

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PRODUCTION RELEASE		
B	EC-10940	08/29/14	Linda Kilgus
C	EC-11202	12/02/14	Linda Kilgus
D	EC-11514	03/31/15	Linda Kilgus
E	EC-11867	07/22/15	Linda Kilgus
F	EC-12321	01/07/16	Linda Kilgus
G	E30000696	07/31/18	Linda Kilgus
H	E30001819	08/03/2021	Linda Kilgus
J	E30003868	02/19/2025	Kyle Gross
K	E30004420	01/15/2026	Valen Johnson
L	E30004443	01/21/2026	Valen Johnson

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Project/Production Order #:		
DWN	D. Goldberg	08/21/14
CKD	N/A	---
EE	N/A	---
ME	N/A	---
PM	K. Foss	12/01/14
PR	N/A	---
PS	N/A	---
MC	D. Goldberg	12/01/14
MFG	N/A	---
CE	N/A	---
QA	M. Rosnick	12/02/14
TE	N/A	---
BD	N/A	---
SW	N/A	---



L3HARRIS

Telemetry & RF Products
1515 Grundy's Lane
Bristol, PA 19007

CONTRACT MANUFACTURER
STATEMENT OF WORK

**SIZE
A**

**CAGE CODE
13923**

GD60050691

1.0	PURPOSE
To define special requirements for Contract Manufacturers (CM) to follow for products manufactured for L3Harris Telemetry & RF Products (L3Harris T&RF) when these requirements are not covered by the purchase order or supporting documentation.	
2.0	DEFINITIONS
Turnkey Manufacturing:	Supplier supply's all materials required to produce product including consumables
Consignment Manufacturing	L3Harris T&RF supply's all materials required to produce product including some or all consumables
OCM	Original component manufacturer
3.0	REFERENCES
GD60050698	Printed Wiring Board Statement of Work
4.0	HIERARCHY: ALL L3HARRIS T&RF PURCHASE ORDERS SHALL BE IN THE FOLLOWING ORDER OF PRECEDENCE
A.	Purchase Order, L3Harris T&RF drawings and specifications, Contract Manufacturer Supplier Statement of Work.
5.0	SPECIFICATIONS AND CERTIFICATIONS
A.	Solder requirements are to ANSI-J-STD-001 class 3
B.	Operators must be trained and certified to ANSI-J-STD-001 and Inspectors to IPC-A-610
C.	All components and assemblies to be handled in accordance with ESD procedure ANSI ESD 20.20 (or equivalent)
D.	Workmanship shall be IAW IPC-A-610 CLASS 3
E.	Temperature Profiles used for mass soldering processes shall be IAW IPC-7530
6.0	GENERAL REQUIREMENTS
A.	No ozone depleting chemicals can be used in any of the manufacturing processes used to assemble these boards.
B.	Boards must be assembled in accordance with drawings provided and/or (ECN's) engineering change notices as provided.
C.	L3Harris T&RF will supply onsite technical support as required.
D.	In process inspections may be specified by L3Harris T&RF and may include source inspection prior to shipment.
E.	All assemblies that require solder paste reflow must use SN62/Pb36/Ag2 or sn63/pb37b solder paste/cream with RMA flux. All other solder used will be as listed on the parts list.
F.	Quality Assurance (QA) Codes shall be identified on the purchase order line for each part number. Definitions of the individual QA codes can be found by using the url link on the Purchase Order. L3Harris Terms and Conditions can be found by using the url link on the Purchase Order. Purchase Order requirements that are "Program specific" will be identified by "QP" codes listed on the order (including a summary statement of the requirement).
G.	If required, L3Harris T&RF may request that Supplier submit three assemblies from the first manufacturing lot of each purchase order for testing at L3Harris T&RF prior to shipping or proceeding with manufacture. The first, last, and a part selected from the middle of the manufacturing lot shall be selected for testing.

