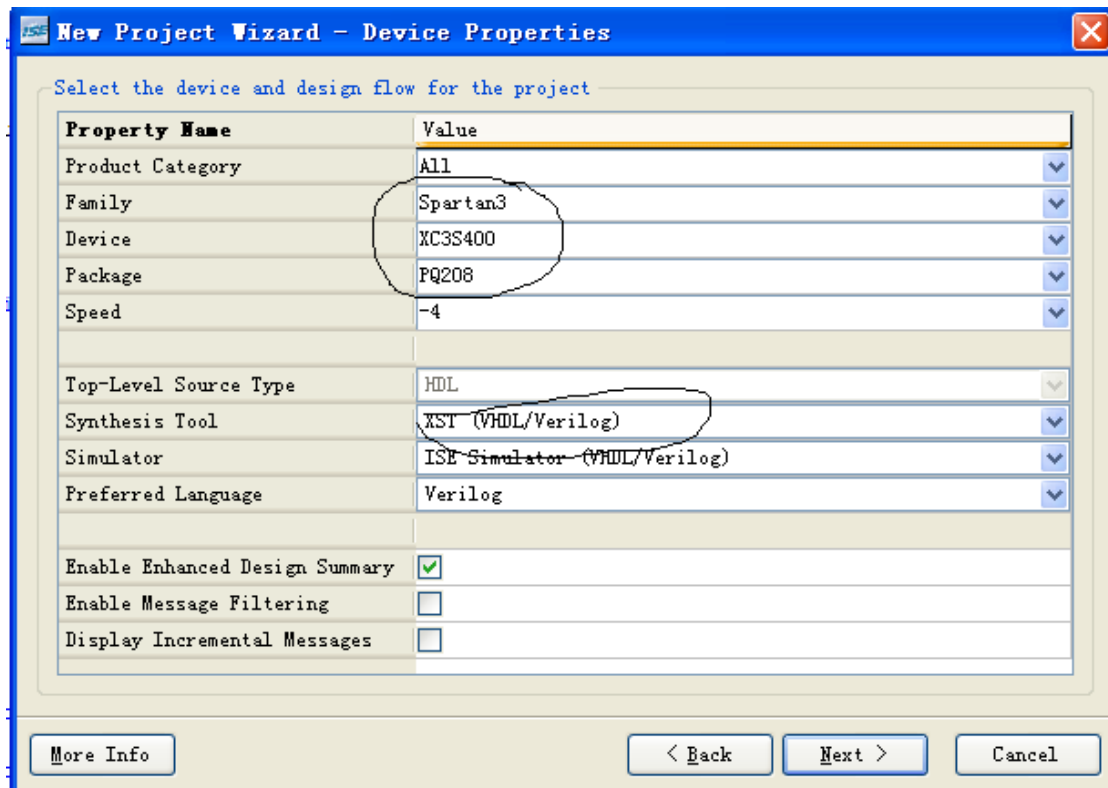
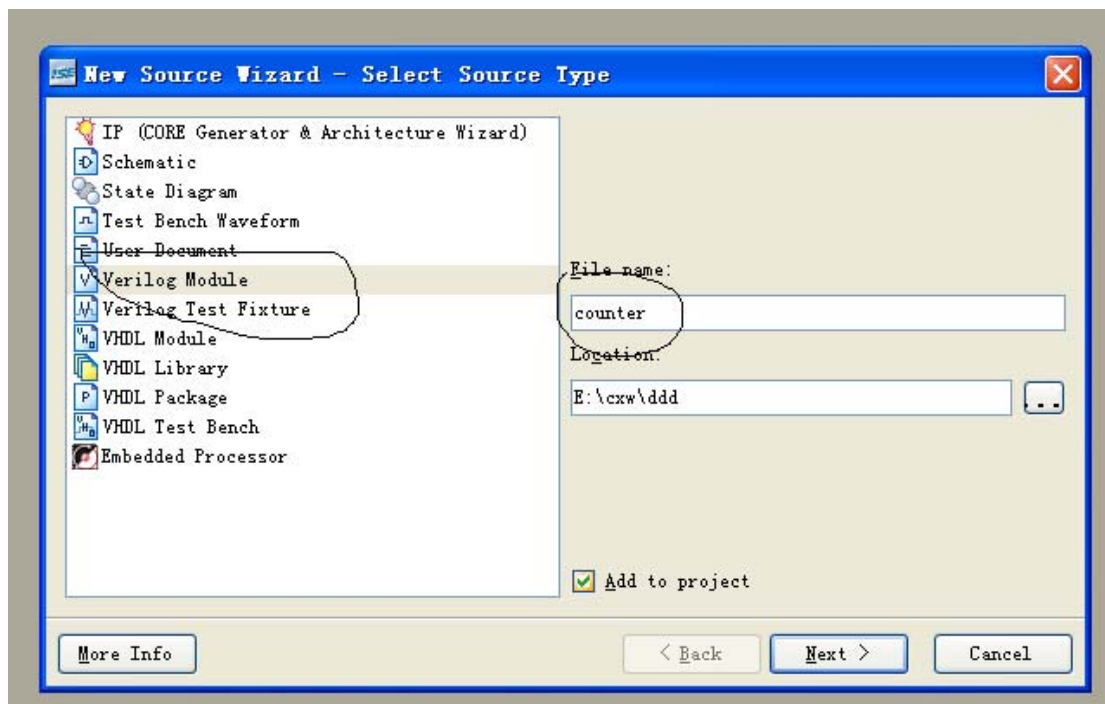
