GROUP FADER DESK PANELS PA8/262A–C

Introduction

The PA8/262 is one of the Type-D sound equipment modules. It is designed to accept the output of the PA8/260 channel module, and to apply group control to the direct and echo chains. Public address, foldback, prehear and other control facilities are provided. The programme circuit may be brought out to an insertion jackfield so that limiters or response selection amplifiers may be connected into the circuit. Each module contains equipment for two identical group circuits.

The equipment is mounted on a CH1/35 chassis having overall dimensions of 16 by 2¼ by 9 inches and weighs 8½ lb (3·8 kg).

General information on the use of this module in specimen installations may be found in Instruction P.9.

General Description

Facilities

The module is made in three versions, coded PA8/262A to PA8/262C, and the facilities available on each version are indicated in Table 1. A simplified diagram of the programme chain is shown in Fig. 1.

Controls

1. PA8/262A

The controls mounted on the front panel, starting from the top, are as follows:

Illuminated pushbutton output changeover switch which connects the outputs of the two programme chains to alternative pairs of pins on the output plug.

Foldback volume control, a 10-kilohm carbon-track log type.

Switch to connect the public address circuit either before or after the group fader.

Public address volume control, a 10-kilohm carbon log type.

Group fader, Type PNN/18Q/1S (two ganged sections).

Prehear key, nonlocking pushbuton.

2. PA8/262B

The pushbutton output switch is replaced by a two-position rotary switch. The public address switch and volume control are replaced by the cue key and lamp.

3. PA8/262C

The public address switch and volume control are replaced by the programme cut key.

Internal Equipment

The equipment mounted inside the chassis is the same on all three versions. Starting from the bottom, next to the fader are transformers T1 and T2 (LG/71A) mounted in a common mumental box with the coils at right-angles, and above them the public address amplifier (AM9/8). Next in order are T5 (LL/76M) and then T6, T7 (LL/76M) in one box, followed by input-2 amplifier (AM9/8), and finally T3 and T4 (LL/76M), input-1 amplifier (AM9/8) and relays CPA and PC.

TABLE 1

Facility	*PA8/262A*	*PA8/262B*	*PA8/262C*
Fader control	X	X	X
Prehear	X	X	X
Group foldback control	X	X	X
Group output switch	X	X	X
Public address	X		
Cue key and lamp		X	
Programme cut key			X

