Peripheral Driver Library Release Notes

PDL Version 2.1.0

Release Date: July 14, 2016

Thank you for your interest in Cypress Peripheral Driver Library version 2.1.0. This document describes the contents of the release package.

Overview

Cypress provides the Peripheral Driver Library (PDL) v2.1.0 to simplify software development for the FM0+ and FM4 MCU portfolios.

The PDL 2.1.0 release provides the following features and capabilities:

- Drivers for all supported peripherals for the FM0+ and FM4 MCU portfolios.
- The ARM Cortex Microcontroller Software Interface Standard (CMSIS) core access header files from the CMSIS release.
- CMSIS compliant device header files, startup code (platform initialization), linker script, flash loaders, and SVD files for all supported MCU series.
- Board-specific configuration including drivers to support other devices on the board.
- Code Examples demonstrating peripheral functionality for starter kits.
- PDL Application Programming Interface Reference Manual.
- PDL Quick Start guide.

See next table to learn about the new features in PDL 2.1.0.

If you have technical questions, visit www.cypress.com/support for help or contact information.

Updates in PDL 2.1.0

Next are the major updates in this version of PDL:

- Code Examples – PDL now includes ready to use project file for each IDE as a part of every code example, no need to reconfigure.
- Low-level programming – Preconfigured project file for each IDE provided for every device package (just the PDL must be linked to the project, see Quick Start Guide).
- IDE Support:
    - Updated to Keil µVision v 5.18.
    - Added support for iSYSTEM winIDEA v9.12, Atollic TrueSTUDIO v5.5, and Makefile support with GCC from ARM Embedded.
- Documentation:
    - Includes overview and setup information for each peripheral.
    - Enhanced API Reference Guide.
    - Enhanced Quick Start Guide.
- Peripherals – See Supported Peripheral Drivers and Driver Updates.

- Device support – Now CMSIS v4.5 compliant dedicated device header file and startup code for every device package; no longer monolithic, no need to use #ifdef to configure PDL for a particular series and package.
- pdl_device.h – No longer used.

NOTE: PDL 2.1.0 does not currently support the FM3 MCU portfolio. To develop firmware for the FM3 MCU portfolio, use version v2.0.x available through the PDL product page.

Supported Peripheral Drivers and Driver Updates

The PDL provides a high-level API to configure, initialize, and use a peripheral driver. The PDL also provides numerous code examples that demonstrate how to use the peripherals. The PDL includes all the necessary startup code for each supported device.

There were many common improvements made to all drivers in this release for all the drivers. These include:

- Updated Doxygen comments to enhance driver description in the API reference manual
- Applied const qualifier to the configuration structure parameter for the Init() function for all drivers to allow passing both const (flash) and RAM variables as function arguments.

Driver	Version	Description	Updates
ADC	1.20	12 bit ADC	Corrected '*declaration does not declare anything*' and '*variable may be used uninitialized in a function'* warning for GCC. Corrected a typo in 8RangeComapreChannel struct member name. The correct name is 8RangeCompareChannel.
BT	1.20	Base Timer	Corrected '*declaration does not declare anything*' and '*variable may be used uninitialized in a function'* warning for GCC.
CAN	1.30	Control Area Network (CAN)	Corrected a problem when the Can_SetTransmitMsgBuffer() function could occasionally resend last message.
CANFD	1.20	CAN with Flexible Data Rate	None except common for all drivers.
CLK	1.20	Clock	None except common for all drivers.
CRC	1.20	Cyclic Redundancy Check	None except common for all drivers.
CR	1.20	Clock Rate High Speed Trimming	None except common for all drivers.
CSV	1.20	Clock Supervisor	None except common for all drivers.
DAC	1.20	Digital Analog Converter	None except common for all drivers.
DMA	1.20	Direct Memory Access	Corrected a typo in enTransferWdith function declaration. The correct name is enTransferWidth.
DT	1.20	Dual Timer	Corrected '*missing braces initialization*' warning for GCC.
DSTC	1.40	Descriptor System Data Transfer Controller	None except common for all drivers.
EXINT	1.30	External Interrupt	None except common for all drivers.
EXTIF	1.50	External Bus Interface	None except common for all drivers.
FLASH	1.20	Flash Memory	None except common for all drivers.
GPIO	1.20	I/O Port	Corrected '*missing braces initialization*' warning for GCC.
HBIF	1.20	Hyper Bus Interface	None except common for all drivers.
HSSPI	1.20	High Speed Quad SPI	None except common for all drivers.
I2CS	1.20	I2C Slave	None except common for all drivers.

