DAVE™ (Version 4) – Introduction

Learning Outcome

- DAVE™ development platform for software development
- DAVE™ highlights
  - Component based programming
  - GUI based configuration
  - Code repository
  - Hardware resource manager
  - Code generation
  - Support 3rd party tools
  - Expert support
  - DAVE™ SDK

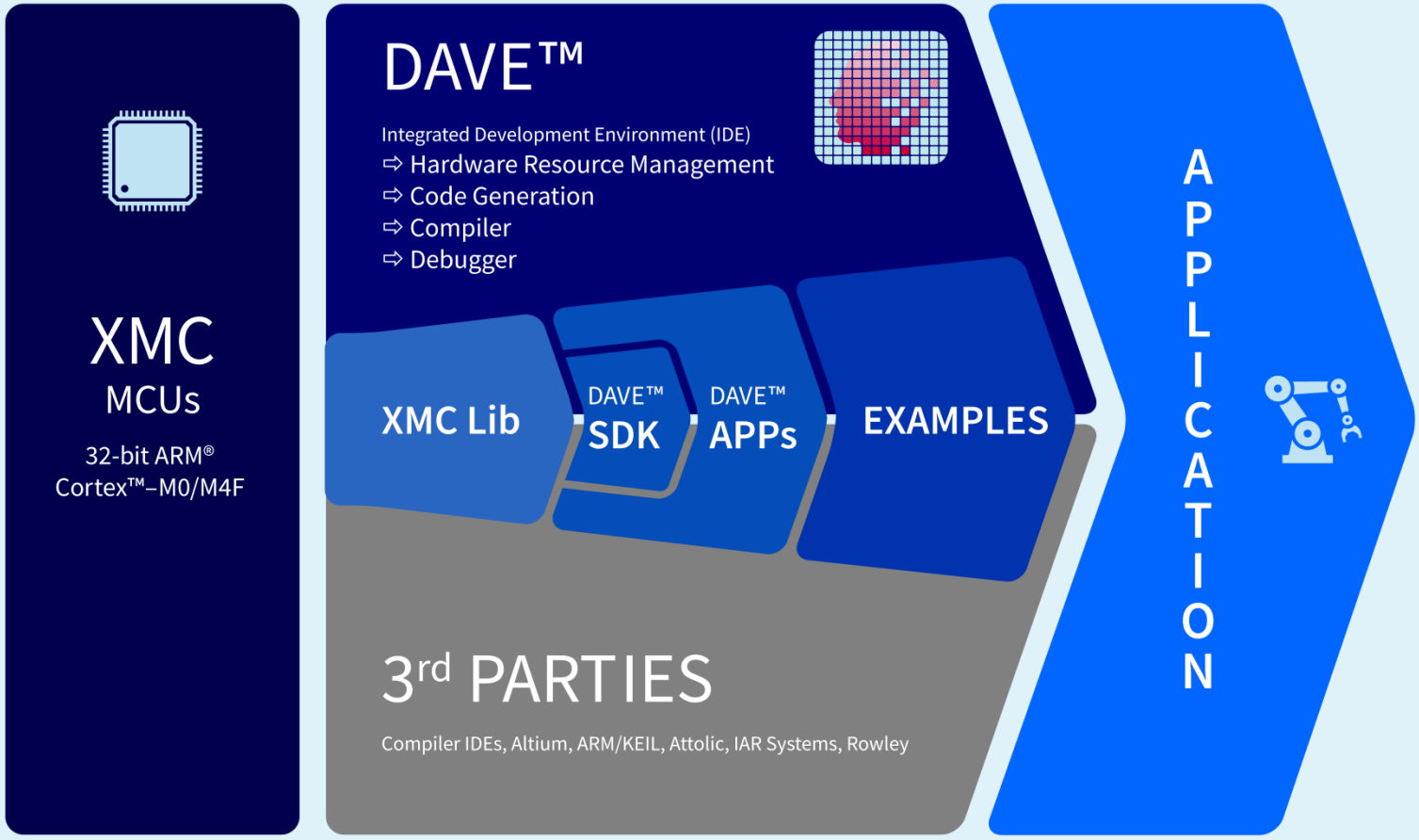
DAVE™

Free Eclipse based IDE offering code repository, graphical system design methods, and automatic code generator to guide XMC microcontroller user along the entire process – from evaluation to production (E2P).

XMC Lib and DAVE™ generated code can be used with other 3rd party tool chains.

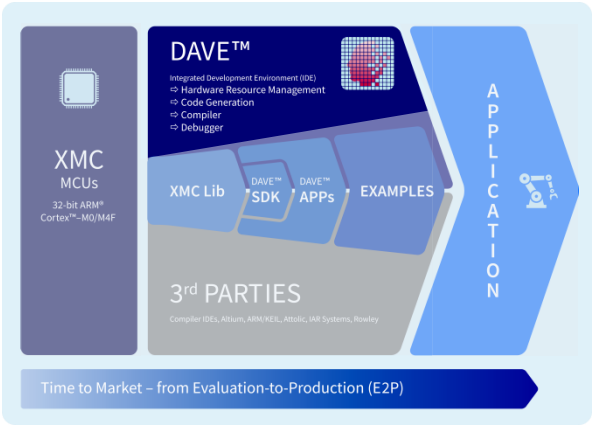
Digital
Application
Virtual
Engineer

XMC Microcontroller
– Software development made easy



DAVE™ IDE

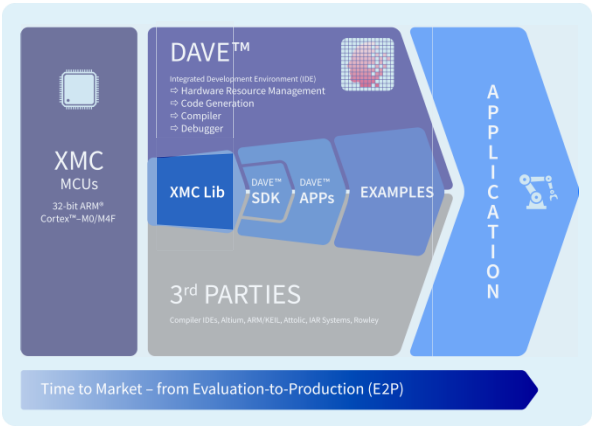
- Eclipse based Integrated Development Environment (IDE)
  - ARM GNU C-Compiler
  - GDB SEGGER J-Link debugger
  - Code generation based on user configuration using graphical user interface (GUI)
  - Hardware resource solver

