Q-120

QUALITY REQUIREMENTS FOR ADTRAN SUPPLIERS OF PURCHASED ASSEMBLIES

FOREWORD

ADTRAN designs and manufactures telecommunications equipment that has an enviable reputation for high reliability and quality content--a reputation that will be maintained and enhanced. This reputation is due to equipment design, production standards, and commitment by all management and operating personnel to the quality concept.

The elements contained in this document are those employed by ADTRAN to achieve its basic quality goals, which are probably best described as good commercial quality practice and are fundamental to any form of management or quality control. This document shall serve as both a requirement and a general guide to the extent of quality control that ADTRAN anticipates from Purchased Assembly (PA) Suppliers.

ADTRAN will assist the Purchased Assembly (PA) Supplier in any reasonable manner to establish an understanding of and compliance with our contractual and purchase order requirements. The Purchased Assembly must be particularly cautioned that no departure from any specification is permitted without a contract change. Clarification of this or any other ADTRAN document affecting contract compliance may be obtained through ADTRAN Purchasing Organization.

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REFRENCE

- ANSI 3.182 Information Systems – Bar Code Print Quality – Guideline
- ANSI/ESD S20.20 Electrostatic Discharge Control Program Standard
- ANSI/ISO/ASQ Q9001-2008: Quality Management Systems (QMS) Requirements
- GR-383-CORE, COMMON LANGUAGE Equipment Codes (CLEI Codes) - Generic Requirements for Product Labels
- Industry Standard Code 39 Barcode Labels and Printing
- IPC-A-610 Acceptability of Electronic Assemblies
- IPC-CM-770 Guidelines for Printed Board Component Mounting
- IPC/EIA/JEDEC J-STD-002 Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires
- IPC-J-STD-033 Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices
- ISO 14001 Environmental management systems -- Requirements
- ISO 26000 Guidance on social responsibility
- ISO/IEC 27001 Information Security Management
- ISO 9001 Quality Management System Requirements
- ISO 2859 Sampling Procedures for Inspection by Attributes
- Q-50 ADTRAN Workmanship Standard
- Q-100 Quality Program Requirements for ADTRAN Suppliers
- TL 9000 Quality Management System Requirements
- UL Marking & Labeling Guideline PGDQ2

1.0 GENERAL

1.1 Intent

The intent of this document is best defined as good commercial practice. When viewed in this context, the requirements herein can be readily and economically satisfied by competent Purchased Assembly Suppliers.

1.2 Scope

When specified in the contract, the requirements contained in this document must be adhered to by ADTRAN Purchased Assembly Suppliers. In the event a Purchased Assembly Supplier desires an exception to the requirements contained herein, a request delineating the exception must be submitted for ADTRAN approval prior to acceptance of a contract. If a conflict exists between the provisions of this document and those of the contract, the contract shall take precedence.

1.3 Purchased Assembly Qualification

Qualified Purchased Assembly Suppliers will be determined by supplier capability and product evaluations, compliance of procured material with ADTRAN requirements, and the promptness and effectiveness of corrective action taken. Continued qualification will be contingent upon continued quality of performance, satisfactory results of Quality System Audits, and/or external TL9000 audit reports.

1.4 ADTRAN Surveys and Supplier Capability Assessments (SCA)

Purchased Assembly Supplier facilities and operations may be surveyed either before or after the placement of a contract. The capabilities to meet ADTRAN requirements and to supply a product of consistent quality will be evaluated. SCAs may be scheduled and conducted if required, to determine compliance with our purchase requirements and the requirements of this document. (See Section 8 SCA Elements)

1.5 ADTRAN Source Inspection

ADTRAN reserves the right to Source Inspect product at the Purchased Assembly Supplier's facility after reasonable notice of such inspection. Final acceptance of all material will be made at ADTRAN regardless of the results of Source Inspection.

1.5.1 On Site Verification

When source inspection is specified by the purchase order, an ADTRAN Quality Assurance representative may be present to witness the inspection/test for all products. ADTRAN and the supplier will agree upon a reasonable time frame for the source inspection to occur.

2.0 PRODUCTION APPROVALS and REQUIREMENTS

2.1 Testing Requirements for Assemblies/Sub-Assemblies

ADTRAN will provide information regarding test parameters requirements for each product. The supplier will be required to provide to ADTRAN the following information, as a minimum, on test fixtures and methods;

a. Tester Model and Fixture Type
b. Actual Test Coverage
c. Connector Test Method (i.e., Pin to pin or WaveScan)
d. Test Program printout or text file including information on each test step performed which has reference designators, tolerances, etc., listed per test step.
e. Method for detecting reversed connectors and polarity of electronic components not covered by test.
f. Test or inspection methods for any untested components.

2.1.1 Purchase Orders

All PCBs used on ADTRAN product shall be purchased per ADTRAN's AVL (Approved Vendor List).

2.1.2 Test Requirements

All PCBs to be used on ADTRAN product shall be 100% electrically tested for circuitry open and shorts.

2.2 Tooling of Custom Part Numbers

Unique ADTRAN part numbers may be tooled by ADTRAN Purchasing directly to the manufacturer. A copy of the approved PA ADTRAN First Article Report (Q120-1) by part number will be provided to the supplier. The supplier would be responsible for placing and inspecting of all production purchase orders.

2.3 First Article Inspection (FAI) Requirements

FAI are required for all New Product Introduction (NPI) Assemblies, subassemblies and mechanical and formed part numbers. This may include current assemblies that incur major changes in Form-Fit-Function.

2.3.1 FAI Compliance

The PA/supplier shall meet the requirements of the Bill of Material (BOM), assembly drawing(s), engineering specification(s) and Purchase Order. All dimensions are to be considered critical.

2.3.2 Inspection criteria

Unless otherwise agreed, the supplier shall use ADTRAN's Workmanship Standard 'Q50' criteria for cosmetic workmanship requirements for fabricated materials/parts, plastics, labels, silk-screening, pad printing, assemblies and finished product.

2.3.3 Deviations to Specifications

A request for deviation to a drawing or specification must be submitted and approved in writing by ADTRAN prior to first article submission. Once approved, the deviation must be clearly documented and attached to the PA ADTRAN FAI Report.

