Application Report
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Differences Among Stellaris® Product Classes

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ABSTRACT

This document addresses design issues to be aware of when migrating working designs among Fury-, DustDevil-, Tempest-, Firestorm-, and Blizzard-class Stellaris® microcontrollers. Topics covered include both software and hardware issues as well as feature changes and enhancements. All software issues are comprehended in the StellarisWare® APIs. As a result, system designers are strongly encouraged to use StellarisWare to write software, making it easy to move software among the Stellaris classes.

Contents

1 Introduction

In this document, information on implementation differences is presented by module with both hardware and software considerations discussed. In general, features that are the same in all classes are not mentioned. Not all modules are on every part in a class. In-depth descriptions of functions and features are not included; for further information on any item, see the microcontroller data sheet. Also, in general, differences due to errata are not comprehended in this document; see the errata document for your specific device to ensure proper system design. This document addresses differences among the classes from Fury through Blizzard. For information on differences between the Sandstorm class and the Fury class, see Application Note SPMA013, *Migrating from Sandstorm-Class to Fury-Class Stellaris Devices*.

NOTE: By using StellarisWare APIs, software can be easily moved among the various classes as these APIs comprehend all functional differences.

2 Determining the Product Class

To determine what class a particular microcontroller is in, see the CLASS field in the **Device Identification 0 (DID0)** register at offset 0x400F.E000. The CLASS designations in this register are as follows:

- Sandstorm: 0x0
- Fury: 0x1
- DustDevil: 0x3
- Tempest: 0x4
- Firestorm: 0x6
- Blizzard: 0x5

To determine which microcontrollers are in a particular class, check the following pages on the TI website:

- Sandstorm
- Fury
- DustDevil
- Tempest
- Firestorm
- Blizzard

3 ARM® Cortex™ CPU

Table 1. ARM Cortex-M Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Cortex-M version	M3, r1p1	M3, r1p1	M3, r2p0	M3, r2p0	M4F, r0p1
Option to run SysTick from PIOSC/4	No	No	No	No	Yes
System clock must be greater than 8 MHz to access **STRELOAD** register	No	No	No	No	Yes
Default stack alignment on exception entry	4-byte	4-byte	8-byte	8-byte	8-byte

4 JTAG/SWD

Table 2. JTAG/SWD Feature

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Alternate function of PB7	$\overline{\text{TRST}}$	NMI	NMI	NMI	I2C5SDA, T0CCP1

5 System Control

5.1 Device Identification

Table 3. Device Identification Registers

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Device identification registers	**DID0, DID1, DC0–DC4**	**DID0, DID1, DC0–DC7**	**DID0, DID1, DC0-–DC9**	**DID0, DID1, DC0–DC9**	**DID0**, **DID1**, peripheral-specific Peripheral Present (**PPx**) registers[1]

(1) **DC0-DC9** registers are present for backward software capability.

Note that StellarisWare APIs automatically adjust for these functional differences.

5.2 Peripheral Control and Capabilities

Table 4. Peripheral Control and Capabilities Registers

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Software reset	**SRCR0–SRCR2**	**SRCR0–SRCR2**	**SRCR0–SRCR2**	**SRCR0–SRCR2**	Peripheral-specific Software Reset (**SRx**) registers[1]
Run mode clock control	**RCGC0–RCGC2**	**RCGC0–RCGC2**	**RCGC0–RCGC2**	**RCGC0–RCGC2**	Peripheral-specific Run Mode Clock Gating Control (**RCGCx**) registers[1]
Sleep mode clock control	**SCGC0–SCGC2**	**SCGC0–SCGC2**	**SCGC0–SCGC2**	**SCGC0–SCGC2**	Peripheral-specific Sleep Mode Clock Gating Control (**SCGCx**) registers[1]
Deep-sleep mode clock control	**DCGC0–DCGC2**	**DCGC0–DCGC2**	**DCGC0–DCGC2**	**DCGC0–DCGC2**	Peripheral-specific Deep-Sleep Mode Clock Gating Control (**DCGCx**) registers[1]
Peripheral capabilities[2]	**DC3–DC4**	**DC3–DC7**	**DC3–DC9**	**DC3–DC9**	Peripheral-specific Peripheral Properties (**xPP**) registers in peripheral's address space[1]
Peripheral configuration[3]	**RCGC0**[4], **RCC**[5]	**RCGC0**[4], **RCC**[5]	**RCGC0**[4], **RCC**[5]	**RCGC0**[4], **RCC**[5]	Peripheral-specific Peripheral Configuration (**xPC**) registers in peripheral's address space[1]

(1) **SRCRn**, **RCGCn**, **SCGCn**, **DCGCn**, and **DCn** registers are present for backward software capability.
(2) Not all peripherals have this status information.
(3) Not all peripherals have configuration options.
(4) For maximum ADC conversion speed.
(5) For PWM clock frequency.

Table 4. Peripheral Control and Capabilities Registers (continued)

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Clock configuration registers[6]	No	No	No	No	Peripheral-specific Clock Configuration (**xCC**) registers in peripheral address space

(6) Not all peripherals have clock configuration options.

Note that StellarisWare APIs automatically adjust for these functional differences.

