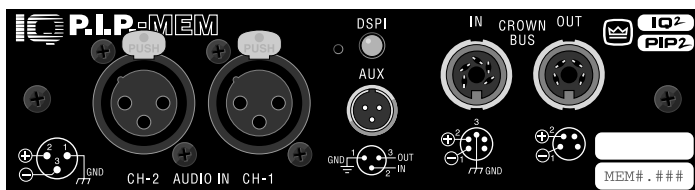


IQ P.I.P.-MEM

REFERENCE MANUAL



An IQ System[®] Programmable Input Processor for Crown[®] PIP[™]-compatible Power Amplifiers

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 219-294-8200.

Note: 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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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.

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**

Important Safety Instructions

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean only with a dry cloth.
- 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10) Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12) Use only with a cart, stand, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 15) To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.



Quick Install Procedure

This procedure is provided for those who are already familiar with Crown's IQ System and who would like to install the IQ-P.I.P.-MEM in the shortest time possible. Less experienced installers or those wishing a full explanation of the installation procedure are encouraged to go to Section 4 where the full installation procedure is described.

Prepare the IQ-P.I.P.-MEM:

1. Set the IQ address switch SW1 (see Figures 4.1 and 4.2) on the IQ-P.I.P.-MEM to an unused IQ address. (Tip: Record the IQ address on the small blank label that is provided on lower right corner of the PIP™ panel.)
2. Set the input switches S1 and S2 (see Figures 4.3 and 4.4) for the desired input gain and, if a microphone input is desired, phantom power. (Tip: Record the input setting on the small blank label that is provided on lower right corner of the PIP panel.)
3. Set jumpers JP4 and JP5. Set both jumpers JP4 and JP5 to the "OUT" position if either a PIP2-compatible amplifier (such as the Com-Tech10 Series or Macro-Tech 02 Series) will be used. Both JP4 and JP5 should be set to the "IN" position for all other amplifiers.

Prepare the amplifier:

4. Turn down the level controls of the amplifier and turn off the amplifier.
5. Unplug the power cord of the amplifier from the AC mains.
6. Remove the existing PIP or cover panel from the amplifier back panel (two screws).
7. Set the amplifier input sensitivity switch to 0.775 V. (See the Reference or Owner's Manual of the amplifier.)

Install the IQ-P.I.P.-MEM into the amplifier:

8. Carefully ground yourself to the chassis of the amplifier before installing the IQ-P.I.P.-MEM. It is a good idea to maintain ground contact between yourself and the amplifier while inserting the module into the PIP card rails in the next step.

9. Install the *IQ-P.I.P.-MEM into the amplifier:*

Standard PIP Amplifiers: Align the edges of the IQ-P.I.P.-MEM in the PIP card rails and firmly push the unit in until it seats against the mounting bracket (see Figure 4.5).

PIP2 Compatible Amplifiers: Connect the PIP2 input adapter to the amplifier input cables. Plug the IQ-P.I.P.-MEM into the PIP2 input adapter and insert the assembly into the PIP opening in the back of the amplifier (see Figure 4.6 and 4.7).

10. Tighten the two PIP mounting screws until it is secured to the amplifier back panel.

Install the wiring:

11. Connect the IQ-P.I.P.-MEM to the IQ System via the Crown Bus (see Section 4.6 if more information is needed).
12. Connect the audio signal wiring to the IQ-P.I.P.-MEM (see Section 4.7 if more information is needed).
13. Connect the amplifier back to the AC receptacle.

Adjust the levels and scale factors:

14. Turn the level controls of the amplifier to their full setting. Use the software-controlled input attenuators on the IQ-P.I.P.-MEM to adjust the input levels down.
15. *Standard PIP Amplifiers:* Manually configure the scaling factors of the IQ-P.I.P.-MEM with appropriate IQ System software.

PIP2 Compatible Amplifiers: The scaling factors will be automatically set.

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 our Technical Support Group.

Crown 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 Internet: <http://www.crownaudio.com>



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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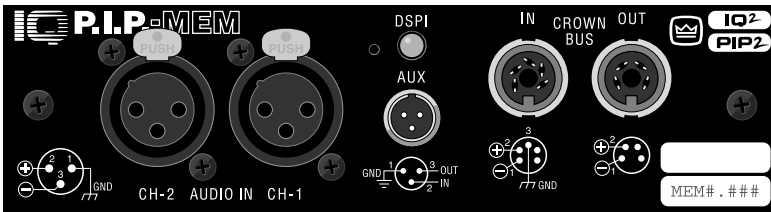


Fig. 1.1 IQ-P.I.P.-MEM

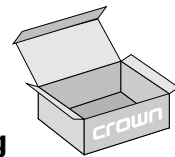
1 Welcome

The IQ-P.I.P.-MEM brings powerful monitor and control capabilities to your Crown PIP™ (programmable input processor) and PIP2-compatible amplifiers.

An IQ2-series component, the IQ-P.I.P.-MEM support Crown's UCODE protocol and requires an IQ System® with an IQ2-compatible IQ Interface (such as IQ-INT V2.00). UCODE (universal code) enables users and third parties to develop custom software objects to control and monitor IQ2-compatible components like the IQ-P.I.P.-MEM.

The IQ-P.I.P.-MEM connects the amplifier to the Crown Bus of an IQ System so the amplifier can be controlled and monitored. It is powered by the amplifier and includes a microprocessor with a memory backup feature that enables the amplifier to resume operation with all of its IQ settings in tact after a power outage.

This manual will help you successfully install your unit. We strongly recommend that you read all the instructions, warnings and cautions contained within. Also for your protection, please send in the warranty registration card today and save the bill of sale since it is your official proof of purchase.



1.1 Unpacking

The unit is shipped in a protective antistatic bag.

CAUTION: STATIC ELECTRICITY MAY DAMAGE THE UNIT. Use caution when handling the unit. Carefully ground yourself **BEFORE** touching the unit. For added safety, touch the outer metal collar of either Crown Bus connector.

Avoid unnecessarily touching the components, edge connector or solder pads on the circuit boards.

Please unpack and inspect the unit for any damage that may have occurred during transit. If damage is found, notify the transportation company immediately. Only you, the consignee, may initiate a claim with the carrier for shipping damage. Crown will be happy to cooperate fully as needed. Save the shipping carton as evidence of damage for the shipper's inspection.

Even if the unit arrived in perfect condition, as most do, save all packing materials.

NEVER SHIP THE UNIT WITHOUT THE FACTORY PACK.

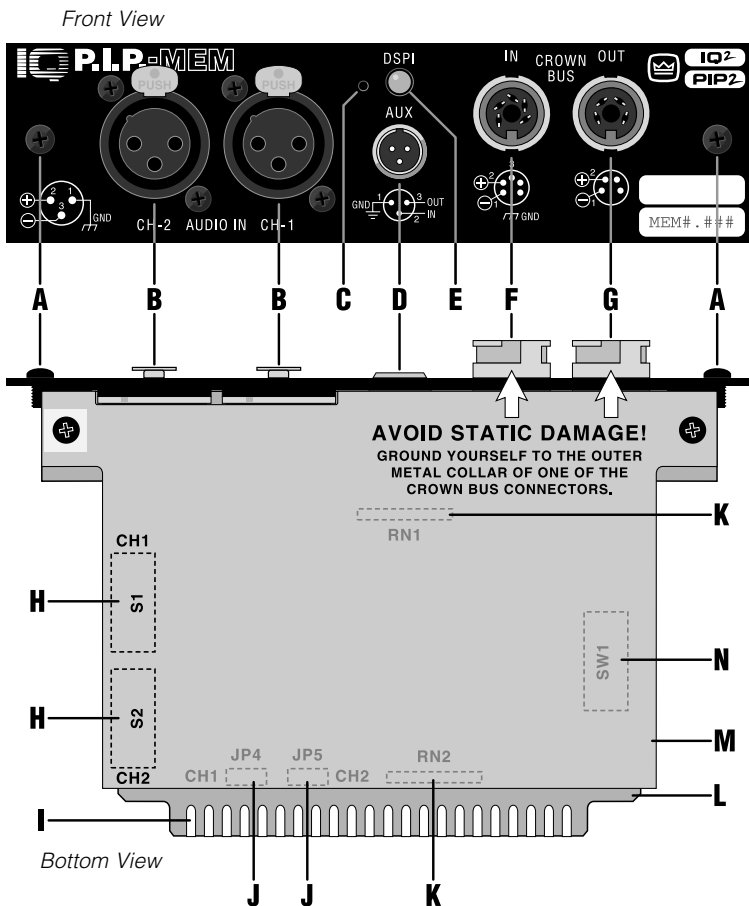


Fig. 2.1 The IQ-P.I.P.-MEM Facilities

2 Facilities

A. Mounting Screws

The IQ-P.I.P.-MEM is secured to the back panel of the amplifier with two phillips-head screws and star-tooth lock washers. The lock washers are required for proper ground connection.

