

AX-1 Digital Circuit LabBoard

The economical digital circuit experiment board contains the necessary tools for supporting the basic experiments. This is greatly suitable & affordable for young experimenters and all beginners.

1. Features :

- DC supply +5V (regulated)
- Clock generator with 4 frequencies 1Hz, 10Hz, 100Hz and 1kHz
- Logic switch 8 channels
- Logic monitor 8 channels
- Binary decoder 1 ch. to decode Binary to BCD (0-9) on LED segments
- Pulse switch 2 channels
- Supply voltage input +9V from external DC adapter
- Breadboard 2.5 x 3.5 inches. 390 contact points.

Includes : AX-1 board, documentation, Wires, DC power adapter and some of Digital ICs for experiments.

2. AX-1 Layout and Schematic

In figure 1 shows the AX-1 Digital Circuit LabBoard layout and figure 2 shows the completely schematic diagram.

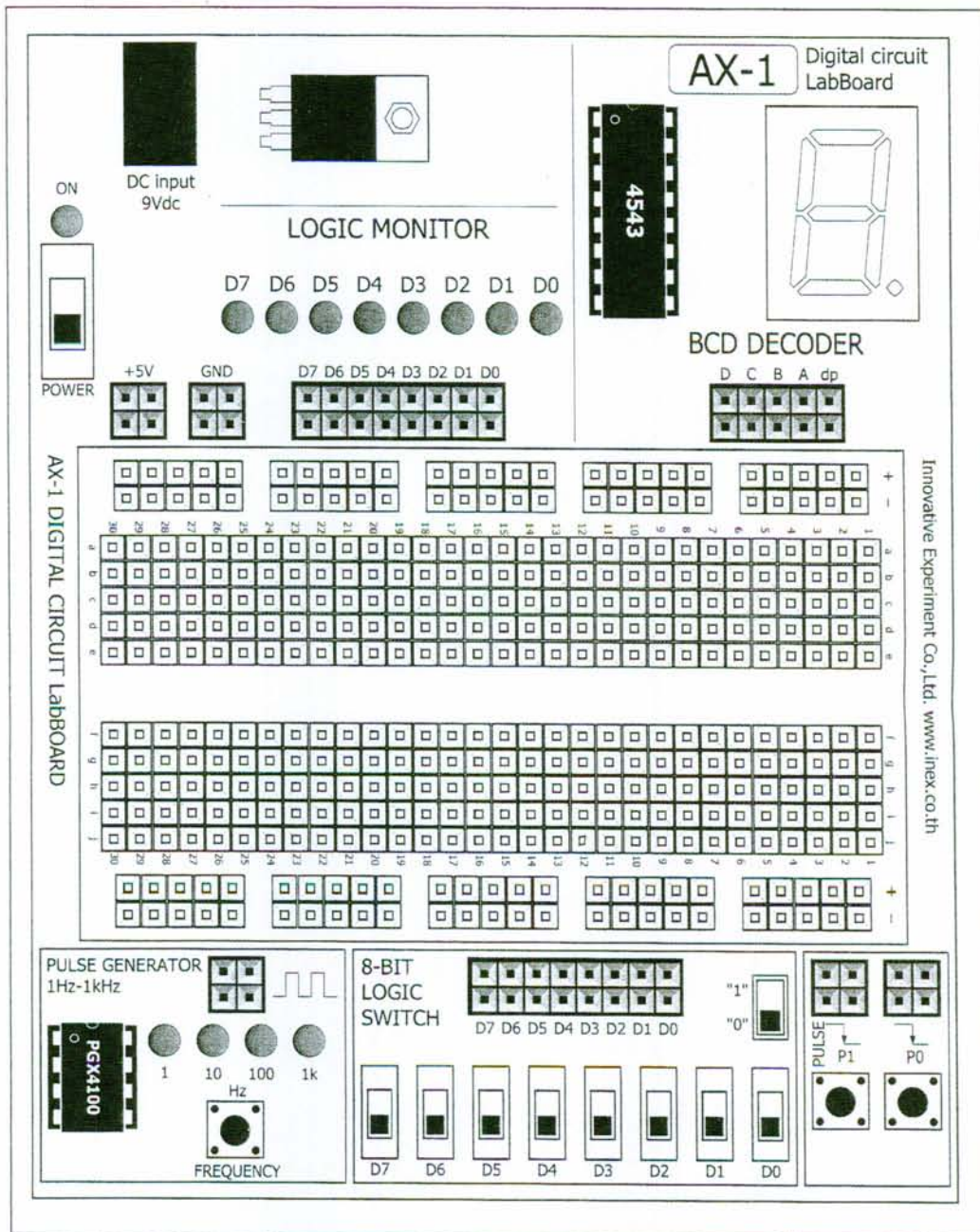


Figure 1 Shows the layout of AX-1 Digital Circuit LabBoard

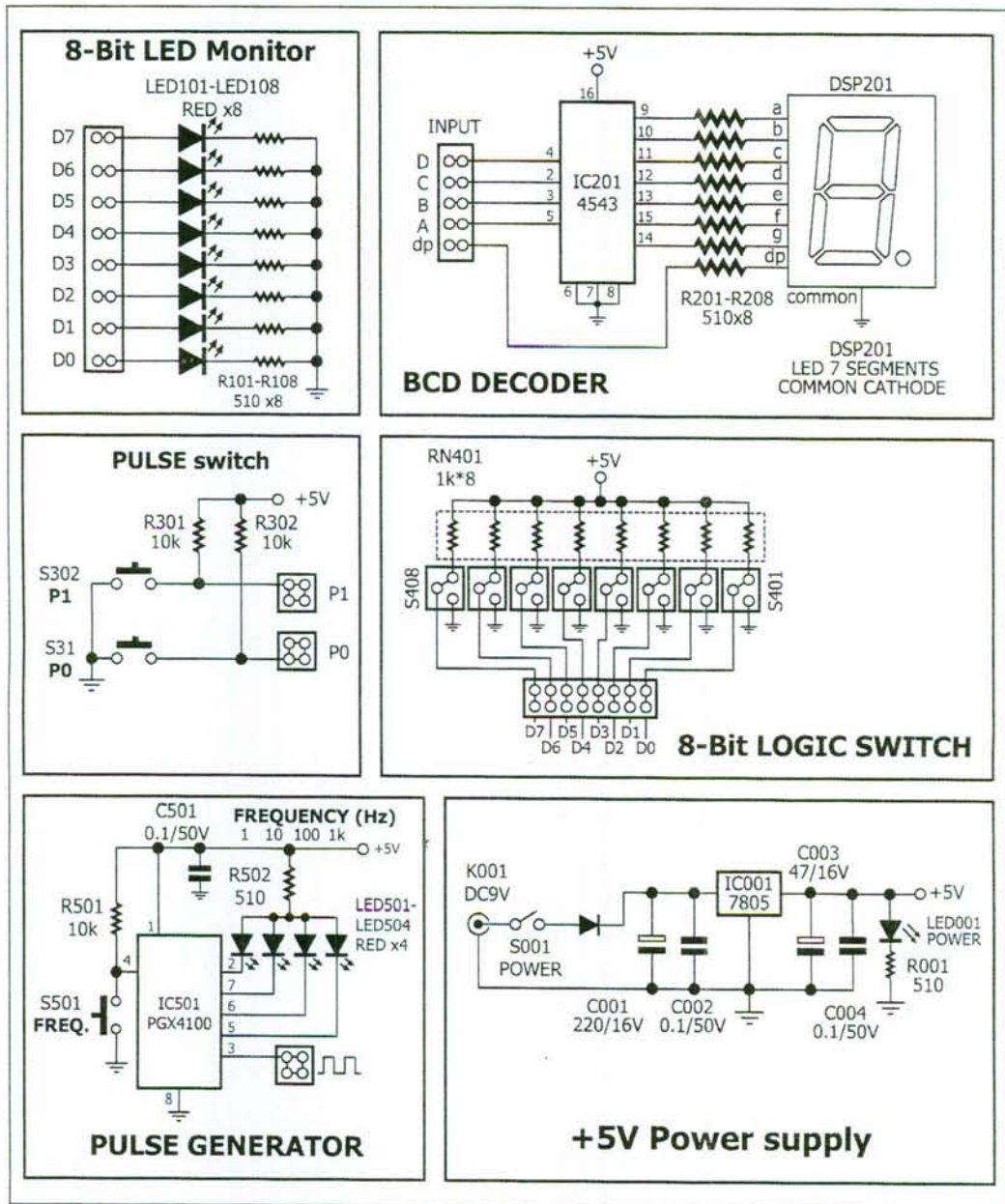


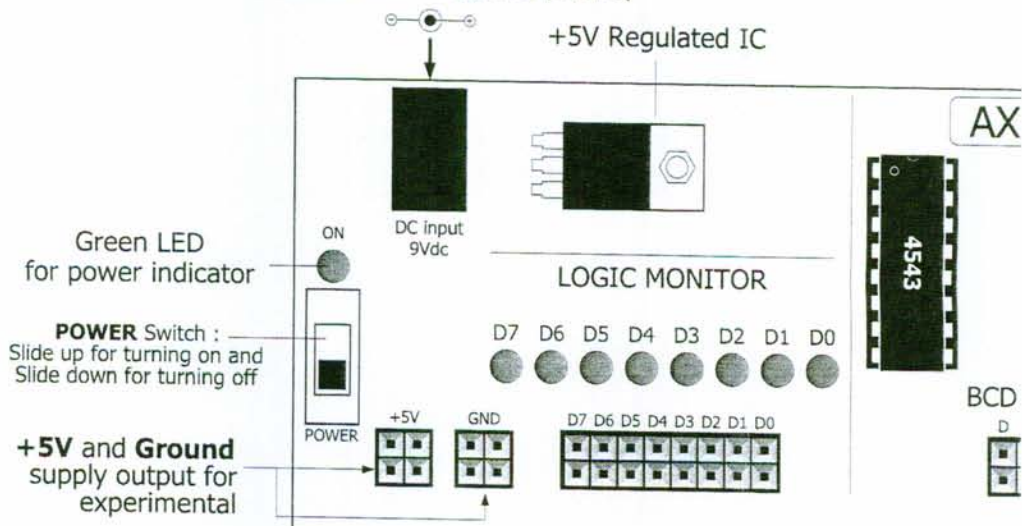
Figure 2 Shows the completely schematic diagram of AX-1 Digital Circuit LabBoard

3. How to using experiment tools on AX-1 Digital Circuit LabBoard

3.3.1 How to use the power supply

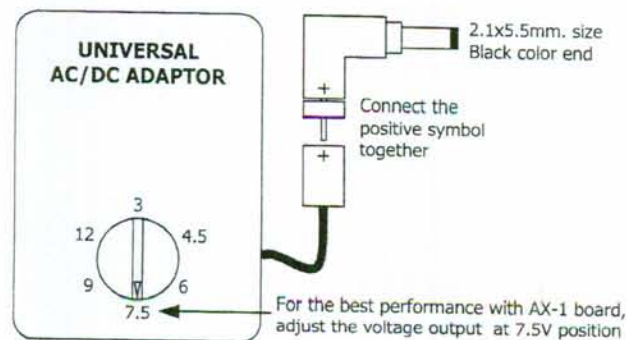
The AX-1 board requires external DC supply in range +9 to +12V 500mA. The DC adaptor is included in the set. On board has **+5V** regulated DC power supply. The connecting of DC supply can do directly and DC voltage has the common ground.