- H. A signed C-of-C shall accompany each purchase receipt and shall reference the purchase order number and if applicable, the Traveler Revisions (TR). All product identification information on the certificate of compliance must match information on the PO.
- I. Component obsolescence or product changes notices received from manufacturers or distributors shall be forwarded to L3Harris T&RF.
- J. Panelized boards supplied to the Contract Manufacturer for the SMT process shall be shipped individually by depanelizing them with a controlled method and shall be compliant with IPC.
- K. Contract Manufacturer shall retain the manufactured item's documented information for 10 years, to include PO, production traveler/router, approved supplier deviation (if needed), inspection records with results, NC with disposition (if any), and CofC of all items delivered to L3Harris. Correction of records may be made, provided the corrections are clearly identified, such as a single line strikethrough that is signed/dated by an authorized individual.
- L. Records shall demonstrate a solid chain of custody from the Original Manufacturer through all intermediate distributors for Turnkey Manufacturing.

7.0

PROCESS REQUIREMENTS

- A. Marker/flags must be removed from inductors prior to delivery of assembly.
- B. Staking of parts and/or components shall be performed at Provider IAW the Assembly Drawing unless the Assembly Drawing specifically states that the task is to be performed after In-Process (IP) testing. If the Assembly Drawing states that staking is to be performed after IP test, then it shall be performed at L3Harris T&RF. All jumper wires shall be installed, routed, soldered, and staked in accordance with drawing and bill of materials requirements. Staking materials shall be in accordance with applicable bill of materials.
- C. PWB Cleaning: Cleaning methods shall be in accordance with J-STD-001. The process covers all boards being produced without Voltage Controlled Oscillators (VCO's).
- D. Coil Craft Inductor Rework: If L3Harris part number 56100178-XXX needs to be reworked, use procedure PD60050660, "Procedure for replacement of CoilCraft Inductors using Hot Air pencil and rework station."
- E. Hand Soldering of Capacitors: ALL Capacitors that are "Hand Soldered" must be installed either the Solder Paste method/Hot Air Pencil from IPC/7711/7721 or procedure 5.3.2 Point to Point method. The supplier shall check the parts list, and/or PCB silkscreen, and/or component datasheet to verify that a component is a capacitor. All capacitors will be listed on parts list with "CAP" in the component description and/or with a "C" reference designator on the PCB.
- F. Gold leaded components shall be mitigated in accordance with J-STD-001. "Gold Removal" section.
 - a. from at least 95% of the solderable surface for SMT components, regardless of the gold thickness.
 - b. from at least 95% of the solderable surface for through-hole components leads with >2.54 microns gold thickness.
- G. Temperature Profiles used for mass soldering processes and BGA rework stations shall be IAW IPC-7530.
- H. New Products – Baseline Temperature Profile
 - a. All new products must have a baseline temperature profile developed and recorded that conform to both product and component datasheets and solder and/or flux datasheets.
 - b. Supplier shall check each purchase order to determine if there is an approved temperature profile. Request for quotes shall also identify any costs associated with generating a new profile as required.
 - c. Profiles must be generated using a populated board assembly.
 - d. L3Harris T&RF shall either order an extra assembly for use in the profile or supply an existing assembly to be used and held at the supplier.
 - e. Before the first production piece is soldered using mass soldering process, the temperature profile must be approved by L3T&RF.