B. Balanced Audio Inputs

A 3-pin female XLR connector is provided for balanced audio input to each channel of the amplifier. Pin 1 is chassis (gnd); pin 2 is not inverted (+); and pin 3 is inverted (-). *Do not use the Ch.2 input if the amplifier is configured in either Bridge or Parallel-Mono mode.*

C. Reset Switch

A multifunction reset switch is provided to restore the IQ-P.I.P.-MEM to a prior state. It can be depressed with a straightened paper clip through the small hole in the PIP panel. Press the reset switch for less than 2 seconds and all settings, except the amplifier model scale factors, will be reset with “user default” parameters and the DSPI will flash once. (If no “user default” settings have been stored, the unit will be reset to the “factory default” settings described next.) Press the reset switch for more than 2 seconds and the same settings will be reset with “factory default” parameters and the DSPI will flash twice. After the unit has been reset to the factory default settings, it will behave like a standard P.I.P.-FX until it is reprogrammed by an IQ System or it is toggled to the “user default” settings.

D. AUX Connector

A 3-pin male mini XLR connector is provided to control auxiliary equipment. When the AUX feature is turned on, +15 VDC is provided across pin 1 (gnd) and pin 3 (+). A nominal current of 10 mA is available. The AUX connector also includes a high-impedance input that can sense logic signals.

E. DSPI

The DSPI is a Data Signal Presence Indicator which flashes whenever a valid IQ command has been received. The indicator can also be forced to stay on to aid rapid troubleshooting of the Crown Bus wiring.

F. Crown Bus Input Connector

A lockable 5-pin female DIN connector is provided for input connection to the Crown Bus. A mating Switchcraft 502 series connector can be ordered from Crown (part C 7776-5). Pin 1 is negative (-), pin 2 is positive (+), and pin 3 is ground (gnd). Pins 4 and 5 are not used.

G. Crown Bus Output Connector

A lockable 4-pin female DIN connector is used for output connection to the Crown Bus. A mating Switchcraft 502 series connector can be ordered from Crown (part C 7777-3). Pin 1 is negative (-) and pin 2 is positive (+). Pins 3 and 4 are not used.

H. Input Switches (S1, S2)

An 8-section DIP switch is used to configure each input. These switches are located on the bottom circuit board. S1 configures the input of Channel 1 and S2 configures the input of Channel 2. The switches activate a microphone preamp and enable phantom power. The preamp can be turned off (0 dB gain) or set to either 20 or 40 dB of gain. See Section 4.1.

I. PIP Edge Connector

The gold-plated edge connector of the top IQ circuit board inserts into the PIP connector inside the back of the amplifier. Use care when installing a PIP module to be certain that the edge connector is properly inserted into the amplifier's PIP connector.

J. Amplifier Output Pad Jumpers (JP4, JP5)

These jumpers enable the circuitry that pads the output signal feeding the IQ-P.I.P.-MEM so it can be properly scaled. Factory default setting for these jumpers is the "OUT" position as marked on the digital circuit board. Switch to the "IN" position whenever the unit is installed into a PIP-style amplifier.

K. PIP2 SIP Sockets (RN1, RN2)

These eight-pin SIP (single in-line package) resistors are provided for full PIP2 compatibility. IQ-P.I.P.-MEM-PIP2 modules (required for PIP2-compatible amplifiers) should come with the SIP networks already installed. The SIP networks are not required and should be absent on standard IQ-P.I.P.-MEM modules.

L. IQ Circuit Board (Top)

The top circuit board contains the

IQ communication circuitry, including the IQ address switch (SW1), amplifier output pad jumpers (JP4, JP5), PIP2 SIP resistors (RN1, RN2) and the PIP edge connector.

M. Audio Circuit Board (Bottom)

The bottom circuit board contains the audio analog circuitry, including the input switches (S1, S2).

N. IQ Address Switch (SW1)

An 8-section DIP switch is used to set the IQ address of the unit (see Section 4.1). This switch is located on the top circuit board. Each IQ component on a Crown Bus is given a unique IQ address so it can be independently controlled and monitored. Two or more IQ components of the same type should NEVER have the same address on the same Crown Bus loop.

3 Features

With an IQ-P.I.P.-MEM module a Crown amplifier can be monitored and controlled by an IQ System. This typically involves a host computer (usually a PC), attached to the IQ System via an IQ2-compatible IQ interface, running IQ software. Please contact your Crown representative or Crown's Technical Support Group if you are unfamiliar with IQ software.

3.1 Amplifier Information

(PIP2 amplifiers only.) Several items of information about an amplifier can be displayed by the IQ software. These include the manufacturer, model, date code, serial number and revision level. Which items are available depends on both the amplifier and the IQ software used.

3.2 Amp Mode

The stereo/mono mode of the amplifier can be stored into the unit's memory so the IQ System is aware of the amplifier's stereo/mono switch setting. Storing this setting serves as an "electronic reminder" to the system—however, the stereo/mono mode cannot be controlled with this setting. The modes are Stereo (Dual), Bridge-Mono and Parallel-Mono. This software amp mode setting is controlled by the IQ System.

3.3 Power Control

Each channel's high-voltage supply can be independently turned on and off with the Power control. The IQ System is used to set this control.

3.4 Input Signal Level Monitor

The input signal level of each channel can be monitored by IQ software. This monitor feature has a range from +16 dBu to -40 dBu in ½ dB steps.

3.5 Signal Mute

The output signal of each channel can be independently muted by the IQ System. The function typically provides 80 dB or more of attenuation.

3.6 Polarity Inverter

The polarity of the input signal of each channel can be independently inverted by the IQ System.

3.7 Input Signal Attenuator

An attenuator is available at the input of each channel to control the input signal level. These attenuators are controlled and monitored by the IQ System. Each input attenuator has a range from 0 dB to -80 dB in ½ dB steps. (Zero equals no attenuation.)

3.8 Output Signal Level Monitor

The output signal level of each channel of the amplifier can be monitored by the IQ System. This monitor feature has a range from -40 dB to 0 dB where 0 dB is referenced to the rated output voltage of the amplifier model. (This is assumed to be 70-V or the rated 8 ohm output for Com-Tech amplifiers or the rated 8 ohm output voltage for all other amplifiers.)

The output signal of some amplifiers must be padded before the IQ-P.I.P.-MEM can scale them. This is accomplished by setting jumpers JP4 and JP5 on the IQ circuit board to the "IN" position. Only PIP2-compatible amplifiers do not require these pads. Set jumpers JP4 and JP5 to the "OUT" position for them (see Figure 4.8).

The output signals of all amplifiers must be scaled in order to "calibrate" the 0 dB level. (See Section 4.5.) This is accomplished with either an **amplifier ID code** or a user **scale factor**. The factory default setting for this is an amplifier ID code of "CT-70V" which assumes that the output level is that of a Com-Tech amplifier (any model) with both channels in the 70-V output mode. Note: PIP2-compatible amplifiers are automatically scaled by the IQ-P.I.P.-MEM.

3.9 IOC Event Monitor

The Input/Output Comparator (IOC®) of each channel of the amplifier can be monitored by the IQ System. The IOC circuitry acts as a sensitive distortion meter to provide you *proof of distortion-free performance*. If distortion of any kind equals or exceeds 0.05%, the IOC circuit will cause an indicator on the front of the amplifier to flash. By monitoring these events, the IQ System can flash an indicator on the screen of the host computer to alert a user that distortion is occurring.

