Passive Radiator

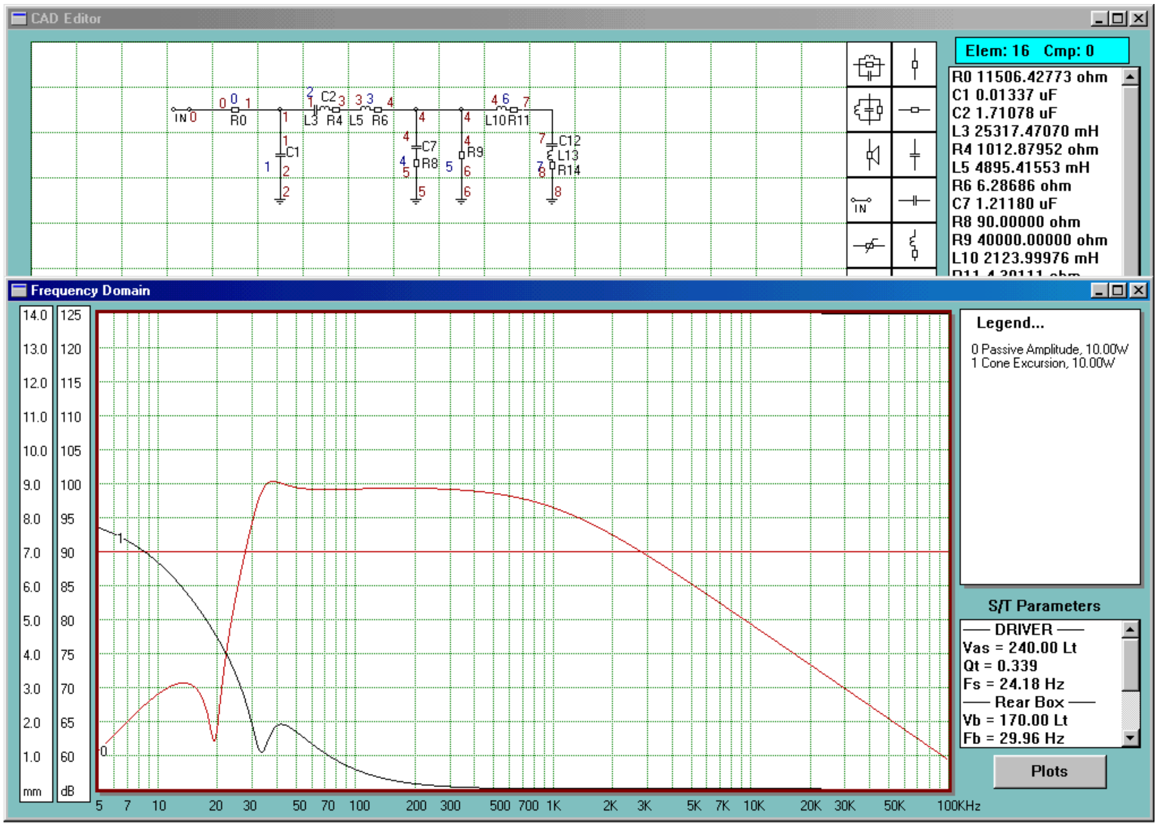

Fig 4.22 shows acoustical impedance representation adopted for the PR enclosure model. The components are:

R0 = Rea, electrical DC resistance Re transformed to acoustical side.
C1 = Lea, voice coil inductance Le transformed to acoustical side.
C2 = Cas, equivalent compliance volume Vas transformed to acoustical side.
L3 = Mad, mass of the vibrating system Mms transformed to acoustical side.
R4 = Ras, vibrating assembly loss Rms transformed to acoustical side.
L5 = Mar+Mab, air radiation of the front side of the diaphragm + air load of the back side of the diaphragm.
R6 = Rar, air radiation of the front side of the diaphragm.
C7 = Cab, enclosure compliance Vab transformed to acoustical side.
R8 = Rab, absorption losses of the enclosure transformed to acoustical side.
R9 = Ral, leakage losses of the enclosure
L10 = Marp, PR radiation.
R11 = Rarp, PR radiation.
C12 = Cap, compliance of the PR.
L13 = Map, mass of the PR.
R14 = Rap, frictional losses of the PR.

