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DIVISION OF THE MUTER CO.

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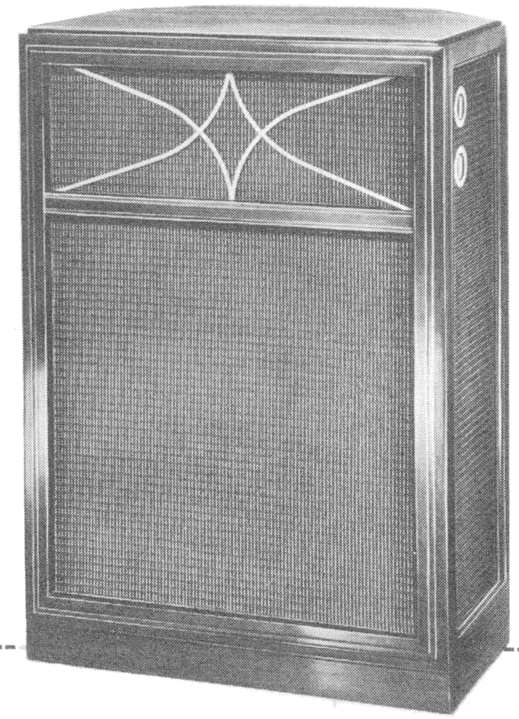
Jensen

TP-200



TRI-PLEX

3-WAY REPRODUCER

Owner's Manual
and a
Certificate of Performance

March 18th 1957

contents

THIS IS YOUR TRi-PLEX REPRODUCER

We want to introduce you to your JENSEN TP-200 TRi-PLEX Reproducer—the finest reproducing instrument that modern science can provide in such moderate size. We know that you will enjoy many hours of listening pleasure and that you will be proud to demonstrate such fine reproduction to all who will listen. We, too, at JENSEN are proud to present the TRi-PLEX for your critical appraisal and enjoyable listening for the years to come. Listen to it—compare with all others—and revel in its satisfying performance.

The design objectives set for the TRi-PLEX were quite demanding. A reproducer was required having performance noticeably superior to anything heretofore available, with size and styling acceptable in the home. Reproduction was to be flawless with smooth, extended output at both ends of the spectrum, and with uniformly wide angular coverage. Power handling capacity adequate for the largest room and efficiency quite high so as to accommodate the amplifiers of lower rating were mandatory. However, it was considered of greatest importance to give unusual and detailed attention to the important middle register where the ear is most sensitive and can discern the slightest abnormality. Not only must distortion of all kinds be reduced to the vanishing point but every possible step taken to achieve an extremely smooth and well-balanced loudspeaker system. Judgment of the latter factors depends essentially on subjective listening tests under actual operating conditions. Reproduction must be free of "coloration" or "formant" which tends to give the loudspeaker individual "character". *This* loudspeaker system was to reproduce music *exactly as supplied to the speaker system,* injecting none of its own character. Extensive tests both of an objective and subjective type to evaluate the results of the extended, tedious and painstaking efforts confirm that the TRI-PLEX has fully met our objectives. The results are most gratifying and we are confident of your appraisal of this reproducer.

Your TP-200 TRi-PLEX Reproducer is a complete loudspeaker system comprised of three separate loudspeaker units each speci-

ally designed to reproduce a specific limited portion of the music spectrum—that is, each is a "specialist" in its own range and can therefore do a better, more thorough job unencumbered by design compromise. Elaborate, precision electrical networks divide the full music range into three segments and "route" each to that speaker unit designed particularly for that portion of the music spectrum. Additional circuit refinements such as intrarange equalization and balance control provide the precise final adjustment necessary for realistic, life-like reproduction. The above essential elements are encased in the unique Bass-Ultraflex enclosure for fine furniture appearance. This back-loading cabinet also is a most important acoustical element contributing the superior low frequency (l-f) performance achieved.

