

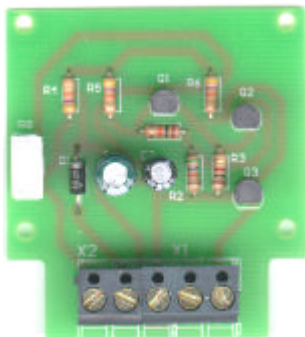
Minitimer MT-2

Einschaltverzögerung

Delayed switching

Temporisateur

Inschakelvertraging



Art.-Nr. 21-001-030

Art.-Nr. 22-001-030

■ **Anleitung**

■ **Manual**

■ **Mode d'emploi**

■ **Handleiding**



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(Pages I to III in the centre of this handbook are removeable)

How to use this manual

If you have no specialist technical training, this manual gives step-by-step instructions for safe and correct assembly of the kit or fitting of ready-built modules, and operation. Before you start, we advise you to read the whole manual, particularly the chapter on safety instructions and the FAQ chapter. You will then know where to take care and how to prevent mistakes which take a lot of effort to correct.

Keep this manual safely so that you can solve problems in the future. If you pass the kit on to another person, please pass on the manual with it.

Intended use

The kit or the ready-built module can be assembled or fitted using this manual. The ready-built module is designed for use in model railways to switch connected devices on with a time delay, e.g. for realistic acceleration of an engine after a signal switches over.

The kit and the ready-built module are not suitable for children under the age of 14.

Reading, understanding and following the instructions in this manual are mandatory for the user.

Any other use of the kit is inappropriate and invalidates any guarantees.

Safety instructions

Mechanical hazards

Cut wires can have sharp ends and can cause serious injuries. Watch out for sharp edges when you pick up the PCB.

Visibly damaged parts can cause unpredictable danger. Do not use damaged parts: recycle and replace them with new ones.

Electrical hazards

- Do not touch powered, live components.
- Do not touch conducting components which are live due to malfunction.
- Avoid short circuits.
- Do not connect the circuit to a higher voltage than designed.
- Impermissibly high humidity.
- Condensation building up can cause serious injury due to electrical shock.

Take the following precautions to prevent this danger:

- Never perform wiring on a powered module.
- Only use low power for this module as described in this manual and only use certified transformers.
- Connect transformers and soldering stations only in approved mains sockets installed by an authorised electrician.
- Observe cable diameter requirements.
- Assembling the kit should only be done in closed, clean, dry rooms. Beware of humidity.
- If the humidity in the room is too high, please do not start working until after a minimum of 2 hours of acclimatisation.
- Use only original spare parts if you have to repair the kit or the ready-built module.

Fire risk

Touching flammable material with a hot soldering iron can cause life-threatening fire, burns and toxic smoke. Connect your soldering iron or soldering station only when actually needed. Use the correct soldering iron or station and never leave a hot soldering iron or station unattended.

Thermal danger

A hot soldering iron or liquid solder accidentally touching your skin can cause skin burns. As a precaution:

- use a heat-resistant mat during soldering,
- always put the hot soldering iron in the soldering iron stand,
- point the soldering iron tip carefully when soldering, and
- remove liquid solder with a thick wet rag or wet sponge.

Dangerous environments

A working area that is too small or cramped is unsuitable and can cause accidents, fires and injury. Prevent this by working in a clean, dry room with enough freedom of movement.

Other dangers

Children can cause any of the accidents mentioned above because they are inattentive and not responsible enough. Children under the age of 14 should not be allowed to work with this kit or the ready-built module.

Little children can swallow small components with sharp edges. Life threatening! Do not allow components to reach small children.

In schools, training centres, clubs and workshops, assembly must be supervised by qualified personnel.

In industrial institutions, health and safety regulations applying to electronic work must be adhered to.

EMC declaration

This product is developed in accordance with the European standards EN 55014 and EN 50082-1, tested corresponding to the EC - directive 89/336/EWG (EMVG of 09/11/1992, electromagnetic tolerance) and meets legal requirements.

To guarantee the electromagnetic tolerance you must take the following precautions:

- Connect the transformer only to an approved mains socket installed by an authorised electrician.
- Make no changes to the original parts and accurately follow the instructions, circuit diagram and PCB layout included with this manual.
- Use only original spare parts if you have to repair the kit or the ready-built module.

Operation overview

If the input of the module is connected to ground, the output stays open for the selected time (between 0 and 25 seconds). The connected device is consequently not powered. When the selected time is over the output switches to ground and the connected device is powered. About one second after the disconnection of the input, the output is also disconnected.

