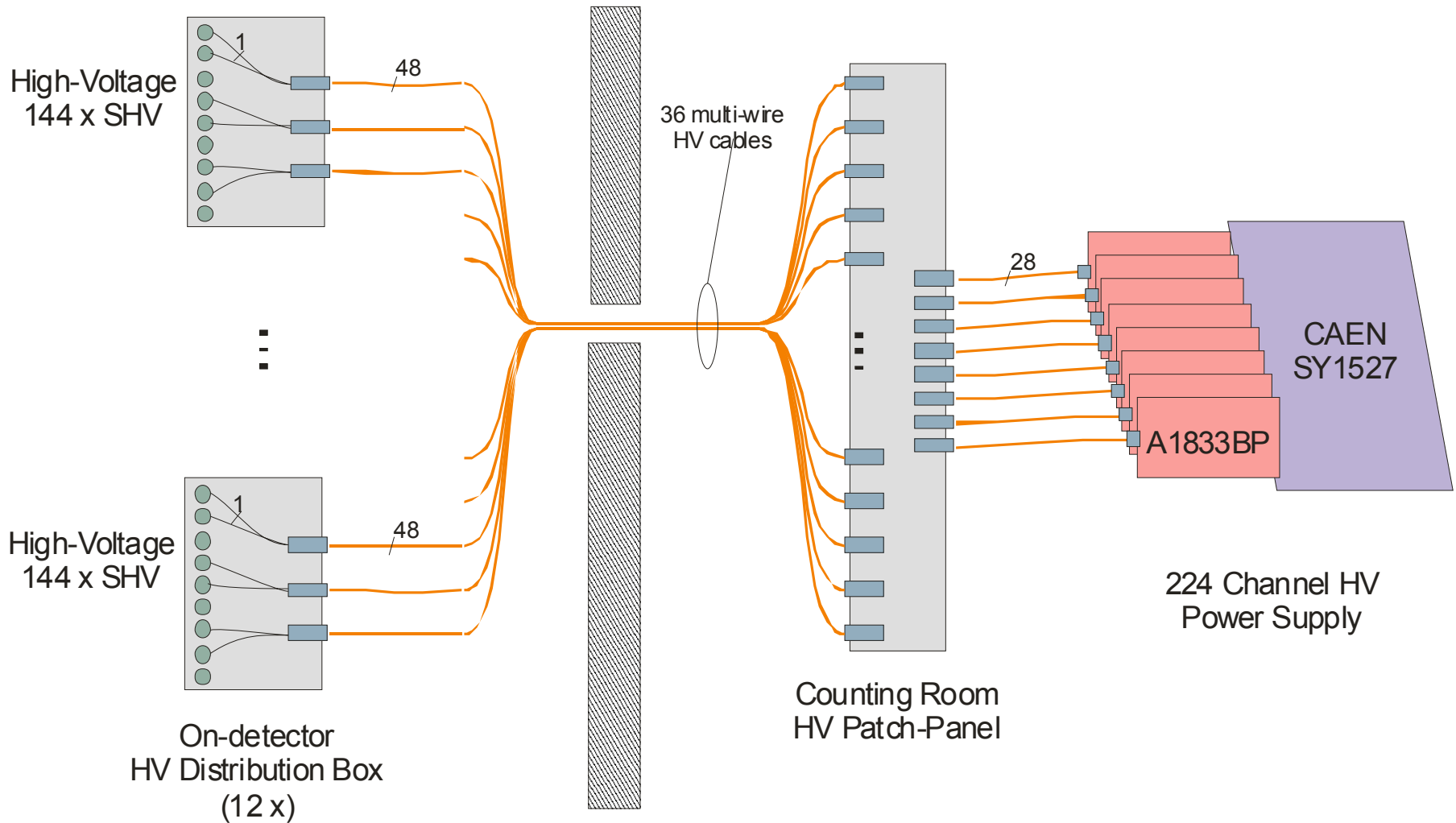# Outer Tracker Distribution Boxes

Ad Berkien

Tom Sluijk

Albert Zwart

High Voltage

- High voltage Power Supplies and HV patch panel in the Counting Room.
- Cables with 48 HV channels and interlock signals to the on-detector HV Distribution Boxes.
- Front End Modules are subdivided in 4 parts of 32 straws with separate connections to the HV Distribution Boxes.
- HV Distribution Box branches off three 48 channel cables into 144 SHV connectors.