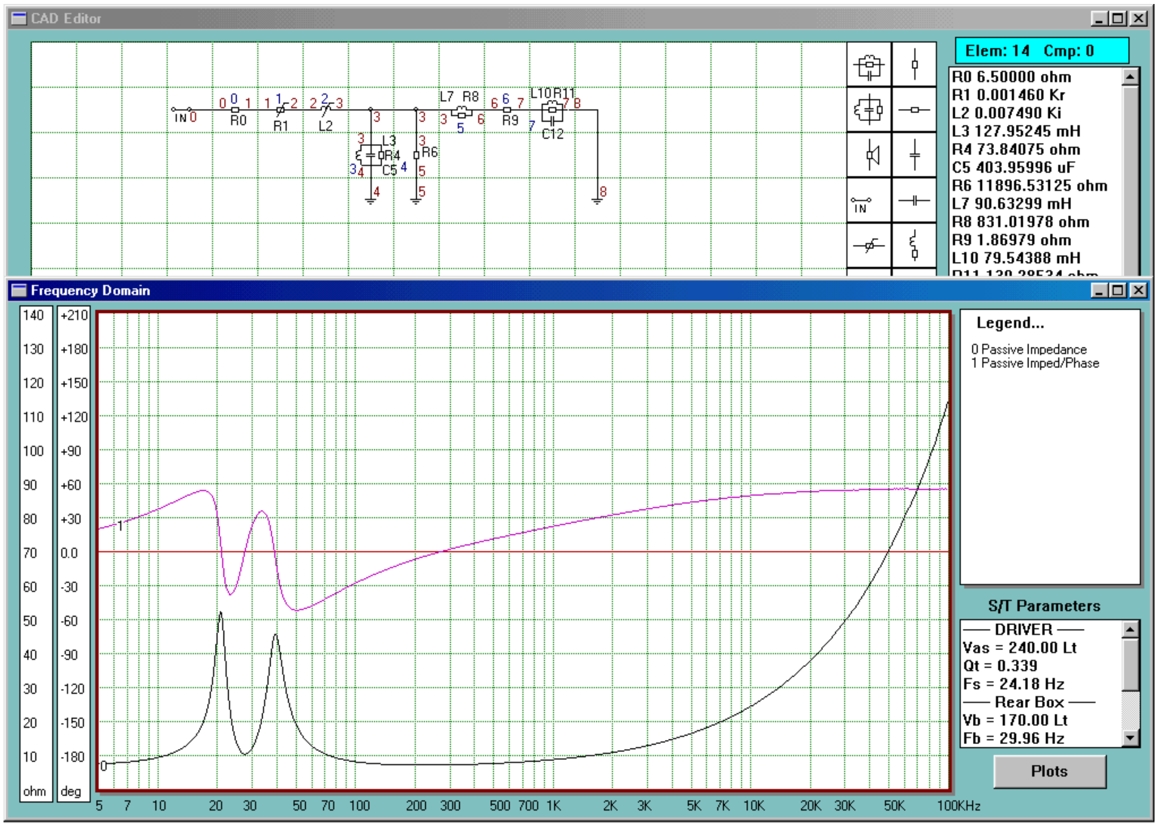

Fig 4.23 shows electrical impedance model of a PR system.

Band-Pass 2 PR System version

Fig 4.24 shows acoustical impedance representation adopted for the BandPass 2 enclosure model (PR version). The components are:

R0 = Rea, electrical DC resistance Re transformed to acoustical side.
C1 = Lea, voice coil inductance Le transformed to acoustical side.
C2 = Cas, equivalent compliance volume Vas transformed to acoustical side.
L3 = Mad, mass of the vibrating system Mms transformed to acoustical side.
R4 = Ras, vibrating assembly loss Rms transformed to acoustical side.
L5 = Mab, air load of the back side of the diaphragm, R6 = dummy resistor.
C7 = Cab, rear enclosure compliance Vab transformed to acoustical side.
R8 = Rab, rear enclosure absorption loss.
C9 = Cap, compliance of the PR, L10 = Map, mass of the PR.
R11 = Rap, frictional losses of the PR.
R12 = Ral, rear enclosure leakage losses.
L13 = Mab, air load of the front side of the diaphragm, R14 = dummy resistor.
C15 = Cab, front enclosure compliance Vab transformed to acoustical side.
R16 = Rab, front enclosure absorption loss.
C17 = Cap, compliance of the PR,
L18 = Map, mass of the PR.
R19 = Rap, frictional losses of the PR,
R18 = Ral, front enclosure leakage losses

