J1
Inputs
From Inputs
1
2
3
4
5
6
7
8
+3.3V
GND

J2
BldgPwr
1
2
(Not UPS)

J3
Outputs
To Relays
1
2
3
4
5
6
+3.3V
GND

C1 1000   R1 10K   R8 1K   U1 4N25   +3.3V
C2 1000   R2 10K   R9 1K   U2 4N25   +3.3V
C3 1000   R3 10K   R10 1K U3 4N25   +3.3V
C4 1000   R4 10K   R11 1K U4 4N25   +3.3V
C5 1000   R5 10K   R12 1K U5 4N25   +3.3V
C6 1000   R6 10K   R13 1K U6 4N25   +3.3V
C7 1000   R7 10K   R14 1K U7 4N25   +3.3V

J5
Grove LCD
Y W R B
GND

+5V   +3.3V

J6
Raspberry Pi Header

SDA/GPIO2
SCL/GPIO3
GPIO4_weatherOK
GPIO27_roofPowerIn
GPIO22_mountPowerIn
GPIO23_roofOpen
GPIO24_roofClosed
GPIO25_mountParked
GPIO17_bldgPowerIn
GPIO5_roofPowerOut
GPIO6_mountPowerOut
GPIO26_fobOutput
GPIO16_laserPowerOut
GPIO13_heartLED

GPIO0
GPIO1
GPIO14/TXD
GPIO15/RXD
GPIO7
GPIO8
GPIO9
GPIO10
GPIO11
GPIO12
GPIO18
GPIO19
GPIO20
GPIO21

GND
GND

+3.3V
R15 330   R16 330
D1 Green   D2 Red
GND   GND

v1.7 direct wire fob isolator to fob trigger
v1.6 merge all schematics into one doc; add accessory modules
v1.5 remove park isolator (see detector module); replace fob relay with isolator
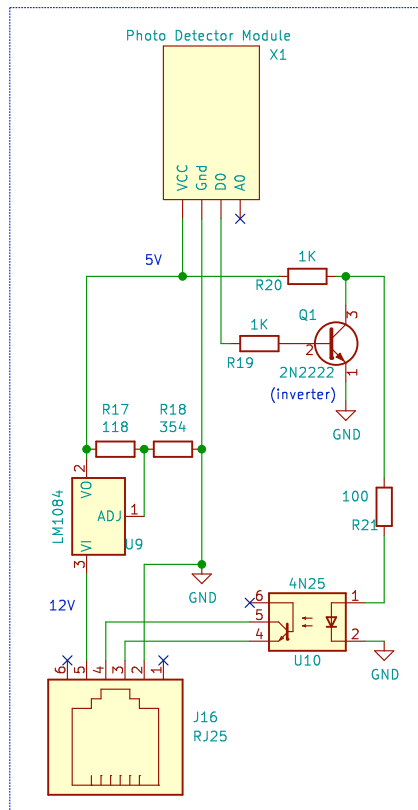David Kensiski
Robert Ferguson Observatory
Sheet: /
File: TRax-Controller.sch

Title: T-Rax Control Board

Size: A   Date: 2021-10-31   **Rev: v1.7**
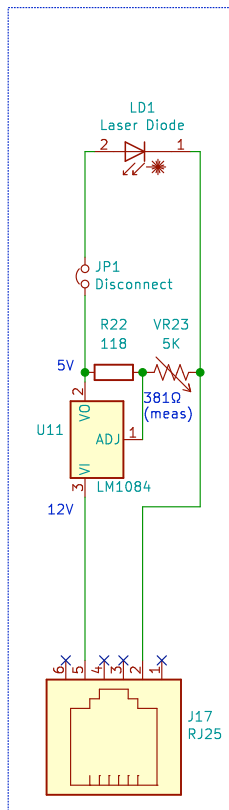KiCad E.D.A. kicad (5.1.9-0-10_14)   Id: 1/3

