



# DBC Network Bridge

## Operation Manual



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

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

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

**Trademark Notice:** Crown, Crown Audio, IQ, IQ System, and Amcron are registered trademarks of Crown International. DBC, IQwic and TCP/IQ are trademarks of Crown International. Other trademarks are the property of their respective owners.

**Some models may be exported under the name Amcron.®**

## 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 (including amplifiers) 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, tripod, 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) WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.
- 16) DO NOT EXPOSE TO DRIPPING OR SPLASHING. DO NOT PLACE OBJECTS FILLED WITH LIQUID, SUCH AS VASES, ON THIS APPARATUS.



TO PREVENT ELECTRIC SHOCK DO NOT REMOVE TOP OR BOTTOM COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

À PRÉVENIR LE CHOC ÉLECTRIQUE N'ENLEVEZ PAS LES COUVERCLES. IL N'Y A PAS DES PARTIES SERVICEABLE À L'INTÉRIEUR. TOUTS REPARATIONS DOIT ÊTRE FAIRE PAR PERSONNEL QUALIFIÉ SEULMENT.

TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE. THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE.

### WATCH FOR THESE SYMBOLS:

The lightning bolt triangle is used to alert the user to the risk of electric shock.

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

**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN

**AVIS**  
RISQUE DE CHOC ÉLECTRIQUE  
N'OUVREZ PAS

## FCC COMPLIANCE NOTICE

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Crown International, Inc.

## DECLARATION of CONFORMITY

ISSUED BY: Crown International, Inc.  
1718 W. Mishawaka Road  
Elkhart, Indiana 46517 U.S.A.

FOR COMPLIANCE QUESTIONS ONLY: Sue Whitfield  
574-294-8289  
swhitfield@crowintl.com

**European Representative's Name and Address:**

Nick Owen  
35, Bassets Field  
Thornhill  
Cardiff, South Glamorgan  
CF14 9UG United Kingdom

**Equipment Type:** Digital B-Chain

**Family Name:** IQ System Component

**Model Names:** DBC Network Bridge

**EMC Standards:**

**EN 55103-1:1997** Electromagnetic Compatibility - Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional Use, Part 1: Emissions

**EN 55103-1:1997** Magnetic Field Emissions-Annex A @ 10 cm

**EN 61000-3-2:2001** Limits for Harmonic Current Emissions (equipment input current less than or equal to 16 A per phase)

**EN 61000-3-3:2002** Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems Rated Current less than or equal to 16A

**EN 55022:2003** Limits and Methods of Measurement of Radio Disturbance Characteristics of ITE: Radiated, Class B Limits; Conducted, Class A

**EN 55103-2:1997** Electromagnetic Compatibility - Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional Use, Part 2: Immunity

**EN 61000-4-2:2001** Electrostatic Discharge Immunity (Environment E2-Criteria B, 4k V Contact, 8k V Air Discharge)

**EN 61000-4-3:2001** Radiated, Radio-Frequency, Electromagnetic Immunity (Environment E2, criteria A)

**EN 61000-4-4:2001** Electrical Fast Transient/Burst Immunity (Criteria B)

**EN 61000-4-5:2001** Surge Immunity (Criteria B)

**EN 61000-4-6:2003** Immunity to Conducted Disturbances Induced by Radio-Frequency Fields (Criteria A)

**EN 61000-4-11:2001** Voltage Dips, Short Interruptions and Voltage Variation

**Safety Standard:**

**IEC 60065: 2002** 7th Ed. Safety Requirements - Audio Video and Similar Electronic Apparatus

I certify that the product identified above conforms to the requirements of the EMC Council Directive 89/336/EEC as amended by 92/31/EEC, and the Low Voltage Directive 73/23/EES as amended by 93/68/EEC.

Signed



Larry Coburn

Title: Senior Vice President of Manufacturing

Date of Issue: Dec. 1, 2004

# 1 Getting Started With the DBC Network Bridge

Welcome! This Quick-start guide will get you up and running in a short time. Then please refer to the rest of the manual for details on the DBC™ Network Bridge and its operation.

**IMPORTANT: Unplug power cord from AC outlet before wiring.**



## 1.1 Hardware Installation

You will need:

- Crown power amplifiers with USP3-CN PIP modules installed, or Crown I-Tech CobraNet- version power amplifiers
- A computer running IQwic software
- A 100Mb network switch
- An Ethernet cable (RJ45 connector on each end) for use between the computer and network switch
- Two Ethernet cables for use between the DBC Network Bridge and the network switch. One cable is sufficient, but two allow redundancy.
- An Ethernet cable between the network switch and each USP3-CN module (or Ethernet connector) installed in a Crown power amplifier.

### 1.1.1 Audio and Network Connections

Please refer to Figures 1.1 and 1.2.

1. Mount the DBC Network Bridge in a standard 19-inch (48.3-cm) equipment rack or cabinet.
2. Turn off all equipment that will connect to the unit.
3. Connect the AES/EBU digital output signal from your cinema processor, media player, or feature server to the analog DB25 connector on the back of the DBC Bridge. DB25 wiring is shown in Table 1 on the next page. Alternatively, connect the analog output signal from your cinema processor to the Analog DB25 connector on the back of the DBC Bridge. DB25 wiring is shown in Table 2 on the next page.
4. See Figure 1.2. Connect any auxiliary mic or line signals to the female XLR Auxiliary Inputs on the back of the DBC Network Bridge. Set the MLP switch for Mic, Line, or Phantom-powered mic. Adjust gain potentiometers to optimize gain structure.

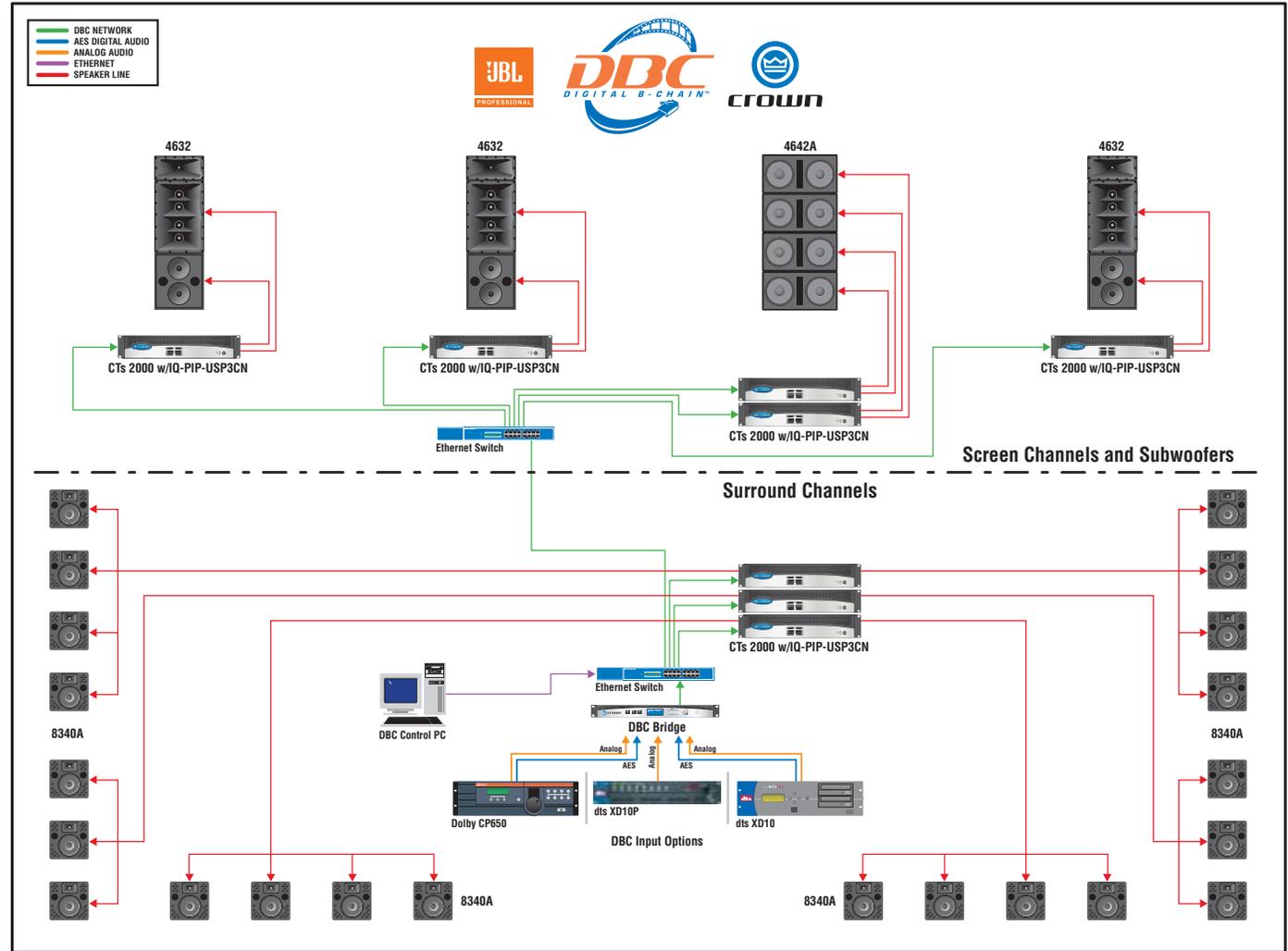


Figure 1.1 System Wiring

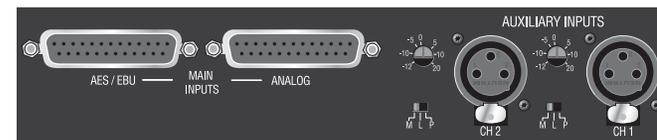
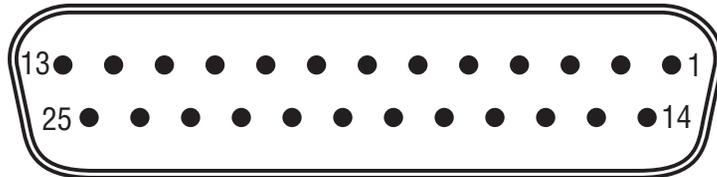


Figure 1.2 Audio Inputs on the Back Panel of the DBC Bridge

## Getting Started With the DBC Network Bridge

Table 1

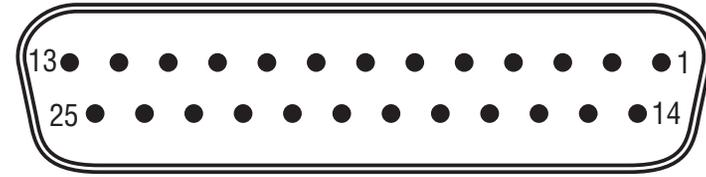
### DBC DB25F DIGITAL AES/EBU PINOUTS



PIN	FUNCTION	PIN	FUNCTION
1	N/C	14	GND
2	N/C	15	AES1 (L/R)-
3	N/C	16	AES3 (Ls/Rs)-
4	N/C	17	N/C
5	N/C	18	GND
6	N/C	19	N/C
7	AES1 (L/R)+	20	N/C
8	AES3 (Ls/Rs)+	21	AES4 (Bsl/Bsr)-
9	GND	22	AES4 (Bsl/Bsr)+
10	N/C	23	AES2 (C/SW)-
11	GND	24	AES2 (C/SW)+
12	N/C	25	GND
13	N/C		

Table 2

### DBC DB25F ANALOG PINOUTS



PIN	FUNCTION	PIN	FUNCTION
1	GND	14	L-
2	L+	15	GND
3	BSL-	16	BSL+
4	GND	17	C-
5	C+	18	GND
6	BSR-	19	BSR+
7	GND	20	R-
8	R+	21	N/C
9	GND	22	GND
10	Ls-	23	Ls+
11	Rs-	24	Rs+
12	SW-	25	SW+
13	GND		

## Getting Started With the DBC Network Bridge

### 1.2 Communicating with the DBC Network Bridge: TCP/IQ™ Networking

#### 1.2.1 The Network Wizard

If you are setting up a dedicated audio network that is not part of another network, you can use the Network Wizard to set up your network easily.

1. Open IQwic.
2. Select Setup > Network Wizard.
3. Follow the instructions on the screen.
4. When done, skip to Step 4 on page 11.

#### 1.2.2 Introduction

The DBC Network Bridge connects directly to Crown IQ networks with TCP/IQ protocol. This permits extensive amp and speaker diagnostics and control by computer. The DSP functions in the DBC Network Bridge are controlled and monitored by a computer running IQwic software.

The computer connects to the DBC Network Bridge on a TCP/IQ network via a Category 5 cable plugged into the Primary Network connector on the back of the DBC Network Bridge. The TCP/IQ format uses off-the-shelf, fast (100 Mb) Ethernet connections. CobraNet lets you plug in a single cable for both networking and digital audio -- this is Crown's Single-Click solution.

Every component in a TCP/IQ network is identified by a unique address.

#### 1.2.3 TCP/IQ Addressing Rules

In the next section, you will be assigning TCP/IP addresses to the devices in your network. When you do so, be sure to follow the addressing rules below. Otherwise, the computer may not communicate with the devices.

Turn off DHCP (automatic addressing). This will be done in Instruction 1C, described later.

Assign each device a static (fixed) IP address. An IP address is made of four numbers separated by periods. Each number can be zero to 255. The last number can never be a zero or 255. For example, 126.126.17.1 could be an IP address. 126.126.17.0 would not be a valid IP address.

Make sure that the computer and all the devices have the same NETWORK IDs in their addresses. This tells the computer that all those devices are on the same network. Various tools are available to determine whether devices are on the same network. In TCP/IQ utility described later, if items are NOT on the same network, they are highlighted in the list.

Make sure that each component has its own TCP/IP address, and there are no duplicate addresses. The same holds true for IQ addresses.

Assign a subnet mask. Make it the same for all devices on the network. If the network you are assembling will interconnect with other networks, your network is considered to be a subnet within the larger network. Check with the network administrator to determine the proper Subnet Mask for your subnet.

If you have a stand-alone network, set the Subnet Mask to 255.255.0.0 for all components, including the computer.

Note: Just because two components have the same subnet mask does not mean that they are on the same network. As we said, the subnet mask just tells what part of the TCP/IP address is the Network ID.

## Getting Started With the DBC Network Bridge

### 1.2.4 TCP/IQ Setup

This example is based on a stand-alone system using switches and routers. The screen captures were done in Windows 2000; your exact configuration may vary. If your computer uses a network for other applications, please check with your Information Technology Department before making any changes. Section 1.2.5 includes a helpful worksheet for assigning addresses.

1. Turn on your computer and the rest of the system equipment. On your computer desktop, select Start > Settings > Control Panel > Network Connections (Figure 1.3). Set a static TCP/IP address and Subnet mask on the master computer. Document the address and mask.

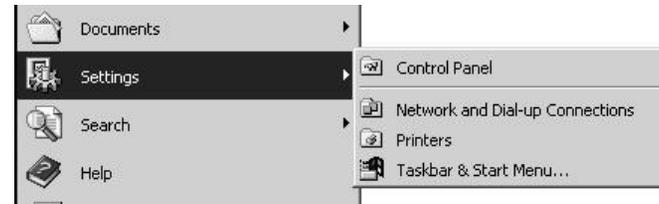


Figure 1.3 Selecting Settings > Control Panel

1A. Right-click on LAN Connections. Then select Internal > Properties (Figure 1.4).

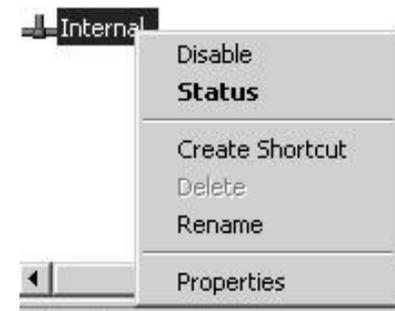


Figure 1.4  
Result of Clicking LAN Connections > Internal

## Getting Started With the DBC Network Bridge

**1B.** Once the Properties window opens (Figure 1.5), click on Internet Protocol (TCP/IP).

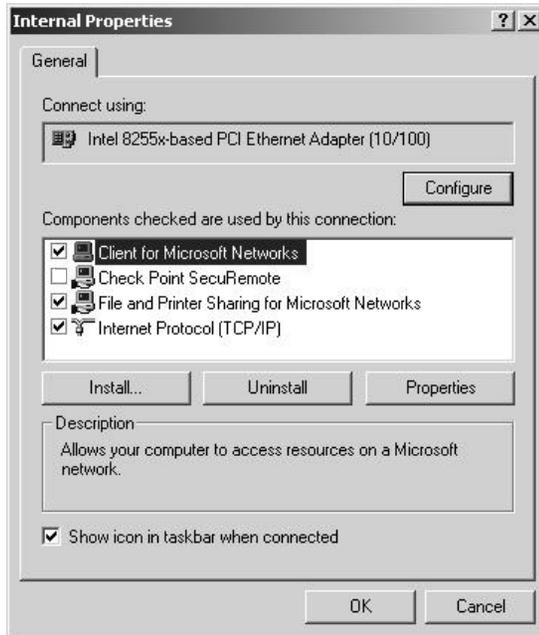


Figure 1.5 Internal Properties Window

The Internet Protocol (TCP/IP) Properties window appears (Figure 1.6). Disable Virtual Private Network or other encryption settings.

See Section 1.2.5, TCP/IP Addressing Worksheet, on the next page. Open the supplied Excel worksheet called IQ Worksheet.XLS.

**1C.** We recommend that you uncheck “Obtain an IP address automatically”, and check “Use the following address.” If you decide to set an IP address manually, specify an IP address. The IP address is four numbers between 1 and 255 separated by periods. For example, 126.126.0.1.

Select a subnet mask. The subnet mask is four numbers between 1 and 255 separated by periods. For example, 255.255.0.0.

**1D.** Click OK and close the Control Panel. At this point, some computer operating systems will require a restart.

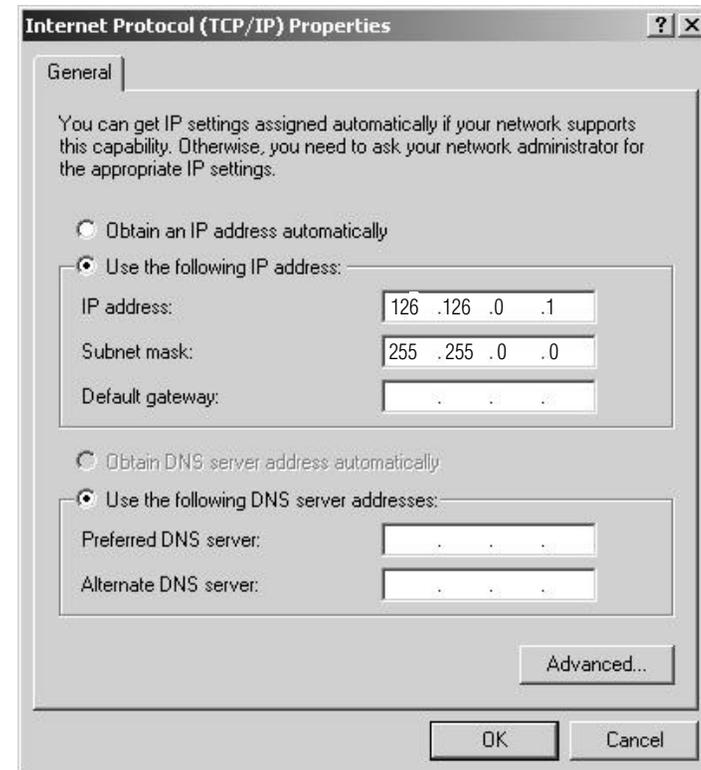


Figure 1.6 Internet Protocol (TCP/IP) Properties Window

## Getting Started With the DBC Network Bridge

### 1.2.5 TCP/IQ Addressing Worksheet

Table 3 is an example of valid TCP/IP addresses on a stand-alone network. If the TCP/IQ network is going to be shared with other people, check with the Network Administrator for their addressing scheme. Without getting into all of the networking rules, the table lists approximately 20 network addresses out of a possible 65,534 addresses on this network. There are other addresses that are valid; these are just shown as a starting point.

- The Subnet Mask for all components, including the computer, needs to be set to 255.255.0.0.
- Each computer running IQwic software must have a subnet mask of 255.255.0.0. It also must be assigned one of the addresses listed on the following table.
- A space has been left to the right of all the addresses. This area is for your notes, such as the IQ address or the component type.

In the CD-ROM that came with your DBC Network Bridge is an Excel spreadsheet that you can use to keep track of TCP/IQ addresses.

Table 3

**EXAMPLE OF AN IQ ADDRESSING WORKSHEET**

ADDRESS	IQ ADDRESS	MODEL	DESCRIPTION	CHANNEL 1	CHANNEL 2
126.126.0.1			COMPUTER		
126.126.0.2	2	I-T8000 #1	RACK ROOM	LEFT CLUSTER	RIGHT CLUSTER
126.126.0.3					
126.126.0.4					
126.126.0.5					
126.126.0.6					
126.126.0.7					
126.126.0.8					
126.126.0.9					
126.126.0.10					
126.126.0.11					
126.126.0.12					
126.126.0.13					
126.126.0.14					
126.126.0.15					
126.126.0.16					
126.126.0.17					
126.126.0.18					
126.126.0.19					
126.126.0.20					

## Getting Started With the DBC Network Bridge

2. Select IQ Systems > IQwic > TCPIQ Utility (Figure 1.7). This launches the TCPIQ Utility on the master computer.



Figure 1.7 Selecting IQ Systems > IQwic > TCPIQ Utility

2A. The master computer should discover the TCP/IQ products (Figure 1.8). If not, please re-read Section 1.2.4 on addressing rules. Also read Chapter 6, Troubleshooting.

TCP/IQ Utility						
File Setup Help						
Discovery Remove Remove All Set Address Send Code Reboot						
IP Address	IQ A...	Description	Version	Con	MAC Addr	Firmware Da
192.168.8.130	130	Crown USP3 v1.00	PSH1001	<input checked="" type="checkbox"/>	00-BA-BE-FA-CE-0A	Oct 30 2002
192.168.8.106	107	Crown USP3/CN v1.00	PSN100	<input checked="" type="checkbox"/>	00-60-2B-02-55-1E	Sep 18 2002
192.168.8.97	98	Crown PIP Lite v1.00	IPL1001	<input checked="" type="checkbox"/>	00-0A-40-00-00-21	Oct 29 2002
192.168.8.74	75	Crown PIP Lite v1.00	IPL1001	<input checked="" type="checkbox"/>	00-0A-40-00-00-3E	Oct 29 2002
192.168.8.231	232	Crown USM810LC V3.00X	LDC300	<input checked="" type="checkbox"/>	00-60-2B-02-52-E2	Oct 21 2002

Figure 1.8 Example of Discovered Components

2B. Once TCP/IQ Utility has launched, select a single component and click on Set Address. In the Set Address window (Figure 1.9), set up a TCP/IQ address—it must be unique. Then set up the same Subnet mask for all of the components as well as the master computer. Set the IQ address, and select Send Code.

2C. Close the software. Repeat as necessary.

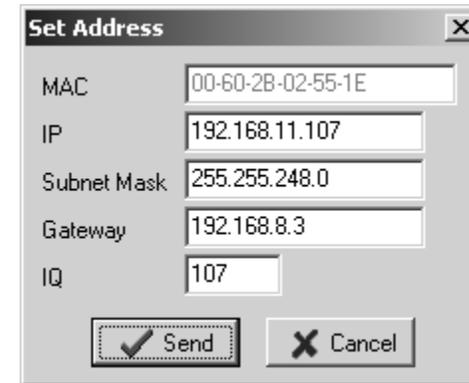


Figure 1.9 Set Address Window

3. Launch the IQwic program. (Figure 1.10).



Figure 1.10 Selecting IQ Systems > IQwic

## Getting Started With the DBC Network Bridge

4. The Component Discovery screen appears and displays the message, "Searching for TCP/IQ components" (Figure 1.11).

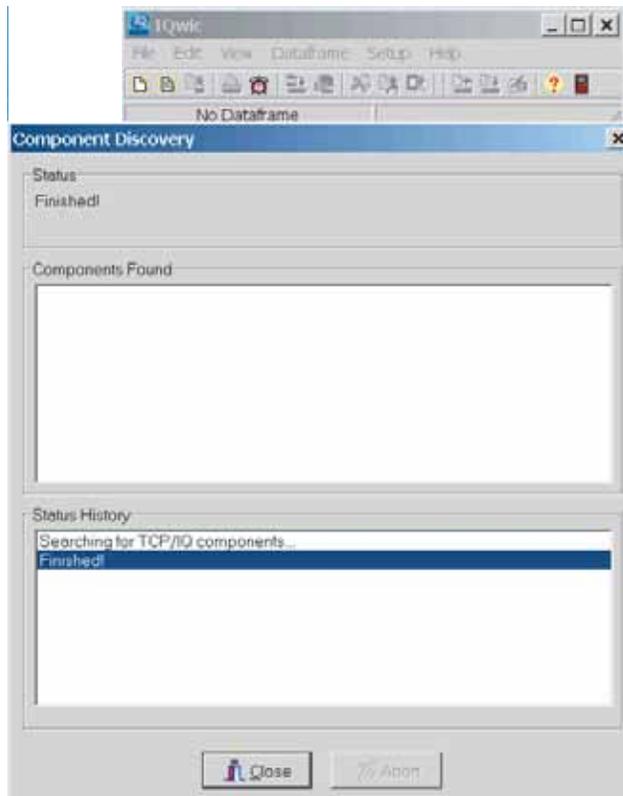


Figure 1.11 The Discovery Screen

5. The IQwic toolbar and Workspace appear. An icon of the DBC Network Bridge appears in the Workspace (Figure 1.12).

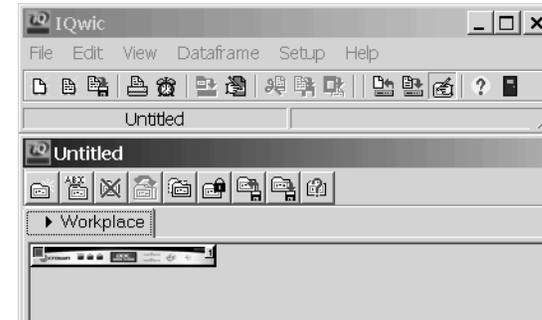


Figure 1.12 The IQwic Toolbar (Top) and Workspace (Bottom)

6. Double-click the DBC Network Bridge Icon. The Input-Output window appears (Figure 1.13).



Figure 1.13 The Input-Output Window

7. Click on the yellow Expand/Shrink bar at the bottom of the Input-Output window.

## Getting Started With the DBC Network Bridge

8. The processing functions appear. Click on the **Unit Presets tab** at the top. The Unit Presets window appears (Figure 1.14).

9. At the bottom right, select Preset 32, Standard Cinema. Then select **Recall this Preset**. Your system is running and ready to configure. Please continue reading the manual.

If there are problems, please re-read Section 1.2.3 on addressing rules. Also read Chapter 6, Troubleshooting.

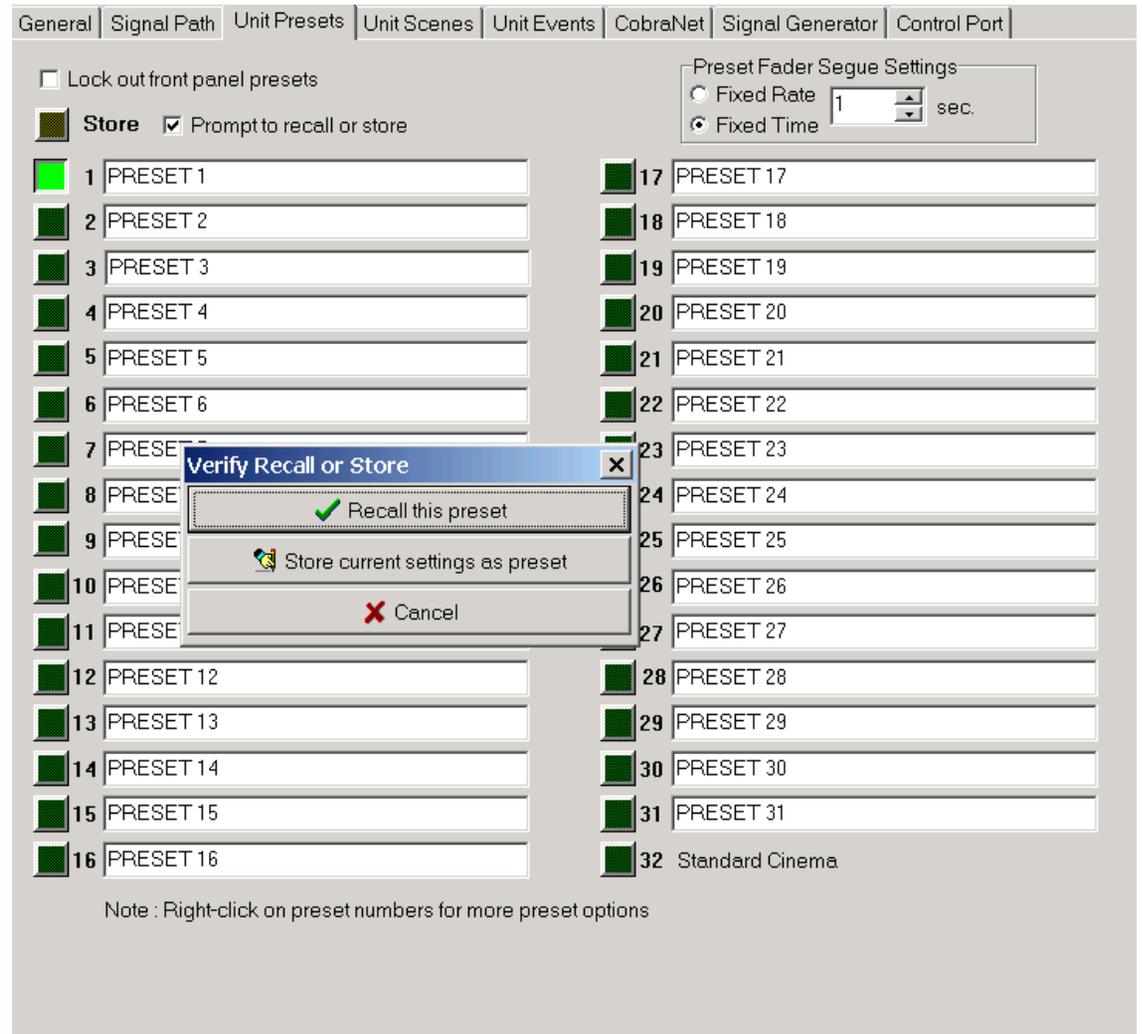
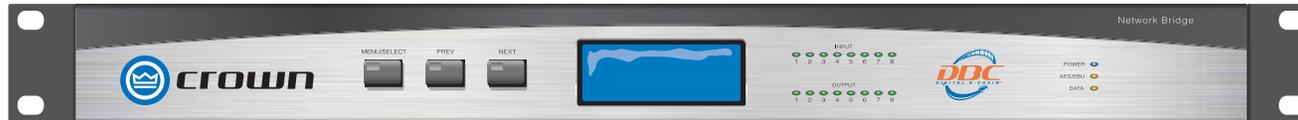


Figure 1.14 The Unit Presets Window

# Table of Contents

Important Safety Instructions .....	2	3.3.5 Unbalanced Monitor Output Wiring .....	19	4.7.12 Scenes.....	39
Declaration of Conformity.....	3	3.3.6 CobraNet Connections.....	19	4.7.13 Scene Editor .....	40
<b>1 Getting Started with the DBC Network Bridge .....</b>	<b>4</b>	3.3.7 Control Port Connections .....	19	4.7.14 Events Scheduler.....	41
1.1 Hardware Installation .....	4	<b>4 Operation .....</b>	<b>20</b>	4.8 General Firmware Features.....	43
1.1.1 Audio and Network Connections.....	4	4.1 Front Panel Controls and Indicators.....	20	4.8.1 Input Level Meters.....	43
1.2 Communicating with the DBC Network Bridge.....	6	4.2 Back Panel Controls and Connectors .....	21	4.8.2 Input Dynamic Cut/Boost Meters.....	43
1.2.1 The Network Wizard.....	6	4.3 Navigating the LCD Control Screen .....	22	4.8.3 Output Level Meters .....	43
1.2.2 Introduction .....	6	4.3.1 Functions, Controls and Screens .....	22	4.8.4 Output Dynamic Cut/Boost Meters.....	43
1.2.3 TCP/IQ Addressing Rules .....	6	4.3.2 Operation Examples .....	23	4.8.5 Memory Backup .....	43
1.2.4 TCP/IQ Setup.....	7	4.3.3 Menu Tree.....	23	4.8.6 Presets .....	43
1.2.5 TCP/IQ Addressing Worksheet.....	9	4.4 IQwic Overview .....	24	4.8.7 Real Time Clock .....	43
Table of Contents .....	13	4.5 Metering .....	25	4.8.8 Events.....	43
<b>2 Welcome .....</b>	<b>14</b>	4.6 General Tab.....	26	<b>5 Advanced Operation .....</b>	<b>44</b>
2.1 Features .....	14	4.7 Basic Processing Functions.....	27	5.1 Advanced Operation Table of Contents.....	44
2.2 How to Use This Manual.....	14	4.7.1 Signal Path Tab, Cinema Surround Form.....	27	5.2 Advanced Functions .....	45
Sample Application Diagram .....	15	4.7.2 Input Compressor .....	28	5.3 Advanced Form Firmware Features.....	54
<b>3 Setup .....</b>	<b>16</b>	4.7.3 Input Delay.....	29	5.4 Technical Description .....	69
3.1 Unpack and Install Your DBC Network Bridge .....	16	4.7.4 EQ Filters .....	30	<b>6 Troubleshooting .....</b>	<b>70</b>
3.2 Connecting to AC Mains .....	16	4.7.5 All Outputs Volume Controls .....	32	<b>7 Specifications .....</b>	<b>73</b>
3.3 Wiring.....	17	4.7.6 Signal Generator .....	33	<b>8 Appendix A: TCP/IQ Network Basics.....</b>	<b>75</b>
3.3.1 Analog, Digital and Auxiliary Inputs.....	17	4.7.7 CobraNet: Explanation .....	34	<b>9 Service.....</b>	<b>80</b>
3.3.2 Balanced Input Wiring .....	18	4.7.8 Cobranet: Output.....	35	<b>10 Warranty .....</b>	<b>81</b>
3.3.3 Unbalanced Input Wiring .....	18	4.7.9 Booth Monitor Source Select.....	36	<b>Crown Audio Factory Service Information Form .....</b>	<b>83</b>
3.3.4 Balanced Monitor Output Wiring .....	18	4.7.10 Presets.....	37		
		4.7.11 Preset Editor .....	38		



## 2 Welcome

At the heart of a Digital B Chain system, the Crown® DBC Network Bridge allows you to distribute multiple channels of digital audio over standard fast Ethernet hardware and cabling for use in traditional, e-cinema and d-cinema applications.

The DBC Bridge accepts standard analog and/or AES digital audio and CobraNet® digital channels from other Cinema processors (Dolby®, DTS®), Cinema Servers, or Alternative Content Media Players; and bridges (routes) them to a Crown DBC network. Figure 2.1 is a sample application drawing.

This network is Crown's proprietary "Single-Click" solution that provides system control, monitoring, diagnostics, and digital audio transport. The DBC network (fed by the DBC Network Bridge) distributes the digital audio and system-wide control protocol to Crown amplifiers. The DBC Network Bridge also provides the necessary system equalization, which is stored and recalled via a series of presets for use in both feature film and alternative content programming.

### 2.1 Features

- Accepts 8 inputs (7.1 surround) via one of the following formats:

Analog  
AES/EBU  
CobraNet

- Selectable mic, mic with 24V phantom power, or line analog XLR inputs for alternative content
- Primary and Secondary 100 Mb Ethernet "Single-Click" connection for DBC network
- Front-panel LCD display and control functions of internal presets and system setup
- Full 32-channel CobraNet digital audio transmit/receive capability
- Enhanced matrix mixer capable of full 8x32 crosspoint matrix mixing
- 24-bit/48 kHz converters
- Studio-grade DSP with multiple filter banks for each channel (up to 256 filters)
- 32 presets, 32 scenes, and 32 events can be stored, labeled, and recalled
- Analog monitoring of cinema processor inputs, pre-amp, or post-amp signals
- Multiple-function control port for third-party automation/control

- Internal clock/calendar for scheduling events
- Auto-leveling functions for dynamic volume control of auditoriums or lobby
- Ambient-leveling functions for maintaining maximum signal-to-noise ratio
- Three-year, no-fault, fully transferable warranty

### 2.2 How to Use This Manual

This manual provides you with the necessary information to safely and correctly setup and operate your DBC Network Bridge. It does not cover every aspect of installation, setup or operation that might occur under every condition. For additional information, please consult Crown's *DBC Bridge Application Guide* (available online at [www.crownaudio.com](http://www.crownaudio.com)), Crown Technical Support, your system installer or retailer.

