Exar Corporation
Quality Manual

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Executive Quality Improvement Team Commitment

This quality manual provides a statement of our quality policy and an overview of our quality management system. It is intended to provide our employees and our Customers with an understanding of our commitment to quality, and delegates the necessary authority to personnel implementing the policy. The members of the Executive Staff retain overall responsibility for the system, as defined in this document.

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1.0 Introduction

This manual is intended to demonstrate compliance to ISO 9001:2008 requirements to promote the adoption of a process approach when developing, implementing, and improving the effectiveness of the quality management system, to enhance customer satisfaction by meeting customer requirements.

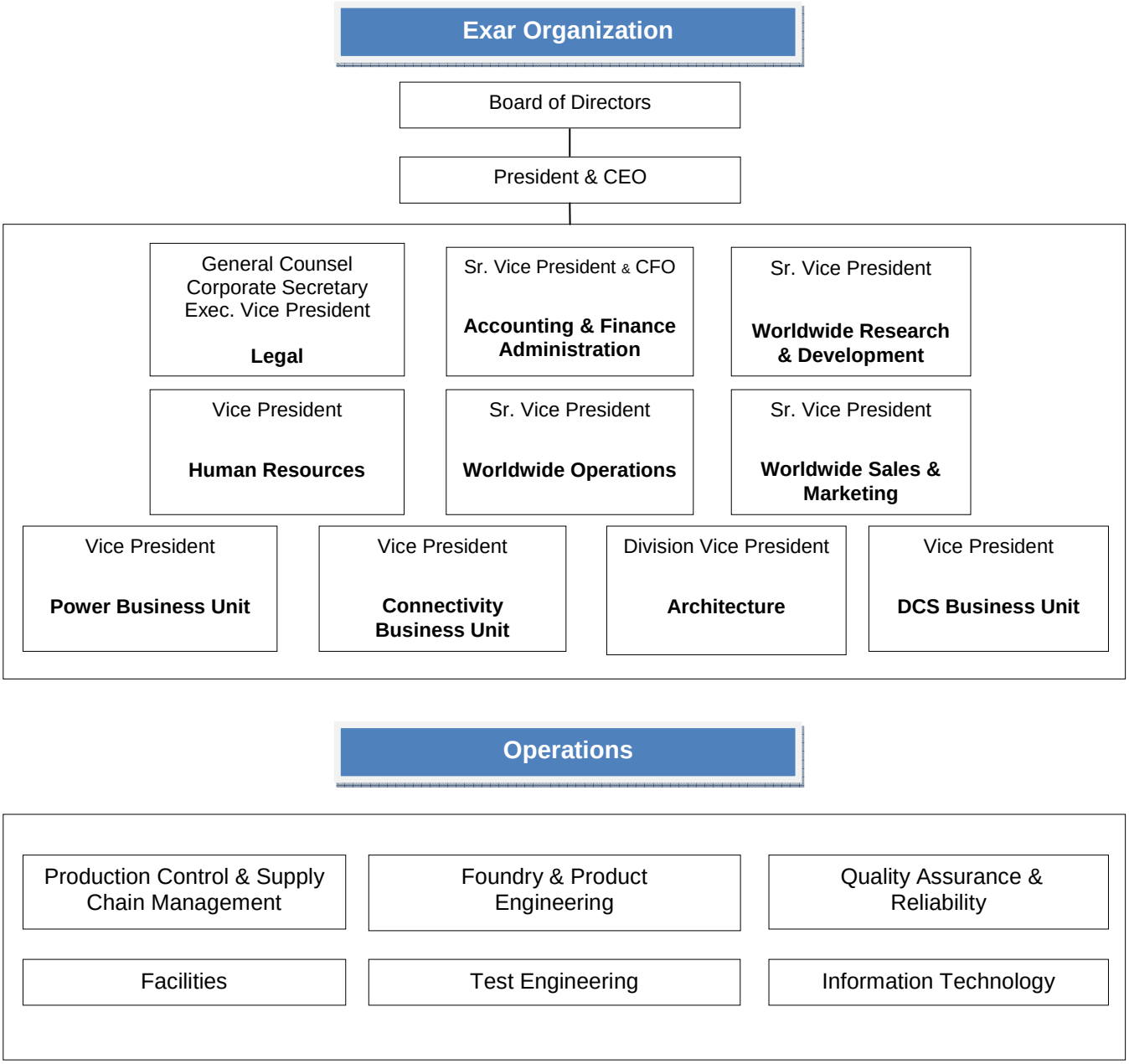
Design, some electrical die sort and final product testing, sales, marketing, and administration functions are located at the Company's headquarters in Fremont, California. Exar employs the manufacturing services of foundry, assembly and test subcontractors at various locations worldwide.

This manual will be revised as required by major changes in organization, policy or procedures. The master manual will be maintained as a controlled document and will be used to prepare quality manuals for external distribution.

Exar's commitment to quality and service is the foundation of our product strategy. The adoption of a Company-wide quality improvement system demonstrates the Company's commitment to continual improvement and Customer satisfaction.

