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A wireless data acquisition and transmission system for smart tool holder based on socket

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Abstract:

Cutting condition monitoring plays an important role in modern manufacturing to improve cutting efficiency and machining accuracy, and reduce cost. More and more researchers start integrating the sensors into the tool holder to detect the cutting status information in view of its convenient use and wide applicability. However the sensor signals are difficult to transmit out through traditional wired way as the tool holder is in high-speed rotation in milling process. Therefore, a multi-channel high-precision wireless data acquisition and transmission system was designed and developed. The system hardware was designed based on AD7606 and AR9331, and a STM32 was used as the microcontroller. The data transmission was based on socket, and the software of the system was completed. Finally, a series of tests were carried out to evaluate the performance of the developed system, including collecting DC voltage and sinusoidal signal under the static state, and applying to the smart tool holder to carry on the data acquisition and transmission test under the rotating state. The test results showed that the developed system had high reliability and precision, and could collect the sensor signals from the tool holder and transmit to the host computer timely and accurately.

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Download Citation	Nowadays, Manufacturing enterprises face the growing demands of increased product quality, reduced cost and higher processing efficiency, so cutting condition monitoring becomes particularly important [1], [2]. A lot of studies have been carried out on this field, and cutting process information acquisition and transmission is one of the extremely important aspect in monitoring.	Full Text
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