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

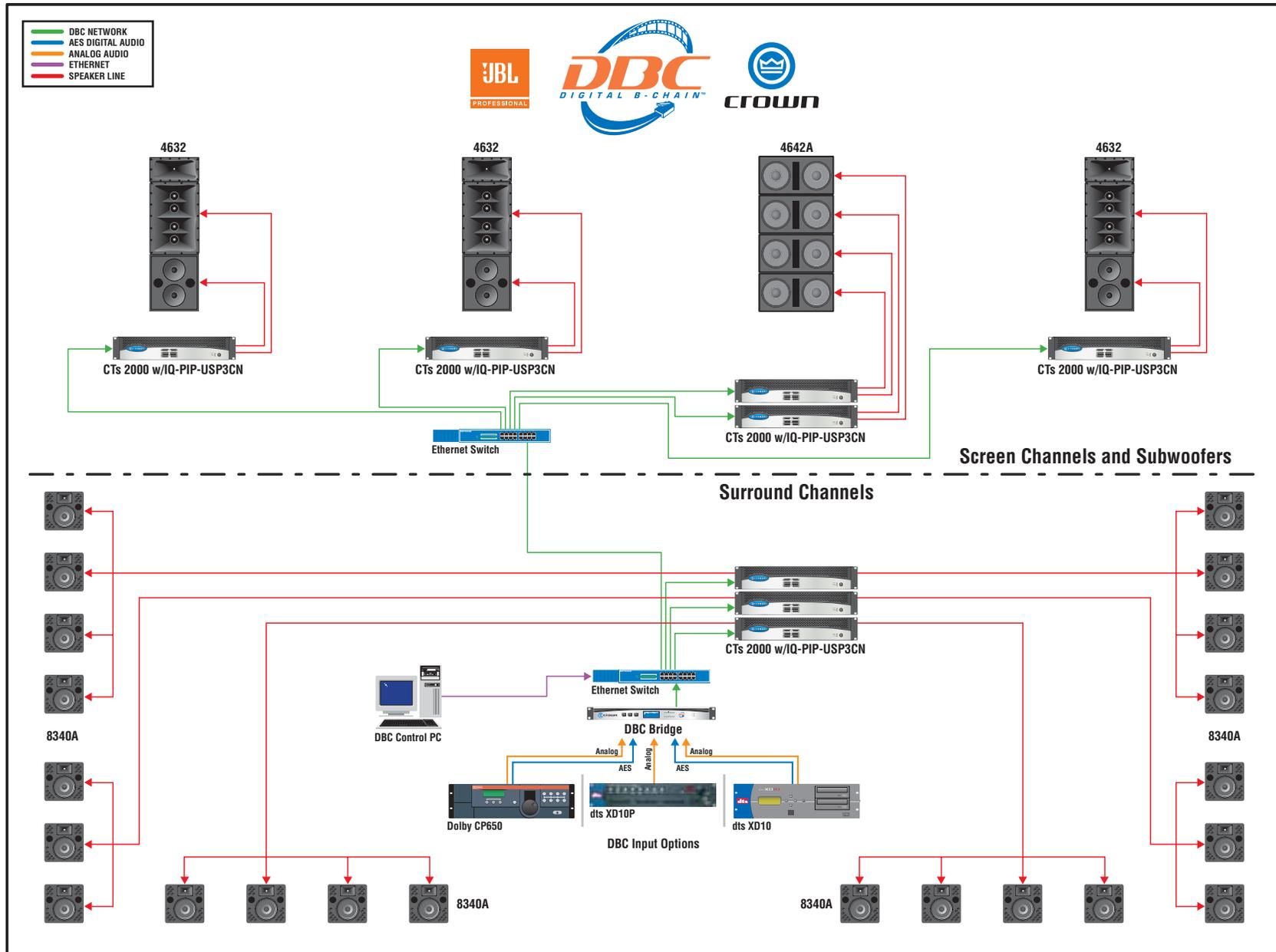
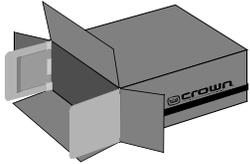


Figure 2.1 Sample Application: Large Cinema System Diagram

### 3 Setup



#### 3.1 Unpack and Install Your DBC Network Bridge

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

We also recommend that you save all packing materials so you will have them if you ever need to transport the unit. **Never ship the unit without the factory pack.**

YOU WILL NEED (not supplied):

- Input wiring cables
- Network cables
- Rack for mounting the DBC Network Bridge (or a stable surface for stacking)



**WARNING:** Before you start to set up your DBC Network Bridge, make sure you read and observe the Important Safety Instructions found at the beginning of this manual.



**CAUTION:** Before you begin, make sure your DBC Network Bridge is disconnected from the power source.

Use a standard 19-inch (48.3 cm) equipment rack (EIA RS-310B). See Figure 3.1 for dimensions.

You may also stack units without using a cabinet.

NOTE: When transporting, units should be supported at both front and back.



#### 3.2 Connecting to AC Mains

**WARNING:** The third (ground) prong of the AC power cord connector is a required safety feature. Do not attempt to disable this ground connection by using an adapter or other methods.

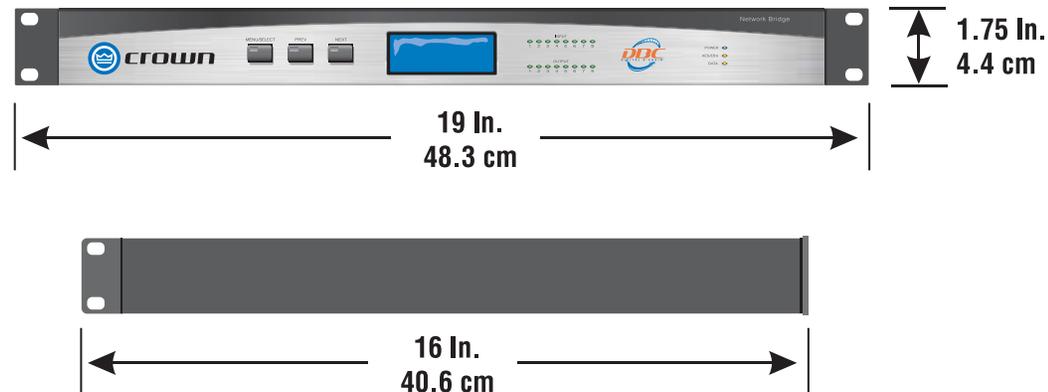


Figure 3.1 Dimensions

## 3 Setup

### 3.3 Wiring

Chapter 1 describes how to make connections to the DBC Network Bridge. The information below describes the connections in detail.

#### 3.3.1 Analog, Digital and Auxiliary Inputs

**Analog Line Input:** DB25 female connector accepts eight balanced analog line-level analog inputs. Pinout matches Dolby CP-650 analog output. See Table 2 on page 5.

**Digital Audio Input:** DB25 female connector accepts eight AES3 digital audio signals. Pinout matches Dolby #778 AES input/output card for CP-650. See Table 1 on page 5.

**Auxiliary Inputs:** Two female XLR balanced inputs for speech reinforcement or announcements (see Figure 3.2).

Each input has an input selector switch.

- Slide it to the left (M) for microphone signal levels up to +7dBu (0dBu = 0.775 volts).
- Select the center position (L) for line-level signals up to +20 dBu.
- Slide it to the right (P) to provide 24VDC to mics requiring phantom power.

Each input has a screwdriver-set, calibrated gain control to compensate for different input source levels. The slot on the control shaft points to the gain setting. The settings are labeled for line-level input. Add 25 dB to the scale if the inputs are switched for microphone level signals.

Use a screwdriver to adjust the gain pot so that the input signal level plus gain equals roughly 0dBu. You will need to know, or estimate, the level of the input source. Setting the source signal level to approximately 0dBu will provide 20dBu of headroom in the input preamp. Some recommended settings are given in Table 4.

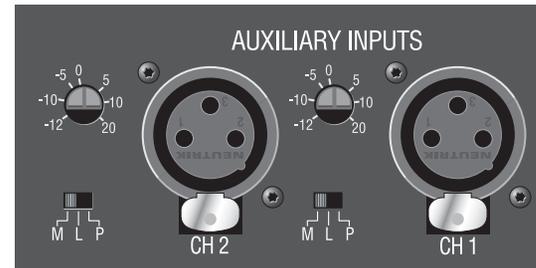


Figure 3.2 Aux Input Level Controls, XLR connectors and Mic/Line/Phantom Slide Switch

	Pro Audio Equipment	Semi-Pro or consumer equipment	Dynamic mic, speech	Condenser mic, speech	Hot condenser mic, speech
<b>dBm/dBV (nominal)</b>	+4 dBm	-10 dBV	-75 dBV	-65 dBV	-45 dBV
<b>dBu (nominal)</b>	+4 dBu	-8 dBu	-73 dBu	-63 dBu	-43 dBu
<b>Suggested Setting</b>	-4 (L)	+8 (L)	+20 (M)	+18 (P)	+11 (P)

Table 4. Suggested Audio Input Gain Control Settings

- 0 dBm = 0.775 Vrms with a 600-ohm load.
- 0 dBV = 1 Vrms.
- 0 dBu = 0.775 Vrms.

### 3 Setup

#### 3.3.2 Balanced Input Wiring

Balanced sources should be wired as shown below. Notice that the shield is not connected to the chassis ground of the source if the source is also connected to the AC ground (that is, it has a grounded AC plug). This prevents unwanted ground loops.

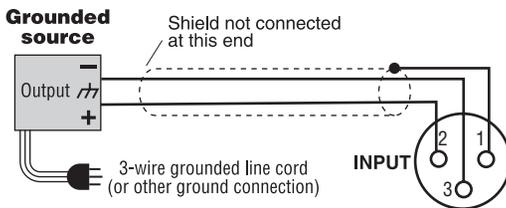
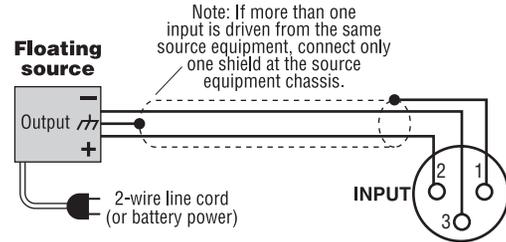
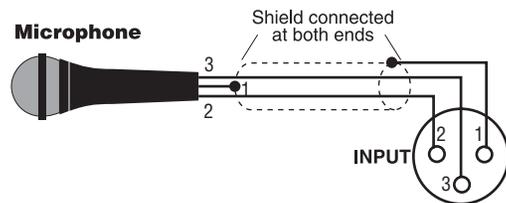


Figure 3.3 Balanced Audio Input Wiring

#### 3.3.3 Unbalanced Input Wiring

Unbalanced sources should be wired as shown below. The examples are grouped according to whether you use twin-lead shielded wire or single-lead coax (or twisted pair).

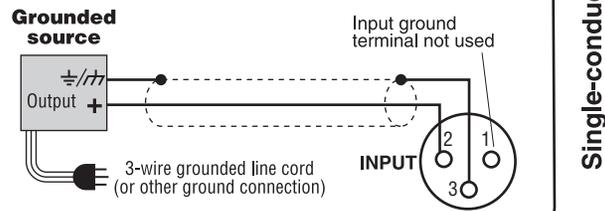
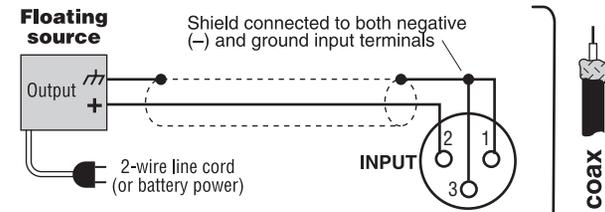
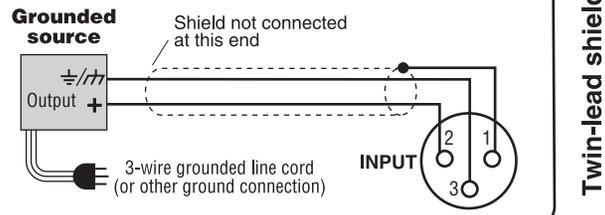
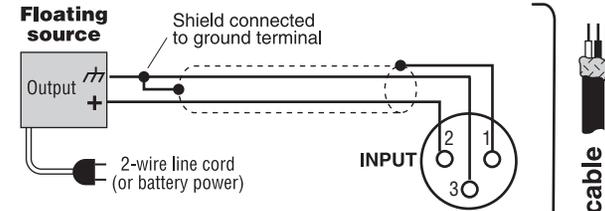


Figure 3.4 Unbalanced Audio Input Wiring

#### 3.3.4 Balanced Monitor Output Wiring

Balanced Monitor Output wiring is shown in Figures 3.5. Notice that if the load is connected to AC ground, the shield should not be connected to the output ground terminal. This will prevent unwanted ground loops.

1. Assemble a 2-conductor shielded cable with a Phoenix-type 3-terminal connector on one end. On the other end, solder a connector that mates with your booth monitor amplifier/speaker.
2. Plug the Phoenix-type connector into the Monitor Output connector on the back of the DBC Network Bridge.
3. Plug the other end of the cable into your booth monitor amplifier/speaker.

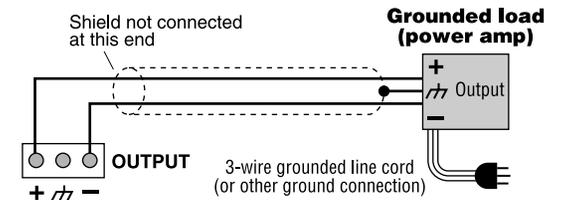
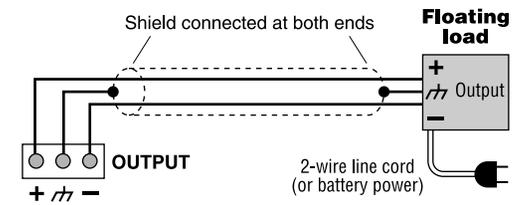
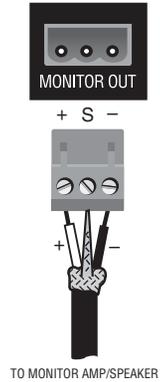


Figure 3.5 Balanced Monitor Output Connections

### 3 Setup

#### 3.3.5 Unbalanced Monitor Output Wiring

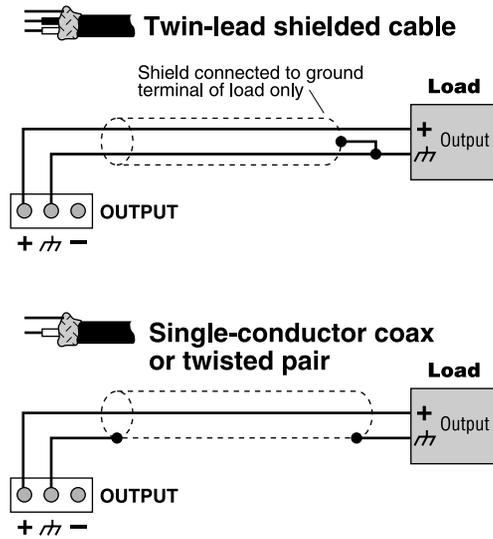


Figure 3.6 Unbalanced Monitor Output Connections

#### 3.3.6 CobraNet Connections

The CobraNet network carries up to 32 channels of audio bidirectionally via a single cable. Connect the DBC Network Bridge to the CobraNet network using RJ45-terminated standard CAT 5 cable from the PRIMARY connector on the rear of the unit.

The PRIMARY connection can either be connected to another DBC Network Bridge unit or other CobraNet-compatible component's PRIMARY port. A further option is to connect to a port on a 100Mbit Ethernet switch or hub in order to distribute the network audio to other devices. Devices that are to communicate with the DBC Network Bridge will all need unique Ethernet IP addresses assigned. See the CobraNet sections 4.7.8 and 8.3 for more details.

The SECONDARY connector is for creating a redundant network for backup purposes. This port should be tied to the backup Ethernet network. In the event of a failure in the cabling or hardware connected to the PRIMARY system the DBC Network Bridge will switch to the SECONDARY network in a matter of seconds.

On each connector are two LEDs. The left LED (IN USE/CONDUCTOR) lights yellow when the port is in use and will blink if the device is also the conductor (the CobraNet timing master). The right LED (LINK/ACTIVITY) lights green when link is established and blinks when network activity is detected. Both LEDs flash yellow in unison to report a fatal error. The Secondary Connector has identical LEDs as the Primary Connector.

#### 3.3.7 Control Port Connections

Connect any external circuits you plan to use to control and/or monitor the DBC Network Bridge via the Control Port. Figure 3.7 shows pin assignments for the Control Port. See the Control Port (Section 5.2.4) for information on the operation of the Control Port, and for examples of wiring circuits to the Control Port connector.

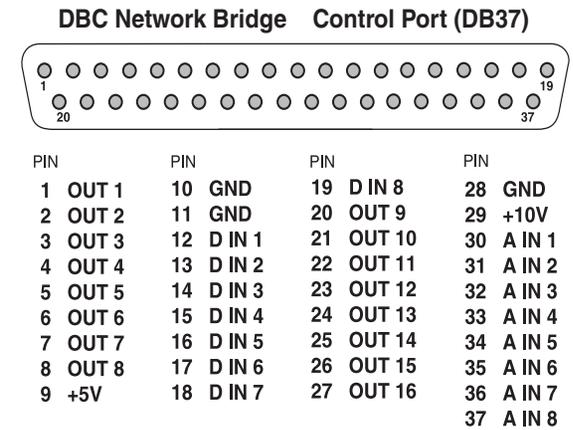


Figure 3.7 Control Port Pin Assignment

Pins 1 through 8 are assignable to manually select a binary (on/off) value, chosen Preset status, or status of any logical binary control or sensor (most likely gate and Preset).

Pins 20 through 27 provide an analog output from 0 to +10VDC that is assignable or can reflect an object (including faders) of the unit.

A total of 1 amp of current is available from all outputs.

Pins 12 through 19 are assignable to logic Preset recall and general control for logical type objects within the unit, and are assignable to any combination of mute controls. Pins 30 through 37 function as analog inputs and are assignable to any combination of fader controls.

## 4 Operation

### 4.1 Front Panel Controls and Indicators

#### A. LCD Display

LCD digital display shows information about the currently selected IQ address, inputs, presets, scenes, and firmware information.

#### B. Input Display

An eight-segment LED display matrix shows input signal presence for all eight analog or digital inputs.

#### C. Power Indicator

Blue LED shows that the unit is plugged in and AC power is being supplied. The unit does not have a power on/off switch.

#### D. Menu/Select Button

Scrolls through the menus of IQ address, inputs, presets, scenes, and firmware information. Also used to select a parameter that is found by the Next/Prev buttons.

#### E., F. Next/Previous Buttons

These two buttons scroll through parameters in each menu.

#### G. Output display

An eight-segment LED display matrix shows output signals for all eight surround channels.

#### H. Data Indicator

Amber LED flashes when commands addressed to the DBC Bridge are received.

#### I. AES/EBU Indicator

Amber LED illuminates when the unit is switched to AES digital inputs.

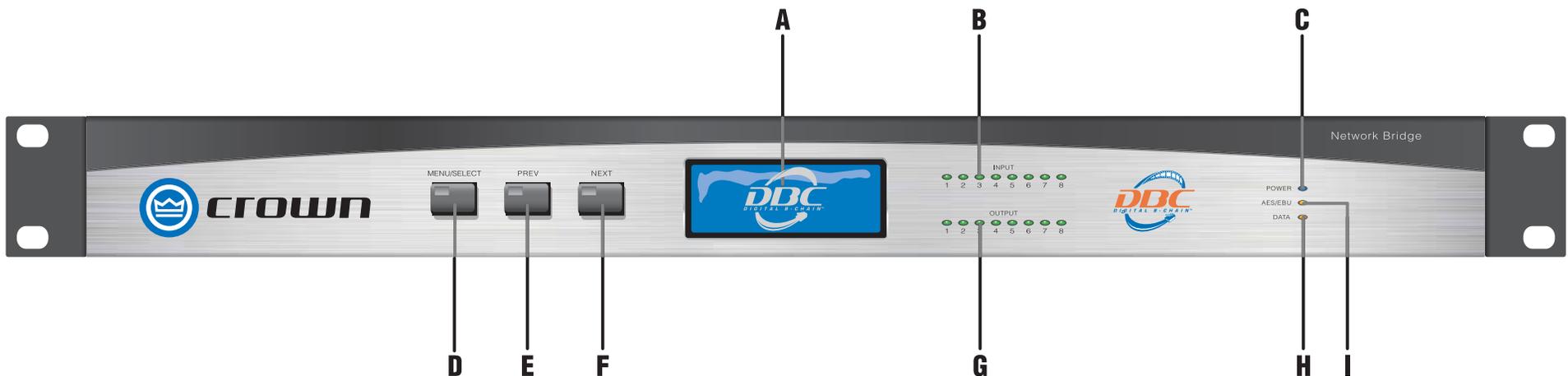


Figure 4.1 Front Panel Controls and Indicators

## 4 Operation

### 4.2 Back Panel Controls and Connectors

#### J. IEC AC Power Inlet

Accepts an IEC AC power cord. The DBC Network Bridge has a universal power supply, and may be operated on AC line voltages from 100 VAC to 240 VAC at 50 Hz or 60 Hz.

#### K. Multifunction Control Port

One DB37M for analog inputs, digital inputs, +5VDC, +10VDC and ground. 8 input-switch closures, 8 analog 0-10VDC inputs, 16 output contact closures, +10VDC power source (1A), GND (1A+).

#### L. Primary Network Connector

RJ45 connector for primary CobraNet network connections (100Mbit CAT 5). Supports TCP/IQ communications with CobraNet digital audio channels.

On the connector are two LEDs (see detail drawing below). The left LED lights yellow when the port is in use and will blink if the device is also the conductor (the CobraNet timing master device). The right LED lights green when link is established and blinks when network activity is detected. Both LEDs flash yellow in unison to report a fatal error.

#### M. Secondary Network Connector

RJ45 connector for secondary (redundant or backup) CobraNet network connections (100Mbit CAT 5). Supports TCP/IQ communications with CobraNet digital audio channels. The SECONDARY connection is similar to the Primary, but is active only in case of a fault in the CobraNet network attached to the PRIMARY. The secondary LEDs work in the same way as the primary ones.

#### N. AES/EBU Digital Audio Input

DB25 female connector accepts eight AES3 digital audio signals. Pinout matches Dolby #778 AES input/output card for CP-650.

#### O. Analog Audio Input

DB25 female connector accepts eight balanced analog line-level analog inputs. Pinout matches Dolby CP-650 analog output.

#### P. Aux Input Level Controls

Screwdriver-set, calibrated gain potentiometer (one per channel) for adjusting the input gain to the input signal level. These can be used to compensate for different microphone sensitivities. Control range is from -12 dB to +20 dB.

#### Q. Aux Inputs

2 female XLR balanced inputs for speech reinforcement or announcements. Switchable between mic, line, and mic with phantom power.

#### R. Monitor Out Connector

3-pin Phoenix-type connector supplies a balanced analog line-level output signal which can feed a powered monitor loudspeaker. This output can be switched to monitor:

- Cinema processor output signals (+20 dBu maximum output level)
- Pre-amp input signals
- Post-amp output signals

#### S. Aux Input Mic/Line/Phantom Switch

Each input has a three-position "M L P" selector switch for mic level, line level, or mic level with phantom power.

- Select the M position for microphone signal levels up to +7dBu (0 dbu = 0.775 volt).
- Select the L position for line level signals up to +32 dBu
- Select the P position for mic inputs that require +24 VDC phantom power.

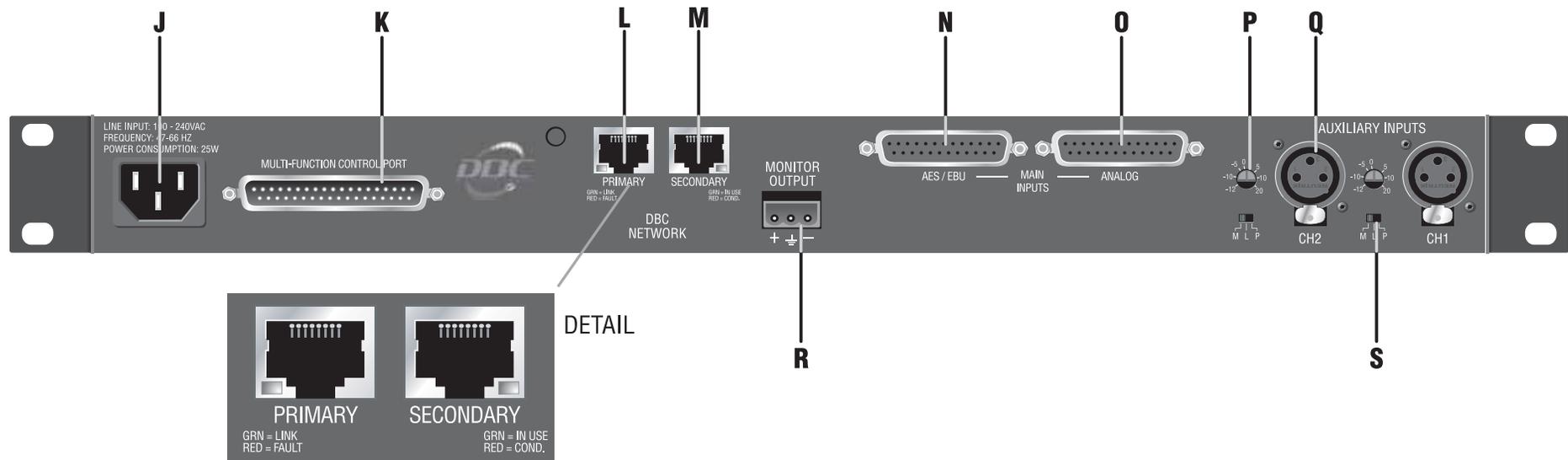


Figure 4.2 Back Panel Controls and Connectors

## 4 Operation

### 4.3 Navigating the LCD Control Screen

#### 4.3.1 Functions, Controls and Screens

The LCD Control Screen and its controls let you view and set up various parameters in the DBC Network Bridge. Settings made on the LCD screen are duplicated in IQwic software, and vice-versa. (DSP parameters cannot be adjusted with the LCD Control Screen. That is done in IQwic.)



Figure 4.3 LCD Control Screen and Its Controls.  
Left-to-right: Menu/Select Button, Prev Button, Next Button, LCD Control Screen

Figure 4.3 shows the LCD Control Screen and its controls. Its functions are described below.

#### The LCD Control Screen shows:

- 32 Preset numbers
- 32 Scene numbers
- Analog or digital audio input selections
- IQ Address / IP Address/ Subnet Mask/MAC Address
- Firmware Info
- Errors

On power-up, the LCD Control Screen displays the Crown logo and DBC logo. The screen defaults to the Preset display.

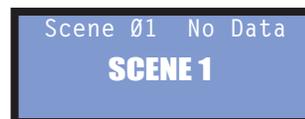
Getting around in the Menu is intuitive. Here are the basic operations:

- Hold the **Menu/Select** button to cycle through the Preset screen, Scene screen, Address screen, Input Board Menu, Firmware Info screen, and back to the Preset screen.
- Press **Next** to go to a higher-numbered Preset, Scene, or Input. Presets and Scenes loop around from 1 to 32.
- Press **Prev** to go to a lower-numbered Preset, Scene, or Input. Presets and Scenes loop around from 32 back to 1.
- Press **Menu/Select** within 2 seconds after pressing **Next** or **Prev** to make a selection.

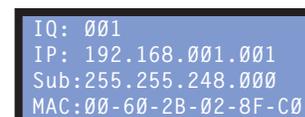
**Preset Screen** is used to select Presets.



**Scene Screen** is used to select Scenes.



**Address Screen** is used to read addresses and subnet mask.



Once the **Menu/Select** button is released, the **Next** and **Prev** arrow buttons are used to adjust the parameter. On releasing the **Menu/Select** button, you have two seconds to press the **Next** or **Prev** button before the display changes back to default. When the parameter is adjusted to the desired value, press the **Menu/Select** button to store the setting.

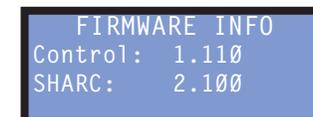
Internal errors are automatically displayed on the LCD Control Screen. If an error is displayed, call Tech Support at Crown and provide them the error number.

Operation examples and the Menu Tree are on the next page.

**Input Board Menu** is used to select input signals.



**Firmware Info Screen** displays the version of the Control firmware and SHARC firmware.



## 4 Operation

### 4.3.2 Operation Examples

#### Operation Example 1

How to select Preset 5 using the LCD Control Screen:

1. After power-up, the Preset Screen appears.
2. Press **Next** until you see Preset 5.
3. Within 2 seconds, press **Menu/Select**.

#### Operation Example 2

How to select the Digital/Surround Input using the LCD Control Screen:

1. After power-up, press and hold **Menu/Select** until the **Input Board Menu** appears.
2. Press **Next** until the arrow is by **Digital/Surround**.
3. Within 2 seconds, press **Menu/Select**. Digital/Surround will be highlighted, showing that it is selected.

#### Operation Example 3

How to read the unit's addresses:

1. After power-up, press and hold **Menu/Select** until the **Address screen** appears.

### 4.3.3 Menu Tree

As a handy reference, Figure 4.4 shows the menu structure of the LCD control screen.

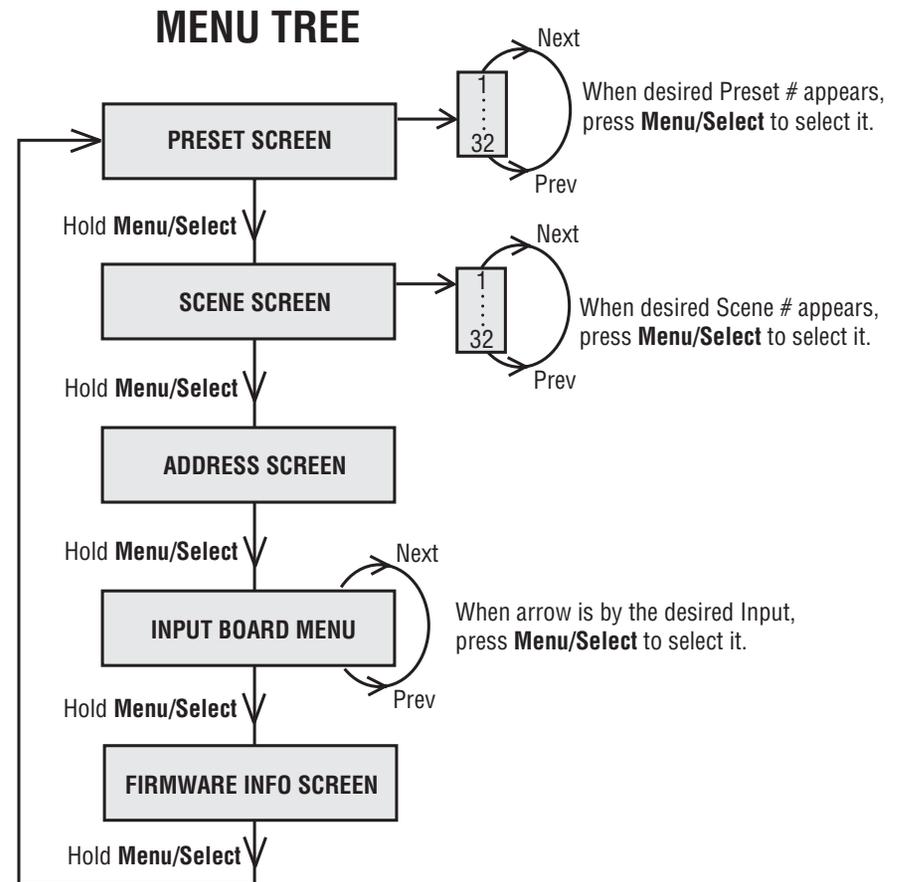


Figure 4.4 Menu Tree of the DBC Network Bridge LCD Control Screen

## 4 Operation

### 4.4 IQwic Overview

This section describes how to set up the DBC Network Bridge from within IQwic software. It includes an overview of the various processing functions and associated windows.

The DBC Network Bridge is configured using IQwic software. This application enables the setup of all the parameters available to the DSP of the DBC Network Bridge unit.

### PC Requirements

To run IQwic successfully a 200MHz Pentium II (preferably 400MHz or better) machine with an absolute minimum of 32MB RAM (64MB or more is better) is recommended. IQwic will run under Windows 95/98/ME/NT or 2000 (2000 Pro recommended).

### System Overview

The DBC Network Bridge is a 'fixed path' processing unit. This means that the audio signal travels along a set course of DSP objects (software processors). These objects can be switched in or out of the path and in some instances matrix routed into other paths. The 'Signal Path' tab in the DBC Bridge setup window in IQwic displays an overview of the main DSP, input/output routing and the various processing objects in them. This is where most of the DBC Network Bridge's DSP configuration is accessed. More information about this 'map' is available in Section 4.7, Basic Processing Functions.

### Presets and Scenes

The basic premise in setting up the DBC Network Bridge is that the unit should be configured for a particular use and this setup then stored as a Preset in the unit. There are also Scene memories that store just the settings of up to 50 of the DSP objects but not the configuration of objects.

Presets or Scenes can be primed to change at set times or dates using the 'Unit Event' scheduler giving a reasonable degree of flexibility not unlike other show controllers. A Preset segue function enables Presets to be crossfaded in level for smooth transitions between setups.

IQwic itself can also switch between different setups including combinations of units wired via the IQ interface. The Dataframe contains all the information for all the devices on the IQ network and is saved as a .WIQ file on the PC's hard drive. Different versions of these files that pertain to the same hardware setups can then be scheduled to change using the Schedule function in the File menu and this can even be linked to MIDI Time Code using the MTC Scheduler in the Setup menu.

A further level of control is also available using IQwic Scenes. These are not the same as the Unit Scenes that can be set up for the DBC Network Bridge alone. These can be scheduled using the Scene Sequencer found in the Dataframe menu and are again saved on the PC hard drive (as .SIQ files). IQwic Scenes can be organized without any units connected to the PC, unlike DBC-Bridge Presets that can only be stored in the unit while the program is on-line to the device.

### IQwic Notes

If you use the **Cut** command from the Edit menu on a DBC Network Bridge icon in the Workplace this will not delete the unit but, instead removes all the settings back to their defaults. Equally, Copy will put the settings on the clipboard for Pasting back into another unit (for example, if you have two or more on a network).

All of the settings in the unit can be printed in list format using the File menu **Print** command. This is useful to assess the configuration of the device on paper although, note that for a standard DBC Network Bridge the printout will run to over 20 pages! Use the 'Select' button to choose for which unit(s) you wish to print the settings.

The **Upload** and **Engage** options in the Dataframe menu enable a manual connection to be made either from the unit in the former case or back to the unit in the latter. All the current settings will be either received or sent to the DBC Network Bridge. These functions can be used to re-establish communication with the unit should the link go down, i.e. the network cable is accidentally unplugged.

The **Edit Control Pages** option allows the construction of 'custom' control panels to give selective access to particular controls and to represent them in a user's chosen layout with added text and images. IQwic also includes some comprehensive error reporting facilities that can be linked to a printer or sent out externally via a connected modem to either a fax or pager. A .wav audio file alert can even be played through the system! Note that at present the error reporting doesn't include information relating to CobraNet installations. Error reporting can be suppressed if necessary - this is useful in larger systems where there may be too much generation of data.

A security system is implemented using a set of passwords to protect almost any aspect of the software's functionality from unauthorized access or alteration. Passwords can be set to secure:

- Running the IQwic program
- Creation of new Dataframes/Scenes
- Access to the current Dataframe
- Operation/editing of component controls
- Setup of Scene sequences

The Administrator mode gives access to all passwords with one single password.

Some passwords are program based, e.g. run program, create new Dataframe/Scene and Administrator. The current Dataframe, Component controls and Scene sequence passwords are saved with the Dataframe in the .WIQ file itself.

## 4 Operation

### 4.5 Metering

After you have followed the steps in Chapter 1, IQwic is running, and the Input/Output meters window (Figure 4.5) is at the left of the screen. Its features are described below.

#### 1. Output Level Meters

Audio level meters are provided for each output channel: Left, Right, Center, Subwoofer, Surround Left, Surround Right, Back Left, and Back Right. The meters sense the audio signal immediately after the audio output processing block. Meter range is from -60 to +20 dBu with 0.5 dB resolution.

Another meter labeled "Monitor" shows the output level at the Monitor Output connector.

#### 2. Input Level Meters

Audio level peak program meters are provided for each of the input channels: Left, Right, Center, etc. The meters sense the digital or analog audio signal, and respond with 1.7 millisecond attack and 350 millisecond release. Calibration is in dBu when the input is in "line" mode and set at 0 dB. Meter range is from -60 to +20 dBu with 0.5 dB resolution.

#### 3. Preset Information

Last Preset indicates the Preset that is currently displayed. Below that is the label associated with that Preset. The Preset can be changed by IQwic, the front panel of the unit, by the event scheduler (described later), or by a programmed control-port input.

#### 4. Status Window

This window shows the current status of the unit and has three modes:

- **Active (green):** Indicates that the settings of the unit agree with the displayed Preset.
- **Modified (yellow):** Indicates that the settings of the unit are different from the displayed Preset.
- **Offline (red):** Indicates that IQwic is not currently communicating with the unit.

#### 5. Expand/Shrink Bar

Click on this bar to expand the view to see all the processing options. Click it again to remove the processing options view.

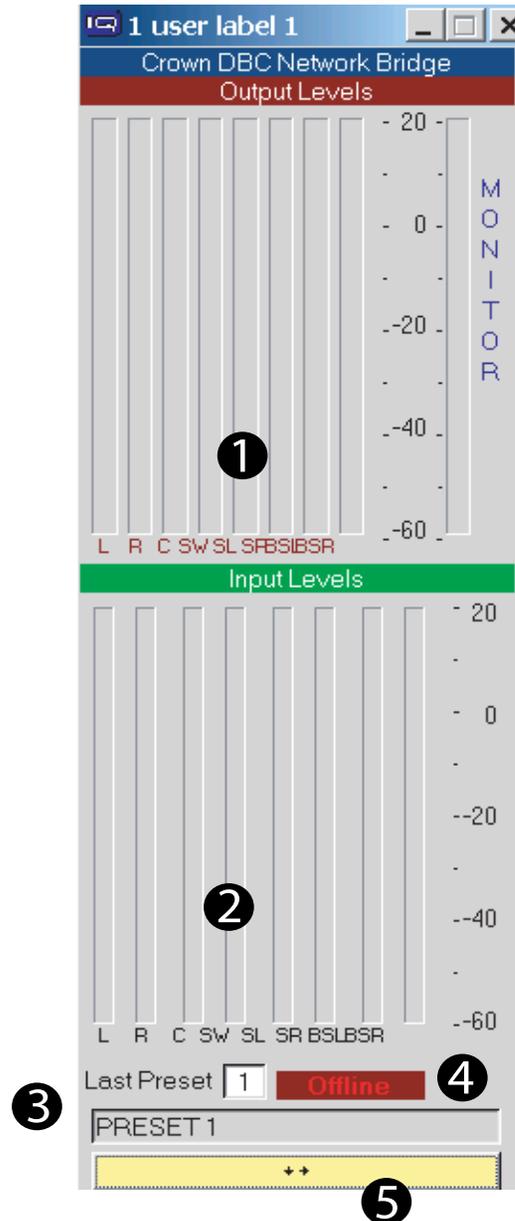


Figure 4.5  
The Input/Output Level Meter Window

## 4 Operation

### 4.6 General Tab

Click on the **Expand/Shrink Bar** so that the Setup and Processing Functions appear. Click on the **General** tab at the top to view the **General** window (Figure 4.6). Its features are described below.

#### 1. Real Time Clock

The onboard Real Time Clock tracks day, date, hour, minute and second, and may be set to any date and time desired, or to match that of the computer running IQwic software. The clock is used as a time reference for the Events Scheduling feature (described later). Internal capacitor storage allows the clock to run for up to 45 days without power being applied to the DBC Network Bridge.

#### 2. Front Panel Control Lock Out

Activation of this control prevents access to the front panel controls. When active, the front panel display will indicate "Lxx" to show that the front panel is not accessible. If a front panel control is pressed, the display will show "Loc", reminding the user that the front panel is locked.

#### 3. Data

This control allows the user to light the front panel "DATA" LED continuously. This is handy as a diagnostic tool to show IQ communications to a particular unit.

#### 4. LED Display Mode

Select the mode of the front-panel LED display: input/output signal presence or Infinity Pattern. The sixteen LED's display input signal levels greater than -40 dBu. The Infinity Pattern is a diagnostic tool.

#### 5. User Labels

The user labels can be used to convey useful information about the unit. User label 1 is also displayed in the title bar in IQwic. These labels are at the top of the I/O Level Meter window, shown on the previous page.

#### 6. IP Address / MAC Address

This display shows the current IP Address and MAC Address of the DBC Network Bridge.

