# ATM Based bank system

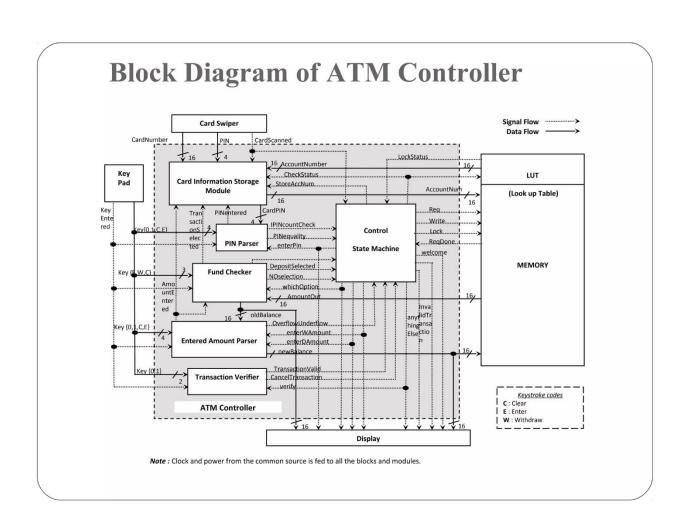
#### 1. Introduction:

- a. In our current age, there are a lot of ATM machines everywhere you go you can see at least one ATM, so they becomes widely used as it make any process related to payments more easier.
- b. ATMs machines support deposits, withdrawals and transfer money to others in addition to you can deal with different Banks as each bank has its own ATM but there is a feature implemented in it so as user you can deal with any ATM it's not related to which bank.

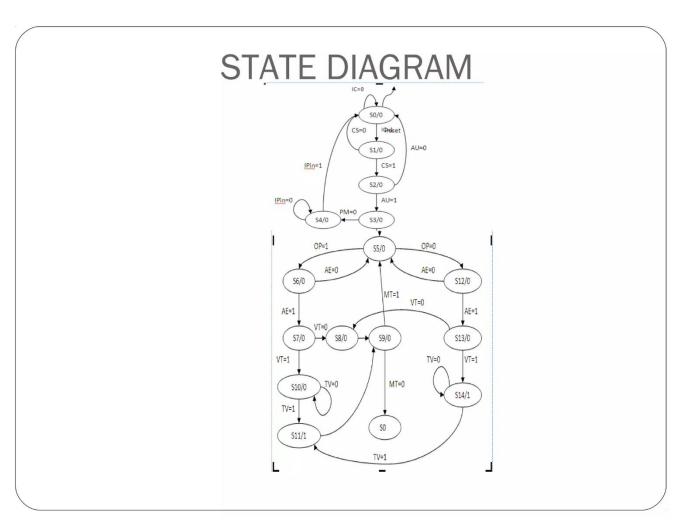
#### 2. Description:

- a. Our main target here to complete ASIC flow by implementing the core of the bank ATM design.
- b.I assume all auxiliary devices like card swiper, amount parser, PIN parser, bank server as memory based system, control unit,...etc.

#### 3. Block diagram of ATM controller:

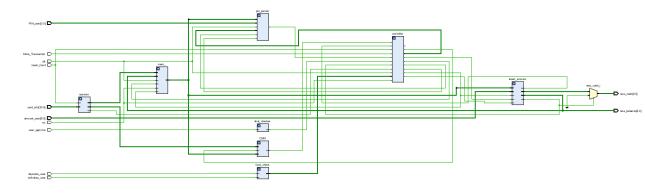


### 4. Finite State Machine (FSM):

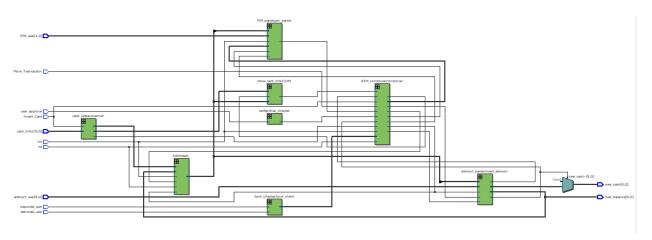


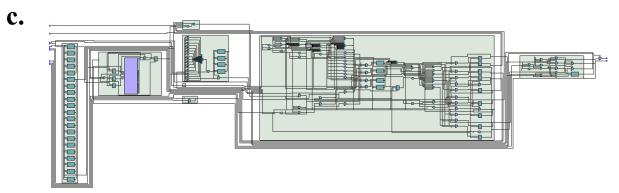
#### 5. RTL netlist:

#### a.



#### b.

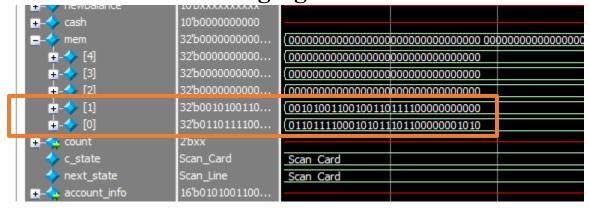


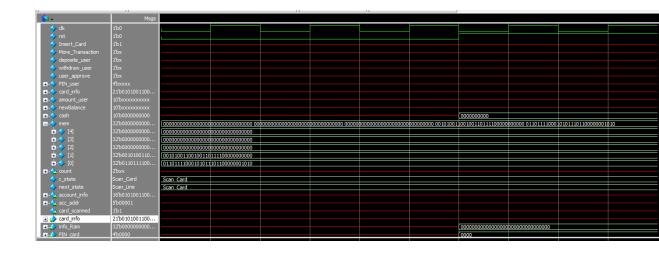


d.

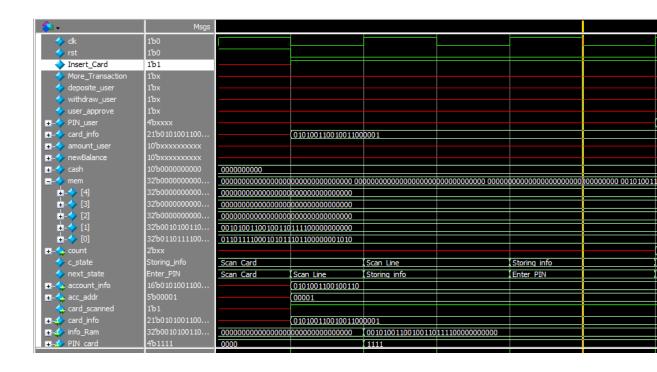
#### 6. Stimulation Snippets:

a. Initially I don't insert any card so all are in default mode, on the other side I have to different accounts in my bank one with 10\$ balance and another with zero balance as shown in the following figure

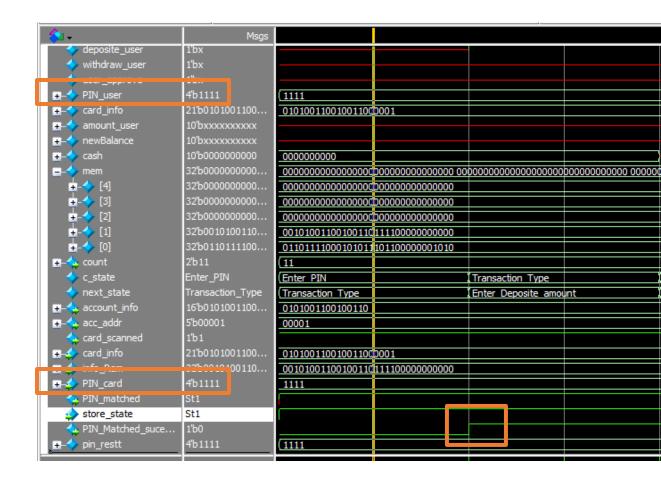




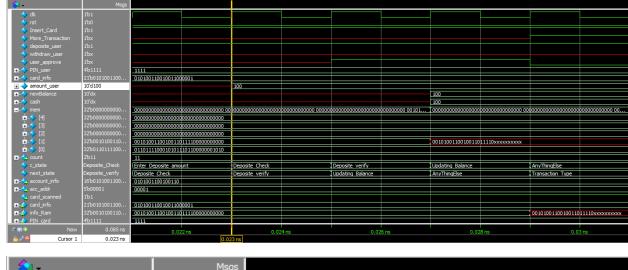
b.Once I inserted my card the card swiper scanned it in the scanned line state to extract the account, PIN and current balance for this card as showing in the following figure

