

**BI-AMPLIFIER  
SYSTEM CONTROL**

**ADS C 2000**

**OWNER'S MANUAL**

To protect your investment, please read  
completely before installation.

**INTRODUCTION**

Congratulations! You have purchased the most advanced and sophisticated Bi-Amplifier System Control ever made.

The ADS Bi-Amplifier System Control combines the functions of a sophisticated two-way electronic crossover and a unique Bass Equalizer circuit. When combined with ADS Professional Monitor Series loudspeaker systems and high quality preamplifier and power amplifier electronics, the C-2000 provides an audio system of unmatched sonic performance and breathtaking dynamic range. The unique Crossover Program controls also allow optimum matching of the C-2000 to loudspeakers other than those built by ADS, providing unexcelled installation flexibility. The design of the C-2000 reflects the ADS commitment to the most modern engineering technology while maintaining the best qualities of "old-world" craftsmanship, skill and care in manufacturing. We are confident that you will enjoy your C-2000 for many years to come.

Because the ADS C-2000 Bi-Amplifier System Control provides a remarkable degree of flexibility and control, you may find many of its features and controls unfamiliar. In fact, the day-to-day use of the C-2000 in your system is less complicated than using more conventional stereo components. Realizing the maximum potential of the C-2000 in your system does require familiarity with its capabilities. Particular attention should be given to the initial installation and calibration, and we strongly urge you to read this manual thoroughly. Please save this manual for future reference.

Thank You, ADS, Analog and Digital Systems, Inc.

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THE C-2000 TO MOISTURE OR RAIN.**

**Packing Carton**

Although it may be inconvenient to store the shipping carton, we highly recommend that you save all packing material for future use. Moving or shipping this unit in anything other than its factory carton can result in costly damage which is not covered by the warranty.

**Owner's Record**

For your protection, please record the serial number, the date and the place of purchase in the spaces below. You will find the serial number of the C-2000 on the center of the rear panel of the chassis.

Serial Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Place of Purchase: \_\_\_\_\_

We urge you to store your sales receipt in a safe (and remembered) location for possible future reference; you may wish to attach it to this manual. Completing and mailing your Owner Registration Card will place your purchase into our records and will assure that this information can be recovered if the need arises.

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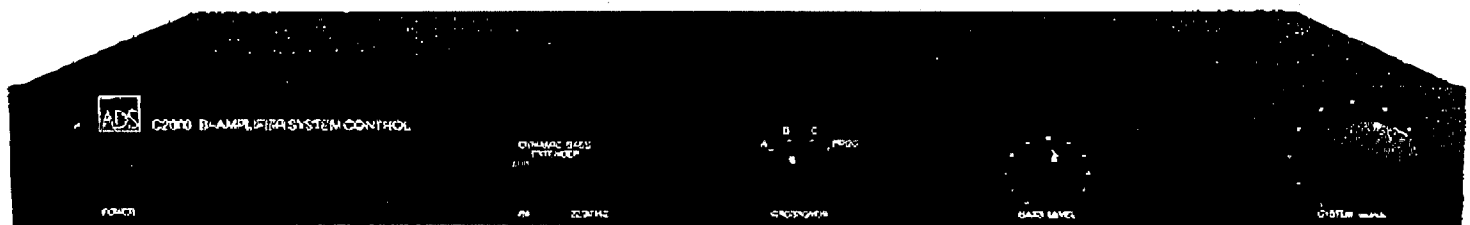
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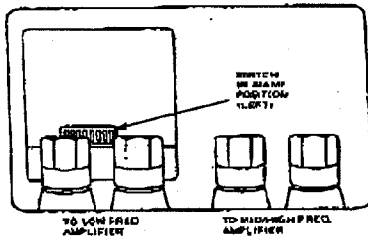


## QUICK CONNECTION GUIDE

We know you are eager to use your new ADS C-2000 Bi-Amplifier System Control. This section will help you make the correct connections to get your ADS Bi-Amplifier System "up" and running safely. Use this section for connecting the C-2000 to a system employing ADS L2030, L1530, or L1230 loudspeakers, a separate preamplifier and two identical separate stereo power amplifiers.

- For C-2000 use with integrated amplifiers or receivers see Connections, page 4, of this manual.
- For C-2000 use with other than ADS loudspeakers see Crossover Program switches, page 9, of this manual.

**IMPORTANT!** Please make all system interconnections and preset all controls as indicated below before turning on the power to any of the system components. Prepare your ADS Professional Monitor Series loudspeakers (L2030, L1530, L1230) for bi-amplified operation as directed in your speaker's Owner's Manual, and as shown below:



The C-2000 Bi-Amplifier System Control draws very little power from the AC main supply and may be safely plugged into any convenient AC outlet. The accessory outlet of the C-2000 must not be used to supply power to power amplifiers or other heavy power consuming components. Please consult Connections, page 4, for further information and cautions.

### Initial Control Settings

1. All power switches off.
2. Preamplifier volume (or main level) control fully counterclockwise (fully down).
3. C-2000 System Level Control fully counterclockwise (fully down).
4. C-2000 Bass Level Control at detented mid-rotation position.
5. C-2000 Crossover Control set to A for use with L2030; set to B for use with L1530; set to C for use with L1230. Do not set to Program position unless you have consulted the Crossover Program Switches section, page 9, of this manual.
6. C-2000 Dynamic Bass Extender Switch out (off); 22/37Hz Bass Response Switch out (22Hz).
7. Power amplifier level controls (if any) fully counterclockwise (fully down); set power amplifier input sensitivity switch (if any) to the most sensitive position.

### Connection to Other Components

ADS recommends placing the power amplifiers as close as possible to the loudspeakers, to keep speaker wire runs as short as possible. Such placement keeps power loss in the wires low and maintains the highest possible damping factor. Use 16 gauge or heavier wire if possible.

