Zilog
Quality Manual

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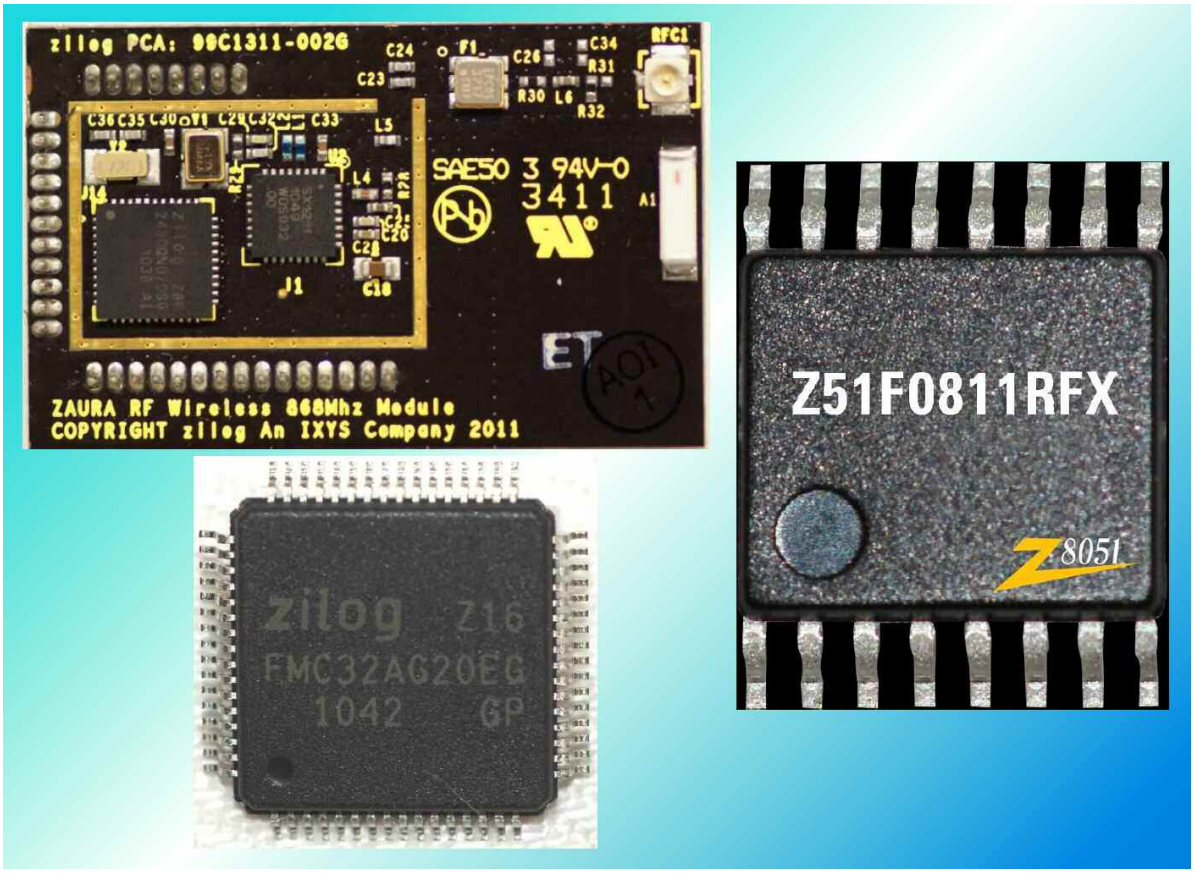
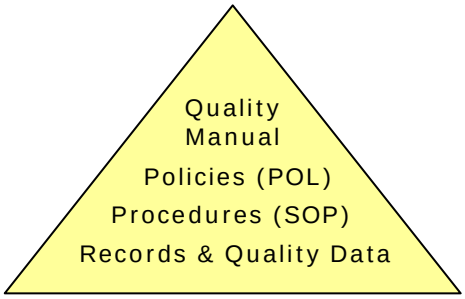


1. Introduction

Zilog, Inc., founded by the inventor of the microcontroller, Federico Faggin in 1974, designs semiconductor products that enable customers to be creative and innovative in their embedded designs. Utilizing Zilog's tools and products, such as the Z80 and Z8 microcontrollers, engineers from around the world have built over one billion end-user devices covering such applications as consumer appliances, remote controls, vending machines, telecommunications controllers, home automation systems, spacecraft instrumentation, industrial automation systems, and thousands of other products.