5.3 Reset Operation

Table 5. Reset Operation

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
MOSC fail reset	No	Yes	Yes	Yes	Yes
JTAG reset	Only POR	Only POR	All except VECTRESET	All except VECTRESET	Only POR
Filtering on $\overline{\text{RST}}$	No	No	No	No	Yes
NMI on Watchdog timeout	No	No	No	No	Yes
MOSC fail	Reset only	Reset only	Reset only	Reset only	Reset or interrupt
Bit 5 in **RESC** register	LDO reset	LDO reset	WDT1 reset	WDT1 reset	WDT1 reset

Note that StellarisWare APIs automatically adjust for these functional differences.

5.3.1 Brown-Out Operation

Table 6. Default Brown-Out Operation

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Default brown-out operation	Interrupt	Interrupt	Interrupt[1]	Reset[1]	Interrupt

(1) If a brown-out condition occurs while the Flash memory is being programmed or erased, a system reset occurs regardless of the setting in the **Power-On and Brown-Out Reset Control** (**PBORCTL**) register.

5.4 Core Voltage and LDO

Table 7. Core Voltage and LDO

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Core power signal	VDD25	VDD25	VDDC	VDDC	VDDC
Core voltage	2.5 V	2.5 V	1.3 V	1.3 V	1.2 V
LDO voltage source	VDDA	VDD	VDD	VDD	VDD
LDO configurable	Yes	Yes	No	No	Yes
LDO output	Yes	Yes	Yes	Yes	No
LDOPCTL register present	Yes	Yes	No	No	Yes

5.5 Clocking

Table 8. System Clock Options

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
PIOSC	No	No	Yes	Yes	Yes
Crystal input	3.579545 MHz to 8.192 MHz(1)	3.579545 MHz to 16.384 MHz(1)	3.579545 MHz to 16.384 MHz(1)	3.579545 MHz to 16.384 MHz(1)	5 MHz to 25 MHz
DIV400 bit	No	No	Yes	Yes	Yes
PLLSTAT register	No	No	No	No	Yes
NOXTAL bit	No	No	No	No	Yes
PLLCFG register	Yes	Yes	Yes	Yes	No
PLLFREQn registers	No	No	No	No	Yes

(1) If the PLL is not used, the minimum crystal frequency is 1 MHz.

Note that StellarisWare APIs automatically adjust for these functional differences.

Table 9. Module Clocking

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Hibernation clock	32.768-kHz oscillator; 4.194304-MHz crystal	32.768-kHz oscillator; 4.194304-MHz crystal	32.768-kHz oscillator; 4.194304-MHz crystal	32.768-kHz oscillator; 4.194304-MHz crystal	32.768-kHz oscillator; 32.768-kHz crystal
ADC	PLL/25 or 16-MHz system clock	PLL/25 or 16-MHz system clock	PLL/25 or 16-MHz system clock	PLL/25 or 16-MHz system clock	PLL/25, 16-MHz system clock, or PIOSC
CAN	PLL/50	System clock	System clock	System clock	System clock
PIOSC source for baud clock(1)	No	No	No	No	Yes

(1) Applies to UART and SSI.

Note that StellarisWare APIs automatically adjust for these functional differences.

5.6 System Control Interrupt Sources

Table 10. System Control Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
BORRIS, PLLLRIS	Yes	Yes	Yes	Yes	Yes
MOFRIS	No	No	No	No	Yes
USBPLLRIS	N/A	Yes	Yes	Yes	Yes
MOSCPUPRIS	No	No	No	No	Yes

5.7 GPIO High-Performance Bus Control

Table 11. GPIO Ports Available on AHB Bus

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
GPIO ports available on AHB bus	None	Port A–Port H	Port A–Port J	Port A–Port J	Port A–Port P(1)

(1) Ports K through P are only available on the AHB bus. The corresponding bits in the **GPIO High-Performance Bus Control** (**GPIOHBCTL**) register must always be set.

5.8 Peripheral Ready Registers

Table 12. Peripheral Ready Registers

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Peripheral-specific **PPx** registers	No	No	No	No	Yes

5.9 StellarisWare APIs

In this section and similar sections throughout this document, the APIs shown in the table are applicable APIs. The ROM version of the various APIs may or may not be included in the on-chip ROM. See the ROM User's Guide for your specific microcontroller to determine which APIs are available in ROM.

Table 13. System Control StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
SysCtlClockSet, SYSCTL_SYSDIV_n_5[(1)]	No	No	Yes	Yes	Yes
SysCtlLDOGet, SysCtlLDOSet	Yes	Yes	No	No	No
SysCtlMOSCConfigSet, SYSCTL_MOSC_VALIDATE	No	Yes	Yes	Yes	Yes
SysCtlMOSCConfigSet, SYSCTL_MOSC_INTERRUPT, SYSCTL_MOSC_NO_XTAL	No	No	No	No	Yes
SysCtlPeripheralPowerOff, SysCtlPeripheralPowerOn	No	No	No	No	Yes
SysCtlPeripheralReady	No	No	No	No	Yes
SysCtlPIOSCCalibrate	No	No	Yes	Yes	Yes
SysCtlResetCauseClear, SysCtlResetCauseGet, SYSCTL_CAUSE_LDO	No	No	No	No	No
SysCtlResetCauseClear, SysCtlResetCauseGet, SYSCTL_CAUSE_MOSCFAIL	No	Yes	Yes	Yes	Yes
SysCtlResetCauseClear, SysCtlResetCauseGet, SYSCTL_CAUSE_WDOG1	No	No	Yes	Yes	Yes
SysCtlUSBPLLDisable, SysCtlUSBPLLEnable	N/A	Yes	Yes	Yes	Yes

(1) The choices available for the SYSCTL_XTAL parameter are defined by the supported crystals for each device. See the microcontroller data sheet description of the `ITAL` field in the **RC** register.

