Controller Area Network

Tiva-C

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Tiva-C Controller Area Network Overview

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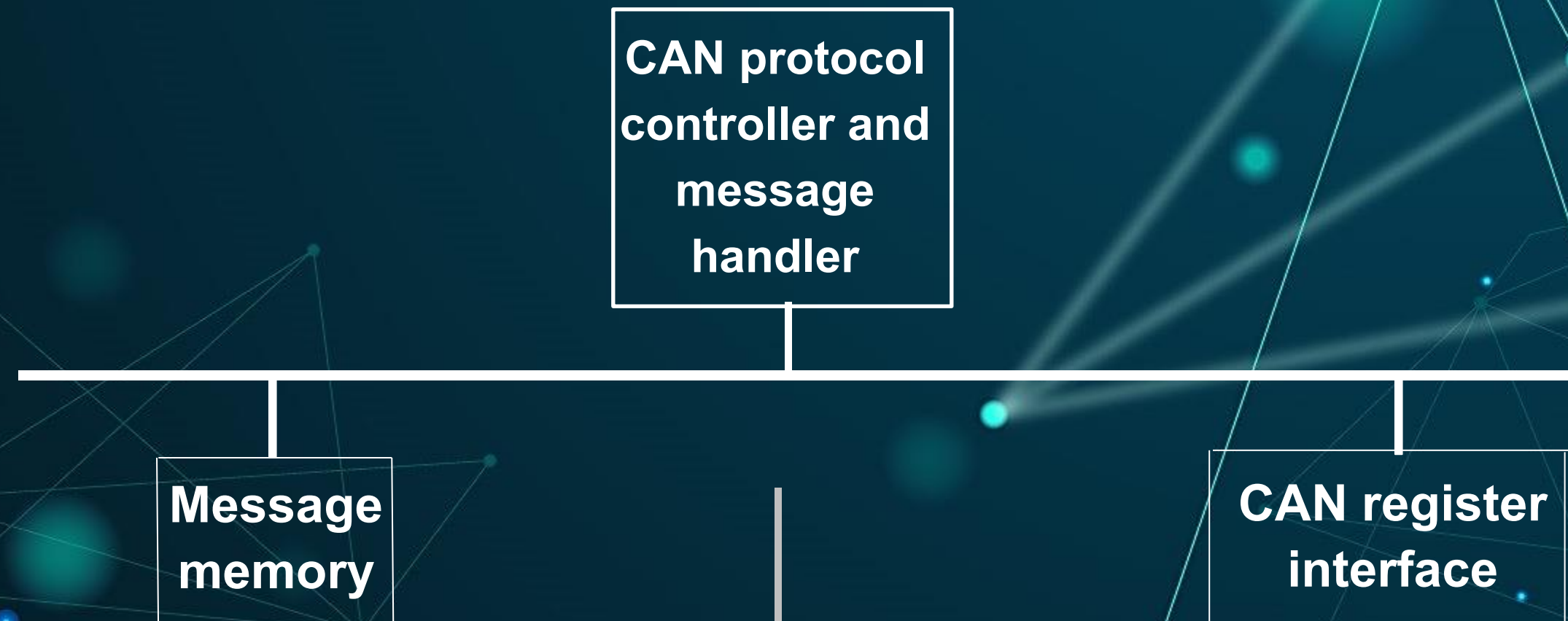
Two CAN Units with some features :

