Service Manual
1-0.

TECHNICAL
SPECIFICATIONS

Driver Compliment:
2 ea. 12" bass drivers
4 ea. 8" midbass drivers
4 ea. 4" midrange drivers
6 ea. 2" cone tweeters
2 ea. 1" soft-dome tweeters

Frequency Response: 24Hz to 20kHz ± 3db
Nominal Impedance: 6 ohms
Maximum Power Input: 350 RMS watts per channel
Maximum Continuous Power Input: 100 RMS watts below 200Hz
Minimum Power Required: 50 RMS watts per channel
Sound Pressure Level: 80db at 1 meter on axis with 1 watt of input at 1,000 Hz

Motion Control Module:
Input Impedance: 22K ohms
Output Impedance: less than 600 ohms
Maximum Output Voltage: 8 volts RMS
Distortion: less than 0.1%
Hum and Noise: less than 100 microvolts
2-0. CIRCUIT DESCRIPTION
MOTION CONTROL MODULE

In sections B4 and D4 operational amplifiers Z1-C and Z1-D serve as active 12db/octave subsonic filters with high pass gain of 6db. The signal path then splits to section C3, ambience circuitry, and sections B3 and D3 which incorporate high frequency and midrange tone shaping circuits. Front panel-mounted switches S1-A and S1-B allow switchable high frequency response selection. Op amps Z2-A and Z2-B incorporate switchable midrange response through front panel-mounted switches S2-A and S2-B, and also low frequency through front panel-mounted switches S3-A and S3-B.

Z2-C and Z2-D in section 2 are output buffers with high frequency boost.

Z1-A in section C4 is a difference amplifier which supplies a weighted L-R signal to the left channel through Z2-A. Z1-B acts as an inverter buffer supplying a R-L signal to the right channel through Z2-B. The amount of ambience mix is governed by potentiometer R501, front panel-mounted.

Q1 and associated circuitry provides time delay output switching through relay K1. Response time is 1 to 2 seconds after turn-on and instantaneous at turn-off.
3-0. SCHEMATICS AND DESIGN HISTORY

For Panel Serial Numbers 1736 and Earlier:

Diagram III-1: Phase III System Schematic
III-2: Crossover Assembly Layout
III-3: Panel Assembly Layout
III-4: Motion Control Module Schematic
III-5: Motion Control Module Assembly Layout
(also see Diagram III-11)

For Panel Serial Numbers 1737 and Forward:

Diagram III-6: Phase III System Schematic
III-7: Crossover Assembly Layout
III-8: Panel Assembly Layout
III-9: Motion Control Module Schematic
III-10: Motion Control Module Assembly Layout

For All Panel Serial Numbers:

Diagram III-11: Motion Control Module Chassis Transformer Layout
III-12: Bass Commode Assembly Layout
PHASE LINEAR

PHASE III SPEAKER

NOTES:
1. ALL CAPS ARE 50V AC NON-POLAR.
2. ONE CHANNEL ONLY SHOWN.

DIAGRAM III-1
Revision shown is for speaker panel serial numbers 1736 and earlier.
NOTE: UNLESS OTHERWISE SPECIFIED
1. FOR SCHEMATIC SEE SHT 2 & 8
2. ALL RESISTORS 1W 5% VALUE IN OHMS.
3. CAPACITORS IN #1 (RED).
4. C1,7/8,40,41 ARE 10K.
   D. JUMPER 22AWS SOLID WHT.
   PN 124-0002-0

Revision shown is for speaker
panel serial numbers 1736
and earlier.

PL25 REV E OGG12

Phase Linear
PCB ASSY, PL25
SPEAKER EQUALIZER
PHASE LINEAR SCHEMATIC

PHASE III SPEAKER

NOTES:
1. ALL RESISTORS 2W UNLESS OTHERWISE SPECIFIED.
2. BLACK CAPS ARE 50 VAC.
3. YELLOW CAPS ARE 100V.
4. ONE CHANNEL ONLY.
Panel, Serial #1736 Forward
MOTION CONTROL MODULE TEST AND ALIGNMENT PROCEDURE

Input signal shall be 250mV @ 2K Hz. Unless otherwise stated all dB measurements are ±1dB

For Phase III Systems with Panel Serial Numbers 1736 and Earlier:

4-1: With all trim controls set at "0" position drive the inputs with a 250mV 2K Hz signal and obtain a 0dB reference at the outputs.

4-2: Repeat step 4-1 with a 1kHz signal and verify a signal boost of 2dB from the 0dB reference. Switch the "MED" control to "+" position and verify another signal boost of 1.5dB. Switch control from "+" position to "-" position and verify a signal drop of 2.5dB. Return control to "0" position.

4-3: Repeat step 4-1 with a 30 Hz signal and verify a signal boost of 8.5dB from the 0dB reference. Switch the "LOW" trim control to the "+" position and verify another signal boost of 6dB. Switch control from "+" position to "-" position and verify a signal drop of 7.5dB. Return control to "0" position.

4-4: Repeat step 4-1 with a 20K Hz signal and verify a signal boost of 4dB from the 0dB reference. Switch "HIGH" control to "+" position and verify another signal boost of 6dB. Switch control from "+" position to "-" position and verify a signal drop of 9.5dB. Return control to "0" position.

4-5: Repeat step 4-1. With the "Spatial Imaging" control set fully counterclockwise unplug the right channel input and verify that the right channel output has dropped 50dB, ±3dB. Now turn the Spatial Imaging control fully clockwise and verify that the right channel output is now inverted and 10dB lower than the left channel, ±3dB.

