

Level 2 Test stand

→ a set of diagnostic tools (**hardware+software**)

Outline:

Why diagnostic tools ?

What are they?

What can they do for us?

Progress made so far

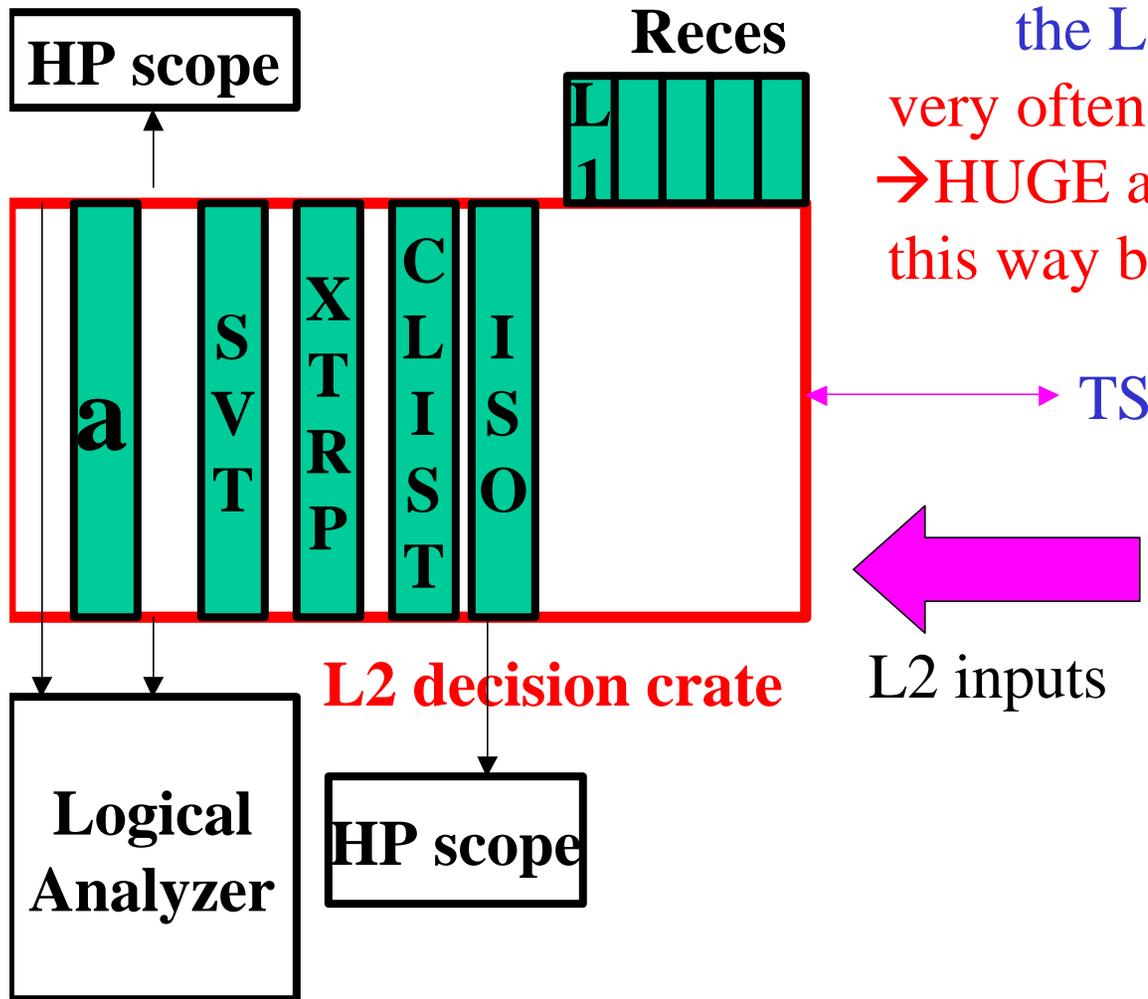
Schedule

(Software is not covered in this talk)

Level 2 Review (Dec. 07, 01)

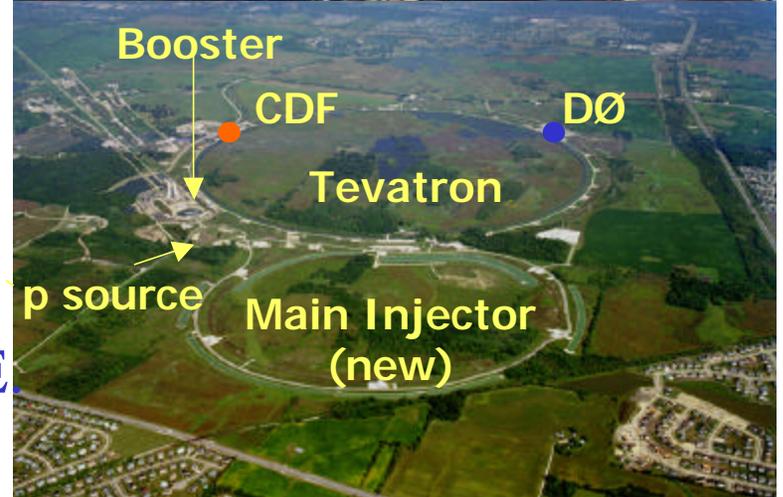
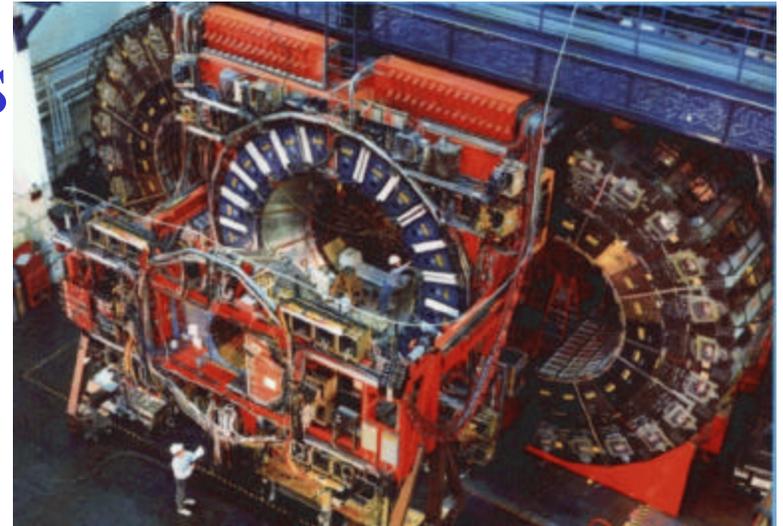
Ted Liu

Why diagnostic tools?