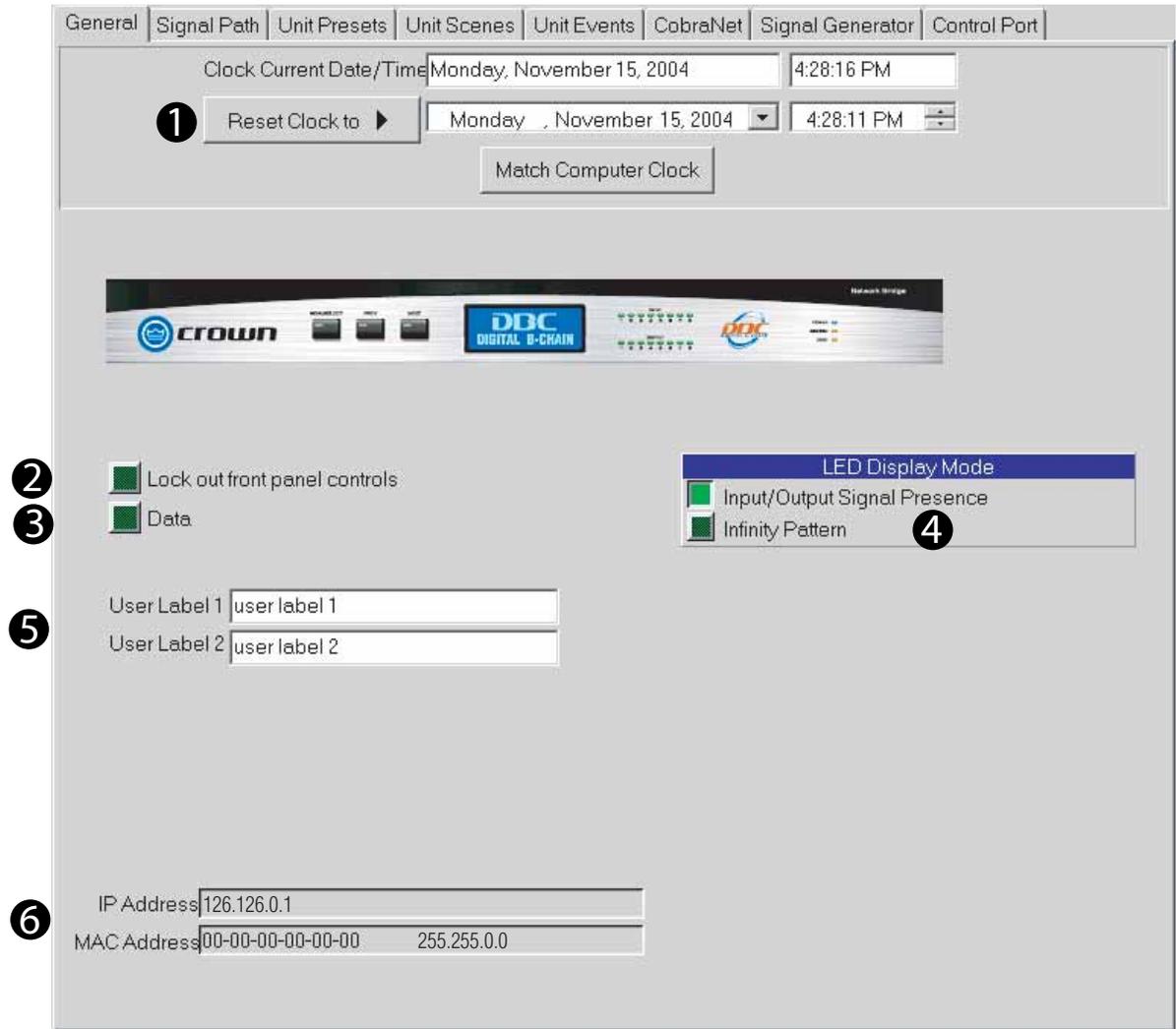


Figure 4.6 The General Window

## 4 Operation

### 4.7 Basic Processing Functions

This section covers the basic processing functions found in the DBC Network Bridge configuration section of IQwic.

#### 4.7.1 Signal Path Tab, Cinema Surround Form

Click on the **Signal Path** tab and the **Cinema Surround** button at the top to view the **Signal Path** window (Figure 4.7). Its features are described below.

##### 1. Cinema Surround / Advanced Buttons

Selecting **Cinema Surround** will access the most common processing for Cinema Surround systems. Selecting **Advanced** will access the more advanced processing functions. Advanced processing is described in Chapter 5. For now, click on **Cinema Surround**.

##### 2. Per-Channel Signal Processing

To the right of each output channel are three greyed-out icons. They light when turned on within the window for each process. From left to right, they are Input Compressor, Input Delay, and EQ Filters (described on the next few pages). Clicking on any of those three icons for each channel will open its settings window. At the far right side is a greyed-out icon. Clicking on it opens the All Outputs Level Setting window, described later.

##### 3. DBC Network Channel Assign

Clicking on this button opens a window for CobraNet Output, allowing you to configure your CobraNet digital audio channels on the DBC Network.

##### 4. Input Select

Click on the input signal that you want to process: AES/EBU, Analog, Auxiliary or CobraNet.

##### 5. Booth Monitor Source Select

Clicking this button opens a window that lets you select the source that feeds the Monitor Output connector on the DBC Network Bridge.

##### 6. CobraNet Input Graphic

This is a graphic, not a button, which shows that CobraNet Inputs feed into the Booth Monitor Source Select.

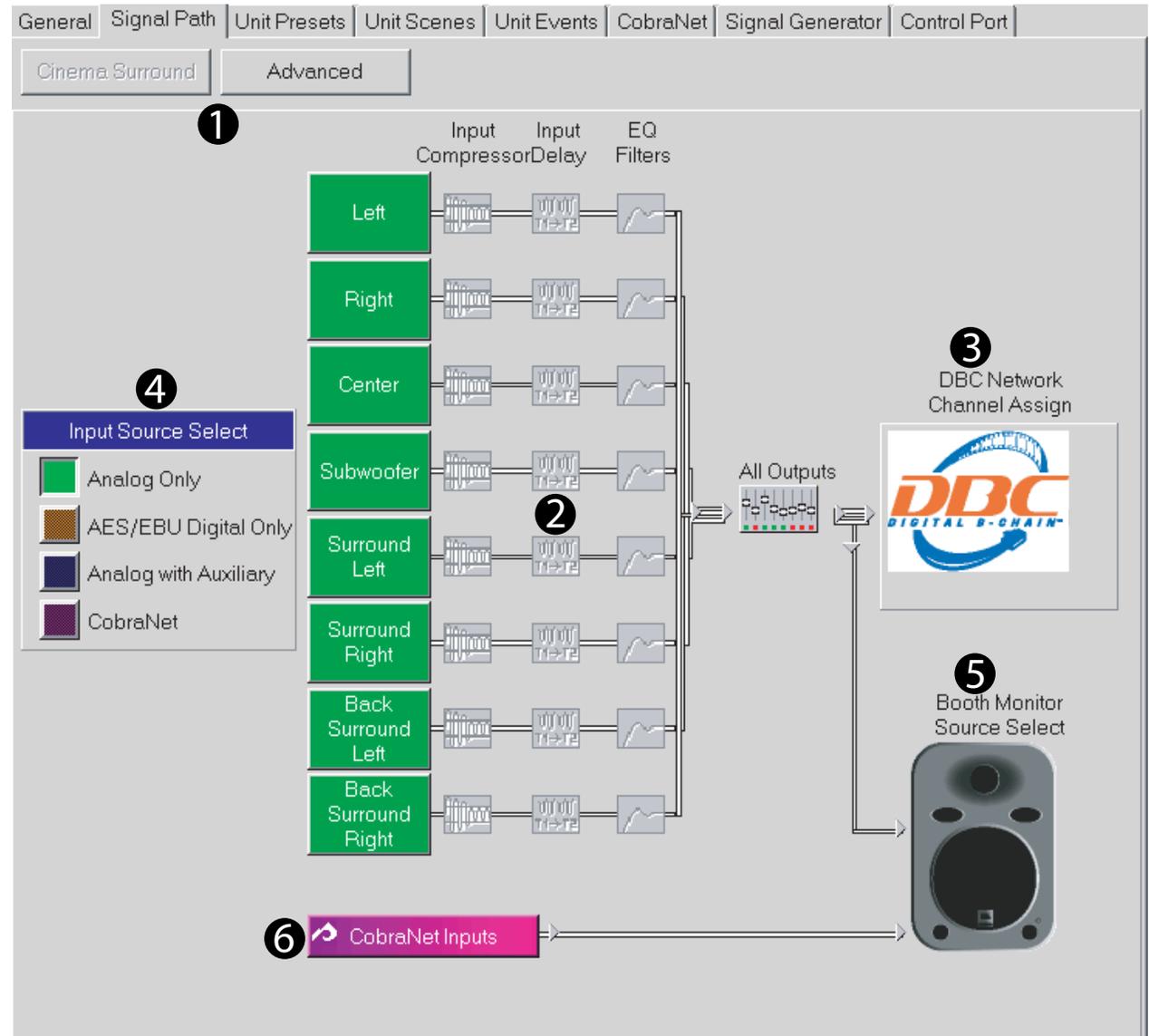
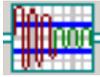


Figure 4.7 Signal Path Window

## 4 Operation

### 4.7.2 Input Compressor



To open the **Input Compressor** window (Figure 4.8), select its icon (shown above) in any channel in the **Signal Path** window.

The input compressor provides a means for controlling the dynamic range of input signals. It is a feed-forward type, which performs the compression after the Input Level Meter. The Input Compressor's effect on input gain is metered by the Input Dynamic Cut/Boost Meter.

Seven parameters control this feature:

#### 1. On/Off

Turns this feature on or off.

#### 2. Compression Ratio

Determines how many dB the input level must change for a 1 dB change in output level. Dynamic variations in the input signal will be reduced by a factor equal to the compression ratio. Control range is 2:1 to 32:1.

#### 3. Threshold

Specifies the average signal level (after side-chain processing) above which the compressor will begin to reduce gain. Control range is from -80 to +20dB in 1 dB steps.

#### 4. Soft Knee (Width)

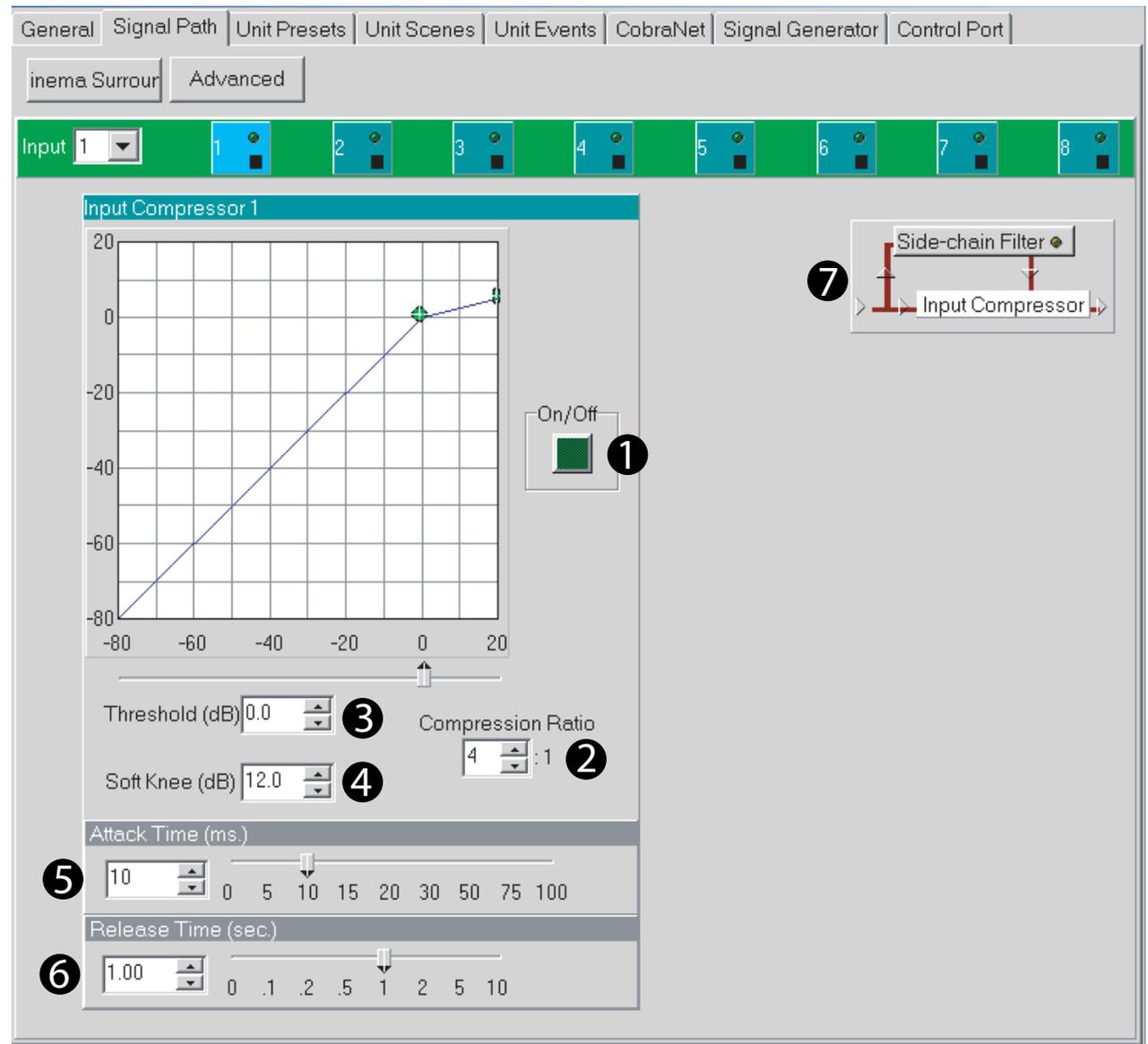
Sets a range in dB around the actual threshold through which the compressor gain is gradually modified from unity to the final compressed gain. Control range is from 0 dB to +20 dB in 0.5 dB steps.

#### 5. Attack Time

Sets the time required for the Compressor to decrease its gain by 20 dB. Control range is from 1.0 to 100 milliseconds in 1 millisecond increments.

#### 6. Release Time

Sets the time required for the Compressor to increase its gain by 20 dB. Control range is from 0.1 to 10 seconds in 10 millisecond increments.



The screenshot shows the 'Input Compressor 1' window. The graph plots input level (x-axis, -80 to 20 dB) against output level (y-axis, -80 to 20 dB). A blue line shows the compression curve, which is linear until it reaches the threshold of 0.0 dB, then curves downwards. The controls are as follows:

- 1. On/Off:** A green square button, currently checked.
- 2. Compression Ratio:** A dropdown menu set to '4 : 1'.
- 3. Threshold (dB):** A dropdown menu set to '0.0'.
- 4. Soft Knee (dB):** A dropdown menu set to '12.0'.
- 5. Attack Time (ms):** A slider and dropdown menu set to '10'.
- 6. Release Time (sec):** A slider and dropdown menu set to '1.00'.
- 7. Side-chain Filter:** A diagram showing a filter block connected to the 'Input Compressor' block.

Figure 4.8 Input Compressor Window

## 4 Operation

### 4.7.3 Input Delay



To open the **Input Delay** window (Figure 4.9), select its icon (shown above) in any channel in the **Signal Path** window.

Signal Delay can be set for each output channel. This delay is especially useful in loudspeaker array alignment, where the crossovers, mix, and other processing is complete and the loudspeaker needs to be aligned to the system. Delay is displayed in milliseconds, feet, and meters. Available delay for each output channel is up to 2 seconds in 20 microsecond steps (1/4 inch).

#### 1. Channel Select

Click on an output channel to adjust its delay.

#### 2. Delay Settings

Use the arrow keys or type in the desired settings.

**Delay** windows in other parts of the signal path work the same way.

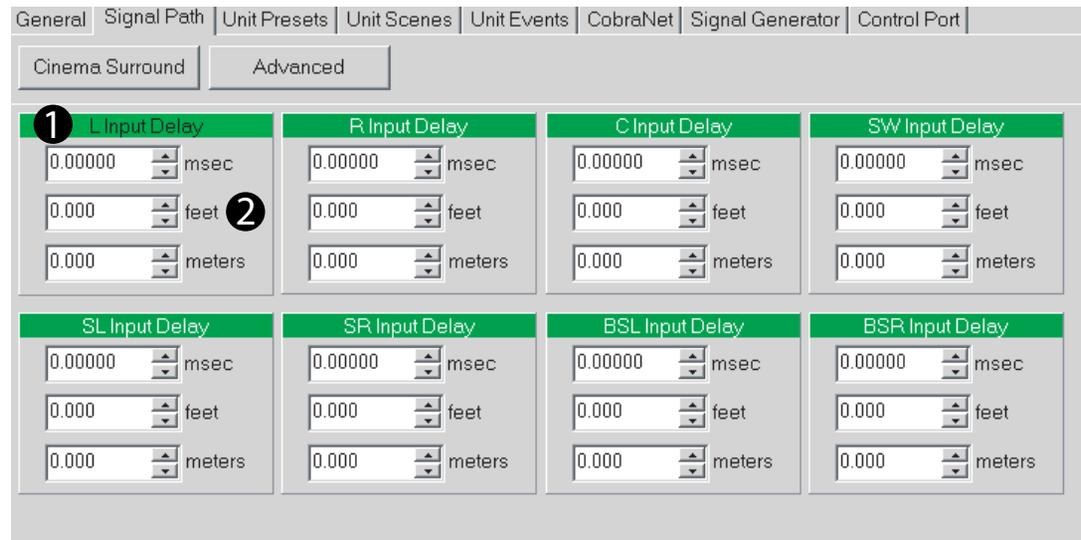


Figure 4.9 Input Delay Window

## 4 Operation

### 4.7.4 EQ Filters



To access the **EQ Filters** window (Figure 4.10), click on its icon (shown above) for any channel in the **Signal Path** window.

#### 1. On/off

Enables or disables filtering.

#### 2. Add Button

Click this to add a filter. A light green circle appears, indicating the active filter.

#### 3. Frequency Response Graph

Shows the frequency response of individual filters (not summed). After turning on filtering (1), click the graph to add a filter. A node appears. Click-drag each node to set its frequency and gain. The node turns yellow when selected, yellow-green when on, and dark green when not selected.

#### 4. Frequency, Gain and Q Settings

This is an alternative to dragging nodes on the Frequency Response Display. Use arrow keys or enter values for each filter band. All filters are frequency adjustable for 20 Hz - 20 kHz. Gain is adjustable from +24 dB to -24 dB.

High-Q filters with gain greater than unity can cause unwanted ringing. This is true for both digital and analog filters and should be used with great care.

#### 5. Active Filter and Delete

**Active Filter** selects the filter you want to adjust. **Delete** removes the selected filter.

#### 6. Type

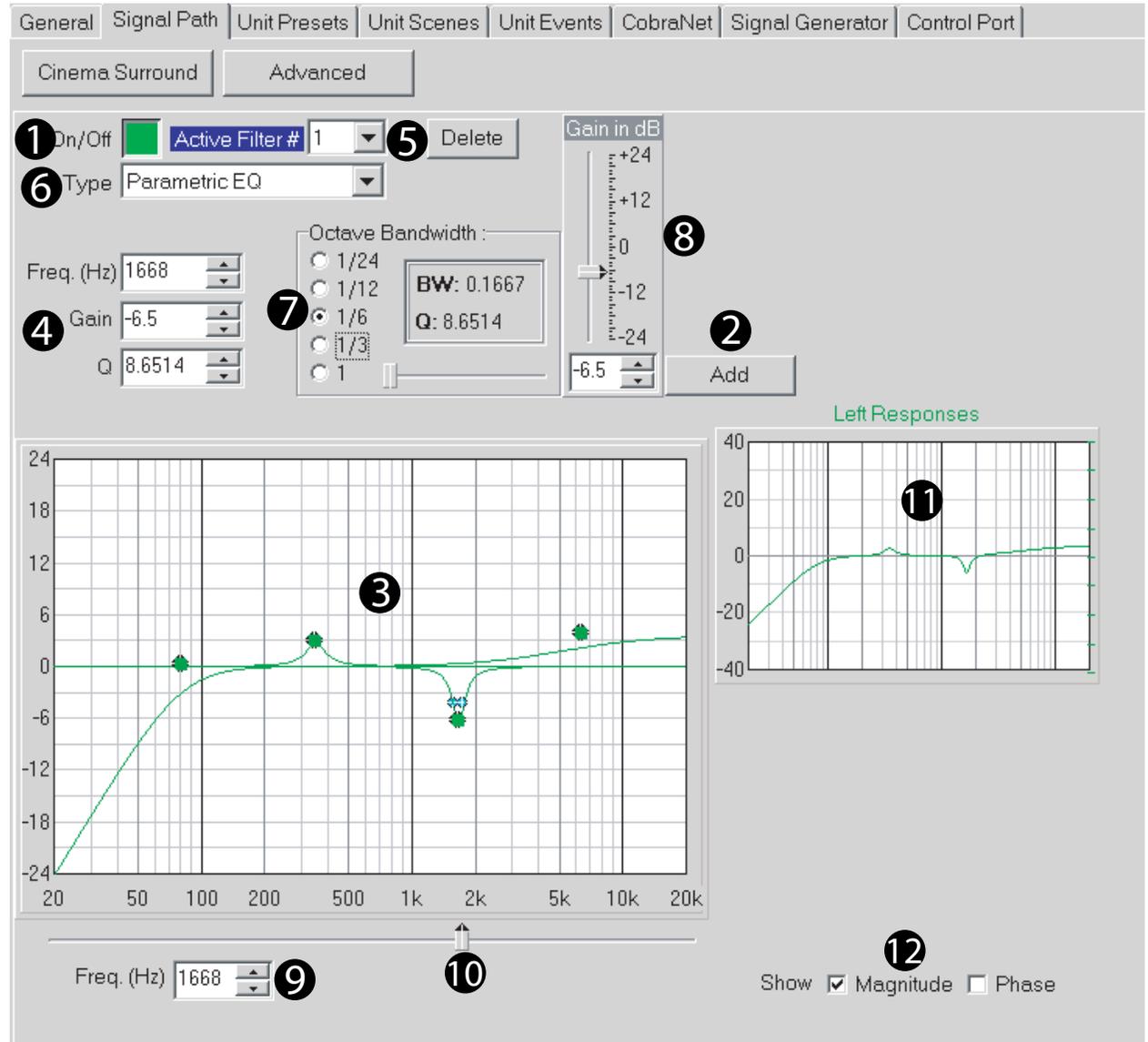
The filters provide an array of filter types for any processing need: Low-pass, High-pass, Low Shelf, High Shelf, Low-pass EQ, High-pass EQ, Parametric EQ, All-Pass1, All-Pass2.

#### 7. Octave Bandwidth

Sets the octave bandwidth of the selected filter.

#### 8. Gain Slider

This is another way to set the gain of the selected filter.



The screenshot shows the 'EQ Filters' window with the following elements:

- 1 On/Off:** A green square indicating the filter is active.
- 2 Add:** A button to add a new filter.
- 3:** A node on the Frequency Response Graph at 1668 Hz.
- 4:** Input fields for Frequency (1668 Hz), Gain (-6.5 dB), and Q (8.6514).
- 5 Delete:** A button to remove the selected filter.
- 6 Type:** A dropdown menu set to 'Parametric EQ'.
- 7 Octave Bandwidth:** Radio buttons for 1/24, 1/12, 1/6, 1/3 (selected), and 1.
- 8 Gain in dB:** A vertical slider set to -6.5 dB.
- 9:** A frequency input field showing 1668 Hz.
- 10:** A frequency slider.
- 11:** A graph titled 'Left Responses' showing magnitude and phase.
- 12:** Checkboxes for 'Show Magnitude' (checked) and 'Show Phase' (unchecked).

Figure 4.10 EQ Filters Window

## 4 Operation

### EQ Filters (continued)

Please refer to Figure 4.11.

#### 9. Frequency Select Field

Another way to select the center frequency of an active filter is to enter its value here, either by typing or by pressing the arrow buttons.

#### 10. Frequency Slider

This is another way to set the center frequency of an active filter.

#### 11. (Combined) Responses

This graph shows the summed total of the filter networks for that input.

#### 12. Show Magnitude/Phase

Selects what is displayed in the Combined Response graph.

EQ Filters windows in other parts of the signal path work the same way.

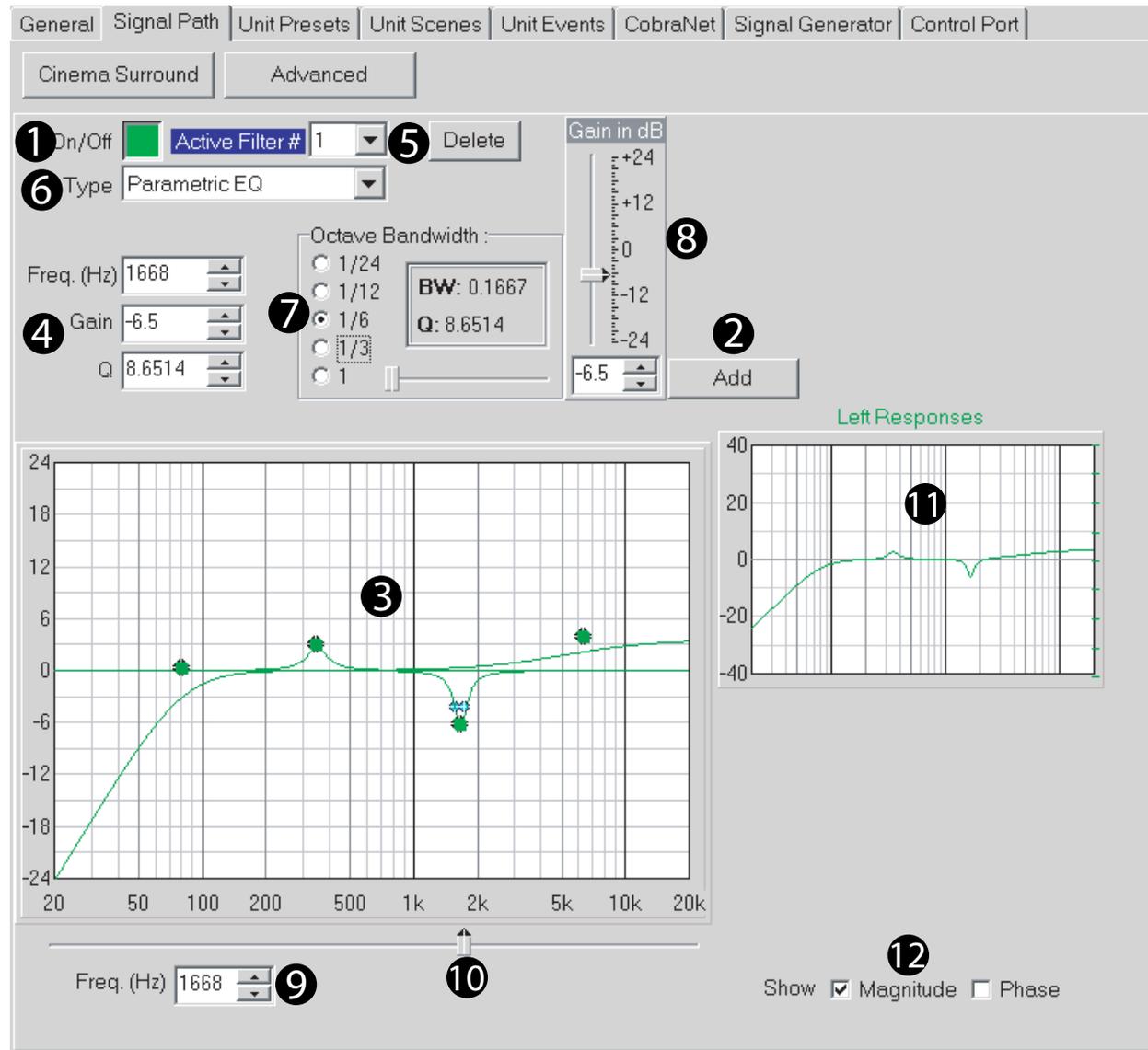


Figure 4.11 EQ Filters Window

## 4 Operation

### 4.7.5 All Outputs Volume Controls

To open the volume controls for the output channels, click on the **All Outputs** icon in the **Cinema Surround Signal Path** window. See Figure 4.12. Here you can adjust the level, muting, and polarity of each channel.



The master fader works like this:

- After you set the individual channel levels, their relative positions will be maintained when you move the master fader. It acts like a group fader.
- If you bring the master fader all the way down and back up without releasing the mouse button, the individual channel levels will be maintained.
- If you bring the master fader all the way down and release the mouse button, all the channel faders will reset to  $-60$  dB.

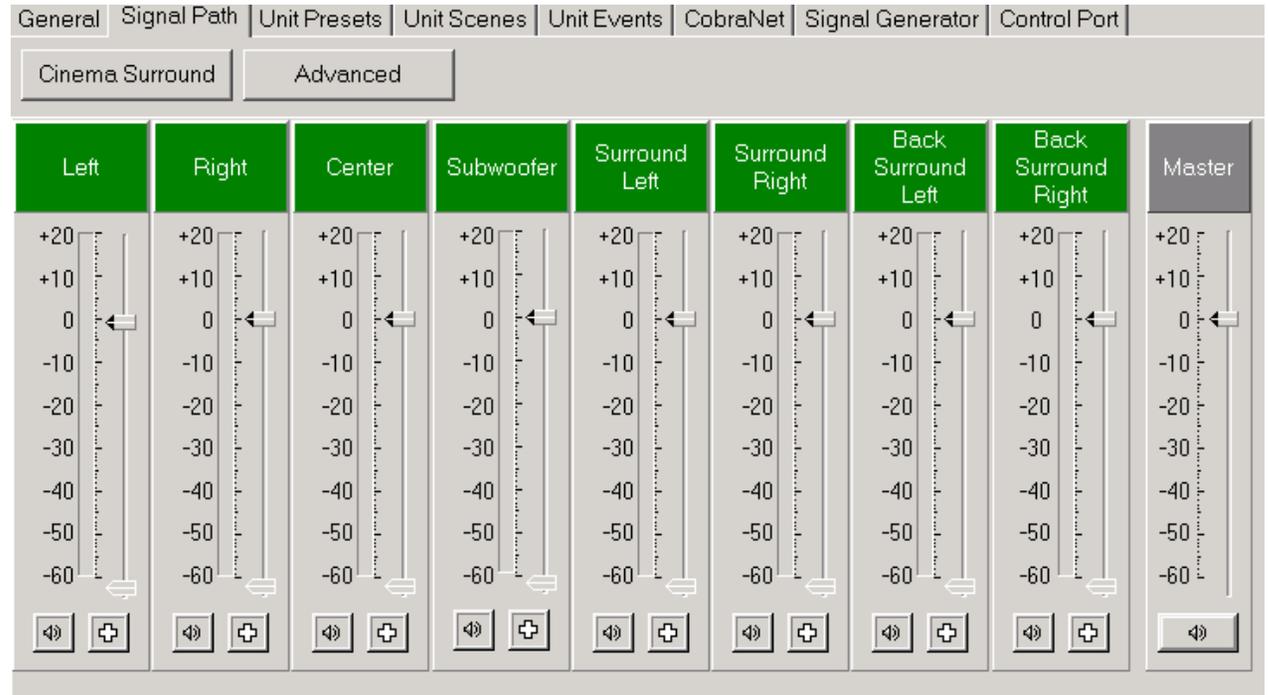


Figure 4.12 All Outputs Volume Controls Window

## 4 Operation

### 4.7.6 Signal Generator

Click on the **Signal Generator** tab to open the **Signal Generator** window (Figure 4.13). This window provides a variety of test signals that can be applied to each output channel. Output levels and sine-wave frequency are adjustable.

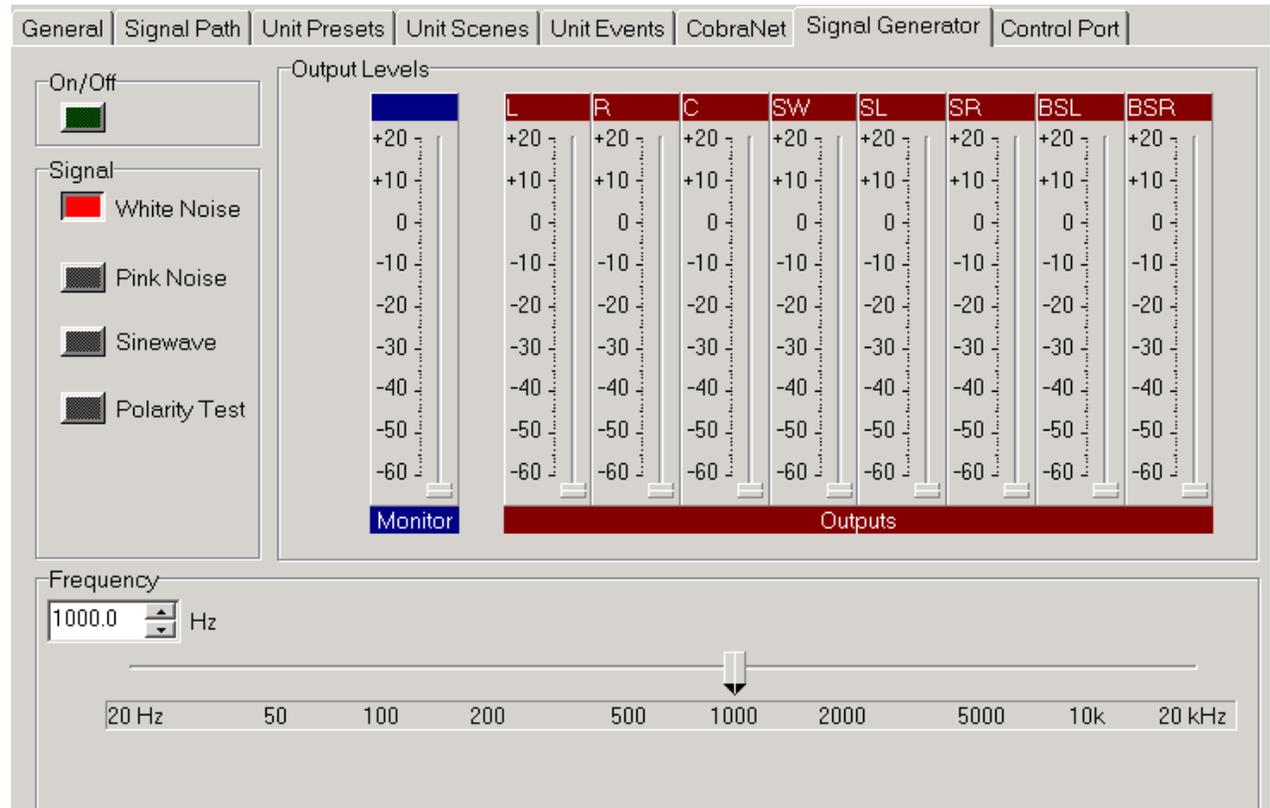


Figure 4.13 Signal Generator Window

## 4 Operation

### 4.7.7 CobraNet: Explanation

In the **Signal Path** window, Cinema Surround form, is a **DBC Network Channel Assign** button which opens the **CobraNet Output** window (described on the next page). If you need to understand how CobraNet works, please read the following section.

CobraNet is a technology developed by Peak Audio, Inc. that allows real time digital audio to be distributed over standard Fast (100Mb) Ethernet hardware. CobraNet allows the DBC Network Bridge to not only have analog or digital inputs, but also to provide 8 digital Inputs and 8 digital Outputs from a CobraNet network. These additional Inputs and Outputs allow enhanced routing and processing capabilities, including the passing of audio channels to other DBC Network Bridges to create larger mixing and processing structures.

Transmission of digital audio via CobraNet is accomplished through 'Bundles' and 'Slots'. Bundles are Ethernet packets that contain up to eight digital audio channels, called 'Slots'. Each digital audio channel is assigned a position (1-8) within the Bundle, hence the name Slot. The Bundle is then assigned a unique number that indicates how it will be transmitted on the CobraNet network. A receiver merely needs to select the Bundle number to receive the audio.

Bundles can be either multicast or unicast. Multicast bundles are sent to all CobraNet network devices, while unicast bundles are sent to one, and only one, CobraNet network device. Through the use of Fast Ethernet switches, unicast transmission of bundles can greatly increase the number of bundles that can be present on a CobraNet network since the bundles only go to the device that is addressed. Since each device can send and receive four bundles (i.e. up to 32 channels), great flexibility is allowed in the routing of audio over the network. Assignment of bundles as multicast or unicast is done through the assignment of the bundle number. Bundles with numbers 1-255 are always multicast, while bundles 256-65,279 are designated as unicast. Bundle assignments need to be unique, with only one CobraNet transmitter allowed per bundle.

The coordination, i.e. clock master, of the CobraNet network is the function of the 'Conductor'. The 'Conductor Priority' is set in each device and decides which unit will be the Conductor. If the Conductor is removed from the CobraNet network for any reason, the remaining devices decide who becomes the Conductor based on a numerical hierarchy, i.e. priority '0'=never and '255'=always. The PS-8810 is set as '32' as a default.

The Conductor is responsible for ensuring that all devices on the CobraNet network transmit their bundles in a coordinated way. The Conductor recognizes each device on the network and assigns a transmission position for each bundle of each device.

In addition the Conductor sends master clock to each device to ensure that all audio is synchronous. Like a conductor of an orchestra, the Conductor signals the beginning of a synchronous transmission cycle, and then each device sends its bundle(s) in lock step. This occurs 750 times a second, with each audio channel having 64 samples of 48KHz audio. Each audio channel can be sent as 16, 20, or 24 bit samples. If 24bit audio is used then a bundle will be reduced to 7 channels. There is a fixed latency of 5.33ms.

CobraNet networks utilize Fast (100Mb) Ethernet hardware and can use either repeater hubs or switches. A repeater hub is a device that takes the data that comes into each port, and sends it back out on all ports except the port it came in on. As a result, only multicast bundles can be used in repeater hub networks and these need to be limited to 8 bundles per network.

On the other hand, switches are much more efficient, in that they examine the destination address of each packet of data received on each port, then switch that data to the particular recipient of that packet. Unicast bundles exploit this feature to minimize the audio traffic on the CobraNet network. The result is that an almost limitless number of unicast bundles can be on a switched CobraNet network. Multicast bundles are allowed on a switched network, but they must be used with care.

Peak recommends that not more than four multicast bundles be used in a switched CobraNet network. Peak also advise not to mix ordinary computer data on a repeater hub network, as this could result in dropout in the audio. In switched CobraNet networks, coexistence of CobraNet audio and ordinary computer data is possible, because there are no collisions with the audio.

If there are only two DBC Network Bridge units involved in a CobraNet network these can be connected using CAT 5 crossover cables.

More information:  
[www.peakaudio.com](http://www.peakaudio.com)  
[www.iqaudiosystems.com](http://www.iqaudiosystems.com)

CobraNet is a registered trademark of Peak Audio, Inc.

## 4 Operation

### 4.7.8 CobraNet: Output



In the **Signal Path** window, click on the **DBC Network Channel Assign** button to open the **CobraNet Output** window (Figure 4.14).

