



Figure 1. Schematics of data-acquisition system.

Table 1. Electronic components of the data-acquisition system.

Id.	Description	Purpose/location
Printed board circuit components and modules		
P11, P13, P22	0.1 μ F electrolytic capacitor	Noise decoupling at power and serial lines
P18, P32	10 μ F electrolytic capacitor	Noise filter
P12, P35, P36	10k Ω resistor	Pull-up or -down resistors
P09	16MHz crystal	16MHz external crystal oscillator
P15	28-pin socket	28-pin socket for the ATmega328p
P17, P23, P26, P30	220 Ω resistor	Resistors to control current drainage
P06, P07	22pF ceramic capacitor	22pf ceramic capacitor for atmega328p
P19, P20	4.7k Ω resistor	Pull-up resistors for I2C lines
P01	ADS1115 module	Direct soldering the module can be substituted by 10 female pin headers for ADS1115
P39	DC input jack	Power input for a 9V-12V AC-DC voltage
P21a, P21b	DS3231 module	Direct soldering the module can be substituted by 6 female pin headers for DS3231
P25	LM7805	Voltage regulator
P14, P24, P27-29, P31, P33-34, P38, P40	Molex with 2 pins ¹	Connectors for various panel buttons and connectors
P37, P02-05	Molex with 3 pins ¹	Connection for temperature and humidity sensor and accelerometer channels
P41	Molex with 4 pins ¹	Connection for LCD screen module ²
P16	Molex with 5 pins ¹	CP2102 connector for USB/UART communication with ATmega328p
P08	Molex with 6 pins ¹	Connection for microSD module ²
P08b	microSD module	MicroSD module with SPI connectors
P10	PCB push button	Push button to allow atmega328p hard reset
Buttons, connectors, and modules to install in external case		
P42-45	(On)-Off panel button	Momentary pushbutton, normally open and 12mm mounting hole diameter, at top panel
P46, P51-54	3.5 mm jack PJ-301M	Stereo audio panel connector with 3 pins for temperature and humidity sensor at top panel and analog input/output at front panel
P47-50	3 way panel connector	Connectors for accelerometer at front panel
P55	5 way panel connector	Connector for a CP2102 module to enable serial communication at back panel
P56	On-Off panel button	Self-lock button, 12mm mounting hole diameter, at back panel
P57	LED + Panel LED holder	LED to indicate system is powered up
P58	LCD screen module	16x2 LCD screen module with I2C interface
P59	microSD card module	MicroSD card module with SPI interface

Notes:

1 –Molex connectors comprise the header, the wire-board receptacle, and crimp terminals.

2 – The LCD screen and microSD card modules are not directly soldered on the PCB. Therefore, an extra pair of connectors are needed to connect the PCB to the modules.