Custom Interconnect Limited

BP2
UK's largest Semiconductor Packaging facility (OSAT)
+ Volume PCBA manufacture
64,000sq ft

CIL House
Prototype PCBA production & Small to Medium volume PCBA production
24,000sq ft

Custom INTERCONNECT

A Total Solutions Provider

CIL has a 40-year track record in the manufacture of Printed Circuit Board Assemblies (PCBA) and Advanced Semiconductor Packaging.

We provide a single source capability from the procurement of all required materials, and complete electronics production including: -

- Wafer dicing and sort
- Wafer, Interposer, PCB, BGA solder bumping from 60um to 760um
- Die Bonding of Si, SiC, GaN, GaAs + others
- Wafer level Chip Scale Packaging & 2.5D Heterogenous integration
- Wire Bonding Al wedge, Au Ball and Au Wedge-wire dia 17, 25 and 32um
- Heavy gauge Al wire / ribbon-wire dia up to 600um
- Microelectronics & Semiconductor packaging
- SiC, GaN and IGBT Power module assembly
- Plastic overmold of QFN and RF MMIC QFN style devices
- Surface Mount Assembly (SMT)
- Conventional Assembly and Specialised Soldering
- Product testing, including X-Ray, CSAM, 3D AOI and Flying Probe Testing
- Product assembly & testing, a complete box build service
- From Prototype quantities, requiring our unique “Rapid” service, to full production volumes using the benefits of our Global Sourcing of Materials and our established production methodology.

Our Customer Markets

Supporting Customers across the United Kingdom, and within mainland Europe, extending into the Americas and Australasia, CIL also operates across very diverse markets. A few primary ones are detailed below: -

- Medical Devices and Sensors “Lab on a chip”
- RF Communications
- Automotive PHEV & BEV Power modules and control electronics
- Down Hole Oil and Gas
- Homeland Security, Border Control and Counter Terrorism
- Military, Naval Systems and Avionics
- Marine Rescue, Location and Distress Beacons
- Transport Infrastructure, ANPR, Security and Safety Systems
- Professional Broadcast, Audio & Video equipment
- High Powered LED, visible & non-visible sources
- Motorsport and Premium Motorsport

Custom Interconnect Limited engages with clients from product conception to qualified production and in quantities as low as 1 -5 off's and 50,000 assemblies per month.

It is accepted by CIL that these partnerships require understanding, commitment, adaptability, flexibility, and responsiveness. These are all key to partner success. CIL's team has an established level of expertise and the all-important willingness to continue to learn in partnership with our clients.

Semiconductor Packaging, (Microelectronics).

CIL's BP2 facility is the UK's largest Semiconductor Packaging facility (OSAT) and has an established reputation for providing outstanding Engineering Solutions to Technical Problems. This is one of our foundation skills, and we have accumulated extensive knowledge and expertise in the following key disciplines:

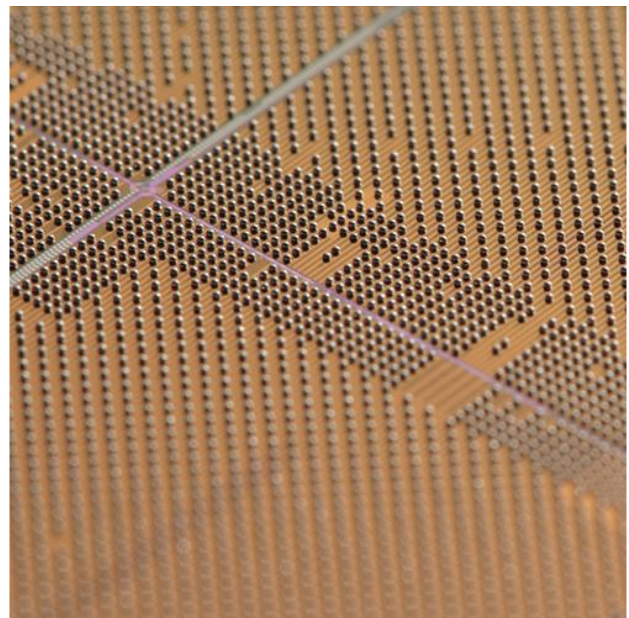
- Wafer, Interposer, PCB, BGA solder bumping from 60um to 760um
- Chip on Board, Chip on Flexible Circuits & "Lab on a Chip" solutions
- Silicon Carbide (SiC) and Gallium Nitride (GaN) power packaging
- Automotive PHEV & BEV Power modules
- Custom BGA's, (Ball Grid Arrays)
- Placement and bonding of complex optical devices, sensors and arrays
- Multi Chip Modules & Chip Scale Packages
- RF GaN MMIC packaging, both overmolded and open cavity
- Plastic overmold of QFN style devices
- Re-Packaging of Silicon Die within bespoke solutions.

And combinations thereof…

Work of this nature is conducted within a 15,000sq ft ISO7 environmentally controlled area; the following manufacturing disciplines are managed by CIL Engineering.

Wafer, Interposer, PCB, BGA solder bumping

CIL has brought on-line the UK's first PacTech SB² – Jet solder ball laser reflow system. The SB² – Jet system is a three laser fully automatic balling system capable of attaching ball sizes ranging from 60um to 760um and up to 300mm wafer sizes. This enables CIL to provide OSAT services for wafer, interposer, Flip Chip, WLCSP, CSP, PCB bumping through to BGA balling and re-balling.



