

INTENSIVE COURSE ON ELECTRICAL CONTACTS AND CONNECTOR DESIGN FOR ELECTRONICS AND MICROELECTRONICS APPLICATIONS

9 –11 June 2025 Hampton Inn Bedford Burlington, 25 Middlesex Turnpike, Billerica (Boston Suburb), MA 01821 Tel. 978-262-9977

Organized by TIMRON ADVANCED CONNECTOR TECHNOLOGIES

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.

COURSE DESCRIPTION

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, interdiffusion 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.

Another important feature of the Course is the assignment of class exercises. These exercises will be carried out individually by participants or in small groups. In particular, the Design component of the course includes a class exercise covering the design of a specified separable connector.

COURSE OUTLINE

Day 1

ELECTRICAL CONTACT FUNDAMENTALS

1. True Contact Area in an Electrical Contact
2. Influence of Mechanical Load on Contact Resistance
3. Temperature in an Electrical Contact and Interconnect
4. Interdiffusion at Electrical Interfaces
5. Effects of Surface Layers on Contact Resistance
6. Skin Effect and Contact Resistance at High Signal Frequencies

MECHANICAL WEAR IN ELECTRICAL CONTACTS

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

Day2

ELECTROPLATES, LUBRICATION AND CORROSION IN ELECTRICAL CONTACTS

1. The Use of Electroplates in Connectors, Including Tin, Palladium, Gold, Silver etc..
2. Corrosion in Separable Electrical/Electronic Connectors
3. Mitigation of Contact Degradation of Separable Electronic Connectors Through Lubricant Use
4. Failure Mechanisms of Interconnects in Microelectronic Packages (Interdiffusion and "Wet Electromigration")

CONNECTOR MATERIALS

1. Metallurgical Properties of Contact Materials
2. Effects of Heat Treatment and Aging of Metal Alloys

Day3

ARCING CONTACTS

1. Overview of Arc Generation in Electrical Contacts
2. Arcing in Sliding/Fretted Electrical Contacts

CONNECTOR DESIGN GUIDELINES

1. Major Connector Technologies (separable connectors, Pogo pins, Insulation Displacement Connectors, press fit, crimp connectors, screw connectors, solder joints, ultrasonic welding)
2. Fundamentals of Connector Design
3. Example of Separable Connector Design; overview of connector performance at high frequencies
4. Crimp Connector Design and Reliability

WHO SHOULD ATTEND

The Intensive Course is intended for all levels of scientific and technical personnel involved in the design, development, testing and failure analysis of electrical connections in electronic and power systems, including switches.

GENERAL INFORMATION

SCHEDULE

Days 1 - 3: 8:00 am - 5:00 pm
Lunch break : 12:15 pm - 1:15 pm

REFUND

Advance registration, as indicated on the Registration Form, is required. Total enrolment will be limited. Organizers reserve the right to cancel the Course (with a full refund of fees) if advance registration is inadequate. Timron Scientific Consulting Inc. will update registrants on a change in status, by 23 May 2025 at the latest.

CANCELLATION AND SUBSTITUTION

Full refund of registration fee, less US\$ 200.00, will be made for cancellations received before 23 May 2025. Fees will not be refunded for cancellations on or after this date. Delegate substitution is permitted up to and including the day of the Course.

ACCOMMODATIONS

A block of rooms is being held at the Hampton Inn, Billerica (Boston suburb), MA, at a special group rate of \$ 154.00 for a double-bed room. Make your own accommodation arrangements by contacting the hotel at 978-262-9977, and asking for the **Timron Course** group rate. The special rate expires on 23 May 2025.

INSTRUCTOR

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, lubrication, metal working processes, brazing, electrical conductor alloys etc... Subsequently 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 two IEEE Best Paper Awards and the IEEE Ragnar Holm Achievement Award in the field of electrical contacts. He is also recipient of two 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 138 papers and holds 19 patents. He is currently President of Timron Scientific Consulting Inc., Toronto, Canada, a company focusing on the design/testing/failure-analysis of electrical connectors and switches.

REGISTRATION FORM

INTENSIVE COURSE ON ELECTRICAL CONTACTS AND CONNECTOR DESIGN FOR ELECTRONICS AND MICROELECTRONICS APPLICATIONS

Name: _____

Company: _____

Title: _____

Address: _____

City: _____

State/Province/Country: _____

Zip/Postal Code: _____

Phone: _____ FAX: _____

Email: _____

REGISTRATION FEE

(includes a Manual of over 400 pages of Course Notes)

Before 23 May 2025 US\$ 1,950

On or After 23 May 2025 US\$ 2,075

Enclosed is a payment for US\$ _____

A discount of 10% is offered for each of two or more attendees from the same company.

PAYMENT MUST ACCOMPANY REGISTRATION FORM

Please make your check payable to:

Timron Scientific Consulting Inc.,

VISA, MasterCard and American Express credit cards are accepted. An overcharge of 3.0% will be added to payments by American Express.

Charge my _____ Card (please specify)

Card #: _____ Exp. _____

Name on Card: _____

Signature: _____

We recommend payment by check, or invoicing if you provide a purchase order number, to preclude possible credit card account charges by your bank.

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