3.10 ODEP Level Monitor

The Output Device Emulation

Protection (ODEP®) level of each channel of the amplifier can be monitored by the IQ software. This level represents the percent of available thermodynamic energy that is currently being used. When the ODEP level reaches 100%, the amplifier cannot produce any more power and "ODEP limiting" will begin to limit the drive level to the output devices, thereby protecting them from too much stress. (See the amplifier's Reference or Owner's Manual for more information about ODEP.)

3.11 Crown Bus "Drop Out" Relays

"Drop out" relays are provided on the Crown Bus ports to maintain the continuity of the IQ communication loop even if the IQ-P.I.P.-MEM loses power.

3.12 DSPI

A Data Signal Presence Indicator (DSPI) is provided on the front panel. It flashes whenever commands addressed to the IQ-P.I.P.-MEM are received. It can be forced to stay on by IQ software to assist with troubleshooting of an IQ System.

3.13 AUX Output

A 3-pin male mini XLR connector is provided to control auxiliary equipment. When the AUX feature is turned on, +15 VDC is provided across pin 1 (gnd) and pin 3 (+). A nominal current of 10 mA is available. The *IQ System* is used to control the AUX output.

3.14 Memory Backup

A memory backup feature is provided which can be disabled, if desired. The factory default setting is “enabled.” When enabled, it stores all run-time parameters that can be controlled by the IQ software into nonvolatile memory (EEPROM) at approximately one second intervals. When disabled, all run-time parameters are returned to the factory defaults whenever the unit loses power.

CAUTION: Be careful to turn on the memory backup feature if the input attenuators will be used to set critical levels. If the memory backup feature is turned off and the IQ-P.I.P.-MEM loses power, the attenuators will be reset to 0 dB, resulting in the loudest possible signal.

3.15 Reset

A recessed reset switch, accessible from outside the PIP panel, enables the IQ-P.I.P.-MEM to be restored to one of two sets of default settings. A straightened paper clip or similar small object is required to press the reset switch.

Press the reset switch for less than 2 seconds and all settings, except

the amplifier ID code or user scale factors, will be reset with “user default” parameters and the DSPI will flash once. This feature is only available if “user default” settings have been previously established. If none have, pressing the reset switch for any length of time will cause the unit to be reset to the “factory default” settings as described below.

Press the reset switch for more than 2 seconds and the same settings will be reset with “factory default” parameters and the DSPI will flash twice. After the unit has been reset to the factory default settings, it will behave like a standard P.I.P.-FX until it is reprogrammed by an IQ System or it is toggled to the “user default” settings.

3.16 User Default Settings

The parameters for all functions, except the amplifier ID code or user scale factors, can be saved as “user default” parameters. Then, pressing the reset switch for less than 2 seconds will restore all settings to the “user default” values. Please consult the documentation of your IQ software for instructions on setting the “user default” values.

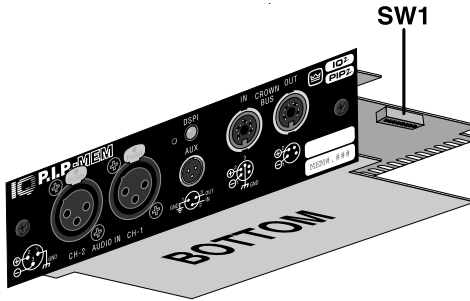


Fig. 4.1 IQ Address Switch (SW1) Location

4 Installation

Before beginning, please carefully note:

CAUTION: STATIC ELECTRICITY MAY DAMAGE THE IQ-P.I.P.-MEM MODULE. Use caution when handling the unit. Carefully ground yourself BEFORE touching the IQ-P.I.P.-MEM module. For added safety, touch the outer metal collar of either Crown Bus connector (Figure 2.1). This should safely discharge any static electricity through the ground plane of the module. Don't unnecessarily touch the components, edge connector or solder pads on the circuit boards.

NOTE — Amplifier Compatibility

The version of the IQ-P.I.P.-MEM card you received will vary depending on whether you indicated the card will be installed in a PIP2-compatible amplifier (such as the Crown Macro-Tech 02 Series or Com-Tech 10 Series amplifiers). The correct card to install in a PIP2-compatible amplifier is the IQ-P.I.P.-MEM-PIP2. The standard IQ-P.I.P.-MEM should be ordered for non-PIP2-compatible amplifiers.

Should you later wish to change the amplifier you are using for your IQ-P.I.P.-MEM installation, it is possible to alter the card's configuration by simply removing or installing two SIPS from the card's circuit boards¹. For instructions on installing or removing these SIPS, contact Crown Technical Support.

4.1 Prepare the IQ-P.I.P.-MEM

1. **Set the IQ address switch SW1.** By giving each IQ component a unique address, it can be individually controlled and monitored. Whenever the IQ System wants to send a command to just one IQ component, it first sends its address and then the command down the Crown Bus.

The 8-segment DIP switch (SW1) shown above is used to set the IQ address of the IQ-P.I.P.-MEM. No two IQ components of the same type which are connected to

¹ IQ-P.I.P.-MEM-PIP2 has SIPS installed; IQ-P.I.P.-MEM has SIPS removed.

the same Crown Bus Loop can have the same address. Suppose, for example, the IQ System has two Crown Bus loops and this IQ-P.I.P.-MEM is installed into loop 1 and given address 77. No other IQ-P.I.P.-MEM can have the same address in loop 1. However, an IQ-P.I.P.-MEM in loop 2 can have the same address.

Different IQ components in the same Crown Bus loop can have the same address. For example, both an SMX-6 mixer and an IQ-P.I.P.-MEM can use address 77 in the same loop.

A valid IQ address is any number from 1 to 250. Do not use a number higher than 250 since they are reserved for special use. An address of "0" (zero) should never be used except to put the IQ-P.I.P.-MEM into a stand-alone mode where it is invisible to the IQ System and acts as a "dumb" balanced audio input.

Switch SW1 is located on the right side on the underside of the top circuit board (Figure 4.1). It has eight segments because it actually contains eight tiny switches inside. There is an arrow printed on the switch along its left side that points to the "ON" position and the switches are numbered along the bottom (Figure 4.2).

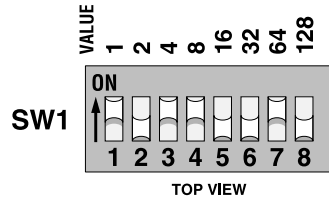


Fig. 4.2 IQ Address Switch (SW1) Values

Each of the eight switches in SW1 has a value which doubles as the switch number increases. For example switch 1 has a value of 1; switch 2 has a value of 2; switch 3 has a value of 4; switch 4 has a value of 8 and so on.

The address is determined by adding the values of all switches which are turned on. In Figure 4.2 switches 1, 3, 4 and 7 are on. Simply add the values to find the address: $1+4+8+64=77$.

A convenient series of IQ address tables are included in Section 7. The tables show the switch settings for all 250 addresses.

2. **Set the input switches S1 and S2.** Each input can be configured for either line-level or microphone-level signals with an 8-segment DIP switch. Phantom power is also available. Switches S1 and S2 (see Figure 4.3) are located on the left side of the lower circuit board. The table in Figure 4.4 shows how to set each switch.

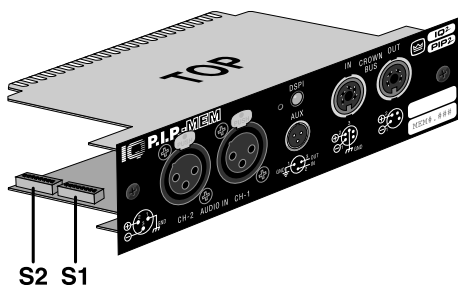


Fig. 4.3 Input Switch (S1, S2) Location

Function	Input Switch (S1, S2)							
	1	2	3	4	5	6	7	8
Phantom Power OFF	OFF	OFF						
Phantom Power ON	ON	ON						
Set Preamp to 0 dB Gain			ON	OFF	OFF	ON		
Set Preamp to 20 dB Gain			OFF	ON	ON	OFF		
Set Preamp to 40 dB Gain			OFF	OFF	OFF	OFF		

Note: DIP switch segments 7 and 8 are not used.

Fig. 4.4 Input Switch (S1, S2) Settings

IMPORTANT: Two switch segments (S1, S2) are required for each setting. Be careful to use both segments or improper operation will result.

Switch S1 configures the input to Channel 1 and switch S2 configures the input to Channel 2.

