Bens R2-D2 Electronic Diagram for Astrocomms Ultra & Benduino Dome Aio v2.0 – 2024/02

www.printed-droid.com

Warning:
I tried to do my best with verifiying that my connections are correct. But please don't rely on this diagram to 100% and make sure that your connections are ok. When it comes to troubleshooting remove everything and add one item at a time. Verify everything.
Add items until you run into trouble and then investigate the last added item!

The latest diagrams and files can always be found here: http://www.printed-droid.com/files/

Links to Firm- & Softwares:
https://www.printed-droid.com (search the wiki for the board you need software/firmware for)

Betterduino:
https://github.com/RealNobser/BetterDuinoFirmwareV4

External Links:
Shadow MD:
https://astromech.net/droidwiki/SHADOW_MD
https://astromech.net/forums/showthread.php?21984-SHADOW-Marcduino-Update-Thread

Marcduino:
https://www.curiousmarc.com/r2-d2/marcduino-system
https://astromech.net/forums/showthread.php?38382-Shady-RC-dEvolution-control
https://astromech.net/forums/showthread.php?38288-JoyMonkey-s-R2-Build-Log-Episode-2/page2

Teeces:
https://www.curiousmarc.com/r2-d2/teeces-dome-lights

XBEE:
https://www.curiousmarc.com/r2-d2/marcduino-system/marcduino-boards/installing-the-wifi-radio

12-14 AWG Wires:
50A Fuse to 50A Relais
50A Relais to 12-16V Fuse Block
12-16V Fuse Block to 12V Regulator
12V Regulator to 12V regulated Fuse Block
12-16V Fuse Block to Sabertooth 2x32A

12 AWG Wires:
Sabertooth 2x32A to Feet Motors

14-16 AWG Wires
12V Regulated Fuse Block to Slipring/Dome
12V Regulated Fuse Block to Amplifier

16-20 AWG
12-16V Fuse Block to Syren 10
Wires to 5V Regulators
Syren 10 to Dome Motor

All Other Cables are Standard Servo or Signal Wires ~AWG22

There are wire connections like RLD to Rear PSI which are drawn with 1 Wire but it's a 5 wire connection

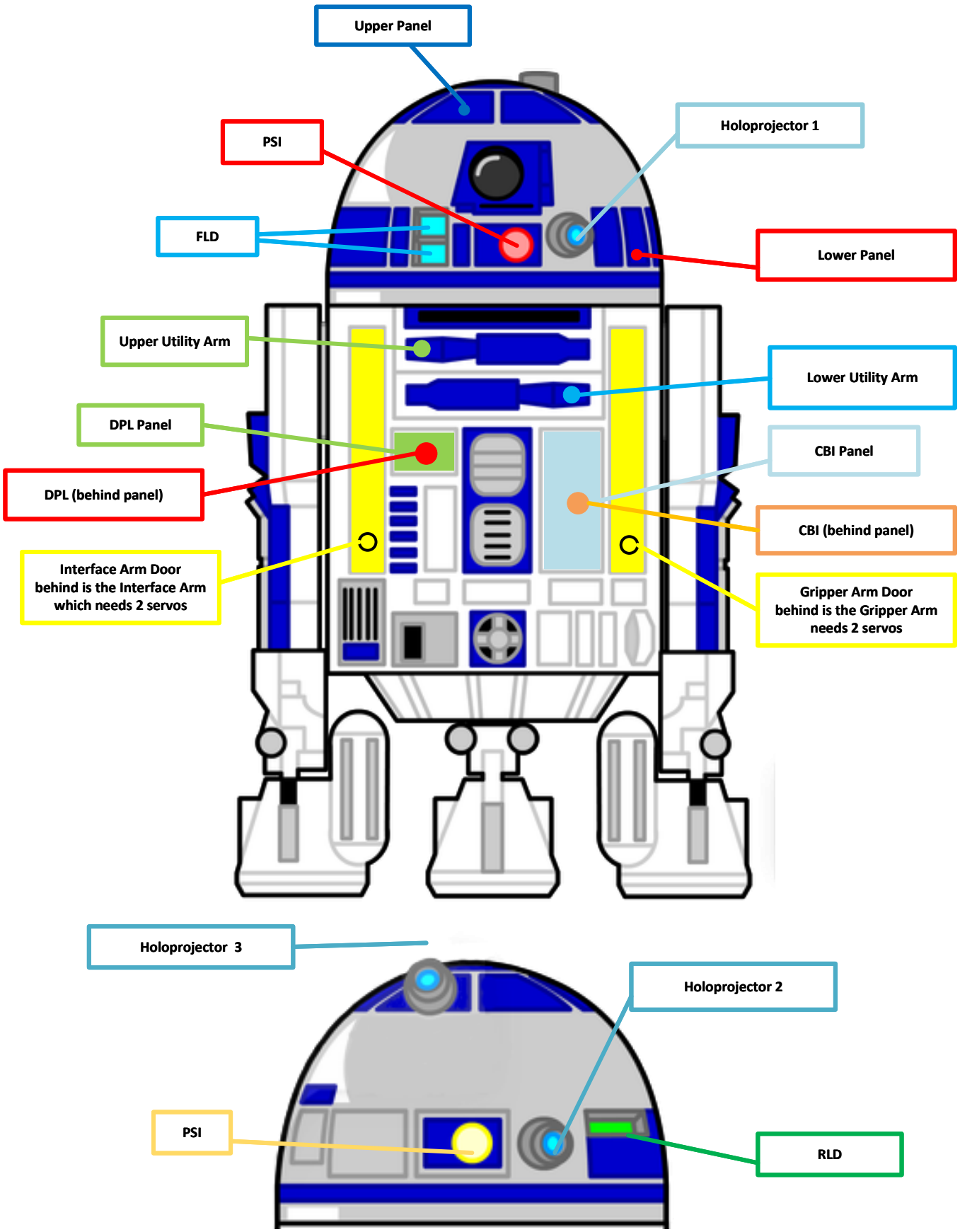
12 AWG = 34A max
14 AWG = 24A max
16 AWG = 20A max
18 AWG = 9.5A max
20 AWG = 6A max