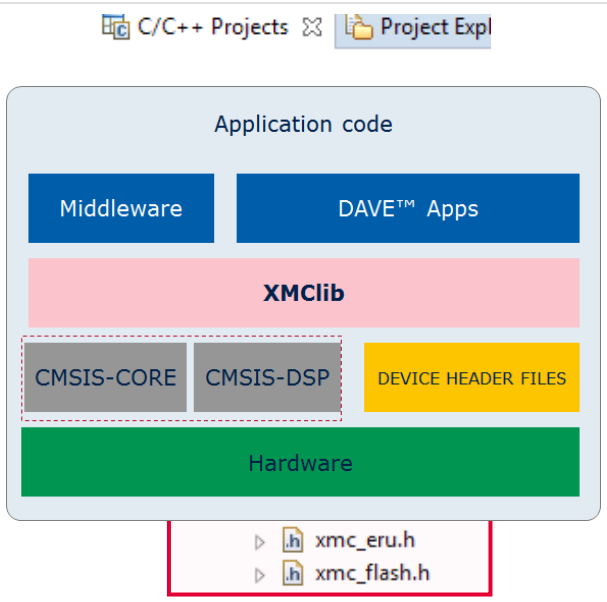


XMC Lib

Productive

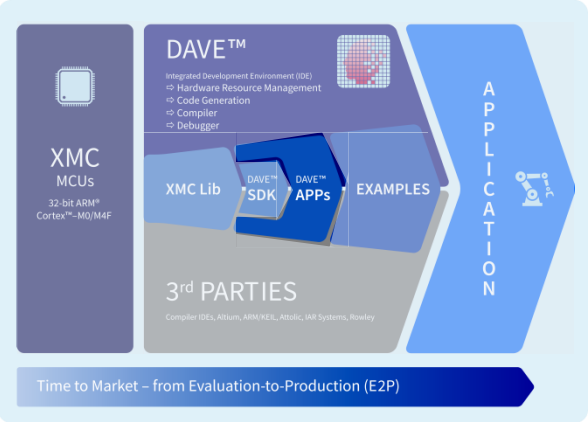
- Fully tested low level driver library for XMC peripherals (APIs)
- CMSIS / MISRA 2004 compliant
- Covers all peripheral functions and features
- XMC Lib is part of any new DAVE™ project

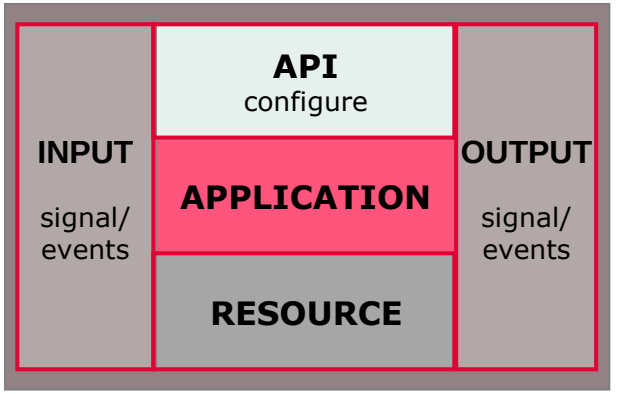




DAVE™ APPs

- Application oriented software components that abstract a certain use case
- Built on top of XMC Lib
- Graphical User Interface (GUI) configurable

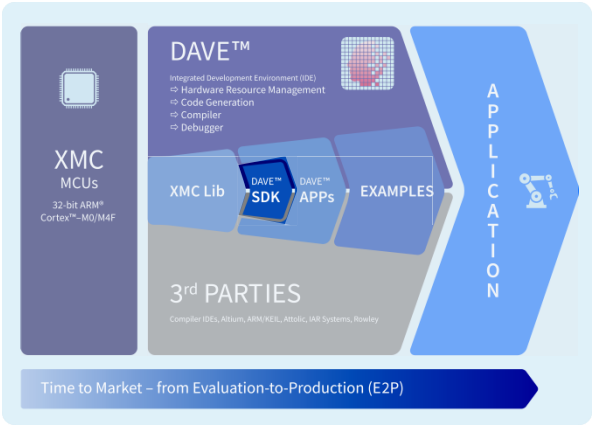


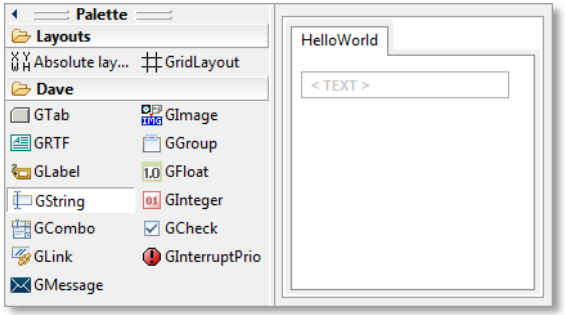


DAVE™ version 4 support a new set of enhanced DAVE™ APPs

DAVE™ SDK

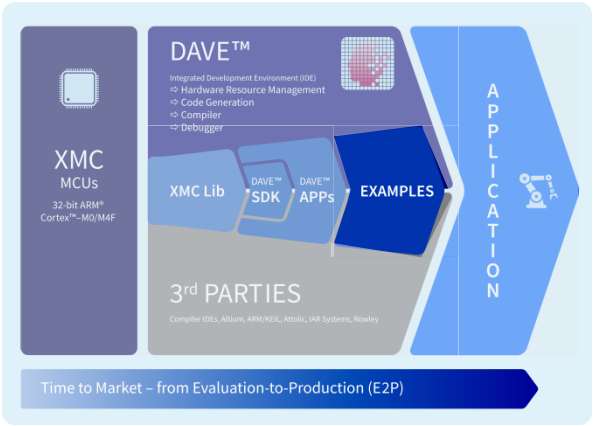
- Software Development Kit for DAVE™ APPs
- Modify, enhance and create new DAVE™ APPs for any use case
- Code templates based on groovy script
- GUI designer with drag and drop functionality for widgets
- Debug features supported

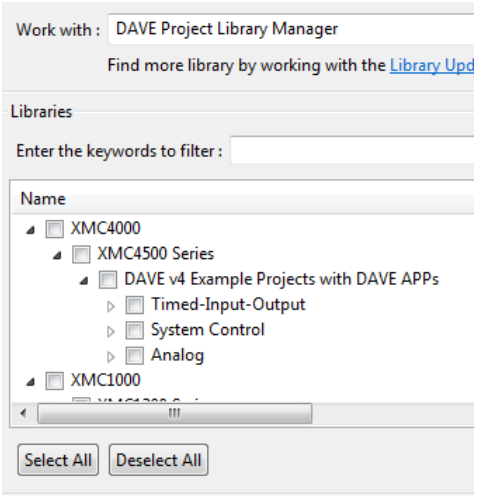




DAVE™ – EXAMPLES

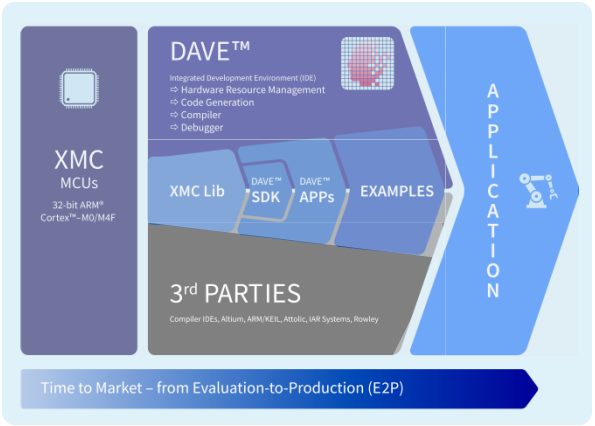
- XMC Lib and DAVE™ APPs composed to applications
- Example projects as references for complete applications
- Download examples with DAVE project library manager





