



**FTF 2016**  
TECHNOLOGY FORUM

FTF-DES-N2044

## How to get the optimum out of your processor board



Presenter:

**Wolfgang Heinz–Fischer (HeiFi)**

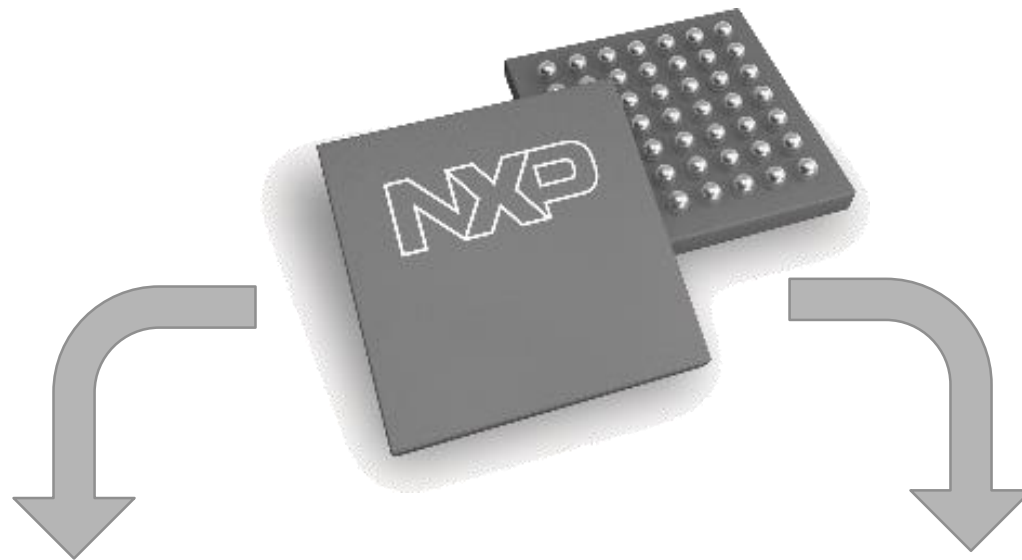
International Business Development

TQ–Embedded



# Processor

Optimum performance



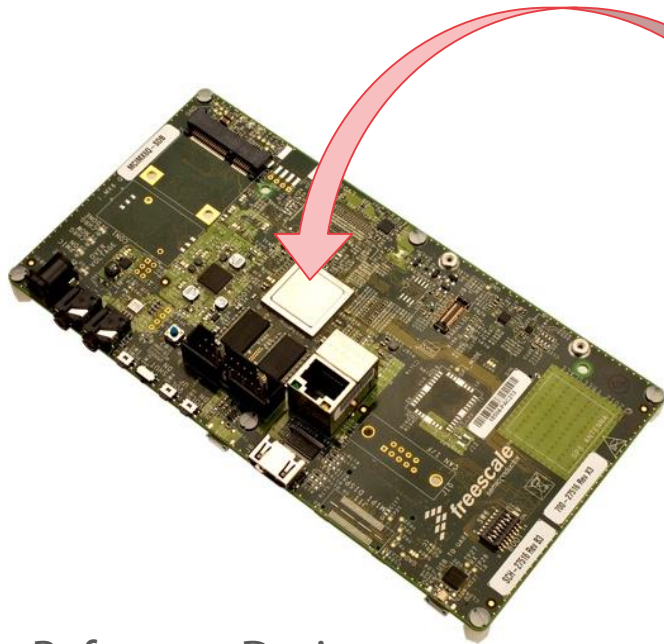
Integrated Design

Modular Design

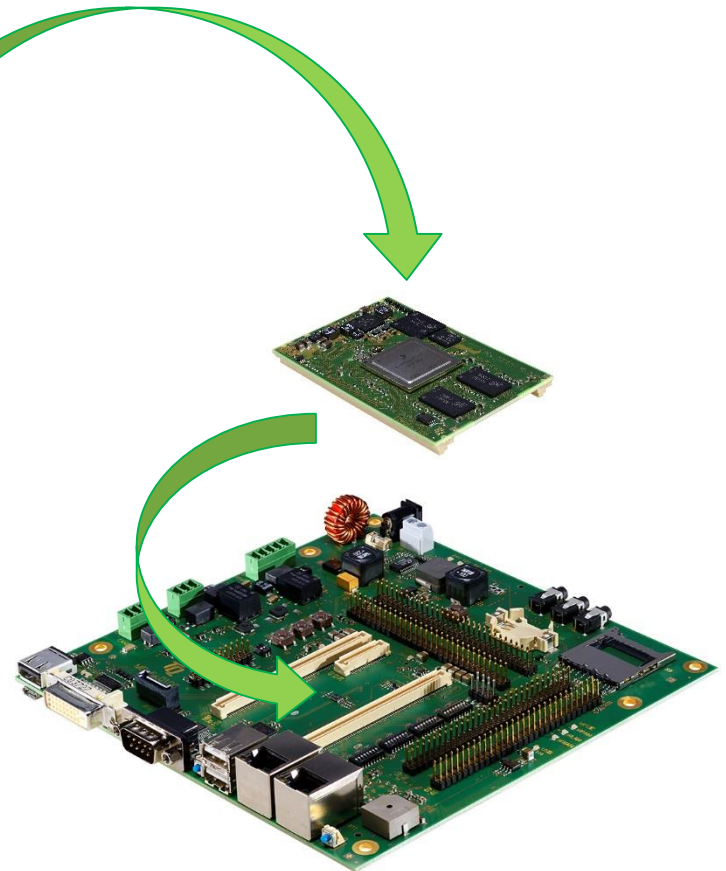
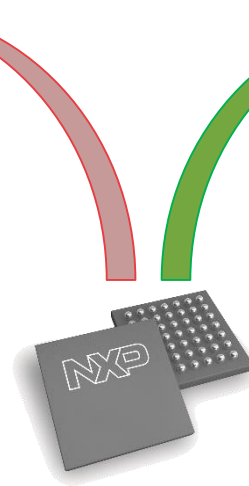
- Any limitations
- Any restrictions
- Different Performance

# Buy vs Build

## Processor Integration or Embedded Module



Reference Design



Modular Design

## What do you get?

- Functionality
- Processor Support
- Application Support

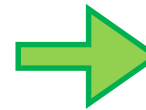
# Processor / Processor Board

What you get out?

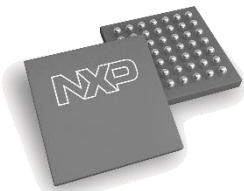


Integrated Design

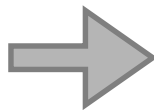
i.MX6Q (example) = 284 function balls



