



July 16, 2025, ePIC Collaboration Meeting

MOSAIX Mockup Board

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ORNL

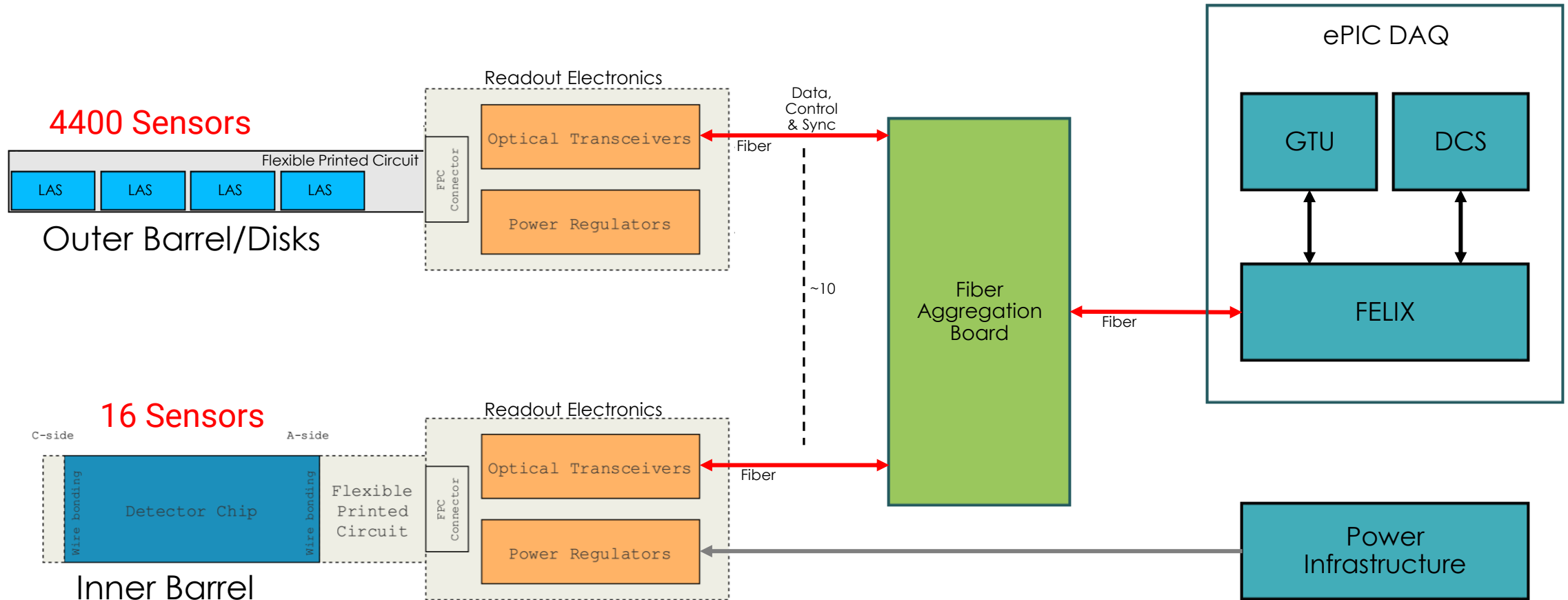


U.S. DEPARTMENT OF
