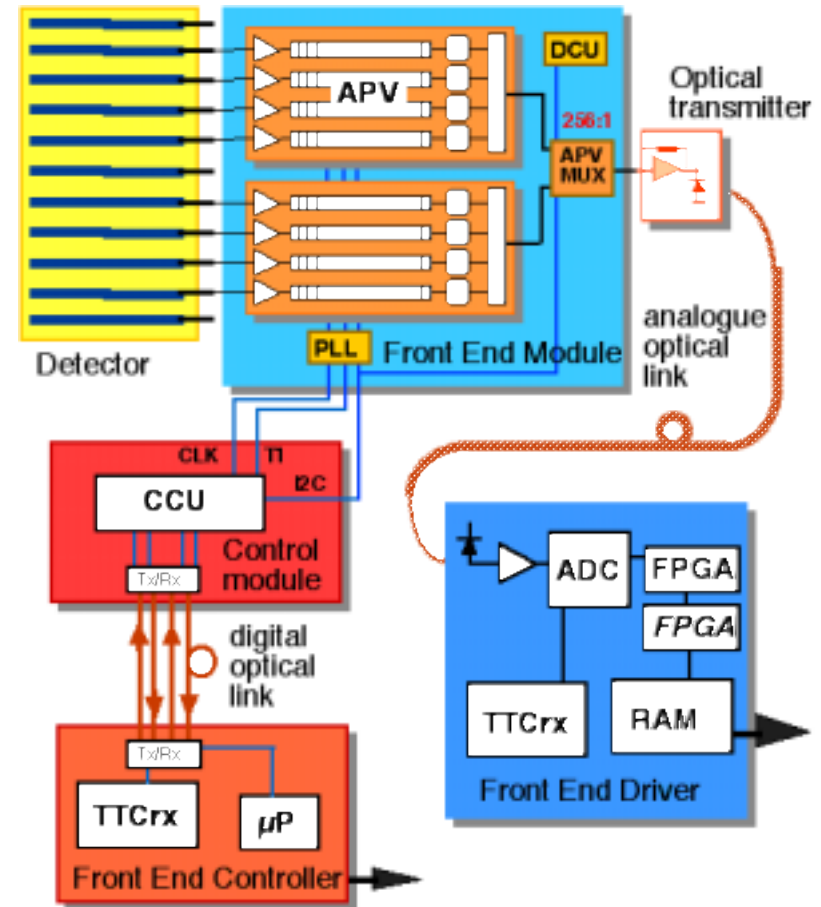


The APV25 Chip & The STT

- **CMS Tracker Readout by APV25**
 - Preamp → Shaper → Pipe → Mux
 - $0.25\mu\text{m} \Rightarrow$ Rad hard to 20 Mrad
 - 128 chan's x 192 cell pipe
 - deadtimeless mode (<32 L1acc)
 - Mux speed 20 or 40 MHz
- **The Basic Readout Chain**
 - Hybrid {
 1. 2 APV (preamp, shape, pipe)
 - * run at 20 MHz each
 2. 1 APVMux
 - * 40 MHz output
 3. 1 Fiber (256 channels)
 - * small size Tx, Rx needed
 4. 1 FED Channel (96 chan/FED)
 - * digitize, subtr ped, reorder, cluster, sparsify
 - * link to DAQ
 5. FEC/CCU (controller)



