



Lesson 10: Digital transmissions

What you need to know:

1. Understand the difference between analogue and digital signals.
2. Which is better; analogue or digital?

As we have seen in the last lesson, a radio signal is produced inside a transmitter when a sound wave enters a microphone. A voltage is created and a radio wave is transmitted. This is called an **analogue signal**. **In an analogue signal the wave varies in exactly the same way as the information it is carrying.** Both FM and AM are analogue signals.

In a digital transmitter, the voltage is converted into a digital signal instead of creating radio waves. This means that the information is sent as a series of pulses, which is a digital code of 1s and 0s. A continuous wave is not transmitted but the information is sent by the signal being turned on and off. When the signal is off the receiver records a '0' and when the signal is on the receiver records a '1'. This is the same as the binary language that your computer uses. The receiver then converts this series of 1s and 0s back into a sound wave.

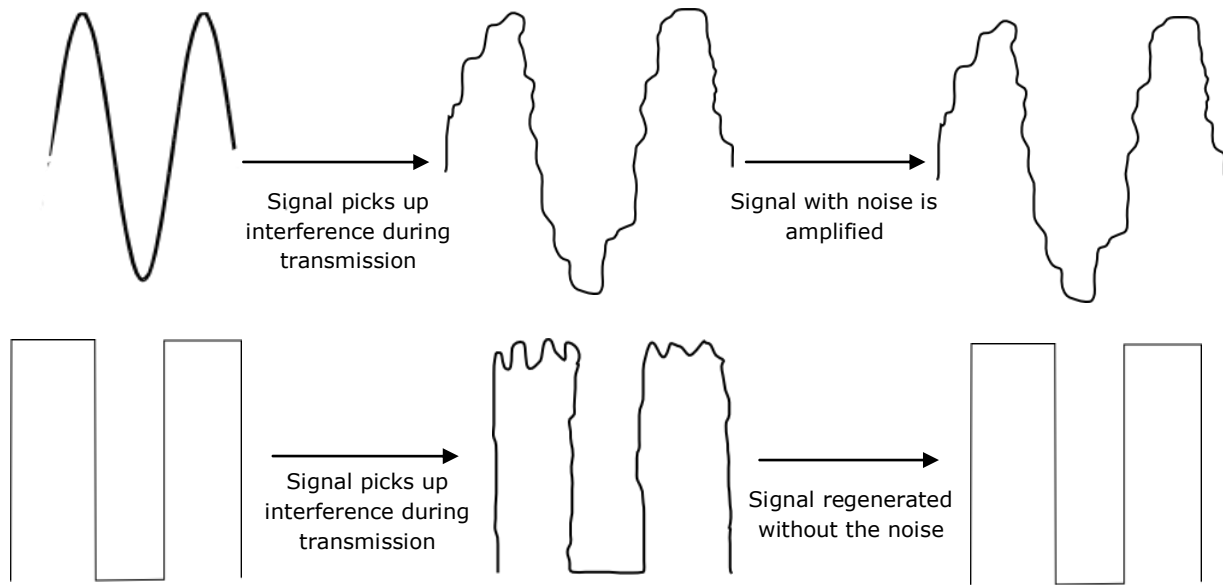


In your exam you may be asked how a digital signal is different to an analogue signal.



You may have seen that in the past few years television and radio signals are being changed over from analogue to digital signals and in a few years analogue signals will no longer be used to transmit radio and tv programmes. But why? Well there are a number of reasons:

1. **Digital signals can carry more information than an analogue signal.**
2. **Digital signals can be processed by computers**, meaning that signals can be picked up and used by your home computer.
3. **Digital signals transmit information of a higher quality than analogue.** When a signal (either digital or analogue), is transmitted it will degrade as it spreads out. This is because the amplitude will decrease and the signal can interact with other signals and pick up interference (called **noise**). This means that, at the receiver, the signals needs to be amplified to try and restore the original signal. With analogue signals this is hard to do and you can get a fuzzy background sound. With a digital signal, the signal is either on or off and so it is easy to amplify these signals and remove the noise. This means that a digital signal can transmit information with little or no loss in the quality of the sound.



In your exam you may be asked why digital signals are better for transmitting information than analogue signals.



Recap:

1. Analogue signals are continuous waves.
2. Digital signals are a series of pulses of 1s and 0s that transmit information.
3. Digital signals are better than analogue because they can transmit more information, and can be used by computers.
4. Digital signals produce better quality sounds as the original wave can be regenerated without any interference.

Further information:

1. This is a good video showing the uses of Morse code. It's a race between people sending a message via text messaging and Morse code:

<http://uk.youtube.com/watch?v=mQaXjqfAgkQ>