- f. The electronic file name of Temperature Profile documents/records must contain the "Part Number" and "Revision".
- g. There shall be minimum of (5) thermocouples used to determine actual PCB temperatures during profiling and L3Harris T&RF will approve locations; 1) leading edge of PCB, 2) trailing edge of PCB, 3) center of PCB, 4) high mass area of PCB, and 5) low mass area of PCB.
- h. If supplier wants to use less than (5) thermocouples, then L3Harris T&RF must approve thermocouple locations.
- i. Supplier will not be responsible for delays caused by excessive L3Harris approval lead-times.
- j. PCB Assembly used for developing and measuring temperature profile must be marked SCRAP on both sides of PCB Assembly.
- k. Panelized Assemblies:
In the event that panelized assemblies are used in manufacturing, one array shall be fully populated and temperature labels, or some other equitable method, shall be used to validate all other array locations on the panel.
- I. L3Harris T&RF shall be notified when a FAIR for a sub-tier supplier has been placed on order. L3Harris T&RF may elect to audit the FAIR results.
- J. Regular Production – Temperature Profile Verification
 - a. Each production lot must have the temperature profile verified by re-measuring the temperature profile or CM internal verification process must be approved by L3.
 - b. Each temperature profile verification must be compared to the baseline temperature profile approved by L3Harris T&RF.
 - c. Supplier shall keep electronic records of all temperature profiles.
 - d. Any changes to the mass soldering process controls, including but not limited to conveyor speed, zone temperatures, solder temperature, etc., must be approved by L3Harris T&RF.
 - e. Non-reversible temperature labels can be used instead of a temperature profile for verification, if labels are used during baseline temperature profile development and labels are adjacent to at least (1) thermocouple.
 - f. Peak temperature must match the peak temperature of the baseline temperature profile (+/- 5 degrees).
- K. Engineering Design Changes
 - a. Any change in the assembly revision will require an analysis of the applicability of the current temperature profile. Assembly Revision changes will be reviewed by L3Harris T&RF to determine if a new profile is required.
 - b. The supplier will be alerted if the existing profile is not approved for use by L3Harris T&RF
 - c. If a new profile is required the Supplier shall follow the New Products – Baseline Temperature Profile section above
- L. Equipment Calibration
 - a. Supplier must have calibration plan for calibrating equipment used for mass soldering processes and BGA rework stations.
- M. Any deviations for the requirement for an approved temperature profile must be in writing by L3Harris T&RF.

8.0

BGA AND BOTTOM TERMINATION COMPONENTS

- A. RoHS BGAs *may not* be used and if received, L3Harris T&RF must be notified and the BGA's solderballs must be converted to Pb/Sn. XRF testing may be done at L3Harris T&RF if required. Each manufacturer's lot date code must be tested.
- B. All BGA and Bottom Termination attachments must be x-rayed with a real-time machine that can show the interface to the board. Contract Manufacturer process traveler shall have documented evidence of x-ray verification and shall be kept on file.

9.0**TRAVELERS**

- A. When using Supplier's Travelers, supplier may perform steps out of sequence as long as it does not affect the form, fit, or function of the assembly or violate supplier documented processes
- B. When required to use and complete L3Harris T&RF travelers supplier may perform serialization and terminal swaging out of sequence as long as it does not affect the form, fit, or function of the assembly or violate supplier documented processes

10.0**CHANGES OR DEVIATIONS**

- A. Supplier shall not make any changes in design, materials or processes which may affect the acceptability (dimensional, visually, functionally, durability, etc.) of the items to be delivered to L3Harris T&RF without prior notification. For the purpose of this clause, a process is defined as any procedure, system or practice used during the manufacture or production of a deliverable item (i.e. soldering, cleaning, finishing, etc). L3Harris T&RF may require a re-qualification of the part depending on the nature of the change.
- B. Advance notification of a process change shall be communicated to L3Harris T&RF by submitting the Supplier Proposed Process Change Notification-Supplied Part Deviation Request Form FM110-F-0201.
- C. All changes to drawings, procedures and operating requirements of the items on the purchase order must be approved in writing by L3Harris T&RF.
- D. Only L3Harris T&RF purchasing personnel have the authority to change the terms of a purchase order. No other L3Harris T&RF personnel have the authority to approve changes. All changes shall be communicated from the purchasing department and shall be confirmed in writing. A change is defined as any deviation from the purchase order quantity, price, delivery, documentation, terms and conditions, or the form, fit, or function of the item or service purchased. Any deviation from this requirement will be at the supplier's risk and may result in a default of the purchase order at no cost to L3Harris T&RF.
- E. All deviations from build requirements and/or material availability shall require an approved Supplier Proposed Process Change Notification-Supplied Part Deviation Request Form FM110-F0201. This form is found at: <https://www.l3harris.com/all-capabilities/airborne-telemetry>. A copy of the approved form shall be submitted with each approved shipment. NOTE: Assembly Drawings and their respective notations will over rule any assembly conflicts with this document. All piece part shortages must be documented on the "discrepancy and rework sheet" at the end of the traveler or equivalent supplier form.

