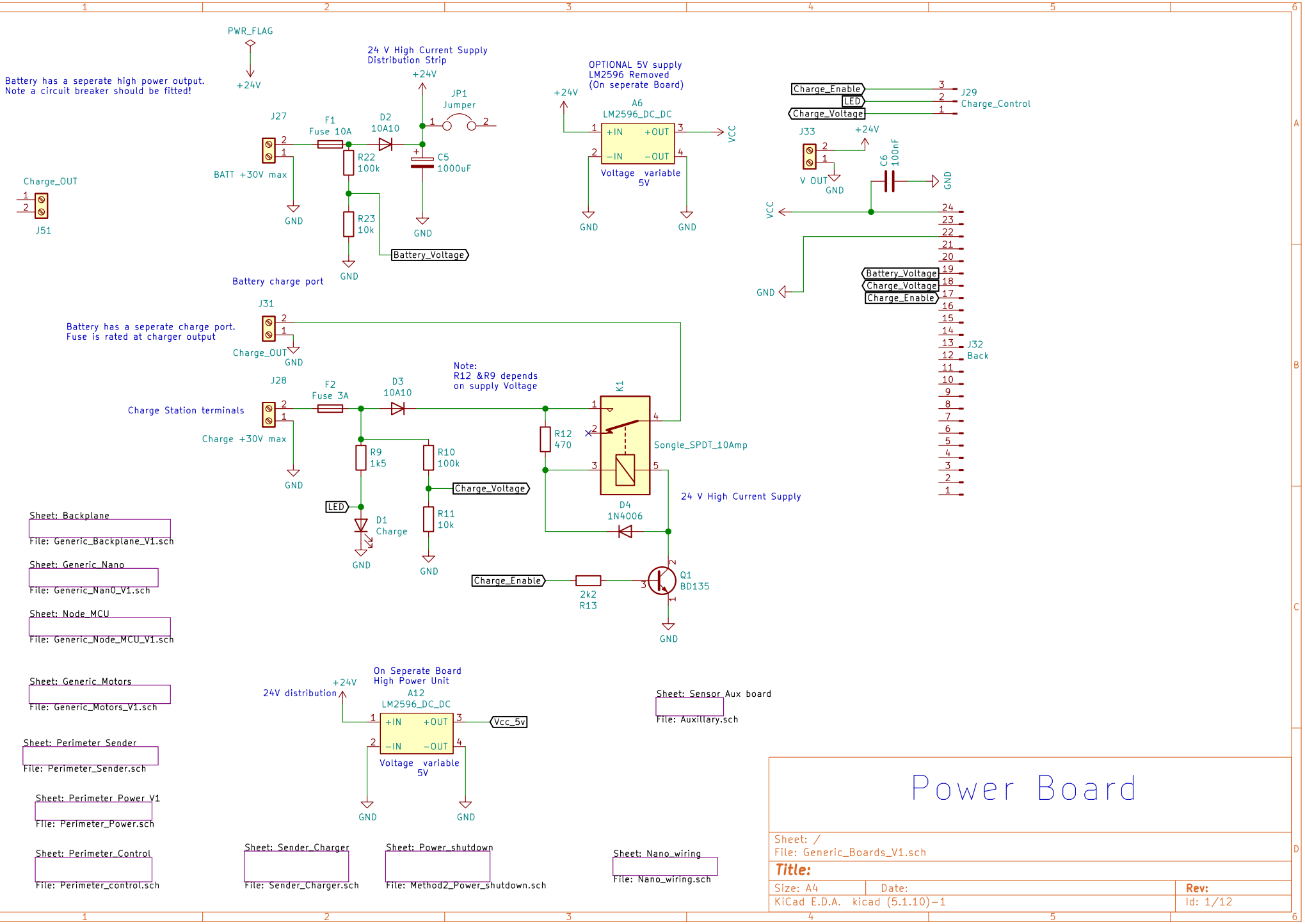
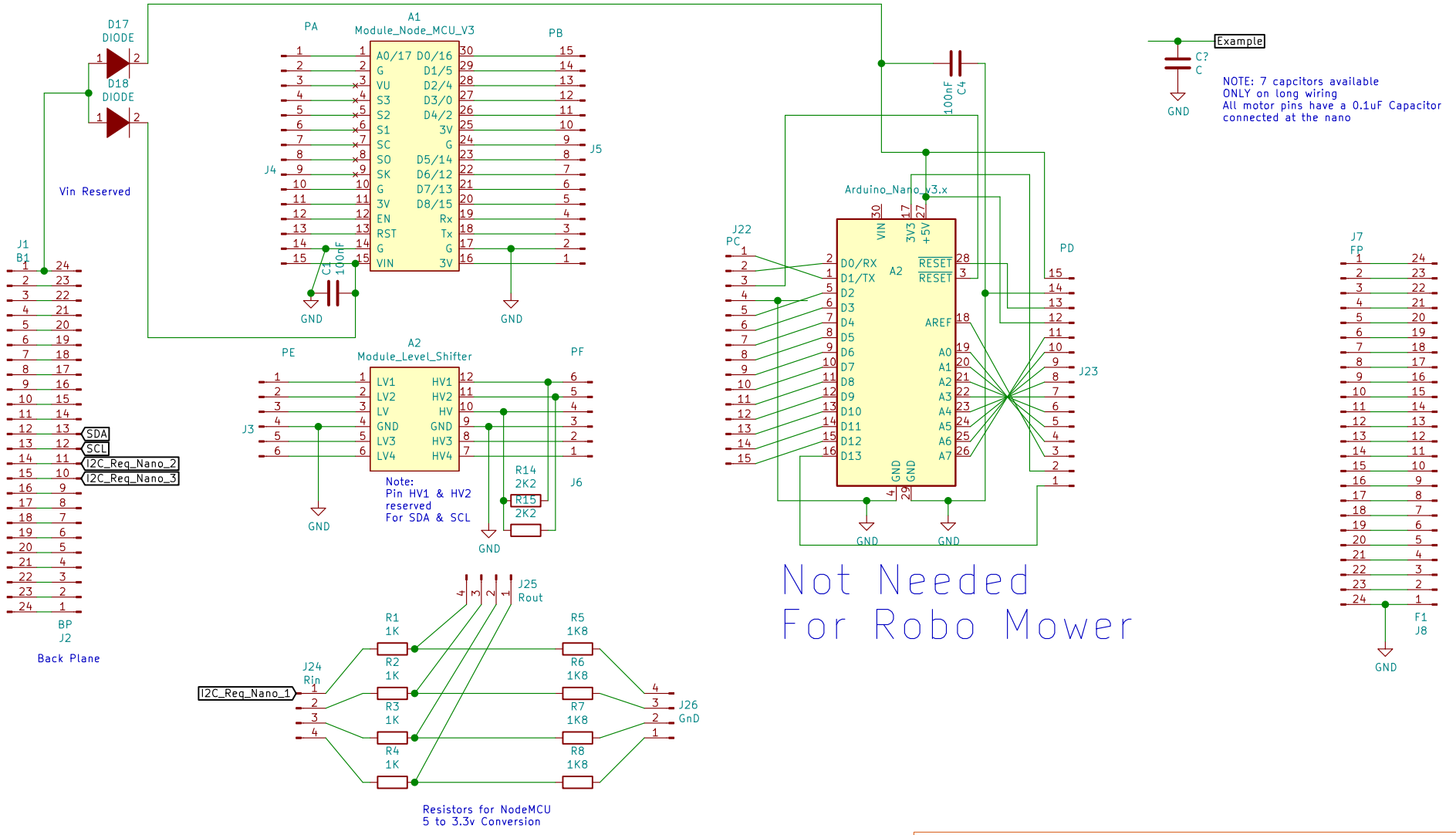
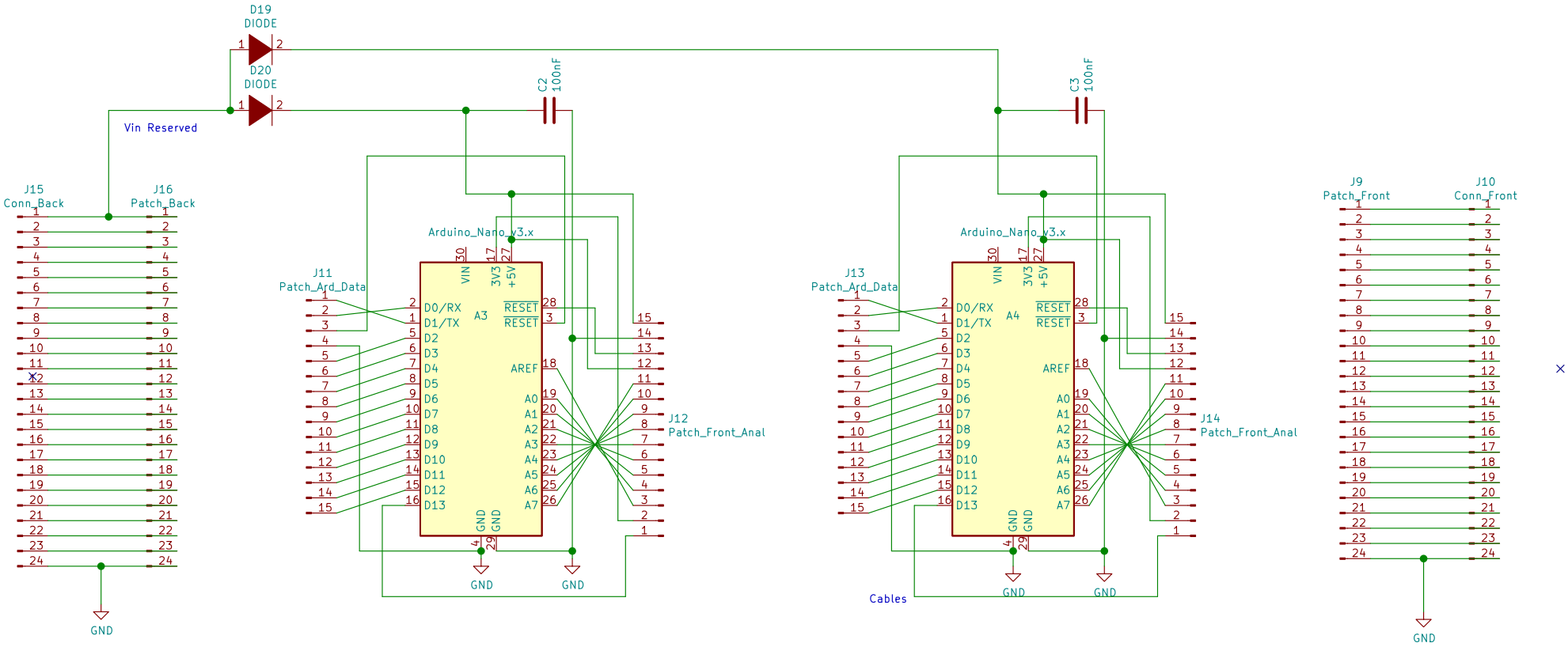
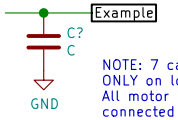