The DBC Network Bridge's eight CobraNet Outputs can be assigned to be transmitted on Slots in one of four CobraNet Bundles. The CobraNet Outputs can accept audio from either the corresponding 'B' Input Processing Section or the corresponding AUX Output Processing Section. Each of the eight CobraNet Outputs is then assigned a Bundle and Slot position. Unlike the CobraNet Inputs, the same CobraNet Output can go to more than one Bundle/Slot position.

The 'Unlink' Button allows all of the Bundle/Slot assignments to be disconnected, while the 'Default Link' Button allows assignment of CobraNet Output 1 to Slot 1 of each Bundle, CobraNet Output 2 to Slot 2 of each Bundle, and so forth.

Each Slot can be assigned either none, 16bit, 20bit, or 24bit resolution. Each Bundle is limited in the number of audio 'bits' that can be placed in a single Bundle and is a function of the maximum Ethernet data payload. The 'Max Packet Size' meter tracks how much room remains in the Bundle. Once the 'Max Packet Size' has been exceeded, additional data will not be allowed. As can be seen in the figure above, seven 24bit Slots are allowed in TxC with Slot 8 not active, while TxD allows all eight slots if three are 20 bit.

The transmit Bundle is assigned in the window and a unique priority can also be assigned for each Bundle. This Bundle Priority is used by the Conductor to assign a transmit position on the CobraNet network. Audio Bundles are sent on the network in a synchronous fashion dictated by the Conductor. The Conductor assigns a position to each transmitting Bundle in the network based upon that Bundle's Priority. At the start of a synchronous cycle, the Conductor tells the highest priority Bundle to transmit, then each successive Bundle transmits based upon its assigned Position. The 'Receiver Count' for each Bundle tells how many receivers, i.e. other devices on the network, are listening to that Bundle. synchronous cycle, the Conductor tells the highest priority Bundle to transmit, then each successive Bundle transmits based upon its assigned Position. The 'Receiver Count' for each Bundle tells how many receivers, i.e. other devices on the network, are listening to that Bundle. Network Bridge Signal Flow Block Diagram for feature locations in the audio signal chain.

The screenshot shows the 'CobraNet Output' configuration window. It is divided into four sections for CobraNet Tx bundles: TxA, TxB, TxC, and TxD. Each section has a 'General' tab and a 'CobraNet Output' sub-tab. The configuration includes:

- CobraNet Output1** (L Output) assigned to Slot 1, Bundle 100, Priority 16.
- CobraNet Output2** (R Output) assigned to Slot 2, Bundle 100, Priority 16.
- CobraNet Output3** (C Output) assigned to Slot 3, Bundle 200, Priority 16.
- CobraNet Output4** (SW Output) assigned to Slot 4, Bundle 200, Priority 16.
- CobraNet Output5** (SL Output) assigned to Slot 5, Bundle 0, Priority 16.
- CobraNet Output6** (SR Output) assigned to Slot 6, Bundle 0, Priority 16.
- CobraNet Output7** (BSL Output) assigned to Slot 7, Bundle 0, Priority 16.
- CobraNet Output8** (BSR Output) assigned to Slot 8, Bundle 0, Priority 16.

Each bundle also shows a 'Max packet size' meter and 'Transmit Position' and 'Receiver Count' fields. The bit resolution for each slot is indicated by a bar chart above the slot numbers (1-8).

Figure 4.14 CobraNet Output Window

**4.7.9 Booth Monitor Source Select**



In the **Signal Path** window, click on the **Booth Monitor Source Select** button to open the **Booth Monitor Source Select** window (Figure 4.15).

The controls in this window allow you to adjust the level, muting and polarity of selected output channels that feed your booth monitor speakers. You can also select CobraNet Bundles and Channels.

**1. Input Selector Buttons**

**2. Level Slider**

This slider adjusts the level of the selected channel.

**3. Mute Button**

Press this button to mute the channel. When muted, the button turns green and displays a red X.

**4. Polarity Button**

Press this button to toggle + or – polarity for the selected channel.

**5. DBC Outputs Meters**

**6. CobraNet Bundle/Channel Selector**

In this area you can set up Bundle numbers with arrow buttons, choose amplifier channels, and label the amplifier for each monitor speaker.

**7. Current Input**

This display shows the selected input channel. If an amplifier channel 1 or 2 is selected, this display shows details on its CobraNet setup.

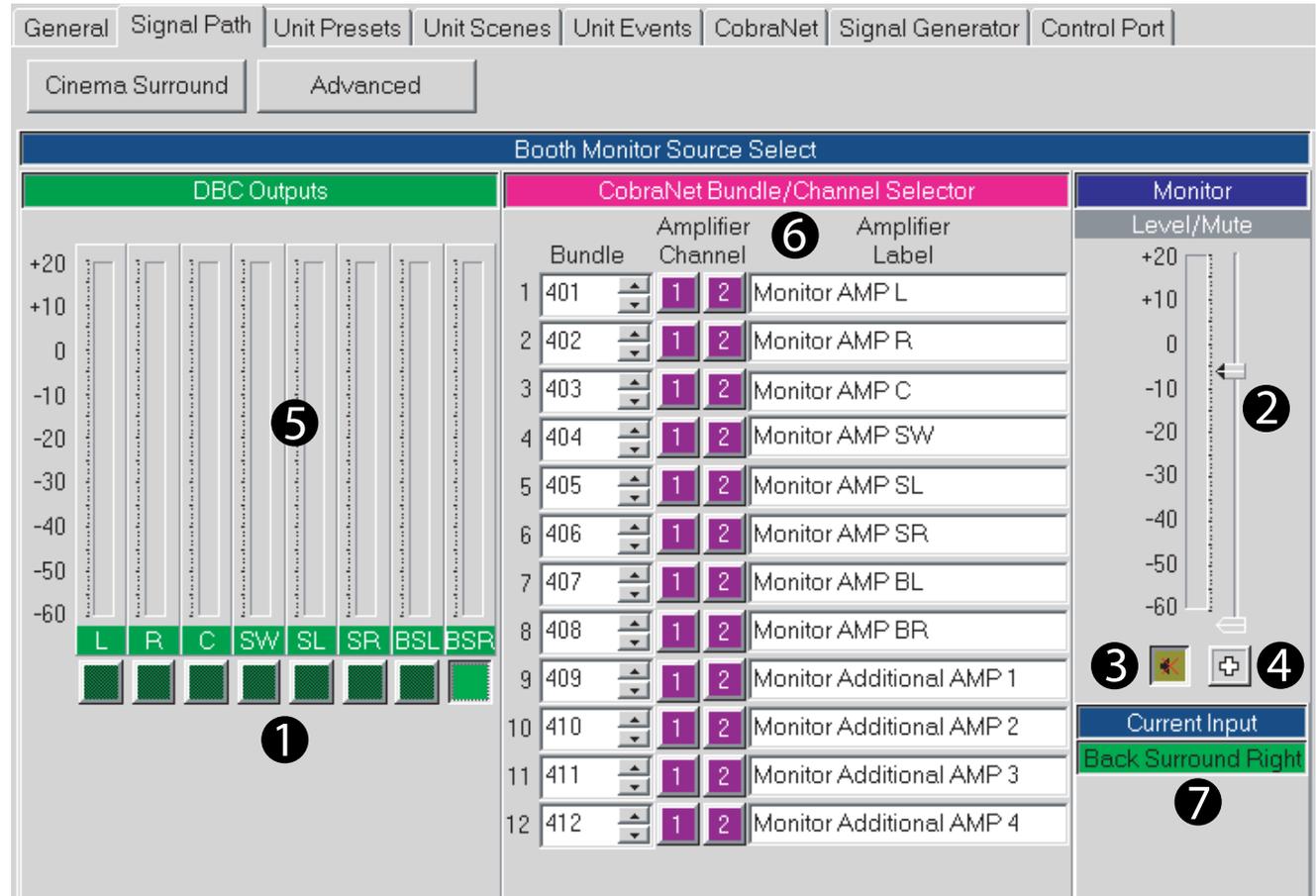


Figure 4.15 Booth Monitor Source Select Window

## 4 Operation

### 4.7.10 Presets

Click on the **Unit Presets** tab to open the **Presets** window (Figure 4.16).

The DBC Network Bridge has the ability to reconfigure itself with a single command. Thirty-two 'Presets' can be stored and recalled via a variety of means including the front panel, a Control Port Input, or a scheduled 'Event'. **Preset 32 is the standard cinema setup**, which works in most cases. Preset 32 is explained under number 6 below.

#### 1. Store

For a Preset to be stored, all of the individual controls needs to be set up using IQwic while on-line to the DBC Network Bridge, then press the 'Store' button and a select a Preset.

To ensure that settings are not inadvertently lost due to selecting a Preset instead of storing a Preset, the "Prompt to recall or store" checkbox allows a query window to display whenever a Preset button is pressed in order to ensure the intent of the user.

#### 2. Label

Each Preset has a 32 character user-definable label.

#### 3. Preset Segue

This enables smooth level transitions between Presets. When a Preset is selected, all of the fader settings are changed at a rate that is determined by the 'Preset Segue Settings' box. The rate of change can be either a 'Fixed Time' that is selectable from 0 second to 255 seconds or a 'Fixed Rate' that goes from 0.5 dB/sec to 40 dB/sec.

#### 4. Verify Recall or Store

When you click on a Preset number, this window appears so that you can recall the selected Preset, store it, or cancel.

#### 5. Preset Options Notice

Right-click on preset numbers to open more options: Load or save Presets to file, cut or copy Presets to clip area, and Edit Presets. Selecting **Edit Presets** opens the **Preset Editor** window described on page 38.

#### 6. Standard Cinema Preset Button (Preset 32)

Pressing this button recalls the preset for a standard cinema setup: a read-only preset that cannot be edited by the user. If you want to create a preset based on Preset 32 but with changes, save it to another Preset. The Standard Cinema preset contains the following settings in the DBC Network Bridge:

- The input is set to analog; the outputs are set to -20 dB.
- The Monitor is set to Ch1 at 0 dB.
- The CobraNet output for L, R, C, SW is set to TxA on Bundle 100 at 24 -bit.
- The CobraNet output for SL, SR, BSL, BSR is set to TxB on Bundle 200 at 24-bit.
- The CobraNet input for all eight input channels set to TxA on Bundle 300.

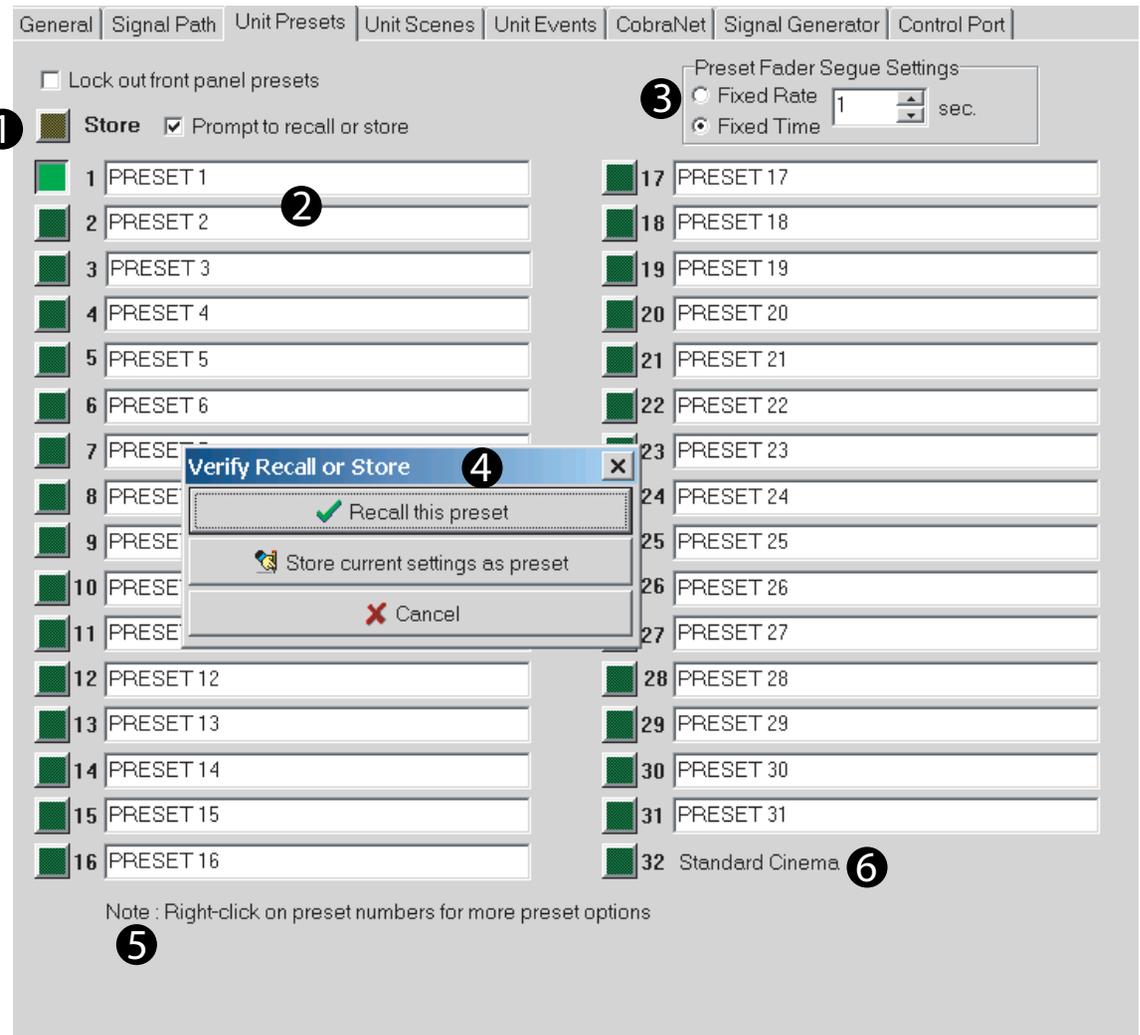


Figure 4.16 Presets Window

## 4 Operation

### 4.7.11 Preset Editor

To open the **Preset Editor** window (Figure 4.17), start in the **Unit Presets** window, right-click on a preset number, and select **Edit Presets**. Note: Preset 32, Standard Cinema, cannot be edited.

#### 1. Preset Name

The name of the currently selected Preset is displayed here. You can give it a new name if desired.

#### 2. Show

This area of the Preset Editor lets you select which control types you want to view in the Preset Control Window (3).

#### 3. Preset Control Window

This window displays all the Preset Control settings that you have chosen to view. Click on any control setting to edit it. Settings made in processing windows are duplicated here, and vice-versa.

#### 4. Preset Select Buttons

Click on the desired Preset number to view its control settings.

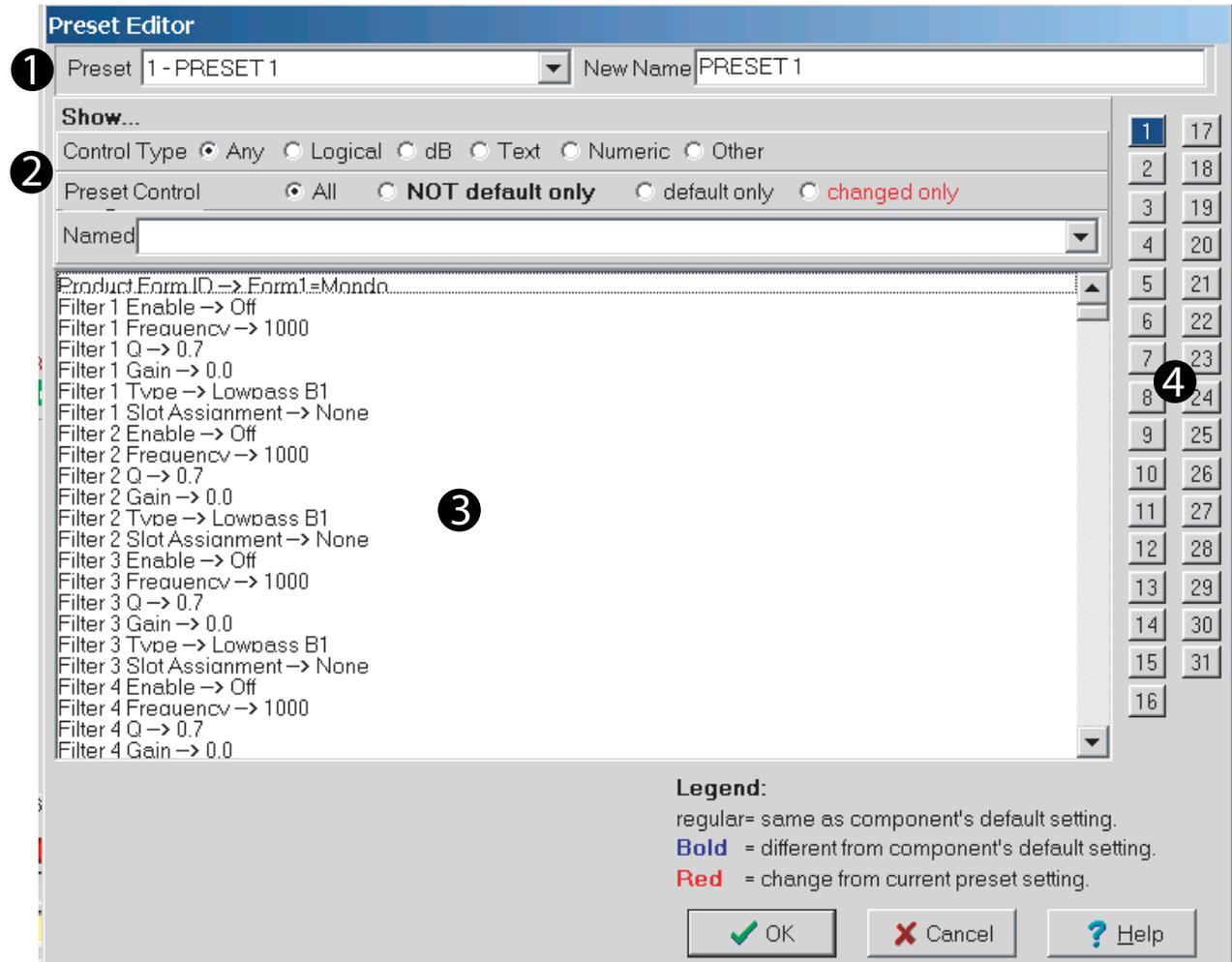


Figure 4.17 Preset Editor Window

## 4 Operation

### 4.7.12 Scenes

Click on the **Unit Scenes** tab to open the **Scenes** window (Figure 4.18).

Remember that an object is a software processor in the DBC Bridge. There are times when only a few objects' settings need to be changed and this is the function of 'Scenes'. DBC Network Bridge Scenes allow up to 50 objects to be grouped together and changed to a specific state with a single command. Like Presets, Scenes can be changed from the front panel, a Control Port Input, or a scheduled 'Event'.

Each Scene has a 32 character label associated with it and the Scene Editor allows the objects to be selected and configured for each Scene. Note: These 'unit' Scenes should not be confused with the IQwic equivalents that are saved as .SIQ files, and are handled quite differently with a different scheduler.

In any channel, click on the **Edit** button to open the **Scene Editor** window (described on the next page).

General			Signal Path	Unit Presets	Unit Scenes	Unit Events	CobraNet	Signal Generator	Control Port
#	Try	Edit	Name			#	Try	Edit	Name
1	<input type="checkbox"/>	Edit	1	SCENE 1	17	<input type="checkbox"/>	Edit	17	SCENE 17
2	<input type="checkbox"/>	Edit	2	SCENE 2	18	<input type="checkbox"/>	Edit	18	SCENE 18
3	<input type="checkbox"/>	Edit	3	SCENE 3	19	<input type="checkbox"/>	Edit	19	SCENE 19
4	<input type="checkbox"/>	Edit	4	SCENE 4	20	<input type="checkbox"/>	Edit	20	SCENE 20
5	<input type="checkbox"/>	Edit	5	SCENE 5	21	<input type="checkbox"/>	Edit	21	SCENE 21
6	<input type="checkbox"/>	Edit	6	SCENE 6	22	<input type="checkbox"/>	Edit	22	SCENE 22
7	<input type="checkbox"/>	Edit	7	SCENE 7	23	<input type="checkbox"/>	Edit	23	SCENE 23
8	<input type="checkbox"/>	Edit	8	SCENE 8	24	<input type="checkbox"/>	Edit	24	SCENE 24
9	<input type="checkbox"/>	Edit	9	SCENE 9	25	<input type="checkbox"/>	Edit	25	SCENE 25
10	<input type="checkbox"/>	Edit	10	SCENE 10	26	<input type="checkbox"/>	Edit	26	SCENE 26
11	<input type="checkbox"/>	Edit	11	SCENE 11	27	<input type="checkbox"/>	Edit	27	SCENE 27
12	<input type="checkbox"/>	Edit	12	SCENE 12	28	<input type="checkbox"/>	Edit	28	SCENE 28
13	<input type="checkbox"/>	Edit	13	SCENE 13	29	<input type="checkbox"/>	Edit	29	SCENE 29
14	<input type="checkbox"/>	Edit	14	SCENE 14	30	<input type="checkbox"/>	Edit	30	SCENE 30
15	<input type="checkbox"/>	Edit	15	SCENE 15	31	<input type="checkbox"/>	Edit	31	SCENE 31
16	<input type="checkbox"/>	Edit	16	SCENE 16	32	<input type="checkbox"/>	Edit	32	SCENE 32

= contains valid data   
  = contains no data   
  = invalid data read, now contains no data

Figure 4.18 Scenes Window

## 4 Operation

### 4.7.13 Scene Editor

To open the **Scene Editor** window (Figure 4.19), click on the **Edit** button for any channel in the **Scene** window.

#### 1. Scene

Select the Scene to be edited in the 'Scene' box at top, or click on one of the 32 buttons located at the right of the screen.

#### 2. Controls

The 'Controls' buttons let you view your choice of all parameters, dB parameters or Logical parameters.

#### 3. Named

Use the 'Named' box to type in all, or part of, the name of the control you wish to add to the Scene. The selection of available parameters will change as you type, if the selection is incorrect, delete all the text and start again to bring back the complete listing.

#### 4. Add/Remove

The 'Add' and 'Remove' buttons allow you to choose which parameters are to be included in the Scene.

#### 5. Try

The 'Try' button allows the Scene to be simulated to ensure that the settings are those that are desired.

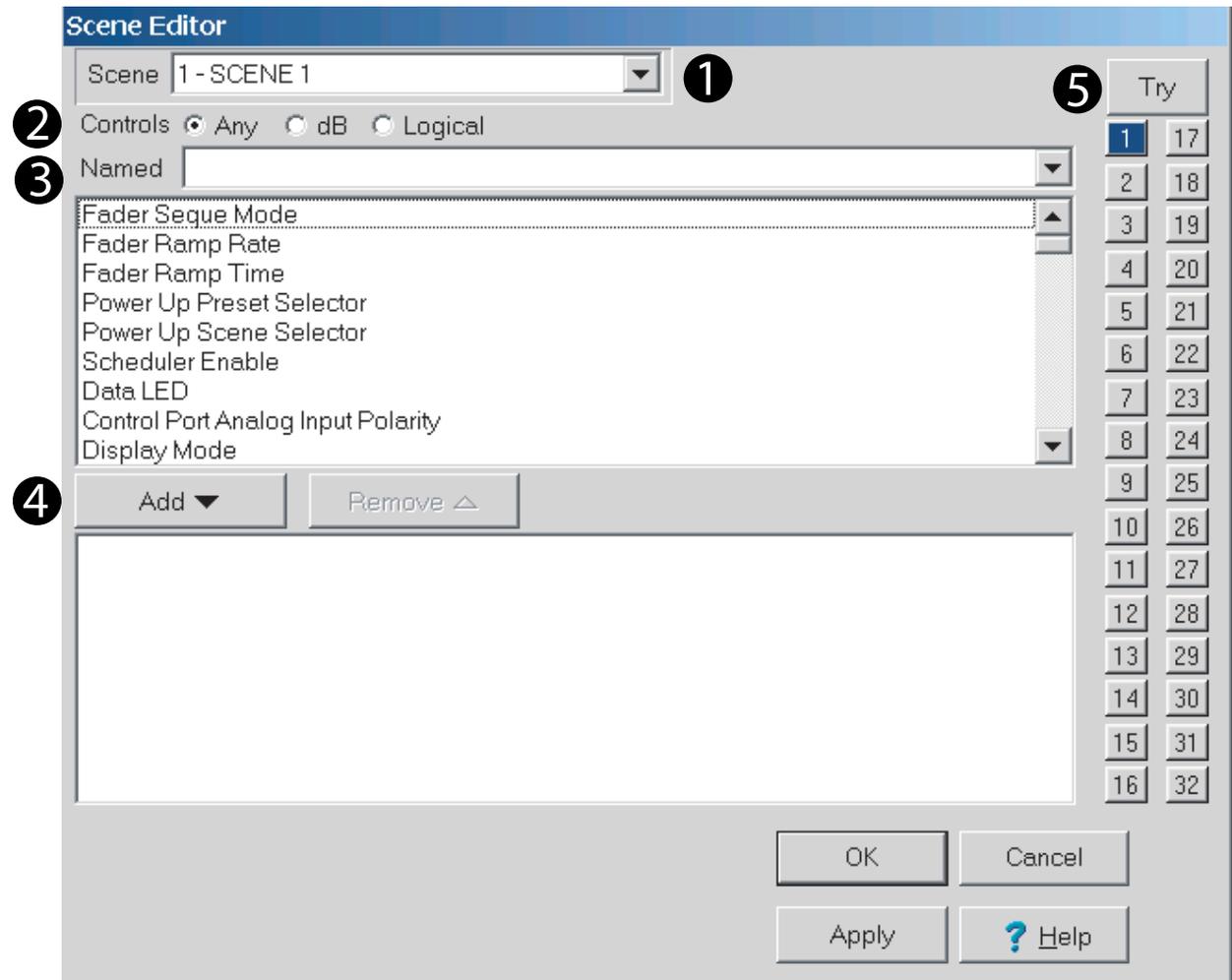


Figure 4.19 Scene Editor Window

## 4 Operation

### 4.7.14 Events Scheduler

Click on the **Unit Events** tab to open the **Events Scheduler** window (Figure 4.20).

Different configurations can be triggered at particular times. The DBC Network Bridge has an internal real time clock that can be used to set up a schedule for recalling Presets or Scenes. By using the 'Event Scheduler' to recall unit settings at certain times, the unit can be used in a variety of different ways.

The internal clock has a 'keep alive' capacitor that allows the unit to be unpowered for up to 45 days without losing the current date and time.

Each Event can be enabled individually and the entire Event Scheduler can be enabled, allowing the scheduler to be turned off without having to switch individual Events off. Each Event has its own label and the 32 Events can be individually set to recall a Preset or Scene in either a one time or periodic mode.

In the **Events Scheduler** window, click on the **Edit** button next to any event number to open the One-Time Event window (described on the next page).

Once events are enabled, you can click on the **View Schedule** button at the top to open the **Schedule** window (described on the next page).

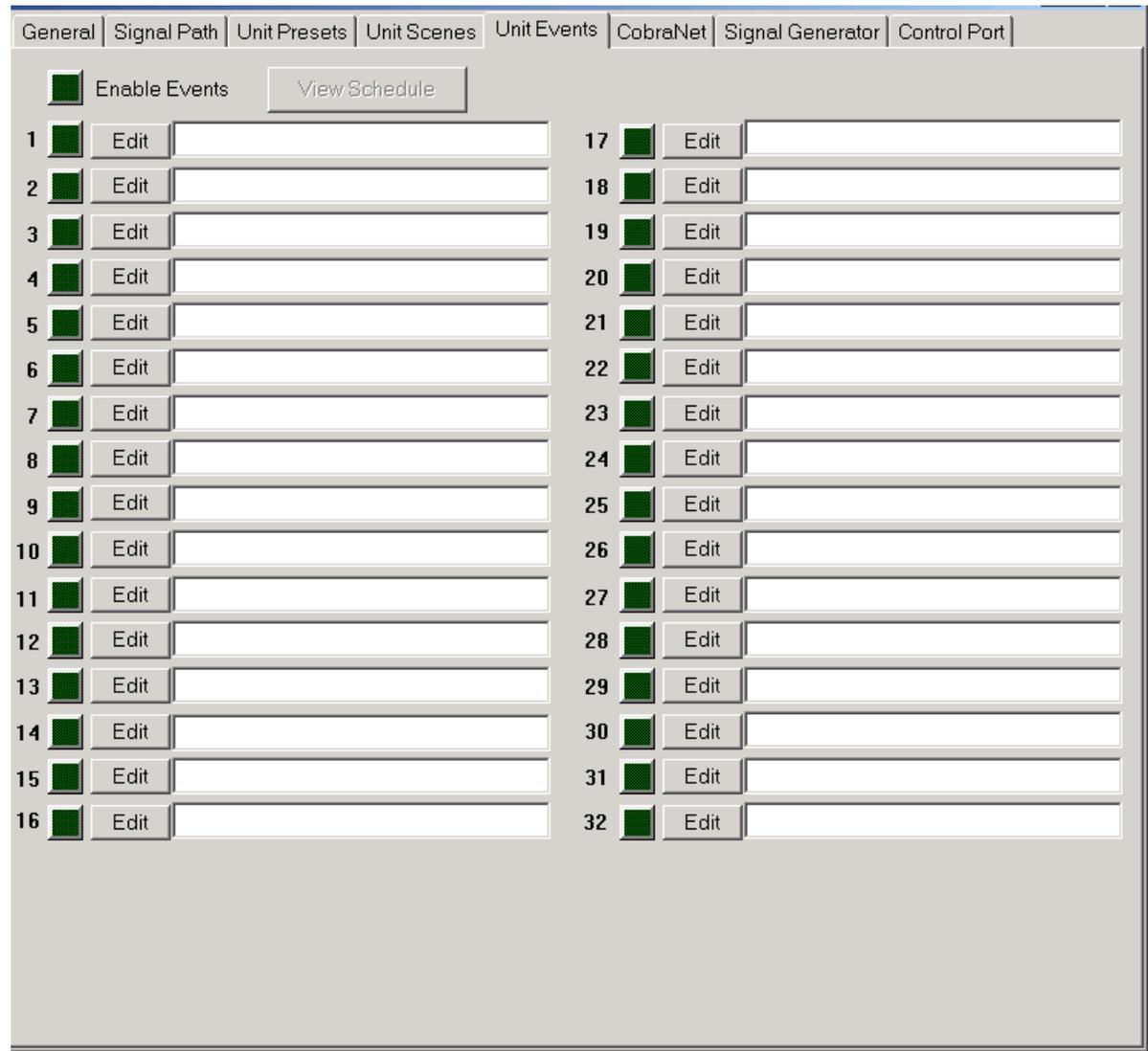


Figure 4.20 Events Scheduler Window

## 4 Operation

### One Time Events

In the **Events Scheduler** window, click on the **Edit** button to the right of any Event number. The **One-Time Event** window will open (Figure 4.21).

An Event can be scheduled to occur only once, and the time of the Event can be programmed by choosing 'once'. The exact time of the Event can then be set.

### Periodic Events

In the **One-Time Event** window, click on the **Periodically** button to open the **Periodic Event** window (Figure 4.22).

If an Event is required at a set rate, the Event editor allows the programming the Event at periodic intervals. Each Event can have its own repetition rate and starting time, independent of any other. The Event schedule window shows the next 10 occurrences of the Event. By using multiple Events that are interleaved, a pattern of Events can allow switching between several setups in a regular timed fashion.

### Schedule

Back in the **Events Scheduler** window, once events are enabled, clicking on the **View Schedule** button at the top opens the **Schedule** window (Figure 4.23).

Here you can view all of the enabled Events for a defined period of time. This ensures that the desired sequence of periodic Events are occurring at the desired times.

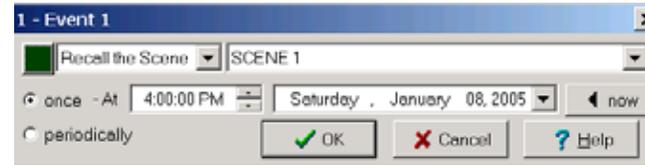


Figure 4.21 One-Time Event Window

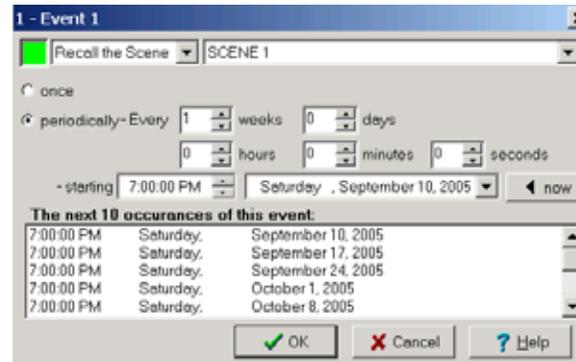


Figure 4.22 Periodic Events Window

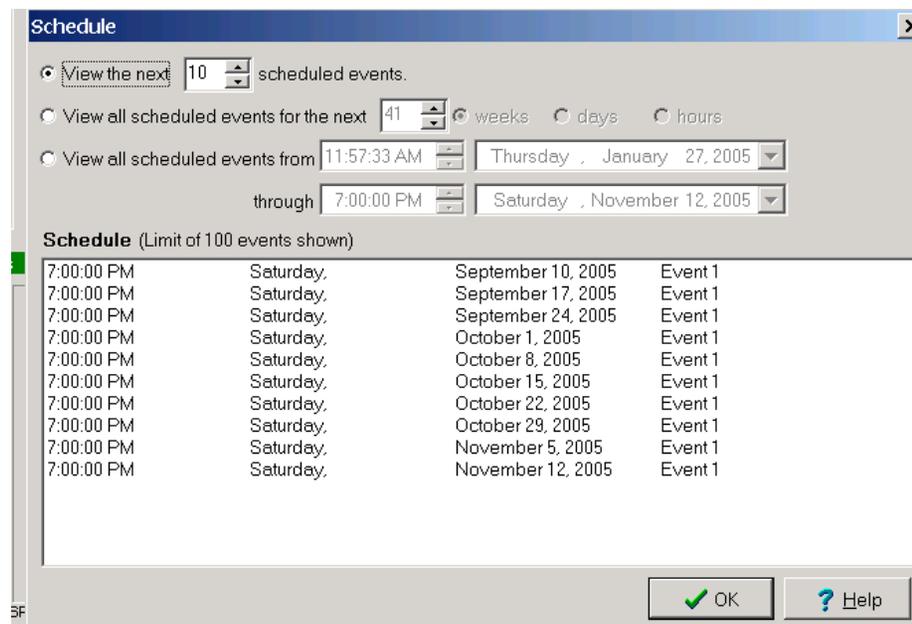


Figure 4.23 Schedule Window

## 4 Operation

### 4.8 General Firmware Features

Note: The following features are accessed via IQwic software unless otherwise stated. Refer to Figure 4.24, DBC Network Bridge Signal Flow Block Diagram for feature locations in the audio signal chain.

#### 4.8.1 Input Level Meters

Audio level peak program meters are provided for each input. The meters sense the audio signal immediately after analog to digital conversion, and respond with 1.7 millisecond attack and 350 millisecond release. Meter range is from -60 to +20 dBu with 0.5 dB resolution. Calibration is in dBu when the input is in "line" mode and set at 0 dB.

#### 4.8.2 Input Dynamic Cut/Boost Meters

Meters are provided for each Input A/B Processing Section to indicate the overall cut or boost being applied from all signal processing features that affect input gain, including Auto-Leveler, Input Compressor, and Auto-Mixing. Meter range is from -60 to +20 dBu with 0.5 dB resolution.

#### 4.8.3 Output Level Meters

Audio level meters are provided for each output. The meters sense the audio signal immediately after the audio output processing block, and respond with 1.7-millisecond attack and 350-millisecond release. Meter range is from -60 to +20 dBu with 0.5 dB resolution.

#### 4.8.4 Output Dynamic Cut/Boost Meters

Meters are provided for each output to indicate the overall cut or boost being applied from all signal processing features that affect output gain, including Ambient-Leveler and Output Limiter. Meter range is from -60 to +20 dBu with 0.5 dB resolution.

#### 4.8.5 Memory Backup

The DBC Network Bridge settings are stored in high-endurance flash memory whenever a parameter is changed. Changed settings are updated every few seconds.

#### 4.8.6 Presets

The parameters for all functions in the DBC Network Bridge can be saved as presets and each can be given a unique 32-character name. A total of 32 user presets can be stored in the DBC Network Bridge's flash memory. Presets can be recalled via the front-panel selector buttons, IQ for Windows preset selector controls, from within events, or by an external system controller via the Multi-Function Control Port.

- **Preset Segue:** When a preset is selected, the Preset Segue feature provides a smooth transition to the new preset. Preset Segue can be set to either a fixed time in seconds or a fixed rate in dB per second. Range for fixed time in seconds is 1 to 255 seconds. Range for fixed rate in dB per second is from 0.5 dB to 40 dB.

#### 4.8.7 Real Time Clock

The onboard Real Time Clock tracks day, date, hour, minute and second, and may be set to any date and time desired, or to match that of the computer running IQ for Windows software. The clock is used as a time reference for the Events Scheduling feature. Internal capacitor storage allows the clock to run for up to 45 days without power being applied to the DBC Network Bridge.

#### 4.8.8 Events

User presets can be scheduled for recall as an Event at a specific date and time, and also can be set to repeat. A total of 32 Events can be scheduled, and each Event can be given a unique 32-character name.

