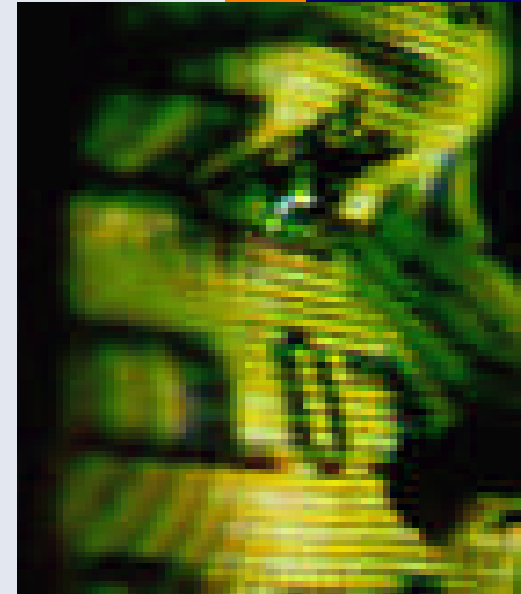


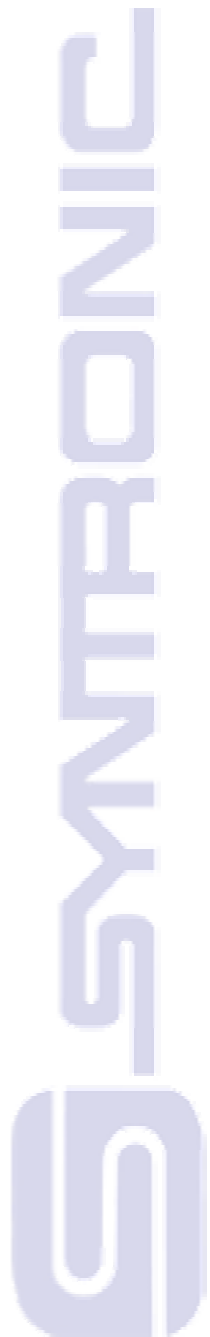


The name to remember for easy access to **the complete design house**

OVERVIEW OF ADVANCED ELECTRONICS DESIGN & DEVELOPMENT



By: Lee Siak Hong
Date: 17 October 2006



MARKET TRENDS IN DESIGN OUTSOURCING

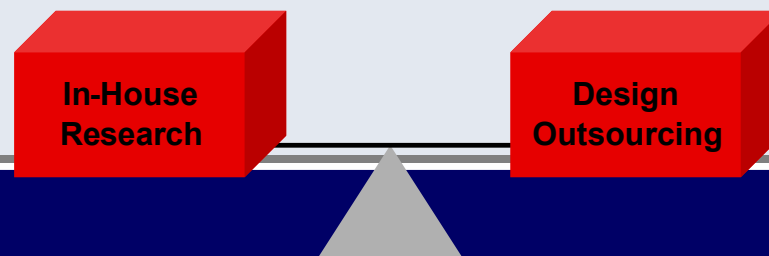
Trends (1)

- In the 80's and 90's, farming out manufacturing to boost efficiency and focus energies on important R&D in-house.
- When consumer electronics are becoming fashion-like items, we then start asking "*Why so few hit products making it out of the labs into the market?*" – Development & Market Testing?
- Pressure to cut costs further and get new products into market faster.
- Speed to market is becoming critical consideration as product life cycles shorten.
- Attractions associated with possible first-entry advantage.



Trends (2)

- Increasing collaboration between in-house R&D and independent engineering design house to maximize use of resources.
- In-house R&D focus on highest level of product creation or innovation to maintain sustainable competitive advantage.
- Risk consideration if product is rushed and some of the stages in the process are skipped.
- Design outsourcing is about putting resources in the right places at the right time through global network of partners.



Suruhanjaya Komunikasi dan Multimedia Malaysia Malaysian Communications and Multimedia Commission		
MyICMS 886 and Hi-Tech Industries		
New and Emerging Technologies		
Services	Infrastructure	Growth Areas
<ol style="list-style-type: none"> 1. High Speed Broadband 2. 3G & Beyond 3. Mobile TV 4. Digital Multimedia Broadcasting 5. Digital Home 6. Short Range Communications (e.g. RFID-based) 7. VoIP/Internet Telephony 8. USP - Universal Service Provision 	<p><i>Hard</i></p> <ol style="list-style-type: none"> 1. Multiservice Convergence Networks 2. 3G Cellular Networks 3. Satellite Networks <p><i>Soft</i></p> <ol style="list-style-type: none"> 4. Next Generation Internet Protocol (IPv6) 5. Home Internet Adoption 6. Information & Network Security 7. Competence Development 8. Product Design & Manufacturing 	<ol style="list-style-type: none"> 1. Content Development (e.g. education, entertainment, games) 2. ICT Education Hub 3. Digital Multimedia Receivers (set top box) 4. Communication Devices (e.g. VoIP phones) 5. Embedded Components & Devices (e.g. RFID) 6. Foreign Ventures

© Malaysian Communications and Multimedia Commission

Source: Malaysian Communications and Multimedia Commission (MCMC)



Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

MyICMS 886 – Opportunities under Product Design & Manufacturing

MyICMS Services

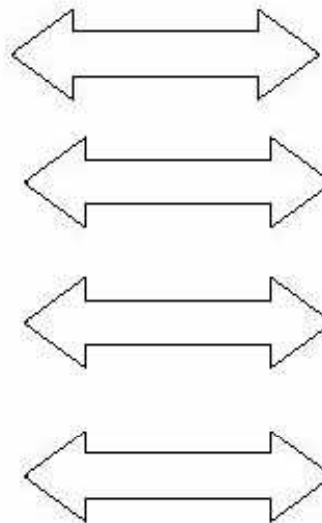
Mobile TV

Digital Multimedia Broadcasting

Digital Home

Short Range Communications (e.g. RFID-based)

VoIP/Internet Telephony



MyICMS Growth Areas



Embedded Components



Smart Antenna



Communication Devices

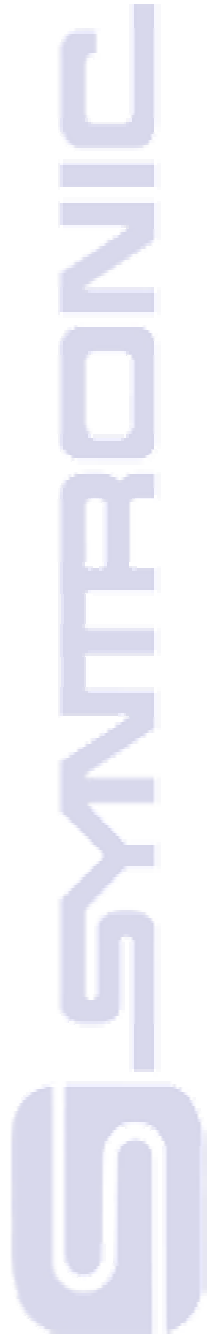


RFID chipset



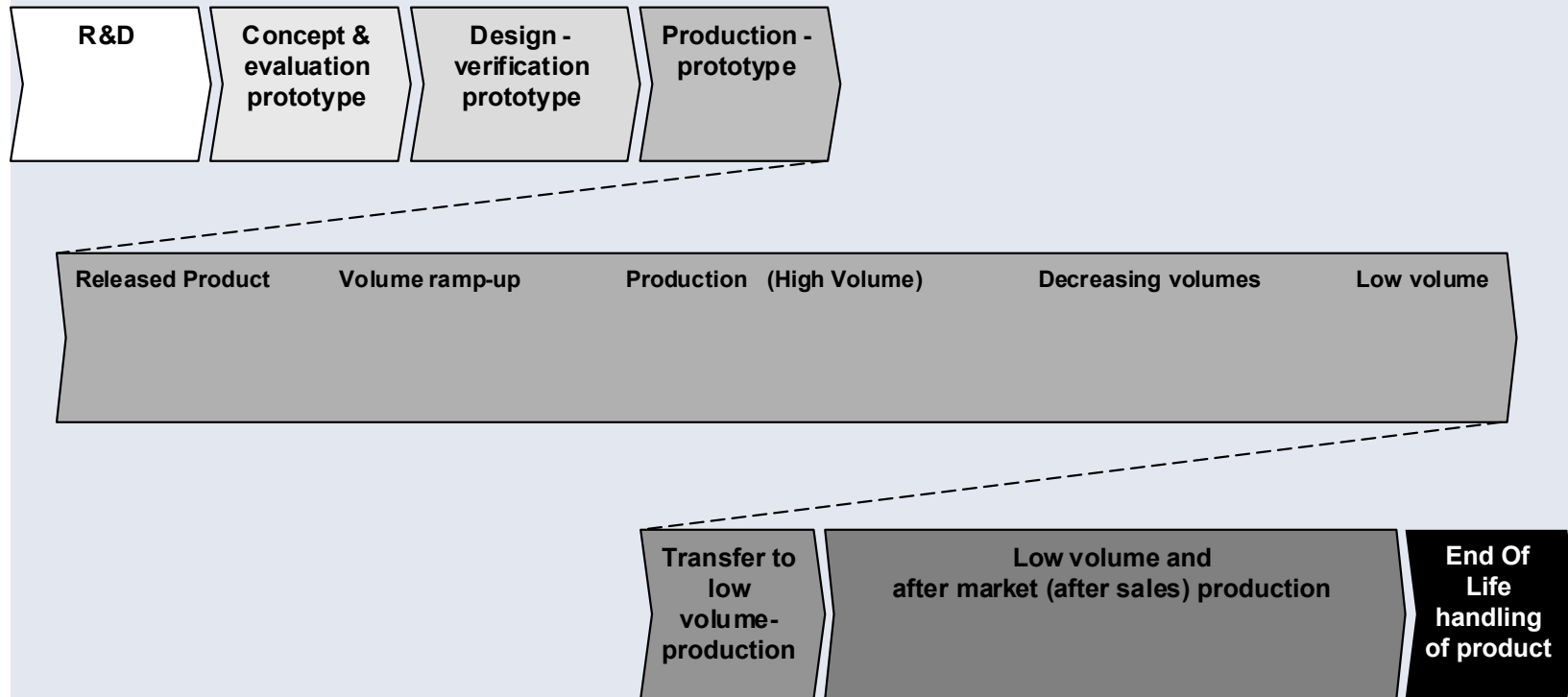
Digital Radio

Source: Malaysian Communications and Multimedia Commission (MCMC)



DESIGN & DEVELOPMENT SOLUTIONS

From Idea to Completion



Development Activities

- Technology development
- Engineering designs
- Process designs
- Prototype manufacture
- Ramp-up production (re-design)

