Simultaneous Projection and Positioning of Laser Projector Pixels

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Abstract— Supplementary material.

1 DISASSEMBLY OF A LASER PROJECTOR

To acquire the V-Sync and H-Drct signals, we disassemble a laser projector (Sony MP-CL1) as follows. First, the front cover of the projector is removed using a plier as shown in Figure 1. Second, a spacing bar is pulled out from the body of the projector using a hex wrench. Third, the back cover is slid down and pulled out from the body. Finally, the main board of the projection unit is removed from the body.

2 ACQUISITION OF V-SYNC AND H-DRCT

The acquisition of a V-Sync signal from a laser projector was demonstrated in a prior study [1]. This work regarded a laser control signal as V-Sync to synchronize a camera and the laser projector for 3D shape measurement. However, we found that the sharpness of this V-Sync signal became too low to be detected when a projection image was dark. This leads to a significant error in the position estimation of a projector pixel in our system.

Therefore, we applied another signal to our V-Sync from the mirror driving circuit. We also found a signal representing the direction of the mirror and regard it as H-Drct. These signals and GND are captured with soldering polyurethane copper wires from the printed circuit board as shown in Figure 2. Figure 3 shows captured signals using a oscilloscope (PicoScope 6402C).

3 CIRCUIT DIAGRAM

The circuit diagrams of the photosensor amplifier and the wireless IR communication module in the direct method are shown in Figure 4.

REFERENCES

 M. O'Toole, S. Achar, S. G. Narasimhan, and K. N. Kutulakos. Homogeneous Codes for Energy-efficient Illumination and Imaging. ACM Transactions on Graphics, 34(4):35:1–35:13, July 2015. 1. Remove a front cover using a plier



2. Pull out a spacing bar from the body using a hex wrench



3. Slide down the back cover, and pull out from the body



4. Pull out the main board from the body



Fig. 1. Disassembling a laser projector.

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Fig. 2. Signal lands on the main board.



Fig. 3. Capturing signals using PicoScope 6402C.



Fig. 4. The circuit diagrams of some components in the direct method.