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Section 0

About Sovereign Circuits, Inc.

Company History

Sovereign Circuits was formed in April of 1987 to produce rigid single sided, double sided and multilayer printed circuit boards. With production beginning in April of 1988, our original emphasis has been placed on providing small to medium quantities of high quality boards combined with quick turnaround service. While Sovereign is still committed to its original business strategy, we have added flex, rigid-flex products and provide low-volume production capacity.

Sovereign Circuits was acquired in October, 2006 and is now a wholly owned subsidiary of DDI Corporation. DDI is a publicly traded company with five PCB manufacturing facilities in North America.

Sovereign has evolved as an engineering solutions provider and a leading supplier to the high-end commercial, military, and aerospace markets.

Sovereign is a customer-driven, quality orientated organization with an emphasis on customer service and technical support.

Sovereign maintains ISO 9001:2000/AS9100:2004 registration, QML and QPL military qualifications, and UL approvals to support a diverse market.

Our factory is located at:

12080 DeBartolo Drive
North Jackson, Ohio 44451

Section 1

Quality Roles

1.1 It is the firm conviction of Sovereign Circuit's Management and employees to provide products and services that contain the highest level of quality consistent with customer requirements. Sovereign is fully committed to meeting the requirements of our customers by delivering quality and performance conforming product on time.

1.2 The responsibility for quality is with each employee of Sovereign Circuits, including the Vice President of Operations, Managers, Supervisors, Staff and Work Force. It is up to each person in the company to ensure that his or her obligations are complete and to verify that their work is completed right the first time.

1.3 Quality belongs to everyone at Sovereign Circuits, Inc. Sovereign will strive to give our customers that extra assurance of quality by empowering and requiring the Quality Assurance Manager and his/her staff to provide through the quality system a standard of excellence to our customers and to produce evidence that this has occurred. This will happen through the implementation and sustaining of a Quality Management System.

1.4 The Management Structure is shown in the organizational chart in Section 3 of this Quality Management Plan.

Section 2

Management Roles

2.1 **Vice President of Operations**

It is the Vice President of Operations' responsibility to ensure that all departments under his or her control achieve their quality objectives and that products are made as and when required.

2.3 **Director of Quality and Engineering**

It is the Director of Quality and Engineering's responsibility to review and ensure that the Quality Management System is effective. The director shall work with senior management to instill a quality culture throughout the organization. They shall participate in strategic planning to set objectives, integrate quality goals, determine priorities, and deploy resources to reach those objectives. He should also evaluate the latest technologies, equipment and materials to enable Sovereign to keep pace with advancing customer requirements.

2.4 **National Sales and Marketing Manager**

It is the National Sales and Marketing Manager's responsibility to ensure the market place is made aware of the Technology, Service and Quality offered by Sovereign Circuits Inc. They should evaluate opportunities to generate new customers and to look at ways of improving service for existing customers.

2.5 **Production Manager**

It is the Production Manager's responsibility to utilize his work force, to make products as specified by the customer, facilitate on-time delivery, and to produce product to the best workmanship standards possible.

2.6 **Finance/Personnel Manager**

It is the Finance/Personnel Manager's responsibility to ensure that employee's responsibilities are defined, they are hired based on competency, and are made aware of the relevance of their activities and how they contribute to the achievement of quality objectives.

It is also their responsibility to ensure that the information provided to the organization enables them to seek continuous improvement in all levels of the company.

2.7 **Quality Assurance Manager**

It is the Quality Assurance Manager's responsibility to monitor the Quality System and to ensure that it meets established standards. The Quality Manager will also analyze statistical data and propose opportunities for continuous improvement.

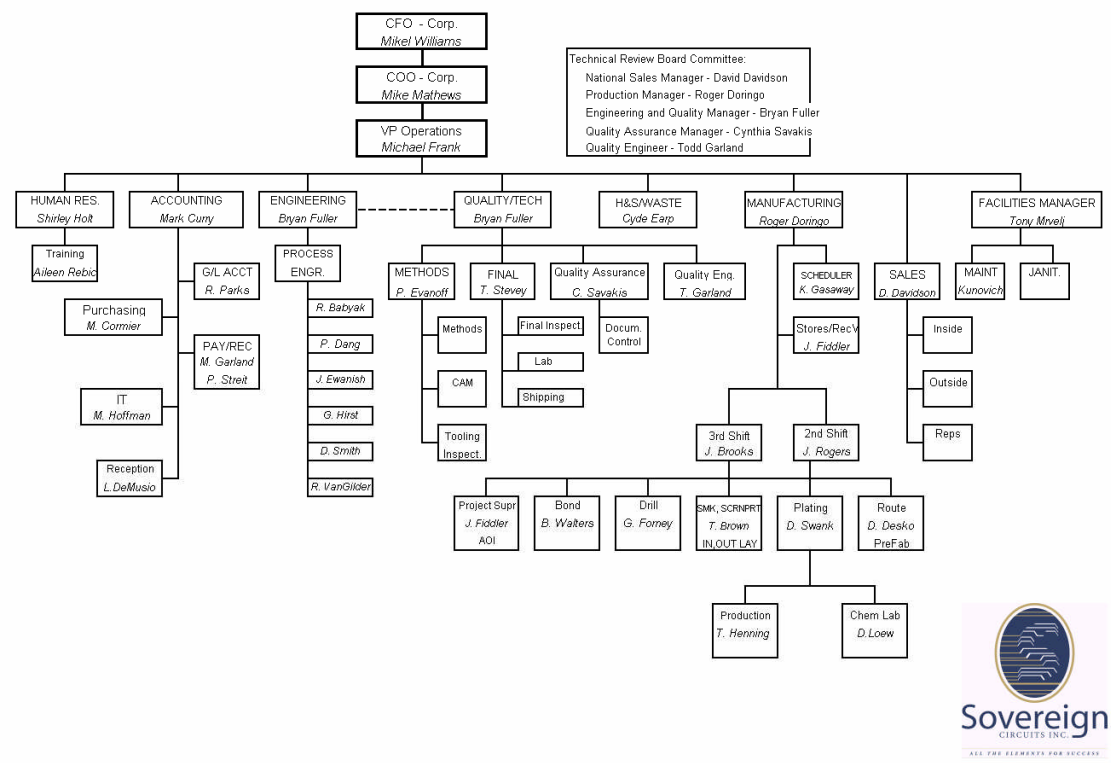
The Quality Assurance Manager and staff will also audit and monitor all elements of the Quality System, to provide useful information to the Manufacturing and Engineering Departments, so that they can consistently strive for continuous improvements.

In the absence of the Quality Assurance Manager, it will be up to the Director of Quality and Technology, or his representative, to ensure this role is carried out as specified in section 2.7.

Section 3

Organizational Chart

The following organizational chart illustrates the interrelations and authority of personnel who manage, execute, and verify work affecting the quality of products and services provided by Sovereign Circuits.



Section 4

Quality Management System Plan

4.1 General Requirements

Sovereign Circuits Inc. recognizes that being a successful company requires our organization to be managed in a way that is systematic and visible. Sovereign has established, implemented and documented an effective Quality Management System in accordance with ISO 9001:2000/AS9100:2004 International Standards.

The appropriate processes have been identified so they are clearly understood, their sequence and interaction determined so they can be more easily applied, managed and improved continuously.

We make resources and information available to support the operations and monitoring of these processes. The processes are monitored, measured and analyzed to reveal any actions needed to maintain the effectiveness of the Quality Management System and for opportunities of continuous improvement.

4.2 Documentation Requirements

4.2.1 General

Our Quality Management System Plan encompasses the required procedures to be compliant to the ISO9001:2000 /AS9100:2004 Standard, and to MIL-PRF-31032, to effectively control and implement our process and procedures.

Our documentation system includes this Quality System Manual, statement of the Quality Policy and Objectives, Quality Planning, Operating Procedures, Quality Procedures, Manufacturing Procedures, Work Instructions, forms, quality system requirements as required by applicable regulatory authorities and other documents as appropriate. **(See Section 10, Index of Master List of Procedures)**. Sovereign ensures that quality management system documentation is accessible to personnel, as well as customers and regulatory authorities and that they are aware of relevant procedures.

The nature of Sovereign's process documentation is based on the complexity and inter-relation of the processes, as well as, the competence of Sovereign's personnel. The review of contractual requirements, applicable standards and specifications are reviewed to ensure the necessary documentation is established and in place.

4.2.2 Quality System Manual

This Quality System Manual is a statement by Sovereign Circuits Inc. that the Quality Management System is compliant to ISO9001:2000 /AS9100:2004. Any exception to this requirement is explained with justification in **Section 7.0 Product Realization section of this manual**.

Sovereign Circuits, Inc. is excluding the requirements of sub-clauses 7.3.1 through 7.3.7 from this Quality System Manual because we do not perform design functions.

The scope of our Quality Management System covers the:

Manufacture and technical support to produce and test various types of high technology printed circuit boards, serving the Military, Aerospace and high-reliability commercial markets.

The interactions of Sovereign's processes within the Quality Management System are based on the Plan-Do-Check-Act methodology to ensure a continuous improvement cycle. This system uses resources to transform inputs into outputs. A model of how this process-based Quality Management Systems works is detailed in Figure 1.

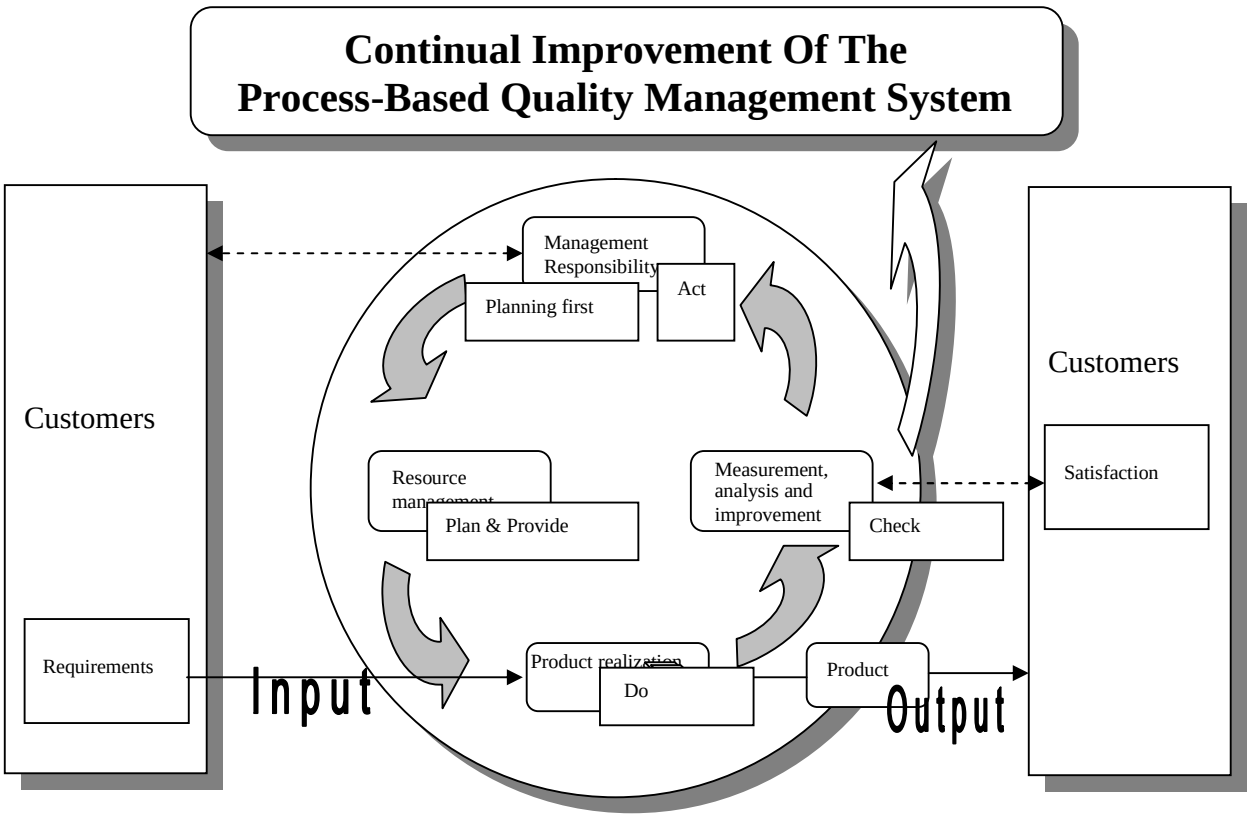


Figure 1

Key

→ Value-adding activities

- - - → Information flow

The Document Control Coordinator maintains the master copy of the Quality System Manual. This Quality System Manual is updated as required and is also maintained electronically. Hard copies may be made available to authorized holders. Each copy of this manual is uniquely identified to the authorized recipient. **(**See procedure SQP 300-01, Document and Data Control**)**. It is the responsibility of the Document Control Coordinator to ensure that the current electronic manual is identified, protected, and controlled. Reason for and details of changes are communicated to authorized recipients.

