# SX SBC Relay Board - SC03, SC13 & SC21

The relay driver board allows the SBC series SXI & II to communicate with the real world. It allows the control of solenoids, motors, lights which could otherwise not be controlled with the 5 volt logic of the SX SBC.

The board plugs into CN1, the 16 pin IDC header on the SX SBC. There are four ports available to use - 80h, 81h, 82h & 83h. A jumper connection has been provided on the Relay Board to select the port you wish to use. Thus a total of four relay boards can be connected to the SXI & SXII. Each board can turn ON/OFF up to 8 relays. The binary pattern of the byte to turn on a particular relay on the board is printed below each relay. You have seen this pattern before on the SX SBC when you programmed it to turn on an individual display or a segment within a display.

Each relay has the Normally Open NO, Normally Closed NC and the Common contacts brought out the edge of the board. When the relay is activated the Normally Open contact closes, and the Normally Closed contact opens.

Power to the relays is provided at the terminal block on the board. Power can come from the SX SBC board itself if it is about the correct +V volts DC required by the relays used. The '+' & '-' pads to the left of C3 on the SXI SBC board are provided for this purpose. By programming the SXI & II SBC these relays may be turned ON/OFF in any order. Here are some examples:

- timer. Use the clock programs supplied to set relays to go on/off at various times of the day or week or month. The DS1216C makes such programs very accurate and easy to write.
- Model Railways. Control lights, points.
- Robotics. Use the SXI & II SBC and relay board to control a robot arm.
- water sprinkler activated by the appropriate sensor (light, temperature, water content of soil, time.)

**Construction.**
Inspect the board carefully for any problems. It is easier to to this first than try to do it after components have been soldered onto the board. Insert and solder the components that stick out the least to the board so they don't fall out when you turn the board over to solder them. Note there are **4 links** to add to the board.

This kit is a combination of kits SC03 and SC13. The components for all 8 relay positions are supplied in SC21. In SC3 only the components for 1 relay position are supplied. Then you can buy SC13 which is the components for the other 7 relay positions. With the introduction of miniature relays in the last few years there is today a wide choice of relay pinouts, ratings and physical sizes to choose from. We had the choice of putting a mixture of relays on this Board or only one type. We thought the latter course would satisfy most users.

The SXI SBC computer kit includes a function to test the Relay Board. Connect it to the SXI SBC, connect power to the relays, put the jumper to connect port 81h and enter Function D on the SXI SBC. The relays should click on and off in sequence. This is a relay sequencer program (RLSTEP) which allows you to program the relay board a bit like the music sequencer. The relay sequencer uses a table of two bytes values, the first byte is the data that is to go to the output latch.The second byte is a time delay in seconds and also determines whether the sequence is to end (00h) or to go back and start again (ffh).

**How it Works.**
The latch IC (74HC273) can be addressed by any one of four I/O ports (80h,81h,82h,83h) that are available at the I/O expansion connector CN1. The jumper on LK1 or LK2 selects the port to use. Each port is connected to the Data Bus and consists of eight bits. When a particular bit output goes high the transistor it is connected to is turned fully on which in turn switches the relay on. The diode across the relay coil is to clamp the back emf caused by the relay switching.

The binary bit pattern printed under each relay on the overlay shows the data byte which will turn on that particluar relay. This pattern has been seen before when turning on the LED displays on the SXI SBC and in turning on the individual display segments within a display.

A total of 4 Relay Driver boards, or 32 individual relays, can be connected to CN1 simultaneously (one board connected to each of the 4 available ports.) This should satisfy most requirements.

## Components

| | |
|---|---|
| 2 pin terminal block | 1 |
| 3 pin terminal block | 8 |
| Goodsky 12V Relay | 8 |
| 1K Resistors 5%, 1/4W | 16 |
| Diode 1N4004 | 8 |
| 5mm LED | 8 |
| Transistor, BC547 | 8 |
| 20 pin IC socket | 1 |
| 74HC273 IC | 1 |
| 10uF electrolytic | 1 |
| Single pin header x 3 | 2 |
| Jumper | 1 |
| Tinned copper wire | 5" |
| 16 pin IDC box header | 1 |
| 16 strand flat cable 10” preassembled | 1 |
| Relay Driver PCB, SC03 | 1 |

**SC03** – Components for 1 relay position only supplied.
**SC13** – additional components for 7 relay positions
**SC21** – all components for all 8 relay positions & PCB.

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