# Ulisse
## Steering Wheel and Display Board

Electronics Department Physis PEB

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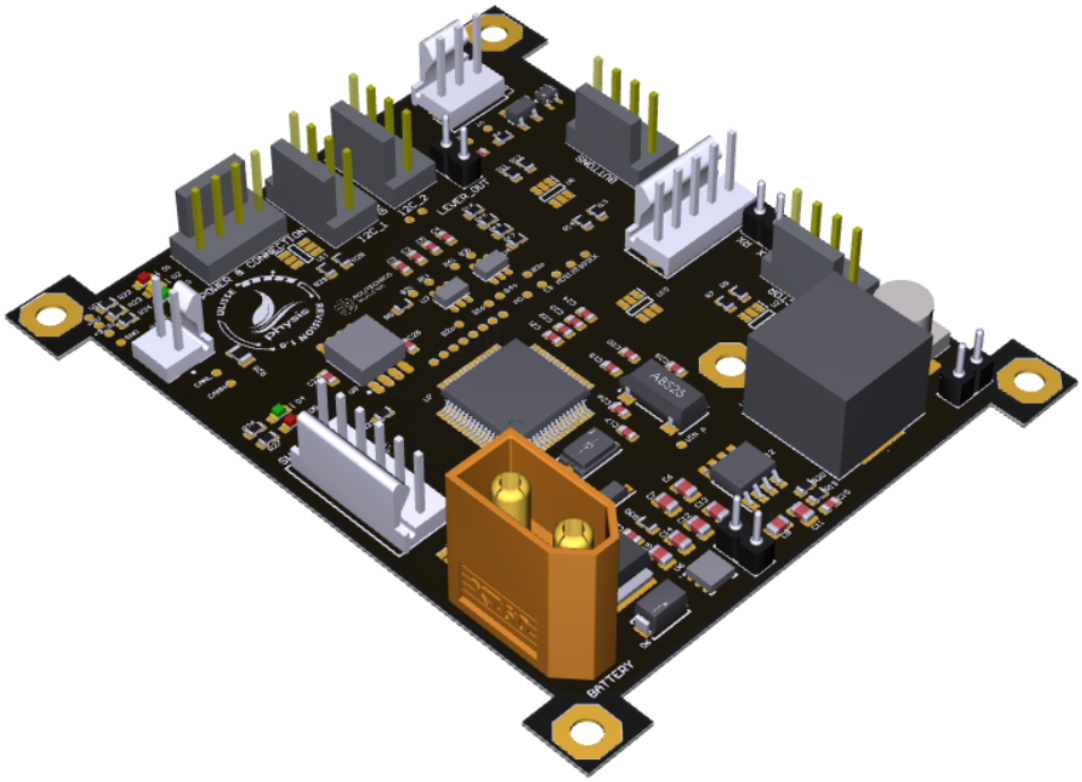
# Chapter 1

# Introduction

For the purpose of relaying various essential information to the racing boat driver as well as transmitting steering wheel input to the motor, a board of great connectivity and fast transmission is needed. Ulisse, the proprietary board of Physis PEB is made for exactly that purpose.
Ulisse allows to relay crucial information from the various systems and sensors on board of the boat to the eye of the pilot via a display. Moreover the board is also able to transmit steering wheel input and power-train changes via an embedded selector.



