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1.0 - INTRODUCTION

KONTRON CANADA SYSTEMS INC. is herein referred to as KONTRON. KONTRON's success is based on the world-class products and services provided to customers. To ensure KONTRON and its suppliers remain competitive, we shall produce, deliver, and continually improve our products to exceed the benchmark for world-class quality. The ability to consistently manufacture high quality products in today's competitive global marketplace requires our supplier to determine the processes needed for their quality management system and their applications throughout the organization to produce a quality product.

Therefore, KONTRON is instituting the following Supplier Quality Requirements.

This document applies to KONTRON suppliers that are responsible for producing the design characteristics of our product. This can include, but is not limited to assemblies, sub-assemblies, and detail parts including castings, forgings, and standard catalogue or Commercial-Off-the-Shelf (COTS) items.

Highlighted sections, identified with an () of this document will not apply to Procured Standard Catalogue Items or COTS items.*

Suppliers shall direct all questions regarding this document to their dedicated KONTRON Component Engineer (Comp. Eng.) and Buyer. A signed copy of this agreement will be kept on supplier file with Supplier Relations Manager.

Note: The word "Supplier" shall mean the party identified as the Seller in this Supplier Quality Requirements document. The word "Vendor" and "Supplier" are used interchangeably in this document.

2.0 – ORDER OF PRECEDENCE

In the event of conflict, the following order of precedence applies:

1. KONTRON Purchase Order
2. KONTRON Part Drawing
3. KONTRON Statement of Work
4. KONTRON Supplier Quality Requirements – FCD-0396.
5. KONTRON Terms & Conditions
6. Mutually Agreed Procurement Requirements.

3.0 – SUPPLIER PERFORMANCE

Supplier performance may be monitored via the KONTRON Supplier Scorecard. The Scorecard measures the supplier performance in areas that focus on delivery and quality. For suppliers not meeting the expected performance requirements, KONTRON will work with the supplier to improve that desired performance. If scorecard measures are not improved, the supplier may be removed from the Approved Vendor List (AVL).

4.0 – SUPPLIER CAPABILITIES*

KONTRON may utilize a capability matrix as a guide to identify each supplier's capabilities. It is highly recommended that suppliers continuously update their technology and capabilities and advise KONTRON of the changes when implemented.

5.0 - GENERAL REQUIREMENTS

The supplier shall implement and maintain a Quality Management System (QMS) in compliance with AS9100, ISO 9001, ISO 13485, AS9120 or NADCAP certifications. In the event the above QMS standards have not been met and/or maintained, the supplier will need to be reevaluated by KONTRON.

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Evidence to demonstrate these general requirements, shall be forwarded to KONTRON. Any changes to the QMS, such as a change to the certification/registration body (which includes updates, withdrawals, or disapprovals) shall also be forwarded to KONTRON for update to KONTRON's Approved Supplier List. Suppliers must also perform periodic monitoring of their certified sub-tier suppliers to ensure that their QMS status has not changed. A Supplier utilizing non-certified QMS sources for parts/products that are provided to KONTRON, must have a process to approve and monitor their performance.

Initial and subsequent periodic review of the supplier's QMS may be performed at the option of KONTRON. Objective evidence of the Supplier's compliance may be acceptable for the purpose of re-survey. This activity does not preclude KONTRON's use of on-site evaluations or other review methods.

The supplier is responsible for ensuring compliance with all government requirements for ITAR (International Traffic in Arms Regulations) /CGP (Controlled Goods Program). Evidence to demonstrate such requirements shall be forward to KONTRON. Any changes to the registration shall also be forwarded to KONTRON.

KONTRON shall be notified of a change in supplier name, ownership, or facility location in writing not less than 30 days prior to the change. KONTRON reserves the right to audit the supplier's quality system. The supplier shall also provide notice to their KONTRON Comp. Eng. and Buyer of any documented changes in key personnel and/or organizational structure.

KONTRON's official language is English. All supplier documentations and communication with KONTRON shall be done in English, unless a mutually agreed upon alternate is agreed in writing.

Suppliers shall adhere to relevant revisions of all Industrial and Military Standards identified in KONTRON documentation.

Suppliers shall NOT substitute parts without approval from KONTRON.

6.0 – SUPPLIER SUB-TIER CONTROL *FLOW-DOWN CLAUSE

Supplier is responsible for ensuring the following:

1. All items procured from their sub-tier suppliers conform to all requirements of the KONTRON purchase order including all flow-down requirements.
2. All applicable provisions of this document must be flowed to the sub-tier supplier.

7.0 – WORKMANSHIP REQUIREMENTS *FLOW-DOWN CLAUSE

Unless otherwise stated, all mechanical assembly and workmanship shall be in compliance with any specifications, drawings or documentation provided by KONTRON.

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7.1 – Circuit Card Assemblies (CCA) *FLOW-DOWN CLAUSE

1. Electrical design shall meet the requirements of IPC-2220 Series & IPC-7351B
2. Printed Circuit Cards shall meet class 3 requirements of IPC-4101, IPC-4203, IPC-4104, IPC-6011, IPC-6012, and IPC-6013 & IPC-A-600. Coupons shall be captured for each run and analyzed prior to commencing work on the CCA. Suppliers and sub-tier suppliers shall have inspectors certified to IPC-A-600 and the ability to validate PCB compliance including micro section evaluation.
3. Soldered Electronic Assemblies shall meet the requirements of J-STD-001, Class 3
4. Electronic Assemblies shall meet the requirements of IPC-A-610, Class 3
5. Where IPC J-STD-001 & IPC-A-610 “Class 3” conflict, use IPC-A-610 “Class 3”.

7.2 - Cable and Harness Assemblies *FLOW-DOWN CLAUSE

Suppliers of cables and harnesses’ design and workmanship criteria shall be in compliance with IPC/WHMA-A-620, Class 3 and any other specifications provided by KONTRON.

