

# Tech Circuits, Inc.

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## QUALITY MANUAL

Revision D

ISO 9001:2000

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Approved By:

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*President (Owner)*

04/04/2008

*Date*



*Vice President (Owner)*

04/04/2008

*Date*



*ISO 9001:2000 Management Rep.*

04/04/2008

*Date*

**Revision Table**

Rev.	Date	Review/Revision Description
<b>A</b>	10/01/02	Initial Release
<b>B</b>	11/10/03	Made all recommended changes per NQA Audit 03/06492/SP01
<b>C</b>	10/19/07	Updated per NQA Audit #RE02/S08
<b>D</b>	04/04/08	Removed internal signature page (duplicate information) per NQA Audit 03/26/08 #S09

## Table of Contents

I.	Introduction .....	4
II.	Quality Policy .....	5
III.	Organizational Flow Chart.....	6
IV.	Manufacturing Plan Flow Chart.....	7
V.	Scope.....	8
VI.	Responsibility and Authority .....	9
VII.	Procedure Matrix .....	12
VIII.	Procedures.....	14
4.0	QUALITY MANAGEMENT SYSTEM .....	14
4.1	<i>General Requirements</i> .....	14
4.2	<i>Documentation Requirements</i> .....	14
5.0	MANAGEMENT RESPONSIBILITY.....	16
5.1	<i>Management Commitment</i> .....	16
5.2	<i>Customer Focus</i> .....	16
5.3	<i>Quality Policy</i> .....	16
5.4	<i>Planning</i> .....	16
5.5	<i>Responsibility, Authority and Communication</i> .....	17
5.6	<i>Management Review</i> .....	17
6.0	RESOURCE MANAGEMENT.....	18
6.1	<i>Provision of Resources</i> .....	18
6.2	<i>Human Resources</i> .....	18
6.3	<i>Infrastructure</i> .....	18
6.4	<i>Work Environment</i> .....	18
7.0	PRODUCT REALIZATION .....	19
7.2	<i>Customer-Related Processes</i> .....	19
7.3	<i>Design and Development</i> .....	20
7.4	<i>Purchasing</i> .....	20
7.5	<i>Production and Service Provision</i> .....	21
7.6	<i>Control of Monitoring and Measuring Devices</i> .....	22
8.0	MEASUREMENT, ANALYSIS AND IMPROVEMENT .....	23
8.1	<i>General</i> .....	23
8.2	<i>Monitoring and Measurement</i> .....	23
8.3	<i>Control of Non-conforming Product</i> .....	24
8.4	<i>Analysis of Data</i> .....	24
8.5	<i>Improvement</i> .....	25

## I. Introduction

This Quality Manual describes the policies and company wide control system of Tech Circuits, Inc., Company Quality Management System (QMS). This Quality Management System addresses the requirements of the ISO (International Organization for Standardization) Quality Standards as defined in ISO 9001:2000. The Quality Procedures and Work Instructions of the Tech Circuits, Inc. are proprietary. All unauthorized use is prohibited.

Tech Circuits is a full-service, totally integrated manufacturer of Printed Circuit Boards, which was founded in 1979 by Philip Walton and Gregory Peterson. Tech Circuits has a single manufacturing facility, located at 340 Quinnipiac St. in Wallingford, Connecticut.

Tech Circuits products range from low technology single and double-sided printed circuits to extremely aggressive multilayer boards using 3 mil line/space technology, impedance control, and/or exotic materials.

### Approval

This quality manual has been approved in its entirety prior to issue by the executive management, signatures of which are listed below the Quality Policy (Ref. Sec. II). One or more of the same functions shall approve all subsequent revisions. Tech Circuits, Inc. reserves the right to make improvements of the quality procedures and work instructions without necessarily revising the quality manual. This manual will receive a general review on an annual basis, and will be revised as needed.

The participation of all Tech Circuits, Inc. employees in the development and approval of quality procedures and work instructions is encouraged.

## II. Quality Policy

**“Tech Circuits, Inc. is committed to  
*continuous improvement*  
in both quality and productivity.**

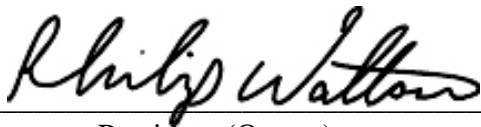
**Our Top Management utilizes quarterly meetings to  
establish, review and communicate our company’s  
*quality system and objectives.***

**Together, we strive to anticipate and fulfill the  
needs of our customers by manufacturing quality products  
that consistently meet or exceed requirements for  
*performance and reliability.***

**Superior quality and on-time delivery is  
*our primary goal.”***

Management ensures that the Quality Policy is understood, implemented and maintained at all levels of the company and is conformant to the ISO 9001:2000 International Standard. This is accomplished by:

1. The proper induction of all personnel to the Quality System.
2. The display of the Quality Policy at prominent locations.
3. Scheduled audits and reviews of Quality Procedures to verify implementation and effectiveness and suitability.
4. Specific and measurable goals are also set and reviewed as part of management meetings.



