the transistor's SOA, without risk of destroying the device when conditions are less than ideal.

Internal fuses, in combination with the power transformer's thermal switch embedded in the windings, protect the power supplies against overload. If the transformers overheat, the thermal switch shuts off automatically, waits until the unit has cooled to a safe temperature and then resets itself. In the rare event that an internal fuse blows, refer the amplifier to a qualified technician.

CAUTION: Never change fuses with power applied!

The high-voltage power supply is fused with a 20 A fuse for 100 V/120 V and a 10 A fuse for 200 V/220 V/240 V. The low-voltage power supply and cooling fan are fused with a 0.5 A fuse for 100 V/120 V and a 0.25 A fuse for 200 V/220 V/240 V. **The use of other fuse sizes will invalidate the warranty.**

4.5 Cleaning

A dust filter is provided on the air intake to the cooling system. If this filter becomes clogged, the unit will not cool as efficiently as it should and may produce lower-than-normal output levels due to high heat-sink temperature.

To clean, remove the filter by loosening the screws on the intake cover, turning the cover counterclockwise slightly so screws line up with larger part of opening, and pulling straight out. Use mild dishwashing detergent and warm water for best cleaning. Replacement filters may be ordered from the factory.

Dust filters are not 100% efficient. Long term use will require that the internal heatsinks be cleaned by a qualified technician. Internal cleaning information is available from our Technical Services Department.

5 Service

Your amplifier has very sophisticated circuitry which should only be serviced by a fully trained technician. This is one reason why each unit bears the following label:

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT OPEN. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO A QUALIFIED TECHNICIAN.

5.1 Amcron Service

Amcron customers may obtain service from an authorized Amcron Service Center. Your local Amcron representative or our office can supply a list of authorized service centers. Simply present the defective unit along with your bill of sale as proof of purchase to an Amcron Service Center. They will handle the necessary paperwork and repair.

Remember to transport your unit in the original factory pack. Amcron will pay the surface shipping costs both ways **for warranty service** to the authorized service center nearest you after receiving copies of all shipping receipts. You must bear the expense of all taxes, duties, and customs fees when transporting the unit.

5.2 Crown Service

Crown customers may obtain service either from an authorized Crown Service Center or from the Crown factory in Elkhart, Indiana. It is important that you have your copy of the bill of sale as your proof of purchase.

5.2.1 Service at a Crown Service Center

This method usually saves you the most time and effort. Simply present your bill of sale along with the defective unit to an authorized Crown Service Center. They will handle the necessary paperwork and repair. Remember to transport your unit in the original factory pack.

5.2.1 Crown Factory Service

To obtain factory service, fill out the Service Information card in the back of this manual and send it along with proof of purchase and the defective unit to the Crown factory. Enclose a letter explaining the nature of the problem and what service you would like. Include your return shipping address and telephone number.

The unit must be shipped in the original factory pack. If you no longer have the original shipping pack, contact us and we will send you a replacement.

Crown will pay surface shipping costs both ways in the United States **for warranty service** upon receiving copies of all shipping receipts. Shipments should be sent UPS Ground. The factory will return your serviced unit via UPS Ground. Please contact us if other arrangements are necessary.

Crown/Amcron
Technical Services Department
57620 C.R. 105
Elkhart, Indiana 46517
Phone: 1-800/342-6939 or: 1-219/294-8200
Crown Fax: 1-219/294-8329
Amcron Fax: 1-219/294-8346

6 Technical Information

6.1 Overview

The PSA-2X is a high-power direct-coupled amplifier. It automatically and continuously analyzes its own dynamic environment and thus is able to control the output level relative to the output transistors' Safe Operating Area. The result: maximum output with maximum safety.

The output circuitry employs 16 rugged 150-watt transistors (2400 W dissipation), each tested on the Crown SOA III Transistor Analyzer. This testing verifies the safe operating area of each output device, which in turn helps improve the amplifier's overall circuit performance.

The output transistors operate in the AB mode of operation where quiescent current is carried by both the driver stages and the output stages. The output is a quasi-complementary design in which the common point between positive and negative output stages is returned to ground. Therefore, the power supplies are allowed to float with the signal output terminal common to the center tap of the high voltage power transformer.

The high-voltage power supply contains two transformers (one per channel) for driving the output stages. Because of this independence, a single channel output stage problem (very unlikely) will not affect the performance of the other. The single low-voltage power supply is responsible for pre-output signals and low power components (LEDs, fan, etc.).

All heat-sinking is internal, eliminating handling problems when the unit is hot as well as providing a shorter and more efficient path for air flow than standard convection cooling.

6.2 Circuit Theory

Refer to the block diagram, Fig 6.1. The diagram does not show all circuit connections or feedback loops due to circuit complexity, but there is sufficient data to grasp the function of each circuit. Note that only channel 1 is shown for simplicity.

An input signal is fed to the initial stages via the standard unbalanced input or the optional balanced input. Both cannot be used simultaneously due to the "interrupt" function of the unbalanced input jacks.

(The balanced input jacks are located on a separate rear-panel plug-in module. See Section 8 for information on the Balanced Input Mod.)

The input amplifier receives the signal next and sends any necessary error-correcting into the Compressor Control circuitry as well as sending the main signal on to the Balanced Stage. Essentially, this feedback path (from the output of the input amp through the Compressor Control circuitry) adjusts the amount of compression needed at that particular instant to provide distortion-free output.

In order to drive the Positive and Negative Output Stages, a Balanced Stage is necessary. Should a situation be encountered where protection of the Output Stages is needed, the Protection Circuitry will automatically reduce the drive available to the Balanced Stage and thus remove the stress on the output devices.

Both the Positive and Negative Output Stages consist of four SOA-analyzed and V_{BE}-matched output transistors plus a predriver/driver combination that also aid in carrying the quiescent power load. Together they help form the quasicomplementary Class AB method of operation used in the PSA-2X.

Feeding positive current to the POSITIVE OUTPUT STAGE, and negative current to the NEGATIVE OUTPUT STAGE, are the POS and NEG Vcc (High Voltage) Supplies. The common point between the two Output Stages is ground. A departure from previous smaller Crown amps, this method allows sophisticated information to be fed to the protection Circuitry from the Output Stages with reference to ground. Both channels' High Voltage supplies work independently of one another.

The point Common to the Neg and Pos Vcc supplies is the "hot" signal of the output terminal which also feed the front panel Display, the Mono switch (for selectable stereo-mono output) and several of the main feedback paths.

The Control Logic is responsible for the action of the Lo Freq Protect, Delay, Standby and thermal protection of the unit. When signaled by the Lo Freq Protect, Standby and/or Delay feature, the Control Logic will remove the power from the Vcc supplies. In the case of Low Freq Protect, when the output has subsided it will place the high-voltage supplies back into operation from Standby or cycle through the same procedure again depending upon the existence of the problem.

Thermal protection may involve the same procedure as mentioned above but only in extreme cases. A thermal switch imbedded in the high-voltage transformer's windings will activate the Control Logic when potentially damaging current demands are being placed on it.

The Low Voltage supply drives all low-power signal path circuitry including the Control Logic, Display and Fan speed logic. At an internal temperature of 47° C (117° F), the unit will automatically shift to high fan-speed operation for additional cooling.