Compliance to this manual and the requirements expressed in all referenced procedures are mandatory. When improved methods are found, and official sign-off for the affected documents are complete, the changes will be implemented.

The Quality Assurance Department retains the master copy of this manual in hard copy format. Uncontrolled copies may be issued to visiting auditors and customers under the control of the Quality Department. The individual receiving an uncontrolled copy of the

Quality System Manual must first sign a non-disclosure agreement. These copies will not be recalled or updated when revisions are made.

4.2.3 Control of Documents

Documents are reviewed and approved for adequacy before they are issued for use. They are reviewed, updated as necessary and re-approved prior to any document changes being issued. The changes are identified and communicated to the document users.

Sovereign documentation is prepared, implemented, and controlled utilizing procedure SQP 300-01, Document and Data Control and applies to both online and hard copy documents. This document control system includes, but is not limited to, this manual, manufacturing procedures, operation procedures, quality procedures, work instructions, specifications, and forms. Non-Sovereign documents, such as equipment manuals and customer drawings, are not under direct revision control by document control, but shall be referenced for use in the applicable Sovereign documents and shall be available for use in the applicable areas.

Documentation and data approval and issuance shall be performed as specified **in** SQP 300-01, Document and Data Control and SQP 300-02, Technical Directive procedures. A master list of all controlled documents identifying revision status shall be maintained by Document Control. The procedure to ensure that obsolete or invalid documents are not used shall be as specified in SQP 300-01, Document and Data Control. This procedure shall ensure that:

- Required documents are available in each area that requires them, including areas where Quality System functions are performed.
- Invalid and/or obsolete documents are promptly removed from all points of use or are identified to ensure against unintended use.
- All new or revised permanent procedures or other documentation under PCR control shall be approved per the process defined in SQP 300-01, Document and Data Control. All temporary procedures or documentation shall be approved per the process defined in SQP 300-02, Technical Directive.
- Sovereign will coordinate documentation changes with customers and/or regulatory authorities when specified by contract or regulatory requirements.

NOTE: The Document Control Coordinator without going through the official change process may incorporate changes that are editorial in nature.

Changes to documents shall be made as specified in SQP 300-01, Document and Data Control. The nature of the change, and supporting background information, shall be included as part of the review and approval process. The functions and personnel reviewing the document shall sign and date the document as verification of approval for the changes made.

Software control is maintained as documented in procedure SQP 103-01, Software Control.

4.2.4 Control of Records

Quality Management System records are established and maintained and shall include supplier quality records where pertinent. The records shall document conformity to requirements and the effective operation of the Quality Management System**.** The control of records as needed for their identification, collection, indexing, filing, storage, maintenance, disposition, and retention times are specified in SQP 300-12, Control of Quality Records. These

records are maintained to demonstrate conformance to specified requirements and the effective operation of the quality system.

All records shall be legible and shall be stored and retained in such a way that they are readily retrievable in an area that provides a suitable environment to prevent damage, deterioration or loss. Where agreed contractually, or as part of regulatory requirements per SQP 300-12, Control of Quality Records, the documents shall be made available, for the customer, the customer's representative, or regulatory authority to evaluate for an agreed period of time.

Each manager is responsible for ensuring the department under their responsibility can provide evidence that work has been carried out as it is required and that records show compliance with customer requirements.

The Internal Audit Coordinator will audit the records as part of his/her overall auditing duties. These audits do not absolve the department managers from retaining full, proper, and retrievable records.

4.3 Configuration Management

Sovereign Circuits, Inc. maintains Configuration Management through various procedures listed in this Quality Manual.

Section 5

Management Responsibility

5.1 Management Commitment

The entire management team at Sovereign Circuits Inc. communicates the importance of meeting customer, as well as regulatory and legal requirements. We provide evidence of this commitment by conducting management reviews and providing resources to maintain and monitor our Quality Management System.

We at Sovereign utilize the quality system to monitor, audit and test products at various defined stages. Sovereign's management believes in total quality compliance from the operator/process level to the very top level of management.

Employees in every area are responsible for monitoring processes that effect the quality of their work and therefore all employees contribute to quality at Sovereign Circuits Inc. They do this by monitoring process inputs, activities and outputs and verifying the effectiveness of this process.

5.2 Customer Focus

Sovereign's ability to be successful as an organization is based on having the ability to understand and satisfy the needs and expectations of our customer and end users. The customer expectations are identified regarding product conformance requirements, availability, reliability, delivery, support, price and life-cycle costs.

We review the customers' expectations and convert them into internal product requirements, which enables us to achieve customer satisfaction.

Contract review shall ensure that before acceptance of a contract or an order, that all pertinent information is reviewed as specified in SOP 104-02, Contract Review Procedure to ensure the following:

Customer requirements are reviewed and, where no written statement of requirements is available, all verbal information pertaining to an order shall be documented prior to acceptance.

Any differences between product delivered and customer requirements, whether written or implied, are reviewed and resolved.

Any amendments to a contract shall be performed as specified **in** SMP 200-06, Customer Revision Changes/Sovereign Processing Changes. As part of Sovereign's customer focus, we have established relationships with our customers and suppliers to share information, create mutual value, and overall to improve our products.

5.3 Quality Policy

> To consistently supply quality printed circuit boards that conform to customer and regulatory requirements, at a fair price and with on-time delivery and to commit to this principle through planned continuous improvement measures.

This quality policy is communicated at new employee training sessions and is displayed proudly in conspicuous locations throughout Sovereign Circuits. (See SOP 109-01,Training Procedure)

5.4 Planning

5.4.1 Quality Objectives

The commitment to our quality policy involves all aspects of Sovereign's business and its employees. The purpose of this quality manual is to describe how our Quality Management System and quality objectives promote our quality policy. Our objectives are communicated to our employees so that they understand their individual contributions. Our objectives are measurable, monitored and documented to verify that they satisfy the needs of our organization and the quality policy. Changes to the quality objectives will ensue as necessary to effect continuous improvement to meet our quality policy. This commitment is reflected in the following company quality objectives:

- Sovereign strives to enhance customer satisfaction by monitoring customer complaints and to maintain a goal of no more than 1% of total orders shipped each month.
- Sovereign's objective is to maintain 100% on-time delivery of products to its customers.
- It is Sovereign's objective to alleviate late deliveries by reviewing stocking levels and setting timely delivery of stock items at 90% and to evaluate supplier performance quarterly.
- It is Sovereign's objective to understand the needs of our customers through accurate assessment of requirements during the quote process. The goal for timely quoting of standard product is 1 day and the goal for non-standard product is 2 days.
- Sovereign's goal is to reduce our internal scrap percentage to set goals as listed on our Internal Reject Report. These goals will be monitored and revised to support continuous improvement.
- Sovereign strives to ensure that non-compliant product does not reach the customer. Our goal is to maintain returns for non-compliant product within 4% of dollars shipped each month.
- Sovereign will strive to improve technical support by identifying solutions for improvement through preventive and corrective measures. It is the goal of Sovereign to maintain 100% closure to actions identified for correction.
- A quality printed circuit board will be achieved by employees who understand their contribution to product quality. Sovereign will strive to maintain a work force competent on the basis of training and skills. Our objective is to maintain yearly updates of skill requirements for operators, taking into account changes caused by the nature of Sovereign's processes.
- Sovereign strives to continually improve our Quality Management System through self-assessment. Sovereign's objective is to complete 100% scheduled internal audits without any major nonconformances thus ensuring that there is no major breakdown of the quality system in this organization.

5.4.2 Quality Planning

Sovereign Circuits shall perform Quality Management planning consistent with our quality policy and quality objectives. Such planning shall ensure that:

- Quality Management is a planned function within this document and is reviewed annually to ensure that the requirements of ISO 9001:2000/AS9100:2004are being met. Any planned changes shall ensure that the integrity of the Quality Management System is not compromised.

- The identification and acquisition of any controls, processes, equipment (including inspection and test equipment), fixtures, resources, and skills that may be needed to achieve the required quality as specified in **Section 7, Product Realization**.

- Ensuring the compatibility of the production process, installation, inspection and test procedures, and the applicable documentation as specified in **Section 7, Product Realization**.

- The updating, as necessary, of quality control, inspection, and testing techniques, including the development or acquisition of new instrumentation as specified in **Section 8, Measurement, Analysis, and Improvement**.

- Identification of any measurement requirements that exceed our capability or the known state of the art for this industry. Sufficient time must be allowed for the needed capability to be developed prior to product release as specified in **Section 5.2, Customer Focus** and **Section 7, Product Realization**.

- The identification of suitable verification, at appropriate stages in the manufacturing steps, of product as specified in **Section 7, Product Realization**.

- Clarification of standards of acceptability for all key features and requirements, including those that contain a subjective element as specified in **Section 5.2, Customer Focus**.

- The identification and preparation of quality records as specified in **Section 4.2.4, Control of Records**. (See procedure SOP 300-12, Control of Quality Records)

5.5 Responsibility, Authority, and Communication

5.5.1 Responsibility and Authority

Sovereign has defined the responsibilities and authorities for our organization. This information is communicated to employees through the use of this manual, procedures, work instructions, etc. to facilitate effective quality management.

See Section 1 of this manual for Quality Roles and Section 2 for Management Roles. Specific responsibilities are defined in the responsibility matrix.

The following responsibility matrix, summarizes the primary and contributing responsibilities of management personnel for key elements of the Quality Management System.

P-Primary Responsibility C-Contributing Responsibility ***Quality System Elements***	Management Personnel												
	CEO / President	V. P. of Operations	National Sales Manager	Internal Sales Manager	Purchasing Director		Engineering Manager	Production Manager	Human Resource Manager	Quality Assurance Manager	Production Supervisors	Director of Quality and Engineering	
Management Responsibility	P	P	P	P	P		P	P	P	P		P	
Quality Management System	C	C	C	C	C		C	C	C	P	C	C	
Review of Product Requirements		C	P	P			P	C		C		P	
Design Control	Not Applicable												
Document and Data Control		C	C		C		C	C		P	C	C	
Purchasing		C			P		C	C		C	C	C	
Customer Product		P	P	C			P	P		C	P	P	
Product Identification and Traceability								P		C	C	P	
Process Control		P					P	P		C	C	P	
Inspection and Testing		C					C	C		P	C	P	
Inspection, Measuring, and Test Equipment							C	C		P	C	P	
Inspection and Test Status		C					C	C		P		P	
Nonconforming Product		C					C	P		P	C	P	
Corrective and Preventive Actions		C	C	C	C		C	C	C	P	C	C	
Handling, Storage, Pkg., Preservation & Delivery		C					C	P		C	C	C	
Quality Records		C	C	C	C		C	C	C	P	C	C	
Internal Quality Audits	C	C	C	C	C		C	C	C	P	C	C	
Training	C	C	C	C	C		C	P	P	C	C	C	
Servicing product	Not Applicable												
Statistical Techniques		C					P	P		P	C	P	

5.5.2 Management Representative

The Quality Assurance Manager has been appointed as the Management Representative and for ensuring the requirements of our Quality Management System are effectively implemented and maintained.

The Management representative ensures that processes are established, implemented, and maintained, and reports the performance of the Quality System to management during the Management Review process. The Management representative is also our liaison to customers and external parties relating to matters concerning our Quality Management System, and has the organizational freedom to resolve matters pertaining to quality.

5.5.3 Internal Communication

Sovereign communicates the quality requirements, objectives and accomplishments within different levels of the organization through the means of management and employee meetings, bulletin boards and electronic media. We provide information regarding the processes of the Quality Management System and its effectiveness so as to involve our employees in achieving established quality objectives and to promote continuous improvement.

5.6 Reviews

5.6.1 General

Management review of the Quality Management System is conducted at least annually. These reviews shall be attended by senior management and designated staff as specified by the Quality Assurance Manager. Objectives are reviewed, updated and approved.

The Quality Management Representative coordinates the quality system review. Records from management reviews shall be maintained per SQP 300-12 Control of Quality Records.