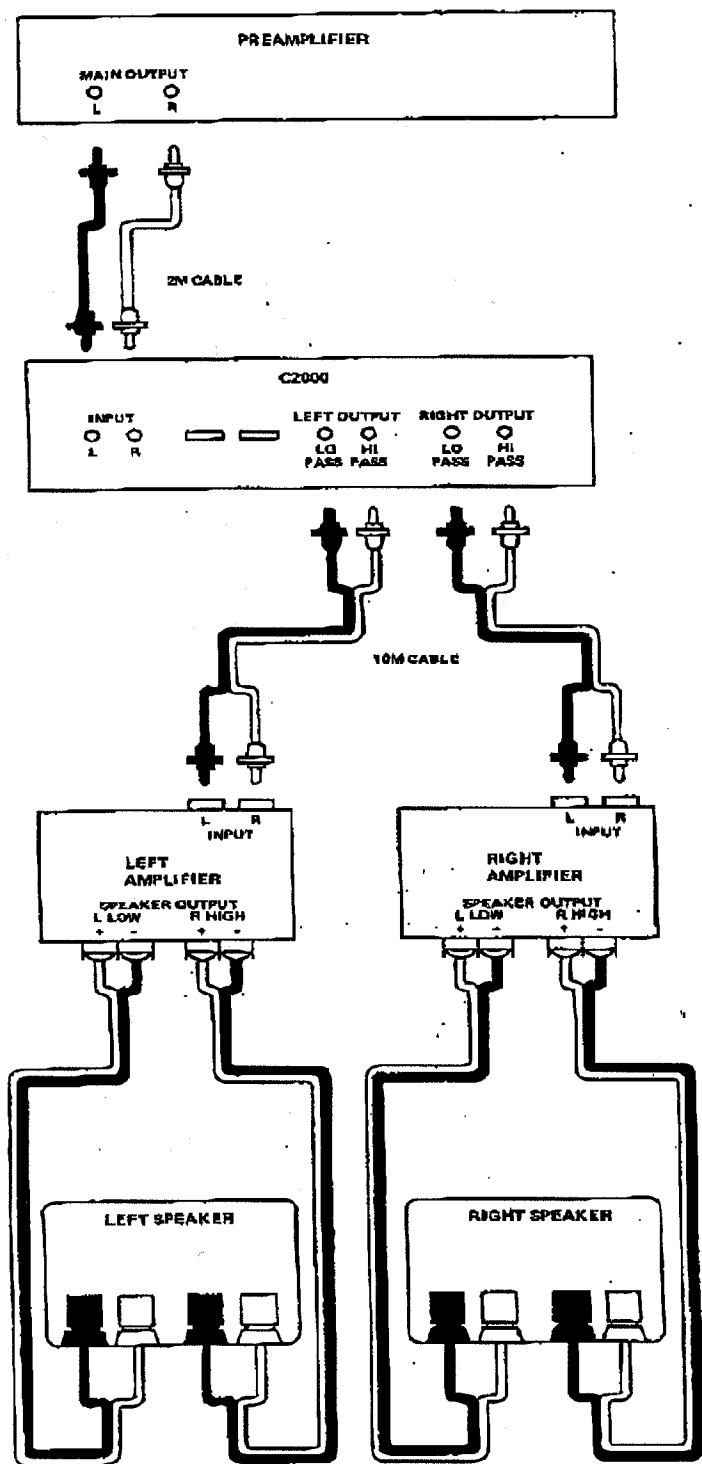
Connect your preamplifier's right and left main outputs to the C-2000 inputs using the supplied 2 meter shielded audio cables.

Connect the C-2000 left channel lo-pass and high-pass output jacks to the left channel power amplifier left and right input jacks respectively. Use one of the supplied 10 meter shielded audio cables. Connect the left channel power amplifier left speaker output to the left channel speaker binding post terminals marked "to low frequency amplifier" located in the Amplifier Interface Panel on the back of the speaker. Connect the left channel power amplifier right speaker output to the left channel speaker binding post terminals marked "to mid/high frequency amplifier" located in the Amplifier Interface Panel. Please refer to the accompanying connection diagram for a graphic view of these connections.

Be sure in all amplifier-to-speaker wire connections that the amplifier's "+", "pos" or "4 Ohm" speaker output terminals are connected to the positive (red) terminals on the speakers. Similarly, connect the amplifiers "-", "neg" or "common" speaker output terminals to the negative (black) terminals on the speakers. **IMPORTANT!** To avoid having low frequency signals enter, and possibly damage the high frequency drivers, please be absolutely certain that the power amplifier channel which is connected to the "to mid/high frequency amplifier" terminals of each speaker is in turn connected to the hi-pass output jacks of the C-2000.

Connect the C-2000 right channel lo-pass and hi-pass output jacks to the right channel power amplifier left and right input jacks, respectively. Use the other supplied 10 meter shielded audio cable. Connect the right channel power amplifier left speaker output to the right channel speaker binding post terminals marked "to low frequency amplifier" located in the Amplifier Interface Panel on the back of the speaker. Connect the right channel power amplifier right speaker output to the right channel speaker binding post terminals marked "to mid/high frequency amplifier" located in the Amplifier Interface Panel.





Now turn on the system power beginning with the preamplifier and ending with the power amplifiers. Advance the power amplifier level controls (if any) clockwise; if all connections are secure, and no buzzing or popping sounds are heard, advance these controls fully clockwise. Similarly advance the C-2000 system level control fully clockwise while listening for any signs of poor connections. NOTE: Unless your power amplifiers have unusually high input sensitivity this control will normally be left fully clockwise. Please see System Level Control, page 9, for further information.

Apply a music source to the preamplifier and gradually advance the volume (main level) control of the preamplifier until music can be heard at a low level. At this time, place your ears near each speaker in turn; verify that the bass drivers are actually reproducing bass frequencies and that the mid and high frequency drivers are reproducing high frequencies. (If this is not happening, immediately reduce the volume, turn all components off and correct cable connections.) If the drivers are reproducing the correct frequencies, rotate the preamplifier balance control alternately full right and full left, and verify that only the right and then the left speaker reproduces sound. (Once again, if this does not occur, turn the system off and check all cable connections.)

Once proper cable and wiring connections have been verified you may play music as you normally do. Depress the C-2000 Dynamic Bass Extender switch; normally you will leave this switch in — please refer to Dynamic Bass Extender Switch, page 9, for further discussion of this control and the 22/37Hz Bass Response Selector switch.

The connection and operational test of your system using the ADS C-2000 Bi-Amplifier System Control is complete, and you are ready to enjoy music with a freedom from distortion and with a dynamic range that you have never experienced before.

