A TO Z GLOSSARY: CONTRACT MANUFACTURING



AUGUST

FORWARD TOGETHER

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A

Automated Optical ¬Inspection (AOI):
A key technique used to visually inspect and test printed circuit boards for solder and component defects.

Acceptable Quality Limit (AQL):
The maximum number of defective units considered acceptable in a particular sample size. Different AQLs are set for critical, major and minor defects.

Approved Vendor List (AVL):
A list of evaluated and approved suppliers utilized to procure components, parts, raw materials, sub-assemblies and sub-components.

Anti-Static Coats:
Minimizes the generation of electrostatic charges from operators clothing when working on sensitive electronic equipment.

Alpha Prototype Phase:
First iteration of a prototype to be manufactured to address whether the product works and test the resulting aesthetics.

B

Bill of Materials (BOM):
A list of raw materials, components, sub-assemblies, sub-components, parts and their respective quantities required to manufacture the end product.

Ball Grid Array (BGA):
A type of surface mount packaging used for integrated circuits, to permanently mount devices such as microprocessors.

Box Build:
Also called electro-mechanical assembly or systems integration, involves enclosure fabrication, installation of sub-assemblies and components as well as installation and routing of cables, wiring and cable harnesses.

Beta Prototype Phase:
Refines and improves the product design based on testing feedback and learnings from earlier iterations of the product, it more closely resembles the appearance and functionality of the final product.

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C

Computer Aided Design (CAD):
The use of computer software to aid developers in the creation, modification, or optimization of a design or product which can be converted directly to a production machine's format.

Contract Electronics Manufacturer (CEM):
A company which manufactures full or partial products on behalf of Original Equipment Manufacturers.

Contract Manufacturer (CM):
A manufacturer hired under contract to build or assemble full or partial products for their client, it is a form of outsourcing.

Consigned Inventory:
Inventory that is owned by the client but is in the possession of the contract manufacturer such as August Electronics.

Conformal Coating:
The process of applying a thin layer of material that conforms to the contours of a printed circuit board to protect its components from harsh environments and conditions.

D

Design for Manufacturability (DFM):
Designing products in a way that they are easy to manufacture.

Dielectric Withstand Test ("hipot" test):
An electrical test of a product or device to measure the effectiveness of its insulation and its ability to operate safely during amplified electrical conditions.

Defect Tracking:
Tracking of product defects found through testing, inspection, or customer feedback, to improve new versions of future products.

Digital Signal Processor (DSP):
A special microprocessor with architecture optimized for digital signal processing.

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E

Electronics Contract Manufacturing (ECM) or Electronics Manufacturing Services (EMS):
A term used for companies that design, manufacture, test, distribute, and provide return or repair services for electronic components and assemblies for original equipment manufacturers (OEMs).

End of Life (EOL):
Indicating the end of a product's useful life when an OEM stops reworking, marketing, and selling a product.

Enterprise Resource Planning (ERP):
A centralized software system which integrates the management of core business processes.

Electrostatic Discharge (ESD):
The sudden flow of electricity from one electrically charged object to another.

Engineering Change (EC):
A change in design or specification that affects the final product as to require further testing and evaluation.

Engineering Change Notice (ECN):
A document which records and seeks appropriate approvals for changes in design during the prototyping and product life cycle phases.

Engineering Change Request (ECR):
Outlines the suggested improvements or problems that need to be addressed and initiates the change process.

Engineering Change Order (ECO):
Used to outline changes in specifications, components, processes, and documents.

Electro-mechanical Assembly:
Combines procedures and processes of both electrical and mechanical systems, assembling the systems together so they perform as one cohesive unit.

Encapsulation:
See Potting.

End-to-end Electronic Manufacturing Partner:
A manufacturing partner that handles the entire manufacturing process from concept to market, including warranty, refurbishment, and repair services.

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F

First Article Inspection (FAI):
Carried out by both the supplier and the purchaser, the inspection compares measurements and observations of the sample against the given product specifications.

