

## A.7 - Signal to Noise Ratio

### A.7.1. Experimental Setup for SNR

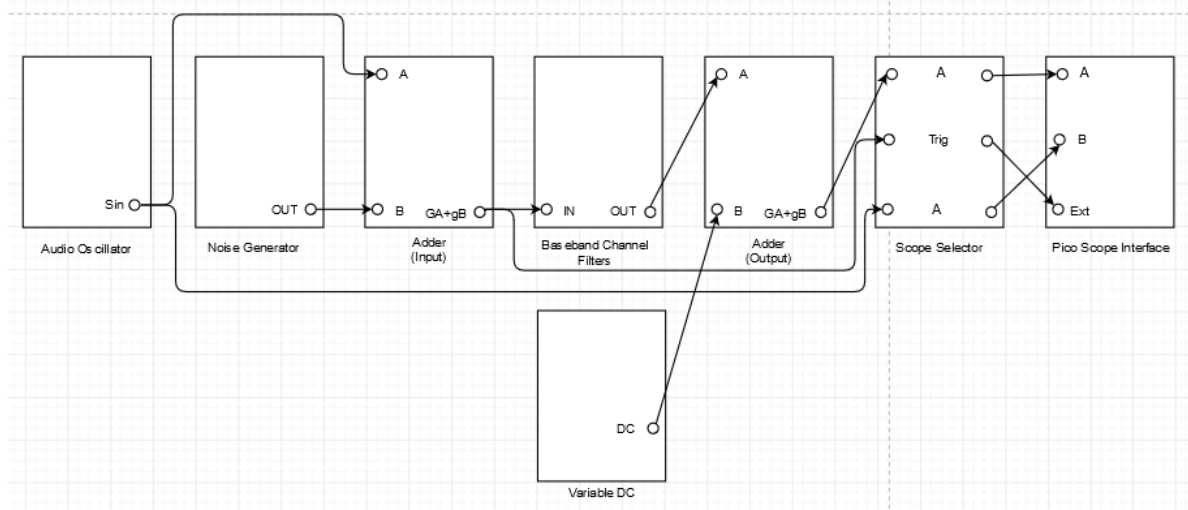


Figure A.7.1: Setup for noisy communication system.

NOTE: Above given experimental setup consists of two adders, i.e., input adder and output adder.

### A.7.2. Laboratory Exercise for SNR

- i. Set an audio oscillator to generate 1 kHz sine signal.
- ii. Make the setup as shown in the Figure A.7.1.
- iii. Toggle the front panel switch of the baseband channel filters to DC. Turn the knob of the noise generator to +22 dB, turn the knob of the baseband channel filters to position 1, turn the knob of the variable DC to minimum, turn both the knobs of the input adder to maximum and turn both the knobs of the output adder to maximum.
- iv. Unplug the signal from output of the audio oscillator to input of the input adder. I.e., current setup has noise signal.
- v. Adjust the knob of the variable DC to shift the noise signal to DC.
- vi. Adjust the noise signal at the output adder to obtain the noise signal with TRUE RMS as 1 V.
- vii. Take a screenshot of output of the output adder and output of the audio oscillator under the scope mode.
- viii. Turn the knob of the baseband channel filters to position 4 to obtain the noise signal with new TRUE RMS voltage. What does it signify?
- ix. Take a screenshot of output of the output adder and output of the audio oscillator under the scope mode.
- x. Unplug the signal from output of the noise generator to input of the input adder. Plug the signal from output of the audio oscillator to input of the input adder. I.e., current setup has message signal.
- xi. Adjust the message signal at the input adder to obtain the message signal TRUE RMS voltage equal to the noise signal TRUE RMS voltage as obtained in step **viii**.
- xii. Calculate the  $\frac{S}{N}$ .

- xiii.** Take a screenshot of output of the output adder and output of the audio oscillator under the scope mode.
- xiv.** Plug the signal from output of the noise generator to input of the input adder. I.e., current setup has message signal and noise signal.
- xv.** Calculate the  $\frac{S+N}{N}$ .
- xvi.** Take a screenshot of output of the output adder and output of the audio oscillator under the scope mode.
- xvii.** Repeat step **x** through step **xvi** twice, for increased message signal, accordingly.
- xviii.** Plot and analyze the graphs for SNRs [dB] vs. message signal [dB].