

BS IEC 62014-4:2015



BSI Standards Publication

IP-XACT, Standard Structure for Packaging, Integrating, and Reusing IP within Tool Flows

bsi.

...making excellence a habit.™

This is a preview. [Click here to purchase the full publication.](#)

National foreword

This British Standard is the UK implementation of IEC 62014-4:2015.

The UK participation in its preparation was entrusted to Technical Committee EPL/501, Electronic Assembly Technology.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2015.
Published by BSI Standards Limited 2015

ISBN 978 0 580 89378 0
ICS 25.040

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2015.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------



IEC 62014-4

Edition 1.0 2015-03

INTERNATIONAL IEEE Std 1685™-2009 STANDARD

IP-XACT, Standard Structure for Packaging, Integrating, and Reusing IP within Tool Flows

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040

ISBN 978-2-8322-2265-2

Warning! Make sure that you obtained this publication from an authorized distributor.

Contents

1.	Overview.....	1
1.1	Scope.....	1
1.2	Purpose.....	2
1.3	Design environment.....	2
1.4	IP-XACT Enabled implementations.....	6
1.5	Conventions used.....	7
1.6	Use of color in this standard.....	12
1.7	Contents of this standard.....	12
2.	Normative references.....	13
3.	Definitions, acronyms, and abbreviations.....	15
3.1	Definitions.....	15
3.2	Acronyms and abbreviations.....	21
4.	Interoperability use model.....	23
4.1	Roles and responsibilities.....	23
4.2	IP-XACT IP exchange flows.....	24
5.	Interface definition descriptions.....	27
5.1	Definition descriptions.....	27
5.2	Bus definition.....	27
5.3	Abstraction definition.....	30
5.4	Ports.....	31
5.5	Wire ports.....	32
5.6	Qualifiers.....	34
5.7	Wire port group.....	36
5.8	Wire port mode constraints.....	38
5.9	Wire port mirrored-mode constraints.....	39
5.10	Transactional ports.....	41
5.11	Transactional port group.....	43
5.12	Extending bus and abstraction definitions.....	44
5.13	Clock and reset handling.....	47
6.	Component descriptions.....	49
6.1	Component.....	49
6.2	Interfaces.....	52
6.3	Interface interconnections.....	52
6.4	Complex interface interconnections.....	54
6.5	Bus interfaces.....	56
6.6	Component channels.....	67
6.7	Address spaces.....	69
6.8	Memory maps.....	81
6.9	Remapping.....	97
6.10	Registers.....	102
6.11	Models.....	120
6.12	Component generators.....	151
6.13	File sets.....	153
6.14	Choices.....	165

6.15 White box elements	167
6.16 White box element reference	168
6.17 CPUs	170
7. Design descriptions.....	171
7.1 Design	171
7.2 Design component instances.....	173
7.3 Design interconnections.....	175
7.4 Active, monitored, and monitor interfaces	176
7.5 Design ad hoc connections	178
7.6 Design hierarchical connections	180
8. Abtractor descriptions	183
8.1 Abtractor.....	183
8.2 Abtractor interfaces	185
8.3 Abtractor models	187
8.4 Abtractor views	189
8.5 Abtractor ports.....	191
8.6 Abtractor wire ports	193
8.7 Abtractor generators	195
9. Generator chain descriptions	199
9.1 generatorChain.....	199
9.2 generatorChainSelector.....	201
9.3 generatorChain component selector.....	202
9.4 generatorChain generator.....	203
10. Design configuration descriptions	207
10.1 Design configuration.....	207
10.2 designConfiguration.....	207
10.3 generatorChainConfiguration	209
10.4 interconnectionConfiguration	211
11. Addressing and data visibility.....	213
11.1 Calculating the bit address of a bit in a memory map	213
11.2 Calculating the bus address at the slave bus interface	214
11.3 Address modifications of an interconnection	214
11.4 Address modifications of a channel	215
11.5 Addressing in the master.....	216
11.6 Visibility of bits	216
11.7 Address translation in a bridge	218
Annex A (informative) Bibliography	219
Annex B (normative) Semantic consistency rules	221
Annex C (normative) Common elements and concepts.....	245
Annex D (normative) Types.....	263
Annex E (normative) Dependency XPATH.....	267

Annex F (informative) External bus with an internal/digital interface 271

Annex G (normative) Tight generator interface..... 273

Annex H (informative) Bridges and channels..... 351

Annex I (informative) IEEE List of Participants.....361

IP-XACT, STANDARD STRUCTURE FOR PACKAGING, INTEGRATING, AND REUSING IP WITHIN TOOL FLOWS

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation.

