Dice - SMD

Schematic description

This is a construction of electronic dice based on SMD components.

The whole construction is based on ATTINY24 microcontroller. It is powered by tiny CR1620 battery. The circuit is turned on pressing a button. Q2 and Q1 transistors are turned on when button is pressed, sourcing microcontroller with power. Microcontroller then activates PWR signal to keep transistors turned on. Button state is signalized by BTN signal that is isolated from the PWR signal by dual Schottky diode D2.

Construction

Construction has components placed on one side of the PCB. We start populating resistors, then continue with diode D2, transistors, microcontroller and LEDs. Finally populate battery holder and button.

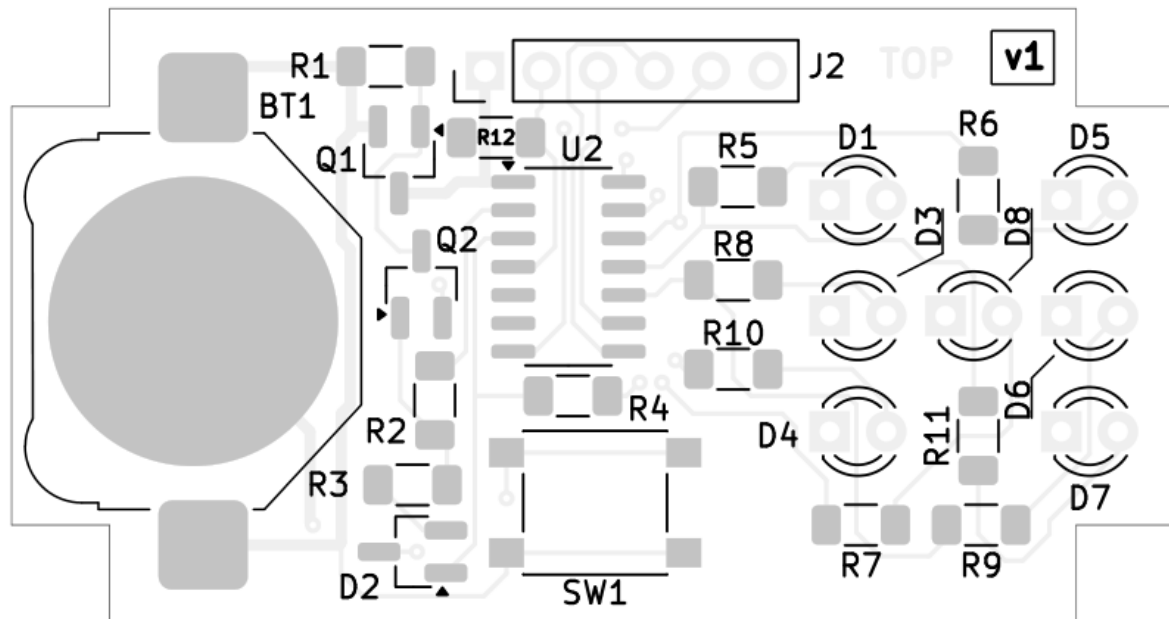J2 does not need to be populated. Microcontroller can be programmed using Arduino wires.

How to get it into service

It should work on the first try when everything is soldered well and microcontroller is programmed.
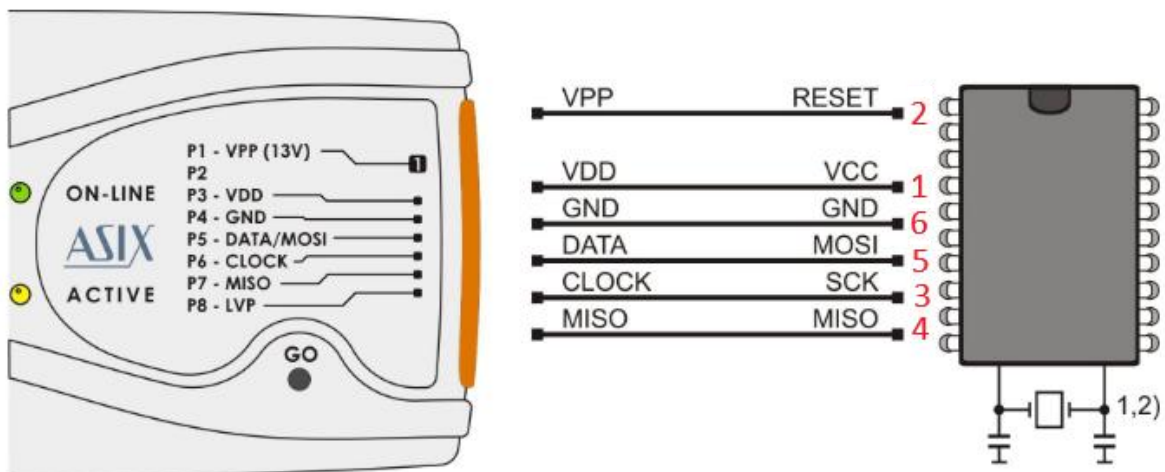
Bill of materials

Annotation	Value	Qty
BT1	Keystone 3012	1
D1,D3,D4,D5,D6,D7,D8	3mm	7
D2	BAS70-06	1
J2	6pin	1
Q1	BSS84	1
Q2	BC848	1
R1	2M2	1
R2,R3,R4,R12	10k	4
R5,R6,R7,R8,R9,R10,R11	220R	7
SW1	6x6 SMD	1
U2	ATtiny24-20SS	1

PCB assembly

Microcontroller programming

Several programmers for Atmel AVR can be used for microcontroller programming. We've used Asix Presto. Following picture shows connection of Asix Presto to J2 connector (J2 pin numbers are red).

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Schematic