

Esmeralda T. Project – Detailed view (v1)

By Bill Weis

Requirements:

1. Be able to control her Drive bed using eye gaze
2. Be able to call for assistance using eye gaze

Solution – High Level:

1. Designed a voice activated bed controller which gave Esmeralda the ability to control all desired functions of her adjustable bed using eye gaze control.
2. We provided a control box that works with the Adaptive Tech Solutions “Call Attendant Device”

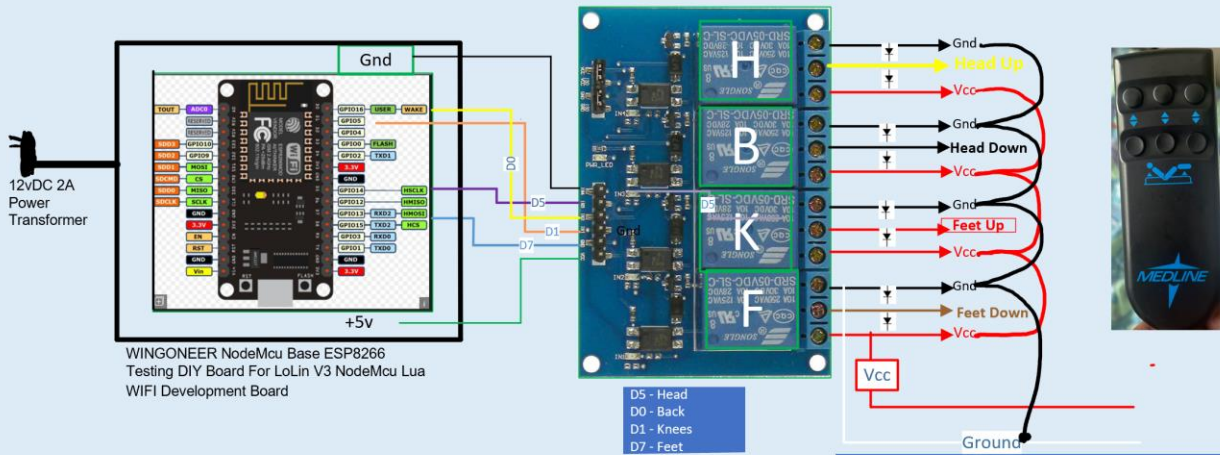
Details of the Solution

1 – Voice Control his bed – Esmeralda has a Drive style bed with a Medline hard wired remote. She wanted the four functions of Head Up, Head Down, Foot Up and Foot Down to be controlled via her Tobii Dynavox. Unfortunately, due to the way the bed controls are wired, it is not possible to provide an alternative way of controlling the bed aside from having the caregiver unplug our bed controller and replacing it with the original handheld Medline pendant.

Esmeralda has a Tobii running Grid 3

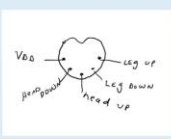
The functional engineering drawing on the next page shows the connections between the microcontroller and the relays, as well as the relays to the bed.

Voice Controlled Bed for Drive Delta 1000 bed (Esmeralda T.)
 Bill Weis 7-8-2023
 S/N 23123.07



WINGONEER NodeMcu Base ESP8266
 Testing DIY Board For LoLin V3 NodeMcu Lua
 WIFI Development Board