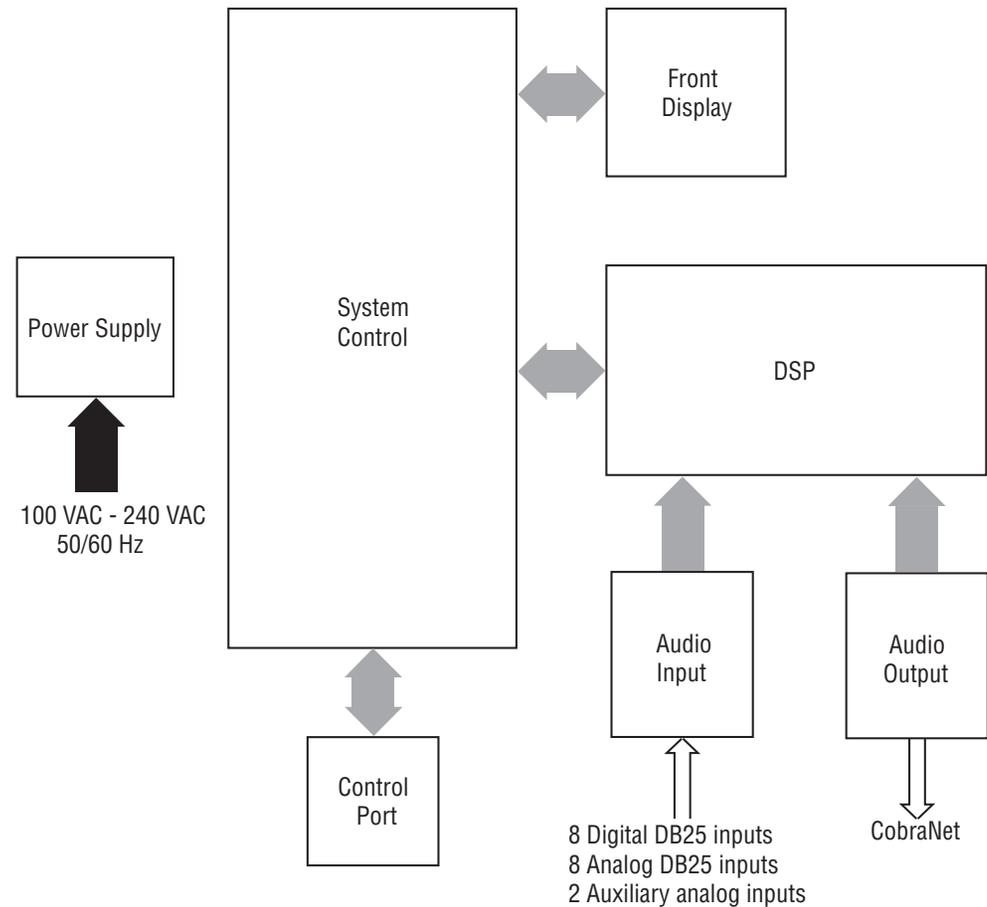


Figure 4.24 DBC Network Bridge Signal Flow Block Diagram

## 5 Advanced Operation

### 5.1 Advanced Operation Table of Contents

<b>5 Advanced Operation .....</b>	<b>44</b>	5.3.3 Input Gate .....	57
5.1 Advanced Operation Table of Contents .....	44	5.3.4 Auto Leveler .....	58
5.2 Advanced Processing Functions.....	45	5.3.5 Automixer .....	59
5.2.1 CobraNet: Setup .....	45	5.3.6 Solo/Mute .....	64
5.2.2 CobraNet: Input .....	47	5.3.7 Output Path .....	65
5.2.3 CobraNet: Output.....	47	5.3.8 Ambient Leveler.....	66
5.2.4 Control Port.....	48	5.3.9 Output Limiter .....	67
5.3 Advanced Form Firmware Features.....	54	5.3.10 Outputs Button .....	68
5.3.1 Input Path .....	55	5.4 Technical Description .....	69
5.3.2 Input Delay .....	56		

## 5 Advanced Operation

### 5.2 Advanced Functions

#### 5.2.1 CobraNet: Setup

To open the CobraNet Setup window, click on the **CobraNet** tab, then click on the **CobraNet Setup** tab. The **CobraNet Setup** window opens (Figure 5.1).

The CobraNet Setup tab allows overall control of the DBC Network Bridge's CobraNet functions.

Several labels and information are available:

##### 1. System Name

This user-defined label indicates the name of the particular DBC Network Bridge.

##### 2. System Description

This label is embedded in the CobraNode and indicates the manufacturer and description of the CobraNet device.

##### 3. System Location

Used to describe the location of the CobraNet device.

##### 4. System Contact

A label that tells who to contact in the event of a problem.

##### 5. Firmware Version

Indicates the CobraNode's firmware Protocol Version, Major Version, and Minor Version.

##### 6. MAC Address

The CobraNode's unique manufacturer hardware address.

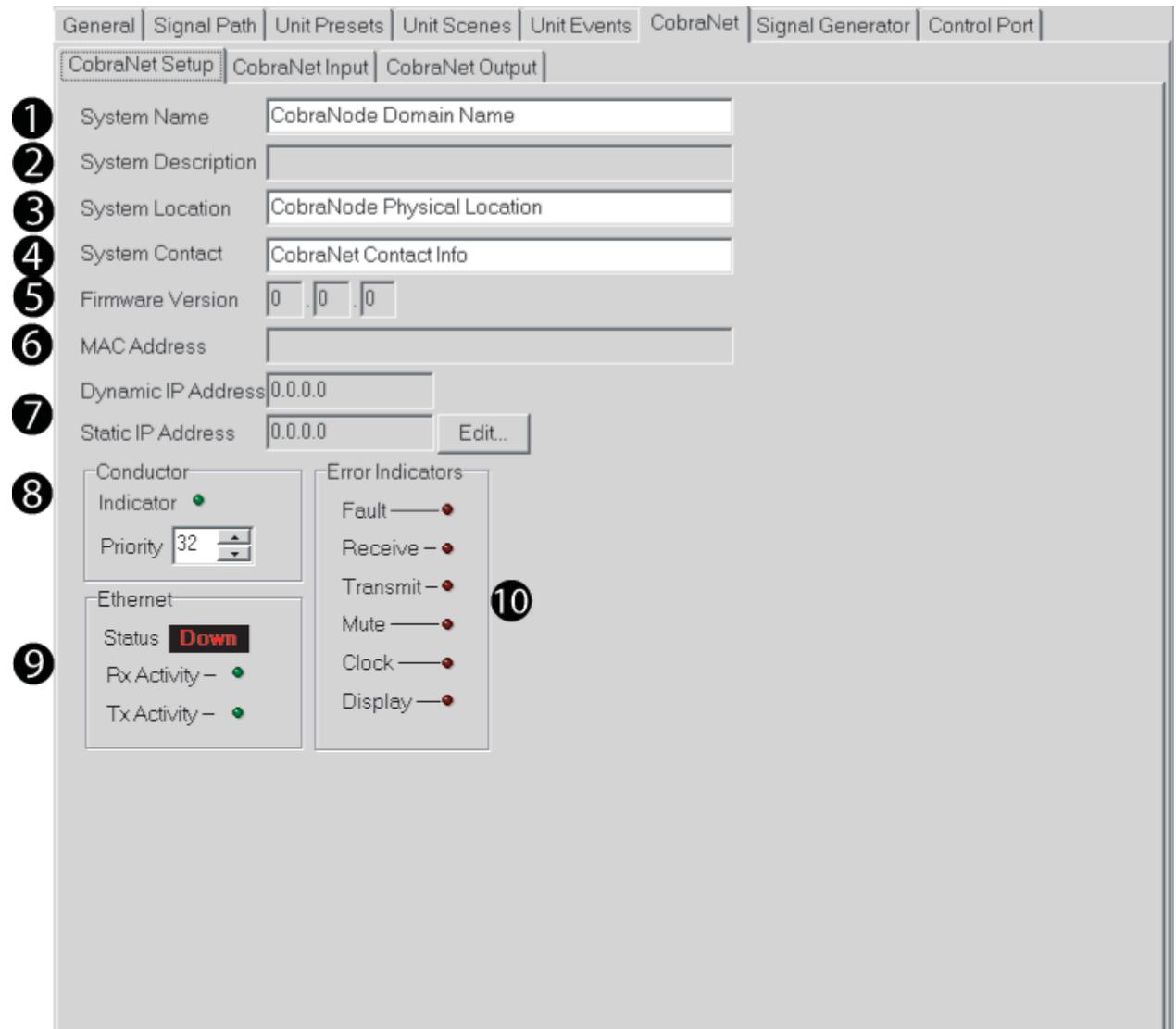


Figure 5.1 CobraNet Setup Window

## 5 Advanced Operation

### CobraNet: Setup (continued)

Please refer to Figure 5.2.

#### 7. IP Address

The Internet Protocol address that is assigned by the system integrator. Used as a standard part of Ethernet networking transmission protocols and works much like a zip/postal code for the unit on the network.

#### 8. Conductor

The CobraNet 'Setup' tab indicates information about the status of the Conductor (the CobraNet timing-master device). Each CobraNet device can be assigned its own Conductor 'Priority' which will be used to determine who will be the Conductor of the network. Conductor Priority values range from 0 to 255, with 0 being the lowest priority and 255 being the highest priority. A light indicates when the CobraNet device is the Conductor of the system. The DBC Network Bridge defaults to 32.

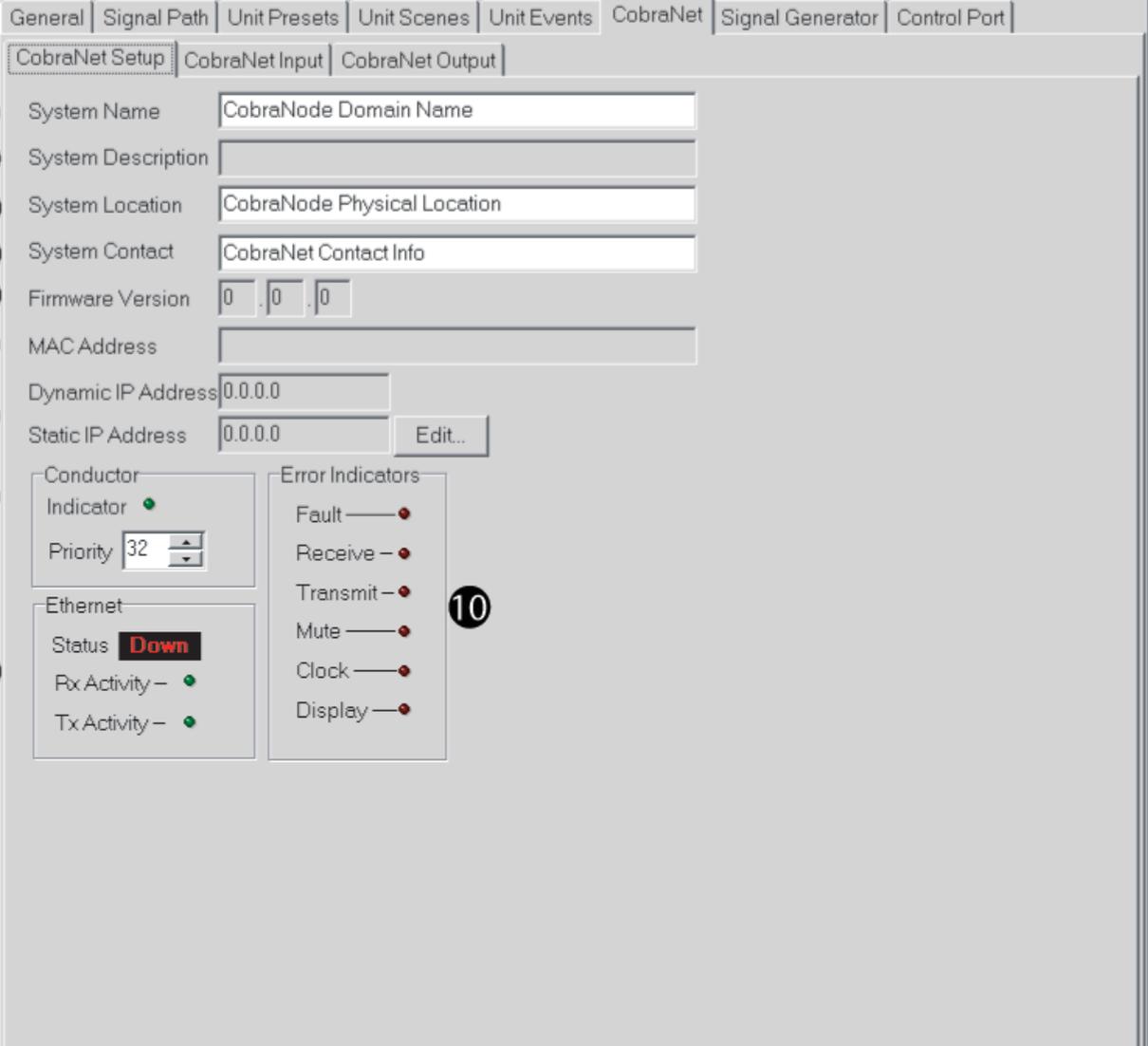
#### 9. Status indicators

There are a number of status and error indicators for the CobraNet network.

The Ethernet 'Status' tells if the physical network is connected to the unit. The 'Rx Activity' and 'Tx Activity' lights tell if there is incoming or outgoing Ethernet activity.

The Error Indicators are:

- Fault: An overall fault in the CobraNet network
- Receive: An error on received CobraNet Bundles
- Transmit: An error on transmitted CobraNet Bundles
- Mute: An audio output may be corrupt
- Clock: Fault or lost contact with the CobraNet network
- Display: Encountered an unexpected error



The screenshot shows the 'CobraNet Setup' window with the following fields and indicators:

- 1** System Name: CobraNode Domain Name
- 2** System Description: (empty)
- 3** System Location: CobraNode Physical Location
- 4** System Contact: CobraNet Contact Info
- 5** Firmware Version: 0.0.0
- 6** MAC Address: (empty)
- 7** Dynamic IP Address: 0.0.0.0
- 7** Static IP Address: 0.0.0.0 (with an 'Edit..' button)
- 8** Conductor Indicator: (green dot)
- 8** Priority: 32
- 9** Ethernet Status: **Down**
- 9** Ethernet Rx Activity: (green dot)
- 9** Ethernet Tx Activity: (green dot)
- 10** Error Indicators:
  - Fault: (red dot)
  - Receive: (red dot)
  - Transmit: (red dot)
  - Mute: (red dot)
  - Clock: (red dot)
  - Display: (red dot)

Figure 5.2 CobraNet Setup Window

## 5 Advanced Operation

### 5.2.2 CobraNet: Input

To access the **CobraNet Input** window, click on the **CobraNet** tab, then click on the **CobraNet Input** tab. The **CobraNet Input** window will open (Figure 5.3).

The DBC Network Bridge can accept three Bundles from the CobraNet network and route the audio Slots of those Bundles into the processing and mixing of the unit. These three Bundles (RxB, RxC, and RxD), are assigned Bundle numbers by the Bundle window. If a transmitter is supplying audio on that Bundle, the Active lamp will light. The 'Seek' button allows scanning of the multicast Bundles (Bundles 1-255) to see if any of the Bundles have audio data on them. If audio is detected on any of those Bundles, the Bundle number will stop at that point.

The individual audio Slots are assigned one of the eight CobraNet Inputs to the DBC Network Bridge. Once the eight CobraNet Inputs have been assigned Bundles and Slots, they can be used by the unit for routing and processing. The CobraNet Inputs each have a unique label for identification and can be routed into the processor in several ways. The Input Processing Sections can accept either the analog input or the CobraNet Input auxiliary analog input, or a digital AES/EBU input. In addition, a CobraNet Input can be routed directly to a corresponding AUX Output. The monitor output has access to all eight CobraNet Inputs in its mix.

Links from any of the 8 bundle audio channels can be drawn by clicking on the pink boxes and dragging the wire to the chosen input. The 'Default Link' button sets up the first bundle to link to the respective 8 CobraNet inputs, while the 'Unlink' button removes all links.

### 5.2.3 CobraNet: Output

See this information in the Operation Section 4.7.8.

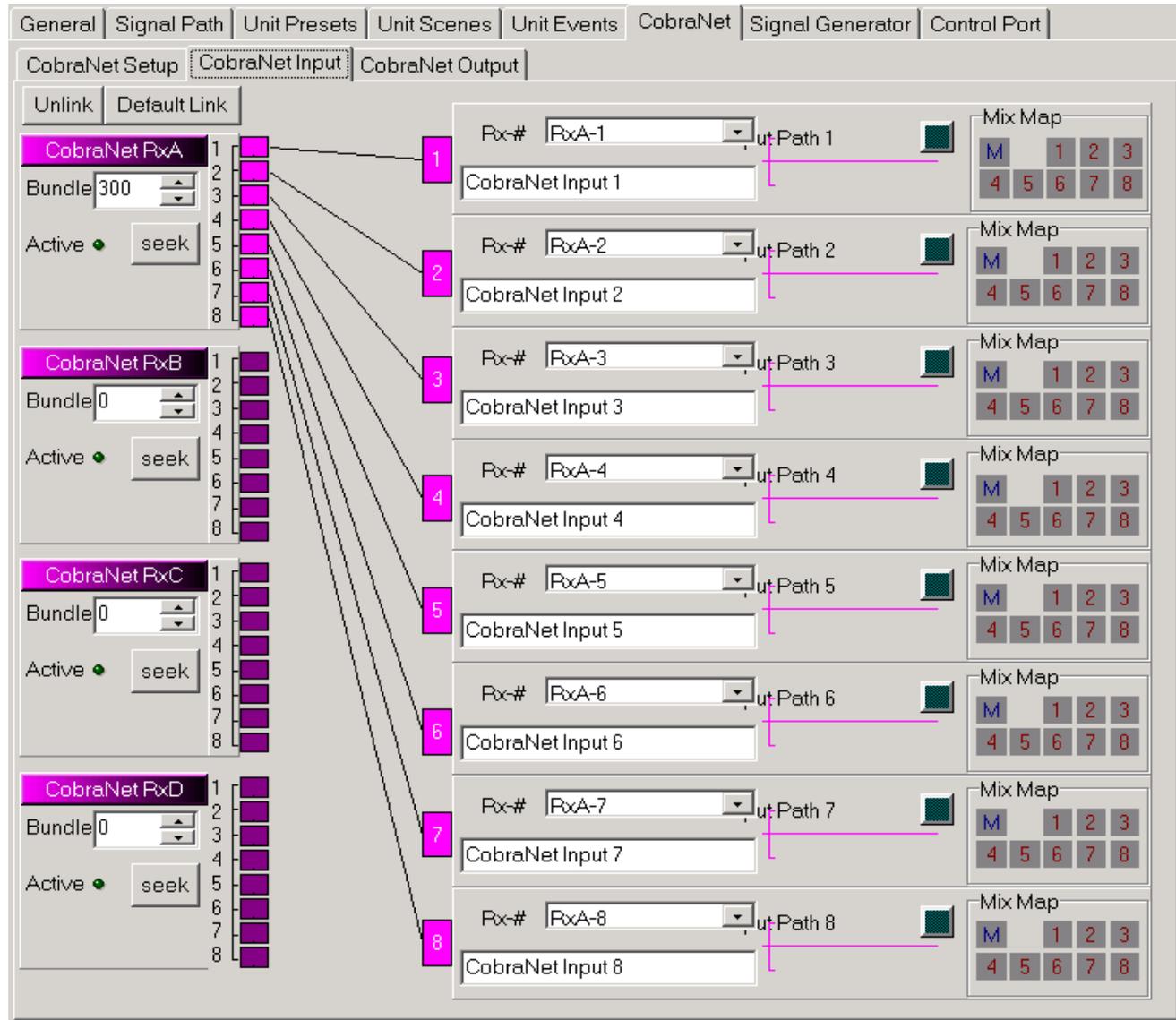


Figure 5.3 CobraNet Input Window

## 5 Advanced Operation

### 5.2.4 Control Port

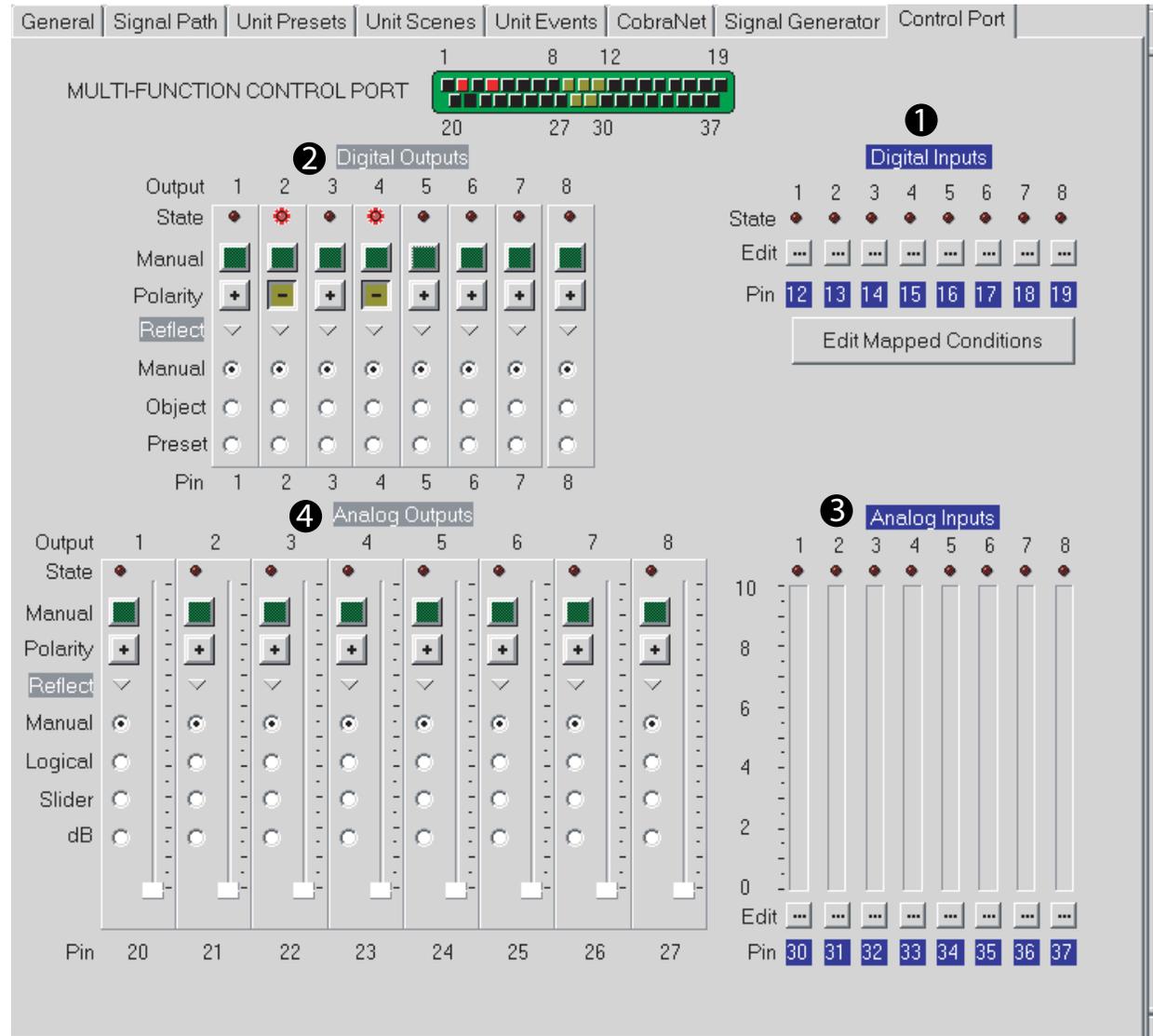
The Control Port provides a means for external monitoring and control of 'objects' (software processors) within the DBC Network Bridge. It can be used to turn peripherals on and off, send signals to other system components, receive digital and/or analog signals from other components, and indicate status of the input gates.

The Control Port implements sixteen outputs and sixteen inputs along with power supply outputs and common grounds. Eight of the outputs are digital 'logic outs', while the other eight are analog outputs that are capable of digital 'logic outs'. Eight of the inputs (AIN1-8) are capable of monitoring digital and analog external signals. The other eight inputs (DIN1-8) are digital only.

To open the **Control Port** window (Figure 5.4), click on the **Control Port** tab in the main window.

In the following pages, we will look at each section of the Control Port window:

1. Digital Inputs
2. Digital Outputs
3. Analog Inputs
4. Analog Outputs



The screenshot shows the 'MULTI-FUNCTION CONTROL PORT' window with several tabs: General, Signal Path, Unit Presets, Unit Scenes, Unit Events, CobraNet, Signal Generator, and Control Port. The Control Port tab is active, displaying a pin configuration diagram at the top with pins 1, 8, 12, 19, 20, 27, 30, and 37 highlighted. Below the diagram are four main sections:

- 1 Digital Inputs:** A table with 8 columns (Pin 1-8) and rows for State (LEDs), Edit (dropdowns), and Pin (12-19). A button 'Edit Mapped Conditions' is below.
- 2 Digital Outputs:** A table with 8 columns (Pin 1-8) and rows for Output, State (LEDs), Manual (checkboxes), Polarity (+/-), Reflect (dropdowns), Manual (radio buttons), Object (radio buttons), and Preset (radio buttons).
- 3 Analog Inputs:** A table with 8 columns (Pin 1-8) and rows for State (LEDs), Edit (dropdowns), and Pin (30-37).
- 4 Analog Outputs:** A table with 8 columns (Pin 20-27) and rows for Output, State (LEDs), Manual (checkboxes), Polarity (+/-), Reflect (dropdowns), Manual (radio buttons), Logical (radio buttons), Slider (vertical sliders), and dB (radio buttons).

Figure 5.4 Control Port Window

## 5 Advanced Operation

### Control Port Window: Digital Inputs

The Digital Inputs are high or low only. They are current driven and will accept +5V or +10V inputs (+25VDC max), and are well suited for sensing contact closure (Figure 5.6). They switch at approximately +1 VDC. They can be used to control one or more objects with the DBC Network Bridge. The Control Port digital inputs can be used to sense logic 'high' or 'low' signals to control many of the features of the DBC Network Bridge.

Find the **Digital Inputs** section (Figure 5.5) in the **Control Port** window. Its features are described below.

#### 1. Pin State Indicator

This shows the actual status of the hardware input as it comes into the rear panel connector.

#### 2. Edit Buttons

Pressing one of these buttons opens the Control Port Assignment Dialog box, explained later.

#### 3. Pin

This number reflects the physical pin number of the DB37 connector on the rear of the unit.

#### 4. Edit Mapped Conditions

Pressing this button opens the Condition Logic Setup window, described later.

### Control Port Assignment Dialog

In the **Control Port** window, find the **Digital Inputs** section (Figure 5.7). When the **Edit** Button is pressed on a Digital Input, the **Control Port Assignment Dialog box** (Figure 5.8) opens to assist in setup of the input. It is described below and on the next page.

#### 1. Control Port Object

This field displays the currently selected object or device, such as Digital Input 1 - Pin12.

#### 2. Controls

The control buttons let you select which type of controls you want to display: Any, dB, or logical.

#### 3. Named

You can enter text here to narrow the search for controls.

#### 4. Controls List

This field displays a list of processes that can be applied to the object. Once the desired control has been found in the Controls List, highlight it and press the Add button (5).

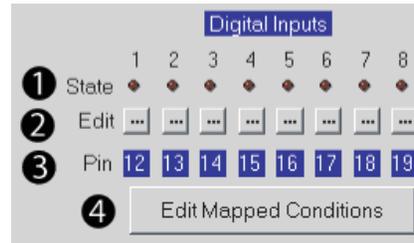


Figure 5.5 Digital Input Section in the Control Port Window

Figure 5.6 Sample Control-Port Digital Input Circuit

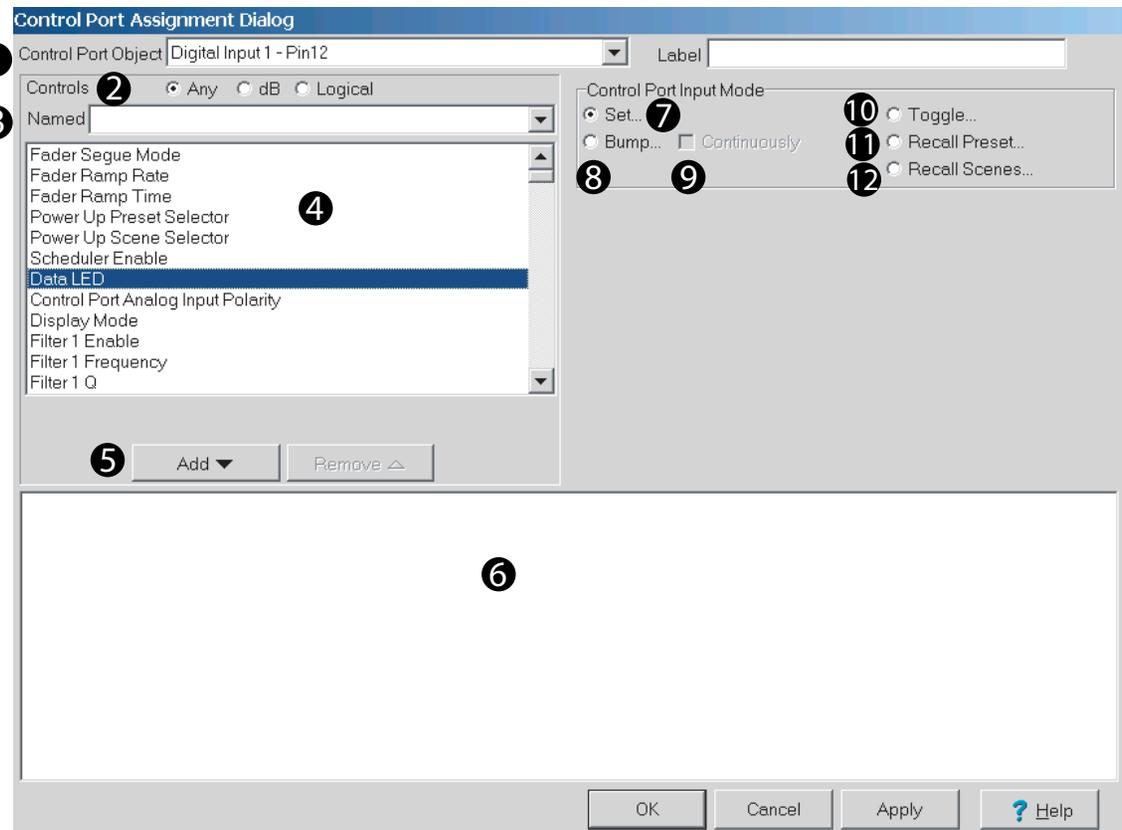
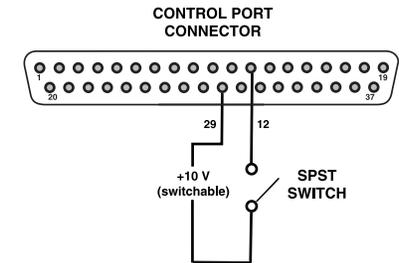


Figure 5.7 Control Port Assignment Dialog Window

## 5 Advanced Operation

### Control Port Assignment Dialog (continued)

Please refer to Figure 5.8.

#### 5. Add / Remove Buttons

Once the desired object has been found in the Controls List (4), highlight it and press the **Add** button (5). The object will appear in the Object List (6) at the bottom of the window. Highlight a particular object in the bottom window to edit its attributes. You can remove a highlighted object by pressing the **Remove** button.

#### 6. Object List

This is a list of objects that have been selected and added.

#### 7. Set Objects

Allows a single input to control up to fifty objects within the DBC Network Bridge. Binary objects can be controlled with normal or inverted logic. Multi-valued objects (e.g. gains, thresholds, etc.) can be set to different settings for input transitions from low-to-high and high-to-low.

#### 8. Bump Objects

Similar to Set Object mode, except that rather than setting the object to an absolute value, the specified values are added to the current object values. Upper and lower limits can be set to limit the range of the control.

#### 9. Bump Objects Continuously

Similar to Bump Object mode, except that the specified values are added to the object value continuously at 1/4 second intervals.

#### 10. Toggle

Toggle applies to binary functions objects that have two states. The toggle will use the same stimulus to switch between states.

#### 11. Recall Preset

Enables the input to recall one of the 32 user Presets. Separate Presets can be recalled for low-to-high and high-to-low transitions.

#### 12. Recall Scene

Enables the input to recall one of the 32 user Scenes. Separate Scenes can be recalled for low-to-high and high-to-low transitions.

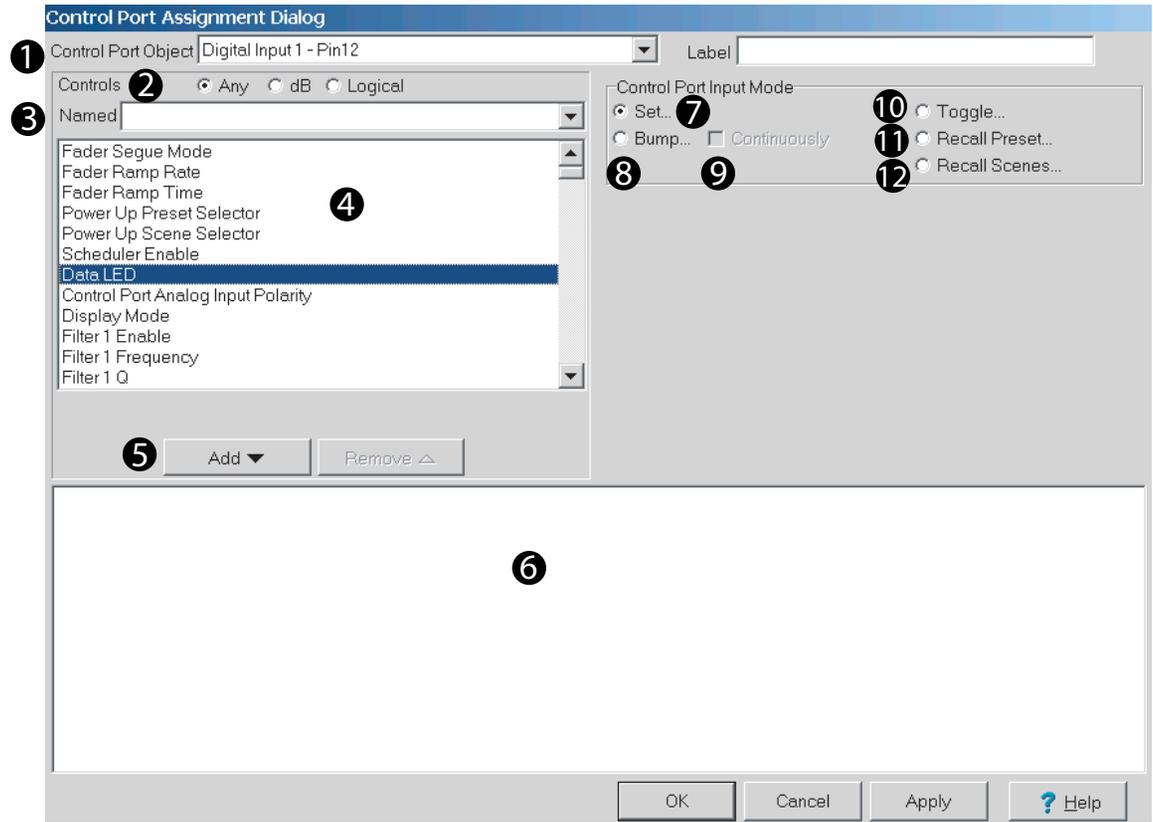


Figure 5.8 Control Port Assignment Dialog Window

## 5 Advanced Operation

### Control Port: Condition Logic Setup Window

To open the **Condition Logic Setup** window (Figure 5.9), press the **Edit Mapped Conditions** button in the **Control Port** window.

#### 1. Condition

Allows up to 64 different binary combinations of pin states. Up to eight inputs are allowed in any state, giving up to 255 different combinations for each of the 64 configurations.

#### 2. Name

Naming convenience for the configuration. 64 names are available.

#### 3. Include

Of the eight bits available to read, **Include** instructs the unit which of the eight to include in the binary scheme.

#### 4. Pin Combinations

Assigns included pins in selected states; it can be either a true or false action. When true, do X; when false, do Y.

#### 5 and 6. Pin Combinations and Resulting State Field

Allows you to assign up to 255 different combinations of pin states, and assign that combination to be either true or false.

#### 7. Conditions

A numeric view of #3 above.

#### 8. Control Port Simulation

An area that allows you to set the pin states on the control port to either high or low to test assigned logic for desired operation.

#### 9. Edit Condition Actions

Press this button to go to the **Control Port Assignment Dialog** (described on the previous two pages).

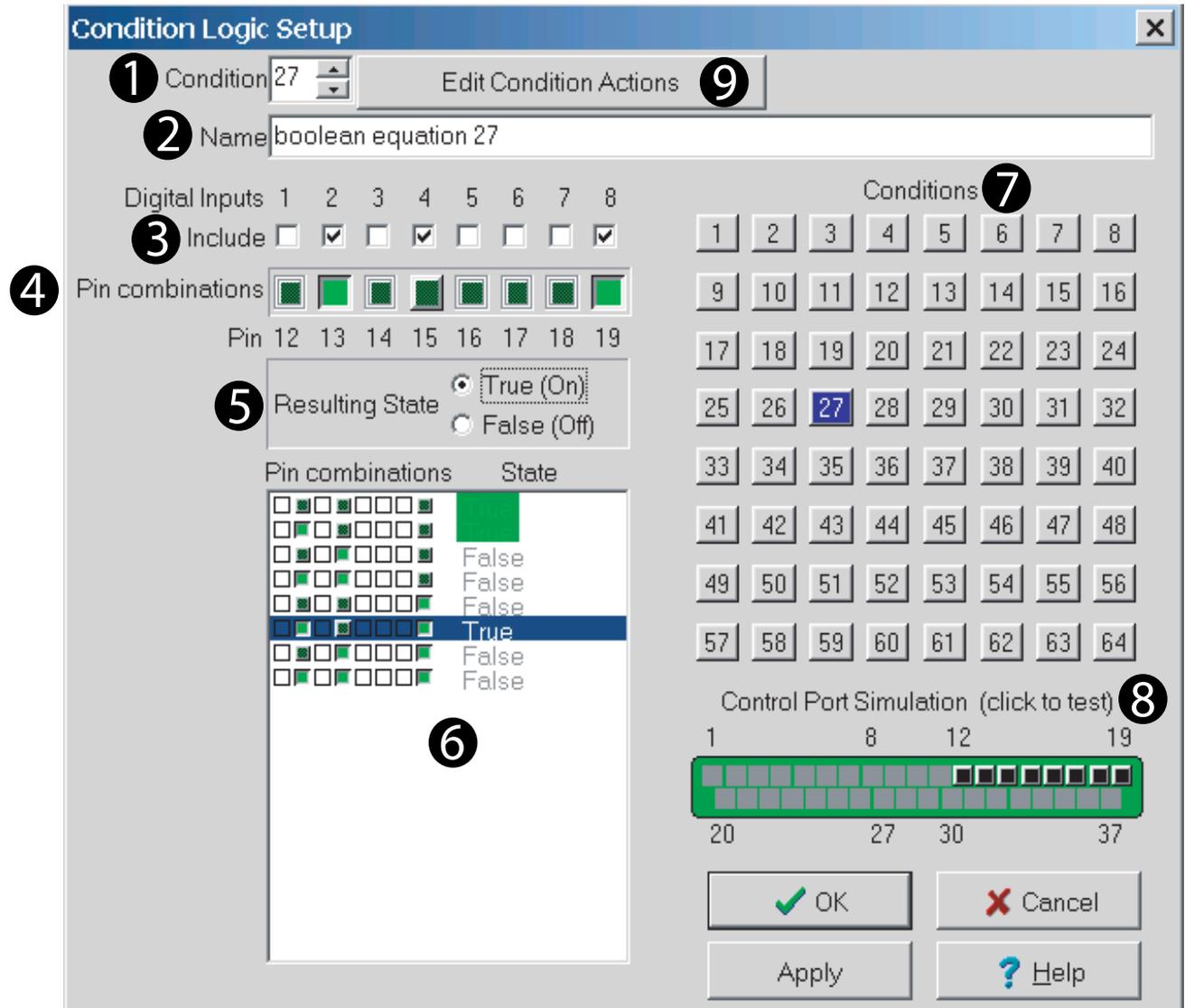


Figure 5.9 Condition Logic Setup Window

## 5 Advanced Operation

### Control Port Window: Digital Outputs Section

In the **Control Port** window, find the **Digital Outputs** section (Figure 5.10).

