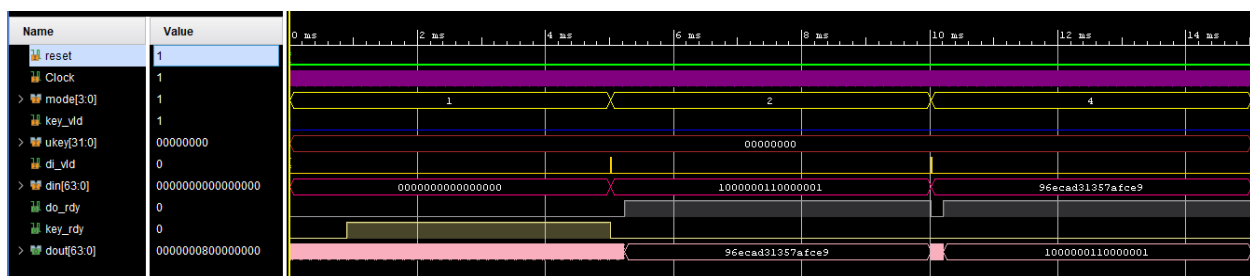


Functional Simulation:

Mode:

- 1 → key expansion
Din: 1000000110000001
Dout: 96ecad31357afce9
- 2 → encryption
Din: 96ecad31357afce9
Dout: 1000000110000001
- 4 → decryption
Din: 96ecad31357afce9
Dout: 1000000110000001

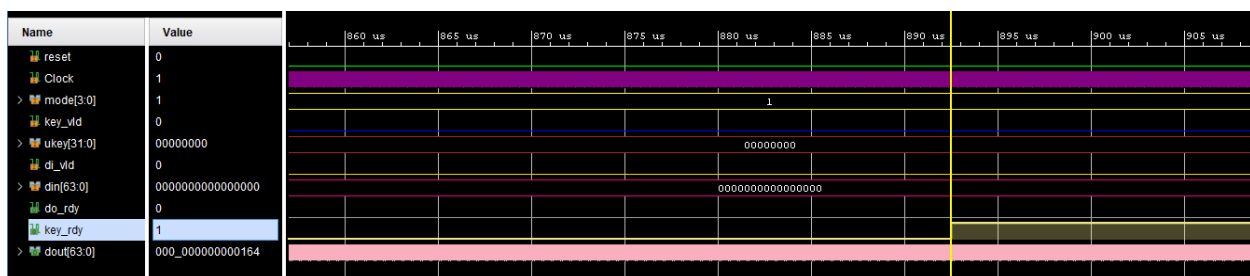
key_expansion + encryption + decryption



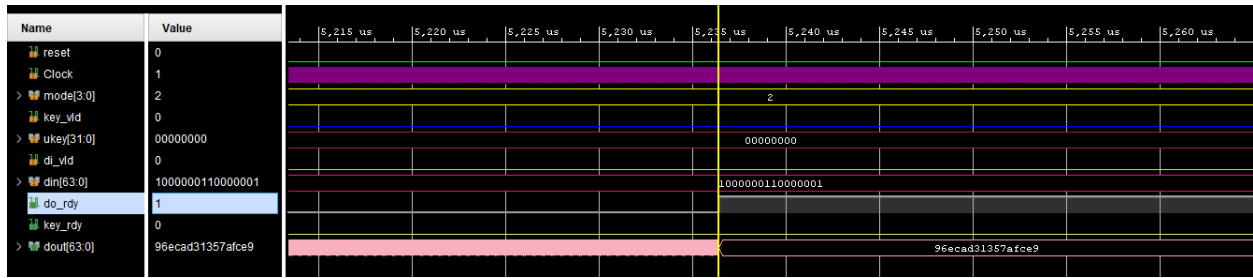
As seen from the screenshot above, key_rdy signal goes high which shows key expansion is completed and then do_rdy signal goes high, which shows encryption is completed and the mode is changed from 1(key_expansion) to 2(encryption). After encryption, do_rdy signal goes high again and mode is changed to 4(decryption).