CAUTION: The IQ-P.I.P.-MEM input preamplifiers should only be used with microphone or low-level signals. Once the PIP is installed, there will be no outward indication of the input preamplifier gain setting. The protection circuitry of the amplifier will probably be activated if the preamplifier gain is set to 40 dB and a

line-level signal is connected to the input. If your amplifier appears to “cut out” when you drive it with a strong input signal, check to see if the input preamplifier gain is set too high.

Recommendations: Attach a small label to the back of the PIP to identify whether it has been set for microphone or line-level input signals. And keep the output levels low if you are uncertain of the preamplifier settings. Remember, Crown is not liable for damage due to overpowering other components.

3. **Set the jumpers JP4 and JP5.** If the IQ-P.I.P.-MEM is

being installed into a PIP2-compatible amplifier, move both jumper JP4 and JP5 on the IQ circuit board to the "OUT" position (Figures 2.1 and 4.8). Set both JP4 and JP5 to the "IN" position for all other amplifiers.

4.2 Prepare the Amplifier

4. Turn down the level controls (full counterclockwise) and turn off the amplifier.
5. Disconnect the amplifier's power cord.
6. Remove the existing PIP or cover panel from the amplifier back panel (two screws). For PIP2 amplifiers, this may involve disconnecting the PIP from a PIP2 input adapter (Figure 4.6). 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 Step 9.
7. Set the amplifier input sensitivity to 0.775 V. (See the amplifier's Reference Manual.)

4.3 Install the IQ-P.I.P.-MEM into the Amplifier

8. Carefully ground yourself to the chassis of the amplifier before installing the IQ-P.I.P.-MEM. It is a good idea to maintain ground contact between yourself and the amplifier while inserting the module into the PIP card rails (standard PIP-compat-

ible amplifiers) or the PIP2 connector (PIP2-compatible amplifiers).

9. Install the IQ-P.I.P.-MEM into the amplifier:

Standard PIP Amplifiers: Align the edges of the IQ-P.I.P.-MEM in the PIP card rails and firmly push the unit in until it is seated against the mounting bracket (see Figure 4.5).

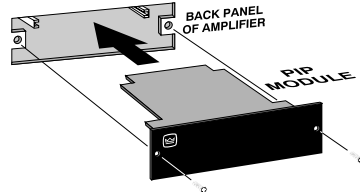


Fig. 4.5 Installation into a Standard PIP Amplifier

PIP2 Amplifiers: Connect the PIP2 input adapter to the two input cables of the amplifier (Figure 4.6). Notice that the PIP2 input adapter should be

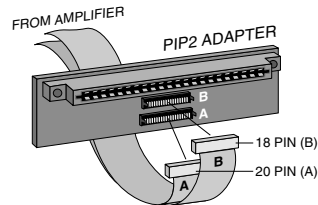


Fig. 4.6 PIP2 Input Adapter Connection

positioned with the PIP edge connector on top facing away from the amplifier. The 20 pin cable (A) is con-

nected 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 IQ-P.I.P.-MEM into the PIP2 input adapter (see Figure 4.7) and insert the assembly into the PIP opening in the back of the amplifier.

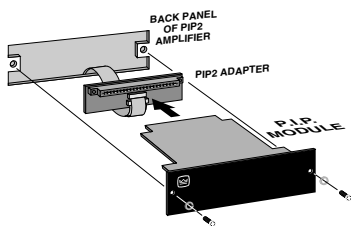


Fig. 4.7 Installation into a PIP2 Amplifier

10. Tighten the two PIP mounting screws until the PIP is secured to the amplifier back panel.

4.4 Install the Wiring

11. **Connect the IQ-P.I.P.-MEM to the IQ System via the Crown Bus.** See Section 4.6 for full instructions.
12. Connect the audio signal wiring to the IQ-P.I.P.-MEM. This includes the XLR input wiring and, if desired, the phone jack daisy chain wiring. See Section 4.7 for full instructions.
13. Reconnect amplifier to the AC receptacle.

4.5 Adjust the Levels & Scale Factors

14. Turn the level controls of the amplifier to their full or maximum setting. This is required by the IQ-P.I.P.-MEM. If needed, use the software-controlled input attenuators on the IQ-P.I.P.-MEM to reduce the audio levels.
15. Configure the amplifier scale factors. (Standard PIP-compatible amplifiers only—the scale factors for PIP2-compatible amplifiers are set automatically.) It is necessary to configure software scale factors in the microprocessor of the IQ-P.I.P.-MEM in order for it to properly interpret the output signal level of the amplifier model in which it is installed. This is easily done by connecting a host computer to the IQ-P.I.P.-MEM via an IQ interface and running the appropriate software (see IQ for Windows online help for more information). The software will prompt you for the amplifier model and send the appropriate scale factors to the PIP. The scale factor values are listed in Figure 4.8 along with the settings of jumpers JP4 and JP5.

Note: Since it is possible to configure one channel of a Com-Tech amplifier in the 8-Ohm output mode and the other channel in the 70-Volt output mode, it may be necessary to configure the scale factors differently for each channel.

Amplifier Model	Scale Values (Decimal)		Output Signal Pads (JP4, JP5)
	Channel 1	Channel 2	
Com-Tech 200 (8 ohm)	57	57	IN
Com-Tech 400 (8 ohm)	45	45	IN
Com-Tech 800 (8 ohm)	40	40	IN
Com-Tech 1600 (8 ohm)	30	30	IN
All Com-Tech (70-volt)	27	27	IN
Macro-Tech 600	44	44	IN
Macro-Tech 1200	39	39	IN
Macro-Tech 2400	30	24	IN
Macro-Tech 24x6	30	44	IN
Macro-Tech 3600VZ	14	14	IN
Macro-Tech 36x12	14	39	IN
Macro-Tech 5000VZ	30	30	OUT
Macro-Tech 10000	24	24	IN
Reference I	17	17	IN
Reference II	30	30	IN
PIP2-Compatible (Auto)	51	51	OUT

Fig. 4.8 Amplifier Scale Factor Values and Output Signal Pad Settings

4.6 A Closer Look at Crown Bus Wiring

The IQ-P.I.P.-MEM must be connected to a Crown Bus loop having an IQ2-compatible IQ interface in order for the IQ System to control or monitor it. The Crown Bus is a serial communication loop designed to transmit IQ commands and data. As implemented in the IQ-P.I.P.-MEM, it is a 20 milliamp current loop operating at a BAUD rate of 38.4 K. The loop must be unbroken.

If the system includes an IQ-INT II interface, it can accept eight different Crown Bus loops or zones. Dividing the sound system into different zones, each with its own Crown Bus loop, can have several advantages. The following list contrasts those advantages with those of a single loop.

Multiloop Advantages

- A break in communication in one loop does not affect other loops.
- Over 250 IQ components of the same type can be used in a system.
- The same IQ address can be used more than once (once per loop per model).

Single Loop Advantages (with IQ-INT II interfaces)

- The IQ System can send and retrieve data faster in a single loop.
- “Real time” level display of a greater number of units is possible.

The IQ-P.I.P.-MEM can be connected to the Crown Bus with inexpensive twisted-pair wiring

(shielded or unshielded). If fiber optic wiring is required contact the Crown Technical Support Group (see page 4).

Here are some guidelines for twisted-pair wiring:

- **Use shielded twisted-pair wire** at least 26 AWG in size when interference is a problem. The wire should be of good quality and should have low capacitance—30 picofarads/foot or less is good. (West Penn 452 or an equivalent wire works well.) The shield serves two purposes: First, it helps prevent the IQ data signal from transmitting to nearby audio wiring. Second, it helps prevent outside RF from interfering with the data signal. However, in most cases interference is not a problem and, since unshielded wire has lower capacitance, it is a better choice.
- **Minimize the total capacitance of each Crown Bus loop.** The total capacitance should be less than 30 nanofarads. Allow for approximately 60 picofarads for each IQ component in a loop. This accounts for a slight delay which occurs as data signals pass through a component.
- **Add an IQ Repeater** for very long loops—greater than 1000 feet (305 m)—or when required by high-capacitance wire. Although we recommend a repeater for loops longer than 1,000 feet, it is

often possible to go 2000 feet (610 m) or more. The most significant characteristic of the wire is its capacitance. Lower capacitance allows longer loops. Unshielded wire usually has less capacitance.