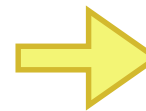
284 function balls free available



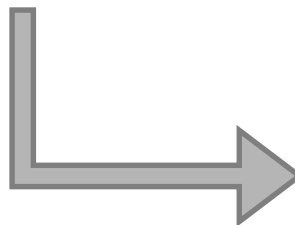
Processor  
i.MX6Q (example)



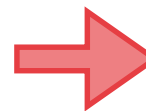
Modular Design:  
Module Example 1



265 function balls free available  
19 function balls for internal use



Modular Design:  
Module Example 2



98 function balls free available  
17 function balls for internal use  
17 function balls used for GbE (PHY)  
12 function balls used for  $\mu$ SD-Card  
29 function balls available on FCC/FPC  
**111 function balls no access**

# Buy vs Build

## Optimize Memory (i.MX6Q)



- Supported Memory:
  - LP-DDR2
  - LCV-DDR3
  - NOR Flash
  - eMMC Flash



Integrated Design



All options



Modular Design:  
Module Example 1



DDR3L, NOR Flash, eMMC Flash



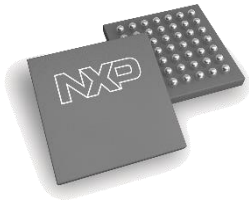
Modular Design:  
Module Example 2



DDR3L,  $\mu$ SD Card

# Buy vs Build

Optimize board size (i.MX6Q)



