ARXTRON TECHNOLOGIES

J1A 5536437-4

A1	DIO#0
A2	DIO#1
A3	DIO#2
A4	DIO#3
A5	DIO#4
A6	DIO#5
A7	AI#1+
A8	AI#1-
A9	AI#2+
A10	AI#2-
A11	AI#3+
A12	AI#3-
A13	TRIGa
A14	RTSIa
A15	DUT_PWR
A16	G_PS
A17	G_PS
A18	PSs+
A19	PS+
A20	PS-
A21	PSs-
A22	AUX_PWR
A23	SIM_PWR
A24	GSIM
A25	24V_PWR
A26	G24V
A27	G24V
A28	G24V
A29	
A30	
A31	SLOT_ID_BIT1
A32	SLOT_ID_BIT2

J1B 5536437-4

B1	DIO#6
B2	DIO#7
B3	DIO#8
B4	DIO#9
B5	DIO#10
B6	DIO#11
B7	AI#4+
B8	AI#4-
B9	AI#5+
B10	AI#5-
B11	AI#6+
B12	AI#6-
B13	DUT_PWR_ON
B14	RSVD#4
B15	DUT_PWR
B16	G_PS
B17	G_PS
B18	PSs+
B19	PS+
B20	PS-
B21	PSs-
B22	AUX_PWR
B23	SIM_PWR
B24	GSIM
B25	24V_PWR
B26	G24V
B27	G24V
B28	G24V
B29	
B30	
B31	SLOT_ID_BIT3
B32	SLOT_ID_BIT4

J1C 5536437-4

C1	DIO#12
C2	DIO#13
C3	DIO#14
C4	DIO#15
C5	5V_NI
C6	G_PS
C7	AI#7+
C8	AI#7-
C9	AI#8+
C10	AI#8-
C11	DUT_CAN-
C12	DUT_CAN+
C13	IO_CAN-
C14	IO_CAN+
C15	G_PS
C16	DUT_PWR
C17	G_PS
C18	PSs+
C19	PS+
C20	PS-
C21	PSs-
C22	AUX_PWR
C23	SIM_PWR
C24	GSIM
C25	24V_PWR
C26	G24V
C27	G24V
C28	G24V
C29	
C30	
C31	SLOT_ID_BIT5
C32	SLOT_ID_BIT6

IO_EXPANDER_#1
File: output.kicad_sch

nRST1 — RESET
nCS — nCS
SCK — SCK
MOSI — MOSI
MISO — MISO
3V3 — 3V3
24V_PWR — 24V
3V3 — R1 4.7K — A0 / A1 / A2

IO_EXPANDER_#2
File: output.kicad_sch

nRST2 — RESET
nCS — nCS
SCK — SCK
MOSI — MOSI
MISO — MISO
3V3 — 3V3
24V_PWR — 24V
3V3 — R2 4.7K — A0 / A1 / A2

IO_EXPANDER_#3
File: output_n.kicad_sch

nRST3 — RESET
nCS — nCS
SCK — SCK
MOSI — MOSI
MISO — MISO
3V3 — 3V3
24V_PWR — 24V
3V3 / 3V3 — R3 4.7K / R4 4.7K — A0 / A1 / A2

IO_EXPANDER_#4
File: input.kicad_sch

nRST4 — RESET
nCS — CS
SCK — SCK
MOSI — MOSI
MISO — MISO
IOCB0_#4 — INTA
3V3 — 3V3

IN_A0+ / IN_A0- — 24V_PWR / FUNC_ID_BIT1
IN_A1+ / IN_A1- — 24V_PWR / FUNC_ID_BIT2
IN_A2+ / IN_A2- — 24V_PWR / FUNC_ID_BIT3
IN_A3+ / IN_A3-
IN_A4+ / IN_A4- — 24V_PWR / SLOT_ID_BIT4
IN_A5+ / IN_A5- — 24V_PWR / SLOT_ID_BIT5
IN_A6+ / IN_A6- — 24V_PWR / SLOT_ID_BIT6
IN_A7+ / IN_A7-

SET ON CARD
SET ON BACKPLANE

IN_B0+ / IN_B0- — 24V_PWR / DUT_PWR
IN_B1+ / IN_B1- — G_PS / SIM_PWR
IN_B2+ / IN_B2- — GSIM / AUX_PWR
IN_B3+ / IN_B3- — G_PS / 5V_NI
IN_B4+ / IN_B4- — G24V
IN_B5+ / IN_B5-
IN_B6+ / IN_B6-
IN_B7+ / IN_B7-

3V3 — R69 4.7K — A0 / A1 / A2

CFG_CH[0..3]
File: load.kicad_sch

DUT_PWR — DUT_PWR
CFG_CH#0 — CFG_CH#0
RTN_CFG_CH#0 — RTN_CFG_CH#0
CFG_CH#1 — CFG_CH#1
RTN_CFG_CH#1 — RTN_CFG_CH#1
CFG_CH#2 — CFG_CH#2
RTN_CFG_CH#2 — RTN_CFG_CH#2
CFG_CH#3 — CFG_CH#3
RTN_CFG_CH#3 — RTN_CFG_CH#3
AI_M4_CFG_CH#0 — AI#1+
AI_M4_CFG_CH#1 — AI#1-
AI_M4_CFG_CH#2 — AI#2+
AI_M4_CFG_CH#3 — AI#2-

CFG_CH[4..7]
File: load.kicad_sch

DUT_PWR — DUT_PWR
CFG_CH#0 — CFG_CH#4
RTN_CFG_CH#0 — RTN_CFG_CH#4
CFG_CH#1 — CFG_CH#5
RTN_CFG_CH#1 — RTN_CFG_CH#5
CFG_CH#2 — CFG_CH#6
RTN_CFG_CH#2 — RTN_CFG_CH#6
CFG_CH#3 — CFG_CH#7
RTN_CFG_CH#3 — RTN_CFG_CH#7
AI_M4_CFG_CH#0 — AI#3+
AI_M4_CFG_CH#1 — AI#3-
AI_M4_CFG_CH#2 — AI#4+
AI_M4_CFG_CH#3 — AI#4+