PWR_FLAG
+24V
Battery has a seperate high power output.
Note a circuit breaker should be fitted!
24 V High Current Supply
Distribution Strip
+24V
JP1
Jumper
J27
F1
Fuse 10A
D2
10A10
BATT +30V max
R22
100k
C5
1000uF
GND
R23
10k
Battery_Voltage
Battery charge port
Charge_OUT
J51
OPTIONAL 5V supply
LM2596 Removed
(On seperate Board)
A6
LM2596_DC_DC
+IN
+OUT
-IN
-OUT
VCC
Voltage variable
5V
Charge_Enable
LED
Charge_Voltage
J29
Charge_Control
J33
V OUT
C6
100nF
Battery_Voltage
Charge_Voltage
Charge_Enable
J32
Back
Battery has a seperate charge port.
Fuse is rated at charger output
J31
Charge_OUT
J28
F2
Fuse 3A
D3
10A10
Charge Station terminals
Charge +30V max
Note:
R12 &R9 depends
on supply Voltage
K1
R12
470
Songle_SPDT_10Amp
R9
1k5
R10
100k
R11
10k
D1
Charge
D4
1N4006
24 V High Current Supply
Q1
BD135
2k2
R13
Sheet: Backplane
File: Generic_Backplane_V1.sch
Sheet: Generic_Nano
File: Generic_Nano_V1.sch
Sheet: Node_MCU
File: Generic_Node_MCU_V1.sch
Sheet: Generic_Motors
File: Generic_Motors_V1.sch
Sheet: Perimeter_Sender
File: Perimeter_Sender.sch
Sheet: Perimeter_Power_V1
File: Perimeter_Power.sch
Sheet: Perimeter_Control
File: Perimeter_control.sch
On Seperate Board
High Power Unit
24V distribution
A12
LM2596_DC_DC
Vcc_5v
Sheet: Sender_Charger
File: Sender_Charger.sch
Sheet: Power_shutdown
File: Method2_Power_shutdown.sch
Sheet: Sensor_Aux board
File: Auxillary.sch
Sheet: Nano_wiring
File: Nano_wiring.sch
Power Board
Sheet: /
File: Generic_Boards_V1.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.1.10)-1
Id: 1/12


