

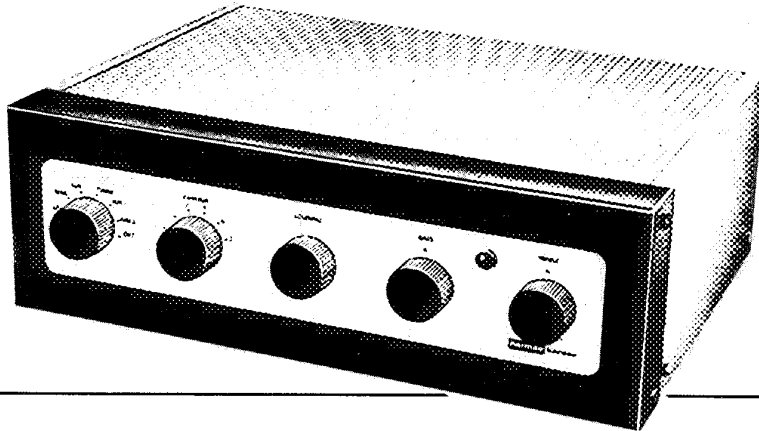
harman kardon

Model - C 300

The Trend

ULTRA LINEAR WILLIAMSON AMPLIFIER AND PREAMPLIFIER

INSTALLATION — OPERATION AND SERVICE INSTRUCTIONS



UNPACKING:

After unpacking the Trend, inspect it carefully for any signs of damage in transit. Your unit was subjected to many inspections and tests, and then carefully packed. If any damage is visible, notify your dealer immediately. If the unit was shipped to you, notify the transportation company at once.

Check the contents of the package carefully.

You should find:

- 1—Amplifier, Model C 300
- 1—Instruction booklet
- 1—Mounting Template
- 1—Bag of Knobs and mounting hardware
- 1—Warranty card

The Mounting Template and Bag of Knobs are for use only if the Trend is installed in a cabinet. If the unit is not installed in a cabinet, it is suggested that this material and the instruction booklet (which contains information needed for repairs) be kept for possible future use.

It is strongly urged that the warranty card be completed and mailed without delay, to protect your rights under warranty. If you should require repair service or information on the use of the Trend, we will be able to identify your unit immediately, and respond quickly.

INSTALLATION:

The appearance and construction of the Trend encourages its use, placed on a shelf or table rather than concealed in a cabinet. The only precaution to be observed consists of allowing sufficient ventilation. DO NOT cover the perforated tube grill or surround the unit with books or other impedimenta.

Installation in a cabinet is quite simple:

- 1— Remove the knobs.
- 2— Remove the two countersunk screws under the knobs, and lift off the escutcheon.
- 3— Drill holes in the panel and shelf of the cabinet to clear the control shafts and mounting screws. (Complete instructions and hole locations will be found on the Mounting Template.)
- 4— Fasten the Trend in place on the shelf, using four #8 x 1" cadmium plated screws to be found in the

Mounting Hardware bag.

- 5- Fasten the escutcheon in place, using the two #2-56 x $\frac{3}{4}$ " copper plated flathead screws to be found in the Mounting Hardware bag. (These screws are long enough to reach through the wood panel and screw into the threaded holes in the front surface of the Trend.)
- 6- Install the replacement knobs with long shanks, to be found in the Mounting Hardware bag.

Note: The original knobs are no longer required, and may be discarded. They may be used in some cases to replace knobs on auxiliary equipment (such as a tuner) to achieve an appearance match.

VENTILATION:

All electrical equipment generates heat as a by-product of normal operation. This heat must be allowed to escape. This is especially true in compact, high-efficiency electronic designs. Examination of the Trend amplifier will indicate that the major heat-producing elements (the power and rectifier tubes) have been grouped together and isolated from the heat-sensitive elements, such as electrolytic condensers. In addition, the airstream through the set has been carefully directed by means of the built-in controlled-flow heat exhaust system. The intake of cool air is through apertures of a large effective area in the bottom plate, reducing resistance to air flow. The exponential enclosure around the power and rectifier tubes constricts the passageway, thus increasing the speed of airflow, increasing the turbulence and forcing more intimate contact between the hot tubes and the cooling airstream. The heated air is then directed out through ample vents at the rear of the amplifier. Low pressure ventilation is provided for the minor heat-producing elements by means of the perforated cage over the entire chassis. This cage performs the further functions of supporting a major element of the controlled-flow system, and preventing accidental contact with hot components.

