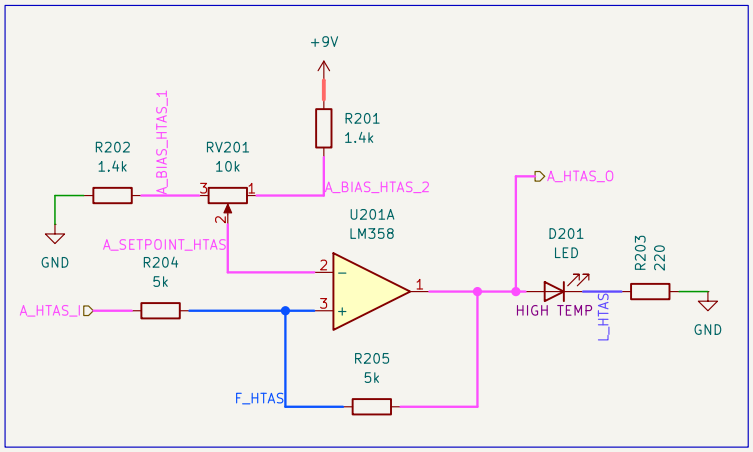
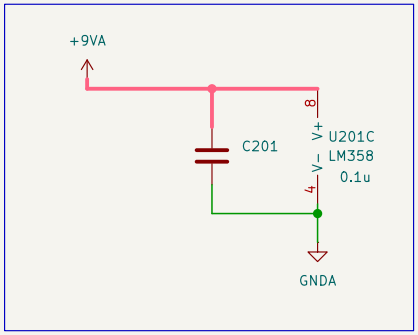
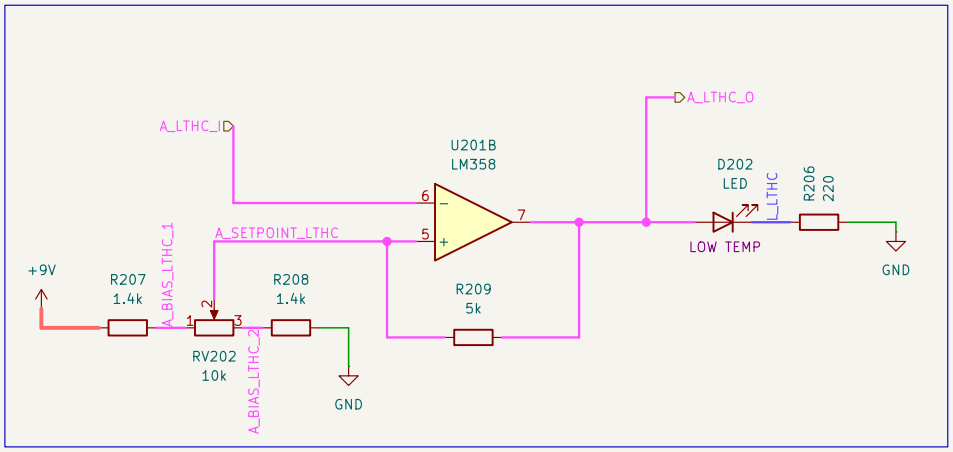
High temp alert system



opamp power



Low temp heater control



Description

High Temp Alarm
IN: A_HTAS_I (amplified temp)
OUT: A_HTAS_O (alarm)
ADJ: HIGH TEMP pot (RV201)

Low Temp Heater Control:
IN: A_LTHC_I (amplified temp)
OUT: HEATER_DRIVE (MOSFET), A_LTHC_O (alarm)
ADJ: LOW TEMP pot (RV202)

