

DDU Status



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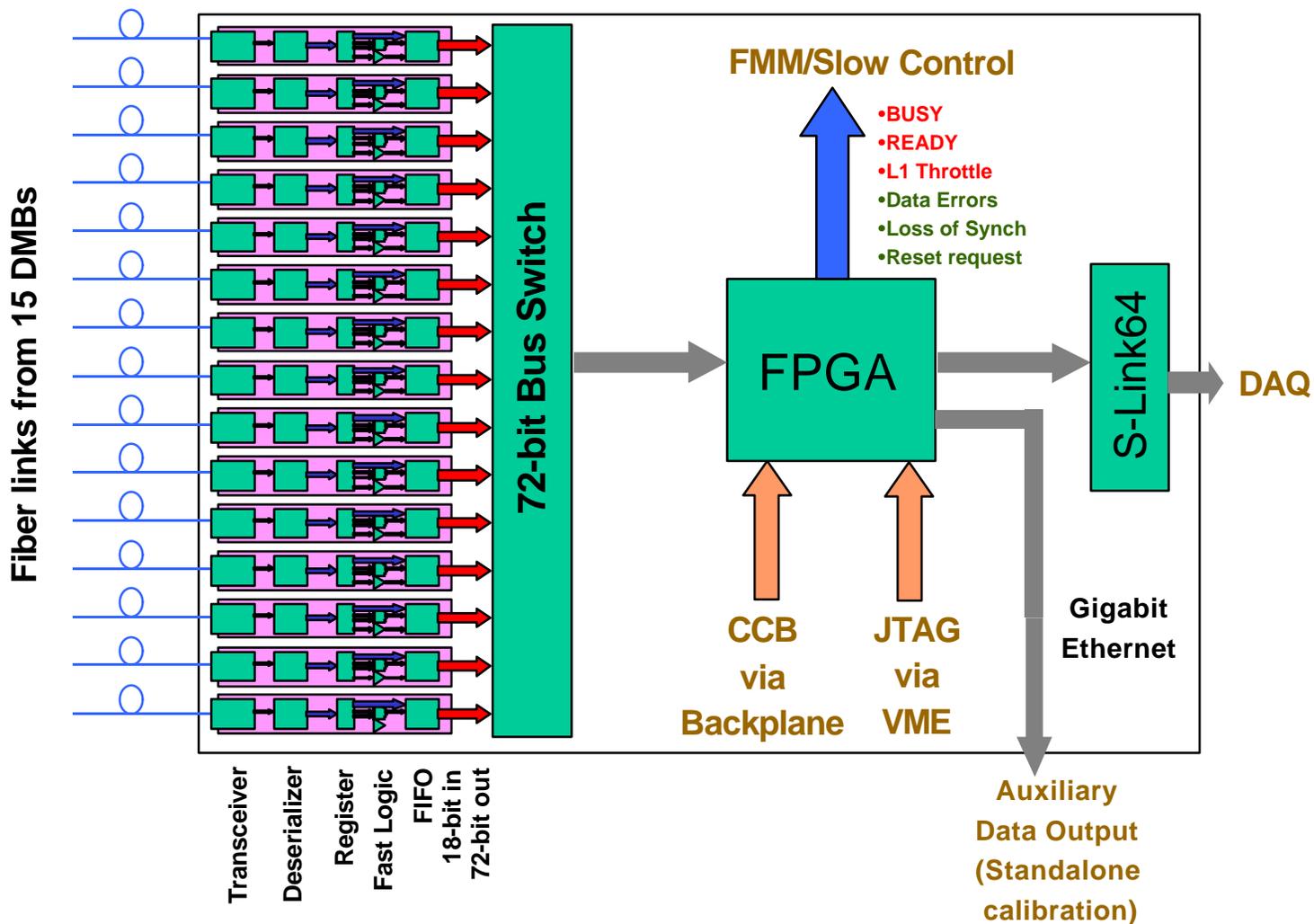
DDU Functions

- **What does the DDU do?**
 - High-Bandwidth data concentration
 - 15 DMB \Rightarrow 1 S-Link64
 - Full error checking and status monitoring
 - CRC check, word count, event number, overflow, link status
 - FMM and Slow Control communication path

- **Current DDU Prototype Tests**
 - 15 DMB inputs
 - Full error checking implemented
 - Interface to VME/Dynatem
 - PC readout via Gigabit Ethernet
 - DMB calibration pulses, regular and random timing
 - 90 MB/sec data transfer rate via Gigabit Ethernet
 - Limited by PC memory and ~20 MB/sec hard drive access
 - S-Link64 tests coming soon!

