



# **TODAY'S TOPIC**



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CAN ERROR HANDLING

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INTRODUCTION TO CAN TOOL CANOE AND INSTALLATION

# CAN ERROR HANDLING



## What are CAN bus errors?

CAN bus errors refers to faults in the CAN bus network, commonly used in automotive and industrial systems for communication between various electronic control units (ECUs).

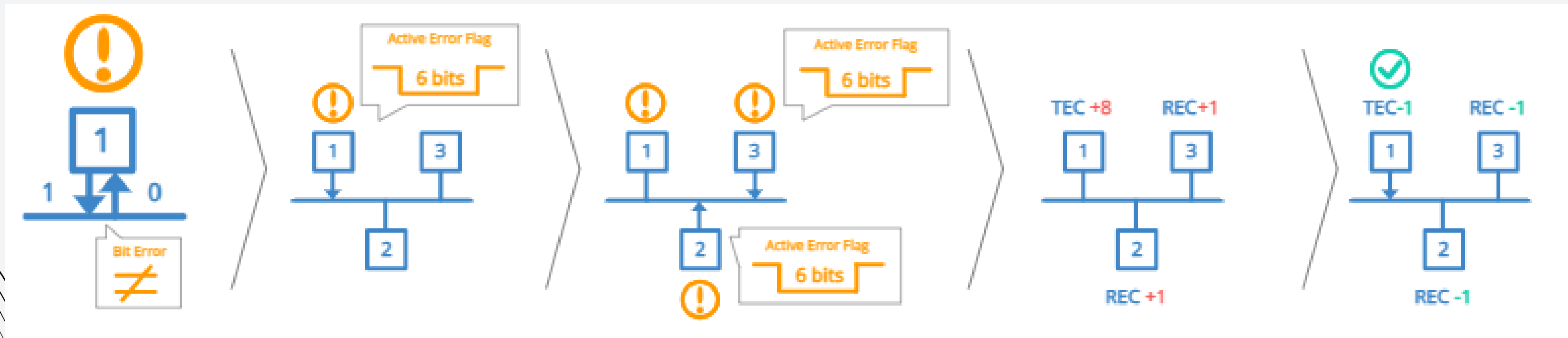
## WHY CAN bus errors?



Error handling is vital to the robustness of CAN.

# CAN ERROR HANDLING

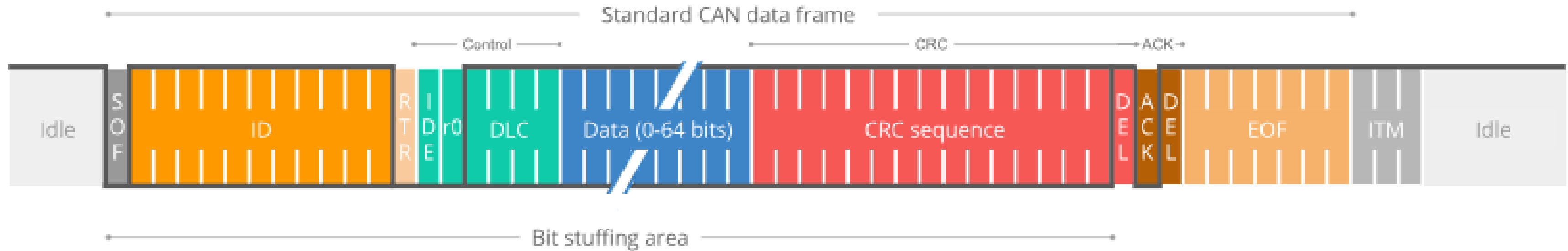
How does CAN error handling work?



Error handling is a built-in part of the CAN standard and every CAN controller. In other words, every CAN node handles fault identification and confinement identically.

# CAN ERROR HANDLING

The CAN bus error frame?



