Experiment 949
RS Monitor Memo

Installation inside LED Box

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All the equipments inside the LED box has been installed by February 26, 2001. The temperature controlled box (Yamato IN601) is located on the top of the detector. It contains 12 LED driver cards, 3 their mother boards, and 3 DC power supplies. All the 12 main bundles are also inserted into the box from its top. Each driver and LED is connected via 20 cm twist pair cable with a micro-connector. Table 1 shows the correspondence of the channel of driver, the bundle number, and the destination of its daughter fibers.

Driver	Bundle	Destination
1	14	RS sector group 1U
2	13	RS sector group 2U
3	11	RS sector group 3U
4	12	RS sector group 4U
5	10	RS sector group 1D
6	9	RS sector group 2D
7	7	RS sector group 3D
8	8	RS sector group 4D
9	5	BV/BVL Upstream Right
10	6	BV/BVL Upstream Left
11	4	BV/BVL Downstream Left
12	3	BV/BVL Downstream Right

Table 1: The correspondence table of drivers, bundles, and their destinations.

Before the installation, the light intensity of an LED with each driver was measured at Kyoto University. In this test, the LED light was guided onto PMT window through a 2 m-long 200 μm fiber (SK-20[1]), which is similar to the actual fiber we use except its optical grade. Fig. 1 shows the distribution of the light intensity as a function of the driver number. (Note we have 15 driver cards including 3 spares.) According to the width-to-mean

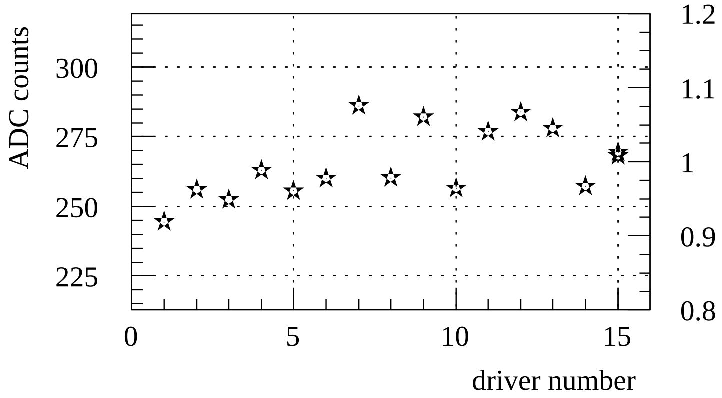


Figure 1: Light intensity with each LED driver minicard.

ratio, 1 count of ADC was equivalent to 4 photoelectrons, which means the intensity of the LED itself was similar to our expecting operation condition. It indicates the intensity is varied with card by card, and the variation is about $\pm 10\%$.

After all the bundles and drivers had been set in the box, we checked whether LEDs emit light successfully or not. As in the final configuration, the light can be monitored through the control bundle. In this check, we used only one reference PMT (H3171-03MOD with standard μ-shield) which was used in January 2001 test and had a YAlO light pulser glued on its window. Between a control bundle and the PMT, there exists a ND filter [1] which we are going to use actually. This check was performed on the top of the magnet, by recording the waveform of the PMT by the oscilloscope. The pictures of the resultant waveforms are shown below. The wider signal in each picture is YAlO's and the narrower is LED's. The lower trace is a NIM trigger pulse just before the driver. We supplied the same voltage to each driver. We didn't take care about the absolute light intensity, but the YAlO

[1] But actual reduction factor is not clear.

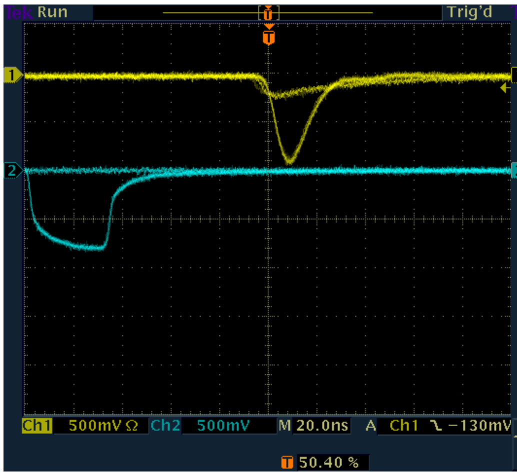
signal which is shown in each picture may be a reference [2]. Even though we have the intensity adjustment system for each LED on the driver mother board [3], it is not sure whether such a large variation as in the figure can be adjusted or not.

