

# User Instructions SOM1 Serial Output Modules

## Introduction

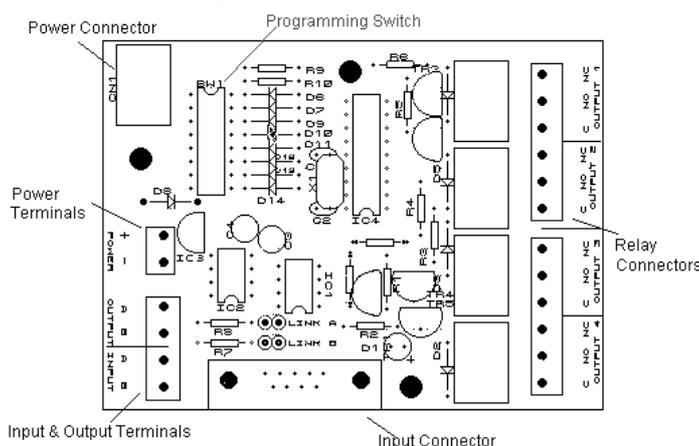
Serial Output Modules are devices which are connected to a Serial Port on a PC. The module is equipped with four relays which are controlled over a 2400 baud serial link from the PC. Each relay has a single set of change over contacts which can be used to switch light loads such as low voltage motors, lamps and solenoids.

The SOM1 is equipped with an Address switch which allows for up to 256 modules to be connected to a single PC Serial Port thus allowing a maximum of 1024 relays.

Connection between the first module and the PC is via a standard null terminated modem cable. Connections from the first module to subsequent modules is via screw terminals using screened twisted pair cable. Wiring between the modules is very versatile allowing for daisy chaining and T junctions.

The maximum distance from the PC to the first module is 50 metres and between subsequent modules is 200 metres

Modules are powered from a d.c. supply in the range 10 to 15 Volts with a maximum current consumption of 100mA (at 12 volts).



## Connecting Power

The SOM1 requires a nominal 12 Volt power source which may be connected to either the power connector or the terminal block. If it is to be connected to the power connector then the power supply should be set to negative earth.

A single power supply may be used for several SOM1's (depending on the rating of the power supply). Each SOM1 will require a maximum current of 100mA. Therefore a 300mA power supply will be sufficient for up to 3 SOM1's and a 500mA sufficient for 5 SOM1's.

On the module itself, the power terminals and the power connector are wire together. Power can therefore be taken from the screw terminals of the SOM1 which is connected to the power supply and connected to the screw terminals of the subsequent modules.

## Setting up the Address

The address for each module is set up using the programming switch. This uses binary notation with the least significant bit being marked as 1 and the most significant bit being 8. A '1' is designated as 'ON' and a zero as 'OFF'. This means that a total of 256 (0 to 255) addresses are available.

For example address 7 would have switches 1, 2 and 3 'ON' and the remaining switches would be 'OFF'. When using the custom software the switch positions are shown in the dialog boxes when addresses are selected.

### **Installing the First Module**

The first module must be connected to the serial port of the host computer. Although the input terminals may be used for this first module it is recommended that a null modem cable be used. This is simply connected into the 9 pin D connector mounted on the module. Note that the maximum cable length between the PC and the first module is 50 metres.

If it is decided that the screw terminals be used then the connections will depend on whether the PC has a 9 way output connector or a 25 way. For a 9 way connector, connect input pin 'A' to pin 3 and input pin 'B' to pin 5. For a 25 way connector, connect input pin 'A' to pin 2 and input pin 'B' to pin 7.

After power has been applied and the address set up the module is ready for use.

### **Installing the Second Module**

Only the first module may be connected directly to the PC, subsequent modules should be connected from the output of earlier modules. While it is possible to use the 9 pin D connector for the data in connection it is recommended that the screw terminals be used.

Note that the maximum cable length between modules is 200 metres. It is recommended that screened pair cable be used for the data line between modules.

From the first module connect output pins 'A' and 'B' to input pins 'A' and 'B' on the second module.

Once again after power has been applied and the address set up, the modules are ready for use.

### **Installing Subsequent Modules**

The data lines to the third and subsequent modules may be connected in one of two ways or a mixture of both. If the line length is relatively short, subsequent input terminals may be connected to the previous modules input terminals. In this way the maximum length of cable from the first to the last module on a run is 200 metres and the maximum number of modules is 20. T junctions are not recommended.

Longer line lengths and / or more modules may be accommodated by using the output terminals. This method is also necessary for T junctions. Having connected the input terminals to an earlier module, the output terminals are used to drive other modules input terminals.

The following points will summarise:

The maximum number of inputs one output can drive is 20.

The maximum length of cable one output can drive is 200metres.

Only one output should be used to drive a set of inputs.

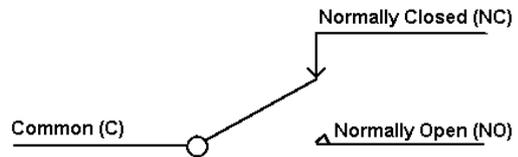
## LED Operation

The on board LED provides an indication of data activity. Each time a burst of data is detected the LED is flashed once. If the module detects that the data contains its own address then the LED will remain on until the next burst of data is detected.

## Using the Relays

The four relays each have three terminals and these are designated in the off state (i.e. when the relays are released)

NO Normally open. These will be connected to the Common terminal when the relay is operated otherwise they will not be connected to any other terminal.



NC Normally closed. These will be connected to the Common terminal when the relay is released otherwise they will not be connected to any other terminal.

## Using Application Software

A range of free windows based application software is available from your supplier. This may be freely used without royalty payment provided that it is only used with these modules.

## Custom Software

If you require to write your own software the follow points should be noted

1. The serial port should be programmed to 2400 baud no parity one start and one stop bit.
2. Two bytes of data are sent with each burst of data. The first byte contains the address of the module and the second byte contains the state of the relays with a 1 indicating that the relay should be operated and a zero indicating that it should be released. Relay 1 uses the most significant bit (128), Relay 2 the next bit (64), Relay 3 uses bit 32 and Relay 4 uses bit 16. The remaining low order bits must be set to zero.

## Problems

Problem:

The module does not work. The LED does not come on and none of the relays operate.

Solution:

Check that the power is connected by checking on the power terminals with a voltmeter. The reading should be in the range 10 to 15 Volts.

Check the polarity of the power (again using the power terminals).

Ensure that you are using a null terminated modem lead.

Ensure that the cable is connected to the correct port on the PC.

Problem:

The module does not work. The LED does flashes on but none of the relays operate.

Solution:

Check that the address is set up correctly. If in doubt set all the address switches to off and set the address in the software to zero.

If the module is not the first (i.e. the one connected to the PC) then check that the data lines are connected correctly and have not been crossed (i.e. output 'A' connected to input 'B').

### **Specification**

Power: 10 to 15 Volts d.c. (regulated) @ 100mA max.

Relay Contacts rating: 2 Amp 24 Volt dc / 110 Volt ac (1 Amp inductive)

Relay Contact type      Single Pole Changeover (SPDT)

Max. Separation          PC to 1st module:          50 metres

Max. Separation module to module:      200 metres

Size      95mm x 80mm

Line Termination (User selectable)      600ohm

Address range      0 to 255

Address selection      8 way DIL switch

Input Connectors      9 pin 'D' and screw terminals

Output Connectors      screw terminals

Relay terminations      screw terminals

Mounting holes          3off @ 3mm diameter

Data rate          2400 baud

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