Integrated Design



All options



Modular Design:  
Module Example 1



70 mm \* 46 mm



Modular Design:  
Module Example 2



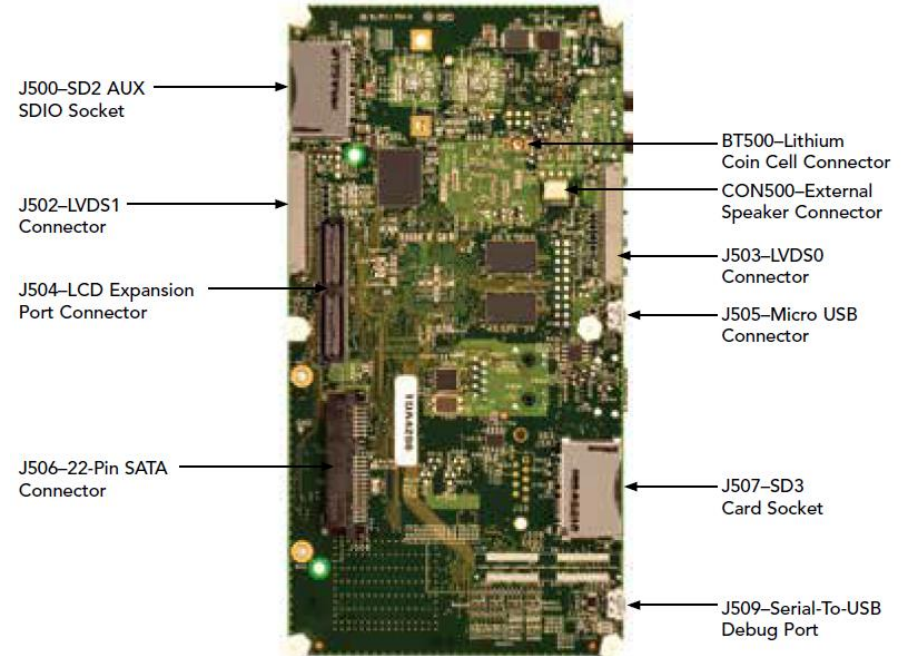
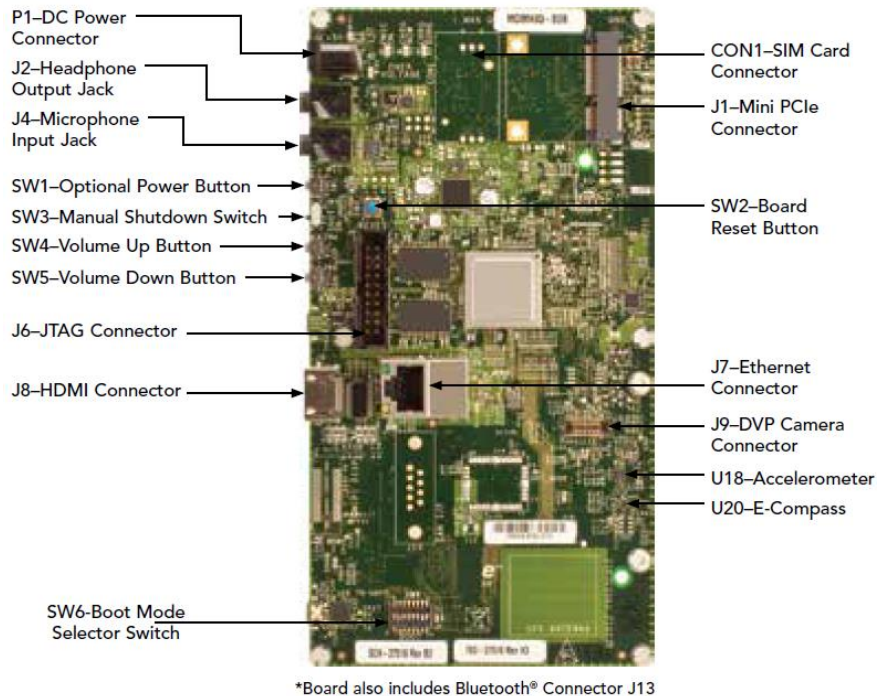
70 mm \* 70 mm

# Reference Design Board (EVAL–Board / Starterkit)

What do you get?



