Sheet: Anode Drivers

File: Anode_Drivers.sch

Sheet: Grid Drivers

File: Grid_Drivers.sch

Sheet: VFD Tubes

File: VFD_Tubes.sch
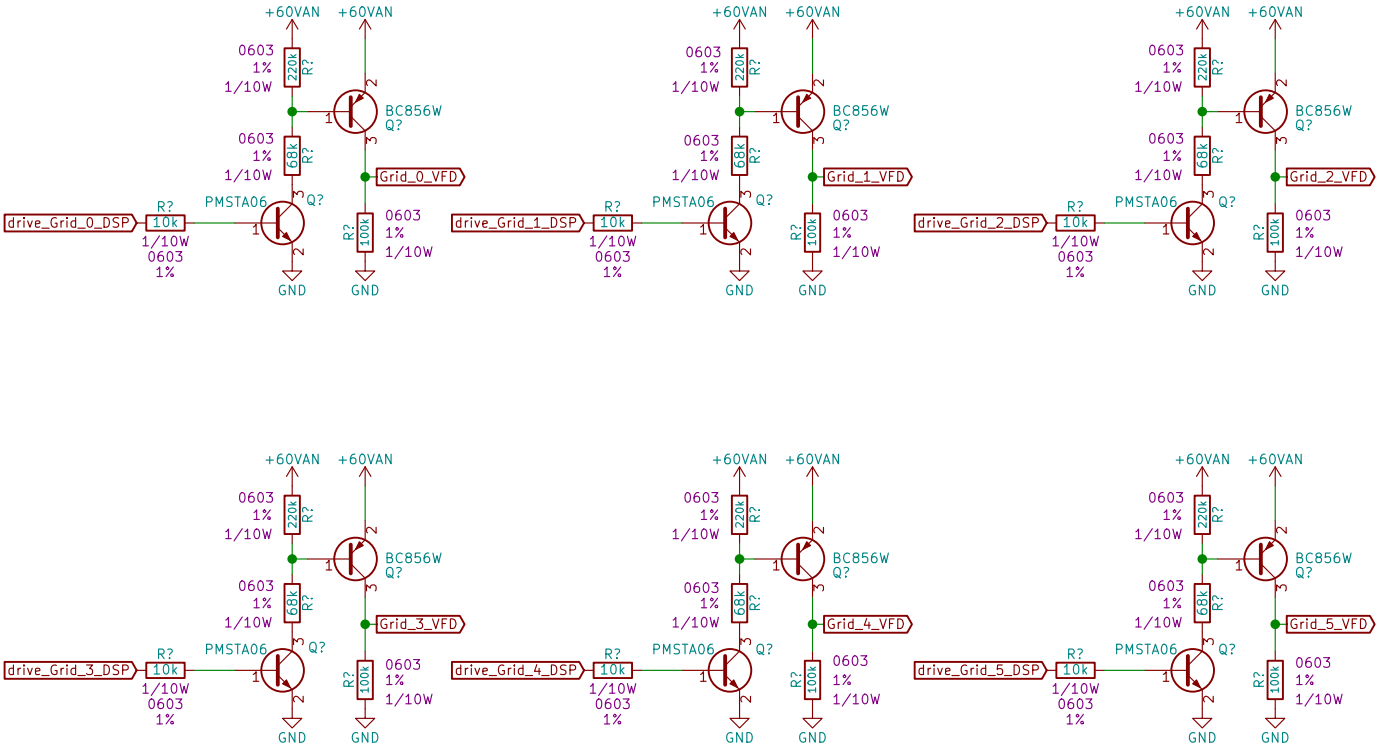