

542 RANGE

Section 2

34128 CHANNEL AMPLIFIER

GENERAL DESCRIPTION

CONTENTS

Para		Page
1	GENERAL DESCRIPTION	2
2	CONTROLS	2
2.1	'mic'	2
2.2	'ph'	2
2.3	Sensitivity	3
2.4	Equalisation	3
2.5	Roll off (High Pass Filter)	4
2.6	Auxiliary Output	4
2.7	Programme and Audition	5
2.8	pfl	5
3	CIRCUIT DESCRIPTION	5
3.1	Input Circuit	5
3.2	Sensitivity Control Circuit	6
3.3	Equalisation Control Circuit	7
3.4	Auxiliary Output Control Circuit	7
3.5	Programme and Audition Output Controls	8
3.6	Prefade Listen	8
4	SETTING UP PROCEDURE	8
	SPECIFICATION	10-11
	PARTS LIST	12-13

LIST OF ILLUSTRATIONS

	Fig. 1 Rear Connector	9
	Figs. 2, 3 & 4 Frequency Response Curves	9
ML34128	Front Panel Layout (Fold Out)	14
EW10635	BA635 Component Layout	16
EH10076	Circuit Diagram	17-18

FOLD OUT PAGE 14 FOR REFERENCE TO FRONT PANEL LAYOUT

GENERAL DESCRIPTION

1. The 34128 Channel Amplifier is fully modular in construction and concept and incorporates printed circuit board BA635. The module contains the processing circuits and controls directly concerned with the initial processing of audio signals from high level (line) or low level (microphone) sources.

The front panel layout of the module is shown on ML34128 where the manually operated controls are arranged in groups with the channel fader occupying the lower part of the module. Each group is identified by a symbol designating the function of the group and within each group, the various controls are identified by colour coded caps or alpha-numeric characters. The component reference shown adjacent to the control, identifies the component with respect to the circuit diagram EH10076. The layout of printed circuit board BA635 is shown on Drawing No. EW10635 with each component identified by silk screened characters.

All input-output connections of the channel amplifiers are located on the rear edge of the p.c.b. and are shown on Fig.1. With the module in situ the rear connectors mate with associated sockets.

CONTROLS

2. The controls mounted on the front panel of the module have the following functions:

'Mic' push button S2

- 2.1 The two position push button switch S2 operates in conjunction with sensitivity switch S1.

- (a) Line (high level) - de-selected (unlocked)
- (b) Mic. (low level) - selected (locked down)

'ph' push button S3

- 2.2 Provides 180 degree phase reversal of the audio signal at the input to the transformer of the amplifier processing circuits.

Sensitivity switch S1

2.3 This is a 6 position rotary switch operating in conjunction with the 'mic' push button S2.

(a) For high level input signals the 'mic' push button S2 is deselected and sensitivity switch S1 is set to the position representing the level of input signal. Four pre-selectable input levels are provided variable in 15 dB steps between +15dB and -30dB. The levels are defined on the outer peripheral ring of characters of the control.

(b) For low level microphone signals the 'mic' push button S2 is selected and sensitivity switch S1 is set to the position representing the level of the input signal. Six pre-selectable input levels are provided variable in 15 dB steps between -15dB and -90dB. The levels are defined on the inner peripheral ring of characters of the control.

The input levels defined in (a) and (b) are with respect to the optimum level of 0 dBu.

Equalisation

2.4 The equalisation controls comprise presence, low and high frequency response.

2.4.1 Presence RV6, push buttons S4 and S5

Rotary level control (RV6) in conjunction with push buttons S4 and S5 provide +15dB cut and boost (relative to the mid position of the control) centred on the following preselectable frequencies. Typical response curves are shown on Fig. 2.

(a)	S4, S5 de-selected	
(b)	S4 (820) Selected	820Hz
(c)	S5 (1K8) Selected	1K8Hz
(d)	S4 (820), S5 (1K8) selected	3K9Hz

2.4.2 High and Low Frequency cut and boost controls RV8 and RV7.

These frequency response controls allow gradual accentuation or reduction of the audio signals at upper and lower frequencies. Typical response curves are shown on Fig. 3.