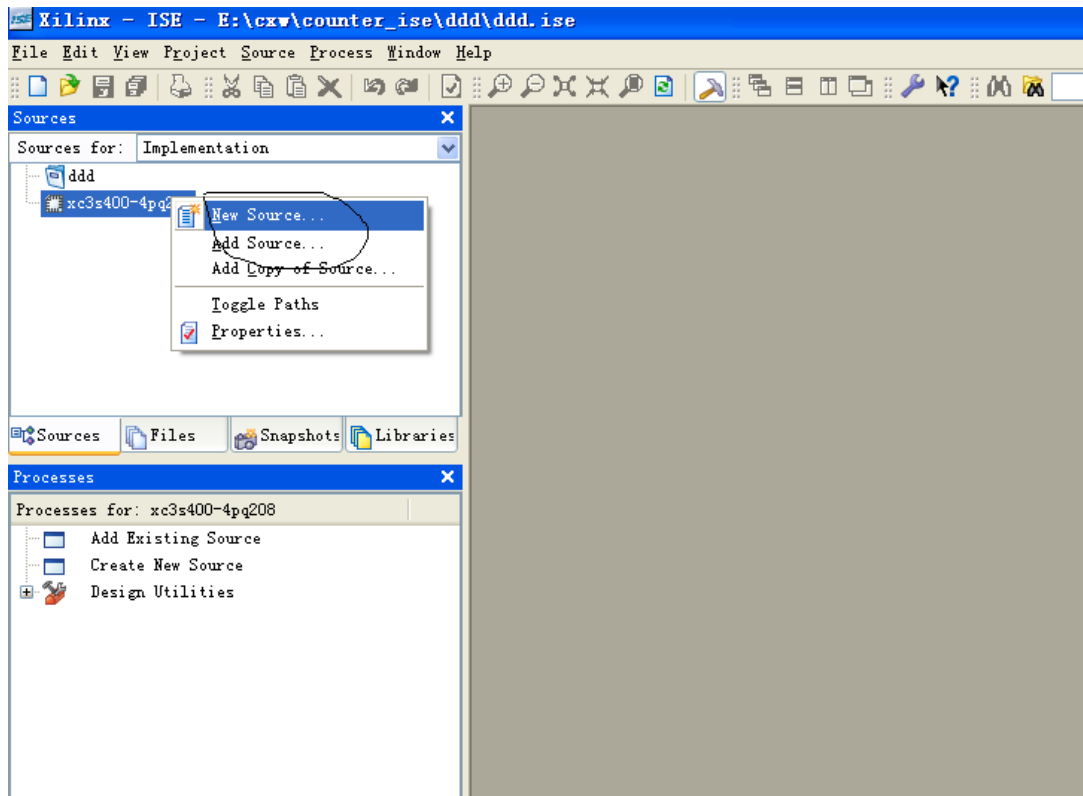