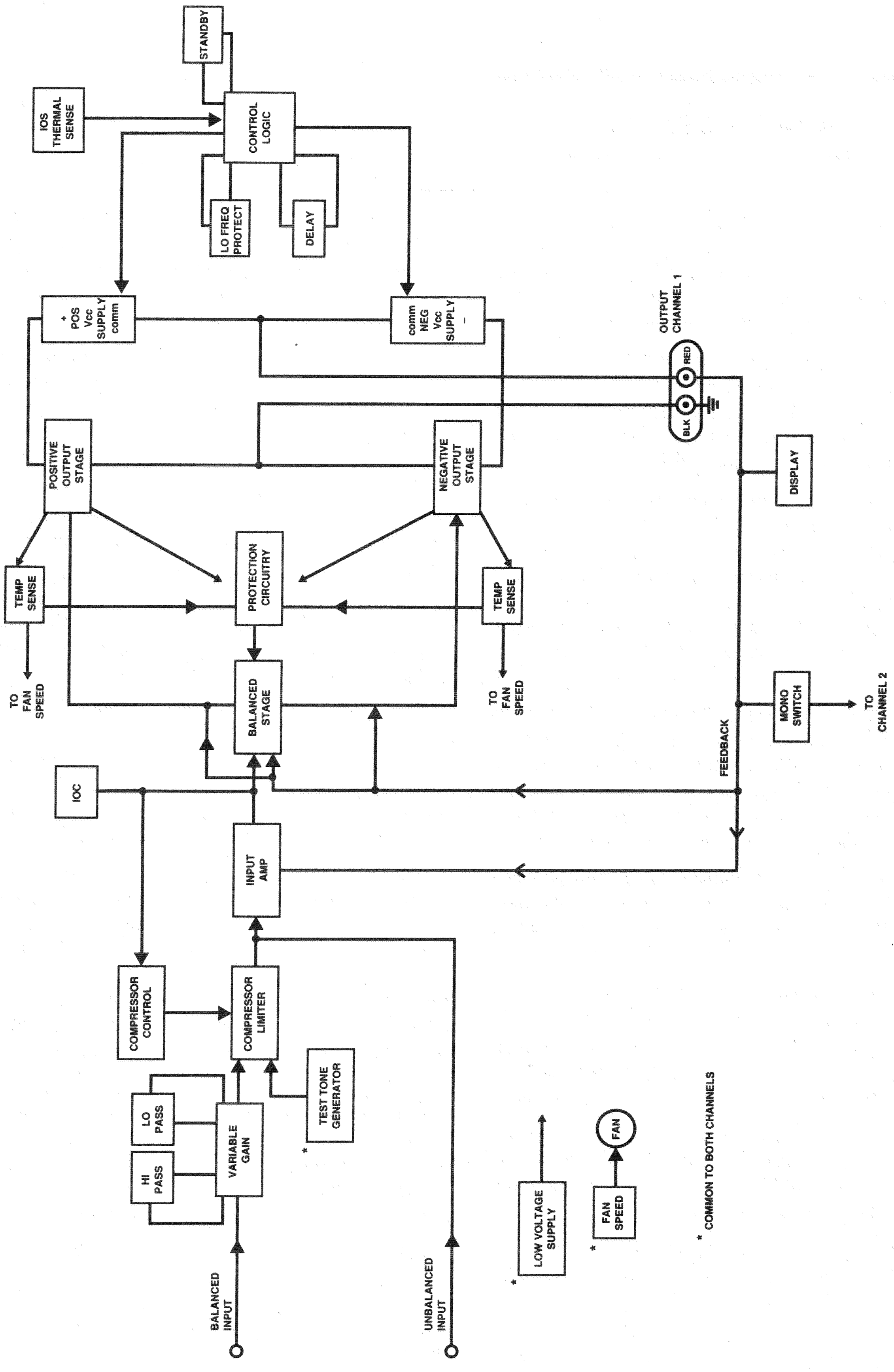


Fig. 6.1 Circuit Block Diagram

7 Specifications

7.1 Performance

Note: 8 ohm loads were used unless specified otherwise.

Frequency Response

Stereo: ± 0.1 dB from 20 Hz to 20 kHz at 1 watt. +0, –1.5 dB from DC (0 Hz) to 80 kHz. See Figure 7.2.

Bridged Mono: ± 0.2 dB from 20 Hz to 20 kHz at 1 watt into 16 ohms.

Phase Response: +0, –15 degrees from DC (0 Hz) to 20 kHz at 1 watt. See Figure 7.3.

Hum and Noise: 115 dB below rated output (A-weighted). 110 dB below rated output (20 Hz to 20 kHz).

Total Harmonic Distortion (THD)

Stereo: Less than 0.002% from 20 Hz to 1 kHz and increasing linearly to 0.05% at 20 kHz at 220W/ channel.

Bridged Mono: Less than 0.003% from 20 Hz – 1 kHz and increasing linearly to 0.08% at 20 kHz at 500 W into 16 ohms. Less than 0.005% from 20 Hz – 1 kHz and increasing linearly to 0.12% at 20 kHz at 800W into 8 Ω.

IM Distortion (IMD)

Stereo: Less than 0.01% from 0.25 watts to 220 watts per channel. See Figure 7.5.

Bridged Mono: Less than 0.015% from 0.25 watts to 500 watts into 16 ohms. Less than 0.015% from 0.25 watts to 700 watts into 8 ohms.

Crosstalk: See Figure 7.4.

Slew Rate

Stereo: Greater than 30 volts per microsecond.

Bridged Mono: Greater than 60 volts per microsecond.

Damping Factor: Greater than 700 from DC to 400 Hz. See Fig. 7.7.

7.2 Power

Output Power

Note: Maximum average power at 1 kHz with no more than 0.1% THD. (See power matrix for further details.)

Stereo: 700 W per channel into 2 Ω. 460 W per channel into 4 Ω. 275 W per channel into 8 Ω. See Fig. 7.8.

Bridged Mono: 915 W into 8 ohms.

Load Impedance: Rated only for 16 to 2 ohm usage (Stereo) and 16 to 8 ohm usage (Bridged Mono). Safe with all types of loads (even totally reactive ones).

Required AC Mains: 50-400 Hz AC with selectable transformer taps for 100, 120, 200, 220 and 240 V (±10%) operation.

It is extremely important to have adequate AC power available to the amplifier. Power amplifiers can not create energy—they must have the required **voltage and current** to deliver the undistorted rated wattages you expect.

AC Line Connector: Standard three-wire grounded connector.

High Voltage Supply: Two 800 VA transformers with computer grade capacitors powered through 10 A relays.

Low Voltage Supply: ±15 VDC supplies are provided by a current-limited short-proof regulator.

7.3 Controls

Power: A two-position switch, located on front panel, turns the unit on and off.

Level: A level control for each channel is located on the front panel.

Stereo-Mono: A two-position switch, located on the back panel, selects between Stereo and Bridged-Mono modes of operation.

Low Freq Protect: A two-position switch, located on the back panel, activates the subsonic protection circuitry.

Delay: A two-position switch, located on the back panel, activates a 4-second turn-on delay to protect loudspeakers from unwanted turn-on transients.

7.4 Indicators

On: An amber indicator which shows the unit has been turned on.

Standby: Normally off, these yellow indicators turn on if a channel is placed in STANDBY mode.

Signal: These green indicators flash synchronously with the input signal to show its presence.

***IOC*:** Normally off, these red indicators flash in the rare event the output waveform differs from that of the input by 0.05% or more.

7.5 Input/Output

Input Connector: Unbalanced ¼-inch phone jack for each channel.

Input Impedance: Nominally 25 K ohms (±30%).

Input Sensitivity

Stereo: 2.1 volts for 220 watts into 8 ohms per channel.

Bridged Mono: 2.2 volts for 500 watts into 16 ohms.

Output Connector: Color-coded dual binding posts (banana jacks) on standard ¾ inch centers, spaced ¾ inch apart.

Output Impedance

Stereo: Less than 12 milliohms in series with less than 1.2 microhenries. See Figure 7.9.

Bridged Mono: Less than 24 milliohms in series with less than 2.4 microhenries.

Output Signal

Stereo: Unbalanced, two-channel.

Bridged Mono: Balanced, single-channel. The controls of Channel 1 are active and the controls of Channel 2 are inactive but not removed from operation. This means the Channel 2 controls should NOT be used but should be turned down for proper mono operation.

DC Output Offset: 0.0±10 millivolts with shorted input.

Voltage Gain

Stereo: 20:1 ±2% or 26 dB ±2 dB at maximum gain.

Bridged Mono: 40:1 ±2% or 32 dB ±2 dB at maximum gain.

Chassis Ground: Two-terminal barrier block with shorting strap.

Accessory: An internal plug, accessed through the rear panel cover plate, accepts optional balanced-input module.

7.6 Protection

Protection circuitry limits the output level to protect the output transistor stage, even in the case of elevated temperature. Transformer overheating results in shutdown (STANDBY) of that particular channel. Controlled slewing rate voltage amplifiers protect the unit against RF (radio frequency) burnouts. Input overload protection is furnished by a resistor at the input of the amplifier to limit current.