ENERGY

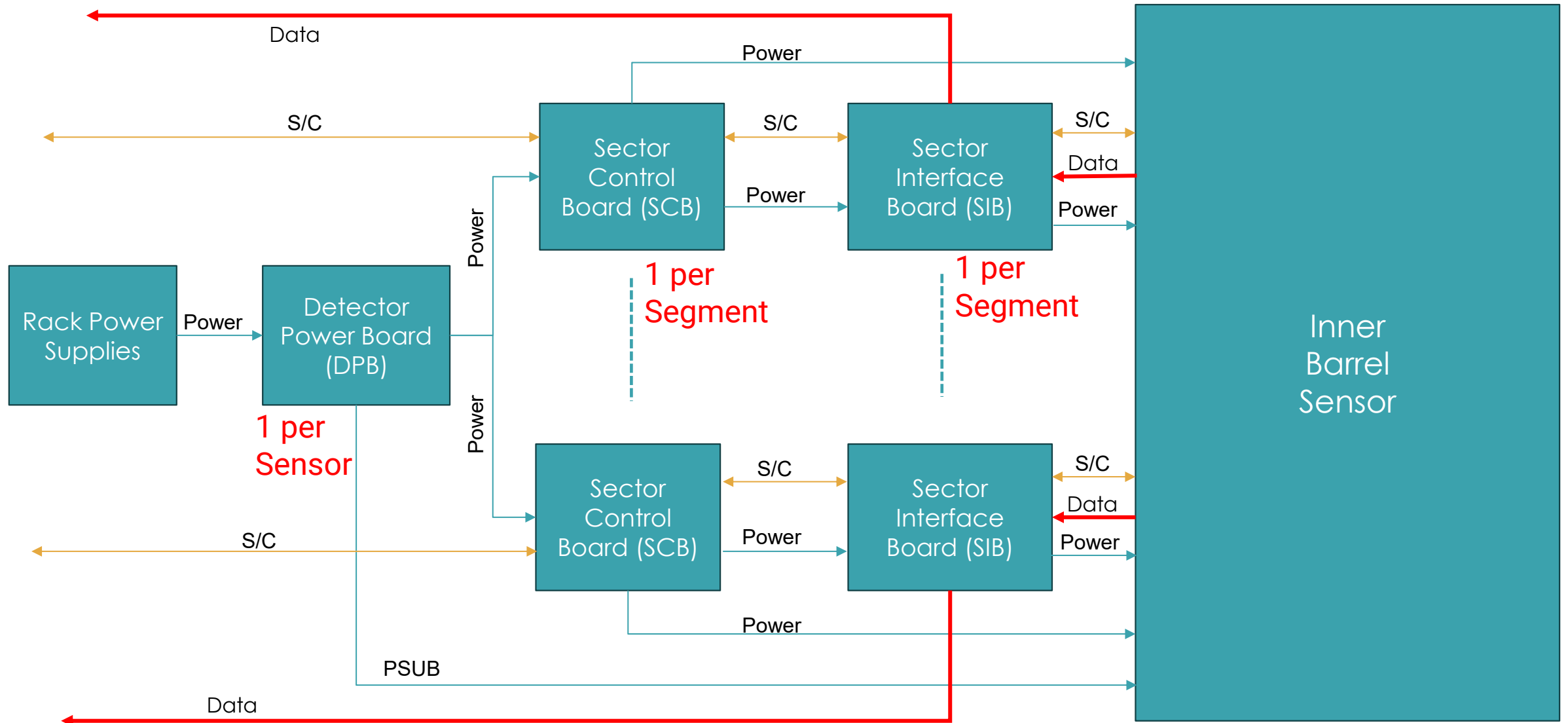
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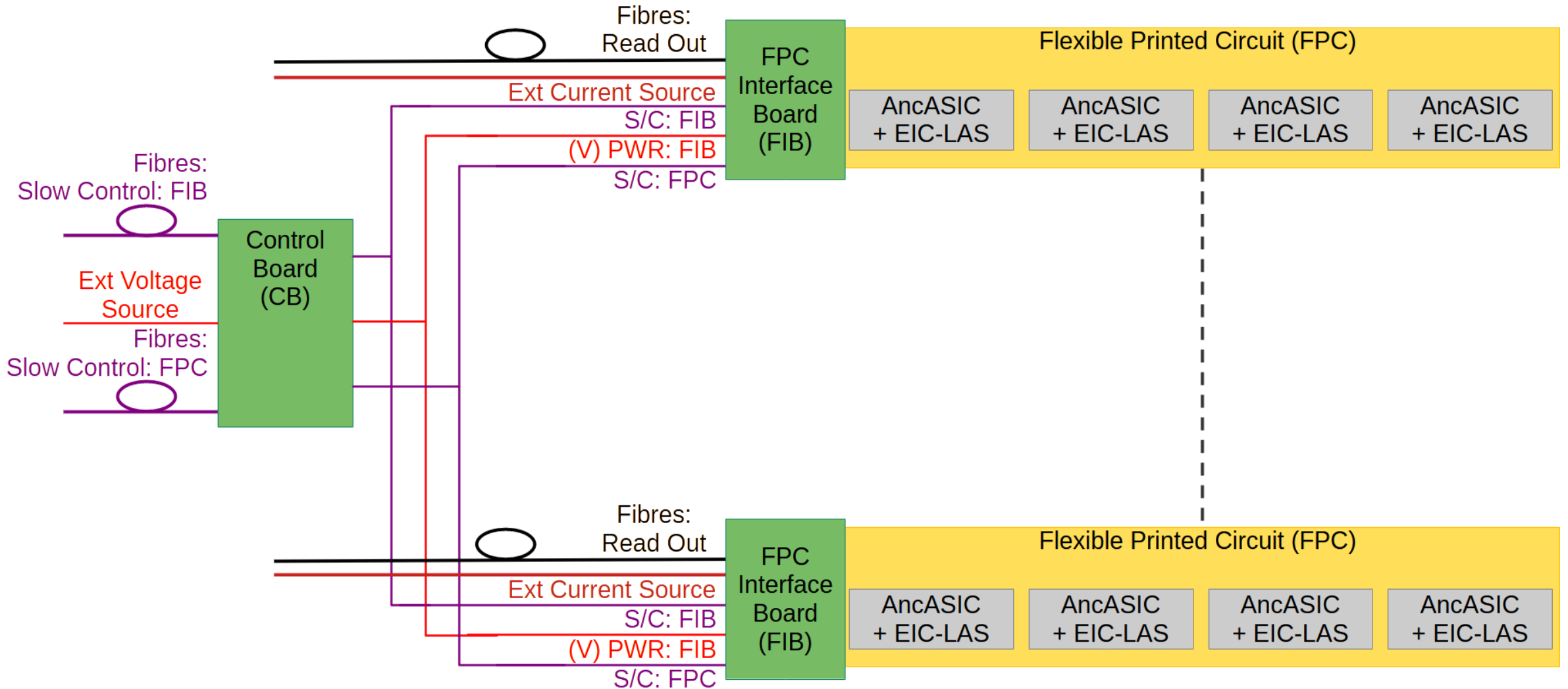
SVT Electronics – Simplified Overview



