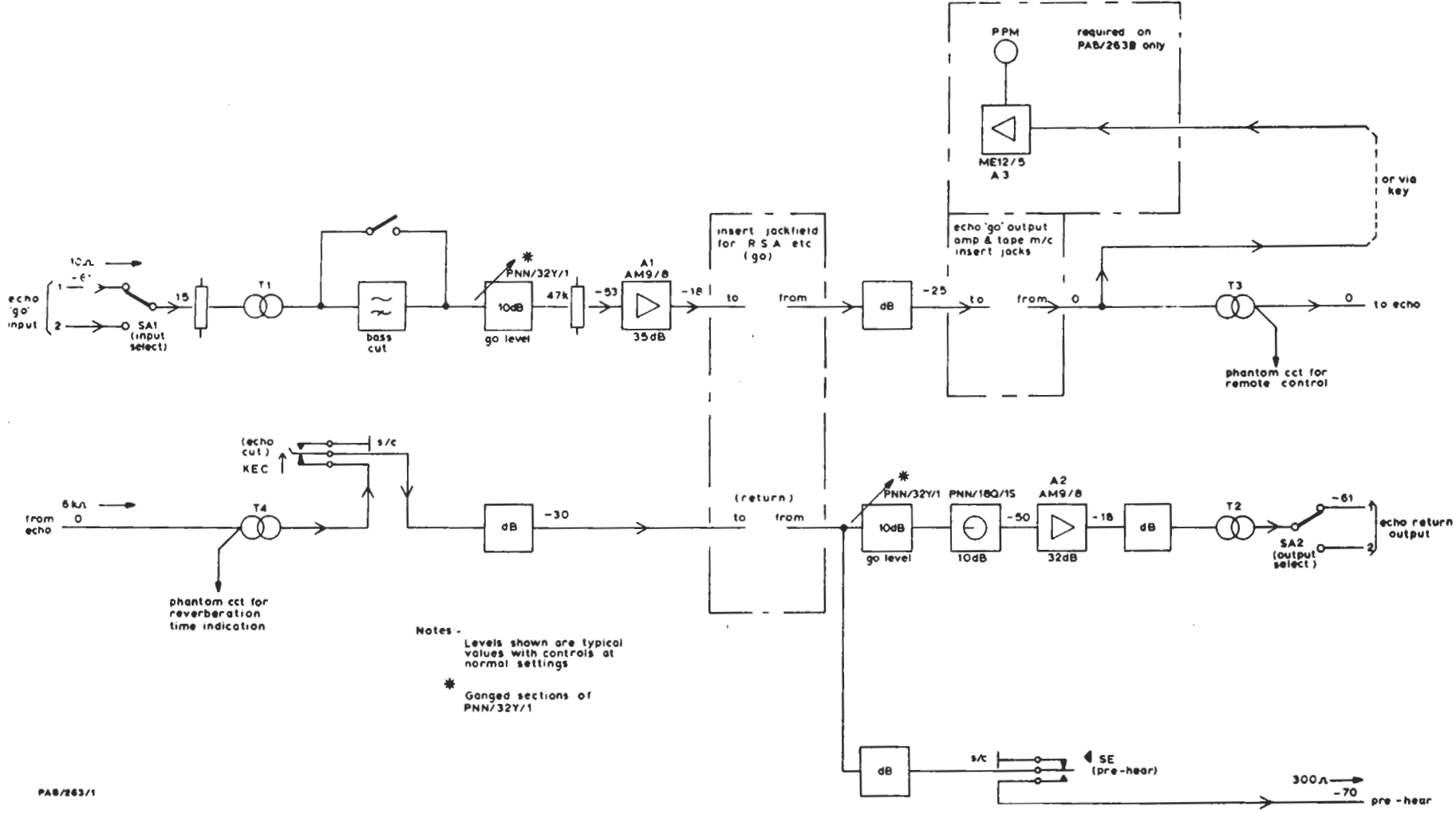


ECHO FADER DESK PANELS PA8/263A AND PA8/263B

Fig. 1. Programme Chain of the PA8/263A and PA8/263B



Notes -
 Levels shown are typical values with controls at normal settings
 * Ganged sections of PNN/32Y/1

PA8/263/1

Introduction

The PA8/263 is a Type-D sound equipment module designed to connect the appropriate chain from the channel module to the echo device, to adjust the levels and to provide control. Signals for the remote control of the echo device can be sent over the programme lines, and a prehear output is available. The PA8/263B is fitted with a programme meter to monitor the level sent to the echo device.