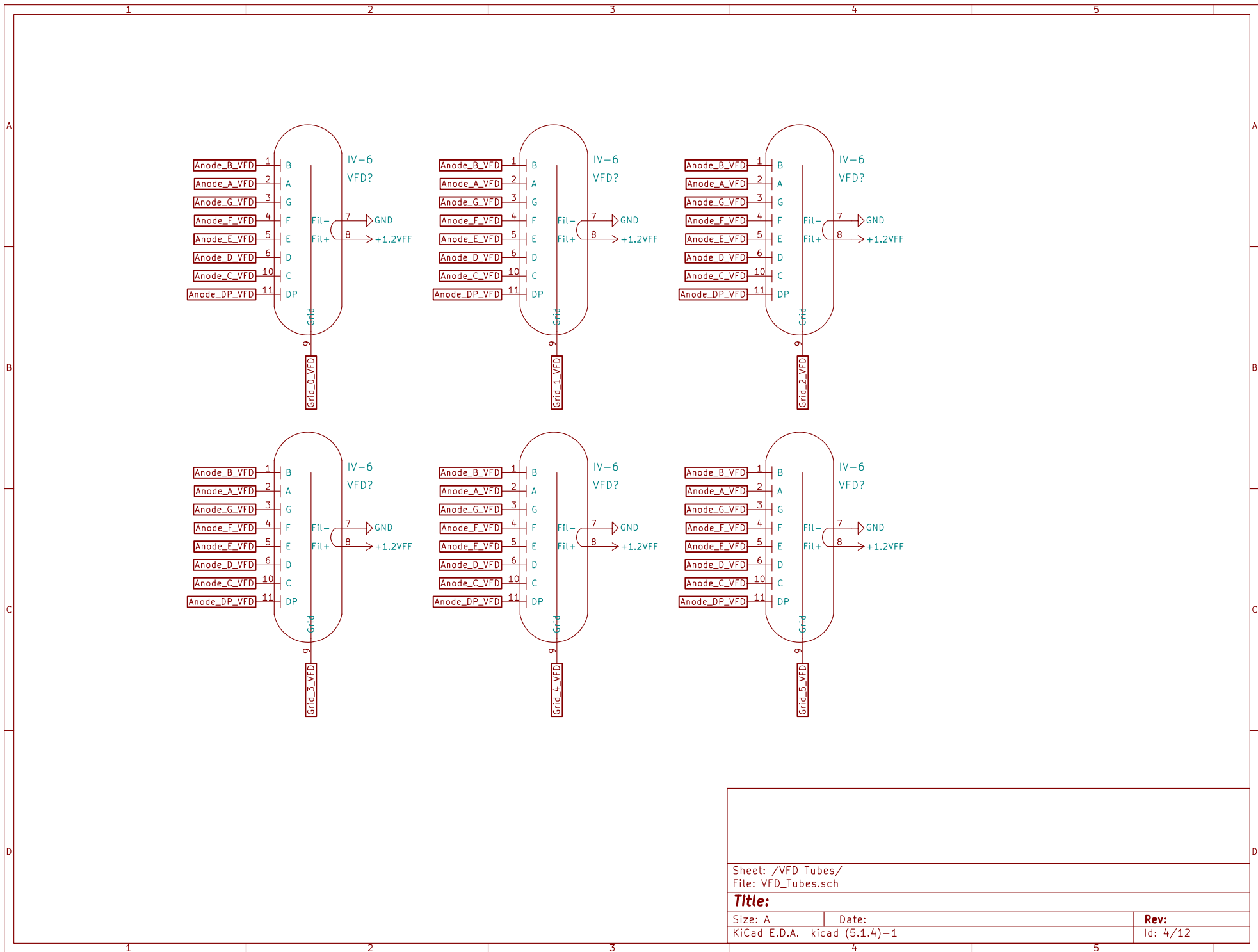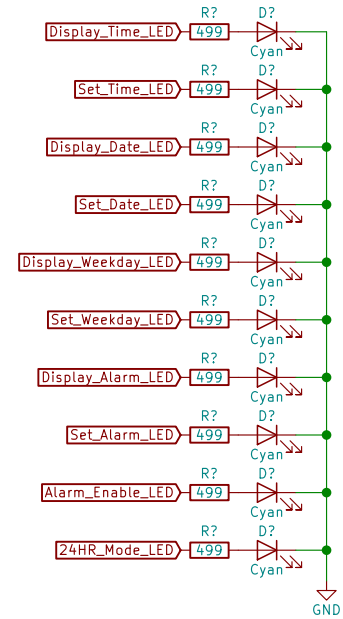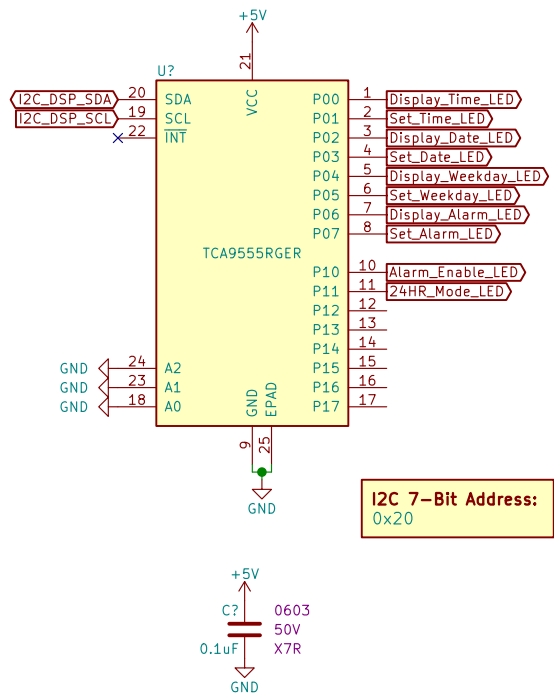
Sheet: Menu LEDs