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President (Owner)

05/30/2003

Date

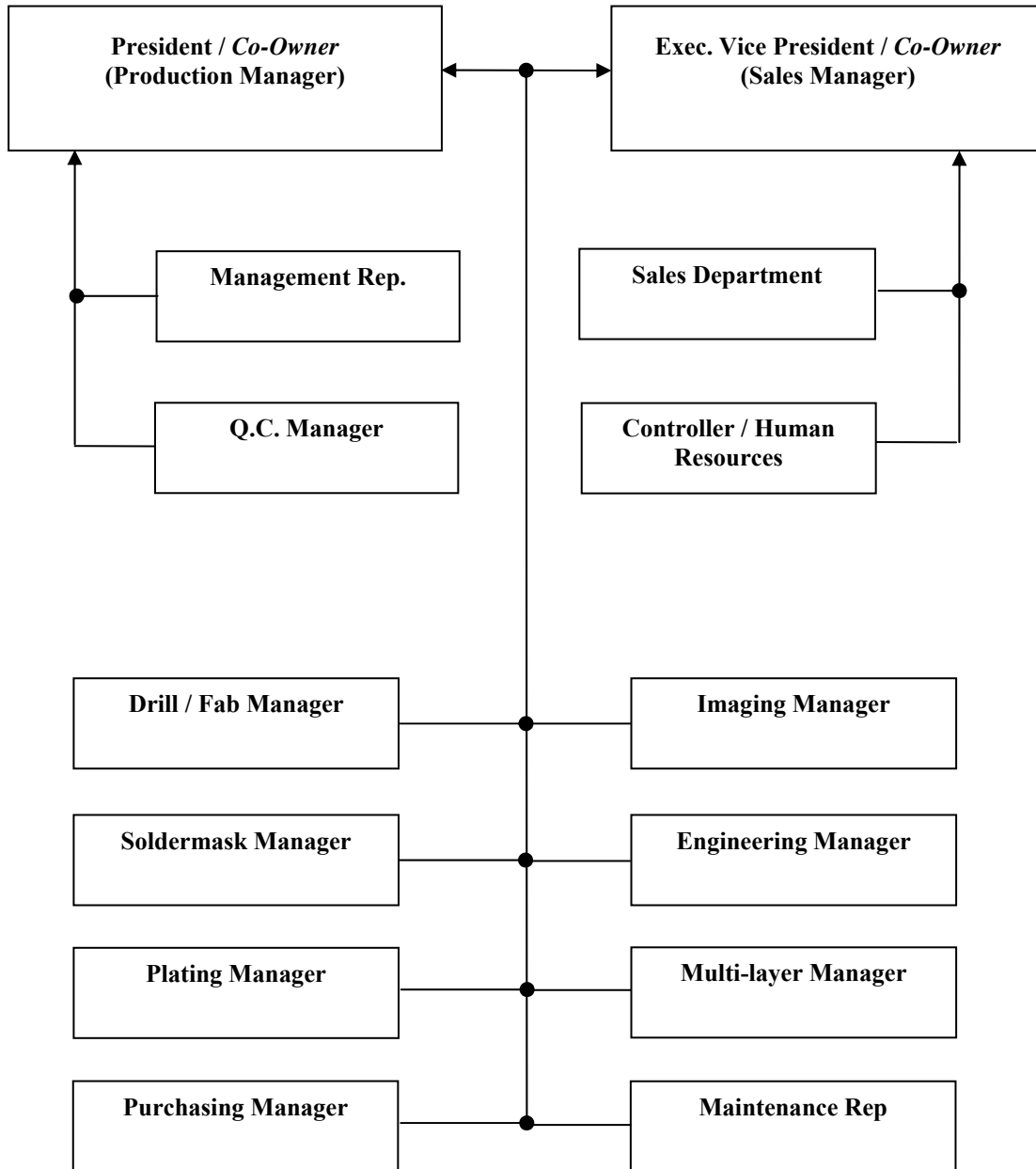


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Vice President (Owner)

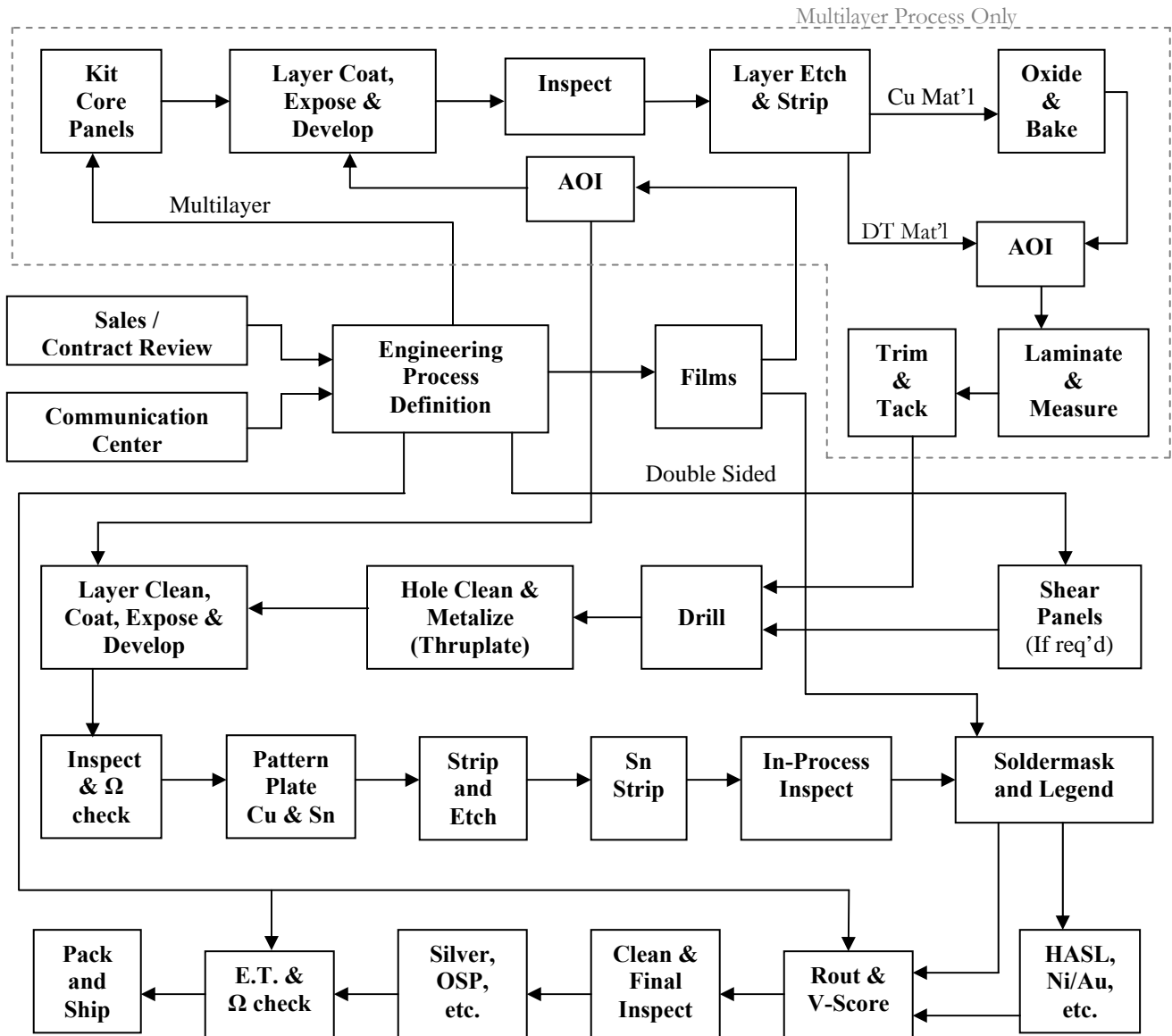
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### III. Organizational Flow Chart



