



**Exception PCB Solutions has a
proven history of supply chain
expertise since 2007**



Jan16

eXception PCB solutions are the largest dedicated time and technology HDI printed circuit board manufacturing company in the UK.

Over 36 years experience and with a turnover in excess of £16M eXception continues to push the boundaries of manufacture with a focused quality and customer service led team.

Our expertise:

- Design – full schematic & layout
- Design for manufacture in support of product realisation - PCB / PCBA
- New Product Introduction (NPI)
- Low series manufacture (UK) to high series manufacture (LCE)
- Extensive range of technologies
- Manufacturing lead-time from 24hrs
- Offshore specialists working with a range of long term partners
- Full turnkey service

2013 – eXception PCB Solutions and Fastprint Merge

2011 – Exception PCB & Exception VAR merge to form **eXception PCB Solutions**

2010 – **IDS established** – Integrated Design Service. PCB design and schematic layout with 24hr Technical & engineering support.

2008 – 2010 - £7M capital equipment investment

2007 – **HDiXS CAM office opened in India** (10 x Engineers)

2007 – Winner in 2 categories at the Best Factory Awards

2006 – £2M capital equipment investment

2005 - **Acquired by eXception Group**
– **£3.8M** capital equipment investment

2001 – Investment doubling the manufacturing capacity to 6,000m² - £7.4M spent on capital equipment

2000 – **Acquired by US DDi Corporation**

1989 – Relocated to the current site in Tewkesbury

1977 – Founded in Cheltenham, UK

120+ Employees

24 / 5 Working

Over 36 Years Trading

Company overview:

- \$160M Revenue in 2012 (Target \$500M+ by 2017)
- 180,000 part numbers manufactured in 2012
- 17000 part numbers per month being manufactured now
- 59% less than 5 SQM per part
- 41% leadtime <7 days
- 94% of parts <12 layers
- Markets - Telecoms 50%, Computer 14%, Military 11%, Industrial 11%
- 6 sites in Guangzhou (each site technology dedicated)
- 1 site in Yixing open Q1 2013 - small & medium volume HDI up to 30 layers
- Full turnkey service



Design Resource:

- 10 offices located in Shenzhen, Guangzhou, Shanghai, Beijing, Chengdu, Xi'an, Nanjing, Changsha, Xiamen, & Silicon Valley California
- Over 250 design engineers
- Layout services of SI, PI, EMC
- Provide design training services to customers

- Double Sided PTH
- Multilayer
- Blind & Buried Vias
- Microvia
- Depth drilling (Schmoll MXY Camera Alignment)
- eXMVT™ (Microvia Tower -10+n+10 where 'n' = buried sub core)
- eXFPT™ (Flat Pad - copper filled umVia's and thru vias**)
- eXVTEX™ (Copper filled thru vias – subject to aspect ratio)
- Resin fill and over plate.
- Copper Core / CIC PCB's
- Controlled Impedance (Inc **Rambus**)
- Flip chip / CSP / μBGA Substrates
- Ceramic Filled (Rogers) / FR4 hybrids
- Epoxy Aramid / FR4
- Composite Builds
- IMS Substrates
- Standard Multilayer Flex & Flex-Rigid
- Multilayer umVia & Blind Flex-Rigid
- Multiple Surface & Selective Finishes

● UL 94 V-0

● ISO 27001 IT Security
Management in progress

● AS 9100 rev C

● ISO 14001
● ISO 9001

**Subject to design review

- PCB design support from schematics / layout through to NPI / production
- Internal design service integrates fully with our technical support team
- Design to IPC2220, considering proven DFM and microvia guidelines
- Time to market – we recognise the importance of fast and accurate DFM with meaningful feedback direct to design
- 20 full time CAM Engineers – direct contact and feedback to design throughout CAM activity
- Option of Technical Engineers working direct with Designers at customer site
- Option of Design Engineers working direct with Engineers at customer site
- Established multilingual technical support team
- Fully integrated manufacturing control system

