PSoC® Creator™ Release Notes

Version 3.0

PSoC Creator 3.0 is a major upgrade from previous releases. It adds the following features:

- Updated GCC ARM Compiler with Smaller Code Footprint
- Better Code Development Experience
- Easier Design/Configuration
- Support for new third-party IDEs
- Updates to the PSoC Creator Framework
- Improved Ease-of-Use / Learning

Also note that as of this release, the PSoC 5 device is no longer supported, and has been replaced by the PSoC 5LP device. PSoC 5 to PSoC 5LP Mapping.

This production-quality release does not replace existing installations of PSoC Creator (e.g., 2.2 or 2.1); it installs alongside them. This enables you to move designs to the new version at your own pace. We guarantee that your existing designs can be opened in the new software, but please upgrade your components to the latest version. To ensure that you can always return to your previous setup, a backup of your project is automatically created when opening a project in a new version of the tool. It is stored in a folder named “backup” in the project’s folder.

If you have technical questions, visit www.cypress.com/go/support or call 1-800-541-4736 and select 8.

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New Features

Updated Compiler with Smaller Code Footprint

Smaller Code Size

PSoC Creator 3.0 integrates the GCC ARM Embedded version 4.7 compiler including making the Newlib-nano libraries standard. These tools are highly optimized to reduce the generated code size in ARM M-class processors like PSoC 4 and PSoC 5LP.

CMSIS v3.20 Core Peripheral Library

This release updates the CMSIS core library shipped with PSoC Creator and, by default, included in ARM projects.

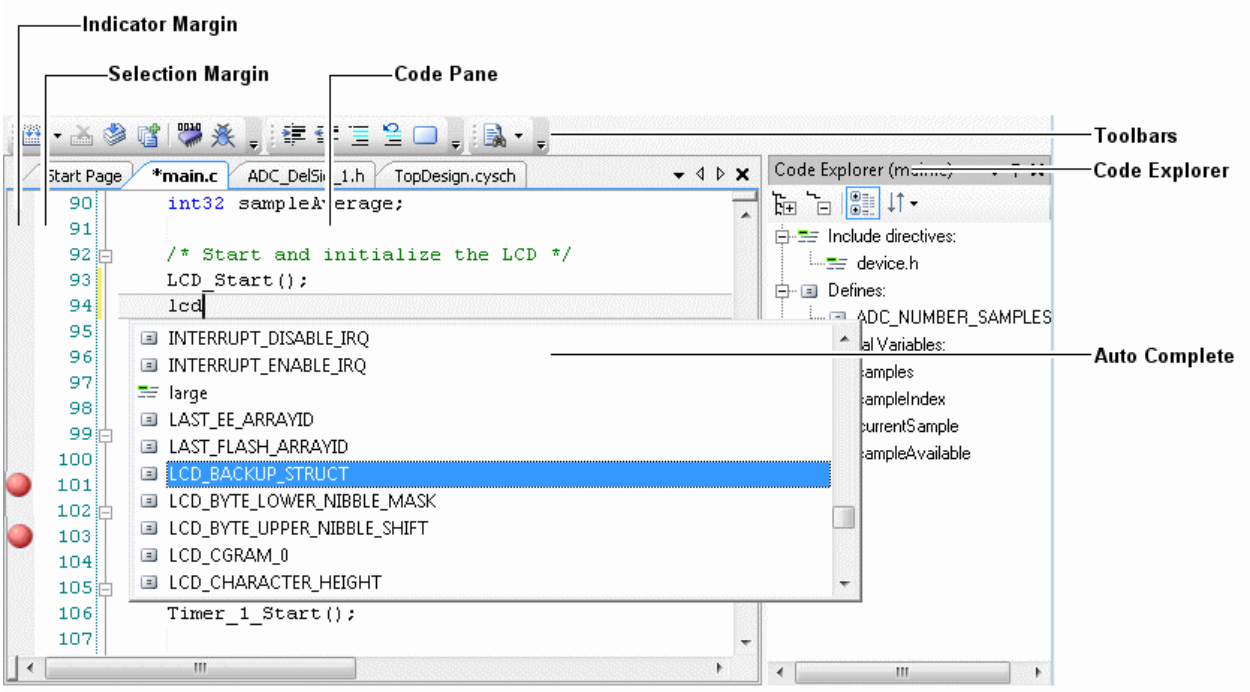
The previously-shipped CMSIS CPL version was 1.30, which did not strictly support the CMSIS-SVD feature that was added in the PSoC Creator 2.2 release. While there is no functional impact, this is an anomaly that needed to be addressed.

Note Updating to 3.20 will obsolete some of the compilers that were shipped or supported in previous PSoC Creator releases. Those old compilers are no longer supported.

