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Development of Precise Measurement System for Structure Bridge

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Key Words: Precise Measurement(), Monitoring(), Microprocessor(), Sensor(

Abstract

In this paper, we concern for development of precise measuement system for civil structure by using one chip microprocessor based on communication system. The datalogger is developed by using 80C196KC microprocessor. It has RF communication modul and data acquisition function for several kinds of sensors such as load cell, tilt-meter, strain gauge, tension meter, themocouple and so on. The data is acquisited by datalogger is sent to a main server which is located at central monitoring office. The server has a function suppervising several data points located at civil structures, it analyzes the data and shows the data graphically. The effectiveness of the developed system is proven through experimental results by an application for the bridge of Nakdong river edge in Busan, Korea.

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			한라보고 및 조치
	PC	Fig. 1 Composition of developed	system
	RF .	2.1	
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	A/D	Fig. 2	

2.1.1 2.1.2 Fig. 3 Table 1 80C196KC

4-20mA

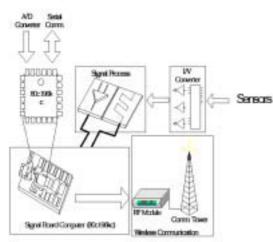
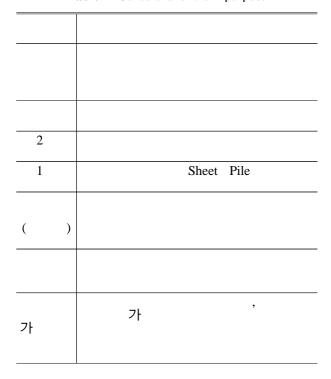


Fig. 2 Datalogger and communication system

/ 0~5V , A/D

Table 1 Sensors and their purpose



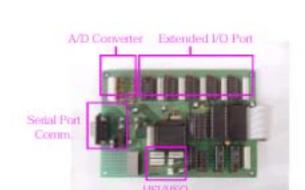


Fig. 3 80C196KC Board for datalogger

10 가 8 A/D 가 A/D A/D 가 . A/D 22µs가 / A/D (ASCII) 가 .(2) 가 RF RAM, RF 가 1000 가 A/D **RAM**

2.1.3

RF . RF RF 가 가 .⁽³⁾ RF RATA-10V . Fig. 4 RF

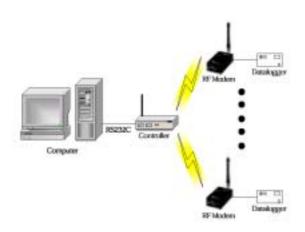


Fig. 4 Overview of wireless communication

Table 2 RF

Table 2 Specification of RF Module

Access Method	Poling / Contection
Frequency Range	(10mW) 219/224Mhz
Frequency Control	Quartz Crystal
Channel Capability	1CH TX/RX
RF Data Rates	9600 bps
Line Data Rates	2400 ~ 19200 bps
DTE Interface	RS-232C (Asynchronous)
Operating Temp	-10 ~ +50
Antenna Require	50 Unblanced (BNC Type)
Power Source	10mW-10V DC 300mA
Flow Control	X ON/OFF RTS/CTS
Dimension(mm)	60(W)×32(D)×160(H)
Service Area	10mW 1km

PC

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PC

SQL Server

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Excel

Excel

Visual Basic GUI

, Excel

. Fig. 5

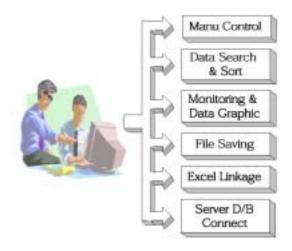


Fig. 5 Function of monitoring software

2.2

3.

Fig. 6

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Fig. 6 Construction field and sensors

Fig. 7



Fig. 7 Developed datalogger

Fig. 8

PC

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PC

PC

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Excel

Excel 가



Fig. 8 Monitoring program

4.

80C196KC

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