2.3.4 Review of FAI Submissions

The first articles will be inspected for workmanship and labels will be scanned to ensure proper barcode printing.

1. ADTRAN will review and approve/reject all First Article submissions. The PA may be required to re-submit First Articles based on engineering review.
2. The ADTRAN International Operations department will notify the PA of disposition of all First Articles submissions in documented form (i.e. email, fax, etc.).

2.4 Deviations and Substitutions

ADTRAN expects the supplier to comply with the requirements of the purchase order. No deviations and/or substitutions in material, design, specifications, or operating performance are permissible unless documented by a purchase order change. Such changes are permissible for single lots if approved by the ADTRAN Non-Conforming Material Report, Waiver or Deviation process.

2.4.1 Operational Change Notification

The supplier shall notify ADTRAN when significant process changes are made to operations used in the production of a product or material purchased by ADTRAN. Examples of major process changes include a new operator, new machine, new technique, materials, and a change in sub-suppliers.

1. ADTRAN shall be notified prior to the change being made on any ADTRAN product.
2. A critical examination shall be made of the first unit(s) processed after the change is implemented.
3. Notification to ADTRAN may be in the form of a letter or email.
4. The notification shall identify the:
   i. Assembly Number
   ii. Type of Deviation required (process, equipment, or material.)
   Note: in the case of a substitute component request the supplier shall provide the required part number of the BOM and the substitute part number.
   iii. Date of change and impact to ADTRAN.
5. The notification shall be sent to the Purchasing Commodity Manger, the Purchasing Buyer and/or Supplier Quality Engineer.

2.4.2 Limits of the Deviation

Unless otherwise agreed, when the Deviation is associated to a Purchased Order (PO) the Deviation quantity shall be limited to the quantity specified on the PO.

2.4.3 Packaging and Packaging Artwork

An 8.5" x 11" sample of the artwork to be used on ADTRAN packaging must be submitted for review and approval.

1. The PA First Article Inspection Report, without the second page requesting dimensions, should accompany the sample. The document must confirm the color numbers that will be used for printing packaging.
2. First articles are required for all tooled endcaps. The First Article Inspection Report should accompany all samples submitted to ADTRAN for review and approval.

2.4.4 Product Builds

First articles of assemblies or subassemblies may be required prior to production builds.

1. When required the first article should be complete per ADTRAN's BOM and contain all labels.
2. The first articles will be inspected for workmanship and all labels scanned to ensure proper barcode printing.
3. The supplier shall provide a copy of their internal manufacturing work instructions for the building of ADTRAN's product and a printed copy of the BOM from the supplier's computer system.
4. The copies may be marked "Unreleased" or "Unofficial" pending the approval of the first article by ADTRAN.
5. ADTRAN will provide in writing to the supplier approval of the first article and/or provide direction on issues requiring correction. The supplier will be advised if additional first articles are required.

"Exceptions will require prior ADTRAN approval."

2.4.5 Refurbished, Rebuilt or Modifications

When ADTRAN tooling becomes worn, damaged or modified and must be rebuilt or refurbished, the supplier shall notify ADTRAN Purchasing.

1. A new First Article shall be required for any and all effected dimensions caused by refurbished, rebuilt or modified tooling.

2.4.6 FAI Report

A completed PA ADTRAN First Article Inspection (FAI) Report form (Q120-1, page 1and 2) shall accompany all shipments of First Article units (Identify the container or box that will contain the FAI documentation).

1. The FAI report shall provide actual measurements in comparison to the specifications. A working print of the BOM and all assembly drawings shall be included in the FAI documentation package.
2. It is recommended that FAI documentation also be forwarded to ADTRAN electronically to the following email address: FIRST_ARTICLE@ADTRAN.COM.

2.5 Engineering Change Orders

ADTRAN will provide copies of all Engineering Change Orders (ECO) as released. A copy of the ECO and an ECO acknowledgement form will be provided via fax, email or FTP to the supplier.

2.5.1 ECO Acknowledgement

The supplier shall complete the ECO acknowledgement form and return to the email address PCNOFFICE@ADTRAN.COM within the time specified with all requested information

2.6 ADTRAN Supplier Corrective Action Requirements

When it has been determined that corrective action is required from a supplier, an External Supplier Corrective Action Request (ECAR) will be submitted to the responsible supplier.

2.6.1 Supplier ECAR Actions

1. The supplier shall use the (10 – 20 Rule) for addressing an ECAR. (See Note).
   i. 10 business days from the receipt of the ECAR to provide immediate actions for correcting the nonconformance.
   ii. 20 business days for submitting a final corrective action plan.

Note: Based on severity of issue, response time may change. For a customer impacting condition, the response time is 5 Business days.

2. If final root cause cannot be provided by the response due date, at a minimum the corrective action should be completed and submitted to Purchasing.
3. The final corrective action response shall include the following information:
   - The initial actions taken to contain the problem
   - A description of the root cause of the problem
   - The proposed corrective action or solution to the problem
   - The actual or planned implementation date of the corrective action
   - The plans for verifying that the corrective action was effective, and
   - The actual or planned date of the verification of effectiveness
4. Inadequate and/or untimely responses, repeat/trends of failures will result in additional actions on the behalf of ADTRAN. Actions may include reissue of ECAR with escalation to the next level of

management, demerits to supplier performance rating, probation, and disqualification.

3.0 GENERAL REQUIREMENTS for PRACTICES, MANUALS & CDs

ADTRAN may require the supplier to submit first articles for ADTRAN practices, manuals, and compact discs (CDs) listed on the BOM.

3.1 First Articles

When first articles are required, the supplier will complete the ADTRAN First Article Inspection Report and submit with the sample. The second portion of the report for dimensions will not be required. ADTRAN will provide the FTP address and password required to download information for the printing of manuals and practices.

3.2 Manuals

Cover stock shall be 8 point C1S with the ADTRAN logo and design elements preprinted in the approved corporate color. A window on the front cover will permit the Product Name, Item Number, and Document Number printed on the title page to be visible.

