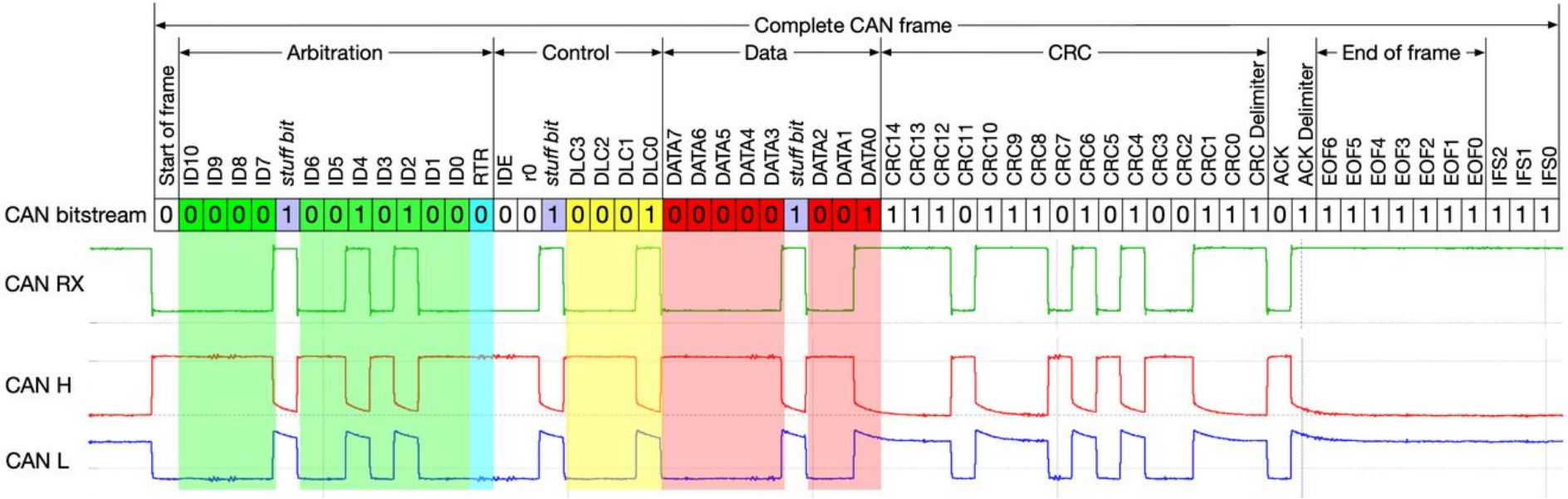
Implementing CAN on FPGA

Alen Cehajic, Nishchay Kulkarni, Josh Kulwicki, Yash Gandham

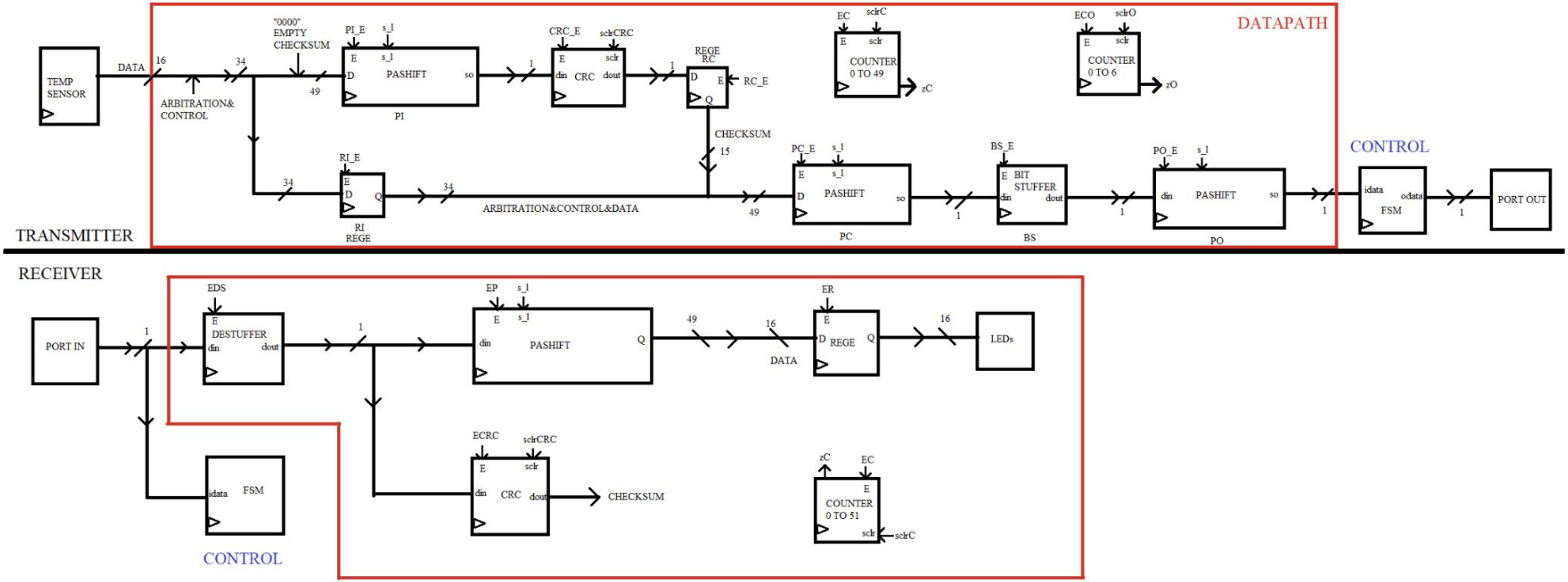
Project Goal

- Read temperature
- Implement CAN communication between two boards
- Transfer data and display temperature on the second board