8.0 – SOURCE INSPECTION: RIGHT OF ENTRY * FLOW-DOWN CLAUSE

KONTRON, its customer, and/or their authorized inspection agency or regulatory authorities shall have the right to send representatives to the Supplier’s facilities on a non-interference basis to determine purchase order compliance. Compliance may be determined by monitoring, witnessing, and/or performing such activities as inspections, test witness, process, and/or product evaluations and verifications as necessary to determine product acceptability to contractual requirements. The type, necessity, and degree of demonstration of conformance shall be at the sole discretion of KONTRON, taking into consideration such factors as product complexity, the environment where the product is used, the ability to determine product quality after receipt, and past supplier performance.

Without additional charges, the supplier and/or their sub-tier shall make their facility and applicable records available for these activities. They will also provide all reasonable support for the safety and convenience of these representatives during their stay at the supplier’s and/or their sub-tier plants and facilities.

Note: Verifications accomplished by KONTRON or its customer shall neither be used as evidence of effective control of quality by the supplier nor shall they preclude subsequent rejection by KONTRON or its customer.

9.0 – INSPECTION/TESTING SAMPLING REQUIREMENTS (BUILD TO PRINT PARTS) *

The supplier shall perform inspection/testing in accordance with the applicable specification/drawing for each production lot or batch. When the specification/drawing does not specify inspection/testing requirements, the supplier shall, at a minimum, inspect/test all parameters/characteristics to an AQL 1.0, level II inspection and single sampling plan for normal inspection, per ANSI/ASQC Z1.4 (current revision & version). Consistent with ANSI/ASQC Z1.4 (current revision & version), the supplier may utilize a reduced and/or tightened inspection/test sampling.

Case by case exceptions to the required level of inspection/testing may be considered by KONTRON. In these instances, the supplier must articulate the proposed inspection/testing plan in their request and shall not initiate inspection/testing in accordance with that plan without approval in writing from KONTRON.

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10.0 – CRITICAL ITEMS AND KEY CHARACTERISTICS * *FLOW-DOWN CLAUSE*

See Definitions Section for Critical items

If no predefined drawing requirements are present, Engineering shall identify the critical item(s) and/or key characteristic(s) to control variability. For example:

1. A Part Number on a window. This indicates that the window part number must be verified to the BOM.
2. A Torque requirement on a fastener. This indicates that the torque on the fastener must be controlled.

The process to control critical items such as a key characteristic(s), are to be verified in the supply chain or in manufacturing, which will be owned by Manufacturing Engineering.

The critical item(s) such as a key characteristic(s) requirement outlined in the engineering drawing, must be incorporated into the manufacturing process with a verification frequency rate of 100%.

When a design document (such as a drawing, etc) identifies raw material as a “Critical Item”, the Supplier shall source a 3rd party to validate the accuracy of the raw material test reports.

11.0 - SUPPLIER FIRST ARTICLE INSPECTION (FAI) * *FLOW-DOWN CLAUSE*

First Article Inspection (FAI) shall be performed in accordance with the requirements of AS9102 (“Aerospace First Article Inspection Requirement”) as per the part revision level established on the purchase order.

A full or partial FAI shall be performed for affected characteristics, when any of the following occurs:

1. A new supplier;
2. A new part number;
3. A variant change;
4. Revision changes as deemed required by KONTRON;
5. The same manufacturer but lapse (2 years) between production runs;
6. For verification of implementation to corrective & preventive actions; • A new facility;
7. Change in supplier ownership

The supplier shall provide a copy of the First Article Inspection Form, FM1050, to be completed by supplier for each FAI. Any FAI report form generated shall not contain open fields. To ensure each field of the FAI has been reviewed, the supplier shall mark all open or unused fields “N/A.”

KONTRON reserves the right to conduct a FAI at KONTRON’s facility. In this instance, the part shall ship with appropriate documentation.

Upon completion of a successful first article inspection, the supplier shall continue to use the same process as was used in the first production; the supplier shall control all manufacturing, processing, testing and inspections as stated in the production of the first article. No deviations, including the selection of supplier’s sub-tier suppliers/processors, are permitted without KONTRON’s prior knowledge and written authorization.

No shipment shall occur until the KONTRON first article review is completed at the supplier’s facility for source inspected items. It is the responsibility of the supplier to coordinate and schedule KONTRON first article inspection review as early during purchase order execution as practical. Production of deliverable items prior to KONTRON acceptance of first article shall be at supplier’s own risk.

Supplier shall notify KONTRON at least ten (10) business days in advance of the need for on-site first article inspection review. All FAI reports shall be submitted, at no charge, to KONTRON

12.0 – Documentation Required for Reworked or Repaired Deliverables

All assemblies returning from supplier after repair/rework shall be accompanied by a repair report indicating:

1. Whether or not KONTRON NCR discrepancy has been confirmed
2. Work completed to repair assembly including a list of components replaced
3. Outgoing test/inspection record showing passing results

The report shall be attached to the vendor Certificate of Conformance and travel with the assembly being returned.

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13.0 - NONCONFORMING MATERIAL CONTROL

Nonconforming material/product shall be identified, documented, evaluated, segregated (where practical), and dispositioned to prevent its unintended release or use. .

Any non-conformances shall be submitted to KONTRON.

The supplier shall immediately notify their KONTRON manufacturing engineer of all systemic non-conformances occurring during manufacturing, inspection, and test, which may impact the yield, delivery schedule, cost and overall quality of the of the items that have been or to be delivered.

When an item is known to have shipped or is suspected to have shipped to KONTRON, the supplier shall submit a formal Quality Notification (QN) to KONTRON Manufacturing Engineering when any one of the following is met:

1. Confirmed, Suspected, or Potentially Non-conforming
2. Confirmed, Suspected, or Potential Impact to Safety or Functionality

At a minimum, the Quality Notification will need:

1. Issue date
2. Problem Description
3. All affected part numbers
4. All affected serial numbers
5. If the issue is systemic, any part number that may be impacted

KONTRON approved nonconforming parts shall be identified by attaching the waiver to the Certificate of Conformance provided with the shipment. Until Supplier receives an approved waiver from KONTRON with designated ECO, parts are not permitted to be shipped.

