RIOT EXP. GADGETS

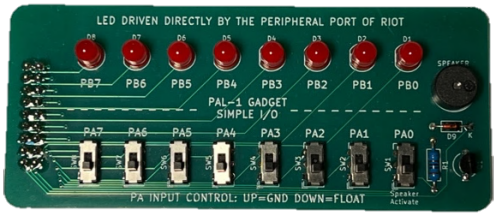
PAL-1

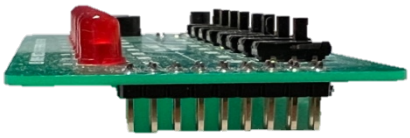
2022-01-25

MANUAL

Use BOM symbol information to assemble the gadgets, the finished gadgets look like these:

- Simple I/O





The Simple I/O card have eight red LEDs as outputs, eight DPDT switches as inputs, and a magnetic buzzer with transistor driver. The PA ports and buzzer part is implemented follows the SPEAKER APPLICATION's circuit design from the KIM-1 user manual page 57, you can try the speaker experiment on the KIM-1 user manual directly with the simple I/O gadget.

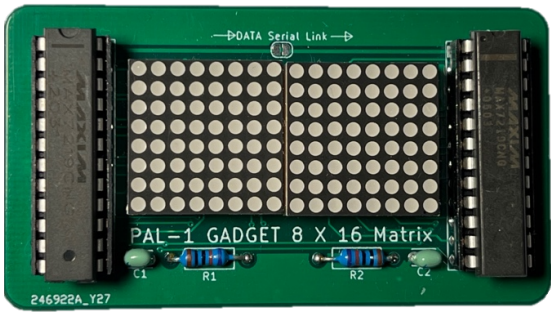
The output LEDs connected to eight PB ports of RIOT chip, driven directly by the RIOT peripheral ports.

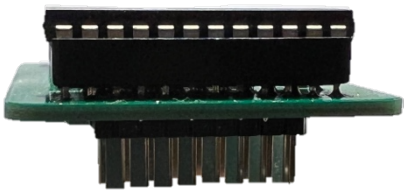
The input DPDT switches connected to eight PA ports of RIOT chip, each PA port will connect to GND when the slide is up and float when the slide is down. Cause these switches are DPDT (Double Pole Double Throw) switches, you can utilize the unused side, which is the left side from the back view, of these switches for your project just like the PA0 switch.

The buzzer speaker is connected to RIOT's PA0 when the PA0 switch is down and disconnect from RIOT's PA0 when the PA0

switch is up. The buzzer is driven by a 2N3904 transistor to provide a noticeable sound level.

- LED Matrix

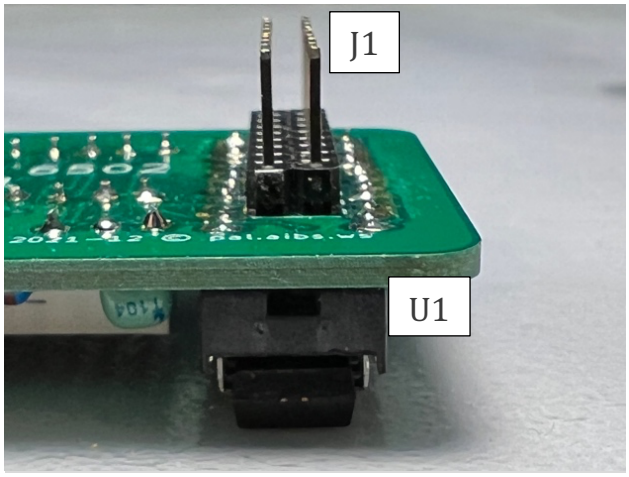




The LED Matrix card is a compact 8x16 dot LED matrix display. It consists of two 8x8 common anode LED matrixes (left and right), driven by two cascading MAX7219s.