- **Never use the ground wire in a mic snake line.** It may sometimes be convenient to run Crown Bus data signals to and from stage monitor amplifiers along unused wire pairs in a mic snake. Do not use the ground wire which is normally connected to pin 1 on an XLR connector or data noise will be added to the audio lines. Use only the signal lines which normally connect to pins 2 and 3 of the XLRs. Note: Because typical mic cables have high capacitance, the maximum possible Crown Bus loop distance will be less.

Outside RF interference is seldom a problem for a Crown Bus loop—especially if shielded twisted-pair wire is used. However, there are extreme situations when fiber optic wiring is recommended. For example, locating a Crown Bus loop next to an AM radio transmission line may require fiber optic cabling. An extremely long Crown Bus loop distance may also require fiber optic cabling.

There are three different types of connectors used for Crown Bus wiring: DIN connectors, RJ45 and screw terminal plugs. The IQ-P.I.P.-MEM uses a 5-pin DIN connector for input and a 4-pin DIN connector for output. Figure 4.9 shows how they should be wired.

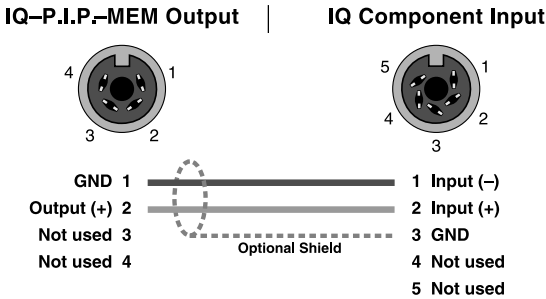


Figure 4.9 IQ-P.I.P.-MEM Output Connection to Another IQ Component with DIN Connectors

The next four figures show how to connect the IQ-P.I.P.-MEM to IQ components with different connectors. Figure 4.10 shows how the Crown Bus output of the IQ-P.I.P.-MEM should be connected to an IQ component with a screw terminal plug connector. Figure 4.11 shows how the Crown Bus input of the IQ-P.I.P.-MEM should be connected to a

component with a removable barrier block connector. Figure 4.12 shows how the Crown Bus output of the IQ-P.I.P.-MEM should be connected to an IQ component with an RJ45 connector. Figure 4.13 shows how an IQ component with an RJ45 connector should be connected to the Crown Bus input of the IQ-P.I.P.-MEM.

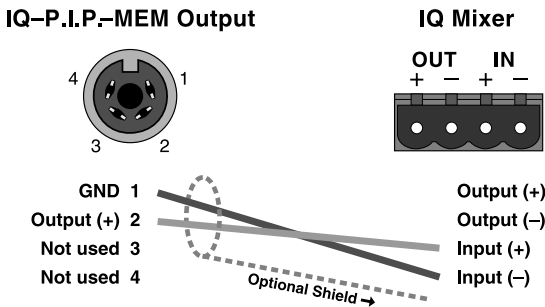


Figure 4.10 IQ-P.I.P.-MEM Output Connection to an IQ Component with a Screw Terminal Plug Connector

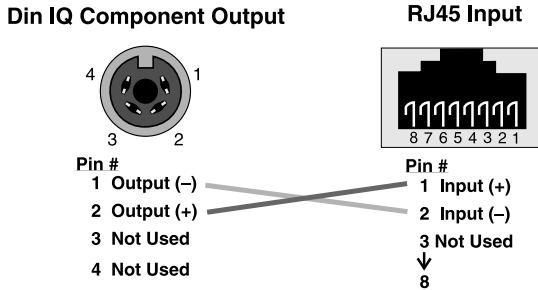


Figure 4.11 IQ-P.I.P.-MEM Output Connection to an IQ Component with an RJ45 Connector

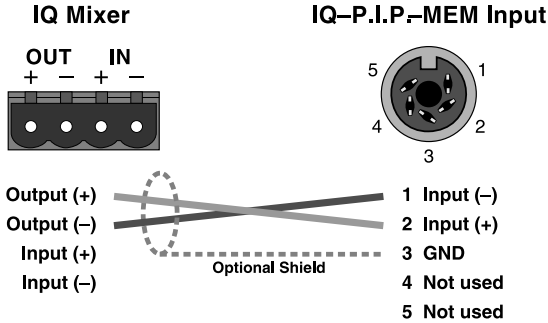


Figure 4.12 An IQ Component with Screw Terminal Plug Connected to the IQ-P.I.P.-MEM Input

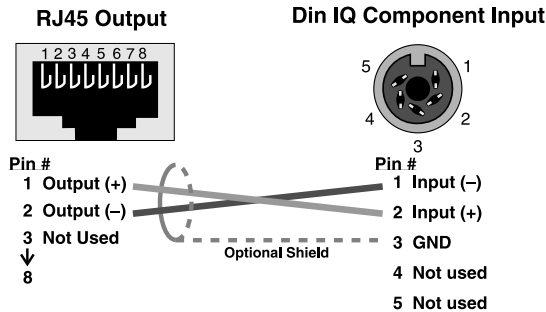


Figure 4.13 An IQ Component with RJ45 Connector to the IQ-P.I.P.-MEM Input

The IQ components in a Crown Bus loop are wired sequentially. The loop begins and ends with the IQ interface. The output of one IQ

component “loops” to the input of the next and so on as shown in Figure 4.14.

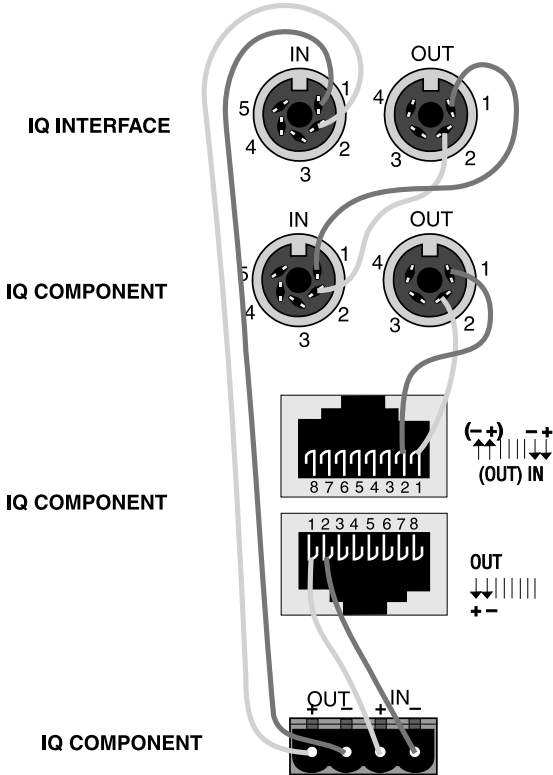


Figure 4.14 Standard Crown Bus Wiring “Loops” from the Output to the Input of each IQ Component

4.7 A Closer Look at Audio Signal Wiring

Balanced 3-pin female XLR connectors are provided for audio input connection. The audio cables should be wired in one of the two manners shown in Figure 4.15:

We strongly recommend that balanced wiring be used if possible. Some important guidelines follow:

- Always use shielded wire. The higher the density of the shield (the outer conductor), the better. Spiral wrapped shield is not recommended.
- When using unbalanced lines, keep the cables as short as possible. Avoid lengths greater than 10 feet (3 meters).
- Do not run audio input cables together with high-level wiring such as loud-speaker wires or AC cords. (This lessens the chance of hum or noise being induced into the input cables.)
- Do not connect audio and data grounds together. For example, do not connect the audio ground to the Crown Bus ground.
- Turn the entire sound system

off before changing any connections. Turn the level controls down before powering the system back up. Crown is not liable for damage incurred when any transducer or component is overdriven.

IMPORTANT: Do not feed a signal into the phone jacks on the back panel of the amplifier (if provided). The phone jacks are wired in parallel with the output of the PIP connector inside the amplifier. Any audio signal fed into the phone jacks could feed back into the output of the IQ-P.I.P.-MEM and generate a distorted input signal. The phone jacks can be used to “daisy chain” the post-processed signal from the IQ-P.I.P.-MEM to the inputs of other amplifiers.

DO NOT USE THE CHANNEL 2 INPUT if the amplifier is used in either Bridge-Mono or Parallel-Mono mode.

