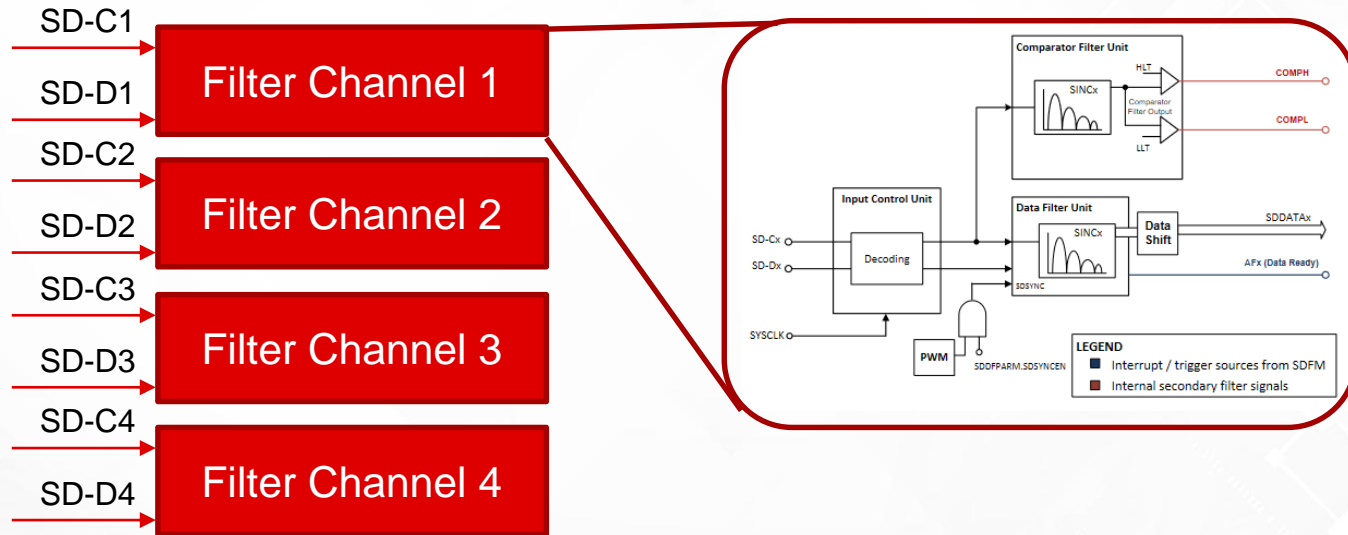


SDFM – Type 0 Overview

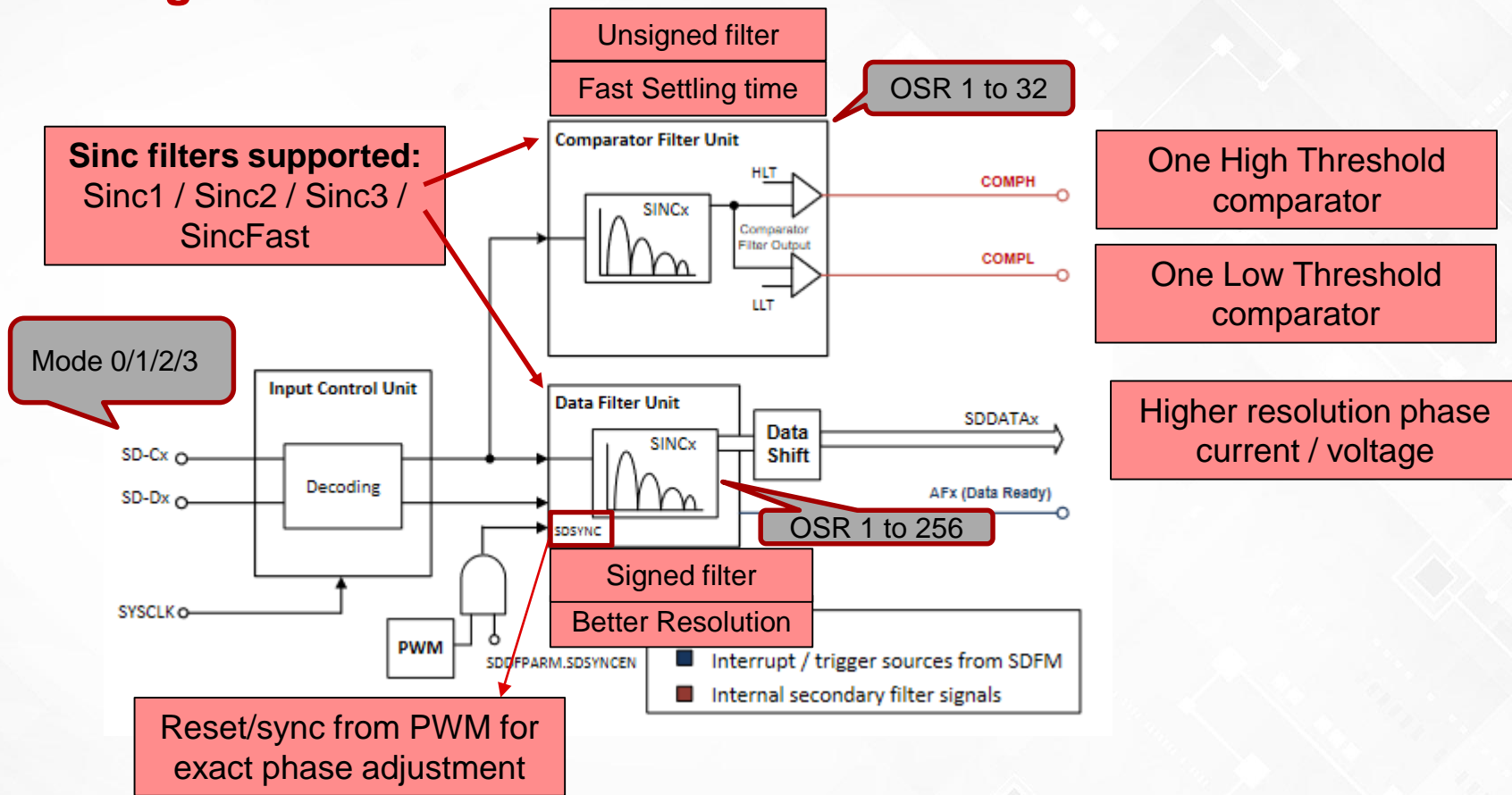
C2000 Sigma Delta Filter Module (SDFM) Series

