Saper
rtl modules documentation

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Github repository: https://github.com/wmiskowicz/Saper_game.git

draw:

- edge_ctr:
  - edge_ctr – module counting posedge pulses to value max.
  - edge_detector – detects rising edge and returns one-cycle 1'b1.
  - ts_counter – counts when counting is high.
- ifs_pkgs:
  - colour_pkg – package of colour constants.
  - vga_pkg – package of vga timing related constants.
  - vga_if – interface with screen steering signals.
- top_char:
  - char_rom16x16 – puts specific chars in given xy of 16x16 char rectangle. Contains information about using device.
  - game_over16x16 – analanogically displays "game over".
  - draw_rect_char – draws 16x16 char rectangle based on screen steering signals and char_line given by module font_rom.
  - font_rom – contains font used by draw_rect_char.
  - game_over_disp – displays "game over" when game_over is high.
  - top_char – top module for char display.
- top_draw_board:
  - draw_bg – draws background on the screen.
  - draw_board – draws game board on the screen.
  - top_draw_board – top module for drawing board.
  - vga_timing – controls timing of vga signals.
- top_redraw_board:
  - defuse:
    - defuse_field – defuses field of given xy and puts '1 to defuse array.
    - defuse_missing – defuses neighbouring unminned fields.
    - draw_defused – draws defused field based on defuse array and mine array.
    - generate_defuse_array – top module for defusing board.
  - flag:
    - draw_flag – draws flag based on flag array.
    - generate_flag_array – generates flag array by putting nagation on given xy.
  - mine:
    - draw_mine – draws mine when explode is high.

top_draw_num:

char_pos - returns char index based on cur_pos and board parameters.
check_char_board - converts given number to char.
draw_char_board - draws mine index of every field of board.
generate_num_array - counts mines around given field.
num_font_rom – resized font rom for number display.
top_draw_num - top module for displaying numbers on board.

array_timing - counts array dimensions.
top_redraw_board - top module for redrawing symbols and numbers during.
minesweeping.

game:

top_game_setup:

latch – passes data when enabled is high.
settings_latch – latch designed for game_set_if interface.
select_level - selects game parameters based on difficulty level of the game.
top_game_setup - top module for setting up a game.

top_mine:

Detect_index – detects button index based on mouse signals.
mine_board - Fills 2D array with '0 and '1, where '1 means there is a mine.
mine_check – based on mine_board and detect_index signals returns marking flag, defusing or explosion.
random_gen – generates a random value for mine_board.
top_mine – top module for mining board.

Game_set_if - Interface with game related parameters.
win_check - Checks if user won the game.

mouse:

draw mouse - connects module Mouse Display to rest of the project.
MouseCtl – returns mouse signals based od ps2 signals from the device.
Ps2Interface – deals with ps2 protocole.
top_mouse – top module for mouse signals.

timer:

Time_controller – countdown timer module.
bin2bcd – bin to bcd encoder.
top_timer – top module for timer. Stops mouse signals when stop is high.

top_vga – project top module.