Zilog maintains its corporate headquarters and a design center in Milpitas, California, with a satellite engineering facility in Meridian, Idaho (referred to as MER), and a manufacturing facility located in the Philippines (referred to as ZEPI).

Zilog employs a fabless company model, with world-wide foundry partners selected and qualified to compliment its current and future designs. Assembly operations and some testing operations are performed at subcontracted operations located within the Asia Pacific region.



The above figure represents Zilog's Quality Management System (QMS) which describes the overall Quality Management System hierarchy with references to subordinate procedures. All Zilog owned manufacturing facilities world-wide must have local Quality Manuals that support, but cannot supersede or override, this document. Non-manufacturing remote sites such as the Design and Engineering Centers, are covered directly by this document and do not require separate Quality Manuals. The Quality Manual is reviewed, revised and approved as needed and at least annually. The Quality Systems department is responsible for establishing, maintaining and implementing the Quality Manual.

2. Quality Policy

zilog

Quality Policy

Delight our Customers by...

- Doing the job right the first time
- Making and meeting commitments
- Excelling through planning and teamwork
- Driving continual improvement with Best Known Methods
- Respecting team members and making Zilog a great place to work

3. Quality Management System

Zilog has established a corporate QMS in accordance with ISO 9001:2000.

ZEPI has established a site specific quality system which extends beyond this manual into more detailed production-oriented procedures, detailed in QCC1479, in accordance with the ISO9001:2008 standard.

ZEPI has been awarded a stand-alone ISO9001:2008 certification for its subcontractor management and warehousing of semiconductor products.

The QMS continually seeks to improve its effectiveness by combining the requirements of the ISO standards with industry best practices, customer feedback (both internal and external) and stakeholder commitments. For the remainder of this document, the term "customer" refers to both internal and external customers.

Zilog accomplishes this primary goal by identifying its core processes and their inter-relationships, monitoring and periodically re-assessing these processes through internal audits, conducting and analyzing customer surveys, customer performance/quality reports and as appropriate presenting the results to senior management in a series of ongoing Management System Review (MSR) meetings. Minutes are maintained from these meetings and are used to record and track all actions resulting from decisions made at these meetings.

Quality Objectives are established annually, aligned to the business objectives, disseminated to all levels of employees as part of the annual Management by Objectives system.

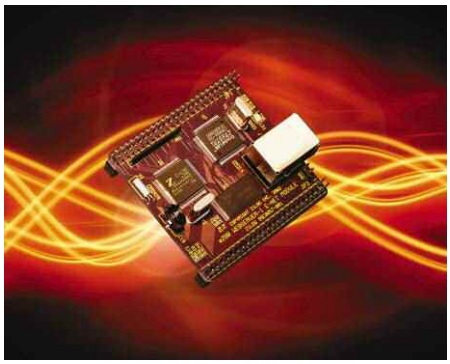
4. Management Responsibilities

The Quality Systems department provides guidance and recommendations to top management staff in defining, developing, implementing and maintaining a Quality Management System.

The Top Level Management Group is responsible for providing evidence of its commitment to the development and implementation of the quality management system and continually improving its effectiveness and reviewing the appropriateness of the system relative to the corporate strategies and objectives.

Through their direct involvement and that of their managers, they are responsible for communicating the Quality Policy throughout the organization and ensuring that every individual understands their responsibilities and how their activities affect overall quality and overall customer satisfaction.

In addition, through both the Management System Review meetings and the normal process of aligning the corporate structure to the current business model, Top Level Management reviews the functioning of the Quality Management System and ensures it remains an effective tool to promote the Quality Policy. This is achieved by developing, maintaining and modifying a strategic business plan that not only provides overall business guidance and goals but also incorporates the Quality System into the business planning of the corporation. This task is governed by SOP2120.



The designated management representative who has the responsibility to aid in the implementation and ongoing support of the Quality Management system is the Director of Quality. This person further supports the QMS by representing the customer and ensuring that the requirements of our customers, including regulatory, national, international and internal specifications are addressed in the QMS and included in the continual improvement process.