## IV. Manufacturing Plan Flow Chart



(Process Flow Chart)

## V. Scope

This Quality Manual describes the Quality Management System used at Tech Circuits and applies to all activities and personnel within. It best describes our efforts to attain compliance with intent of the general quality requirements of ISO 9001:2000. The quality policy of Tech Circuits shall apply this system to supplies, materials and services procured as well as products produced for end use by Tech Circuits' customers.

Exclusions to the ISO 9001:2000 Standard (Ref. 1.2 Application) for Tech Circuits, Inc. include the following:

Design Requirements (Ref. 7.3) – All of Tech Circuits, Inc. product designs are created, controlled and supplied by it's customers although Tech Circuits, Inc. regularly offers design recommendations to enhance manufacturability.

Service Provisions (Ref. 7.5) – Due to the nature of the products manufactured by Tech Circuits, Inc., our customers do not require us to perform any services that would be covered by this section.

This manual provides Tech Circuits' personnel and customers with a general description of our Quality Management System, which has been planned and developed to assure all products and services conform to customer orders and contracts.

Written procedures for supplementing the system described herein shall be established and maintained.

### Facility

Tech Circuits, Inc. is located on a single site in Wallingford, CT 06492 (USA)

### Mailing Address

Tech Circuits, Inc.  
340 Quinnipiac Street  
P.O. Box 309  
Wallingford, CT 06492  
Tel: (203)-269-3311  
Fax: (203)-284-9389

## **VI. Responsibility and Authority**

### **General**

The organizational flow chart (Ref. Sec. III) shows the interrelationship of positions and functions within the company and the paths of responsibility and authority in relation to quality. Quality is the responsibility of every employee of Tech Circuits Inc. The responsibility to provide leadership, training, and education of employees is shared, but not limited to Top Management. The following have been assigned responsibility and authority for providing and maintaining capabilities to meet product requirements and ensuring the integrity of the Quality System (Ref. International Organization for Standardization, ISO 9001:2000).

### **President and Executive Vice President**

The President and Executive Vice President are the co-owners of Tech Circuits and have equal authority within the organization. The President is also the Production Manager and oversees the day-to-day workings of the manufacturing floor from a managerial standpoint. The Executive Vice President is also the Sales Manager and is responsible for all sales, marketing, quoting, and the release of orders to the shop floor. Together, they are also responsible for the appointment of all managerial positions within Tech Circuits.

### **Top Management (Management Council)**

The Top Management reviews commitment to development and implementation, continuous improvement, establishing quality policy and objectives, communications to Tech Circuits employees the importance of meeting customer satisfaction as well as statutory and regulatory requirements, and establish proper planning to assure that changes maintain integrity.

### **Management Representative**

The Management Representative is in charge of the ISO 9001:2000 Quality System program at Tech Circuits, Inc. Although Tech Circuits has no Quality Assurance Manager, the title is used within our documentation to describe the Management Representative. In addition, any references to the Quality Assurance Department is to be interpreted as all those responsible for, and having the authority for the coordination and administration of the ISO 9001:2000 Quality System program.

### **Quality Control Manager**

The Quality Control Manager is responsible for the inspection and test of all products manufactured at Tech Circuits Inc. Also for the implementation and enforcement quality standards set fourth by Tech Circuits and all necessary industry standards and regulations (Ref. ISO 9001:2000, IPC, UL, etc).

### **Controller/Human Resources Manager**

The Controller/Human Resources Manager is responsible for and has the authority over all of the day-to-day office and financial activity, purchasing, payroll, and all Human Resource functions including administration of insurance and benefit programs.

### **Engineers**

Tech Circuits engineers are responsible for the creation and introduction of detailed instructions and tooling to the production floor. They also handle customer design (*Design for Manufacturability* or *DFM*) problems and issues, directly through the customer. They also maintain Customer specs and documentation.

