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CAN

transmission

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# CAN peripheral configuration

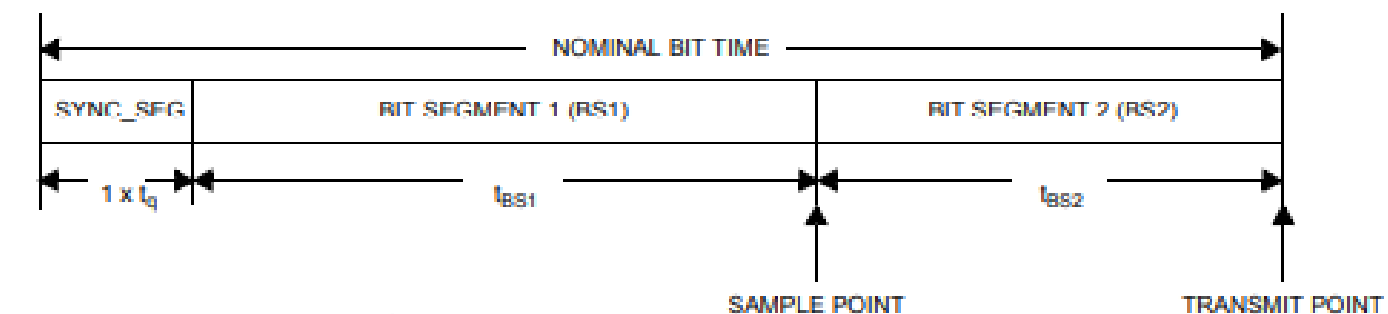
- Enable the clock for the CAN module. (**RCC\_APB1ENR**) . Set the CAN1EN and CAN2EN with logical 1 according to your test mode.

[illegible]

# CAN peripheral configuration

- Calculate the bitrate through the BTR registers. (*Bit Timing Register*) Doing some calculations according to our datasheet.

Figure 346. Bit timing



$$\text{BaudRate} = \frac{1}{\text{NominalBitTime}}$$

$$\text{NominalBitTime} = 1 \times t_q + t_{BS1} + t_{BS2}$$

with:

$$t_{BS1} = t_q \times (\text{TS1}[3:0] + 1),$$

$$t_{BS2} = t_q \times (\text{TS2}[2:0] + 1),$$

$$t_q = (\text{BRP}[9:0] + 1) \times t_{\text{PCLK}}$$

where  $t_q$  refers to the Time quantum

$t_{\text{PCLK}}$  = time period of the APB clock,

BRP[9:0], TS1[3:0] and TS2[2:0] are defined in the CAN\_BTR register.

CA  
CO

- Configure the mode test of the CAN controller. It could be: ***normal, loopback, sleep.***

[illegible]