Below are the additional screenshots for detailed operation view:

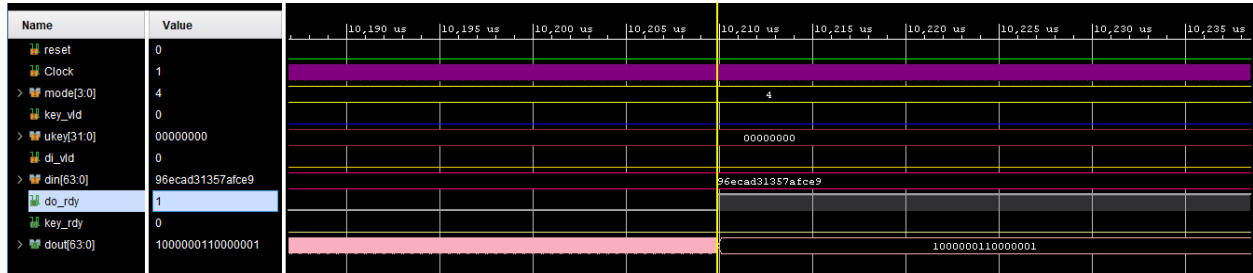
key_rdy – 1



do_rdy – 1 for encryption



do_rdy – 1 for decryption

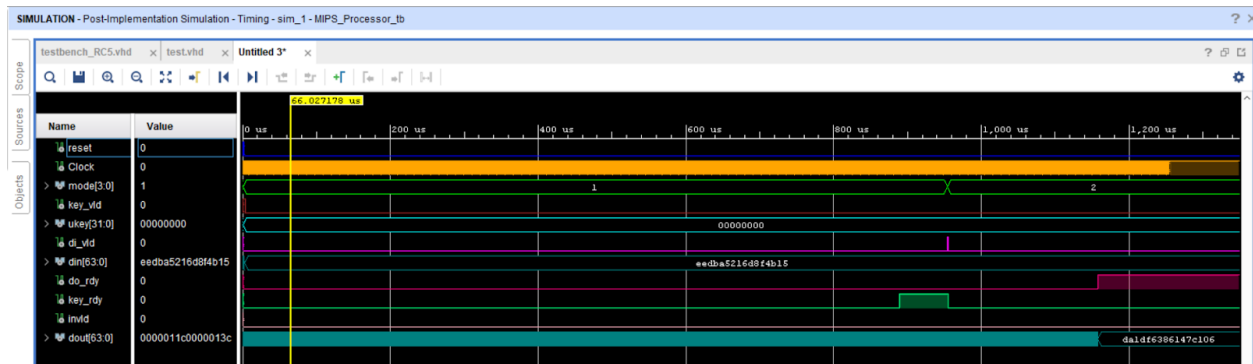


Timing Simulation

1) Key-expansion + encryption

Din: eedba5216d8f4b15

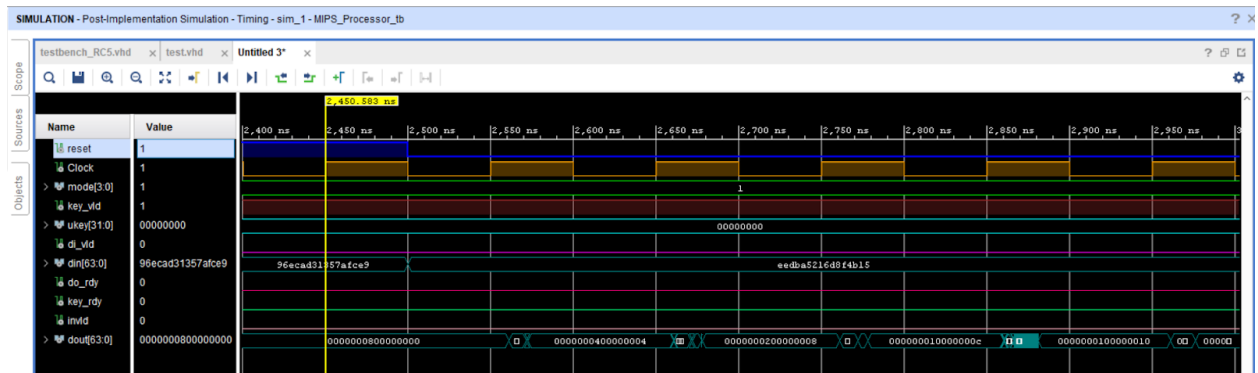
Dout: da1df6386147c106



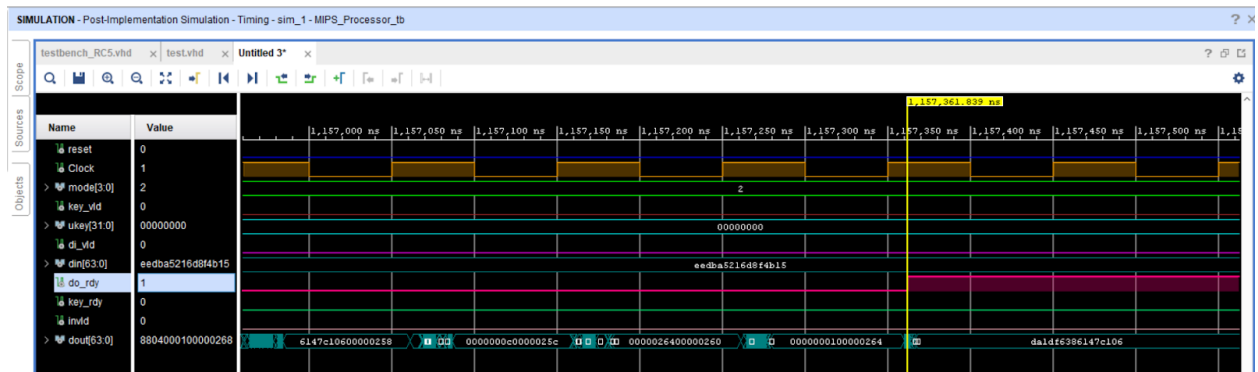