Better Code Development Experience

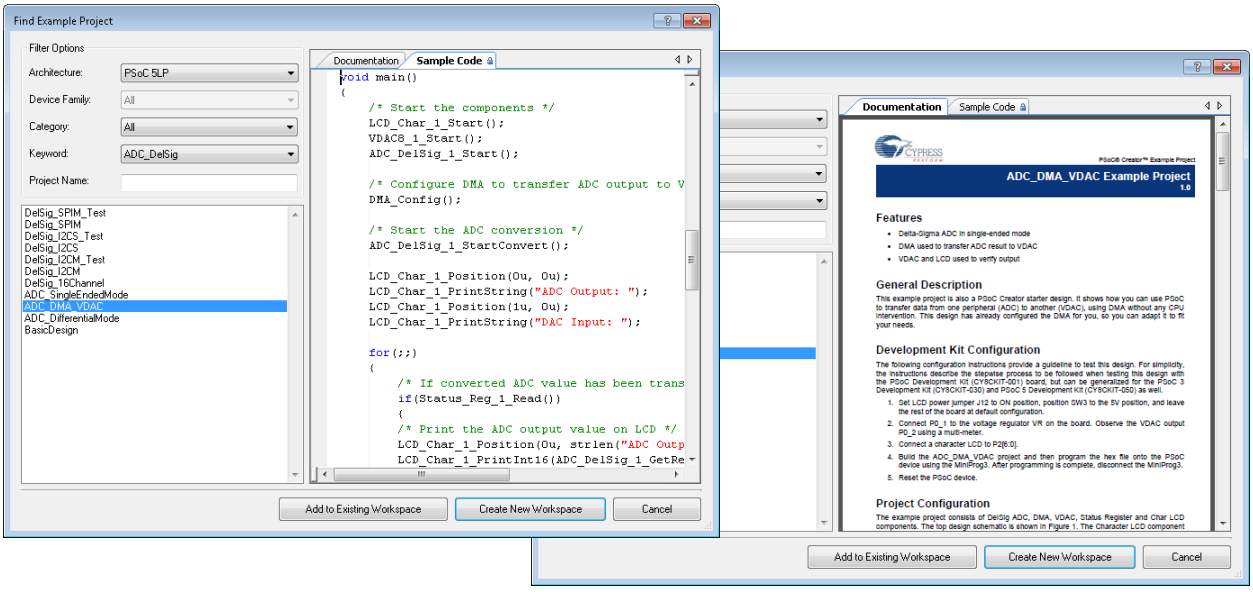
Updated Code Editor

The Code Editor has been updated to support common features such as Auto Complete, Outlining, Indentation, and Go To References.



View Source in Example Finder

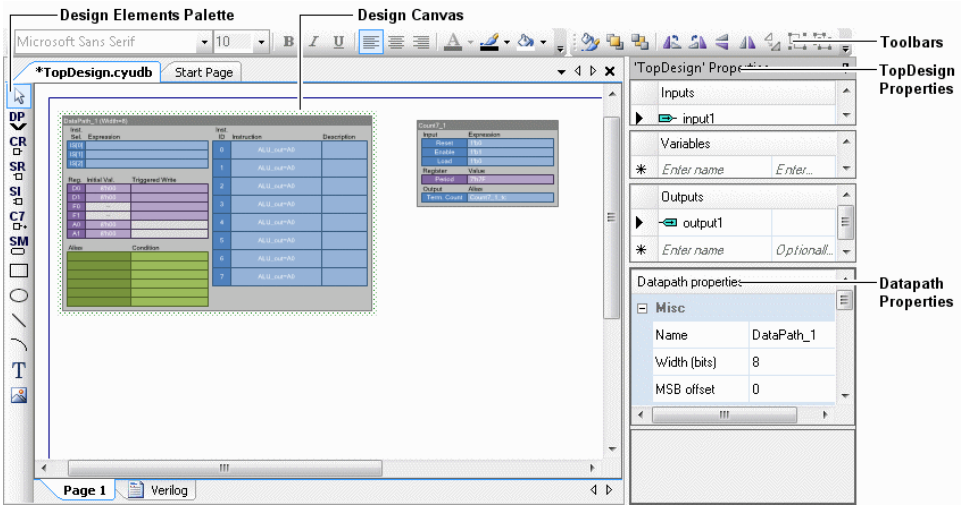
The Find Example Project dialog has been updated to display an example project's *main.c* file. This provides quick access to the C source code without having to create a new project. You can also view the project's documentation.



Easier Design/Configuration

UDB Editor

This release provides the UDB Editor, which is a user-friendly interface to universal digital blocks (UDBs) to help create unique functionality on datapaths and PLDs.



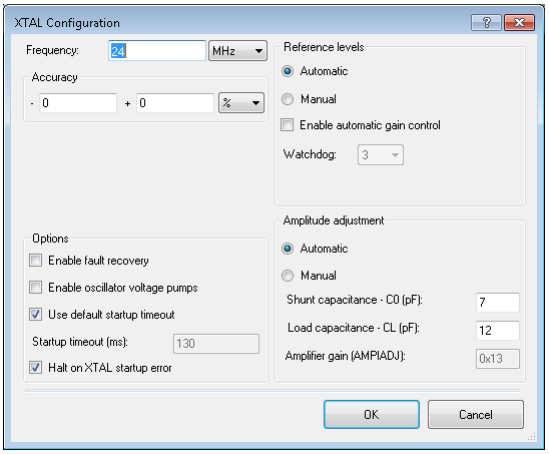
The UDB is an extremely powerful design, but it is not simple to program. The existing Datapath Config Tool is an expert tool (that is still supported) and requires intimate knowledge of the datapath functionality and its registers. The UDB Editor is much easier to use, and will help increase your ability to utilize UDB resources.

