PICmicro® 18C MCU Family Reference Manual Errata Sheet

Clarifications/Corrections to the Reference Manual:

The PICmicro® 18C MCU Family Reference Manual (DS39500**A**) correctly describes the function of the PIC18C MCU family of devices, except for the anomalies described below.

All of the issues listed will be addressed in future releases of the Family Reference Manual.

Errata Summary

All references to Overload Notification, Overload Frame and Overload Flag have been removed from **Section 22.0 "CAN"** (DS39522**A**), as the Overload feature does not exist in the PIC18C MCU family of devices.

1. Page 22-30, Section 22.3.3 "ISO Model"

All references to Overload Notification, Overload Frame and Overload Flag have been removed from **Section 22.3.3 "ISO Model"** on page 22-30 and should be replaced with the following:

22.3.3 ISO Model

The lSO/OSl Reference Model is used to define the layers of protocol of a communication system as shown in Figure 22-2. At the highest end, the applications need to communicate between each other. At the lowest end, some physical medium is used to provide electrical signaling.

The higher levels of the protocol are run by software. Within the CAN bus specification, there is no definition of the type of message or the contents or meaning of the messages transferred. These definitions are made in systems such as Volcano, the Volvo automotive CAN specification; J1939, the U.S. heavy truck multiplex wiring specification; and Allen-Bradly DeviceNet™ and Honeywell SDS, examples of industrial protocols.

The CAN bus module definition encompasses two levels of the overall protocol.

- The Data Link Layer
  - The Logical Link Control (LLC) sub layer
  - The Medium Access Control (MAC) sub layer
- The Physical Layer
  - The Physical Signaling (PLS) sub layer

The LLC sub layer is concerned with Message Filtering and Error Recovery Management. The scope of the LLC sub layer is:

- To provide services for data transfer and for remote data request,
- To decide which messages received by the LLC sub layer are actually to be accepted,
- To provide means for error recovery management.

The MAC sub layer represents the kernel of the CAN protocol. The MAC sub layer defines the transfer protocol (i.e., controlling the Framing, Performing Arbitration, Error Checking, Error Signalling and Fault Confinement). It presents messages received from the LLC sub layer and accepts messages to be transmitted to the LLC sub layer. Within the MAC sub layer, it is decided whether the bus is free for starting a new transmission or whether a reception is just starting. The MAC sub layer is supervised by a management entity, called Fault Confinement, which is a self-checking mechanism for distinguishing short disturbances from permanent failures. Also, some general features of the bit timing are regarded as part of the MAC sub layer.

