QUALITY MANAGEMENT MANUAL

DOCUMENT APPROVAL:

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DOCUMENT CONTROL

Any changes in the methods or procedures outlined in this document must be approved by Quality Management. The Change Control History includes a brief description of the changes made and compatibility with earlier releases. The current revision of this document is controlled by Document Control and maintained on ADTRAN's internal network.

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1.0 REFERENCE DOCUMENTS

ANSI/ISO/ASQ Q9001-2008
Quality management systems requirements

TL9000 4.0
Quality Management Systems Requirements Handbook

TL9000 4.0
Quality Management Systems Measurements Handbook

GR-209-CORE
Generic Requirements for Product Change Notices (PCNS)

GR-282-CORE
Software Reliability and Quality Acceptance Criteria (SRQAC)

2.0 STATEMENT OF PURPOSE

This manual provides an overview of the Quality Management System (QMS) by which ADTRAN operates. The nature of ADTRAN's Quality Management System will result in changes to this overview since Continuous Improvement is an integral part of the system. In all cases where change occurs, the result is expected to provide improved customer satisfaction. Adjustments will be made periodically; therefore, this document will be reviewed accordingly and updated to reflect the current QMS. The QMS is documented to the extent that the documentation is useful to describe or maintain the system. Documentation without purpose or necessity is not required.

ADTRAN's QMS is based on Total Quality Management concepts, which provide an environment of employee involvement with management support. Total Quality Management includes modern management techniques, statistical tools and team building. These are evolving characteristics and require continued improvement. The ultimate objective of Total Quality Management and ADTRAN's QMS is customer satisfaction.

ADTRAN's QMS is designed to meet and exceed all of the hardware and software requirements of TL9000 and ISO9001

The system described in this manual is applicable to all functions within the company that may have an impact on the quality of our products or services, either directly or indirectly. This system is subject to approval by our customers and by accredited organizations for certification under the ISO standards.

Elements of the Quality Management System described in this manual, when applicable, reference an ADTRAN Work Instruction that addresses that element.

3.0 COMPANY PROFILE

ADTRAN began operations in January 1986, with an experienced nucleus of managerial, engineering, sales, and marketing personnel. This initial management and engineering team brought to the new company many years of extensive experience and success in the telecommunications industry.

ADTRAN was created with the strategy to design, manufacture, and market a broad range of Advanced TRANsmission products for the Telco industry. The first group of products was oriented toward the digital transmission area in DDS and related generic digital services. ADTRAN is now a leading global provider of networking and communications equipment with an innovative portfolio of more than 1,600 solutions for use in the last mile of today's telecommunications networks. Widely deployed by Carriers, Distributed Enterprises and Small- and Medium-sized Businesses (SMBs), ADTRAN solutions enable voice, data, video, and Internet communications across copper, fiber, and wireless network infrastructures. ADTRAN solutions are currently in use by every major U.S. service provider and many global ones, as well as by thousands of public, private and governmental organizations worldwide.

ADTRAN became an ISO9001 certified supplier in 1993, TL9000 certified in 2000 and ISO14001 in 2004. Current certifications are maintained.

4.0 QUALITY MANAGEMENT SYSTEM

General

ADTRAN has established a documented Quality Management System (QMS) to ensure control and continuous improvement of the QMS processes. The QMS is set forth in this manual and is detailed in the reference procedures. Referenced procedures also define the Product Life Cycle Model for all ADTRAN products, customer communication, documentation requirements, internal auditing, manufacturing procedures, supplier evaluation and control, performance measurements and implementing corrective and preventive action. The ADTRAN Quality Plan provides an overview of the system.

The QMS within ADTRAN applies to interactions between, Engineering, Operations, Purchasing, Quality, Sales/Marketing (includes Technical Support) and Training. The interaction of processes required for the QMS are identified in Attachment 3.

The management of each functional group in the QMS is responsible for ensuring that quality consideration is an integral part of all processes. Assuring compliance to the QMS, implementing actions necessary to achieve planned results and continual improvement is a management responsibility.

The Purchasing organization is responsible for identifying and controlling all outsourced processes. Purchasing ensures that these processes are identified within the QMS.

Documentation Requirements (GEN05.1)

General

ADTRAN's QMS documentation includes:

a) ADTRAN's Quality Policy and Quality Objectives,
b) The Quality Manual,
c) General Work Instructions, includes procedures required by TL9000,
d) Departmental Work Instructions, includes procedures required by TL9000,
e) Quality Records as required by ADTRAN and TL9000,
f) Product and Service Documentation; and
g) The Quality Plan

Quality Manual

This Quality Manual includes; the scope of the ADTRAN QMS, reference to documented procedures, and a description of the interaction between the processes of the QMS. Corporate Quality Management maintains the quality manual and ensures, as a minimum, an annual review. Acceptance by Top Management is recorded as the signature of the Vice President of Quality.

Control of Documents

The documentation system requires operating policies and procedures to be documented, approved, periodically reviewed and re-approved. Documentation changes are approved by the same organizations that approved the original release. A description of the revision is included with each occurrence. (GEN05.1)

An Engineering Change Order (ECO) procedure defines the means of making changes to Engineering documentation, as well as obtaining approvals. (GEN05.4)

The Document Control organization is responsible for distribution of new and changed documents.

Customer supplied documents and data are identified as such and controlled in the same manner as ADTRAN documentation. (GEN05.1 and GEN05.12)

Each manager is responsible for ensuring that the most current revision of applicable documentation is available where used.

Archiving of obsolete documents is controlled by each department and is audited by the Quality Auditor. In some appropriate cases, obsoleted documents are identified and maintained in a history file. Factory service is an example of a need to maintain historical information.

Control of Records
The Vice President of Quality is responsible for identifying the information necessary to measure the effectiveness of the QMS. These records and their retention are identified in ADTRAN work instructions. This information is collected, analyzed and acted upon to assure continuous improvement. The data is maintained so that retrieval and review by management or customer representatives may be easily accomplished. All data associated with product quality is kept in secure areas to avoid loss or damage. (GEN05.1)

5.0 MANAGEMENT RESPONSIBILITY

Management Commitment
ADTRAN's QMS Steering Committee, comprised of top management, is committed to developing, implementing and overseeing continuous improvement of the QMS. Corporate Quality documents committee-meeting minutes, which are maintained on ADTRAN's internal network.

The Steering Committee is responsible for communicating to the organization the importance of meeting customer as well as legal and regulatory requirements, establishing and reviewing the quality policy, ensuring quality objectives are established, conducting management reviews and ensuring the availability of resources. (GEN01.1)

Management exhibits its commitment to, and active involvement in, the administration of the QMS by providing employees with periodic updates on the systems performance.