As well as ball sizes from 60um to 760um, it uses a selection of varying solder alloys for different market applications, these include

- SAC305 Standard RoHS alloy for most applications
- SAC405 Standard RoHS alloy for some applications
- SACQ Offers superior fatigue resistance and improved board-level reliability over SAC405 or SAC305
- Tin / Lead Defence, Mil Aero, Aerospace & Space requirement
- Bismuth Medical & Biomedical devices

CIL's WLCSP / Flip Chip packaging services will be engaged in wide-range of industry applications, including defence, aerospace, automotive, premium motorsport, commercial, communication, industrial power, 5G and RF and many more. They are suitable for numerous assembly and packaging applications, such as:

- Flip Chip Package on Package (FC PoP)
- 3D Integrated Circuit (IC)
- 5D Interposer
- Flip Chip
- Embedded Integrated Circuit (IC)
- Fan-Out Wafer Level Packaging (FO WLP)
- Wafer Level Chip Scale Packaging (WLCSP)
- Chip Scale Packaging (CSP)
- Ball Grid Array (BGA)
- Ball Grid Array re-balling
- Printed Circuit Board (PCB) balling

Wafer Dicing

CIL has the capability to Wafer saw substrates up to 300mm diameter using its DISCO 3361 Semi-automatic dicing system. CIL's DISCO 3361 system has been installed with all of the water treatment and purification sub-systems to support multiple wafer types such as Silicon (Si), Gallium Arsenide (GaAs), Gallium Nitride (GaN), Glass and Ceramics.

The wafer dicing equipment is all housed within CIL's ISO7 Semiconductor packaging facility and utilises specialist LED lighting for the control of UV sensitive processes.

Die Bonding

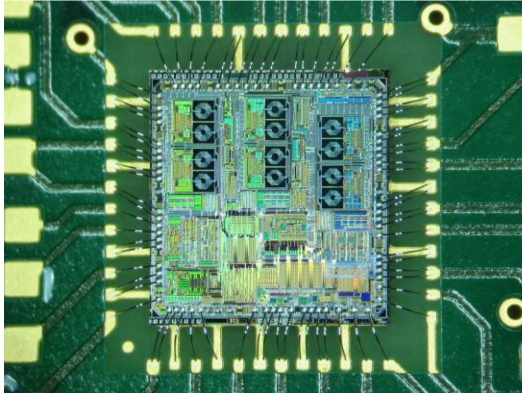
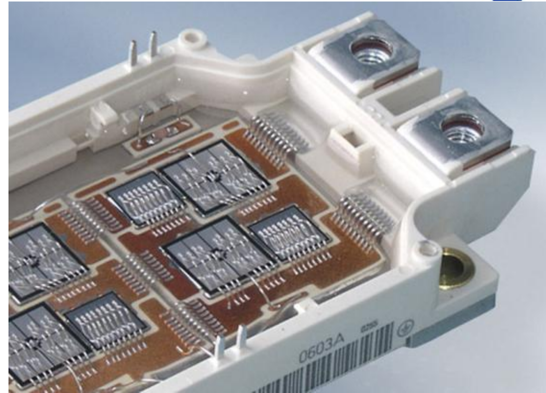
CIL provides the attachment of bare die using conductive and non-conductive die attach materials, that include epoxies, eutectic solders and pressureless/pressure Silver Sintering. We process production volumes of 100,000 die per month down to single projects for "Proof of Concept" or prototypes. Our placement capability in terms of positional accuracy is less than 10 um X & Y and theta accuracy of <1.0 degree. We have extensive experience of running production quantities of Si / SiC / GaN / ASIC's / MEM's / LED's / Detectors / Sensors / Lab on a Chip and all commercially available die types. The smallest die we currently process is 200um x 200um, and the largest is 175mm x 150mm. CIL currently has 3 off DATACONN 2200EVO die bonders, the latest of which is the highest specified machine in the UK, CIL also has a further 2 off HACKER auto die bonders. These 5 off Auto die bonders gives CIL the No1 capability and capacity for semiconductor packaging in the UK.

2 off DATACONN for Si based die

1 off DATACONN for SiC & GaN die

We bond die to a variety of substrates, and as new materials and structures become available, we conduct shear testing, X-Ray, CT-Scan and CSAM analysis in-house and ensure that appropriate standards for die attach are met.