一、ISE 使用方法

- 1、新建项目： **File->new project** 在对话框中填写项目名称，下一步
- 2、在如下对话框中选择话



- 3、点击“下一步”，直至结束。
- 4、新建文件 verilog module 文件: song.v



```
`timescale 1ns / 1ps
////////////////////////////////////////////////////////////////
module song(clk_6mhz, clk_4hz ,sp,high ,med,low);

input clk_6mhz,clk_4hz;
```

```
output sp;
output[3:0]high,med,low;
reg[3:0]high,med,low;
reg[13:0]divider,origin;
reg[7:0]counter;
reg sp;
wire carry;

assign carry=(divider==16383);

always @(posedge clk_6mhz)
begin  if(carry)divider=origin;
        else      divider=divider+1;
end

always@(posedge carry)
begin
    sp =~sp;
end

//tone maker
always@(posedge clk_4hz)
begin
    case({high ,med ,low })
        'b0000000000011:    origin=7281;
        'b0000000000101:    origin=8730;
        'b0000000000110:    origin=9565;
        'b0000000000111:    origin=10310;
        'b000000010000:      origin=10647;
        'b000000100000:      origin=11272;
        'b000000110000:      origin=11831;
        'b000001010000:      origin=12556;
        'b000001100000:      origin=12974;
        'b000100000000:      origin=13516;
        'b000000000000:      origin=16383;
    endcase
end

//tone index
always@(posedge clk_4hz)
begin
    if(counter==50)          counter=0;
    else counter=counter+1;
end
```

```
case(counter)
0:  {high,med,low}='b000000000011;

1:  {high,med,low}='b000000000011;
2:  {high,med,low}='b000000000011;
3:  {high,med,low}='b000000000011;
4:  {high,med,low}='b000000000101;
5:  {high,med,low}='b000000000101;
6:  {high,med,low}='b000000000101;
7:  {high,med,low}='b000000000110;
8:  {high,med,low}='b000000010000;
9:  {high,med,low}='b000000010000;
10: {high,med,low}='b000000010000;
11: {high,med,low}='b000000010000;
12: {high,med,low}='b00000000110;
13: {high,med,low}='b000000010000;
14: {high,med,low}='b00000000101;
15: {high,med,low}='b00000000101;

16: {high,med,low}='b000001010000;
17: {high,med,low}='b000001010000;
18: {high,med,low}='b000001010000;
19: {high,med,low}='b000100000000;
20: {high,med,low}='b000001100000;
21: {high,med,low}='b000001010000;
22: {high,med,low}='b000000110000;
23: {high,med,low}='b000001010000;
24: {high,med,low}='b000000100000;
25: {high,med,low}='b000000100000;
26: {high,med,low}='b000000100000;
27: {high,med,low}='b000000100000;
28: {high,med,low}='b000000100000;
29: {high,med,low}='b000000100000;
30: {high,med,low}='b000000100000;
31: {high,med,low}='b000000100000;

32: {high,med,low}='b000000100000;
33: {high,med,low}='b000000100000;
34: {high,med,low}='b000000100000;
35: {high,med,low}='b000000110000;
36: {high,med,low}='b000000000111;
37: {high,med,low}='b000000000111;
```

```
38: {high,med,low}='b000000000110;
39: {high,med,low}='b000000000110;
40: {high,med,low}='b000000000101;
41: {high,med,low}='b000000000101;
42: {high,med,low}='b000000000101;
43: {high,med,low}='b000000000110;
44: {high,med,low}='b000000010000;
45: {high,med,low}='b000000010000;
46: {high,med,low}='b000000100000;
47: {high,med,low}='b000000100000;
default:{high,med,low}='d0;

//后边乐曲片断此处省略
    endcase
end

endmodule
```

5、新建 puf 文件，

#PACE: Start of Constraints generated by PACE

#PACE: Start of PACE I/O Pin Assignments

NET "clk" LOC = "p76" ;

NET "rst_n" LOC = "p152" ;

NET "sp" LOC = "p15" ;

#NET "led[0]" LOC = "P200";

#NET "led[1]" LOC = "P203";

#NET "led[2]" LOC = "P204";

#PACE: Start of PACE Area Constraints

#PACE: Start of PACE Prohibit Constraints

#PACE: End of Constraints generated by PACE

5、在 source 中选择项目 (top.v)

6、Synthesize-XST 双击，进行综合

7、双击 implement Design 实现

8、下载

双击 Generate Programming File ...

选择*.bit 文件

9、固化

...