CURRENT_MEAS
File: current_meas.kicad_sch

PS+ — DIN_PS+
PS- — PS-
OUT_PS+ — OUT_PS+
AI_ON_CARD_5VD — AI#5-
AI_CURR_MEAS_RmAD — AI#6+
AI_CURR_MEAS_RuAD — AI#7+

J2
1786976

1	PSs+
2	PSs+
3	OUT_PS+
4	
5	PS-
6	PS-
7	PSs-
8	PSs-
9	DUT_PWR
10	DUT_PWR
11	G_PS
12	G_PS
13	CFG_CH#0
14	RTN_CFG_CH#0
15	CFG_CH#1
16	RTN_CFG_CH#1
17	CFG_CH#2
18	RTN_CFG_CH#2
19	CFG_CH#3
20	RTN_CFG_CH#3
21	CFG_CH#4
22	RTN_CFG_CH#4
23	CFG_CH#5
24	RTN_CFG_CH#5
25	CFG_CH#6
26	RTN_CFG_CH#6
27	CFG_CH#7
28	RTN_CFG_CH#7
29	DUT_CAN-
30	
31	DUT_CAN+
32	DUT_CAN_SHIELD

AI#5+ — R5 1M — C58 100 pF — G_PS

NOTE

WIRES ARE GOING TO DUT:
- PSs+
- PSs-
- OUT_PS+
- PS-

WIRES ARE COMING FROM DUT:
- DUT_PWR
- G_PS

- CAN LINES ARE SHORTED TO CFG
  CONFIGURABLE)
  TO GET CONTROLLED TERM
- DVRS IS CONNECTED TO CFG
  CONFIGURABLE)
- IGN IS CONNECTED TO CFG
  (CONFIGURABLE)

U4 — ULN2803ADWR

Pin	Signal		Pin	Signal
1	I1 — DIO#0		18	O1
2	I2 — DIO#1		17	O2
3	I3 — DIO#2		16	O3
4	I4 — DIO#3		15	O4
5	I5 — DIO#4		14	O5
6	I6 — DIO#5		13	O6
7	I7 — DIO#6		12	O7
8	I8 — DIO#7		11	O8
9	GND		10	COM

O1 — 8 — K33A — 24V_PWR
COM — 24V_PWR — C79 0.1µF
G24V

CONFIGURED AS NRSE
WITH AI_SENSE = G_PS

AI1+ — AI1-
AI2+ — AI2-
AI3+ — AI3-
AI4+ — AI4-
AI5+ — AI5-

CONFIGURED AS DIFF

AI6
AI7
AI8

AI#6- — R11 0 — PS-
AI#7- — R12 0 — PS-
AI#8- — R13 0 — G24V

ID
File: ID.kicad_sch

3V3 — 3V3
24V_PWR — 24V
SLOT_ID_BIT1 — SLOT_ID_BIT1 — POS_ID_BIT1 — POS_ID_BIT1
SLOT_ID_BIT2 — SLOT_ID_BIT2 — POS_ID_BIT2 — POS_ID_BIT2
SLOT_ID_BIT3 — SLOT_ID_BIT3 — POS_ID_BIT3 — POS_ID_BIT3
FUNC_ID_BIT1 — FUNC_ID_BIT1
FUNC_ID_BIT2 — FUNC_ID_BIT2
FUNC_ID_BIT3 — FUNC_ID_BIT3

CAN
File: can.kicad_sch

IO_CAN- — CANL
IO_CAN+ — CANH
ECAN0Tx — ECAN0Tx
ECAN0RxD — ECAN0Rx
3V3 — 3V3

PIC18F26K83
File: pic18f26k83.kicad_sch

ECAN0Tx — ECAN0Tx
ECAN0Rx — ECAN0Rx
nCSD — nCS
SCKD — SCK
MISO — MISO
MOSID — MOSI
nRST1D — nRST1
nRST2D — nRST2
nRST3D — nRST3
nRST4D — nRST4
IOCB0_#4 — IOCB0_#4
POS_ID_BIT1D — POS_ID_BIT1
POS_ID_BIT2D — POS_ID_BIT2
POS_ID_BIT3D — POS_ID_BIT3

DC&RSU_SIM_CTRL
File: power.kicad_sch

24V_PWR — 24V
5V_NI — 5V_NI
SIM_PWR — SIM_PWR
PS+ — PS+
PS- — PS-
DIO#8 — DIO_TRIG
DIO#9 — DIO_RTSI
3V3D — 3V3 — DUT_PWR_ON — DUT_PWR_ON
TRIGaD — TRIGa
RTSIaD — RTSIa