**Warning: I am not an APV expert
watch for errors!**

DØ Implementation & STT Issues

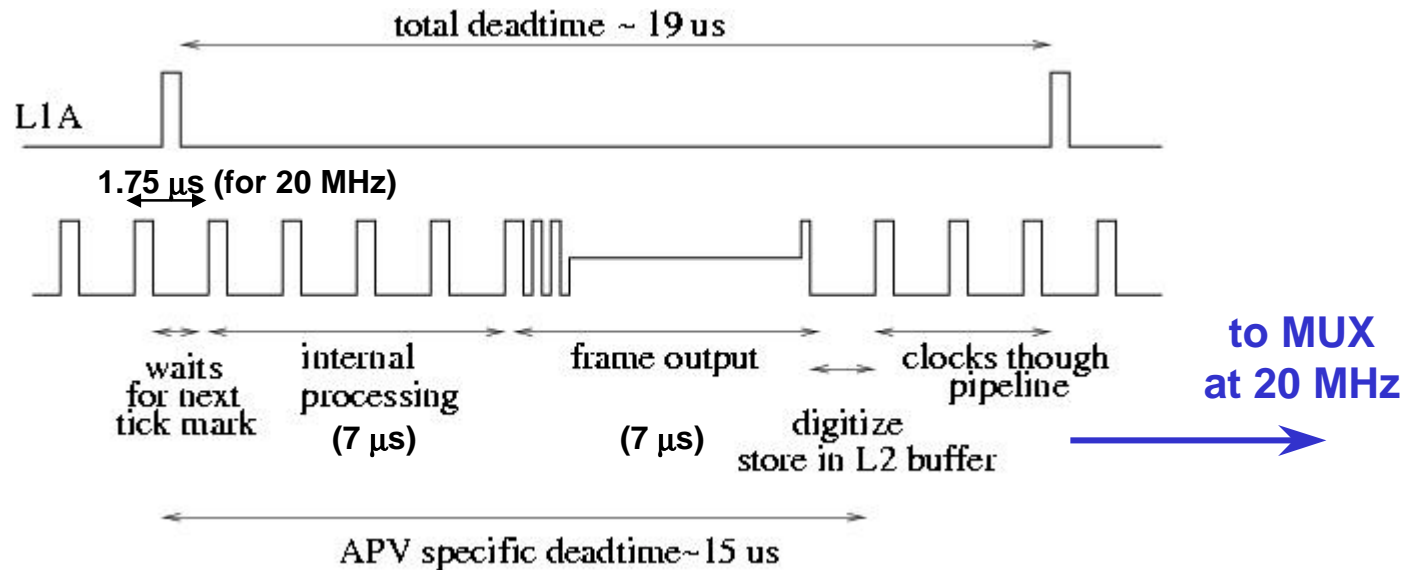
DØ Modifications to System

- **Use unchanged**
 - APV & MUX (hybrid?)
 - Optical Xmitter & Fiber
 - CCU
- **Remake for DØ**
 - APV & optical hybrids ?
 - FED / FEC
 - * replace VRB / VRBC?
 - Interface to STT
 - * FEC output ?
 - Interface card(s)
 - * temp interlocks, etc.
- **APV vs SVX4**
 - + The chip exists
 - The readout doesn't

Issues for the STT

- **Increased readout time ⇒ longer latency**
- **APV readout not channel ordered**
 - FED reorders / clusters
 - Multi-event buffering of roads on STC & TFC
- **SMT input medium changes**
 - 4 g-link fibers → VTM may not be optimal
 - * optical Xmit in units of 12 fibers
 - * make a new VTM ?

APV Deadtime



Possibilities for speedup

- Run APV at 40 MHz (1 APV / MUX) \Rightarrow ~8 μ s
double fiber count
- Run in deadtimeless mode \Rightarrow ~7 μ s (?)
add buffering at L1

Schedule & Cost (my understanding)

APV	<ul style="list-style-type: none"> • Chips finalized now • Yield (so far) has been around 84%
APV Mux	<ul style="list-style-type: none"> • One more iteration \Rightarrow finalize end of 2000
Optical Tx,Rx	<ul style="list-style-type: none"> • Commercial components, but few vendors • Choose vendor mid 2001 – then build units • Note: can test w/out these
FED	<ul style="list-style-type: none"> • Development through 2002 (?) • Some help from RAL possible? for DØ FED devel
Cost	<ul style="list-style-type: none"> • Total: 2 CHF / channel \Rightarrow 1 M\$ for DØ <ul style="list-style-type: none"> – 28 CHF / APV – 9 MCHF for optical (50% Tx, 25% Rx) – 7.5 kCHF / FED (96 chan) – includes 10% spares + 10% contingency + test