

# **B 400**

## **USER GUIDE**

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**B400**

**1**

# **Introduction**

# Introduction

Congratulations on purchasing a Soundcraft console.

The B400 has been designed to meet the needs of Live TV & Radio Broadcast and Production Facilities including OB vehicles. Based on the highly successful B800, the B400 delivers a level of configurability unrivalled in its class.

## System Overview

- 24, 32, 40, 48 and 56-module frames
- 1 stereo and 3 mono auxes
- LED indication on all switches
- Wide variation in module audio and logic / control functions via internal jumpers
- Stereo ISDN cleanfeed facilities via direct outputs on Telco channels
- Versatile and highly configurable monitoring via speakers and studio and guest headphones
- Limiters on master output
- Wide range of meterbridge options
- Balanced audio inputs and outputs throughout, on XLRs and EDACs
- Pseudo-balanced internal bussing

## Power Supply

- The B400 uses the CPS275 Power Supply.

## Warranty

- 1 **Soundcraft** is a trading division of Harman International Industries Ltd .

**End User** means the person who first puts the equipment into regular operation.

**Dealer** means the person other than Soundcraft (if any) from whom the End User purchased the Equipment, provided such a person is authorised for this purpose by Soundcraft or its accredited Distributor.

**Equipment** means the equipment supplied with this manual.

- 2 If within the period of twelve months from the date of delivery of the Equipment to the End User it shall prove defective by reason only of faulty materials and/or workmanship to such an extent that the effectiveness and/or usability thereof is materially affected the Equipment or the defective component should be returned to the Dealer or to Soundcraft and subject to the following conditions the Dealer or Soundcraft will repair or replace the defective components. Any components replaced will become the property of Soundcraft.
- 3 Any Equipment or component returned will be at the risk of the End User whilst in transit (both to and from the Dealer or Soundcraft) and postage must be prepaid.
- 4 This warranty shall only be available if:
  - a) the Equipment has been properly installed in accordance with instructions contained in Soundcraft's manual; and
  - b) the End User has notified Soundcraft or the Dealer within 14 days of the defect appearing; and
  - c) no persons other than authorised representatives of Soundcraft or the Dealer have effected any replacement of parts maintenance adjustments or repairs to the Equipment; and
  - d) the End User has used the Equipment only for such purposes as Soundcraft recommends, with only such operating supplies as meet Soundcraft's specifications and otherwise in all respects in accordance Soundcraft's recommendations.
- 5 Defects arising as a result of the following are not covered by this Warranty: faulty or negligent handling, chemical or electro-chemical or electrical influences, accidental damage, Acts of God, neglect, deficiency in electrical power, air-conditioning or humidity control.
- 6 The benefit of this Warranty may not be assigned by the End User.
- 7 End Users who are consumers should note their rights under this Warranty are in addition to and do not affect any other rights to which they may be entitled against the seller of the Equipment.





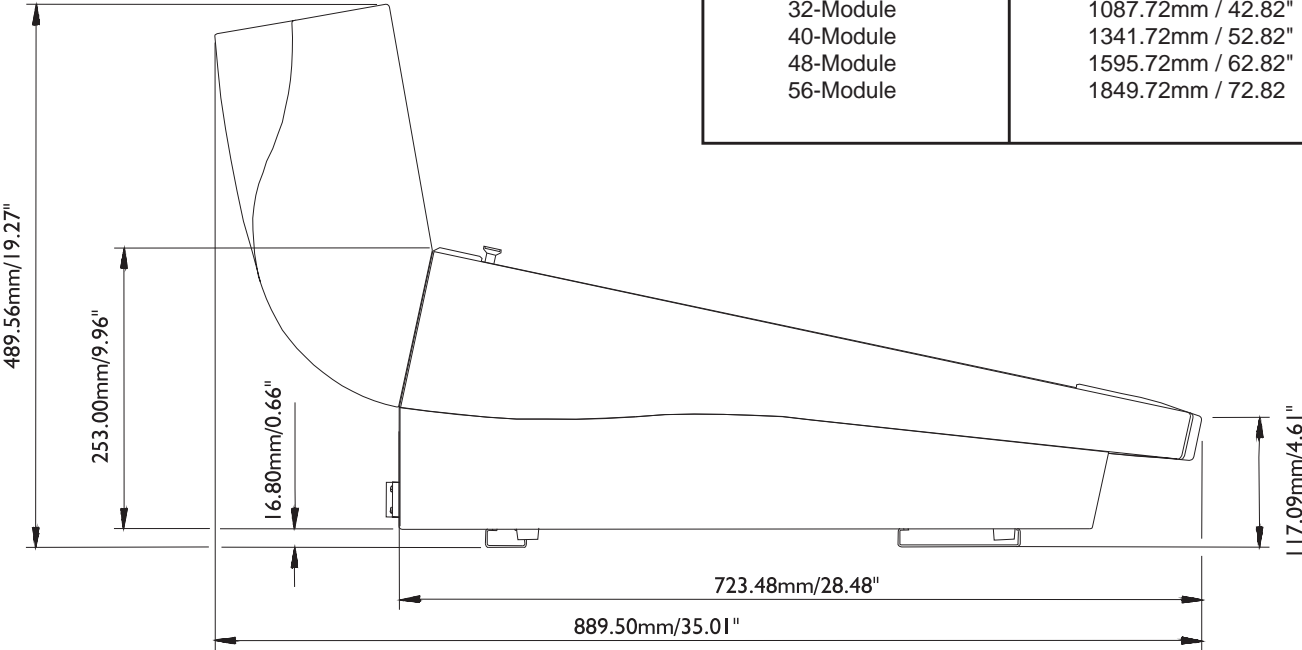
**B400**

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# **Installation**

# Dimensions

Frame Size	Width
24-Module	833.72mm / 32.82"
32-Module	1087.72mm / 42.82"
40-Module	1341.72mm / 52.82"
48-Module	1595.72mm / 62.82"
56-Module	1849.72mm / 72.82"





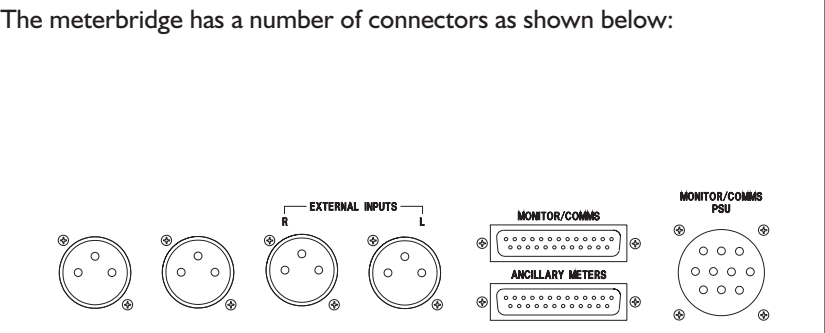
# Earthing the Console

## Important Notice.

The console has two earth posts on the rear connector panel. They are located near to the power supply connectors. The un-insulated metal post is the chassis ground, and the insulated post is the system ground. The console is supplied with these two posts linked together. It is essential that the console is operated with these two earths linked. They may, however, be linked at a different point in the installation: for example, a technical earth in the installation site. In this case the wire link between the two posts must be removed.

# Meterbridge

The meterbridge has a number of connectors as shown below:



The MONITOR/COMMS D-type connector routes signals to the Monitor Selector PCB ( see the Meterbridge connector list on the previous page for pin details).  
The ANCILLARY METERS D-type connector carries the Groups and Auxes into the meterbridge. The actual connections used will depend on the number of ancillary meters which are fitted. The connections are:

1	Ground	14	Ground
2	Group 8	15	Group 7
3	Group 6	16	Group 5
4	Group 4	17	Group 3
5	Group 2	18	Group 1
6	Not Used	19	Not Used
7	Not Used	20	Not Used
8		21	Aux 1
9		22	Aux 2
10		23	Aux 3
11		24	
12	Aux 4L	25	Aux 4R
13	Not Used		

The EXTERNAL INPUTS XLRs are also routed to the Monitor Selector PCB. The inputs here may be monitored on the Meters which are associated with the Monitor Selector PCB.  
There are also 2 additional XLRs: these are for future expansion.

## Rear Connector Panel EDAC Connectors

There are two female 90-way EDAC connectors on the rear connector panel. The illustration below shows the pin labelling (as viewed from the outside of the console).

The pins are listed in circuits below - the circuit functions for each EDAC are shown on the following pages.

	HI (+)	LO (-)	GND
CCT 1	A	B	C
CCT 2	H	J	K
CCT 3	R	S	T
CCT 4	X	Y	Z
CCT 5	AE	AF	AH
CCT 6	AM	AN	AP
CCT 7	BJ	BK	BL
CCT 8	BS	BI	BU
CCT 9	BY	BZ	CA
CCT 10	CF	CH	CJ
CCT 11	CN	CP	CR
CCT 12	CW	CX	CY
CCT 13	F	E	D
CCT 14	P	N	M
CCT 15	W	V	U
CCT 16	AD	AC	AB
CCT 17	AL	AK	AJ
CCT 18	AU	AT	AS
CCT 19	BR	BP	BN
CCT 20	BX	BW	BV
CCT 21	CE	CD	CC
CCT 22	CM	CL	CK
CCT 23	CV	CU	CT
CCT 24	DB	PA	CZ

### EDAC 1

<i>Circuit Number</i>	<i>Function</i>
CCT 1	not used
CCT 2	Ext Cue I/P
CCT 3	Prod T/B I/P
CCT 4	T/B to Ext
CCT 5	Oscillator L
CCT 6	Oscillator R
CCT 7	Ext Mon I/P L
CCT 8	Ext Mon I/P R
CCT 9	Stud Spkr L
CCT 10	Stud Spkr R
CCT 11	PH1L Studio
CCT 12	PH1R Studio
CCT 13	T/B to opt 1
CCT 14	T/B to opt 2
CCT 15	Ext 1L
CCT 16	Ext 1R
CCT 17	Ext 2L
CCT 18	Ext 2R
CCT 19	Ext 3L
CCT 20	Ext 3R
CCT 21	Ext 4L
CCT 22	Ext 4R
CCT 23	PH2L Guest
CCT 24	PH2R Guest

### EDAC 2

<i>Circuit Number</i>	<i>Function</i>
CCT 1	Mono
CCT 2	Aux 1
CCT 3	Aux 2
CCT 4	Aux 3
CCT 5	Aux 4L
CCT 6	Aux 4R
CCT 7	Ext 5L
CCT 8	Ext 5R
CCT 9	Ext 6L
CCT 10	Ext 6R
CCT 11	Ext 7L
CCT 12	Ext 7R
CCT 13	RTN T/B
CCT 14	T/B Line I/P
CCT 15	ST1L
CCT 16	ST1R
CCT 17	Mono
CCT 18	No connection
CCT 19	No connection
CCT 20	No connection
CCT 21	No connection
CCT 22	No connection
CCT 23	Ext 8L
CCT 24	Ext 8R

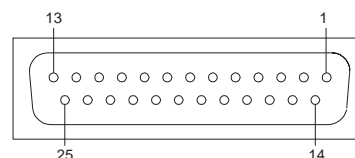
## Rear Connector Panel D-Type Connectors

There are a number of 25-way D-type female connectors (depending upon the number of input channels) on the rear connector panel. The connector layout varies with the configuration of input modules and mono and stereo input modules differ in the facilities available.

- Each block of four Mono inputs has one D-type connector for external mutes, and one D-type for Mic Live Remotes.
- Each block of four Stereo inputs has one D-type connector for external mutes, and one D-type for Remote Stop/Starts.

The diagram opposite shows the pin labelling (as viewed from the outside of the console).

The pin-outs of the various D-types are given below.



### REMOTE 25-Way D-Types

*Pin Function*

*Channel 4, 8, 12 etc., Grp 3, Grp 7*

1 EXT MUTE (active low)  
2 STOP #2(n/o relay contact)  
3 REMOTE START#2 (n/o relay contact)

*Channel 3, 7, 11 etc., Grp 2, grp 6*

4 EXT MUTE  
5 STOP#2(n/o relay contact)  
6 REMOTE START#2(n/o relay contact)

*Channel 2, 6, 10 etc., Grp 1, Grp 5, ST*

7 EXT MUTE  
8 STOP #2(n/o relay contact)  
9 REMOTE START #2(n/o relay contact)

*Channel 1, 5, 9 etc. Grp 4*

10 EXT MUTE  
11 STOP #2(n/o relay contact)  
12 REMOTE START #2(n/o relay contact)  
13 not used

*Pin Function*

14 VCA CTL (0V=0dB, 5V= -∞)  
15 STOP#1(n/o relay contact)  
16 REMOTE START#1(n/o relay contact)

17 VCA CTL  
18 STOP #1(n/o relay contact)  
19 REMOTE START#1(n/o relay contact)

20 VCA CTL  
21 STOP #1(n/o relay contact)  
22 REMOTE START#1(n/o relay contact)

23 VCA CTL  
24 STOP #1(n/o relay contact)  
25 REMOTE START #1(n/o relay contact)

Notes: GRP & ST Master modules do not utilise the "stop" function.

Ground Ref. for EXT MUTE and VCA CTL is on EXT LOGIC D-type connector.

### MONO INPUT MIC LIVE REMOTES

*Pin Function*

1 MIC LIVE#2 (Ch 4, 8, 12 etc.)  
2  
3 MIC LIVE#2 (Ch 3, 7, 11 etc.)  
4  
5 MIC LIVE#2 (Ch 2, 6, 10 etc.)  
6  
7 MIC LIVE#2 (Ch 1, 5, 9 etc.)  
8  
9 Not used  
10 Not used  
11 Not used  
12 Not used  
13 Not used

*Pin Function*

14 MIC LIVE#1 (Ch 4, 8, 12 etc.)  
15  
16 MIC LIVE#1 (Ch 3, 7, 11 etc.)  
17  
18 MIC LIVE#1 (Ch 2, 6, 10 etc.)  
19  
20 MIC LIVE#1 (Ch 1, 5, 9 etc.)  
21  
22 Not used  
23 Not used  
24 Not used  
25 Not used

## STEREO INPUT REMOTES

<i>Pin</i>	<i>Function</i>	<i>Pin</i>	<i>Function</i>
1	REMOTE START #4 (Ch 4, 8, 12 etc.)	14	REMOTE START #3 (Ch 4, 8, 12 etc.)
2	REMOTE STOP #4 (Ch 4, 8, 12 etc.)	15	REMOTE STOP #3 (Ch 4, 8, 12 etc.)
3	REMOTE START #4 (Ch 3, 7, 11 etc.)	16	REMOTE START #3 (Ch 3, 7, 11 etc.)
4	REMOTE STOP #4 (Ch 3, 7, 11 etc.)	17	REMOTE STOP #3 (Ch 3, 7, 11 etc.)
5	REMOTE START #4 (Ch 2, 6, 10 etc.)	18	REMOTE START #3 (Ch 2, 6, 10 etc.)
6	REMOTE STOP #4 (Ch 2, 6, 10 etc.)	19	REMOTE STOP #3 (Ch 2, 6, 10 etc.)
7	REMOTE START #4 (Ch 1, 5, 9 etc.)	20	REMOTE START #3 (Ch 1, 5, 9 etc.)
8	REMOTE STOP #4 (Ch 1, 5, 9 etc.)	21	REMOTE STOP #3 (Ch 1, 5, 9 etc.)
9	Not used	22	Not used
10	Not used	23	Not used
11	Not used	24	Not used
12	Not used	25	Not used
13	Not used		

NOTE: Each input slot may be fitted with a Mono or Stereo module, and the pinouts for the last two connectors may therefore be a combination of the two versions on some frames.