### **All Employees**

All Tech Circuits employees strive to maintain and improve the quality of their work processes. They are also empowered to stop the work process when it becomes apparent that the required quality is not being achieved.

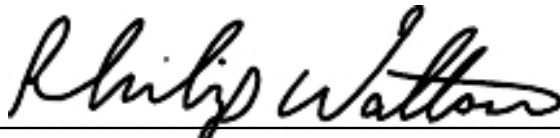
**Top Management/Management Council of Tech Circuits, Inc.  
[as appointed by Philip Walton and Gregory Peterson].**

The Management Council is made up of the following members:

**Official Title / Appointed Position**

President / Production Manager  
Vice President / Sales Manager  
Management Rep. /Q.A. Manager  
V. P. Sales / Marketing  
Controller / Human Resources  
Quality Control Manager  
Purchasing Manager  
Engineering Manager  
Drill / Fabrication Manager  
Dry Film Manager  
Screening Manager  
Plating Manager  
Multi-layer Manager  
Maintenance Representative

The employees listed above are responsible for all of the duties and conditions of Tech Circuits Quality Manual Section 5.0 and their positions, so stated in our Training Records, are of executive appointment as seen both necessary and appropriate by the Tech Circuits owners.



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*President (Owner)*

**05/30/2003**

*Date*



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*Vice President (Owner)*

**05/30/2003**

*Date*

## VII. Procedure Matrix

Section	Section Title	Procedure No.	Procedure Title
4.1	Quality Management System	TCP-QM-0003	Quality System
4.2	Documentation Requirements	TCP-QM-0003	Quality System
4.2.1	General Document Requirements	TCP-QM-0005	Control Document Distribution
4.2.2	Quality Manual	TCP-QM-0003	Quality System
4.2.3	Control of Documents	TCP-QM-0005 TCP-QM-0006 TCP-QM-0007 TCP-QM-0008 TCP-QM-0009 TCS Database	Control Document Distribution Quality Manual I,C &D Procedures Manual I,C &D Work Instructions I,C&D Forms & Records I,C & D ISO Documentation Control
4.2.4	Control of Quality Records	TCP-QM-0020 JTS Database	Control of Quality Records Customer Documentation Control
5.0	Management Responsibility	TCP-QM-0001 & TCP-QM-0002	Management Responsibility & Management Review
5.1	Management Commitment		
5.2	Customer Focus		
5.3	Quality Policy		
5.4.1	Quality Objectives		
5.4.2	Quality Management System Planning		
5.5.1	Responsibility and Authority		
5.5.2	Management Rep.		
5.5.3	Internal communication		
5.6.1	Management Review		
5.6.2	Review Input		
5.6.3	Review Output		
6.1	Provisions of Resources	TCP-QM-0003	Quality System
6.2.1	Human Resources	TCP-QM-0003 TCP-QM-0028	Quality System Training
6.2.2	Competence, Awareness and Training	TCP-QM-0028	Competence, Awareness and Training
6.3	Infrastructure	TCP-QM-0030	Process Control
6.4	Work Environment	TCP-QM-0015 TCP-QM-0022 TCP-QM-0024	Prevent Maintenance Department Safety Plant Start up

Section	Section Title	Procedure No.	Procedure Title
7.1	Planning of Product Realization	TCP-QM-0003 TCP-QM-0001 TCP-QM-0002 TCP-QM-0002 TCP-QM-0026 TCP-QM-0030 TCP-QM-0016	Quality System Management Responsibility Monthly Quality Reports Management Review Work Instruction Process Control Inspection and Test
7.2.1	Determination of Requirements Related to the Product	TCP-QM-0004 TCP-QM-0032	Contract Review Design
7.2.2	Review of Requirements Related to the Product	TCP-QM-0004	Contract Review
7.2.3	Customer Communication	TCP-QM-0004	Contract Review
7.4.1	Purchasing Process	TCP-QM-0010 TCP-QM-0011	Purchasing Supplier Qualifications
7.4.2	Purchasing Info	TCP-QM-0010	Purchasing
7.4.3	Verification of Purchased Product	TCP-QM-0010 TCP-QM-0016	Purchasing Inspection and Test
7.5.1	Control of Production	TCP-QM-0015 TCP-QM-0026 TCP-QM-0030 TCP-QM-0016 TCP-QM-0014	Preventive Maintenance Work Inst. Development Process Control Inspection and Test Handl'g, Stg, Pkg, Perv, & Del.
7.5.2	Validation of Process for Production	TCP-QM-0030	Process Control
7.5.3	Identification and Traceability	TCP-QM-0012 TCP-QM-0016 TCP-QM-0018	Product ID and Traceability Inspection and Test Inspection and Test Status
7.5.4	Customer Property	TCP-QM-0033	Control of Customer Supp. Product
7.5.5	Preservation of Product	TCP-QM-0014	Handl'g, Stg, Pkg, Perv, & Del.
7.6	Control of Monitoring & Measuring Devices	TCP-QM-0017	Control of Insp., Meas.& Test
8.1	Measurement, Analysis & Improvement	TCP-QM-0016 TCP-QM-0021 TCP-QM-0027	Inspection and Test Internal Audits Statistical Techniques
8.2.1	Customer Satisfaction	TCP-QM-0002 QAM sec 8.2.1	Management Review Customer Satisfaction
8.2.2	Internal Audits	TCP-QM-0021	Internal Audits
8.2.3	Monitoring and Measurement of Process	TCP-QM-0030 TCP-QM-0026 TCP-QM-0021 TCP-QM-0027	Process Control Work Instruction Internal Audits Statistical Techniques
8.2.4	Monitoring and Measurement of Product	TCP-QM-0016 TCP-QM-0027	Inspection and Test Statistical Techniques
8.3	Control of Nonconformity	TCP-QM-0019	Control of Nonconforming Product
8.4	Analysis of Data	TCP-QM-0013 TCP-QM-0019 QAM sec 8.2.1 TCP-QM-0027	Corrective and Preventive Action Control of Non-conforming Product Customer Satisfaction Statistical Techniques
8.5.1	Continual Improvement	QAM sec 8.5.1	Continual Improvement
8.5.2	Corrective Action	TCP-QM-0013	Corrective and Preventive Action
8.5.3	Preventive Action	TCP-QM-0013	Corrective and Preventive Action

