

PICAXE-20M NURSERY MONITOR KIT (AXE136)

Contents:

- PCB AXE136 Project board PCB
- R1-8 330 resistor (orange orange brown gold)
- R9/10 10k resistor (brown black orange gold)
- R11 4k7 resistor (yellow violet red gold)
- R12 22k resistor (red red orange gold)
- LED1-8 LEDs
- SW1 On/Off Switch
- SW2 Push switch
- BB 4.5V Battery Box
- Socket 3.5mm Download socket
- IC1 20 pin IC socket
- IC1 PICAXE-20M
- IC2 DS18B20 Temperature Sensor



Description:

The Nursery Monitor kit enables an accurate LED display of the room temperature, by use of the DS18B20 digital temperature sensor. This can help parents to monitor the temperature of the room for a new born baby, and hence keep it between the recommended 16-20°C.

To help reduce the risk of cot-death the charity FSID (www.fsid.org.uk) recommends to

- Place your baby on the back to sleep
- Cut smoking in pregnancy - fathers too!
- Do not let anyone smoke in the same room as your baby
- **Do not let your baby get too hot (or too cold)**
- Keep baby's head uncovered - place your baby with their feet to the foot of the cot
- The safest place for your baby to sleep is in a cot in a room with you for the first six months
- Do not share a bed with your baby if you have been drinking alcohol, take drugs or if you are a smoker
- If your baby is unwell, seek medical advice promptly
- Settling your baby to sleep (day and night) with a dummy can reduce the risk of cot death, even if the dummy falls out while your baby is asleep.

Additionally for temperature:

- Babies do not need hot rooms, all night heating is rarely necessary. Keep the room at a temperature between 16-20°C. 18°C (65°F) is just right.
- Adults find it difficult to judge the temperature in the room, so use a room thermometer in the rooms where your baby sleeps and plays.

(Source: www.fsid.org.uk website, January 2009)

The nursery monitor allows a display of the appropriate temperature range by a row of different coloured LEDs: red = too hot, green = ok, blue = too cold.

Assembly Instructions:

1. Solder the resistors in position.
2. Solder the IC socket, download socket and on/off switch in position.
3. Solder the 8 LEDs in position, ensuring correct polarity (align flat edge with diagram on PCB). The LED colours can be chosen as you like, but we recommend:

red	(7 & 6)	(too hot)
yellow	(5 & 4)	(warm)
green	(3 & 2)	(correct)
blue	(1 & 0)	(too cold)
4. Solder the push switch in the position marked 'switch'.
5. Solder the DS18B20 temperature sensor in the 3 diagonal holes between the resistors under the 20 pin chip socket. The CURVED side of the sensor must face the 4K7 resistor.
6. Use a glue gun to stick the battery box securely to the PCB. Solder the two contacts in position.
7. Insert the PICAXE-20M microcontroller into the socket and connect 3xAA batteries.
8. Use the PICAXE software to develop a control program/flowchart, and then download the program to the board by connecting the PICAXE download cable (part AXE026 or AXE027).

Operation:

To save battery power the LEDs are only lit when the switch is pushed. This takes the PICAXE microcontroller out of sleep mode, uses the DS18B20 digital temperatures sensor to measure the temperature, and then lights the appropriate LEDs for five seconds.

Note that the kit will only function correctly when the temperature sensor is at the same temperature as the room. Therefore, if placing in an enclosure, make sure the room air can circulate past the sensor.

Sample Program:

This program shows how to read the temperature (using the readtemp, which puts the temperature into variable b1). The LEDs can then be lit as appropriate.

```
main:
    sleep 1                ; sleep a while
    if pin3 = 1 then do_temp
    goto main

do_temp:
    readtemp 5,b1          ; read temperature
    select case b1         ; light correct LEDs
    case > 20              ; too hot
        high 6,7
    case 19,20             ; getting warm
        high 5,4
    case 16,17,18         ; ok
        high 2,3
    case < 16              ; too cold
        high 0,1
    end select

    wait 5                 ; wait 5 seconds

    low 0,1,2,3,4,5,6,7   ; all LEDs off

    goto main
```

Circuit Diagram

