

VHDL Version (1A)

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VHDL Versions

VHDL-87	IEEE 1076-1987
VHDL-93	IEEE 1076-1993
VHDL-2000	IEEE 1076-2000
VHDL-2002	IEEE 1076-2002
VHDL-2006	IEEE 1076-2006
VHDL-2008	IEEE 1076-2008

VHDL-87

IEEE 1076-1987

The initial version of VHDL included a wide range of data types,

- numerical ([integer](#) and [real](#)),
- logical ([bit](#) and [boolean](#)),
- [character](#)
- [time](#)
- arrays of bit called [bit_vector](#)
- arrays of character called [string](#)

IEEE 1164

A problem in VHDL-87, however, was "[multi-valued logic](#)".

a signal's drive strength ([none](#), [weak](#) or [strong](#)) and [unknown](#) values should be considered.

IEEE standard 1164 defined the [9-value logic types](#):

- scalar [std_ulogic](#) and
- its vector version [std_ulogic_vector](#).

VHDL-93

IEEE 1076-1993

made the **syntax** more consistent,
allowed more flexibility in **naming**,
extended the **character type** to allow ISO-8859-1 printable characters,
added the xnor operator, etc.

[specify]

Incompatibility with VHDL-87

the syntax of **file** declaration has changed (this is the most visible source of incompatibility)

new keywords were introduced

(**group**, **impure**, **inertial**, **literal**, **postponed**, **pure**, **reject**,

rol, **ror**, **sla**, **sll**, **sra**, **srl**,

unaffected, **xnor**, **shared**)

some **dynamic behaviours** have changed (the **concatenation** is one of them),

rules have been added.

VHDL-2000, VHDL-2002

VHDL-2000

IEEE 1076-2000

VHDL-2002

IEEE 1076-2002

Minor changes in the standard (2000 and 2002) added the idea of **protected types** (similar to the concept of class in C++) removed some restrictions from **port mapping rules**.

IEEE 1076.1, 2, 3

In addition to IEEE standard 1164, several child standards were introduced to extend functionality of the language. IEEE standard **1076.2** added better handling of **real** and **complex data types**. IEEE standard **1076.3** introduced **signed** and **unsigned** types to facilitate arithmetical operations on **vectors**. IEEE standard **1076.1** (known as **VHDL-AMS**) provided **analog** and **mixed-signal** circuit design extensions.

VITAL

Some other standards support wider use of VHDL, notably **VITAL (VHDL Initiative Towards ASIC Libraries)** and microwave circuit design extensions.

VHDL-2006

IEEE 1076-2006

In June 2006, the VHDL Technical Committee of Accellera (delegated by IEEE to work on the next update of the standard) approved so called Draft **3.0** of **VHDL-2006**.

maintaining full compatibility with older versions

providing numerous extensions that make writing and managing VHDL code easier

- **incorporation** of child standards (1164, 1076.2, 1076.3) into the main 1076 standard
- an **extended** set of **operators**
- more **flexible syntax** of **case** and **generate** statements
- incorporation of **VHPI** (interface to C/C++ languages)
- and a subset of **PSL** (Property Specification Language)

These changes should improve *quality of synthesizable VHDL code*,
make *testbenches more flexible*,
and allow wider use of VHDL for *system-level descriptions*.

References

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