PICBOT HARDWARE

Describes the physical architecture of the PicBot hardware, Version 1C, including the schematic and PCB layout, components and wiring.

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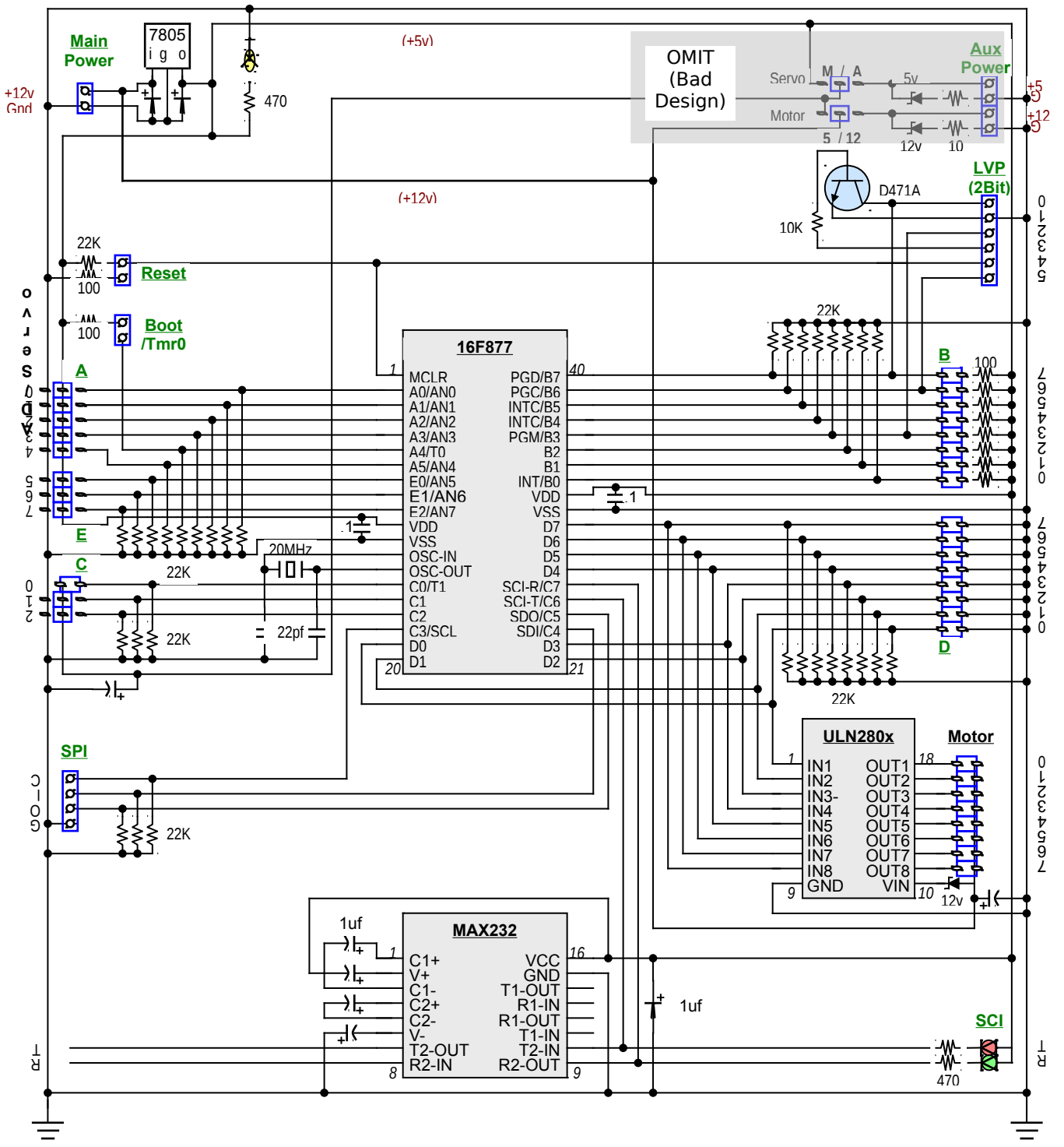
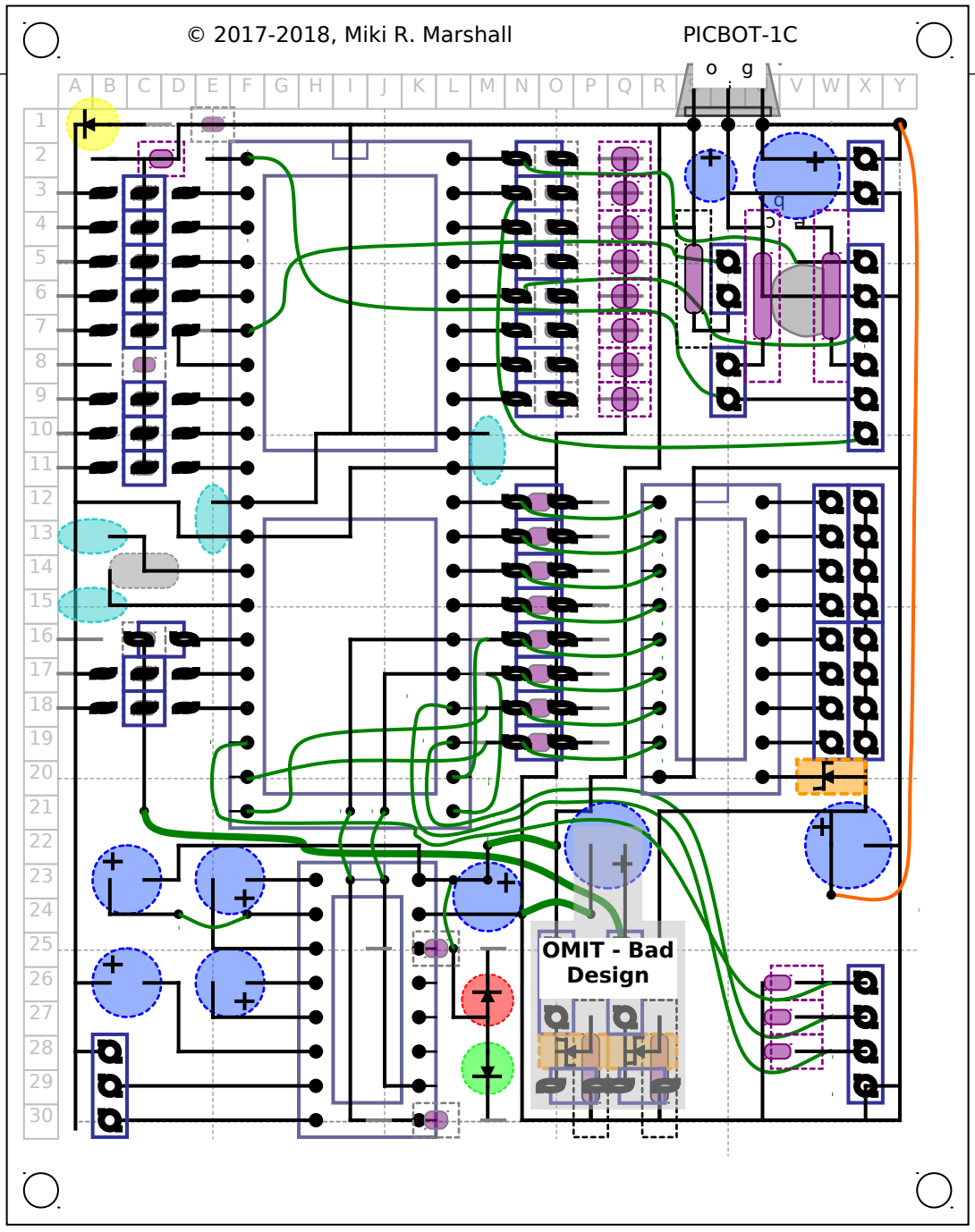
Schematic Diagram

