Doorbell Camera

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Demo Links:
Video Part 1
Video Part 2
Overall System Hardware
Mbed Board Subsystem

**Interface:** Button  
**Protocol:** GPIO pin Interrupt (interrupt)

**Interface:** Speaker/Amplifier  
**Protocol:** GPIO pin Interrupt (interrupt)

**Interface:** CC3000  
**Protocol:** CC3000_hostdriver_mbedsocket Library (SPI)

**Interface:** JPEG RS-232 Camera 2M  
**Protocol:** Serial library, customized code (TTL Serial)

**Interface:** 2.8" TFT LCD Screen with microSD socket  
**Protocol:** SPI_TFT_ILI9341 Library (SPI) - LCD screen  
**Protocol:** SDFFileSystem Library (SPI) - microSD socket
Apache Detector Server

**Interface:** mbed

**Protocol:** HTTP Get Request

**Interface:** Personal computer terminal

**Protocol:** SSH

**Interface:** Firebase server

**Protocol:** Firebase Python API
Tornado Email Server

**Interface:** mbed

**Protocol:** Websocket

**Interface:** Personal Computer Terminal

**Protocol:** SSH

**Interface:** Email

**Protocol:** SMTP
**Firebase Database**

**Interface:** Apache Detector Server  
**Protocol:** Firebase Python API

**Interface:** iOS Application  
**Protocol:** Firebase iOS API
Location Tracking iOS App

**Interface:** Firebase Server

**Protocol:** Firebase iOS API
Successes

- Getting the Wifi module CC3000 working with MBed.
- Get Websocket working with Mbed to send/receive messages to Server on Digital Ocean cloud.
- Able to take a photo using Camera Module with MBed.
- Get push button and speaker and amplifier working with MBed.
- The Apache server scripts is able to query Firebase DB and calculate if person is at home.
- Get Websocket and a user interface works using Tornado server on Digital Ocean.
- iOS App (Swift) is able to track user location from simulator.
- iOS App is able to keep updating Firebase DB variable once it changes.
Issues

- microSD card file system failure - can’t save files
  - Multiply Libraries: SDFileSystem and SDHCFFileSystem with multiple microSD cards
  - Others also had these errors using KL25Z board, yet no solutions found

- Email photo not possible
  - HTTP Clients don’t support Post Requests with desired content type
  - Five clients tried: HTTPClient (x3), NetServices, NetServicesSource

- Serial Connections with Interrupts example doesn’t work on KL25Z (camera)
  - Rewrote our own serial interrupt with buffer almost from scratch

- Camera output .jpg, screen input .bmp, but can’t convert files
  - Found an example, but it doesn’t compile and can’t figure out why
  - Implementing algorithm ruled out
Sources and Inspirations

mbed Official Library
Project Demo; by Antonio Iannopollo
CC3000 (wifi) by Martin Kojtal
HTTPClient; original by Donatien Garnier, latest fork by David Smart
Firebase (iOS-side) by Firebase.com
SPI_TFT_ILI9341; by Peter Drescher
Tornado (Python-side) by tornadoweb.org
Websocket (Python-side); by python.org
WebSocket; by Samuel Mokrani
Camera: Link Sprite (Arduino)
Serial Interrupt Cookbook mbed

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