Typical Studio Wiring

The Description below applies to a typical dual RIO console installation with a 32-slot console.

RIOs and Rio Power supplies can be mounted in the same rack – provide 1RU of space between "stacked" units. RIO1 is all analog. RIO2 has half-n-half analog and digital audio cards.

If it's going to be difficult to access the rear panel of the RIOs and power supplies once installed in the rack, it's best to pre-attach the cabling. For each RIO this will be seven I/O cables, two power cables, one RIO CAT5 "link" cable (J1202). Additionally, RJ45 (straight-through) patch cables will jumper the BLUE meter-bridge cable to the RAD-84 Digital (RJ-45 jack) on the lower output card of RIO1. When attaching the cabling, take a sharpie or a labeler and label both ends of each cable with which RIO and which connector on the RIO it goes to. (eg – RIO1 Out1-16 or RIO2 OPTOS).

The in-studio Audio and control I/O is all connected to the SAS RIOs. There are two RIOs in the Control Room. These two RIOs will be terminated on a total of six krone blocks and one 89D2132 block, which is physically similar in size to a krone block.
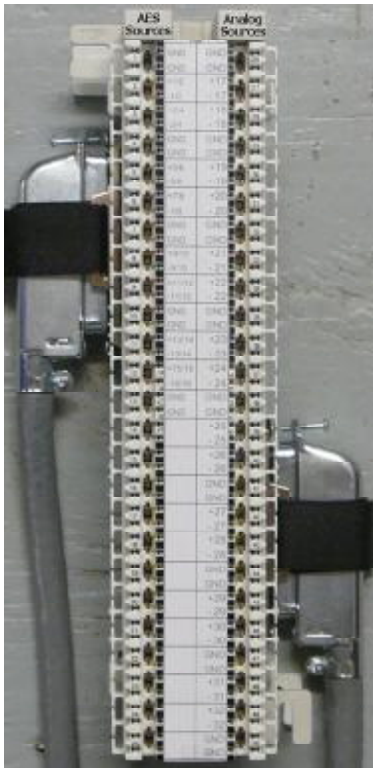
Krone block
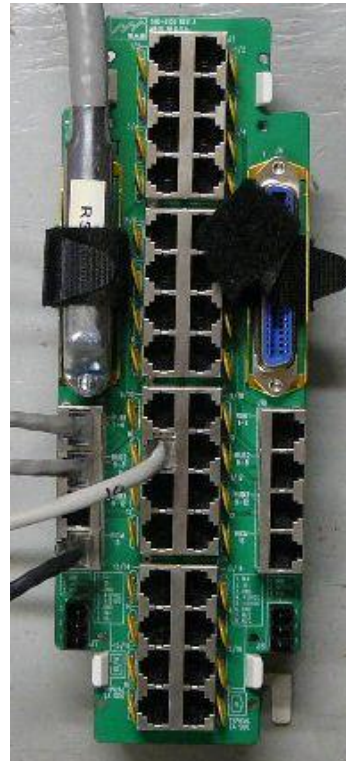
89D-2132 Control Fanout Block

Suggested RIO to Block Cabling:
Each RIO has 7 Centronics-50 pin (Rj-21 style) connectors for audio and control I/O.
Supplied cables connect the RIOs to the Krone blocks and 89D2132 block.

Krone Block1: Audio INPUTS to first RIO – connect the lower input connector (inputs 1-16) on RIO to left connector on block, upper input connector (inputs 17-32) on RIO to right connector on Block. Be sure to cinch down the Velcro strain reliefs so the centronics connectors are kept tight.   In SAS-speak all inputs to the system are called sources.

Krone Block2: Audio Inputs to the SECOND RIO – same as above

Krone Block3: Audio OUTPUTS of first RIO – connect the lower output connector (outputs 1-16) on RIO to left connector on block, upper input connector (outputs 17-32) on RIO to right connector on Block. In SAS-speak all outputs from the system are called destinations.

Krone Block 4:   Audio Outputs from the second RIO – same as above.

Krone Block 5: Optos for both RIOs. Connect the OPTOs connector on RIO1 to the left side of the block, and the OPTOs connector on RIO2 to the right side of the block.

Krone Block6: Relays for both RIOs. Connect the RELAYS connector on RIO1 to the left side of the block, and the RELAYS connector on RIO2 to the right side of the block.

89D2132 Control Fanout Block: Connect the RS485 connector on RIO1 to the left side of the 89D2132 block. Connect the RS485 connector for RIO2 to the right side. A "line-lump" power supply is available for the 89D-2132 block – If you ordered one, connect it to the power (3 pin phoenix) connection at the lower left corner.

POWER: The typical configuration uses two Rack Mounted power supplies for redundant power to both RIOs, the Console "tub," and the Meter bridge. The meter bridge uses a smaller connector so a furniture pass-through hole can be hidden by the left meter leg. Your power supply cabling includes two special cables for the meter bridge and four standard cables for the RIO and console tub. Since each device has two power inputs, you'll use one power supply to feed the 'A' power inputs of each device and the other to feed the 'B' power inputs. There's no priority impled by A & B, just make sure they go to different supplies or you'll negate the power redundancy feature.