-Bit rates up to 1 Mbps
-32 message objects with individual identifies
  masks
-Maskable interrupt
-Programmable FIFO mode enables storage
  of multiple message
-Attaches to an external CAN transceiver
  through TX,RX
-Programmable loopback mode for self-test
-CAN protocol version 2.0 part A/B
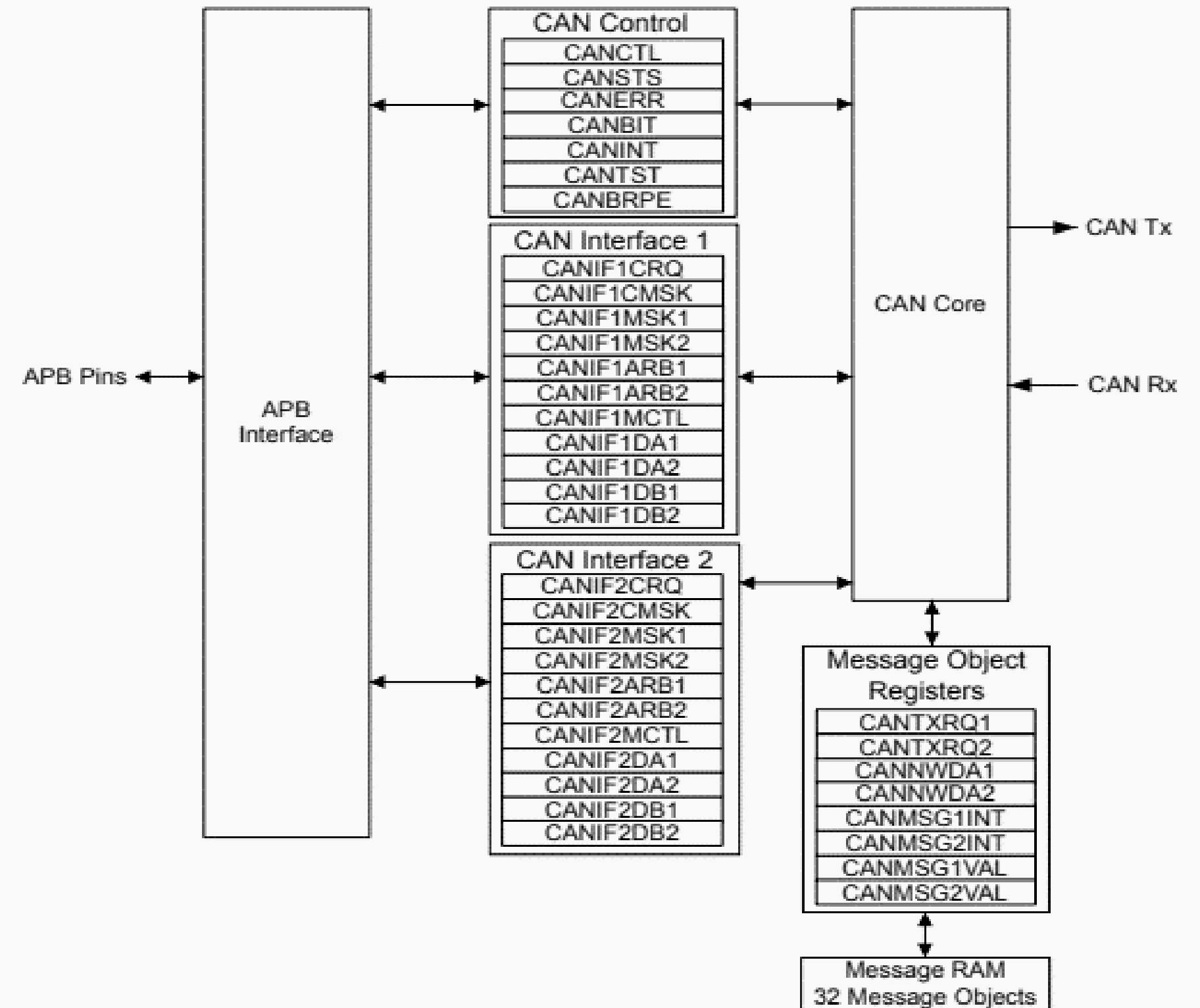
Tiva-C Controller Area Network Overview

Major parts of CAN module

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CAN protocol controller and message handler

Message memory

CAN register interface

It consists of 32 block Save the current configuration ,status and actual data for each message object .this blocks are accessed via CAN register interface.

TM4C123GH6PM CAN controller provides an interface to communicate with message memory via two CAN interface register sets for communicating with the message objects .