If the selected time is longer than the duration of the connection of the input with ground, the output remains open. In this case the connected device is not supplied with voltage.

Checking the package contents

Check the contents of the package for completeness:

- 1 kit, containing the components listed in the parts list, or 1 ready-built module.
- 1 manual.

Choosing a power supply

The module is designed for connection to a model railway power source, i.e. 10-18 Volt direct (d.c.) or alternating (a.c.) voltage.

Technical specifications

Supply voltage	12-18 Volt a.c. or d.c. voltage
Current consumption (without connected devices)	ca. 5 mA
Max. current loading	100 mA
Protected to	IP 00
Ambient temperature in use	0 - + 60° C
Ambient temperature in storage	-10 - + 80° C
Comparative humidity allowed	max. 85 %
Dimensions	ca. 48 x 52 mm
Weight	ca. 17 g

Required tools and consumables

Make sure you have the following tools, equipment and materials ready for use:

- a heat-resistant mat
- a soldering iron stand with tip-cleaning sponge
- a small side cutter and wire stripper
- a pair of tweezers and long nose pliers (not necessary for the ready-built module)
- an electronic soldering iron (max. 30 Watt) with a fine tip
- tin solder (0,5 mm. diameter)
- wire (diameter: $\geq 0,22 \text{ mm}^2$ for all connections)

Safe and correct soldering



Caution:

Incorrect soldering can cause fires (through excessive heat). Avoid this danger by reading the chapter **Safety instructions** again and following the directions given.

If you have had training in soldering you can skip this chapter.

- When soldering electronic circuits never use soldering-water or soldering grease. They contain acids that can corrode components and copper tracks.
- Only use tin solder SN 60 Pb (i.e. 60 % tin, 40 % lead) with rosin-based flux.
- Solder fast: long soldering can destroy components and copper tracks, and damages through plated holes.
- Use a small soldering iron with max. 30 Watt. Keep the soldering tip clean so the heat of the soldering iron is applied to the solder point effectively.
- Observe correct polarity orientation of semi-conductors, LEDs electrolytic capacitors and integrated circuits before soldering and ensure that the solder time does not exceed 5 seconds, otherwise components can be damaged.
- Apply the soldering tip to the soldering spot in such a way that the part and the soldering spot are heated at the same time. Simultaneously add solder (not too much). As soon as the solder becomes liquid take it away. Hold the soldering tip at the spot for a few seconds so that the tin solder finds its way, then remove the soldering iron.
- Do not move the component for about 5 seconds after soldering. A glossy and perfect soldering spot should remain.
- To make a good soldering joint you must use a clean and unoxidised soldering tip. Clean the soldering tip with a damp piece of cloth, a damp sponge or a piece of silicon cloth.
- Cut the wires after soldering directly above the PCB solder side with a side cutter.
- After placing the parts, please double check for correct polarity. Check the PCB tracks for solder bridges, short circuits created by accident. This would cause faulty operation or, in the worst case, damage. You can remove excess solder by putting a clean soldering tip on the spot. The solder will become liquid again and flow from the soldering spot to the soldering tip.

Assembling the kit

You can skip this part if you have a ready-built module.

Preparation

Put the sorted components in front of you on your workbench. An explanation of the separate electronic components follows:

Resistors



A resistor will "brake" the current. Mounting orientation is of no importance. Because resistors are very small there is no readable information on them, but their value is given with colour rings.

Key:

Value	Colour ring
1 k Ω	brown - black - red (gold)
5,6 k Ω	green - blue - red (gold)
10 k Ω	brown - black - orange (gold)
47 k Ω	yellow - violet - orange (gold)

The colour ring in brackets indicates the tolerance of the resistor and is of no importance here.

Adjustable resistors (Trim pots)



Adjustable resistors are a special kind of resistor, built symmetric. Their orientation is easy to recognise because of their off-centre connection. Their value is easily adjusted with a screwdriver to meet particular requirements.

Capacitors



There is a difference between "normal" capacitors and electrolytic capacitors which have to be placed in a certain direction. They have a very bright line at one end marked with

the minus (-) sign. That end must always be connected to minus.

Diodes



Diodes allow current to flow in one direction only and have to be placed in that direction. The characteristic for a diode is the ring at one end. Place them as drawn in the PCB layout.

Transistors



Transistors are in fact power switches. They have three wires and a flat part on the body. They also have to be placed in a certain direction. The PCB layout will help you to place the transistor. In the layout, the flat part of the transistor is shown.

Terminal strips

Terminal strips are solder-in screw-type terminals. They provide a solder-free and safe connection of the cables to the circuit.