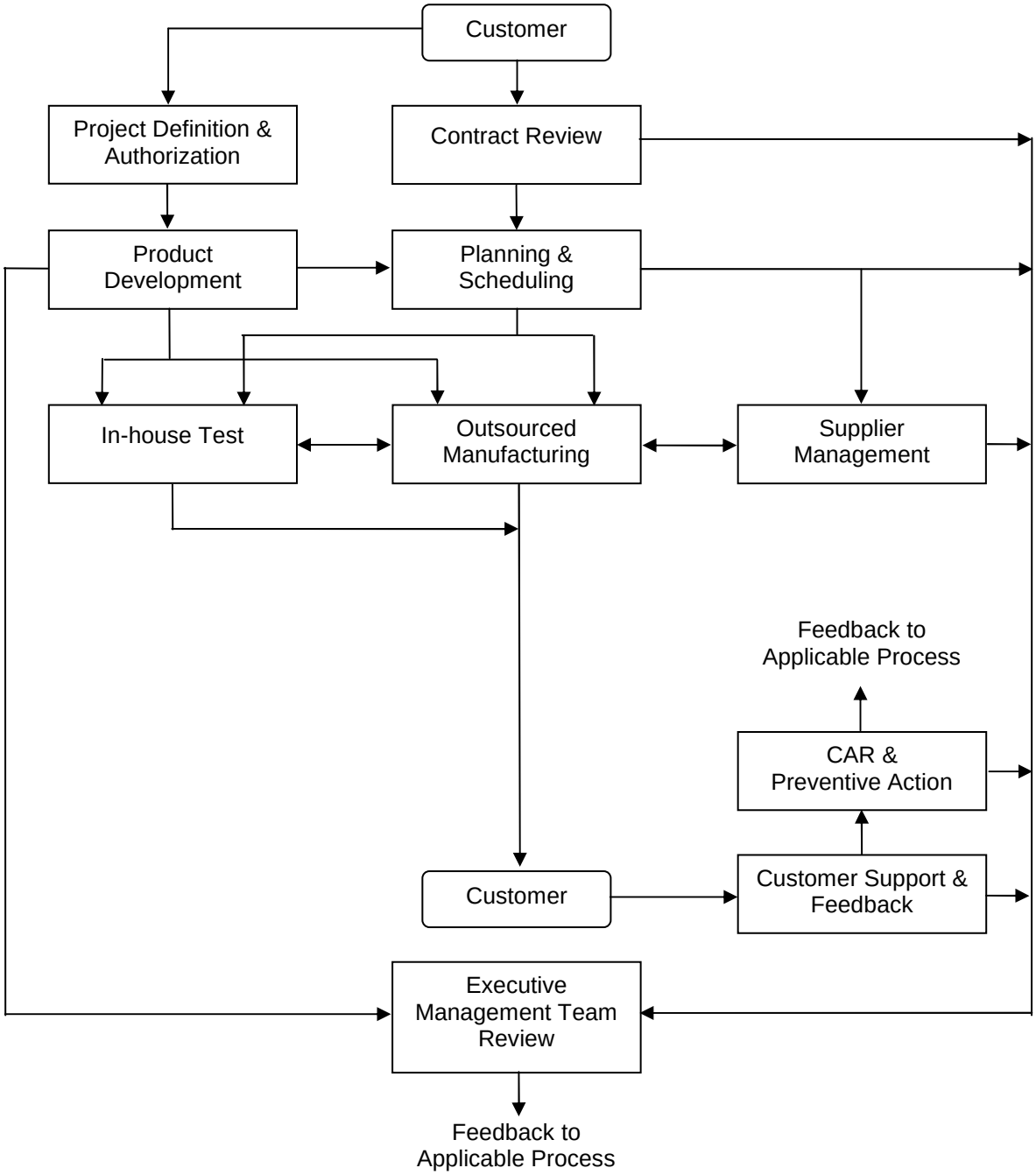
2.0 Organization

Figure 1: Exar Executive Staff Organization Chart and Functional Diagram for Operations



3.0 Process

Figure 2: Quality Management System Process



3.1 Quality Management System Description

Table 1

Process	Application	Input(s)	Output(s)
Contract Review	Receive, review & process orders from Customers.	• Orders from Customers	• Sales orders
Planning & Scheduling	Manage the amount of product manufactured to meet Customer orders on time.	• Sales orders • Sales forecasts • Manufacturing yields and cycle times	• Release against PO • Manufacturing forecasts & scheduling
In-House Test	Perform wafer sort and/or final test using Exar's in-house test equipment.	• Test HW & SW • Untested wafers • Assembled parts	• Wafers for assembly • Finished parts
Outsourced Manufacturing	Day to day control and management of outsourced manufacturing, including: wafer fab, die sort, packaging & final test.	• PO's to manufacturing suppliers • Mask sets • Test HW & SW • Assembly diagrams & instructions	• Wafers or parts for in-house test • Finished parts • Data, reports, yields
Project Definition & Authorization	Definition of new products and the allocation of design resources to work on their development.	• Customer needs • Market needs and opportunities	• Development work orders
Product Development	Design product to meet specifications. Develop test HW/SW and other items required for production.	• Development work orders • Simulation models • Design rules	• Mask sets • HW & SW • Assembly diagram & instructions • Data sheets • Sample parts
Supplier Management	Manage suppliers of out-sourced manufacturing, such as (but not limited to) wafer fabrication, package assembly and testing	• Supplier performance metrics • Manufacturing yields and cycle times	• Approved supplier list • P.O.'s to manufacturing suppliers • Scorecards
Customer Support & Feedback	Sales Customer support; Handling returned materials requests, Customer complaints and measuring Customer satisfaction.	• CCARs & RMAs • Customer complaints • Customer scorecard • On-time delivery reports • Customer survey	• Corrective & preventive action requests • Reports to executive management
CAR & Preventive Action	Investigation and elimination of causes/ potential causes of nonconforming product and prevent recurrence of same or similar issues.	• CCAR reports & RMAs • Customer complaints	• Corrective & preventive action requests (internal & to suppliers)
Management Review	Set corporate business & quality objectives and metrics. Review business & quality metrics	• Business & quality metric data • Customer satisfaction survey results	• Business & quality objectives • Continual improvement feedback

4.0 Quality Management System

4.1 General Requirements

Quality management system processes and their interactions are shown in Figure 2. A description of quality management system processes and their applications throughout Exar is shown in Table 1.

Exar employs outsourced manufacturing for foundry, assembly and test at various locations worldwide. The Supplier Management Team is responsible for maintenance and control of supplier partnership programs.

4.2 Documentation Requirements

4.2.1 General

The quality management system includes this quality manual, containing the quality policy as stated in section 5.3 and the required records as per the applicable specification. The document control system at Exar, available to the appropriate areas, has been established to ensure the quality management system documents are properly requested, prepared, reviewed, approved, distributed, amended and obsoleted. The system includes documents required by the ISO 9001 standard.