Schematic Comments

The Schematic Comments feature allows you to specify a portion of a design to be excluded from the build. Specifically, you can disable (and re-enable) one or more pages in your schematic. This allows you remove sections for testing and debugging, as well as provide different configurations. Access the Disable/Enable Page feature from the right-click menus on the page tabs and schematic white space.

MHz ECO (XTAL) Setup

The XTAL Configuration dialog has been updated so you can manually enter an AMPIADJ value. The dialog also provides visual feedback for the actual values of the calculated reference levels and amplitude current adjustment.



Extended Support for Third-Party Tools and Standards

IAR Integration

This feature enables firmware development on PSoC 5LP and PSoC 4 devices in IAR's Embedded Workbench (EW) for ARM (EW-ARM). This allows you to design the PSoC device in PSoC Creator and the software application in EW.

New Keil Integration

The existing IDE Export function has been replaced by a new implementation that uses the XML-based project import feature being implemented in uVision.

Eclipse Export

This feature enables firmware development on PSoC 5LP and PSoC 4 devices in Eclipse (Juno SR2 and Kepler releases). This feature is similar to the IAR and uVision export functions. It enables firmware development in Eclipse, with the ARM GNU tool chain (including the ARM-optimized newlib-nano C run-time library) and debugging via the Segger J-Link debug probe.

PSoC Creator Import Feature for Eclipse

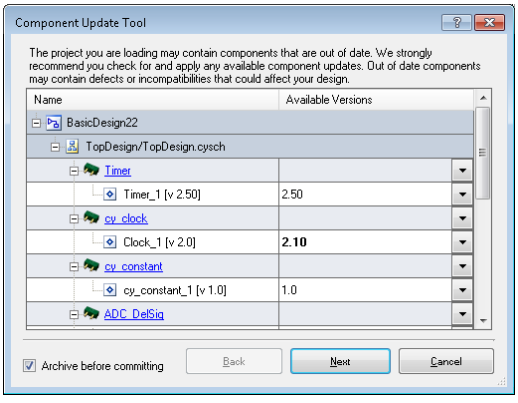
The PSoC Creator Import feature allows you to add files, edit code, and build in Eclipse. However, to enable the ability to debug, you must install an Eclipse plug-in.

Note Eclipse and the debugger plug-in to support ARM and J-Link are not Cypress products. This release supports their use, but you must install them separately from PSoC Creator. In addition, the PSoC Creator Import feature for Eclipse must be downloaded from the Cypress web page. It is not shipped with PSoC Creator. Refer to the *Export a Design to Eclipse IDE* document for more information. The document will open when the export process is complete. It is also a topic in the PSoC Creator Help.

Updates to the PSoC Creator Framework

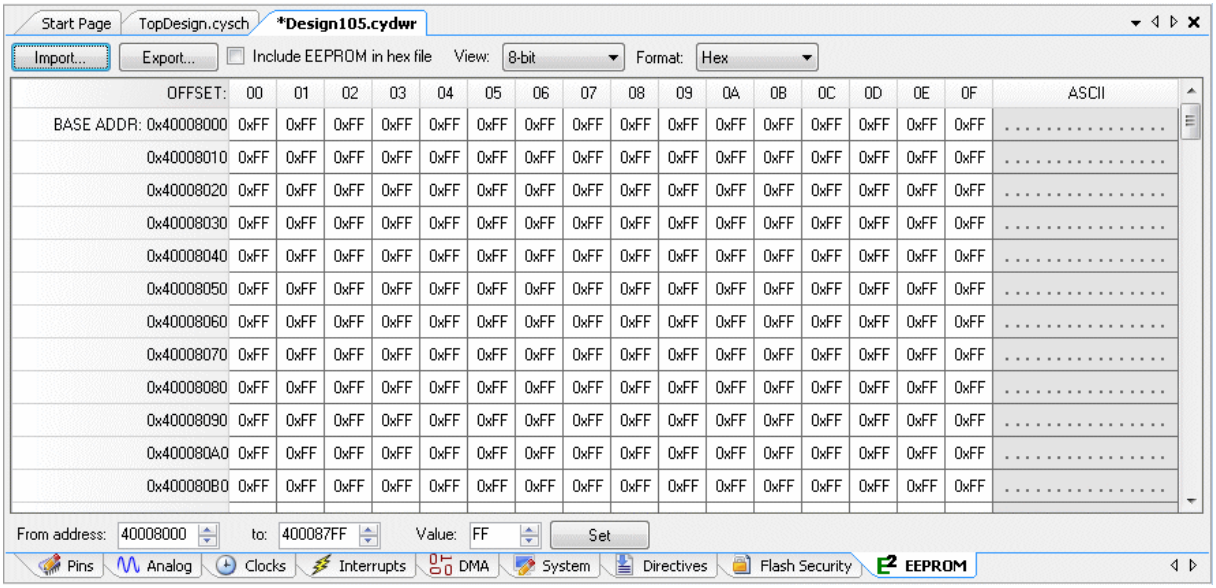
Component Update Tool

The Component Update Tool has been simplified. It will only open when there are newer versions of components.



