AME
Manufacturing Execution in the Cloud

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SANMINA®
Sanmina Profile

- Founded in 1980 in San Jose, California
- Global footprint: 75 facilities in 25 countries
- $6.37B revenue, FY’15
- ~43,000 employees

Global, Leading-edge Technology, Engineering, Manufacturing and Services Solutions Company

Argentina • Australia • Brazil • Canada • China • Colombia • Czech Republic • England • Finland • France • Germany • Hungary • India • Indonesia • Ireland • Israel • Japan • Malaysia • Mexico • Scotland • Singapore • South Africa • Sweden • Thailand • United States
Integrated Manufacturing Solutions

MARKET FOCUS
- COMMUNICATIONS
- COMPUTING & STORAGE
- MEDICAL SYSTEMS
- DEFENSE & AEROSPACE
- MULTIMEDIA
- CLEAN TECHNOLOGY
- INDUSTRIAL
- AUTOMOTIVE

END-TO-END SOLUTIONS

ADVANCED TECHNOLOGY

- MEMORY MODULES
- PCB ASSEMBLY
- BACKPLANE ASSEMBLY
- OPTICAL RF
- PLASTIC INJECTION MOLDING
- CABLES
- STORAGE DESIGN
- MICROELECTRONICS
- PRECISION MACHINING
- PCB FABRICATION
- ENCLOSURES

Integrated Manufacturing Solutions

Advanced Manufacturing Technologies

Design & Engineering
Technology & Components
NPI & Test Development
Supply Chain & Manufacturing
Fulfilment & Repair Services
Services We Provide:
End-to-end Solution

- Advanced Technology Development
- Technology R&D
- Quick Turns
- Integrated Technology Expertise for Key Markets
- Demand Management
- Supplier Localization
- Alternate Suppliers
- Supplier Performance Mgt
- Agility/ Flexibility Planning
- Inbound Logistics
- End Customer Order Management
- Design BTO/CTO models & Process
- Available To Promise Process
- Direct Order Fulfilment
- Outbound Logistics

- Turnkey Product Design
- Joint Product Development
- Component Design
- Component engineering
- Test Development
- Industrialization
- Product Validation
- Environmental & Reliability Stress Tests
- EMC/RFI Design & Qualification
- Custom Tooling
- 75 Locations
- One IT & Quality System
- Broad Product Expertise
- Vertical Integration
- Automation
- Repair/ Upgrade
- Refurbishment
- Component Obsolescence Management
- Sustaining Engineering

Design
Technology
DFM/DFX/NPI
Supply Chain
Manufacturing
CTO/DOF
Repair & REF.

Share • Learn • Grow
Sanmina Global Footprint

**North America**
- Austin, TX
- Carrollton, TX
- Costa Mesa, CA
- El Paso, TX
- Foothill Ranch, CA
- Fort Mill, SC
- Fremont, CA
- Huntsville, AL
- Kenosha, WI
- Laredo, TX
- Louisville, CO
- Manchester, NH
- Newark, CA
- Ontario, Canada
- Ottawa (Kanata), Canada
- Owego, NY
- Salt Lake City, UT
- San Jose, CA
- Toronto, Canada
- Turtle Lake, WI

**Europe**
- Basingstoke, UK
- Brno, Czech Republic
- Fermoy, Ireland
- Gunzenhausen, Germany
- Haukipudas, Finland
- Ma’alot, Israel
- Miskolc, Hungary
- Örnsköldsvik, Sweden
- Port Glasgow, UK
- Salo, Finland
- Tatabánya, Hungary

**Asia**
- Batam, Indonesia
- Chai Chee, Singapore
- Chennai, India
- Depot Close, Singapore
- Hong Kong, China
- Johannesburg, S. Africa
- Kunshan, China
- Melbourne, Australia
- Pathum Thani, Thailand
- Penang, Malaysia
- Penjuru, Singapore
- Shenzhen, China
- Suzhou, China
- Wuxi, China
- Yasu, Japan

**Latin America**
- Bogota, Colombia
- Buenos Aires, Argentina
- Campinas, Brazil
- Guadalajara, Mexico
- Juárez, Mexico
- Mexico City, Mexico
- Monterrey, Mexico
- Reynosa, Mexico
- São Paulo, Brazil
Sanmina’s Manufacturing Journey into the Cloud
WHY