The following precautions should be observed when the Trend is installed in a cabinet.

- 1- Leave the back of the cabinet open. If this is not possible, provide several large holes or slots as low down and as high up in the cabinet back as possible. As an alternate, holes may be provided in the sides, bottom or top of the cabinet.

Large holes or slots in the shelf directly beneath the Trend are suggested. In any case, the Trend should be spaced up from the shelf by at least the thickness of its rubber feet, to permit cool air to circulate under and up through the perforated bottom plate.

Remember that really effective ventilation requires provision for cool air to enter at the bottom and hot air to leave at the top.

- 2- Isolate any accessories which might interfere with ventilation or be affected by heat. Do not block the rear ventilation slots of the Trend. Do not drape connecting cables over the Trend.

- 3- In some cases, it might be advisable to provide insulation (such as sheet asbestos) between the Trend and any other heat producing or heat-sensitive device.

- 4- While it is suggested that the cage be left on the

Trend when it is installed in a cabinet, it would be wise to remove the 4 screws that fasten the cage to the chassis. This will facilitate removing the cage to check tubes.

SPEAKER CONNECTIONS:

Provision has been made to connect to any of today's fine speaker systems. A four-screw terminal strip marked "SPEAKER" is located on the rear of the chassis. The terminals are identified as "C", "4", "8", and "16".

While the generous use of inverse feedback in the design of the Trend reduces the importance of critical speaker matching, it is suggested that the speaker be connected between the "C" and the "4", "8" or "16" terminals as recommended by the speaker manufacturer. This will optimize the operation of the Variable Damping Factor control.

If two or more speakers are to be connected to the Trend, connect them in parallel to the terminal marked most closely to the resulting speaker impedance. For example, two 16 ohm speakers should be connected to the "8" terminal; three, four or five 16 ohm speakers should be connected to the "4" terminal. This of course does not apply to multiple speaker systems designed to operate together as a unit and usually incorporating cross-over networks; for these the manufacturer's recommendations should be followed.

In no case should the speaker wire or the "C" terminal be grounded: This would result in malfunction of the Variable Damping Factor control, or excessive hum, or both.

It is suggested that fairly heavy wire be used to connect to the speaker, to maintain the high damping factor of the Ultra-Linear Williamson amplifier circuitry. Ordinary 18 gauge lamp cord will suffice if the speaker and receiver are in the same cabinet or are immediately adjacent. If the separation is greater, 16 gauge or 14 gauge wire should be used.

SPEAKER DAMPING AND THE VARIABLE DAMPING FACTOR CONTROL:

In a musical instrument, resonance is necessary and, in fact, is basic in determining the very character of the instrument's tone. In a speaker, the function of which is to reproduce rather than create sound, resonances are a form of distortion. Resonance in a speaker can be reduced to a minimum by having the proper load presented to the speaker by the amplifier. The proper load in each case is a function of the particular speaker being used, and is termed the "critical damping point" by engineers. The Harman-Kardon "Trend" incorporates a Variable Damping Factor Control which, when set at the appropriate point in its range (from .1 to 20), causes the amplifier to present the "critical damping" load to the particular speaker being used. The range of this control is sufficient to either under-damp, over-damp or critically-damp the speaker, as required to provide the smooth, clean bass response essential to high fidelity reproduction.

The damping effect of the amplifier on a speaker is analogous to the effect of shock absorbers on the springs of a car. In a car with jammed shock absorbers, the ride is hard and rough because the springs are not allowed to

perform their function. This would correspond to over-damping of a speaker, which results in reduced speaker efficiency at low frequencies, and generally "colder" tone.

In a car without shock absorbers, any undulation in the road causes uncontrolled bobbing and weaving. This corresponds to under-damping of a speaker, which results in boominess. In electrical equipment it is possible to exaggerate under-damping to the point where it becomes negative. This frequently results in undesirable hangover effects, where every sound is followed by a shadow and the general tone is muddy. To insure against this possibility, the Trend Variable Damping Control is deliberately limited at its low end to 0.1.

In a car with proper shock absorbers, slow or fast undulations or even potholes in the road are followed closely by the wheels, while the passengers experience a smooth even ride. This corresponds to "critical damping" in an audio system, where the speaker is free to follow subtle or gross electrical impulses, and yet introduces no gyrations of its own.

