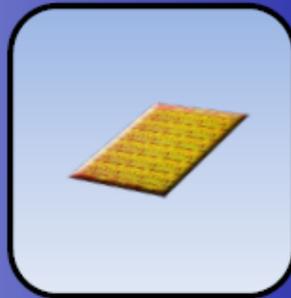


XTREMETM ***Semiconductor***

Chip RecoveryTM Solutions

Breathing New Life



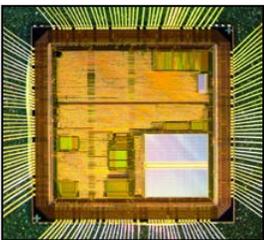
Into Obsolescence

12908 Trails End Road, Suite E, Leander TX 78641
Austin Office: tel 512-255-5401 • San Diego Office: tel 858-230-6961
www.xtremesemi.com

Chip Recovery™ Solutions

Breathing New Life into Silicon Devices

Procurement of components that are no longer in production has become increasingly difficult for manufacturers that support legacy systems, which despite being superseded by newer systems, still remain viable due to their widespread use. Many military systems are enjoying a 20-30-year life cycle where many devices or components utilized in these military systems only have a 2-3-year production life cycle. Accordingly, the bare die (IC) required to create a MIL-Standard part is often unavailable resulting from low demands or technology obsolescence. Often the desired die is available but not in the desired packaging or pin out configuration such that the device cannot be utilized as a drop-in replacement for the obsolete device. For example, the needed replacement part may specify a TSOP package where the desired die is only available on a DIP, SOIC, LCC, or PQFP package configuration. Enter our ***Chip Recovery™*** Solutions



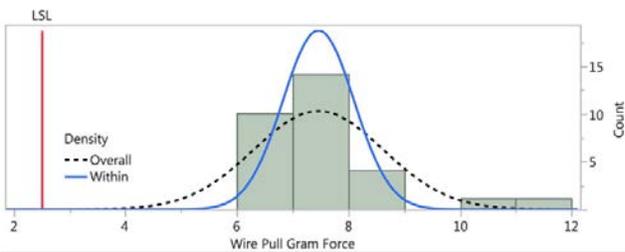
XTREME Semiconductor™ *Chip Recovery™* solutions, offers a reliable, cost-effective, process of removing silicon die from any plastic or ceramic package and place the die into the desired package while maintaining full die functionality. Extracted die are then ready for re-assembly into the desired plastic or hermetic package, meeting the form, fit and function of the desired obsolete semiconductor product.

Our ***Chip Recovery™*** solutions provide a cost-effective alternative to other higher-cost alternatives such as redesign or re-fabrication of the microcircuit chip to resolve Diminishing Manufacturing Sources and Material Shortage (DMSMS) issues.

Once the die has been successfully recovered from its original package, the original gold or aluminum wires are disconnected just above the original gold ball or aluminum wedge bond, providing a clean, uncontaminated surface such that new wires can be installed with a reliable high adhesion bonding process.

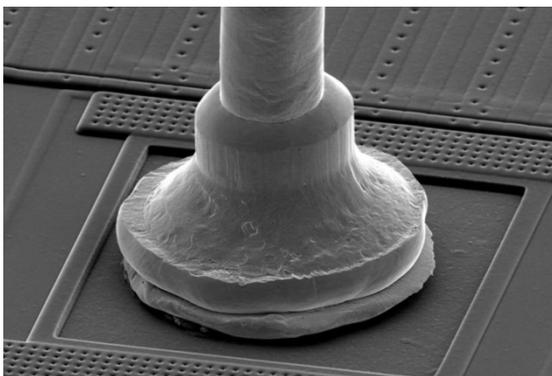
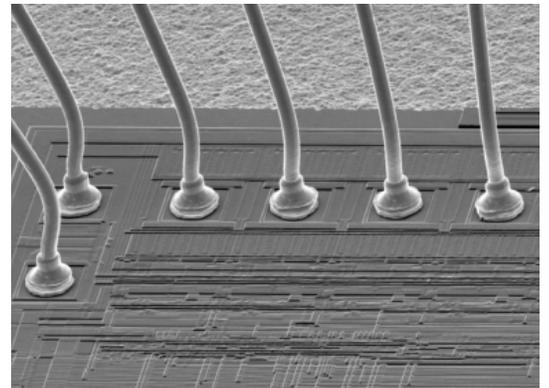
Per the figures below, die shear and bond pull results have shown that this production process is extremely robust and has statistically identical reliability when compared to pre and post assembly processing of the original connections. Our **Chip Recovery™** solutions provides additional assurance in knowing that only fully inspected, authentic Original Component Manufacturer (OCM) die are re-assembled into the finished product which significantly reduces risks associated with receiving and utilizing counterfeit devices.