High Voltage System

High-Voltage
144 x SHV

1

48

On-detector
HV Distribution Box
(12 x)

High-Voltage
144 x SHV

1

48

36 multi-wire
HV cables

Counting Room
HV Patch-Panel

28

CAEN
SY1527

A1833BP

224 Channel HV
Power Supply

LHCb

Low Voltage

- One complete Front End Box draws 2.6 A from the positive (+5,3V) supply and 0.9 A from the negative (-5,3V) supply (typical).
- LV Distribution Box has 40 fused taps to to accommodate 36 Front End Boxes and 3 service boxes (1 spare).
- The number of incoming cables are dependant on the selected power supplies, no power supplies in parallel.
- Total power for one LV Distribution Box:
    - 130A @ +5,3V
    - 45A @ -5,3V

Optical Fiber Connections

- The Optical Receiver Card of the L1 Board accepts 12-fiber ribbon cables and connectors.

- A patch panel in the Counting Room and an off-detector patch panel in the cavern, in between the patch panels a bulk fiber cable with 54 ribbon cables; 39 used and 15 spares.

- The TTC and SPECS signals also use this fiber cable.

- The on-detector Fiber Distribution Box combines 12 ST connectors into three 12-fiber ribbon connectors

- Four ribbon cables between the on-detector Fiber Distribution Box and the off detector Fiber Patch Panel; 3 used and 1 spare.

- The off detector Fiber Patch Panel branches off 12 TTC ST type connectors and 12 SPECS LC type connectors.