## EXT LOGIC

<i>Pin</i>	<i>Function</i>	<i>Pin</i>	<i>Function</i>
1	GND	14	GND
2	GND	15	Prod T/B Stud CTL
3	Prod T/B to Ext CTL (I/P)	16	Ext mute I/P (studio spkr)
4	Prod T/B to Eng CTL (I/P)	17	Talk to Ext CTL O/P
5	Option 2 - CTL #2	18	Option 2 - CTL #1
6	Option 1 - CTL #2	19	Option 1 - CTL #1
7	On-Air o/p #	20	On-Air O/P #2
8	On-Air i/p #1	21	On-Air I/P #2
9	Not Used	22	Not Used
10	Ext Mntr (Level CTL I/P)	23	Ext CUE (Level CTL I/P)
11	RET T/B CTL (I/P)	24	Ext A/B CTL R (I/P)
12	Ext A/B CTL L (I/P)	25	Ext mute R (I/P)
13	Ext mute L (I/P)		

## METERBRIDGE

This connects via a ribbon cable to the Monitor/Comms D-type on the meterbridge.

1	Not used	14	Not used
2	ST Mntr/Meter	15	ST Mntr/Meter
3	MONO Mntr/Meter	16	MONO Mntr/Meter
4	not used	17	not used
5	not used	18	not used
6	Not Used	19	GND
7	TB Mic	20	TB Mic + IV5
8	Studio Meter R	21	Studio Meter L
9	Ext VCA Warning LED	22	Monitor Meter L
10	Monitor Meter R	23	O/Press Meter
11	O/Press Ctl	24	Squawk Feed
12	Cue Meter R	25	Cue Meter L
13	Cue Ctl		

# Jumper Options

\* = DEFAULT

## MONO INPUT

### Audio

SW19	Released = Insert Point is Pre-fade (see links 1 to 4) Depressed = Insert Point is Post-fade (links 1 to 4 have no effect, but they must be present)	
LK1-4	Pre-fade Insert	1-2 = Pre Eq 2-3 = Post Eq*
J1,2	HF EQ	1-2 = Bell* 2-3 = Shelf
J3	Meter Input	1-2 = Pre EQ 2-3 = Pre Fade*
J4	Stereo Aux 4 pre fade source	1-2 = Pre mute* 2-3 = Post mute
J5	Mono Aux 1-3 pre fade source	1-2 = Pre mute* 2-3 = Post mute
J6	Dir O/P via Aux 1 Level pot	1-2 = Dir O/P* 2-3 = J3 setting

### Logic

SW21-A	Closure disables dual action of Cue sw.	Open
SW21-B	Closure enables Cue Cancel from fader open	Closed
SW21-C	Open enables Rem Com in mic mode	Closed
SW21-D	Closure enables latching start in line mode	Open
SW21-E	Closure enables momentart start in line mode	Closed
SW21-F	Closure enables start/stop function from PFL	Closed
SW21-G	Closure for mic live studio mute	Closed
SW21-H	Closure for mic live control room mute	Open

## STEREO INPUT

### Audio

J1, 2	Dir output source L/R (removed on Telco)	1-2 = Post fade* 2-3 = pre mute
J3, 4	Meter source L/R	1-2 = Post fade 2-3 = Pre EQ*
J5, 6	Aux 4 pre fade source L/R	1-2 = Post mute* 2-3 = Pre mute
J7, 8	Aux 1-3 pre fade source L + R	1-2 = Post mute* 2-3 = Pre mute

\*Telco Version, on Sub Board

J1, 2	Dir O/P pre fade source L/R	1-2 = Post mute* 2-3 = Pre mute
J11	Input 'B' mode	1-2 = Telco 'CLNFD' 2-3 = Dir O/P



### Logic

SW21-A	Closure disables dual action of Cue sw.	Open
SW21-B	Closure enables Cue Cancel from fader open	Closed
SW21-C	Open enables latching start line 1	Open
SW21-D	Closure enables momentary start in line 1	Closed
SW21-E	Closure enables latching start in line 2 from fader/On and PFL	Open
SW21-F	Closure enables momentary start in line 2	Closed
SW21-G	Closure enables line 1 momentary start/stop from PFL (active only when CUE is pressed)	Closed
SW21-H	Closure enables line 2 momentary start/stop from PFL (active only when CUE is pressed)	Closed

### MONO GRP

J1	Remote Common	A = local* B = rem com
J2	Talkback to Group replaces or mixes with Prog	Fit = replaces* Omit = mixes
J3	Slate replaces or mixes with Prog	Fit = replaces* Omit = mixes
J4	ON-AIR kills Talkback Enable	A = No effect* B = kills
J7	Aux 1-3 pre-fade source	A = Pre mute B = post mute*
J8	Stereo Aux 4 pre-fade source	A = Pre mute B = Post mute*
SW30	Internal Insert Pre/post selection	Released = Pre-fade* Pressed = Post-fade

### STEREO GRP

J1	Remote Common	1-2 = local* 2-3 = rem com
J2	Talkback to Group replaces or mixes with Prog	Fit = replaces* Omit = mixes
J3	Slate replaces or mixes with Prog	Fit = replaces* Omit = mixes
J4	ON-AIR kills Talkback Enable	1-2 = No effect* 2-3 = kills
J9, 10	Aux 4 pre-fade source	1-2 = Pre mute 2-3 = post mute*
J11, 12	Aux 1-3 pre-fade source	1-2 = Pre mute 2-3 = Post mute*
SW30, 31	Internal Insert Pre/post selection L/R	Released = Pre-fade* Pressed = Post-fade

## STEREO MASTER

J1	Remote Common	1-2 = Local * 2-3 = Rem com
J2 - J3	Mono Output post fade,pre limiter/post limiter	1-2 = Post limiter* 2-3 = Pre limiter
J4	Talkback replaces or mixes with Program	Fit = Replaces* Omit = Mixes
J5, 6	Limiter Pre-emphasis	Fit = On Omit = Off*

## MONITOR MODULE

J1	Ext 8 Input Sensitivity	1-2 = +4dBu * 2-3 = -10dBV
J2, 3, 4	Cue to Monitor/Talk to Studio (2 Mntr Mods.)	1-2 = Cue* 2-3 = Talk
J5-9	Talkback Selection (with 2 Monitor Modules)	1-2 = Default * 2-3 = T/B to studio

### J10 & J11

If the Cue Speaker Outputs are not being used, link J10 pins 1 to 2, and link J11 pins 1 to 2. In this configuration, a sum of the Cue Left and Right Signals are routed to the Cue Speaker on the Overbridge. This feed is muted by using the Overpress facility (if it is fitted).

If the Cue Speaker Outputs are being used, link J10 pin1 to J11 pin1, and link J10 pin 2 to J11 pin 2. In this configuration the sum of the Cue Left and Cue Right signals is never routed to the Cue Speaker on the Overbridge. The individual Cue Left and Cue Right signals are routed to their respective Cue Speaker Outputs, but these are muted by using the Overpress facility (if it is fitted). Alternatively if only pins J10 pin2 and J11 pin 2 are linked then the Overpress facility will not mute the Cue L & R signals to the Cue Speaker Outputs.

J12	Cue to Headphones mixes or replaces Program	1-2 = Mixes * 2-3 = Replaces
J13	Monitor Dim or Mute from DIM bus	1-2 = Dim* 2-3 = Mute
J14	Studio Dim bus	1-2 = Studio Mute* 2-3 = Studio Dim

## COMMS MODULE

J1, 2	Feeds T/B to the external destinations. When not operated these can be either an external cue input signal or no signal	1-2 = Cue signal* 2-3 = No signal
J3	Talkback to Studio Speakers	1- 2 = Mute kills T/B* 2- 3 = T/B overrides
J4	T/B to Studio Speakers mixes or replaces Prog.	1-2 = Mixes* 2-3 = Replaces
J5, 6	Engineer talkback to cleanfeed L/R busses	1-2 = Enabled 2-3 = Disabled*

# Internal Monitor Source Selection

The DESK 'A' bank of switches, on the Monitor Module, allows you to select 1 of 6 internal signals as the internal monitor source. The 6 are selected via the scramble card (SC3556) in the console. The appropriate section of this PCB's silk screen is reproduced below. The six signals may be chosen from Groups 1 to 8, the Stereo Mix (ST), a mono sum of the Stereo Mix, or Aux1 to Aux 4.

There is also a spare left and spare right feed which may be used to monitor any suitable point in the console.

The Scramble Card used is common to the larger B800 console, and the legending corresponds as follows:

Aux 2 legend = Aux 1      Aux 4 legend = Aux 2  
 Aux 6 legend = Aux 3      Aux 8 legend = Aux 4 (stereo)  
 ST2 legend = ST

The Layout of the card is shown below:

	1 L	1 R	2 L	2 R	3 L	3 R	4 L	4 R	5 L	5 R	6 L	6 R	
GRP8	L1	L27	L53	L79	L105	L131	L157	L183	L209	L235	L261	L287	GRP8
GRP7	L2	L28	L54	L80	L106	L132	L158	L184	L210	L236	L262	L288	GRP7
GRP6	L3	L29	L55	L81	L107	L133	L159	L185	L211	L237	L263	L289	GRP6
GRP5	L4	L30	L56	L82	L108	L134	L160	L186	L212	L238	L264	L290	GRP5
GRP4	L5	L31	L57	L83	L109	L135	L161	L187	L213	L239	L265	L291	GRP4
GRP3	L6	L32	L58	L84	L110	L136	L162	L188	L214	L240	L266	L292	GRP3
GRP2	L7	L33	L59	L85	L111	L137	L163	L189	L215	L241	L267	L293	GRP2
GRP1	L8	L34	L60	L86	L112	L138	L164	L190	L216	L242	L268	L294	GRP1
ST1L	L9	L35	L61	L87	L113	L139	L165	L191	L217	L243	L269	L295	ST1L
ST1R	L10	L36	L62	L88	L114	L140	L166	L192	L218	L244	L270	L296	ST1R
ST2L	L11	L37	L63	L89	L115	L141	L167	L193	L219	L245	L271	L297	ST2L
ST2R	L12	L38	L64	L90	L116	L142	L168	L194	L220	L246	L272	L298	ST2R
MND1	L13	L39	L65	L91	L117	L143	L169	L195	L221	L247	L273	L299	MND1
MND2	L14	L40	L66	L92	L118	L144	L170	L196	L222	L248	L274	L300	MND2
AUX1	L15	L41	L67	L93	L119	L145	L171	L197	L223	L249	L275	L301	AUX1
AUX2	L16	L42	L68	L94	L120	L146	L172	L198	L224	L250	L276	L302	AUX2
AUX3	L17	L43	L69	L95	L121	L147	L173	L199	L225	L251	L277	L303	AUX3
AUX4	L18	L44	L70	L96	L122	L148	L174	L200	L226	L252	L278	L304	AUX4
AUX5	L19	L45	L71	L97	L123	L149	L175	L201	L227	L253	L279	L305	AUX5
AUX6	L20	L46	L72	L98	L124	L150	L176	L202	L228	L254	L280	L306	AUX6
AUX7L	L21	L47	L73	L99	L125	L151	L177	L203	L229	L255	L281	L307	AUX7L
AUX7R	L22	L48	L74	L100	L126	L152	L178	L204	L230	L256	L282	L308	AUX7R
AUX8L	L23	L49	L75	L101	L127	L153	L179	L205	L231	L257	L283	L309	AUX8L
AUX8R	L24	L50	L76	L102	L128	L154	L180	L206	L232	L258	L284	L310	AUX8R
SPARE L	L25	L51	L77	L103	L129	L155	L181	L207	L233	L259	L285	L311	SPARE L
SPARE R	L26	L52	L78	L104	L130	L156	L182	L208	L234	L260	L286	L312	SPARE R

## Fitting Links

Suitably sized hair-pin links may be soldered into the appropriate through-plated holes. Take care to select the correct side when connecting a stereo pair. For example, if you wanted to assign Source 1 to Aux 3 then you would fit links L20 and L47. If you then wanted to assign Source 2 to Aux 4 (which is a stereo pair) then you would fit links L75 and L102.