Standard DC Power Cable   Meter Bridge Power Cable

Console and Meter Bridge mounting:
Suggested hole patterns for the console tub and the meter bridge are at the end of this wiring guide. The meter bridge comes with two rj45 couplers. One goes on the blue cable (audio feed to meters), and the other goes on the pink cable (timer control).

Audio for driving the meters typically comes from one of two places:
   a) four AES outputs from a RIO Digital Output Card (RDO). One end of a typical straight-through (TIA568B-style) patch cable plugs into the coupler on the Meter Bridge's Blue Cat5 cable; the other end of the cat5 patch cable is cut off and the pairs are punched down using the following color code: Wite-Orange/Orange feeds Meter1, Green feeds Meter2, Blue feeds Meter3, and Brown feeds Meter4.
   OR
   b) We often configure the RAD-84 auxiliary Digital Audio Outputs to directly feed the meters. In this case a straight-through (TIA568B-style) patch cable plugs into the coupler on the Meter Bridge's Blue Cat5 cable; the other end of the cat5 patch cable plugs directly into the RAD-84's Digital Audio (RJ-45) port.

Timer Start, Stop, and Reset relays (from your RIO) connect to the Orange, Green, and Blue pairs respectively on the Pink Cat5 cable coming from the Meter Bridge.

ESE or SMPTE timecode connects to the Gray single-pair cable from the Meter Bridge.

Check your specific System documentation / Configuration information to determine your specific connections. Contact us if you need assistance.

Other RIO connections:
RIO1 has dedicated outputs designed to feed the (blue cable) meter bridge audio inputs. You may have already connected a Cat5 jumper (straight-through type) to the RAD-84 Digital jack on the lower OUTPUT card of RIO1 – this jumper gets plugged onto the RJ45 coupler on the blue meter-bridge cable.

Both RIOs connect back to the KRL card in the new 32KD mainframe using EITHER duplex SC fiber connections OR CAT5 cables. The RIO Fiber transceiver and the RIO CAT5 connections are right next to each other, near the bottom left corner of the RIO as viewed from the back.

NOTE that the RIO comes from the factory with a Grey-hooded DB25 male plugged into J1502 – this connector has a jumper installed that sets the RIO to match the system clock of 44.1kHz. If the 32KD is running at 44.1k this jumper must be installed for the RIO to link with the 32KD.

RS485 connections:
Each RS485 port from the RIO supports 4 slots on the console, so a 32 slot console wil require 8 RS485 ports. Specifically the first eight RS485 ports on RIO1. These RS 485 ports are conveniently connected to the console tub using two Straight-thru CAT5 jumpers. The "Slots 1-16" jack on the bottom of the console tub connects to the RJ45 jack labeled "RUBI 1-4" on the left-hand side of the 89D2132 block. The "Slots 17-32" jack on the bottom of the console tub connects to the RJ45 jack labeled "RUBI 5-8" on the left-hand side of the 89D2132 block.

The RS485 port for the MIC control panels is the 89D-2132 jack labeled "Port 10." If you've connected the power supply to the 89D-2132 block, all you have to do to wire the mic control panels is set the dipswitches for proper addressing and daisy-chain the Port 10 connection to all four mic control panels.

The RS485 port for the console-mounted intercom panel (in slot 1 of the console) is provided via CAT5 cable as well. On the bottom of the console, you'll find an ethercon connector (bulkhead RJ45 jack) – run a cat5 patch-cable from this jack to the 89D-2132 jack labeled "RICM-16."

89D-2132 power connection.

DIP switches on MIC control Panels:
The panel for the four mic positions should be set, in order, to addresses 0,1,2, and 3.
DipSwitch 1 (DS1) sets the addresses and power options for the modules. Switch positions 1 and 2 set the address, 7 and 8 set the pass-thru power mode. 3-6 should be OFF.

```
Panel     pos1, pos2    pos7, pos8
Addr 0  OFF, OFF      ON , ON
Addr 1  ON , OFF      ON , ON
Addr 2  OFF, ON       ON , ON
Addr 3  ON , ON       ON , ON
```

