

**STUDIO CONTROL DESK DK4/12**

*See also AM1/4, AM7/3, AM9/5, ME12/4, ME12/5, PSC/2*

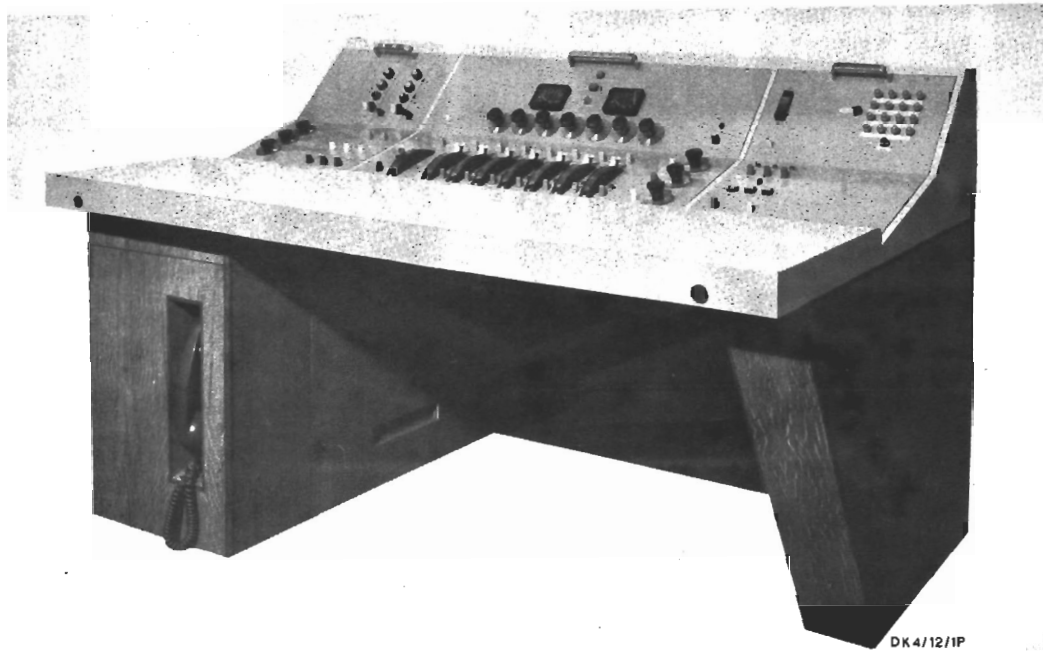


Fig. 1. General View of the DK4/12

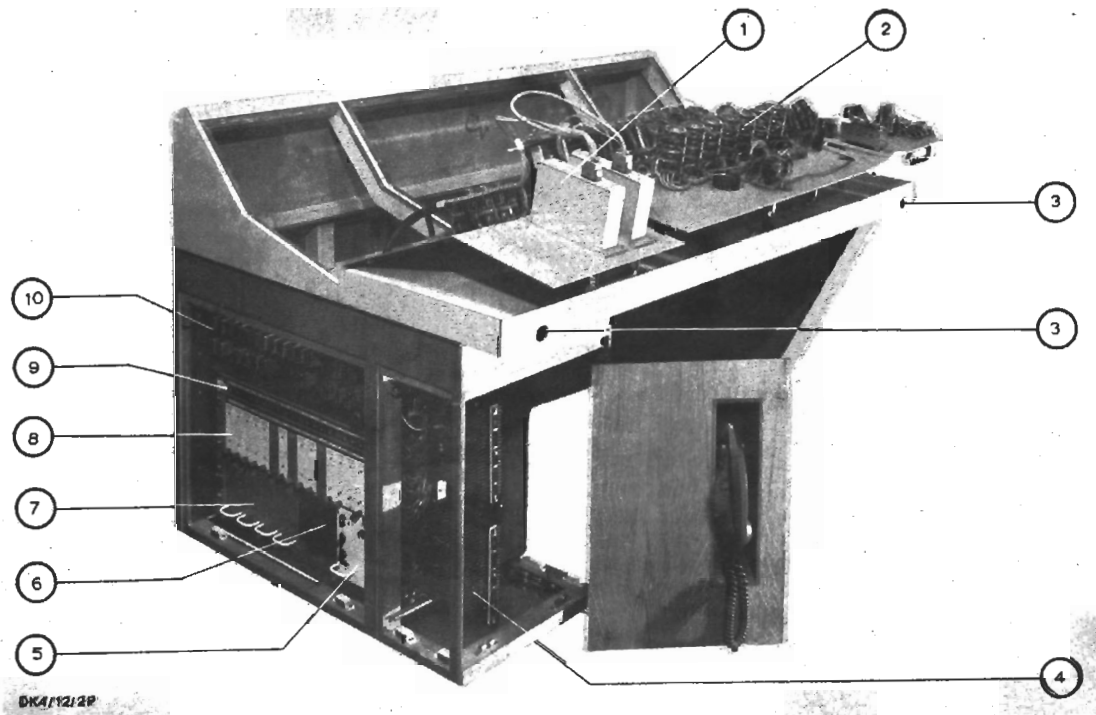


Fig. 2. DK4/12 with interior exposed for maintenance

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|--|--|
| 1. Response selection amplifiers AM1/4     | 6. Space on CH1/18C for two amplifiers, e.g., ME12/4s    |
| 2. Channel source switches                 | 7. Line sending amplifiers AM7/3                         |
| 3. Headphone jacks                         | 8. Source and channel amplifiers AM9/5, plus two ME12/5s |
| 4. Two 250-way cable-terminating tagblocks | 9. Jackfield with 20 jacks                               |
| 5. Power supplier PS2/49 (for amplifiers)  | 10. Relay panel  |

### Introduction

The DK4/12 is a low-profile sound-control desk with angled control panels set in a wooden frame and mounted on a wooden pedestal housing amplifiers and relay panels. The desk occupies an area 56 inches wide by 34 inches deep, and is 35 inches in overall height. It is designed for talks studios, and has normally seven (or optionally eight) channels, each with switchable access to 15 sources. Quadrant faders, Type PB/38Q/4S, are used throughout. The channels are mixed to form two groups, each with its own response selection amplifier, but there are no group faders. One channel may be opted out to act as the independent channel for two-way working. Monitoring facilities using ME12/5 (or optionally ME12/4) units follow normal practice.

Other features are:

- (a) Remote start circuits for local reproducing apparatus selected by the channel source switch and using the fader off-normal contacts and/or the cue light key.