3.2.1 Manual Content

Manual contents shall be printed on 8.5" x 11" white 20# text stock. Trim sizes shall be approximately 8.5" x 5.5". ADTRAN manual text shall be printed using high-speed xerographic technology such as provided by the Xerox Docutech or an equivalent device. ADTRAN manuals shall be perfect bound.

3.3 Practices and Job Aids

The following shall apply for printing ADTRAN practices and Job Aids:

3.3.1 Paper Dimensions

ADTRAN Practices and Job Aids will be printed using 8.5" x 11.0" 20 lb. white xerographic paper.

3.3.2 Paper Type

ADTRAN Practices and Job Aids shall be printed using high-speed xerographic technology such as provided by the Xerox Docutech or an equivalent device.

3.3.3 Staple Placement

ADTRAN Practices and Job Aids shall be stapled in the upper left corner. Fold horizontally to 8.5" x 5.5" (page 1 exposed) then fold again horizontally to 8.5" x 3". Note that this allows the part number of the document to be visible from front and back.

3.3.4 Packaging

The document should be placed in a 3.5" x 9" clear anti-static bag.

3.4 Compact Disk (CD) Roms

Master copies for the printing of CDs will be provided by ADTRAN. The CD is to be assembled per the drawing provided by ADTRAN

4.0 LABELING REQUIREMENTS

In addition to the requirements of Section 2.4.4 the PA supplier shall ensure compliance to the following areas;

4.1 Label Requirements

All labels used on ADTRAN product must be purchased in accordance with UL Marking & Labeling Guideline PGDQ2. In addition, specific material may be required to meet Telecordia Technologies GR-383-CORE as specified on the ADTRAN drawing or source directed per the ADTRAN Manufacturer Cross Reference.

4.1.1 Label Placement

ADTRAN will provide to the supplier a digital image showing placement of all labels for each product.

4.1.2 Exceptions

1. Request for approval to use material other than that specified may be submitted to Purchasing.
   i. The request should be submitted using the ADTRAN First Article Report form with a copy of the requested material specification attached.
   ii. All barcodes should be in accordance with Industry Standard Code 39. Print quality will also meet ANSI Standard 3.182, which requires all symbols to meet or exceed grade C on a scale of "A" through "F". All barcodes should be minimum density of 7.5 mils.

4.2 Blister Pack Labels (Reference Appendix A)

ADTRAN may require outside labeling of boxes using the current revision of ADTRAN part number 3289786-E@, Blister Pack Label.

4.2.1 Blister Pack Label Placement

The blister pack is to be placed in the upper right hand corner of the carton on the width dimension. Appendix A is an example of a printed blister pack label.

4.3 Common Language Equipment Identification (CLEI) Labels

CLEI codes provide ADTRAN carrier customers with standardized product description and part numbering for automated tracking of product in purchased and installed field systems. When CLEI labels are required, ADTRAN will

communicate this requirement to the supplier. The format is a CODE 39 barcode with human readable text below it. ADTRAN will provide label content to the supplier unless otherwise noted.

4.3.1 Approved CLEI Labels

ADTRAN has approved specific label material to be used for the printing of CLEI labels. ADTRAN will provide the current approved manufacturer and manufacturer part number based on the product the supplier is building

1. The supplier may suggest different material to be used by submitting a deviation request with supporting documentation. The printing of the CLEI label shall be in accordance to latest revision of ADTRAN drawing 399901098.

4.4 Compliance Marking Requirements

Agencies such as Underwriters Laboratories (UL) require that assemblies have the manufacturing company identified by visual markings on the board assembly.

4.4.1 Conspicuousness

The markings shall be visible without the need for disassembly of plug-in units or after the cover is removed for enclosed units.

4.5 Erasable Programmable Read Only Memory (EPROM) Labels

EPROM labels, if required, will be listed on the BOM. ADTRAN will provide via BOM text the information to be printed on the label.

4.6 Serial Number Labels

Serial numbers may be required on ADTRAN product. When required, ADTRAN will generate a serial number range based on the product and the Purchase Order number. Serial numbers are specific to product/Purchase Order and cannot be used for any other product/Purchase Order.

4.6.1 Serial Label Format

The human readable portion of the serial number is printed directly beneath the bar code portion. The revision level of the top assembly is printed to the left of the human readable portion, but is not included in the bar code printing.

4.6.2 Engineering Change Orders (ECO)

ECOs implemented after the serial numbers are generated may change the revision level of the assembly. If printed serial number labels were provided by ADTRAN:

1. The supplier will place a revision change label to the left of the serial number.
2. The label must not cover the bar code or human readable portion of the label.

3. The revision level shall match the revision printed on the blister pack label (Section 4.2).
4. If the supplier is printing the serial number label, the labels shall be re-printed with the correct revision level.

5.0 PACKAGING REQUIREMENTS

5.1 Packing List

ADTRAN requires that all Packing Lists provided with shipments contain the following information in a barcode and human readable text. This information may be preprinted on the packing list or on a label and applied to the packing list, if applicable. The following information shall be included on the packing list:

- ADTRAN P. O. Number
- ADTRAN Part Number
- Manufacturer's Part Number
- Date Code
- Quantity
- Packing List Number (invoice number)
- Shipping Tracking Number (requested but not required)

5.2 Palletization Guidelines

ADTRAN provides basic guidelines for palletizing unit loads for shipment. Appendix B. This diagram is a pictorial based on the guidelines.

5.2.1 Exceptions

All products, due to size and shape, may not be able to be palletized in this manner and exceptions should be brought to the attention of ADTRAN. The supplier may submit for review and approval their internal standardized palletization guidelines.

5.2.2 Pallet Specifications

Unless otherwise specified, all units are to be packed on a standard wooden pallet. If product is shipping into the United States, a certification is required that the wood is treated.

1. The unit load may be stacked no higher than 48” from the floor. This will allow tested units to go directly into ADTRAN’s Finished Goods warehouse.
2. Maximum weight per standard pallet should not exceed 2,200 pounds.
3. Pallet should have no overhang of product. A minimum of 4” clearance is preferred between the edges of the outer units and the pallet.

