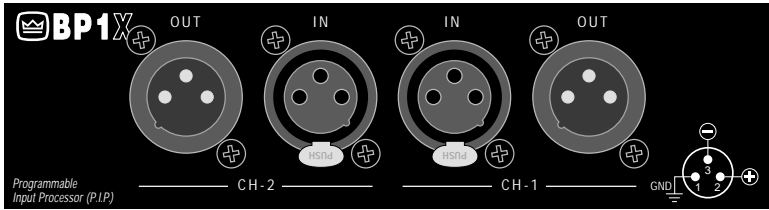


# P.I.P.–BP1X & P.I.P.–BP1C

## REFERENCE MANUAL



©2000 by Crown International, Inc., P.O. Box 1000, Elkhart, IN 46515-1000 U.S.A. Telephone: 219-294-8000. Fax: 219-294-8329. Trademark Notice: *PIP™ is a trademark, and Crown® and IOC® are registered trademarks of Crown International, Inc. Other trademarks are the property of their respective owners.*



Printed on  
recycled paper.

127924-1A  
10/00



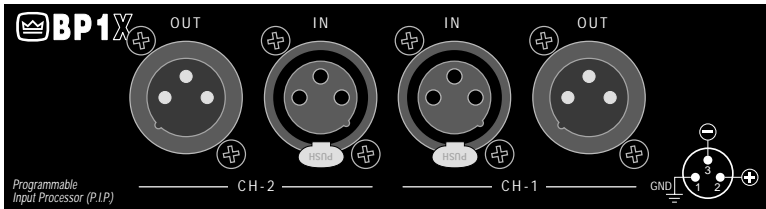


Fig. 1.1 P.I.P.–BP1X Shown

## 1 Welcome

Congratulations on your purchase of Crown's *P.I.P.–BP1X* or *P.I.P.–BP1C*. *PIP*™ modules are designed to quickly install in the back of many Crown amplifiers. *PIP* stands for "Programmable Input Processor." Each *PIP* has features that expand the capabilities of your amplifier, enabling you to customize it for your particular needs.

The *P.I.P.–BP1X* and *P.I.P.–BP1C* are versatile stereo Band-Pass processors that plug into any *PIP*-capable Crown amplifier. The *P.I.P.–BP1X* uses XLR connectors and the *P.I.P.–BP1C* uses a removable barrier block. Each channel of the *PIP* is completely independent from the other and combines the functions of a low-pass filter, a high-pass filter, vented-speaker box equalization, horn equalization and compression.

DIP switches and convenient jumper blocks make it easy to configure any of its powerful operating features.

## Features

- ❑ Variable 24-dB/octave (4th order) Butterworth low-pass filter.
- ❑ Variable 24-dB/octave (4th order) Butterworth high-pass filter.
- ❑ Variable 12-dB/octave (2nd order) low-frequency filter with Q=2 for vented box equalization.
- ❑ Variable 6-dB/octave high-frequency shelving network with variable 12-dB/octave high-frequency low-pass filter for constant-directivity horn equalization.
- ❑ Variable threshold, feedback/error-driven compressor/limiter with infinite compression ratio.
- ❑ Configurable compressor control path.
- ❑ Configurable "daisy chain" outputs.
- ❑ Balanced 3-pin XLR connectors or quick-disconnect removable barrier block connectors (depending on model) for input and daisy chain outputs.

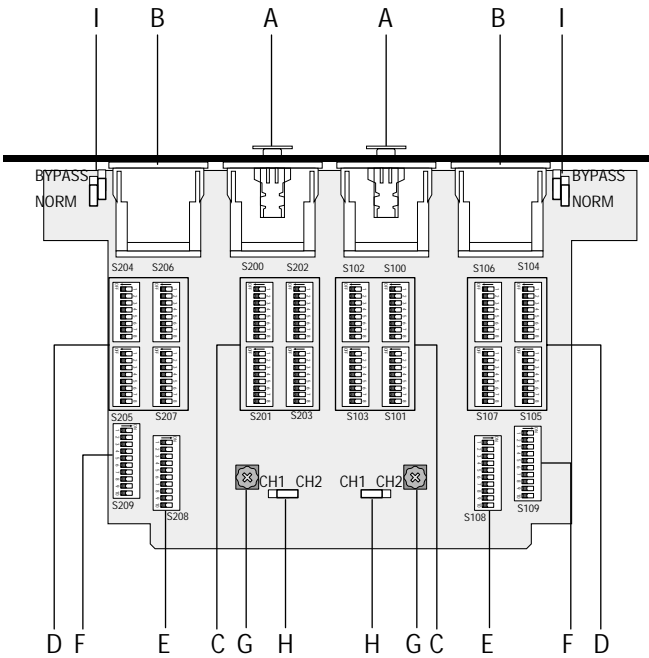
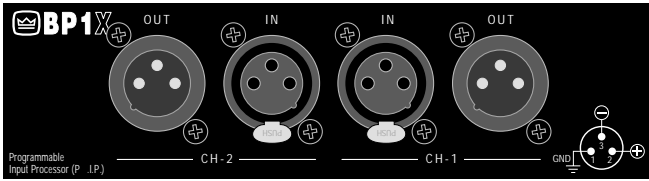


Fig. 2.1 P.I.P.-BP1X  
 Front & Bottom Views

## 2 Controls, Connectors & Setup

### A/B. Connectors

Balanced 3-pin XLR or quick-disconnect removable barrier block connectors are provided for the inputs and outputs. The *P.I.P.–BP1X* is supplied with XLR Jacks: a female XLR for the input connector and a male XLR for the daisy chain output. These connectors are wired for pin 2 = Hot. The *P.I.P.–BP1C* is supplied with quick-disconnect removable barrier block connectors; mating connectors are supplied to allow the user to quickly disconnect an input or output and move it to the other channel. These connectors are wired pin1=Hot. (See Section 3 for input and output wiring examples.)

### C. Low-Pass Filter DIP Switches

The input signal is processed first by a 4th-order (24-dB/octave) low-pass filter network with a Butterworth response characteristic. Four eight-segment DIP switches (S100, S101, S102 and S103 for channel 1), (S200, S201, S202 and S203 for channel 2) select the low-pass filter frequency at which the output is –3-dB down from the input. (See Figure 2.2 for a complete table of frequencies and settings and Figure 2.3 for sample frequency-response graphs.) Note that all four DIP switches must use the same settings for the response to be correct. These DIP switches are factory-set to 20 kHz.