DAVE™ – 3rd PARTIES

- XMC Lib and DAVE™ generated Code are tested with
  - GCC compiler
  - ARM® compiler
  - TASKING compiler
- And released for
  - Altium
  - ARM/KEIL
  - Atollic
  - IAR Systems
  - Rowley



Compiler IDEs

TASKING

KEIL™ Tools by ARM

atollic

IAR SYSTEMS

DAVE™ – APPLICATION

Today's Status

Motor Control

- Asynchronous Motors (FOC, Frequency Control)
- PMSM, BLDC (FOC, Scalar, Hall Sensor)
- PWM Generation
  - Space Vector
  - Block Commutation
- Position Detection (Hall, Encoder, Resolver)
- Drive Automation

Power Conversion

- Buck Converter
  - Peal Current Control
  - Voltage Control
- PWM Generation using HRPMW

Lighting

- LED Lamp Control
- DALI
- DMX512

HMI

- SEGGER GUI Library
- Display
- Touch

Communication

- USIC
  - UART
  - SPI
  - I2C
- USB
- Ethernet

General Purpose

- Timer/PWM (Capture, Compare)
- ADC
- DAC
- GPIO

System

- Interrupt
- DMA
- AES
- CRC
- RTOS
- File System
- Emulated EEPROM

XMC Lib, DAVE™ APPs, EXAMPLES

Today's Status

XMC Lib

CMSIS / MISRA 2004 compliant low level driver libraries (APIs) for XMC MCU peripherals

System	Timer/PWM	Analog-mixed Signal	Communication	Application specific
• DMA • ERU • FCE • FLASH • GPIO • MATH • PAU • PRNG • RTC • SCU • WDT	• CCU4 • CCU8 • HRPWM • POSIF	• ACMP • ADC • DAC	• CAN • I2C • SPI • UART • USB • USIC	• BCCU • LEDTS • MATH • POSIF • HRPWM

XMC APPs

Graphical User Interface (GUI) configurable application oriented software components using XMC Lib (Low Level Driver); arranged in a library (APIs)

General Purpose

- ADC_MEASUREMENT
- ADC_QUEUE
- ADC_SCAN
- CAN_NODE
- CAPTURE
- CLOCK
- COUNTER
- CRC_HW
- CRC_SW
- CRYPTO_AES
- DAC
- DAC_BCCU
- DAC_LUT
- DAC_SWEEP
- DBG_PIN
- DMA_CH
- E_EEPROM
- EVENT_DETECT
- EVENT_GEN
- EXT_INTERRUPT
- GPIO
- INTERRUPT
- IO_PORT
- PRNG_HW
- PWM
- PWM_BC
- PWM_CCU4
- PWM_CCU8
- PWM_SVM
- RTC
- SYSTIMER
- TEMPERATURE
- TIMER
- WATCHDOG

Application specific

Motor Control
- ACIM_FOC
- ACIM_FREQ_CTRL
- BLDC_SCALAR_CTRL
- MOTOR_LIB
- PMSM_FOC
- PMSM_SCALAR_CTRL
- QUAD_ENC_POSIF
- RESOLVER

Power Conversion
- BUCK_CONVERTER
- CURRENTCTRL
- HRPWM
- POWER_MGMT

Lighting
- PDM_BCCU

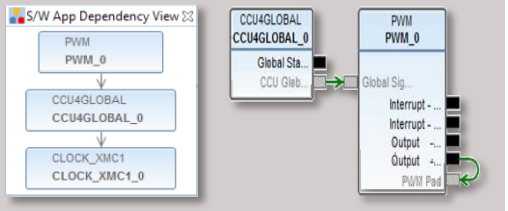
And many more …

- DALI_CD
- DALI_CG
- DISPLAY_14SEG
- DISPLAY_7SEG
- FTP
- GUI_KeyBoard
- GUI_LCD
- GUI_Mouse
- GUI_SeggerLib
- HALL_POSIF
- HTTP
- I2C_MASTER
- I2C_SLAVE
- LED_LAMP
- LED_MATRIX
- MANCHESTER_SW
- MODBUS
- RTOS
- SNMP
- SP_MASTER
- SPI_SLAVE
- TOUCH_BUTTONS
- TOUCH_PAD
- TOUCH_SLIDER
- TOUCH_WHEEL
- UART
- USBD
- USBD_HID
- USBD_MS
- USBD_VCOM
- USBD_WINUSB
- USBH
- USBH_HID

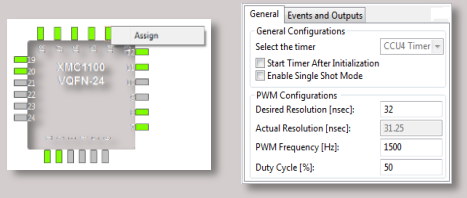
DAVE™ EXAMPLES

XMC Lib (Low Level Driver for XMC MCUs) and DAVE™ APPs composed to applications

DAVE™

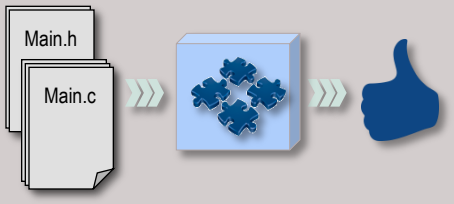


Component based programming 1

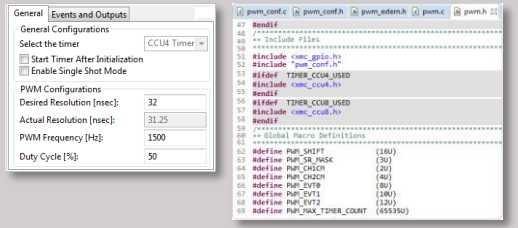


GUI based configuration 2

Code repository 3



Hardware resource manager 4



Code generation 5

Released for
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- IAR Systems
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TASKING
atollic
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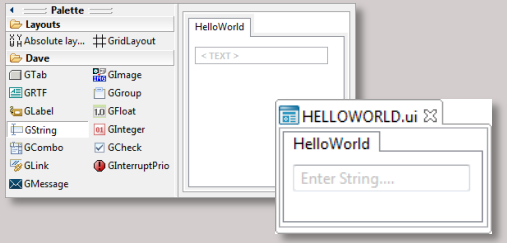
IAR SYSTEMS

Support 3rd party tools 6

- FAQ
- FORUM
- Knowledge Base
- eMAIL: dave@infineon.com

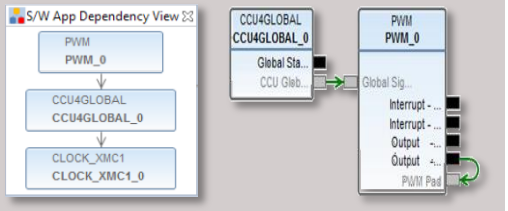
Expert support 7



DAVE™ SDK 8

Free of charge 9

DAVE™



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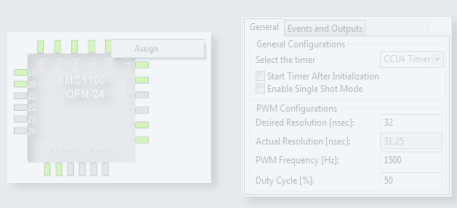

