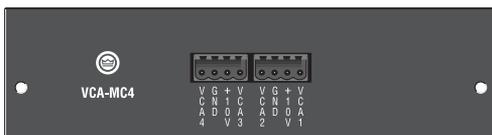


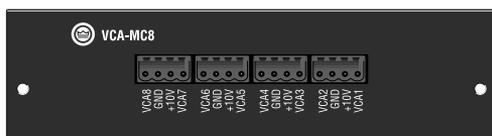


VCA-MC Series Operation Manual

VCA-MC4



VCA-MC8



1-VCAP



4-VCAP



Obtaining Other Language Versions: To obtain information in another language about the use of this product, please contact your local Crown Distributor. If you need assistance locating your local distributor, please contact Crown at 574-294-8000.

This manual does not include all of the details of design, production, or variations of the equipment. Nor does it cover every possible situation which may arise during installation, operation or maintenance.

The information provided in this manual was deemed accurate as of the publication date. However, updates to this information may have occurred. To obtain the latest version of this manual, please visit the Crown website at www.crownaudio.com.

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Some models may be exported under the name Amcron.®

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Telephone: 574-294-8000

The information furnished in this manual does not include all of the details of design, production, or variations of the equipment. Nor does it cover every possible situation which may arise during installation, operation or maintenance. If you need special assistance beyond the scope of this manual, please contact Crown Technical Support.

Crown Technical Support

1718 W. Mishawaka Rd., Elkhart, Indiana 46517 U.S.A.

Phone: **800-342-6939** (North America, Puerto Rico and Virgin Islands) or 574-294-8200

Fax: 574-294-8301 Internet: <http://www.crownaudio.com>



WATCH FOR THIS SYMBOL. The exclamation point triangle is used to alert the user to important operating or maintenance instructions.



WARNING

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE!

FCC COMPLIANCE NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

"The user is cautioned that any changes or modifications not expressly approved by Crown International could void the user's authority to operate the equipment."

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1 Welcome

The VCA-MC (VCA multichannel module) is an optional accessory module for the CTs 4200 or CTs 8200 power amplifier. The module provides independent remote level control for each channel. **VCA-MC4** (Figure 1.1) is the VCA module for the CTs 4200. **VCA-MC8** (Figure 1.2) is the VCA module for the CTs 8200.

Figure 1.1
VCA-MC4 Module

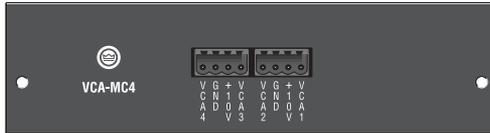


Figure 1.2
VCA-MC8 Module



Four-pin removable Phoenix-style barrier connectors provide the +10 VDC control voltage, ground, and control inputs for two amplifier channels. Thus, the 4-channel CTs 4200 uses two connectors; the 8-channel CTs 8200 uses four connectors. The control inputs are labeled VCA1 (for channel 1), VCA2 (for channel 2), and so on.

VCA-MC modules can be controlled in one of two ways:

- Optional Crown 1-VCAP or 4-VCAP wall-mount level controls
- An external control voltage of 0 to 10 VDC

1-VCAP: See Figure 1.3. Used in conjunction with a VCA-MC module, this is a single-gang panel with one potentiometer that provides remote volume control for one or more CTs amplifier channels. The potentiometer on the panel is wired directly to the VCA connectors on the VCA-MC.

4-VCAP: See Figure 1.4. This is a two-gang panel with four potentiometers that provide remote volume control for four or more CTs amplifier channels. The potentiometers on the panel are wired directly to the VCA connectors on the VCA-MC.