5.2.3 Securing Methods

All loads must be secured to the pallet with a minimum of two plastic straps. Metal straps are not allowed.

1. Corner protectors will be used on all four vertical corners as well as under the plastic straps.
2. Loads must be stretch-wrapped to the pallet after straps and corner protectors are added.

5.2.4 Finished Goods (FG) – Direct Shipment

For product being shipped directly into ADTRAN FG, it is important that the boxes remain in good shape and with no labeling on the product box except for as required per the BOM.

6.0 SUPPLIER MANAGEMENT SYSTEM

ADTRAN suppliers should have an established-documented and maintained Quality Management System (QMS) which complies with the requirements of an accredited QMS such as:

- ANSI (American National Standards Institute) QS 9000 Requirements
- ISO (International Organization of Standards) 9001 QMS Requirements
- TL (Telecommunications) 9000 QMS Requirements

ADTRAN is an ISO 9001/TL9000 registered company. The ADTRAN Management Policy may be viewed at t: ADTRAN - About - Management Systems.

6.1 Supplier Management System Certifications

The supplier shall provide ADTRAN copies of its quality and other system registered certifications.

6.1.1 At a minimum the latest version of the suppler certificates shall be provided when an update or release of the certificate is made.

7.0 SUPPLIER ENVIRONMENTAL- SUSTAINABILITY – HEALTH AND SAFETY MANAGEMENT SYSTEM

ADTRAN suppliers should have an established-documented and maintained Environmental Management System (EMS). In addition to having an established EMS the supplier should have an established Sustainability (Corporate Social Responsibility CSR)) Program (CSR), and established Health and Safety (H&S) System. The EMS a CSR, and H&S program should comply with the requirements of an accredited standard such as:

- ISO 14001 Environmental management systems -- Requirements
- ISO 26000 Guidance on social responsibility
- OHSAS 18001 Occupational Health and Safety

ADTRAN is an ISO 14001 certified and an ISO 26000 and OHSAS 18001 compliant company, and has established a CSR program that focused on the "Sustainability" aspects of an environmental and sociability system. ADTRAN Environmental Policy may and Sustainability commitment may be viewed at: ADTRAN - About - Management Systems.

8.0 SUPPLIER INFORMAITON SECURITY MANAGEMENT SYSTEM (ISMS)

ADTRAN suppliers should have an established-documented and maintained Information Security Management System (ISMS) which complies with the requirements of an accredited IMS such as:

- ISO/IEC 27001 Information Security Management

ADTRAN is an ISO/IEC 27001 compliant company. The ADTRAN ISMS Policy may be viewed at: ADTRAN - About - Management Systems.

9.0 SUPPLIER CAPABILITY ASSESSMENT ELEMENTS

ADTRAN has established 25 business element requirements for procurement and for ensuring that purchased items and supplier processes conform to the product/material drawing, specification, and procurement requirements.

Note: Some business elements may not be applicable to a supplier; for example Section 8.10 "Moisture Sensitive Devices/materials" may not be applicable to a metal supplier.

9.1 Development and Design

- The supplier should establish and maintain a documented product development procedure to control the design process from the initial product conception to the final product release. This procedure should include a flow chart overview of the design cycle, and the design review documentation templates.
- For each individual design project, a milestone plan detailing the development phases and their duration and design review dates should be created and agreed with the customer. Any modifications to this plan after the initial release must have the customer's approval.
- The initial design phase should include detailed customer specifications, including all applicable standards (those defined by the customer and those which are considered mandatory for the product given its intended use – CE, Network Equipment Building System (NEBS), etc.) and target costs. Both the supplier design manager and the customer representative should sign off. These specifications should be available to all members of the design team.

9.2 Document and Data Control

- The supplier shall establish and maintain a documented procedure to control all documents related to the requirements of the supplier's quality system.

The procedure shall not only address the control of the supplier's documents, but also the control of customer supplied documents.

- The supplier shall maintain a master list, identifying the current revision status of all controlled documents.
- Pertinent and current issues of appropriate documents shall be available at the locations where the operations that impact quality are being performed.
- The supplier shall establish and maintain a documented procedure for the identification, collection, indexing, access, filing, storage, maintenance, and disposal of quality records.

9.3 Change Management

- The supplier shall establish and maintain a formal documented procedure to control elements related to the requirements of a formal change control system. The procedure shall not only address the control of the supplier's documents, but also the control of customer supplied documents (such as drawings, Specifications, etc.). The procedure shall describe the review, approval, release, distribution and revision of change documents in a timely and controlled manner.
- Engineering Change Orders (ECO) whether design / procedural, issued on a temporary or permanent basis must be adequately controlled and communicated to all affected organizations.
- Records of the changes and the results of the review of changes including any necessary actions shall be maintained.
- The supplier must have an internal process capable of transmitting applicable change (ECO) requirements from a customer to all downstream suppliers in an effective and timely manner.

9.4 Supply Chain Management (Purchasing)

- The supplier shall ensure the adequacy of specified purchase requirements prior to communicating with the supplier. The documented purchasing procedure shall include product requirement definition.
- The supplier shall establish and implement the inspection or other activities necessary for ensuring that purchased product meets specified purchase requirements.
- The supplier shall establish criteria for selecting suppliers including the quality system and specified quality assurance requirements.
- The supplier shall have a documented procedure for generating purchase orders. Purchasing information shall describe the product to be purchased, including the appropriate requirements needed for approval of product. Suppliers must also ensure compliance to special instructions that are requested by ADTRAN and be capable of flowing down ADTRAN requirements to second tier Suppliers.

- The supplier must be able to demonstrate an effective Purchase Order (PO)/material requirement process.
- The supplier must have a defined process on escalating delivery requirements with their downstream suppliers. The process must define the appropriate times to escalate and establish the steps involved.

9.5 Supplier Management

- The supplier shall establish and maintain a formal documented process to qualify vendors. This procedure shall define the criteria for the qualification/disqualification of a vendor.
- The supplier shall have a documented procedure to evaluate risk analysis and maintain the ability to communicate to management the risk within the supply chain.
- The supplier shall have a documented process for corrective action that provides feedback to suppliers on all quality and performance issues.
- The supplier must establish a process that tracks the recall and replacement of non-conforming material that is in current production.

