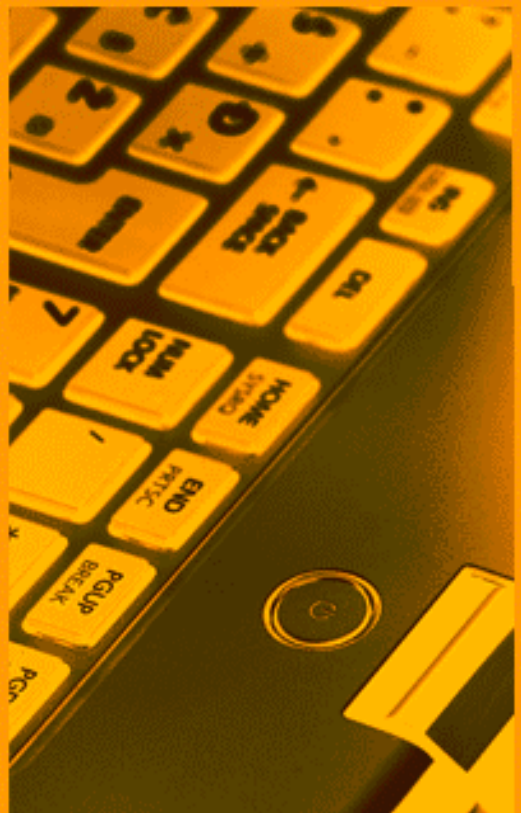
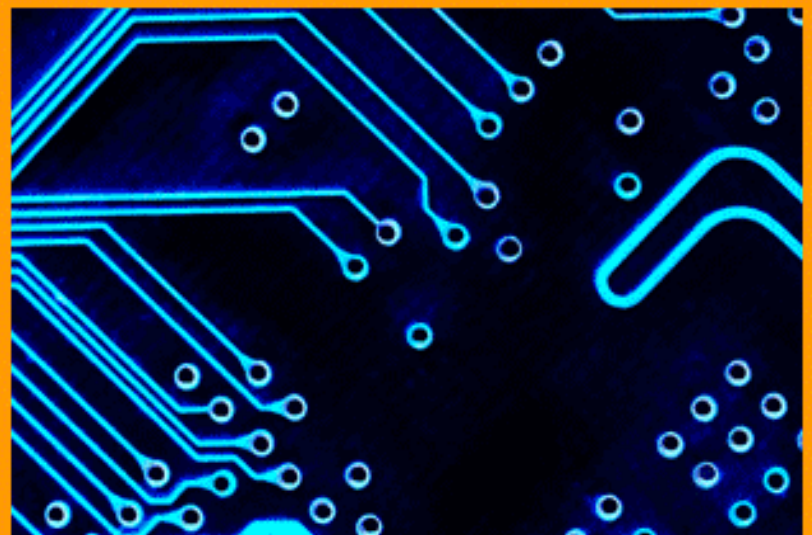
SGIA Printed Electronics Roundtable











Substrates and Transferring Ink

Soft Pliable Durable the New Printed Electronics Form Factor

What it is

Why it is in demand

Material options

Process considerations



What Is It?

- 3D flex, crumple, soft, pliable, durable
  - Stretch is a challenge, but relatively good
  - PET realistically flexes only in 2D unless heat formed or die cut
- Conductive inks on thermoplastic urethane (TPU)
- Conductive inks on resin-coated fabrics
- Conductive inks with heat-transfer ink systems

Why It Is In Demand?



- Smart Fabrics
- E-Textiles
- Wearable Technology
- Human-machine interface, e.g. automotive

- Invisible or undetectable biometrics
- Quiet user-friendly human machine interface
- Capacitive sensing wave

Material Options

- Thermoplastic Urethane
  - Many varieties
  - Blown mono-layer
  - Multi-function multi-layer
  - Melting temp, stretch hysteresis, UV, moisture
  - Lubrizol
    - Bemis
    - American PolyFilm
    - Policrom
  - Etc etc etc…

Material Options (cont.)

- Silver ink
  - Durable, creasable, stretchable
- Dielectric UV-cure insulator
  - Compatible with silver
- Carbon ink analogue
  - Silver top coat or resistance adjustment
- Silver chloride for biosensing
  - Durable, creasable, stretchable

Material Options (cont.)

- Ink Transfer System
  - Transfer inks designed for garment decoration
  - Selective compatibility with conductive ink package
  - Designed for wash/dry cycling
  - Can be used on fabrics and other substrates, e.g. TPU
  - Heat transfer adhesive layer can vary for substrate



Material Options (cont.)

- Electrical connection or integration remains a big challenge
- Magnetic chip/battery module w landing pad
  - Easily attached and removed for wash/dry of garment
- Garment fasteners, e.g. snaps, button, grommets, micro nuts-n-bolts



Process Considerations

- New form factor processing challenges
- TPU welds when at temp required to dry ink
- Soft compressible substrate requires special screen and set up considerations
- Applying connectors, sealing exposed silver ink areas.



Conclusions

- Much interest in new form factor
- Many applications for new form factor
- Durable ink set needed
- Many substrates to be considered
- WANTED – COLLABORATORS
  - Chip makers
  - Substrate makers
  - Product designers
  - Fabricators