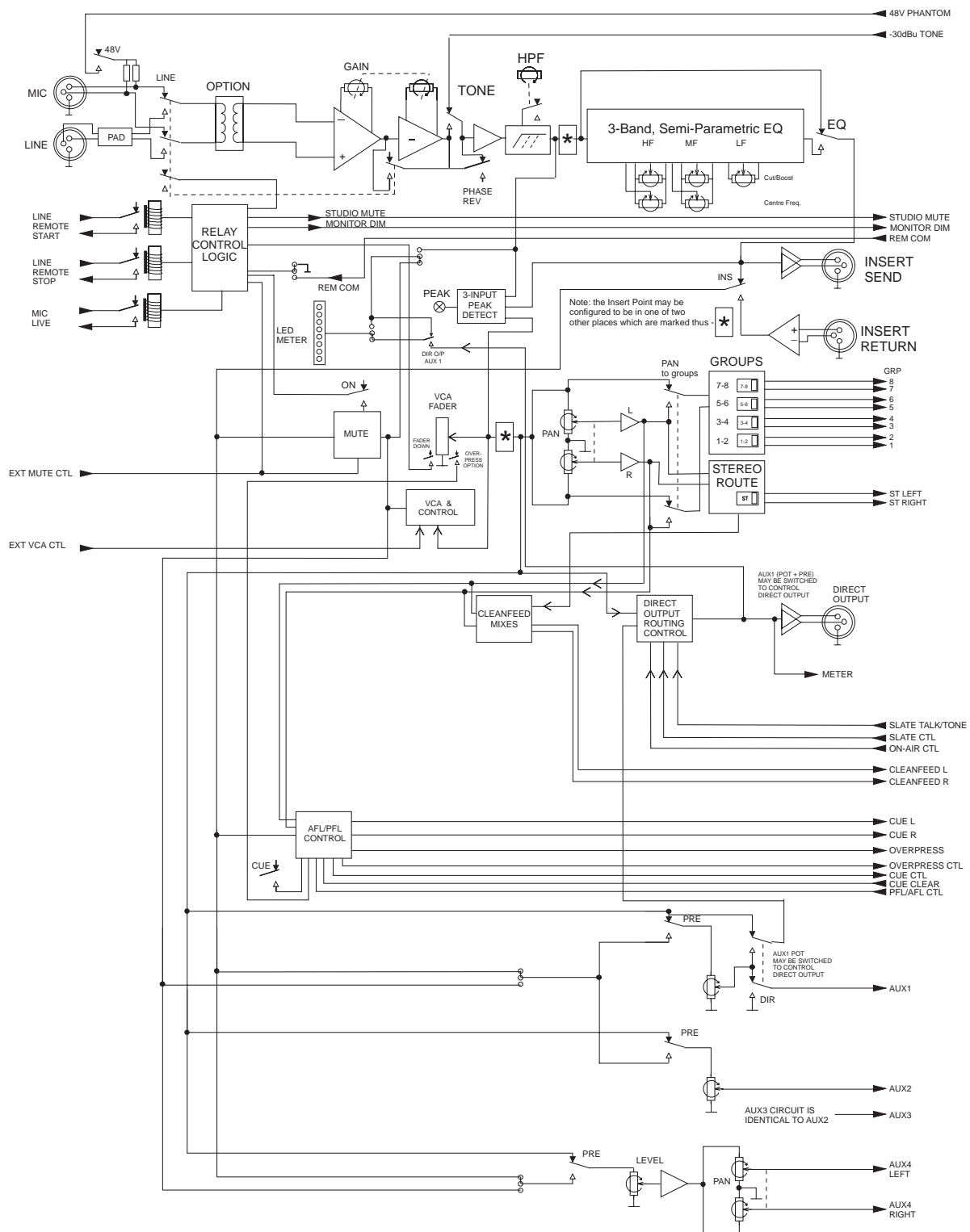


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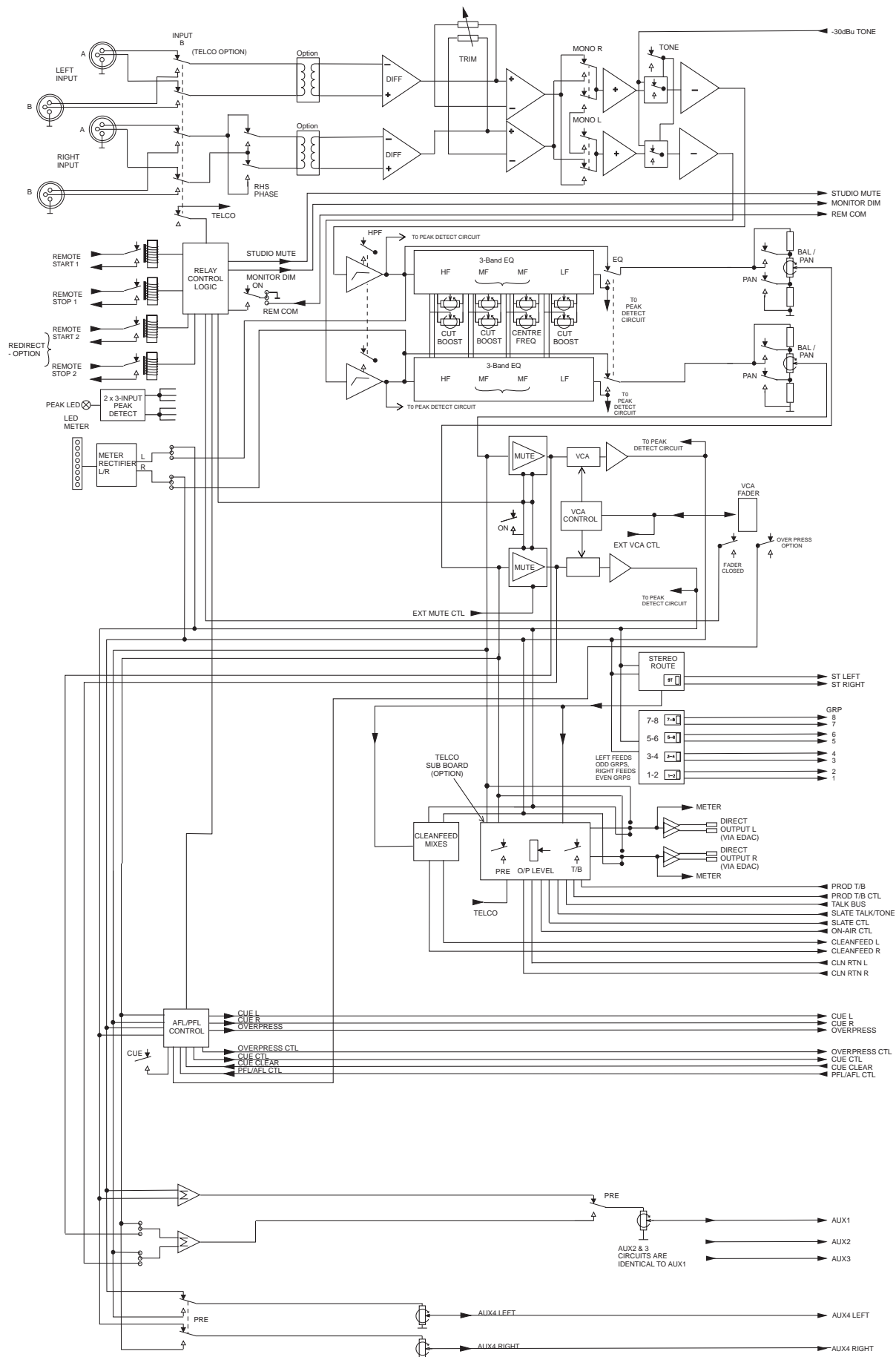
**3**