As seen from the screenshot above, key_rdy signal goes high which shows key expansion is completed and then do_rdy signal goes high, which shows encryption is completed and the mode is changed from 1(key_expansion) to 2(encryption).

Below are the additional screenshots for detailed operation view:

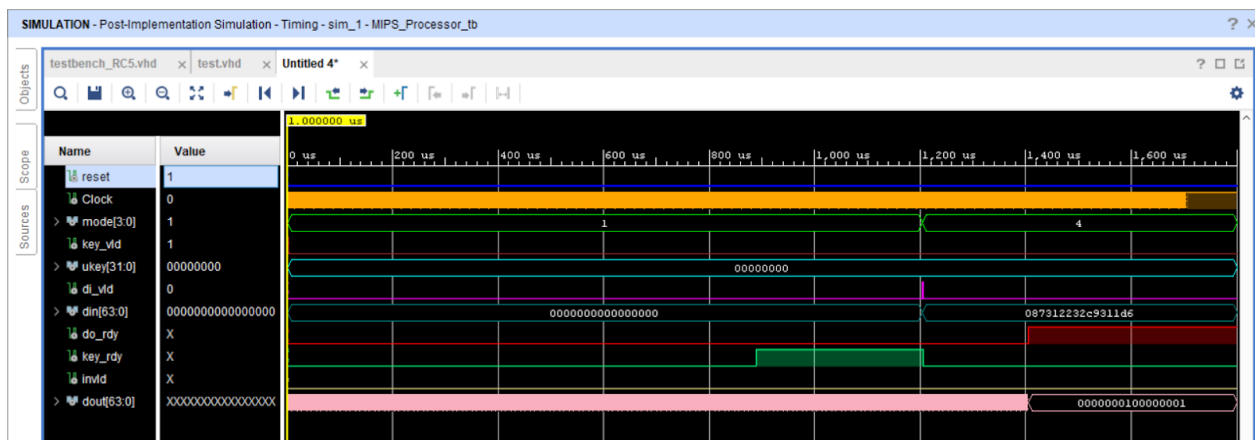
Reset - 1



Do_rdy - 1



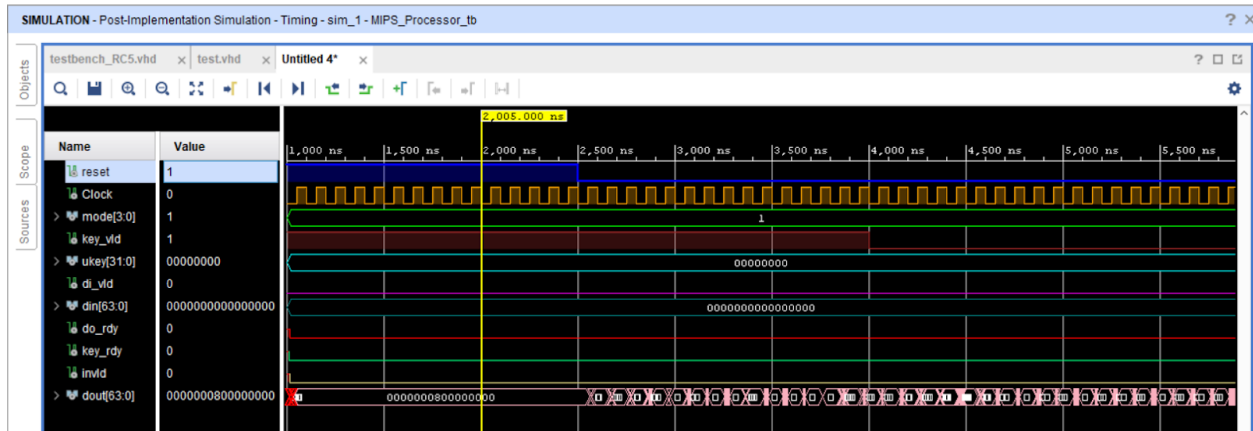
- 2) Key-expansion + decryption
 Din: 087312232c9311d6
 Dout: 0000000100000001



