Weekly Status Report
Week 3

EECE 460

MCU TNC Design

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Submittal Date: October 5th, 2020

Accomplished tasks for this week:

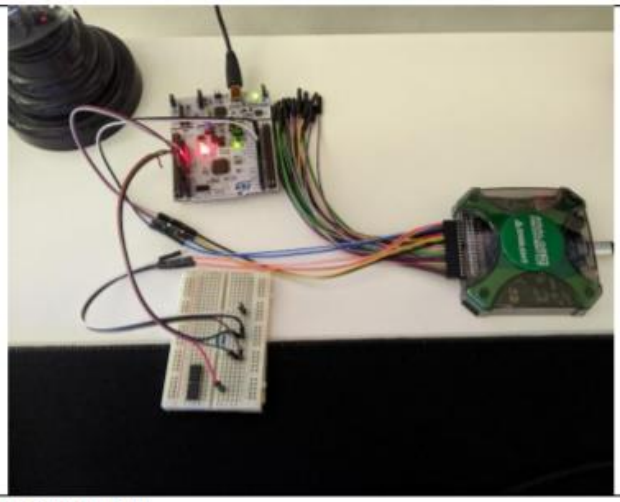
- Completed testing of baud rate on the testing tree
- Completed testing of amplitude on the testing tree
- Helped Kobe with assembling the prototyping boards

Planned tasks for next week:

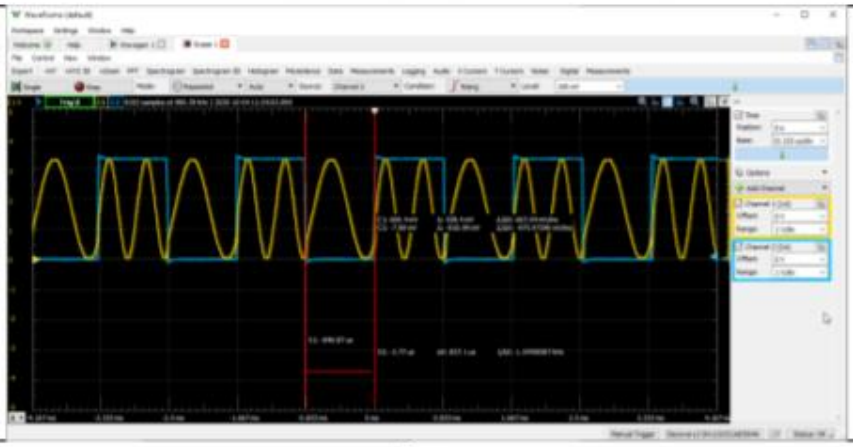
- Finish the rest of the prototyping board
- Add more packet functionality to the code
- Complete more of the testing tree
- Analyze waveform output of the newly assembled prototype boards

Examples of Completed Task

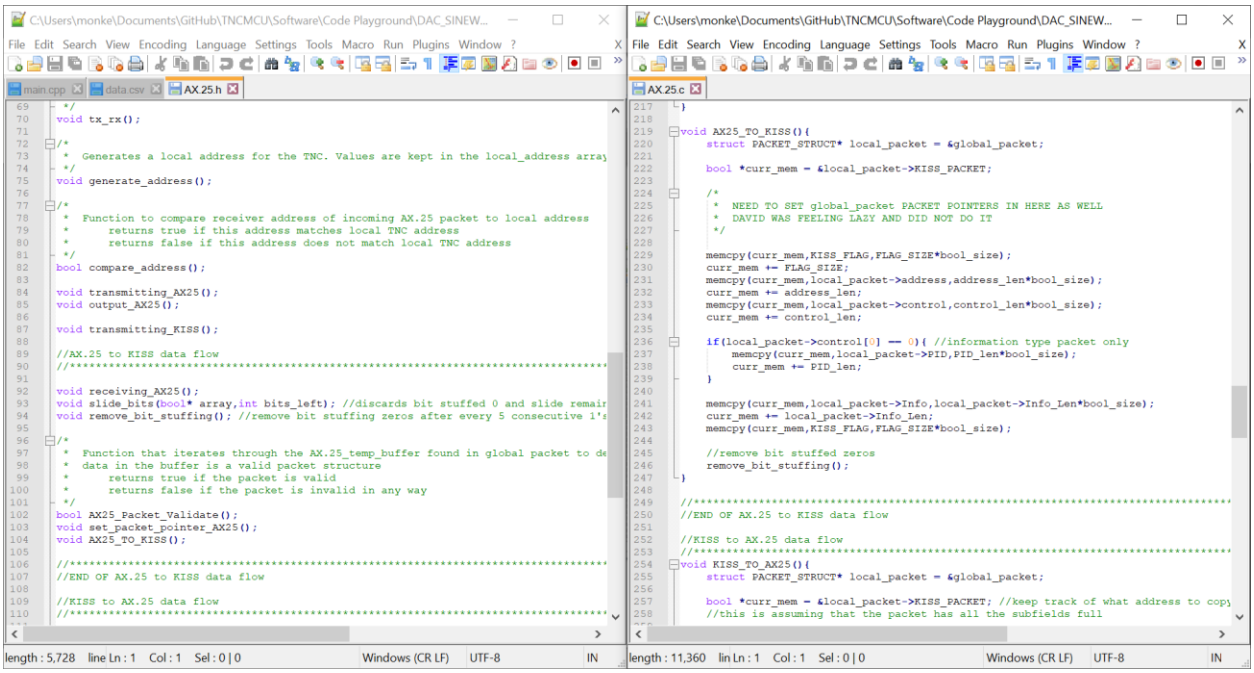
Testing tree form for amplitude:

TNC Testing Form (REV1)	
Leaf on the Tree	Amplitude
Device Under Test (Testing Tree Number):	2.3.1.2.2.1
Date:	10/4/2020
Person(s) Conducting Experiment:	David Cain
Signature:	
Experiment Purpose:	The purpose of this experiment is to measure waveform output voltage. Part of our specifications it to be capable of sinking 400mV(ptp) into 1k.
Experiment Procedure:	To verify amplitude, the analog output will be connected to a 1k load and measured. In this case, 2 x 2k resistors will be wired in parallel on a bread board, creating 1k of resistance across the terminals.
Equipment Settings / Software Settings (w Revision):	The Digilent will be set to record the maximum value of the waveform measured. For general insight, the RMS and minimum were also recorded
Testing Diagram / Picture:	
Data Points:	Maximum: 399.19 mV RMS: 137.11 mV Minimum: -1.43 mV
Pass / Fail:	Pass
Interpreted Notes:	The waveform satisfies the 400mV requirement. Potentially some feedback could be used to tune the output during runtime, but this is not necessarily required.
Recommendations for Modifications:	None, currently

Testing Tree for baud rate:

TNC Testing Form (REV1)	
Leaf on the Tree	Baud
Device Under Test (Testing Tree Number):	2.3.1.2.3.1
Date:	10/4/2020
Person(s) Conducting Experiment:	David Cain
Signature:	
Experiment Purpose:	The purpose of this experiment is to measure and ensure the number of signaling events per second (or baud rate) is correctly established as 1200Hz
Experiment Procedure:	To verify the baud rate, a diagnostic signal will be enabled in software to output the current transmission bit value represented in binary. This binary wave form can easily have baud rate measured.
Equipment Settings / Software Settings (w Revision):	Analog Discovery 2 input channel 1 and 2 will be connected to the STM32 output pins D8(PA9) and A2(PA4)
Testing Diagram / Picture:	
Data Points:	
Pass / Fail:	Pass
Interpreted Notes:	Waveform is sustaining a baud rate of 1200Hz. This was tested with multiple wave forms but easily viewed with alternating bit pattern.
Recommendations for Modifications:	None

Example code with more pointer structure:



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main.cpp | data.csv | AX.25.h

```
 */
void tx_rx();

/*
 *  Generates a local address for the TNC. Values are kept in the local_address array
 */
void generate_address();

/*
 *  Function to compare receiver address of incoming AX.25 packet to local address
 *      returns true if this address matches local TNC address
 *      returns false if this address does not match local TNC address
 */
bool compare_address();

void transmitting_AX25();
void output_AX25();

void transmitting_KISS();

//AX.25 to KISS data flow
//*************************************************************************************

void receiving_AX25();
void slide_bits(bool* array,int bits_left); //discards bit stuffed 0 and slide remair
void remove_bit_stuffing(); //remove bit stuffing zeros after every 5 consecutive 1's

/*
 *  Function that iterates through the AX.25_temp_buffer found in global packet to de
 *  data in the buffer is a valid packet structure
 *      returns true if the packet is valid
 *      returns false if the packet is invalid in any way
 */
bool AX25_Packet_Validate();
void set_packet_pointer_AX25();
void AX25_TO_KISS();

//*************************************************************************************
//END OF AX.25 to KISS data flow

//KISS to AX.25 data flow
//*************************************************************************************
```

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AX.25.c

```
}

void AX25_TO_KISS(){
    struct PACKET_STRUCT* local_packet = &global_packet;

    bool *curr_mem = &local_packet->KISS_PACKET;

    /*
     *  NEED TO SET global_packet PACKET POINTERS IN HERE AS WELL
     *  DAVID WAS FEELING LAZY AND DID NOT DO IT
     */

    memcpy(curr_mem,KISS_FLAG,FLAG_SIZE*bool_size);
    curr_mem += FLAG_SIZE;
    memcpy(curr_mem,local_packet->address,address_len*bool_size);
    curr_mem += address_len;
    memcpy(curr_mem,local_packet->control,control_len*bool_size);
    curr_mem += control_len;

    if(local_packet->control[0] == 0){ //information type packet only
        memcpy(curr_mem,local_packet->PID,PID_len*bool_size);
        curr_mem += PID_len;
    }

    memcpy(curr_mem,local_packet->Info,local_packet->Info_Len*bool_size);
    curr_mem += local_packet->Info_Len;
    memcpy(curr_mem,KISS_FLAG,FLAG_SIZE*bool_size);

    //remove bit stuffed zeros
    remove_bit_stuffing();
}

//*************************************************************************************
//END OF AX.25 to KISS data flow

//KISS to AX.25 data flow
//*************************************************************************************
void KISS_TO_AX25(){
    struct PACKET_STRUCT* local_packet = &global_packet;

    bool *curr_mem = &local_packet->KISS_PACKET; //keep track of what address to cop
    //this is assuming that the packet has all the subfields full
```

