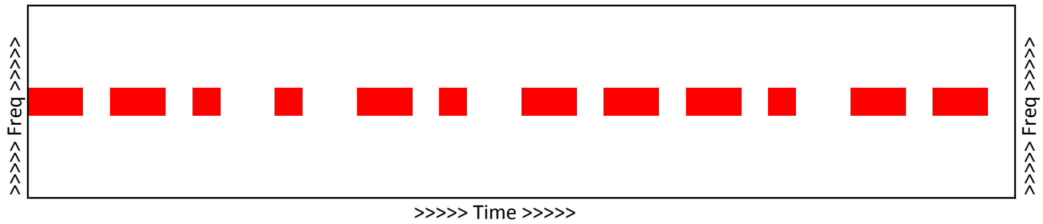
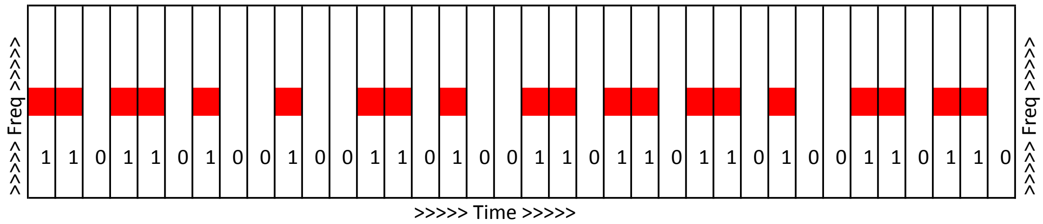
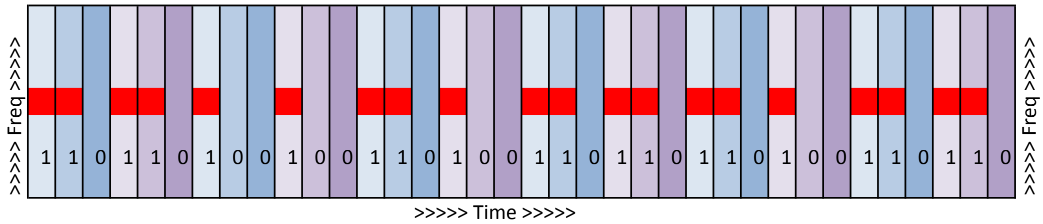
Modulation Cheat-sheet (1/3)



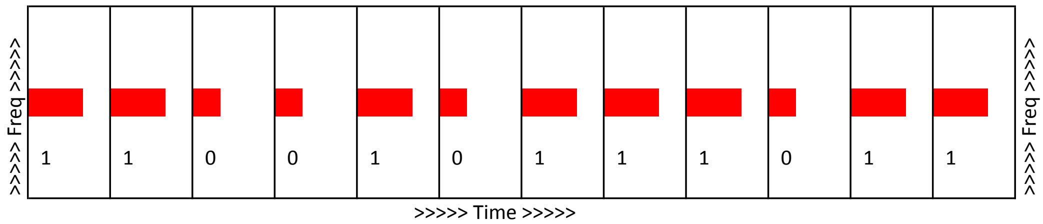
This is a bit hard to look at with accuracy. Let's add a grid overlay so that we can more clearly see how big the pulses are. We set the grid so that the smallest pulse is neatly encapsulated by the grid.



I've added some colour here for no other reason that to help us clearly visualise the spacing between the pulses.



We notice that there are only 2 different lengths for pulses, and that each can be neatly encapsulated if we assume that each pulse occupies three "cells". We determine this with trial and error. Eventually, with practice, it becomes more intuitive. Let's remove the colour and adjust the overlaying grid to match.

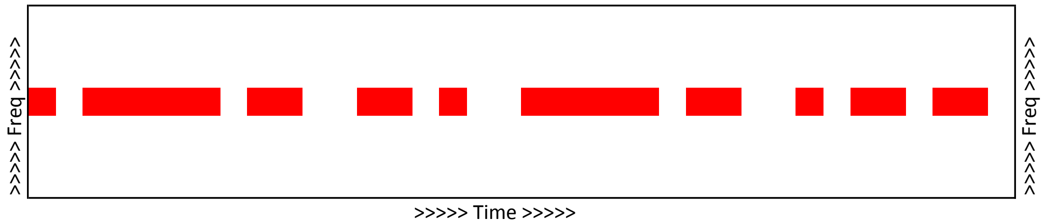


This modulation is Pulse-Width Modulation (PWM) 66/33. A '1' is a pulse covering 66% (2/3) of the symbol space, and a '0' is a short pulse covering 33% (1/3) of the symbol space. PWM pulses can be different lengths, e.g. 75/25, which would mean that there would be 4 "cells" per symbol, and a long pulse would occupy 3/4 cells and a short pulse would occupy 1 cell.