5.6.2 Review Inputs

Topics covered at Management Review meetings include but are not limited to:

- ☐ Internal, external and 3rd party audit results
- ☐ Customer feedback and satisfaction results
- ☐ Process performance and product conformance
- ☐ Status of corrective and preventive actions
- ☐ Marketplace evaluations
- ☐ Performance of suppliers
- ☐ Financial effects of quality activities
- ☐ Changes that could affect the Quality Management System
- ☐ Follow-up actions from previous management reviews
- ☐ Recommendations for improvement
- ☐ Human Resource activities
- ☐ Continuous improvement projects and reporting

5.6.3 **Review Outputs**

Outputs from management reviews shall include decisions and actions related to:

- ☐ Improvements to the effectiveness of the quality system and its processes
- ☐ Improvement of the product related to customer requirements
- ☐ Resource requirements
- ☐ Update equipment as our strategic plans change or technology requires.

Section 6

Resource Management

Sovereign strives to achieve its quality objectives and business strategies through the implementation of resource management. Sovereign identifies and strives to make necessary resources available, including the people, organizational structure, information, suppliers, work environment and finances. To ensure employees are competent to carry out their responsibilities, training will be conducted per SOP 109-01, Training Procedure.

6.1 Provision of Resources

Appropriate resources are provided for the implementation, maintenance and improvement of the Quality Management System. This enhances our ability to achieve customer satisfaction.

The management team identifies resource requirements through management reviews and subsequent contract order reviews.

6.2 Human Resources

Sovereign Circuits encourages the active involvement of our employees in the Quality Management System. We provide and promote active employee participation concerning quality.

Our employees are involved in suggesting ideas and making decisions in a continuous improvement effort. They are encouraged to use Information Technology to help disseminate customer requirements and improve efficiencies throughout the processes.

6.2.1 General

Sovereign Circuits identifies education and training needs and provides for the training of all personnel performing activities affecting quality. We ensure that persons effecting quality are competent on the basis of the required education, training and experience.

Reorganization, subcontracting and temporary personnel may be considered to ensure we meet our organizational objectives.

6.2.2 Competence, Awareness and Training

Sovereign identifies the competence needed for each process affecting quality throughout the manufacturing steps. Employees will be assessed of their abilities and then will be given the required training by their department manager, supervisor, or lead person.

Training will encompass current and expected needs of the organization, the interrelations of processes and their effects on quality. Training is arranged to provide the knowledge, which together with education and/or experience, will lead to the needed competence.

Employees are made aware of the relevance and importance of their responsibilities and how they contribute to the achievement of the quality objectives. They are also made aware of the negative consequences when requirements are not met.

The employee is trained according to departmental training schedules, which are documented and certified by the department manager, supervisor or lead person. This training is coordinated and records retained by the Training Coordinator per SQP 300-12, Control of Quality Records.

6.3 Infrastructure

Sovereign provides the infrastructure that supports the foundation for operations. This infrastructure is reviewed and modified to maintain product conformity and includes facilities, utilities, work space, equipment, software, and communication services.

Maintenance will be performed in accordance to SOP 105-00 Maintenance (General). Departmental maintenance is performed in accordance to the specific work instruction as listed below:

Bonding	SWI 105-00-01
Routing	SWI 105-00-02
Plating	SWI 105-00-03
Photo Outer	SWI 105-00-04
Screen Print	SWI 105-00-05
CAM/Tooling	SWI 105-00-06
Final Inspection / Lab	SWI 105-00-07
Air Compressors	SWI 105-00-08
Material Store Room	SWI 105-00-09
Drilling	SWI 105-00-10
Photo Inner	SWI 105-00-11
AOI	SWI 105-00-12
Soldermask Exposure	SWI 105-00-13
Soldermask Coating	SWI 105-00-14
Electrical Test	SWI 105-00-15
Precision Fabrication	SWI 105-00-16

6.4 Work Environment

Sovereign reviews all human factors affecting the work environment, including ergonomics, temperature, safety, workspace, noise, lighting, humidity, and ventilation.

These factors can influence personal motivation and performance. Sovereign identifies and evaluates these factors to ensure that conformity of the product is maintained to the highest level.

Section 7

Product Realization

7.1 Planning of Product Realization

Sovereign's Quality Management System is a collection of linked processes consisting of inputs, activities and outputs.

Sovereign ensures product realization by considering the process steps, inputs, activity flows, desired outputs, training needs, equipment, control measures, materials and other resources, as appropriate for the overall operation and maintenance of product.

Quality plans are developed to describe how the processes of our Quality Management System are applied to specific product, projects, or contracts. These plans identify specific objectives, inspection and test activities, and acceptance criteria. They also define needed processes and documentation for verification that conformity is achieved for the specified product. Records are identified and maintained per SQP 300-12, Control of Quality Records to provide evidence in meeting product conformity.

Sovereign will enroll employees in outside supplemental training courses when needed and available. Certification of such training shall become a permanent part of his/her training record.

All company Managers, Supervisors and Lead Persons have a contributing responsibility in assessing training needs, providing on-the-job reinforcement of skills, and evaluating the effectiveness of training given to personnel they directly manage. (**See** SOP 109-01, Training Procedure).

7.2 Customer-Related Process

Sovereign fully understands the importance of identifying the customer requirements before initiating any action to comply. Any product requirements that have not been specified by the customer but are necessary for the end product will be addressed during the process of product requirements review. (See Procedure SOP 104-02, Contract Review Procedure).

7.2.1 Requirements Related to the Product

To meet the requirements as stated by the customer, each contract is reviewed to ensure that the requirements are adequately defined and documented. Any requirement differing from those in the tender will be resolved.

7.2.2 Review of Requirements Related to the Product

Sovereign Circuits will not accept any orders for which it feels it cannot satisfy the customer and our own internal requirements.

Contract Reviews are conducted, documented and coordinated with the customer according to the SOP 104-02, Contract Review Procedure.

All incoming orders will be reviewed to ensure that they can be manufactured, inspected, tested, packaged, delivered, etc., to meet all applicable quality requirement performance specifications, and that Sovereign maintains the proper technology to manufacture the customers' products.

On receipt of the customer's procurement package, Engineering will verify that the limits of Sovereign's capability will not be exceeded.

Engineering in conjunction with the Sales and Quality departments will resolve any problems that the customer requirements may cause Sovereign Circuits.

Methods Engineering verifies that the quality of the customer's documentation, data and drawings are sufficient to produce a good product. During this pre-production stage the customer is contacted for clarification of requirements or to resolve any issues. Any deviations from their original requirements are requested from them, as additional documentation to their order, by means of a fax, e-mail, etc.

A General Data (Properties) Sheet, SF-200-01-01, is initiated by the Method Engineering Department, consisting of the manufacturing requirements related to the product. A Traveler, generated electronically or printed on paper, will consist of the process flow and manufacturing instructions to sequence the product through manufacturing, test, and packaging.

Customer Revision Changes/Sovereign Processing Changes are reviewed to determine if they are correct and complete and to established effectivity points. They shall verify that old tooling and documentation are obsoleted as applicable. The disposition and effectivity of the changes, as applicable, will be recorded on Process Change Request form, SF-300-01-02.

Engineering records will be kept on file covering all changes in processes together with dates of receipt, approval and implementation.

The records and pertinent related correspondences are maintained on file for a minimum of five (5) years per SQP 300-12, Control of Quality Records unless agreed upon between the customer and Sovereign Circuits.

7.2.3 Customer Communications

Sovereign has defined the appropriate requirements relating to the process to assure adequate communication with customers. This process includes, but not limited to, product information, inquiries, contracts, order handling (including amendments), and customer feed back, including customer complaints. See **Section 10, Index of Procedures.**

7.3 Design and Development

Sovereign Circuits does not perform design functions but offers technical support and will work with customers in regards to product development as agreed upon contractually. Limited design changes can be implemented if specified in writing by the customer. Records will be maintained on design changes specified by the customer per SQP 300-12, Control of Quality Records.

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7.4 Purchasing

7.4.1 Purchasing Control

Sovereign Circuits has established and maintains a controlled document system to ensure that key purchased products, including those purchased from customer-designated sources meet specified requirements. (**See** SOP 100-00, Purchasing Procedure). Sovereign will specify the requirements for purchased goods.

Sovereign Circuits selects and evaluates vendors and subcontractors as specified in SOP 100-01, Vendor Rating System and per the following:

- Ability to meet product subcontract requirements, including all quality and performance specifications.

- Attainment of a Sovereign Circuits supplier survey or audit, acceptable past history and/or ongoing performance, including product quality.

- Sovereign Circuits shall maintain a list of approved suppliers, including customer designated suppliers, for critical products and shall maintain records of these suppliers per SQP 300-12, Control of Quality Records.

7.4.2 **Purchasing Information**

Purchasing documents shall be generated as specified in SQP 100-00, Purchasing Procedure and shall describe the product being purchased, and include where appropriate, the following information:

- The type, class, grade, or other specific information to ensure compliance.

- Required specifications, drawing, process requirements, inspection instructions and other relevant technical data, including requirements for approval or qualification of product, arrangements for notification and approval of nonconforming material, procedure, process equipment and personnel, where applicable.

- The title and number of quality system standard to be applied, where applicable.

7.4.3 **Verification of Purchased Product**

It is policy at Sovereign Circuits to have the supplier inspect, verify and certify that the supplied product conforms to requirements as specified in the purchasing contract. Sovereign will periodically validate reports for critical materials. Where specified by the contract, the customer or customer's representative shall have the right to verification at the supplier's or Sovereign's premises. Verification by the supplier, customer or Customer's representative, does not absolve Sovereign Circuits from our responsibility to provide acceptable product to our customers, nor does it preclude Sovereign's right to rejection of the product at a subsequent time.

The Purchasing Department is responsible for preparing purchase orders. The Accounting Department is responsible for storage and maintenance of records for all materials procured, whether for specific or non-specific customer contracts. Material certifications are stored electronically upon acceptance of material in Receiving and the originals become attached to the purchase order and invoice to be archived in Accounting. Certifications are available for review upon request.

The Quality Assurance Department is responsible for the audits of these materials and records. Audits will be conducted per procedure SQP 300-03, Internal Audits and the results will be documented and filed by the Quality Assurance Department.

The Purchasing Department is to furnish the vendors with adequate information for the production and delivery of satisfactory materials. The type of information supplied to vendors will be both technical and procedural and may include part numbers, performance requirements and tolerances, along with reference to industry, national, international or military specifications as required.

To allow traceability of individual items, a condition is placed on laminate suppliers that there shall be only one manufacturing batch number, lot number, press cycle etc., per package. A Certificate of Conformance relating to this number is demanded and shall include as a minimum; the purchase document number, part number of item procured, related specifications and signed by an authorized person from the suppliers' Quality Department. All suppliers for critical materials must periodically sign a materials specification, which include testing requirements and results availability, in order to remain on the list for critical

supplies. All other materials are purchased to the supplier's proprietary specifications, and where appropriate, certification of shelf life is required. Materials are purchased in quantities, which are normally completely consumed well within the shelf life expiration date.

All critical materials are to be purchased from a vendor on the Approved Suppler List. Periodic appraisals are undertaken on suppliers, either as a matter of routine, or if it is thought that improvements in the quality of supplied items will result from such an appraisal.

Upon receipt of materials, the shipping container and contents will be examined for transportation damage, proper identification, correct quantity, and proper type. If furnished materials are found to be incorrect (visually) or where transit damage is evident, the supplier of the materials and/or the transportation company shall be notified immediately as to disposition.

- Material will be functionally tested, if required by contract, to determine proper and accurate operation.

- The Quality Assurance Department is responsible for periodic inspections to assure that materials are properly stored and adequately protected. Materials are subjected to periodic checks to ensure proper precautions exist to protect them from improper usage if they are damaged or degraded due to storage or environmental reasons.

7.5 Production and Service Provision

Sovereign identifies the operation requirements that are needed to generate products. Sovereign personnel who are ultimately responsible for quality of end products are also responsible for reviewing our capacity, training of personnel, process flow, automation, yields, communications and any other activities that may affect operations.

7.5.1 Control of production operations are defined and planning shall consider, as applicable:

The establishment of process controls and development of control plans where key characteristics have been identified.

Identification of in-process verification points where verification can not be performed at a later stage of production.

The production and use of tooling, for variable measurements including key product characteristics, and special processes.

Sovereign Circuits, Inc. plans and carries out production under controlled conditions that include as applicable:

Approved work instructions and procedures shall be provided as required in each manufacturing area.

Manufacturing shall be performed utilizing suitable equipment for the specific process.

Process parameters and product characteristics shall be monitored, verified, and audited through the use of various measuring and monitoring devices, including SPC procedure SQP 300-04, Statistical Process Control and internal auditing per procedure SQP 300-03, Internal Audit Procedure.

