ASK Modulation Simulation in Multisim

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ASK Modulation Simulation in Multisim

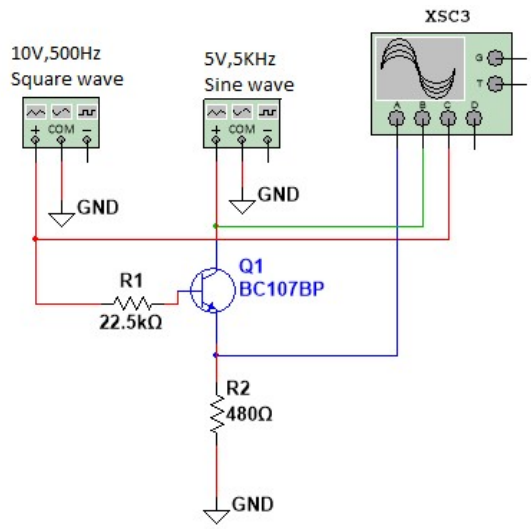
What is ASK modulation?

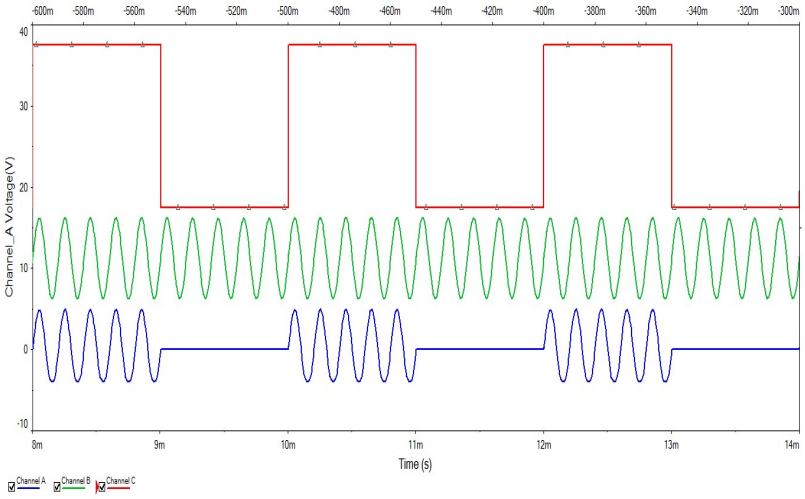
Amplitude shift keying refer to a type of amplitude modulation in which the amplitude of carrier sinusoidal is modified according to binary input data.

Design of ASK modulation

Transistor is need to be operate as a switch hence choose saturation values from data sheet

i.e $V_{CE(sat)}$ = 200mV $V_{BE(on)}$ = 700mV $h_{FE} = \beta = 50$, Ic=10mA and assuming that $I_C = I_E$.





Calculation of RE

Vpeak = Vcc=V_{CE} + $I_E R_E$

5V= 200m + 10m R_E

RE= R2=480 Ω

Calculation of R_B

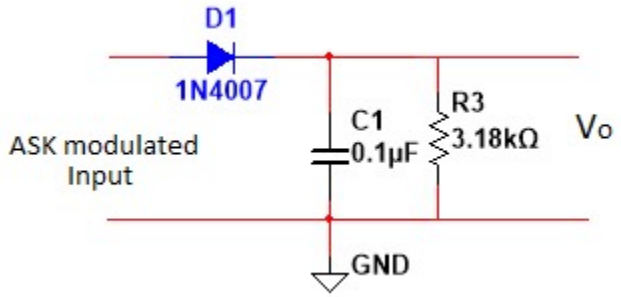
$V_B = I_B R_B + V_{BE} + I_E R_E$

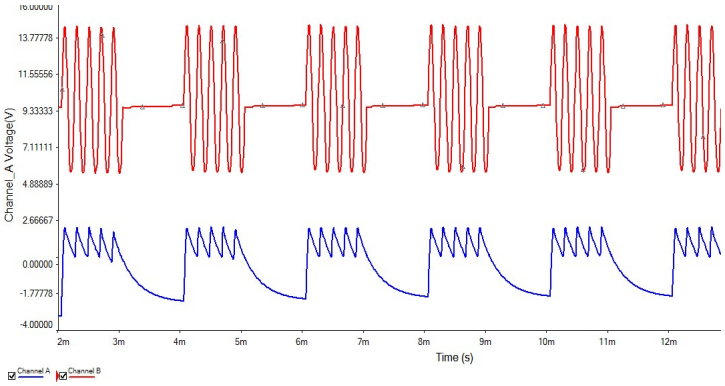
10= (10m /50) R_B + 700m + 10m X 480

$R_B = R_2 = 22.5K\Omega$

- Like Amplitude modulation, an ASK is also linear and sensitive to atmospheric noise, distortions, propagation conditions on different routes in PSTN, etc.
- The ASK technique is also commonly used to transmit digital data over optical fiber. For LED transmitters, binary 1 is represented by a short pulse of light and binary 0 by the absence of light.
- In case of Laser transmitters normally have a fixed "bias" current that causes the device to emit a low light level. This low level represents binary 0, while a higher-amplitude light wave represents binary 1.
- The ASK operates as a switch, using the presence of a carrier wave as a binary one and its absence/-ve to indicate a binary zero. This type of modulation is called **on-off keying** (OOK), and is used at radio frequencies to transmit Morse code

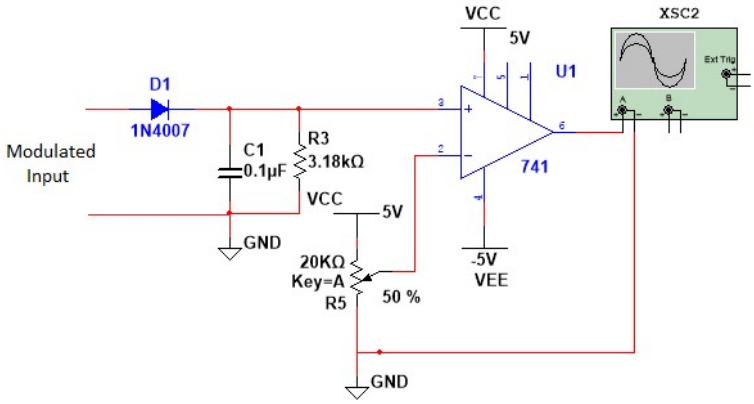
Design of Demodulation





The demodulator circuit works as a low pass filter, it allows low frequency signal source 500Hz and filter out carrier frequency 5KHz.

Hence assume Xc=R and C=0.1uF corner frequency fc=500Hz $\quad Xc = R = \frac{1}{(2\pi \times 500 \times 0.1\mu)} = 3.18K\Omega$



Original message signals is recovered form demodulator by using opamp.