Wire Bond Pull Strength (MIL SPEC > 2.5 grams)



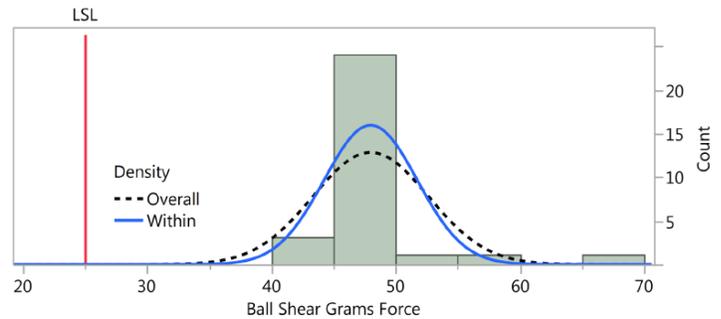
Index	Estimate	Lower 95%	Upper 95%
Cpk	2.59	1.742	3.436
Cpl	2.59	1.742	3.436

* Mil-Std-883 J method 2011.9 p 283-286, Au Postseal



Data representative of Aurora Semiconductor Bond-Coin™ Process

Ball Shear (JEDEC spec > 25 grams*)



Index	Estimate	Lower 95%	Upper 95%
Cpk	2.044	1.37	2.715
Cpl	2.044	1.37	2.715

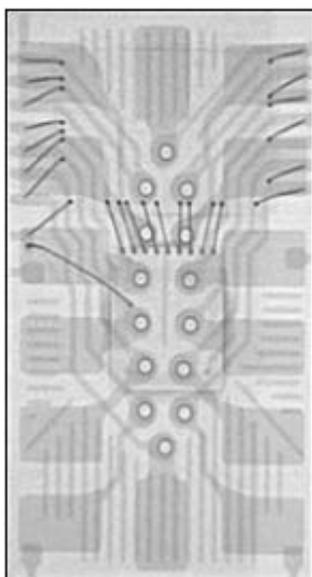
* JESD22B116 p 8, 2.75mil Ball

What is a *Chip Recovery*TM *Product Solution*?

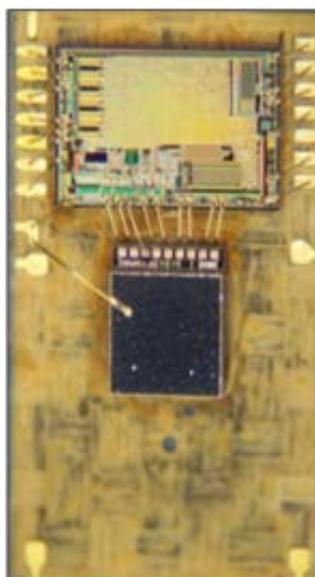
An innovative, cost effective solution that utilizes a reliable die extraction and reassembly processes to solve product obsolescence issues.