6 Hibernation

6.1 Features

Table 14. Hibernation Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Battery-backed memory	64 words	64 words	64 words	64 words	16 words
VDD3ON mode	No	No	No	No	Yes
Hibernate with arbitrary power removal	No	No	No	No	Yes
WRC bit	No	Yes, some registers	Yes, some registers	Yes, some registers	Yes, all registers
Hold off HIBREQ during Flash operations	No	No	Yes	Yes	Yes
GNDX pin	No	No	No	No	Yes

6.2 Supporting Circuitry

Table 15. Required Supporting Circuitry

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Supported crystal	4.194304 MHz	4.194304 MHz	4.194304 MHz	4.194304 MHz	32.768 kHz
External load resistor on crystal	Yes	Yes	Yes	Yes	No
External pull-up on $\overline{\text{HIB}}$	No	Yes	Yes	Yes	No
External pull-up on $\overline{\text{WAKE}}$	No	No	Yes	Yes	Yes

6.3 Clocking Options

Table 16. Clocking Options

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Internal 32.768-kHz oscillator powered down during Hibernate if RTCEN bit is clear	Yes	Yes	Yes	Yes	No
Oscillator hysteresis control	No	No	No	No	Yes
Oscillator drive capability	No	No	No	No	Yes
Oscillator bypass	No	No	No	No	Yes

6.4 Battery Management

Table 17. Battery Management Options

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Configurable low-battery threshold	No	No	No	No	Yes
Software check of battery level	No	No	No	No	Yes
Hold off HIBREQ if battery low	No	No	No	No	Yes
Battery voltage monitored in Hibernate	No	No	No	No	Yes
Wake on low battery	No	No	No	No	Yes

6.5 Real-Time Clock (RTC)

Table 18. Real-Time Clock Options

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Sub second counter	No	No	No	No	Yes
RTC clock output	No	No	No	No	Yes
Match registers	Two	Two	Two	Two	One
Trim value applied	After 64 seconds	After 64 seconds	After 64 seconds	After 64 seconds	When **HIBRTCC** bits [5:0] go from 0x00 to 0x01, regardless of **HIBRTCLD** value

6.6 Hibernate Interrupt Sources

Table 19. Hibernate Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
`EXTW, LOWBAT, RTCALT0`	Yes	Yes	Yes	Yes	Yes
`WC`	No	No	No	No	Yes
`RTCALT1`	Yes	Yes	Yes	Yes	No

6.7 StellarisWare APIs

Table 20. Hibernate StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
HibernateBatCheckDone, HibernateBatCheckStart	No	No	No	No	Yes
HibernateClockConfig	No	No	No	No	Yes
HibernateClockSelect, HIBERNATE_CLOCK_SEL_DIV128	Yes	Yes	Yes	Yes	No
HibernateIntClear, HibernateIntDisable, HibernateIntEnable, HibernateIntStatus, HIBERNATE_INT_WR_COMPLETE	No	No	No	No	Yes
HibernateIntClear, HibernateIntDisable, HibernateIntEnable, HibernateIntStatus, HIBERNATE_INT_RTC_MATCH_1	Yes	Yes	Yes	Yes	No
HibernateLowBatGet, HibernateLowBatSet	No	No	No	No	Yes
HibernateRTCMatch1Get, HibernateRTCMatch1Set	Yes	Yes	Yes	Yes	No
HibernateRTCSSGet, HibernateRTCSSMatch0Get, HibernateRTCSSMatch0Set	No	No	No	No	Yes
HibernateWakeGet, HibernateWakeSet, HIBERNATE_WAKE_LOW_BAT	No	No	No	No	Yes

7 Internal Memory

7.1 Features

Table 21. Internal Memory Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
ROM	N/A	Yes	Yes	Yes	Yes
Flash memory	64 KB to 256 KB	64 KB to 128 KB	16 KB to 256 KB	384 KB to 512 KB	32 KB to 256 KB
SRAM	16 KB to 64 KB	16 KB to 64 KB	6 KB to 96 KB	48 KB to 96 KB	12 KB to 32 KB
EEPROM	N/A	N/A	N/A	NA	2 KB

7.2 ROM Features

Table 22. ROM Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Boot Loader	N/A	UART, SSI, I^2C	UART, SSI, I^2C, Ethernet	UART, SSI, I^2C, Ethernet	UART, SSI, I^2C, USB
DriverLib	N/A	Yes	Yes	Yes	Yes
SafeRTOS	N/A	No	LM3S9B96, LM3S9BN6	LM3S9D96, LM3S9DN6, LM3S9U96	No
AES tables	N/A	No	Yes	Yes	Yes
CRC	N/A	No	Yes	Yes	Yes
GPIO control of Boot Loader	N/A	No	Yes	Yes	Yes

7.3 Flash Memory Features

Table 23. Flash Memory Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
USECRL register	Yes	Yes	No	No	No
Separate two writes to the same word with erase	No	No	Yes	Yes	No
Write buffer	No	No	32 words	32 words	32 words
FCTL register	No	No	Yes	Yes	No

Note that StellarisWare APIs automatically adjust for these functional differences.