Turn On: Can be selected for either instantaneous or four-second delay after applying power. The unit, itself, creates no dangerous transients.

Low Frequency Load Protection: A switchable protection circuit is provided to place the unit in STANDBY mode when subsonic output (from DC to 10 Hz) is greater than 26 V. See Figure 7.10.

7.7 Construction

All aluminum construction for maximum heat conduction and minimum weight with specially-designed "flow-through" ventilation top, front and side panels. Satinized aluminum front panel with grey suede Lexan insert and black painted aluminum chassis covers.

Cooling: Forced-air with high-efficiency coolers. A two-speed fan with an intake filter (washable) mounted on the back panel forces air through the coolers and out both the top and side panels.

Dimensions: 19 inch (48.3 cm) standard rack mount width (EIA Std. RS-310-B), 7 inch (17.8 cm) tall, 14.75 inch (37.5 cm) deep behind front mounting surface.

Weight: 57 pounds (25.9 kg).

Mounting: Standard EIA 310 front-panel rack mounting.

Crown specifications are guaranteed for three years.

At Crown our published specifications are *guaranteed* for three years. Further, because our "in-house" specs are more stringent than our published specs, *every* Crown amplifier will *exceed* its published specs.

Other manufacturers may publish specifications with a tolerance of ±1 dB or worse. This means their amplifier can deviate more than 20% in output! For example, a 100 watt amp would meet their spec if it only produced 79.4 watts. Still other manufacturers qualify their specs by saying they are "typical" or "subject to manufacturing tolerances," thereby removing any performance guarantee.

Why a Power Matrix?

The maximum output power an amplifier can produce varies with both the type of load and the type of input signal. This is why we provide the following power matrix—to provide power data for a variety of conditions. The power matrix also gives you enough data to accurately compare the high power producing capabilities of our amplifiers with the amps of other manufacturers. Without this data you might be comparing "apples to oranges." Some spaces in the table may be left blank because we do not provide a guaranteed spec for that situation—however, your amplifier will perform well under all conditions whether shown in the matrix or not.

We believe you should get what you pay for.

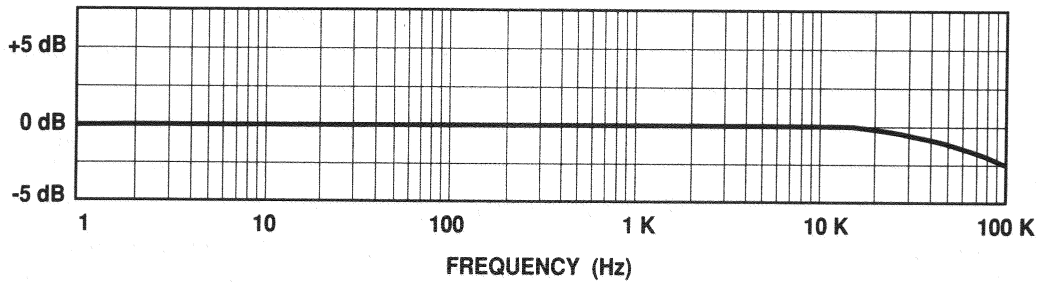
PSA - 2X							
Configuration & Load (ohms)		FTC Continuous Average Power at 0.1% THD (See note 1) 20Hz-20kHz	FTC Continuous Average Power at 0.1% THD (See note 1) 1 kHz	Max Average Power at 0.1% THD (See note 2) 1 kHz	1 Cycle Tone Burst Watts at <0.05% THD (See note 3) 1 kHz	40 mS Tone Burst Watts at <0.05% THD (See note 4) 1 kHz	EIA Watts at 1% THD (See note 5) 1 kHz
Stereo (both channels powered)	2		580	700	840	740	650
	4	380	425	460	640	470	470
	8	265	260	275	335	280	285
	16	150	150	150	170	155	160
Bridge-Mono (balanced output)	4		1,210				
	8	760	850	915	1,260	950	920
	16	520	520	545	670	565	565

Fig. 7.1 Power Matrix

Notes:

All of the above specifications were performed with 0.1% regulated AC mains of 120 VAC, 60 Hz and an ambient room temperature of 70° F (21° C).

1. Continuous power in the context of Federal Trade Commission testing is understood to be a minimum of five minutes of operation. Harmonic distortion is measured at the RMS sum total as a percentage of the fundamental output voltage. This applies for all wattages greater than 0.25 watts.
2. A 1 kHz sine wave is presented to the amplifier and the output monitored for non-linear distortion. The level is increased until the THD reaches 0.1%. A this level the average power per channel is reported.
3. A single cycle of sine wave is fed to the amplifier and monitored for non-linear distortion. The average power during the burst is reported. Speakers must be able to withstand this level to be safely used with this amplifier.
4. A 40 millisecond burst or two cycles of sine wave (whichever is of greater duration) is used and the power computed as the average power during the burst. The duty cycle of this test is 10 percent. This power level is a measure of how loud an amplifier is as perceived by the hearing process.
5. EIA standard RS-490 (both channels driven).



ONE WATT INTO AN EIGHT OHM LOAD

Fig. 7.2 Typical Frequency Response

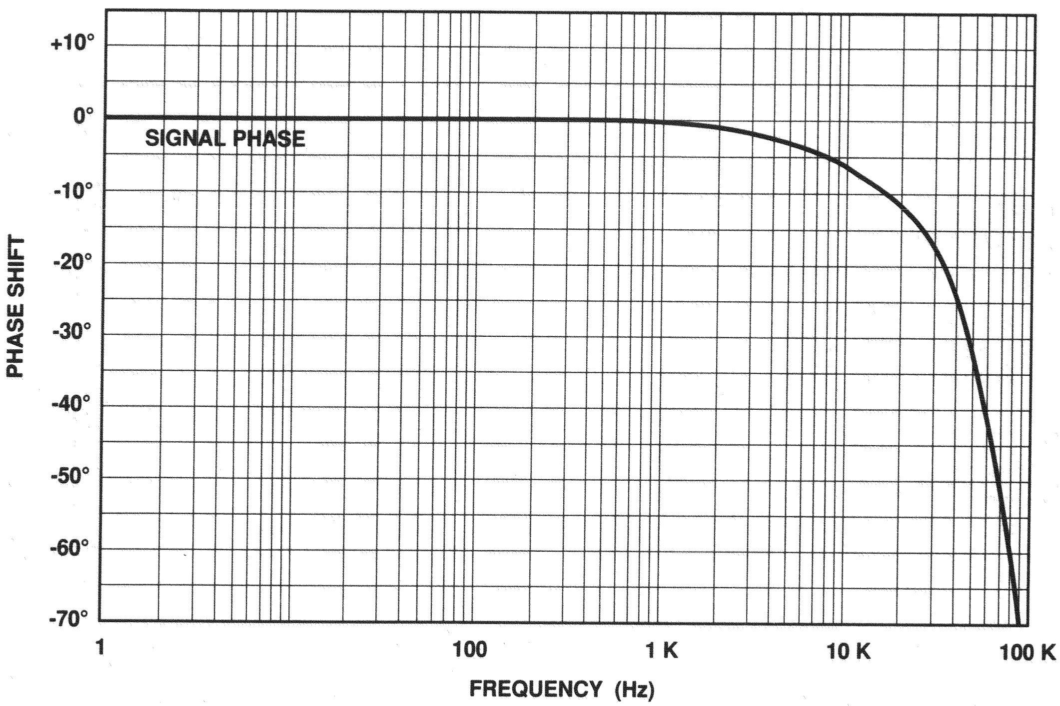
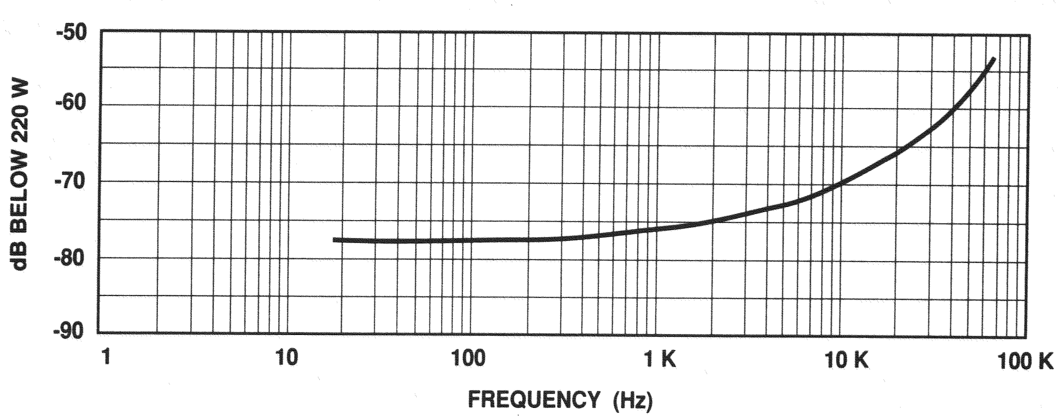