14.0 - ROOT CAUSE CORRECTIVE ACTION

The Supplier shall perform and supply to KONTRON a formal root cause and corrective action under two (2) conditions:

1. Request from KONTRON. Criteria for this request could stem from:
 - a Failure Trend
 - b Final Acceptance Test Procedure (ATP) FAILURE
 - c Critical Failure
 - d Early Field Failures
2. An initiated Supplier Corrective Action Request (SCAR). The response shall be submitted using the KONTRON SCAR form or Approved vendor SCAR response format. Expected closure dates and timelines with the SCAR shall be met. Criteria for this request could stem from:
 - a Re-occurrences of NCRs with same issue
 - b Supplier Scorecards
 - c Field Related
 - d Quality Alerts/Notification
 - e Systemic Breakdown in Supplier Process
 - f Supplier Assessments
 - g FAI Failure

Supplier shall have a process for determining root causes of the documented non-conformance and obtaining corrective actions. This includes identifying opportunities for improvements both internally and from sub tier-suppliers. The supplier is accountable for effectiveness of the corrective actions and any opportunities for improvements identified.

KONTRON retains the right to conduct corrective action verification at the supplier and supplier's sub-tier facility to assess effectiveness of the implemented corrective action.

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15.0 – SUSPECT AND COUNTERFEIT PARTS AND MATERIALS

It is the policy of KONTRON that its suppliers avoid the risks associated with counterfeit parts, by purchasing parts and materials only from the Original Equipment/Component Manufacturer (OEM/OCM) or an authorized distributor. The process controls described in this section are required when parts and materials cannot be procured from the Original Equipment/Component Manufacturer (OEM/OCM) or the authorized distributor. Parts and Materials include, but are not limited to electrical, mechanical, electro-mechanical, hardware, wire, cable, connectors, assemblies and raw materials.

All suppliers shall adhere to the following requirements:

1. Only new and authentic components and materials are to be delivered to KONTRON. The supplier must use only component parts and component material that are new production of current manufacture.
2. No counterfeit or suspect counterfeit parts (see definitions in Appendix A) are to be contained within the delivered product.
3. Documentation shall be available that authenticates traceability to the applicable Original Component/ Equipment Manufacturer (OCM/OEM). Original Certificates of Conformance (C of Cs) shall be available for all purchases. All documentation shall be requested and retained, as well as made available by the supplier. Record retention requirements shall be in accordance with the Record Retention section (16.3) of this document.
4. If a counterfeit or suspect counterfeit part were to be identified, then the supplier shall follow the Counterfeit/Suspect Counterfeit Containment section (14.1) of this document.
5. All electrical devices without OEM published packaging, packaging shelf life and storage requirements, shall have a lot/date code not greater than 2 years (730 days) old on date of receipt at Supplier; with a humidity indicator card specifying dry, (blue) present for all surface-mount devices.
6. All OEM policies governing acceptability of use shall be followed where OEM published packaging, shelf life and storage requirements exist. Devices which do not meet these requirements shall not be supplied without written permission from KONTRON
7. Independent Distributors (ID) shall not be used without written consent from KONTRON. All purchases on the independent market are to be placed with KONTRON approved Independent Distributors. A list of the KONTRON ID's is available from your KONTRON Buyer. Consent shall be obtained prior to securing material for KONTRON.

Where KONTRON consent is granted, the following shall apply:

1. When procuring active components from an Independent Distributor, the purchase order clause referenced in Appendix B, including test requirements defined therein shall be flowed down as part of the procurement requirements. Suppliers may add but not diminish testing requirements listed in Appendix B.
2. When procuring passive components and connectors from an Independent Distributor, the purchase order clause referenced in Appendix C, including testing requirements defined therein shall be flowed down. Suppliers may add but not diminish testing requirements listed in Appendix C.
3. When procuring COTS Assemblies (Including Electro-mechanical items, Hard Drives, Network Equipment and Peripheral Cards) from an Independent Distributor, the purchase order clause referenced in Appendix D, including test requirements defined therein shall be flowed down as part of the procurement requirements. Suppliers may add but not diminish testing requirements listed in Appendix D.

When procuring **Mechanical Parts and Materials**, from an Independent Disturber, the purchase order clause referenced in Appendix E, including inspection and test requirements defined therein shall be flowed down as part of the procurement requirements. Suppliers may add but not diminish testing requirements listed in Appendix E.

15.1 – CONTAINMENT OF SUSPECT AND COUNTERFEIT PARTS AND MATERIALS

In the event that a supplier is made aware that a counterfeit or a suspect counterfeit part has been delivered to them in the execution of the KONTRON contract, and **NOT** incorporated into products. The supplier shall:

1. Notify their sub-tier supplier and provide a Quality Notification to KONTRON within 5 business days of the event.

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2. Report the incident to Government Industry Data Exchange Program (GIDEP) and ERAI no more than 10 business days of the event
3. Quarantine parts shall be retained until disposition instructions have been provided by KONTRON.

In the event that a supplier or their sub-tier are made aware that a counterfeit or a suspect counterfeit part has been delivered to them in the execution of the KONTRON contract and **HAS BEEN** incorporated into products. The supplier shall:

1. Notify the KONTRON Buyer and provide a Quality Notification within 1 business day of the event
2. Report the incident to Government Industry Data Exchange Program (GIDEP) and ERAI no more than 5 business days of the event.
3. Quarantine parts shall be retained until disposition instructions have been provided by KONTRON.

The supplier shall promptly replace such suspect/counterfeit parts with parts acceptable to the KONTRON Buyer, and the supplier shall be liable for all costs relating to the removal and replacement of said parts.

KONTRON Buyer reserves all contractual rights and remedies to address grievances and detrimental impacts caused by suspect/counterfeit parts.

16.0 - OBSOLESCENCE MANAGEMENT *FLOW-DOWN CLAUSE*

In the event the Supplier receives a product discontinuance notice or a product change notice for a component and or sub-assembly on a KONTRON BOM, then the Supplier shall forward in writing the information to the KONTRON Buyer within **3** working days. In these instances, KONTRON is responsible for resolving the issue via a change to the design (bill of material) or exercising a last time buy, either directly, or indirectly through an agreement with the Supplier.

