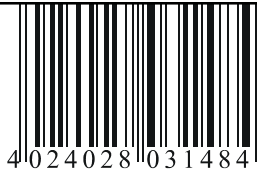
Cutoff element: power MOS transistor in the negative line

Own current consumption: approx.  $< 0,7$  mA in off-condition, approx.  $< 1,5$  mA in on-condition (LED lights up)

Note: A completely charged 12 V car battery has a voltage of 13,5...14 V

Dimensions approx. 72 x 50 x 42 mm (without fixing straps)

Price group: 6



## M149 Solar charging controller 12 V= 5 A

This solar charging controller is connected between a solar cell 12 V= (open circuit voltage 14...22 V=) and an accumulator 12 V= to prevent an overcharge of the accumulator. LED displays for "accu full" (approx. 14,4 V=) and "charging". Own power consumption  $< 2,5$  mA.

### Technical data:

Input voltage: solar cell panels: 14...22 V= open circuit voltage, nominal voltage: 12 V=

Max. input current: 5 A

Inrush voltage: battery voltage  $<$  approx. 13,4 V

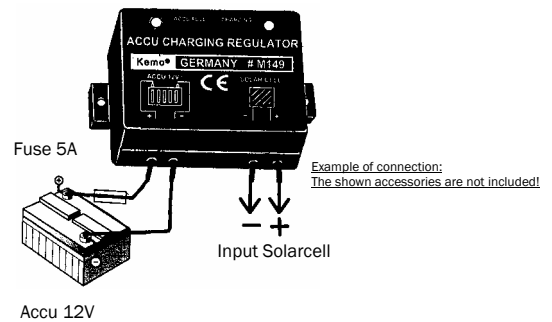
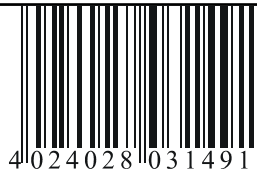
Interrupting voltage: battery voltage  $>$  approx. 14,4 V

Displays: 1 LED for "Charging", 1 LED for "Accu full"

Own power consumption:  $< 2,5$  mA (LED switched on)

Dimensions: approx. 72 x 50 x 29 mm (without fixing straps)

Price group: 6



## M150 DC and pulse converter

By connecting this module in series, it is possible to control our dimmer modules (230 V~ or 110 V~) M012 + M028 (from microcomputers or PCs) with a DC voltage or a pulse width modulation. This module is connected at the spot of the potentiometer. Galvanic separation of the control circuit via optocouplers. Control may be done optionally (at 230 V~): DC 1...5 V, DC 3...12 V, DC 6...24 V. Or TTL rectangular pulses 5 V= 1...10 kHz pulse width 10...90 % PWM (Puls width modulation). Regulation is done by changing the pulse width.

### Technical data:

Operating voltage: 110 V~ or 230 V~ (is led to the dimmer module via the connections)

Output: The module delivers a control voltage for the potentiometer input of the dimmer modules M012 or M028

Input: The module M150 may either be controlled with control DC voltages of 1...5 V= or 3...12 V= or 6...24 V=. Or with TTL pulses with a pulse width modulation. Frequency between 1...10 kHz, impulse voltage approx. 5 V=, pulse width 10...90 % PWM. The power is adjusted with the pulse width 10...90 %.

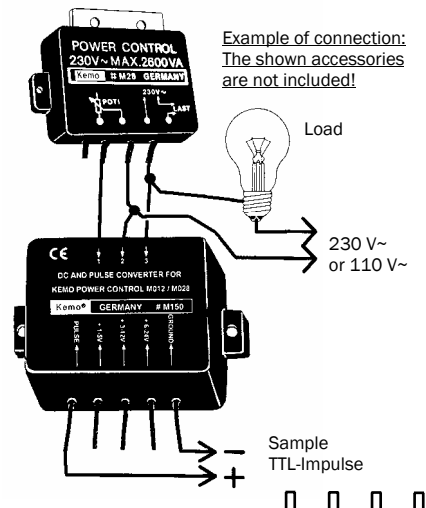
Input resistances: control input 1...5 V=  $>$  1,4 k, control input 3...12 V=  $>$  4,1 k, control input 6...24 V=  $>$  9,1 k

TTL pulse input:  $>$  1,1 k

Galvanic separation: via an optocoupler between the control inputs and the signal output towards the dimmer module

Dimensions: approx. 70 x 60 x 23 mm

Price group: 7



Output power of the dimmer module on gradual shutoff with:

1 V=	3 V=	6 V=	10 % TTL PWM		power: "0"
3 V=	8 V=	16 V=	50 % TTL PWM		power: approx. 50 %
5 V=	12 V=	24 V=	90 % TTL PWM		power: approx. 100 %

## M152 Rain sensor 12 V=

If the sensor plate gets into contact with rain or slushy snow / hail, it switches on a relay. Sun blinds may be retracted with that, skylights may be closed or a simple rain alarm can be given. The automatically heated surface of the sensor prevents any freezing or wetting of the sensor surface. 2 installed LEDs indicate the function. Operating voltage: 12 V=, current consumption: 8/120 mA (without / with heating). Relay contact: 1 x ON, max. 25 V 2 A. Waterproof-encapsulated electronics.

### Technical data:

Operating voltage: 12 V=

Current consumption without / with heating: approx. 8/120 mA

Relay contact: 1 x ON, maximum load 25 V 2 A

Sensor heating: automatically in case of contact with rain

Light-emitting diode 1: indication that the rain sensor works

Light-emitting diode 2: indication that rain is reported and the relay has switched on

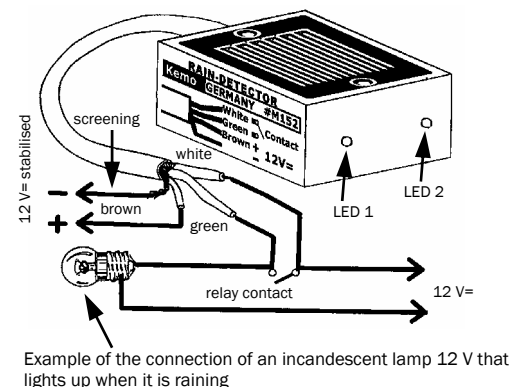
Duty cycle of the relay: as long as the sensor is wet

The module is encapsulated waterproof.

Active sensor surface, gold-plated: approx. 29 x 30 mm

Dimensions: approx. 57 x 43 x 25 mm

Price group: 10



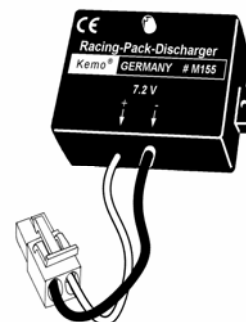
## M155 Discharger for 7,2 V - racing packs

...discharges partially charged 7,2 V racing packs to prevent a memory effect and thus to increase the accumulator's life. The accumulator is discharged to approx. 5,4 V (display through control LED) through a special protective circuit.

### Technical data:

Connection voltage: 7,2 V (6 NiCd or NiMH cells)  
 Discharge current: max. 0,45 A ( $\pm 20\%$ )  
 Final discharge voltage:  
 approx. 5,4 volts (0,9 V per cell)  
 Indicator: by LED  
 Socket type: TAM socket type "A"  
 Dimensions (W x D x H): approx. 60 x 45 x 19 mm

Price group: 5



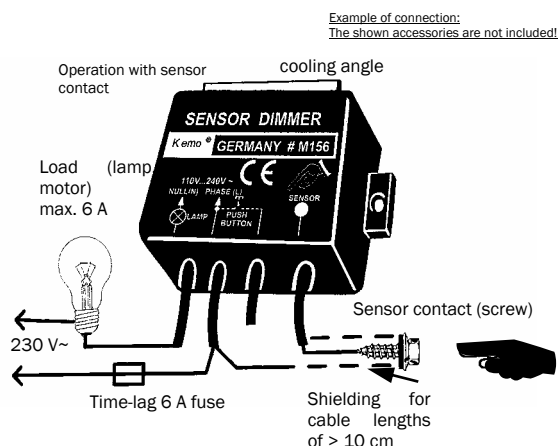
## M156 Sensor dimmer 230 V ~, 1 kW

Dimmer for incandescent lamps and motors to be operated via push button or sensor contact. When pressing the key button, the power raises and decreases again automatically and keeps this setting if the key button is detached. If the key button is touched shortly in the desired setting, the dimmer switches off and upon touching it once again in the last dimmer setting it switches on again. Also to be employed as light dimmer in the clock frequency of 5...9 seconds per rise and decline.

### Technical data:

Operating voltage: 220...240 V~, 50...60 Hz  
 Loading capacity: max. 6 A  
 Loads to be connected: incandescent lamps, electric motors and other inductive loads which may be regulated through phase control with a nominal voltage of 220...240 V~  
 Operation: via a push button or a sensor contact using the finger (not enclosed)  
 Threshold frequency: approx. 5...9 seconds for adjusting 1 x upward and downward again  
 Dimensions: approx. 80 x 56 x 23 mm (without lateral fastening straps)

Price group: 10



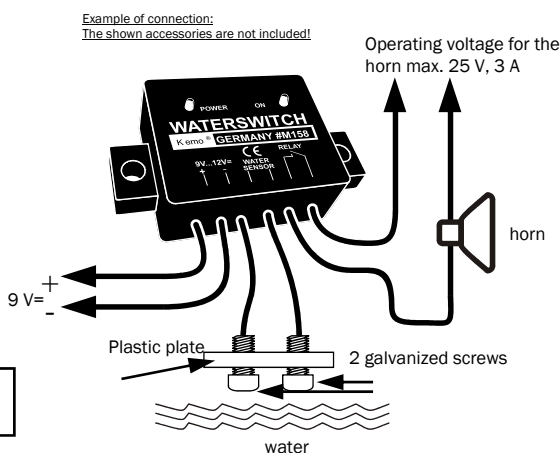
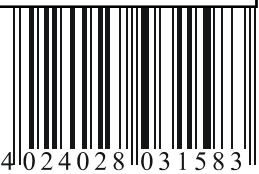
## M158 Water detector 9...12 V=

If the 2 sensor connections of the module come into contact with water, the built-in relay switches on. Sirens, other cutoff relays, etc. may be triggered with that. Operating voltage: 9...12 V=. Relay contact 1 x ON max. 3 A / 25 V. 2 LED displays: "POWER" and "ON".

### Technical data:

Operating voltage: 9 V DC voltage are ideal (max. 12 V), (please do only employ a stabilised power supply).  
 Current consumption: "Ready": < 10 mA. In case of contact with water when the relay picks up: < 90 mA each with 9 V.  
 LED displays: 1 LED for the indication of readiness "POWER", 1 LED for the indication "ON", if the relay switches on.  
 Connections: via free cables.  
 Dimensions: sealing case approx. 71 x 45 x 20 mm  
 Approved cable length towards the water sensors: max. 5 m with normal cable, max. 100 m with shielded cable, if the shielding braid is connected with the negative pole of the distribution voltage.

Price group: 5



NEW NEW NEW NEW

## M161 Ultrasonic Power Cannon

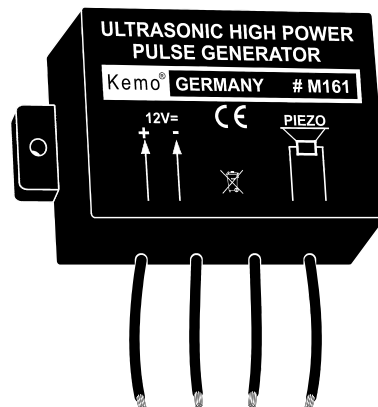
High-Power Ultrasonic Pulse Generator with Loudspeaker

...to chase away wild animals such as martens, wild boars, deers etc from gardens, farmlands etc. The loudspeaker emits pulsed ultrasonic sounds (max. 120 dB  $\pm 15\%$ ), which have an acoustic range of up to 300 m with a tube placed upon (not included). Operating voltage: 12 V=.

### Technical data:

Operating voltage: 12...14,4 V  
 Power consumption: max. 150 mA  
 Frequency: approx. 22 kHz (not audible to men)  
 Frequency curve: sine  
 Pulse width: approx. 0,5 sec.  
 Pulse sequence: approx. 5 sec.  
 Indication: LED that flashes at impulses when the loudspeaker is connected  
 Loudspeaker output: for piezo-loudspeakers. Max. 2 each of the enclosed type L010 may be operated in parallel (1 loudspeaker is attached).  
 Dimensions of the module: approx. 60 x 45 x 20 mm (without fastening straps)

Price group: 9



NEW NEW NEW NEW

### Data of the attached loudspeaker:

Type: L010  
 Diameter: approx. 41 mm  
 Height: approx. 12 mm  
 Frequency range: approx. 2...60 kHz  
 Max. sound pressure: max. approx. 120 dB ( $\pm 15\%$ )  
 Type: piezo

## FG008N Flasher, slow 230 V~

Flasher with adjustable flash period: approx. 0,6...9 seconds turn-on time. Turn-off time approx. 50 % of the turn-on time, respectively. Built-in fuse: T 1,6 A. For electric light bulbs 25...300 Watt, 230 V~. Use: billboards, model lighthouse etc.  
Dimensions: approx. 110 x 65 x 62 mm



Only for indoor use!

Price group: 8



## FG009 Twin flasher lamp 230 V~

This flasher lamp makes 2 incandescent lamps or light chains flashing alternately. Practical connector shell with 2 integrated euro-sockets.

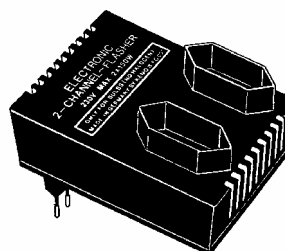
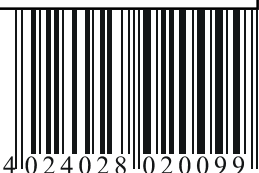
Technical data:

Operating voltage: 230 V~  
Load: max. 150 W per channel  
Clock speed: adjustable  
Dimensions: approx. 100 x 75 x 68 mm



Only for indoor use!

Price group: 8



## FG010 3-Channel running light 230 V~

This running light has 3 sockets where incandescent lamps, lamp groups or light chains of 230 V~ may be connected. Only incandescent lamps may be connected, no fluorescent lamps, quartz lamps, power saving lamps nor halogen bulbs with a superposed transformer! You may only connect lamps up to a maximum of 300 W total power to each socket.

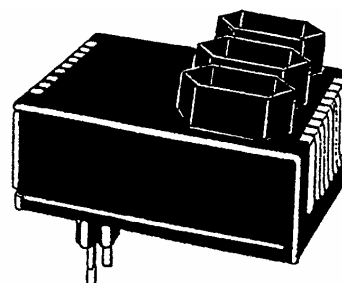
Technical data:

Operating voltage: 230 V~  
Channels: 3  
Load: max. 300 W per channel  
Running speed: adjustable  
Dimensions: approx. 100 x 65 x 75 mm



Only for indoor use!