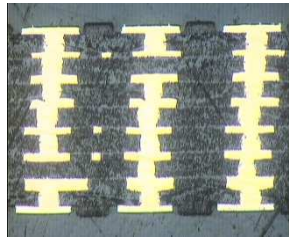
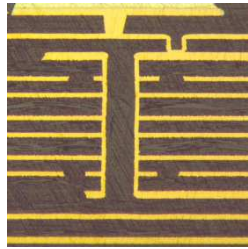
DFM – the purpose of ‘true’ DFM requires closer interaction between the designer and the fabricator to minimise the potential failure modes commonly seen in PCB manufacturing. PCB design on site enables the closest possible interaction between design and fabrication:

- Data that conforms to IPC spec
- A design that withstands fabrication robustness
- A design that meets customers performance throughout its entire life cycle
- A fully considered design & manufacturing process that provides total lowest cost

....as a result you will receive:

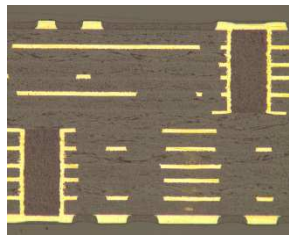
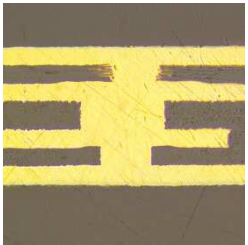
- High yield
- On time delivery
- Reliability
- Repeatability





Copper filled and resin filled B/B via holes

Complex ML > 36 (Pb-Free)
Complex HDI 5+N+5 /
eXMVT™ (stacked via, microvia tower) / IC
Substrates



Via in pad / capped via holes
eXFPT™ (Flat Pad Technology)

Complex ML (Pb-Free)
Standard HDI 1+N+1

Complexity

Ceramics /
PTFE/Arlon/Taconic

Thermount / heat management
Including **eXMVT™** (Microvia Tower)
~Copper Filled Vias

