

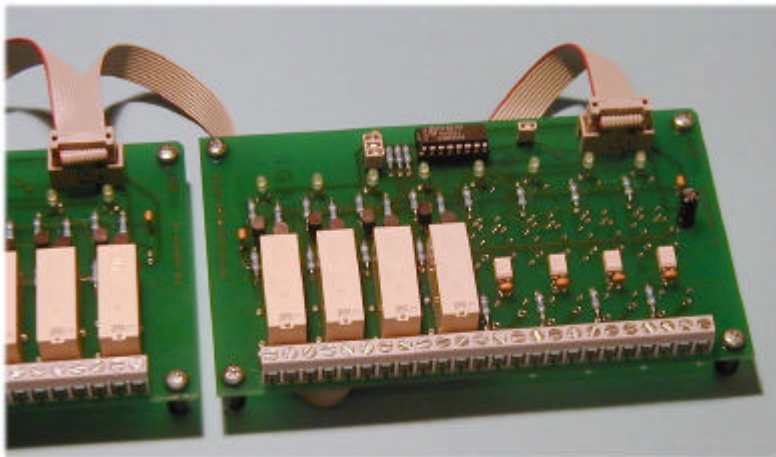
## The I<sup>2</sup>C-Bus

The I<sup>2</sup>C-Bus<sup>1</sup> is commonly known in industry. Because is convenient and easy to use, we developed a library for the  $\mu$ C/51. Many different parts may be connected to the I<sup>2</sup>C-Bus, as: E<sup>2</sup>Proms, Real-Time-Clocks, up to 128 I/O-ports, A/D-converters, ...

We developed a universal I/O board too, working with optical isolated inputs and relays for power output as well as a LC-Display. More boards will follow. Information about the display is given in a seperate folder. Here, the I/O board is described.

Other I<sup>2</sup>C-components (like E<sup>2</sup>Proms of different sizes (up to 64kB)) and Real-time-clocks are described in the folder MINI535.

## The Universal I/O board



*The univereal I/O board, here as a variant with 4 relays and 4 optical inputs*

### Features

- | Up to 16 boards on the same I<sup>2</sup>C-Bus
- | Relays: maximal 250V ~ / 8A per channel
- | Designed for industrial standard relays (Low Power)
- | Optical isolated inputs for up to 60 Volts (depends on used components)
- | I<sup>2</sup>C-bus and power supply by using only on 10p flat ribbon cable
- | One LED per channel

### **IMPORTANT SAFETY NOTE**

**Attention: if using higher voltages than 60 Volt, special care must be taken. Consider the EN- and DIN-recommendations!**

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<sup>1</sup>I<sup>2</sup>C-is a trademark of PHILIPS

## **Demo sourcecode**

This software will copy the 4 inputs of a board at address #64 to 4 outputs of the same board:

```
// *** I2C_REL.C ***
#include <stdio.h> // printf, ...
#include "i2c_ll.h" // I2C-Low-Level Handler
void main(void){
    uint erg; // Unsigned int.
    i2c_reset(); // From the I2C Library
    for(;;){
        erg=get_i2c_byte(64); // read #64
        if(erg>255) printf("R-ERROR: $%x\n",erg); // Oops???
        erg=set_i2c_byte(64,(erg<<4)|15); // Low-Nibble to high
        if(erg>255) printf("W-ERROR: $%x\n",erg);
    } // That's all...
}
```

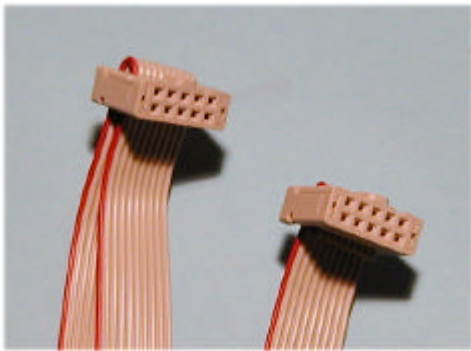
Note: If writing: write 1's to input pins.