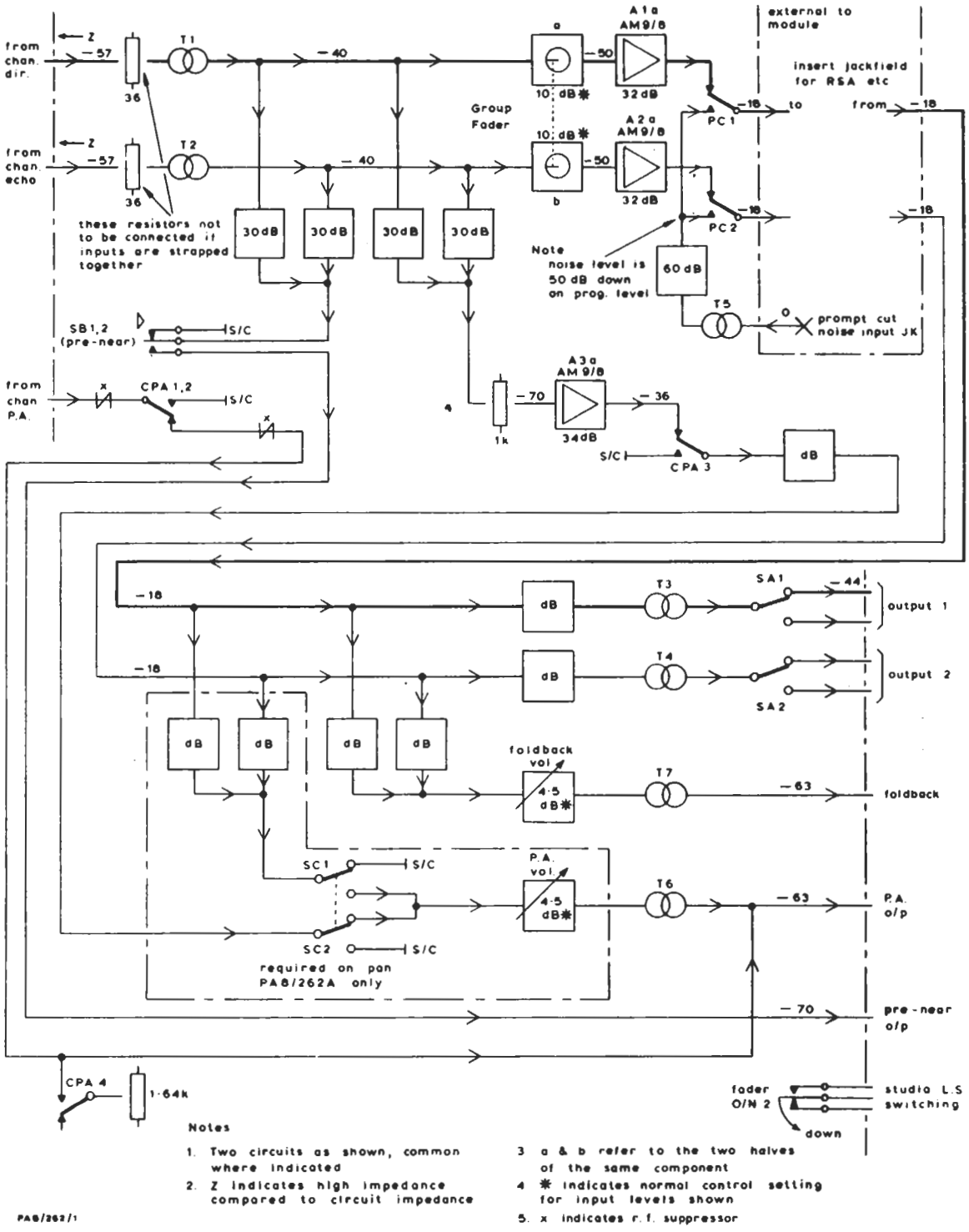

Fig. 1. Programme Chain of PA8/262A–C (Two similar circuits)

Circuit Description (Figs. 1 and 2)

The Programme Chain

There are two identical programme chains in each group circuit. Signals for public address, foldback and prehear circuits are taken simultaneously from both through isolating resistors.

The two chains may be used in different ways. Their inputs may be paralleled (omitting the load resistors R3 and R4) thus giving two isolated outputs, or they may be used separately for the simultaneous control of a direct and an echo circuit. The input is of low impedance (approximately 24 ohms), and a step up transformer, LG/71A, connects it to the double ganged group fader PNN/18Q/1S. The prehear and public address before fader circuits are bridged at this point. Following the fader there is an amplifier AM9/8 (in each chain) whose output is taken to the prompt cut relay contacts, and from there to the response selection amplifier insertion jackfield. (When the prompt cut relay operates, background noise may be substituted for the programme.) On the inputs and outputs of the amplifiers there are coupling components to reduce the effect of switching noise due to the fader and relay contacts. The circuit is completed by the mixing resistors, output transformer LL/76M and output switch. Foldback and public address after fader circuits are taken off after the R.S.A. insertion point through large isolating resistors.

Foldback

Programme derived from both chains of the group is passed through a 10-kilohm volume control and earth isolating transformer LL/76M. The series resistors in the volume control circuit provide the necessary attenuation between the programme line and the foldback bus-bar, and also give isolation of about 80 dB between chains.

