

FCFD Variant Update

ASIC WG Monthly Update

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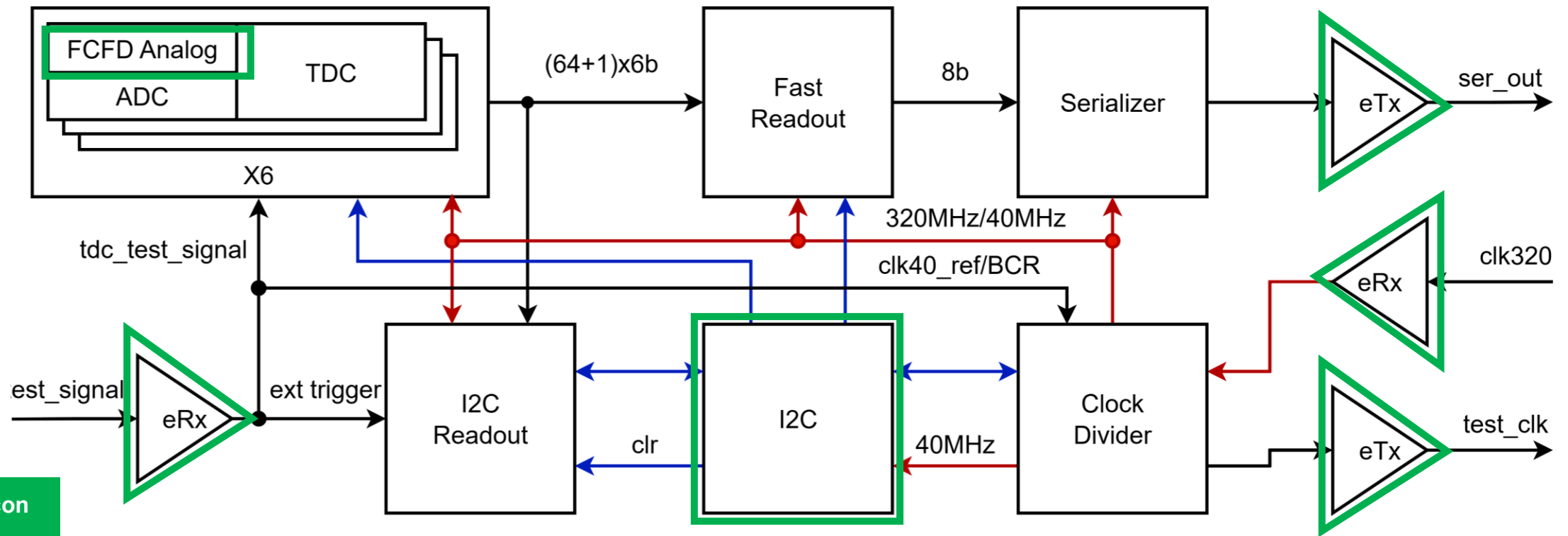


Updates

- HRPPD FDR completed this week for CD-3C
- Push for specification signoff for FCFD design this month
- Testing FCFD Variant FEB for signal integrity and reflections
- Preliminary power dissipation analysis

FCFD1.2

- This prototype implements and tests components beyond the FCFD1.1
 - This version focuses on digitization (ADC/TDC), readout (fast/I2C) and configuration (I2C)
 - Fast readout builds data frame; I2C readout uses self/ext trigger



Silicon
proven

Elec

Power Consumption per Detector

- Power per HRPPD: 10.5 W
 - 8x FEBs = 9W
 - IpGBT and VTRX+ = 1.5W
 - Includes efficiency losses
- pfRICH: 716 W total
 - 68 units
- hpDIRC: 756W total
 - 72 units
 - 6x HRPPDs per crate = 63W

FEB Power Consumption		
Parts	Per unit	QTY
FCFD (32-ch)	200mW	4
bPOL48	70% eff	1 per line
Per FEB	1.13W	8
Total	~9W	Per HRPPD

Transceiver Power Consumption		
Parts	Per unit	QTY
IpGBT	750mW	1
VTRX+	300mW	1
bPOL48	70% eff	1 per line
Total	~1.5W	Per HRPPD

QUESTIONS?



Appendix

Data Rate and Bandwidth

- Data Rate for pfRICH

Average Hit Rate	Average Data Rate per HRPPD (1 unit)	Transceiver per HRPPD (1 unit)	Transceiver Bandwidth	Data Rate per pfRICH (68 units)
12,000 /cm ² /s	200 Mbps	1	7.68 Gbps	13.6 Gbps

- Each HRPPD will have its own transceiver pairs (VTRX+ and IpGBT) for redundancy – will only lose 1 sensor if data failure
- Two transceivers would cover the entire pfRICH

- FCFD Bandwidth for pfRICH

Max Data Rate per HRPPD Channel	Max Data Rate per HRPPD Channel	Number of Channels per FCFD	Max Data Rate per 32 Channels	FCFD Data Bandwidth
20,000 kHz	3.2 Mbps	32	102 Mbps	320 Mbps

- Rates for hpDIRC

- The hpDIRC is expecting a similar average hit rate (10,000 /cm²/s)
- Each HRPPD will still contain a transceiver pair
 - Data rate is OK, plenty of overhead
- Max rate is TBD and FCFD bandwidth will be checked once available

