Migrate STM32F2/F4 Device Family Pack 1.x to 2.x

Application Note

AN269, October 2014, v1.0

ARM KEIL Microcontroller Tools

Abstract

Keil Middleware Version 6.0 relies on CMSIS-Driver API 2.0. It is required that you upgrade to STM32F2 or F4 Device Family Packs (DFPs) version 2.x or higher. These DFPs will require a number of changes in your existing project.

The new DFPs are based on the STM32CubeFx firmware package from STMicroelectronics without any changes to the directory structure or individual files. In addition, there is an MDK folder that contains a set of example projects and template files, as well as the CMSIS folder containing Flash Programming Algorithms, CMSIS-Driver and CMSIS-SVD files.

This application note describes the differences to version 1.x DFPs and provides guidance on how to update existing projects. When creating new projects or running readymade examples projects from the new DFPs, none of the described updates are required.

Contents

Prerequisites

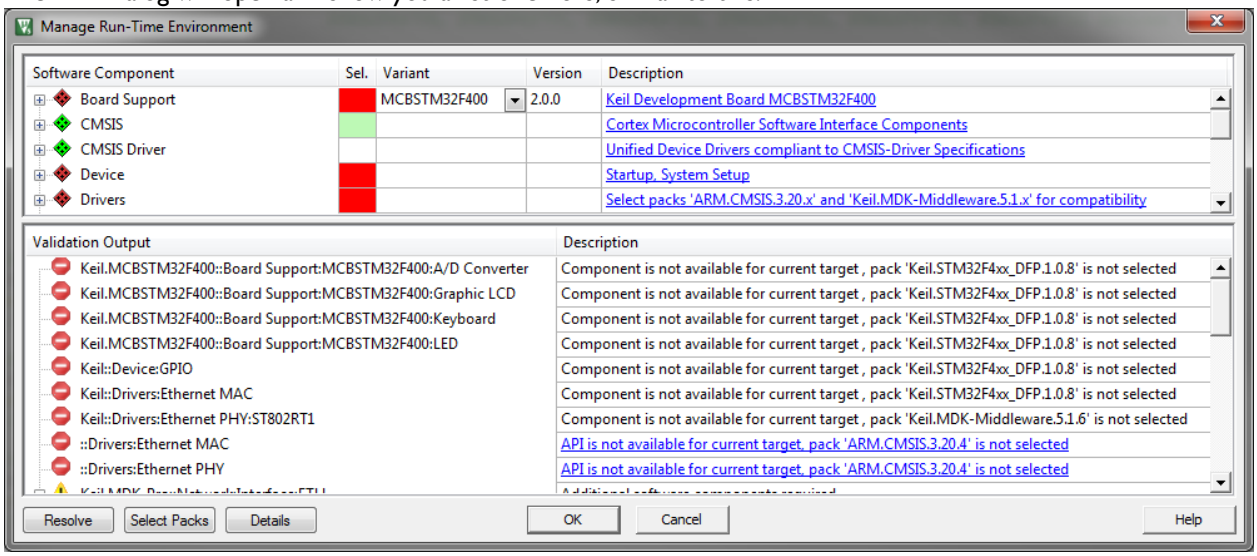
This application note assumes that you have MDK v5.12 or higher installed, that you are using one of the STM32F4 or STM32F2 DFPs in your project and that your current project is configured correctly, builds and runs on your target.

The following or higher versions of Software Packs must be installed using the PackInstaller:

- ARM.CMSIS.**4.2.0** (installed with MDK v5.12 automatically)
- Keil.MDK-Middleware.**6.2.0**
- Keil.STM32F4xx_DFP.**2.2.0**
- Keil.STM32F2xx_DFP.**2.0.0**