# Contents

# Part I

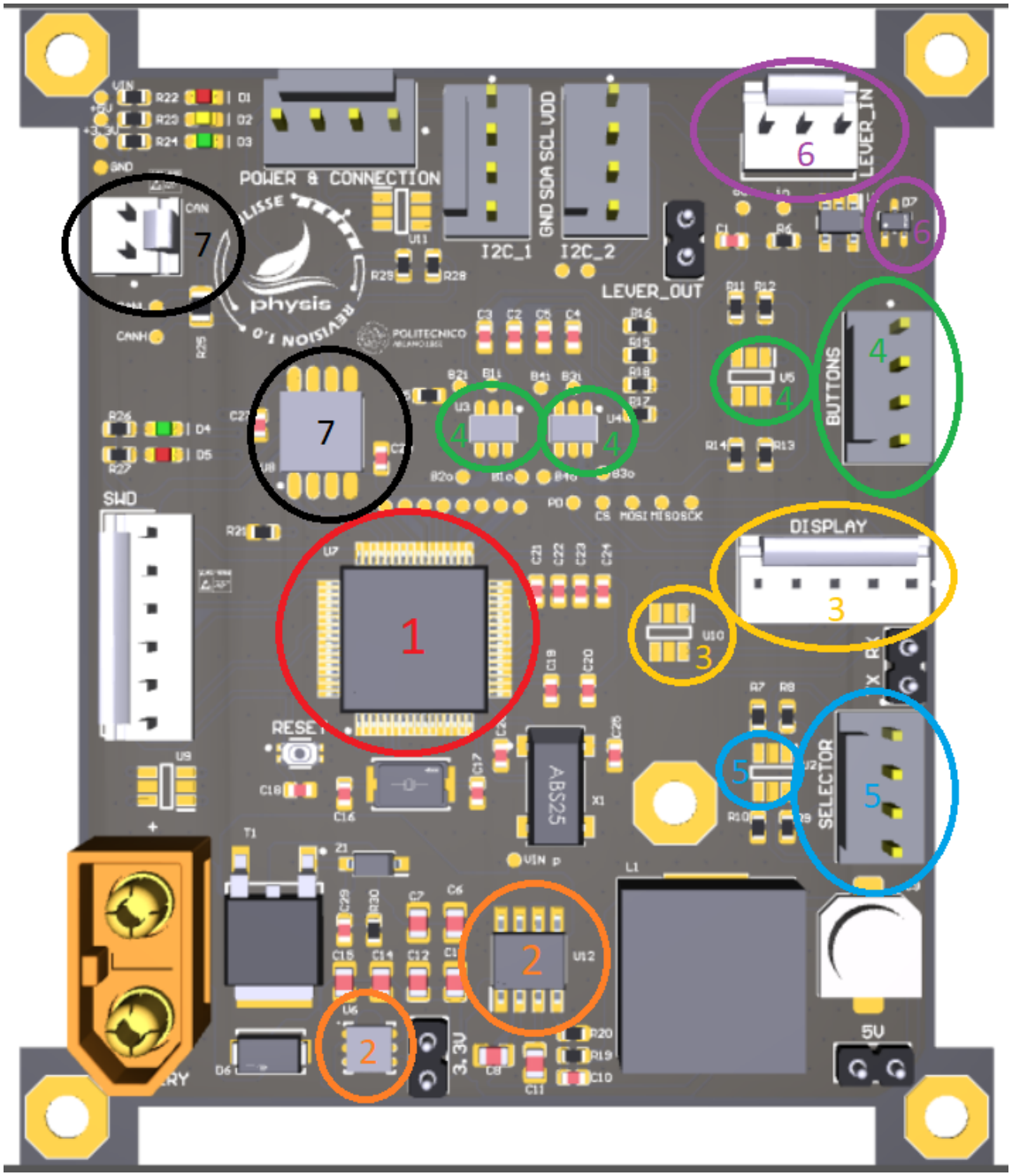
# Board

# Chapter 2

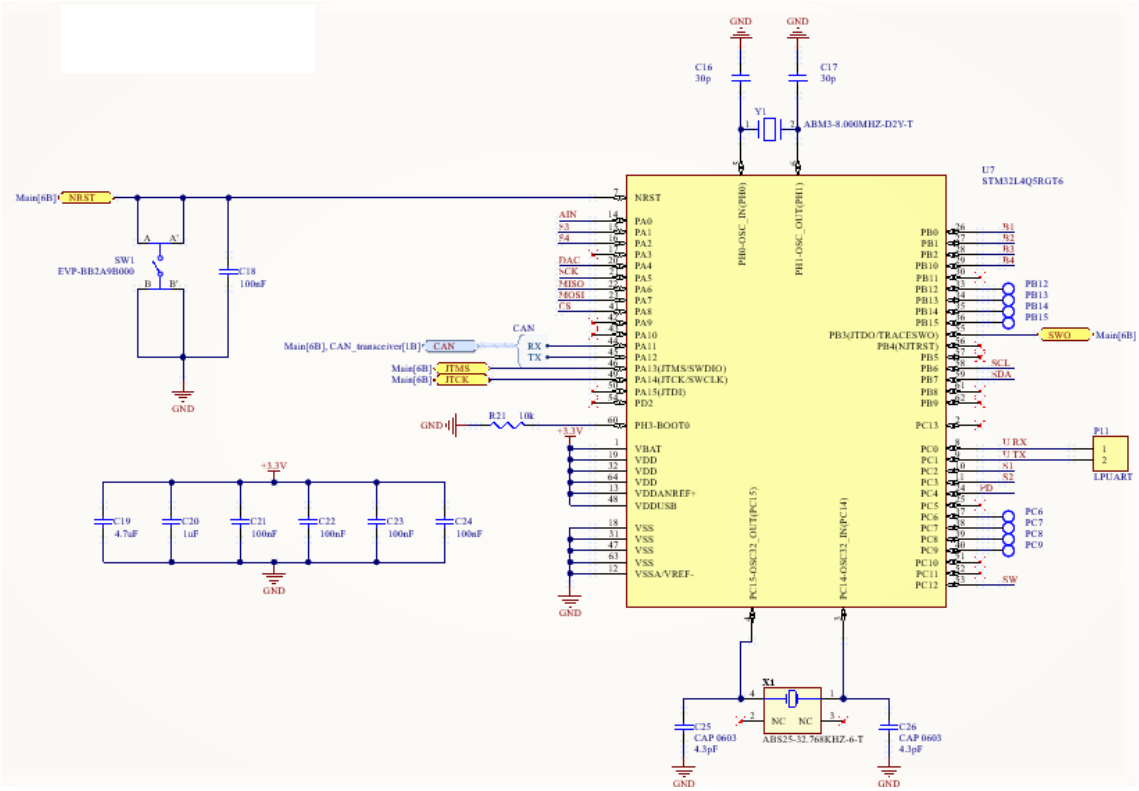
# Steering Wheel Board

**Size**: 66mm x 78.5mm

Below is the Top view of Ulisse and highlighted are the important components of the board. A detailed pin arrangement can be found in the corresponding sections (i.e. each number corresponds to the respective section of the component).

