SAS RIO Bravo IP Engine

User Guide- Preliminary

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Preface

Thank you for purchasing an SAS product. We are confident it will meet your requirements and provide years of service. Please check this product and make sure it is the model you ordered. If you need to contact us, please refer to Appendix A: Support and Limited Warranty.

Proprietary Notice

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Limited Warranty

This product RIO Bravo IP Engine of Sierra Automated Systems & Engineering Corporation (SAS) is warranted to be free from defects in materials and workmanship for a period of one year from the date of sale (see Support and Other Information for details.)

User Guide Revision

This RIO Bravo IP Engine User Guide is published by the Engineering Department of Sierra Automated Systems & Engineering Corporation, which is responsible for its contents. SAS reserves the right to revise this publication and to make changes in the content hereof without obligation to notify any person or organization of such revisions or changes

Overview

The RIO BRAVO IP Engine is a fully integrated DSP based engine from SAS. The high capacity small footprint engine is designed to fit in any control room and provides all functions necessary for Radio Broadcast operations. The RIO Bravo provides you with direct Ethernet connectivity. You can now control your SAS 32KD system using an internet web browser interface while maintaining compatibility with the traditional SAS Router
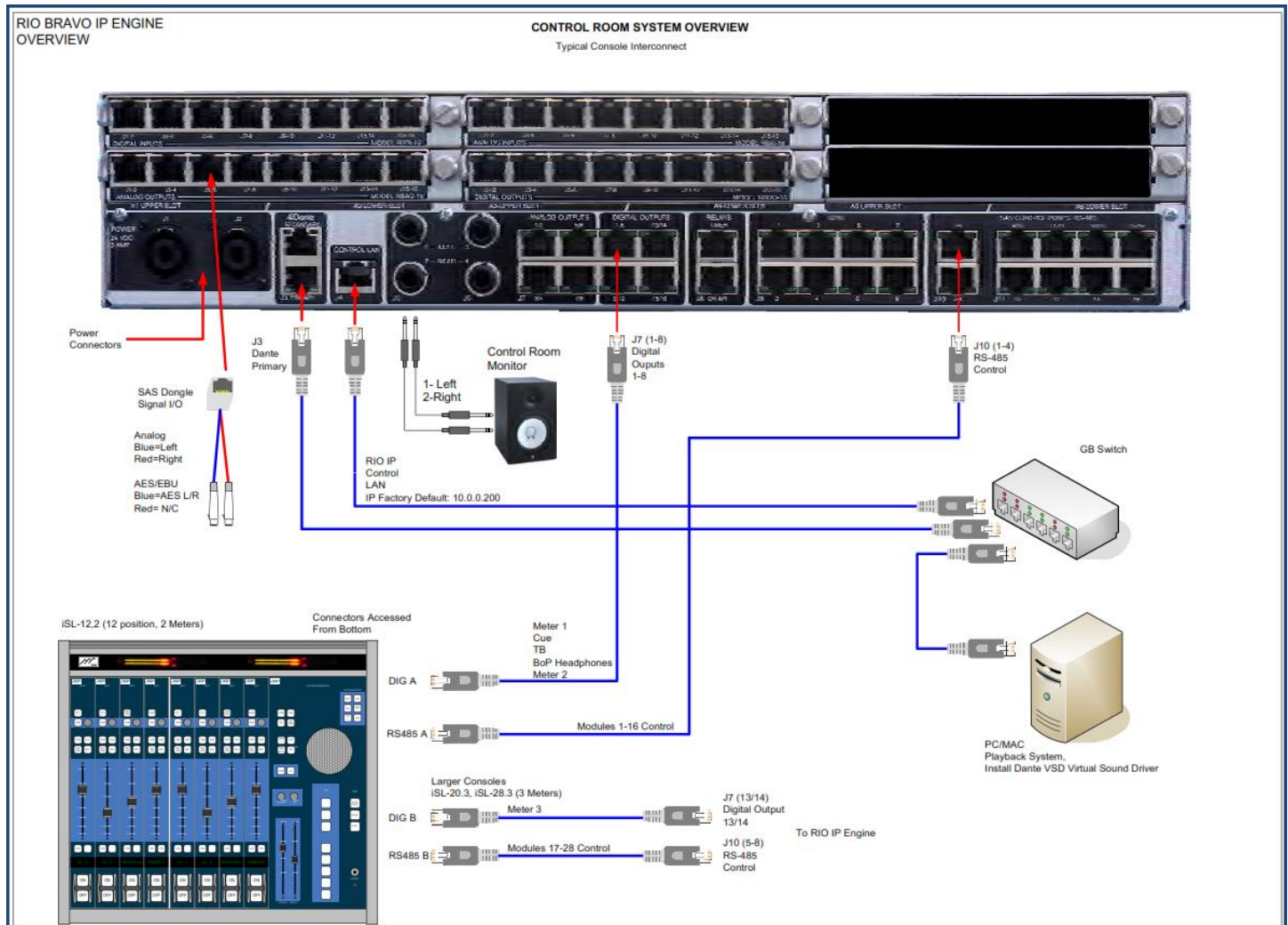