What is SDFM?

- Four-channel configurable Digital Low pass Filter based on Sinc filters
- Filter channels are identical and independently configurable
- Each filter channel has comparator filter and data filter which work on same bit stream

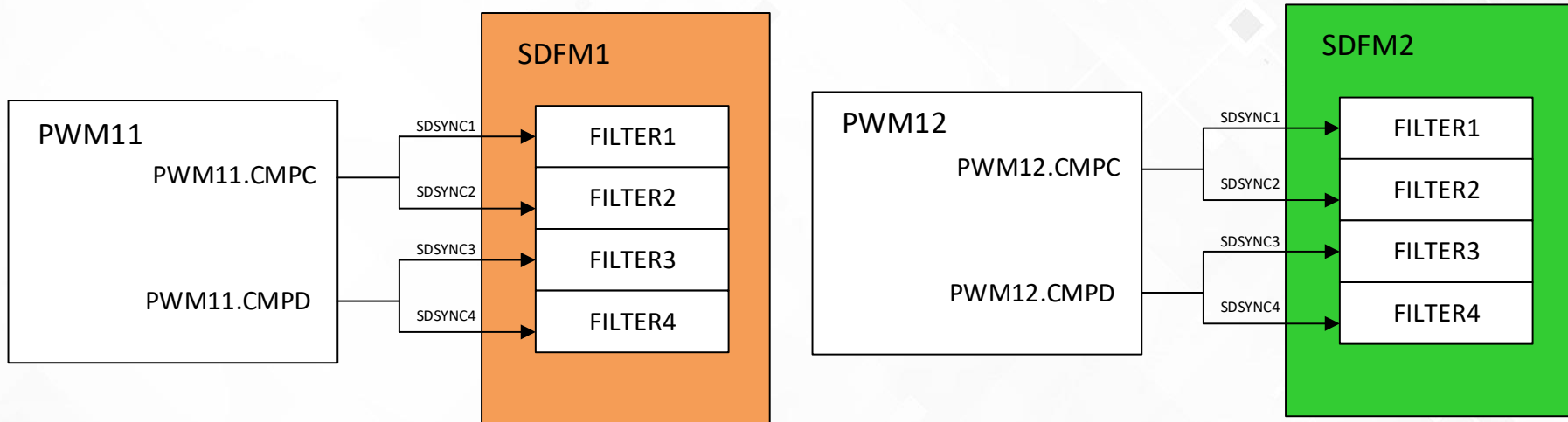


Block Diagram of One Filter Module



PWM Sync (SDSYNC)

- Provide ability to use PWM to reset / synchronize data filter for exact phase adjustment