References

[1] http://www.mrc.co.jp/dep/pofeskae/comme/comme.htm

[2] The light intensity of this YAlO was about 1000 p.e. and the pulse height ratio in case of same photoelectron number was about a factor of 5. Thus, the LED intensity viewed by a control bundle should be V(LED)/5/V(YAlO)$\times$1000 p.e.

[3] The adjustment system is a simple voltage divider consisted of a 10 kOhm resistor and a 2 kOhm variable resistor. It can vary the Vcc of each card within $\pm$10% of parent supplied voltage.



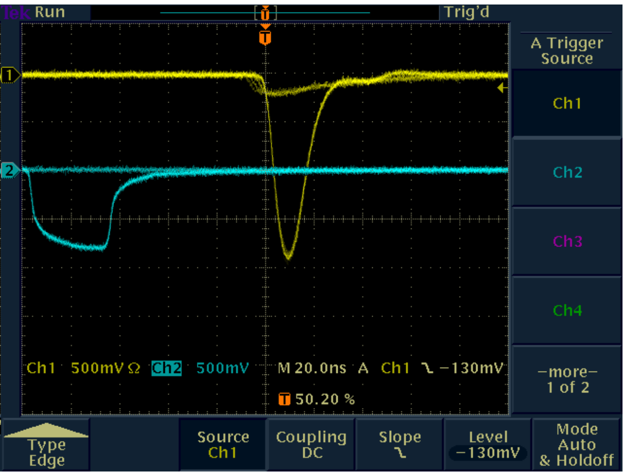
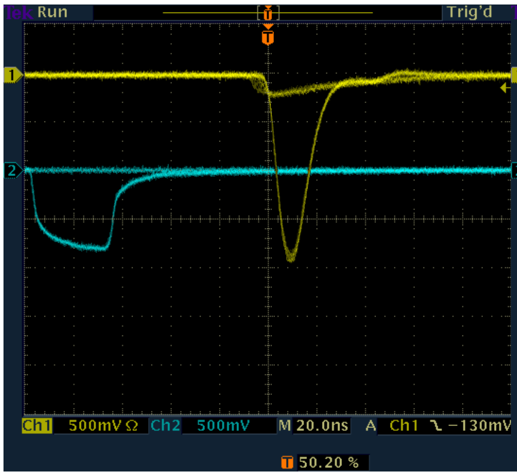


Figure 2: Driver ch.1 + Bundle #14, for RS sector group 1U.

Figure 3: Driver ch.2 + Bundle #13, for RS sector group 2U.



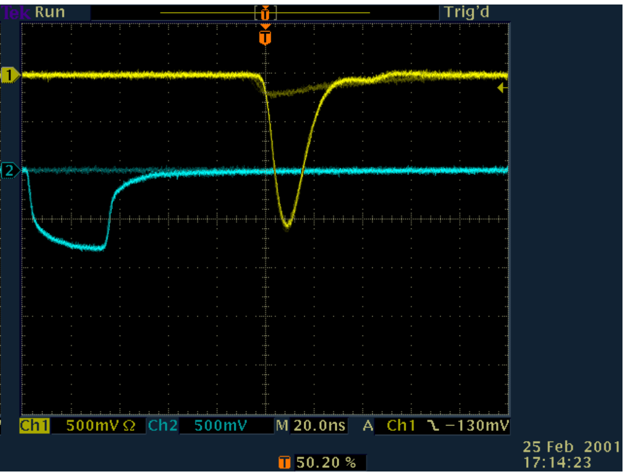


Figure 4: Driver ch.3 + Bundle #11, for RS sector group 3U.