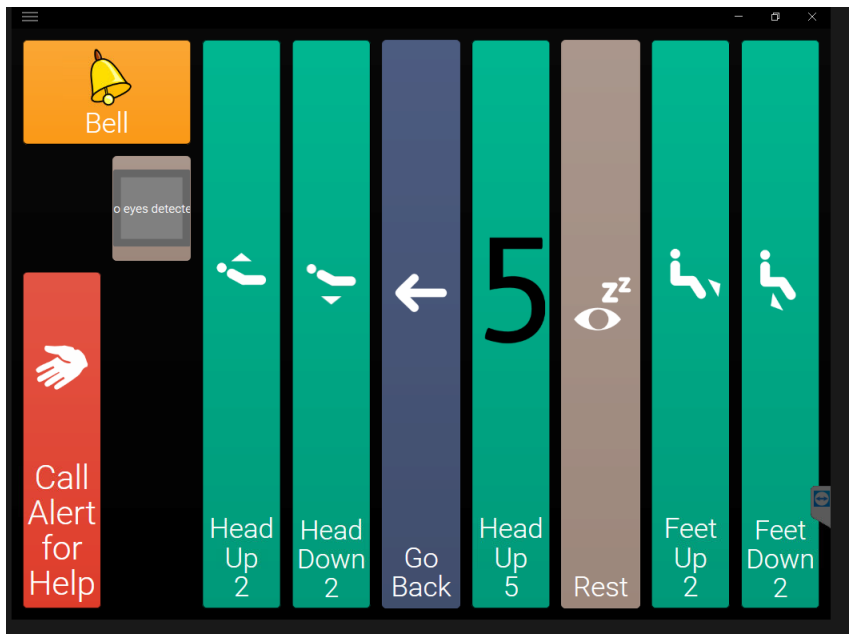
For testing purposes, if no relay board is available use a 10k resistor to pull up the GPIO pins to 3.3v so you can validate things are working as seen on a oscilloscope or logic analyzer. This is because the sketch for mechanical relays uses open drain on the GPIO pins.



Wires From Remote to Relays
 Yellow -> S1 -> Head Up
 Black -> S2 -> Head Down
 Red -> S3 -> Feet Up
 Brown -> S4 -> Feet Down
 White -> GND Tied to all black wires on the relay
 Green -> VDD Tied to all Red wires on the relay

Includes Schottky SR2010 flyback diodes to extend the life of the relay contacts due to motor current

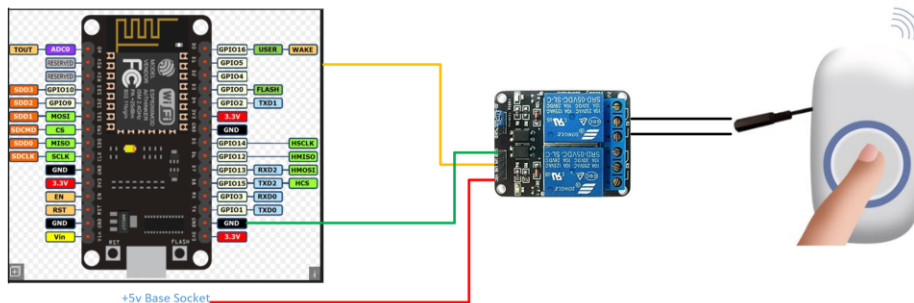
Here is what the Grid 3 screen looks like



2. **2 - Use the Tobii to call for assistance** - Esmeralda's voice is compromised from complications of ALS and she needed a solution so she could call to her caregivers for assistance. We found a device from www.AdaptiveTechSolutions.com called the [Wireless Attendant Call](#). We purchased the SKU WDBA-FX-M-Plug which comes with two receivers, one is a plug into the wall device and the other is a portable device that you can wear like a pager on your belt. The system operates on 433mhz, so it should have good coverage within a house and possibly close proximity outside the house as well. Future designs for this will likely just use a small relay box controlled by an Amazon Smart plug with a relay set to close the normally open contacts upon relay power up. When ordering the Wireless Attendant Call device, do not check the box "Remove Switch Adaptation" as this removes the external 1/8" plug that you will need to connect to the relays. A button was added to TD Snap in the iPad-based-Tobii so Esmeralda can use eye control to activate the Wireless Attendant Call solution.

Here is the Schematic of the Attendant Call design

Esmeralda T - Voice Activated Attendant Call
7/14/2023
S/N 23113.01



www.AdaptiveTechSolutions.com – Wireless Attendant Call Button part WDBA-FX-M-PLUG. (Remove Switch Adaptation = No You want the external 1/8" plug wired connection to connect to the relay. This solution could have also been done using a Smart Plug and a small relay box where the relay was configured to close n/o contacts on power up.