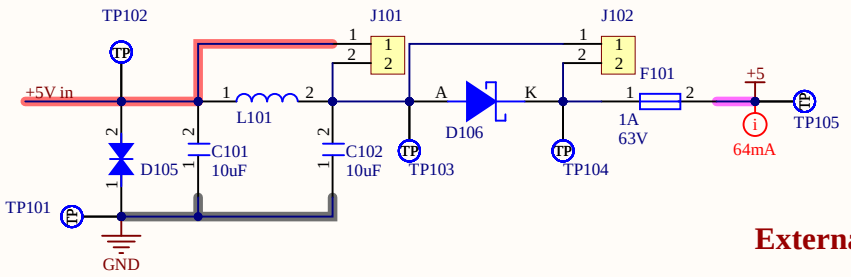
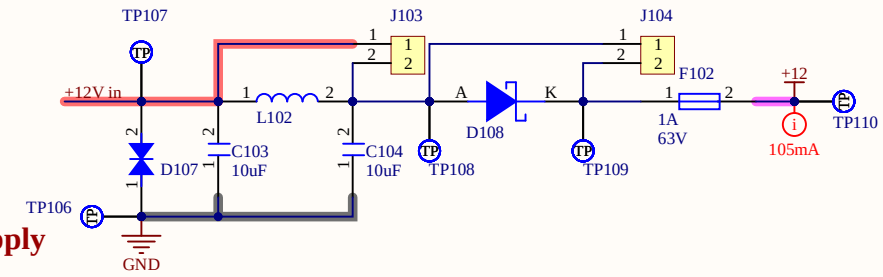
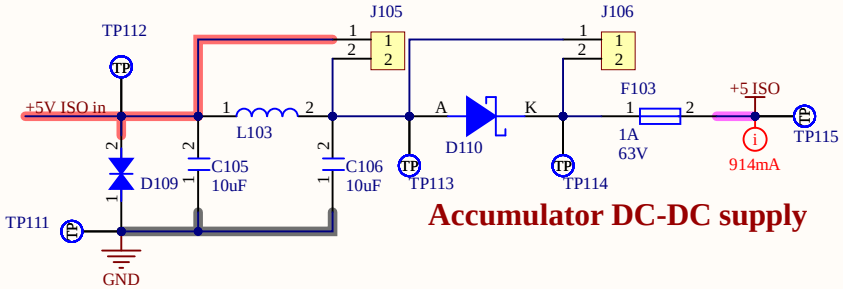
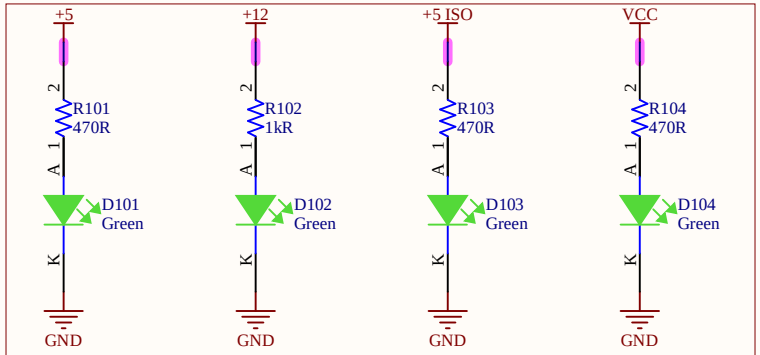




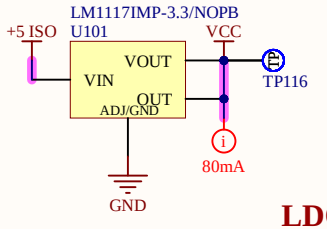
External supply



Accumulator DC-DC supply



Supply LEDs

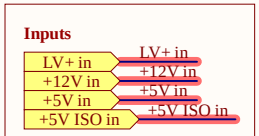


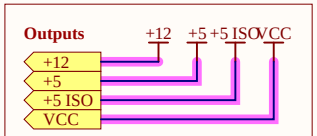
LDO

MCU is supplied from battery cells (see [6])

