Arduino Draw:

Expected required power for 3V3 external:
Load is 2k2 pull up + 5k nominal NTC resistance
Eff resistance = 1/(1/(2.2k+5k)+1/220)=213 Ohms
I = 3.3/213 = 15mA
Arduino 3V3 pin capcable of 150mA

5V only powers MAX485 and arduino pin capable of 850mA.

RS485 Comms
to Relay Driver

RS485 Comms
File: RS485.kicad_sch

IPM Logic
Done Internally
in Arduino

A1
Arduino_Nano_Every

Relays SET
LED

SSR ON
LED

Connections to
Solid State Relay

External 12V

Fan Connectors

Thermistor
Connections

CurrNeg drives 4 relays (U, V, W and Brake)

CurrLowers drives 3 relays (U, V, W)

SeperateEmitters drives 3 relays (U, V, W).

LowersOn drives 1

UppersOn drives 1

G5V-2 requires 41.70mA for its coil.
Each channel of ULN2003 can supply 500mA (Max).

U14
ULN2003

C18
100n

Lower IGBTs ON LED

Upper IGBTs ON LED

Seperate Emitters LED

Current in Lower Devices LED

Current in Diodes LED

Low Current
File: LowCurr.kicad_sch

DC Supplies
File: DCSupp.kicad_sch

DEVICE UNDER TEST DIAGRAM

Short These Panel Sockets for Common Emitter Drives

DUT Connects

GAVIM Main Sheet

Nidec Drives

Sheet: /
File: TEST137.kicad_sch

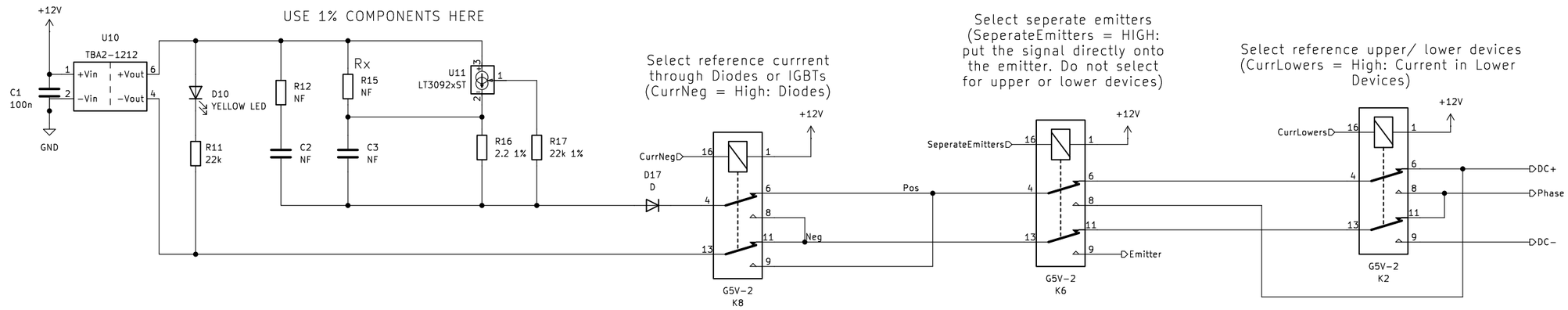
Title: GAVIM V4 TEST 137

Size: A3 | Date: 2024-11-07 | **Rev: 04.02**
KiCad E.D.A. 8.0.4 | Id: 1/8

Set Output Current
Isource = 10uA*Rset/Rout
Rset = 100mA/10uA*2.2 = 22k

Supply
12V TBA used as can supply 165mA and 5.6V required.