File: Menu_LEDs.sch

Sheet: Pushbuttons 1

File: Pushbuttons_1.sch

Sheet: Pushbuttons 2

File: Pushbuttons_2.sch

Sheet: Pushbuttons 3

File: Pushbuttons_3.sch
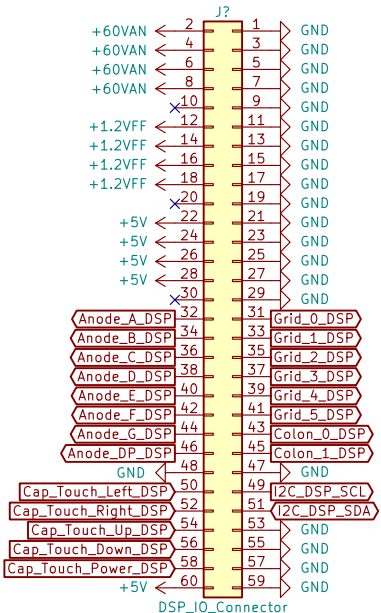
Sheet: IO Connector

File: IO_Connector.sch
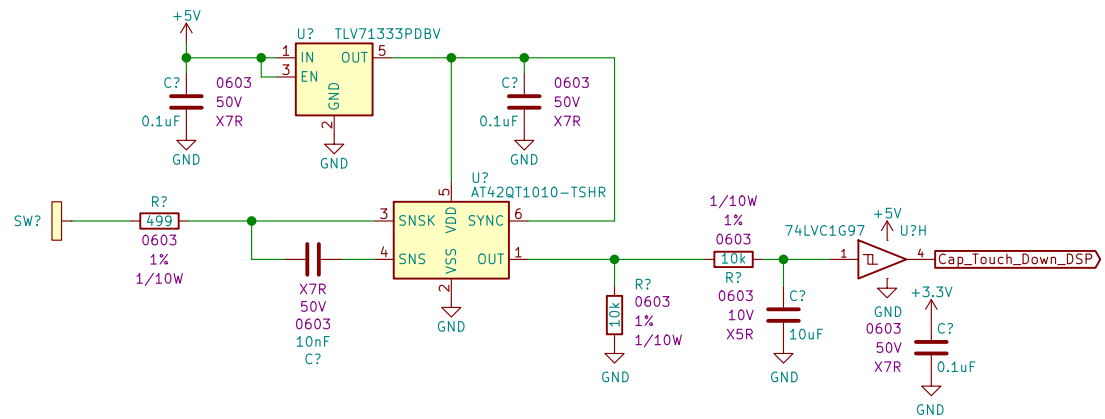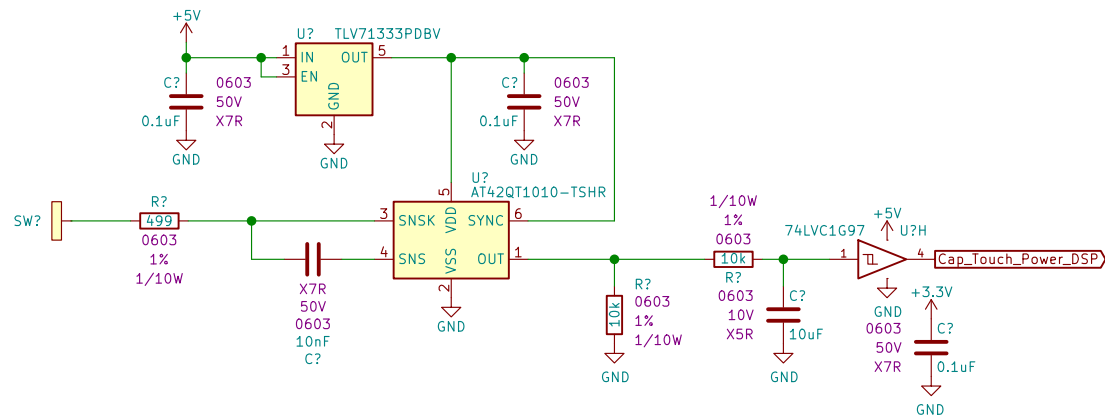
Sheet: Display Telemetry

