

L-3 Communications Corporation  
Link Simulation & Training Division  
Purchase Order Supplement No. 3  
Quality Assurance

**Q10 QUALITY SYSTEM REQUIREMENTS**

- Q10A. ISO 9001:2000 – Seller's quality system shall be in compliance with the requirements of ISO 9001, "Model for Quality Assurance in Design, Development, Production, Installation and Servicing."
- Q10B. AS9100:2004 – Seller's quality system shall be compliant with the requirements of AS9100:2004, "Quality Management System – Requirements"
- Q10C. RESERVED
- Q10D. RESERVED
- Q10E. Seller's Documented Inspection System – Seller shall maintain a documented inspection system. Seller shall perform or have performed the inspections and tests required to substantiate product conformance to drawing, specification and purchase order requirements. Records of all inspections shall be maintained. Seller shall use calibrated equipment to assure that products conform to requirements. Seller shall maintain a positive system for identifying the inspection status of product. If the Seller's system is found to be deficient by the Buyer, the Seller will be responsible for bringing the system into compliance as a condition of this purchase order.
- Q10F. Calibration – Seller shall maintain a calibration system in compliance with the requirements of ANSI/NCCL Z540-1-1994, "Calibration Laboratories and Measuring and Test Equipment – General Requirements" or equivalent.
- Q10G. SSOW – Seller shall comply with the Quality Assurance requirements specified in the Subcontractor Statement of Work (SSOW) or Task Description document for the product or service supplied on the purchase order.

**Q20 INSPECTION AND IDENTIFICATION REQUIREMENTS**

- Q20A. Source Inspection at the Seller's Facility – Buyer inspection/test is required prior to shipment from the Seller's facility. Seller shall have performed all evaluations necessary to verify that the product being supplied meets the purchase order requirements prior to notifying the Buyer of readiness for source inspection. Seller shall notify Buyer a minimum of five (5) working days in advance of the date when the material will be ready for Buyer inspection/test. Seller shall withhold shipment pending necessary action by the Buyer's Quality organization. Seller shall provide and supply all records, facilities, personnel and assistance for the Buyer's Quality organization to perform the following: (1) Review of all records relating to items supplied on the purchase order, (2) Workmanship and dimensional evaluation of items supplied on the purchase order, (3) Witnessing of testing required on the purchase order.

Final acceptance of all items furnished on this purchase order shall be at the Buyer's facility. Inspection at source by the Buyer or Buyer's Customer, including the Government, shall not constitute final acceptance, nor shall it relieve the Seller of the responsibility of furnishing acceptable products, documentation and/or services.

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Q20B. First Article Inspection (FAI) – The first part fabricated shall be given a complete inspection (and test, if applicable) to verify that the Seller’s manufacturing processes (and design, if applicable) yield a part that complies with Buyer specifications, drawings and purchase order. A Seller that passes FAI shall be approved for production. The FAI requirement shall not apply to subsequent purchase orders of the same part, providing there has been no change in the manufacturing processes, design (if applicable), materials, or there has been a lapse in production of no more than one year. Exceptions shall require Buyer approval. Similar to parts may also be exempt from FAI subject to Buyer review and approval.

The FAI shall be performed by the Seller and Buyer. FAI shall be conducted at the Seller’s facility, or at the Buyer’s facility, if so required. Seller shall notify Buyer five (5) working days in advance of the date when part is ready for FAI. Seller shall prepare and complete an inspection check sheet listing every drawing or specification attribute, the actual measurement of each and the inspection media used. The check sheet shall include verification of functional characteristics. A copy of the completed inspection (and test) check sheet shall accompany the first article when delivered. The first article part and accompanying check sheet shall be so identified. Seller shall not ship any production units until the first article has been accepted by Buyer’s Quality Assurance.

Q20C. Quality Records- Seller shall maintain procedures for identification, collection, indexing, filing, storage, and retention of quality records. Quality records include reports, test data, inspection records, and process data for all operations, special processes, inspections and tests performed by the Seller to document the quality of the Seller’s deliverable product(s) or services. Quality records shall be legible and identifiable (all pages) to the product involved. Inspection and test data records shall include pass/fail criteria and a description of any non-conformances found. All quality records shall be retained for a minimum of 5 years. Records shall be safely stored to ensure recovery in the event of a nature catastrophe. These requirements equally apply to Seller sub-tier suppliers.