## **Jumper / Address selection**

Each board has 3 jumpers (J1-J3), a closed jumper is '0'. With these, 8 addresses can be selected. There are two variants for the chip: PCF8574 and PCF8574A, they differ in their base address (PCF8574: #64, PCF8574A: #112). The jumper for the #INT-Signal should be left open. Use polling to read the boards.

## **Cable**

Use one long flat ribbon cable for the whole bus. Stripe 1 is RED.



The I<sup>2</sup>C-cable. The noses of the plugs are on the top.

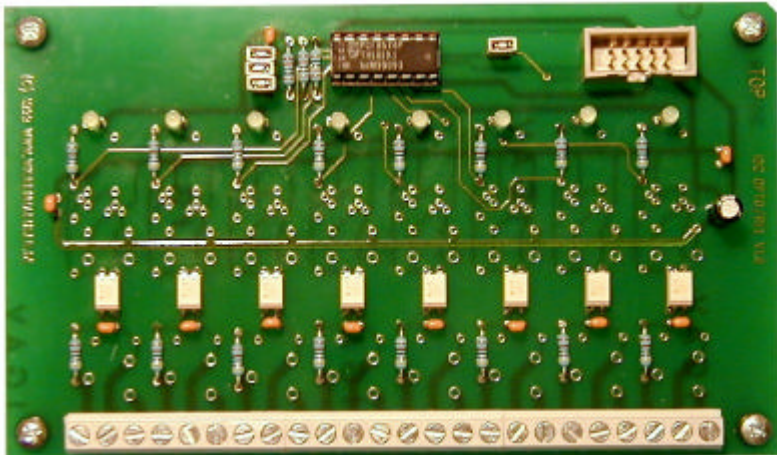
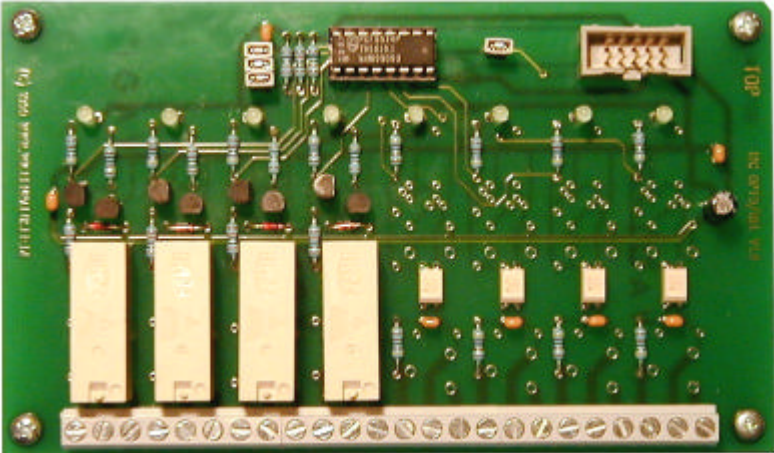
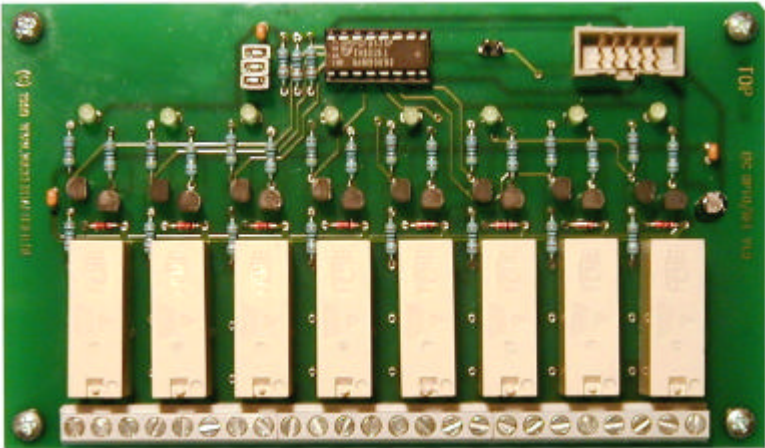
## **Parts**

