Release Notes SRN44

PSoC Express 3.0 CapSense Express
Release Date: February 28, 2008

Thank you for your interest in PSoC Express™ 3.0. The information in this document describes software updates and changes as they relate to CapSense Express for PSoC Express 3.0.

CapSense Express is an application specific mixed signal array device targeting a variety of non-MCU based embedded applications. CapSense Express offers a low cost solution to customers, allowing them to implement CapSense buttons or sliders without requiring MCU embedded design tools, thus cutting design cycles and helping them get to market sooner. Powerful general-purpose input/output (GPIO) functions are also available for LED drive and system interface.

The user must have PSoC Express v3.0 installed on their computer prior to installing this Express Pack. If this is not already installed PSoC Express v3.0 can be downloaded from http://www.cypress.com/psocexpress.

System Requirements and Recommendations

System Requirements	Minimum	Recommended
PSoC Express version	Express v3.0	Express v3.0
PSoC Programmer version	2.33	2.33 or later
Processor Speed	500 MHz	1 GHz
MB of RAM	256 MB	512 MB
MB of Free Hard Drive Space	250 MB	300 MB
Screen Resolution	1024x768	1280x1024
CD-ROM Drive	☑	☑
USB Port, preferably Open Host Controller or Universal	☑	☑
Windows® 2000, XP (SP 1 or 2), or Vista	☑	☑
Microsoft Internet Explorer 6.0 (SP1)	☑	☑
Adobe Reader (For Viewing of .PDF Documentation)	☑	☑

Getting More Information

Everything about PSoC Express can be found at http://www.cypress.com/psocexpress.

All Cypress Semiconductor Corp. software (including PSoC Express software) is maintained in a company repository. Check http://www.cypress.com/ under Design >> Software Downloads, where a list of all Cypress software and drivers appear.

Installation

To Install Express Pack 3.0 for PSoC Express v3.0:

1. Shut down any currently running instances of PSoC Express.

2. Install Express Pack for PSoC Express v3.0 by running the provided installer.

This Express Pack Includes

Included in the CapSense Express Extension pack are 7 new drivers for PSoC Express. The extension pack includes drivers for various button and general-purpose I/O configurations along with support for two different slider implementations. Three example projects are also available in the Express Design Catalog portion of the PSoC Express start page.

These projects are intended for use with one of the three CAPEXP evaluation kits. Click on the desired project in the Express Design Catalog to open the project. You will then be prompted to supply a path and project name so you can work on it.

Table 1: New Express Drivers for CapSense Express

	Driver Name	Description
1.	10 GPIO / CS Button Set	10 configurable GPIO and Capsense Buttons. Starts with 10 Capsense Buttons
2.	8 GPIO / CS Button Set	8 configurable GPIO and Capsense Buttons. Starts with 8 Capsense Buttons
3.	6 GPIO / CS Button Set	6 configurable GPIO and Capsense Buttons. Starts with 6 Capsense Buttons
4.	4 GPIO / CS Button Set	4 configurable GPIO and Capsense Buttons. Starts with 4 Capsense Buttons
5.	4 GPIO / CS Button Set Compact	4 configurable GPIO and Capsense Buttons. Starts with 4 Capsense Buttons
6.	5 Segment Slider 5 GPIO	One 5-segment slider with 5 configurable GPIO and Capsense Buttons
7.	10 Segment Slider	One 10-segment slider

Table 2: New Express Example Projects

	Express Designs	
1.	CY3218 CAPEXP1 CapSense Express	Uses 3 capacitive sensing buttons, 6 LED outputs and a pushbutton.
2.	CY3218 CAPEXP2 CapSense Express	Uses 5-segment slider in addition to 4 LED outputs and a pushbutton.
3.	CY3218 CAPEXP3 CapSense Express	Uses 2 capacitive sensing buttons and 2 LED outputs.

Table 3: CapSense Express part list.

	Name	Pin Package	Notes
1.	CY8C20142	8-Pin SOIC	Up to 4 configurable I/O
2.	CY8C20140	16-pin SOIC 16-pin QFN	Up to 4 configurable I/O

	Name	Pin Package	Notes
3.	CY8C20160	16-pin SOIC 16-pin QFN	Up to 6 configurable I/O
4.	CY8C20180	16-pin SOIC 16-pin QFN	Up to 8 configurable I/O
5.	CY8C20110	16-pin SOIC 16-pin QFN	Up to 10 configurable I/O
6.	CY8C201A0	16-pin SOIC 16-pin QFN	Up to 10 configurable I/O with Sliders

Table 4: CapSense Express Kit List.