(a) RV7 Low frequency control

RV7 is a rotary level control giving +15dB cut and boost relative to the mid position of the control. The control becomes effective at 1kHz and movement of the control gives proportionate cut and boost reaching +15dB at 50Hz.

(b) RV8 High frequency control

RV8 is a rotary level control giving +15dB cut and boost relative to the mid position of the control. The control becomes effective at 1kHz and movement of the control gives proportionate cut and boost reaching +15dB at 15kHz.

2.4.3 'eq' pushbutton S6

The 'eq' (equalisation) push button S6 provides overriding control of the equalisation circuits defined in 2.4.1 and 2.4.2.

- | | | |
|-----|---------------------|------------------------------------|
| (a) | 'eq' selected | equalisation circuits
operative |
| (b) | 'eq' S6 de-selected | equalisation circuits
by-passed |

H.P.F. control push buttons S8, S9

2.5 Push buttons S8 (47), S9 (82) either individually or in conjunction with each other provide 12dB/octave roll off at the following pre-selectable frequencies. Typical response curves are shown on Fig. 4.

- | | | | |
|-----|---------|-------------|-------|
| (a) | S8, S9 | de-selected | 15Hz |
| (b) | S8 (47) | selected | 47Hz |
| (c) | S9 (82) | selected | 82Hz |
| (d) | S8, S9 | selected | 150Hz |

Auxiliary Output Controls

2.6 Auxiliary output levels Aux 1 and Aux 2 are controlled by rotary control RV11 and push button 'pre' (S7), Aux 1 (S12) and Aux 2 (S13).

- (a) Prefade output:- With the 'pre' push button S7 selected (locked down) pefade audio (pre channel fader control RV10) is routed via the rotary level control RV11 and the selector push buttons to the auxiliary outputs.
- (b) Postfade output:- With the 'pre' push button S7 de-selected post-fade audio (post channel fader RV10) is routed via the selector push buttons to the auxiliary outputs. In this mode, the output level is controlled by both the rotary level control RV11 and channel fader RV10, with push buttons S8, S9 providing 12dB/octave roll off at pre-selectable frequencies of 15 Hz, 47Hz, 82Hz and 150Hz.

- (c) Selector push buttons S12 and S13:- These push buttons individually route pre or post fade audio to the respective auxiliary outputs when selected (locked down). When de-selected the audio signal is isolated from the outputs.

Programme and Audition Outputs

- 2.7 The programme and audition audio output levels are controlled by channel fader RV10 with rotary panning control RV8 providing stereo distribution between left and right output terminals. Push buttons S8, S9 provide 12dB/octave roll off at pre-selectable frequencies of 15Hz, 47Hz, 82Hz and 150Hz.

The programme outputs Pgm-L, Pgm-R and audition outputs Aud-L, Aud-R are controlled by push buttons S11, S10 respectively. The push buttons provide mutually exclusive switching allowing programme or audition outputs to be selected. The mechanical interlock includes a centrally located 'off' push button. When selected this push button automatically disengages both 'pgm' and 'aud' push buttons to isolate the audio from the output.

p.f.1. push button S14

- 2.8 The p.f.1. non-locking push button S14 when selected (held down) routes pre-fade audio to the Aud-L bus via the p.f.1. output.

CIRCUIT DESCRIPTION

3. The circuit diagram of the channel amplifier, including p.c.b. BA635 is shown on Drawing No. EH10076. All controls, with the exception of preset potentiometers RV1, RV2 and RV3 mounted on the p.c.b. and used to establish the operating characteristics of the amplifying circuits, are located on the front panel.

Input\Output edge connectors on the p.c.b. are defined by alphabetic characters and pin connectors by numerals.