Apply the DC voltage from external DC adaptor to DC jack adaptor. The positive polarity must be center pole and outside is Negative polarity



How to use universal DC adaptor with AX-1 board

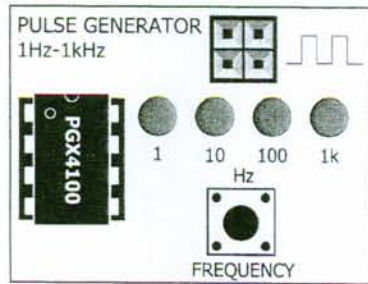
For suitable using, please select the output voltage of the universal DC adaptor at 7.5V and connect the output socket with 2.1x5.5mm. black color end plug following the figure below.



3.3.2 How to use the Pulse Generator

(1) Select the frequency value by pressing the FREQUENCY switch. The indicator will shift following the switch pressing. User can select 4 frequency values 1Hz, 10Hz, 100Hz and 1kHz.

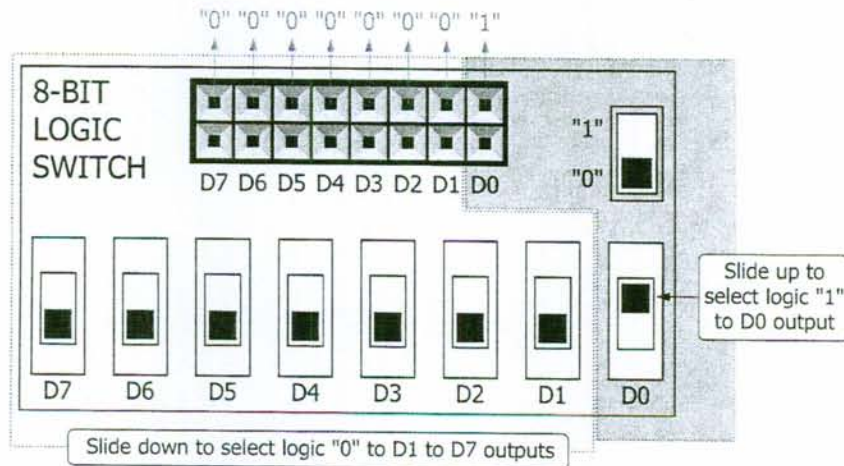
(2) Connect the output to the experimental circuit.