Theoretically, selection of the critical damping factor for any individual speaker is a procedure which can be performed only in the laboratory. However, since the enjoyment of music is, in the final analysis, a subjective experience, an entirely satisfactory setting is easily found by ear, as follows:

Set the Damping Factor control at "1", select a program material with fairly heavy bass drum content, and set all controls for most pleasing tone at medium high volume. Now vary the Damping Factor control to find the highest setting at which the drumbeats sound separate and distinct.

Note that the total range of the control has been held within useful limits, so that it is actually not possible to select a bad setting.

TUNER CONNECTION:

A coaxial connector marked "Tuner" will be found on the rear of the Trend. A shielded cable may be connected between this receptacle and the output receptacle of any tuner rated for at least $\frac{1}{4}$ volt output.

The tuner output impedance will determine the maximum practical length of this cable. It is suggested that not more than 3 or 4 feet be used if the tuner has a high impedance output. If the tuner has a low impedance cathode-follower output (as in the Theme, Model A-300 and Counterpoint, Model A-400), any length up to 50 feet may be used.

A slotted control shaft, marked "Tuner Level" adjacent to the Tuner connector may be used to balance the level from the tuner with the phonograph input. This will effect a smooth transition in switching from Phono to Tuner operation, without excessive change in volume.

PHONOGRAPH CONNECTION:

Any type of record player will operate with the Trend. To derive maximum enjoyment it is suggested that a high quality pickup cartridge and a rumble-free turntable be used. Two classes of pickup cartridges are in general use: Magnetic (GE, Pickering and Fairchild) and Crystal (including the newly developed ceramics).

Magnetic cartridges should be plugged into the receptacle marked "PHONO" on the rear of the chassis. (A mating plug is furnished with the Trend, and will be found plugged

into the "PHONO" socket.)

The slide-switch marked "Pickering - GE - Fairchild", located directly above the "PHONO" receptacle should be set to the appropriate position.

Crystal or ceramic cartridges should be plugged into one of the two "AUX" receptacles.

A word of advice: The useful life of a phonograph needle is quite short, ranging from 15 minutes to several hours. In addition to degradation of tone quality as the needle wears, the strong possibility exists that valuable records will be damaged if worn needles are not promptly replaced. The purchase of a diamond, which has almost infinite life, is therefore a worthwhile investment.

The power cord of the turntable may be plugged into one of the auxiliary outlets on the rear of the Trend chassis. In order to protect the mechanism of the turntable, it is suggested that the receptacle marked "LIVE" be used, and that the turntable's own power switch be operated to turn it on or off. This receptacle (LIVE) always provides 110 volt AC regardless of whether the power switch of the Trend is on or off.

It is sometimes advisable to ground the phonograph chassis to the amplifier to reduce hum or other unwanted noises. This may be accomplished by the use of any type of wire connecting the metal framework of the phonograph to the chassis of the Trend.

AUXILIARY INPUTS:

Two input receptacles marked "AUX 1" and "AUX 2" are located on the rear of the Trend chassis. Any auxiliary equipment, such as a crystal pickup, tape recorder or television tuner may be connected to either or both receptacles.

The "AUX 1 LEVEL" and "AUX 2 LEVEL" controls may be adjusted to balance the level from these inputs with the phonograph and tuner level.

TAPE OUTPUT:

A receptacle marked "TAPE OUT" is located on the rear of the Trend chassis. This is used to provide output to a tape recorder or other auxiliary equipment. Any program material appearing at the speaker terminals also appears at the "TAPE OUT" receptacle, but unmodified by the volume and tone controls. This makes it possible to record programs with the proper recording equalization (as determined by your tape recorder) while simultaneously listening to the program with the proper tone control, contour and loudness settings.

The low output impedance at the tape receptacle (10,000 ohms) permits the use of any length of cable up to 50 feet for connecting to the tape recorder.

POWER CONNECTIONS:

Plug the power cord into any outlet furnishing 117 volts, 60 cycles house current. The exact voltage is relatively unimportant, and may vary between 105 and 125; be sure, however, that you have 60 cycle AC power. For your convenience, the power cord of the Trend has been made extra long. Three auxiliary AC receptacles are incorporated on the chassis to furnish power to associated devices, such as record changer, tape recorder, etc. Two receptacles (marked "SWITCHED") are controlled by

the power switch of the Trend. The third (marked "LIVE") is on at all times.

