Tool interfaces in different industries

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Agenda

- About AIXTRON
- Motivation
- AIXTRON’s Control Concept
- Implementation of MES Interfaces
- Next Steps…
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AIXTRON AG

- Founded in 1983 as a spin-off of the RWTH Aachen University
- Market leader in the MOCVD Equipment market
- Market share around 72% (2008)
- Over 80% of the revenue is made by Compound Semiconductor Equipment
- 73% of the End Applications are LED's
- Around 75% of the revenue will be achieved in Asia
- Around 680 employees
AIXTRON System Technologies

Introduction

Compound
- Nanoinstruments Black Magic II - PECVD
- OVPD®, PVPD
- MOCVD Planetary Reactor®, MOCVD Close Coupled Showerhead®
- Silicon Tricent® ALD
- Lynx-iXP CVD
- Silicon Tricent® AVD®

Compound
- Hot Wall SiC CVD
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Motivation

Marketing Requirements

- Easy to use Systems
- Professionalization of the business
- "Global Players" move into the market
- Compliance with relevant regulations (e.g. SEMI)
- Standalone Tools
- No Networking
- No Automation
- Highly skilled Operators
- Individual local Recipes
- Scientific oriented production

"Start-up & Spin-off Companies"

Productivity & product quality

- Run to Run System to System reproducibility
- Data Mining And Data Evaluation
- Advanced Process Control (APC)
- Clustering of Tools
- Networking of Tools
- Automated Material handling
- Central Recipe Database

AIXTRON MOCVD Systems

Professionalization of the business

AIXTRON

Automated Material handling

Networking of Tools

Clustering of Tools
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The AIXTRON Control Software: AIXACT = AIXTRON’s Advanced Control Technology

Principle structure of the AIXACT Software

- HTML User Interface:
  - Graphic View
  - Table View
  - Chart View
  - 3D Chart View
  - Panel View
  - Configuration Views
  - Recipe Manager
  - Recipe Editor
  - Offline Analyzer

- Frontend Interface

- Server
  - Script Core
    - Config Data Access
    - Datalogger, Logbook
    - Recipe Engine
    - Recipe Compiler
    - PLC or Simulator
    - EpiTune

- Storage, Devices
  - Config Data
  - Datalogs, Logbook
  - Recipes
  - ControlLogix or PLC5
  - ADDI Card
Common AIXTRON Control Software: AIXACT

Modular structure
- Scalability of control system
- No programming for customized systems → only configuration
- New components can be integrated with moderate effort

Web based automation
- Client-Server architecture
- PMC data's can be distributed to the whole fab network
- Remote control of PMC is possible

Database for system configuration
- All system specific settings are stored in a database (XML)
- No system settings in source code
- Different process modules can be configured easily
Concept of AIXACT – Control Architecture (I)

Example: MOCVD system

- PLC
- PMC
- Sensors & Actuators

Levels

Connection to Customer network

Router

AIXACT GUI
Server PC

AIXACT GUI
external Client PC

AIXProcess
ControlLogix®

DeviceNet

SCS
Safety Control System

Digital I/O
Controller
Analog I/O
Concept of AIXACT – Control Architecture (II)

AIXACT control architecture for Silicon Equipment

- Factory Host
- Remote PC
- Factory Automation Network
- Additional Customer Networks (SPC etc.)
- CTC
- Switch
- TMC
- Router
- PM1
- AIXACT PMC
  - AIXProcess ControlLogix
- Router
- PM2
- AIXACT PMC
  - AIXProcess ControlLogix
- PM3
- optional
- PM4
- optional

AIXACT control architecture
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Implementation of a MES interface for AIXACT

Make use of the “industrial proofed” Product AIS FabLink™ as basis

Build an AIXTRON customized FabLink™ Framework Application

Implement a generic .NET Remoting interface in the AIXACT Control Environment

Use the proven Product AIXACT with it’s configuration features
SW Architecture of AIXACT with MES Interface

MES

Cell Controller

Fab Network

AIXTRON
Process Module

AIXACT
Server PC

AIXTRACT
Server
application

AIXACT
AIS FabLink™
application

AIXTRon
MOCVD system

SECS/GEM

FabLink™

AixCtcServer

Interface
cfg

.ini

.xml

.xml

.Interface
cfg

.config
SW Architecture for Silicon Tools

AIXTRON Process Module

CTC PC

AIXACT Server PC

AIXACT Server PC

MEAS

Fab Network

Cell Controller

AIXTRon

AIS FabLink™ Application

AIS VCTC™ VAC Cluster Tool Controller

AIXACT Server Application

SECS/GEM

FabLink™

VCTC™

AixCtcServer

Interface config

.xml
.ini

.xml

AIXTRON MOCVD Silicon Tool
SW Architecture of OVPD® Tools

MES

Cell Controller

Fab Network

AIXTRON

Process Module

CTC PC

AIXACT

Server PC

AIXACT

Server PC

AIXTRON

OVPD® MOCVD system

Customer specific CTC

SECS/GEM

SECS/CTMC

AIS FabLink™ application

AIXACT Server application

AixCtcServer

Interface config

.xml

.ini

.xml

interface

config

AIXACT Server PC

AIXACT Server PC

AIXTRON Process Module

CTC PC

AIXACT Server PC

AIXTRON OVPD® MOCVD system

AIXTRON
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Next Steps…

Product Finishing of the MES Interface
  ▪ Make it even more flexible and configurable to fulfill the needs of all AIXTRON Customers

Cluster Tool Controller
  ▪ Make it easier customizable
  ▪ Improve the customizability of the GUI

Handling System
  ▪ Integration of different Handling Systems
Questions?
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