PRINTED CIRCUIT BOARDS: POWER ASSEMBLY

Présenté par

gentec

Presentation Overview

01 **Our Team**
Short presentation of Gentec

02 **General Assembly**
Overview of PCB assembly process

03 **Design**
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04 **High Power**
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05 **Process Adaptation**
Demanding configurations for production

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About Gentec

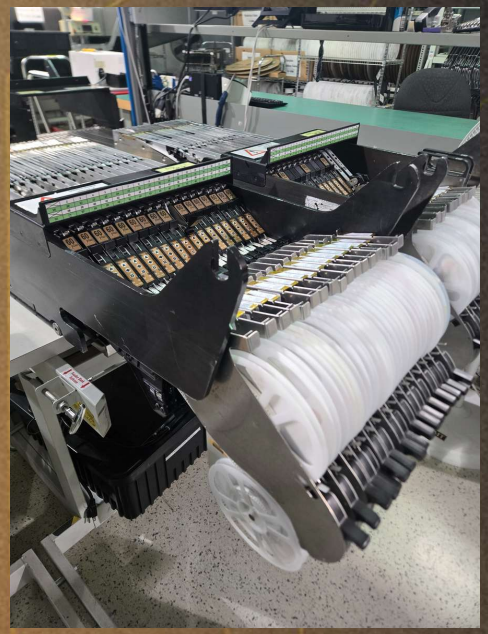
Gentec designs and manufactures customized solutions and products in the fields of high-tech electronics, power, and energy management. Since 1959, Gentec has maintained its leading position in this sector.

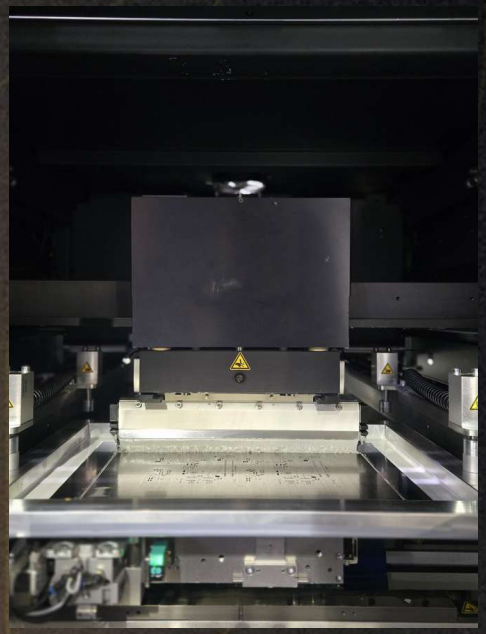
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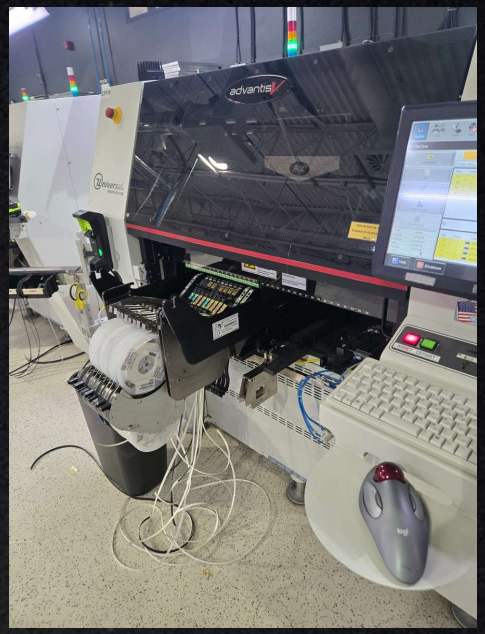