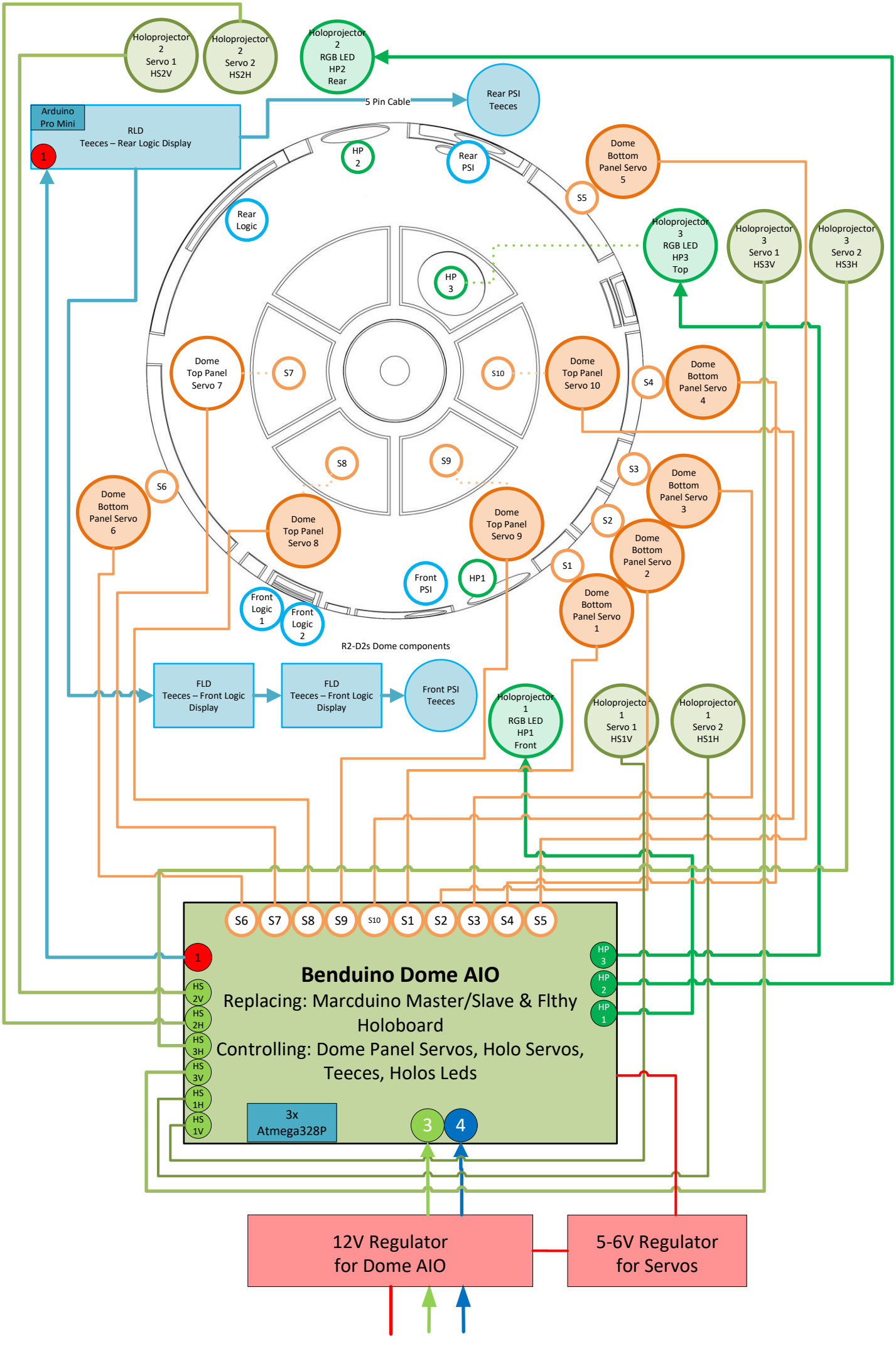
Needed Servos are:

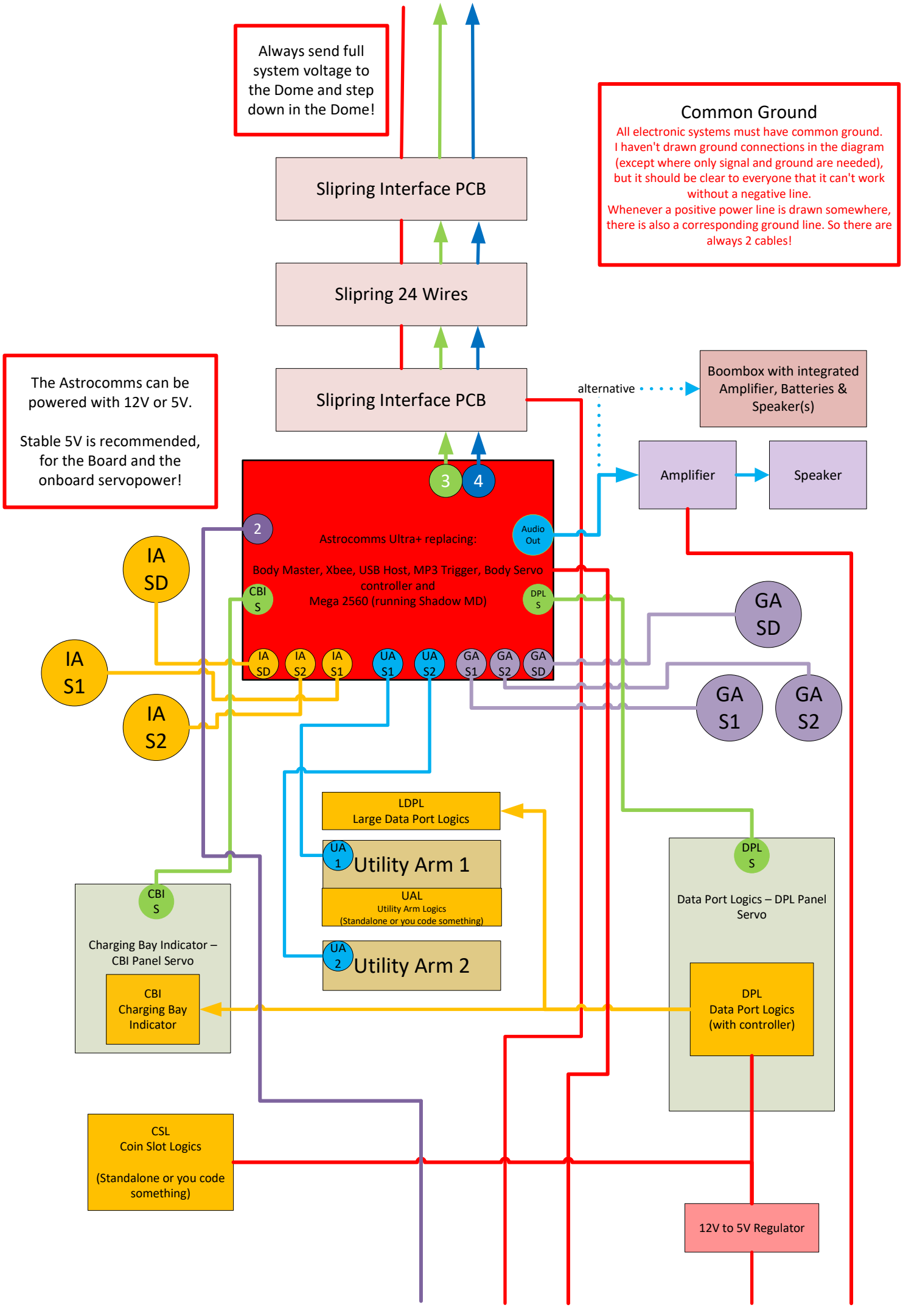
6x MG90 Holoprojector Servos
4x MG90 Dome Top Panel Servos
6x MG90 Dome Bottom Panel
2x MG90 CBI & DLP Door Servos
2x MG966 Utility Arm Servos
3x MG90 Interface Arm Servos
3x MG90 Gripper Arm Servos

