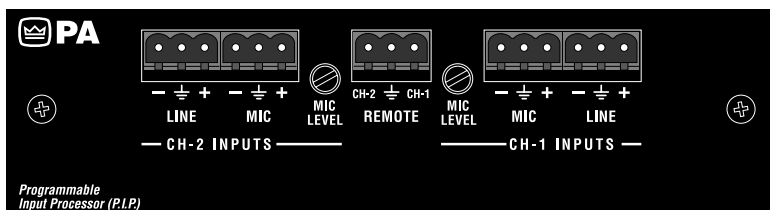


P.I.P.—PA

REFERENCE MANUAL



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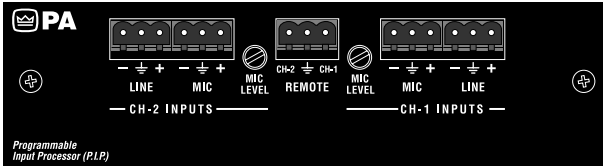


Fig. 1.1 P.I.P.-PA

1 Welcome

Thank you for purchasing the Crown *P.I.P.-PA* accessory. *P.I.P.*® modules are designed to quickly install in the rear panel of many Crown amplifiers. *P.I.P.* stands for “Programmable Input Processor.” Their versatile features expand the capabilities of your amplifier and enable you to customize it for your particular needs.

The *P.I.P.-PA* adds a switchable balanced low-Z microphone input and a balanced line-level input to each channel of a *Com-Tech*® or *Macro-Tech*® series amplifier. A remote-control feature allows you to independently switch between the mic and line-level inputs of each channel. Designed for paging and background music systems, the switching circuitry has built-in delays for pleasing, less abrupt fades from mic to line and visa versa.

The mic inputs are transformer isolated and employ a variable gain stage. The gain of each

channel can be easily controlled from the rear panel. Phantom power is also provided via the microphone connectors. It can be disabled by moving a jumper on the circuit board.

Bass roll-off for each mic input is provided with a low-cut filter. These filters roll off at 6 dB/octave and have a -3 dB frequency of 150 Hz. They can be independently disabled by moving a jumper on the circuit board.

Finally, each channel includes a variable-threshold compressor which is *IOC*® error-driven at its maximum setting or acts as an audio feedback signal-driven compressor at less than maximum settings.

Features

- Remote switchable balanced mic and line-level inputs with custom mute-delay circuitry for pleasing fades.
- Balanced 1:1 isolation transformers for mic inputs.
- Adjustable mic input sensitivity.

- ❑ Phantom power provided for mic inputs (can be disabled).
- ❑ Low-frequency filters for mic inputs (can be disabled).
- ❑ Variable-threshold error-driven or audio feedback signal-driven compressor.
- ❑ Balanced RFI suppression is provided at each input.
- ❑ Gold plated edge-connector for trouble-free connection to amp.
- ❑ Quick-connect barrier connectors provide greater wiring flexibility and make installation easier.

2 Facilities

A. Low-Cut Filter Jumper

A 150-Hz, 6-dB/octave low-cut filter is provided for each mic input only. (It has no effect upon the line-level input.) It can be used to attenuate unwanted pops and noise which microphones sometimes pick up. The filter of either channel can be enabled or disabled with the jumpers shown. The on/off positions of the jumpers are labeled on the circuit board.

B. Compressor Threshold

The threshold of each channel's compressor can be adjusted with these controls. When turned to their maximum setting (full clockwise), the compressors respond only to the IOC error-signal of their respective channel. When set lower, the compressors are signal-driven by an audio feedback signal.

C. Phantom Power Jumper

Phantom power (+18 VDC at 9 mA) is provided to the mic inputs when these jumpers are set to their "on" position. The on/off positions of the jumpers are labeled on the circuit board.

D. Ground Isolation Jumper

The input grounds can be isolated from the chassis ground by removing this jumper.

E. Balanced Line Input

Line-level connection is made with these convenient quick-connect barrier connectors. Each conductor is easily attached with screws. Once the cable is attached, the connector can be quickly unplugged and, if desired, moved to a different line input.

F. Balanced Mic Input

Low-impedance mic line connection is made with these connectors in similar fashion as the line-level inputs (E).

G. Mic Input Gain Control

Use a small, flat-blade screwdriver to adjust the mic input sensitivity with these controls.