Figure 1: RIO Bravo Overview

Features:

- Fully Integrated DSP Mixing IP Engine, up to 92 separate mixes
- On-board 8 discrete analog channels (4 stereo) and 16 discrete digital channels (8 AES).
- Up to 96 discrete I/O ports configured in 6 slots
- Dual Dante AoIP ports with built in switch for network redundancy.
- 5 embedded High Power DSP engines
- EQ, Effects, Silence Sense, and Peak Detection.
- Web Based User Interface for control and configuration
- Fully integrated Automation for control room and show control.
- Redundant Power Connectors
- 2 sets of TRJ jacks for audio monitoring

Front Panel

The 2RU aluminum front panel is polished and anodized gun metal blue. Indicator lights as follows:

Figure 2: RIO Bravo Front Panel

System Backup provides an SD card for saving and restoring frame system data and specifying initial IP address information
V Digital indicator is solid blue when powering digital devices.
V Analog indicator is solid blue when powering analog devices.
Audio Link is solid green when Dante's Ethernet is working and red when it is not.
Control Link light blinks green when engine is connected to the network.
Run light flashes green when engine is running.
Master light is solid green when engine operates single or when providing master clock with multiple engines.
Message light blinks green when a message is received over the link.
Error light blinks red when the RIO encounters an error.

Rear Panel

All installation and configuration devices for the RIO Bravo are located in the rear panel (see Figure 3):
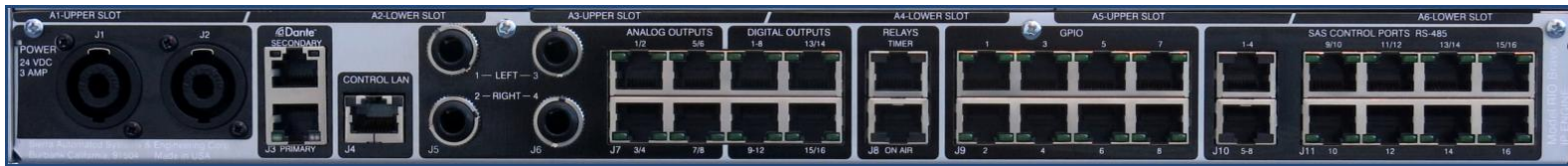

Figure 3: RIO Bravo Rear Panel

J1 & J2 POWER: two connectors for feeding redundant power (+24 VDC) from SAS power supply.

J3 Dante PRIMARY & SECONDARY: dual RJ45 for connection to Dante AoIP network.

CONTROL LAN J4: for connection to your control network.

J5 1(L)/2(R) & J6 3(L)/4(R): two stereo 1/4" jacks for connection to monitoring devices. *Note,TRS jacks in parallel with RJ45 1-4: J5-1 (L) to J7-1; J5-2 (R) to J7-2; J6-1 (L) to J7-3; and J6-2 (R) to J7-4.*

J7 1–8 ANALOG OUTPUTS: four RJ45 for connection to eight discrete analog outputs or four stereo. These connectors also provide +12V DC that can power head phone amps. *Note TRS jacks in parallel with RJ45 1-4: J5-1 (L) to J7-1; J5-2 (R) to J7-2; J6-1 (L) to J7-3; and J6-2 (R) to J7-4.*

J7 1–16 DIGITAL OUTPUTS: four RJ45 for connection to 16 discrete digital outputs or eight AES outputs (4 AES outputs on first RJ45, 2 AES on next and 1 AES on two connectors). Digital Outputs 1-8 often used to feed console meters, cue, talkback, and headphones.