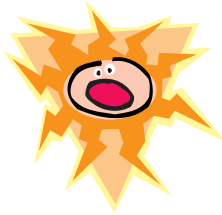
- | Clamps: Lumberg KRMB8 (3 parts à 8 clamps, i. e. Farnell 871-291)
- | Relays (alle: 12 Volt, abt.. 650 Ohms):
  - Omron G6RN-1-12VDC
  - Siemens V2301-B105-A601 or -A401
  - Feme M15E12
- | Optical inputs: use AC or DC types (AC usually a little more expensive, DC are more sensitive, but may require a diode in reverse direction):
  - TLP620: AC-type, triggers at abt. 1.5 mA (max. 7 mA, i.e.. Farnell 623-994)  
with resistor 4.7 kOhm the input range is abt. +/- 7-30Volt.
- | Status-LED: Low Current-Type ( $I_F$  abt.. 1-2 mA), resistor abt. 4.7 kOhm
  - HLMP1790 (green) oder similar

## **Products**

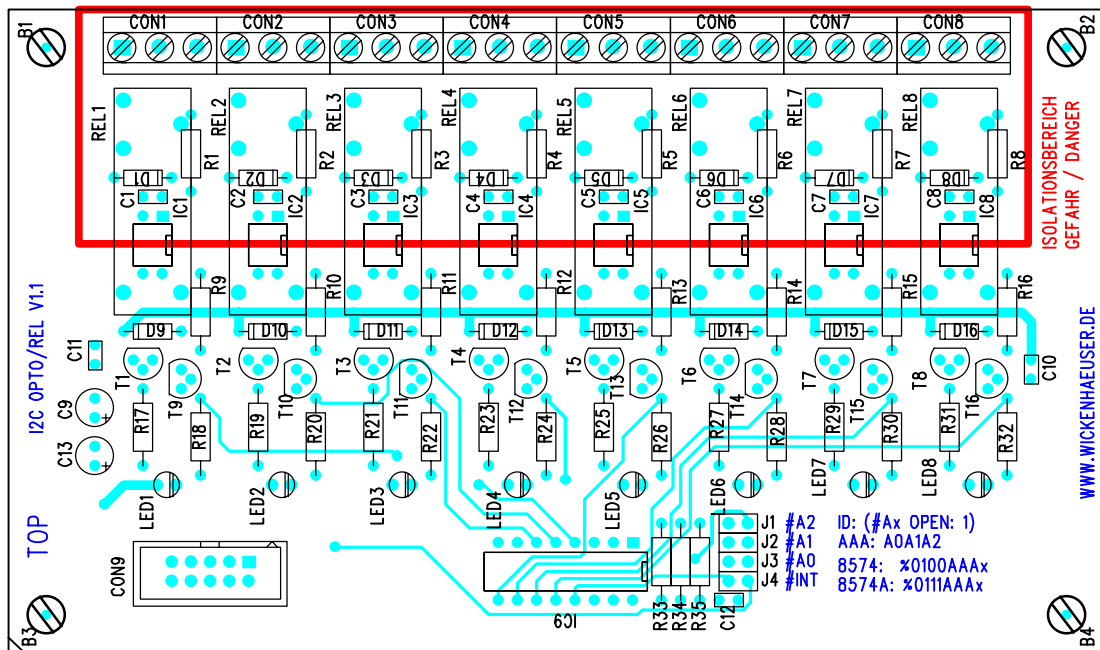
Currently the board is only available as unsoldered PCB without components (they may easily be bought at many distributors). But we plan to offer 2 or 3 different assembled versions for the future, watch our site.