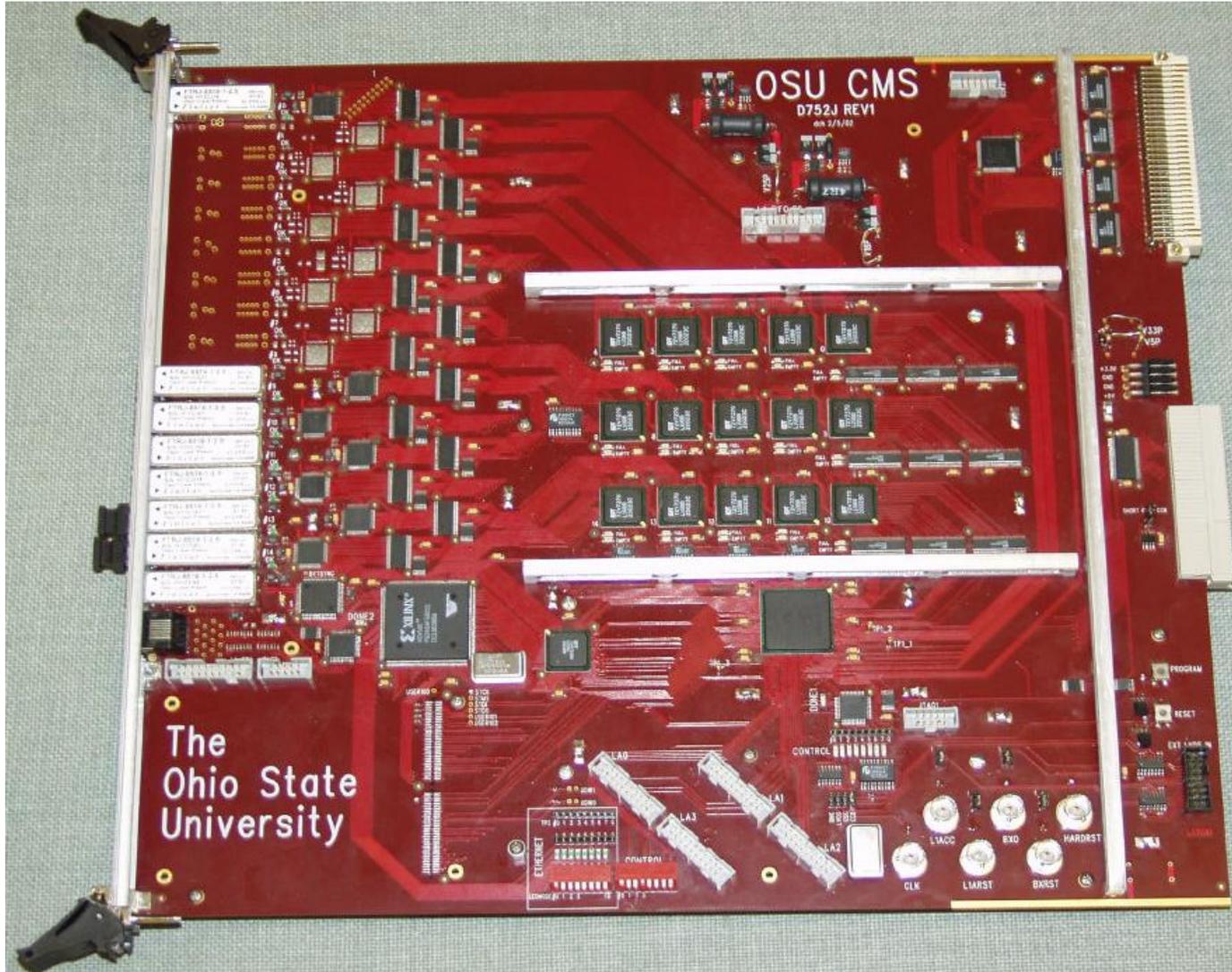


DDU Design





Current DDU Prototype





DDU: Current and Future

- **Current DDU Design**

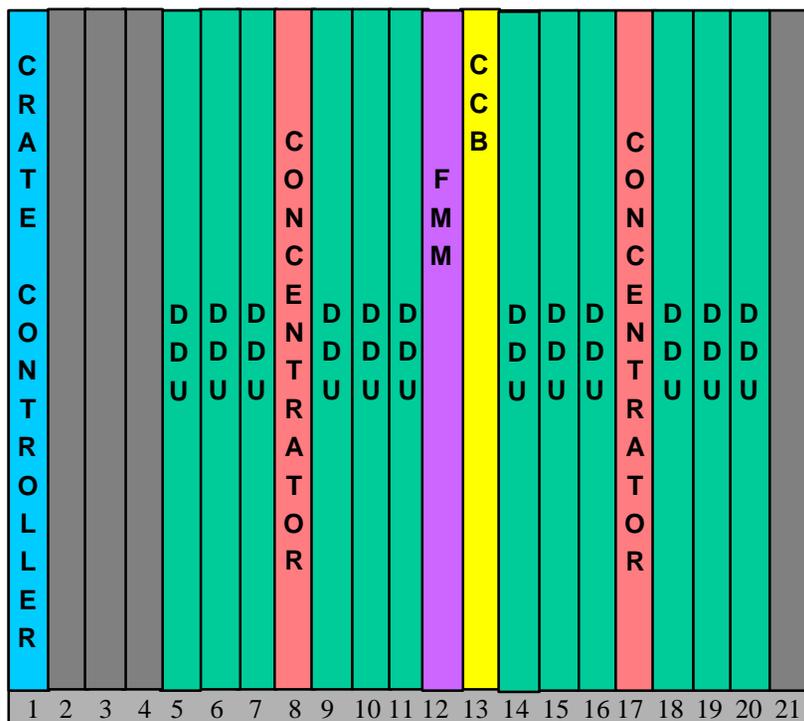
- ✓ Full 15 DMB readout prototype, 17 ball-grid arrays!
 - No ball-grid problems yet, but still some channels to check
- ✓ VME support for Slow Control
- ✓ Gigabit Ethernet readout
- S-Link64 readout
- FMM communication port (LVDS via RJ45): not tested yet

- **Future Concerns**

- FMM and TTS
 - No prototypes available yet, protocol not finalized
- Gigabit Ethernet data volume (calibration and spy data)
 - 90 MB/s continuous data transfer (direct to memory, no processing)
 - Data storage is SLOW: fastest disk only ~20 MB/s (SCSI Ultra 160)
 - 4 GB RAM (current Linux limit) ⇒ ~45 seconds maximum storage
 - Data analysis processes further reduce this rate
 - Calibration run may use ~12 GB per DDU * (2-3 DDUs per readout PC)
 - We need a fast storage solution! (~90 MB/sec)