Fig. 7.3 Typical Output Phase Response



OUTPUT OF UNDRIVEN CHANNEL WITH OTHER CHANNEL
DRIVEN TO LEVEL OF 220 WATTS INTO 8 OHMS

Fig. 7.4 Typical Crosstalk

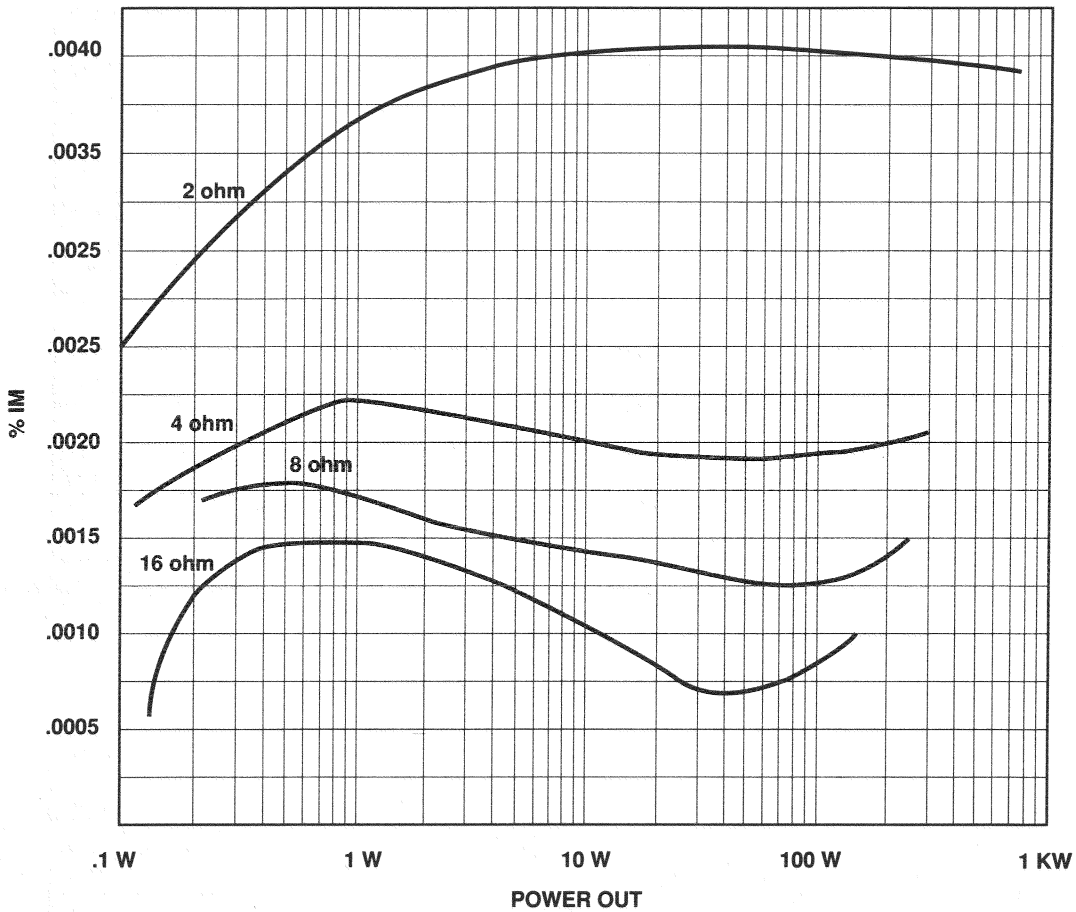


Fig. 7.5 Typical IM Distortion

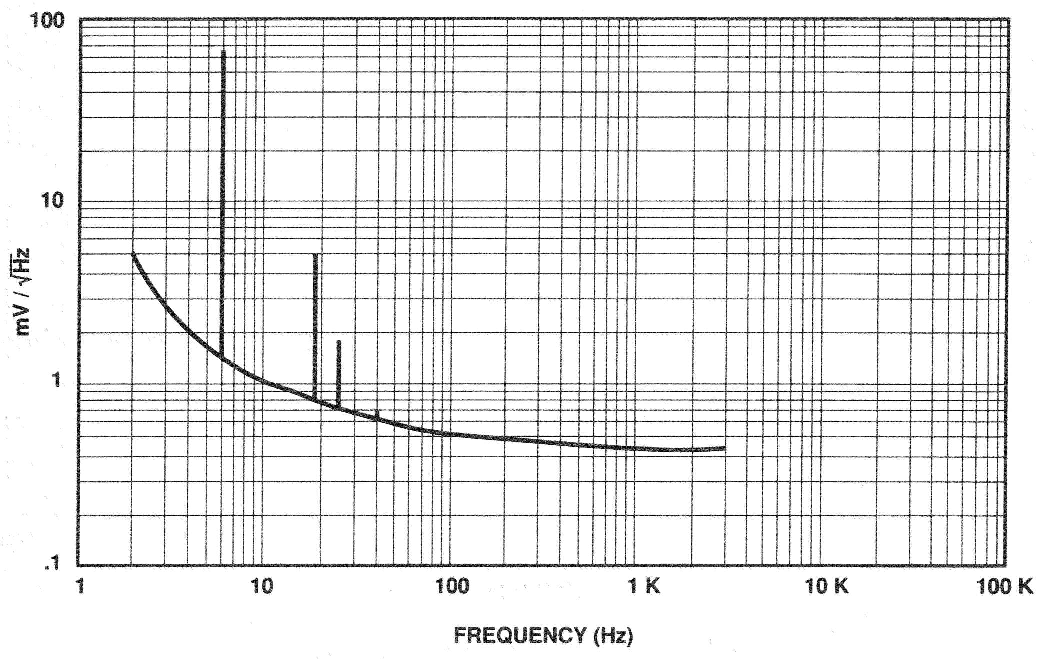


Fig. 7.6 Typical Noise Spectrum

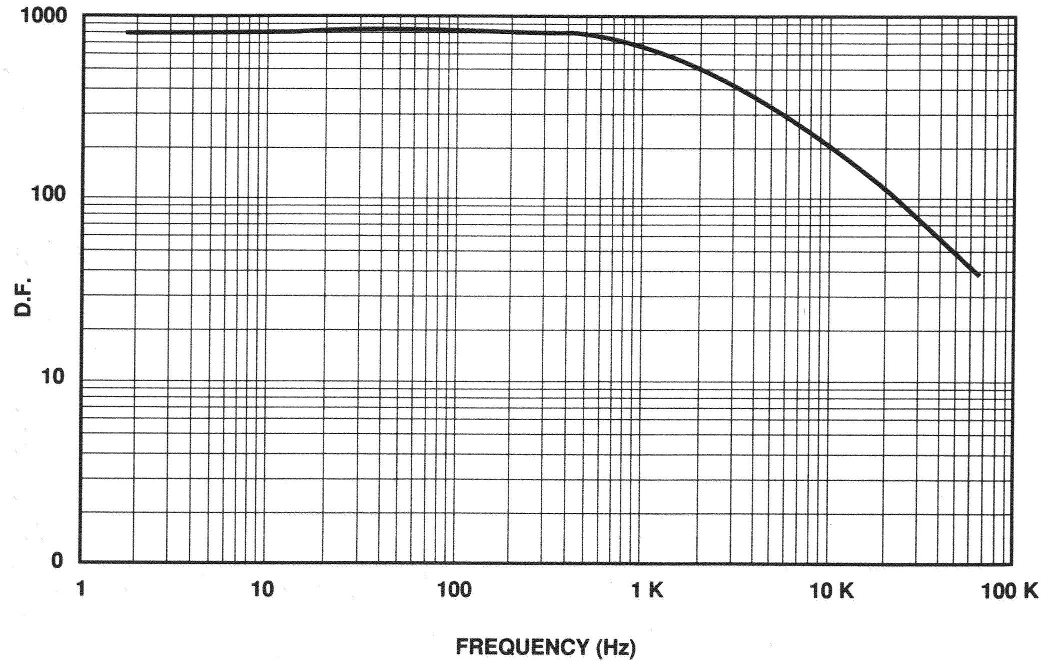


Fig. 7.7 Typical Damping Factor (8 ohm)