9.6 Demand and Production Planning

- The supplier shall establish and maintain a forecasting procedure that is capable of handling the requirements place by ADTRAN. This procedure shall define the prescribed interval to update the accuracy of the forecast.
- The supplier shall have a Material Requirements Planning (MRP) system. The MRP system shall have the ability to feed into the purchasing of materials, synchronize demand and supply.
- The supplier must have a procedure to track delivery performance on a weekly basis and maintain a feedback system on performance for its customers.
- The supplier shall have a process for capacity planning.
- The supplier must have an effective process that handles material shortages and helps prioritize and expedite a recovery effort to bring back production up to speed.

9.7 Inventory Management

- The supplier should have a documented inventory management process that addresses access control of the warehouse, the provisioning of materials that are impacted by engineering change, and excess/obsolete inventory review process.
- The supplier shall establish an inventory monitoring and management system. Whenever appropriate, the inventory items should be categorized based on their value and/or lead-time. The inventory items should be properly identified with their part number.

- Supplier should establish a mechanism to monitor the materials in their supply chain. In case of materials shortage, a proper escalation process should be in place to resolve the key shortage issue including a notification to ADTRAN.

9.8 Moisture Sensitive Devices/materials (MSD)

- The supplier shall establish a documented program as to how its handle MSD materials in accordance with the JEDEC requirements (J-STD-033).
- The supplier shall have procedures and facilities for opening, inspecting, sealing and storing packages containing MSDs in accordance with JEDEC requirements.
- Some method of dry storage facilities (dry nitrogen, dry air, and desiccant) shall be available as required in the component storage area, manufacturing assembly areas, and repair areas.

9.9 Process Control

- The Supplier shall establish documented procedures defining all manufacturing steps for a product.
- A formal sign-off process is required prior to placing new equipment into manufacturing operations. Records for all process change and equipment must be maintained.
- The suppliers shall establish and maintain a documented procedure to promptly advise the customer prior to transferring work to another location than that described in the quality plan or otherwise initially agreed to with the customer.
- The Supplier shall develop a planned preventive maintenance system requiring procedures, predicative maintenance and replacement schedules.
- In case of components or materials that are MSD or ESD (Electrostatic Sensitive Devices), procedures must clearly indicate the process for handling, storage, packaging, transportation and review of these materials.
- Traceability for all materials must be clearly identified. This requirement includes all raw material, work-in-progress (WIP) and finished goods. The processes should be established in accordance with Industry procedures such as IPC-A-610, IP-CM-770, and ANSI 20.20.
- Production materials that are build up as a kit for an aggregate assembly must be tracked and controlled to ensure accuracy and completeness prior to issuance to the production floor. Verification of the work instructions, identification and part shortage issues for kits must be clearly defined.
- All points to be soldered (terminal, leads, stranded wire, etc.) shall meet the solderabilty requirements defined in IPC ANSI / J-STD-002 - 4.2 and 4.3.

9.10 Corrective Action and Non-Conforming Processes

- The supplier shall establish and document a system to control product that does not conform to specified requirements and ensure that the problem is

contained, root cause is determined and preventive measures are established. The system should provide for identification, evaluation, and disposition of non-conforming product.

- Adequate facilities should be provided to analyze the root cause of non-conforming product. The throughput period should be agreed upon with the customer – normally two weeks, for products that have failed external to the supplier's manufacturing facility.
- A full failure mode analysis (FMA) must be carried out. The quality organization must be responsible for determining the failure mode, the root cause analysis and the corrective/preventive actions taken to prevent a reoccurrence. Subsequent to this, a detailed failure analysis report should be issued to the customer for each failure mode.
- All corrective action results must be made available at internal management reviews and available to the customer upon request.
- The supplier shall establish a documented return material authorization (RMA) process for customer returned material.

9.11 Process Improvement Program.

- The supplier shall establish and maintain a documented Quality Improvement Program to improve the quality and reliability of the processes/product. The program shall be active and contain a prioritized list of scheduled quality/reliability issues being addressed.

9.12 In-Process and Final Inspection, and Testing

- Test plans shall be documented (including a flow diagram for all inspection points) and all results must be recorded. The test plan should also include acceptance criteria for the tests and inspections.
- Inspection and testing results shall be recorded and analyzed using control charts or a similar technique as appropriate for the purpose of identifying problem areas and monitoring the effectiveness of the quality system.
- Repair or rework product shall be inspected in accordance with the defined quality plan. Repair and return products shall also be subjected to the appropriate test(s) to ensure conformance to product specification.
- Records shall be maintained to provide evidence that the inspection and testing have been completed. All inspection or testing activity shall have detailed documentation, status identification and be available for inspection personnel.
- Product should not be shipped until all inspecting and testing activities have been completed and verified as conforming to specific requirements. ADTRAN requires an out of box audit of product using an approved sampling plan per ISO 2859 – International Standards: "Sampling Procedures". All products must have a documented test plan.

9.13 Receiving, and In-Coming Inspection

- The supplier shall have a documented procedure to ensure that incoming material conforms to specified requirements prior to its usage. If incoming inspection is not required, the supplier must demonstrate adequate controls and justification in place to ensure that the qualities of the material received are acceptable.
- The supplier shall establish and maintain a specific area that clearly segregates incoming material from material already received.
- The supplier shall ensure that there is a documented process to accurately label crates, boxes, shipping containers, etc.

9.14 Inspection, Measuring and Test Equipment.

- The supplier shall establish processes to ensure that the measurement and test equipment is acceptable for use, maintained to suitable accuracy and protected from damage and deterioration during handling and storage.
- All applicable equipment in the calibration program shall be clearly identified with necessary information to enable calibration, traceability and status.
- Measurement and test equipment shall be verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards.
- Any out of calibration measurement or test equipment shall be documented and the status shall be clearly identified. The supplier shall have a procedure to address active equipment found to be out of calibration.
- Any contracted calibration services or labs shall be accredited to the appropriate national or international standards within the industry.
- The Supplier shall have a defined and effective Preventive Maintenance program that addresses all production and non-production related services and equipment that could impact the product received by ADTRAN.

