

ANGUS SYSTEMS BOARD – GENERAL INSTRUCTIONS

1. Power Supply

The board is designed to operate from a 5V or 6V supply, connected via a 2.5mm standard power plug.

A 4 x AA battery holder with power connector is supplied. If a mains derived supply is preferred, it should be regulated and ideally have current limiting – a suitable plug-top supply with power connector is available from JJM.

A power connector to 4mm lead is also available if you wish to run boards from your existing regulated supplies – eg both the JJM 5V Regulator board and the Alpha Power Supply board would be suitable.

With a 5V supply, the maximum current drawn (all LED's lit and all outputs on) is approximately 100mA.

Reverse polarity protection is provided by a reverse biased 3A diode across the supply. Note that this protection relies on the power supply current limit.

2. Temperature Sensor

The temperature sensor switches on when the temperature exceeds a preset level. The usual method of operation is for pupils to warm the thermistor by touch with a finger or (better) thumb. Rubbing the thermistor should be discouraged as it could physically damage the component.

The switching temperature can be altered by adjustment of the potentiometer labelled “temperature”. The range of adjustment is roughly 10°C to 30°C (both figures very approximate). This allows redefinition of “hot” and “cold” – the usual use of the sensor assumes room temperature to be “cold” and warmed with a thumb “hot”. But if pupils are asked to design eg an Ice Warning Alarm, then the potentiometer can be reset to define room temperature as “hot”.

The alteration of switching temperature also allows the circuit to be set for maximum sensitivity. The mid position should be fine for normal use, but maximum sensitivity in any environment can be achieved by lowering the switching temperature until the LED lights, then raising it slightly so that the LED is just off. The sensor will then switch almost immediately when touched.

3. Light Sensor

The light sensor switches on when light falls on the LDR (light dependent resistor). In a classroom environment the light sensor will be on most of the time, switching off only in very low light conditions such as covering the LDR with a hand or other object.

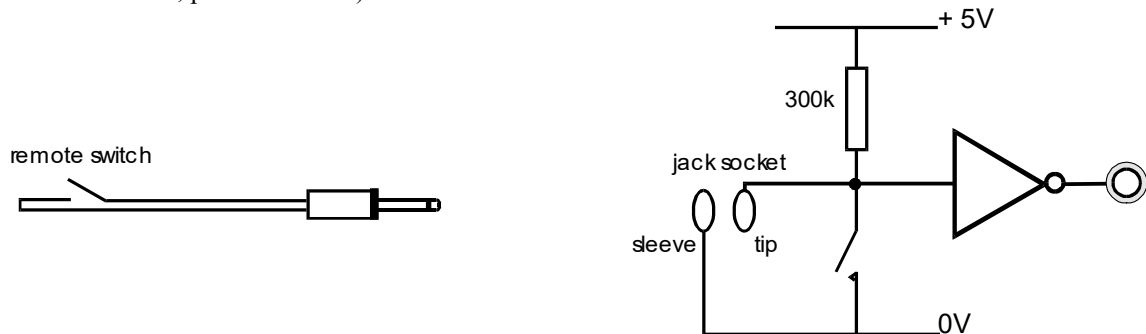
4. Push Switches and Remote Input jack sockets

The two Push Switches are ideal for testing gates individually and in combination. The switches are identified A and B to match the usual input labels in truth tables.

External sensors are connected via the jack sockets (see next section). The push switches are connected in parallel with the jack sockets, so will override any external sensor – this should be useful in checking circuits and fault finding.

5. Connecting Remote Sensors

The basic circuit of the push switch is shown below. It can be seen that the jack socket connects the external sensor in parallel with the push switch. Thus any switch type sensor (reed switch, microswitch, pressure switch) can be used as a remote sensor.



6. Controlling Buzzer Volume

The loudness of the buzzer can be reduced by connecting a resistor in parallel with it. To achieve this two sockets are located on the track side of the board immediately underneath the buzzer. A 1/4W resistor with the legs bent and trimmed will fit into these sockets.

Two resistors are supplied in the accessories pack – the 200 Ω resistor (blue body) will significantly quieten the buzzer, whilst the “zero ohm link” (brown body) will silence it.