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Surface Mount Technologies





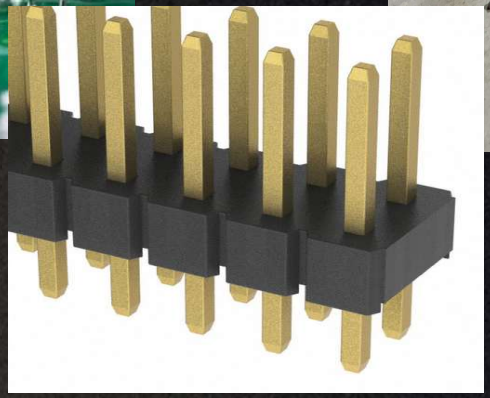




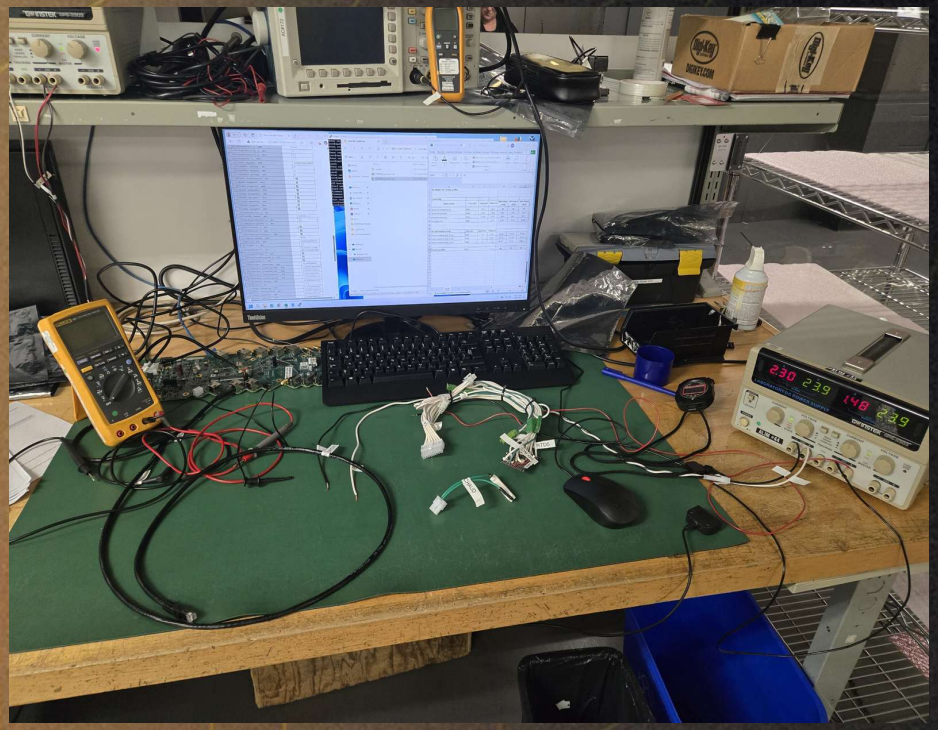
Through Hole Technology