Reconfigure the project

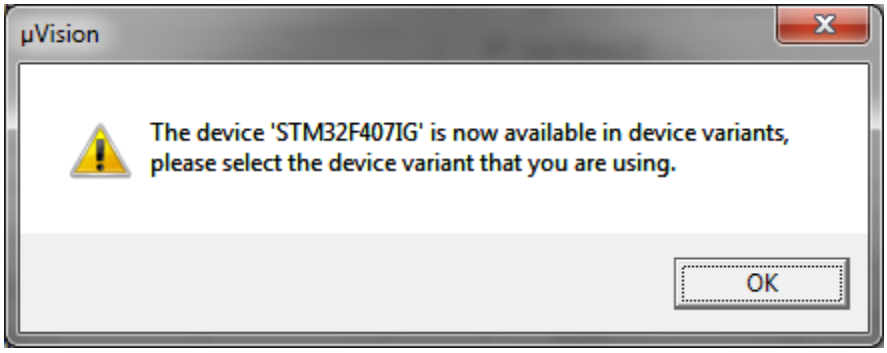
1. After upgrading the STM32F2/F4 DFP to the latest version (2.x+), open your existing project.
2. The RTE dialog will open and show you a list of errors, similar to this:



3. Deselect all components that are marked missing (red).
4. Most of the missing dependencies can now be resolved automatically by pressing “Resolve”. Resolve the remaining issues manually.
5. In case the project uses STMicroeletronics’ StdPeriph library drivers for the application directly, please select the according new components from the STM32Cube HAL. For necessary changes to your source code please refer the the STM32Cube API documentation. Some APIs are not compatible to the StdPeriph variant. The **Error! Reference source not found.** section of this documentation gives additional guidance to map StdPeriph library drivers to the STM32Cube variant.
6. Close the RTE Management dialog by clicking **Ok**.

The device names have been changed to match the device selection done by Cube MX for consistency. For example, STM32F407IG now becomes either STM32F407IG**Hx** or STM32F407IG**Tx.**

7. Open **Project → Options for Target → Device**. Because the device names changed you’ll get a warning.



8. Confirm the warning and select your device from the list shown.
9. Close the Options for Target dialog by clicking **Ok**.

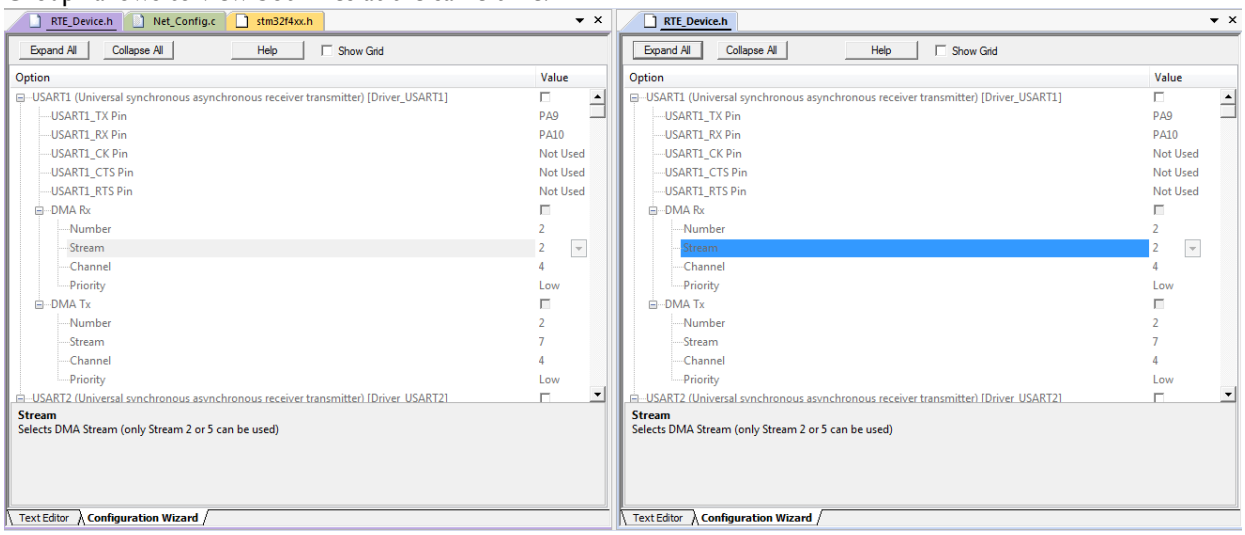
Note:

STM32Cube manuals can be found in the pack installation folder:.\Keil\STM32F4xx_DFP\2.x.x\Documentation.

