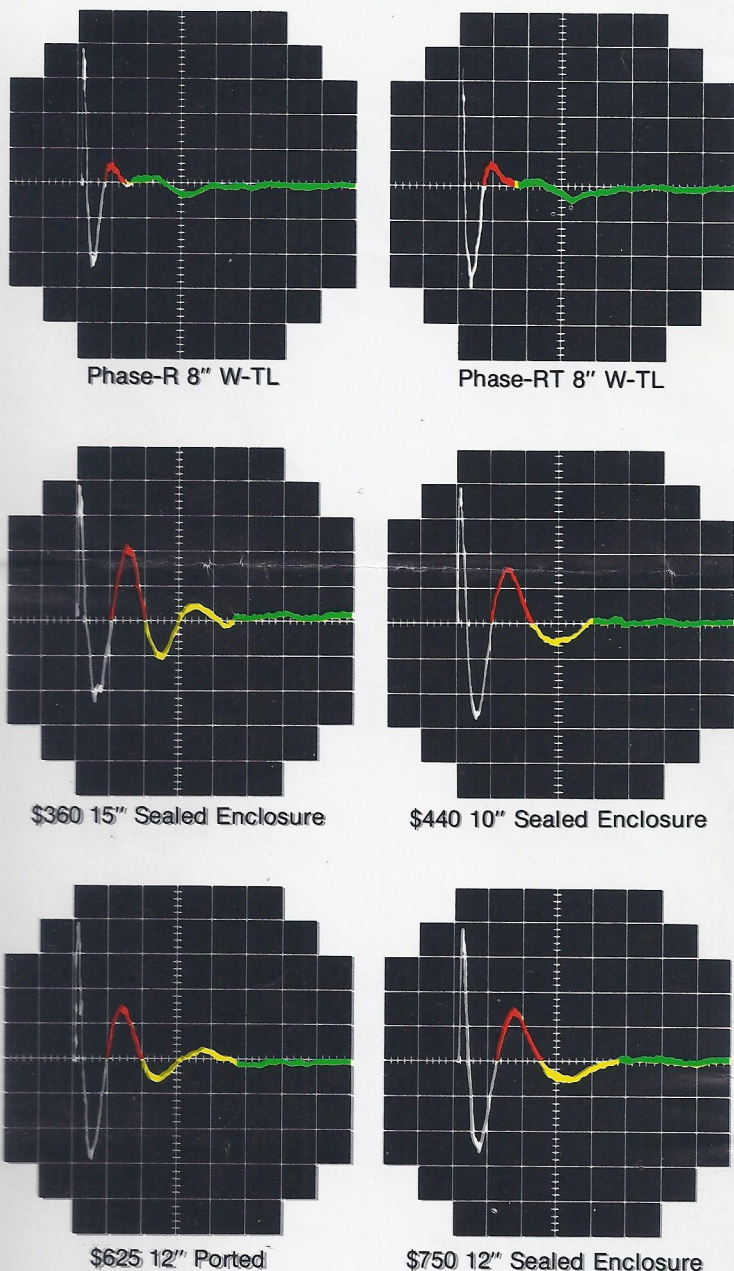


ing in more responsive and effective coupling between the air and the water.

In Phase-R loudspeakers our patent pending "Compression Line Loading" affords this same responsive coupling technique to substantially improve and fill the need for dynamic range.

Our unique internal geometric structure (Figure 2) takes air movements from the back of the woofer cone and constantly compresses them at a controlled taper rate. This continues to where maximum compression is achieved and the air is forcefully released into the room, resulting in greater ability to excite air movement

Figure 3



DESCRIPTION — IMPULSE CHARTS

The photographs depict the impulse responses of various national brand speakers using various loading methods and driver sizes. The red section of the waveform shows system "Q". An overstated peak indicates the system will have an exaggerated bass response. The yellow section of the waveform shows the amount of cone overhang, in other words, the woofer's inability to stop after an impulse. The higher the "Q", typically, the greater the woofer overhang and consequently distortion. Why? Because the woofer's continued motion after the impulse has ended results in artificially created sounds of the woofer itself. Secondly, if the woofer is still moving when a second impulse begins, distortion of the second impulse is added to the overhang of the first signal and distortion is increased again. Note: The low Q and almost total absence of woofer overhang in the Phase "R" and "RT."

throughout the room. "Compression Line Loading" coupled with our specially developed 8" woofer turns the air inside the cabinet into a piston made of air. Air, being extremely light compared to heavy woofer cones, simply requires less amplifier power to excite air movement. When compression line loaded, Phase-R's 8" woofers react faster, tighter, cleaner, and with a significantly more powerful pulse (Figure 3). Large bass wavefronts are forcefully driven with greater impact energy with "Compression Line Loading" so life-like dynamic range finally becomes possible.

It could be compared to blowing air into a small paper bag, closing the top, and smashing it together with your hands. The result is a loud, solid and distinct sound with definite impact. If the bag is smashed without the top being held shut, therefore not pressurized, there would only be a soft cushy tone and no impact, typical of many bass reflex and sealed systems. That's the whole idea behind Phase-R's "Compression Line Loaded" design, bass clarity with real dynamic range impact.

PHASE-R's PATENT PENDING

R — HD — Line Filter
Resonance — Harmonic Distortion

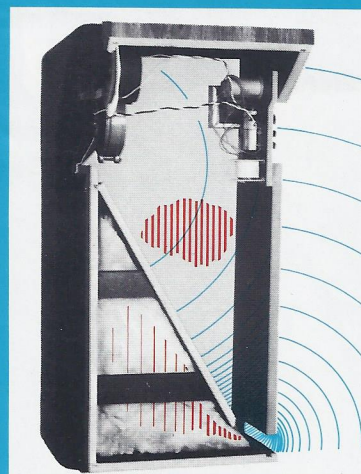
All speakers have what is called system resonance. Typically, system resonance frequencies are the greatest in output and are perceived audibly as an unwanted peak or exaggeration of bass output. One method used to reduce unwanted output is by lining the box internally with dampening material. This works, and is an inexpensive way out. However, the associated disadvantage is loss of acoustic sensitivity resulting in reduced dynamic range and the need for more power.

Another method is to use an equalizer to compensate for resonance frequency imbalances, but this means extra cost and can be accompanied by its own inherent problems, such as phase shifts resulting in tonal changes.

Not content with these trade-off solutions, we re-examined the plagueing resonance problem and created what we call a "Resonance- Harmonic Distortion Line Filter" (patent pending) or abbreviated, an "R-HD Line Filter." Note Figure 4. This filter, or bass trap, does exactly what the name implies, it filters out problematic resonance frequencies that distort sound and interact unfavorably with other frequencies. By capturing air movement inside the bass trap which is filled with dampening material, unwanted resonance peaks in output are eliminated and a smooth uncolored response finally becomes possible.

And Phase-R's uniqueness doesn't stop there. The industry has long understood that a high order of second and third harmonic content of any frequency is not desirable in reproduced sound. These

Figure 4



Acoustic Bass Trap or Line Filter attenuating unwanted resonance frequencies and harmonic distortion, leaving only clean, pure tonal frequencies.