5. Provision of Resources

Among their other responsibilities, Top Level Management provides the resources needed to implement and maintain the quality management system and continually improve its effectiveness and to enhance customer satisfaction by providing the customer with a positive experience. This is achieved by maintaining an effective organization through multi-layered, cascading organization charts which show the relationships of each individual to his/her department and departments to each other. In this manner every employee is educated in their role and how it relates to enhancing product quality.

As the needs of the organization change, management reviews the organization, facilities, and infrastructure to maintain the balance necessary to achieve its goals, promote a rewarding environment to its employees, and meet the needs of its customers.

6. Human Resources

Zilog's greatest asset is its people; Zilog provides opportunities to learn new skills and to become more knowledgeable in the company's technology.

The Human Resources departments, in conjunction with the department managers, maintain detailed job descriptions, including skill requirements and experience levels. An annual Performance Review provides every employee with an assessment of their current skills and performance against the requirements of their jobs, and suggestions of areas of improvement and the means to obtain the skills needed to successfully accomplish their goals. Such reviews are an integral part of the continuous improvement philosophy of Zilog, as well as ensuring that all personnel affecting the quality of the products and services provided by Zilog are competent.

The Human Resource Department has responsibilities including recruiting, hiring, training, performance, and maintenance of personnel records as detailed in SOP0955-COP20 and POL106.

Recruiting is based on organizational needs. Management initiates a personnel requisition based on job requirements. Candidates are selected using resume reviews and personal interviews to assess their skill sets and general suitability for the position being filled. They are qualified on the basis of appropriate education, training and/or experience.

The company is committed to the training and retention of its employees in order to achieve and maintain the quality standards and objectives of the company.

7. Control of Documents & Records

Document Control maintains a system to control documents dealing with processes, standard operating

procedures, policies and related operations with established guidelines for initiation, modification, approval, distribution, removal, archival and traceability. This system is detailed in SOP2113 and utilizes a document management system called ZiDOC. Complete revision tracking and controlled approval routing is ensured by ZiDOC.

Hard and/or electronic document archives are maintained per retention requirements at an off-site commercial storage facility in accordance with SOP0914 and SOP2013.

Records consist of documents that do not require revision control because they are reports, meeting minutes, presentations, etc. These records may be digital or hard copy. They are important to the running of the company and provide essential information needed to meet customer and/or regulatory requirements. Accordingly, they are stored in the same document management system (ZiDOC) that the controlled documents are maintained but do not require revision control nor change approval. Alternatively, at the discretion of the issuing department, they may be stored on network servers in dedicated directories that may be secured with restrictive access rights.

8. Customer Related Processes

Zilog's internal and external sales force, in conjunction with our distribution partners and marketing organization, provide the primary communications channel between our external customers and the product fulfillment organization. They assist in determining the current and forecasted customer needs for products and services, and provide the feedback that determines new product needs.

These groups also provide the information needed to establish fair and equitable pricing commiserate with the corporate financial goals and competitive pricing. These activities are documented in SOP1544.

Working with the customer service organization, they also ensure that Zilog satisfies its customers' production needs from order entry through order fulfillment. These functions are detailed in SOP0955-COP02.

9. Quality Planning

Quality Planning is a key component of the company's business philosophy. It is a tool used in the business planning, product design and development, and overall management of the company. All functional elements of the company participate in the quality planning cycle. It is used in establishing the relationships between processes, monitoring customer satisfaction, reviewing and incorporating customer specific requirements into our business flows, establishing new products and processes, improving current products and processes, evaluating subcontractors and captive manufacturing, driving the continuous improvement programs, and many more areas.

Some of the tools utilized in quality planning include the 8D/CFA system for determining root causes of problems and establishing robust corrective actions to preclude repetitive incidents, and Statistical Process Control in manufacturing to drive continual process improvements.

Reliability and outgoing quality levels are monitored and reported in various quality metrics which are reviewed periodically in the Management System Review meetings. All new products, processes and subcontractors must pass established reliability testing prior to release to the customer, and periodically in conformance with SOP0940.

All of these functions are aimed at improving our customer satisfaction by methodically identifying and eliminating causes of customer dissatisfaction, improving our process efficiencies by identifying and eliminating non-value-added steps, and ensuring that we learn from our errors and do not repeat them.