R111 1M / R112 1M
FP1 FP_4U — M2 / M1

PS-

4 LAYERS 1.6H
ARXTRON LABEL
FAB NOTES
ASSEMBLY NOTES

DUT_PWR — R9 432K — AI#5+ — R17 432K — 24V_PWR
AI#8+
R7 432K / R8 432K / R10 432K / R15 432K / R16 432K / R18 432K
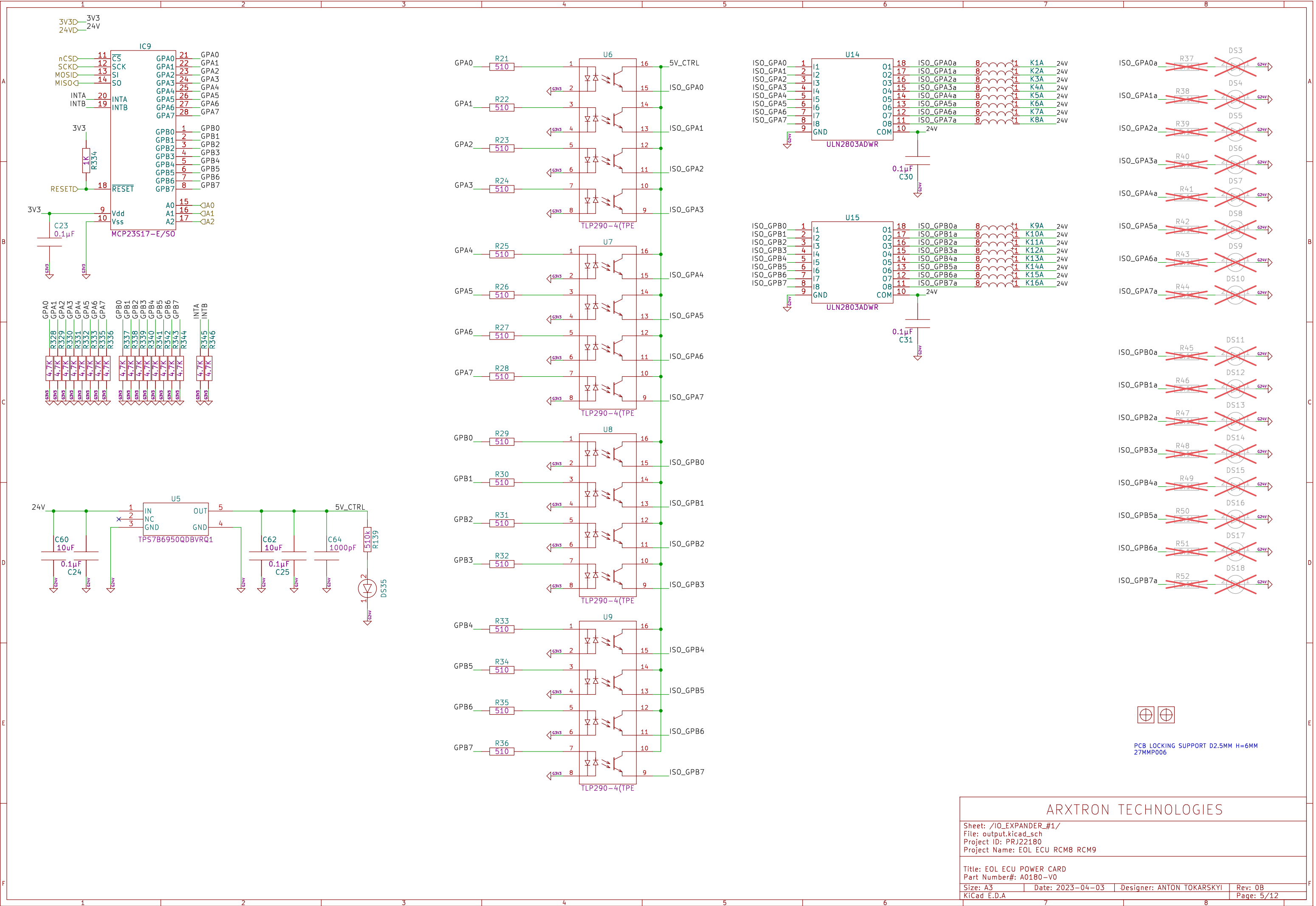G_PS / G24V

Title Block

Sheet: /
File: A0180_eol_ecu_mix.kicad_sch
Project ID: PRJ22180
Project Name: EOL ECU RCM8 RCM9