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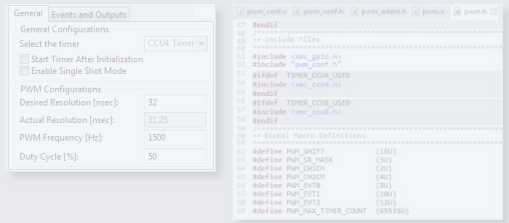

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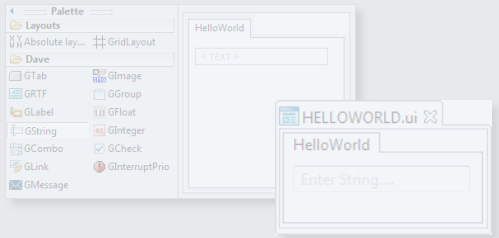

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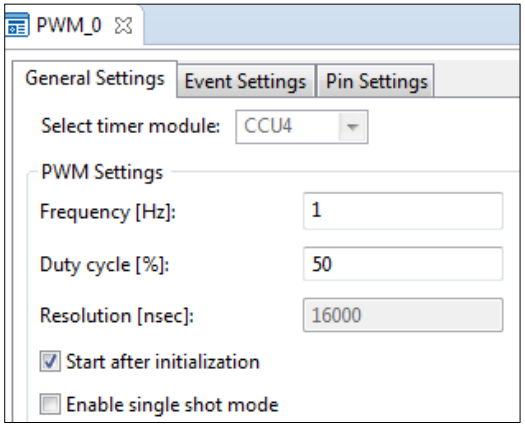
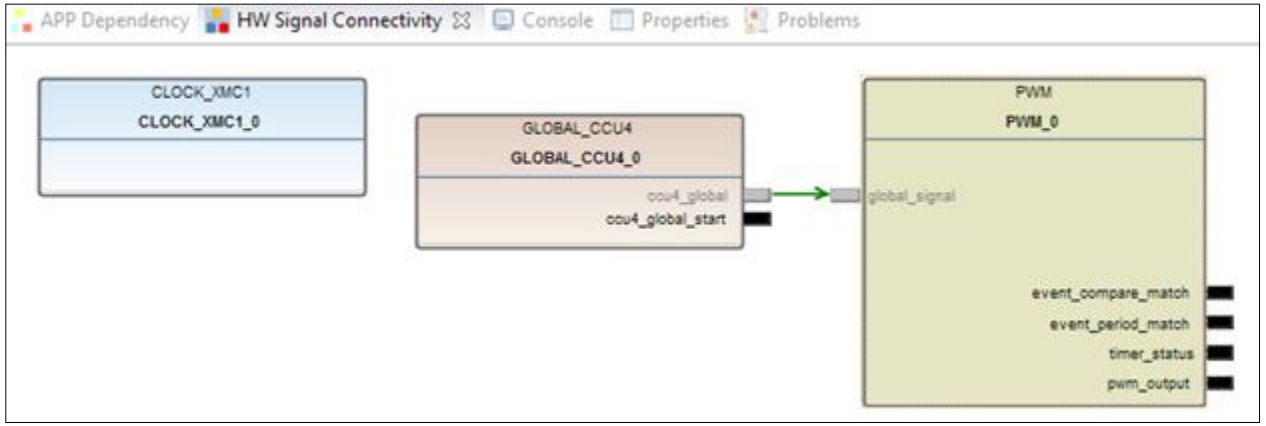
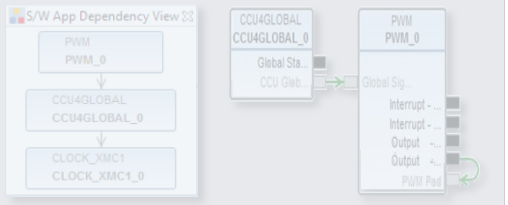
DAVE™
Component Based Programming

- Build application with use-case oriented, reusable software components DAVE™ APPs
- Configure DAVE™ APPs and connect hardware signals with graphical user interface
- APIs of the XMC Lib can be used with DAVE™ APPs for full flexibility of peripherals and connectivity





DAVE™



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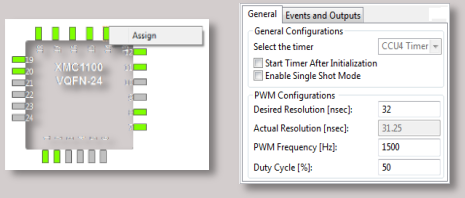
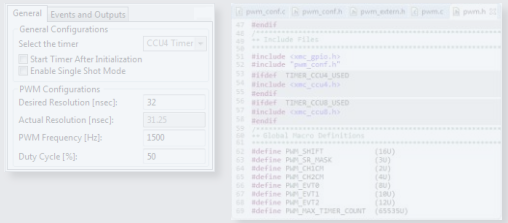


GUI based configuration 2

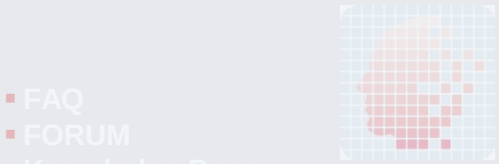
Code repository 3

Hardware resource manager 4



Code generation 5

Support 3rd party tools 6



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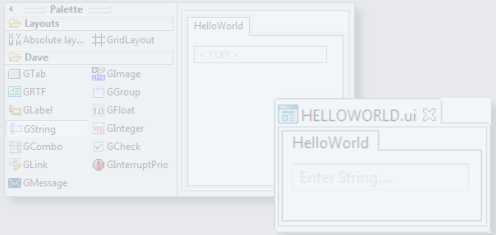