11.0**PRINTED WIRING BOARDS**

- a. Printed Wiring Boards (PWBs) shall be processed in accordance with GD60059698.

12.0

FOREIGN OBJECT CONTROL Supplier shall maintain a foreign object (FOD) control program with a documented and current plan assuring work is accomplished in a manner preventing foreign objects or materials from entering and remaining in deliverable items. The supplier shall identify a FOD control person responsible for implementing the FOD control program. Supplier shall provide FOD control program training to employees performing operations on L3Harris T&RF FOD sensitive products. Maintenance of the work area and control of tools, parts and material shall preclude the risk of FOD incidents. prior to closing inaccessible or obscured areas and compartments during assembly, The supplier shall inspect for foreign objects/materials. tooling, jigs, fixtures, and test or handling equipment shall be maintained in a state of cleanliness and repair to prevent foreign object damage (FOD). The supplier shall document and investigate all FOD incidents assuring elimination of the root cause. L3Harris T&RF shall have the right to perform inspections, verification and FOD control program audits at supplier's facility to assure program documentation and effectiveness. supplier shall flow down requirements as required to their suppliers to ensure compliance to this requirement.

13.0 COMSEC CONTROLLED DOCUMENTS

DOCUMENT NUMBER:	GD60050691	REV. L	SHEET 5
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- a. Supplier shall maintain a procedure for the management, security, storage, and access for L3Harris T&RF supplied COMSEC documentation. It is the supplier's responsibility to own, implement, and ensure compliance with the requirements defined herein:
 - i. Maintain ownership and not distribute to anyone.
 - ii. Keep log of who has documents at all times.
 - iii. Not to make copies or reproductions.
 - iv. To secure drawings in an unseen area when not in use
 - v. Returned documents to L3T&RF when work has been completed.
 - vi. No foreign nationals can perform work on any parts or view documentation for these assemblies.

14.0

COUNTERFEIT AVOIDANCE SUBCONTRACTORS AND CONTRACT MANUFACTURERS

Only new and authentic materials are to be used in products delivered to Buyer. No counterfeit or suspect counterfeit parts are to be contained within the delivered product. Parts shall be purchased directly from the OCMs/OEMs, or through the OCM/OEMs Authorized Distributor. Documentation must be available that authenticates traceability to the applicable OCM/OEM. Independent Distributors (Brokers) shall not be used without written consent from Buyer (L3Harris T&RF).

Definitions

Counterfeit Electronic Part:

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, 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.

Suspect Counterfeit Electronic Part:

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.

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.

Authorized Distributor (AD):

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 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.

Independent Distributor (Broker) – 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.

15.0

TRACEABILITY

Traceability is required for all subassemblies. Seller shall maintain a traceability system on all electronic/ electrical parts (Turnkey Manufacturing), raw material, mechanical machined parts and consumables used in the manufacturer of subassemblies from receipt at Seller's facility to shipment of the end product to L3Harris T&RF. The system shall provide for two-way traceability.

- A. Traceability forward, where each part can be traced to the next assembly and subsequently to the end product delivered to L3Harris T&RF.
- B. Traceability backward, where each end product can be traced back to an individual part receipt at the Seller's facility, with the original component manufacturer's lot date code.