In the event the Supplier receives a product discontinuance notice or a product change notice for a component and or sub-assembly on a supplier controlled BOM, then the Supplier shall forward in writing, the information to the KONTRON Buyer a minimum of 6 (six) months in advance of the last order date. If less than 6 months' notice is available, KONTRON is to be provided a Last Time Buy (LTB) opportunity equal to 100% of the previous 12 months order quantities, or the 12-month future forecast, whichever one is greater. The notice shall include details of the cause, maximum quantity available, the last time buy order date and the delivery schedule options. For a component and or sub-assembly issue on a Supplier controlled BOM, the Supplier is responsible for any LTB. If the supplier elects not to execute LTB in favor of selecting an alternate component, then any and all costs associated with qualification of the alternate are the responsibility of the supplier.

17.0 - DOCUMENT CONTROL **FLOW-DOWN CLAUSE*

Supplier has the responsibility to ensure that the only current issue of drawings and specifications are available for use, as well as internal or external to their organization as it relates to the purchase order.

It is the responsibility of the supplier to question and resolve any conflicting or ambiguous requirements prior to order fulfillment. All discrepancies found related to KONTRON documentation, design, tooling, fixtures, software, firmware and special or manufacturing process shall only be resolved through the use of a waiver request form in Vendor's waiver request format.

17.1 - Records **FLOW-DOWN CLAUSE*

The supplier shall retain all required records as objective evidence of conformance to Purchase Order requirements, including Supplier's records and certifications of the inspection and test performed in the course of procurement, manufacturing, testing, processing, inspecting, preserving, packaging and shipping product(s) against the purchase order within legal requirements. Supplier shall make records available to the KONTRON Buyer upon request within three business days, and at no cost to KONTRON Buyer.

17.2 - Control **FLOW-DOWN CLAUSE*

The supplier shall include documented information required for the control of record creation, change (handwritten or other), completion, and control of Quality records in accordance with the applicable quality system standard (i.e.: ISO 9001, etc.).

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Note: Electronic records have the same requirements, control, and retention as paper records. They shall also be capable of maintaining data integrity for the retention period.

17.3 - Retention FLOW-DOWN CLAUSE

Supplier quality records required for product development/implementation shall be retained. Retention requirements in the excess of 10 years, where required, will be identified on the purchase order.

18.0 - CONFIGURATION MANAGEMENT *FLOW-DOWN CLAUSE

The Supplier shall be responsible for controlling / tracking the actual configuration of the parts and/or assemblies through a documented engineering change process at their facility.

KONTRON suppliers that are build to print/specification, shall not make any form, fit or functional changes to KONTRON configuration of parts and/or assemblies without approval from KONTRON.

19.0 - SERIALIZATION *FLOW-DOWN CLAUSE

Serial numbers are assigned to individual units within a Configuration Item (CI) family. Once assigned, serial numbers provide the audit trail for an item's complete life cycle.

Serial numbers shall be unique, consecutive, and non-duplicating for all items within a specific configuration item family's root number. Example: 45000-01-300 ((45000) Root-(01) Variant- (300) Attribute)).

Serial numbers shall be assigned to specific units at the start of their manufacturing cycle. Once assigned to a unit, the serial number shall not be changed and shall not be re-used.

Where KONTRON defines serial number format it shall be specified in the contracting documentation.

20.0 - MATERIAL TRACEABILITY

The supplier shall establish and maintain a documented process by suitable means "throughout product realization and the product life" for unique identification of product, and batches. This includes product marking as necessarily for identification and traceability purposes.

Traceability requirements can include all products manufactured from the same batch of raw material, or from the same manufacturing batch.

Traceability records shall be maintained and be available to KONTRON for inspection upon request as identified under section 17.0 Document Control, section 17.3 – Retention.

KONTRON may require details for sub-assembly/sub-component/firmware/software items which are incorporated into next level assemblies prior to delivery to KONTRON. These details may include, but are not limited to, Part Number, Description, Revision, and Serial Number.

21.0 - PHYSICAL & CHEMICAL TEST REPORTS *FLOW-DOWN CLAUSE

Physical and chemical test analysis data for unprocessed material shall be supplied to KONTRON. This includes a certified statement that the test results are within specified limits and are required/furnished by the supplier and made available to KONTRON upon request. The test data shall provide objective evidence that the material supplied meets the chemical and physical requirements of the drawing(s) and/or specification(s) cited on the respective PO.

22.0 - SHIPPING DOCUMENTATION REQUIREMENTS

22.1 PACKING SLIP

Supplier shall provide a packing slip for each separate shipment with the following minimum requirements:

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1. Supplier's company name and address
2. HTS and Country of Origin
3. Invoice number
4. KONTRON Supplier Bar-coding Specifications 67523
5. Purchase order number

22.2 Certificate of Conformance

Suppliers shall provide a Certificate of Conformance (C of C) assuring that all work conforms to the requirements of the purchase order. The C of C may be a separate document or included on the packing sheet. The supplier's Quality Representative shall sign and/or stamp this document (an electronic signature is acceptable).

The C of C shall accompany each shipment on the PO and where applicable, certify the following:

1. Items were produced in conformance with requirements as specified in the KONTRON purchase order
2. KONTRON part number
3. Associated purchase order and line number
4. Supplier's part number
5. Quantity delivered
6. KONTRON part revision
7. Traceability information including serial numbers, lot codes, or date codes as appropriate
8. Serial numbers as applicable
9. KONTRON disposition nonconformance document number(s) as applicable (NCR)

22.3 Commercial Invoice (required for Suppliers shipping from outside of Canada)

HTS and Country of Origin

22.4 Material Safety Data Sheet (MSDS)

The Supplier shall provide the appropriate Material Safety Data Sheets (MSDS) or Globally harmonized System Safety Data Sheets (SDS) with each shipment of Hazardous Materials. Immediately following an MSDS or SDS update, the supplier shall provide an updated MSDS or SDS to the KONTRON Buyer. The shelf life of the hazardous chemical shall also be identified on each product container.

23.0 - PACKAGING AND SHIPPING

The Supplier shall control all preservation, packing, storage, shipping and handling to assure that all materials are adequately protected during all phases of contract performance. Methods used shall be sufficient for protection against damage from normal handling, shipping, and storage conditions.

ESD precautions shall be applicable, and packaging shall be identified with a suitable ESD label. Returnable ESD containers are strongly recommended for use. Corrugated fiber board is acceptable for exterior packaging only for the protection of goods in transport to KONTRON. Corrugated fiber board shall not to be used for internal packaging. Any exception to this must be mutually agreed upon in writing on a part-by-part basis.