The way we have been debugging the Level 2 decision crate:

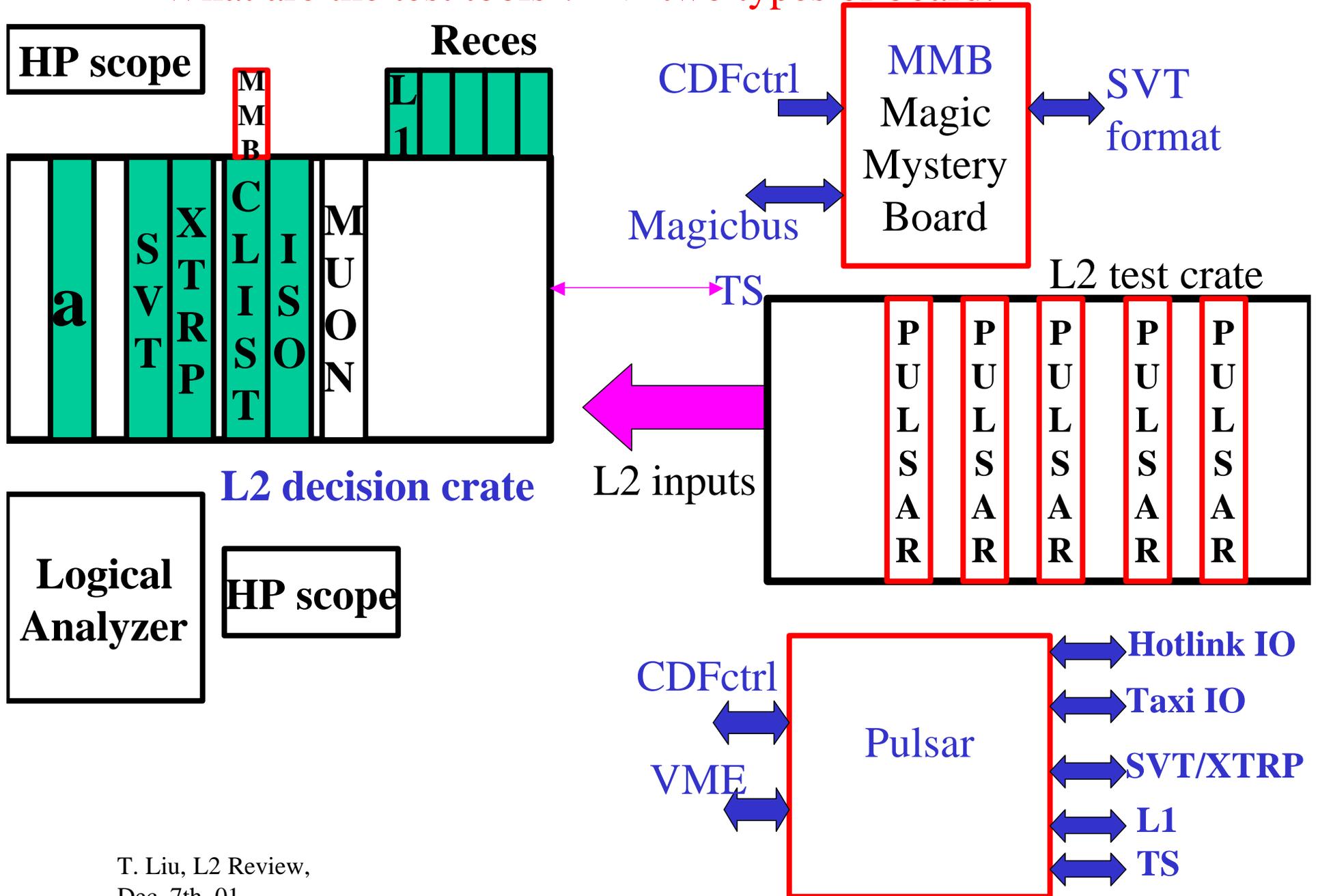
very often need to use CDF+Tevatron
→ HUGE amount of work has been done this way by a few hardworking experts!



The idea is to build test stand tools to “replace” CDF and Tevatron, to make life MUCH easier for EVERYONE

T. Liu, L2 Review,
Dec. 7th, 01

What are the test tools ? -> two types of board:

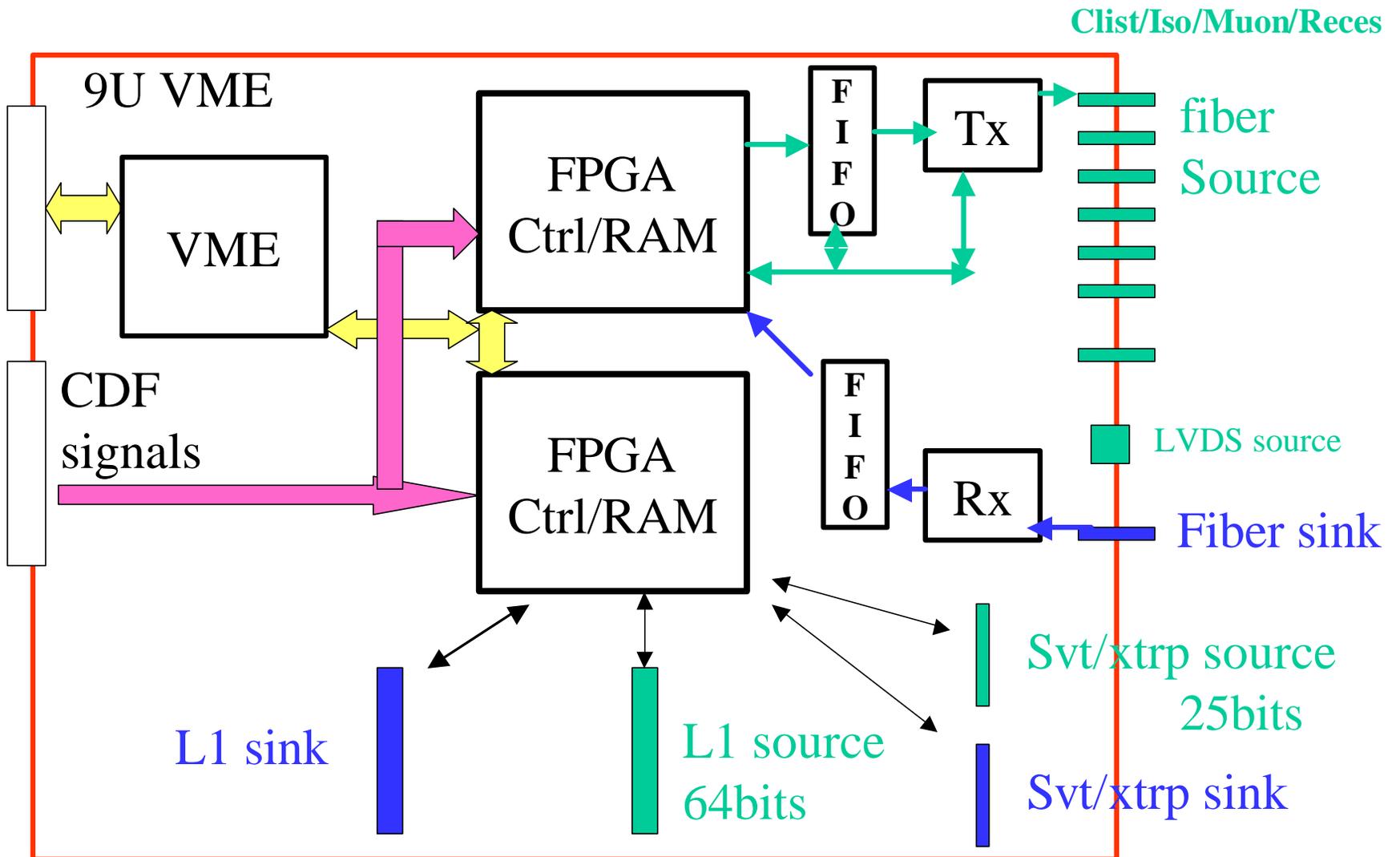


Goals of Level 2 Test stand

- (1) Speed up the debugging process for L2 system:
Alpha, Mbus, all interface boards
- (2) Speed up the optimization process for the soft(firm)ware;
Alpha code&firmware, interface firmware etc
- (3) Fully test the robustness and rate capability of the L2 system
without the need of beam or high luminosity beam;
- (4) Able to capture upstream errors and reproduce them in test stand
- (5) Long term maintenance of the system ...**

**Overall goal: make sure we have a robust
L2 system with great performance into Run2b ...**

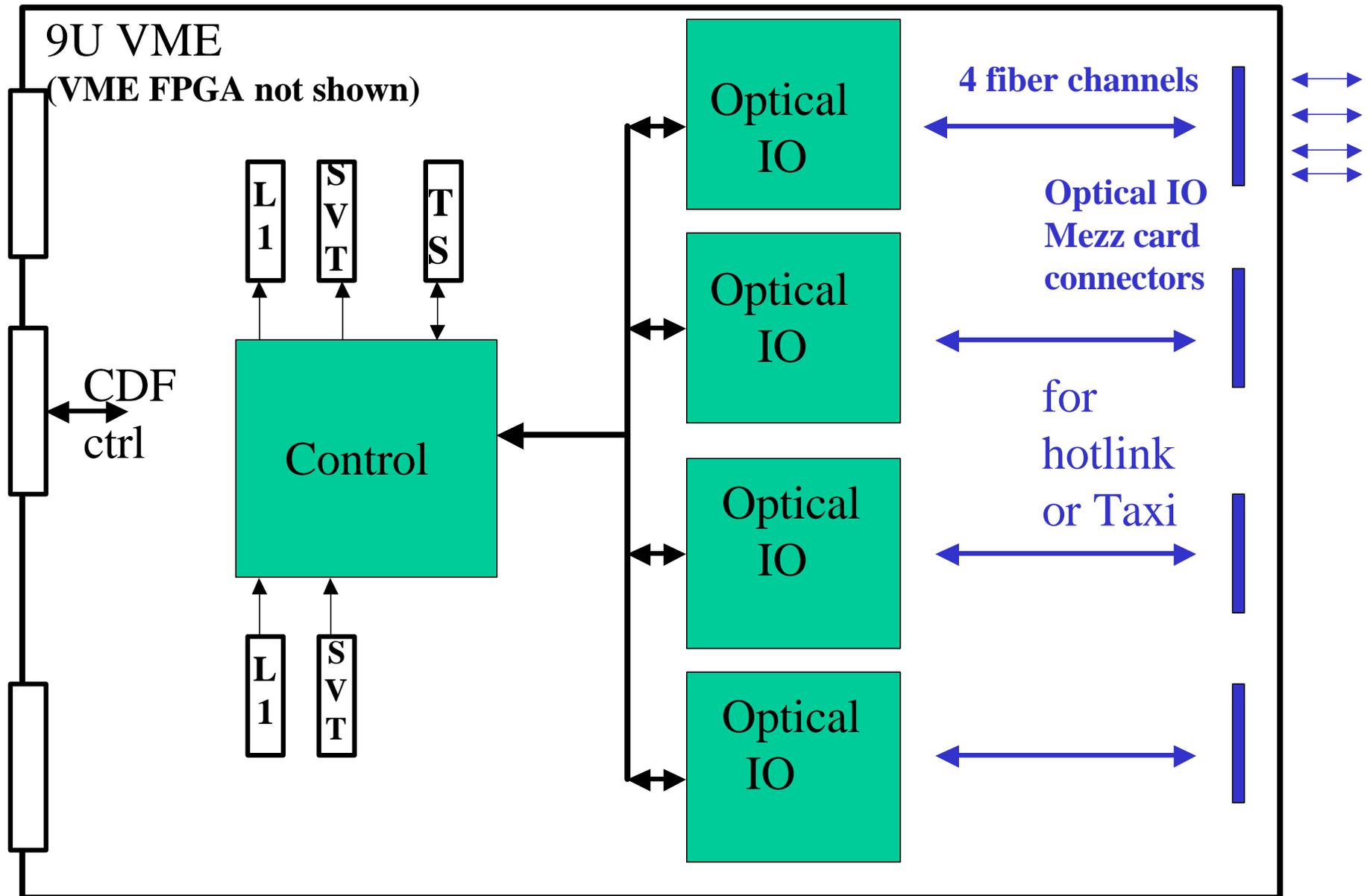
Original design for Pulsar board (proposed on Oct 10th):