	Name	Type	Description
1.	CAPEXP1 – CY8C20110	16-pin QFN	10 configurable I/O
2.	CAPEXP2 - CY8C201A0	16-pin QFN	5 segment slider with up to 5 additional configurable I/O
3.	CAPEXP3 – CY8C20142	8-in SOIC	4 configurable I/O

Limitations

None

Limitations with PSoC Express v3.0

NOTE: Designs built with version 2.2 are compatible with version 3.0.

1. When working with projects created in previous versions of PSoC Express, it is recommended that you work with copies of the projects. Import the copy into the new version of PSoC Express and verify it is still correct. You will have the original as a backup in case you need to go back to v2.2.

2. If you have PSoC Designer 4.4 installed and the new HiTech Compiler selected as the default compiler, PSoC Express will fail to build projects. Choose the ImageCraft compiler before building projects in PSoC Express.

3. A display setting of 120 DPI prevents proper display of PSoC Express dialogs. If you cannot see a dialog box and its buttons correctly, right mouse click on your desktop and review display settings. If 120 DPI is selected, change this to 96 DPI to see the correct dialog boxes and buttons.

4. Cannot load a new simulation stimulus file while the viewer is open. First close the viewer window and then load the new stimulus file.

5. Tuners are currently modal and while one is open no other windows or widgets will be actively updated with data from the target hardware. Access to documentation files outside the tuner dialog may also be blocked until the tuner window is closed,

6. PSoC Express project (.CMX) and application (.APP) files must reside in their properly named folder or they cannot be opened. The entire path is not required, just the immediate folder. Do not rename the files; use the "Save Project As..." function within PSoC Express.

7. Text input properties, such those used with LCD Scrolling Text, are not bounds-checked and appear to allow strings longer than what can be supported. The text displayed is truncated if the text entered is too long.

8. There can be only one CSA, CSD or CSR properties driver in a project at a time, and it must match the type of all other CapSense drivers. Currently this is not checked and no error may be given.

9. Certain drivers, including CapSense and WUSB, depend upon other drivers being present (i.e. Properties). You may have to manually add these and the application will not warn you if they are missing.

10. CapSense designs cannot mix other analog elements in the same project.

11. PSoC Express has a single compile engine, which prevents multiple simultaneous "Build" operations. Do not attempt to build more than one PSoC Express project at a time (although more than one project/instance of PSoC Express may be open at a time).

12. Opening a PSoC Express project in PSoC Designer redirects PSoC Designer to the PSoC Express user module database. This may cause the user modules normally seen in PSoC Designer to look and behave differently (including missing data sheets). The redirection ensures that a project generated by PSoC Express provides consistent firmware/hex file results whether it is built by PSoC Express or by PSoC Designer.

13. PSoC Express currently allows explicit expression assignments to appear in transfer function definitions. Writing explicit assignments within transfer function definitions is deprecated because these assignments create bugs that are difficult to find, and they violate the spirit and intent of the transfer function programming model. This "loophole" may be closed in future revisions of PSoC Express. If explicit expression assignment is desired, program this operation in custom.c.

14. The prefix `pse_` and the string `__` (two underscores with no intervening characters) are not allowed in object names. If you try to use these in object names, the program prevents you from completing the step until you remove the offending entity from the name.

15. Do not use reserved words as the name of objects. Reserved words are: C-Language reserved words, PSoC Express reserved words and the state names defined in a design (under user control). If undetected by the GUI, this results in a build error, indicating the offending name in the error messages.

16. PSoC Express automatically detects the needed hardware resources and matches an appropriate PSoC device when "Build" is selected. However, the resource manager cannot detect when RAM or ROM is exceeded. If a build error occurs, try to build the project on the largest PSoC device (in RAM and ROM) in order to isolate this possibility. The resource manager also cannot determine whether the PSoC device has adequate internal bus lines between hardware resources. If the initial automatic pin assignment fails, try to build the project on the next larger PSoC device (in number of pins) within the same family in order isolate this possibility.

17. User pin assignment requires the PSoC Express code generation engine to auto-place and route functional blocks within the PSoC device. The order of pins assigned manually and combination of functions may sometimes make pin assignment fail. The workaround is:

    a. See which drivers are not getting assigned (what type).

    b. Click Unassign All.

   c.   Place the drivers that did not initially get assigned.

   d.   Auto-place the remaining drivers.