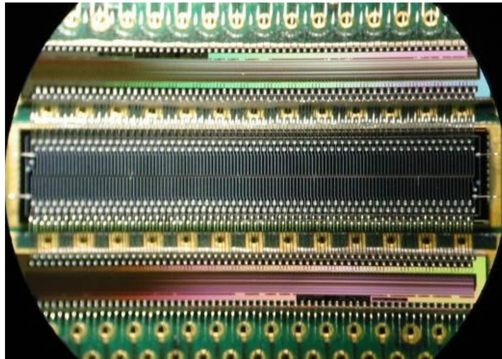
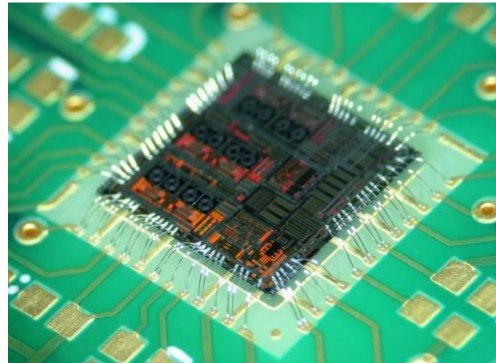
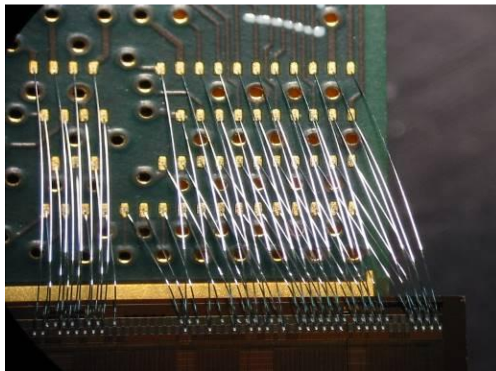
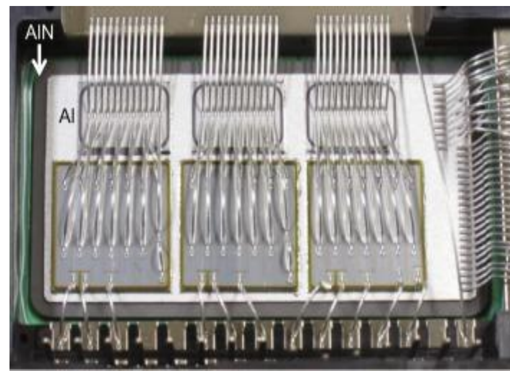
- FR4 Laminates, including flex-rigid
- Alumina or other Metallised ceramics
- Direct bonded copper (DBC) Substrates
- Active Metal Brazing SiN (AMB) Substrates
- Thick Film & Thin Film
- Polyimide rigid and flexible
- Commercially off the shelf (COTS) packages

Wire Bonding

Fully complimenting CIL's Die Bonding capability is its fully automated Wire Bonding, where we can use both Aluminium and Gold Wire Bonding, utilising "Wedge" and "Ball-Bonding" formats. CIL currently has 7 off Auto wire bonders running, coupled with its 5 off Auto die bonders and wafer bumping capability gives it the title of the UK's largest and most sophisticated semiconductor packaging facility. In addition to fine wire, we also have Automatic Heavy gauge Aluminium/Copper wire/ribbon wedge bonding for SiC and GaN based power modules for Automotive and wider power conversion markets.

Our processes require strict process control and we can achieve this using our QA Wire Pull test and die / component shear test station and can accommodate a number of wire diameters. Following die placement and wire bonding we can also provide an encapsulation, Plastic overmold or glob-topping service subsequent to complete device laser marking and test.

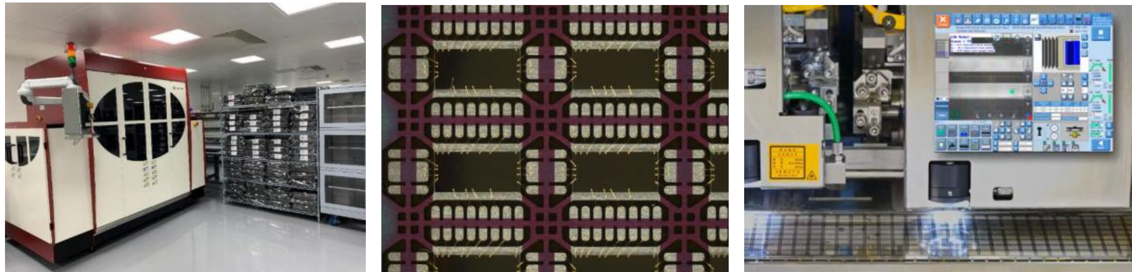





Glob top encapsulation

The die can be encapsulated using a glob top or Dam / Fill encapsulation process. Another process area that CIL excels at is the partial encapsulation / glob top of COB devices where active areas of the die have to remain open, but all wire bonding has to be encapsulated. With modern complex die designs, this means CIL has had to evolve wet epoxy processes controlled to <25um. In very small quantities, CIL operators perform this manually, but for medium to volume quantities CIL has this fully automated and can control dam & fill glob top material to within 25um, thus encapsulating the bonds, but not contaminating the active die area. CIL has 4 Automatic ASYMTEK Glob top dispensers performing this operation seen below.

Plastic Overmold (QFN)

UK semiconductor packaging has for decades been focussed on low volumes using ceramic and metal packages with batch sizes limited to small volumes. This is ideal for harsh military environments and prototyping, but not optimal for the vast majority of lower cost semiconductor packaging applications. In mid-2023, CIL opened its BP2 semiconductor packaging facility offering low / medium / volume Chip on Board (COB) assemblies and then 6 months later low / medium / volume QFN plastic packages. The shift to this lower-cost and high-volume compatible plastic packaging technology at CIL is further complimented by CIL's eight SMT lines all capable of placing these devices onto PCBA assemblies.



