DOWNLOAD PDF AMPLITUDE SHIFT KEYING APPLICATIONS

Chapter 1 : Amplitude-shift keying - Wikipedia

Amplitude shift keying (ASK) is one of the methods to squeeze more bits into each pulse of a signal transmission. What is ASK? If a basic digital link transmit "ones" and "zeros" as one bit per each pulse, for example the bit 1 is a pulse of +3 vo.

A digital modulation technique in which the amplitude of the carrier wave is altered according to the modulating signal bitstream is known as Amplitude Shift Keying ASK. It is the easiest and straightforward digital modulation scheme. ASK is sometimes known as On-Off keying because the carrier wave swings between 0 and 1 according to the low and high level of input signal respectively. Theory of Amplitude Shift Keying In ASK, frequency and phase of the carrier wave is kept constant and only the amplitude is varied according to the digitized modulating signal. However, one can have multiple levels of signal elements also. In the figure given below, we can see waveforms of amplitude shift keying. Here, i figure represents a message signal represented in the forms of the bitstream, ii shows the carrier wave; whose amplitude is to be varied according to the digital message signal. The last figure iii shows the resultant ASK waveform which is amplitude modulated. It is clear from the figure that the signal is present only in case of the high-level digital stream. No signal waveform is achieved when the bit shows a low level, showing on and off behaviour. Generation of ASK signal The figure below shows the block diagram representing the process of generation of an amplitude shift keying waveform. It consists of a signal generator that produces a high-frequency sinusoidal waveform, a message signal in digitized form and a bandpass filter. The switch provided here gets open and closed according to the bits of the message signal. When the digital bit is of level high i. Thus, allows the carrier wave to get transmitted. As against, in case of low-level bit i. This is the reason why the signal appears at the output in case of a high level. After this, pulse reshaping is done by the band limiting filter according to the amplitude and phase characteristics of the filter. Detection of ASK signal Detection or demodulation is the process of recovering original message signal from the modulated waveform. Coherent detection It is noteworthy in case of coherent detection that the carrier at the receiver must be in synchronization with the carrier at the transmitter for accurate detection. The figure below shows the process of coherent detection. The demodulation circuitry consists of a product modulator along with an integrator and a decision-making device. Here, the input to the product modulator is modulated waveform along with the sinusoidal carrier. The combination of the two is then fed to the integrator that operates successively according to the bit interval. After which it also executes low pass filtration of the signal. Then the output of the integrator acts as input to the decision device. Also, a preset threshold is provided to the decision-making device. The decision device compares the signal at its input with the threshold value. When the signal exceeds the threshold value then bit 1 is provided by the decision device as its output. However, when the signal deceeds be less than the threshold value then bit 0 is achieved. Non â€" coherent detection A coherent detection technique somewhat leads to a complex design as it needs synchronization. However, the design can be simplified by non-coherent detection that makes use of envelope detector. The figure below shows the block diagram of a non-coherent ASK detection technique composed of a bandpass filter and envelope detector along with a decision device. As it does not require a synchronized carrier thus the method makes use of the rectifier circuit for the rectification of the signal. After which the signal is fed to the low pass filter. The output of which is then provided to a decision device that compares the signal value with the preset threshold value in a similar manner as done in the coherent detection. Thus generates the equivalent output, which is the original digital bit stream. As ASK is an amplitude modulation scheme, the modulated wave and the message signal has the same bandwidth. Here, an abrupt change in the amplitude is noticed according to the respective change in data bit. Thus, the scheme allows data transmission in case of low or medium data rate rather than the high data rate. Advantage of Amplitude shift keying Its generation and detection are easy thus facilitate simple transmitter and receiver sections. Disadvantages of Amplitude shift keying ASK technique is not suitable for high bit rate data transmission. Highly susceptible to noise and other external factors. Applications of Amplitude shift keying Digital data through an optical fiber is transmitted using ASK technique. The

technique was widely used in traditional telephone modems. Thus we can conclude that by using ASK technique, digital data can be transmitted and by varying only the amplitude factor the carrier wave.

