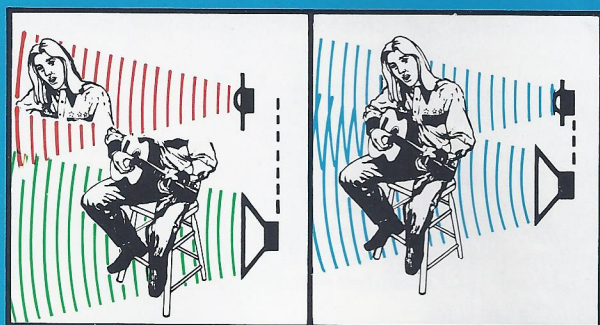


TIME PHASING

To insure that all air movement through the entire frequency range starts at the same point in time and arrives at our ears concurrently, Phase-R products are "**time phased**." Notice how the woofer is pulled forward and the tweeter is recessed. This allows all frequencies to reach the listener at the same time. You've probably experienced the distorted image reflected from a fun house mirror. Parts of the mirror are an inch or two nearer or farther from you causing light to arrive at your eyes from different angles at different times. By time phasing the voice coils of the tweeter and the woofer, the distorted fun house mirror effect is eliminated and the sense of sonic clarity and depth are maintained, through enhanced detail and sharp sonic focus.

Figure 7



Fun house mirror effect causing loss of detail and coherence

Timed phase focus for precise detail and structural coherence

LOW DIFFRACTION

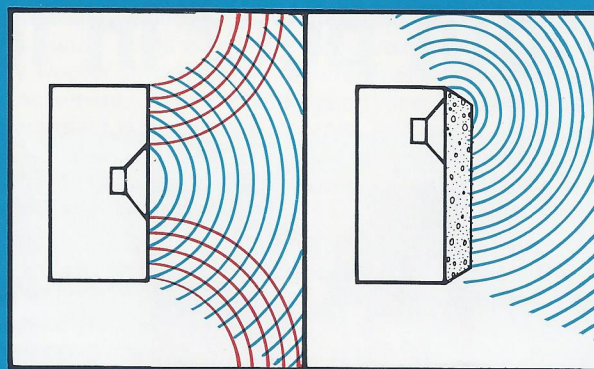
Notice how both the woofer and tweeter are located extremely close to the upper end and edges of the enclosure. As the vibrated air waves leave these components, almost nothing is in their way to break up their precise "physical" structure, which is what creates an actual three dimensional illusion. It is like clearly defined ripples spreading through water when a rock is thrown in. If anything is in their path, the once clear image of spreading rings becomes deformed and broken causing a loss of detail and symmetry. This is exactly what happens to sound waves which diffract or shatter off objects, typically the speaker enclosure itself. With both Phase-R components precisely located close to the edge of the cabinet, there remain three virtually unobstructed paths (around each side and over the top) for the natural physical projection of sonic waves.

The fourth path down the front of the speaker baffle itself had to be separately considered. **Baffle reverberation is the most unaddressed problem in the industry, but not by Phase-R.** It is this front baffle area where air waves can bounce into and interact with those that do not. The result is a slurred, heavy unnatural tonal quality. Frequencies from as low as 500 cycles up can be disturbed causing severe tonal impurities. All Phase-R products have a chemically treated pad used to attenuate this reverberation from the front of the speaker (baffle).

To fully comprehend what diffraction and baffle reverberation do to natural tonal quality, ask someone to hold a large book or record album projecting forward tightly from under the chin and then speak. You will immediately notice a deepening of chest tone and overall coarseness and hardness of the sound. Now take away the object and once again you hear the pure naturalness of human voice tonality, distinctly, clearly, and without coloration. **Please be sure and try this simple test.** It will prove without refute that any speaker, no matter how expensive or elaborate its raw components, *cannot possibly be accurate* when it has a solid reflective surface!!! And the larger the reflective area, the worse the problem, because lower and lower frequencies are affected.



Figure 8



Uncontrolled shattering and disturbance of wave forms

PHASE-R controlled and undisturbed wave patterns

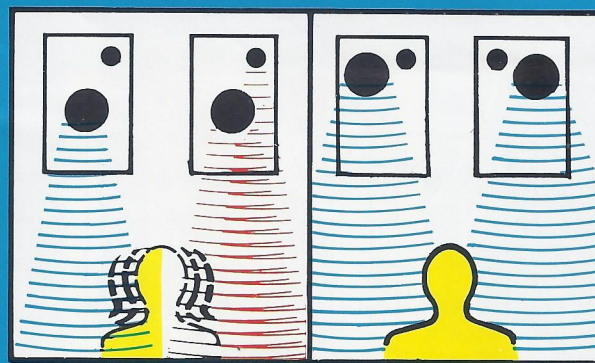
MIRROR IMAGING

Phase-R driver arrangements are opposite for Right and Left speakers, or what is more commonly called **mirror image pairs**. The result is that the vibrated air waves leave each Phase-R in the same exact symmetry, following the same path to you, the listener, and toward each other. With mirror imaging, musicians are not always bunched to right or left of the room but individually positioned across the center as they should be.

To optimize mirror image performance requires that unit to unit performance be identical. To facilitate this need, Phase-R's cross-overs employ the **tightest tolerance level values in the industry**. All resistors and capacitors are $\pm 5\%$ tolerances, typically $2\frac{1}{2}\%$ or put another way, **4 times** more exacting than industry standards. All of our inductors are hand wound and/or checked and set ourselves. These inductors also feature heavy gauge (typically 17 or 18 gauge) solid copper wire for superior power transmission and greater damping ability. This allows your amplifier to more tightly control speaker woofers and play your system louder with less stress and distortion. This works in much the same way that a heavier fishing line and longer rod afford the ability to handle heavier fish while reducing line tension, both resulting in improved control.

Combining then, both **mirror imaged loading** with **precise crossover values** Phase-R uniquely offers what in reality is "**Matched Pair Performance**." And this offering is **unmatched** in the entire industry at **any** price. When your dealer offers you a system containing Phase Research speakers he's more interested in providing you with quality sound and products than making a fast buck. Good Listening.

Figure 9



Unfocused fuzzy offset image

Clearly focused and defined centered image