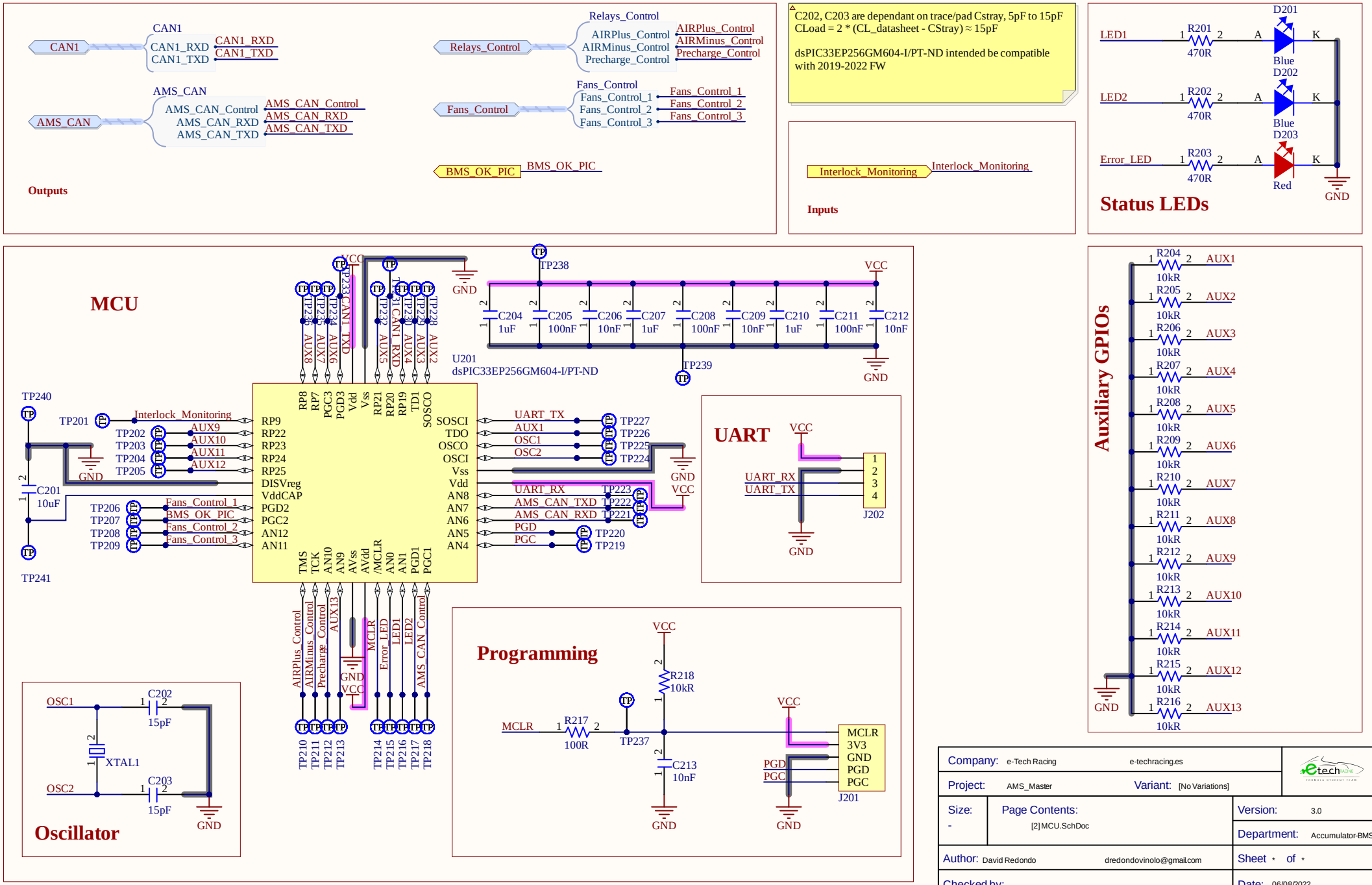
Isupp
- 5V: 2mA (LM339D)+52mA (ISO1050) + 10mA (D101) = 64mA
- 5V ISO: 2mA (LM339D)+832mA (ISO1050*16) + 20mA (D103,4) + 60mA (dsPIC) = 914mA
- 12V: 80mA (LEM CAB300) + 5mA (CANLogger) + 10mA ([4] & [5]) + 10mA (D102) = 105mA

Pdiss
- U101: (5V-3.3V)*0.3A = 0.51W
- D106: 0.430V*0.064A = 27mW
- D108: 0.430V*0.105A = 45mW
- D110: 0.430V*0.914A = 393mW