Driver	Version	Description	Updates
I2S	1.20	Inter-IC Sound	None except common for all drivers.
I2SL			Removed I2SL (the same functionality is in I2S).
ICC	1.20	Smart Card Interface	None except common for all drivers.
LCD	1.20	Segment LCD Controller	None except common for all drivers.
LPM	1.30	Low Power Consumption Mode	None except common for all drivers.
LVD	1.20	Low Voltage Detection	Corrected '*unused variable*' warning for GCC.
MFS	1.20	Multi-Functional Serial Interface	Corrected '*missing braces initialization*' warning for GCC.
MFT	1.20	Multi-Functional Timer	Corrected '*missing braces initialization*' and '*variable may be used uninitialized in a function*' warning for GCC. Corrected a typo in Mft_Wfg_NzclClrAnalogFilterIrqFlag() function declaration. The correct name is Mft_Wfg_Nzcl_ClrAnalogFilterIrqFlag(). Corrected a typo in Mft_Wfg_Nzcl_SwTiggerDtif() function declaration. The correct name is Mft_Wfg_Nzcl_SwTriggerDtif().
PCRC	1.20	Programmable Cyclic Redundancy Check	None except common for all drivers.
PPG	1.20	Programmable Pulse Generator	None except common for all drivers.
QPRC	1.20	Quad Decoder and Position/Revolution Counter	None except common for all drivers.
RC	1.20	HDMI-CEC/Remote Control Reception/Transmission	Corrected '*variable may be used uninitialized in a function'* warning for GCC.
RESET	1.20	Reset	None except common for all drivers.
RTC	1.20	Real Time Clock	Corrected condition to see if an RTC is running before initialization procedure. Corrected '*missing braces initialization* 'warning for GCC.
SDIF	1.20	SD Card Interface	Corrected a typo in Sdif_DisableNomralIrq() function declaration. The correct name is Sdif_DisableNormalIrq().
UID	1.20	Unique ID Register	None except common for all drivers.
VBAT	1.20	VBAT Domain	Implemented workaround for Cypress ID 245800 on FM0+ TYPE2 (S6E1B) series. Updated en_clk_current_t enum and Vbat_Init() function to reflect TRM.
WC	1.20	Watch Counter	None except common for all drivers.
WDG	1.20	Watch Dog Timer	None except common for all drivers.

Supported Devices

This release supports Cypress FM0+ and FM4 devices as listed in the following table.

MCU Portfolio	MCU Series	Supported Package
FM0+	S6E1A	s6e1a1xb, s6e1a1xc
	S6E1B	s6e1b3xe, s6e1b3xf, s6e1b3xg, s6e1b8xe, s6e1b8xf, s6e1b8xg
	S6E1C	s6e1c1xb, s6e1c1xc, s6e1c1xd, s6e1c3xb, s6e1c3xc, s6e1c3xd
FM4	MB9BFx6xM/N/R	mb9bf16xm, mb9bf16xn, mb9bf16xr, mb9bf36xm, mb9bf36xn, mb9bf36xr, mb9bf46xm, mb9bf46xn, mb9bf46xr, mb9bf56xm, mb9bf56xn, mb9bf56xr
	MB9BFx6xK/L	mb9bf16xk, mb9bf16xl, mb9bf36xk, mb9bf36xl, mb9bf46xk, mb9bf46xl, mb9bf56xk, mb9bf56xl