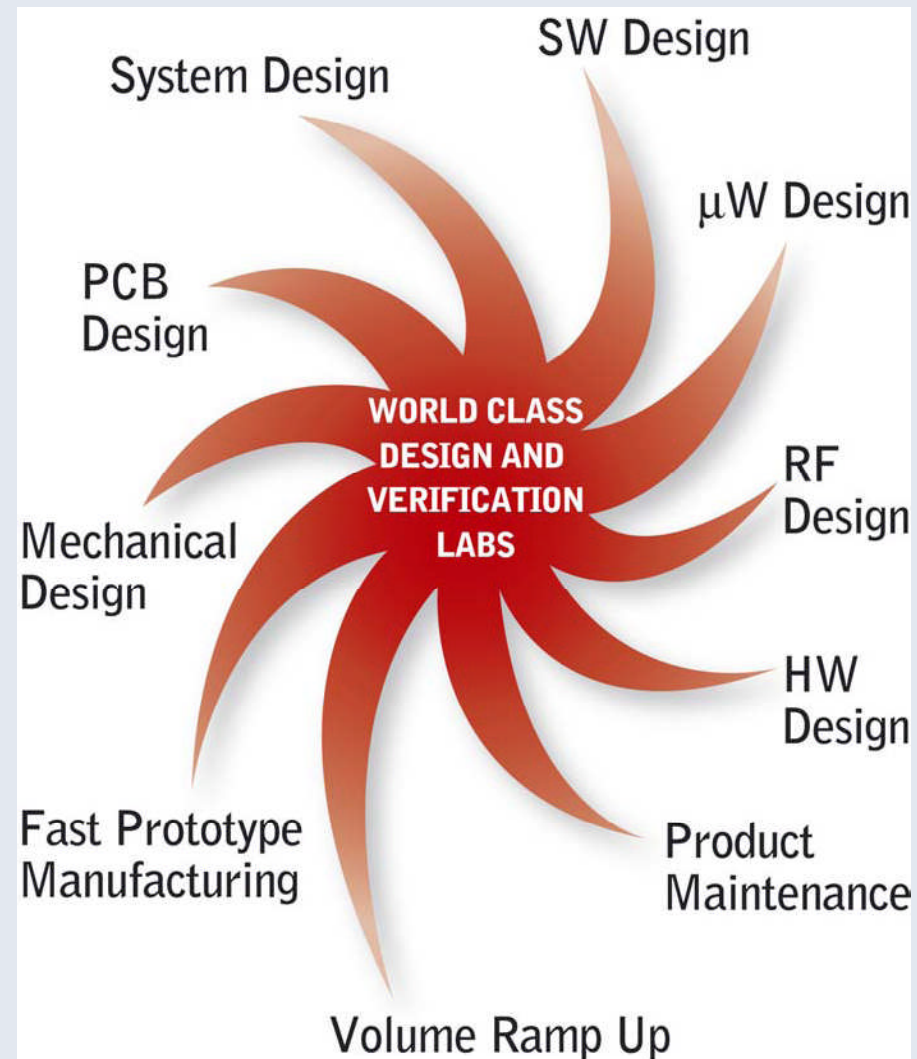
Design Assignments

- ✓ Functional Assignment
- ✓ Product Assignment
- ✓ Resource- and Competent-Consultancy



Center of R&D Competence

SYNTRONICS



Design

RF Design

- ✓ System engineering at system- and block- level.
- ✓ Application design from chipset platforms
- ✓ Pre-study and analysis / Requirement- and design specification
- ✓ Production- and verification test specifications

Applications:

- ✓ Antenna / Filters / Cavity filters / Combiners
- ✓ PA/LNA
- ✓ Modulators / Demodulators
- ✓ Synthesizers / Mixers / Oscillators and more ...

Digital Baseband Design

- ✓ DAC / ADC
- ✓ Audio / Acoustics
- ✓ Main controllers
- ✓ Signal processor applications
- ✓ VHDL design
- ✓ PLD: ALTERA, XYLINK ...



Mechanical Design

- ✓ Mechanical-/Electro-Mechanical Construction (low- and high volume)
- ✓ Surface treatment
- ✓ Joining techniques
- ✓ Die-casting techniques (Plastic/Aluminium etc)
- ✓ Stress calculations (e.g. MTBF)
- ✓ Material work-up, manufacturing

Computer-Aided Design (CAD)

PCB CAD

- ✓ Mentor Graphics
- ✓ Mentor Expedition
- ✓ CadInt
- ✓ Protel
- ✓ ORCAD (Cadence)

Mechanical CAD

- ✓ AutoCad
- ✓ Unigraphics NX2
- ✓ Solidworks 2005
- ✓ Inventor 11 Professional

Tools & Equipment

Instruments

- ✓ Spectrum Analyzers
- ✓ Networking Analyzers
- ✓ Audio (UPL/UPV)
- ✓ Communication
- ✓ Bluetooth ...

Design Tools/Environment

- ✓ ADS
- ✓ Pspice
- ✓ Matlab
- ✓ Mathcad
- ✓ Excel ...



Design

Software Design

- ✓ Software architecture/Partitioning SW/FW/HW
- ✓ Embedded software development
- ✓ Real-time applications like radio control in wireless products
- ✓ Embedded and management software for networking and telecommunications systems
- ✓ Algorithm development
- ✓ System engineering process: RUP, UML, xUML



Design Tools

- **Operating Systems**

- * DOS
- * All Windows OS
- * Novell Netware
- * UNIX/Linux/Solaris/X-windows
- * OS/2
- * OS51
- * OSE
- * Real time/embedded
- * VxWorks

- **Programming**

- * C
- * C++
- * Java
- * Object Oriented Pascal (Delphi)
- * Assembler
- * PASCAL
- * COM/CORBA
- * Object Oriented Pascal
- * HTML
- * Java-script
- * Microsoft Office Macro-programming (VBA)

- **Database**

- * ODBC
- * SQL
- * Oracle
- * Relational Databases and Database Servers

- **Tools**

- * Visual C++ (Microsoft)
- * Visual Basic (Microsoft)
- * Delphi (Inprise)
- * PowerBuilder (Power Soft)
- * Java Café (Symantec)
- * J++ (Microsoft)
- * J Builder (Inprise)
- * C++ Builder (Inprise)
- * Rose (Rational)
- * SQA (Rational)
- * Clear Case (Rational)
- * Microsoft Transaction Server
- * BEA M3 (BEA Systems)
- * Agilent ADS
- * pSpice
- * Protel
- * Matlab
- * Rational RT
- * Bridgepoint
- * xUML
- * Labview
- * HPVEE

- **Analysis and Design**

- * OOA and OOD
- * UML
- * Data modelling
- * Database Design

Test & Verification

More than 20 years of experience in developing systems for test, verification and production.

- Design For Tests (DFT)
- Design For Manufacturability (DFM)
- Design For Environment (DfE)
- Tests Platform
- Boundary Scan Test
- Function Tests & Fault-Finding
- Product Upgrade/Modification/Repair
- Verification & Compliance Test of components, modules & systems



*design
house*

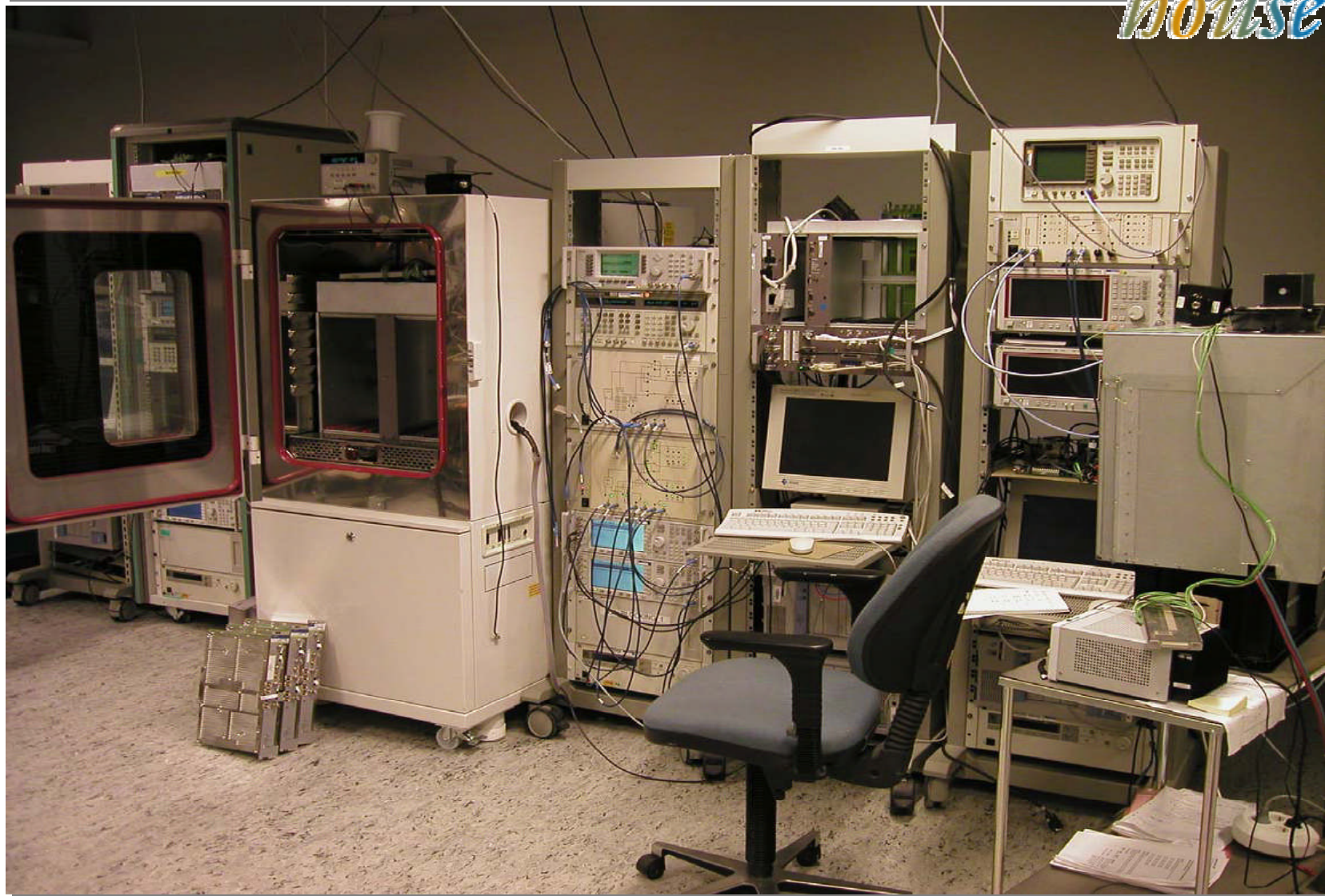
Digital Design Labs



Digital Design Labs



Integration & Verification Lab

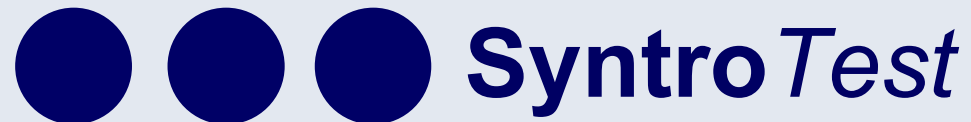


Integration & Verification Lab

*design
house*



Test Platform



A modular and versatile Test Platform designed for R&D, production test, verification, repair, supervision and data acquisition.