LED:
If = 12/1k = 12mA



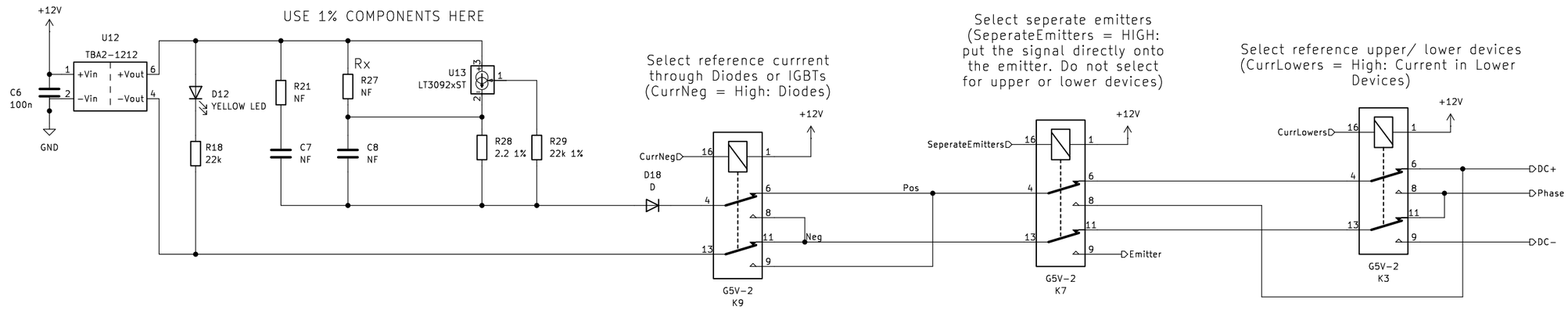
Low Current Source

Nidec Drives	
Sheet: /Low Current/V 100mA/	
File: LowCurrSource.kicad_sch	
Title: GAVIM V4 TEST 137	
Size: A3	Date: 2024-06-25
KiCad E.D.A. 8.0.4	Id: 2/8
	Rev: 04.02

Set Output Current
Isource = 10uA*Rset/Rout
Rset = 100mA/10uA*2.2 = 22k

Supply
12V TBA used as can supply 165mA and 5.6V required.

LED:
If = 12/1k = 12mA



Low Current Source

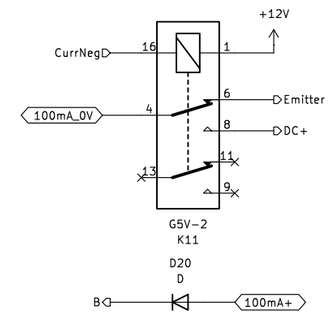
Nidec Drives	
Sheet: /Low Current/W 100mA/	
File: LowCurrSource.kicad_sch	
Title: GAVIM V4 TEST 137	
Size: A3 | Date: 2024-06-25	**Rev: 04.02**
KiCad E.D.A. 8.0.4	Id: 3/8

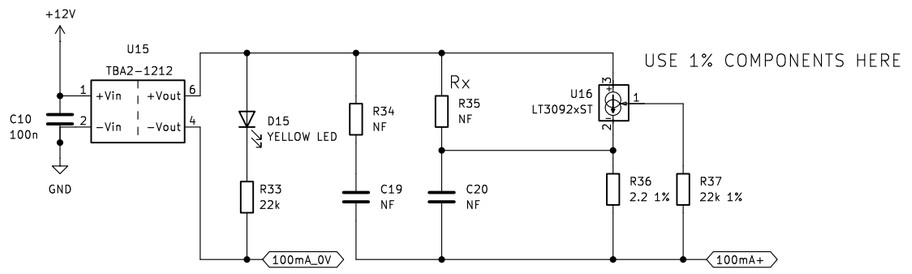
Set Output Current
Isource = 10uA*Rset/Rout
Rset = 100mA/10uA*2.2 = 22k

Supply
12V TBA used as can supply 165mA and 5.6V required.