Please take the time to read this Owner's Manual thoroughly as it will provide you with interesting and valuable information about your C-2000.

## CONNECTIONS

### AC Power Connection

The AC line cord of the C-2000 Bi-Amplifier System Control may be plugged into one of the switched accessory outlets on your preamplifier, amplifier or receiver. By leaving the C-2000 power switch depressed, the C-2000 will turn on and off with the rest of your system. The AC power consumption of the C-2000 is extremely low, about 6 Watts, and will not, by itself, affect the total load on the master power switch of your system. You may power other components from the accessory outlet on the rear of the C-2000 so long as the load is 150 Watts or less.

### Connections Between the C-2000 and Other System Components

The C-2000 Bi-Amplifier System Control has been primarily designed to be used in a system comprised of a preamplifier, two identical separate power amplifiers, and a pair of ADS Professional Monitor Series loudspeakers. The connection of such a system has been described in the Quick Connection Guide section of this manual.

### Electronic Equipment Connections Using an Integrated Amplifier or Receiver and an Additional Stereo Power Amplifier

The integrated amplifier or receiver must have a set of preamplifier out/main amplifier in jacks for use with the C-2000.

The stereo power amplifier must have a set of input level controls so that the gain of this amplifier can be exactly matched to that of the main amplifier section of the integrated amplifier or receiver. It may occur that the additional stereo power amplifier will not have as much maximum voltage gain as the main amplifier section of your integrated amplifier or receiver. If this is the case you must either use a more sensitive power amplifier, or install an attenuator in the input section of the main amplifier of your integrated amplifier or receiver. An external attenuator "box" may be constructed and used for input level control for either a control-less power amplifier or for the main amplifier section of an integrated amplifier or receiver; please consult your ADS dealer. Additionally, the input-to-output phase relationship of each of the two amplifiers must be known. Some amplifiers are non-inverting and some are inverting. Either or both types may be used, but for correct connection you must know which types you have.

Please see Amplifier Gain and Phase Matching without Test Equipment, page 6 of this manual.

Now preset controls:

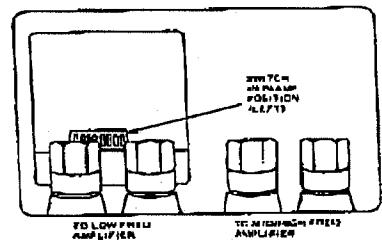
1. All power switches off.
2. Preamplifier volume (or main level) control fully counterclockwise (fully down).
3. C-2000 System Level Control fully counterclockwise (fully down).
4. C-2000 Bass Level Control at detented mid-rotation position.
5. C-2000 Crossover Control set to A for use with L2030; set to B for use with L1530; set to C for use with L1230. Do not set to program position unless you have consulted the Crossover Program Switches section, page 9, of this manual.
6. C-2000 Dynamic Bass Extender Switch out (off); 22/37Hz Bass Response Switch out (22Hz).
7. Power amplifier level controls (if any) fully counterclockwise (fully down); set amplifier input sensitivity switch (if any) to the most sensitive position.

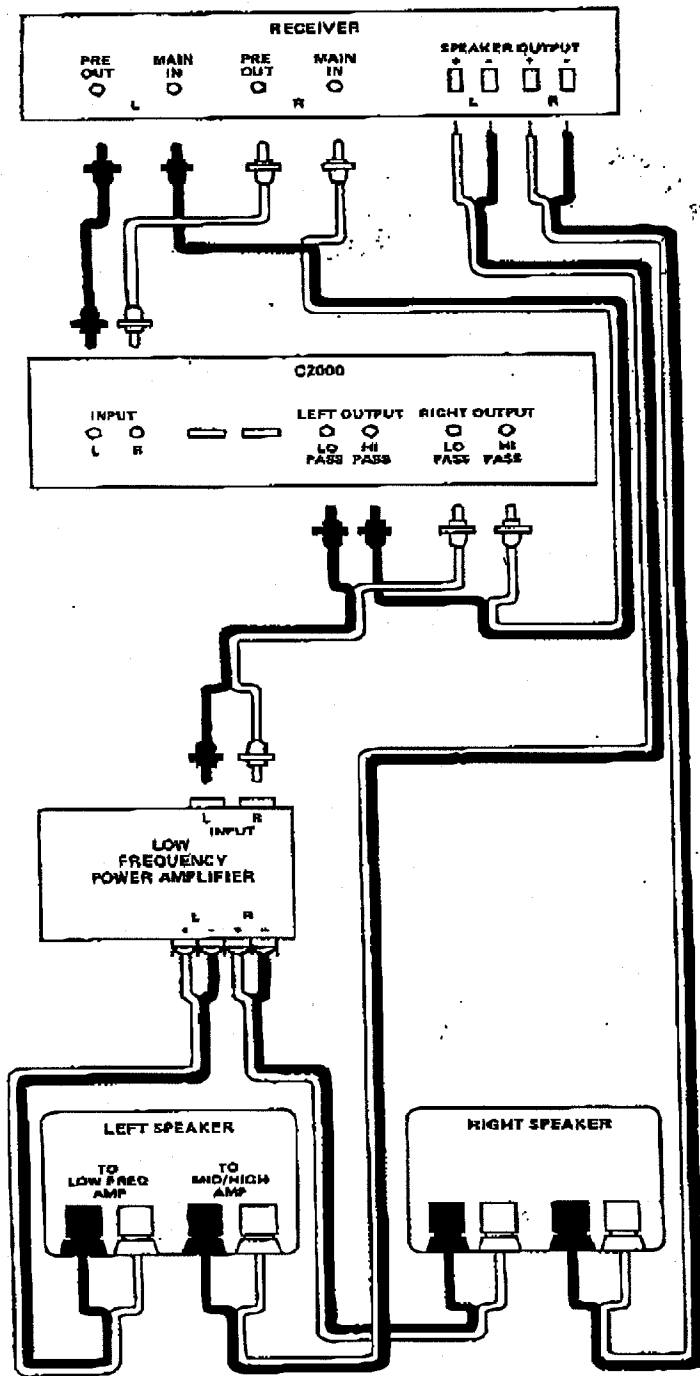
The C-2000 Bi-Amplifier System Control is supplied with one 2 meter and two 10 meter stereo shielded cables. Use the 2 meter cable to connect the integrated amplifier or receiver preamplifier output jacks to the C-2000 input jacks. Be sure to connect right channels to right channels, and left channels to left channels throughout the system. Some manufacturers use jumper wires or cables to connect the preamplifier output jacks to the main amplifier input jacks. Others use a coupler switch, often with a locking device.

