ZONE	REV	REASON DESCRIPTION	DATE	DRAWN	APP'VD	DATE
	01	Initial Release per DCN 1570	05/03/90		JFC	
	02	Change per DCN 1680	05/22/90	JFC	SA	
	02a	S/W App Conversion per DCN 4004	01/13/93	KB	RT	
	03	Change per DCN 4925	12/29/93	YN	FM	
	04	Change per DCN 6991	06/19/95	CN	CN	06/19/95
	05	Change per DCN 7141	07/26/95	CN	CN	07/26/95
	06	Change per DCN 7264	08/28/95	KH	FM	09/01/95
	07	Change per DCN 7652	11/17/95	CN	CN	11/17/95
	08	Change per DCN 8862	10/22/96	CN	CN	10/23/96
	09	Change per DCN 10159	10/13/97	CN	CN	10/13/97
	10	Change per DCN 10256	11/5/97	CN	CN	11/5/97
	11	Change per DCN 11752	4/14/99	CN		

XILINX®

TITLE:
Quality Manual

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Unless otherwise specified, dimensions are in inches.

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A	QAP0002	11

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QUALITY MANUAL CONTROL

The Management Representative for ISO 9001 is responsible for revising the Quality Manual to ensure that all policies contained herein reflect the current policies of the Quality System. The Quality Manual shall be reviewed at a minimum of once per year and shall be revised when changes in the Quality System are made.

Any revisions to this Quality Manual must comply with the requirements of the International Organization for Standardization ISO 9001 (1994) and all military specifications specified in Section 2.0 of this manual. Final approval of all changes will require the signature of the Management Representative for ISO 9001, the Director of Quality Assurance, and the Chief Executive Officer of Xilinx.

Whenever there is a revision to the Quality Manual, Xilinx Document Control will update all controlled copies, incorporating revision changes into the new release. A revision history will be maintained by Document Control. An uncontrolled copy shall be issued to the ISO 9001 Registrar.

Controlled manuals are tracked by Xilinx's Document Control department, and are updated by Document Control whenever there is a revision to the Quality Manual. Controlled copies are stamped "Controlled" in red ink by Document Control (reference Section 5.0 of this manual). All other copies of this manual will be considered uncontrolled and may be distributed as needed to Xilinx's customers and suppliers. Uncontrolled manuals will not be maintained beyond the issue supplied at the time of request.

CORPORATE HEADQUARTERS

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Section 1.0

MANAGEMENT RESPONSIBILITY

Section 1.1

1.0 **TITLE: QUALITY POLICY**

2.0 **SCOPE:** This policy applies to all Xilinx employees, and, where applicable, to Xilinx's suppliers and subcontractors.

3.0 **PURPOSE:** To define and document the concepts that Xilinx management has established as a means to communicate its policy for quality, including objectives for quality and commitment to quality.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.1.1 Quality Policy
MIL-PRF-38535:	Appendix G, par. 30.3

5.0 **POLICY:**

5.1 The quality policy statement (displayed on the following page) has been established by Management to communicate Xilinx's total commitment to quality.

5.2 The quality policy statement reflects Xilinx's commitment towards meeting or exceeding customer goals and expectations through continuous improvement and excellence in Quality, Reliability, and On-Time Delivery.

5.3 It is the responsibility of the Quality Assurance department to ensure that this policy is understood, implemented and maintained at all levels of the organization.

5.4 The Management Review process (reference Section 1.6 of this manual) will review the quality system at defined intervals to ensure that the requirements of this quality policy are met.

5.5 A supplementary mission statement may be derived by other Xilinx facilities or departments for their own specific operation.

Willem P. Roelandts
Chief Executive Officer

Date:

Randy Ong
Vice President, Worldwide Operations

Date:

Joseph Fabula
Director, Quality Assurance

Date:

Section 1.2

1.0 **TITLE: RESPONSIBILITY AND AUTHORITY**

2.0 **SCOPE:** This policy applies to all employees of Xilinx.

3.0 **PURPOSE:** To define and document the responsibility, authority and interrelation of Xilinx personnel who manage, perform and verify work affecting quality.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.1.2.1 Responsibility and Authority
	4.1.2.2 Resources
	4.1.2.3 Management Representative
MIL-PRF-38535:	Appendix G, par. 30.2.1

5.0 **POLICY:**

5.1 **Organization:** Xilinx's Corporate Executive Organization, Manufacturing Operations Organization, and Quality Assurance Organization are shown in Section 1.3, Section 1.4, and Section 1.5, respectively. These organization charts graphically depict the interrelation of personnel who manage, perform and verify work affecting quality. In general, the various departments at Xilinx have additional documentation, such as detailed organization charts and job descriptions, which fully describe an employee's job function and responsibilities.

5.2 **Management Representative:** The Quality Assurance Manager has been appointed by the Vice President of Worldwide Operations to be the Management Representative for ISO 9001. Irrespective of other responsibilities, the Q.A. Manager has the overall responsibility and authority for ensuring that the quality system is established, implemented and maintained in accordance with the ISO 9001 International Standards.

5.3 **Management Responsibility:** In general, Xilinx's Management has both the responsibility for defining operating policies and the authority to ensure that these policies are followed.

5.4 **Quality Assurance Responsibility:** The Quality Assurance organization has the responsibility and authority for ensuring product quality consistent with Customer, Xilinx, and ISO 9001 requirements.

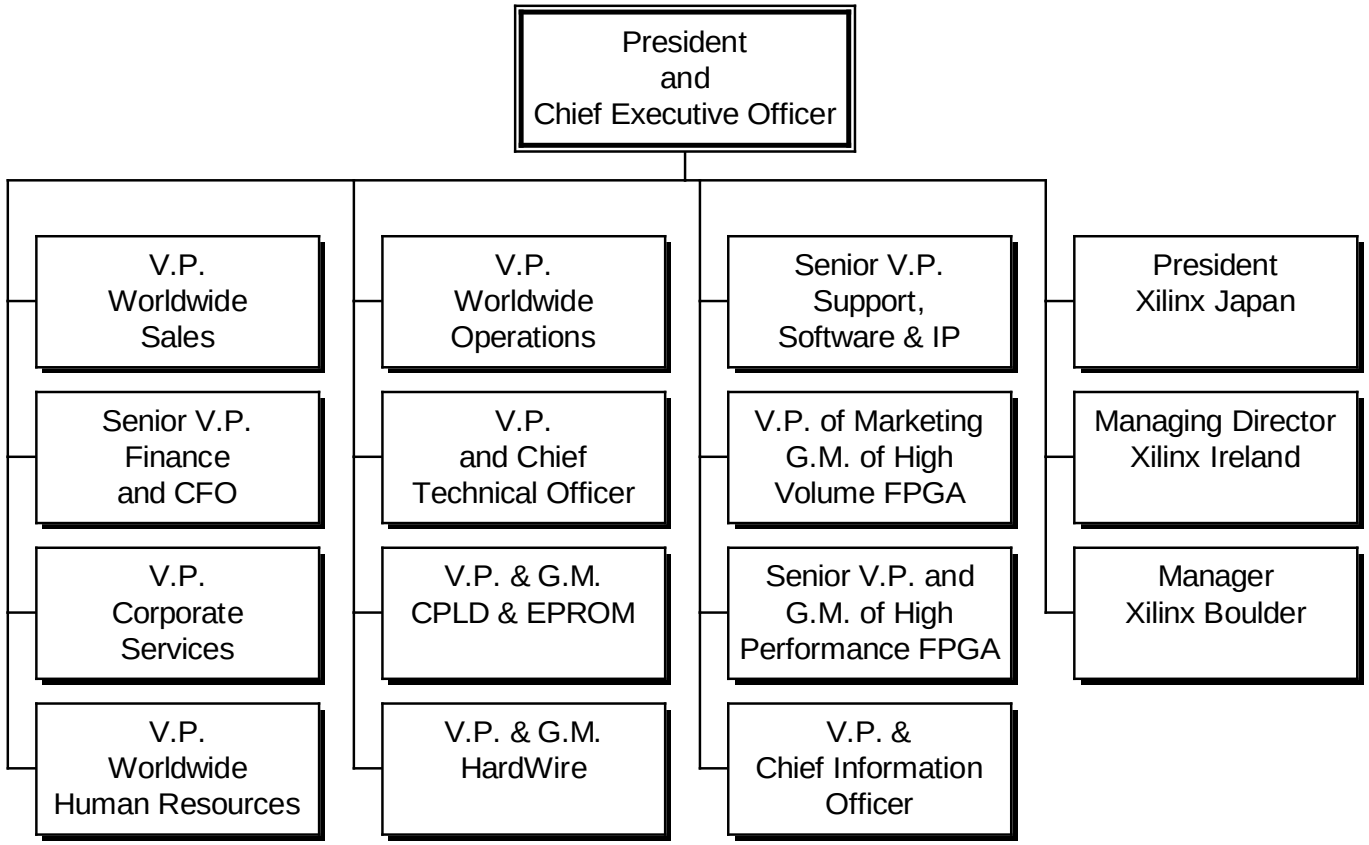
5.5 **Employee Responsibility:** Although the Q.A. department is responsible for product quality, every employee of Xilinx is responsible for the quality of their actions in support of the quality policy.

5.6 **Delegation of Authority:** In situations where employees are absent, their signature authority may be delegated to a designee. This may be accomplished by a memo stating the delegation of authority to the designee. When a delegation memo is not created, the designee shall be, by default, the absent employee's next level of management.

5.7 **Resources:** It is the responsibility of individual department management to ensure that adequate resources have been provided in order to meet the requirements of Xilinx's quality policy (reference Section 1.1 of this manual). Resource requirements may also be reviewed at Management Review Meetings (see Section 1.6). When it is determined that inadequate resources have been allocated so that the quality policy (see Section 1.1) cannot be met, Management has the responsibility to take appropriate actions.