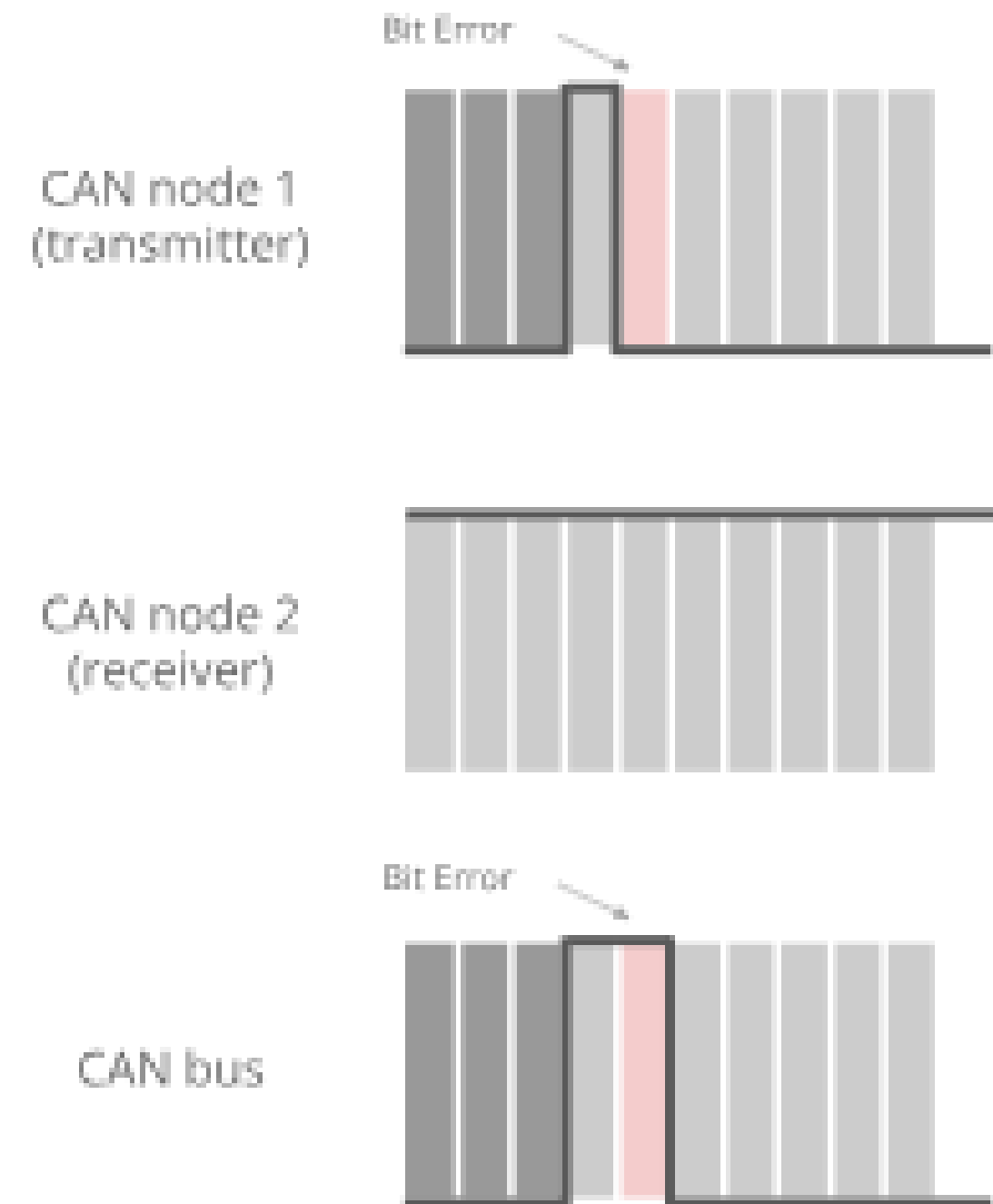
# CAN ERROR HANDLING

## Type of CAN errors?

### #1 Bit Error

If the bit transmitted and the bit received are not of the same value, a "bit error" occurs.