J8 RELAYS: Two RJ45 for connection to a Timer (Relay 9=Stop, Relay 10=Run, Relay 11=Reset) and a studio On Air light (Relay 12).

J9 GPIO 1 - 8: Eight RJ45 for connecting 8 relays out and logic in. Use these GPIO for reading external switches, driving indicators, and other control functions in your studio. Relay on pins 1 & 2. Logic In close pin 7 to 8.

J10 SAS CONTROL PORTS 1 - 8: 2 RJ45 for connecting eight RS-485 control ports. You can connect a console with up to 16 modules per RJ45 (up to 32 slots using both connectors).

J11 CONTROL PORTS 9 – 16: 8 RJ45 for connecting to eight RS-485 ports. Use these to connect any SAS controller including console modules. You can connect up to 4 controllers per port.

A1 – A6 SLOT: for connecting up to six I/O plugin modules (sold separately). Available modules provide 16 discrete analog or digital channels. Figure 4: Model RBAI-16 provides 8 Stereo (16 Mono) Analog Inputs; Model RBDI-16 provides 8 AES3 (16 Mono); Model RBAO-16 provides 8 Stereo (16 Mono) Analog Outputs: and the RBDO-16 provides 8 AES3 (16 Mono) outputs.

Figure 4: RIO Bravo I/O Plugin Modules

Getting Started

1.   Connect power cord supplied by SAS to either RIO Bravo's J1 or J2 connectors. Connect to both when using redundant power supplies. Figure 5 below shows power cord connected to J1.

2.   You should see the following lights on the front panel: V Digital, V Analog, Audio Link, Run, and Master. You should also see the following lights on the rear panel: J3, J4, J7 Analog 1 – 8, and J11 Control Ports 9 – 16.

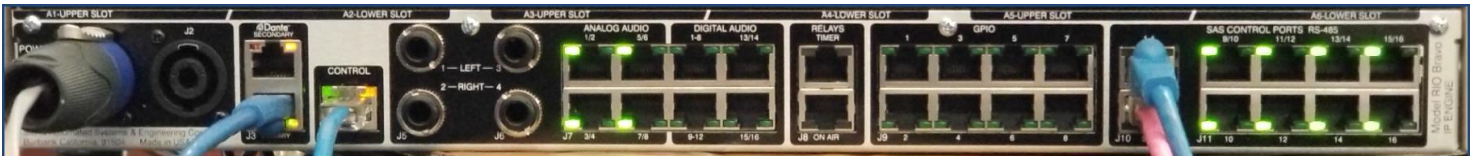3.   Connect RIO Bravo to your IP network using "CONTROL LAN J4" connector.

Figure 5: Rear Panel Power and Control Connections

4.   Once you have successfully connected your RIO Bravo to the network, you'll need to know its temporary IP address in order to access the web server for programming and configuration. There will be a tag with the IP address attached to the unit's front panel. You can also find the IP address in the "SYSCFG.TXT" file, which is contained on the SD card. Remove the SD card from the "System Backup" slot in the front panel and use an SD card reader/writer to open and view its contents. The 'SYSCFG.TXT" file should look like the one in Figure 6 below.

Figure 6: SYSCFG File

5.   Open your web browser and type IP address. In our example, this address is 10.0.0.130.

6. Enter Username and Password and click Submit. In our example we are using the default username: **SASDefault** and password: **sas** as shown in Figure 7 below. *Note that you won't see the password on your screen. Also note that you can change both Username and Password if needed.*