Workmanship shall meet applicable standards recognized within Sovereign Circuits or as defined in the manufacturing, test, and inspection documentation.

All product shall be accounted for during manufacturing, including part quantities, split travelers, and any non conforming product.

Evidence that manufacturing and inspection operations have been completed, documented, and authorized.

Implementation of release, delivery and post-delivery activities, as applicable, are controlled.

Monitoring and control of supplies and utilities such as water, compressed air and chemical products as to not adversely affect product quality.

Criteria for workmanship shall be defined in the clearest practical manner using written standards, samples, illustrations or photos, including the provision for prevention, detection and removal of foreign objects.

Maintenance of equipment shall be as specified in procedure SOP 105-00, Maintenance Procedure (General) to ensure continuing process capabilities.

- New products, equipment, process installations, and major process changes shall be tested for compliance with product specifications prior to production release.
- Prior to manufacturing release, Process Engineering and/or Quality Assurance shall review existing test data and conduct additional tests as needed to ensure compliance with the appropriate specifications.
- New chemical processes or raw materials shall be reviewed for environmental and safety compliance prior to release.

7.5.1.1 Sovereign's Production Documentation ensures that production operations shall be carried out in accordance with approved data, this data shall contain as necessary:

Any drawings, part lists, process flow charts, inspection operations, and production documents such as a traveler or router, or other documents as necessary, as well as a list of specific or non-specific tools or numerical control programs required, and the specific instructions for their use.

7.5.1.2 Sovereign identifies those persons authorized to make changes to production processes. In the event where changes to process require customer or regulatory authority, Sovereign obtains written authorization to make changes in accordance with a contract or regulatory requirements. All changes affecting processes, production equipment, tools, and programs shall be documented per SQP 300-01, Document and Data Control Procedure and/or SQP 300-02, Technical Directive (TD) Procedure, and records maintained per SQP 300-12, Control of Quality Records. Results of changes to production processes are assessed to confirm the desired effect has been achieved without adverse effect to product quality.

7.5.1.3 Sovereign ensures that control of Production Equipment, Tools, and Numerical Control Machine programs shall be validated prior to use and are inspected periodically according to documented procedures. Validation prior to use shall include verification of a first article produced to the design/data specification. Storage requirements, including the periodic inspection and preservation/condition checks of production equipment or tooling in storage shall be established.

7.5.1.4 When Sovereign transfers work on a temporary basis outside of our facility, the work is controlled via the conditions of the purchase order agreement to the subcontractor. Upon return to Sovereign all work performed by subcontractor is validated prior to being returned to the appropriate manufacturing process.

7.5.1.5 Control of Service Operations: Sovereign Circuits, Inc. does not perform Service functions.

7.5.2 Validation of Processes for Production Provision

Sovereign's current manufacturing processes have evolved over many years and are at a mature state. Processes are continuously monitored to ensure they are operating within specified parameters and are verified by test and inspection of the realized product before delivery of product.

There may be times when new products require process modifications or when new processes based on new technology or materials, or special processes, are required. When this occurs, Sovereign Engineering and Quality Assurance will work together to define test samples, specify inspection points and end performance requirements to qualify the processes prior to use. These samples, after approval by Engineering and Quality Assurance, will serve as process validation or revalidation, as applicable. Records will be maintained per SQP 300-12, Control of Quality Records.

7.5.3 Identification and Traceability

In accordance with the requirements of ISO 9001:2000 /AS9100 Sovereign Circuits identifies the inspection and test status of all products by using markings, authorized stamps, travelers, inspection records, physical location designators, and other methods, which verify the conformance of the product with regard to the inspection or test performed. The identification of inspection and test status is maintained, as necessary, throughout production of the product to ensure that only product that has passed the required inspections and tests is dispatched to the customer.

Company personnel responsible for the release of conforming product, based upon inspection and test activities, are responsible for "signing off" on the appropriate job traveler, which serves as a documented record.

Company personnel who detect non-conforming product are responsible for following Sovereign's policies and documented procedures regarding documentation of such product. **(See Section 10, Index of Procedures)**

All product, whether it be work in process (WIP) or finished product, is identified through all stages of production to shipping as specified in SQP 300-16, Product Identification and Traceability Procedure. All product produced by Sovereign Circuits is traceable through the assignment of unique and individual lot numbers. Finished product is traceable back to its sub-components. This identification and traceability process is achieved per the following:

- A signed and dated electronic or written traveler and/or attachment identifying all production steps and inspections shall accompany each production order.

- A part number and associated lot code shall accompany parts and sub-components through the Manufacturing process. Each product order shall be assigned a unique lot number that is marked on the associated traveler. This information shall be included in retained test records as specified in section 8.2.7 Inspection and Test Records

- Each product shipping container shall bear a number that uniquely identifies the contents. (**See Shipping Procedures,** SOP 108-01, SOP 108-02, SOP 108-03, SOP 108-05.

- A history file of manufacturing travelers shall be maintained as a record to permit traceability of product following delivery as specified in procedure SQP 300-12, Control of Quality Records.

7.5.4 Customer Property

Sovereign Circuits maintains procedures for ensuring that any raw material, component parts or subassemblies supplied by our customers are subjected to the same checks upon receipt as if we had purchased them. The assignment of responsibilities for receipt, inspection and control of customer supplied product, and guidelines for the reporting and documentation of lost, damaged, or incorrect quantities are addressed in SOP 101-00, Receiving Procedure.

Upon receipt of furnished materials, the contents will be examined for transportation damage, proper identification, correct quantity, and proper type. Where furnished materials are found to be incorrect (visually) or where transit damage is evident, the supplier of the furnished materials shall be notified immediately as to disposition.

- Material or components will be tested, if required by contract, to determine compliance to required specifications.
- The Quality Assurance Department is responsible for periodic inspections to assure that materials are properly stored, adequately protected, and that proper precautions exist to prevent improper usage.
- Records will be maintained per SQP 300-12, Control of Quality Records.
- Customer intellectual property, i.e., designs, drawings, etc., supplied in electronic format will be received per SMP 201-04, Electronic Data Input and Output. This data will be identified and stored per SMP 201-03, Back-up and Archiving of CAM Data, as a safeguard against damage or loss.

7.5.5 Preservation of Product

All materials, products and accompanying documentation and/or other deliverables, produced by Sovereign Circuits shall be protected from damage during internal processing, handling, storage, packaging, preservation and delivery to the customer. Preservation of product shall also include where applicable in accordance with specifications or regulations the prevention, detection and removal of foreign objects, cleanliness of product, special handling of sensitive or hazardous materials, marking, labeling, and applicable safety warnings as well as shelf life control and stock rotation.

Handling

Manufacturing Supervisors shall monitor material handling methods in the manufacturing areas and shall recommend changes in processes or give additional training as required. Considerations for special handling will be given to sensitive materials including hazardous materials

Sensitive materials and sub-components shall be protected from damage or degradation due to environmental conditions. Protection from adverse environmental conditions shall be provided during handling, storage, packaging, and preservation through use of proper equipment, supplies, environmental conditioning, and training of personnel. Equipment and supplies may include among other things:

- Specially designed transporting devices (e.g. dry boxes, carts and racks)
- Personal garments and gloves

- Clean room environments
- Climate controlled environment

Storage

Sovereign maintains facilities, equipment, and designated areas to store material in a manner to help prevent damage or degradation. Only authorized persons may move material in or out of designated storage locations.

- Raw materials shall be kept under controlled environmental conditions to prevent damage or degradation. For most items (e.g. prepreg), this is accomplished by keeping them in protective wrap or containers and managing temperature and humidity, as applicable and defined in procedure SMP 207-15, Lamination Storeroom Environment.
- Items with limited shelf life are defined as "perishable." Such items, which include prepreg, wet masks, legend ink, and flex materials shall bear documentation regarding the date of manufacture so that limited shelf life may be periodically audited. Items with an expired date or which fail re-testing shall be disposed of as defined in procedure SOP 101-03, Shelf-Life Control.

Packaging

Product shall be appropriately packed and identified. This includes any labeling, marking or safety warnings as applicable in accordance with specifications or regulations.

- Packaging requirements specified by the customer shall be used as mutually agreed upon by Sovereign and the customer as specified in SOP 104-02, Contract Review Procedure.
- Handling after final test, packaging and methods of shipment shall be such as to protect the quality of the product under normal shipping conditions, as defined in procedure SOP 108-01, Packaging Requirements. Special packaging requirements shall be provided as contractually specified.

Delivery

Delivery shall be performed as specified in SOP108-02, Shipping of Package. Non-standard or customer-specified delivery requirements shall be used as agreed upon between Sovereign and the customer per SOP 104-02, Contract Review Procedure, this includes any documentation and/or deliverables to accompany the product.

7.5.6 Servicing

Sovereign Circuits does not perform a service function.

Permissible Exclusion

7.6 Monitoring and Measuring Devices

7.6.1 General

Sovereign Circuits shall control, calibrate, or performance test and maintain all inspection, measuring and test equipment used to demonstrate or ensure the conformance of products. Equipment shall be used such that measurement uncertainty is known and is

consistent with required measurement capability. Inspection, measuring and test equipment shall be checked against devices that are traceable to national or international standards. This shall take place prior to release for use in production and shall be rechecked at prescribed intervals. Data and records of maintenance and calibration pertaining to inspection, measurement and test equipment shall be maintained and available as requested per procedure SQP 300-12, Control of Quality Records.

7.6.2 Calibration shall be performed in accordance with procedure SQP 302-01, Calibration and the following:

- Process Engineering and/or Quality are responsible for the selection of the measurement equipment and shall ensure that the selected equipment has the accuracy and precision required for the application.

- A unique number shall identify each inspection, measurement and testing equipment used by Sovereign. The equipment shall be calibrated and adjusted at prescribed intervals or prior to use against certified equipment having a known valid relationship to internationally recognized standards. All applicable measuring and test equipment shall be calibrated to standards traceable to the National Institute of Standards and Technology. Where no such standards exist, the basis used for calibration shall be documented.

- There shall be a record file maintained on the calibration or performance test status of all tools, gauges, inspection, measurement and test equipment, and process machines. The information shall include unique identification, location, frequency of checks, check method, acceptance criteria and action to be taken when results are unsatisfactory.

- The date of last calibration and due date for next calibration shall be applied to each measurement device or its container.

- Process Engineering and/or QA personnel shall determine the standards and periods of calibration based upon manufacturer recommendations, frequency of use and equipment history. Records shall be maintained for calibration, repair, and addition or deletion of instruments per procedure SQP 300-12, Control of Quality Records.

- QA personnel shall assess and document the validity of previous inspections and test results when equipment is found to be out of calibration.

- Environmental conditions shall be suitable for calibration, inspection, measurement, and testing, based upon point of use and manufacturer recommendation.

- Measurement tools and equipment shall be handled and stored under conditions that fall within the manufacturer's environmental specifications. Normal office or manufacturing workspace environments shall be considered acceptable unless more restrictive conditions are specified.

- An electronic calibration schedule for measurement tools shall be maintained and followed.

- Tools overdue for calibration, performance testing or suspected of being out of compliance shall be immediately removed from the production area. Rejected devices must be submitted for calibration prior to reissue.

- QA shall be notified of all new equipment purchased by Sovereign for use in product

measurement or acceptance testing. QA personnel shall add the equipment to the calibration program as specified in SQP 302-01, Calibration.

- Services provided to Sovereign shall be in accordance with ISO 10012-1, Quality Assurance Requirements for Measuring Equipment.
- A statement of parameter tolerances, given in percentage, must accompany each device calibrated by the subcontractor. The parameters to be included in the statement will be determined at the time of calibration.
- The contractor shall maintain records of calibration and maintenance for each device and shall provide Sovereign with certification.
- A calibration label must be attached to each device. This label shall include the contractor's name or identifying number, a device serial number and/or model number, date calibrated, and due date for next calibration.
- Calibration and recall shall be coordinated through the Quality Assurance Department as specified in procedure SQP 302-01, Calibration .
- Should the contracting service find any equipment to be out of calibration, the appropriate manager or QA personnel shall be notified. The QA personnel, along with Process Engineering, shall evaluate any negative impact that may have occurred regarding the performance of material or product tested by this equipment and take appropriate action.

Section 8

Measurement, Analysis and Improvement

8.1 General

Sovereign has defined quality plans to measure, monitor and evaluate product, processes, and customer satisfaction. The resulting data is analyzed and used as a mechanism to continuously improve the quality of our products and our Quality Management System. Statistical Techniques may be used to support the following as appropriate: design verification, process control, selection and inspection of key characteristics, process capability, SPC, design of experiments, inspection and failure effects and mode analysis.