## VIII. Procedures

### 4.0 Quality Management System

#### 4.1 General Requirements

Tech Circuits shall establish, document, implement, maintain and continually improve the effectiveness of its quality management system in accordance with the requirements of the ISO 9001:2000 International Standard.

To implement the quality management system, Tech Circuits shall:

- a. Identify the processes needed for the quality management system.
- b. Determine the sequence and interaction of these processes.
- c. Determine the criteria and methods required to ensure the effective operation and control of these processes.
- d. Ensure the availability of resources and information necessary to support the operation and monitoring of these processes.
- e. Measure, monitor and analyze these processes, and
- f. Implement actions necessary to achieve planned results and continual improvement of these processes.

Tech Circuits shall manage these processes in accordance with the requirements of the ISO 9001:2000 International Standard.

When a choice to outsource any process that affects product conformity with requirements, Tech Circuits shall ensure control over such processes. Control of such outsourced processes shall be identified within our Quality Management System.

#### 4.2 Documentation Requirements

##### 4.2.1 General Documentation Requirements

The quality management system documentation shall include:

- a. A Quality Manual,
- b. documented statements of a quality policy and quality objectives,
- c. documented procedures required in this International Standard,
- d. documents needed by Tech Circuits, Inc. to ensure the effective planning, operation and control of its processes,
- e. records required by the International Standard ISO 9001:2000. (Ref. 4.2.4).

*Note 1: Where the term **documented procedures** appears within the ISO 9001:2000 Standard, this requires the procedure to be established, documented, implemented and maintained.*

*Note 2: The extent of the quality management system documentation at Tech Circuits, Inc. shall be dependent on the following:*

- a. Size and type of our activities conducted at Tech Circuits, both present and future.
- b. Complexity and interaction of the processes.
- c. Competence of personnel.

*Note 3: The documentation can be in any form or type of medium.*

#### 4.2.2 Quality Manual

Tech Circuits, Inc. will establish and maintain a quality manual that includes;

- a. the scope of the Quality Management System, including details of, and justification for any exclusions (Ref Sec. 1.2 of ISO 9001:2000)
- b. the documented procedures established for the quality management system or reference to them, and
- c. a description of the interaction between the processes of the quality management system.

#### 4.2.3 Control of Documents

Documents required by the Quality Management System will be controlled. Quality records are a special type of document and will be controlled according to the requirements given in section 4.2.4 below.

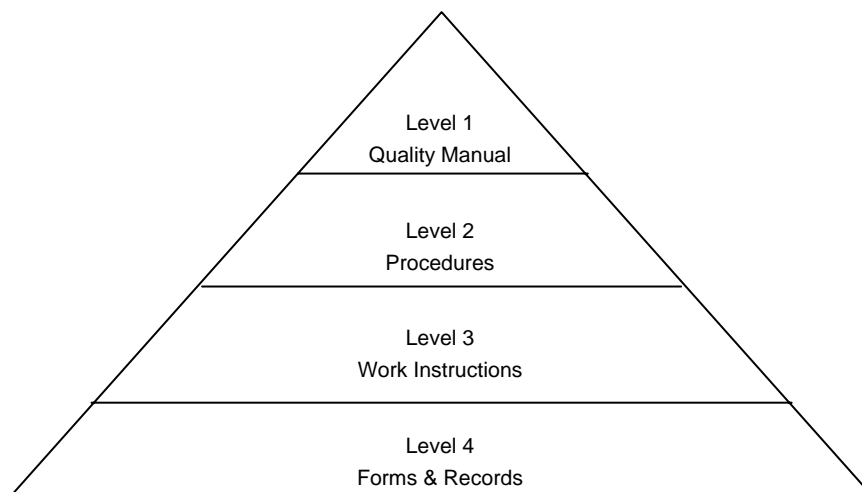
A documented procedure will be established to define the controls needed to,

- a. approve documents for adequacy prior to issue,
- b. review and update as necessary and re-approve documents,
- c. ensure that changes and current revision status of documents are identified,
- d. ensure that relevant versions of applicable documents are available at points of use,
- e. ensure that documents remain legible and readily identifiable,
- f. ensure that documents of external origin are identified and their distribution controlled,
- g. prevent the unintended use of obsolete documents and to apply suitable identification to them if they are retained for any purpose.

#### 4.2.4 Control of Quality Records

Quality records will be established and maintained to provide evidence of conformity to requirements and the effective operation of the Quality Management System. Quality records will remain legible, readily identifiable and retrievable. A documented procedure will be established to define the controls needed for the identification, storage, protection, retrieval, retention time and disposition of quality records.

Note: The Quality Management System documentation structure will be as follows:



## **5.0 Management Responsibility**

### **5.1 Management Commitment**

Top management shall provide evidence of its commitment to the development and implementation of the quality management system and continually improving its effectiveness by:

- a. communicating to Tech Circuits employees the importance of meeting customer as well as regulatory and legal requirements,
- b. establishing and reviewing the quality policy,
- c. ensuring that quality objectives are established and reviewed,
- d. conducting scheduled Management reviews and,
- e. ensuring the availability of all necessary resources.

