

# Development of Noncontact Height Measurement Device Fabricated Using Microcontroller HT46R232 as Foundation

Jen-Yu Shieh\*, Shun-Ming Lo<sup>1</sup>, Kun-Hsien Lin<sup>1</sup> and Bai-Hao Chang<sup>1</sup>

Department of Electro-Optics Engineering, National Formosa University, Yunlin, Taiwan, ROC

<sup>1</sup>Graduate Institute of Electro-Optical and Materials Science,  
National Formosa University, Yunlin, Taiwan, ROC

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This study presents a low-cost, extremely practical, and easy-to-operate composite instrument for measuring height. This instrument uses the level-, distance-, and height-measuring devices typically employed in construction works for further integration. Because most instruments used in construction and architecture are expensive and have only single functions, the system developed in this study combines laser modules, ultrasonic sensors, inertial sensors, and an HT46R232 microcontroller. We also used SolidWorks to design a multifunction construction measurement device that can measure distance and level, and measure height by a noncontact method. This system adds the tangent theorem of trigonometric functions to the microcomputer controller for height calculation. Experimental verification indicated that this system can use sensors to obtain correlation coefficients for measuring height. The tangent theorem of trigonometric functions was used to measure object height. This facilitated noncontact height measurements in the microcomputer controller. Measurement system analysis (MSA) was employed to verify that the measurement system adheres to the QS9000 measurement system specifications.

\*Corresponding author: e-mail: reed@nfu.edu.tw