First of all, for any CAN communication to work with the TX2, the following command line commands must be executed:

```
sudo modprobe can_raw
sudo modprobe mttcan
sudo ip link set can0 type can bitrate 250000
sudo ip link set up can0
```

Currently for our purposes, we only need to use one can port, so we can just set up can0. The TX2 has two CAN ports, so to initialize the second one (which once again is necessary for us) execute the following as well:
```
sudo ip link set can1 type can bitrate 250000
sudo ip link set up can1
```

Every 3 seconds a "heartbeat" of 5 messages is sent out by each battery. Here is an example:

```
  can0   5FF    [8]   20 81 21 01 00 00 00 38

  can0   5FF    [8]   30 01 38 64 DC 05 E8 03

  can0   5FF    [8]   31 01 4D CF 01 00 00 00

  can0   5FF    [8]   32 01 5F 0B 73 0B 72 0B

  can0   5FF    [8]   33 01 00 00 00 00 00 00
```

For each message, the first value is D0, then D1, and so on until D7.

D0, or data0 contains the message identifier, 20, and 30-33. In the code file, these data values are converted to 32, 48-51.

Message 20/32 is referred to as soc_msg.
Message 30/48 is referred to as soh_msg.
Message 31/49 is referred to as cyclecount_msg.
Message 32/50 is referred to as temp_msg.
Message 33/51 is referred to as bytecurrent_msg.

List of the data contained in each message:
Note: For values that are just numbers, they are always that number and are used for internal battery communication

We only use Temp 1

20: 81, 21, Battery Number, Alarm1, Alarm2, Status, SOC

30: Battery Number, SOC, SOH, Max Discharge Current (D4 and D5), Max Regen Current (D6 and D7)

31: Battery Number, Pack Voltage (D2 and D3), Cycle Count (D4 and D5), Not Used, Not Used

32: Battery Number, Temp 1 (D2 and D3), Temp 2 (D4 and D5), Temp 3 (D6 and D7)

33: Battery Number, Low byte current 1, Low byte current 2, High byte current 1, High byte current 2, Not Used, Not Used

Examples:
Deconstruction of 30
- SOC (state of charge): D2
    - D2: 38
    - Hex value: 38
    - Decimal value: 56
        - Note: On Page 8, says the following
            - Range: 0-100, %of remaining capacity
        - So: 56%

- Max Discharge Current: D4 and D5
    - D4: DC   D5: 05
    - Hex value: 05DC
    - Decimal value: 1500
        - Note: On Page 5, says to do the following:
            - 1500/10 = 150A
- Max Regen Current
    - D6: E8   D6: 03
    - Hex value: 03E8
    - Decimal value: 1000
        - Note: On Page 5, says to do the following:
            - 1000/10 = 100A

Deconstruction of 32

- Temp 1: D2 and D3
    - D2: 5F   D3: 0B
    - Hex value: 0B5F
    - Decimal value: 2911
        - Note: On Page 8, says to do the following:
            - Range: -40C to 120C
            - $(Value-2731)/10 = tempC$
        - So:
            - $(2911-2731)/10 = 18$ Degrees C = 64.4 Degrees F

Info of the battery we used (From manual - https://ceb8596f236225acd007-8e95328c173a04ed694af83ee4e24c15.ssl.cf5.rackcdn.com/docs/product/InsightBatteryManual_040121_210401_115955.pdf)

- Model: 48V030-GC2
- Nominal Voltage: 51.2V
- 30 Ah
- 1.536kWh
- 128Wh/kg
- Continuous Discharge Current: 100A