Low Dk / Inc thermal stability

Complex ML (Pb-F)
Impedance control (5%>), specific materials

Enhanced RoHS FR4
Tg 180+

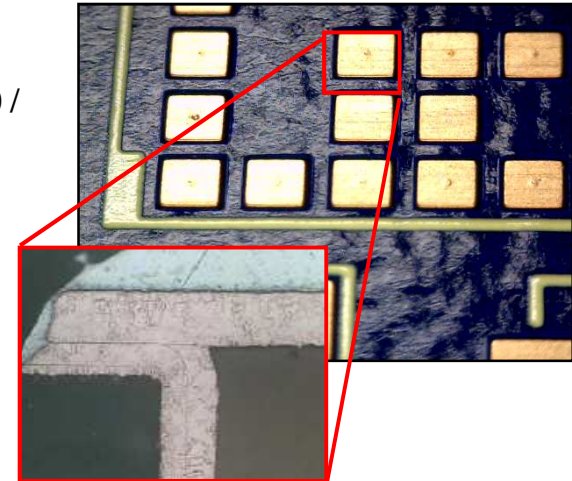
Low CTE, Higher Td / T260 /
T288

Standard ML (Pb-F)
4 / 4 track and gap

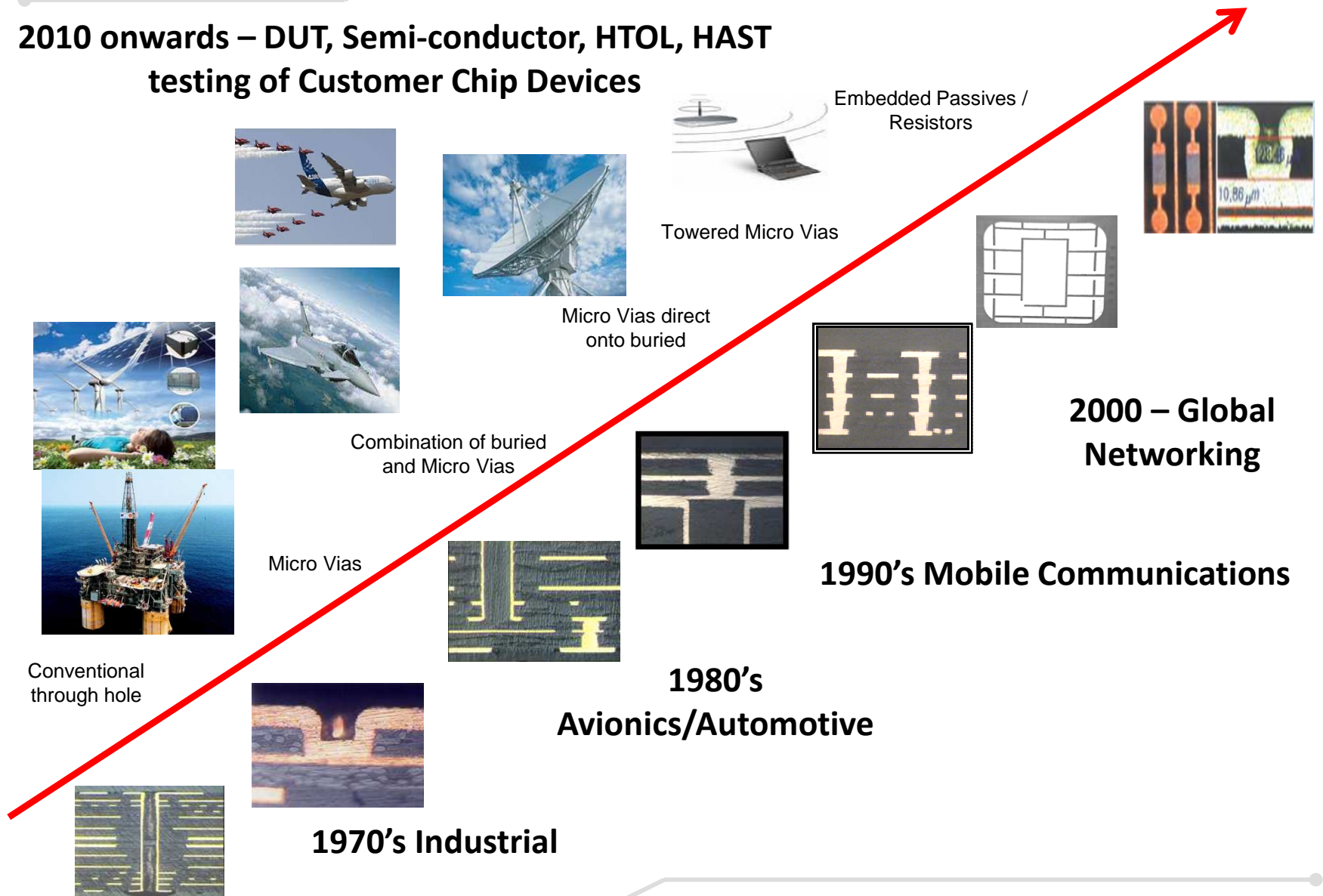
Multifunctional RoHS FR4
Tg 150

STD RoHS compliant FR4
Tg 135

**Ease of
supply**



2010 onwards – DUT, Semi-conductor, HTOL, HAST
testing of Customer Chip Devices



TUC

High TG FR4 / Halogen Free / High Speed Low Loss / No Flow



Mid & High TG FR4 / Polyimide / Halogen Free



High TG FR4

isola

370HR / IS410 / IS400 / FR408 / Itera

TMT

Flex Material

Panasonic

R1755 / R1566 HF



RO3000 – 6000 Series / Duroid



Flex Materials / Coverlay - AP9121 / LF0110

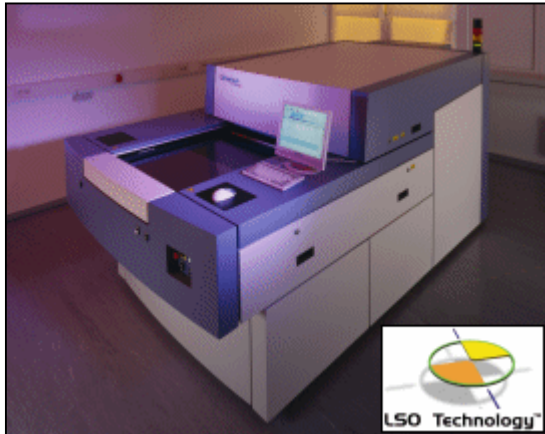
TACONIC
Advanced Dielectric Division

TLY / TLX / RF-35

ARLON

49N / 37N / 85N

**Others at request*



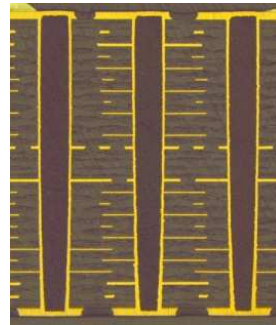
Orbotech Paragon 8000Si LDI

- 25µm features
- 160 scanned images per hour
- Powerful 355nm solid state laser
- High resolution system
- Ideal for packaging, flex, sequential build up and high layer count product

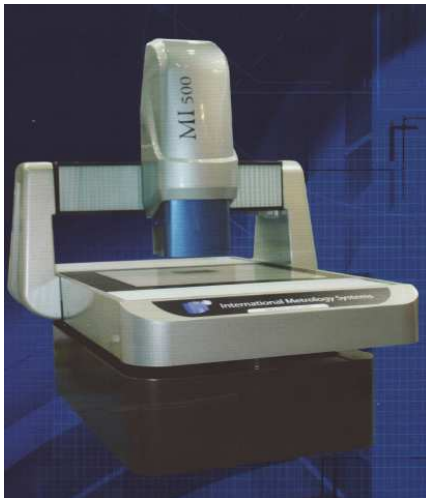


Orbotech Discovery 8HR AOI

- Push to scan (no set up)
- 35µm T&G image capability
- 77 scanned layers per hour (35µm)
- Uses alternate coloured light beam for high inspection of ceramic materials



Vacuum Assisted Resin Filling
Improved control and reduction in lead-times. Beneficial to improve the HDI process and enable Via In Pad technology.