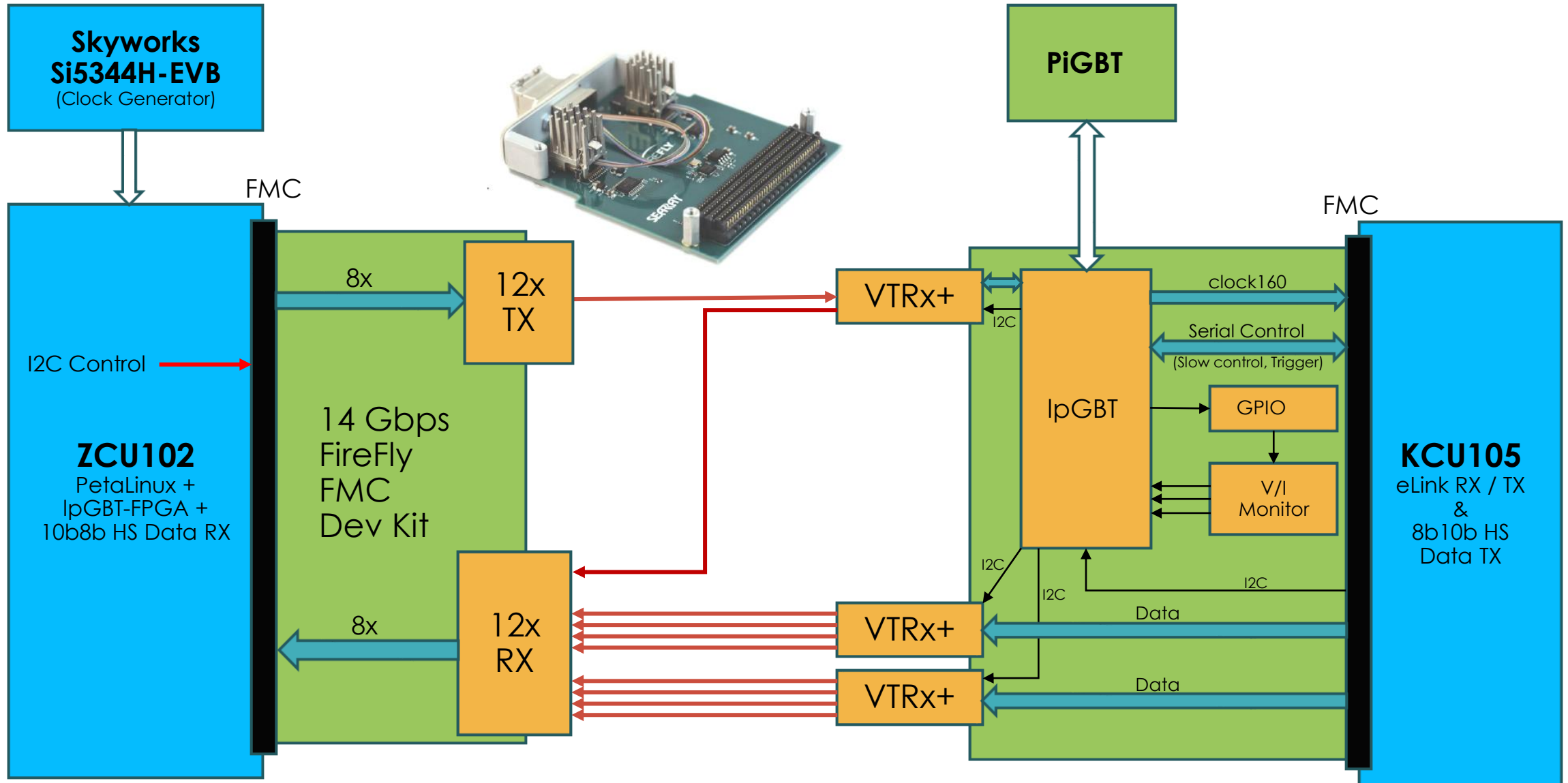
IB Readout, Power & Controls Scheme



OB & Disc Readout, Power & Controls Scheme



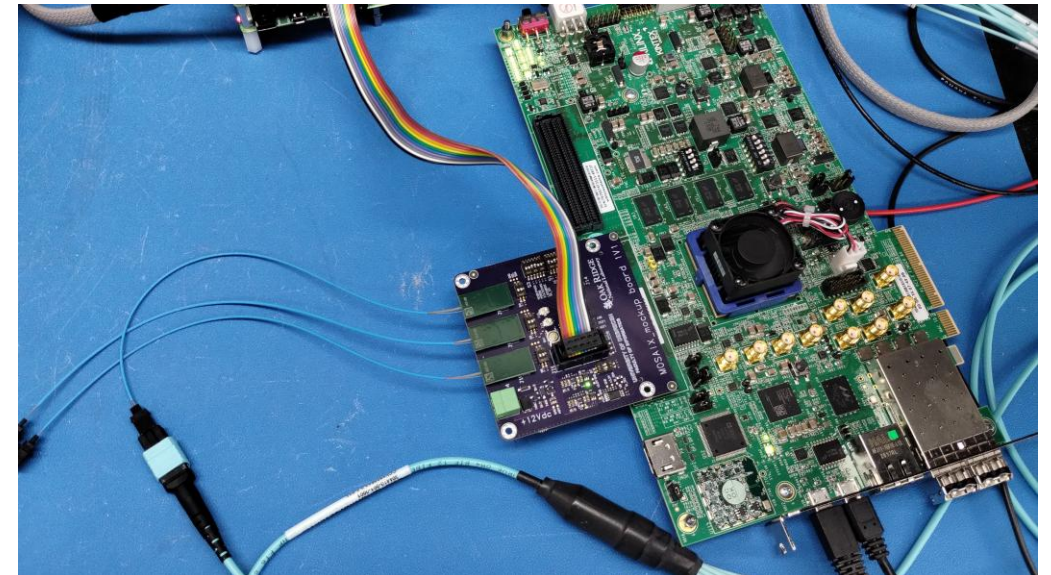