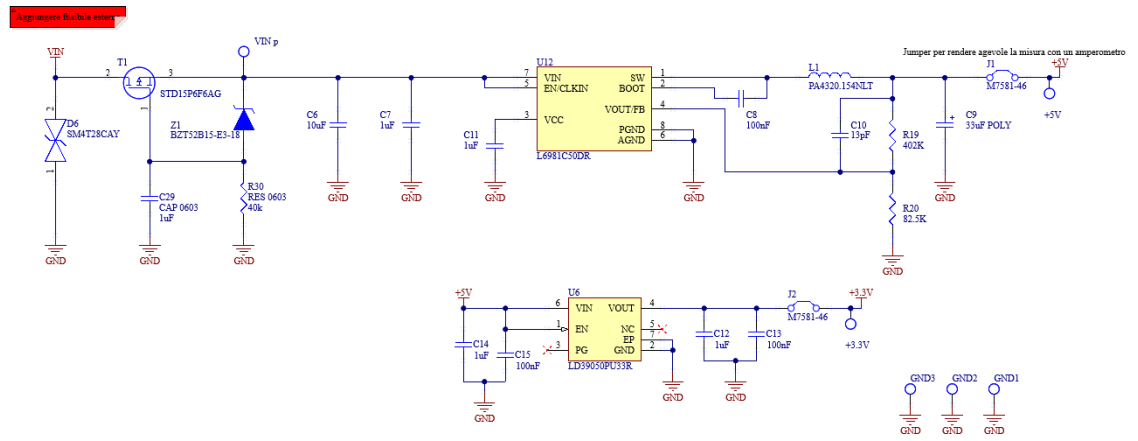


## 2.1 MCU



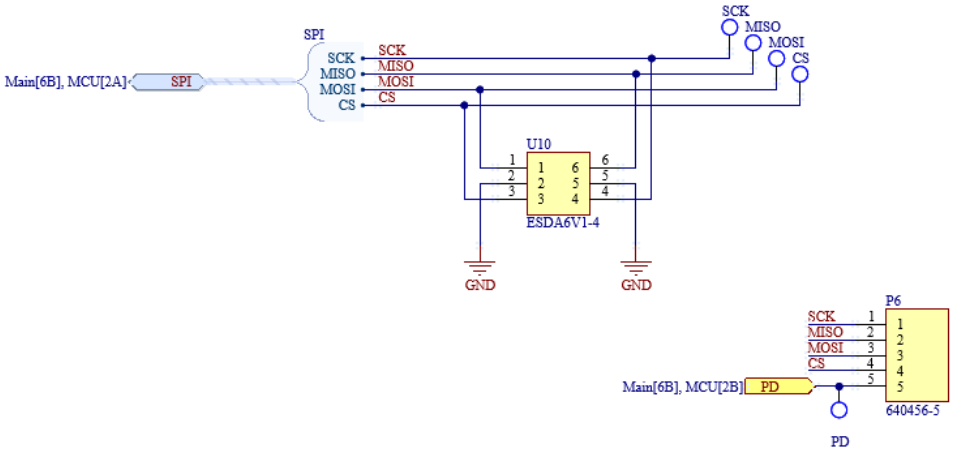

Seen above is the schematic of the micro-controller of the board. Ulisse uses a STM32 MCU and it is the heart of the Board and connects all of the components together. Corresponding pins to other components can be found on other schematics.

## 2.2 Power



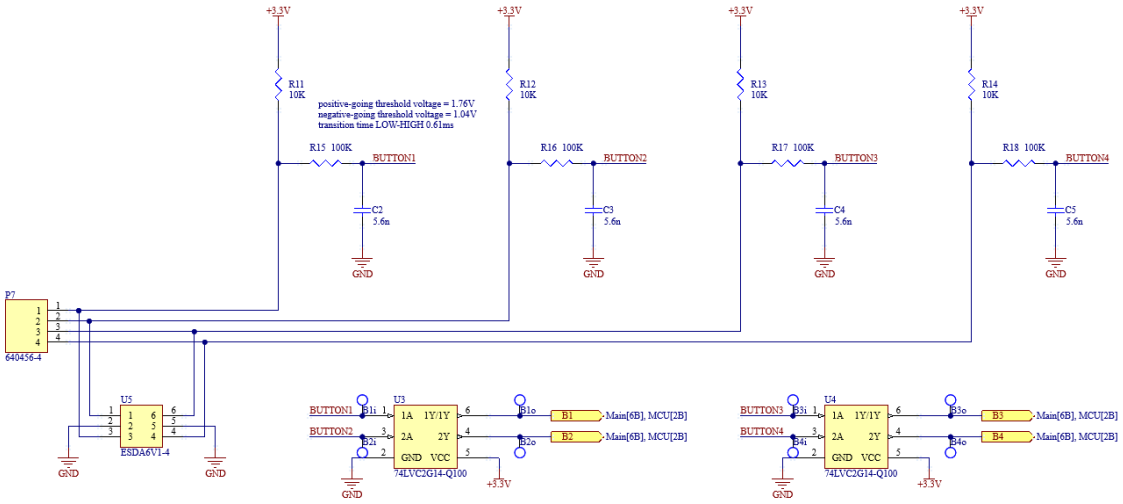

Seen above is the schematic of the power and connections of the board. As it can be seen the board is powered by a voltage of 3.3V-5V.