Your TRi-PLEX Reproducer is completely assembled, wired and tested and no parts need be installed or added. It is ready to connect to any fine amplifier without the need of accessory equipment of any kind. Simply connect wires from the two terminals on the back of the reproducer to the output terminals of your amplifier labelled "16 OHMS". Adjust the level control of the amplifier to the desired loudness and enjoy the superlative reproduction pos-

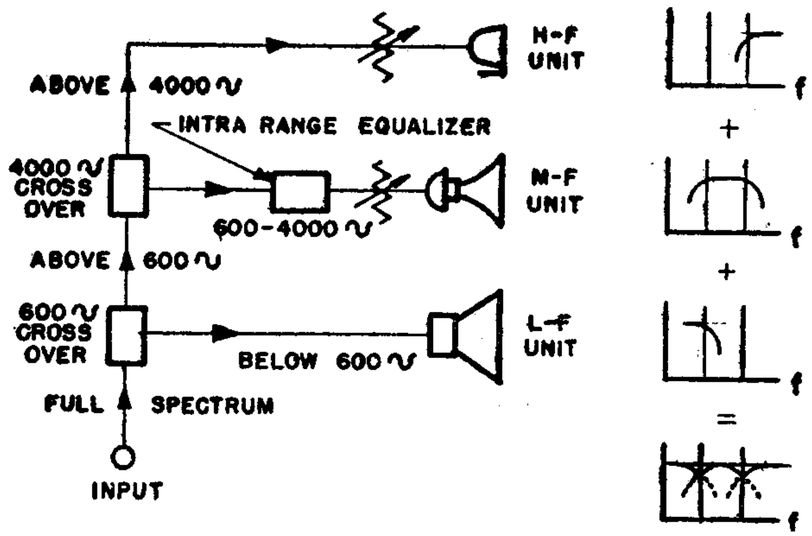


Figure 1. How the TRi-PLEX Operates.

sible from your treasured records, tapes or even an appropriate radio program.

Two controls are located on the right side of the reproducer. Precise adjustment of these controls will give that final important touch needed to correct the subtle and evasive differences that spell perfection of reproduction. Adjust the controls while listening to wide range music; they alter the output sound level of the two speaker units reproducing the middle and high frequency portions of the music spectrum. A position near vertical will be about right for the "H-F BALANCE CONTROL" knob (the upper control) and a position near "2 o'clock" best for the "M-F BALANCE CONTROL" knob. The next section of this booklet discusses the adjustment of these controls in greater detail.

Figure 1 shows a block diagram of the TP-200 TRi-PLEX Reproducer. The incoming signal is first divided by a crossover network (Model A-61) at 600 cycles (just above the middle of the piano keyboard); all of the music components below this frequency are fed directly to the special 1-f unit (Model P15-LL) and converted to sound which you hear through the aid of the special enclosure discussed in detail below. The music components above 600 cycles are then again divided by a second crossover network (Model A-402) at 4000 cycles (about the highest note of the piano). The music content between 600 and 4000 cycles then passes through a special "intrachannel balancing" equalizer and a continuously variable level control (M-F BALANCE CONTROL) to the reproducing unit (Model RP-201 H-F Unit.) This yields high efficiency, exceptionally smooth, low distortion reproduction in the important middle frequency (m-f) range where the ear is most critical. The balance of the music components, above 4000 cycles, is fed through another level control (H-F BALANCE CONTROL) to the "super tweeter" (Model RP-302 Ultra H-F Unit, renowned for its smooth, high efficiency reproduction to the upper limits of audibility).

Figure 1 also shows diagrammatically the way in which the music spectrum is divided; you can see that the TP-200 is truly a 3-channel system, each channel being reproduced by its own

loudspeaker unit. Every possible step has been taken to insure proper division of the full spectrum, and proper control of each channel to give the very best overall performance.