As seen from the screenshot above, key_rdy signal goes high which shows key expansion is completed and then do_rdy signal goes high, which shows encryption is completed and the mode is changed from 1(key_expansion) to 4(decryption).

Below are the additional screenshots for detailed operation view:

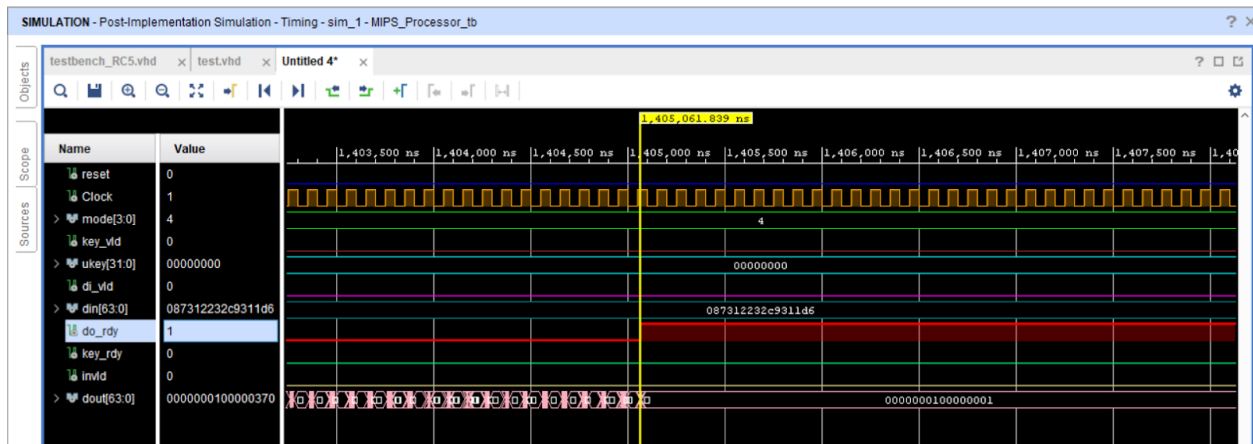
Reset – 1



Key_rdy - 1



Do_rdy – 1



3) Key-expansion + encryption + encryption

First Encryption:

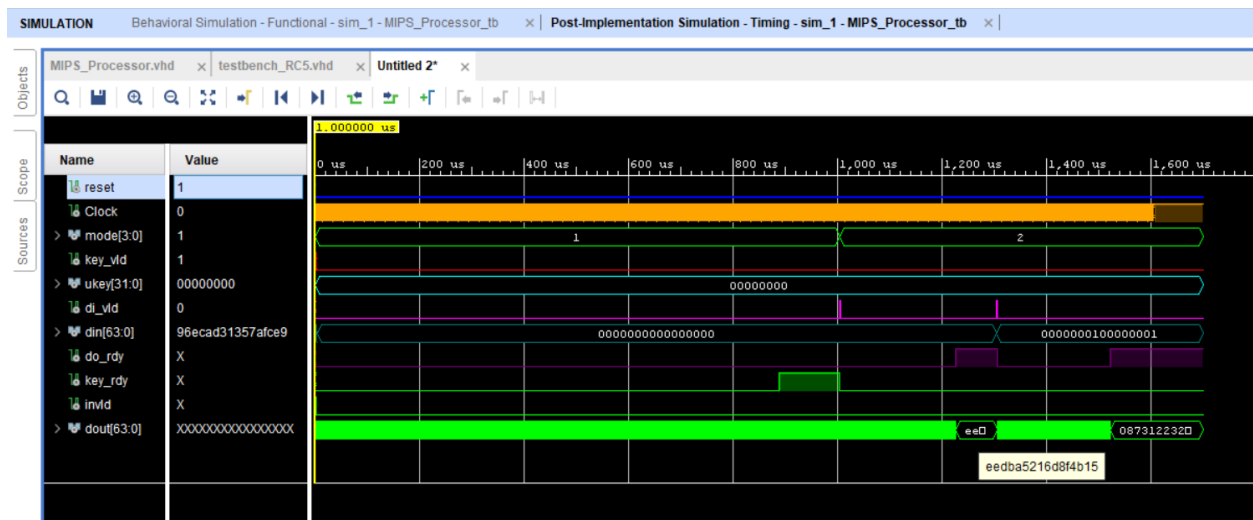
Din: 0000000000000000

Dout: eedba5216d8f4b15

Second Encryption:

Din : 0000000100000001

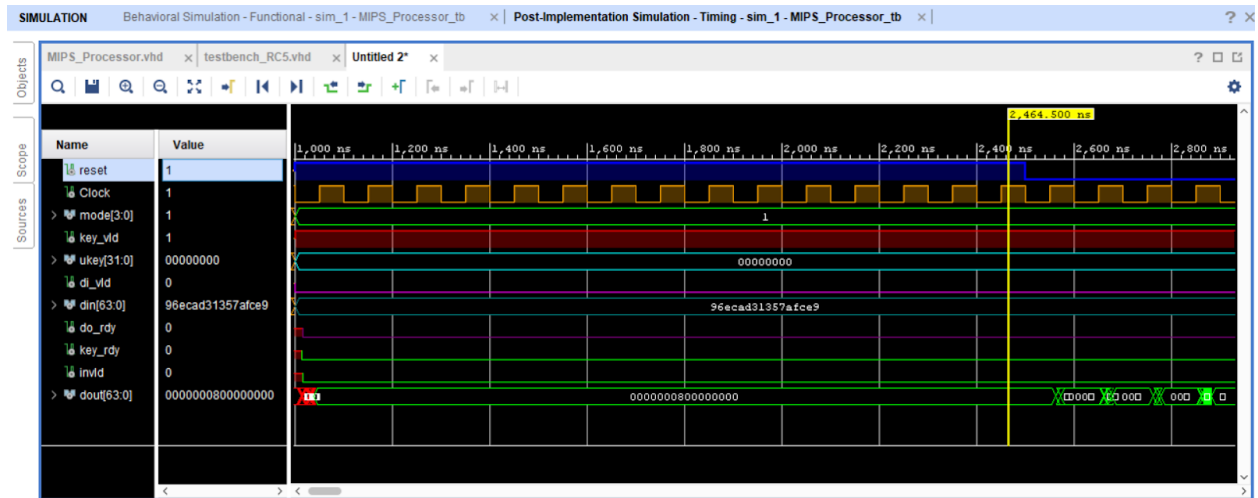
Dout: 087312232c9311d6



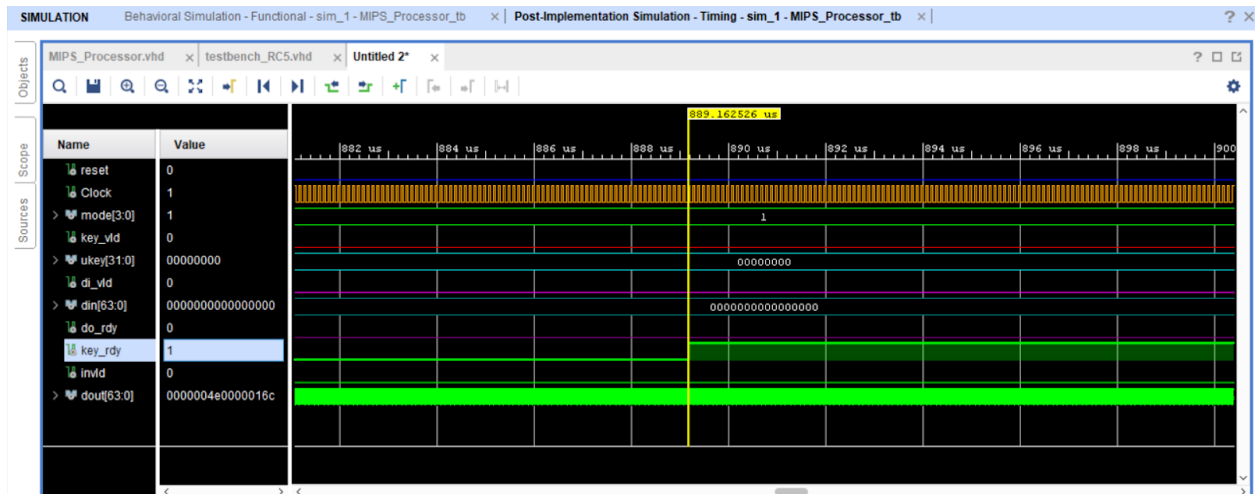
As seen from the screenshot above, key_rdy signal goes high which shows key expansion is completed and then do_rdy signal goes high, which shows encryption is completed and the mode is changed from 1(key_expansion) to 2(encryption).