## Reference Design – SABRE Board



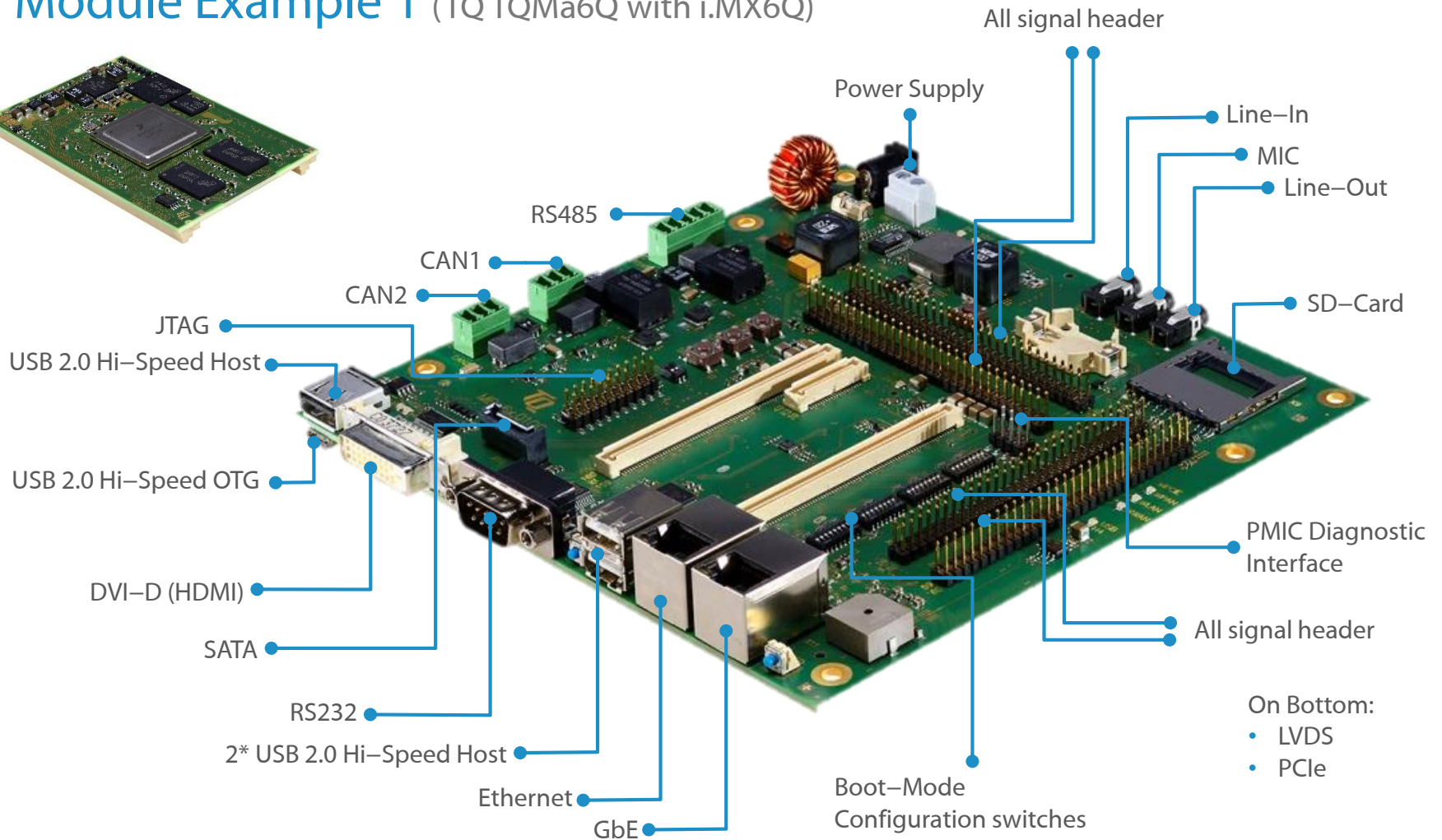


# Reference Design Board (EVAL-Board / Starterkit)

What do you get?