The equipment is mounted in a CH1/35 chassis having overall dimensions of 16 by 2½ by 9 inches and weighs 6 lb.

General information on the use of this module in specimen installations is given in Instruction P.9.

General Description

Controls

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

A two-position input switch, and a three-position bass-cut switch giving two degrees of bass cut.

On the PA8/263B only, a P.P.M. meter.

A meter indicating the reverberation-time setting of a reverberation plate, together with the plate control circuit on-off switch, and nonlocking pushbutton switches to increase or decrease the reverberation time.

Echo fader PNN/18Q/1S, *Go Level* control PNN/32Y/1, and echo cut key.

Nonlocking pushbutton *Prehear* key.

Internal Equipment

Mounted inside the chassis, on the left-hand side of the centre division, are transformers T3 and T4 in a common mumental case, the two amplifiers AM9/8 and relay A. On the other side are the programme-meter amplifier ME12/5, and transformers T1 and T2. The law and sensitivity controls of the ME12/5 are accessible through holes in the bottom of the chassis.

Circuit Description (Figs. 1 and 2)

General

The echo circuit may be switched to one of two groups by the operation of the input selector SA1, and the selection made is indicated by the fader lamps.

The switch is followed by input transformer T1 which steps up both level and impedance. A bass-cut circuit is introduced after the transformer having a straight-through position and positions giving two degrees of bass cut. The first provides an attenuation of 3 dB at 270 Hz and the second gives an attenuation of 3 dB at 470 Hz and 10 dB at 270 Hz. This is followed by the *Go Level* preset control PNN/32Y/1 which is used to increase or decrease the level sent to the echo device by an amount up to 10 dB, in steps

of 3.3 dB. The attenuator is a double-ganged control, the second section of which is connected in the return chain immediately before the main fader. It has a differential action, so that the final level is unaffected by the setting of the control.

Next comes an amplifier AM9/8 (A1) whose output is taken to the response selection amplifier insertion jackfield and from here, after attenuation, the signal passes to an external output amplifier, AM7/3. Tape machine delay can be added at this point. The output of the AM7/3 is taken back to the output transformer T3 in the module and from here passes to the echo device. The output transformer secondary provides a phantom circuit for the remote control of the reverberation plate.

The return circuit from the echo device is taken through transformer T4, the echo cut key and a 20-dB attenuator to the R.S.A. insertion jackfield. The transformer primary is used to provide a phantom for the reverberation plate setting indication circuit. The prehear circuit is connected after the R.S.A. insertion point, and the return circuit is completed by the second section of the preset level control, the echo fader, an amplifier AM9/8 (A2), mixing resistors and output transformer T2. Coupling capacitors are introduced at the input of both amplifiers to reduce attenuator switching noise.

Echo Plate Control Circuit

The module incorporates the control circuit of the UN3/4 remote plate control unit, a description of which is to be found in the instruction for the EMT/140 artificial reverberation plate. Power for this circuit is supplied by a power supplier PS3/31, mounted externally.

Programme Meter

A monitoring point for the signal sent to the echo device is taken from the primary side of T3. On the PA8/263B this may be connected to the input of the monitoring amplifier ME12/5 by strapping tags 9 and 10 and 21 and 22 on plug PLB. Alternatively these tags may be connected via a key so that the PPM may also be used to monitor other parts of the circuit.

Tests

The levels under normal working conditions are given on Fig. 1. Tests on the PA8/263 are best carried out using test panel TE1/13

Modifications to PA8/263 (Alternative Amplifiers)

The amplifier AM9/8 has been superseded by the AM5/7, and later models of the PA8/263 may be fitted with the newer amplifiers.