Future Ready

Business Agility
WHY

Future Ready

Business Agility
Fourth Industrial Revolution

Mechanization

Coal, Railways, Iron machines

Late 18th Century

Efficiency

Mass Production

Oil (Transportation, Car, Buses, Planes), Urbanization

Early 20th Century

Computer Automation

IBM, Rockwell Automation, General Electric

Late 1990s

Internet of Things, Cloud

Google, 42Q

Today

Fourth Industrial Revolution
WHY

Future Ready

Business Agility
A New Trajectory: Focus on Market & Value

Speed

Flexibility

Cost optimized

Security & Compliance
A New Trajectory: Focus on Innovation

Empower Manufacturing Operations

Automation & Integration

scalability

Leverage the Cloud ecosystem
HOW

Plant Engagement

Start small, then scale
HOW

Plant Engagement

Start small, then scale
Plant Engagement

- Plant Management & Plant Staff engagement
- Assess & Strengthen Network Management
- Enforce physical & information security
- Business Alignment
  - Uptime reporting & ROI validation
  - On site support for Go Live
HOW
Structured Approach
Start small, then scale
Start small, then scale

Manage Risk

Plant Size

Product / Process Complexity
Start small, then scale

Integration

Baseline MES

Equipment Integration

ERP Integration

Test Automation

Advanced MES

Advanced Automation

PLM Integration
WHAT
Manufacturing in the Cloud

47 Factories across 15 countries in the cloud
Build to Order, Build to Stock, Configure to Order/Lot size of 1

Core capabilities

• Track & Trace, Genealogy management
• Yield & Throughput management
• On Demand Labeling / Machine Integration
• Statistical Process Control
• Preventative Maintenance
• Compliance (21 CFR Part 11 / FDA Registered Factories, AS 9100 Factories & TS 16949 Factories)
Cloud Deployment Architecture

42Q Cloud Solution
- Security and Access Control
- Persistent Data
- Transactional Data & Business Logic
- User Experience
- Device Connections
- IoT Interface
- ERP/PLM Interface

Security and Access Control

Users
Shop Floor Devices
Factory Equipment
ERP/PLM
Global View of Operations
Global View of Operations

Zoom through regional view and plant view to a shop floor view. Then hover over trouble spots to see what is affecting production anywhere in the plant.
Operations Management

Live demonstration - Sanmina Singapore
Operations Management

- Real Time Visibility → Anywhere, Anytime
- Drill Down to Unit Detail → Identify Root Issues
- Real time alerts → Responsiveness, Escalations
Real Time Operations Visibility

**Production Yield**
- Provides product build and quality reporting

**Operations Management**
- Web based graphical view of production performance and status, with drill down

**Quality**
- Real-time SPC

**Product Data**
- Detailed parametric and traceability data
Current Deployments

Medical Manufacturing

- Manufacturer of Record with FDA – Ships to Field
- All Electronic DHR’s, Intuitive Traceability Links
- Training Records & Operator Lock-out
- Multi-plant Traceability & Multi-plant Genealogy
Printed Circuit Board Fabrication
Complex Finished System Mfg

Diverse Finished Industrial System Production:
- Complex Semiconductor Vacuum Equipment
- ATM Machines, Cash Sorters/Counters
- Large Industrial Printers

Kiosks & Vending

Electric Car Charging Stations

Battery Packs for Grid & Electric Vehicles

Building Controls, Smart Meters
Automotive Systems Manufacturing

- Body Controllers
- Meter Clusters
- Climate Control Systems
- Fully Automated Line
- LED Lighting Systems
- Climate Control Systems
- Fully Automated Line Blower Assembly
Datacenter Hardware Production

Requirements:

▪ Production for large datacenter in Europe
▪ Quarterly Volumes: 300+ racks per quarter
▪ Full build, CTO at a rack level
  ▪ Configure & verify hardware & firmware
  ▪ Complete system test and burn-in
Line monitors - Real time performance
Various statistical tools provide visibility to issues that may cause quality problems if left unaddressed. Early detection and correction of quality issues leads to leaner manufacturing and better customer satisfaction.
Statistical process control charts assure quality.
Preventative maintenance

Visibility to maintenance schedules aids planning
Local language support allows maintenance personnel to record correct reasons for failures.
Equipment dashboards

Visibility to machine status promotes efficiency
What’s Next – “Building on the Foundation”

Complete cloud MES deployment

Develop Machine Learning Capabilities

Wearable devices / Hands Free operation

Connect cloud services - data analytics, IIoT, etc.
Takeaways

Industry 4.0 is a journey

Foundation of manufacturing in the cloud

- Empower manufacturing operations
- Start small, then scale
- Realize operational agility, speed and improved TCO

Start the journey now !!
Thank You!

Your opinion is important to us!
Please take a moment to complete the survey using the conference mobile app.

Session: ThP/51
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