Below are the additional screenshots for detailed operation view:

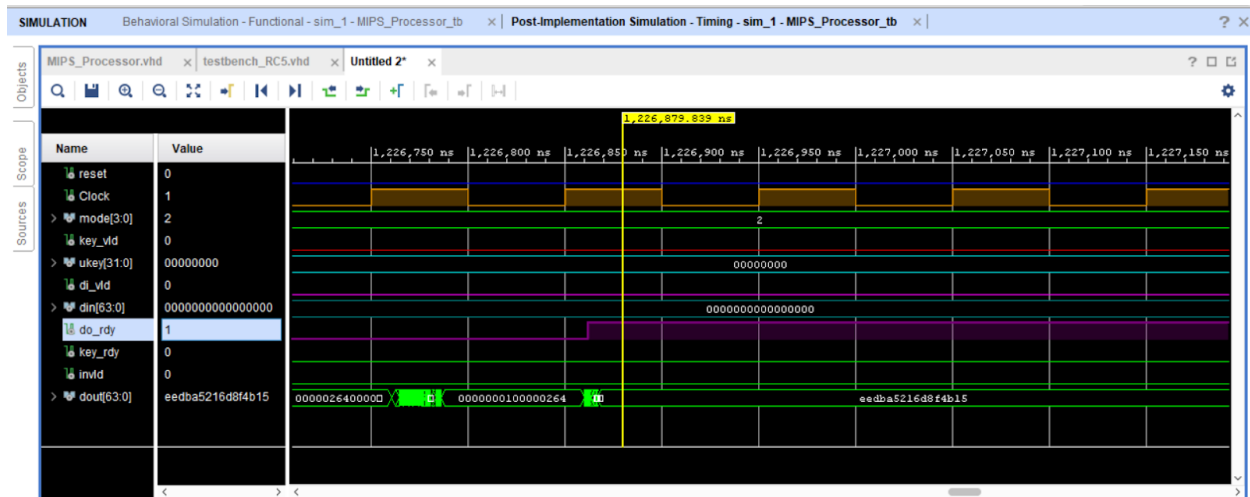
Reset - 1



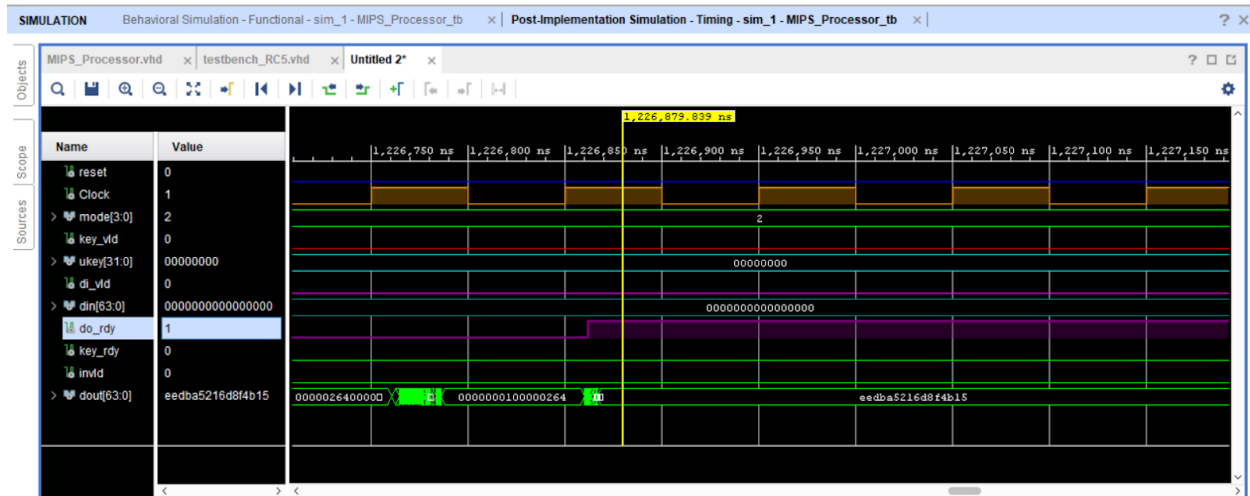
key_rdy – 1 for 1st Encyption



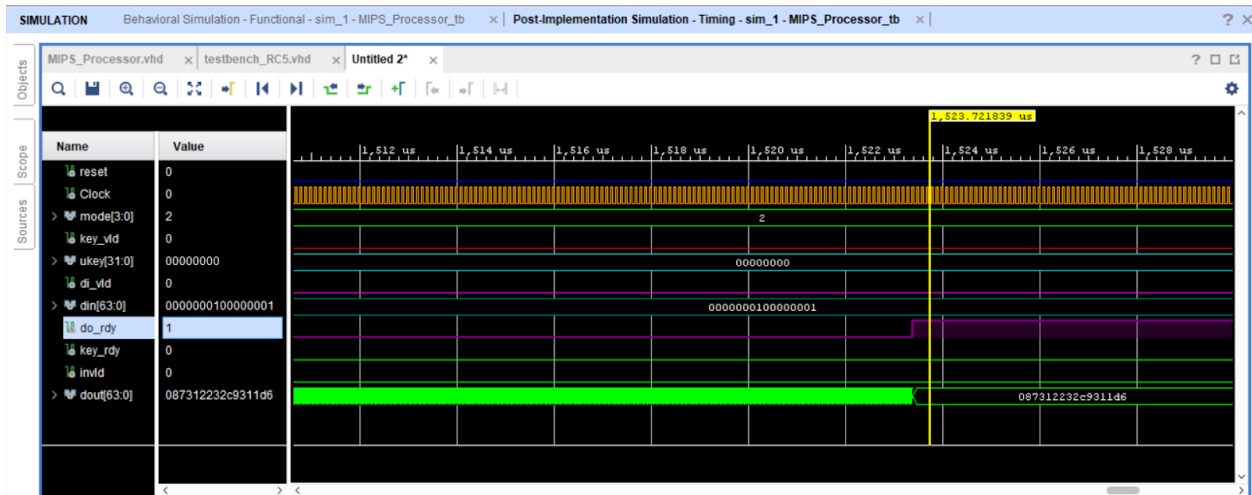
key_rdy – 1 for 2nd Encyption