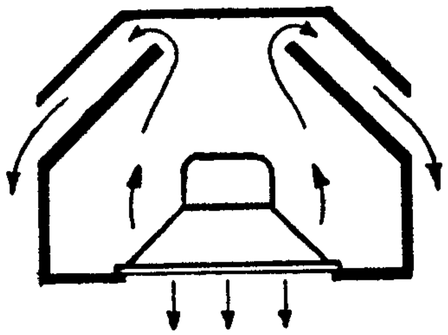


Figure 2. Interior Design of Bass-Ultraflex Enclosure.

The m-f and h-f units are of the horn type or compression type; the driver units use plastic diaphragms with the desired internal damping so difficult to obtain in any other way. The driver units are attached to carefully matched horns using a flare formula of the hyperbolic-exponential family (a JENSEN development). Such a design yields best performance with the desired wide angle of coverage.

As indicated above the enclosure is a most important element in any reproducing system. For the TP-200 TRi-PLEX we have adopted the unique Bass-Ultraflex (Model BL-250) back-loading cabinet. This unusual enclosure utilizes two carefully tuned passages coupled to the back of the diaphragm of the 1-f unit through its enclosing chamber. These passages open to the room through the sides of the enclosure and are adjusted to properly coordinate the enclosure with the 1-f unit, giving high efficiency over the widest range. That is, the radiation from both the front and the back of the diaphragm is controlled to give mutual benefit and resultant smooth 1-f output extending to the lowest frequencies possible for an enclosure of this modest size. The combined results are quite gratifying.

The above description should prove helpful in emphasizing the important part the enclosure plays and how important its correlation with the 1-f unit. Figure 2 is a simplified drawing showing the important side-opening passages. The h-f music components radiate directly from the front of the h-f horn units and are not affected by the enclosure.

INSTALLATION AND USE OF YOUR TRi-PLEX

Your TRi-PLEX reproducer is complete, assembled, wired, tested and shipped in final form ready for operation. The input impedance of this reproducer is 16 ohms. Simply connect its two terminals to the output terminals of a quality amplifier by means of two wires (Type POSJ cable is recommended). Separate the individual leads for a few inches and strip and tin about ½ inch of the ends. Place a lead under each screw terminal and tighten with a screwdriver. Treat the cable in the same way at the other end connecting, of course, to the 16 ohm terminals. Some amplifiers may not have screw terminals for the speaker cable; they will then have a special plug and socket arrangement. The cable is attached to the plug according to the instruction manual supplied with your amplifier. Ideally the amplifier should be near the TP-200 but cable lengths up to about 100 feet are permissible without undue loss and without reduction in the quality of reproduction.

In rare cases you may encounter an amplifier that does not provide for a 16 ohm loudspeaker system. JENSEN Autotransformer Z-3422 can be used to effect a perfect impedance match; connect your TRi-PLEX to the "C" and "16" leads on the transformer and the amplifier to "C" and "8", if 8 ohm terminals are provided, or "C" and "4" if only 4 ohm terminals are available. About the only other possibility is the amplifier with only provision for a 500 ohm loudspeaker. In this case simply use any high quality 500-16 ohm transformer having a power rating of at least 25 watts to effect a perfect match. Obviously, the TP-200 should be connected to the 16 ohm, or secondary, leads of the transformer and the amplifier to the 500 ohm, or primary, leads.

The nominal power rating of the TP-200 TRi-PLEX is 35 watts maximum speech and music signal. This means that reproduction of speech and music will be free of distortion and the elements of the speaker system will not be endangered when a standard level indicating meter shows maximum readings of 35 watts. The peak power will, of course, exceed this figure. For steady-state single-frequency signals (such as from an oscillator or frequency test record) the power should be limited according to the following table:

TABLE I

Frequency	*Max. Power*
Below 2000 Cycles	25 Watts
2000-4000 Cycles	10 Watts
Above 4000 Cycles	5 Watts

The above technical description merely means that the power capability depends on the type of signal being reproduced. Note that you do not need a 35 watt amplifier just because that is the rating of the TRi-PLEX. Power amplifiers of lower power rating will work perfectly well because of the high efficiency of the speaker system and conversely, your TRi-PLEX can be used with amplifiers of more than 35 watt rating. At normal listening levels the listener will adjust the volume control so that only a few watts at most are being delivered to the speaker system for even loud reproduction in the usual living room.