## 2.3 Display



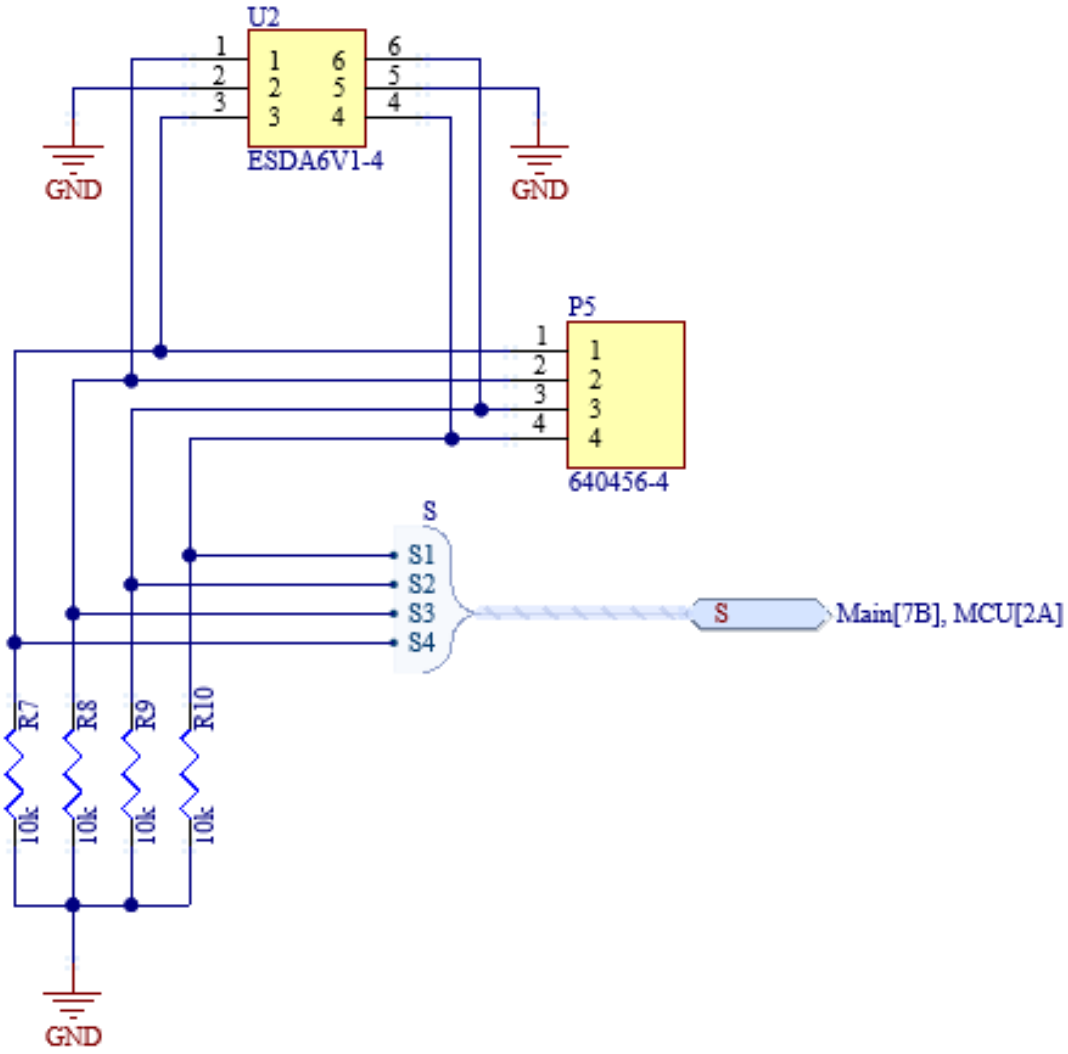

Seen above is the schematic of the display connections and below the datasheet of the actual display used is linked.
**Datasheet**: *Click here.*

## 2.4 Buttons



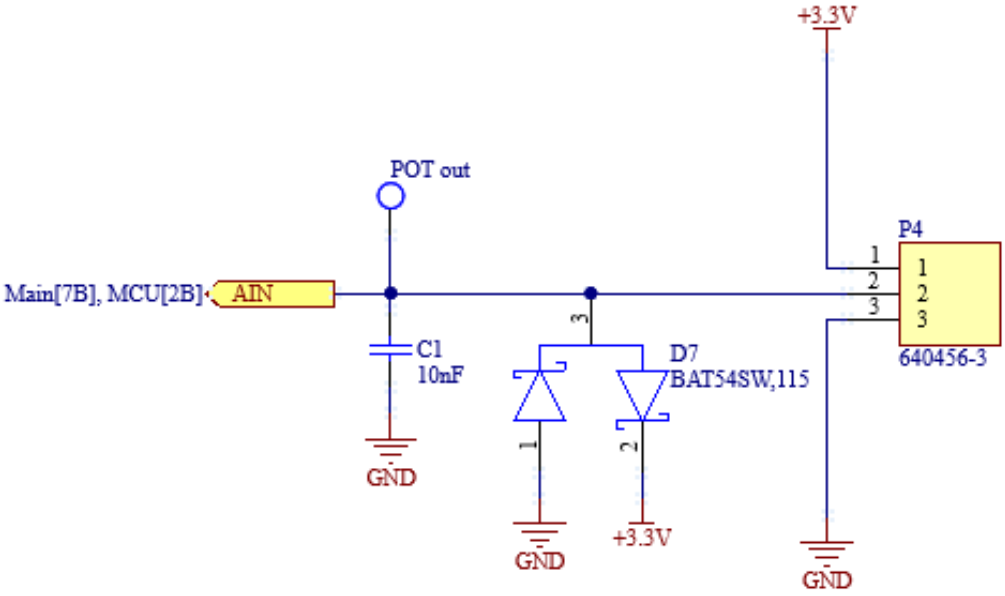

Seen above is the schematic of the buttons connections.

