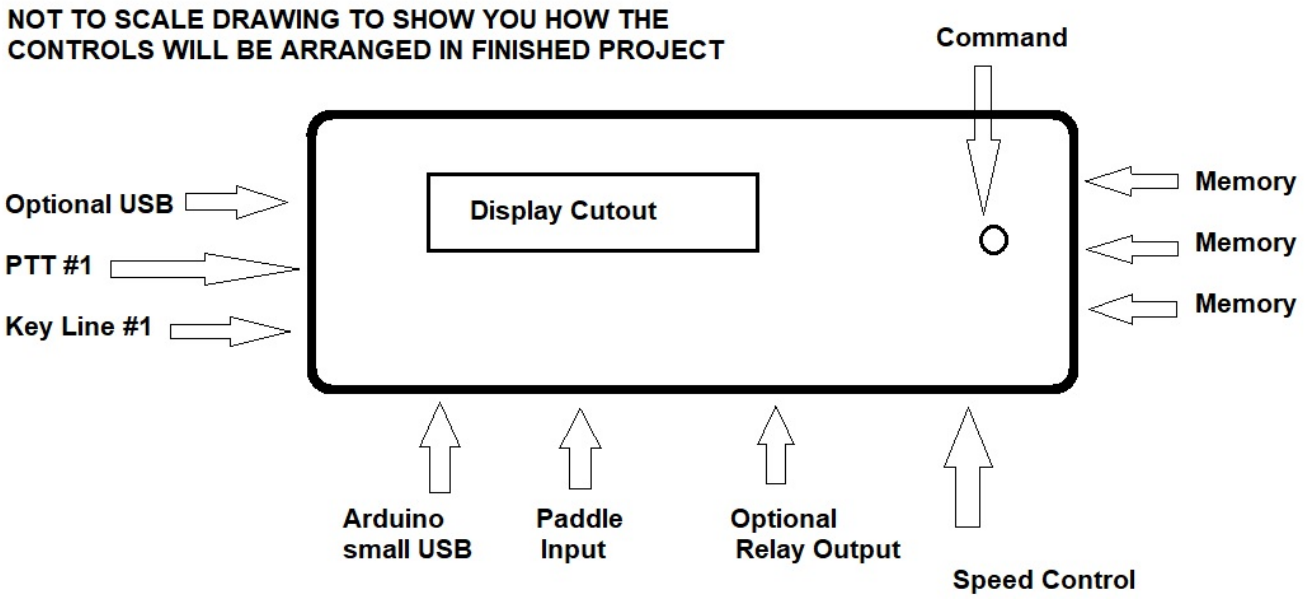
ARDUINO WINKEYER MOUNTING INSTRUCTIONS

DRAFT 0.1
GORDON GIBBY SEPTEMBER 2024

Drilling round holes (with an electric drill and drill bits) is a LOT EASIER than making square holes! Square holes can be made by

- Carefully drilling round holes at the insides of the corners, and then using a hacksaw or sabre saw to take out the straight lines -- this is very difficult and potential for injury is ever present
- Using a "nibbler" after drilling round holes at the insides of the corners
- Using a miniature circular saw (mounted on a dremel tool) to make the straight lines. This will usually unavoidably have some overshoot that must be covered by a bezel of some sort; an easy one can made made with black plastic electrical tape.

For this project, I elected to place "function" over "beauty" and just come up with the EASIEST mounting techniques possible for newcomers to building. This doesn't result in the most elegant outcome, but it is very functional.



Steps:

1. Place a template for the printed circuit board against what will be the lower left hand corner when the completed project is viewed from the TOP. (***Remember the board will be bottom side up because the display is on the bottom***.) Our chosen project box unfortunately has

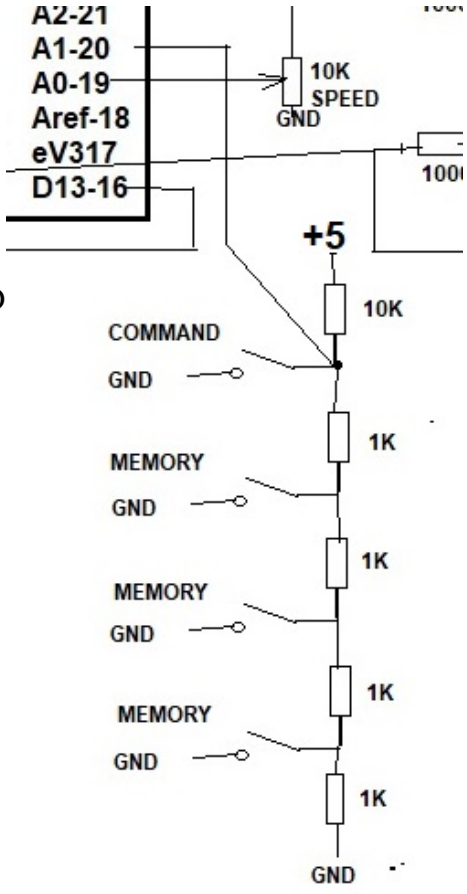
internal strenghtening members that push us a bit inward, but it still works. Mark and drill the found mounting holes for the standoffs on the board. The standoffs use 3mm screws which are 0.118" in diameter so a 1/8" drill bit works nicely for this.