Figure 7: Web Interface Access

7. If you have successfully logged in you should see the screen shown in Figure 8.
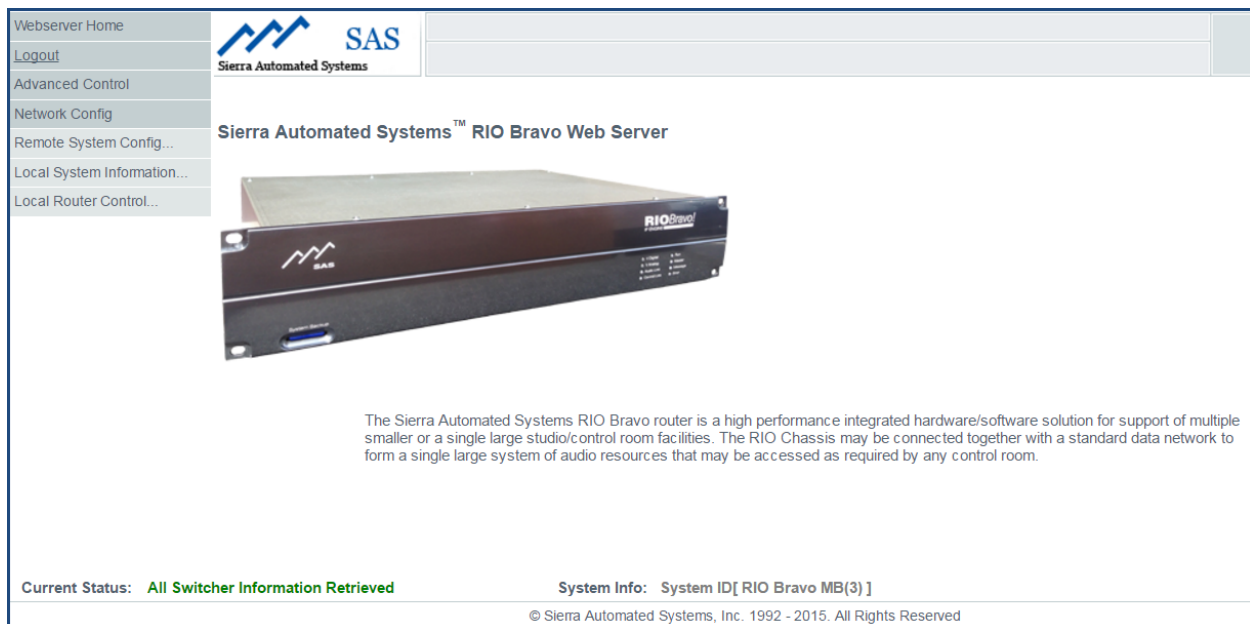

Figure 8: RIO Bravo Web Server Menu

8. Notice the grayed items in the upper left. We will refer to these as the **User Menu.** We'll briefly describe Network Config and Local System Information and describe Local Router Control in more detail.

Network Configuration

Choose the **Network Config** tab to obtain a window similar to Figure 9 below. Here you can change any network settings in your system. Be sure to press the Send button to send your changes through the system.

Figure 9: Network Config Screen

RIO Bravo Local System Configuration

In most instances your RIO Bravo will be pre-configured at SAS. However, if you need to make any changes, follow the procedure below:
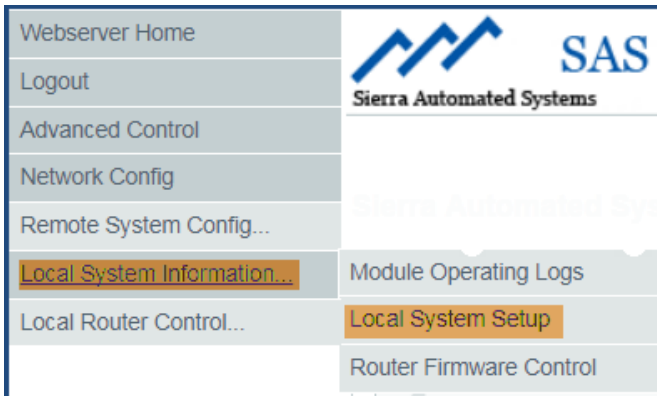
Figure 10: Local System Setup