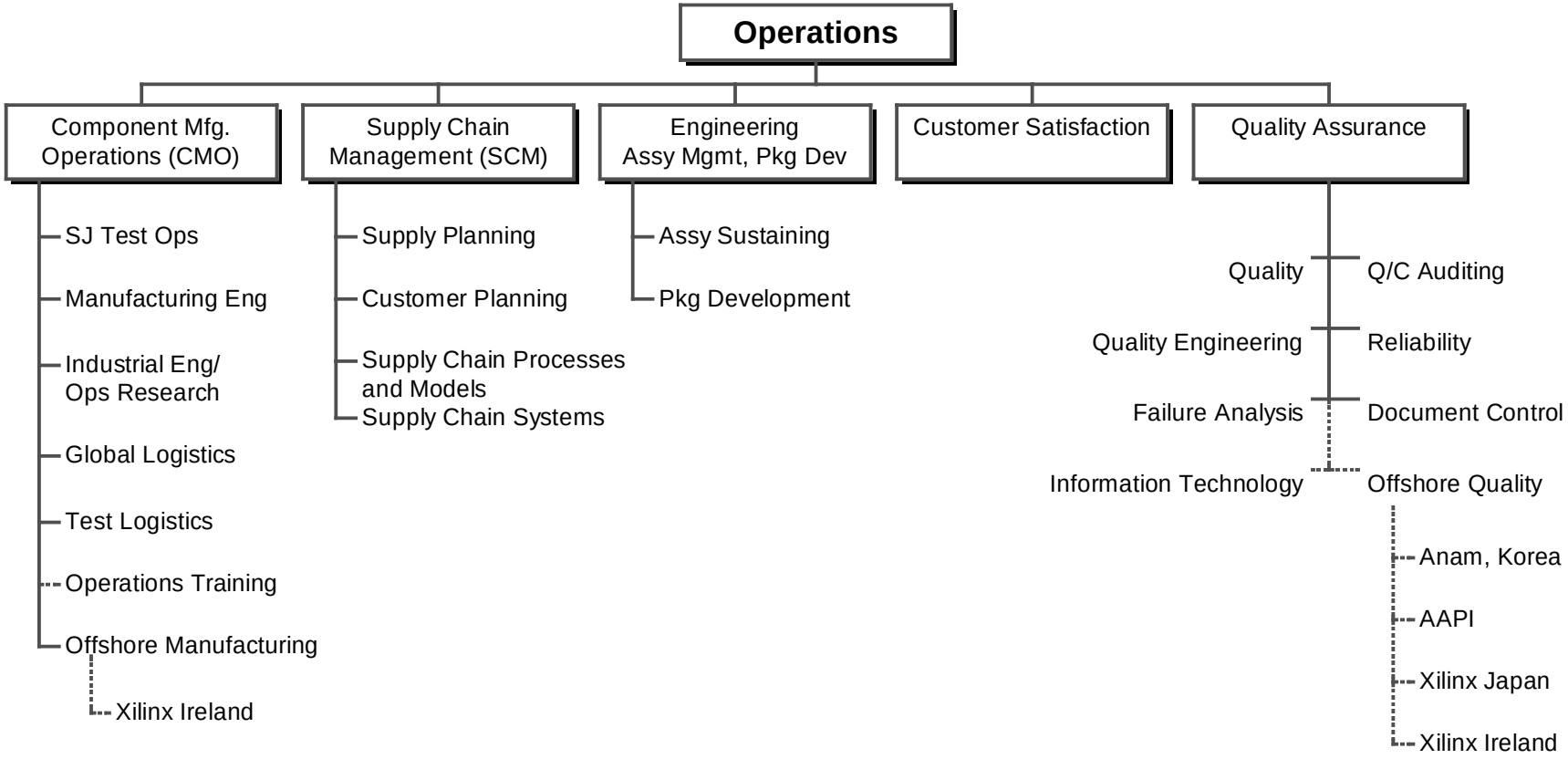
Section 1.3

Corporate Executive Organization



Section 1.4

Operations Organization



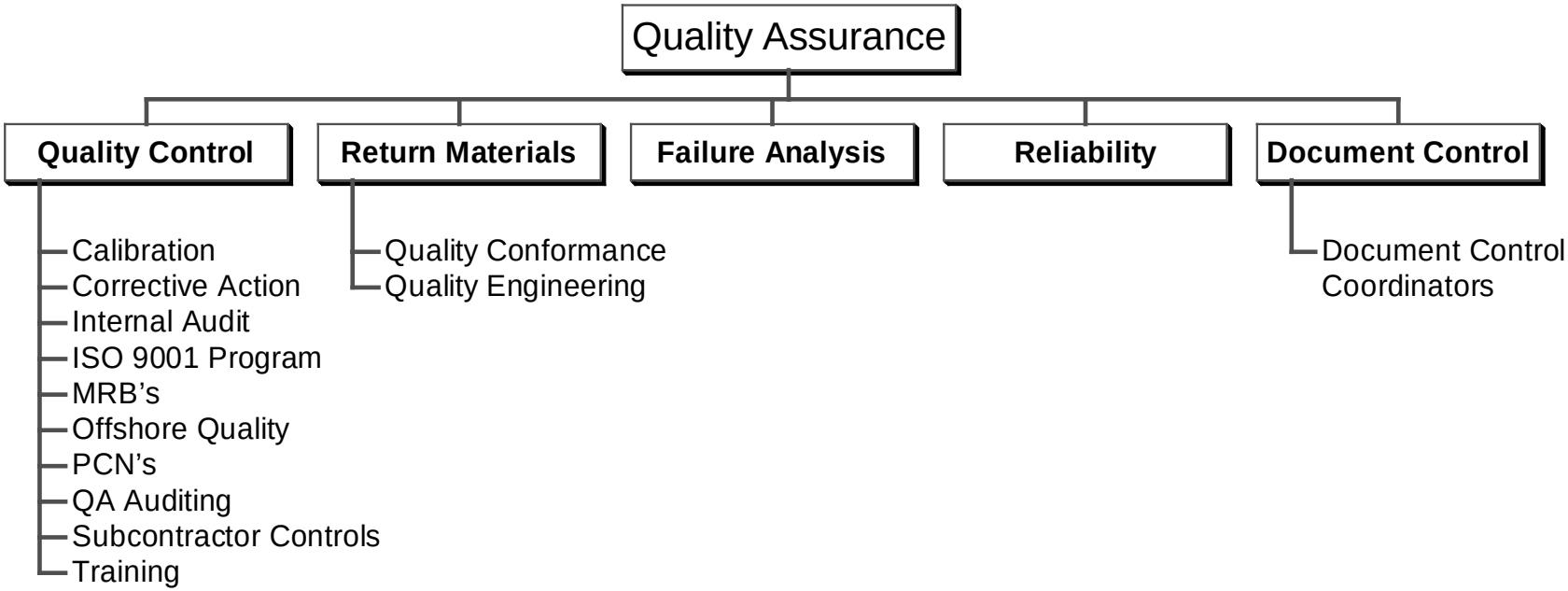
Operations Purpose:

Be the world's leader as viewed by our customers, among semiconductor companies in quality, service, and on-time delivery...

... by offering products at competitive prices by maintaining long term synergistic relationships and state of the art systems with our subcontractors/partners.

Section 1.5

Quality Assurance Organization



The Quality & Reliability organization has the responsibility and authority for ensuring product quality consistent with Customer, Xilinx, and ISO 9001 requirements.

Section 1.6

1.0 **TITLE: MANAGEMENT REVIEW**

2.0 **SCOPE:** This policy describes the Management Review Process of Xilinx's Quality System and manufacturing operations.

3.0 **PURPOSE:** To review the Quality System at defined intervals to ensure its continuing suitability and effectiveness in satisfying Xilinx's quality policy (reference Section 1.1 of this manual) and ISO 9001 requirements. This review will be used as a basis for improvement of the Quality System.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.1.3 Management Review
Xilinx Documents:	DPS0021, IC Design General Flow
	QAP0059, Record Retention Requirements
	QAP0093, TRB Management, Functions, and Responsibilities
MIL-PRF-38535:	Appendix G, par. 30.2.2

5.0 **POLICY:**

5.1 **Monthly Management Review Meeting:** On a monthly basis, Xilinx Management will hold a review of Xilinx's Quality Systems and Manufacturing Operations. Appropriate metrics will be reviewed to ensure the objectives of the quality policy (see Section 1.1) are being met.

5.1.1 Attendees for the Management Review meeting shall consist of the following members (or their designee):

- Vice President, Operations
- Director, Quality Assurance
- Director, Component Manufacturing
- Director, Supply Chain Integration
- Director, Engineering
- Management Representative for ISO 9001

5.1.2 As a minimum, the following will be reviewed and action items assigned as required:

- ☑ Quality and Reliability Indices (other than Quality Indices distributed per par 5.2.2)
- ☑ Delivery Performance

5.1.3 The Management Representative for ISO 9001 or designee will document all recommendations and actions that are derived from the Management Review meetings. Various vehicles may be used to implement required actions items, such as the Eight-Discipline Corrective Action System, the Quality Alert/Action System, Cross-functional teams designed to attack a particular issue, etc. The status and verification of effectiveness of assigned action items may be reviewed in subsequent Management Review meetings, other meetings attended by Xilinx Management, interoffice memos giving the updated status on an action or a project, etc.

5.2 **Other Management Review activities performed:** (in all of the following Management Review activities, top management is represented)

5.2.1 Meetings with Major Foundries and Subcontractors:

5.2.1.1 A meeting between Xilinx and its major foundries/subcontractors shall be held at a minimum of once every six months. As a minimum, the Vice President of Manufacturing Operations, Director of Engineering, Director of Quality Assurance, Director of Manufacturing, Product Engineering teams, Manufacturing Engineering, and Business/Production Planners (or the designees of any of these individuals) attend this meeting.

5.2.1.2 In a confidential format, the following topics as a minimum are discussed: wafer/assembly forecast, capacity allocation, overview of engineering/R&D projects, any process changes/notifications, reliability and qualification test results, yield trends and improvements, and other process/product roadmaps.

5.2.1.3 Additional actions or re-direction may be defined by the management and/or by the team during this meeting. Status of actions will be presented during the next meeting.

5.2.1.4 All presentation materials are consolidated in a binder and filed by the designated Engineering department. These records are considered as quality records and shall be maintained per QAP0059 under the Management Review category. The binder will contain as a minimum:

a) the meeting agenda
b) listing of the attendees
c) summary of actions
d) meeting venue
e) presentation materials (mostly confidential)

5.2.2 Quality Indices reported/distributed weekly and monthly to Xilinx Management which include topics such as:

- Corrective Action System Status
- Internal Audit System Status
- Incoming Inspection Results for Assembly Subcontractors
- Xilinx Components Manufacturing Quality Status
- Shipping Inspection Results

5.2.3 Strategic Review Board (SRB): A committee, chaired by the Vice President of Marketing, established to review Product Design proposals and progress of key company projects. Reference DPS0021 for additional SRB information.

5.2.4 Technology Review Board (TRB): A committee, chaired by the Reliability Engineering Manager, established to oversee the QML (Qualified Manufacturing Line) Program. Xilinx High Reliability and Military products are qualified, processed, and manufactured in accordance with the QML Program requirements. Reference QAP0093 for additional TRB information.

5.3 **Record Retention:** Records of Monthly Management Review Meetings shall be maintained by the Management Representative for ISO 9001, or designee. Records of Quality Indices reported/distributed weekly and monthly to Xilinx Management shall be maintained by the Quality Assurance department. Records of TRB activities will be maintained by Reliability Engineering. Records of all other Management Review activities will be maintained by the individual departments conducting the meetings. All Management Review records shall be retained per QAP0059, Record Retention Requirements.

Section 2.0

1.0 **TITLE:** **QUALITY SYSTEM**

2.0 **SCOPE:** The scope of the quality system applies to all departments within Xilinx whose function affects product quality.

3.0 **PURPOSE:** To establish, document and maintain a quality system as a means of ensuring that product conforms to specified requirements.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.2 Quality System
Xilinx Document:	QAP0093, TRB Management, Functions, and Responsibilities
ANSI/NCSL Z540-1-1994:	Calibration Laboratories & Measuring & Test Equip Gen. Proc.
MIL-PRF-38535:	Appendix G, par. 30.3 a-g
MIL-STD-883:	Test Method and Procedures for Microelectronics
MIL-STD-45662:	Calibration System Requirements

5.0 **POLICY:**

5.1 Xilinx's quality system is intended to comply with the requirements of ISO 9001, MIL-PRF-38535, MIL-STD-883, and MIL-STD-45662 (or ANSI/NCSL Z540-1-1994). The Director of Quality Assurance, or designee, has the responsibility and authority to ensure that the quality system complies with the requirements of the standards listed above.

5.2 All departments within Xilinx are responsible for implementing the policies as stated within this Quality Manual.

5.3 Quality System Documentation:

5.3.1 The range and detail of the documentation that form the quality system is dependent upon the complexity of the work, the methods used, and the skills and training needed by personnel involved in carrying out the activity.