There are eight digital outputs. Each output may be controlled manually, configured to indicate the state of a binary object or, configured to indicate whether a particular Preset is loaded. There is one indicator and five controls for each output:

#### 1. Output State (Pin State Indicator)

Indicates the logical 'Pin-High' or 'Pin-Low' status of the actual hardware output.

#### 2. Manual

Directly controls the output state of the corresponding pin when in Manual mode.

#### 3. Polarity

Changes the polarity of the digital output regardless of the pin control mode.

#### 4. Reflect Manual

This causes the output to directly reflect the state of its Manual control.

#### 5. Reflect Object

This causes the output to reflect the state of the selected binary object within the DBC Network Bridge. Only a single object may be specified.

#### 6. Reflect Preset

This causes the output to reflect whether the chosen Preset number is loaded within the DBC Network Bridge.

When the Control Port digital outputs are turned 'on', +10VDC at 10 mA is supplied across the output to ground. A total of 1 amp of current is available.

There are many possible uses for the Control Port outputs. For example, they can be used to turn on auxiliary cooling fans. To do this the output signal might be used to close a relay (Figure 5.11). The relay would then turn the fans on or off.

By monitoring the operating condition of amplifiers (with the IQwic software), the need for additional cooling would be apparent. The software could then be used to turn on the appropriate Control Port input.

Another use for the Control Port outputs might be to light an LED on an annunciator panel to indicate Preset status, input channel mute, or any other on/off type function (Figure 5.12).

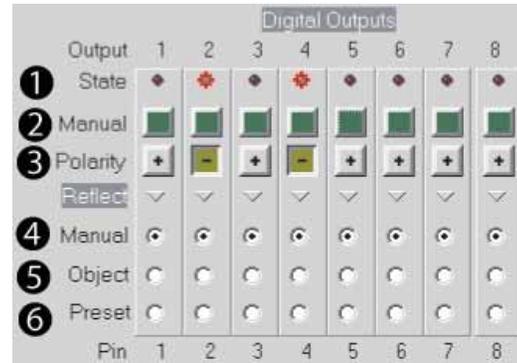


Figure 5.10 Digital Outputs Section of the Control Port Window

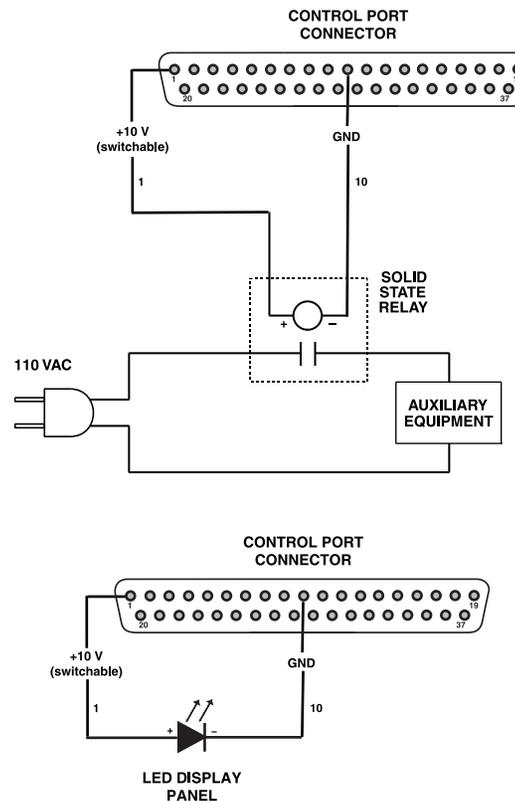


Figure 5.11 A Sample Control-Port Output Circuit

Figure 5.12 A Sample Control-Port Output LED Circuit

## 5 Advanced Operation

### Control Port Window: Analog Inputs Section (AIN 1-8)

Find the **Analog Inputs** section (Figure 5.13) in the **Control Port** window. It has a status indicator and level meter for each input channel.

The Control Port analog inputs allow a 0 to +10 VDC signal to be input to allow remote control of continuously variable objects such as faders or filter frequencies. They can also be used to control switched objects (just like the Digital Inputs). When the **Edit** button associated with a particular input is pressed, the **Control Port Assignment Dialog** box appears and allows programming of the input just as was discussed for the Digital Inputs. These inputs can be used to sense the presence of an analog input signal level, such as ordinary 10 kilohm linear potentiometers for level control (Figure 5.14). Analog inputs can alternately be set to sense simple contact closure.

### Control Port Window: Analog Outputs Section

Find the **Analog Outputs** section (Figure 5.15) in the **Control Port** window.

In addition to the eight Digital Outputs, there are eight Analog Outputs that can be used to provide an output voltage (0 to +10V DC for control). These outputs can reflect a particular analog object such as a fader, or a switched object and, can be used to provide drive for such things as lighting controls or for a standard digital type output.

The settings are remembered in a Preset, so they can be used to change the voltage of a particular output based upon Preset.

There are one indicator and six controls for each output.

- 1. Pin State Indicator:** indicates the logical 'Pin-High' or 'Pin-Low' status of the actual hardware output.
- 2. Manual:** directly controls the binary output state of the corresponding pin when in Manual mode.
- 3. Polarity:** changes the polarity of the analog output regardless of the pin control mode.
- 4. Reflect Manual:** causes the output to directly reflect the state of its Manual control.
- 5. Reflect Binary:** causes the digital output to reflect the state of the selected binary object within the DBC Network Bridge. Only a single object may be specified.
- 6. Reflect Slider:** causes the analog output to reflect the setting of the slider control associated with the output.
- 7. Reflect dB:** causes the analog output to reflect the status of the selected dB object. Only a single dB object may be specified.

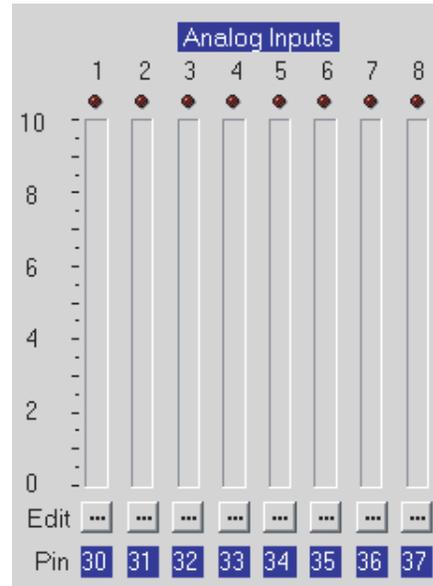


Figure 5.13 Analog Inputs Section of the Control-Port Window

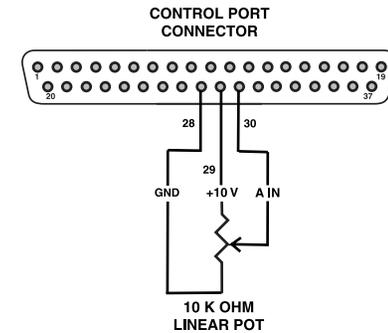


Figure 5.14 Sample Control-Port Analog Input Circuit

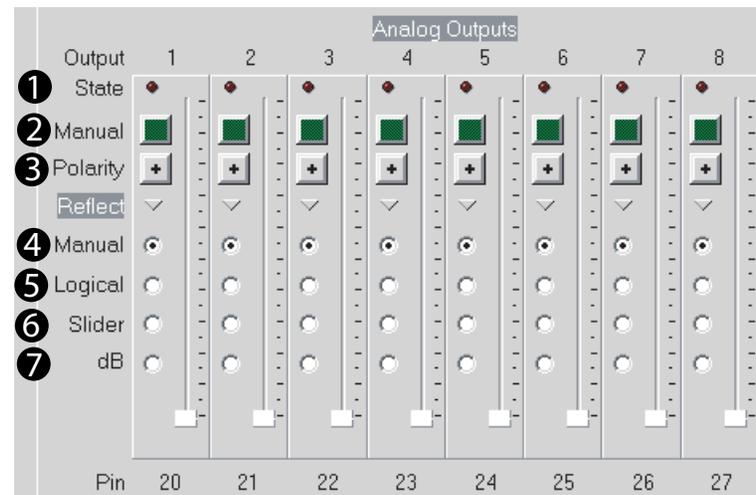


Figure 5.15 Analog Outputs Section of the Control-Port Window

A screw-terminal board with barrier-block to DB37M connections makes it easy to interface external circuitry to the Control Port. Measurement Computing™ Corp. offers a suitable screw-terminal board (part number CIO-MINI37), along with an enclosure (part number ENCMINI37) for this use.

Contact Measurement Computing Corp. at [www.measurementcomputing.com](http://www.measurementcomputing.com) or (508) 946-5100.

## 5 Advanced Operation

### 5.3 Advanced Form Firmware Features

This section explains the advanced signal-path features in the DBC Network Bridge.

From the **Signal Path** tab, click on the **Advanced** button at the top. This opens the **Advanced Form** window (Figure 5.16). Its functions are listed below, and each function is explained in the following pages.

Note that most functions are duplicated on all the input and output channels. Also, the Input EQ Filters and Input Compressor were covered earlier in Section 4.

#### 1. Input Select

Toggles between analog/digital input or CobraNet input.

#### 2. Input Path

3. Input Level/Polarity/Mute (same as 2)

4. Input EQ Filters (see Section 4.7.4)

#### 5. Input Delay

#### 6. Input Gate

#### 7. Auto Level Settings

8. Input Compressor (see Section 4.7.2)

#### 9. Auto-mix Controls

10. Input Path Filter (Same as Input Filter - see Section 4.7.4)

#### 11. Output Path

12. Same as 11

#### 13. Output Delay

14. Output EQ Filters (Same as Input EQ Filter - see Section 4.7.4)

#### 15. Ambient Leveler

#### 16. Output Limiter

17. Output Path (Same as 11)

18. CobraNet Output = Input Path or Output Path

19. View CobraNet Input (same as CobraNet tab > CobraNet Input)

20. View CobraNet Output (same as CobraNet tab > CobraNet Output)

21. Inputs button: View all input sections

22. Auto-mix Matrix Button

23. Auto-mix Groups Button

24. Solo/Mute Button

25. Outputs Button: View all output level controls

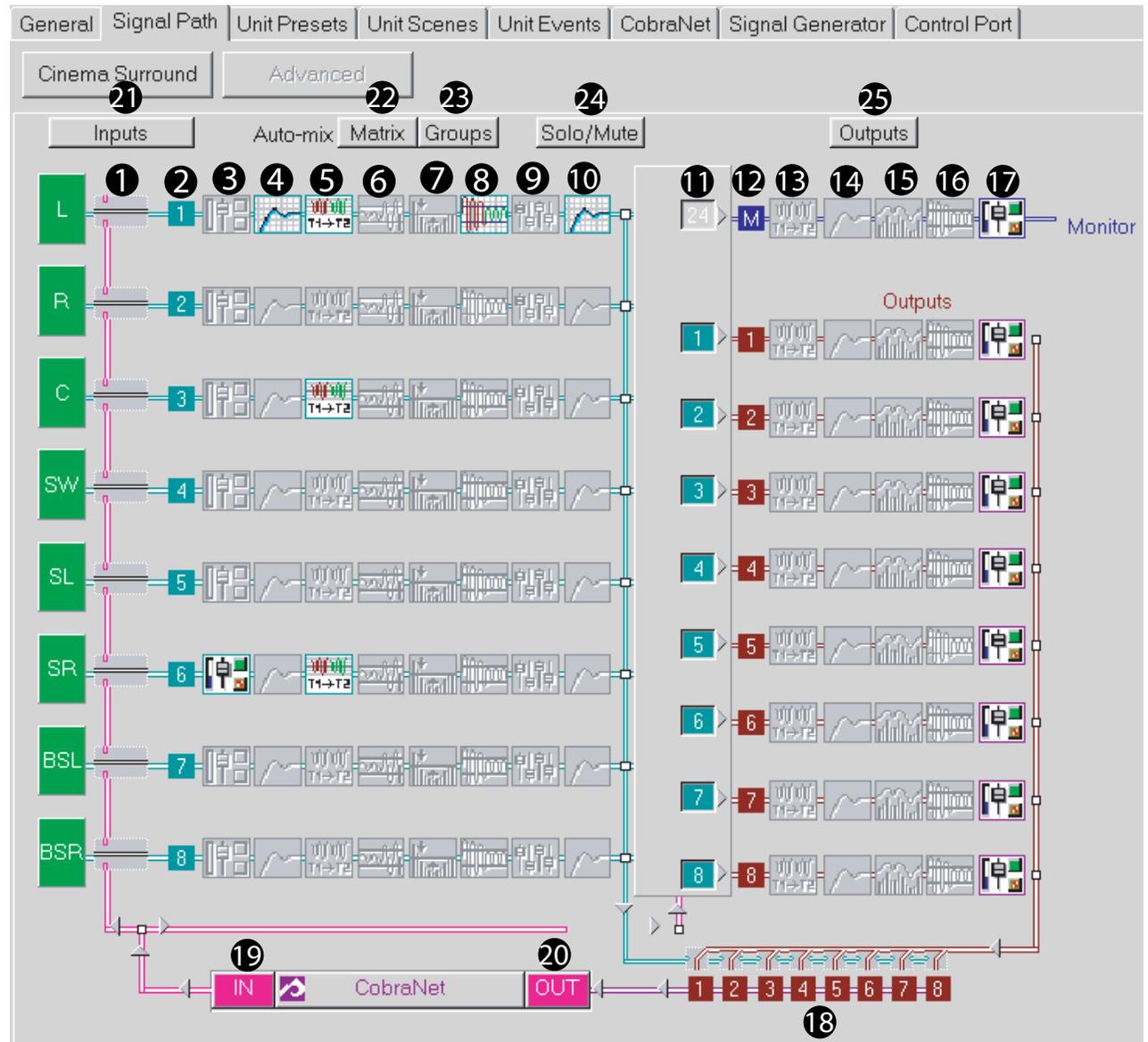


Figure 5.16 Advanced Form Window in the Signal Paths Tab

## 5 Advanced Operation

### 5.3.1 Input Path



Starting from the **Signal Path** window, you can access the **Input Path** window (Figure 5.17) for any channel by clicking on either an input-select button or the Input Path icon (shown above) for the channel.

#### 1. Input Selector

Choose which input channel to view by either pressing the blue or green input channel required or, pick an input from the drop-down box.

#### 2. Input Meter

The switched input signal is sampled and displayed.

#### 3. Input Select Switch

The signal that is input to each of the Input Processing Sections can be either the associated analog audio signal from the rear panel or the associated CobraNet input.

#### 4. Input Processing Selection

Displays the DSP processes available to the selected input path. If the icons are colored, the processes are enabled. Click on the process box in order to edit its parameters.

#### 5. Input Signal Fader, Muter, and Inverter

The output of each of the Input Processing Sections has a fader associated with it prior to the Matrix Mixer. In addition, the Input Processing Section has a muter and inverter.

#### 6. Input Window Link

This button opens a further window (Figure 5.18) that displays all the input gain faders with level meters, mute, polarity and input select switches. It provides an overview of the Input Processing Section DSP processes that are enabled/disabled for the selected input channel.

#### 7. Outputs

Controls the "mix" level or matrix level of that particular input to the various outputs available on the unit.



Figure 5.18 Input Window

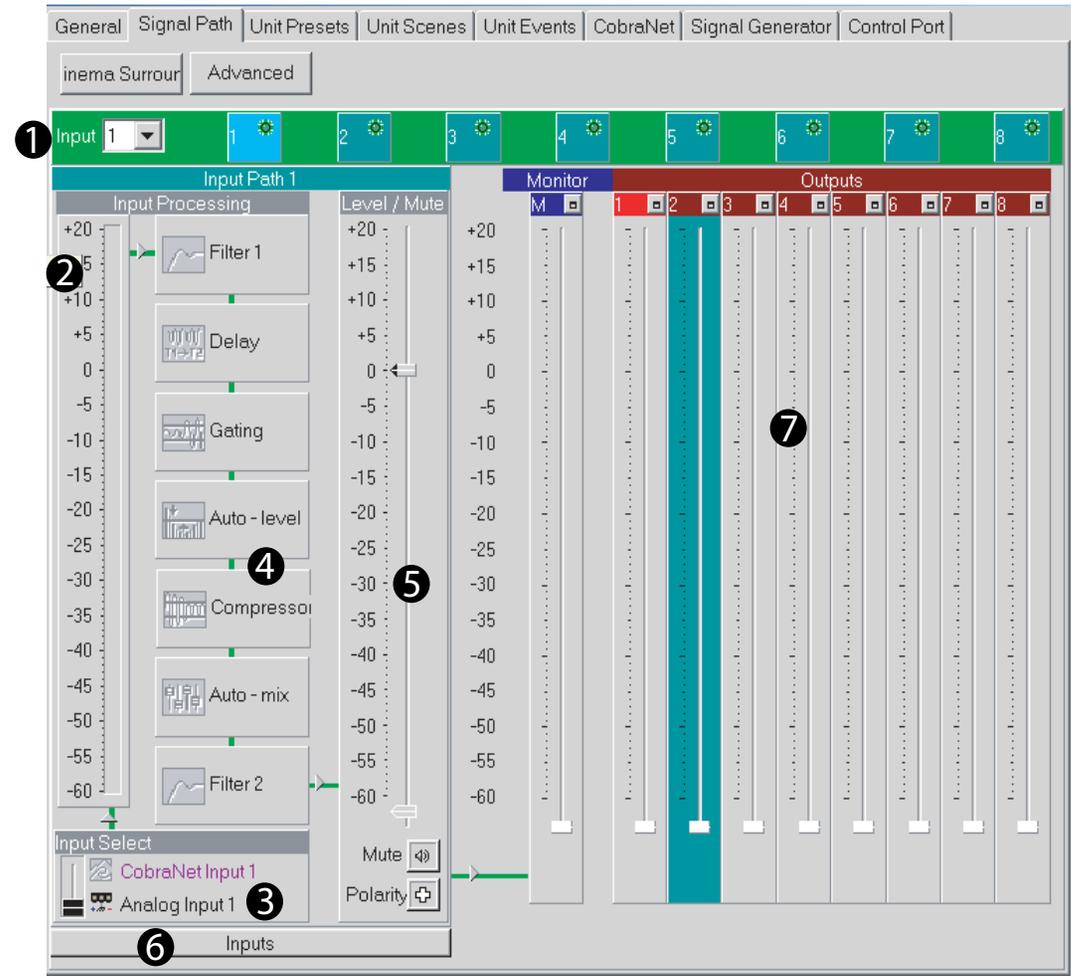


Figure 5.17 Input Path Window

## 5 Advanced Operation

### 5.3.2 Input Delay



Starting from the **Input Path** window, you can access the **Input Delay** window (Figure 5.19) by clicking on its icon (shown above).

A delay can be added to any of the Input Processing Sections in order to time-equalize the various input signals. Delay is displayed in IQwic software in time, feet, and meters. Control range is from 0 to 100 milliseconds in 20 microsecond steps. Delay time can be adjusted up to a maximum of 2 seconds for each channel.

#### Hardware Delays

The delays in the DBC Network Bridge are fixed and allow very precise alignment of audio signals. Delay elements are available in each Input Processing Section to ensure that audio alignment is attained. The processing time delays of each of the various components in the DBC Bridge and CobraNet network need to be taken into account in this alignment process. These are fixed latencies in order to keep filter alignment together.

The various delays in the DBC Network Bridge are:

- Input A/D Converter: 667us
- DAC Converter: 520us
- Input Processing: 1.665ms
- Output Processing: 1.665ms
- CobraNet: 5.333ms

L Input Delay	R Input Delay	C Input Delay	SW Input Delay
0.00000 msec	0.00000 msec	0.93749 msec	0.14583 msec
0.000 feet	0.000 feet	1.059 feet	0.165 feet
0.000 meters	0.000 meters	0.323 meters	0.050 meters
SL Input Delay	SR Input Delay	BSL Input Delay	BSR Input Delay
0.10417 msec	0.00000 msec	0.27083 msec	0.00000 msec
0.118 feet	0.000 feet	0.306 feet	0.000 feet
0.036 meters	0.000 meters	0.093 meters	0.000 meters

Figure 5.19 Input Delay Window

## 5 Advanced Operation

### 5.3.3 Input Gate



Starting from the **Input Path** window, you can access the **Input Gate** window (Figure 5.20) by clicking on its icon (shown above). The Input Gate feature allows signals above a certain level to pass and attenuates lower level signals. When 'open', the Input Gate passes the input signal un-attenuated. When 'closed', it attenuates the input signal by an amount specified with the Depth control. There are eight parameters which control this feature:

#### 1. Enable Gate

Switches the gate on or off.

#### 2. Depth

Sets the 'closed' gain of the Gate. Control range is from  $-100$  dB to 0 dB in 0.5 dB steps.

#### 3. Static Threshold

Specifies the peak signal level (after side-chain processing) above which the gate will open. Control range is from  $-80$  to  $+20$  dB in 0.5 dB steps.

#### 4. Hysteresis

Sets a range in dB above and below the Threshold which separates the levels at which the Input Gate opens and closes (Figure 5.21). The input signal must reach a level above the Threshold plus Hysteresis to open. Once opened, the input must reach a level below the Threshold minus Hysteresis to close. Control range is from 0 dB to 12 dB in 0.5 dB steps.

#### 5. Signal Delay

Additional delay applied to the input signal, but not to the control key signal. Provided to allow the Input Gate to 'look ahead' in time. Control range is from 0 milliseconds to 10 milliseconds.

#### 6. Attack Time

Sets the time required for the Input Gate to increase its gain by 20 dB. Control range is from 0.2 millisecond to 100 milliseconds.

#### 7. Hold Time

Determines how long the Input Gate will remain open after the control key signal falls below the Threshold. Control range is from 0.01 second to 10 seconds.

#### 8. Release Time

Sets the time required for the Input Gate to decrease its gain by 20 dB. Control range is from 0.01 second to 10 seconds.

#### 9. Side-chain Filter

The Side-chain Filter processes the Control Key signal used to trigger the Input Gate. Its output is not directly in the signal path, and only affects the sensitivity of the Gate Threshold versus frequency. This filter can be especially useful in situations where certain frequency components need to be rejected by the gate. The use of this filter in conjunction with the Signal Delay can provide de-essing of the gate.

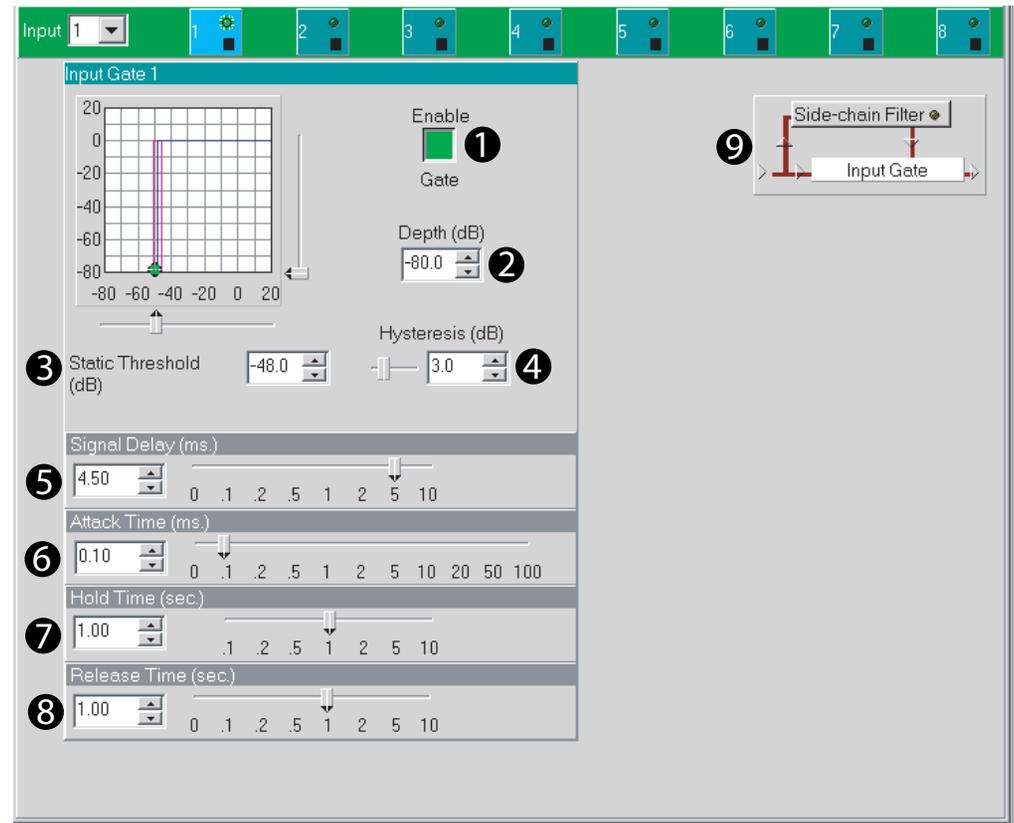


Figure 5.20 Input Gate Window

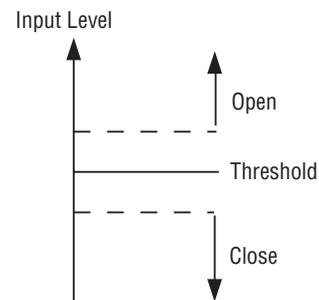


Figure 5.21 Hysteresis

## 5 Advanced Operation

### 5.3.4 Auto-Leveler



Starting from the **Input Path** window, you can open the **Auto-Leveler** window (Figure 5.22) by clicking on its icon (shown above). The Auto-leveler works in tandem with the Input Gate to compensate for long-term average input levels that vary over time. When the Auto-leveler is enabled, the open state gain of the corresponding Input Gate, normally 0 dB, is adjusted dynamically to achieve a desired average output level. The Auto-leveler's effect on input gain is metered by the Input Dynamic Cut/Boost Meter.

In the example above, the Threshold is set to  $-20$  dB and the Auto-leveler allows the input signal to pass unaffected at levels below the Threshold. At input signals above the Threshold, the Auto-leveler adds gain to try and adjust the signal to the 0 dB Target Level. At input signal levels above 0dB, the signal is clamped to 0 dB. Eight parameters control this feature:

#### 1. On/Off

Turns this feature on or off.

#### 2. Target Level

Sets the desired average output level. The Auto-leveler will expand input signals below this level and compress input signals above this level. Control range is from  $-100$  to  $+20$  dB in 0.5 dB steps.

#### 3. Max Gain

Sets the maximum gain through the Auto-Leveler. This feature can prevent 'runaway' from occurring during periods of very low signal level. Control range is from  $-100$  to  $+20$  dB in 0.5dB steps.

#### 4. Idle Gain

Sets the initial Gate gain when the Auto-Leveler mode is set to "Open to Idle Gain". Using the "Idle Gain" setting can provide a smoother transition from very soft to very loud input program. Control range is from  $-100$  to  $+20$  dB in 0.5dB steps.

#### 5. Open to...

When set to "Last Gain" the Gate opens to the last gain computed by the Auto-Leveler. In "Idle Gain" position, the Gate opens to a potentially safer "Idle Gain" setting.

#### 6. Threshold

Sets the input level below which the Auto-Leveler action will be inhibited. This allows the Auto-Leveler to suspend gain changes during quiet passages and, along with Max Gain, prevent excessive system gain. Control range is from  $-100$  to  $+20$  dB in 0.5 dB steps.

#### 7. Attack Time

Sets the time required for the Auto-Leveler to expand its gain by 20 dB. Control range is 0.1 to 60 seconds in 0.1 second steps.

#### 8. Release Time

Sets the time required for the Auto-Leveler to compress its gain by 20dB. Control range is 0.1 to 60 seconds in 0.1 second steps.

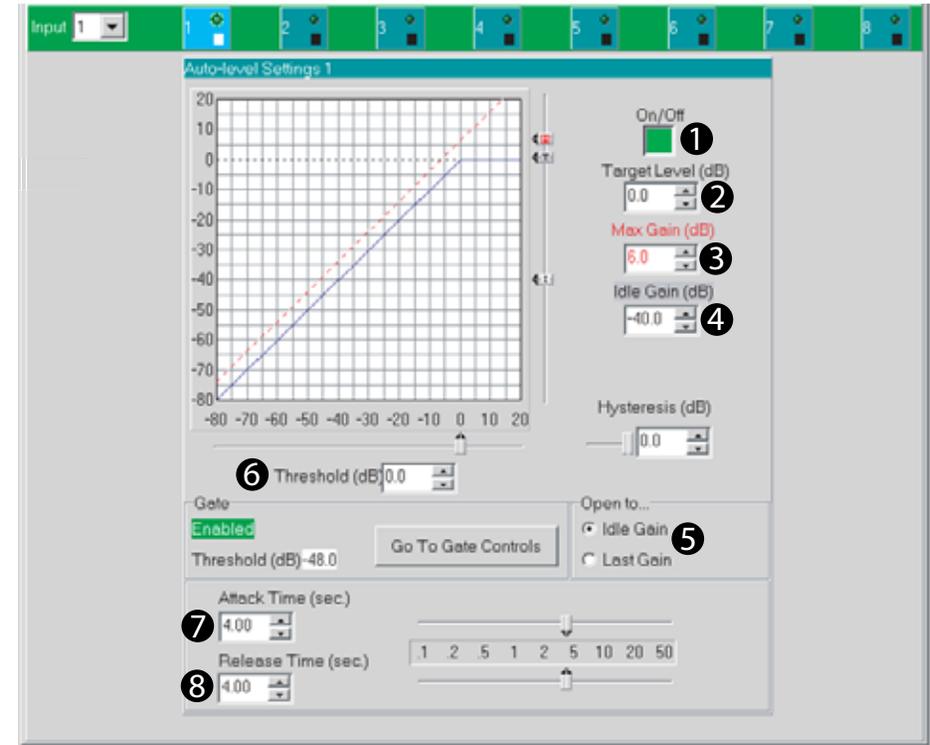


Figure 5.22 Auto-Leveler Window

## 5 Advanced Operation

### 5.3.5 Automixer



Automatic mixers allow 'hands-free' mixing that minimizes many of the undesirable effects of using multiple microphones. Applications such as conference rooms, training rooms and boardrooms typically implement many microphones for individual speakers. Simultaneously mixing all microphones with acceptable gain before feedback manually is not possible.

The DBC Network Bridge implements three auto-mixing functions to address this situation: Priority Ducking, NOM Attenuation and Adaptive Gating.

Each of the sixteen Input Processing Sections can be grouped into any of 32 Auto-Mix Groups. In addition to the Group assignment, each Input Section includes a separate 'Enable' control. This controls whether the respective channel participates in its assigned groups AutoMixing functions. There are group Automixing controls and individual Input Processing Section controls. Automixing's effect on input gain is metered by the Input Dynamic Cut/Boost Meter.

### Priority Ducking

Enforces a priority order of open microphones such that high priority inputs duck (attenuate) lower-priority inputs. Additionally, a maximum number of equal-priority open microphones may be specified. Each input can be assigned a Priority from 1 (highest) to 8 (lowest). When an input gate opens, it is allowed to pass according to the priority that has been assigned and is dependent upon the other open inputs within its group.

Keeping the number of open microphones to a minimum reduces background noise while allowing a higher gain before feedback for improved intelligibility.

Input gates must be enabled for all inputs participating in Priority Ducking within an Automix Group. If an input belongs to more than one Auto-Mix Group, it **MUST** be the highest priority in all of the groups in which it participates.

## 5 Advanced Operation

### Automix Controls



Starting in the **Input Path** window, you can open the **Automix Controls** window (Figure 5.23) by clicking on its icon (shown above).

There are four individual Input controls:

#### 1. Priority

Assigns a relative priority to each channel. Control range is 1 to 8, where 1 is the highest priority and 8 is the lowest priority.

#### 2. Depth of Cut

Sets the 'ducked' mic gain. Control range is from -100 to 0 in 0.5dB steps.

#### 3. Attack Time

Sets the time required for Priority Ducking to attenuate the mic gain by 20 dB. Control range is from 10 milliseconds to 10 seconds in 10 millisecond steps

#### 4. Release Time

Sets the time required for Priority Ducking to increase the mic gain by 20 dB. Control range is from 10 milliseconds to 10 seconds in 10 millisecond steps

#### 5. Ambience Weighting

The weighting factor used in the ambient level calculation for each input. This control should be set to 1 with the following two exceptions:

1. To exclude the mic from the ambient level calculation, set the weighting factor to zero.
2. To compensate for a mic in a relatively noisy location set the weighting factor to a value between zero and one. Control range is from 0 to 1 in 0.1 step increments.

#### 6. Priority Ducking vs. Channel Graph

Allows you to see and adjust the gate priority of the selected input. The dB level adjustment is the level that input will duck down when a higher-priority input gate is activated. 1 is the highest priority, while 8 is the lowest.

#### 7. Include in Automix Groups

There are 32 automix groups available. Each group would most likely represent an individual room or zone if the DBC were to be used for multiple areas.

#### 8. Automix Matrix Button

Clicking this button opens the Automix Matrix, described on the next page.

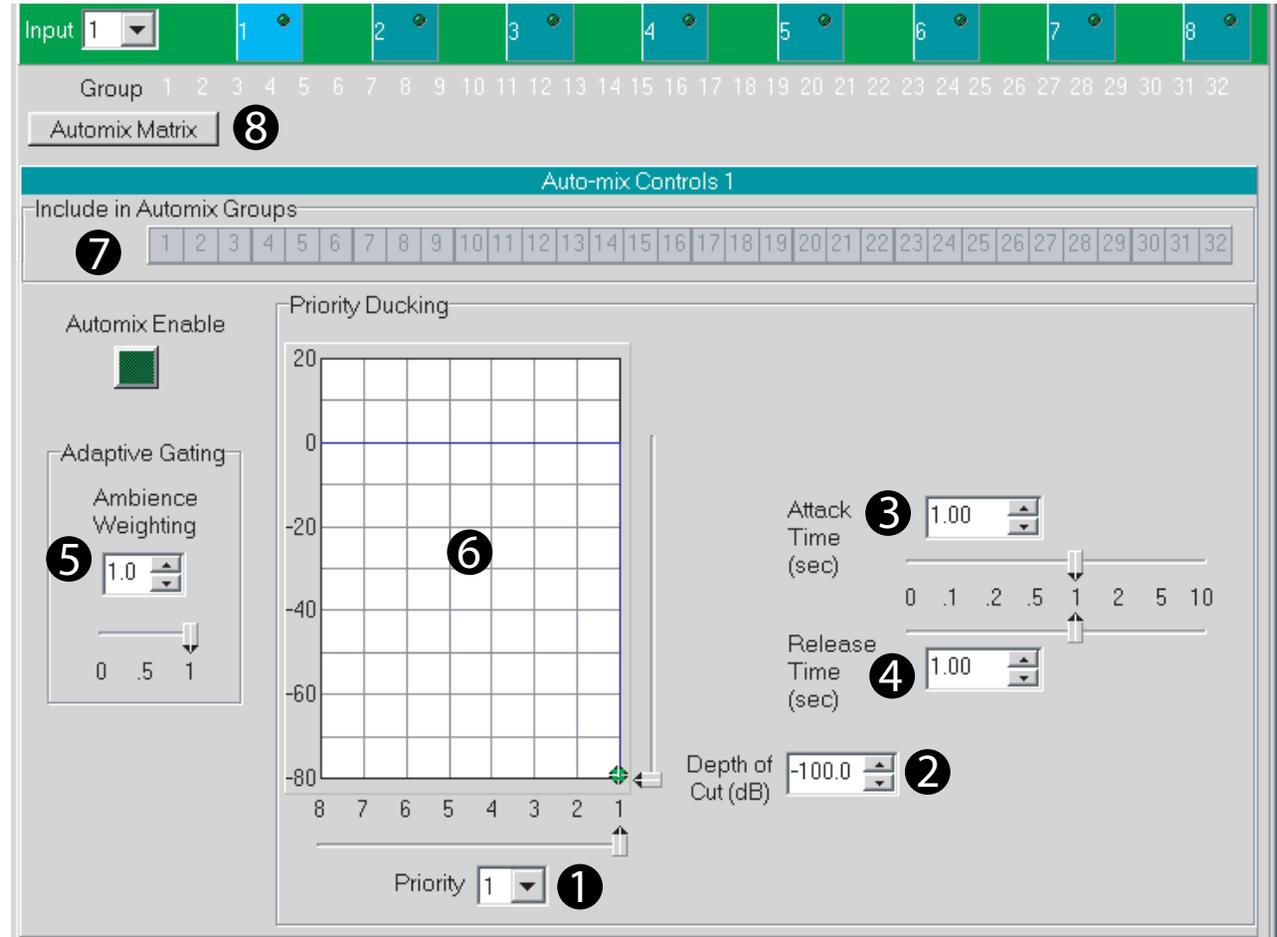


Figure 5.23 Automix Controls Window

## 5 Advanced Operation

### Automix Matrix



Access the Automix Matrix (Figure 5.24) by pressing the **Auto-mix Matrix** button in the **Signal Path** window.

This window is an interactive overview of all the possible automix routings assignments and priorities. There are three main automix functions; Ducking, NOM and Adaptive Gating and these work as a group.

Ducking is based upon the 16 inputs, these inputs are assigned a priority (1 being the highest) and involves cutting an input based upon a gate being open for a higher priority. NOM is a reduction based upon how many open mics are in the group and Adaptive Gating moves the threshold of the gate based upon an external source.

Colors denote the type of function assigned from the input to the automix group, Blue=Ducking, Yellow=NOM and Green=Adaptive Gating. Assignments set up in the matrix take on the color of the active function and, if two or more functions are set up then the color will change to red. If the individual input enable switches are off then the colors become faint and, if the group functions are disabled then the numbers become white although the assignment remains.

The group function is enabled by clicking on the rows (either Duck, Nom or Gate) at the top of the window. Clicking on the Group row numbers at the very top of the window accesses the group controls window for that group number.