Audio Connections:
The Krone blocks have numbered pairs from 1-25 on the left and 26-50 on the right.
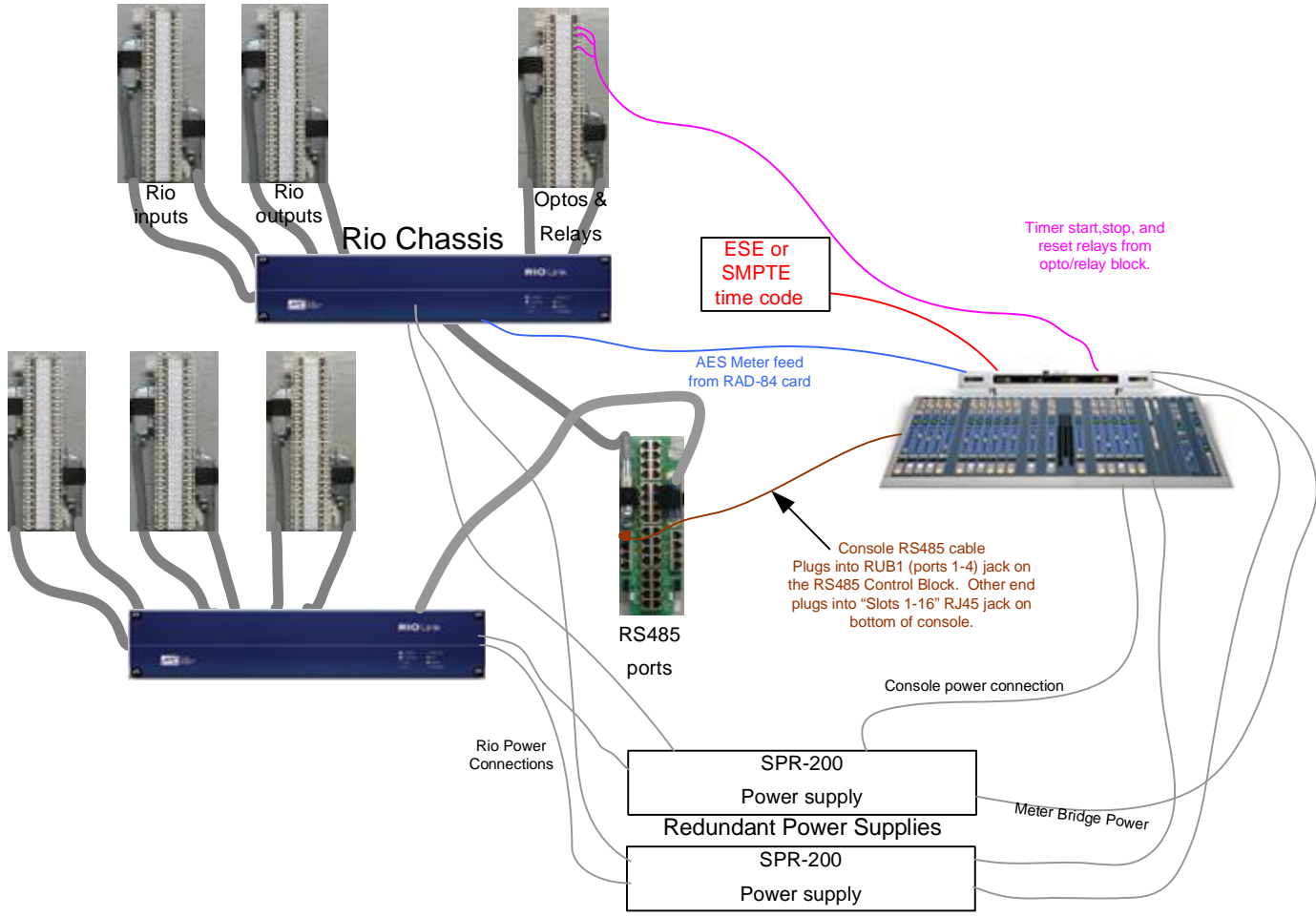
Sample RIO Configuration Data (be sure to use YOUR data for installation.
Audio Sources feeding inputs of the Router/RIO.

Input Chan Num	Module Chan Num	Chan Label 8 character max	LocalLabel 8 character max	Linked 0=Mono, 1=Stereo	Hidden 0=No, 1=Yes	Notes 256 character max	Block and Side	Krone Pair number
		1	KRL	0	1	F1-S1 RIOLink: A Control Room		
1	1	A Hyb1	Phone 1	0		Caller audio out	B1L	2
2	2	A Hyb2	Phone 2	0		Caller audio out	B1L	2
3	3	A PC 1	PC Play1	1		PC Playback	B1L	3
4	4	{A PC1	{pc1	1	1		B1L	3
5	5	A PC 2	PC Play2	1		PC Playback	B1L	5
6	6	{A PC2	{pc2	1	1		B1L	5
7	7	A PC 3	PC Play3	1		PC Playback	B1L	6
8	8	{A PC3	{pc3	1	1		B1L	6
9	9	A PC 4	PC Play4	1		PC Playback	B1L	8
10	10	{A PC4	{pc4	1	1		B1L	8
11	11	A ISDN1	ISDN 1	1		Inbound ISDN audio	B1L	9
12	12	{A ISDN1	{isdn1	1	1		B1L	9
13	13	A CD1	CD 1	1		CD playback	B1L	11
14	14	{A CD1	{cd1	1	1		B1L	11
15	15	A CD2	CD 2	1		CD playback	B1L	12
16	16	{A CD2	{cd2	1	1		B1L	12
17	17	A OpMic	OP MIC	1		MIC1 - Operator	B1R	27
18	18	A Mic2	MIC 2	1	1	MIC Audio	B1R	28
19	19	A Mic3	MIC 3	1		MIC Audio	B1R	30
20	20	A Mic4	MIC 4	1	1	MIC Audio	B1R	31
21	21	A Tivo	TIVO	1		Tivo playback audio	B1R	33
22	22	{A Tivo	{tivo	1	1		B1R	34
23	23	A AuxIn	Aux In	1		Auxiliary in audio	B1R	36
24	24	{A Auxin	{auxin	1	1		B1R	37
25	25	B PGM	B PGM	1		PGM bus from other CR	B1R	39
26	26	{B PGM	{B PGM	1	1		B1R	40
27	27	SAT 1	SAT 1	0		mono satellite source	B1R	42
28	28	SAT 2	SAT 2	0	1	mono satellite source	B1R	43
29	29	SAT 3	SAT 3	1		Stereo Sat source	B1R	45
30	30	{SAT3	{SAT3	1	1		B1R	46
31	31	AirTuner	AirTuner	1		ON-Air Tuner feed (confidence)	B1R	48
32	32	{AirTunr	{AirTunr	1	1		B1R	49