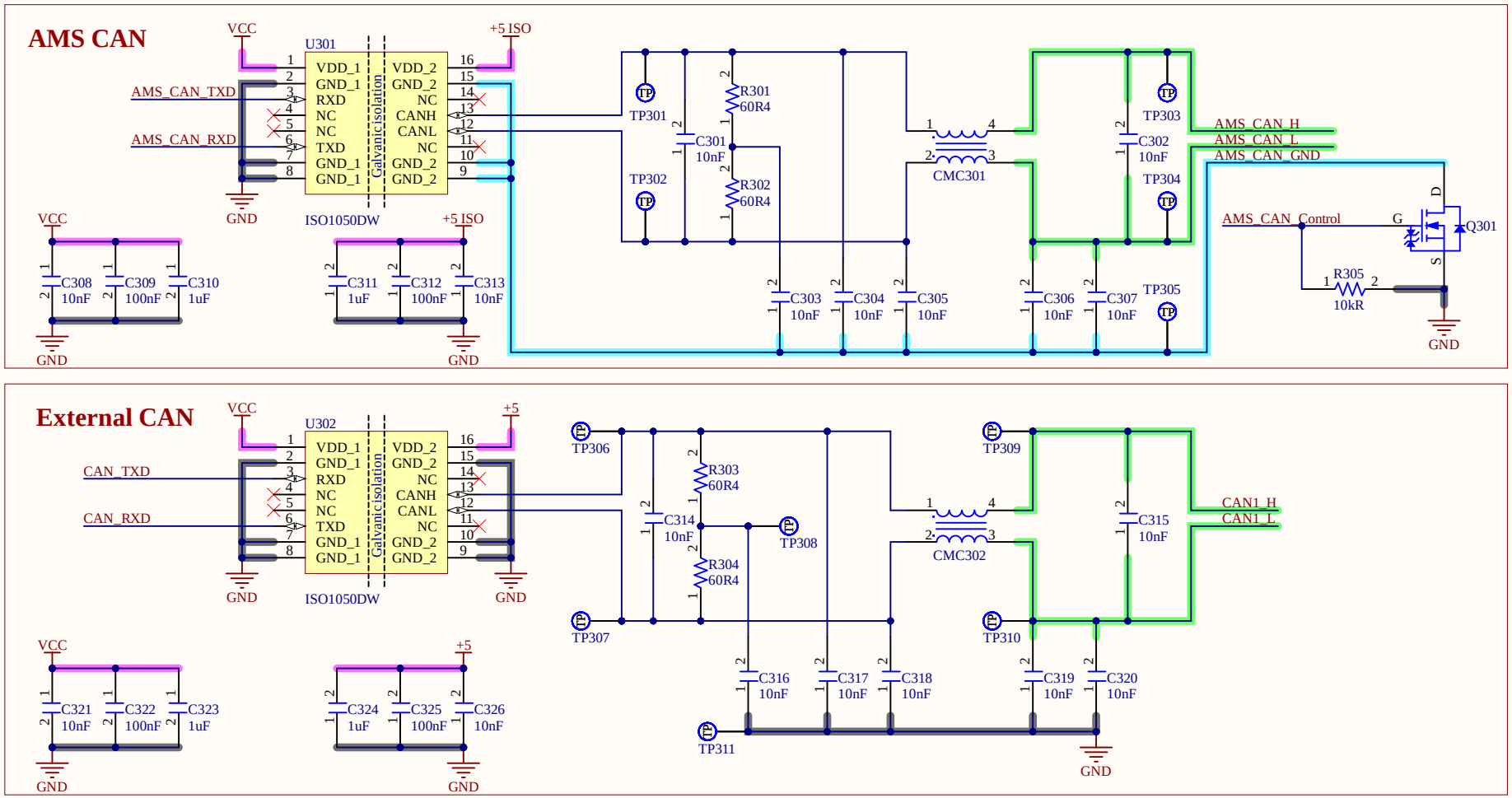




Company: e-Tech Racing	e-techracing.es		
Project: AMS_Master	Variant: [No Variations]		
Size: -	Page Contents: [1] Supply.SchDoc	Version: 3.0	
		Department: Accumulator-BMS	
Author: David Redondo	dredondovinolo@gmail.com	Sheet * of *	
Checked by:		Date: 06/08/2022	



Company: e-Tech Racing	e-techracing.es	
Project: AMS_Master	Variant: [No Variations]	
Size: -	Page Contents: [2] MCU.SchDoc	Version: 3.0
		Department: Accumulator-BMS
Author: David Redondo	dredondovinolo@gmail.com	Sheet * of *
Checked by:		Date: 06/08/2022