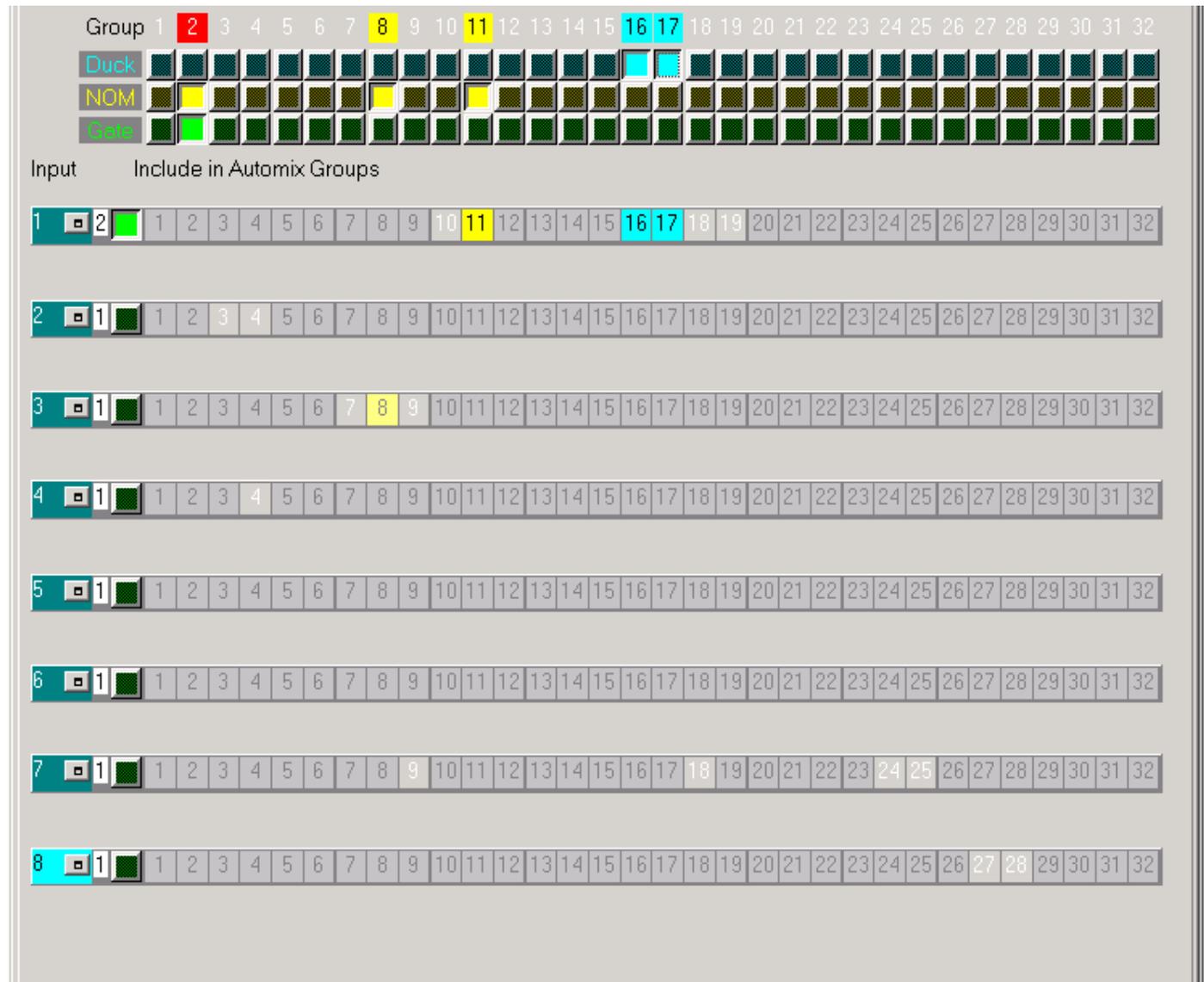


Figure 5.24 Automix Matrix Window

## 5 Advanced Operation

### Automixing Group Controls

Auto-mix Matrix Groups

Access the **Automixing Group Controls** (Figure 5.25) by pressing the **Auto-mix Groups** button in the **Signal Path** window.

There are two group controls and two group indicators for this feature:

#### 1. Priority Mix Enable

Turns Ducking Priority Mix on and off for the automix group.

#### 2. Max Number of Open Mics

Sets the max number of open mics within the automix group. A last-in, first-out algorithm is used to determine which mics are ducked.

#### 3. Highest Open Mic Priority Indicator

Shows the highest priority level for all open mics within the automix group.

#### 4. Total Number of Open Mics Indicator

Indicates the total number of presently open mics within the automix group.

**NOM (Number of Open Mics) Attenuation** reduces overall system gain as the number of open mics increases beyond one for improved gain before feedback.

There are three group controls for this feature:

#### 5. Enable

Turns NOM Attenuation on and off within an automix group.

#### 6. Mode

Sets the attenuation algorithm to linear or logarithmic. In linear mode, each open mic beyond one will cause all inputs in the auto-mix group to be attenuated by an amount equal to the Attenuation Step Size, defined below.

*Logarithmic mode:* the attenuation per open mic will decrease as more mics open. Logarithmic mode with Attenuation Step Size of 3dB emulates 'classic' NOM attenuation schemes.

*Linear mode:* allows each individual mic to use a higher nominal gain by more aggressively attenuating as more mics open.

#### 7. Step Size

With NOM Attenuation mode, determines the attenuation as a function of the number of open mics in the auto-mix group. In linear mode, each open mic beyond one increases the attenuation by this amount. Control range is from 0.5 to 3dB in 0.5dB steps.

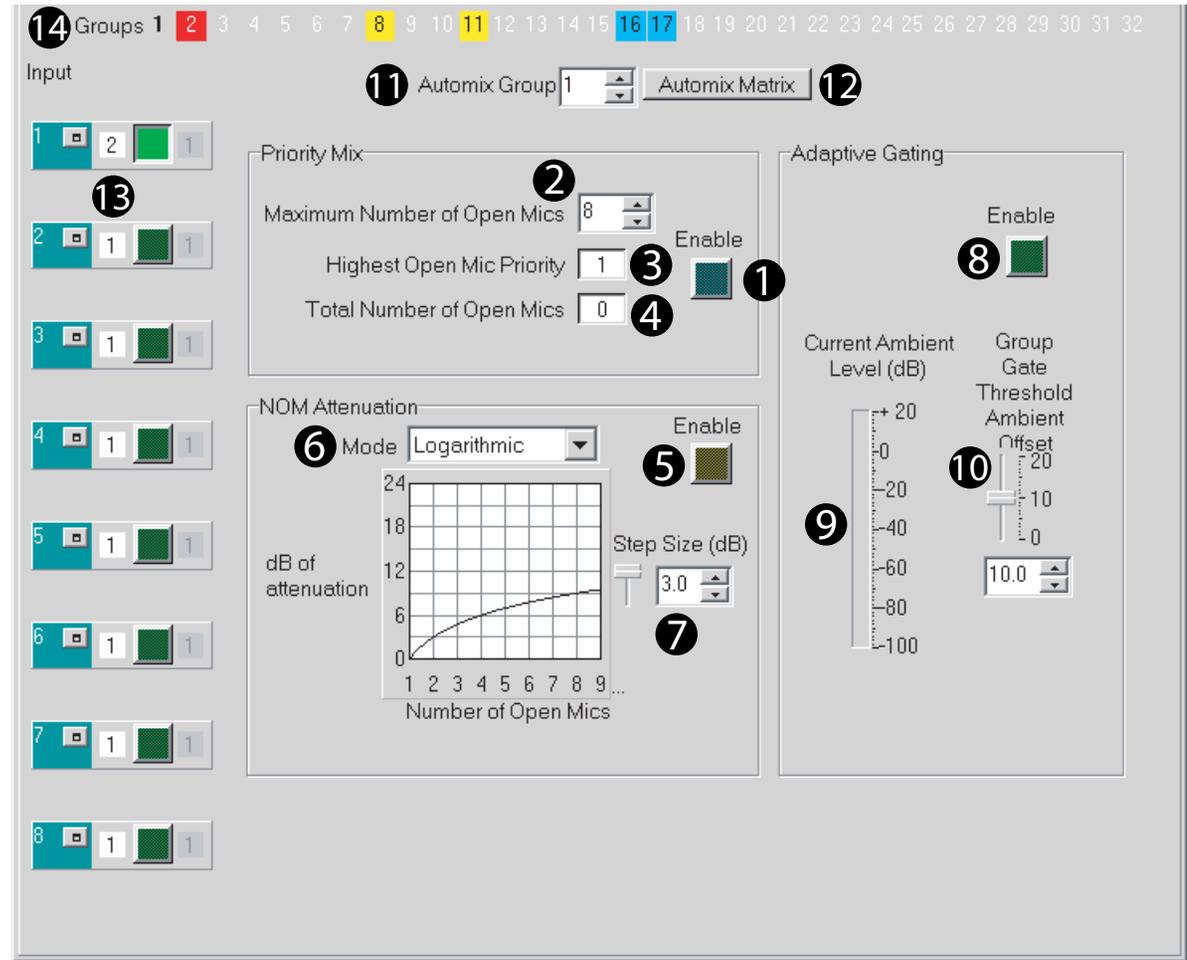


Figure 5.25 Automixing Group Controls Window

## 5 Advanced Operation

### Automixing Group Controls (continued)

Please refer to Figure 5.26.

#### Adaptive Gating

Adaptive Gating dynamically modifies the Input Gate thresholds in the auto-mix group as a function of the ambient level in the room. The ambient level is computed as the weighted average of the closed mic input levels. The weighted average makes it possible to compensate for mic locations with different ambient levels. Adaptive Gating functions are described below in numbers 8, 9, 10 and 14.

#### 8. Enable

Turns Adaptive Gating on and off for an automix group

#### 9. Ambient Level Meter

Indicates the calculated ambient level for the automix group.

#### 10. Group Gate Threshold Ambient Offset

Sets the amount above the calculated ambient level for the gate threshold for all inputs participating in the automix group.

- For inputs with ambient weighting factors equal to zero or one, the actual gate threshold will be offset from the calculated ambient level by this amount.
- For inputs with ambient weighting factors between zero and one, the offset is expanded prior to adding it to the calculated ambient level — the smaller the weighting factor, the larger the expansion. Control range is from 0 to 20 dB in 0.5 dB steps.

#### 11. Automix Group

This selects/indicates the automix group that the accompanying settings are adjusted for. There can be different settings for different automix groups (1-32).

#### 12. Automix Matrix Button

Pressing this button opens the Automix Matrix window (described earlier).

#### 13. Input Buttons

This area and buttons indicate and control the following:

- Input Number
- Ducking Priority Number (1-8)
- Automix Group Attached (1-32).

#### 14. Groups

Indicates with color which groups are active, and which of the three options are enabled. Options are:

- Gate Ducking
- NOM (Number of Open Microphones)
- Adaptive Gating

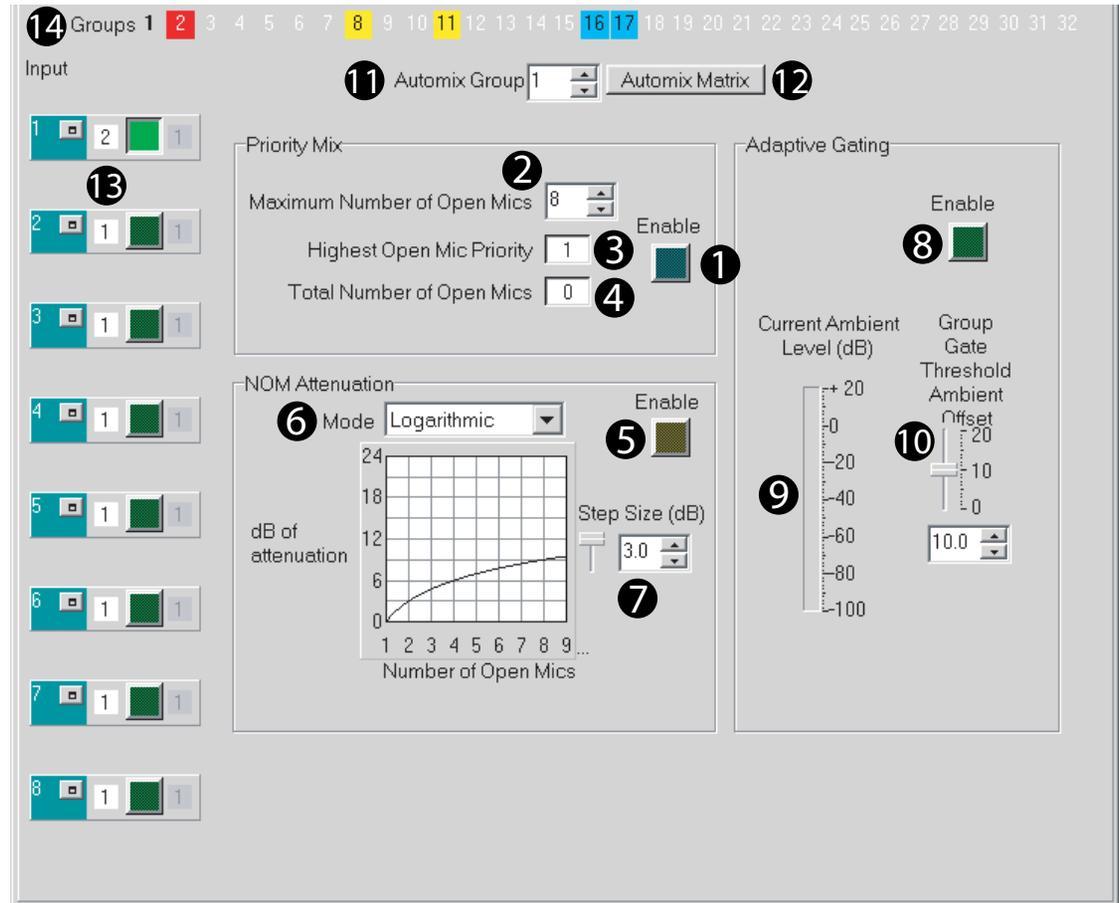


Figure 5.26 Automixing Group Controls Window

## 5 Advanced Operation

### 5.3.6 Solo/Mute



At the top of the **Signal Path** window, find the **Solo/Mute** button. Pressing this button opens the **Solo/Mute** window (Figure 5.27). It lets you monitor the status of the Input and Output channel mutes and solos. From here, individual channels can be soloed for preview purposes, and can be muted equally. All solos and mutes can be switched in or out for the Inputs and Outputs separately.

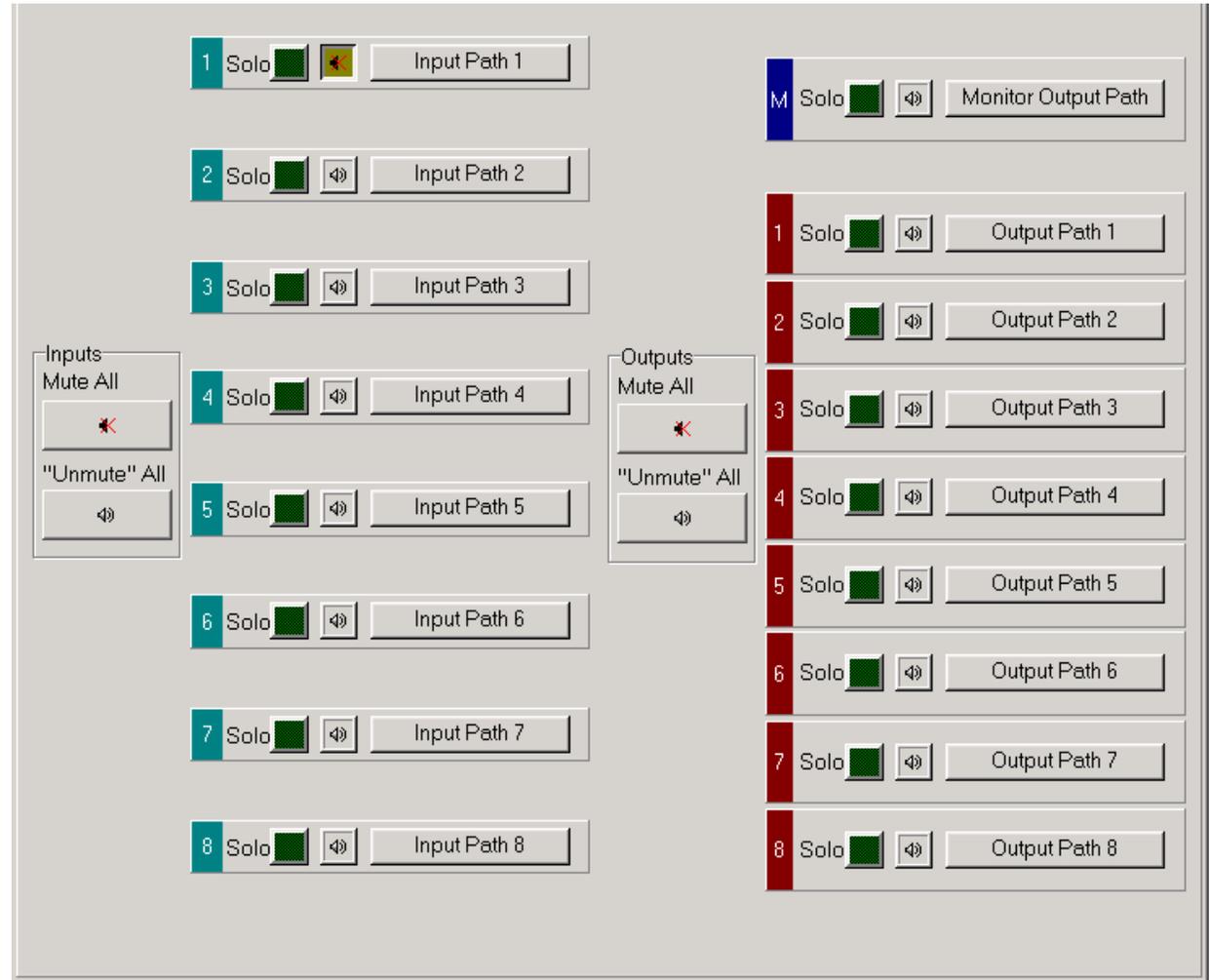


Figure 5.27 Solo/Mute Window

## 5 Advanced Operation

### 5.3.7 Output Path



Starting in the **Signal Path** window, at the end of the Output processing section, you can access the **Output Path** window (Figure 5.28) by clicking on its icon (shown above).

In addition to the output of each of the sixteen Input Processing Sections, the eight CobraNet Inputs are fed to the Matrix Mixer, providing a 24 Input by 10 Output fully independent crosspoint mix as controlled by the Input/Output Matrix. Each of the ten Output Processing Sections has independent fader control of all of the inputs to the selected output, i.e. a 24:1 mixer, as shown in Figure 5.29.

The Mix Mode drop-down box is used for selecting exclusive assignments between a particular input and output. This function is repeated with the Single Input Mix Mode Buttons or the routing can be reassigned to the 24:1 mixer.

The selected output channel displays the status of the Output Processing Section objects and their parameters can be accessed by clicking on these icons. There is also a button to quickly access the Input/Output Matrix for further routing options.

#### Output Processing Sections

Each of the ten Outputs, (two 'Main' and eight 'AUX'), have independent Output Processing Sections to allow control of the mixed output. Output Processing functions include delay, filters, ambient leveler, limiter, fader, mute, and polarity inverter.

#### Output Delay

Output Delay (Figure 5.29) can be set for each Output Processing Section. This signal delay is especially useful in loudspeaker array alignment, where the crossovers, mix, and other processing is complete and the loudspeaker needs to be aligned to the system. The inherent delays of the various input signals should be corrected by the delay in the Input Processing Section.



Delay is displayed by IQwic software in milliseconds, feet, and meters. Available delay for each Output Processing Section is up to 2 seconds in 20 microsecond steps (1/4 inch).

#### Output EQ Filters

These filters are identical to the Input EQ Filters. Please read Section 4.7.4 on Input EQ Filters for more information. As was the case with the Input EQ Filters, the two DSP's that process the outputs have a finite amount of processing capability. Each of the DSP's can provide up to 64 filters, with Main 1 and AUX 1-4 processed by one DSP and Main 2 and AUX 5-8 processed by the other. The CPU Utilization meters indicate how much DSP processing capability remains.

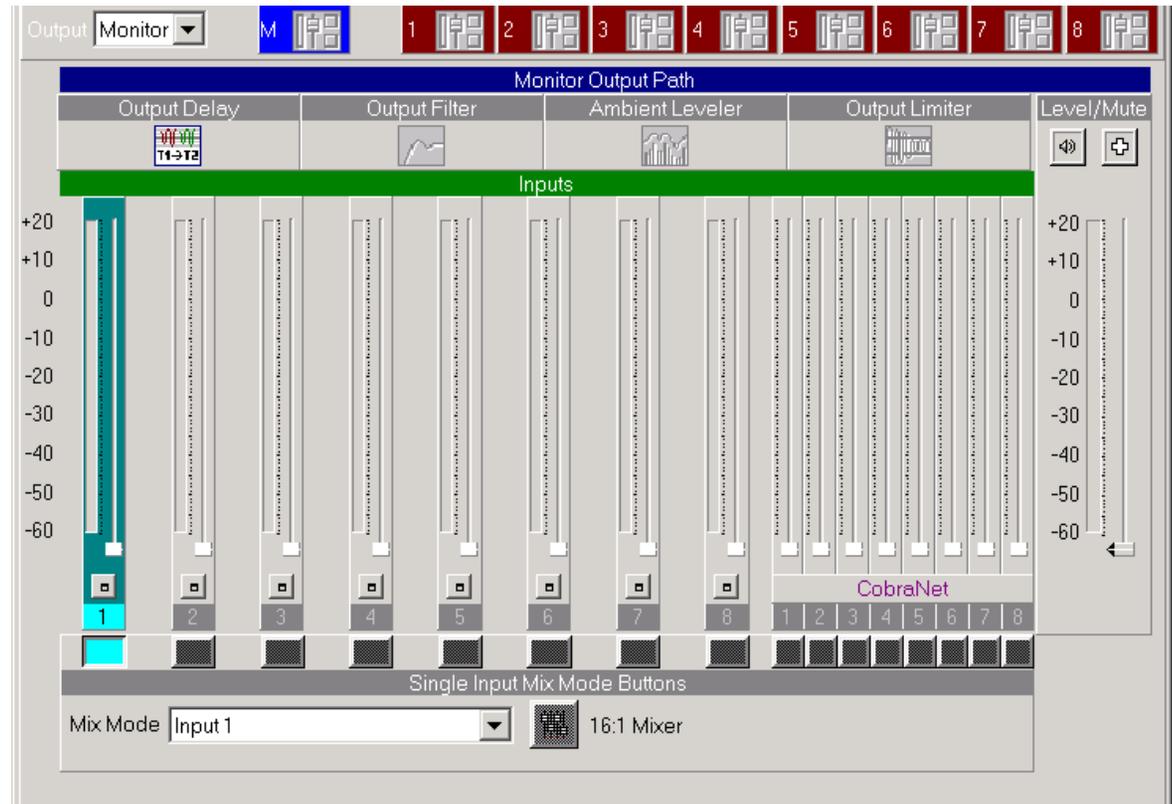


Figure 5.28 Output Path Window

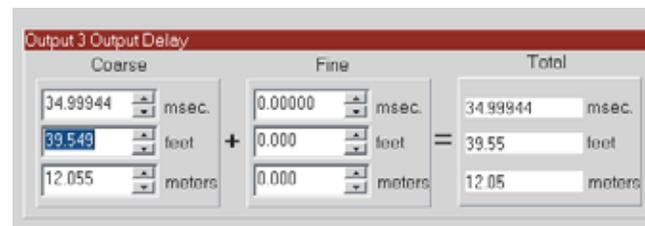


Figure 5.29 Output Delay Window

## 5 Advanced Operation

### 5.3.8 Ambient Leveler



Starting in the **Output Path** window, you can access the **Ambient Leveler** window (Figure 5.30) by clicking on its icon (shown above).

The Ambient Leveler expands the output channel gain to compensate for a sensed ambient level. The ambient level can be sensed from any of the sixteen Input Processing Sections, or the computed ambient level from one of the 32 auto-mix groups. This feature allows the DBC Network Bridge to maintain optimum signal to noise and intelligibility in environments with varying background noise.

The software graphically displays the gain function, with line meters underneath the graph displaying the Input Ambient Sense level (green) and the Output Signal Level (blue).

Seven parameters control this feature:

#### 1. On/Off

Turns this feature on or off.

#### 2. Sense Input

Determines the source for the ambient level that will do the adjustment.

#### 3. Sense Threshold

Sets a level for the ambient sensor input threshold. The Ambient-Leveler expansion will be inhibited for input levels below this threshold. This action allows the Ambient-Leveler to suspend gain changes when the ambient level is low and, along with Max Added Gain, prevent excessive system gain. Control range is from -80 dB to +20 dB in 0.5 dB steps.

#### 4. Expansion Ratio

Determines how much the gain of the output channel will increase for every increase in the ambient signal level above the Threshold setting. A 4:1 Expansion Ratio setting will raise the output gain 4 dB for every 1 dB that the ambient signal increases. Control range is from 0.1:1 to 5:1.

#### 5. Max Added Gain

Sets the maximum increase in gain through the Ambient Leveler. Control range is from 0 dB to +20 dB in 0.5 dB steps.

#### 6. Attack Time

Sets the time required for the Ambient Leveler to expand its gain by 20dB. Control range is from 0.1 to 60 seconds in 0.1 second steps.

#### 7. Release Time

Sets the time required for the Ambient Leveler to compress its gain by 20 dB. Control range is from 0.1 to 60 seconds in 0.1 second steps.

#### 8. Program Level Dependent Mode

Allows the Ambient-Leveler expansion to be inhibited when the actual output Program Level is above a prescribed level. This mode prevents program material 'feed-through' from artificially increasing the apparent ambient level.

#### 9. Program Level Threshold

Sets the output program level threshold above which Ambient Leveling will be inhibited when in Program Level Dependent mode. Control range is from -80 to +20 dB in 0.5 dB steps.

#### 10. Sense Delay

Sets the delay after the output program level falls below the Program Level Threshold before the Ambient Leveling begins. Control range is 0 to 60 seconds in 0.1 second increments.

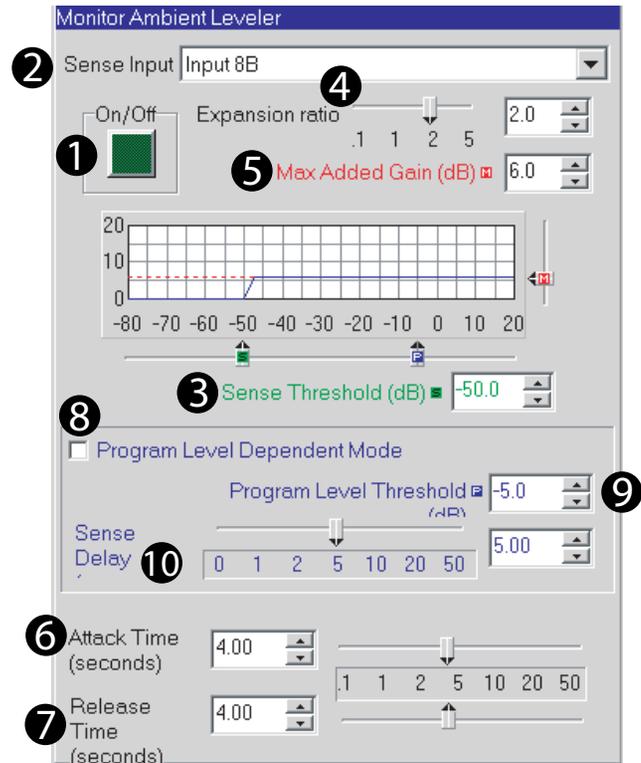


Figure 5.30 Ambient Leveler Window

## 5 Advanced Operation

### 5.3.9 Output Limiter



Starting in the **Output Path** window, you can open the **Output Limiter** window (Figure 5.31) by clicking on its icon (shown above).

This function lets you monitor and control the peak output level. It is especially valuable for the protection of amplifiers, loudspeakers and other audio equipment. The Output Limiter operates like a compressor with an infinite compression ratio, preventing the output level from exceeding the specified Threshold.

Four parameters control this feature:

#### 1. On/Off

Turns this feature on or off.

#### 2. Threshold

Used to set the peak signal level above which compression occurs. Control range is from -80 to +20 dB in 0.5 dB steps.

#### 3. Attack Time

Sets the time required for the Output Limiter to decrease its gain by 20 dB. Control range is from 1 to 100 milliseconds in 1 millisecond steps.

#### 4. Release Time

Determines how long it takes for the gain to return to normal when the level drops below the Threshold. Control range is from 10 milliseconds to 10 seconds in 10 millisecond steps.

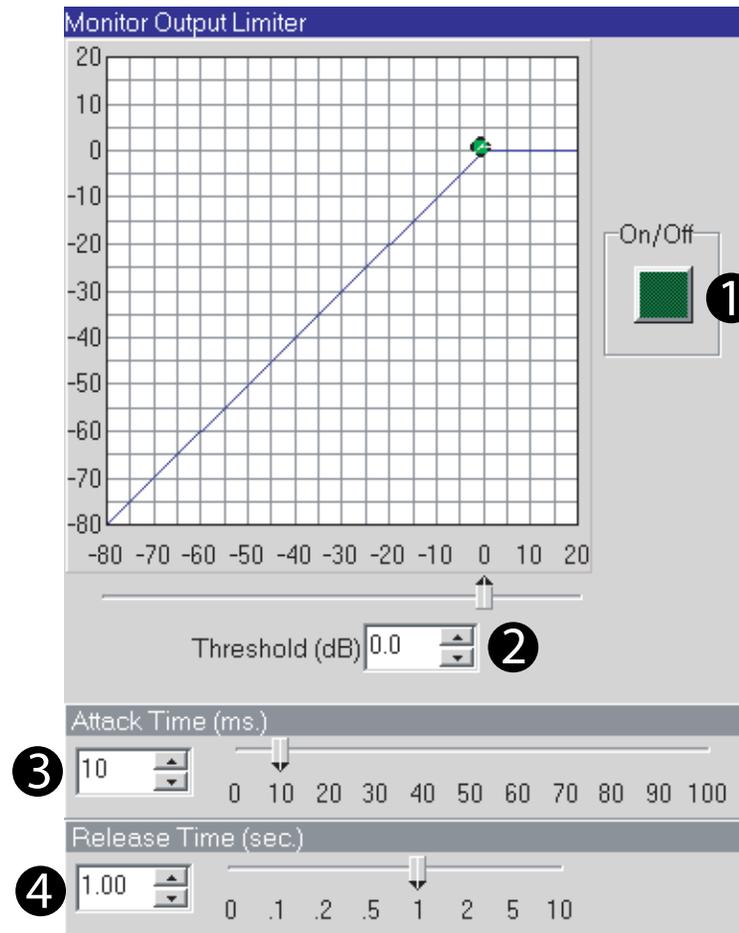


Figure 5.31 Output Limiter Window

**5.3.10 Outputs Button**


Locate the **Outputs** button at the top-right of the Advanced Form Signal-Path window. Press this button to view all the output channels' processing (Figure 5.32).

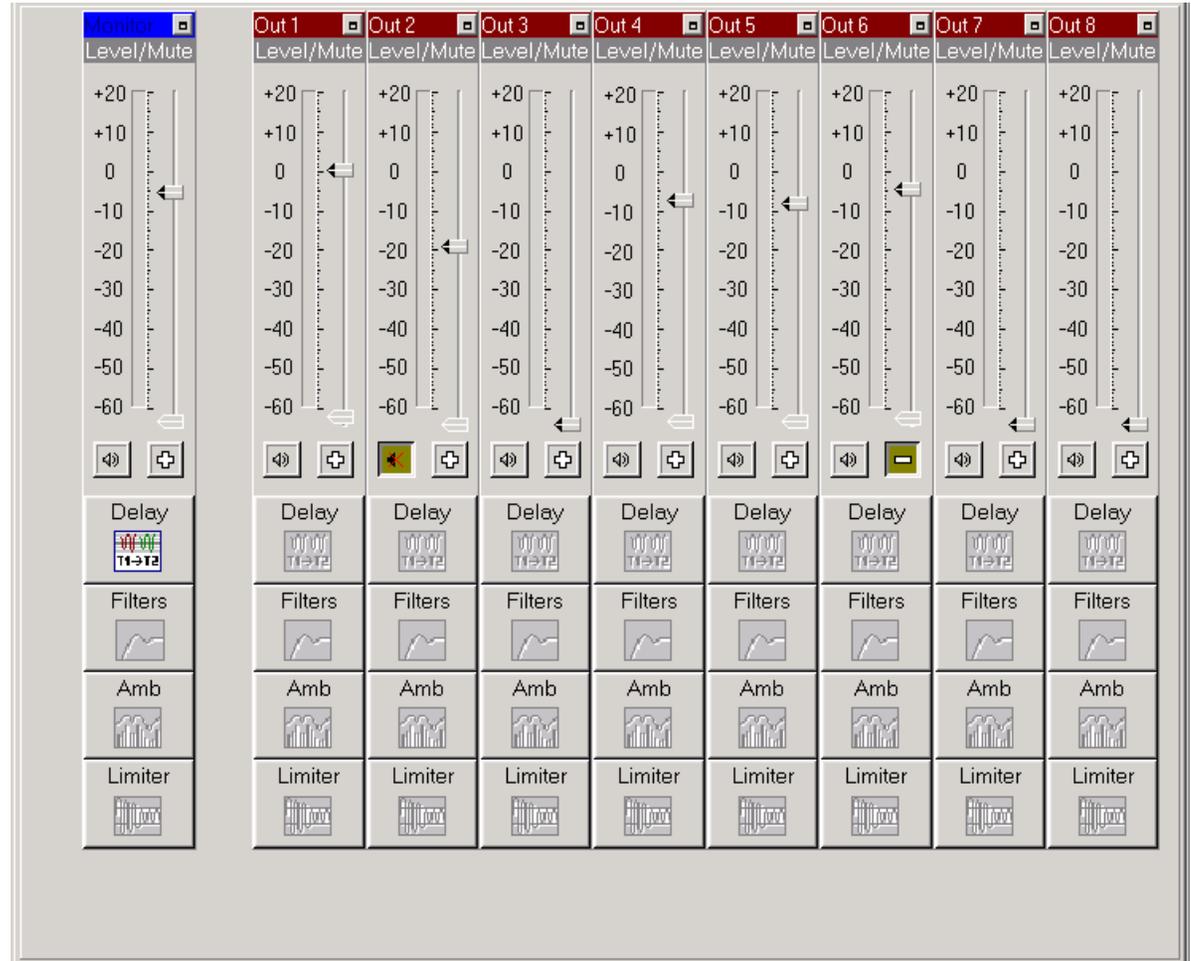


Figure 5.32 Outputs Window

## 5.4 Technical Description

Following is a technical description of the operation of the DBC Network Bridge. Please refer to the System Block Diagram (Figure 4.24).

### Audio

#### Input Section

Each audio input signal first passes through a balanced filter designed to eliminate RF interference. The RF filters are a balanced network of chokes, ferrite beads, and capacitors that attenuate both common-mode and differential-mode signals above 500 kHz. Input isolation transformers are used for the digital AES/EBU inputs.

**Analog Auxiliary Inputs:** The balanced signal then enters the input switching circuit. This circuit can insert a 25dB pad for line level signals. The signal is filtered again to eliminate lower frequency RF energy such as interference from the AM broadcast band.

A discrete preamp stage takes the balanced input signal and provides 13 to 45 dB of voltage gain adjustable by a rear panel potentiometer. The preamp output provides a single-ended voltage output that is then coupled to a single-ended-to differential amplifier that also provides the bias offset needed by the A/D converter.

A 24-bit high-resolution A/D converter samples the input audio at 48 kHz. The audio processing is set to provide +20dBu as full scale, allowing full utilization of the dynamic range of the converter. Each converter supplies a two-channel digital audio stream to the DSPs for processing. One A/D converter acts as a master to supply sampling clocks to the rest of the system. A 12.288 MHz oscillator (256 times the 48 kHz sampling rate) acts as the master clock source.

**Digital Inputs:** There's also a digital input via DB25, analog mux.

#### DSP Processing Section

Four DSP processors supply all of the digital audio processing in the unit. Serial digital audio from the input converters is sent to the DSP board for processing. Digital audio from either the Input board or the CobraNet

board is routed to the two input DSPs. The processors collect 16 samples of audio, then process the audio as a 'brick' of data. After the input DSPs have processed the data, they transfer the audio bricks to shared memory. The two output DSPs then retrieve the audio from memory and do the required output processing. The audio is then sent serially from the DSPs serial ports either to the monitor output or the CobraNet outputs. The DSP processors have a 30 MHz clock, while serial digital audio is locked to serial clock (3 MHz) and frame sync clock (48 KHz) supplied from the Input board.

An interface to the System Controller board allows programming of the DSPs, control updates, and metering information to be passed to the outside world. The DSPs depend upon the System Controller for programming upon reset or initial power, as there is no nonvolatile memory on board.

#### Output Section

Output serial digital audio from the DSP board is sent to the output board for conversion and analogue processing. The serial digital audio is comprised of two channels of 24-bit signals. Each DAC converts the audio data stream into two differential output channels. A differential amplifier filters the DAC's audio output and provides single-ended audio to a gain stage that sets the full scale output of the DAC. A single-ended-to-differential stage provides a 50-ohm output.

### Control and Interface

#### System Controller

The System Controller board provides interface to the outside world as well as providing all of the program storage and initialization.

At reset, the control processor uses boot code from nonvolatile flash memory. Program code is then transferred to fast RAM and the processor begins to run. Each DSP processor is then booted via the system interface and upon successful booting of all the DSPs, audio processing begins.

• **Flash Memory Storage:** In addition to storing program code for the control and DSP processors, flash memory provides storage for all non-volatile data including Presets and setting.

• **DSP Interface:** The control processor boots all of the DSP processors via this interface. Additionally, the control processor sets all audio processing controls and receives all meter data over this port.

• **Real Time Clock:** An internal real time clock allows Presets to be called based upon a real time. The event scheduler works independently of the computer and can recall a specific Preset either as a one-time function or a repeatable event with a specific start time and repeat rate. The clock is capable of retaining the correct time for up to 45 days without power applied the DBC Network Bridge.

• **Front Display:** The control processor communicates to the front display via a serial interface. All LED updates and display information is passed to the front panel in this manner. The control processor monitors the front-panel switches.

• **Power Interface:** The System Controller board receives voltages from the power supply and routes them to the Input and DSP boards. A regulator creates the +10V available for the Control Port.

#### Control Port:

External events can be either generated or monitored via this port and used to control or signal some function within the unit. Sixteen digital outputs, eight digital inputs, and eight analog inputs provide access to the unit. current-limited voltages (+5V and +10V) are provided to power external circuits.

#### Digital Inputs:

8 AES/EBU Digital Inputs via DB25 with Dolby 778 configuration.

#### Analog Inputs:

Any fader in the unit can be controlled via one of these inputs. A 10VDC swing allows the control to vary from null to full scale. I.Q software controls provide limiting of the fader value in the unit.

## 6 Troubleshooting

<p>POWER </p> <p>AES/EBU </p> <p>DATA </p>	<p><b>CONDITION: Power indicator is off.</b></p> <p><b>POSSIBLE REASON</b></p> <ul style="list-style-type: none"> <li>The unit has lost AC power.</li> <li>The unit is not plugged into the power receptacle.</li> </ul>
---	--

<p>POWER </p> <p>AES/EBU </p> <p>DATA </p>	<p><b>CONDITION: AES/EBU indicator is off, even though the unit is being fed an AES/EBU signal.</b></p> <p><b>POSSIBLE REASON</b></p> <ul style="list-style-type: none"> <li>The AES input has not been selected, either from the front panel or in IQwic software.</li> </ul>
---	--

<p>POWER </p> <p>AES/EBU </p> <p>DATA </p>	<p><b>CONDITION: Data indicator is off, even though the unit is connected to a network.</b></p> <p><b>POSSIBLE REASON:</b></p> <ul style="list-style-type: none"> <li>Unit is not receiving data. Check network addressing of all components.</li> <li>Note: Data indicator flashes only when the amplifier is polled for data, or is polled to see whether it is online.</li> </ul>
--	--

### Additional Error Checking

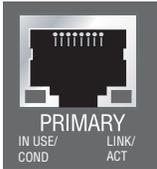
The CobraNet Setup window (Section 5.2.1) describes a group of error indicators that show errors associated with CobraNet status.