Test & Verification

Flexible Test Platform



Customization for different types of tests :

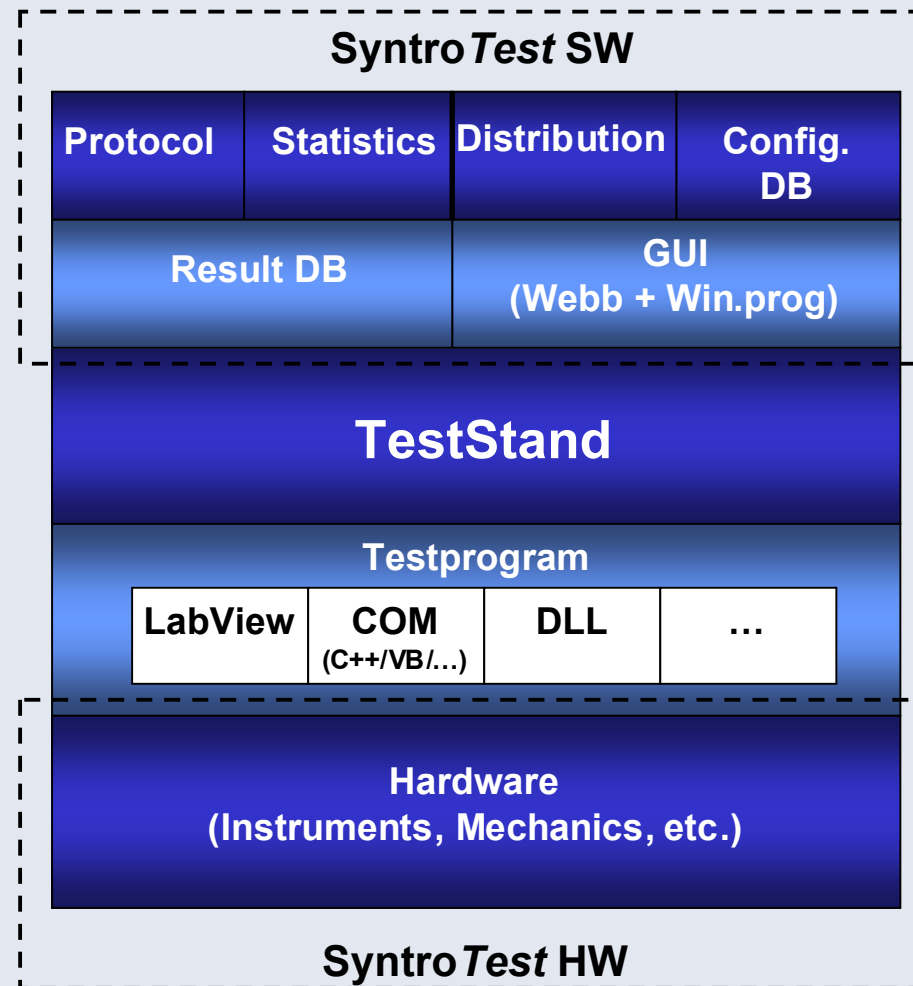
- System test (e.g. RBS)
- Module test
- Board test
- Component test



Test & Verification

Test Platform

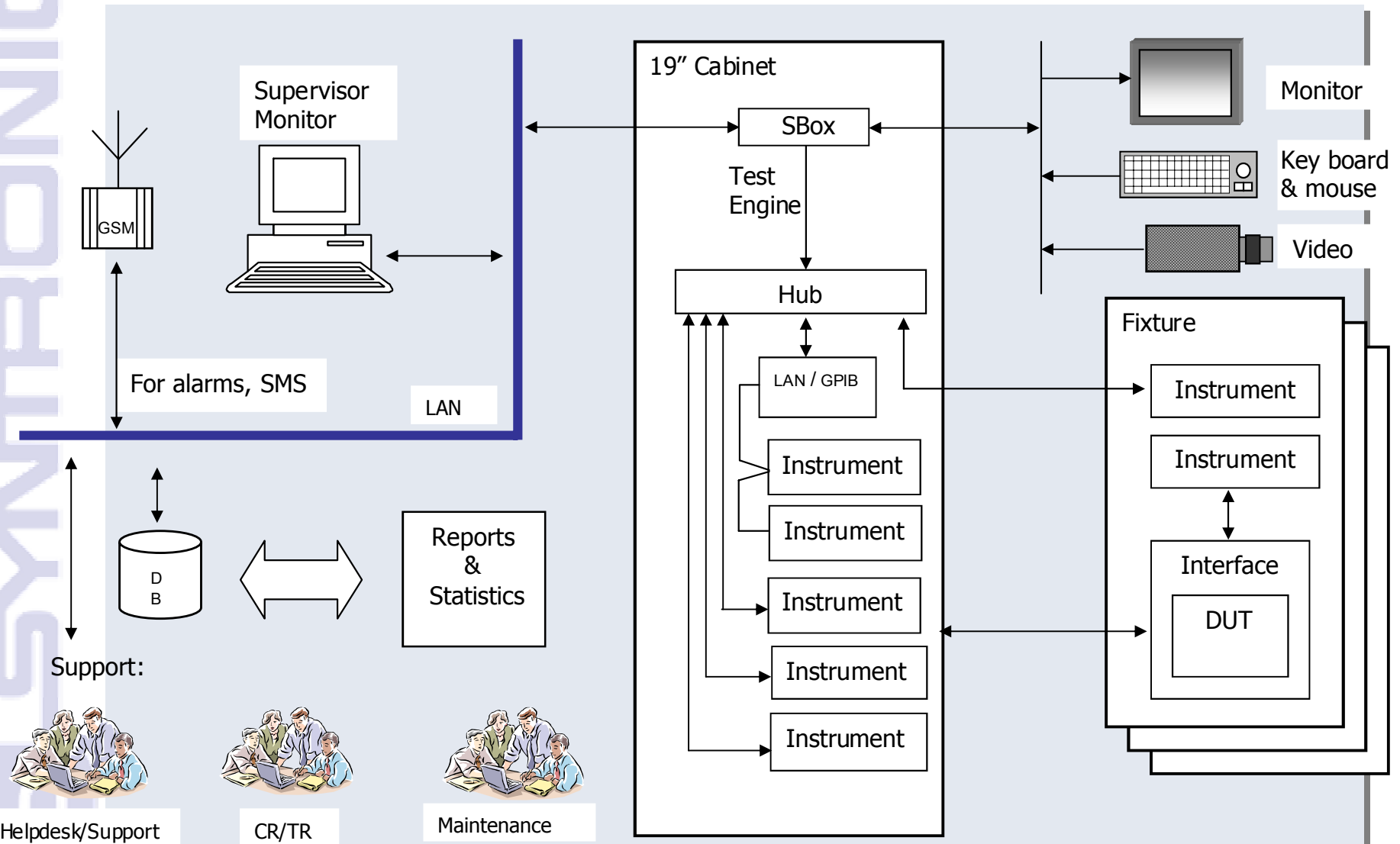
● ● ● SyntroTest



Test & Verification

Test Platform

●●● SyntroTest



Test & Verification

SyntroTest GUI

The screenshot displays the SyntroTest GUI with two main windows: TestConfigurator and TestExecutor.

TestConfigurator Window:

- Test configurations table:**

Name	Product Number	Revision	WebSafe	MultiDut	Date
Opto Module Performance	SCAL 101 1031/2	R2H	True	True	2003-03-13 16:03:26
Opto Module Functional	SCAL 101 1031/1	R1F	True	True	2003-03-13 16:02:50
Multicable	SCYA 122 109	R3A	True	False	2003-03-11 16:02:25
Cabinet Final Test	1/SCAL 101 1003	R1A	False	False	2003-03-07 13:28:12
Power Adapter	2/1SCYA 122 166	R1D	True	False	2003-03-07 10:15:37
- Edit Package dialog:**
 - Package Name:** Fint Board Test
 - Product number:** SCAL 101 1044
 - Revision:** R1A
 - Archives:**

Name	Size	Date
Criteria.zip	2 kB	2003-03-13 15:59:00
Load Modules.zip	18 kB	2003-03-13 15:59:00
Test Program.zip	15 kB	2003-03-13 15:59:00
 - Start sequence:** FintBoardTest.seq

TestExecutor Window:

- Product Information:**
 - Name:** Fint Board
 - Product No:** RQA 117 9423/1, R2C
 - Serial No:** 7854
- Test Program Information:**
 - Name:** Fint Board Test
 - Product No:** SCAL 101 1044, R1A
- DUT 1 Test Results Table:**

Steps	Result	Limits	Status
Power On, Current Consum	310 mA	250 <= X <= 350	Passed
3.3V Output Rise Time	20.92 μ s	10 <= X <= 150	Passed
5.0V Output Rise Time	66.35 μ s	10 <= X <= 150	Passed
3.3V Output Voltage	3.34 V	3.135 <= X <= 3.465	Passed
5.0V Output Voltage	4.98 V	4.75 <= X <= 5.25	Passed
Firmware Version	1/CXC 112 1644 R3E	1/CXC 112 1644 R3E	Passed
DRAM	True	Pass/Fail	Passed
Load IP_FPGA Module	True	Pass/Fail	Passed
Load RAM_FPGA Module	True	Pass/Fail	Passed
Load IO_FPGA Module	True	Pass/Fail	Passed
SRAM	True	Pass/Fail	Passed
Opto Link	0	X = 0	Passed

The Syntronic AB logo is visible in the bottom right corner of the TestExecutor window.