For additional information on audio input connection please refer to the amplifier’s Reference or Owner’s Manual. It contains helpful information on preventing unwanted sub-sonic frequencies, radio frequency interference, ground loops, and feedback oscillation.

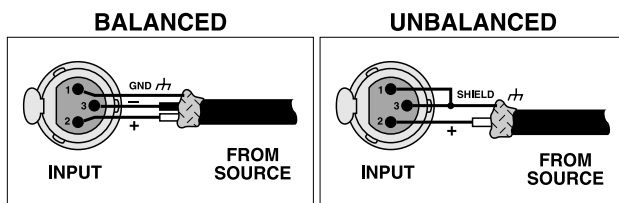


Figure. 4.15 Audio Input Wiring

4.8 Using the AUX Connector

The IQ System offers tremendous flexibility and the auxiliary feature connector provides a means of tapping into it. It can be used to turn something on/off, send a signal to another component and receive a signal from another component. (See Figure 4.16 for internal circuit diagram.)

The AUX connector is a 3-pin male mini XLR connector. Pins 1 and 3 are used to send a signal and pins 1 and 2 are used to receive a signal.

4.8.1 AUX Output

When the auxiliary feature is turned on by the IQ System software +15 VDC is supplied across pins 1 (ground) and 3 (+). A total of 10 milliamps of current is available. A 1.5 K ohm resistor protects against shorts.

There are many possible uses for the AUX output. For example, it can be used to turn on auxiliary cooling fans. To do this the AUX connector would be used to close a relay. The relay would then turn the fans on or off. This is shown in Figure 4.17.

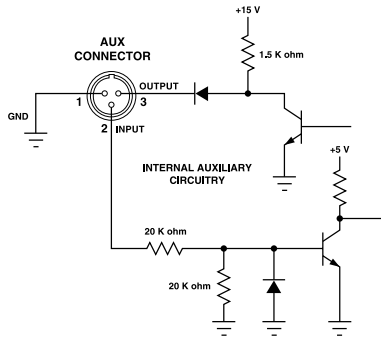


Fig. 4.16 The Internal AUX Circuit

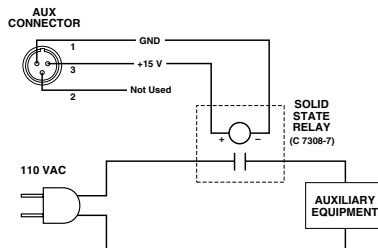


Fig. 4.17 A Sample AUX Output Circuit

Note: A Crown part number is provided in the given illustration for a suitable solid-state relay (C 7308-7). Contact your local Crown representative or the Crown factory Parts Department (219-294-8200) to order.

By monitoring the operating condition of amplifiers with the IQ System software, the need for additional cooling will be apparent. The same software could then be used to turn on the appropriate AUX connector. (For more information about turning the auxiliary feature on/off, consult the IQ software User's Manual.)

In addition to the preceding examples, the AUX ports of more than one IQ component can be used to send binary codes to auxiliary equipment. For example, eight AUX ports can be used to send 8-bit binary codes to external equipment.

4.8.2 AUX Input

Depending on the IQ software being used, the AUX connector can be used to sense the presence of an input signal across pins 1 (ground) and 2 (+). A 2.5 to 15 VDC signal at the input will be interpreted as a logic "high" and will be communicated to the Crown Bus where a host computer or drone can act upon it. A signal less than 2.5 VDC is interpreted as a logic "low." Note: A negative signal can also be used as a logic low because the signal is internally clamped to protect the internal circuitry.

5 Technical Information

The purpose of the IQ-P.I.P.-MEM is to enable an IQ System to control and monitor a PIP-compatible amplifier. The exact features of your unit are determined by the firmware in its microprocessor. Here is a typical list of features:

- Control the audio signal level.
- Control the audio signal polarity.
- Control the high-voltage power supplies.
- Control the DSPI LED.
- Control and monitor the AUX port.

In addition, all units can monitor these parameters:

- Monitor the input level to the IQ-P.I.P.-MEM.
- Monitor the output level from the amplifier.
- Monitor the ODEP level.
- Monitor the IOC.

5.1 Audio Signals

Balanced and unbalanced audio signals enter the module at the XLR connectors. From these connectors, the signals are RFI filtered and fed into a balanced to single-ended conversion stage. Additional gain and/or phantom power for a microphone are also provided in this stage. From this point, the audio signal is sent to a monitor input (see section 5.2) and also to a digi-

tally controlled attenuator. Following the attenuator, the signals pass through a final output buffer stage, which also can invert the polarity of the signal when required. The audio signal is then fed through the PIP edge card connector and into the amplifier.

5.2 Amplifier Monitoring: “Monitor Inputs”

The IQ-P.I.P.-MEM can monitor the status of the amplifier using a number of “monitor inputs.” There are two types of signals—audio and status. The audio signals that are monitored are the input to the PIP and the output of the amplifier. These signals enter the PIP and are fed into a precision peak detector which insures that instantaneous signal peaks are not “missed” by the PIP. The detector outputs are then fed through a multiplexer into a logarithmic conversion circuit for dynamic range scaling. The output of this circuit is then fed into the A/D converter on the microprocessor, where the signal is converted and sent to the host computer via the Crown Bus. The status signals that are monitored are ODEP level, IOC status and VCC status. These signals enter the PIP, pass through a buffer stage, and are fed into the A/D converter on the microprocessor. The signals are then converted and sent to the host computer via the Crown Bus.

5.3 Amplifier Control

The IQ-P.I.P.-MEM can control the following functions: audio level, audio polarity, high-voltage power supplies, DSPI and the AUX port. These functions are controlled us-

ing ports on the microprocessor and some external support circuitry. The audio level is controlled by the microprocessor through a digitally controlled analog attenuator. The DSPI LED flashes whenever a valid IQ command has been received and can be forced to stay on to facilitate diagnosis of Crown Bus wiring problems.

5.4 IQ System Communica- tions

The IQ-P.I.P.-MEM communicates with the host computer via the Crown Bus. Connections to the Crown Bus are made via the 4 and 5-pin locking DIN connectors on the rear panel. IQ commands entering the PIP are fed into an input receiver circuit that converts the 20 mA current loop signal into a standard logic signal that the microprocessor can understand. This signal is also passed directly to the Crown Bus for output where it is passed on to the remainder of the loop. Data sent in response to IQ commands is also sent through the Crown Bus output where it passes through the remainder of the loop and back to the host computer. A “drop out” relay is also present which makes a physical contact between the Crown Bus input and output connectors in the event of a power failure. This means that as long as the Crown Bus cables are connected to the PIP, the Crown Bus will remain unbroken—even if power to the PIP is lost.

5.5 Microprocessor and Reset Switch

The “brains” of the IQ-P.I.P.-MEM are contained in the microproces-

sor. It interprets commands received from the Crown Bus and responds accordingly. The IQ-P.I.P.-MEM is designed to provide an “automatic reset” in the event of a power failure, but the rear reset switch has also been added. Pressing this switch re-

stores all PIP settings to the “user defaults” if it is pressed for less than 2 seconds or to the factory defaults if it is pressed for more than 2 seconds. The only exception is the initialization data which can only be changed with IQ System software on the host computer.

