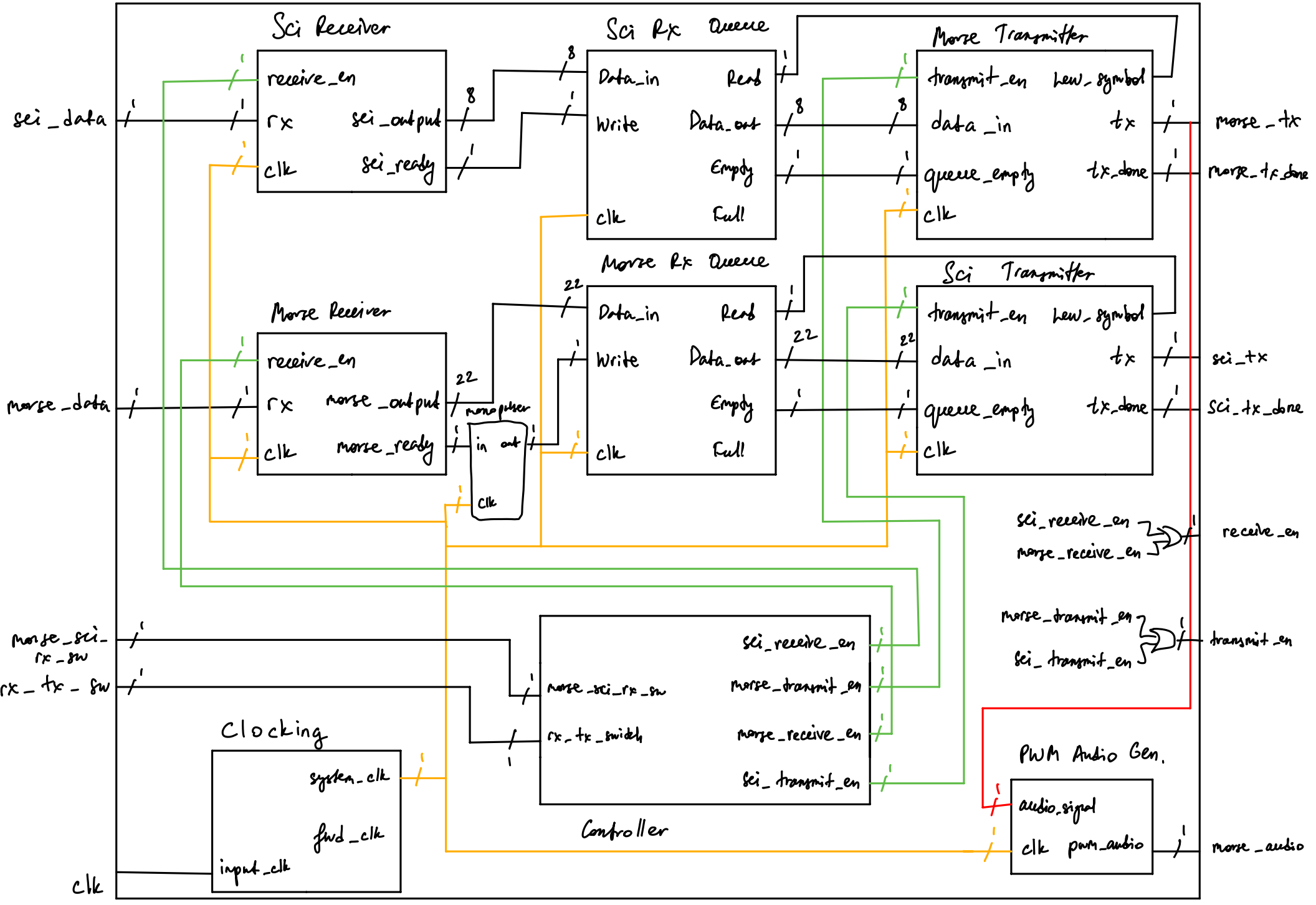
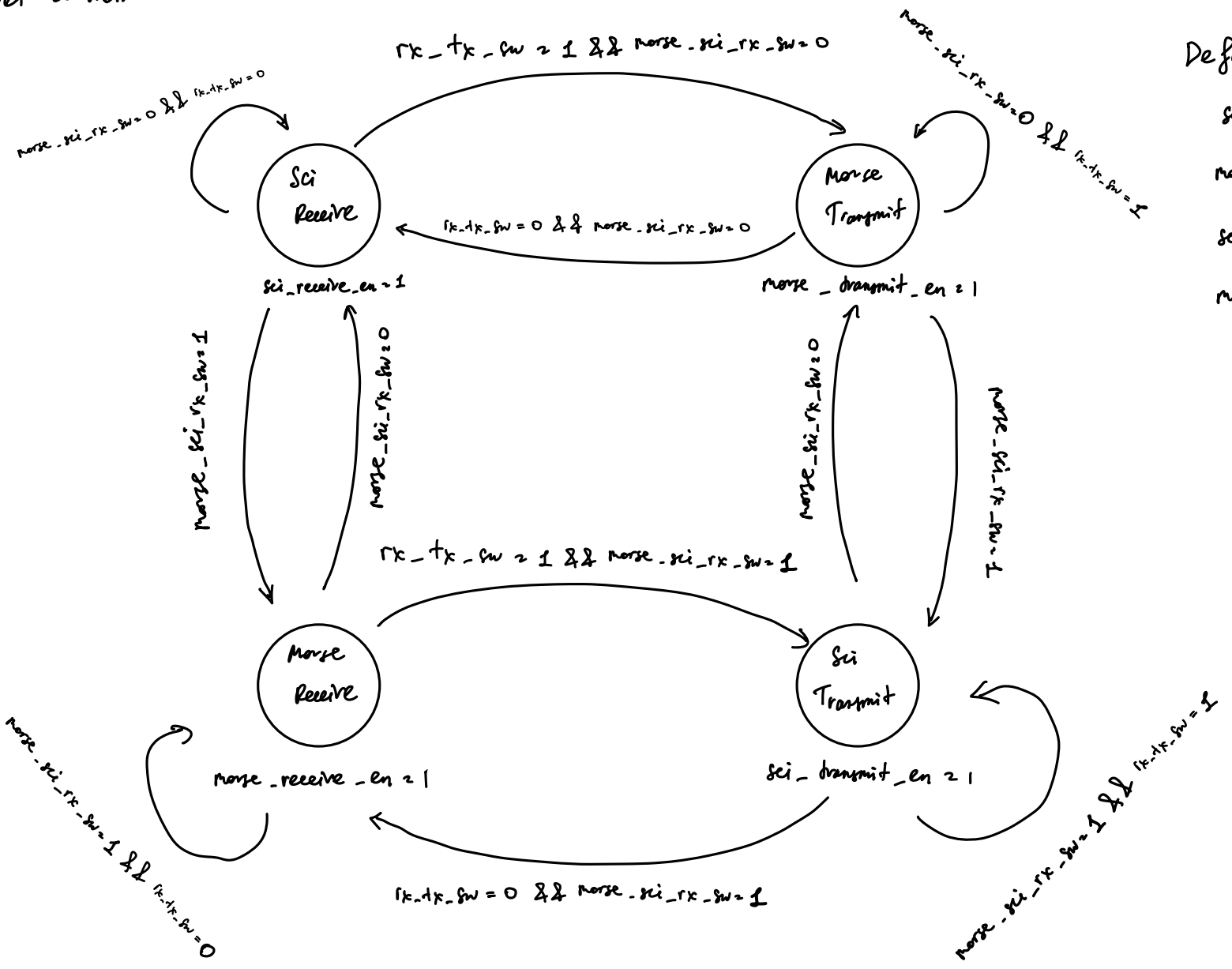