Customer Focus
Top management ensures that customer requirements are communicated and provided as agreed upon. Sales/Marketing and Engineering have the primary responsibilities for determining and defining customer needs, expectations, and product requirements.

ADTRAN's management is committed to establishing and maintaining effective relationships with its customers and continuously improving customer satisfaction.

Customer information is sought to secure an understanding of customer expectations and to track resolutions of issues stemming from this communication.

Documented procedures have been established to define methods of communicating with select customers to share expectations, solicit, and consider customer input, a method to share joint expectations with our customers, and to periodically review the status of expectations and the resolution of issues. (GEN21.2)

Quality Policy
The Quality Policy Statement is defined by ADTRAN top management and re-examined at least once a year when this document is reviewed and revised. Acceptance by the Executive staff is recorded as the signature of the Vice President of Quality. See Attachment 1, Quality Policy Statement.

The Vice President of Quality ensures overall quality of ADTRAN products and services by communicating the Quality Policy to all ADTRAN associates. Top management is authorized to ensure the Quality Policy is understood, implemented, and maintained at all levels in the organization by setting direction, methodology, and quality goals, which are aimed at total customer satisfaction and continuous improvement.

Planning
Top management establishes at relevant functions and levels of the organization, quality objectives that are measurable and consistent with the quality policy. The objectives include targets for the TL9000 measurements and those that are required to meet product requirements.

ADTRAN's QMS Steering Committee develops a generic Quality Plan involving all the processes determined necessary to ensure conformance of products and services. In addition, top management develops business plans for

both CND and END divisions. Contributions are solicited from interfacing organizations, as well as customers and subcontractors. These plans include short and long-term plans for improving quality and customer satisfaction, cycle time, customer service, training, cost, delivery commitments, product reliability and targets for TL9000 measurements as defined in the current release of TL9000 QMS measurements handbook. The plans are periodically reviewed to ensure that the methods and processes involved remain current to the Quality Policy and Objectives, including the systems methods for disaster recovery. These plans set quality goals to assure continuous improvement of ADTRAN processes, products and services. (GEN01.1, GEN01.2)

Responsibility, Authority, and Communication

An organization chart is attached as Attachment 2. The Corporate Quality function reports to ADTRAN's Chief Executive Officer (CEO). The Corporate Quality organization consists of Quality Assurance, Quality Management, Customer Quality Engineering, Component Engineering, Reliability Engineering, Product Qualification, Product Service and Document Control.

The responsibility for quality belongs to each individual within the company. Management provides all personnel with the training and resources needed to deliver "Quality Performance". All personnel at ADTRAN have the authority to stop production if the product quality is suspect. Corporate Quality is responsible for assuring systems and processes are established that will produce products or services that satisfy or exceed customer expectations. Data collection and analysis, measurements, audits, corrective actions, and preventative actions are some of the methods used to confirm that ADTRAN processes result in quality outputs.

The Vice President of Quality is the management representative, and has the authority and responsibility for ensuring that the QMS is implemented and maintained.

The effectiveness of the QMS is communicated to ADTRAN personnel through, postings, electronic reporting, Town Hall meetings and departmental meetings. Each manager is responsible for ensuring that responsibilities are defined and communicated to all associates.

Management Review

The QMS at ADTRAN is in review on a continuous basis. However, specific audits by qualified personnel occur on a scheduled basis so that each process of ADTRAN's QMS is audited to ensure continued system effectiveness and improvement. With recommendations, the result of this audit is published to upper management.

On an annual basis, as a minimum, Corporate Quality shall present data from the QMS to top management for their review and support of improvements and resource needs. This data includes the review and establishment of the company quality policy, quality objectives, audit results, customer feedback, process performance, product conformity, status of preventive and corrective actions, follow-up of actions from previous management reviews, changes that could affect the QMS, and recommendations for improvement. Minutes of these reviews are generated which may include any decisions or actions relative to the QMS effectiveness, improvement of product quality, customer satisfaction or resource needs. These records are maintained by Corporate Quality for a minimum of one year. (GEN01.1)

6.0 RESOURCE MANAGEMENT

Provision of Resources

ADTRAN management determines and provides the resources needed to implement and maintain the QMS, and continually improve its effectiveness, and to enhance customer satisfaction by meeting customer requirements.

Human Resources

To ensure the highest quality of products and services at ADTRAN, training programs are developed to match skills with job functions. All new associates receive orientation, at which time they are made aware of ADTRAN policies, procedures, and expectations regarding quality and customer satisfaction. Additionally ADTRAN training programs provide training in soldering, component recognition, ESD, Problem Solving, and Hazardous Materials. Advanced Quality Improvement training and product training are offered as well. A proficiency test is administered in some classes prior to job assignments. Records of all classes and training hours completed are maintained electronically. The supervisor is responsible for identifying specific regulatory, job-related education and training requirements. (GEN18.1)

Compliance engineering personnel are trained and supervised by experienced Compliance Department personnel while performing tests until appropriately qualified. (CEN01)

ADTRAN has an Employee Education Assistance Program to encourage and support further education at all levels. Training and Qualification opportunities are discussed during performance reviews. Employees may also recommend training needs relative to their immediate assignments.

Associates are selected on the basis of education, training, and/or experience. All identified training needs or requirements are defined either in an employee's performance review or job training packet.

Infrastructure
ADTRAN management is responsible for ensuring that buildings, workspaces, associated utilities, process equipment (both hardware and software), and supporting services (such as transport or communication) are sufficient to support product conformity. Security is provided in critical areas; restoration plans have been developed and are periodically assessed. (HRWI151, IT192, IT198, CBP01, IT Recovery Plan)

Work Environment
ADTRAN management determines and manages the work environment to ensure product conformity. Areas used for handling, storage, and packaging of products shall be clean, safe, and organized.