H. Remote Switch Input

The remote control switches for both Channel 1 and Channel 2 are attached to this connector. (The ground leads are common.) With no switch attached, the line-level inputs (E) are normalled to the amplifier inputs.

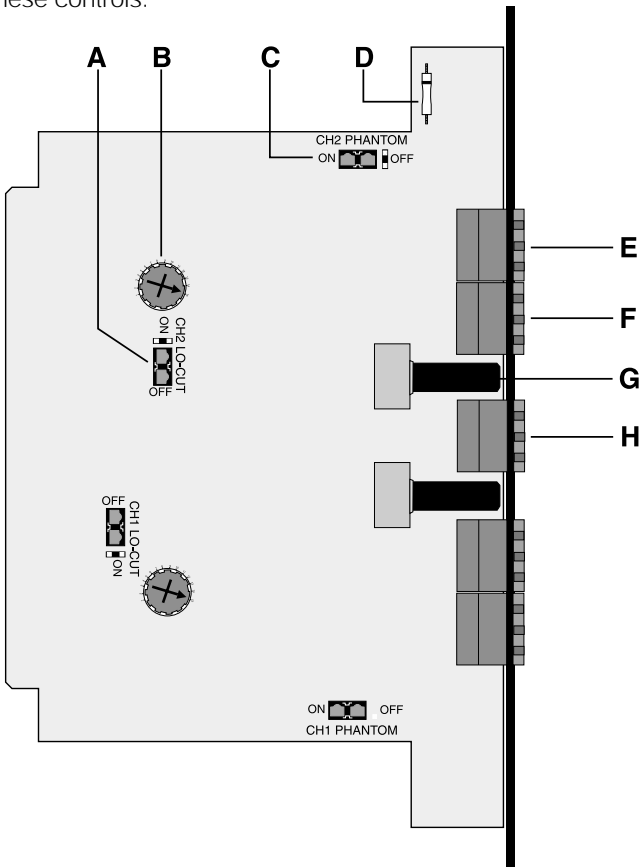


Fig. 2.1 Bottom View

3 Installation

Before installing this *P.I.P.* module, you'll want to configure it.

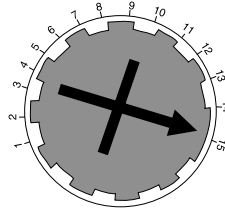
1. Set the microphone phantom power jumper of each channel to the desired position. The on/off positions are labelled on the circuit board (see Figure 2.1).
2. Set the microphone low-cut filter jumpers of each channel to the desired position. The on/off positions are labelled on the circuit board (see Figure 2.1).
3. Adjust the compressor threshold of each channel. A fifteen-mark scale is printed on the circuit board (see Figure 2.1) which corresponds to the typical threshold settings shown in the table in Figure 3.1.

Now you are ready to install the *P.I.P.* in the amplifier.

Installation Procedures

You may need a Phillips screwdriver to remove the existing *P.I.P.* module or panel from your amplifier.

CAUTION: Before connecting this or any *P.I.P.* to your amplifier, it is important to turn its level controls down, turn it off and remove the AC power. Don't touch the circuitry. Even though the



Tick	MAX SINE WAVE RMS VOLTAGE	WATTS into 8 OHMS
1	9.5 V	12
2	10 V	13
3	10.5 V	14
4	11 V	15
5	12 V	18
6	13 V	21
7	15 V	28
8	18 V	40
9	22 V	60
10	26 V	85
11	32 V	128
12	44 V	242
13	62 V	480
14	85 V	903
15	100 V	1250

Fig. 3.1 Compressor Threshold Settings

Note: These voltage and power levels are valid only for Stereo (Dual) and Parallel-Mono modes of operation. The voltages shown must be doubled and the power levels recalculated for Bridged-Mono mode.

Also note: The maximum output power is strictly limited to the capability of your amplifier. Any threshold setting above the maximum output power of your amp will result in the compressor acting solely as a "clip" eliminator.

amplifier is off, there could still be enough energy remaining to cause electric shock.

1. Turn down the level controls (full counterclockwise), turn off the amplifier and unplug it from the AC power source.
2. Remove the existing *P.I.P.* module or panel (two screws). For *PIP2* amplifiers, this may involve disconnecting the *P.I.P.* from a *PIP2* input adapter (see Figures 3.3 and 3.4). If a *PIP2* input adapter is already present, do not remove the ribbon cables from the adapter. Otherwise you will have to reconnect them in the next step.
3. *Standard P.I.P. Amplifiers:* Align the edges of the *P.I.P.-PA* in the *P.I.P.* card rails and firmly push the unit in until it is seated against the mounting bracket (see Figure 3.2).

