



**communications**  
**Aviation Recorders**

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Cage Code: 06141

## **PURCHASING SPECIFICATION**

### **Attachment "W" Quality Assurance Requirements**

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Revision: U

Original signatures on file with EDC:

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<b>Record of Revisions</b>			
<b>Rev</b>	<b>Description</b>	<b>Date</b>	<b>Approved By</b>
A	RCD CHG Add clause 26 (Two Year Limited Life)	03-13-01	R. Wallace
B	ECO 9504 24 mil aperture was 21 in 35.1.10 and 35.2.12	05-17-01	R. Basham
C	RCD CHG Added clause 27 (Non-Static Packaging)	05-31-01	R. Wallace
D	ECO 9678 Clause 31 (Supplier's Records)	01-22-02	R. Basham
E	ECO 9706 Revise clause 17; add clause 33; and delete clause 53	02-25-02	A. Davis
F	RCD CHG Revise clause 35 by adding 35.1.11 and 35.2.13	04-16-02	A. Davis
G	RCD CHG Rev Clause 11 to reflect 7 year record requirement; rev Clause 99 to include drawings	01-31-03	A. Davis
H	RCD CHG Remove clause 24 and change 36 to ISO 9001	02-26-03	J. Templeton
J	RCD CHG Added clause 24	06-23-03	R. Basham
K	RCD CHG Rev IPC specifications in section 35	10-30-03	J. McNaughton
L	RCD CHG Revise clause 17, 21 and 42	02-18-04	A. Davis
M	RCD CHG Added clause 34, Revise clause 35.1.11 and 35.2.13 to include HASL finish	6/9/04	J. McNaughton
N	RCD CHG Added last two sentences under clause 31	8/31/04	A. Davis
P	RCD CHG Added clause 37 & updated 36	9/29/04	A. Davis
R	RCD CHG Revise Clause 10 to merge with 11. Revised 11 to remove 7-year record requirement. Revised 12 to remove "Attention Receiving Inspection"	11-30-05	D. Larocque
T	RCD CHG Revised Clause 11 to clarify C of C requirements. Added Clause 56 to address Industrial Specification revision levels.	2/15/06	D. Larocque
U	RCD CHG Added clause 57	1/21/08	D. Larocque

## INTRODUCTION

This document is an attachment to L-3 Communications (L-3) purchase orders listing Quality Assurance requirements. When referred to on the face of an L-3 purchase order, the requirements listed herein form a part of it and are in addition to other provisions thereof.

### **DELIVER THIS ATTACHMENT TO YOUR QUALITY CONTROL MANAGER.**

#### 10. THIS ITEM REMOVED

All Clause 10 items now revert to Clause 11.

#### 11. Certification of Conformance and General Supplier Commitment

The seller shall supply a certification of conformance (C of C), identified to the L-3 Purchase Order, signed by a responsible official, preferably from Quality Assurance, attesting that the materials or parts supplied fulfill all requirements of the Purchase Order.

At a minimum, the C of C will contain the information listed below:

- Manufacturer of part/assembly.
- L-3 Part number and Revision Level
- L-3 Purchase Order Number
- Date of manufacture or shipping.
- Serial numbers of product supplied, (serialized products only).
- Signature of responsible individual and date signed.

#### 12. Process Certification

The seller shall supply a certification signed by a responsible official, attesting that all processes performed were in accordance with the specifications referenced on the Purchase Order and any applicable L-3 supplied drawings. The certification shall be identified to the L-3 Purchase Order. Certification shall be enclosed in an envelope and clearly marked.

#### 13. L-3 Inspection at Seller's Facility

L-3 inspection of materials under this Purchase Order is required prior to shipment from your facility. Evidence of such inspection shall be by stamp or signature of the L-3 representative on your shipper or other document accompanying the shipment. The seller shall notify the L-3 buyer 10 days in advance of the start of final test or inspection, so source inspection may be planned and accomplished.

#### 14. Government Inspection at Source

A. Government inspection is required prior to shipment from your plant. Upon receipt of this order, promptly notify the Government Representative who normally services your plant so that appropriate planning for Government inspection can be accomplished.

B. On Receipt of this order, promptly furnish a copy to the Government Representative who normally services your plant, or, if none, to the nearest Army, Navy, Air Force, FAA, or Defense Supply Agency inspection office. In the event the representative or office cannot be located, our purchasing agent should be notified immediately.

#### 15. Physical and/or Chemical Test Report

Seller shall supply a test report containing physical properties and/or chemical composition of all raw materials supplied on this P.O. The report must specifically identify the material by reference to the number of the melt, cast, heat, drop, lot or other similar designation and must indicate the applicable specification and revision. Test reports shall be enclosed in an envelope marked "Attention Receiving Inspection".

