CPU

CPU

U1 — AVR-64DA32

+3V3

22u   22u   GND

Pin	Signal
27	UPDI
20	PF0/TOSC1 — UDCC-b
21	PF1/TOSC2 — ISENS
22	PF2
23	PF3 — 33k — DCC-b (COM-2)
24	PF4 — RCM.tx
25	PF5 — V24.rts
26	PF6/RESET — V24.cts
10	PD0 — UDCC-a
11	PD1 — uSENS1
12	PD2 — IFL
13	PD3 — LED.R.wht
14	PD4 — LED.R.red
15	PD5 — LED.F.wht
16	PD6 — Vref
17	PD7 — uSENS2

VDD 28   AVDD 18

EXTCLK/PA0 — 30 — V24.tx (COM-0)
PA1 — 31 — V24.rx
PA2 — 32 — F0r
PA3 — 1 — F0f
PA4 — 2 — PWM1
PA5 — 3 — PWM2
PA6 — 4
PA7 — 5

PC0 — 6
PC1 — 7
PC2 — 8 — 33k — DCC-a (COM-1)
PC3 — 9 — LED.F.red

GND 19   GND

LEDs

LED.R.wht — 2.2k — dummy
LED.R.red — 2.2k
LED.F.wht — 3.3k — dummy
LED.F.red — 3.3k — LED — GND

NEM651

8	GND
7	Lf
6	Lr
5	DCC-a
4	DCC-b
3	M1
2	M2
1	VHBR

UPDI & Debug IF

Service IF

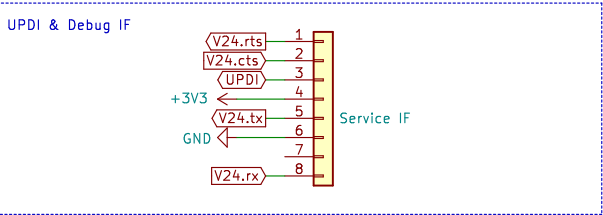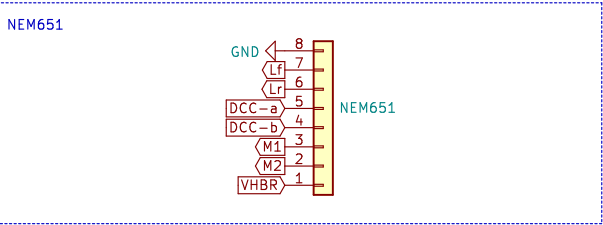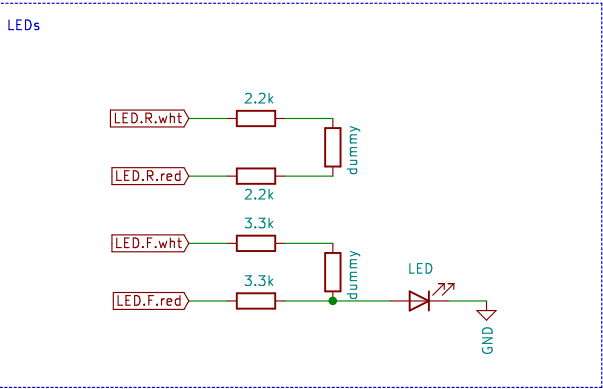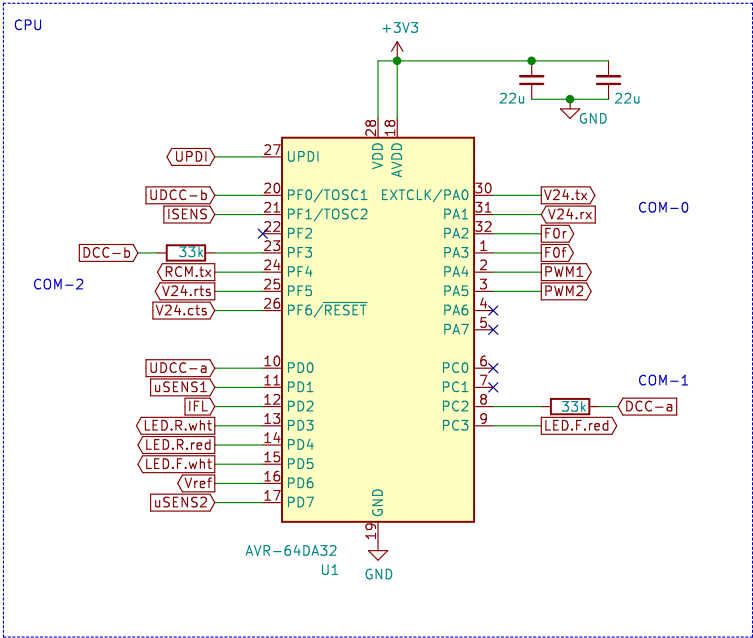| 1 | V24.rts |
2	V24.cts
3	UPDI
4	+3V3
5	V24.tx
6	GND
7	
8	V24.rx