**Automated 3-Axis CMM
(Coordinate Measuring Machine)**
Accurate dimension measurement.
Automated size and position checking.

Aid Process Engineering.
Avoid customer returns such as incorrect board dimensions.



High-precision drilling machines.

- CCD camera registration for the highest accuracy and maximum productivity.
- In Process-monitoring.
- Real-time Laser measuring system and Contact Bit Detection for accurate controlled depth drilling.
- The perfect combination of mechanical components and optical systems to exceed the requirements of the current and next generations of Printed Circuit Board Designs.

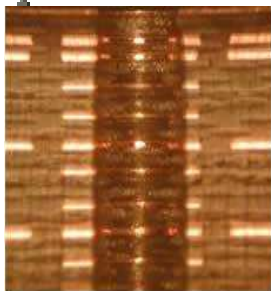
XRI

- Powerful predictive software engine and accurate automated layer measurement to improve registration capability

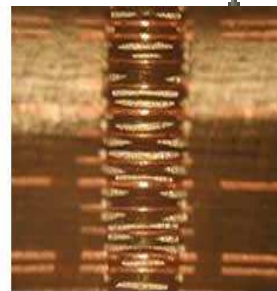
Plasma Etch back



The mechanical drilling of vias in multi-layer PCBs creates a residual resin that smears along the walls of the vias, impeding metallisation of the electrical connections. After drilling, resin removal from inner layer posts is required to ensure reliable electrical contact. Traditional methods of etching and desmearing are often not effective for today's multi-layer board designs due to the capillary effect present with wet chemicals, and the limitations related to the use of advanced board materials. In contrast, plasma effectively removes epoxies, polyimides, high Tg blends, mixed materials, and other resins in standard and high aspect ratio panels.