IEEE Standards documents are developed within IEEE Societies and Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. IEEE develops its standards through a consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of IEEE and serve without compensation. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards. Use of IEEE Standards documents is wholly voluntary. IEEE documents are made available for use subject to important notices and legal disclaimers (see <http://standards.ieee.org/IPR/disclaimers.html> for more information).

IEC collaborates closely with IEEE in accordance with conditions determined by agreement between the two organizations.

- 2) The formal decisions of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees. The formal decisions of IEEE on technical matters, once consensus within IEEE Societies and Standards Coordinating Committees has been reached, is determined by a balanced ballot of materially interested parties who indicate interest in reviewing the proposed standard. Final approval of the IEEE standards document is given by the IEEE Standards Association (IEEE-SA) Standards Board.
- 3) IEC/IEEE Publications have the form of recommendations for international use and are accepted by IEC National Committees/IEEE Societies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC/IEEE Publications is accurate, IEC or IEEE cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications (including IEC/IEEE Publications) transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC/IEEE Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC and IEEE do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC and IEEE are not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or IEEE or their directors, employees, servants or agents including individual experts and members of technical committees and IEC National Committees, or volunteers of IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board, for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC/IEEE Publication or any other IEC or IEEE Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that implementation of this IEC/IEEE Publication may require use of material covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. IEC or IEEE shall not be held responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patent Claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

International Standard IEC 62014-4/ IEEE Std 1685-2009 has been processed through IEC technical committee 91: Electronics assembly technology, under the IEC/IEEE Dual Logo Agreement.

The text of this standard is based on the following documents:

IEEE Std	FDIS	Report on voting
1685 (2009)	91/1207/FDIS	91/1226/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The IEC Technical Committee and IEEE Technical Committee have decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IEEE Standard for IP-XACT, Standard Structure for Packaging, Integrating, and Reusing IP within Tool Flows

Sponsor

Design Automation Standards Committee

of the

IEEE Computer Society

and the

IEEE Standards Association Corporate Advisory Group

Approved 9 December 2009

IEEE SA-Standards Board

Grateful acknowledgment is made to The SPIRIT Consortium, Inc., for permission to use the following source material:

IP-XACT 1.2 and IP-XACT 1.5

Abstract: Conformance checks for eXtensible Markup Language (XML) data designed to describe electronic systems are formulated by this standard. The meta-data forms that are standardized include: components, systems, bus interfaces and connections, abstractions of those buses, and details of the components including address maps, register and field descriptions, and file set descriptions for use in automating design, verification, documentation, and use flows for electronic systems. A set of XML schemas of the form described by the World Wide Web Consortium (W3C®) and a set of semantic consistency rules (SCRs) are included. A generator interface that is portable across tool environments is provided. The specified combination of methodology-independent meta-data and the tool-independent mechanism for accessing that data provides for portability of design data, design methodologies, and environment implementations.

Keywords: abstraction definitions, address space specification, bus definitions, design environment, EDA, electronic design automation, electronic system level, ESL, implementation constraints, IP-XACT, register transfer level, RTL, SCRs, semantic consistency rules, TGI, tight generator interface, tool and data interoperability, use models, XML design meta-data, XML schema

AMBA is a registered trademark of ARM Limited.

Design Compiler and VCS are registered trademarks of Synopsys, Inc.

SystemC is a registered trademarks of Open SystemC Initiative, Inc. in the United States and other countries.

Verilog is a registered trademark of Cadence Design Systems, Inc. in the United States and/or other jurisdictions.

W3C is a registered trademark of the World Wide Web Consortium.

XMLSpy is a registered trademark of Altova GmbH in the U.S., the European Union and/or other countries.