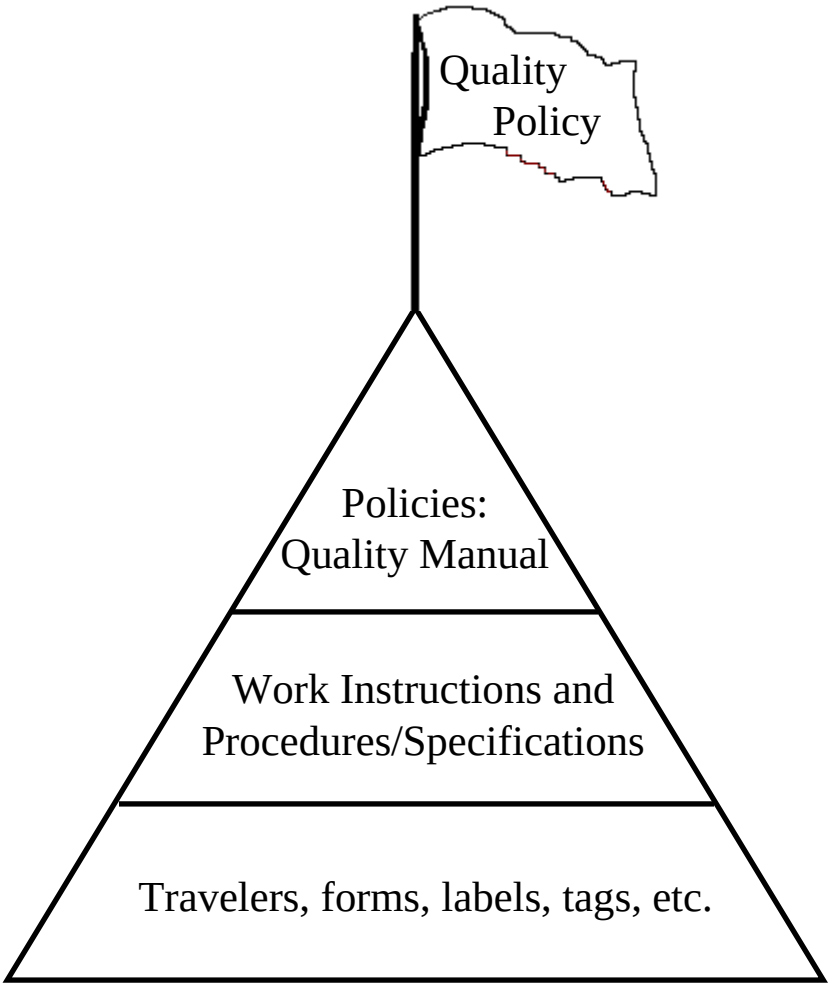
5.3.2 In general, the quality system consists of three levels of documentation:

5.3.2.1 Policies describe the major courses of action within the quality system. The scopes of policies are generally corporate-wide. The Quality Manual is an example of a document that contains policies which are corporate-wide in scope.

5.3.2.2 Work instructions and procedures/specifications provide specific directions and criteria to enable employees to carry out assigned tasks. The objective of work instructions and procedures/specifications is to help eliminate unacceptable variation, thereby ensuring that all processes are repeatable. Work instructions and procedures/specifications support Corporate policies and are generally used at the

departmental level. An example of a work instruction/procedure/specification may be TSC0006, which is the Work Instructions for Final Electrical Class Testing.

5.3.2.3 Travelers, forms, labels, tags, etc., record the details needed for traceability, indication of inspection status, etc., during all stages of manufacturing and delivery. Travelers, forms, labels, tags, etc., are designed so that their use is self-evident and, in general, procedures on how to use them are not required.



Different Levels of Quality System Documentation

5.3.3 It is the responsibility of each operational area within Xilinx to create and revise their procedures, work instructions, forms, etc., to reflect current practice. Documentation shall be revised to capture and standardize improvements when processes are changed.

5.4 Quality Planning: Xilinx has defined and documented how the requirements for quality will be met. The major components of the quality plan are listed below. The major policies for each of these components can be found in the various sections of this manual. Additional documents are referenced in each section to give the detailed procedures that support the policies.

- ☑ Qualification of Wafer Fabrication and Assembly processes (reference Section 9.2)
- ☑ Qualification of Wafer Foundries (reference Section 6.2)
- ☑ Qualification of Assembly Subcontractors (reference Section 6.2)
- ☑ Qualification of Suppliers, Subcontractors, and Distributors (reference Section 6.2)
- ☑ Qualification of Xilinx products (reference Section 9.2)
- ☑ Documented flows for Xilinx Components Manufacturing Operations (reference Section 9.1)
- ☑ Defined Inspection and Testing of Xilinx products (reference Section 10.1, 10.2, 10.3)
- ☑ Periodic reliability monitors on existing production processes (reference Section 9.2)
- ☑ Management Review Activities, both at Xilinx and with Xilinx Subcontractors (reference Section 1.6)

Additional Quality Planning activities commonly referred to as process, product, and quality improvement programs, may be initiated by various sources such as:

- ☒ Management Review Activities
- ☒ Cross-functional teams designed to address a particular goal/project
- ☒ Quality and Process Improvement Teams
- ☒ Brainstorming Sessions

Section 3.0

1.0 **TITLE: CONTRACT REVIEW**

2.0 **SCOPE:** This policy applies to customer contract reviews performed at Xilinx.

3.0 **PURPOSE:** To establish the policy for the review of customer orders to ensure that Xilinx has sufficient capabilities to fulfill contractual requirements.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.3 Contract Review
Xilinx Documents:	CUS0002, General Order Processing Procedures
	CUS0007, Order Entry Procedures
	PCC0026, Order Scheduling/Backlog Review Procedure
MIL-PRF-38535:	Appendix G, par. 30.3.1 b

5.0 **POLICY:**

5.1 The general flow for Order Processing begins with the Customer submitting a request for Quote to Xilinx. Xilinx's Sales and Marketing departments determine issues such as pricing and delivery, and will respond to the Customer with the quote information.

5.2 Upon the placement of an order by the Customer (verbal or by fax), Customer Service will verify the order for completeness of information.

5.2.1 In the event that a customer part number is referenced and/or special processing is requested, Customer Service forwards the order to Spec Review/QA to determine whether Xilinx is able to meet the customer's requirements per General Order Processing Procedure (CUS0002).

5.3 Once Spec Review/QA has determined that the order requirements can be met, Customer Service enters the order into Xilinx's electronic order tracking system per CUS0007. Acknowledgments of the entered order are sent to the Customer.

5.3.1 Entered orders can now be scheduled for production by the Planning department. The Planning Department references PCC0026 for the procedure for order scheduling and backlog review vs. material inventory.

5.4 The original Purchase Order is reviewed by Customer Service against the order that was entered to verify correlation of part numbers, quantities, prices, and all other terms agreed upon.

5.5 Change Orders: Change Orders are processed exactly in the same way as an order is processed and validated. Refer to CUS0007 for the change order procedure.

Section 4.0

1.0 **TITLE: DESIGN REVIEW AND CONTROL**

2.0 **SCOPE:** This policy applies to Integrated Circuits/Components designed and manufactured for sale by Xilinx.

3.0 **PURPOSE:** To establish and maintain documented procedures used during IC Design as well as verification and validation processes required to ensure compliance to defined Design, Quality, Reliability, and other specified requirements.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.4 Design Control
Xilinx Documents:	DPS0021, IC Design General Flow
	QAP0034, Product Qualification & Reliability Monitor
	QAP0059, Record Retention Requirements
	QAP0075, Qualified Product Listing Index
	QAP0093, TRB Management, Functions, and Responsibilities
MIL-PRF-38535:	Appendix G, par. 30.2.3d, 30.3.1, 30.4

5.0 **POLICY:**

5.1 A documented IC design flow describing the general guidelines and procedures of the Xilinx design process is established and maintained through Document Control.

5.2 The IC design flow specification describes not only the Design and Development phases, but also includes Pre-Production, Production, and End-of-Life phase reviews.

5.2.1 Xilinx's New Product Phase Review through End-of-Life Phase Review are as follows:

Phase 0 : Investigation
Phase 1 : Specification
Phase 2 : Development
Phase 3 : Pre-Production
Phase 4 : Production
Phase 5 : End-of-Life

5.2.2 The IC design flow defines and emphasizes the organizational technical responsibilities and interfaces between departments during each phase.

5.2.3 In addition, the level of details and the deliverables during each phase are defined, documented, and reviewed.

5.3 Strategic Review Board (SRB):

5.3.1 The Strategic Review Board is chaired by the Vice President of Marketing. Members include the Chief Executive Officer and his senior technical staff.

5.3.2 Xilinx has installed an SRB to review Design proposals. The SRB ensures that a project is introduced as a complete solution and makes good business sense.

5.3.3 The SRB may elect to review the major milestones of key company projects or design plans periodically as designs or projects progress. This is to ensure compliance to pre-defined product specs and functional plans, to review that resources are sufficient, and schedules are met.

5.3.4 A list of current projects scheduled to be reviewed by the SRB is documented and maintained by Marketing on their homepage on the Xilinx Intranet. In addition, a memo is also generated by Marketing to inform the attendees regarding the topics and the schedule of the SRB meetings.

5.3.5 When a major milestone is completed or achieved, the SRB grants a “certificate of achievement” to the Project Team.

5.3.6 The SRB minutes, presentation material, dispositions, and derived actions are posted on the Marketing homepage on the Xilinx Intranet. This information is also filed in accordance with the Record Retention Requirements specified in QAP0059.

5.4 Organizational and Technical Interfaces: IC design development requires a conscientious interface between different technical groups. These groups include Design Engineering, Marketing, Product Engineering, Test Engineering, Process Technology Engineering, CAD Engineering, Package Engineering, Reliability Engineering, and our Customers.

5.4.1 IC design development is a very fluid process. Regular reviews and decisions between members of the Product Teams are communicated through Project meetings held by the Project Team Leader. Meetings may be weekly for new projects. The frequency of meetings is decided by the Project Leader.

5.4.2 Some of the items that are reviewed during these meetings are: key issues, updates, milestones, qualification status, production schedules, etc.

5.5 Design Reviews:

5.5.1 There are several formal reviews required during an IC design development. These are the SRB Review and Approval during the “Investigation” phase, the SRB Design Spec Review and Approval before actual Design during the “Specification” phase, and Design/Technical Reviews within the Project Design Teams during the “Development” phase followed by a Final Design Review prior to Tapeout.

5.6 Design Rules, Tools and Libraries:

5.6.1 The success of IC designs depends highly on accuracy and completeness of design inputs, such as, initial product specs, design rules, verification tools, reference SPICE model libraries, and other design guidelines. Xilinx has a centralized Engineering team whose charter is to shorten development time while maintaining and improving the quality of IC design products. This is achieved by installation and documentation of uniform design and verification methodologies including Electrical Rules, Layout Rules and general design guidelines. The Engineering team consists of members from Process Technology, Design Engineering and CAD Engineering.

5.7 Design Verification: A thorough design verification is performed prior to each critical design stage.

5.7.1 Final check of layout is performed by running automated software tools, such as, DRC, LVS, ERC plus “Handchecks.” These are performed by Design Engineering prior to Tapeout.

5.7.2 Testing of electrical parameters in conformance to Product specification and datasheets is performed by Product Engineering and Test Engineering after wafer fabrication and package assembly. These are Wafer Sort and Final Test operations.

5.7.3 Product Characterization wherein the device is sample checked for functionality. Characterization data is reviewed against Speeds files and product specifications, performed by Design Engineering and Product Engineering. This verification is performed prior to Preliminary Speeds files and Datasheet finalization.

5.7.4 ESD, Latch-up, and Capacitance testing data and results are reviewed against product specifications. These tests are performed by Reliability Engineering prior to production release.

5.7.5 Thermal and Electrical Characterization of Packages are performed by Package Engineering. These are additional product specifications that the customer will need during board layout and design.

5.8 Design Validation and Qualification:

5.8.1 The process of validation is performed on the final product to ensure that the product conforms to the defined product specs and operating conditions and to the Xilinx Reliability Requirements specified in QAP0034.

5.9 Design Changes:

5.9.1 Design changes and modifications identified during design reviews, verification and/or validation stages are documented, reviewed, and approved by the Project Team.

5.9.2 Revised product is subjected to the applicable verification and validation processes per paragraph 5.7 and 5.8 prior to Production release.

5.10 Product Release to Production:

5.10.1 A new or revised product is released for customer shipment when the Qualification and Reliability requirements specified in QAP0034 are met and completed successfully. Production release process including documentation is performed by Reliability Engineering.

5.10.2 Once a product is qualified, it will be noted in the Qualified Product Listing as Production worthy product. This Quality Product Listing is used as a reference during QA buy-off of product shipments.

5.11 Product Reliability Monitor Program:

5.11.1 In addition to initial Product Qualification and Reliability testing, Xilinx performs a Product Reliability monitoring to continually verify and demonstrate conformance to Product Quality Requirements as specified in QAP0034 and Product Datasheets.

5.11.2 The Reliability monitor test samples are withdrawn from the Finished Goods inventory, which is the same inventory shipped to customers. This Reliability monitor program is performed by Reliability Engineering.

5.11.3 Reliability test data and results are published quarterly. This data is reported and maintained with a full two-year moving data window. This publication is distributed to customers for quality and reliability information on Xilinx products.

Section 5.0

1.0 **TITLE: DOCUMENT AND DATA CONTROL**

2.0 **SCOPE:** All documents and data that pertain to the quality system, including, to the extent applicable, documents of external origin such as standards and customer drawings.