# **Block Diagrams**

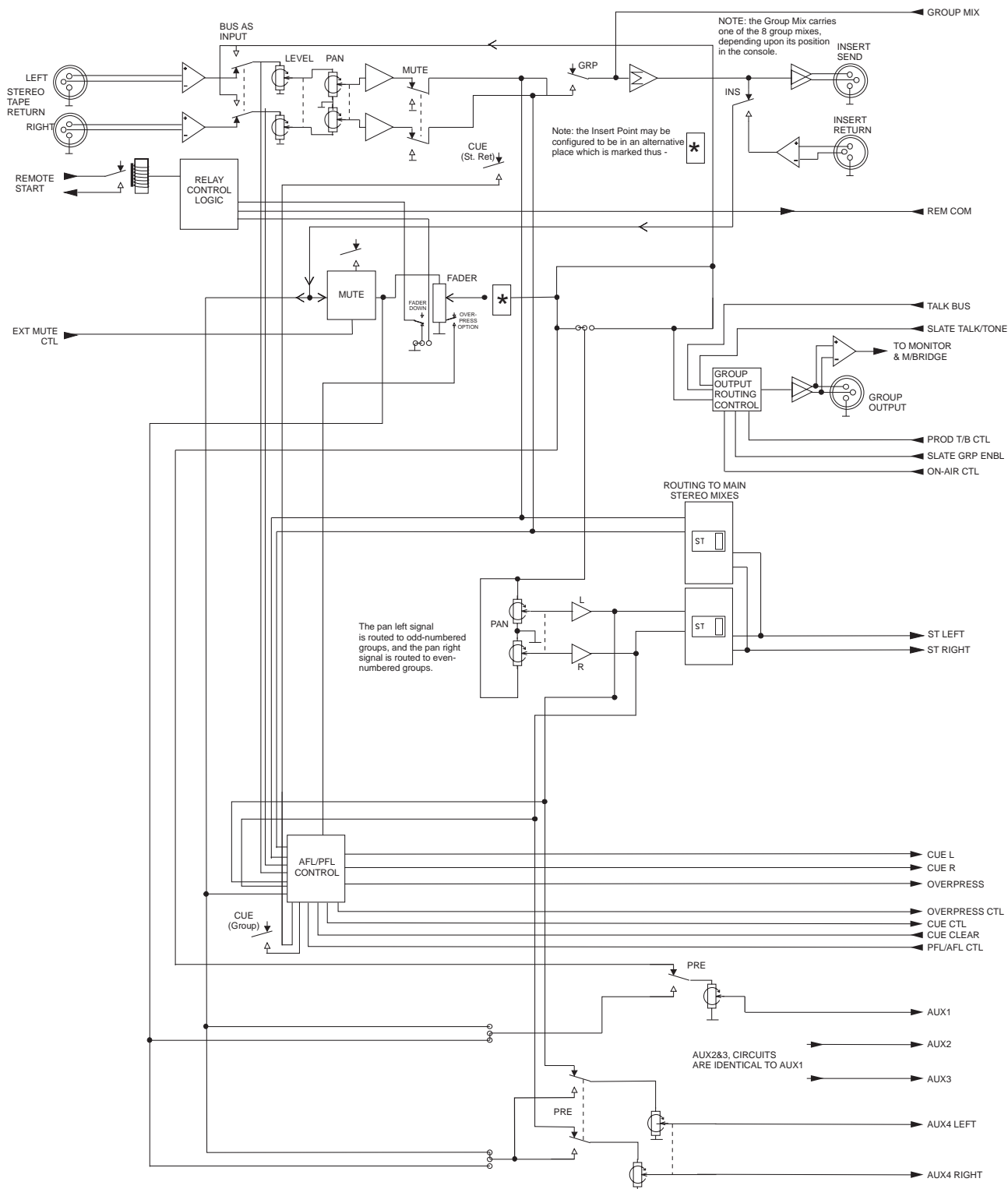
# Mono Input Block Diagram



# Stereo Input Block Diagram

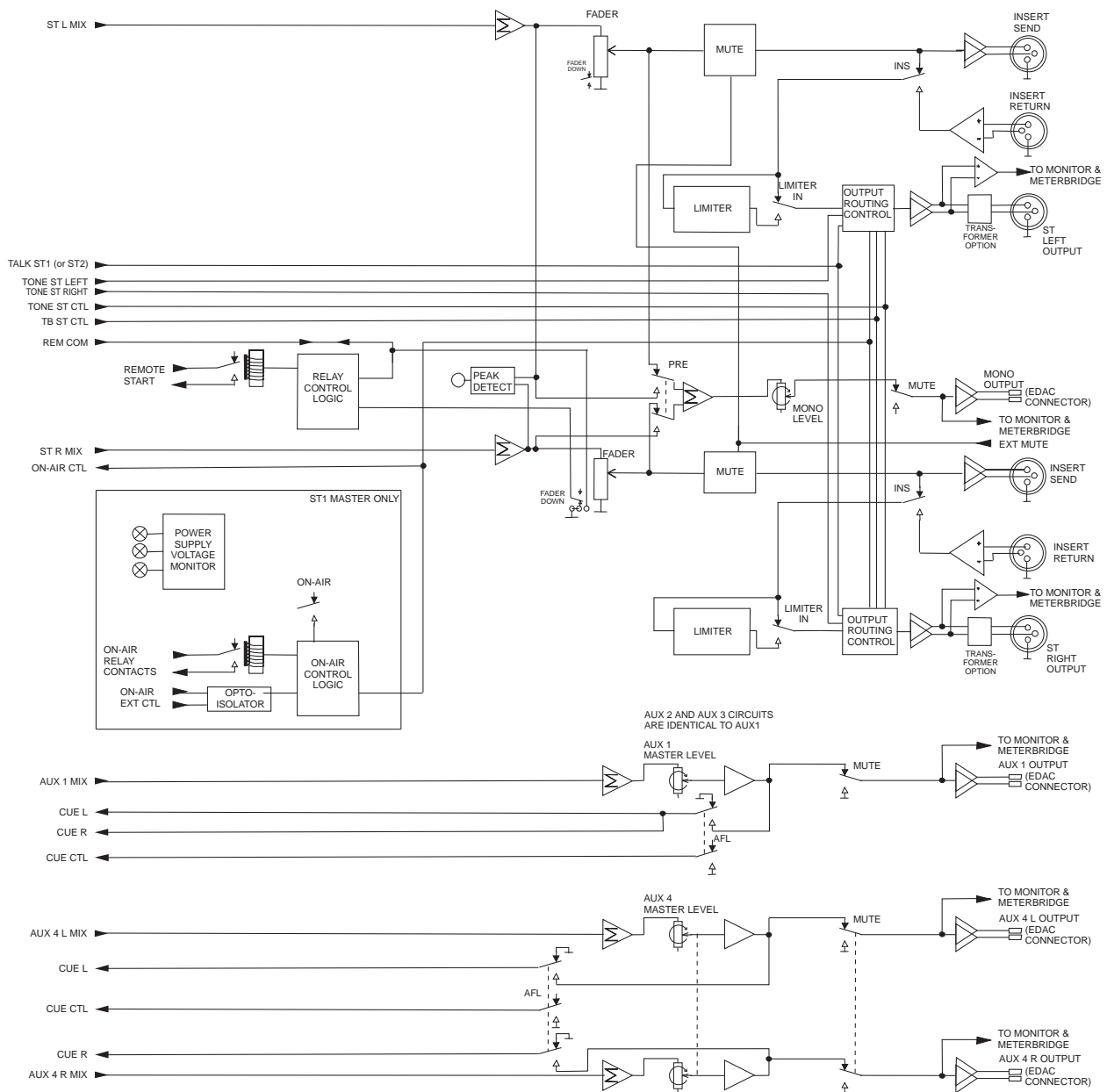


# Mono Group Block Diagram





# Stereo Master Module Block Diagram

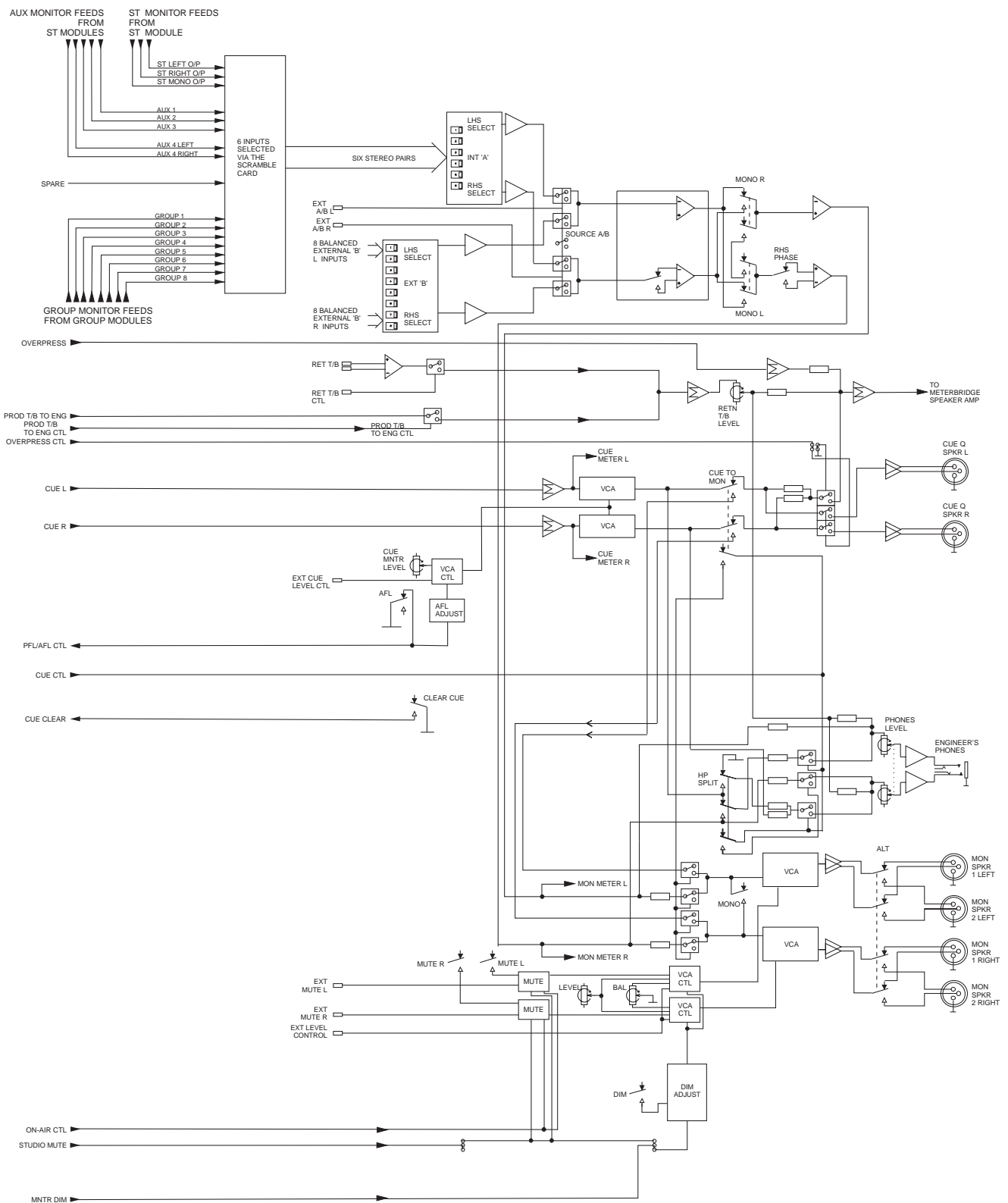


The diagram illustrates the complex signal routing and control for a radio station transmitter. Key components and their functions include:

- SLATE/TALKBACK CONTROL:** Manages slate and talkback signals, including a 100 kHz oscillator.
- OSCILLATOR/SLATE OSCILLATOR:** Provides a stable frequency reference for the transmitter.
- ST (Studio Transmitter) Module:** The central processing unit for studio signals, including talkback and monitor outputs.
- TALK TO STUD & PROD TALK TO STUD:** Modules for bidirectional communication between the studio and production areas.
- GUEST PHONES & STUDIO PHONES:** Modules for monitoring and communication with guests and studio personnel.
- STUDIO SPEAKERS & MIC OPEN:** Output stages for monitoring and microphone input.

The diagram shows a high degree of integration, with multiple control lines (CTL) and feedback paths (CLN FD, CLN RTN) ensuring precise signal control and monitoring throughout the system.

# Monitor Module Block Diagram

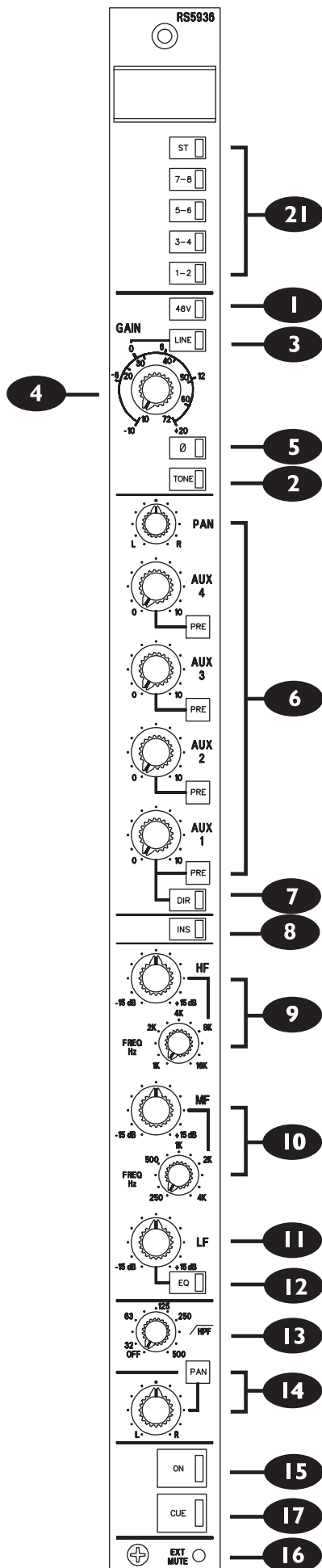




**B400**

**4**

# **Functional Description**



## Mono Input Module

### 1 +48V

The 48V switch applies 48V Phantom power to the MIC I/P XLR on the rear connector panel. The switch illuminates to indicate that it is switched on.

### 2 TONE

The TONE switch replaces the mic/line signal with the desk oscillator, allowing you to check the operation of the module. The switch illuminates to indicate that it is switched on. Note that if the module is switched to TONE the monitor mutes and remotes (start/stop) are disabled.

### 3 LINE

The LINE switch, when active, selects the LINE I/P XLR as the module's signal source instead of the MIC I/P XLR. The switch illuminates to indicate that it is switched on.

### 4 GAIN

The rotary channel GAIN control provides continuous variation from +10dB tp +72dB mic gain, and -10dB to +20dB line gain.

### 5 PHASE

The Phase of the input signal may be reversed by use of this switch. The switch illuminates to indicate that it is active.

### 6 AUXILIARY SENDS

Aux 4 is a Stereo Send. The AUX 4 control sets the level of the send and the associated PAN control adjusts the position of the signal within the stereo image. The send is normally post-fade, but pressing the PRE switch configures the send as pre-fade.

Aux 1, 2 and 3 are mono sends with individual level controls and are normally post-fade, but may be reconfigured as pre-fade by pressing the associated PRE switches.

The pre-fade source is normally pre-mute, but may be selected as post-mute by changing internal jumpers.

### 7 DIR

Pressing DIR switches the Aux1 level pot into the direct output circuit, following the pre/post selection, and mutes the send to the Aux 1 bus. Note that the Direct Output signal may be replaced by slate tone or talkback from the Communications module if required.

### 8 INS

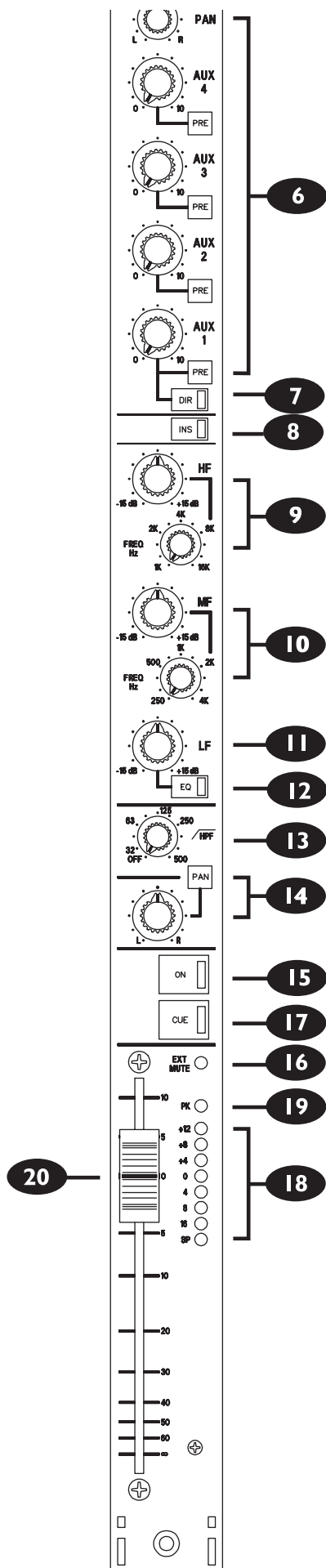
When the INS (Insert) button is depressed, the signal path is routed via the insert return XLR. When the INS button is released the insert is bypassed. Note that the signal is always available on the insert send XLR, irrespective of the position of the INS switch.

The Insert Point may be configured to be pre, post-EQ or post-fade, via an internal pcb-mounted switch and jumpers.

### 9 Equaliser - HF

The Equaliser is a 3-band semi-parametric design.

The upper, larger knob of the HF section allows you to cut or boost the HF shelving filter by up to 15dB. The Cut-off frequency is sweepable, using the lower knob, between 1kHz and 16kHz.



## 10 MF

The upper, larger knob of the MF section allows you to cut or boost the High Mid-Range bell-response filter by up to 15dB. The Mid-point frequency is sweepable, using the lower knob, between 250Hz and 4kHz. The Q-factor of the filter is fixed at 1.4.

## 11 LF

The LF knob provides 15dB cut or boost of the LF shelving filter.

## 12 EQ

The EQ section may be switched in and out of circuit via the EQ switch. The switch illuminates when pressed to indicate that the EQ is switched in.

## 13 HPF

The variable frequency HIGH PASS FILTER is controlled by a rotary pot, covering 32Hz to 500Hz. Turning the control fully anticlockwise to the click-stop position switches the filter out of circuit.

## 14 PAN

The Pan control allows the input signal to be positioned within the stereo image of the main stereo mix. The PANned signal is routed via the five buttons (21) at the top of the module to any combination of the four pairs of Groups (1-2, 3-4, 5-6, 7-8) and to the stereo master bus (ST). Pan left sends the signal to odd-numbered busses, and pan right sends the signal to even-numbered busses. When the PAN switch is released the pre-pan signal is sent to all groups.

## 15 ON

The channel is turned on when the ON switch is pressed, or may be muted under the control of a remote mute signal via the 25-way D-type connector on the rear panel. When the channel is ON and the fader is open, this is used as a cough mute in mic mode. Also in mic mode, when the fader is raised, the relevant monitors will be muted or dimmed depending on the internal jumper settings. A relay contact output pair for a 'mic live' indicator is also provided on the D-type connector. The Fader Open control signal can be set via an internal jumper to Rem Com on the Stereo Master fader. Monitor mutes will therefore not be activated until the stereo master fader is open.

## 16 EXT MUTE LED

The EXT MUTE LED glows to indicate that a remote mute is active (see above).

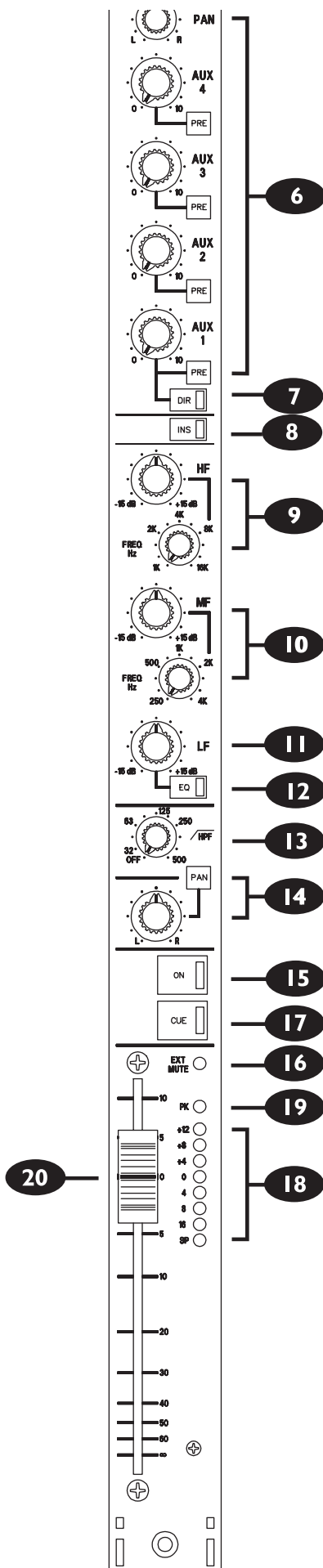
## 17 CUE

The cue system is activated by pressing the CUE button. The CUE button may be operated in latched or momentary mode, depending upon how long you hold it down. If you press and release within approximately 0.5 seconds the button will latch. If, on the other hand you press and hold for more than 0.5 seconds then the cue will remain momentary.

When the CUE switch is active, and the fader is in its fully-down position, the PFL signal will be put onto the Cue L & R busses irrespective of the AFL/PFL master setting on the Monitor Module.

The CUE button may be (optionally) reset by moving the fader away from the fully-down position.

If the CUE button is pressed when the fader is already away from the fully-down position the AFL/PFL signal will be selected according to the setting of the AFL/PFL master switch on the Monitor module.



When the input is in line level mode and the CUE switch is pressed, this will (optionally) trigger the remote start/stop facility which has two sets of relay contacts, available via the rear panel D-type connector. These relays can be set to either latching or pulsed operation via internal jumpers, enabling most types of machines to be remotely started and stopped.

**Under no circumstances should mains voltages be placed on the contacts of the remote Start/Stop relays.**

When both CUE and ON are selected, the cue will (optionally) be cancelled automatically and the signal will be live, provided that the fader is already raised. If the fader is down, the cue will only be cancelled when raised from its end position.

## 18 METER

The 8-segment LED meter may be set to pre-fade (post Mute) or pre-EQ by an internal jumper. Optionally the meter can be configured to normally display the signal selected above and follow the Direct output when DIR is pressed.

## 19 PK (Peak)

The 3-input PK LED monitors pre-EQ, post-EQ and post-fade signal levels. If any of these points rises to 6dB below clipping the LED will illuminate.