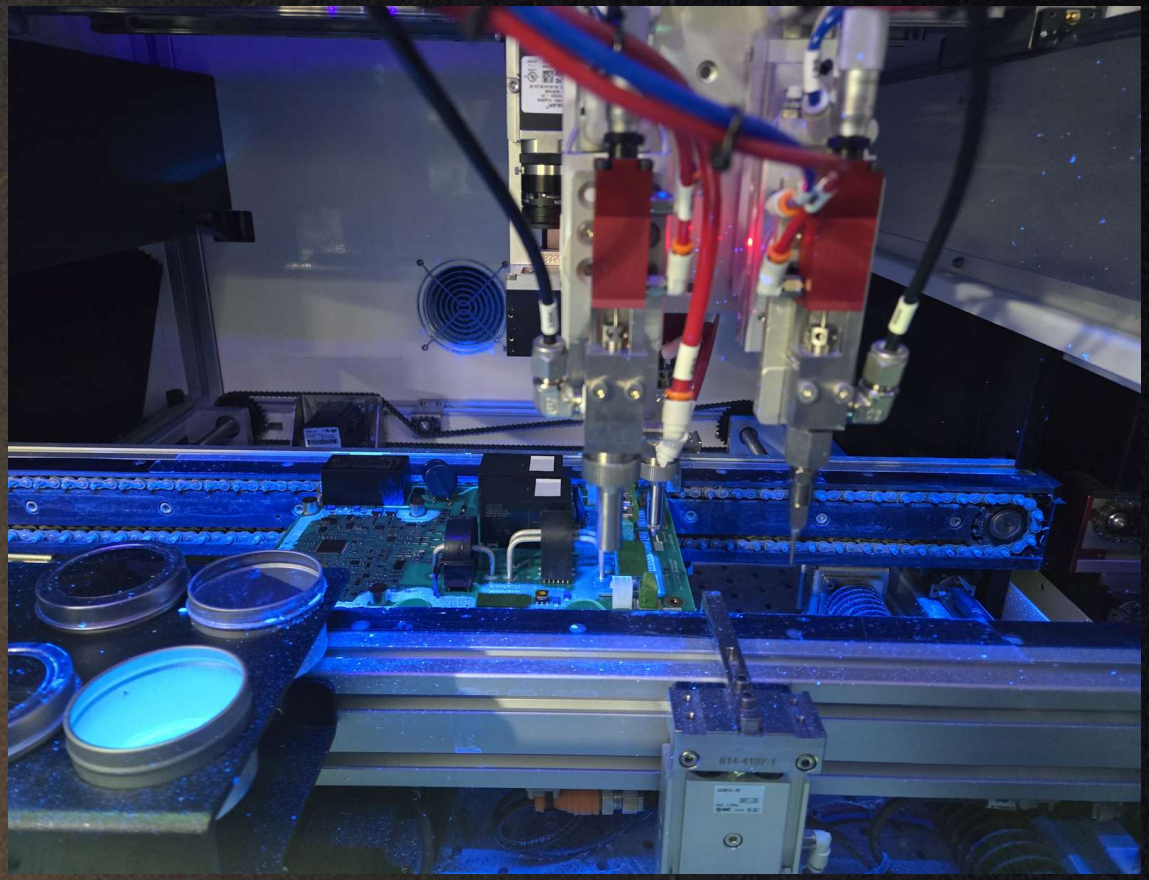
Functionnal tests







Coating

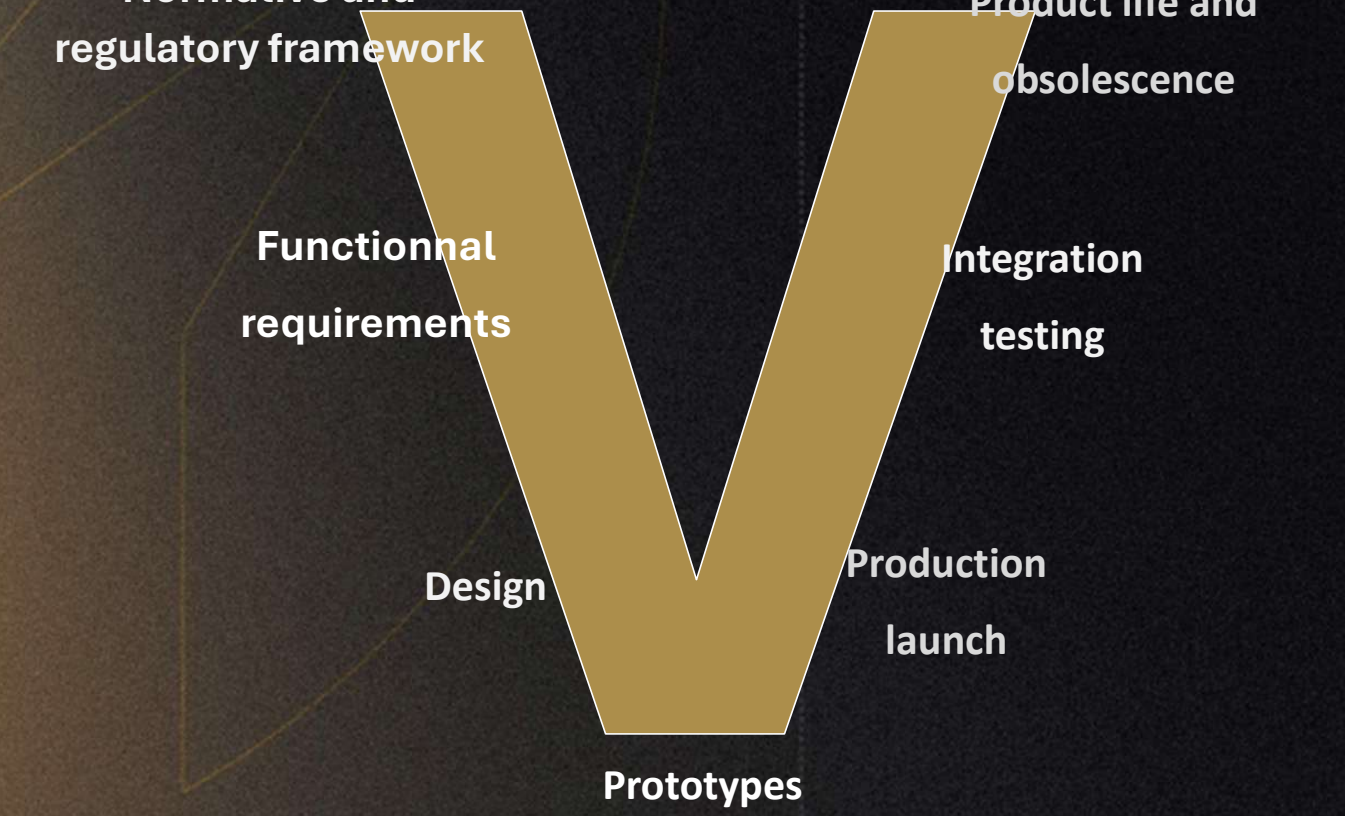




Product design

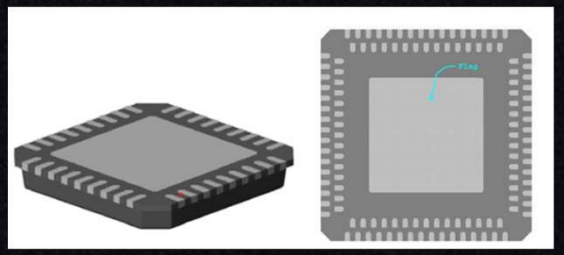
From the beginning of the project, it is important to have a clear and comprehensive vision of the product. This will allow for the optimization of production processes and cost reductions based on the product's lifespan.