Audio Destinations fed by Outputs of the Router/RIO.

Output Chan Num	Module Chan Num	Chan Label *8 character max*	Local Label *8 character max*	Linked *0=Mono, 1=Stereo, 3=Mono LR Sum*	Hidden *0=No, 1=Yes*	Notes *256 character max*	Bus Type # *0=Router, 1=Program, 2=Audition, 3=Send, 4=Aux, 5=Off-Line, 6=Record, 7=Utility, 12=Mix-Minus, 15=Cue*	Bus Type Name *calculated from #*	Block and Side	Krone Pair number
0	0	Undef	Undef			Undefined		Router		
	1	KRL				F1-S1 RIOLink: A Control Room				
1	1	A Hyb1>	A Hyb1>	3	0	mix minus feed to Hybrid	12	Mix-Minus	B2L	2
2	2	A Hyb2>	A Hyb2>	3	0	mix minus feed to Hybrid	12	Mix-Minus	B2L	2
3	3	A PROC>	A PROC>	1	1	AES out for processing chain (xpt dsplb17)		Router	B2L	3
4	4	{A PROC>	{A PROC>	1	1			Router	B2L	3
5	5	A REC	A REC	1		REC bus feed to recording devices	7	Utility	B2L	5
6	6	{A REC	{A REC	1	1		7	Utility	B2L	5
7	7				1			Router	B2L	6
8	8				1			Router	B2L	6
9	9	A ISDN1>	A ISDN1>	1	0	mix minus feed to ISDN unit	12	Mix-Minus	B2L	8
10	10	{A ISDN1>	{A ISDN1>	1	1		12	Mix-Minus	B2L	8
11	11	A PCREC>	A PCREC>	1	0	AES out for PC Rec (xpt dsplb23)		Router	B2L	9
12	12	{A Pcre	{A Pcre	1	1			Router	B2L	9
13	13	A OFFL	A OFFL	3	0	OFFLINE bus		Router	B2L	11
14	14	A TBbus	A TBbus	3	0	TalkBack Bus inbound to Operator (32kd)		Router	B2L	11
15	15	A CueMix	A CueMix	1	0	Cue mix bus		Router	B2L	12
16	16	{A Cuex	{A Cuex	1	1			Router	B2L	12
17	17	A PGM1	A PGM1	1		Main Pgm bus (RJ45 AES feed meter1)	1	Program	B2R	27
18	18	{A PGM1	{A PGM1	1	1		1	Program	B2R	28
19	19	A Meter2	A Meter2	1		move to 17,19,21 or 23 for steerable meter	0	Router	B2R	30
20	20	{A Mtr2	{A Mtr2	1	1	(RJ45 AES output feeds steerable meter)	0	Router	B2R	31
21	21	A PGM2	A PGM2	1		PGM2 output	1	Program	B2R	33
22	22	{A PGM2	{A PGM2	1	1		1	Program	B2R	34
23	23				1			Router	B2R	36
24	24				1			Router	B2R	37
25	25	A MonSpk	A MonSpk	1		Feed to monitor amp/speakers	14	Speaker	B2R	39
26	26	{A MonSp	{A MonSp	1	1		14	Speaker	B2R	40
27	27	A CueSpk	A CueSpk	1		feed to cue amp/speakers	14	Speaker	B2R	42
28	28	{A CueSp	{A CueSp	1	1		14	Speaker	B2R	43
29	29	A OpHP	A OpHP	1		feed to operator Headphone amp	15	Headphone	B2R	45
30	30	{A OpHP	{A OpHP	1			15	Headphone	B2R	46
31	31	A GstHP	A GstHP	1		feed to guest HP amp	15	Headphone	B2R	48
32	32	{A GstHp	{A GstHp	1	1		15	Headphone	B2R	49

Rio inputs

Rio outputs

Rio Chassis

Optos & Relays

ESE or SMPTE time code

Timer start, stop, and reset relays from opto/relay block.