Flexible PCBs:
Printed circuit boards that can bend and accommodate flexible circuit integration and final assembly.

Functional Testing:
A testing method utilized to simulate the electronic assembly's normal functions are working as they are intended to operate.

Final Assembly:
Last stage of the product assembly process, before shipping.

G

Gerber Files:
An electronics industry file format for communicating design information to manufacturers of printed circuit boards.

H

Hand Soldering:
Using solder and a hand soldering iron to secure surface mount components to a circuit board and provide electrical connectivity.

High Volume Low Mix (HVLM):
Where mix refers to the complexity of the PCB assembly, and volume refers to the number of units produced. A high-volume low mix manufacturer produces a high volume of low complexity assemblies.

Human Machine Interface (HMI):
Software application which acts as a medium of communication between manufacturing equipment and its user. Provides status updates and allows for process management and change implementation.

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Integrated Circuit (IC):
A small chip, of semiconductor material usually made of silicon, containing resistors, transistors, and capacitors. For example, timers, microprocessors, amplifiers, or oscillators.

In-Circuit Test (ICT):
Uses electric probes on a populated printed circuit board to check resistance, capacity, shorts, and opens, to determine whether the assembly has been manufactured correctly.

IPC Standards:
The trade association that standardizes assembly and production requirements of electronic equipment and assemblies.

IPC Class 2: The workmanship standard for products requiring continued performance and extended life, where uninterrupted service is desired but not critical and the end use environment would not cause failures.

IPC Class 3: The workmanship standard for products where continued high performance or performance-on-demand is critical, downtime could have catastrophic results. These products are typically used in harsh environments making it critical for the equipment to function when required.

ISO 9001:
International Standards Organization that sets out the criteria for a quality management system (QMS). An ISO 9001 certification indicates the company is able to consistently provide good quality products and services that meet regulatory and customer requirements.

Intellectual Property (IP):
Legal right to images, names, ideas, creations, symbols, inventions, and designs. Protected using a patent, copyright and/or trademark.

Internet of Things (IoT):
Extending internet connectivity to classic devices or equipment which had no previous internet capabilities. Allowing these devices to communicate, interact, and be controlled and monitored in a remote manner.

Incoming Quality Control (IQC):
Quality control for parts and materials required to manufacture a product.

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J

Just-in-Time (JIT):
Inventory system used to minimize waste and costs by aligning material orders with production schedules. Streamlining the production process by receiving goods as they're needed.

K

Key Performance Indicator (KPI):
Measures progress and indicates how effective a business has been in reaching its goals.

L

Land Grid Array (LGA):
A type of surface mount packaging with a rectangular grid of contacts on the underside of a package connected to a PCB by a socket or by soldering it directly to the board.

Lead Time:
The time from initiation to completion of a production process.

Last Time Buy:
When a manufacturer is going to stop producing a product, Last Time Buy is a customer's last chance to order that particular product.

Low Volume High Mix (LVHM):
Where mix refers to the complexity of the PCB assembly, and volume refers to the number of units produced. A low volume high mix manufacturer produces a low volume of high complexity assemblies.

Leaded Manufacturing:
Occurs when leaded solder is used to manufacture printed circuit board assemblies (SMT or THT).

Lead Free Manufacturing:
Occurs when lead free solder is used to manufacture printed circuit board assemblies (SMT or THT).

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M

Moisture Sensitive Device (MSD):
Devices/semiconductors with high moisture sensitivity that require special care for shipping, handling, and storage.

Materials Requirement Planning (MRP):
A software application used to control inventory and plan production, ensures the appropriate levels of inventory are available as needed.

Minimum Order Quantity (MOQ):
The smallest quantity of product a manufacturer is willing to produce and sell at one time.

Material Review Board (MRB):
Holds regular meetings to address and deal with non-conforming products and materials.

