Up to six CAN FD cores on one micro-controller

Starting with the Aurix family, Infineon offers CAN FD for all its micro-controllers. The CAN FD IP supports up to 64 data bytes and mixing of classical CAN messages and CAN FD messages.

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Starting with the Aurix family, Infineon offers CAN FD for all devices. The CAN FD IP supports up to 64 data bytes and mixing of classical CAN messages and CAN FD messages.

Depending on the device, up to 6 nodes support CAN FD. Typical application use cases like 500 kbit/s arbitration speed and 2 Mbit/s data speed can be realized. The data segment can be used up to 5 Mbit/s. CAN FD frames can include up to 64 data bytes.

With Aurix, MultiCAN+ has been introduced, which is a further development of the MultiCAN module. The module has always supported features like automatic rerouting of messages (gateway mode) and flexible Fifo structures. All devices come with an asynchronous clock input for the bit-rate clocking, enabling the nodes to be driven by either the system clock, directly from an oscillator, or by the precise ERAYPLL configured to 80 MHz. Each message object can take part in a receive time-out. The receive time-out counter exists once per node. This opens the possibility to react if a specific message no longer arrives. In automotive applications this message is part of the network management messages. To trigger messages in equidistant time distances, three messages per node can be configured to be transmitted automatically. For example in case of an operating system alarm, the contents of the message objects can be updated.

Figure 1: Aurix can mix classic CAN and CAN FD messages

After the execution of the interrupt, the CPU gets the IDLE instruction and goes back in IDLE mode. By using this feature, the transmit request is set by the module at the right point in time. As an interrupt can be triggered on a received message, these functions can be used to support pretended networking.

CAN FD integration into CAN nodes

The integration of the CAN FD protocol is quite straightforward: After enabling the module, the device remains in classical CAN mode. CAN FD can be enabled for every single node. Only in case CAN FD is enabled for the node, the registers additionally needed for CAN FD become active and can be programmed. Once enabled, bit timing can be configured for arbitration and data phase separately. The transmitter delay compensation is configurable automatically or manually, dependent on the setting.

Figure 2: Overview over the Aurix family

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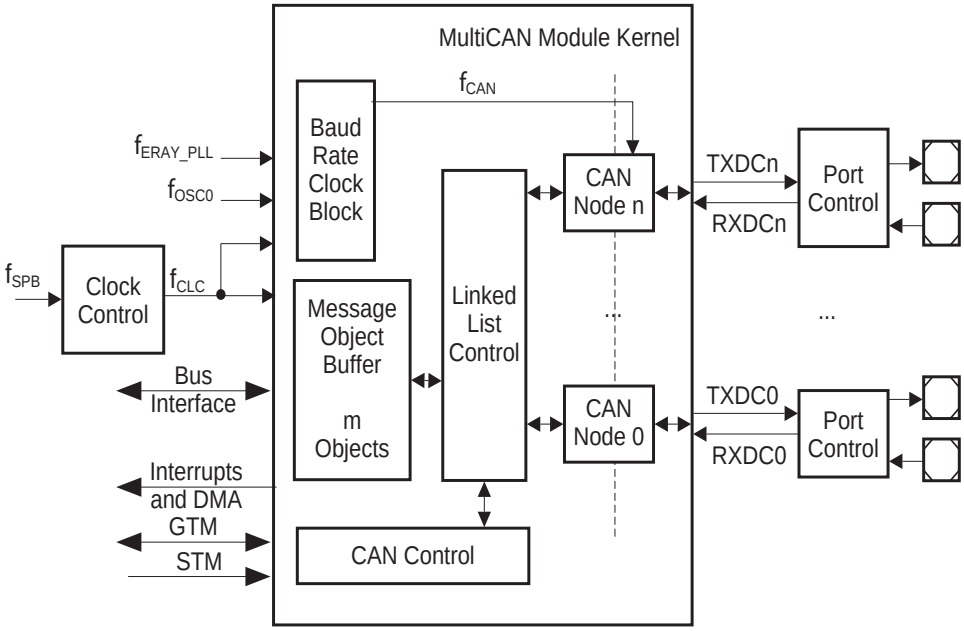

Figure 3: Structure of the MultiCAN+ module

CAN FD integration into the message structure

The Linked List Structure enables the integration of 64 bytes. If the additional bytes are enabled for a message object, the message object itself points to the additional message objects used as data space. A concatenation of three message objects gives the 64 bytes needed for example for a flashing application.

In every message object chosen for transmission, the message can be configured to be sent in classical CAN mode or in CAN FD mode. For example ISO 11898-6 compliant devices, so called partial networking transceivers, still need the classical CAN mode, whereas the rest of the bus might run with CAN FD. Inside every message object the mode can also be configured, if bit-rate switching is used.

The same bits used for configuration in case of transmission are used as status bits for reception. This enables software to check if the message has been received in the right mode. If not, the application layer can react accordingly.

The MultiCAN+ implementation used in the Aurix family enables CAN FD with 64 data bytes. Mixing of classical CAN messages and CAN FD messages is supported. The module enables pretended and partial networking for automotive applications. ◀