Title: EOL ECU POWER CARD
Part Number#: A0180-V0

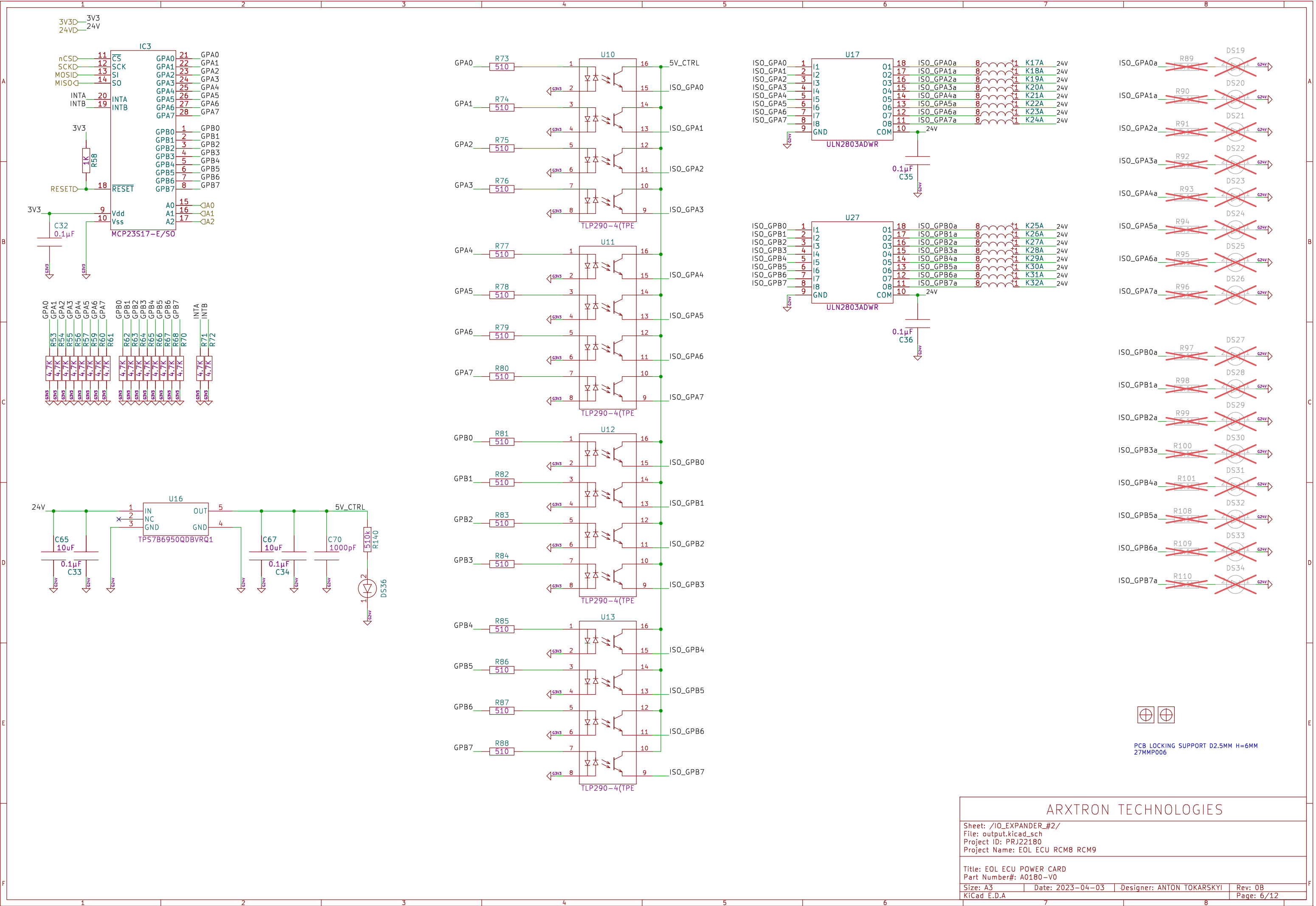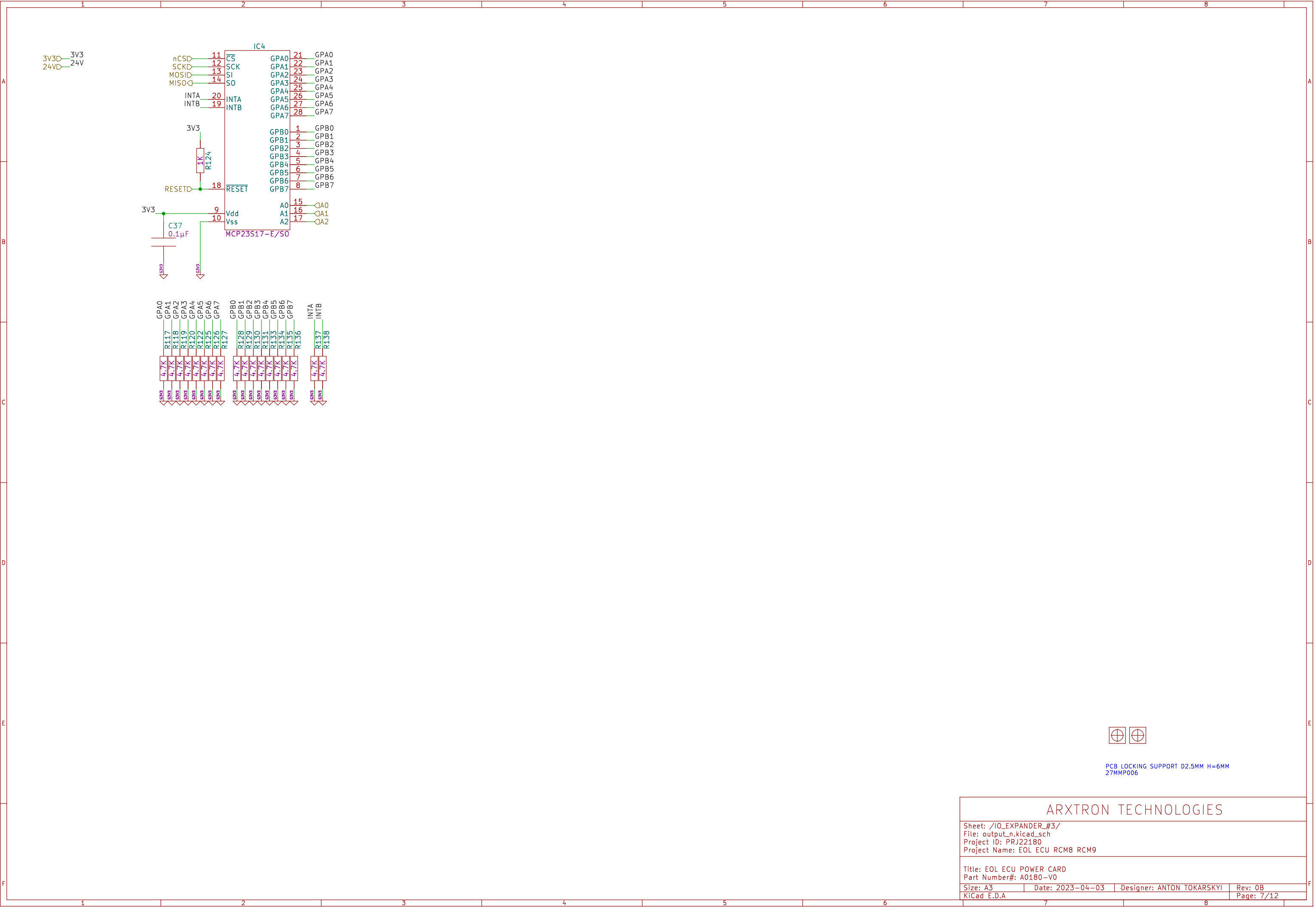