Micro Ball Grid Array (uBGA):
Used to mount chips or microprocessors in integrated circuits. uBGA offers more interconnection pins than other chip mounting methods.

N

New Product Introduction (NPI):
An NPI program encompasses all the activities within an organization to define, develop and launch a new or improved product.

Non-Conformance Report (NCR):
Used to address deviations from specifications in manufacturing and initiate corrective actions.

Non-Recurring Engineering (NRE):
The one-time cost of research, design, development, and testing of a new product or product modification.

Non-Disclosure Agreement (NDA):
A legal contract between at least two parties regarding the confidential use of proprietary information, knowledge or materials.

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O

Original Equipment Manufacturer (OEM):
The original manufacturer of a product or component, even if marketed and sold by another manufacturer.

Original Design Manufacturers (ODM):
The original design and manufacturers of a product which is then produced by another company.

Optical Character Verification (OCV):
Inspection of print quality and legibility of an optical character recognition string using machine vision software.

Optical Character Recognition (OCR):
Use of computer software and photoelectric devices to identify printed characters.

P

Printed Circuit Board (PCB):
Flat boards that hold electronic components.

Printed Circuit Board Assembly (PCBA):
Mounting and connecting the required components to a printed circuit board.

Pick and Place Machines:
Used to place surface-mount components onto printed circuit boards. These automated robotic machines are fast and precise.

Potting:
The process of filling a final electronic assembly enclosure with a compound that provides shock and vibration resistance, which also creates a seal against moisture, solvents and corrosion.

Production:
The process of manufacturing from components or raw materials to create a product.

Pilot Prototype Phase:
The final prototype before volume production starts. It is still considered to be a prototype until product quality reviews, approvals, final testing and certifications are completed.

Prototyping:
The early model of a product built to prove the concept/design and is used to develop aspects of the finished product's aesthetics as well as provide information on the production process, techniques, materials and costs.

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P

Programmable Logic Controller (PLC):
An industrial computer designed to control robotic equipment during the manufacturing process.

Product Lifecycle Management (PLM):
The management of a product as it moves through its lifecycle from development to growth, maturity and decline.

Q

Quality Control (QC):
Inspection and testing to ensure product's quality standards are met.

Quality Assurance (QA):
Managing every stage of the production process to ensure products are manufactured without defects and to the desired level of quality.

Quality Management System (QMS):
Policies, procedures, and processes focused on meeting or exceeding requirements and customer satisfaction.

Quad Flat No-Leads (QFN):
Physically and electrically connect integrated circuits to printed circuit boards without through-hole leads.

Quarantine:
When work on a repair item needs to be postponed due to circumstances outside of the contract manufacturer's control and are typically moved to a specified quarantine area.

R

Rigid-flexible PCBs:
Rigid printed circuit boards with flexible interconnects and cabling

Radio Frequency (RF):
Oscillation rate of electromagnetic radio waves in the range of 3 KHz to 300 GHz.

Radio-frequency Identification (RFID):
Using radio signals to detect the presence of an object, product, animal, or person, equipped with an RFID tag.

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R

Request for Quotation (RFQ):
Recognized business practice inviting suppliers to bid on specific products, services, or entire projects.

Request for Information (RFI):
Gathers written information about the capabilities of perspective suppliers, for comparison.

Return Material Authorization (RMA):
First step of the return process when a manufacturer is contacted by a customer regarding a warranty issue. The manufacturer communicates with the customer regarding the nature of the problem and issues an RMA if applicable.

RoHS Compliance (Restriction of Hazardous Substances):
Restricts the use of ten hazardous materials (with exceptions) found in electronic and electrical equipment to reduce occupational exposure during manufacturing and reduce toxic electronic waste.

Return on Investment (ROI):
Measures the gain or loss generated on an investment relative to the amount of resources invested.

Repair, Refurbishment, Rework:
The act of reprocessing or repairing non-complying or non-conforming products in a manner that assures compliance to the applicable drawings or specifications.