some changes: use mezzanine cards to reduce the number of boards

T. Liu, L2 Review, Dec. 7th, 01, needed to drive the full system (from 13 to 5);
 this also means a few more FPGAs per board.

Level2_Pulsar design



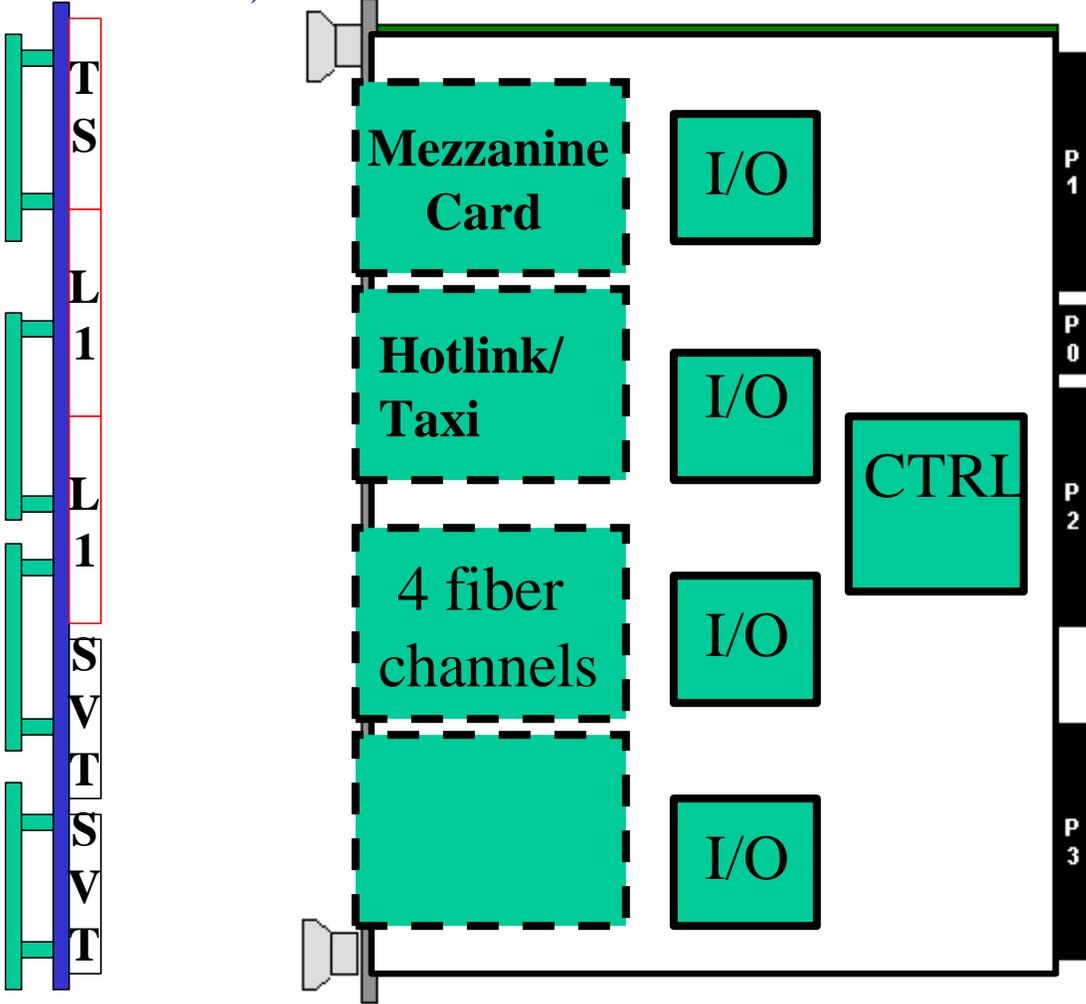
T. Liu, L2 Review,
Dec. 7th, 01

Can source data, also can record data from upstream

PULSAR Design

Front-panel
(double width)

Can handle up to 16 fiber I/O per board



Two L1 connectors will stay inside main board

4 types Mezzanine card:

Hotlink Tx/Rx: 2

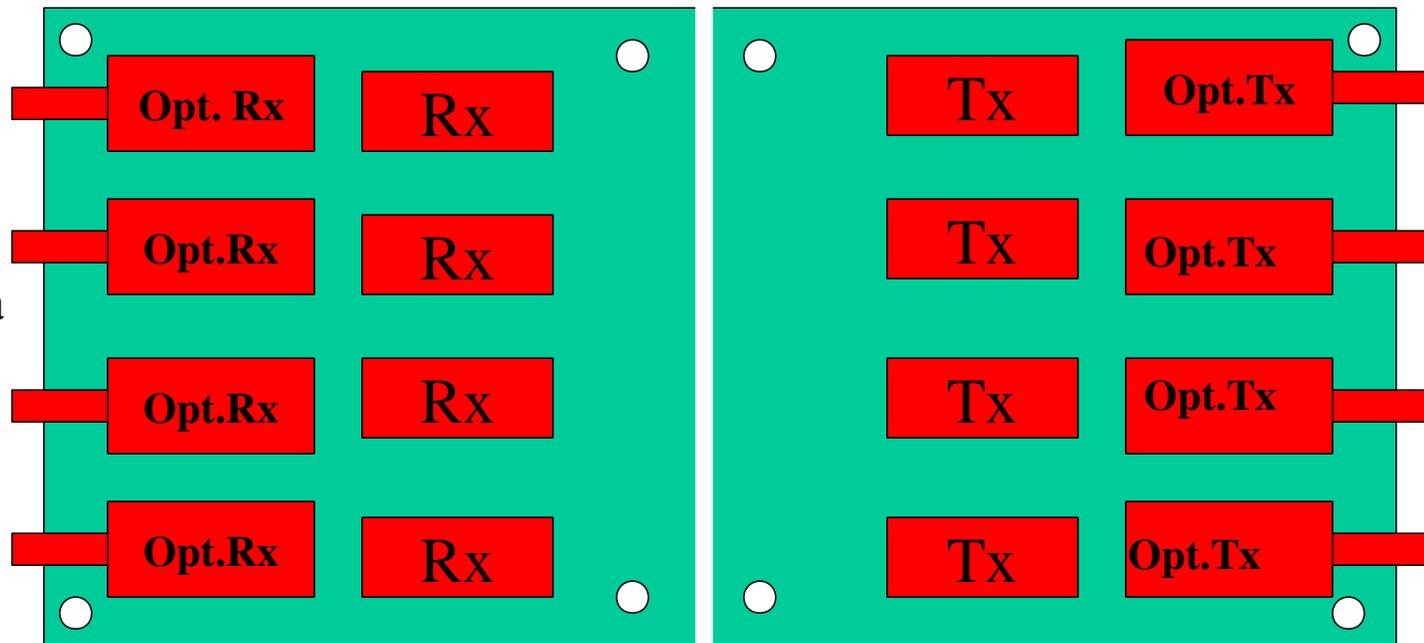
Taxi: Tx/Rx: 2

Hotlink Tx/Rx: CY7B923JC/933JC

Taxi Tx/Rx: AM7968/7969-175JC

Rx type is for:

- Pulsar self-test
- Record upstream data



Each card has a few bits ID so that the main board can identify which type is plugged in.

Will add LVDS connectors for CLIST case.