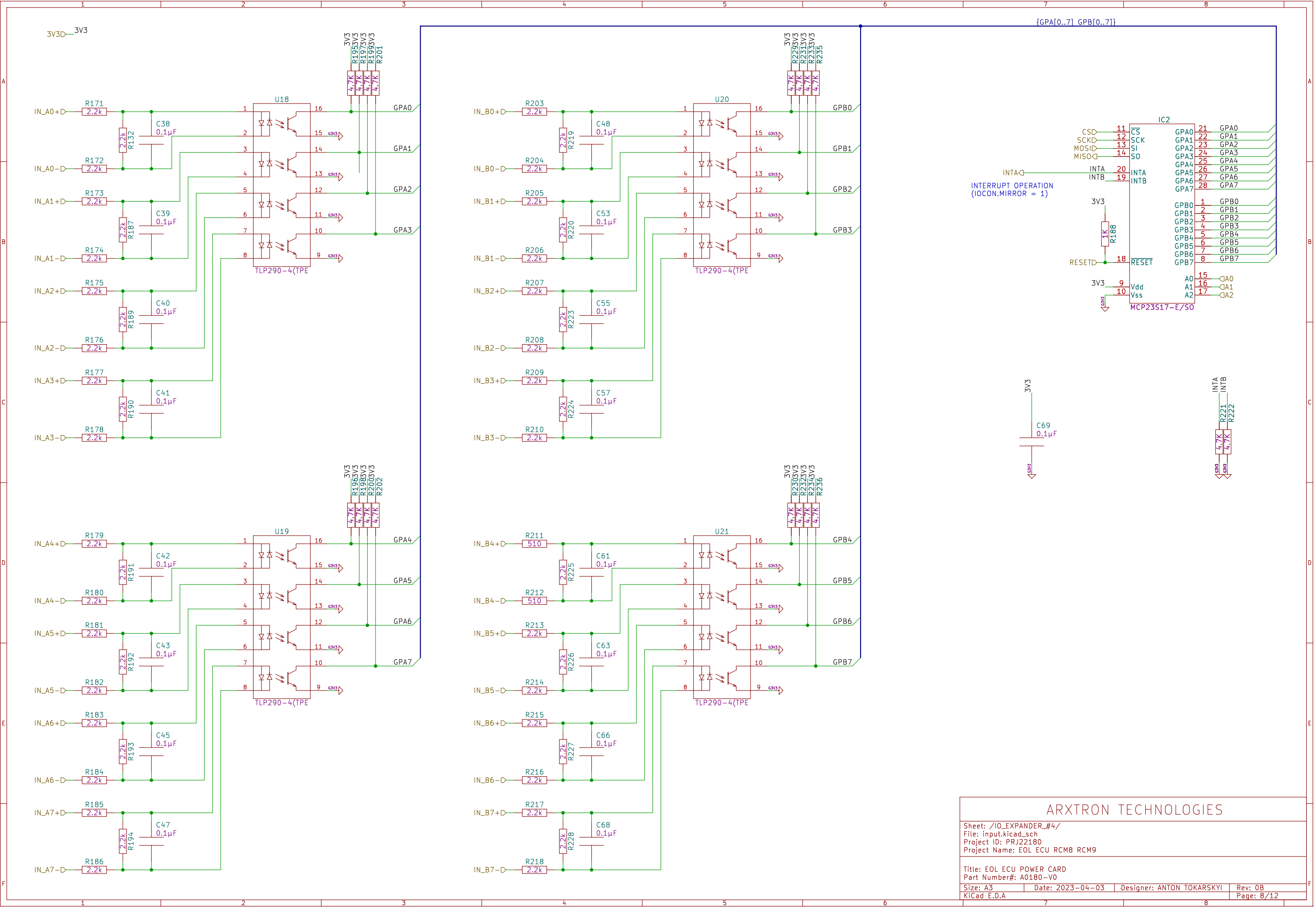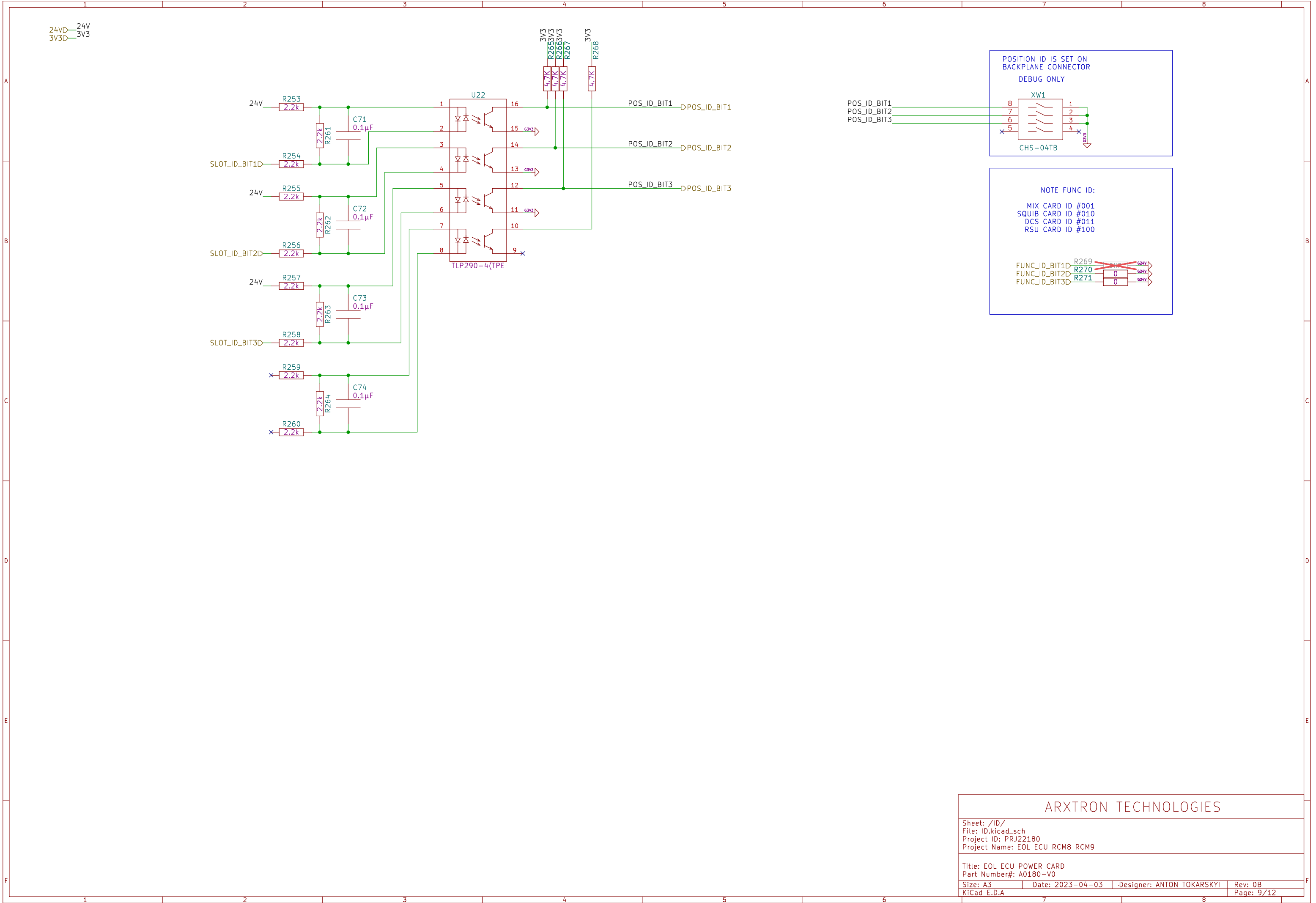| Size: A3	Date: 2023-04-03	Designer: ANTON TOKARSKYI	Rev: 0B
KiCad E.D.A			Page: 1/12

