canola_axi_slave

Address width: 32

Data width: 32

Base address: 0x00000000

AXI-Lite slave for Canola CAN Controller

1 Register List

#	Name	Mode	Address	Type	Length	Reset
0	STATUS	RO	0x00000000	FIELDS	6	0x0
1	CONTROL	PULSE	0x00000004	FIELDS	10	0x0
2	CONFIG	RW	0x00000008	FIELDS	2	0x0
3	BTL_PROP_SEG	RW	0x00000020	SLV	16	0x7
4	BTL_PHASE_SEG1	RW	0x00000024	SLV	16	0x7
5	BTL_PHASE_SEG2	RW	0x00000028	SLV	16	0x7
6	BTL_SYNC_JUMP_WIDTH	RW	0x0000002C	SLV	3	0x1
7	BTL_TIME_QUANTA_CLOCK_SCALE	RW	0x00000030	SLV	8	0xF
8	TRANSMIT_ERROR_COUNT	RO	0x00000034	SLV	16	0x0
9	RECEIVE_ERROR_COUNT	RO	0x00000038	SLV	16	0x0
10	TX_MSG_SENT_COUNT	RO	0x0000003C	SLV	16	0x0
11	TX_ACK_ERROR_COUNT	RO	0x00000040	SLV	16	0x0
12	TX_ARB_LOST_COUNT	RO	0x00000044	SLV	16	0x0
13	TX_BIT_ERROR_COUNT	RO	0x00000048	SLV	16	0x0
14	TX_RETRANSMIT_COUNT	RO	0x0000004C	SLV	16	0x0
15	RX_MSG_RECV_COUNT	RO	0x00000050	SLV	16	0x0
16	RX_CRC_ERROR_COUNT	RO	0x00000054	SLV	16	0x0
17	RX_FORM_ERROR_COUNT	RO	0x00000058	SLV	16	0x0
18	RX_STUFF_ERROR_COUNT	RO	0x0000005C	SLV	16	0x0
19	TX_MSG_ID	RW	0x00000060	FIELDS	31	0x0
20	TX_PAYLOAD_LENGTH	RW	0x00000064	SLV	4	0x0
21	TX_PAYLOAD_0	RW	0x00000068	FIELDS	32	0x0
22	TX_PAYLOAD_1	RW	0x0000006C	FIELDS	32	0x0
23	RX_MSG_ID	RO	0x00000070	FIELDS	31	0x0
24	RX_PAYLOAD_LENGTH	RO	0x00000074	SLV	4	0x0
25	RX_PAYLOAD_0	RO	0x00000078	FIELDS	32	0x0
26	RX_PAYLOAD_1	RO	0x0000007C	FIELDS	32	0x0

2 Registers

Register 2.1: STATUS - RO (0x00000000)
Status register

unused	ERROR_STATE	TX_FAILED	TX_DONE	TX_BUSY	RX_MSG_VALID	
31 6	5 4	3	2	1	0	
-	0x0	0	0	0	0	Reset

RX_MSG_VALID	Received message is valid
TX_BUSY	Busy transmitting message
TX_DONE	Done transmitting message
TX_FAILED	Transmitting message failed
ERROR_STATE	Error state. b00 = ERROR_ACTIVE, b01 = ERROR_PASSIVE, b1X = BUS_OFF

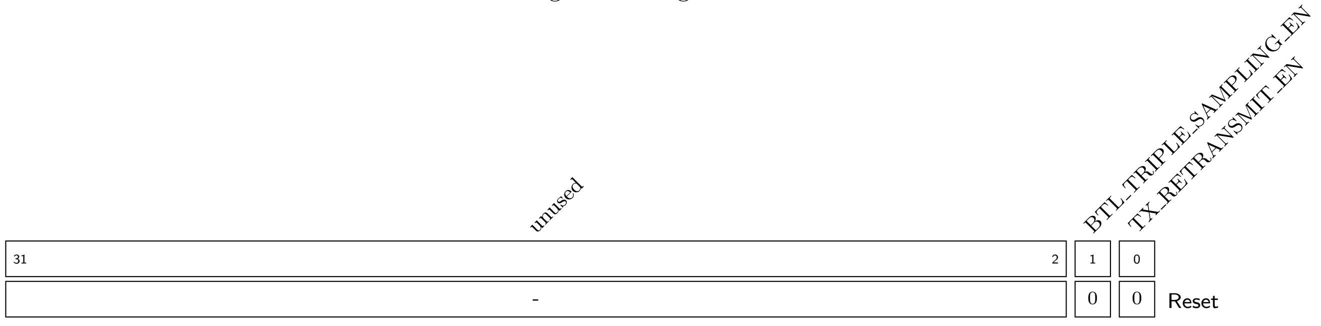
Register 2.2: CONTROL - PULSE FOR 1 CYCLES - (0x00000004)
Control register