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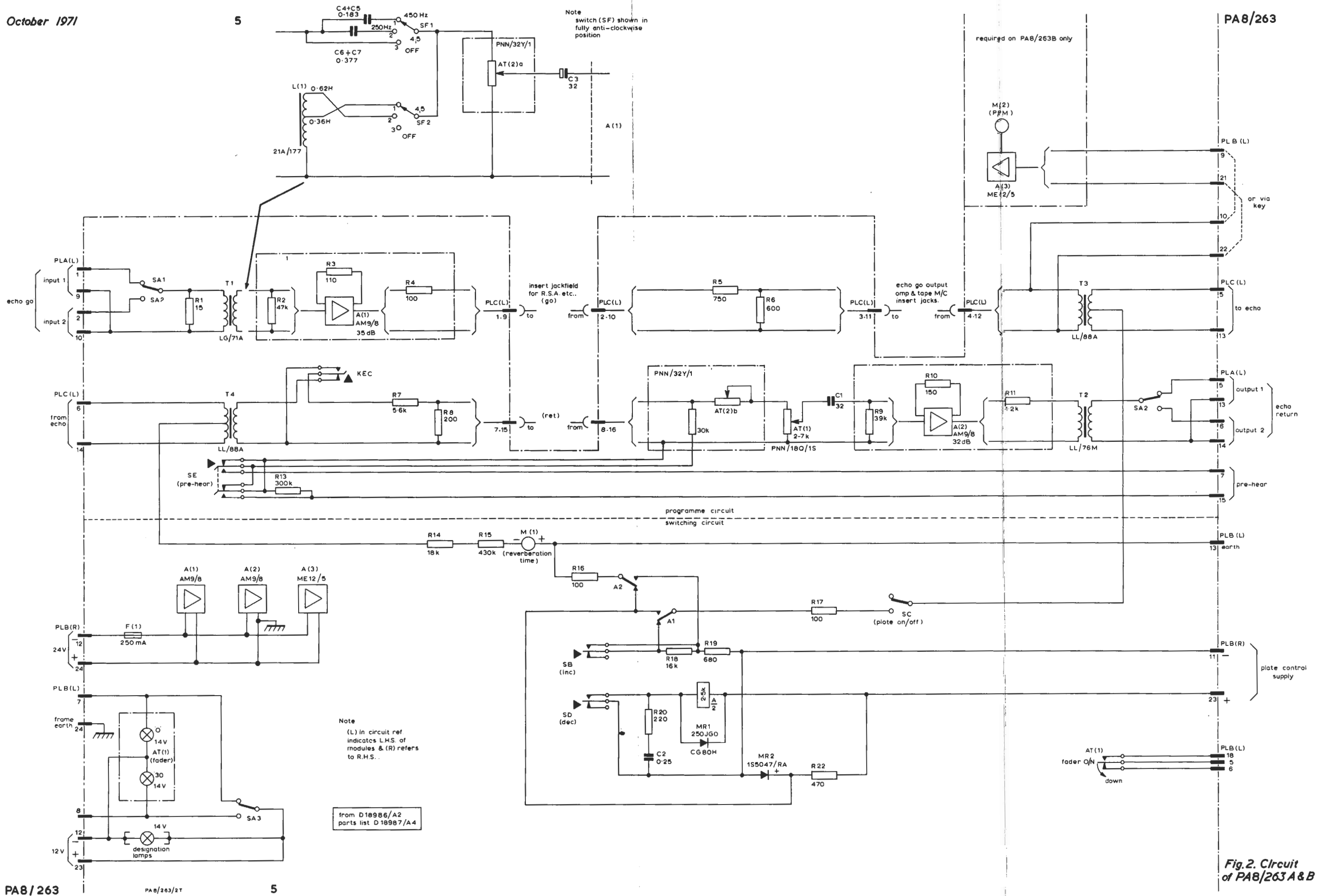


Fig.2. Circuit of PA8/263 A & B

TEST PROCEDURE**Apparatus Required**

Portable Routine Line Tester RLT/1P
 Tone Source TS/10
 60-dB Attenuator AT/30
 Repeating Coil
 A.C. Test Meter ATM/1
 Loudspeaker Unit LS5/1
 Oscilloscope
 Desk Panel Tester TE1/13 including connector
 cables TE1A/2A-G
 Resistor 5.1 kilohms $\pm 2\%$
 Resistor 51 kilohms $\pm 2\%$

Note re Group Switch

The group switch is at the top of the front panel of the module. References in what follows to position A or B of this switch denote the extreme clockwise or extreme anticlockwise setting.