1. As shown in Figure 10, select **Local System Information** and then click **Local System Setup**. You'll get a graphic representation of the I/O modules installed in your RIO Bravo (see Figure 11).
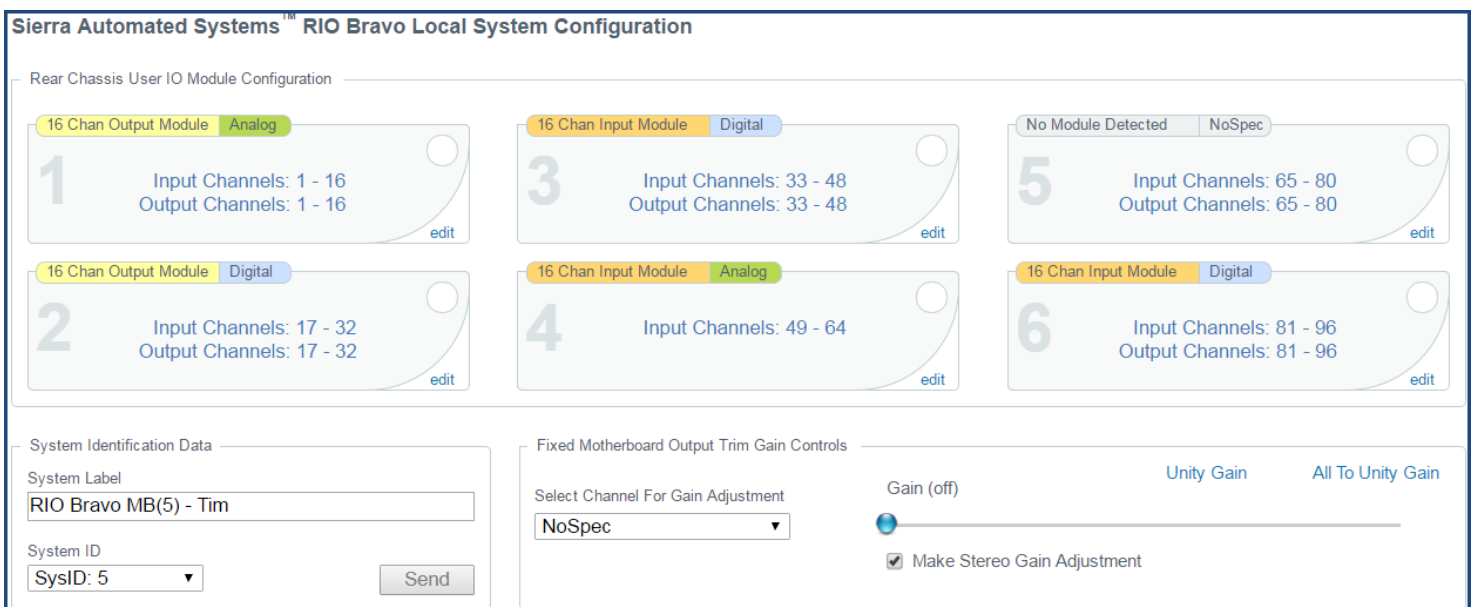
Figure 11: RIO Bravo Configuration

2. Click the **edit** button at the right-hand corner of each module to make the following changes:

A. Assignment of channel numbers to I/O modules. Typically SAS will set the first Input to number 001 and the first Output to 001, and then increment to each of the next installed modules.
B. Adjust Input and/or Output Gain for each channel.

Figure 12: Edit User Slot Configuration

Input Channel Configuration

Figure 13: User Menu

From User Menu (shown in Figure 12), click **Local Router Control** and then select **Input Channel Config** to get a table similar to Figure 13 below:

Source Channel Configuration - Basic Options

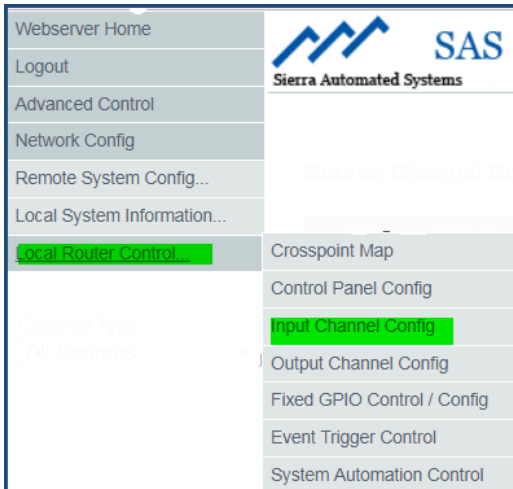| Edit	Group	Chan	Label	Local	Stereo	Type	Hide	SRC	Location
Edit	User	1	Z Mic 1	Mic 1	Mono	Microphone	No	Yes	KBZT Control
Edit	User	2	Z Mic 2	Mic 2	Mono	Microphone	No	Yes	KBZT Control
Edit	User	3	Z Mic 3	Mic 3	Mono	Microphone	No	Yes	KBZT Control
Edit	User	4	Z Mic 4	Mic 4	Mono	Microphone	No	Yes	KBZT Control
Edit	User	5	Z CD 1	CD 1	Stereo	General Purpose	No	Yes	KBZT Control
Edit	User	6	Inpt0006	Inpt0006	Stereo	General Purpose	No	Yes	KBZT Control
Edit	User	7	Z Phn 1	Phone 1	Mono	General Purpose	No	Yes	KBZT Control
Edit	User	8	Z Phn 2	Phone 2	Mono	General Purpose	No	Yes	KBZT Control
Edit	User	9	Inpt0009	Inpt0009	Stereo	General Purpose	No	Yes	No Spec
Edit	User	10	Inpt0010	Inpt0010	Stereo	General Purpose	No	Yes	No Spec
Edit	User	11	Inpt0011	Inpt0011	Stereo	General Purpose	No	Yes	No Spec
Edit	User	12	Inpt0012	Inpt0012	Stereo	General Purpose	No	Yes	No Spec
Edit	User	13	Inpt0013	Inpt0013	Stereo	General Purpose	No	Yes	No Spec
Edit	User	14	Inpt0014	Inpt0014	Stereo	General Purpose	No	Yes	No Spec
Edit	User	15	Inpt0015	Inpt0015	Stereo	General Purpose	No	Yes	No Spec
Edit	User	16	Inpt0016	Inpt0016	Stereo	General Purpose	No	Yes	No Spec
Edit	User	17	Inpt0017	Inpt0017	Stereo	General Purpose	No	Yes	No Spec
Edit	User	18	Inpt0018	Inpt0018	Stereo	General Purpose	No	Yes	No Spec

Figure 14: Input Channel Configuration

There are four types of Input Channels available to the user:

224 User - 92 Mix Bus - 64 Network - 64 Effect

You can choose the Type of Input displayed from **Channel Type** drop down or by scrolling down the table. These are shown under the column labeled **Group**:

Edit	Group	Chan	Label	Local	Stereo	Type	Hide	SRC	Location
Edit	User	222	Inpt0222	Inpt0222	Stereo	General Purpose	No	Yes	No Spec
Edit	User	223	Inpt0223	Inpt0223	Stereo	General Purpose	No	Yes	No Spec
Edit	User	224	Inpt0224	Inpt0224	Stereo	General Purpose	No	Yes	No Spec

Edit	Group	Chan	Label	Local	Stereo	Type	Hide	SRC	Location
Edit	Mix Bus	90	Bus 0090	Bus 0090	Stereo	General Purpose	No	Yes	No Spec
Edit	Mix Bus	91	Bus 0091	Bus 0091	Stereo	General Purpose	No	Yes	No Spec
Edit	Mix Bus	92	Bus 0092	Bus 0092	Stereo	General Purpose	No	Yes	No Spec

Edit	Group	Chan	Label	Local	Stereo	Type	Hide	SRC	Location
Edit	Network	63	Z Tie-V5	Z Tie-V5	Mono	Network Trunk	No	Yes	No Spec
Edit	Network	64	Z Tie-V6	Z Tie-V6	Mono	Network Trunk	No	Yes	No Spec

Edit	Group	Chan	Label	Local	Stereo	Type	Hide	SRC	Location
Edit	Effect	44	eFX 0044	eFX 0044	Stereo	General Purpose	No	Yes	No Spec
Edit	Effect	45	eFX 0045	eFX 0045	Stereo	General Purpose	No	Yes	No Spec
Edit	Effect	46	eFX 0046	eFX 0046	Stereo	General Purpose	No	Yes	No Spec
Edit	Effect	47	eFX 0047	eFX 0047	Stereo	General Purpose	No	Yes	No Spec

Figure 15: Input Channel Assignment

Note that you can get seven different views of your input channel configurations by clicking either of the two top buttons (see yellow highlight in Figure 16): Basic Options, Console Options, GPI Options, GPO Options, Silence Detect Info, Peak Detect Info, and Channel Status Info

Source Channel Configuration - Basic Options   << Status Info   Cnsl Options >>

Edit	Group	Chan	Label	Local	Stereo	Type	Hide	SRC	Location
Edit	User	1	Z Mic 1	Mic 1	Mono	Microphone	No	Yes	KBZT Control

Source Channel Configuration - Console Options   << Basic Options   GPI Options >>