10. Product Design and Development

The accurate, timely, and efficient design and development of new products is crucial to both Zilog and its customers. Accordingly, a 6 phase product development process has been implemented by Zilog that

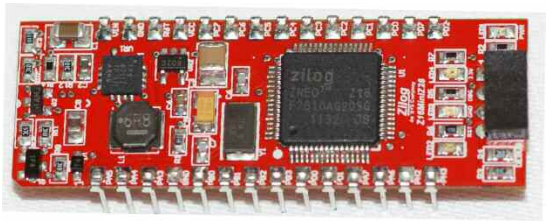
provides the following benefits to both Zilog and its customers:

a. Effectively identify products that have a high potential for success within the overall Zilog business plan
b. Ensures that the proper resources are focused on the right projects
c. Makes the product development more efficient, effective and focused on reducing time-to-market
d. Improves quality, reliability and productivity through numerous cross-disciplinary reviews and planning cycles, and foundry and assembly process capabilities.

The complete Product Design and Development process summarized above is contained in SOP1506.

11. Planning of Product Realization

Zilog establishes objectives for product realization yearly and monitors them on an ongoing basis with postings and communications occurring at least quarterly. These objectives include not only the traditional yield and reliability objectives but also include objectives related to customer satisfaction, such as using customer surveys or customer supplier performance reports/ratings to identify areas of further improvement and satisfying customer specific requirements.



Product requirements are set before production begins and monitored closely throughout manufacturing, on all shifts, by employees having delegated responsibility to ensure product quality. Records of the monitoring are tracked through computer systems utilizing Oracle database management software and various logs/records throughout the manufacturing process.

During the actual production process, including all storage and handling of production product, internationally accepted and approved handling and storage techniques are used exclusively in order to protect the product from undo environmental and/or ESD issues per SOP1604.

Before product ships from Zilog to its customers, it must meet the process evaluation parameters and stringent final electrical testing established to guarantee performance against its respective product datasheet. Once tested and stored, a first-in, first-out inventory management system insures that all inventory is utilized in an appropriate manner.

Zilog has established and periodically reviews a disaster recovery plan aimed at minimizing the impact of any disaster on our ability to support our customers. This plan is contained in SOP0950 for corporate and design centers and SOP1903 for ZEPI.

12. Subcontractor Management

Subcontractors are defined as those companies with whom Zilog shares with (or delegates to) portions of the manufacturing processes used to fabricate our products. As such, subcontractors need to be both certified and qualified by Zilog before production can be released to them.

Zilog employs a stringent selection process that includes, but is not limited to, the following criteria:

a. Capable of meeting our process/product technical and quality requirements as well as our delivery requirements
b. Able to provide the required process control information in a timely, concise and accurate manner
c. Is environmentally friendly
d. Provides rapid feedback in resolving all customer related issues

Our subcontractors generally fall into one of three categories: wafer foundry, assembly and/or test. The wafer foundry management is provided in accordance with SOP0830, while the assembly and test management is covered under SOP2108 Attachment V.

Subcontractors are required to have a quality management system compliant to ISO9001 and an environmental management system compliant with ISO14000. As part of their business relationship with Zilog, they must allow our quality and technical teams to periodically audit their processes, procedures and premises even if certified by a third party registrar, and must pass initial and periodic qualification testing.

Regardless of their certification and qualification status, Zilog maintains the full responsibility for all quality and reliability of product manufactured by our subcontractors and delivered by Zilog to our customers.

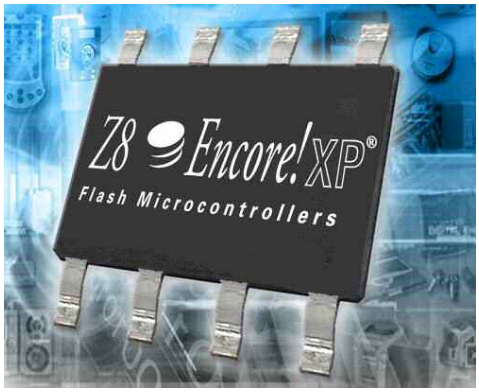
13. Purchasing

Purchase requisitions with specific requirements are completed by the requestor and submitted to the Purchasing Department for review. The Purchasing Department ensures the requirements on the requisition conform to applicable purchasing agreements and/or material specifications.