9.15 Field Quality and Customer Returns

- Supplier shall establish a documented procedure to address the return and repair process. This procedure should include the movement (steps taken) of material through all operations.
- The supplier shall have the capability to track field turnaround time.
- Failure mode analysis should be conducted for each ADTRAN complaint and a documented FMA process must be available.
- For no trouble found (NTF) cases, ADTRAN should be notified in an appropriate manner. For cases that have been confirmed as a quality issue, a formal corrective action process should be applied to each complaint/return, and ADTRAN should be notified of the result of the FMA and corrective action plan.
- Customer returns and complaints must be recorded, and proper statistical techniques should be applied to monitor ADTRAN's return rate.

9.16 Customer Support and Satisfaction

- Suppliers must have a documented procedure for Customer Support. The procedure must include elements or sections that describe technical support, points of contact, dedicated account managers (where applicable), forms/duration of support, geographical region of support (where applicable) and a customer complaint system.
- An effective Customer Satisfaction process must be in place with well-defined metrics that quantifies customer satisfaction surveys and customer complaint response times. Suppliers must have a formal and effective customer complaint system.
- The Customer Satisfaction process must define clearly the interface with the Management Review process. Metrics such as number of complaints, response times and survey results must also be used to communicate the effectiveness of the customer satisfaction process at the Management Review.

9.17 Reliability Program

- Supplier must establish and maintain a design reliability program to predict and measure the reliability of new or modified products. As necessary the program must include the review of software reliability and reliability testing on work in process to ensure compliance. The program must also ensure that if the results do not meet ADTRAN expectations, corrective actions must be implemented. As part of this program, the product's life cycle should be determined with both the early life, mean time between failure (MTBF) and steady state failure rates defined.
- The supplier must ensure that all sub-components meet the reliability requirements specified for the products intended use. There should be documented criteria regarding the selection process for commercial, industrial and military grade components.
- The design change procedure shall specify the reliability levels required for the individual products. The reliability should be re-assessed, if ADTRAN or the supplier reliability manager deems it necessary, or when Engineering Change Orders (ECO) are introduced.

9.18 Disaster Planning and Security

- The supplier shall ensure that copies of Quality records / data / software are stored either off-site or within fireproof storage on-site. Supplier must also ensure that disaster recovery and contingency plans are documented and available for review by ADTRAN.
- Quality records shall be maintained to demonstrate conformance to specified requirements (reference throughout the quality elements where a "Record" is required).
- Emergency action plans that are approved, tested and reviewed for (fire, flood, hurricane, tornado, terrorist, etc.) must be clearly defined and in place.

- Security policies governing an employee/non-employee's access to buildings/facilities shall be clearly defined and enforced.
- The supplier shall assure that adequate security protocols (i.e., security guards, card-access, photo identification, visitor's badges, etc.) are in place for all buildings/facilities.
- Procedures shall be in place to notify Customs authorities if the supplier notes anomalies in shipments or illegal imports.
- The supplier shall ensure that policies are in place to control the following Information Technology (IT) applications: Firewall access, encryption, phone and voicemail, e-mail and virus protection. IT servers shall be backed up regularly and overall IT disaster contingency and recovery plans shall be well defined.

9.19 ESD Sensitive Materials

- Ownership of the ESD process is essential and reflects on the level of management commitment. It is imperative that all employees who come in direct contact with ESD sensitive components undergo formal ESD training and re-training in order to raise ESD awareness.
- The supplier shall establish and maintain a formal documented ESD program. ESD audits at a pre-determined frequency should be performed to ensure compliance to the program. External ESD audits must be performed where necessary to ensure supplier compliance.

9.20 Environmental-Sustainability - Health & Safety

- The supplier should have an effective system in place for assuring compliance to applicable (supplier and customer) legal requirements.
- The facility should have a management process, with clearly defined roles and responsibilities for managing Environmental, Health and Safety issues.
- ADTRAN customer contracts may require or encourage suppliers to establish environmental management systems, preferably certified by an accredited external registrar.
- The facility should have established health and safety programs to ensure the well-being of personnel and property.

9.20.1 Corporate Social Responsibility (CSR)

- The supplier should have agreed on a program, and communicated an explicit commitment to CSR.
- The supplier should have a common definition of CSR as it relates to their company, their sector and broader societal trends.
- The CSR program should address key CSR areas such as human rights, labor, ethics, supply chain, and community support.
- The supplier should conduct regularly review progress on the company's performance against CSR goals, objectives and targets.

9.21 Training (Human Resources)

- The supplier shall establish and maintain a documented procedure for identifying and training all personnel (including temporary personnel) performing activities affecting quality.
- Appropriate records of training shall be maintained for all employees performing activities affecting quality, and will include an employee training plan, training status, continuous improvement training, re-certification status (as applicable), problem solving training and customer satisfaction training.
- The supplier shall determine the personnel resources and capabilities required, prior to accepting a customer's order or committing to a customer delivery. The supplier shall provide adequate and capable personnel resources for management, performance of work, and verification activities to satisfy order requirements.
- The supplier must have a policy that requires a background check on employees, contractors or interns.

9.22 Management System(s)

- The supplier shall have a documented system manuals and/or procedures to ensure product and service conformance. The supplier shall conduct Management Reviews on at least an annual basis includes the review of its management systems (quality, environmental, information security,….). at planned intervals, to ensure its continuing suitability, adequacy, effectiveness and alignment with the strategic direction of the company stated policies, and objectives..
- The supplier shall establish and maintain documented procedures for planning and implementing internal quality audits to verify quality activities and the effectiveness of the quality system. The internal audit shall be done at prescribed interval with results report at the management review.
- Resources for the implementation of the Management System will be required from the supplier Internal audits must be formally planned, performed at pre-specified intervals and communicated to management during management reviews. The supplier must also perform formal procedure reviews at a pre-determined frequency to ensure that the documentation is current and relevant.