<p>INPUT</p> <p>1 2 3 4 5 6 7 8</p> <p>OUTPUT</p> <p>1 2 3 4 5 6 7 8</p>	<p><b>CONDITION: Input LEDs are off.</b></p> <p><b>POSSIBLE REASON:</b></p> <ul style="list-style-type: none"> <li>The unit is not receiving an analog or digital (CobraNet) input signal. Check cables, cable wiring, and connections.</li> <li>The source feeding the DBC Network Bridge is not producing a signal. Check its output signal.</li> <li>The cable between the signal source and the DBC Network Bridge is defective. Replace or repair it.</li> <li>Addressing has not been set up correctly. Please review Section 1.2.</li> </ul>
--	---

<p>INPUT</p> <p>1 2 3 4 5 6 7 8</p> <p>OUTPUT</p> <p>1 2 3 4 5 6 7 8</p>	<p><b>CONDITION: Output LEDs are off but Input LEDs are flashing.</b></p> <p><b>POSSIBLE REASON:</b></p> <ul style="list-style-type: none"> <li>In IQwic, Signal Path tab, Cinema Surround form, the output path has not been set up.</li> </ul>
--	--

Internal errors are automatically displayed on the LCD Display Screen. If an error is displayed, call Tech Support at Crown and provide them the error number.

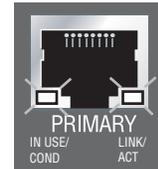
## 6 Troubleshooting



**CONDITION:** *IN USE/CONDUCTOR LED does not light, even though the network cable is plugged in.*

**POSSIBLE REASON:**

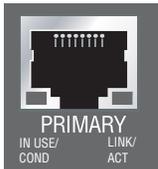
- Ethernet link is broken.
- Network connection is 10 Megabits instead of 100 Megabits.



**CONDITION:** *Both LEDs flashing.*

**POSSIBLE REASON:**

- Fatal error.



**CONDITION:** *LINK/ACTIVITY LED does not light, even though the network cable is plugged in.*

**POSSIBLE REASON:**

- Ethernet link is broken.
- Network connection is 10 Megabits instead of 100 Megabits.

**CONDITION:** *Computer does not communicate with the network devices.*

**POSSIBLE REASON:**

- Incorrect wiring. See Section 1.1.1 on wiring.
- IP Addressing is not done correctly. See Section 1.2 on addressing rules.

On the connector are two LEDs. The left LED (IN USE/CONDUCTOR) lights yellow when the port is in use and will blink if the device is also the conductor (the CobraNet timing-master device). The right LED (LINK/ACTIVITY) lights green when link is established and blinks when network activity is detected. Both LEDs flash yellow in unison to report a fatal error.

## 6 Troubleshooting

If the DBC Network Bridge seems to be functioning in unexpected ways, go to the **Signal Path tab** and select **Advanced**. If the unit is set up for Preset 32, Standard Cinema Setup, only four icons in each channel should be lit. These icons are input level, input delay, input path filter, and output level (as in Figure 6-1). If other icons are lit as in the example Figure 6-2, the unit is no longer functioning as a cinema bridge, but as a mixer.

To return to the normal Cinema Setup, go to the **Unit Presets tab** and select Preset 32, Standard Cinema.

Figure 6.1 Advanced Signal Path Window with Preset-32 Icons Enabled

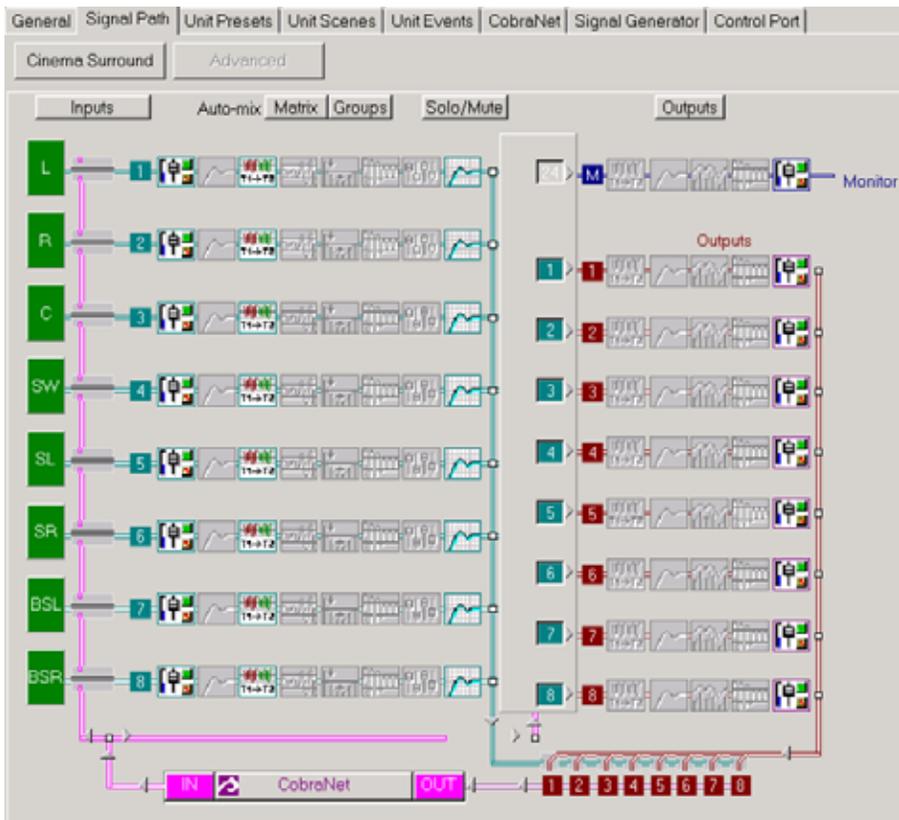
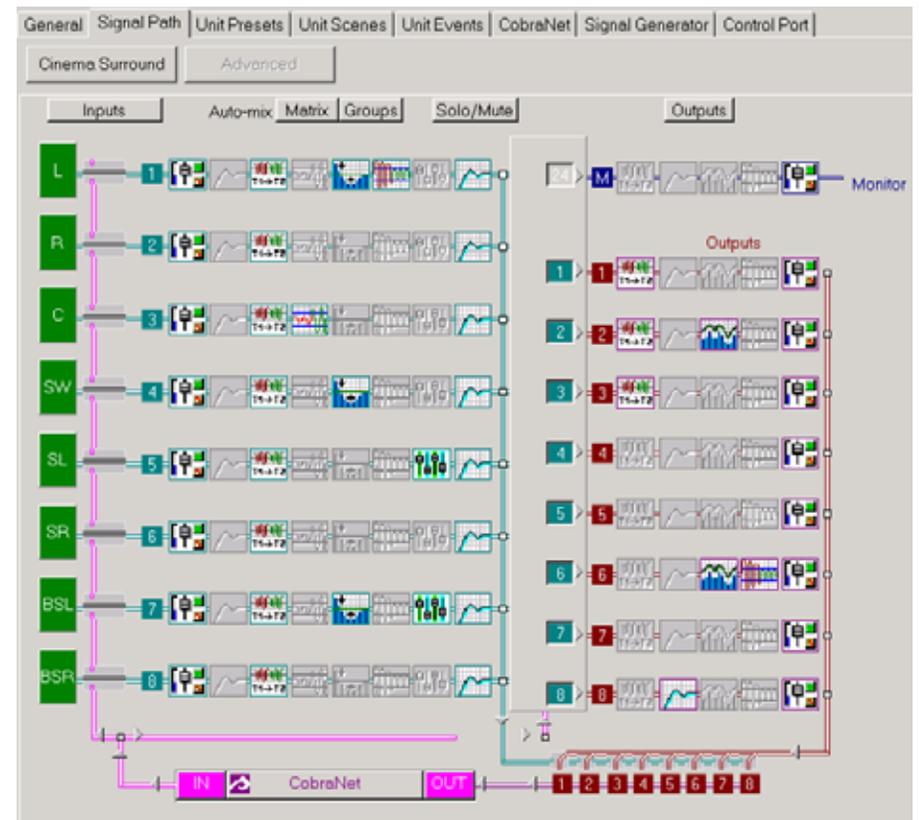


Figure 6.2 Example of Advanced Signal Path Window with Extra Icons Enabled



## 7 Specifications

Audio	
Dynamic Range	> 108 dB (A-weighted, 20 Hz-20 kHz)
Digital Sampling	24-bit, 48 kHz
Frequency Response	± 0.5 dB, 20 Hz-20 kHz
Total Harmonic Distortion	< 0.05% THD+N (1 kHz, 0 dBu)
Common Mode Rejection	50 dB at 60 Hz (typical)
Crosstalk	> 80 dB at 10 kHz
Maximum Input Level	+32 dBu (line) or +7 dBu (mic)
Maximum Output Level	+20 dBu
Analog Auxiliary Input Gain Range	+20 dB to -12 dB (add 25 dB for mic setting)
Input Impedance	20 kilohms balanced, 10 kilohms unbalanced
Output Impedance	100 ohms balanced, 50 ohms unbalanced
Latency (analog, digital inputs)	Analog: 1.13 mS. Digital: See Table 5 to the right
A/D, D/A Converters	24-bit 96 kHz Cirrus Logic
Digital Input	AES/EBU, 24-bit, 32-96 kHz. Onboard sample rate converter
Network	Onboard TCP/IP, compatible with standard 100Mb Ethernet hardware
DSP	24-bit conversion with 32-bit, floating-point DSP processing
Control Port	
Power Supply	+5 VDC and +10 VDC outputs. Total output current 1 A.
Monitor Output Logic Low	< 0.1 V
Monitor Output Logic High	10 V (via internal pull-up). Output current limited to 10 mA max per pin
Input Impedance	> 50 kilohms
Input Logic Low	< 0.5 V
Input Logic High	> 5 V
Input Analog Range	0 to 10 V (for inputs 9-16 only)
Max Input Voltage	25 V

Table 5

Latency vs Sample Rate

Sample rate	Latency
32 kHz	2.74 mS
44.1 kHz	2.36 mS
48 kHz	2.28 mS
96 kHz	1.81 mS

## 7 Specifications

<b>Power</b>	
<b>Required AC Mains</b>	Universal AC input. Operates from 100 VAC to 240 VAC at 50/60 Hz, 24W nominal.
<b>AC Line Connector</b>	15A IEC AC power inlet
<b>Mechanical</b>	
<b>Cooling</b>	Convection cooled, no vents, no fans
<b>Dimensions</b>	19 in. (48.3 cm) W x 1.75 in. (4.4 cm) H x 16 in. (40.6 cm) D
<b>Net Weight</b>	15.3 lbs (6.9 kg)

## 8 Appendix A: TCP-IQ Network Basics

### 8.1 Glossary

The following glossary explains network terminology. It is arranged in logical order rather than alphabetical order.

**Network:** A group of interconnected components, such as a central computer, network switching equipment, and other computers or devices.

**TCP/IQ network:** A network made of a computer, network switching equipment, and other audio devices such as IQ-PIP cards plugged into power amps. Since each I-Tech amp connects directly to a network, each amp is also a network component.

**Subnet:** A small network within a larger network. For example, a TCP/IQ audio network might be a subnet of a venue's network, which could include computers throughout the building. Or an audio network might be divided into subnets. For example, one audio subnet might be for the house system and another audio subnet might be for the paging system.

**IP address:** An identifier for a computer or device on a TCP/IP network. Each device in a network has its own IP address to identify it. Example: 126.126.17.42. Networks using the TCP/IP protocol route messages based on the IP address of the destination. An IP address is made of four numbers separated by periods. Each number can be zero to 255. The last number can never be a zero or 255. For example, 126.126.17.1 could be an IP address. 126.126.17.0 would not be a valid IP address. A TCP/ IP or IP address has two parts: the NETWORK ID and the HOST ID. The NETWORK ID identifies the network, and the HOST ID identifies either the subnet and device, or just the device if there is no subnet.

The **subnet mask** is a code that indicates which part of the TCP/IP address is the NETWORK ID and which part is the HOST ID. In subnet-mask code, 255 means "This part of the address is the NETWORK ID".

Example:

Suppose the IP ADDRESS of a device is 126.126.17.42 and the SUBNET MASK is 255.255.0.0.

That means, (126.126) is the NETWORK ID. The remaining set of numbers (17.42) is the HOST ID. If your audio network stands alone (it is not part of a larger network) then the HOST ID identifies each device in the network.

If your audio network is part of a venue's larger network, your network is actually a sub-network or subnet. In this case, the HOST ID can be further divided into two or more parts. The first part is the SUBNET ID. The other part is the DEVICE ID. The first part of the HOST ID identifies the subnet of your audio system, and the remaining part identifies the particular device within that subnet.

So in this case, a complete IP address is in the form NETWORK ID - SUBNET ID - DEVICE ID.

All devices in the network have the same network ID. All devices in a subnet have the same subnet ID.

There are many resources available on the Internet for IP and subnet calculation. For a stand-alone system, Crown has provided a worksheet of a tested configuration in Section 1.2.5.

**DHCP (Dynamic Host Configuration Protocol):** This is a protocol for automatically assigning IP addresses to devices on a network. With dynamic (DHCP) addressing, a device might have a different IP address every time it connects to the network. If a computer is NOT connected to a network with a DHCP server, the computer will place a default network ID into the TCP/IP address and Subnet Masks.

TCP/IQ does not use DHCP. A computer attached to a TCP/IQ network must have its IP addresses assigned statically (manually).

### 8.2 TCP/IQ Network Basics

TCP/IQ is a network based protocol that has the ability to control and monitor IQ components over a common TCP/IP network. For IQ components that have CobraNet capability, TCP/IQ has the ability to control and monitor these IQ components over the same Ethernet network used for CobraNet audio, resulting in a single Category-5 connection for control, monitoring, and digital audio. Figure 8.1 shows a typical TCP/IQ network.

TCP/IQ offers a number of advantages over other non-network communications platforms.

- **The use of “off-the-shelf” networking hardware.** This technology makes use of network connectivity and hardware commonly used in the computer industry, making it both low-cost and readily available.
  - **Better Performance.** The capacity for real-time display of meters is greatly enhanced through the use of the wide-bandwidth network.
  - **Single connection for both CobraNet audio and IQ communications.** Gone are the days of multiple connections to a component for audio and control. A single CAT 5 connection handles it all.
- Some of the features of TCP/IQ include:
- Ability to quickly discover all IQ components connected to the network.
  - Synchronization of multiple control points on a network.
  - Control and monitor of IQ components on different Local Area Networks (LANs) through the use of an IP router.
  - Component firmware upgrades via the network.

Ethernet Networks are established through the use of either a hub or a switch. These devices are centralized in the network and transfer the Ethernet data from point to point. Ethernet data is transferred in data packets that have addresses coded into their structure. Hubs and switches decipher these addresses and route the data packets to the appropriate component. Hubs do this by taking packets from any port and sending them out all other ports. Switches, on the other hand, are more intelligent and examine each packet's address, sending that packet only to the addressed component. This results in a much more efficient data flow. TCP/IQ depends on the use of 100Mb switches and their use is highly encouraged. 100Mb or 100Base-T switches are required in CobraNet networks.

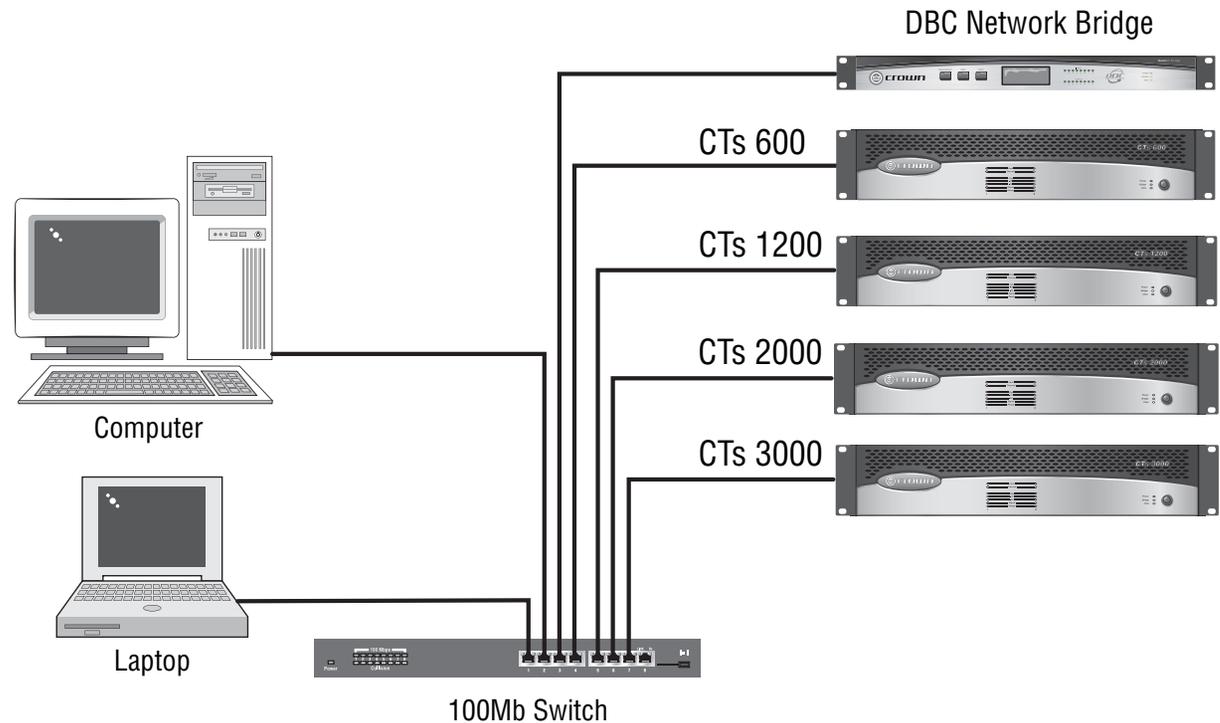


Figure 8.1 A TCP/IQ Network

Communications between networks is allowed, but requires the use of a special piece of equipment called an IP Router. The router acts as a Gateway to allow this communication to exist. Any data traffic that is to go to the other network is routed through the IP Router. The CobraNet data is held behind but IP data goes through.

Each IQ Component has three identifiers that are used in the TCP/IQ system:

- Media Access Control (MAC) Address
- Internet Protocol (IP) Address
- IQ Address

Let's explain each identifier.

**Media Access Control (MAC) Address:** This is a physical address that specifies a specific physical network component. This address is predefined during manufacture and cannot be modified. No two network components have the same MAC address and each component is uniquely identified by its MAC address. This 48 bit address is located on the outside of every IQ component and is shown in hexadecimal format as 6 two-byte octets such as: **00-0A-40-00-DC-2F**

**Internet Protocol (IP) Address:** The IP address of a component is assigned during the setup of the network and identifies the IQ component to a larger audience. Because the MAC address is limited to a single physical LAN, communications between LANs is impossible solely through the use of the MAC address. The IP address allows components and controllers on other networks to communicate with each other through the use of an IP Router as shown in Figure 8.2.

This allows the network designer to isolate network traffic from each other. For example, when using wireless devices to control IQ components, the bandwidth limitation of wireless devices will not allow them to reside on the same network with CobraNet. As a result, the use of an IP router and a separate network allows the wireless controllers to access the IQ components through the router using IP addressing. The IP address appears as four numbers (0-255) separated by periods, such as: **126.126.0.1**

**IQ Address:** TCP/IQ components will be addressed with a unique number from 1 to 65,535 and are assigned within the IQ software. A separate utility is then run which queries the network and establishes what IQ components and their associated MAC addresses are present. An IP Address and IQ Address can then be assigned to each IQ component.

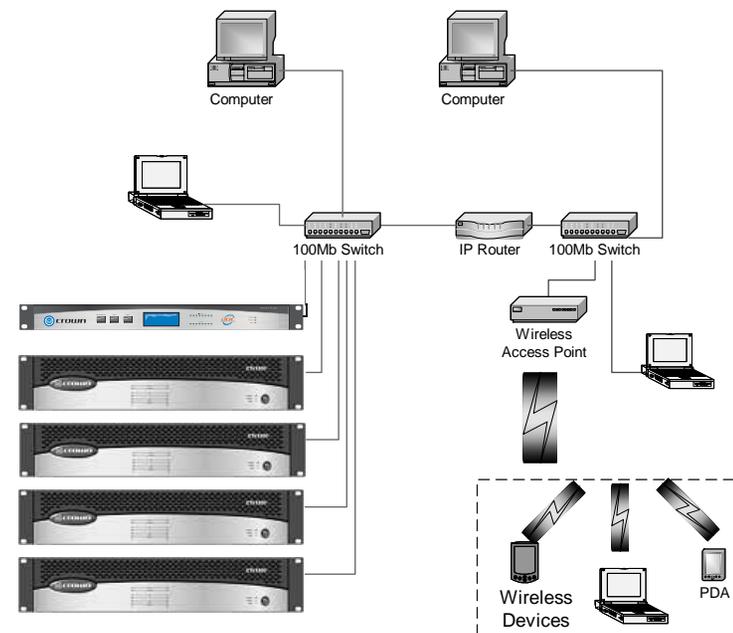


Figure 8.2 Multiple Network Communication Via an IP Router

The MAC address does uniquely identify each TCP/IQ component and can be used to establish the physical location of the unit. The binding of the MAC address to the IQ address through the use of the TCP/IQ Utility assures that each TCP/IQ component is physically in the right position. The use of the IP address establishes the Local Area Network (LAN) and what components reside within that LAN. The Subnet Mask associated with each IQ Component tells what IP addresses can be assigned to a particular LAN. The Subnet Mask is also four numbers (0-255) separated by periods. For example, a subnet mask of 255.255.0.0 and an IP address of 126.126.1.123 says that all IP addresses in that LAN are in the IP address range of 126.126.1.1 to 126.126.1.255.

If a TCP/IQ controller is on a different network than the TCP/IQ components, communications must occur through an IP router. TCP/IQ discovery requires the use of broadcast Ethernet data packets onto the network. These broadcast commands cannot be done through an IP router, therefore a Discovery Proxy is required. The establishment of this proxy is done in TCP/IQ by naming the IP address of a known component on the component network as the Discovery Proxy within IQWin or TCPIQ Util.

### 8.3 A Closer Look at CobraNet

CobraNet is a licensed technology developed by Peak Audio, Inc. consisting of proprietary communications protocol, firmware and hardware. It allows reliable, deterministic transmission of digital audio over a 100Base-T Fast-Ethernet network.

This section provides an overview of CobraNet. Peak Audio has provided a number of technical papers that describe CobraNet in detail. These papers are available at <http://www.PeakAudio.com>.

#### 8.3.1 Fast Ethernet (100Base-T)

Fast Ethernet (100Base-T) uses a hub to interconnect all network nodes to form a star topology (see Figure 8.3). In the star topology all PCs are connected to a centralized hub. Messages are sent from the originating PC to the hub, which then transmits the message either to the whole network or, if a switched hub is used, to the destination PC only. Hubs may be active or switched.

In larger Fast Ethernet networks, additional hubs, concentrators, and other network hardware are used to form a larger network, as shown in Figure 8.4.

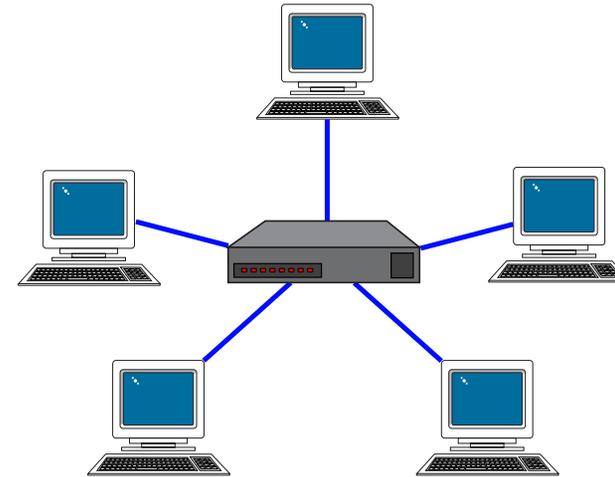


Figure 8.3 Star Network Topology

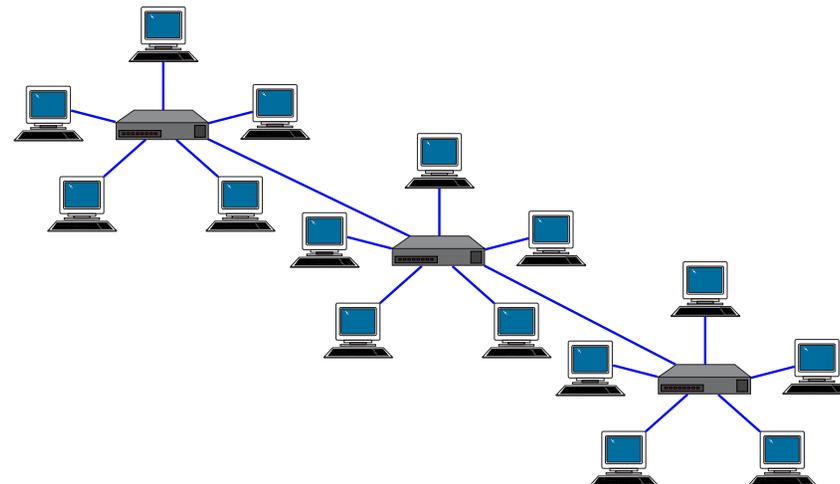


Figure 8.4 Multi-Star Topology

Today, commonly available networking cards are 10/100Base-T capable, which allows them to be used on either 10Base-T or 100Base-T networks.

Fast Ethernet distance limitations apply to CobraNet installations: 100 meters over Cat-5 copper cable, 2 kilometers over multimode fiber. Proprietary Fast Ethernet via single mode fiber solutions can reach even further.

### 8.3.2 Audio Specs

CobraNet implements fixed sample rates of 48 kHz or 96 kHz. Each channel may be selected to transmit 16-, 20- or 24-bit audio data as desired. The transmitter and receiver buffering required for reliable transmission is fixed at 256 samples yielding a network transmission latency of 5.333 ms (256 samples at 1/48 kHz per sample).

### 8.3.3 The Conductor

A CobraNet system is coordinated by one of the devices called the Conductor. When two or more CobraNet devices are interconnected properly, one of the devices will be elected the network conductor based on a priority scheme. The Conductor indicator will light on the CobraNet device that is serving as the conductor.

Deterministic transmission on Ethernet is enabled by a protocol that implements a “Conductor” for control of time-division multiplexing and clock recovery. The “Conductor” periodically broadcasts a well-defined “beat” packet onto the network for each transmitter and receiver to recover synchronous timing information. The “beat” also includes information as to which addresses can transmit at certain time slots within the “beat” period.

The Conductor regulates the CobraNet digital audio traffic on the CobraNet network. Each transmitter is given a “permission” to transmit in a given time-slot within the Conductor controlled isochronous cycle-time. The time-slot is determined by the assigned bundle priority. Higher bundle priorities receive lower-numbered positions and are transmitted first. The “Receiver Count” monitor indicates how many devices are receiving the digital audio bundle. The “Active” indicator indicates whether the particular Bundle is being actively transmitted onto the network.

### 8.3.4 Bundles and Audio Channels

All audio channels are packaged into groups called Bundles (formerly called Network Channels) for transmission over the Ethernet network. Each CobraNet device has the ability to send and receive a fixed number of Bundles. The Bundle number tells the CobraNet conductor which specific CobraNet device is trying to communicate with which other CobraNet device(s) over the network. A given Bundle may have only one transmitter that places it onto the network. Unicast Bundles may have only a single receiver. Multicast Bundles may have multiple receivers.

Bundles from 1 to 255 are designated as “multicast” (“broadcast”) Bundles. This means that they are transmitted to multiple receivers. This type is most used on “repeater” networks limited to 64 channels.

Bundles from 256 to 65,279 are “uni-cast”. This means that they are transmitted to one and only one receiver. This type is most used on “switched” networks requiring more than 64 channels.

A Bundle can carry up to 8 audio channels. The usual assignment is 8 channels at 20 bits. Using less audio channels is possible but maximum size bundles are suggested for most efficient utilization of network bandwidth. If 24-bit data is desired, then only 7 audio channels can be loaded into a single Bundle.

### 8.3.5 Repeater Networks

CobraNet can operate on “repeater” networks and more complex “switched” networks. Repeater networks use low-cost Ethernet hubs.<sup>1</sup> On this type of an Ethernet network, all packets are broadcast to all connected nodes. CobraNet multi-cast and uni-cast Bundles can be assigned but because of the simpler repeater-type hubs, even uni-cast transmissions are broadcast to all nodes. Therefore, a maximum of 8 full-loaded Bundles (64 audio channels) are allowed on the entire network. More Bundles may be allowed if they are loaded with less than the full eight audio channels. There is no limit to the number of active receivers on a repeater network. Generally, a repeater based CobraNet network must be dedicated to CobraNet traffic only to guarantee reliable transmission of audio packets.

### 8.3.6 Switched Networks

A more complex CobraNet network can be built using Ethernet Switches.<sup>2</sup> Ethernet switching technology is more sophisticated than hubs. Switches do not simply broadcast each and every packet to all nodes. Instead, they can interrogate each incoming packet transmission to determine its destination and (very quickly) transmit the data to only that destination port. This allows for more overall network traffic. In effect each port has 100MB of bandwidth and the overall network can be as large as 100MB times the number of ports on the network.

Switched networks allow both multi-cast and uni-cast CobraNet Bundles. Uni-cast transmissions can only be received by a single node and are typically used for point-to-point routing. This technique leverages Ethernet switching technology to significantly conserve overall network bandwidth and in-turn allow many more Bundles and Audio Channels.

Another enhancement available with most switched network environments is “full-duplex” links. A full-duplex link allows simultaneous send and receive over the same Ethernet connection. This allows simultaneous send and receive of up to 64 channels per node for a total of 128 channels. That said, please keep in mind that today’s CobraNet node designs are only capable of 64 channels (32 in and 32 out).

The combination of switching and full-duplex technologies in switched CobraNet networks allows up to 128 channels per node and greater than 3000 individual uni-cast channels. There is no limit to the number of active receivers on a switched CobraNet network. Switched networks also allow control traffic such as PCs, to coexist on the same network as CobraNet devices.

<sup>1</sup> See Tested Ethernet Products on the Peak Audio website for a list of recommended Ethernet repeaters.

<sup>2</sup> See Tested Ethernet Products on the Peak Audio website at [www.peakaudio.com/CobraNet](http://www.peakaudio.com/CobraNet) for a list of recommended Ethernet switches.

## 9 Service

Crown amplifiers are quality units that rarely require servicing. Before returning your unit for service, please contact Crown Technical Support to verify the need for servicing.

This unit has very sophisticated circuitry which should only be serviced by a fully trained technician. This is one reason why each unit bears the following label:

**CAUTION: To prevent electric shock, do not remove covers. No user serviceable parts inside. Refer servicing to a qualified technician.**



Complete the Crown Audio Factory Service Information form, in the back of this manual, when returning a Crown product to the factory or authorized service center. The form must be included with your product inside the box or in a packing slip envelope securely attached to the outside of the shipping carton. Do not send this form separately.

*Warranty is only valid within the country in which the product is purchased.*

### 9.1 International and Canada 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.

### 9.2 US 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.

#### 9.2.1 Service at a US Service Center

This method usually saves the most time and effort. Simply present your bill of sale along with the defective unit to an authorized service center to obtain service. They will handle the necessary paperwork and repair. Remember to transport the unit in the original factory pack. A list

of authorized service centers in your area can be obtained from Crown Factory Service, or online from <http://www.crownaudio.com/support/servcent.htm>.

#### 9.2.2 Factory Service

Crown accepts no responsibility for non-serviceable product that is sent to us for factory repair. It is the owner's responsibility to ensure that their product is serviceable prior to sending it to the factory. Serviceable product list is available at <http://crownweb.crownintl.com/crownrma/>. For more information, please contact us direct.

A Service Return Authorization (SRA) is required for product being sent to the factory for repair. An SRA can be completed online at [www.crownaudio.com/support/factserv.htm](http://www.crownaudio.com/support/factserv.htm). If you do not have access to the web, please call Crown's Customer Service at 574.294.8200 or 800.342.6939 extension 8205.

For warranty service, we will pay for ground shipping both ways in the United States. Contact Crown Customer Service to obtain prepaid shipping labels prior to sending the unit. Or, if you prefer, you may prepay the cost of shipping, and Crown will reimburse you. Send copies of the shipping receipts to Crown to receive reimbursement. Your repaired unit will be returned via UPS ground. Please contact us if other arrangements are required.

#### 9.2.3 Factory Service Shipping Instructions:

1. Service Return Authorization (SRA) is required for product being sent to the factory for service. Please complete the SRA by going to [www.crownaudio.com/support/factserv.htm](http://www.crownaudio.com/support/factserv.htm). If you do not have access to our website, call 1.800.342.6939, extension 8205 and we'll create the SRA for you.
2. See packing instructions that follow.
3. Ship product to:  
CROWN AUDIO FACTORY SERVICE  
1718 W MISHAWKA RD.  
ELKHART, IN 46517
4. Use a bold black marker and write the SRA number on three sides of the box.

5. Record the SRA number for future reference. The SRA number can be used to check the repair status.

#### 9.2.4 Packing Instructions

**Important:** These instructions must be followed. If they are not followed, Crown Audio, Inc. assumes no responsibility for damaged goods and/or accessories that are sent with your unit.

1. Fill out and include the Crown Audio Factory Service Information sheet in the back of this manual.
2. Do not ship any accessories (manuals, cords, hardware, etc.) with your unit. These items are not needed to service your product. We will not be responsible for these items.
3. When shipping your Crown product, it is important that it has adequate protection. We recommend you use the original pack material when returning the product for repair. If you do not have the original box, please call Crown at 800.342.6939 or 574.294.8210 and order new pack material. See instructions for "foam-in-place" shipping pack. (Do not ship your unit in a wood or metal cabinet.)
4. If you provide your own shipping pack, the minimum recommended requirements for materials are as follows:
  - a. 275 P.S.I. burst test, Double-Wall carton that allows for 2-inch solid Styrofoam on all six sides of unit or 3 inches of plastic bubble wrap on all six sides of unit.
  - b. Securely seal the package with an adequate carton sealing tape.
  - c. Do not use light boxes or "peanuts". Damage caused by poor packaging will not be covered under warranty.

#### Using your 'foam-in-place' shipping pack

Note: The foam-in-place packing is molded so that there is only one correct position for your product.

1. Open carton and lift center cushion leaving both end-cushions in place.

2. Carefully place your product with the product's front panel facing the same direction as arrows indicate.
3. Reset center cushion down over top of product's chassis. The foam-in-place packing was molded to accommodate different chassis depth sizes. If your product's chassis does not completely fill the foam-in-place cavity, you may use a soft but solid packing material (such as paper or bubble wrap) behind the chassis.
4. Enclose the completed Crown Audio Factory Service Information form (or securely attach it to the outside of carton) and re-seal the shipping pack with a sturdy carton sealing tape.

#### 9.2.5 Estimate Approval

Approval of estimate must be given within 30 days after being notified by Crown Audio Inc. Units still in the possession of Crown after 30 days of the estimate will become the property of Crown Audio Inc.

#### 9.2.6 Payment of Non-Warranty Repairs

Payment on out-of-warranty repairs must be received within 30 days of the repair date. Units unclaimed after 30 days become the property of Crown Audio Inc.

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

**Crown Factory Service**  
1718 W. Mishawaka Rd.,  
Elkhart, Indiana 46517 U.S.A.

**Telephone:**  
574.294.8200  
800.342.6939 (North America,  
Puerto Rico, and Virgin Islands only)

**Facsimile:**  
574.294.8301 (Technical Support)  
574.294.8124 (Factory Service)

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

## 10 Warranty



### UNITED STATES & CANADA

#### SUMMARY OF WARRANTY

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

*Warranty is only valid within the country in which the product was purchased.*

#### ITEMS EXCLUDED FROM THIS CROWN WARRANTY

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

#### WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal

to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at the factory. Warranty work for some products can only be performed at our factory. We will remedy the defect and ship the product from the service center or our factory within a reasonable time after receipt of the defective product at our authorized service center or our factory. All expenses in remedying the defect, including surface shipping costs in the United States, will be borne by us. (You must bear the expense of shipping the product between any foreign country and the port of entry in the United States including the return shipment, and all taxes, duties, and other customs fees for such foreign shipments.)

#### HOW TO OBTAIN WARRANTY SERVICE

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

#### DISCLAIMER OF CONSEQUENTIAL AND 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 after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS. 9/07

## 11 Warranty (continued)

### WORLDWIDE EXCEPT USA & CANADA



#### SUMMARY OF WARRANTY

Crown International, 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW 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 Warranty.

*Warranty is only valid within the country in which the product is purchased.*

<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 your local Crown importer of your need for warranty service within the warranty period. All components must be shipped in the original box. 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 AND 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 after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS. 9/07



# Crown Audio Factory Service Information

Shipping Address: Crown Audio Factory Service, 1718 W. Mishawaka Rd., Elkhart, IN 46517

**PLEASE PRINT CLEARLY**

SRA #: \_\_\_\_\_ (If sending product to Crown factory service.)      Model: \_\_\_\_\_      Serial Number: \_\_\_\_\_      Purchase Date: \_\_\_\_\_

**PRODUCT RETURN INFORMATION**

Individual or Business Name: \_\_\_\_\_

Phone #: \_\_\_\_\_      Fax #: \_\_\_\_\_      E-Mail: \_\_\_\_\_

Street Address (please, no P.O. Boxes): \_\_\_\_\_

City: \_\_\_\_\_      State/Prov: \_\_\_\_\_      Postal Code: \_\_\_\_\_      Country: \_\_\_\_\_

Nature of problem: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other equipment in your system: \_\_\_\_\_

If warranty is expired, please provide method of payment. Proof of purchase may be required to validate warranty.

**PAYMENT OPTIONS**

have open account payment terms. Purchase order required. PO#: \_\_\_\_\_       CDD

Credit Card (Information below is required; however if you do not want to provide this information at this time, we will contact you when your unit is repaired for the information.)

**Credit card information:**

Type of credit card:     MasterCard       Visa       American Express       Discover     

Type of credit card account:     Personal/Consumer       Business/Corporate

Card # \_\_\_\_\_      Exp. date: \_\_\_\_\_      \* Card ID #: \_\_\_\_\_

\* Card ID # is located on the back of the card following the credit card #, in the signature area. On American Express, it may be located on the front of the card. This number is required to process the charge to your account. If you do not want to provide it at this time, we will call you to obtain this number when the repair of your unit is complete.

Name on credit card: \_\_\_\_\_

Billing address of credit card: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**H** A Harman International Company