Do_rdy – 1 for 1st Encryption



Do_rdy – 1 for 2nd Encryption



3) Key-expansion + decryption + encryption

First Decryption:

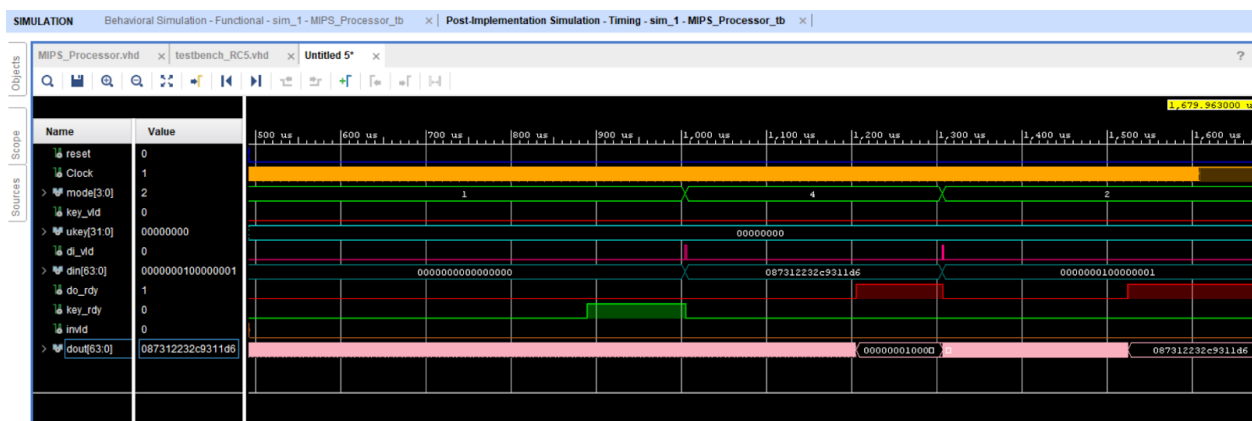
Din: 087312232c9311d6

Dout: 0000000100000001

Second Encryption:

Din : 0000000100000001

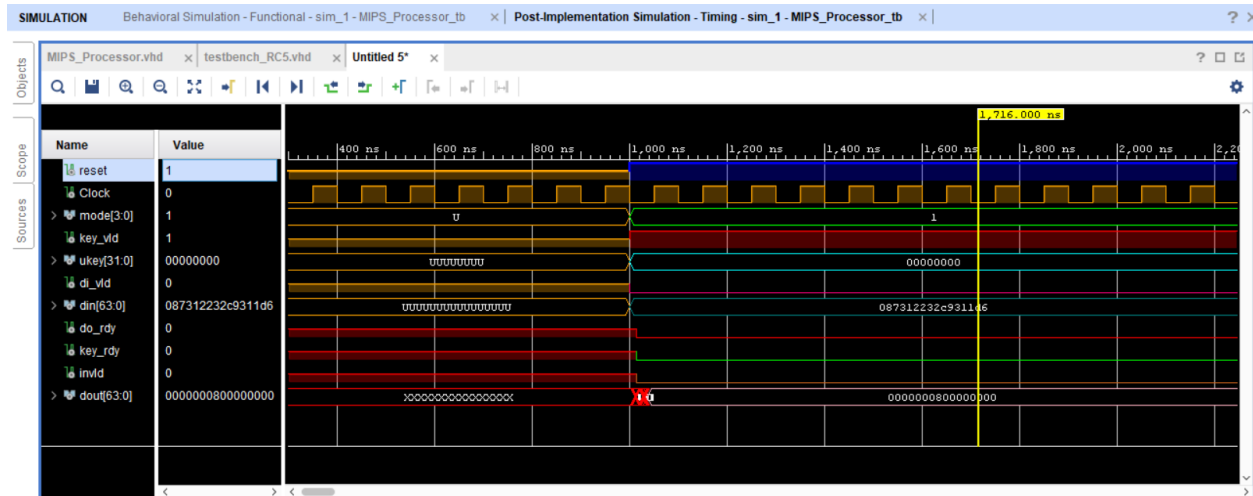
Dout: 087312232c9311d6



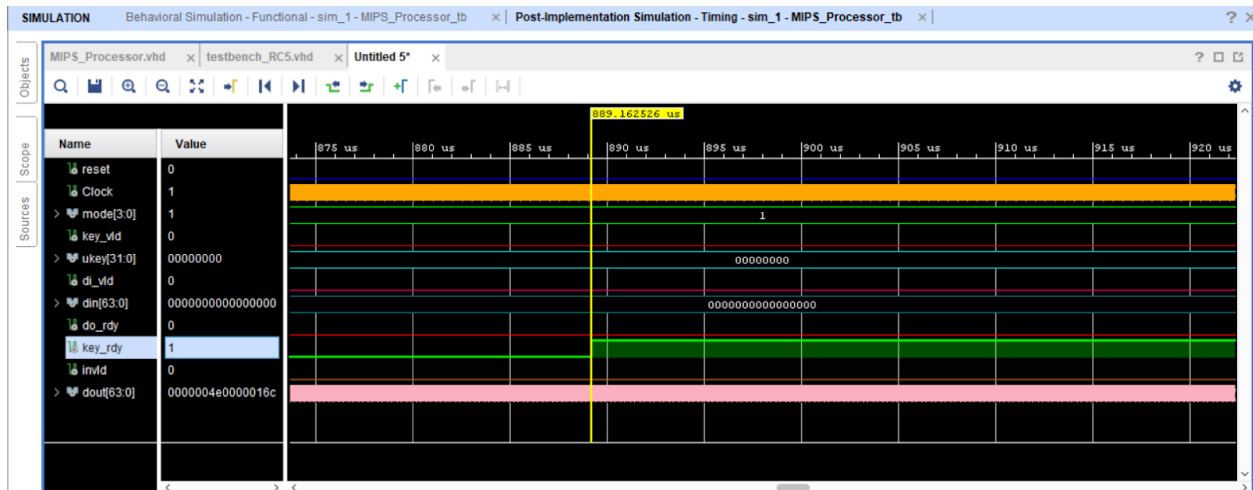
As seen from the screenshot above, key_rdy signal goes high which shows key expansion is completed and then do_rdy signal goes high, which shows encryption is completed and the mode is changed from 1(key_expansion) to 4(decryption) and finally 2(encryption).

Below are the additional screenshots for detailed operation view:

Reset - 1



Key_rdy - 1



Do_rdy – 1 for Decryption