unused	RESET_RX_STUFF_ERROR_COUNTER	RESET_RX_FORM_ERROR_COUNTER	RESET_RX_CRC_ERROR_COUNTER	RESET_RX_MSG_RECV_COUNTER	RESET_TX_RETRANSMIT_COUNTER	RESET_TX_BIT_ERROR_COUNTER	RESET_TX_ARB_LOST_COUNTER	RESET_TX_ACK_ERROR_COUNTER	RESET_TX_MSG_SENT_COUNTER	TX_START
31 10	9	8	7	6	5	4	3	2	1	0
-	0	0	0	0	0	0	0	0	0	0

Reset

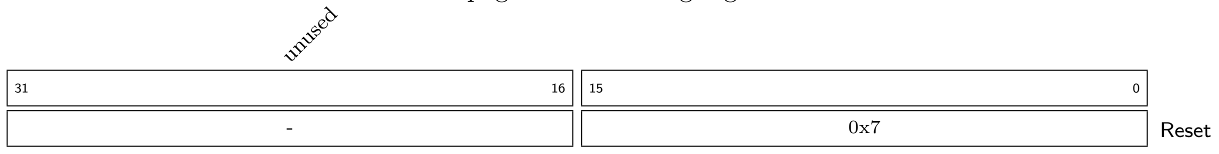
TX_START	Start transmitting message
RESET_TX_MSG_SENT_COUNTER	Reset messages transmitted counter
RESET_TX_ACK_ERROR_COUNTER	Reset Tx acknowledge error counter
RESET_TX_ARB_LOST_COUNTER	Reset Tx arbitration lost counter
RESET_TX_BIT_ERROR_COUNTER	Reset Tx bit error counter
RESET_TX_RETRANSMIT_COUNTER	Reset Tx retransmit counter
RESET_RX_MSG_RECV_COUNTER	Reset messages received counter
RESET_RX_CRC_ERROR_COUNTER	Reset Rx CRC error counter
RESET_RX_FORM_ERROR_COUNTER	Reset Rx form error counter
RESET_RX_STUFF_ERROR_COUNTER	Reset Rx stuff error counter

Register 2.3: CONFIG - RW (0x00000008)
Configuration register

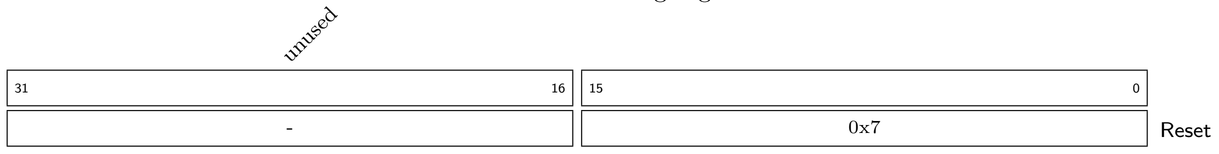


TX_RETRANSMIT_EN	Enable retransmission of messages that failed to send
BTL_TRIPLE_SAMPLING_EN	Enable triple sampling of bits

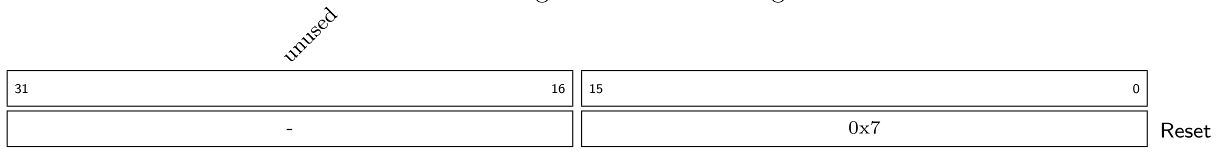
Register 2.4: BTL_PROP_SEG - RW (0x00000020)
Propagation bit timing segment