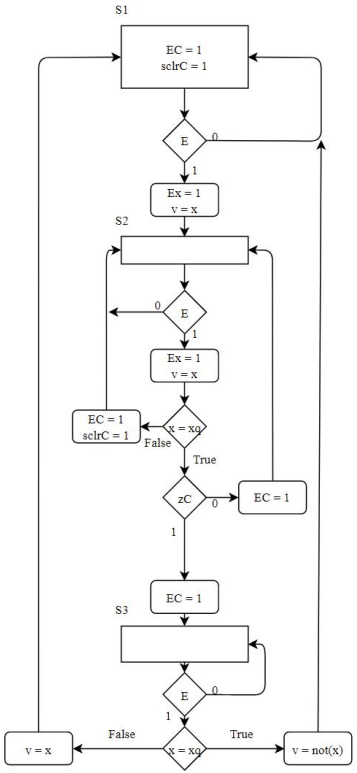
CAN communication



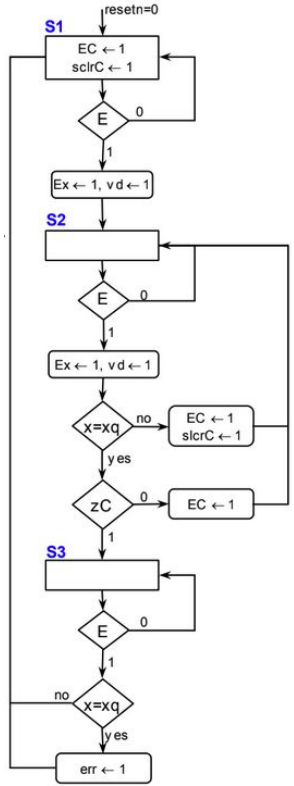
Block Diagram



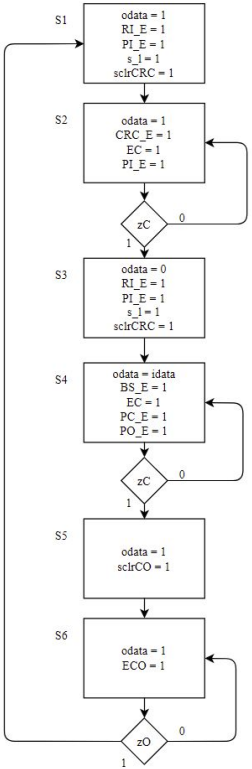
Bit-Stuffer



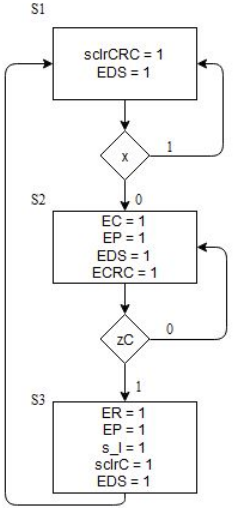
Destuffer



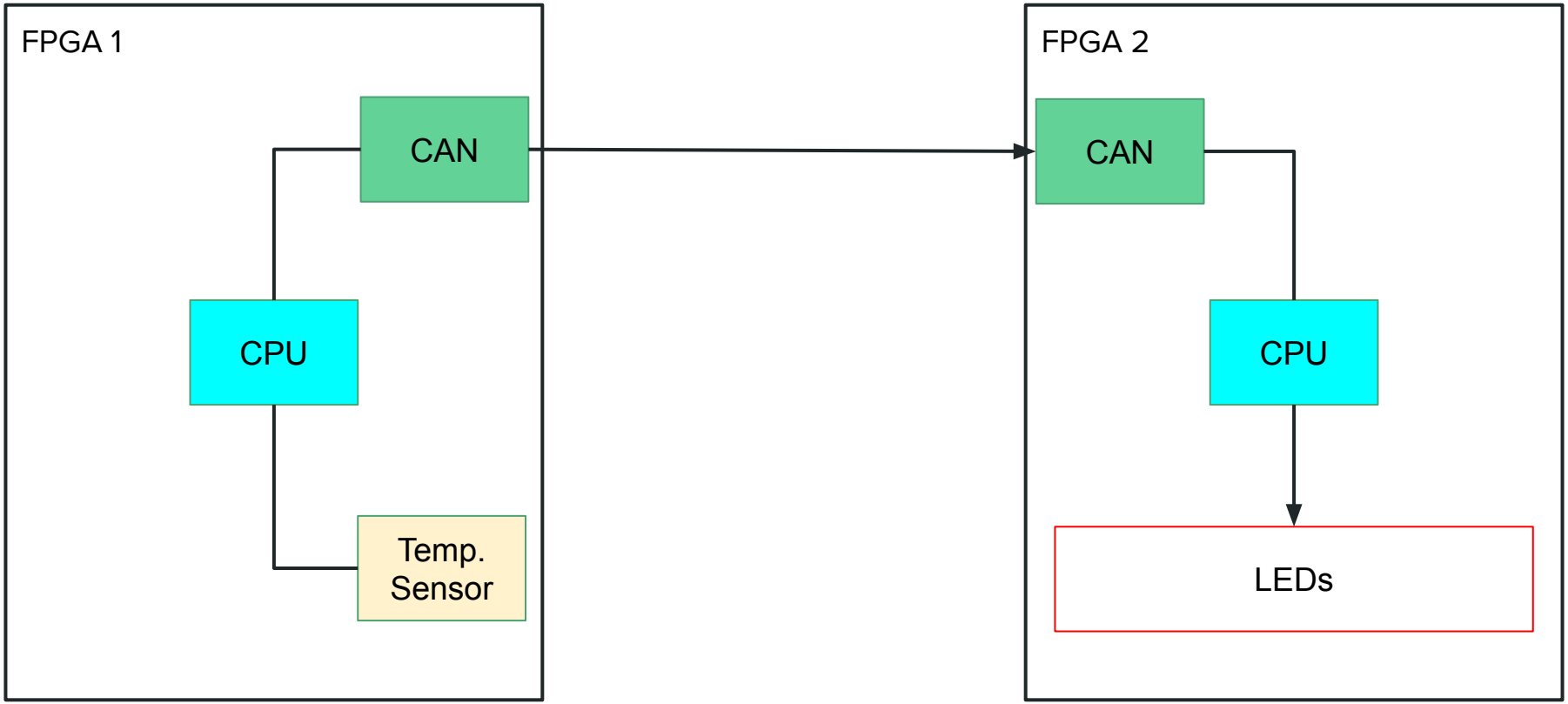
Transmitter FSM



Receiver FSM

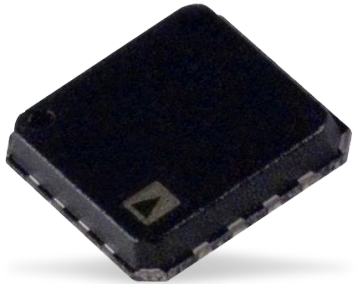


Flow diagram



Temperature Sensor

- The FPGA is equipped with the ADT7420 16-bit temperature sensor
- The sensor inter-communicates via I2C
- No calibration needed, so the output does not need to be altered
- High accuracy temperature sensor