- (b) Prehear facilities on all channels. (These facilities may be used for reverse talkback.)
- (c) Local tape playback/edit facilities with remote control.
- (d) Fader escutcheons lit in red or green to act as a reminder of the type of source selected, e.g., a microphone or a reproducer.
- (e) Line-up tone facilities allowing uninterrupted studio rehearsal.

- (f) Switchable source selection for local tape recorders.

### Construction (Figs. 1 and 2)

The control panel consists of three sections, the central section 28 inches wide and the two side sections each 13 inches wide. The rear 8 inches of each section is bent up to form an inclusive angle of 150 degrees with the front 10½ inches. The panel sections are set into a wooden frame which is integral with a full-width writing desk. The control panel assembly is mounted on a wooden pedestal. The right-hand end of the pedestal is cut away toward the base to provide room for a second person, e.g., a producer. The left-hand end of the pedestal is enlarged to form a cabinet, 15 inches deep, which houses the amplifier panels, the relay panels and cable tagblocks. The side, front and inside panels of the cabinet are fitted with magnetic catches and are quickly detachable. Fig. 2 shows the desk with the control panel sections hinged forward and the cabinet panels removed.

A wall-mounted power supply cabinet, PSC/2 (modified), houses the maintained and non-maintained power distribution and circuit breakers, the 50-volt fuseboard and signal lamp relays.

DK4/12 equipments installed at Bush House have certain special features as indicated later.