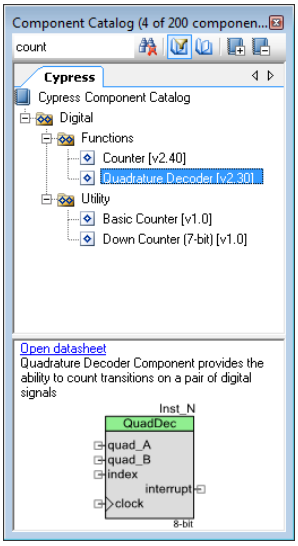
EEPROM Editor

The EEPROM Editor enables you to set up EEPROM data from PSoC Creator without requiring any code to run in the PSoC application. This new feature applies to anyone who wants to place an image in the EEPROM. You can set the EEPROM image up with multiple and individual edits and the tool will program the part with those selections.



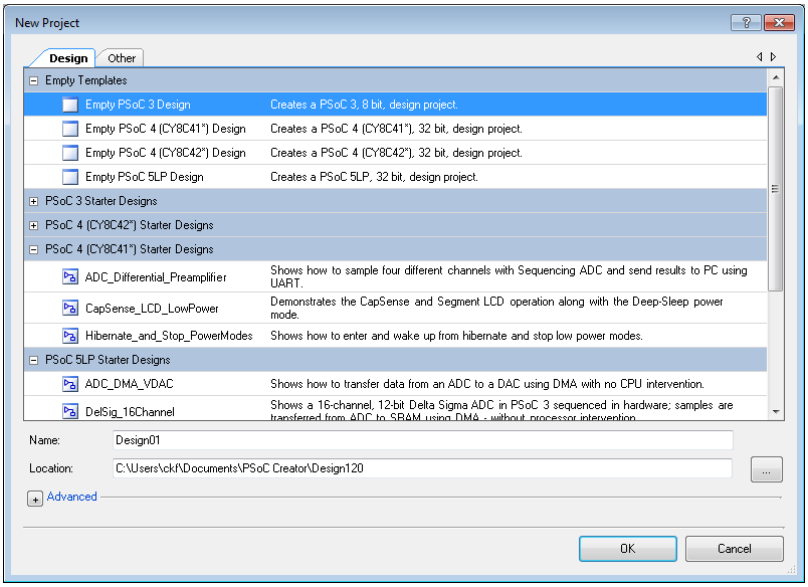
Component Catalog

The Component Catalog has been simplified. Among the changes are the search feature and component preview. The search feature now only shows those components that match the search criteria as you type. The preview area has been updated to provide an obvious link to the component datasheet.



Various Dialogs (New Project, Add Component, etc.)

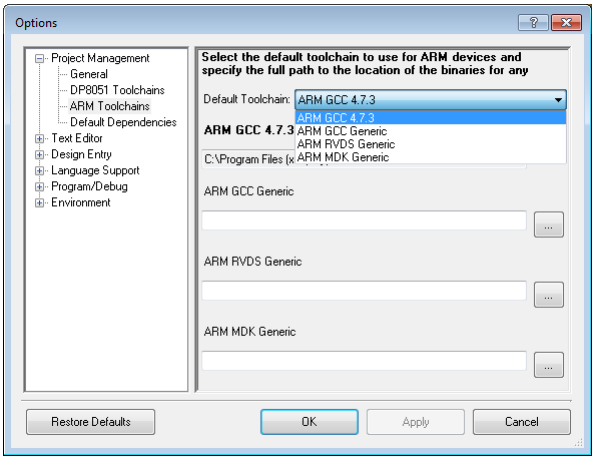
Various dialogs in the tool have been updated to provide a better view of items to select. Among the dialogs updated are New Project and Add Component Item.



Improved Ease-of-Use / Learning

Default Toolchain Option

The Options dialog was updated under “Project Management” to provide a choice of default compiler that will apply to any new project.



Components

This section contains information about new and updated components in this release. Refer to the applicable component datasheets (available in the PSoC Creator distribution and on the web) for additional information.

New Components

The following new component has been added as part of this release:

- **7-Bit Down Counter (Count7) –** This component provides a resource-efficient 7-bit down-counter with the count value accessible as a hardware signal.
- **Dithered VDAC (DVDAC) –** This component has a selectable resolution between 9 and 12 bits. Dithering is used to increase the resolution of its underlying 8-bit VDAC8.
- **Scanning Comparator –** This component provides a hardware solution to compare up to 64 pairs of analog input voltages signals using just one hardware comparator.
- **WaveDAC8 –** This component provides a simple and fast solution for automatic periodic waveform generation.

Updated Components

The following components have been updated to be MISRA-compliant:

- ADC_DelSig
- ADC_SAR_SEQ
- Amux
- AMuxSeq
- Bootloadable
- Bootloader
- CapSense_CSD
- EZI2C
- Filter
- LIN
- PRS
- RTC
- SPI_Slave
- StaticSegLCD
- USBFS