Advanced Manufacturing Support Facilities

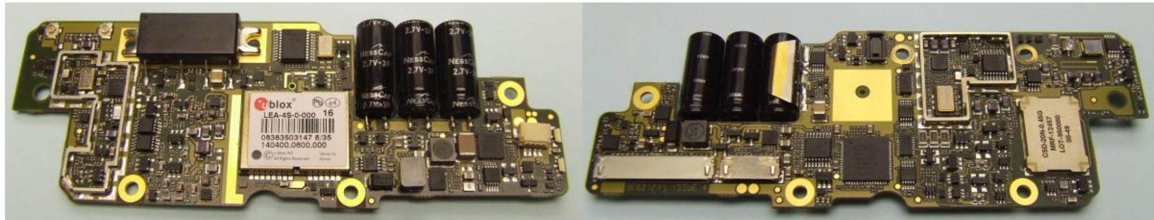
CIL's expertise and experience is available for all of our customers and we are well placed to assist and advise on methods, process selection and the materials available. We can fully support projects and are able to combine our own expertise with that of our other Industry partners and suppliers, so that best economic and quality levels are always attained. Our in-house resources such as Digital X-Ray/CT Scan and non-Contact 3D measurement, Flying Probe Testing, Scanning Acoustic Microscopy (CSAM) and Temperature Cycling are also available as project control tools.

Surface Mount Assembly PCBA

CIL has within its Electronics Manufacturing Facilities 8 fully independent Surface Mount Assembly Lines all 01005 capable, comprising in-line Automated Solder Paste print, High Speed Placement of Surface Mount Devices and Multi-Zone Re-Flow including N2 atmosphere and in-line 3D Automatic Optical Inspection (AOI)

In addition to the very latest in solder print technology we also have a MYCRONIC MY700 Solder Jet Printer, all of our Solder Paste Screen Printers operate with an integral Paste verification system prior to placement. Manufacturing Capability for component placement through our Surface Mount Assembly is from 01005 Chip components to larger 55mm square devices and all current IC package styles. Reflow Soldering can be achieved using our multi-zone reflow systems and can be soldered in a Nitrogen Environment using high

reliability solder pastes. For power devices used mainly in the Automotive BEV & PHEV systems we have Vacuum Assisted Vapour Phase reflow for very low solder voiding and in line vacuum soldering for volume production.



Batch sizes we can accommodate are

Small – Prototypes –	1 off Auto SMT line	(CIL House)
Medium volume -	3 off Auto SMT lines	(CIL House)
High volume -	4 off Auto SMT lines with in-line 3D AOI	(BP2)

Complexity extends from the simple to high complexity double sided multi-layer assemblies utilising a variety of substrates, including the high temperature Polyimide and specialised RF base materials.

Solder Paste

Solder Paste Screen Printers are DEK Horizon 03iX all with Hawkeye 100% solder print inspection verification. In addition, CIL also has a MYCRONIC MY700 Jet Printer which provides CIL with the versatility we need for early model production and the ability to process and apply paste into PCB cavities and for applications such as stacked components.

SMT Placement Stations

CIL is equipped with 8 modern "state of the art" SMT placement lines, all with in line solder printers. All 8 SMT lines are equipped with new MYCRONIC MY300 SMT placement machines which are 01005/CSP capable. These 8 SMT lines give CIL significant SMT capacity, but more importantly it gives CIL an overwhelming

flexibility within our manufacturing resource. All 8 systems utilise 100% intelligent feeder systems and again all 8 have built in component test. The combination of intelligent feeders and machine component test significantly improves product accuracy and quality. In terms of our technical capability, we are currently placing 01005 chip components every day of the week. In terms of IC's packages, BGA's, LGA's, QFN's etc are the norm and we are placing modern packages such as Wafer Level Chip Scale Packages / WLCSP and CSP again on a daily basis.

Reflow-Soldering

CIL operates within the High Reliability and High Temperature market sectors and accordingly process many High temperature Laminates and substrates; therefore, we possess high capability multi-zone reflow soldering machines. All projects are assessed as part of our NPI (New Product Introduction) processes, and re-flow profiles are established based upon the thermal characteristics of the layout and the components used. This then becomes an established critical process parameter and unique reflow profiles are used for each board design. Re-Flow Soldering can also be achieved in a Nitrogen environment ensuring that no oxidation of substrates or solder surfaces can occur during the reflow soldering process. In addition to 10 zone air/N2 Reflow we also have ASSCON VP6000 Vacuum Assisted Vapour phase used predominantly in the Automotive BEV applications where <5% solder voiding is required. This system is for small to medium batch sizes.

As well as the ASSCON VP6000 system, in September 2022, CIL also installed an in-line 10 zone N2 reflow oven with vacuum assist. CIL now has the VP6000 solution for small to medium volume production and the new in-line vacuum system for volume production of power electronics where solder voiding of >5% is not acceptable.

Vacuum Assisted Vapour Phase soldering

In line 10 zone Air/N2 Vacuum Reflow system

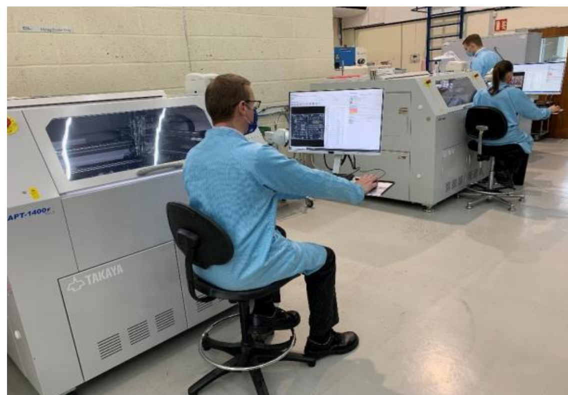
CIL has existing customers who demand product with <3% total solder voiding and also no single solder void >1%. The above systems are the only method of achieving these voiding restrictions.

