**Tardis System Calls**

1. Cell call from Tardis to Cell Phone
   1. ~~Full Audio in both directions~~
   2. ~~Manual PTT~~
   3. ~~Manual PTT by shorting PTT pins~~
2. ~~Cell call from Tardis to Cell Phone with VOX audio~~
   1. ~~Full audio with VOX circuit~~
3. ~~Cell call from Cell Phone to Tardis~~
   1. ~~Tardis detects incoming call~~
   2. ~~Tardis performs Auto Answer~~
   3. ~~Full audio with VOX circuit~~
4. DTMF capture by Tardis from Radio
   1. Capture \*1234567890#
5. Cell call from Tardis using DTMF from Radio
   1. Transmit \*\*14032002497# from Radio
   2. See capture of DTMF tone
   3. Tardis should make cell phone call based on input
      1. \* should tell Tardis to capture digits and it will be making a phone call
      2. Tardis should count number of digits, if 11 proceed to next step
      3. # should tell Tardis that end of digits/command is complete
      4. Tardis should now dial 14032002497
   4. Full audio with VOX circuit
6. Hang up Tardis cell call when call done from radio
   1. With cellular call in progress Radio transmits \*1#
   2. Tardis terminates cell call
7. Hang up Tardis cell call when terminated by cell phone
   1. End user hangs up cell phone
      1. Tardis detects call terminated
      2. PTT turned off
   2. End cell phone user sends \*1# and Tardis terminates call
      1. Some console systems phone interfaces don’t always terminate calls properly
      2. This is capturing Tone from cell phone verses from radio
8. Cell phone call from Tardis via radio and sending unit ID upon answer
   1. Transmit \*\*14032002497# from Radio
   2. Tardis should now dial 14032002497
   3. Once call is answered pause 5 seconds and then send 123456#
   4. Full audio with VOX circuit
9. Cell call from Tardis using auto dial
   1. Transmit \*\*123# from Radio
   2. Tardis calls 14038162797
   3. End user answers call
   4. Full audio with VOX circuit
10. Cell call from Tardis using auto dial and send unit ID
    1. Transmit \*\*222# from Radio
    2. Tardis calls 4038162797
    3. Full audio with VOX circuit
    4. Once call is answered pause 5 seconds and then send 123456#
    5. Full audio with VOX circuit it
11. Timers, actual times will vary
    1. Hang up cell phone after 2 minutes
    2. Hand up cell phone when no audio is detected from cell phone after 1 minutes
    3. Turn off PTT after 3 minutes, even if audio is present
    4. Stop digit capture after 30 seconds if # not received
12. Tones to be sent over the radio under certain circumstances
    1. OK Tones, 2 quick tones, when proper tone commands are sent
    2. Incoming call tones, Long, short, long, short tones repeated 3 times
    3. Send error tone, 5 quick tones, if incomplete tone sequence received
    4. Call terminated tone, 1 long high tone followed by 1 short low tone

**Mini Console System**

1. Tardis to Console
   * Tardis speed dial Console (PC with Dial-up modem on Auto answer)
   * Modem answers call
   * Using handset attached to modem to pass audio
   * Send Call terminate tones \*1#
2. Console to Tardis
   * ATDT 4032002497
   * Tardis answers
   * Using handset attached to modem to pass audio
   * Send Call terminate tones \*1#
3. Tardis send GPS info to Console via data path
   * GPS data received and put into data base
   * Tardis location displayed on Google Earth, shows current speed and bearing
   * Update every time GPS data received
4. From Console display select Tardis Icon and call
   * Point to Icon and right click, call, display info, turn on Call waiting LED
   * Select call
   * Console autodials Tardis
   * Audio call
   * Send Call termination code when call done
5. Call Waiting on Console – Option 1
   * Tardis Auto Dials Console
   * Console answers
   * Tardis sends DTMF Tones to indicate call waiting
   * Console Tardis Icon Changes color to indicate call waiting
   * Audio Call
   * Console sends Call termination code when call done
6. Call Waiting on Console – Option 2
   * Press Console call Button
   * Tardis sends data message to tell Console they want to talk
   * Console gets message and Tardis Icon changes color
   * Console operator selects Icon and calls Tardis
   * Tardis Answers
   * Audio Call
   * Console send Call termination code when call done

**Future Requirements**, to be added (more complete before prototype the better, functions not fine tuning i.e. audio adjustment such as levels and noise cancelling)

1. Send standard data packet with every voice call to dispatcher
   1. Send GPS info, from cell phone or external GPS
      1. Speed, bearing, lat/long, timestamp
   2. Also send even when call not in progress at a regular intervals
   3. Data sending while call in progresses
2. Send voice over encrypted packets
3. SMS
   1. Display on radio (faceplate if available for radio used) or display unit
   2. Send canned messages
   3. Audio capture and send message to end user as text
      1. Optional to send full audio message as email, voice mail
4. WiFi (or Bluetooth) to other data systems intigration in locomotive
5. External Ethernet port send data over internal cell phone
6. Send data out Serial ports via built in terminal server
7. All data to be sent to a central server to log all data for later retrieval etc.
8. Record all voice and data transmitted, another black box
9. Touchscreen, external keyboard/mouse ports
10. Toggle LED’s, via phone calls. DTMF tones from /cell phone user activates LED’s
    1. Call RTC message LED comes on
11. One button Calls
    1. Press button to autodial Dispatch
12. Handset interface to Tardis, radio relay not required, use CleanCab handset and switch
13. Radio Controls, channel changes, send data via radio