EXTERNAL CLOCK SOURCE:
- XT Oscillator mode
- HS Oscillator mode

3V3

OSC1 Y2 OSC2
C9 8MHz C13
22pF 22pF

R121 DS2
680

IC1

RA0
RA1
RA2
RA3
RA4
RA5
OSC2_CLKOUT/RA6
OSC1_CLKIN/RA7

RC0/SOSC0   nRST1a   R115 0   nRST1
RC1/SOSCI   nRST2a   R116 0   nRST2
RC2   nRST3
RC3   nRST4
RC4   nCS
RC5   SCK
RC6   MOSI
RC7   MISO

IOCB0_#4   RB0
POS_ID_BIT1   RB1
POS_ID_BIT2   RB2
POS_ID_BIT3   RB3
ECAN0Rx   RB4
ECAN0Tx   RB5
PGC R105 10   RB6/ICSPCLK
PGD R106 10   RB7/ICSPDAT

PROG1
MCLR_1   R104   MCLR
3V3   100
PGD
PGC

Vpp/MCLR/RE3

3V3   Vdd   Vss
C11   Vss
0.1µF

C10   C12
1uF   100 pF

PIC18F26K83-I/SO

3V3
R102
4.7K

JP1   JUMPER FOR DEBUG ONLY

SW1
R103
1K

C8
0.1µF

ARXTRON TECHNOLOGIES

Sheet: /PIC18F26K83/
File: pic18f26k83.kicad_sch
Project ID: PRJ22180
Project Name: EOL ECU RCM8 RCM9

Title: EOL ECU POWER CARD
Part Number#: A0180-V0

Size: A3   Date: 2023-04-03   Designer: ANTON TOKARSKYI   Rev: 0B
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TR1
760390015

U1
SN6501DBVR

U3
TPS76350DBVR

U2
ISO1050DWR

C14
0.1µF

C18
10µF

C17
0.1µF

R114
2k

C20
10µF

C22
0.1µF

C21
10µF

C19
0.1µF

C15
22pF

C16
22pF

R123

D2
SBR80520LT1G

D3
SBR80520LT1G

D4

3V3
5V_ISO

ECAN0Rx
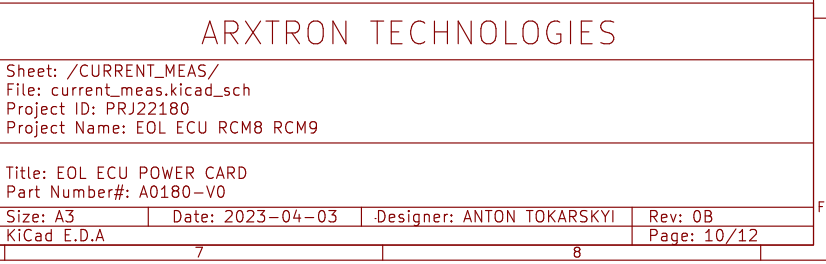ECAN0Tx

CANH
CANL

DEFAULT
TERMINATOR
1000 Ohm
ALL NODES

PCB LOCKING SUPPORT D2.5MM H=6MM
27MMP006
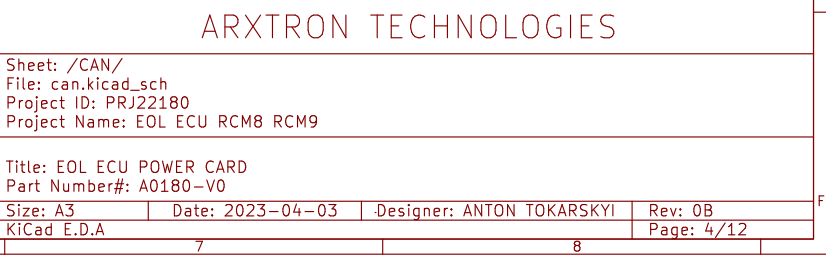
ARXTRON TECHNOLOGIES

Sheet: /IO_EXPANDER_#2/
File: output.kicad_sch
Project ID: PRJ22180
Project Name: EOL ECU RCM8 RCM9

Title: EOL ECU POWER CARD
Part Number#: A0180-V0

| Size: A3 | Date: 2023-04-03 | Designer: ANTON TOKARSKYI | Rev: 0B |
| KiCad E.D.A | | | Page: 6/12 |

