



DESIGNS DEPARTMENT

DESIGNS DEPARTMENT HANDBOOK

No. 3.226(79)

AM5/29 Fader Drive Amplifier

BRITISH BROADCASTING CORPORATION
ENGINEERING DIVISION

DESIGNS DEPARTMENT HANDBOOK

No. 3.226(79)

AM5/29 Fader Drive Amplifier

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for Head of Designs Department

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AM5/29 Fader Drive Amplifier

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AM5/29 Fader Drive Amplifier

1. INTRODUCTION

The AM5/29 is an unsupported 3U BMM card which carries twelve identical non-inverting unbalanced buffer amplifiers each with a pre-set gain of +6 dB. Each of these twelve are directly coupled at the input and a.c. coupled at the output to enable them to drive the faders of a PA6/87 Mono Microphone module forming part of the EP10/18 Continuity Suite.

The card also carries a thirteenth amplifier, a.c. coupled at both input and output to provide the 'ECHO SEND' facility of the module.

2. PERFORMANCE

Amplifiers 1-12 (fader drivers) are identical.

Input impedance	20 k Ω d.c. coupled
Input level	-18 dB volume
Output impedance	47 Ω
Output level	-12 dB volume
Maximum output	+17 dB

Amplifier 13 (Echo Send)

Input impedance	75 Ω a.c. coupled
Input level	-18 dB volume
Output impedance	47 Ω
Output level	0 dB volume
Maximum output	+17 dB
Frequency response (all amplifiers)	40 Hz - 15 kHz \pm 0.03 dB
Output noise	Fader Drivers <-80 dB4 Echo Send <-76 dB4
Power supply	+12 volt, 0; -12 volt at 20 mA approximately.

Continued

3. CIRCUIT DESCRIPTION

Each amplifier consists of a simple non-inverting operational amplifier stage with an input impedance set by R1 (fader drivers) and R21 (echo send). The gain of each amplifier is pre-set by R6 (fader drivers) and R23 (echo send). The gain of amplifiers 1-12 is set to +6 dB and the gain of the Echo Send amplifier to +18 dB during production testing.

Each fader drive circuit has a simple unbalanced output. The Echo Send amplifier is a T.E.R.* send stage.