Assembling the kit

Start the assembly with the resistors and the diode. First solder the components on the solder side of the PCB and then cut the excess wires with the side cutter as short as possible. Next solder the transistors, the trimm-pot and finally the capacitors and the terminal strips.



Caution:

Electrolytic capacitors, transistors and diodes must be placed in the right direction! If you solder them the wrong way the affected parts can be damaged when you connect the power. In the worst case the whole circuit can be damaged. In any case, a wrongly connected part will not function.

Performing a visual check

Even if you have a ready-built module you must perform a visual check that screws, plugs and other fasteners are firm and tight to exclude transport damage.

Caution:

Do not power up the module yet.

Damaged material and/or incorrect handling of parts can always be a danger. After assembling the kit, perform a visual inspection.

Check all nuts, pins and connections as well as the mechanical connections for correct assembly.

Remove all loose parts, wire ends or drops of solder from the PCB. Remove all sharp wire ends.

Check solder spots that are too close to each other for short circuits. Check that all components are polarised correctly. When you have taken all these precautions, go on to the next part.

Functional test and connecting the mini-timer

If you have purchased a ready-built module, check all functions. Transport damage can never be excluded.

First turn the trimm pot R7 to the mid position. This selects a medium time delay.

Follow the connections diagram (fig. 3a). Check the functions of the module with a test lamp. Connect it between X1-1 and X1-2.

Then connect the module to the power supply (X2-2 und X2-3) and turn the power supply on. The lamp now lights for a certain time and goes off again.

**Caution:**

If a component gets too hot, disconnect the mini-timer and power supply from the mains **immediately**. Possible short circuit! Check the assembly!

The module is now ready for operation. Connect the input X2-1 to earth. When the selected time is over, the lamp starts to light. Disconnect the input X2-1 from earth, the lamp goes off about 1 second later.

After performing a successful functional test, disconnect power from the mini-timer. Disconnect the test-lamp from the module and install the module (see figure 3a). Proceed as described in the functional test.

Adjustment of the time delay

The length of the time delay is adjusted at the trimm pot R7. Depending on how the module is housed it might be convenient to adjust the time delay during the functional test using the test lamp.

Tip: If the maximum adjustable time delay is not sufficient, replace the capacitor C2 with a higher value capacitor.

Connection of a relay

If you connect a relay to the output, you must solder an additional diode (e.g. 1N4148) as anti-surge diode (see fig. 3b). If you do not, the module will be destroyed after switching it several times.

FAQ

- Parts are getting too hot and/or start to smoke.

**Disconnect the system from the mains immediately!**

Possible cause: one or more components are soldered incorrectly.

→ Perform a visual check.

- The lamp connected for the functional test of the module does not light.

Possible cause: The diode D1 is soldered in the wrong way.

→ Reverse D1!

Possible cause: The lamp is defective.

→ Check the lamp by connecting it directly to the voltage supply.

- The module does not switch.

Possible cause: The length of time the input is connected to ground is shorter than the selected time delay.

→ Reduce the time delay or lengthen the time the input is connected to ground.

If you cannot find the problem, please return the module for repair (address on the cover page).

Manufacturer's note

According to DIN VDE 0869, the person who builds this kit or brings the circuit into operation is the manufacturer of the product. If he sells the product to another person he is responsible for passing on all the relevant papers. Domestic appliances assembled from a kit are deemed industrial products and must comply with health and safety regulations.

Certification

This product conforms with the EC- directive 89/336/EEG on electromagnetic radiation and is therefore CE certified.

Conditional warranty

This product is guaranteed for two years. The warranty includes free repair if the problem is due to material failure or incorrect assembly of the ready-built module by us. Because we have no control over the assembly of the kit, we can only guarantee the quality of the components and the completeness of the kit.

Other claims are excluded. By law, we are not responsible for damages or secondary damages in connection with this product. We retain the right to repair, make improvements, supply spare parts or return the purchase price.

The following invalidate the warranty:

- using an unsuitable soldering iron, solder containing liquid acids or similar,
- if the kit is assembled and soldered poorly, or if damage is caused by not following the instructions in this manual or the circuit diagram,
- if the circuit has been altered and repair attempts have failed,
- if arbitrary changes in the circuit are made,
- if parts are stored incorrectly and if the wires to the switches, the power resistors, etc. are made incorrectly,
- if parts other than the original ones delivered with this kit are used,
- if the copper tracks or soldering points are damaged,
- if parts are placed incorrectly or the circuit is connected incorrectly,
- if damage occurs due to an overload of the circuit,
- if the wrong power or current is connected,
- if damaged by other persons,
- if damaged by the wrong use or abuse of the circuit,
- if parts are damaged due to static because they were touched before a discharge is performed.

