

## **PSMA Capacitor Committee Minutes & Action List**

### **Attendees September 7, 2022**

Fred Weber – Future Technology Worldwide

**Stephan Menzel - CapXon**

**Frank Puhane – Würth**

**Andrew Mikulski – KEMET**

Ada Cheng – AdaClock

Beth Massey – TEA - The Energy Authority

Brian Sparks - FEDCO

Caleb Breazeale – Independent

Connor Carr – WL Gore

Ed Herbert – PSMA – Magnetics Workshop

Ed Lobo – CDE

**Eduardo Drehmer – TDK**

Eric Schneider - Independent

Hengzhao Yang – New Mexico Institute of Mining and Technology / IEEE

Henry Lee - CapXon

Joe Horzepa – PSMA

**John Horzepa - PSMA**

Jon Izkue Rodriguez - Würth

Kevin O'Connor – Caporus Technologies

Mark Scott – Miami U / IEEE

Matt Wilkowski – Magnetics Committee – Workshop

Mike Cannon - TDK

Mike Dombrow – Faratronic

Mike Dombrow Jr – Faratronic

Mike McGeachie – FAE Cornell Dublier

Nick Visic – AISHI Capacitors

Norm Schutzkus – Richardson Electronics

Peter Victor - Fedco

Phil Whitmire – CDE

Raj Pulugurtha – Florida International University

Rene Kalbitz -Würth

Rob Haywood – Gore

Scott Franco – CDE

Thomas Gietzol – Collins

Victor Boyadzhyan – Midcon Instruments & Avionics

Liaisons:

**Energy Storage** - René from Würth was suggested

**Magnetics** – Frank Puhane - Würth

**Semiconductor** - TDK?

**Reliability** - Stephan Menzel - CapXon

**Transportation** – Connor Carr - Gore

**Next Meeting Wednesday, October 12,**  
**2022 at 10:00 CDT**

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### **Updates for September 7, 2022:**

A) 1<sup>st</sup> Webinar – 18<sup>th</sup> of October ca. 45min

Topic: Capacitor Basic 201 – Cap Technologies and Parameters

Agenda for next Board Meeting (16<sup>th</sup> of September)

Andrew (Yageo/KEMET) and Eduardo (TDK) check internally, If they can contribute material for 1<sup>st</sup> or 2<sup>nd</sup> webinar

Webinar will cover basic but important parameters of capacitors as well as introducing all major cap-technologies Film, Ceramic, Al E-Caps an Tantalums

2<sup>nd</sup> Webinar – December / January

Topic: Datasheet & Cap Selection

Presenters and deeper content will be scheduled in October meeting

B) Workshop – Application focused

Special Project Nomination form is prepared and will be shared with PSMA shortly

Approaching the earlier discussed potential speakers

Workshop is announced by last PSMA Newsletter

C) Industry Session – WBG and focus on end users

Industry Session requested / planning sent in  
Speakers will be requested within next week

4-6 speaker session is planned, and Andrew will start reaching out to potential speakers for their participation

Andrew will lead as chair for Industry Session and Frank and Stephan will support him as Co-Chairs and in case of any situation to have a backup plan.

## **PSMA Capacitor Committee Minutes & Action List**

D) Motivation Mailing before next committee meeting to mailing list of Capacitor list – Frank will take care on this

### **Updates for August 8, 2022:**

#### **A ) Webinars:**

>> possible on Tuesdays / Thursdays

At least a month heads up for promo and arrangements

Webinar Schedule:

October 2022 – November 2022 – January 2023

#### **October 2022:**

Presenters for September Frank Puhane / Stephan Menzel

*“Capacitors 201 – Deep Dive on Basics of Film, MLCC, E-Caps, Supercaps and their characteristics”*

#### **November / January**

focus on integration density / high power / SiC & GaN and changes on capacitor requirements