Figure 1.3
1-VCAP Wall-Mount
Level Control



Figure 1.4
4-VCAP Wall-Mount
Level Control

1.1 VCA Module Features

- Provides independent remote level control for each channel of a Crown CTs 4200 or CTs 8200 power amplifier.
- Four-pin removable Phoenix-style barrier connectors provide the +10 VDC control voltage, ground, and control inputs for two amplifier channels.
- Can be controlled by Crown VCAP wall-mount level controls or external DC source (0 to 10 VDC).
- Any number of control inputs can be electronically tied together to control several channels from one VCAP or 10VDC voltage source.
- 0 dB attenuation default. If nothing is connected to a control input, the VCA module defaults to unity gain.
- VCA gain element is in series with amplifier attenuator, allowing the maximum gain of the system to be set at the amplifier.

1.2 1-VCAP Level Control Features

- Provides remote volume control for one or more CTs amplifier channels.

1.3 4-VCAP Level Control Features

- Provides remote volume control for four or more CTs amplifier channels.

2 How to Use This Manual

This manual provides you with the necessary information to safely and correctly set up and operate your amplifier accessory. It does not cover every aspect of installation, setup or operation that might occur under every condition. For additional information, please consult Crown's *Amplifier Application Guide* (available online at www.crownaudio.com), Crown Tech Support, your system installer or retailer.

We strongly recommend you read all instructions, warnings and cautions contained in this manual. Also, for your protection, please send in your warranty registration card today, or register online at www.crownaudio.com. And save your bill of sale—it's your official proof of purchase.

3 Setup



It is important that you read and understand Section 4 “Operation” and Section 5 “Theory of Operation” before completing the setup of the system. Serious damage may result to the loudspeakers if VCA operation is not well understood.

The VCA-MC4 and VCA-MC8 can be controlled either by Crown VCAP wall-mount level controls, by your own potentiometer, or by an external variable-voltage source (0-10 VDC).

3.1 Wiring to the 1-VCAP or 4-VCAP Wall-Mount Control

1. Install a single-gang junction box for the 1-VCAP or a double-gang junction box for the 4-VCAP. Run a cable between the junction box and the power amplifier, allowing some slack on both ends. No cable is provided. CAT-5 cable will work fine, but Crown recommends using standard twisted-pair shielded microphone cable.
2. See Figure 3.1. In this example, the twisted-pair HOT led is white; the twisted-pair COLD lead is black. On the VCAP circuit board, pull out and turn over the removable barrier-strip plug to expose the screws. Then connect the cable leads to the barrier-strip plug from left to right as follows: COLD lead, HOT lead, Shield. The facing side of the VCAP circuit board is labeled accordingly.
3. Turn over the barrier-strip plug and insert it into the socket in the VCAP level control.
4. Trap the cable under a wire tie inserted into the holes in the board as shown. Wire-tie holes are also provided on 4-VCAP panels.

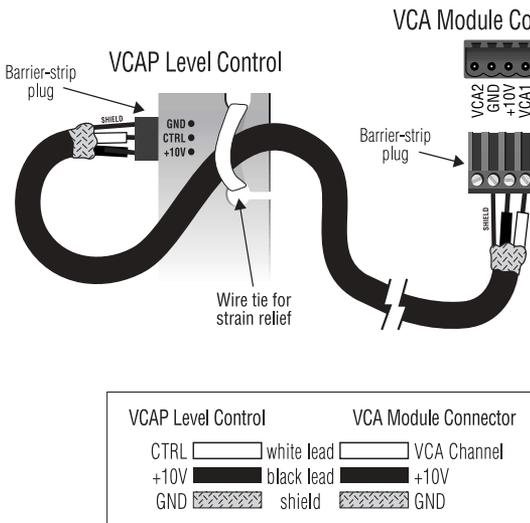


Figure 3.1 Wiring the VCAP Level Control to the VCA-MC Module

- Align a supplied barrier plug with the corresponding pins in the VCA-MC4 or VCA-MC8 module. Attach the cable to the plug as follows:
 - Connect twisted-pair HOT lead to the VCA channel terminal(s) you want to control.
 - Connect twisted-pair COLD lead to the +10V terminal.
 - Connect cable shield to the GND terminal.