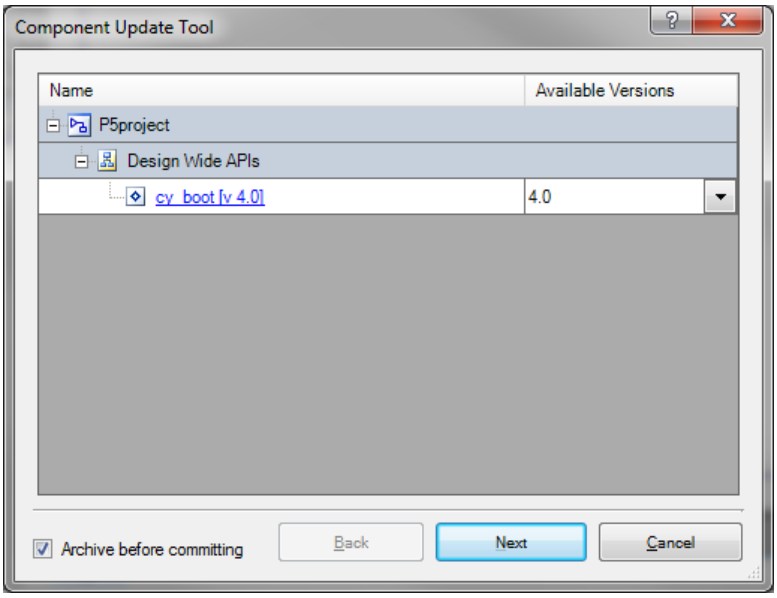
The following components have been updated to address minor defects and enhancement requests:

- ADC_SAR
- BoostConv
- CapSense_CSD_P4
- Clock
- DFB
- I2C LCD
- I2S
- MDIO_Interface
- PWM
- SegLCD
- ShiftReg
- SMBusSlave
- SW Tx UART
- Trim and Margin
- Voltage Sequencer

Design Impact

New cy_boot Component

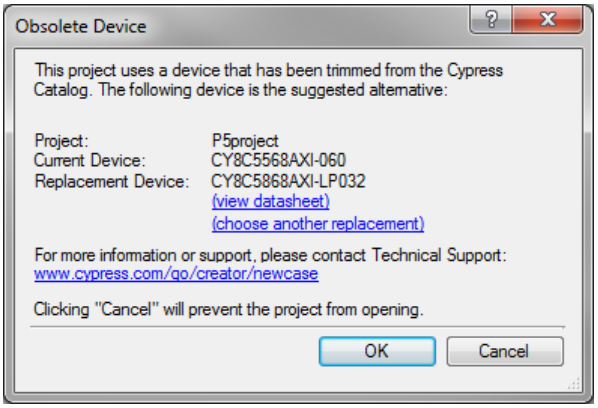
The switch to the GCC ARM compiler improves code and data optimization but necessitated changes to the boot code that is shipped in the cy_boot component. As a result all previous versions of cy_boot are now obsolete in PSoC 4 and PSoC 5LP designs. When first opening projects that were created in PSoC Creator 2.x, you will be prompted to update the component version with the Update Components dialog.



PSoC 5 to PSoC 5LP Mapping

As of this release, PSoC 5 devices are no longer supported. They have been replaced by functionally-equivalent PSoC 5LP devices.

If you open a project that targets an obsolete part the following dialog will appear.



The dialog suggests the appropriate new part number and pressing OK will update the project to the functionally-equivalent device. It automatically creates a backup of the original design. Pressing Cancel will abort the opening of the project.

Note that if you wish to migrate PSoC 5 designs on Cypress development kits to the new kits, with PSoC 5LP devices, the new target part number should be CY8C5868AXI-LP035. This is different from the part listed below (CY8C58568AXI-LP032) because the 035 part also supports the CAN interface, which was needed in development kit. In this situation, click on “choose another replacement” to launch the Device Selector dialog and switch to the LP035 part.

The following table lists all obsolete parts and their functional equivalents.

Device Family	PSoC 5	PSoC 5LP
CY8C52 = CY8C52LP	CY8C5246AXI-054	CY8C5266AXI-LP033
	CY8C5246LTI-029	CY8C5266LTI-LP029
	CY8C5247AXI-051	CY8C5267AXI-LP051
	CY8C5247LTI-089	CY8C5267LTI-LP089
	CY8C5248AXI-047	CY8C5268AXI-LP047
	CY8C5248LTI-030	CY8C5268LTI-LP030
CY8C53 = CY8C54LP	CY8C5365AXI-043	CY8C5465AXI-LP043
	CY8C5365LTI-104	CY8C5465LTI-LP104
	CY8C5366AXI-001	CY8C5466AXI-LP002
	CY8C5366LTI-053	CY8C5466LTI-LP085
	CY8C5367AXI-108	CY8C5467AXI-LP108
	CY8C5367LTI-003	CY8C5467LTI-LP003
	CY8C5368AXI-106	CY8C5468AXI-LP106
	CY8C5368LTI-026	CY8C5468LTI-LP026
CY8C54 = CY8C56LP	CY8C5466AXI-064	CY8C5666AXI-LP004
	CY8C5466LTI-063	CY8C5666LTI-LP005
	CY8C5467AXI-011	CY8C5667AXI-LP006
	CY8C5467LTI-007	CY8C5667LTI-LP008
	CY8C5468AXI-018	CY8C5668AXI-LP010
	CY8C5468LTI-037	CY8C5668LTI-LP014
CY8C55 = CY8C58LP	CY8C5566AXI-061	CY8C5866AXI-LP021
	CY8C5566LTI-017	CY8C5866LTI-LP022
	CY8C5567AXI-019	CY8C5867AXI-LP024
	CY8C5567LTI-079	CY8C5867LTI-LP028
	CY8C5568AXI-060	CY8C5868AXI-LP032
	CY8C5568LTI-114	CY8C5868LTI-LP038

New RAM Usage Calculation

Prior to the 3.0 release, the reporting of SRAM usage at the end of a build with the GNU Compiler Toolchain did not correctly report the stack and heap settings in the System DWR file. This has been corrected and PSoC Creator is now properly reporting the RAM usage (note that the actual RAM usage has not changed, just the reporting in the Output Window). You can modify the Stack and Heap Size values in the System DWR.