Optical Fiber Connections
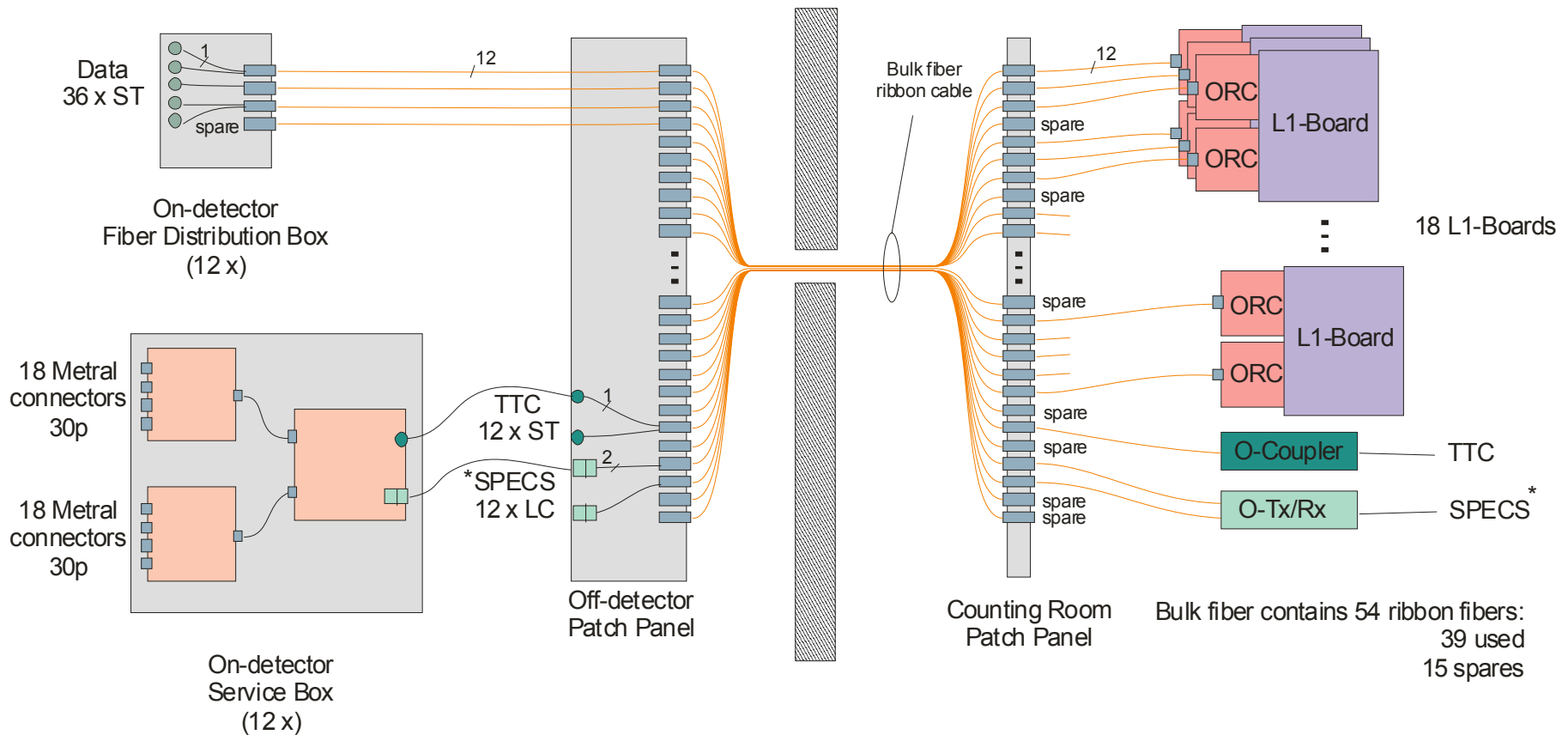
Service Boxes

- The Service Box function is subdivided into one Master Service Box at the middle of the detector curtain and two Slave Service Boxes at the top and bottom of the detector curtain.
- The Master Service Box contains the TTCrx and the SPECS Slave, it supplies;
  - The TFC signals and JTAG ports for the Slave Service Boxes.
  - The I2C ports, directly connected to the Front end Boxes.
- The Slave Service Box contains;
  - LVDS drivers for the TFC signals.
  - ADC's for the monitor signals.
- The TFC/monitor connections from Master to Slave Service box is done by 3 CAT5 cables
- The TFC/monitor connections from Slave Service Box to the Front End Boxes is proposed to be made with 30 pin Metral connectors and 14 twisted pair shielded cable.
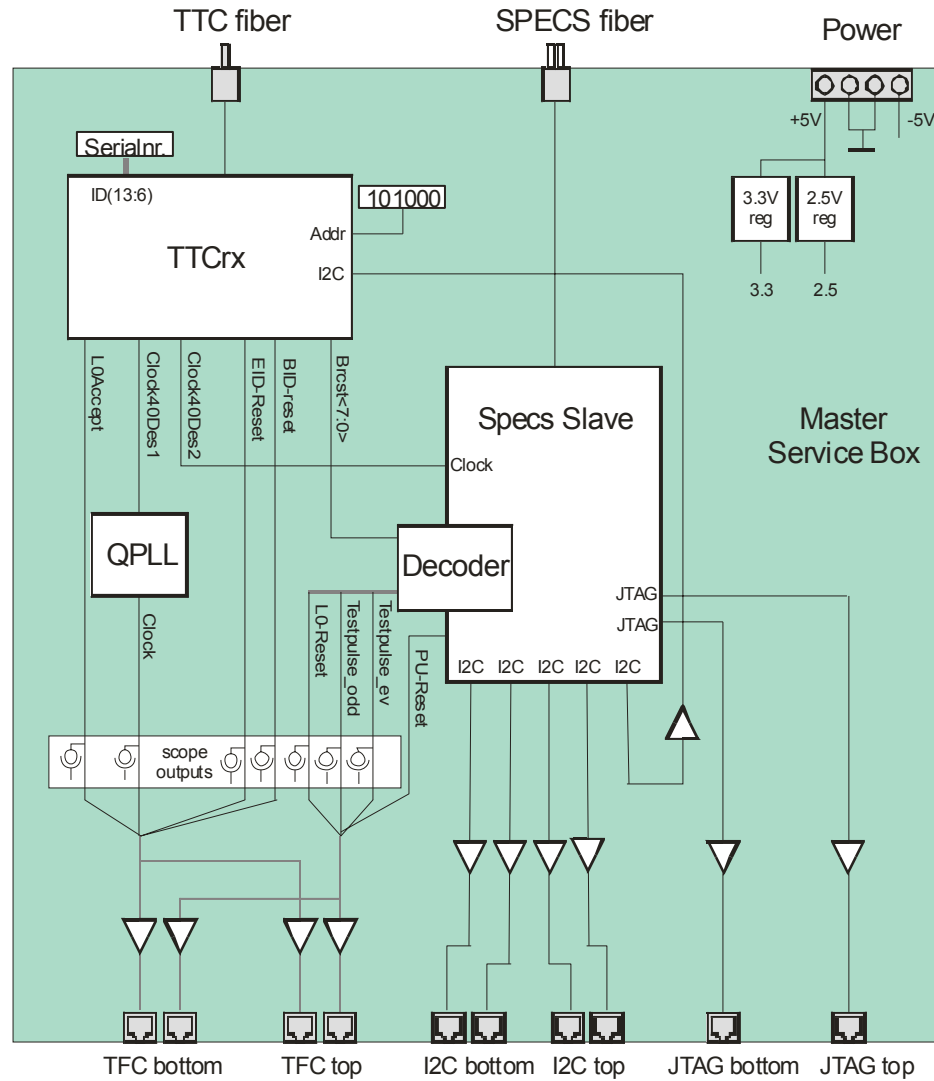
TFC and Monitor signals