Figure 5: Driver ch.4 + Bundle #12, for RS sector group 4U.

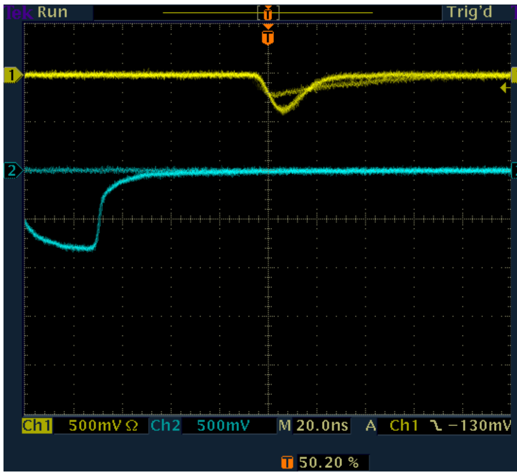


Figure 6: Driver ch.5 + Bundle #10, for RS sector group 1D.

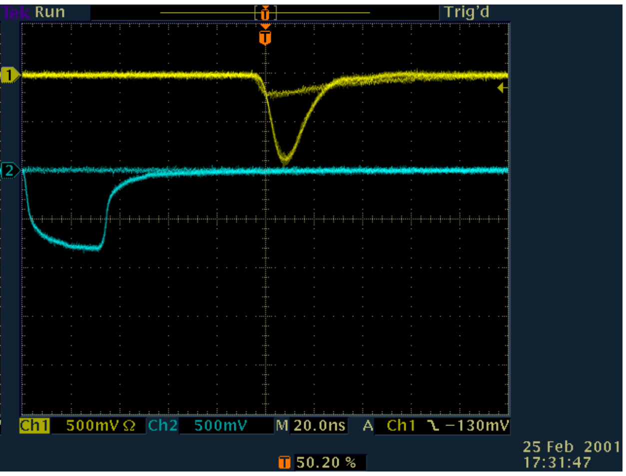


Figure 7: Driver ch.6 + Bundle #9, for RS sector group 2D.

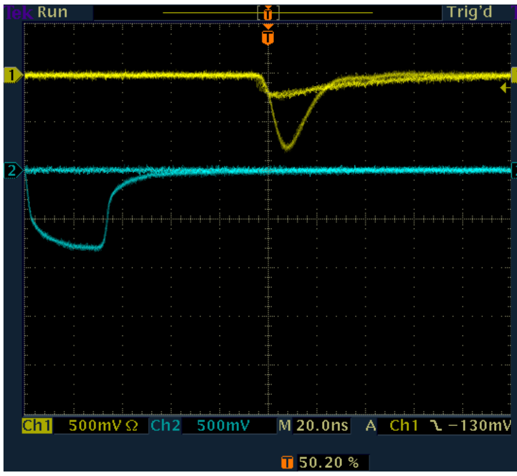


Figure 8: Driver ch.7 + Bundle #7, for RS sector group 3D.

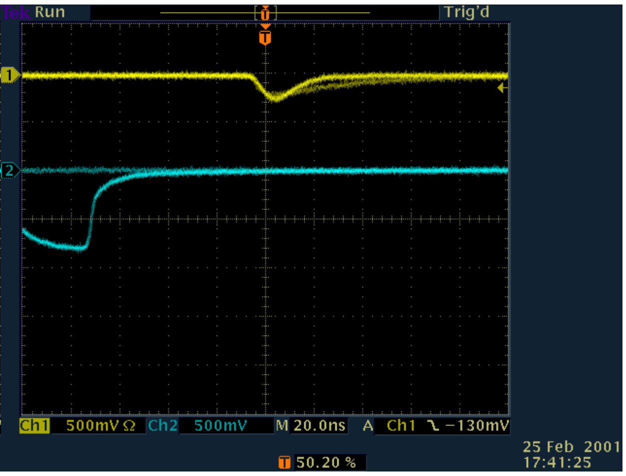


Figure 9: Driver ch.8 + Bundle #8, for RS sector group 4D.