The "M-F BALANCE CONTROL" and the "H-F BALANCE CONTROL" must be carefully adjusted to gain the finest performance. This was briefly described in the previous section and suggested positions were given for the average installation. Suggested procedure for final setting of these controls is to start with the above settings and then decrease and again increase the H-F BALANCE CONTROL (while listening to wide range music) until the output from the h-f unit just becomes identified or noticeable. Next revise the M-F BALANCE CONTROL setting for proper middle register reproduction—too low a setting destroys naturalness and presence—too high a setting gives strident or raucous reproduction. A final readjustment of the H-F BALANCE CONTROL can then be attempted—too high a setting here will tend to give "glassy" or "brittle" reproduction. The proper settings yield smooth natural reproduction with good "presence" and "definition" of the individual orchestra instruments. For a room that is highly reverberant the h-f region will be somewhat emphasized and a lower setting will prove beneficial. On the other hand if excessive absorption in the form of draperies, carpeting and overstuffed furniture is present, a higher setting of these balance controls is indicated.

Note that these balance controls adjust the output loudness in their respective channels; they are independent controls and do not affect the input level nor the frequency range of the system. Since they affect only one channel they *do* alter the response-frequency characteristics of the entire reproducer to bring each in balance with the remainder of the system and thus they are properly designated as *balance controls.*

The balance controls of this reproducer are not intended to correct abnormalities of the source material (such as phonograph record characteristics). Any high quality amplifier suitable for use with this reproducer should have h-f and l-f "boost" controls and these should be used to best advantage (the controls may often be located on the associated preamplifier). Remember that you are listening to a complete system or *chain* of equipment and each "link" should be adjusted to give the best overall performance characteristics attainable. Only then will you approach the goal of true, faithful, life-like reproduction technically possible.

Special attention has been given to the Bass-Ultraflex backloading enclosure design to effect the best possible reproduction in the l-f region. The resulting cabinet is "matched" quite well to the room at these frequencies. Here is an enclosure of modest size that performs very well against a side wall—no longer is a corner position (often non-existent) necessary for good l-f performance. The radiation effects of the two side opening passages not only supplement the output due to larger effective radiating area in the desired frequency range but also eliminate the usual cabinet resonance effects. Results noted are complete lack of boxiness or "rain barrel" effect. A further advantage is that the l-f radiation is practically non-directional due to the side openings—that is, the output is equal in all directions.

Above the 600 cycle crossover frequency, as has been described above, the sound is radiated by the horn-type units designed primarily to obtain uniform sound output over a wide angle (over 100°). This is important since a fairly large percentage of the sound one hears must be reflected from the walls to be realistic; a wide angular radiation obviously encourages this desirable re-

sult. Here is a reproducer that does not aim a beam of sound straight forward with the usual resulting "hole in the wall" sound.

Of course, if a corner position is available there is some slight advantage and we recommend its use. Note that the cabinet exterior is designed with this particularly in mind. The reproducer can be placed in a corner with excellent appearance. The back is then "chamfered" and therefore need not extend into the very corner —often impossible due to moldings.

Preferably choose a position for the reproducer at one end of the listening room or an adjacent corner. Performance will suffer unless the side opening radiation is unimpeded. Avoid large obstacles within a foot or two of these sides.

Remember that the room acoustics will also play a part in the reproduction obtained. These effects are exactly the same as they would be for a vocalist or small orchestra in the same room. Artists quickly notice abnormal room characteristics when they perform—these effects are precisely the same for reproduced music. However, the usual living room used for listening will generally prove quite satisfactory—experiment with the controls available for best results.