Supported Devices

The design flow and tools available in this release support the following PSoC 3 (CY8C3x), PSoC 4 (CY8C4x), and PSoC 5LP (CY8C5x-LP) families of devices.

PSoC 3:	CY8C32*	CY8C34*	CY8C36*	CY8C38*
PSoC 4:	CY8C41*	CY8C42*		
PSoC 5LP:	CY8C52*LP	CY8C54*LP	CY8C56*LP	CY8C58*LP

Supported Tool Chains

Toolchains for PSoC 3 (8051)

DP8051 Keil™ 9.51

The Keil PK51 Professional Developers Kit for PSoC is installed with PSoC Creator. It supports optimization levels 0 through 5. If you would like to use the compiler optimization levels above level 5, you should purchase the standard PK51 product by contacting Keil.

- In North, Central, or South America... sales.us@keil.com
- In Europe, Asia, Africa, or Australia... sales.intl@keil.com

The free toolchain comes with a 30 day evaluation license. You can extend the license, without cost, by registering the product from within PSoC Creator (Help > Register > Keil…). Note that the extended license is for one year and that you will need to re-register it on expiry.

DP8051 Keil Generic

This option can be used to select a separately-installed version of the Keil toolchain. While any version can be selected, the only officially supported versions are 8.16, 9.03, and 9.51.

Toolchains for PSoC 4 and PSoC 5LP (ARM)

ARM GCC 4.7.3

The GCC ARM Embedded v 4.7.3 toolchain is installed with PSoC Creator. It has no use restrictions and does not require license activation (it is distributed under the terms of the GNU Public License).

ARM GCC Generic

This option can be used to select a separately-installed version of the ARM GCC toolchain.

ARM RVDS Generic

This option can be used to select a separately-installed version of the ARM RealView Development System. The officially supported versions are 4.0 (build 529) and 4.1 (build 791).

ARM MDK Generic

This option can be used to select a separately-installed version of the ARM Microcontroller Development Kit. The officially supported versions are 4.0 (build 524) and 4.1 (build 713).

Installation

Minimum and Recommended System Requirements

The following are system requirements to install and use PSoC Creator. Each requirement specifies a minimum that your system must meet or exceed.

PSoC Creator will execute correctly in highly resource-constrained systems. However, performance (startup time, project creation and opening, build times, and so on) may be impacted when resources are scarce. The most directly impacted performance metric is build time. The following sections provide examples of the resource scarcity impact.

Note During initial startup, PSoC Creator builds and caches component DLL files used to display the component parameter editors. As a result, the tool will launch slowly the first time after installation or a Windows® reboot. This is not indicative of a problem or a long-term performance degradation.

Summary

Hardware/Operation System Requirements	Minimum
▪ Processor	1 GHz or faster 32-bit (x86) or Intel 64/AMD64 64-bit
▪ RAM	512 MB (1 GB preferred)
▪ Free Hard Drive Space	2 GB
▪ Screen Resolution	1024x768
▪ USB	2.0

Software Prerequisites *	Minimum Version
▪ Microsoft Internet Explorer (not IE8 beta)	7
▪ .NET Framework	2.0 SP2
▪ Adobe Reader (for viewing PDF Documentation)	9.2 **
▪ Windows Installer	3.1
▪ PSoC Programmer	3.19.1

* To install and run PSoC Creator, you may also need to install additional software. The Cypress Installer will guide you through the process if the additional programs are not already installed.

** For Windows 7, the minimum required version of Adobe Reader is version 9.2. You can download the latest version here: http://get.adobe.com/reader/. You can also use a non-Adobe PDF reader if you prefer; however, Cypress has no recommendations for any particular non-Adobe reader or version.

Processor

1 GHz or faster 32-bit (x86) or Intel 64/AMD64 64-bit processor is required.

PSoC Creator exhibits a predictable relationship between CPU speed and build time above 1 GHz. Doubling the CPU speed, e.g., from 1 GHz to 2 GHz or 1.5 GHz to 3 GHz, almost halves the build time.

On a fast (3 GHz) PC, simple designs can build in about one minute. At low speeds even designs that fill the device and generate complex routing solutions will build in under 5 minutes.