Input Circuit

- 3.1 Balanced audio from line (high level) or microphone (low level) signal sources are input on connectors A and B via 'mic' and 'ph' push buttons S2 and S3 and are routed to the primary of the transformer.

The two position push button S2 is used in conjunction with sensitivity control S1 to match the input signal to the operating characteristics of IC1. For line signal sources S2 is de-selected and a resistive pad of 10.2 K ohm formed of R1, R2 and R3 with a 30dB loss is inserted between input and transformer. For microphone sources S2 is selected (locked down) and the resistive pad is bypassed. The 'ph' push button S3 transposes the connections to the transformer to provide 180 degree phase reversal.

The transformer provides balanced to unbalanced conversion with a gain of 12dB and the secondary output via S1 of the sensitivity control switch is coupled to the non inverting input of audio amplifier IC1 via capacitor C39.

Sensitivity Control Circuit

- 3.2 To maintain optimum performance of the channel amplifier over a wide range of signal sources at various levels, the gain of amplifier IC1 is controlled by sensitivity switch S1 in conjunction with 'mic' push button S2.

Sensitivity switch S1 is a two layer rotary switch (S1a and S1b) and matches the gain of the amplifier to the level of input signal. For high level signals S1 is de-selected inserting the 10.2K resistive pad between input and transformer and S1a introduces further selective resistive attenuation into the input path to prevent overloading of the amplifier and therefore distortion. The input levels which can be selected are -30dB, -15dB, 0dB and +10dB.

For low level signals S2 is selected to bypass the resistive pad and S1b provides selective resistive attenuation into the feedback path of the amplifier to give pre-selectable gain.

The input levels available vary in 15dB steps between -15dB and -90dB below the nominal input level of 0dBu.

The output of the amplifier via R9 and capacitor C38 is coupled to equalisation control switch S6 and via capacitor C8 and R10 is coupled to amplifier IC2 of the equalisation control circuit.

Equalisation Control Circuit

3.3 The equalisation control circuits comprise audio amplifiers IC2 and IC3 connected in cascade each with individual gain and frequency response controls.

3.3.1 Presence Control:- The presence control circuit comprises audio amplifier IC2 the gain of which is controlled by potentiometer RV6 and the frequency response characteristics by R.L.C. filters introduced into the amplifier feedback path by push buttons S4 and S5.

By selection of S4 and S5 or both +15dB variation of the output is obtained by adjusting RV6 at peaking frequencies of 820 Hz, 1K8Hz and 3K9Hz. The output of the amplifier via R16 and C15 is coupled to audio amplifier IC3 of the Hf, Lf control circuit.

3.3.2 High and Low Frequency Response Circuit:- Audio amplifier IC3 in conjunction with potentiometer RV7 and RV9 each of which forms part of the amplifier feedback CR network paths of the amplifier, provides gain compensation at the lower and upper ends of the frequency spectrum. At the lower frequencies RV7 is effective and initiates the cut and boost characteristics at 1KHz and reaches +15dB at 50Hz. At the upper frequencies, RV9 is effective and initiates the cut and boost characteristics at 1kHz and reaches +15dB at 15kHz. The output of the amplifier, via equalisation control switch S6, is routed to programme, audition, prefade listen and auxiliary outputs through the associated processing and switching circuits.

3.3.3 Equalisation Control S6:- The 'eq' push button S6 provides overriding control of the equalisation circuits of para 3.3.1 and 3.3.2. When selected (locked down) the equalisation circuits are operative and when de-selected the circuits are by-passed.

Auxiliary Output Control Circuit

3.4 Audio amplifier IC4, the gain of which is controlled by RV11, processes either prefade or postfade audio and the signals are routed to auxiliary output Aux 1 and Aux 2 via push buttons S12 and S13 respectively. In the prefade mode (pre-channel fader RV10) push button S7 is selected and the audio is routed to the outputs with the output level directly controlled by RV11. In the postfade mode (post channel fader RV10) the audio output level is dependent on channel fader RV10 and also on RV11 with roll off frequencies selected by S8 and S9.