Inputs

- AMS_CAN_TXD
- AMS_CAN_RXD
- AMS_CAN_Control
- CAN_TXD
- CAN_RXD

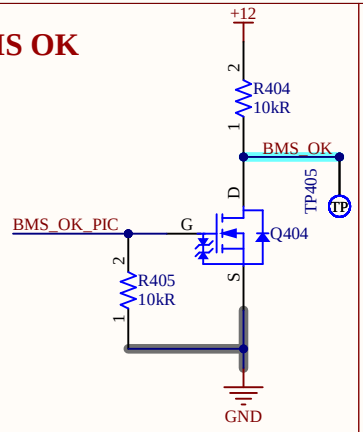
Outputs

- AMS_CAN_H
- AMS_CAN_L
- AMS_CAN_GND
- CAN1_H
- CAN1_L

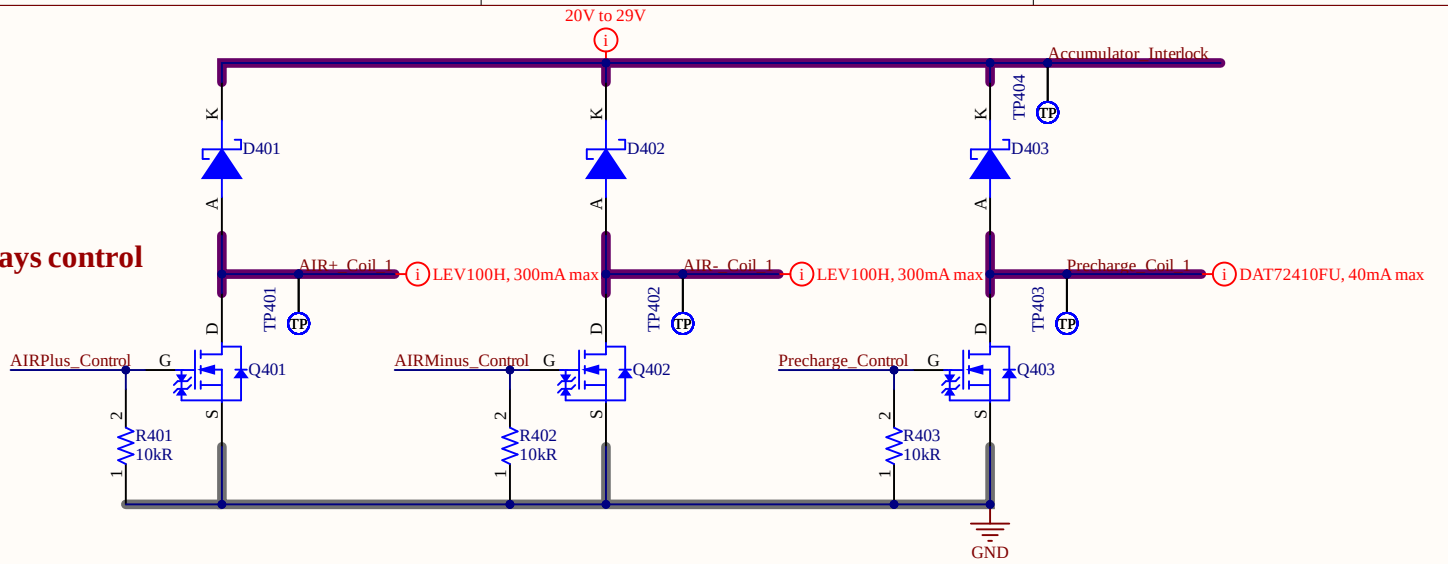
CAN output filter: f0 = 1.1MHz, G = -6dB

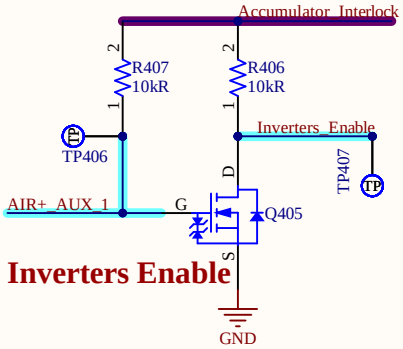
Company: e-Tech Racing	e-techracing.es	
Project: AMS_Master	Variant: [No Variations]	
Size: -	Page Contents: [3] CAN.SchDoc	Version: 3.0
		Department: Accumulator-BMS
Author: David Redondo	dredondovinolo@gmail.com	Sheet * of *
Checked by:		Date: 06/08/2022