PIP2 Amplifiers: (Requires a *PIP2* input adapter. Crown part number Q43528-1.) Connect the *PIP2* input adapter to the two input cables of the amplifier (see Figure 3.3). Notice that the *PIP2* input adapter should be positioned with the *P.I.P.* edge connector on top and facing away from the amplifier. The 20-pin cable (A) is connected first then the 18-pin cable (B) is connected. Both

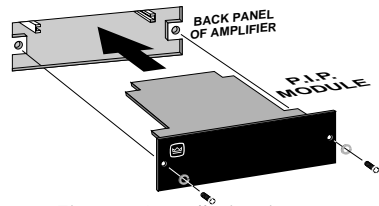


Fig. 3.2 Installation into a Standard *P.I.P.* Amplifier

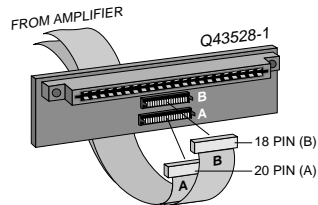


Fig. 3.3 *PIP2* Input Adapter Connection

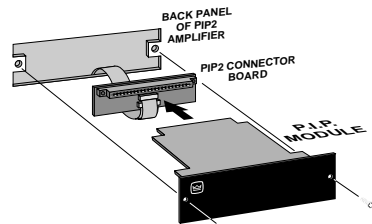


Fig. 3.4 Installation into a *PIP2* Amplifier

ribbon cables should extend below the *PIP2* input adapter.

Next, insert the edge connector of the *P.I.P.-PA* into the *PIP2* input adapter (see Figure 3.4) and insert the assembly into the *P.I.P.* opening in the back of the amplifier.

4. Secure the *P.I.P.-PA* with the two screws and lock washers

provided. (The lock washers are important because they bind the *P.I.P.* to the chassis ground of the amplifier.)

5. Connect input and output wiring.
6. Plug in the amplifier and turn it on. Adjust its level controls to a desired setting.

Do not tamper with the circuitry. Circuit changes made by unauthorized personnel, or unauthorized circuit modifications are not allowed.

Remember: Crown is not liable for any damage resulting from overdriving other components in your sound system.

Important: If the amplifier is used in either Bridged-Mono or Parallel-Mono mode, you must turn the Ch. 2 amplifier level control off (fully counterclockwise). The input and level control of Ch. 2 are not defeated in mono mode so any signal applied to Ch. 2 will beat against the signal in Ch. 1.

Refer to the amplifier *Reference Manual* for more information about Bridged-Mono or Parallel-Mono modes of operation.

Mono-Mode Wiring

There are two ways to install the *P.I.P.-PA* in a mono configuration. One method uses the amplifier in STEREO (Dual) mode. The other

method uses BRIDGED-MONO or PARALLEL-MONO mode.

If you want to use the *P.I.P.-PA* in a mono system but still want to individually control the level of each amp channel, follow these instructions: Place the amplifier in STEREO (Dual) mode, being careful to follow the instructions in your amplifier's *Reference Manual*. Then simply "daisy chain" the audio signal from one input of the *P.I.P.-PA* to the other. Either the mic inputs or the line-level inputs can be paralleled to give both channels the same signal. (Daisy chaining the inputs reduces the input impedance to half.)

You can also mix this technique in any fashion you desire. For example, you could daisy chain a single microphone to both mic inputs while feeding the line inputs each with a different line-level feed and visa versa. In this way you could feed background music from a radio to one channel, audio from a tape recorder to another channel and enable both channels to be interrupted by the same paging mic.

The second method for wiring a mono system gives less flexibility at the inputs but provides more power to a single mono output. This technique requires that you place your amplifier in either BRIDGED-MONO or PARALLEL-

MONO mode. Remember to follow the instructions in your amplifier's *Reference Manual*. Then connect the mono input wiring to the mic and/or line **input of Channel 1 only. Do not use the input of Channel 2 while the amplifier is in BRIDGED-MONO or PARALLEL-MONO mode** and keep the amplifier's Channel 2 level control turned down.