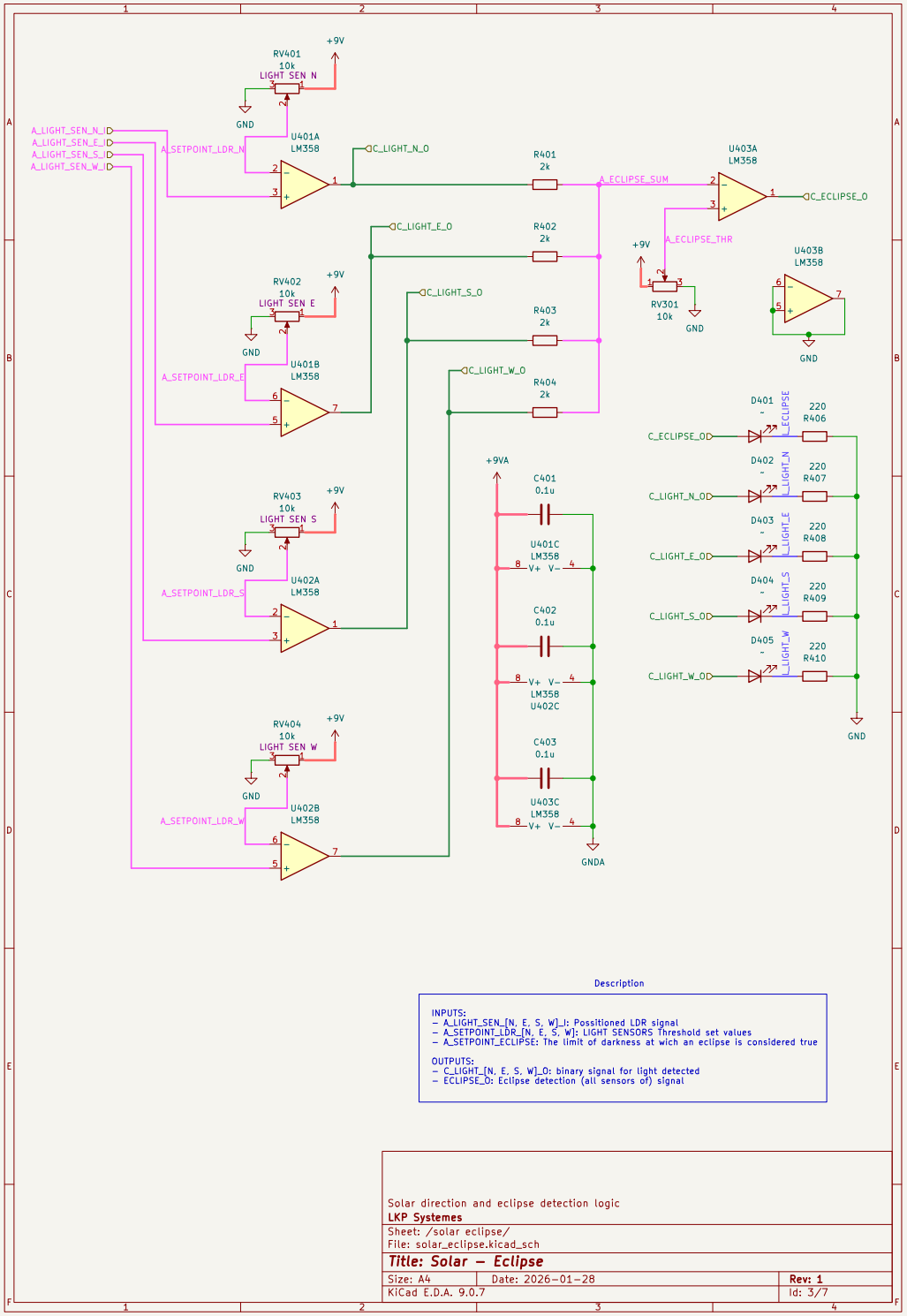
Thermal control logic for both high and low temp alert

LKP Systemes

Sheet: /thermal control/
File: thermal_control.kicad_sch

Title: Thermal control

Size: A4	Date: 2026-01-28	**Rev: 1**
KiCad E.D.A. 9.0.7		Id: 2/7



Description

INPUTS:
- A_LIGHT_SEN_[N, E, S, W]_I: Possitioned LDR signal
- A_SETPOINT_LDR_[N, E, S, W]: LIGHT SENSORS Threshold set values
- A_SETPOINT_ECLIPSE: The limit of darkness at wich an eclipse is considered true

OUTPUTS:
- C_LIGHT_[N, E, S, W]_O: binary signal for light detected
- ECLIPSE_O: Eclipse detection (all sensors of) signal