9.23 Order Management and Logistics

- In terms of the supply base, delivery performance must be available for feedback on supplier performance. In terms of the customers, delivery performance must be current, maintained and available for review upon demand.
- The supplier shall have an effective process for conducting root cause analysis, corrective and preventive action on missed shipments/ delivery delays to the customer.

- The supplier shall establish an effective process for analyzing commitments and customer notification on customer orders when there is a change in a supply constraint.
- The supplier shall establish an effective process for notifying the customer of missed commitments when product is sourced to multiple facilities (locations).
- The supplier shall establish a process to provide a timely response to informal customer delivery requests based on priority. The same tools used in the commitment process should be used.

9.24 New Product Introduction (NPI) & Transfer Process

- The New Product Introduction process must be formalized and should establish clear guidelines on product development, testing requirements, prototype launch and production hand-off. The process shall also establish the planning involvement by the senior management team.
- The NPI process must also establish internal "metrics" to track the performance (and success) of the NPI projects. These metrics must provide one with an overview of the projects, schedules, and performance and completion rates.
- The Quality Plans established during NPI must be adequate and data collected during this phase must be maintained.
- The supplier shall establish a well-defined and documented transfer process (globally and locally), identifying (at a minimum): roles for transfer teams, a corporate knowledge base, delineation of corporate/local responsibilities and guidelines for ensuring supply chain continuity for customers.

9.25 Firmware Control

- The supplier shall establish a development environment, configuration management and change management tools for firmware.
- The supplier shall maintain defects and the defect records should be recorded in a defect management system and tracked through to closure.
- The supplier shall have documented requirements for the firmware, which have been reviewed and baseline defined.
- Where appropriate the supplier should evaluate the use of Power on Self-Test (POST) and Built-In-Self-Test (BIST) designed into the firmware.

9.26 Information Security Management System (ISMS)

- The supplier should have a written ISMS policy signed and endorsed by senior management that is published and communicated as appropriate to all employees
- The supplier should have an Information Security Management System that is compliant and/or certified by an accredited registrar (e.g., ISO 27001 or IMAS

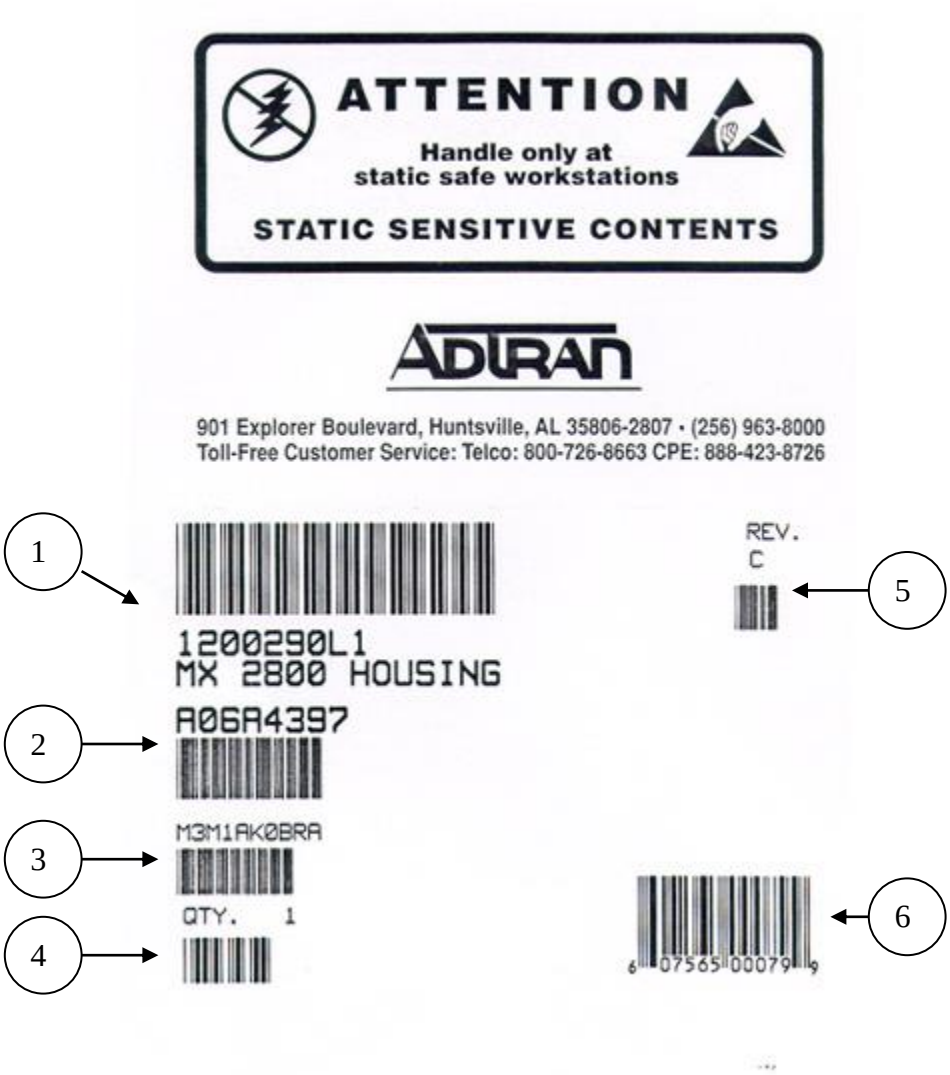
- The supplier should have established a process for ensuring employees, contractors and third party user's assets rights are terminated and that the user surrender all of the supplier's assets in their possession upon termination of their employment, contract or agreement.
- The supplier should have established Confidentiality or Non-Disclosure Agreement (NDA) for protection of information shared with external parties. The document should be is clearly defined and regularly reviewed.
- The supplier should have established methods and guidelines for managing contacts with special interest groups or other specialist security forums, and professional associations.
- The supplier should have a 'Risk Assessment procedure and should have performed an ISM Risk Assessment. The risk assessment should include the review of the supplier facility(s) for environmental threats and hazards, and opportunities for unauthorized access, equipment usage, of business systems, processes,, etc.
- The supplier should have a procedure for ensuring that information is classified in terms of its value, legal requirements, sensitivity and criticality to its business activities.
- The supplier should have procedures for information labelling and handling, in accordance with the classification scheme adopted by the organization.
- The supplier should have defined policies and procedures for ensuring that products and services received and/or delivered to the customer are compliant to the customer requirements and/or regulatory and/or information standards for ensuring the security of the intellectual property.
- The supplier should have a process for ensuring changes to information processing facilities and systems are controlled.
- The supplier should have security acceptance methods and controls for employees, contractors, and training party users in accordance with the supplier polices, and procedures.