Unplug the jumpers, or set the coupler switch to "separate". Connect the lo-pass right and left output jacks to the separate power amplifier inputs jacks and the hi-pass right and left output jacks to the main amplifier input jacks on the integrated amplifier or receiver. Use the 10 meter cables for these connections. You may use standard shielded audio cables for these connections if you do not need the long cables supplied. We suggest using the separate power amplifier as the low-frequency amplifier as it will usually be the more powerful of your amplifiers, and large low frequency signals will not affect the preamplifier small signal power supplies and circuitry.

## SPEAKER CONNECTIONS

Prepare your ADS Professional Monitor Series loudspeaker for bi-amplifier operation as discussed in the loudspeaker Owner's Manual and as shown below:





For bi-amplifier operation with speakers other than ADS consult the speaker's Owner's Manual or manufacturer. Also see Crossover Program Switches, page 9, of this manual.

If both the main amplifier of the integrated amplifier or receiver and the separate power amplifier are inverting or both are non-inverting, connect the left and right speaker output terminals of the separate

amplifier to the "low frequency amplifier" connections of the left and right speakers. Connect the "+" or "pos" or "4 Ohm" amplifier speaker output terminal to the red binding post terminal of the speaker and connect the "-" "neg" or "common" amplifier speaker output terminal to the black binding post terminal of the speaker.

Connect the left and right speaker output terminals of the integrated amplifier or receiver to the "to Mid/High Frequency Amplifier" connections of the left and right speakers. Use the connection polarity as described above for the low-frequency connections. Please refer to the accompanying connection diagram for a graphic view of these connections.

If one of the amplifiers is of opposite output phase to the other, reverse the polarity of the wire connections of each channel at the speaker output terminals of the low frequency amplifier. This reversal will restore the correct acoustic phase between the low frequency and high frequency sections of the speakers.

Now turn on system power beginning with the pre-amplifier and ending with the power amplifiers. Advance the power amplifier level controls (if any) clockwise; if all connections are secure, and no buzzing or popping sounds are heard, advance these controls fully clockwise. Similarly advance the C-2000 System Level control fully clockwise while listening for any signs of poor connections. NOTE: Unless your power amplifiers have unusually high input sensitivity this control will normally be left fully clockwise. Please see System Level Control, page 9, for further information.

Apply a music source to the preamplifier and gradually advance the volume (main level) control of the preamplifier until music can be heard at a low level. At this time place your ears near each speaker in turn; verify that the bass drivers are actually reproducing bass frequencies and that the mid and high frequency drivers are reproducing high frequencies. (If this is not happening, immediately reduce the volume, turn all components off and check all cable connections.) When the connections have been verified, rotate the preamplifier balance control alternately full right and full left, and verify that only the right and then the left speaker reproduces sound. (Once again, if this does not occur, turn the system off and check all cable connections.)

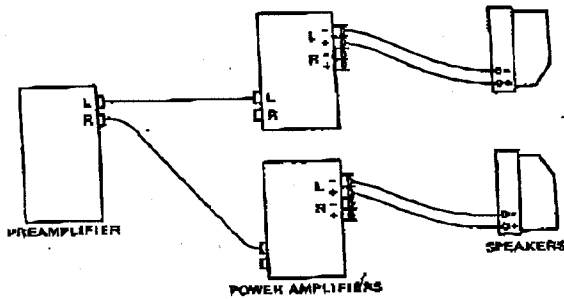
Once proper cable and wiring connections have been verified you may play music as you normally do. Depress the C-2000 Dynamic Bass Extender Switch; normally you will leave this switch in— please refer to Dynamic Bass Extender Switch, page 9, for further discussion of this control and the 22/37Hz Bass Response Selector Switch.

The connection and operational test of your system using the ADS C-2000 Bi-Amplifier System Control is complete, and you are ready to enjoy music with a freedom from distortion and with a dynamic range that you have never experienced before.

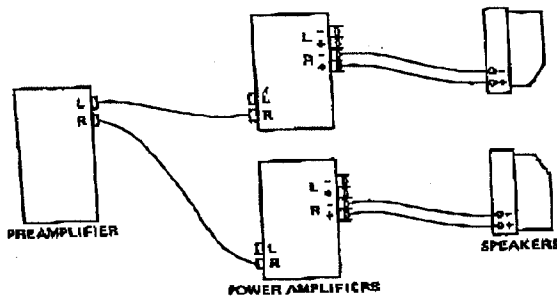
### Amplifier Gain and Phase Matching without Test Equipment

ADS does not recommend the following procedure unless you have no access to instrumentation or to technical help. This procedure will produce acceptable results if done with care.

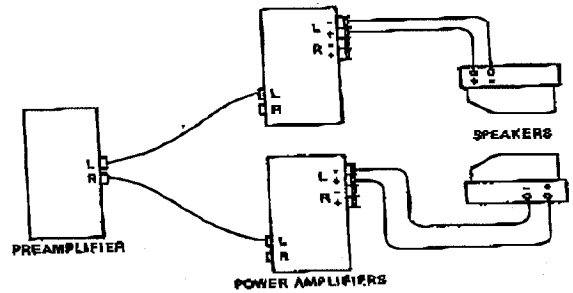
**Gain Matching:** Connect the left channel of each of the power amplifiers you intend to use to each of your speakers. Set up the speakers as full range units. Connect the left channel preamplifier output to the left channel input of one of your power amplifiers and the right channel preamplifier output to the left channel input of the other power amplifier. Set the preamplifier to its monophonic mode and set the balance control to mid-rotation. (Any preamplifier output imbalance will be passed on through the system; if possible, connect the two left channel power amplifier inputs to the same output jack on the preamplifier via a "Y" adapter.) Place the speakers a few feet apart in the middle of your room facing you, and adjust the power amplifier input level controls for maximum (full clockwise). Play music or FM inter-station noise through the system, and adjust the power amplifier input control of the amplifier connected to the loudest speaker down until the two speakers sound precisely equally loud.



