Completing the E&E Chain in Malaysia
ACM’s Participation

April 23, 2014
SEMICON Singapore

E & E Ecosystem in Malaysia

Process Development
FMEA
Precision Assembly
System Build
High Mix, Low Volume
Quality Control

Value-added Contract Mfg

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Precision Engineering, Assembly & High-level Equipment Integration

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ACM Group of Companies

ACM Group (Penang-Based)
USD, MYR
USD100 million
815 Staff worldwide
410,000 sqft Factory Space

Confidential

Strategic alliance
550 H-C, 50K sf
Applimotion Inc
(CA, USA)
Motor Design
Motor control

120 H-C, 70K sf
Exerion Prec. Tech
(Olomouc, Czech)
Sheet-Metal VA
Contract Mfg

85 H-C, 100K sf
ACM, Penang
(Malaysia)
1998
USD, MYR

150 K sf
ACM, Changshu
(China)
2007
USD, RMB

50 H-C
Exerion Prec. Tech
(Ulft, Netherlands)
Feb 2012
USD, EUR

80 H-C
Machining VA
Sheet-Metal VA
Contract Mfg

3D Structure Design
Welded Frame
60 H-C, 90K sf
ACM, Changshu
(China)

ACM/Exerion Global Footprint

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Rochester NY
(3rd Party Hub)

Los Angeles, CA
(3rd Party Hub)

Ulft
NL

Olomouc CZ

Changshu CN

Penang MY
ACM 3 Core Business Units

ACM
The Precision Opto-Electromechanical Specialty CM

Critical Precision Engrg Components
Precision Optics/ Electromechanical Assembly
Module/Sub-Sys Equipment Integration

Machined Components
Sheet Metals/Structure
Cable Wire-Harness
Motor Components/Design

Tooling & Tester Development
Tooling & Tester Development

high volume - economic of scale
economic of scope – high mix

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Core Competencies

Motor & Motion Control
Assembly, CM & Program Mgmt
Machining & 2nd Ops
Sheet Metal & Welding

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Capabilities Road Map

Complexity/Technology

1999 2001 2003 2005 2007 2009 2011 2013

Competency-focused  Product-focused

Technology-focused

Sys/Equip Integration

Contract Design Mfg (CDM)

Technology Partner

Sub-Assemblies

Components

Modules & Sub-system

Customer Technology Xfer

Product Migration

Complexity (Value-Add & Part Count)

2000 2010 2012 2015

• High Part Count (up to thousands per module/system)

- System Build
- System Test (few hours to weeks)
- Spare Parts

- Devices, Modules
- Complex Functional Test

- System Integration (Few modules integrated)

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Our integrated Manufacturing services

- **We offer**
  - R&D, Prototype, NPI Support: DFMs, Value Engineering
  - Volume Manufacturing, SPC, Assembly & Test
    - Automation and Test Development
    - Complex & Precision Machining, value-add assemblies
    - Electromechanical Assemblies, Optical Display Assemblies
    - Clean-room Assemblies
    - Motor/Gear/Bearing/Actuator Assembly
    - Module & Equipment Integration
  - Supply Chain Management
  - Demand & Order fulfillment: VMI, 3rd Party Hub, Kanban, Drop Ship for customers
    - Hubs at Roc-NY, KF-OR, WGQ-Shanghai, Penang, S’pore

- **We develop stable, repeatable, sometimes unique but often challenging manufacturing solutions for OEM customers**
  - ACM Penang Facility – ISO 9001, 13485, 14001 certified
  - ACM Suzhou Facility – ISO 9001 certified

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Manufacturing Engineering Value Add

1. Assembly Process Development and Qualification
2. Fixture and Tooling Design & Fabrication
3. Automation, Test Station Design & Fabrication
4. FMEA
5. DOE
6. Process Control, SPC
7. Value Engineering – Materials Selections, manufacturing Technologies
   - Al, Zinc, Mg, Steel, Cast Iron…etc
   - Casting (Sand, Investment, Gravity, Die Cast), Extrusion, Forging…etc
   - Component Tooling Design & Qualification
8. 3D welded Frame & Structure with FEA - Exerion
   - Stress & Rigidity
9. Supply Chain Services
   - Tooling & Process design, Mechanical & Metallurgical properties, Plating, Painting & Finishing, Turnkey Services & Quality Ownership
ACM Competitive Advantages