The pin labeled GND on the VCA module is connected directly to the internal ground of the amplifier. **NOTE: Do not connect this pin to any ground or extend it for any other purpose.**

In the VCAP wall-mount panel, do not connect the ground pin to the VCAP metal panel or its junction box.

3.2 Wiring Your Own Potentiometer

You may use your own linear-taper potentiometer to control the VCA-MC module. We recommend using a 5 k ohm potentiometer; however, values up to 100 k ohms are acceptable. A potentiometer near 100 k ohms may require an RFI bypass capacitor.

Wire the potentiometer as shown in Figure 3.2. Connect one end-terminal of the pot to the power-supply ground and VCA ground; connect the other end-terminal to +10 VDC, and connect the wiper to the VCA control input of your choice (VCA1, VCA2, and so on).

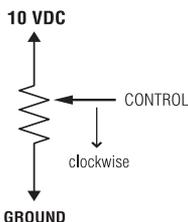


Figure 3.2 Wiring Your Own Potentiometer

3.3 Wiring to an External Variable DC Voltage Source

The VCA-MC *control input* is the pin labeled VCA1, VCA2, and so on. It is possible to drive the control input from an external voltage source such as a Crestron control system. Connect a variable voltage source (0-10 VDC) between the ground pin and control input on the MC-VCA module. No build-out resistance is required. DO NOT connect to the +10V pin.



The voltage range of the control input is 0 TO 10 VDC. If this range is exceeded, proper operation is not guaranteed and damage may result to the VCA card or amplifier.

It is not recommended to draw more than 20mA from the 10V supply. (20mA is approximately equivalent to having a 5 k ohm potentiometer connected to each channel of an 8-channel amplifier. Crown-supplied VCAP panels are equipped with 5 k ohm potentiometers). The 10V supply will survive a direct short.



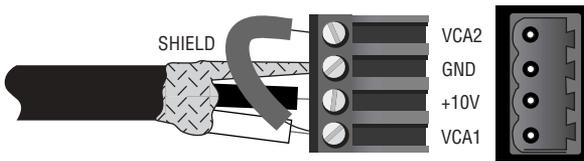
NOTE: When connecting your DC supply to the control pin and ground pin, be sure to avoid ground loops. The control input filters out most AC voltages but a ground loop can modulate the gain element of the VCA if the interference is of great enough amplitude.

3.4 Wiring for Multi-Channel Control

Often it is beneficial to control multiple amplifier channels with one control. For example, some channels of the amplifier may be driving full-range loudspeakers, and other channels driving subwoofers — all for the same room. In this case, it is convenient to control all of those channels with the same control. Also, for correct operation when channels are bridged, control inputs for the bridged channel pairs should always be wired together.

To electrically tie control inputs together, connect the control inputs of the channels together with a jumper wire, as shown in Figure 3.3. Connect the tied combination to the VCAP wall panel, or to the external voltage source.

It is recommended (but not mandatory) that the control inputs of bridged channels be electrically tied together even if the VCA option is not used for that channel pair. Wire used to connect two control inputs together should be as short as possible.



*Figure 3.3 Example
Showing VCA1 and
VCA2 Tied Together*

4 Operation

4.1 Operation Using the VCAP Wall-Mount Level Control

1. Turn the amplifier's back panel attenuator fully counterclockwise (off).



2. Unplug the connections to the VCA-MC module if they have been previously installed. Remember that each connector has two channels on it. **Don't unplug the VCA control for a channel that is in use, because full volume will be sent to that zone since the VCA attenuation is 0dB when nothing is connected!**

3. Turn on your audio source. Set its output level to the maximum value you expect to use it at. You should not hear any sound yet.

4. Slowly turn the amplifier attenuator clockwise until the system's volume is at the maximum value you want it to operate at. (Remember to refer to the power rating of the speakers.)