Operating System

One of the following Windows platforms is required:

- Windows XP SP2 or SP3 (32-bit supported)
- Windows Vista SP1 and SP2 (32- and 64-bit supported)
- Windows 7 (32- and 64-bit supported) and SP1
- Windows 8 (32- and 64-bit supported)
- Mac OS X with Parallels Desktop v7 running Windows XP 32-bit SP3
- Mac OS X with Parallels Desktop v7 or v8 running Windows 7 64-bit SP1

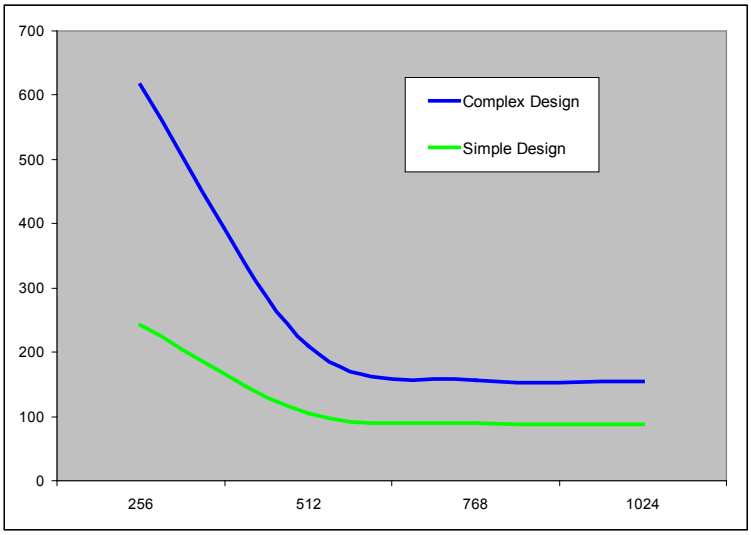
Memory

A minimum of 512 MB of RAM is required, but 1 GB is recommended.

Note Cypress does extensive performance testing on every PSoC Creator release. The minimum RAM configuration used in these tests is 1 GB. No guarantees of system performance are given below 1 GB.

With no other applications running, the minimum system configuration will ensure that the tool launches quickly, creates and opens projects in a few seconds, and responds to user input without feeling sluggish.

System RAM has the most direct impact on PSoC Creator build times. The following chart shows how insufficient RAM (i.e., below 512 MB) causes an excessive increase in build time, even for “empty” designs.



The graph shows that performance is heavily degraded below the threshold where memory paging is required but extra memory above that level does not generate a significant improvement.

Free Disk Space

PSoC Creator requires 2 GB of free disk space.

PSoC Creator will install and run with just 1 GB of free disk space. However, in order to allow Windows to do memory paging, we also require at least as much free disk space as you have RAM in your system, resulting in a minimum free disk space requirement of 2 GB.

If your disk is highly fragmented it will severely impact memory paging time and can result in very long build times. Disks that are nearly full are particularly prone to fragmentation. We recommend de-fragmenting your disk if you experience excessively long build times (10 minutes or more).

USB

PSoC Creator requires a USB 2.0-compliant host to program and debug.

Screen

A resolution of 1024x768 pixels or higher is required.

Note The build time examples given above were obtained with new product installations on minimally fragmented disks with no other applications running. If your build times exceed these expectations we recommend closing unnecessary applications, adding RAM to the system (to reduce paging) and ensuring that there is sufficient free and unfragmented disk space.

Software Update Instructions

As part of the installation process, the Cypress Update Manager utility will also be installed and located on the Start menu. You can use this utility to update all programs you have installed when updates for them become available.

Open Source

Portions of this software package are licensed under free and/or open source licenses such as the GNU General Public License. Such free and/or open source software is subject to the applicable license agreement and not the Cypress license agreement covering this software package. The applicable license terms will accompany each source code package. You may obtain the source code of such free and/or open source software at no charge from the following web site: www.cypress.com/go/opensource.

Installation Notes

The installation process is a set of wizards that walk you through installing various components. You can install PSoC Creator and various prerequisites from the web or from a CD. There are slight differences in the process, based on the medium used to install the software.

The CDs provide the necessary prerequisites and the wizards to guide you through installing the appropriate software. The following sections contain more specific installation details.

Note Do NOT plug in your Miniprog3 until all software installation is complete AND the PSoC Creator application has been opened.

PSoC Creator CD Installation

The PSoC Creator CD contains PSoC Creator and PSoC Programmer, as well as various prerequisites.

1. Load the CD. The main installer program should run automatically. If not, double-click the cyautorun.exe file to launch it.
2. On the main installer, click the **Install Software for PSoC…** button to launch the PSoC Creator InstallShield Wizard.
3. Follow the prompts on the wizard. The CyInstaller for PSoC Creator opens and displays steps to install PSoC Creator.

4. Click the hyperlink for any software that is not installed as indicated (such as, Acrobat Reader, etc.). Run the installer for that program as needed.
5. Continue following the prompts to install PSoC Creator.

Cypress PSoC Kit CD Installation

A kit CD contains PSoC Creator and PSoC Programmer, as well as projects, documentation, and prerequisites needed for the associated kit. Refer to kit instructions.

Web Installation

If you are downloading the software from the web (www.cypress.com/creator), run the PSoC Creator single package executable.

1. Double-click the PSoC Creator executable file to launch the installer.
2. If a non-Cypress prerequisite is missing (like .Net and Windows Installer, etc), a webpage with a download link will pop up. Download and install the prerequisites. Run the installer of those programs as needed.
3. Follow the prompts to install PSoC Creator. The CyInstaller for PSoC Creator opens and displays a series of steps to install PSoC Creator, and it will perform pre-requisite checks and install the prerequisites.
4. When complete, close the installer.