2. Select standoffs that will position your board at a compromise such that the display is adequately close to the top surface of the box, but your connectors just below the mating surface between top and bottom portions of the box. Remember that you can combine 3mm standoffs. You want to use SCREWS from the top surface of the box, but it is perfectly acceptable to secure the board itself with nuts on screw-ends of standoffs depending on which you have available. The length should be chosen so that you can more easily drill the entrance holes to reach the connectors. Mark the line through the centers of the connectors on the lower portion of the enclosure so you will know at which height to DRILL. It is easier if your holes are just barely all within the LOWER portion of the box, rather than straddling both top and bottom. **If your drill holes will reach into the top portion of the board, it is important that you temporarily securely assembly the box for that portion of the drilling.**
3. Using the provided template, mark the square cutout to be constructed for visualization of the display. You may wish to compare to some of the previously constructed projects to adjust for any errors in the template.
4. Carry out the removal of the square opening for the display. If you are using a dremel-mini-circular saw, try to keep the circular blade perpendicular to the top surface, and try to avoid over-cutting as much as posible.
5. Using the template, mark the centers of each of the round holes that you will need to drill for connectors. If you have a 13.8VDC power line, add a mark for a hole to allow this to go through, remembering that it must hit the split of the box so you can pass the already assembled power line easily.
6. With careful control of the box so as to keep your hands out of reach of the drill, drill each of the required connector access holes.
7. For the speed control, which has an indexing pin, you will want to mark BOTH HOLES before drilling. The main hole can be made with a "wobbled" 1/4" drill or a straight 5/16"; the index pin should be marked exactly 0.3" from the center (think carefully how the control will be positioned to put the index hole in the right locaiton) and a diameter of 1/8"
8. Using sandpaper or a larger drill, remove sharp edges from all holes.
9. Now assemble your project.

	Connector	Suggested hole size	Comments
	3mm mounting screws	1/8"	
	USB Jack	3/4"	Avoid adding this unless absolutely necessary.
	PTT #1	1/2"	Helpful in contests but not absolutely necessary
	Key #1	1/2"	Necessary for solid state-keyed radios such as Icom/Yaesu
	Arduino small USB	1/2"	Necessary for computer control

	connector		
	3.5mm paddle connector	0.4" or greater; 7/16" or 1/2"	Necessary
	Relay phono output	1/2"	(used to control vacuum tube radios)
	Speed control main shaft	1/4" (wobbled) or 5/16"	Shaft is 0.265" Can use a 1/4" drill and "wobble" it a bit to enlarge hole, or 9/32 or a 5/16" bit. I would probably try the 1/4" first.
	Speed control index pin	1/8" exactly 0.3" from center of speed control shaft.	pin's width is 0.095" 1/8" bit works nicely.
	Buttons	1/4 wobbled just slightly	Button mounting diameter is 0.261" I suggest a 1/4" drill wobbled a bit or a 9/32"

WIRING BUTTONS



The buttons are wired point-to-point, and then inserted and wired to the board. You could use a pin and dupont wires for this if you wished and they were available, otherwise any suitable wire. There are multiple ground pads available. An earlier version of the schematic incorrectly showed the wiring of the 10K resistor. This has been corrected in this document.

Notice how the buttons function, by observing their CORRECTED schematic presented here:

One side of every button goes to GROUND. So you can run one wire daisy-=chain style from button to button to button, and to a ground point on the board (mutiple are provided).

The first resistor, directly from the board, is 10K. The remaining resistors are in SERIES TO GROUND from this point, and for each button desired, an additional 100 ohms should be wired in series to that button-- no matter how many buttons you decide to provide (which are totally optional). This is to match the programming.

When the COMMAND button is depressed, the A1 senses 0 volts and recognizes a command press.

When the first memory is pressed, A1 recognizes 1/(1+10) * 5 volts.

When the next memory is pressed, A1 recognizes 2/(2+10) * 5 volts.

And so on.

Do the point to point wiring of the buttons , providing a sufficient length between the COMMAND button and the first Memory button..... and only after that is completed, insert them into the case and wire to the board.