STM32CubeFxGettingStarted.pdf helps to configure and use Cube components in your application code.

STM32CubeFramework.htm provides details about the specific extension made to Cube for the DFP.

1. Open the **RTE_Device.h** from the Device section in your project. You can open the previous RTE_Device.h from the .\RTE\Device folder in your project folder. It can still be found in the folder with the previous device name.
2. With both files open in the editor, you can easily migrate the old settings to the new RTE_Device.h using the configuration wizard view. Right-Clicking on the editor tab of one both files and clicking "New Vertical Tab Group" allows to view both files at the same time:



3. Repeat this for the startup_stm32xxx.s file.
4. Using the same method, settings of middleware configuration files have to be migrated. The old file version will reside in .\RTE\<Middleware component>\<filename>.0000, where the RTE has created a backup before exchanging the file.

Further Changes

Due to the fact that the Board Support is now based on the Board Interfaces as specified in MDK-Middleware 6.x, both the include file names (e.g. LED.h → Board_LED.h) and the APIs have been modified, you are required to update your application code making references to the Board Support components.

Differences

The Standard Peripheral Library (StdPeriph) contained in the DFPs V1.x has been replaced by the STM32Cube HAL.

Note: DMA, EXTI, FSMC and GPIO are taken automatically based on dependencies.

Driver	DFP 1.x	DFP 2.x
Analog to Digital Converter	ADC	ADC
Controller Area Network	CAN	CAN
CRC calculation unit	CRC	CRC
Cryptographic	CRYP	N/A
Common HAL driver	(Framework)	Common
Cortex HAL Driver	N/A	Cortex
Digital to Analog Converter	DAC	DAC
MCU debug component	DBGMCU	N/A
Digital Camera Interface	DCMI	DCMI
DMA controller	DMA	DMA
External interrupt/event controller	EXTI	N/A
Ethernet MAC Interface	ETH	ETH
Flexible Static Memory Controller	FSMC	N/A
Embedded Flash Memory	Flash	Flash
Framework	Framework	(Common)
General Purpose I/O	GPIO	GPIO
HASH	HASH	N/A
USB Host Controller	HCD	HCD
Inter-intergrated Circuit	I2C	I2C
Digital Interface	N/A (SPI)	I2S
Infrared Interface	N/A (SPI)	IRDA
Independant Watchdog	IWDG	IWDG
NAND Flash Controller	N/A (FSMC)	NAND
NOR Flash Controller	N/A (FSMC)	NOR
PC Card Controller	N/A	PC Card
USB Peripheral Controller	N/A	PCD
Power Controller	PWR	PWR
Reset and Clock Control	RCC	RCC
Random Number Generator	RNG	RNG
Real-time Clock	RTC	RTC
Secure Digital Interface	SDIO	SDIO
Serial peripheral interface	SPI	SPI
SRAM Controller	N/A (FSMC)	SSRAM
Smartcard	Smartcard	Smartcard
System Configuration Controller	SYSCFG	N/A
Timer	TIM	TIM
Universal asynchronous receiver transmitter	N/A (USART)	UART
Universal synchronous asynchronous receiver transmitter	USART	USART
Window Watchdog	WWDG	WWDG

CMSIS-Driver class names changed from Drivers to CMSIS Drivers

Version 1.x	Version 2.x
Drivers:Ethernet MAC	CMSIS Driver:Ethernet MAC
	CMSIS Driver:Ethernet PHY
Drivers:I2C	CMSIS Driver:I2C
Drivers:MCI	CMSIS Driver:MCI
Drivers:NOR	CMSIS Driver:Flash
Drivers:NAND	CMSIS Driver:NAND
Drivers:SPI	CMSIS Driver:SPI
Drivers:UART	CMSIS Driver:USART
Drivers:USB Device	CMSIS Driver:USB Device
Drivers:USB Host	CMSIS Driver:USB Host

Revision History

- October 2014: Initial Version