4.2.2 Quality Manual – Quality Management Scope

Exar Corporation is a fabless semiconductor company that designs, sub-contracts manufacturing and sells highly differentiated silicon, software and subsystem solutions for industrial, telecom, networking and storage applications.

The quality management system of Exar establishes the methods required to ensure the quality system is properly documented, implemented and monitored to achieve planned results, Customer satisfaction and to promote continual improvement throughout the organization.

Post delivery activity excluded as there are no after sale post delivery activity connected with the sale of Exar products. Validation of processes for production and service provision is excluded because of 100% electrical test and sample or 100% final visual inspection on all products before shipment.

Human Resources and Finance Policies and Procedures are exempted from the Exar Quality Management System.

Quality management system documented procedures have been referenced throughout this manual. A description of the interaction between the quality management system processes is given in Figure 2 and section 4.1 of this manual.

4.2.3 Control of Documents

The Exar document control system, identified in the applicable specification has been established to ensure that quality management system documents are properly requested, prepared, reviewed, approved, re-approved, distributed, amended and obsoleted.

Document Control is responsible for defining the structure and format of the specified documents and arranging for their controlled issue, at points of use and maintenance. Engineering Change Notice forms state the nature of the document change.

Document Control has a master index available upon request of all documents by revision level within the document control system. For Exar employees, document copies are available via the intranet. For external customers, Document Control will distribute documents, as required.

In order to retain traceability, all controlled production documents are archived by Document Control in accordance with the applicable specification.

Copies of applicable external standards & codes are maintained by Document Control and are listed in the master index. Revisions to these documents are handled by an outside service.

4.2.4 Control of Records

Department managers are responsible for correct and complete record generation, identification, storage, protection, retrieval, retention and disposal in their functional areas. The extent of Exar quality records is defined in the applicable specification. Designated records are maintained within the responsible functional department until space constraints dictate that they be moved off-site

and archived. Purchasing is responsible for providing archive record storage at an off-site storage facility.

Applicable Documents	
Dxxxx	Document Control Procedures
G0055	Procedure for the Identification, Storage, Protection, Retrieval, Retention and Disposition of Quality Records
PO100	Purchasing Policy

5.0 Management Responsibility

5.1 Management Commitment

Exar's Executive Management Team, comprised of the President/CEO and his staff, is responsible for establishing the quality policy and objectives, defining the requirements of the quality management system, and periodically reviewing the effectiveness of the system and providing resources.

The effectiveness of the quality management system and the importance of meeting Customer as well as statutory and regulatory requirements are communicated by Company-wide performance review meetings or other means of communication.

5.2 Customer Focus

The Sales Department is responsible for Customer communications and the review of Customer requirements prior to sales order completion in order to enhance Customer satisfaction.

5.3 Quality Policy

Exar's quality policy, established by the Executive Management Team, states:

> In our relentless drive to zero defects, Exar employees, using a process of continual improvement, will accept from suppliers and deliver to Customers goods and services that meet or exceed agreed requirements.

The quality policy is communicated to employees at all levels in the Company through communication meetings and training conducted by department managers and supervisors. Suitability and effectiveness are reviewed through the Executive Management Team.

5.4 Planning

5.4.1 Quality Objectives

The Executive Management Team develops and maintains a set of corporate strategic quality goals and objectives focused on satisfying Customer requirements and improving time to market for new products. Quality activities throughout the Company are, whenever possible, conducted in support of one or more of these goals and objectives. Quality objectives shall be measurable and consistent with the quality policy.

5.4.2 Quality Management System Planning

Quality management planning falls into one of the following categories:

a) Establishment of quality goals and objectives throughout the organization.
b) Promotion of continual improvement of both products and the quality management system.
c) Ensuring that changes take place in a controlled manner.

The Executive Management Team establishes measurable quality objectives at the corporate level on a yearly basis to support EXAR quality policy requirements. Departmental as well as individual goals and objectives are defined to support corporate goals. Monitoring, measuring, and analysis of processes will provide continual improvement of both products and the quality management system. Quality management system documentation as defined in section 4.2 will provide sufficient control when changes are planned and implemented.

5.5 Responsibility, Authority and Communication

5.5.1 Responsibility and Authority

5.5.1.1 Exar's President and Chief Executive Officer (CEO)

Exar's President and Chief Executive Officer is responsible for providing the overall leadership of the quality management system, demonstrating executive management commitment, and leading the Executive Management Team.

5.5.1.2 Executive Management Team

Exar's Executive Management Team, comprised of the President/CEO and his staff, is responsible for establishing the quality policy, defining the requirements of the quality system, and periodically reviewing the effectiveness of the system.

5.5.1.3 Senior Vice President, Worldwide Research and Development

Reports to: President and Chief Executive Officer

Responsibilities: (1) Select process technologies required for product development. (2) Assign the development of products that have been approved by the selection process.

5.5.1.4 Division Vice President, Architecture

Reports to: President and Chief Executive Officer

Responsibilities: Define product architecture. This includes:

a) Offer technical support to marketing decisions, including new product selection and product obsolescence
b) All product line strategy decisions.
c) Define, architect, and propose new IP, Market and technologies to be engaged on.

5.5.1.5 Sr. Vice President, Worldwide Operations

Reports to: President and Chief Executive Officer

Responsibilities: (1) Implementing and maintaining a quality management system to assure that quality objectives are achieved. (2) Planning and execution of manufacturing operations and product inventory objectives to achieve the product sales and product costs plans of the company. (3) Provide facilities management to sustain a safe, clean workplace for the employees of Exar.