D17
DIODE
D18
DIODE
Vin Reserved
J1
B1
BP
J2
Back Plane
SDA
SCL
I2C_Req_Nano_2
I2C_Req_Nano_3
A1
Module_Node_MCU_V3
PA
PB
J4
J5
A0/17 D0/16
G D1/5
VU D2/4
S3 D3/0
S2 D4/2
S1 3V
SC G
SO D5/14
SK D6/12
G D7/13
3V D8/15
EN Rx
RST Tx
G G
VIN 3V
C1
100nF
GND
A2
Module_Level_Shifter
PE
PF
J3
J6
LV1 HV1
LV2 HV2
LV HV
GND GND
LV3 HV3
LV4 HV4
Note:
Pin HV1 & HV2
reserved
For SDA & SCL
R14
2K2
R15
2K2
J25
Rout
J24
Rin
J26
GnD
I2C_Req_Nano_1
R1
1K
R2
1K
R3
1K
R4
1K
R5
1K8
R6
1K8
R7
1K8
R8
1K8
Resistors for NodeMCU
5 to 3.3v Conversion
100nF
C4
Arduino_Nano_v3.x
J22
PC
PD
J23
A2
VIN
3V3
+5V
D0/RX
D1/TX
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
RESET
RESET
AREF
A0
A1
A2
A3
A4
A5
A6
A7
GND
GND
Example
C?
C
GND
NOTE: 7 capcitors available
ONLY on long wiring
All motor pins have a 0.1uF Capacitor
connected at the nano
J7
FP
F1
J8
GND
Not Needed
For Robo Mower
NodeMCU and Nano Board
Sheet: /Node_MCU/
File: Generic_Node_MCU_V1.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.1.10)-1
Id: 2/12



Noise supression on long motor wiring



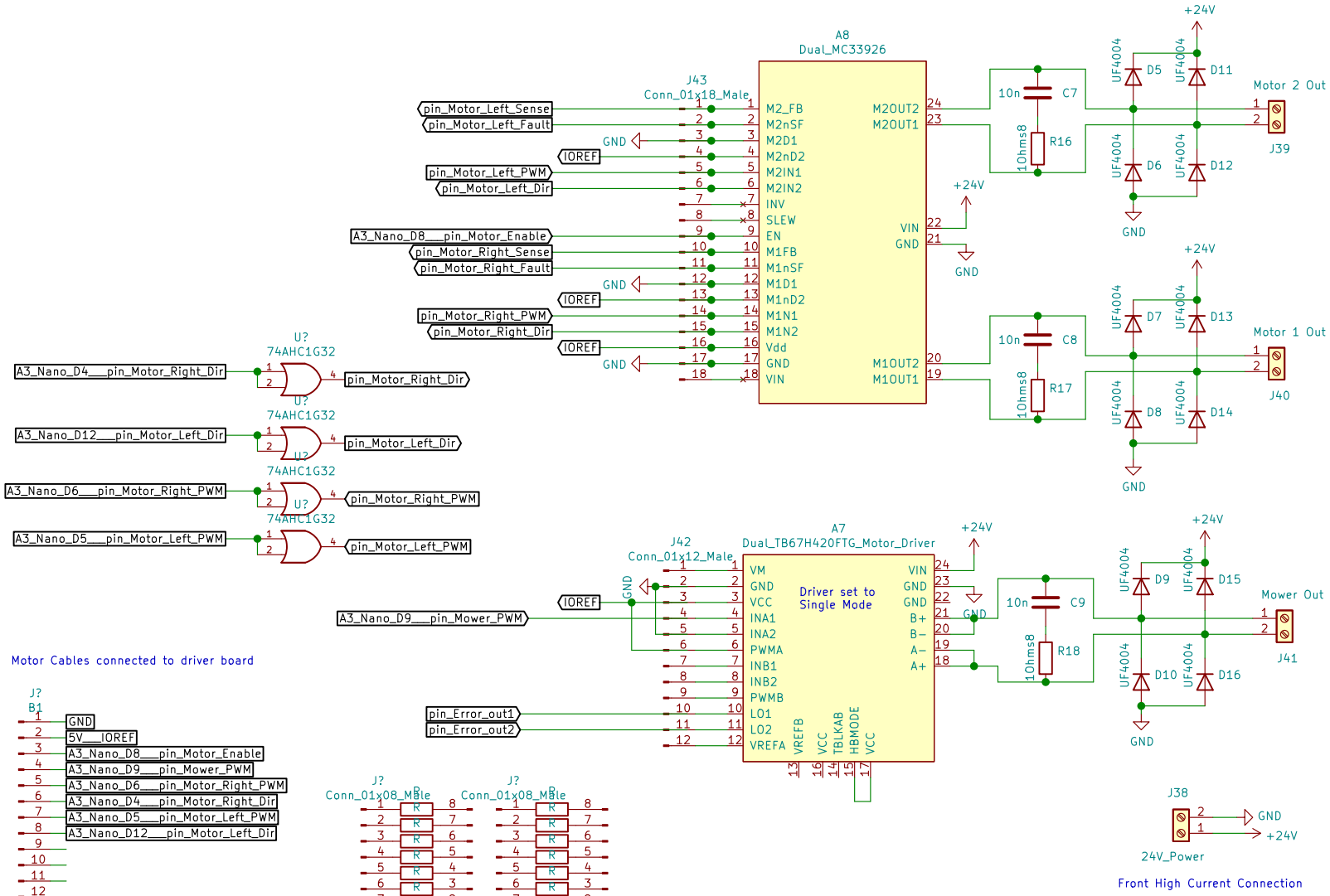
NOTE: 7 capcitors available
ONLY on long wiring
All motor pins have a 0.1uF Capacitor
connected at the nano