Programme and Audition Output Controls

- 3.5 Equalised or unequalised audio, depending on the position of S6, is routed via the channel fader RV10 and high pass CR filters, which can be selected in or out, to the input of audio amplifier IC5. RV10 controls the output level of the amplifier and S8, S9 introduce the filters into the amplifier input circuit to give selectable roll off of -12dB/octave at frequencies of 17Hz, 47Hz and 150Hz. The amplifier output is routed via panning potentiometer RV8 to the 'pgm' and 'aud' push buttons S11 and S10.

The 'pgm' push button S11 and 'aud' push button S10 are mutually exclusive and route the audio signal to PGM-L, PGM-R or AUD-L, AUD-R output terminals. The push buttons are mechanically interlocked with an 'off' push button located between them. This push button when selected disengages both S11 and S10 to isolate the audio from output terminals.

p.f.l. push button S14

- 3.6 The p.f.l. non locking push button S14 when selected routes equalised or unequalised audio pre-channel fader RV10 to the p.f.l. (prefade listen) output terminal.

SETTING UP PROCEDURE

4. Prior to despatch the consoles are subjected to stringent test procedures to meet the specified operating characteristics defined in the associated test report.

In the event that it becomes necessary to check or reset the operating parameters of the input sensitivity stage of the channel amplifier, the following procedure should be followed:-

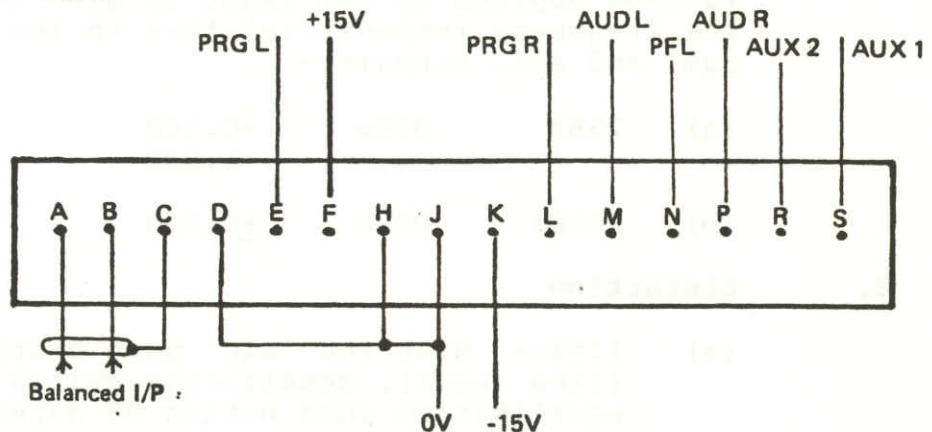
Test Procedure

- 4.1
- (a) Remove the channel amplifier from the mixer and reconnect using extension lead (Spares kit, Part No. PL20240).
 - (b) De-select 'mic' push button S2 (mic input selected).
 - (c) De-select 'eq' push button S6 (equalisation by-passed).
 - (d) Set sensitivity control S1 to the 0dB position.
 - (e) Set the signal input level to 0dBu at 1kHz.
 - (f) Verify the signal level at pin 17 on p.c.b. BA635 (top of channel fader RV10) is -22dBu. If necessary adjust RV1.

- (g) Set channel fader RV10 to minimum attenuation (0 position on scale).
- (h) Verify the signal level at Pgm L and R output terminals is -2.5dBu. If necessary adjust RV3.
- (i) Set auxiliary output level control RV11 to minimum attenuation (fully clockwise).
- (j) Verify the signal level at Aux 1 and 2 output terminals is -2.5dBu. If necessary adjust RV2.