4. MAINTENANCE

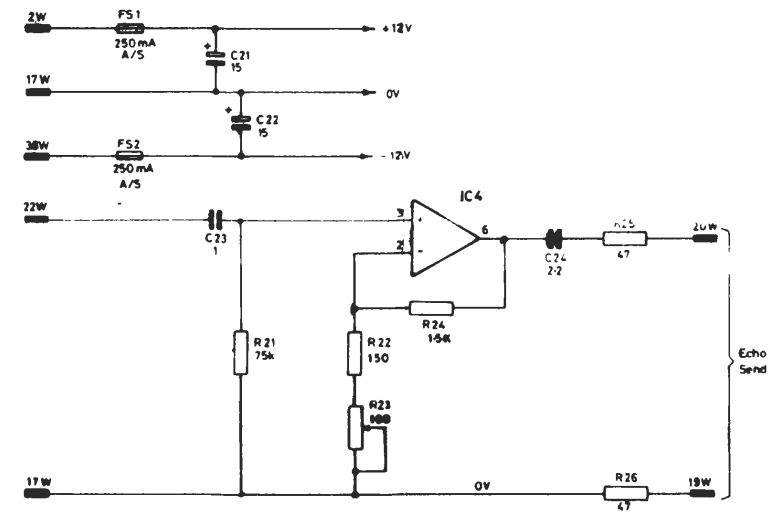
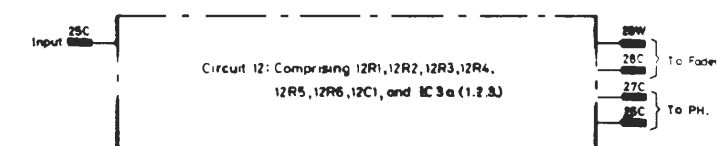
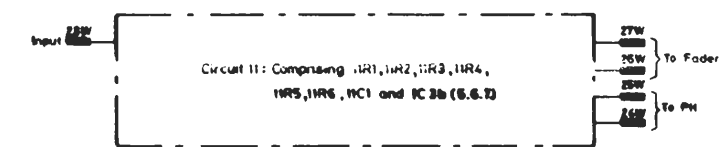
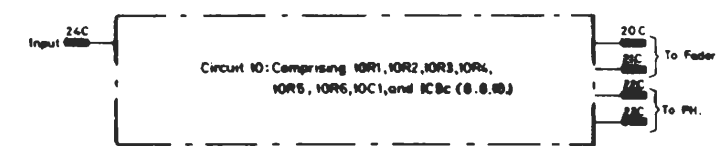
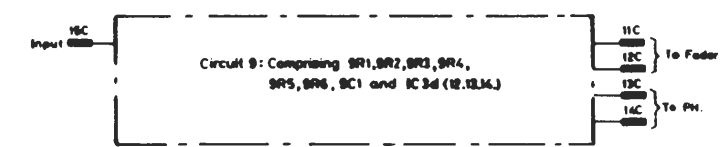
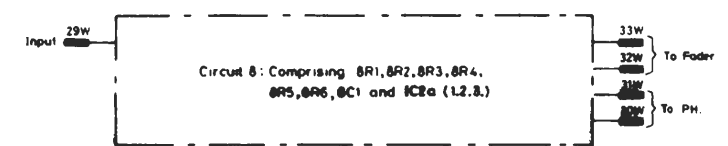
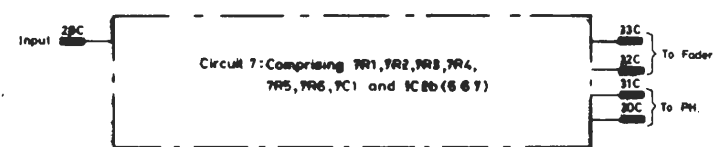
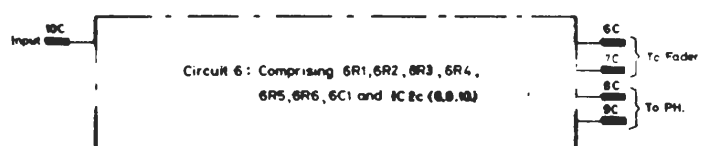
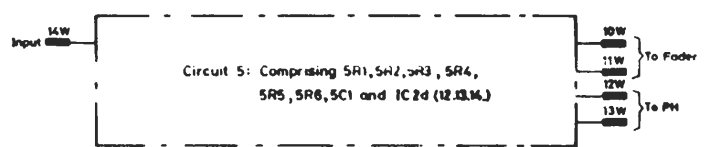
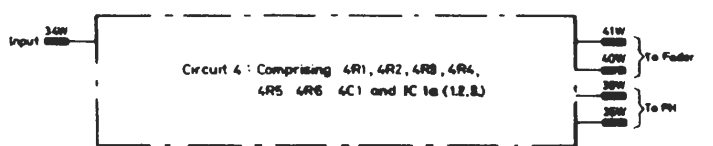
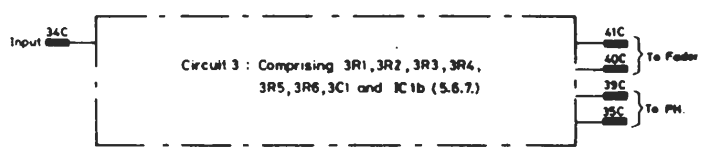
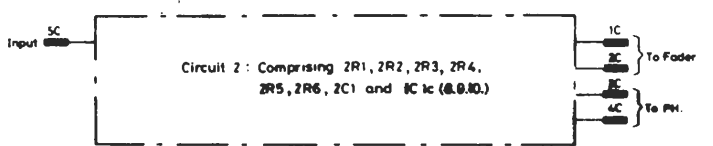
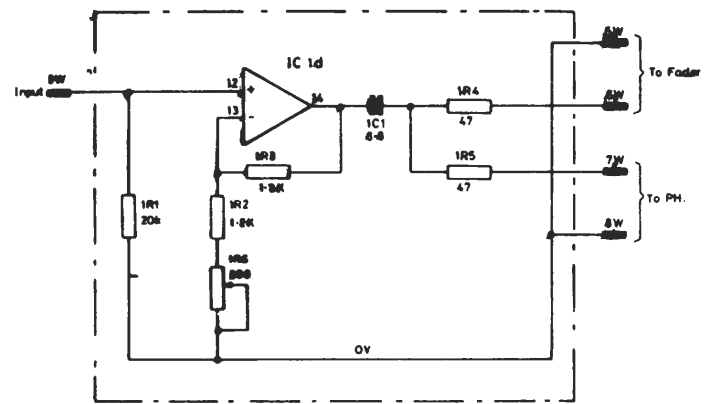
In the case of a fault firstly check that the output pin of each operational amplifier is at 0 volts +20 mV w.r.t. the 0 volt rail.

Most dry joints or amplifier faults will result in the appropriate amplifier output being close to either the +12 volt or -12 volt rail.

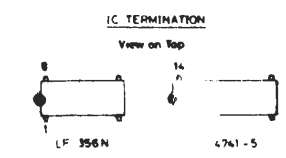
Noise may be checked by shorting the appropriate input to the 0 volt rail and peaking the output noise on a TPM. The fader drivers should be better than -80 dB peaked to '4' unweighted and the Echo Send amplifier some 4 dB worse than this.