Public Address

When the public address output is taken after the fader, a similar circuit to that for foldback is used, and a switch is introduced before the volume control to transfer the circuit from that point to take the feed before the fader. This switch short-circuits the source not in use to minimise interchannel breakthrough. The feed from before the fader is amplified by an AM9/8 (A3) and is connected through the muting relay contacts to the changeover switch. The muting relay is operated from the fader off-normal switch contact so that when the group fader is fully down, no public address output is obtained. This relay also has contacts for muting the channel public address output which comes from the channel group selection switch and which is paralleled with the group public address output. An additional contact connects a resistor across the public address busbar in the cut condition to compensate for the removal of the channel circuits

Prehear

The signals at the secondaries of the input transformers of the two chains are combined by mixing resistors and taken through the prehear key to tags on output plug PLA. The key connects the junction of the resistors to earth when prehear is not in use.

Prompt Cut

Group selection of the prompt cut facility may be made on a panel PA8/267A which also carries volume controls for the group separate outputs. On the PA8/262C group cut is performed by the prompt cut relay energised through a key on the module.

Background noise at zero level is fed to a jack on the main studio jackfield and attenuated by a 60 dB attenuator before connection to the make contacts of the prompt cut relay.

Output Switching

(a) Panels PA8/262A and C

The output switch is a locking push key having a button which is internally illuminated when operated. These panels are normally used in a situation requiring a *main* and *group separate* feed, and the key exchanges the chains in case of failure. (See Instruction P.9.)

(b) Panel PA8/262B

The output switch is a rotary one. The panel is normally used to provide *direct* and *echo* chains and the switch is used to select different echo circuits. It can also be used in other ways.

Miscellaneous Circuits

Studio loudspeaker switching, cue light control and switching of the before-fader public address and channel public address circuits are provided by fader off-normal contacts. The operation of the CPA relay is performed through a switching transistor to reduce clicks generated by relay currents.

Tests

Programme levels under normal working conditions are given on Fig. 1. Tests on the PA8/262 are best carried out using a test panel TE1/13.

Modifications to PA8/262 (Alternative Amplifiers)

The amplifier AM9/8 has been superseded by the AM5/7, and later models of the PA8/262 may be fitted with the newer amplifiers.