D.C. Tests**General**

Plug the module to tester TE1/13 and apply power.

It is recommended that the module should be completely d.c. tested before a start is made on further tests. The connector cables TE1A/2A-G, which are part of the TE1/13, are required to gain access to the module for checks and measurements as described below.

D.C. Feeds

Remove the Meter Link from the tester and insert a milliammeter capable of reading up to about 50 mA. The total current feed, shown on the meter, should be about 47 mA.

Lamps

The designation lamps should function as soon as power is applied to the tester. Operate the group switch to positions A and B to check the fader lamps.

D.C. Test Schedule

Remove power from the tester and make resistance measurements on the module in accordance with the schedule given in Table 1. Resistances above 10 kilohms

TABLE 1

TE1/13 Jack Nos.	RLT/IP 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)	∞/∞	∞/∞	$\approx 3\Omega/\infty$	gp. sw. to A/gp. sw. to B
A.2.10(L)	∞/∞	∞/∞	$\approx 3\Omega/\infty$	gp. sw. to B/gp. sw. to A
A.5.13(L)	∞/∞	∞/∞	$\approx 60\Omega/\infty$	gp. sw. to A/gp. sw. to B
A.6.14(L)	∞/∞	∞/∞	$\approx 60\Omega/\infty$	gp. sw. to B/gp. sw. to A
A.7.15(L)	$\infty/30k\Omega$	300k $\Omega/0$	$\infty/30k\Omega$	normal/prehear operated
B.5.6(L)	∞/∞	∞/∞	0/ ∞	fader down/fader up
B.5.18(L)	∞/∞	∞/∞	$\infty/0$	fader down/fader up
B.7.12(L)	∞/∞	∞	20 $\Omega/50\Omega$	gp. sw. to A/gp. sw. to B
B.10.22(L)	∞	∞	$\approx 65\Omega$	
B.8.12(L)	∞/∞	∞	50 $\Omega/20\Omega$	gp. sw. to A/gp. sw. to B
B.7.23(L)	∞/∞	∞/∞	0/70 Ω	gp. sw. to A/gp. sw. to B
B.8.23(L)	∞/∞	∞/∞	70 $\Omega/0$	gp. sw. to A/gp. sw. to B
B.—.24(L&R)	∞	0	∞	
C.2.10(L)	∞	∞	1350 Ω	dummy plug jack C.3.11(L)
C.3.11(L)	∞	∞	600 Ω	dummy plug jack C.2.10(L)
C.4.12(L)	∞	∞	$\approx 65\Omega$	
C.5.13(L)	∞	∞	$\approx 40\Omega$	
C.6.14(L)	∞	∞	$\approx 40\Omega$	
C.7.15(L)	∞	∞	$\approx 200\Omega$	
B.9.21(L)	∞	∞	$\approx 400\Omega$	PA8/263B only

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. Note that the lower tag number of a pair is designated as the A leg.

Reverberation Plate Control Circuit

(a) 'Plate On' Condition

1. Apply 64 volts d.c. (negative and positive) from a low-impedance stabilised source to the 4-mm sockets B(R)11.23 on the tester.
2. Connect a milliammeter with f.s.d. 10 mA in series with a 5.1-kilohm resistor between tag C(L)5 (negative) and B(L)13. Access to C(L)5 can be obtained via the single-ender, TE1A/2B.
3. With the Plate On/Off switch On, note the current reading, which should be about 2 mA.

(b) Reverberation Time 'Increase/Decrease'

Operation of the Increase button should increase the current in the Plate On condition to about 8 mA. Operation of the Decrease button should reverse the current, which should again be 8 mA.

(c) Reverberation Time Meter

Check the meter calibration by applying test voltages as shown below to tag C(L)6 (negative) and B(L)13 (positive) via a 51-kilohm resistor. Access to C(L)6 can be obtained via the single-ender, TE1A/2B.

Rev. Time (seconds)	Volts
1	19.2
2	25.6
3	32.0
4	38.4

Circuit Transmission Tests (Fig. 3)

General

Fig. 3 gives the a.c. test circuit. On the TE1/13 connect jack C(L)1.9 to C(L)2.10 and jack C(L)7.15 to C(L)8.16 using connector cables TE1A/2A. Repower the TE1/13 and carry out the measurements scheduled in Table 2, using the ATM/1 in the 50-kilohm amp-det condition.