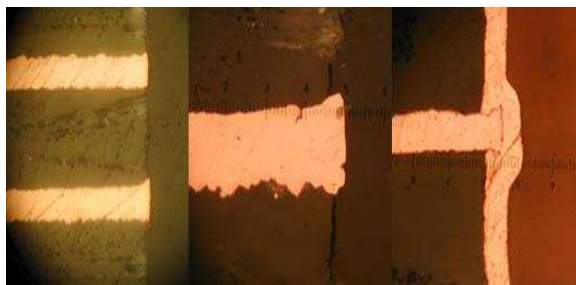


Before desmear process



After plasma desmear process

As displaying in the photograph on the left the copper inner layers within the via are not completely exposed due to drill smear. The photograph on the right displays the exposed copper inner layers after the plasma desmear process.



The pictures on the left illustrate the effect of a plasma etch back process. Displays copper layers that are even with the epoxy. After the plasma process the epoxy is etch back exposing more copper for the plating process (middle picture). The picture on the right shows the three-point contact after the plating process. The etch back process improves the reliability of the printed circuit board.

DESIGN : OPERATIONS : SUPPLY CHAIN : TIME TO MARKET

eXception IDS Design Engineering

- Integrated Design Service:
- Schematic, Layout & Library Mgt.
- DFM / DFX / DFT Collaboration.
 - Component Obsolescence Management
- 24hr Technical & Engineering Support
- Risk Averse PCB Solutions

eXception PCB Manufacture

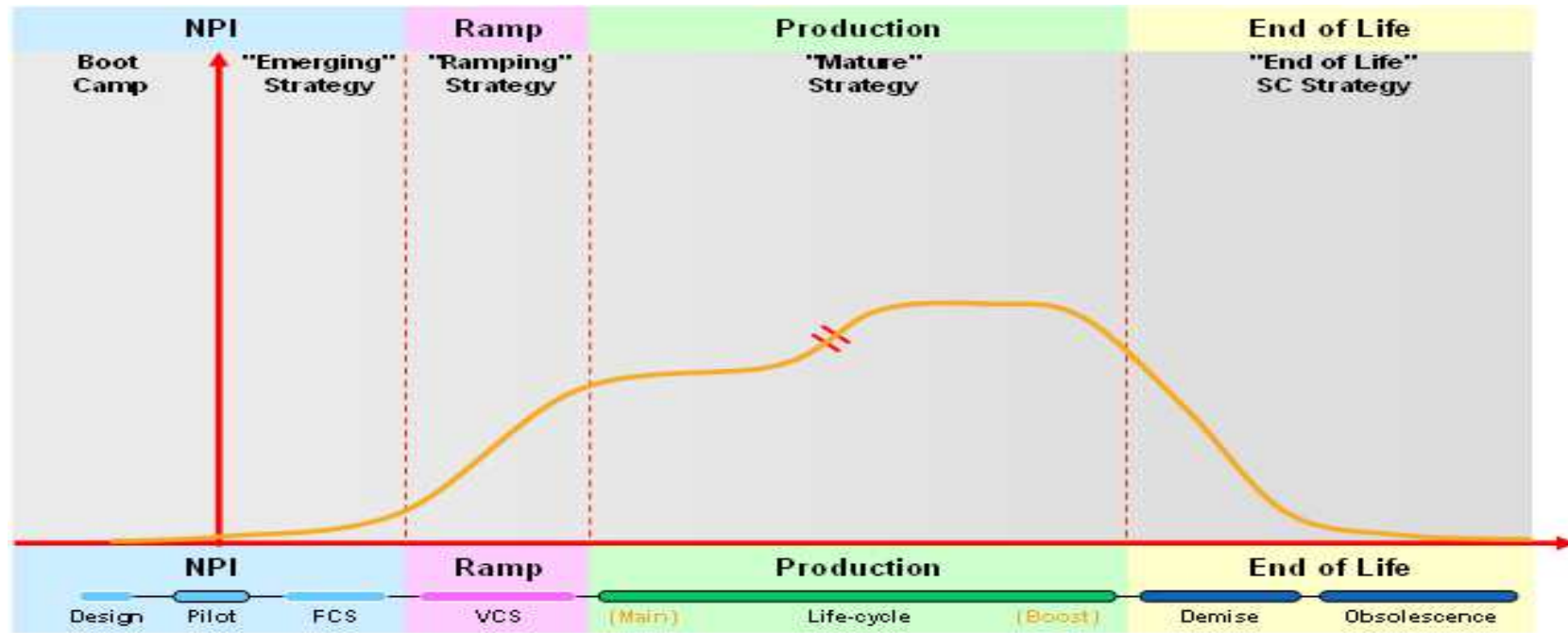
- Critical time to market:
NPI – Lead-time from 24 hours
- High Technology: HDI, RF, Flex Rigid + IC Substrate Specialists.
- High Reliability Specialists: A&D, Energy, Space, Medical
 - Customer Focused
- Dedicated Account Managers