#### Example: CAN Bus Bit Error



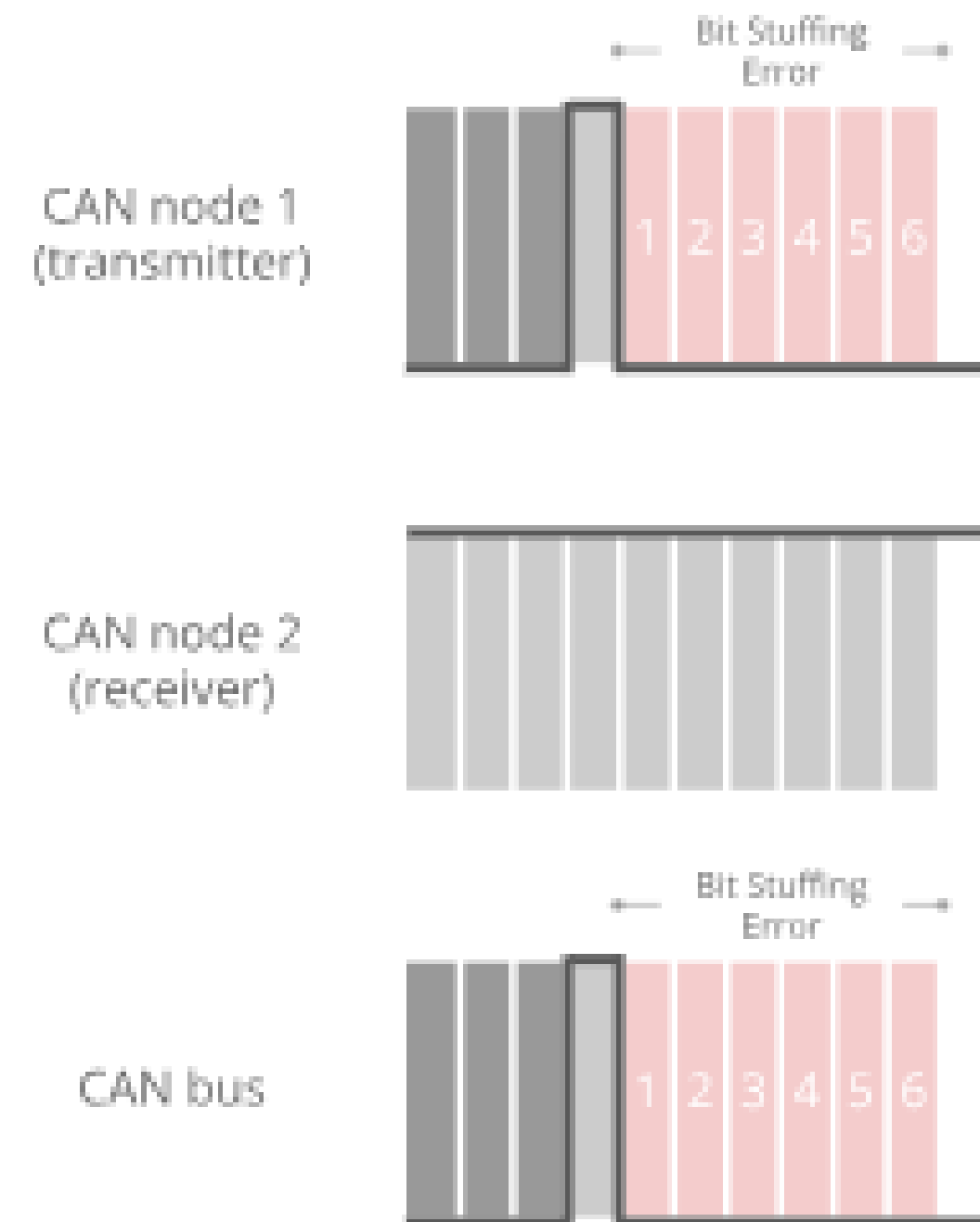
# CAN ERROR HANDLING

## Type of CAN errors?

### #2 Bit Stuffing Error

Following the bit stuffing process, if more than five consecutive bits of the same level occur on the Bus, a "Stuff Error" is signalled.

Example: CAN Bus Bit Stuffing Error



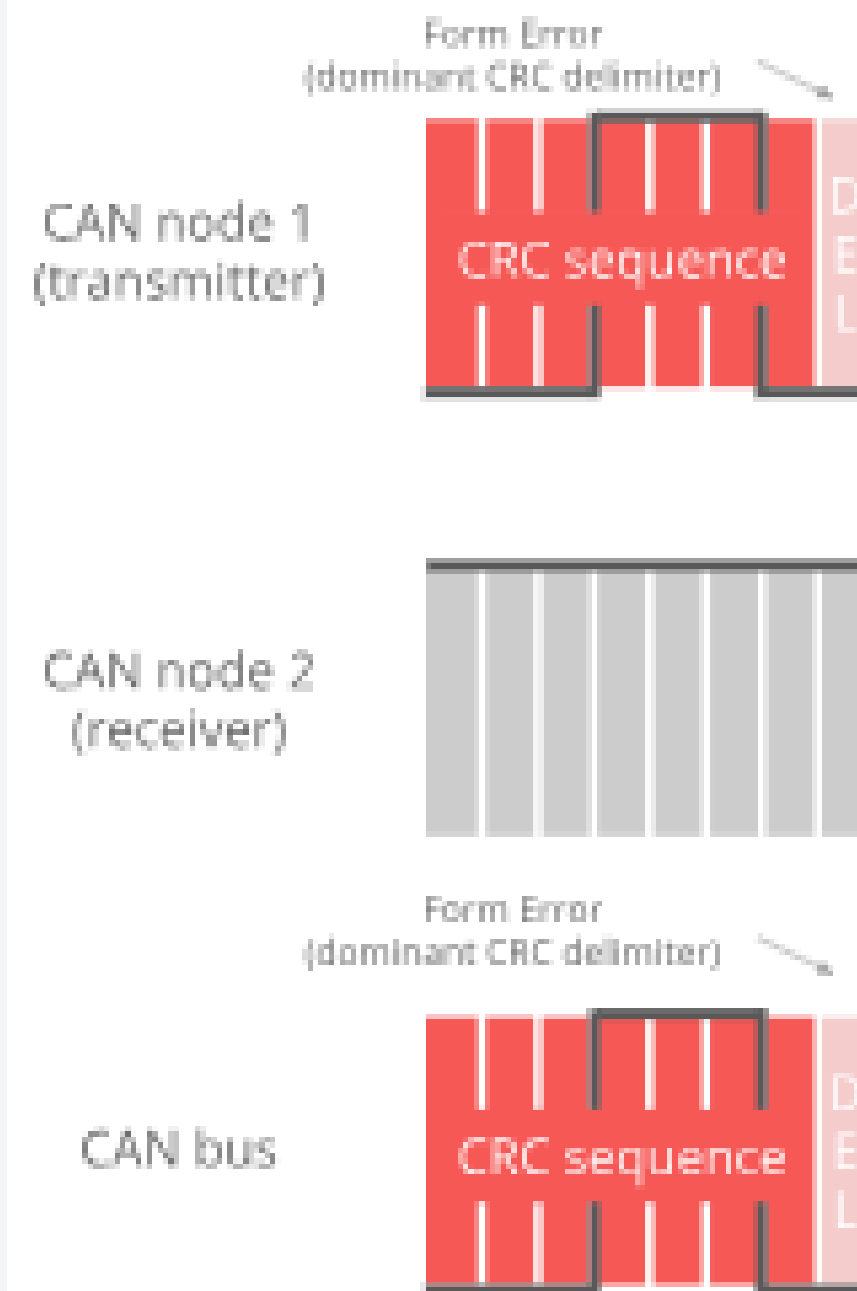
# CAN ERROR HANDLING

## Type of CAN errors?

### #3 Form Error

Violation of fixed bit format results in a Form Error. E.g. CRCD, ACKD, EOF have to be recessive bits, and the presence of any dominant bit will automatically be treated as a Form Error.