File: Display_Telemetry.sch

Sheet: Colons

File: Colons.sch
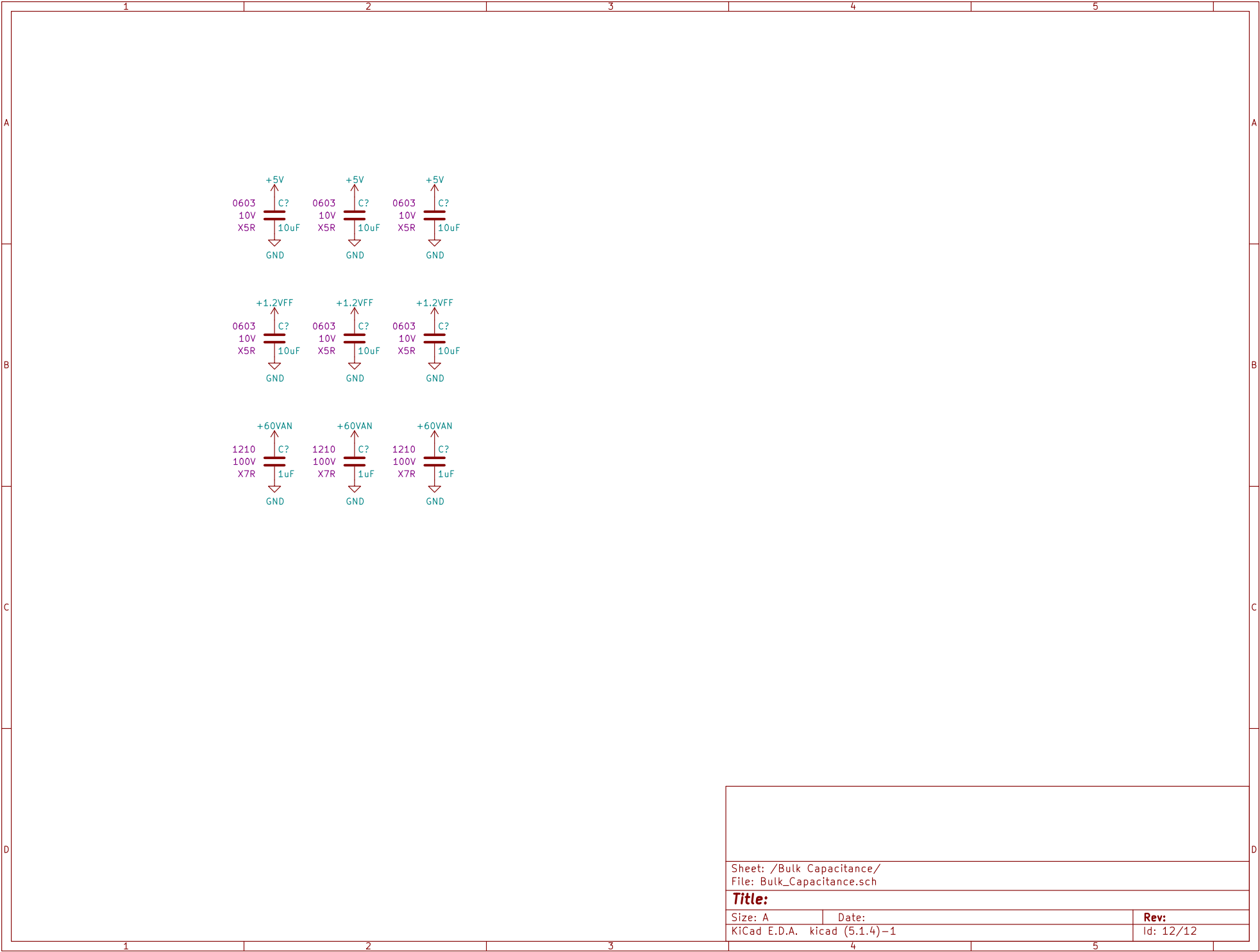
Sheet: Bulk Capacitance