Table 24. Flash Memory-Resident Registers

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Debug port unlock restores Flash memory resident registers	No	Yes	Yes	Yes	Yes
USER_REG2, **USER_REG3** registers	No	Yes	Yes	Yes	Yes
USER_DBG register	Yes	Yes	No	No	No
BOOTCFG register	No	No	Yes	Yes	Yes
NW bit in **USER_REGn** and **USER_DBG** / **BOOTCFG** registers	Yes	Yes	Yes	Yes	No
Can change **USER_REGn** and **USER_DBG** / **BOOTCFG** registers after committing	No	No	No	No	Yes

7.4 SRAM Organization

Table 25. SRAM Organization

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
SRAM organization	One Bank	Two Banks	Two Banks	Two Banks	Two Banks

7.5 Internal Memory Interrupt Sources

Table 26. Internal Memory Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
PROGRIS, ERRIS, INVDRIS, VOLTRIS	No	No	No	No	Yes
ERIS	N/A	N/A	N/A	N/A	Yes
PRIS, ARIS	Yes	Yes	Yes	Yes	Yes

7.6 StellarisWare APIs

Table 27. Internal Memory StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
FlashIntClear, FlashIntDisable, FlashIntEnable, FlashIntStatus, FLASH_INT_EEPROM, FLASH_INT_VOLTAGE_ERR, FLASH_INT_DATA_ERR, FLASH_INT_ERASE_ERR, FLASH_INT_PROGRAM_ERR	No	No	No	No	Yes
FlashUsecGet, FlashUsecSet	Yes	Yes	No	No	No

8 μDMA

8.1 Features

Table 28. μDMA Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Per-peripheral completion interrupt	N/A	No	No	Yes	Yes
Channel assignments	N/A	Single	Primary/ Secondary	Primary/ Secondary	Up to Five Possible Assignments

Note that StellarisWare APIs automatically adjust for these functional differences.

8.2 Supported Peripherals

Table 29. Supported Peripherals

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
UART	N/A	Yes	Yes	Yes	Yes
SSI	N/A	Yes	Yes	Yes	Yes
USB	N/A	Yes	Yes	Yes	Yes
GPTM	N/A	No	Yes	Yes	Yes
Ethernet	N/A	N/A	Yes	Yes	N/A
ADC	N/A	No	Yes	Yes	Yes
I^2S	N/A	N/A	Yes	Yes	N/A
GPIO	N/A	No	No	No	Yes

8.3 StellarisWare APIs

Table 30. µDMA StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
uDMAChannelAssign	N/A	No	No	No	Yes
uDMAChannelSelectDefault	N/A	Yes	Yes	Yes	Yes(1)
uDMAChannelSelectSecondary	N/A	No	Yes	Yes	Yes(1)
uDMAIntClear, uDMAIntStatus	N/A	No	No	Yes	Yes

(1) This API works for parameters that match those available on Tempest- and Firestorm-class parts. For mappings that are added in the Blizzard class of microcontrollers, use the uDMAChannelAssign function.

9 GPIOs

9.1 Features

Table 31. GPIO Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Available ports	A - G, parts with Ethernet; A - H, parts without Ethernet	A - E, 64-pin parts; A - H, 100-pin parts	A - E, 64-pin parts; A - J, 100-/108-pin parts	A - E, 64-pin parts; A - J, 100-/108-pin parts	A - G, 64-pin parts; A - K, 100-pin parts; A - P, 144-pin parts
Interrupts per pin	No	No	No	No	Yes, on parts with Port P
Trigger µDMA	No	No	No	No	Yes
Configurable pin assignments	No	No	Yes	Yes	Yes
ADC inputs on GPIOs	No	Yes	Yes	Yes	Yes
ADC trigger	PB4	PB4	PB4	PB4	Any GPIO

9.2 StellarisWare APIs

Table 32. GPIO StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
GPIOADCTriggerDisable, GPIOADCTriggerEnable	No(1)	No(1)	No(1)	No(1)	Yes
GPIODMATriggerDisable, GPIODMATriggerEnable	N/A	No	No	No	Yes
GPIOIntTypeGet, GPIOIntTypeSet, GPIO_DISCRETE_INT	No	No	No	No	Yes
GPIOPinConfigure	No	No	Yes	Yes	Yes
GPIOPinTypeADC	No	Yes	Yes	Yes	Yes

(1) PB4 is selected as the ADC trigger source using the ADCSequenceConfigure function.

10 External Peripheral Interface

There are no differences between the EPI module on the Tempest-class microcontrollers and the one on the Firestorm-class microcontrollers.