REVISION HISTORY

Revision	Author	Date	Description
A	Unknown	02/18/2002	Initial Release
B	G. Giles	5/7/14	Total document reformat and rewrite to meet ADTRAN and Industry current requirements.
C	G. Giles	2/1/18	Foreword: owner and title changes References: ISO 27001; Sec 2.7.1.4: updated to include escalation of the ECAR; Sec. 6: Title change; Sec. 6.1: new; Sec. 7: title changed, and added Health and Safety; Sec 8: ne w [ISMS]; Sec. 9.26: new [ISMS]

Appendix A

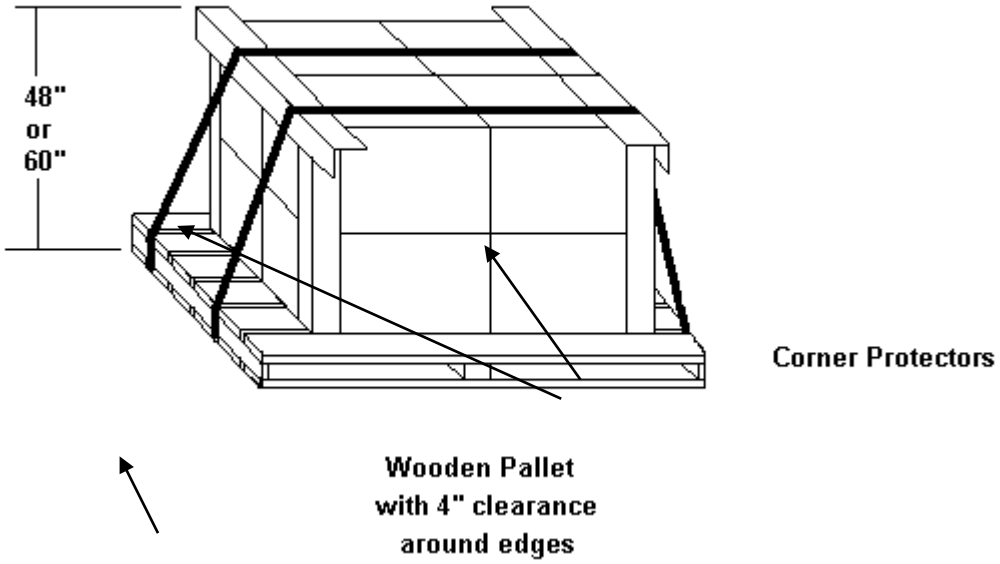
Blister Pack Printing



1. Top level assembly number and description listed on ADTRAN's PO in bar-code and human readable format.
2. Unit specific ADTRAN serial number in human readable and bar-code format.
3. CLEI number assigned to the product in human readable and bar code format.
4. Quantity per box. (For example, the overpack label may state "4" due to four units per overpack and the label on the individual box may state "1".).
5. Revision level of the unit. This revision level must match the revision level noted on the serial number of the unit and ADTRAN's purchase order.
6. UPC Code (as required).

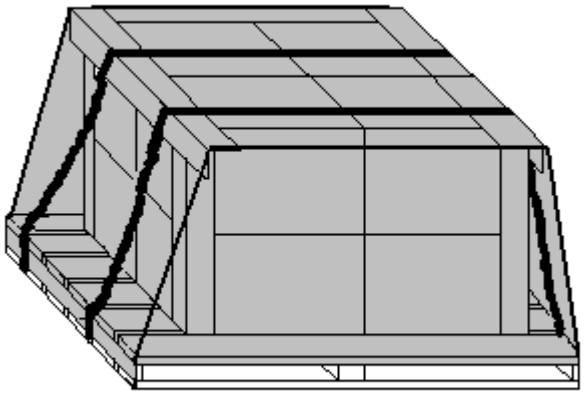
Appendix B

Loaded Pallet with Protective Corners and Plastic Banding



Loaded / Banded Pallet with Stretch-wrap Securing Load to Pallet

Note: Stretch-wrap to come all the way down to the pallet



PA FIRST ARTICLE INSPECTION REPORT

Part No. _____ Rev. _____ Sheet _____ Of _____

Part Name: _____ Date: _____

Contract MFR: _____ Originator: _____

Work Order No. _____ Purchase Order No. _____ (If applicable)

Quantity Shipped: _____ Test(s) conducted ☐ICT ☐FVT ☐Hi POT ☐Visual Inspection

ADTRAN Assembly DWGs/specification(s) used

First Article unit(s) Serial Number

Remarks:

☐ **1st Submission** ☐ **2nd Submission** ☐ **Tooling Rebuilt/Refurbish**

Certification Of Compliance

I certify that the parts furnished on the above shipment meet all the necessary Engineering Instructions, Mechanical Specifications and Necessary Requirements, and that the above parts have been inspected by this Company. A copy of all working documentation used for verification to include deviation notices, assembly and label placement drawing(s), BOM and any other written instructions shall be included with this First Article Shipment.

Quality Manager_____Date_____

For ADTRAN use only

Disposition: ☐ Approved ☐ Rejected ☐ Conditional Approval

Resubmission of 1st Article Required? ☐ YES ☐ NO

Remarks:

ADTRAN ADTRAN®

PA FIRST ARTICLE INSPECTION REPORT -

Reference Document	Zone# BOM POS#	Assembly Drawing Dimension or BOM note Requirement	Measured Actual Dimension, enter V for visual verification	Test Result PASS?	REMARKS
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	
☐DWG ☐BOM POS ☐OTHER				☐Yes ☐ No	

Q120-1, Rev. A (Quality Record)