Parts shall be individually wrapped, bagged, or otherwise protected to prevent part-to-part contact/damage when packaged within a larger pack. The supplier shall be responsible to determine method of packaging to ensure adequate protection during transit.

Foreign Object Debris (FOD): All parts shall be packaged in a manner that ensures that risk associated with FOD transfer is mitigated. Materials and accessories used in packaging shall be clean, free of contamination and free of "loose" filler material. This shall include but not be limited to ensuring that no foam 'peanuts', loose foam filler, excess cardboard filler and other like material is used to package any product for shipment.

Hazardous material shall be properly contained and packaged in accordance with all applicable Federal, Provincial or State Regulations regarding the transportation of dangerous goods. The container shall be marked as to the contents with appropriate handling instructions, warnings & precautions, and environmental storage instructions if applicable. The supplier shall ensure that the selected carriers are authorized to transport each type of hazardous material that they are supplying to KONTRON.

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Only materials with a shelf life shall be clearly marked with an expiry date on each package, or container. The remaining shelf life of the product at time of delivery to KONTRON, shall be at a minimum, the lesser of one year or 65% of its useful life.

All material with specific storage requirements such as, "Storage in Freezer when not in use", shall be clearly identified on the packing slip, label and outside of shipping container.

24.0 - LABELS FOR PACKAGING

Suppliers shall label all inner and outer packaging in a conspicuous area. All data fields shall be provided in both Human Readable and 1D and 2D Bar Code formats.

The label shall contain to following data fields at a minimum;

1. KONTRON Part Number
2. Manufacturers Name
3. Waiver # (if applicable)
4. KONTRON Revision
5. Quantity in the Package
6. Serial number (If applicable)
7. KONTRON Purchase Order Number
8. Date Code or Lot Code
9. ESD and HAZMAT (if applicable)
10. KONTRON Purchase Order Line Number
11. Manufacturer's P/N (if applicable)

Suppliers shall barcode all inner and outer packaging that is readable by 2D barcode scanners.

25.0 - FOREIGN OBJECT DEBRIS/DAMAGE (FOD) FLOW-DOWN CLAUSE

To reduce the introduction of foreign objects into any deliverable item, the supplier shall practice good housekeeping and maintain and comply with a documented FOD prevention program. The Supplier shall manufacture, distribute, or maintain products in such a way to eliminate foreign object debris/damage in items delivered to KONTRON. KONTRON shall consider received items to be verified by the supplier to be free of foreign materials.

The supplier FOD prevention program is subject to review and approval by KONTRON. Where a sub-tier supplier will not implement a FOD prevention program, the supplier shall include in their program all necessary actions required to ensure any potential FOD is eliminated prior to shipment to KONTRON.

As a reference, the Supplier can use NAS412 (standard developed jointly by industry and DOD working groups sponsored by National Aerospace FOD Prevention Inc.), and Aerospace Industries Association (AIA) standard in order develop their own FOD prevention program.

26.0 - ELECTRO-STATIC DISCHARGE (ESD) CONTROL FLOW-DOWN CLAUSE

Suppliers that handle ESD sensitive items shall have an Electrostatic Discharge (ESD) control program in compliance with ANSI/ESD S20.20 to protect parts during manufacturing, inspection/test, packaging, shipping, rework, and/or failure analysis. The suppliers ESD control program is subject to review and approval by KONTRON.

27.0 - CALIBRATION SYSTEM, MEASURING AND TEST EQUIPMENT FLOW-DOWN CLAUSE

Calibration of inspection equipment shall be in accordance with a nationally or internationally recognized standard (i.e. ISO/IEC 17025, ANSI NCSL Z540 or ISO 10012) to the extent necessary to maintain required levels of accuracy. This as well is subject to KONTRON approval. If production tooling such as jigs, fixtures, templates, and patterns are used as a media of inspection, a calibration plan shall also be established.

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When required, the supplier's measuring and test equipment shall be made available for use by the KONTRON representative to determine conformance of product(s) with purchase order requirements. In addition, if conditions warrant, supplier's personnel shall be made available for operation of such devices and for verification of their accuracy and condition.

Supplier must notify KONTRON of any out of tolerance calibration. A risk/impact assessment will be delivered in a form of a quality notification.

28.0 - KONTRON OWNED EQUIPMENT *FLOW-DOWN CLAUSE*

When test/support equipment, fixtures, tooling or assemblies for use in qualification or production activities is owned by KONTRON, the supplier shall:

1. Upon receipt verify quantity and inspect for visible defects/damage and note findings in an incoming inspection log,
2. Identify as KONTRON property and segregate from other material, and
3. Document the receipt, inspection, test, handling, and disposition of the material.

KONTRON assets shall not be used for other than the original intended purpose, and shall not be modified or disposed of without the written authorization from KONTRON

The KONTRON asset label shall not be removed from the item.

29.0 - GOVERNMENT OWNED EQUIPMENT (GOE)/CUSTOMER OWNED EQUIPMENT (COE) *FLOW-DOWN CLAUSE*

When goods owned by KONTRON's customers are returned for evaluation, repair or upgrade; the goods will be identified as such by KONTRON with a GOE/COE tag. Upon receipt, the supplier shall verify quantity and inspect for visible defects/damage, which includes findings in an incoming inspection log. GOE/COE goods shall be segregated from other material while in storage and where feasible while in the evaluation, repair or upgrade process. The GOE/COE tag shall remain affixed to the goods at all times. Where the evaluation, repair or upgrade process does not allow for this, the tag shall travel with the goods and be re-affixed prior to shipment of the goods to KONTRON. GOE/COE assets shall not be modified or disposed of, without the written authorization from KONTRON.