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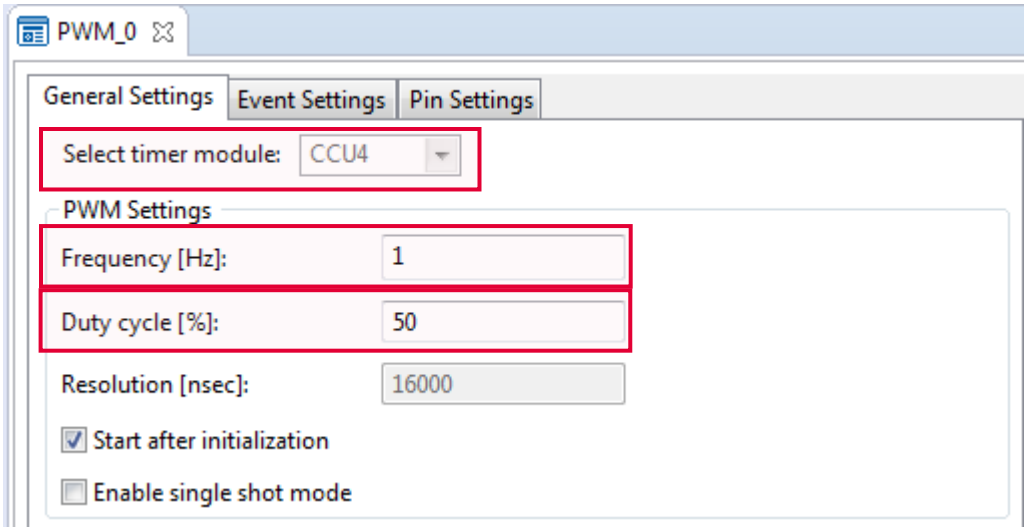
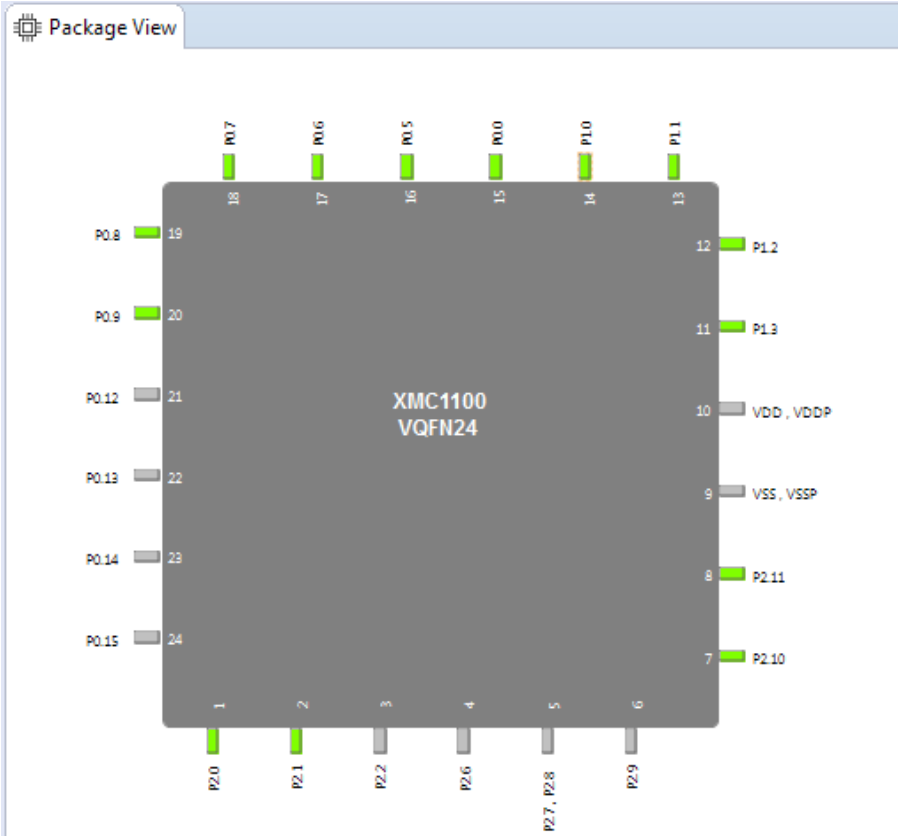
DAVE™
GUI Based Configuration (1/2)

- An application use case can be configured quickly with a graphical user interface
  - Example: Configure timer, frequency and duty cycle to generate PWM waveform with PWM APP



DAVE™
GUI Based Configuration (2/2)

- Graphical pin mapping
  - Pin package represented in a graphical view
  - Assign signal to one of the possible pins marked in green



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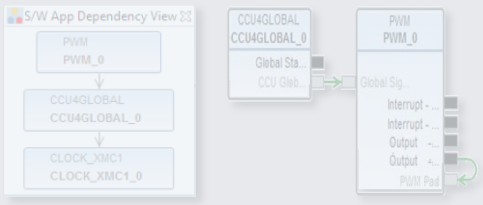

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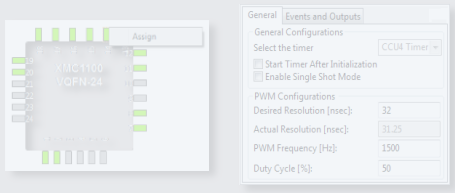
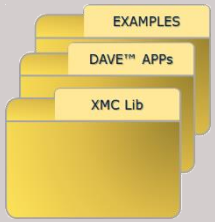
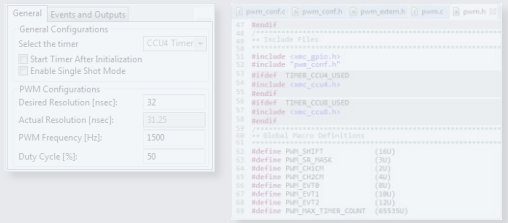


GUI based configuration 2



Code repository 3

Hardware resource manager 4



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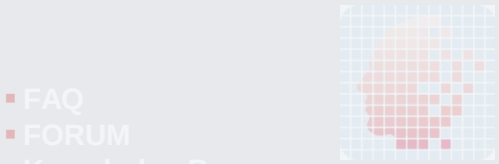
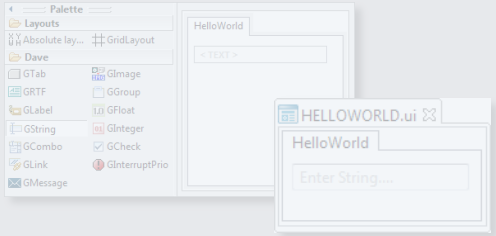


Expert support 7



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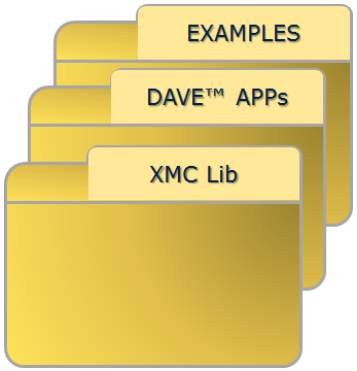
DAVE™
Code Repository

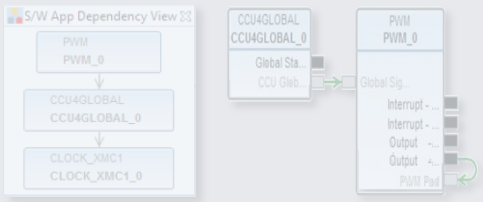
- Access to free code libraries
  - DAVE™ APPs
  - EXAMPLES
  - XMC Lib (Low Level Driver)



- Customizable for specific application or use case

- Get new APPs releases and updates with one-click update in DAVE™ IDE

DAVE™



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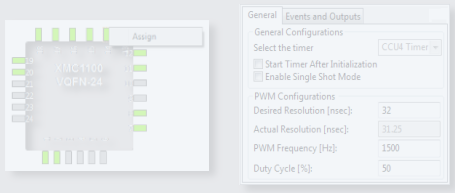
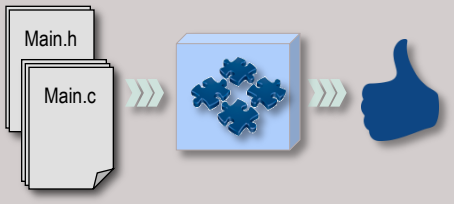
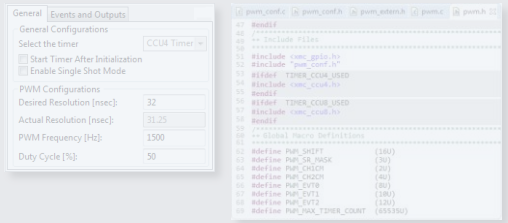