Process Overview

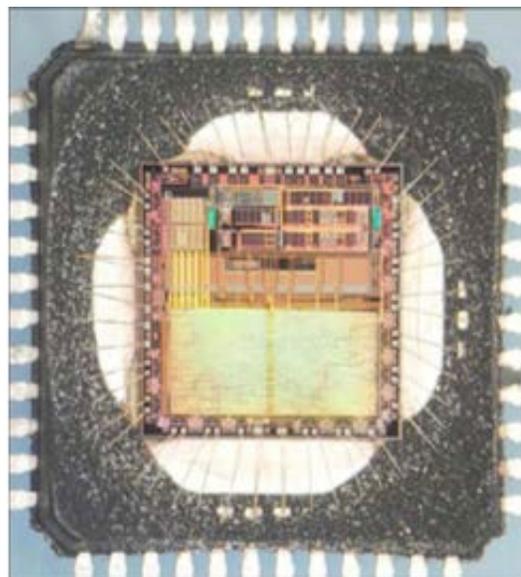
X-RAY



Mechanical



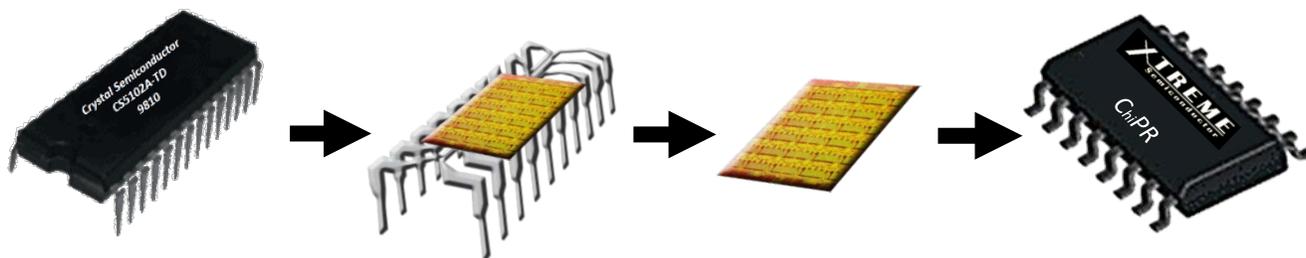
De-capsulation



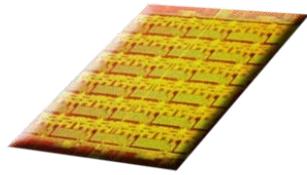
Start with existing OCM component in undesired package

Disassemble package and extract the die

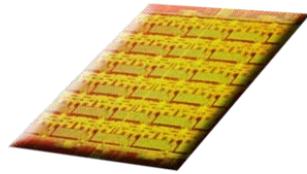
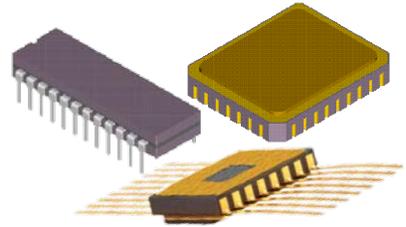
Re-assemble the die into the required package configuration



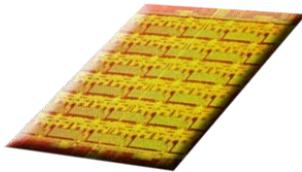
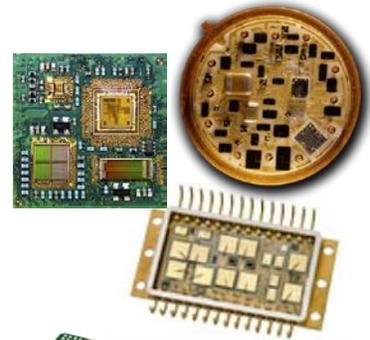
Uses for *Chip Recovery*TM Die



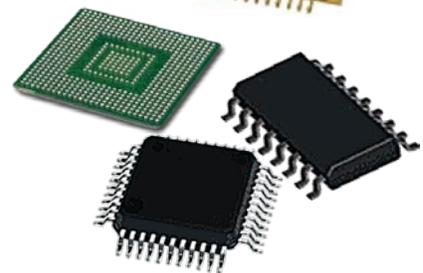
→
Hermetic Packages



→
Hybrids & MCM's



→
Plastic Packages



*Chip Recovery*TM Solutions Standards

- ✘ XTREME Semiconductor manufactures in strict compliance with industry standard for assembly, test and qualification.
- ✘ Manufactured to be MIL-STD-883 compatible product
- ✘ Guaranteed to meet original OCM data sheet or specification requirements.

Chip Recovery™ Solutions

✗ All *Chip Recovery™* product is clearly marked with our **ChiPR™** identifier



20-pin CLCC
Dual Precision Op Amp
Military Application
200pcs Delivered



68-pin PGA
16x16-bit Multiplier
DOE Application
220pcs Delivered



176-pin PQFP
PCI Ethernet Controller
Military Application
1500pcs Delivered



52-pin QFP
DSP System Memory
Commercial Aviation
320pcs Delivered

✗ All correspondence and written quotations clearly identify the product being offered contains extracted die

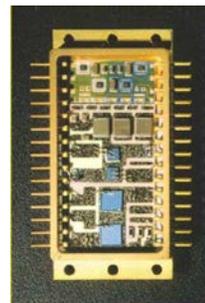
✗ **XTREME Semiconductor™** works closely with our customer to develop qualification plans based on specific end customer applications, environments and requirements

