NEW

InCAM™

A new wave in HDI and IC packaging pre-production CAM

64 Bit Technology

Multi-Core CPU CAM

- Fast, high-precision CAM tooling
- Improved data integrity and fault indication
- Collaborative and secure work environment
- Streamlined user interface; easy-to-use tools
- Dedicated DFM and analysis tools for HDI boards
- Dedicated cleanup and analysis tools for IC Packaging boards

Frontline

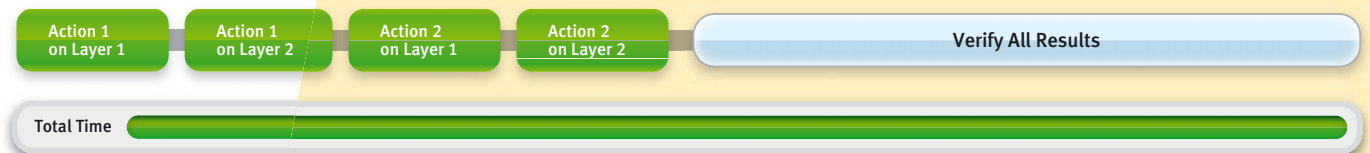**PCB SOLUTIONS**
An Orbotech Valor Company

Fast, high-precision CAM tooling
Gain full control of production data and achieve amazing results fast with dedicated DFM tools, Check & Fix, collaborative processing, background processing and system-wide automation. Run global repairs on any layer, undo and redo results or rerun selected repairs with new parameters while other tasks run in the background. And for unmatched efficiency, combine standard scripting languages with InCAM line mode commands to streamline your operations.
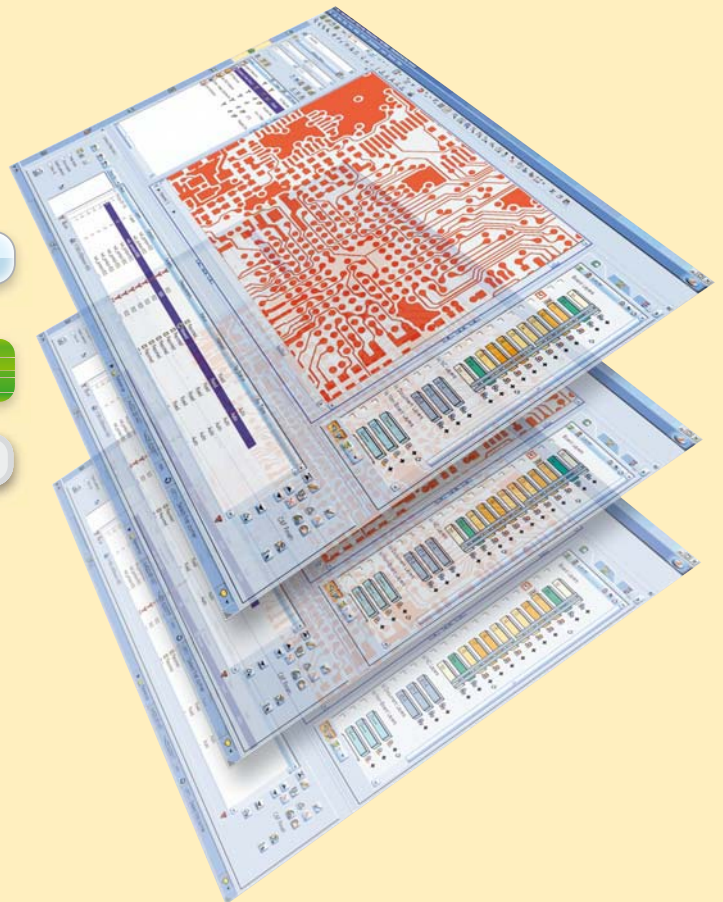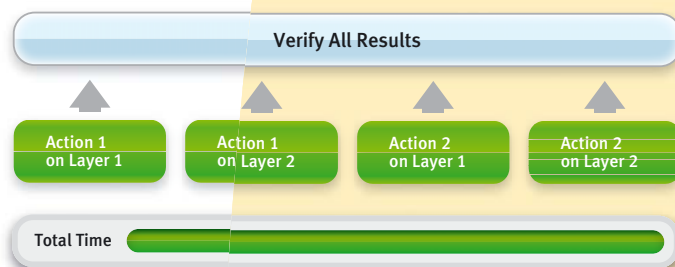
Parallel processing

Conventional CAM
Analysis and DFM progress in a conventional CAM system

Action 1 on Layer 1	Action 1 on Layer 2	Action 2 on Layer 1	Action 2 on Layer 2	Verify All Results