18. If you experience difficulty assigning pins, it may be that the part shown does not have enough pins or enough internal bus lines for the functions. (External Watchdog drivers when used in large number in conjunction with Tachometer drivers show this tendency in particular). As a workaround, choose either another device with more pins from the same family or a device from a family with more pins and more resources (higher part number).

19. If PSoC Programmer is installed but does not appear when "Program" is selected or appears and disappears, remove any connected PSoC programming devices from the computer and then re-connect them. If PSoC Programmer is still not operating, shutdown the computer and restart.

    Note: This was a problem with versions before 2.20.

20. A valid project must consist of at least one input or one output device. A project consisting of interface drivers and/or valuators only will not correctly build. Add an input or output and then choose "Build."

21. When a transfer function references discrete states owned by other objects (LED with ON and OFF, for example), the transfer function should always use the named states when setting a new state or comparing a current state. This ensures portability of a design regardless of a particular device's property setting. Additionally, simulation of the following "If (Input_1) Then 0" does not work properly due to JavaScript characteristics. The generated PSoC firmware performs as expected, according to C language rules, but the simulation does not reflect this behavior. To ensure simulation results consistent with generated code performance, use explicit comparisons with an object's named states (select Expression Assistant on any dialog that supports expressions to see a complete list of names).

22. Some devices must be selected and instantiated (select in catalog and click OK) for all property settings to be available (Tachometer inputs are one example). If you do not see expected choices when selecting a device, complete the catalog selection (click OK) and then right-mouse-click on it and choose "Properties" to see the complete property list.

23. When defining custom states for a Valuator or Output Driver, you may have to first define the states, save the transfer function and then choose to edit it in order for the states to be visible in the Expression Assistant.

24. Stimulus file inputs are not range checked and are shown numerically as entered on the simulation widget, but the graphical widget position is bound by the driver's range. It is your responsibility to ensure the proper input range in a stimulus file.

25. Simulation in PSoC Express is implemented with JavaScript. Boolean expressions, such as (Input_1 > 33), cannot themselves be assigned to an output in JavaScript. It is poor design practice to do this, even in the C firmware, and it can lead to avoidable bugs.

26. Simulation and firmware do not match exactly with respect to integer math results. The JavaScript performs floating point math and the PSoC firmware performs strict integer math. Use the simulation as a guideline for integer math results.

27. Simulation and firmware do not match exactly with respect to specific driver range limiting behavior (such as the 0-100 limit of a PWM). The JavaScript performs general operations and the PSoC firmware performs specific, range-limiting operations. Use the simulation as a guideline for range-limiting driver results.

28. Expressions perform range checking of signed integer values, limiting them from –32767 to 32767. Octal values (0777, for instance) and hexadecimal values (0x4343, for instance) are not range checked for valid 16 bits. They are truncated in the PSoC firmware (but the simulation does not truncate them). Expressions may not contain the valid 16-bit signed integer "-32768," because the application prevents it. As an alternative you can enter "0x8000," which is equal to "-32768" for a 16 bit.

29. Byte values are not promoted to integer type for math operations in which all of the types in the expression are byte. At least one continuous type valuator (16-bit signed integer) must be used to prevent overflow in arithmetic operations.

30. Designs with complex combinatorial expressions may experience build failures due to long line lengths not handled correctly by the compiler parser. The solution is to split complex and involved combinational logic lines into multiple lines (the Status Encoder Transfer Function is well suited to this).

31. The PDF conversion utility for the Schematic report requires installation of a Java Runtime engine. Follow the prompts during the first-time execution of "Print to PDF" to install the JRE.

32. A PDF conversion operation may trigger a warning from the computer's antivirus software agent. Enable the script during this operation or PDF conversion will not succeed.

33. Interface Valuators allow input from outside the system and are not explicitly range checked/limited. If you include these in your system and use as an input to a Table Lookup Transfer Function, you can cause random behavior. Instead, define another Valuator and define its Transfer Function to perform range checking and limiting.

34. On computers containing Microsoft Office 2003 SP1, some driver data sheets display dotted lines in areas that should show text.

35. The 7-segment multi-digit display drivers do not always automatically assign, and the user-assignment is not always remembered from build-to-build. Always confirm the pin assignment manually when performing a build. Manually check the pin assignment each build, or choose **Lock Pins** to prevent re-assignment.