- Specializing in Precision Engineering, Opto-Electromechanical Assembly and Equipment Integration
  - Solid track records as a dependable outsourcing manufacturing partner
  - Cost Down programs
- Nimble and Flexible Business Model
  - Responsive
- Excellent IT and world-class ERP system (SAP)
  - Specific business processes for customer needs and Product Traceability
- Robust Quality Systems
  - ACM Penang: ISO9001, ISO14001, ISO13485
  - ACM China: ISO9001
  - Robust quality programs (Lean, SPC, 6-sigma Methodology, Training & Certification, Active Calibration Recall System)
- Steadily Growth with healthy balance sheet
  - Investment Capacity growth with customer
  - 2012: Enlarged synergetic group with technology partners
    - Motors
    - Sheet Metal Welded Frames/Structures
CARESTREAM Healthcare Supplier of the Year 2009
Hewlett-Packard Outstanding contributions
Kodak Best Performance Award For The Past 3 Years 2004 (Out of 500+ suppliers)

Enterprise 50 Award 2005

Malaysia National Productivity Award 2005
Precision Assembly

Some OEM Products…
Some OEM Products…

Medical Product Assembly

Spine

Chest

Point-of-Care Reader

Digital X-Ray Cassette

Eye Inspection & Surgery Equipment
Advanced Printer Assembly

Complex Electromechanical Assy
Indexer & Heater Holder for Wire-Bond Machine

5u machined tolerances
Precision Alignment & Setting

20u // on X-Y moving stage,
dual head wire-bonding
Linear Motors

Quad and Prism Assembly
Precision Magnet / MEMS Assembly

Advanced Optics & Display Modules

8x 250u glass ball lens insert into .240 +/- .003 slot
<Positioning ref to > .697 +/- 1u 2x MT Pins

Flat Panel Projector

Wedge Display/Imaging Panel

Anamorphic Lens

Optical Precision Assembly
(Fiber to Transceiver Device Interface)
High-Level Electrical & Electronics, Equipment, System Integration
Paper Collection and Sorting Machine

Semiconductor Wafer Processing Equipment
Assemble the complete Power distribution Unit for the 300mm Wafer Furnace.
CTP Machine - Big Part Milling / Turning / Assembly

4-axis: 2200x900x800mm

1800Lx 450mm dia

1500mm L, 350mm Dia
- TIR 10 micron
- Diamond Turn Finishing
- Hard Anodize +/- 1u

Advanced Printer Mechanisms

Raw Material From Supplier

High-Speed Machining & Multi-Axis
Large Format Machine Structure Welding and Machining.

New 5-axis Gantry Precision Machining Center
6M (L) x 3M (W) x 1.5M (H)
SMT Machine Welded Frame
(1.5M x 2.1M)

Rotor / Stator for CT Scan (Diameter ~2Meter)
SM Frame Re Engineering, Sheet Metal & Robotic Welding

Flying Optic Laser Bender
Robotic Welding

- Very complex processes
- Very tight tolerances
- Low volumes but automation need for tolerances, rapid set-up, tool-based thinking
- Glue technology for ultra tolerances with special coated materials (vacuum glue)

Measurement Equipment
Big Structure Measurement System...

- Measuring Strokes (mm)
  \[
  \begin{align*}
  X & : 3000 \\
  Y & : 5100 \\
  Z & : 2000 
  \end{align*}
  \]

MPE$_X$: 3.8 µm
MPE$_Y$: 3.5 µm
MPE$_Z$: 3.5 µm

Maximum Permissible Error of Indication for size measurement (ISO 10360-3)

MPE$_P$: 3.8 µm
Maximum Permissible Probing Error (ISO 10360-2)

3D SM Frame Design Capability...
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