

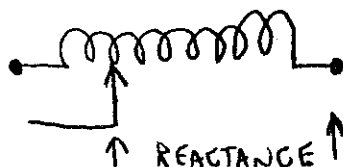
INSERT

PROCEDURE FOR TUNING
Sideband Network
And Program Information Entry Procedure

- ① Run SBNET program, using sideband loads for \pm 10KHz from carrier frequency.

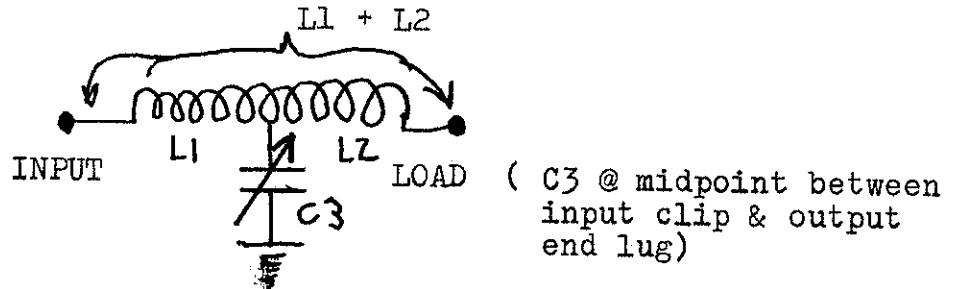
| | | <u>Frequency</u> | <u>RA</u> | <u>XA</u> |
|--------|-------------------|------------------|-----------|-----------|
| High | (Carrier + 10KHz) | 1010, | Load | |
| Center | (Carrier) | 1000, | 50, | 0 |
| Low | (Carrier - 10KHz) | 990, | Load | |

- ② Enter Power of Carrier (watts). Perfect sideband powers would be = Carrier Power/4.
- ③ Observe starting values for sideband loads.
- ④ Select one of the two "phase" answers (whichever gives the best input and results; in conjunction with the SB power split and the practicality of the C3 and L1 + L2 component requirements.
- ⑤ To see if the additional Series Network will give a substantial improvement, enter 0 for the "new phase shift" request and then enter the "phase" that was selected in "④". (This must be entered twice.)
- ⑥ Observe the new input Z and power split results, and, especially, the component requirements for C4 and L5. The total inductance indication on the printout refers to the coil value that would be required if you chose to use a single coil to act as L1 + L2 + L5.
- ⑦ You can choose to vary the value of C4, as follows: A higher C4 value will require a smaller L5 value and often produces very satisfactory sideband results.
- ⑧ The best way to tune the Sideband Network (example for type without series network) is as follows:
- a. Select a coil, the inductance of which is \geq ^{THAN} the value shown for (L1 + L2) on the printout.
- b. Calculate the reactance at Carrier for (L1 + L2).
- c. Set the coil to that reactance (by bridge measurement), as shown below.



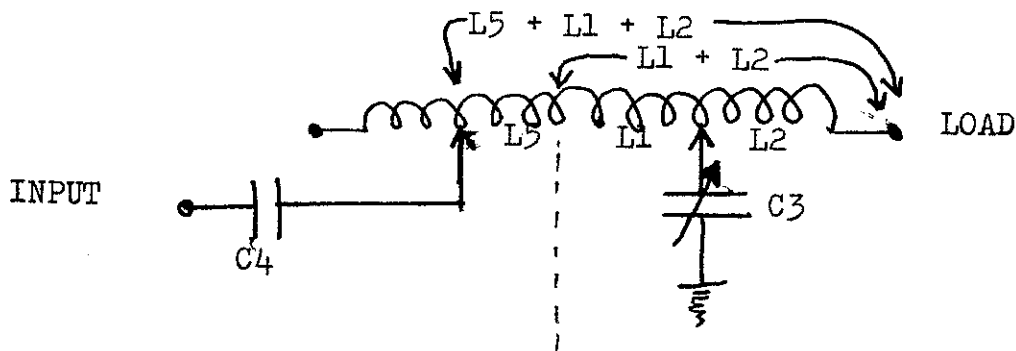
- d. Accurately count the number of turns required to obtain that reactance.
- e. Next, connect the capacitor shunt leg to the point that is 1/2 the number of turns that were counted, after having made a bridge measurement of the capacitor to set it at its proper reactance value.

Final network:



- f. Bridge input impedances at carrier and sidebands. Should get $50 \angle 0$ at carrier and SBNET printout values at sidebands.
 - g. For different sideband results, you can move the input clip and the capacitor clip, equal distances (turns) toward either end of the coil; then turn the capacitor to produce $50 \angle 0$ at the input. Once again, check the sideband results.
- ⑨ If electing to use the additional Series Network with a single coil for $L_5 + L_1 + L_2$, select a coil \geq the total inductance printout.
- a) First, follow the same procedure as given in Step ⑧
 - b. Next, connect the selected capacitor C_4 as shown below, and move the input clip toward the input of the coil until you get $50 \angle 0$ at carrier.

Then, check sidebands.