Chapter 2 : Applications of amplitude shift keying

*amplitude shift keying is a form of modulation in digital signal that variation in the amplitude of carrier www.nxgvision.comation of ask:*used mainly for radio frequencies.*

It is particularly well suited to the growing area of data communications. PSK, phase shift keying enables data to be carried on a radio communications signal in a more efficient manner than Frequency Shift Keying, FSK, and some other forms of modulation. With more forms of communications transferring from analogue formats to digital formats, data communications is growing in importance, and along with it the various forms of modulation that can be used to carry data. There are several flavours of phase shift keying, PSK that are available for use. Each form has its own advantages and disadvantages, and a choice of the optimum format has to be made for each radio communications system that is designed. To make the right choice it is necessary to have a knowledge and understanding of the way in which PSK works. Phase Shift Keying, PSK, basics Like any form of shift keying, there are defined states or points that are used for signalling the data bits. Binary phase shift keying, BPSK The problem with phase shift keying is that the receiver cannot know the exact phase of the transmitted signal to determine whether it is in a mark or space condition. This would not be possible even if the transmitter and receiver clocks were accurately linked because the path length would determine the exact phase of the received signal. To overcome this problem PSK systems use a differential method for encoding the data onto the carrier. This is accomplished, for example, by making a change in phase equal to a one, and no phase change equal to a zero. Further improvements can be made upon this basic system and a number of other types of phase shift keying have been developed. One simple improvement can be made by making a change in phase by 90 degrees in one direction for a one, and 90 degrees the other way for a zero. This retains the degree phase reversal between one and zero states, but gives a distinct change for a zero. In a basic system not using this process it may be possible to loose synchronisation if a long series of zeros are sent. This is because the phase will not change state for this occurrence. There are many variations on the basic idea of phase shift keying. Each one has its own advantages and disadvantages enabling system designers to choose the one most applicable for any given circumstances. Other common forms include QPSK Quadrature phase shift keying where four phase states are used, each at 90 degrees to the other, 8-PSK where there are eight states and so forth. PSK constellation diagrams It is often convenient to represent a phase shift keyed signal, and sometimes other types of signal using a phasor or constellation diagram. Using this scheme, the phase of the signal is represented by the angle around the circle, and the amplitude by the distance from the origin or centre of the circle. In this way the can be signal resolved into quadrature components representing the sine or I for In-phase component and the cosine for the quadrature component. Most phase shift keyed systems use a constant amplitude and therefore points appear on one circle with a constant amplitude and the changes in state being represented by movement around the circle. For binary shift keying using phase reversals the two points appear at opposite points on the circle. Other forms of phase shift keying may use different points on the circle and there will be more points on the circle. Constellation diagram for BPSK When plotted using test equipment errors may be seen from the ideal positions on the phase diagram. These errors may appear as the result of inaccuracies in the modulator and transmission and reception equipment, or as noise that enters the system. It can be imagined that if the position of the real measurement when compared to the ideal position becomes too large, then data errors will appear as the receiving demodulator is unable to correctly detect the intended position of the point around the circle. Constellation diagram for QPSK Using a constellation view of the signal enables quick fault finding in a system. If the problem is related to phase, the constellation will spread around the circle. If the problem is related to magnitude, the constellation will spread off the circle, either towards or away from the origin. These graphical techniques assist in isolating problems much faster than when using other techniques. QPSK is used for the forward link form the base station to the mobile in the IS cellular system and uses the absolute phase position to represent the symbols. On the reverse link from mobile to base station, O-QPSK is used to prevent transitions through the origin. Consider the components that make up any particular vector on the constellation diagram as X and Y components.