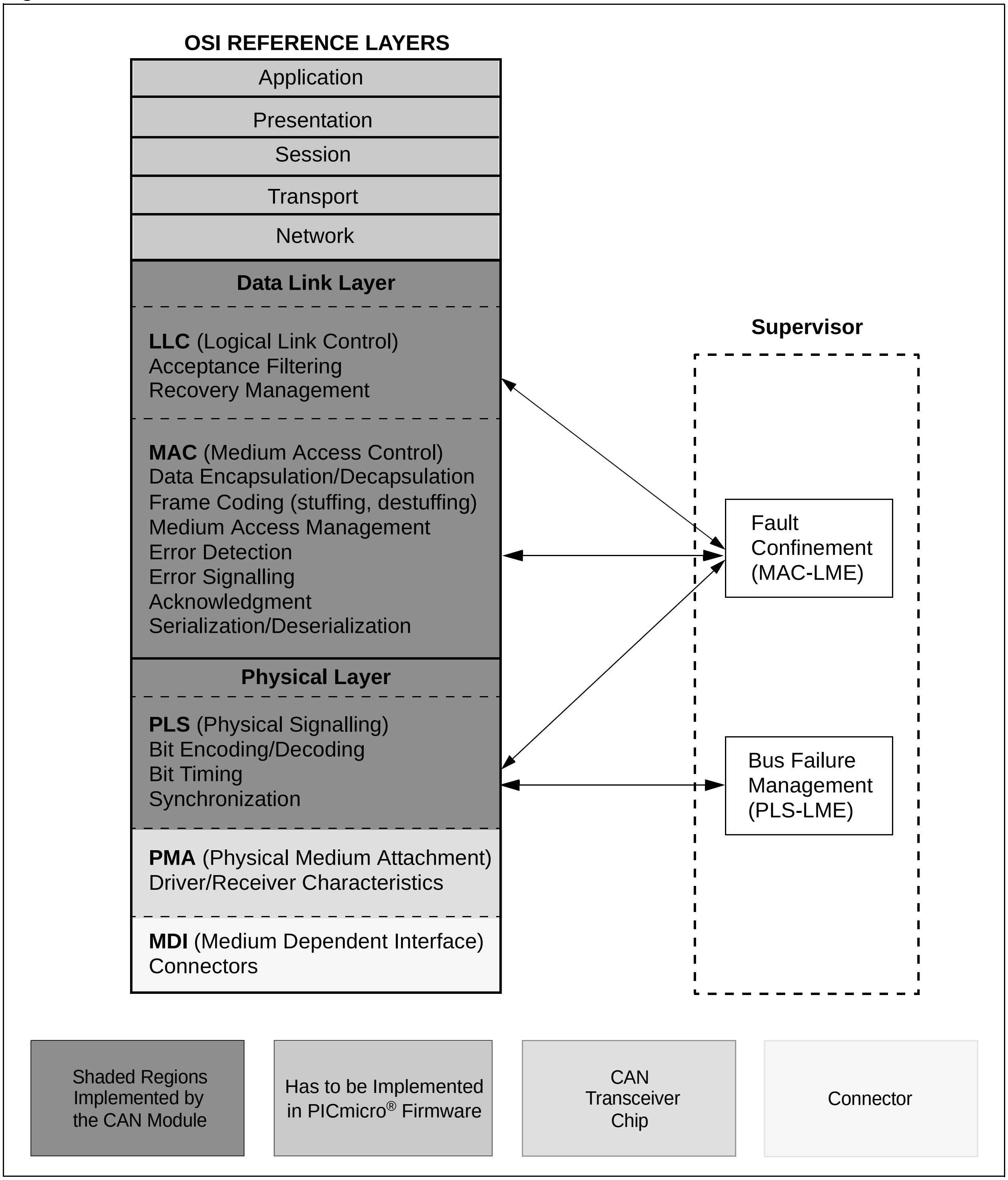
The physical layer defines the actual transfer of the bits between the different nodes with respect to all electrical properties. The PLS sub layer defines how signals are actually transmitted and therefore, deals with the description of Bit Timing, Bit Encoding and Synchronization.

The lower levels of the protocol are implemented in driver/receiver chips and the actual interface, such as twisted pair wiring or optical fiber, etc. Within one network, the physical layer has to be the same for all nodes. The Driver/Receiver Characteristics of the Physical Layer are not defined so as to allow transmission medium and signal level implementations to be optimized for their application. The most common example is defined in ISO11898 Road Vehicles multiplex wiring specification.

2. Page 22-31, Figure 22-2: CAN bus in ISO/OSI Reference Model

All references to Overload Notification, Overload Frame and Overload Flag have been removed from Figure 22-2: CAN bus in ISO/OSI Reference Model on page 22-31 and should be replaced with the following:

Figure 22-2: CAN bus in ISO/OSI Reference Model



3. Page 22-36, Section 22.5.3 "CAN Module Functionality"

All references to Overload Notification, Overload Frame and Overload Flag have been removed from **Section 22.5.3 "CAN Module Functionality"** on page 22-36 and should be replaced with the following:

22.5.3 CAN Module Functionality

The CAN protocol engine handles all functions for receiving and transmitting messages on the CAN bus. Messages are transmitted by first loading the appropriate data registers. Status and errors can be checked by reading the appropriate registers. Any message detected on the CAN bus is checked for errors and then matched against filters to see if it should be received and stored in one of the 2 receive registers.

The CAN module supports the following Frame types:

- Standard Data Frame
- Extended Data Frame
- Remote Frame
- Error Frame
- Interframe Space

Section 22.6 "Frame Types" describes the Frames and their formats.