Further Reading

The primary documentation for PSoC Creator is provided in the Help, which you can open from the **Help** menu or by pressing [**F1**]. Other documents included with this release are also available from the **Help** menu, under **Documentation**. These documents include (but are not limited to):

- Quick Start Guide
- System Reference Guide
- Component Author Guide

Even more information is provided online at www.cypress.com/creator, including:

- PSoC 3, PSoC 4, and PSoC 5LP Device Datasheets
- Device Architecture Technical Reference Manual (TRM)
- Device Registers TRM
- Migration Guides
- Application Notes
- Training

Contact your Cypress representative, as needed.

Defects Fixed

The following defects were fixed in this release. These defects are separated into different categories.

Bootloading

Cypress ID	Defect	Fix and Impact
144418	PSoC Creator throws an unhandled exception error in a Bootloadable project when the selected device is changed from PSoC 5 to PSoC 5LP.	The problem only affected Bootloadable projects. The migration process would try to validate the DMA boot mode setting across the Bootloader and Bootloadable projects. However, the Bootloader information was not available and this caused a null exception. The fix prevents the check from causing an exception (and the DMA mode validation is deferred to build time).

Build System

Cypress ID	Defect	Fix and Impact
115747	Attempts to register the Keil PK51 tools create error: "prj.M0132: Unable to register your LIC number"	The problem was caused by an error in updating the Keil TOOLS.INI file. The file modification steps have been updated and made more robust. Registering the Keil compiler should be more reliable with this change.
152850	Successful build reports "build failed" and will not allow debugging.	The tool is reporting that the GCC compiler list files (.lst) were not generated. This occurs when the Build Settings option to generate list files is disabled. The build system was updated to only check for list files when the user has requested them to be built.
154308	Datasheet generation fails to create a document when Topdesign.cysch has been renamed.	This generator assumed the top schematic on the design would be called "TopDesign". Because this is not a requirement of a project, the code was updated to enable datasheet generation regardless of the name of the file.
155537	Datasheet generation fails to create a document for PSoC 5LP.	This generator only supported the 58* family of PSoC 5LP devices. It has been updated to support the 52*, 54* and 56* devices.
159307	Building designs with new versions of MDK (generic) causes compiler errors related to un-found system libraries and headers.	Recent versions of RVDS and MDK can find their include/lib directories without environment variables. If the directories are missing (because they are in newer versions of the toolchain), the tool now simply skips creating the variables. Older versions of MDK remain supported as well as the latest, and future, releases.

Debugging/Programming

Cypress ID	Defect	Fix and Impact
148382	Setting up Keil µVision for downloading with MiniProg3 fails to update the debugger settings.	The µVision IDE has dialogs to configure the MiniProg port settings, which it applies for programming. For debugging, it relies on a stand-alone PSoC Creator-based cypsocXdebugger.exe file that uses PSoC Creator's port settings. The new export to µVision function updates both settings in µVision, ensuring that there is no mismatch, so that both downloading and programming are correctly set up.

Framework

Cypress ID	Defect	Fix and Impact
145749	Verilog created by the Datapath Editor tool is over-written when the component (for example, the symbol file) is modified (and Verilog re-generated).	Because the Verilog code was not protected by merge regions, the "Generate Verilog" function on a symbol would overwrite the whole file. The Datapath Editor now inserts code between a `#start body` / `#end` pair. It is now safe to regenerate Verilog code after updating a component symbol.

System

Cypress ID	Defect	Fix and Impact
148459	The Analog Editor displays DAC0 and DAC1 while the datasheet for the 54xx family datasheet says that DAC 0 and 2 are present in the devices.	The devices were erroneously described in the tool. The part definition is now correct - the actual DACs (0 and 2) are presented in the Analog resource page.
152498	On PSoC 4, the output enable on a pin does not control the output when it is connected to a TCPWM.	The output enable cannot be driven from fixed blocks (TCPWM or SCB), only the DSI. As a result the OE fails to gate the signal. The tool now issues a DRC when an output pin is configured to display OE and the connection is to a fixed block (OE only accepts a routed signal).
154264	Design-wide clocks on PSoC 4 don't allow for Sync option on clocks generated from the DSI.	The design-wide clock dialog was updated to make the Advanced tab available, which gives users the option to sync. This is required for those cases where a routed signal being used as a clock needs to be synchronized and there are no UDB resources available to perform the sync. It is also more useful than using the Sync component because it is routed over the global clock tree, though it is always synchronized to HFCLK.
157049	PLL is unstable even though setup completed successfully.	The Clock Setup routine does a 16-bit write to FASTCLK_CFG0, which also sets FASTCLK_CFG1. The lower nibble of FASTCLK_CFG1 has two reserved bits and the two vco_gain bits. These bits must be retained at their reset values, but the code is overwriting them and this may lead to an unstable PLL. The code has been modified to protect the vco_gain bits.
158839	The 28 pin SSOP package PSoC 4 devices only claim 22 GPIOs when the device has 24.	The device definition in the tool was wrong and has been updated to enable all 24 GPIO.
158935	Erroneous timing violation messages when MASTER_CLK is divided by 3!	Due to a rounding error the STA tool calculates routing times based the frequency of the clock divided by two. The rounding has been re-coded to avoid spurious warnings.

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