## Module Example 1 (TQ TQMa6Q with i.MX6Q)

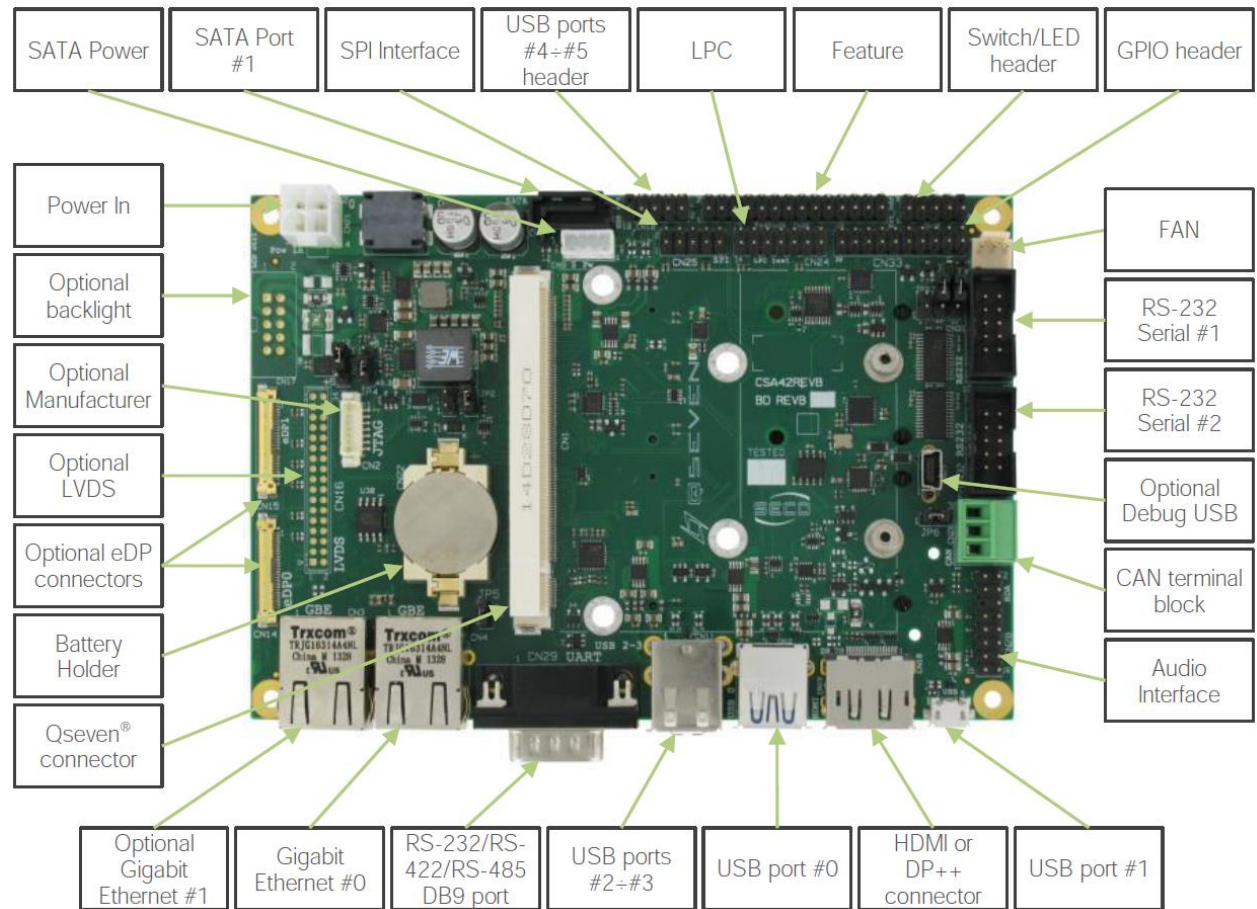


# Reference Design Board (EVAL–Board / Starterkit)



What do you get?

## Module Example 2 (SECO Q7–928 with i.MX6Q)



On Bottom:

- mSata
- miniPCle
- µSD miniSIM



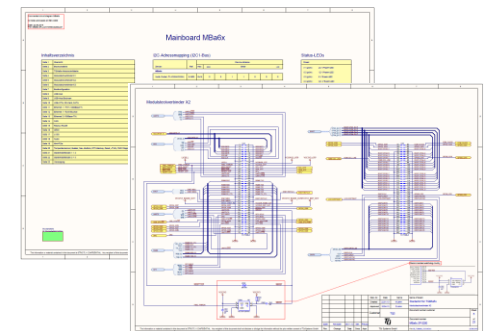
# Reference Design Board (EVAL–Board / Starterkit)

What is in the Box?



## Module Example 1 (TQ TQMa6Q with i.MX6Q)

- i.MX6 Starter kit with plugged in module
  - Power Supply
  - USB cable (micro–B to standard–A)
  - Null Modem Cable
  - DVI–D to HDMI Adaptor
  - 4 GB SD Card with Bootable demonstration code
  - Connector for CAN and RS485 Interface
  - Module Extractor tool
  - 2.54 mm Header, 60 pin
- 
- Schematics for Carrier Board
  - Step File