#### 16. Seller's Acceptance Test Data

Seller will furnish a copy of test data electrical and/or mechanical that verifies compliance of the materials to Purchase Order requirements. The test data and materials must be marked to insure they are identifiable one to the other and to the L-3 Purchase Order number.

#### 17. Reservation of Inspection Rights/Entry

Items being purchased hereunder may be inspected or tested by representatives of L-3, the U.S. Government and the L-3 customer at all times and places including the place and period of manufacture. If any inspection or test is made by the aforementioned representatives on the premises of the seller, the seller without additional charge shall provide all reasonable facilities and assistance for the safety and convenience of the inspectors in the performance of their duty. All inspection and tests shall be performed in such manner as not to unduly delay the work. These rights shall be flowed down to any subcontractor utilized by the seller. No inspection made prior to final inspection and acceptance shall relieve the seller from responsibility for defects or other failure to meet the requirement of this contract.

L-3 reserves the right of access to all facilities utilized by the supplier to fulfill applicable purchase order requirements. Access shall be granted by the supplier in conjunction with a prior written request from L-3. Access activities may include but are not limited to inspections, investigations, physical supplier audits/surveys, and quality record reviews.

#### 18. Single Lot/Date Code

This item must be supplied as a single lot or date code to fulfill the demands of an individual purchase order. Multiple lots, batches, manufacturer's batches or date codes will not be accepted.

#### 19. Lot Identification

Each item of material shall have lot identification. "Lot" is defined as product of a single facility, produced at essentially the same time by essentially the same process from essentially the same material.

#### 20. Lot Test Coupon

A test coupon identifiable to the lot of material supplied shall be furnished.

#### 21. Calibration Requirements

The seller shall maintain a system for the calibration of all measuring and testing equipment used in fulfillment of the Purchase Order that is in accordance with ANSI/NCSL Z540-1-1994 and/or ISO 10012.

#### 22. Limited-Life and Special Storage Items

Materials shipped against this Purchase Order shall have not less than three quarters of the shelf life remaining at time of shipment. Materials or containers shall be marked with the date of manufacture. Where storage at other than room conditions would extend life in storage, recommended storage conditions shall be marked on the material or container.

#### 23. Static Sensitive Devices

This order is for Static sensitive device(s) that should be handled per MIL-STD-1686 (latest revision). These items must be packaged in conductive material or must be packaged in material which is inherently anti-static or which has been coated or treated with an anti-static material to prevent buildup of static charge. If anti-static material is used, the vendor shall furnish certification with the delivery that the packing material is or has been treated to prevent buildup of static charge. Shipping containers shall have a warning label affixed to the outside stating that the package contains static sensitive devices.

#### 24. Serialization

This part requires L-3AR issued serial numbers. If no serial numbers were supplied with this order, contact L-3AR procurement.

#### 25. Manufacturer's Identification Marking

Manufacturer must mark parts produced with unique symbol or logo in an unobservable area of each piece. Marking will allow L-3 to distinguish manufacturer from other producers of part. Contact L-3 if unsure of location available for symbol or logo. Small parts may be bagged and tagged for marking purposes.

#### 26. Two Year Limited-Life and Special Storage Items

Materials shipped against this Purchase Order shall have not less than two years shelf life remaining at time of shipment. Materials or containers shall be marked with the expiration date. Where storage at other than room conditions would extend life in storage, recommended storage conditions shall be marked on the material or container.

#### 27. Non-Static Packaging

Items shipped against this P.O. shall be wrapped / packaged with materials that do not generate a static charge. Contact the Purchasing Agent for clarification if required.

#### 28. Repairable Items

Subassemblies/assemblies costing more than \$150 shall be designed as repairable.

#### 29. Microelectronic Devices

Microelectronic devices shall conform to MIL-M-38510, JAN parts, class B. When MIL-M-38510 parts are not available, microelectronics shall be screened in accordance with MIL-STD-883 methods 5004 and 5005, class B.

#### 30. Semiconductor Devices

Semiconductors shall be JANTXV devices. Semiconductors shall be hermetically sealed. Plastic encapsulated devices shall not be used. Where JANTXV devices are not available, the following order shall take precedence:

- (1) JANTX
- (2) JAN screened to TX level
- (3) Nonstandard screened to TXV level

#### 31. Supplier's Records

The supplier shall maintain all pertinent records for a minimum of seven years from the date of manufacture. The records shall be available for review by L-3 Communications and/or applicable regulatory authorities as required. The supplier shall ensure records remain legible, readily identifiable, and retrievable. Records should be disposed of via shredding after they exceed seven years from date of manufacture.

