# Half size line follower board and experience at KES

David Hannaford

MINOS 2022

The UKMARS half size line follower board

- Purpose - To enable a UKMARSBOT to run on a half size course, which means it has to sense and follow a half width (10mm) line and detect half size course start, end and radius markers

- To be easily plugged straight into J1 on a UKMARSBOT main board

- To be simpler to build for schools than the basic line follower board - the transistor bypass and sensitivity resistor connectors are removed and components spaced out more for easier soldering

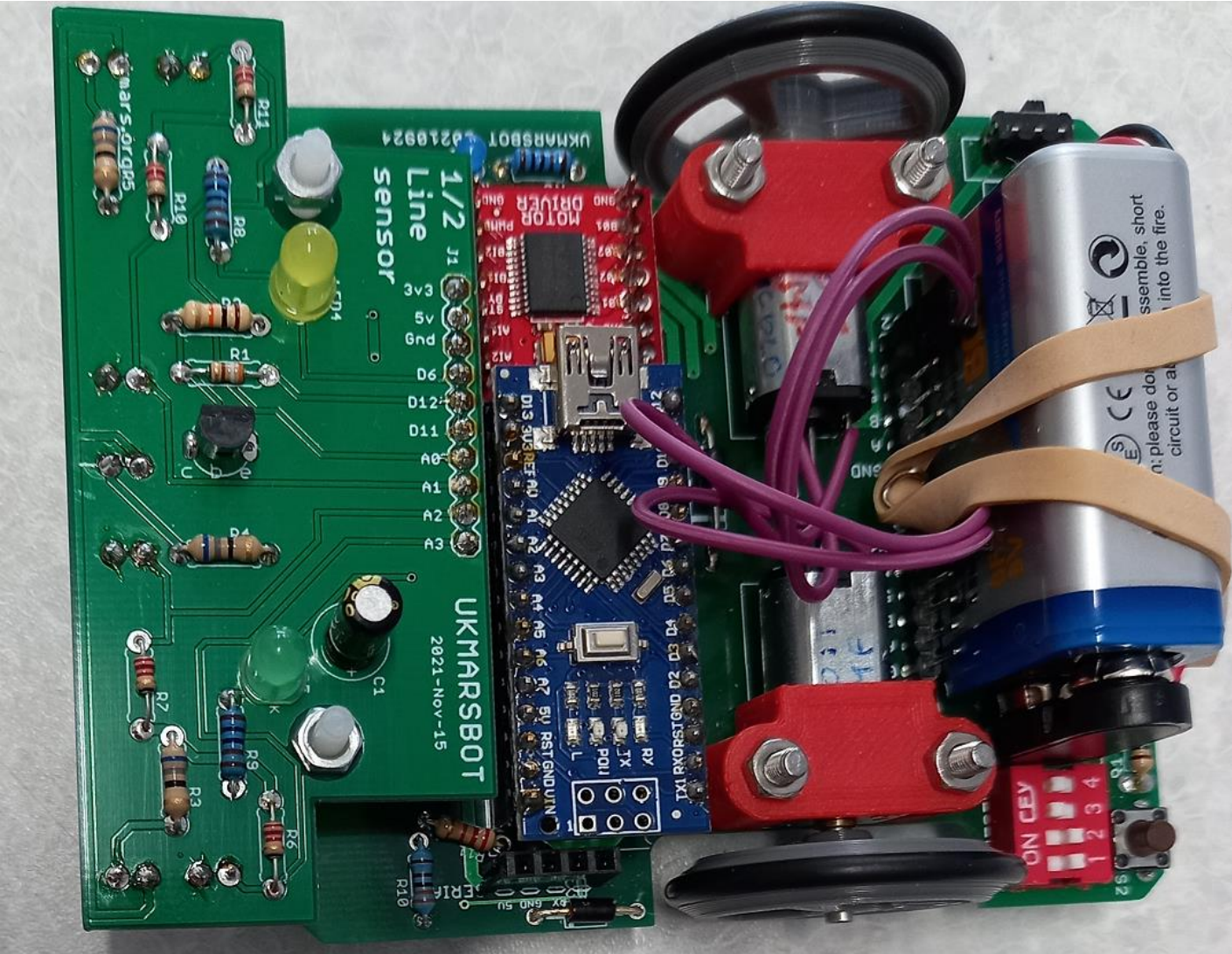- To be robust enough to withstand being dropped from a desk
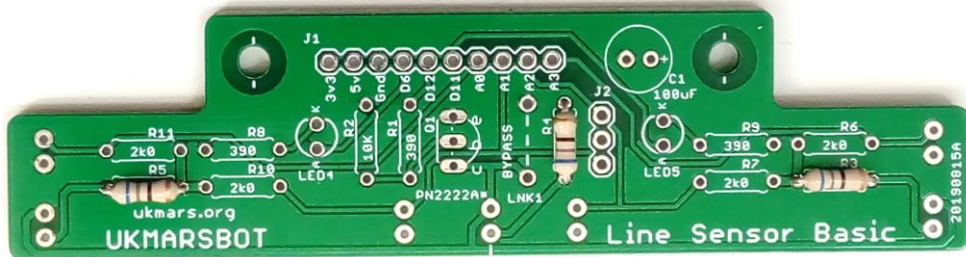
Standard line sensor basic
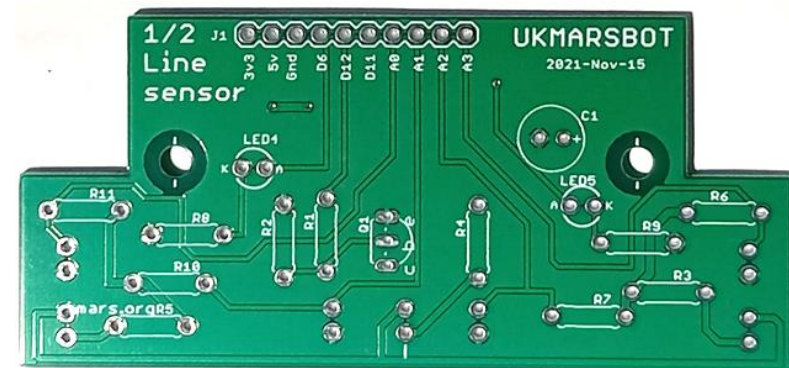
Half size line sensor