PCB LOCKING SUPPORT D2.5MM H=6MM
27MMP006

IC4

Pin	Signal
nCS	11 CS
SCK	12 SCK
MOSI	13 SI
MISO	14 SO

INTA 20 INTA
INTB 19 INTB

3V3

R124
1K

RESET 18 RESET

3V3

9 Vdd
10 Vss

C37
0.1µF

MCP23S17-E/SO

GPA0 21 GPA0
GPA1 22 GPA1
GPA2 23 GPA2
GPA3 24 GPA3
GPA4 25 GPA4
GPA5 26 GPA5
GPA6 27 GPA6
GPA7 28 GPA7

GPB0 1 GPB0
GPB1 2 GPB1
GPB2 3 GPB2
GPB3 4 GPB3
GPB4 5 GPB4
GPB5 6 GPB5
GPB6 7 GPB6
GPB7 8 GPB7

A0 15 A0
A1 16 A1
A2 17 A2

GPA0 R117 4,7K
GPA1 R118 4,7K
GPA2 R119 4,7K
GPA3 R120 4,7K
GPA4 R122 4,7K
GPA5 R125 4,7K
GPA6 R126 4,7K
GPA7 R127 4,7K

GPB0 R128 4,7K
GPB1 R129 4,7K
GPB2 R130 4,7K
GPB3 R131 4,7K
GPB4 R133 4,7K
GPB5 R134 4,7K
GPB6 R135 4,7K
GPB7 R136 4,7K

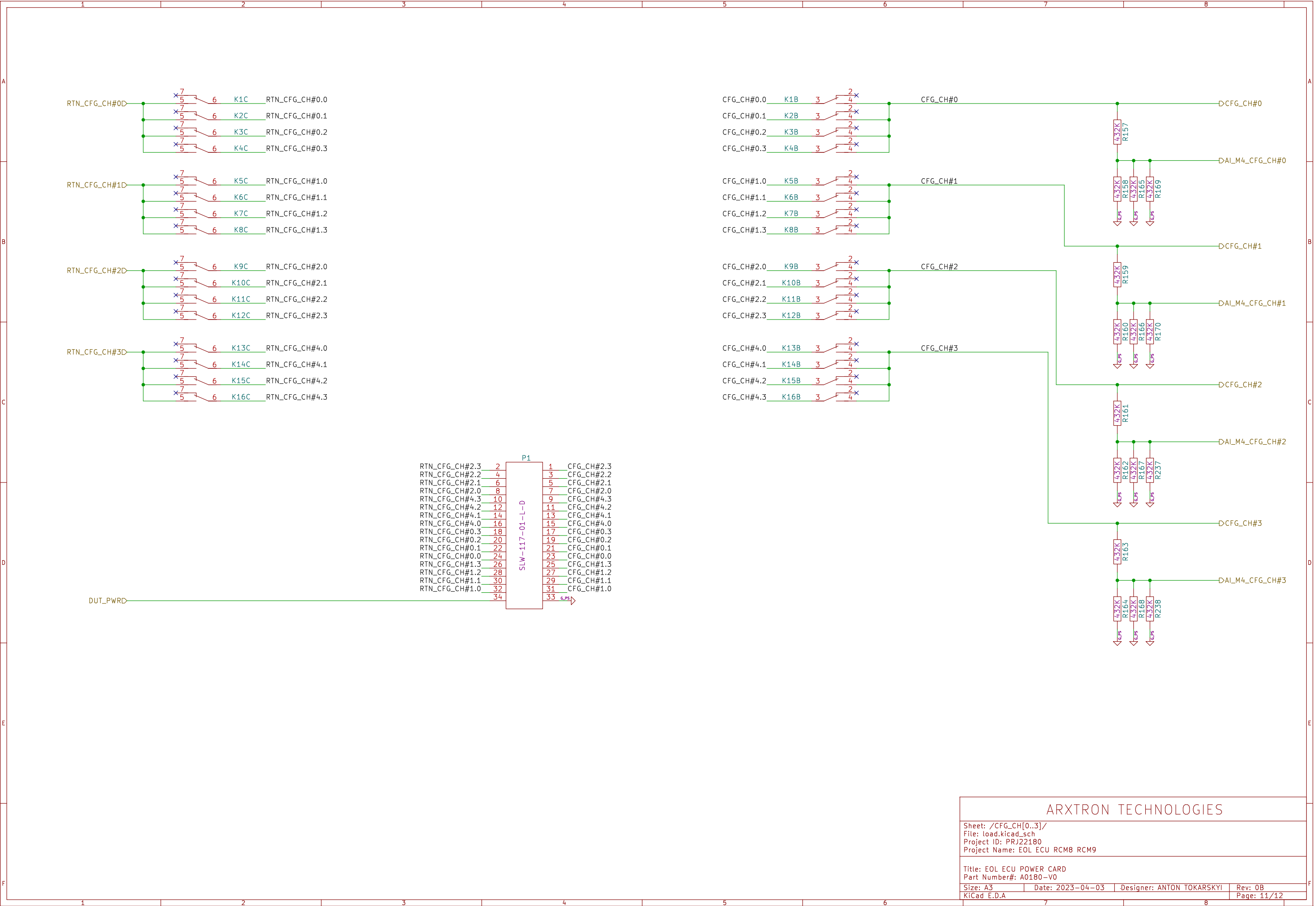INTA R137 4,7K
INTB R138 4,7K

3V3 3V3
24V 24V

PCB LOCKING SUPPORT D2.5MM H=6MM
27MMP006

ARXTRON TECHNOLOGIES

Sheet: /IO_EXPANDER_#3/
File: output_n.kicad_sch
Project ID: PRJ22180
Project Name: EOL ECU RCM8 RCM9

Title: EOL ECU POWER CARD
Part Number#: A0180-V0

| Size: A3 | Date: 2023-04-03 | Designer: ANTON TOKARSKYI | Rev: 0B |
| KiCad E.D.A | | | Page: 7/12 |

3V3
{GPA[0..7] GPB[0..7]}
U18
U19
U20
U21
TLP290-4(TPE
IN_A0+
IN_A0-
IN_A1+
IN_A1-
IN_A2+
IN_A2-
IN_A3+
IN_A3-
IN_A4+
IN_A4-
IN_A5+
IN_A5-
IN_A6+
IN_A6-
IN_A7+
IN_A7-
IN_B0+
IN_B0-
IN_B1+
IN_B1-
IN_B2+
IN_B2-
IN_B3+
IN_B3-
IN_B4+
IN_B4-
IN_B5+
IN_B5-
IN_B6+
IN_B6-
IN_B7+
IN_B7-
R171 2.2k
R172 2.2k
R132 2.2k
C38 0.1µF
R173 2.2k
R174 2.2k
R187 2.2k
C39 0.1µF
R175 2.2k
R176 2.2k
R189 2.2k
C40 0.1µF
R177 2.2k
R178 2.2k
R190 2.2k
C41 0.1µF
R179 2.2k
R180 2.2k
R191 2.2k
C42 0.1µF
R181 2.2k
R182 2.2k
R192 2.2k
C43 0.1µF
R183 2.2k
R184 2.2k
R193 2.2k
C45 0.1µF
R185 2.2k
R186 2.2k
R194 2.2k
C47 0.1µF
R203 2.2k
R204 2.2k
R219 2.2k
C48 0.1µF
R205 2.2k
R206 2.2k
R220 2.2k
C53 0.1µF
R207 2.2k
R208 2.2k
R223 2.2k
C55 0.1µF
R209 2.2k
R210 2.2k
R224 2.2k
C57 0.1µF
R211 510
R212 510
R225 2.2k
C61 0.1µF
R213 2.2k
R214 2.2k
R226 2.2k
C63 0.1µF
R215 2.2k
R216 2.2k
R227 2.2k
C66 0.1µF
R217 2.2k
R218 2.2k
R228 2.2k
C68 0.1µF
R195 R197 R199 R201 4.7K
R196 R198 R200 R202 4.7K
R229 R231 R233 R235 4.7K
R230 R232 R234 R236 4.7K
GPA0
GPA1
GPA2
GPA3
GPA4
GPA5
GPA6
GPA7
GPB0
GPB1
GPB2
GPB3
GPB4
GPB5
GPB6
GPB7
IC2
CS
SCK
MOSI
MISO
SI
SO
INTA
INTB
INTERRUPT OPERATION
(IOCON.MIRROR = 1)
R188 1K
RESET
Vdd
Vss
A0
A1
A2
MCP23S17-E/SO
C69 0.1µF
R221 4.7K
R222 4.7K