BMS OK



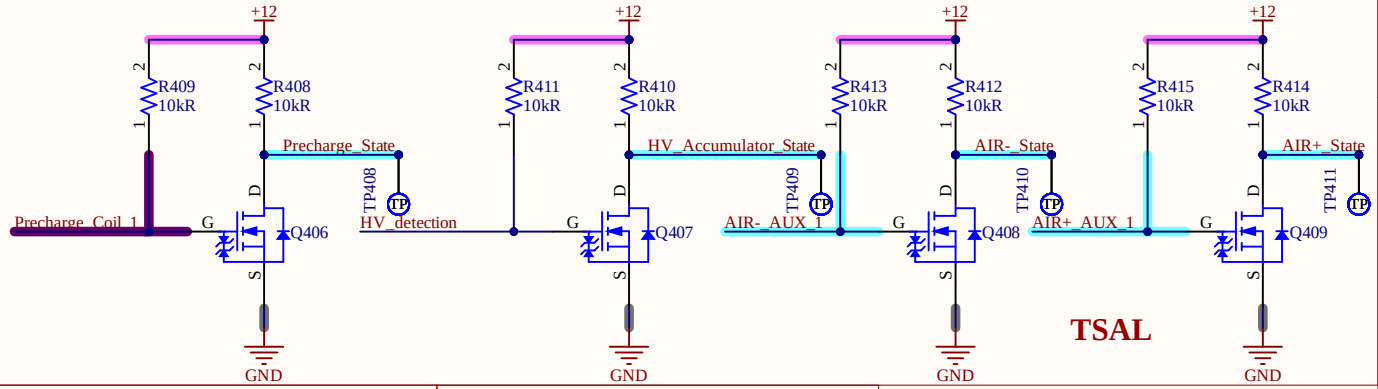
Relays control





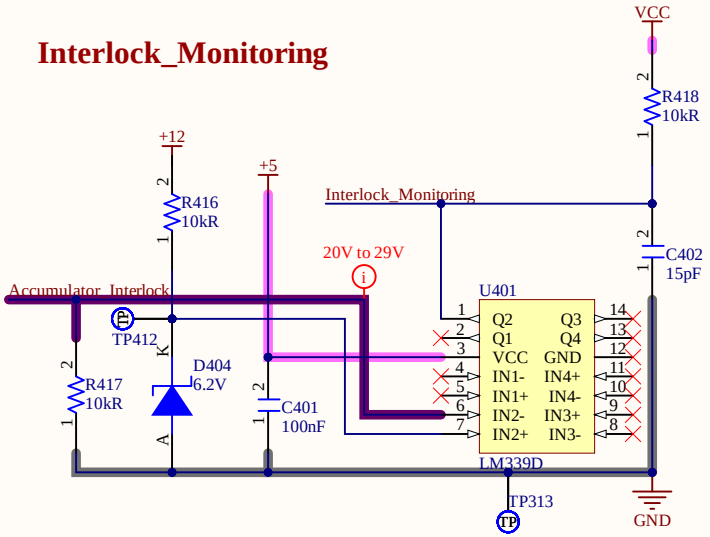
Inverters Enable

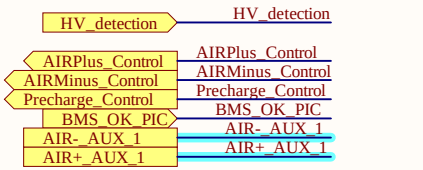
BMS_OK: to Shutdown PCB with latching on low state.
Inverters_Enable: Bamocar D3 HW enable, 10 to 30V, given after precharge is done.
Relays control: Freewheeling diode Ipk = 10A.
TSAL: all signals pulled up, reverse logic (0/GND is active).
Interlock monitoring: reverse logic (0/GND is active).