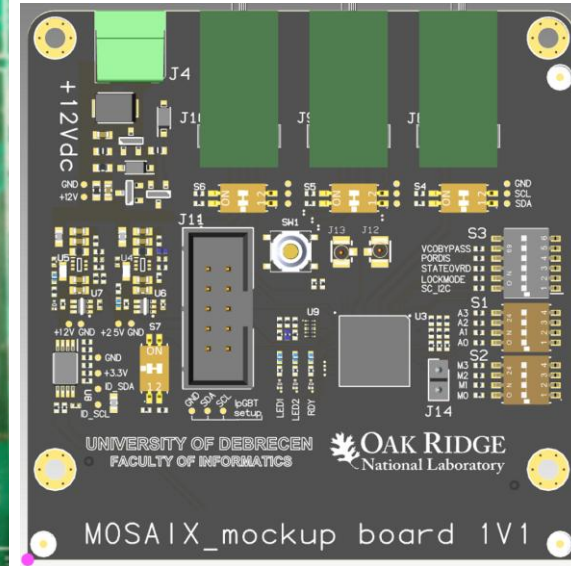
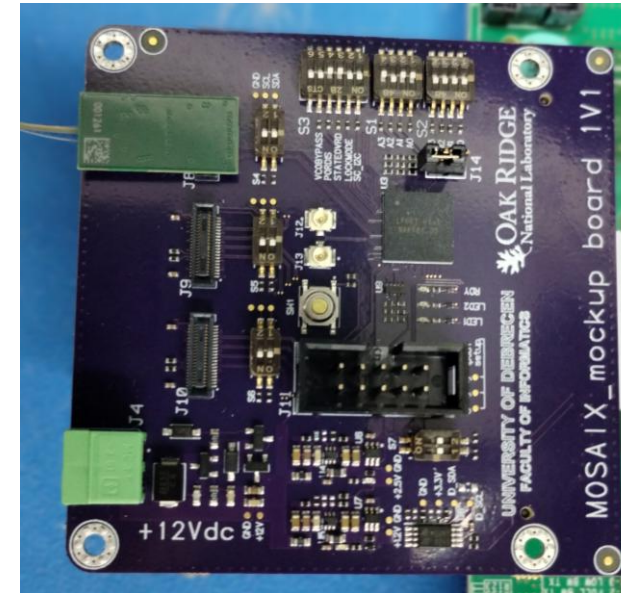
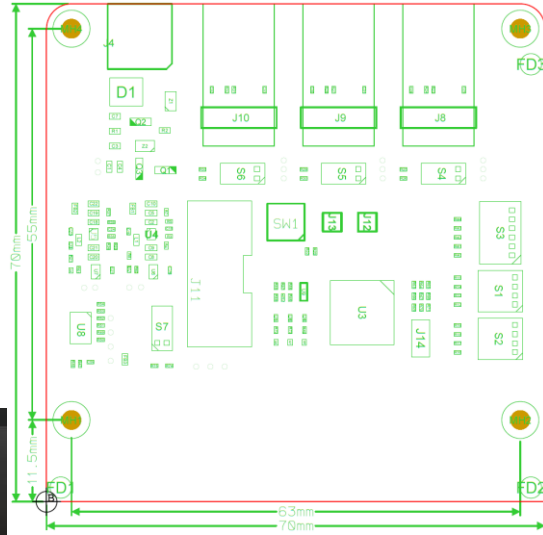
Test Setup at ORNL