Tiva-C Controller Area Network Tx Overview

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1 **Priority Modes**

2 **ID Format**

3 **Frame Types**

Tiva-C Controller Area Network Tx Overview

Priority Modes

ID

Mail box number

The lower number has the highest priority

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ID Format

Standard ID 11 bits

Extended ID 29 bits

CAN module in Tiva-C support Standard/ Extenden ID

Tiva-C Controller Area Network Tx Overview

Frame Types

Remote Frame

Frame that send to request a specific data

Data Frame

Frame that contain data

CAN module in Tiva-C support Remote/ Data

Tiva-C Controller Area Network Tx Overview

Transmission configurations :

1. Set WRNRD bit In CANIFnCMSK to write from CANIF registers to message object
2. Set UMASK bit in CANIFnMCTL to enable MSK bits in CANIFnMSK which identify which message IDs will pass through acceptance filtering
3. MXTD bit in CANIFnMSK2 should be set if message ID is 29-bit.
4. For 11-bit message ID: Configure ID in CANIFnARB2 . For 29-bit message ID: Configure ID in CANIFnARB1 & CANIFnARB2 .
5. (Clear/Set XTD) bit to use standard/extended.
6. Set DIR to transmit in CANIFnARB2
7. Set MSGVAL in CANIFnARB2 to indicate that this message object of MNUM configured in CANIFnCRQ is valid
8. In CANIFnMCTL register: Set EOB bit for a single message object.
9. Configure DLC bits [3:0] to specify data field size (0-8)bytes.
10. Load data to be transmitted in CANIFnDA1,CANIFnDA2, CANIFnDB1 ,CANIFnDB2
11. Program which message object to be addressed in MNUM field in CANIFnCRQ
12. 12. Set TXRQST in CANIFnMCTL and NEWDAT to start transmission

Tiva-C Controller Area Network Rx Overview
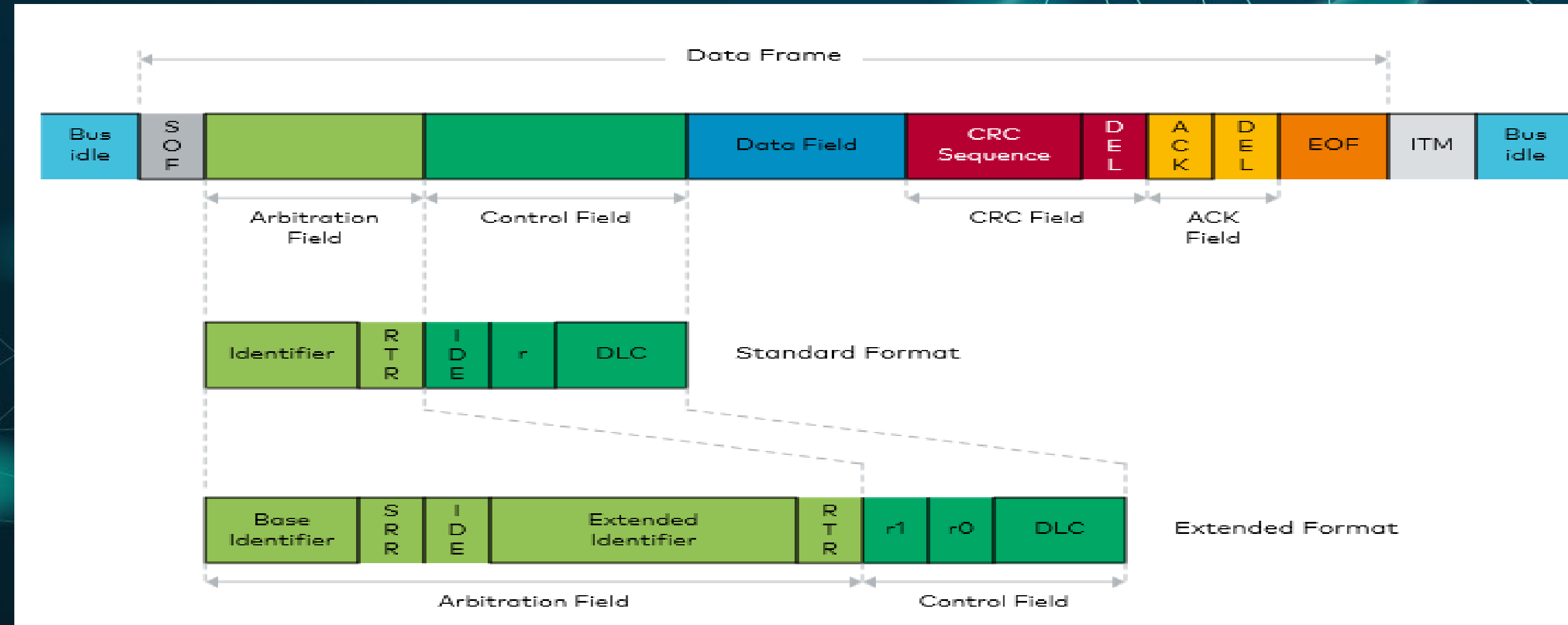
1 **Data/Remote frame**