The majority of purchases of direct materials and services are controlled by ZEPI in accordance with SOP1600. For corporate headquarters and all design centers, SOP2158 controls the purchasing function.

An Approved Vendors List (AVL) is referenced by the Purchasing Department for selection of a qualified vendor(s). Approved Vendors List is applicable only for those service or material purchases which have an impact on production and the environment.

Vendor Qualification is performed when a vendor is not listed on the Approved Vendors List. Selection and approval of vendors are based on the ability to meet quality, delivery, service and cost requirements. The Requestor, Purchasing, and Quality Systems perform vendor Qualification. Key vendor performance is monitored by ZEPI using a Supplier Rating System.



Upon arrival of material in ZEPI having a direct impact on production from the vendor, Incoming Quality Assessment (IQA) confirms that the purchased product meets specific requirements defined in the procurement specification by reviewing the Certificate of Conformance.

Accepted material is released to stores inventory. Disposition of nonconforming material is documented on a Discrepant Material Service Report (DMSR) which is submitted to the Material Review Board in ZEPI for approval (SOP1549). If necessary, the vendor is formally contacted for return of material and for a corrective action response. Corrective actions are tracked to closure and documented.

14. Identification and Traceability of Production Materials

There is no production material handling or storage in corporate headquarters or any of the Design Centers. Any production product delivered to these locations is used only for the purpose of engineering evaluation and/or customer support. Product delivered to these locations will not be shipped to any customer unless clearly identified as engineering product.

Please refer to SOP1599 for identification and traceability of all product intended for delivery to customers.

15. Customer Owned Property

Zilog exercises great care with customer property while under our control. Materials are identified, verified, protected, and safeguarded by following the procedures within SOP2169. Customer property that is lost, damaged, or otherwise unsuitable for use is reported to the customer. Records of such transactions are maintained.

Customer intellectual property is carefully guarded by being entered into Zilog's Document Control System. Intellectual property includes processing flow, ROM codes, pricing and other communications from the customer deemed confidential either by direct declaration or through normal business practices. Such documentation is treated by Zilog in the same manner as Zilog's own confidential material in accordance with POL035 and SOP1004.

16. Calibration

Calibration in all Design Centers is performed on equipment identified on the Key Equipment List for each Laboratory as specified in SOP2060. Vendors used for these services are listed on the Corporate Approved Vendor Listing, and are either certified to ISO17025 or are capable of meeting the requirements of this standard based upon Zilog's audit of their facilities.

Key equipment is labeled to identify its calibration status in accordance with SOP0949. Equipment residing outside of a Laboratory (such as equipment used to monitor application tools or used to assist customers in programming and using Zilog's products) is exempt from these requirements because such equipment is not used in the characterization or validation of products or designs.

All equipment used to assess the quality and fitness for use in production (outside of the laboratories) is calibrated and maintained on a calibration recall list in accordance with QCC1479 and our various subcontractor contracts.

The responsibility for establishing and maintaining the calibration system in our Design Centers resides with the various Laboratory Managers; for all other locations, such responsibility is designated in either SOP1561 or our subcontractors' Quality Management System.

17. Customer Satisfaction

Zilog monitors and measures customer satisfaction by tracking a variety of different reports. Traditional metrics such as on-time delivery, outgoing quality levels, and cost of poor quality are combined with a variety of different surveys, measuring such items as customer perception of our application support functions, overall satisfaction our product offerings, problem resolution efforts and other areas deemed necessary by management. The overall corporate policy concerning measuring and improving on our various customer satisfaction ratings in contained in POL116.

The Human Resources department is responsible for measuring and improving our internal customer satisfaction ratings, also in compliance with POL116.

This information is summarized and presented for discussion in the Management Systems Review meetings held periodically.

18. Quality Auditing

The Internal Quality Systems Audit Program is a combination of traditional procedural audits combined with contemporary process audits. It is composed of an established system of planned and unscheduled audits which verifies compliance to specifications and determines effectiveness of the quality system as well as issues relating to environmental and safety regulations.