7.0 PRODUCT REALIZATION

Planning of Product Realization
Product Management along with Design Engineering plan and develop the processes needed for product realization. Requirements considered are the quality objectives for the product, processes, documents, resources specific to the product, estimation of project factors, required verification, validation, monitoring, inspection, test activities, and criteria for product acceptance. Product schedules are then developed and maintained by the Engineering Planners to record and track product development. (GEN04.4, EN03)

Life Cycle Model (Attachment 4)
ADTRAN maintains an integrated set of guidelines to cover the entire product life cycle from conception through end of life. ADTRAN Work Instructions have been developed to control the planning of product sun setting. (GEN02.3, GEN04.4, GEN05.5, GEN09.3, GEN09.7, GEN09.9, SL13, TS19, TS19.1)

New Product Introduction
New Product Engineering establishes Operations Production Introduction Teams (OPIT) to aid in the introduction of new products and services per ADTRAN work instructions. (GEN9.3, GEN9.7, GEN09.9, AM4.9-34)

Disaster Recovery
All documentation, quality records and other necessary documents are stored on the internal network servers. ADTRAN maintains a documented Information Technology (IT) Recovery Plan. This plan is designed to provide immediate response and subsequent recovery from any unplanned computing services interruption, such as loss of utility services, building evacuation or catastrophic event such as a major fire. (CBP01, IT Recovery Plan)

End of Life Planning
A documented procedure is maintained for the discontinuance, sun-setting of existing products. This procedure ensures that manufacturing and service are notified prior to sun-setting and that actions are implemented to ensure support of the product through warranty or contractual agreement. (GEN04.9, GEN05.12, SL13)

Configuration Management
ADTRAN controls and documents the configuration of all its products utilizing a defined process. Product development and changes are recorded and controlled to assure defined requirements are completed prior to further processing. (GEN4.1, GEN04.5, GEN05.4, GEN05.5, GEN05.12, EN05, EN06)

Customer Related Processes
The Sales and Marketing department along with Engineering determine and review the customer and product requirements. All affected departments within ADTRAN review each non-standard contract and amendments to

contracts to assure the capability and desire to meet the requirements. Any exceptions are communicated through Sales and Marketing, and negotiated to resolve or obtain the most favorable terms prior to contract execution; however, the CEO or appropriate Division General Manager is authorized to finalize contract negotiations with unresolved issues if an impasse occurs that could jeopardize the pending business relationship. Records of each contract review are maintained by the appropriate organization. A copy of the executed contract is distributed to the cognizant departments for reference in performing the contract. (GEN03.1, SL15)

The Sales and Marketing department communicates with our customers on product information, contracts, order handling, amendments, customer feedback, including customer complaints. Sales and Marketing maintains a documented customer notification process to ensure that customers are notified of any product problems or changes that may affect them. The ADTRAN/Customer Purchase Contract and/or the latest issued Telcordia technical publication GR-209-CORE are used as a guide for determining whether a product change warrants a customer notification. (SL02)

Product repairs are coordinated by the Customer and Product Service group (CaPS). The warranty period and any special handling requirements are outlined in the repair warranty agreement or customer contract. (GEN02.3)

ADTRAN maintains a dedicated Technical Service function whose responsibilities include: providing answers to technical and application questions, assisting in resolution of problems, and Marketing for product training. Product training is available for ADTRAN personnel and customers.

Documented procedures have been developed and implemented defining processes for notifying the customer of reported problems, resolution of customer reported problems and providing the customer with feedback. Documented procedures are in place for assigning severity level to customer reported problems to ensure timely resolution. (GEN14.1, SL12, TS19.5)

ADTRAN has a documented recall process to ensure the identification and recalling of products that are unfit to remain in service. (SL12)

Design and Development
Planning
As an integral part of the QMS, Engineering assures all product designs and specifications are reviewed, tested, verified and validated, when appropriate, prior to production. This is accomplished by guidance documents and control documents. (EN02, EN07, EN10, EN11, and PQ01)

Upon request, ADTRAN communicates, jointly agreed upon, design and development measurements with the customer.

The organizational and technical interfaces between groups, in which design input is received, are defined in procedures outlining design engineering responsibilities. The design input information is captured by the designated responsible engineer and regularly reviewed during design review meetings. (GEN04.4 and GEN05.5)

The Engineering Manager plans projects, schedules and assigns activities. The Project Engineer interfaces with groups to assure requirements are transmitted so that the project progresses on schedule. Typical interfaces are with: Sales and Product Management for specification and customer requirements, Component Engineering for new part qualification, Purchasing and Component Engineering for Supplier Qualification, Technical Publications for document preparation, Material Control for planning material, Manufacturing Engineering for testability and manufacturability, Test Engineering for Test Plans, and Technical Support Services for end of life planning. (GEN04.4)

Product schedules are maintained by the Engineering Planners and available on the ADTRAN internal network. Engineering Planners revise product schedules as the design and development progresses. (GEN04.4)

Requirements Traceability
The responsible engineer ensures that the design meets all specifications and that all specifications are verified by verification testing. (EN10)

Documented approval is required for each phase of the design, ensuring all deliverables are complete before progressing to the next phase. (GEN05.5)

Test Planning
Engineering develops documented test plans for all products. The results of these tests are maintained as quality records by the organization performing the test. (EN07, EN10, PQ01, TE01, TE09, SL15,)

Integration Planning
The responsible engineer develops a plan for integrating software components into the product. The plan includes methods and documented procedures to insure that the software component function as designed. (EN10)

Migration Planning
Engineering, Product Management, and Marketing are responsible for planning the system or software migration from an old to a new environment. These requirements are documented and analyzed. Then a migration plan is developed and executed. (SL15, EN02)

Design and Development Process Quality Measurement
Appropriate design and development measurements are reported as suitable to the project. (Gen 4.4 and EN02)

Regression Test Planning
When performed, regression tests, features and functions are identified on the test plans. (PQ01)

Inputs
There are numerous sources that provide input for the design specifications, features, and decisions. The range of sources include original new ideas, input from our OEM activities, continual improvement and evolution of existing products, results from customer field trials, customer input from Sales, Marketing, Product Management, feedback from Technical Services, Outsource Manufacturing, competitive evaluation, benchmarking, manufacturability, and quality reviews. Design reviews are used to determine compliance with design and program objectives and to provide independent assessment of design methology. (EN02,EN11, and SL15)

The responsible engineer documents design and development requirements in product specifications and other product related documents. These requirements include, but are not limited to functional and performance requirements, software requirements, applicable statutory and regulatory, information derived from similar designs, and other requirements essential for design and development. (EN11)

Outputs
The results of an engineering product design are evidenced in successive releases, i.e., Engineering Prototype, Production Planning, Limited Production and Full Production. A comprehensive checklist of required items to accomplish each release includes attention to Bill of Material entries, Piece Part Drawings, PCB Artwork, Test Set and Documentation, Design Verification Testing, Acceptance Test Procedure etc. The entire set of ADTRAN policies and procedures is intended to influence the quality of designs, reduce the length and cost of the development cycle, and to meet the requirements of our customers. (GEN04.4, GEN05.5, EN02, EN10, and EN11)

Software outputs include specifications, source code, executable files, and user documentation.