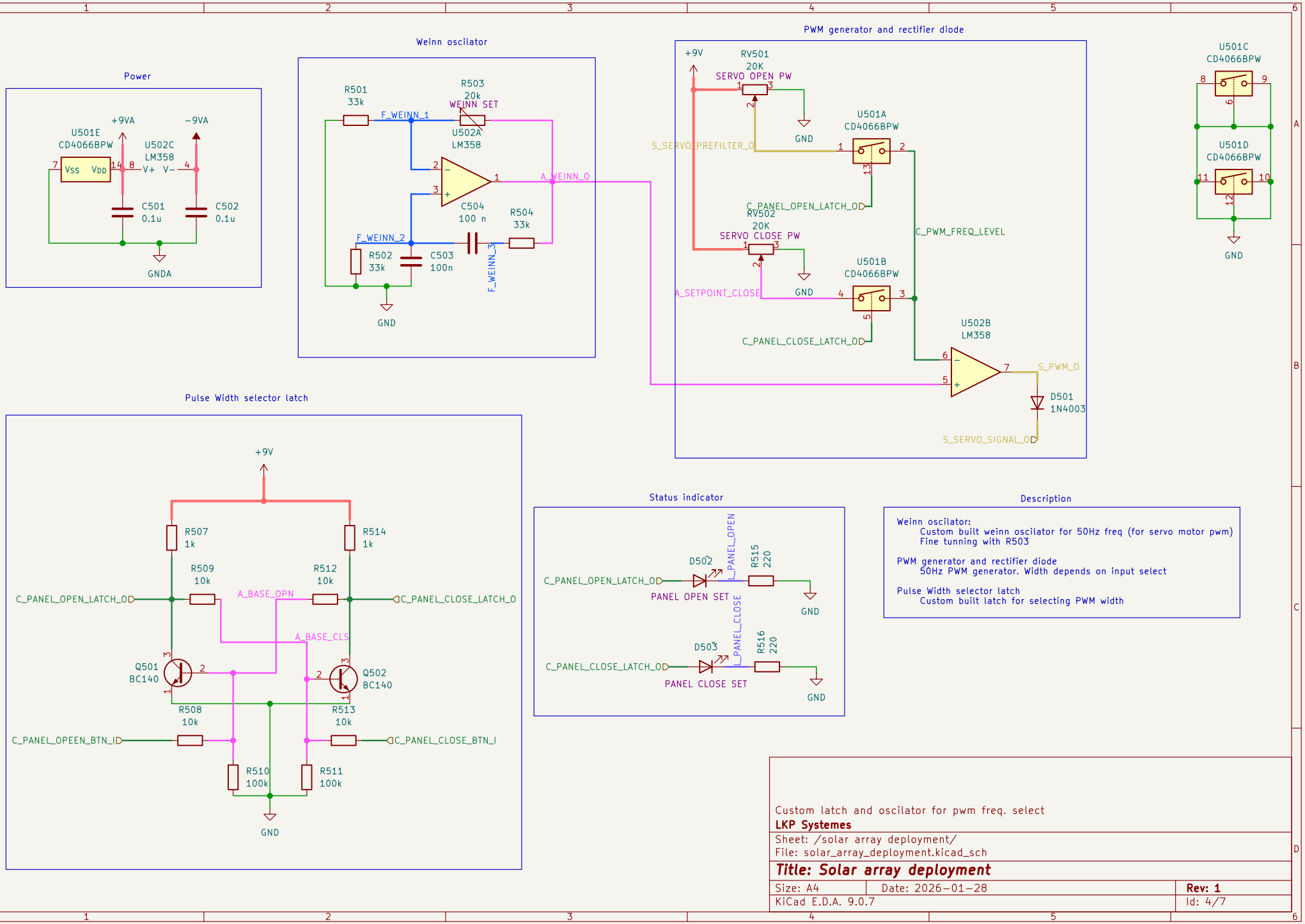
Solar direction and eclipse detection logic