8.2 Measurement and Monitoring

8.2.1 Customer Satisfaction

Information regarding the satisfaction level of our customers will be used as one of the measurement tools for our Quality Management System. This data enables Sovereign an opportunity to make improvements to reflect actual customer needs. Measurement of customer satisfaction or dissatisfaction includes reviewing results of customer complaints and returns. See procedure SQP 300-10, Customer Complaint Procedure.

8.2.2 Internal Audit

Sovereign shall perform periodic internal audits to verify that the Quality Management System activities comply with established internal procedures, along with, ISO 9001:2000 / AS9100:2004, and contract or regulatory requirements. These audits will be prioritized and are used to determine the effectiveness of the Quality Management System and shall be per SQP 300-03, Internal Audit Procedure. Quality management shall schedule internal audits using trained auditors independent from the area being audited. Each area will receive no less than one audit per year. Some audits may occur more often, based on the importance of the activity being performed by the function. The results of all audits shall be documented and brought to the attention of the manager or supervisor of the area being audited. The manager, supervisor or their designee shall respond to any non-conformances within 10 working days with a corrective or preventive action, structured to resolve the discrepancy and prevent recurrence. Follow-up of actions taken for adequacy, effectiveness, and implementation for all non-conformances recorded shall be performed. Records documenting internal quality audits and subsequent corrective and preventive actions shall be maintained as specified in procedure SQP 300-12, Control of Quality Records.

8.2.3 Monitoring and Measurement of Processes

Sovereign Circuits' processes and products are monitored and measured to confirm that intended requirements are met and outcomes achieved.

Sovereign maintains records that requirements are monitored to confirm that processes are able to achieve desired outcomes. These process measurements may include throughput, efficiency, effectiveness, accuracy or cost. (**See Section 10, Index of Procedures**) In the event of process nonconformity Sovereign Circuits will take the appropriate actions to correct the nonconforming process, evaluate whether the process nonconformity has resulted in product nonconformity, identify and control the nonconforming product per SQP 300-09, Non-Conforming Material.

8.2.4 Monitoring and Measurement of Product

Sovereign Circuits provides means to assure compliance to specifications to ensure customer satisfaction. The monitoring and measurement process includes product performance, characteristics and variables.

Sovereign Circuits identifies, monitors and controls key characteristics. When sampling inspection is used the sampling plan is statistically valid and appropriate for use and shall be submitted for approval to customers when required. Product shall not be used until it has been inspected or verified as conforming to specified requirements, except when product is released under positive-recall pending the completing of all required measurement and monitoring activities.

We maintain records per SQP 300-12, Control of Quality Records as evidence of product conformity to acceptance criteria. Product is not released for shipment until all specified requirements have been met, unless otherwise authorized by the customer.

8.2.4.1 Sovereign Circuits documents inspection measurement requirements for product acceptance. Documentation may be part of production documentation and shall include criteria for acceptance and/or rejection, where in the sequence of measurement and testing operations are performed, a record of measurement results, the type of measurement instruments used, and any specific instructions for their use.

Test records shall show actual test results data when required by specification or acceptance test plan to demonstrate product qualification, shall provide evidence that the product meets the defined requirements.

8.2.4.2 Sovereign Circuits provides a process for the inspection, verification, and documentation of a representative item from the first production run of a new part, or following any subsequent change that invalidates the previous first article inspection result, for customers unless otherwise defined by contract or regulatory authority.

Records of first article inspections are maintained per SQP 300-12, Control of Quality Records as evidence of product conformity to acceptance criteria.

8.2.5 In-Process Inspection and Testing

The Department Manager or Supervisor is responsible for ensuring that all employees are trained to inspect the work they produce. Operators are required to inspect the work they produce according to process and procedural instructions. They are to record the quantities accepted or rejected, equipment used if applicable, and sign and date the traveler as evidence of inspecting of product. Operators are also responsible for having their product tested by the quality department when specified in the process instructions.

The operator can contact a supervisor, manager or process engineer if they need assistance in determining the acceptability of product. They should add any relevant notes to the traveler and have the contacted individual sign and date the notes. These notes should include reference to any rework, reprocessing, changes in original process instructions or any other relevant observations.

Any product that is scrapped is assigned a unique scrap code that is recorded on the traveler. The quantities and associated scrap code information is recorded and entered into the scrap report for analysis purposes.

8.2.6 Final Inspection and Testing

Final product inspection and test shall be per procedure SQP 301-00, Final Inspection of Printed Circuit Boards (General). Test and inspection results shall be recorded on the traveler and associated forms that are traceable to the production order. This documentation reflects all applicable manufacturing and performance requirements for the specific production lot.

Product that has passed all required tests and inspections, along with any other required deliverables and paperwork, shall be sent for packing and shipping.

Products that have failed to pass the required inspections and testing shall be identified to provide visual evidence of the failed status. Rejected material shall be segregated from the production order for subsequent disposition. Material will either be dispositioned as scrap or rework by the Material Review Board. (**See** SQP 300-06, Order Remake Procedure.)

Any materials failing inspection or test and having been dispositioned "rework" by the MRB, shall be returned following rework for re-testing and inspection.

8.2.7 Inspection and Test Records

All inspection and test records will be documented and retained in accordance with procedure SQP 300-12, Control of Quality Records. These records will be made available upon request by customers or their authorized representative.

8.3 Control of Nonconforming Product

Employees are authorized to report all non-conforming materials, components, sub-assemblies, or products and shall segregate from the normal production flow whenever possible. It shall be processed as specified in SQP 300-09, Non-Conforming Material. This will ensure that non-conforming material or product is prevented from unintended use or delivery to the customer. Records associated with non-conforming product and their disposition shall be maintained as specified in SQP 300-12, Control of Quality Records.

The responsibility for review and authority for disposition of non-conforming product is specified in SQP 300-06, Order Remake Procedure and includes the following:

- Disposition of materials not previously issued to manufacturing.
- Disposition of materials issued to manufacturing (Work-In-Process).
- Disposition of non-conforming product, identified at Final Inspection.
- Disposition of non-conforming product returned from a customer.

Product that is thought to be nonconforming shall be reviewed through an MRB in accordance with SQP 300-06, Order Remake Procedure and dispositioned as follows:

- Rework to meet specified requirements.
- Use as is if meets specifications and authorized by customer.
- Scrap
- Continue processing for disposition at a later operation.

8.4 Analysis of Data

Sovereign Circuits provides means for measuring, collecting and analyzing data from product records, processes, and other quality records to determine conformance to our quality plans and the effectiveness of our Quality Management System.

The data is analyzed to determine trends of the processes, product yields, scrap rates, conformity to customer requirements and operations effectiveness for the purpose of continuous improvement.

8.5 Improvement

Sovereign Circuits is committed to improving our processes and product yields. Steps to make improvements include monitoring process variations and product yields, identifying the possible causes and then placing them in order of importance based on financial impact and impact on customer satisfaction. Preventative and corrective actions will be monitored for their effectiveness against desired outcomes.

8.5.1 Continual Improvement

Sovereign Circuits uses available feedback from customer complaints, internal audits, and analysis of internal data to continually improve our Quality Management System. This improvement is facilitated by corrective and preventative actions and management reviews. (**See procedure** SQP 300-11, Continuous Quality Improvement).

8.5.2 Corrective Action

Sovereign will take actions to eliminate the cause of known nonconforming product or other undesirable situations to prevent recurrence. Corrective action shall be determined through analysis of data from Manufacturing, MRB's, Customer Complaints/RMA's, and Internal Quality Audits. The corrective action taken to eliminate causes of actual non-conformities and the priority placed on this action shall be based on the magnitude of the problem. Procedures revised due to corrective actions shall have the cause/nature of the change recorded. Records documenting corrective action shall be maintained as specified in procedure SQP 300-12, Control of Quality Records.

Corrective actions consist of the following elements:

- Identify and record the nonconformance
- Determine and document the root cause
- Implement and document the corrective action
- Follow-up as required to confirm the effectiveness of the corrective action

Corrective actions may be initiated by the following:

- RMA per SQP 300-08, Return Material Authorization – Used in conjunction with actual returns to initiate defect analysis and corrective action
- Customer Complaints per SQP 300-10, Customer Complaint Procedure – Used for customer complaints and technical support generated from customer contacts

- Non Conformance Reports per SQP 300-09, Non Conforming Material– Primarily used when defects are found during the manufacturing process

- Internal Quality Audits per SQP 300-03, Internal Audit Procedure – Used when non-conformances are identified during the course of internal audits

- MRB's per SQP 300-06, Order Remake Procedure – Used when a remake is required due to 20% or more of the scheduled quantity being scrapped due to a single cause or defect.

Corrective Actions shall be implemented through changes in procedures or processes, as appropriate in accordance with SQP 300-01, Document and Data Control and/or in accordance with SQP 300-02, Technical Directive (TD) Procedure.

For more details refer to SQP 300-07, Corrective Action System.

8.5.3 **Preventive Action**

Sovereign uses available information to identify and implement preventive actions to eliminate the cause of a potential nonconformity to prevent any occurrences. This information may come from trend analysis, MRB's, RMA's, internal audit results or customer complaints. Sovereign follows the following approach in order to institute preventive actions:

- Identify and record potential nonconformities and their causes

- Evaluate the need to implement a preventive action to prevent the occurrence of nonconformities

- Determine, implement and record the preventive action needed

- Follow-up as required confirming the effectiveness of the preventive action taken.

Preventive Action plans will be included in the management review process.

Preventive Actions can be applied to any process, manufacturing or operation function.

The source of input for Preventive Actions may come from any of the following actions:

SQP 301-03, Disposition of Rejected Work in Process
SQP 300-06, Order Remake Procedure
SQP 300-07, Corrective Action System
SQP 300-10, Customer Complaint
SQP 300-03, Internal Audit Procedure
SQP 300-04, Statistical Process Control
SQP 300-08, Returned Material Authorization

The identification of potential nonconformities, their causes and the implementation of a subsequent preventive action are the responsibility of the managers of the Quality Assurance, Engineering, Manufacturing, Purchasing, and Sales Departments.

The Quality Assurance Department is responsible for administration of the Preventative Action System. The individuals responsible for MRB's are responsible for identifying corrective and preventive actions associated with known and potential problems.

Weekly and monthly Quality reports are generated and available for review. Based on this information individuals should establish corrective or preventive measures to eliminate the causes of actual or potential non-conformities.

Records will be maintained per SQP 300-12, Control of Quality Records.

Section 9

Quality Management Plan

This Quality Management Plan outlines the requirements for compliance to MIL-PRF-31032.

The following are guidelines to reflect our Quality Management System using a TRB concept. This Quality Plan is a controlled document established under the guidelines of SQP 300-01, Document and Data Control.

The Quality Management System represented in this Quality System Manual is the basis for our Quality Plan as related to the requirements of **MIL-PRF-31032**.

The Quality Plan addresses the following requirements of **Appendix A Para. A. 3.2.1**:

A. **TRB SYSTEM**

The TRB System, including structure, duties and methods is outlined in **SQP** 300-17, Technical Review Board (TRB) Structure and Responsibilities.

B. **PROCESS FLOW**

Process Flows are controlled by procedures listed in the Quality System Manual. All procedures are listed in Section 10 of this manual and the process flows are documented on the Process Flow Chart on page 40 of this manual.

The combination of machines, tools, processes, material and people are reflected in the process flow. The listings of documented procedures enable this Quality Plan to be reviewed, verified and continuously improved as required by MIL-PRF-31032.

C **PROCESS FLOW DOCUMENTATION INDEX**

All manufacturing, operating, quality and work instruction procedures effecting the Process Flow are listed in **Section 10** of this Quality System Manual.

For actual process flow refer to the Process Flow Chart shown on page 40.

All procedure revisions and additions are governed by **Control of Documents**, paragraph 4.2.3.

D. **FUNCTIONAL ORGANIZATIONAL CHART**

The Functional Organization chart for this Quality Plan is listed in **Section 3**. The organization chart includes the structure and member names of the TRB Committee as required for MIL-PRF-31032.

In addition to the organizational chart a listing of primary and contributing responsibilities is documented in **Section 5**, paragraph 5.5.1.

E. **CONVERSION OF CUSTOMER REQUIREMENTS**

Conversion of customer requirements is addressed in **Section 7, Product Realization**.

As part of product realization, supplemental operating and manufacturing procedures are associated with meeting this requirement:

The following procedures are used to meet the requirements of MIL-PRF-31032 **Appendix A paragraph A.4.4, Sections A, B, C, G, J and M**.