### D. High-Pass Filter DIP Switches

The signal is processed next by a 4th-order (24-dB/octave) high-pass filter network with a Butterworth response characteristic. Four eight-segment DIP switches (S104, S105, S106 and S107

for Channel 1), (S204, S205, S206 and S207 for Channel 2) select the high pass filter frequency at which the output is –3-dB down from the input. (See Figure 2.2 for a complete table of frequencies and settings and Figure 2.4 for sample frequency-response graphs.) Note that all four DIP switches must use the same settings for the response to be correct. These DIP switches are factory-set to 23 Hz.

### E. Low-Frequency Equalization DIP Switches

Following the high-pass filter is a 6th-order loudspeaker equalization feature. A ten-segment DIP switch (S108 for Channel 1); (S208 for Channel 2) sets the +6 dB boost frequency of the vented-box equalization filter. Note: (Switch 7 is not active and can be set to either the “ON” or “OFF”) position. This feature is used for loudspeakers that have been designed as a 6th-order system and require 2nd-order equalization to achieve optimum performance. The filter uses the Sallen-Key non-inverting second-order high-pass topology. The loudspeaker manufacturer determines the frequency to which this filter should be set. Low-Frequency Equalization is factory-set to Flat (Figure 2.5 shows a complete listing of equalization points and the corresponding switch positions; Figure 2.6 shows typical response curves for the filter).

### F. Constant-Directivity Horn Equalization DIP Switches

This ten-segment DIP Switch (S109 for Channel 1); (S209 for Channel 2) sets both the +3-dB shelving frequency and the –3-dB low-pass roll-off frequency of the constant-directivity horn equalization filter. Constant-directivity horns have an inherent roll-off in their

response that must be corrected electronically by this filter. The actual response is determined by the combination of a stage of first-order boost (controlled by switches 8, 9, and 10) and a stage of second-order high-frequency roll off (controlled by switches 1-6),

*Note: switch 7 is not active and can be set at either the "ON" or "OFF" position.*

The loudspeaker manufacturer determines the frequencies to which these switches should be set. Constant-Directivity Horn Equalization is factory-set to Flat. Refer to Figure 2.7a for –3-dB low pass roll-off frequency settings and corresponding switch positions. Refer to Figure 2.7a for +3-dB shelving frequency settings and corresponding switch positions. Figure 2.8 shows sample response curves.

## **G. Compressor Threshold Potentiometer**

The compressor occurs in the signal path after the filters and equalizers. A variable-threshold signal-driven compressor is provided and by default is ON and is error driven. With error-driven compression, the compressor will activate if the amplifier clips, regardless of the output signal. Error-driven compression is useful when the possibility of over-driving the amplifier by several dB is present and the resulting distortion is unacceptable.

Reducing the output voltage at which the compressor will activate is useful for applications where driver and/or system protection is desired. Compression will then limit the output voltage to a predetermined level, even as the input to the amplifier is increased.

Attack time is 10 msec and release time is 360 msec. The compressor has an infinite compression ratio, meaning that when the threshold is

reached, an increase in input level will not result in a change in output level. The range of compression is 16 dB. If the input is driven more than 16 dB over the threshold, the portion of the signal over 16 dB will be passed linearly. At that point, the next limit to output will be amplifier clipping. (See Figure 2.9 for a table of potentiometer settings and the corresponding voltage and power outputs from the amplifier.)

## **H. Compressor Control**

This two-position jumper block controls the feedback path that will drive the compressors. The compressor in a certain channel can be controlled by the error amplifier of that channel, the error amplifier of the other channel, or neither (compressor turned off). When the compressor is turned off, no amplifier condition, whether it is high output voltage or clipping, will cause the compressor to activate. To turn the compressor off, place the jumper on only one pin of the jumper block.

## **I. Daisy Output Jumpers**

These two-position jumpers are used to select between sending the processed signal (NORM) and the unprocessed signal (BYPASS) to the daisy chain outputs. Sending the processed signal to the daisy chain outputs will allow two or more amplifiers to run off of the same processed signal, so only one P.I.P.–BP1 would have to be used (the signal needs only to be processed once for all of the amplifiers that need the signal). Sending the unprocessed signal to the daisy chain outputs will enable the use of other P.I.P.–BP1 modules with different DIP switch settings or the use of other P.I.P. modules to perform different functions on the same input signal. Both jumpers of each channel must be in the same position for correct operation.

### J. Input Ground Lift Jumper

The unit is shipped from the factory with pin 1 of each input XLR connected to signal ground through independent 0-ohm resistors. If hum problems are

experienced, the appropriate resistor may be removed. This will then connect pin 1 of the XLR from that channel to signal ground through an 82-ohm resistor in parallel with a 0.1µF capacitor.

## Low Pass Frequencies

CUTOFF FREQUENCIES										Low Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
ON	ON	ON	ON	ON	ON	ON	ON	...	...	20000
OFF	ON	ON	ON	ON	ON	ON	ON	...	...	15800
ON	OFF	ON	ON	ON	ON	ON	ON	...	...	12300
OFF	OFF	ON	ON	ON	ON	ON	ON	...	...	10600
ON	ON	OFF	ON	ON	ON	ON	ON	...	...	8000
OFF	ON	OFF	ON	ON	ON	ON	ON	...	...	7228
ON	OFF	OFF	ON	ON	ON	ON	ON	...	...	6412
OFF	OFF	OFF	ON	ON	ON	ON	ON	...	...	5907
ON	ON	ON	OFF	ON	ON	ON	ON	...	...	4000
OFF	ON	ON	OFF	ON	ON	ON	ON	...	...	3783
ON	OFF	ON	OFF	ON	ON	ON	ON	...	...	3547
OFF	OFF	ON	OFF	ON	ON	ON	ON	...	...	3386
ON	ON	OFF	OFF	ON	ON	ON	ON	...	...	3067
OFF	ON	OFF	OFF	ON	ON	ON	ON	...	...	2947
ON	OFF	OFF	OFF	ON	ON	ON	ON	...	...	2802
OFF	OFF	OFF	OFF	ON	ON	ON	ON	...	...	2701
ON	ON	ON	ON	OFF	ON	ON	ON	...	...	1800
OFF	ON	ON	ON	OFF	ON	ON	ON	...	...	1775
ON	OFF	ON	ON	OFF	ON	ON	ON	...	...	1721
OFF	OFF	ON	ON	OFF	ON	ON	ON	...	...	1683
ON	ON	OFF	ON	OFF	ON	ON	ON	...	...	1600
OFF	ON	OFF	ON	OFF	ON	ON	ON	...	...	1567
ON	OFF	OFF	ON	OFF	ON	ON	ON	...	...	1525
OFF	OFF	OFF	ON	OFF	ON	ON	ON	...	...	1494
ON	ON	ON	OFF	OFF	ON	ON	ON	...	...	1332