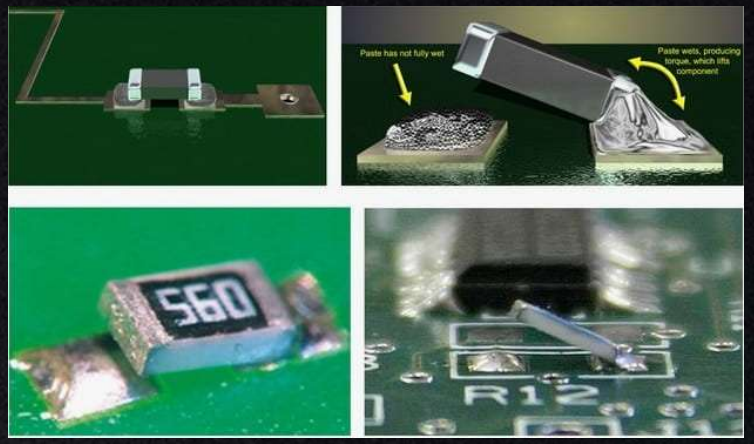
From design to production



Process considerations

- Board Size (Minimum Panel Size: 2' x 2'; Maximum Panel Size: 18' x 20')
- Component Selection: Verify SMT compatibility and solder profile (Lead-free: 260°C; Leaded: 230°C)
- Packaging: Prioritize QFP/BGA over QFN when possible
- O201 form factor and larger
- Component Placement (Equal Heat/Weight Distribution)
- 5mm (200 mils) clearance and/or edge clearance on each side.
- Through-hole components on one side only.
- 5mm (200 mils) clearance between through-hole solder points and SMT components.
- Presence and position of fiducials (not mirrored between top and bottom)







High Power

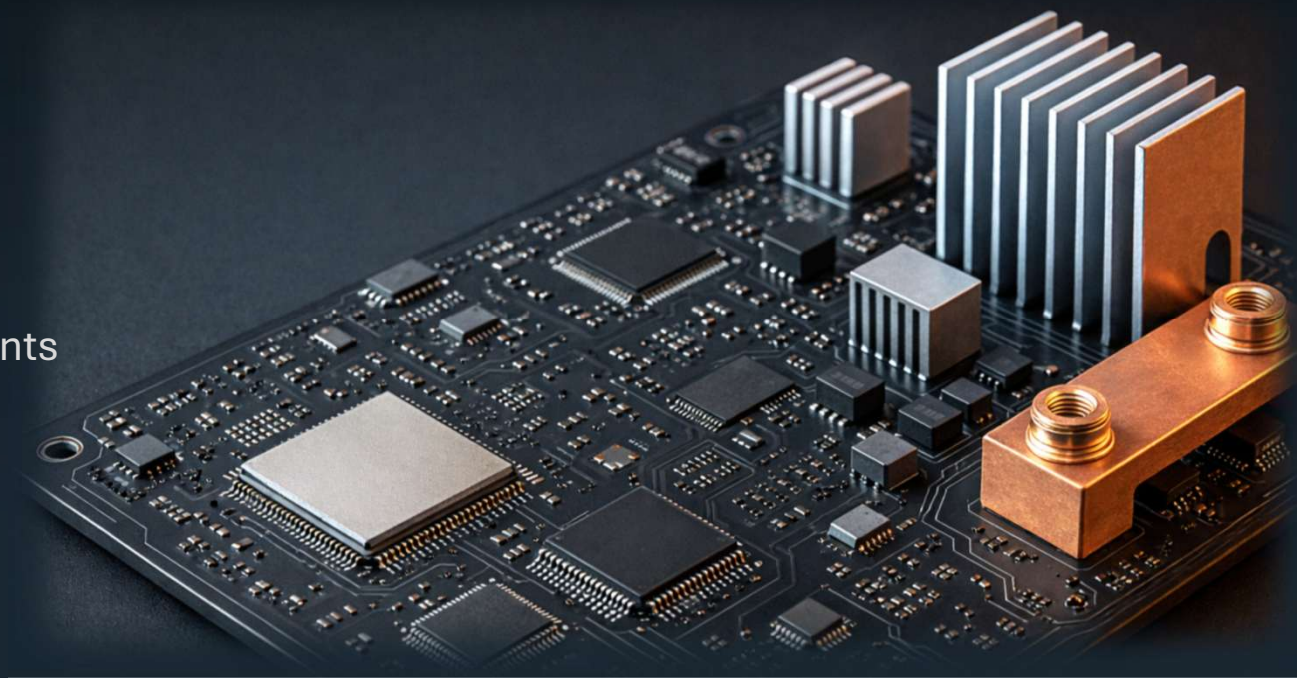
CONVENTIONNAL ELECTRONICS

- Weak high frequency signals
- Miniaturized components
- Limited thermal capacity
- Controlled Environment