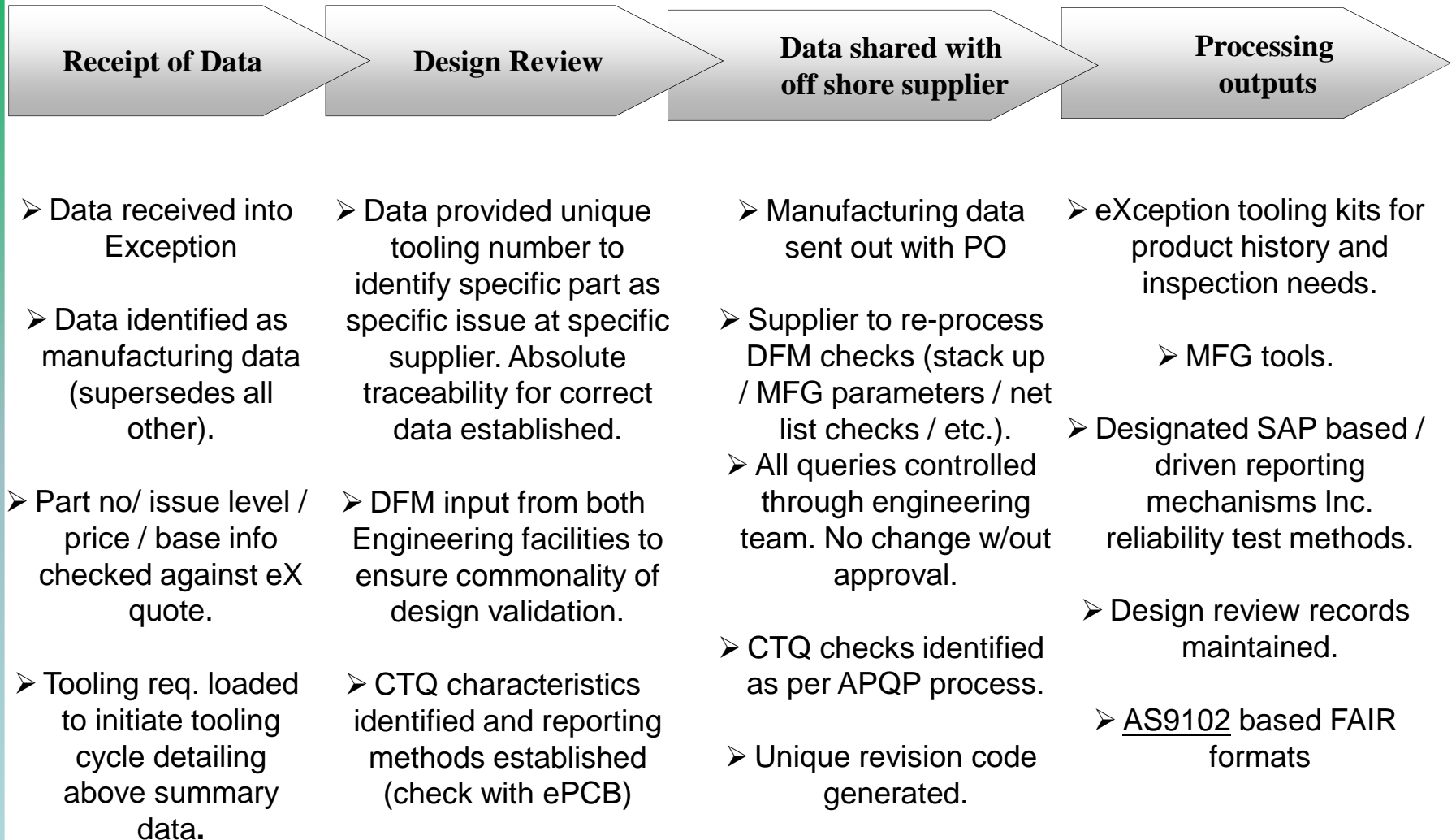
eXception VMI Dynamic Supply Chain

- Supply Chain Strategy
 - Customer Focused
 - Customer Schedule Management
- Customer Forecast Models
 - Kanban
 - Ship To Line
 - Consignment

- Engineering Project Teams manage data transition & NPI knowledge to offshore facility providing seamless migration.
- Full verification, FAIR & test by Off Shore manufacturer on all Batches.
- Additional Inspection, Testing and FAIR on all Batches as product is received back in nominated eXception Hub.
- If preferred - All Quotations and Sales Documentation in USD.
- Chosen Supplier has equal technical capability to eXception UK and aerospace experience.
- Delta changes can be discussed & engineered in the UK with controlled [transition](#) to eXception Off shore.

- Understand the Customer
 - Drivers
 - Perception
 - Knowledge
 - Requirements
- Risk Management
 - Highlight /Agree Risks
 - Manage Risks
 - Contingency Planning
 - Added Value Services
- Professional Services
 - Use Experts
 - Support Decision Making
 - Propose Solutions
 - Proven Track Record
 - Processes in Place
 - Transfer Methodology
- Product Lifecycle
 - Understanding
 - Managed Solutions





exception PCB Supply Chain - Commitment to affordability

Exception PCB Solutions, through the application of continuous improvement philosophy, lean manufacturing principles and focused sourcing strategies, is highly successful in realising significant labour and material savings for our customers.

- Long term supplier contracts and relationships
- Aggressive lead-time management
- Highly efficient facility layout
- Cost reduction initiatives in partnership with customers
- Overseas procurement
- Strict overhead controls to maintain competitive cost structure
