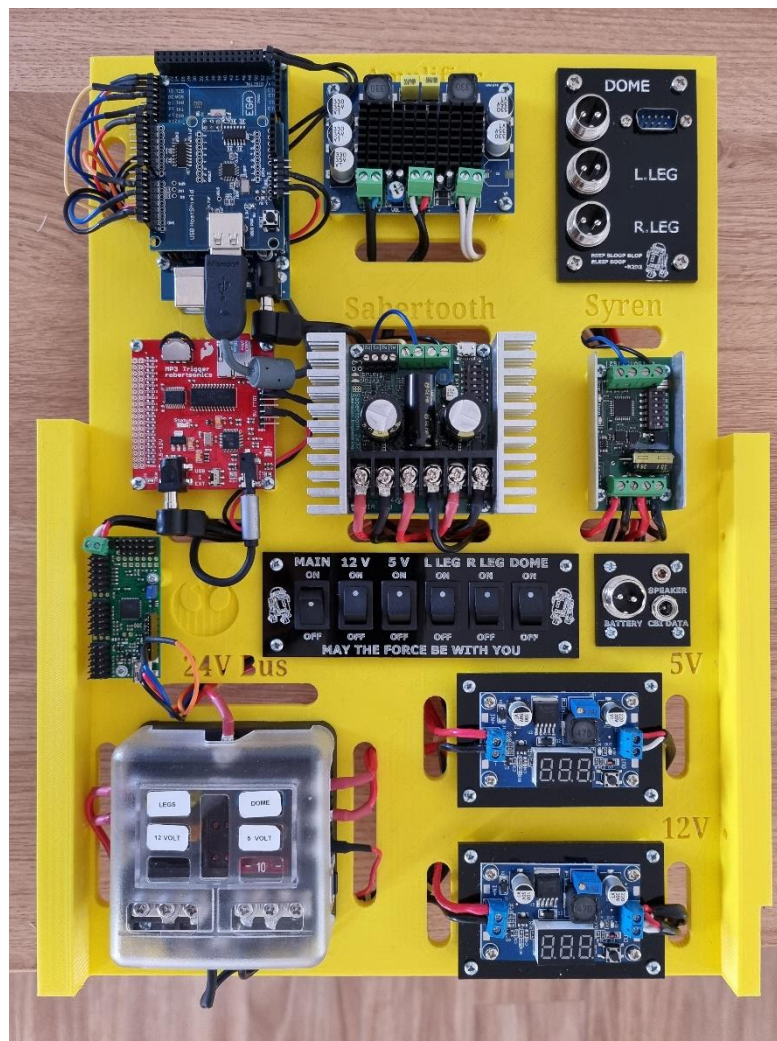


R2 Electronics

This is just a little write up for the electronics for r2d2 for the system that I am personally running, and can change from person to person depending on the options you would like to have in your r2 unit I will try and give as much details and information as I can and links to useful sources

Padwon 360

This is the drive system I am using; it is commonly referred as the cheapest and easiest system and most bang for your buck. it will give you drive controls for the wheels and dome as well as the function of sounds and can be hooked up to your dome lights (teeces) to give you little displays for sound and light functions as well a visual cues for speed. On top of this I have a mini maestro servo controller that controls all the servo motors for door opening and arms this requires some code into the padwon sketch but is quite easy.



Mounting board:

The board to mount your electronics to can be anything you would like as long as it is not conductive, I have 3d printed mine but a lot of people use a cutting board which works really well. The use of standoffs is a good idea to increase airflow and stop the underside of boards from getting damaged

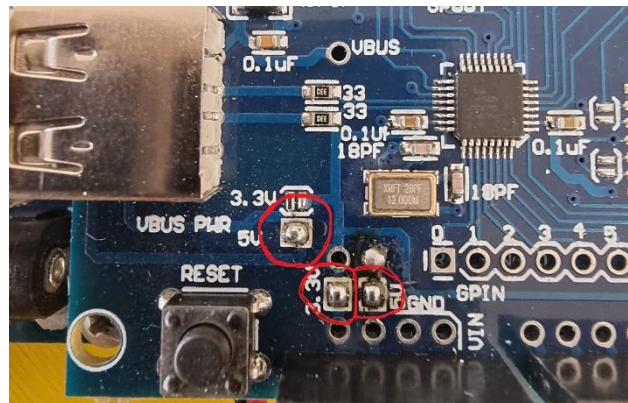
Arduino mega 2650:

An Arduino is like a small computer you upload programs to (sketches) and will work as the brain of the system these are readily available



USB host shield:

This sits directly on top of the Arduino mega and allows for a USB interface which is needed for the controller note: the board will need three bridges **soldered** to work as shown



Xbox 360 USB receiver:

This allows the controller to talk to the Arduino, some non-genuine don't work so it is best to get a genuine Microsoft if possible



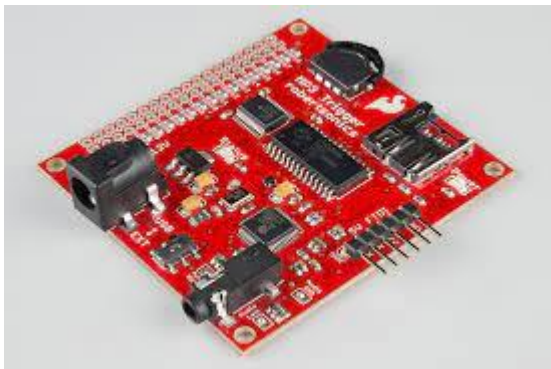
Xbox 360 controller:

This is what is used for the controls of the system once again some non-genuine controllers may not work so it is best to try and source a genuine controller



sparkfun mp3 trigger:

the sparkfun mp3 trigger is needed to play the sounds of R2 that are to be pre-loaded onto a micro SD card



Micro SD card:

The sound files need to be dragged onto this one by one in order not copied all at once other wise the wrong sounds will be played at the cues this doesn't have to be big a 4gb is bigger enough



Amplifier board:

This is very much up to you how big and loud you want to go. I went with a mono amplifier board for one single speaker and it is louder than it needs to be but you can have a stereo board (two speakers)



Speaker:

Once again the size of this speaker and how many you would like is up to you, I have 1 3 inch 15 w speaker which is the correct size to bolt behind the front vent and I found this to be extremely loud and very clear



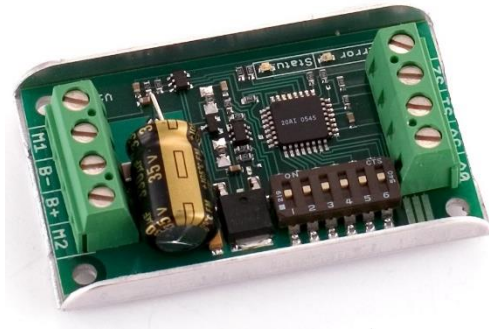
Sabertooth dual 32A motor driver:

This is to control the motors for the feet drive there is different sizes but this is the one that I found most people use



Syren 10:

This board is what connects to the dome motor



Fuse block with bus bar:

The fuse block is used to distribute power to all the components with fuses to protect the boards this is very important. You can get ones that hold more fuses its up to you. I use the one with the bus bar to have a common negative.

DC-DC buck converters:

Depending on what voltage system you go for, these are needed to drop the voltage to operate different boards if u are running 24 volt system you can use one to run all ur 12 volt components and one to run your 5 volt components



Mini Maestro:

This is not necessary if u don't want any of the doors or arms to move and there are other servo controllers you can use this is just one that I found was the best for me there are different sizes depending on how servos u may would like to control.



Feet motors:

This is up to you what motors you wish to use most use the ZY6812 electric scooter motors these are a direct fit into the feet drive system and come in a 12volt and 24 volt system. You will need two



Dome motors:

This is also a personal preference I personally used a 55RPM 12VDC Reversible Gearhead Motor from a local supplier, some people have motors with higher rpm this is up to you



Switches:

This is completely up to you I have single pole rocker switches that allow me to disconnect battery power, 12 volt power, 5 volt power and turn all motors off individually that I placed into a



Wires:

I'm not going to go into any details into the wiring up that can be found in the sources below

BODY:

Servos:

This is a list of servos for the body for a mk111

MG966

- 2 these are needed for the utility arms

S3003

- 3 of these are used to open the 3 doors of the body
- 1 of these are used for the gripper arm
- 1 of these are used for the utility arm

SG90

- 1 of these are used for the utility arm
- 1 of these are used for the gripper arm

Batteries:

Once again this is completely up to you there are endless possibilities some people use lipo batteries some use tool batteries and some use lead acid batteries this is completely dependent on your wants and needs