EMU DDU/FED Crate (1)

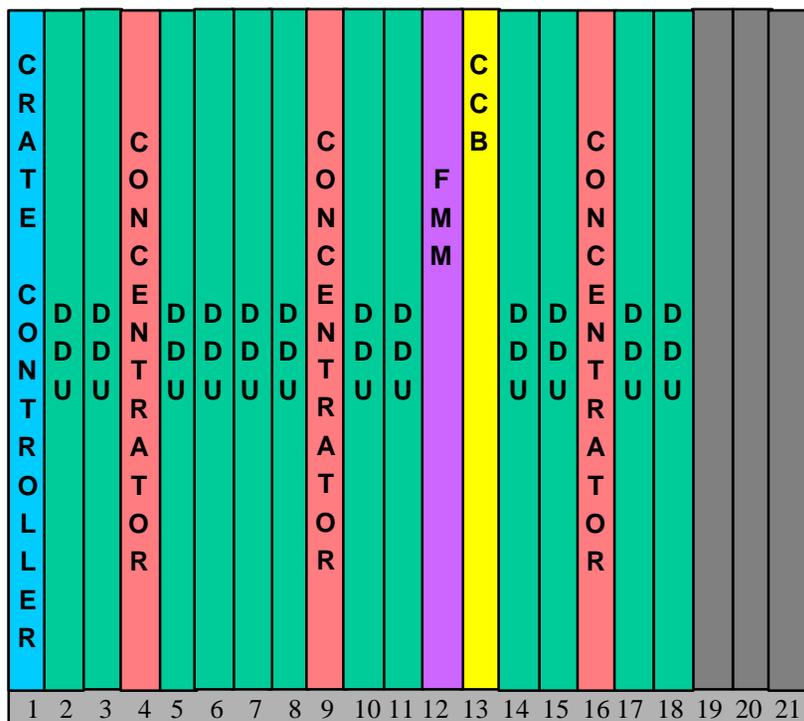


- Each of the 36 DDUs receive input from 15 DMBs
- EMU Readout needs 3 crates with 12 DDUs / crate
- Uses peripheral crate backplane and CCB
- Concentrator (DCC): 6 to 1 data merging
- FMM collects (from DDU) **BUSY, READY, L1_Throttle**
- Slow Control via controller

- **6 DCC option: 6-to-1 concentration**
 - Where does SR/SP DDU come into the DCC?
- **Need 12-18 standalone PCs in nearby racks for calibration and spy data readout**



EMU DDU/FED Crate (2)



- Each of the 36 DDUs receive input from 15 DMBs
- EMU Readout needs 3 crates with 12 DDUs / crate
- Uses peripheral crate backplane and CCB
- Concentrator (DCC): 4 to 1 data merging
- FMM collects (from DDU) BUSY, READY, L1_Throttle
- Slow Control via controller

- **9 DCC option: 4-to-1 concentration**
 - Where does SR/SP DDU come into the DCC?
- **Need 12-18 standalone PCs in nearby racks for calibration and spy data readout**