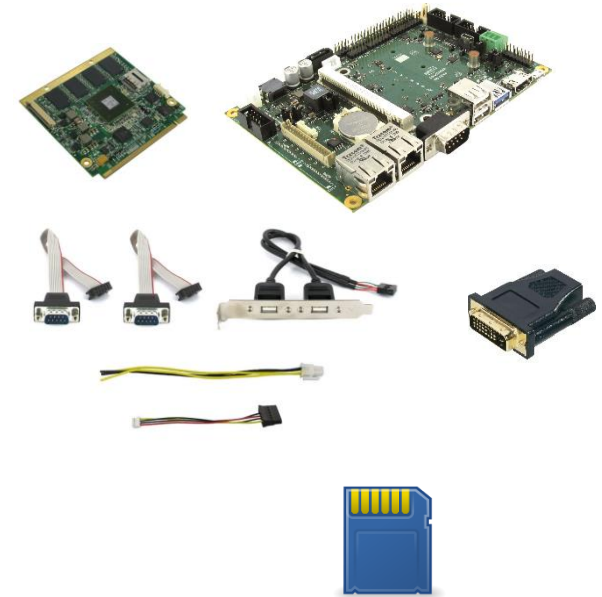
# Reference Design Board (EVAL–Board / Starterkit)

What is in the Box?

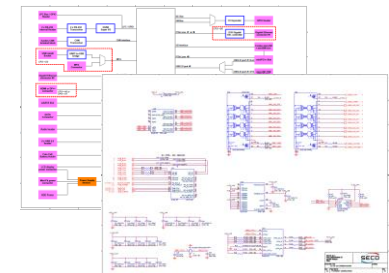


## Module Example 2 (SECO Q7–928 with i.MX6Q)

- i.MX6 Starter kit with plugged in module
- Power Supply
- HDDP++ to HDMI adapter
- Cable Kit
- SD–Card



- Schematics for Carrier Board



# Reference Design Board (EVAL–Board / Starterkit)

## Tool Support



Reference Design

- Which tools are supporting the Reference Design Board



Modular Design:  
Module Example 1

- Which tools are supporting the Starterkit / EVAL Board



Modular Design:  
Module Example 2

# Reference Design Board (EVAL–Board / Starterkit)

## BSP Support



Reference Design



Modular Design:  
Module Example 1

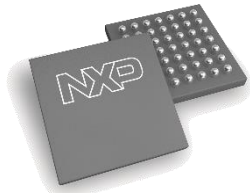


Modular Design:  
Module Example 2

- Which BSP are available for the Reference Design Board
  - Which functions are supported
  - Design Help
- 
- Which BSP are available for the Starterkit / EVAL Board
  - Which functions are supported
  - Design Help

# Reference Design Board (EVAL–Board / Starterkit)

Longevity



Integrated Design



Modular Design:  
Module Example 1



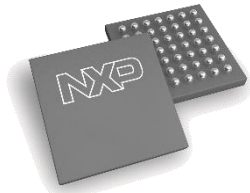
Modular Design:  
Module Example 2

- NXP longevity commitment and availability of other components
- Commitment on processor and rest of components (complete Embedded Module)
- Obsolescence management in place



# Reference Design Board (EVAL–Board / Starterkit)

Other design support



Integrated Design



Modular Design:  
Module Example 1



Modular Design:  
Module Example 2

- Mainboard schematic review
- Application board design support
- System integration support
- Product qualification support (EMC, schock & vibration)
- Certification support
- Mainboard layout support
- Product life cycle support



- TQ = Technology in Quality
- Founded 1994
- >1.400 Employees, 160 Design Engineers, >200 Mio € Revenue (Status January 2016)
- Leading European CEM / E<sup>2</sup>MS Provider
- OEM / ODM Provider (Embedded, Drives, Automation)
- 9 Manufacturing Locations (approx. 600.000 sqft., 12 Million Parts per day), 8 Design Locations
- ISO 9001, ISO 14001, ISO 13485 (Medical), EN 9100 (Aviation), ISO16949 (Automotive) certified



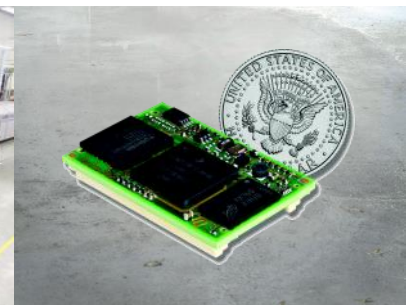
President (Owner):  
Detlef Schneider (left)  
and Rüdiger Stahl



Headoffice:  
Seefeld / Delling  
(West of Munich)