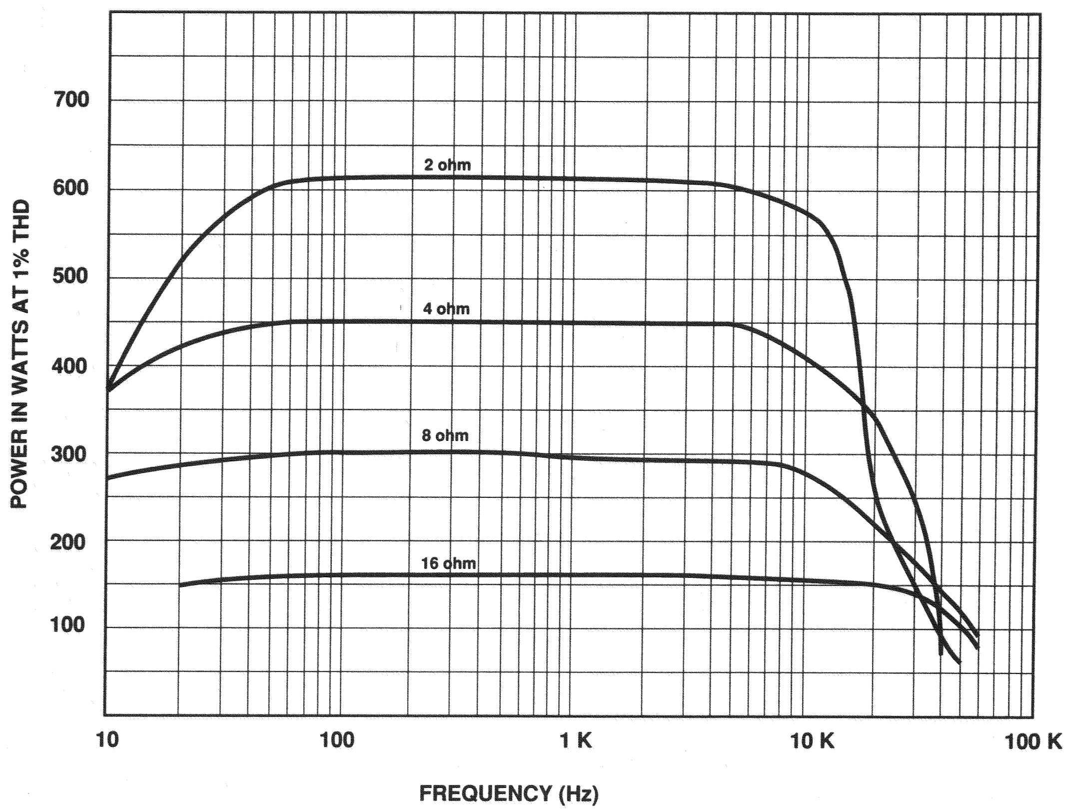


Fig. 7.8 Typical Power Output, 16, 8, 4 and 2 ohm

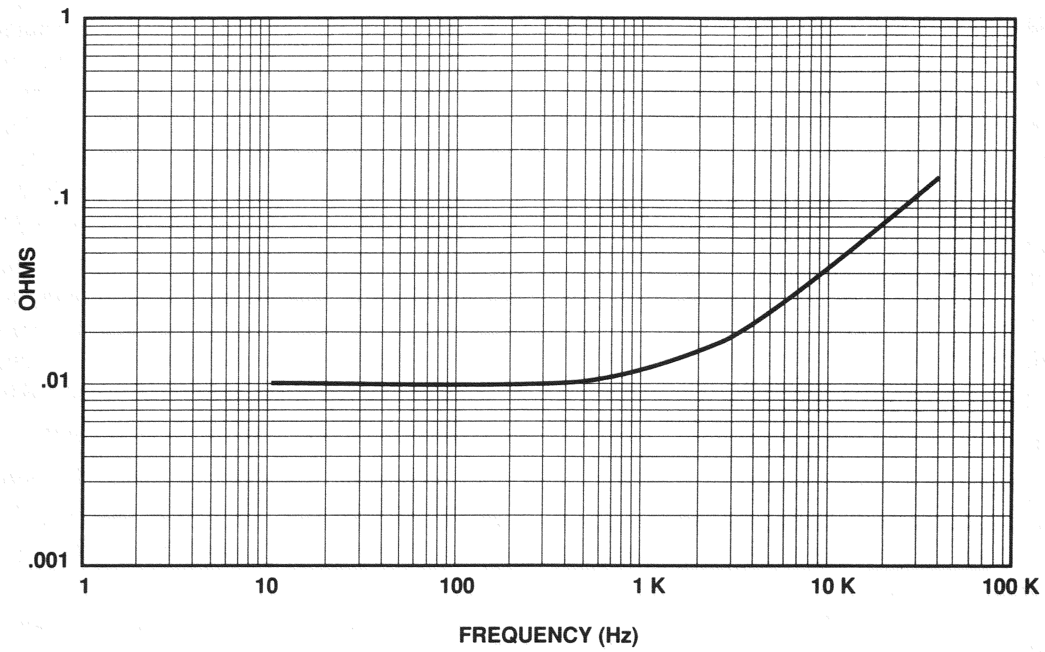


Fig. 7.9 Typical Output Impedance

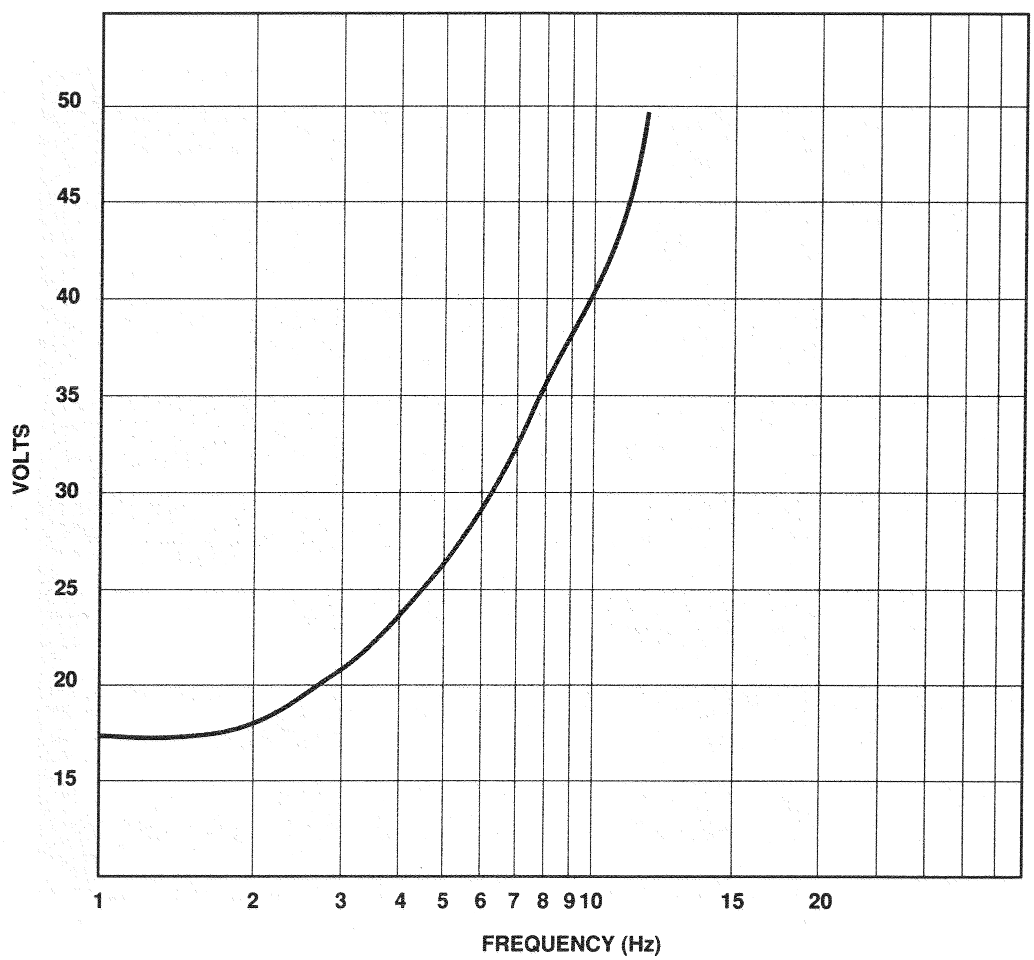


Fig. 7.10 Typical Low-Frequency Protect Action

8 Balanced Input module

8.1 Features

The PSA-2 Balanced Input Mod (PSA-2 Mod) is an accessory card that plugs into the rear of the PSA-2X. It contains several professional features:

- XLR-type balanced input connectors
- Gain adjustment controls
- Test-tone generator
- High-pass and low-pass filters
- Automatic gain control (AGC)

XLR-type balanced input connectors: One per channel, these greatly reduce hum and noise picked up by the input lines. Pin 1 is ground, pin 2 is audio in-phase, and pin 3 is audio return. Connecting to the unbalanced phone-jack inputs disables the XLR input connectors.

Gain adjustment controls: These potentiometers control the amplifier's internal gain (from 0-10 dB). In most cases, the input sensitivity of the PSA-2 is sufficient to achieve full output from most mixers, etc. However, if additional gain is necessary, simply increase the control, being careful not to overload the input stages of the amplifier. The unit is factory shipped with input gain adjustment at unity gain.

Test tone: This is a wideband pulse that covers 50 Hz to 20 kHz—extremely useful for system troubleshooting. The tone signal appears at the speaker dual-banana output jacks. Because the tone is a wide-band signal, it is possible to hear the tone throughout the woofer midrange and tweeter range.

To activate the tone, follow this procedure:

1. **Caution:** Turn input level controls completely CCW before activating the test tone generator.
2. Activate the test-tone slide switch between the XLR input jacks.
3. Use the front panel level controls to bring the level up slowly!!

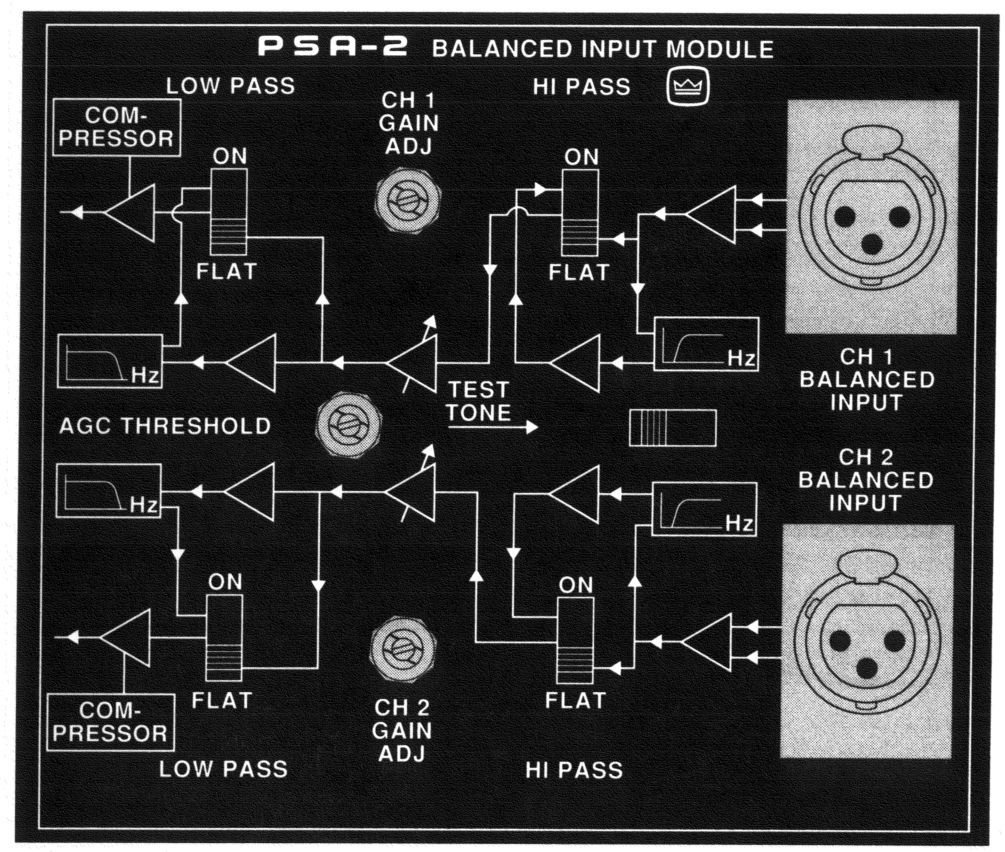


Fig. 8.1 PSA-2 Balanced Input Module