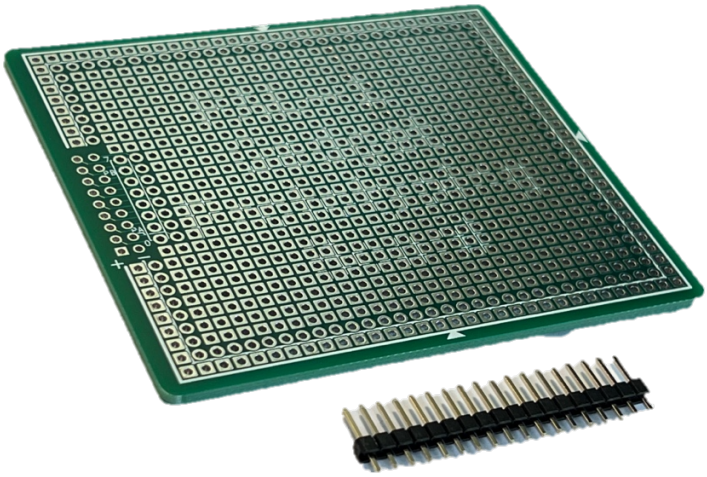
The LED Matrix card using PA1(Data In), PA2(LOAD) and PA3(CLOCK) of RIOT expansion card as 3-wire interface. Default circuit is cascading two MAX7219s to drive all 8x16 dot, you can cut the top-middle solder jumper pad and fly a wire from the RIOT pin you want to use to the right side MAX7219's Data in pin for the independent data-in control.

Assembly information: because the 2x9 pin head (J1) solder pads are inside one IC socket (U1) solder pads, you need to solder the J1 on the back side before soldering the U1 socket.



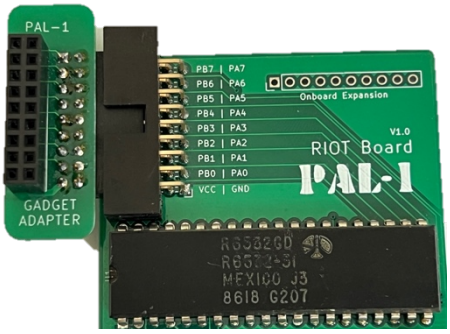
Please refer to the MAX7219 datasheet for usage.

- Protoboard



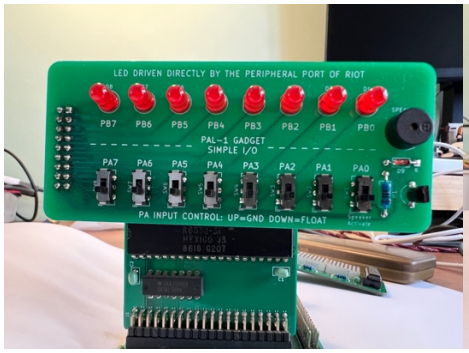
The Prototyping card is a 2.54 mm/0.1 inches hole-to-hole spacing 32x28 hole multipurpose circuit board. The most outer ring is the +5V rail from the PAL-1 power supply, the second outer ring (round solder pad) is the GND rail. The RIOT peripheral ports are mapped to the right side of the connector (round solder pad) for ease of use.

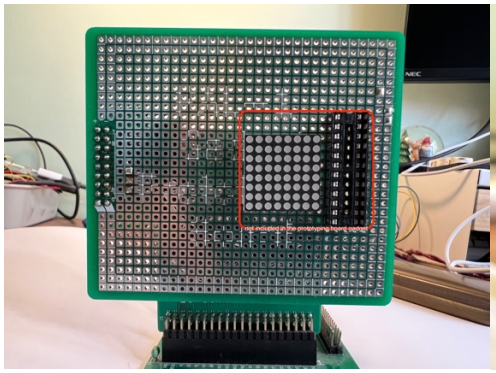
- Gadget Adapter

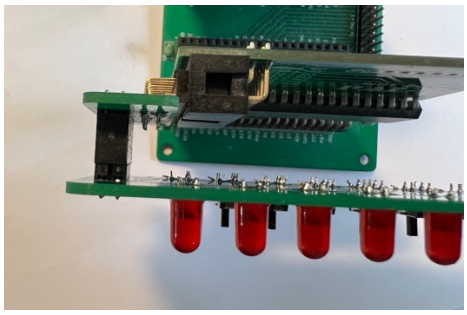


This adapter can connect RIOT gadgets to the RIOT expansion card easily and securely, please power off your PAL-1 system before connect/disconnect gadgets.

After connected, the computer system looks like these:







For interactive BOM, please visit http://pal.aibs.ws/ibom .