### **5.2 Customer Focus**

Top management will ensure that customer requirements are determined and met with the aim of enhancing customer satisfaction. Methods by which we accomplish this are covered in Section 8.2.1

### **5.3 Quality Policy**

Top Management shall ensure that the quality policy:

- a. is appropriate to the purpose of Tech Circuits, Inc.,
- b. includes a commitment to comply with requirements and to continually improve the effectiveness of the quality management system,
- c. provides a framework for establishing and reviewing quality objectives,
- d. is communicated and understood at appropriate levels in the company, and
- e. is reviewed by Top Management for continuing suitability.

## **5.4 Planning**

### **5.4.1 Quality Objectives**

Top management shall ensure that quality objectives, including those needed to meet requirements for product (Ref. Section 7.1a), are established at relevant functions and levels within Tech Circuits. The quality objectives shall be measurable and consistent with the quality policy.

### **5.4.2 Quality Management System Planning**

Top management shall ensure that,

- a. the planning and the quality management system is carried out in order to meet the requirements given in Section 4.1, as well as the quality objectives, and
- b. the integrity of the quality management system is maintained when changes to the quality management system are planned and implemented.

## 5.5 Responsibility, Authority and Communication

### 5.5.1 Responsibility and Authority

Top management will ensure that the responsibilities and authorities are defined and communicated within Tech Circuits, Inc. (See Organization Flow Chart, Sec. III)

### 5.5.2 Management Representative

Top Management shall appoint members of management who, irrespective of other responsibilities, shall have responsibility and authority that includes:

- a. ensuring that processes of the quality management system are established, implemented and maintained,
- b. reporting to top management on the performance of the quality management system and any needs for improvement, and
- c. ensuring the promotion of awareness of customer requirements throughout Tech Circuits.

*NOTE: The responsibility of a management representative may include liaison with external parties on matters relating to the quality management system.*

### 5.5.3 Internal Communication

Top management will ensure that appropriate communication processes are established within Tech Circuits and that communication takes place regarding the effectiveness of the quality management system.

## 5.6 Management Review

### 5.6.1 General

Top Management will review Tech Circuits' quality management system at planned intervals to ensure its continuing suitability, adequacy and effectiveness. The review will include assessing opportunities for improvement and the need for changes to the quality management system, including the Quality Policy and quality objectives. Records from management reviews will be maintained (Ref. 4.2.4)

### 5.6.2 Review Input

The input to management review will include information on,

- a. results of audits,
- b. customer feedback,
- c. process performance and product conformity,
- d. status of preventive and corrective actions,
- e. follow up actions from previous management reviews,
- f. changes that could affect the quality management system, and
- g. recommendations for improvement.

### 5.6.3 Review Output

The outputs from the management review shall include any decisions and actions related to,

- a. improvement of the effectiveness of the quality management system and its processes,
- b. improvement of product related to customer requirements, and
- c. resource needs.

## **6.0 Resource Management**

### **6.1 Provision of Resources**

Tech Circuits, Inc. shall determine and provide the resources needed:

- a. to implement and maintain the quality management system and continually improve its effectiveness, and
- b. to enhance customer satisfaction by meeting customer requirements.

### **6.2 Human Resources**

#### **6.2.1 General**

Personnel performing work affecting product quality shall be competent on the basis of appropriate education, training, skills and experience.

#### **6.2.2 Competence, Awareness and Training**

Tech Circuits shall,

- a. determine the necessary competence for personnel performing work affecting product quality,
- b. provide training or take other actions to satisfy these needs,
- c. evaluate the effectiveness of the action taken,
- d. ensure that its employees are aware of the achievement of the quality objectives, and
- e. maintain appropriate records of education, training skills and experience (Ref. 4.2.4).

### **6.3 Infrastructure**

Tech Circuits, Inc. shall determine, provide and maintain the infrastructure needed to achieve conformity to product requirements. Infrastructure includes, as applicable,

- a. buildings, workspace and associated utilities,
- b. process equipment (both hardware and software)
- c. supporting services (such as transport or communication).

### **6.4 Work Environment**

Tech Circuits, Inc. will determine and manage the work environment needed to achieve conformity to product requirements. All work areas shall comply with safety, regulatory and environmental standards.

## 7.0 Product Realization

### 7.1 Planning of Product Realization

Tech Circuits, Inc. will plan and develop the processes needed for product realization. Planning of product realization will be consistent with the requirements of the other processes of the quality management system (Ref. 4.1). In planning the processes for realization of product Tech Circuits shall determine the following, as appropriate,

- a. Quality objectives and requirements for the product,
- b. IPC Standard for the circuit board industry as applicable
- c. the need to establish processes, documentation and provide resources specific to the product,
- d. required verification, validation, monitoring, inspection and test activities specific to the product and the criteria for product acceptance,
- e. records needed to provide evidence that the realization process and resulting product meet requirements (Ref. 4.2.4).
- f. The output of this planning will be in a form suitable for Tech Circuit's method of operations. (Work instructions through the Bar Code JTS System).

### 7.2 Customer-Related Processes

#### 7.2.1 Determination of Requirements Related to the Product

Tech Circuits, Inc. shall determine,

- a. requirements specified by the customer, including the requirements for delivery and post-delivery activities,
- b. requirements not stated by the customer but necessary for specified use or an intended use, where known,
- c. statutory and regulatory requirements related to the product, and,
- d. any additional requirements determined by Tech Circuits.

