Canutil
Library documentation

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Author :	**BRS**
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DOCUMENT AMENDMENT RECORD

Author	Issue	Date	Reason for change
BRS	**1.0**	**28/10/2011**	**Initial version**
BRS	**1.1**	**17/10/2018**	**New symbols defined**

Table of contents

1. PREREQUISITES

This library must be used in conjunction with MCP2510 library:

```
#include <MCP2510.h>
#include <Canutil.h>
```

2. CONSTRUCTOR

```
MCP2510         can_dev(9);
Canutil         canutil(can_dev);
```

3. MODE SELECTION ROUTINES

3.1 setOpMode(opMode)

```
//*************************************************************
// sets operating mode
// argument: uint8_t opMode
//  opMode = OPMODE_NORMAL , OPMODE_SLEEP , OPMODE_ LOOPBACK ,
// OPMODE_LISTEN_ONLY , OPMODE_CONFIG
// returns: nothing
//*************************************************************
Example:        canutil.setOpMode(OPMODE_NORMAL);
```

3.2 whichOpMode()

```
//*************************************************************
// requests operating mode
// argument: none
//
// returns: uint8_t operating mode number
// 0: normal, 1: sleep, 2: loopback, 3: listen only, 4: configuration
//*************************************************************
Example:        opmode = canutil.whichOpMode();
```

3.3 waitOpMode(opMode)

```
//*************************************************************
// waits until the requested operating mode is set
// argument: uint8_t opMode
//  opMode = OPMODE_NORMAL , OPMODE_SLEEP , OPMODE_ LOOPBACK ,
// OPMODE_LISTEN_ONLY , OPMODE_CONFIG
// returns: nothing
//*************************************************************
Example:        canutil.waitOpMode(OPMODE_NORMAL);
```

3.4 setClkoutMode(enable, prescaler)

```
//*************************************************************
// sets CLKOUT pin mode
// argument: uint8_t enable, uint8_t  prescaler
// enable = CLKOUT_DISABLED, CLKOUT_ENABLED
// prescaler = CLKOUT_DIV_1, CLKOUT_DIV_2, CLKOUT_DIV_4, CLKOUT_DIV_8
// returns: nothing
//*************************************************************
```

Example: canutil.ClkoutMode(CLKOUT_ENABLED, CLKOUT_DIV_1) ;

4. RX ROUTINES

4.1 setRxOperatingMode(RRXmode, rollover, buffer)

```
//*************************************************************
// sets RX operating mode
// argument: uint8_t RRXmode, uint8_t rollover, uint8_t buffer
// RXmode = RXMODE_MASKOFF, RXMODE_EXTONLY, RXMODE_STDONLY,
// RXMODE_ALLVALID
//  rollover = ROLLOVER_ENABLE, ROLLOVER_DISABLE
// buffer = RX_BUFFER_0, RX_BUFFER_1
// returns: nothing
//*************************************************************
```

Example: canutil.setRxOperatingMode(RXMODE_STDONLY, ROLLOVER_ENABLE, RX_BUFFER_0);

4.2 setAcceptanceFilter(stdID, extID, extended, filter)

```
//*************************************************************
// sets RX acceptance filter
// argument: unsigned int  standard ID, unsigned long extended ID, uint8_t  extended flag,
uint8_t filter number
// 0 <= stdID <= 2047, 0 <= extID <= 262143,
// extended =  NORMAL_FRAME, EXTENDED_FRAME
// filter number = RX_ACCEPT_FILTER_0, RX_ACCEPT_FILTER_1, RX_ACCEPT_FILTER_2,
//  RX_ACCEPT_FILTER_3, RX_ACCEPT_FILTER_4, RX_ACCEPT_FILTER_5
// returns: nothing
//*************************************************************
```

Example: canutil.setAcceptanceFilter(0x123, 2000, NORMAL_FRAME, RX_ACCEPT_FILTER_5) ;

4.3 setAcceptanceMask(stdID, extID, buffer)

```
//*************************************************************
// sets RX acceptance mask
// argument: unsigned int standard ID, unsigned long extended ID, uint8_t  buffer number
// 0 <= stdID <= 2047, 0 <= extID <= 262143
// buffer number  = RX_BUFFER_0, RX_BUFFER_1
// returns: nothing
//*************************************************************
```

Example: canutil.setAcceptanceMask(0xFF0, 0xFFFFFFFF, RX_BUFFER_1);

4.4 isRtrFrame(buffer)

```
//*************************************************************
// requests if a RTR frame was received
// argument: uint8_t  buffer number
// buffer = RX_BUFFER_0, RX_BUFFER_1
// returns: unsigned int  frame type
// frame type = (0: data frame received, 1: RTR received)
//*************************************************************
```

Example: rtrFrame = canutil.isRtrFrame(RX_BUFFER_0);

4.5 isExtendedFrame(buffer)

```
//*************************************************************
// requests if an extended frame was received
// argument: buffer number
// buffer = RX_BUFFER_0, RX_BUFFER_1
// returns: unsigned int  frame type
// frame type = (0: std frame received, 1: extended received)
//*************************************************************
```

Example: rtrFrame = canutil.isExtendedFrame(RX_BUFFER_0);

4.6 whichStdID(buffer)

```
//*************************************************************
// requests RX buffer standard ID
// argument: uint8_t buffer number
// buffer = RX_BUFFER_0, RX_BUFFER_1
// returns: unsigned int standard ID
//*************************************************************
```