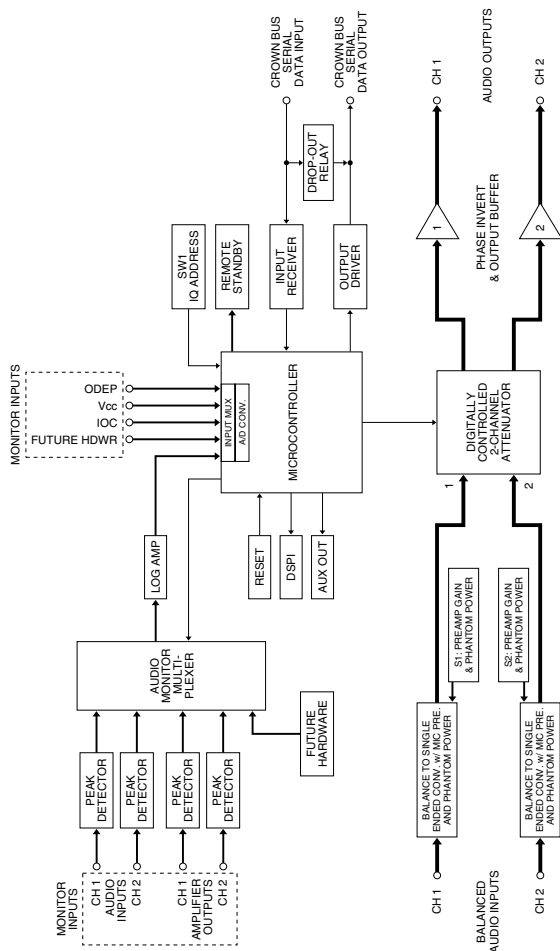


Fig. 5.1 IQ-P.I.P.-MEM Circuit Block Diagram

6 Specifications

General

Internal Controls: An 8-segment DIP switch is used to set the IQ address (decimal range: 1–250). Note: If address “0” is selected, the IQ-P.I.P.-MEM will operate in stand-alone mode. Two additional 8-segment DIP switches (one for each channel) set the preamp gain of each input and turn phantom power on and off. A Reset switch, accessible with a straightened paper clip through the PIP panel, resets all settings (except the amplifier initialization data) to the “user defaults” if it is pressed for less than 2 seconds or the factory defaults if it is pressed for more than 2 seconds.

Connectors: Crown Bus Input: Locking 5-pin female DIN connector. Crown Bus Output: Locking 4-pin female DIN connector. Audio Input: Balanced 3-pin female XLR connector for each channel. AUX: A 3-pin male mini connector.

Indicators: A yellow DSPI (Data Signal Presence Indicator) flashes when a valid IQ command is received from the IQ System via the Crown Bus. Depending upon the firmware version in your unit, the DSPI can be forced on to facilitate rapid troubleshooting of Crown Bus wiring.

Auxiliary Feature: +15 VDC is supplied across pins 1 (ground) and 3 (+) of the AUX connector when turned on by the IQ System software.

Power Requirements: When installed into a Crown PIP-comp-

atible amplifier, the unit receives ± 24 VDC.

Crown Bus Data Communication

Protection: If communication is lost, the unit will continue to function with the last commands received.

Data Rate: 38.4 K BAUD.

Data Format: Serial, binary, asynchronous; 1 start bit; 1 stop bit; 8 data bits; no parity.

Crown Bus Interface Type: Optically isolated 20 milliamp serial loop.

Operation: Half duplex.

Intelligence: 8-bit microprocessor with 12 K byte control program.

Transmission Distance: Variable from 200 to 3000 feet (61 to 914 m), depending upon wire capacitance. Typically 1000 feet (305 M) using shielded twisted-pair wire, #26 AWG or larger. Can be extended with an IQ Repeater.

Audio

Please note: The audio specifications are referenced to 0.775 V (0 dBu). Measurements were made at the output of the IQ-P.I.P.-MEM module, itself.

Input Impedance: Nominally 24 K ohms balanced and 12 K ohms unbalanced.

Phantom Power: Nominally +15 VDC, 1.5 mA.

Microphone Preamp: Adds +20 or

+40 dB of gain.

Maximum Input Level: +12 dBu, balanced.

Signal-to-Noise Ratio: >90 dB from 20 Hz to 20 kHz.

Frequency Response: ± 0.1 dB from 20 Hz to 20 kHz.

Crosstalk Ratio: >75 dB at 1 kHz.
>65 dB at 20 kHz.

Common Mode Rejection (CMR):
>70 dB at 60 Hz with +10 dBu input.

Total Harmonic Distortion (THD):
<0.05% from 20 Hz to 20 kHz.

IQ System Data Acquisition

Input/Output Monitor Accuracy:
Typically ± 1 dB. ± 2 dB maximum.



7 IQ Address Tables

This section contains lookup tables for every valid IQ address. The valid addresses are 1 to 250. Remember that address “0” (zero) will put the IQ-P.I.P.-MEM into a stand-alone mode where it is invisible to the IQ System and acts like a “dumb” balanced audio input. **Do not use an address number higher than 250!** Addresses

above 250 are reserved for special system use.

Remember: No two IQ components of the same type which are connected to the same Crown Bus loop can have the same address.

To use the IQ address tables, simply find the address you want and set the IQ address switch of the IQ-P.I.P.-MEM as shown. See Section 4.1 also.

IQ Address	IQ Address Switch								IQ Address	IQ Address Switch								IQ Address	IQ Address Switch							
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	42	OFF	ON	OFF	ON	OFF	ON	OFF	OFF	84	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	43	ON	ON	OFF	ON	OFF	ON	OFF	OFF	85	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	44	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	86	OFF	ON	ON	OFF	ON	OFF	ON	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	45	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	87	ON	ON	ON	OFF	ON	OFF	ON	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	46	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	88	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	47	ON	ON	ON	OFF	ON	OFF	OFF	OFF	89	ON	OFF	ON	OFF	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	48	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	90	ON	OFF	ON	OFF	ON	OFF	ON	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	49	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	91	ON	ON	ON	OFF	ON	OFF	ON	OFF
8	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	50	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	92	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	51	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	93	ON	OFF	ON	OFF	ON	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	52	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	94	OFF	ON	ON	OFF	ON	OFF	ON	OFF
11	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	53	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	95	ON	ON	ON	OFF	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	54	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	96	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
13	ON	OFF	ON	ON	OFF	OFF	OFF	OFF	55	ON	ON	ON	OFF	ON	OFF	OFF	OFF	97	ON	ON	OFF	OFF	ON	OFF	ON	OFF
14	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	56	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	98	OFF	ON	OFF	OFF	ON	OFF	ON	OFF
15	ON	ON	ON	ON	OFF	OFF	OFF	OFF	57	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	99	ON	ON	OFF	OFF	ON	OFF	ON	OFF
16	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	58	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	100	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
17	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	59	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	101	ON	OFF	ON	OFF	ON	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	60	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	102	OFF	ON	ON	OFF	ON	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	61	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	103	ON	ON	ON	OFF	ON	OFF	ON	OFF
20	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	62	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	104	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	63	ON	ON	ON	OFF	ON	OFF	OFF	OFF	105	ON	OFF	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	64	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	106	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
23	ON	ON	ON	OFF	ON	OFF	OFF	OFF	65	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	107	ON	ON	OFF	ON	OFF	ON	OFF	OFF
24	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	66	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	108	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
25	ON	OFF	OFF	ON	ON	OFF	OFF	OFF	67	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	109	ON	OFF	ON	OFF	ON	OFF	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF	OFF	OFF	68	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	110	OFF	ON	ON	OFF	ON	OFF	ON	OFF
27	ON	ON	ON	OFF	ON	OFF	OFF	OFF	69	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	111	ON	ON	ON	OFF	ON	OFF	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	70	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	112	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
29	ON	OFF	ON	ON	ON	OFF	OFF	OFF	71	ON	ON	ON	OFF	ON	OFF	OFF	OFF	113	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
30	OFF	ON	ON	ON	ON	OFF	OFF	OFF	72	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	114	OFF	ON	OFF	OFF	ON	OFF	ON	OFF
31	ON	ON	ON	ON	ON	OFF	OFF	OFF	73	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	115	ON	ON	OFF	OFF	ON	OFF	ON	OFF
32	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	74	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	116	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
33	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	75	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	117	ON	OFF	ON	OFF	ON	OFF	ON	OFF
34	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	76	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	118	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
35	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	77	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	119	ON	ON	ON	OFF	ON	OFF	ON	OFF
36	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	78	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	120	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
37	ON	OFF	ON	OFF	OFF	ON	OFF	OFF	79	ON	ON	ON	OFF	ON	OFF	OFF	OFF	121	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
38	OFF	ON	ON	OFF	OFF	ON	OFF	OFF	80	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	122	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
39	ON	ON	ON	OFF	OFF	ON	OFF	OFF	81	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	123	ON	ON	OFF	ON	OFF	ON	OFF	OFF
40	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	82	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	124	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
41	ON	OFF	OFF	ON	OFF	ON	OFF	OFF	83	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	125	ON	OFF	ON	OFF	ON	OFF	ON	OFF