Normally, both of these components would transition simultaneously, causing the vector to move through the origin. A constellation diagram will show the accuracy of the modulation. Forms of phase shift keying Although phase modulation is used for some analogue transmissions, it is far more widely used as a digital form of modulation where it switches between different phases. This is known as phase shift keying, PSK, and there are many flavours of this. It is even possible to combine phase shift keying and amplitude keying in a form of modulation known as quadrature amplitude modulation, QAM. The list below gives some of the more commonly used forms of phase shift keying, PSK, and related forms of modulation that are used: Each form of phase shift keying has its own advantages and disadvantages. In general the higher order forms of modulation allow higher data rates to be carried within a given bandwidth. However the downside is that the higher data rates require a better signal to noise ratio before the error rates start to rise and this counteracts any improvements in data rate performance. In view of this balance many radio communications systems are able to dynamically choose the form of modulation depending upon the prevailing conditions and requirements.

Chapter 3 : Digital Communication Amplitude Shift Keying

Amplitude-shift keying (ASK) is a form of amplitude modulation that represents digital data as variations in the amplitude of a carrier www.nxgvision.com an ASK system, the binary symbol 1 is represented by transmitting a fixed-amplitude carrier wave and fixed frequency for a bit duration of T seconds.

Modulation is a technique of varying any component of carrier signal in proportion to that of base band signal. In this article I have covered several Analog and Digital modulation techniques. So lets go into brief description and application of some of the techniques. Amplitude Modulation In the simplest way possible, AM can be explained as changing Amplitude of the carrier signal or the high frequency signal with respect to the modulating signal. It is used in Aircraft for communication between station to pilot and vice versa. It is still used in commercial radio broadcasting. But AM having Low frequency, they only broadcast the commentary or news or we can say only vocals will be their. As the frequency is increased, in ground wave propagation attenuation will increase. Hence FM having higher frequency will get more degraded in ground wave as compared to AM. But still use of FM is more than AM. Because it uses direct wave propagation line of sight. Frequency Modulation In case of frequency Modulation, the frequency of Carrier is varied with the instantaneous value of modulating signal. For storing Luminance i. Quadrature Amplitude Modulation Till now we have seen that, only single parameter is changed with the instantaneous value of base band signal. QAM can be of different types depending upon the number of possibilities of Amplitude and Phase. I have shown two fig. Phase , and the second fig. Amplitude Shift Keying Till now, the modulation techniques were used for analog signal, but now the modulation techniques we will discuss are used in digital signal modulation. First is ASK, it is very much similar to AM, in which Amplitude of the carrier is varied in proportional to the digital base band signal. As digital signal is a binary signal, so we will have only 2 different amplitude value in ASK. ASK modulation is shown below. I have used this module many time for making wireless robo car. We need to attach Encoder and Decoder IC to code decode the data. And the digital data from the Encoder is modulated by ASK and than it is transmitted. This modulation technique is used only for low data transfer rate around bits per second. It works on 38 kHz carrier frequency. But this modulation technique is used on digital modulation. In this, frequency of the carrier is changed in accordance with the data bit. FSK modulation technique is shown in below fig. Phase Shift Keying In phase shift keying, phase of the carrier is changed in accordance with the data or base band signal. Different versions have different speeds and also uses different modulation Techniques. Difference between this two is the speed of data transfer. It is commonly called as 2. It looks similar to that of FSK. Gaussian filter is used to reduce the side band power of the spectrum. Ships uses GMSK modulation technique for communication with other ships as well as the station. Data like speed of the ship, its current position, Estimated Arrival Time, Type of the ship etc is constantly transmitted through Time division multiplexing. This much of data I got when I was researching the topic "Application of modulation techniques". If you know something more than this, do share it with others by commenting below.

Chapter 4 : What is APSK | Amplitude & Phase Shift Keying | www.nxgvision.com

Amplitude Phase Shift Keying Constellation Design and its Applications to Satellite Digital Video Broadcasting 3 satellites or digital video broadcasting when higher spectral efficiency is needed.