REAR CONNECTOR 34128

Figure 1



Frequency Response Curves

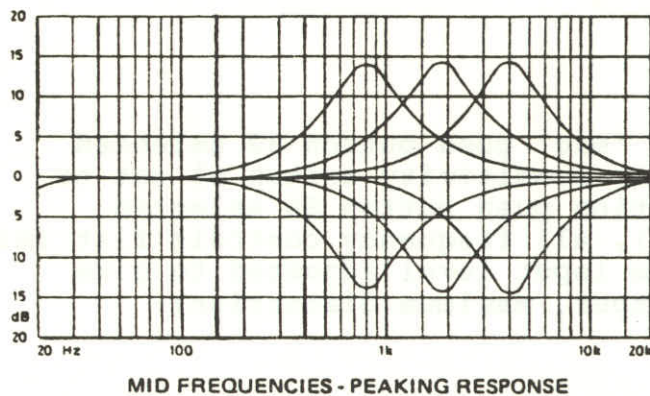


Figure 2

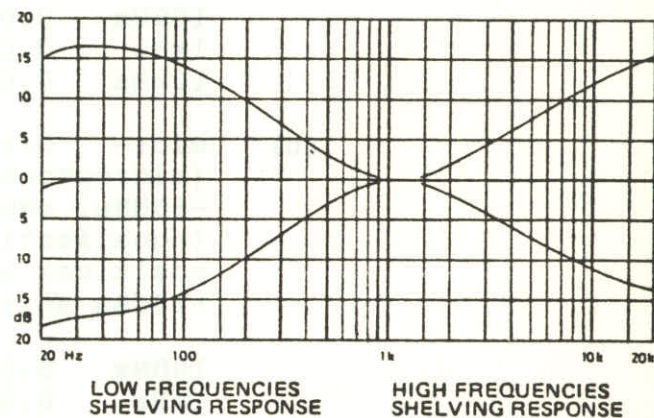


Figure 3

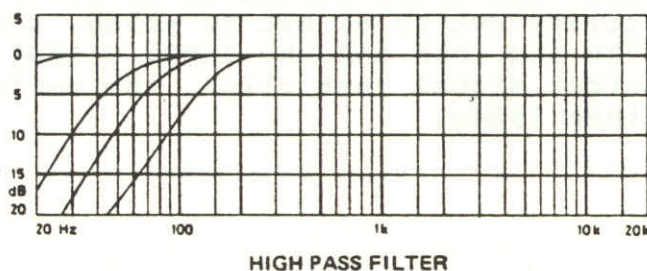


Figure 4

34128 CHANNEL AMPLIFIER

SPECIFICATION

1. Frequency response

With the 'mic' push button S2 de-selected (line input), sensitivity switch S1 set to 0dB, Channel Fader RV10 set to 0, RV11 set fully clockwise and a 1kHz signal set to +2.5dBu applied to the input to give 0dBu at the output, the frequency response relative to the value measured at pgm, and aux. outputs:-

- | | | | |
|-----|-------|------|------------------|
| (a) | 25Hz | 0dBu | +0.5dB
-1.0dB |
| (b) | 20kHz | 0dBu | <u>+0.5dB</u> |

2. Distortion

- (a) line:- With the 'mic' push button S2 de-selected (line input), sensitivity switch S1 set to -15dB, equalisation push button S6 selected (equalisation in), all frequency controls flat (mid position) and the input level adjusted to give +18dBu at the output maximum distortion:-

100Hz	0.05%
1kHz	0.02%
10kHz	0.02%

- (b) mic:- With the 'mic' push button S2 selected (microphone input) sensitivity switch S1 set to -60dBu, equalisation push button S6 selected (equalisation in), all frequency controls flat (mid position) and the input level adjusted to give +18dBu at the output, maximum distortion:-

100Hz	0.02%
1kHz	0.02%
10kHz	0.02%

3. Maximum output

With the 'mic' push button S2 de-selected (line input) sensitivity switch S1 set to -15dB, the output terminated by a 7K5 ohm load and the input signal increased until the output signal just clips, the maximum output:- not less than 19dBu.