CUTOFF FREQUENCIES										Low Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
OFF	ON	ON	OFF	OFF	ON	ON	ON	...	...	1308
ON	OFF	ON	OFF	OFF	ON	ON	ON	...	...	1279
OFF	OFF	ON	OFF	OFF	ON	ON	ON	...	...	1257
ON	ON	OFF	OFF	OFF	ON	ON	ON	...	...	1211
OFF	ON	OFF	OFF	OFF	ON	ON	ON	...	...	1191
ON	OFF	OFF	OFF	OFF	ON	ON	ON	...	...	1167
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	...	...	1149
ON	ON	ON	ON	ON	OFF	ON	ON	...	...	772
OFF	ON	ON	ON	ON	OFF	ON	ON	...	...	764
ON	OFF	ON	ON	ON	OFF	ON	ON	...	...	750
OFF	OFF	ON	ON	ON	OFF	ON	ON	...	...	747
ON	ON	OFF	ON	ON	OFF	ON	ON	...	...	730
OFF	ON	OFF	ON	ON	OFF	ON	ON	...	...	723
ON	OFF	OFF	ON	ON	OFF	ON	ON	...	...	714
OFF	OFF	OFF	ON	ON	OFF	ON	ON	...	...	707
ON	ON	ON	OFF	ON	OFF	ON	ON	...	...	668
OFF	ON	ON	OFF	ON	OFF	ON	ON	...	...	663
ON	OFF	ON	OFF	ON	OFF	ON	ON	...	...	655
OFF	OFF	ON	OFF	ON	OFF	ON	ON	...	...	649
ON	ON	OFF	OFF	ON	OFF	ON	ON	...	...	637
OFF	ON	OFF	OFF	ON	OFF	ON	ON	...	...	631
ON	OFF	OFF	OFF	ON	OFF	ON	ON	...	...	624
OFF	OFF	OFF	OFF	ON	OFF	ON	ON	...	...	619
ON	ON	ON	OFF	OFF	ON	ON	ON	...	...	557
OFF	ON	ON	ON	OFF	OFF	ON	ON	...	...	553

Figure 2.2a Low Pass Cutoff Frequencies

Note: Switches 9 and 10 are not active. "..." denotes switch may be set to either the ON or OFF position.

## Low Pass Frequencies

CUTOFF FREQUENCIES										Low Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
ON	OFF	ON	ON	OFF	OFF	ON	ON	---	---	548
OFF	OFF	ON	ON	OFF	OFF	ON	ON	---	---	544
ON	ON	OFF	ON	OFF	OFF	ON	ON	---	---	535
OFF	ON	OFF	ON	OFF	OFF	ON	ON	---	---	531
ON	OFF	OFF	ON	OFF	OFF	ON	ON	---	---	526
OFF	OFF	OFF	ON	OFF	OFF	ON	ON	---	---	522
ON	ON	ON	ON	OFF	OFF	ON	ON	---	---	501
OFF	ON	ON	OFF	OFF	OFF	ON	ON	---	---	498
ON	OFF	ON	OFF	OFF	OFF	ON	ON	---	---	493
OFF	OFF	ON	OFF	OFF	OFF	ON	ON	---	---	490
ON	ON	OFF	OFF	OFF	OFF	ON	ON	---	---	483
OFF	ON	OFF	OFF	OFF	OFF	ON	ON	---	---	480
ON	OFF	OFF	OFF	OFF	OFF	ON	ON	---	---	476
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	---	---	473
ON	ON	ON	ON	ON	ON	OFF	ON	---	---	326
OFF	ON	ON	ON	ON	ON	OFF	ON	---	---	324
ON	OFF	ON	ON	ON	ON	OFF	ON	---	---	322
OFF	OFF	ON	ON	ON	ON	OFF	ON	---	---	321
ON	ON	OFF	ON	ON	ON	OFF	ON	---	---	318
OFF	ON	OFF	ON	ON	ON	OFF	ON	---	---	317
ON	OFF	OFF	ON	ON	ON	OFF	ON	---	---	315
OFF	OFF	OFF	ON	ON	ON	OFF	ON	---	---	314
ON	ON	ON	OFF	ON	ON	OFF	ON	---	---	306
OFF	ON	ON	OFF	ON	ON	OFF	ON	---	---	304
ON	OFF	ON	OFF	ON	ON	OFF	ON	---	---	303

CUTOFF FREQUENCIES										Low Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
OFF	OFF	ON	OFF	ON	ON	OFF	ON	---	---	302
ON	ON	OFF	OFF	ON	ON	OFF	ON	---	---	300
OFF	ON	OFF	OFF	ON	ON	OFF	ON	---	---	298
ON	OFF	OFF	OFF	ON	ON	OFF	ON	---	---	296
OFF	OFF	OFF	OFF	ON	ON	OFF	ON	---	---	295
ON	ON	ON	ON	OFF	ON	OFF	ON	---	---	280
OFF	ON	ON	ON	OFF	ON	OFF	ON	---	---	279
ON	OFF	ON	ON	OFF	ON	OFF	ON	---	---	278
OFF	OFF	ON	ON	OFF	ON	OFF	ON	---	---	277
ON	ON	OFF	ON	OFF	ON	OFF	ON	---	---	274
OFF	ON	OFF	ON	OFF	ON	OFF	ON	---	---	273
ON	OFF	OFF	ON	OFF	ON	OFF	ON	---	---	272
OFF	OFF	OFF	ON	OFF	ON	OFF	ON	---	---	271
ON	ON	ON	OFF	OFF	ON	OFF	ON	---	---	265
OFF	ON	ON	OFF	OFF	ON	OFF	ON	---	---	264
ON	OFF	ON	OFF	OFF	ON	OFF	ON	---	---	263
OFF	OFF	ON	OFF	OFF	ON	OFF	ON	---	---	262
ON	ON	OFF	OFF	OFF	ON	OFF	ON	---	---	260
OFF	ON	OFF	OFF	OFF	ON	OFF	ON	---	---	259
ON	OFF	OFF	OFF	OFF	ON	OFF	ON	---	---	258
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	---	---	257
ON	ON	ON	ON	ON	OFF	OFF	ON	---	---	232
OFF	ON	ON	ON	ON	OFF	OFF	ON	---	---	231
ON	OFF	ON	ON	ON	OFF	OFF	ON	---	---	230
OFF	OFF	ON	ON	ON	OFF	OFF	ON	---	---	229

*Figure 2.2b Low Pass Cutoff Frequencies*

Note: Switches 9 and 10 are not active.  
 "---" denotes switch may be set to either the ON or OFF position.