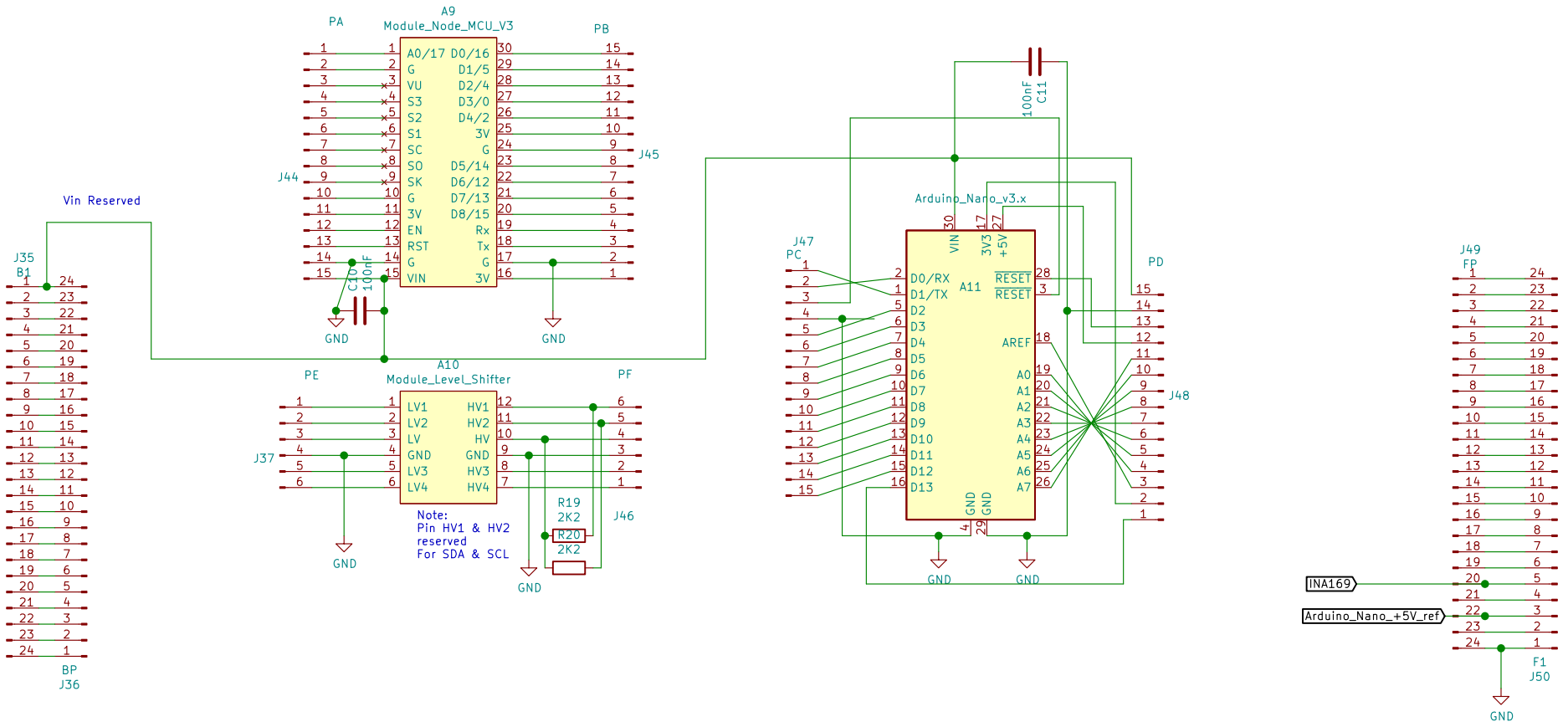
Typical Dual Nano Board

Sheet: /Generic_Nano/
File: Generic_Nan0_V1.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 3/12


A8
Dual_MC33926
J43
Conn_01x18_Male
pin_Motor_Left_Sense
pin_Motor_Left_Fault
GND
IOREF
pin_Motor_Left_PWM
pin_Motor_Left_Dir
A3_Nano_D8___pin_Motor_Enable
pin_Motor_Right_Sense
pin_Motor_Right_Fault
pin_Motor_Right_PWM
pin_Motor_Right_Dir
M2_FB
M2nSF
M2D1
M2nD2
M2IN1
M2IN2
INV
SLEW
EN
M1FB
M1nSF
M1D1
M1nD2
M1N1
M1N2
Vdd
GND
VIN
M2OUT2
M2OUT1
VIN
GND
M1OUT2
M1OUT1
+24V
GND
10n
C7
10Ohms8
R16
UF4004
D5
D11
D6
D12
Motor 2 Out
J39
10n
C8
10Ohms8
R17
D7
D13
D8
D14
Motor 1 Out
J40
U?
74AHC1G32
A3_Nano_D4___pin_Motor_Right_Dir
pin_Motor_Right_Dir
A3_Nano_D12___pin_Motor_Left_Dir
pin_Motor_Left_Dir
A3_Nano_D6___pin_Motor_Right_PWM
pin_Motor_Right_PWM
A3_Nano_D5___pin_Motor_Left_PWM
pin_Motor_Left_PWM
A7
Dual_TB67H420FTG_Motor_Driver
J42
Conn_01x12_Male
A3_Nano_D9___pin_Mower_PWM
pin_Error_out1
pin_Error_out2
VM
GND
VCC
INA1
INA2
PWMA
INB1
INB2
PWMB
LO1
LO2
VREFA
Driver set to
Single Mode
VIN
GND
GND
B+
B−
A−
A+
VREFB
VCC
TBLKAB
HBMODE
VCC
10n
C9
10Ohms8
R18
D9
D15
D10
D16
Mower Out
J41
Motor Cables connected to driver board
J?
B1
GND
5V___IOREF
A3_Nano_D8___pin_Motor_Enable
A3_Nano_D9___pin_Mower_PWM
A3_Nano_D6___pin_Motor_Right_PWM
A3_Nano_D4___pin_Motor_Right_Dir
A3_Nano_D5___pin_Motor_Left_PWM
A3_Nano_D12___pin_Motor_Left_Dir
J?
Conn_01x08_Male
R
Conn_01x08_Male
Interface resistors as needed
motors 270ohms
Mower 220ohms
Each arduino pin is interfaced witha series resistor
for protection against over current.
J38
24V_Power
GND
+24V
Front High Current Connection
Motor Driver Board
Sheet: /Generic_Motors/
File: Generic_Motors_V1.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.1.10)-1
Id: 4/12