#### 7.2.2 Review of Requirements Related to the Product

Tech Circuits, Inc. will review the requirements related to the product. This review shall be conducted prior to Tech Circuits' commitment to supply a product to the customer (e.g. submission of a tender, acceptance of a contract or order, acceptance of changes to contracts or orders) and shall ensure that,

- a. product requirements are defined and
- b. contract or order requirements differing from those previously expressed (e.g. in a tender or quotation) are resolved,
- c. Tech Circuits has the ability to meet defined requirements.

Records of the results of the review and actions arising from the review will be maintained (Ref. 4.2.4).

Where the customer provides no documented statement of requirements, the customer requirements will be confirmed by Tech Circuits before acceptance.

Where product requirements are changed, the Tech Circuits shall ensure that relevant documentation is amended, and relevant personnel are made aware of the changed requirements.

### 7.2.3 Customer Communication

Tech Circuits shall identify and implement arrangements for communication with customers relating to,

- a. product information,
- b. enquiries, contracts or order handling, including amendments, and
- c. customer feedback, including customer complaints.

## 7.3 Design and Development

*Not Applicable*      *Exclusion per sec. 1.2 of ISO 9001:2000 Standard*

## 7.4 Purchasing

### 7.4.1 Purchasing Process

Tech Circuits shall ensure specific purchased product conforms to requirements. The type and extent of control applied to the supplier and the purchased product shall be dependent upon the effect of the purchased product on subsequent product realization or the final product.

Tech Circuits shall evaluate and select suppliers based on their ability to supply product in accordance with Tech Circuit's requirements. Criteria for selection, evaluation and re-evaluation shall be established. Records of the results of evaluations and any necessary actions arising from the evaluations will be maintained (Ref. 4.2.4).

### 7.4.2 Purchasing Information

Purchasing information will describe the product to be purchased, including where appropriate,

- a. requirements for approval of the product, procedures, processes and equipment,
- b. requirements for qualifications of personnel, and
- c. Quality Management System requirements.

Tech Circuits, Inc. shall ensure the adequacy of specified purchase prior to their communication to the supplier.

### 7.4.3 Verification of Purchased Product

Tech Circuits, Inc. shall establish and implement the inspection or other activities necessary for ensuring that purchased product meets specified purchased requirements.

Where Tech Circuits or its customer intends to perform verification activities at the supplier's premises, Tech Circuits shall state the intended verification arrangements and method of product release in the purchasing information.

## 7.5 Production and Service Provision

*Not Applicable Exclusion per sec. 1.2 of ISO 9001:2000 Standard*

### 7.5.1 Control of Production (and Service Provision)

Tech Circuits, Inc. shall plan and carry out production provision under controlled conditions. Controlled conditions shall include, as applicable,

- a. the availability of information that describes the characteristics of the product,
- b. the availability of work instructions, as necessary,
- c. the use of suitable equipment,
- d. the availability and use of measuring and monitoring devices
- e. the implementation of monitoring and measuring devices, and
- f. the implementation of release, delivery and applicable post-delivery activities.

### 7.5.2 Validation of Processes for Production (and Service) Provision

Tech Circuits will validate any processes for production provision where the resulting output cannot be verified by subsequent monitoring or measurement. This includes any processes where deficiencies become apparent only after the product is in use. Validation will demonstrate the ability of these processes to achieve planned results.

Tech Circuits will establish arrangements for those processes including, as applicable;

- a. defined criteria for review and approval of these processes,
- b. approval of equipment and qualification of personnel,
- c. use of specific methods and procedures,
- d. requirements for records (Ref. 4.2.4) and
- e. revalidation.

### 7.5.3 Identification and Traceability

- a. Tech Circuits shall identify all product by suitable means throughout product realization.
- b. Tech Circuits shall identify the product status with respect to measurement and monitoring requirements.
- c. Tech Circuits shall control and record the unique identification of the product, where traceability is a requirement (Ref. 4.2.4)

### 7.5.4 Customer Property

Tech Circuits shall exercise care with customer property while it is under its control or it is being used. Tech Circuits shall identify, verify, protect, and safeguard customer property provided for use or incorporation into the product.

If any customer property is lost, damaged or otherwise found to be unsuitable for use shall be reported to the customer and records maintained (Ref. 4.2.4).

*Note: Customer property may include intellectual property (e.g. Information provided in confidence, specifications, drawings, etc.).*

### 7.5.5 Preservation of Product

Tech Circuits, Inc. shall preserve conformity of product during internal processing and delivery to the intended destination. This preservation shall include identification, handling, packaging, storage and protection. Preservation will also apply to the constituent parts of a product.

## 7.6 Control of Monitoring and Measuring Devices

Tech Circuits shall determine the monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide evidence of conformity of product to determined requirements (Ref. 7.2.1).

Tech Circuits will establish processes to ensure that monitoring and measurement can be carried out and are carried out in a manner that is consistent with monitoring and measurement requirements.

Where necessary to ensure valid results, measuring equipment shall,

- a. be calibrated or verified at specific intervals, or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or validation shall be recorded;
- b. be adjusted or re-adjusted as necessary;
- c. be identified to enable the calibration status to be determined;
- d. be safeguarded from adjustments that would invalidate the measurement result;
- e. be protected from damage and deterioration during handling, maintenance and storage.

In addition, Tech Circuits will assess and record the validity of the previous measuring results when the equipment found not to conform to requirements. Tech Circuits will take appropriate action on the equipment and any product affected. Records of the results of calibration and validation will be maintained (Ref. 4.2.4). Recall of product will be at the request of the customer and/or Tech Circuits after notification of any significant measurement non-conformity. Field investigations may substitute recall with customer concession.