Test Protocol

●●● SyntroTest

SyntroTest - Test Report - Microsoft Internet Explorer provided by Syntronic AB

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Links

SyntroTest - Test Report

Product Name Fint Board Product Number ROA 117 9423/1, R2C Serial Number: 100102		Test Program Name Fint Board Test Product Number SCAL 101 1044, R1A	
---	--	--	--

Test Data Time den 18 mars 2003 08:29:52 Test Computer TESTSTATION		Execution Time 21,237695 seconds Result Passed	
---	--	--	--

Test Results Step	Result	Unit	Limit	Status
Initialize Test Program				Done
Property Loader				Done
Power On, Current Consumption	307	mA	250 <= X <= 350	Passed
3.3V Output Rise Time	21	µs	10 <= X <= 150	Passed
5.0V Output Rise Time	71	µs	10 <= X <= 150	Passed
3.3V Output Voltage	3,328	V	3,135 <= X <= 3,465	Passed
5.0V Output Voltage	4,99	V	4,75 <= X <= 5,25	Passed
Firmware Version				Passed
DRAM	True		Boolean	Passed
Load IP_FPGA Module	True		Boolean	Passed
Load RAM_FPGA Module	True		Boolean	Passed
Load IO_FPGA Module	True		Boolean	Passed
SRAM	True		Boolean	Passed
Opto Link	0		X = 0	Passed
Power Off				Done

End of report

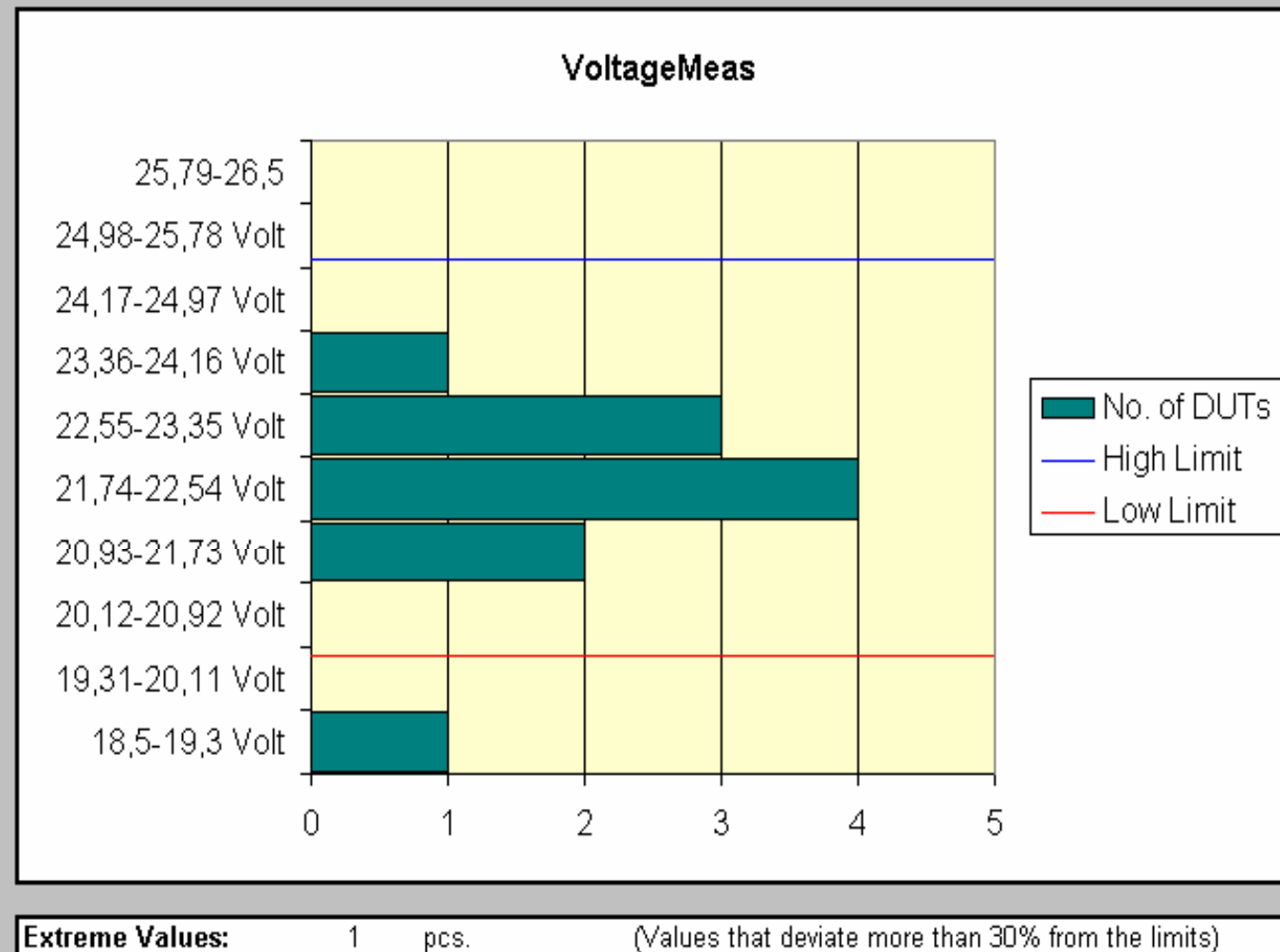
Done Local intranet

Test & Verification

Example of Statistics - Measurements

● ● ● SyntroTest

SYNTRONIC AB



Test & Verification

Example of Statistics – Test Points

● ● ● Syntro*Test*

SYNTRONICAB

STATISTICS

Graphs:

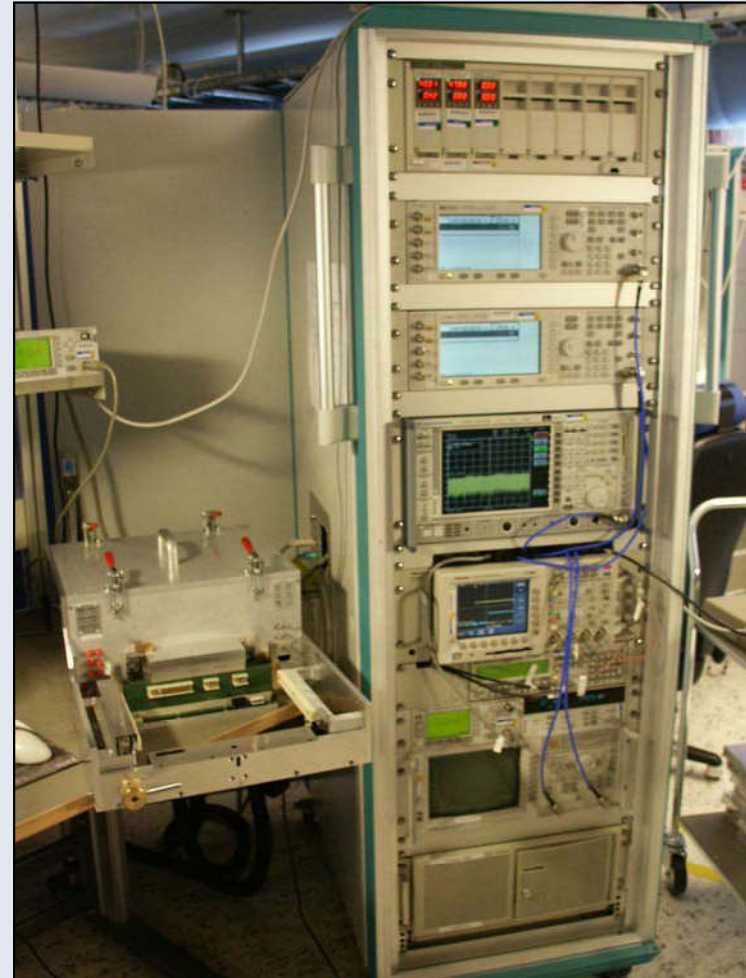
GetVolt1

Name	Total	Passed	Failed	Failed	1st Pass	2nd Pass	Measurements		
							Max	Min	Avg
VoltageMeas	12	10	2	16,7%	10	2	24,1	18,3	21,43
StartUp	12	12	0	0,0%	12	0			
CableCheck	12	12	0	0,0%	12	0			
CurrentMeas	12	12	0	0,0%	12	0	0,7	0,3	0,52
CurrentMean	12	12	0	0,0%	12	0	0,51	0,5	0,51