Edit	Group	Chan	Label	Mix Minus	IFB Chan	Blocking Mix-Minus	Timer	Fader	Global On/Off
Edit	User	1	Z Mic 1	NoSpec	NoSpec	Yes	No	No	No

Source Channel Configuration - GPI Options   << Cnsl Options   GPO Options >>

Edit	Group	Chan	Label	Mod On	Mod Off	Mod Cough	Mod Cue	Off Light	GPI Options
Edit	User	1	Z Mic 1	NoSpec	NoSpec	NoSpec	NoSpec	NoSpec	Off

Source Channel Configuration - GPO Options   << GPI Options   Silence Detect >>

Edit	Group	Chan	Label	On Relay	Off relay	GPO Options
Edit	User	1	Z Mic 1	NoSpec	NoSpec	Off

Source Channel Configuration - Silence Detect Info   << GPO Options   Peak Detect >>

Edit	Group	Chan	Label	Enabled	Action	On/Off	Threshold	Detect Time	Release Time	Device
Edit	User	1	Z Mic 1	No	Msg Only	Activate	NoSpec	0 Seconds	0 Seconds	NoSpec

Source Channel Configuration - Peak Detect Info   << Silence Detect   Status Info >>

Edit	Group	Chan	Label	Enabled	Action	On/Off	Threshold	Detect Time	Release Time	Device
Edit	User	1	Z Mic 1	No	Msg Only	Activate	NoSpec	0 Seconds	0 Seconds	NoSpec

Source Channel Configuration - Channel Status Info   << Peak Detect   Basic Options >>

Edit	Group	Chan	Label	Trim Gain	Fx Status	Fx Bypass	Silence	Peak	Tie Line	Remote System
Edit	User	1	Z Mic 1	0dB	No	No	Inactive	Inactive	N/A	N/A

Figure 16: Input Channel Configuration Views

Clicking the Edit button on the any input channel will provide you with the Input Channel Configuration window shown in Figure 17. TIP:*Hovering your mouse pointer over any entry box will display important user information.*

Figure 17: Input Channel Configuration

Output Channel Configuration

Select **Output Channel Config** from Local Router Control tab to get a table similar to Figure 18.