Plugs:

The plugs I used are just 2 pole dim plugs for the motors and the battery this is so its easy to remove the board if I want to pull it out the speaker is a 3.5mm jack and the cdi and data port are a standard 12volt power jack plug. I use a serial plug for the dome interface up to my slip ring

Slip ring:

The slip ring allows wires to go to the dome without being twisted or pulled with the rotation of the dome. Depending on the function of your droid the number of wires may vary I went with 12 wires

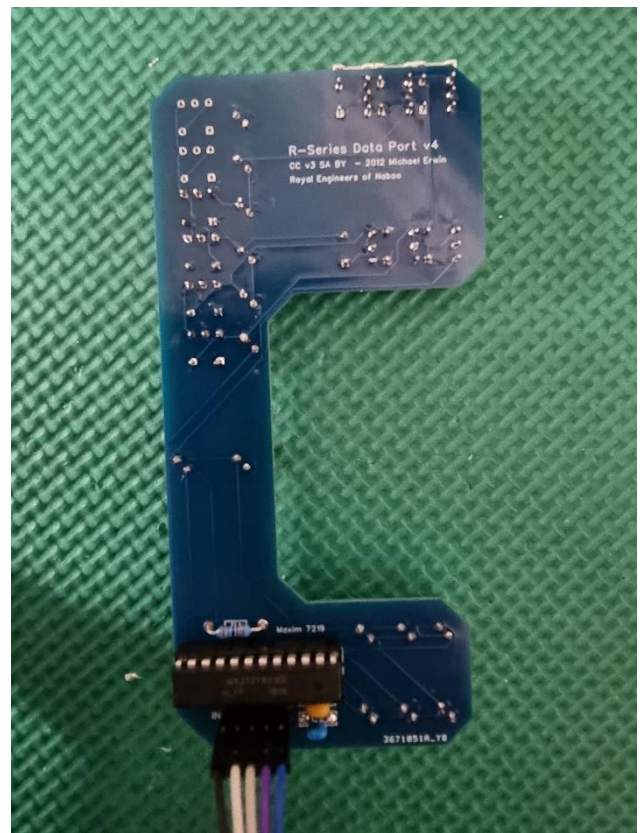
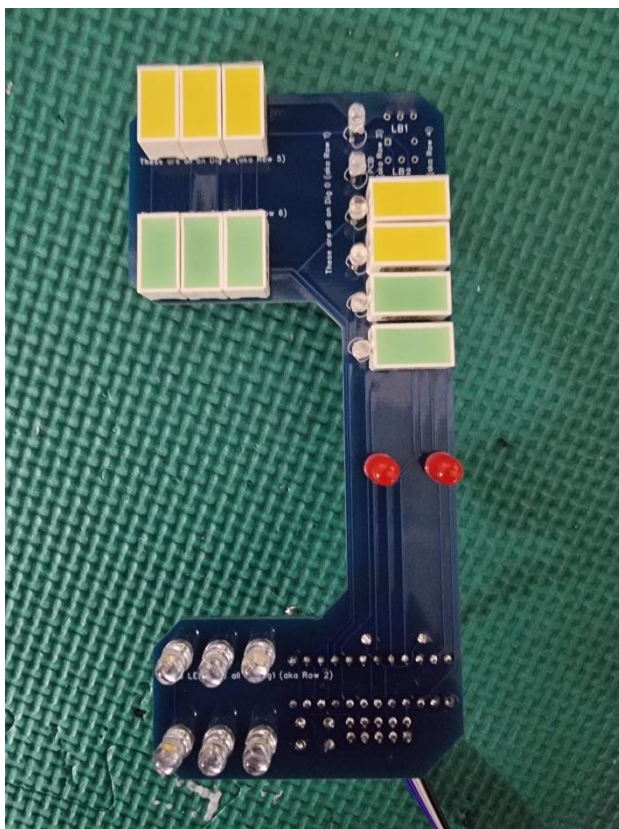


Lights:

The body lights you can have as much or as little as you like I have gone with the charge bay indicators and the data panel lights. These can be purchased complete, or you can make them yourself. I personally sent the gruber files to have pcb made and bought all the components and made them. The BOQ is as follows