### Low Pass Frequencies

CUTOFF FREQUENCIES										
Switch Settings										Low Pass Frequency (Hz)
1	2	3	4	5	6	7	8	9	10	
ON	ON	OFF	ON	ON	OFF	OFF	ON	---	---	228
OFF	ON	OFF	ON	ON	OFF	OFF	ON	---	---	227
ON	OFF	OFF	ON	ON	OFF	OFF	ON	---	---	226
ON	ON	ON	OFF	ON	OFF	OFF	ON	---	---	221
ON	OFF	ON	OFF	ON	OFF	OFF	ON	---	---	220
OFF	OFF	ON	OFF	ON	OFF	OFF	ON	---	---	219
ON	ON	OFF	OFF	ON	OFF	OFF	ON	---	---	218
OFF	ON	OFF	OFF	ON	OFF	OFF	ON	---	---	217
ON	OFF	OFF	OFF	ON	OFF	OFF	ON	---	---	216
ON	ON	ON	ON	OFF	OFF	OFF	ON	---	---	208
OFF	ON	ON	ON	OFF	OFF	OFF	ON	---	---	207
ON	OFF	ON	ON	OFF	OFF	OFF	ON	---	---	206
ON	ON	OFF	ON	OFF	OFF	OFF	ON	---	---	204
ON	OFF	OFF	ON	OFF	OFF	OFF	ON	---	---	203
ON	ON	ON	ON	OFF	OFF	OFF	OFF	---	---	199
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	---	---	198
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	---	---	196
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	---	---	195
ON	ON	ON	ON	ON	ON	ON	OFF	---	---	132
ON	ON	OFF	ON	ON	ON	ON	OFF	---	---	131
OFF	OFF	OFF	ON	ON	ON	ON	OFF	---	---	130
ON	ON	ON	OF	ON	ON	ON	OFF	---	---	129
OFF	OFF	ON	OFF	ON	ON	ON	OFF	---	---	128
ON	OFF	OFF	OFF	ON	ON	ON	OFF	---	---	127
ON	ON	ON	ON	OFF	ON	ON	OFF	---	---	124
ON	ON	OFF	ON	OFF	ON	ON	OFF	---	---	123

CUTOFF FREQUENCIES										
Switch Settings										Low Pass Frequency (Hz)
1	2	3	4	5	6	7	8	9	10	
OFF	OFF	OFF	ON	OFF	ON	ON	OFF	---	---	122
ON	ON	ON	OFF	OFF	ON	ON	OFF	---	---	121
ON	ON	OFF	OFF	OFF	ON	ON	OFF	---	---	120
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	---	---	119
ON	ON	ON	ON	ON	OFF	ON	OFF	---	---	114
ON	OFF	ON	ON	ON	OFF	ON	OFF	---	---	113
ON	OFF	OFF	ON	ON	OFF	ON	OFF	---	---	112
ON	ON	ON	ON	OFF	ON	OFF	ON	---	---	111
ON	ON	OFF	OFF	ON	OFF	ON	OFF	---	---	110
ON	ON	ON	ON	OFF	OFF	ON	OFF	---	---	108
OFF	ON	ON	ON	OFF	OFF	ON	OFF	---	---	107
ON	OFF	OFF	ON	OFF	OFF	ON	OFF	---	---	106
ON	ON	ON	ON	OFF	OFF	OFF	ON	---	---	105
ON	ON	OFF	OFF	OFF	OFF	ON	OFF	---	---	104
ON	ON	ON	ON	ON	ON	OFF	OFF	---	---	95
OFF	ON	ON	ON	ON	ON	OFF	OFF	---	---	94
ON	ON	ON	OFF	ON	ON	OFF	OFF	---	---	93
OFF	OFF	ON	OFF	ON	ON	OFF	OFF	---	---	92
ON	ON	ON	ON	OFF	ON	OFF	OFF	---	---	90
ON	OFF	OFF	ON	OFF	ON	OFF	OFF	---	---	89
ON	OFF	ON	OFF	OFF	ON	OFF	OFF	---	---	88
ON	ON	ON	ON	ON	OFF	OFF	OFF	---	---	85
ON	OFF	ON	ON	ON	OFF	OFF	OFF	---	---	84
ON	ON	ON	ON	ON	OFF	OFF	OFF	---	---	83
ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	---	---	82
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	---	---	80

Figure 2.2c Low Pass Cutoff Frequencies

Note: Switches 9 and 10 are not active.  
 "---" denotes switch may be set to either the ON or OFF position.

## High Pass Frequencies

CUTOFF FREQUENCIES										High Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	---	---	23
OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	---	---	24
ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	---	---	25
ON	OFF	ON	OFF	OFF	ON	OFF	OFF	---	---	26
ON	OFF	OFF	ON	OFF	ON	OFF	OFF	---	---	27
ON	ON	ON	OFF	ON	ON	OFF	OFF	---	---	28
ON	ON	OFF	OFF	OFF	OFF	ON	OFF	---	---	32
ON	ON	OFF	OFF	ON	OFF	ON	OFF	---	---	33
ON	OFF	OFF	ON	ON	OFF	ON	OFF	---	---	34
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	---	---	36
ON	ON	ON	OFF	OFF	ON	ON	OFF	---	---	37
ON	OFF	OFF	OFF	ON	ON	ON	OFF	---	---	38
OFF	OFF	ON	OFF	ON	ON	ON	OFF	---	---	39
ON	ON	ON	ON	ON	ON	ON	OFF	---	---	40
ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	---	---	58
ON	ON	ON	OFF	OFF	OFF	OFF	ON	---	---	59
ON	OFF	OFF	ON	OFF	OFF	OFF	ON	---	---	60
ON	OFF	ON	ON	OFF	OFF	OFF	ON	---	---	61
ON	OFF	OFF	OFF	ON	OFF	OFF	ON	---	---	64
ON	ON	ON	OFF	ON	OFF	OFF	ON	---	---	65
ON	OFF	OFF	ON	ON	OFF	OFF	ON	---	---	66
OFF	ON	OFF	OFF	OFF	ON	OFF	ON	---	---	76
ON	ON	OFF	OFF	OFF	ON	OFF	ON	---	---	77
OFF	ON	ON	OFF	OFF	ON	OFF	ON	---	---	78
OFF	OFF	OFF	ON	OFF	ON	OFF	ON	---	---	79