AES Meter feed from RAD-84 card

Console RS485 cable
Plugs into RUB1 (ports 1-4) jack on the RS485 Control Block. Other end plugs into "Slots 1-16" RJ45 jack on bottom of console.

RS485 ports

Console power connection

Rio Power Connections

SPR-200
Power supply

Redundant Power Supplies

Meter Bridge Power

SPR-200
Power supply

Block Diagram of Interconnects for SAS Standalone Console - Single RIO

RIO rear panel connections.

The high connection density of the RIO (and 32KD I/O cards) demands an efficient connectorization scheme. RIO audio connections, Optos, Relays, and RS485 control ports are brought out on RJ-21 style (Centronics 50) high-desity connectors. High-quality 25-pair cabling connects the RIO to SAS customized Krone blocks, which also have RJ-21 style connectors. This high-density wiring system maintains Category 5 characteristics all the way to the punch terminals, ensuring maximum performance and noise immunity. One of the benefits of Krone blocks is the built-in patch-bay feature, allowing you to directly patch two connections together if required for bypassing gear or troubleshooting.

Adaptors and patch cables of various lengths are available from ADC/Krone dealers or directly from SAS.

In addition to the Krone blocks, SAS offers RJ-45 wiring options, old-school '66' blocks, or direct-wire to the RJ-21 connectors.
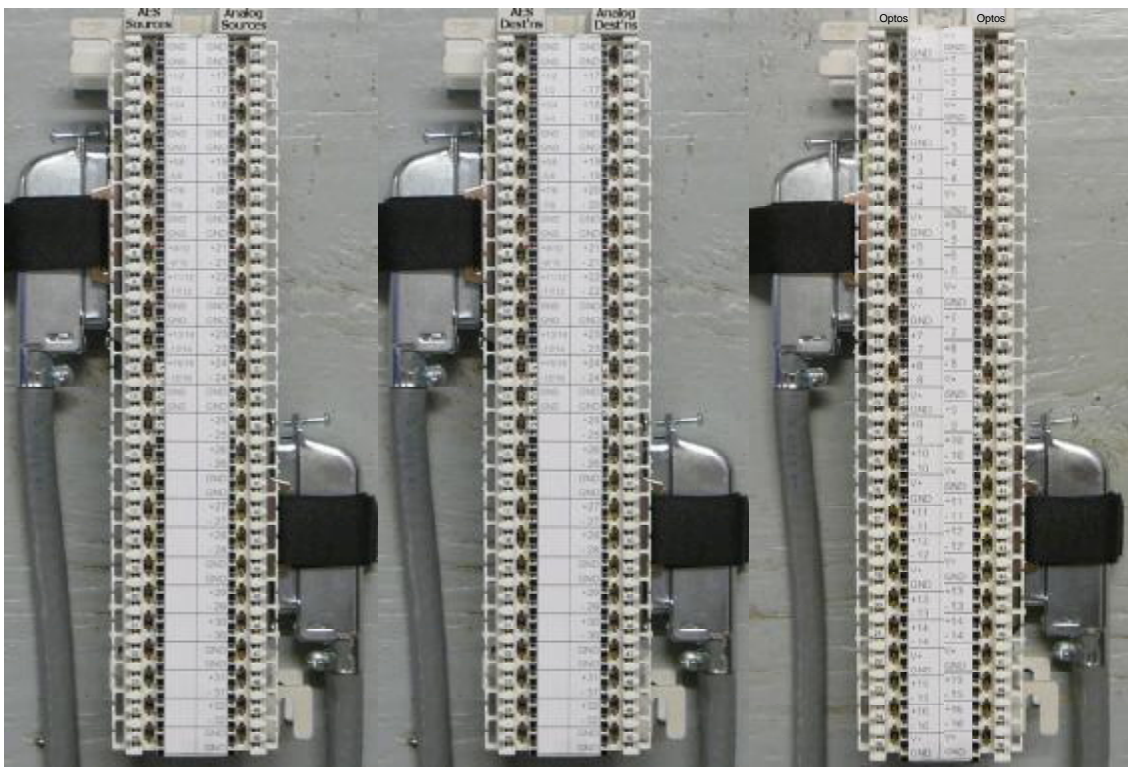
RS485 (both RIOs)
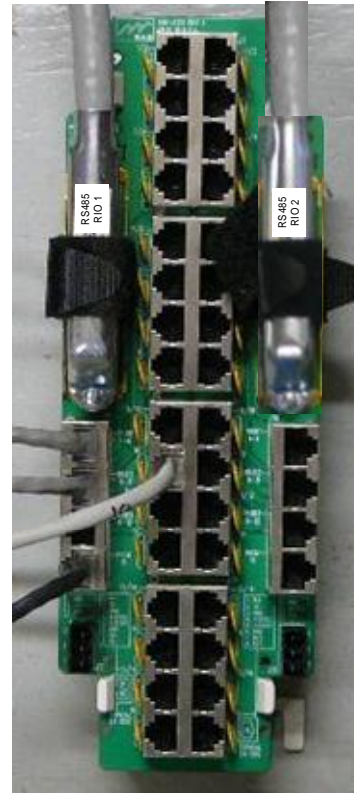
RIO 2 Inputs   RIO 2 Outputs   Relays (both RIOs)