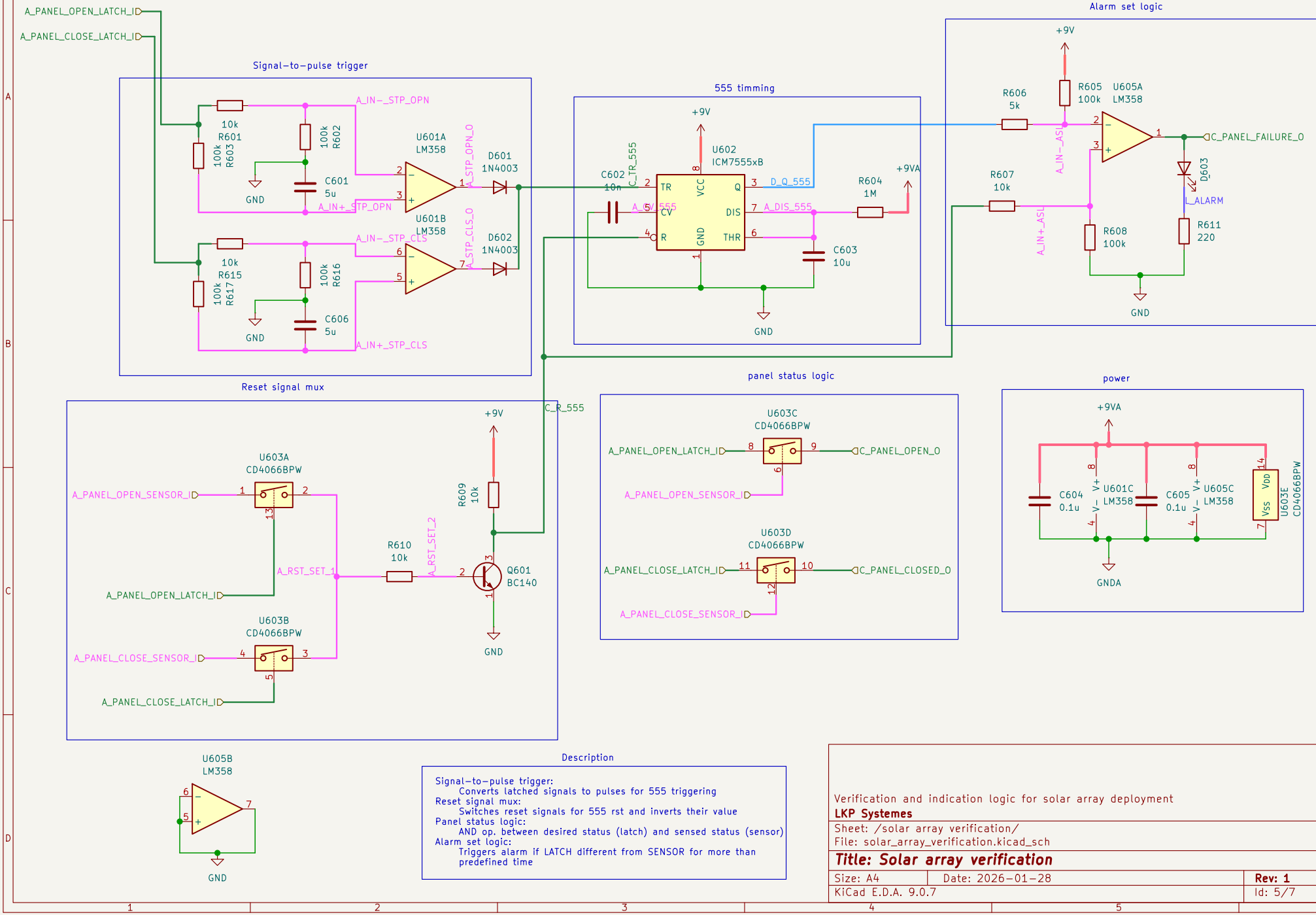
LKP Systemes

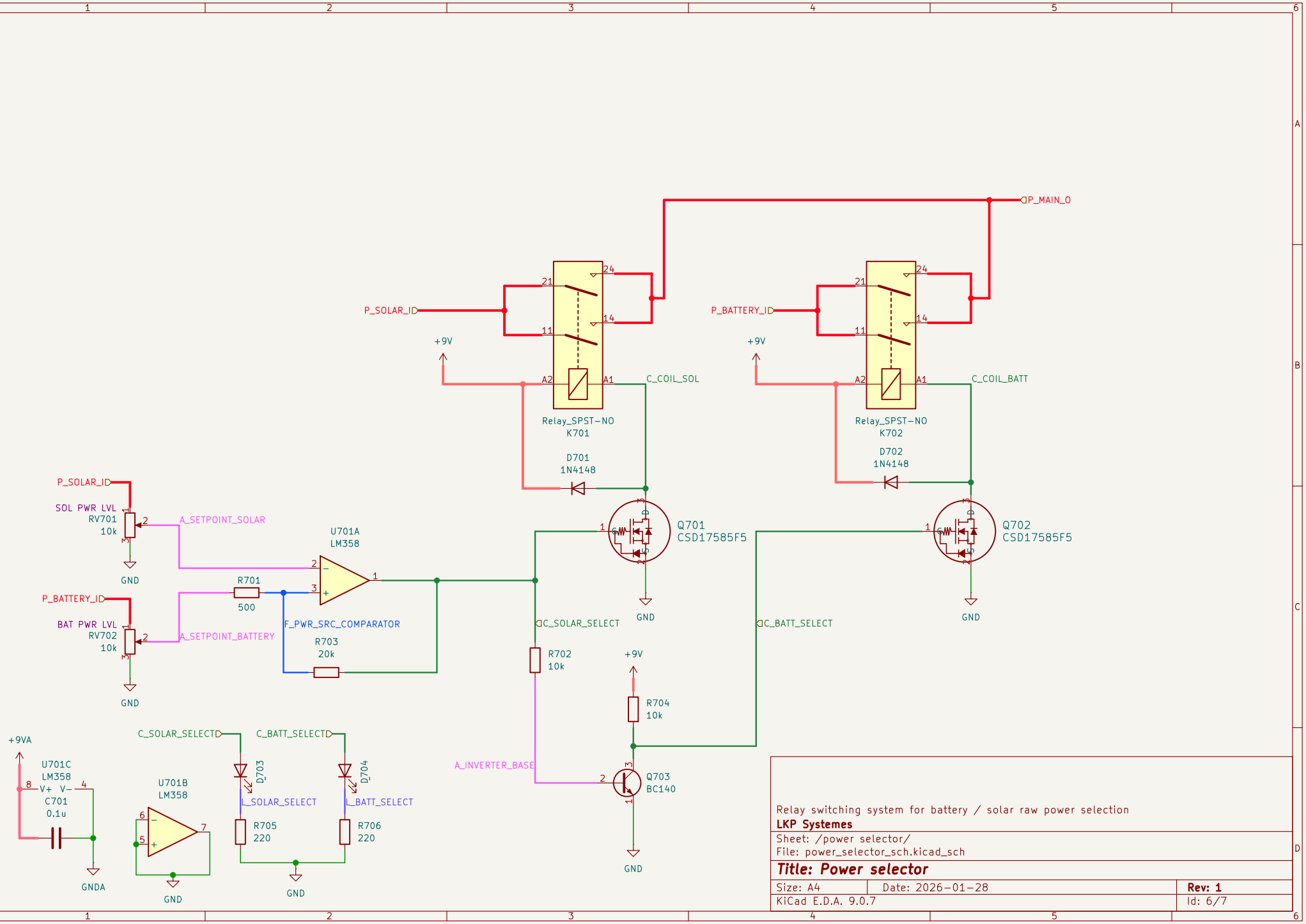
Sheet: /solar eclipse/
File: solar_eclipse.kicad_sch