Ideal Applications for Products using our Chip Recovery™ Solution

✗ Military/Aerospace



✗ Hybrids



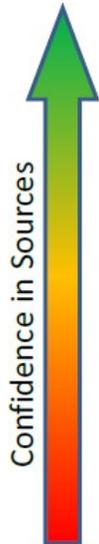
✗ Geophysical



✗ Commercial/Industrial

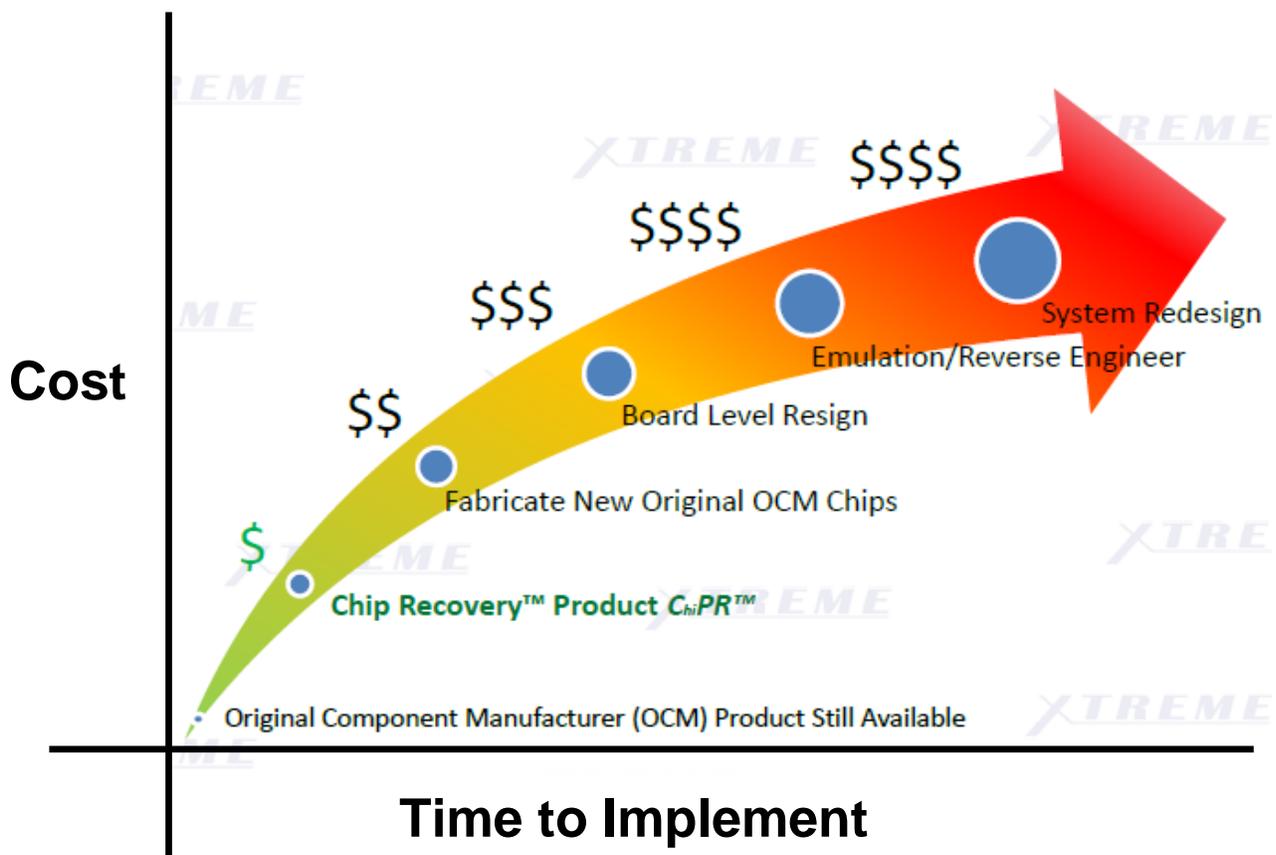


Sources for Die used in our *Chip Recovery™* Solutions



- ✗ Direct from OCM
 - Preferred choice, highly reliable, full traceability
- ✗ Franchised Distributor
 - Highly reliable, traceability back to OCM
- ✗ Excess Inventory
 - Possibility of limited traceability
- ✗ Open/Aftermarket Material
 - Limited/Questionable/No traceability

Analysis of System Redesign Options





Available Standard Process Flows for Chip Recovery™ Solutions

Hi-Rel Product Flow:	Commercial Plastic Flow:
Military 2nd Optical Inspection	Commercial 2nd Optical Inspection
Die Attach	Die Attach
Aluminum or Gold Wire Bond	Aluminum or Gold Wire Bond
3rd Optical Inspection	3rd Optical Inspection
Seal	Mold
Temperature Cycle	Marking
Centrifuge	Electrical Test
Fine Leak	
Gross Leak	
Marking	
25°C Test	
Burn-in	
25°C Test	
Final Test (-55°C to +125°C)	

Quality Conformance Inspection:

QCI in accordance with MIL-STD-883 Method 5005 shall be performed as required by purchase order or drawing specification.