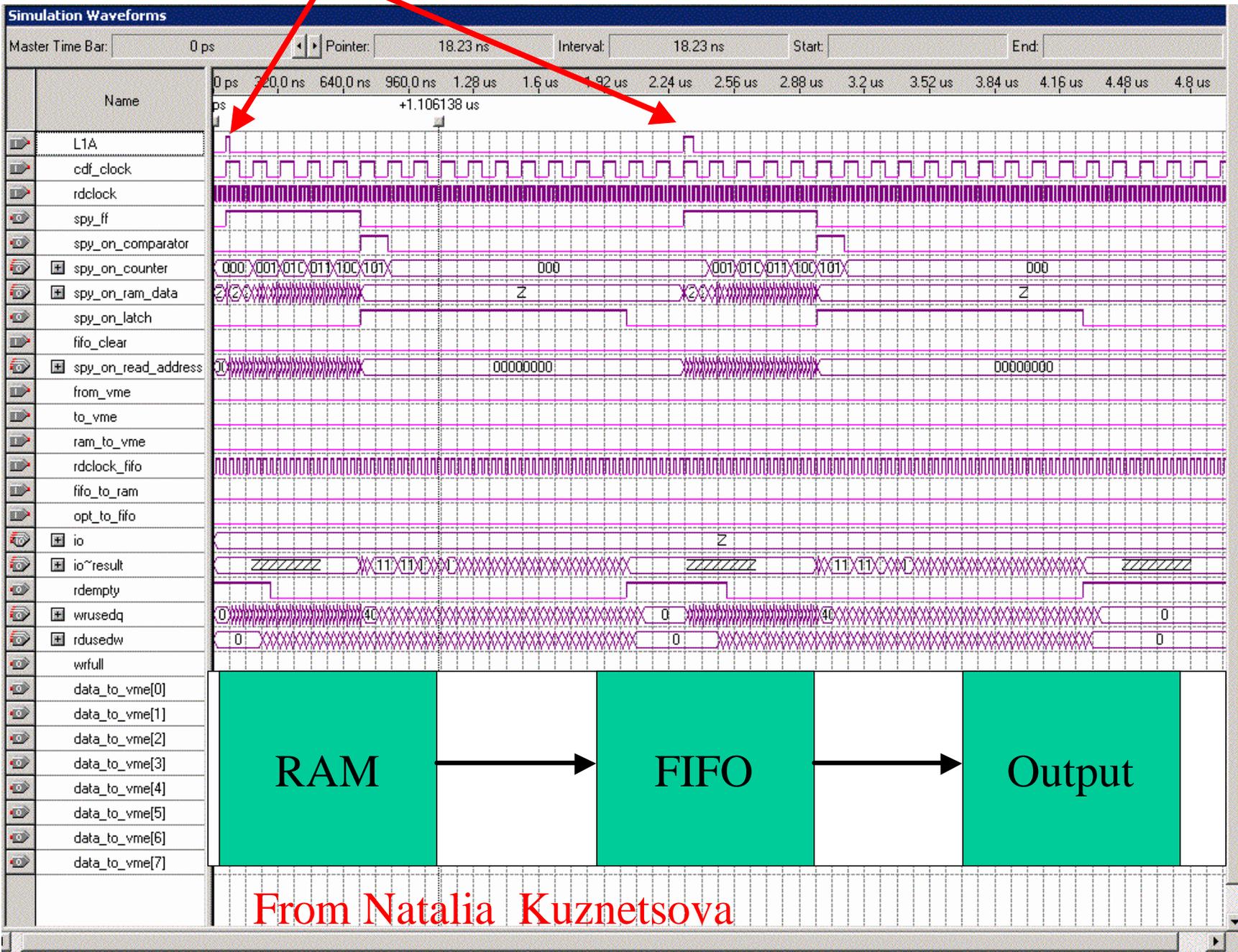
T. Liu, L2 Review,
Dec. 7th, 01

Hotlink Optical Tx: AMP269051-1
Hotlink Optical Rx: AMP269052-1
(replacement: HFBR-1119T/2119T)

Taxi Optical Tx: HFBR-1414T

Taxi Optical Rx: HFBR-2416T

Two L1A case: L1A -> RAM to FIFO -> FIFO -> output



From Natalia Kuznetsova

MMB
Designer:

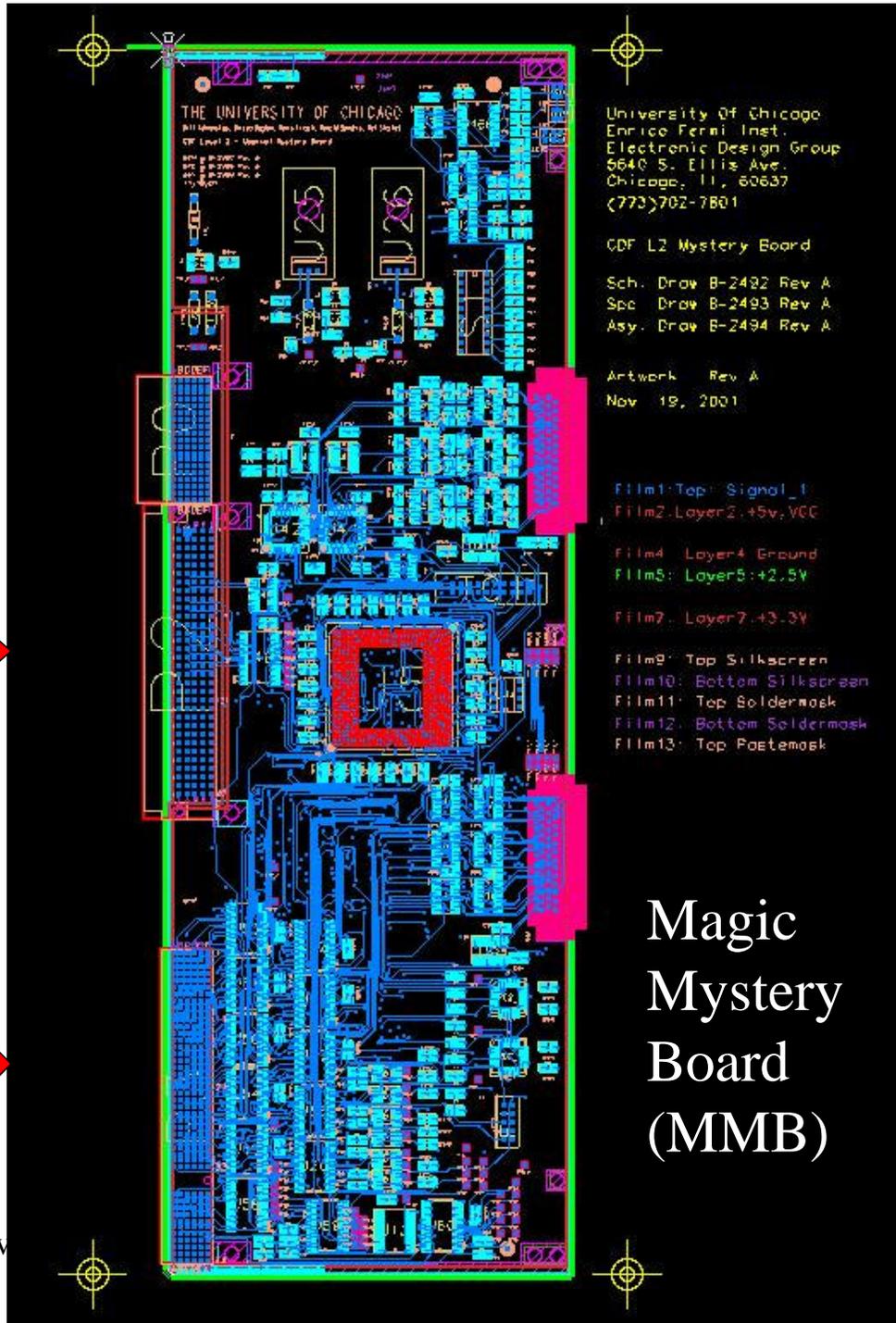
Bill
Ashmanskas

CDFCtrl

MagicBus
interface

Master/slave

T. Liu, L2 Rev
Dec. 7th, 01



Proposed in Oct,
PCB design was
sent out last Friday

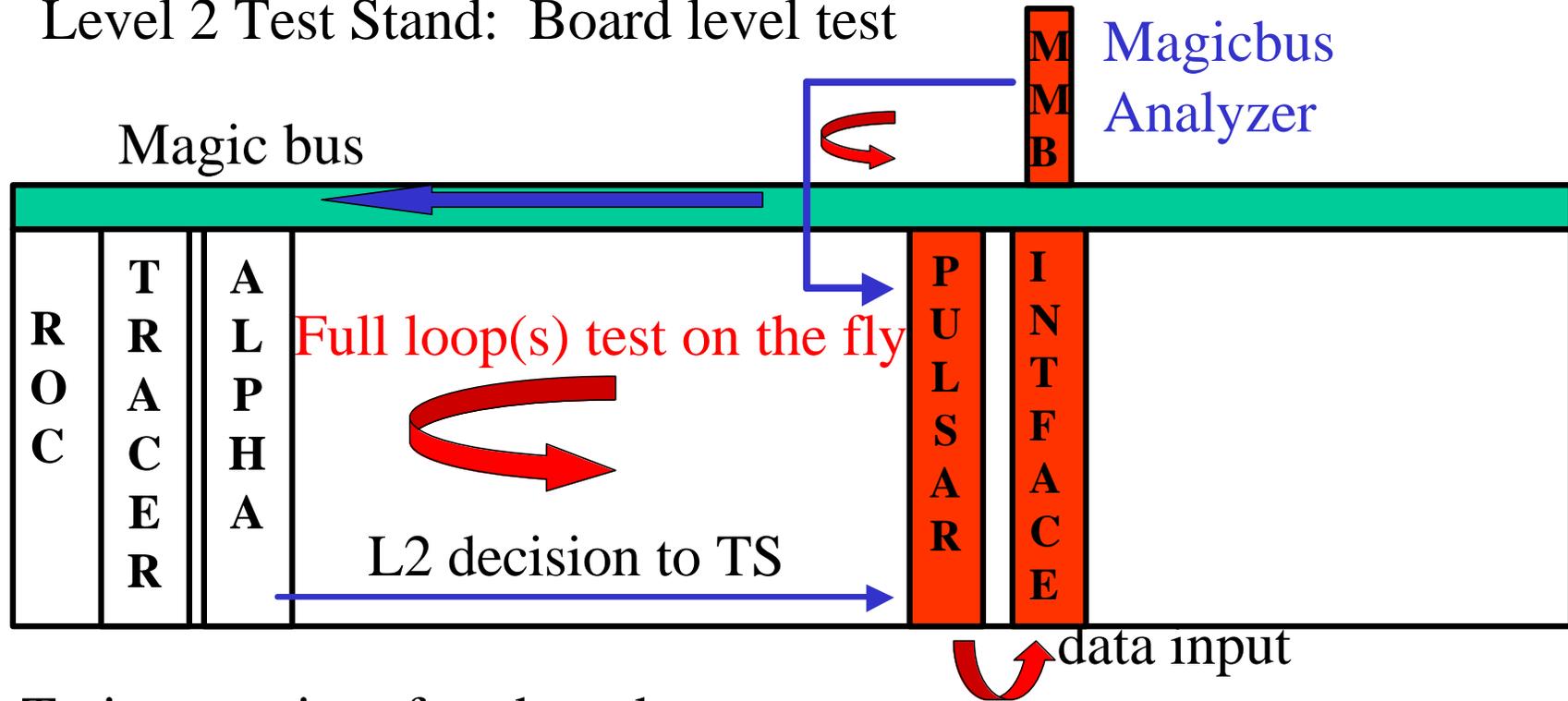
← SVT input

A simple board
which can do
A LOT

→ SVT output

**MMB is a Magicbus
Analyzer, but it can
do much more ...**

Level 2 Test Stand: Board level test



- To just test interface board, one Pulsar + MMB is needed.
- To just test alpha and magicbus, one Pulsar and MMB is needed
- many other options...

Pulsar will provide data inputs and check alpha decisions on the fly, MMB can tell us where is the problem