5.5.1.6 Sr. Director, Information Technology

Reports to: Sr. Vice President, Worldwide Operations

Responsibilities:

a) Maintenance of manufacturing execution systems (MES) tools
b) Provision of all Information Technology services to the company

5.5.1.7 Division Vice President, Quality & Reliability

Reports to: Sr. Vice President, Worldwide Operations

Responsibilities:

a) Initiate action to prevent the occurrence of product nonconformity
b) Identify and record any product quality problems
c) Initiate, recommend or provide problem solutions through designated channels
d) Verify the implementation of solutions
e) Control further processing or delivery of nonconforming product until the deficiency or unsatisfactory condition has been corrected
f) Develop, propose and implement quality improvement programs
g) Specify and conduct internal and external quality audits
h) Investigate causes of nonconformance

i) Report the performance of the quality system to the Executive Management Team for review and as a basis for improvement
j) Establish a Customer quality satisfaction plan
k) Define and implement quality improvement training
l) Ensure prompt awareness of Customer requirements in Exar
m) Administration of Malaysia based manufacturing QA team
n) Chairing the Qualification Review Board
o) Coordination of quality assurance activities
p) Administration of the Material Review Board
q) Assembly and Packaging

5.5.1.8 Director, Customer & Product Quality and Reliability

Reports to: Division Vice President, Quality & Reliability

Responsibilities:

a) Administration of failure analysis from internal and external sources
b) Administration of lab analytical services
c) Administration of product and process change control system
d) Reliability qualifications
e) Reliability monitors
f) Administration of a document control system
g) Administration of internal quality audits
h) Administration of equipment calibration recall system
i) Administration of the corrective action system
j) Customer Support: Environmental

5.5.1.9 Division Vice President, Supply Chain Management

Reports to: Sr. Vice President, Worldwide Operations

Responsibilities:

a) Supplier Management Team: Chairperson
b) Supplier communications which includes managing the SQBR (Supplier Quarterly Business Review) with key suppliers
c) Enhance the supplier management system towards a world class level
d) Conducts evaluations of key suppliers
e) Spokesperson for all supplier relations including negotiations and contractual agreements
f) Approved Suppliers: maintains list and status of all suppliers
g) Global support for company procurement
h) Managing and directing customer related processes for order processing and general customer information requests.
i) Receiving and transmitting customer information such as specification reviews, complaints and claims
j) Customer satisfaction results
k) Production planning and scheduling in response to sales and marketing forecasts, and outstanding sales backlog
l) Management of internal and external manufacturing and test supply chain
m) Manufacturing cost control and improvement programs

5.5.1.10 Vice President of Engineering

Reports to: Senior Vice President, Worldwide Research and Development

Responsibilities:

a) Providing design capability for the Company, including the personnel, software and systems necessary to successfully complete new product designs on schedule and in a cost-effective manner
b) Developing, implementing, and enabling design capabilities, and know-how for the Company product design community
c) Ensuring that adequate quality control is built into the design methodologies, systems, and processes of circuit design through adequate documentations and records of revisions, changes, or updates
d) Continually Improving Company productivity in product design by identifying and correcting any deficiencies in design methodologies, flows, tools, systems, resource usage, resource capacity or allocation

5.5.1.11 Engineering Design Managers and Directors

Reports to: Vice Presidents of Engineering and Product Development

Responsibilities:

a) The control and verification of product designs
b) Ensuring the documentation and verification of design output
c) Ensuring that these results meet the design input requirements and that the requirements are correctly and completely expressed in the technical documentation of the product
d) The correction of any deficiencies related to design identified in product non-conformity reports
e) Adequate qualification of design personnel

5.5.1.12 Business Unit (Power, Connectivity and DCS) Vice Presidents

Reports to: President and Chief Executive Officer

Responsibilities: All product marketing and product support. This includes:

a) All product marketing decisions, including new product selection and product obsolescence
b) All pricing decisions
c) All product line strategy decisions, including strategic development and implementation
d) All product promotional activities

5.5.1.13 Senior Vice President, Worldwide Sales & Marketing

Reports to: President and Chief Executive Officer

Responsibilities:

a) Managing all aspects of the Company's Sales processes
b) Achieving Company quarterly bookings goals
c) Managing all sales channels for the Company: Strategic accounts, direct Customers and Distributors
d) Managing the Company's Sales Representative network
e) Managing the Company's world-wide sales offices
f) Developing and executing account plans for major accounts
g) Meeting/exceeding sales targets for all new products
h) Administration of corporate communication systems

5.5.1.14 Senior Vice President and Chief Financial Officer

Reports to: President and Chief Executive Officer

Responsibilities:

a) Providing all sources of Finance
b) Providing all budgeting and cost accounting processes and services
c) Managing all aspects of Treasury
d) Managing the Company's internal and external financial auditing processes
e) Accurately reporting and filing all necessary documents pertaining to the Company's operations
f) Ensuring that the Company is in compliance with all externally mandated financial regulations, including Sarbanes-Oxley requirements
g) Managing investor relationships

5.5.1.15 Vice President, Human Resources

Reports to: President and Chief Executive Officer

Responsibilities: The planning, development, implementation and administration of all personnel, compensation, benefits, employment, training and employee relations programs.

5.5.1.16 General Counsel, Secretary & Executive Vice President

Reports to: President and Chief Executive Officer

Responsibilities: Reviewing of the statutory and regulatory requirements related either to products, Customer, purchasing, personnel, contractual, or any other legal issues as required in the course of conducting Exar's business.

5.5.1.17 All Exar Employees

All Exar employees are responsible for the quality of the products and services provided by them to Exar and its Customers. Unless otherwise stated, the functional responsibilities and authority of all Exar employees are embedded in the applicable functional operating procedures.

5.5.2 Management Representative

The Division Vice President of Quality & Reliability is designated as the management representative with authority and responsibility for ensuring that the requirements of the quality management system are established, implemented, maintained and communicated to improve customer satisfaction and continual improvement.

5.5.3 Internal Communication

Effectiveness of the quality management system is communicated through the performance review meetings or other means of communication.

5.6 Management Review

5.6.1 General

The Executive Management Team periodically conducts reviews of the quality management system to assess its effectiveness and suitability in assuring the quality of products provided. The frequency of these reviews is defined in the applicable specification. The results of these reviews are documented in the minutes of the review meetings and maintained as per the applicable specification.