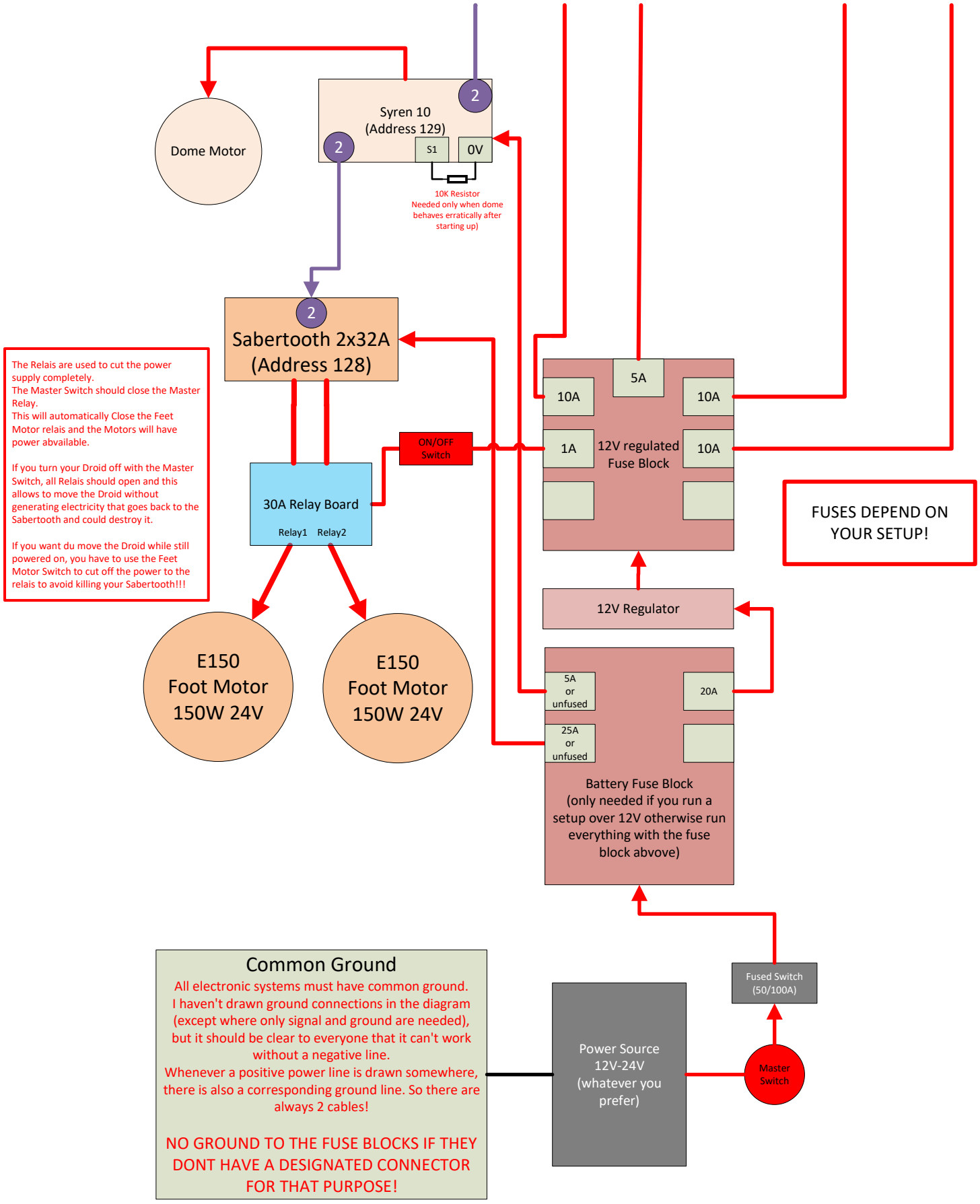
Instead of MG90 (metal gear) you can use SG90 (standard gear) – BUT use MG