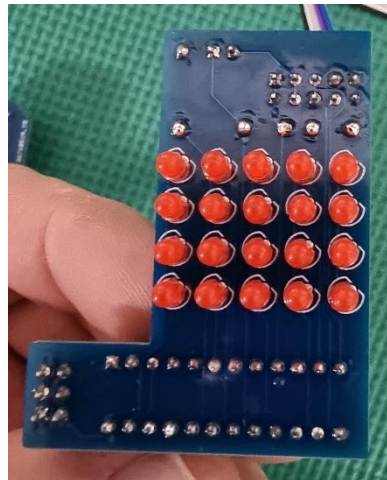
Data Port Components

2 x EDE2SRD Super Bright Red LED Light Bar	DE/2SURKD	56-1700
5 x EDE2SGD Super Bright Green LED Light Bar	DE/2CGKD	56-1705 or 56-1707 (Rapidonline)
5 x EDE2YD Yellow LED Light Bar	DE/2SYKD	56-1706 (Rapidonline)
6 x 5mm White – Diffused or Clear		
6 x 3mm Blue – CLEAR		
2 x 5mm Red – Diffused		
1 x 10uf Cap – C1		
1 x .1uf Cap – C2		
1 x 28k Ohm 1/4 Watt Resistor		
1 x Maxim 7219CNG IC		
2 x 5 pins		
1 x 2 pin		
1x 24 pin socket narrow		



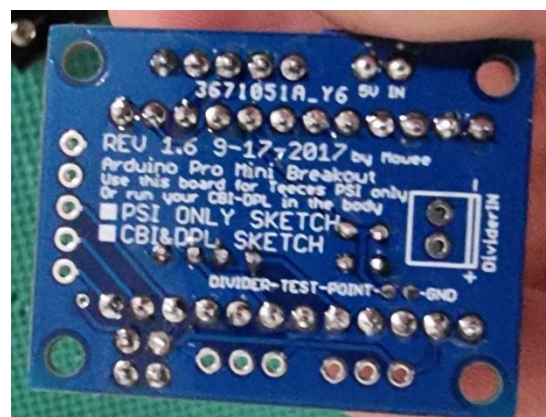
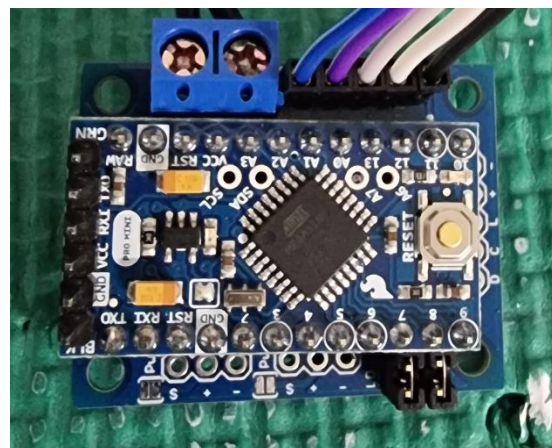
Charge bay Indicator Components

- 21 x 3mm Red – Diffused
- 1 x 3mm yellow – Diffused
- 1 x 3mm green – Diffused
- 1 x Maxim 7219CNG IC
- 1 x 10uf Cap – C1
- 1 x .1uf Cap – C2
- 1 x 24k Ohm 1/4 Watt Resistor
- 2 x 5 pins
- 4 x 2 pin
- 1 x jumper -SW
- 1 X 24 pin socket narrow



Break Out Board

- 1 x 5 pins
- 2 x 2 pins
- 2 X 12 pins
- 2 x jumper
- 2 x 1.5 Dual screw terminal
- 1 x 24 pin socket wide
- 1 x Arduino pro mini
- 1 x R1 47 K - 12 volt
- 1 x R2 24 K - 12 Volt
- 1 x R1 30k -24 Volt
- 1 X R2 6.2k -24 Volt
- 1 X R3 10k
- 1 X R4 10

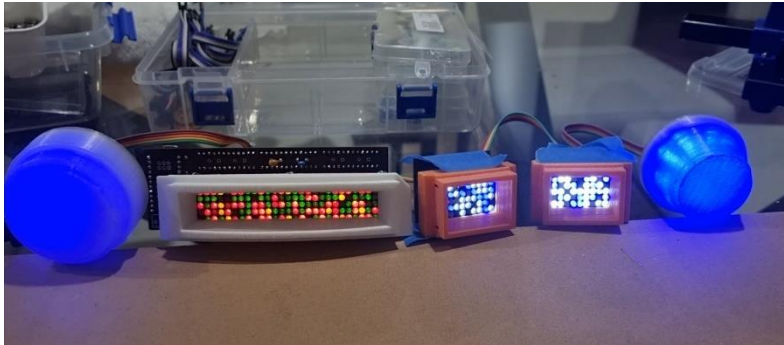


DOME:

The dome can have a lot of electronics for the different options of use

Teecess:

The teecess consist of 1 large rear logic display 2 small front logic display and 2 psi they run of an small arduino and can be a stand alone unit or can be connected to the body Arduino for different cues being displayed. These can be purchased complete pre-programmed as well but are also fairly easy to do yourself I had the PCBs made from gruber files and made them from scratch



- (1) Arduino ProMicro/ProMini (5V 16Mhz)
- (1) set of 5 PCBs
- (7) MAX7219 LED Driver chips
- (7) 24-pin narrow sockets (single-row DIP sockets can be used for PSI V3.2)
- (2) 10K resistors (for PSI's)
- (2) 24K resistors (for FLD)
- (1) 28K resistor (for RLD)
- (5) 0.1uF capacitors (1 per PCB)
- (5) 10uF capacitors (1 per PCB)
- (1) single-row long pin header
- (1) single-row long pin header
- (1) single-row female header (24-pin wide socket could alternatively be used)
- (1) double-row pin header
- (1) 2-position screw terminal

- (1) toggle on/off switch
- (1) piece of heatshrink tubing (for switch)
- (1) 9V battery connector
- REGULATOR PARTS (for RLD v3.1):**
- (1) LM7805 regulator
- (1) 1uF capacitors
- (1) 10uF capacitors
- LEDs:**
- (64) 3mm flangeless red (4 extra)
- (68) 3mm flangeless green (6 extra)
- (14) 3mm flangeless yellow (1 extra)
- (59) 3mm flangeless white (5 extra)
- (41) 3mm flangeless blue (5 extra)
- (14) each 5mm red, blue, green, yellow
- (4) 5mm bright white or warm white

WIRES:

- (2) 5-pin 8inch (RLD to rear PSI, FLD to front PSI)
- (1) 5-pin 24inch (RLD to FLD)
- (1) 5-pin 4inch (FLD to FLD)
- (2) 2-pin 12inch (used for HP LEDs)
- (2) 2-pin 8inch (used for HP LEDs)

CNC-CUT PARTS:

- (1) set of black acrylic logic bezels
- (1) set of non-glare clear acrylic logic screens
- (1) set of white Lexan PSI diffusers
- Note: PSI diffusers & boards fit standard 1 1/2" PVC DWV Couplings, found at any US hardware store.

Holo projectors:

The holo projectors can be either stationary or can move. To have them move you will need

2 SG90 servos per projector (total of 6)

There are a lot of different lighting options from

4 x 5mm LEDs per projector (total of 12)

to specific holoprojector boards most of which can be powered from the teecess this is a personal option and completely up to you to decide.

Dome Lift mechanism:

Matt Zwarts has designed a fantastic dome lift mechanism which can be found in the files ill list his hardware BOQ so its all in this one document but check out his files and all the information he has

- Micro switches: (10 off required)
- DC geared motors: (5 off required)
- Bearings: (3 off required)
- Arduino Mega: (1 off)
- DC-DC converter: (1 off)
- 9 gram servo: (4 off required)
- Servo Motor Driver: (1 off)
- Motor Driver Board: (3 off required)
- GT2 6mm wide Pulley Belt: (1 off 5m length, to be cut to suit)

On top of this **9gram servos GS90** are used to lift the pie panels and if u wish the side pannels it takes 1 servo per panel so the amount will depend on you.

Resources

<https://github.com/dankraus/padawan360> - this has all the files you will need for the padwon system including sound and the Arduino sketches for the body and dome, it has a good step by step instructions on where all the wires need to be connected and is a must read

<https://www.youtube.com/watch?v=SLkgoe9RS10> – Mr Michael Alan Baddeley himself YouTube explaining how the maestro system works and how to add it to your sketch to get the servos to work

<https://www.thingiverse.com/thing:3654411> – Matt Zwarts thing verse page with the details on the dome lift

<http://joymonkey.com/run/index.php?pg=tools> – joy monkeys page on the teecess

And of course, all of Mr Baddeley's instructions found in the patron page

Hope this info can be of some help

Regards Brent Talarico