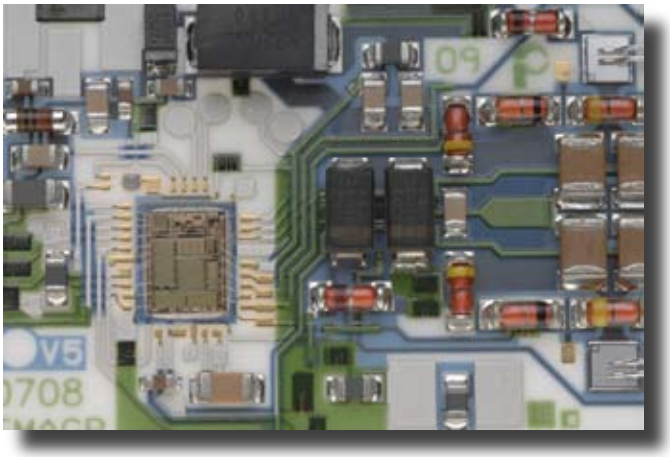
C-MAC MicroTechnology

AUTOMOTIVE TECHNOLOGY

Advanced Electronic Technology for Automotive Applications

Design, Manufacture and Test



C-MAC MicroTechnology is a leader in the design, manufacture and test of complex, high reliability electronics for automotive applications.

C-MAC MicroTechnology is one of the world's leading designers and manufacturers of automotive electronic modules. Our leading technologies, expertise and reliability have made us the preferred supplier to many Tier 1 automotive manufacturers.

With high volume manufacturing facilities in Europe and North America and specialised production and R&D in the UK, we are well placed to serve the major manufacturers in the worldwide automotive industry. Our manufacturing facilities are among the most up-to-date in the world with state-of-the-art machinery and equipment, enabling us to maintain the highest standards of manufacture and to get ever closer to our goal of zero defects.

We specialise in designing and manufacturing complex high reliability components and systems for harsh and extreme conditions including high temperature, high vibration and high humidity environments.

Our ceramic technology is the perfect solution for modular applications that require high circuit density, high operating temperature (>125˚C), high power dissipation and low cost, high volume manufacture. The application of bare silicon ICs bonded directly to ceramic based interconnect eliminates one packaging step and thereby enhances thermal management and product reliability in high temperature environments.

In order to support continued expansion of the automotive sector business, C-MAC has achieved ISO TS16949 registration. This is part of our commitment to continuous improvement, a policy that extends throughout C-MAC MicroTechnology.

Our technologies

C-MAC's modern manufacturing facilities are supported by automated state-of-the-art equipment, in an ESD-protected clean room production environment. Processes are optimised using Design For Manufacturing (DFM), Design for Test (DFT) and statistical process control (SPC) methods.

Thick Film Printing

›› Precision, high volume screen printing of thick film and LTCC circuits
›› Class10,000 clean room conditions
›› Automatic Optical Inspection (AOI). Perfect layer on layer alignment. In-process control and post print inspection
›› Metallised through-holes and multilayer structures
›› Laser trimming of passive resistors and active adjustment of assembled circuits

Chip and Wire Assembly

›› Fully automated die bonding, ball and wedge wire bonding. Wire sizes from 25 micron gold up to 500 micron aluminium
›› Mixed technologies combining chip and wire and standard SMT components
›› Encapsulation techniques with epoxy or silicone

Surface Mount Assembly

›› Solder paste screen printing, convection reflow (air or N_2) and vacuum soldering.
›› Surface mount component placement. Either single or double sided component mounting
›› Component styles and sizes from 0201 passives to large BGA packaged devices. Placement rate up to 40,000 per hour
›› Lead-frame assemblies using reel-to-reel equipment
›› No-clean flux system or conventional flux followed by solvent or aqueous cleaning.

Module Packaging

›› Hermetic packages for full chip & wire designs
›› Epoxy encapsulation
›› Silicone cavity fill for mixed technologies providing high levels of moisture resistance
›› Conformal coating using polyurethane or acrylic spray coating or silicone dip.
›› Final module assembly in custom designs

Electrical Test

›› C-MAC specialises in custom test solutions working closely with our customer's engineering teams. Test optimisation from the design stage forward ensures the drive for zero defects is not compromised.
›› C-MAC's experience with both electrical and optical testing at frequencies of up to 80 GHz provides 100% design coverage

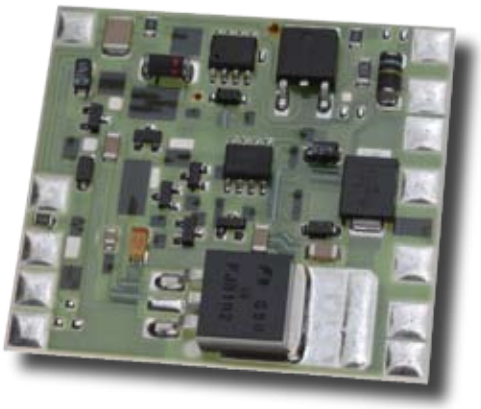
Test House Climatic Chamber

Product Qualification

›› C-MAC also offers an ISO 17025 accredited Test House. Accelerated life-time and endurance environmental testing is available for design proving
›› Unique suite of IEC, MIL-STD-883 and MIL-STD-202 test methods

Our design and manufacturing solutions are in a wide range of applications including:

- Turbo charger controllers
- Mass air flow and pressure sensors
- Exhaust gas recirculation valve controllers
- Alternators - voltage regulation
- Electronic parking brake (EPB) sensors
- High intensity discharge (HID) headlamp controls
- Electronic control units (ECUs); ignition, fuel injection, transmission
- Electronic power steering (EPS)
- Integrated starter alternators and stop-start technology ECUs
- Electronic stability control ESC (ESP/ABS)
- High power motor drive controls (brushless)
- LED headlamp controllers - thick film or insulated metal substrate
- Advanced driver assistance systems (ADAS) and anti-collision systems
- Other automotive sensors - MEMs technology; acceleration, YAW-rate, inclination
- Hybrid electric vehicle (HEV) applications, traction control and other motor drive controls



Enquiries

Bart Amez
C-MAC MicroTechnology
Industriezone Klein Frankrijk 28
9600 Ronse
Belgium

T: +32 (0) 55 21 53 51
Email: ronse@cmac.com

Marco Lajoie
C-MAC MicroTechnology
3000 Boulevard Industriel
Sherbrooke,
Quebec J1L 1V8
Canada
T: +1 819 821 4524
Email: sherbrooke@cmac.com

www.cmac.com **Email: info@cmac.com**

March 2008