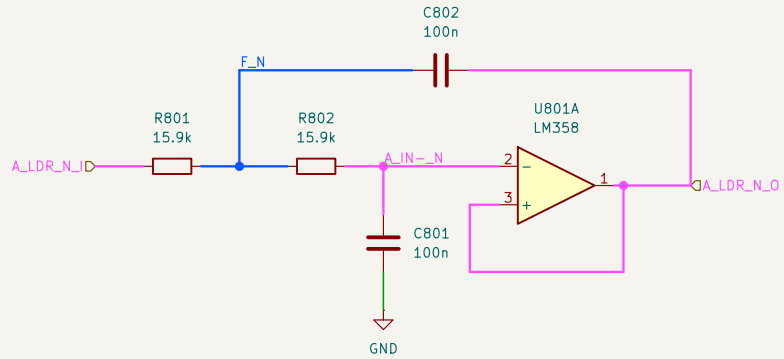
Title: Solar – Eclipse

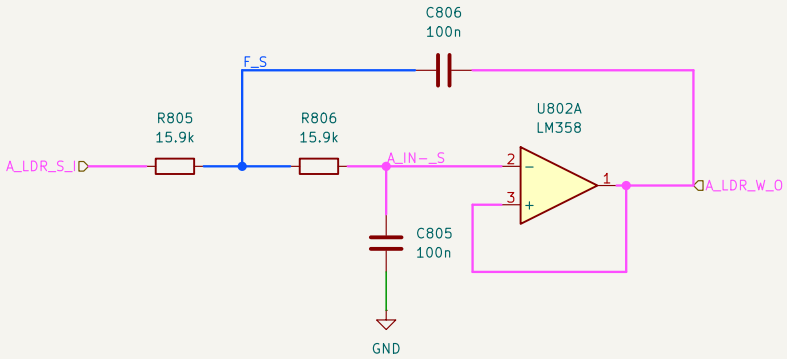
Size: A4	Date: 2026-01-28	**Rev: 1**
KiCad E.D.A. 9.0.7		Id: 3/7