Q20D. Seller Provided Data– Seller shall furnish with each shipment a complete data package for all analyses, inspections, examinations, demonstrations and tests performed that substantiate the deliverable product is fully compliant with the requirements of the Purchase Order and referenced documentation (i.e. specifications, drawings, Buyer / Seller commercial standards, etc.) The data package shall include actual measurements taken of quantifiable requirements, or pass/fail indications of examinations/demonstrations that are non-quantitative in nature. Data records should be signed off by the person performing the verification. The drawing or specification governing the product may be annotated to show the measurements taken or inspections/examinations performed where a data sheet or test procedure is not a requirement of the Purchase Order.

Q20E. Certificate of Conformance – Each shipment made against this purchase order must contain a Certificate of Conformance by the Seller verifying that all applicable drawings, specifications and purchase document requirements have been met. The certificate must include the purchase order number, the part number and shall show the date of execution, the title of the authorized company representative and his/her signature. Sellers that do not have a prescribed certificate containing the above information shall submit the Certificate of Conformance provided in Attachment A of PO Supplement No. 3.

Q20F. Item Returned to Vendor for Rework or Repair – Seller is requested to include with the returned item results of any failure analysis they elect to perform to determine cause. Please Note: 1) When the returned item failure is documented on a Link Nonconformance Material Report that

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has been assigned by Link as the Seller's responsibility, that failure will negatively affect the Seller's quality approval rating. Seller failure analyses that identify the root cause of the failure was not caused by the Seller will have the responsibility re-assigned, thereby improving the Seller's quality rating. 2) Part revisions stated in the PO are for reference only, unless otherwise specified. 3) Any rework or repair of the returned item that would change the as-built/received configuration must be approved in advance by Link.

- Q20G. Items Containing Software or Firmware – When software or firmware is contained in a hardware deliverable line item of the PO, it shall clearly be identified on the packing list and Certificate of Conformance, including its version or revision.
- Q20H. Identification of Parts – In the absence of specific drawing, specification, or purchase order identification instructions, Seller shall individually identify materials, parts, or products furnished on this purchase order in accordance with Link Manufacturing Standard (LMS) 1-1. If the materials, parts, or products have no suitable or adequate marking surfaces, identification shall be by means of a tag or identification on the container.
1. Purchase order number
  2. Purchase order part number
  3. Quantity enclosed
- Q20I. Failure Reports – Seller shall provide a failure report with each shipment. The report shall identify the cause of the failure, document the action taken to correct the problem and actual results of examinations and tests to verify that the failure was corrected. The report shall further include the signature of an authorized company representative.
- Q20J. Government Furnished Equipment Repaired Parts – All parts removed as a result of rework/repair from the Government property supplied with this order must be returned to this facility. Seller does not have the authority to scrap or otherwise use such parts. Seller shall place an identifying tag on each removed part and identify it with the purchase order number. This requirement is considered void if the item is exchanged instead of reworked/repaired.
- Q20K. Buyer-Furnished Material – Seller shall inspect, upon receipt, all materials or parts furnished to Seller on this purchase order. Inspection, as a minimum, shall include quantity, damage, corrosion, deterioration and compliance to any applicable purchase order requirements. Seller shall provide written notification to Buyer through the Buyer's Procurement Organization of any discrepancies pending written disposition by the Buyer's Quality Organization.
- Q20L. Inspection Results for Items with Key Characteristics – Seller shall furnish with each shipment a report of all measurements made during product acceptance. As a minimum, the report shall include actual recorded dimensional readings for all key characteristics specified on the drawing.
- Q20M. Functional Test or Fit Check as part of Receiving Inspection (For internal use by LINK only) – The functional performance or fit of this item shall be verified prior to final receiving inspection acceptance. After verification of the item's acceptability for marking, documentation, mechanical and dimensional conformance, and any other characteristic that can be verified by incoming inspection, the item shall be submitted to test or program engineering for functional performance or fit evaluation in accordance with QI 6-3-115.

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Q20N. Quality Engineer Notification (For internal use by LINK® only) – Inspector shall notify the cognizant program Quality Engineer via e-mail when product has completed Receiving Inspection.

