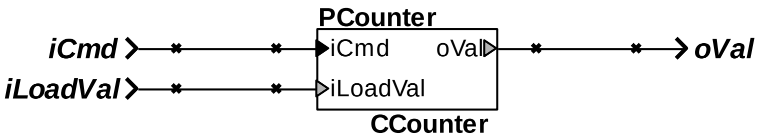
ExamplesSeq 01 Counter

This example illustrates the sequential implementation of a counter.

The psC program

The main schematic of the counter is:



The counter has two input ports and one output port, the count value “oVal”. It receives commands on “iCmd” and the “iLoadVal” is used to change the output “oVal”. The commands are defined in a small library:

```
library CounterLib
{
    enum Cmd_t { cReset, cUp, cDown, cLoad };
};
```

The psC code of the counter is self explanatory:

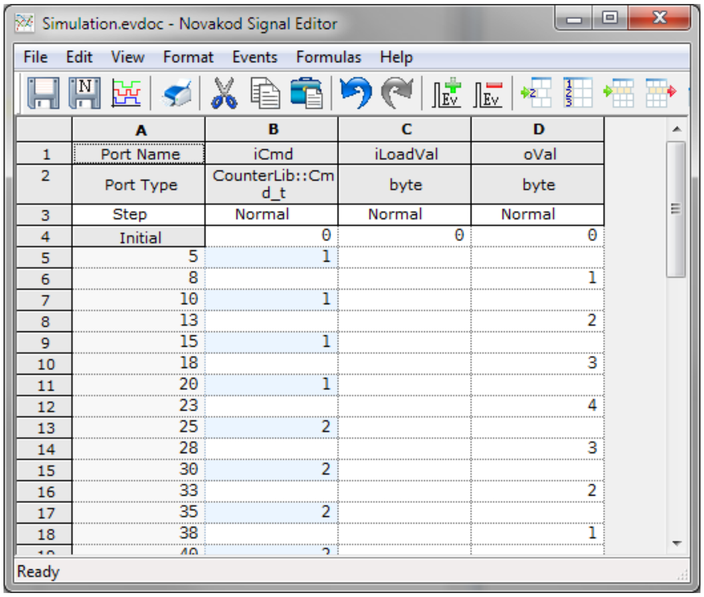
```
component CCounter (in  active  Cmd_t iCmd,
                    in  passive byte  iLoadVal,
                    out passive byte  oVal)
{
    sequential ExecCmd()
    {                             // PC
        while(!istrig(iCmd)) {};  // 0

        switch(iCmd)              // 1
        {
            case cReset:
                oVal = 0b;        // 2
                break(true);      // 3
            case cUp:
                oVal++;           // 4
                break(true);      // 5
            case cDown:
                oVal--;           // 6
                break(true);      // 7
            case cLoad:
                oVal = iLoadVal;  // 8
        };  // Infinite loop         9
    };
};
```

Compiling and running the application

You will now compile and execute the program, then use the signal editor and signal viewer to see the results.

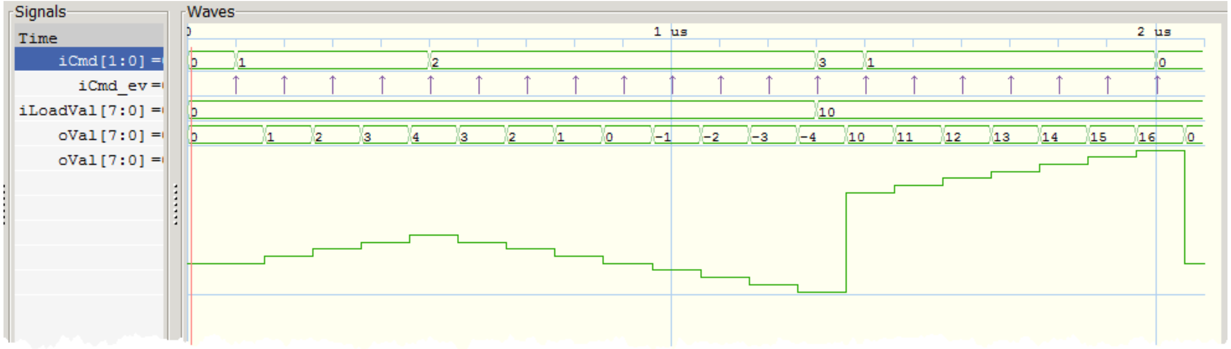
1) Double-click on “main.rpj” to start Novakod Studio.
2) Double-click on the “main” component to view the schematic.
3) Now select the menu Run→Run N Steps to simulate.
4) Double click on “Simulation.evo”. You will see the simulated outputs.


Simulation.evdoc - Novakod Signal Editor
File Edit View Format Events Formulas Help
Ready

	A	B	C	D
1	Port Name	iCmd	iLoadVal	oVal
2	Port Type	CounterLib::Cmd_t	byte	byte
3	Step	Normal	Normal	Normal
4	Initial	0	0	0
5	5	1		
6	8			1
7	10	1		
8	13			2
9	15	1		
10	18			3
11	20	1		
12	23			4
13	25	2		
14	28			3
15	30	2		
16	33			2
17	35	2		
18	38			1
19	40	2		

As it is executed sequentially, it takes a few cycles for the output to change. A command is sent every 5 steps and the result appears 3 steps later.

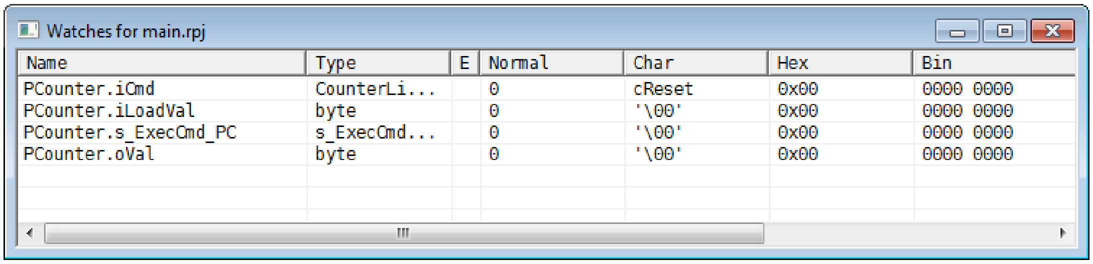
5) In the signal editor click the view signal button to see the signals:



Running in watch mode

For a better understanding of sequential execution, you can execute in watch mode.

1) Now select the menu Run→Paused to begin simulation.
2) Add the signals from the Inspect windows, as shown:



Name	Type	E	Normal	Char	Hex	Bin
PCounter.iCmd	CounterLi...		0	cReset	0x00	0000 0000
PCounter.iLoadVal	byte		0	'\00'	0x00	0000 0000
PCounter.s_ExecCmd_PC	s_ExecCmd...		0	'\00'	0x00	0000 0000
PCounter.oVal	byte		0	'\00'	0x00	0000 0000

3) Click on F8 to single step and observe the watch window changes, specially the PC – Program Counter.