SOP 104-00 Sales Instruction (General)
SOP 104-01 Customer Request for Quote
SOP 104-02 Contract Review Procedure
SMP 200-01 Review of Documentation Package
SMP 200-02 Recording of the Order
SMP 200-03 Release to Production
SMP 200-05 Processing Repeat Orders
SMP 200-06 Customer Revision Changes/Sovereign Processing Changes
SMP 200-07 Military Coupon Design Requirements

To ensure we are capable of producing and certifying orders, at the time of request for quotes, the sales representative will review our current approval list. If an order requires certification to MIL-PRF-31032, they will check our QML listing of capabilities by Technology and associated specifications to verify if we are qualified.

The following procedures are used to meet the requirements of **Section D, Phototool Generation**.

SMP 201-00 Tooling (General)
SMP 201-01 Generation of Tooling Films (CAM)
SMP 201-02 Generation of Drill Path (CAM)
SMP 201-03 Back-up and Archiving of CAM Data
SMP 201-04 Electronic Data Input and Data Output
SMP 201-05 Photoplotting of Tooling Films
SMP 202-01 Order Inspection
SWI 202-01-01 Post Plot Film Set-Up and Operation
SMP 202-04 Automated Optical Film Inspection
SWI 202-05-01 Viewing the Panel Step
SWI 202-05-02 Running the Graphic Comparison Macro

The following procedures are used to meet the requirements of **Section E**, **Testing Capabilities**

SMP 215-00 Electrical Test (General)
SWI 215-00-01 High-Potential Voltage Testing
SMP 215-01 Electrical Testing of Printed Circuit Boards
SMP 215-02 Preparation of Test Fixture
SMP 215-03 Controlled Impedance Testing
SQP 302-00 Testing (General)
SQP 302-02 Solderability Testing
SQP 302-03 Thermal Stress
SQP 302-04 Copper Peel Strength Test
SQP 302-05 Manual and Automated Microsection Preparation
SQP 302-06 Group "A" Microsection Inspection
SQP 302-07 Monthly Group B Testing, Yearly Retention of Qualification Reports and Requalification requirements
SQP 302-10 Testing of Electroplated Copper.
SWI 302-00-01 Ionic Contamination Test

The following is used to meet the requirements of **Section F**, **Approved Process Flow and certification of capabilities by technology and associated specifications.**

Printed boards are approved and certified as the results of in-process inspections, Group A and Group B testing, lot conformance and periodic testing per the required associated

specifications. The test results, retention data and documentation are noted with the submission of this data, supplied to DSCC, covering a period of twelve months, beginning with November of the current year through October of the following year.

Certified records and documents are on file in the Quality Department for review and verification.

The following procedure is used to meet the requirements of **Section H**, **Lot Conformance Inspection.**

SQP 301-05 Lot Conformance Inspection (LCI) for MIL-PRF-31032

The following procedures are used to meet the requirements of **Section I, Incoming Inspection and Vendor Procurement Documentation** is covered in **Section 7.4** of this manual and in the following procedures:

SOP 100-00 Purchasing Procedure
SOP 100-01 Vendor Rating System
SOP 101-00 Receiving Procedure
SPS 100-00-01 Laminate and Prepreg

The following procedures are used to meet the requirements of **Section K, Marking.** The lot date code will either be etched in metal or applied by permanent nonconductive ink. The two-digit week date code will be per the calendar week of the year and it will be within one week of the actual week the product went through the process applying the code.

SMP 215-05 Serialization of Work in Process
SQP 301-04 Marking Requirements for MIL-PRF-31032
SMP 215-04 Thermal Label Printing of Electrical Test and Traceability Markings

The following procedure is used to meet the requirements of **Section L, Rework.** There are additional rework instructions included in certain manufacturing procedures (SMP's) that require control and documentation in an equivalent manner as the original process.

SQP 301-00 Final Inspection of Printed Circuit Boards (General)

F. SELF-VALIDATION

Self-Validation requirements are covered in **Section 8**, paragraph 8.2.2 of this manual and In addition to the Internal Audits, a Quality Manual Review Checklist has been established for the Self-Validation Process.

G. QML STATUS SUMMARY AND TRB REPORTING

The Status Summary and TRB Reporting plan will be controlled under the guidelines associated with procedure SQP 300-17, Technical Review Board (TRB) Structure and Responsibilities.

H. DOCUMENTATION AND DATA RETENTION, STORAGE AND DISPOSITION

The Documentation and Data Retention, Storage and Disposition plan will be controlled under the guidelines of **Section 4.0, paragraph 4.2.3 Control of Documents** in this manual and per procedure SQP 300-12, Control of Quality Records.

I. CONTINUOUS IMPROVEMENT

Continuous Improvement is controlled by **Section 8.0**, **paragraph 8.5.1 Continual Improvement** in this manual and per SQP 300-11, Continuous Quality Improvement.

J. FAILURE ANALYSIS

Failure Analysis as established in this Quality Plan will be controlled under the guidelines of **Section 8.0**, **Measurement, Analysis and Improvement** in this manual**.** This section covers measurement and monitoring of processes, inspection and testing of products, and analysis of this data to use for continuous improvement.

K. PROCESS CONTROL

Process Control is maintained per **Section 7.0, Product Realization** of this manual. More specifically, **sections 7.5 Product and Service Provision and 7.6 Monitoring and Measuring Devices**, explain how processes are controlled. The Process Flow Chart listed on page 40 of this manual lists each process and the associated procedure that governs that process. A traveler is generated for each specific order and lists the required inspection, measurement, and test points through all of the steps of manufacturing.

L. CORRECTIVE ACTION

Corrective actions are controlled under the guidelines in **Section 8.0** of this manual. Specifically **paragraph 8.5.2 Corrective Action,** gives the details of our corrective action plan. The following procedures give further details on how we correct problems associated with processes, products, materials or customer concerns.

SQP 300-06 Order Remake Procedure
SQP 300-07 Corrective Action System
SQP 300-08 Returned Material Authorization
SQP 300-09 Nonconforming Material
SQP 300-10 Customer Complaint

M. CHANGE CONTROL

The Change Control plan regarding how we monitor, implement and control changes to customer data, processes or our Quality Management System is covered in SMP 200-06, Customer Revision Changes/Sovereign Processing Changes. Process Change Requests (PCR's) are initiated to change processes, procedures, etc. Technical Directives (TD's) are issued to implement immediate and possibly temporary changes. See **Section 4.0**; **paragraph 4.2.3 Control of Documents** for additional information.

Major changes will be reviewed and governed by the TRB Committee and acted on as determined appropriate per SQP 300-17, TRB Structure and Responsibilities.

The following procedures are used to support change control:

SQP 300-01 Document and Data Control
SQP 300-02 Technical Directive

N. LIST OF VERIFICATION TEST AND INSPECTION METHODS

Verification test and inspection methods that are performed at Sovereign Circuits as a means to verify product conformance are listed in the following procedures.

SMP 202-04	Automated Optical Film Inspection
SMP 205-02	Automated Optical Inspection
SMP 208-05	Inspection of First Article Drilling
SMP 209-05	Operation of X-Ray Fluoroscope
SMP 215-00	Electrical Test (General)
SWI 215-00-01	High-Potential Voltage Testing
SMP 215-01	Electrical Testing of Printed Circuit Boards
SMP 215-03	Controlled Impedance Testing
SQP 301-00	Final Inspection of Printed Circuit Boards (General)
SQP 301-02	Inspection of Heatsink or Metal Cores
SQP 301-05	Lot Conformance Inspection (LCI) for MIL-PRF-31032
SWI 301-00-02	Ionic Contamination Test
SQP 302-00	Testing (General)
SQP 302-02	Solderability Testing
SQP 302-03	Thermal Stress
SQP 302-04	Copper Peel Strength Test
SQP 302-06	Group “A” Microsection Inspection
SQP 302-09	Microsection Requirements on First Article Plating

Verification test and inspection methods that are performed at an outside test facility as a means to verify product conformance are listed in the following procedures.

SQP 302-04	Copper Peel Strength Test
SQP 302-07	Monthly Group B Testing, Yearly Retention of Qualification Reports, and Requalification Requirements
SQP 302-10	Testing of Copper Plating Per Weapons Spec. 6536

O. QUALIFICATION TESTING

The methods used in this quality plan for Qualification Testing to meet the requirements of MIL-PRF-31032 will be per SQP 300-13, MIL-PRF-31032 Qualification, Periodic Conformance, and Capability Verification Testing/Inspection Plans.

P. PERIODIC CONFORMANCE INSPECTION

Conformance inspection as documented in this Quality Plan will be under the guidelines as stated in **Section 8.0 Measurement, Analysis and Improvement,** of this manual. We will use our normal in-process and final production inspection and test results to cover our requirements for periodic conformance inspection. Lot conformance inspection will be per procedure SQP 301-05, Lot Conformance Inspection (LCI) for MIL-PRF-31032. Monthly and annual periodic conformance testing will be performed as specified in SQP 300-13, MIL-PRF-31032 Qualification, Periodic Conformance, and Capability Verification Testing / Inspection Plans.

Procedures used as part of this plan are:

SQP 300-13	MIL-PRF-31032 Qualification, Periodic Conformance, and Capability Verification Testing/Inspection Plans
SQP 301-00	Final Inspection of Printed Circuit Boards (General)
SQP 301-03	Disposition of Rejected Work in Process
SQP 301-05	Lot Conformance Inspection (LCI) for MIL-PRF-31032

Q. CALIBRATION

Calibration requirements in this plan will be governed by formal documentation and procedures as stated in **paragraph 7.6, Monitoring and Measuring Devices** in this manual and in SQP 302-01, Calibration System.

R. TRAINING

The training plan for employees at Sovereign Circuits will be controlled by the guidelines as stated in **Section 6, Resource Management** in this manual and procedure **SOP 109-01.**

Procedures related to this part of the quality plan are:

SOP 109-01 Training Procedure
SOP 109-04 AS9100 Training
SOP 109-05 Conducting Hazard Training

S. CONTRACT SERVICES

Contract services will be reviewed on an individual case and on an as needed basis. Sovereign prefers to supply and control as many of the manufacturing processes, raw materials and components as possible, required to build customer products. Vendors offering contract services will be governed by the same requirements as put on all other approved material vendors.

The need for contract services will be determined at the request for quote stage. Inside sales will use SF-104-01-02 to request price and delivery when contract services are necessary. Products received from contract services will be inspected for conformance to specified requirements. Vendors will be issued cause and corrective action requests if supplied products are nonconforming. Quality and delivery performance will be tracked through our vendor rating procedure.

Procedures related to this part of the quality plan are:

SOP 100-00 Purchasing Procedure
SOP 100-01 Vendor Rating
SOP 100-02 Subcontract Services
SOP 104-01 Customer Request for Quote