Test & Verification

Reference 1

●●● SyntroTest



Test & Verification

Reference 2

●●● SyntroTest



Test & Verification

Reference 3

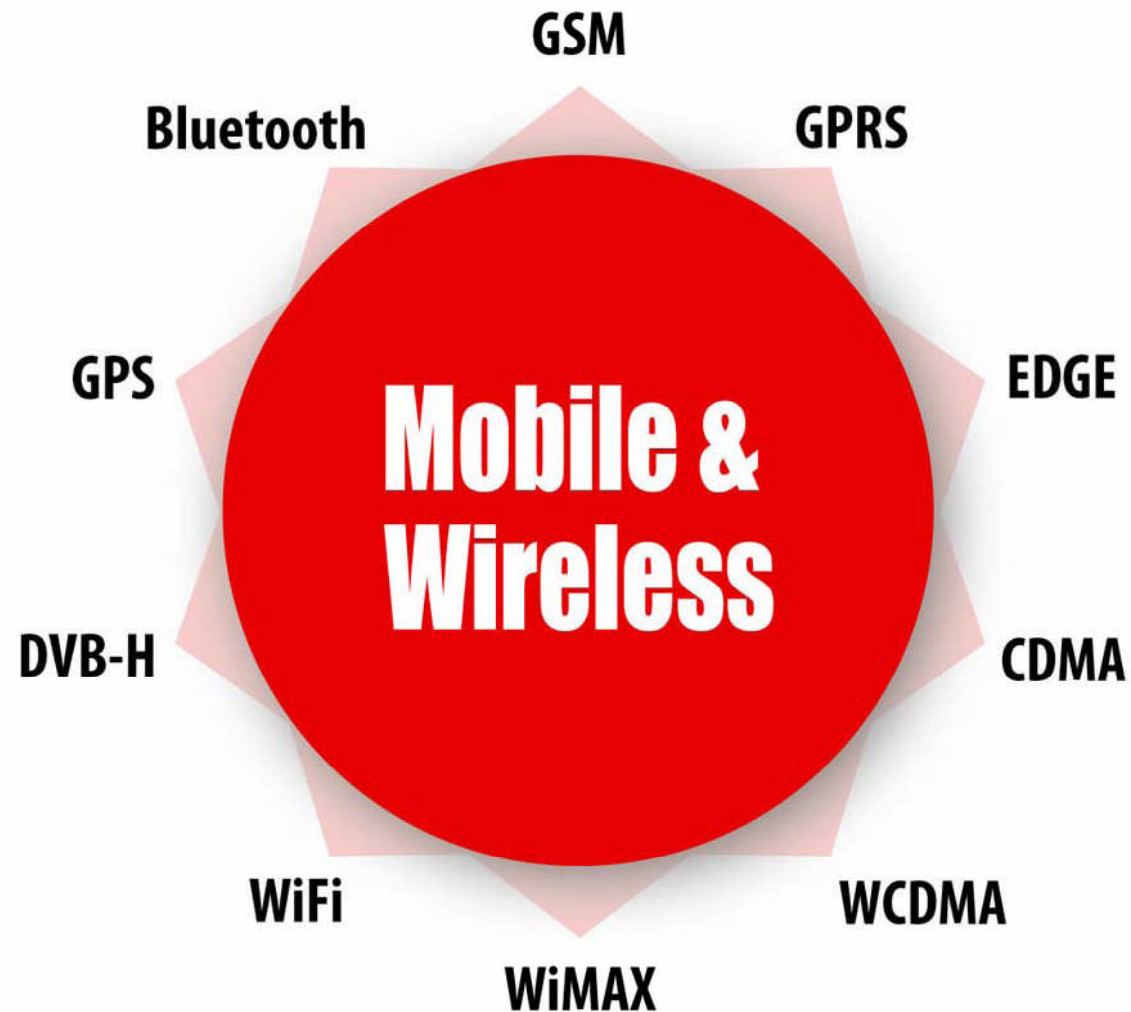
●●● Syntro *Test*



Test & Verification

APPLICATIONS

Technologies & Applications we support...



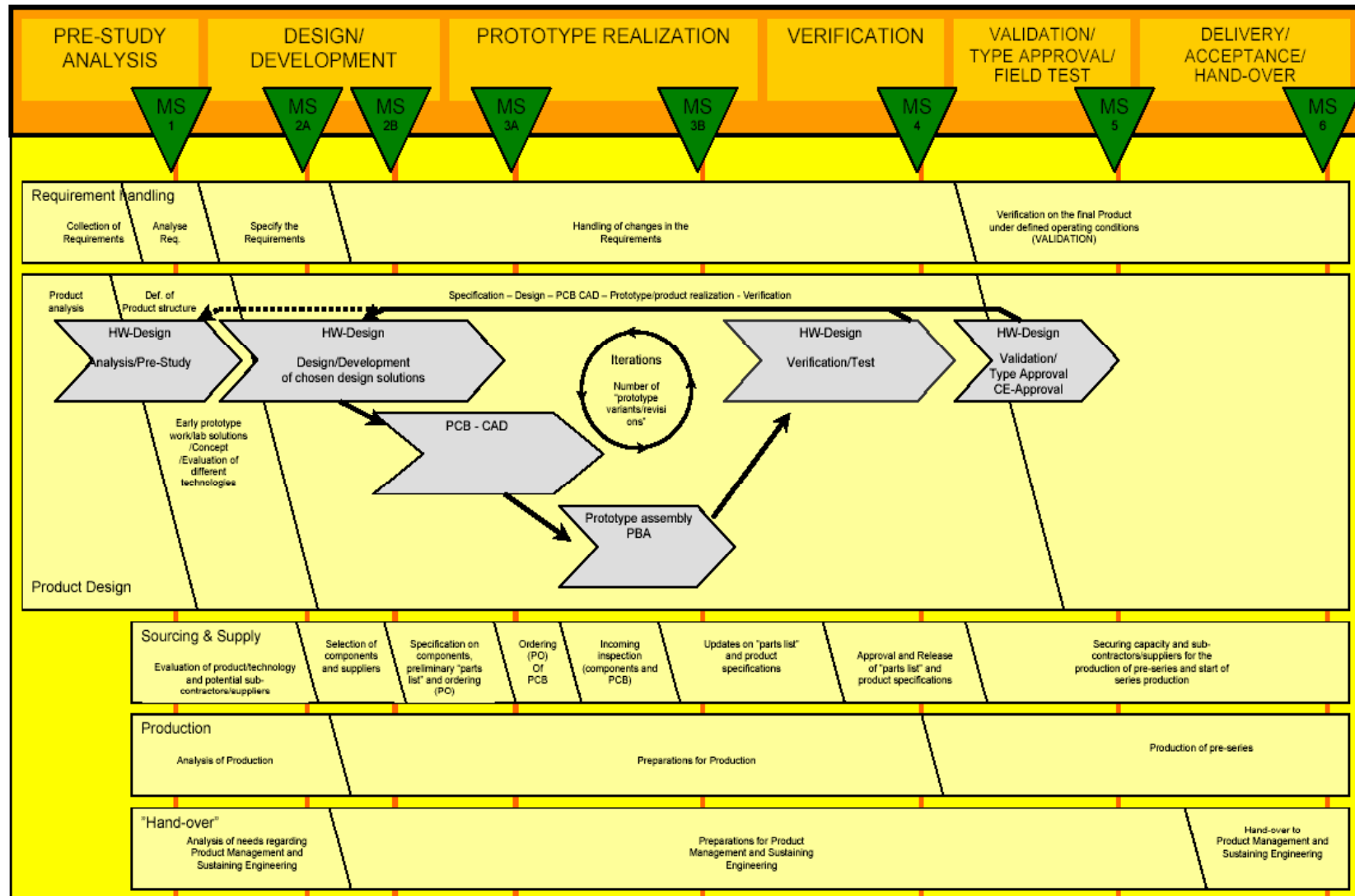
Design Capabilities & Applications (1)

- **1) Transport and Communication**
 - Automotive EMC
 - Automotive Radar
 - Dedicated Short Range Communications (DSRC)
 - Intelligent Transport Systems
 - Maritime Radio
- **2) Public Safety Technologies**
 - TETRA digital radio
 - Private Mobile Radio, Amateur & CB
- **3) Access Technologies**
 - DECT
 - HiperLAN
 - Powerline Telecommunications
 - Radio LAN
 - xDSL

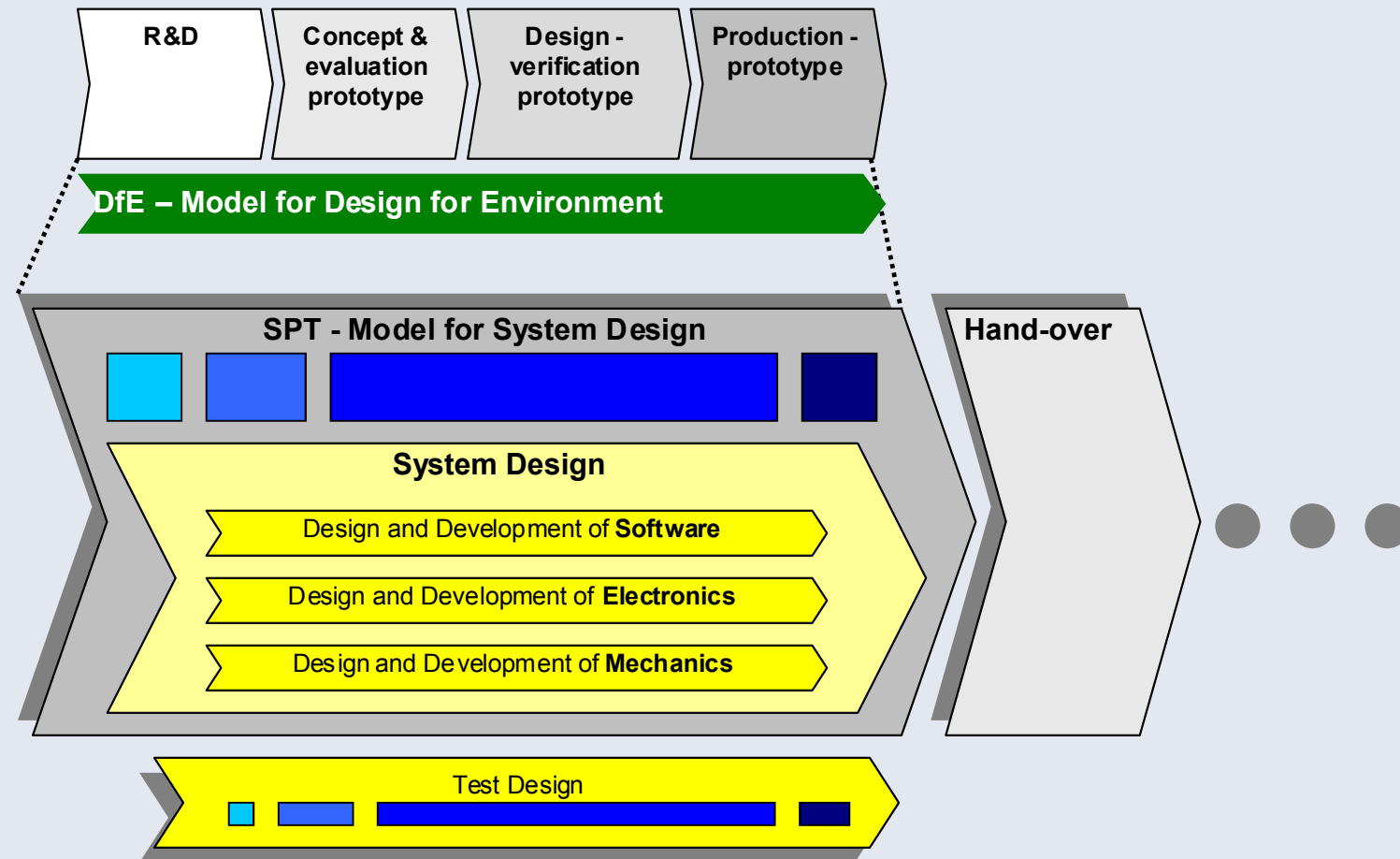
Design Capabilities & Applications (2)

- **4) Network Technologies**
 - Fixed Radio Links
 - IMT-2000
- **5) Broadcasting Technologies**
 - Analogue Radio Broadcasting
 - Analogue TV Broadcasting
 - Digital Audio Broadcasting (DAB)
 - Digital Radio Mondiale (DRM)
 - Digital Video Broadcasting (DVB)
- **6) Communication Technologies**
 - Medical Devices
 - Private Mobile Radio, Amateur & CB
 - Radio Frequency Identification (RFID) and NFC
 - Radio Microphones
 - Radio Site Engineering
 - Short Range Devices
 - Ultra Wide Band

