Alexa Lambda Linux (ALL) Reference Design

Overview

ALL is a HW/SW reference design meant to enable quick prototyping and realization of the control and monitoring of things using Amazon Alexa Voice Services

Features and Benefits

- Integrated with Lambda and ASK
- Real-time Linux / user space app dev model
- Raspberry PI, open source, AWS services
- End to end SSL/TLS integration
- Quick bring-up of new voice controls
- Low effort to control fast real-world events
- Low cost and quick deployment
- Customer data security

Voice Control of a Home Security System Using Echo and the Alexa Services

Built from the ALL reference design
Lindo St. Angel 2015

Alarm Panel
(DSC Power832)

Keybus +15V
Keybus GND
Keybus data
Keybus clock

To house wide network of sensors (4 zones of 16) and keypads

2000 bits/s
30 messages/s

Keybus to GPIO Interface Unit

GPIO +3V
GPIO GND
GPIO PIN 6 DATA_OUT
GPIO PIN 13 CLOCK_IN
GPIO PIN 5 DATA_IN

house

Internet

AWS cloud

Utterance database

Intent Schema

Alexa Skill Application

intent triggers and responses

Lambda Function

skill handlers

Internet

Write FIFO

Bit-level processing thread

Read FIFO

Server thread

Panel status

Message-level processing thread

stdout and stderr

TLS authenticated and encrypted TCP socket

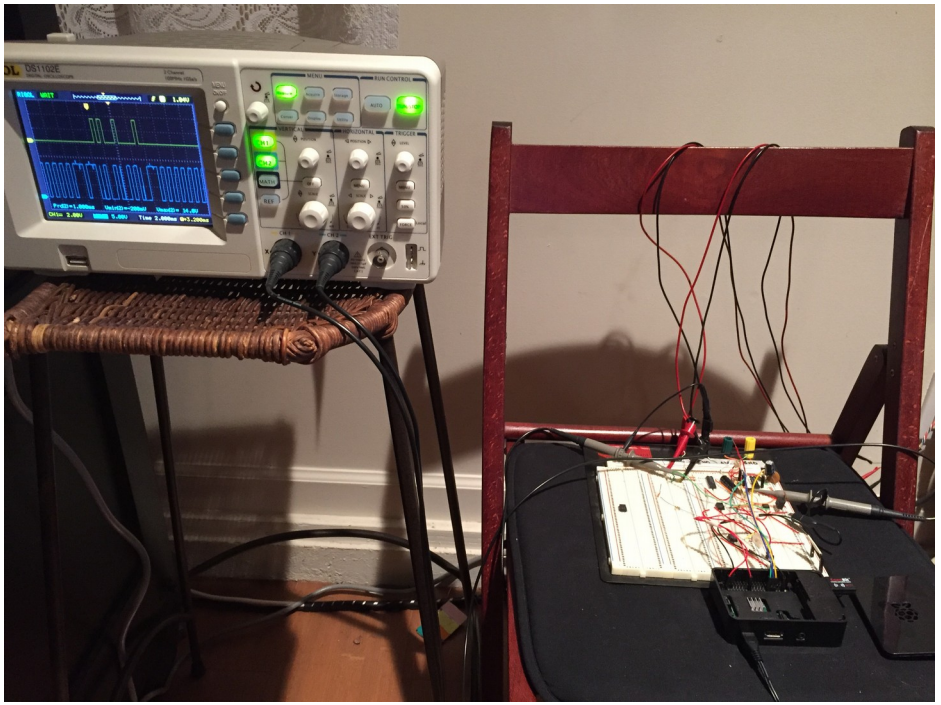
Raspberry pi 2 running real-time Linux (3.18.9-rt5-v7+)