The two carrier waves are a cosine wave and a sine wave, as indicated by the signal-space analysis above. Here, the odd-numbered bits have been assigned to the in-phase component and the even-numbered bits to the quadrature component taking the first bit as number 1. Jumps in phase can be seen as the PSK changes the phase on each component at the start of each bit-period. The topmost waveform alone matches the description given for BPSK above. Timing diagram for QPSK. The binary data stream is shown beneath the time axis. The two signal components with their bit assignments are shown at the top, and the total combined signal at the bottom. Note the abrupt changes in phase at some of the bit-period boundaries. The binary data that is conveyed by this waveform is: The odd bits, highlighted here, contribute to the in-phase component: Offset quadrature phase-shift keying OQPSK is a variant of phase-shift keying modulation using four different values of the phase to transmit. When the signal is low-pass filtered as is typical in a transmitter , these phase-shifts result in large amplitude fluctuations, an undesirable quality in communication systems. By offsetting the timing of the odd and even bits by one bit-period, or half a symbol-period, the in-phase and quadrature components will never change at the same time. This yields much lower amplitude fluctuations than non-offset QPSK and is sometimes preferred in practice. The modulated signal is shown below for a short segment of a random binary data-stream. Note the half symbol-period offset between the two component waves. The sudden phase-shifts occur about twice as often as for QPSK since the signals no longer change together , but they are less severe. Timing diagram for offset-QPSK. The two signal components with their bit assignments are shown the top and the total, combined signal at the bottom. Note the half-period offset between the two signal components. Usually, either the even or odd symbols are used to select points from one of the constellations and the other symbols select points from the other constellation.

Chapter 5 : SmS : Practical Application - Modulation Techniques

Amplitude Shift Keying (ASK) is a type of Amplitude Modulation which represents the binary data in the form of variations in the amplitude of a signal. The ASK modulator block diagram comprises of the carrier signal generator, the binary sequence from the message signal and the band-limited filter.

Any modulated signal has a high frequency carrier. The binary signal when ASK modulated, gives a zero value for Low input while it gives the carrier output for High input. The following figure represents ASK modulated waveform along with its input. ASK Modulator The ASK modulator block diagram comprises of the carrier signal generator, the binary sequence from the message signal and the band-limited filter. Following is the block diagram of the ASK Modulator. The carrier generator, sends a continuous high-frequency carrier. The binary sequence from the message signal makes the unipolar input to be either High or Low. The high signal closes the switch, allowing a carrier wave. Hence, the output will be the carrier signal at high input. When there is low input, the switch opens, allowing no voltage to appear. Hence, the output will be low. The band-limiting filter, shapes the pulse depending upon the amplitude and phase characteristics of the band-limiting filter or the pulse-shaping filter. Otherwise, it is known as Asynchronous. Following is the block diagram for the same. The modulated ASK signal is given to the half-wave rectifier, which delivers a positive half output. The low pass filter suppresses the higher frequencies and gives an envelope detected output from which the comparator delivers a digital output. The ASK modulated input signal is given to the Square law detector. A square law detector is one whose output voltage is proportional to the square of the amplitude modulated input voltage. The low pass filter minimizes the higher frequencies. The comparator and the voltage limiter help to get a clean digital output.

Chapter 6 : Phase-shift keying - Wikipedia

Amplitude-shift keying (ASK), frequency-shift keying (FSK), and phase-shift keying (PSK) are digital modulation schemes. ASK refers to a type of amplitude modulation that assigns bit values to discrete amplitude levels.

Chapter 7 : What is Frequency-Shift Keying (FSK)? - Definition from Techopedia

APSK, Amplitude & Phase Shift Keying is a form of modulation that is being considered increasingly for technologies like 5G mobile communications and for many other applications.

Chapter 8 : Amplitude Shift Keying (ASK) Modulation | Technology Everywhere

Applications: 1. DSB-SC. Lower power AM Amplitude modulation ASK Amplitude shift keying Phase shift keying. QAM ;.

Chapter 9 : What is Phase Shift Keying, PSK :: www.nxgvision.com

Amplitude shift keying - ASK - in the context of digital communications is a modulation process, which imparts to a sinusoid two or more discrete amplitude levels. These are.