WWM(X) 12/70

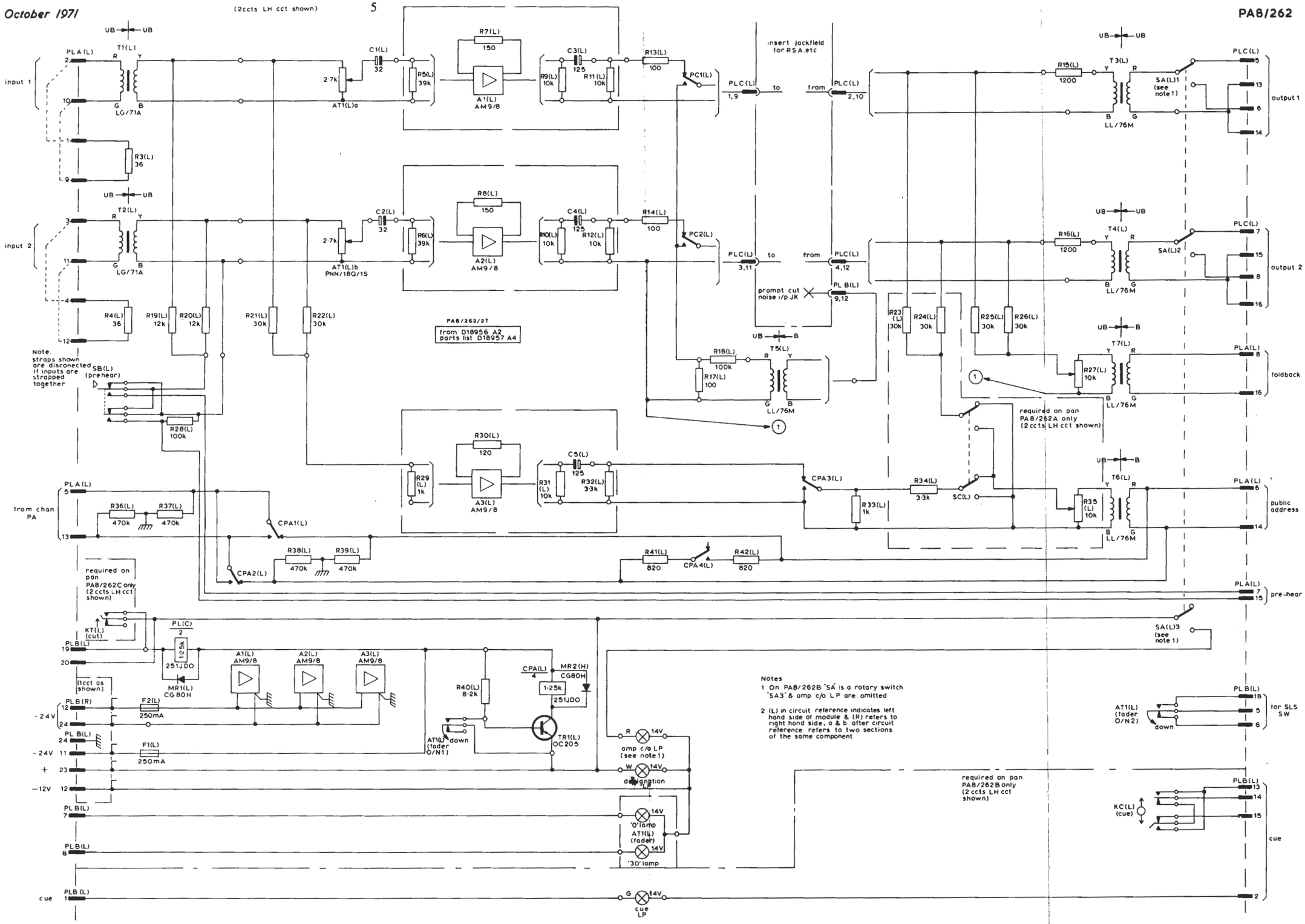

Fig.2. Circuit of PA8/262 A-C

TEST SCHEDULE

Apparatus Required

Portable Routine Line Tester RLT/1P
Tone Source TS/10
Repeating Coil
Amplifier Test Meter ATM/1
Loudspeaker Unit LS5/1
Oscilloscope
Amplifier AM9/5
Desk Panel Tester TE1/13 including connector cables TE1A/2A-G

D.C. Tests

General

Plug the module into tester TE1/13 and apply power. It is recommended that the module should be d.c. tested completely before a start is made on further tests.

D.C. Feeds

Remove the Meter Link from the tester and insert a milliammeter capable of reading up to about 150 mA. The total feed current, shown on the meter, should be about 125 mA with the fader up and about 90 mA with the fader down.

Lamps

The designation lamps should light when the tester is powered. Connect B7 and B8 to B(L)23 to check the fader lamps. For panel PA8/262B apply 12 volts from B(L)12 (negative) and B(L)23 (positive) to B1 and B2 and check that the cue lamp functions.

D.C. Test Schedule

Remove power from the tester TE1/13 and make resistance measurements on the module in accordance with the sehedule given in Table 1. Resistances above 10 kilohms should be measured with the routine line tester RLT/1P in the A/E, B/E, and A/B Insulation modes; resistances below 10 kilohms should be measured in the E-A-E, E-B-E and Loop R(A-B) modes.

The connector cables, TE1A/2A-G, will be needed for these checks and measurements.

TABLE 1

TE1/13 Jack Nos.	*RLT/1P Mode*			*Relevant Module Control Settings*
	E-A-E or A/E	*E-B-E or B/E*	*Loop R or A/B*	
A.1.9(L&R)	∞	∞	36Ω	
A.2.10(L&R)	∞	∞	3Ω	
A.3.11(L&R)	∞	∞	3Ω	
A.4.12(L&R)	∞	∞	36Ω	
A.5.13(L&R)	120kΩ	120kΩ	≈60Ω	dummy plug jack A(L)6.14
A.6.14(L&R)	120kΩ	120kΩ	≈60Ω	dummy plug jack A(L)5.13
A.7.15(L&R)	∞	100kΩ	∞	
A.8.16(L&R)	∞	∞	60Ω	