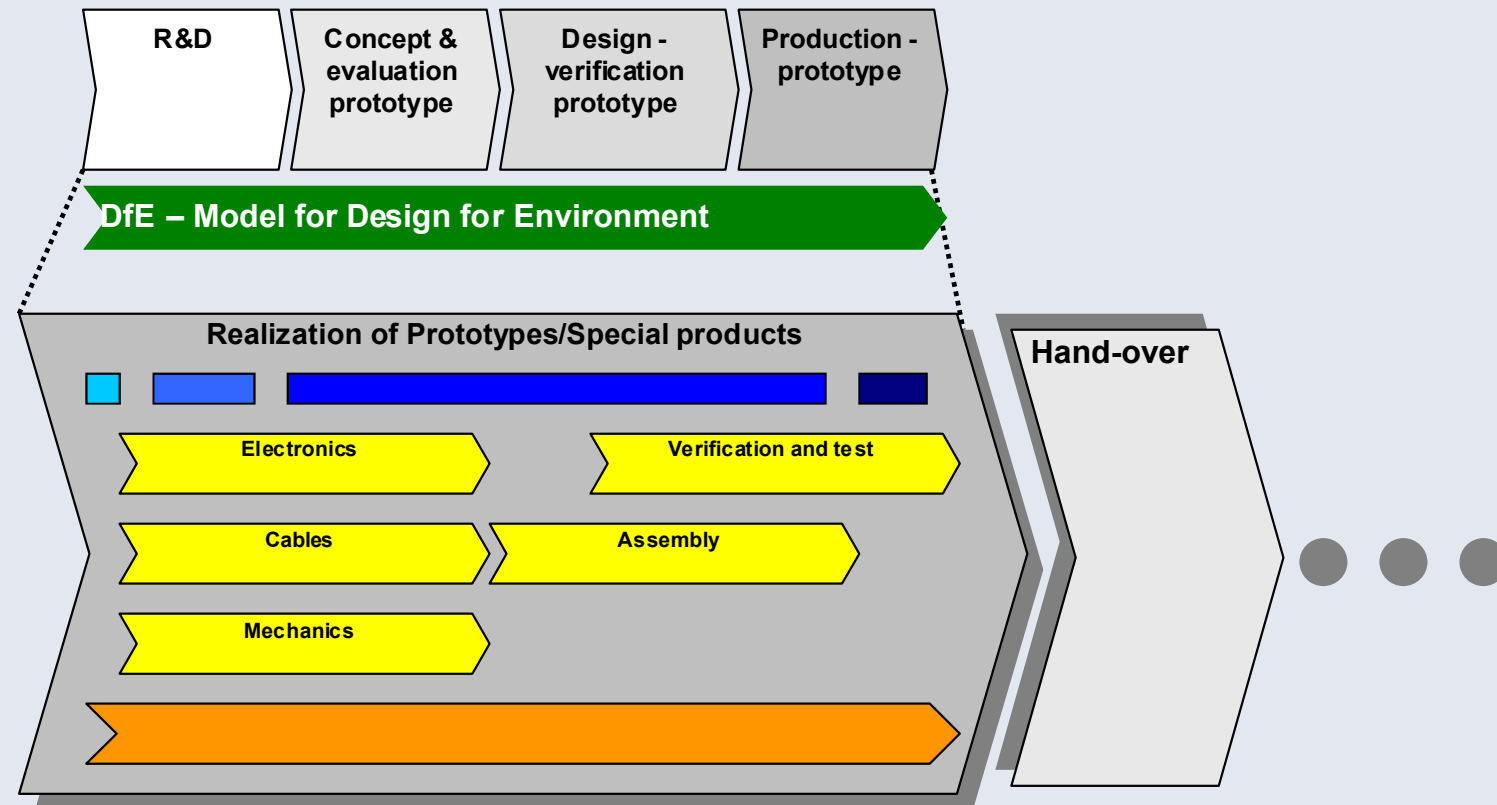
Syntronic's Design Process – Design of Electronics