Bottom and Top view of board on UKMARSBOT

Experience at KES school

- 13 UKMARSBOTS were built this year
  UKMARSBOT main boards + ½ line sensor boards
- Boys really enjoyed acquiring soldering skills
- Initial minimal build of ½ size sensor had just the line sensor

All 13 minimal boards were built over 3 weeks in December
  All 13 worked

From January to end March we:

- Got boys coding line following and testing on ½ size track
- Added side sensor components to the boards
- Wrote code for drag race and trying to stop at end

Made some code procedures available online plus some tests such as motor test and phototest to read the sensor values at
https://www.davidhannaford.com/kes2020/examples.pdf

Hiccups

- About 10 resistors were put on the sensor board with the wrong value (out of about 140 resistors) But easily replaced when we found that the sensors did not give the right readings.

- One lad put LEDs in where the phototransistors should have gone

- A few dry joints occurred, but not many

- Quite a lot of battery leads got pulled off and had to be resoldered on

- Not having quite enough computers – meant that lads not busy coding got up to mischief some of the time

- Lots of the robots jumped off the test tracks on the desk and hit the floor but they all survived

Helpers

Two pupils who did KES "pi wars at home" last year and previously built Arduino based robots, plus one student from 6th form, came along to help the students to sort out error messages and bugs, as part of their D of E volunteering activities

What next?

- Lots of them will be here tomorrow for the schools challenges
- After Easter we expect to lose some boys due to sports practice and other school activities in that term. But for the rest:
- I would like to see the code for stopping implemented on more robots
- They will want to try controlling their robots from their phones. Then perhaps we could try a pi wars style competition bursting balloons or sumo
- It would be nice to try to learn the course or at least use the side markers to speed up and slow down. We don't have encoders on the robots and don't plan to put them on.
- I hope to bring some of the boys back for the June competition
- Then a new set of lads in September!!