2 **Filter**

3 **Priority**

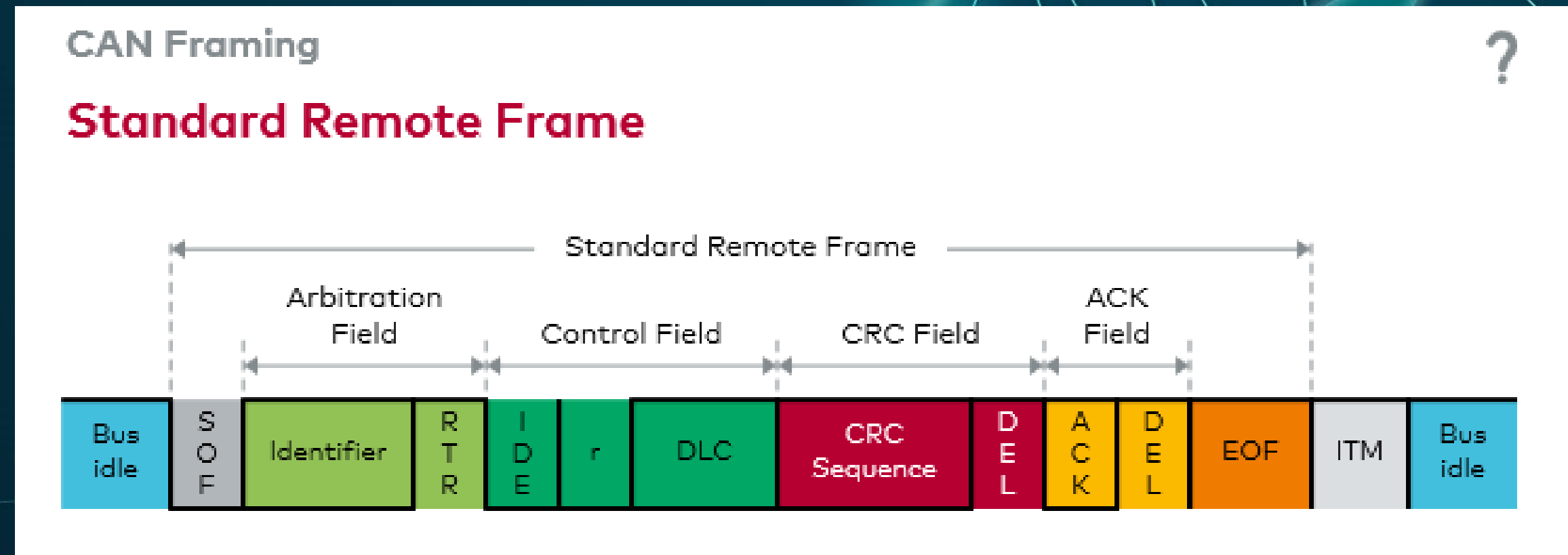# Tiva-C Controller Area Network Rx Overview

Data Frame :

Receiving a Data frame : Message handler stores the message in message RAM via can controller

Tiva-C Controller Area Network Rx Overview

Remote Frame :