Potential Presenter: Alexander Nebel - Kemet

#### **B ) APEC – Industry Session:**

**Be aware** - deadline 2<sup>nd</sup> of September – proposal for list of presenters and topics

<http://apec-conf.org/conference/sessions/industry/>

- Mix of voice of industry (key users) / university / manufacturer
- Requesting further committees for potential contribution
- WBG – semi committee / IC manufacturers
- Life considerations of caps
- Renewables & energy storage / harvesting

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Potential presenters:

[davide.giacomini@infineon.com](mailto:davide.giacomini@infineon.com)

[dennis.stephens@vitesco.com](mailto:dennis.stephens@vitesco.com)

University of North Carolina - Doug Hopkins

[profdchopkins@gmail.com](mailto:profdchopkins@gmail.com)

Aalborg University – Assistant Prof. Ariya Sangwongwanich

[ars@energy.aau.dk](mailto:ars@energy.aau.dk)

University of Southern Denmark – Prof. Dr. Thomas Ebel

[ebel@sdu.dk](mailto:ebel@sdu.dk)

Potential Session:

DC Bias loss in ceramic caps - Victor Boyadzhyan

+ resonance frequency movement (as live demo?)

[victorb@mcico.com](mailto:victorb@mcico.com)

### **C ) Status Update - PSMA Workshop @ APEC :**

Special project form for board of directors >> assign costs

Oriente on last year's submission as reference

**Updates for June 9, 2022:**

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### **a) New Meeting Schedule - Capacitor Committee**

>> each month on every second Wednesday 10AM CDT <<

You can check all dates at:

[Meeting Schedule | PSMA](#)

### **b ) Capacitor Survey done – will be posted within Newsletter**

[https://www.pdma.com/Capacitor\\_Survey](https://www.pdma.com/Capacitor_Survey)

Please promote on social media and via your own channels as well.

### **c ) Can a member of the capacitor committee (board) attend the APEC prep meeting in Orlando, October 15 / 16, 2022?**

>> dates pending and may change

>> Andrew Mikulski – pending / Ed Herbert - fixed

### **d) Updates on workshop, webinars, industry session**

#### **Webinars:**

>> possible on Tuesdays / Thursdays

At least a month heads up for promo and arrangements

Webinar Schedule:

September 2022 – November 2022 – January 2023

Presenters latest by next July meeting

#### **Workshop / industry session:**

no updates at the moment, survey input will be needed for further directions

**Deadlines:** August – Industry Session for APEC, Workshop for PSMA

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### **e) review article about last capacitor workshop**

>> Frank will share with Lisa till 10<sup>th</sup> of June

>> will be included in the PSMA June Newsletter

## **Prep a Webinar Roadmap for 2022 / 2023**

**Target: 2 – 3 webinars before APEC 2023**

### **1) Caps for Vehicular Applications**

EV / OBC / ....

>> Eric Schneider???

### **2) Restart Cap Fundamentals**

### **3) Further Ideas:**

- Application based Webinar
- Datasheet need to know and specifics
- Component behavior vs. temp / frequency / mechanical stress

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>> idea of a non-manufacturer presenter for session 2 or 3

### **Proposal for timeline of webinars:**

July / August 2022 – September / October 2022 – January 2023

## **Webinars- ASAP**

*There is a desire and demand to restart the Fundamentals Webinars from the beginning with a fresh approach. Need volunteers, preferably from those that were NOT part of the first series.*

### **PSMA Capacitor Committee Offers Capacitor Fundamentals for Automotive Applications**

Webinars / Low power and control circuit applications  
/ Power Stage – High Power

Picking Capacitors for your application is always a challenge. Deciding on the proper component given all of the various parameters associated with your design and the numerous capacitor technologies results in choosing a part that best balances the pros and cons of each component and how your application will react to the use of that specific part. Add in the need to consider an automotive application with the temperature extremes, need for EMI suppression, not to mention shock and vibration and you have a true challenge for only the most experienced engineers.