TABLE 2

Apply tone at level shown to jack	Conditions	Use 50-k Ω amp-det to measure at jack	Level (dB) at 1 kHz	Tolerance (dB) w.r.t. 1 kHz	
				40 Hz	15 kHz
A(L)1.9 (-50 dB)	Operate Bass Cut switch to Off, Go Level switch fully clockwise and Group switch to A	C(L)3.11	-5.5 \pm 0.3	+0.0 -0.2	+0.0 -0.2
A(L)2.10 (-50 dB)	As above but with Group switch on B	C(L)3.11	-5.5 \pm 0.3	+0.0 -0.2	+0.0 -0.2
C(L)4.12 (0 dB)		C(L)5.13 (600 ohm)	-1.4 \pm 0.3	+0.0 -0.2	+0.0 -0.2
C(L)6.14 (0 dB)	Set fader to maximum. Operate Go Level switch fully anticlockwise and Group switch to A	A(L)5.13 with 100 Ω plugged to related listen jack	-21.2 \pm 0.2	+0.0 -0.2	+0.0 -0.2
C(L)6.14 (0 dB)	As above but with Group switch on B	A(L)6.14 with 100 Ω plugged to related listen jack	-21.2 \pm 0.4	+0.0 -0.2	+0.0 -0.2
C(L)6.14 (0 dB)	Go Level switch fully anticlockwise. Prehear button operated	A(L)7.15 (600 ohm)	-64.4 \pm 0.5	+0.0 -0.2	+0.0 -0.2

AC Test Levels ENCIRCLED and gains in SQUARES are dB at 1kHz measured with 50-kHz amp-det