Remote frame not contain data but it ask for a specific data
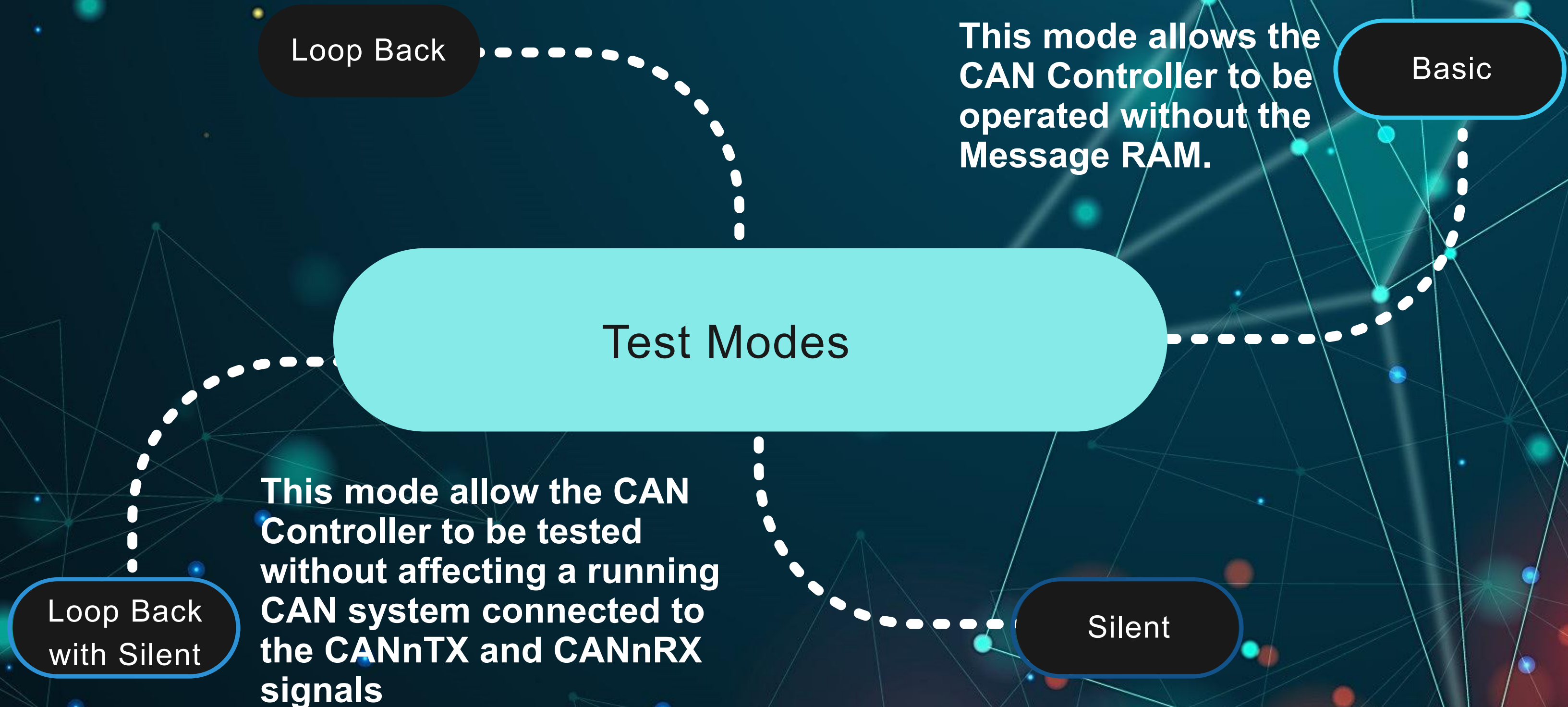
Tiva-C Controller Area Network Rx Overview

Receiving configurations:

1.Same Registers in Transmission Configured for receiving
2. Data found in CANIFnDA1,CANIFnDA2, CANIFnDB1 ,CANIFnDB2 registers
3. polling till the NEWDAT bit is cleared AS , On reading this data from message object this bit is cleared

Tiva-C Controller Area Network Test Modes

Loop Back

This mode allows the CAN Controller to be operated without the Message RAM.