System Example
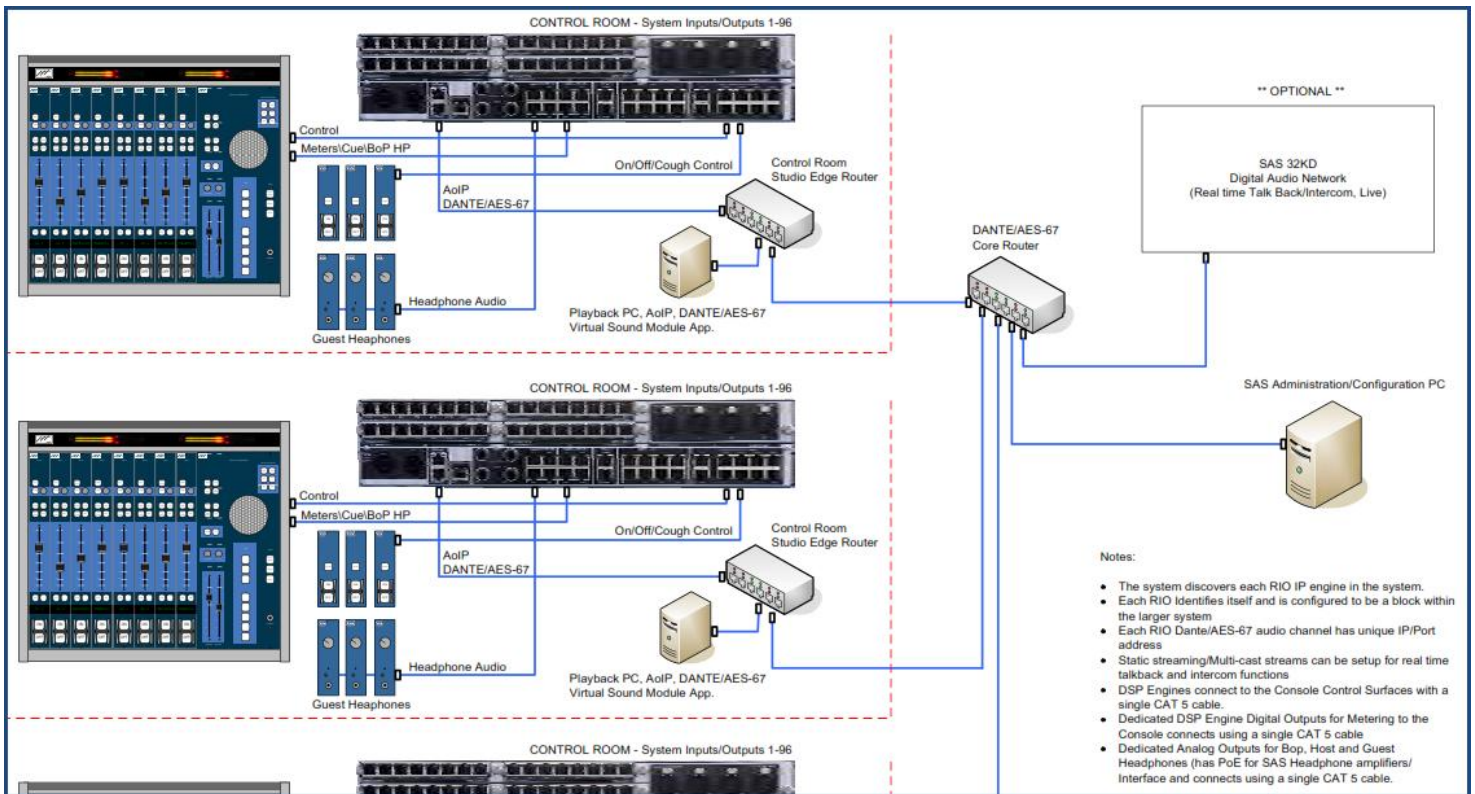
Web User Interface

Web browsers currently tested compatible are:

1. Microsoft Internet Explorer, version 11
2. Google Chrome, version 41.xx
3. Firefox, version 21.xx
4. Safari, version 5.1.7

SYSCFG.TXT

For any change to take effect you must restart the RIO Bravo engine. This can be accomplished by cycling the power or clicking on Restart from the System Update page on the web browser interface.

1. Modify the IP address and other parameters as needed to work with your IP network and save the file. *Caution*: *do not change MAC Address under any circumstances!*
2. Install the SD card into the slot on the RIO Bravo front panel and restart if changes were made. The IP address is only established with a Restart.
3. When Power is applied to the RIO Bravo both blue Power lights will come on initially. After 10 to 15 seconds the unit will being to operate and the Run light will blink green.

Glossary

Input:

Source:

Output:

Destination:

Appendix A: Support and Limited Warranty

Customers can contact Sierra Automated Systems & Engineering Corporation (SAS):
Phone: 818-840-6749
Fax: 818-840-6751
Website: http://www.sasaudio.com/

Our business hours are Monday through Friday, from 9am to 6pm Pacific Time. If you need to contact us after hours for emergency support, call us at (818) 840-6749 - please leave a message if you do not get an answer and we will be contacted.

If your SAS product needs to be returned to the factory, contact us to obtain an RA number.
SAS is located at 2821 Burton Avenue, Burbank, California 91504. Before you contact us about support or returns, please have the following ready:
• Model number of the product (ex: RIO Bravo)
• Serial Number (s/n number printed on a silver label)

Limited Warranty

The product RIO Bravo of Sierra Automated Systems & Engineering Corporation is warranted to be free from defects in materials and workmanship for a period of one year from the date of sale. Sierra Automated Systems & Engineering Corporation's sole obligation during the warranty period is to provide, without charge, parts and labor necessary to remedy covered defects appearing in products returned prepaid to Sierra Automated Systems & Engineering Corporation, 2821 Burton Avenue, Burbank, California, 91504, U.S.A.

This warranty does not cover any defect, malfunction or failure caused beyond the control of Sierra Automated Systems & Engineering Corporation, including unreasonable or negligent operation, abuse, accident, failure to follow instructions in the Technical Manual, Owner's Manual or User Guide, defective or improper associated equipment, attempts at modification and repair not authorized by Sierra Automated Systems & Engineering Corporation, and shipping damage. Products with their serial numbers removed or effaced are not covered by this warranty.

This warranty is the sole and exclusive express warranty given with respect to Sierra Automated Systems & Engineering Corporation products. It is the responsibility of the user to determine before purchase that this product is suitable for the user's intended purpose.

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