4. Crosstalk

- (a) Pgm - Aud, Aux Outputs
With the input signal at frequencies of 100Hz, 1kHz and 10kHz set to give +10dB at the program output terminals, crosstalk measured at audition and auxiliary outputs:- not greater than -80dB.
- (b) Audition, Auxiliary - Pgm
With an input signal at frequencies of 100Hz, 1kHz and 10kHz set to give +10dBu at the audition or auxiliary outputs, crosstalk measured at the program outputs:- not greater than -80dB.

5. Noise

With the 'mic' push button S2 selected, input terminated with 200 ohms, equalisation push button S6 de-selected (equalisation out) push buttons S8 and S9 de-selected (high pass filter out) and sensitivity switch set to -90 (gain 87.5dB) the noise measured at the output:- equal to or less than -37.5dBu.

6. High frequency control

With the 'mic' push button S2 de-selected (line input), sensitivity switch S1 set to 0dB and a 15kHz signal applied to the input and adjusted to give 0dBu at the output:-

- (a) Maximum boost by adjusting RV9 +15dB +20%
(b) Maximum cut by adjusting RV9 -15dB +20%

7. Low frequency control

With the 'mic' push button S2 de-selected (line input), sensitivity switch S1 set to 0dB and a 50Hz signal applied to the input and adjusted to give 0dB at the output:-

- (a) Maximum boost by adjusting RV7 +15dB +20%
(b) Maximum cut by adjusting RV7 -15dB +20%

8. Presence

Maximum boost and cut obtained by adjusting RV6 at the preselectable frequencies of 820Hz, 1k8Hz and 3k9Hz (S8, S9): +15dB +20%.

9. Input headroom

With sensitivity switch S1 set to -30dB, an input signal of -30dBu applied to the input and channel fader RV10 adjusted to give -30dBu the input level can be increased by 40dB before clipping occurs giving an equivalent headroom of 40dB.

10. Input current

Quiescent input current: 27mA. (nominal).