You will find some additional guides to improved performance in the later section entitled "About High Fidelity".

COMMENTS ON CARE OF THE TP-200

The Certificate of Performance at the back of this booklet (a copy is also attached to the back of your TRi-PLEX) assures you that your particular TRi-PLEX fully meets our exacting standards. It has been manufactured under expert supervision using the finest materials and techniques. Its final tests, under the personal supervision of a member of our Engineering Staff, included a listening test under normal operating conditions. Every effort has been made to give you the finest reproduction possible; every component of your reproducer is of rugged and durable construction and for these reasons you can expect trouble-free performance for many years to come.

Each individual unit of your TRi-PLEX has also been carefully tested as an individual item before installation in the final system and no deterioration should occur except in rare cases where damage has resulted due to a mishap in operation. It is a simple matter to gain access to the units of your TRi-PLEX—simply remove the socket head wood screws holding the back cover and lift it aside exposing the entire interior.

Figure 3 is a pictorial wiring diagram for this reproducer showing color coding for each connection.

The procedures below describe how each unit can easily be removed if service should ever be required. Any offending unit can usually be identified by reproducing a test record or oscillator signal and noting the frequency range where trouble is evident. Recheck after removing the particular unit under suspicion. The input impedance of each of the three loudspeaker units is the same as that of the entire system—namely, 16 ohms. The d-c resistance can be measured with an ohmmeter and should lie between 12 and 14 ohms (be sure the unit is disconnected from the circuit for proper reading).

TO REMOVE RP-302 ULTRA H-F UNIT:

1. With a soldering iron remove the two cable leads of the RP-302 from the H-F BALANCE CONTROL.
2. With a screwdriver remove the three (3) wood screws and lift the RP-302 and its adaptor mounting plate out of the cabinet.

TO REMOVE RP-201 H-F UNIT:

1. With soldering iron remove the two cable leads of the RP-201 from the M-F BALANCE CONTROL.
2. With wrench or pliers remove the bolt through the L-bracket into the back of the RP-201.
3. With a screwdriver loosen the three (3) wood screws holding the supporting L-bracket to the cabinet top.
4. With wrench or pliers remove the two (2) fastening nuts and washers at the front of the horn; support the unit from the back and slide off the bolts, rotate, and remove from cabinet.

We do not recommend disassembly of the above units—ask your dealer to return them to our factory for expert inspection and repair if it becomes necessary. These units are precision devices and elaborate fixtures and special techniques are required for their proper reassembly. Be sure that a detailed description of the suspected trouble accompanies any unit which must be returned.

When replacing units in your TRi-PLEX be sure to observe the correct color coding shown in Figure 3.