POWER ELECTRONICS

- High current and/or high voltage
- High intensity solid state components
- Critical thermal mass
- Reliability in extrem condition

  (heat – vibration – humidity)



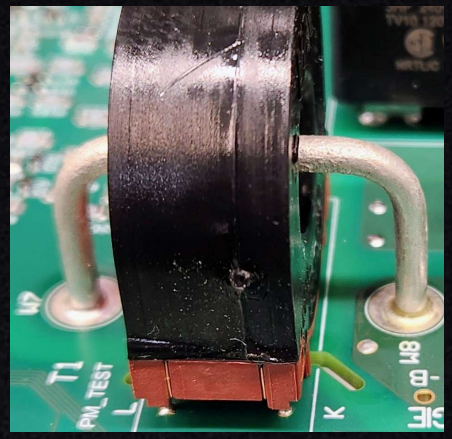
Specific component challenges

- Multi layer (above 10), heavy copper boards (above 8 oz)
- Metal heatsink (air flow, local thermal profile disruption)
- Open case components (flux infiltration)
- AC/DC voltage converters (mezzanines)
- Connection terminals (100% one way reflow)

- Inductors (weak winding connections)

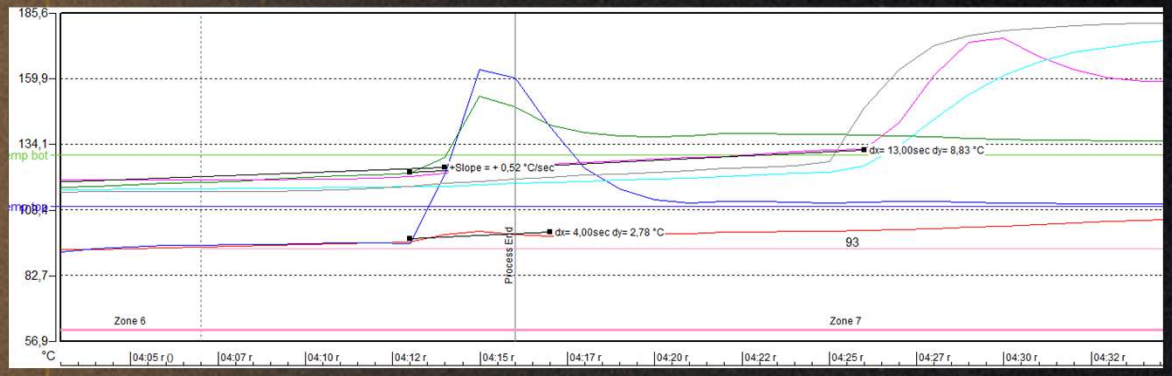
- Filtering SMT components (thermal shock)





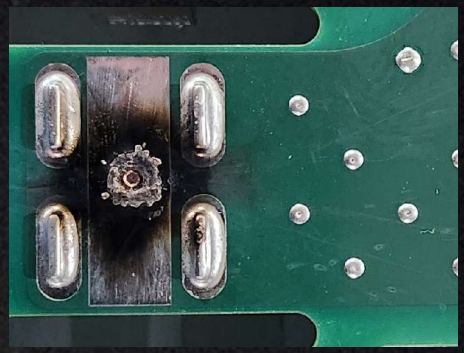
Process Adaptation

- SMT Profile
  - Multiple zones oven for more resolution of the thermal profile
  - Slower profiles to get uniform temperature of copper mass
- Wave Profile
  - Multiple zones preheat with various technologies (short wave, medium wave, long wave)
  - Nitrogen inertization



Process Adaptation

- Alloy selection
- Flux selection
- Rework capacity
    - Stand alone preheat devices (oven, hot plate, heat gun)
    - Optimized iron tips for maximum surface contact
    - Compatible low temp alloys
- Testing capacity
    - Ensure load capacity of facility
- Test station security
    - Enclosed station
    - Finger safe equipments



Process Adaptation

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