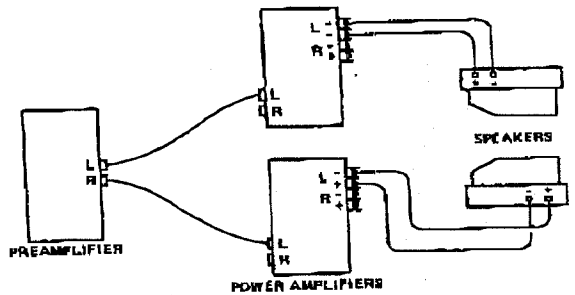
Now repeat this process using the right channels of the two power amplifiers. Carefully mark all of the level control settings. The amplifiers are now gain matched.



**Phase Matching:** Set your two speakers about one foot apart, facing each other, and connect the speakers, one of the channels of each power amplifier, and the preamplifier as in Gain Matching above. Be certain that the polarity of the speaker wires is the same to both speakers. Set your Bass Control up, and your Treble Control down; adjust the Volume Control for a comfortable listening level. Note the level of the deep bass output.



Now reverse the polarity of the speaker wires at one of the speakers. If the bass output is noticeably reduced, the amplifiers have the same output phase. If the bass output becomes noticeably stronger, the amplifiers have opposite output phase. Make note of the phase relation (in phase or out of phase) for future reference.



If you have any doubts about the gain compatibility or the phase relations of the power amplifiers you intend to use, consult your ADS dealer or contact the manufacturers of your components.

Please be sure that all power to the system is off, and that all level controls are fully counterclockwise or fully down before making connections.

## WARNINGS

- Leave the C-2000's power switch off (out) until all connections are complete.
- A delay circuit in the C-2000 (as in many other audio components) mutes all output for several seconds after the power is switched on in order to protect the loudspeakers from power transients. Avoid advancing volume or level controls before the muting circuit releases. This will prevent a startling and possibly damaging burst of sound when the circuit releases.
- Never connect the amplifier which receives its signal from the C-2000 low-pass output to the "mid/high frequency amplifier" binding post terminals of the ADS Professional Monitor Series loudspeakers, or to the "tweeter" or "high frequency" connections of other loudspeaker systems. Severe and expensive driver damage may result which is not covered by the manufacturer's warranty.
- Never connect equipment with a total AC power consumption of greater than 150 Watts to the C-2000 auxiliary AC outlet.
- Never install the C-2000 close to heat sources (such as radiators, or very hot amplifiers), or in a place subject to any moisture or excessive dust.
- Never clean the exterior surfaces of the C-2000 with detergents or solvents. See the Maintenance section page 12, of this manual for cleaning instructions.
- Never remove or attempt to remove the metal cabinet cover of the C-2000 for any reason, due to the potential lethal shock hazard. If you experience difficulty see the In Case of Difficulty section, page 10, of this manual.

## SYSTEM OPERATION

In order to understand the advantages of bi-amplification, one must first consider the manner in which a conventional full-range system operates. In a conventional system, the entire spectrum of audio frequencies is amplified by a single stereo amplifier. A passive crossover network in the speaker, consisting of inductors, capacitors and resistors, separates the amplified signal into low, middle and high frequency bands to drive the woofer, midrange and tweeter respectively.

In a bi-amplified system, the signal from the pre-amplifier first goes to an electronic crossover containing active filters which split the signal into low frequency and high frequency portions. These are fed to separate power amplifiers which handle the lows and mid/high bands independently. These amplifiers then drive the woofers and midrange/tweeter sections directly. This procedure yields several benefits:

- In a conventional single-amplifier operation, the passive crossover network in the speaker absorbs a fraction of the incoming amplifier power. In bi-amplification, coupling the drivers directly to their own amplifiers brings about an immediate improvement in efficiency. A bi-amplified system employing a 60-Watt woofer amplifier and a 60-Watt midrange/tweeter amplifier can thus equal or exceed the performance of a single 150-Watt amplifier driving a full-range speaker through its passive network.
- The woofer in a bi-amplified system is demonstrably "tighter" and has superior deep bass response than its conventional counterpart. This is because the woofer in a full-range system receives the amplified signal through a large series inductor. ADS' passive crossover networks feature the lowest DC-resistance inductors found in production loudspeakers today; residual resistance is an impressively low 0.2 Ohm, which, nevertheless, is sufficient to reduce the highest of amplifier damping factors to a value of 25 measured at the woofer. (This figure, incidentally, is far worse with most loudspeakers in production today.) In bi-amplification the woofer series inductor is bypassed. Direct coupling of the amplifier to the woofer results in a far greater damping factor and superior control of the driver's transient behavior. As an allied benefit, the "Q" of the woofer is reduced so that the system rolls off less steeply below its resonant frequency. Deep bass output is thus stronger with bi-amplification.
- A bi-amplified system has an important advantage in the reduction of audible distortion at high loudness levels. This is attributable in part to the elimination of the intermodulation distortion which occurs in amplifiers when low and high frequency signals are combined. But the most readily audible reduction in distortion obtained through bi-amplification has to do with the "clipping" behavior of amplifiers.

Although the power ratings of amplifiers are obtained with sine-wave test tones, music, unlike sine-waves, has a high crest factor — high-frequency overtones ride on top of low-frequency waveforms and increase the peak voltage relative to the average signal level. On a dynamic basis, moreover, music contains short-term peaks, typically lasting only a few thousandths of a second, demanding a power level five to ten times higher than the average level. Piano chords, plucked guitar notes, drum beats and cymbal crashes all have attack transients which demand tremendous power levels for brief instants. Thus, if you are playing music loudly, and your average signal level corresponds to one-third of the amplifier's power rating, it is easy to overdrive the amplifier past its maximum capacity. In this condition, the amplifier will "clip off" the signal peaks.

This clipping has two effects. First, the loss of the signal peaks tends to diminish the subjective dynamic impact of the musical sound as well as its "openness" and clarity of detail. Second, and usually more important, the peak clipping adds momentary bursts of false high-frequency energy (severe harmonic distortion) to the signal coming out of the amplifier. In full-range operation, the loudspeaker receiving this clipped signal cannot distinguish the distortion from the genuine high-frequency content of the musical program; all high-frequency portions of the signal, both normal and spurious, go through the passive crossover and are reproduced. The result is gritty, fatiguing, harsh sound, a clear indication that the system is being overdriven.