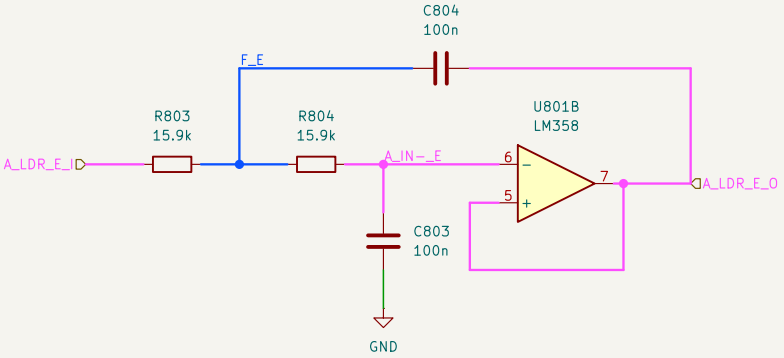

Power
U501E
CD4066BPW
+9VA
−9VA
U502C
LM358
C501
0.1u
C502
0.1u
GNDA
Weinn oscilator
R501
33k
R503
20k
WEINN SET
F_WEINN_1
U502A
LM358
A_WEINN_O
C504
100 n
R504
33k
F_WEINN_2
R502
33k
C503
100n
F_WEINN_3
GND
PWM generator and rectifier diode
+9V
RV501
20K
SERVO OPEN PW
GND
U501A
CD4066BPW
S_SERVO_PREFILTER_O
C_PANEL_OPEN_LATCH_OD
RV502
20K
SERVO CLOSE PW
C_PWM_FREQ_LEVEL
U501B
CD4066BPW
A_SETPOINT_CLOSE
C_PANEL_CLOSE_LATCH_OD
U502B
LM358
S_PWM_O
D501
1N4003
S_SERVO_SIGNAL_O
U501C
CD4066BPW
U501D
CD4066BPW
GND
Pulse Width selector latch
+9V
R507
1k
R514
1k
R509
10k
R512
10k
C_PANEL_OPEN_LATCH_O
A_BASE_OPN
C_PANEL_CLOSE_LATCH_O
A_BASE_CLS
Q501
BC140
Q502
BC140
R508
10k
R513
10k
C_PANEL_OPEEN_BTN_I
C_PANEL_CLOSE_BTN_I
R510
100k
R511
100k
GND
Status indicator
C_PANEL_OPEN_LATCH_OD
D502
L_PANEL_OPEN
R515
220
PANEL OPEN SET
GND
C_PANEL_CLOSE_LATCH_OD
D503
L_PANEL_CLOSE
R516
220
PANEL CLOSE SET
GND
Description
Weinn oscilator:
Custom built weinn oscilator for 50Hz freq (for servo motor pwm)
Fine tunning with R503
PWM generator and rectifier diode
50Hz PWM generator. Width depends on input select
Pulse Width selector latch
Custom built latch for selecting PWM width
Custom latch and oscilator for pwm freq. select
LKP Systemes
Sheet: /solar array deployment/
File: solar_array_deployment.kicad_sch
Title: Solar array deployment
Size: A4
Date: 2026-01-28
Rev: 1
KiCad E.D.A. 9.0.7
Id: 4/7