PSMA Capacitor Committee will be offering two Educational Webinars presented by a design leader in the automotive industry explaining a best practices approach to choosing the capacitor that will be best for your application. The Webinars will be broken into different power levels.

**Best Practices for Choosing Capacitors for Automotive Low-Power and Control Circuit Applications**

**Best Practices for Choosing Capacitors for Automotive High-Power Applications (power stage in Chargers, Converters, & Inverters)**

Specific capacitor locations will be identified on schematics, and their requirements will be reviewed and all of the various critical parameters will be identified. Various suppliers' products will be analyzed using their

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**datasheets as possible candidates. Will we be able to find the best solution?  
We will have to see...**

**Eric Schneider, Independent Engineer with over 35 years of engineering experience.**

### **Pierre to offer a Würth Fundamentals 101 presentation**

#### **Educational Webinar – Sorting out the Data Sheets**

Need an FAE or using engineer with experience reviewing different brands of cap datasheets to compare and contrast and to pull out key data – Frank is working on it. Shooting for April / May timeframe

#### **Redo the Capacitor Fundamentals series**

Need volunteer(s) to start at the beginning - CDE Scott to send

## **Roadmap Webinar 2023 Ideas – Reviewing Options**

### **FUTURE ROADMAP Webinar Ideas – sharing Underwriting Opportunities with the Committee**

**Norm, RELL – Vishay possible high voltage ceramics discussion, disks... trying to get more details**

### **High Frequency Testing for Caps - Raj**

#### **NEED IDEAS!!!**

New technologies for Broadband application Capacitor support  
Tantalums

#### **New in Ultra Caps – Takata, more than ELC – Hybrid package?**

Application Driven – how different technologies behave – Filtering, Inverters (DC Link), Power Supplies, compare and contrast technologies and certain parameters for each technology.

Also include Environmental technology discussion (i.e. Heat, Vibe, EMI).

Würth – Power Supply - DC Link / MLCC DC bias

**EPCOS – Filtering X/Y Caps, Rob Haywood – Gore’s new dielectrics**, Würth - Polymers with higher capabilities

#### **Cap optimization for EMC & EMI, BOM, layout, etc. – Raj**

**New: Aug, 4<sup>th</sup>**

**Raj and Victor to supply an abstract of his presentation**

**Polymer Caps, MLCCs – at least two segments: low voltage / high voltage**

**Make suggestion to Connor & Dhaval for Power Tech Roadmap**

**Possible Eaton Hybrid Supercap – need contact**



# PSMA Capacitor Committee Minutes & Action List

<https://www.eaton.com/us/en-us/products/electronic-components/faq/what-is-a-hybrid-supercapacitor.html>

## Workshop Mission Statement –

*The PSMA Capacitor Committee Annual Workshop aligned with APEC has a mission to educate the attendees on capacitor trends, technologies, and innovations. Wherever and whenever applications need energy, Capacitors are at the spotlight, and as energy moves the world it is incumbent for everyone to keep their finger on the pulse of capacitor issues. PSMA's Capacitor Committee is committed to present the best material available to meet the industry's needs.*

## Workshop 2023 – Overview

### 2023 Theme

??

**Frank to supply a first draft of a survey to be sent out by the PSMA office and all manufacturers – due ASAP**

Need to create a flier for the sponsorship opportunities – on the registration Page. Need to promote within our organizations.

Need a few more demo stations – How about asking for payment for tables by suppliers.

Need more attendees.

Possibly go Hybrid

Presentations to be reviewed end of January to mid-February

Student Waivers?? – How many

Speakers for round table??

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**Industry Session 2023 – Andrew Mikulski**

**Theme:**

**??**

**Reliability Improvements, Calculations?**

**Capacitor Users Problems and Fixes**

Use IC manufactures

Frank to pass on contacts to Andrew

**GET MORE COMMITTEE PARTICIPANTS**