MODEL-BASED DESIGN TOOLBOX
ENABLING FAST PROTOTYPING AND DESIGN

- WHO ARE WE AND WHAT DO WE DO?
- WHAT IS IT?
- WHAT WE DELIVER?
- WHAT WE COVER?
Model-Based Design Team – Who Are We & What Do We Do?

✓ Tools enablement group within AMP

✓ Develop toolboxes to assist automotive customers with rapid prototyping and accelerate algorithm development on NXP MCU

✓ Peripheral initialization through UI configuration from a Model Based Design environment like Simulink™

✓ Supported platforms: MagniV S12ZVMx and S12ZVC, MPC56xx, MPC57xx, ARM S32K, DSC and Kinetis families

✓ Customer support and training: https://community.nxp.com/community/mbdt
What is it? … the Ultimate Abstractization Layer

Model-Based Design Toolboxx – Abstractization Layer

<table>
<thead>
<tr>
<th>Simulink Examples</th>
<th>Peripheral Configuration</th>
<th>Matlab Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demos</td>
<td>Applications</td>
<td>Driver Examples</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Middleware & Stacks

- LIN
- SBC
- AMMCLib
- ...

Low-level Drivers

- Analog
  - ADC
  - SBC
  - PDB
- Comms
  - UART
  - FlexIO
  - CAN-FD
  - LIN
  - SPI
  - I2C
- Safety & Security
  - EIM
  - ERM
  - CRC
  - MPU
  - cSEC
- Timers
  - FTM
  - LPIT
  - LPTMR
  - RTC
  - WDOG
  - EWM
- SoC
  - Clocks
  - Interrupts
  - Power
  - Pins
  - GPIO
  - FLASH
  - DMA
  - TRGMUX

FreeRTOS

- OSIF

Headers

- Processor Expert UI
- Config files
- Start-up/Compiler
- linker files

Model-Based Design Features
- Matlab/Simulink oriented
- Drag-drop programming
- Automatic ANSI C-code generation
- Easy to port

SDK Quality Class

- Class B
- Class C
- Class D

SDK Features
- Integrated Non-Autosar SW Prod-grade SW
- Graphical-based Configuration
- Layered Software Architecture
- Documented Source Code and Examples
- Integrated with S32 DS and other IDEs
- Featuring various Middleware
- FreeRTOS integration
- Multiple toolchains supported
- Several examples and demos
Model-Based Design Team – What We Deliver?

Basic/Advanced Building Blocks
- MATLAB integration
- Automatic ANSI C Code Generation
- Abstractionization of peripherals
- Support for: S32K, MPC5744, etc.

Ideas & Designs
- Minimal knowledge about hardware
- Ultra fast development – drag&drop approach
- Simulation environment for validation
- Technical expertise

Easy Prototyping
- Easy migration between NXP solution
- Matching solution for TI, Arduino, Raspberry
### What We Cover?

#### On-Chip Peripherals
- **General**
  - ADC conversion
  - Digital I/O
  - PIT timer
  - ISR
- **Communication Interface**
  - CAN driver
  - SPI driver
  - I2C
  - UART
- **Motor Control Interface**
  - Cross triggering unit
  - PWM
  - eTimer block(s)
  - Sine wave generation
  - ADC Command List
  - GDU (Gate Drive Unit)
  - PTU (Programable Trigger Unit)
  - TIM Hall Sensor Port
  - FTM (Flex Timer Module)
  - PDB (Programmable Delay Block)

#### Configuration/Modes
- **Compilers Supported**
  - CodeWarrior
  - Wind River DIAB
  - Green Hills
  - Cosmic
  - IAR
  - GCC
  - RAM/FLASH targets
- **Simulation Modes**
  - Normal
  - Accelerator
  - Software in the Loop (SIL)
  - Processor in the Loop (PIL)
- **MCU Option**
  - Multiple packages
  - Multiple Crystal frequencies

#### Utilities
- **FreeMASTER Interface**
  - Data acquisition
  - Calibration
  - Customize GUI
- **Profiler Function**
  - Exec. time measurement
  - Available in PIL
  - Available in standalone

#### Embedded MCU Support
- MPC5643L
- MPC567xK
- MPC574xP
- S12ZVM
- KV10Z
- 56F82xx
- KV31/30/40/50
- S32K

**NOTE:** Peripheral Blocks and compiler support is dependent on MCU use.