- Conservative cash management assures long-term financial stability
- Lean manufacturing principles practiced
- Experienced senior management
- Advanced IT security protection to maintain complete data integrity

- Euro fighter Typhoon
- Saab Gripen
- Lockheed Martin F-16
- Hercules C-130
- Lynx
- Merlin EH-101
- Gazelle
- NH90
- Tornado
- Eurocopter
- Euro Hawk
- Dreamliner
- Joint Strike Fighter
- Apache AH-64
- Airbus A380
- Boeing 787
- Boeing 777



Whether its Mission Critical, Commercial, Defence or Avionics, each application demands quality and reliability.

With over 25 years experience in the field, eXception PCB are at the forefront of providing the necessary PCB solutions to suit each program.

eXception PCB have for many years listened to its clients in jet fighter, combat and commercial avionics to enable successful partnerships to provide expertise in this high quality high reliable application. With component density, weight and the on-going challenges being faced to reduce electronics, designers are being continually pushed to evaluate new technologies and PCB methods to aid function and performance prior to product launch and flight approval. eXception PCB are able to facilitate several key factors in this critical development and production program from the support of >Build and Stack Up>DFM to aid fabrication and EMS>Supply of quick turn prototypes and the supply of serial production. Many of the designs are incorporating the use of Flex, Flex-Rigid, ML and HDI (High Density Interconnect) using advanced micro via, (laser drilled holes) via-in-pad and eXMVT™ (Micro Via Tower) as well as vast varieties of material and surface finish options.

Typical applications and services supported

- Head-up Displays
- Engine Management
- Weapon Intelligence and Management
- Control & Instrumentation