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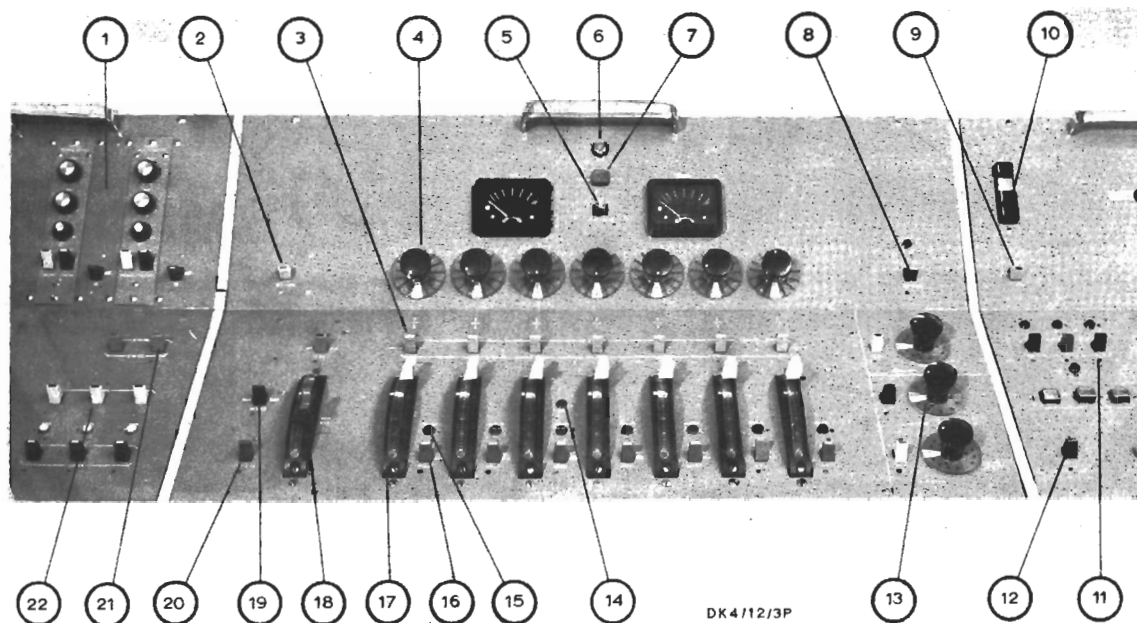


Fig. 3. Control Panel of DK4/12

- |   |                                     |
|---|-------------------------------------|
| 1. Response selection amplifiers                  | 12. Talkback key                    |
| 2. Interval signal key                            | 13. Monitoring controls             |
| 3. Channel prehear key                            | 14. Clean feed indicator            |
| 4. Source switch                                  | 15. Remote indicator                |
| 5. P.P.M. line-up check key                       | 16. Cue-light/Remote-start key      |
| 6. P.A.B.X. call indicator                        | 17. Channel fader                   |
| 7. P.P.M. changeover button                       | 18. Main gain control               |
| 8. Cubicle microphone key                         | 19. Main gain control bypass        |
| 9. Two-way working key                            | 20. Talkback key                    |
| 10. Rehearsal, transmission, tone and off buttons | 21. Cue programme to outside source |
| 11. S.P.E. and tape monitoring controls           | 22. Telephone controls              |

### Control Panel Layout (Fig. 3)

The centre section mounts all the programme and monitoring controls. The main gain control (18 in Fig. 3) and channel faders (17) are in a line along the front of the panel. Close to the main gain control are the MGC Bypass key (19) and one of the two Talkback keys (20). To the right of each channel fader are its associated Cue/Start key (16) and Remote (replay) indicator lamp (15). To the right of channel-3 fader is the amber Clean Feed indicator lamp (14). In line with, and above, each channel fader are its associated Prehear key (3) and, on the raised part, its source selection switch (4). These 16-rotary switches are fitted with a transparent mask on which the sources are engraved. The mask is provided with a fixed backing which is coloured except for one segment against which the source in use shows. The colour of the remainder is such that the available sources are easily identified.

The two peak programme meters are mounted above the source switches, the Main meter on the left and the Tape Mon./Prehear meter on the right. The meters are separated by a PPM C/O pushbutton (7), Check Line-up key (5) and PABX Call repeater lamp

(6). The local red light key is mounted on the left of the meters. The area (13) to the right of the channel faders is occupied by the Cubicle Prog. Select switch, LS Vol. attenuator, Prehear/Prog. Sel./Line Out key, LS Dim key, Studio Prog. Sel. switch and Studio LS Off key.

The left-hand side section (at 22) mounts the three telephone Ring/Answer keys, Call lamps and Recall keys. The three circuits are EMX (extended through to the distant point when the studio is selected by the continuity) and two outside source control lines. Above these controls are two 'Q-to-C/L or Q-to-F/B' keys (21). Source selection switches are fitted for up to three local recorders to allow recordings to be made from the desk output, or from either outside source music line independently of the desk. A 14-dB high-impedance pad is inserted between each source and the multiplied switch inputs. A 'miscellaneous' position and a 600-ohm terminated position are provided for maintenance purposes. The 'miscellaneous' input is wired from a jack, JK12, inside the cabinet. At the rear of this section are two response selection amplifiers AM1/4 (1) and their Insert keys.