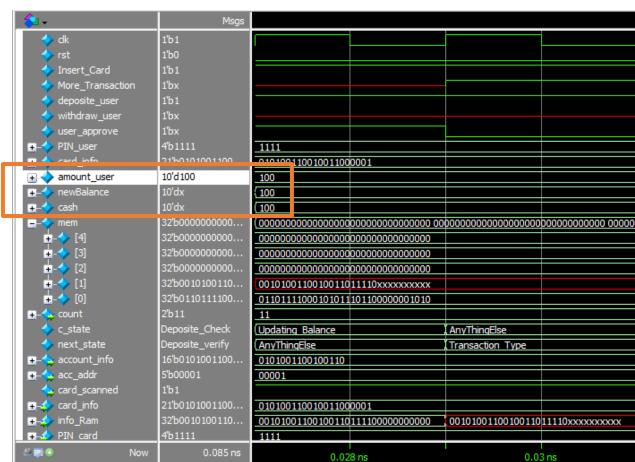


c. Our current state to enter the PIN and check correctness in the PIN parser as showing in the next figure



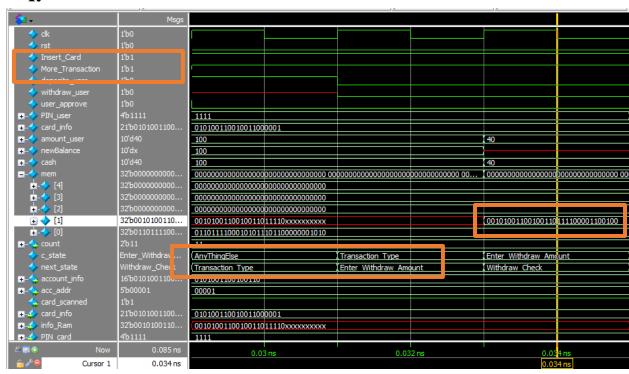
- d.At transaction state, as user i select to deposite money to my account then the update to be shown for user there are to outputs
  - i. New balance in his/here account
  - ii. Cash inserted to machine in deposite state or withdrawn by user in another state



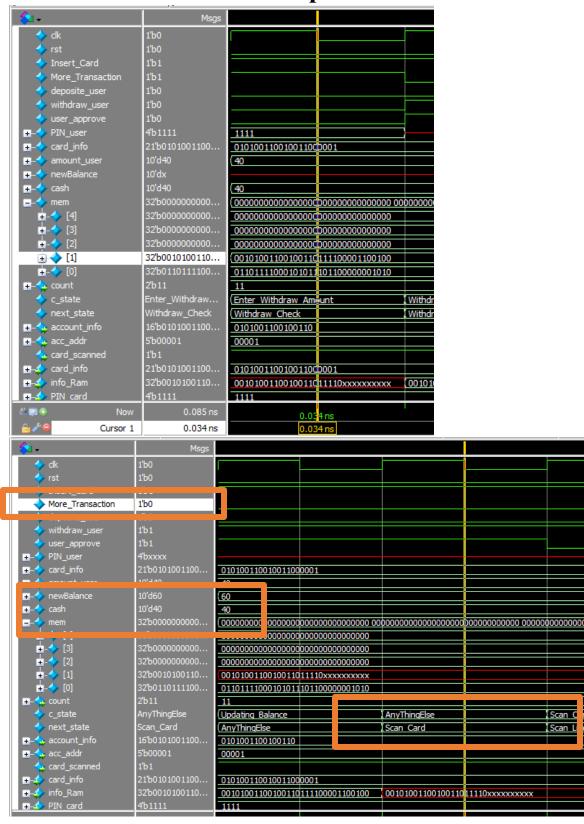


e. Now our bank will be notified by the latest update then update the amount but as user I choose to do more transaction so I'm in transaction selection state

i.

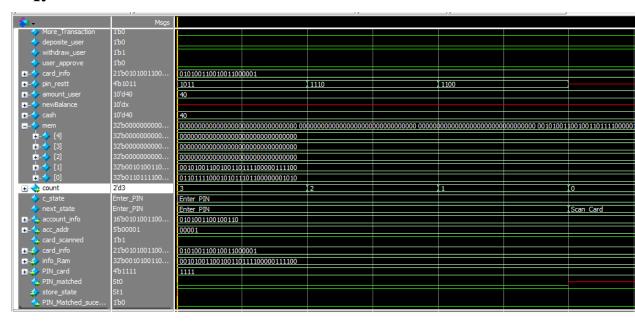


#### ii. Now let's check withdraw process



f. Now let's check if insert wrong PIN for 3 time and the account will be locked as you can't deal with it

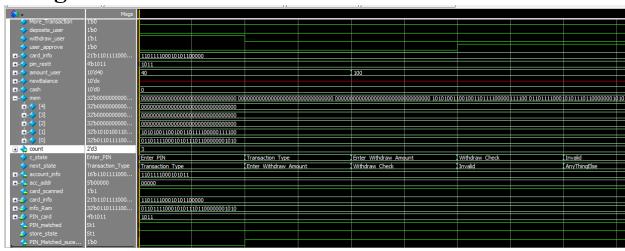
i.