## 2.5 Selector



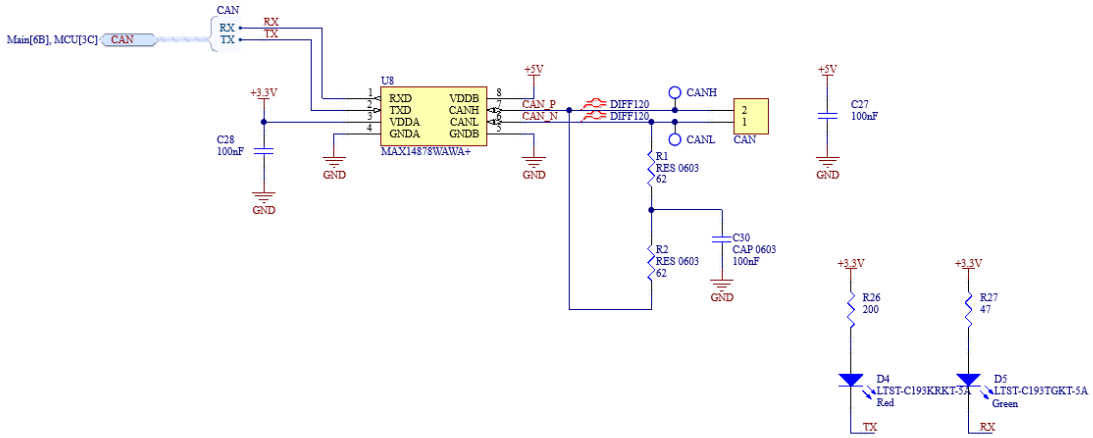

Seen above is the schematic of the selector connections.

## 2.6 Potentiometer




Seen above is the schematic of the potentiometer connections.

## 2.7 CAN Transceiver




Seen above is the schematic of the CAN Transceiver connections.

