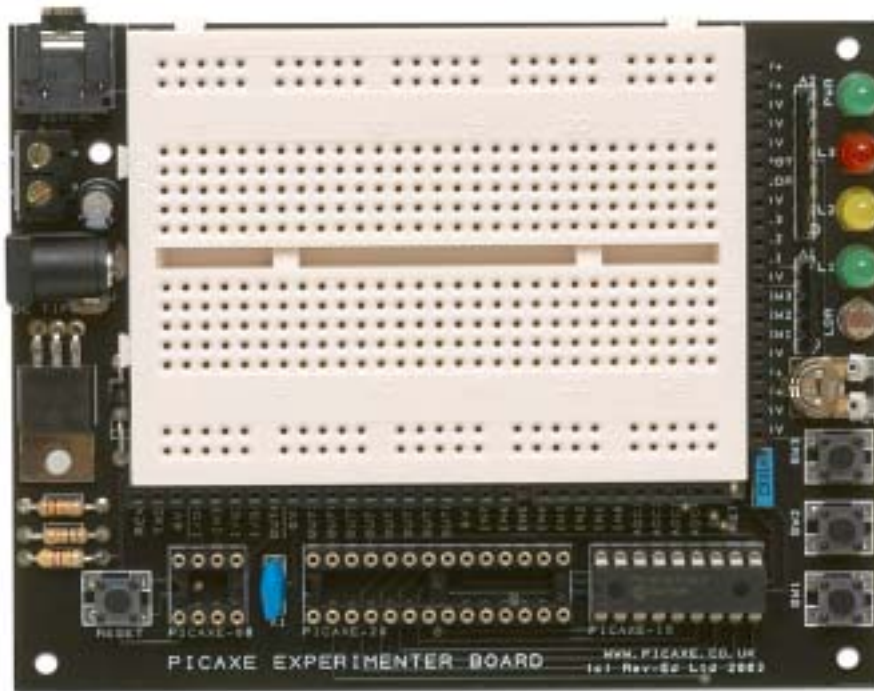


PICAXE EXPERIMENTER BOARD (AXE090)

Description:

The PICAXE experimenter board allows circuits for any size/revision of PICAXE chip (8 / 18 / 28) to be quickly tested using a prototyping breadboard. The experimenter board provides power and computer download connections, as well as simple input and output devices for testing purposes.

This datasheet provides construction and circuit information for the Experimenter board only. Please see the main PICAXE manuals for information on how to use the software and how to build circuits.



Features:

- Supports all 8/18/28 pin PICAXE chips.
- Computer download circuit pre-configured on PCB.
- Large breadboard area.
- Regulated power supply or battery powered, with LED power indicator.
- 3 LED indicator outputs.
- 3 Digital switch inputs.
- LDR and preset resistor analogue inputs.

Assembly Overview:

The PICAXE experimenter board is a high quality plated through PCB and is therefore relatively straight forward to assemble. However a number of the electronic components are polarised, so please ensure these components are fitted the correct way around before soldering (see table on next page).

Tools required (not supplied):

- Soldering iron and solder
- Side Cutters
- Small pair of pliers

Soldering experience is assumed.

Contents:

• PCB	PICAXE Experimenter PCB	
• BB	self adhesive protoboard (breadboard)	*** align text correct way up (supplied on BB)
• ICH08	8 pin IC socket	“
• ICH18	18 pin IC socket	“
• ICH28	28 pin IC socket	“
• IC1	PICAXE-18X microcontroller	
• H1-2	20 pin SIL connector (x2)	
• H3	10 pin SIL connector	
• A1	10k 5 pin resistor array	*** text on one side of device
• A2	330R 8 pin resistor array	*** text on one side of device
• R1	22k resistor (red red orange gold)	
• R2	10k resistor (brown black orange gold)	
• R3	4k7 resistor (yellow violet red gold)	
• R4	180 resistor (brown grey brown gold)	
• C1	100uF electrolytic capacitor	*** +, - marked on PCB
• C2	100nF (104) polyester capacitor	
• RG1	7805 5V voltage regulator	*** text on device faces up
• L3	red 5mm LED	*** flat marked on PCB
• L2	yellow 5mm LED	*** flat marked on PCB
• L1, PWR	green 5mm LED (x2)	*** flat marked on PCB
• X1	4MHz 3 pin ceramic resonator	
• D1	1N4001 diode	*** bar end marked on PCB
• D2	BAT85 schottky diode	*** bar end marked on PCB
• LDR	miniature LDR	
• POT	100k preset pot resistor	
• SW1-4	miniature push switch (x4)	
• CONN3	2.1mm power socket	
• CONN2	3.5mm stereo socket	
• CONN1	2 pin screw terminal block	
• AXE026	PICAXE serial cable	