A diagram of the wiring of the PIC microcontroller with its peripherals.

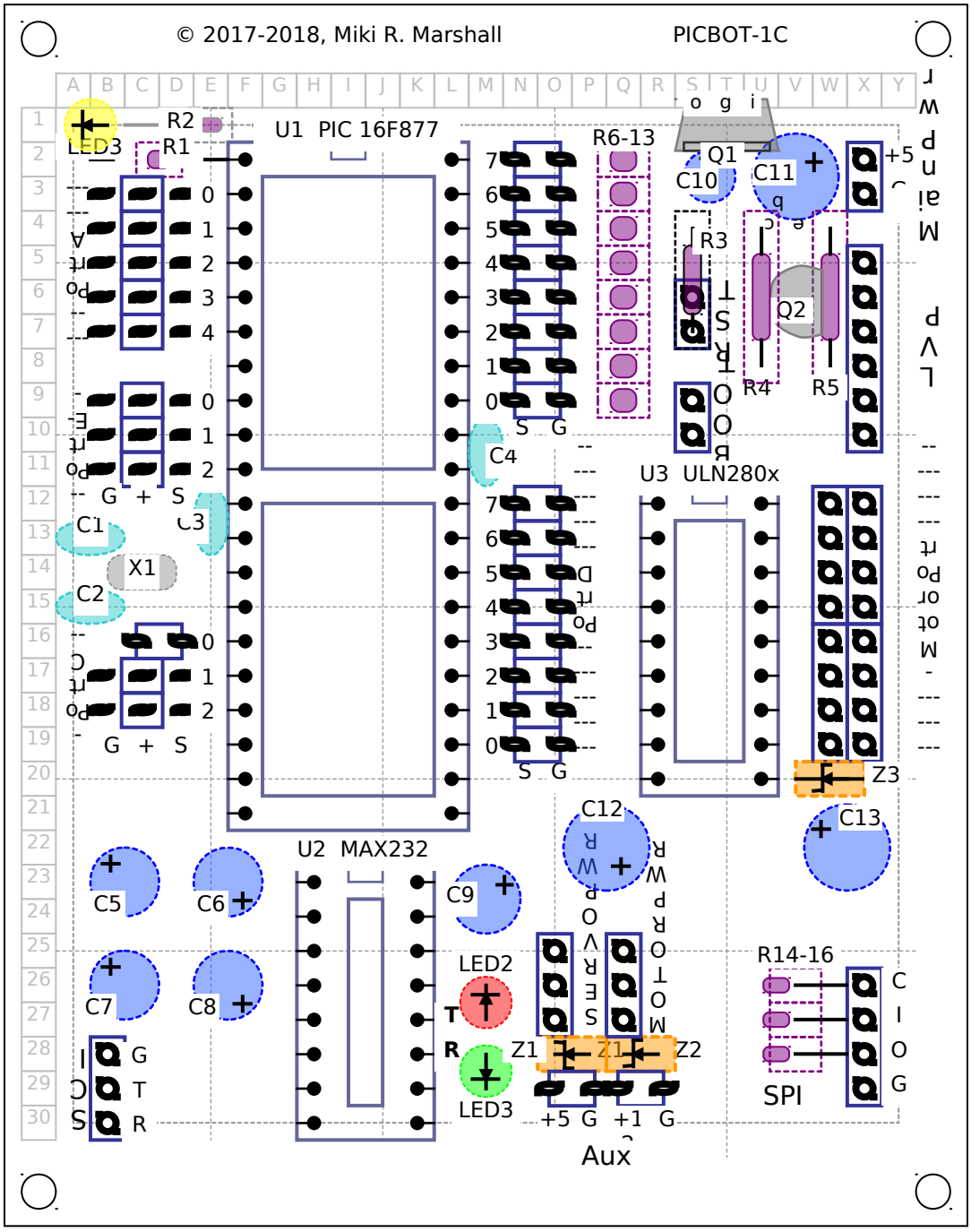


PCB Design

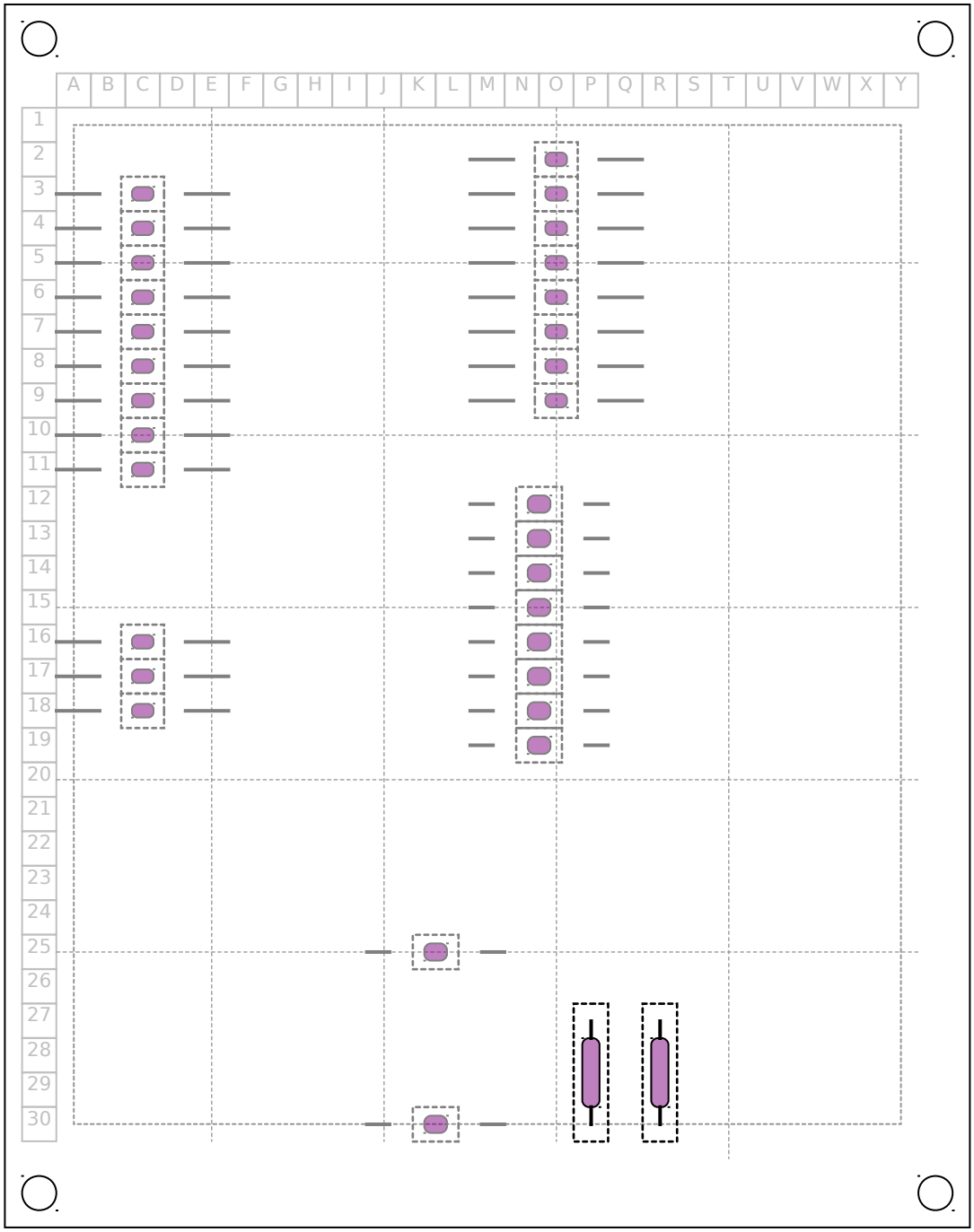
Component Layout - Both Sides



COMPONENTS & LABELS – FRONT-SIDE



COMPONENT LAYOUT – BACK SIDE (FRONT VIEW)



PCB Design Notes

DESIGN

The PCB for this version is built on a standard Radio Shack project patch board, which worked nicely (though got a little cramped for all of those resistors). One problem: The traces are not glued to the board very well, so any “repairs” changes, etc., usually lift the little copper squares off and call for ugly fixes, so you might want to avoid Radio Shack boards in the future.

CONSTRUCTION

Current

Using the above layout diagrams, particularly the last one, you can get an idea of where resistors were mounted on the back side of the board. Had there been handy resistor packs onhand at the time, I probably would have used those on top of the board. But they weren’t, so this kluge was created. Still, it works...

Much care was taken not to allow the resistor leads to come in contact with pass-thru leads they might be passing over, especially the longer-lead ones such as those beneath the headers of U1.

The rest of the components are mounted more traditionally (i.e., on the front). Some of the (green) jumper wires were run on the front side, many on the back, as space and confusion would allow. The back of that board did get quite busy after all was said and done, leaving the currently shown design to be the finished product as there is no room to add anything and the board itself will not take any further “modifications”.

Future

Use of resistor packs (inline) would greatly simplify the design and construction, getting rid of the rear-mounted resistors and making the whole board look a lot more friendly.

Another lesson, like not using Radio Shack PCBs, is to avoid the bent-pin (horizontal) headers. Especially for this board, with its loose traces, the sideways stresses put on them to connect anything to them almost immediately breaks the traces off of the board. The only solution was to glue the headers down to the board from the front with some craft glue (which makes it a little ugly at close inspection) and resolder the traces as tight as possible onto the pins again.

A similar problem occurred with the vertical headers, where the heat of soldering actually loosened the pins in the header and they slipped to random heights and had to be reset. Perhaps a cooler soldering iron, or tighter holes would have helped here.