5.6.2 Review Input

Quality management system reviews include the results of audits of the quality management system, Customer feedback, failure analysis of returned material, process performance and product conformity, changes for continual improvement and the resultant corrective/ preventive actions, follow up of previous actions, changes that could affect the quality management system and recommendations for improvement. The format of the Executive Management Team reviews, as per the applicable specification, enables the discussion and actions needed for continual improvement in the quality management system.

5.6.3 Review Output

The Executive Management Team directs actions needed to improve the effectiveness of the quality management system processes and Customer relations and also to assess productivity and provide resources.

Applicable Documents	
CP401	Development and Periodic Update of a Strategic Business Plan
G0055	Procedure for the Identification, Storage, Protection, Retrieval, Retention & Disposition of Quality Records
TQM1010	Quality Management System Review

6.0 Resource Management

6.1 Provisions of Resources

Exar's Executive Management Team shall determine and provide necessary resources to implement and maintain the quality management system with focus on continual improvement to enhance Customer satisfaction.

6.2 Human Resources

6.2.1 General

All employees performing work affecting product shall be competent based on appropriate education, training, skills and experience.

6.2.2 Competence, Awareness and Training

Human Resources is responsible for initial employee orientation training and for establishing Company wide training as necessary to support the goals of Exar's business plan. This training includes a review of the Exar Quality Policy.

Human Resources and management shall utilize the employee performance review process to identify employee competency and to ensure that personnel are aware of the relevance of their job activities toward corporate goals and objectives.

The effectiveness of any training provided may be evaluated during the employee performance review process.

6.3 Infrastructure

Management is responsible for providing an adequate infrastructure and work environment. The Information Technology Group maintains and upgrades computer systems and networks. Area managers have the responsibility to ensure that the equipment, personnel and services required to perform job duties are available.

6.4 Work Environment

Facilities Maintenance is responsible for the building environmental controls. The Safety Department is responsible for safety and ergonomics. Human Resources Department is responsible for maintaining a positive working atmosphere among employees by using recognition, communication and development programs.

Applicable Documents	
G0001	Operations Training and Certification Procedure
HR101	Internal Procedure Regarding Employee Competence and Awareness
	Exar Safety Handbook

7.0 Product Realization

7.1 Planning and Product Realization

Product realization planning falls into one of the following categories:

a) Planning and defining of the overall product quality objectives, systems and procedures.
b) Product realization and preparation of individual quality plans as required for specific quality programs or contracts.
c) Definition of requirements for suppliers.

Planning of quality requirements for new product designs are integrated into the product planning formalities outlined in section 7.3 of this manual. Planning is performed by a cross-functional team with input from Customers and suppliers as applicable.

Individual contracts, purchase orders, and Customer specifications are reviewed in light of existing processes, procedures and equipment in order to identify incompatibilities and special needs. Manufacturing instructions shall be prepared detailing how the Customer's requirements and product acceptance are to be achieved if required by contract, or otherwise deemed necessary. Reference Section 7.2 of this manual.

Requirements for subcontractors are detailed to the extent necessary in quality plans, either generic or unique to a product or order. These may take the form of procurement specifications, procedural documents, control plans, flow charts, build diagrams and/or manufacturing instructions. Reference Section 7.4 of this manual.

7.2 Customer Related Processes

7.2.1 Determination of Requirements Related to the Product

The Exar Sales department is responsible to determine Customer specific requirements, including the requirements for delivery, by review of contract documents, Customer drawings, specifications and purchase orders. The product data sheet will provide necessary information for product application as well as statutory, and regulatory requirements, if any.

7.2.2 Review of Requirements Related to the Product

Contract documents and Customer purchase orders are reviewed by the Exar Sales department prior to order acceptance. Special contract requirements as well as Customer drawings and specifications are forwarded to the Manufacturing Instructions Group. The Manufacturing Instructions Group reviews the referenced documents in accordance with documented procedures to ensure that they are within Exar's capabilities. Any requirements that are non-standard or require technical support for resolution are forwarded to the responsible functional organization. Once comments are received from the functional organization, the comments including requests for Customer contract exceptions, are summarized on a specification review form and forwarded to Sales for resolution.

Once any non-standard requirements are resolved, the Manufacturing Instructions Group is responsible for generating the manufacturing instruction to define the inspection, test, backend processing, packing and product identification requirements in accordance with Customer specific requirements.

Amendments/revisions to contracts are reviewed in a similar manner to original contracts.

Exar Sales will document and confirm the requirements prior to order acceptance if the Customer provides no documented statement of requirements. The Manufacturing Instructions Group maintains a Customer file containing records of the contract review/Customer related processes and any Customer approved waivers.

7.2.3 Customer Communication

The Exar public website is utilized to communicate product information to its Customers. Inquiries, contracts or order placement/acceptance and amendments are channeled through the Sales department utilizing applicable procedures. Results of review, when applicable, are communicated to Customers for confirmation.

Sales department utilizes the CustomerSupport@Exar.com email box and the RightNow system to manage requests for product information, Return Material Authorization and Corrective Action Requests. Customer Corrective Action Requests (CCARs) are handled through the CCAR@Exar.com email box. The Customer survey system is used to enhance Customer satisfaction and may make associated department referrals to address Customer complaints. Customer surveys shall be used to obtain feedback and focus on enhancements to improve Customer satisfaction.

7.3 Design and Development

Exar employs a “four-phase” system in order to manage and execute its new product design activities on schedule and in a cost effective manner. These activities are outlined as follows:

Phase 1 – Product Definition
Phase 2 – Design Phase
Phase 3 – Prototype Phase
Phase 4 – Production Release Phase

Process details are outlined in Sections 7.3.1-7.3.7 as noted below.

7.3.1 Design and Development Planning

Design and development activities necessary to meet the specified requirements are detailed in the product development specifications. Engineering standard operating procedures and general operating procedures cover the product authorization, development, verification, qualification and validation and, finally, release to production. They also identify the resources and responsibilities throughout various stages of development plan and schedule tracking.

