CAN BUS Power Rail

Never powered Down so that
emergency signal keep blinking

Conn_01x04
CAN IN J1
CANH
CANL
VBUS
Conn_01x04
CAN OUT J2
CANH
CANL
GND
+5V
GND
+12V
GND

lightning

5A MAX
+12V
10K
R12
J10
MOSFET_GATE_0
NMOS
Q6
small sig
20 V 5A
mosfet
SENSE_0
0.001 R
R14 size R for 20 mA
or better of resolution
GND
keep power below
0.1 W ->
max 20 mV
max 0.004 mR

5A MAX
+12V
10K
R11
J9
MOSFET_GATE_1
NMOS
Q5
small sig
20 V 5A
mosfet
SENSE_1
0.001 R
R15
GND

5A MAX
+12V
10K
R10
J8
MOSFET_GATE_2
NMOS
Q4
small sig
20 V 5A
mosfet
SENSE_2
0.001 R
R16
GND

5A MAX
+12V
10K
R9
J7
MOSFET_GATE_3
NMOS
Q3
small sig
20 V 5A
mosfet
SENSE_3
0.001 R
R17
GND

5A MAX
+12V
10K
R8
J6
MOSFET_GATE_4
NMOS
Q2
small sig
20 V 5A
mosfet
SENSE_4
0.001 R
R19
GND

5A MAX
+12V
10K
R2
J5
MOSFET_GATE_5
NMOS
Q1
small sig
20 V 5A
mosfet
SENSE_5
0.001 R
R20
GND

5A MAX
+12V
10K
R1
J4
MOSFET_GATE_6
NMOS
Q8
small sig
20 V 5A
mosfet
SENSE_6
0.001 R
R21
GND

5A MAX
+12V
10K
R13
J11
MOSFET_GATE_7
NMOS
Q7
small sig
20 V 5A
mosfet
SENSE_7
0.001 R
R22
GND

Compute

3v3 provided by internal LDO of ESP32 devboard

U4
ESP32-C3_SUPERMINI_TH
+3.3V
R7 4K7
R6 4K7
SDA
SCL
ECHO_A
ECHO_B
ECHO_C
CAN_TX
CAN_RX
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
+5V
3V3
3v3 come from ESP32-C internal regulator
GPIO7
GPIO8
GPIO9
GPIO10
GPIO20
GPIO21
GND
CAN_S
RGBLED_DIN
PIEZO_PWM_HALF_X
TRIG_A
PIEZO_PWM_HALF_Y
TRIG_B
TRIG_C
GND

proximity sensor

C17
100nF
SIG_A
R32
1K
1K resistor to
limit inrush
current inside the
AOP protection
diode while the
shottky diode
polarize
+3.3V
R35
100K
D10
D_Schottky
R36
100K
D9
D_Schottky
GND
Gain :
(1+39K/1K)=40
U12
MCP6L01x-xOT
ECHO_A
R34
39K
R33
1K

C18
100nF
SIG_B
R37
1K
1K resistor to
limit inrush
current inside the
AOP protection
diode while the
shottky diode
polarize
R38
100K
D11
D_Schottky
R39
100K
D12
D_Schottky
U13
MCP6L01x-xOT
ECHO_B
R40
39K
R41
1K

C19
100nF
SIG_C
R42
1K
1K resistor to
limit inrush
current inside the
AOP protection
diode while the
shottky diode
polarize
R43
100K
D13
D_Schottky
R44
100K
D14
D_Schottky
U14
MCP6L01x-xOT
ECHO_C
R45
39K
R46
1K

J15
TRIG_A
ECHO_A
5V
TRIG
ECHO
GND
Conn_01x04
J14
TRIG_B
ECHO_B
J13
TRIG_C
ECHO_C

backup:
if the driver dont work,
we can use off the shelf
module.

C6
100nF
PIEZO_PWM_HALF_X
EN_PIEZO_A
U5
LM2104
classic
bootstap
capacitor
setup
D1
D
C5
100nF
R3
470R
Q9
BSS123-7-F
R4
470R
Q10
BSS123-7-F
theses
resistor
are to
limit
EMI
VBUS
Q11
BSS123-7-F
LS3
Speaker_Ultrasound
R5
470R
Q12
BSS123-7-F
theses
resistor
are to
limit
EMI
R23
470R
clamp to ground
this mosfet while
listenning
for echo
D2
D
C8
100nF
U6
LM2104
C7
100nF
PIEZO_PWM_HALF_Y
EN_PIEZO_A

C9
100nF
PIEZO_PWM_HALF_X
EN_PIEZO_B
U7
LM2104
classic
bootstap
capacitor
setup
D3
D
C10
100nF
R24
470R
Q13
BSS123-7-F
R25
470R
Q14
BSS123-7-F
theses
resistor
are to
limit
EMI
VBUS
Q15
BSS123-7-F
LS1
Speaker_Ultrasound
R27
470R
Q16
BSS123-7-F
theses
resistor
are to
limit
EMI
R26
470R
clamp to ground
this mosfet while
listenning
for echo
D6
D
C11
100nF
U9
LM2104
C12
100nF
PIEZO_PWM_HALF_Y
EN_PIEZO_B

C13
100nF
PIEZO_PWM_HALF_X
EN_PIEZO_C
U10
LM2104
classic
bootstap
capacitor
setup
D7
D
C14
100nF
R28
470R
Q17
BSS123-7-F
R29
470R
Q18
BSS123-7-F
theses
resistor
are to
limit
EMI
VBUS
Q19
BSS123-7-F
LS2
Speaker_Ultrasound
R31
470R
Q20
BSS123-7-F
theses
resistor
are to
limit
EMI
R30
470R
clamp to ground
this mosfet while
listenning
for echo
D8
D
C15
100nF
U11
LM2104
C16
100nF
PIEZO_PWM_HALF_Y
EN_PIEZO_C

ADC for current sensing

C3
100nF
U2
ADS1115IDGS
SENSE_0
SENSE_1
SENSE_2
SENSE_3
SCL
SDA
I2C addr : 1001000-> 0x48

C4
100nF
U3
ADS1115IDGS
SENSE_4
SENSE_5
SENSE_6
SENSE_7
I2C addr : 1001001-> 0x49

GPIO

U8
MCP23017_SO
SDA
SCK
INTB
INTA
RESET
A2
A1
A0
0100000 = 0x20
MOSFET_GATE_0
MOSFET_GATE_1
MOSFET_GATE_2
MOSFET_GATE_3
MOSFET_GATE_4
MOSFET_GATE_5
MOSFET_GATE_6
MOSFET_GATE_7
EN_PIEZO_A
EN_PIEZO_B
EN_PIEZO_C
EN_PIEZO_D

daylight sensor

J12
SDA
SCL
GND
3V3
Conn_01x04

RGB strip

RGBLED_DIN
D4
US1M
D5
WS2812B
DIN
DOUT
VDD
VSS
J3
Conn_01x03
diode -> little hack to drive
the WS2812 using 3v3 logic
https://hackaday.com/2017/01/20/cheating-at-5v-ws2812-control-to-use-a-3-3v-data-line/

CAN

U1
TJA1051T-3
CAN_TX
CAN_RX
CAN_S
TXD
RXD
VIO
S
VCC
GND
CANH
CANL
120 R
R18
C1
100nF
C2
100nF

Sheet: /
File: velion_lightboard_pcb.kicad_sch

Title:

Size: A3	Date:	Rev:
KiCad E.D.A. 9.0.6		Id: 1/1