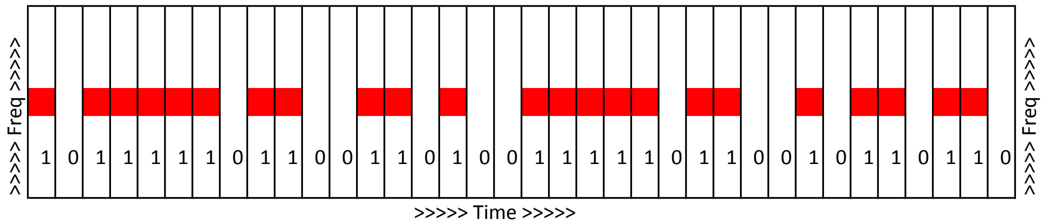
VERDICT:
PWM (66/33)

nullwolf

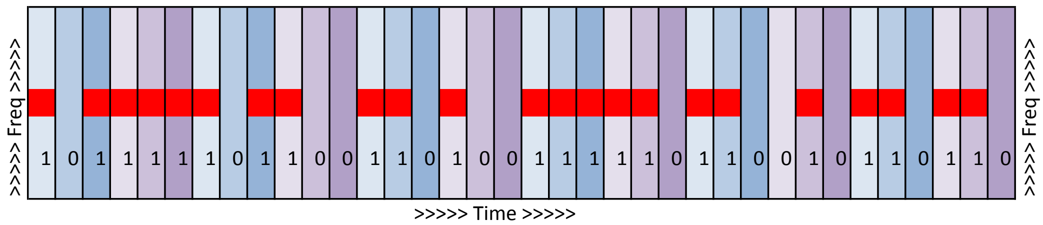
Modulation Cheat-sheet (2/3)



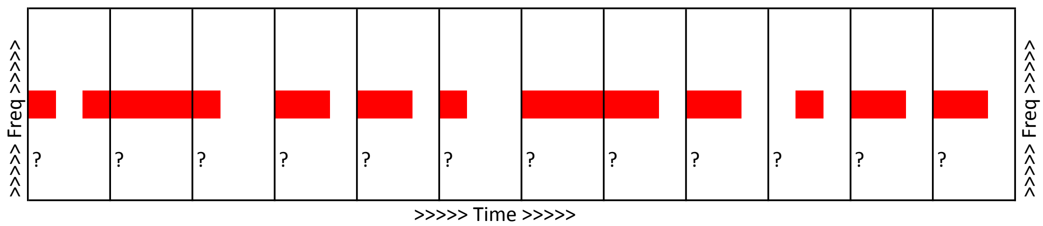
This is a bit hard to look at with accuracy. Let's add a grid overlay so that we can more clearly see how big the pulses are. We set the grid so that the smallest pulse is neatly encapsulated by the grid.



I've added some colour here for no other reason that to help us clearly visualise the spacing between the pulses. Let's see if we can find a way to neatly encapsulate it in as multi-cell symbols like we did for PWM.



We notice that there are only many different pulse lengths that almost seem random, and doubt that they can be neatly encapsulated in larger "cells". We try this a few times anyway, just to make sure, but it ends up looking sort of like this....

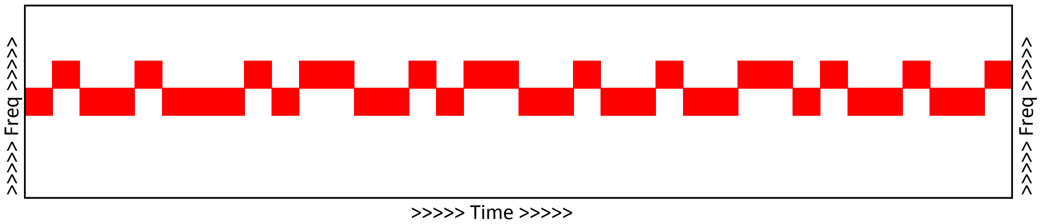


Comparing this to the PWM page, it clearly didn't work out as expected. We can rinse and repeat for other PWM duty-cycle lengths (i.e. other than 66/33 like we are trying for here), but we eventually determine that it's just not PWM. It's just plain old On-Off-Keying (OOK)

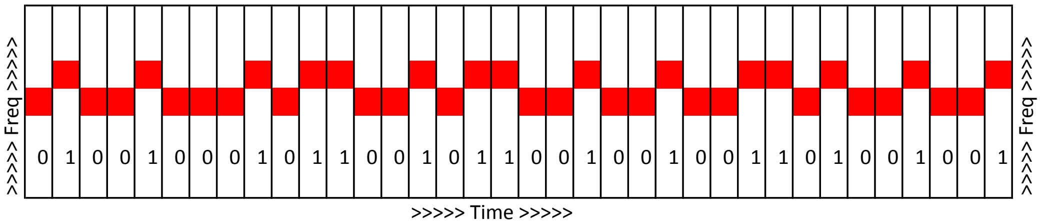
VERDICT:
OOK

nullwolf

Modulation Cheat-sheet (3/3)



This one has a pretty unique characteristic compared to the others. The frequency shifts. There are two distinct frequency offsets it swtiches between. It is 2FSK (2 Frequency Shift Keying) modulation. Let's add an overlay neatly encapsulating the shortest pulse we can find, just like we did with OOK.



This time 1s and 0s are differentiated by their frequency offset, not by the existance of a pulse vs the absence of a pulse. We'll label pulses in Frequency offset 'a' as '0' and the other as '1'.

VERDICT:
2-FSK

nullwolf