MCU Portfolio	MCU Series	Supported Package
	S6E2C	s6e2c1xh, s6e2c1xj, s6e2c1xl, s6e2c2xh, s6e2c2xj, s6e2c2xl, s6e2c3xh, s6e2c3xj, s6e2c3xl, s6e2c4xh, s6e2c4xj, s6e2c4xl, s6e2c5xh, s6e2c5xj, s6e2c5xl, s6e2ccxh, s6e2ccxj, s6e2ccxl
	S6E2D	s6e2d3xg, s6e2d3xj, s6e2d5xg, s6e2d5xj, s6e2dfxg, s6e2dfxj, s6e2dhxg, s6e2dhxj
	S6E2G	s6e2g2xh, s6e2g2xj, s6e2g3xh, s6e2g3xj, s6e2ghxh, s6e2ghxj, s6e2gkxh, s6e2gkxj, s6e2gmxh, s6e2gmxj
	S6E2H	s6e2h1xe, s6e2h1xf, s6e2h1xg, s6e2h4xe, s6e2h4xf, s6e2h4xg, s6e2hexe, s6e2hexf, s6e2hexg, s6e2hgxe, s6e2hgxf, s6e2hgxg

Supported Toolchains

- IAR Embedded Workbench for ARM 7.50
- Keil Embedded Development Tools for ARM 5.17
- GCC ARM Embedded 4.9-2015-q1-update
- Atollic TrueSTUDIO 5.5.2
- iSYSTEM winIDEA 9.12

Release Contents

The PDL is organized into several folders. The following table shows the PDL folder structure.

Path\Folder	Description
cmsis	CMSIS core access headers
devices	Device header files, startup code, linker files, flash loader implementation, the CMSIS SVD file, and platform drivers for each device series. Preconfigured project files for each supported IDE.
doc	PDL documentation
driver	Driver source code and headers
example	Example code for each supported kit
utilities	Various utility files

Updates

Check the Cypress PDL product page for the latest software and documentation.

PDL 2.1.0 Limitations

1. Atollic TrueSTUDIO relies on GDB server for debugging. Some debug probes, such as SEGGER J-LINK, do not support flash programming for all available FM device series. If your device is not supported, you can manually download an application image to the board using a standalone flash programmer. Refer to the PDL Quick Start Guide for more information.

PDL 2.1.0 Known Defects

	Defect	Work Around
1.	A call to Mfs_I2c_GetStatus() after calling Mfs_I2c_ConfigAck() may not return, and the application will hang. [239460].	Set the IBCR register directly using pstcI2c->IBCR with read-modify-write instead of calling Mfs_I2c_ConfigAck() if you observe the problem.

Documentation

PDL Quick Start Guide and API Reference Manual are located in the `/doc` subdirectory of the PDL installation directory. The default location is:

Documents/Cypress/ PDL <version>

Technical Support

For assistance, go to http://www.cypress.com/support or contact our customer support at +1 (800) 541-4736 Ext. 2 (in the USA), or +1 (408) 943-2600 (International).

Additional Information

Technical Reference Manuals

- FM0+ Family of 32-bit ARM® Cortex®-M0+ Microcontrollers Peripheral Manuals (TRM)
- FM4 Family of 32-bit ARM® Cortex®-M0+ Microcontrollers Peripheral Manuals (TRM)

Application Notes

- AN202487 - Differences Among FM0+, FM3, and FM4 32-Bit Microcontrollers
- AN211122 - Getting Started with FM4 Development
- AN210985 - Getting Started with FM0+ Development

Development Kits/Boards

- FM4-176L-S6E2GM - ARM® Cortex®-M4 MCU Pioneer Kit with Ethernet and USB Host
- FM4-176L-S6E2DH - ARM® Cortex®-M4 FM4 Graphics MCU Starter Kit with WQVGA TFT Display
- FM4-176L-S6E2CC-ETH - ARM® Cortex®-M4 MCU Starter Kit with Ethernet and USB Host
- FM4-120L-S6E2HG FM4 S6E2H-Series Starter Kit
- FM4-U120-9B560 - ARM® Cortex®-M4 MCU Starter Kit with USB and CMSIS-DAP
- FM0-64L-S6E1C3 - ARM® Cortex®-M0+ MCU Starter Kit with USB and Digital Audio Interface
- FM0-100L-S6E1B8 - ARM® Cortex®-M0+ MCU Starter Kit with USB and SD Card Interface

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