The Thermostat Industry: Transformation from Analog to Digital

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INTRODUCTION

Before a sound or piece of information is transmitted, it is encoded in the transmitter in one of the ways described below - analogue or digital. The receiver must then decode the signal to produce a copy of the original information or sound.

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WHAT IS ANALOG AND DIGITAL SIGNAL?

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ANALOG SIGNALS

Music and speech vary continuously in frequency and amplitude. In the same way, analogue signals can vary in frequency, amplitude or both. The diagram shows a typical oscilloscope trace of an analogue signal which varies in the same way as the sound signal it represents.

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MODULATION

A wave that has been modified to carry a signal is said to have been modulated. There is more than one way to do this.

FM radio and AM radio (Frequency Modulated and Amplitude Modulated) are two ways in which radio waves are transmitted.

In Amplitude Modulation, the radio wave varies in amplitude to match the changes in the sound wave.

In Frequency modulation, the radio wave varies in frequency to match the changes in the sound wave.
Oscilloscope trace of an analog signal

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The upper trace is amplitude modulated. The amplitude changes from large to small to large again to copy the changes in the sound wave being carried by the radio wave. The frequency does not change.

The lower trace is frequency modulated. The frequency changes from high to low to high again to copy those same changes in the sound wave being carried by the radio wave. The amplitude does not change.