WEAVER`S SSB DEMODULATOR

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ACHIEVEMENTS: *alignment of Weaver`s SSB receiver*

PREREQUISITES: *completion of experiment entitled* ***Weaver`s SSB generator*** *in this Volume.*

EXTRA MODULES*: a total of four MULTIPLIERS, two PHASE SHIFTERS, and two TUNEABLE LPF modules is required. This is twice as many of these modules as are in the TIMS Basic Set.*

PREPARATION

It is assumed that you have completed the experiment entitled *Weaver`s SSB generator*, where the general principles of Weaver`s method were met.

The demodulator employs the same principles, although 'in reverse', as it were.

Its block diagram is shown in Figure 1.

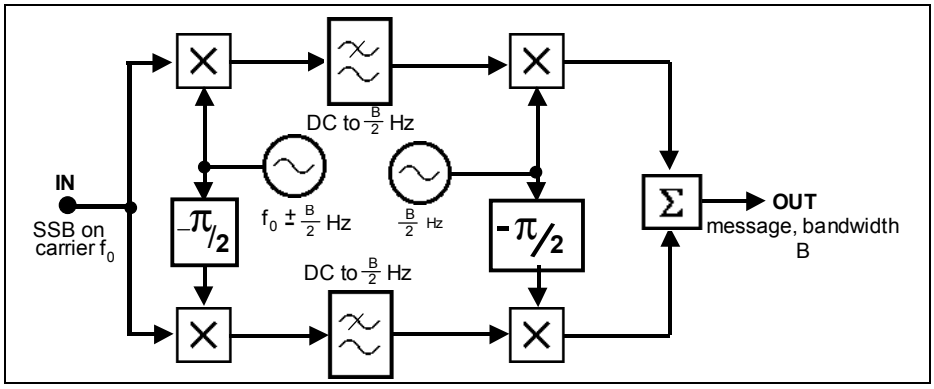

Figure 1: model of Weaver`s SSB demodulator

As in the case of the phasing method of SSB generation, two lowpass filters are shown at the *inputs* to the second pair of quadrature multipliers. In practice these two are replaced by a single lowpass filter, of bandwidth B Hz, at the *output* of the summing block. Similar comments apply here as were made when describing the phasing-type SSB demodulator.

EXPERIMENT

If you have completed the experiment entitled *Weaver`s SSB generator* you should have no difficulty in modelling Weaver`s demodulator !

Your low frequency carrier will be the nominal 2 kHz 'message' available from the MASTER SIGNALS module.

When aligned, you should demonstrate that the receiver looks out at the RF spectrum on one side only of the carrier to which it is tuned. You should confirm that this window is B Hz wide [1].

[Refer to the technique of testing used in the experiment entitled ***SSB demodulation – the phasing method*** in Volume A1. This used a VCO to simulate an SSB signal derived from a single tone message. Thus, with the VCO tuned to 102 kHz, it simulates the USB of a 100 kHz SSB transmitter, derived from a 2 kHz message.

When the receiver is tuned to receive the VCO on the high side (USB) of the 100 kHz carrier (say at 102 kHz) then there should be no output from the receiver when the VCO is tuned to 98 kHz (the LSB)].

TUTORIAL QUESTIONS

Q1 *analyse the system illustrated in Figure 1, and show that it has a window on the frequency spectrum of bandwidth B/2 Hz. Show exactly where this is located in the spectrum.*

Q2 *describe the practical problems associated with placing the* ***two*** *filters at the inputs to the second pair of multipliers, and the different set of problems encountered when they are replaced by a* ***single*** *filter at the summing block output.*

[1] where B is defined in Figure 1