Example: stdID = canutil.whichStdID(RX_BUFFER_0);

4.7 whichExtdID(buffer)

```
//*************************************************************
// requests RX buffer extended ID
// argument: uint8_t buffer number
// buffer = RX_BUFFER_0, RX_BUFFER_1
// returns: long extended ID
//*************************************************************
```

Example: extID = canutil.whichExtdID(RX_BUFFER_0);

4.8

```
//*************************************************************
// requests RX buffer data length
// argument: uint8_t buffer number
// buffer = RX_BUFFER_0, RX_BUFFER_1
// returns: uint8_t number of received bytes in buffer
//*************************************************************
```

Example: dLength = canutil.whichRxDataLength(RX_BUFFER_0);

4.9 receivedDataValue(buffer, byteNum)

```
//*************************************************************
// requests RX buffer data byte
// argument: uint8_t  buffer number, uint8_t  byte number
// buffer = RX_BUFFER_0, RX_BUFFER_1
// 0 <= byte number <= 7
// returns: uint8_t  requested byte value
//*************************************************************
```

Example: rxdata[i] = canutil.receivedDataValue(RX_BUFFER_0, i);

5. TX ROUTINES

5.1 setTxnrtsPinMode(b2rtsm, b1rtsm, b0rtsm)

```
//*************************************************************
// sets TXnRTS pins mode
// argument: uint8_t  B2RTS pin mode, uint8_t  B1RTS pin mode, uint8_t B0RTS pin mode
//BxRTS pin mode= PIN_MODE_ALL_PURPOSE, PIN_MODE_HARD_TX_REQUEST
// returns: nothing
//*************************************************************
```

Example: canutil.setTxnrtsPinMode(PIN_MODE_ALL_PURPOSE, PIN_MODE_HARD_TX_REQUEST, PIN_MODE_ALL_PURPOSE);

5.2 setTxBufferID(stdID, extID, extended, buffer)

```
//*************************************************************
// sets TX buffer ID
// argument: unsigned int  standard ID, unsigned long extended ID, uint8_t  extended flag,
uint8_t  buffer number
// 0 <= stdID <= 2047, 0 <= extID <= 262143,
// extended flag =  NORMAL_FRAME, EXTENDED_FRAME,
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: nothing
//*************************************************************
```

Example: canutil.setTxBufferID(0x123, 2000, EXTENDED_FRAME, TX_BUFFER_0);

5.3 setTxBufferDataLength(rtr, length, buffer)

```
//*************************************************************
// sets TX buffer data length
// argument: uint8_t rtr, uint8_t data length, uint8_t buffer number
// rtr =  SEND_DATA_FRAME, SEND_RTR_FRAME
//  0 <= data length <=8
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: nothing
//*************************************************************
```

Example: canutil.setTxBufferDataLength(SEND_DATA_FRAME, 5, TX_BUFFER_2);

5.4 setTxBufferDataField(data[8], buffer)

```
//*************************************************************
// sets TX buffer data field
// argument: uint8_t  data array, uint8_t  buffer number
// data array: an array of exactly 8 bytes
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: nothing
//*************************************************************
```

Example: canutil.setTxBufferDataField(toSend, TX_BUFFER_2);

5.5 messageTransmitRequest(txbuffer, transmit, priority)

```
//*************************************************************
// requests transmission of a message
// argument: uint8_t  buffer number, uint8_t  transmit request, uint8_t  priority
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// transmit request = TX_ABORT, TX_REQUEST
// priority = TX_PRIORITY_LOWEST, TX_PRIORITY_LOW, TX_PRIORITY_HIGH, TX_PRIORITY_HIGHEST
// returns: nothing
//*************************************************************
```

Example: canutil.messageTransmitRequest(TX_BUFFER_2, TX_REQUEST, TX_PRIORITY_HIGH) ;

5.6 isMessagePending(buffer)

```
//*************************************************************
// asks if a message is pending transmission in a particular buffer
// argument: uint8_t  buffer number
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: uint8_t  message status
// message status = (0: message sent, 1: transmission pending)
//*************************************************************
```

Example: txstatus = canutil.isMessagePending(TX_BUFFER_1);

5.7 isTxError(buffer)

```
//*************************************************************
// asks for TX error
// argument: uint8_t  buffer number
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: uint8_t  TX error
// TX error = (0: no bus error, 1: bus error)
//*************************************************************
```

Example: txstatus = canutil.isTxError(TX_BUFFER_1) ;

5.8 isArbitrationLoss(buffer)

```
//*************************************************************
// asks for arbitration loss
// argument: uint8_t  buffer number
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: uint8_t  MLOA
// MLOA = (0: OK, 1: message lost arbitration)
//*************************************************************
```

Example: txstatus = canutil.isArbitrationLoss(TX_BUFFER_1) ;

5.9 isMessageAborted(buffer)

```
//*************************************************************
// asks for message aborted
// argument: uint8_t  buffer number
// buffer number = TX_BUFFER_0, TX_BUFFER_1, TX_BUFFER_2
// returns: uint8_t  ABTF
// ABTF = (0: OK, 1: message aborted)
//*************************************************************
```

Example: txstatus = canutil.isMessageAborted(TX_BUFFER_1) ;

6. OTHER ROUTINES

6.1 flashRxbf()

```
//*************************************************************
// flashes the RXB leds for test purpose
// argument: none
//
// returns: nothing
//*************************************************************
```

Example: canutil.flashRxbf();