30.0 – EXCEPTIONS PAGE & APPROVALS

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31.0 - APPENDIX A – ACRONYMS / DEFINITIONS

Active Component	An electronic component that contains semiconductor junctions. Examples of active components include monolithic microcircuits, hybrid microcircuits and semiconductor devices such as diodes, silicon-controlled rectifiers and transistors
AIA	Aerospace Industries Association - U.S. Trade association representing the nation's leading aerospace manufacturers
ANSI	American National Standards Institute - Organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States
ANSI/ESD S20.20	ESD Association Standard for the Development of an Electrostatic Discharge Control Program for – Protection of Electrical and Electronic Parts, Assemblies and Equipment
ANSI NCLS Z540	Standards facilitated by the American National Standards Institute (ANSI) and the National Conference of Standards Laboratories, which is intended for calibration laboratories
AS9100	Aerospace Standard based on the ISO 9001 quality system requirements
AS9102	Aerospace Standard for First Article Inspection Requirements
AS9120	Aerospace Standard for stockists and distributors of parts to manufacturers that supply the aerospace industry.
Authorized	Transactions conducted by an OCM-Authorized Distributor distributing product within the terms of an OCM contractual agreement. Contractual Agreement terms include, but are not limited to, distribution region, distribution products or lines, and warranty flow down from the OCM. Under this distribution, the distributor would be known as an Authorized Distributor. The term Franchised Distributor is considered synonymous with
Distributor (AD)	Authorized Distributor
Authorized Reseller	For certain Commercial Off-The-Shelf (COTS) assemblies and material commodities such as Information Technology (IT) equipment, mechanical hardware, fasteners and raw materials, Authorized Resellers purchase parts and materials either from the manufacturers or their authorized distributors and then sell to the end user. Chain of custody is maintained throughout the process. Authorized Reseller is synonymous with Authorized Distributor when buying these types of commodities
BOM	Bills of Materials - A comprehensive list of raw materials, components and assemblies required to build or manufacture a product
CI	Configuration Item (Family) – The part number as a whole consisting of the root part number (all characters prior to the first dash) and variant and/or other attributes
COTS	Any item of supply that is a commercial item. COTS items should be purchased directly from the OEM or its authorized distributors / reseller

Commercial off the-shelf (COTS) Assemblies:	Any item of supply (including construction material) that is: a) A commercial item; b) Sold in substantial quantities in the commercial marketplace; and c) Offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace. COTS assemblies should be purchased directly from the OEM or its authorized distributor/ reseller in lieu of flowing down part level counterfeit prevention clauses
Counterfeit Electronic Part:	Counterfeit electronic part means an unlawful or unauthorized reproduction, substitution or alteration that has been knowingly mismarked, misidentified or otherwise misrepresented to be an authentic, unmodified electronic part from the original manufacturer, or a source with the express written authority of the original manufacturer or current design activity, including an authorized aftermarket manufacturer. Unlawful or unauthorized substitution includes used electronic parts represented as new, or the false identification of grade, serial number, lot number, and date code or performance characteristics
Counterfeit Material	Material that has been confirmed to be a copy, imitation or substitute that has been represented, identified or marked as genuine, and/or altered by a source without legal right with intent to mislead, deceive or defraud
Critical Item	Those items (e.g., functions, parts, software, characteristics, processes) having significant effect on the provision and use of the products and services; including safety, performance, form, fit, function, producibility, service life, etc.; that require specific actions to ensure they are adequately managed. Examples of critical items include safety critical items, fracture critical items, mission critical items, key characteristics, etc.
DOD	Department of Defense - an executive branch department of the federal government of the United States charged with coordinating and supervising all agencies and functions of the government concerned directly with national security
Electronic Part	Electronic part means an integrated circuit, a discrete electronic component (including, but not limited to, a transistor, capacitor, resistor or diode) or a circuit assembly
ERAI	An information services organization that monitors, investigates, reports and mediates issues affecting the global supply chain of electronics
FOD	Foreign Object Debris or Foreign Object Damage - Foreign object debris is a substance, debris or article alien to a product which would potentially cause damage
GIDEP	Government Industry Data Exchange Program - A cooperative activity between U.S Government and industry participants seeking to reduce or eliminate expenditures of resources by sharing technical information essential during research, design, development, production and operational phases of the life cycle of systems, facilities and equipment

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Independent Distributor (ID):	A distributor that purchases parts with the intention to sell and redistribute them back into the market. Purchased parts may be obtained from Original Equipment Manufacturers (OEMs) or Contract Manufacturers (typically from excess inventories), or from other Distributors (Franchised, Authorized, or Independent). Resale of the purchased parts (redistribution) may be to OEMs, Contract Manufacturers or other Distributors. Independent Distributors do not normally have contractual agreements or obligations with the OCMs
IPC	Association Connecting Electronics Industries, is a trade association whose aim is to standardize the assembly and production requirements of electronic equipment and assemblies
IPC-2220	Set of IPC Standards for Printed Circuit Board Design and CAD
IPC-7351B	Requirements for Surface Mount Design and Land Pattern Standard
IPC-4101	Specification for Base Materials for Rigid and. Multilayer Printed Boards
IPC-4203	Cover and Bonding Material for Flexible Printed Circuitry
IPC-4104	Specification for High Density Interconnect (HDI) and Micro via Materials
IPC-6011,	Generic Performance Specification for Printed Boards
IPC-6012,	Qualification and Performance Specification for Rigid Printed Boards
IPC-6013	Qualification and Performance Specification for Flexible Printed Boards
IPC-A-600	Acceptability of Printed Boards
IPC-A-610	Acceptability of Electronics Assemblies
IPC/WHMA-A-620	Requirements and. Acceptance for Cable and Wire Harness. Assemblies
IPC J-STD-001	Requirements for Soldered Electrical and Electronic Assemblies
ISO	International Organization for Standardization - requirements for a quality management system
ISO 9001	Sets out the criteria for a quality management system and is the only standard in the family that can be certified to
ISO/IEC 17025	This accreditation is intended for all organizations performing tests and/or calibration, including first-, second- and third-party laboratories and laboratories where testing and/or calibration forms part of inspection and product certification
ISO 10012	Specifies generic requirements and provides guidance for the management of measurement processes and metrological confirmation of measuring equipment used to support and demonstrate compliance with metrological requirements
ITAR	International Traffic in Arms Regulations Guidelines used by the US Department of State to regulate the export of military products
(OCM)	Original Component Manufacturer: An entity that designs and/or engineers a part and is pursuing or has obtained the intellectual property rights to that part. Note: 1. The part and/or its packaging are typically identified with the OCM's trademark. 2. OCMs may contract out manufacturing and/or distribution of their product. 3. Different OCMs may supply product for the same application or to a common specification