CUTOFF FREQUENCIES										High Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
ON	OFF	OFF	ON	OFF	ON	OFF	ON	---	---	80
OFF	OFF	ON	ON	OFF	ON	OFF	ON	---	---	81
ON	ON	ON	ON	OFF	ON	OFF	ON	---	---	82
OFF	OFF	OFF	OFF	ON	ON	OFF	ON	---	---	86
ON	OFF	OFF	OFF	ON	ON	OFF	ON	---	---	87
OFF	OFF	ON	OFF	ON	ON	OFF	ON	---	---	88
OFF	ON	ON	OFF	ON	ON	OFF	ON	---	---	89
OFF	OFF	OFF	ON	ON	ON	OFF	ON	---	---	91
OFF	ON	OFF	ON	ON	ON	OFF	ON	---	---	92
OFF	OFF	ON	ON	ON	ON	OFF	ON	---	---	93
ON	ON	ON	ON	ON	ON	OFF	ON	---	---	94
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	---	---	148
ON	OFF	OFF	OFF	OFF	OFF	ON	ON	---	---	149
OFF	ON	OFF	OFF	OFF	OFF	ON	ON	---	---	150
ON	ON	OFF	OFF	OFF	OFF	ON	ON	---	---	151
OFF	OFF	ON	OFF	OFF	OFF	ON	ON	---	---	153
ON	OFF	ON	OFF	OFF	OFF	ON	ON	---	---	154
OFF	ON	ON	OFF	OFF	OFF	ON	ON	---	---	155
ON	ON	ON	OFF	OFF	OFF	ON	ON	---	---	156
OFF	OFF	OFF	ON	OFF	OFF	ON	ON	---	---	162
ON	OFF	OFF	ON	OFF	OFF	ON	ON	---	---	163
OFF	ON	OFF	ON	OFF	OFF	ON	ON	---	---	165
ON	ON	OFF	ON	OFF	OFF	ON	ON	---	---	166
OFF	OFF	ON	ON	OFF	OFF	ON	ON	---	---	168
ON	OFF	ON	ON	OFF	OFF	ON	ON	---	---	169

*Figure 2.2d High Pass Cutoff Frequencies*

Note: Switches 9 and 10 are not active.  
 "---" denotes switch may be set to either the ON or OFF position.

### High Pass Frequencies

CUTOFF FREQUENCIES										High Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
OFF	ON	ON	ON	OFF	OFF	ON	ON	---	---	170
ON	ON	ON	ON	OFF	OFF	ON	ON	---	---	171
OFF	OFF	OFF	OFF	ON	OFF	ON	ON	---	---	194
ON	OFF	OFF	OFF	ON	OFF	ON	ON	---	---	195
OFF	ON	OFF	OFF	ON	OFF	ON	ON	---	---	197
ON	ON	OFF	OFF	ON	OFF	ON	ON	---	---	200
OFF	OFF	ON	OFF	ON	OFF	ON	ON	---	---	202
ON	OFF	ON	OFF	ON	OFF	ON	ON	---	---	203
OFF	ON	ON	OFF	ON	OFF	ON	ON	---	---	205
ON	ON	ON	OFF	ON	OFF	ON	ON	---	---	207
OFF	OFF	OFF	ON	ON	OFF	ON	ON	---	---	219
ON	OFF	OFF	ON	ON	OFF	ON	ON	---	---	221
OFF	ON	OFF	ON	ON	OFF	ON	ON	---	---	223
ON	ON	OFF	ON	ON	OFF	ON	ON	---	---	225
OFF	OFF	ON	ON	ON	OFF	ON	ON	---	---	229
ON	OFF	ON	ON	ON	OFF	ON	ON	---	---	231
OFF	ON	ON	ON	ON	OFF	ON	ON	---	---	234
ON	ON	ON	ON	ON	OFF	ON	ON	---	---	236
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	---	---	385
ON	OFF	OFF	OFF	OFF	ON	ON	ON	---	---	390
OFF	ON	OFF	OFF	OFF	ON	ON	ON	---	---	398
ON	ON	OFF	OFF	OFF	ON	ON	ON	---	---	403
OFF	OFF	ON	OFF	OFF	ON	ON	ON	---	---	419
ON	OFF	ON	OFF	OFF	ON	ON	ON	---	---	425
OFF	ON	ON	OFF	OFF	ON	ON	ON	---	---	434

CUTOFF FREQUENCIES										High Pass Frequency (Hz)
Switch Settings										
1	2	3	4	5	6	7	8	9	10	
ON	ON	ON	OFF	OFF	ON	ON	ON	---	---	440
OFF	OFF	OFF	ON	OFF	ON	ON	ON	---	---	500
ON	OFF	OFF	ON	OFF	ON	ON	ON	---	---	509
OFF	ON	OFF	ON	OFF	ON	ON	ON	---	---	522
ON	ON	OFF	ON	OFF	ON	ON	ON	---	---	531
OFF	OFF	ON	ON	OFF	ON	ON	ON	---	---	558
ON	OFF	ON	ON	OFF	ON	ON	ON	---	---	569
OFF	ON	ON	ON	OFF	ON	ON	ON	---	---	586
ON	ON	ON	ON	OFF	ON	ON	ON	---	---	625
OFF	OFF	OFF	OFF	ON	ON	ON	ON	---	---	997
ON	OFF	OFF	OFF	ON	ON	ON	ON	---	---	1031
OFF	ON	OFF	OFF	ON	ON	ON	ON	---	---	1088
ON	ON	OFF	OFF	ON	ON	ON	ON	---	---	1128
OFF	OFF	ON	OFF	ON	ON	ON	ON	---	---	1258
ON	OFF	ON	OFF	ON	ON	ON	ON	---	---	1311
OFF	ON	ON	OFF	ON	ON	ON	ON	---	---	1405
ON	ON	ON	OFF	ON	ON	ON	ON	---	---	1500
OFF	OFF	OFF	ON	ON	ON	ON	ON	---	---	2458
ON	OFF	OFF	ON	ON	ON	ON	ON	---	---	2673
OFF	ON	OFF	ON	ON	ON	ON	ON	---	---	3091
ON	ON	OFF	ON	ON	ON	ON	ON	---	---	3400
OFF	OFF	ON	ON	ON	ON	ON	ON	---	---	5000
ON	OFF	ON	ON	ON	ON	ON	ON	---	---	6000
OFF	ON	ON	ON	ON	ON	ON	ON	---	---	8700
ON	ON	ON	ON	ON	ON	ON	ON	---	---	1200

Figure 2.2e High Pass Cutoff Frequencies

Note: Switches 9 and 10 are not active.  
 "---" denotes switch may be set to either the ON or OFF position.