**Q30 WORKMANSHIP REQUIREMENTS**

Q30A. RESERVED

Q30B. Electronic Workmanship - Seller shall implement and maintain IPC-A-610 Class 3 compliant processes, or equivalent, and the following requirements, if not otherwise specified in the drawing, parts list, specification, etc.:

- a. If crimped connections are necessary, they shall comply with LMS 11-9.
- b. If cables are necessary, they shall comply with LMS 11-6 for the assembly and identification of them.
- c. Non-adhesive based products shall be used to mechanically fasten cable lays (bundles). Cable routing shall be neat and orderly.
- d. Strain relief and chafing shields shall be provided for finished cable lays and associated discreet wiring at all bends and termination points.
- e. Continuous cables greater than 20 inches in length, which terminate in other than RJ-45 connectors shall be mechanically fastened at 8-inch minimum to 10-inch maximum intervals.
- f. All cable assemblies, conduits, and harness assemblies shall be packaged to prevent deformation of conductor insulation and damage to connectors and connector pins. Particular attention shall be given to routing of cables so that they do not block the natural air flow.
- g. Where part number and quantity are specified, no substitutions shall be made without written approval.
- h. All components shall be free of loose, spattered, or excess solder.

Seller may use their internal standards in lieu of the Link LMSs' subject to Link approval. In the event of conflicts in referenced Buyer documentation or interpretation of requirements, the Seller shall obtain clarification from the Buyer's Quality organization.

Q30C. Mechanical Workmanship - Seller shall comply with the following workmanship requirements, if not otherwise specified in the drawing, parts list, specification, etc.:

- a. Neatness and thoroughness of wiring, welding, machining, and assembly of parts, subassemblies, and assemblies shall be maintained.
- b. Surfaces shall be clean and free of smudges, scratches, rusting or other marks detracting from a new appearance. Touchup of minor imperfections shall be accomplished prior to hardware acceptance.
- c. There shall be no foreign matter left inside the product that might detract from the intended operation, function or appearance of the item.
- d. There shall be no sharp corners that could injure someone
- e. Screw assemblies and bolts shall be fastened using applicable American National Standards Institute (ANSI) or military standards (MS), without over tightening, based on their dimensions, material, and type of application.

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- f. Screws, nuts and bolts shall show no evidence of cross threading, rusting, mutilation or detrimental or hazardous burrs. There shall be a minimum of one and half screw threads protruding beyond the nut when tightened.

Q30D. Welding – Seller shall comply with the welding requirements of AWS D17.1:2001, including the qualification of weld operators and inspectors, unless otherwise specified in the purchase order or accompanying documents.

**Q40 RESERVED**

**Q50 MATERIAL, TOOLING, CALIBRATION AND PROCESS CONTROLS**

Q50A. Age Sensitive/Shelf Life Material – Material identified on this purchase order is considered to be age sensitive. Seller shall provide the following data upon delivery: (1) Manufacturing date, (2) Shelf life and/or expiration date and (3) Cure date for rubber products.

Material must have at least 75% of its shelf life remaining at the time of shipment.

Q50B. Material Safety Data Sheet – Material Safety Data Sheets (MSDS) are required for each shipment on this purchase order.

Q50C. Chemical and Physical Test Reports – Seller must have on file, at their facility or sub-tier supplier's facility, physical and chemical test reports of raw material used on this order. Records substantiating the foregoing shall be available for examination by Buyer Quality Assurance. When Q20D is applied, Seller shall submit results to Buyer.

Q50D. Electrostatic Discharge Protection - Seller agrees that all static-sensitive electrical and electronic parts, assemblies and equipment shall be handled and protected to effectively prevent damage from electrostatic discharge using an Electrostatic Discharge (ESD) control system which encompasses protected areas, handling procedures, protective covering, quality precautions, audit and review, training of employees, and packing and packaging for delivery.

Q50E. Component Solderability – All electronic components supplied on this purchase order shall meet the requirements of MIL-STD-202, Method 208, for component solderability.

Q50F. Tool Control – Buyer-supplied inspection tooling and/or gages shall be periodically proved for accuracy. This action shall occur at the Buyer's plant or at a Buyer-approved facility. If an outside lab is used, a certified report of each tool and/or gage shall be sent to the Buyer's Procurement Organization. Any tooling or gage furnished to the Seller by the Buyer shall not be altered, reworked or modified without written approval of the Buyer. Buyer shall be immediately notified of damage or loss.

Q50G. Calibration – A certificate, report, or data sheet attesting to the date, accuracy of the standards used, and the environmental condition under which the results furnished were obtained must be supplied for each item calibrated under this purchase order. This report or certificate must attest to the fact that the accuracy of the standards used in obtaining the results has been compared at planned intervals with the NIST, WWVB, has been derived from accepted values of Natural Physical Constants, or has been derived by the ratio-type of self-calibration techniques. The accuracy of the standards must be at least four times the accuracy of the equipment being calibrated.