#### Example: CAN Bus Form Error





# CAN ERROR HANDLING

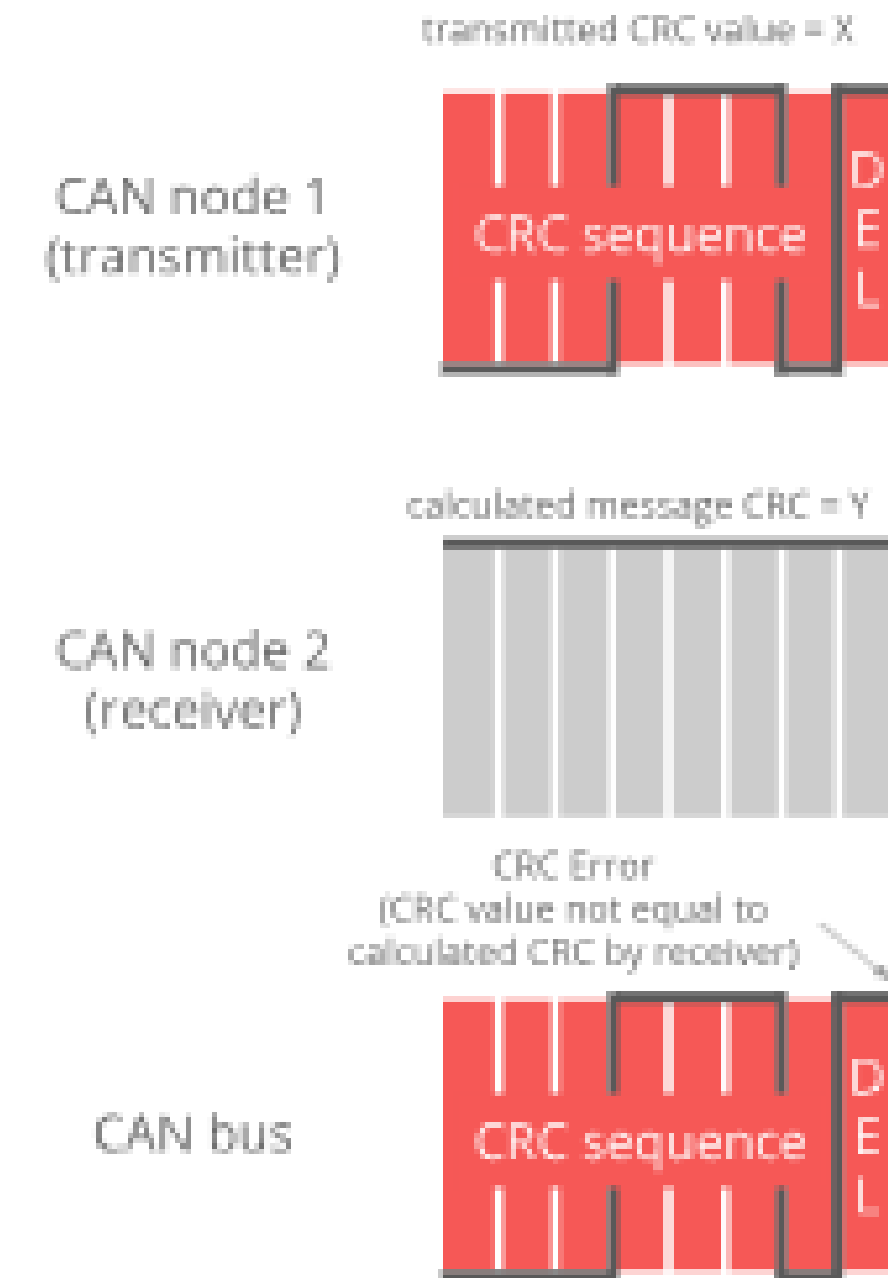
## Type of CAN errors?

### #4 CRC Error

The receiving node then calculates a 15-bit number based on the payload it receives on its own.

If the received CRC does not match with the calculated code, the receiver knows that the 8 bytes of the payload were corrupted or modified during transmission, known as CRC Error.