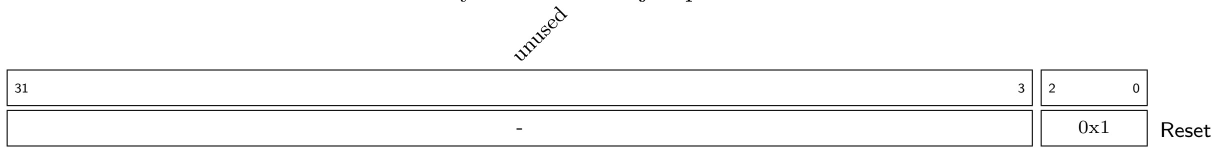
Register 2.5: BTL_PHASE_SEG1 - RW (0x00000024)
Phase 1 bit timing segment



Register 2.6: BTL_PHASE_SEG2 - RW (0x00000028)
Phase segment 2 of bit timing



Register 2.7: BTL_SYNC_JUMP_WIDTH - RW (0x0000002C)
Synchronization jump width



Register 2.8: BTL_TIME_QUANTA_CLOCK_SCALE - RW (0x00000030)
Clock prescale ratio for time quanta generator

unused		
31 8	7 0	
-	0xF	Reset

Register 2.9: TRANSMIT_ERROR_COUNT - RO (0x00000034)
Transmit Error Counter (TEC) of Error Management Logic (EML)

unused		
31 16	15 0	
-	0x0	Reset

Register 2.10: RECEIVE_ERROR_COUNT - RO (0x00000038)
Receive Error Counter (REC) of Error Management Logic (EML)

unused		
31 16	15 0	
-	0x0	Reset

Register 2.11: TX_MSG_SENT_COUNT - RO (0x0000003C)
Number of successfully transmitted messages

unused		
31 16	15 0	
-	0x0	Reset

Register 2.12: TX_ACK_ERROR_COUNT - RO (0x00000040)
Number of transmitted messages where ACK was missing

unused		
31 16	15 0	
-	0x0	Reset

Register 2.13: TX_ARB_LOST_COUNT - RO (0x00000044)
Number of times arbitration was lost while attempting to send message

unused		
31 16	15 0	
-	0x0	Reset

Register 2.14: TX_BIT_ERROR_COUNT - RO (0x00000048)
Number of transmit bit errors (read-back bit didn't match transmitted bit)

unused		
31 16	15 0	
-	0x0	Reset

Register 2.15: TX_RETRANSMIT_COUNT - RO (0x0000004C)
Number attempts at retransmitting messages that failed to send.

unused		
31 16	15 0	
-	0x0	Reset

Register 2.16: RX_MSG_RECV_COUNT - RO (0x00000050)
Number of messages that were successfully received

unused		
31 16	15 0	
-	0x0	Reset

Register 2.17: RX_CRC_ERROR_COUNT - RO (0x00000054)
Number of received messages with CRC error

unused		
31 16	15 0	
-	0x0	Reset

Register 2.18: RX_FORM_ERROR_COUNT - RO (0x00000058)
Number of received messages with form error

unused		
31 16	15 0	
-	0x0	Reset

Register 2.19: RX_STUFF_ERROR_COUNT - RO (0x0000005C)
Number of received messages with stuff error

unused		
31 16	15 0	
-	0x0	Reset

Register 2.20: TX_MSG_ID - RW (0x00000060)
Number of received messages with stuff error

unused	ARB_ID_A	ARB_ID_B	RTR_EN	EXT_ID_EN	
31	30 20	19 2	1	0	
-	0x0	0x0	0	0	Reset

EXT_ID_EN	Transmit message with extended ID
RTR_EN	Remote Transmission Request
ARB_ID_B	Arbitration ID B (extended only)
ARB_ID_A	Arbitration ID A

Register 2.21: TX_PAYLOAD_LENGTH - RW (0x00000064)
Transmit payload length

unused		
31 … 4	3 … 0	
-	0x0	Reset

Register 2.22: TX_PAYLOAD_0 - RW (0x00000068)
Tx payload bytes 0 to 3

PAYLOAD_BYTE_3	PAYLOAD_BYTE_2	PAYLOAD_BYTE_1	PAYLOAD_BYTE_0	
31 … 24	23 … 16	15 … 8	7 … 0	
0x0	0x0	0x0	0x0	Reset

PAYLOAD_BYTE_0	Payload byte 0
PAYLOAD_BYTE_1	Payload byte 1
PAYLOAD_BYTE_2	Payload byte 2
PAYLOAD_BYTE_3	Payload byte 3