Mockup Board Content

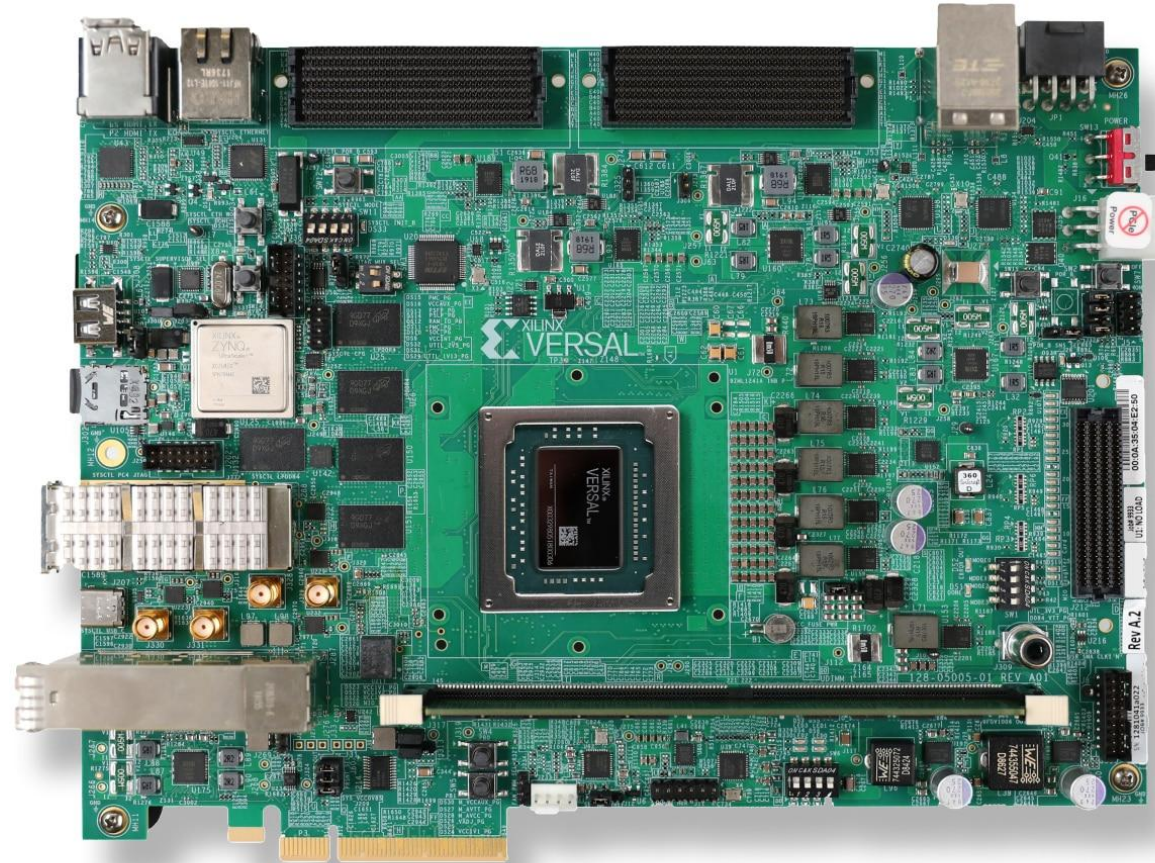
- IpGBT v1
- HPC FMC Interface
- 3 VTRx+
 - 1 slow controls interface (1 TX, 1RX)
 - 2 data interface (4 TX each, 8 TX total)
- IpGBT GPIO interfaces:
 - RST & DISABLE to 2 Data VTRx+
 - Monitoring MUX
 - Debug LEDs
- IpGBT I2C (master) interfaces to 3 VTRx+
- LEDs for debugging
- FMC EEPROM (programmed to provide for 1.2V)
- IpGBT Mode & Address switches
- Power from FMC or separate connector
- Possibility for External Reference clock
- IpGBT ADC interfaces (with MUX):
 - V & I monitoring
 - VTRx+ RSSI
 - VTRx+ Thermistors
- 3 IpGBT clocks:
 - 2 PSCLK
 - 1 ECLK
- 4 ePort OUT: SC_CORE_WR, SC_SRV_WR, SYNC, RSTB
- 2 ePort IN: SC_CORE_RD, SC_SRV_RD
- piGBT compatible IpGBT Configuration Connector
- IpGBT Configuration from FMC connector