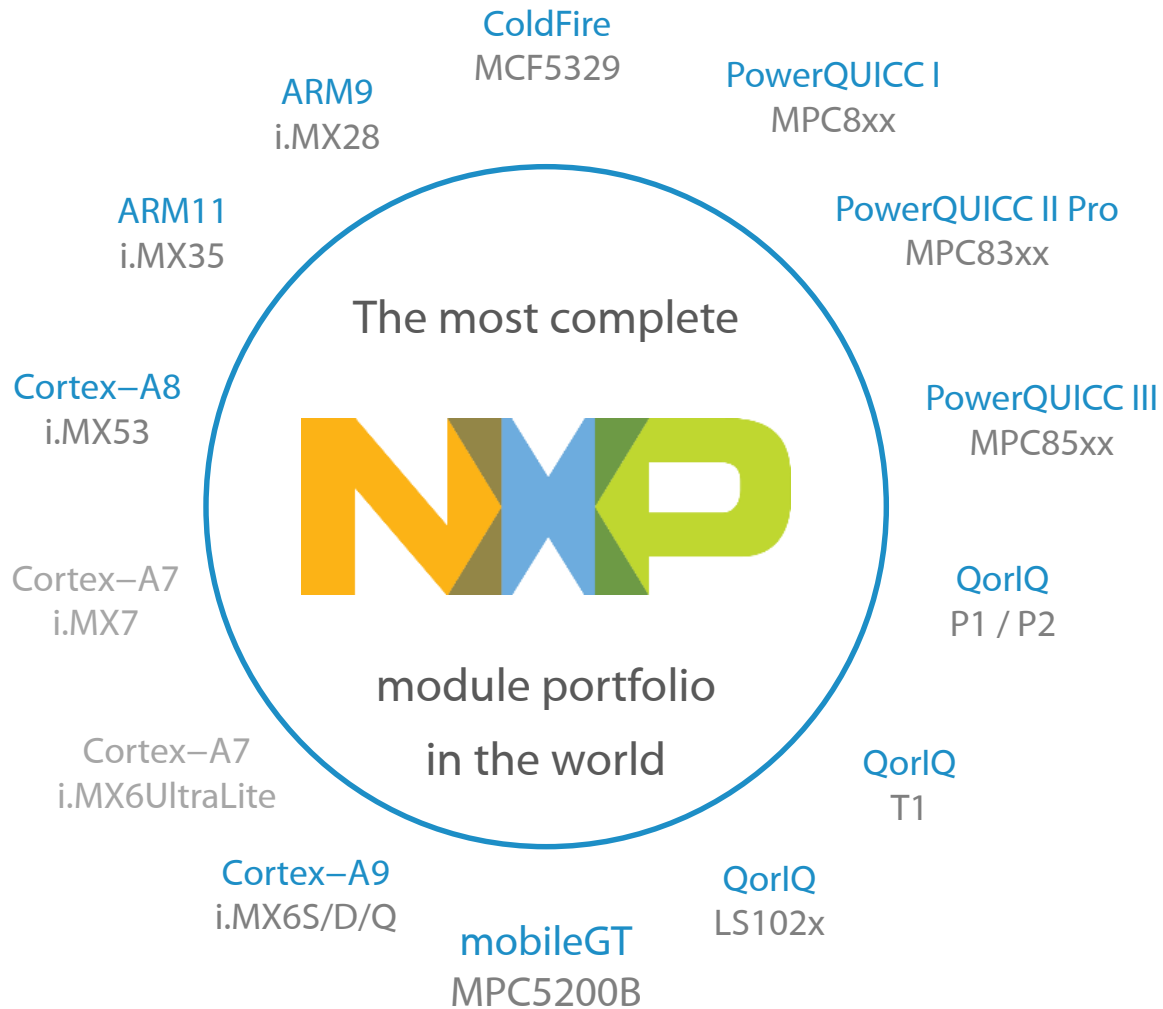
SMD Production Line:  
Durach



Embedded Product:  
i.MX28 / ARM9 Module  
40 mm \* 26 mm

# TQ / NXP Products

## Product Overview



Contact Data:

Wolfgang Heinz-Fischer (HeiFi)  
International Business Development  
[heifi@tq-group.com](mailto:heifi@tq-group.com)



ARM9 / i.MX28 Module  
40 mm x 26 mm

[www.tq-group.com](http://www.tq-group.com)

QorIQ T1 Module  
74 mm x 54 mm