Register 2.23: TX_PAYLOAD_1 - RW (0x0000006C)
Tx payload bytes 4 to 7

PAYLOAD_BYTE_7	PAYLOAD_BYTE_6	PAYLOAD_BYTE_5	PAYLOAD_BYTE_4	
31 … 24	23 … 16	15 … 8	7 … 0	
0x0	0x0	0x0	0x0	Reset

PAYLOAD_BYTE_4	Payload byte 4
PAYLOAD_BYTE_5	Payload byte 5
PAYLOAD_BYTE_6	Payload byte 6
PAYLOAD_BYTE_7	Payload byte 7

Register 2.24: RX_MSG_ID - RO (0x00000070)
Number of received messages with stuff error

unused	ARB_ID_A	ARB_ID_B	RTR_EN	EXT_ID_EN	
31	30 … 20	19 … 2	1	0	
-	0x0	0x0	0	0	Reset

EXT_ID_EN	Received message with extended ID
RTR_EN	Received Remote Transmission Request (RTR)
ARB_ID_B	Received Arbitration ID B (extended only)
ARB_ID_A	Received Arbitration ID A

Register 2.25: RX_PAYLOAD_LENGTH - RO (0x00000074)
Received payload length

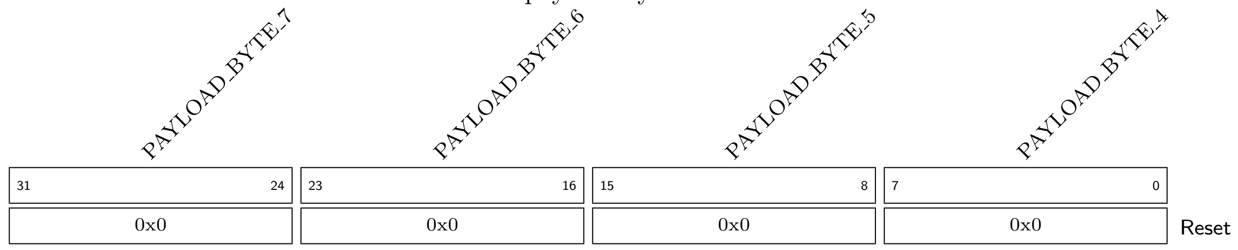
unused		
31 … 4	3 … 0	
-	0x0	Reset

Register 2.26: RX_PAYLOAD_0 - RO (0x00000078)
Rx payload bytes 0 to 3

PAYLOAD_BYTE_3	PAYLOAD_BYTE_2	PAYLOAD_BYTE_1	PAYLOAD_BYTE_0	
31 … 24	23 … 16	15 … 8	7 … 0	
0x0	0x0	0x0	0x0	Reset

PAYLOAD_BYTE_0	Payload byte 0
PAYLOAD_BYTE_1	Payload byte 1
PAYLOAD_BYTE_2	Payload byte 2
PAYLOAD_BYTE_3	Payload byte 3

Register 2.27: RX_PAYLOAD_1 - RO (0x0000007C)
Rx payload bytes 4 to 7



PAYLOAD_BYTE_4	Payload byte 4
PAYLOAD_BYTE_5	Payload byte 5
PAYLOAD_BYTE_6	Payload byte 6
PAYLOAD_BYTE_7	Payload byte 7

3 Example VHDL Register Access

All registers are bundled in records based on their mode. E.g. all RW registers are accessed through the record *bustype_rw_regs*. Access is also dependent on the type of register. All register of type SL, SLV and DEFAULT are all directly accessed by just specifying the mode record signal. E.g. the RW register *reg0* can be assigned a value like this (assuming AXI-bus):

```
axi_rw_regs.reg0 <= (others => '0');
```

Registers of type FIELD cannot be directly accessed without specification of a certain field. This is because the registers are implemented as a record in VHDL (thus a record of records). E.g. if the RO register *reg1* contains the field *field3* it can be accessed like this (assuming AXI-bus):

```
axi_ro_regs.reg1.field3 <= (others => '0');
```