#### Example: CAN Bus CRC Error



# CAN ERROR HANDLING

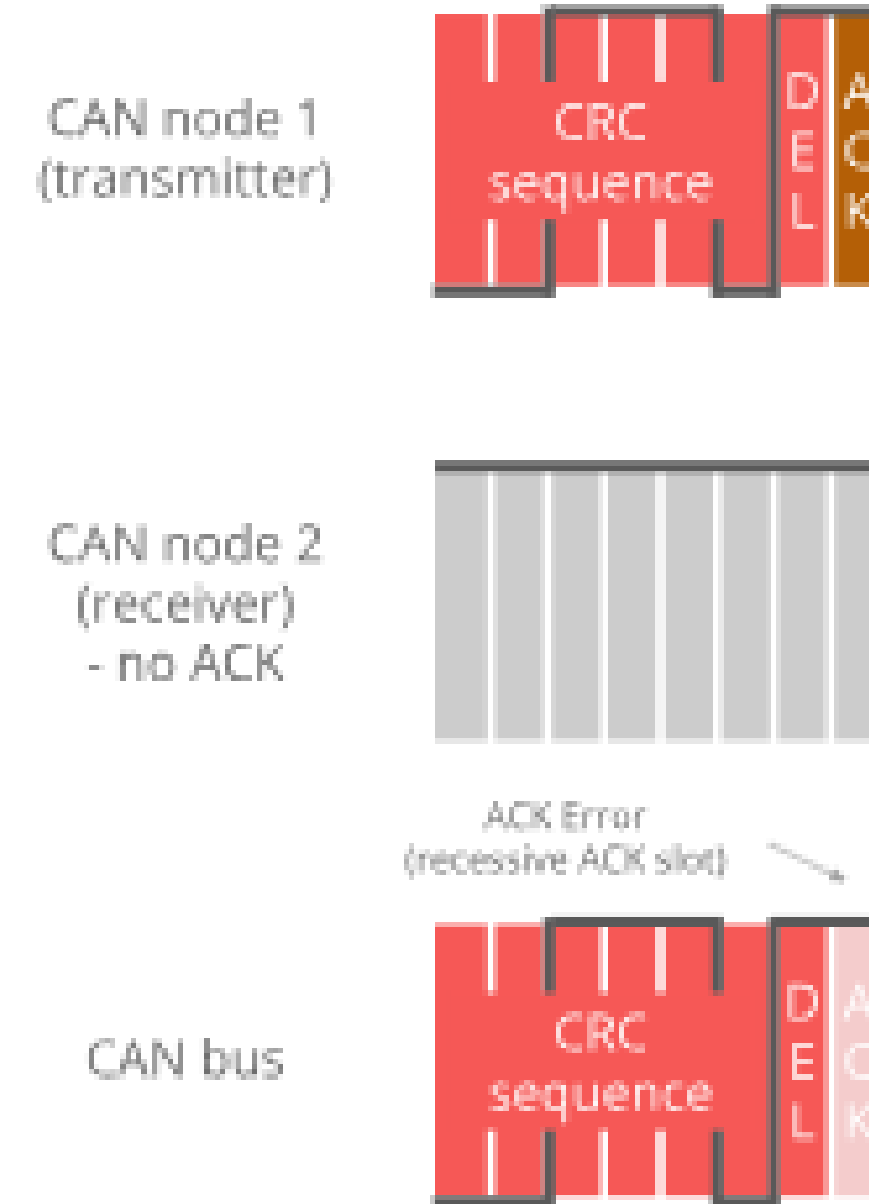
## Type of CAN errors?

### #5 ACK Error

The ACK bit is a defined recessive "1" (transmitted by the transmitter node), and the reply from the receiver is a defined dominant "0".

if that is not the case and the transmitter does not receive a dominant acknowledgement bit in reply, it is termed ACK Error.