LED:
If = 12/1k = 12mA

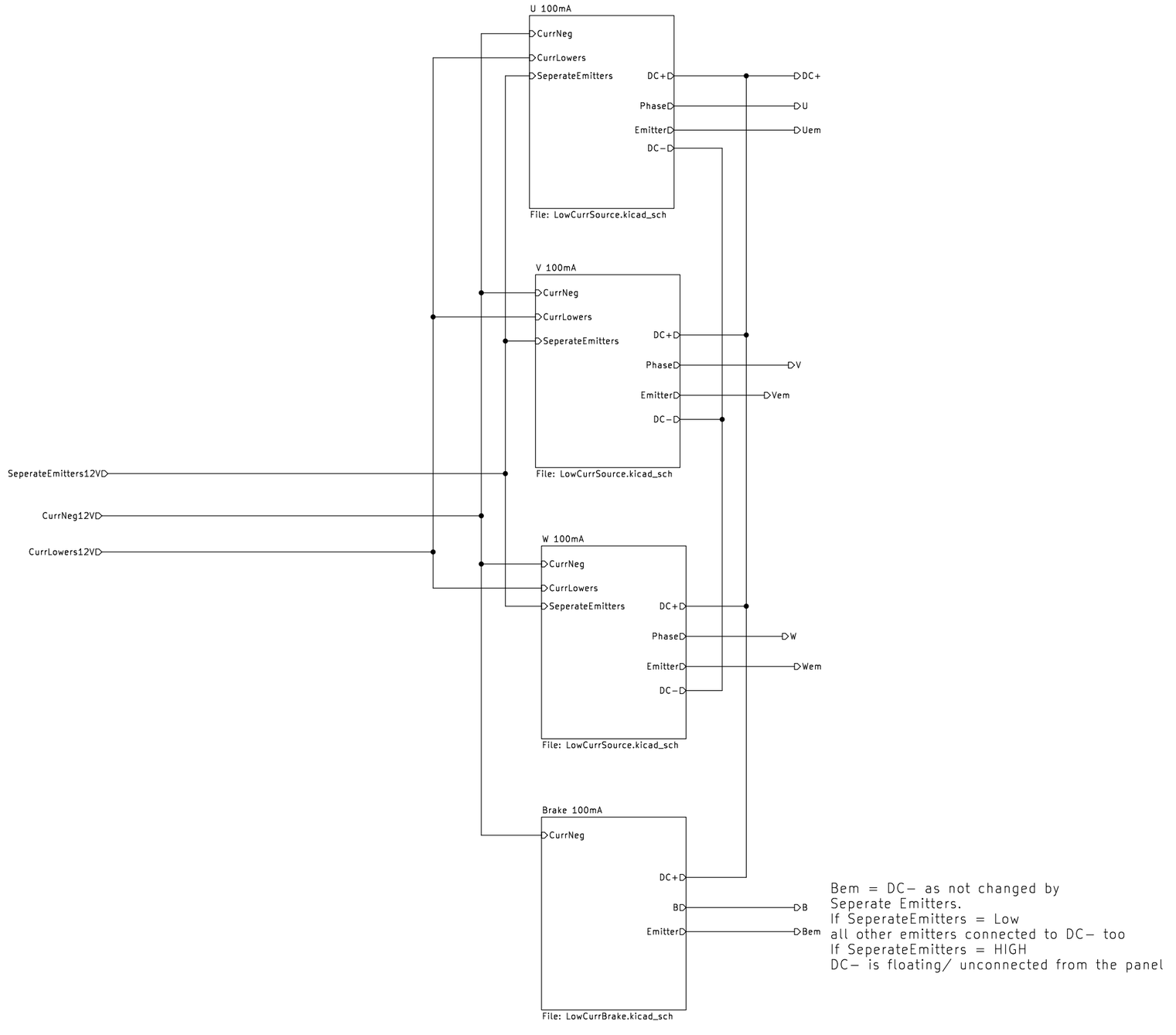
Brake IGBT is always on.
Only whether the current is through the IGBT or
Diode is changed (CurrNeg)





Low Current Source

Nidec Drives	
Sheet: /Low Current/Brake 100mA/	
File: LowCurrBrake.kicad_sch	
Title: GAVIM V4 TEST 137	
Size: A3	Date: 2024-06-25
KiCad E.D.A. 8.0.4	**Rev: 04.02**
	Id: 4/8