Input Cable Routing

Because the gain of a Crown amplifier equipped with a *P.I.P.–PA* can be quite high (as high as 90 dB) it is very important to exercise care when routing the input and output cables.

IMPORTANT: Use shielded wire for mic input cables and **avoid** routing them near the output cables or noise and/or feedback oscillation may result. It is wise to take similar precautions with line-level inputs cables too.

To avoid hum, do not route the input cables near power cables.

Switching Between Mic/Line

The line-level inputs are the default inputs if no switch is attached to select the mic inputs. In this case, each mic input is attenuated 54 dB while each line input is delivered to the amplifier.

When the remote switch connection is shorted (that is, a switch is

installed and turned on) the line-level input is attenuated 30 dB and the mic input is delivered to the amplifier.

A timed fader circuit causes the switch from line to mic and mic to line to be a smooth transition. The intent is to create a more pleasing transition for situations where the line-level input is used to feed background music and the mic input is used for paging.

When the switch is activated, the line-level input is muted after a delay of 10 msec. Because it is muted only 30 dB it is still barely audible. The mic input turns on almost immediately to insure that no syllables of speech are lost, giving an abrupt transition from background music to paging.

When the switch is opened the mic input is quickly muted 54 dB in about 3 msec. The line-level input is turned back on after a lengthy delay of 1.5 seconds, providing a more pleasing fade back to music after the page.

The remote line can also be controlled with a +5 to +24 VDC logic line. For example, you could use the Auxiliary control feature of an *IQ–P.I.P.* or an *MPX/SMX-6* multiplexer to control the mic/line switching with an *IQ System*®. To do this, add a 20 K ohm “pull down” resistor across each remote line. When the logic line is

“Hi” the line-level input is enabled. When it is “Lo” the mic input is enabled.

Figure 3.5 shows how to connect a remote switch (or logic line) to each channel using the remote connector.

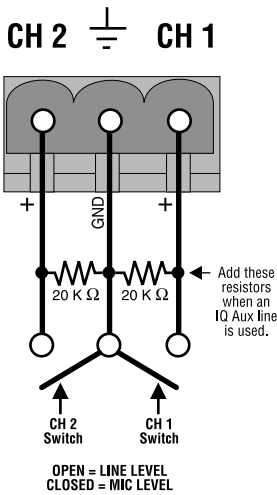


Fig. 3.5 Remote Switch Wiring

Ground Isolation

If present, ground loop problems can be reduced by unsoldering or cutting and removing the ground jumper shown in Figure 2.1.

When removed, the signal ground is isolated from the chassis ground by a 2.7 ohm resistor as shown below:

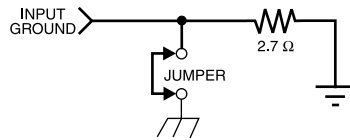


Fig. 3.6 Ground Isolation

4 Specifications

Note: All specifications referenced to a 0.775 V input signal.

Signal to Noise: Line: Nominally -80 dB from 20 Hz to 20 kHz. Mic: Nominally -118 dB equivalent input noise, 20 Hz to 20 kHz ($R_s=150\Omega$).

Frequency Response: Line: ± 0.5 dB from 20 Hz to 20 kHz. Mic: ± 1 dB from 50 Hz to 15 kHz.

Common Mode Rejection: Better than 70 dB at 60 Hz.

Nominal Input Impedance: Line: 50 K ohms balanced and 25 K ohms unbalanced. Mic: 2 K ohms balanced.

Phantom Power: 18 VDC at 9 mA. (Can be disabled with a jumper block on the circuit board.)

Recommended Source Impedance: Line: 600 ohms. Mic: 250 ohms.

Maximum Input Level: Line: $+22$ dB. Mic: $+8$ dB.

Nominal Gain: Line: Unity. Mic: Adjustable from 20 to 50 dB with user-accessible gain pots.

Compressor: Driven by both the audio signal and by the *IOC* error signal. The adjustable threshold is controlled by a pot on the circuit board and the attack and decay times are nominally fixed at 20 msec and 200 msec, respectively. At its maximum setting it functions as an error-driven compressor and is activated by the *IOC* signal. Below the maximum setting it is driven by the audio feedback signal.