TABLE 1 CONTINUED

TE1/13 Jack Nos.	*RLT/1P Mode*			*Relevant Module Control Settings*	
	E-A-E or A/E	*E-B-E or B/E*	*Loop R or A/B*		
B.1.2(L&R)	∞	∞	≈50Ω		PA8/ 262B only
B.13.14(L&R)	∞/∞	∞/∞	∞/0	normal/operate cue key to n/1 posn.	
B.14.15(L&R)	∞/∞	∞/∞	0/∞	normal/operate cue key either way	
B.7.12(L)	∞	∞	≈50Ω		
B.8.12(L)	∞	∞	≈50Ω		
B.5.6(L&R)	∞/∞	∞/∞	∞/0	fader up/fader down	
B.5.18(L&R)	∞/∞	∞/∞	0/∞	fader up/fader down	
B.9.21(L&R)	∞	∞	60Ω		
B.24.–(L&R)	0	∞	∞		
C.2.10(L&R)	15kΩ	15kΩ	1·26kΩ	foldback and p.a. pots set to min. (0)	
C.4.12(L&R)	15kΩ	15kΩ	1·26kΩ	foldback and p.a. pots set to min. (0)	
C.5.13(L&R)	∞	∞	60Ω		
C.6.14(L&R)	∞/∞	∞/∞	∞/60Ω	normal/operate amp. c/o	
C.7.15(L&R)	∞	∞	60Ω		
C.8.16(L&R)	∞/∞	∞/∞	∞/60Ω	normal/operate amp. c/o	

TABLE 2

Apply tone at −50 dB to jack	Switch Positions: SA amp c/o	Switch Positions: SB prehear	Switch Positions: SC bef/aft fader	Foldback Pot Position	P.A. Pot Position	Measure at jack	Level (dB at 1 kHz	Tolerances (dB w.r.t. 1 kHz): 40 Hz	Tolerances (dB w.r.t. 1 kHz): 15 kHz
A.2.10	not op	-	after	0	0	C.5.13 (100 Ω)	−24.4 ±0.2	±0.2	±0.3
	operated	-	after	0	0	C.6.14 (100 Ω)	−24.4 ±0.2	-	-
	-	-	after	8	0	A.8.16 (600 Ω)	−36.6 ±0.3	-	-
	-	-	after	4	0	A.8.16 (600 Ω)	−60 about	-	-
	-	-	after	0	8	A.6.14 (600 Ω)	−36.6 ±0.3	(dummy plug jack A.5.13)	
	-	-	after	0	4	A.6.14 (600 Ω)	−60 about		
	-	-	before	0	8	A.6.14 (600 Ω)	−46.5 ±0.3	-	-
	-	operated	before	0	0	A.7.15 (600 Ω)	−59.7 ±0.3	-	-
A.3.11	not op	-	after	0	0	C.7.15 (100 Ω)	−24.4 ±0.2	±0.2	±0.3
	operated	-	after	0	0	C.8.16 (100 Ω)	−24.4 ±0.2	-	-
	-	-	after	8	0	A.8.16 (600 Ω)	−36.6 ±0.3	-	-
	-	-	after	0	4	A.6.14 (600 Ω)	−36.6 ±0.3	-	-
	-	-	before	0	8	A.6.14 (600 Ω)	−46.5 ±0.3	-	-
	-	operated	before	0	0	A.7.15 (600 Ω)	−59.7 ±0.3	-	-
A.5.13	-	-	-	-	0	A.6.14 (600 Ω)	−50.0 ±0.0	-	-

Circuit Transmission Tests (Fig. 3)

Fig. 3 gives the a.c. test circuit. On the TE1/13 connect jack C.1.9 to C.2.10 and jack C.3.11 to C.4.12 using connector cables TE1A/2A. Set the fader to maximum. Repower the TE1/13 and carry out the measurements scheduled in Tables 2 and 3, using the ATM/1 in the 50-kilohm amp-det condition.