High-pass and low-pass filters: Each channel of the balanced input module incorporates a low-pass and high-pass filter slide switch. By engaging either switch, you activate that channel's filter at the factory-set frequency of 50 Hz for the high-pass filter and 15 kHz for the low-pass filter. These filters help prevent load damage at subsonic and ultra-high signal frequencies. They are switchable, 3-pole Butterworth filters.

Should the rolloff frequency need changing, you must change several components located on the input module.

Figure 8.2 lists the component changes and formulas needed for any desired cutoff frequencies.

Component changes for various high-pass and low-pass cutoff frequencies

1. **C103, 203, 104, 204, 105, and 205 all equal C***
2. **R107, 207, 108, 208, 109, and 209 all equal R***
3. **R* and C* are chosen according to the following general limitations:**
   a) **1K< R*< 330K (increasing R* value gives increased noise)**
   b) **R102, 202> 2K**
   c) **R104, 204< 1M**
4. **With valid values of R* and C*, the other resistor and capacitor values are chosen according to the following formulas:**

$$R102,202 = \frac{.7184}{2\pi f_h C^*}$$

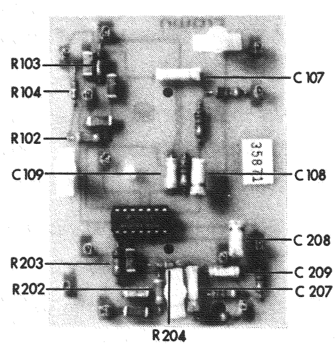
$$R103,203 = \frac{.2820}{2\pi f_h C^*}$$

$$R104,204 = \frac{4.941}{2\pi f_h C^*}$$

$$C107,207 = \frac{1.392}{2\pi f_l R^*}$$

$$C108,208 = \frac{3.546}{2\pi f_l R^*}$$

$$C109,209 = \frac{.2024}{2\pi f_l R^*}$$



When f_h = high-pass cutoff
When f_l = low-pass cutoff

5. **For values shown in schematic f_h = 50 Hz and f_l = 15 kHz**

Fig. 8.2 Low-/High-Pass Conversion Formulas

Automatic Gain Control (AGC) Threshold Adjust: The Automatic Gain Control circuit is a limiter-compressor circuit designed for use with sound-reinforcement systems. It effectively controls excessive signals with a minimum of waveform distortion. The AGC Threshold Adjust controls the point at which the AGC circuit begins to limit the output.