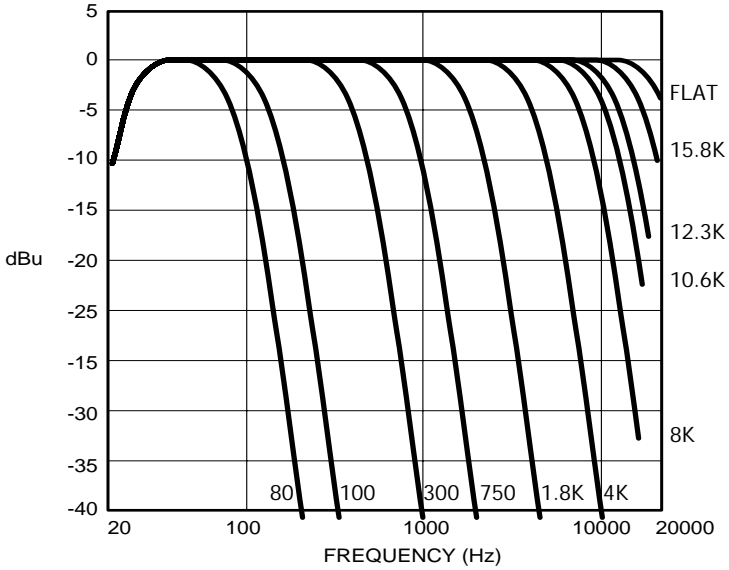


Fig. 2.3 Low-Pass Frequency Responses

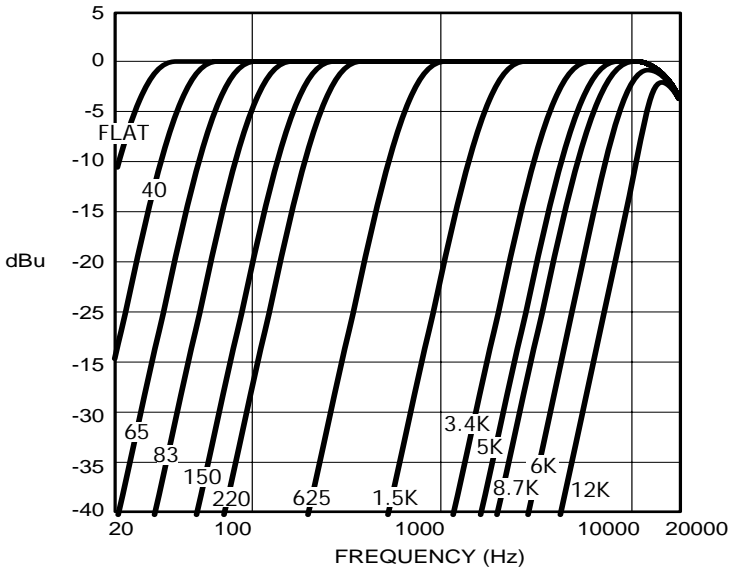


Fig. 2.4 High-Pass Frequency Responses

LOW-FREQUENCY (BOX) EQUALIZATION										
Switch Settings										+6 dB Freq. (Hz)
1	2	3	4	5	6	7	8	9	10	
ON	ON	ON	OFF	OFF	OFF	---	ON	ON	ON	20
ON	ON	OFF	OFF	ON	ON	---	OFF	ON	ON	24
OFF	ON	ON	OFF	OFF	OFF	---	ON	ON	OFF	28
ON	ON	ON	OFF	ON	ON	---	ON	ON	ON	30
ON	ON	OFF	OFF	ON	ON	---	OFF	ON	ON	36
OFF	ON	OFF	OFF	OFF	OFF	---	OFF	ON	OFF	38
OFF	ON	ON	OFF	ON	ON	---	ON	ON	OFF	42
ON	OFF	ON	OFF	OFF	OFF	---	ON	OFF	ON	44
OFF	ON	OFF	OFF	ON	ON	---	OFF	ON	OFF	56
ON	OFF	ON	OFF	ON	ON	---	ON	OFF	ON	65
ON	OFF	OFF	OFF	OFF	OFF	---	OFF	OFF	ON	68
ON	OFF	OFF	OFF	ON	ON	---	OFF	OFF	ON	102
OFF	OFF	ON	OFF	OFF	OFF	---	ON	OFF	OFF	120
OFF	OFF	ON	OFF	ON	ON	---	ON	OFF	OFF	180
---	--	---	ON	---	---	---	---	---	---	FLAT

Fig. 2.5 Low Frequency EQ Settings

Note: Switch 7 not active.  
 "----" denotes switch may be set to either the ON or OFF position.

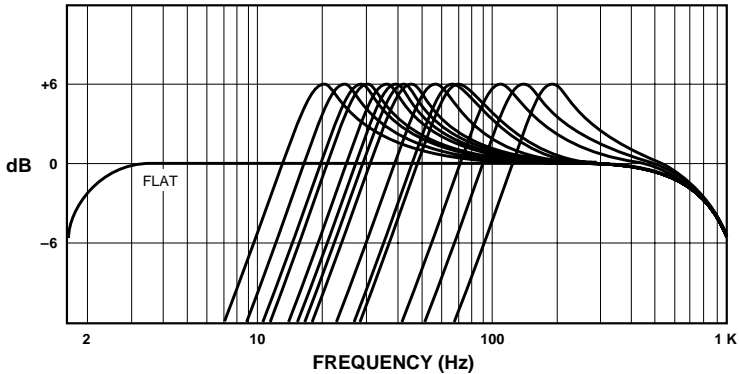


Fig. 2.6 Low-Frequency EQ Response Curves

CONSTANT-DIRECTIVITY HORN EQUALIZATION							
–3dB Roll-Off Frequency Settings (Switches 1-6) S109 and S209							
Switch Settings							–3dB Roll-Off Frequency (kHz)
1	2	3	4	5	6	7	
OFF	OFF	OFF	OFF	OFF	OFF	---	12
ON	OFF	OFF	ON	OFF	OFF	---	15
OFF	ON	OFF	ON	ON	OFF	---	16
ON	ON	OFF	ON	ON	OFF	---	18
OFF	OFF	ON	OFF	OFF	ON	---	22
ON	OFF	ON	ON	OFF	ON	---	25
OFF	ON	ON	OFF	ON	ON	---	26
ON	ON	ON	ON	ON	ON	---	28

*Fig. 2.7a –3dB Roll-Off Frequency Settings for CD Horn EQ*

CONSTANT-DIRECTIVITY HORN EQUALIZATION				
+3dB Shelving Frequency Settings (Switches 8-10) S109 and S209				
Switch Settings				+3dB Shelving Frequency (kHz)
7	8	9	10	
---	ON	ON	ON	1.8
---	OFF	ON	ON	2.2
---	ON	OFF	ON	2.4
---	OFF	OFF	ON	3.2
---	ON	ON	OFF	4.0
---	OFF	ON	OFF	6.8
---	ON	OFF	OFF	10
---	OFF	OFF	OFF	FLAT

*Fig. 2.7b –3dB Shelving Frequency Settings for CD Horn EQ*

Note: Switch 7 not active.  
 "–" denotes switch may be set to either the ON or OFF position.