Design Review
Processes for conducting design reviews have been established to ensure that, at appropriate stages of design, it is reviewed to assure that planned activities have been conducted. Participants involved are those required for the specific stage of design and determined by the responsible engineer. Engineering holds design reviews and maintains records of these reviews. (GEN09.3, EN02, PQ01*)*

Design reviews and design verification tests are conducted by Design Engineering during the development of a product. The culmination of the design phase results in a formal documentation release meeting to facilitate first production. (EN10 and GEN05.5)

Verification
The responsible engineer develops a Design Verification Test (DVT) to ensure that the design meets the intended requirements. The results of these tests are recorded and maintained by Document Control. (EN10)

During product qualification testing, user documentation is verified; stress testing, system testing and abnormal conditions tests are performed. (PQ01)

Validation
In addition to design verification tests, Product Qualification/Validation is performed in accordance with planned arrangements by the Product Qualification group, which tests the product in a user intended environment. The Product Qualification department maintains records of the results of these tests. (PQ01)

Release Management
Product Management and Marketing review the product schedules and status. This information is communicated to the customer in advance. This information aids the customer in planning for upcoming product hardware and software releases. (EN06, SL02, GEN21.2)

Changes
Any changes to released documentation require approval of the Responsible Engineer, Responsible Manager, Configuration Control, and the Quality Assurance department, as a minimum. Design Engineering ensures that fixes to problems are incorporated into future designs. Approval by other departments is on an as-needed basis when affected by the Engineering Change Order (ECO). Records of the results and review of changes are maintained by the Document Control department. (GEN05.4)

Documented procedures are established to define change processes and for informing customers of changes that affect contractual commitments. (EN06, GEN05.4 and SL02)

Component Engineering evaluates, per procedures, all component changes and substitutions to ensure quality product performance. (GEN0401, PG13)

Purchasing
The quality of finished products and ultimately the customer's satisfaction depends on procured materials and subassemblies. Effective supplier selection, procurement, measurement, disposition of discrepant materials, supplier rating reports, and joint ADTRAN/supplier participation are essential to providing high quality products. Documented Purchasing procedures are in place to facilitate these activities. (GEN06.1, GEN06.2, GEN06.8, GEN06.11, PG13)

ADTRAN suppliers are evaluated, per documented procedures, by Purchasing, Component Engineering, and Supplier Quality. Records of these reviews are maintained. (GEN06.11)

Purchase Orders (Pos) are placed using ADTRAN assigned released part numbers that are unique to the specific part. Purchase Orders include the applicable Quality System to be applied and all contract requirements. The supplier has the responsibility for ensuring that purchased products meet ADTRAN specifications for quality. (PG13)

All purchased material is confirmed to meet required specifications. This confirmation is by use of sampling plans either at ADTRAN Component Inspection, Quality Assurance or by ADTRAN Source Inspection. A Dock-To-Stock program is in place expediting material from suppliers that consistently meets ADTRAN requirements. Purchasing documents define verification arrangements and the method of product release when product acceptance is determined to be at the supplier's facility.

Production and Service Provision
Control of production and service provision
ADTRAN controls the process with documented requirements and audits of the processes. Each work order and each purchase order for subcontractors specify process requirements. A Bill of Material (BOM) is generated for each work order. On the Bill of Material, special assembly instructions relating to specific components are written. One item on the Bill of Material is a drawing specifying the process flow. These drawings are released and controlled by

Engineering Change Order (ECO). Any deviation to this process requires an approved Process Deviation Notice. (AM4-9-1, EN05, GEN09.1, GEN09.2, GEN09.8)

Manufacturing processes are monitored utilizing suitable process parameters and product characteristics. Operators and inspectors record the results of inspections and tests for analysis. (AM4.20-1, AM4.9-1, AM4.10-2, QA10.15)

Support Program
ADTRAN Technical Services has complete cooperation and coordination from and with the Engineering Design department. Through the ADTRAN SPARTA system, customer issues are communicated with Design Engineering and design changes developed from problem resolutions. (GEN14.1)

Service Resources
Complete resources for problem solving are available to the Technical Services function. Resources include a simulation lab, state of the art test and measurement equipment, and training on new/current products, technologies, and applications.

During delivery and installation, ADTRAN strives to minimize interference with its customer's normal operation and service.

Emergency Service
ADTRAN's Technical Services is available through a toll-free 800 number 24 hours every day, including holidays. When a problem cannot be resolved by telephone, engineers are dispatched to the problem site within the timeframe requested by the customer. Overnight emergency loaner units can be provided as part of ADTRAN's service.

Installation Plan
ADTRAN maintains an installation process. When required by contract or ADTRAN management, installation and maintenance support shall be provided by trained ADTRAN or third party personnel in accordance with procedures provided by ADTRAN. ADTRAN maintains documented results associated with the installation. (TS19)

Patching Procedures and Patch Documentation
Documented procedures are maintained for guidance in determining when patching is required, applying and verifying the patch. When patching is required, the customer is provided with a statement of impact. (GEN4.4)

Replication and Virus Protection
ADTRAN maintains a work instruction for replication of software products. Following these procedures aids in virus detection and removal from the software deliverable. (EN06, EN11)

Validation of Processes
Manufacturing processes are monitored utilizing suitable process parameters and product characteristics. Operators and inspectors record the results of inspections and tests for analysis.

Criteria for operator qualification(s) have been established and documented, along with an employee skill list that is utilized in determining work assignments.

Each time a significant change to a production process is made, Process Engineering ensures a critical examination of the first unit(s) is performed.

Identification and Traceability
ADTRAN controls and documents the configuration of all its products utilizing a defined process. Product development and changes are recorded and controlled to assure defined requirements are completed prior to further processing. (GEN08.1)

Each assembly, subassembly, and component is assigned a unique number. Engineering creates Bills of Materials and/or drawings for all assemblies and subassemblies. Printed circuit boards are identified with ADTRAN part numbers. In addition, serial numbers are assigned to each unit in a work order. Serial number labels are attached

during the manufacturing process. Traceability is then maintained within ADTRAN's Management Information System by part number for data collection purposes, trace design changes, and for product recalls.

Customer Property
Each customer-supplied product is assigned a unique ADTRAN part number. Definition of the supplied product is also required so that Component Inspection can confirm the product meets specified requirements. The unique ADTRAN part number allows for separation in storage and maintenance, if required. Procedures are in place to ensure that Sales and Marketing notify the customers of product issues. (GEN07.1)

Preservation of Product
Material handling includes methods and equipment required to move or store purchased, in-process, manufactured, or completed material. Adequate handling methods and procedures are proposed and used to prevent damage, loss, deterioration or degradation of the product. These procedures may include the use of special boxes, containers, and Electrostatic Discharge (ESD) controls. Manufacturing Engineering is responsible for preparing and implementing handling procedures with Quality Engineering approval. (GEN15.1)

ADTRAN documentation defines the steps to be taken for proper handling of ESD sensitive material and assemblies, both within ADTRAN and when transported to and from our subcontractors. (GEN09.5)

Quality Assurance performs Out-of-Box audits, per documented procedure(s), to confirm product, labeling and packaging quality. (QA10.5)

The Materials manager has the responsibility for technical direction of material storage to minimize the possibility of damage, corrosion, deterioration, or contamination.