3.0 **PURPOSE:** To define the system for controlling document revisions and distribution within Xilinx to ensure the appropriate level of review and approval of documents prior to initial release and before modifications may be made to released documents.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.5 Document and Data Control
Xilinx Documents:	DCC0001, Document Control System.
	DCC0003, Formal Document Release and Change Control
	DCC0004, Document Change Notice Approval Requirements
	DCC0006, Document Distribution Requirements
	QAP0059, Record Retention Requirements
MIL-PRF-38535:	Appendix G, par. 30.3.1 a, j, 30.4

5.0 **POLICY:**

5.1 **Document Approval and Change:**

5.1.1 The Document Change Notice (DCN) form is the authorized method for formally initiating, changing, or obsoleting controlled documentation used at Xilinx. The DCN Originator is responsible for submitting the DCN to Document Control for official release.

5.1.2 The Document Control department may be used by the Originator as a vehicle to track the DCN process (e.g., the gathering of required approvals, conveying change information to the DCN approvers, etc.) of an unreleased document. Alternatively, the Originator may take the responsibility for tracking the DCN through the approval process. In either case, DCN's may only be formally released by Document Control after all the required approval signatures have been obtained. This process applies to both initial (new) releases and to changes made to previously released documents.

5.1.3 The minimum approval requirements have been documented in DCC0004.

5.2 **Control and Distribution of Released Documents:**

5.2.1 All documents issued by Document Control are either "Controlled" or "Uncontrolled" as defined below:

Controlled Documents: The ownership of controlled documents belongs to Document Control. Only Document Control is permitted to move, alter, replace or destroy documents which are stamped "Controlled" in

red ink. Controlled documents are maintained in files in various areas as needed and as identified in DCC0006.

Uncontrolled Documents: Uncontrolled document copies will have the word “Uncontrolled” stamped on each sheet of the document, or will, alternatively, be unstamped. All unstamped documents are considered “Uncontrolled."

5.2.2 Document Control has the responsibility to ensure that only the current revision levels of controlled documents are maintained in the controlled copy files. Invalid and/or obsolete documents are promptly removed from all points of issue or use.

5.2.3 Only controlled documents may be used in the manufacture, inspection and testing of products for sale by Xilinx.

5.2.4 Released documents are distributed to the controlled copy files of the areas where the documents are needed. Determination of the distribution points is performed by Document Control in conjunction with the DCN Originator and the personnel approving the DCN.

5.3 The revision history and the changes made to all released documents will be maintained by Document Control.

5.4 Controlled copy files are periodically audited by Document Control for accuracy. All audit findings are recorded and retained by Document Control.

5.5 Data Control: Document Control data or quality records is maintained per QAP0059, Record Retention Requirements. Document Control maintains the ten most recent revisions of a document onsite, as a minimum. For test programs, the latest two revisions are stored onsite, as a minimum. Afterwards, depending on how much storage space is available, the data may be sent for offsite archiving.

Section 6.0

PURCHASING

Section 6.1

1.0 **TITLE: PURCHASING**

2.0 **SCOPE:** This policy applies to product and services procured by Xilinx's Purchasing department.

3.0 **PURPOSE:** To define a policy to ensure that purchased product conforms to specified requirements.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.6 Purchasing
Xilinx Document:	PSP0008, General Flow for Purchasing Process
	PSP0009, Working Instruction for Purchasing Process
	QCP0015, Approved Supplier/Subcontractor/Distributor List

5.0 **POLICY:**

5.1 Upon receipt of a purchase requisition from a requester, Purchasing will ensure that the appropriate levels of Management have approved the purchase requisition. A Signature Authorization Levels Chart is used by Purchasing to determine the required approval levels.

5.2 When applicable, Purchasing will obtain the appropriate drawings and/or specifications of the purchased item from Document Control. These documents are used to clearly describe the product ordered.

5.3 Purchasing references the Approved Supplier/Subcontractor/Distributor List (reference Section 6.2 of this manual) prior to placing the purchase order to ensure that the supplier or subcontractor has the appropriate qualifications.

5.4 Both the Buyer and the Purchasing Manager will review purchase requisitions for adequacy of the specified requirements prior to submitting a purchase order to the supplier.

5.5 Verification of Purchased Product:

5.5.1 Where specified in the contract, Xilinx's customer or the customer's representative shall be afforded the right to verify at Xilinx's and/or Xilinx's subcontractor's facilities that subcontracted product conforms to specified requirements. Such verification shall not be used by Xilinx as evidence of effective control of quality by the subcontractor.

5.5.2 Verification by the customer does not absolve Xilinx of the responsibility to provide acceptable product, nor shall it preclude subsequent rejection by the customer.

5.5.3 Xilinx does not perform verification of purchased product at the supplier or subcontractor's premises.

Section 6.2

1.0 **TITLE: CONTROL OF SUPPLIERS/SUBCONTRACTORS/DISTRIBUTORS**

2.0 **SCOPE:** This policy applies to the suppliers, subcontractors and distributors of materials and services listed in QCP0015.

3.0 **PURPOSE:** To define the system of supplier, subcontractor and distributor control used by Xilinx.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.6 Purchasing
Xilinx Documents:	QAP0057, Supplier/Subcontractor Quality System Requirements
	QAP0061, Electrical Test Subcontractor Qual./Cert. and Quality System Guidelines.
	QAP0062, Supplier/Subcontractor Qualification
	QAP0063, Wafer Foundry Qualification/Certification and Quality Systems Guidelines.
	QCP0015, Approved Supplier/Subcontractor/Distributor List
MIL-PRF-38535:	Appendix G, par. 30.3.1 r

5.0 **POLICY:**

5.1 **Approved Vendor List:** Xilinx maintains an Approved Supplier/Subcontractor/Distributor List (AVL, reference QCP0015) which lists all approved/qualified suppliers, subcontractors and distributors that may be used by Xilinx for various purposes. Xilinx's Purchasing Department may only procure materials and services (listed on the AVL) from approved suppliers/subcontractors/distributors. Approval from the Quality Assurance department is necessary to obtain materials or services from suppliers, subcontractors or distributors not listed on the AVL.

5.2 **Qualification Audits:** Most suppliers, subcontractors and distributors must be qualified before being placed on the AVL. Some suppliers of indirect material may not need to be qualified through an audit. Indirect material is defined as material which is not incorporated into the final product for sale by Xilinx, e.g., labels, tubes, trays, etc. Qualification may be based upon an On-site Audit, a Checklist Audit, an ISO 9000 Certification Review, or any combination of these three types of audits. Refer to QAP0062 for additional information on the types of qualification audits, and how to implement these audits.

5.2.1 For an On-site Audit, a cross-functional audit team from Xilinx visits the external facility to evaluate the Quality System. On-site audits are performed for more crucial operations, such as Assembly, Wafer Foundry, Environmental Laboratories, and certain direct material suppliers.

5.2.2 For a Checklist Audit, a checklist/survey is sent to the external facility for their self-assessment. Upon completion, the checklist is sent back to Xilinx for evaluation. Qualification is based upon the results of the checklist evaluation. An On-site audit may be scheduled subsequent to the evaluation of the checklist if deemed necessary.

5.2.3 An ISO 9000 Certification Review involves the supplier, subcontractor or distributor providing an ISO 9000 Certificate of Registration to Xilinx.

5.3 **Periodic Audit:** Once the supplier, subcontractor or distributor is qualified and is place on the AVL, a quality system audit must be conducted on a periodic basis. This periodic audit may be in any of the three types of audits specified in paragraph 5.2 of this section. The frequency of the periodic audits is specified in QAP0062.

5.3.1 **Quality Assurance Department Responsibilities:**

- Maintain an audit schedule of the suppliers, subcontractors and distributors listed on the AVL.
- Send the audit checklist/survey on an annual basis to the suppliers, subcontractors and distributors who are to receive a Checklist Audit.
- Providing notices of impending On-site audits to Xilinx personnel who are responsible for conducting the audits.
- Retain all records of external audits per Section 16.0 of this manual.
- Update the QCP0015 when there is a change to the qualification status of a supplier, subcontractor or distributor.

5.4 **Quality System Requirements:** Quality system requirements for Xilinx's suppliers, subcontractors and distributors are fully documented (reference QAP0057, QAP0061 and QAP0063).

5.5 **ISO 9000 Requirement:** ISO 9000 Registration is a requirement for Xilinx Assembly facilities and Wafer Foundries. If ISO 9000 Registration has not been achieved, then a plan must be in place to achieve it.

Section 7.0

1.0 **TITLE:** **CONTROL OF CUSTOMER-SUPPLIED PRODUCT**

2.0 **SCOPE:** This policy applies to all product supplied by Xilinx's customers.

3.0 **PURPOSE:** To state the policy for customer-supplied product.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001: 4.7 Control of Customer-Supplied Product

5.0 **POLICY:**

5.1 Xilinx does not use customer-supplied product.

Section 8.0

1.0 **TITLE: PRODUCT IDENTIFICATION AND TRACEABILITY**

2.0 **SCOPE:** This policy applies to areas involved in the manufacture of products at Xilinx, from receipt, through production processes, and up to shipment of product.

3.0 **PURPOSE:** To define the system used at Xilinx for product identification and traceability.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.8 Product Identification and Traceability
Xilinx Documents:	IVC0016, Data Entry for WIP Tracking System
MIL-PRF-38535:	Appendix G, par. 30.3.1a, 30.3.1 b5, b9

5.0 **POLICY:**

5.1 Xilinx uses an electronic WIP tracking system to track the status of product from receipt and throughout all stages of production up until shipment.

5.2 As product moves through the production process (including Wafer Fabrication, Assembly, and Mark and Test) lot numbers are assigned to the product. Xilinx's electronic WIP tracking system assigns lot numbers using the next available lot number in the numbering scheme. These lot numbers are used to provide product traceability. At any instance, these lot numbers may be used to obtain a complete lot history listing detailed information such as product description, lot type, vendor lot, when lots were moved from location to location, quantities, etc. Additionally the system also allows for a trace of all lot numbers, lot splits, and shipments.

5.3 Documented work instructions provide the details for the operation of the WIP tracking system.

Section 9.0

PROCESS CONTROL

Section 9.1

1.0 **TITLE: PROCESS CONTROL**

2.0 **SCOPE:** This policy applies to the manufacturing operations and the in-process inspection at Xilinx.

3.0 **PURPOSE:** To define the policy for the control of manufacturing processes.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.9 Process Control
Xilinx Documents:	HPC0001, Comprehensive HardWire Product Flow
	MAC0062, Special Processing Request Procedure
	PCC0001, Manufacturing Traveler Build
	QAP0029, Creation of a Specification Control Document
	QAP0034, Product Qualification & Reliability Monitor Req.
	QAP0056, Internal Audit Procedures
	QAP0093, TRB Management, Functions, and Responsibilities
	TSC0340, Manufacturing ATE Evaluation & Release Req.
	Individual process procedures
MIL-PRF-38535:	Appendix G par. 30.3, 30.3.1

5.0 **POLICY:**

Manufacturing processes at Xilinx are carried out under controlled conditions. These controlled conditions include the following:

a) Documented procedures for performing each operation. Documentation shall be to the extent such that product quality is not adversely affected. This applies to all subcontractors used by Xilinx to perform various manufacturing operations. Manufacturing processes at Xilinx are performed in accordance with documented flows (e.g., PCC0001) which dictate the order in which each operation is to be performed. These flows are in turn supported by documented procedures which define the actions to be followed to carry out each operation. In general, the flows and procedures are based upon military and industry standard procedures.

For customer orders that deviate from the general process flow, a special set of instructions (Specification Control Document, SCD) is created to specify the non-standard procedures that must be followed (reference QAP0029).

In situations where the manufacturing process deviates from the standard Xilinx process flows, a Special Processing Request (SPR) may be used to provide instructions for the special processing (reference MAC0062). SCD's and SPR's differ in that SCD's are created prior to the manufacturing process during the contract review cycle, whereas an SPR may be implemented at any step during the manufacturing process.