3.3.3 How to use the logic switch

To select logic "1" - Slide up the switch shaft. It supply +5V at output point, that means logic "1"

To select logic "0" - Slide down the switch shaft. Output voltage is about 0.8V, it equal logic "0"



3.3.4 How to use the logic monitor

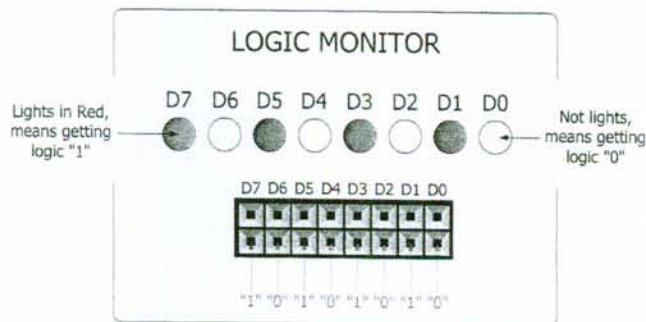
This tool is shown the logic status. On this board has 8 channels which enough for all digital circuit experiments.

At default, the all input are pulled down to ground. The LED output off that mean logic "0" occur. To test the logic level in the circuit, connect the input point to a test point on the circuit. Observe the result at the LED monitor.

Light ON mean the point under test has logic status "1"

Light OFF mean the point under test has logic status "0"

Attention: The logic monitor can use with every digital circuit, which use supply voltage +5V or TTL level.

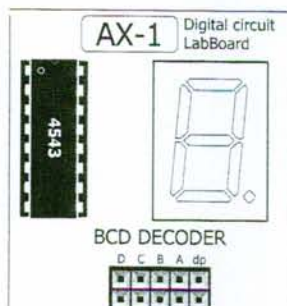


3.3.5 How to use the LED 7 segment decoder

This tool's function is decoding binary data to decimal data and drive to LED 7 segment for displaying. **On this board has 1 units.** At default, the display show "0" because all inputs is pulled-down to ground. It causes the all inputs receive "0" data.

To use, fed data signal into DCBA inputs and "dp" input, in case wants to use the dot point of LED 7 segment. For driving the dot-point in LED, connect the positive voltage (+5V max.) at "dp" point.

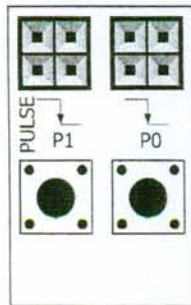
Thus, please notice like logic switch and logic monitor. It can connect suddenly, don't connect the ground line.



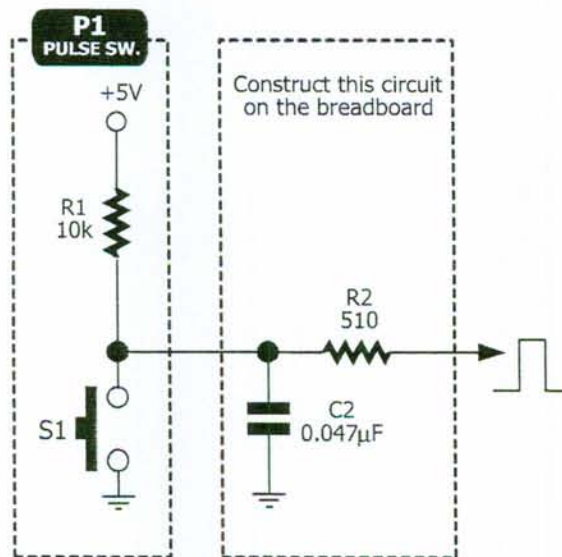
3.3.6. How to use the Pulse switch

It's used for supplying the single pulse for the digital circuit. Normally, the output will be logic "High" or "1". After pressing the switch, output changes to logic "low" or "0" until release.

It is noticed that, logic switch, logic monitor and debounce switch can work suddenly, do not use/connect the ground line.



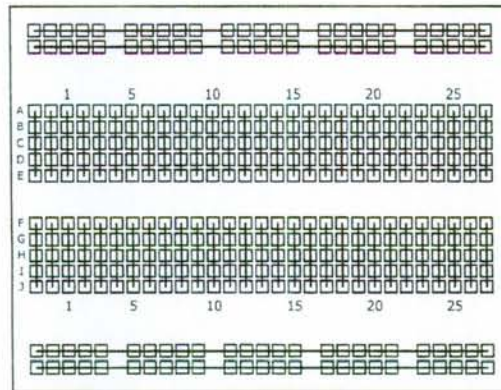
However the signal output will not perfect pulse signal. The addition Debounce switch required for making the perfect pulse signal. Use can construct the circuit on breadboard with the schematic below.



3.3.7 Breadboard Basics

A breadboard, as the one showed on Figure below, is a device that allows one to assemble electrical circuits without the burden of soldering. The breadboard is divided into two sides: left and right. Each side has many holes that can accommodate 22 or 24AWG (American Wire Gauge) wires or the legs of chips (ICs). The holes on any particular side of the breadboard are electrically connected to the holes to the left and to the right. There are no electrical connections between holes that located above or below one another.

Holes on the right half are not connected to any holes on the left side and vice-versa.



This figure shows the electrical connection inside the breadboard.