Total Time

*In*CAM
Analysis and DFM progress in InCAM

Verify All Results

Action 1 on Layer 1	Action 1 on Layer 2	Action 2 on Layer 1	Action 2 on Layer 2

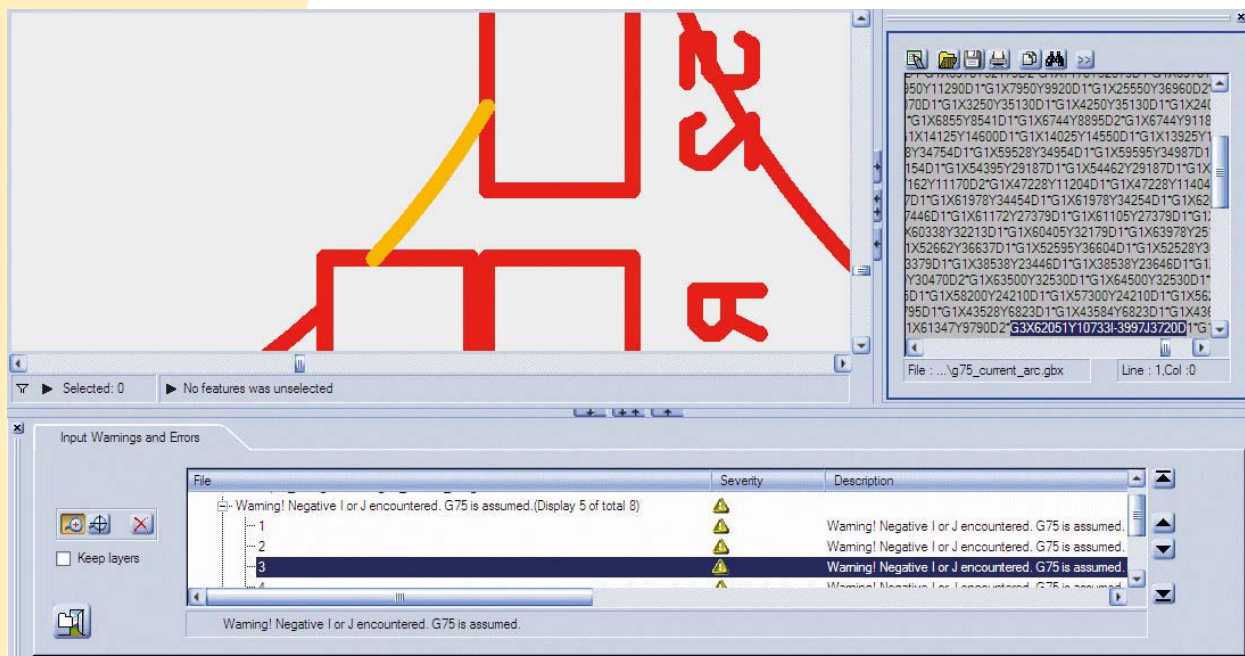Total Time

A new wave in HDI and IC packaging pre-production CAM

InCAM offers everything you'd expect from a CAM system designed and delivered in the 21st century. Everything and more.

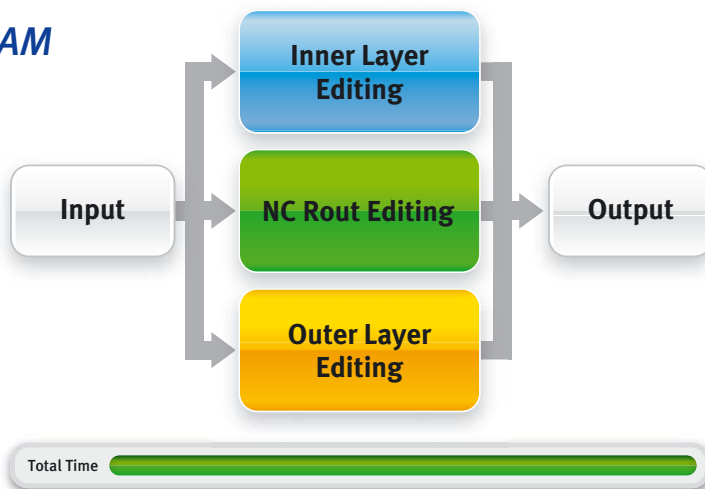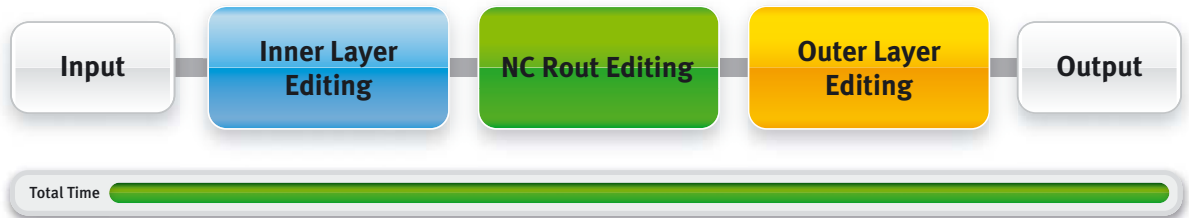Input report with ASCII-to-graphic synchronization

In today's fast-paced PCB manufacturing environment, improving production efficiency and speed is critical to achieving lasting profitability and a competitive edge.