The right-hand side section mounts the other studio Talkback key (12) and the Clean Feed Talkback key. These are positioned close together for one-hand operation. Above these (at 11) are three Tape Mon. interlocked pushbuttons, the Panel Edit indicator lamp (blue) and three Record Start/Panel Edit keys and indicators. At the rear are four interlocked illuminated pushbuttons (10) for Off/Tone/Rehearsal/Transmission, and the Two-way Working key (9), which has two operated positions, with or without Transmission Talkback.

via a 16-way Winkler-type rotary switch. Two wafers, wired in parallel and fitted with gold-plated contacts, carry the unbalanced programme at  $-24$  dB. Further wafers, fitted with silver contacts, select d.c. circuits.

#### Source Circuits (Figs. 4, 5 and 6)

The two microphone low-level circuits (Fig. 4) are fitted with microphone correction units and cut-off relays, and are amplified to  $-24$  dB and wired to the source switches. Both circuits have test jacks (JK3 and 4) where tone at  $-70$  dB, available on JK2, may

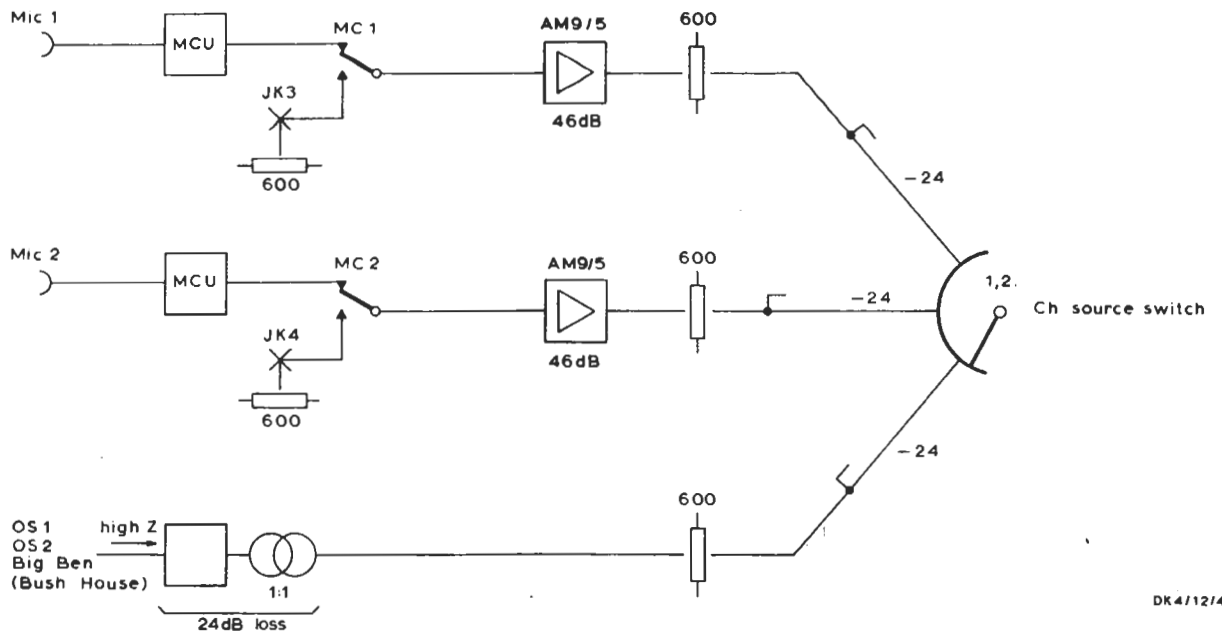


Fig. 4. Microphone and High-level Sources

#### Circuit Diagrams

The various sections of the programme chain are shown in Figs. 4 to 15. Further details are available in station diagrams. The following drawings refer specifically to the installation in Studio Suite S7 on the lower-ground floor of the south-east wing of Bush House but may be regarded as typical:

1. Programme Systems Diagram:  
Drawing No. SP 21241.9.2. A1.
2. Switching Systems Diagram:  
Drawing No. SP 21241.9.1. A1.
3. Power Supply Cabinet PSC/2 Modified Circuit:  
Drawing No. SP 21241.3.1. A1.