Low Current Control

Nidec Drives

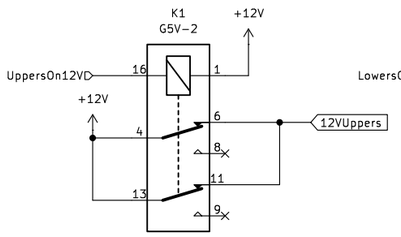
Sheet: /Low Current/
File: LowCurr.kicad_sch

Title: GAVIM V4 TEST 137

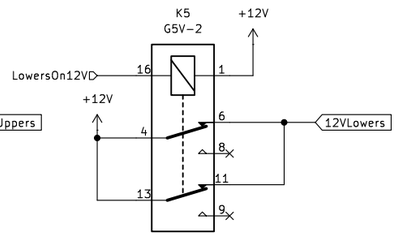
Size: A3	Date: 2024-06-25	**Rev: 04.02**
KiCad E.D.A. 8.0.4		Id: 5/8

G5V-2 2A through contact.
This is enough for 3 TBA2.

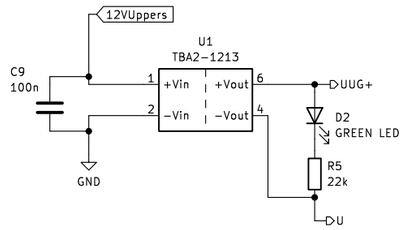
Lower Devices ON

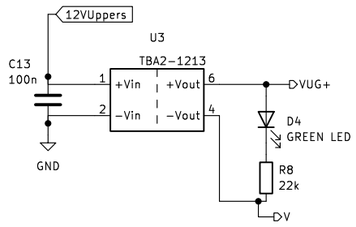


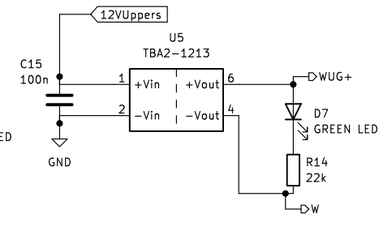
Upper Devices ON

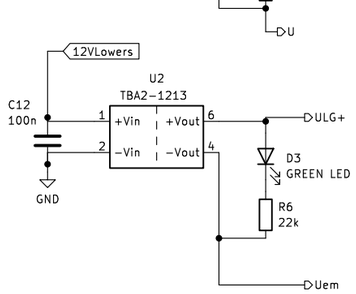


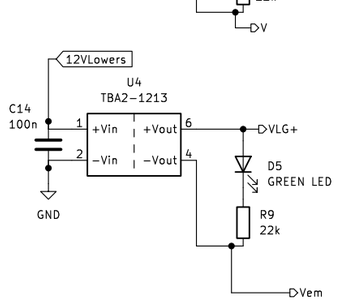
Gate Drivers

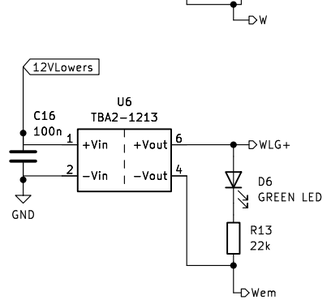


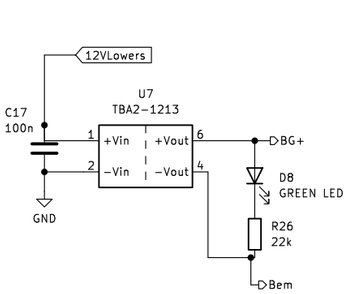












DC Supplies

Nidec Drives

Nidec Drives
Sheet: /DC Supplies/