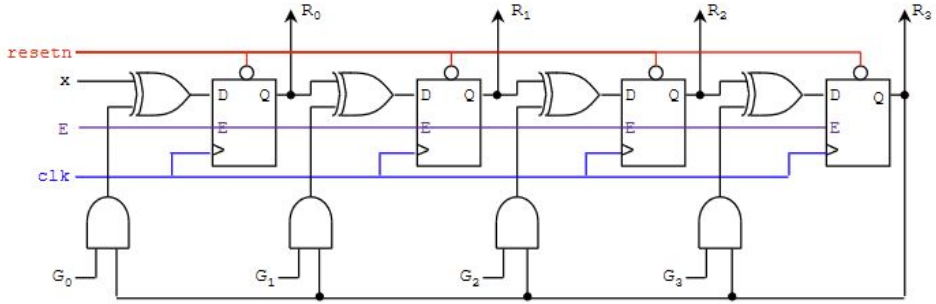


CAN communication

- CAN - Controller Area Network
- Automotive Industry communication standard
- Used widely in the automotive industry, very essential skill for engineers looking into going into the automotive industry
- Start of frame, Arbitration, Control, Data, CRC, end of frame

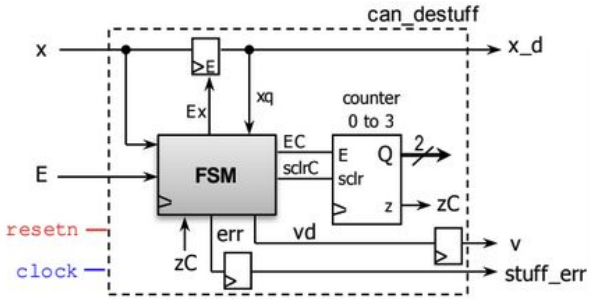
CRC

- Stands for Cyclic redundancy check
- Error detecting code in CAN communication
- Specifically useful when there are multiple CAN modules

