

# Final Project Proposal – Tetris Battle

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## Design Topic

- ✓ A Tetris game with multi-player battling function across two FPGA demo board.

## Input / Output Table

Input	Function	Output	Function
Push Button S1	● Start matching	LEDs	K.O.s Counting Display
	● Cancel matching	FTSD Digit 1~2	Timer Display
	● Back to menu	FTSD Digit 3~4	Score Display
Push Button S7	Music Volume Down	Speaker	Background Music
Push Button S8	Music Volume Up		
DIP Switch 1	Music On/Off		
Keypad 7	Block move left	LCD Screen	Main Gaming Table Display
Keypad 8	Block move down		
Keypad 9	Block move right		
Keypad C	Block turn clockwise		
Connector A1	Clock Sync Signal In	Connector B1	Clock Sync Signal Out
Connector A2~4	Game Status Sync In	Connector B2~4	Game Status Sync Out
Connector A5~11	Score Comparison In	Connector B5~11	Score Comparison Out
Connector A12~14	K.O. Comparison In	Connector B12~14	K.O. Comparison Out
Connector A15	Bomb (Layer Add) In	Connector B15	Bomb (Layer Add) Out

## Functions of the proposed Tetris Battle

### [ Basic Gaming Operations ]

- ✓ The basic game operation is like a traditional Tetris game. Use keypad to let the block move left, right, down or rotate the block.
- ✓ When player 1 clear one row, player 2 will be added a row which cannot be eliminated in the bottom.
- ✓ When a player reaches the top of the gaming table, this player lose, and the other player gets 1 K.O.

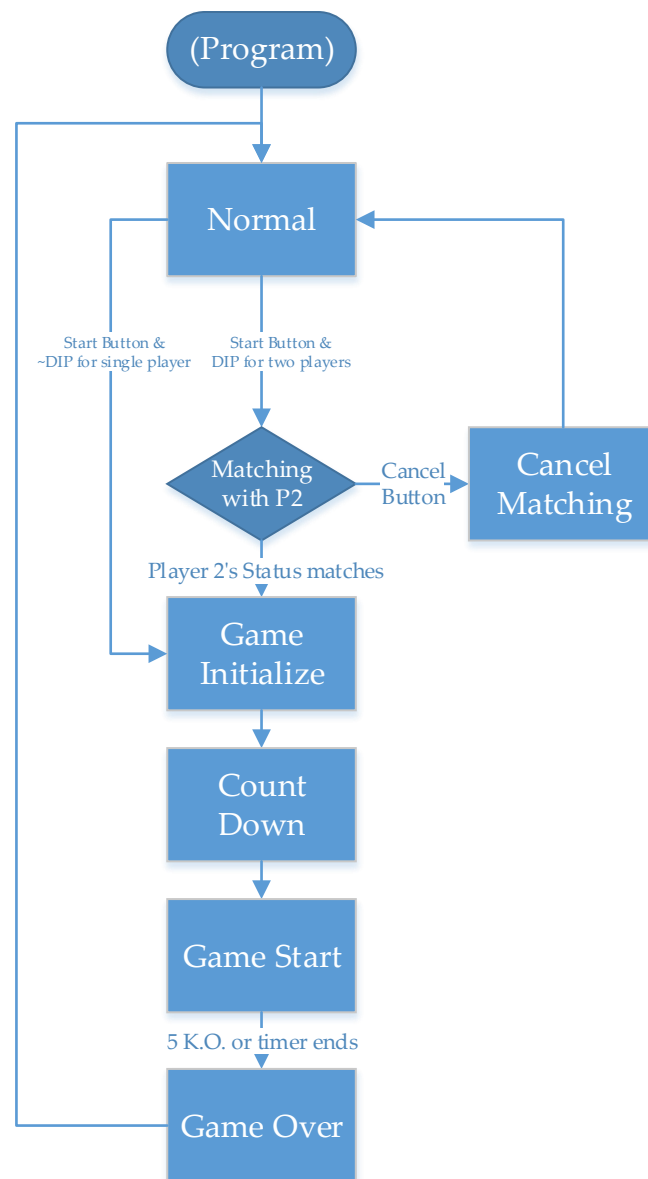
### [ Game Status Control ]

- ✓ The sudo state table of gaming status FSM:

State	Explanation	Input	Next State
Normal	The default state.	Start Button (S1) & DIP	Match with P2
Normal		Start Button (S1) & ~DIP	Game Initialize
Match with P2	Waiting to connect with other player.	Cancel Button (S1)	Cancel Matching
Match with P2		Player 2's Status matches	Game Initialize
Cancel Matching	Cancel connecting and go back to	None	Normal

State	Explanation	Input	Next State
	default state.		
Game Initialize	Gaming table and data initialize.	None	Count Down
Count Down	Count down for 3 seconds.	None	Game Start
Game Start	Play the game.	5 K.O. or timer ends	Game Over
Game Over	Game over, display the winning status and final score.	Restart Button (S1)	Normal

✓ The flow chart of the gaming status FSM:



### [ Scoring ]

- ✓ When reduce/ clean a row, gets 1 point.
- ✓ When K.O. the other player, gets 5 point.

- ✓ The maximum possible score is **99** points.
- ✓ The player who gets **5** K.O.s first wins. Otherwise, when the time ends, the player who gets higher score wins. When a winner is generated, the game ends.