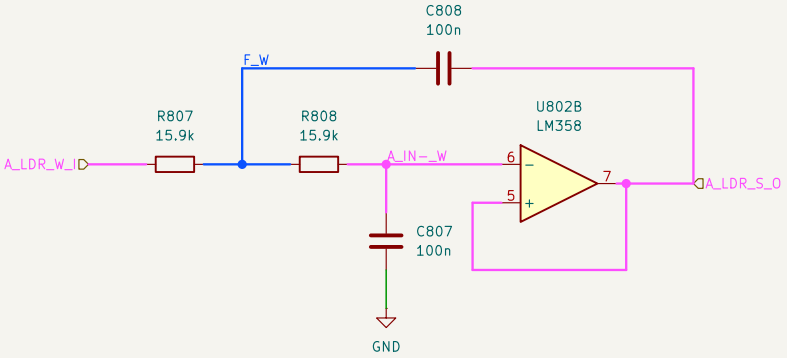

A_PANEL_OPEN_LATCH_I
A_PANEL_CLOSE_LATCH_I
Signal–to–pulse trigger
10k
R601
100k
R603
100k
R602
A_IN–_STP_OPN
U601A
LM358
A_STP_OPN_O
D601
1N4003
C601
5u
GND
A_IN+_STP_OPN
U601B
LM358
10k
R615
100k
R617
100k
R616
A_IN–_STP_CLS
A_STP_CLS_O
D602
1N4003
C606
5u
GND
A_IN+_STP_CLS
555 timming
+9V
C602
10n
C_TR_555
U602
ICM7555xB
TR
VCC
Q
D_Q_555
A_5V_555
CV
DIS
A_DIS_555
R
GND
THR
R604
1M
+9VA
C603
10u
GND
Alarm set logic
+9V
R606
5k
R605
100k
U605A
LM358
A_IN–_ASL
C_PANEL_FAILURE_O
D603
L_ALARM
R607
10k
A_IN+_ASL
R608
100k
R611
220
GND
Reset signal mux
C_R_555
+9V
U603A
CD4066BPW
A_PANEL_OPEN_SENSOR_I
R609
10k
R610
10k
A_RST_SET_1
A_RST_SET_2
Q601
BC140
A_PANEL_OPEN_LATCH_I
U603B
CD4066BPW
A_PANEL_CLOSE_SENSOR_I
GND
A_PANEL_CLOSE_LATCH_I
panel status logic
U603C
CD4066BPW
A_PANEL_OPEN_LATCH_I
C_PANEL_OPEN_O
A_PANEL_OPEN_SENSOR_I
U603D
CD4066BPW
A_PANEL_CLOSE_LATCH_I
C_PANEL_CLOSED_O
A_PANEL_CLOSE_SENSOR_I
power
+9VA
C604
0.1u
U601C
LM358
C605
0.1u
U605C
LM358
U603E
CD4066BPW
GNDA
U605B
LM358
GND
Description
Signal–to–pulse trigger:
Converts latched signals to pulses for 555 triggering
Reset signal mux:
Switches reset signals for 555 rst and inverts their value
Panel status logic:
AND op. between desired status (latch) and sensed status (sensor)
Alarm set logic:
Triggers alarm if LATCH different from SENSOR for more than predefined time
Verification and indication logic for solar array deployment
LKP Systemes
Sheet: /solar array verification/
File: solar_array_verification.kicad_sch
Title: Solar array verification
Size: A4
Date: 2026–01–28
Rev: 1
KiCad E.D.A. 9.0.7
Id: 5/7

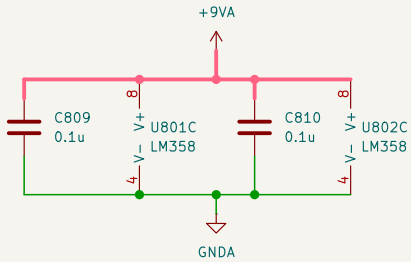

P_MAIN_O
P_SOLAR_ID
P_BATTERY_ID
+9V
C_COIL_SOL
C_COIL_BATT
Relay_SPST-NO
K701
K702
D701
1N4148
D702
1N4148
Q701
CSD17585F5
Q702
CSD17585F5
GND
SOL PWR LVL
RV701
10k
BAT PWR LVL
RV702
10k
A_SETPOINT_SOLAR
A_SETPOINT_BATTERY
U701A
LM358
R701
500
R703
20k
F_PWR_SRC_COMPARATOR
C_SOLAR_SELECT
C_BATT_SELECT
R702
10k
R704
10k
A_INVERTER_BASE
Q703
BC140
+9VA
U701C
LM358
C701
0.1u
GNDA
U701B
LM358
D703
D704
L_SOLAR_SELECT
L_BATT_SELECT
R705
220
R706
220
Relay switching system for battery / solar raw power selection
LKP Systemes
Sheet: /power selector/
File: power_selector_sch.kicad_sch
Title: Power selector
Size: A4
Date: 2026-01-28
Rev: 1
KiCad E.D.A. 9.0.7
Id: 6/7











