

## 15 Electronics Workshop

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A main effort of this year's activities went into the CMS barrel pixel project. The complete electronics for the Supply Tube prototype half shells and the final system was designed, manufactured and assembled. This includes also the Barrel Pixel detector front-end control system with the associated communication and control unit boards (CCU boards) which connect the detector system to the front end controller module. The boards for the complete detector system and additional spares were manufactured and assembled. For the mounting of the ball grid array chips we had the chance to use the dedicated system available at the PSI electronics workshop. The prepared components were then mounted with our help onto the basic Supply Tube structures and all solder connections had to be made accurately (see Fig. 15.1).

Finally the completed systems had to be tested. After installing the electrical and opto-electrical readout components including the optical fibers the entire system was again tested. All components are now at PSI where the assembly of the complete detector system is in the final stage.

We were also involved in the installation and commissioning of the trigger tracker system of the LHCb experiment. In different stages the single detector modules were mounted into the detector housings already installed in the experimental hall at CERN and subsequently electrically tested.

The electronics workshop supported also all research groups in maintaining and repairing the existing devices. We designed and developed some dedicated preamplifiers, main-amplifiers and a push-pull amplifier with an output impedance of 200 Ohm used to drive detection coils. For the XENON experiment a

series of existing amplifier modules was supplemented with a USB computer interface allowing the control over each single channel.

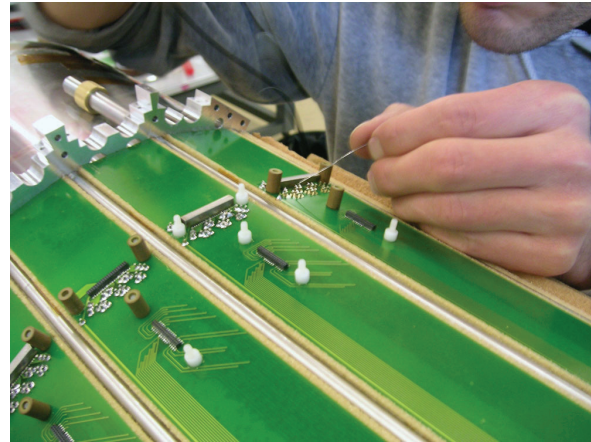


Figure 15.1: Soldering of the copper plated aluminum power wires to the Supply Tube printed circuit boards.

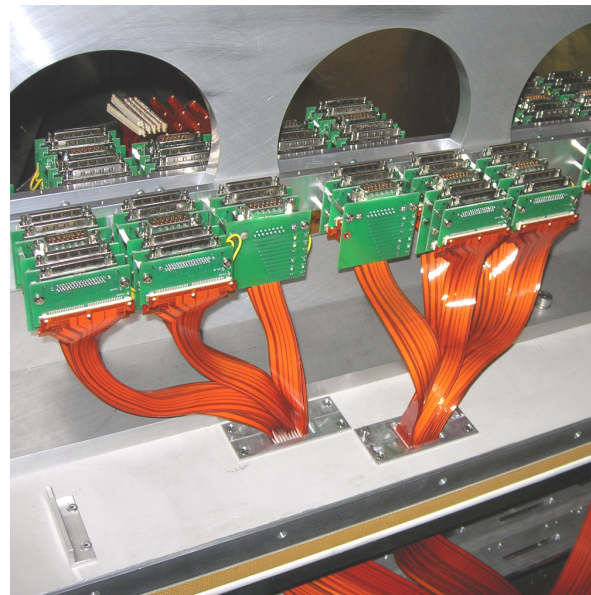


Figure 15.2: Readout electronics of the LHCb trigger tracker detector.

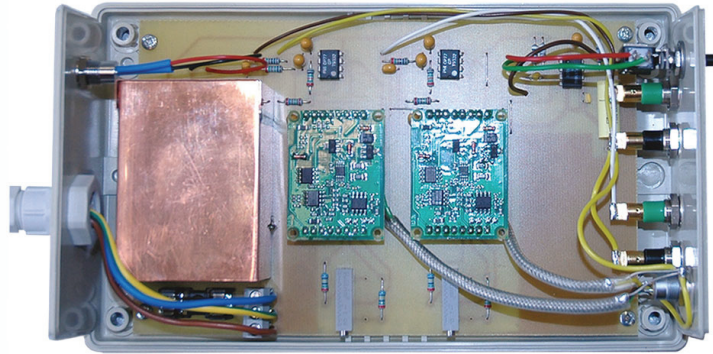


Figure 15.3: Amplifier for the resistance strain gauge experiment.

In collaboration with L. Pauli and J. Seiler, who are responsible for the preparation of the demonstration experiments, we renewed and improved some experiments. Figure 15.3 shows the new amplifier built for the strain gauge demonstration experiment. In most cases we have to improve the output sig-

nal quality which we then also match to the computer readout system installed in the lecturer halls used to visualize the measurements. The workshop staff attended seminars and tutorials to remain up-to-date in the fastly-developing field of modern electronics.