MOSAIX Mockup v1.1

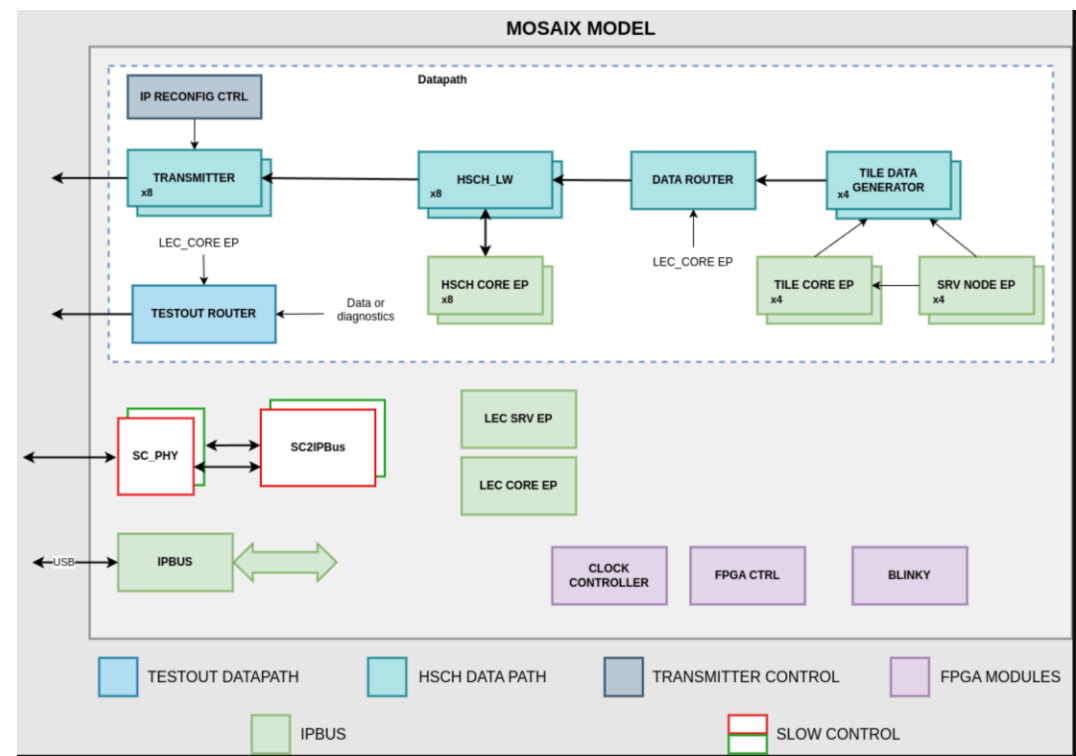
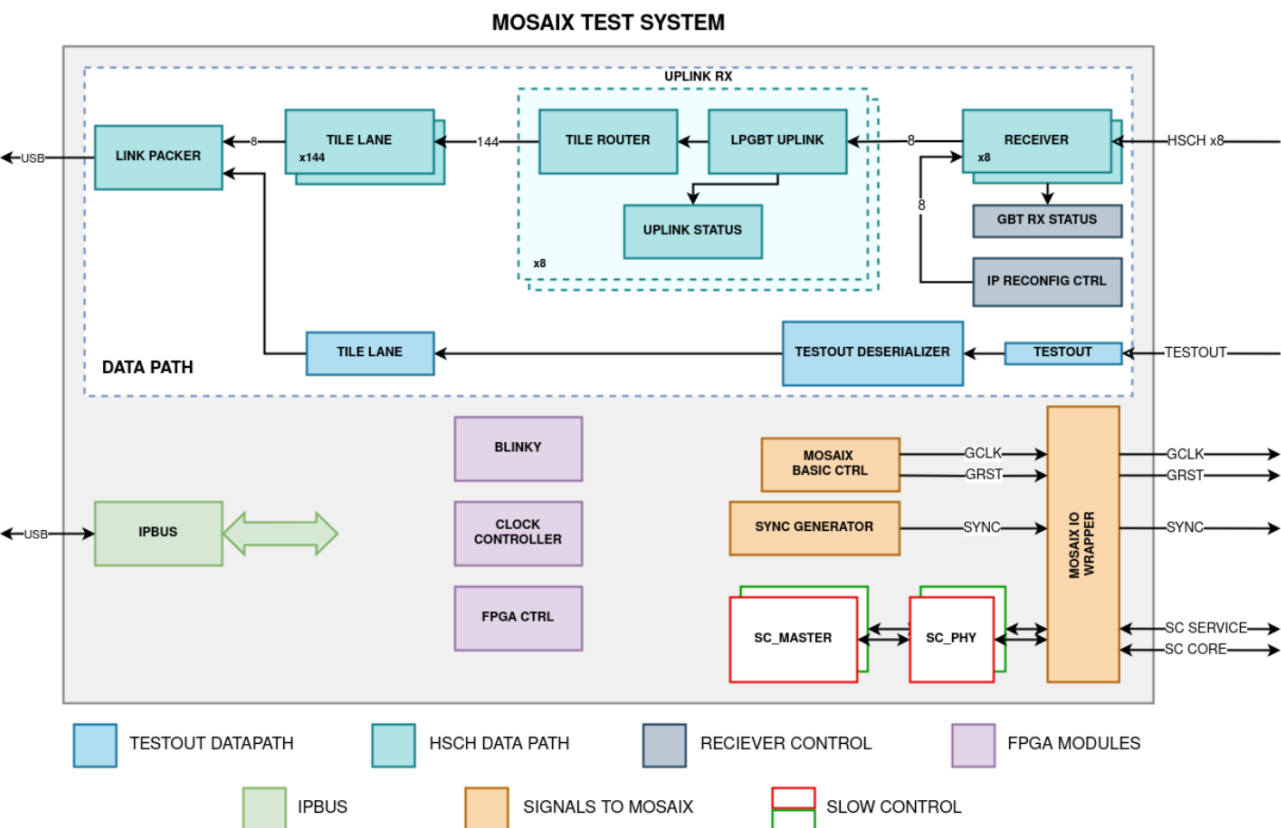


VMK180 Versal Evaluation Board as FELIX Prototype?