Price group: 9



## FG011 Alarm flasher 230 V~

When this unit will be plugged into the socket, the integrated light-emitting diode starts to twinkle. Burglars, who can see this unit twinkle through the window, can suspect an active alarm system.

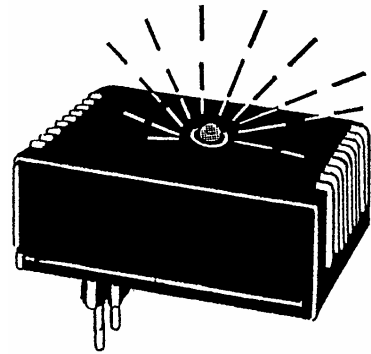
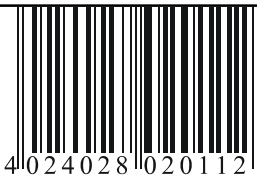
Dimensions: approx. 104 x 87 x 47 mm



Only for indoor use!



Price group: 4



## FG014 Marten repellent tester

Testing instrument to prove existing ultrasonic sounds (15...29 kHz) and high voltage (150...700 V=) at the contact plates. Thus the function of ultrasonic and / or contact plate marten repellents may be tested. Operating voltage: 9V battery.

**Technical data:**

Operating voltage: 9 V battery

Current consumption operation: 10...15 mA

Battery check: automatically, if the instrument is switched on

Frequency range: reacts to ultrasonic sounds in the range of 15...29 kHz (- 20 dB)

Sensitivity: at 23 kHz approx. 40 dB

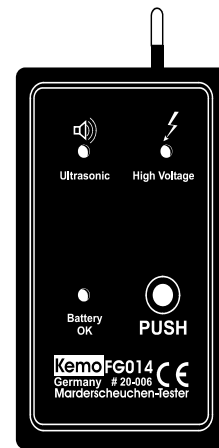
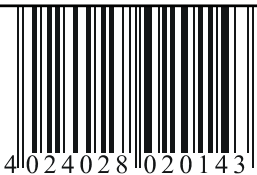
Series resistor high voltage-tracer pin: 36 M Ohm

Dimensions: approx. 100 x 60 x 25 mm



Only for indoor use!

Price group: 12



## FG015 High power ultrasonic generator

...to drive away wild animals such as martens, rodents (e.g. out of carports, lofts, camper vans), wild boars, deer, etc. (from gardens, farmland, etc.). The device produces an enormously loud, pulsating and aggressive ultrasonic sound of about 21 kHz which is not audible to most people, but represents a considerable annoyance for wild animals which, therefore, try to avoid it. In some cases (not always!) it is also possible to drive away dogs and cats that are used to human community. The device is operated with 4 batteries R14 (UM2) which last up to 8 months depending on the quality.

**Technical data:**

Fastening: at walls or ceilings with 4 screws  $\varnothing$  3 mm (not attached)

Batteries: operation with 4 batteries UM2 (R14, round cell), not included

Equipment-on indication: via a built-in LED which lights up during radiation of ultrasonic sounds.

Assembly: suitable for outside assembly but only at spots that are protected against splash water (under the canopy, installed into aviaries in the garden, under a parking caravan, etc.)

Ultrasonic frequency: approx. 21 kHz ( $\pm$  10 %)

Mark space ratio: approx. 0,6 sec. ON, approx. 6 sec. rest

Sound pressure: > 100 dB ( $\pm$  15 %)

Angle of radiation: > 120 degrees

Loudspeaker: special piezoelectric ultrasonic high-power loudspeaker with lacquered (humidity-proof) membrane

Acoustic range: > 200 m

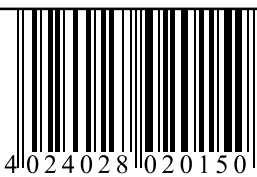
Operating voltage: 6 V (4 x batteries UM2)

Current consumption: rest: approx. 0,000005 A, active time: approx. 0,005 A

Tested temperature range: - 15° C...+ 60° C

Dimensions: approx. 190 x 70 x 33 mm L x W x D (dimensions without fixing straps)

Price group: 15

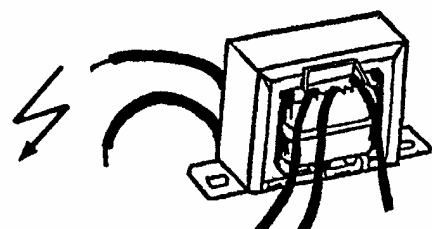


## TR01 Transformer for converter

This transformer is especially suitable for a push-pull DC-voltage converter of 12 V up to 230 V~. It can be used directly when working with our converter-kit B038. The maximal output power of this transformer is about 40/50 W. Packed in a carton.

Dimensions: approx. 76 x 69 x 59 mm

Price group: 9

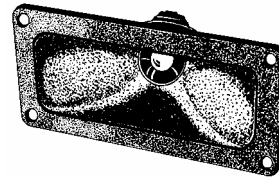


## L001 Piezo-spherical cap-tweeter with flare

High-quality piezo-spherical cap-tweeter with flare approx. 65 x 145 mm, approx. 40 mm deep. Frequency range: approx. 2.500...45.000 Hz. This tweeter can be connected directly at the amplifier or at a diplexer. This tweeter has a vaulted aluminium spherical cap and no conical membrane (as usual with flare loudspeakers). Due to the aluminium spherical cap the acoustic pressure is not so strong as with comparable other piezo-tweeters. In return the loudspeaker has a very broad angle of radiation and a very good brilliant sound. Due to the aluminium spherical cap with its special radius of gyration and very low mobile mass the frequency response is very clean up to 45.000 Hz. Therefore this tweeter is especially suitable as ultrasonic loudspeaker for the control of parasites (against rodents, vermins etc.).

Dimensions: approx. 65 x 145 mm.

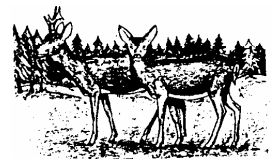
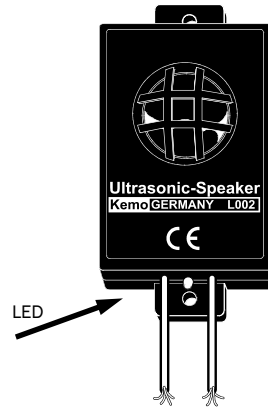
Price group: 3



## L002 Ultrasonic wall loudspeaker

Additional loudspeaker (Piezo) for our ultrasonic vermin scare No. M071N. An installed light emitting diode serves as operation indication. Range of transmission: approx. 6.000...45.000 Hz. Aluminium spherical cap membrane with a very broad angle of radiation. Suitable for mounting outside provided the loudspeaker will be installed protected from rain (e.g. under the roof ledge). The LED is loaded by the supplied ultrasonic wave frequency and thus does not require any additional operating voltage. Dimensions: approx. 72 x 50 x 28 mm (without fixing straps).

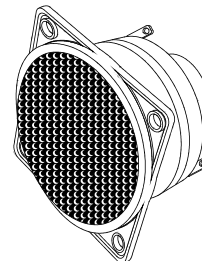
Price group: 5



## L003 Piezo-tweeter

Piezo-high tone loudspeaker with an installed transformer to increase the power. Concerning the technical Data this loudspeaker is indicated with a frequency response of approx. 5.000 ... 20.000 Hz, a top performance of 105 dB at a distance of 1 m. Our tests have shown that it also works very well in an ultrasonic-region of approx. 24.000 Hz. Due to the dynamic connection load 2 of these loudspeakers have to be connected in series (because of its little inner resistance 8 Ohm), and may then operate at our ultrasonic modules M048 and M071N. With this you have a very high output of radiation! Dimensions: approx. 63,5 x 63,5 mm, 50 mm deep.

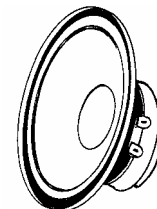
Price group: 3



## L006 Small loudspeaker

Small loudspeaker 8 Ohm, 0,25 W, Ø 45 mm, fitting for many kits!

Price group: E



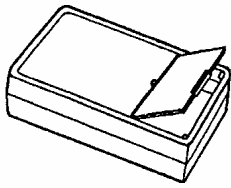
## P5123 Mini-piezoelectric-tweeter for M094

Ø approx. 30 x 14 mm. With aluminium spherical cap for especially low distortion and constant high pitch radiation. Very suitable for ultrasonic vermin scares because these robust loudspeakers are small and can be installed in narrow angles 2.500...45.000 Hz.

Price group: 2



## G01B 9 V Plastic case, small

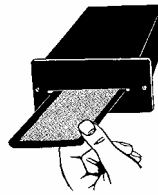


Double wall black plastic case with battery box for incorporation of a 9 V-compound battery or two 1,5 V minicells. Dimensions (L x W x H) 101 x 60 x 26 mm.

Price group: F



## G008 Case for card reader

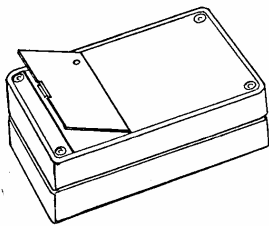


For cards in credit card size (approx. 54 x 85 mm). There are guiding notches available for the card and for the board. Dimensions: approx. 70 x 60 x 25 mm (without flange).

Price group: J

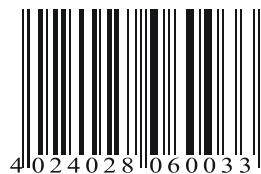


## G02B 6 V Plastic case, large

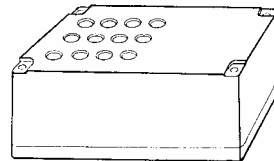


Double wall black plastic case with a large battery box for incorporation of a battery support for 4 round cells. Dimensions: approx. 123 x 72 x 39 mm

Price group: H

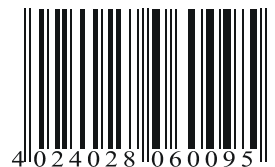


## G009 Code lock-wall case

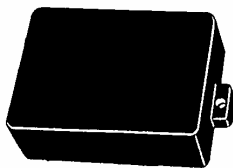


Stable case for wall fastening with holes to hold 12 key buttons for a code lock. Suitable key buttons are deliverable, if mini-board key buttons are used. Dimensions: approx. 130 x 80 x 50 mm

Price group: K

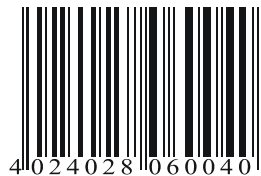


## G004 Modul case



Sealing case black, without bottom. With fixings straps. Dimensions: approx. 60 x 45 x 20 mm

Price group: C



## G010 Shell case

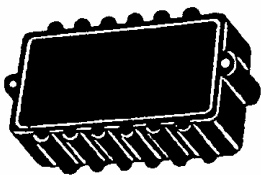


With ventilating slots and removable front panels. Colour: black. Dimensions: approx. 95 x 134 x 45 mm

Price group: G

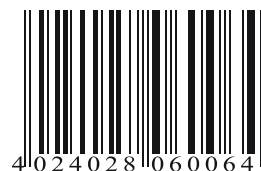


## G006 Ribbed module case

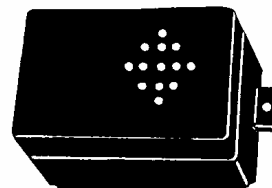


Sealing case, black, without bottom, with fixing straps. Dimensions: approx. 61 x 35 x 23 mm

Price group: C

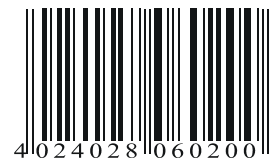


## G020 Case for signals

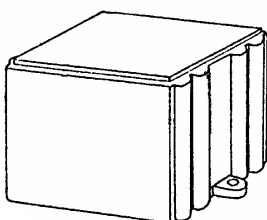


Dimensions: approx. 72 x 50 x 28 mm  
Screws are enclosed!

Price group: D



## G007 Ribbed module case

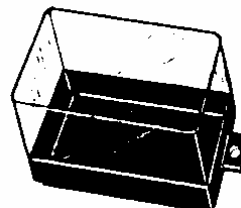


Sealing case, black, without bottom, with fixing straps. Dimensions: approx. 67 x 65 x 37 mm

Price group: D

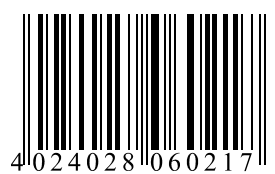


## G021 Transparent case

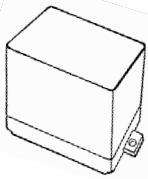


Black bottom part with fixing straps and internal possibilities to fasten boards. Transparent upper part. Dimensions without fixing straps: (L x W x H) approx. 72 x 50 x 40 mm.

Price group: G



## G022 Case with fixing straps



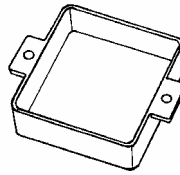
Inside there are 4 screw nipples to fasten one board. The case will be screwed down by using the 4 attached screws.  
Dimensions: approx. 72 x 50 x 63 mm (without fixing straps L x W x H).

Price group: G



## G059 Module case

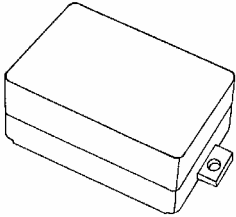
Dimensions: approx. 40 x 40 x 13 mm.



Price group: B



## G023 Case with fixing straps



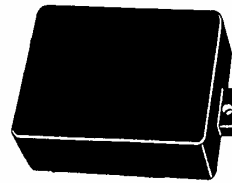
Inside there are 4 screw nipples to fasten one board. The case will be screwed down by using the 4 attached screws.  
Dimensions: approx. 72 x 50 x 27 mm (without fixing straps L x W x H).

Price group: F

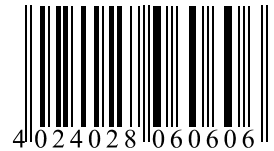


## G060 Modul case,

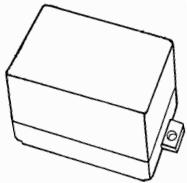
Sealing case black, without bottom  
Dimensions: approx. 70 x 60 x 23 mm (without fixings straps).



Price group: D

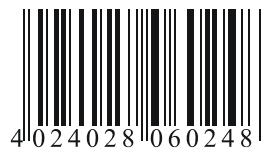


## G024 Case with fixing straps



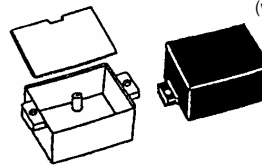
Inside there are 4 screw nipples to fasten one board. The case will be screwed down by using the 4 attached screws.  
Dimensions : approx. 72 x 50 x 40 mm (without fixing straps L x W x H).