When used in the monitoring and measurement of specified requirements, the ability of computer software to satisfy the intended application will be confirmed. This will be undertaken prior to initial use and reconfirmed as necessary. Reference ISO 10012-1 and ISO 10012-2

## 8.0 Measurement, Analysis and Improvement

### 8.1 General

Tech Circuits, Inc. shall plan and implement the monitoring, measurement, analysis and improvement processes needed,

- a. to demonstrate conformity of the product,
- b. to ensure conformity of the quality management system, and
- c. to continually improve the effectiveness of the quality management system.

This shall include the determination of applicable methods, including statistical techniques and the extent of their use.

### 8.2 Monitoring and Measurement

#### 8.2.1 Customer Satisfaction

As one of the measurements of performance of the quality management system, Tech Circuits shall monitor information relating to customer perception as to whether Tech Circuits has met customer requirements. The methods for obtaining and using this information shall be in the form of an annual Internet based survey, On-Time delivery data and RMA reports all of which shall be reviewed by Top Management on a monthly basis (Rev. 5.1 and 5.2).

#### 8.2.2 Internal Audit

Tech Circuits, Inc. shall conduct internal audits at planned intervals to determine whether the quality management system

- a. conforms to the planned arrangements (Ref. 7.1),
- b. conforms to the requirements of this international standard and to the quality management system requirements established by Tech Circuits and,
- c. is effectively implemented and maintained.

Tech Circuits shall plan the audit program, taking into consideration the status and importance of the processes and areas to be audited as well as the results of previous audits. The audit criteria, scope, frequency and methods shall be defined. Selection of auditors and conduct of auditors shall ensure objectivity and impartiality of the audit process. Auditors will not audit their own work.

The responsibilities and requirements for planning and conducting audits, and reporting results and maintaining records (Ref. 4.2.4) will be defined in a documented procedure.

Management responsible for the area being audited will ensure that actions are taken without undue delay to eliminate detected non-conformances and their causes. Follow-up activities will include the verification of the actions taken and the reporting of verification results (Ref. 8.5.2). Follow-up activities shall also include the verification of the implementation of Corrective Actions, and the reporting of verification results. Reference ISO 10011-1, ISO 10011-2 and ISO 10011-3.

#### 8.2.3 Monitoring and Measurement of Processes

Tech Circuits shall apply suitable methods for monitoring and, where applicable, measurement of the quality management system processes. These methods shall demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, correction and corrective action will be taken as appropriate to ensure conformity of the product.

#### **8.2.4 Monitoring and Measurement of Product**

Tech Circuits shall measure and monitor the characteristics of the product to verify that product requirements have been met. This shall be carried out at appropriate stages of the product realization process in accordance with planned arrangements (Ref. 7.1).

Evidence of conformity with the acceptance criteria shall be maintained. Records shall indicate the person(s) authorizing release of product (Ref. 4.2.4).

Product release and service delivery shall not proceed until all the planned arrangements (Ref. 7.1) have been satisfactorily completed, unless otherwise approved by a relevant authority, and where agreed to by the customer.

#### **8.3 Control of Non-conforming Product**

Tech Circuits shall ensure that product which does not conform to product requirements is identified and controlled to prevent unintended use or delivery. The controls and related responsibilities and authorities for dealing with non-conforming product will be defined in a documented procedure.

Tech Circuits will deal with non-conforming product by one or more of the following ways,

- a. by taking action to eliminate the detected nonconformity,
- b. by authorizing its use, release or acceptance under concession by a relevant authority and where applicable, by the customer,
- c. by taking action to preclude its original intended use or application.

Records of the nature of non-conformities and any subsequent actions taken, including concessions obtained, shall be maintained (Ref.4.2.4).

When non-conforming product is corrected it will be subject to re-verification to demonstrate conformity to the requirements.

When non-conforming product is detected after delivery or use has started, Tech Circuits will take action appropriate to the effects, or potential effects of the nonconformity.

#### **8.4 Analysis of Data**

Tech Circuits will determine, collect and analyze appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the quality management system can be made. This includes data generated as a result of monitoring and measurement and for other relevant sources.

The analysis of data will be provide information relating to,

- a. customer satisfaction (Ref. 8.2.1),
- b. conformity to product requirements(Ref. 7.2.1),
- c. characteristics and trends of processes and products including opportunities for preventive action, and
- d. suppliers.

## **8.5 Improvement**

### **8.5.1 Continual Improvement**

Tech Circuits will continually improve the effectiveness of the quality management system through the use of the Quality Policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

### **8.5.2 Corrective Action**

Tech Circuits, Inc. shall take corrective action to eliminate the cause of non-conformity's in order to prevent recurrence. Corrective action shall be appropriate to the effects of the nonconformities encountered.

A documented procedure will be established to define requirements for,

- a. reviewing non-conformities (including customer complaints),
- b. determining the causes of nonconformities,
- c. evaluating the need for actions to ensure that nonconformities do not recur,
- d. determining and implementing action needed,
- e. records of the results of action taken (Ref 4.2.4), and
- f. reviewing corrective action taken.

### **8.5.3 Preventive Action**

Tech Circuits, Inc. shall determine action to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions shall be appropriate to the effects of the potential problems.

A documented procedure will be established to define requirements for,

- a. determining potential nonconformities and their causes,
- b. evaluating the need for action to prevent occurrence of non-conformities
- c. determining and implementing action needed,
- d. records of results of action taken (Ref. 4.2.4), and
- e. reviewing preventive action taken.