File: Bulk_Capacitance.sch

Grid Drivers

+60VAN +60VAN

0603 1% 1/10W 220k R?
BC856W Q?
0603 1% 1/10W 68k R?
Q?
Grid_0_VFD
drive_Grid_0_DSP R? 10k 1/10W 0603 1% PMSTA06 Q?
R? 100k 0603 1% 1/10W
GND GND

+60VAN +60VAN

0603 1% 1/10W 220k R?
BC856W Q?
0603 1% 1/10W 68k R?
Q?
Grid_1_VFD
drive_Grid_1_DSP R? 10k 1/10W 0603 1% PMSTA06 Q?
R? 100k 0603 1% 1/10W
GND GND

+60VAN +60VAN

0603 1% 1/10W 220k R?
BC856W Q?
0603 1% 1/10W 68k R?
Q?
Grid_2_VFD
drive_Grid_2_DSP R? 10k 1/10W 0603 1% PMSTA06 Q?
R? 100k 0603 1% 1/10W
GND GND

+60VAN +60VAN

0603 1% 1/10W 220k R?
BC856W Q?
0603 1% 1/10W 68k R?
Q?
Grid_3_VFD
drive_Grid_3_DSP R? 10k 1/10W 0603 1% PMSTA06 Q?
R? 100k 0603 1% 1/10W
GND GND

+60VAN +60VAN

0603 1% 1/10W 220k R?
BC856W Q?
0603 1% 1/10W 68k R?
Q?
Grid_4_VFD
drive_Grid_4_DSP R? 10k 1/10W 0603 1% PMSTA06 Q?
R? 100k 0603 1% 1/10W
GND GND

+60VAN +60VAN

0603 1% 1/10W 220k R?
BC856W Q?
0603 1% 1/10W 68k R?
Q?
Grid_5_VFD
drive_Grid_5_DSP R? 10k 1/10W 0603 1% PMSTA06 Q?
R? 100k 0603 1% 1/10W
GND GND

Six identical IV-6 VFD tube symbols, arranged in two rows of three.

Each tube (top-left shown, repeated for all six):

Pin	Signal	Label
1	B	Anode_B_VFD
2	A	Anode_A_VFD
3	G	Anode_G_VFD
4	F	Anode_F_VFD
5	E	Anode_E_VFD
6	D	Anode_D_VFD
10	C	Anode_C_VFD
11	DP	Anode_DP_VFD
7	Fil−	GND
8	Fil+	+1.2VFF
9	Grid	Grid_N_VFD

IV-6
VFD?

Grid labels by position:
- Top row: Grid_0_VFD, Grid_1_VFD, Grid_2_VFD
- Bottom row: Grid_3_VFD, Grid_4_VFD, Grid_5_VFD

U?

I2C_DSP_SDA	20	SDA	VCC	21	+5V
I2C_DSP_SCL	19	SCL		
	22	INT		

P00	1	Display_Time_LED
P01	2	Set_Time_LED
P02	3	Display_Date_LED
P03	4	Set_Date_LED
P04	5	Display_Weekday_LED
P05	6	Set_Weekday_LED
P06	7	Display_Alarm_LED
P07	8	Set_Alarm_LED

TCA9555RGER

P10	10	Alarm_Enable_LED
P11	11	24HR_Mode_LED
P12	12	
P13	13	
P14	14	
P15	15	
P16	16	
P17	17	

GND	24	A2
GND	23	A1
GND	18	A0

GND EPAD
9   25

GND

I2C 7-Bit Address:
0x20

+5V

C?   0603
      50V
0.1uF X7R

GND

Display_Time_LED — R? 499 — D? Cyan
Set_Time_LED — R? 499 — D? Cyan
Display_Date_LED — R? 499 — D? Cyan
Set_Date_LED — R? 499 — D? Cyan
Display_Weekday_LED — R? 499 — D? Cyan
Set_Weekday_LED — R? 499 — D? Cyan
Display_Alarm_LED — R? 499 — D? Cyan
Set_Alarm_LED — R? 499 — D? Cyan
Alarm_Enable_LED — R? 499 — D? Cyan
24HR_Mode_LED — R? 499 — D? Cyan

GND

Top circuit:

+5V

U? TLV71333PDBV
1 IN OUT 5
3 EN
GND 2

C? 0603 50V 0.1uF X7R
GND

C? 0603 50V 0.1uF X7R
GND

SW?
R? 499 0603 1% 1/10W

X7R 50V 0603 10nF C?