Price group: F



## G061 Mini module case

With fixing straps and cover. With fastening pivot for a board. Color: black.  
Dimensions: approx. 30 x 25 x 15 mm (without fixing straps).

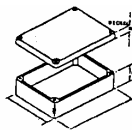


Price group: B



## Plastic case, black

With a wall thickness of 1.8 mm. Delivery with four fastening screws for the case cover. The height of covers varies according to the type of cases. Therefore, the cases are usable for general purposes. Packed in poly-bag with SB-suspension.



No.	Dimensions:	Price group:
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G025	72x50x21mm	D
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Price group: D



G026	72x50x28xmm	D
------	-------------	---



G027	72x50x35mm	E
------	------------	---



G028	72x50x42mm	E
------	------------	---



G029	72x50x63mm	F
------	------------	---



69/GB

## G070 Module case long

Black sealing case with possibility to fasten one board. The bottom is open. With fixing straps. Dimensions: approx. 120 x 50 x 24 mm (incl. fixing straps).

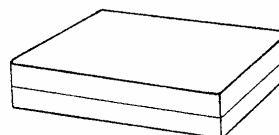


Price group: D



## G080 Standard flat-case

Dimensions: approx. 120 x 70 x 20 mm



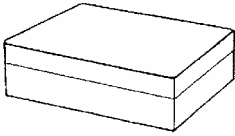
Price group: G



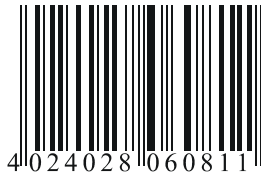


## G081 Standard case

Dimensions: approx. 120 x 70 x 35 mm

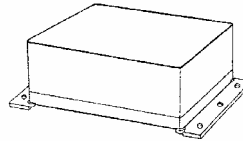


Price group: G

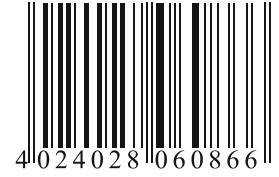


## G086 Standard wall case "middle"

Dimensions: approx. 120 x 70 x 50 mm

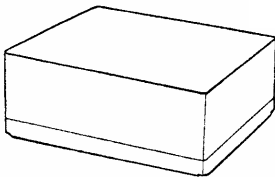


Price group: I

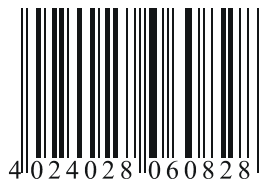


## G082 Standard case "middle"

Dimensions: approx. 120 x 70 x 50 mm

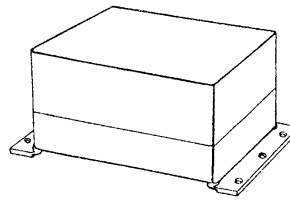


Price group: G



## G087 Standard wall case "high"

Dimensions: approx. 120 x 70 x 65 mm

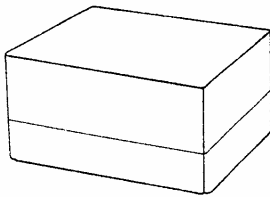


Price group: I

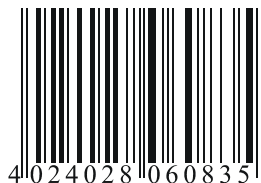


## G083 Standard case "high"

Dimensions: approx. 120 x 70 x 65 mm

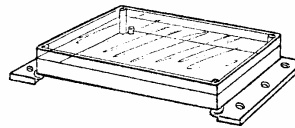


Price group: H

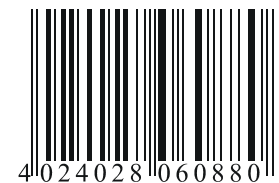


## G088 Transparent wall case "flat"

Dimensions: approx. 120 x 70 x 15 mm

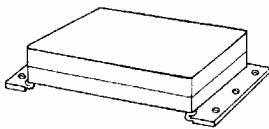


Price group: J



## G084 Standard wall case "flat"

Dimensions: approx. 120 x 70 x 20 mm

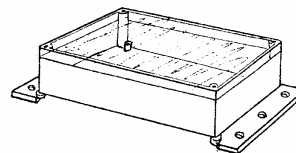


Price group: H

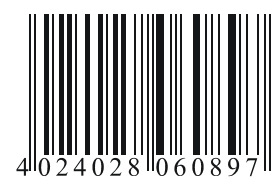


## G089 Transparent wall case "standard"

Dimensions: approx. 120 x 70 x 30 mm

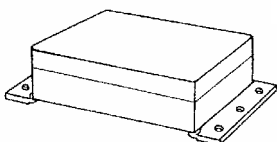


Price group: J



## G085 Standard wall case

Dimensions: approx. 120 x 70 x 35 mm

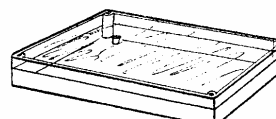


Price group: H



## G090 Transparent cover-case "flat"

Dimensions: approx. 120 x 70 x 15 mm

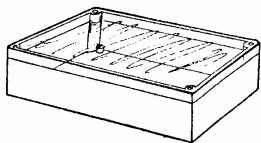


Price group: H



## G091 Transparent cover-case

Dimensions: approx. 120 x 70 x 30 mm

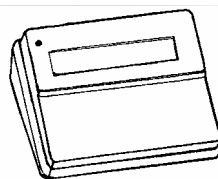


Price group: H



## G104 Small console case

Dimensions: approx. 95 x 90 x 40 mm  
Color: grey

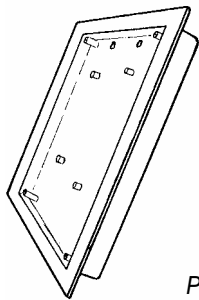


Price group: 2



## G100 Display case

Dimensions: approx. 130 x 130 x 17 mm (L x B x D). With holes for wall fastening and wraparound edge for optional assembly of pictures. With transparent front panel. For installation of presentation electronics with illuminants (LEDs, neon lamps, etc.)

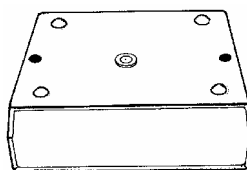


Price group: 3



## G108 Shell case

Dimensions: approx. 210 x 160 x 66 mm  
Color: grey

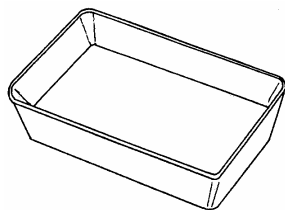


Price group: 6



## G062 Working bowl

Made of plastic.  
Dimensions: approx. 205 x 130 x 35 mm

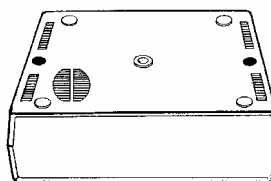


Price group: E

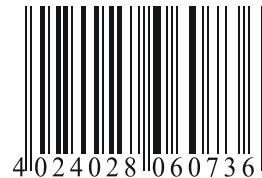


## G109 Shell case with loudspeaker grid

Colour: grey  
Dimensions: approx. 260 x 195 x 90 mm

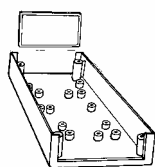
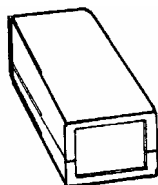


Price group: 8



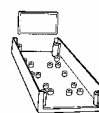
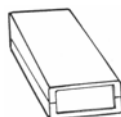
## Case with front panels Colour: grey

No.:	Dimensions approx. :	Price Group:
G105	150 x 80 x 58 mm	4
G106	150 x 80 x 45 mm	4
G107	150 x 80 x 30 mm	K

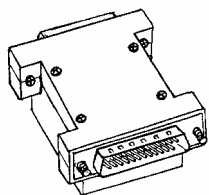


## Case with front panels Colour: grey

No.:	Dimensions approx. :	Price Group:
G110	90 x 50 x 17 mm	2
G111	90 x 50 x 25 mm	2
G112	90 x 50 x 33 mm	H
G113	120 x 60 x 30 mm	H
G114	120 x 60 x 40 mm	I
G117	120 x 60 x 50 mm	3



### G123 Computer module case

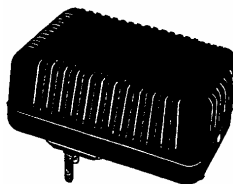


With 25-pole SUB-D-plug and 25-pole SUB-D-jack. For installation of adapters and appliances which shall be operated at the parallel port of the computer.  
Dimensions: approx. 73 x 56 x 30 mm

Price group: K



### STG10 Case for shock-proof plug



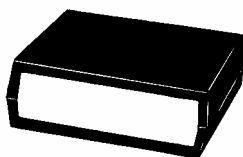
Black plastic with injection-moulded shock-proof plug (with grounding bow). With ventilation slots.  
Dimensions: approx. 110 x 65 x 62 mm.

Price group: H



### G200 Lighting console-case

Solid stable construction, colour: black.  
Dimensions: approx. 284 x 160 x 76 mm.

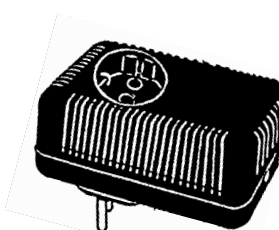


Price group: 7



### STG15 Connector case with socket

Case with injection-moulded shock-proof plug and injection-moulded shock-proof socket (each with grounding bow). Colour: black.  
Dimensions: approx. 110 x 65 x 62 mm.

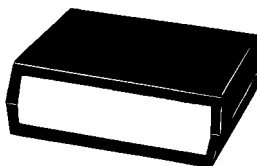


Price group: K



### G201 Lighting console-case with transparent front panel

As G200, however, with transparent front panel. Colour: black.  
Dimensions: approx. 284 x 160 x 76 mm.

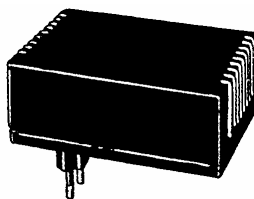


Price group: 7



### STG20 Connector case, large

Large connector shell with mains plug. Colour: black.  
Dimensions: approx. 105 x 77 x 47 mm.



Price group: F

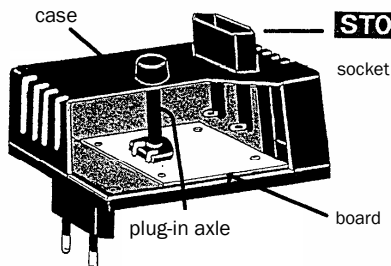


### Accessories

Possibility of application for our connector shell STG20.



**STG20**



**ST04**

socket

plug-in axle

board

**K001**

Sectional drawing



### K001 Plug-in axle with button

Plug-in axle with injection-moulded button Ø approx. 15 x 8 mm.  
Total length together with button: approx. 46 mm.

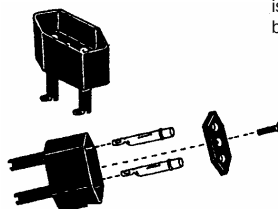


Price group: B



### ST04 Euro-socket

Insert-socket for 230 V~ mains plug. Delivery is effected disassembled in SB-bag. Colour: black.

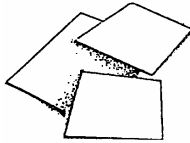


Price group: D



## E001 Platine FR3 approx. 160 x 100 x 1 mm

One-side copper layer approx. 35 µm. Special offer for "do-it-yourself-designers" of boards (FR3).  
1 pack = 20 pc / price = 1 pc

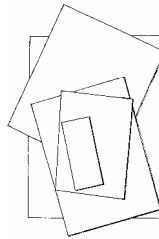


Price group: D



## S019 Board assortment, approx. 500 g

Different board blanks, copper-laminated one-side and double-sided. With working instruction.

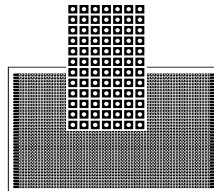


Price group: G



## E002 Experimental board - dot grid

One-side copper layer approx. 35 µm, gold plated (better for soldering "lead-free").  
Material FR2, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 160 mm.



Price group: F



## E004 Experimental board - dot grid

One-side copper layer approx. 35 µm, gold plated (better for soldering "lead-free").  
Material FR4 Epoxid, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 160 mm.

Price group: G



## E012 Experimental board - strip grid

One-side copper layer approx. 35 µm, gold-plated (better for soldering "lead-free").  
Material FR2, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 100 mm.

Price group: E



## E003 Experimental board - strip grid

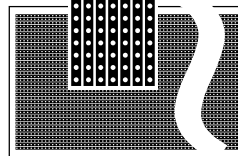
One-side copper layer approx. 35 µm, gold-plated (better for soldering "lead-free").  
Material FR2, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 160 mm.

Price group: F



## E005 Experimental board - strip grid

One-side copper layer approx. 35 µm, gold-plated (better for soldering "lead-free").  
Material FR4 Epoxid, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 160 mm.



Price group: G



## E011 Experimental board with strip raster

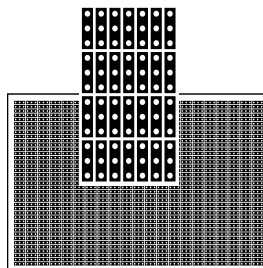
One-side copper layer approx. 35 µm, copper layer gold-plated (better for soldering "lead-free").  
Material FR2, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 500 mm.

Price group: K



## E013 Experimental board with 3 strip raster

The strip raster is interrupted every 3rd hole. One-side copper layer approx. 35 µm, gold-plated (better for soldering "lead-free").  
Material FR2, approx. 1,5 mm thick, hole distance approx. 2,54 mm, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 160 mm.

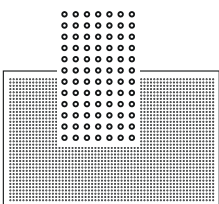


Price group: F



## E010 Experimental board - punched raster

Raster: approx. 2,54 mm, without copper layer, approx. 1,5 mm thick.  
Material FR2, diameter of holes approx. 1 mm. Dimensions: approx. 100 x 160 mm.

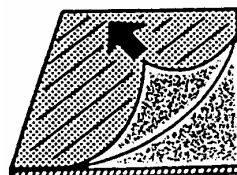


Price group: E



## F001 Photopositive-coated board

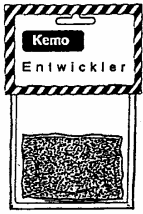
One-side copper layer, approx. 35µm.  
Material FR2. Dimensions: approx. 100 x 160 mm.



Price group: G

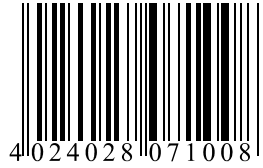


## E100 Developer

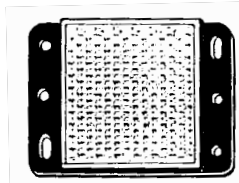


For development of photopositive coated boards. Double welded in 2 polybags with SB-suspension.