For Xilinx HardWire product, an HPC document is created to detail the work instructions that are to be performed (reference HPC0001, Comprehensive HardWire Product Flow).

b) Use of suitable production equipment, and a suitable environment. Documented procedures provide the instructions for which equipment is to be used and how to operate the equipment. In areas where environmental conditions (temperature, relative humidity, etc.) are of concern, adequate controls must be implemented to ensure that product quality is not adversely affected.

c) Compliance with documented procedures. All manufacturing personnel are required to be in compliance with the documented procedures that govern their manufacturing operation. Compliance with documented procedures is verified through periodic internal audits (reference QAP0056, Internal Audit Procedures), and through various Quality Control inspection gates (reference Section 10.0 of this manual).

d) Monitor and control of suitable process parameters and characteristics. Statistical Process Monitoring is used at various stages of production, including Wafer Fabrication, Assembly, and Back-end processing. Reference Section 20.0 of this manual, which further describes the use of SPM at Xilinx. Additionally, a Reliability Monitor program is in effect to confirm continued satisfactory performance of Xilinx product in field conditions (reference Section 9.2 of this manual).

e) Approval of processes and equipment, as appropriate. A product and process qualification process has been implemented at Xilinx. Qualification requirements for new products or processes are detailed in QAP0034, Product Qualification and Reliability Monitor Requirements (Hermetic & Plastic - Commercial Grade). The purpose of these qualifications is to assure that the devices meet all requirements of the device specification.

   Documented procedures have been established to release Automated Test Equipment (ATE) used in manufacturing at Xilinx. Procedure TSC0340 defines the requirements that must be met in order to release an ATE Tester. This procedure also lists the ATE Testers that have been released for production.

f) Criteria for workmanship. Workmanship standards are documented in the applicable process procedures and product specifications, and are verified at various stages of production through inspection gates (reference Section 10.0 of this manual). Criteria for workmanship shall meet or exceed customer and Xilinx requirements.

g) Suitable maintenance of equipment. Preventive maintenance shall be performed as outlined in the applicable equipment procedures. This may be performed internally by Xilinx, or may be contracted to an outside service. Preventive maintenance shall be to the extent that continuing process capability is ensured.

h) Process control for QML product is monitored by review of Statistical Process Control (SPC), Parametric Monitors, Technology Characterization Vehicles (TCV), and Standard Evaluation Circuit (SEC). Reference QAP0093 for additional information.

Section 9.2

1.0 **TITLE: PRODUCT QUALIFICATION AND RELIABILITY MONITOR PROGRAM**

2.0 **SCOPE:** This specification applies to all Xilinx products, processes and materials used to build these products.

3.0 **PURPOSE:** To define the Xilinx Qualification and Reliability Monitor Program.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.9 Process Control
Xilinx Documents:	QAP0027, Failed/Defective IC Material Processing
	QAP0034, Product Qualification and Reliability Monitor Proc.
	QAP0046, MIL-STD-883 Product Qual for Military Product
	QAP0093, TRB Management, Functions, and Responsibilities
	RTP0004, Die Monitor Program
	RTP0005, Package Monitor Program
	TSP0003, Integrated Circuit Characterization Procedure
MIL-PRF-38535:	Appendix G, par. 30.2.2.1, 30.3f, 30.3g
MIL-STD-883:	Test Method and Procedures for Microelectronics

5.0 **POLICY:**

5.1 All new and existing Military products shall meet the requirements of the Xilinx Product Qualification outlined under QAP0034 and Quality Conformance Inspection (QCI) program outlined in QAP0046, which is in compliance with MIL-PRF-38535 Appendix G and MIL-STD-883.

5.2 All new and existing commercial products shall meet the requirements of the Xilinx Product Qualification outlined in QAP0034.

5.3 Process reliability monitors sensitive to wearout mechanisms shall be used in Wafer Fabrication and Assembly.

5.4 All new products as well as Wafer Fabrication and Assembly process introductions shall be qualified by stress testing as defined in QAP0034 and characterization as defined in TSP0003 prior to production release.

5.5 Periodic reliability monitors shall be performed on existing production processes from each of the product families using the guidelines of QAP0034. Results of these monitors will be published on a quarterly basis to feed back information to Product Engineering, Marketing, Design, Technology Development, Packaging, Quality Assurance, and Xilinx's customers. These reports shall contain the results of reliability stress and failure rate (FIT) calculations.

5.6 Qualification, Reliability Monitor and Characterization Tests include the following as a minimum:

- ☑ Static High Temperature Life Test
- ☑ Temperature Humidity Bias Stressing (85/85)
- ☑ Surface Mount Preconditioning (for plastic packages)
- ☑ Unbiased Pressure Pot
- ☑ Temperature Cycle (air-to-air)
- ☑ Thermal Shock (liquid-to-liquid, optional)
- ☑ Constant Acceleration (ceramic packages)
- ☑ Solderability Testing
- ☑ Lead Integrity
- ☑ Vibration, Variable Frequency (ceramic packages)
- ☑ Moisture Resistance (ceramic packages)
- ☑ Salt Atmosphere
- ☑ Hermeticity (ceramic packages, PPGA and MQFP)
- ☑ Latch-up
- ☑ ESD Sensitivity

5.7 All failures observed during stress testing and characterization shall be evaluated and analyzed to determine the failure mode and mechanism (reference QAP0027). On a routine basis, distribution of failure modes and mechanisms for each of the product families shall be analyzed using Pareto charts. Failure analysis information shall be fed back to Product Engineering, Manufacturing, Design, Technology Development, Packaging, Quality Assurance and the appropriate subcontractors for root cause determination and formal corrective action.

Section 10.0

INSPECTION AND TESTING

Section 10.1

1.0 **TITLE: INCOMING INSPECTION AND TESTING**

2.0 **SCOPE:** This policy applies to incoming product processed by external subcontractors.

3.0 **PURPOSE:** To define the policy for the inspection of incoming packaged integrated circuits.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.10.2 Receiving Inspection and Testing
Xilinx Documents:	QAP0099, Subcontract Quality Monitor
	QCP0003, Incoming Inspection
	QCP0032, Skip Lot Inspection Plan
MIL-PRF-38535:	Appendix G, par. 30.3, 30.3.1

5.0 **POLICY:**

5.1 All raw material piece parts inspection is performed by Xilinx's assembly subcontractors. Xilinx purchases the raw material piece parts (lids, caps, bases, etc.) and ships directly to the subcontract assembly facility for inspection.

5.2 Before the final assembled product may be processed by Xilinx, Xilinx's Incoming Quality Control (IQC) department reviews the subcontractor's inspection data for completeness, legibility, and to ensure that the raw material has passed the subcontractor's inspections.

5.3 Upon receipt of the assembled product, Xilinx's Incoming Inspection include, but is not limited to the following activities:

- ☑ Verifying correct device type and mask set per applicable specifications.
- ☑ Verifying fab locations, mask code against applicable specifications.
- ☑ Verifying device marking compliance.
- ☑ Verifying piece parts compliance to applicable specifications.
- ☑ Verification of proper product packaging.
- ☑ Performing visual/mechanical inspection as required per applicable specifications.
- ☑ Performing a physical count verification.

5.4 Lots may be subject to a Skip Lot Inspection Plan if the requirements of QCP0032 are met.

5.5 For lots that fail Incoming Inspection, a Nonconforming Material Report (NMR) is issued to address the nonconformance(s). Refer to Section 13.1 of this manual for further information on the NMR process.

5.6 Lots that pass Incoming Inspection requirements will continue with further processing. The appropriate transaction in Xilinx's electronic tracking system will be performed to move the lot to the next step.

Section 10.2

1.0 **TITLE: IN-PROCESS INSPECTION AND TESTING**

2.0 **SCOPE:** This procedure applies to packaged IC's tested at Xilinx production facilities.

3.0 **PURPOSE:** To define the procedures for performing in-process inspection and testing at Xilinx.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.10.3 In-Process Inspection and Testing
Xilinx Document:	PCC0001, PCWip Cage Activities Lot Start
	TSC0006, Work Instructions for Final Electrical Test (Class)
MIL-PRF-38535:	Appendix G, par. 30.3, 30.3.1

5.0 **POLICY:**

5.1 In-process inspection and testing at Xilinx is performed as required by the applicable product manufacturing flow (reference PCC0001). Inspection and testing are performed according to detailed documented work instructions.

5.2 Detailed work instructions specify the proper equipment to be used (tester, test program, loadboard, handler, etc.) and the proper procedures for operating the equipment. Various methods, such as checksums, setup verification, gauge blocks, correlation units, etc., are utilized to eliminate possible sources of error before actual electrical testing is performed.

5.3 After electrical testing has been performed, products that fail inspection are properly identified and segregated to await disposition. Each lot must pass a specified yield criteria in order to be allowed to continue on to the next process.

5.4 Lots that pass electrical testing are moved to the next processing step. Lot travelers are updated as appropriate to record the results of inspection and testing. Transactions are made as appropriate on Xilinx's electronic WIP tracking system to move the lot to the next operation.

Section 10.3

1.0 **TITLE: FINAL INSPECTION AND TESTING**

2.0 **SCOPE:** This procedure applies to all Xilinx product submitted for QC Electrical Test after Final Electrical Test (Class).

3.0 **PURPOSE:** To ensure that all specified inspection and testing have been carried out, and that the results meet specified requirements.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.10.4 Final Inspection and Testing
Xilinx Documents:	QAP0100, Post-Pack QA Monitor
	QCP0006, Work Instructions for QC Electrical Test (QCE)
	QCP0010, Shipping Inspection of Components
	QCP0016, QC In-Process Lot Verification
MIL-PRF-38535:	Appendix G, par. 30.3, 30.3.1

5.0 **POLICY:**

5.1 Final inspection is performed at Xilinx by the Quality Control group to verify that all specified inspection and testing have been carried out, and that the results meet specified requirements.

5.2 Items that shall be verified by Quality Control include, but is not limited to:

- ☑ Use of proper equipment (load boards, DUT cards, testers, handlers, test programs, equipment calibration, etc.)
- ☑ Correct electrical test parameters (temperature, humidity, soak time, etc.)
- ☑ All required inspection and testing have been completed (e.g., setup verification)
- ☑ Lot was tested according to the appropriate speed
- ☑ Test yield requirements
- ☑ Visual/mechanical inspection per the applicable specifications
- ☑ Documentation is complete and accurate (travelers, test summaries, etc.)
- ☑ Correct count (actual physical count vs. quantity indicated on paperwork)
- ☑ Correct labeling
- ☑ Correct packing requirements

5.3 Lots that pass final inspection by QC shall be appropriately labeled. Lot travelers shall be updated to reflect inspection results, and the appropriate lot movement on the WIP tracking system shall be performed.

5.4 A Nonconforming Material Report (NMR) shall be issued in accordance with Section 13.1 of this manual for all nonconforming product found at final inspection. Failing lots shall be appropriately labeled and segregated to a separate holding area to await disposition.

Section 11.0

1.0 **TITLE: CONTROL OF INSPECTION, MEASURING AND TEST EQUIPMENT**

2.0 **SCOPE:** This policy applies to all inspection, measuring and test equipment used in the manufacture and inspection of Xilinx products, including, but not limited to, equipment used by subcontractors.

3.0 **PURPOSE:** To establish procedures to control, calibrate and maintain inspection, measuring and test equipment used by Xilinx to demonstrate the conformance of product to specified requirements.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.11 Control of Inspection, Measuring & Test Equipment
Xilinx Document:	QAP0015, Calibration
	TSC0073, Test Program Control and Release Procedure
	TSP0058, EPROM Test Program Development Procedure
	TSP0059, EPLD Test Program Development Procedure
	TSP0068, FPGA Test Program Development Procedure
	TSP0069, HardWire Test Program Development Procedure
ANSI/NCSL Z540-1-1994:	Calibration Laboratories & Measuring & Test Equip General Procedures.
MIL-STD-45662:	Calibration System Requirements
MIL-PRF-38535:	Appendix G, par. 30.3.1 l

5.0 **POLICY:**

5.1 All inspection, measuring and test equipment used in manufacturing and end-point acceptance inspection of Xilinx products shall be placed in the Xilinx calibration system. Xilinx's calibration system is designed to be fully compliant to the requirements of MIL-STD-45662, ANSI/NCSL Z540-1-1994 and ISO 9001.