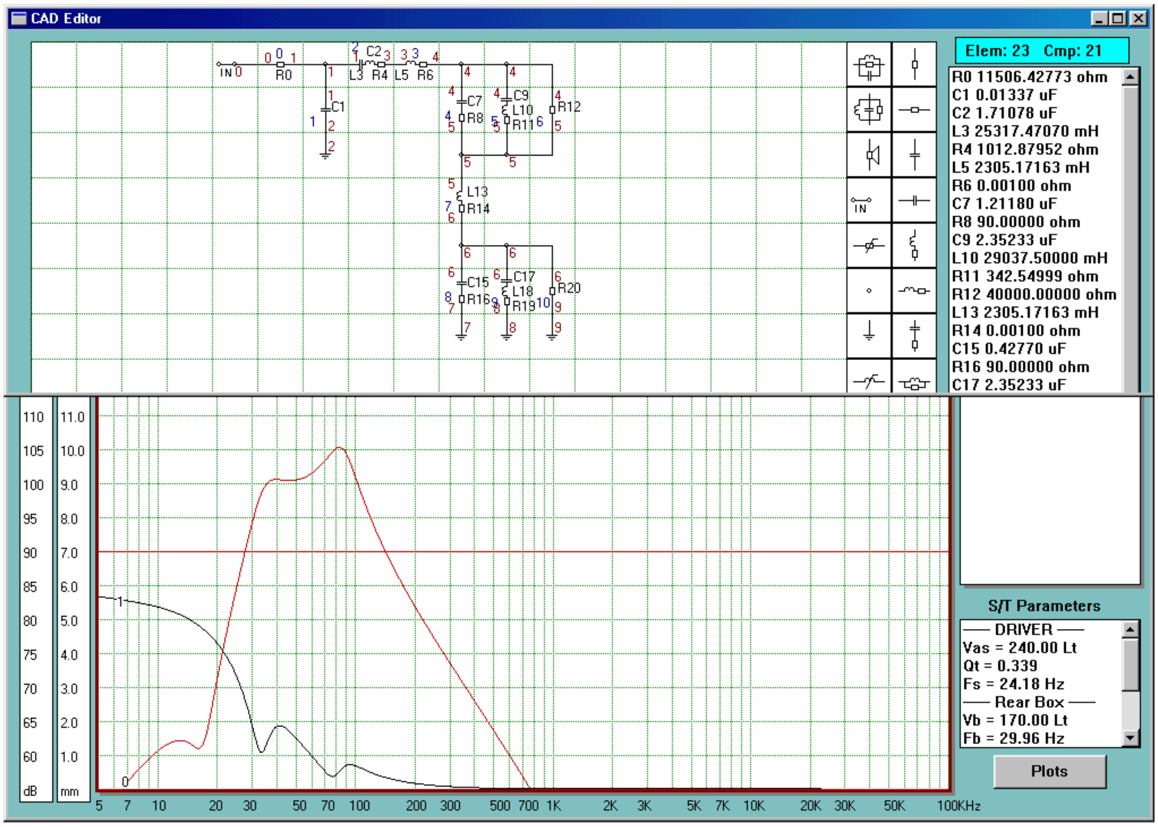

Fig 4.24 shows acoustical impedance representation of the BandPass 2 (PR version).