In a bi-amplified system the situation is different. First, since the low and high frequency portions of the signal are separated prior to amplification, high frequencies no longer ride atop low-frequency waveforms. The crest factor is thus significantly reduced. The peak signal levels are lower, and clipping is less likely to occur. Even when clipping does occur, it is much less audible in a bi-amplified system. In most musical programs the largest power demands are at the low and middle frequencies. Clipping with such music, therefore, is more likely to occur in the woofer amplifier. Spurious harmonics which result from such clipping, however, are fed only to the woofer, which simply absorbs the high-frequency energy without reproducing it. Meanwhile, the genuine high-frequency portion of the musical signal is amplified cleanly by the mid-range/tweeter amplifier and reproduced by the mid/high-frequency drivers. A bi-amplified speaker system can thus have clarity, detail and impact at high sound levels even when medium-powered amplifiers are used.

Bi-amplifying ADS Professional Monitor Series speakers with the ADS C-2000 Bi-Amplifier System Control yields even more advantages. Although the ADS Professional Monitor Series speakers can technically be bi-amplified with virtually any high-quality electronic crossover, no "all-purpose" unit can possibly match the drivers as well and as conveniently as the C-2000.

The C-2000 features a special crossover selector position with amplitude, phase and damping characteristics custom-tailored to ADS Professional Monitor's bass and midrange drivers. Equally important is the C-2000's unique opto-electronic Dynamic Bass Extender Circuit, which extends the deep bass response while protecting the woofers from excessive excursion on large low-frequency transients.

The ADS C-2000 Bi-Amplifier System Control is easily the most sophisticated crossover system available today. Its control flexibility adds new dimensions to any stereo system — it enables you to tailor various aspects of bass performance to the needs of differing program sources and preferences to an

unprecedented degree. If you wish, you may set the controls on the C-2000 Bi-Amplifier System Control once during initial calibration and "forget" that the unit exists (with the possible exception of its System Level Control), using the rest of your system as you did before the addition of the C-2000. More likely, however, you will find the variety of controls on the C-2000 a welcome means to adjust system performance as the program material, listening occasion or mood dictates. Familiarity with the C-2000 Bi-Amplifier System Control, in any event, is the key to eliciting the maximum performance from your audio system.

The following sections will describe the functions and characteristics of the controls and switches on the C-2000 in detail. In each case, follow the recommendations for initial settings. After you have gained some familiarity with the system, you can return to the various controls to make adjustments as you see fit.

Most of the finer adjustments will be made while listening to music through the system. We recommend that you prepare several "reference" program sources of high quality, with which you are very familiar, for these adjustments. (Unless you own studio-quality master tapes, it is best to use high-quality phonograph records.) You should prepare a variety of material which represents a cross-section of your music library. Cleanly recorded material of wide frequency and dynamic range, including symphonic, popular vocal (male, female and ensemble) and instrumental (particularly solo piano) music, will facilitate system calibration.

#### **Power Switch**

This push switch quite obviously turns the AC power on or off to the C-2000. You may leave this control in (on) permanently by connecting the AC cord of the C-2000 to a switched accessory outlet, and controlling system power via the power switch of your preamplifier, integrated amplifier or receiver.

#### **Crossover Switch**

This rotary switch (with positions marked A, B, C, and Prog.) controls the crossover frequencies and filter form factors for precisely matching the characteristics of the ADS Professional Monitor Series loudspeakers. Use position A with the ADS L2030, position B with the ADS L1530, and position C with the ADS L1230. The fourth position, Prog., activates the Crossover Program Switches located on the C-2000 rear panel.

The Program position of the Crossover Switch and the Program Control Switches are provided for those who wish to use speakers other than ADS Professional Monitor Series loudspeakers in their system. Please see the Crossover Program Switches section, page 9, of this manual for information on the function and setting of these switches.

### System Level Control

This rotary level control provides a means of optimizing the preamplifier volume (main level) control range, particularly if you are using power amplifiers which have high input sensitivity. Turning this control from full clockwise rotation to mid-rotation will lower the C-2000 throughput gain from 0dB (unity) to approximately -24dB, providing a better match with some amplifiers. In many systems it will be convenient to set this control to its full clockwise rotation, and leave it there.

### Bass Level Control

This rotary level control adjusts the level of the low-pass output of the C-2000 approximately  $\pm 3$ dB referred to the high-pass output level. It is because of the relatively small but very significant range of this control that the power amplifier voltage gains must be very closely matched. ADS recommends amplifier gain matching to better than 0.5dB to preserve the useful  $\pm 3$ dB range of the Bass Level Control. You may use this control to adjust the tonal balance of your system to compensate for variations in program source material, differing room acoustics or subjective qualities of preference.

### Dynamic Bass Extender Switch

This push switch activates a remarkable equalization network which actually extends the already deep bass response of the ADS Professional Monitor Series speakers. This circuit counteracts the natural bass rolloff of the speaker by boosting the input signal by an equal and opposite amount.

The action of the Dynamic Bass Extender, however, goes considerably beyond that of a simple linear boosting circuit. First, the boost stops at 20Hz, below which a subsonic filter sharply attenuates the input signal to the power amplifiers. This prevents non-musical and potentially harmful subsonic information, such as turntable rumble and record warps, from reaching the bass drivers.

Second, the amount of boost at any given time is governed by a sophisticated opto-electronic control circuit which constantly monitors signal level. Although the control circuit has little effect on musical transients, it will react to bass signals of unusually large magnitude by progressively deactivating the boost. This ensures that the loudspeaker's bass drivers will remain within their range of linear, distortion-free excursion.

It is important to understand that the opto-electronic control circuit is not a "limiter" or "compressor" in the usual sense of these terms. Its maximum effect (when confronted with extremely large bass signals) is to remove all boost; i.e., under full protection the response of the C-2000 is "flat" with subsonic filtering.