#### Example: CAN Bus ACK Error

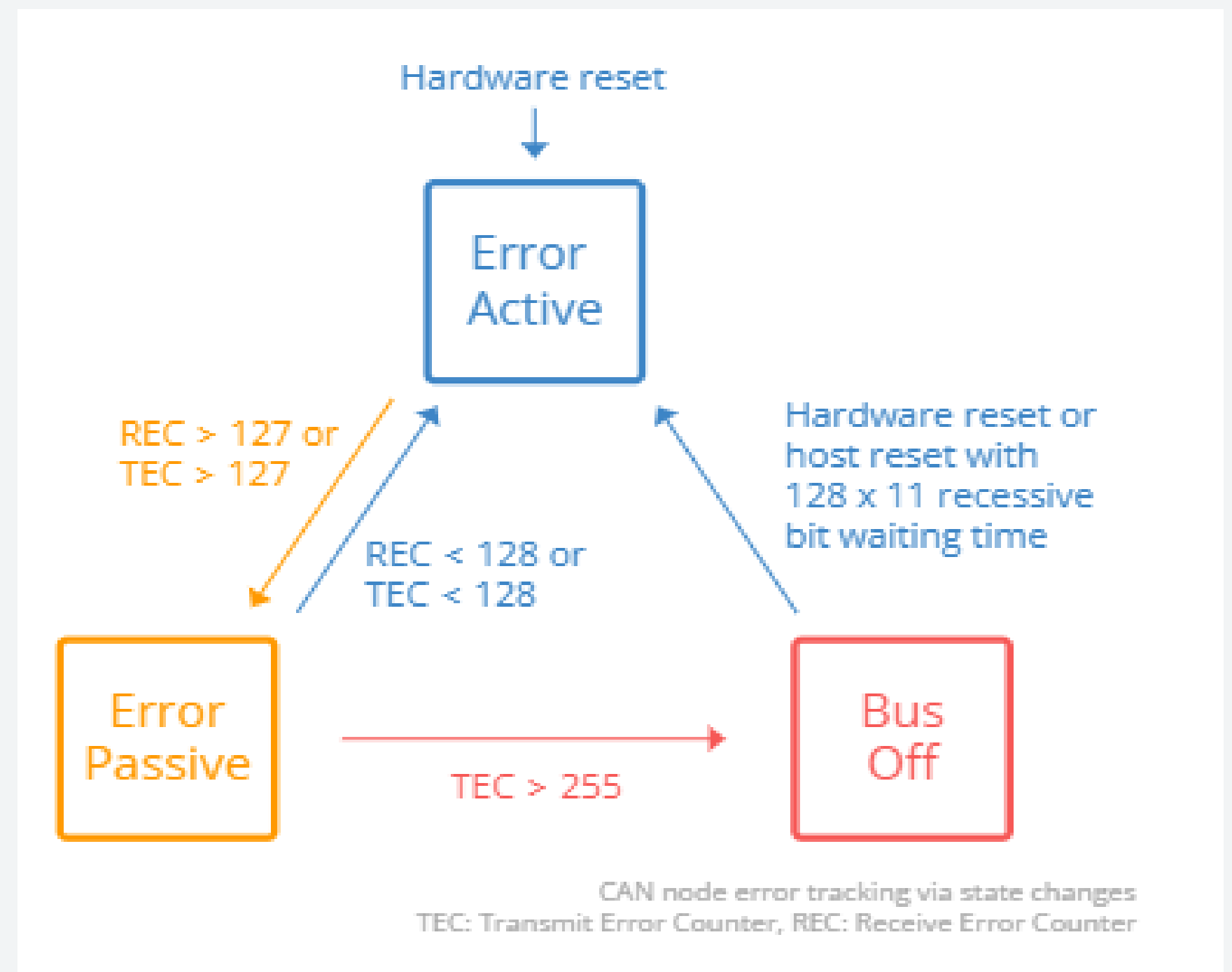


# CAN ERROR HANDLING

## CAN node states & error counters?

### #1 Error Active

This is the default state of every CAN node, in which it is able to transmit data and raise 'Active Error Flags' when detecting errors