# Part II

# Appendix

## 2.8 Ulisse BOM

| Comment | Description | Designator | Footprint | LibRef | Quantity |
|---|---|---|---|---|---|
| Test Point | Test point 0,8mm | +3.3V, +5V, B1i, B1o, B2i, B2o, B3i, B3o, B4i, B4o, CANH, CANL, CS, GND, in, MISO, MOSI, out, PB12, PB13, PB14, PB15, PC6, PC7, PC8, PC9, PD, SCK, SCL, SDA, VIN, VIN p | Test Point | CMP-012-000000-6 | 32 |
| M7581-46 | Conn Jumper Socket 2 POS 2.54mm Red Bulk | 3.3V, 5V | HDR1X2M VERT | CMP-00049-2 | 2 |
| XT60M | XT60, 2-Pin | BATTERY | XT60M | CMP-013-000021-1 | 1 |
| 640456-4 | Header, Friction Lock; MTA-100; 4; 250 VAC; Polyester; Tin; Copper Alloy; Tin | BUTTONS, I2C_1, I2C_2, POWER & CONNECTION, SELECTOR | TECO-640456-4 | CMP-00091-2 | 5 |
| CAP 0603 | CAP CER 0603 | C1, C2, C3, C4, C5, C10, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29 | CAP0603 | CMP-003-000000-1 | 20 |
| CAP 0805 | CAP CER 0805 | C6, C7, C8, C11, C12, C13, C14, C15 | CAP0805 | CMP-003-000001-1 | 8 |
| CAP POLY | CAP POLY SMD | C9 | CAPAE7366X60M | CMP-003-000002-1 | 1 |
| 640456-2 | Connector 250V AC/DC 5A 2P 1 Row PCB - Vertical Mounting Polyester White | CAN | TECO-640456-2_V | CMP-00089-3 | 1 |
| LED R 0603 | LED CHIPLED 645NM RED DIFF 0603 | D1, D5 | LED0603-R | CMP-006-000010-1 | 2 |
| LED Y 0603 | LED YELLOW DIFFUSED 0603 SMD | D2 | LED0603-Y | CMP-006-000012-1 | 1 |
| LED G 0603 | LED GREEN DIFFUSED 0603 SMD | D3, D4 | LED0603-G | CMP-006-000006-1 | 2 |
| SM4T28CAY | Diode TVS Single Bi-Dir 24V 400W Automotive 2-Pin SMA T/R | D6 | FP-SM4T28CAY-MFG | CMP-00066-1 | 1 |
| BAT54SW,115 | BAT54SW, 240Vf@0.1ma, Ilk=2uA@25V, SMD Schottky Barrier Diode - SOT-323 | D7 | FP-SOT323-IPC_A | CMP-00035-1 | 1 |
| 640456-5 | Connector 250V AC/DC 5A 5P 1 Row PCB - Vertical Mounting Polyester White | DISPLAY | TECO-640456-5 | CMP-00092-2 | 1 |
| PA4320.154NLT | Inductor Power Shielded Drum Core 150uH 20% 100KHz Ferrite 2.3A 0.185Ohm DCR T/R | L1 | PA4320.154NLT-Footprint-1 | CMP-00098-1 | 1 |
| 640456-3 | Header, Friction Lock; MTA-100; 3; 250 VAC; Polyester; Tin; Copper Alloy; Tin | LEVER_IN | 640456-3-Footprint-1 | CMP-00090-1 | 1 |
| HDR1X2M VERT | Header, 2-Pin | LEVER_OUT | HDR1X2M VERT | CMP-004-000005-1 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| RES 0603 | RES SMD 0603 | R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R26, R27, R28, R29, R30 | RES0603 | CMP-010-000001-1 | 25 |
| RES 0805 | RES SMD 0805 | R25 | RES0805 | CMP-010-000002-1 | 1 |
| EVP-BB2A9B000 | Switch Tactile N.O. SPST Round Button Gull Wing 0.02A 15VDC 1.6N SMD T/R | RESET | FP-EVP-BB2A9B000-MFG | CMP-00086-2 | 1 |
| 640456-6 | Connector Wire to Board Header 6 Position 2.54mm Solder Straight Thru-Hole | SWD | 640456-6-Footprint-1 | CMP-00095-2 | 1 |
| STD15P6F6AG | P-channel 30 V, 0.024 Ohm typ., 12 A, STripFET(TM) VI DeepGATE Power MOSFET in a DPAK package | T1 | STD26P3LLH6-Footprint-1 | CMP-00094-1 | 1 |
| LPUART | Header, 2-Pin | TX | HDR1X2M VERT | CMP-004-000005-1 | 1 |
| TSV7721ILT | Amplificatori operazionali - Amp. op. High bandwidth (22MHz) Low offset (200 µV) low-rail 5V Op amp | U1 | TSV7721ILT-Footprint-1 | CMP-00074-1 | 1 |
| ESDA6V1-4 | ESDA Series 4 Channel 6.1V 45 pF Bi-Directional SMT Transil □ Suppressor-SOT-23-6 | U2, U5, U9, U10, U11 | ESDA6V1-4-Footprint-1 | CMP-00087-2 | 5 |
| 74LVC2G14-Q100 | Dual inverting Schmitt trigger with 5 V tolerant input | U3, U4 | TSOP95P280X110-6N | CMP-00006-4 | 2 |
| LD39050PU33R | Linear Voltage Regulator IC Positive Fixed 1 Output 3.3V 500mA 6-DFN (3x3) | U6 | DFN6D_L | CMP-00011-1 | 1 |
| STM32L4Q5RGT6 | Low power microcontroller | U7 | QFP50P1200X1200X160-64N | CMP-00007-7 | 1 |
| MAX14878WAWA+ | high speed can transceiver | U8 | SOIC127P790X213-8N | CMP-00013-1 | 1 |
| L6981C50DR | 38 V, 1.5 A synchronous step-down converter with low quiescent current | U12 | SOIC127P600X175-8N | CMP-003-000015-3 | 1 |
| ABS25-32.768KHZ-6-T | Crystal, Plastic Molded 32.768Khz, 6Pf, 20Ppm-40+85C, 8 X 3.8 X 2.5 Rohs Compliant: Yes | X1 | ABRA-ABS25-4_V | CMP-00063-2 | 1 |
| ABM3-8.000MHZ-D2Y-T | 5032 2-SMD 8MHz 18pF ±20ppm -40°C~85°C | Y1 | FP-ABM3-MFG | CMP-00059-1 | 1 |
| BZT52B15-E3-18 | Diode Zener Single 15V 2% 500mW 2-Pin SOD-123 T/R | Z1 | BZT52B15-E3-18-Footprint-1 | CMP-00096-2 | 1 |