Please not, that the needed servos depends on your the added „gadgets/functions"


Upper Panel
PSI
Holoprojector 1
FLD
Lower Panel
Upper Utility Arm
Lower Utility Arm
DPL Panel
CBI Panel
DPL (behind panel)
CBI (behind panel)
Interface Arm Door
behind is the Interface Arm
which needs 2 servos
Gripper Arm Door
behind is the Gripper Arm
needs 2 servos
Holoprojector 3
Holoprojector 2
PSI
RLD


Holoprojector 2 Servo 1 HS2V
Holoprojector 2 Servo 2 HS2H
Holoprojector 2 RGB LED HP2 Rear
5 Pin Cable
Rear PSI Teeces
Arduino Pro Mini
RLD
Teeces – Rear Logic Display
1
HP 2
Rear PSI
Rear Logic
Dome Bottom Panel Servo 5
S5
Holoprojector 3 RGB LED HP3 Top
Holoprojector 3 Servo 1 HS3V
Holoprojector 3 Servo 2 HS3H
HP 3
Dome Top Panel Servo 7
S7
S10
Dome Top Panel Servo 10
S4
Dome Bottom Panel Servo 4
S8
S9
S3
Dome Bottom Panel Servo 3
S6
Dome Bottom Panel Servo 6
Dome Top Panel Servo 8
Dome Top Panel Servo 9
S2
Dome Bottom Panel Servo 2
S1
Front PSI
HP1
Dome Bottom Panel Servo 1
Front Logic 1
Front Logic 2
R2-D2s Dome components
FLD
Teeces – Front Logic Display
FLD
Teeces – Front Logic Display
Front PSI Teeces
Holoprojector 1 RGB LED HP1 Front
Holoprojector 1 Servo 1 HS1V
Holoprojector 1 Servo 2 HS1H
S6 S7 S8 S9 S10 S1 S2 S3 S4 S5
1
HS 2V
HS 2H
HS 3H
HS 3V
HS 1H
HS 1V
HP 3
HP 2
HP 1
Benduino Dome AIO
Replacing: Marcduino Master/Slave & Flthy Holoboard
Controlling: Dome Panel Servos, Holo Servos, Teeces, Holos Leds
3x Atmega328P
3
4
12V Regulator for Dome AIO
5-6V Regulator for Servos


Always send full system voltage to the Dome and step down in the Dome!
Common Ground
All electronic systems must have common ground. I haven't drawn ground connections in the diagram (except where only signal and ground are needed), but it should be clear to everyone that it can't work without a negative line.
Whenever a positive power line is drawn somewhere, there is also a corresponding ground line. So there are always 2 cables!
Slipring Interface PCB
Slipring 24 Wires
Slipring Interface PCB
The Astrocomms can be powered with 12V or 5V.
Stable 5V is recommended, for the Board and the onboard servopower!
alternative
Boombox with integrated Amplifier, Batteries & Speaker(s)
Amplifier
Speaker
3
4
2
Astrocomms Ultra+ replacing:
Body Master, Xbee, USB Host, MP3 Trigger, Body Servo controller and
Mega 2560 (running Shadow MD)
Audio Out
CBI S
DPL S
IA SD
IA S1
IA S2
GA SD
GA S1
GA S2
IA SD
IA S2
IA S1
UA S1
UA S2
GA S1
GA S2
GA SD
LDPL
Large Data Port Logics
UA 1
Utility Arm 1
UAL
Utility Arm Logics
(Standalone or you code something)
UA 2
Utility Arm 2
CBI S
Charging Bay Indicator – CBI Panel Servo
CBI
Charging Bay Indicator
DPL S
Data Port Logics – DPL Panel Servo
DPL
Data Port Logics
(with controller)
CSL
Coin Slot Logics
(Standalone or you code something)
12V to 5V Regulator