Which Firmware?



Top Level Block Diagrams



USA: unit service-node addressing
GSA: global service-node addressing

UTA: unit tile addressing
GTA: global tile addressing

RSU 0											
UNIT SLICE: 0						UNIT SLICE: 1					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 0, 0 GSA: 0	UTA: 0, 0, 0 GTA: 0	UTA: 0, 1, 0 GTA: 1	UTA: 0, 2, 0 GTA: 2	USA: 1, 0 GSA: 1	UTA: 1, 0, 0 GTA: 3	UTA: 1, 1, 0 GTA: 4	UTA: 1, 2, 0 GTA: 5	USA: 2, 0 GSA: 4	UTA: 2, 0, 0 GTA: 12	UTA: 2, 1, 0 GTA: 13	UTA: 2, 2, 0 GTA: 14
USA: 0, 1 GSA: 2	UTA: 0, 0, 1 GTA: 6	UTA: 0, 1, 1 GTA: 7	UTA: 0, 2, 1 GTA: 8	USA: 1, 1 GSA: 3	UTA: 1, 0, 1 GTA: 9	UTA: 1, 1, 1 GTA: 10	UTA: 1, 2, 1 GTA: 11	USA: 2, 1 GSA: 6	UTA: 2, 0, 1 GTA: 18	UTA: 2, 1, 1 GTA: 19	UTA: 2, 2, 1 GTA: 20
UNIT SLICE: 0						UNIT SLICE: 1					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 0, 0 GSA: 0	UTA: 0, 0, 0 GTA: 0	UTA: 0, 1, 0 GTA: 1	UTA: 0, 2, 0 GTA: 2	USA: 1, 0 GSA: 1	UTA: 1, 0, 0 GTA: 3	UTA: 1, 1, 0 GTA: 4	UTA: 1, 2, 0 GTA: 5	USA: 2, 0 GSA: 4	UTA: 2, 0, 0 GTA: 12	UTA: 2, 1, 0 GTA: 13	UTA: 2, 2, 0 GTA: 14
USA: 0, 1 GSA: 2	UTA: 0, 0, 1 GTA: 6	UTA: 0, 1, 1 GTA: 7	UTA: 0, 2, 1 GTA: 8	USA: 1, 1 GSA: 3	UTA: 1, 0, 1 GTA: 9	UTA: 1, 1, 1 GTA: 10	UTA: 1, 2, 1 GTA: 11	USA: 2, 1 GSA: 6	UTA: 2, 0, 1 GTA: 18	UTA: 2, 1, 1 GTA: 19	UTA: 2, 2, 1 GTA: 20

RSU 1											
UNIT SLICE: 2						UNIT SLICE: 3					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 2, 0 GSA: 4	UTA: 2, 0, 0 GTA: 12	UTA: 2, 1, 0 GTA: 13	UTA: 2, 2, 0 GTA: 14	USA: 3, 0 GSA: 5	UTA: 3, 0, 0 GTA: 15	UTA: 3, 1, 0 GTA: 16	UTA: 3, 2, 0 GTA: 17	USA: 3, 1 GSA: 7	UTA: 3, 0, 1 GTA: 21	UTA: 3, 1, 1 GTA: 22	UTA: 3, 2, 1 GTA: 23
USA: 2, 1 GSA: 6	UTA: 2, 0, 1 GTA: 18	UTA: 2, 1, 1 GTA: 19	UTA: 2, 2, 1 GTA: 20	USA: 3, 1 GSA: 7	UTA: 3, 0, 1 GTA: 21	UTA: 3, 1, 1 GTA: 22	UTA: 3, 2, 1 GTA: 23	USA: 3, 1 GSA: 7	UTA: 3, 0, 1 GTA: 21	UTA: 3, 1, 1 GTA: 22	UTA: 3, 2, 1 GTA: 23
UNIT SLICE: 2						UNIT SLICE: 3					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 2, 0 GSA: 4	UTA: 2, 0, 0 GTA: 12	UTA: 2, 1, 0 GTA: 13	UTA: 2, 2, 0 GTA: 14	USA: 3, 0 GSA: 5	UTA: 3, 0, 0 GTA: 15	UTA: 3, 1, 0 GTA: 16	UTA: 3, 2, 0 GTA: 17	USA: 3, 1 GSA: 7	UTA: 3, 0, 1 GTA: 21	UTA: 3, 1, 1 GTA: 22	UTA: 3, 2, 1 GTA: 23
USA: 2, 1 GSA: 6	UTA: 2, 0, 1 GTA: 18	UTA: 2, 1, 1 GTA: 19	UTA: 2, 2, 1 GTA: 20	USA: 3, 1 GSA: 7	UTA: 3, 0, 1 GTA: 21	UTA: 3, 1, 1 GTA: 22	UTA: 3, 2, 1 GTA: 23	USA: 3, 1 GSA: 7	UTA: 3, 0, 1 GTA: 21	UTA: 3, 1, 1 GTA: 22	UTA: 3, 2, 1 GTA: 23