7.3.2 Design and Development Inputs

Design inputs including statutory and regulatory requirements are reviewed during the project authorization phase. Product functional and performance requirements are reviewed to determine if Exar has the capabilities and access to appropriate technologies compatible with the specified requirements. Information derived from previous designs may be utilized to improve device performance in the next generation of the related products. Incomplete, ambiguous or conflicting requirements are resolved with Marketing and, if appropriate, with the Customer prior to completion of the design and layout.

7.3.3 Design and Development Outputs

The output of the design process takes the form of a mask set, test software and hardware, datasheets, evaluation boards and the necessary manufacturing instructions. Prior to mask making, simulations and verification steps have to be performed to verify compliance to the specifications as well as manufacturability. After mask making, prototypes are built to qualify, characterize and validate product performance against the requirements.

7.3.4 Design and Development Review

Depending on the complexity and challenge of certain circuit designs, informal design review meetings will be held throughout the design to solicit input from peers and improve the odds of success. Formal final design reviews, involving other functions concerned with the new product development, are held prior to making the first mask set of a product.

7.3.5 Design and Development Verification

Design verifications establish that the design output meets the design input as well as manufacturability requirements. This is accomplished by circuit simulations, using process libraries, throughout the design and additional verification programs prior to release to mask making.

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7.3.6 Design and Development Validation

Upon receiving the first prototypes, a series of evaluation, validation, characterization and qualification tests will be performed to ensure adherence of the product to the target specifications. If all of the test results are satisfactory, the product will move to the release stage.

7.3.7 Control of Design and Development Changes:

Design and development changes to the existing products are reviewed, verified, validated and approved as defined in the applicable procedures. The Qualification Review Board is responsible to evaluate the changes and to inform applicable Customers when there is a major change to a released product. The results of the design activities are documented in various technical documents, drawings, specifications, notes and computer files which reflect the requirements for implementation of the design changes into a functional product. Copies of certain documents are filed in the design binder which resides with the respective design group. Copies of relevant documents are filed in the product binder which resides with manufacturing. Computer files are archived and backed-up from the engineering computer network. The results of design verification, such as document review or qualification testing, are recorded and retained by the respective design department. Design of Exar integrated circuits is not regulated by any regulatory body such as UL/CSA, FDA, OSHA, etc. When applicable standards are revised, Exar receives the latest revision for review and internal distribution as applicable.

7.4 Purchasing

7.4.1 Purchasing Process

Purchasing is responsible for key supplier relations, negotiations with suppliers, obtaining quotations and issuing the purchase documents. Purchasing, together with the Supplier Management Team, is responsible for initiating the supplier selection process. Purchasing ensures order acknowledgment and is responsible for monitoring the processing of the order to ensure that Exar purchased products comply with the specified requirements. Purchasing is also responsible for maintaining an approved supplier list.

7.4.2 Purchasing Information

Purchasing documents are required to contain a clear description of the products ordered and the requirements the product has to meet. To the extent appropriate for the product or the service, the following forms a part of the purchase documents:

a) Drawing number
b) Bill of materials
c) Material, test and inspection specifications
d) Indications of required quality records and certificates
e) Quantity ordered
f) Cost
g) Required delivery dates
h) Packaging requirements
i) Manual for Supplier Partnerships Towards Excellence

The Supplier Management Team, chaired by the Sr. Purchasing Director, is comprised of representatives of Manufacturing, Foundry, Assembly and Test Engineering, R&QA and Production Control. The team is responsible for developing a supplier management program, supplier selection, and the preparation of score cards reflecting key supplier performance. A quarterly supplier rating is prepared to assess key supplier performance. Purchasing shall arrange a quarterly business review with key suppliers.

7.4.3 Verification of Purchased Product

Should Exar, Exar's Customer or Exar's Customer representative decide to perform source inspection at the supplier's facility, the source arrangements and method of product acceptance shall be incorporated into the purchase order. This verification would not absolve the supplier of the responsibility to provide acceptable product nor would it preclude subsequent rejection.

7.5 Production and Service Provision

7.5.1 Control of Production

Technical process specifications necessary for production control are prepared by the respective manufacturing, test or product engineer. These documents contain the process details (working steps, equipment to be used, machine parameters, related documents and forms) and are applied by qualified personnel working with appropriate equipment. The formal document system is maintained by Document Control.

Necessary steps are carried out following the written instructions on the manufacturing instruction. Production results are recorded on the manufacturing instructions or logs for each process step.

Equipment used for production is selected by the responsible managers and engineers on the basis of its ability to perform the intended function. Measuring & test equipment used to verify the quality of the product is subject to calibration prior to being included in the production process. Regular preventive maintenance of equipment is performed and recorded.

Critical production steps, such as planning, scheduling and shipping of products on time, are monitored on a regular basis to assure that all parameters are within the specified limits.

7.5.2 Validation of Processes for Production Provision

Conformance to specified limits and conditions and mechanical performance of the end product are assured by performing electrical test on 100% of each production lot and sample or 100% final visual/mechanical inspection, depending on the Exar product line. All guaranteed electrical parameters are validated through testing, correlation, or characterization. Additionally, critical mechanical parameters are monitored as required. Test equipment is checked for calibration and preventive maintenance prior to use.

7.5.3 Identification and Traceability

Identification and traceability are assigned according to the applicable procedures. Functional departments must ensure that the documentation accompanying product, such as production, inspection and test records, and the electronic manufacturing tracking systems contain the correct product identification and traceability. Examples of these are:

a) Sales assigns order numbers via the ERP system.
b) Inventory Control assigns lot numbers for wafer sort and subsequent processing steps.
c) Manufacturing controls the proper marking of the product by the supplier.
d) Shipping generates the packing slip and bar code labeling.

Production lot numbers are identifiable at any production stage. Production status and process history, including direct material, shall be identifiable for every production lot.

Material in process shall be identified such that it can be determined where the material is located in the production flow. Identification has to be sufficient to prevent accidental movement of the product.