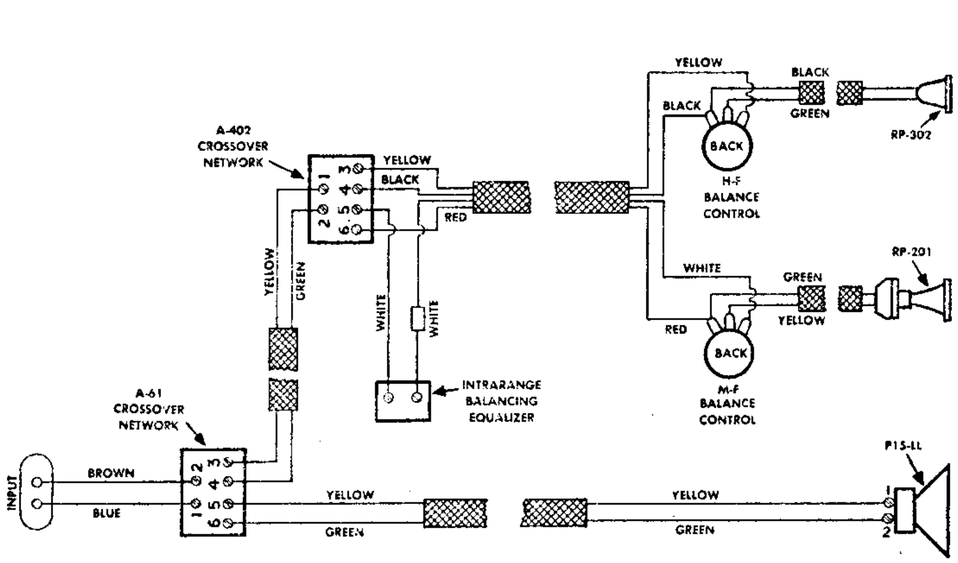


Figure 3. Pictorial Wiring Diagram of TP-200.

ABOUT HIGH FIDELITY

It is not difficult to achieve truly high fidelity performance. A quality record player or changer equipped with one of the modern magnetic cartridges and an amplifier providing record equalization control (internal or in companion preamplifier) and preferably "bass" and "treble" boost controls are all that are needed with your TRi-PLEX to obtain excellent reproduction of the great wealth of good recorded music. This simple high fidelity system can be expanded when convenient to include a tuner for a-m or f-m broadcasts of fine music. Another simple step is the addition of a tape recorder to preserve such broadcasts.

You may well ask—"Just what is this 'high fidelity'"? The term has been bandied about with reckless abandon, authors and lecturers have expounded their pet theories about it, commercial interests have extensively advertised it. Claims for equipment often imply certain accepted definitions or standards of performance (strangely enough their equipment is always superior by such standards).

The truth is that committees representing commercial and professional groups have studied the problem at great length and cannot at this time define "high fidelity" with any degree of completeness or accuracy. There *are* no simple standards to differentiate equipment that is "high fidelity" from that which is not. Obviously it is a matter of degree and all of the important factors are highly interrelated.

In the speaker system, for example, it is not meritorious to have a frequency range extending to the limits of audibility if the important m-f range, where the ear if most sensitive, is not free of distortion. A good loudspeaker system must be free of spurious noises to be acceptable no matter what other virtues it may possess. The various portions of the frequency spectrum must be properly balanced if the reproduced music is to sound natural—the balance controls provided on the TP-200 permit accurate adjustment of this balance and is one important reason for the superior results.

All this has given an aura of mystery to the subject and this has stimulated the authors and lecturers all the more. Advocates can give extensive and convincing arguments for gadgetry of all kinds. Advertisers now have adopted the magic term indiscriminately for all sorts of equipment. Although no standards can be formulated that are satisfactory for evaluating equipment there is one simple test at your disposal—the only sensible test—an actual listening test of the equipment under normal operating conditions. No matter what its specifications, it is not suitable *if it does not sound well.* All other tests and measurements are only tools useful to some degree in evaluation but the "proof of the pudding" is always the listening thereto.

There is a current trend to stereophonic reproduction (often called binaural) particularly in the larger cities, where regular programs are available. Ideally two identical loudspeaker systems are used. It is also true that two such speaker systems give a great deal more realism even when only a single channel signal is being reproduced. The reproduction from two speakers spaced from 6 to ten feet apart and connected to the same amplifier adds a great deal of "depth" or pseudo-three dimensional effect and such a procedure is highly recommended.

Remember that the final result one hears is the composite of a long chain of interconnected components starting at the *broadcast or recording studio* and only *ending* with the loudspeaker system. If one or more links in this chain is faulty the whole chain is weak and the potential performance of any part such as the loudspeaker system is not then realized. On faulty signals it is often desirable to reduce the h-f range by decreasing the treble control setting on your amplifier. The h-f range can be restored to normal for those outstanding records and broadcasts that make the expense and effort expended to assemble such a system well worthwhile.

The subject of high fidelity can consume many pages but the best guarantee we can offer is that for more than a quarter of a century JENSEN loudspeakers have been recognized as the world's quality standard.