1. MCU

The main purposes microprocessor unit (MCU) are decoding and manipulating temperature and humidity data transmitted from transmitter, clock and drive LCD display.

At 12:00, the transmitter transmits a 6ms synchronizing signals. As the MCU on weather station receive and decode this signals successfully, it will reset it's timer into 12:00. The purpose synchronization of both MCU is to minimize the time drift. Since the transmitter send temperature and humidity data every 5 minutes, the weather station must know the actual time to turn on the receive.

At power on reset, the MCU is switched into normal time display mode. The MCU takes data from humidity sensor and temperature sensor every 5 minutes. The MCU will convert this data into BCD forma and display the data on LCD. Since the MCU was synchronized with the transmitter MCU, the MCU turns on the receiver before the transmitter turn on. When the receiver is receiving signals, the antenna icon will flash. When the MCU receive and decode the weather information from transmitter successfully, it will display the information on the LCD. At this moment, the MCU will analyze the weather information and show a weather report on the LCD.

As the MCU receive a low battery signal from transmitter, it displays a low-bat icon on LCD display.

2. LCD display

The LCD displays current time, indoor and outdoor temperature and humidity information.

3. RF receiver

The 433.92 MHz receiver converts RF modulated information into digital data for MCU.

The 433.92 MHz receiver converts RF modulated information into digital data for MCU. The receiver is composed of a transistor, loop antenna and 433.92 MHz resonator. The RF signals is received by the loop antenna, the antenna convert the RF signals into current. When the receiver detects RF power successfully, it will send bit 1 to MCU. When there is no RF power detected successfully, it will send bit 0 to MCU.

4. Humidity sensor

The humidity sensor provides humidity data for MCU. The humidity sensor actually is a variable resistor. The resistance of the sensor change along with the change of humidity. In order to detect the resistance, the capacitor is connected to the sensor. The RC oscillator is formed. When humidity change, the resistance of sensor change. Finally, the frequency of RC oscillator change as resistance change. An A/D converter in MCU is responsible to detect the frequency of the oscillation. The humidity of the sensor could be detected by counting the frequency of oscillation.

5. Temperature sensor

The temperature sensor provides temperature data for MCU. The temperature sensor actually is a variable resistor. The resistance of the sensor change along with the change of temperature. In order to detect the resistance, the capacitor is connected to the sensor. The RC oscillator is formed. When temperature change, the resistance of sensor change. Finally, the frequency of RC oscillator change as resistance change. An A/D converter in MCU is responsible to detect the frequency of the oscillation. The temperature of the sensor could be detected by counting the frequency of oscillation.

8. Q1

The function of Q1 in the weather station is to drive the buzzer (Amplify the signal

current)

9. Q5

The function of Q5 in the weather station is to amplify and detect the 433.92 MHz RF modulated signals.