SAS Consoles and Control Panels communicate with the RIO via RS485. the RIO has 16 RS485 ports. Each port can handle four devices. Each console module is a device, so a 16 slot console connects to the RIO with four RS485 ports; a 32 slot console requires eight. The Control Fanout Block shown above makes it convenient to connect RS485 ports to your console and other SAS devices.

Typically the RIOs are set up with half analog and half AES for audio I/O. This Audio Source blocks are where playback devices or other audio sources are connected. AES sources 1-16 go on the left; each AES connection represents two mono-equivalent channels which can be configured as stereo or independent mono signals in the system.

The Analog sources, 17-32, connect to the right side of the block. Stereo sources are connected to adjacent channels, left on the lower-numbered odd channel

The Audio Destinations blocks are where you connect equipment that requires an audio feed from the console. The layout is the same as the input blocks; AES on the left, analog on the right. Note that the RAD-84 Analog Output Card on the RIO has 16 (mono equiv.) analog outputs AND four auxiliary AES outputs (on the RJ-45 jack) that are copies of the card's first eight mono outs. These first four stereo outputs are often used dual-duty, for buses and meters.

Each RIO has 16 Optos and 16 Relays for interfacing with user equipment logic. The Optos cable from RIO1 connects to the left side of the block and the Optos cable from RIO2 connects to the right side. The Opto block has a +5V logic supply brought out along with ground so you can activate the optos conveniently. The Relay Block is similar, Relays from RIO1 on left, Rio2 on right. The relays are rated at 10W (30V max), perfect for controlling external gear or driving a Solid State relay for your On-Air light circuit.

Source Data

Source Channels 1-16 are AES inputs to the system (eight stereo AES sources) – Channels 17-32 are analog inputs to the system.

Krone block connection information is on the right.

For Example, the AES connection for inbound ISDN audio is on inputs 11/12, which is punched down to Block 1 (inputs) Left side, on the ninth pair of the block.

The analog connection for MIC 3 (a mono, line-level input from a pre-amp) is connected to Block 1 Right side, on the fifth pair of the block.

System Input Chan Num	Module Chan Num	System Channel Label 8 character max	LocalLabel 8 character max	Linked 0=Mono, 1=Stereo	Hidden 0=No, 1=Yes	Notes 256 character max	Block and Side	Krone Pair number
1	1	A Hyb1	Phone 1	0		Caller audio out	B1L	2
2	2	A Hyb2	Phone 2	0		Caller audio out	B1L	2
3	3	A PC 1	PC Play1	1		PC Playback	B1L	3
4	4	{A PC1	{pc1	1	1		B1L	3
5	5	A PC 2	PC Play2	1		PC Playback	B1L	5
6	6	{A PC2	{pc2	1	1		B1L	5
7	7	A PC 3	PC Play3	1		PC Playback	B1L	6
8	8	{A PC3	{pc3	1	1		B1L	6
9	9	A PC 4	PC Play4	1		PC Playback	B1L	8
10	10	{A PC4	{pc4	1	1		B1L	8
11	11	A ISDN1	ISDN 1	1		Inbound ISDN audio	B1L	9
12	12	{A ISDN1	{isdn1	1	1		B1L	9
13	13	A CD1	CD 1	1		CD playback	B1L	11
14	14	{A CD1	{cd1	1	1		B1L	11
15	15	A CD2	CD 2	1		CD playback	B1L	12
16	16	{A CD2	{cd2	1	1		B1L	12
17	17	A OpMic	OP MIC	1		MIC1 - Operator	B1R	2
18	18	A Mic2	MIC 2	1	1	MIC Audio	B1R	3
19	19	A Mic3	MIC 3	1		MIC Audio	B1R	5
20	20	A Mic4	MIC 4	1	1	MIC Audio	B1R	6
21	21	A Tivo	TIVO	1		Tivo playback audio	B1R	8
22	22	{A Tivo	{tivo	1	1		B1R	9
23	23	A Auxin	Aux In	1		Auxiliary in audio	B1R	11
24	24	{A Auxin	{auxin	1	1		B1R	12
25	25	B PGM	B PGM	1		PGM bus from other CR	B1R	14
26	26	{B PGM	{B PGM	1	1		B1R	15
27	27	SAT 1	SAT 1	0		mono satellite source	B1R	17
28	28	SAT 2	SAT 2	0	1	mono satellite source	B1R	18
29	29	SAT 3	SAT 3	1		Stereo Sat source	B1R	20
30	30	{SAT3	{SAT3	1	1		B1R	21
31	31	AirTuner	AirTuner	1		ON-Air Tuner feed (confidence)	B1R	23
32	32	{AirTunr	{AirTunr	1	1		B1R	24