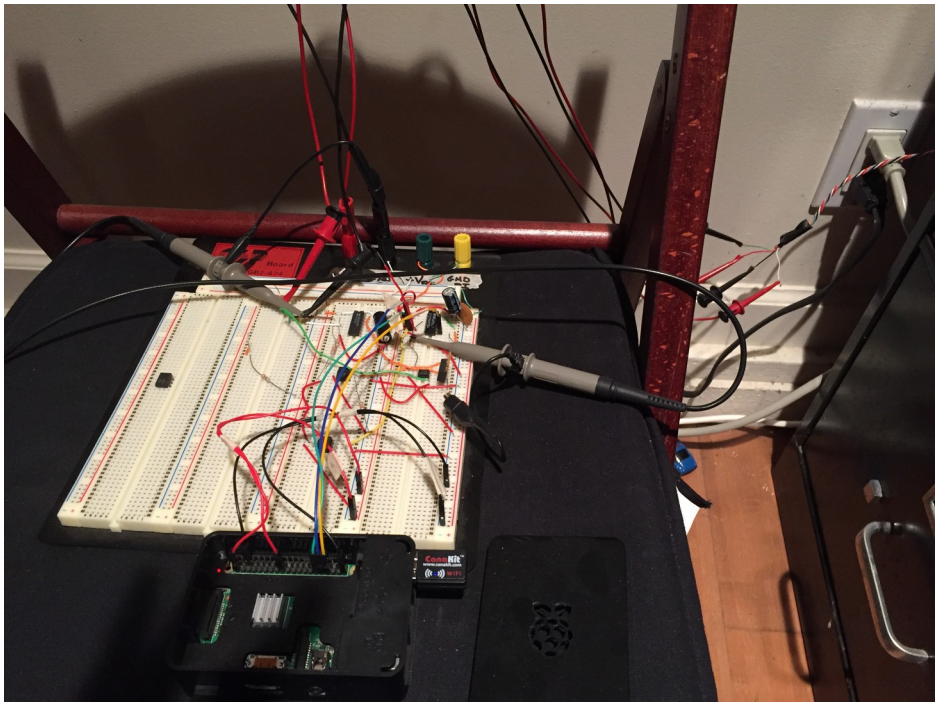
Prototype Output to Terminal

- index:39476,Undefined command from panel data: 0x63 0x00 0x00 0x00 0x00 0x00 0x31 0x80
- index:39477,LED Status Ready, data: 0x05 0x40 0x80 0xc0 0xe3 0x80 0x00 0x00
- index:39478,Undefined command from panel data: 0x5d 0x00 0x00 0x00 0x00 0x00 0x2e 0x80
- index:39479,LED Status Ready, data: 0x05 0x40 0x80 0xc0 0xe3 0x80 0x00 0x00
- index:39480,Keypad query data: 0x11 0x55 0x55 0x55 0x45 0x55 0x54 0x00
- index:39481,From Keypad unknown keypad msg data: 0xff 0x87 0xff 0x80 0x01 0xff 0xfe 0x00
- index:39482,LED Status Ready, data: 0x05 0x40 0x80 0xc0 0xe3 0x80 0x00 0x00
- index:39483,From Keypad idle data: 0xff 0xff 0xff 0xff 0xff 0xe0 0x00 0x00
- server: connection requested from (ec2-54-165-125-70.compute-1.amazonaws.com, 42928)
- index:39484,Undefined command from panel data: 0x63 0x00 0x00 0x00 0x00 0x00 0x31 0x80
- index:39485,LED Status Ready, data: 0x05 0x40 0x80 0xc0 0xe3 0x80 0x00 0x00
- server: client 54.165.125.70 connected with AES256-GCM-SHA384 encryption
- server: panel received command pound
- index:39486,From Keypad button # pressed data: 0xff 0x96 0xff 0xff 0xff 0xe0 0x00 0x00
- index:39487,Undefined command from panel data: 0x5d 0x00 0x00 0x00 0x00 0x00 0x2e 0x80
- index:39488,From Keypad idle data: 0xff 0xff 0xff 0xff 0xff 0xff 0xff 0xc0
- index:39489,LED Status Ready, data: 0x05 0x40 0x80 0xc0 0xe3 0x80 0x00 0x00
- server: connection requested from (ec2-54-165-125-70.compute-1.amazonaws.com, 42929)
- server: client 54.165.125.70 connected with AES256-GCM-SHA384 encryption
- server: panel received command idle
- index:39490,From Keypad unknown keypad msg data: 0xff 0xff 0xff 0xf7 0xff 0xe0 0x00 0x00
- index:39491,Undefined command from panel data: 0x39 0x7f 0xff 0xf8 0xbf 0xf8 0x00 0x00
- index:39492,Zone4 14, data: 0x3e 0x40 0x80 0xc0 0xe3 0x90 0x14 0x00
- index:39493,From Keypad idle data: 0xff 0xff 0xff 0xff 0xff 0xff 0xff 0xc0
- index:39494,LED Status Not Ready, data: 0x05 0x40 0x01 0xc0 0xe3 0x80 0x00 0x00
- index:39495,From Keypad unknown keypad msg data: 0xff 0xff 0xff 0xf7 0xff 0xe0 0x00 0x00
- index:39496,Undefined command from panel data: 0x39 0x7f 0xff 0xff 0xff 0xff 0x80 0x00