GUI based configuration 2

Code repository 3



Hardware resource manager 4



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TASKING
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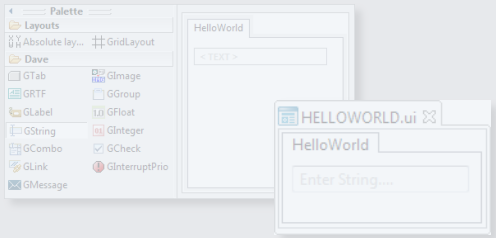
- eMAIL: dave@infineon.com

Expert support 7



DAVE™ SDK 8

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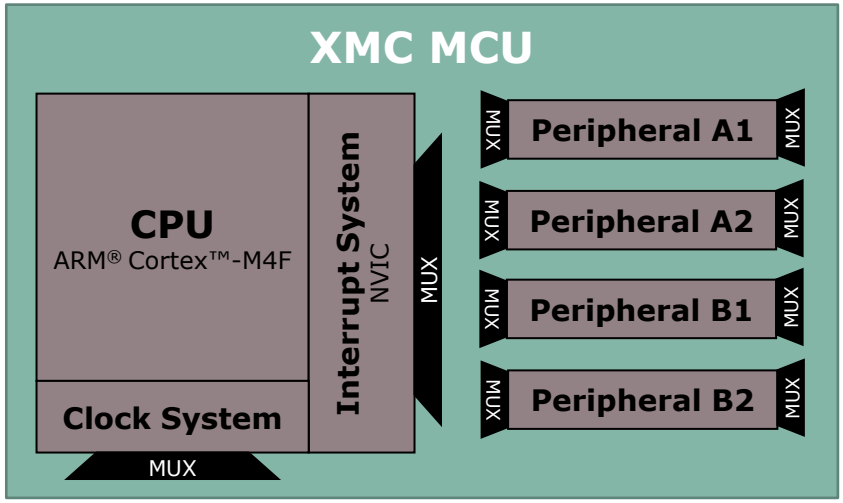
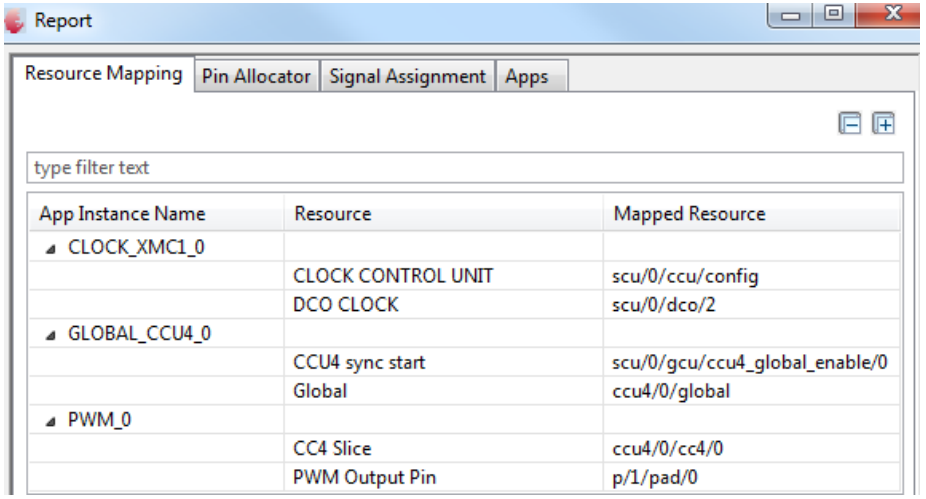
DAVE™
Hardware Resources Manager

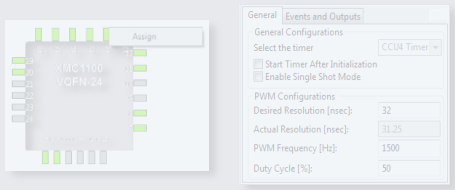
- Resource solver manages chip hardware resources
  - Signal connections
  - Pin constraints
- Automatically maps DAVE™ APPs to real peripherals and determines the right multiplexer settings
- Automatically maps signal to pin (solver assigned pins)





DAVE™

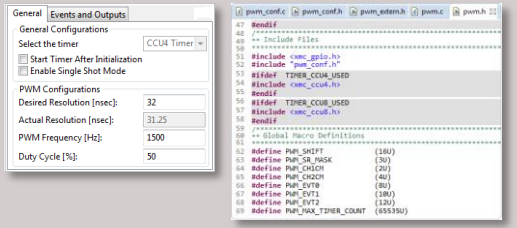
Component based programming 1



GUI based configuration 2

Code repository 3

Hardware resource manager 4



Code generation 5

Support 3rd party tools 6

- FAQ
- FORUM
- Knowledge Base
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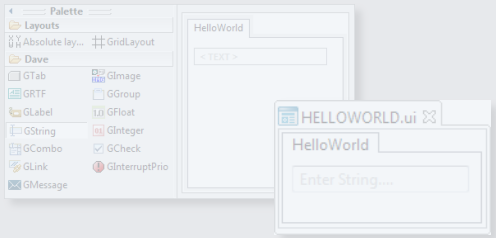
Expert support 7



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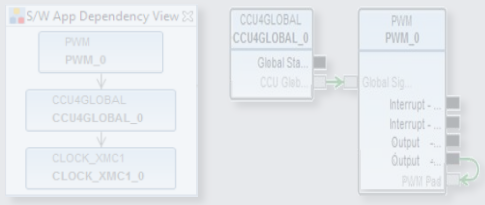
DAVE™
Code Generation

- Automatic code generation in a single click 
- Generate code based on DAVE™ APPs configuration
- More efficient and readable code based on XMC Lib
- Use generated code with
  - APIs of XMC Lib in DAVE™
  - 3rd party compiler tools

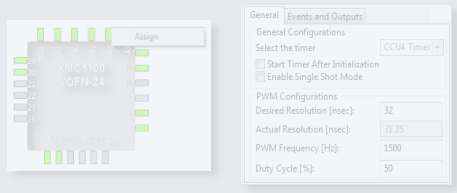
pwm_conf.c | pwm_conf.h | pwm.c | pwm.h

```
 */
typedef enum PWM_TIMER_TYPE
{
  PWM_TIMER_SLICE_CCU4 = 0U,
  PWM_TIMER_SLICE_CCU8
} PWM_TIMER_TYPE_t;

/**
 *   @brief The type identifies the timer status.
 */
typedef enum PWM_TIMER_STATUS
{
  PWM_TIMER_IDLE = 0U,
  PWM_TIMER_RUNNING
} PWM_TIMER_STATUS_t;

/**
 *   @brief The type identifies the timer interrupts.
 */
typedef enum PWM_InterruptType
{
  PWM_PERIODMATCH_INTERRUPT      = 0U,      /**< Period match interrupt while counting up */
  PWM_COMPAREMATCH_INTERRUPT     = 2U       /**< Compare match interrupt while counting up */
} PWM_InterruptType_t;

/**
 *   @brief The type identifies the timer interrupts.
 */
typedef enum PWM_OutputPassiveLevelType
{
  PWM_OUTPUT_PASSIVE_LEVEL_LOW  = 0, /**< Passive level = Low */
  PWM_OUTPUT_PASSIVE_LEVEL_HIGH    , /**< Passive level = High */
  PWM_OUTPUT_PASSIVE_LEVEL_MAX
} PWM_OutputPassiveLevelType_t;