Surface Mount Assembly / SMT Support Facilities

Our Engineering and Customer Support Group possess an extensive experience in the processing of PCBA's containing a wide variety of components and are available to assist and advise on all new projects. Process Verification is achieved using our multiple in-house X-Ray/CT-Scan, Koh Young 3D Automated Optical Inspection (3D AOI), Flying Probe Testing (FPT) and Scanning Acoustic Microscopy (CSAM) and the base industry IPC 610 class 2 & 3 standards as levels of acceptability. The 3D AOI systems come complete with extensive "live" SPC data collection and control.

Our Bake-out and in-process storage facilities are paramount to achieving high reliability electronics and where specified components and sub-assemblies are pre-baked or conditioned prior to controlled storage within Nitrogen charged & Temperature controlled cabinets.

Choices are available for Solder types, such as "Clean" or "No-Clean" and Un-Leaded or HMP type solders including Leaded, SAC305 and Bismuth based alloys.



Conventional Electronics Assembly / Thru Hole

General

Modern PCBA designs have endeavoured to eliminate conventional or Thru Hole component devices. However, within CIL's markets of Power, BEV, PHEV, Oil & Gas, Defence & Homeland Security there is always a significant proportion of Conventional Electronics manufacture that will never be replaced by SMT devices. Therefore, CIL continues to excel in this assembly style using a variety of assembly techniques.

We use a combination of single work stations, flow-lines and light-guided assembly stations, operating to standards of workmanship: IPC 610 levels 2 & 3 target conditions.

CIL provides specialised soldering of high temperature components and substrates, where soldered surfaces are prepared and pre-conditioned prior to the soldering process, backed up with X-Ray inspection of joints and surfaces. Down-hole Oil & Gas drill bit PCBA's operate at 150°C, 165°C, 195°C and 220°C for up to 4 years whilst pulling 20G's in 3 axis simultaneously.

Our Automated Soldering includes both Leaded and Lead-free wave soldering and Lead-free Selective soldering equipment. Hand soldering is completed to internationally recognised standards with some of CIL's Employees holding National Awards for hand Soldering.

PCB De-panel

Once the PCBA assemblies are complete, they then go through a process of being removed from their support panel. In most CEM's this is done manually using basic techniques such as side cutters. CIL has invested heavily in this area and now uses both automated CENCORP SR1300 PCBA AUTOMATIC CNC ROUTER **and** LPKF MicroLine 2120P LASER DE-PANELLING SYSTEM for much higher precision and product quality. CIL has 2 off on the SR1300 systems.

PCBA Cleaning, Conformal Coating & Potting

PCBA Cleaning

CIL has a process matched cleaning system based upon the MB TECH NC25 System and Zestron Chemistry of which CIL has 3 systems installed. CIL performed an extensive trial and approval process, in conjunction with our customers. This ensured the cleaning system matched all expectations and our additional processes, such as Conformal Coating and Potting. CIL also uses a GEN3 CM33L Contamination tester, which uses both IPC and DEF STD levels of cleanliness as benchmarks.

Conformal Coating

Following a specified board cleaning regime, we can provide a Conformal Coating service using either a controlled dip and withdraw system, or a spray system. We can also mask PCBA, assemblies or individual components to prevent coating ingress.

Potting or Component Staking

Within the High Reliability sectors some components or assemblies require complete or partial encapsulation, using a variety of materials and application or staking methods, Custom Interconnect has a wealth of experience in the selection and application of such materials.

Custom INTERCONNECT

Testing and Inspection

General

At CIL Quality Standards or Workmanship standards, Materials we source and the Processes chosen are verified against known or established Standards. We develop, with the customer, a test and Inspection plan as part of our NPI Process from the inspection or testing of incoming materials to the in-process controls required for ongoing production, and tests to be adopted for final product release. Our Quality Assurance Team and Test Engineering Support group will work with our clients to ensure that we only supply 100% inspected and fully tested product, that operate to planned and expected levels of operation, safety and reliability.

In-Process Inspection 3D AOI

In-Process Inspection of Electronics Assemblies produced at CIL uses a series and combinations of "First Off" machine or process verifications Batch Inspections and 3D Automated Optical Inspection. CIL uses multiple Koh Young Zenith2 3D Inspection Stations and due to the precise and quantifiable measurement of the Koh Young platform and by exploiting KSMART Statistical Process Capability, our Engineering Process Improvement & Quality Teams can aggregate real time production information to not only remove the chances of an escape, but also to study our production processes in detail to improve our yields and drive our quality standards ever higher. This functionality comes alongside many new features of KSMART including Remote Line Monitoring, Offline Programming, Offline fine tuning and Foreign Object Material Inspection. Using the machine capability and KSMART software packages, CIL assists all customers with statistical data on their products for design for test (DST) and design for manufacture (DFM) on early prototypes / pre-production. This statistical feedback enables customers to fine tune their designs to guarantee long term reliability of their products, which of course will be confirmed by all production, both SMT and Thru hole components and soldering being 100% 3D inspected.

Flying Probe Test

In conjunction with Inspection processes, we recommend a level of testing which verifies the assembly of components fitted with their respective values and operational characteristics. Using predictive software tools, we are able to provide customers with an expected "Test Coverage" for Flying Probe Fixtureless testing a quick and easy method of presenting electronics assemblies for functional testing to a very high confidence level. CIL has two TAKAYA APT1400F, and the very latest TAKAYA APT2400F Flying Probe Test Stations all providing a very reliable and repeatable In Circuit Test of components.