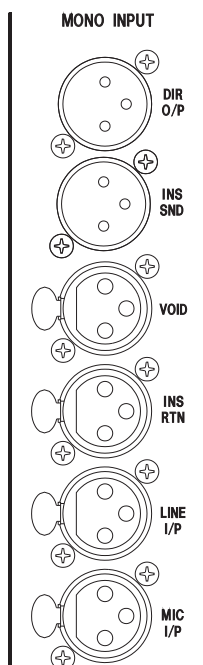
## 20 FADER

The VCA Fader controls the final channel level before PAN and Routing with 10dB of gain in hand. Note that the Insert point may be configured post-fader if required (see 8 above). External VCA control of the fader is available via the D-type connector on the rear panel if required.

## 21 ROUTING

The module's output may be routed to any or all of the pairs of Group busses (1-2, 3-4, 5-6, 7-8), or the stereo master bus (ST), subject to the position of the PAN control (see 14 above).





## Rear Connector Panel

XLR-type connectors are provided for the main audio connections to the module.

Pinouts are as follows:

### Direct Output

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Insert Send

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Insert Return

Pin1	Chassis
Pin2	Hot
Pin3	Cold

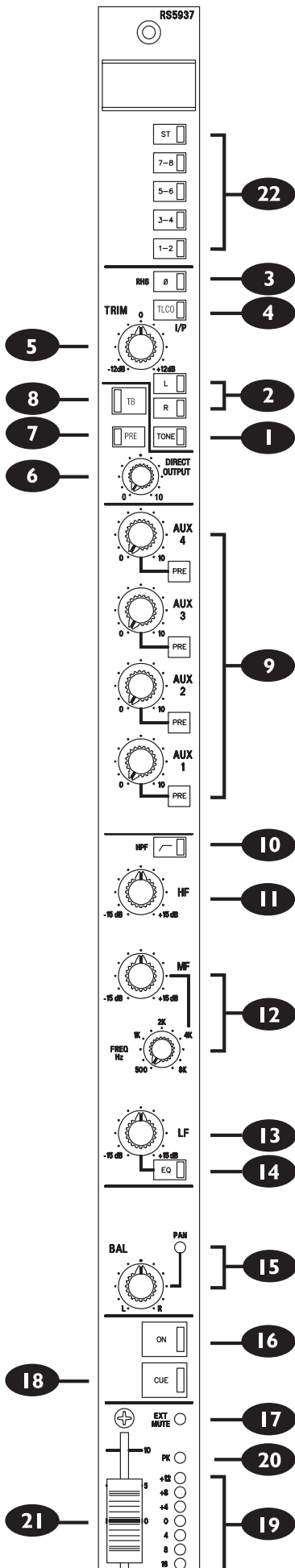
### Line Input

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Mic Input

Pin1	Chassis
Pin2	Hot
Pin3	Cold

# Stereo Input/Telco Module



## 1 TONE

The TONE switch applies a -60dBu signal to the module's pre-amplifier circuit. This allows you to check the operation of the module. The switch illuminates to indicate that TONE is active. Note that if the module is switched to TONE the monitor mutes and remotes (start/stop) are disabled.

## 2 MONO SOURCE

When the L and the R switches are both released the stereo pairs of the sources are routed normally in stereo. However if the L switch is depressed then the left signal is fed in mono to both sides of the channel. Similarly the right signal is routed to both sides if the R switch is pressed. If both switches are depressed then a mono mix of left and right is fed to both sides of the channel.

## 3 RHS (Ø)

The PHASE of the right-hand input signal may be inverted by use of the RHS (Ø) switch. The switch illuminates to indicate that it is switched on.

## 4 I/P (B)

The module accepts two stereo sources via separate pairs of XLR-type connectors. Pressing B (TLCO on the Telco module) selects the alternative input. On the Telco module this would be suitable for a telephone input from an external hybrid.

## 5 TRIM

TRIM provides -12dB to +12dB continuous control of whichever input is selected.

## 6 DIRECT OUTPUT

The Telco module has a separate level control for the Direct Output.

With TELCO selected, and the channel routed to the stereo master, the Direct Output sends a stereo clean feed signal consisting of the stereo mix, minus the channel's input signal. If not routed to the stereo master, the signal at the Direct Output will be the stereo mix.

## 7 PRE

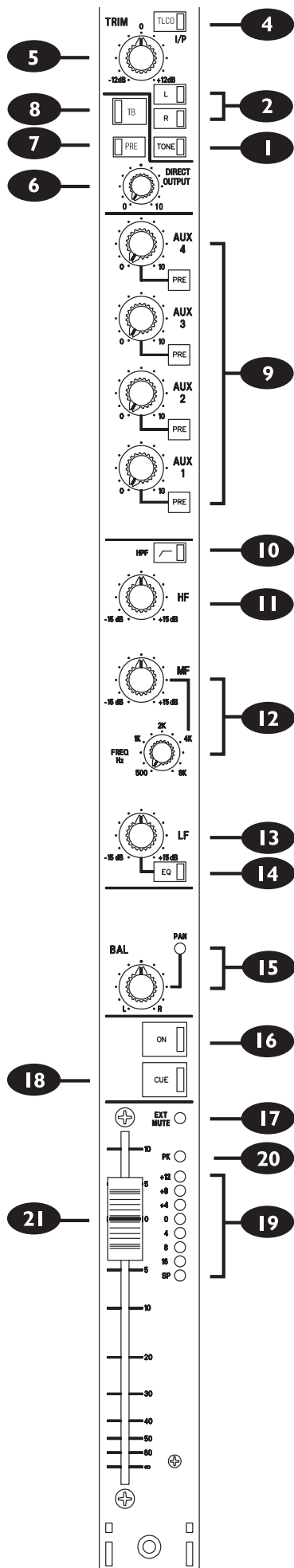
The Direct Output is normally post-fade, but may be selected as pre-fade by pressing the PRE switch. When the channel is switched to TELCO, the function of the PRE button is disabled.

## 8 TB

Pressing TB allows talkback from the overbridge microphone XLR input to be routed to the Direct Output.

## 9 AUXILIARY SENDS

There are four AUXILIARY SENDS with individual level controls. Aux 1, 2 and 3 carry a mono sum of the channel signal and Aux 4 is fed in stereo. All Aux Sends are normally post-fade, but may be selected as pre-fade by pressing the associated PRE switches. The pre-fade source for Aux 1-3 is normally post-mute, but may be selected as pre-mute by changing internal jumpers. Aux 4 pre-fade source is always pre-mute.



## 10 HPF

The High-Pass Filter is switched on when the button is pressed. The switch illuminates to indicate that it is switched on.

The filter has a slope of 18dB/Octave and a cut-off point of 100Hz.

## 11 Equaliser - HF

The Equaliser is a 3-band semi-parametric design.

The HF shelving section provides 15dB cut or boost at 10kHz.

## 12 MF

The upper knob of the MF section allows you to cut or boost the Mid-Range bell-response filter by up to 15dB. The Mid-point frequency is sweepable, using the lower knob, between 500Hz and 8kHz. The Q-factor of the filter is fixed at 1.4.

## 13 LF

The LF shelving section provides 15dB cut or boost at 100Hz.

## 14 EQ

The EQ section may be switched in and out of circuit via the EQ switch. The switch illuminates to indicate that it is switched in.

## 15 Pan

The BAL/PAN pot allows the input signal to be positioned within the stereo image of the main mix. The Balance control automatically becomes a PAN control if either or both the L or R switches are selected, and at this point the PAN LED will illuminate. In PAN mode the left or right signal may be infinitely attenuated by panning hard right or hard left, this also applies +3dB of gain to the opposite signal; the centre applies 0dB of gain to both signals. In BAL mode the control will balance the stereo signal, i.e. the centre position gives 0dB gain to both left and right whilst hard left or hard right provides +3dB and -10dB to the appropriate signals.

## 16 ON

The channel is turned on when the ON switch is pressed or may be muted under the control of a remote mute signal via the 25-way D-type connector on the rear panel.

## 17 EXT MUTE LED

The EXT MUTE LED glows to indicate that a remote mute is active (see above).

## 18 CUE

The cue system is activated by pressing the CUE button, but the logic functions depend on whether Line A or Line B (TLCO) is selected.

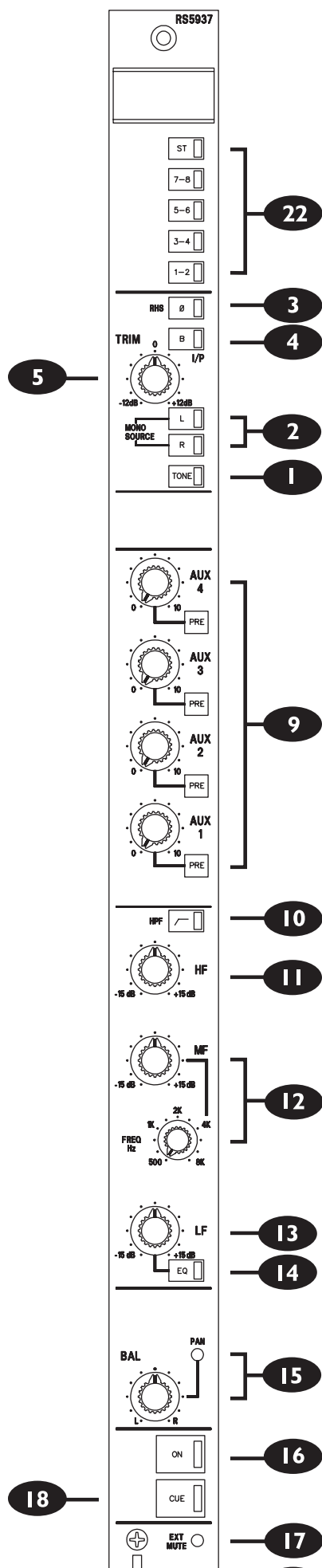
### Line A Mode

In Line A mode it functions in the same way as the mono input in Line mode. The CUE button may be operated in latched or momentary mode, depending upon how long you hold it down. If you press and release within approximately 0.5 seconds the button will latch. If, on the other hand you press and hold for more than 0.5 seconds then the cue will remain momentary.

When the CUE switch is active, and the fader is in its fully-down position, the stereo PFL signal will be put onto the Cue L & R busses irrespective of the AFL/PFL master setting on the Monitor Module.

The CUE button may be (optionally) reset by moving the fader away from the fully-down position.

If the CUE button is pressed when the fader is already away from the fully-down position the AFL/PFL signal will be selected according to the setting of the AFL/PFL master switch on the Monitor module.



When the input is in line level mode and the CUE switch is pressed, this will (optionally) trigger the remote start/stop facility which has two sets of relay contacts, available via the rear panel D-type connector. These relays can be set to either latching or pulsed operation via internal jumpers, enabling most types of machines to be remotely started and stopped.

**Under no circumstances should mains voltages be placed on the contacts of the remote Start/Stop relays.**

When both CUE and ON are selected, the cue will (optionally) be cancelled automatically and the signal will be live, provided that the fader is already raised. If the fader is down, the cue will only be cancelled when raised from its end position.

### Line B (TLCO) mode

In this mode the Start B relay (pulsed or latching) is used as a “DIVERT” or “HYBRID” latch. This is initially activated from the Cue function to set up a call or remote line with a clean feed return. Switching the channel ON will maintain this relay closure, ensuring that the line is held while the fader is opened. Closing the fader will drop the line from the hybrid.

### 19 METER

The 8-segment LED meter may be set to pre-fade (post Mute) or pre-EQ by an internal jumper.

### 20 PK (Peak)

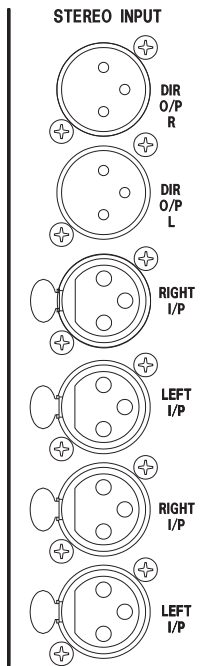
The 3-input PK LED monitors pre-EQ, post-EQ and post-fade signal levels. If any of these points rises to 6dB below clipping the LED will illuminate.

### 21 FADER

The VCA Fader controls the final channel level after the Pan/Bal but before the Routing with 10dB of gain in hand. External VCA control of the fader is available via the D-type connector on the rear panel if required.

### 22 Output Routing

The module’s output may be routed to any or all of the pairs of Group busses(1-2, 3-4, 5-6, 7-8), or the stereo master bus (ST), subject to the position of the PAN control (see 14 above).



## Rear Connector Panel

XLR-type connectors are provided for the main audio connections to the module.

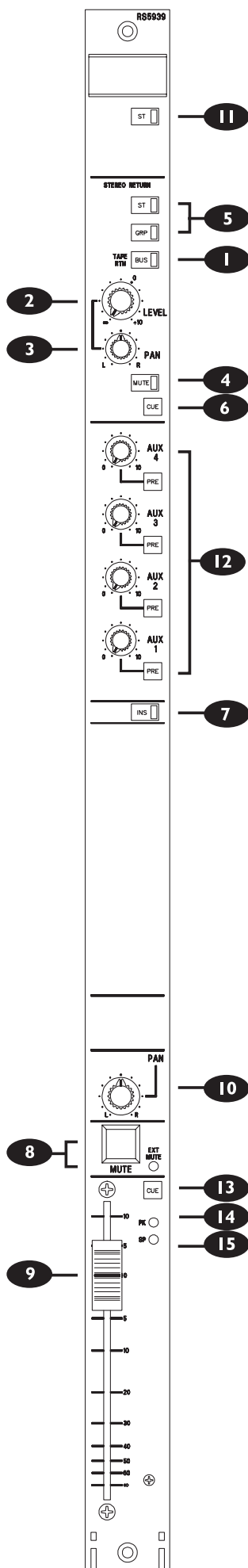
Pinouts are as follows:

### Direct Output

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Input

Pin1	Chassis
Pin2	Hot
Pin3	Cold



## Mono Group Module

There are up to eight Mono Group Modules in the console. The module comprises a Group Master section and a Stereo Return section.

### Stereo Return

The stereo return normally receives inputs via two XLR sockets on the rear connector panel.

#### 1 TAPE RTN (BUS)

When the BUS switch is pressed the inputs to the stereo return section are disabled and are replaced by the local Group output signal.

#### 2 LEVEL

The Level control adjusts the level of the stereo return or bus input depending on the position of the TAPE RTN switch.

#### 3 PAN

When the input is selected as TAPE RTN, this pot acts as a Balance control with a gain of 3dB at the centre position and a drop of -10dB to left and right.

When BUS is pressed the source is the mono group mix, and in this mode the PAN pot acts as a PAN left and right allowing the signal to be positioned in the stereo image of the main mix.

#### 4 MUTE

The stereo return is muted when the MUTE switch is pressed.