```

DAVE™



Component based programming 1



GUI based configuration 2

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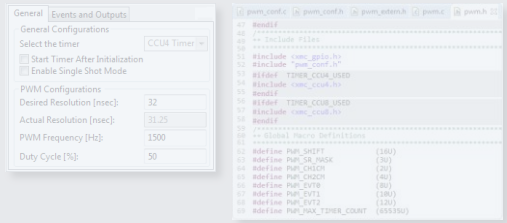
Hardware resource manager 4



Code generation 5

Released for
- Altium Limited
- Atollic
- ARM/KEIL
- IAR Systems
- Rowley Associates

TASKING
atollic
KEIL Tools by ARM
IAR SYSTEMS

Support 3rd party tools 6

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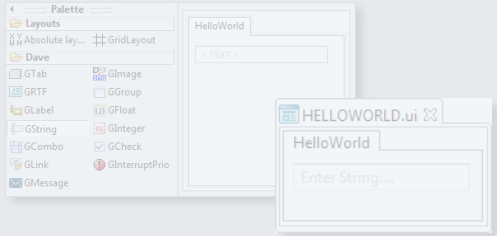
Expert support 7



DAVE™ SDK 8

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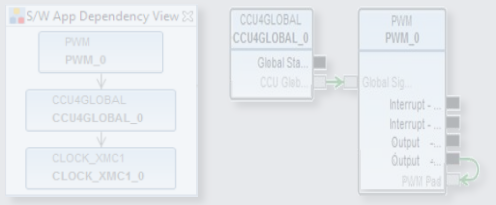
DAVE™
Support 3rd Party Tools

- Interface to third party and commercial tools
- XMC Lib can be used independent of DAVE™ or DAVE™ APPs with 3rd party tools
- Easy import of DAVE™ generated code to 3rd party tools

DAVE™



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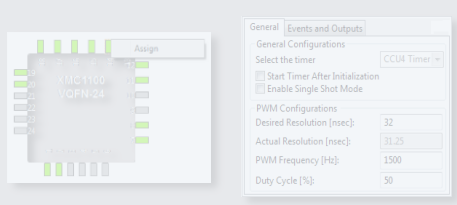

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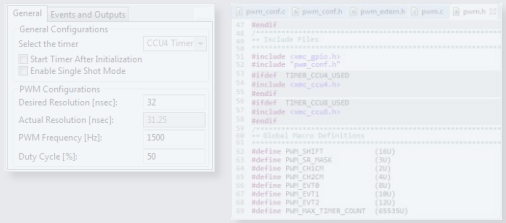

Code generation 5

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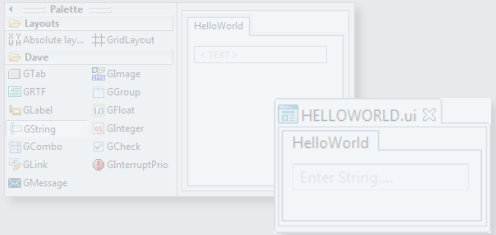

DAVE™ SDK 8

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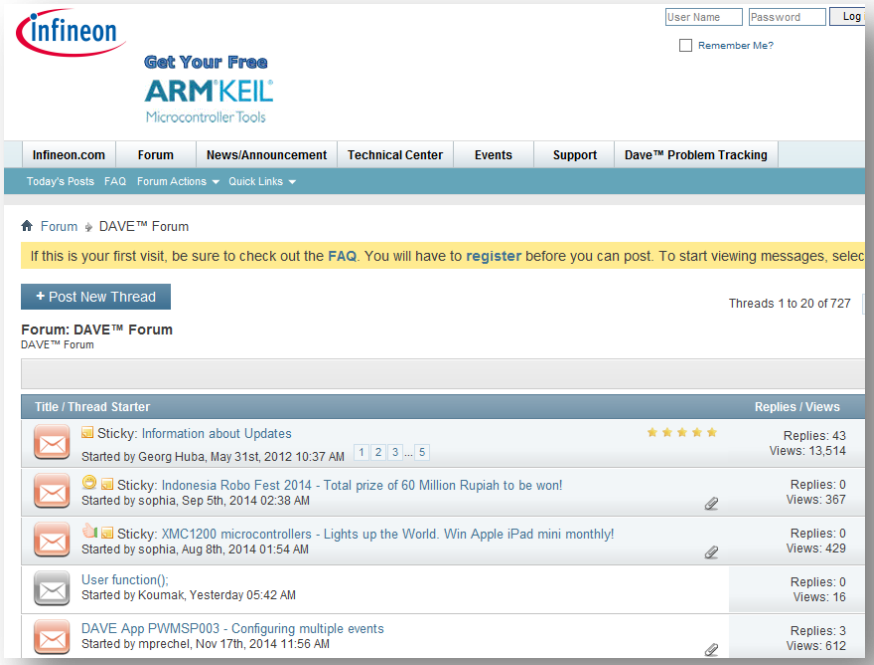
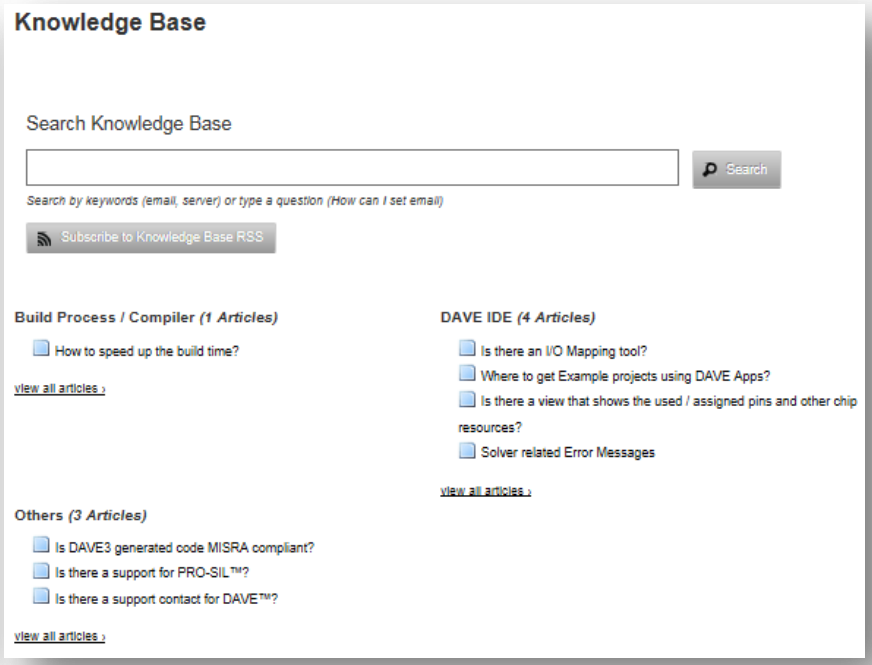
DAVE™
Expert Support