D16.4
Lok Decoder NEM651
Frank Schumacher
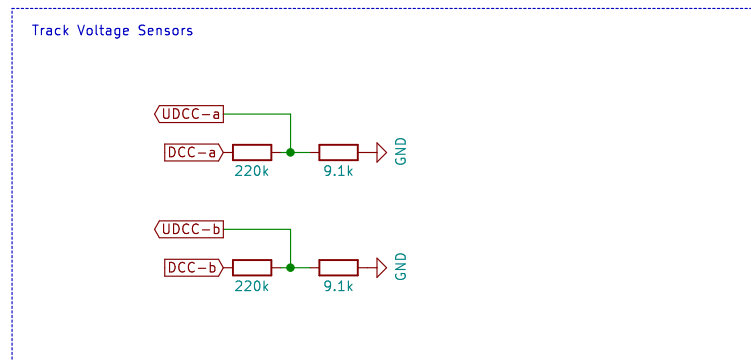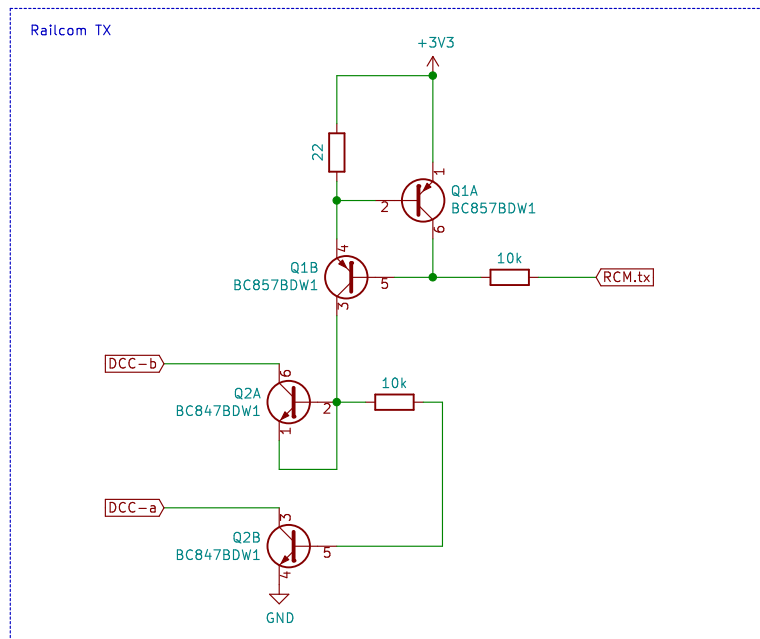Sheet: /CPU/
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Size: A4   Date: 2023-10-24   **Rev: 4**
KiCad E.D.A. kicad (5.1.12)-1   Id: 2/4

