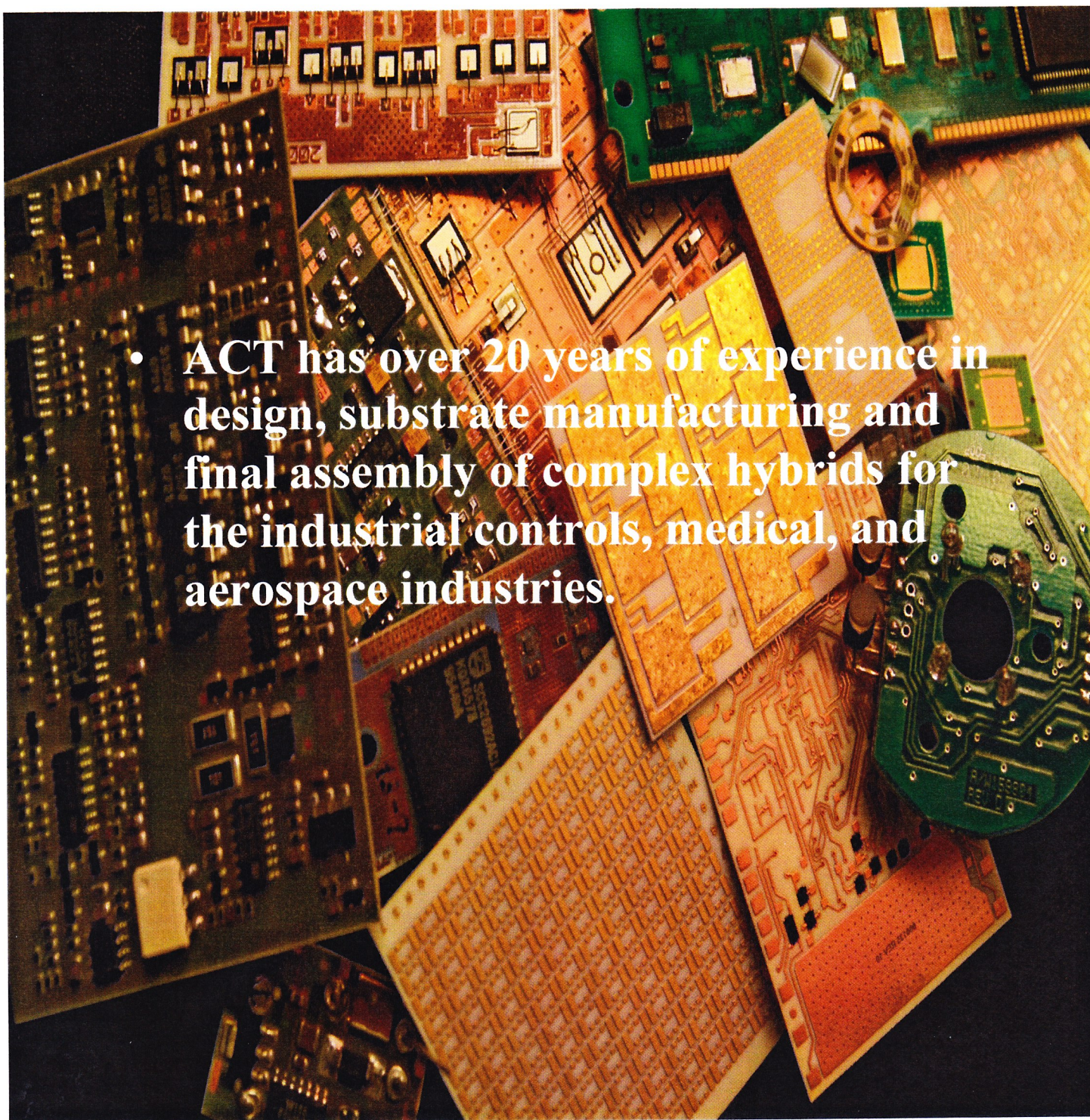


Advance Circuit Technology

Thick Film Hybrids

- ACT has over 20 years of experience in design, substrate manufacturing and final assembly of complex hybrids for the industrial controls, medical, and aerospace industries.