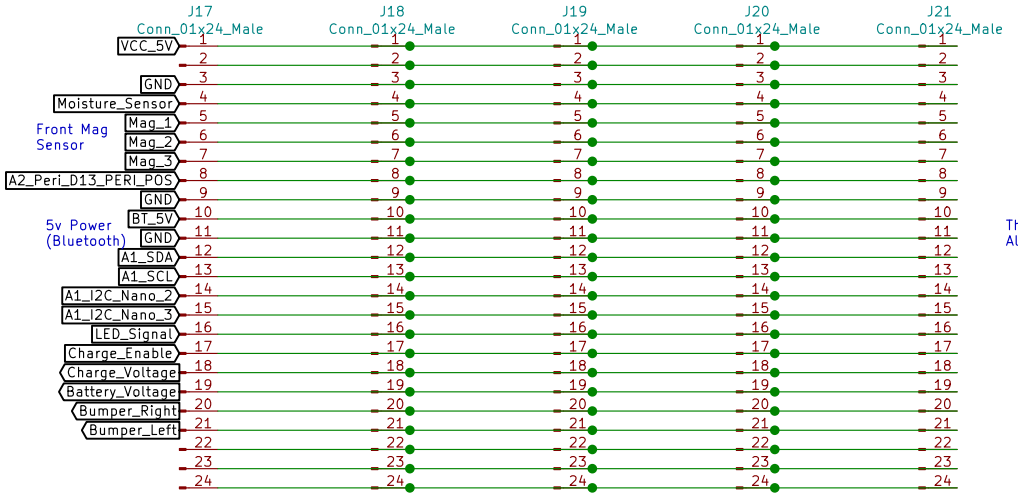
Sender Board

Sheet: /Perimeter Sender/
File: Perimeter_Sender.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 5/12

BackPlane Allocation



The backplane can be any size.
Also screw terminals can be added instead of the connector

Back Plane

Sheet: /Backplane/
File: Generic_Backplane_V1.sch

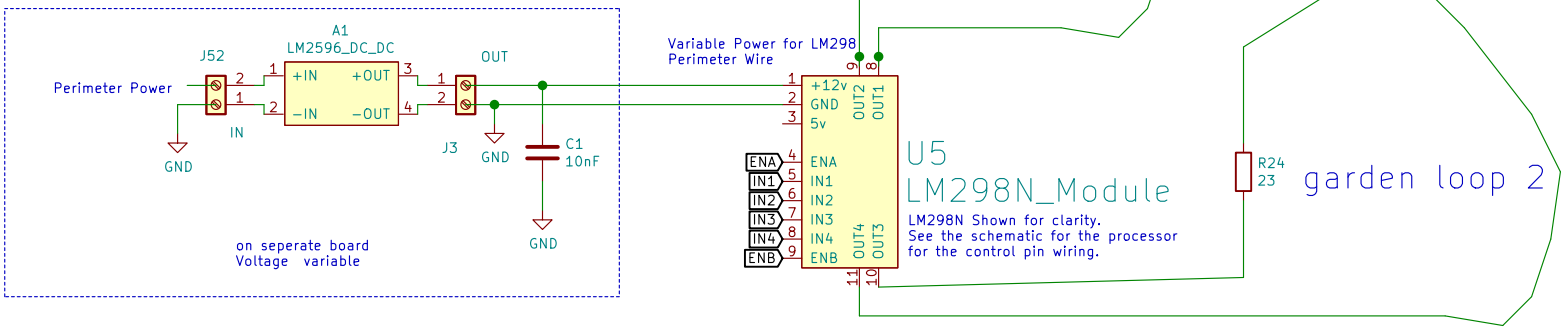
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 6/12

Power resistor Rx was tested at 23 ohms:
If your perimeter wire resistance (R) is below 5 Ohms,
you will not be able to further reduce voltage below 6.5v (otherwise
the motor driver will not work properly). Then you have to increase
the perimeter wire resistance (R) by using a power resistor in series
with your perimeter wire. Important: your power resistor must be
suitable for the power! Typically could be a 10watt