SDFM Noise immunity

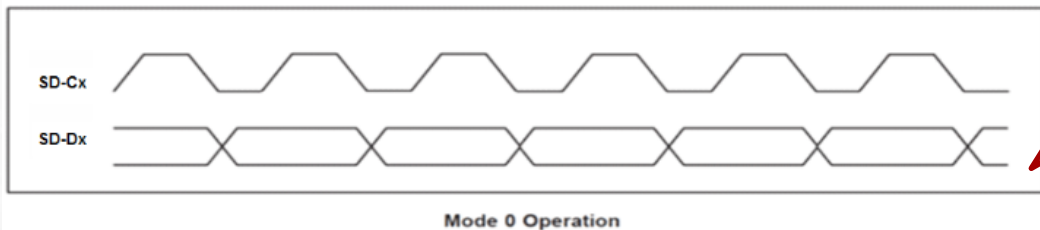
Layout Guidelines: Best Practices for clock and data line routing and termination

Application Report

[Achieving Better Signal Integrity With Isolated Delta-Sigma Modulators in Motor Drives](#)

Improper routing schemes of clock and data signals on the PCB can create signal-integrity issues and sample and hold violations.

Additional C2000 HW Protection: GPIO 3-sample QUAL feature provides protection against occasional random noise glitches