7.5.4 Customer Property

Procedures for identification, verification, and protection of Customer supplied product have been defined in the applicable specs. Customer supplied product must be clearly identified as such. Until the use or installation of these products, they shall be kept segregated under conditions which protect them from damage. If Customer supplied product is lost, damaged, or otherwise becomes unsuitable for use, it shall be treated under the control of nonconforming product described in section 8.3 of this manual and shall be reported to the Customer for disposition.

7.5.5 Preservation of Product

Preservation of product including identification, handling, transportation, storage, packing and delivery within Exar, from receiving of material to shipping of finished product have been defined in the applicable procedures. These procedures are designed to avoid damage, deterioration and mishandling of product.

7.6 Control of Monitoring and Measuring Equipment

The Calibration Coordinator maintains a listing of all equipment that require calibration and records of such calibrations. When equipment is received it is required to be checked for calibration before being placed in use. Inspection measuring and test equipment in use are regularly calibrated per the due date scheduled on the recall list. This is either performed in-house or by an outside calibration laboratory. When the calibration validity period has expired the equipment is returned by the user or recalled by the Calibration Coordinator. It is the user group's responsibility to ensure that equipment is not in use past the "next calibration due" date.

Equipment used for performing calibration must have a known and valid relationship to calibration standards traceable to NIST or international standards. Necessary data is maintained in the corresponding equipment files. Calibration status of the equipment is indicated on labels showing the last calibration date and the date the next calibration is due. If, during an equipment calibration, deviations are detected exceeding the admissible tolerances, the Calibration Coordinator is notified. The Calibration Coordinator then convenes a meeting of the Material Review Board to assess the impact on product processed at the applicable inspection and/or test operation where the out of calibration condition occurred. If calibration standards are found out of tolerance, the equipment checked with them shall be withdrawn from use for re-verification.

The calibration lab, either internal or external, is responsible for ensuring the correct environmental conditions during calibrations, inspections, measurements and tests. This is ensured by suitable environmental monitoring such as temperature or relative humidity. The user ensures that the equipment is handled, stored and preserved in such a manner that accuracy and fitness for use are maintained.

Applicable Documents	
A0055	Tray Strapping, Vacuum Sealing, Component Weighing and Tape & Reel Operating Procedure
A0077	Packing Requirements for Exar Products
ASXXX	Subcontract Assembly Specifications
CP737	Signature Authority - Capital and Business Expense
ESOP7002	Work Order Initiation for Exar Products
ESOP7005	Project Authorization Procedure
ESOP7006	Exar Semiconductor Product Development
ESOP7008	Engineering Design Files and Product Files
ESOP7015	Product Characterization Procedure
ESOP7018	Engineering Archives
ESOP7019	Procedure for Archiving and Controlling Mask Designs and Changes
ESOP7055	Design Procedure for New Semiconductor Products
FG001	Final Test Operating Procedure (Critical)
FP018	ERP (Enterprise Resource Planning) Procedure (Critical)
G0003	General Operating Procedure for Electrostatic Discharge (ESD) Control (Critical)
G0005	Product Traceability
G0006	Change Control, Change Notification and Qualification Review Board (QRB) Procedure
G0007	Procedure for New Product Release to Production
G0014	General Operating Procedure for General Manufacturing Instructions
G0033	General Operating Procedure for Product Identification
G0040	General Specification for Reliability Qualification
G0047	Manual for Supplier Partnerships Towards Excellence
G0049	General Operating Procedure for Finished Goods
G0055	Procedure for Identification, Storage, Protection, Retrieval, Retention & Disposition of Quality Records
G0111	Purchasing Requisition Guidelines
PO100	Purchasing Policy
PPXXX	Purchasing Procurement Specifications
PWXXX	Procurement Specifications - Wafers
QA020	Approved Supplier List
QC002	Procedure for QC External Visual Inspection (Critical)
QR002	Calibration Procedure for Measuring and Test Equipment and Measurement Standards
QR013	Reliability Monitor Specification
RGXXX	Receiving General Specifications
SDXXX	Sales Department Procedures
TCXXX	Test Maintenance Calibration Procedures
TMXXX	Preventive Maintenance Specifications

8.0 Measurement, Analysis and Improvement

8.1 General

Information gathered from monitoring, measurement & analysis of the quality management system processes from section 4.1 shall be utilized to demonstrate that products meet the planned requirements and also demonstrate effectiveness of the quality management system.

Requirements for the use of statistical techniques are imposed on the Company's suppliers and subcontract manufacturers by the Supplier Management Team described in Section 7.4 of this manual.

8.2 Monitoring and Measurement

8.2.1 Customer Satisfaction

The Sales Department utilizes the Customer Corrective Action Requests (CCARs), Return Material Authorization, Corrective Action Request and Customer survey systems to enhance Customer satisfaction and may make associated department referrals to address Customer complaints.

8.2.2 Internal Audits

Internal quality management system audits are performed annually (unless otherwise specified). Internal audits are used to verify that the requirements of the quality management system are being complied with and identify any non-conformances. Internal audits are performed in all areas within Exar that are covered by this quality manual and the ISO-9001 standard.

The Audit Coordinator has the responsibility to effectively implement, plan/schedule, perform, document, evaluate and maintain records as per the applicable specification of the internal audits. He/She is also responsible for verification of the corrective actions taken.

Auditors shall be selected on the basis of their knowledge and capabilities, shall have received formal training in the auditor task and shall be approved by the Director, Reliability & Quality Assurance. No auditor shall audit their own work. There shall be no punitive measures taken against either an auditor or an auditee.

Department managers and supervisors are responsible for ensuring that the quality management system audit findings are responded to and that the necessary corrective actions are taken in a timely manner. Results of internal audits together with corrective actions and improvements, are reported to the Executive Management Team.

8.2.3 Monitoring and Measurement of Processes

Quality management system processes have been defined in section 4.1 of this manual. Responsible departments shall monitor and measure, where applicable, to ensure planned goals are achieved. Corrective and preventive action shall be taken as necessary, if measured results do not meet their goals.