Crosstalk and Breakthrough

The measurement chain for these tests should comprise an amplifier AM9/5, wired for maximum gain and using the 600-ohm input, followed by an ATM/1 used as a 50-kilohm T.P.M. An oscilloscope connected to the listen output of the T.P.M. should be used for breakthrough tests. On the TE1/13 jack C.1.9 should be connected to C.2.10 and jack C.3.11 to C.4.12, using cables TE1A/2A. The tests scheduled in Table 4 should be carried out.

TABLE 3

Test Conditions:-
1. Tone at +20 dB applied via TE1/13 test jack to B.9.21.
2. Amplifier changeover switch SA not operated.
3. B.19.20 short-circuited.

Measure at jack	*Level (dB) at 1 kHz*
C.5.13 (100 Ω)	−64 about
C.7.15 (100 Ω)	−64 about

TABLE 4

Apply 10 kHz at −50 dB to jack	*Fader Posn*	*B.19.20*	*Switch Positions: SA amp c/o*	*Switch Positions: SB prehear*	*Measure at*	*Level (dB)*	*Visibility in Noise on CRO*
A.2.10	up	o/c	not op	-	C.7.15 (100 Ω)	⩾−26	-
	down	o/c	not op	-	C.5.13 (100 Ω)	-	not vis
	up	s/c	not op	-	C.5.13 (100 Ω)	-	just vis
A.3.11	up	o/c	not op	-	C.5.13 (100 Ω)	⩾−26	-
	down	o/c	not op	-	C.7.15 (100 Ω)	-	not vis
	up	s/c	not op	-	C.7.15 (100 Ω)	-	just vis
	up	o/c	not op	not op	A.7.15 (600 Ω)	-	not vis
A.5.13	down	-	-	-	A.6.14 (600 Ω)	-	not vis