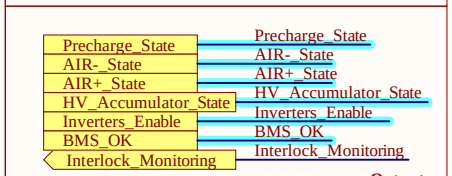


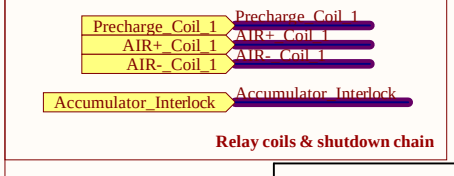
TSAL

Interlock_Monitoring

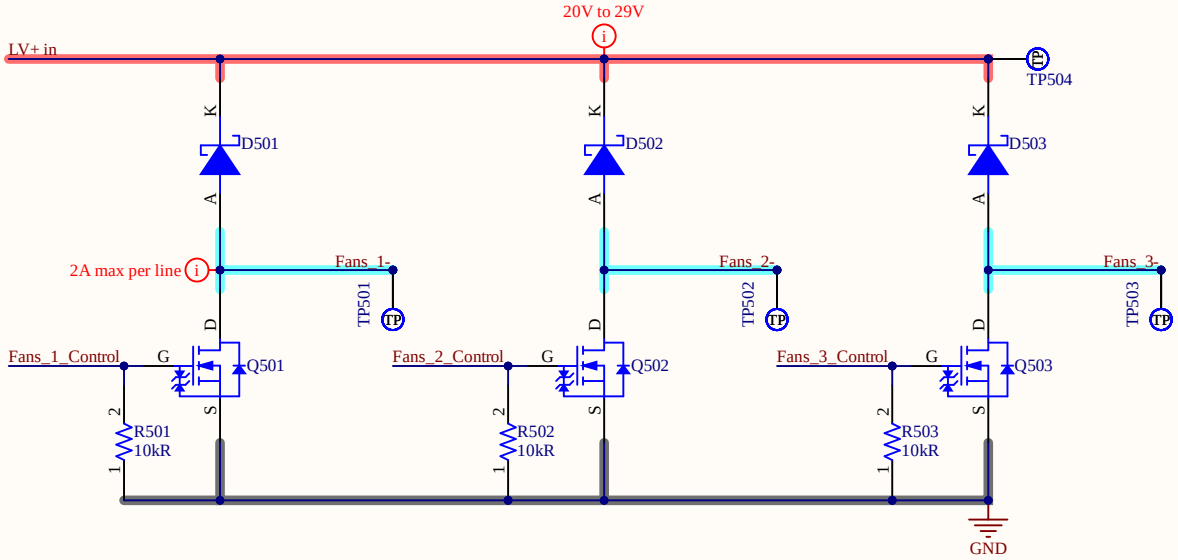


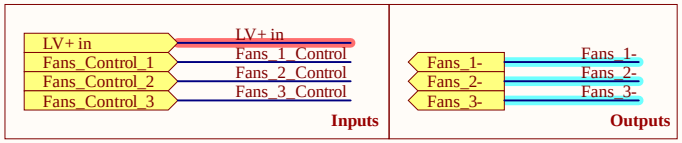




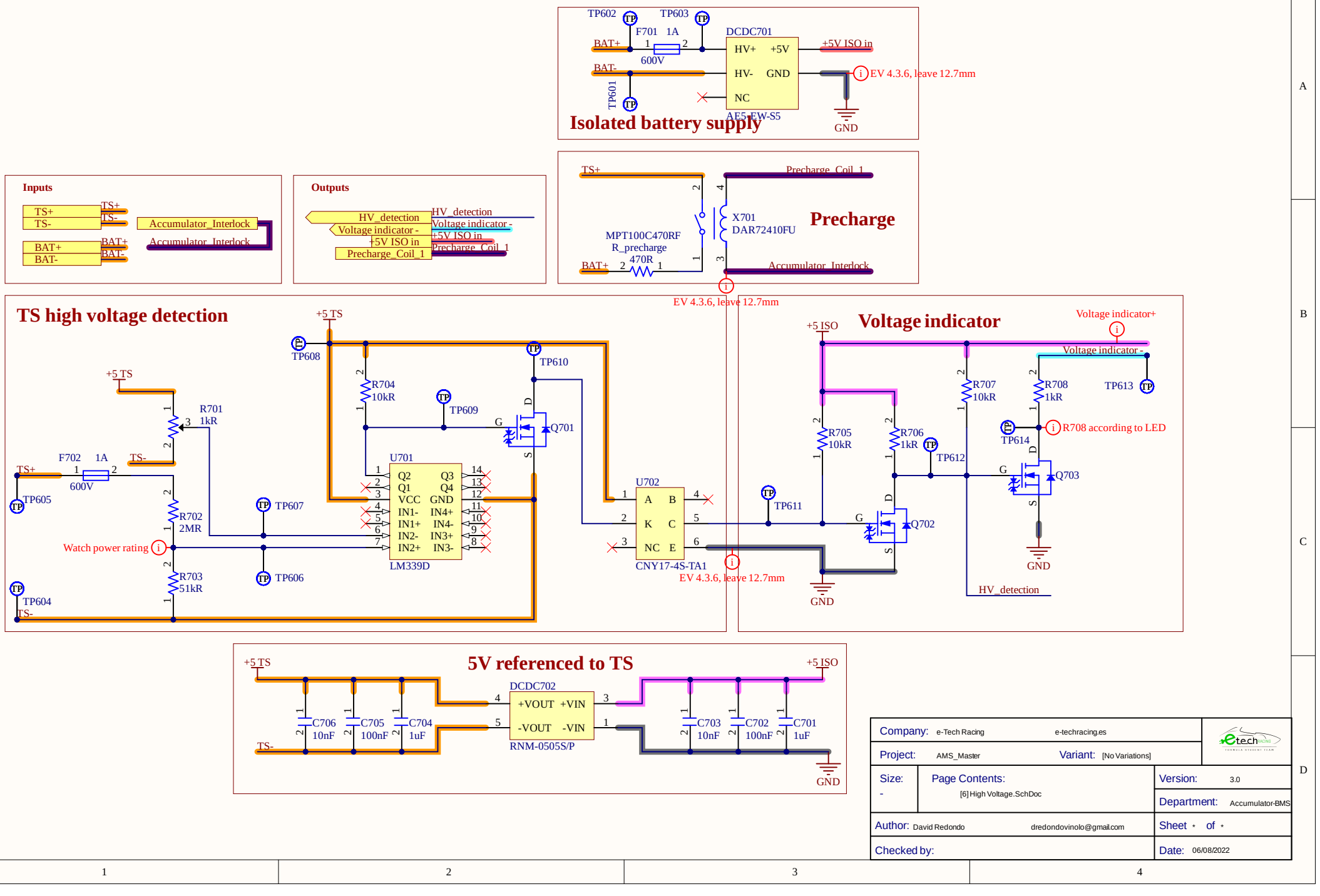


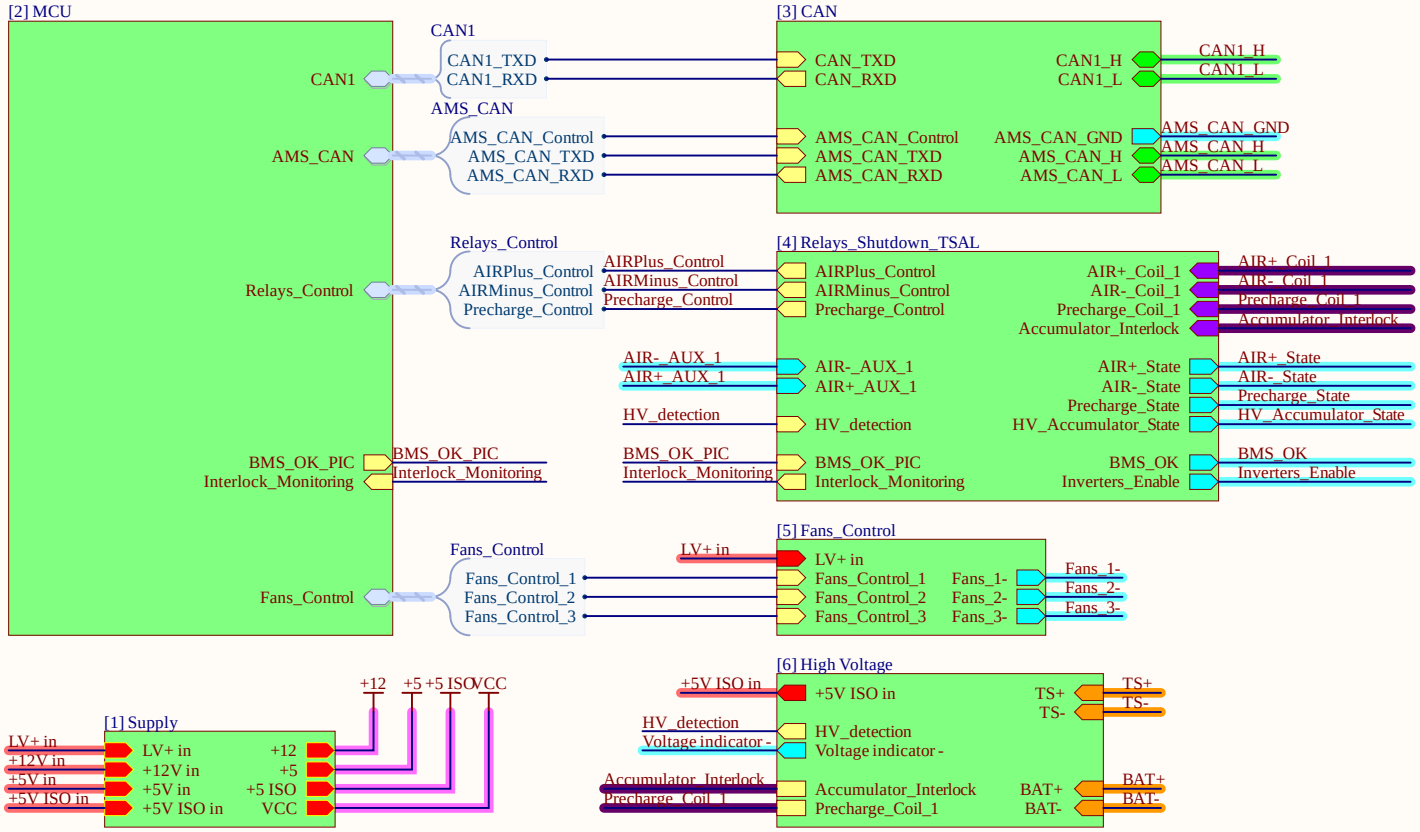
Company: e-Tech Racing	e-techracing.es		
Project: AMS_Master	Variant: [No Variations]		
Size: -	Page Contents: [4] Relays_Shutdown_TSAL.SchDoc	Version: 3.0	
		Department: Accumulator-BMS	
Author: David Redondo	dredondovinolo@gmail.com	Sheet * of *	
Checked by:		Date: 06/08/2022	





