
VHDL Coding Guidelines


The Twenty Commandments: 1 - 10

1. Do not use the types **bit** and **bit_vector**
2. Recommended data types:
 - * **std_logic, std_logic_vector**
 - * **unsigned, signed**
 - * **integer, natural**
 - * **enumerated data types**
 - * **array, records**
3. Do not use **after** statements in synthesizable code
4. Use sequential coding for both combinational and sequential logic
5. Use concurrent statements with extreme moderation
6. Do not use the port type **INOUT** and **BUFFER**
7. Do not use of latches (our focus is the design of synchronous digital systems)
8. Do not use **wait** statements in synthesizable code
9. The only type of synthesizable loop is the **for-loop**
10. VHDL coding styles: **behavioral, RTL, structural**

The Twenty Commandments: 11 - 16

11. Limit the use of the term **behavioral** to **non synthesizable** code (e.g. testbenches or models of blocks such as RAMs, ROMs, ..., IP cores).
12. Limit the use of the term **RTL** to **synthesizable high level** code
13. Limit the use of **structural** coding to tie together the various units you have designed (i.e. use structural coding to provide **hierarchy**)
14. Use **generic** with extreme moderation
15. Use **generate** statements with even more moderation
16. If you decide to use **generic** and/or **generate** make sure to understand the automatic “naming convention” used by your synthesis tool and verify it doesn’t break any other CAD tool “naming convention”

The Twenty Commandments: 17-20

17. The use of **function** and **procedure** in RTL code is strongly discouraged (... but strongly encouraged in testbenches ← behavioral coding)
 **Think Hardware**
18. Using sequential coding for combinational logic:
 - * Make sure all signals “read” in the process are in sensitivity list
 - * Make sure all output signals are defined for all possible input combinations
 - * Make sure to do not have the same signal both on the right and left hand side of an assignment (δ delay issue)
19. Use variable to “compute” intermediate values
20. Make sure your code does not originate multiple drivers