# ii. as shown the first bit in info RAM act as flag if one then account is locked

| ^                            |                 |   |   |   |   |   |   |   |
|------------------------------|-----------------|---|---|---|---|---|---|---|
| <b>\$</b> 1 <b>•</b>         | Msgs            |   |   |   |   |   |   |   |
| More_Transaction             | 1'b0            |   |   |   |   |   |   |   |
| deposite_user                | 1'b0            |   |   |   |   |   |   |   |
| withdraw_user                | 1'b1            |   |   |   |   |   |   |   |
| user_approve                 | 1'b0            |   |   |   |   |   |   |   |
| <b>≖</b>                     | 21'b0101001100  | 01010011001001100                       | 0001                                    |   |   |   |   |   |
| <b>-</b>                     | 4b1011          |   |   |   |   |   |   |   |
| <b>±</b> -♦ amount_user      | 10'd40          | 40                                      |   |   |   |   |   |   |
| <b>≖</b> -∜ newBalance       | 10'dx           |   |   |   |   |   |   |   |
| <b>±</b> -∜ cash             | 10'd40          | 40                                      |   |   |   |   |   |   |
| <u>-</u> → mem               | 32'b00000000000 | 000000000000000000000000000000000000000 | 000000000000000000000000000000000000000 | 000000000000000000000000000000000000000 | 000000000000000000000000000000000000000 | 000000000000000000000000000000000000000 | 000000000000000000000000000000000000000 | 000000000000000000000000000000000000000 |
| <u>+</u> -🔷 [4]              | 32'b00000000000 | 000000000000000000000000000000000000000 | 0000000000000000                        |   |   |   |   |   |
| <b>. . . . .</b> [3]         | 32'b00000000000 | 000000000000000000000000000000000000000 | 0000000000000000                        |   |   |   |   |   |
| <b></b>                      | 32'b00000000000 | 000000000000000000000000000000000000000 | 0000000000000000                        |   |   |   |   |   |
| <u>+</u> [1]                 | 32'b0010100110  | 00101001100100110                       | 111100000111100                         |   | 10101001100100110                       | 111100000111100                         |   |   |
| <b>₫-</b> � [0]              | 32'b0110111100  | 01101111000101011                       | 101100000001010                         |   |   |   |   |   |
| <u>→</u> count               | 2'd3            | 0                                       |   |   |   |   |   |   |
| 🔷 c_state                    | Enter_PIN       | Enter PIN                               | Scan Card                               |   | Scan Line                               |   | Storing info                            |   |
| next_state                   | Enter_PIN       | Scan Card                               | Scan Line                               |   | Storing info                            |   | Scan Card                               |   |
| <b>≖</b> -4 account_info     | 16'b0101001100  | 0101001100100110                        |   |   |   |   |   |   |
| <b>≖</b> – <b>4</b> acc_addr | 5'b00001        | 00001                                   |   |   |   |   |   |   |
| card_scanned                 | 1'b1            |   |   |   |   |   |   |   |
| <b>∓</b> -                   | 21'b0101001100  | 01010011001001100                       | 0001                                    |   |   |   |   |   |
| <b>- →</b> info_Ram          | 32'b0010100110  | 00101001100100110                       | 111100000111100                         |   | 10101001100100110                       | 111100000111100                         |   |   |
| ■ → PIN_card                 | 4'b1111         | 1111                                    |   |   |   |   |   |   |
| A PIN_matched                | St0             |   |   |   |   |   |   |   |
|                              | St1             |   |   |   |   |   |   |   |
| PIN_Matched_suce             | 1'b0            |   |   |   |   |   |   |   |

g. Let's get the card out and insert another one to check if there is no enough balance to withdrawal so the cash to user is equal to zero and go to invalid state



## **Thanks**