If the sound from your speakers is distorted within the first several detents, consider decreasing the output level of your audio source.

5. The volume limit of the system is now set. This volume limit is relative to the input level you just used to set it. If the input level from the audio source increases, so will the output level of the amplifier. The volume limit is not an absolute limiter.

6. Turn off the amplifier.

7. Plug the VCA control (potentiometer or independent 0-10V DC source) into the VCA-MC module.

8. Turn the amplifier on.

The VCA level control can now be used to set the system volume at any level between off and the "volume limit" you just set. See Table 1.

TABLE 1. ATTENUATION PER DETENT OF CROWN VCAP LEVEL CONTROL

Set the VCAP panel knob to the desired attenuation according to the table below.

DETENT	ATTENUATION		DETENT	ATTENUATION
0	-69		16	-31
1	-69		17	-29
2	-67		18	-26
3	-65		19	-24
4	-62		20	-21
5	-59		21	-19
6	-56		22	-16
7	-52		23	-14
8	-51		24	-11
9	-48		25	-9
10	-45		26	-6
11	-43		27	-4
12	-40		28	-1
13	-38		29	0
14	-36		30	0
15	-33			

Detent 0 is full counterclockwise. Dentent 30 is full clockwise. Note: This table is for reference only. Actual attenuation may vary ± 1 dB.

4.1.1 Troubleshooting

If the amplifier gain does not respond to the wall-mount potentiometer, a miswire is suspect. Check the pinout at both ends of the cable. Make sure that each potentiometer is wired to the correct channel's VCA control input (VCA1, VCA2, etc.). Check that the +10V and ground connections are made properly.

If the operation of the VCA control is inverted (i.e., full volume when the control is full counterclockwise), check the VCA control wiring (refer to Section 3).

4.2 Operation Using Your Own Potentiometer or an External 10VDC Variable Source

1. Turn the amplifier's back panel attenuator fully counterclockwise (off).



2. Unplug the connections to the VCA-MC module if they have been previously installed. Remember that each connector has two channels on it. **Don't unplug the VCA control for a channel that is in use, because full volume will be sent to that zone since the VCA attenuation is 0dB when nothing is connected!**

3. Turn on your audio source. Set its output level to the maximum value you expect to use it at. You should not hear any sound yet.

4. Slowly turn the amplifier attenuator clockwise until the system's volume is at the maximum value you want it to operate at. (Remember to refer to the power rating of the speakers.) If the sound from your speakers is distorted within the first several detents, consider decreasing the output level of your audio source.

5. The volume limit of the system is now set. This volume limit is relative to the input level you just used to set it. If the input level from the audio source increases, so will the output level of the amplifier. The volume limit is not an absolute limiter.

6. Turn off the amplifier.

7. Plug the VCA control (potentiometer or independent 0-10V DC source) into the VCA-MC module.

8. Turn the amplifier on.

Using the potentiometer or the DC supply control, set the supply voltage to achieve the desired attenuation according to the equation below:

$$V_c = \text{Attn (dB)} / (-7)$$

[V_c is the dc control voltage; Attn (dB) is the attenuation in decibels.]

0 VDC results in no attenuation (0 dB).

10 VDC results in full attenuation (-70 dB).

4.2.1 Troubleshooting

If the amplifier volume does not respond to the external DC supply, a miswire is suspect. Check the pinout at both ends of the cable. Check that the +10V and ground connections are made properly. If you are using an external 10VDC variable supply, make sure that the supply is switched on and is wired to the correct channel's VCA control input (VCA1, VCA2, etc.). If you are using your own potentiometer, check that it is wired as in Figure 3.2.

If the operation of the VCA control is inverted (i.e., full volume when the control is fully counterclockwise), check the VCA control wiring (refer to Section 3).