Remote Mic/Line Switch: The mic/line priority of each channel can be remotely controlled using the “Remote” connector provided. Each channel is controlled independently. When mic priority is selected, the line-level input is attenuated 30 dB. When line-level priority is selected, the mic input is attenuated by 54 dB. A delay circuit provides a smooth fade from mic to line and visa versa.

Dimensions: $6\frac{3}{8} \times 1\frac{7}{8} \times 3\frac{7}{8}$ in (16.2 x 4.8 x 9.8 cm).

Weight: 12 ounces (340 grams).

5 Schematic

Electronic image for this figure was not included due to quality considerations. Please refer to the printed documentation.

Notes:

1. All resistors are in ohms, $\frac{1}{4}$ W, 5% unless otherwise specified.

Electronic image for this figure was not included due to quality considerations. Please refer to the printed documentation.

2. All capacitors are in microfarads unless otherwise specified.

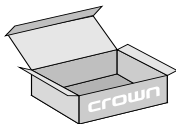
6 Service

This unit has very sophisticated circuitry which should only be serviced by a fully trained technician.

6.1 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.



Always use the original factory pack to transport the unit.

6.2 North American 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.

6.2.1 Service at a North American Service Center

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 our Technical Support Group.

6.2.2 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 or Technical Support 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.

Factory Service Shipping Instructions:

1. When sending a Crown product to the factory for service, be sure to fill out the service information form that follows and enclose it inside your unit's shipping pack. Do not send the service information form separately.
2. To ensure the safe transportation of your unit to the factory, ship it in an original factory packing container. If you don't have one, call or write Crown's Parts Department. With the exception of polyurethane or wooden crates, any other packing material will not be sufficient to withstand the stress of shipping. **Do not use loose, small size packing materials.**

3. 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 instruction manual, cables and other hardware.

If you have any questions, please call or write the Crown Technical Support Group.

Crown Audio Customer Service

Technical Support / Factory Service
Plant 2 SW, 1718 W. Mishawaka Rd.,
Elkhart, Indiana 46517 U.S.A.

Telephone: 219-294-8200
800-342-6939
(North America,
Puerto Rico, and
Virgin Islands only)

Facsimile: 219-294-8301
(Technical Support)
219-294-8124
(Factory Service)

Fax Back: 219-293-9200 or
800-294-4094
(North America only)
219-294-8100
(International)

Internet: www.crownaudio.com



NORTH AMERICA

SUMMARY OF WARRANTY

The Crown Audio Division of Crown International, Inc., 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.

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. 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 not later than ninety (90) days after expiration of 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.

THREE YEAR
FULL WARRANTY

WORLDWIDE



SUMMARY OF WARRANTY

The Crown Audio Division of Crown International, Inc., 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown¹ 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, and we further warrant the new Crown product regardless of the reason for failure, except as excluded in this Crown Warranty.

¹ Note: If your unit bears the name "Amcron," please substitute it for the name "Crown" in this warranty.

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. We will remedy the defect and ship the product from the service center within a reasonable time after receipt of the defective product at our authorized service center.

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service not later than ninety (90) days after expiration of the warranty period. All components must be shipped in a factory pack. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by our authorized service center. If the repairs made by our authorized service center are not satisfactory, notify 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.

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.

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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.

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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.

THREE YEAR
FULL WARRANTY

Crown Factory Service Information

Shipping Address: Crown Factory Service,
Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, IN U.S.A. 46517
Phone: 1-800-342-6939 or 1-219-294-8200 Fax: 1-219-294-8124

Owner's Name: _____

Shipping Address: _____

Phone Number: _____ Fax Number: _____

Model: _____ Serial Number: _____

Purchase Date: _____

NATURE OF PROBLEM

(Be sure to describe the conditions that existed when the problem occurred and what attempts were made to correct it.)

Other equipment in your system: _____

If warranty has expired, payment will be:

Cash/Check VISA MasterCard C.O.D.

Card Number: _____

Exp. Date: _____ Signature: _____

**ENCLOSE THIS PORTION WITH THE UNIT.
DO NOT MAIL SEPARATELY.**

For Technical Support contact:

Crown Audio Division Technical Support Group

Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, Indiana 46517 U.S.A.
Phone: **800-342-6939** (North America, Puerto Rico and Virgin Islands) or 219-294-8200
Fax: 219-294-8301 Fax Back (North America only): 800-294-4094 or 219-293-9200
Fax Back (International): 219-294-8100
Internet: <http://www.crownaudio.com>