11 General-Purpose Timers

11.1 Features

Table 33. GP Timer Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
32-/64-bit timers	No	No	No	No	Yes
Timer synchronization	No	No	No	No	Yes
Match interrupt	No	No	Yes	Yes	Yes
Snap-shot mode	No	No	Yes	Yes	Yes
µDMA trigger	N/A	No	Yes	Yes	Yes
ADC trigger choice	No	No	Yes	Yes	Yes

Table 34. GP Timer Added Registers

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
GPTMnPMR registers	Yes	No	Yes	Yes	Yes
GPTMTnV registers	No	No	Yes	Yes	Yes
GPTMTnPV registers	No	No	No	No	Yes
GPTMTnPS registers	No	No	No	No	Yes
GPTMRTCPD register	No	No	No	No	Yes

11.2 Periodic and One-Shot Mode Features

Table 35. Periodic and One-Shot Mode Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Timer use	Individual or Concatenated	Individual or Concatenated	Individual or Concatenated	Individual or Concatenated	Individual or Concatenated
Count direction	Down	Down	Down or Up	Down or Up	Down or Up
Prescaler available	Individual Mode Only	Individual Mode Only	Individual Mode Only(1)	Individual Mode Only(1)	Individual Mode Only(1)
Wait on trigger	No	No	Yes	Yes	Yes
Delayed load of new load value	No	No	No	No	Yes
Delayed load of new match value	No	No	No	No	Yes

(1) When counting up, the prescaler acts as a timer extension and holds the most-significant bits of the count.

11.3 Real-Time Clock (RTC) Mode Features

Table 36. RTC Mode Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Timer use	Concatenated	Concatenated	Concatenated	Concatenated	Concatenated
Count direction	Up	Up	Up	Up	Up
Prescaler available	No	No	No	No	No
Wait on trigger	No	No	No	No	No
Delayed load of new load value	No	No	No	No	Yes
Delayed load of new match value	No	No	No	No	Yes

11.4 Input Edge-Count Mode Features

Table 37. Input Edge-Count Mode Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Timer use	Individual	Individual	Individual	Individual	Individual
Count direction	Down	Down	Down	Down	Down or Up
Prescaler available	No	No	Yes(1)	Yes(1)	Yes(1)
Wait on trigger	No	No	No	No	No
Delayed load of new load value	No	No	No	No	Yes
Delayed load of new match value	No	No	No	No	Yes

(1) In this mode, the prescaler acts as a timer extension and holds the most-significant bits of the count.

11.5 Input Edge-Time Mode Features

Table 38. Input Edge-Time Mode Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Timer use	Individual	Individual	Individual	Individual	Individual
Count direction	Down	Down	Down	Down	Down or Up
Prescaler available	No	No	No	No	Yes(1)
Wait on trigger	No	No	No	No	No
Delayed load of new load value	No	No	No	No	Yes
Delayed load of new match value	No	No	No	No	Yes

(1) In this mode, the prescaler acts as a timer extension and holds the most-significant bits of the count.

11.6 PWM Mode Features

Table 39. PWM Mode Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Timer use	Individual	Individual	Individual	Individual	Individual
Count direction	Down	Down	Down	Down	Down
Prescaler available	No	No	No	No	Yes(1)
Wait on trigger	No	No	No	No	Yes
Delayed load of new load value	No	No	No	No	Yes
Delayed load of new match value	No	No	No	No	Yes
Option to set CCP to '1' at timeout	No	No	No	No	Yes

(1) In this mode, the prescaler acts as a timer extension and holds the most-significant bits of the count.

11.7 GPTM Interrupt Sources

Table 40. GPTM Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
WUERIS	No	No	No	No	Yes
TnMRIS	No	No	Yes	Yes	Yes
CnRIS, CnMRIS, TnTORIS	Yes	Yes	Yes	Yes	Yes

11.8 StellarisWare APIs

Table 41. Timer StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
TimerConfigure, TIMER_CFG_ONE_SHOT_UP, TIMER_CFG_PERIODIC_UP, TIMER_CFG_n_ONE_SHOT_UP, TIMER_CFG_n_PERIODIC_UP	No	No	Yes	Yes	Yes
TimerConfigure,TIMER_CFG_n_COUNT_UP, TIMER_CFG_n_TIME_UP	No	No	No	No	Yes
TimerControlWaitOnTrigger	No	No	Yes	Yes	Yes
TimerSynchronize	No	No	No	No	Yes

12 Watchdog Timers

12.1 Features

Table 42. Watchdog Timer Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Watchdog 0 on system clock	Yes	Yes	Yes	Yes	Yes
Watchdog 1 on PIOSC	No	No	Yes	Yes	Yes
WRC bit for Watchdog 1	No	No	Yes	Yes	Yes
NMI option	No	No	No	No	Yes

12.2 StellarisWare APIs

Table 43. Watchdog Timer StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
WatchdogIntTypeSet	No	No	No	No	Yes

13 Analog-to-Digital Converters (ADC)

13.1 Features

Table 44. ADC Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Resolution	10-bit	10-bit	10-bit	12-bit, with 10-bit compatibility mode	12-bit
Analog inputs	ADC[0-7]	ADC[0-7]	AIN[0-15]	AIN[0-15]	AIN[0-23]
Sample phase shift	No	No	Yes	Yes	Yes
Voltage reference	Internal 3 V, external 3 V	Internal 3 V, external 3 V	Internal 3 V, external 3 V	VREFA Internal 3 V, external 3 V, external 1 V	VDDA / GNDA, VREFA+ / VREFA–
µDMA	N/A	No	Yes	Yes	Yes
PIOSC clock option	No	No	No	No	Yes
Digital comparators	No	No	Yes	Yes	Yes
Option to synchronize modules	N/A	N/A	Yes	Yes	Yes

