

# EOS/ESD Association, Inc. Tutorials in Singapore

**Lifelong Learning Institute**  
**11 Eunos Road 8, Singapore 408601**  
**August 16-19, 2021**

## Essentials for ESD Programs Factory: Technologies • Controls • Procedures

**AUGUST 16-17, 2021 9:00 AM - 5:00 PM**

*Marcus Koh; Bernard Chin, Qorvo*

This Seminar offers a broad exposure to the essentials of ESD control systems and programs. It offers a two-day comprehensive set of factory technologies and procedures designed for managers, technicians, and specialists desiring ESD control program training and information. The key concepts and information from the courses listed have been selected for this two-day seminar. Demonstrations and videos are included in this seminar. Examples of electrostatics and ESD calculations are included where appropriate throughout the seminar.

- ESD Basics for the Program Manager
- Ionization and Answers for the Program Manager
- Packaging Principles for the Program Manager
- System Level ESD/EMI: Testing to IEC and Other Standards
- Cleanroom Considerations for the Program Manager
- How To's of In-Plant ESD Survey and Evaluation Measurements
- Device Technology and Failure Analysis Overview
- Electrostatic Calculations for the Program Manager and the ESD Engineer
- ESD Standards Overview for the Program Manager
- ESD Program Development & Assessment (ANSI/ESD S20.20 Seminar)

### DAY 1 August 16

#### PART I (9:00 AM-12:30 PM)

This section reviews the fundamentals of electrostatics, charge flow, electric field and voltage. The concept of capacitance and the fundamental relationship,  $Q = CV$ , is introduced and explored with demonstrations and videos. The practical application of these concepts to the measurement of resistance, fields and voltages, and the relevant standards are reviewed and demonstrated.

### DAY 2 August 17

#### PART III (9:00 AM-12:30 PM)

Key ESD technical areas are reviewed such as air ionization, ESD-safe packaging, cleanroom principles and electrostatic attraction. Standards relevant to these areas are described.

#### PART II (1:30 PM-5:00)

The principles from Part I are then applied to grounding principles and standards, measurement of charge, standard models for ESD (i.e., human-body model and charged device model), and static induction with demonstrations and videos. Very simple and basic ESD protection circuit concepts and relevant failure analysis techniques are introduced and reviewed.

#### PART IV (1:30 PM-5:00)

The final section includes charge generation test methods, additional ESDA standards, system-level ESD standards and testing, practical auditing techniques and strategies, and ESD event detection. The tutorial concludes with a review of ESD Protected-Areas (EPAs), ESD Program Management and the application of ANSI/ESD S20.20.

**Setting the Global Standards for Static Control!**

EOS/ESD Association, Inc. 7900 Turin Rd., Bldg. 3 Rome, NY 13440-2069, USA

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## ESD Basics

**AUGUST 18, 2021 9:00 AM - 12:30 PM**

*John T. Kinneer, IBM Corporation*

This talk will discuss the fundamental causes of ESD and its control. It includes how ESD impacts industry, with brief explanations of charge generation, field measurement, the role of capacitance and voltage, charge measurement, and charge decay. Device failure mechanisms, including the respective test models like Human Body Model or Charged Device Model, will also be explained. The tutorial will discuss how to protect ESD sensitive devices and assemblies, give definitions of an Electrostatic Protected Area (EPA), and show how to assess the risk in an automated production line.

## FC140: System Level for the Program Manager

**AUGUST 18, 2021 1:30 PM - 5:00 PM**

*John T. Kinneer, IBM Corporation*

Certification: PrM

This tutorial is intended to help those tasked with testing products to IEC and other system level ESD standards by providing detailed information on IEC 61000-4-2, the most widely used standard, and highlighting the harmonization and differences among IEC, ANSI, Telcordia, and some automotive ESD standards. We will answer common questions regarding test set-ups, test points, and procedures, and address key issues, including: 1) Differences between “verification” and “calibration” and when is each required; the influence of ESDA WG14 technical report (TR) on IEC and how it affects the calibration and verification procedures. 2) Test set-up requirements, the test environment, ground connections, and return paths and ground plane effects. 3) Testing procedures with demonstration on actual products, how the tester affects test results, and problems with test result variations due to simulator influences. 4) What points need to be tested and why, guidance on determining “operator accessible” points and ports, exempted points and ports, and what to do around connectors and connector pins. 5) ANSI and other ESD standards, the drive toward harmonization with IEC, why standards will probably never be the same as IEC, and the scope of different standards. This system level ESD tutorial will cover several facets of ESD as applied to electronic systems.

## Compliance Verification and Auditing

**AUGUST 19, 2021 9:00 AM - 5:00 PM**

*John T. Kinneer, IBM Corporation*

Compliance verification is one of the required elements in the ANSI/ESD S20.20 standard. Without periodic verification of the ESD materials used within an Electrostatic Protected Area (EPA) programs can degrade over time. This course will cover some of the items that need to be considered for a successful compliance verification program. Topics covered in this program include,

- What is a compliance verification program?
- What is the difference between product qualification and compliance verification?
- How does the ESD program manager determine the frequency of testing?

