



Syn Shop DefCon 2026 Type 2 Badge

Assembly Instructions

These instructions are for the DC2026_Type2 Syn Shop badge. This badge uses mostly surface mount devices (SMD) and the builder should have some experience soldering 1206, 0805, and SOIC device packages. The solder pads have been enlarged to the extent possible to make hand-soldering easier.

The micro-controller has been pre-programmed with a flashing lights display, but can be reprogrammed through the three pin J1 connector and a suitable UDPI programmer. This is discussed in Appendix I.

The Type2 badge can be powered with 3v by a SAO host or a CR2032 coin cell battery holder. Only one should be active at a time. REMEMBER, DO NOT use the battery with the SAO connected.

The SAO connector I2C lines (SDA & SCL) are attached to the I2C lines of the micro-controller should the user wish to 'hack' the device to control it through this interface.

There is an optional serial port connector (J4) configured to accept standard FTDI USB-to-Serial and BLE-to-Serial pods. Should the user wish to 'hack' the device and utilize this interface. The jumper JP1 can be bridged to allow the USB pod to supply power or to supply power to a BLE pod. It should not be bridged for the USB pod if power is supplied by other means.

The jumpers JP2, JP3, JP4, and JP5 make unused micro-controller pins available. These are not used by the pre-programmed code.

To Start

Insure that you have all of the parts required. Refer to the parts list below.

Reference	Value	Description	Qty
D1,D2,D3, D4,D5,D6	LED	LED RED CLR CHIP SMD BOTTOM ENT	6
J1	Conn_01x03	CONN HEADER SMD R/A 3POS 2.54MM	1
J2	SAO-2x3	CONN HEADER VERT 6POS 2.54MM	1
J4	Conn_01x06	CONN HEADER SMD R/A 6POS 2.54MM	1
R1,R2,R3	68	RES 68 OHM 5% 1/4W 1206	3
U1	ATtiny814-SS	IC MCU 8BIT 8KB FLASH 14SOIC	1
PCB	~	Printed Circuit Board	1
BT1	Coin 20mm	HOLDER COIN 20MM PC PIN	1
B1	CR2032	LITHIUM 3V COIN 20MM	1

If only using SAO power, then BT1 does not need to be installed and B1 is not needed.

Part Orientation

The LEDs have an orientation marking on their back side that indicates the Cathode (negative) pin as shown in Figure 1 below.



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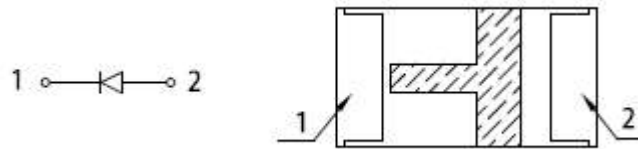


Figure 1

The SOIC package should have a silver dot near pin 1. There may also be a recessed dot or a beveled edge along the pin 1 through 7 side.

Assembly Suggestions

1. Use blue painter's tape to secure the PCB to a flat surface. 'Tin' the solder pads as needed.
2. Install R1, R2, and R3.
3. Install D1 through D6. Note: These should snap into the holes provided.
4. Install U1.
5. Install the coin cell holder.
6. Install J2 SAO connector if needed.
7. Install J1 and/or J4 if needed.
8. Apply power to test.



Minimal Parts Added – rev 2 badge



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The J2 SAO connector is only needed if the badge is going to be powered through the SAO connector. REMEMBER, DO NOT use the battery with the SAO connected.

The J1 connector is only needed if the badge is to be reprogrammed. It is configured to be compatible with the Microchip SNAP Programmer.

The J4 connector is only needed if the badge is to be hacked to provide a serial interface port.

References

ref1: DC2026_Type2_SCH.pdf – Schematic drawing

ref2: DC2026_Type2_PCB_F.pdf – Printed circuit board layout – Front view

ref3: DC2026_Type2_PCB_B.pdf – Printed circuit board layout – Back view



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Appendix I – Reprogramming the Micro-controller

The ATtiny814 micro-controller can be reprogrammed through use of the Microchip MPLAB X IDE and a SNAP or other suitable UPDI programmer. The MPLAB X project can be downloaded from [<url link here>](#).

1. Install the J1 connector to provide access to the UDPI pin.
2. Attach the SNAP programmer pins 2,3,&4 to J1 pins 1,2,&3 respectively.
3. Load the project into the MPLAB X IDE and make desired changes.
4. Compile and download the new code through the SNAP UPDI programmer.