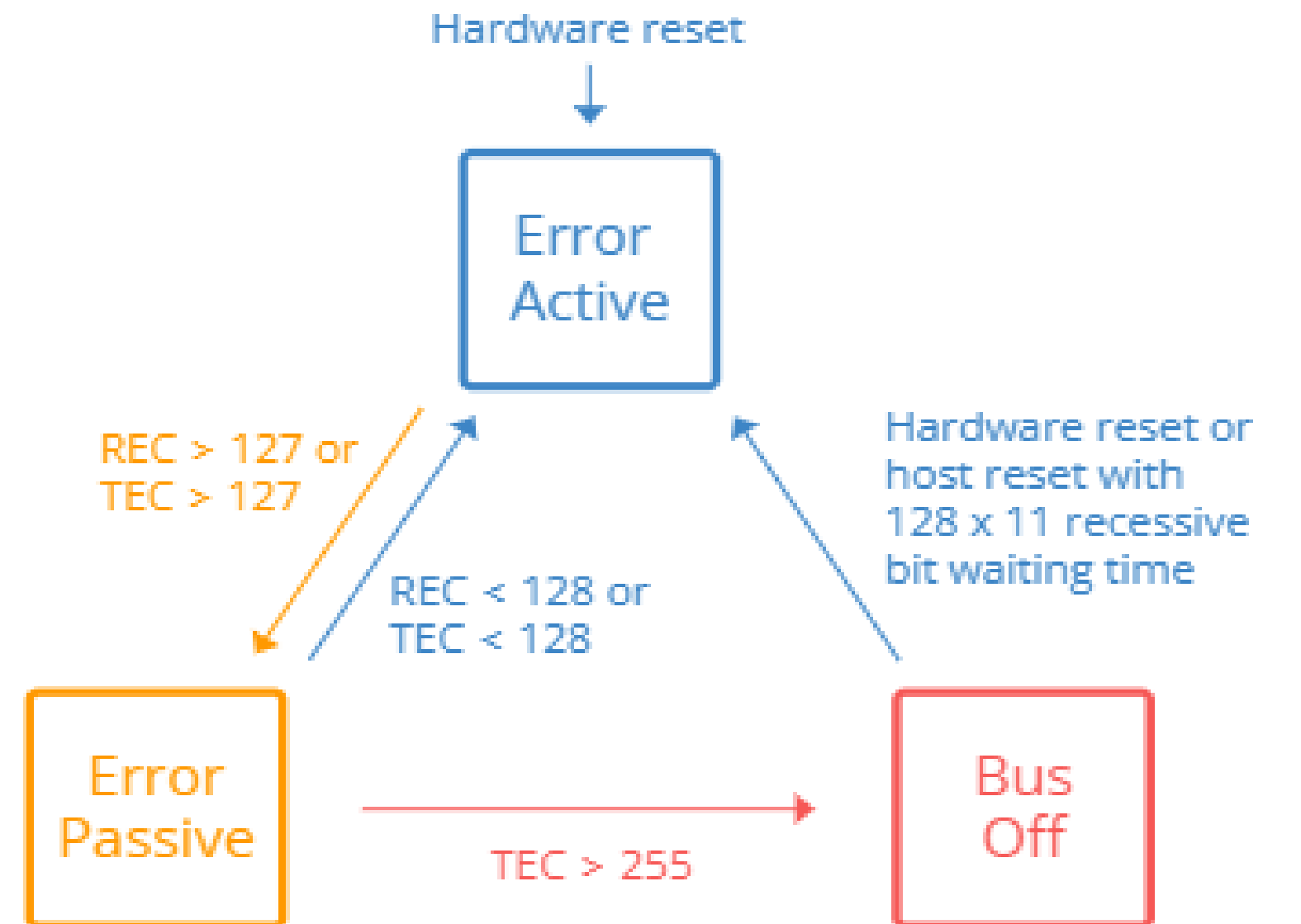


# CAN ERROR HANDLING

## CAN node states & error counters?

### #2 Error Passive

In this state, the CAN node is still able to transmit data, but it now raises 'Passive Error Flags' when detecting errors.



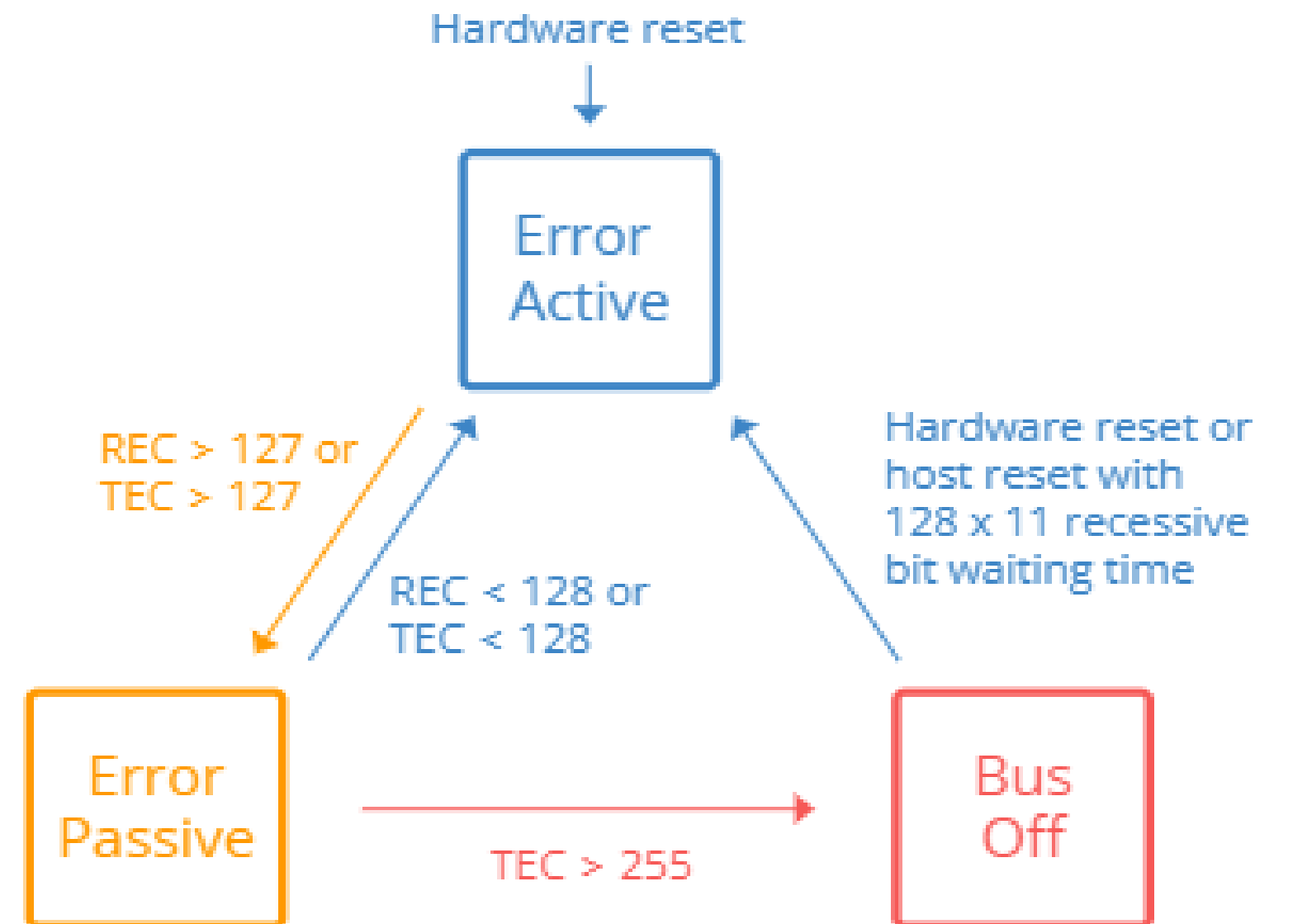
CAN node error tracking via state changes  
TEC: Transmit Error Counter, REC: Receive Error Counter