The audit function is detailed in SOP0951 for corporate audit and SOP1548 for ZEPI's audit system. Its primary responsibility is to insure that the Quality Systems are functional, meeting their established goals, and providing the guidance to the remainder of the organization to maintain compliance to all international, national, customer and corporate requirements.

19. Lot Traceability

The only products that are handled by corporate and design centers are prototypes and engineering samples (both of which are classified as non-production products).

Traceability of all products is assured via the part marking in accordance with SOP1599. Using only the marking on the package, traceability is assured from final testing back to the original wafer fabrication lot (which also provides traceability even further to the mask set used on that lot) and all intermediate processing steps.

20. Control of Non-Conforming Materials

All products received by corporate and design centers are either prototype products or engineering samples. Control of non-conforming products does not apply to such units, since they are non-valued and not shipped for revenue to customers.

Zilog, however, does maintain strict controls segregating conforming and non-conforming products, wafers, ROM code masks, etc. in its production facilities and at all of its subcontractors. Please refer to the SOP1549 for details.

21. Continual Improvement

Zilog continually improves the effectiveness of the QMS through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions, customer surveys, other customer feedback and management reviews

Continual improvement activities, conducted by individual or cross-functional groups, are reviewed periodically at the Management Systems Review meetings and follow the procedures recommended in SOP2096.

Customer concerns are conveyed to the Quality Department through the customer service group in various forms, including requests for customer failure analysis, requests to return materials, and other direct communication means including voice and email. Applications related questions and concerns are processed by our Applications support groups located world-wide. Customer concerns also may surface in customer or 3rd party audits.

Regardless of the manner in which the customer chooses to communicate with us, Zilog will respond in the customers' preferred corrective and preventive action format (if provided to us). If not, Zilog will initiate either an 8D to record and forward our response to the customer or a corrective action report. Our procedure for

generating, tracking and closing 8D reports is SOP1692, and for corrective actions is SOP0951.

Anyone detecting a need for corrective or preventive action at any step in the business cycle is responsible for reporting the problem to the proper supervisor/manager and/or quality representative.

Preventive actions are taken based upon systematic review of quality systems' information on product and work processes, procedures, output, site facilities, quality systems, internal and external customers, line and die yields. Some of these reviews are ad hoc and informal, while others are the results of formal Process (refer to SOP1506).

The effectiveness of implemented corrective and preventative actions is reviewed both as part of the immediate analysis (8D or CAR) and again during the annual internal audit process.

Preventive Actions, though similar to Corrective Actions, are usually associated with information analysis over a longer period of time. SOP0953 suggests methods and techniques to use in dealing with preventive actions. This information encompasses product quality, manufacturing, audit results, quality records, work processes, feedback on product quality output, site facilities, quality systems, internal and external customers, line and die yield.

CHANGE HISTORY				
REV	DATE	WORKFLOW	DESCRIPTION	APPROVAL (NAME/INITIALS)
	2004			
01	11-19	CORP_Q-R	Original release to support the ISO9001:2000 QMS	M. Goldberg J. Nation
	2005			
02	6-29	Corp–Non-technical	Changed SOP0951 title from Internal Audit Procedure to: Quality Audit Procedure.	B. Koontz
03	6-29	Corp–Non-technical	Eliminated references to SOP0945 which was obsoleted.	T. Stortini
04	10-13	CORP_QS	Complete Rewrite	T. Stortini B. Koontz
	2006			
05	01-24	CORP_Q-R	Inserted hyperlinks for all specs.	T. Stortini B. Koontz
06	05-03	CORP_Q-R	Modified QA Policy, deleted references to TS16949, modified section 8 and 9 to provide more detail.	T. Stortini
07	09-15	CORP_Q-R	Added in Section 3 exclusions due to ZEPI ISO certification and their certification number in response to BSI audit 4826877 dated 8/16/06.	T. Stortini
08	09-21	CORP_Q-R	Correct alternate, .pdf, file (SOP2120 inadvertently appended)	J. Nation
09	12-19	CORP_Q-R	Deleted para 12 subsection “a”	T. Stortini
	2008			
10	04-16	CORP_Q-R	Changed QA Policy, front cover picture, added new logo and deleted references to SEA and CDC.	A. Shaw
	2013			
11	08-12	CORP_Q-R	Changed front cover and some product images, deleted ZIEL references and obsolete document references.	S. Daley