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- Q50H. Special Process Control Qualification/Records Maintained by Seller– Seller and any subtier supplier using special processes (heat treating, welding, painting, plating, nondestructive testing etc.) shall ensure that the facility performing the special process operation is both qualified to perform and that records of the special process operations are maintained.
- Q50I. Special Process Control Approval by Buyer – Seller and any subtier supplier using special processes (heat treating, welding, painting, plating, nondestructive testing etc.) must have these special processes approved by the Buyer. Seller shall prepare and present special process procedures for Buyer’s Quality Organization approval prior to performing any special processes on items to be supplied on this purchase order and no later than sixty (60) days after receipt of this purchase order. Special process procedures shall be in accordance with the appropriate specification as defined by the purchase order, drawing or specification. Seller shall maintain records verifying that special processes and personnel are certified, or if the Seller is purchasing special processes, subcontractor records are available to ensure that the subcontractor is certified to the applicable specification.
- Q50J. Directed Approved Processor – Seller’s subtier supplier(s) must be listed as an Approved Processor or shall use Approved Processors on the Buyer-provided Approved Processor List. Buyer approval of any processor shall not relieve Seller of their obligation and liabilities under this purchase order. Seller shall submit a Certificate of Conformance identifying the Buyers directed source used (refer to Q20E).
- Q50K. Raw Material Samples – For a first time order, the Seller shall provide sufficient quantity of test samples of the material for independent testing by the Buyer of the material as required by the controlling material specification or standard. Samples shall also be provided, if this is a repeat order, where more than 12 months has elapsed since the last purchase order samples were provided.

**Q60 MATERIAL REVIEW AUTHORITY**

- Q60A. Material Review Board (MRB) Authority – Only shipments of supplies and/or services that conform to all requirements will be accepted unless authorized in writing by the Buyer’s Quality Organization. Any nonconforming materials, parts or products that affect specific Buyer requirements imposed by the purchase order, Buyer’s drawing, or any other applicable specification shall be submitted to the Buyer for Buyer’s MRB disposition. This task shall be accomplished at the earliest possible time and must be prior to shipment. Seller shall include the description of the nonconformance, the root cause of the nonconformance and the corrective action taken to prevent its recurrence. If the Seller is uncertain as to the affect of the nonconformance on specific requirements, the concurrence of a representative of the Buyer’s Quality Organization shall be obtained.

Nonconformances that do not affect specific Buyer requirements may be dispositioned by the Seller through the Seller’s normal MRB procedures.

**Q70 MILITARY STANDARD HARDWARE**

- Q70A. Military Hardware and Components - Seller expressly warrants that parts furnished on this purchase order conform to the applicable military part specification. Seller shall provide copies of acceptance data from the original manufacturer with each shipment.

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Q70B. Military Hardware and Components - Seller expressly warrants that parts furnished on this purchase order conform to the applicable military part specification. Seller shall maintain copies of acceptance data from the original manufacturer on file.

**Q80 PACKAGING REQUIREMENTS**

Q80A. Product Packaging – All products shall be packaged to ensure delivery at final destination when shipped by common carrier. Cable assemblies, conduits, and harness assemblies shall be packaged to prevent deformation of conductor insulation and damage to connectors and connector pins. All connectors shall be individually wrapped. Circuit card, printed wiring, multi-wire or wire wrap board assemblies furnished on this purchase order shall be individually packaged in an ESD shielded bag.

ATTACHMENT A

**CERTIFICATE OF CONFORMANCE**

DATE: \_\_\_\_\_

COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

PO NUMBER: \_\_\_\_\_

PART NUMBER: \_\_\_\_\_ REVISION: \_\_\_\_\_

QUANTITY: \_\_\_\_\_ SERIAL NUMBER(S): \_\_\_\_\_

LOT NUMBER (if applicable): \_\_\_\_\_

DESCRIPTION:

It is hereby certified that all material, parts, assemblies, and/or final product(s) furnished under this purchase order as listed herein are in compliance with the requirements of the purchase order, drawing(s), and/or specification(s). It is further certified that the product(s) furnished under this purchase order have been inspected and tested. Applicable supporting inspections, testing, and/or material/part specifications and test data not required as a deliverable under this purchase order are on file and available for review upon request.

CERTIFIED BY: \_\_\_\_\_

TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_