The unit is shipped from the factory with the control fully clockwise. This means a higher output level is attainable before any limiting action takes place as compared to a lower output level with the control decreased (turned CCW). See the graphs in Fig. 8.3 for various control positions and functions.

As shown on these graphs, no matter where the Threshold Control is adjusted, a constant 13 dB of compression is available after that point. With an increased input level under 13 dB, the output signal will not rise. Over 13 dB, the signal will continue to rise as if the limiter/compressor circuitry was not utilized.

Note that the shaded areas indicate the "clip area" of operation. This is the reason the front panel *IOC* indicators begin and continue to illuminate throughout this region. Therefore, you can operate the amplifier with the *IOC* indicators illuminated (graph A), but with relatively little distortion produced at the output of the amplifier because of the constant limit on the signal.

There are basically two methods which may be used to properly adjust the AGC Threshold Control: the listening method or the measurement method.

Listening Method

This method required the use of two important tools: your right and left ears (one may be used in case of emergency).

1. Connect the PSA-2 as shown in Fig. 3.1.
2. Loosen the locking level nut from the AGC Threshold Control and adjust full counter-clockwise (minimum).
3. Increase the listening level (either by the input source or by the front panel input level controls) until the output remains at a constant level. This level is the 13 dB of limiting shown in the previous graphs.
4. Continue increasing the input source until the output level rises abruptly (limiting no longer effective).
5. Increase the AGC Threshold Control to maximum desired listening level ("x" dB).
6. The input may now be increased by the same amount ("x" dB) without increasing the output level into severe clipping.

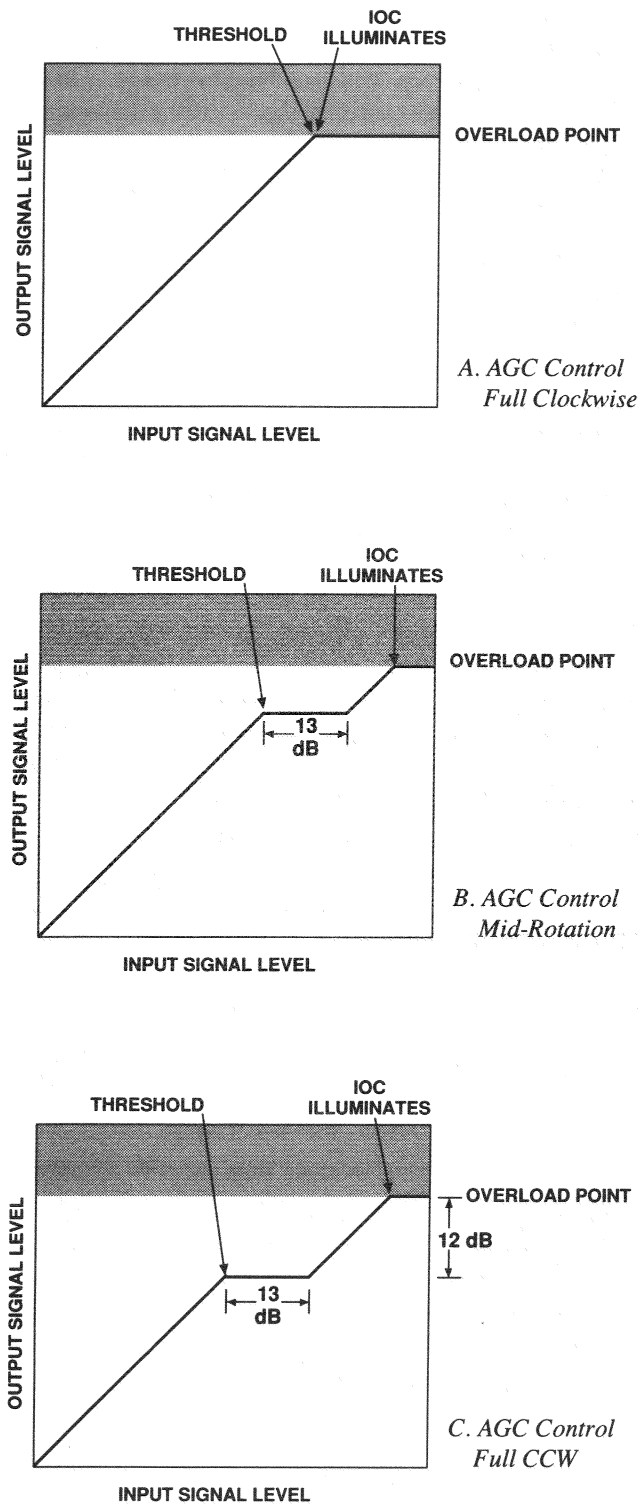


Fig. 8.3 AGC Threshold Control Positions

Measurement Method

1. Connect the PSA-2 as shown in Fig. 3.1 except replace the load with a RMS voltmeter.

2. Determine the amount of voltage necessary to produce the desired wattage level with a specific speaker. For example:

   Speaker rating: 8 ohm

   Desired wattage: 30 watts continuous

   Desired voltage: calculated by $E^2=PR$

   $E^2=30 \times 8$

   $E^2=240$

   $E=15.5$ V RMS

3. Loosen the locking level nut from the AGC Threshold Control, and adjust to full counter-clockwise (minimum).

4. Increase the input level until the output remains at a constant voltage (use an input signal representative of the application).

5. Continue increasing the input signal until the output voltage rises abruptly (limiting no longer effective).

6. Increase the AGC Threshold Control to the desired RMS voltage.

7. Input may now be increased without altering the output level voltage (for the 13 dB range).

The AGC circuitry is limited to 13 dB in order to eliminate severe feedback problems that could exist during pauses of program material.

If you don't want the AGC feature, you can deactivate it by removing several components. Refer to the Balanced Input Module Schematic MI-277;

1. To deactivate both channels, remove LM339 Comparator, U6.

2. To deactivate only channel 1, remove U4 (do not remove U6).

3. To deactivate only channel 2, remove U5 (do not remove U6).

8.2 Circuit Theory

An input signal is fed to the initial stages via the standard unbalanced input or the balanced input. Both cannot be used simultaneously due to the "interrupt" function of the unbalanced input jacks.

The balanced input jacks are located on a separate, rear-panel plug-in module (PSA-2 Mod) which also contains several other professional features.

A Variable Gain stage, next in line on the Balanced Input Module, adds an adjustable voltage gain (0-10) ahead of the main amplifier.

Connected to this stage are high- and low-pass filters, factory set at 50 Hz and 15 kHz respectively.

The resultant of the above-mentioned stage, along with a switch-controlled wide-bandwidth Test Tone Generator signal, is fed to the Compressor-Limiter circuitry. At its output point, an unbalanced signal may enter if so desired via 1/4" phone jacks.

The input amplifier receives the signal next and sends any necessary error-correcting info to the Compressor Control circuitry as well as sending the main signal on to the Balanced Stage. Essentially, this feedback path (from the output of the input amp through the Compressor Control circuitry) adjusts the amount of compression needed at that particular instant to provide distortion-free output.

8.3 Specifications

Controls: Channel 1 and Channel 2 input gain adjust, also the AGC Threshold adjust.

Hum and Noise: -85 dBm equivalent input noise, 20 Hz-20 kHz, 600-ohm source, gain set at unity.

Frequency Response: Flat ±0.2 dB, 20 Hz to 20 kHz. See Figure 8.4.

High Pass and Low Pass Filters: 3-pole Butterworth 18 dB per octave; 50 Hz and 15 kHz standard frequencies. (Other roll-off points available; see Fig. 8.2 for details.) Slide switch activated.

Compressor Action: Range of compression restricted to 13 dB by design (wider range would aggravate feedback in live performance). Threshold adjustable from overload level of main amplifier to 12 dB lower. See Figure 8.6.

Balanced Input Voltage Gain: Variable 0-10.

Test Tone: Switch-activated wideband pulse, 50 Hz-20 kHz.

Common-Mode Rejection: 70 dB from 5 Hz-20 kHz; 55 dB at 20 kHz. See Figure 8.5.