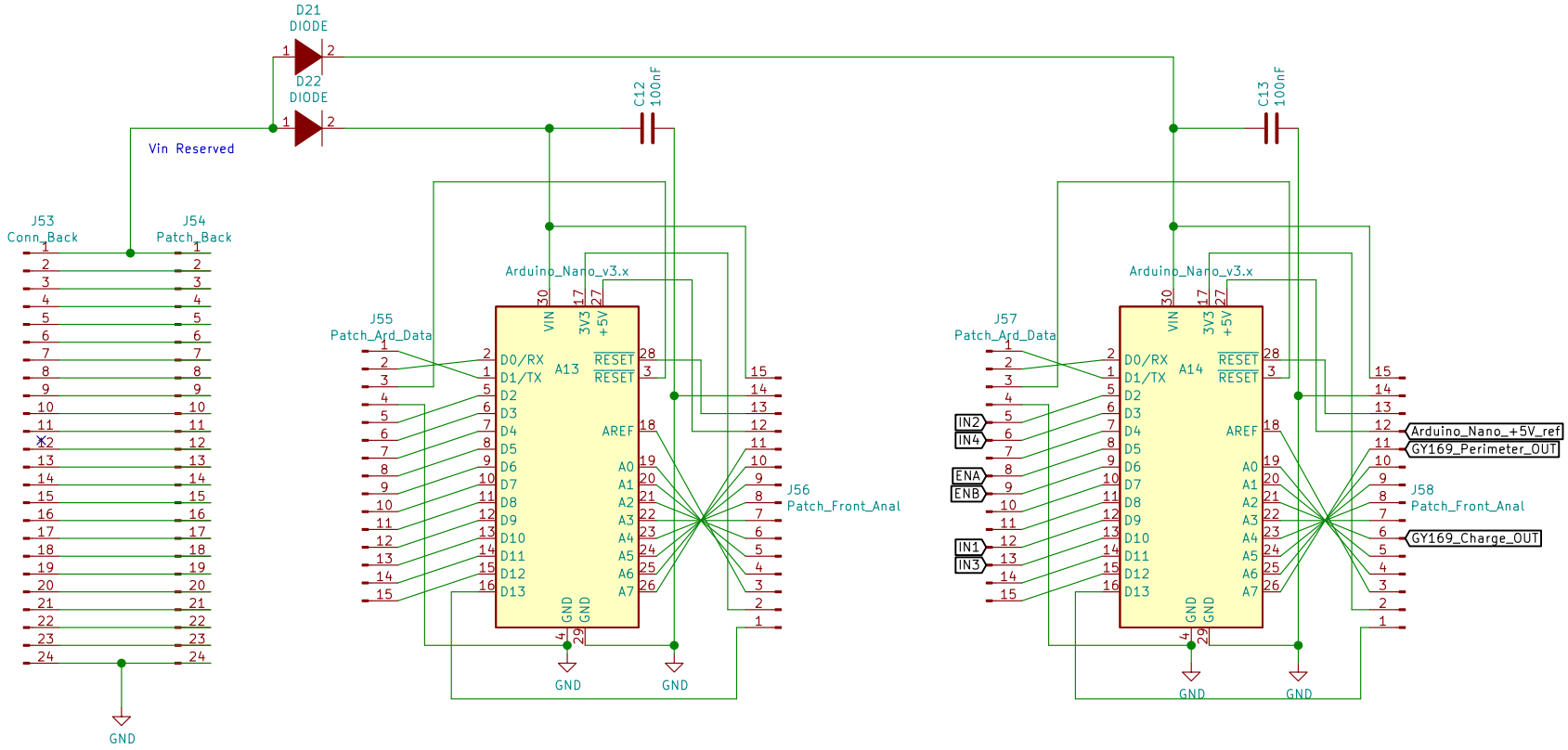
https://wiki.ardumower.de/index.php?title=Perimeter_wire
and
https://wiki.ardumower.de/index.php?title=Perimeter_wire_ru

The motor driver output voltage can be changed between 6.5–12V
via the potentiometer on the DC/DC converter.
Adjust the potentiometer so that not more than 1 Ampere current flows.



Sender Loop and Driver

Sheet: /Perimeter Power V1/ File: Perimeter_Power.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 7/12

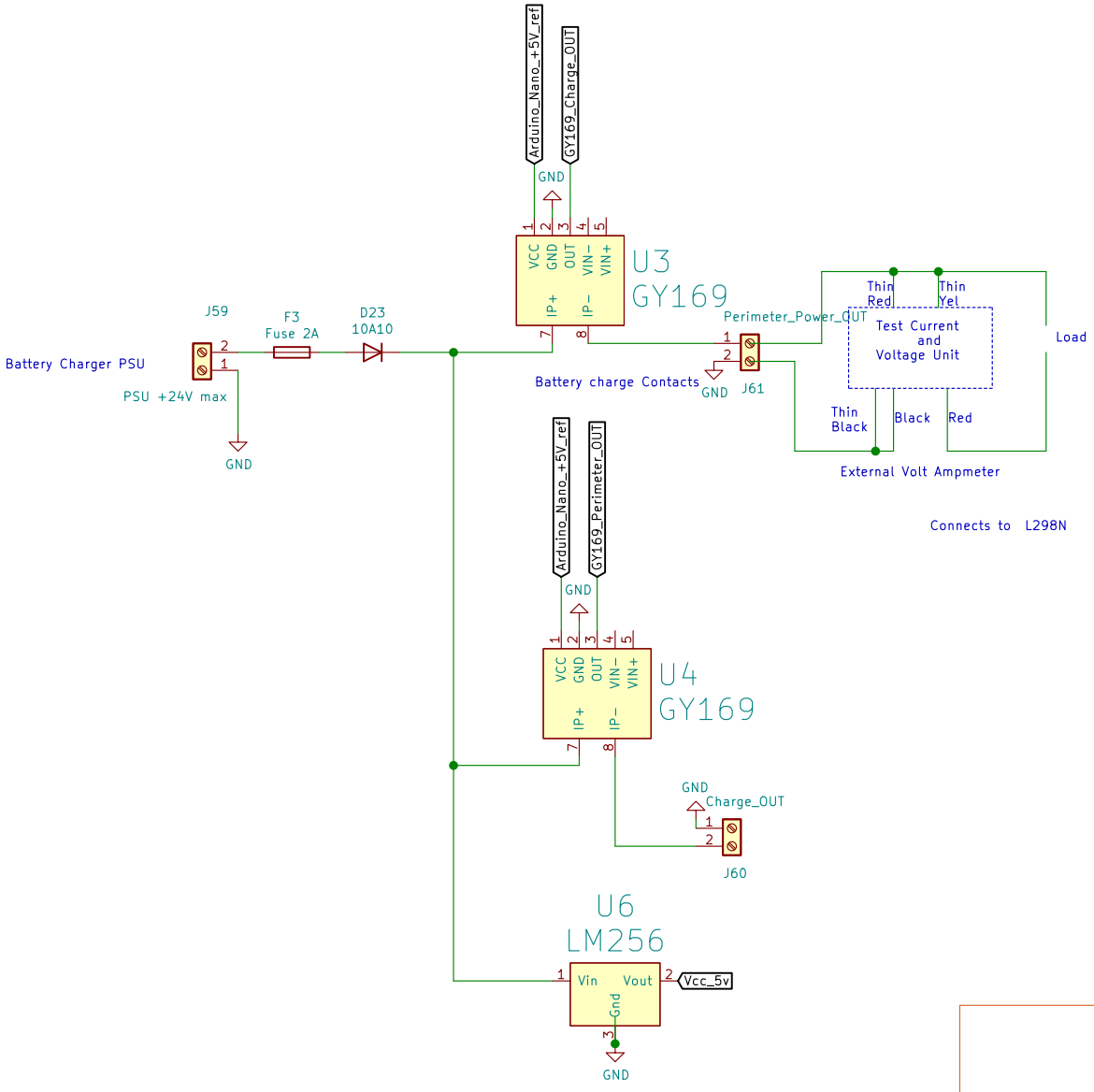


Sender Nano

Sheet: /Perimeter_Control/
File: Perimeter_control.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 8/12