Handling and storage practices are defined in ADTRAN's Stockroom procedure(s). A first-In, First-out (FIFO) inventory control system is used. Items with definitive shelf life are stipulated and controlled. (GEN09.5, GEN15.1)

Control of Monitoring and Measuring Equipment
ADTRAN uses an outside service to perform equipment calibration a minimum of two times a year. Each service results in calibration of a portion of the equipment requiring calibration. Primarily, each piece of equipment will be calibrated once each year. The frequency may be changed for specific equipment based on history.

The Corporate Quality department maintains a listing of all equipment requiring calibration. The listing is reviewed by Quality on a regular basis. In addition, process audits require confirmation of calibration status of equipment. All inspection, measuring, and test equipment that do not require calibration are identified as such. (GEN11.1, GEN11.6)

8.0 MEASUREMENT, ANALYSIS AND IMPROVEMENT

General
Statistical techniques and team tools are used throughout ADTRAN processes to assure process controls and continuous improvement, as well as verification of results. This data is reviewed regularly to determine appropriate changes required to cause consistent improvement.

Metrics are collected and submitted to the Quest Forum by the Customer Quality Engineer, or designated individual, per the TL9000 Quality Management System Measurements handbook (current release). (GEN21.3)

Monitoring and Measurement
Methods have been established to collect data from customers concerning their satisfaction with ADTRAN products and services. This data is reviewed continuously by Sales and Marketing, and during Management Reviews of the QMS.

ADTRAN collects data on delivery and customer response times. This data is reviewed weekly and/or monthly by the responsible management and during management review.

Internal Audit
Quality Audit performs regularly scheduled internal audits to assure compliance with established processes. These audits are conducted by trained personnel who coordinate the audits with area managers. The results of the audits are documented; corrective actions are documented and evaluated through follow-up audits. These audit reports are forwarded to management for review. (GEN17.1)

Processes
Corporate Quality Plans are developed to identify suitable methods of monitoring and measuring QMS processes. Corrective action is taken when unfavorable conditions exist. (GEN01.1)

Operations Quality consistently monitors the production process, at appropriate points, through statistical process control methods. Corrective actions and preventive actions are implemented when necessary. (AM20-1)

Product
ADTRAN has implemented inspection and test points to ensure product requirements are met. Inspectors and Test Operators work from detailed work instructions. Records are maintained on all inspection and testing activities.

ADTRAN performs functional and final testing to engineering released Acceptance Test Procedures (ATP). The continuous flow lines at ADTRAN utilize the concepts of all personnel as inspectors to visually detect workmanship defects prior to packaging.

Inspection and test records are recorded by the performing function and maintained electronically on the ADTRAN internal network. Records include, but are not limited to: product identification, quantity of product inspected, inspection procedures followed, person performing the test and inspection, date of inspection and/or test, number, type, and severity of defects found.

Product requalification / retesting of released product is accomplished by Quality Assurance / Operations on a periodic basis. “Retesting” is conducted in a more robust environment than the original acceptance test. (GEN10.3 and RE01)

All ADTRAN returned products are reworked, or repaired, and retested in accordance with the ADTRAN Engineering Acceptance Test Procedures.

Software tests are conducted according to documented procedures and test plans. (EN10, PQ01)

Control of Non-conforming Product
Non-conforming material is reviewed and dispositioned by the Material Review Board (MRB). The chairperson of this board is the Quality representative. Operations Engineering, Manufacturing Services, and Purchasing are also board members. Other support personnel may be called upon as required. MRB dispositions are use-as-Is, Scrap, Repair, or Return to Vendor. Standard rework that meets specification requires no disposition. All rework or repair is subjected to inspection prior to continuing processing. Records of discrepancies are maintained on the ADTRAN internal network and reviewed for trends as input for corrective and preventive action. (GEN13.1,GEN13.2 GEN13.3 and AM4.13-1)

Analysis of Data
Data and information recorded in quality records are compiled and analyzed periodically to determine trends in the performance and effectiveness of the quality system and to identify opportunities for improvement Some data utilized in this process comes from, but is not limited to, the following:

Customer Satisfaction Surveys	Field Performance Data	Internal Audit Results
Inspection Records	Corrective and Preventive Action	Nonconforming Material
Manufacturing and Test Records	First Pass Yield and Delivery	Supplier Performance

Corporate Quality is responsible for coordinating these activities, and for reporting conclusions and trends to top management. This is usually done within the framework of management reports and reviews of the quality system.

Improvement

Continual Improvement

ADTRAN's Quality Improvement Program has, as its nucleus, the Continuous Improvement Team (CIT) concept. Teams provide the forum by which all employees can contribute to quality improvements proactively. Teams identify and prioritize improvement activities. The results of the team efforts are periodically presented to upper management.

ADTRAN maintains a documented Quality Improvement and Customer Satisfaction program to promote continuous improvement of customer satisfaction, products, services, and processes within ADTRAN. (GEN21.1)

Corrective Action

The ADTRAN corrective action procedure defines the means by which anyone with a problem can cause action to occur for resolution of a problem. The problem may be related to product or process. The originator defines the problem and assigns the individual responsible for resolution. Corrective Action Requests are documented in the ADTRAN corrective action system(s), and maintained for a minimum of one year. The originator is responsible for verifying action effectiveness and the quality organization periodically audits for the same. (GEN14.1)

All forms of customer complaints are captured and maintained within the ADTRAN corrective action process to assure effective actions are taken and responses provided. (GEN14.1)

Preventive Action

Management reviews product and process data identifying potential problems, their causes and determining the action required to eliminate the possibility of occurrence. Preventative actions are documented utilizing ADTRAN's documented corrective action system and/or action item registers.

All ADTRAN associates are encouraged to analyze the need for preventative action when implementing or changing actions or functions. (GEN14.1)

9.0 DEFINITIONS

Conformity

Fulfillment of a requirement.

Continual Improvement

Recurring activity to increase the ability to fulfill requirements

Customer

Organization that receives a product.

Correction

Action to eliminate a detected nonconformity.

Corrective Action

Action to eliminate the cause of a detected nonconformity or other undesirable situation.

Customer Satisfaction

Customer's perception of the degree to which the customer's requirements have been met.

Effectiveness

Extent to which planned activities are realized and planned results achieved.

Inspection

Conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging.

Measuring Equipment

Measuring instrument, software, measurement standard, reference material or auxiliary apparatus or combination thereof necessary to realize a measurement process.