5 Theory of Operation

The amplifier attenuator and the VCA attenuator are in series (Figure 5.1). The gain of the series combination is the sum of both attenuator settings. For example, if the amplifier attenuator is set at -10 dB and the VCA attenuator is set at -33.3 dB, the total attenuation is -43.3 dB. (See the *CTs Multi-Channel Series Operation Manual* for attenuation vs. detent of the amplifier attenuator.)

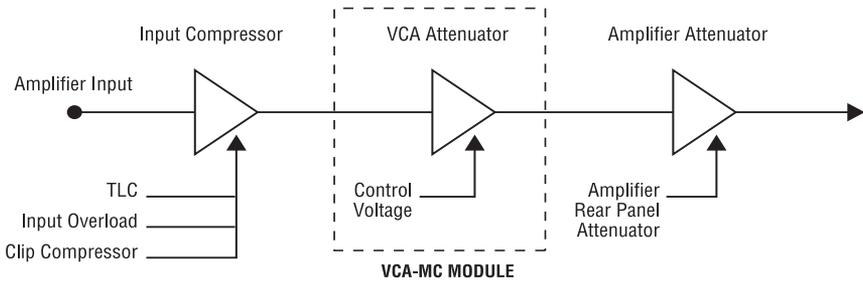


Figure 5.1 System Block Diagram

This unique design allows the system designer to limit the power available to the user of the VCA control. In the above example, the amplifier attenuator is set at -10 dB. In this configuration, the VCA control can vary the total amplifier gain only from a quiet -80 dB to a maximum of -10 dB. This mode of operation keeps a novice user from turning up the system too loud and damaging the loudspeakers.

6 Specifications

VCA-MC4

Pins: VCA, GND, +10V, VCA (x2)

Weight: 3.6 oz (102 g)

Dimensions:

Gain Module: 5-1/2" x 2-1/2" (14.0 cm x 6.4 cm)

Connector Break-Out: 1-9/16" x 3" (1.4 cm x 7.6 cm)

Control Voltage: 0 to +10VDC between GND and VCA

VCA-MC8

Pins: VCA, GND, +10V, VCA (x4)

Weight: 5.0 oz (142 g)

Dimensions:

Gain Module: 5-1/2" x 2-1/2" (14.0 cm x 6.4 cm)

Connector Break-Out: 5-15/16" x 1-1/2" (15 cm x 3.8 cm)

Control Voltage: 0 to +10VDC between GND and VCA

1-VCAP

Pins: VCA, GND, +10V

Weight: 3.0 oz (85 g)

Dimensions: 2-1/2" x 4-1/2" (6.4 cm x 11.4 cm)

4-VCAP

Pins: VCA, GND, +10V (x4)

Weight: 6.5 oz (184 g)

Dimensions: 4-1/2" x 4-1/2" (11.4 cm x 11.4 cm)

7 Service

7.1 Worldwide Service

Service may be obtained from an authorized service center. (Contact your local Crown/Amcron representative or our office for a list of authorized service centers.) To obtain service, simply present the bill of sale as proof of purchase along with the defective unit to an authorized service center. They will handle the necessary paperwork and repair. Remember to transport your unit in the original factory pack.

7.2 US and Canada Service

Service may be obtained in one of two ways: from an authorized service center or from the factory. You may choose either. It is important that you have your copy of the bill of sale as your proof of purchase.

7.2.1 Service at a US or Canada Service Center

This method usually saves the most time and effort. Simply present your bill of sale along with the defective unit to an authorized service center to obtain service. They will handle the necessary paperwork and repair. Remember to transport the unit in the original factory pack. A list of authorized service centers in your area can be obtained from the Crown website at www.crownaudio.com, or by calling Crown Factory Service.

7.2.2 Factory Service

To obtain factory service, fill out the service information page found in the back of this manual and send it along with your proof of purchase and the defective unit to the Crown factory.