Applications (1) – Model for System Design

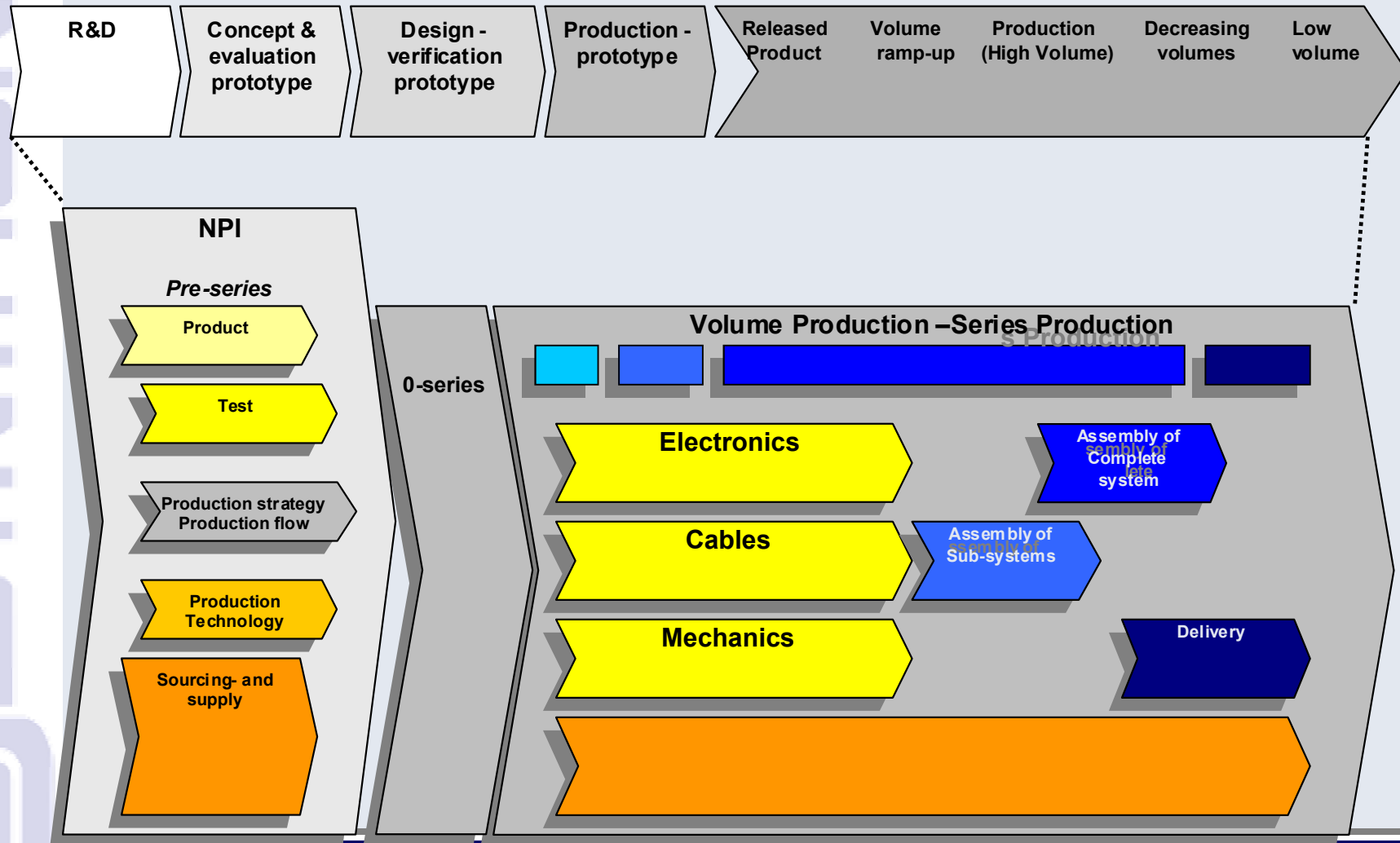


Applications (2) – Realization of Prototypes/Special Products

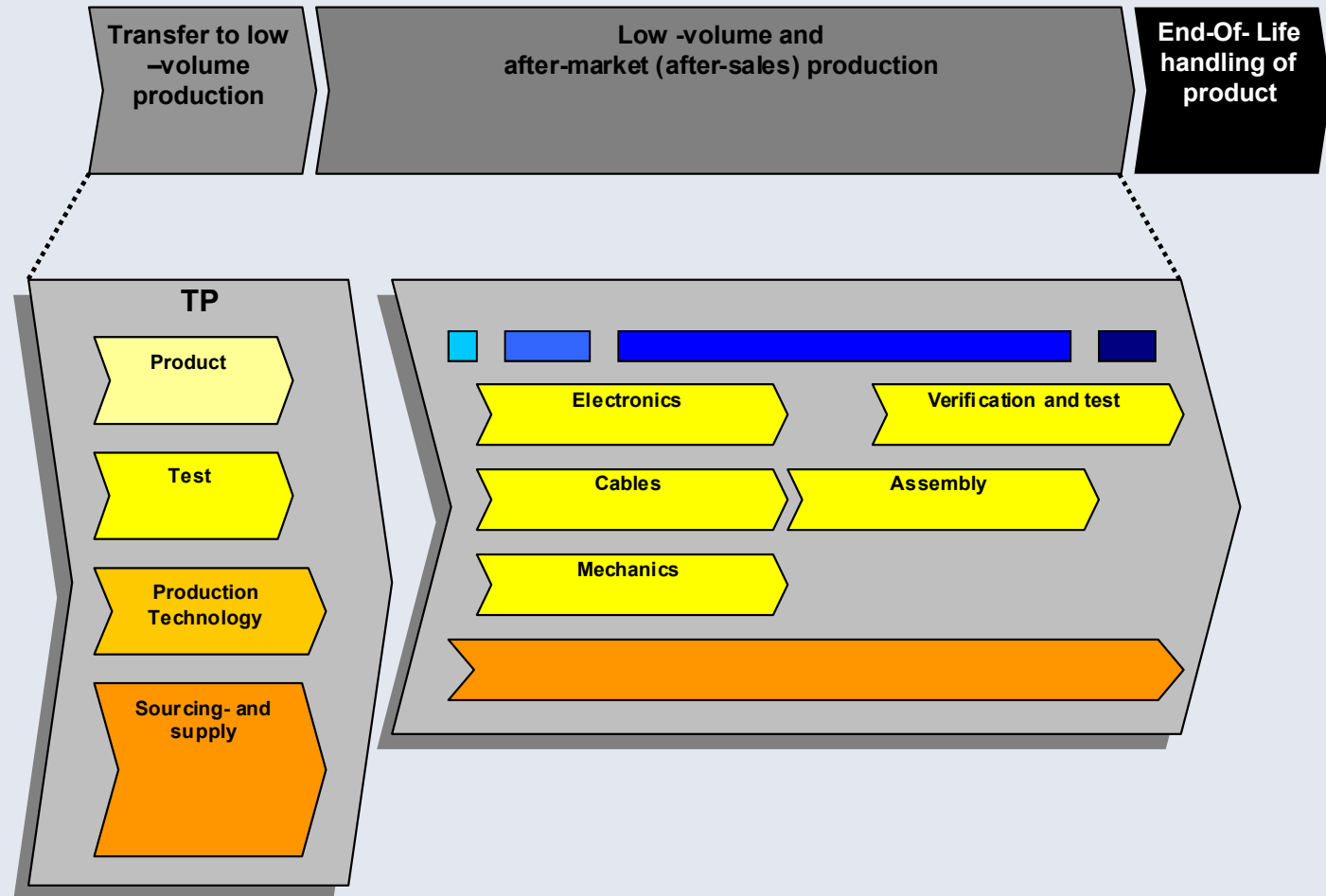


Applications (3) – NPI & Volume Production

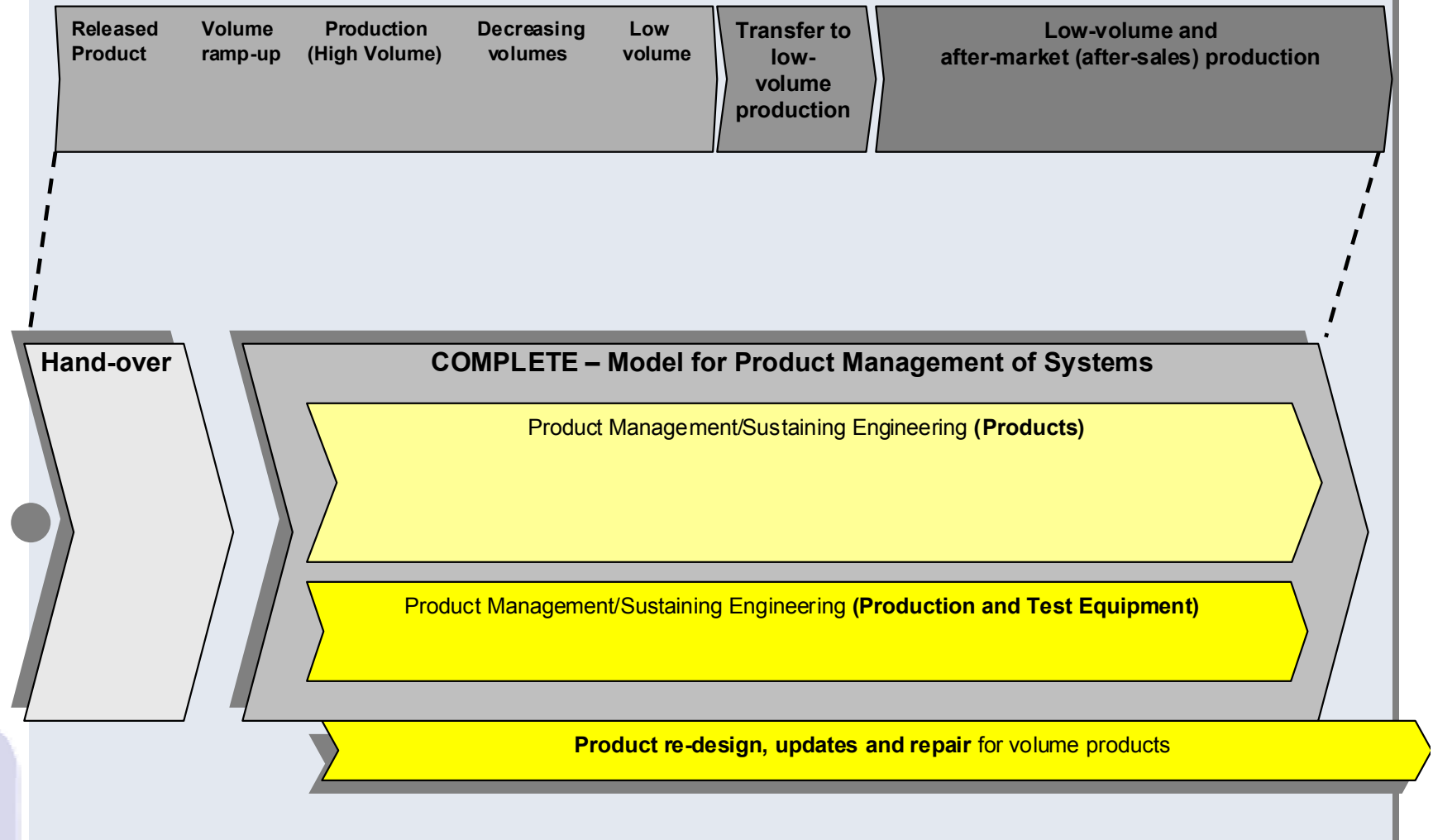
DfE – Model for Design for Environment



Applications (4) – Transfer Project (TP)



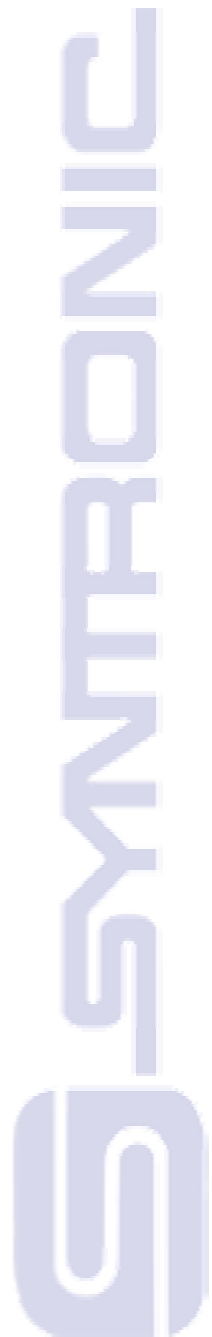
Applications (5) – Model for Product Mgmt. Systems



Applications – Design for Environment (DfE)



RoHS Compliant
(effective 1 July 2006)



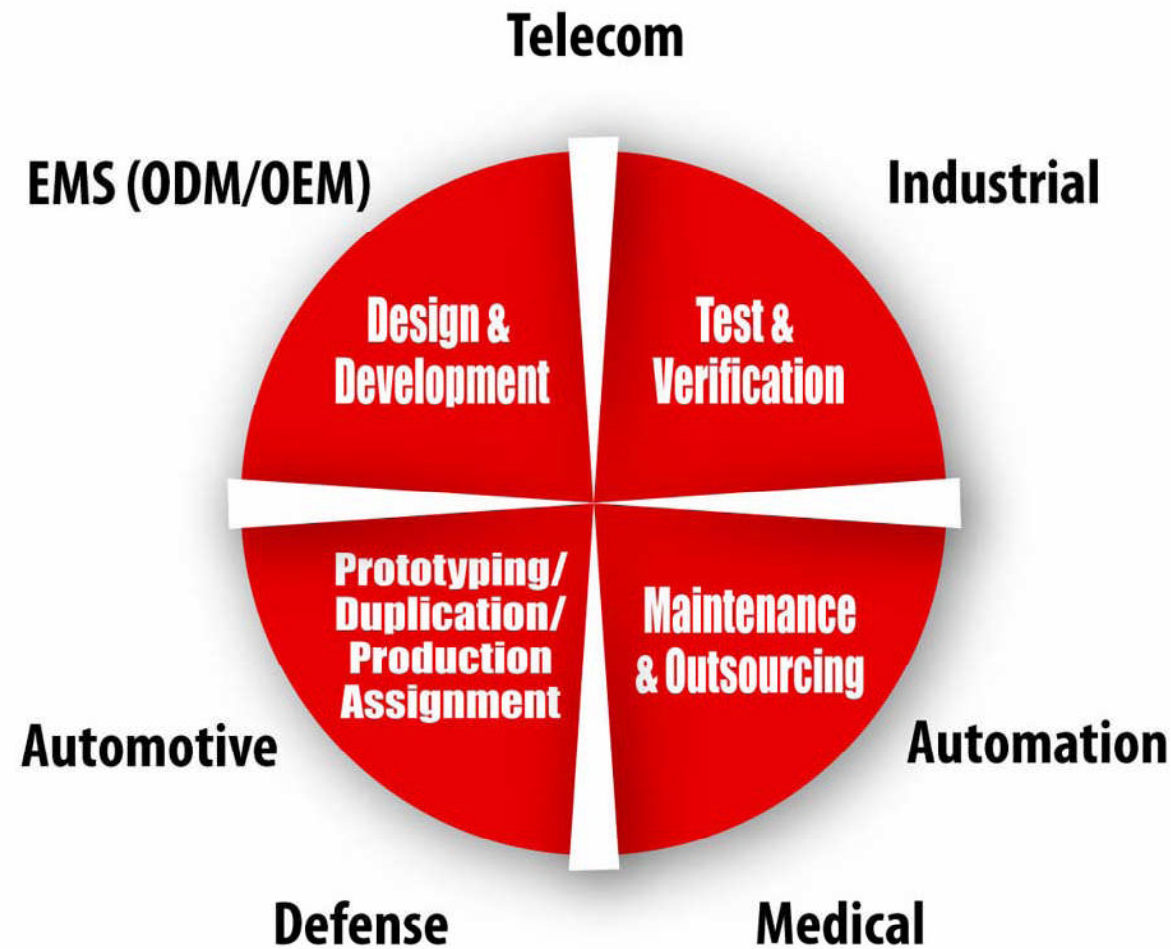
INTRODUCTION TO SYNTRONIC

Company Background

- Founded in 1984 with focus on R&D and Test Systems.
- More than 20 years of experience in developing systems for test, verification and production with long-term commitment.
- Has been awarded Dun & Bradstreet's (D&B) Triple A rating since 1995 for maintaining outstanding financial strength.
- 1st place on Ahrens Rapid Growth and SvD list in year 2003 for being fastest growing company.
- 7 offices worldwide across regions with global support & local presence.
- ISO 9001:2000 certified.
- MSC-status certified.



The Markets We Serve....