Scanning Acoustic Microscopy (CSAM)

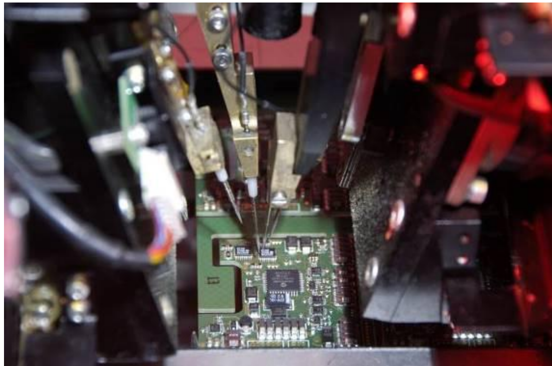
When processing high power heavy copper electronics as used on Automotive PHEV and BEV power modules and control electronics, X-Ray / CT scan is, in many instances rendered unusable due to metallisation thicknesses. To compliment CIL's in house X-Ray / CT scan it also has in house SONOSCAN GEN7 Scanning Acoustic Microscopy (CSAM).

High Precision / High-definition Digital Optical Microscope

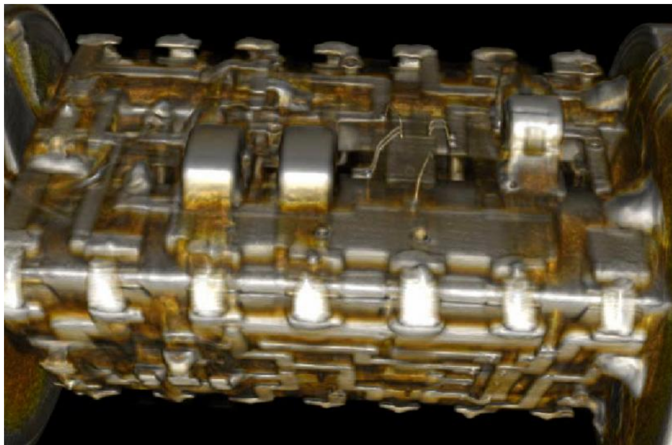
To complement 3D AOI, FPT, X-Ray, CT scan and CSAM also has in-house 4K Ultra high definition 4K Digital Optical Microscope complete with 1um laser measurement system.

Functional Testing

CIL has established itself as one of the leading providers of testing solutions available with high capability in the High Temperature Electronics, Communications and RF sectors. In addition to this high skill set we have an array of available equipment and platforms such as JTAG and Labview, in addition to custom made testing jigs and fixtures, and proprietary equipment. We can offer Test screening such as Temperature Cycling, Humidity and RF Shielding and Screening. Some testing we conduct is in unique environments such as Non-Magnetic and Open Channel and Frequency testing.


Flying probe test

TAKAYA Flying probe Test x 3


CT Scan

X-RAY

GEN 7 Scanning Acoustic Microscope (CSAM)

KEYENCE VHX-7000
4K Ultra high-Def Digital Microscope

Custom Interconnect Limited, CIL House, Charlton Road, Andover, Hants SP10 3JL.
Tel 01264 321321 email sales@cil-uk.co.uk www.cil-uk.co.uk

Primary Test Equipment

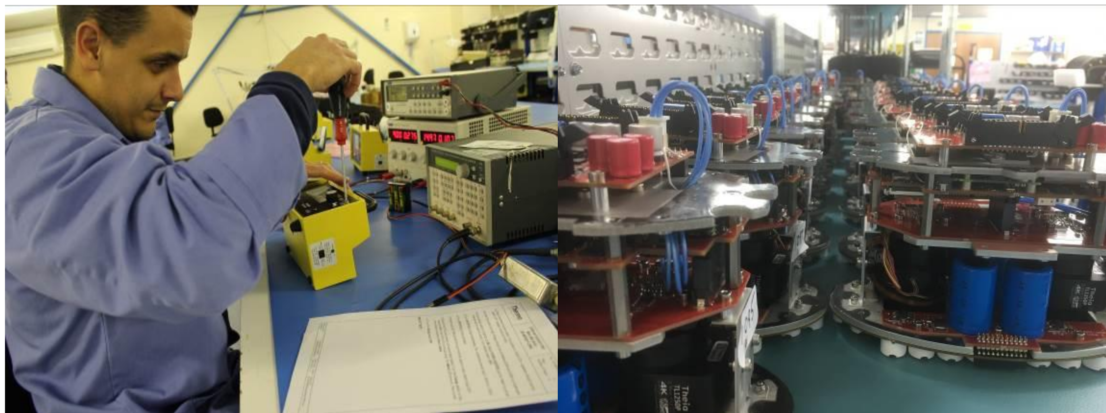
Listed below are a selection of the Primary Test Stations and Equipment we have available at CIL: -