Basic

Test Modes

This mode allow the CAN Controller to be tested without affecting a running CAN system connected to the CANnTX and CANnRX signals

Loop Back with Silent

Silent

Tiva-C Controller Area Network Test Modes
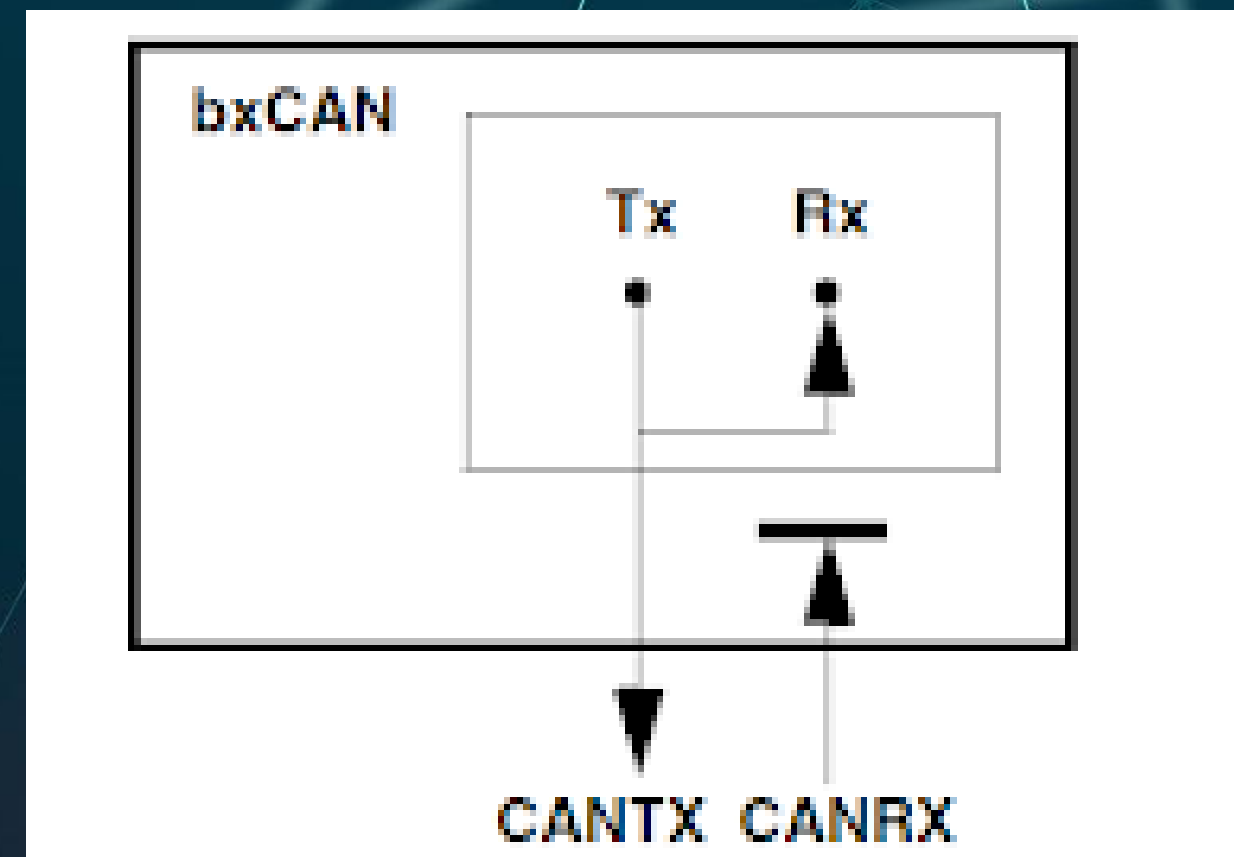
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Silent Mode :