The PSC/2 was first used in Type-B sound studio equipment and is described in Instruction S.7.

#### Programme Input Channels

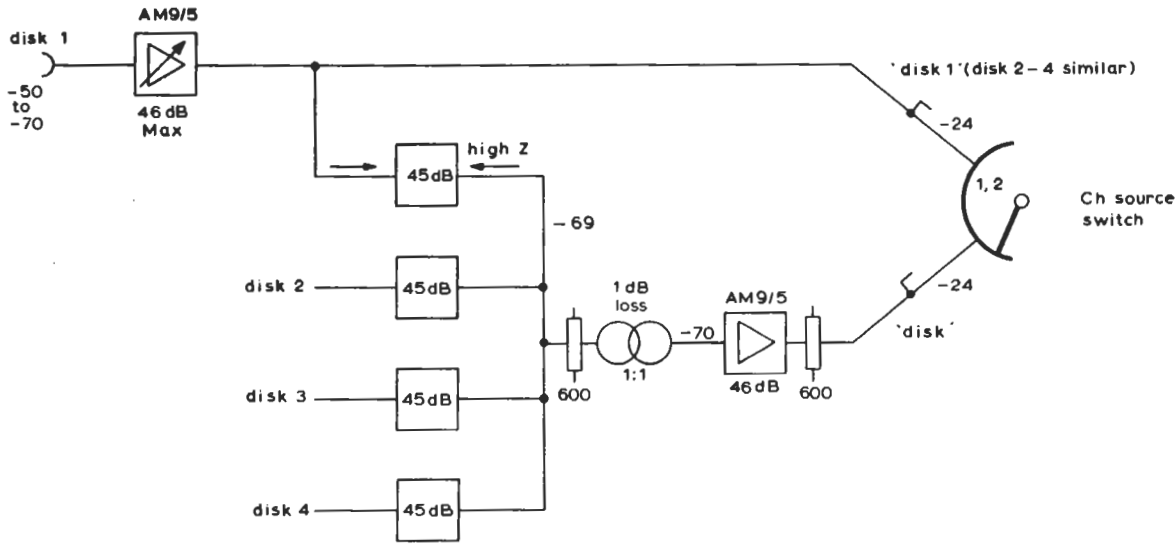
##### General

Seven identical channels are provided, but channel 3 can be diverted from the normal mixer and used as the independent channel for two-way working. An eighth channel may be added without modification to the circuit, but requires a new control panel. All seven channels have access to 15 sources (plus Off)

be plugged to test signal levels throughout the system. Under this condition, the cut-off relay is energised by auxiliary contacts of the test jack.

The three high-level sources, i.e., OS 1, OS 2 and, at Bush House, Big Ben, are attenuated to  $-24$  dB by a high-input-impedance balanced pad, and wired via a 1:1 unbalancing transformer to the source switches.

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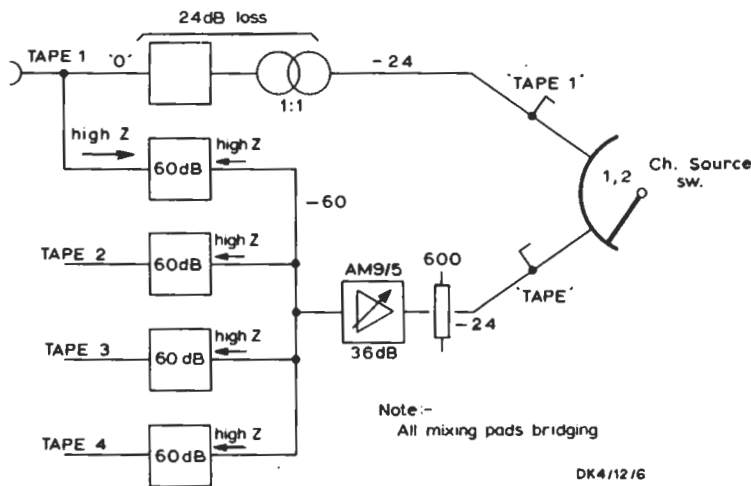
Fig. 5. Local Disk Reproducer Sources

Local disk reproducers (Fig. 5) are made available either as independent sources with remote starting facilities, or as a group without remote start. Twin-turntable units, e.g., Type RP2/1, are modified to provide this independent output from each turntable. The independent outputs are amplifier to  $-24$  dB. The amplifier outputs are available directly on the source switches, and are also current-mixed and reamplified to form the group output, also at  $-24$  dB.