Easy to use, InCAM is a comprehensive CAM system for HDI (High Density Interconnect) PCB and IC Packaging manufacturers that combines editing and analysis with automatic design-for-manufacture optimization tools to perform high-precision CAM tooling faster than ever before. And that's not all. Watch yields grow as operators start multi-tasking and running advanced processes in the background as they work. Speed up cycle time as colleagues team up on jobs in a data-secure environment. Achieve excellence every time by running interactive post-processing on selected DFM results.

It's the 21st century. You deserve a new CAM solution.

Collaborative processing

Conventional CAM

| Input | Inner Layer Editing | NC Rout Editing | Outer Layer Editing | Output |

Total Time ████████████████████████████████

InCAM

	Inner Layer Editing	
Input	NC Rout Editing	Output
	Outer Layer Editing	

Total Time ███████████████████

Improved data integrity and fault indication

Find out how InCAM can help your people manage and protect job data:

- Quickly identify and respond to warnings with ASCII-to-graphic synchronization. Available both at input and output, warnings are highlighted in the original ASCII file and in its corresponding graphic file, for fast and thorough error correction.
- Prevent errors by storing customer preferences safely in the Customer Library. Then load customer-specific checklists, parameters, wheels and other data elements. Leverage InCAM's libraries to standardize company practices and reduce errors from manual input.
- Avoid costly builds of scrap boards from incorrect data with the powerful Netlist Compare tool that compares your customer's netlist with InCAM's

generated netlist. Netlist Compare finds any errors, pinpoints their exact location and starts the troubleshooting process for you by suggesting the source of the problem.

- Use cleanup tools to optimize input data for analysis and transform even the poorest quality data into an intelligent format that InCAM DFMs can understand. Choose from a range of cleanup actions to improve DFM repair accuracy, speed up error detection, reduce false alarms and ensure only workable designs are sent to manufacture.

Collaborative and secure work environment

The first and only CAM system to provide true collaborative processing, InCAM empowers your workforce to maximize their time by simplifying the way people work together. The Lock Layers feature lets

operators co-tool jobs at the same time without coming into conflict. Operators can lock layers for editing, run analyses on layers locked by others and check the lock/unlock status of a layer. The result: increased productivity with high data integrity.

Streamlined user interface; easy-to-use tools

Give your people an uncluttered, customizable workspace to minimize distraction and help achieve the results they want quickly and easily. You'll find related features grouped together in task based subsystems so that the tools you need are always at hand. All features are designed for maximum ease of use with minimum training.

Create a customized CAM Guide that will take your operator step by step through the process flow, using menu shortcuts, checklists and automation tools.

Solder mask repair

Signal layer repair

Experience the familiar and the new

Discover easy-to-use tools – some familiar, some new – to help streamline the processes that slow down your work today.
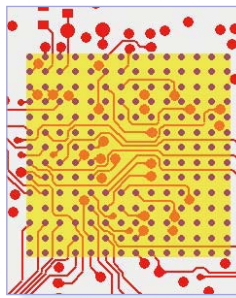
Dedicated DFM and analysis tools for HDI boards

Enhance the speed and efficiency of HDI board production with InCAM's new range of dedicated DFM and analysis tools:

- *Automatic feature recognition tools,* including recognition of SMD, BGA (Ball Grid Array) component pads and BGA areas on the board as well as customer drawn teardrops.

CAM Guide
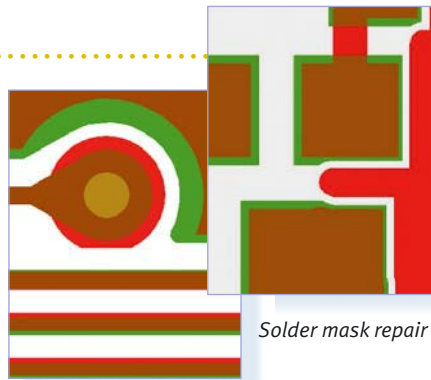

Automatic BGA recognition

- *Powerful cleanup tools* automatically convert drawn copper areas to surfaces, merge multi-polarity surfaces to a single polarity surface and automatically construct flashes from drawn pads.