RSU 2											
UNIT SLICE: 4						UNIT SLICE: 5					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 4, 0 GSA: 8	UTA: 4, 0, 0 GTA: 24	UTA: 4, 1, 0 GTA: 25	UTA: 4, 2, 0 GTA: 26	USA: 5, 0 GSA: 9	UTA: 5, 0, 0 GTA: 27	UTA: 5, 1, 0 GTA: 28	UTA: 5, 2, 0 GTA: 29	USA: 6, 0 GSA: 12	UTA: 6, 0, 0 GTA: 36	UTA: 6, 1, 0 GTA: 37	UTA: 6, 2, 0 GTA: 38
USA: 4, 1 GSA: 10	UTA: 4, 0, 1 GTA: 30	UTA: 4, 1, 1 GTA: 31	UTA: 4, 2, 1 GTA: 32	USA: 5, 1 GSA: 11	UTA: 5, 0, 1 GTA: 33	UTA: 5, 1, 1 GTA: 34	UTA: 5, 2, 1 GTA: 35	USA: 6, 1 GSA: 14	UTA: 6, 0, 1 GTA: 42	UTA: 6, 1, 1 GTA: 43	UTA: 6, 2, 1 GTA: 44
UNIT SLICE: 4						UNIT SLICE: 5					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 4, 0 GSA: 8	UTA: 4, 0, 0 GTA: 24	UTA: 4, 1, 0 GTA: 25	UTA: 4, 2, 0 GTA: 26	USA: 5, 0 GSA: 9	UTA: 5, 0, 0 GTA: 27	UTA: 5, 1, 0 GTA: 28	UTA: 5, 2, 0 GTA: 29	USA: 6, 0 GSA: 12	UTA: 6, 0, 0 GTA: 36	UTA: 6, 1, 0 GTA: 37	UTA: 6, 2, 0 GTA: 38
USA: 4, 1 GSA: 10	UTA: 4, 0, 1 GTA: 30	UTA: 4, 1, 1 GTA: 31	UTA: 4, 2, 1 GTA: 32	USA: 5, 1 GSA: 11	UTA: 5, 0, 1 GTA: 33	UTA: 5, 1, 1 GTA: 34	UTA: 5, 2, 1 GTA: 35	USA: 6, 1 GSA: 14	UTA: 6, 0, 1 GTA: 42	UTA: 6, 1, 1 GTA: 43	UTA: 6, 2, 1 GTA: 44

RSU 3											
UNIT SLICE: 6						UNIT SLICE: 7					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 6, 0 GSA: 12	UTA: 6, 0, 0 GTA: 36	UTA: 6, 1, 0 GTA: 37	UTA: 6, 2, 0 GTA: 38	USA: 7, 0 GSA: 13	UTA: 7, 0, 0 GTA: 39	UTA: 7, 1, 0 GTA: 40	UTA: 7, 2, 0 GTA: 41	USA: 7, 1 GSA: 15	UTA: 7, 0, 1 GTA: 45	UTA: 7, 1, 1 GTA: 46	UTA: 7, 2, 1 GTA: 47
USA: 6, 1 GSA: 14	UTA: 6, 0, 1 GTA: 42	UTA: 6, 1, 1 GTA: 43	UTA: 6, 2, 1 GTA: 44	USA: 7, 1 GSA: 15	UTA: 7, 0, 1 GTA: 45	UTA: 7, 1, 1 GTA: 46	UTA: 7, 2, 1 GTA: 47	USA: 7, 1 GSA: 15	UTA: 7, 0, 1 GTA: 45	UTA: 7, 1, 1 GTA: 46	UTA: 7, 2, 1 GTA: 47
UNIT SLICE: 6						UNIT SLICE: 7					
SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE	SRV_NODE	TILE	TILE	TILE
USA: 6, 0 GSA: 12	UTA: 6, 0, 0 GTA: 36	UTA: 6, 1, 0 GTA: 37	UTA: 6, 2, 0 GTA: 38	USA: 7, 0 GSA: 13	UTA: 7, 0, 0 GTA: 39	UTA: 7, 1, 0 GTA: 40	UTA: 7, 2, 0 GTA: 41	USA: 7, 1 GSA: 15	UTA: 7, 0, 1 GTA: 45	UTA: 7, 1, 1 GTA: 46	UTA: 7, 2, 1 GTA: 47
USA: 6, 1 GSA: 14	UTA: 6, 0, 1 GTA: 42	UTA: 6, 1, 1 GTA: 43	UTA: 6, 2, 1 GTA: 44	USA: 7, 1 GSA: 15	UTA: 7, 0, 1 GTA: 45	UTA: 7, 1, 1 GTA: 46	UTA: 7, 2, 1 GTA: 47	USA: 7, 1 GSA: 15	UTA: 7, 0, 1 GTA: 45	UTA: 7, 1, 1 GTA: 46	UTA: 7, 2, 1 GTA: 47