13.2 ADC Interrupt Sources

Table 45. ADC Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
INRDC	No	No	Yes	Yes	Yes
DMAINRn	N/A	No	Yes	Yes	Yes
INRn	Yes	Yes	Yes	Yes	Yes

13.3 StellarisWare APIs

Table 46. ADC StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
ADCComparatorConfigure, ADCCompartorIntClear, ADCComparatorIntDisable, ADCComparatorIntEnable, ADCComparatorIntStatus, ADCComparatorRegionSet, ADCComparatorReset	No	No	Yes	Yes	Yes
ADCPhaseDelayGet, ADCPhaseDelaySet	No	No	Yes	Yes	Yes
ADCProcessorTrigger, ADC_TRIGGER_WAIT	No	No	Yes	Yes	Yes

Table 46. ADC StellarisWare Available Functions and Parameters (continued)

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
ADCReferenceGet, ADCReferenceSet, ADC_REF_EXT_1V	No	No	No	Yes	No
ADCResolutionGet, ADCResolutionSet	No	No	No	Yes	No
ADCSequenceStepConfigure, ADC_CTL_CMPn	No	No	Yes	Yes	Yes

14 Universal Asynchronous Receivers/Transmitters (UARTs)

14.1 Features

Table 47. UART Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
µDMA	N/A	Yes	Yes	Yes	Yes
Modem support[1]	No	No	Yes	Yes	Yes
LIN support	No	No	Yes	Yes	Yes
9-Bit support	No	No	No	No	Yes
EOT interrupts	No	No	Yes	Yes	Yes
ISO 7816 support	No	No	Yes	Yes	Yes
Fastest baud clock	Sysclk/16	Sysclk/16	Sysclk/8	Sysclk/8	Sysclk/8
Option for PIOSC as baud clock	No	No	No	No	Yes

(1) Modem support is only available on UART1 on some devices.

14.2 UART Interrupt Sources

Table 48. UART Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
LME5RIS, LME1RIS, LMSBRIS	No	No	Yes	Yes	Yes
9BITRIS	No	No	No	No	Yes
EOTRIS	No	No	Yes[1]	Yes[1]	Yes[1]
DSRRIS, DCDRIS, CTSRIS, RIRIS	[2]No	No	Yes	Yes	Yes[3]
OERIS, BERIS, PERIS, FERIS, RTRIS, TXRIS, RXRIS	Yes	Yes	Yes	Yes	Yes

(1) Reported on TXRIS when the EOT bit in the **UARTCTL** register is set.
(2) Modem support is only available on UART1 on some devices.
(3) Parts in 64-pin package do not support DSRRIS, DCDRIS, and RIRIS.

14.3 StellarisWare APIs

Table 49. UART StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
UART9BitAddrSend, UART9BitAddrSet, UART9BitDisable, UART9BitEnable	No	No	No	No	Yes
UARTClockSourceGet, UARTClockSourceSet	No	No	No	No	Yes
UARTDMADisable, UARTDMAEnable	No	Yes	Yes	Yes	Yes
UARTFlowControlGet, UARTFlowControlSet	No	No	Yes	Yes	Yes
UARTIntClear, UARTIntDisable, UARTIntEnable, UARTIntStatus, UART_INT_9BIT	No	No	No	No	Yes
UARTIntClear, UARTIntDisable, UARTIntEnable, UARTIntStatus, UART_INT_DSR, UART_INT_DCD, UART_INT_CTS, UART_INT_RI(1)	No	No	Yes	Yes	Yes(2)
UARTModemControlClear, UARTModemControlGet, UARTModemControlSet(1)	No	No	Yes	Yes	Yes(3)
UARTModemStatusGet(1)	No	No	Yes	Yes	Yes(4)
UARTSmartCardDisable, UARTSmartCardEnable	No	No	Yes	Yes	Yes
UARTTxIntModeGet, UARTTxIntModeSet, UART_TXINT_MODE_EOT	No	No	Yes	Yes	Yes

(1) Modem support is only available on UART1.
(2) Parts in a 64-pin package do not support UART_INT_DSR, UART_INT_DCD, and UART_INT_RI.
(3) Parts in a 64-pin package do not support the UART_OUTPUT_DTR parameter for these functions.
(4) Parts in a 64-pin package do not support the UART_INPUT_RI, UART_INPUT_DCD, and UART_INPUT_DSR parameters for this function.

15 Synchronous Serial Interface (SSI)

15.1 Features

Table 50. SSI Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
µDMA	N/A	Yes	Yes	Yes	Yes
Fastest slave clock	1/12 SysClk	1/12 SysClk	1/12 SysClk	1/12 SysClk	1/6 SysClk
EOT interrupts	No	No	Yes	Yes	Yes
Option for PIOSC as baud clock	No	No	No	No	Yes

15.2 SSI Interrupt Sources

Table 51. SSI Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
EOTRIS	No	No	Yes(1)	Yes(1)	Yes(1)
TXRIS, RXRIS, RTRIS, RORRIS	Yes	Yes	Yes	Yes	Yes

(1) Reported on TXRIS when the EOT bit in the **SSICR1** register is set.