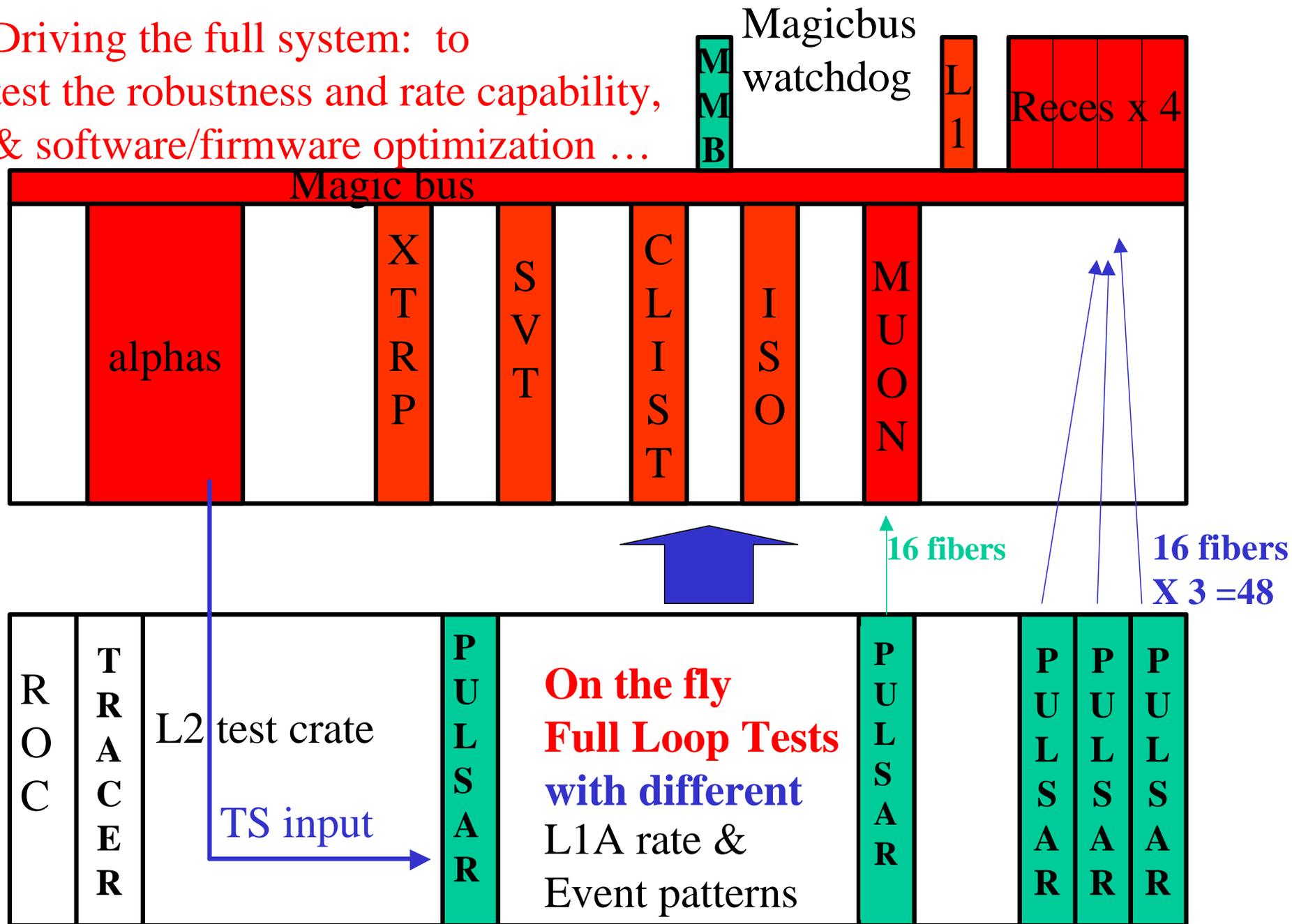
Data source: Level2_Pulsar

Data sink: Alpha, MMB+Pulsar/GB

Data patterns:

- (1) hand made
- (2) derived from MC
- (3) derived from data bank
- (4) recorded from upstream, catch errors and reproduce them

Driving the full system: to test the robustness and rate capability, & software/firmware optimization ...



Dec. 7th, 01

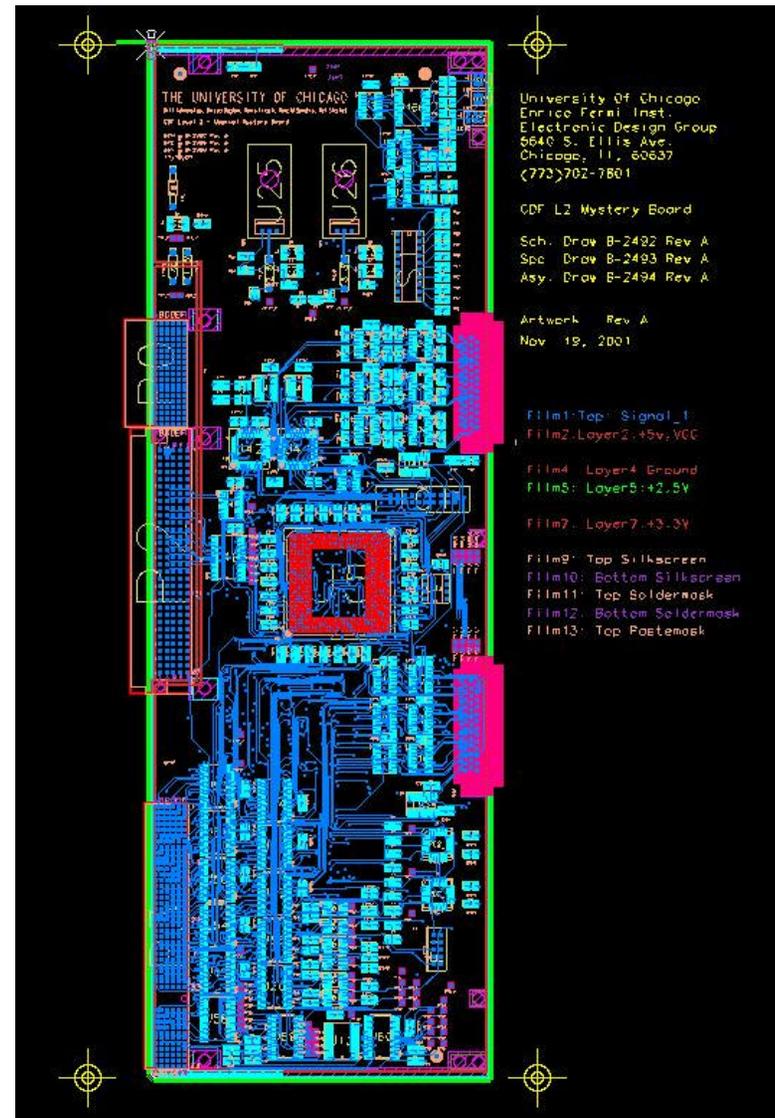
only 5 Pulsar boards needed to drive the full system

Progress made so far for MMB (Magic Mystery Board)

- **Bill** proposed the board design on Oct. 10th;
- **Bill** and UC engineer **Mircea** finished the PCB design last Friday!



Two MMB PCBs are scheduled to be shipped to UC today...



Progress made so far for Pulsar:

- **Conceptual Design** was proposed on Oct. 10th;
- **Top level schematics** done, design exists for most IO connections;
- **initial firmware/simulation** started (**Natalia Kuznetsova** with lots of help from UC chief engineer **Harold Sanders**);
- **Upenn group** helped us to purchase all hard to find interface components. And we found a replacement for obsolete hotlink optical Tx/Rx (and tested);
- **purchased hotlink evaluation board** and have a working hotlink test stand at UC (**Natalia**), mezzanine card design started;
- **Test Stand software** work started (**Peter Wittich**);
- **UC engineer (Mircea)** started working on Pulsar full time starting this week (after finishing MMB)...
- **many help from other experts: Bill Ashmanskas, Karen Byrum, Thurston Chandler, Bob Demaat, Eric James, Matthew Jones, Steve Kuhlmann, Jonathan Lewis, Steve Miller, Monica Tecchio, Peter Wilson ...fully supported by UC group, FNAL group and Ops management**

Schedule for Level 2 Test Stand