Note connections to AWS Lambda triggered by Alexa

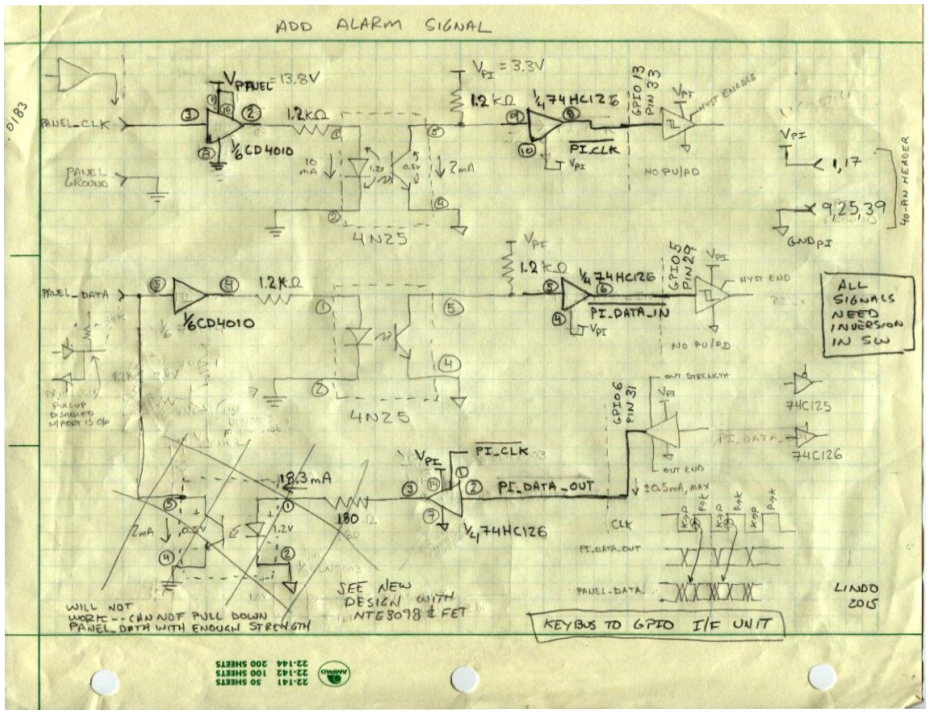
Prototype Current State

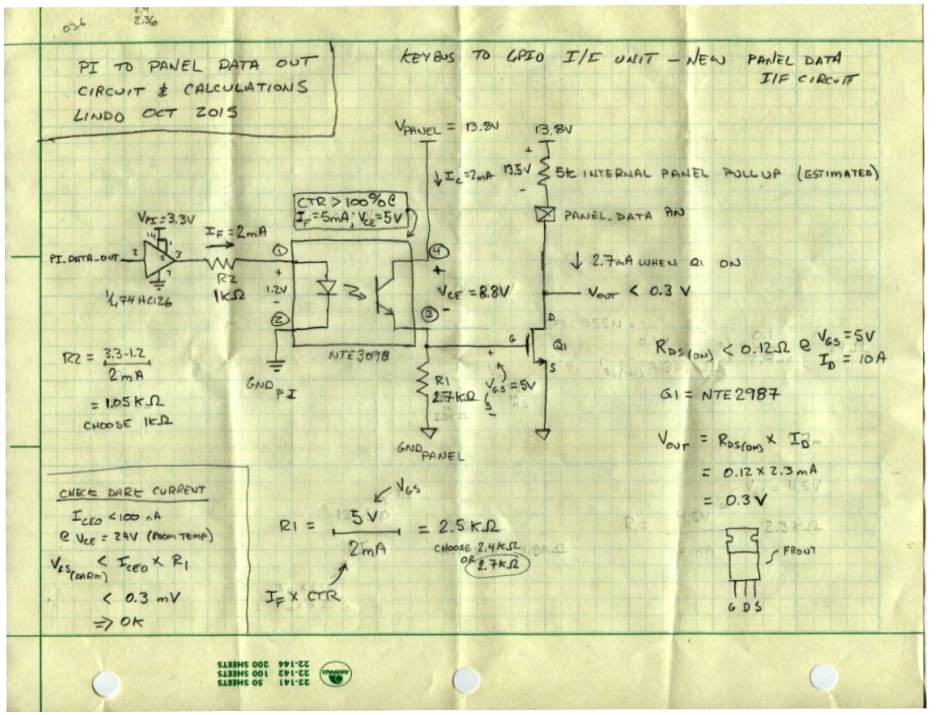




Planning to move interface circuits from breadboard to board that fits in Raspberry PI housing

Netbus to GPIO I/F Unit





Source code, schematics and documentation at
https://github.com/goruck/all