This being the case, it makes good sense to leave the Dynamic Bass Extender in the system circuit at all times. This is accomplished by setting the Dynamic Bass Extender Switch to its depressed position. Under large-signal conditions, when the opto-electronic control circuit is activated, the red indicator located directly above the switch will glow brightly to show that bass extension has been diminished.

### Bass Extension Response Selector Switch

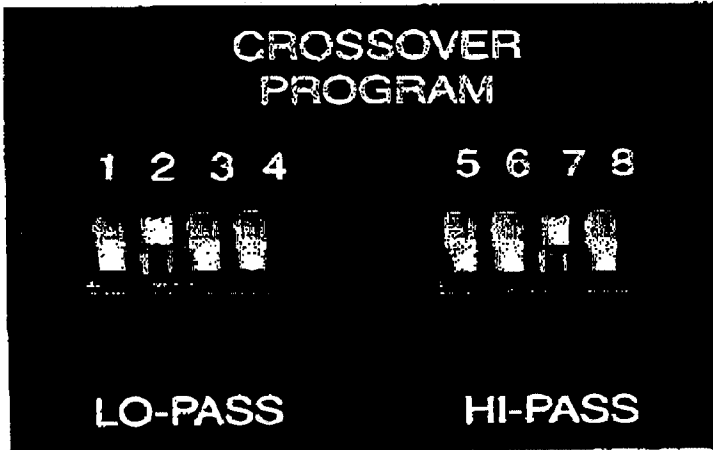
The C-2000 Dynamic Bass Extender has been designed with a choice of two different characteristics in order to ensure maximum effectiveness with a wide variety of program material. The Bass Extension Response Selector Switch should thus be set according to the type of program source being played.

With classical music, which often has bass fundamentals down to the lowest octaves, the "out" position (22Hz) of the selector switch is usually preferable. This position provides the "flattest" response and the greatest bass extension. The "in" position (37Hz) of the selector switch shifts the frequency range of the boost upward so that the bass system is more effective with most types of popular music, including disco and rock. With such music there is typically little information below 40Hz, making bass extension below this frequency purely academic. For initial system calibration, set the Response Selector Switch to 22Hz ("out"). After you are more familiar with the system's capabilities, should you decide this position does little for your musical tastes, you can set the switch to 37Hz ("in").

### CROSSOVER PROGRAM SWITCHES

Although the C-2000 Bi-Amplifier System Control was designed primarily to meet the precise crossover requirements of the ADS Professional Monitor Series speakers, ADS recognizes that the unique capabilities of the C-2000 will be attractive to owners of other loudspeakers designed for bi-amplification. Most two way (woofer/tweeter) loudspeakers will require crossover frequencies higher than those available from the C-2000. Please consult your loudspeaker Owner's Manual for specific recommendations.

When the Crossover Switch on the C-2000 front panel is placed in the Prog. position, a unique set of eight miniature Crossover Program Switches on the C-2000 rear panel are enabled. These switches control the crossover frequency and the filter form factor ("Q") for the low-pass and high-pass active filter circuits.

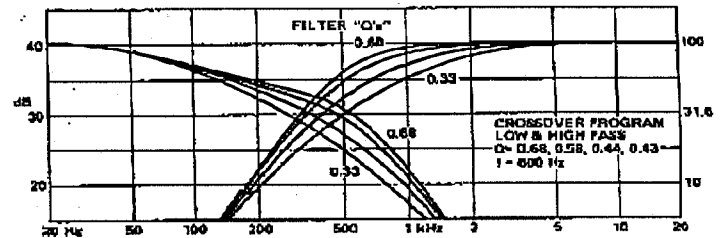
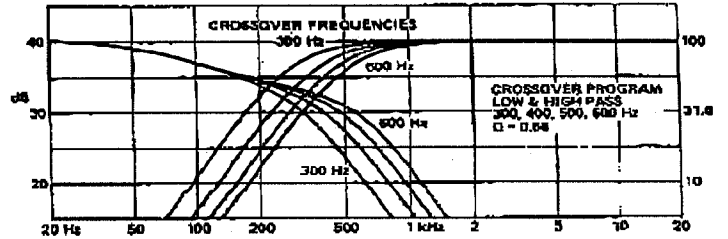


Switches 1 and 2 work in concert to provide four lo-pass crossover frequencies, while switches 3 and 4 combine to provide four lo-pass filter "Q's". Switches 5 and 6 combine to provide four high-pass crossover frequencies, while switches 7 and 8 combine to provide four high-pass filter "Q's". The following tables show the switch settings and their resultant frequency and "Q" values:

Crossover Frequency	SWITCH NUMBER			
	LO-PASS	1, 2	1, 2	1, 2
HI-PASS	5, 6	5, 6	5, 6	5, 6
UP		●	●	●●
DOWN	●●	●	●	
CROSSOVER F, Hz	300	400	500	600

Filter Q	SWITCH NUMBER			
	LO-PASS	3, 4	3, 4	3, 4
HI-PASS	7, 8	7, 8	7, 8	7, 8
UP		●	●	●●
DOWN	●●	●	●	
FILTER Q	0.68	0.58	0.44	0.33

The indicated crossover frequencies occur at the -3dB frequency point referred to the filter bandpass level, and at a filter "Q" of 0.68. Although reducing the filter "Q" has the effect of technically raising (or lowering) the crossover -3dB frequency, a glance at the amplitude-vs-frequency response curves will show that the practical effect of reducing filter "Q" is to soften the corner of the filter's response and make its rolloff more gradual.



All of the filter configurations result in maximum rolloff slopes of -12dB per octave. The above information should enable effective consultation with the manufacturer of your loudspeaker as to the most appropriate settings to use with his product. While the trial and error approach to finding the correct control settings is entertaining, it is not likely to produce either excellent or precise results.

## IN CASE OF DIFFICULTY

### Problem Diagnosis

During the initial setup or at some point in the future, you may encounter difficulties with your system. You may hear poor sound, noise or no sound at all. The following guide discusses the most common problems and some recommended remedies. Remember always to turn the system power off when changing connections and to make all tests at low sound levels.

Should you encounter difficulties beyond the scope of this guide, please consult your ADS dealer or ADS Customer Service.

#### 1. Symptom: No power

- Check all AC power connections, switches and cords.
- Try different outlets or use a tester (a table lamp will do) to make sure that the outlet supplying your system is "live."