* Transmitted Earth Reference.
See D.D. Tech. Mem. No. 3.221(79)

Original Frame Base	185
CHANGE	
7-11-79	1
8-12-79	2
20-7-80	3



IC Circuit Ref.	No. of Parts	Supply Conn.	Type
IC 1, 2, 3	4	4	HA1-4741-5
IC 4	1	7	LF 356 N



AM5/29
FADER DRIVE
AMPLIFIER
CIRCUIT

DRN	TCD	CKD	APPD
STATUS REPT.			
Parts List: D46228A4			
D46228A1			

D46228A1

SCALE

ISS. 1
CHANGE
7-11-79

AM5/29 AMPLIFIER, FADER DRIVE, PARTS LIST

ITEM No.	No. OFF	DESCRIPTION	C'T REF.	BBC REF. OR DRG. No.
DRAWING NUMBERS				
		CIRCUIT	D46228A1	
		PARTS LIST	D46229A4	
		ASSEMBLY	D46230A2	
		DETAIL I	D46231A4	
		P.B. WIRING	D46232A2	
		P.B. COMP. SIDE WIRING	D46233A2	
		P.B. COMP. LOCATION	D46234A2	
		P.B. DRILLING	D46235A3	
FURTHER INFORMATION REQUIRED FOR MANUFACTURE				
		UNIT ASSEMBLY INFORMATION	EA10484	
		UNIT WIRING INFORMATION	EA10140	
		HANDLE	D31303A3-CP	
1	1	PRINTED BOARD		D46232A2, D46233A2 D46234A2, D46235A3
2	1	CODING PLATE, 3U MODIFIED TO		S52253 - 0351637 D46231A4 DET.1
3	1	HANDLE		D31303A3-CP
4	2	SPACER, 5mm LG X 5mm DIA, TAPPED M2.5		S58285 - 0207406
5	1	SCREEN PLATE ASSY		S52255 - 0367154
6		SCREWS	FOR FIXING ITEMS	
7	2	M2.5 X 12 LG CSK HD M.S. ZN.P	2, 4	
8	6	M2.5 X 6 LG PAN HD M.S. ZN.P	5	
9		NUTS		
10	2	M2.5 HEX FULL M.S. ZN.P	2, 4	
11		WASHERS		
12	8	M2.5 PLAIN M.S. ZN.P	2, 4, 5	
13				
14	2	RIVET, 1.6 DIA X 6.35 LG, OVAL HD SEMI-TUBULAR, COPPER	3	
		TOWER MANUFACTURING LTD		

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AM5/29
AMPLIFIER, FADER DRIVE
PARTS LIST

DRN. GRB
TPD.
CKD.

DESIGNS DEPARTMENT

D46229A4

CHANGE
7-11-79

AM 5/29 PARTS LIST

ITEM No.	No. OFF	DESCRIPTION	CCT REF.	BBC REF. OR DRG. No.
CAPACITORS, POLYESTER, METALLISED				
15	1	1.0 NF ± 10% 100V	C23	S21034 - 0209155
16	1	2.2 NF ± 10% 100V	C24	S21034 - 0209171
17	1	6.8 NF ± 10% 100V	1C1	S21034 - 020920X
18	1	6.8 NF " "	2C1	" "
19	1	6.8 NF " "	3C1	" "
20	1	6.8 NF " "	4C1	" "
21	1	6.8 NF " "	5C1	" "
22	1	6.8 NF " "	6C1	" "
23	1	6.8 NF " "	7C1	" "
24	1	6.8 NF " "	8C1	" "
25	1	6.8 NF " "	9C1	" "
26	1	6.8 NF " "	10C1	" "
27	1	6.8 NF " "	11C1	" "
28	1	6.8 NF " "	12C1	" "
29				
30				
31				
32				
CAPACITORS SOLID TANTALUM				
33	1	15 NF 20V	C21	S21124 - 0209372
34	1	15 NF 20V	C22	S21124 - 0209372
35				
36				
37				
REGISTORS METAL FILM, 0.4W				
38	1	47Ω ± 2%	R25	S26877 - 0099291
39	1	47Ω " "	R26	" "
40	1	47Ω " "	1R4	" "
41	1	47Ω " "	1R5	" "
42	1	47Ω " "	2R4	" "
43	1	47Ω " "	2R5	" "
44	1	47Ω " "	3R4	" "
45	1	47Ω " "	3R5	" "
46	1	47Ω " "	4R4	" "
47	1	47Ω " "	4R5	" "
48	1	47Ω " "	5R4	" "
49	1	47Ω " "	5R5	" "
50	1	47Ω " "	6R4	" "
51	1	47Ω " "	6R5	" "
52	1	47Ω " "	7R4	" "
53	1	47Ω " "	7R5	" "
54	1	47Ω " "	8R4	" "
55	1	47Ω " "	8R5	" "
56	1	47Ω " "	9R4	" "
57	1	47Ω " "	9R5	" "
58	1	47Ω " "	10R4	" "
59	1	47Ω " "	10R5	" "
60	1	47Ω " "	11R4	" "
61	1	47Ω " "	11R5	" "
62	1	47Ω " "	12R4	" "
63	1	47Ω " "	12R5	" "