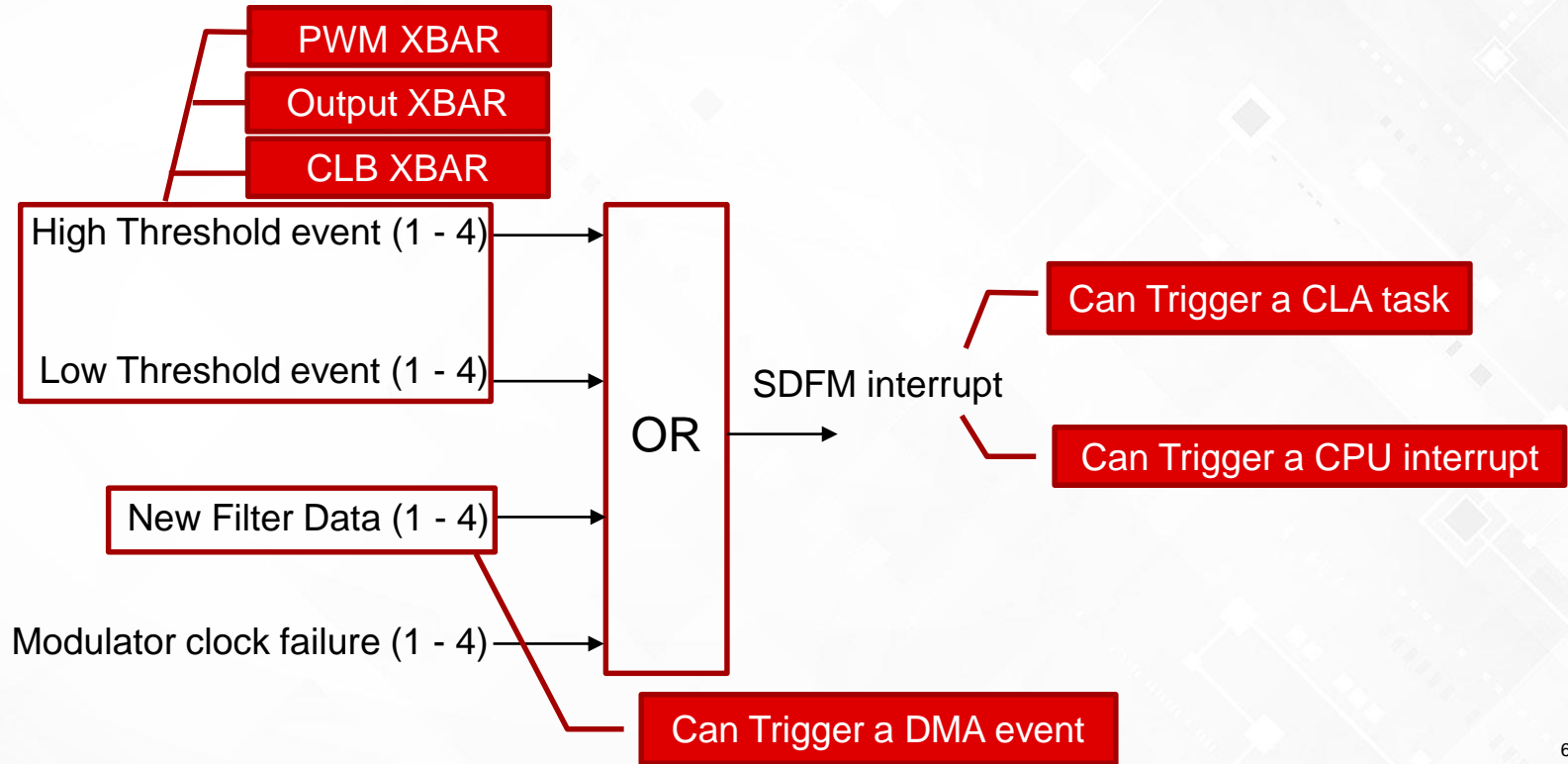


Mode 0

Recommended mode for best noise immunity

SDFM Interrupt

- Each SDFM instance can generate one CPU interrupt



SDFM Sysconfig support

SDFM (1 of 2 Added) + ADD REMOVE ALL

✓ SDFM_1 🗑

Name	SDFM_1
Use Filter Channel 1	<input checked="" type="checkbox"/>
Use Filter Channel 2	<input checked="" type="checkbox"/>
Use Filter Channel 3	<input checked="" type="checkbox"/>
Use Filter Channel 4	<input checked="" type="checkbox"/>

FILTER Configurations ∨

Filter1	Configure Filter1	∧
Filter2	Configure Filter2	∧
Filter3	Configure Filter3	∧
Filter4	Configure Filter4	∧

Interrupt Configurations ∨

Use SDFM interrupts	<input type="checkbox"/>
Register Interrupts	None ∨
PinMux Use Case	ALL ∨
PinMux	Peripheral and Pin Configuration ∧

Provides ability to select the filter channels to be used

Each filter channel has be independently configured

SDFM Sysconfig support

Filter1 Configure Filter1	(Mode0) Modulator clock is identical to the data rate
Enable Data Filter	<input checked="" type="checkbox"/>
ComparatorFilter Settings	
FilterType	Sinc3 structure
COSR	32
Data rate (us)	1.6
Latency (us)	4.8
High Level Threshold	32767
Low Level Threshold	0
DataFilter Settings	
FilterType	Sinc3 structure
DOSR	256
Data rate (us)	12.8
Latency (us)	38.4
Min (Data filter output)	-16777216
Max (Data filter output)	16777216
Data Filter Output Representation	32 bits 2's complement format
Shift 32-bit filter output by x bits	10
Use PWM synchronization	<input type="checkbox"/>
SD_modulator_Settings	
SD Modulator Frequency (MHz)	20
Differential clipping voltage (V)	0.32
DC input to SD-modulator (V)	0
Bitstream 1's density	0.5
Theoretical Data filter Output	0
Theoretical Comparator filter Output	16384

Select SDFM mode

Configure Comparator filter

Data rate and Latency automatically calculated

Configure Data filter

SDFM modulator settings

SDFM Sysconfig support

Interrupt Configurations

Use SDFM interrupts

SDFM interrupt Configure SDFM interrupt

Modulator Clock failure	None
Low Threshold interrupt	<input type="checkbox"/> FILTER 1
High Threshold interrupt	<input type="checkbox"/> FILTER 2
Data Acknowledge	<input type="checkbox"/> FILTER 3
	<input type="checkbox"/> FILTER 4

Register Interrupts None

PinMux Use Case ALL

PinMux Peripheral and Pin Configuration

Sigma-Delta Peripheral	Any(SD2)
SD_C1	Any(GPIO25)
SD_D1	Any(GPIO24)
SD_C2	Any(GPIO133)
SD_D2	Any(GPIO26)
SD_C3	Any(GPIO29)
SD_D3	Any(GPIO28)
SD_C4	Any(GPIO31)
SD_D4	Any(GPIO30)

Enable / Disable SDFM interrupts for each filter channel

Configure SDFM pins

Additional SDFM Resources

Foundational Materials

- [How delta-sigma ADCs work, Part 1](#)
- [How delta-sigma ADCs work, Part 2](#)
- [Nuts and Bolts of the Delta-Sigma Converter](#) (video)
- [C2000 Academy](#) with Hands-on Labs

Expert Materials

- [Achieving Better Signal Integrity With Isolated Delta-Sigma Modulators in Motor Drives](#)
- [C2000 DesignDRIVE Development Kit for Industrial Motor Control](#)
- [Isolated Current Shunt and Voltage Measurement Kit](#)
- [Three Phase Power Factor Correction Reference Design Using C2000 MCU](#)

Check Video Description for Additional Resources