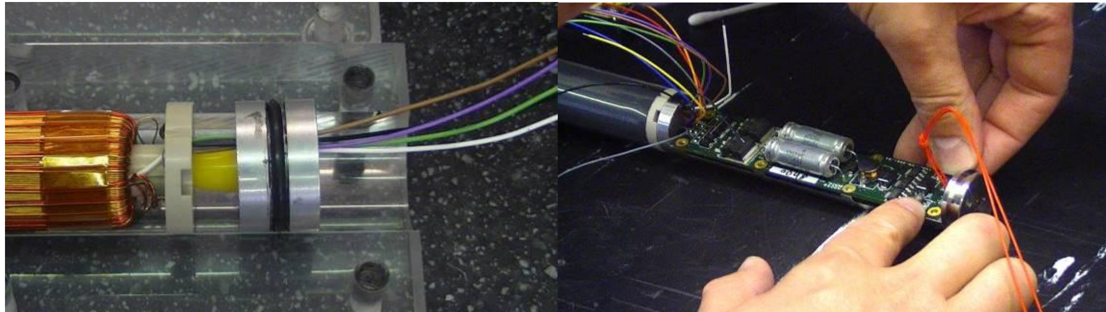
- 3 off Koh Young Zenith2 3D Automatic Optical Inspection (AOI) stations
- 4 off Koh Young ALPHA HS 3D Automatic Optical Inspection (AOI) stations
- 2 off Takaya APT1400F Flying Probe Test Stations
- 1 off Takaya APT2400F Flying Probe Test Station
- DAGE QUADRA 5 digital X-Ray inspection & CT Scan capability
- DAGE QUADRA 7 PRO X-Ray inspection & CT Scan capability
- SONOSCAN GEN7 Scanning Acoustic Microscope (CSAM)
- KEYENCE VHX-7000 4K Digital Microscope with 1um laser measurement
- Various Signal & Function Generators, Spectrum Analysers
- Labview Stations with IEEE interfacing
- JTag Boundary Scan
- Temperature Cycling with Humidity, 15 degrees per/min
- Various Meters, Power Supplies and obligatory test equipment.

Product Box Build & Testing

General

CIL has established a Product Build Facility in full support of our Electronics Production resource. Comprising a stand alone environmentally controlled facility equipped with its own clean-room for the assembly of optical and electro-optical devices and sensors. This business unit also operates its own Goods Acceptance and Finished Goods Storage, and providing the essential services required for the manufacture and testing of Electronics Assemblies.





Our Product Build facility is producing Test Equipment for the Nuclear Industry, Medical Devices to ISO13485:2016 and Down Hole Oil & Gas Probes & Gauges.

CIL can also accommodate "Back to Base" repair and Product upgrades for customers including specified levels of refurbishment.

Rapid Prototyping

In Jan 2024, CIL introduced a dedicated SMT line and associated thru-hole soldering and inspection to assist its customers with their prototypes and early model builds. At CIL we fully understand the importance of having Prototype and Early Model production manufactured as quickly as possible, but in doing so maintaining control and the all-important expected levels of quality. At CIL Rapid Production is an Engineering support function, to assist its customers with accelerated time to market. CIL now has given its customers the possibility of fast turn proto's, small to medium volume builds and volume production all from one supply.

- **Dedicated prototype area, equipment and personnel, it does not use production equipment**
- Providing prototypes and early evaluation models for our customers.
- Prototype department in run by CIL Engineering, talking engineer to engineer to solve problems
- SMT line comprises of MYCRONIC MY700 Ink Jet printer, MY300DX SMT Placement machine, 10 zone reflow oven and AOI.
- If the prototype is successful, CIL has an additional 5 x SMT lines for small to medium volumes and 2 x SMT lines for volume builds
- All equipment and processes are 01005 / BGA / WLCSP capable
- Receive your quotes in as little as 48 hours from receipt of data pack.
- We can use provisional or early issue data, drawings and information.
- We can source all the materials for you, or work from Free Issue Materials, in part or in full.
- CIL Offers fast turnaround production - from a clear kit of materials we can supply product in as little as 1- 3 days working days
- Part hand build & part machine build can be accommodated.
- Services such as 3D AOI & Flying Probe testing (FPT) of more complex boards can be provided, if required.
- All other services such as X-Ray and CT-Scan testing are available as a Rapid Service.

Power Electronics for BEV & PHEV Vehicles

At CIL we have an unrivalled assembly capability to anywhere in the UK. With an extensive SMT PCB assembly facility, a state of the art high power die and wire bond assembly facility and a rapidly growing diagnostic equipment portfolio, our power electronics boast high quality production and superior technology for your battery engine vehicles (BEV) and plug-in hybrid electric vehicles (PHEV).

Our Power Electronic Semiconductor Packaging Capabilities

Interconnect Technologies include

- Silver Sinter die attach
- Silver Sinter top level interconnect
- Silver Sinter both low/pressure-less and High Pressure methods
- Eutectic Soldering
- Laser Soldering

Packaged SiC types include

- ST Micro STPAK Modules
- ST Micro SCTG011H75G3AG
- Wolfspeed WM4 Modules
- ON SEMI Modules
- Hitachi Modules
- Multiple other packaged types

Die types include

- Silicon Carbide SiC
- Gallium Nitride GaN
- IGBT
- Mosfet's
- Multiple other die types

Substrate materials include

- Alumina or other Metallised ceramics.
- DBC Direct Bonded Copper substrates
- AMB Active Metal Brazing substrates
- AiN substrates
- Copper
- Copper Tungsten
- Aluminium Backed & Aluminium
- Other high thermal materials

Heavy Gauge Wire Bonding includes

- Aluminium (Al) to 600um wire
- Aluminium (Al) to 2.00mm ribbon
- Copper to (Cu) 600um wire
- Copper to (Cu) 2.00mm ribbon
- Aluminium/Copper (AlCu) to 600um wire
- Aluminium/Copper (AlCu) to 2.00mm ribbon

Why work with CIL?