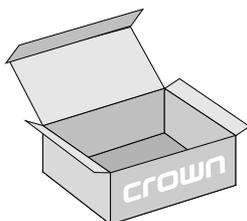
For warranty service, we will pay for ground shipping both ways in the United States. Contact Crown Factory Service to obtain prepaid shipping labels prior to sending the unit. Or, if you prefer, you may prepay the cost of shipping, and Crown will reimburse you. Send copies of the shipping receipts to Crown to receive reimbursement.

Your repaired unit will be returned via UPS ground. Please contact us if other arrangements are required.

7.2.3 Factory Service Shipping Instructions

1. Before sending a Crown product to the factory for service, first call Crown Factory Service for a return authorization (RA) number.
2. Be sure to fill out the service information form that follows and enclose it with your shipment, either inside the box or in a packing slip envelope securely attached to the outside of the shipping carton. Do not send the service information form separately. If you are sending the unit from a Shipping Center, we recommend taping the form to the product. We also recommend recording the serial number and model before shipping for your reference.

3. To ensure the safe transportation of your unit to the factory, ship it in an original factory packing container.



If you don't have the original carton, you may obtain a product service foam-in-place shipping pack from Crown Factory Service at the number listed below. For non-warranty service, you may also provide your own shipping pack, however we still recommend using a Crown supplied shipping container. Minimum recommended requirements for materials are as follows: 275 P.S.I. burst test Double-Wall carton that allows for 2-inch solid Styrofoam on all six sides of unit or 3 inches of plastic bubble wrap on all six sides of unit; securely seal the package with an adequate carton sealing tape. Do not use light boxes or "peanuts." Damage caused by poor packing cannot be covered under warranty.

4. Do not ship the unit in any kind of cabinet (wood or metal). Ignoring this warning may result in extensive damage to the unit and the cabinet. Accessories are not needed-do not send the product documentation, cables and other hardware.

If you have any questions, please contact Crown Factory Service.

Crown Factory Service

1718 W. Mishawaka Rd.

Elkhart, Indiana 46517 U.S.A.

Telephone:

574-294-8200

800-342-6939 (North America,
Puerto Rico, and Virgin Islands only)

Facsimile:

574-294-8301 (Technical Support)

574-294-8124 (Factory Service)

Internet:

<http://www.crownaudio.com>

8 Warranty

UNITED STATES & CANADA



SUMMARY OF WARRANTY

Crown International, 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown product, for a period of three (3) years from the date of purchase by the original purchaser (the "warranty period") that the new Crown product is free of defects in materials and workmanship. We further warrant the new Crown product regardless of the reason for failure, except as excluded in this Warranty.

**Warranty is only valid within the United States of America. For information on Warranty outside of the U.S.A, please contact your local distributor.*

ITEMS EXCLUDED FROM THIS CROWN WARRANTY

This Crown Warranty is in effect only for failure of a new Crown product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, accident, negligence, or loss which is covered under any of your insurance contracts. This Crown Warranty also does not extend to the new Crown product if the serial number has been defaced, altered, or removed.

WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at the factory. Warranty work for some products can only be performed at our factory. We will remedy the defect and ship the product from the service center or our factory within a reasonable time after receipt of the defective product at our authorized service center or our factory. All expenses in remedying the defect, including surface shipping costs in the United States, will be borne by us. (You must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other customs fees for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service within the warranty period. All components must be shipped in a factory pack, which, if needed, may be obtained from us free of charge. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by us or our authorized service center. If the repairs made by us or our authorized service center are not satisfactory, notify us or our authorized service center immediately.

DISCLAIMER OF CONSEQUENTIAL & INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE NEW CROWN PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this Crown Warranty. This Crown Warranty is not extended by the length of time which you are deprived of the use of the new Crown product. Repairs and replacement parts provided under the terms of this Crown Warranty shall carry only the unexpired portion of this Crown Warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

THIS CROWN WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. No action to enforce this Crown Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS. 12/01

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H A Harman International Company