Dome Motor
Syren 10
(Address 129)
2
2
S1
0V
10K Resistor
Needed only when dome
behaves erratically after
starting up)
2
Sabertooth 2x32A
(Address 128)
The Relais are used to cut the power supply completely.
The Master Switch should close the Master Relay.
This will automatically Close the Feet Motor relais and the Motors will have power abvailable.
If you turn your Droid off with the Master Switch, all Relais should open and this allows to move the Droid without generating electricity that goes back to the Sabertooth and could destroy it.
If you want du move the Droid while still powered on, you have to use the Feet Motor Switch to cut off the power to the relais to avoid killing your Sabertooth!!!
ON/OFF
Switch
30A Relay Board
Relay1 Relay2
5A
10A
10A
1A
12V regulated
Fuse Block
10A
FUSES DEPEND ON
YOUR SETUP!
12V Regulator
E150
Foot Motor
150W 24V
E150
Foot Motor
150W 24V
5A
or
unfused
20A
25A
or
unfused
Battery Fuse Block
(only needed if you run a setup over 12V otherwise run everything with the fuse block abvove)
Common Ground
All electronic systems must have common ground.
I haven't drawn ground connections in the diagram (except where only signal and ground are needed), but it should be clear to everyone that it can't work without a negative line.
Whenever a positive power line is drawn somewhere, there is also a corresponding ground line. So there are always 2 cables!
NO GROUND TO THE FUSE BLOCKS IF THEY DONT HAVE A DESIGNATED CONNECTOR FOR THAT PURPOSE!
Power Source
12V-24V
(whatever you
prefer)
Fused Switch
(50/100A)
Master
Switch

Needed system wiring:

1 1(3) Wire Connection (Signal - 5V - Ground) from Dome AIO „Teeces“ to the Teeces Board/Arduino RX (5V - Ground)

2 2 Wire Signal Connection Arduino Serial2 (Tx2 Pin 16) to Syren10 S1 & Arduino GND to Syren 0v

3 Astrocomms „Dome TX“ to Dome AIO „Astrocomms Master“ (or via RJ45)

4 Astrocomms „Flthy“ to Dome AIO „Flthy“ (or via RJ45)

Dome wiring:

S S1-S10 are the Dome Panel Servos
They are connected to the Dome AIO „Dome Panel“ Pins. Corresponding to the Pins on the Board.
For example S1 goes to Pin 1, S2 to Pin 2 and so on
This is a standard 3 wire Servo connection, 5V, Signal, Ground

HS HS are the Holoprojector Servos.
They’re connected to the Dome AIO Holo Pins. It’s labeled with Front/Rear/Top and H for horizontal and V for vertical
This is a standard 3 wire Servo connection, 5V, Signal, Ground

HP HP1 – HP3 are the Holoprojector LEDs. The are connected to the Dome AIO to the Pins labeled „Holo Leds“
Labeled with F, R & T (Front, Rear & Top)
This is a 3 wire connection, 5V, Signal, Ground

Body wiring:

CBIS CBIS is the CBI Door Servo. The Servo is connected to the Astrocomms Body Servos (Pin must be defined within the shadow MD sketch!)
This is a standard 3 wire Servo connection, 5V, Signal, Ground

DPLS DPLS is the DPL Door Servo. The Servo is connected to the Astrocomms Body Servos (Pin must be defined within the shadow MD sketch!)
This is a standard 3 wire Servo connection, 5V, Signal, Ground

UAS UAS are the Utility Arm Servos.
UA1 is the upper Utility Arm, UA2 is the lower UtilityArm.
They are connected to the Astrocomms Body Servos (Pins must be defined within the shadow MD sketch!)
This is a standard 3 wire Servo connection, 5V, Signal, Ground

IAS IAS are the Gripper Arm Servos.
IASD is the Gripper Arm Door Servo, IAS1 is the 1st Servo for the Gripper Arm and IAS2 is the second Gripper Arm Servo.
They are connected to the Astrocomms Body Servos (Pins must be defined within the shadow MD sketch!)
This is a standard 3 wire Servo connection, 5V, Signal, Ground

GAS GAS are the Gripper Arm Servos.
GASD is the Gripper Arm Door Servo, GAS1 is the 1st Servo for the Gripper Arm and GAS2 is the second Gripper Arm Servo.
They are connected to the Astrocomms Body Servos (Pins must be defined within the shadow MD sketch!)
This is a standard 3 wire Servo connection, 5V, Signal, Ground

Common Ground

All electronic systems must have common ground.
I haven't drawn ground connections in the diagram (except where only signal and ground are needed), but it should be clear to everyone that it can't work without a negative line.
Whenever a positive power line is drawn somewhere, there is also a corresponding ground line. So there are always 2 cables!