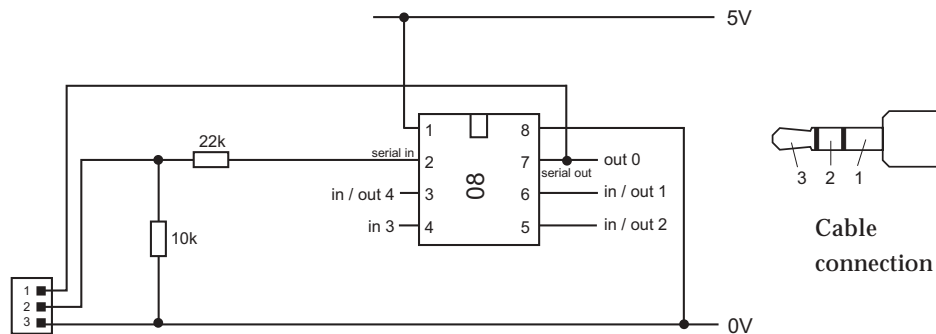
(*** denotes components which must be soldered the correct way around. See notes above).

(Parts D2 and R4 are only fitted on PCB version 1D and later)

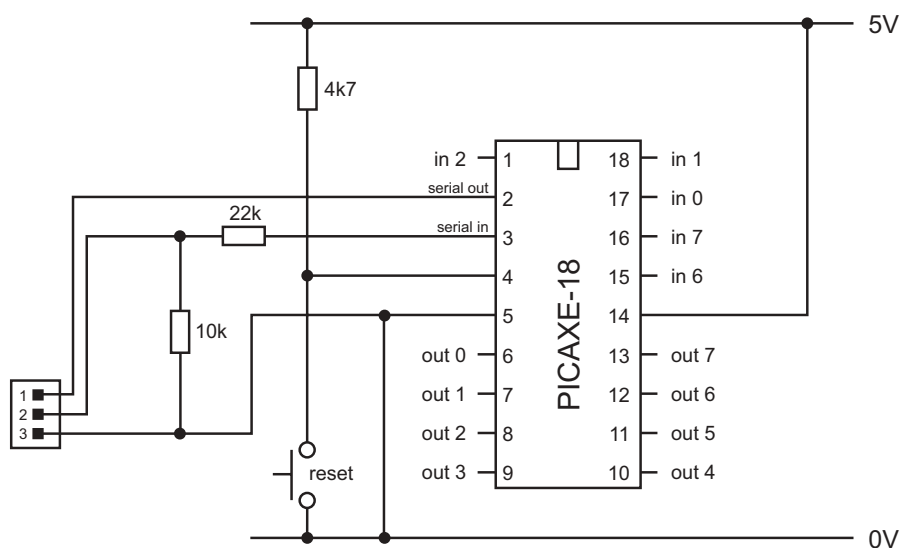
Assembly Instructions:

1. Solder the resistors and two diodes in position, ensuring correct polarity of the diodes.
2. Solder the two resistor arrays in position, ensuring correct polarity of the 'dot' marker (shown on the text side of the device). The text side of both devices should 'face' the LED positions.
3. Solder the three IC sockets in position. Solder the 10 pin, and the two 20 pin, SIL connectors in position.
4. Solder the capacitors and 7805 voltage regulator in place. Ensure the voltage regulator is connected the correct way around (text facing up).
5. Solder the LEDs, resonator, LDR and preset pot in position. Ensure correct polarity of the LEDs.
6. Solder the switches and connectors in place. Ensure the CONN2 stereo socket 'clicks' into position flat on the PCB prior to soldering (it does not matter if solder joins the two 'pairs' of contacts each side).
7. Peel the protective paper off the rear of the breadboard and use the self adhesive layer to carefully stick the breadboard in position (ensure the text is the correct way up).
8. Insert the PICAXE-18X microcontroller supplied into the 18 pin socket, pin1 to the left.