Sci Receiver
receive_en
rx
clk
sci_output
sci_ready
sci_data
Sci Rx Queeue
Data_in
Write
clk
Read
Data_out
Empty
Full
Morse Transmitter
transmit_en
data_in
queue_empty
clk
new_symbol
tx
tx_done
morse_tx
morse_tx_done
Morse Rx Queeue
Data_in
Write
clk
Read
Data_out
Empty
Full
Sci Transmitter
transmit_en
data_in
queue_empty
clk
new_symbol
tx
tx_done
sci_tx
sci_tx_done
Morse Receiver
receive_en
rx
clk
morse_output
morse_ready
morse_data
monopulser
in
out
clk
sci_receive_en
morse_receive_en
receive_en
morse_transmit_en
sci_transmit_en
transmit_en
morse_sci_rx_sw
rx_tx_sw
morse_sci_rx_sw
rx_tx_switch
sci_receive_en
morse_transmit_en
morse_receive_en
sci_transmit_en
Controller
Clocking
system_clk
fwd_clk
input_clk
clk
PWM Audio Gen.
audio_signal
clk
pwm_audio
morse_audio

Top level controller



Default signals:

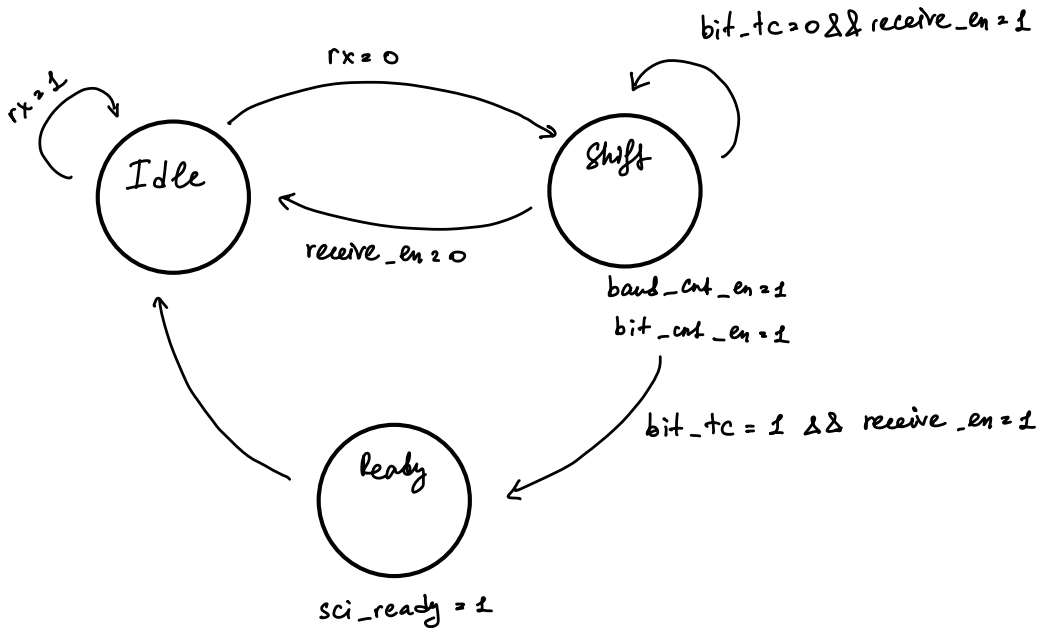
sci_receive_en = 0

morse_receive_en = 0

sci_transmit_en = 0

morse_transmit_en = 0

Sci Receiver Controller



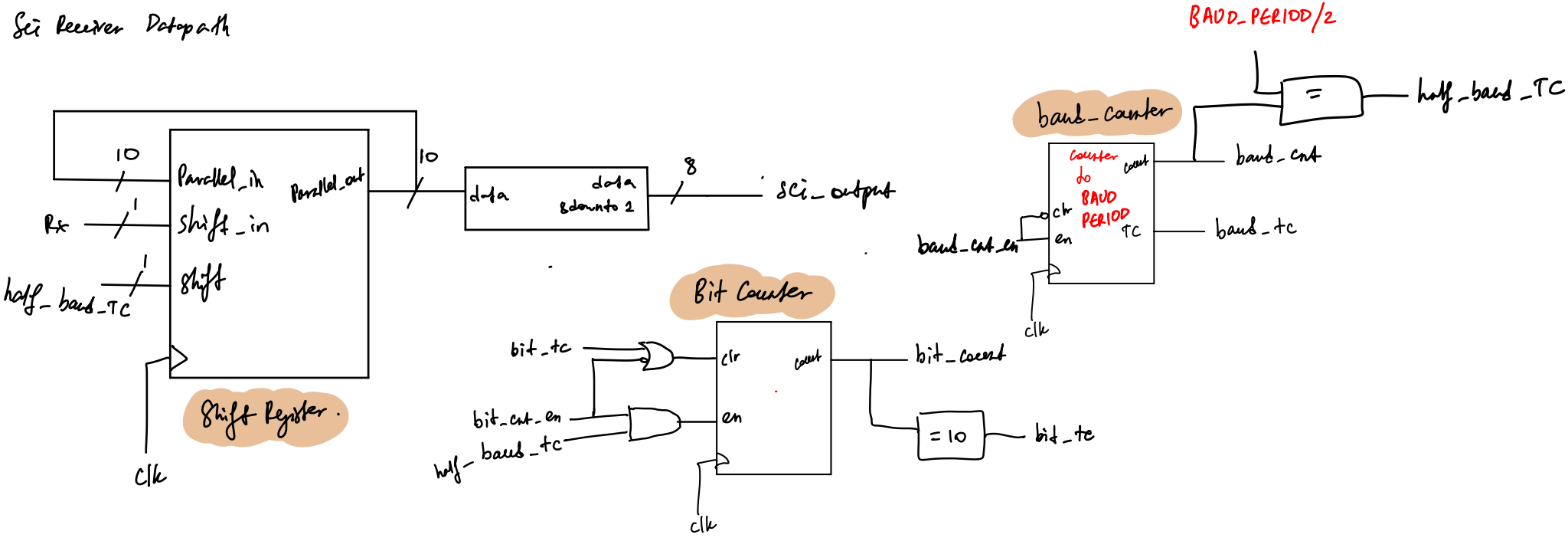
Default signals:

baud_cnt_en = 0

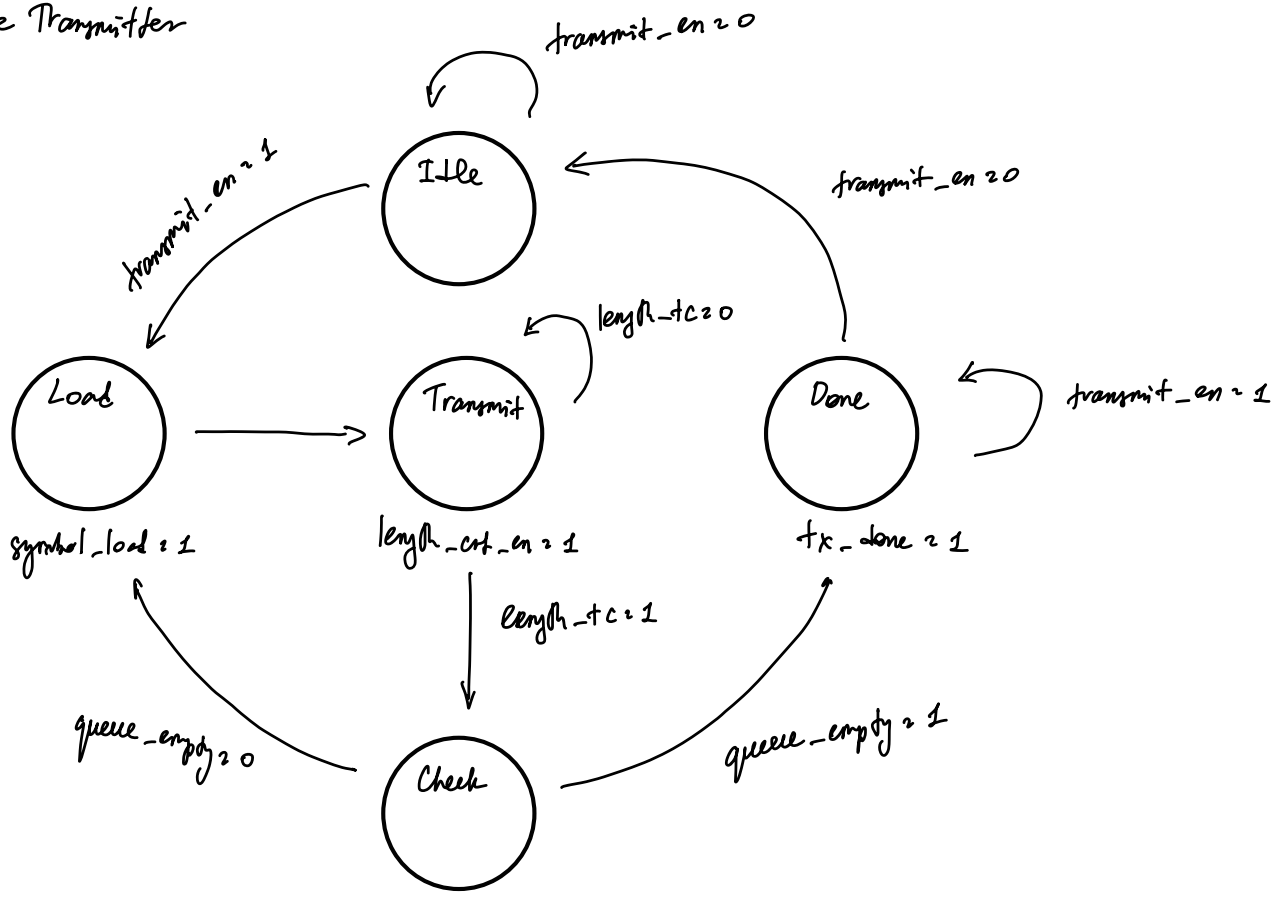
bit_cnt_en = 0

sci_ready = 0

Sci Receiver Datapath



Morse Transmitter

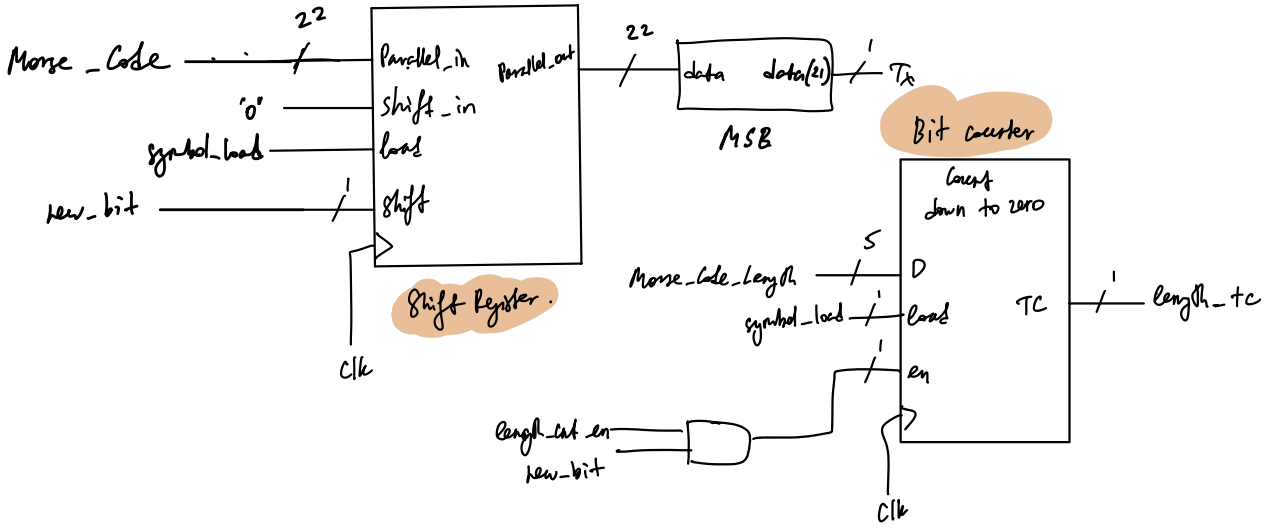


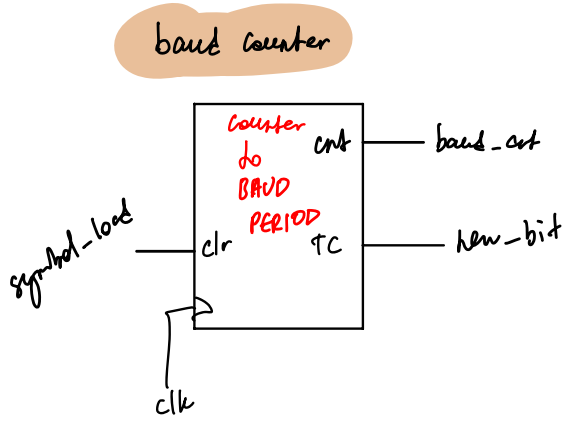
Default Signals:

