# INVOICE

James Dean
Technical Solutions Australia
109 Ferndale Road
Silvan
VIC 3795

Tom Harris
Redgum and Rust
128 Sandfly Road
Margate
TAS 7054

| | |
|---|---|
| Ref: 20221013 | 13/10/2022 |

| | |
|---|---|
| **Total: $4821.00**<br><br>Payment would be appreciated within 7 days. | Bank Details<br>Name: T.E. Harris<br>Account: 64780462<br>BSB: 923100<br><br>**ABN: 32 298 251 937** |

| **Description** | **Hours** | **Rate** | **Total** |
|---|---|---|---|
| Work onsite TSA per hour on project SBC2022 | 133:55 | $36.00 | $4821.00 |
| Total | | | **$4821.00** |

| **Date** | **Description** | **Start** | **Finish** | **Break** | **Hours** |
|---|---|---|---|---|---|
| | **$4,821.00** | | **$36.00** | | **133:55:00** |
| 24/08/2022 | Plan project, start designing hardware. | 9:00 | 18:10 | 0:30 | 8:40:00 |
| 25/08/2022 | More schematic design, look at Arduino libaries, place order with Digikey for parts. | 8:00 | 17:30 | 0:30 | 9:00:00 |
| 26/08/2022 | Schematic Design completed. Build prototype Relay unit & Sensor unit. Made a start on software. | 7:30 | 18:30 | 0:45 | 10:15:00 |
| 29/08/2022 | Hardware & software debugging on Relay & Sensor boards.<br>Started Display board prototype.<br>Able to send commands to MODBUS relay board. | 7:20 | 18:00 | 0:35 | 10:05:00 |
| 30/08/2022 | Getting Relay Driver working, working on getting boards talking to each other. | 7:40 | 18:30 | 0:30 | 10:20:00 |
| 31/08/2022 | Got accelerometer working, trying to get reliable tilt data from it. | 7:50 | 18:20 | 0:40 | 9:50:00 |
| 01/09/2022 | Tilt sort of going, working on controlling bed motor to drive to tilt, found problem where tilt reading sensitive to roll (tilt around perp axis). Got going at last.<br>Trying out Micropython on ESP32. Decided at last that it would be easier to continue with Arduino. | 8:00 | 18:00 | 0:30 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 05/09/2022 | Built Display prototype, got simple proof of concept software running, no display yet. | 8:10 | 18:30 | 0:30 | 9:50:00 |
| 06/09/2022 | Decided to write own MODBUS driver as could not getArduino lib driver to work. Got simple MODBUS driver to send commands to relay board. LCD on Display unit working but showing nonsense. | 7:45 | 17:50 | 0:30 | 9:35:00 |
| 07/09/2022 | Fixed display, wrong aspect ratio. Reorganised software to share common code. More work on MODBUS driver.<br>Built test jig for bed with gate linear motor. | 8:15 | 18:20 | 0:30 | 9:35:00 |
| 08/09/2022 | LCD demo working on Display board.<br>Lots of work on modbus driver to receive response from slave. Also had to have timeout to recover from no response. Working on better control of motor, at present very jerky. | 7:45 | 18:00 | 0:30 | 9:45:00 |
| 09/09/2022 | Achieved local control of motor with deadband. Modbus reliable. Relay code does crash intermittently, not sure why. Moving control over to Relay getting tilt from Sensor. | 8:20 | 18:10 | 0:40 | 9:10:00 |
| 11/09/2022 | Get MODBUS driver to read tilt from Sensor. Make Atmel Studio project for Relay. Finally got tilt angle working.<br>Fixed crash in Relay code, due to too much printing onto soft serial. Big cleanup of code. | 7:45 | 19:30 | 2:20 | 9:25:00 |
| 12/09/2022 | PCB for Sensor & Relay boards. | 8:00 | 19:30 | 1:00 | 10:30:00 |
| 13/09/2022 | PCB for Sensor & Relay boards. Schematic for Display unit. Boat out | 7:30 | 16:20 | 0:55 | 7:55:00 |