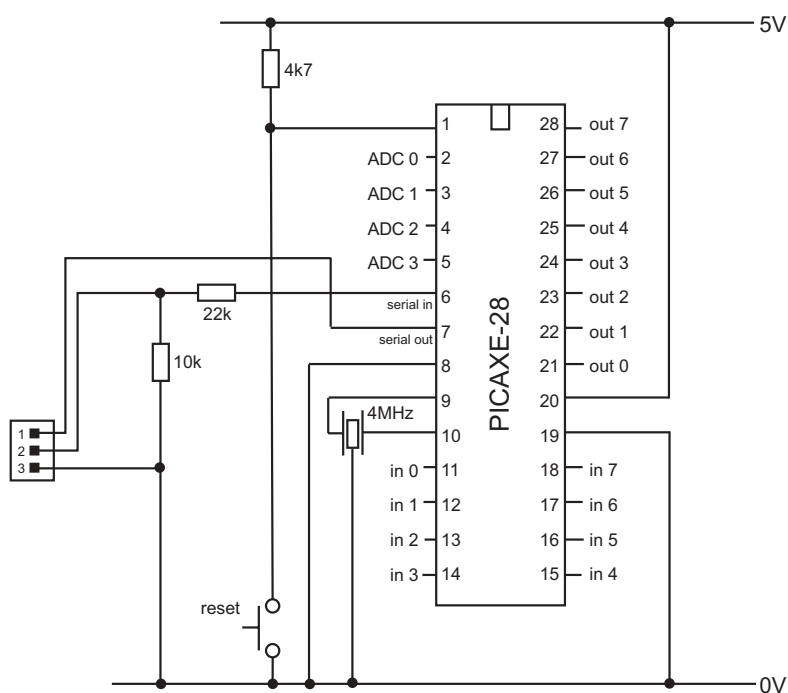
Circuit Diagram (PICAXE-08/08M):



Circuit Diagram (PICAXE-18/18A/18X):



Circuit Diagram (PICAXE-28A/28X):



Using the Experimenter Board:

Important Notes:

1. Only one size of PICAXE chip should be fitted at any one time.
2. Only one power source should be connected at any one time.
3. PICAXE chip polarity (pin 1 to left) should be observed at all times.

Failure to observe any of these points may result in damage to the PICAXE chip.

PICAXE Input/Output Pin Connections:

The PICAXE-08 has its own input/output pin connection points. The PICAXE-18 and PICAXE-28 share pin connection points. The serial in (RCV) and serial out (TXD) signals from the download socket are connected directly to all three PICAXE chip sockets via tracks on the PCB. (NB Version 1d PCB now uses the 'enhanced' download circuit with additional resistor R4 and shottky diode D2. See the PICAXE manual for more details about this enhanced circuit.)

To make connections between the input/output pin headers and the breadboard it is recommended that 1/0.6mm single core equipment wire is used. Do not place component legs (e.g. resistors) directly in the input/output pin headers as the leg of the component may not be thick enough to make a reliable connection within the header. Use the wire to connect to the breadboard, and then place the component in the breadboard.

PICAXE-08 / 08M

The PICAXE-08 input/output connections are on the left hand side of the board, marked OUT0, I/O1, I/O2, IN3 and I/O4. Note that OUT0 is also connected to TXD and so will flicker when a download is taking place (PICAXE-08/08M only).

PICAXE-18 / 18A / 18X

The PICAXE-18 input / output connections are as follows:

OUT0 to OUT7	outputs
IN0, IN1, IN2	digital inputs or analogue inputs
IN6, IN7	digital inputs
RST	reset

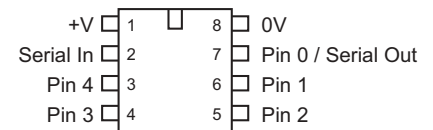
(IN3-5 and ADC0-3 are not used).