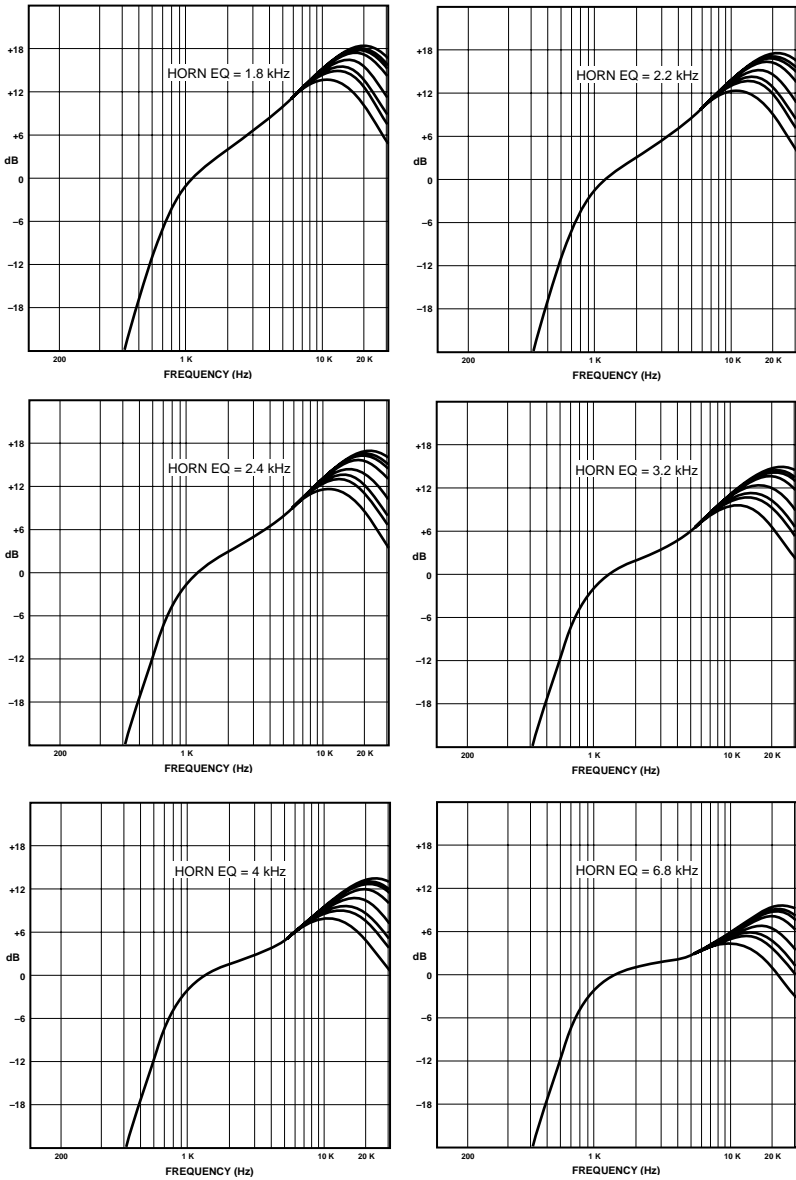


Fig. 2.8a High-Frequency EQ Response Curves (800 Hz High-Pass)

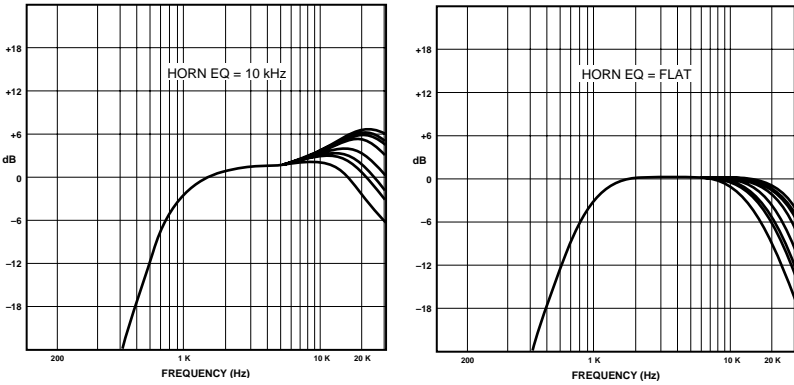


Fig. 2.8b High-Frequency EQ Response Curves (800 Hz High-Pass)

THRESHOLD CONVERSION				
Percent Rotation	RMS Volts	Watts @ 8 Ohms	Watts @ 4 Ohms	Watts @ 2 Ohms
5	4	2	5	9
10	9	10	20	39
15	14	23	46	92
20	18	43	85	170
25	24	69	139	278
30	29	105	209	419
35	35	149	298	596
40	40	204	408	817
45	47	271	542	1085
50	53	352	703	1407
55	60	448	895	1790
60	67	561	1122	2244
65	75	695	1389	2778
70	83	851	1702	3404
75	91	1033	2067	4134
80	100	1246	2492	4984
85	109	1493	2986	5973
90	119	1780	3561	7121
95	130	2114	4227	8455
100	141	2501	5002	10003

OUTPUT VOLTAGE POT  
PERCENTAGE OF ROTATION

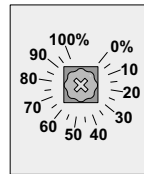


Fig. 2.9 Threshold Conversion Table  
(Peak Power in Watts to RMS Volts)



### 3 Installation

To avoid damaging the P.I.P.–BP1, turn off the amplifier's power before making any changes (the P.I.P.–EXT accessory should not be used to adjust settings with the power on).

#### Input/Output Wiring

Both models of the P.I.P.–BP1, have balanced inputs and daisy-chain outputs. XLR connectors are supplied with the P.I.P.–BP1X and are wired such that pin 1 is ground, pin 2 is non-inverting ("hot"), and pin 3 is inverting. (Figures 3.1 and 3.2 illustrate this.)