5.2 Xilinx uses outside commercial calibration laboratories and accepts the responsibility for ensuring that the outside commercial calibration facility complies with the requirements of MIL-STD-45662 and ANSI/NCSL Z540-1-1994. This is accomplished through periodic audits of their facilities. Records of all such audits will be maintained and be made available for review upon request.

5.3 **Calibration System:**

5.3.1 Equipment Labeling: Inspection, measuring and test equipment are labeled with the current calibration status. Calibration labels are used to indicate who performed the last calibration, the last calibration date, and when the equipment is next due for calibration. Equipment that is overdue for calibration will be identified as such, and removed from the area when possible, to preclude accidental or unintended use. Equipment not requiring calibration, such as equipment used for engineering use only, will also be appropriately identified.

5.3.2 Recall System: A calibration interval is assigned to all equipment entered into the calibration system. A calibration recall system has been established to recall equipment due for calibration. The Quality Assurance Department provides advance notification of the upcoming calibration due date to the owners of the equipment.

5.3.3 Calibration: All calibrations performed on inspection, measuring and test equipment must be traceable to the National Institute of Standards and Technology (NIST). It is also required that all equipment used in the calibration of Xilinx inspection, measuring and test equipment be traceable to NIST.

5.3.3.1 Calibration will be performed in accordance with documented procedures or equipment specifications.

5.3.3.2 Environmental conditions are to be suitable for the calibration being performed. This may include such factors as temperature, humidity, vibration, cleanliness, etc.

5.3.4 Out-of-Tolerance Conditions: When equipment is found to be out-of-tolerance during calibration, the following items shall be addressed:

- Cause of the out-of-tolerance condition.
- Description of the impact of the out-of-tolerance equipment on any production lots processed during the suspect out-of-tolerance condition.
- Corrective action to minimize any further out-of-tolerance conditions, such as a reduced calibration interval.

5.4 **Preventive Maintenance:** Preventive maintenance at Xilinx is performed as outlined in the applicable equipment specification.

5.5 It is the responsibility of the equipment users to ensure that the handling, preservation and storage of inspection, measuring and test equipment is such that the accuracy and fitness for use are maintained.

5.6 **Records:** Records will be maintained for all calibration and preventive maintenance performed on inspection, measuring and test equipment used in the manufacture and inspection of Xilinx products per Section 16.0 of this manual.

5.7 **Test Program Release and Control:** A test program is developed by the Product Engineering department for all product released for production. The test program includes the following coverages, as a minimum:

- Functional Test
- DC Parameters
- AC Parameters

Reference TSP0058, TSP0059, TSP0068, and TSP0069 for the Test Program Development Procedures. Reference TSC0073 for the procedure to buy-off (approve) test programs for production.

Section 12.0

1.0 **TITLE: INSPECTION AND TEST STATUS**

2.0 **SCOPE:** This policy applies to all product and material whose inspection and test status needs to be identified.

3.0 **PURPOSE:** To define the policy for identifying the inspection and test status of products and materials throughout all stages of production.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.12 Inspection and Test Status
Xilinx Documents:	QAP0007, Filling Out Documents
	QCP0017, Inspection Stamp Control
	PCC0017, Production Stamp Control
MIL-PRF-38535:	Appendix G par. 30.3.1

5.0 **POLICY:**

5.1 The inspection and test status of all product for sale and production materials at Xilinx shall be identified by suitable means, whether it be through the use of labels, inspection stamps, lot travelers, or other documentation. All indicators of inspection status shall indicate the conformance or nonconformance of product or materials with regard to the inspections and tests performed.

5.2 A standard lot traveler or Specification Control Document (not applicable to Wafer Fabrication) must accompany every lot through each process step in order to record the completion of an operation or process on a lot of material or product. Where applicable, these travelers shall be stamped to indicate both the inspection status and the identity of the inspector.

5.2.1 Reference QCP0017 and PCC0017 for the system to control the issuance and retrieval of inspection stamps.

5.2.2 Reference QAP0007 for guidelines for completing all controlled forms and documents, including lot travelers, material transfers, picklists and shippers at Xilinx.

5.3 The identification of inspection status shall be maintained throughout the production process to ensure that only product that has passed the required inspections and tests are released for shipment.

Section 13.0

CONTROL OF NONCONFORMING PRODUCT

Section 13.1

1.0 **TITLE: NONCONFORMING MATERIAL REPORT (NMR)**

2.0 **SCOPE:** This procedure applies to the control and disposition of nonconforming product processed by Xilinx.

3.0 **PURPOSE:** To define the methods for controlling and dispositioning nonconforming product processed by Xilinx.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.13 Control of Nonconforming Product
Xilinx Documents:	QCP0008, Nonconforming Material Control and Defect List
MIL-PRF-38535:	Appendix G, par. 30.2, 30.3

5.0 **POLICY:**

5.1 When product is found to be nonconforming to Xilinx specifications at Incoming Inspection, In-Process Inspection, or at QC Shipping Buy-Off, a Nonconforming Material Report (NMR) is used to address the nonconformance.

5.2 Quality Control (QC) will document the nonconformance on an NMR form. All nonconforming products are segregated to a separate holding area to await disposition. Rejected lots are labeled accordingly with a reject stamp.

5.2.1 For Incoming Inspection rejects where product performance is not affected, such as packing errors, incorrect quantities received, or incorrect marking alignment, Quality Control will move the product to the next operation for processing. The NMR is generated as normal, and the product will be dispositioned in parallel with product processing.

5.3 QC will notify the appropriate personnel to review and disposition the nonconforming product. Based upon the type of nonconformance, the responsible Engineering, Manufacturing, or Quality Assurance personnel will provide the appropriate disposition.

5.3.1 Rework of nonconforming material is permitted only with written (or electronic) instructions by the personnel responsible for dispositioning the product.

5.3.2 If the nonconformance has been invalidated by the appropriate personnel, QC will submit the NMR to the Quality Assurance Supervisor, Q.A. Engineer, or the Q.A. Manager for concurrence.

5.3.3 The department responsible for taking the required action indicated on the NMR disposition will complete the work required and resubmit the lot and the NMR form to QC for reinspection and closure. QC will perform reinspection of the rejected lot(s) and will record reinspection results. If reinspection fails, another NMR is generated, and the process starts over. The Quality Assurance Manager, or designee, is responsible for signing the NMR form to document the approval for the release of product after reinspection.

5.3.4 Quality Assurance in conjunction with Engineering will determine whether corrective action is needed to address the source of the discrepancy. If corrective action is needed, it is the responsibility of Quality Assurance to initiate the corrective action request per Section 14.1 of this manual.

5.4 For QC Electrical Test failures, the test operator will place the lot on Engineering Hold. Product Engineering then determines the validity of the nonconformance, and will disposition the lot accordingly.

5.5 Records of nonconforming product and their disposition shall be retained per Section 16.0 of this manual.

Section 13.2

1.0 **TITLE: MATERIAL REVIEW BOARD (MRB) PROCEDURE**

2.0 **SCOPE:** This procedure applies to materials, products, processes, and services found to be nonconforming to applicable procedures, specifications, drawings, or customer contractual agreements.

3.0 **PURPOSE:** To establish the policy for evaluating and dispositioning nonconforming materials, processes, and services.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.13 Control of Nonconforming Product
Xilinx Document:	QAP0014, Corrective Action Procedures
	QAP0060, Material Review Board (MRB) Procedure
MIL-PRF-38535:	Appendix G, par. 30.2, 30.3

5.0 **POLICY:**

5.1 When materials, products, processes and services are found to be nonconforming to applicable procedures, specifications, drawings, or customer contractual agreements, a Material Review Board (MRB) may be initiated by a Xilinx employee to evaluate and disposition the matter.

5.2 The Material Review Board shall be composed of representatives from various operational areas as specified by QAP0060.

5.3 Nonconforming situations shall be investigated to determine the cause, and to what extent the problem may extend to other products, processes or services. The appropriate groups shall be notified, and when necessary, corrective action implemented to prevent recurrence of the problem (reference QAP0014).

5.4 Final disposition (scrap, rework, use as is, etc.) of the problem by the Material Review Board shall be documented and follow-up actions shall be determined when necessary.

5.5 The Quality Assurance Department is responsible for verifying the implementation of required follow-up actions.

5.6 Where possible, nonconforming product shall be segregated from acceptable product. A suitable means of indicating that the product is nonconforming shall be used.

5.7 All records of MRB actions shall be maintained by the Quality Assurance Department per Section 16.0 of this manual.

Section 14.0

CORRECTIVE AND PREVENTIVE ACTION

Section 14.1

1.0 **TITLE: CORRECTIVE AND PREVENTIVE ACTION**

2.0 **SCOPE:** This policy applies to all design, component manufacturing, and systems development operations of Xilinx and its Suppliers and Subcontractors.

3.0 **PURPOSE:** To define the steps that are to be taken by Xilinx, Xilinx's Subcontractors, and Xilinx's Suppliers so that they may apply a systematic, documented, problem-solving corrective action to any deficiency, error or omission that affects the ability of the company to meet its quality goals.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.14 Corrective and Preventive Action
Xilinx Document:	QAP0014, Corrective Action Procedures
MIL-PRF-38535:	Appendix G, par. 30.2, 30.3

5.0 **PROCEDURES:**

5.1 Two corrective action procedures are used at Xilinx. The Eight-Discipline Corrective Action Request (8D-CAR) Procedure is used for major discrepancies, whereas the Quality Alert/Action (QA/A) Procedure is used for minor discrepancies.

5.1.1 Major discrepancies include situations where there is a system breakdown, or when misprocessed or out-of-spec materials affect a product's quality or reliability. In these cases, an 8D-CAR is issued to address the discrepancy. An 8D-CAR is a more severe form of corrective action than a QA/A and usually requires a team approach involving personnel from different departments.

5.1.2 Minor discrepancies include situations where misprocessed or out-of-spec material does not affect the product's quality or reliability, or when no corrective action is required. A QA/A may or may not require a written response. QA/A's provide the vehicle in which minor recurring discrepancies may be tracked. If a minor discrepancy continues to recur even after one or more QA/A's have been issued, an 8D-CAR may be issued to address the problem.

5.1.3 Eight-Discipline Corrective Action Requests and Quality Alert/Actions Requests may be initiated by any employee to address a nonconformance. Additionally, customers may request for corrective action implementation. The Quality Assurance Manager, or designee, has the responsibility to ensure that the appropriate corrective action procedure (8D-CAR or QA/A) is being used.

5.2 **Eight-Discipline Corrective Action Request Procedure:** Refer to QAP0014 for the complete instructions on how to implement the 8D-CAR process. Below is a synopsis of the eight disciplines used:

5.2.1 **Discipline 1: Select the Team:** Select and record the corrective action team members. By using a team approach, the benefit of a diverse but experienced group of people develops a cohesive plan for problem correction and also lays the foundation for training in problem avoidance.

5.2.2 **Discipline 2: Describe the Problem:** Describe the change in condition or pre-existing condition which caused the problem. Express the condition in quantifiable terms. Data should be included for proof of the need to initiate a corrective action in the first place.

5.2.3 **Discipline 3: Describe the Cause:** Describe why the cause of the change in condition occurred and what caused it, or identify the “holes” in the system which allowed the pre-existing condition to go undetected. The cause should be described by the team members of the department that contributed most to the cause.

5.2.4 **Discipline 4: Implement Containment Plan:** Describe who, what, when and how the defects will be captured and contained, and how they will be prevented from getting to the customer. Consider the effect of the containment plan on factors such as cost, delivery, and inducement of other types of defects. Consideration should be given to material that may be affected (inventory or as work-in-progress). The effect on customers who may have already received such materials should be reviewed.

5.2.5 **Discipline 5: Implement Permanent Corrective Action Plan:** Describe who, what, when and how changes will be implemented to totally eliminate the root cause of the problem.