Other values can be tried – no damage can be done to the circuit by the resistor. Any value greater than 1k Ω will have little effect. Reducing the resistance value will progressively quieten the buzzer tone, with values of around 100 Ω or less silencing it.

7. Using the Relay to Control External Loads

The relay switch terminals are connected by a “pluggable” terminal block - the screw terminal block plugs on to two pins, and can be attached and removed easily. This allows quick connection of external loads, which can be prepared with a suitable lead attached to a terminal block.

One terminal block is supplied on the board and another in the accessories pack.. Further blocks can be obtained from JJM or from most electronic suppliers (JPR, Rapid, RS) described as 2 way pluggable terminal block (10A, 5mm pitch).

Battery operated equipment (torch, mini-fan) can be controlled by connecting the relay switch contacts across the appliance switch (or replacing the switch completely), or by connecting in series with the battery supply.

Some devices have “trigger” contacts which can be switched by the relay – a flashgun is a good example.

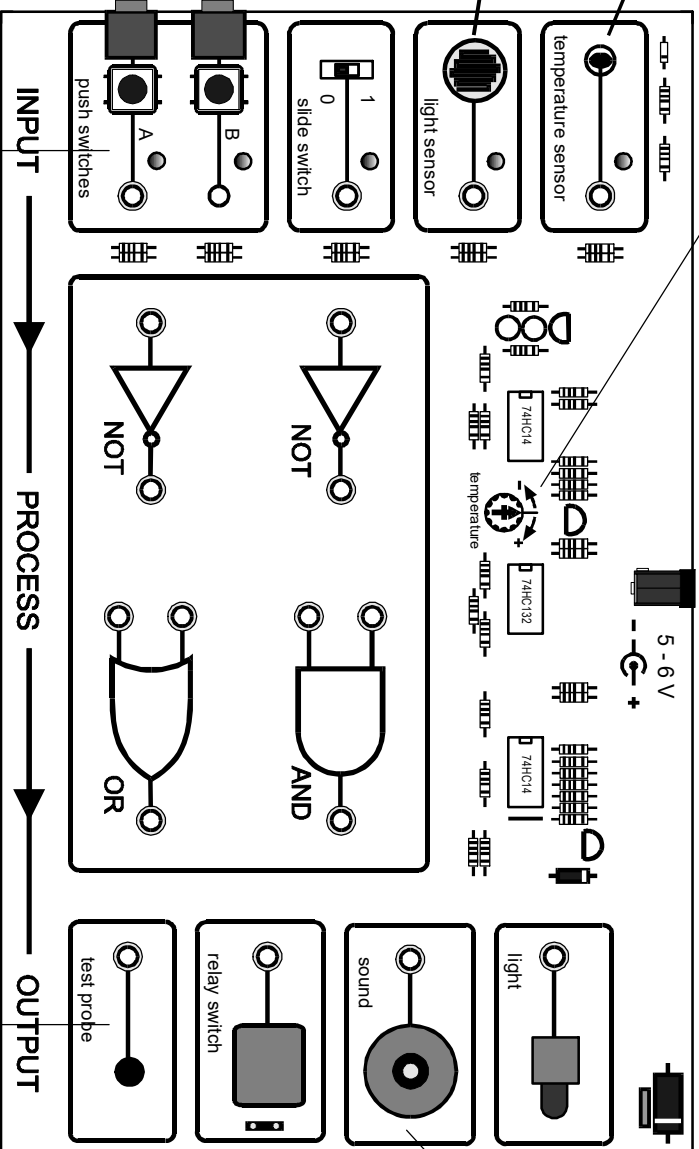
Set switching temperature by adjustment of this potentiometer - clockwise raises switching temperature

Use 5V or 6V supply - either regulated supply or battery pack connected via 2.5mm power plug

Thermistor - warm with thumb or heel of hand. Do not rub.

LDR. Alter characteristics by slipping short piece of tubing over LDR.

Connect REMOTE SENSORS via 3.5mm jack plugs



TESTING GATES - use push switches as inputs and test probe as output to check "truth tables" for AND / OR / NOT.

Buzzer loudness can be reduced by mounting resistor in sockets on underside of board

Use pre-wired "plug-on" connector to connect remote loads (e.g. torch, fan) to the relay.

BOARD LAYOUT DIAGRAMS FOR USE IN YOUR OWN NOTES