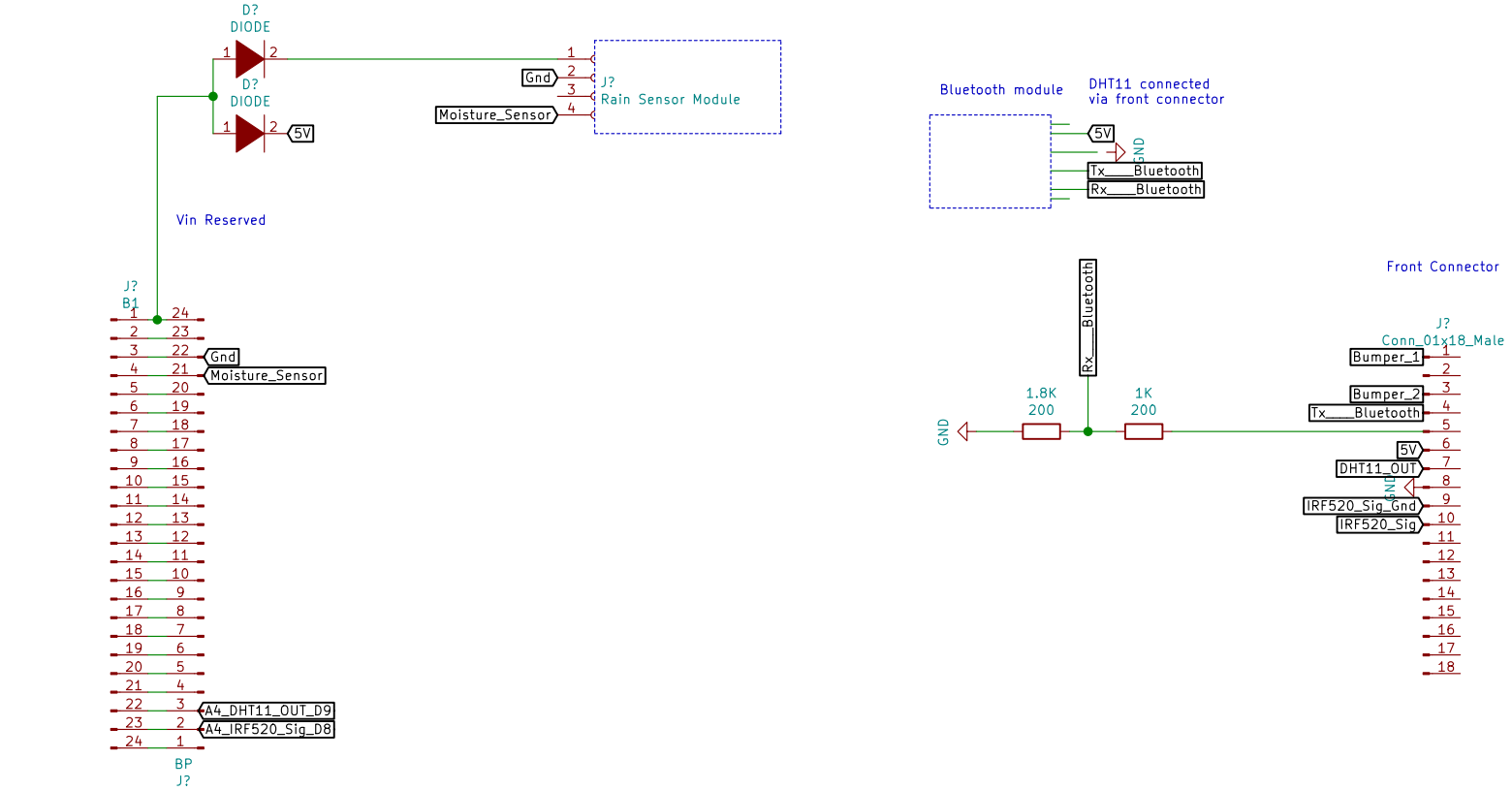


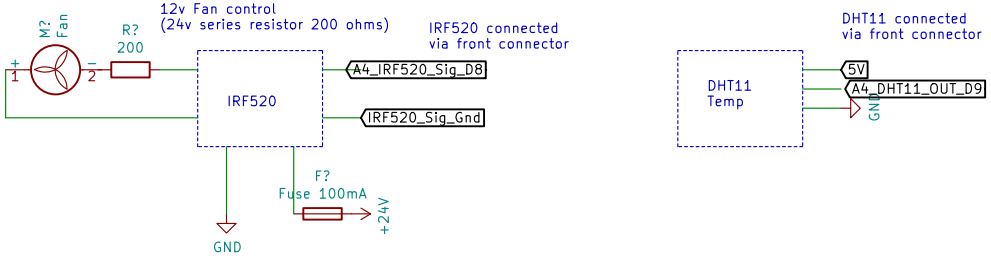
Sender Charger

Sheet: /Sender_Charger/
File: Sender_Charger.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 9/12