(OEM)	Original Equipment Manufacturer: A company that manufactures products that it has designed from purchased components and sells those products under the company's brand name
Mil-Std	The United States Military Standard
MRB - Material Review Board	This is a defined number of individuals identified at our Company that have the authority to disposition nonconforming materials
MSDS	Material Safety Data Sheet - to provide workers and emergency personnel with procedures for handling or working with that substance in a safe manner
NADCAP	Is company level accreditation based on specific processes used by aerospace suppliers such as chemical processing, coatings, conventional machining, heat treating, nondestructive testing and welding among others. This accreditation is intended for organizations doing business in the aerospace industry
NAFPI	National Aerospace FOD Prevention, Inc. (NAFPI), is a nonprofit, educational organization developed to standardize terms and methods for the prevention of foreign object damage to aircraft and aerospace vehicles.
NAS 412	Foreign Object Damage / Foreign Object Debris (FOD) Prevention
Parts and Materials	Parts and Materials include electrical, mechanical, electro-mechanical, hardware, wire, cable, connectors, assemblies and raw materials used in qualification units and deliverable products. This also applies to parts and assemblies used in test equipment and inspection fixtures for acceptance of deliverable products
Passive Component	An electrical and/or electromechanical component that does not contain semiconductor junctions. Examples of passive components include resistors, capacitors, inductors, transformers and connectors
PCB	A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate
Substitute Parts	Unauthorized substitution includes used electronic parts represented as new, or the false identification of grade, serial number, lot number, and date code or performance characteristics.
Suspect Counterfeit Electronic Part	Suspect counterfeit electronic part means an electronic part for which credible evidence (including, but not limited to, visual inspection or testing) provides reasonable doubt that the electronic part is authentic.
Suspect Counterfeit Material	Material, items, or products in which there is an indication by visual inspection, testing or other information that it may meet the definition of counterfeit material

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32.0 - APPENDIX B – DISTRIBUTOR OR PURCHASE ORDER CLAUSE – ACTIVE COMPONENTS

Independent Distributor's procedures shall meet the requirements of IDEA-STD-1010 and AS6081. Quality Management System shall be certified to AS9120 and/or AS9100.

Inspections and tests shall be conducted in accordance with IDEA-STD-1010 and AS6081. IDEA-STD1010 and the inspection and tests defined below shall take precedence over AS6081 for conflicts in inspection methodology and defect criteria.

Manufacturer specifications and parameters shall be used for part requirements as applicable. Recorded evidence of all testing performed shall be included with each shipment. When available, OEM/OCM and/or AD Certificates of Conformance (C of Cs) shall also accompany each shipment.

The following inspections and tests are required for active components as applicable based on device package type.

1. 100% Visual Microscopy Inspection of all parts in the order is required to a magnification level capable of identifying nonconformities related to part size. This includes visual inspection requirements for packaging. Sampling for mechanical dimensions shall be as defined by Supplier's internal procedures.
2. X-Ray inspection (100% of the lot)
3. XRF/RoHS (3 parts per lot date code)
4. Solderability testing per IPC/EIA J-STD-002 (3 parts per lot date code)
5. Scanning Electron Microscopy (1 part per lot date code)
6. Solvent Testing for Remarking (3 parts per lot date code)
7. Solvent Testing for Resurfacing w/acetone, (same 3 parts per lot date code)
8. Scrape testing - only applicable to parts that cannot be heated solvent tested (same 3 parts per lot date code)
9. Solvent Testing for Resurfacing (If pass acetone test) - Heated Solvent testing w/ Dynasolve 750, (same 3 parts per lot date code)
10. De-lid and Die Verification (3 parts per lot date code)
11. Flash and programmable memory devices shall be verified (100%) for clean memory, not pre-programmed

If suspect/counterfeit parts are furnished under this subcontract and are found in any of the goods delivered hereunder, such items will be impounded by KONTRON Buyer. The Supplier shall promptly replace such suspect/counterfeit parts with parts acceptable to the KONTRON Buyer and the Supplier shall be liable for all costs relating to the removal and replacement of said parts as specified in the subcontract requirements or Distributor's insurance policies. KONTRON Buyer reserves all contractual rights and remedies to address grievances and detrimental impacts caused by suspect/counterfeit parts.

Supplier shall report all occurrences of Counterfeit parts to GIDEP and ERAI.

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33.0 - APPENDIX C – DISTRIBUTOR OR PURCHASE ORDER CLAUSE – PASSIVE COMPONENTS AND CONNECTORS

Independent Distributor procedures shall meet the requirements of IDEA-STD-1010 and AS6081. Quality Management System shall be certified to AS9120 and/or AS9100.

Inspections and tests shall be conducted in accordance with IDEA-STD-1010 and AS6081. IDEA-STD1010 and the inspection and tests defined below shall take precedence over AS6081 for conflicts in inspection methodology and defect criteria.

Manufacturer specifications and parameters shall be used for part requirements as applicable. Recorded evidence of all testing performed shall be included with each shipment. When available, OEM/OCM and/or AD Certificates of Conformance (C of Cs) shall also accompany each shipment.

The following inspections and tests are required for passive components and connectors as applicable based on device package type:

1. 100% Visual Microscopy Inspection of all parts in the order is required to a magnification level capable of identifying nonconformities related to part size. This includes visual inspection requirements for packaging. Sampling for mechanical dimensions shall be as defined by Supplier's internal procedures.
2. X-Ray inspection for non-glass diodes and tantalum capacitors (100% of the lot)
3. XRF/RoHS (3 parts per lot date code)
4. Solderability testing per IPC/EIA J-STD-002 (3 parts per lot date code)
5. Scanning Electron Microscopy (1 part per lot date code)
6. Solvent Testing for Remarking (3 parts per lot date code)
7. Solvent Testing for Resurfacing w/acetone, (same 3 parts per lot date code)
8. Scrape testing - only applicable to parts that cannot be heated solvent tested (same 3 parts per lot date code)
9. Solvent Testing for Resurfacing (If pass acetone test) - Heated Solvent testing w/ Dynasolve 750, (same 3 parts per lot date code)

All electrical test reports shall contain a read/record data table showing the measured values of each device tested. Electrical test shall be performed after parts have passed the inspection and tests listed above.