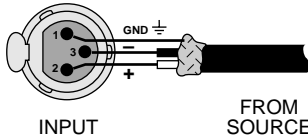


Fig. 3.1 Balanced Input Wiring

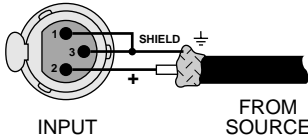


Fig. 3.2 Unbalanced Input Wiring

The P.I.P.–BP1C, comes supplied with removable barrier block connectors. These connectors are wired with pin 1 non-inverting ("hot"), pin 2 ground and pin 3 inverting. (See Figure 3.3.) Mating barrier block connectors are supplied with the unit that are used to attach to the interconnecting cables. The barrier block connectors can then be connected and disconnected easily.

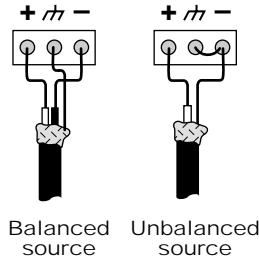


Fig. 3.3 Audio Wiring

Some Crown amplifiers come supplied with permanent 1/4-inch input jacks. These should not be used for input while the P.I.P.–BP1, is installed but they may be used as unbalanced daisy chain outputs with loads greater than 5 k ohms. If used in this manner, the signal available at each jack will be the channel output signal from the PIP. This signal is the same signal that is sent to the amplifier to which the PIP is connected. This provides another way to have several amplifiers track the signal that one P.I.P.–BP1 produces. (Another is to use the daisy chain outputs of the PIP.)

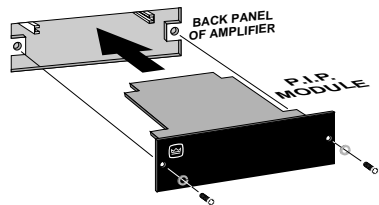


Fig. 3.4 Installation into a Standard P.I.P. Amplifier

## Installation

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

**CAUTION:** Before connecting this or any *PIP* to your amplifier, it is important to turn the amplifier's level controls down, turn it off and remove the AC power. Don't touch the circuitry. Even though the 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 *PIP* module or panel (two screws). For *PIP2* amplifiers, this may involve disconnecting the *PIP* from a *PIP2* input adapter (see Figures 3.5 and 3.6). 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.

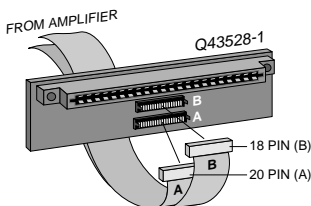


Fig. 3.5 *PIP2* Input Adapter Connection

3. **Standard *PIP* Amplifiers:** Align the edges of the *P.I.P.–BP1* in the *P.I.P.* card rails and firmly push the unit in until it is seated against the mounting bracket (see Figure 3.4).

***PIP2* Amplifiers:** (Requires a *PIP2* input adaptor, included.) Connect the *PIP2* input adapter to the two

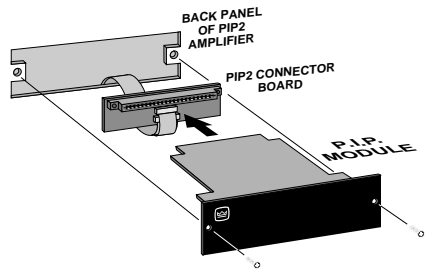


Fig. 3.6 Installation into a *PIP2* Amplifier

input cables of the amplifier (see Figure 3.5). Notice that the *PIP2* input adapter should be positioned with the *PIP* 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 ribbon cables should extend below the *PIP2* input adapter.

Next, insert the edge connector of the *P.I.P.–BP1* into the *PIP2* input adapter (see Figure 3.6) and insert the assembly into the *PIP* opening in the back of the amplifier.

4. Tighten the two *PIP* mounting screws.
5. Connect input and output wiring as described in the preceding section (Input/Output Wiring).
6. Plug in the amplifier and turn it on. Adjust its level controls to a desired setting. (In Dual mode, the level controls can now be used to balance the low and high frequencies.)

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.

## 4 Specifications

**Signal to Noise Ratio:** Greater than 85 dB (equivalent input noise) from 20 Hz to 20 kHz.

**Common Mode Rejection:** Greater than 90 dB at 60 Hz; greater than 60 dB at 20 kHz.

**Crosstalk:** Greater than 46 dB below the signal level at 20 kHz.

**Harmonic Distortion:** Less than 0.05% THD at 1 kHz with any setting and no compression. Less than 0.5% at 1 kHz with 6 dB of compression.

**Input Impedance:** Nominally 36 k ohms balanced and 18 k ohms unbalanced.

**Maximum Input Level:** +18 dB at mid-band. Other bands will vary with equalizer amplitude boost.

**Nominal Gain:** Unity  $\pm$ 0.5 dB.

**Low-Pass Filter:** Butterworth, 24-dB/octave (4th order) with Sallen-Key topology. Corner Frequency: Variable from 80 Hz to 20 kHz via DIP switches. Factory set to 20 kHz.

**High-Pass Filter:** Butterworth, 24-dB/octave (4th order) with Sallen-Key topology. Corner Frequency: Variable from 23 Hz to 12 kHz via DIP switches. Factory set to 23 Hz.

**Compressor:** Driven by the audio and the *IOC*<sup>®</sup> error signal. Threshold: continuously adjustable from 0 volts to 85 VRMS or “off” such that compressor is driven by amplifier clipping. Dynamic Range: greater than 16 dB. Attack: 10 msec. Decay: 360 msec. Compression Ratio:  $\infty$ :1.

### Connectors

**Input:** Balanced female 3-pin XLR on *P.I.P.–BP1X*. Removable barrier block disconnect with mating connectors on *P.I.P.–BP1C*.

**Output:** Balanced male 3-pin XLR on *P.I.P.–BP1X*. Removable barrier block disconnect with mating connectors on *P.I.P.–BP1C*.

**Maximum Output Level:** +18 dB (into a 600-ohm load).

**Power Requirements:** The *P.I.P.–BP1* requires the  $\pm$ 24 volts that is typically supplied by amplifiers with *PIP* capability.

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

**Weight:** 10 ounces (284 grams).

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

## 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.

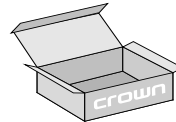
### 6.2 North American Service

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.



**Always use the original factory pack to transport the unit.**

#### 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](http://www.crownaudio.com)



# NORTHAMERICA

## 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 Crown<sup>1</sup> 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.

<sup>1</sup> 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.

## 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

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: 800-294-4094 (North America only) or 219-293-9200  
Internet: [www.crownaudio.com](http://www.crownaudio.com)