Destination Data

Destination Channels 1-16 are AES outputs from the system (eight stereo AES sources) – Channels 17-32 are analog outputs from the system.
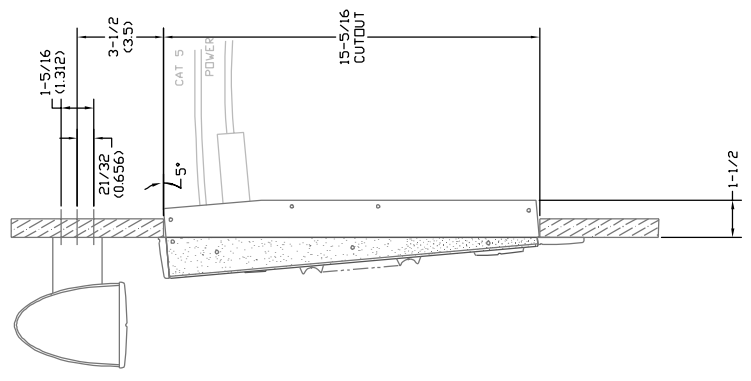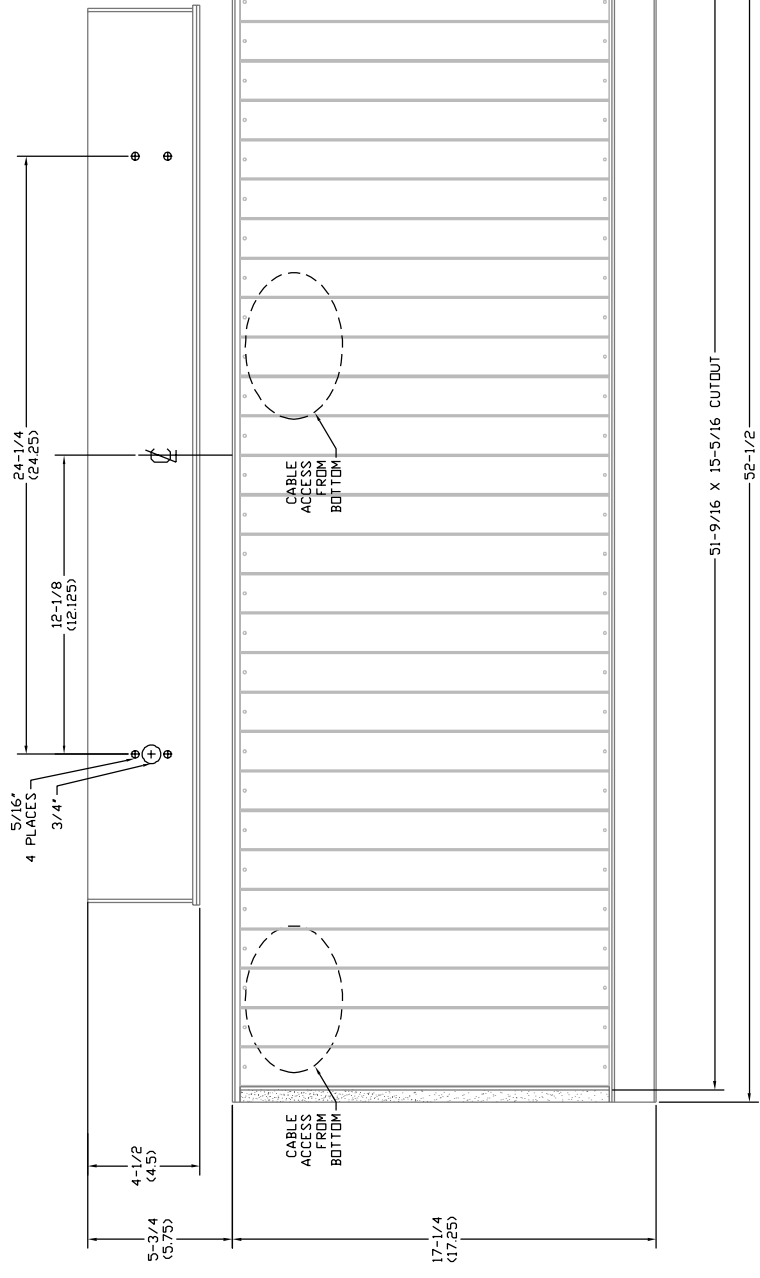
Krone block connection information is on the right.