Sample value measurements required per ANSI/ASQ Z1.4 at ambient temperature, 1% AQL level II. Component value tests are defined in the following chart:

COMPONENT	TEST
Resistors	DC resistance
Capacitors	Capacitance
Inductors	Inductance
Transformers (open framed/wiring)	Winding-to-winding isolation, winding continuity, inductance, turns or voltage ratio
Connectors	Continuity on a 1% AQL sample of pins/connections
Relays	Contact and coil resistance

If suspect/counterfeit parts are furnished under this subcontract and are found in any of the goods delivered hereunder, such items will be impounded by the KONTRON Buyer. The Supplier shall promptly replace such suspect/counterfeit parts with parts acceptable to the KONTRON Buyer, and the Supplier shall be liable for all costs relating to the removal and replacement of said parts as specified in the subcontract requirements or Distributor's insurance policies. The KONTRON Buyer reserves all contractual rights and remedies to address grievances and detrimental impacts caused by suspect/counterfeit parts.

Supplier shall report all occurrences of Counterfeit parts to GIDEP and ERAI.

34.0 - APPENDIX D – INDEPENDENT DISTRIBUTOR PURCHASE ORDER CLAUSE – COTS ASSEMBLIES

(Including Electro-Mechanical Items, Hard Drives, Network Equipment, and Peripheral Cards)

Independent Distributor procedures shall meet the requirements of IDEA-STD-1010 and AS6081. Quality Management System shall be certified to AS9120 and/or AS9100.

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Manufacturer specifications and parameters shall be used for part requirements as applicable.

Recorded evidence of all testing performed shall be included with each shipment. When available, OEM/OCM and/or AD Certificates of Conformance (C of Cs) shall also accompany each shipment.

The following inspections and tests are required for general COTS assemblies, hard drives, network equipment and peripheral cards:

34.1 General COTS Assemblies

1. Packaging inspection (part number, evidence of tampering, etc.)
2. Mechanical dimensions (3 parts minimum per lot)
3. Visual Inspection (100%) for indications of prior usage/refurbishment/counterfeiting including damage to:
4. Components visible on circuit cards when applicable o Interface connector(s)/contact(s)
5. Crimped, cut, spliced, pinched, and/or broken wire(s) where applicable Manufacturer label bar code information verification

34.2 Hard Drives

1. Packaging inspection (part number, evidence of tampering, etc.)
2. Mechanical dimensions (3 parts minimum per lot)
3. Visual Inspection (100%) for indications of prior usage/refurbishment/counterfeiting including damage to:
 - a Components visible on circuit cards when applicable)
 - b Interface connector(s) / contract(s)
 - c Casing
4. Manufacturer label bar code information verification
5. 100% Power on test
6. 100% Read/write benchmark
7. 100% Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) data pull (when applicable)
 - a Verification of serial number
 - b Total power on hours
8. Serial numbers recorded

34.3 Network Equipment

1. Packaging inspection (part number, evidence of tampering, etc.)
2. Mechanical dimensions (3 parts minimum per lot)
3. Visual Inspection (100%) for indications of prior usage/refurbishment/counterfeiting including damage to:
 - a Components visible on circuits cards when applicable
 - b Interface connector(s) / contact(s)
 - c Casing
4. Manufacturer label bar code information verification
5. 100% Power on test
6. 100% Test RJ-45 ports (when applicable)
7. Serial numbers recorded

34.4 Peripheral Cards

1. Packaging inspection (part number, evidence of tampering, etc.)
2. Mechanical dimensions (3 parts minimum per lot)
3. Visual Inspection (100%) for indications of prior usage/refurbishment/counterfeiting including damage to:

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- a** Components visible on circuit cards when applicable
- b** Interface connector(s)/contact(s)

4. Manufacturer label bar code information verification

If suspect/counterfeit parts are furnished under this subcontract and are found in any of the goods delivered hereunder, such items will be impounded by KONTRON Buyer. The Supplier shall promptly replace such suspect/counterfeit parts with parts acceptable to the KONTRON Buyer and the Supplier shall be liable for all costs relating to the removal and replacement of said parts as specified in the subcontract requirements or Distributor's insurance policies. KONTRON Buyer reserves all contractual rights and remedies to address grievances and detrimental impacts caused by suspect/counterfeit parts.

Supplier shall report all occurrences of Counterfeit parts to GIDEP and ERAI.

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35.0 - APPENDIX E – TEST LAB PURCHASE ORDER CLAUSE – MECHANICAL PARTS AND MATERIALS

Manufacturer specifications and parameters shall be used as applicable for part and material requirements. Recorded evidence of all testing performed shall be included with each shipment.

The following inspections and tests are required for mechanical parts and materials by an accredited third-party testing facility:

1. Packaging inspection (part number, evidence of tampering, etc.)
2. Part/Packaging marking inspection for evidence of remarking or alterations (part number, mfg. name, trademark or logo, lot or date code, grade, etc.) - sample of 3 pieces per lot for part markings.
3. Mechanical parts external visual inspection (100%) for damage, wear, contamination, or use.
4. Mechanical parts dimensional inspection – selected critical dimensions shall be verified per manufacturer specifications on a sample of 3 pieces per lot.
5. Plating Verification (e.g. XRF) - sample of 3 pieces per lot.
6. Base material verification (certification of composition/chemical analysis, heat treatment, hardness testing, tensile strength, torque testing, magnetic particle, etc. as applicable per material specification) - sample of 1 piece per lot.
7. Mechanical Item Test Verification (if required by the item specification) - sample of 1 piece per lot.

Supplier shall report all occurrences of Counterfeit parts to GIDEP and ERAI.

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36.0 - APPENDIX F – ACKNOWLEDGMENT OF YEARLY REVIEW

This is an acknowledgement that the management group of _____ have read and fully understand and is in compliant with this document, FCD-0396.

This document will be acknowledged on a yearly basis and submitted to KONTRON by March 1st of each year.

Name (Supplier): _____	Signature: _____
Title: _____	Date: _____

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