15.3 StellarisWare APIs

Table 52. SSI StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
SSIClockSourceGet, SSIClockSourceSet	No	No	No	No	Yes
SSIDMADisable, SSIDMAEnable	No	Yes	Yes	Yes	Yes

16 Inter-Integrated Circuit (I²C) Interface

16.1 Features

Table 53. I² C Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
High-speed	No	No	No	No	Yes
Dual slave address	No	No	No	No	Yes
Clock low timeout	No	No	No	No	Yes
ACK override	No	No	No	No	Yes

16.2 I²C Interrupt Sources

Table 54. I²C Interrupt Sources

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
CLKRIS	No	No	No	No	Yes
STOPRIS, STARTRIS	No	No	Yes	Yes	Yes

16.3 StellarisWare APIs

Table 55. I²C StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
I2CMasterIntClearEx, I2CMasterIntDisableEx, I2CMasterIntEnableEx, I2CMasterIntStatusEx I2C_MASTER_INT_TIMEOUT	No	No	No	No	Yes
I2CMasterLineStateGet	No	No	No	No	Yes
I2CMasterTimeoutSet	No	No	No	No	Yes
I2CSlaveACKOverride, I2CSlaveACKValueSet	No	No	No	No	Yes
I2CSlaveAddressSet, secondary address	No	No	No	No	Yes
I2CSlaveIntClearEx, I2CSlaveIntDisableEx, I2CSlaveIntEnableEx, I2CSlaveIntStatusEx I2C_SLAVE_INT_STOP, I2C_SLAVE_INT_START	No	No	Yes	Yes	Yes

Table 55. I^2C StellarisWare Available Functions and Parameters (continued)

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
I2CSlaveStatus, I2C_SLAVE_ACT_OWN2SEL, I2C_ACT_QCMD, I2C_SLAVE_ACT_QCMD_DATA	No	No	No	No	Yes

17 Inter-Integrated Circuit Sound (I^2S) Interface

There are no differences between the I^2S module on the Tempest-class microcontrollers and the one on the Firestorm-class microcontrollers.

18 Controller Area Network (CAN) Module

Table 56. CAN Clocking

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
CAN clocking	PLL/50 = 8 MHz	System Clock	System Clock	System Clock	System Clock

19 Ethernet Controller

19.1 Features

Table 57. Ethernet Controller Features

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
MII available on some devices	No	N/A	Yes	Yes	N/A
µDMA	N/A	N/A	Yes	Yes	N/A
MDI/MDI-X	Automatic	N/A	With software assist	With software assist	N/A
PHY power	VCCPHY / GNDPHY	N/A	VDD / GND	VDD / GND	N/A

19.2 MAC Register Differences

Table 58. MAC Register Differences

Register	Fury	DustDevil	Tempest	Firestorm	Blizzard
MACMADD	No	N/A	Yes, devices with MII	Yes, devices with MII	N/A
MACLED	No, function provided in PHY	N/A	Yes, devices with integrated PHY	Yes, devices with integrated PHY	N/A
MDIX	No, function provided in PHY	N/A	Yes, devices with integrated PHY	Yes, devices with integrated PHY	N/A

Note that StellarisWare APIs automatically adjust for these functional differences.

19.3 PHY Register Differences

Table 59. PHY Register Differences

Register	Fury	DustDevil	Tempest	Firestorm	Blizzard
MR1, option to suppress preamble on management frames	Yes	N/A	No	No	N/A
MR2, PHY identifier 1	0x000E	N/A	0x0161	0x00161	N/A
MR3, PHY identifier 2	0x000E	N/A	0x0161	0x00161	N/A
MR16	Control of minor options	N/A	Revision Identifier	Revision Identifier	N/A
MR17	Interrupt Control and Status	N/A	Control of minor options	Control of minor options	N/A
MR18	Diagnostic	N/A	N/A	N/A	N/A
MR19	Transceiver Control	N/A	N/A	N/A	N/A
MR23	LED Configuration	N/A	N/A, function provided in MAC	N/A, function provided in MAC	N/A
MR24	MDI/MDIX Control	N/A	N/A, function provided in MAC	N/A, function provided in MAC	N/A
MR27	N/A	N/A	Special Control and Status	Special Control and Status	N/A
MR29	N/A	N/A	Interrupt Status	Interrupt Status	N/A
MR30	N/A	N/A	Interrupt Mask	Interrupt Mask	N/A
MR31	N/A	N/A	PHY Special Control and Status	PHY Special Control and Status	N/A

Note that StellarisWare APIs automatically adjust for these functional differences.

19.4 StellarisWare APIs

Table 60. Ethernet StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
EthernetConfigGet, EthernetConfigSet, ETH_CFG_TS_TSEN	Yes[1]	N/A	Yes[1]	Yes[1]	N/A
EthernetPHYAddrSet	No	N/A	Yes[2]	Yes[2]	N/A
EthernetPHYPowerOff, EthernetPHYPowerOn	Yes	N/A	Yes[3]	Yes[3]	N/A

(1) Only on devices that support IEEE 1588.
(2) Only on devices that do not have an integrated PHY.
(3) Only on devices that have an integrated PHY.

20 USB Controller

20.1 Features

Table 61. USB Controller Features

Register	Fury	DustDevil	Tempest	Firestorm	Blizzard
Endpoints	N/A	8	32	32	16
Endpoint memory	N/A	2 kB	4 kB	4 kB	4 kB
µDMA	N/A	Yes	Yes[1]	Yes[1]	Yes[1]
USB0RBIAS pin	N/A	Yes	Yes	Yes	No
DEVMODOTG bit	N/A	No	Yes	Yes	Yes
VBUS droop control	N/A	No	Yes	Yes	Yes
Valid ID detect	N/A	No	Yes	Yes	Yes

(1) Endpoints are selected using the **USBDMASEL** register.