## **2. Symptom: Power, but no sound from either speaker**

- Check preamplifier control and switch settings, especially tape monitor and source selector switches.
- Check Power Amplifier Speaker Selector or on/off switches, and input level controls.
- Check program source output level controls and function switches.
- Check all cables and wires.
- Check System Level Control on C-2000.

If no obvious faults are found, turn off all power and connect the preamplifier output cables to the input jacks of the low-frequency power amplifier. Turn power on and check for output sound. If you now have sound, you may be experiencing trouble with the C-2000. Please consult your ADS Dealer for assistance. If you still have no sound, the problem lies with another system component.

## **3. Symptom: No sound in one channel**

- Total driver failure in a loudspeaker system is uncommon, so a dead channel is normally an electronic or cable problem. Faulty audio cables are all too common so check preamplifier-to-C-2000 and C-2000-to-power amplifier cables carefully.
- Check preamplifier control settings, particularly the balance control and tape monitor switches. Wiggle controls and switches to check for intermittent operation.
- Try other program sources to eliminate this area.
- Reverse the input cable connections to the C-2000. If the dead channel does not reverse in the speakers, you may be experiencing trouble with the C-2000. Please consult your ADS Dealer.

## **4. Symptom: No low frequency output in either channel**

- Check the low frequency power amplifier speaker switch and input level controls, if any.
- Check the loudspeaker bass driver fuses, if any.
- Test for speaker operation by disconnecting the low frequency speaker leads from the amplifier, and connecting each channel's pair in turn across a 1.5V flashlight battery.

If you do not hear a popping or thumping sound the speakers are faulty. Please consult your dealer. If you do hear sound, exchange the two stereo power amplifiers and note whether there is now high frequency output. If there is not, the amplifier is faulty. If the amplifier is working correctly, you may have trouble with the C-2000. Please consult your ADS Dealer.

## **5. Symptom: No high frequency output in either channel**

- Follow the same general procedure as in 4 above, checking the high frequency speakers and fuses, the high frequency amplifier and the C-2000.

## **6. Symptom: No low frequency output in one channel**

- Follow the same general procedure as in 4 above; however, instead of switching amplifiers, reverse the left and right channel input cables to the low frequency amplifier. If the dead channel does not change speakers the amplifier is faulty; if the dead channel does change speakers the fault is in the cables or the C-2000. Reverse the left and right channel low frequency output cables at the C-2000. If the dead channel does not change speakers the cable is faulty; if the dead channel does change speakers the fault is in the C-2000. Please consult your ADS Dealer.

## **7. Symptom: No high frequency output in one channel**

- Follow the same general procedure as in 4 and 6 above, tracing the high frequency signal path.

## **8. Symptom: Poor sound, distortion, or channel imbalance**

- Check all cables and wire connections carefully, looking especially for frayed or loose speaker wire connections. Work from the speakers back through the system by reversing channel connections, swapping amplifiers, or bypassing suspect components. If, when reversing channel connections the symptom changes channels, the fault will be earlier in the signal path. If, when connections are reversed the symptom does not change channels, the fault is later in the signal path.

## **9. Symptom: Continuous hum or buzz**

- These sounds are usually the result of bad audio cables or connections, or an electronic failure. Replace or bypass suspected components or cables.
- Occasionally these sounds occur when components are placed in close physical proximity. Try separating the electronic components by a foot or so and note the affect on the unwanted hum or buzz. If your problem persists, consult your ADS Dealer.

## **SHIPPING DAMAGE**

When you unpack your C-2000 Bi-Amplifier System Control inspect it for physical damage and any loose or rattling parts. The C-2000 left the ADS factory in perfect condition. If your C-2000 was obtained directly from an ADS Dealer, return it to that dealer. If your C-2000 was shipped to you by a public carrier, report the damage immediately in writing to the carrier and request instructions for filing a claim.

## **OBTAINING SERVICE**

Although it is highly unlikely that you will ever have to return your C-2000 Bi-Amplifier System Control for repair, your ADS Dealer or ADS Customer Service will be happy to provide you with instructions for obtaining service. Please be prepared to furnish the unit's serial number, a complete description of the problem and a history of symptoms so that we can assist you efficiently.

## MAINTENANCE

Your ADS C-2000 Bi-Amplifier System Control is essentially maintenance-free. An occasional dusting with a slightly damp, soft cloth will help maintain its attractive appearance. Do not use paper towels as they may scratch the finish. More stubborn dirt can be cleaned with a mild soap solution applied with a soft, damp cloth. Never use detergents or solvents, and never get the C-2000 cabinet or chassis wet. Once the C-2000 is adjusted for your system you probably will not change the control settings often. It is good practice to periodically operate all of the controls and switches (with the power off) to keep the electrical contacts clean.

## SPECIFICATIONS

### Frequency Response

Dependent upon control settings; see curves in this manual, page 10.

### Crossover Frequencies

300 Hz, 400 Hz, 500 Hz, 600 Hz (High-pass and low-pass frequencies independently selectable)

### Crossover Slope

Nominally -12 dB/octave

### Filter Damping Factor ("Q")

0.68, 0.58, 0.44, 0.33 (High-pass and low-pass "Q's" independently selectable)

### Dynamic Bass Extender

Maximum boost: 4.5 dB; Minimum boost: 0 dB

Maximum boost frequency: 22 Hz or 37 Hz depending on extension range selected

Subsonic Filter: -12 dB/octave below 22 Hz or 37 Hz depending on extension range selected

### Distortion

Less than 0.01 percent THD (Bass Level Control at detent, Dynamic Bass Extender off, passband output at 2.0 VRMS)

### Signal/Noise Ratio

Better than 90 dBA below 0.5 VRMS output (Bass Level Control at detent, Dynamic Bass Extender off)

### Input Sensitivity/Impedance

0.53V/47.5 KOhms

### High-Pass Gain

Unity (with System level maximum)

### Low-Pass Gain

Variable  $\pm 3$  dB with respect to high-pass output

### Maximum Output Level

4.0 VRMS (all outputs)

### Input/Output Phase

Inverting (all outputs)

### Dimensions

2" (H) x 17" (W) x 10" (D)

### Approximate Weight

10 lb

### Finish

Front panel: satin black anodized

Chassis and covers: Matte black