1520 KHz System

240 Ft. Line (50 Ω , V.P. = .81)

| <u>Frequency</u> | <u>Loads @ B (Same as before.)</u> | | | |
|------------------|------------------------------------|---------|-------------------|-----------|
| 1500 | - | 162.560 | 49.632 - j 17.331 | 112.241 W |
| 1505 | - | 163.102 | 49.722 - j 13.032 | |
| 1510 | - | 163.644 | 49.833 - j 8.712 | |
| 1515 | - | 164.186 | 49.956 - j 4.368 | |
| * 1520 | - | 164.727 | 50 j 0 | |
| 1525 | - | 165.269 | 50.233 + j 4.394 | |
| 1530 | - | 165.811 | 50.389 + j 8.813 | |
| 1535 | - | 166.353 | 50.556 + j 13.261 | |
| 1540 | - | 166.895 | 50.734 + j 17.738 | 109.773 W |

New, resulting values at input of Line (@ C)


| <u>Frequency</u> | <u>R</u> | <u>X</u> | <u>SB Powers</u> |
|------------------|------------|----------|------------------|
| 1500 | 61.179 - j | 15.666 | 95.872 |
| 1505 | 57.828 - j | 11.676 | 103.845 |
| 1510 | 54.899 - j | 7.723 | 111.636 |
| 1515 | 52.331 - j | 3.815 | 118.802 |
| * 1520 | 50 j | 0 | |
| 1525 | 48.101 + j | 3.864 | 129.102 |
| 1530 | 46.374 + j | 7.647 | 131.206 |
| 1535 | 44.868 + j | 11.402 | 130.848 |
| 1540 | 43.561 + j | 15.138 | 128.018 |

Next, rerun the SBNET program to determine network needed at input of the line and resulting values presented to XMTR (@ D), which probably will not change much from the original network.

Using: 101.2° Sideband Network (starting with 1525/1515)

| | <u>Results using SB Network</u> | | <u>Results adding Series Network</u> | | |
|--------|---------------------------------|-------|--------------------------------------|----------------|--------|
| 1540 | 42.41 - j | 14.44 | 264.16 | 42.41 + j 2.22 | 293.96 |
| 1535 | 45.45 - j | 11.69 | 257.96 | 45.45 j .82 | 274.95 |
| 1530 | 47.86 - j | 8.23 | 253.69 | 47.86 j .12 | 261.20 |
| 1525 | 49.39 - j | 4.24 | 251.21 | 49.39 - j .06 | 253.06 |
| * 1520 | 50 j | 0 | 1000 | 50 j 0 | 1000 |
| 1515 | 49.38 + j | 4.14 | 251.35 | 49.38 - j .06 | 253.11 |
| 1510 | 47.93 + j | 7.91 | 253.90 | 47.93 - j .50 | 260.78 |
| 1505 | 45.93 + j | 11.02 | 257.32 | 45.93 - j 5.0 | 268.95 |
| 1500 | 43.00 + j | 13.51 | 264.56 | 43.00 - j 3.36 | 288.92 |

1240 KHz System

20 Ft. Line RG17 (50 , V.P. = .666)

| <u>Frequency</u> | <u>θ</u> | <u>Loads @ ①, output of Line</u> | |
|------------------|-----------|----------------------------------|--------|
| 1265 | - 13.881° | 45.5 + j | 14.979 |
| 1255 | - 13.771 | 46.9 + j | 9.544 |
| 1245 | - 13.661 | 48.4 + j | 3.987 |
| * 1240 | - 13.6063 | 49.5 j | 0 |
| 1235 | - 13.551 | 50 - j | 4.692 |
| 1225 | - 13.442 | 52 - j | 9.894 |
| 1215 | - 13.332 | 53.7 - j | 15.519 |

New, resulting values at input of Line (@②)

| | <u>R</u> | <u>X</u> | <u>SB Powers</u> |
|--------|------------|----------|------------------|
| 1265 | 53.171 + j | 16.607 | 214.194 |
| 1255 | 51.709 + j | 10.397 | 232.343 |
| 1245 | 50.404 + j | 4.365 | 246.150 |
| * 1240 | 49.555 + j | 0.228 | |
| 1235 | 47.928 - j | 4.100 | 258.914 |
| 1225 | 47.445 - j | 9.297 | 253.720 |
| 1215 | 46.592 - j | 14.464 | 244.704 |

SBNET Program could be run using the point ② values to see if use of the sideband network at the input of the line would give substantial improvement (probably not worth the cost involved).

Original Values (before network is added)

| | | | |
|--------|------------|--------|---------|
| 1540 | 43.561 + j | 15.138 | 128.015 |
| 1535 | 44.868 + j | 11.402 | 130.850 |
| 1530 | 46.374 + j | 7.647 | 131.205 |
| 1525 | 48.101 + j | 3.864 | 129.100 |
| * 1520 | 50 j | 0 | 500 |
| 1515 | 52.331 - j | 3.815 | 118.800 |
| 1510 | 54.899 - j | 7.723 | 111.655 |
| 1505 | 57.828 - j | 11.676 | 103.845 |
| 1500 | 61.179 - j | 15.666 | 95.875 |