#### 32. Product Screening Data

A certificate of compliance providing lot identity, customer order identity, test, methods and conditions of processing performed shall be provided with all dash 883X material shipped. In addition, group A subgroup -- test summary attributes data shall be furnished.

33. Notification by Supplier

The supplier is required to notify L-3 immediately in writing of any process modifications or anomalies, which may adversely affect the quality, or reliability of items supplied for use by L-3. Notification shall occur within three working days of discovery of the deviation.

34. Foreign Object Debris/Damage Prevention

Supplier shall manufacture, distribute, or maintain products in such a way to eliminate or reduce foreign object debris/damage (FOD) in items delivered to L-3. That tooling, test equipment, and fixtures as required in the supplier's processes are maintained in a manner to prevent FOD. L-3 will consider received items to be verified by the supplier to be free of foreign materials.

### 35. Printed Circuit Board (PCB) Requirements

NOTE: The following clauses apply unless otherwise specified on the drawing.

#### 35.1 Single/Double Sided Boards

35.1.1 All boards will meet/exceed L-3 Spec. #5111 (obsolete) OR IPC- 6011/6012/6013 Class 3.

35.1.2 All boards will have gloss finish green soldermask on both sides when specified. All circuits must be completely covered with mask. There shall be no mask on pads or in component holes. Soldermask must be compatible with conformal coatings utilized by L-3.

35.1.3 All boards will be started with 1 oz. copper laminate unless otherwise specified.

35.1.4 All boards will be legended on both sides per IPC-6011/6012/6013 with yellow ink, color no. 13655 per FED-STD-595 unless otherwise specified. Legend ink is not permitted on pads or in component holes.

35.1.5 All shipments of PWBs to L-3 will include a certification of compliance with the following statements:

- Quantity of Boards shipped
- Purchase order boards are shipped against
- Boards comply with L-3 Spec #5111 (obsolete) or IPC-6011/6012/6013 Class 3

35.1.6 The L-3 Communications test coupon that is located on each artwork board layer which depicts a group of representative plated through-holes and lines, shall be submitted with each production lot of boards produced. Each coupon shall be serialized to each production panel and each board made to the production lot produced for tracking purposes. If the artwork package does not have an L-3 coupon on it, the latest revision IPC coupon may be substituted. One coupon per lot shall be submitted for evaluation. Include samples of smallest pad/drilled hole size.

35.1.7 A certification of electrical test, including parameters of the test performed shall be included with each applicable order.

35.1.8 Unless otherwise stated, all finished hole tolerances will be  $\pm 0.003$ ". When holes are specified as tooling holes, pads may be removed from artwork.

35.1.9 The PWB drawing revision level must be permanently marked (etched or legended) on the side of each printed circuit board near the PWB part number.

35.1.10 Surface Mount PWBs - via holes must be open. Preferred mask method utilizes 24 mil. aperture centered on via. Supplier may plug vias if previously authorized by L-3. Via plugging must be stated on the certificate of compliance. All vias must be completely plugged and not create protrusions which interfere with solder pasting.

35.1.11 If boards are nickel and gold plated or HASL plated, measurements of plating thickness must be submitted along with the lot's certificate of compliance.

## 35.2 Multilayer/Surface Mount Boards/Microvia

35.2.1 All boards will meet/exceed IPC-6011/6012/6013 Class 3.

35.2.2 All boards will receive gloss finish green soldermask on both sides unless otherwise specified. All circuits must be covered completely with mask. There shall be no mask on pads or in component holes. Soldermask must be compatible with conformal coatings utilized by L-3.

35.2.3 All boards will be started with 1 oz. copper laminate unless otherwise specified.

35.2.4 All boards will be legended on both sides per IPC-6011/6012/6013 with yellow ink, color no. 13655 per FED-STD-595 unless otherwise specified. Legend ink is not permitted on pads or in component holes.

35.2.5 A certification of electrical test, including parameters of the test performed shall be included with each order.

35.2.6 Kovar welding will not be allowed.

35.2.7 All shipments of PWBs to L-3 will include a certification of compliance with the following statements:

- Quantity of boards shipped
- Purchased order boards are shipped against
- Boards comply with applicable IPC Standard and Class.

35.2.8 All shipments of PWBs to L-3 will include coupons.

The L-3 test coupon that is located on each artwork board layer which depicts a group of representative plated through holes and lines (connecting with all layers). Each coupon shall be serialized to each production panel produced and each board shall be serialized to each panel. One coupon for each panel of boards produced shall be submitted for evaluation. (If the artwork has no coupon, the latest revision IPC coupon may be substituted.) Include samples of smallest pad/drilled hole size.