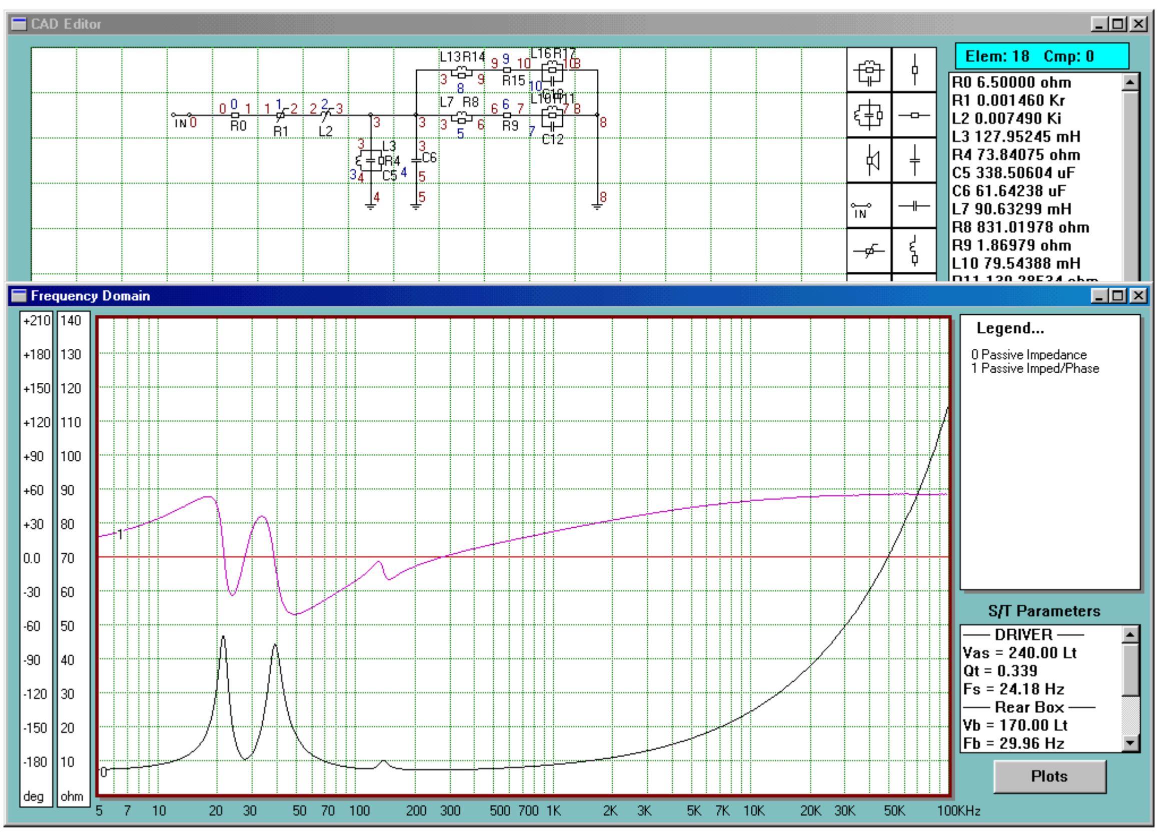

Fig 4.25 shows acoustical impedance representation of the BandPass 2 (PR version).