The Syntronic Solutions

*design
house*

*Turnkey Product Design &
Process Development*

●●● **SyntroTest**

*Modular and Versatile Test &
Verification Platform*

●●● **COMPLETE**

*Product Maintenance &
Management Process*

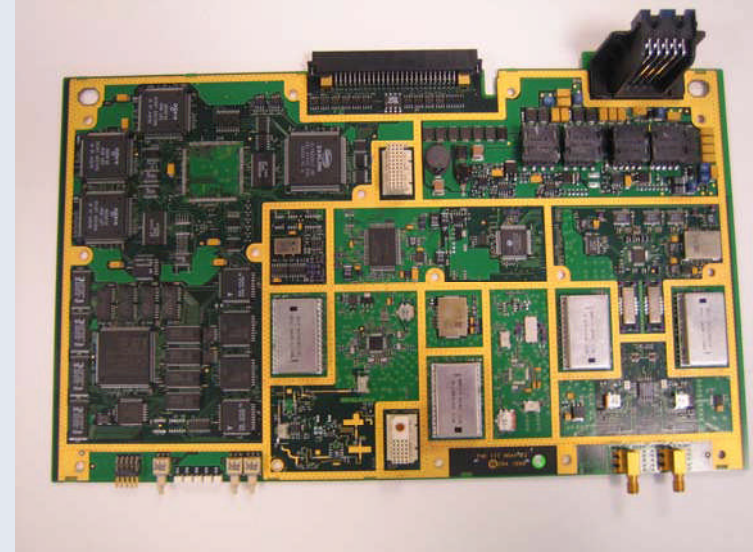
REFERENCES

Project References

- **World leading Mobile Phone Vendor:**
 - Design of Bluetooth communication (Tx, Rx) for mobile phones.
 - RX ,TX Radio design for 900/1800/1900 GSM/GPRS Mobile Phones
- **World leading Mobile Phone Vendor:**
 - Responsibility within the industrialization segment for 3G handsets.
 - The assignment involves test-developer responsible for 3 different test platforms and includes development of test methods for keyboard, camera and LCD.
- **World leading Telco Equipment Vendor:**
 - WCDMA/3G project management. Syntronic participated in project management of design, product design, test design and production start up of the third generations mobile systems. The project consisted of about 2500 members.

Project References

- **World leading Telco Equipment Vendor:**
 - Design of complete Radio Base Station transceiver for 1800MHz and 1900 MHz GMSK (GSM) and 8-PSK (Edge) modulation.
 - The design includes Rx, Tx, Control processor platform (Power PC), DSP platform (ASIC with eight parallel DSP's), DC-DC and RF-Power amplifier (50 dBm, 47.25W).
 - It also includes software for the control processor platform and DSP processor platform.
- **World leading Telco Equipment Vendor:**
 - Design of test beds for antenna systems in 3G-mobile systems.



Project References (3)

- **World leading Telecom Equipment Vendor:**
 - Design of a Mobile Network Test Unit supporting TDMA/GSM/CDMA/WCDMA standards with Real-Time Status Indicator (RSI).
 - Application for cell planning.
- **A prominent RF Transmitter Vendor:**
 - Design of a Tower Mounted Booster unit for 1800MHz and 1900 MHz supporting GMSK (GSM) and 8-PSK (Edge) modulation.
 - Syntronic is responsible for the transmitter, control unit and DC-DC parts.
- **Ascom Tateco Wireless Solutions:**
 - Provision of expertise for end-to-end verification of products within the DECT-standard.
 - The assignment has included both handsets and different access-points to cover the whole communication chain.

Project References

- **RFID Solution for an European Government:**
 - Design of RFID Card Reader (13MHz) for “free seating” and “free voting” application in the Parliament.
 - Turnkey design including HW, SW, FW, mechanical parts and IT networking.
- **RFID Wallet for Mobile Phones:**
 - Design of compact RFID antenna (13MHz) to work with SIM card in mobile phones and Card Reader.
 - Use of mobile phone as a “wallet” for purchases via RFID technology.

Project References

- **World leading Vendor of Medical Equipment:**
 - 405 MHz RF-Modem for remote radio programming of implants (pace makers) with Wake-Up functionality using 2.45GHz.
 - Included are 405 MHz antenna, 2.45 GHz antenna, Rx/TX 405 MHz, Tx 2.45 MHz
 - Processor platform and DC-DC.
- **Senior Care Vendor:**
 - RF radio safety system for monitoring of senior citizen 868/869 Mhz.
 - Included here are Base Station, Apartment units, Alarm buttons carried by seniors and RF switch interfaces for windows and doors.

SYNTRONIC AUTOMOTIVE

We offer competencies within:

- Simulation
- Embedded systems (CAN, LIN and MOST)
- Real-time programming
- RF-design (GSM/GPRS/3G and Bluetooth)
- Cost Engineering
- Telematics
- Testing (environment, function and performance)



Contact

Syntronic Malaysia Sdn. Bhd.

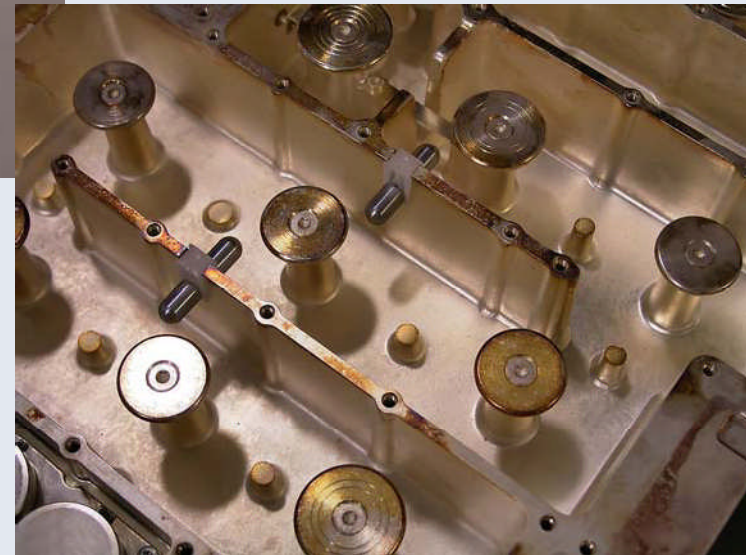
Phone: +60 3 2382 2322

www.syntronic.com

Partnerships

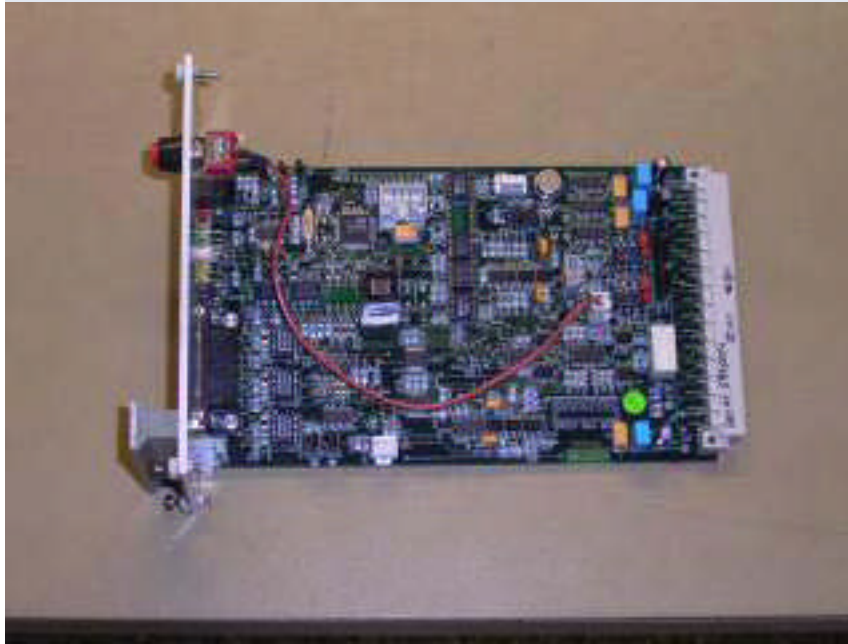
National Instruments (LabVIEW)

Project References



GSM Power Amplifier & Cavity Filters

Project References



Computerised Measurement System for Quality Control

Project References



Smart Home Device

Project References

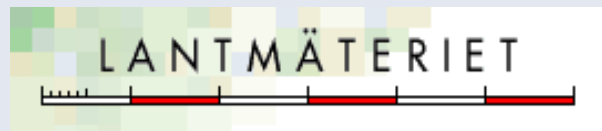


RF Transmission Device for Medical System

Customer References (1)



Customer References (2)



Global References

- Brazil
- Bangladesh
- China
- Dominican Republic
- Estonia
- Finland
- Germany
- Hungary
- India
- Indonesia
- Japan
- Malaysia
- Mexico
- Netherlands
- Poland
- Puerto Rico
- Romania
- Spain
- Sweden
- Thailand
- Turkey
- UK
- USA

BENEFITS & ADVANTAGES

Advantages of Design Outsourcing

- Allow concentration on core activities
- Change fixed cost to variable cost
- Reduce inventory cost and lower overall costs
- Give access to wider knowledge and latest technologies
- Ensure alternative solutions
- Create strategic partnerships
- Maintain supplier commitment

Doing the RIGHT THINGS
vs.
Doing the THINGS RIGHT

...putting resources in the right place, at right time & right price!

Why SYNTRONIC? (1)

- Advanced Electronics & Test System design experience of more than **20 years** with over **2,000 assignments** completed worldwide.
- Turnkey engineering *design house* handling projects from **idea to completion** by designing for quality to satisfy customers' needs.
- Knowledge and adoption of **latest technologies** in software development and electronics design with pool of technically **competent and skilled staff** worldwide.
- Focus on **reduction of development costs and time**, hence speedier introduction of new products to market.

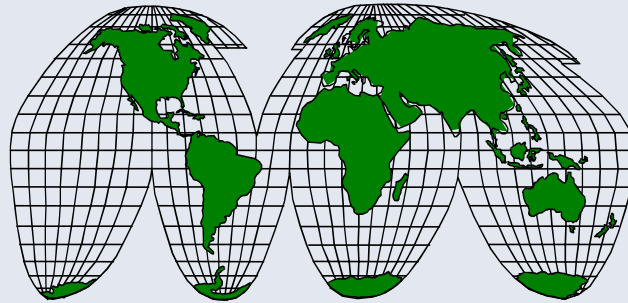


Why SYNTRONIC? (2)

- Design for **ease of production** (concurrent/simultaneous engineering)
- Ability to **tailor designs** and **processes** to specific markets.
- Design for Environment (**DfE**) – RoHS compliant.
- Established global network of suppliers and partners with access to **24x7 global processes**.
- Global supply-chain co-ordination and execution
- **Re-design** for cost-down engineering and LTB purposes.



Contact Information



SYNTRONIC Malaysia Sdn. Bhd.

Lee Siak Hong
lesh@syntronic.com



WWW.SYNTRONIC.COM