Nonconformity

Non-fulfillment of a requirement.

Objective Evidence

Data supporting the existence or verity of something.

Preventive Action

Action to eliminate the cause of a potential nonconformity or other undesirable potential situation.

Process

Set of interrelating or interacting activities which transforms inputs into outputs

Product
Result of a process (Hardware, Processed Material, Service, Software)
Record
Document stating results achieved or providing evidence of activities performed.
Repair
Action on a nonconforming product to make it acceptable for the intended use.
Rework
Action on a nonconforming product to make it conform to the requirements.
Quality Management System
Management system to direct and control an organization with regard to quality.
Quality Policy
Overall intentions and direction of an organization related to quality as formally expressed by top management.
Quality Objective
Something sought or aimed for, related to quality.
Quality Planning
Part of quality management focused on setting quality objectives and specifying necessary operational processes and related resources to fulfill the quality objectives.
Quality Control
Part of quality management focused on fulfilling quality requirements.
Quality Assurance
Part of quality management ocused on providing confidence that quality requirements will be fulfilled.
Quality Improvement
Part of Quality Management focused on increasing the ability to fulfill quality requirements.
Supplier
Organization or person that provides a product.
Top Management
Person or group of people who directs and controls an organization at the highest level.
Validation
Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled.
Verification
Confirmation through the provision of objective evidence, that specified requirements have been fulfilled

ADTRAN ABBREVIATIONS

ADTRAN	Advanced TRANsmissions	MRB	Material Review Board
AM	ADTRAN Manufacturing	MRP	Material Requirements Planning
ATP	Acceptance Test Procedure	MSDS	Material Safety Data Sheet
ATS	Analytical Troubleshooting	MT	Manufacturing Test
AWI	ADTRAN Work Instruction	NMR	Non-conforming Material Report
Baan	ERP System	MRD	Marketing Requirements Document
BOM	Bill of Material	NPI	New Product Introduction
CaPS	Customer and Product Service	NTF	No Trouble Found
CAR	Corrective Action Request	NWRK	Network
CARe	Customer Action Request	OCU DP	Office Channel Unit Data Port
CE	Component Engineering	OEM	Original Equipment Manufacturer
CI	Component Inspection	OPIT	Operations Product Introduction Team
CIT	Continuous Improvement Team	P/N	Part Number
CND	Carrier Network Division	PCB	Printed Circuit Board
CS	Customer Support	PCN	Product Change Notice
DCE	Data Communications Equipment	PDR	Preliminary Design Review
DDR	Detailed Design Review	PE	Process Engineering
DDS	Digital Data System	PO	Purchase Order
DO	Document Control	POTS	Plain Old Telephone Service
DOP	Design for Operations	PURCH / PG	Purchasing
DTE	Data Terminal Equipment (Computer)	PQ	Product Qualification
DVT	Design Verification Test	QA	Quality
E1	European Version of T1 (2.048MBPS)	QMS	Quality Management System
ECO	Engineering Change Order	QuEST	Quality Excellence for Suppliers of Telecommunications
EF&I	Engineer, Furnish & Install	RE	Reliability Engineering
END	Enterprise Network Division	SIP	Single in-line Package (IC-integrated chip)
EMS	Environmental Management System	SMT	Surface Mount Technology
ENGR /EN	Engineering	T1	Carrier Line (leased from phone company @ 1.544MBPS)
ESD	Electrostatic Discharge	TE	Test Engineering
ESDS	Electrostatic Discharge Sensitive	TL9000	Telecommunications Leadership 9000
GEN	General Work Instruction	TS	Technical Support
HAZCOM	Hazardous Communication	TSU	T1 Service Unit
HDSL	High-Bit Rate Digital Subscriber Line	UUT	Unit Under Test
ILEC	Incumbent Local Exchange Carrier	WAN	Wide Area Network
I/M	Installation / Maintenance		
ISDN	Integrated Services Digital Network		
ISO	International Standardization Organization		
ISU	ISDN Service Unit		
LAN	Local Area Network		
LIU	Line Interface Unit		
I/M	Installation / Maintenance		
ICT	In-Circuit Test		
MDA	Manufacturing Defect Analyzer		
MFG	Manufacturing		
MKTG / MK	Marketing		
MPATT	Monitored Product Audit Thermal Test		