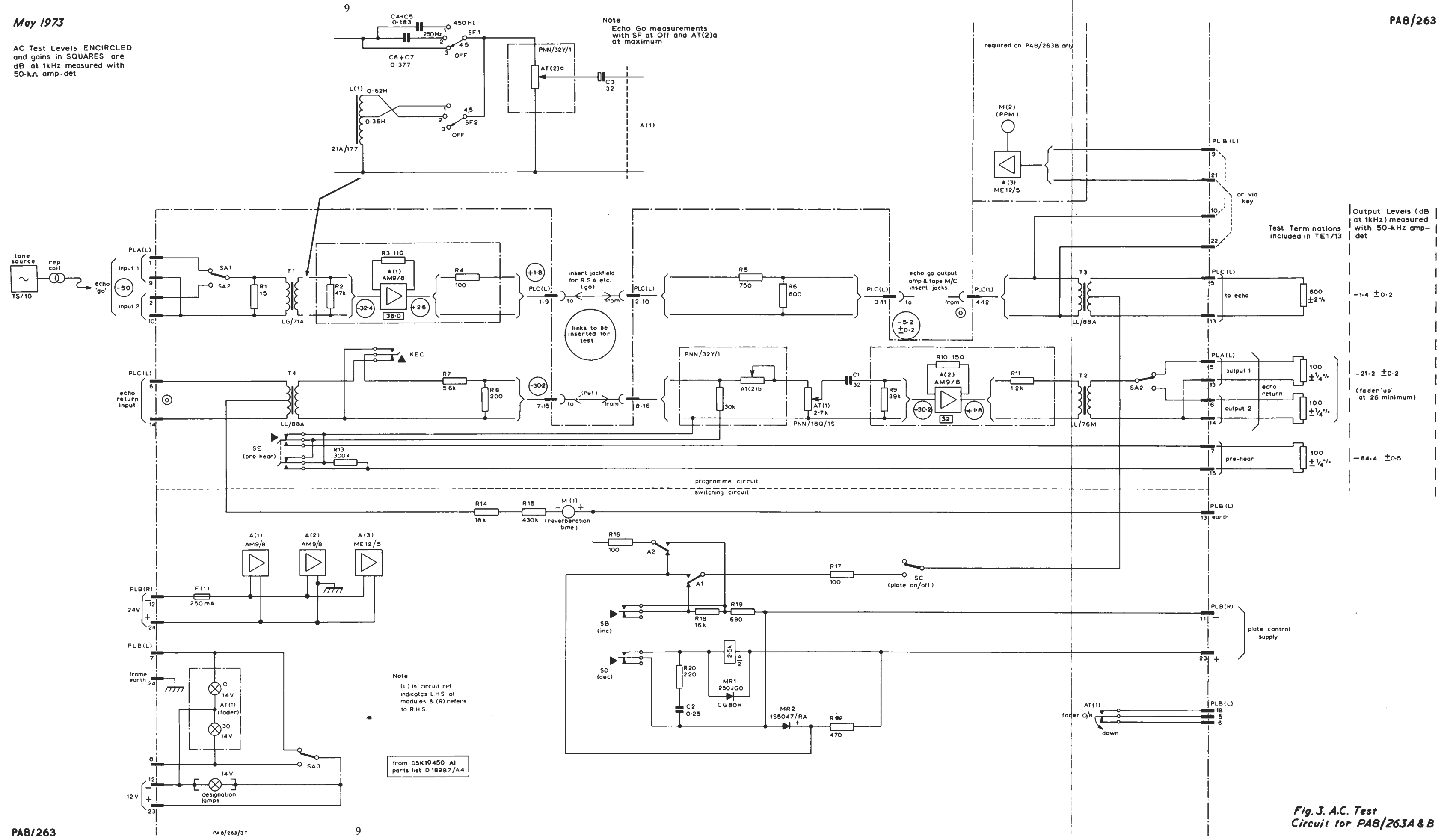


Fig. 3. A.C. Test Circuit for PAB/263A & B

Bass Cut Control

Apply tone to the module as described in the first entry in Table 2 and check the spot frequency response with respect to 1 kHz for Bass Cut 1 and 2, which should be as shown in Table 3.

TABLE 3

<i>Bass Cut</i>	<i>-3 dB at</i>	<i>-10 dB</i>
1	about 270 Hz	about 160 Hz
2	about 470 Hz	about 270 Hz

Peak Programme Meter (PA8/263B Only)

Apply 1-kHz tone at 0 dB to sockets B(L)9 and 21. Access to these, via the tester TE1/13, can be had using the Test Jack sockets and the connector TE1A/2C. Adjust the Sensitivity, Law-1 and Law-2 controls of the ME12/5 according to the procedure given in the Instruction on this amplifier.

Silent Operation of Switched Controls**General**

For the following checks use a monitoring loudspeaker (e.g., LS5/1) connected to the listen output of the T.P.M. section of the ATM/1. In each instance the loudspeaker volume control should be set for reasonable listening level when the T.P.M. is registering normal programme peaks.

'Go Level' Switch

1. Apply programme at a volume of -60 dB to jack A(L)1.9.
2. Set the Go Level switch to N.
3. Check at jack C(L)3.11 that operation of the Go Level switch increases and decreases the programme volume cleanly.
4. Make a similar test with an input at a programme volume of 0 dB at jack C(L)6.14 and output at jack A(L)5.13.

'Bass Cut' Switch

Apply programme as for the previous test. Operation of the Bass Cut switch between 1, 2 and Off should vary the bass response cleanly.

'Echo Cut' Key

1. Apply programme at 0 dB to jack C(L)6.14.
2. Set the fader to maximum.
3. Check that programme from the echo return outputs on 100-ohm jacks A(L)5.13 and A(L)6.14 is cut cleanly by operation of the Echo Cut key and that there is no breakthrough.

'Prehear' Button

1. Apply programme as for the previous test.
2. Check that the prehear output on 600-ohm jack A(L)7.15 is applied and broken cleanly by operation of the Prehear pushbutton and that this operation does not affect programme on the 100-ohm jacks A(L)5.13 and A(L)6.14.

Noisefree Operation of Fader

1. Apply programme at 0 dB to jack C(L)6.14.
2. Monitor at 100-ohm jack A(L)5.13 with the loudspeaker.
3. Set the Group switch to A.
4. Check that the fader operates in a noisefree manner and that there is no breakthrough on the bottom stud.

Phasing

Using an asymmetric test waveform check, with an oscilloscope on the listen output of the T.P.M. section of an ATM/1, that the inputs and outputs are in phase.

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).

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