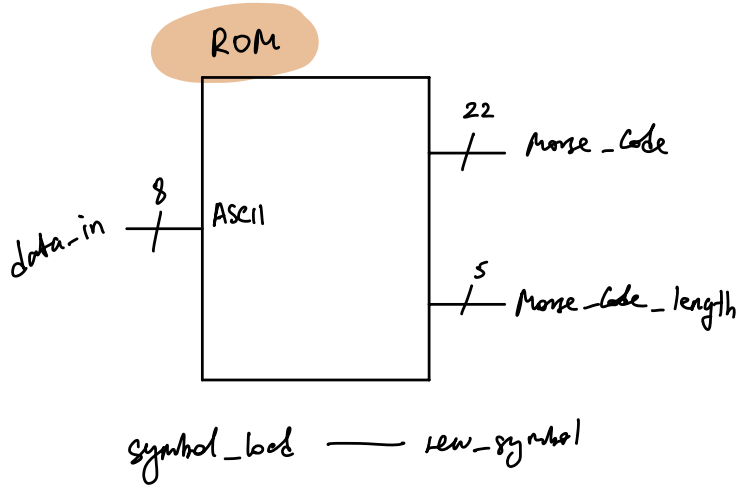
symbol_load = 0

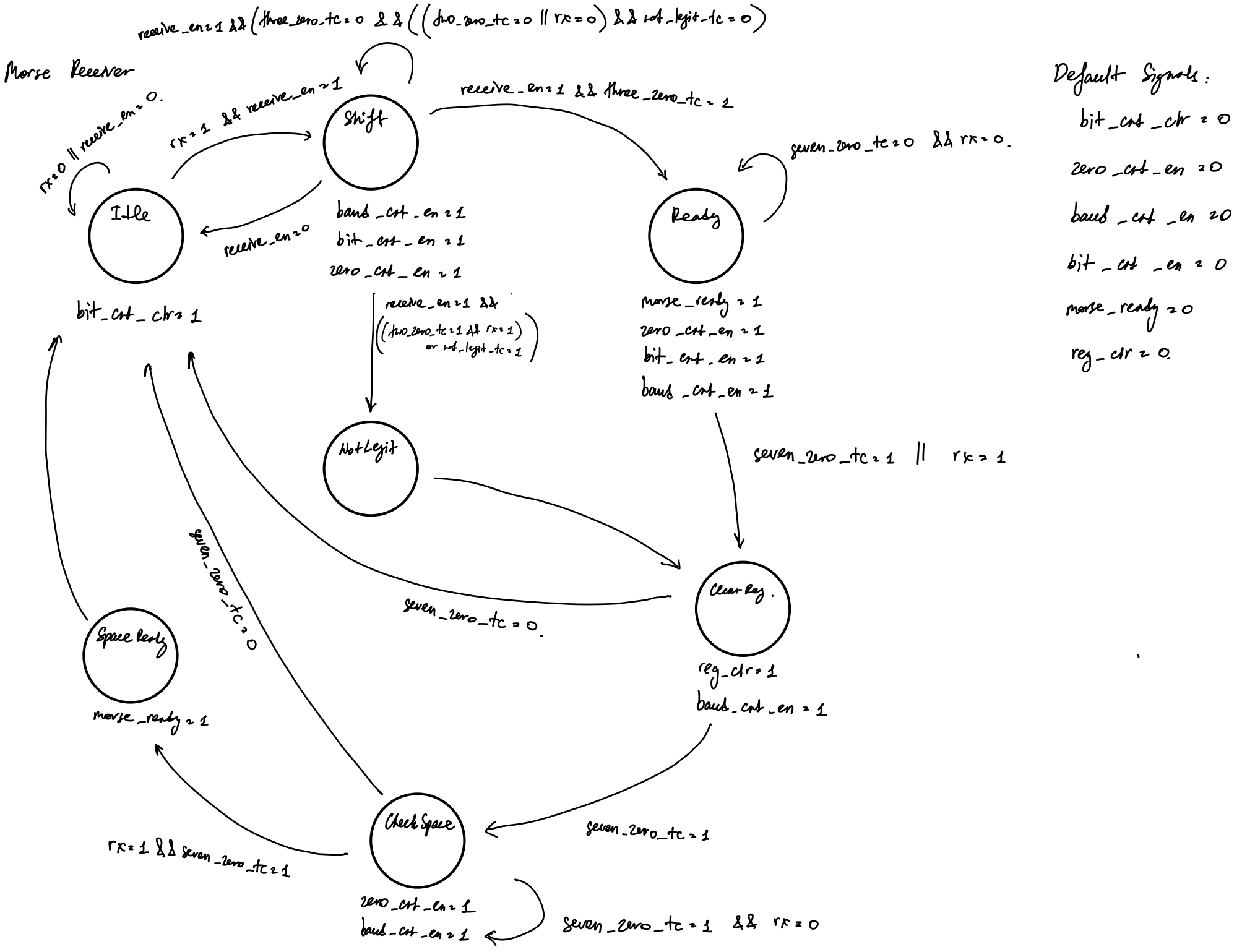
length_cnt_en = 0

tx_done = 0

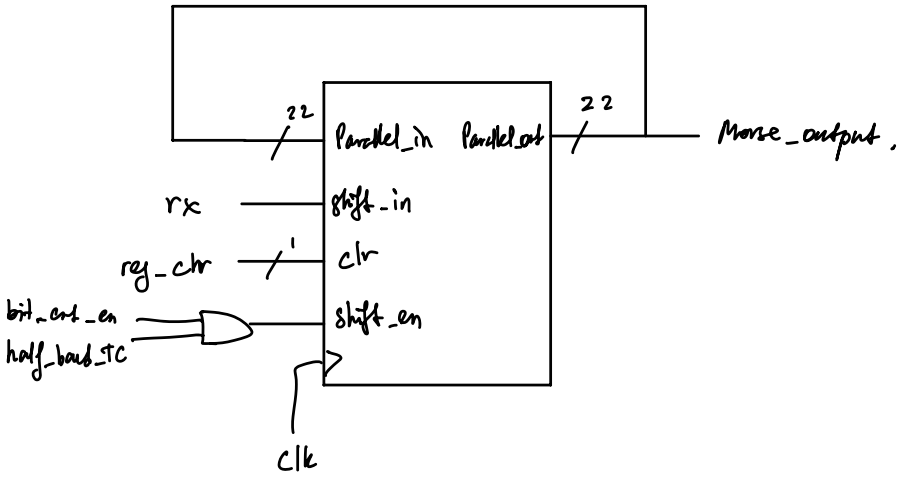




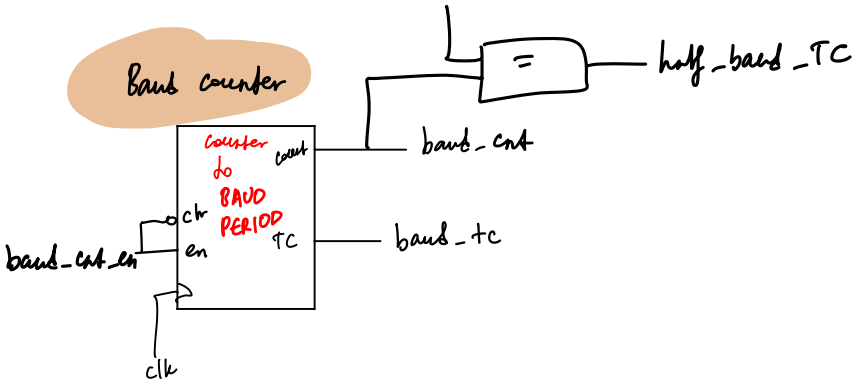



Morse Receiver
receive_en = 1 && (three_zero_tc = 0 && ((two_zero_tc = 0 || rx = 0) && not_legit_tc = 0))
rx = 0 || receive_en = 0.
rx = 1 && receive_en = 1
receive_en = 1 && three_zero_tc = 1
seven_zero_tc = 0 && rx = 0.
Idle
bit_cnt_clr = 1
Shift
baud_cnt_en = 1
bit_cnt_en = 1
zero_cnt_en = 1
receive_en = 0
Ready
morse_ready = 1
zero_cnt_en = 1
bit_cnt_en = 1
baud_cnt_en = 1
receive_en = 1 && ((two_zero_tc = 1 && rx = 1) or not_legit_tc = 1)
NotLegit
seven_zero_tc = 1 || rx = 1
Clear Reg.
reg_clr = 1
baud_cnt_en = 1
seven_zero_tc = 0.
seven_zero_tc = 0
Space Ready
morse_ready = 1
Check Space
zero_cnt_en = 1
baud_cnt_en = 1
seven_zero_tc = 1
rx = 1 && seven_zero_tc = 1
seven_zero_tc = 1 && rx = 0
Default Signals:
bit_cnt_clr = 0
zero_cnt_en = 0
baud_cnt_en = 0
bit_cnt_en = 0
morse_ready = 0
reg_clr = 0.