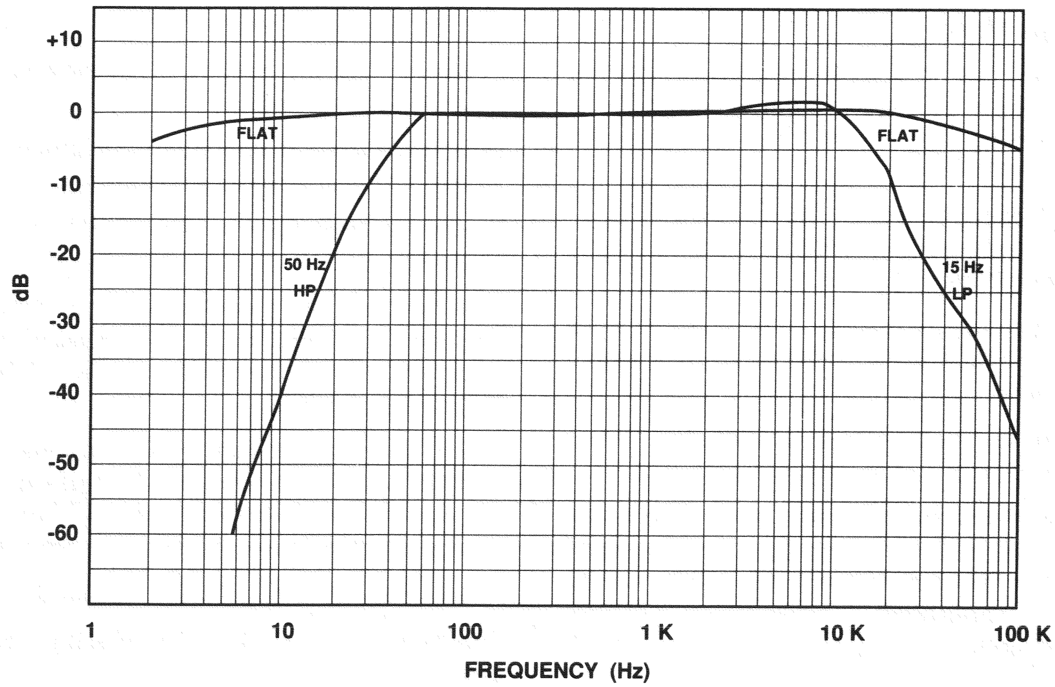


Fig. 8.4 Typical Frequency Response—Balanced Input Module

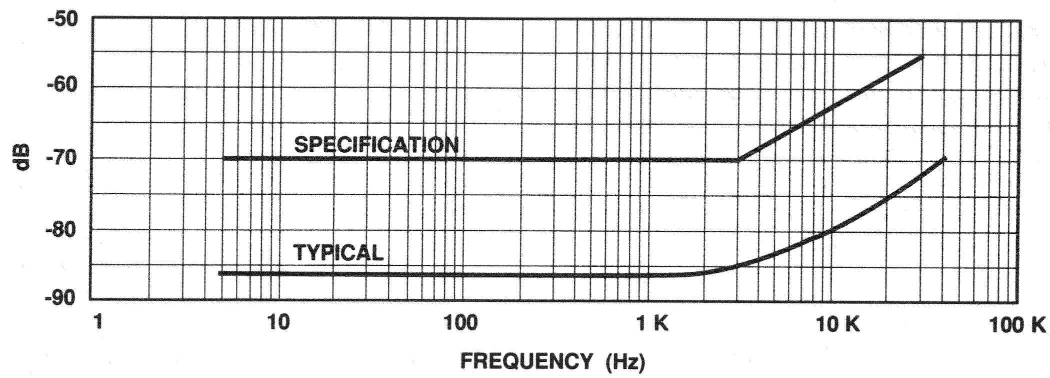


Fig.8.5 Typical CMR Through Balanced Input Module

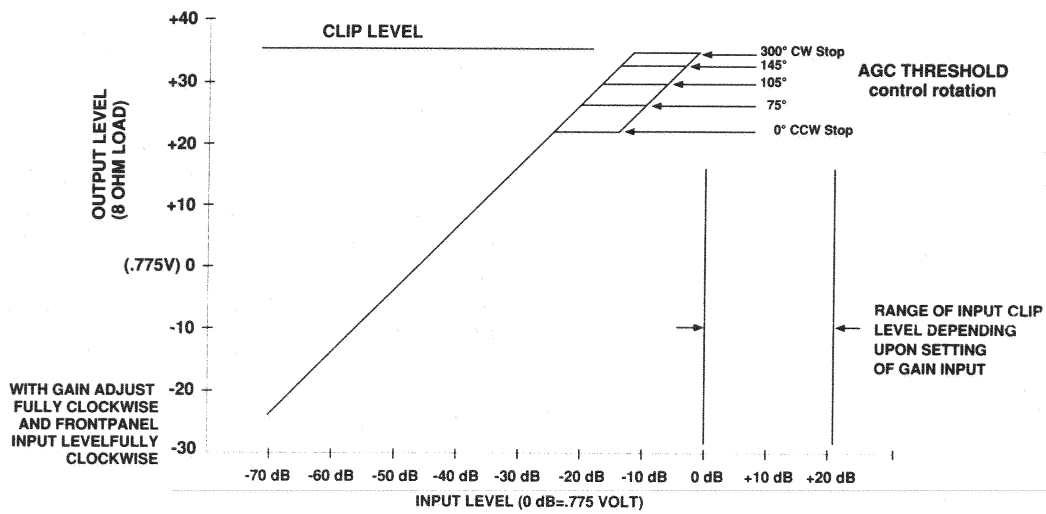
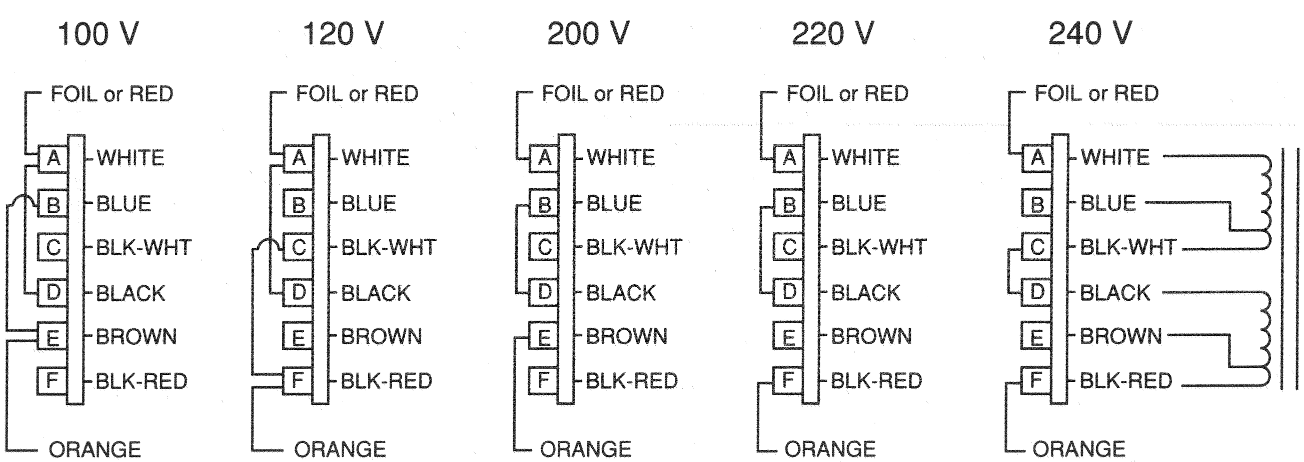


Fig. 8.6 Typical AGC Action

Voltage Conversion Instructions

1. **Disconnect power and remove bottom cover.**
2. **Select the desired operating voltage.**
3. **Identify all leads and follow the connect drawing shown below. All connectors are made with push-on terminals.**
4. **Make all necessary fuse changes (if needed).**

VOLTAGE CHANGE JUMPERS



NOTE:
Three sets of jumpers must be changed. One set on each large power transformer and one set on the relay board. When selecting 100 or 120 volts, F1 and F2 (refer to schematic diagram) should be 20 amps and F3 1/2 amp. For 200, 220 and 240 volts, both F1 and F2 should be 10 amps and F3 should be 1/4 amp.