OPERATING INSTRUCTIONS:

Full understanding of the relationship among the Trend's five operating controls will assure you realization of the rich potential of this excellent instrument.

The Function, Bass and Treble controls should be used to adjust the overall physical system for optimum performance. They compensate for the peculiar characteristics of the record, the cartridge, the system enclosure and the room acoustics.

The Contour and Loudness controls are used to adjust for your personal hearing characteristics (see paragraph on contour control below).

The Trend, therefore, permits ideal adjustment of the physical sound as it reaches you and ideal compensation of your hearing response to it.

FUNCTION SELECTOR:

This is the control to the far right of the control panel. Note that three positions of record equalization (marked LP, RIAA and EUR) are repeated on the left and right sides of the switch. The three positions on the right are identical with the three on the left except that each of the three on the right includes a sharp cut-off below 50 cycles. This is the rumble filter, which serves to eliminate the extremely low frequency noises often generated by defects in the turntable. These positions should be used only if found necessary in your own system.

The three record equalization positions compensate for the characteristics of over 30 recording labels:

LP: Most American long-playing records made before 1954 and some European LP's. Labels include: Columbia, London, Mercury, Oceanic, Remington, Tempo, Urania, Vanguard-Bach Guild, Vox, Westminster, RCA Victor (older), Atlantic, Decca, Polyphonic, Cetra-Soria, Esoteric, Haydn Society, MGM, Angel.

RIAA: Most American records made after 1954, all records cut to standards of Audio Engineering Society, NAB, new RCA Victor Ortho, and newly standardized RIAA. Labels include RCA Victor (newer), Extended Play 45, Blue Note Jazz, Canyon, Capitol, Good Time Jazz, Mercury, some London, Bartok, Caedman, Capitol-Cetra, Philharmonic, EMS.

EUR: Most European Longplaying, some American LP's and most 78 RPM discs.

The Function Selector also has positions for "TUNER" and 2 separate auxiliary inputs - (your television "front end" or tape recorder, etc.).

CONTOUR AND LOUDNESS: Simply stated, these controls make it possible to adjust the sound to your own hearing, by automatically compensating for the natural human inefficiency in hearing bass and treble at low volume.

Every position of the contour control causes the loudness ("volume") control to perform with a different degree of compensation, the amount increasing with each clockwise setting. Position 0 is uncompensated. Positions 1 and 2 provide somewhat less compensation than that required

to match the Fletcher-Munson loudness contour curves. Position 3 matches the Fletcher-Munson curves. Positions 4 and 5 provide greater amounts of compensation than the curves suggest. Since hearing characteristics vary from person to person (some require more and others less compensation), the great flexibility provided in these controls can be appreciated.

In operation, the proper choice of contour is easily made, by switching through the several loudness contour positions and selecting the one which sounds best to you.

The great advantage of the exclusive Harman-Kardon Dynamic Contour Control is that you can hear flat response at low volumes - the bass and treble will not fall away in your hearing.

BASS AND TREBLE:

Model C 300 provides separate bass and treble controls - with the full range of adjustment required for satisfactory high fidelity performance. Each control provides 18db of boost and 18db of attenuation.

MAINTENANCE AND REPAIR:

In some installations, hum may be encountered due to a voltage difference between the amplifier, tuner and record changer chassis. This may be eliminated by reversing one or all of the AC power plugs. Simply reverse one at a time until improvement is experienced.

Due to the conservative design and high quality components of the Trend, no routine maintenance other than yearly tube-testing is required. Should trouble develop, however, only the most qualified serviceman should be employed, as special equipment and training is required to properly service high fidelity equipment.

This instruction booklet contains diagrams and other information needed by your repairman. It should be kept available for his use.

WARRANTY:

We warrant each Trend to be free from defects in material and workmanship under normal use and service, and in accordance with the conditions herein below set forth, for a period of 90 days from date of delivery to the original purchaser, and agree to replace or repair any part or parts returned to us within said 90 days, with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective. This warranty does not include free labor nor is it applicable to any instrument which shall have been repaired or altered in any way so as in our judgement to affect its stability or reliability nor which has been subject to neglect, misuse, abuse, negligence or accident nor which has had the serial number altered, effaced, or removed. Neither shall this warranty apply to any instrument which has been connected otherwise than in accordance with the instructions furnished by us.

This warranty is expressly in lieu of all other warranties, express or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any representative or other person to assume for us any other liability in connection with the sale of the Model C 300 Trend.