Price group: D

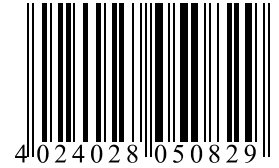


## K002 Reflector mirror



For infrared light barriers. Dimensions: approx. 51 x 69 mm, 8 mm thick.

Price group: G



## L100 Conductive silver

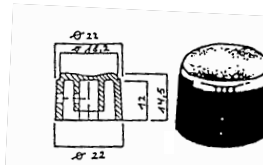
Silver-conductive lacquer with excellent adhesive power. Ideal for repairing boards, window alarm loops and window heatings. Very conductive: approx. 0,02 Ohm - 0,1 Ohm/cm<sup>2</sup>. Based on the new regulations, we supply this lacquer jointly with the package insert "DIN-Safety Data Sheet" in glass bottles and SB-packing. (Contents of bottle approx. 3 g)



Price group: I

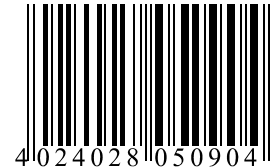


## K062-4 Turning knob with grub screw for Ø 4 mm axle



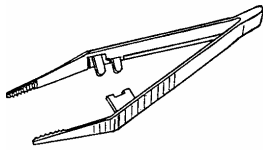
Knob body, black, with grey cap. Knob approx. Ø 22 mm x 14,5 mm. Stable fastening with set screw M3 and nut.

Price group: B

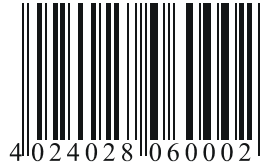


## W001 Plastic forceps

Length approx. 125 mm. Internal geared point with an especially broad and flexible clamping surface. Ideal for works at alive parts or for handling caustic baths.

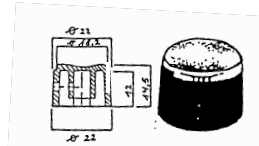


Price group: B

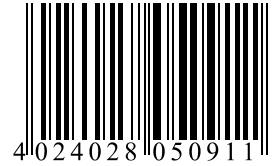


## K062-6 Turning knob with grub screw for Ø 6 mm axle

Knob body, black, with grey cap. Knob approx. Ø 22 mm x 14,5 mm. Stable fastening with set screw M3 and nut.



Price group: B



## Ä100 Corrosive

White corrosive: approx. 100 g (sodium persulphate) for engraving of boards. Sufficient for 0,5 l water.

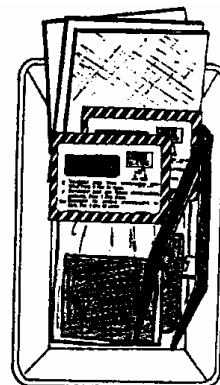


Price group: F



## Ä200 Corrosive set, complete

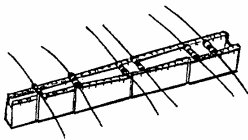
3-copper-clad + 1 photo-coated board, 1 developer, 1 corrosive, 1 forceps, 1 working bowl, 1 comprehensive, illustrated instruction. Packed in stable polybags with SB-suspension.



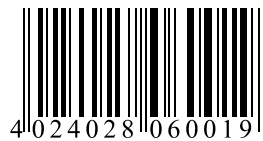
Price group: 5



## A001 Bending device



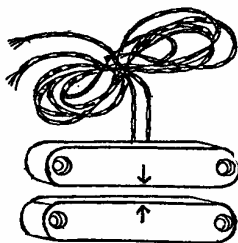
For resistors, diodes, chokes, capacitors and electrolytic capacitors. Earmarked for five grid sizes: 7,5 / 10 / 12,5 / 15 / 17,5 mm.



Price group: C

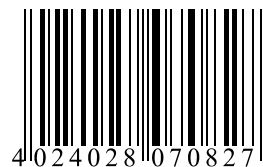
## Alarm contact construction

The contact is closed (NC) when the magnet is connected. The alarm contact is potted humidity-proof. The electrical connection is not done via interference-prone threaded terminal ends at the alarm contact, but via cables which have to be soldered on (like prescribed by the VDS-regulations of the insurers a.o.). 1 Set consists of 1 magnet and 1 potted alarm contact with pigtails. Available in brown or white. Dimensions: approx. 43 x 10 x 11 mm. Rupturing capacity max. 0,3 A / 40 V.



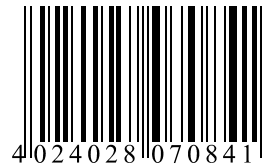
A002  
brown

Price group: J



A004  
white

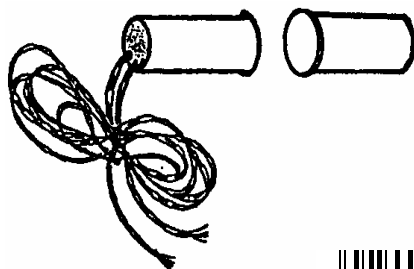
Price group: J



## A003 Alarm contact for embedding

The contact is closed (NC) when the magnet is connected. The alarm contact is potted humidity-proof. This alarm contact is embedded into the door folding or window rabbet.

Boring: approx.  $\varnothing$  9,2 x 22 mm. Colour: brown.

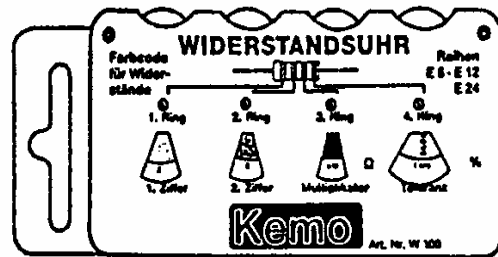


Price group: J



## W100 Resistance timer / colour code

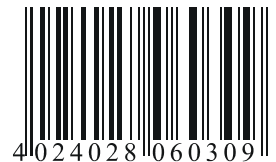
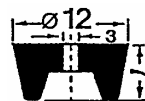
This resistance timer is readable from both sides and substitutes the old colour code timers with 3 wheels. Steady wipeable performance! Front: For the series E6, E12, E24. Back: For the series E48 and E96.



Price group: D

## G030 Case feet, black, small

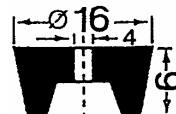
For screwing down, made of soft-plastic.



Price group: A

## G040 Case feet, black, medium

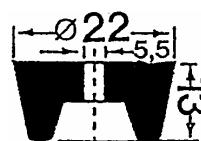
For screwing down, made of soft-plastic.



Price group: A

## G050 Case feet, black, large

For screwing down, made of soft-plastic.

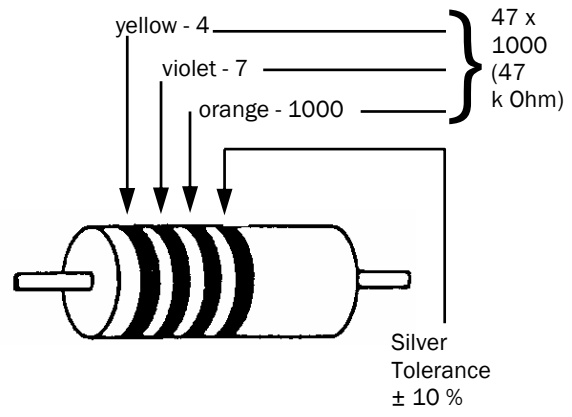
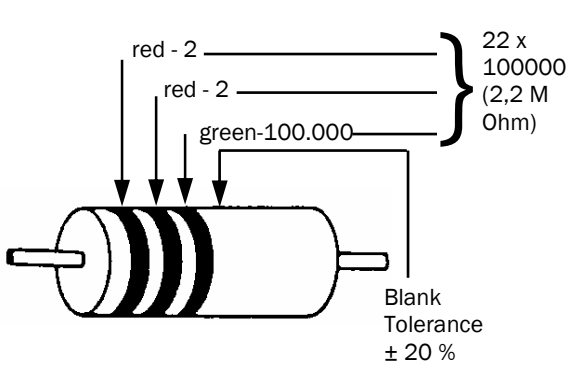


Price group: A

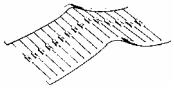
# International colour code for resistors

Colour	1. Ring	2. Ring	Factor	Tolerance
black	0	0	1	
brown	1	1	10	
red	2	2	100	
orange	3	3	1.000	
yellow	4	4	10.000	
green	5	5	100.000	
blue	6	6	1.000.000	
violet	7	7	10.000.000	
grey	8	8	100.000.000	
white	9	9	1.000.000.000	
gold	-	-	0,1	Gold ± 5%
silver	-	-	0,01	Silver ± 10%
				Blank ± 20%

## Example

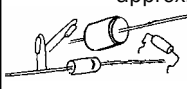


S001 Resistors, approx. 200 pieces



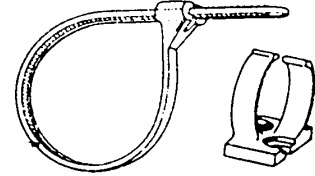
Price group: E

S011 Diodes with data sheet, approx. 100 pieces



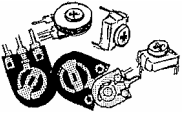
Price group: G

S028 Cable binders, 1 set



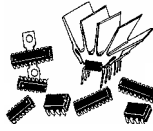
Price group: D

S003 Trimming potentiometers, approx. 50 pieces



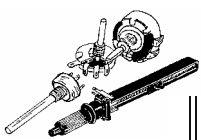
Price group: G

S012 Integrated circuits + data, approx. 20 pieces



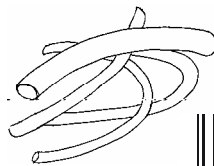
Price group: G

S004 Potentiometers etc., approx. 20 pieces



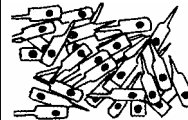
Price group: H

S013 Insulating plastic tube



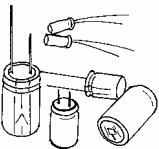
Price group: F

S030 Board flat plugs, approx. 100 pieces



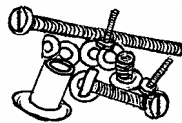
Price group: D

S005 Elektrolytic capacitors approx. 50 pieces



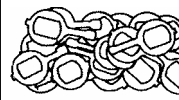
Price group: F

S017 Screws + accessories



Price group: D

S032 Lug, approx. 30 pieces for S030 board flat plugs



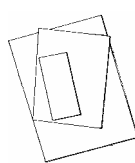
Price group: D

S007 Ceramic capacitors, approx. 100 pieces



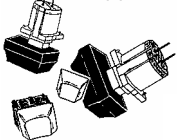
Price group: F

S019 Board material, approx. 500 g



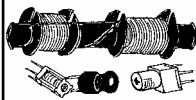
Price group: G

S009 Switches + key buttons approx. 20 pieces



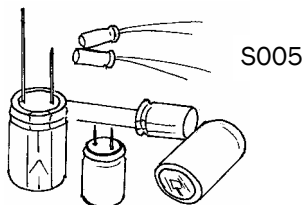
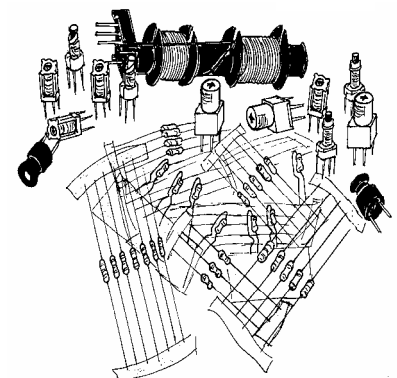
Price group: G