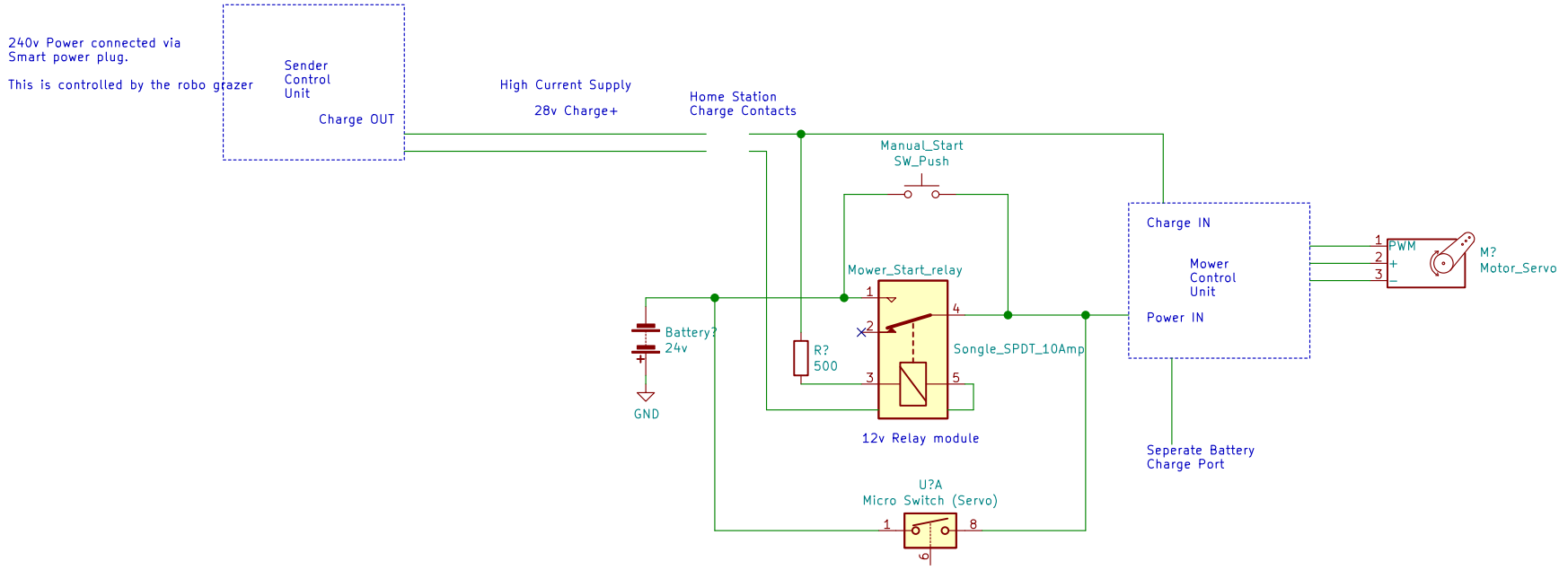


Sensor Aux Board

Sheet: /Sensor Aux board/
File: Auxillary.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 10/12



Power Shut down Servo

Sheet: /Power_shutdown/
File: Method2_Power_shutdown.sch

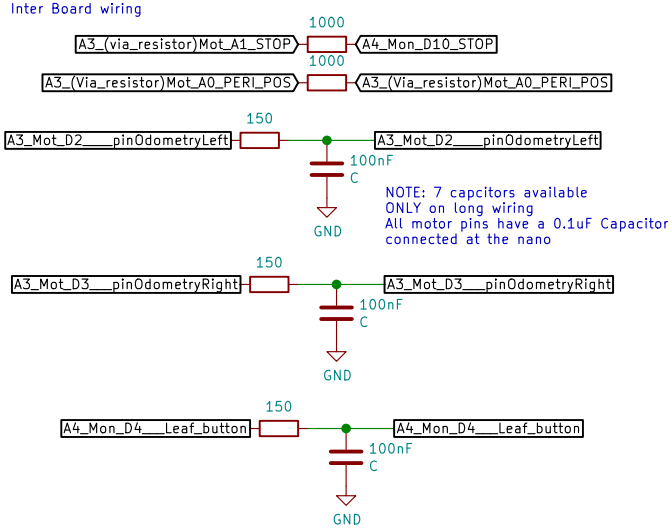
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 11/12

Wire Wraps

Boards
1) Power
2) NodeMCU(A1) and Perimter(A2)[Not Used]
3) Motors(A3) and Monitor(A4)
4) Sensor Board
5) Power and Charging

Inter Board wiring



Board 2 Front Connector

J?
B1
Ribbon cable and Nano pins

Board 3 – Front Connector

J?
B1
Ribbon cable and Nano pins

1	+5V
2	A4_Mon_D4___Leaf_button
3	GND
4	A3_Mot_D8___pin_Motor_Enable
5	A3_Mot_D9___pin_Mower_PWM
6	A3_Mot_D6___pin_Motor_Right_PWM
7	A3_Mot_D4___pin_Motor_Right_Dir
8	A3_Mot_D5___pin_Motor_Left_PWM
9	A3_Mot_D12___pin_Motor_Left_Dir
10	GND
11	A2_Peri_Nano_A6___pin_Peri_Sense
12	+5V
13	GND
14	+5V
15	A4_Mon_D6_Leaf_Servo_PWM
16	GND
17	+5V
18	A4_Mon_D5_Power_Servo_PWM
19	A3_Mot_Nano_Tx____Bluetooth
20	A3_Mot_Nano_Rx____Bluetooth
21	A3_Mot_D3___pinOdometryRight
22	A3_Mot_D2___pinOdometryLeft
23	5V_Tacho
24	GND___Tacho

A2_Peri_D13_PERI_POS

Board 2 – Back Connector

J?
Conn_01x24_Male

1	VCC_5V
3	GND
11	A1_SDA
12	A1_SCL
13	A1_I2C_Nano_2
14	A1_I2C_Nano_3

Board 3 – Back Connector

J?
Conn_01x24_Male

1	VCC_5V
3	GND
4	A4_Moisture_Sensor_A2
8	A3_(Via_resistor)Mot_A0_PERI_POS
9	GND
12	A3-A4_SDA
13	A3-A4_SCL
14	A4_D7__I2C_Nano_2
15	A3_D7_I2C_Nano_3
16	A4_LED_Signal_D2
17	A4_Charge_Enable_D3
18	A4_Charge_Voltage_A0
19	A4_Battery_Voltage_A1
20	A4_Bumper_Right_D11
21	A4_Bumper_Left_D12
22	A4_DHT11_OUT_D9
23	A4_IRF520_Sig_D8

Board 4 – Back Connector

J?
B1

1	VCC_5V
3	Gnd
4	Moisture_Sensor
20	A4_Bumper_Right_D11
21	A4_Bumper_Left_D12

Power Board – Back Connector

J?
Conn_01x24_Male

1	VCC_5V
3	GND
16	LED_Signal
17	Charge_Enable
18	Charge_Voltage
19	Battery_Voltage

These Boards are mounted on a back plane
Each board has the components mounted on veroboard.
On board connections are mostly done with wire wrapping.
Mostly only power wiring is soldered.

Each tag denotes the Processor and its Pin
i.e A4 (Nano)_ <Name>_ Pin

All boards have a front and back connector 24 way

Connecter Wiring

Sheet: /Nano_wiring/
File: Nano_wiring.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 12/12