8.2.4 Monitoring and Measurement of Product

Electrical tests and lot acceptance inspections are in place to monitor and measure the characteristics of the product.

Test Engineering within the division is responsible for creating and maintaining test programs for Final Test & QC acceptance. Subcontract testing is controlled by the Supplier Management Team described in section 7.4 of this manual.

Final Test personnel are responsible for carrying out the required electrical tests and recording the results on the applicable lot documentation. Test personnel are responsible for performing final QC Electrical acceptance sample testing and inspection. Inspection and test results are recorded on the manufacturing instructions.

Under Exar's Total Quality Management philosophy, the Company's suppliers are expected to furnish material that meets the specification. Incoming inspection is not normally required on material furnished by suppliers that are ISO 9001 registered and provide Exar with periodic SPC data. Internal Quality Assurance inspection may be performed on an exception basis and any resulting rejections will be dispositioned by the Material Review Board.

In-process inspection and testing shall be carried out by Production in accordance with the conditions specified on the manufacturing instructions.

Prior to testing of product, the setup is verified using correlation units maintained specifically for this purpose. Mark and Pack performs the final external visual inspection.

Plant Clearance is the last inspection operation performed before the product is shipped to the Customer. This function is performed by shipping personnel at Exar or at the subcontract test facility.

Non-conforming product is segregated and reworked, scrapped or submitted to the Material Review Board for disposition in accordance with section 8.3 of this manual.

The manufacturing instructions define all production and inspection/testing stages of the process flow. No deviation from the chronological order in the manufacturing instructions is permitted.

Completion of every step on the manufacturing instructions has to be confirmed by entry of the employee ID number of the respective production or inspection personnel. The results of any inspections or tests also have to be recorded on the manufacturing instructions. The completed manufacturing instructions are the base document for traceability purposes. Records are maintained as per applicable specification.

8.3 Control of Non-conforming Product

Non-conforming material is to be clearly identified and segregated from acceptable material to avoid use or shipment of non-conforming product.

If non-conformities are detected, a discrepant material report can be issued and the product put on hold pending an evaluation of the severity of the non-conformance. Material rejected for serious non-conformances is forwarded to the Material Review Board administrator where it is segregated pending Material Review Board disposition.

Material Review Board disposition decisions are entered onto the Discrepant Material Report, e.g.; use as is, scrap, 100% screen, return to supplier, Customer waiver & rework. Results of the rework activities are confirmed on a rework run card or rework manufacturing instruction. Reworked material shall be reinspected to original specification requirements.

Records of the nature of non-conformities and any subsequent actions taken, including concessions obtained shall be maintained as per applicable specification.

If non-conforming product is detected after delivery, the Customer will be contacted.

8.4 Analysis of Data

Data collected from the quality management system and product realization processes will be analyzed to provide necessary information toward Customer satisfaction by using Return Material Authorization, Customer Surveys, etc. and also to ensure that product meets the planned requirements. Gathered information is utilized to support preventive action process and also to provide information to the Company's suppliers for continual improvement.

8.5 Improvement

8.5.1 Continual Improvement

Strategic objectives, established as an integral part of the annual business plan, define the expected results from the Company's processes. A key overall objective is Customer satisfaction, which begins with a thorough understanding of Customer requirements. Improvements in Customer satisfaction are achieved through the quality management system processes defined on Figure 2. Also shown on Figure 2 are the measurements used to provide feedback to the processes in order to continually improve effectiveness and ultimately to improve Customer satisfaction, done through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and Executive Management Team review.

8.5.2 Corrective Action

The corrective action system eliminates causes of non-conforming product and system deficiencies, by identifying root cause and implementing corrective action plans to avoid reoccurrence.

Corrective Action Request coordinator evaluates discrepant material reports issued to Manufacturing and initiates Corrective Action Requests when warranted. Corrective Action Requests are issued to subcontractors when appropriate.

Marketing and/or Sales records nonconformities of product at the customer. Necessary information is transmitted to the Director, Customer Quality Engineering for analysis and corrective action.

For evaluation and traceability purposes the corrective action report is generated per requested format as defined in the applicable specification. Records of the results of action taken shall be maintained. Results of corrective actions are reported to the Executive Management Team for review.

8.5.3 Preventive Action

Available trend data from quality monitoring and process performance in addition to corrective action results, Customer complaints, failure analysis results, audit observation, etc. form the basis of preventive action.

The intent of preventive action is to proactively eliminate potential root causes prior to the occurrence of non-conformities. The ultimate responsibility of implementing preventive action belongs to not only each process owner but also the supplying and receiving sides of this process. Evaluation, qualification, and brainstorming prior to product design or realization are required to discover the potential deficiencies or problem areas.

Records of preventive action results taken shall be maintained as per applicable specification. The results of preventive actions are reported to the Executive Management Team for review.

Applicable Documents	
AI003	External Visual Inspection Criteria (Critical)
CP401	Development and Periodic Update of a Strategic Business Plan
FG001	Final Test General Operating Procedure (Critical)
FP019	Procedure for Holding and Dispositioning of Lots At Final Test and QC Electrical Test
FPXXX	Final Test Procedures
G0014	Manufacturing Instructions (M.I.) (Critical)
G0036	Material Review Board (MRB) - Material Disposition of Suspect/Discrepant Material Using Discrepant Material Reports (DMR), low yield Return to Vendor (RTV).
G0037	Corrective Action Procedure
G0047	Manual For Supplier Partnerships Towards Excellence
G0058	Shipping: Plant Clearance Inspection of Commercial Product
G0094	Preventive Action Procedure
QA012	Procedure for Issuing Return Material Authorization (RMA) and Disposition of Return Material
QA052	Quality Management Systems Audit –Internal
QC001	Quality Control Wafer Inspection After Electrical Die Sort (EDS) (Critical)
QC002	Procedure for QC External Visual Inspection (Critical)
SDXXX	Sales Department Procedures
TS015	General Operating Procedure for Electrical Die Sort (EDS) (Critical)
TQM1010	Quality Management System Review