Stückliste - Partslist

Nomenclature - Stuklijst

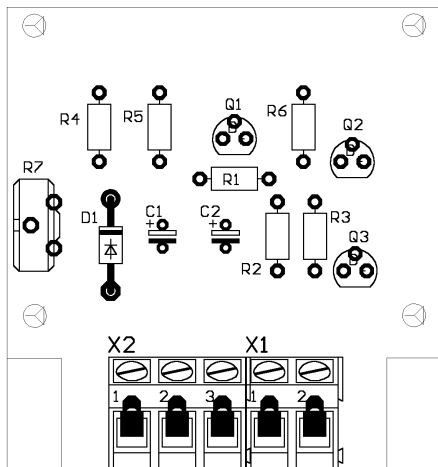
Kondensatoren - Condensers Condensateurs - Condensatoren	C1	100 μ F/25 V
	C2	220 μ F/10 V
Dioden - Diodes - Diodes - Diodes	D1	1N4002 *
Transistoren - Transistors	Q1, Q2	BC547B *
	Q3	BC557 *
Widerstände - Resistors Résistances - Weerstanden	R1	10 k Ω
	R2	5,6 k Ω
	R3	1 k Ω
	R4, R5, R6	47 k Ω
Trimpotis - Trim pots Potentiomètres - Trimpotmeter	R7	470 k Ω
Anreihklemmen - Terminal strips Borniers - Printkroonstenen	X1	2-pol.
	X2	3-pol.