CIL's BP2 power and semiconductor packaging facility is at the forefront of the electric vehicle (EV) power revolution and is primarily used in Automotive BEV & PHEV drive train systems - we place IGBT & SiC packaged devices on a daily basis. Using Vacuum Assisted Vapour Phase reflow technology supplemented with the very latest DAGE QUADRA 7 Pro and DAGE QUADRA 5 X-Ray/CT scan systems complimented with Nordson GEN3 Scanning Acoustic Microscopy (CSAM) machines mean we can offer extremely low solder / sinter voiding which is critical in high power electronic assembly for this market.

We have a specialist knowledge unlike our competitors due to our experience in other fields. For example, based on 20 years of extensive component and assembly knowledge gained from the Oil & Gas downhole industry, many of the assemblies we produce have to operate at 150 °C. These temperatures are being generated in SiC based BEV Inverters.

Centred around **Silicon Carbide (SiC) and Gallium Nitride (GaN) power packaging using Silver Sinter die attach techniques**, CIL has the most advanced capability in the UK. Top level connectivity is normally achieved with Heavy Gauge Aluminium or Copper wire/ribbon with a wire diameter of up to 600um. We are also involved with Tier 1 OEM's Research looking into low cost and high reliability methods of connection that are not wire bonded. This has ultimately culminated in CIL being selected by both

BMW and **McLaren** on the **APC15@FutureBEV** consortium to develop SiC based power switches and associated drive electronics/sensors inverters to be used on their future vehicles. This project success was repeated with

APC20 EleVAIT, whereby CIL is now working with a consortium headed by **Jaguar Land Rover (JLR)** again working on future SiC power modules and control electronics. CIL is also working with a number of other customers in this sector and multiple other sectors using IGBT / SiC / GaN based power electronics.

All of this assembly capability is backed up with wire bond pull and die shear test capability. The detection of voiding under power devices is critical, so CIL uses its in-house Dage QUADRA5 X-ray / CT Scan system and will soon also have in-house Scanning Acoustic Microscopy (C-SAM) capability. Our capabilities include:

FR4 ALL THICKNESSES AND FR4 Hi TEMPERATURE

FR4 HEAVY COPPER TO 6oz, 8oz, 10oz, 12oz and up to 32oz

ALUMINIUM, ALUMINIUM CLAD & COPPER CLAD PCB’s

Get in contact with a member of our friendly sales team for more information on our BEV & PHEV power electronic capabilities today.

Our History

The Company was formed in 1987 as a Design and Manufacturing Company specialising in Thick Film Hybrids and the packaging of micro-electronic devices. CIL was originally based in Whitchurch, Hampshire, some 15 miles from the current facilities today in Andover, which it acquired in late 2005. CIL has matured and grown to be one of the leading UK Electronics Manufacturing Companies and has enjoyed steady growth. Its continued policy of investing in plant, equipment and its staff has solidified CIL's reputation for supplying high quality products at competitive commercial costs.

CIL House is home to a dedicated RAPID prototype SMT facility as well as four SMT lines for small to medium volume PCBA assemblies. It also houses all associated equipment / processes such as 3D AOI, flying probe test, X-Ray, CT Scan, thru hole soldering and inspection / test. In late Dec 2021, CIL took the decision to create the UK's largest Semiconductor packaging facility in Andover UK in addition CIL House. After almost 18 months of planning and fitting out, in June 2023 the 64,000sq ft facility of BP2 came on line. Contained within this facility is a single 15,000sq ft ISO 7 (Class 10,000) cleanroom and all of CIL's micro-electronics and power device assembly. CIL now has 90,000sq ft of manufacturing and office space across 2 Andover sites and we currently employ over 220 highly qualified and skilful staff.

Quality Assurance Arrangements. Environmental and Health & Safety.

ISO9001:2015 remains the backbone of our Business Control System and we also are ISO13485:2016 approved for the manufacture of Medical Devices. In addition to ISO9001:2015 & ISO13485:2016, we also hold AS9100 Rev D quality approval for Aerospace and Aviation products.

To complement our quality accreditations, CIL also holds Cyber Essentials certification. Cyber Essentials guards against the most common cyber threats and demonstrates CIL's commitment to cyber security on its IT systems.

CIL is now part of the Joint Supply Chain Accreditation Register (JOSCAR). This certification provides businesses in the aerospace, defence, security, and space sectors with a clear overview of CIL's commitment to quality and following industry standards and best practices

Our Quality Assurance Team understand the requirements needed to support the traceability and associated production records required for devices which are mission or in-service critical and construct appropriate History or Record systems required for all projects.

The achievement of required Product Quality Standards is a given at CIL and we continue to strive to exceed and improve, a trait which has held us in good regard within the High reliability market sectors. IPC standards are adopted as the specific standard and codes of practice issued or referenced by our customers.

Custom Interconnect Limited, CIL House, Charlton Road, Andover, Hants SP10 3JL.
Tel 01264 321321 email sales@cil-uk.co.uk www.cil-uk.co.uk

Award winning manufacture

Over its 36-year history, CIL has won multiple manufacturing and technological development awards. All of this culminated in 2024 when CIL won the National ELEKTRA award for "Manufacturer of the Year" after winning the same award in 2022

Please feel free to call Business Development here at Custom Interconnect Limited for an informal discussion or to arrange a visit and meet the team, we would be delighted to see you and show you around our manufacturing facilities.

Contact details are as follows: -

Email: - sales@cil-uk.co.uk

Phone UK 01264 321321

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