5.2.6 **Discipline 6: Prevent Recurrence:** Describe the internal and/or external cultural or systematic changes that must be made to prevent the problem from recurring. Preventing recurrence is the most difficult of the eight disciplines to organize. If recurrence should occur, then a new 8D-CAR should be issued referencing the original so that it may be used as a learning process in improving the effectiveness of the corrective action process.

5.2.7 **Discipline 7: Verify Effectiveness of Actions:** All follow-up actions are verified by the Quality Assurance organization to ensure the effectiveness of the actions taken.

5.2.8 **Discipline 8: Congratulate Your Team:** If everything is found to be satisfactory after reviewing accuracy and discussions, congratulate your team on a job well done.

5.3 **Quality Alert/Action Procedure:** Since not all discrepancies warrant the use of an 8D-CAR, a system (the QA/A procedure) has been established to address minor discrepancies. A corrective action response may or may not be needed, depending on the severity of the discrepancy. The QA Manager, or designee, is responsible for determining whether each discrepancy requires a corrective action response.

5.4 **Quality Assurance Responsibilities**: The Quality Assurance Department has the responsibility for the proper implementation of the corrective action system. This responsibility includes the following activities:

- Ensuring that the all steps in the corrective action process are being followed.
- Verifying the completeness of the data.
- Provide notification of delinquent responses to the appropriate individuals.
- Verifying the implementation of the corrective or preventive action.
- Maintaining pertinent corrective action records.
- Distributing a semi-annual report detailing trends in corrective action response time for Management Review. Refer to Section 1.6 of this manual.

5.5 **Preventive Action:** Xilinx's preventive action system is accomplished through the quality systems that have been established and through the use of various Cross-Functional and Management teams and activities. Additionally, once nonconformities are found, corrective action systems are in place to prevent recurrence.

5.5.1 The quality systems documented in this Quality Manual, such as the Training Program (Section 18), the ESD Control Program (Section 15.2), and the Document Control System (Section 5.0), are established primarily to achieve customer satisfaction by preventing nonconformity at all stages from design through to delivery.

5.5.2 Various Cross-Functional and Management teams and activities are established to review different aspects of the Quality System to determine necessary actions to be taken in order to prevent potential causes of nonconformities. Examples include but are not limited to:

5.5.2.1 Management Review Activities: Meetings are held by Xilinx Management at defined intervals to review the Quality System. Appropriate sources of information, such as metrics and reports, are analyzed to detect potential causes of nonconformities. Necessary actions are determined and initiated to avoid future problems. Reference Section 1.5 for a more detailed description of Xilinx's Management Review Activities.

5.5.2.2 Technology Review Board Meetings: Cross-Functional team consisting of members from various departments (such as Design Eng., Process Technology, Product Eng., Reliability Eng., Quality Assurance, etc.) established to oversee activities pertaining to the Xilinx QML Program. Some of these activities include: new Process, Product, or Package introductions or qualifications, process change control, reliability data

analysis, corrective actions resulting from failure analysis, etc. Reference QAP0093 for more details on TRB activities.

5.5.2.3 Yield Improvement Meetings: Xilinx has a dedicated Yield Improvement Team for each Business Unit whose charter is to continuously improve Wafer Sort and Final Test yield. Some of the activities performed by these Yield Improvement Teams include:

- Communications between Xilinx and the Wafer Foundry to discuss yield trends and issues.
- Any lot that yields less than the target is discussed between Xilinx and the Wafer Foundry, along with the cause of the low yield.
- Implementation of corrective actions as a result of failure analysis.
- Real-time review and analysis of SPC and Process E-Test data.

5.5.3 Relevant information pertaining to preventive actions are submitted for Management Review (reference Section 1.6 of this manual). Both of the activities described in paragraphs 5.5.2.1 and 5.5.2.2 are considered as Management Review activities. Yield trends resulting from the Yield Improvement Meetings (paragraph 5.5.2.3) are reviewed during the semi-annual meetings between Xilinx and Xilinx's major foundries and assembly subcontractors.

5.5.4 When nonconformities are found, preventive action is addressed through the use of various vehicles such as the Eight-Discipline Corrective Action Procedure (reference Section 14.0), the Quality Alert/Action Procedure, and the Internal Audit Procedure (reference Section 18.0), to implement necessary corrective actions to prevent recurrence of the nonconformities.

Section 14.2

1.0 **TITLE: CUSTOMER RETURNED PRODUCT**

2.0 **SCOPE:** This policy applies to all customer returned products.

3.0 **PURPOSE:** This policy establishes the quality system for the authorization, control, evaluation and disposition of customer returned products, as well as notification to the appropriate individuals (external and internal to Xilinx).

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.13 Control of Nonconforming Product
	4.14 Corrective and Preventive Actions
Xilinx Documents:	QAP0004, Return Material Authorization Procedure
	QAP0005, Systems Returned Material Processing
	QAP0014, Corrective Action Procedures
	QAP0023, Components Return Material Processing
	QAP0053, RMA Request, Approval and Credit
	RVP0005, RMA Receipts Processing
	DSP0001-DSP0016, Distributor Policies and Procedures
MIL-PRF-38535:	Appendix G, par. 30.2, 30.3

5.0 **POLICY:**

5.1 Customer returned product authorization shall be the responsibility of Xilinx Customer Service and Xilinx QA RMA department. The overall RMA (Returned Material Authorization) process flow is described in QAP0004. Component RMA's are processed in accordance to QAP0023. Development System RMA's are processed in accordance to QAP0005.

5.1.1 Product returned through QA RMA has no credit approval requirements, whereas product returned through Xilinx Customer Service does. These requirements are described in QAP0053.

5.2 Customer returned product is classified as suspect nonconforming material and is processed accordingly.

5.3 The RMA process provides for the control of the returned product, as well as for the control of the associated documentation. The RMA process consists of the following systemic aspects: identification, segregation, documentation, evaluation, disposition and notification.

5.3.1 Identification: When an RMA is approved, an identification number (RMA number) is assigned to the returned material. This RMA number is the common identifier among the physical material return, RMA written documentation, RMA electronic database entries, failure analysis reports, product engineering reports, RMA reports, etc.

5.3.2 Segregation: The RMA product is identified and segregated by the Receiving department for delivery to the RMA area (refer to RVP0005). The RMA

area is a secured and isolated area. Material Transfer forms are required to release material from this area. The RMA area complies with the Xilinx "ESD Control Program" (reference Section 15.2 of this manual).

5.3.3 Documentation: All documentation associated with the RMA product shall be maintained according to the Xilinx "Control of Quality Records" policy (refer to Section 16.0 of this manual).

5.3.4 Evaluation: Product returned by the customer, regardless of reason (quality return or policy return), will be classified as nonconforming material, until it has been evaluated and specified otherwise.

5.3.4.1 All returns are subject to initial RMA incoming screen: verification of returned product against authorization and verification of returned product integrity due to packing and shipping methods.

5.3.4.2 Furthermore, policy returns are subject to individual customer contracts and distributor policies (reference DSP0001 - DSP0016). A policy return may be sampled and evaluated as a quality return, pending the results of incoming screen and customer supplied RMA information.

5.3.4.3 Quality returns are subject to an arrival screen, an electrical screen, a mechanical screen, or any combination of these screens, depending on the customer supplied RMA information. Based on the results of these screens, the RMA product may then be transferred for disposition or further evaluation by Product Engineering or manufacturing operations, or for extensive failure analysis.

5.3.5 Disposition: No customer returned product (policy or quality) may be directly dispositioned to Finished Goods without evaluation against applicable specifications. A statistically significant sample evaluation is permitted, depending on the quality of the return. Rework of RMA product is permitted only with written instructions (refer to Section 13.1 of this manual). Retest of RMA product requires appropriate travelers (refer to Sections 8.0 and 9.0 of this manual). All reworked RMA product must be re-verified against applicable specifications. Scrap, retest, rework & retest, credit, replace, or return product are disposition options.

5.3.5.1 RMA's issued by Customer Service are dispositioned by Customer Service, with disposition recommendations by QA RMA, as required. RMA's issued by QA RMA are dispositioned by QA RMA.

5.3.5.2 Policy RMA's recommended for scrapping must be reviewed by World-Wide Inventory Management and by Production Control.

5.3.6 Notification: RMA notification is two-fold:

1) External notification to the customer, the distributor, and the associated representative on specific RMA evaluation results, and

2) Internal notification to the affected departments on specific RMA results or on general RMA trends. Internal notification may be informal, via a copy of the specific RMA report, semi-formal, via the Quality Alert/Action system, or formal, via the Eight Discipline Corrective Action program (refer to Section 14.1 of this manual. RMA trend analysis data is provided to affected departments on a monthly basis. The RMA electronic tracking database provides on-line RMA status and RMA WIP tracking information.

Section 14.3

1.0 **TITLE: CUSTOMER PROBLEM REPORT**

2.0 **SCOPE:** This policy applies to customer reported problems which pertain to general customer dissatisfaction.

3.0 **PURPOSE:** To establish a procedure to be followed for customer reported problems which pertain to general customer dissatisfaction.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.14 Corrective and Preventive Actions
Xilinx Documents:	QAP0069, Customer Problem Report Procedure
MIL-PRF-38535:	Appendix G, par. 30.2, 30.3

5.0 **POLICY:**

5.1 The Customer Problem Report (CPR) process is used for customer reported problems which pertain to general customer dissatisfaction, such as Wrong Quantity Shipped, Shipped to the Wrong Location, etc. This system will be used as a vehicle to track all such reported problems and to initiate corrective actions when needed.

5.2 The customer's problem is documented by a Xilinx employee and forwarded to the Quality Assurance department. Q.A. will determine whether corrective action (see Section 14.1 of this manual) is required, and if so, to issue the corrective action request.

5.3 Upon closure of the CPR, Q.A. shall notify all involved parties, including the customer, of the actions taken and the final status/results of the Customer Problem Report.

5.4 All Customer Problem Report records shall be retained by Q.A. per Section 16.0 of this manual.

Section 15.0

HANDLING, STORAGE, PACKAGING, PRESERVATION, AND DELIVERY

Section 15.1

1.0 **TITLE: HANDLING, STORAGE, PACKAGING, PRESERVATION AND DELIVERY**

2.0. **SCOPE:** This policy applies to the handling, storage, packaging, preservation and delivery of product at Xilinx.

3.0 **PURPOSE:** To establish a policy for the handling, storage, packaging, preservation and delivery of product to prevent damage, deterioration, loss, theft and substitution.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.15 Handling, Storage, Packaging, Preservation and Delivery
Xilinx Documents:	IVC0012, Inventory Control
	IVC0014, Shipping Procedure
	IVC0021, Final Pack Operation
	IVC0024, Carousel Pull Procedure for Finished Goods
	IVC0031, Component Inventory Cycle Count
	MAC0002, Mark & Cure
	MAC0029, Preparation for Packing IC Components
	QAP0003, ESD Handling Requirements
MIL-PRF-38535:	Appendix G, par. 30.3

5.0 **POLICY:**

5.1 **Handling:**

Detailed procedures have been established and maintained to provide methods of handling product in order to prevent damage of Xilinx products. These procedures include proper methods for adding or removing product from tubes or trays, methods for transport of product from one location to another, methods to prevent Electrostatic Discharge damage (reference Section 15.2 of this manual), etc. Refer to MAC0029 for detailed handling methods.

5.2 **Storage:**

Various stock room locations have been designated for the storage of Xilinx products. These stock room locations are static in nature and are used for temporary storage of product. Methods for authorizing receipt to and dispatch from these stock room locations have been established. Product that are ready to be shipped are transferred from stock room locations through the use of a picklist or a material transfer form (reference IVC0024). The movement of inventory from any stock room location to work-in-process is controlled by the applicable process flows and by appropriate lot travelers.

A cycle count of finished inventory is performed on a periodic basis to ensure correlation of actual physical inventory with inventory as reported by the electronic inventory tracking system. Additional actions are required when the variance between physical count and electronic tracking system count exceeds a specified percentage (e.g., greater than 1% variance). Additionally, all inventory with a date code greater than 30 months must be identified, segregated, and dispositioned per the appropriate processing flows.