#### 5 ROUTING

The post-mute stereo signal may be routed by the appropriate switches to the Stereo Mix (ST) or the Group (GRP) for the module on which is located.

#### 6 CUE

When the CUE button is depressed either the pre-level-control signal or the post-mute signal, depending on the position of the PFL/AFL switch on the Monitor module, is fed to the cue system. The CUE button may be operated in latched mode (press and release within 0.5 secs) or momentary mode (press and hold for more than 0.5 secs).

### Group Section

#### 7 INS (Insert)

The Group mix is fed to an internal switch which allows you to select the Insert Point as pre or post-fade. The default setting is pre-fade.

When the INS button is pressed the signal path is routed via the Insert Return XLR. When the INS button is released the signal path is routed internally. The Group signal is always available on the Insert Send, irrespective of the position of the INS switch.

#### 8 MUTE

The Mute may be activated by pressing the MUTE switch (note that the group number is printed on the switch), or by a remote mute signal, available on the rear connector panel. The associated LED glows to indicate that the remote mute is active. Note that the Insert Send is never muted.

## 9 Fader

The Fader controls the overall Group level, with 10dB of gain in hand at the top of the fader.

A set of relay contacts to start an external machine is available on the rear connector panel. These contacts close when the fader is away from the fully-down position.

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**Under no circumstances should mains voltages be placed on these contacts.**

---

## 10 PAN

PAN sets the level of the group signal feeding the Stereo Left and Right busses (When ST is pressed) allowing the group signal to be positioned within the stereo image. When the control is turned fully right or left +3dB of gain is also applied to the opposite signal; the centre applies 0dB of gain to both signals.

## 11 ST (Stereo)

The panned signal may be routed to the master stereo mix by pressing the ST switch.

The mono Group signal is also routed to the Group Output XLR on the rear connector panel, unaffected by PAN or ST switches.

## 12 AUXILIARY SENDS

There are four AUXILIARY SENDS with individual level controls. Aux 1, 2 and 3 carry a mono sum of the channel signal and Aux 4 is fed in stereo with the post-pan signal. All Aux Sends are normally post-fade, but may be selected as pre-fade by pressing the associated PRE switches. When Aux 4 is switched to pre-fade both left and right receive the mono pre-fade signal. The pre-fade source for the Auxiliaries is normally pre-mute, but may be selected as post-mute by changing internal jumpers. One jumper sets the source for Aux 1-3, and a separate jumper sets the source for Aux 4.

## 13 Cue

The cue system is activated by pressing the CUE button. The CUE button may be operated in latched or momentary mode, depending upon how long you hold it down. If you press and release within approximately 0.5 seconds the button will latch. If, on the other hand you press and hold for more than 0.5 seconds then the cue will remain momentary.

When the CUE switch is active, and the fader is in its fully-down position, the PFL signal will be put onto the Cue L & R busses irrespective of the AFL/PFL master setting on the Monitor Module.

The CUE button may be (optionally) reset by moving the fader away from the fully-down position.

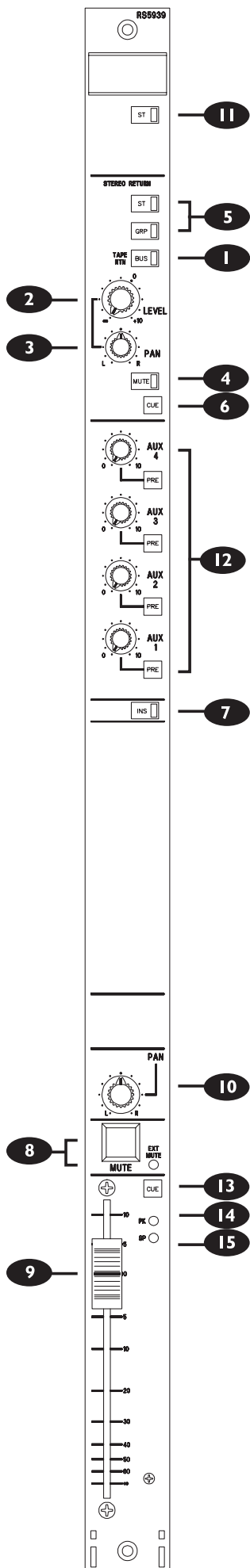
If the CUE button is pressed when the fader is already away from the fully-down position the AFL/PFL signal will be selected according to the setting of the AFL/PFL master switch on the Monitor module.

When the CUE switch is pressed, this will (optionally) trigger the remote start/stop facility which has a set of relay contacts, available via the rear panel D-type connector. The relay can be set to either latching or pulsed operation via internal jumpers, enabling most types of machines to be remotely started and stopped.

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**Under no circumstances should mains voltages be placed on the contacts of the remote Start/Stop relays.**

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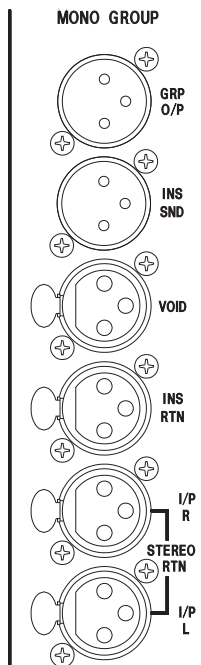
#### 14 PK

The PK LED monitors pre-insert and post-fade signal levels. If either of these points rises to 6dB below clipping the LED will illuminate.

#### 15 SP (Signal Present)

The signal present circuit monitors the output of the mix amp. The SP LED illuminates when a signal is present on the Group Mix bus.





## Rear Connector Panel

XLR-type connectors are provided for the main audio connections to the module.  
Pinouts are as follows:

### Group Output

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Insert Send

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Insert Return

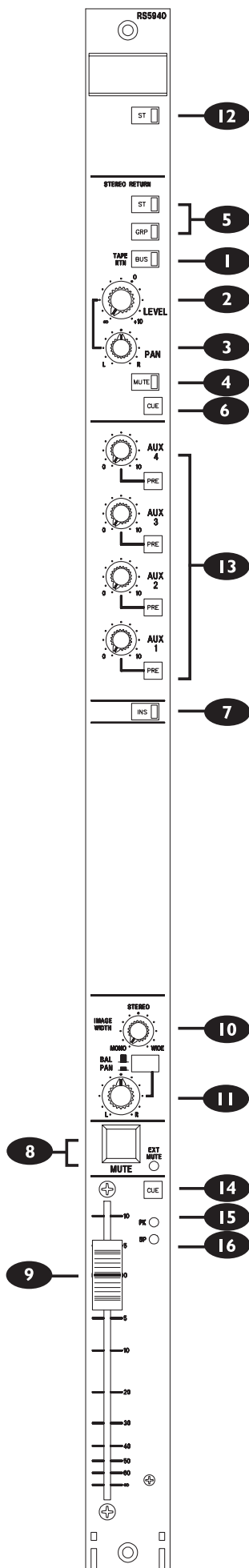
Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Stereo Return R

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Stereo Return L

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold



## Stereo Group Module

There are up to four Mono Group Modules in the console. The module comprises a Group Master section and a Stereo Return section.

### Stereo Return

The stereo return normally receives inputs via two XLR sockets on the rear connector panel.

#### 1 TAPE RTN (BUS)

When the BUS switch is pressed the inputs to the stereo return section are disabled and are replaced by the local Group output signal.

#### 2 LEVEL

The Level control adjusts the level of the stereo return or bus input depending on the position of the TAPE RTN switch.

#### 3 PAN

The PAN control acts as a Balance control with a gain of 3dB at the centre position and a drop of -10dB to left and right allowing adjustment of the signal position in the stereo image of the main mix.

#### 4 MUTE

The stereo return is muted when the MUTE switch is pressed.

#### 5 ROUTING

The post-mute stereo signal may be routed by the appropriate switches to the Stereo Mix (ST) or the Group (GRP) for the module on which is located.

#### 6 CUE

When the CUE button is depressed either the pre-level-control signal or the post-mute signal, depending on the position of the PFL/AFL switch on the Monitor module, is fed to the cue system. The CUE button may be operated in latched mode (press and release within 0.5 secs) or momentary mode (press and hold for more than 0.5 secs).

### Group Section

#### 7 INS (Insert)

The Group mix is fed to two internal switches (S30/31) which allows you to select the Insert Point as pre or post-fade. The default setting is pre-fade.

When the INS button is pressed the signal path is routed via the Insert Return XLR. When the INS button is released the signal path is routed internally. The Group signal is always available on the Insert Sends, irrespective of the position of the INS switch.

#### 8 MUTE

The Mute may be activated by pressing the MUTE switch (note that the group number is printed on the switch), or by a remote mute signal, available on the rear connector panel. The associated LED glows to indicate that the remote mute is active. Note that the Insert Sends are never muted.

## **9 Fader**

The Fader controls the overall Group level, with 10dB of gain in hand at the top of the fader.

A set of relay contacts to start an external machine is available on the rear connector panel. These contacts close when the fader is away from the fully-down position.

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**Under no circumstances should mains voltages be placed on these contacts.**

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## **10 IMAGE WIDTH**

The image width control allows the stereo image to be varied from Mono, through normal Stereo, to Wide Stereo. This control has an integral push-action switch which turns the width control on and off.

## **11 BAL/PAN**

PAN sets the level of the group signal feeding the Stereo Left and Right busses (When ST is pressed) allowing the group signal to be positioned within the stereo image. The associated switch allows the control to act either as a PAN (switch pressed) or as a BALance (switch released).

## **12 ST (Stereo)**

The panned signal may be routed to the master stereo mix by pressing the ST switch.

## **13 AUXILIARY SENDS**

There are four AUXILIARY SENDS with individual level controls. Aux 1, 2 and 3 carry a mono sum of the channel signal and Aux 4 is fed in stereo with the post-pan signal. All Aux Sends are normally post-fade, but may be selected as pre-fade by pressing the associated PRE switches. The pre-fade source for the Auxiliaries is normally pre-mute, but may be selected as post-mute by changing internal jumpers. One jumper sets the source for Aux 1-3, and a separate jumper sets the source for Aux 4.

## **14 Cue**

The cue system is activated by pressing the CUE button. The CUE button may be operated in latched or momentary mode, depending upon how long you hold it down. If you press and release within approximately 0.5 seconds the button will latch. If, on the other hand you press and hold for more than 0.5 seconds then the cue will remain momentary.

When the CUE switch is active, and the fader is in its fully-down position, the PFL signal will be put onto the Cue L & R busses irrespective of the AFL/PFL master setting on the Monitor Module.

The CUE button may be (optionally) reset by moving the fader away from the fully-down position.

If the CUE button is pressed when the fader is already away from the fully-down position the AFL/PFL signal will be selected according to the setting of the AFL/PFL master switch on the Monitor module.

When the CUE switch is pressed, this will (optionally) trigger the remote start/stop facility which has a set of relay contacts, available via the rear panel D-type connector. The relay can be set to either latching or pulsed operation via internal jumpers, enabling most types of machines to be remotely started and stopped.

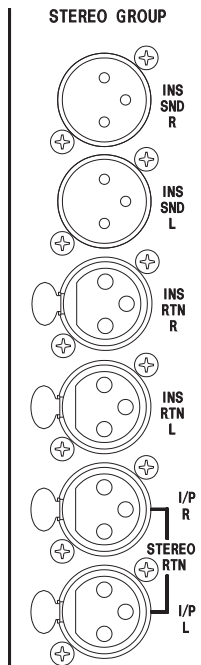
---

**Under no circumstances should mains voltages be placed on the contacts of the remote Start/Stop relays.**

---



## Rear Connector Panel



XLR-type connectors are provided for the main audio connections to the module.

Pinouts are as follows:

### Insert Send

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Insert Return

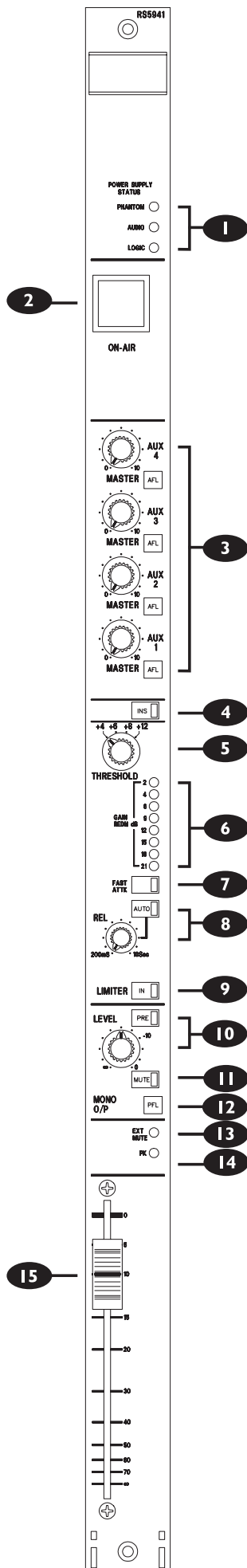
Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Stereo Return R

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold

### Stereo Return L

Pin 1	Chassis
Pin 2	Hot
Pin 3	Cold



## Stereo Master Module

### 1 POWER SUPPLY STATUS

The three LEDs provide visual confirmation that the 48V phantom power, +17V & -17V Audio Supplies, and the +5V Logic Supply are all present.

### 2 ON-AIR

The ON-AIR switch, when activated, will close a set of normally-open relay contacts. It also disables the oscillator and some talkback facilities provided by the Communications Module.

The On-Air switch may also be operated externally via the opto-isolated connections on the rear panel.

### Aux Master Section

### 3 AUX MASTERS

Master controls are provided for each of the four auxiliaries. The rotary control sets the final output level and the associated AFL button allows you to listen to the After-Fade Signal via the Cue System.

### Stereo Master Section

### 4 INS

When the INS (Insert) button is depressed, the signal paths (left and right) are routed via the insert return XLRs (there is a separate XLR for the left and the right signal). When the INS button is released the signal paths are routed internally.

Note that the signals are always available on the insert send XLRs, irrespective of the position of the INS switch.

### LIMITER

The limiter is located post-insert.

### 5 THRESHOLD

The 4-position rotary THRESHOLD switch sets the signal level (in dB<sub>r</sub>) at which the limiter starts operating.

### 6 GAIN REDN (Gain Reduction)

The 8-LED GAIN REDUCTION meter shows the extent to which the limiter is reducing the gain.

### 7 FAST ATTK (Fast Attack)

The FAST ATTACK switch gives a choice of attack times: 10msec when the switch is released, 0.5msec when the switch is depressed.

### 8 REL (Release)

The RELEASE control allows you to select a limiter release time from 200msecs to 10secs.

The AUTO switch gives a preset release time of one second with a 2-stage release action.

### 9 IN

Pressing the LIMITER IN switch places the limiter in-circuit.