* oder ähnlich - or similar - ou équivalent - of gelijkwaardig

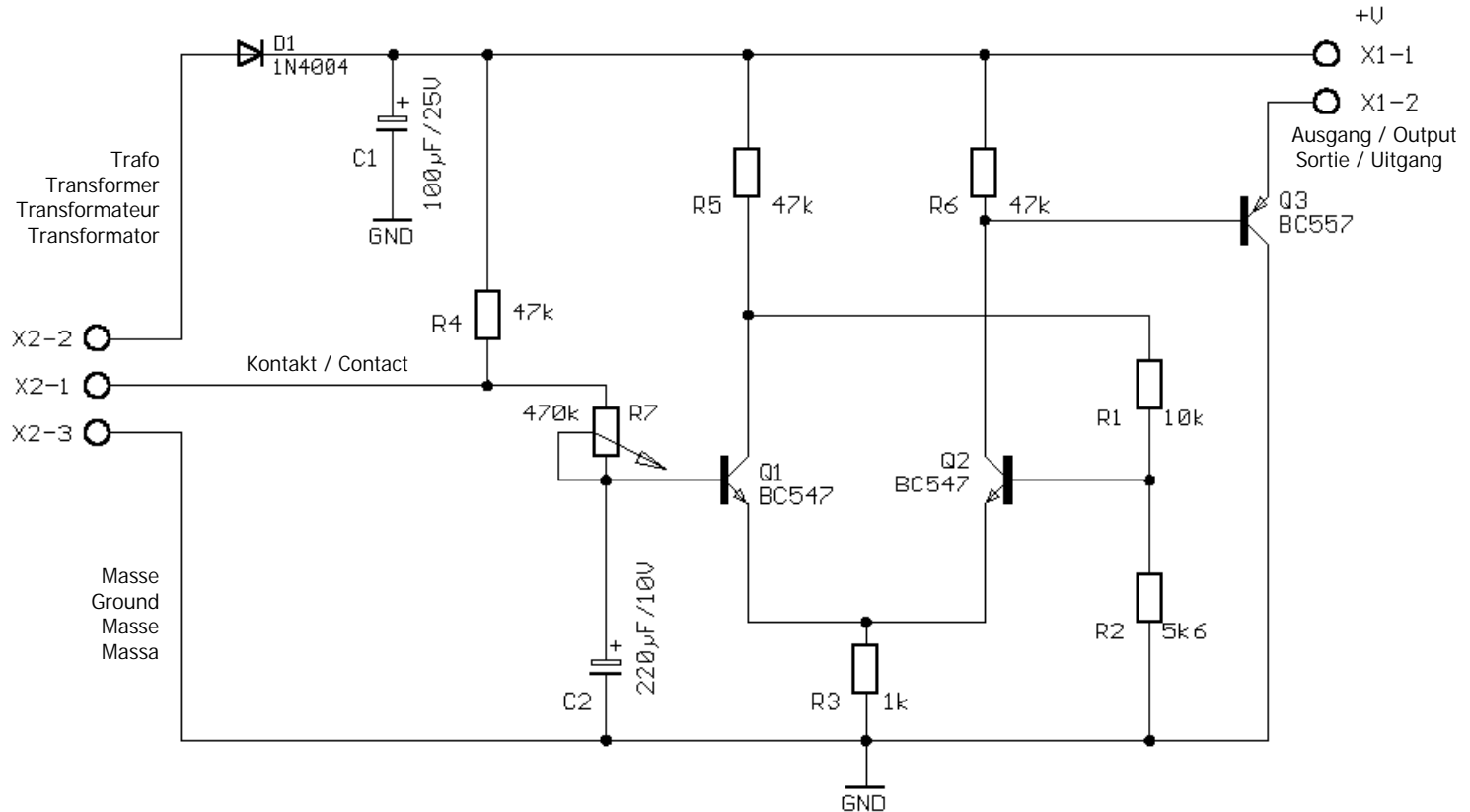
Bestückungsplan - PCB layout

Plan d'implantation - Printplan

■ ■ ■ Fig. 1



■ ■ ■ Fig. 2:
Schaltplan - Circuit diagram - Schéma de principe - Schakelschema



■ ■ ■ Fig. 3:
Anschlußplan - Connections - Plan de raccordement - Aansluit plan

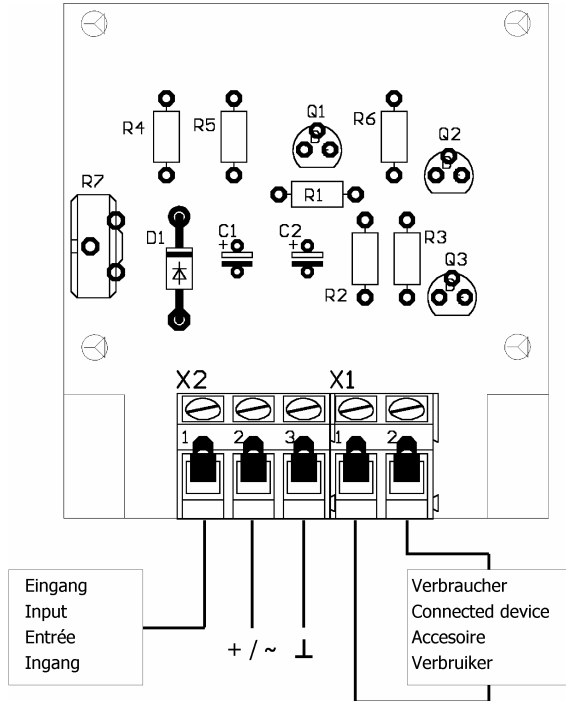


Fig. 3a:
Anschluß eines Verbrauchers
Connection of a device
Raccordement d'un accessoire
Aansluiten van een verbruiker

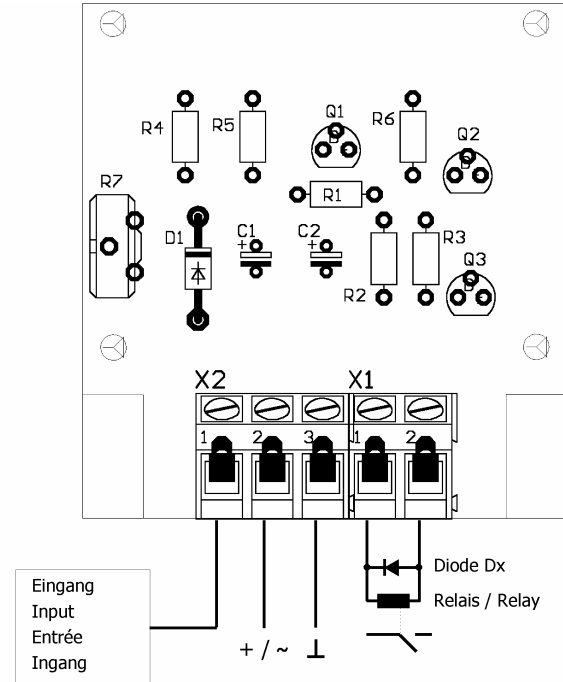


Fig. 3b:
Anschluß eines Relais
Connection of a relay
Raccordement d'un relais
Aansluiten van een relais

Aktuelle Informationen und Tipps:

Information and tips:

Informations et conseils:

Actuele informatie en tips:

<http://www.tams-online.de>

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