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BBC
DS/PLA4

AM 5/29
PARTS LIST

DRN.	6RB	DESIGNS DEPARTMENT
TPD.		
CKD.		
APPD.	(R)	

D46229A4
SHEET 2 OF 4 SHEETS

D46229A4

SHEET 4 OF 4 SHEETS

PARTS LIST

AM 5/29

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AM 5/29

PARTS LIST

ITEM No.	No. OFF	DESCRIPTION	C'T REF.	BBC REF. OR DRG. No.
RESISTORS POTENTIOMETER CERMET 0.5 W. (CONTINUED)				
114	1	200Ω ± 10%	5R6	527113 - 0381744
115	1	200Ω	6R6	" "
116	1	200Ω	7R6	" "
117	1	200Ω	8R6	" "
118	1	200Ω	9R6	" "
119	1	200Ω	10R6	" "
120	1	200Ω	11R6	" "
121	1	200Ω	12R6	" "
122				
123				
124				
INTEGRATED CIRCUITS				
125	1	HAI-4741-5	IC1	0184061
126	1	HAI-4741-5	IC2	"
127	1	HAI-4741-5	IC3	"
128	1	LF356N	IC4	0194930
129				
130				
131				
132	1	FUSE, 250 mA, ANTI-SURGE	FS1	522425 - 0345327
133	1	FUSE, 250 mA, ANTI-SURGE	FS2	522425 - 0345327
134	2	FUSE HOLDER, PRINTED WIRING		522252 - 0345142
135				
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137	113	TERMINAL PINS, SEAELECTRO A0013620G/T		0239341
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DRN. GRB

DESIGNS DEPARTMENT

TPD.

CKD.

D46229A4

D 46229A4

SHEET 3 OF 4 SHEETS

AM 5/29 PARTS LIST

CHANGE	ISS.
7-11-79	1
ITEM 78 VALUE CHANGED	2
6.26 18-12-79	
26-7-80	3

ITEM No.	No. OFF	DESCRIPTION	CCT REF.	BBC REF. OR DRG. No.
RESISTORS METAL FILM 0.4W (CONTINUED)				
64	1	150Ω ±2%	R22	S26877 - 0099468
65	1	1.2KΩ "	1R2	" 0099102
66	1	1.2KΩ "	2R2	" "
67	1	1.2KΩ "	3R2	" "
68	1	1.2KΩ "	4R2	" "
69	1	1.2KΩ "	5R2	" "
70	1	1.2KΩ "	6R2	" "
71	1	1.2KΩ "	7R2	" "
72	1	1.2KΩ "	8R2	" "
73	1	1.2KΩ "	9R2	" "
74	1	1.2KΩ "	10R2	" "
75	1	1.2KΩ "	11R2	" "
76	1	1.2KΩ "	12R2	" "
77				
78	1	1.5KΩ ±2%	R24	S26877 - 0099110
79	1	1.3KΩ "	1R3	S26877 - 0099476
80	1	1.3KΩ "	2R3	" "
81	1	1.3KΩ "	3R3	" "
82	1	1.3KΩ "	4R3	" "
83	1	1.3KΩ "	5R3	" "
84	1	1.3KΩ "	6R3	" "
85	1	1.3KΩ "	7R3	" "
86	1	1.3KΩ "	8R3	" "
87	1	1.3KΩ "	9R3	" "
88	1	1.3KΩ "	10R3	" "
89	1	1.3KΩ "	11R3	" "
90	1	1.3KΩ "	12R3	" "
91				
92	1	20KΩ ±2%	1R1	S26877 - 022806X
93	1	20KΩ "	2R1	" "
94	1	20KΩ "	3R1	" "
95	1	20KΩ "	4R1	" "
96	1	20KΩ "	5R1	" "
97	1	20KΩ "	6R1	" "
98	1	20KΩ "	7R1	" "
99	1	20KΩ "	8R1	" "
100	1	20KΩ "	9R1	" "
101	1	20KΩ "	10R1	" "
102	1	20KΩ "	11R1	" "
103	1	20KΩ "	12R1	" "
104				
105	1	75KΩ ±2%	R21	S26877 - 0228157
106				
107				
108				
RESISTORS POTENTIOMETER, CERMET 0.5W				
109	1	100Ω ±10%	R23	S27113 - 0381728
110	1	200Ω "	1R6	" 0381744
111	1	200Ω "	2R6	" "
112	1	200Ω "	3R6	" "
113	1	200Ω "	4R6	" "

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