Connector Board

WX — J4
- 6
- 5
- 4 red*
- 3 violet
- 2
- 1

RoofPower — J7
- 6
- 5 green
- 4 red*
- 3 blue
- 2 blue
- 1

MountPower — J8
- 6
- 5 orange
- 4 red*
- 3 green
- 2 blue
- 1

Open/Close — J9
- 6
- 5 yellow
- 4 red*
- 3 orange
- 2 red*
- 1

Parked — J10
- 6
- 5 white   12V switched
- 4 white
- 3
- 2 black
- 1

Fob — J11
- 6
- 5 red   12V
- 4 yellow
- 3 blue
- 2 black
- 1

Inputs J12
- Violet   1
- Blue   2
- Green   3
- Orange   4
- Yellow   5
- White   6
- Red   7
- Black   8

Inputs J14
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Inputs from Control Board

Relays J13
- Blue   1
- Green   2
- Orange 3
- Yellow 4
- White   5
- Red   6
- Black   7

Relays J15
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Fob J19
- Yellow 1
- Blue   2

Fob J20
- 1
- 2

Relay Board

Outputs from Control Board

Hardwired to relays: Green, Orange, Yellow, White, Red, Black

K1 Roof
- NC   VCC
- Com   In
- NO   Gnd

K2 Mount
- NC   VCC
- Com   In
- NO   Gnd

FOB
- Black 4
- Red   1
- 6
- U8   4N35
- 1K   R201
- 2
- 1

K3 Laser
- NC   VCC
- Com   In
- NO   Gnd

GND +12V

RJ Color Code: Telco (Cat5)   Park Wiring
5. Yellow (Orange/White)   5: +12v
4. Green   (White/Blue)   4: D0 digital out @5v
3. Red   (Blue/White)   3: A0 analog out @5v
2. Black   (White/Orange)   2: Ground

* The red leads (+3.3v) on these jacks are wired to "black" pins.
  I had wired them with black (ground) initially but that turned out to
  be in error and it was easier to just change the color than rewire
  the whole thing.

v1.7 direct wire fob isolator to fob trigger
v1.6 merge all schematics into one doc; add accessory modules
v1.5 remove park isolator (see detector module); replace fob relay with isolator
David Kensiski
Robert Ferguson Observatory
Sheet: /TRax Relays/
File: TRax-Relays.sch

Title: T-Rax Relays & Connector wiring

| Size: A | Date: 2021-10-31 | **Rev: v1.7** |
| KiCad E.D.A. kicad (5.1.9-0-10_14) | | Id: 2/3 |

Park Detector

Photo Detector Module
X1

VCC Gnd D0 A0

5V

1K
R20

1K
R19

Q1
2N2222
(inverter)

GND

R17
118

R18
354

LM1084

VO
ADJ
VI
U9

12V

GND

100
R21

4N25
U10

GND

J16
RJ25

Park Laser

LD1
Laser Diode

JP1
Disconnect

R22
118

VR23
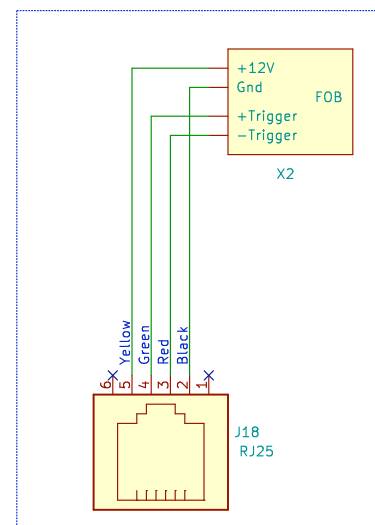5K

5V

381Ω
(meas)

U11

VO
ADJ
VI
LM1084

12V

J17
RJ25

NOTE: Park Laser and Detector are wired alike and should
connect to the "Park" port through an RJ11 splitter

FOB Module

+12V
Gnd
+Trigger
−Trigger

FOB

X2

Yellow
Green
Red
Black

J18
RJ25

Tigger wiring may be revered; need to verify on install