Gina Project – Detailed view
By Bill Weis

Gina - ALS

Requirements:
1. Be able to voice control her Drive Competitor II bed.
2. Be able to use the 'Drop-In' feature to call her caregiver
3. Be able to voice control her WiseLift chair

Solution – High Level:
1. We designed a microcontroller based solution to allow Gina to use voice commands for her Drive Competitor II bed.
2. We configured two Amazon Echo Dots for the Drop-In feature
3. We provided a microcontroller based solution to give Gina the ability to use voice commands to control certain features of her WiseLift chair.
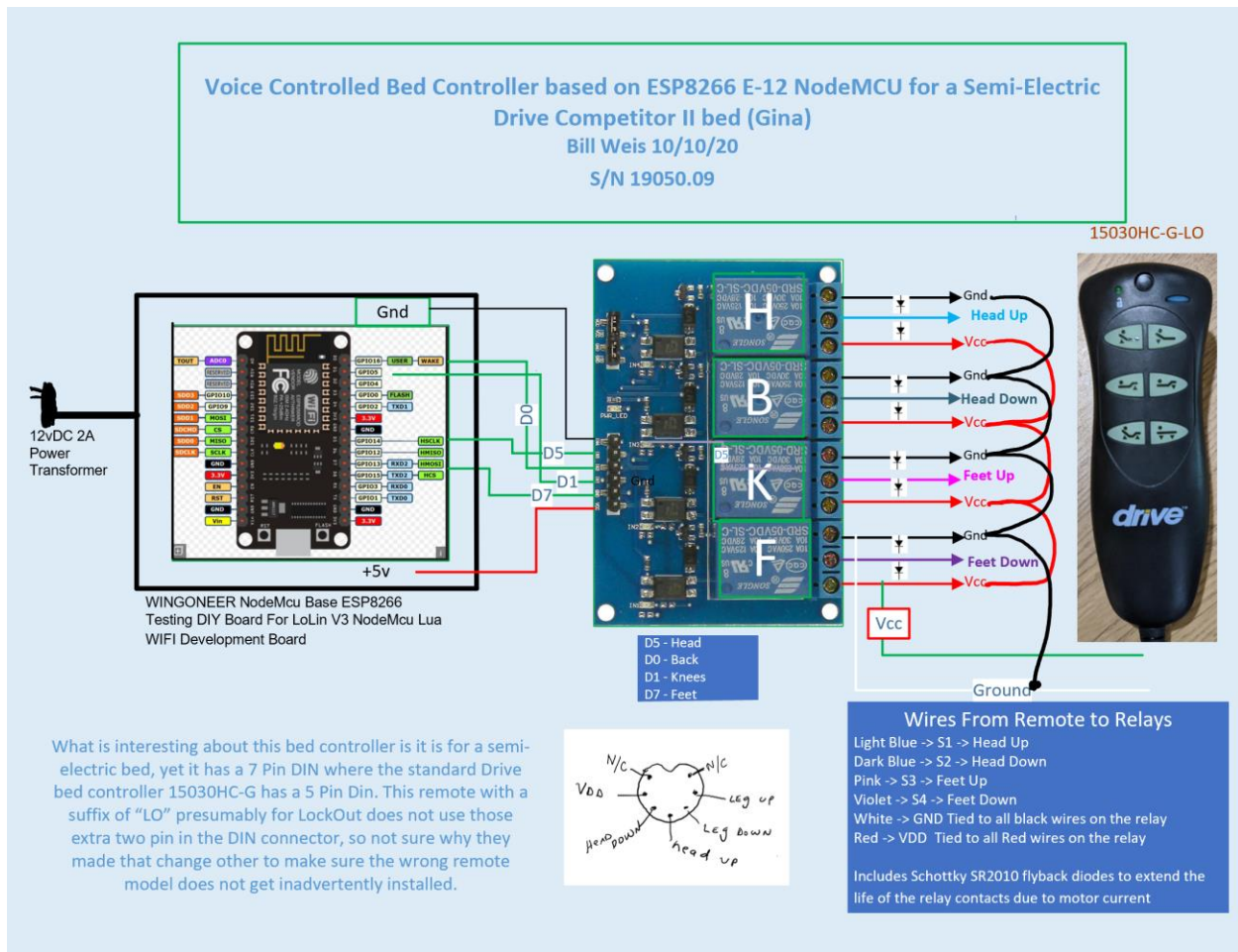
Details of the Solution

1 – Voice Control her bed – Gina has a Drive Competitor II bed that has a 15030HC-G-LO hand remote that is hard wired. She wanted the 4 buttons (head up, head down, legs up, legs down) on the remote to be voice activated. The design of this bed control does not lend itself to being able to have a backup means of controlling the bed by hand in the event of internet downtime or other failures. This means that in cases where the bed cannot be controlled through the use of the voice activated bed controller for whatever reason, it will be necessary to unplug the bed controller and plug in the original handheld controller. What is interesting about this particular model is the fact the hand remote has a lockout button and unlike the 15030HC-G which we are very much accustomed to seeing has a 5 pin DIN connector. This hand remote has a 7 pin DIN, although the 2 extra pins are not connected to any wire. In our solution I used the 7 pin DIN cable from the full electric Drive remote (15033HC-G). It should be noted that it took extra force to seat this 7 pin DIN into the bed. More force than the original hand remote. Normally I would have purchased the exact remote to be used as part of the solution, but they are on backorder for several months due to the impact of Covid.

The voice activated bed controller uses mechanical relays with Schottky SR2010 flyback diodes offering protection to the contacts on those relays.