Transmission Line System

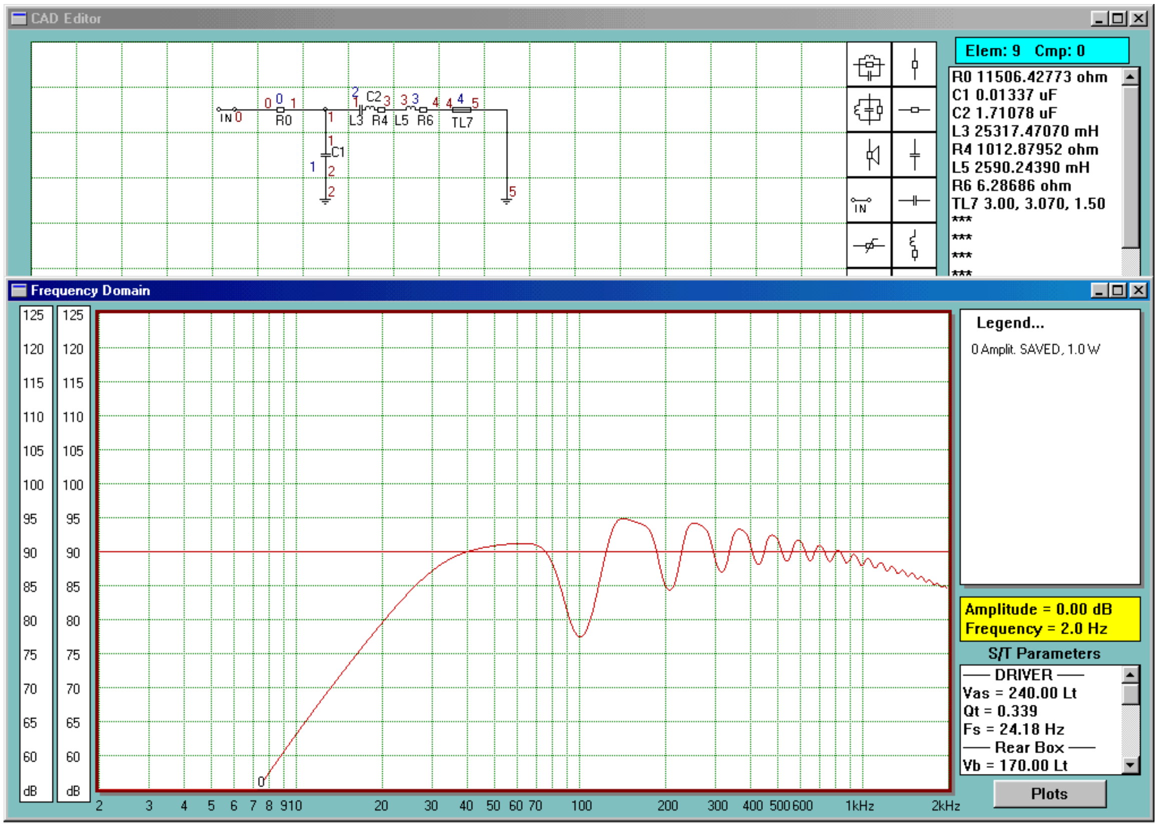

Fig 4.26 shows acoustical impedance representation of the TL.

R0 = Rea, electrical DC resistance Re transformed to acoustical side.
C1 = Lea, voice coil inductance Le transformed to acoustical side.
C2 = Cas, equivalent compliance volume Vas transformed to acoustical side.
L3 = Mad, mass of the vibrating system Mms transformed to acoustical side.
R4 = Ras, vibrating assembly loss Rms transformed to acoustical side.
L5 = Mab, air radiation of the front side of the diaphragm + air load of the back side of the diaphragm,
R6 = Rar, air radiation of the front side of the diaphragm,
TL7 = transmission line at the back of the driver.

Figure 4.28 shows a double transmission line system (acoustic cannon). The system consists of a long tube with the driver mounted inside the tube, closer to one end. The front of the diaphragm could radiate into shorter section of the tube, so the back side of the diaphragm would excite the longer (rear) tube. Taper ratios may need to be adjusted individually for both tubes. The double transmission line system allows for improved performance around 100-15Hz. The system shown is not optimized, however it illustrates the usage of BoxCad for modeling the double TL systems.