U? AT42QT1010-TSHR
3 SNSK VDD 5
4 SNS SYNC 6
2 VSS OUT 1
GND

10k 0603 1% 1/10W R?
GND

1/10W 1% 0603 10k R?
R? 0603 10V X5R
C? 10uF
GND

74LVC1G97 U?H
+5V
1
4
GND
+3.3V
C? 0603 50V 0.1uF X7R
GND

Cap_Touch_Left_DSP

Bottom circuit:

+5V

U? TLV71333PDBV
1 IN OUT 5
3 EN
GND 2

C? 0603 50V 0.1uF X7R
GND

C? 0603 50V 0.1uF X7R
GND

SW?
R? 499 0603 1% 1/10W

X7R 50V 0603 10nF C?

U? AT42QT1010-TSHR
3 SNSK VDD 5
4 SNS SYNC 6
2 VSS OUT 1
GND

10k 0603 1% 1/10W R?
GND

1/10W 1% 0603 10k R?
R? 0603 10V X5R
C? 10uF
GND

74LVC1G97 U?H
+5V
1
4
GND
+3.3V
C? 0603 50V 0.1uF X7R
GND

Cap_Touch_Right_DSP

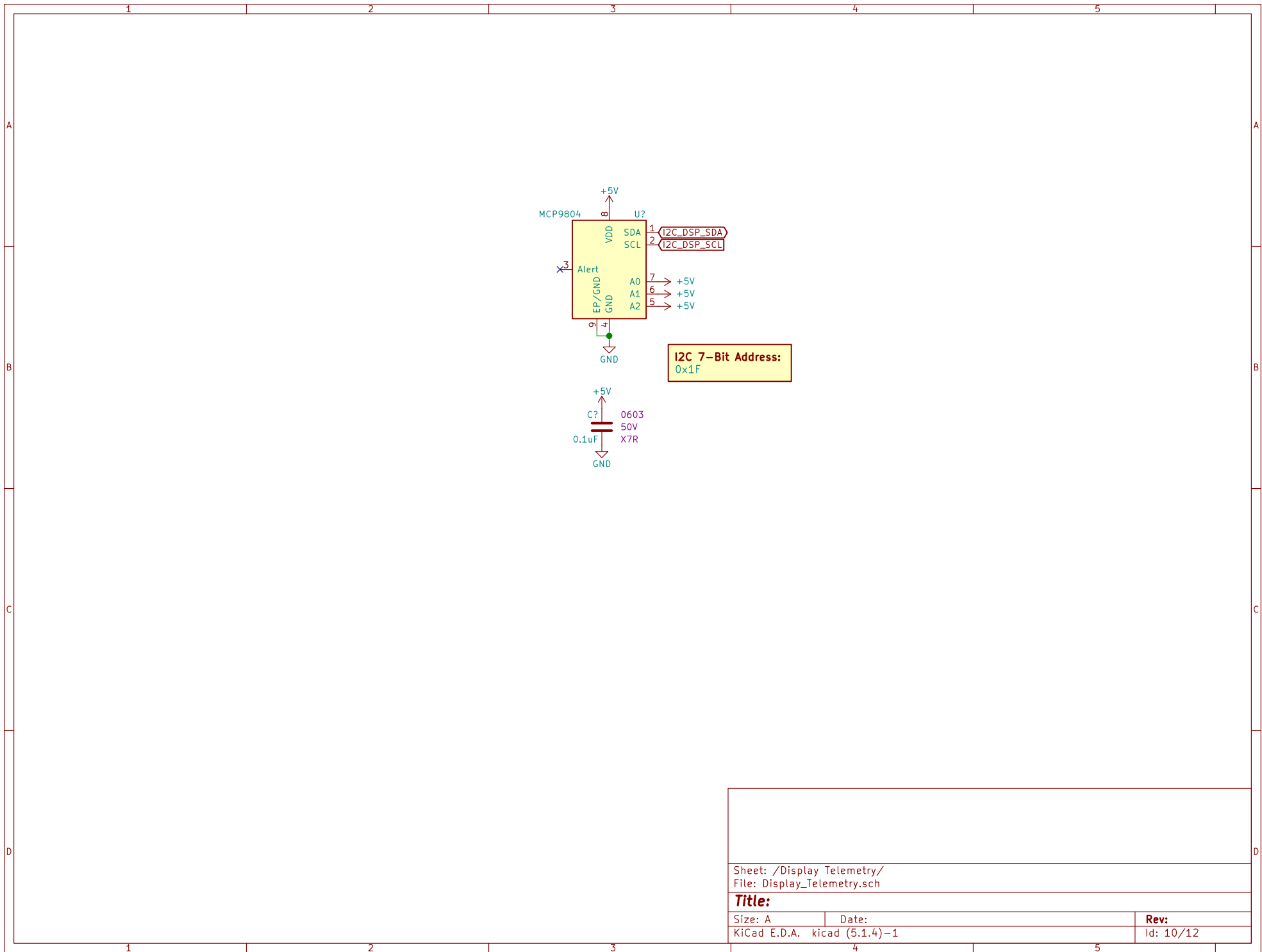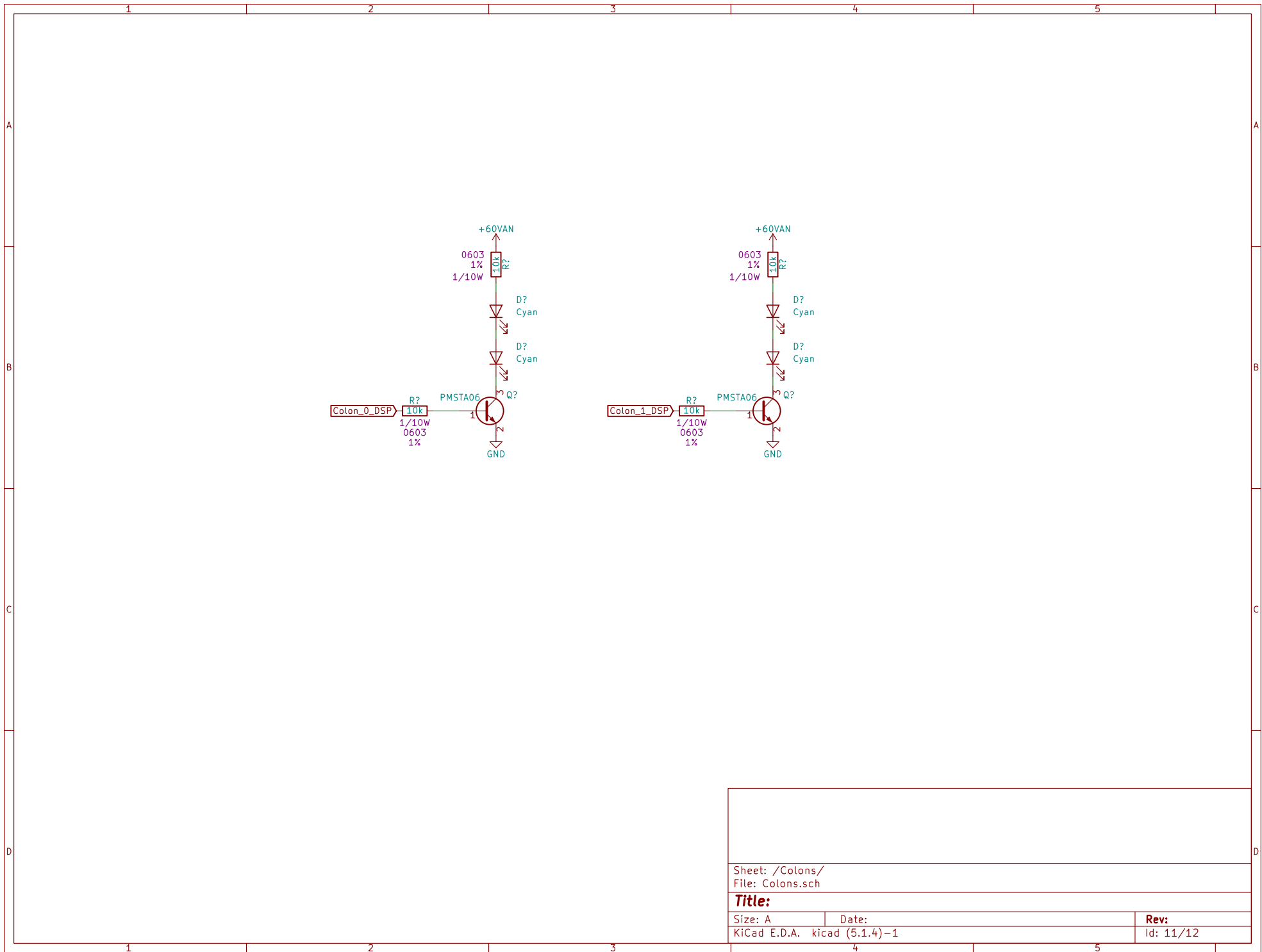Drew Maatman
Sheet: /Pushbuttons 1/
File: Pushbuttons_1.sch
Title: Incrementor
Size: A   Date: 2019-09-03   Rev: A
KiCad E.D.A. kicad (5.1.4)-1   Id: 6/12

J?