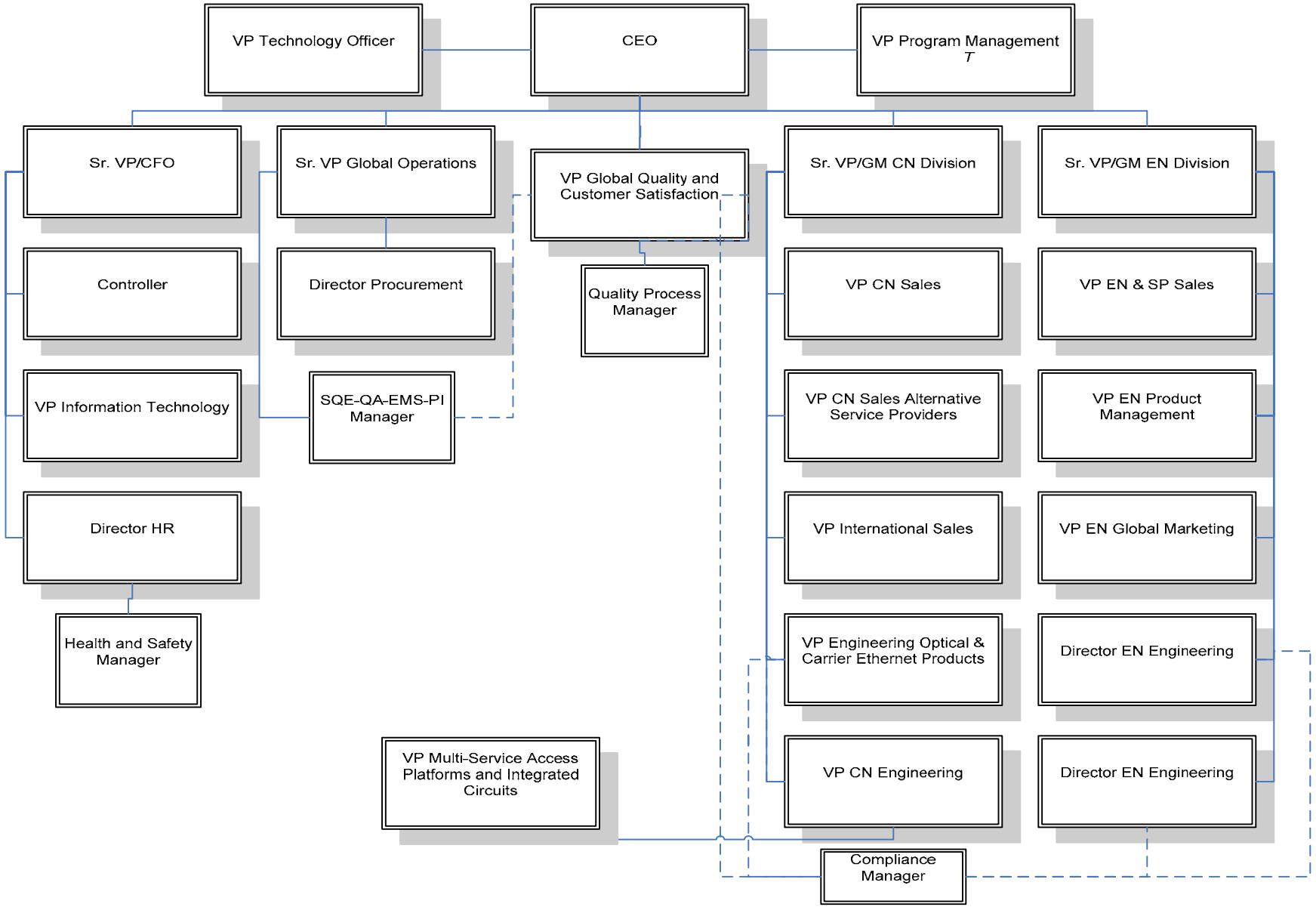
QUALITY POLICY

"The ADTRAN team will provide our Customers with ***dependable***, cost effective, on-time products and services; we expect our products to perform without interruption to stated specifications."

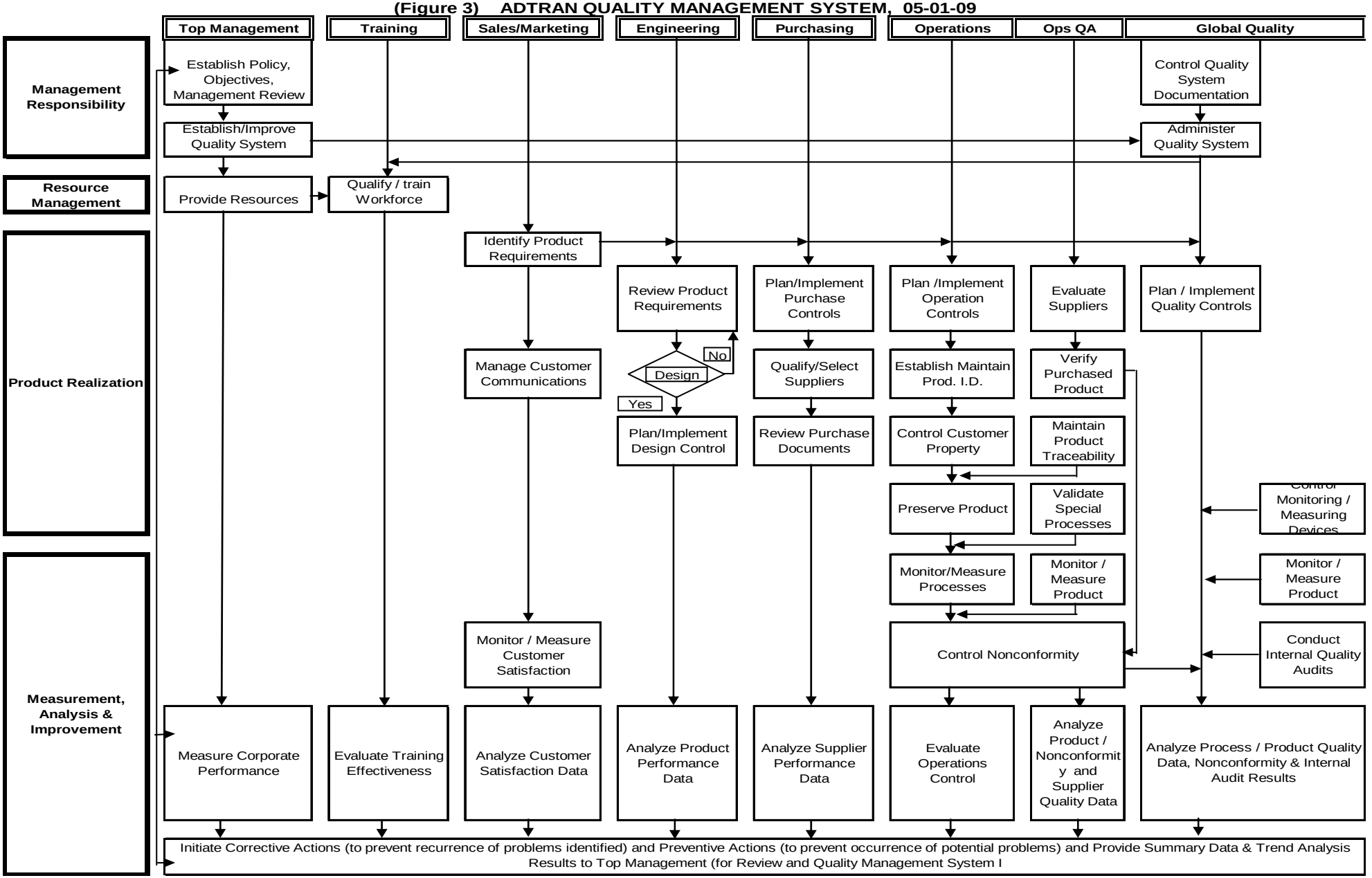
Thomas R. Stanton, Chief Executive Officer