S023 Coils, chokes, approx. 50 pieces

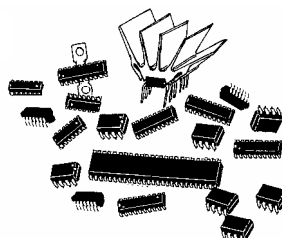


Price group: G

S023

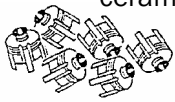


S012



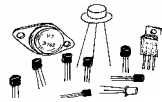


S035 Trimming capacitors,  
ceramic, approx. 20 pieces



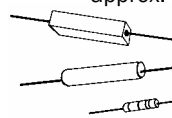
Price group: E 4 024028 040356

S046 Transistors T03/T092 data,  
approx. 20 pieces



Price group: F 4 024028 040462

S053 Power resistors,  
approx. 50 pieces



Price group: F 4 024028 040530

S036 Light emitting diodes  
approx. 30 pieces



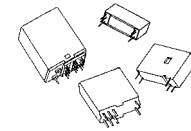
Price group: E 4 024028 040363

S048 Distance bolts,  
approx. 30 pieces



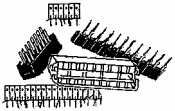
Price group: D 4 024028 040486

S054 Relays, approx. 5 pieces



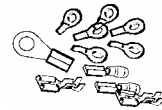
Price group: G 4 024028 040547

S038 Connectors,  
approx. 100 pieces



Price group: G 4 024028 040387

S049 Soldering terminals,  
assorted, approx. 50 pieces



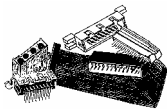
Price group: D 4 024028 040493

S056 Compression + tension  
springs, approx. 30 pieces



Price group: D 4 024028 040561

S039 Computer connectors,  
approx. 25 pieces



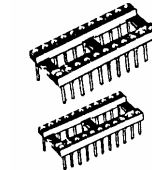
Price group: H 4 024028 040394

S050 LED's red-green-yellow,  
Ø 5 mm, approx. 18 pieces



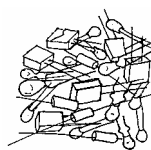
Price group: F 4 024028 040509

S057 IC-socket, approx. 30 pieces



Price group: F 4 024028 040578

S040 Tantalum elcas, bead + AX,  
approx. 100 pieces



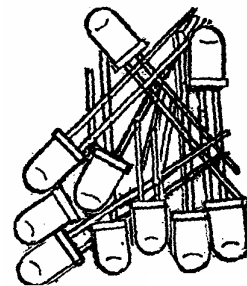
Price group: H 4 024028 040400

S051 Fuses, approx. 30 pieces



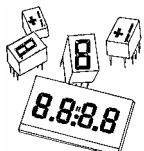
Price group: F 4 024028 040516

S062 LED Ø 5 mm red,  
approx. 10 pieces



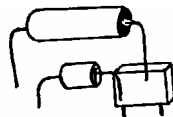
Price group: C 4 024028 050621

S043 Numeric. display LED +  
LCD, approx. 10 pieces



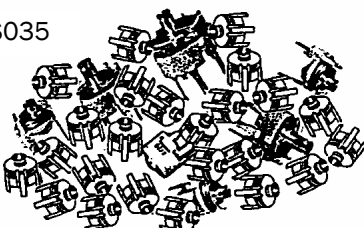
Price group: G 4 024028 040431

S052 Foil capacitors  
approx. 100 pieces

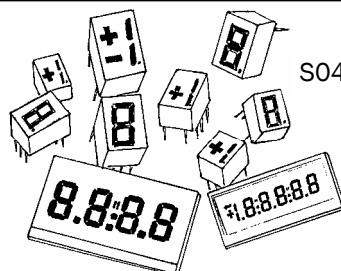


Price group: H 4 024028 040523

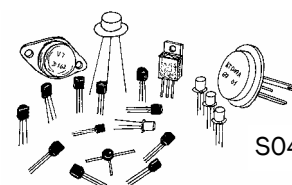
S035



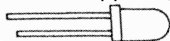
S043



S046

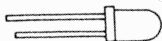


S063 LED Ø 5 mm green  
approx. 10 pieces



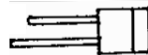
Price group: C 4 024028 050638

S070 LED Ø 5 mm yellow  
approx. 50 pieces



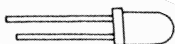
Price group: G 4 024028 050706

S079 Line-up LED red  
approx. 10 pieces Ø 5 mm



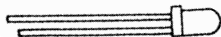
Price group: C 4 024028 050799

S064 LED Ø 5 mm yellow  
approx. 10 pieces



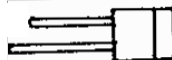
Price group: C 4 024028 050645

S071 LED Ø 3 mm red  
approx. 50 pieces



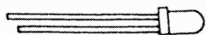
Price group: G 4 024028 050713

S080 Line-up yellow  
approx. 10 pieces Ø 5 mm



Price group: C 4 024028 050805

S065 LED Ø 3 mm red  
approx. 10 pieces



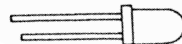
Price group: C 4 024028 050652

S072 LED Ø 3 mm green  
approx. 50 pieces



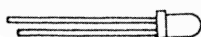
Price group: G 4 024028 050720

S081 Infrared-LED Ø 5 mm  
approx. 10 pieces



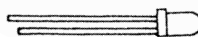
Price group: C 4 024028 050836

S066 LED Ø 3 mm green  
approx. 10 pieces



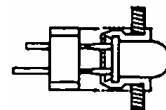
Price group: C 4 024028 050669

S073 LED Ø 3 mm yellow  
approx. 50 pieces



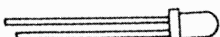
Price group: G 4 024028 050737

S085 LED-socket Ø 5 mm  
approx. 10 pieces



Price group: D 4 024028 050874

S067 LED Ø 3 mm yellow  
approx. 10 pieces



Price group: C 4 024028 050676

S074 Blink-light Ø 5 mm red  
approx. 5 pieces



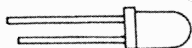
Price group: G 4 024028 050744

S089 LED Ø 10 mm red  
approx. 5 pieces



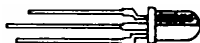
Price group: D 4 024028 050935

S068 LED Ø 5 mm red  
approx. 50 pieces



Price group: G 4 024028 050683

S076 DUO-LED Ø 5 mm red/green,  
approx. 10 pieces



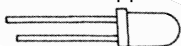
Price group: E 4 024028 050768

S091 LED Ø 10 mm green  
approx. 5 pieces



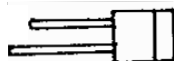
Price group: D 4 024028 050959

S069 LED Ø 5 mm green  
approx. 50 pieces



Price group: G 4 024028 050690

S078 Line-up LED green  
approx. 10 pieces Ø 5 mm



Price group: C 4 024028 050782

S092 LED Ø 10 mm clear-red  
approx. 5 pieces



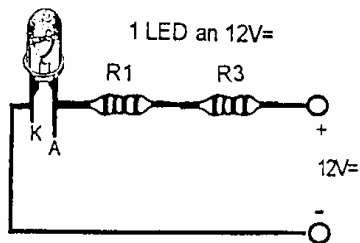
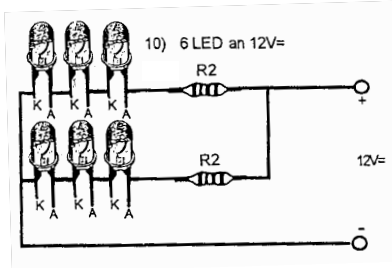
Price group: D 4 024028 041018

# Kemo Electronic

Assortments, high frequency litz wire + ferrite antenna

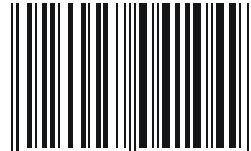
## S093 LED-creative-set

Approx. 50 light-emitting diodes and 20 resistors. For operation of the light-emitting diodes at 6 V= or 12 V=. With detailed description and connecting diagrams.



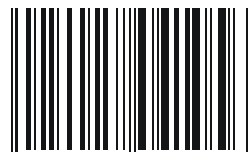
Price group: H 4 024 028 041 025

S095 LED Ø 10 mm clear-yellow, approx. 5 pieces



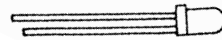
Price group: D 4 024 028 041 049

S096 LED Ø 10 mm clear-green approx. 5 pieces



Price group: D 4 024 028 041 056

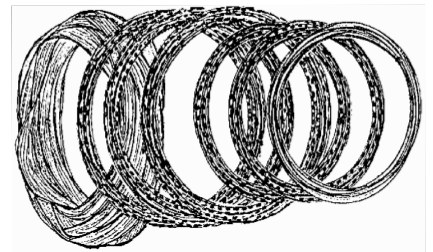
S097 LED Ø 3 mm orange approx. 10 pieces



Price group: C 4 024 028 041 063

## S100 Cable Assortment

Contains approx.:  
5 rolls of approx. 10 m equipment wire, various colours  
5 rolls of approx. 10 m flexible equipment wire, various colours  
2 rolls of approx. 5 m double wire



Price group: 4 4 024 028 041 100

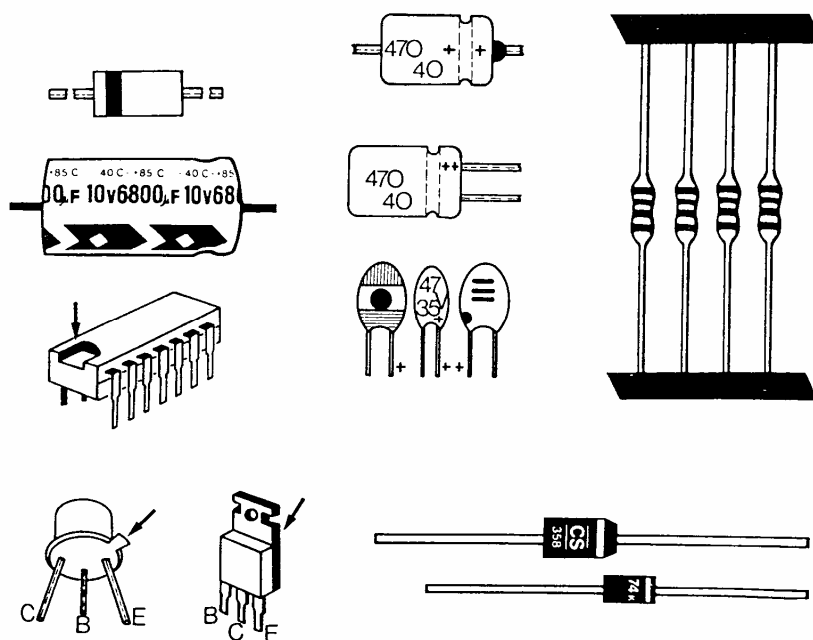
Article-No.	Article	Roll-Length/Dimensions	Price group	Barcode
HF001	High frequency litz	approx. 10 m	E	
S044	Standard wire, insulated	approx. 2 x 10 m	E	
S045	Jumper wire, insulated	approx. 2 x 10 m	E	
FE001	Ferrite antenna	approx. 10 x 120 mm	D	
FE003	Flat rod	approx. 13 x 5 x 55 mm	D	
FE004	Ferrite antenna	approx. 10 x 60 mm	C	
FE005	Ferrite antenna	approx. 8 x 5 x 80 mm	D	

Article-No.	Article	Diameter approx.	Roll-Length	Price group	Barcode	
KL001	 Enamelled copper wire	140 m	0,1 mm	F	4024028050010	
KL002		115 m	0,2 mm	F	4024028050027	
KL003		55 m	0,3 mm	F	4024028050034	
KL004		23 m	0,4 mm	F	4024028050041	
KL005		23 m	0,5 mm	F	4024028050058	
KL006		16 m	0,6 mm	F	4024028050065	
KL007		12 m	0,7 mm	F	4024028050072	
KL008		10 m	0,8 mm	F	4024028050089	
KL010		6 m	1,0 mm	F	4024028050102	
KL012		6 m	1,2 mm	F	4024028050126	
KL015		4 m	1,5 mm	F	4024028050157	
<hr/>						
KS006		 Silver-plated copper wire	10 m	0,6 mm	F	4024028050201
KS008			7 m	0,8 mm	F	4024028050218
KS010			5 m	1,0 mm	F	4024028050225
KS012	3 m		1,2 mm	F	4024028050232	
KS015	2 m		1,5 mm	F	4024028050249	
KS020	0,8 m		2,0 mm	F	4024028050256	
<hr/>						
W030	 Resistance wire	5 m	30 Ohm/m	F	4024028040905	
W044		5 m	44 Ohm/m	F	4024028040912	
W060		5 m	60 Ohm/m	F	4024028040936	
W062		5 m	62 Ohm/m	F	4024028040943	

### The component parts

The kits consist of versatile different electronic component parts which have to be fitted and soldered on the boards. For better orientation every board has been provided with an equipping print, which indicates the position of each components part. We would like to stress the importance of correct polarity of the components parts! With resistances, ceramic and foil capacitors polarity does not matter, it is of no importance in which way they are fitted into the boards. But with the other components parts, as e.g. diodes, elcas (electrolytic capacitors), transistors, IC's (integrated circuits), it has strictly to be observed that these parts are fitted correctly into the board. Each of these components parts have been marked on one side, and this mark will also be found in similar version on the boards. With the elcas, e.g. one side is the positive pole. Diodes have a "cathode-line" and "integrated circuits" have at one side of the housing a notch which is also printed on the board. Please check before starting soldering of the board once more, that the component parts have been placed on the correct spot and do have the right polarity! In case that the already fitted component parts may cover up the equipping print on the board, it is advisable to compare it with the one indicated in the kit instruction. Not until after the repeated check-up, it is advisable to start soldering the board!

### Some examples:



## Conversion tables (selection)

### Resistances

As unit of measure for resistances is applied the denomination Ohm ( $\Omega$ ).	1 $\Omega$	= 1 Ohm
	1 K $\Omega$ resp. 1 K	= 1 Kiloohm (1.000 Ohm)
	1 M $\Omega$ resp. 1 M	= 1 Megohm (1.000 Kiloohm)
Examples:	0,6 M $\Omega$	= 600 K $\Omega$ = 600 x 1.000 $\Omega$
	0,15 M $\Omega$	= 150 K $\Omega$ = 150 x 1.000 $\Omega$

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### Capacitors

As unit of measure for the capacity of capacitors is applied farad (F).	1 pF	= 1 Picofarad
	1 nF	= 1 Nanofarad (1.000 pF)
	1 $\mu$ F	= 1 Microfarad (1.000 nF)
Examples:	0,025 $\mu$ F	= 25 nF = 25.000 pF
	0,5 $\mu$ F	= 500 nF = 500.000 pF

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### Current

As unit of measure for the current capacity is used Ampere (A).	1 A	= 1.000 Milliampere (mA)
	1 mA	= 1.000 Microampere ( $\mu$ A)
	1 $\mu$ A	= 0,001 Milliampere

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### Voltage

Voltage is indicated in Volt (V).	1 kV	= 1 Kilovolt (1.000 Volt)
	1 V	= 1.000 Millivolt (mV)
	1 mV	= 1.000 Microvolt ( $\mu$ V)

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### Power

The electrical power is indicated in Watt (W).	1 kW	= 1 Kilowatt (1.000 Watt)
	1 W	= 1.000 Milliwatt (mW)

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### Frequency

Our alternating current mains has 50 cycles per second. The number of cycles per second is determined as frequency (f). It is indicated in Hertz (Hz).	1 MHz	= 1 Megahertz (1.000 Kiloherzt)
	(m.c.p.s.)	= m.c.p.s. Megacycles per second
	1kHz	= 1.000 Hertz (c.p.s.)
	(k.c.p.s.)	



NOTES:

A	
M083	Accu-charging regulator, 12 V= 51
M102	Accumulator charger, second-, 6...24 V 53
M057	Accumulator charging module, automatic 46
B079	Accumulator, univ. Ni-Cd-, battery charger, 5 - 600 mA 11
B136	Acupuncture, electronic, 3...6 V 20
B232Z	Additional light barrier for infrared stopwatch 34
A002	Alarm contact construction, brown 75
A004	Alarm contact construction, white 75
A003	Alarm contact for embedding, brown 75
B198	Alarm display, 9...12 V= 28
FG011	Alarm flasher, 230 V~ 66
M117	Alarm module for computers, alarm for house and home, for connection to a computer 58
M061	Alarm monitor, 9...12 V= 46
M073	Alarm, motorbike-, 49
B217	Alarm, smoke-, 12 V= 32
B190	Alarm system, mini-, 9...12 V= 26
B101	Alarm system, univ.-, for car, boat, house, garden, 12 V= 14
B092	Alternating flasher, LED-, 6...12 V= 13
M010	Alternating flasher 230 V~, 2 x 500 W at maximum 38
M080	Alternating flasher f. small glow lamps/flasher, 6...12 V= 50
M079	Alternating flasher/flasher for 1 to 10 LED's at maximum, 6...12 V= 50
B003	Alternating flasher for 2 small lamps 4,5...16 V=, max. 100 mA 1
B182	Amplifier, 1 W 24
B075	Amplifier, 12 W 10
B125	Amplifier, 200 W 18
B115	Amplifier, 8 W 16
B086	Amplifier, 80 W 11
B199	Amplifier, antenna-, approx. 50...1000 MHz 28
M034	Amplifier, power-, 40 W 42
B073	Amplifier, pre-, universal, super wideband: approx. 10...150 kHz, 12...30 V= 10
B122	Amplifier, stereo-, 6...12 V= 17
M055	Amplifier, stereo-, 3 W 45
B114	Amplifier, stereo-, 2 x 8 W 16
M032	Amplifier, universal-, 12 W 42
M033	Amplifier, universal-, 18 W 42
M031N	Amplifier, universal-, 3,5 W 41
B199	Antenna amplifier, approx. 50...1000 MHz 28
B099	Antenna amplifier, special-, 30...850 MHz 14
M100N	Anti marten devices for motor vehicles, 11...15 V= 52
B189	Anti-flea-generator for the cat- and dog-basket, 9 V= 25
B108	Atomium, 9 V= 15
M019	Automatic light switch, 230 V~ 40
B	
B005	Banisher, mosquito-, flea and tick banisher, 9 V= 1
B079	Battery charger, univ. Ni-Cd-accumulator-, 5 - 600 mA 11
M148N	Battery guard, 12 V= 63
B116	Battery guard, 3...15 V= 16
C	
M060	Car noise filter, universal-, 46
M068	Card switch, electronic, 9 V= 48
M121	CCD-camera-dummy 59
M149	Charging controller, solar-, 12 V= 5 A 63
M083	Charging regulator, Accu-, 12 V= 51
M057	Charging module, automatic accumulator-, 46
B235	Christmas tree, 9 V= 35
B209	Circuit board, LED series printed-, 230 V~ 30
B080	Clap switch, 12 V= 11
B229	Clean-air measuring device, 12 V= 34
B123	Combination kit: Light barrier/heat switch/twilight switch, 12V= 17
B240	Computer laser show 35
M104	Computer switch, 4-Channel 54
B162	Continuity tester with piezo buzzer, 9 V= 22
B119	Converter, approx. 100...200 MHz 17
M044	Converter, fluorescent lamp voltage-, 12...13,8 V 44
M038	Converter from 24 V= > 12 V=, max. 3 A 42
M150	Converter, DC- and pulse-, 110 V~ or 230 V~ 63
M029	Converter, voltage-, in: 6...14 V=, out: 11...26 V= 41
M046	Cross-over network 2-way, 4...8 Ohm, max. 120 W 44
M045	Cross-over network 3-ways, max. 120 W 44
D	
M150	DC and pulse converter, 110 V~ or 230 V~ 63
M082	DC-Flasher, 12...24 V=, max. 8 A 50
M107	DC-motor-interface 54
M101A	Decalcifier against calcification and corrosion in water pipes, without power supply, 6...15 V= 53
B212	Decalcifier against calcification, 9...12 V= 31
M101	Decalcifier against calcification, with power supply 52
B127	Decoder, stereo-, 4,5...12 V= 18
B221	Decoration picture, neon-, 12 V= 33
B081	Deftness game, 9...12 V= 11
M115N	Defence, marten-, for motor vehicles, 12...15 V= 58
B052	Destroyer siren, 6...12 V= 7
M128	Detector, HF-, (Mini Spy Finder), 60
B195	Detector, infrared-, 9 V= 27
M085	Detector, infrared-, 9 V= 51
B070	Detector, water-, 6...9 V= 9
M158	Detector, water-, 9...12 V= 64
B093	Die, electronic-, 6 V= 13
B063	Digital number lock with super-flat foil keyboard, 6 V 9
B208	Digital voltmeter, LED-, 4,5...5,5 V= 30
B071	Dimmer, 12...24 V= - 10/30 A speed regulator 10
M063	Dimmer, 12 V~, 50 W (or 24...48 V~) 47
M156	Dimmer, sensor-, 230 V ~, 1 kW 64
M043	Discharge protection module, solar-, 43
M155	Discharger for 7,2 V - racing packs 64
B155	Dog barking, electronic-, 9 V= 21
M067	Dog barking, electronic-, 9...12 V= 47
B179	Dog whistle, ultrasonic-, 9 V= 23
E	
P055	Electric motor, 0,5...15 V 62
B136	Electronic acupuncture, 3...6 V= 20
M068	Electronic card switch, 9 V= 48
B093	Electronic die, 6 V= 13
M067	Electronic dog barking, 9...12 V= 47
B155	Electronic dog barking, 9 V= 21
B152	Electronic fence appliance, 6 V= 21
B231	Electronic key, 12 V= 34
M126N	Electronic key, 12 V= 60
B146	Electronic melody "Coo Coo Waltz", 3 V= 21
B145	Electronic melody "It's a small world", 3 V= 20
M131	Electronic spare key ring 60
M069	Electronic underground rodent pest repeller, 9 V= 48
B239	Electronic wheel of fortune, 9...12 V= 35
B007	Electrostat apparatus, 3...4,5 V= 2
B233	Emergency light, LED-, 6...15 V=~/~ 35
F	
B035	FBI siren, 12 V=, 15 W 4
B152	Fence appliance, electronic-, 6 V= 21
B196	Field-intensity indicator, 9 V= 27
M060	Filter, car noise-, universal-, 46
M041	Filter, noise-, 43
M010	Flasher, alternating-, 230 V~, 2 x 500 W at maximum 38
B003	Flasher, alternating-, for 2 small lamps, 4,5...16 V=, max. 100 mA 1
M080	Flasher/alternating flasher f. small glow lamps, 6...12V= 50
M079	Flasher/alternating flasher for 1 to 10 LED's at max. 50
M082	Flasher, DC-, 12...24 V=, max. 8 A 50
M008	Flasher, 230 V~ 38
M077	Flasher, 5...12 V=, max. 1 A 50
B185	Flasher, 6...12 V=, max. 100 mA 24
B186	Flasher, jumbo LED-, 25
FG008N	Flasher, slow, 230 V~ 65
M114N	Flasher, slow, 230 V~/110 V~ 57
FG009	Flasher lamp, twin-, 230 V~ 65
B204	Flash-LED, 230 V~ 29
P5656	Fluorescent lamp, mini-, approx. 500 V 44
M044	Fluorescent lamp voltage converter 44
B060	Fluorescent lamp voltage transformer, 12 V= 8
M143	FM test transmitter, 9 V= 62
B018	FM oscillator, 2 W, 9...26 V= 3
B100	FM receiver, 9 V= 14
B156	FM receiver, 9 V=, 108...132 MHz 21
B015	Fog-horn, 5 W, 4,5...12 V= 3
G	
B081	Game, deftness-, 9...12 V= 11
B051	Gas sensor - Spirits tester, 12 V= 7
B237	Generator, 6-Melody-, 3...4,5 V= 35
B164	Gong, 3-Tone-, 9 V= 22
H	
M065	Halogen music light for 12 V~ lamps 47
B123	Heat switch-/light barrier-/twilight switch-, combination kit, 12 V= 17
M128	HF-Detector (Mini Spy Finder) 60
FG015	High power ultrasonic generator 66
M062	High-voltage-generator, mini-fence-, 9...12 V= 47
B015	Horn, fog-, 5 W 3
B188	Horn, mini signal-, 6...12 V= 25
I	
B013	IC-Radio HF-MF-LF, 9 V= 2
M144	Impulse switch-lock control 62
B195	Infrared detector, 9 V= 27
M085	Infrared detector, 9 V= 51

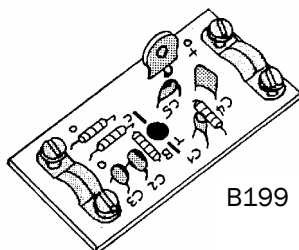


B215	Infrared light barrier, mini-, 10 cm, 6...12 V=	32	B085	Microphone, parabolic-, 9 V=	11
B062	Infrared light barrier - range over 18 m	8	B090	Microphone preamplifier	12
B216N	Infrared light barrier 5 m	32	M058N	Microwave leakage tester, 9 V=	46
M116	Infrared light barrier approx. 30 m	58	B190	Mini alarm system, 9...12 V=	26
B213	Infrared light barrier max. 50 m	31	B009	Mini running light, 9...12 V=	2
B241	Infrared remote control, 10-Channel-,	36	B188	Mini signal horn, 6...12 V=	25
B223	Infrared spotlight, 12...14 V=	33	B191	Mini timer, 9 V=	26
M120	Infrared spotlight, 12...15 V= for CCD-cameras	59	B088	Mini traffic light, 4,5...6 V=	12
B232	Infrared stopwatch	34	M062	Mini-fence-high-voltage generator, 9...12 V=	47
M108	Interface switch, 4-fold	55	P5656	Mini-fluorescent lamp, approx. 500 V	44
B098	Interval switch, 9...15 V=	13	B215	Mini-infrared light barrier, 10 cm	32
B137N	Ion generator, 12 V=	20	P5123	Mini-piezoelectric-tweeter for M094	67
<b>J</b>			B131	Mixer unit, stereo-, 6...12 V=	19
B186	Jumbo LED flasher, 6...12 V=	25	B242	Mole and vole repellent, solar-, 2,5...4,5 V	36
<b>K</b>			B134	Mono sound controller, 9...18 V=	20
B231	Key, electronic, 12 V=	34	B041	Morse-practice-set, sound generator-, 3...9 V=	6
M126N	Key, electronic, 12 V=	60	B005	Mosquito banisher, flea and tick banisher, 9 V=	1
B091	Kojak siren 12 V=, 15 W	12	M012	Motor and lamp control, 240 V~/110 V~	39
<b>L</b>			M073	Motorbike alarm	49
M012	Lamp and motor controller, 240 V~/ 110 V~	39	M107	Motor, DC-, -interface	54
L005	Laser module for B224, B240 + M133	33	M110	Motor-driver, stepper-, 6 pin	55
B224	Laser show, 6 V=	33	P055	Motor, electric	62
M133	Laser show	60	P046	Motor for M139 solar cell, electric	62
B240	Laser show, computer-,	35	M106	Motor-interface, step-, 4 pin	54
M058N	Leakage tester, microwave-, 9 V=	46	M109	Motor-interface, stepper-, 6 pin	55
B092	LED-alternating flasher, 6...12 V=	13	M007	Music light, 3-Channel, 230 V~	38
M142	LED-constant current, 4...30 V=	62	M065	Music light for 12 V~ lamps, halogen	47
B208	LED digital voltmeter, 4,5...5,5 V=	30	B174	Music light, 3-Channel microphone-, for halogen lamps, 12 V~	23
B233	LED emergency light, 6...15 V=~/~	35	B033	Music light, microphone-, 3-Channel-, 230 V~...240 V~ + 12 V=	4
B204	LED, flash-, 230 V~	29	<b>N</b>		
B186	LED flasher, jumbo-, 6...12 V=	25	B221	Neon decoration picture, 12 V=	33
B130	LED-recording level indication, 5 LED's, LED volt- and ammeter, 12 V=	19	P1089	Neon lamp, > 1.500 V	44
B202	LED running light, 10 channels-, 9...12 V=	29	B079	Ni-Cd-accumulator, univ.-, battery charger, 5 - 600 mA	11
M137	LED-signal lamp green, 12 V=	61	M041	Noise -Filter, max. 240 V~	43
M136	LED-signal lamp red, 12 V=	61	B004	Noise switch / telephone-two-call device, 9 V=	1
M138	LED-signal lamp yellow, 12 V=	61	B063	Number lock, digital, 6 V=	9
B209	LED series printed circuit board, 230 V~	30	B037	Number lock, sensor-, 12 V=	5
M087	LED tester, 9 V battery	51	<b>O</b>		
B124	LED-volume indicator, stereo-, 2 x 11 LED's, 12 V=	18	B018	Oscillator, FM-, 2 W	3
B111	LED-VU-Meter - 11 LED's	16	M028	Output regulator, 110...240 V~, 2600 VA	41
B160	LED-VU-Meter - 30 LED's	22	<b>P</b>		
B045	Light barrier, 12 V=	6	B085	Parabolic-microphone, 9 V=	11
M135	Light barrier 4 m, 12 V=	61	B181	Paralyser 10.000 V, self defense	24
B194	Light barrier, 6...12 V=	27	M069	Pest repeller, electronic underground rodent-, 9 V=	48
B232Z	Light barrier, additional, for infrared stopwatch	34	M091	Phase coupler for wireless intercom	52
B123	Light barrier- / heat switch- / twilight switch-, combination kit, 12 V=	17	P5123	Piezoelectric-tweeter, mini-, for M094	67
B062	Light barrier, infrared-, range over 18 m	8	L001	Piezo-spherical cap-tweeter with flare	67
B216N	Light barrier, infrared-, 5 m	32	L003	Piezo-tweeter	67
M116	Light barrier, infrared-, approx. 30 m	58	M015N	Potential transformer, max. 1,5 A	40
B213	Light barrier, infrared-, max. 50 m	31	M034	Power amplifier, 40 W	42
B215	Light barrier, mini-infrared-, 10 cm	32	M161	Power cannon, ultrasonic-, 12...14,4 V	64
M009	Light flasher, 230 V~	38	B049	Power control, 2600 VA 230 V~	7
M019	Light switch, automatic, 230 V~, 1 sec. to 30 min.	40	M026	Power converter, solar-, 0,9...10 V	41
M124	Light sweller, 12 V=, max. 24 W	59	B184	Power supply, 0...12 V=, max. 0,8 A	24
B022	Lighting console, 6-Channel	3	B126	Power supply, approx. 1,2...30 V, 5 A	18
M051	Lightning arrester	45	B102	Power supply, approx. 1,2...30 V, max. 2 A	14
B069	Listening-stethoscope, 9 V=	9	M039	Power supply, approx. 1,2...30 V=, 2 A	43
M016	Loudspeaker separating filter, 3-way, max. 120 W	40	B203	Power supply, approx. 1,2...18 V, max. 10 A	29
L006	Loudspeaker, small	67	B090	Preamplifier, microphone-, 6...20 V=	12
L002	Loudspeaker, ultrasonic wall-,	67	M040	Preamplifier, universal-, 9...24 V=	43
B206	Luminous letter control, 12...15 V=	29	B073	Preamplifier, universal-, 10...150 kHz	10
B200	Luminous letters, 12 V=	28	B133	Precision timer, 12 V=	19
<b>M</b>			B214	Proximity sensor, ultrasonic-, 9...12 V=	32
B078	Magnetizer, 12 V=	10	M150	Pulse converter, DC-,	63
B095	Marine diesel, 12 V=	13	<b>R</b>		
B243	Marten and vermin repellent, 12...16 V=	36	M155	Racing packs, discharger for 7,2 V-,	64
M115N	Marten defence for motor vehicles, 12...15 V=	58	M152	Rain sensor, 12 V=	63
FG014	Marten repellent tester	66	B100	Receiver, FM-, 9 V=	14
M111	Marten shock for motor vehicles	57	B156	Receiver, FM-, 9 V=, 108...132 MHz	21
M094	Marten repeller, 12...15 V=	52	K002	Reflector mirror	74
B077	Martin siren, German police siren, 12 V=, 15 W	10	M028	Regulator, output-, 110...240 V~, 2600 VA	41
M103	Master-slave, 230 V~	53	B210	Relay board, 8-Channel-, 12 V=, max. 0,8 A	30
M119	Master-slave, 6...30 V DC	58	B197	Relay card, 12 V=	27
B146	Melody "Coo Coo Waltz", electronic, 3 V=	21	M125	Relay module 8-channel	59
B145	Melody "It's a small world", electronic, 3 V=	20	B241	Remote control, infrared-, 10-Channel	36
M141	Melody generator, 5 W	62	B243	Repellent, marten and vermin-, 12 V=	36
B237	Melody, 6-, generator-, 3...4,5 V=	35	M094	Repellent, marten-, 12...15 V=	52
B055	Metal searching device, 9 V=	7	B242	Repellent, solar mole and vole-, 2,5...4,5 V	36
B014	MHz-transmitter, 27-, 6 W	3	FG014	Repellent tester, marten-,	66
B174	Microphone music light for halogen lamps, 12 V~, 3-Channel	23	M071N	Repellent, ultrasonic vermin-, 12 V=	48
B033	Microphone music light, 3-Channel-, 230 V~...240 V~ + 12 V=	4	B107	Robot voice, 9...12 V=	15
			M069	Rodent pest repeller, electronic underground-,	48