For Example, the AES connection for outbound PC Record audio is on outputs 11/12, which is punched down to Block 2 (outputs) Left side, on the ninth pair of the block.

The analog connection for the cue speaker amp is connected to Block 2 Right side, on the seventeenth and eighteenth pairs of the block for left and right respectively.

Output Chan Num	Module Chan Num	Chan Label 8 character max	Local Label 8 character max	Linked 0=Mono 1=Stereo 2=Mono LR Sum	Hidden 0=No 1=Yes	Notes 255 character max	Bus Type # 0=Router 1=Program 2=Audition 3=Send 4=Aux, 5=Off	Bus Type Name calculated from #	Block and Side	Krone Pair number
1	1	A Hyb1>	A Hyb1>	3	0	mix minus feed to Hybrid	12	Mix-Minus	B2L	2
2	2	A Hyb2>	A Hyb2>	3	0	mix minus feed to Hybrid	12	Mix-Minus	B2L	2
3	3	A PROC>	A PROC>	1	1	AES out for processing chain (xpt dsplb17)		Router	B2L	3
4	4	{A PROC>	{A PROC>	1	1			Router	B2L	3
5	5	A REC	A REC	1		REC bus feed to recording devices	7	Utility	B2L	5
6	6	{A REC	{A REC	1	1		7	Utility	B2L	5
7	7				1			Router	B2L	6
8	8				1			Router	B2L	6
9	9	A ISDN1>	A ISDN1>	1	0	mix minus feed to ISDN unit	12	Mix-Minus	B2L	8
10	10	{A ISDN1>	{A ISDN1>	1	1		12	Mix-Minus	B2L	8
11	11	A PCREC>	A PCREC>	1	0	AES out for PC Rec (xpt dsplb23)		Router	B2L	9
12	12	{A Pcre	{A Pcre	1	1			Router	B2L	9
13	13	A OFFL	A OFFL	3	0	OFFLINE bus		Router	B2L	11
14	14	A TBbus	A TBbus	3	0	TalkBack Bus inbound to Operator (32kd)		Router	B2L	11
15	15	A CueMix	A CueMix	1	0	Cue mix bus		Router	B2L	12
16	16	{A Cuex	{A Cuex	1	1			Router	B2L	12
17	17	A PGM1	A PGM1	1		Main Pgm bus (RJ45 AES feed meter1	1	Program	B2R	2
18	18	{A PGM1	{A PGM1	1	1		1	Program	B2R	3
19	19	A Meter2	A Meter2	1		move to 17,19,21 or 23 for steerable meter	0	Router	B2R	5
20	20	{A Mtr2	{A Mtr2	1	1	(RJ45 AES output feeds steerable meter)	0	Router	B2R	6
21	21	A PGM2	A PGM2	1		PGM2 output	1	Program	B2R	8
22	22	{A PGM2	{A PGM2	1	1		1	Program	B2R	9
23	23				1			Router	B2R	11
24	24				1			Router	B2R	12
25	25	A MonSpk	A MonSpk	1		Feed to monitor amp/speakers	14	Speaker	B2R	14
26	26	{A MonSp	{A MonSp	1	1		14	Speaker	B2R	15
27	27	A CueSpk	A CueSpk	1		feed to cue amp/speakers	14	Speaker	B2R	17
28	28	{A CueSp	{A CueSp	1	1		14	Speaker	B2R	18
29	29	A OpHP	A OpHP	1		feed to operator Headphone amp	15	Headphone	B2R	20
30	30	{A OpHP	{A OpHP	1	1		15	Headphone	B2R	21
31	31	A GstHP	A GstHP	1		feed to guest HP amp	15	Headphone	B2R	23
32	32	{A GstHp	{A GstHp	1	1		15	Headphone	B2R	24

REVISIONS

DATE	DESCRIPTION	

1-5/16
(1.312)

3-1/2
(3.5)

21/32
(0.656)

15-5/16
CUTOUT

CAT 5

POWER

5°

1-1/2

24-1/4
(24.25)

12-1/8
(12.125)

5/16"
4 PLACES

3/4"

CABLE
ACCESS
FROM
BOTTOM

51-9/16 x 15-5/16 CUTOUT

52-1/2

4-1/2
(4.5)

5-3/4
(5.75)

17-1/4
(17.25)

CABLE
ACCESS
FROM
BOTTOM

NOTES:
1. CUTOUT DIMENSIONS ALLOW FOR VARIATIONS.
   DO NOT INCREASE 15-5/16 DIM. USE 5° FOR THICK TOPS.
   ENSURE OPENING IS SQUARE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: ANGLES
FRACTIONS: DECIMALS   ± Z
± 1/64   .XX =±0.015
         .XXX=±0.005

DRAWN	EDF
CHECKED	
APPROVED	
DATE	07/05

SAS   Sierra Automated Systems

RUBICON SL OUTLINE DRAWING,
32 MODULE FRAME WITH 4 METER POD

DRSL3240L

SHEET 1 OF 1