- Easy access to DAVE™ technical support, downloads and information updates

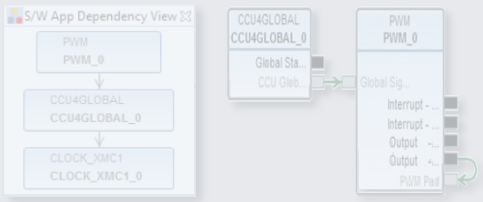


DAVE™ Forum

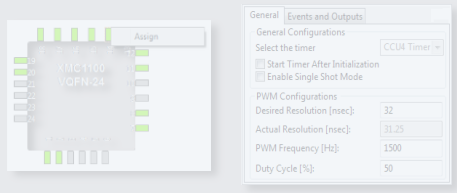


Knowledge Base

DAVE™



Component based programming 1



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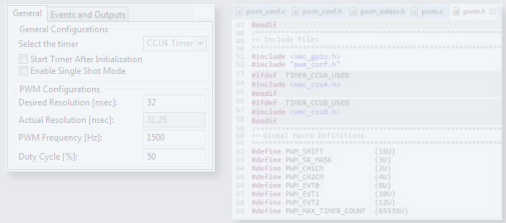
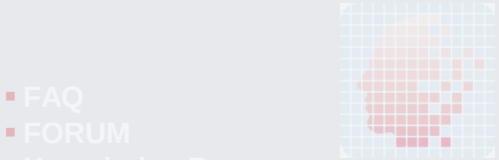


Code generation 5

Support 3rd party tools 6



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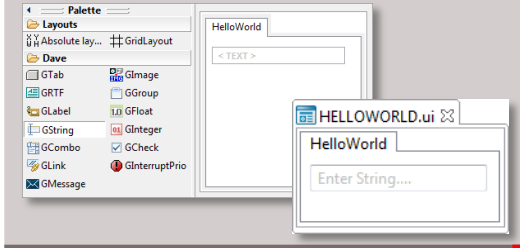

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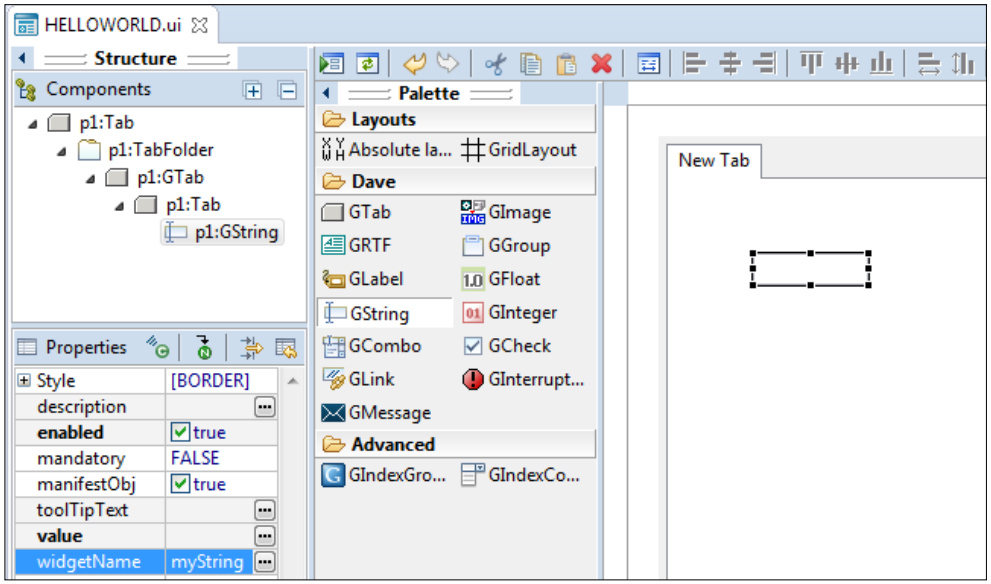
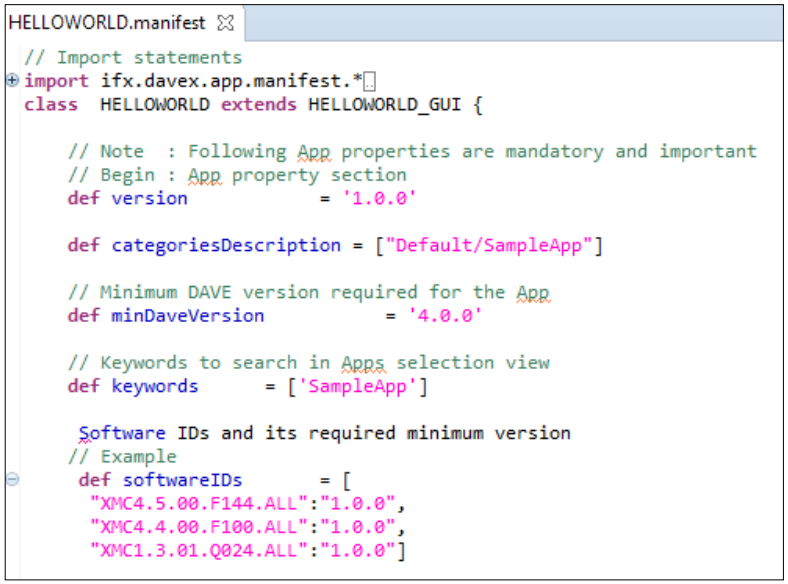
DAVE™ SDK

- Develop new DAVE™ APPs or modify DAVE™ APPs
- GUI designer with drag and drop functionality
- Professional software editor with syntax highlights and completion functions for efficient coding
- Debugging features

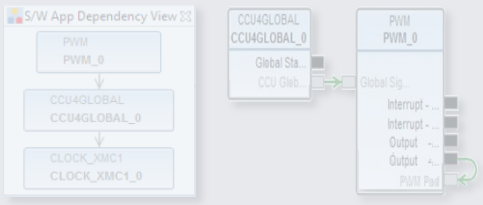


GUI designer

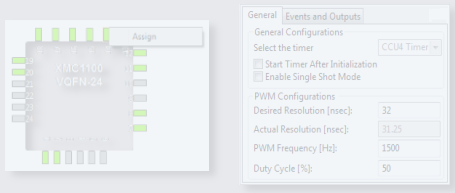


Software editor

DAVE™



Component based programming 1



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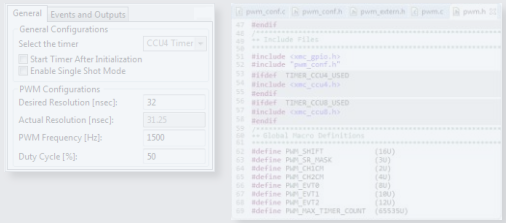

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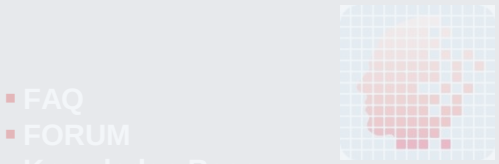

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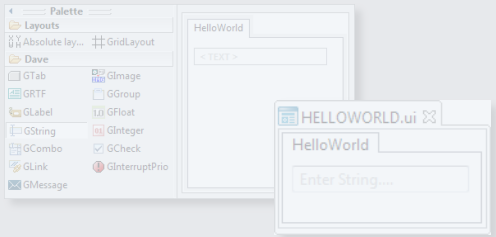

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DAVE™
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- Download DAVE™ for free

  www.infineon.com/DAVE
- Download package includes DAVE™ v4.0.0 and DAVE™ SDK v4.0.0

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