File: DCSupp.kicad_sch

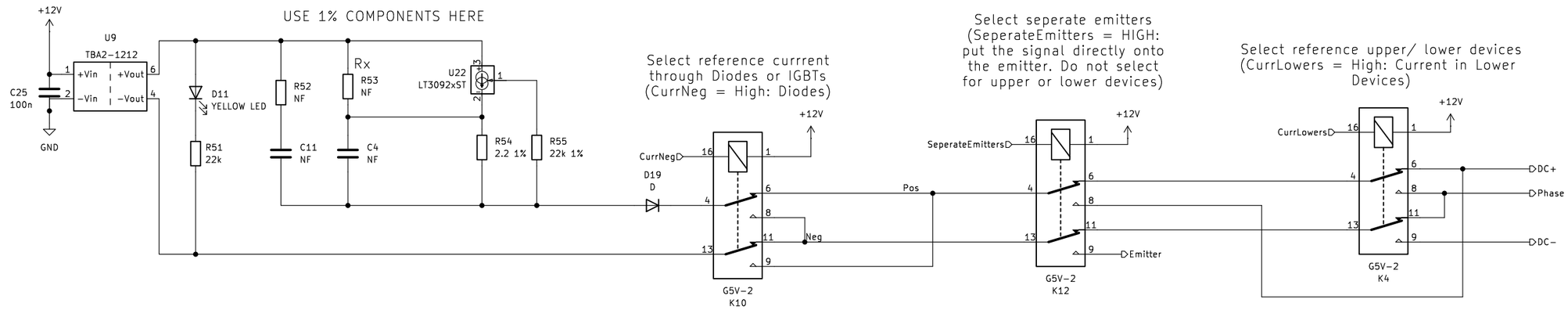
Title: GAVIM V4 TEST 137

Size: A3	Date: 2024-06-25	**Rev: 04.02**
KiCad E.D.A. 8.0.4		Id: 6/8

Set Output Current
Isource = 10uA*Rset/Rout
Rset = 100mA/10uA*2.2 = 22k

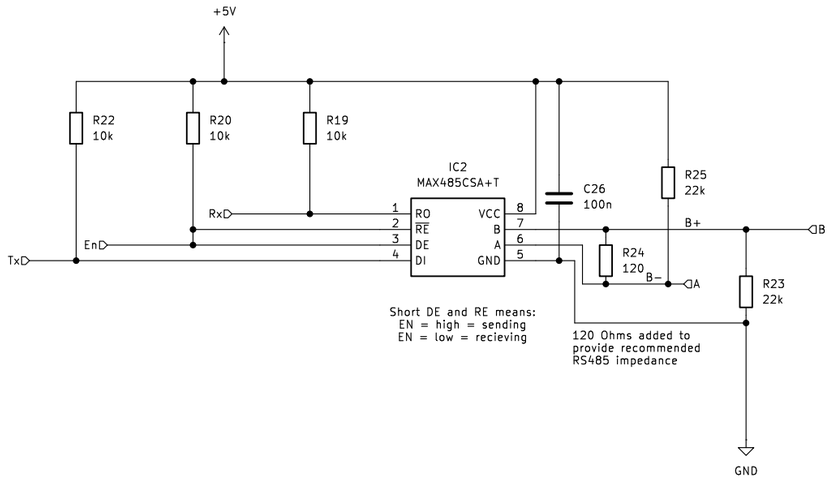
Supply
12V TBA used as can supply 165mA and 5.6V required.

LED:
If = 12/1k = 12mA



Low Current Source

Nidec Drives	
Sheet: /Low Current/U 100mA/	
File: LowCurrSource.kicad_sch	
Title: GAVIM V4 TEST 137	
Size: A3 | Date: 2024-06-25	**Rev: 04.02**
KiCad E.D.A. 8.0.4	Id: 9/8



Nidec Drives

Nidec Drives

Sheet: /RS485 Comms/
File: RS485.kicad_sch

Title: GAVIM V4 TEST 137

Size: A3	Date: 2024-06-25	**Rev: 04.02**
KiCad E.D.A. 8.0.4		Id: 11/8