Pin	Signal (left)	Pin	Signal (right)
2	+60VAN	1	GND
4	+60VAN	3	GND
6	+60VAN	5	GND
8	+60VAN	7	GND
10	X	9	GND
12	+1.2VFF	11	GND
14	+1.2VFF	13	GND
16	+1.2VFF	15	GND
18	+1.2VFF	17	GND
20	X	19	GND
22	+5V	21	GND
24	+5V	23	GND
26	+5V	25	GND
28	+5V	27	GND
30	X	29	GND
32	Anode_A_DSP	31	Grid_0_DSP
34	Anode_B_DSP	33	Grid_1_DSP
36	Anode_C_DSP	35	Grid_2_DSP
38	Anode_D_DSP	37	Grid_3_DSP
40	Anode_E_DSP	39	Grid_4_DSP
42	Anode_F_DSP	41	Grid_5_DSP
44	Anode_G_DSP	43	Colon_0_DSP
46	Anode_DP_DSP	45	Colon_1_DSP
48	GND	47	GND
50	Cap_Touch_Left_DSP	49	I2C_DSP_SCL
52	Cap_Touch_Right_DSP	51	I2C_DSP_SDA
54	Cap_Touch_Up_DSP	53	GND
56	Cap_Touch_Down_DSP	55	GND
58	Cap_Touch_Power_DSP	57	GND
60	+5V	59	GND

DSP_IO_Connector

+5V

U? TLV71333PDBV

C?
0603
50V
0.1uF   X7R

GND

1 IN   OUT 5
3 EN
GND
2

GND

C?
0603
50V
0.1uF   X7R

GND

U?
AT42QT1010-TSHR

SW?

R?
499
0603
1%
1/10W

3 SNSK VDD 5
          SYNC 6
4 SNS OUT 1
     VSS
     2

GND

X7R
50V
0603
10nF
C?

1/10W
1%
0603
10k
R?
0603
10V
X5R

10k
1%
1/10W
R?

GND

C?
10uF

GND

74LVC1G97
U?H
+5V

1 TL 4

GND
+3.3V

C?
0603
50V
X7R
0.1uF

GND

Cap_Touch_Power_DSP

Drew Maatman
Sheet: /Pushbuttons 3/
File: Pushbuttons_3.sch
Title: Incrementor
Size: A   Date: 2019-09-03   Rev: A
KiCad E.D.A. kicad (5.1.4)-1   Id: 9/12

MCP9804   U?

+5V

8

VDD   SDA 1   I2C_DSP_SDA
              SCL 2   I2C_DSP_SCL

3 Alert

       A0   7   +5V
       A1   6   +5V
       A2   5   +5V

EP/GND GND

9   4

GND

I2C 7-Bit Address:
0x1F

+5V

C?   0603
      50V
0.1uF X7R

GND

+60VAN

0603
1%
1/10W
10k R?

D?
Cyan

D?
Cyan

PMSTA06 3 Q?

Colon_0_DSP R?
10k
1/10W
0603
1%

1

2

GND

+60VAN

0603
1%
1/10W
10k R?

D?
Cyan

D?
Cyan

PMSTA06 3 Q?

Colon_1_DSP R?
10k
1/10W
0603
1%

1

2

GND

+5V

0603 C?
10V
X5R   10uF

GND

+5V

0603 C?
10V
X5R   10uF

GND

+5V

0603 C?
10V
X5R   10uF

GND

+1.2VFF

0603 C?
10V
X5R   10uF

GND

+1.2VFF

0603 C?
10V
X5R   10uF

GND

+1.2VFF

0603 C?
10V
X5R   10uF

GND

+60VAN

1210 C?
100V
X7R   1uF

GND

+60VAN

1210 C?
100V
X7R   1uF

GND

+60VAN

1210 C?
100V
X7R   1uF

GND