## **Mono Output**

The mono output may either be derived from a mono sum of the pre-mute, pre-insert left and right signals, and therefore is also unaffected by the limiter, or, by changing internal jumpers, may be derived post-limiter.

### **10 LEVEL**

The LEVEL control sets the final output level. This may be fed by a pre-fade signal or a post-fade signal (i.e. pre or post-fade the stereo master fader) by use of the associated PRE switch.

### **11 MUTE**

The output is muted when the MUTE switch is pressed.

### **12 PFL**

The PFL switch allows you to listen to the Mono Output signal via the cue system.

## **Output Level Control**

### **13 EXT MUTE**

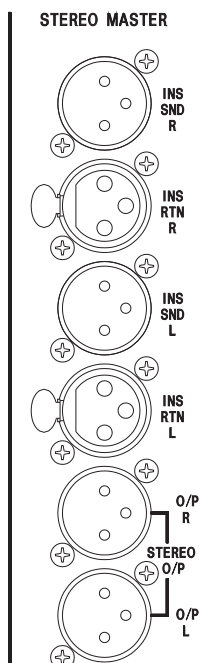
The main stereo outputs may be muted via the external logic inputs, available on the rear panel. The EXT MUTE LED illuminates to indicate that an external mute is active.

### **14 PK (Peak)**

The PK LED monitors both the left and right mix bus signals at a position post-mix-amp and pre-fader. The PK LED will illuminate if either signal goes above 6dB below clipping.

### **15 FADER**

The Stereo Master Fader sets the final Stereo output level.



## Rear Connector Panel

XLR-type connectors are provided for the main audio connections to the module.

Pinouts are as follows:

### Insert Send L

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Insert Return R

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Insert Send R

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Insert Return L

Pin1	Chassis
Pin2	Hot
Pin3	Cold

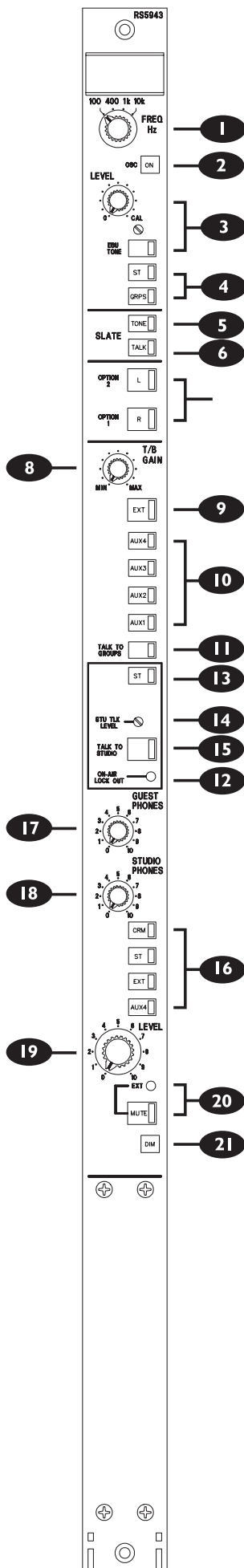
### Stereo Output R

Pin1	Chassis
Pin2	Hot
Pin3	Cold

### Stereo Output L

Pin1	Chassis
Pin2	Hot
Pin3	Cold





## Communication Module

### Oscillator

#### 1 FREQ Hz

The internal oscillator may be set to one of 4 different frequencies by the FREQ switch, ranging from 100 to 10kHz

#### 2 ON

The ON switch enables the oscillator when pressed and illuminates to indicate that the oscillator is active. The oscillator bus is however muted when the Master Module "ON AIR" switch is pressed, but it should be noted that the ON switch will remain illuminated, if selected, to indicate that the oscillator will be available as soon as "ON AIR" status is turned off.

#### 3 OSCILLATOR CONTROL

The mono oscillator signal is routed through the **CAL**(calibrate) preset control. This should not require adjustment under normal circumstances. The calibrated signal is routed to the internal tone bus and also to two sets of balanced outputs which are available on the rear connector panel's EDAC connector (OSC L and OSC R).

The **LEVEL** control adjusts the final output level.

An **EBU TONE** facility is available on the OSC L output, which switches off the output for 100msec every 3 seconds (nominal times) when the button is pressed.

#### 4 ST/GRPS

The oscillator signal may be routed to the main Stereo output (ST pressed) or to the Groups (GRPS pressed).

### Slate Oscillator

#### 5 TONE

Pressing the TONE switch routes the oscillator signal to the Direct Output of every input module.

#### 6 TALK

Pressing the TALK switch routes the talkback signal to the Direct Output of every input module.

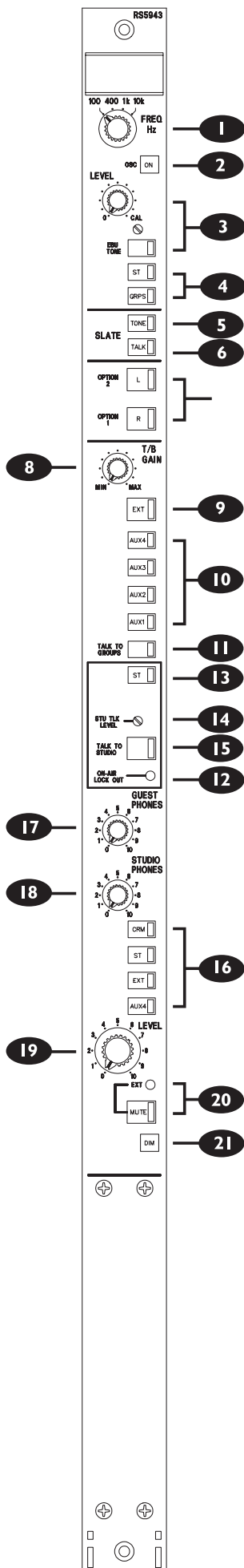
Note: Pressing both the TONE and TALK switches together will route the talk-back signal and tone to the Direct Output of every input module, but the oscillator frequency will be automatically set to 30Hz.

#### 7 OPTION SWITCHES

Two switches, OPTION 1 and OPTION 2, are provided to give you the option of remote control of external devices/ lamps etc. A pair of normally-open contacts from each switch are made available via the External Logic D-type connector on the rear panel.

**Under no circumstances should mains voltages be placed on these contacts.**

In addition each switch has a pair of talkback contacts which are available on the Comms Module EDAC.



When the switch in question is released the talkback output carries, depending on link settings, either no signal or the signal from the EXT CUE contacts which are also available on the Comms Module EDAC. When the switch is pressed the appropriate output carries the console Talkback signal.

## Talkback

### 8 T/B GAIN

The input to the talkback system is from the Talkback Mic XLR which is provided as standard on the overbridge and overall gain is adjusted via the T/B GAIN control. The talkback signal may be routed to various destinations as follows:

### 9 EXT

Pressing this switch routes the talkback signal to the External Talkback output on the rear panel EDAC connectors.

### 10 AUX 1-4

The talkback signal may be routed to any combination of the four Aux outputs by pressing the appropriate switch.

### 11 TALK TO GROUPS

Pressing this switch routes the talkback signal to all groups simultaneously. Note that each individual Group is jumper selectable to enable the talkback signal to either completely replace the group signal or mix with it.

### 12 ON-AIR LOCK OUT

Talkback is also available to Studio or the Stereo Master, as described below, except when the ON-AIR switch on the Master module is pressed. The ON-AIR LOCK OUT LED illuminates to show that the talkback to these outputs is disabled.

### 13 ST

Pressing the ST switch routes the talkback to the Stereo Master, except when the ON-AIR LOCK OUT LED is illuminated.

### 14 STU TLK LEVEL

This preset allows you to adjust the level of the talkback signal to the studio speakers and the studio phones.

### 15 TALK TO STUDIO

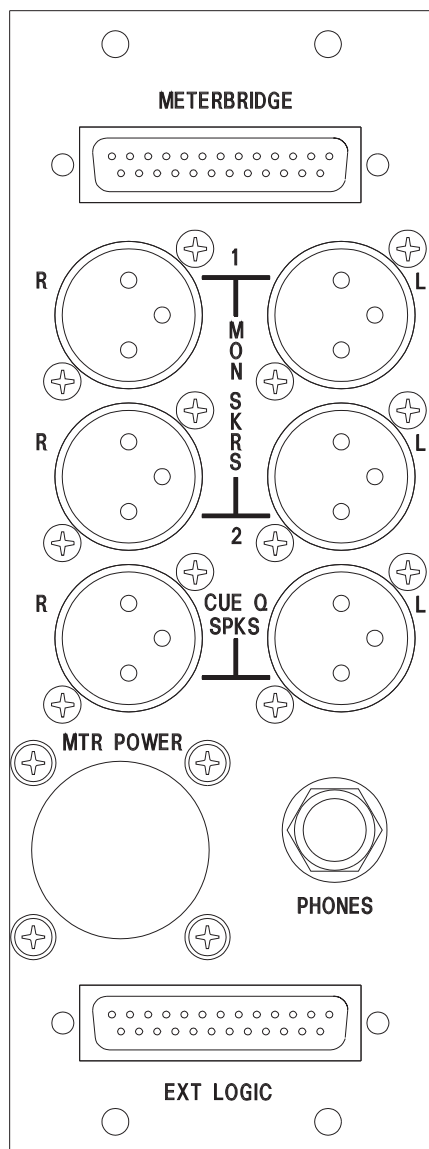
Pressing the TALK TO STUDIO switch routes the talkback signal to the studio speakers and the studio phones. Note that the studio speakers will be muted by the On-Air switch (ON-AIR LOCK OUT illuminated), but talkback is still sent to studio phones.

## Headphones/Studio Speakers

There are two sets of studio headphones outputs - studio phones and guest phones, plus a studio speaker output. There is a choice of inputs to the three outputs, as described below.

### 16 Headphones/Studio Speaker source

The four switches select the source for the headphones/studio speakers and can be CRM (i.e. whatever the control room monitor is sourcing via the Monitor module), the Stereo Master, Aux 4 or and external source via the rear panel EDAC connector.



## 17 GUEST PHONES

This control sets the level of the Guest Heaphones output. The source is selected as described in (16) above.

## 18 STUDIO PHONES

This control sets the level of the Studio Heaphones output. The source is selected as described in (16) above.

If TALK TO STUDIO is active (see 15 above), the stereo master signal will be routed in mono to the left side of the headphones, with talkback routed to the right. A producer-to-studio input is also available to the phones, with audio input and control via the rear panel EDAC connector and external logic connector. This signal is routed left, with talkback on the right whenever it is present.

## 19 LEVEL

The LEVEL control sets the level of the Studio Speaker output. This is a VCA control, and may be controlled externally (connections are via the EXT LOGIC D-type).

## 20 MUTE

The Studio Speakers May be muted locally by pressing the MUTE switch. The integral LED illuminates to show that the local mute is active. The Studio Speakers may also be muted by an external mute via the external logic connector on the rear panel, or by the ON-AIR switch on the Master. An associated EXT LED indicates when the Mute has been activated remotely.

## 21 DIM

The Studio Speakers may be dimmed by pressing the DIM switch. The amount of dimming is adjustable via an internal preset.

## Rear Connector Panel

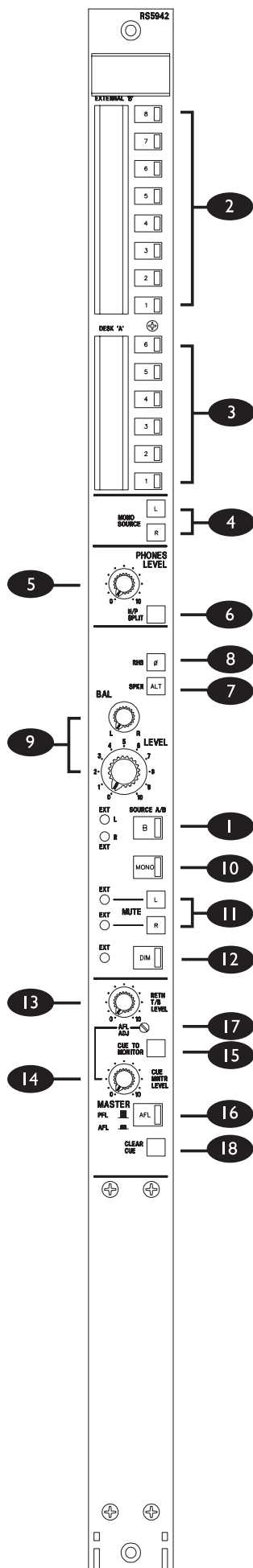
This rear connector panel is a joint panel for the Monitor Module and the Comms Module.

### All output XLR connectors are wired as follows:

Pin1	Ground
Pin2	Hot
Pin3	Cold

### Phones Jack Socket

Tip	Left
Ring	Right
Sleeve	Gnd



# Monitor Module

The Monitor Module provides facilities for mono and stereo monitoring of many internal and external sources.

## Monitor Sources

### 1 SOURCE A/B

The SOURCE A/B switch selects either the DESK 'A' or the EXTERNAL 'B' bank of switches as the monitor source. The switching may also be done externally via separate control lines for the left and right signals. The EXT L and EXT R LEDs illuminate when the external control is active.

### 2 EXTERNAL 'B'

The EXTERNAL 'B' bank of illuminated switches allows you to select any 1 of 8 external inputs as the external monitor source, when the SOURCE A/B switch is pressed. The external source inputs are via the 90-way EDAC connectors on the rear panel.

The adjacent writing strip is provided to identify the inputs.

### 3 DESK 'A'

The DESK 'A' bank of switches allows you to select any 1 of 6 internal signals as the internal monitor source when the SOURCE A/B switch is released. The 6 are selected via the scramble card in the console (see section 2 of this manual). The six signals may be chosen from the following list:

- Group 1 to Group 8 (mono)
- The Main Stereo Master mix
- The Mono Mix of the Stereo Master
- Aux 1 to Aux 3 (mono)
- Aux 4 (stereo)

There is also a spare feed which may be used to monitor any suitable point in the console.

The adjacent writing strip is provided to identify the inputs.

The factory default setting is detailed in section 2 of this manual.

### 4 MONO SOURCE

When the MONO SOURCE L & R switches are both released, stereo sources are normally sent in stereo to the monitor. However if the MONO SOURCE L switch is pressed then the left signal is fed to both sides of the monitor circuit. Similarly the right signal is routed to both sides if the MONO SOURCE R is pressed. If both switches are pressed then a mono mix of left and right is fed to both sides of the monitor.

## Monitor Outputs

The Monitor System outputs its signals to two pairs of Monitor Speaker Outputs and to a Headphones Output. These outputs are all located on the rear connector panel.

