



Intensive Course on Electrical Contacts and Connector Design for Electronics and Microelectronics Applications



Duration: Three Full Days

Time: 9am - 5pm

Registration starts at 8.30am

Location: Singapore

Email Us at resources@wizlogix.com to Register!



Background

Electrical connections are often the weak links in electrical and electronic systems. A knowledge of the causes of degradation of electronic connections, and means of mitigating these through good design, can lead to substantial improvement in system reliability. To achieve these objectives, scientific and technical personnel must understand the basic principles of electronic connections.

Who Should Attend?

All levels of scientific and technical personnel involved in the design, development, testing and failure analysis of electrical connections in power and electronic systems, and microelectronic packages.



Learning Objectives

The Course takes a fundamental approach and emphasizes the fundamentals of electrical contacts, electrical conduction through metallic constrictions over a wide frequency range. The Course also covers key electrical and mechanical properties of contact materials, effects of friction on separable electronic connections, properties of electroplates. The root causes of connector degradation, such as oxidation, fretting, galvanic corrosion, inter diffusion etc. are addressed in detail.

An important component of the Course focuses on guidelines for connector design, with examples of design approaches for separable connectors and crimp connectors.

One important feature of the Course is the assignment of class exercises. These problem-solving exercises will be carried out in small designated groups. In particular, the Design component of the course includes a class exercise in the design of a specified separable connector.

Course Content

Day 1

ELECTRICAL CONTACT FUNDAMENTALS

- True Contact Area in an Electrical Contact

- Influence of Mechanical Load on Contact Resistance
- Temperature in an Electrical Contact and Interconnect
- Inter diffusion at Electrical Interfaces
- Effects of Surface Layers on Contact Resistance
- Skin Effect and Contact Resistance at High Signal Frequencies

MECHANICAL WEAR IN ELECTRICAL CONTACTS

- Fundamentals of Friction, Lubrication and Mechanical Wear in Electrical Contacts
- Degradation of Separable Electronic Connectors due to Mechanical Wear (Adhesive Wear, Fretting etc...)

Day 2

ELECTROPLATES, LUBRICATION AND CORROSION IN ELECTRICAL CONTACTS

- The Use of Electroplates in Connectors, Including Lead-Free Tin
- Corrosion in Separable Electrical/Electronic Connectors
- Mitigation of Contact Degradation of Separable Electronic Connectors Through Lubricant Use
- Failure Mechanisms of Interconnects in Microelectronic Packages (Inter diffusion and Electro migration)

CONNECTOR MATERIALS

- Metallurgy “Made Simple”
- Metallurgical Properties of Contact Materials

Day 3

ARCING CONTACTS

- Overview of Arc Generation in Electrical Contacts
- Examples of Arcing Contact Failure in Automotive Applications

CONNECTOR DESIGN GUIDELINES

- Fundamentals of Connector Design
- Example of Separable Connector Design
- Class Exercise: Design a Specific Separable Connector
- Principles of Crimp Connector Design
- Design Challenges in MEMS Structures

Course Facilitator

Dr. Roland Timsit spent 20 years in R&D with one of the world's largest aluminum companies, where he focused on electrical connections with power conductors, thermal contacts, surface modification, lubrication, brazing, electrical conductor alloys etc... In 1994, Dr. Timsit joined AMP Inc. (now TE Connectivity) as Director of Research and was later appointed Director of Technology and Chief Technologist. He is recipient of the 2005 IEEE Erle Shobert Best Paper Award and the 1998 IEEE Ragnar Holm Achievement Award in the field of electrical contacts. He is recipient of three additional international awards relating to electrical contacts and metal joining. Dr. Timsit is an instructor at the IEEE Intensive Course on Electrical Contacts. He is author of over 130 papers and holds 16 patents. He is currently President of Timron Scientific Consulting Inc., Toronto, Canada.



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