As part of the course, common ESD control items will be covered and how to do the testing efficiently and to meet the requirements of ANSI/ESD S20.20 and TR53. Questions can be submitted in advance to be answered as part of the course. This online course will also outline the steps that you should take to examine your process before you audit your line or even leave your office. A systematic approach will be explained on the logical steps to take for ESD troubleshooting. Only after such an analysis should you go on the line for measurements or assessments.

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## MEET THE INSTRUCTORS



Bernard is the Corporate ESD Program Manager for Qorvo in Asia. Prior to joining Qorvo, he was the Corporate ESD Program Manager at United Test and Assembly Center (UTAC) and was also responsible for the ESD control program at the Integrated Circuits Business Division of Hewlett-Packard Singapore. Bernard has more than 28 years of experience in the area of ESD control management.

In his role as Corporate ESD Program Manager, Bernard is responsible for the ESD control program for Qorvo and actively leads manufacturing and test factories (both internal factories and OSATs) to obtain compliance to ANSI/ESD S20.20 facility certification requirements. He actively presents technical papers at various EOS/ESD symposiums organized by the ESD Association and serves as a Technical Program Committee (TPC) member for the EOS/ESD Symposium and ESD Association Manufacturing Symposium. Besides being active in the area of ESD control, Bernard has also contributed technical papers in the area of failure analysis. He has published papers in IEEE sponsored symposiums, ASM International sponsored symposiums, the Semiconductor International journal and the HP Journal. Bernard has also held various committee appointments in the IEEE Rel/EDS/CPMT (Singapore chapter), and in the steering committee and Technical Program Committee of the IEEE sponsored symposium for integrated circuit failure analysis, IPFA. Bernard graduated from the State University of New York at Buffalo with a BS in Electrical Engineering (Distinction and Honors). He is an ESD Association Certified Professional ESD Program Manager, a TR53 certified professional ESD Technician and an iNARTE certified ESD Engineer.



John Kinnear is an IBM senior engineer specializing in process & system technology, and facility certification in accordance with ANSI/ESD S20.20. He has a BS degree from University of Buffalo and a MS degree from Syracuse University. John is well known globally for his technical contributions to national and international standards. He has been the IBM ESD site coordinator for the Poughkeepsie site since 1989. He is past chairman of the IBM inter-divisional technical liaison committee for ESD protection and is an important member of his company's committee to develop and implement the ESD corporate program for IBM. John has coordinated the testing of large mainframes for compliance to EMC, safety, environmental, shipping, and volatile organic emission standards. He has also been the lead engineer on testing large mainframe systems to EMC emissions and immunity standards for FCC, CE Mark, VCCI, and other national requirements. As a member of EOS/ESD Association, Inc., since 1990, John has served in several standards development committees as well as association management positions. John is the appointed technical adviser to the United States National Committee/IEC technical committee 101, where he represents the United States to the International Electrotechnical Commission (IEC). In this

position he assisted in the evolution of international ESD standards and supports international adoption of ANSI/ESD S20.20. As chair of the ESDA's facility certification (ANSI/ESD S20.20) development program, John played major roles in the program's development and industry launch. In particular, John coordinated the initial development of lead assessor training, ISO registrar certification, and witness audits. John has served in every EOS/ESD Association, Inc. officer's position, including vice president, senior vice president, and president. He is the past chairman of the EOS/ESD Symposium technical program committee and past general chairman of the 2004 EOS/ESD Symposium. For his contributions to EOS/ESD Association, Inc., John was presented with the outstanding contribution award in September 2006.



Dr. Marcus Koh is an ESD Association (ESDA) Certified ESD Professional-Program Manager, ESD TR53 Certified; and iNARTE Certified ESD Engineer. He was the instructor, technical session speaker, publicity chair and co-sponsor for various ESDA Asian EOS/ESD Manufacturing Symposiums from 2012 to 2019, in Singapore and Malaysia. He has numerous technical publications in Conferences, Transactions, Journals and Symposiums. He has been proactive in supporting EOS/ESD matters in electronics assembly and manufacturing industries across Asia Pacific. His English and Mandarin (Chinese) workshops are closely associated with ANSI/ESD S20.20 & IEC61340-5-1 standards & best practices, and instrumental in guiding ESD practitioners in the region, leading them toward iNARTE ESD Control Certification. Marcus studied at the Nanyang Technological University, graduating with a Bachelor of Engineering (First Class Honors) and a Doctorate of Philosophy. There, he was awarded the PUB Book Prize for outstanding performance in the subject "Power Electronics and Drives". Subsequently, he was on the Dean's List, and ranked as among the best in his graduating class. Marcus' current research area is in andragogy, lifelong learning, competency based training, artificial intelligence, system reliability and solving stochastic problems using statistical modelling.

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First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Street: \_\_\_\_\_ City: \_\_\_\_\_

State/Province: \_\_\_\_\_ Country \_\_\_\_\_ Zip/Postal Code: \_\_\_\_\_

Address is (please circle the one that applies) Home or Company

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

## Tutorial Selection

- |  |           |
|--|-----------|
| <input type="checkbox"/> August 16-17 Essentials for ESD Programs Factory:<br>Technologies • Controls • Procedures | \$680 USD |
| <input type="checkbox"/> August 18 ESD Basic and FC140: System Level for the Program Manager                       | \$460 USD |
| <input type="checkbox"/> August 19 Compliance Verification and Auditing  | \$460 USD |

**Register Online at:** <http://www.cvent.com/d/dhqzmn>



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