Company: e-Tech Racing	e-techracing.es	
Project: AMS_Master	Variant: [No Variations]	
Size: -	Page Contents: [5] Fans_Control.SchDoc	Version: 3.0
		Department: Accumulator-BMS
Author: David Redondo	dredondovinolo@gmail.com	Sheet * of *
Checked by:		Date: 06/08/2022


Isolated battery supply
TP602
TP603
F701 1A
600V
DCDC701
BAT+
BAT-
TP601
HV+ +5V
HV- GND
NC
AE5_EW-S5
+5V ISO in
EV 4.3.6, leave 12.7mm
GND
Inputs
TS+
TS-
BAT+
BAT-
Accumulator_Interlock
Outputs
HV_detection
Voltage indicator -
+5V ISO in
Precharge_Coil_1
Precharge
MPT100C470RF
R_precharge
470R
X701
DAR72410FU
TS high voltage detection
+5 TS
TP608
TP610
TP609
R704
10kR
R701
1kR
Q701
U701
F702 1A
600V
TP605
R702
2MR
Watch power rating
TP607
TP606
R703
51kR
TP604
LM339D
U702
CNY17-4S-TA1
TP611
EV 4.3.6, leave 12.7mm
Voltage indicator
+5 ISO
Voltage indicator+
Voltage indicator -
R707
10kR
R708
1kR
TP613
R705
10kR
R706
1kR
TP612
TP614
R708 according to LED
Q703
Q702
HV_detection
5V referenced to TS
DCDC702
RNM-0505S/P
C706
10nF
C705
100nF
C704
1uF
C703
10nF
C702
100nF
C701
1uF
Company: e-Tech Racing
e-techracing.es
Project: AMS_Master
Variant: [No Variations]
Size: -
Page Contents: [6] High Voltage.SchDoc
Version: 3.0
Department: Accumulator-BMS
Author: David Redondo
dredondovinolo@gmail.com
Sheet * of *
Checked by:
Date: 06/08/2022



AMS Master

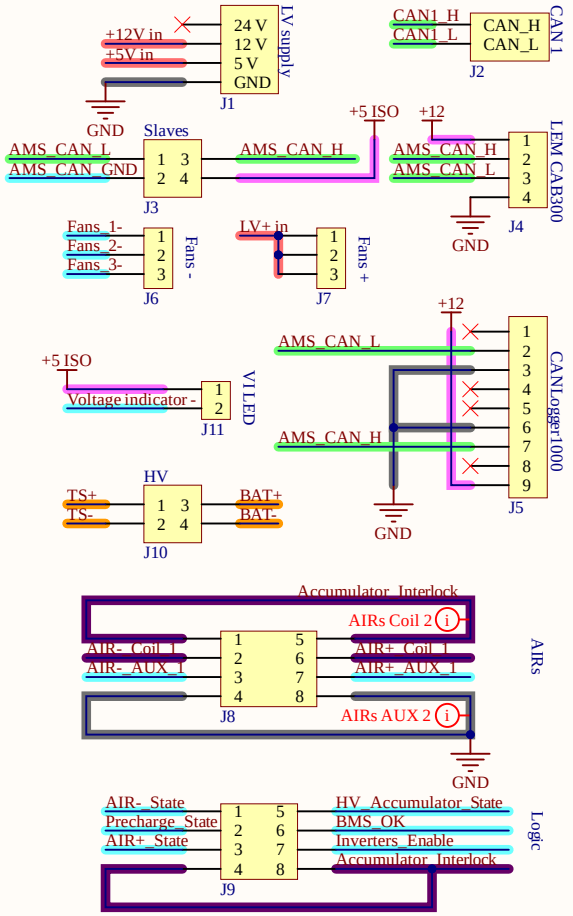
This PCB is the AMS (BMS) Master ECU of the 2022-23 Accumulator from e-Tech Racing Formula Student Team.

It is capable of communicating with two CAN buses and through UART. The MCU is from the 16-bit dsPIC33 family and firmware can be loaded using a PICkit3.

The ECU also controls the AIRs and precharge relays, the battery cooling fans and the Voltage Indicator.

A LEM CAB300 current sensor is needed. A CANLogger1000 data logger can be installed to record internal messages to be further analyzed.

The Voltage Indicator LED is supplied with 5VDC and it shall not draw any more than 100mA.



Company: e-Tech Racing	e-techracing.es		
Project: AMS_Master	Variant: [No Variations]		
Size: -	Page Contents: AMS_Master.SchDoc	Version: 3.0	
		Department: Accumulator-BMS	
Author: David Redondo	dredondovinolo@gmail.com	Sheet * of *	
Checked by:		Date: 06/08/2022	