5.3 Packaging:

Detailed procedures have been established for packaging of product from receipt of product, to delivery of product. These procedures include

- the selection of proper trays and tubes during components manufacturing operations and for shipment,
- the use of proper packing materials such as bubble wrap, foam, boxes, etc. to protect product during shipment,
- and appropriate labels to be used, such as ESD labels, patent labels, etc.

5.4 Preservation:

Cleanliness to the extent necessary to prevent deterioration or damage of product is a requirement at all locations where product is processed or stored at Xilinx.

Appropriate procedures for material with shelf-life restrictions, such as marking inks (reference MAC0002), have been established to prevent the use of expired material. These procedures address issues such as storage requirements, floor-life time limits and disposition of expired material.

5.5 Delivery:

All products shall be packaged for shipment from Xilinx in a manner to prevent mechanical, electrical, or electrostatic damage to devices. Full compliance to specific customer, Government, and Xilinx requirements regarding packing materials and labeling requirements will be maintained.

Section 15.2

1.0 **TITLE: ELECTROSTATIC DISCHARGE (ESD) CONTROL PROGRAM**

2.0 **SCOPE:** This policy applies to all Xilinx product which are ESD sensitive, and to the personnel handling these products.

3.0 **PURPOSE:** To define the policies and procedures to be used to protect Xilinx products from potential damage induced by Electrostatic Discharge.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.15 Handling, Storage, Packaging, Preservation and Delivery
Xilinx Documents	QAP0003, ESD Handling Requirements
	QAP0013, Operator Training and Certification
MIL-PRF-38535:	Appendix G, par. 30.3.1p

5.0 **POLICY:**

5.1 From receipt of assembled IC's through final packaging and shipment, all Xilinx integrated circuits are required to be handled in compliance with the ESD handling requirements of QAP0003. This does not apply to wafer handling operations from receipt of wafers through die saw and break.

5.2 When not at an ESD protected workstation, Xilinx ESD sensitive products are required to be stored or handled in ESD protective containers to prevent ESD damage. Refer to QAP0003 for the proper ESD protective containers to be used.

5.3 ESD sensitive products may only be removed from their protective packaging at an ESD protected workstation. Personnel handling product at an ESD protected workstation are required to wear static-shielding smocks, and must be properly grounded. Static generating sources at ESD protected workstations shall be removed when possible, or their harmful effects neutralized.

5.4 Periodic verification of ESD protected equipment/installations shall be performed according to QAP0003.

5.4.1 Written records of all such verifications will be maintained per Section 16.0 of this manual.

5.5 Personnel handling ESD sensitive product shall be adequately trained per QAP0013.

Section 16.0

1.0 **TITLE: CONTROL OF QUALITY RECORDS**

2.0 **SCOPE:** This policy applies to all Manufacturing, Test, and Inspection operations at Xilinx, and to Xilinx Subcontractors and Suppliers, as applicable.

3.0 **PURPOSE:** To establish the policy for the retention, use, and analysis of records throughout all Manufacturing, Test, and Inspection operations.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.16 Control of Quality Records
Xilinx Documents:	QAP0059, Record Retention Requirements
	IVC0019, Microfilm of Travelers
	IVC0026, Archiving Procedure
MIL-PRF-38535:	Appendix G, par. 30.2.3, 30.3, 30.3.1

5.0 **POLICY:**

5.1 The responsibility for the identification, collection, indexing, access, filing, storage, maintenance, and disposition of quality records shall belong to each individual department.

5.2 Records shall be stored and retained in such a way that they are readily retrievable in facilities that provide a suitable environment to prevent damage or deterioration and to prevent loss.

5.3 Records shall be maintained to demonstrate both conformance to specified requirements and the effectiveness of the Quality System. Records may be in the form of any type of media, such as hard copy or electronic media.

5.4 In general, quality records at Xilinx remain on-line for a certain length of time. This length of time is dependent upon how frequently the records need to be accessed, which varies from department to department. Once there is no immediate need to reference the records, the records may be stored on-site at Xilinx, or may be sent to an offsite contracted storage facility. The length of time that records need to be on-line need not be specified unless product quality will be affected.

5.5 All quality records at Xilinx must be retained for the minimum period of time specified by QAP0059, Record Retention Requirements. The minimum retention time specified includes both the time that records are retained on-line and the time that records are archived.

5.6 The Quality Assurance Department shall periodically monitor (through Internal Quality Audits) all operations to ensure that records are complete, accurate, and legible (reference Section 17.0 of this manual).

5.7 Quality records shall be available for review by Government and/or Customer representatives as required and agreed to by Xilinx Management.

Section 17.0

1.0 **TITLE: INTERNAL AUDIT PROGRAM**

2.0 **SCOPE:** This policy applies to all Xilinx manufacturing, inspection, and quality functions.

3.0 **PURPOSE:** To establish a system to verify Xilinx's conformance to internal specifications, ISO 9001 Standards, and Military specifications as well as to provide Xilinx Management with an assessment of the effectiveness of the quality system.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.17 Internal Quality Audits
Xilinx Documents:	QAP0056, Quality Internal Audit Procedure
MIL-PRF-38535:	Appendix G, par. 30.3.1 f

5.0 **POLICY:**

5.1 **Audit Scheduling:** An audit schedule is created at the beginning of each year detailing the areas to be audited by the Internal Audit Group. Audits are scheduled on the basis of the status and importance of the activity being audited such that each area is audited no less than once per year. Refer to QAP0056 for a listing of the areas to be audited.

5.2 **Auditor Selection:** Auditors are selected on the basis of experience, training, education, or previous job experience. Training requirements for auditors are documented in QAP0056. Auditors must be independent of those having direct responsibility for the activity being audited.

5.3 **Audit Preparation:** Before performing an audit, the auditor must be familiar with the applicable documented procedures and specifications that govern the area to be audited. In addition, the auditor must review past audit results of that area, and whether or not any corrective action requests have been issued against the area. Preparation prior to performing the actual audit is essential to minimize the time spent in the work area in order to prevent excessive interference with the operation.

5.4 **Performance of an Audit:** Various checklists are available for use by the internal auditor. These checklists point out various items that the auditor must verify during the audit. Some of these items include:

- ☒ Training and Certification of Employees
- ☒ Equipment Controls
- ☒ Recordkeeping Requirements
- ☒ Safety and Environmental Controls
- ☒ Discrepant Material Handling
- ☒ Electrostatic Discharge Control
- ☒ Usage of Statistical Process Control
- ☒ Adequacy of Documented Procedures
- ☒ Adherence to Documented Procedures

5.5 **Audit Report:** At the completion of an audit, the auditor will prepare a Quality Audit Report (QAR) listing the discrepancies (if any) found during the audit. A corrective action due date is established when discrepancies are found, and the QAR is distributed to the responsible individual.

5.6 **Audit Response:** When discrepancies are found during an audit, the audited area will submit a corrective action plan to the auditor before the reply due date. The corrective action need not be completed by the reply due date, but the estimated completion date for all corrective actions is required. The Audit Manager, or designee, reviews the corrective action response to ensure that the corrective action plan is sufficient to address the discrepancy. Corrective action responses that are overdue (response to QAR not submitted within allotted time) are forwarded to the next level of Management.

5.7 **Reaudits:** Once the corrective action response has been received, the auditor will schedule a reaudit based on the estimated completion dates of the corrective actions. Reaudits are actual verification by the auditor that the stated corrective action has been implemented by the dates committed. Reaudits encompass only those items found to be discrepant during the initial audit. The audit is not considered “closed” until all issues have been verified by a reaudit and approved by the Audit Manager, or designee.

5.8 **Six-Month Follow-Up Audit:** Once all issues pass the reaudit, a third audit will be scheduled approximately six months from the reaudit close date. The six month follow-up audit is in place to ensure that corrective actions are in effect and are adequate.

5.9 **Audit Records:** An Audit Follow-up Report shall be kept to document the results of the Reaudit and the Six-Month Follow-Up Audit. All audit records (QAR, Audit Follow-Up Report, etc.) shall be maintained per Section 16.0 of this manual.

5.10 **Management Review:** Audit Response Metrics shall be distributed for Management Review on a semi-annual basis. The results of internal quality audits form an integral part of the input to management review activities (refer to Section 1.6, Management Review, of this manual).

Section 18.0

1.0 **TITLE: TRAINING**

2.0 **SCOPE:** This policy applies to all Xilinx personnel required to be trained and certified per QAP0013.

3.0 **PURPOSE:** To define the training that Xilinx personnel receive in specific critical tasks, and the methods used to certify and decertify Xilinx personnel as capable of performing those tasks.

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.18 Training
Xilinx Documents:	QAP0013, Procedure for Training & Certification
MIL-PRF-38535:	Appendix G, par. 30.3.1 n

5.0 **POLICY:**

5.1 Xilinx operators are trained and certified for all applicable critical operations before they are permitted to perform work independently. Before an operator can be certified, he or she must demonstrate sufficient knowledge of the specifications and procedures. Operators are required to read the applicable procedures and specifications and to observe demonstrations on how to perform the tasks given by the trainer. After completing these steps, operators will be permitted, at the judgment of the trainers, to begin performing the tasks under close, careful supervision by the trainer.

5.2 The training of Xilinx operators and other individuals is conducted by engineers, supervisors, or trainers who are qualified (by reason of their education, training and/or work experience) both to perform the required function and to train others to perform the function.

5.3 All test operators receive a “general” operator training which consists of training and certification on operations which are commonly performed (e.g., filling out lot travelers), or on general subjects essential for production work (e.g., ESD handling precautions). In addition to the “general” operator training, before an operator is allowed to perform specific operations, he/she must be trained and certified for that particular operation (such as Mark or Test operations). Additionally, training and certification in the use of specific equipment (such as test handlers, mark equipment, etc.) is required.

5.4 The period of time spent in training for each individual may vary depending on background and experience, and may be extended as deemed necessary by the trainer. However, the minimum amount of training time required for each area has been specified (reference QAP0013).

5.5 In general, certification is valid for one year. Before a certification to perform a task may be reissued (recertification), a trainer must verify that the operator is still capable of performing the work satisfactorily. This will generally be accomplished by observation of the operator’s work, but other methods may be used, such as oral or written questions on specifications and procedures, or interviews and group discussions.

5.6 The Xilinx training program also includes provision for operator decertification for various reasons, such as extended absences, operator is no longer performing the task satisfactorily, etc.

5.7 Training requirements for other non-manufacturing areas, such as Purchasing, Customer Service, RMA, Engineering (e.g., Design Engineering, Packaging Engineering, Reliability Engineering), etc., have also been documented (reference QAP0013).

Section 19.0

SERVICING

Servicing is not a function performed at Xilinx. For this reason documented procedures for performing servicing are not required.

Section 20.0

1.0 **TITLE: STATISTICAL TECHNIQUES**

2.0 **SCOPE:** This policy applies to the Components Manufacturing Operations at Xilinx, and to Xilinx Suppliers and Subcontractors as applicable.

3.0 **PURPOSE:**

4.0 **APPLICABLE DOCUMENTS:**

ISO 9001:	4.20 Statistical Techniques
Xilinx Documents:	MAC0071, Statistical Process Control (SPC) System
	MAC0072, Procedure for Test Mark Operation In-Line SPC
MIL-PRF-38535:	Appendix G, par. 30.2.2, 30.2.3, 30.3

5.0 **POLICY:**

5.1 Identification of Need:

5.1.1 Statistical techniques shall be used as needed to control the manufacturing processes of Xilinx's Wafer Foundries, Assembly Subcontractors, and Xilinx's Components Manufacturing Operations. Data for analysis may be provided by an outside source (i.e., Wafer Foundry, Assembly Subcontractor), or may be gathered internally at Xilinx.

5.2 Procedures:

5.2.1 Documented procedures have been established to implement and control the application of statistical techniques for Xilinx's Components Manufacturing Operations (reference MAC0071 and MAC0072). Cross-functional SPC Teams are used at Xilinx to determine which processes need the application of statistical techniques, and how to effectively perform experiments and monitor data to improve process capability.

5.2.2 The Engineering groups and Quality Assurance work in conjunction with Xilinx's Wafer Foundries and Assembly Subcontractors to define parameters that are to be monitored and supplied to Xilinx on a periodic basis. Xilinx will monitor critical parameters to ensure process capability is met.