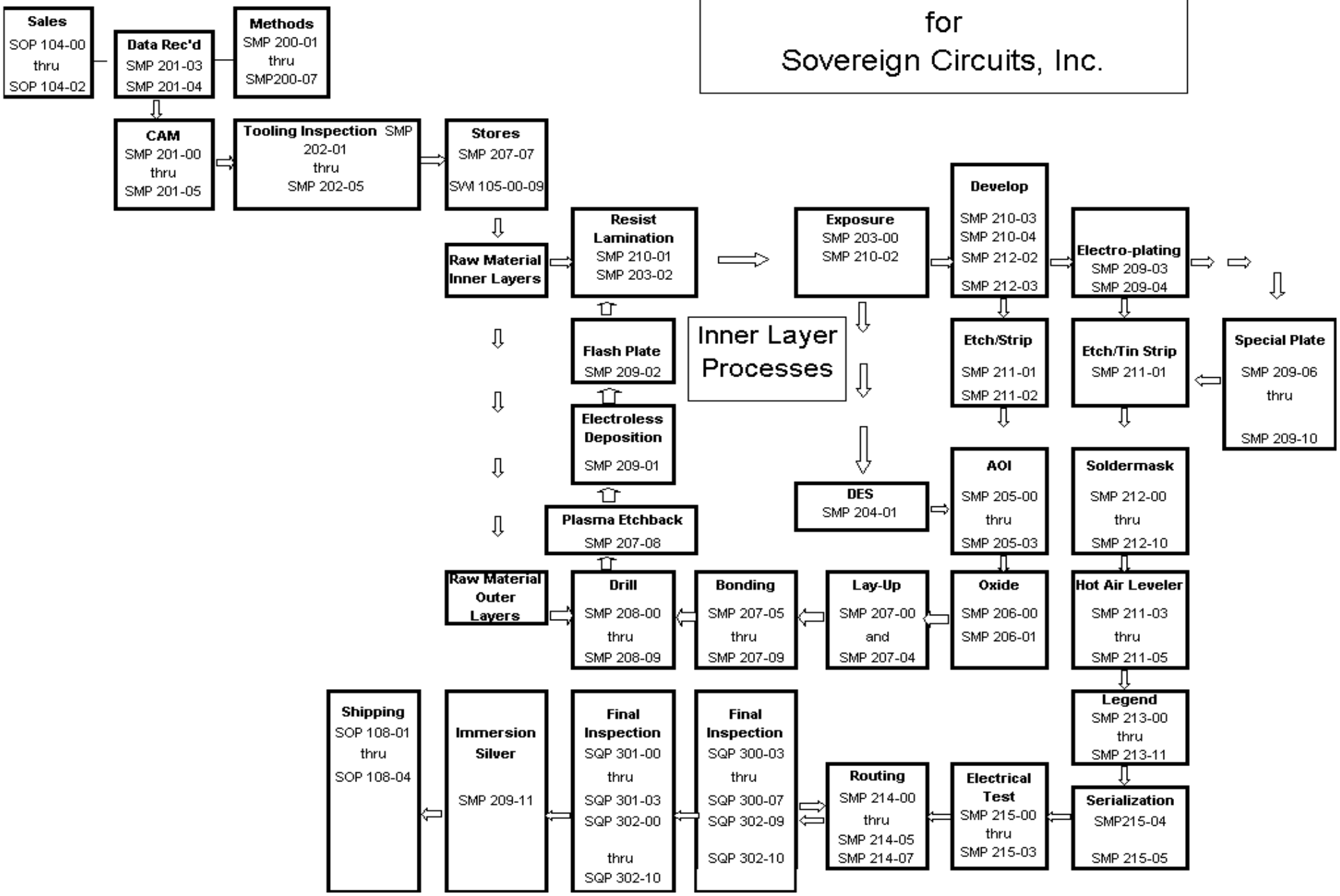
T. TEST OPTIMIZATION

Any TRB approved and implemented test optimization will meet the requirements of MIL-PRF-31032, Appendix D and be in accordance with Section B, Measurement, Analysis and Improvement, of this Quality System Manual. The procedure is SQP 300-14, Test Optimization.

U. CAPABILITY VERIFICATION INSPECTION

Capability Verification Inspection will meet the requirements of MIL-PRF-31032, Appendix C and the associated specification sheets. The types of tests/inspection and frequency will be per SQP 300-13, MIL-PRF-31032 Qualification, Periodic Conformance, and Capability Verification Testing/Inspection Plans.

Process Flow Chart for Sovereign Circuits, Inc.



Process Identification Matrix

Sovereign Circuits identifies specific processes needed for quality system management and their sequence and interaction.

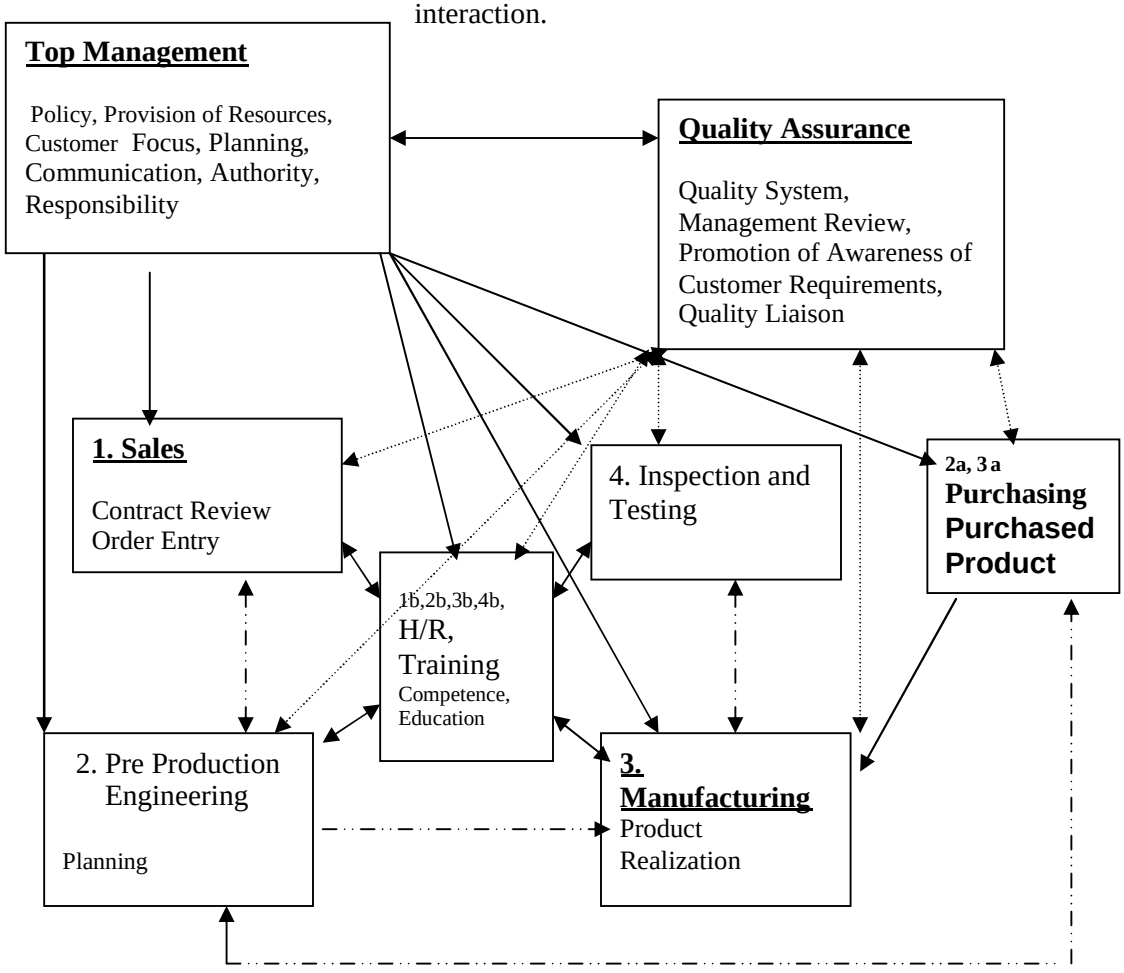


Figure 2.

Sovereign Circuits identifies specific processes for quality system management and their sequence and interaction.

Section 11

Index of Procedures

Procedure #	***Title***
Purchasing (100)	
SOP 100-00	Purchasing Procedure
SOP 100-01	Vendor Rating System
SOP 100-02	Subcontract Services
SOP 100-03	Purchasing Specification
SOP 100-04	Cycle Count and Inventory Verification
SPS 100-00-01	Laminate & Prepreg
SPS 100-00-02	Drills/Router Bits
SPS 100-00-03	Flex Materials
SPS 100-00-04	Foils
SPS 100-00-05	Pressure Sensitive Adhesive (PSA)
SPS 100-00-07	Testing and Calibration Service

Procedure #	***Title***
Receiving (101)	
SOP 101-00	Receiving Procedure
SOP 101-02	Procedures for Issuing Raw Materials
SOP 101-03	Shelf Life Control

Procedure #	***Title***
Human Resources (102)	
SOP 102-00	Hiring New Employees
SOP 102-03	Issuing of Time Cards for Ohio Time and eWORC to Achieve Level Sign-offs
SOP 102-04	ITAR (International Traffic in Arms Regulations)

Procedure #	***Title***
Information Technology (103)	
SOP 103-00	Backup of NT File Server
SOP 103-01	Software Control
SOP 103-02	eWORC Instructions

Procedure #	***Title***
Sales (104)	
SOP 104-00	Sales Instruction (General)
SOP 104-01	Customer Request for Quote
SOP 104-02	Contract Review Procedure
SOP 104-03	Boards to be Shipped from Finished Goods

Procedure #	***Title***
Maintenance (105)	
SOP 105-00	Maintenance Procedure
SWI 105-00-01	PM for Bonding Department
SWI 105-00-02	PM for Routing and Precision Fabrication

SWI 105-00-03	PM for Plating Department
SWI 105-00-04	PM for Photo Outer Department
SWI 105-00-05	PM for Screen Print Department
SWI 105-00-06	PM for Tooling, Darkroom and CAM Departments
SWI 105-00-07	PM for Final Inspection and QC Lab Departments
SWI 105-00-08	PM for Air Compressors
SWI 105-00-09	PM for Material Store Room
SWI 105-00-10	PM for Drilling Department
SWI 105-00-11	PM for Photo Inners Department
SWI 105-00-12	PM for A.O.I. Department
SWI 105-00-13	PM for Solder Mask Exposure Department
SWI 105-00-14	PM for Solder Mask Coating Department
SWI 105-00-15	PM for Electrical Test Department
SWI 105-00-16	PM for Precision Fabrication Department

Procedure #	***Title***
Waste Treatment (106)	
SOP 106-00	Waste Treatment (General)
SWI 106-00-01	Calibration of Waste Treatment Probes
SWI 106-00-02	Cleaning of Pump Strainers
SWI 106-00-03	Monthly Water Sampling
SWI 106-00-04	pH Variations and High Water Levels
SWI 106-00-05	Cleaning Ball Check Valves
SWI 106-00-06	Treating Bulk Waste
SWI 106-00-07	Making of Sludge Bag
SWI 106-00-08	Checking Copper Level with Colorimeter
SWI 106-00-09	Regeneration of D.I. System
SWI 106-00-010	Waste Treatment System
SWI 106-00-11	Clarifier Cleaning
SWI 106-00-12	Filter Press Operation
SWI 106-00-13	Cleaning of Filter Press Plates
SWI 106-00-14	Making of Sludge Box
SWI 106-00-15	Changing Reserve DI Water Bottles
SWI 106-00-16	Below Grade Tank Cleaning
SWI 106-00-17	Shipping of Hazardous Waste
SWI 106-00-18	Operation of Gold Bug
SOP 106-01	Sovereign Barrel Control
SOP 106-04	Waste Treatment Initial Training

Procedure #	***Title***
Health and Safety (107)	
SOP 107-01	Bloodborne Pathogen Standard
SOP 107-02	Safe Operation of Powered Industrial Trucks
SOP 107-03	X-Ray Safety Instruction to Individuals
SOP 107-04	Formaldehyde Compliance Procedure
SWI 107-04-01	Recording and Reporting Occupational Injuries and Illnesses

SOP 107-05	Respirator Protection Program
SWI 107-06-01	Inspection of Building Safety Equipment
SOP 107-07	Lead Standard Compliance
SOP 107-09	Operation of Glenbrook RTX-113 X-Ray Units
SOP 107-10	Safety Lockout / Tagout Program
SOP 107-11	Emergency Spill Response Guidelines Procedure
SOP 107-12	Hazard Communication Plan
SOP 107-13	Hearing Conservation

Procedure #	***Title***
Shipping (108)	
SOP 108-01	Packaging Requirements
SOP 108-02	Shipping of Package
SOP 108-03	UPS Shipping of Hazardous Material
SOP 108-05	Vacuum Packaging

Procedure #	***Title***
Training (109)	
SOP 109-01	Training Procedure
SOP 109-04	AS9100 Training
SOP 109-05	Conducting Hazard Training

Procedure #	***Title***
Pre Production (200)	
SMP 200-01	Review of Documentation Package
SMP 200-02	Recording of the Order
SMP 200-03	Release to Production
SMP 200-04	Material Issue
SMP 200-05	Processing Repeat Orders
SMP 200-06	Customer Revision Changes/Sovereign Processing Changes
SMP 200-07	Coupon Creation

Procedure #	***Title***
CAM (201)	
SMP 201-00	Tooling (General)
SMP 201-01	Generation of Tooling Films
SMP 201-02	Generation of Drill Path
SMP 201-03	Back-Up and Archiving of CAM Data
SMP 201-04	Electronic Data Input & Data Output
SMP 201-05	Photoplotting of Tooling Films

Procedure #	***Title***
Tooling Inspection (202)	
SMP 202-01	Order Inspection
SMP 202-04	Automated Optical Film Inspection
SWI 202-01-01	Post Plot Film Set-Up and Operation
SWI 202-05-01	Viewing the Panel Step

SWI 202-05-02	Running the Graphic Comparison Macro

Procedure #	***Title***
Photo Print Inners (203)	
SMP 203-00	Photo Print (General)
SMP 203-01	Inner Layer Chemical Clean
SMP 203-02	Lamination of Dry Film Photoresist on Cut-Sheet Laminator
SMP 203-03	Post Etch Punch Exposure System