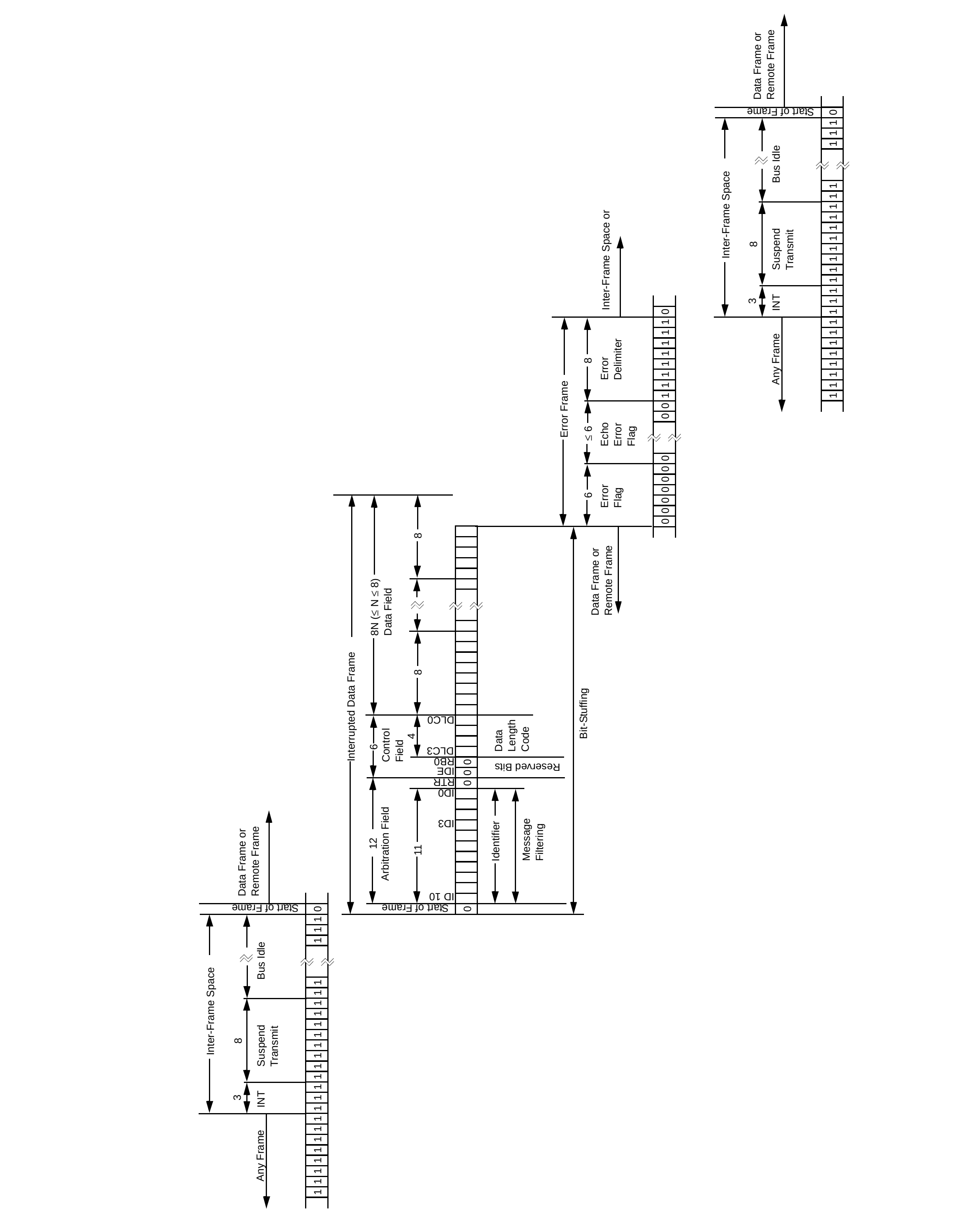
4. Page 22-38, Section 22.6.1.4 "The Overload Frame"

On page 22-38, **Section 22.6.1.4 "The Overload Frame"** should be removed in its entirety.