B202	Running light, LED-, -10 channels-, 9...12 V=	29	B187	Test signal generator, signal-injector, 6...12 V=	25
B201	Running light 10 channels, 12 V=	28	B172	The little electro-technician, 4,5 V= battery	22
B089	Running light, 230 V~ + 9 V=, 10-Channel	12	B042	Time switch (short) approx. 2 sec. to 5 min., 12 V=	6
B023	Running light, 230 V~, 3-Channel	4	M113N	Time switch 12...15 V=, 2 sec. to 10 (~30) min.	57
FG010	Running light, 230 V~, 3-Channel	65	B191	Timer, mini-, 9 V=	26
M011N	Running light, 230 V~, 4-Channel	39	B133	Timer, precision-, 12 V=	19
B128	Running light for glow lamps, 6...24 V=, 3-Channel	19	B164	Tone, gong-, 3-, 9 V=	22
B097	Running light, 230V~ + 12 V=, 4-Channel	13	B110	Tone control, stereo-, 9...18 V=	16
B009	Running light, mini-, 9...12 V=	2	B011	Touch switch, sensor-, 12 V=	2
	<b>S</b>		B088	Traffic light, mini-, 4,5...6 V=	12
M102	Second accumulator charger, 6...24 V	53	M050	Transformer control, 230 V~	45
M156	Sensor dimmer, 230 V ~, 1 kW	64	TR01	Transformer for converter	66
B037	Sensor number lock, 12 V=	5	B060	Transformer, fluorescent lamp voltage-, 12 V=	8
B193	Sensor switch, 9 V=	26	M020	Transformer, voltage-, from 24 V= > 12 V= (13,8 V=)	40
B011	Sensor touch switch, 12 V=	2	M143	Transmitter, FM test-,	62
M016	Separating filter, loudspeaker-, 3-way, max. 120 W	40	B014	Transmitter, 27 MHz-, 6 W, 9...24 V=	3
M152	Sensor, rain-, 12 V=	63	E55XX	Transponder key for M126N Glas	60
B104	Ship siren, 6...12 V=	15	TK55XX	Transponder key for M126N Plast	60
B120	Ship super diesel, 6...12 V=	17	L001	Tweeter, cap-, piezo-spherical-, with flare	67
B188	Signal horn, mini-, 6...12 V=	25	P5123	Tweeter for M094, mini-piezoelectric	67
B187	Signal-injector (test signal generator), 6...12 V=	25	L003	Tweeter, piezo-	67
M137	Signal lamp green, LED-, 12 V=	61	B123	Twilight switch- / light barrier- / heat switch- / combination kit, 12 V=	17
M136	Signal lamp red, LED-, 12 V=	61			
M138	Signal lamp yellow, LED-, 12 V=	61	M122	Twilight switch, 12 V=	59
B052	Siren, destroyer, 6...12 V=	7	M013	Twilight switch, 210...240 V~	39
B035	Siren, FBI-, 12 V= 15 W	4	B056	Twilight switch, 230 V~	8
B091	Siren, Kojak-, 12 V=, 15 W	12	FG009	Twin flasher lamp, 230 V~	65
B077	Siren, martin-, German police siren, 12 V=	10		<b>U</b>	
B104	Siren, ship-, 6...12 V=	15	B179	Ultrasonic dog whistle, 9 V=	23
M103	Slave, master-, 230 V~	53	M048	Ultrasonic generator, 12...15 V=	45
M119	Slave, master-, 6...30 V DC	58	FG015	Ultrasonic generator, high power-,	66
L006	Small loudspeaker	67	M161	Ultrasonic power cannon, 12...14,4 V	64
B217	Smoke alarm, 12 V=	32	B214	Ultrasonic proximity sensor, 9...12 V=	32
M139	Solar cell	61	M071N	Ultrasonic vermin repellent, 12 V=	48
M149	Solar charging controller, 12 V=, 5 A	63	L002	Ultrasonic wall loudspeaker	67
M043	Solar discharge protection module	43	B101	Universal alarm system, 12 V=	14
B242	Solar mole and vole repellent, 2,5...4,5 V=	36	M032	Universal amplifier, 12 W	42
P046	Solar motor for M139	62	M033	Universal amplifier, 18 W	42
M026	Solar power converter, 0,9...10 V	41	M031N	Universal amplifier, 3,5 W	41
B134	Sound controller, mono-, 9...18 V	20	M060	Universal car noise filter, 48 V	46
B041	Sound generator morse-practice-set, 3...9 V	6	B079	Universal Ni-Cd-accumulator	11
B036	Space siren, 12 V=, 15 W	5	M040	Universal preamplifier, 9...24 V=	43
B099	Special antenna amplifier, 30...850 MHz, 9...12 V=	14	B025	U-Stroboscope, 230 V~	4
B180	Speed control for mini-drilling machines, 12...24 V	23		<b>V</b>	
B223	Spotlight, infrared-, for CCD-cameras, 12...14 V=	33	B243	Vermin and marten repellent, 12...16 V=	36
M120	Spotlight, infrared-, for CCD-cameras, 12...15 V=	59	M071N	Vermin repellent, ultrasonic-, 12 V=	48
B232	Stopwatch, infrared-,	34	B242	Vole and mole repellent, solar-, 2,5...4,5 V	36
B051	Spirits tester - gas sensor, 12 V=	7	M029	Voltage converter, in: 6...14 V=, out: 11...26 V=	41
B207	Steamer noise with steam whistle+steam bell, 4,5...6 V=	30	M044	Voltage converter, fluorescent lamp-,	44
B211	Stepper motor-control, 6...12 V=	31	B038	Voltage converter from 12 V= > 220 V~	5
M110	Stepper motor-driver 6 pin	55	M020	Voltage transformer from 24 V= > 12 V=	40
M106	Stepper motor-interface 4 pin	54	B065	Voltage transformer, in 6...12 V= out 12...30 V=	9
M109	Stepper motor-interface 6 pin	55	B060	Voltage transformer, fluorescent lamp-, 12 V=	8
B122	Stereo amplifier, 2 x 2,5 Watt, 6...12 V=	17	M084	Voltage protection, telephone-,	51
M055	Stereo amplifier, 3 W	45	B111	VU-Meter, LED-, 11 LED's	16
B114	Stereo amplifier, 2 x 8 W, 6...15 V=	16	B160	VU-Meter, LED-, 30 LED's	22
B127	Stereo decoder, 4,5...12 V=	18		<b>W</b>	
B124	Stereo LED-volume indicator 2 x 11 LED's, 12 V=	18	B070	Water detector, 6...9 V=	9
B131	Stereo mixer unit, 6...12 V=	19	M158	Water detector, 9...12 V=	64
B110	Stereo tone control, 9...18 V=	16	B192	Water level sensor, 9 V=	26
B069	Stethoscope, listening-, 9 V=	9	L002	Wall loudspeaker, ultrasonic-,	67
M112	Stop-watch for PC with infrared light barrier	57	B239	Wheel of fortune, electronic, 9...12 V=	35
B232	Stopwatch, infrared-,	34			
B025	Stroboscope, U-, 230 V~	4			
M068-5	Substitutional cards for M068 electronic card switch (5 pieces)	48			
M124	Sweller, light-, 12 V=, max. 24 W	59			
B193	Switch, sensor, 9 V=	26			
B080	Switch, clap-, 12 V=	11			
M144	Switch-lock control, impulse-, 12 V= (11,5...15 V)	62			
B004	Switch, noise-, /telephone-two-call device, 9 V=	1			
B048	Switch, temperature-, 12 V=	6			
B042	Switch, time-, (short) approx. 2 sec. to 5 min., 12 V=	6			
M113N	Switch, time-, 12...15 V=, 2 sec. to 10 (~30) min.	57			
M122	Switch, twilight-, 12 V=	59			
M013	Switch, twilight-, 210...240 V~	39			
B056	Switch, twilight-, 230 V~	8			
	<b>T</b>				
B004	Telephone-two-call device, 9 V= / noise switch	1			
M084	Telephone voltage protection	51			
B048	Temperature switch, 12 V=	6			
FG014	Tester, marten repellent-,	66			

## 1. Amplifier and similar

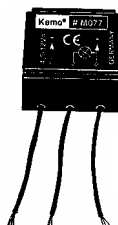
No.	Article	Page
B069	Listening stethoscope, 9 V=	9
B073	Pre-Amplifier universal, 12...30 V=	10
B075	Amplifier, 12 W	10
B085	Parabolic-microphone, 9 V=	11
B086	Amplifier, 80 Watt	11
B090	Microphone preamplifier	12
B099	Special antenna amplifier, 30...850 MHz	14
B110	Stereo tone control, 9...18 V=	16
B114	Stereo amplifier, 2 x 8 W, 6...15 V=	16
B115	Amplifier, 8 W	16
B122	Stereo amplifier, 6...12 V=	17
B125	Amplifier, 200 W	18
B131	Stereo mixer unit, 6...12 V=	19
B134	Mono sound controller, 9...18 V=	20
B182	Amplifier, 1 W	24
B199	Antenna amplifier, 50...1000 MHz	28
M016	Loudspeaker separating filter, 3-way, max. 120 W	40
M031N	Universal amplifier, 3,5 W	41
M032	Universal amplifier, 12 W	42
M033	Universal amplifier, 18 W	42
M034	Power amplifier, 40 W	42
M040	Universal preamplifier, 9...24 V=	43
M045	Cross-over network, 3-ways, max. 120 W	44
M046	Cross-over network, 2-way, max. 120 W, 4...8 Ohm	44
M055	Stereo amplifier, 3 W	45



B199

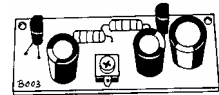
## 2. Power supply and similar

No.	Article	Page
B079	Universal Ni-Cd-accumulator	11
B102	Power supply, approx. 1,2...30 V, max. 2 A	14
B126	Power supply, approx. 1,2...30 V, 5 A	18
B184	Power supply, 0...12 V=, max. 0,8 A	24
B203	Power supply, approx. 1,2...18 V, max. 10 A	29
M039	Power supply, approx. 1,2...30 V=, 2 A	43
M057	Accumulator charging module, automatic	46



M077

## 3. Flasher, running light and similar



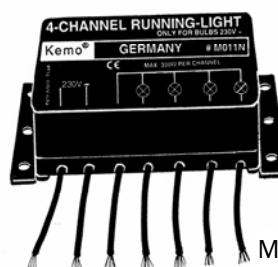
B003

No.	Article	Page
B003	Alternating flasher for 2 small lamps, 4,5...16 V=	1
B009	Mini running light, 9...12 V=	2
B022	6-Channel lighting console	3
B023	3-Channel running light, 230 V~	4
B025	U-Stroboscope, 230 V~	4
B033	Microphone music light, 3-Channel, 230~...240 V~ + 12 V=	4
B088	Mini traffic light	12
B089	10-Channel running light, 230 V~ + 9 V=	12
B092	LED-alternating flasher, 6...12 V=	13
B097	4-Channel running light, 230 V~ + 12 V=	13
B108	Atomium, 9 V=	15
B111	LED-VU-Meter, 11 LED's	16
B124	Stereo LED-volume indicator, 2 x 11 LED's	18
B128	3-Channel running light, 6...24 V=	19
B130	LED-Recording level indication, 5 LED's	19
B155	LED volt- and ammeter, 12 V=	21
B160	Electronic dog barking, 9 V=	22
B174	LED-VU-Meter, 30 LED's	22
B174	3-Channel microphone music light for halogen lamps, 12 V~	23
B185	Flasher, 6...12 V=, max. 100 mA	24
B186	Jumbo LED-flasher, 6...12 V=	25
B201	Running light, 10 channels, 12 V=	28
B202	LED running light -10 channels,	29
B204	Flash-LED, 230 V~	29
B209	LED series printed circuit board, 230 V~	30
B235	Christmas tree, 9 V=	35
FG008N	Flasher, slow, 230 V~, max. 300 W	65
FG009	Twin flasher lamp, 230 V~	65
FG010	3-Channel running light, 230 V~	65
FG011	Alarm flasher, 230 V~	66
M007	3-Channel music light	38
M008	Flasher, 230 V~	38
M009	Light flasher, 230 V~	38
M010	Alternating flasher, 230 V~, 2 x 500 W at maximum	38
M011N	4-Channel running light, 230 V~	39
M065	Halogen music light for 12V~ lamps	47
M077	Flasher, 5...12 V=, 1 A	50
M079	Flasher / alternating flasher for 1 to 10 LED's at maximum	50
M080	Flasher / alternating flasher for small glow lamps, 6...12 V=	50
M082	DC-Flasher, 12...24 V=, max. 8 A	50
M114N	Flasher, slow, 230 V~/110 V~	57

FG008N



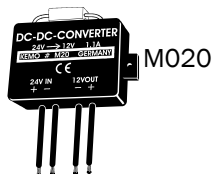
M114N



M011N

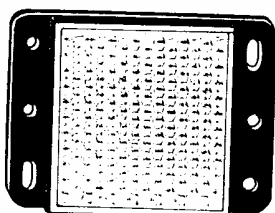
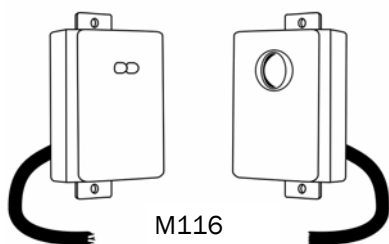
## 4. Voltage-transformer and similar

No.	Article	Page
B007	Electrostat apparatus, 3...4,5 V=	2
B038	Voltage converter from 12 V= > 220 V~	5
B060	Fluorescent lamp voltage transformer, 12 V=	8
B065	Voltage transformer, in 6...12 V= out 12...30 V=	9
B152	Electronic fence appliance, 6 V=	21
M015N	Potential transformer, max. 1,5 A	40
M020	Voltage-transformer from 24 V > 12 V=	40
M026	Solar power converter, 0,9...10 V	41
M029	Voltage converter, 6...14 V=, 11...26 V=	41
M038	Converter from 24 V= > 12 V=, max. 3 A	42
M044	Fluorescent lamp voltage converter	44
M062	Mini-fence-high-voltage-generator, 9...12 V=	47