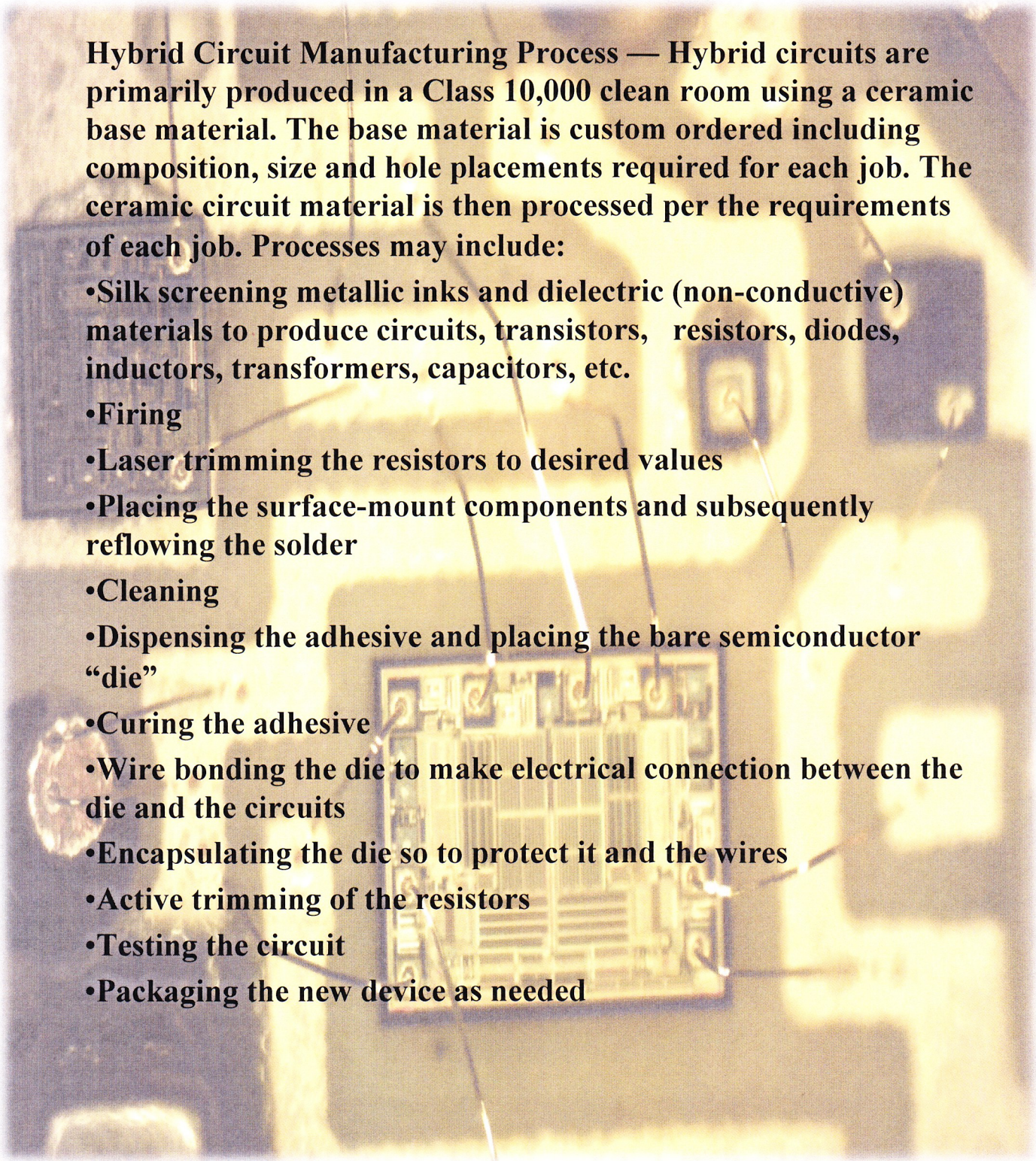




Advance Circuit Technology

Hybrid Circuit Manufacturing Process — Hybrid circuits are primarily produced in a Class 10,000 clean room using a ceramic base material. The base material is custom ordered including composition, size and hole placements required for each job. The ceramic circuit material is then processed per the requirements of each job. Processes may include:

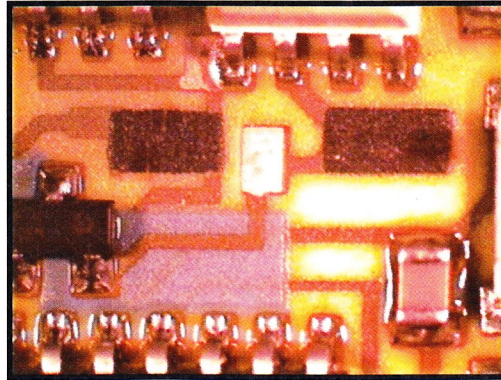
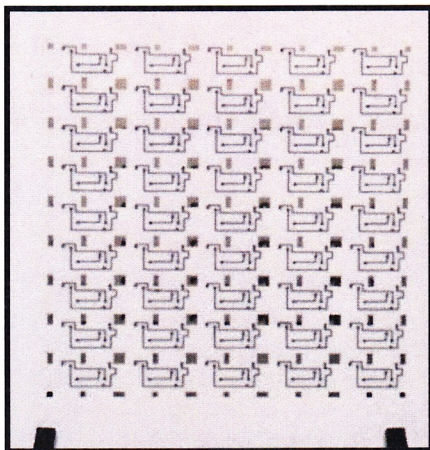
- Silk screening metallic inks and dielectric (non-conductive) materials to produce circuits, transistors, resistors, diodes, inductors, transformers, capacitors, etc.**
- Firing**
- Laser trimming the resistors to desired values**
- Placing the surface-mount components and subsequently reflowing the solder**
- Cleaning**
- Dispensing the adhesive and placing the bare semiconductor “die”**
- Curing the adhesive**
- Wire bonding the die to make electrical connection between the die and the circuits**
- Encapsulating the die so to protect it and the wires**
- Active trimming of the resistors**
- Testing the circuit**
- Packaging the new device as needed**



HYBRID CIRCUIT MANUFACTURING

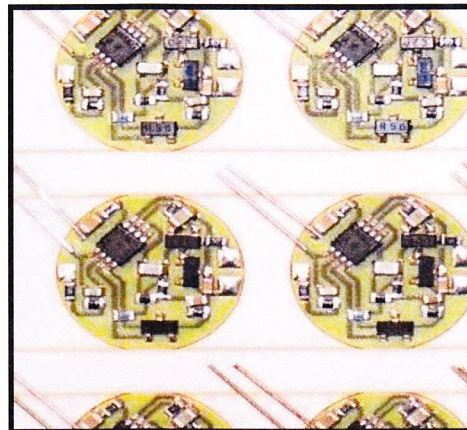
Thick Film Capabilities

- Variety of Substrates
 - 96% Alumina
 - 99% Alumina
 - BeO
 - ALN
 - Other
- Integrated Passive Components
 - Resistors
 - Capacitors
 - Inductors
- Laser Trimming
 - Active
 - Passive



Thick Film Hybrid Capabilities

- Die Attach
- Wire Bonds
- Surface mount components
 - Epoxy attach
 - Solder attach
- Wire attach (from substrate to the outside world)
- Testing
- Special –underfill, glop top, etc.



Equipment List

- 2400 SF Class 10K Clean Room, Static Dissipative Flooring
- 1 Ceramic Substrate Wash System
- 5 DEK Manual Thick Film Screen Printers
- 1 DEK Automatic Thick Film Printer with Load
- 2 RTC Thick Film Firing Furnaces
- 2 CLS Passive Trim Laser with Step & Repeat Handler
- 4 CLS Active Trim Lasers
- 1 MRSI Automatic Die Bonder
- 2 K&S 1419 Automatic Ball Bonders
- 1 Fine Gold Wire Bonders
- 1 Automatic Fine Aluminum Wire Bonder
- 1 Trebor Die Bonder
- 1 Asymtek Dispensing Machine for Die Encapsulation
- 1 Tencor Sigma Scan Thickness Measurement System