# CAN ERROR HANDLING

## CAN node states & error counters?

### #3 Bus Off

In this state, the CAN node disconnects itself from the CAN bus and can no longer transmit data or raise error flags

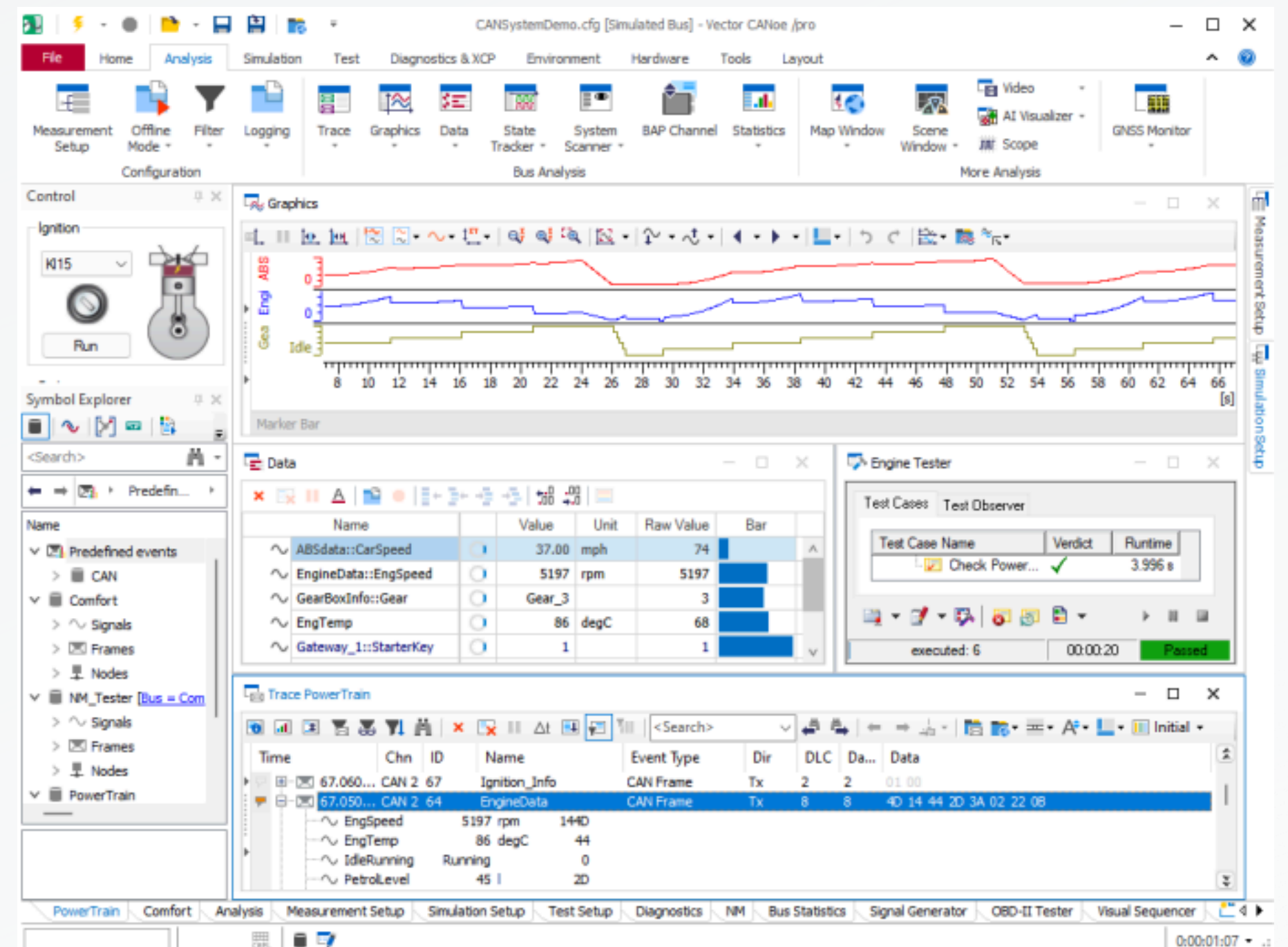


CAN node error tracking via state changes  
TEC: Transmit Error Counter, REC: Receive Error Counter

# INTRODUCTION TO CANOE TOOL CANOE AND INSTALLATION

## What is CANoe?

CANoe is a versatile tool for the development, testing and analysis of entire ECU networks as well as individual ECUs.





# INTRODUCTION TO CAN TOOL CANOE AND INSTALLATION

Execution course?

Create New Configuration(select mapping channel) → Make Iterative Generators

→ Configuration → Add CAN Frame → Select periodic and Run → select Simulated bus

→ select Start button → select Trace and check → Stop → Make DBC

→ Select Node && Select Frame what you send messages → Run && Start and Check Trace