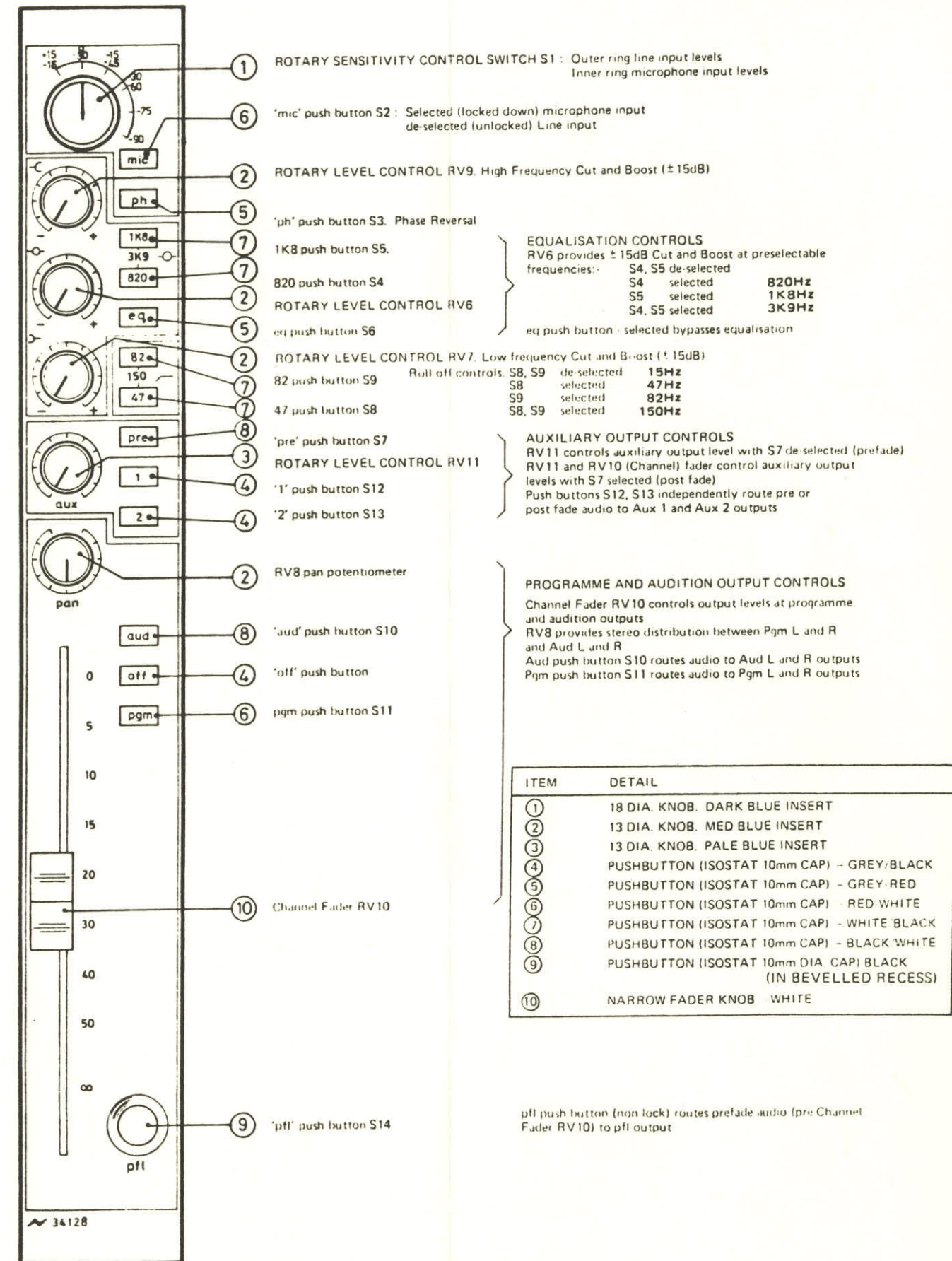
CHANNEL AMPLIFIER 34128

PARTS LIST

Ref	Description	Part No.
R1, 2, 25	Resistor TR4 5K1 ohms	RA005K1
R27, 31, 39	Resistor TR4 5K1 ohms	RA005K1
R43, 44	Resistor TR4 5K1 ohms	RA005K1
R3	Resistor TR4 430 ohms	RA430R0
R4	Resistor TR4 2K0 ohms	RA002K0
R5, 9, 16	Resistor TR4 22 ohms	RA022R0
R24	Resistor TR4 22 ohms	RA022R0
R6, 8	Resistor TR4 39K ohms	RA039K0
R7, 45	Resistor TR4 12K ohms	RA012K0
R10, 14, 22	Resistor TR4 7K5 ohms	RA007K5
R11, 12, 13	Resistor ISKRA 4M7 ohms	RH004M7
R15, 30, 37	Resistor TR4 1K5 ohms	RA001K5
R17, 21	Resistor TR4 6K8 ohms	RA006K8
R18	Resistor TR4 470 ohms	RA470R0
R19	A.O.T.	
R20, 33	Resistor TR4 10K ohms	RA010K0
R23	Resistor TR4 680 ohms	RA680R0
R26/42	Resistor TR4 750 ohms	RA750R0
R28	Resistor TR4 4K7 ohms	RA004K7
R29	Resistor TR4 2K7 ohms	RA002K7
R32, 38	Resistor TR4 220 ohms	RA220R0
R34	Resistor TR4 24K ohms	RA024K0
R35	Resistor TR4 6K2 ohms	RA006K2
R36	Resistor TR5 330K ohms	RB330K0
R40, 41	Resistor TR4 1K6 ohms	RA001K6
R46	Resistor TR4 100K ohms	RA100K0
R50	Resistor TR4 12K ohms	RA012K0
R51	Resistor TR4 10K ohms	RA010K0
R52	Resistor TR4 5K6 ohms	RA005K6
R53	Resistor TR4 620 ohms	RA620R0
R54	Resistor TR4 110 ohms	RA110R0
R55	Resistor TR4 3K0 ohms	RA003K0
RV1	Preset pot. 10K Linear	PT15026
RV2, 3	Preset pot. 1K Linear	PT11009
RV6, 9, 11	Rotary Pot linear 10K	PT15028
RV7	Rotary Pot linear 47K	PT19010
RV8a, b	Rotary Pot 10K + 10K	PT45013
RV10	Fader 1100 series 600 ohms	FD10009
R56, 57	Resistor BTT 10 ohms	R0010R0