It can be used to analyze the traffic on a CAN bus without affecting it by the transmission of dominant bits in this mode can controller is able to receive valid data frames and valid remote frames.
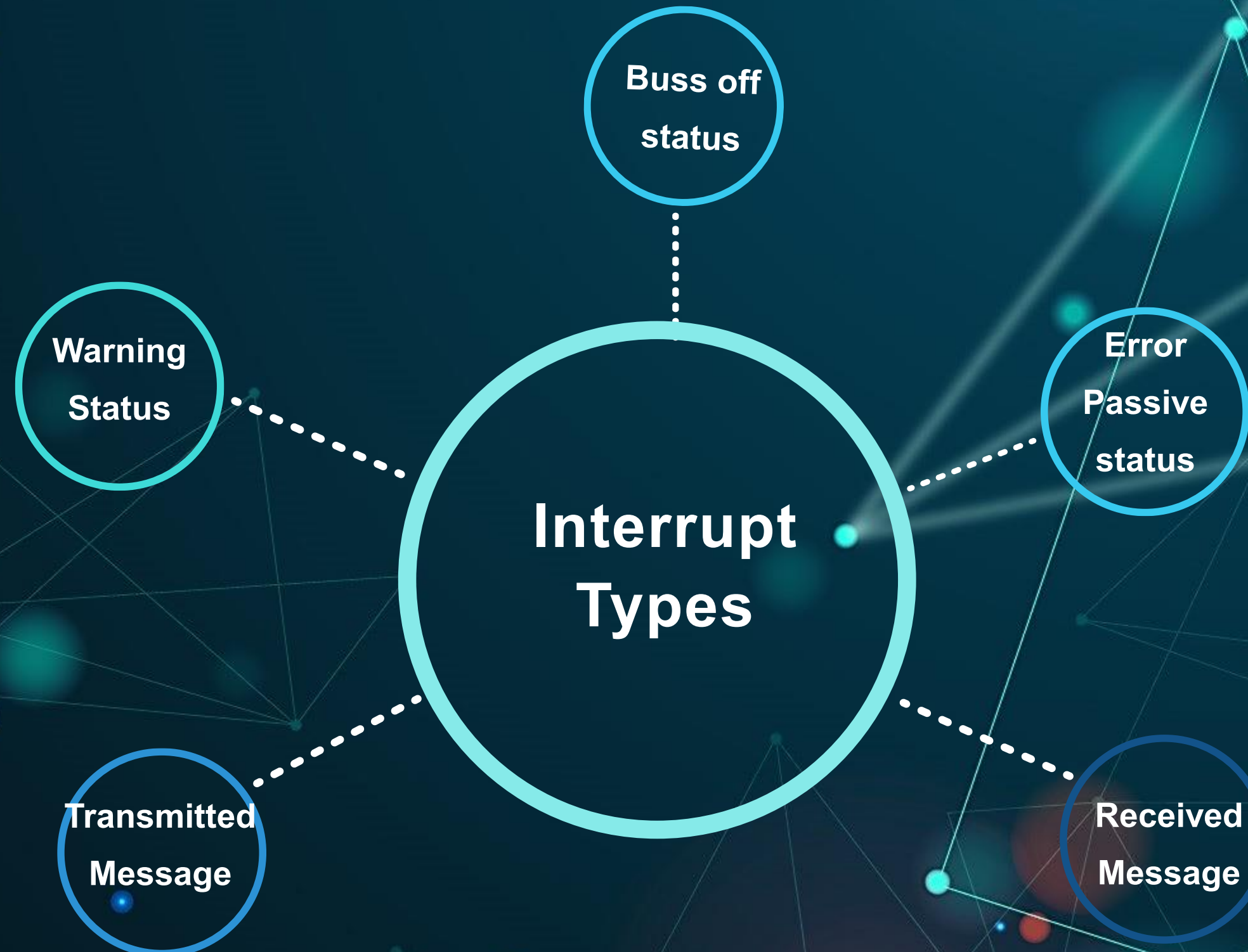
Loop Back Mode :

It is useful for self-test functions. e is useful for self-test functions and treats its own transmitted messages as received messages and stores them

Tiva-C Controller Area Network Interrupt types

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Buss off status

Warning Status

Error Passive status

Interrupt Types

Transmitted Message

Received Message

Thank you