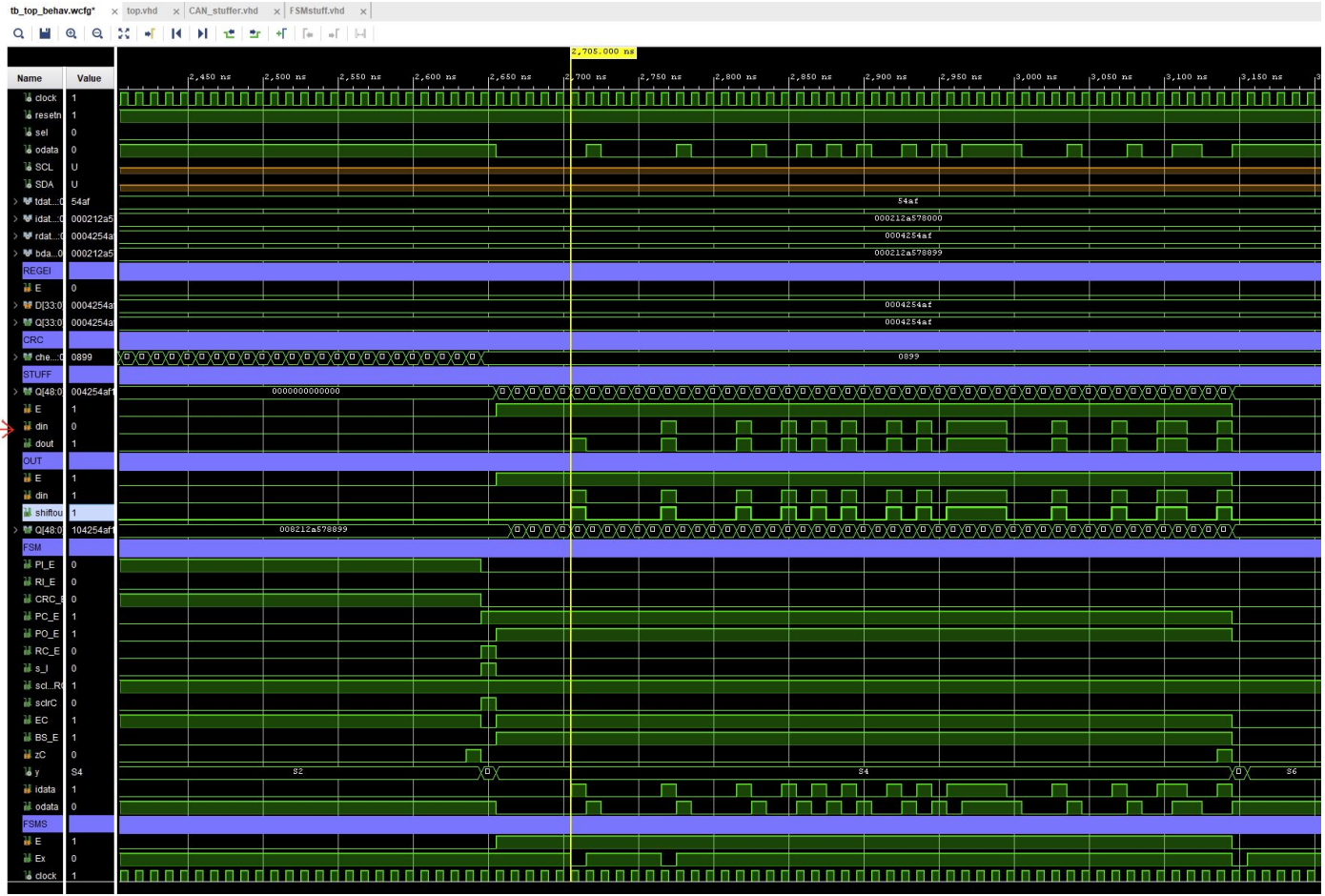


Bit stuffing

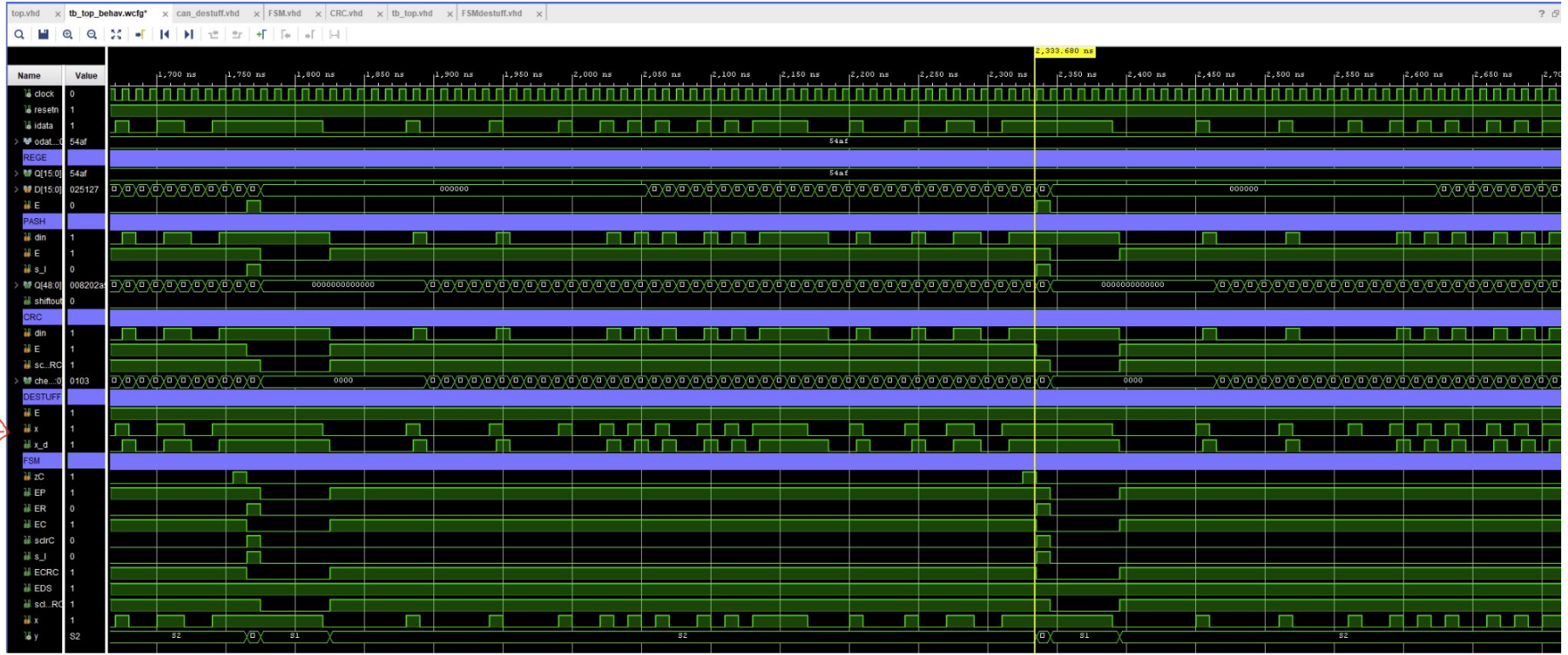
- Insertion of non-information bits
- Used specifically for maintaining the bit size and the bit locations for data when sent over CAN.