35.2.9 Unless otherwise stated, all finished hole tolerances will be  $\pm 0.003$ ". When holes are specified as tooling holes, pads may be removed from the artwork.

35.2.10 The PWB drawing revision level must be permanently marked (etched or legended) on the side of each printed circuit board near the PWB part number.

35.2.11 All multilayers require evidence of etchback at final x-section.

35.2.12 Surface Mount PWBs - via holes must be open. Preferred mask method utilizes 24 mil. aperture centered on via. Supplier may plug vias if previously authorized by L-3. Via plugging must be stated on the certificate of compliance. All vias must be completely plugged and not create protrusions which interfere with solder pasting.

35.2.13 If boards are nickel and gold plated or HASL plated, measurements of plating thickness must be submitted along with the lot's certificate of compliance.

36. ISO 9001

Seller's Quality System shall comply with and be certified to ISO 9001.

37. AS 9100

Seller's Quality System shall comply with and be certified to AS 9100.

38. Thru 40. These Items Reserved for Future Use

41. Special Packaging

The subcontractor shall package all items with 3-M oxidation arrest paper in a sealed, air tight, clear plastic bag. If the size of the part is less than 3.3" X 3.3" or 10.0 square inches, the package may contain one strip and no more than 10 pieces per sealed bag. All other parts shall be individually packaged with one strip in each sealed bag.

42. Workmanship

All materials supplied by the subcontractor shall meet the requirements of the latest revision of the L-3 Workmanship Standards Manual. All flow down requirements shall apply.

43. IPC-J-STD-001

The subcontractor shall comply with IPC-J-STD-001. All flowdown requirements shall apply.

44. This Item Reserved for Future Use

45. Government - Furnished Property to Sub-Contractor

The following clause of the Federal Acquisition Regulation (FAR), and the Department of Defense FAR Supplement as in effect in the Prime Contract on the date of this Purchase Order is incorporated herein by reference and made a part hereof with the same force and effect as if it were given full text:

FAR 52.245-2 Government Property (Fixed-Price Contracts)

NOTE: Describe assets quantity, P/N, and description on Purchase Order.

46. Documentation

Documentation for any engineering change, modification, and/or discrepant material (MRB) shall be supplied with shipment in order to allow inspection of items at Buyer's facility.

47. Accounting Notification

Notification to L-3 Accounting is required upon receipt of material.  
(Material may require the application of an asset tag.)

48. Calibration Lab Notification

Notification to the L-3 Calibration Lab is required upon receipt of material.  
(Material may require entry into the calibration system.)

49. Fabricated Parts

All L-3 drawings for fabricated parts comply with ANSI 14.5 unless otherwise specified on the individual drawing.

50. Test Report Requirements for Subcontractors and Vendors.

The seller shall comply with L-3 document number 905-E1695-44 (latest revision).

51. Age of Electrical Components

All electronic components, with the exception of aluminum electrolytic capacitors, shall be from lots manufactured no more than two (2) years from the date ordered. Exceptions to this must be approved by Components Engineering.

52. Age of Aluminum Electrolytic Capacitors

All aluminum electrolytic capacitors shall be from lots manufactured no more than two years from the date ordered. Exceptions to this must be approved by Components Engineering.

53. This Item Reserved for Future Use

54. L-3AR Paint Specification 21412

Supplier shall conform with the requirements of L-3AR specification 21412 (latest revision). All manufactured parts or assemblies that receive organic coatings must have the coatings applied and meet the inspection requirements of this specification.

55. L-3AR Design Specifications 905-E1721-07 and 905-E1741-07

Supplier shall conform with the requirements of L-3AR Design Specifications 905-E1721-07 (latest revision), or 905-E1741-07 (latest revision), whichever is applicable.

56. L-3 requirements for Industry Specifications.

Supplier shall conform with the latest revision of all Industry Specifications noted on L-3 drawings, contracts, or purchase orders ( i.e. IPC, ANSI, Mil-Std, etc). Latest revision is defined as the revision level at the time of purchase order acceptance.

57. L-3 PWA specification 905-L0182-44

Supplier shall conform to the Requirements for Supplier manufacture of L-3 circuit board assemblies, 905-L0182-44, (latest revision).

58 Thru 98. These Items Reserved for Future Use

99. Drawings For Purchase Orders

The drawings required for this purchase order have been reviewed for associated L-3AR specifications and/or drawings.