Fig. 7.1 IQ Address Switch (SW1) Settings from 0 to 125

IQ Address	IQ Address Switch								IQ Address	IQ Address Switch								IQ Address	IQ Address Switch							
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
126	OFF	OFF	ON	ON	ON	ON	ON	OFF	168	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	210	OFF	ON	OFF	OFF	ON	OFF	ON	ON
127	ON	ON	ON	ON	ON	ON	ON	OFF	169	ON	OFF	OFF	ON	OFF	ON	OFF	ON	211	ON	ON	OFF	OFF	ON	OFF	ON	ON
128	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	170	OFF	ON	OFF	ON	OFF	ON	OFF	ON	212	OFF	OFF	ON	OFF	ON	OFF	ON	ON
129	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	171	ON	ON	OFF	ON	OFF	ON	OFF	ON	213	ON	OFF	ON	OFF	ON	OFF	ON	ON
130	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	172	OFF	OFF	ON	ON	OFF	ON	OFF	ON	214	OFF	ON	ON	OFF	ON	OFF	ON	ON
131	ON	ON	ON	OFF	OFF	OFF	OFF	ON	173	ON	OFF	ON	ON	OFF	ON	OFF	ON	215	ON	ON	ON	OFF	ON	OFF	ON	ON
132	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	174	OFF	ON	ON	ON	OFF	ON	OFF	ON	216	OFF	OFF	OFF	ON	OFF	ON	ON	ON
133	ON	OFF	ON	OFF	OFF	OFF	OFF	ON	175	ON	ON	ON	ON	OFF	ON	OFF	ON	217	ON	OFF	OFF	ON	ON	OFF	ON	ON
134	OFF	ON	ON	ON	OFF	OFF	OFF	ON	176	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	218	OFF	ON	OFF	ON	ON	OFF	ON	ON
135	ON	ON	ON	ON	OFF	OFF	OFF	ON	177	ON	OFF	OFF	OFF	ON	ON	OFF	ON	219	ON	ON	OFF	ON	ON	OFF	ON	ON
136	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	178	OFF	ON	OFF	OFF	ON	ON	OFF	ON	220	OFF	OFF	ON	ON	ON	OFF	ON	ON
137	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	179	ON	ON	OFF	OFF	ON	ON	OFF	ON	221	ON	OFF	ON	ON	ON	OFF	ON	ON
138	OFF	ON	OFF	ON	OFF	OFF	OFF	ON	180	OFF	OFF	ON	ON	OFF	ON	OFF	ON	222	OFF	ON	ON	ON	ON	OFF	ON	ON
139	ON	ON	ON	ON	OFF	OFF	OFF	ON	181	ON	OFF	ON	OFF	ON	ON	OFF	ON	223	ON	ON	ON	ON	ON	OFF	ON	ON
140	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	182	OFF	ON	OFF	ON	ON	OFF	ON	ON	224	OFF	OFF	OFF	OFF	ON	ON	ON	ON
141	ON	OFF	ON	ON	OFF	OFF	OFF	ON	183	ON	ON	ON	OFF	ON	ON	OFF	ON	225	ON	OFF	OFF	OFF	OFF	ON	ON	ON
142	OFF	ON	ON	ON	OFF	OFF	OFF	ON	184	OFF	OFF	OFF	ON	ON	OFF	ON	ON	226	OFF	ON	OFF	OFF	OFF	ON	ON	ON
143	ON	ON	ON	ON	OFF	OFF	OFF	ON	185	ON	OFF	OFF	ON	ON	OFF	ON	ON	227	ON	ON	OFF	OFF	OFF	ON	ON	ON
144	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	186	OFF	ON	OFF	ON	ON	OFF	ON	ON	228	OFF	OFF	ON	OFF	OFF	ON	ON	ON
145	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	187	ON	ON	OFF	ON	ON	ON	OFF	ON	229	ON	OFF	ON	OFF	OFF	ON	ON	ON
146	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	188	OFF	OFF	ON	ON	ON	ON	OFF	ON	230	OFF	ON	ON	OFF	OFF	ON	ON	ON
147	ON	ON	OFF	OFF	ON	OFF	OFF	ON	189	ON	OFF	ON	ON	ON	ON	OFF	ON	231	ON	ON	ON	OFF	OFF	ON	ON	ON
148	OFF	OFF	ON	OFF	ON	OFF	OFF	ON	190	OFF	ON	ON	ON	ON	ON	OFF	ON	232	OFF	OFF	OFF	ON	OFF	ON	ON	ON
149	ON	OFF	ON	OFF	ON	OFF	OFF	ON	191	ON	ON	ON	ON	ON	ON	OFF	ON	233	ON	OFF	OFF	ON	OFF	ON	ON	ON
150	OFF	ON	ON	OFF	ON	OFF	OFF	ON	192	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	234	OFF	ON	OFF	ON	OFF	ON	ON	ON
151	ON	ON	ON	OFF	ON	OFF	OFF	ON	193	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	235	ON	ON	OFF	ON	OFF	ON	ON	ON
152	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	194	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	236	OFF	OFF	ON	ON	OFF	ON	ON	ON
153	ON	OFF	OFF	ON	ON	OFF	OFF	ON	195	ON	ON	OFF	OFF	OFF	OFF	ON	ON	237	ON	OFF	ON	ON	OFF	ON	ON	ON
154	OFF	ON	OFF	ON	ON	OFF	OFF	ON	196	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	238	OFF	ON	ON	ON	OFF	ON	ON	ON
155	ON	ON	ON	OFF	ON	OFF	OFF	ON	197	ON	OFF	ON	OFF	OFF	OFF	ON	ON	239	ON	ON	ON	ON	OFF	ON	ON	ON
156	OFF	OFF	ON	ON	ON	OFF	OFF	ON	198	OFF	ON	ON	OFF	OFF	OFF	ON	ON	240	OFF	OFF	OFF	OFF	ON	ON	ON	ON
157	ON	OFF	ON	ON	ON	OFF	OFF	ON	199	ON	ON	ON	ON	OFF	OFF	ON	ON	241	ON	OFF	OFF	OFF	ON	ON	ON	ON
158	OFF	ON	ON	ON	ON	OFF	OFF	ON	200	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	242	OFF	ON	OFF	OFF	ON	ON	ON	ON
159	ON	ON	ON	ON	ON	OFF	OFF	ON	201	ON	OFF	OFF	ON	OFF	OFF	ON	ON	243	ON	ON	OFF	OFF	ON	ON	ON	ON
160	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	202	OFF	ON	OFF	ON	OFF	OFF	ON	ON	244	OFF	OFF	ON	OFF	ON	ON	ON	ON
161	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	203	ON	ON	OFF	ON	OFF	OFF	ON	ON	245	ON	OFF	ON	OFF	ON	ON	ON	ON
162	OFF	ON	OFF	OFF	OFF	ON	OFF	ON	204	OFF	OFF	ON	ON	OFF	OFF	ON	ON	246	OFF	ON	ON	OFF	ON	ON	ON	ON
163	ON	ON	ON	OFF	OFF	ON	OFF	ON	205	ON	OFF	ON	ON	OFF	OFF	ON	ON	247	ON	ON	ON	OFF	ON	ON	ON	ON
164	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	206	OFF	ON	ON	ON	OFF	OFF	ON	ON	248	OFF	OFF	OFF	ON	ON	ON	ON	ON
165	ON	OFF	ON	OFF	OFF	ON	OFF	ON	207	ON	ON	ON	ON	OFF	OFF	ON	ON	249	ON	OFF	OFF	ON	ON	ON	ON	ON
166	OFF	ON	ON	OFF	OFF	ON	OFF	ON	208	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	250	OFF	ON	OFF	ON	ON	ON	ON	ON
167	ON	ON	ON	OFF	OFF	ON	OFF	ON	209	ON	OFF	OFF	OFF	ON	OFF	ON	ON									

Fig. 7.2 IQ Address Switch (SW1) Settings from 126 to 250

8 Factory Service

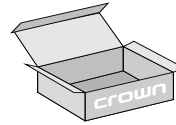
To obtain factory service, fill out the **service information page** found in the back of this manual and send it along with your proof of purchase and the defective unit to the Crown factory.

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.**



Always use the original factory pack to transport the unit.

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 product documentation, cables and other hardware.

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

Crown 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)

Internet: www.crownaudio.com

Email: iqsupport@crowntl.com

Crown Factory Service Information

Shipping Address: Crown Audio, Inc., 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.**

Detach and send with unit.