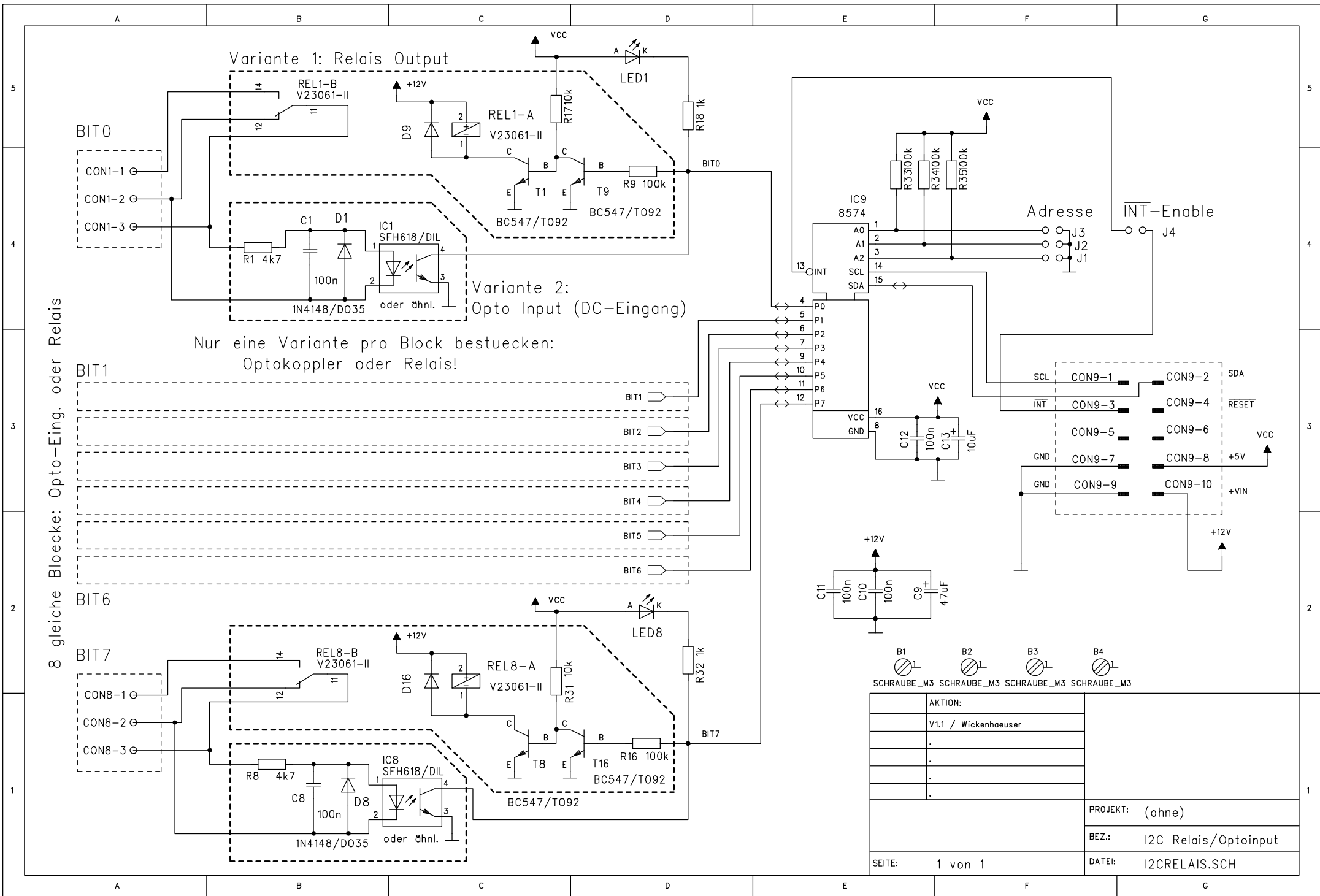
**Three variants: 8 relays, 4 input & 4 relays, 8 inputs**





Danger if switching high voltages!





Variante 1: Relais Output

Variante 2: Opto Input (DC-Eingang)

Nur eine Variante pro Block bestuecken:  
Optokoppler oder Relais!

8 gleiche Bloেকে: Opto-Eing. oder Relais

<p>B1 B2 B3 B4 SCHRAUBE_M3 SCHRAUBE_M3 SCHRAUBE_M3 SCHRAUBE_M3</p>	
AKTION:	
V1.1 / Wickenhaeuser	
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PROJEKT: (ohne)	
BEZ.: I2C Relais/Optoinput	
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