5. Page 22-42, Figure 22-9: Error Frame

All references to Overload Notification, Overload Frame and Overload Flag have been removed from Figure 22-9: Error Frame on page 22-42 and should be replaced with the following:

Figure 22-9: Error Frame



6. Page 22-43, Figure 22-10: Overload Frame

On page 22-43, Figure 22-10: Overload Frame should be removed in its entirety.

7. Page 22-56, Section 22.9.6.4 "Rules for Modifying the Receive Error Counter"

All references to Overload Notification, Overload Frame and Overload Flag have been removed from **Section 22.9.6.4 "Rules for Modifying the Receive Error Counter"** on page 22-56 and should be replaced with the following:

22.9.6.4 Rules for Modifying the Receive Error Counter

The Receive Error Counter is modified according to the following rules:

- When the receiver detects an error, the Receive Error Counter is incremented by 1, except when the detected error was a Bit Error during the transmission of an Active Error Flag.
- When the receiver detects a "dominant" bit as the first bit after sending an Error Flag, the Receive Error Counter will be incremented by 8.
- If a Receiver detects a Bit Error while sending an Active Error Flag, the Receive Error Counter is incremented by 8.
- Any Node tolerates up to 7 consecutive "dominant" bits after sending an Active Error Flag or a Passive Error Flag. After detecting the 14th consecutive "dominant" bit (in case of an Active Error Flag), or after detecting the 8th consecutive "dominant" bit following a Passive Error Flag and after each sequence of additional eight consecutive "dominant" bits, every Transmitter increases its Transmission Error Counter and every Receiver increases its Receive Error Counter by 8.
- After a successful reception of a message (reception without error up to the ACK slot and the successful sending of the ACK bit), the Receive Error Counter is decreased by 1 if the Receive Error Counter was between 1 and 127. If the Receive Error Counter was 0, it will stay 0. If the Receive Error Counter was greater than 127, it will change to a value between 119 and 127.

8. Page 22-67, Section 22.10.10.4 “Rules for Modifying the Transmit Error Counter”

All references to Overload Notification, Overload Frame and Overload Flag have been removed from **Section 22.10.10.4 “Rules for Modifying the Transmit Error Counter”** on page 22-67 and should be replaced with the following:

22.10.10.4 Rules for Modifying the Transmit Error Counter

The Transmit Error Counter is modified according to the following rules:

- When the Transmitter sends an Error Flag, the Transmit Error Counter is increased by 8 with the following exceptions. In these two exceptions, the Transmit Error Counter is not changed.
  - If the transmitter is “error passive” and detects an Acknowledgment Error because of not detecting a “dominant” ACK and does not detect a “dominant” bit while sending a Passive Error Flag.
  - If the Transmitter sends an Error Flag because a Bit-Stuffing Error occurred during arbitration, whereby the Stuffbit is located before the RTR bit and should have been “recessive”, and has been sent as “recessive” but monitored as “dominant”.
- If a Transmitter detects a Bit Error while sending an Active Error Flag, the Transmit Error Counter is increased by 8.
- Any Node tolerates up to 7 consecutive “dominant” bits after sending an Active Error Flag or a Passive Error Flag. After detecting the 14th consecutive “dominant” bit (in case of an Active Error Flag), or after detecting the 8th consecutive “dominant” bit following a Passive Error Flag and after each sequence of eight additional consecutive “dominant” bits, every Transmitter increases its Transmission Error Counter and every Receiver increases its Receive Error Counter by 8.
- After the successful transmission of a message (getting an Acknowledge and no error until End of Frame is finished), the Transmit Error Counter is decreased by 1 unless it was already 0.

REVISION HISTORY

Rev A Document (10/2004)

Original version of the document. Includes issues 1 (page 22-30), 2 (page 22-31), 3 (page 22-36), 4 (page 22-38), 5 (page 22-42), 6 (page 22-43), 7 (page 22-56) and 8 (page 22-67).

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
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