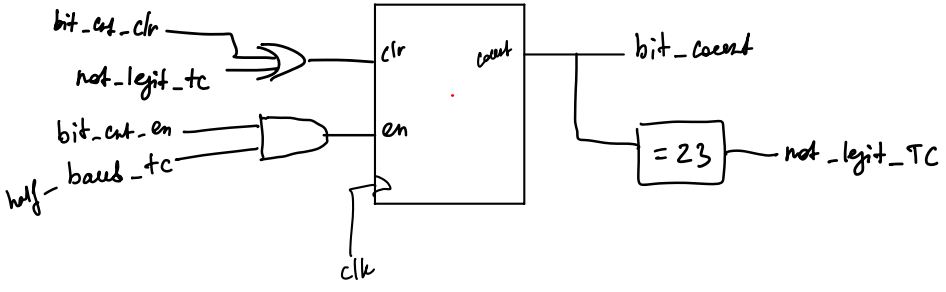
Shift Register



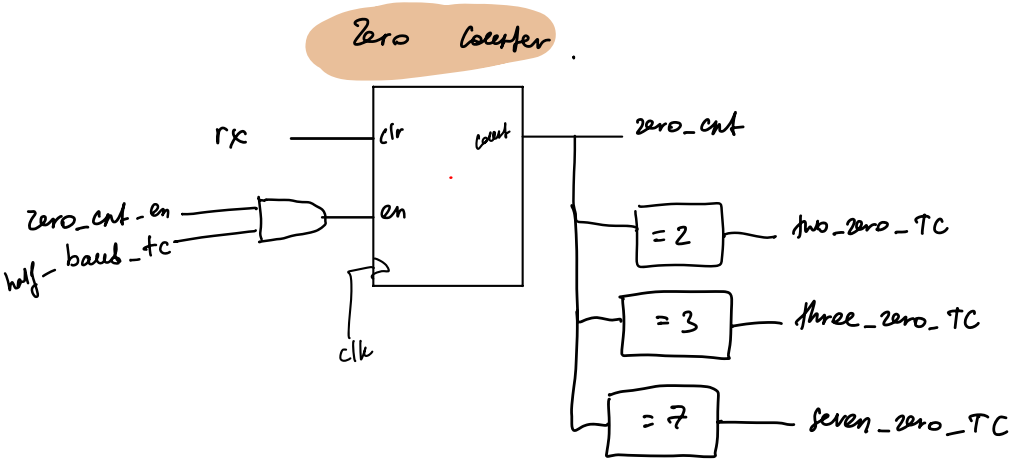
Baud counter



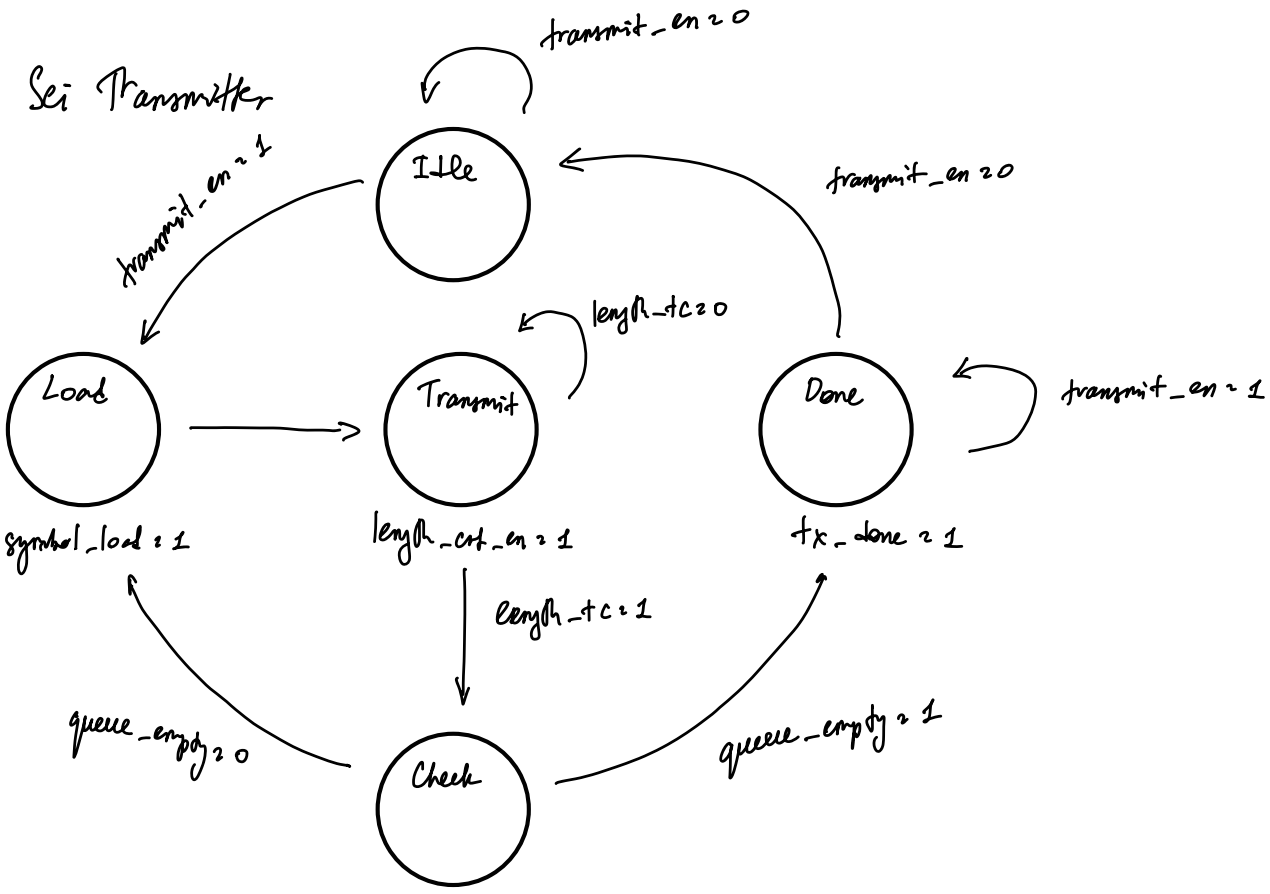
Bit counter



Zero counter



Sci Transmitter

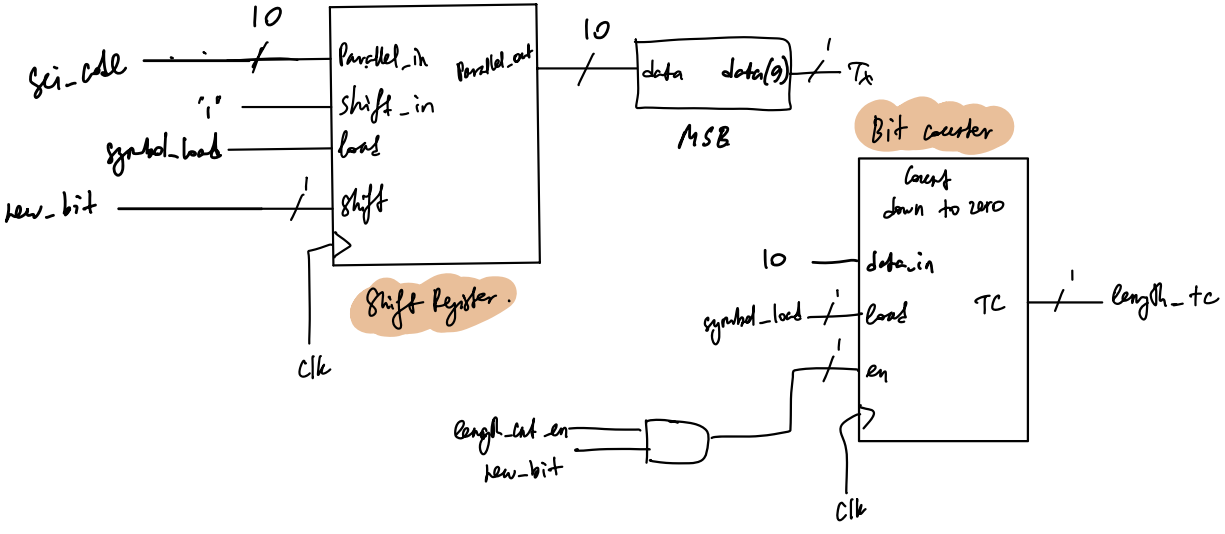