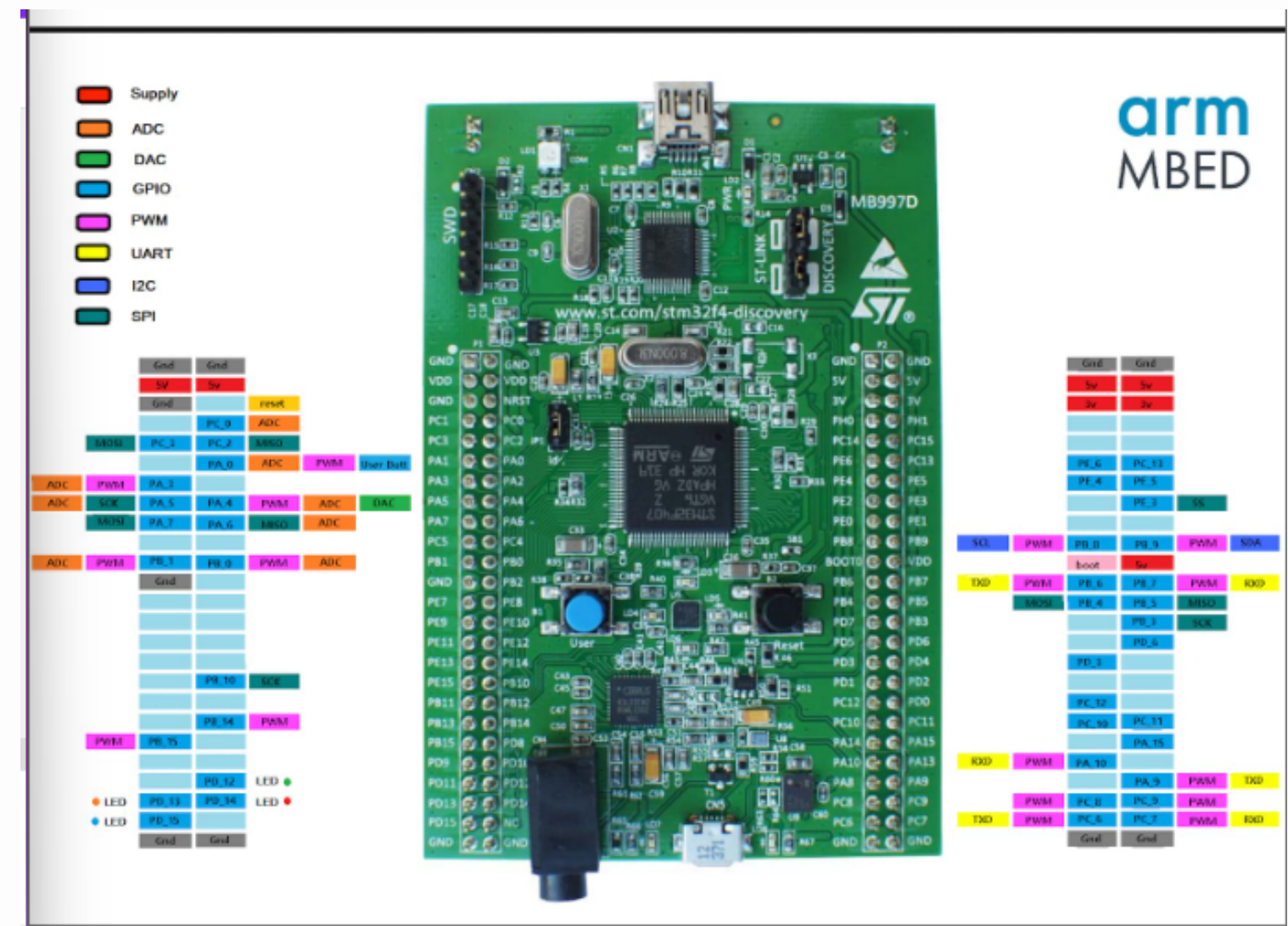
CA  
CO

- Configure the mode test of the CAN controller. It could be: ***normal, loopback, sleep.***

[illegible]

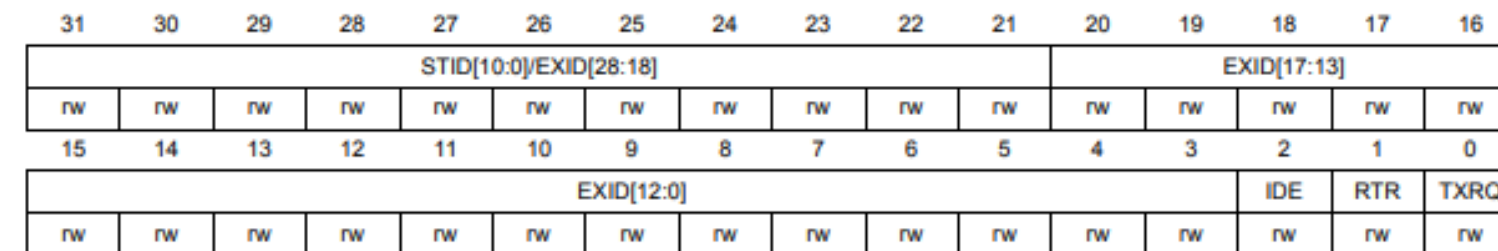
# CAN peripheral configuration

- Configure the pin associated with CAN. Basically, we have to see the pinout of our model and find the RX and TX pines.



# Frame prepare

- Prepare the data that is going to be sent in the frame.
- Configure the ID of the frame, determine the priority of CAN bus.



Bits 31:21 **STID[10:0]/EXID[28:18]**: Standard identifier or extended identifier  
The standard identifier or the MSBs of the extended identifier (depending on the IDE bit value).

Bits 20:3 **EXID[17:0]**: Extended identifier  
The LSBs of the extended identifier.

Bit 2 **IDE**: Identifier extension  
This bit defines the identifier type of message in the mailbox.  
0: Standard identifier.  
1: Extended identifier.

Bit 1 **RTR**: Remote transmission request  
0: Data frame  
1: Remote frame

# Frame transmission

- Write the register data that is suitable for the CAN controller
- Configure the length of the frame.
- Configure the ID frame.
- Initialize the transmission.

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
TIME[15:0]															
rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reserved							TGT	Reserved				DLC[3:0]			
							rw					rw	rw	rw	rw

Bits 31:16 **TIME[15:0]**: Message time stamp

This field contains the 16-bit timer value captured at the SOF transmission.

Bits 15:9 Reserved, must be kept at reset value.

Bit 8 **TGT**: Transmit global time

This bit is active only when the hardware is in the Time Trigger Communication mode, TTCM bit of the CAN\_MCR register is set.

0: Time stamp TIME[15:0] is not sent.

1: Time stamp TIME[15:0] value is sent in the last two data bytes of the 8-byte message: TIME[7:0] in data byte 7 and TIME[15:8] in data byte 6, replacing the data written in CAN\_TDHxR[31:16] register (DATA6[7:0] and DATA7[7:0]). DLC must be programmed as 8 in order these two bytes to be sent over the CAN bus.

Bits 7:4 Reserved, must be kept at reset value.

Bits 3:0 **DLC[3:0]**: Data length code

This field defines the number of data bytes a data frame contains or a remote frame request. A message can contain from 0 to 8 data bytes, depending on the value in the DLC field.



# Data transmission

- Uses a lossless bitwise arbitration method of contention resolution.
- CAN specifications use the terms *dominant* (0) and *recessive* (1) bits.

	Start bit	ID bits											The rest of the frame
		10	9	8	7	6	5	4	3	2	1	0	
Node 15	0	0	0	0	0	0	0	0	1	1	1	1	
Node 16	0	0	0	0	0	0	0	1	Stopped Transmitting				
CAN data	0	0	0	0	0	0	0	0	1	1	1	1	