ARXTRON TECHNOLOGIES

Sheet: /IO_EXPANDER_#4/
File: input.kicad_sch
Project ID: PRJ22180
Project Name: EOL ECU RCM8 RCM9

Title: EOL ECU POWER CARD
Part Number#: A0180-V0

Size: A3	Date: 2023-04-03	Designer: ANTON TOKARSKYI	Rev: 0B
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24VD 24V
3V3D 3V3

POS_ID_BIT1 ▷POS_ID_BIT1
POS_ID_BIT2 ▷POS_ID_BIT2
POS_ID_BIT3 ▷POS_ID_BIT3

24V R253 2.2k
SLOT_ID_BIT1D R254 2.2k
24V R255 2.2k
SLOT_ID_BIT2D R256 2.2k
24V R257 2.2k
SLOT_ID_BIT3D R258 2.2k
R259 2.2k
R260 2.2k

R261 2.2k C71 0.1µF
R262 2.2k C72 0.1µF
R263 2.2k C73 0.1µF
R264 2.2k C74 0.1µF

3V3 R265 4.7K
3V3 R266 4.7K
R267 4.7K
3V3 R268 4.7K

U22
TLP290-4(TPE

POSITION ID IS SET ON
BACKPLANE CONNECTOR
DEBUG ONLY

XW1
CHS-04TB

POS_ID_BIT1   8   1
POS_ID_BIT2   7   2
POS_ID_BIT3   6   3
               5   4

NOTE FUNC ID:

MIX CARD ID #001
SQUIB CARD ID #010
DCS CARD ID #011
RSU CARD ID #100

FUNC_ID_BIT1D R269
FUNC_ID_BIT2D R270 0
FUNC_ID_BIT3D R271 0

RTN_CFG_CH#0 — 7 5 6 K1C — RTN_CFG_CH#0.0
7 5 6 K2C — RTN_CFG_CH#0.1
7 5 6 K3C — RTN_CFG_CH#0.2
7 5 6 K4C — RTN_CFG_CH#0.3

RTN_CFG_CH#1 — 7 5 6 K5C — RTN_CFG_CH#1.0
7 5 6 K6C — RTN_CFG_CH#1.1
7 5 6 K7C — RTN_CFG_CH#1.2
7 5 6 K8C — RTN_CFG_CH#1.3

RTN_CFG_CH#2 — 7 5 6 K9C — RTN_CFG_CH#2.0
7 5 6 K10C — RTN_CFG_CH#2.1
7 5 6 K11C — RTN_CFG_CH#2.2
7 5 6 K12C — RTN_CFG_CH#2.3

RTN_CFG_CH#3 — 7 5 6 K13C — RTN_CFG_CH#4.0
7 5 6 K14C — RTN_CFG_CH#4.1
7 5 6 K15C — RTN_CFG_CH#4.2
7 5 6 K16C — RTN_CFG_CH#4.3

CFG_CH#0.0 — K1B 3 2 4 — CFG_CH#0
CFG_CH#0.1 — K2B 3 2 4
CFG_CH#0.2 — K3B 3 2 4
CFG_CH#0.3 — K4B 3 2 4

CFG_CH#1.0 — K5B 3 2 4 — CFG_CH#1
CFG_CH#1.1 — K6B 3 2 4
CFG_CH#1.2 — K7B 3 2 4
CFG_CH#1.3 — K8B 3 2 4

CFG_CH#2.0 — K9B 3 2 4 — CFG_CH#2
CFG_CH#2.1 — K10B 3 2 4
CFG_CH#2.2 — K11B 3 2 4
CFG_CH#2.3 — K12B 3 2 4

CFG_CH#4.0 — K13B 3 2 4 — CFG_CH#3
CFG_CH#4.1 — K14B 3 2 4
CFG_CH#4.2 — K15B 3 2 4
CFG_CH#4.3 — K16B 3 2 4

CFG_CH#0
432K R157
AI_M4_CFG_CH#0
432K R158
432K R165
432K R169
CFG_CH#1
432K R159
AI_M4_CFG_CH#1
432K R160
432K R166
432K R170
CFG_CH#2
432K R161
AI_M4_CFG_CH#2
432K R162
432K R167
432K R237
CFG_CH#3
432K R163
AI_M4_CFG_CH#3
432K R164
432K R168
432K R238

P1
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RTN_CFG_CH#2.3 2   1 CFG_CH#2.3
RTN_CFG_CH#2.2 4   3 CFG_CH#2.2
RTN_CFG_CH#2.1 6   5 CFG_CH#2.1
RTN_CFG_CH#2.0 8   7 CFG_CH#2.0
RTN_CFG_CH#4.3 10   9 CFG_CH#4.3
RTN_CFG_CH#4.2 12   11 CFG_CH#4.2
RTN_CFG_CH#4.1 14   13 CFG_CH#4.1
RTN_CFG_CH#4.0 16   15 CFG_CH#4.0
RTN_CFG_CH#0.3 18   17 CFG_CH#0.3
RTN_CFG_CH#0.2 20   19 CFG_CH#0.2
RTN_CFG_CH#0.1 22   21 CFG_CH#0.1
RTN_CFG_CH#0.0 24   23 CFG_CH#0.0
RTN_CFG_CH#1.3 26   25 CFG_CH#1.3
RTN_CFG_CH#1.2 28   27 CFG_CH#1.2
RTN_CFG_CH#1.1 30   29 CFG_CH#1.1
RTN_CFG_CH#1.0 32   31 CFG_CH#1.0
                34   33 GPS

DUT_PWR