Edward E. Rohlfs, Vice President of Quality

Attachment I
01/01/09

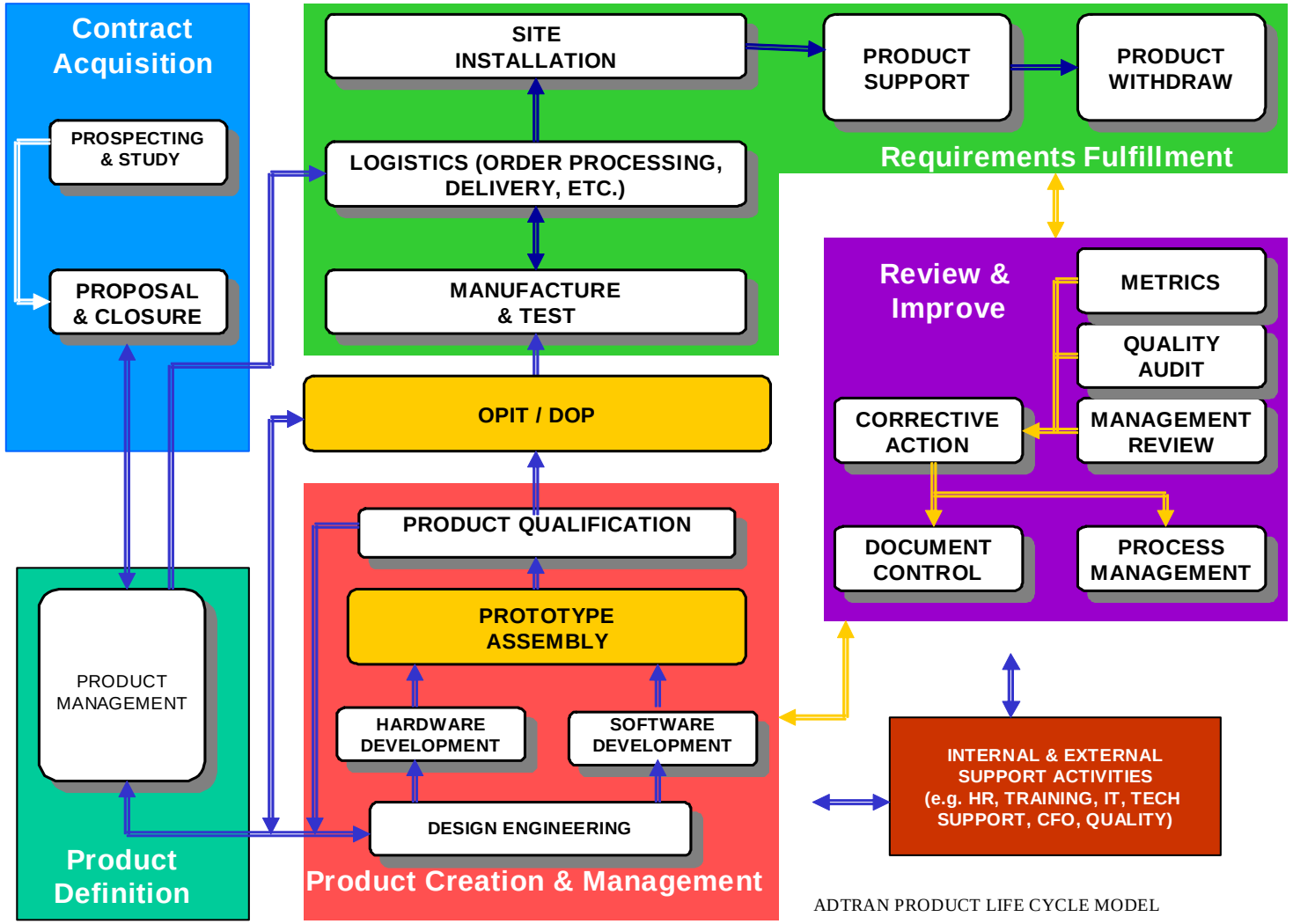

VP Technology Officer
CEO
VP Program Management
T
Sr. VP/CFO
Sr. VP Global Operations
VP Global Quality and Customer Satisfaction
Sr. VP/GM CN Division
Sr. VP/GM EN Division
Controller
Director Procurement
Quality Process Manager
VP CN Sales
VP EN & SP Sales
VP Information Technology
SQE-QA-EMS-PI Manager
VP CN Sales Alternative Service Providers
VP EN Product Management
Director HR
VP International Sales
VP EN Global Marketing
Health and Safety Manager
VP Engineering Optical & Carrier Ethernet Products
Director EN Engineering
VP Multi-Service Access Platforms and Integrated Circuits
VP CN Engineering
Director EN Engineering
Compliance Manager

(Figure 3) ADTRAN QUALITY MANAGEMENT SYSTEM, 05-01-09



Attachment III
05-01-09

ADTRAN PRODUCT LIFE-CYCLE



ADTRAN PRODUCT LIFE CYCLE MODEL

Attachment IV
05-01-09

Q101 REVISION HISTORY

Revision	Date Revised	Author	Paragraph	Description
A	10/14/92	GF	All	Initial Release
B	12/23/92	GF	All	Added and modified support document numbers and titles.
C	12/04/93	GF	All	Changes support document numbers.
D	01/14/94	GF	4.1.2	Add, "is the management representative" to 1st line of 3rd par.
			4.1.3	Added quarterly management review of quality data.
			4.19	Added last par. To include installation and maintenance service.
			All	Remove ref. To rev. from bottom of page.
E	01/24/95	GF	2.4, 4.2, 4.3, 4.4.6, 4.4.7, 4.14,	Revised to meet requirements of 1994 revision of ANSI/ASQC Q9001.
F	06/15/95	GF	4.2.1	Added reference to customer and other organization contributions.
G	03/11/96	GF	Attachment 1 Attachment 2	Updated the Quality Policy Statement and Organization chart.
H	06/19/96	HT	2.3 Attachment 1 Attachment 2	Revised method of distribution for this manual. Updated the Quality Policy Statement and Organization Chart
J	05/21/97	CO	4.4.3	Revised Quality Policy (Attachment 1) Revised Org. Chart (Attachment 2). Renumbered section 4.4.
K	06/11/99	CO	All	Revised to meet TL9000 requirements.
L	08/26/99	CO	4.1, 4.1.3, 4.3, 4.6.4, 4.6.5	Revised as result of NSAI audit dated 08/24/99.
M	07/00	CO		Revised as result of NSAI audit 07/00.
N	04/24/02	SJ	All	Revised to meet TL9000 3.0 (includes ISO9000:2000). Also changed format.
P	09/16/02	SJ	2.0 and Planning	Add all elements of TL9000 to 2.0; add Top Management's requirements for establishing quality objectives. Changed: operating procedures to work instruction pg. 6, Design to Responsible pg. 11. Added: business plans pg. 7, or designated individual Pg. 13, maintained on the pg. 14.
R	06/12/03	EB SJ	Numerous	Add reference to software. Add definitions and Attachment 3 (Life Cycle Model). Remove Attachment 1 (Q. Policy) use Q. Policy statement in Manual.
T	12/19.05	SJ	Signature Customer Related Processes	Revised Officer signatures, revised org. chart, add Q Policy as Attachment 1 and remove policy from. Revised Customer Related Processes, Para 1, to adequately describe contract review.
U	09/17/07	SJ	Numerous	Revised Organizational Chart, added Compliance Engineering procedure reference, added verbiage on TL9000 4.0.
V	11/12/08	SJ	Numerous	Revised Organizational Chart, included patching
W	05-05-09	SJ	Attachment I, II and III, revised reference to ISO9001:2008	Changed date of last review on Attachment I and II , Revised Attachment III to reflect SQE move to Ops QA, revised reference to ISO9001:2008