20.2 StellarisWare APIs

Table 62. USB StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
USBEndpointDMAChannel	N/A	No	Yes	Yes	Yes
USBHostPwrConfig, USB_HOST_PWREN_FILTER	N/A	No	Yes	Yes	Yes

21 Analog Comparator

There are no differences among the Analog Comparators on the various classes of product.

22 PWM Module

22.1 Features

Table 63. PWM Controller Features

Register	Fury	DustDevil	Tempest	Firestorm	Blizzard
Extended PWM synchronization	No	Some[1]	Yes	Yes	Yes
Extended PWM fault handling	No	Some[2]	Yes	Yes	Yes
Control over when to update **PWMENABLE** register	No	No	Yes	Yes	Yes

(1) To identify devices with this capability, look for *Extended PWM synchronization* in the feature list at the start of the PWM chapter in the data sheet.

(2) To identify devices with this capability, look for *Extended PWM fault handling* in the feature list at the start of the PWM chapter in the data sheet.

22.2 Extended PWM Synchronization Features

- Option to update Dead-Band Rising-/Falling-Edge delay immediately, after the generator counts to 0 or after a synchronous update is requested
- Option to update Dead-Band Control register immediately, after the generator counts to 0 or after a synchronous update is requested
- Option to update PWM Generator registers immediately, after the generator counts to 0 or after a synchronous update is requested

22.3 Extended PWM Fault Handling Features

- Up to four FAULTn signals
- Option to specify how PWM signals are driven on a fault
- Option to latch a fault condition
- Option to provide a minimum fault condition period
- Option to generate a fault based on a single FAULTn input or on the ORed value of all FAULTn inputs and the ADC module digital comparators

22.4 StellarisWare APIs

Table 64. PWM StellarisWare Available Functions and Parameters

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
PWMEnableUpdateComplete, PWMEnableUpdateModeConfigure	N/A	Some(1)	Yes	Yes	Yes
PWMGenConfigure, PWM_GEN_MODE_GEN_NO_SYNC, PWM_GEN_MODE_GEN_SYNC_LOCAL, PWM_GEN_MODE_GEN_SYNC_GLOBAL, PWM_GEN_DB_NO_SYNC, PWM_GEN_DB_SYNC_LOCAL, PWM_GEN_DB_SYNC_GLOBAL	N/A	Some(1)	Yes	Yes	Yes
PWMGenConfigure, PWM_GEN_MODE_FAULT_LATCHED, PWM_GEN_MODE_FAULT_UNLATCHED, PWM_GEN_MODE_FAULT_MINPER, PWM_GEN_MODE_FAULT_NO_MINPER, PWM_GEN_MODE_FAULT_EXT, PWM_GEN_MODE_FAULT_LEGACY	N/A	Some(2)	Yes	Yes	Yes
PWMGenFaultClear, PWMGenFaultConfigure. PWMGenFaultStatus, PWMGenFaultTriggerGet, PWMGenFaultTriggerSet, PWMOutputFaultLevel	N/A	Some(2)	Yes	Yes	Yes

(1) To identify devices with this capability, look for *Extended PWM synchronization* in the feature list at the start of the PWM chapter in the data sheet.

(2) To identify devices with this capability, look for *Extended PWM fault handling* in the feature list at the start of the PWM chapter in the data sheet.

23 Quadrature Encoder Interface (QEI)

23.1 Features

Table 65. QEI Programmable Noise Filter

Feature	Fury	DustDevil	Tempest	Firestorm	Blizzard
Programmable noise filter	No	No	Yes	Yes	Yes

23.2 StellarisWare APIs

All current StellarisWare QEI APIs can be used on all classes.

24 Peripheral Pin-Mapping APIs

24.1 StellarisWare APIs

Table 66. Peripheral Pin-Mapping StellarisWare APIs

StellarisWare Function / Parameter	Fury	DustDevil	Tempest	Firestorm	Blizzard
PeripheralEnable, PinTypeADC, PinTypeCAN, PinTypeComparator, PinTypeEthernetLED, PinTypeI2C, PinTypePWM, PinTypeQEI, PinTypeSSI, PinTypeTimer, PinTypeUART, PinTypeUSBDigital	Yes	Yes	No	No	No

25 Conclusion

Among the various classes of Stellaris microcontrollers, there are minor hardware and software differences. This application note has provided an overview of these differences for the Fury, DustDevil, Tempest, Firestorm, and Blizzard classes. By using StellarisWare APIs, software can be easily moved among the various classes as these APIs comprehend all functional differences.

26 References

The following related documents and software are available on the Stellaris web site at www.ti.com/stellaris:

- Stellaris Microcontroller Data Sheet (individual device documents available through product selection tool).
- Stellaris Microcontroller ROM User Guide (individual device documents available through product selection tool).
- StellarisWare Driver Library. Available for download at www.ti.com/tool/sw-drl.
- StellarisWare Driver Library User's Manual, publication SW-DRL-UG (literature number SPMU019).

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