PARTS LIST CONT'D

Ref	Description	Part No.
C1	Capacitor, Suflex 220 pF	CA12200
C2, 3	Capacitor 330 μ F, 4V	CA63300
C4	Capacitor Suflex 100 pF	CA11000
C5	Capacitor Suflex 18 pF	CA10180
C6, 7, 13	Capacitor Tant 10 μ F, 25V	CA60101
C14, 23, 24	Capacitor Tant 10 μ F, 25V	CA60101
C30, 31, 35	Capacitor Tant 10 μ F, 25V	CA60101
C36	Capacitor Tant 10 μ F, 25V	CA60101
C8	Capacitor Tant 47 μ F, 16V	CA60471
C9	Capacitor Tant 56 nF, Siemens	CA20560
C10	Capacitor Tant 27 nF, Siemens	CA20270
C11	Capacitor Tant 12 nF, Siemens	CA20120
C12, 22	Capacitor Suflex 22 pF	CA10220
C29, 34	Capacitor Suflex 22 pF	CA10220
C15, 39, 40	Capacitor Tant 3.3 μ F, 25V	CA60030
C16, 17, 19	Capacitor Siemens 22 nF	CA20222
C21	Capacitor Siemens 22 nF	CA20222
C25, 27, 32	Capacitor Mullard 100 μ F, 4V	CA61000
C33, 37, 38	Capacitor Mullard 100 μ F, 4V	CA61000
C18, 20	Capacitor Suflex 3.3 nF	CA20031
C26, 28	Capacitor Siemens 470 nF	CA24703
S1a, b	Rotary Sw. 2P 12W	SR14605
For S2	Isostat Spacer	MU21139/7
For S3	Isostat Spacer	MU21139/3
For S4	Isostat spacer	MU21139/1
T1	Transformer EM20014	TF10014
L1	Inductor VT23127	IN12018
IC1-5	Operational Amp	IC20007
	Knobs and Caps	
	Isostat Cap 10 mm black, round	KA10013
	Fader knob, narrow, white	KA11024
	13 mm dia. knob	MK20055/1
	18 dia. smooth knob	MK20056/4
	13 dia. knob cap light blue	MD20063/1
	13 dia. knob cap med. blue	MD20063/2
	18 dia. knob cap dark blue	MD20069/3
	Engraved Caps	
	Isostat cap 10 mm grey '1'	MG65001/B
	Isostat cap 10 mm grey '2'	MG65002/B
	Isostat cap 10 mm white '47'	MG63047/B
	Isostat cap 10 mm white '82'	MG63082/B
	Isostat cap 10 mm grey 'off'	MG65389/B
	Isostat cap 10 mm grey 'eq'	MG65396/R
	Isostat cap 10 mm grey 'ph'	MG65397/R
	Isostat cap 10 mm black 'pre'	MG64557/W
	Isostat cap 10 mm white '820'	MG63820/B
	Isostat cap 10 mm black 'aud'	MG64595/W
	Isostat cap 10 mm red 'mic'	MG66597/W
	Isostat cap 10 mm red 'pgm'	MG66596/W
	Isostat cap 10 mm white '1K8'	MG63598/B
S14	Isostat Sw. 1B 2P N/L	SW20000
S2-S9	Isostat Sw. 10B 2P P/P	SW20182
S12, S13	Isostat Sw. 10B 2P P/P	SW20182
S10, S11	3B 2P O 2P I/L	SW20042

CHANNEL MODULE FRONT PANEL LAYOUT
(ML 34128 Issue 3)