Procedure #	***Title***
DES (204)	
SMP 204-00	DES (General)
SMP 204-01	Develop-Etch-Strip
SWI 204-01-01	Developer Bath Changes/Cleaning of Developer Sump
SWI 204-01-02	Etcher Sump Cleaning
SWI 204-01-03	Resist Strip Bath Change/Cleaning of Resist Strip Pump
SWI 204-01-04	Filter Changes

Procedure #	***Title***
AOI (205)	
SMP 205-00	AOI (General)
SWI 205-00-01	Discovery AOI
SMP 205-01	Post Etch Laminate Punch
SMP 205-02	Automated Optical Inspection

Procedure #	***Title***
Oxidizing (206)	
SMP 206-01	Oxidizing of Bare Copper Finish

Procedure #	***Title***
Bonding (207)	
SMP 207-00	Multilayer Assembly, Lamination and Breakdown (General)
SMP 207-04	Lay-Up of Multilayer Package
SMP 207-05	Bonding (Lamination)
SMP 207-07	Pre-Assembly Staging
SMP 207-08	Plasma Desmear/Etchback
SMP 207-09	Surface Resin Removal
SMP 207-10	Post Lamination Panel Preparation
SMP 207-11	Coverlaying of Flexible Layer/Panels
SMP 207-12	Flex and Rigid-flex Multilayer Assembly
SMP 207-14	Strain Relief
SMP 207-15	Lamination Storeroom Environment

Procedure #	***Title***
Drilling (208)	
SMP 208-00	CNC Drilling (General)

SMP 208-01	Primary Drilling
SMP 208-02	Tooling for CNC Drilling
SMP 208-03	X-Ray Procedure
SMP 208-04	Inspection of Drill Bits
SMP 208-05	Inspection of First Article Drilling
SMP 208-06	Test Fixture Drilling
SMP 208-07	Deburring of Drilled Panels
SMP 208-08	Spindle Runout Verification and Regulation
SMP 208-09	Multiline X-Ray Drill Setup / Tooling / LAP / LAP-RA Process
SMP 208-10	Drill Registration Check – Annular Ring
SMP 208-11	Drill Staging
SWI 208-11-01	Creating Drill Files Using NCCAM7 Software

Procedure #	***Title***
Plating (209)	
SMP 209-00	Plating (General)
SWI 209-00-01	Cleaning of Copper Etchers and Filters
SMP 209-01	Electroless Deposition of Copper
SMP 209-02	Flash Plate Procedure
SMP 209-03	Electroplated Deposition of Copper/Tin R4
SMP 209-04	Tin Lead Plating
SMP 209-05	Operation of X-Ray Fluoroscope
SMP 209-06	Hand Line
SMP 209-07	Taping for Gold Plate
SMP 209-08	Electroplating of Ni/Au Tabs
SMP 209-09	Immersion Gold Plating
SMP 209-10	Tape Testing of Gold Plated Panels
SMP 209-11	Silver Line
SMP 209-12	Immersion Tin Process

Procedure #	***Title***
Photo Outers (210)	
SMP 210-00	Photo Outers (General)
SMP 210-01	Lamination of Dry Film Photoresist Using Hot Roll Laminator
SMP 210-02	Exposure of Dry Film Resist
SMP 210-03	Developing of Dry Film Photoresist
SWI 210-03-01	Primary Developer Breakpoint Verification
SMP 210-05	Lamination of Dry Film Soldermask

Procedure #	***Title***
Surface Finish (211)	
SMP 211-00	Surface Finish (General)
SMP 211-01	Removal of Dry Film Image
SMP 211-02	Chemical Removal of Copper (Etching)
SMP 211-03	Chemical Removal of Oxide and Copper Preparation (Chem Clean)
SMP 211-04	Hot Air Solder Level

SMP 211-05	Removal of Fluxing Agents
SMP 211-06	Hot Oil Fusing
SMP 211-07	Pre-Cleaning of Panels
SMP 211-08	Hot Air Solder Level Rework
SMP 211-09	Application of OSP (CU-56)

Procedure #	***Title***
Soldermask (212)	
SMP 212-00	Dry Film Soldermask (General)
SMP 212-01	Exposure of Dry Film Soldermask
SMP 212-02	Developing of Dry Film Soldermask
SMP 212-03	Inspection of Dry Film Soldermask Image
SMP 212-04	Procedure for Making Diazo Film
SMP 212-05	Procedure for Liquid Photoimageable Soldermask
SMP 212-06	Ultra Violet Curing of Dry Film Soldermask
SMP 212-07	Ultra Violet Curing of Screen Printed Ink
SMP 212-08	Coating of Liquid Photoimageable Soldermask
SMP 212-09	Spray Coating of Panels with LPI Soldermask
SMP 212-10	Thermal Curing of LPI Soldermask
SMP 212-11	Aluminum Oxide Scrubber

Procedure #	***Title***
Screen Printing (213)	
SMP 213-00	Screenprint (General)
SMP 213-01	Preparation of Screen
SMP 213-02	Exposure of Screen
SMP 213-03	Developing of Screens
SMP 213-04	Inspection of Screens
SMP 213-05	Stretching of Screens
SMP 213-06	Printing of Image
SMP 213-07	Mixing of Inks
SMP 213-08	Sharpening of Squeegee
SMP 213-09	Inspection of Silkscreen Image
SMP 213-10	Thermal Curing Two Part Epoxy Screen Printed Ink
SMP 213-11	Peelable Soldermask

Procedure #	***Title***
Routing (214)	
SMP 214-00	Routing (General)
SMP 214-01	Manual Programming of Rout Path
SMP 214-02	CNC Routing
SMP 214-03	Inspection of Profiled Image
SMP 214-04	Specialty Machining
SMP 214-05	Scoring
SMP 214-07	Secondary Drilling
SMP 214-08	CNC Routing of Caps, Cores, Prepreg, Coverlay and Fillers

SMP 214-09	Steel Rule Diemaking
SMP 214-10	Specialty Machining Countersink/Counterbore Procedure
SWI 214-12-01	Creating Acu-Gage Programming

Procedure #	***Title***
Electrical Test (215)	
SMP 215-00	Electrical Test (General)
SWI 215-00-01	High-Potential Voltage Testing
SMP 215-01	Electrical Testing of PCB
SMP 215-02	Preparation of Test Fixture
SMP 215-03	Controlled Impedance Testing
SMP 215-04	Thermal Label Printing of Electrical Test and Traceability Markings
SMP 215-05	Serialization of Work-In-Process

Procedure #	***Title***

Chemical Lab (216)	
SMP 216-00	Chemical Laboratory (General)
SMP 216-01	BIOACT EC-1 Tape Residue Remover
SMP 216-02	Gold and Palladium Handling Procedure
SWI 216-00-09	Multibond Cleaner R
SWI 216-00-11	Multibond Oxide Pre-Dip
SWI 216-00-12	G-4 Micro-Etch on Hand Line
SWI 216-00-14	MacDermid Macalloy Tin Lead
SWI 216-00-15	Technic 2010C Hard Gold
SWI 216-00-17	Micornutrients Advantage 400 Etch
SWI 216-00-18	Technic Pallaspeed S Palladium Bath
SWI 216-00-19	Calibration of HACH EC-30 Meter
SWI 216-00-20	Techni Semi S Nickel Sulfamate on Tab Line
SWI 216-00-21	Pattern Line Micro Etch
SWI 216-00-22	Chemical Clean G-6
SWI 216-00-23	Handline Activator
SWI 216-00-24	Acid Cleaner
SWI 216-00-25	E-56 Soft Gold Bath
SWI 216-00-26	Hand Line Techni Semi S Nickel Sulfamate
SWI 216-00-28	Fluoboric Acid (PAL Line)
SWI 216-00-29	Sulfuric Acid (Pattern Line)
SWI 216-00-30	20% Sulfuric Acid/Tab Line
SWI 216-00-31	9271 Pattern Plate Cleaner
SWI 216-00-33	Etch Rates
SWI 216-00-34	Hi-Spec-2 Acid Copper
SWI 216-00-35	Colmatte Tin Bath
SWI 216-00-36	Multibond Oxide Coating Solution
SWI 216-00-40	Omikron Immersion Tin Process OV 4 Pre-Dip
SWI 216-00-42	Assist Resist Bath
SWI 216-00-43	Acid Clean UC Bath

SWI 216-00-44	Hand Held pH Meter
SWI 216-00-46	Primary Developer PC-450 CSG Chemistry
SWI 216-00-47	Primary Photo Developer pH Meter Calibration
SWI 216-00-48	Soldermask Developer PC-450 CSG Chemistry
SWI 216-00-49	Calibration and Standardization of X-Ray Fluoroscope
SWI 216-00-50	MacDermid Final Finish Spray Cleaner 75040
SWI 216-00-51	MacDermid Final Finish Surface Prep
SWI 216-00-52	Predip DP-472
SWI 216-00-53	MacDermid Sterling Silver
SWI 216-00-54	Resist Stripper 426N Surface Strip
SWI 216-00-55	E-Prep Solvent II
SWI 216-00-56	E-Prep Permanganate
SWI 216-00-57	C4000 Preposit Etch 748
SWI 216-00-58	C4000 Circuposit Neutralizer 4190-1
SWI 216-00-59	C4000 Circuposit Catalyst 4444
SWI 216-00-60	C4000 Circuposit Electroless Copper 4500
SWI 216-00-67	Operating Guide for the Rinse Modules of the Hollmueller Electroless Cu Line
SWI 216-00-68	C4000 Circuposit Conditioners 4223 & 4200
SWI 216-00-70	Operating Guide for Module #21 of the Hollmueller Electroless Cu Line
SWI 216-00-71	MacDermid Sterling Predip
SWI 216-00-74	Tin / Lead Stripper
SWI 216-00-75	CSN 7004 Immersion Tin
SWI 216-00-76	PCB 7000 Pre-dip
SWI 216-00-77	Ludy Line Rack Stripper (50% (V/V) Nitric Acid)
SWI 216-00-78	Electrochemicals Neutra Brite (Hot Oil Fusing)
SWI 216-00-79	DES Developer Cleaning and Bath Formulation
SWI 216-00-80	Pure Tin Resist Plating
SWI 216-00-81	DES Etcher

Procedure #	***Title***
Quality General (300)	
SQP 300-01	Document & Data Control
SQP 300-02	Technical Directive (TD) Procedure
SQP 300-03	Internal Audit Procedure
SQP 300-04	Statistical Process Control
SQP 300-05	Quality Measurement Variability
SQP 300-06	Order Remake Procedure
SQP 300-07	Corrective Action System
SQP 300-08	Returned Material Authorization
SQP 300-09	Non-Conforming Material Procedure
SQP 300-10	Customer Complaint Procedure
SQP 300-11	Continuous Quality Improvement Procedure
SQP 300-12	Control of Quality Records
SQP 300-13	MIL-PRF-31032 Qualification, Periodic Conformance Inspection, and Capability Verification Testing Inspection Plans
SQP 300-14	Test Optimization
SQP 300-15	Preventive Action System

SQP 300-16	Product Identification and Traceability
SQP 300-17	Technical Review Board (TRB) Structure and Responsibilities
SQP 300-18	Material Review Board (MRB) Responsibilities and Process

Procedure #	***Title***
Final Inspection (301)	
SQP 301-00	Final Inspection (General)
SQP 301-02	Inspection of Heat Sinks or Metal Cores
SQP 301-03	Disposition of Rejected Work In-Process
SQP 301-04	Marking Requirements for MIL-PRF-31032
SQP 301-05	Lot Conformance Inspection (LCI) for MIL-PRF-31032
SWI 301-00-01	Ionic Contamination Test
SWI 301-00-02	Instructions for Operating the Opic III Coordinate Measuring Machine

Procedure #	***Title***
Quality Lab (302)	
SQP 302-00	Testing (General)
SQP 302-01	Calibration Procedure
SQP 302-02	Solderability Testing
SQP 302-03	Thermal Stress
SQP 302-04	Copper Peel/Strength Test
SQP 302-05	Manual and Automated Micro-Section Preparation
SQP 302-06	Group "A" Microsection Inspection
SWI 302-05-01	Checking Calibration of Microsection Grinding Wheels
SQP 302-07	Monthly Group "B" Testing - Yearly Retention of Qualification Reports and Requalification Requirements
SQP 302-08	Retention of Microsection Mounts, Solderability Samples and Coupon Strips
SQP 302-09	Microsection Requirements on First Article Plating
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