- The TFC signals;
    - Bx Clock
    - L0
    - L0 reset
    - BID reset
    - EID reset
    - PU reset
    - Testpulse odd
    - Testpulse even

- The Monitor signals;
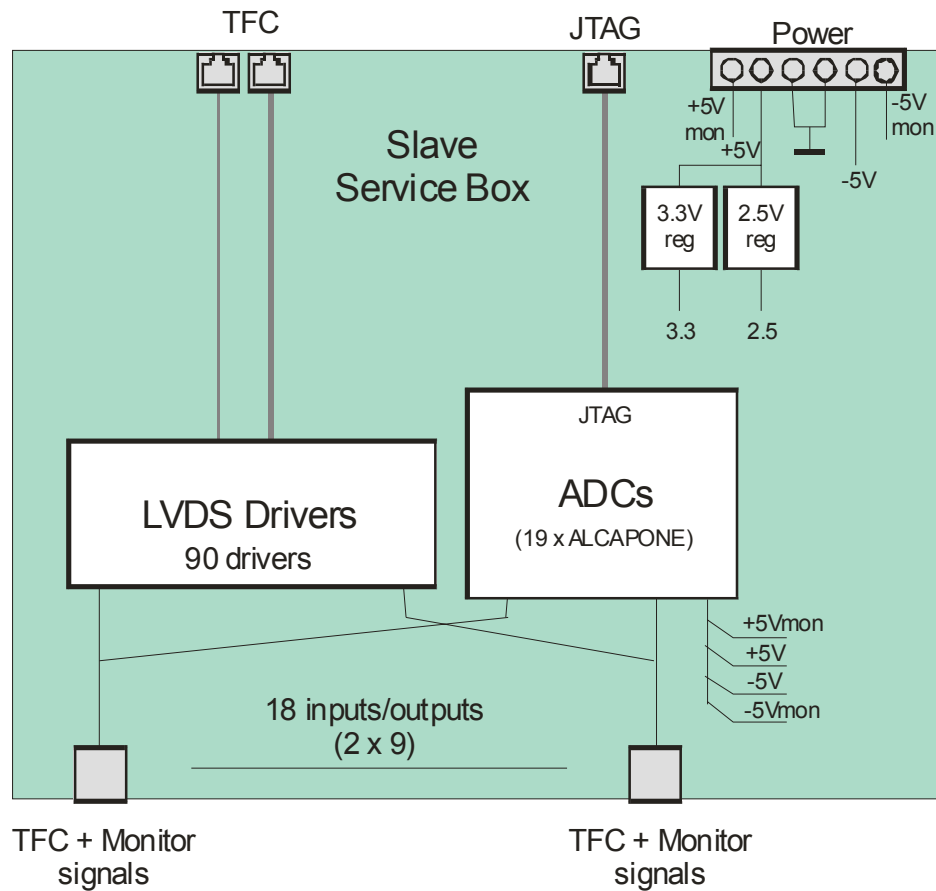   - +3V
    - -3V
    - +2,5V
    - Temperature

More signals needed ???

Master Service Box

Slave Service Box

Overview

TFC
Monitor

Detector curtain

Ground plane

Slack-space for TFC cables

Slave
Service Box

HV
Distribution Box

I2C

Overlap

Master
Service Box

Fiber
Distribution Box

LV
Distribution Box

Cavern

Counting Room

Slave
Service Box

For the total detector:
54 ribbon fibers (12)
72 LV cables 95mm2
36 multiwire HV cables

TFC

ECS

TFC, Data,
SPECS = fiber

DATA

For one Detector curtain:
4 x 12 fiber ribbon
1 x single TTC fiber
1 x double ECS fiber
6 x single LV cable 95mm2
3 x 48 conductor shielded HV cable

Off-Detector
Fiber Patch Panel

HV, LV = copper

NIKHEF

Outer Tracker Distribution Boxes   11   04/02/2004 az

LHCb