PICAXE-28 / 28A / 28X

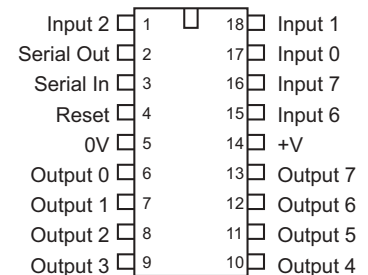
The PICAXE-28 input / output connections are as follows:

OUT0 to OUT7	outputs
IN0 to IN7	digital inputs
ADC0-ADC3	analogue inputs
RST	reset

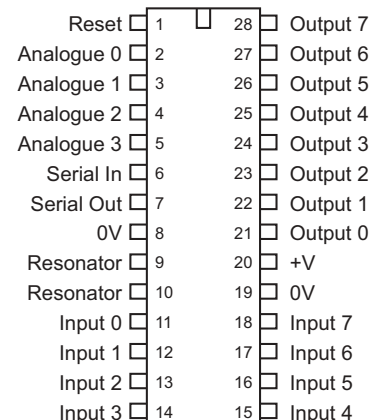
PICAXE-08



PICAXE-18



PICAXE-28



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Computer Connection:

Only use the AXE026 PICAXE serial cable. For USB connection, the USB to serial adapter (part USB010) is also required.

Reset Switch:

The reset switch only resets PICAXE chips with a reset pin (18 and 28). To reset the PICAXE-08/08M you must disconnect and reconnect the battery (or power supply). The reset switch also has a header connection marked RST.

Power Supply:

There are two options on how to provide power to the Experimenter board, but ensure only one option is connected at any one time. The PWR LED indicates power to the board.

1. Battery - connect a 4.5V (3xAA cell, not supplied) battery box to the screw terminals, ensuring correct polarity. Do not use 6 or 9V battery packs.
2. Power supply - connect a regulated 9V DC power supply with 2.1mm (positive tip) connector (not supplied e.g. part PWR009).

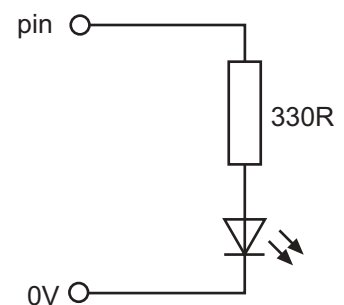
The power supply connection is regulated to 5V by the 7805 regulator and reverse polarity protected by a diode.

The screw terminal battery connection is not regulated and so connects **directly** to the PICAXE chip. Do **not** use a 9V PP3 battery on this connection. Only use a 4.5V (not 6V) battery pack.

Input and Output Devices:

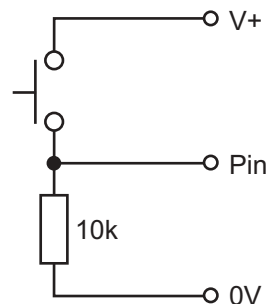
Output - LEDs

Three LEDs are provided (L1 to 3). The LED will light when a positive signal is applied. The cathode of the LED is connected by a 330R resistor to 0V.



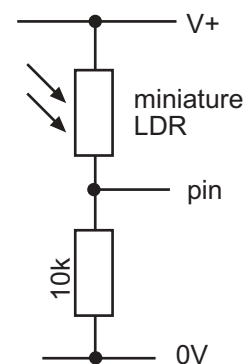
Digital Input - Switches

Three switches are provided (SW1 to 3). The input is tied low by a 10k resistor, with the switch connected between the input and V+. Therefore pressing the switch will result in a high signal.



Analogue Input - LDR

The LDR is arranged with a 10k resistor in a potential divider arrangement. The LDR is connected between the input and V+, the resistor between the input and 0V.



Analogue Input - Preset Pot

The preset pot is a 100k device connected directly between the V+ and 0V power rails. The wiper of the preset pot is connected to the input.

Prototyping board (breadboard):

The prototyping board (breadboard) has 60 sets of connection points and 4 power rails.

The breadboard has 60 sets of vertical 5 hole connection sets (30 top sets and 30 bottom sets) for making connections. The vertical sets are not connected across the centre of the breadboard.

The breadboard has 4 sets of horizontal 25 hole power rails (2 top sets and 2 bottom sets). The horizontal sets are connected all the way across the top (bottom) of the breadboard. The four rails are all independant (not connected).

Power connection points (marked V+ and 0V) are provided on the header beside the ends of the power rails for connecting power to the breadboard rails.