General e-Manufacturing Requirements and first Interface A Experiences

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Automation Capabilities Management

e-Manufacturing Areas

- GEM 300
- Recipe Management - RaP
- Interface A

GEM 300 – Status of 300 mm Equipment Automation

300 mm standards are **productive** since years

- **E37 HSMS** (Ethernet to all tools)
- **E84 AMHS** PI/O
- **E87 CMS** Carrier Management
- **E40 PJM** Process Job Management
- **E94 CJM** Control Job Management
- **E90 ST** Substrate Tracking (increasing usage)
- **E116 EPT** Equipment Performance Tracking

Basic Interoperability is defined

- **300 mm Operational Scenarios v 10.0**

Error Handling Scenarios are defined

- **MOES** guideline v 2.0 (Manufacturing Operation and Error Handling Scenarios)

Areas of standardization are extended

- **E127 IMM** Integrated Metrology
- **E109 RM** Reticle Management

GEM 300 – Current Areas of Improvement

- E84 / E87 Interaction and Error Recovery
  uniform behavior an AUTOMATED error recovery are necessary in a highly automated fab
  –> MOES guideline update and E84/E87 extensions

- Remote Chamber off
  FDC is going to get from tool to chamber fine
  -> host commands to not to use a chamber
    - time based (from now on)
    - job based (not for this material, recipe, route, ...)

GEM 300 – Single Point of Control

Equipments are getting more complex with
- R2R control
- Integrated Metrology
- W2W control
- on-tool FDC
- Group Controllers and

- a second Interface (Interface A) for Data Collection

BUT

➔ **SECS** is the **Single Point of Control** for all
- Material Management
- Job Management
- Recipe and R2R parameters

Recipe Management – RaP

Current Recipes are:

- binary (very few formatted)
- consist of sequence/recipe/steps/sub-recipe
- not documented
- different from every supplier

Very few support for Recipe Management and Verification

Current work around:

- Automation Capability Management (ACM)
  needs to negotiate with every equipment vendor on format
- Equipment Automation needs to be customized for each different type of equipment

A lot of effort has to be spent!

Recipe Management - RaP

Why RaP can help us:

RaP enables a generic recipe management implementation.
This would reduce the rollout time significantly.

RaP speeds up the ACM negotiation process,
no more discussion required to obtain binary recipe format.

RaP improves process quality.
Parameter control could be implemented with reduced effort.

This fits into our strategy and vision!

Experiences from our RaP pilot:

- Successfully implemented RaP wrapper
  with our Global Recipe Management Solution
- Field proved the RaP concept

Conclusion: Rollout of RaP capable RMS at Qimonda in 2006

Interface A – First applicatory Experiences

First Equipments with Interface A are on the production floor

➔ **Pilot Host / EDA-Client applications**

Experiences: **General Communication**

Services Implementation is correct (based on schema)
Slight deviations in the Schemas (standards versions) cause the communication not to work at all

➔ **Schema version freeze & development of a mechanism to deal with different versions**

Experiences: **Tool Models – EqSD**

Tool Models are not always self descriptive as expected

➔ **Guidance on how to model an Equipment is necessary**

Interface A – First applicatory Experiences

Experiences: **Data Collection**

High data rates from the tools are possible (up to 40Hz)

Refreshment rate is much lower than data rate

3 time stamps are requested for EDA traces:

- Acquisition time (at I/O device)
- Preparation time (when trace is created)
- Transmission time (when data are sent)

but all 3 times have been found equal

Time resolution is requested to be 1 ms

➔ **Equipment HW & SW Architecture must support Interface A all the way down to the I/O level**

Interface A – First applicatory Experiences

Experiences: **Operations and Maintainability**

Interface A was defined with focus to Equipment

There are potentials for increasing the maintainability of hundreds of tools in a productive fab (central URL, DCP, ACL)

as well as real-time performance potentials (offline verification of DCP against ESD)

➔ Interface A is the Equipment DC Interface of the future

- **Equipment HW + SW architecture must support Interface A capabilities**
- **Maintainability and Operations of Interface A ought to be improved to support larger numbers of tools per fab with Interface A**

What is Qimonda and Infineon requesting?

E37 HSMS
E5 SECS
E30 GEM
E39 OSS

E87 CM
E40 PJM
E94 CJM
E90 STS

E84 PIO
E54 SAN

I300I Guidelines
ISMT 300mm Scenarios

TOS II
2000

E109 Reticle Mgmt.
E127 Integrated Metrology
Linked Litho (#3682)
E116 Equipment Performance
E126 EQIP

HVM Guideline (MOES)
E-Diagnostics Guideline

TOS III 1.0
2004

E121 XML Style Guide
E128 XML Message Structure
E138 XML Common Components

E132 Authentication
E120 Common Equipment Model
E125 Equipment Self Description
E134 Data Collection

EDA Port (Interface A)
E-Diagnostics (Interface C)

E133 PCS (Interface B)

E139 Recipe and Parameter

EEC Guide

TOS III 2.0
September 2006

Thank you

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