Drawn area substitution

- *Dedicated BGA analysis* sorted per BGA component.
- *Dedicated analysis for gold and carbon masks.*
- *Automatic via optimization*
  Moves laser and/or mechanical via holes with their related pad stacks and connections to solve spacing between vias and other drills and rout features.

- *Automatic signal layer repair*
  Automatically solves spacing, annular ring and trace width problems using a range of repair methods according to user-defined priorities. Repair methods include trace and bus rerouting, surface shaving, blow-up traces, local trace thinning and more.
- *Automatic solder mask repair*
  Automatically solves solder mask clearance, bridge and coverage problems with dedicated repairs according to the underlying copper. Special treatment is provided for embedded or partially embedded component pads, SMD and BGA clearances and small or partially covered clearances.
- *Automatic silk screen repair*
  Automatically moves legend texts and resizes component frames away from soldermask clearances, ensure minimal line width after merging or clipping with the solder mask.


Automatic silk screen repair

- *SIT/ENIG mask creation*
  Creates the ENIG gold mask and SIT (Secondary Image Transfer) mask from a customer delivered gold mask, optimized to meet production requirements.
- *Advanced dynamic etch compensation*
  The most advanced etch compensation capability on the market today, with unlimited possibilities. Compensates different elements in a variety of ways according to your defined priorities.

Dedicated cleanup and analysis tools for IC packaging boards

Enhance the speed and efficiency of IC packaging board production with InCAM's new range of dedicated DFM and analysis tools:

- The Contour to Circuit conversion tool, automatically converts layers defined as surfaces or outlines (e.g. coming from DXF data) to regular layers defined with pads and traces.
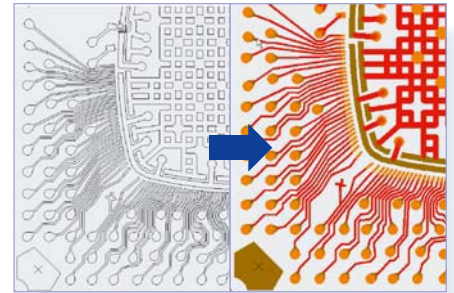
Contour to Circuit

- Customize signal analysis result categories to fit your needs and interests, according to defined feature attributes (e.g., for bonding pads).

Automatic panelization tools

- Lower production costs using automatic panelization tools to guarantee optimum board placement inside the panel and the most economical use of board materials.
- Other panelization tools include: automatic part and coupon placement, pattern fills based on predefined standard patterns and easy panel overlay construction together with alignment holes, text and patterns.
- Verify complex panel designs with panel analysis to make sure that there is no accidental overlap between PCBs and coupons, alignment drills etc.
- Automatically verify whether all gold plated tabs are correctly connected to panel gold plating bars.

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Advanced Rout Editor

Create rout drawings from blueprint or customer data quickly and efficiently using the Rout Editor. With a complete set of flexible drawing tools to hand, operators can accurately draw the path of any rout layer — however awkward or unusual — and avoid manual edits in the machine rout file after output.

Integrated NC Drill and Rout Manager

Use the NC Manager to combine drill and rout files and achieve the fastest throughput in the NC department. NC files can also be split over different runs or different machines as needed.

Robust Output module

Effortlessly prepare job data for output to a range of machines and systems using the Output module. Verify the success of the output by generating a graphic postview of the output file or comparing the postview file to the original board layer, using Compare Layers.

Integrated Engineering Solutions

InCAM™ is part of a complete integrated engineering product suite, from the quoting stage, through process planning and CAM all the way to the production floor. The Frontline suite comprises industry leading, rules-based engineering applications, all revision controlled.

Minimum System Requirements

Platforms	Core II processor or above
Monitor	Minimum size: 19", resolution: 1280x1024 Recommended size: 24", resolution: 1600x1200 or wide-screen 1920x1200
RAM	Minimum: 2GB (32 bit OS) Recommended: 4GB or above (64 bit OS)
Disk Usage	1GB for client; data storage on server
OS	Windows XP (64 bit recommended), Linux Suse 10 or above (64 bit) , Linux RedHat ES 5 or above (64 bit)

About Frontline

Frontline PCB Solutions is the world leader in pre-production CAM and engineering software solutions for the PCB industry. Frontline draws on proven technologies from Orbotech and Valor to create new standards in vertical and horizontal integration for the PCB industry. Frontline builds on the strategic vision, knowledgebase and hands-on track record of two market leaders, as well as over two decades of experience and the largest installed base of front-end solutions in the world of over 7000 seats.

InCAM™   Genesis2000   GenFlex™   InPlan™   InPlanFlex™   InStack™   InCoupon™

Leading you UpFront.

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Frontline

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R.BRnCAM-Q360-8/09 The information in this brochure is not a set of specifications and is subject to change without notice.