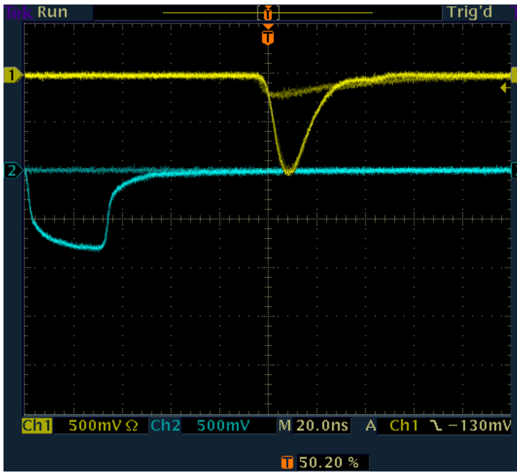


Figure 10: Driver ch.9 + Bundle #5, for BV/BVL UR.

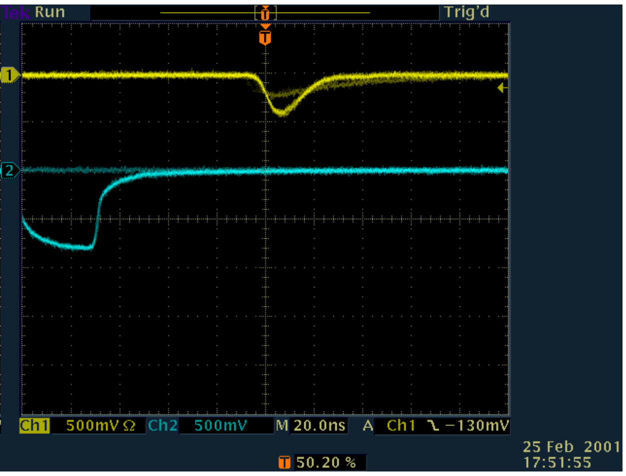


Figure 11: Driver ch.10 + Bundle #6, for BV/BVL UL.

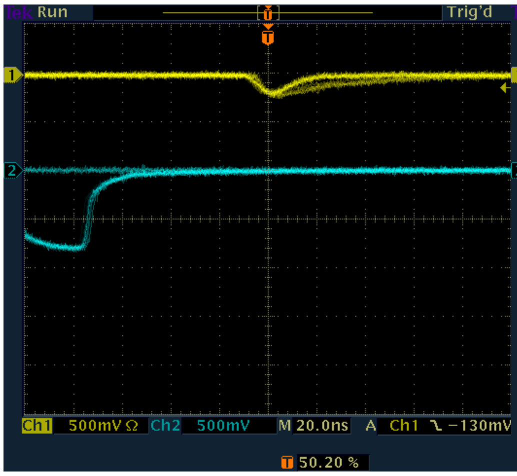


Figure 12: Driver ch.11 + Bundle #4, for BV/BVL DL.

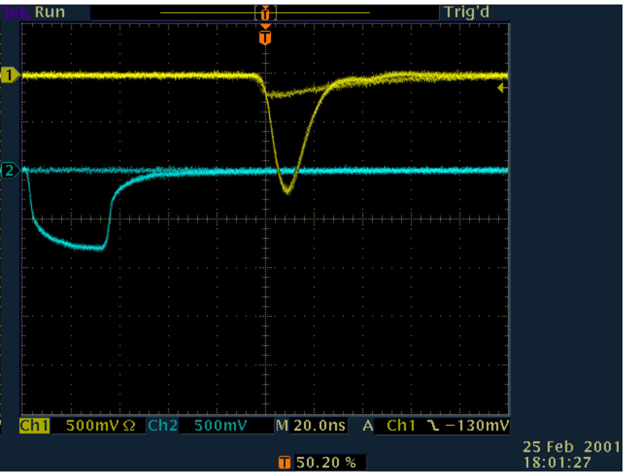


Figure 13: Driver ch.12 + Bundle #3, for BV/BVL DR.