Gina's bed can be controlled by both an Amazon Echo and a Google Mini for added redundancy.
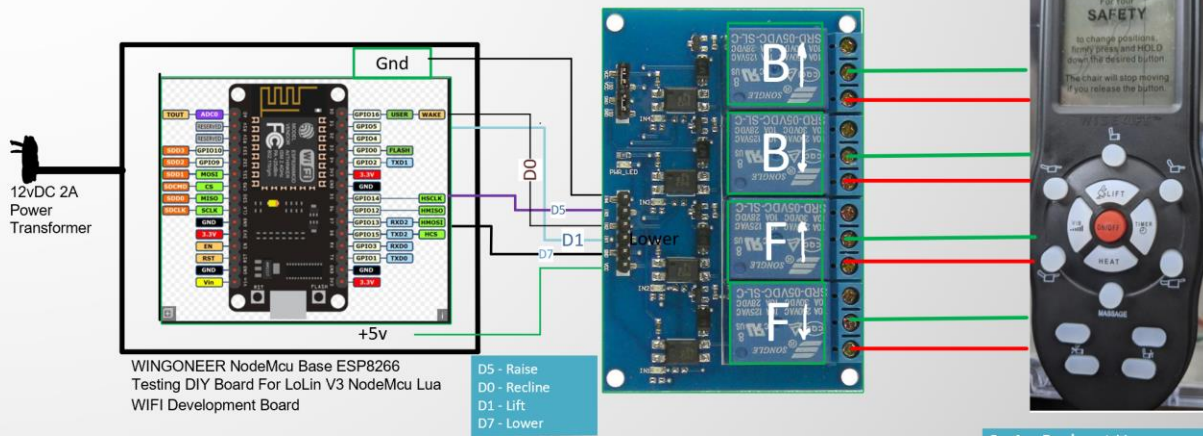
Here is a Visio diagram of the solution.

Voice Controlled Bed Controller based on ESP8266 E-12 NodeMCU for a Semi-Electric Drive Competitor II bed (Gina)
Bill Weis 10/10/20
S/N 19050.09

15030HC-G-LO

12vDC 2A Power Transformer

Gnd

+5v

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

D5 - Head
D0 - Back
D1 - Knees
D7 - Feet

Gnd — Head Up — Vcc
Gnd — Head Down — Vcc
Gnd — Feet Up — Vcc
Gnd — Feet Down — Vcc

Ground

Vcc

drive

What is interesting about this bed controller is it is for a semi-electric bed, yet it has a 7 Pin DIN where the standard Drive bed controller 15030HC-G has a 5 Pin Din. This remote with a suffix of "LO" presumably for LockOut does not use those extra two pin in the DIN connector, so not sure why they made that change other to make sure the wrong remote model does not get inadvertently installed.

Wires From Remote to Relays
Light Blue -> S1 -> Head Up
Dark Blue -> S2 -> Head Down
Pink -> S3 -> Feet Up
Violet -> S4 -> Feet Down
White -> GND Tied to all black wires on the relay
Red -> 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

2 – Use the Drop in Feature – We configured two Amazon Echo Dots appropriately so they could be used for Drop-In (Which is a handy intercom like feature allowing in this case Gina to contact her caregiver who might be at the other end of the house.

3 – Provide a voice activated solution for Gina's WiseLift chair – Gina asked that we voice enable some of the features of her WIseLift chair. The WiseLift chair has a wired remote with an 8 pin DIN connecting to a control box in the chair. I put a logic analyzer on the TX pin from the hand remote and noticed there are continuous packets being transmitted to the control box in the chair. The remote also appears to determine position without feedback from the linear actuators. Furthermore, the packets for heat/massage are continuously transmitted for 10 minutes, so doing this programmatically would be difficult with the ESP8266. In the end, I decided to give them the best of both worlds. The caregiver can activate the major buttons on the hand remote manually, while the relays in our voice activated controller take control of the 4 lower buttons. As a result Gina can use voice commands for incremental changes to the backrest and footrest position, which is what she needs to maintain comfort. She will issue upwards of 100 voice commands per day to maintain comfort.

Here is a Visio diagram of the solution.

Voice Controlled Bed Controller for Gina's WiseLift chair. Mechanical relays
Bill Weis 10-24-2020
S/N 20069.02

12vDC 2A Power Transformer

Gnd
+5v

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

D5 - Raise
D0 - Recline
D1 - Lift
D7 - Lower

Sw1 = Backrest Up
Sw2 = Backrest Down
Sw3 = Footrest Up
Sw4 = Footrest Down

The WiseLift chair has a wired remote with a 8 pin DIN connecting to a control box in the chair. I put a logic analyzer on the TX from the hand remote and noticed there are continuous packets being transmitted. The remote also appears to determine position without feedback from the linear actuators. Also, the packets for heat/massage are continuously transmitted for 10 minutes, so doing this programmatically would be difficult with the ESP8266. In the end, I decided to give them the best of both worlds. The caregiver can activate the major buttons manually, while our relays take control of the 4 lower buttons so Gina can use voice commands for incremental changes to the position, which is what she needs to maintain comfort. She will issue upwards of 100 voice commands per day to maintain comfort.

Resources
Amazon Echo
Alexa Support (Contact Support via the Amazon Alexa app - can have them call your number)
Google Home getting started
Google Home Help Forum
Google Home Support   Phone number for Google Home hardware support = 855-971-9121 (24/7 days a week)
Logitech Harmony Knowledge Base
Logitech Harmony Support Phone # for Support = 866-601-5644 (M-F 8am to 6pm PST)
Lifx
Wemo Support Phone number for Support = 1-844-745-wemo (9366)
inside the bed controller box. The drawing on the following page shows the voice activated bed controller, solid state relays and the remote.