RcmTX

Railcom TX

+3V3

22

Q1A
BC857BDW1

Q1B
BC857BDW1

10k

RCM.tx

DCC-b

Q2A
BC847BDW1

10k

DCC-a

Q2B
BC847BDW1

GND

Track Voltage Sensors

UDCC-a

DCC-a   220k   9.1k   GND

UDCC-b

DCC-b   220k   9.1k   GND

Power

Power Regulation

D3
BAS3007ARPPE6327HTSA1

DCC-a
DCC-b

10k 10k

GND

VHBR

1u/35V   22u/25V

must be close
to H-Bridge

IC2
NCP730BM

6 IN   OUT 1
5 NC/PG NC/ADJ 2
4 EN   GND 3
         EP
         7

+3V3

22u/6V   100u/4V

GND

Motor Diver

IC1
DRV8231ADSGR

M1   8 OUT2   IPROPI 1
     7 GND_1   IN2   2
M2   6 OUT1   IN1   3
VHBR 5 VM   VREF   4
        GND_2
        9

GND

220k

3.3k   1u

PWM1
PWM2
Vref

ISENS

M2 M1
47k 47k

uSENS1
uSENS2

10k 10k

GND

Lr/Lf output

Q3
SSM6N55NU

F0r

1 S1   G2   5
2 G1   D1_1   6
3 D2_1 D1_2
4 S2   D2_2

F0f
Lr

D1
D2   Lf

2.2 2.2

GND

220k

IFL
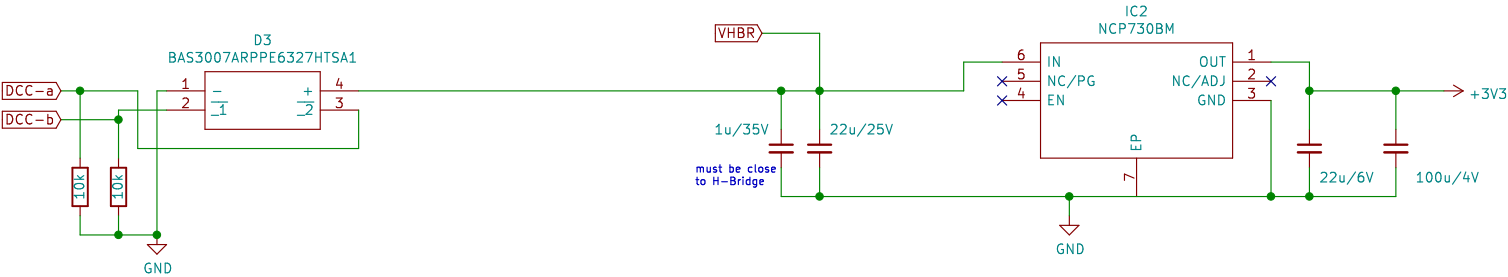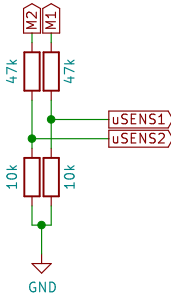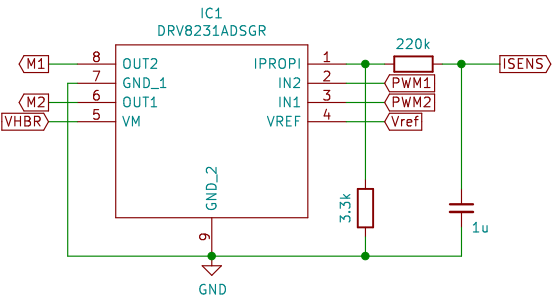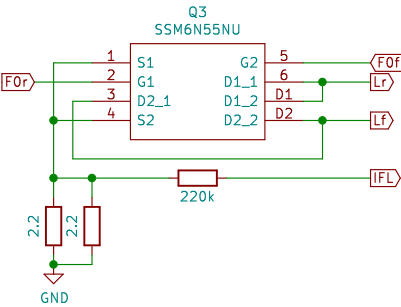
D16.4
Lok Decoder NEM651
Frank Schumacher
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Size: A4   Date: 2023-10-24   Rev: 4
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