**Routines/ software that need to be written**

**for V12 board options to be fully functional.**

**As of February 12, 2024**

1. **MAIN BOARD**
   1. **Shutdown Routine Activation.** On interrupt of Teensy PIN 2, call a Shutdown(); routine. The routine can be empty for now… just a simple shell that users can fill in with whatever they want to do before the power goes off.
2. **RF BOARD**
   1. **HF-MF switch.** This is controlled by the MCP28017 on the board on I2C buss “WIRE” at I2C hex address 0x22, bit GPA7; High = HF frequency range, Low = HF frequency range. Just modify that bit… so read back what resides inn the GPAn word and a write back with a “1” or “0” to bit #7 (words “or-ed”).
   2. **RF Gain Attenuator.** This is controlled by the MCP28017 on the board on I2C buss “WIRE” at I2C hex address 0x22, bits GPA0-GPA5 (GPA0 is the low bit). The attenuator has the range 0-31.5 dB (this is a reduction) by 0.5dB steps. Therefore when high, GPA0 = 0.5dB, GPA1 = 1.0dB, GPA2 = 2.0dB, GPA3 = 4.0dB, GPA4 = 8.0dB, GPA5 = 16.0dB. Therefore, a readback of the GPA word “or-ed” with x3F written to the GPA word implies a 31.5dB signal reduction from the antenna, while a readback of the GPA word setting the lower 5 bits low written to the GPA word gives a reduction of 0.0dB.
   3. **Transmit Gain Attenuator.** This is controlled by the MCP28017 on the board on I2C buss “WIRE” at I2C hex address 0x22, bits GPB0-GPB5 (GPB0 is the low bit). The attenuator has the range 0-31.5 dB (this is a reduction) by 0.5dB steps. Therefore when high, GPB0 = 0.5dB, GPB1 = 1.0dB, GPB2 = 2.0dB, GPB3 = 4.0dB, GPB4 = 8.0dB, GPB5 = 16.0dB. Therefore, a readback of the GPA word “or-ed” with x3F written to the GPA word implies a 31.5dB transmit signal reduction to the PA, while a readback of the GPA word setting the lower 5 bits low written to the GPA word gives a reduction of 0.0dB.
   4. **CALIBRATE.** The CAL routine feeds-back the transmitter back to the receiver through an attenuator for calibration. Some of the steps in the existing manual calibration can be written into a routine and performed for the user by just activating the routine. The “CAL” switch is turned on by writing a “1” to Teensy pin #30. Write “0” to the same pin when calibration is complete and in normal receive.
3. **NEW BPF**
   1. **BAND FILTER.** This is controlled by the MCP28017 on the board on I2C buss “WIRE2” at I2C hex address 0x24, bits GPB0-GPB7 and GPA0-GPB2. Therefore:
      1. GPB0 = high for 60M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      2. GPB1 = high for 160M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      3. GPB2 = high for 80M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      4. GPB3 = high for 40M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      5. GPB4 = high for 30M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      6. GPB5 = high for 20M; Rest [GPB0-GPB7 and GPA0-GPA2]] low.
      7. GPB6 = high for 17M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      8. GPB7 = high for 15M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      9. GPA0 = high for 12M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      10. GPA1 = high for 10M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      11. GPA2 = high for 6M; Rest [GPB0-GPB7 and GPA0-GPA2] low.
      12. GPB3 = high for bypass; Rest [GPB0-GPB7 and GPA0-GPA2] low.