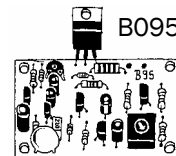
## 5. Receiver, transmitter and similar

No.	Article	Page
B013	IC-Radio HF-MF-LF	2
B014	27 MHz transmitter, 6 W	3
B018	FM-Oscillator, 2 W	3
B100	FM-Receiver, 9 V=	14
B119	Converter, approx. 100...200 MHz	17
B156	FM-Receiver, 9 V=, 108...132 MHz	21
B241	10-Channel infrared remote control	36
M128	HF-Detector (Mini-spy-finder)	60
M143	FM Test transmitter, 9 V=	62



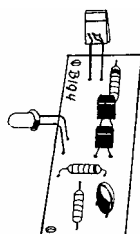
## 6. Sirens, sound generator and similar

No.	Article	Page
B005	Mosquito banisher, flea and tick banisher	1
B015	Fog horn, 5 W, 4,5...12 V=	3
B035	FBI siren, 12 V= 15 W	4
B036	Space siren, 12 V=, 15 W	5
B041	Sound generator morse-practice-set, 3...9 V=	6
B052	Destroyer siren, 6...12 V=	7
B077	Martin siren, 12 V=, 15 W	10
B091	Kojak siren, 12 V=, 15 W	12
B095	Marine diesel, 12 V=	13
B104	Ship siren, 6...12 V=	15
B120	Ship super diesel, 6...12 V=	17
B145	Electronic melody "It's a small world", 3 V=	20
B146	Electronic melody "Coo Coo Waltz", 3 V=	21
B155	Electronic dog barking, 9 V=	21
B162	Continuity tester with piezo buzzer, 9 V=	22
B164	3-Tone gong, 9 V=	22
B179	Ultrasonic dog whistle, 9 V=	23
B187	Signal-injector (test signal generator)	25
B188	Mini signal horn, 6...12 V=	25
B189	Anti-flea-generator for the cat- and dog-basket	25
B207	Steamer noise with steam whistle + steam bell	30
B214	Ultrasonic proximity sensor, 9...12 V=	32
B237	6-Melody generator, 3...4,5 V=	35
B242	Solar mole and vole repellent, 2,5...4,5 V=	36
B243	Marten and vermin repellent, 12 V=	36
M048	Ultrasonic generator, 12...15 V=	45
M067	Electronic dog barking, 9...12 V=	47
M069	Electronic underground rodent pest repeller	48
M071N	Ultrasonic vermin repellent, 12 V=	48
M094	Marten-repeller, 12...15 V=	52
M100N	Anti marten devices for motor vehicles	52
M141	Melody generator, 5 W	62
FG015	High power ultrasonic generator	66

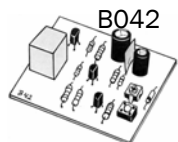


## 7. Light barriers and similar

No.	Article	Page
B045	Light barrier, 12 V=	6
B062	Infrared light barrier - range over 18 m	8
B123	Combination kit: Light barrier heat switch - twilight switch, 12 V=	17
B194	Light barrier, 6...12 V=	27
B213	Infrared light barrier, max. 50 m	31
B215	Mini-infrared light barrier, 10 cm	32
B216N	Infrared light barrier, 5 m	32
B232	Infrared stopwatch	34
B232Z	Additional light barrier for infrared stopwatch	34
M116	Infrared light barrier, approx. 30 m	58
M135	Light barrier, 4 m	61
K002	Reflector mirror	74



8. Timer, precision timer, universal interval switch and similar



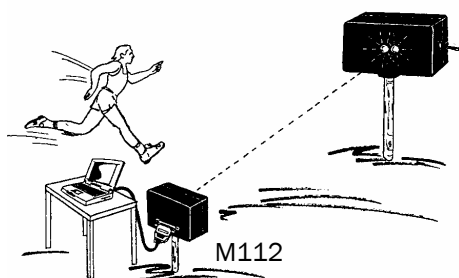
No.	Article	Page
B042	Time switch (short), approx. 2 sec. 5 min.	6
B098	Interval switch, 9...15 V=	13
B133	Precision timer, 12 V=	19
B191	Mini timer, 9 V=	26
M019	Automatic light switch, 230 V ~	40
M113N	Time switch, 12...15 V=, 2 sec.-10 (~30) min.	57
M152	Rain sensor, 12 V=	63

9. Universal alarm systems and similar

No.	Article	Page
A002	Alarm contact construction, brown	75
A003	Alarm contact for embedding, brown	75
A004	Alarm contact construction, white	75
B070	Water detector, 6...9 V=	9
B101	Universal alarm system, 12 V=	14
B190	Mini alarm system, 9...12 V=	26
B198	Alarm display, 9...12 V=	28
B214	Ultrasonic proximity sensor, 9...12 V=	32
M061	Alarm monitor	46
M073	Motorbike alarm	49
M117	Alarm module for computers, alarm for house and home, for connection to a computer	58

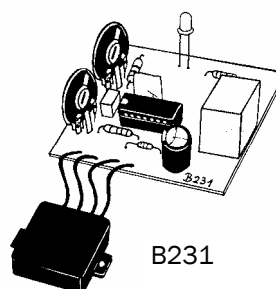
10. Modules and kits for computer and similar

No.	Article	Page
B210	8-Channel-relay board	30
B240	Computer laser show	35
M104	4-Channel computer switch	54
M106	Stepper motor-interface 4 pin	54
M107	DC-Motor-interface	54
M108	4-fold Interface switch	55
M109	Stepper-motor-interface 6 pin	55
M112	Stop-watch for PC with infrared light barrier	57
M117	Alarm module for computers, alarm for house and home, for connection to a computer	58
M125	Relay module, 8-channel	59



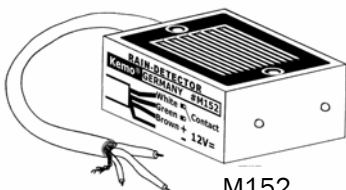
11. Diverse kits, modules and devices

No.	Article	Page
B004	Noise switch / telephone-two-call device	1
B011	Sensor touch switch, 12 V=	2
B037	Sensor number lock, 12 V=	5
B048	Temperature switch, 12 V=	6
B049	Power control, 2600 VA 230 V~	7
B051	Gas sensor - Spirits tester, 12 V=	7
B055	Metal searching device, 9 V=	7
B056	Twilight switch, 230 V~	8
B063	Digital number lock, 6 V	9
B071	Dimmer, 12...24 V=, -10/30 A speed regulator	10
B078	Magnetizer, 12 V=	10
B080	Clap switch, 12 V=	11
B081	Deftness game, 9...12 V=	11
B093	Electronic die, 6 V	13
B107	Robot voice, 9...12 V=	15
B116	Battery guard, 3...15 V=	16
B123	Combination kit: light barrier / heat switch / twilight switch, 12 V=	17
B127	Stereo decoder, 4,5...12 V=	18
B136	Electronic acupuncture, 3...6 V	20
B137N	Ion generator, 12 V=	20
B172	The little electro-technician	22
B180	Speed control for mini-drilling machines, 12...24 V	23
B181	Paralyser 10.000 V, self defense	24
B192	Water level sensor, 9 V=	26
B193	Sensor switch, 9 V=	26
B195	Infrared detector, 9 V=	27
B196	Field-intensity indicator, 9 V=	27
B197	Relay card, 12 V=	27
B200	Luminous letters, 12 V	28
B206	Luminous letter control, 12...15 V=	29
B208	LED digital voltmeter, 4,5...5,5 V=	30
B211	Stepper motor-control, 6...12 V=	31
B212	Decalcifier against calcification, 9...12 V=	31
B217	Smoke alarm, 12 V=	32
B221	Neon decoration picture, 12 V=	33
B223	Infrared spotlight for CCD-cameras, 12...14 V=	33
B224	Laser show, 6 V=	33
L005	Laser module for B224, B240 + M133	33
B229	Clean-air measuring device, 12 V=	34
B231	Electronic key, 12 V=	34
B233	LED Emergency light, 6...15 V=/~	35
B239	Electronic wheel of fortune, 9...12 V=	35
B241	10-Channel infrared remote control, 12 V=	36



## 11. Diverse kits and modules

No.	Article	Page
FG014	Marten Repellent Tester	66
M012	Motor and lamp control, 240 V~/110 V~	39
M013	Twilight switch, 210...240 V~	39
M028	Output regulator, 110...240 V~, 2600 VA	41
M041	Noise filter	43
M043	Solar discharge protection module	43
M050	Transformer control, 230 V~	45
M051	Lightning arrester	45
M057	Accumulator charging module, automatic	46
M058N	Microwave leakage tester, 9 V=	46
M060	Universal car noise filter, 48 V	46
M063	Dimmer, 12V~ 50 W (or 24...48 V~)	47
M067	Electronic dog barking, 9...12 V=	47
M068	Electronic card switch 9 V=	48
M068-5	Substitutional cards for M068 electronic card switch (5 pieces)	48
M083	Accu-charging regulator, 12 V=	51
M084	Telephone voltage protection	51
M085	Infrared detector	51
M087	LED tester	51
M091	Phase coupler for wireless intercom	52
M101	Decalcifier against calcification <u>with power supply</u>	52
M101A	Decalcifier against calcification <u>without power supply</u>	53
M102	Second accumulator charger, 6...24 V	53
M103	Master-slave, 230 V~	53
M110	Stepper motor-driver, 6 pin	55
M111	Marten shock for motor vehicles	57
M115N	Marten defence for motor vehicles, 12...15 V=	58
M119	Master-slave, 6...30 V DC	58
M120	Infrared spotlight, 12...15 V= for CCD-cameras	59
M121	CCD-camera-dummy	59
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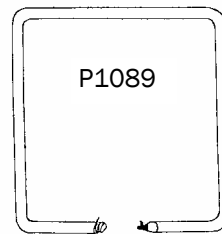


M152

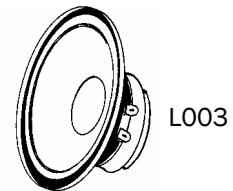
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## 13. Accessories

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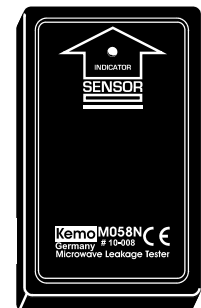
P1089



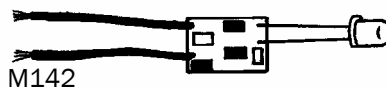
L003



FG014



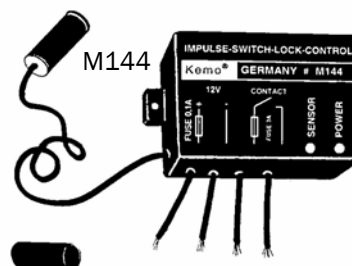
M058N



M142



M149

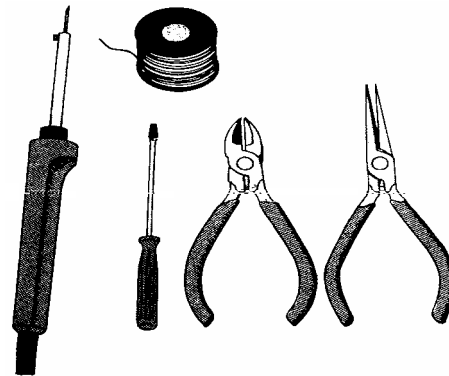


M144

## Necessary set of tools:

In order to mount any kit it is necessary to be provided with the following minimum equipment:

- 1 One electronic soldering iron with a pointed tip and with a power of approx. 15...30 Watt. For best results we recommend to use the so-called "soldering terminal" with temperature-controlled soldering iron, as e.g. offered by the companies Weller, Ersa, etc. Of course, this is more of a professional disposing of the necessary money, but for beginners there is solely necessary the already mentioned ordinary soldering iron with 15...30 Watt.
- 2 Soldering tin. It is advisable to work only with electronic resin-core solder with a tin-lead proportion of 60:40 or 63:37! Do not use plumber soldering iron! It is also forbidden to use acidiferous soldering flux because it would damage the sensitive boards.
- 3 One pair of small side cutters or wire cutters.
- 4 One pair of small long-nose pliers.
- 5 One small screwdriver with approx. 6 mm tip.



## Putting into operation

After having equipped and soldered completely the printed board according to the mounting instructions, it is advisable as a precaution to check once more, if nevertheless a mistake has been slipped while mounting the kits. Not until after this check-up, operating voltage should be switched on. In regard to the operating voltage, there are some facts to be considered: Unless otherwise is indicated, the kits are operated exclusively with direct current. Who can afford it, may work with an adjustable laboratory power supply which presents no difficulties because it is feasible to adjust steplessly the desired voltage. Furthermore, it is possible to operate the kits with batteries. Doing so, it is of very great importance that the applied batteries have enough power. In the mounting instructions of the kits we have stressed this fact. It is not only necessary that voltage is adequate but also the maximum available output of the battery. A device that e. g. shows approx. 1 Ampere current supply, cannot be operated through a small mini-battery with approx. 0,01 A! Even if voltage does coincide. The required batteries are indicated in those kits where there is an increased current supply. On market can be found small switchable plug-in power supplies. They can be bought at moderate prices and are suitable for a great number of kits. Although, they show often the disadvantage of having during no-load condition a considerably higher output voltage as indicated. This fact may lead sensitive kits to the destruction of the whole kit. In our laboratories we have tested some power supplies and detected that while on "position 12 V" there can be a power output of 20 V! In case you aren't provided with a voltmeter in order to control voltage, then we recommend to have your plug-in power supply at your dealer measured, so that you are able to mark correspondingly the change-over device. These power supplies, which are normally switchable from 3...12 V, are apart from that especially suitable for the kits.

When connecting loudspeakers, so far these are mentioned in the kits, it is important to consider the following facts: Loudspeakers should be fitted at any circumstances into a housing because consequently sound and volume will become considerably better. Each loudspeaker requires the housing as "resonance body". The loudspeaker will, however, operate if it has been connected loose at the workshop-desk but not that well.

Some kits, e.g. power supply-kits, have component parts which have to be cooled. In this connection it has to be observed that the cooling element has not been chosen smaller as indicated in the description, and that the component part to be cooled has been fixed firmly and plane (for great heat abstraction) onto the cooling element. The kits should never, even for a short instance, be operated without cooling element if a cooling element is required.

With operating voltages of more than 41 V, it is necessary to observe the VDE-safety regulations. This is the matter with e. g. music lights, flashers, etc. which are operated with 230 V~ mains voltage. Among others it has always strictly to be observed, that parts carrying voltage cannot be touched: In order of putting into operation such kind of devices, it is advisable to ask for an expert.