Reflow Oven:
A machine used primarily for reflow soldering of surface mount electronic components to PCBs.

S

Surface Mount Technology (SMT):
Type of components that are placed on to and soldered onto the top surface of the board. Typically mounted by pick and place machines and soldered into place in a reflow oven.

Solder Paste Inspection (SPI):
An automated inspection system that detects and evaluates any missing or insufficient solder paste areas on PCBs.

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Supply Chain Management (SCM):
Involves procuring, managing, storing and providing visibility on raw materials, work-in-process inventory and finished goods from point of order through to delivery.

Selective Solder Machine (SSM):
The process of selectively soldering components to PCBs that could be damaged by the heat of a reflow oven or wave soldering in a surface-mount technology (SMT) or through-hole technology (THT) assembly processes.

Soldering:
The process in which components are attached to the PCB by melting and putting a filler metal (solder) into the joint. Soldering typically involves leaded or lead-free solder.

Solder Wire:
Typically applied manually using a soldering iron in contact with the surface of a PCB and is melted to form a solder connection.

Solder Bars:
Used in the wave solder pot for automated PCB wave soldering.

Stock Keeping Units (SKU):
A number assigned to a component or product to identify the price, product options, manufacturer and are also used to track inventory.

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T

Through Hole Technology (THT):
Type of components that are mounted to the board by inserting their leads through holes drilled into the board, the leads are soldered by wave or by hand into place on the opposite side of the board.

Total Quality Management (TQM):
An approach that considers all quality measures at every stage of production working to improve quality and performance to meet or exceed customer expectations.

U

UL Standards:
Underwriters Laboratory Nationally Recognized Standards for Safety is a global safety standards developer and certification company that provides safety standards. UL is approved to conduct safety testing by OSHA across various industries such as electronics.

W

Wave Soldering:
An automated soldering process using waves of molten solder to attach electronic components to a printed circuit board.

Work in Progress (WIP):
An unfinished project that is still being added to or developed.

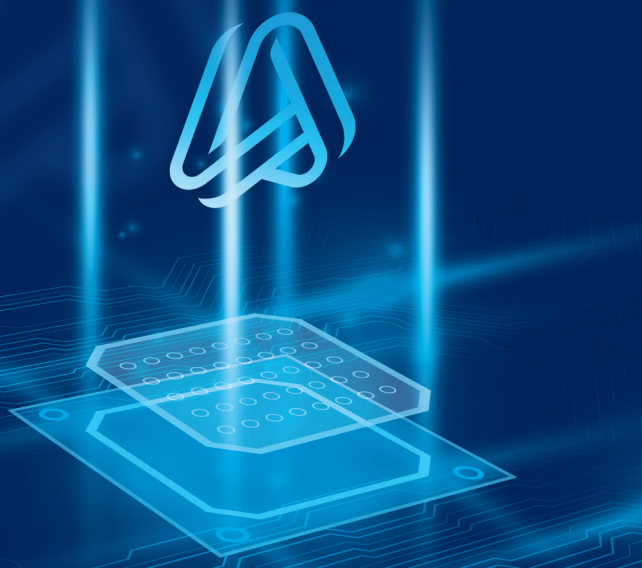
X

X-ray Testing:
Quality assurance testing method used in production to inspect and verify solder joints for accuracy and connectivity, inside the board as well as inside all components on the board.

ABOUT AUGUST

We deliver advanced technical expertise, innovative manufacturing solutions, dedication with a high level of quality and service to all of our client-partners. Flexibility, reliability and results make us the preferred partner for Electronic Manufacturing Services (EMS).

August Electronics can be your strategic business partner and create a stable supply chain and manufacturing environment with rigorous testing, quality control and assurance. We will collaborate diligently to earn your trust – because when you succeed, we succeed.



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403-273-3131

1810 Centre Ave N.E.
Calgary, AB T2E 0A6

info@aeicm.com

aeicm.com

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