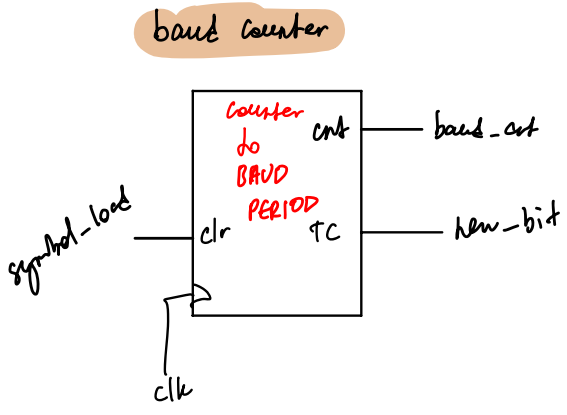
Default Signals:

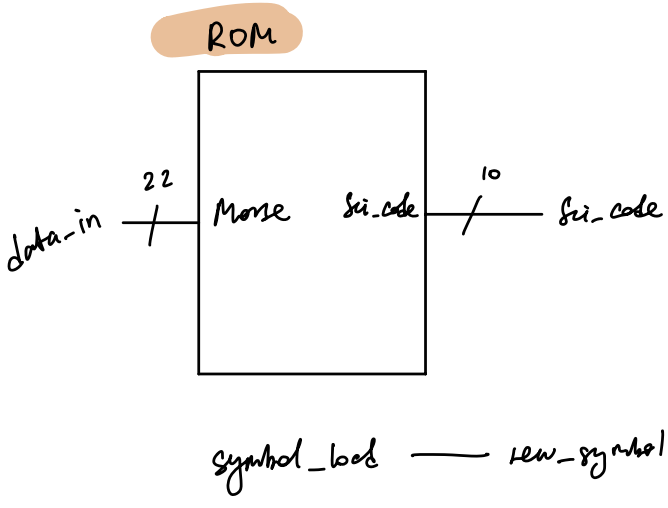
symbol_load = 0

length_cnt_en = 0

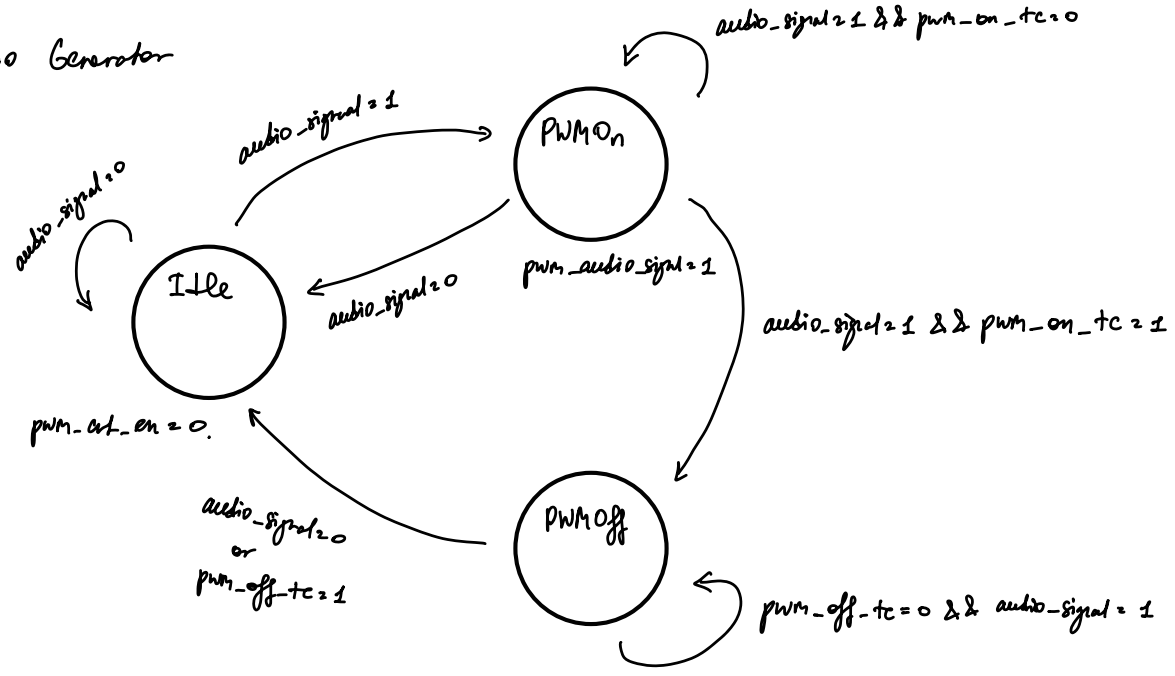
tx_done = 0







PWM Audio Generator



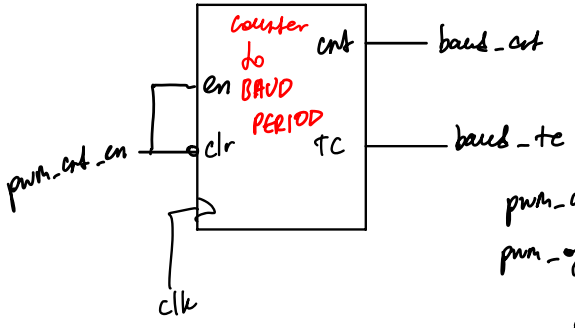
Default signals:

pwm_cnt_en = 1

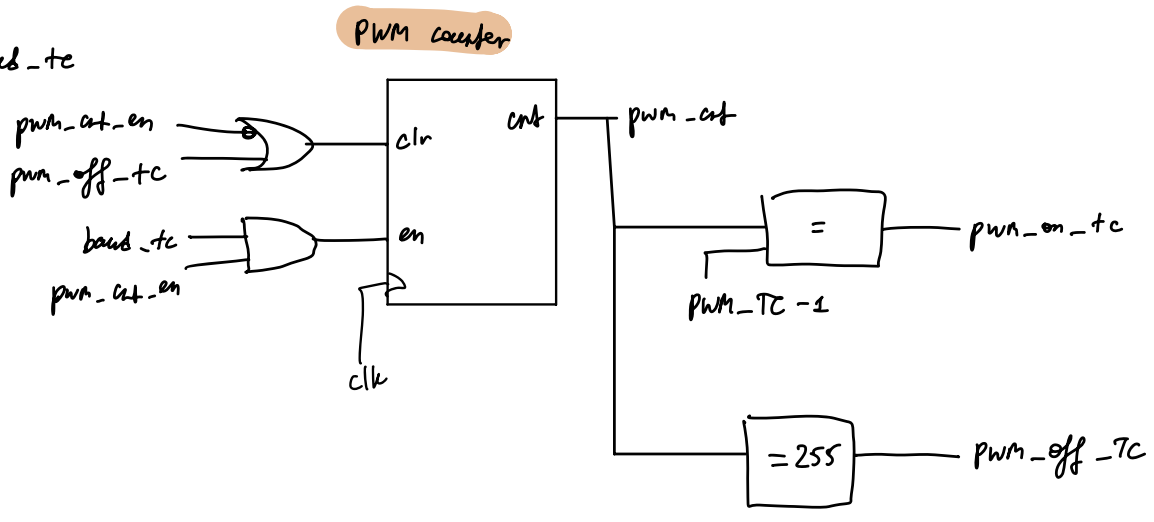
pwm_audio_signal = 0

$$BAUD\_PERIOD = \frac{AUDIO\_SAMPLE\_RATE}{256} - 1$$

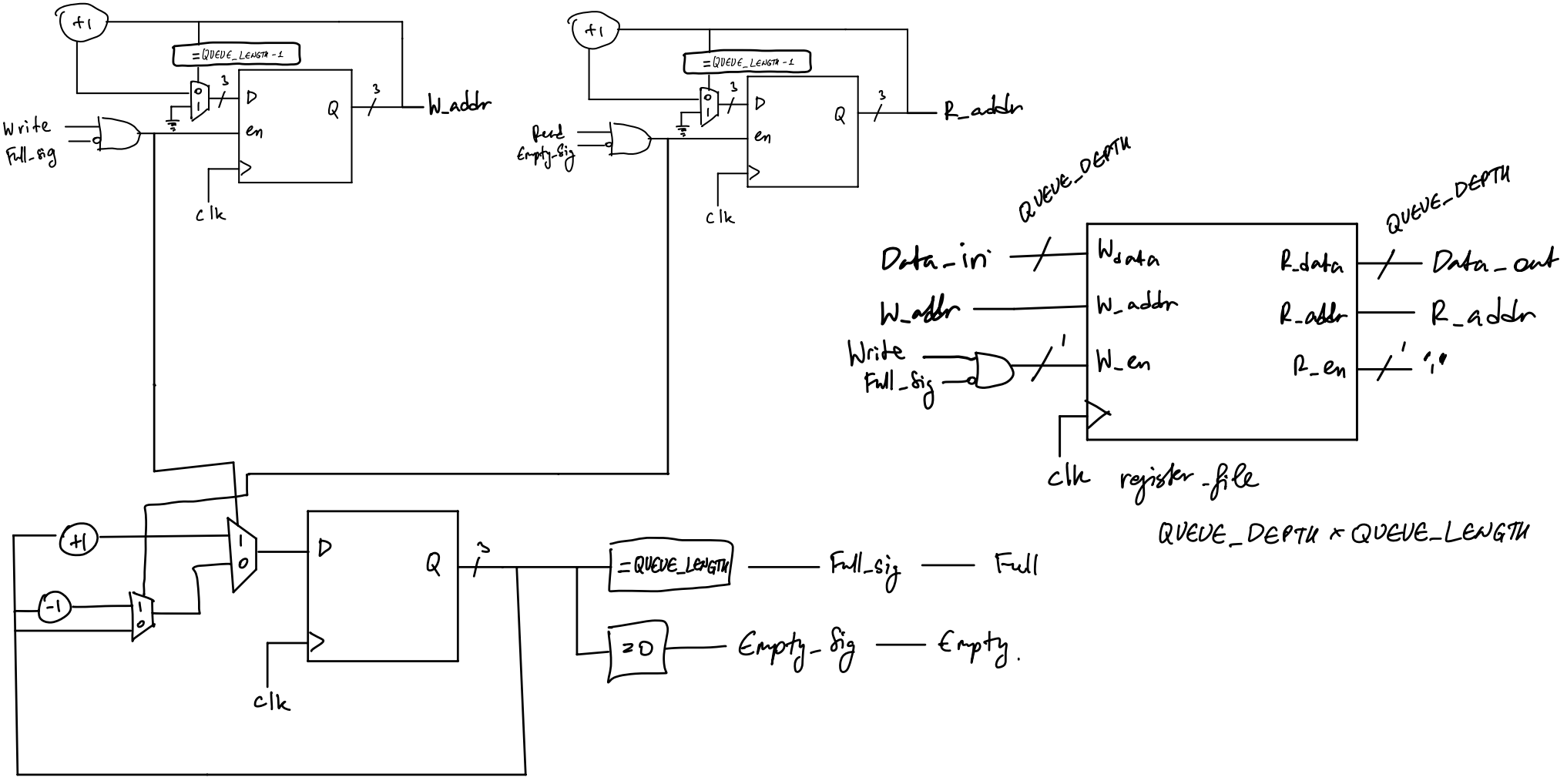
baud counter



PWM counter



Queue



QUEUE_DEPTH × QUEUE_LENGTH