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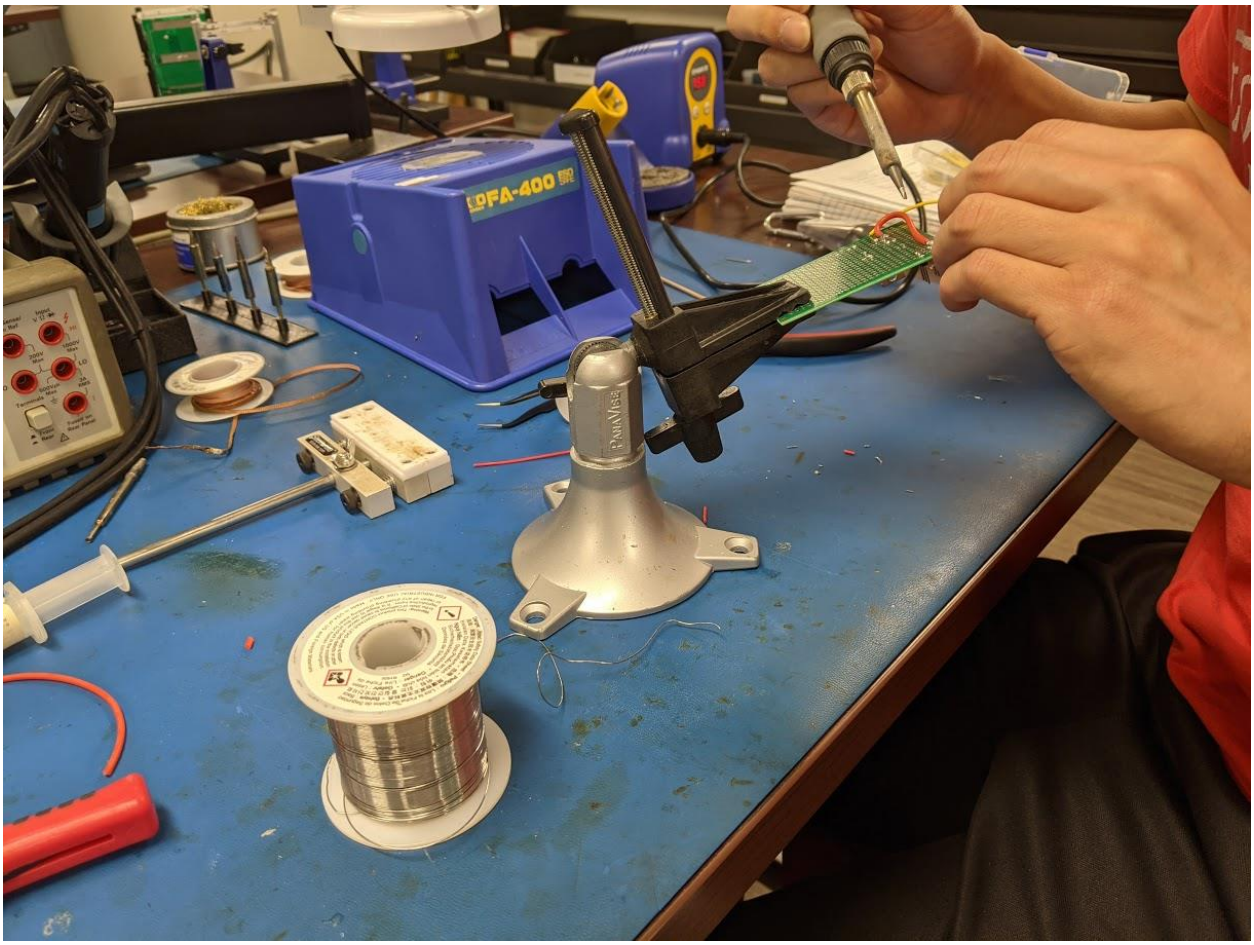
Prototype Assembly with Kobe:



Time Sheet

Item	Date/Time	Description	Hours
1	9/28/2020 5:30pm-6pm	Edited our old testing sheet to new be in word format. The previous version was okay but did not integrate into papers well.	0.5
2	9/30/2020 3:30pm-6pm	Completed testing for amplitude output of TNC. Needed to test the output with a load of 1k so I needed a simple resistor circuit.	2.5
3	10/1/2020 5:30-7pm	Completed testing for the baud rate output of TNC. Used the Digilent to measure waveform.	1.5
5	10/3/2020 12pm-6:30pm	Worked on packet structure code.	6.5
		Total:	11