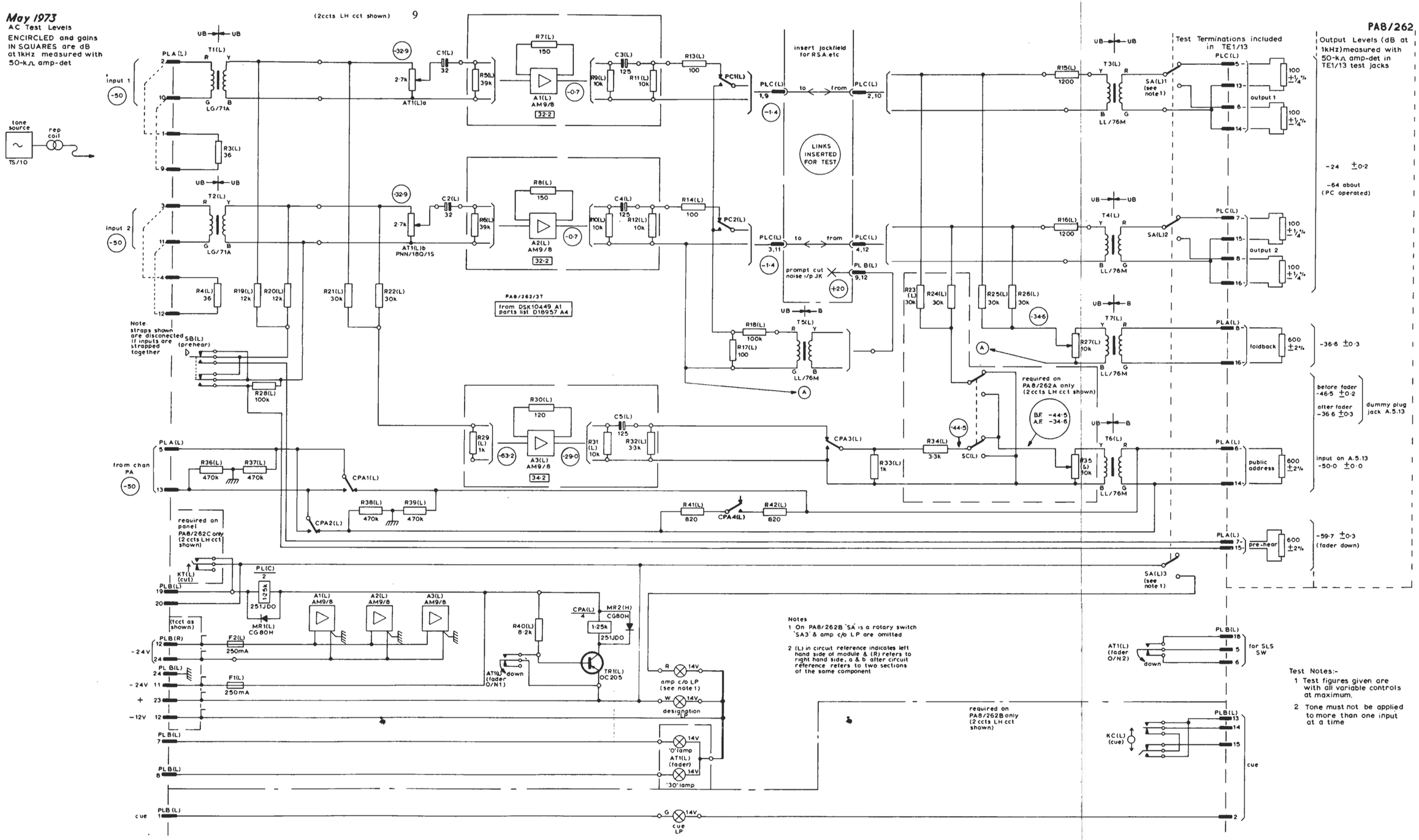

Fig. 3. A.C. Test Circuit for PA8/262A-C

Noise Tests

For the following tests use an AM9/5 (600-ohm input) in conjunction with an ATM/1 operating as a 600-ohm T.P.M. Connect an oscilloscope to the listen output of the T.P.M. to check that there is minimum hum.

1. With the fader down, measure at listen jacks C.1.9 and C.3.11. The noise on the T.P.M. peaked to 6 should be ⩾−51 dB and fluctuations ⩾±1 dB.
2. With P.A. switched to Before Fader, the fader up, and the P.A. control on 8, measure at 600-ohm jack A.6.14. The noise on the T.P.M. peaked to 6 should be ⩾−64 dB and fluctuations ⩾±1 dB.

Noise-free Operation of Controls

General Conditions for Tests

For the following tests apply programme at a volume of −60 dB to the two main inputs, jacks A.2.10 and A.3.11. Set the monitoring loudspeaker to loud volume when fed from the listen output of an ATM/1 registering the normal range of programme peaks.

Switched Controls

(a) Prehear

With the Amp. C/O unoperated, operate the Prehear pushbutton. A clean prehear output should be produced at 600-ohm jack A.7.15, and there should be no audible effect on programme at the two main outputs on 100-ohm jacks C.5.13 and C.7.15.

(b) P.A. Cut

Operation of the CPA relay, as a result of fader off-normal operation, should break cleanly the public address output on 600-ohm jack A.6.14 and should not produce clicks on the two main outputs at 100-ohm jacks C.5.13 and C.7.15. The public address output should be derived for the above test from the two main inputs and from the 'From Chan. P.A.' input (A.5.13). The P.A. should be switched to Before Fader.

(c) Prompt Cut

Short-circuit B.19 and B.20. This operates the PC relay. The programme on the two main outputs at 100-ohm jacks C.5.13 and C.7.15 should break cleanly. Operation with no programme should cause no audible click. (Operate the Prompt Cut key on the PA8/262C for these tests.)

Faders and Control Potentiometers

Using test programme applied to the appropriate input, check by listening at the following outputs that the relevant variable controls function without noise.

Jack	*Variable Control*
C.5.13 (100 ohms)	Fader
C.7.15 (100 ohms)	Fader
A.6.14 (600 ohms)	P.A. control
A.8.16 (600 ohms)	Foldback control

Phasing

Using an asymmetric test waveform, check, with an oscilloscope connected to the listen output of the ATM/1, that all outputs are in phase with all inputs.

An asymmetric waveform may be produced conveniently by shunting a tone source (say a TS/10 set for +10 output) with a suitable diode (say an AAY 32).

WWM(X) 12/71