### 5 PHONES LEVEL

The headphones output level is controlled by the PHONES LEVEL control.

## **6 H/P SPLIT**

If the H/P SPLIT switch is pressed, and a CUE is operated from anywhere on the console, the monitor signal (in mono, summed if it is stereo) is sent to the left side of the headphones only. The Cue signal is fed to the right side of the headphones.

## **7 ALT SPKR**

There are two sets of monitor speakers. Monitor Speakers 1 are normally selected but Monitor Speakers 2 may be selected by pressing the ALT switch.

## **8 Ø (Phase)**

The phase of the right signal (of whichever set of monitor speakers is selected) may be reversed by pressing the Phase (Ø) switch.

## **9 LEVEL/BAL**

The overall output level of the monitor speakers is adjusted by the LEVEL control, whilst the relative level between left and right is set by the BAL (Balance) control.

## **10 MONO**

The left and right signals may be summed and fed in mono to both the left and right speakers by pressing the MONO switch.

## **11 MUTE**

The left and right monitor speakers may be individually muted by the MUTE L and MUTE R switches. They may also be muted under external control via the control lines which are available on the EXT LOGIC connector on the rear panel. The associated LEDs illuminate when the external mutes are active.

## **12 DIM**

The left and right monitor speakers may also be dimmed by pressing the DIM switch. The amount that the signal is attenuated is variable between 0 and -30dB by an internal preset. Monitor dimming may also occur as a result of other operations, e.g., use of talkback, and in these instances the EXT LED illuminates when the dim is active.

## **The Cueing System**

A Cue Speaker is fitted into the overbridge as standard, with its own level control. The Cue Speaker is fed with Overpress Cue signals (if the Overpress Option is fitted), the Return Talkback signal and, if the relevant internal jumpers are configured appropriately, a mono sum of the Cue L and R signals: this mono sum is overridden by the Overpress facility (if it is fitted).

## **13 RETN T/B LEVEL**

The Return Talkback level is adjusted via the RETN T/B LEVEL control.

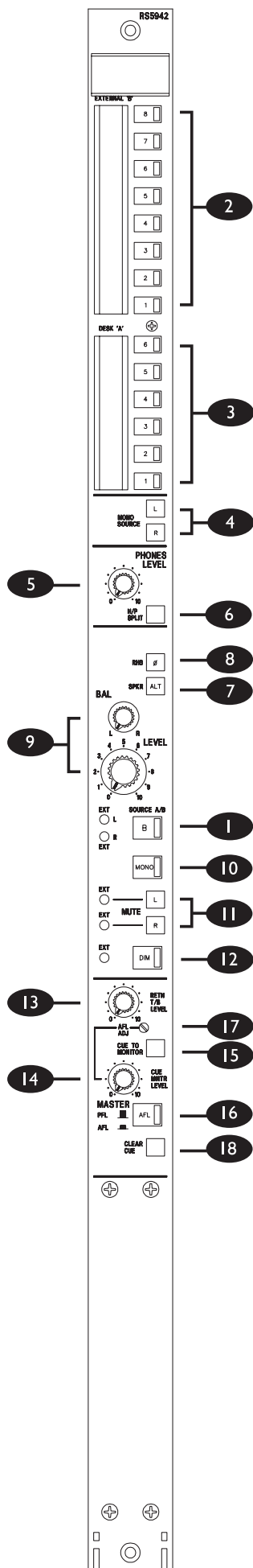
## **14 CUE MNTR LEVEL**

A stereo pair of Cue Speaker outputs are also provided on the rear connector panel. The output level of these outputs is adjusted by the CUE MNTR LEVEL control.

The Cue speaker outputs carry a mix of any PFLs / AFLs via the Cue L and R busses. These signals will be overridden by the Overpress facility (if fitted), provided that the relevant internal jumpers are configured appropriately.

## **15 CUE TO MONITOR**

The Cue L and R signals may be switched from the Cue Speakers to the Monitor Speakers by pressing the CUE TO MONITOR switch.



## 16 MASTER AFL

The Cueing system may be set to monitor PFL or AFL signals from the various CUE switches on the console. This is done via the MASTER AFL switch, which selects AFL mode when pressed.

## 17 AFL ADJ

Note that when AFL is selected, the AFL ADJ preset is switched into operation. This preset allows you to trim the level set by the CUE MNTR LEVEL pot.

## 18 CLEAR CUE

The various Cue switches may be electronically latched and unlatched by toggling the individual switches. They may also all be unlatched via the CLEAR CUE switch. Note that the CLEAR CUE switch illuminates when one or more cues are active, and the CUE TO MONITOR switch is depressed.

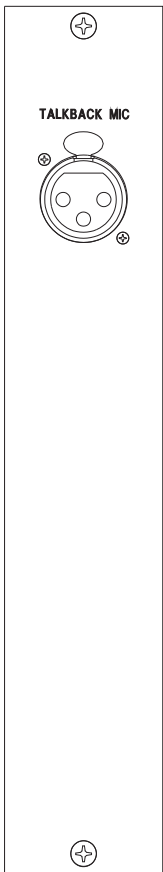
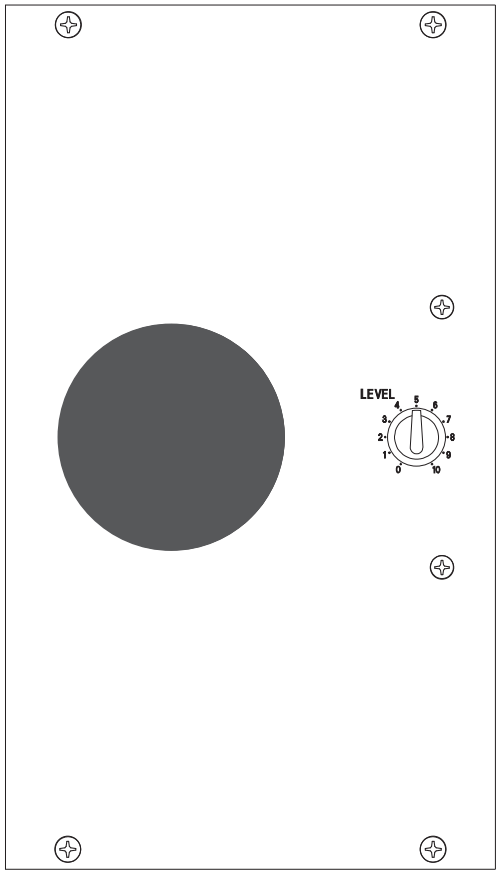
# Meterbridge Modules

## Meterbridge Speaker

The meterbridge speaker is sourced from the Monitor Module, and has its own local volume control.

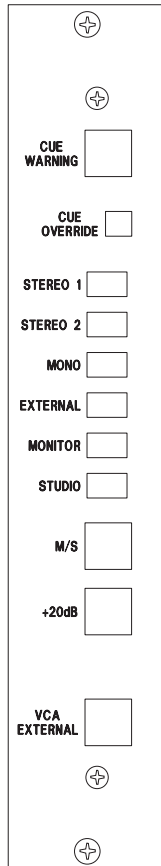
## Talkback Mic

The talkback mic socket is routed onto the Talk Bus via the Communications Module.



## Meter Selector Panel

This panel allows you to monitor a variety of console signals. The meters which would be used in conjunction with this panel may be chosen from a range of Soundcraft meter panels which are available from your dealer. It is suggested that a suitable choice would be a L/R pair + phase correlator.



### SELECTOR SWITCHES

There are six sources for monitoring:

STEREO monitors the Stereo output of the Stereo Master module, MONO monitors the Mono outputs from the Stereo Master module, EXTERNAL monitors any signal placed on the external Input L and R XLRs on the meterbridge rear connector panel, MONITOR monitors the Monitor Module's output (to output speakers), and STUDIO monitors the Studio Speakers.

### CUE OVERRIDE

If the CUE OVERRIDE switch is depressed, any Overpress or Cue generated from the console will replace the selected meter source. The green CUE WARNING lamp will also light whenever a Cue or Overpress signal is present.

### M/S

The M/S switch encodes an incoming Stereo L/R signal pair into M/S for display on the meters. The +20dB switch works in conjunction with the M/S switch: it boosts the S signal by 20dB.



**B400**

**5**

# **Specifications**

# B400 Typical Specifications

## Connections

Mic Input (XLR)	> 1.5k $\Omega$ balanced	-72dBu to -10dBu ..... +20dBu max
Line Input (XLR)	> 10k $\Omega$ balanced	-20dBu to +10dBu ..... +28dBu max
Insert Send (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+25dBu into 600 $\Omega$ )
Insert Return (XLR)	> 10k $\Omega$ balanced	0dBu ..... +28dBu max
Mono Direct Out (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+25dBu into 600 $\Omega$ )
Stereo Direct Out (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+25dBu into 600 $\Omega$ )
Group Insert Send (XLR)	< 60 $\Omega$ balanced	
Group Insert Return (XLR)	> 10k $\Omega$ balanced	
Group Output (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+26dBu into 600 $\Omega$ )
Aux Output (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+26dBu into 600 $\Omega$ )
Monitor Output (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+26dBu into 600 $\Omega$ )
Main O/P Insert Send (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max
Main O/P Insert Return (XLR)	> 10k $\Omega$ balanced	0dBu ..... +28dBu max (+26dBu into 600 $\Omega$ )
Main Output (XLR)	< 60 $\Omega$ balanced	0dBu ..... +28dBu max (+26dBu into 600 $\Omega$ )

## Filter and EQ

		Mono Input ..... Stereo Input
Filters		
High Pass Filter	Freq	OFF / 32-500Hz ..... 80Hz
	Slope	12dB/Oct ..... 12dB/Oct

## EQ

High Frequency	Freq	1 kHz to 16kHz ..... Fixed 10kHz
	Gain	$\pm 15$ dB ..... $\pm 15$ dB
	Q	Shelf / Bell=1 ..... Shelf
Mid Frequency	Freq	500Hz to 8kHz ..... 500Hz to 8kHz
	Gain	$\pm 15$ dB ..... $\pm 15$ dB
	Q	1.4 ..... 1
Low Frequency	Freq	100Hz ..... 100Hz
	Gain	$\pm 15$ dB ..... $\pm 15$ dB
	Q	Shelf ..... Shelf

## Auxiliaries

1	Mono	..... Pre/Post fade switched
2	Mono	..... Pre/Post fade switched
3	Mono	..... Pre/Post fade switched
4	Stereo	Separate Level/Pan ..... Pre/Post fade switched in stereo

## Oscillator

Switchable 100Hz, 400Hz, 1kHz, 10kHz plus 30Hz Slate override

## Frequency Response

Any input into any output	Measured at +50dB gain ..... +0/-0.5dB, 20Hz - 20kHz
---------------------------	--

## THD and Noise

Mic input to Group or Main output	Measured at +20dBu output	< 0.1% 20Hz - 16kHz
	Measured at 0dBu output	< 0.025% @1kHz
		< 0.05% 20Hz - 16kHz
Mic input EIN (22Hz - 22kHz bandwidth, unweighted)		< -128.5dBu (150 $\Omega$ source)
Mix bus output noise (32ch routed)		Less than -80dBu
Mix Bus noise (no channels routed)		Less than -90dBu
'Line' noise		Less than -88dBu

**CMRR**

	Mono Input		Stereo Input
	Min Gain	Max Gain	
Mic Input	65dB @ 50Hz	90dB @ 50Hz	
	55dB @ 1kHz	80dB @ 1kHz	
	50dB @ 10kHz	60dB @ 10kHz	
Line Input	45dB @ 1kHz		55dB @ 1kHz
	40dB @ 10kHz		50dB @ 10kHz

**Crosstalk**

Channel muting	95dB @ 1kHz	90dB @ 1kHz
	90dB @ 10kHz	85dB @ 10kHz
Channel fader attention	90dB @ 1kHz	90dB @ 1kHz
	85dB @ 10kHz	85dB @ 10kHz

Note: These figures are typical of performance in a normal electromagnetic environment. Performance may be degraded in severe conditions.

All measurements refer to electronically balanced inputs and outputs with VCAs enabled. Input and output transformers may affect these specifications.

# B400 Specification

	Module	Signal	Conn.	Pin	Nom Level	Max Level	Impedance
Inputs	Mono Input	Mic	Female XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	-72 to -10dBu	+20dBu	>1.5k $\Omega$
		Line	Female XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	-20 to +10dBu	+28dBu	>10k $\Omega$
	Stereo Input	Left/Right A & B	Female XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	-20 to +10dBu	+28dBu	>10k $\Omega$
	Mono Group	Tape Return	Female XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	-20 to +10dBu	+28dBu	>10k $\Omega$
	Comms	TB MIC	Female XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	-60 to -25dBu	0dBu	>1.5k $\Omega$
		Other Ext Inputs	Edac		0dBu	+26dBu	>10k $\Omega$
Insert points	Mono Input	Send & Return	XLR	Send: Male Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold Return: Female	Send 0dBu Return 0dBu	+26dBu <sup>(into 1k<math>\Omega</math>)</sup> +28dBu	Send <60 $\Omega$ Return >10k $\Omega$
	Mono Group	Send & Return	XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	Send 0dBu Return 0dBu	+26dBu <sup>(into 1k<math>\Omega</math>)</sup> +28dBu	Send <60 $\Omega$ Return >10k $\Omega$
	Stereo Master	Send & Return L/R	XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	Send 0dBu Return 0dBu	+26dBu <sup>(into 1k<math>\Omega</math>)</sup> +28dBu	Send <60 $\Omega$ Return >10k $\Omega$
Outputs	Mono Input	Direct Output	Male XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	0dBu	+26dBu (into 1k $\Omega$ )	<60 $\Omega$
	Mono Group	Group Output	Male XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	0dBu	+26dBu (into 1k $\Omega$ )	<60 $\Omega$
	Stereo Master	ST Left & Right	Male XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	0dBu	+26dBu (into 1k $\Omega$ )	<60 $\Omega$
	Monitor	Cue Q SPKR L & R	Male XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	0dBu	+26dBu (into 1k $\Omega$ )	<60 $\Omega$
		Mon SPKR 1/2 L & R	Male XLR	Pln 1 - Chassis Pin 2 - Signal Hot Pin 3 - Signal Cold	0dBu	+26dBu (into 1k $\Omega$ )	<60 $\Omega$
		Headphones Output	TRS (1/4" Jack)	Tip - Left Ring - Right Sleeve - Ground	0dBu	+20dBu (into 600 $\Omega$ )	50 $\Omega$
	Comms	Osc/TB/Phones & Spkr Outputs	Edac		0dBu	+26dBu (into 1k $\Omega$ )	

N.B. Nominal 'LINE' Level can be either 0dBu or +6dBu (Europe 'DIN')