(*) Signal input may have to be increased in order to obtain separation measurements.
For Phase III Systems with Panel Serial Numbers 1736 and Forward:

4-6: With all trim controls set at "0" position drive the inputs with 250mV 2K Hz signal and obtain a 0dB reference.

4-7: Repeat step 4-6 with a 200 Hz signal and verify another boost of 2dB. Switch "MID" control to "+" position and verify another signal boost of 2dB. Switch control from "+" position to "-" position and verify a signal drop of 4dB. Return control to "0" position.

4-8: Repeat step 4-6 with a 30 Hz signal and verify a signal boost of 3dB from the 0dB reference. Switch "LOW" control to "+" position and verify another signal boost of 2dB. Switch control from "+" position to "-" position and verify signal drop of 6db. Return control to "0" position.

4-9: Repeat step 4-6 with a 20K Hz signal and verify a signal boost of 3 db from the 0dB reference. Switch "HIGH" control to "+" position and verify another signal boost of 4dB. Switch control from "+" position to "-" position and verify a signal drop of 8dB. Return control to "0" position.

(*1)4-10: Repeat step 4-6. With the "Spatial Imaging" control set fully counterclockwise unplug the right channel input and verify that the right channel output has dropped 50db, + 3dB. Now turn the Spatial Imaging control fully clockwise and verify that the right channel output is now inverted and 10dB lower than the left channel, + 3dB.

(*) Signal input may have to be increased in order to obtain separation measurements.
SPEAKER PANEL AND BASS COMMODE TEST PROCEDURE

Panel Test:

Phase III speaker panels are tested at the factory in a special acoustic environment. The test procedure involves the use of a sweep signal oscillator, pink noise generator, sound pressure level meter, and realtime analyzer.

Since most repair facilities are not equipped with such speaker testing equipment the easiest method of testing the speakers is to simply listen to them since most speaker failures are audibly straightforward. A defective driver will normally manifest itself by either giving no audible sound whatsoever, or giving a definite audible distortion or breaking up of the signal.

To give the panels a listening test drive them with a low noise signal source (e.g., sine wave sweep oscillator, or quiet record or tape with fairly dynamic material) at various sound pressure levels and listen to each driver in the panel. In the case of the tweeters it may be necessary to make a "listening tube" by rolling up a piece of paper and listen to each tweeter through this tube as sometimes a tweeter may be hard to hear by merely placing your ear close to it. Verify that there is 1) sound coming from each driver, and 2) that there is no audible break-up or distortion.

If an entire set of drivers goes silent, such as all of the tweeters, both midrange drivers, etc., the problem probably lies with the crossover assembly and it may be necessary to give each component on the crossover board which is in circuit with the set of drivers a continuity check (refer to the appropriate crossover schematic in Section III).

Bass Commode Test:

The bass commode is tested at the factory using a sweep signal oscillator (with amplification) and is driven in a sweep mode from around 100Hz down to 5Hz. This allows not only an audible check of each driver's performance, but offers an audible check for air leaks or vibrations in the cabinet.

To test the bass commode the same sort of test may be utilized, or if a signal oscillator isn't available it may be driven with a low noise record or tape which contains suitable bass material. Verify that both drivers give an audible signal and that the material is free of distortion, break-up, rattles or air leaks.
### PHASE III PARTS LIST

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>12&quot; Bass Driver</td>
<td>129-0039-0</td>
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<tr>
<td>8&quot; Midbass Driver</td>
<td>129-0040-0</td>
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<td>4&quot; Midrange Driver</td>
<td>129-0041-0</td>
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<td>2&quot; Cone Tweeter</td>
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<td>1&quot; Soft-Dome Tweeter</td>
<td>125-0082-0</td>
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<td><strong>Crossover Assy:</strong></td>
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<tr>
<td><strong>Ser#1736 &amp; Earlier</strong></td>
<td>210-0072-0</td>
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<td><strong>Ser#1736 &amp; Forward</strong></td>
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<td><strong>ABS Plastic Tweeter Bracket:</strong></td>
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<td><strong>Ring</strong></td>
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<td><strong>Tweeter Cone Deflector</strong></td>
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<td>Cap, 3.3/100V NP</td>
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<td>Res., 15 Ohm 5W</td>
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<td>Res., 7.5 Ohm 10W</td>
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**NOTE:** Whenever ordering parts BE SURE TO INCLUDE THE PANEL SERIAL NUMBER OF THE SPEAKER SYSTEM.
SERVICE BULLETIN

SUBJECT: Phase III Motion Control Module

We have discovered that due to the positive feedback used in one of the frequency contouring stages the Motion Control Module will oscillate (10V AC @ about 200Hz) if the inputs are opened. This can happen when switching the tone controls in and out on a preamp which has a non-shorting tone switch (such as the Phase 2000). To arrest this oscillation the inputs should be referenced to ground through a 47K-ohm resistor. The resistor should be soldered on the foil side of the PCB board from each input hot (+) to the ground plane provided for the shorting input jacks.

Thus far the oscillation has proven to be a rare complaint but can be a potential hazard to unfused speakers. If you have any further questions feel free to contact the factory service department at the following address:

PHASE LINEAR
20121-48th AVE. WEST
LYNNWOOD, WA 98036
(206) 774-8848

[Diagram of the circuit]
PHASE LINEAR

PHASE III SPEAKER

NOTES:
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