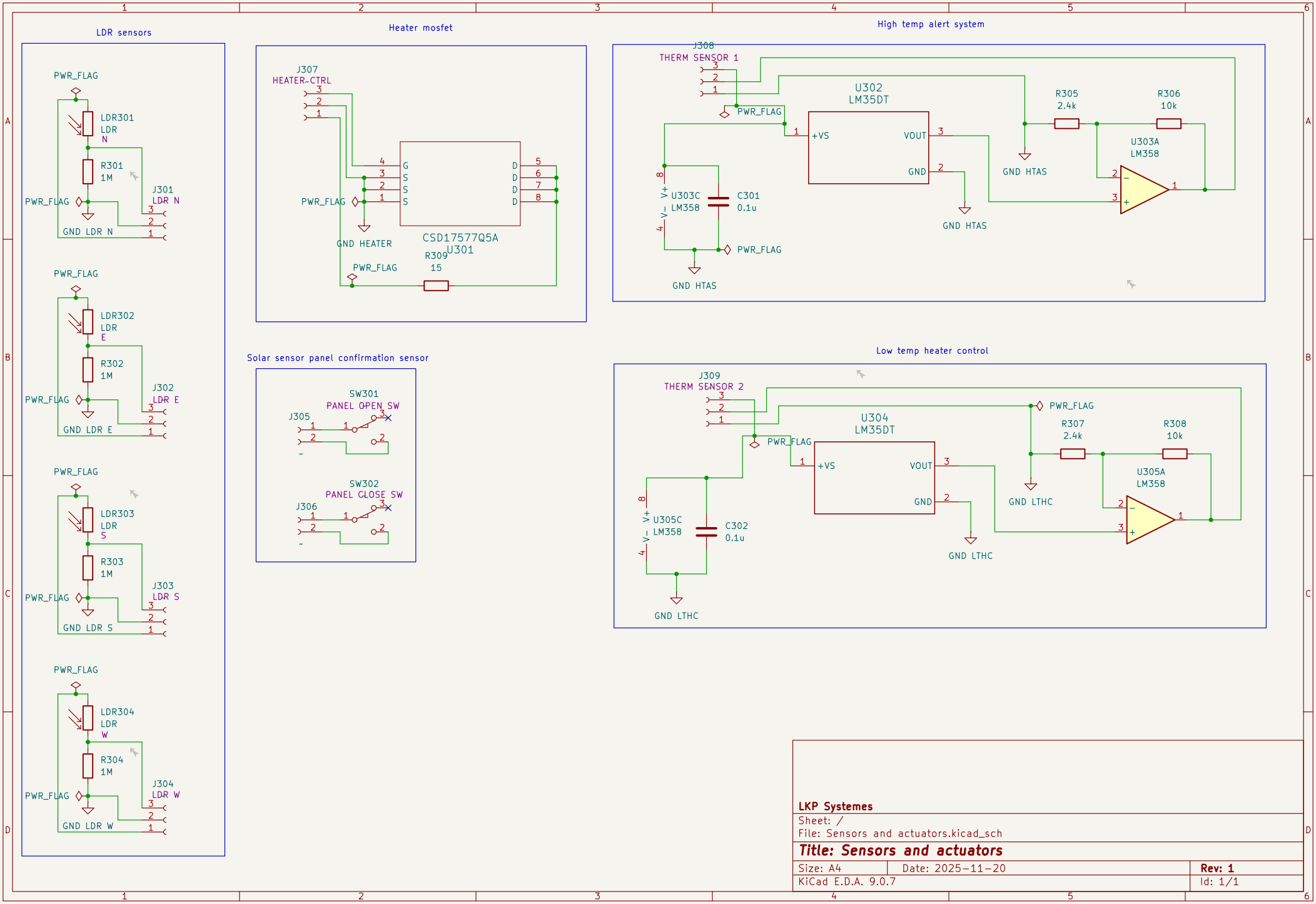
4 implementations of active filter for LDR signals noise cleaning

LKP Systemes

Sheet: /active filter/
File: active_filter.kicad_sch

Title: Active filter

Size: A4	Date: 2026-01-28	**Rev: 1**
KiCad E.D.A. 9.0.7		Id: 7/7


LDR sensors
PWR_FLAG
LDR301
LDR
N
R301
1M
J301
LDR N
GND LDR N
LDR302
LDR
E
R302
1M
J302
LDR E
GND LDR E
LDR303
LDR
S
R303
1M
J303
LDR S
GND LDR S
LDR304
LDR
W
R304
1M
J304
LDR W
GND LDR W
Heater mosfet
J307
HEATER-CTRL
CSD17577Q5A
U301
GND HEATER
R309
15
Solar sensor panel confirmation sensor
SW301
PANEL OPEN SW
J305
SW302
PANEL CLOSE SW
J306
High temp alert system
J308
THERM SENSOR 1
U302
LM35DT
+VS
VOUT
GND
R305
2.4k
R306
10k
U303A
LM358
U303C
LM358
C301
0.1u
GND HTAS
Low temp heater control
J309
THERM SENSOR 2
U304
LM35DT
R307
2.4k
R308
10k
U305A
LM358
U305C
LM358
C302
0.1u
GND LTHC
LKP Systemes
Sheet: /
File: Sensors and actuators.kicad_sch
Title: Sensors and actuators
Size: A4
Date: 2025-11-20
Rev: 1
KiCad E.D.A. 9.0.7
Id: 1/1