36. Automatic pin assignment for CapSense drivers can sometimes fail. Manually check the pin assignment each build, or choose **Lock Pins** to prevent re-assignment.

37. If no Interface Valuators (writeable registers) are included in a design, the Read-Only registers become writeable. To prevent this, always add a single interface valuator.

38. There is a problem with TableLookup transfer functions and container (multi-element) inputs. Use a Priority Encoder TF as a workaround.

39. A table lookup transfer function that has a large number of output states is sized so that it fits the window. This makes the table text very small.

40. Loop Delay Transfer Functions are updated before CustomPreOutputUpdate() executes. To use a past state in CustomPreOutputUpdate() add a second Loop Delay.

Known PSoC Express 3.0 Bugs

1. The USBUART driver will not pass Chapter 9 testing.

2. The USBUART driver has difficulty running with a host that is using Windows 2000.

3. The USBUART driver refers to the Hyperterm program. This program is not included with any version of Windows Vista. A comparable terminal program can be substituted.

4. When using the board monitor, renaming drivers can cause the monitor widget to not update properly. The workaround in this case is to save, close, and reopen the project, then return to monitoring.

5. Some firewalls will issue a warning when starting PSoC Express 3.0. This is due to the Adobe SVG Viewer looking for updates. Please dismiss such warnings as they will not affect the performance of your computer or the operation of PSoC Express.

6. The "Add States" option in the valuator creation dialog box may change the default value. For instance, a default value set to 0xA can change to 0x10 when the "States" button is clicked.

7. The CSD slider tuner window does not display the segment count values correctly when they are more than 999, and the bars can be cut-off at the top for large values.

8. When a build attempts and fails but the window shows "Page not found", then code generation has failed. Exit the application, and re-try with the project. If that fails again, re-try with a different part family. If that succeeds, installation has become corrupted and you must manually uninstall PSoC Express and re-install according to the instructions in the "Installation" section.

9. During build operations, the CPU load can become great enough that proper window painting is disrupted and other applications can "bleed" through PSoC Express windows. If this persists after the build is complete, minimize and restore the window to refresh it.

10. If a build completes with failure and the message shows "No rule to make target" the device family selected has become corrupted in the installation and the only recourse is to uninstall completely and install fresh.

11. It is possible to use up available RAM when creating mixed CSA and CSD designs (for instance 4 proximity sensors, plus 3 buttons, plus 1 slider). This is due to the amount of data required to tune all three at the same time. The workaround is to separately tune the slider on the hardware from the other drivers and manually transfer in the slider and properties to the final design with tuning disabled on all drivers.

12. Display of colors in the high brightness LED tuners can be affected by a monitor's ability to correctly display colors. There is no way at this time to calibrate the monitor for the color mixing tuner.

13. If a project contains custom.c customizations, a build may fail with the following error message if the last line of custom.c is not a blank line:

14. "RefreshBOMTab sPinsDOM is empty. No project reports will be generated."

15. The workaround is to add a carriage return to the end of custom.c.

16. The transfer function report portion of a project data sheet does not know the difference between 1-line status encoder transfer functions and 1-line priority encoder transfer functions. Both types of transfer functions are listed as a status encoder transfer function in the report.

17. The non-configurable Initial Condition property of the InternalPulledUp Banked Input driver is shown as Low in the driver data sheet. The value is actually High. The non-configurable Initial Condition property of the InternalPulledDown Banked Input driver is shown as High in the driver data sheet. The value is actually Low.

18. The State Machine valuator allows usage of C keywords in state and transition names. This bug may be fixed in future revisions of PSoC Express, and as such should be avoided.

19. Statements in Status Encoder and Priority Encoder transfer functions that are longer than 21 characters overrun the columns in the PDF version of a project data sheet. The recommended workaround is to manipulate and print out the HTML (original) version of the project data sheet in order to see the transfer function definitions.

20. When creating a new driver, a driver name is not allowed to contain double underscore (__) characters. The driver renaming function allows a new driver name to contain this character combination. Renaming drivers with names containing double underscores is deprecated as this "loophole" will be closed in future revisions of PSoC Express.

21. Renaming a tachometer instance will clear the associated fan property.

22. Many names get too long to appear in pin assignment dialog boxes. The workaround is to make sure all other names are recognizable.

23. Closing a project will not release all files; you must exit PSoC Express to ensure all files are released.