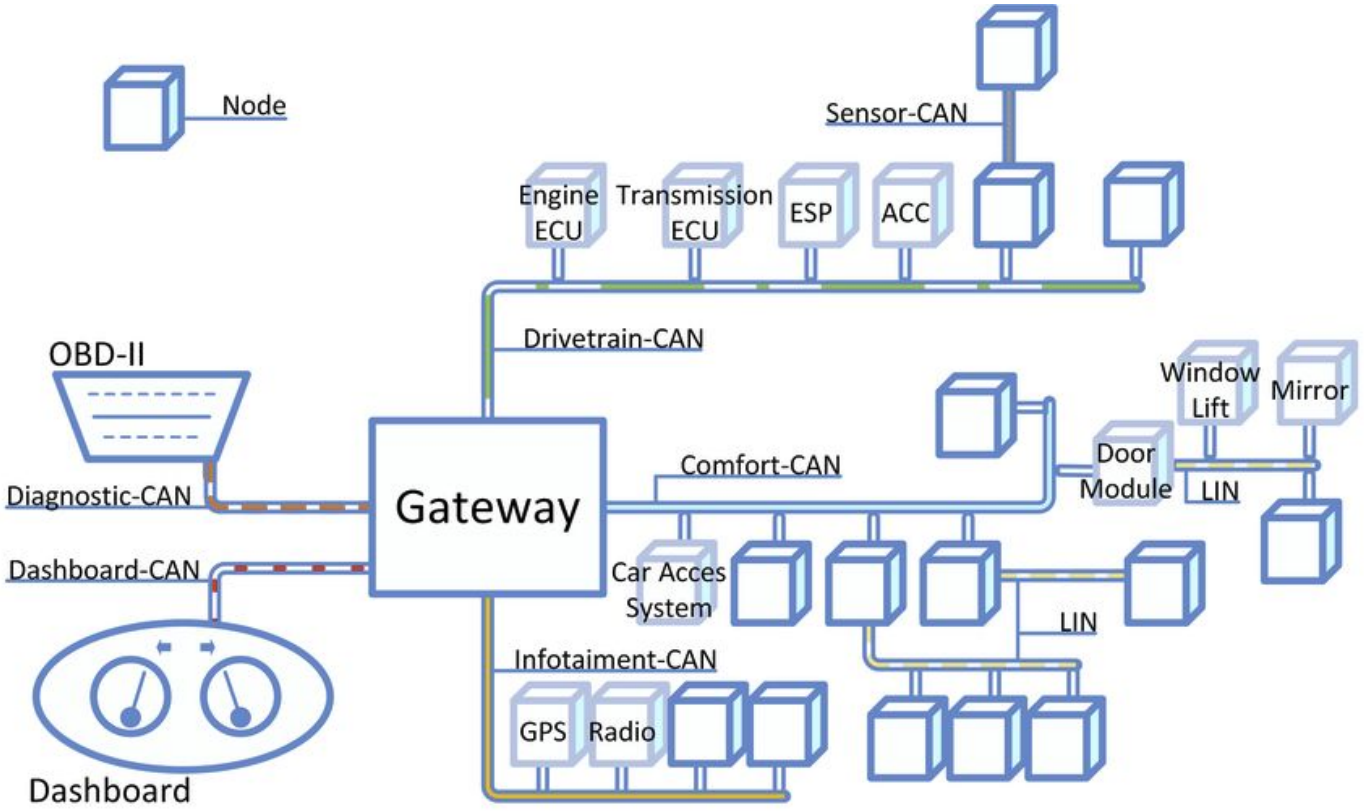


Transmitter Testbench



Receiver Testbench




Node
Sensor-CAN
Engine ECU
Transmission ECU
ESP
ACC
Drivetrain-CAN
OBD-II
Window Lift
Mirror
Door Module
LIN
Comfort-CAN
Diagnostic-CAN
Gateway
Dashboard-CAN
Car Acces System
LIN
Infotaiment-CAN
GPS
Radio
Dashboard

Thank you