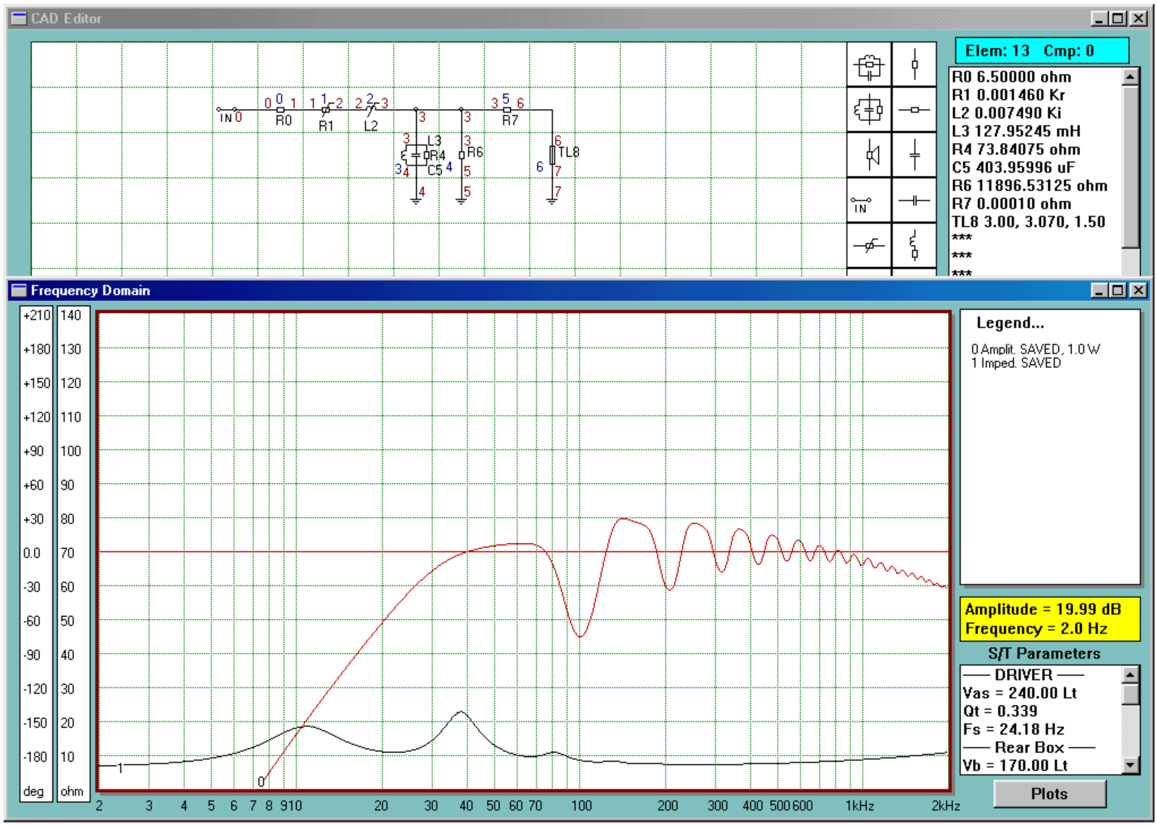

Fig 4.27 shows electrical impedance representation of the TL.

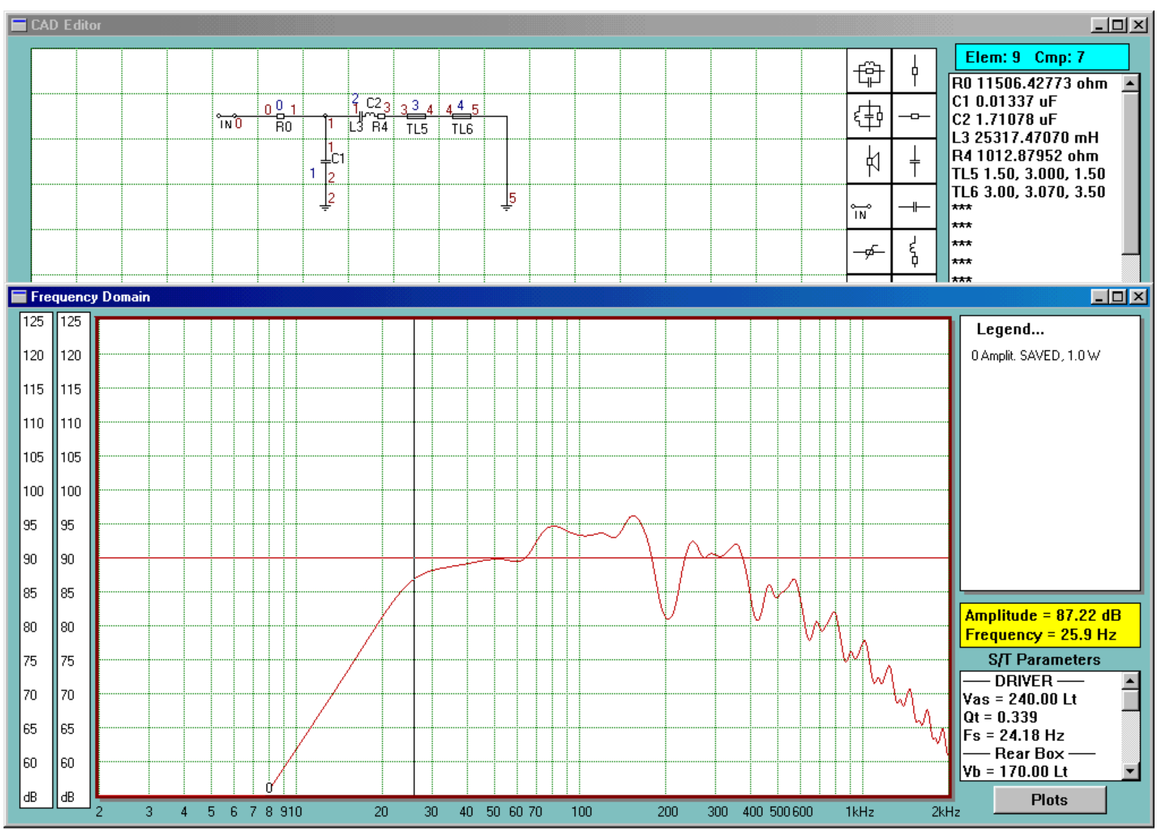

Fig 4.28 shows acoustical impedance representation of the “acoustic cannon”.