The outputs of the local tape machines (Fig. 6) are similarly available, but as the outputs are at high level, they are attenuated to  $-24$  dB by a balanced 600-ohm pad for the independent circuit, and also to  $-60$  dB by a high-impedance pad. The outputs of these pads are current-mixed and amplified back to  $-24$  dB as the 'Tape' group.

Channel Circuits (Fig. 7)

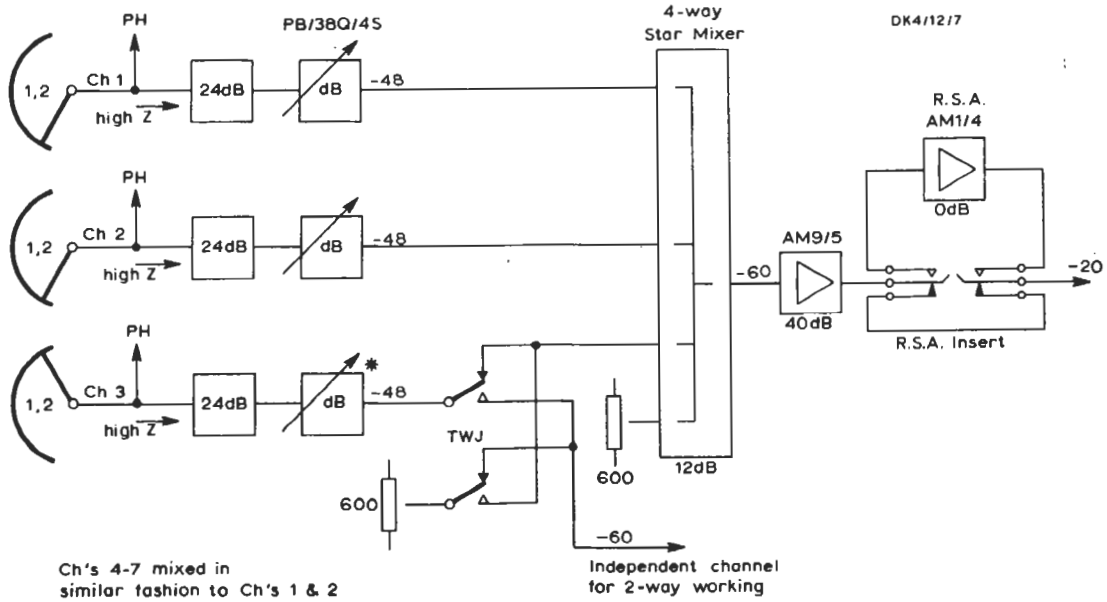
All inputs to the source multiple are unbalanced either by the AM9/5 amplifier or by a 1:1 transformer. Two wafers of the source switch are wired in parallel for the live leg. The earthy leg is wired direct to the programme earth. The switch wipers are wired via a high-impedance 24-dB pad to the channel fader PB/38Q/4S; this has 31 studs, with infinite loss between studs 0 and 1, and a 2-dB loss between studs 0 and 1, and a 2-dB loss between studs 1 and 2 for the remainder. The faders are normally used fully open, i.e., with no loss. Channels 1 and 2 (and channel 3 when not used independently) are combined in one star-mixer, the fourth input to which is normally dummy-loaded but is used for the optional eighth channel where required; channels 4 to 7 are combined in a second star-mixer. The output of each star-mixer is amplified by an AM9/5 to a level of  $-20$



Note:-  
All mixing pads bridging

DK4/12/6

Fig. 6. Local Tape Sources



\*Ch 3 fader inserts 8dB when used as independent channel

Fig. 7. Channel Circuit

dB, suitable for the input to the response selection amplifiers AM1/4, which are normally bypassed but may be inserted at this point.

The Main Chain (Fig. 8)

The two groups are current-mixed on a 600-ohm busbar. This enables local facilities to be added without substantially affecting programme levels. At Bush House the 600-ohm load for the busbar is provided

by the interval signal generator. In External Services, the talkback microphone is also used for live announcements which precede foreign-language transmissions, and when so used is connected to the busbar via the CA relay. The combined signal is fed via the rehearsal talkback relay MCO to the main gain control PB/38Q/45 and main amplifier AM9/5. The main gain control may be bypassed by an 18-dB fixed attenuator.

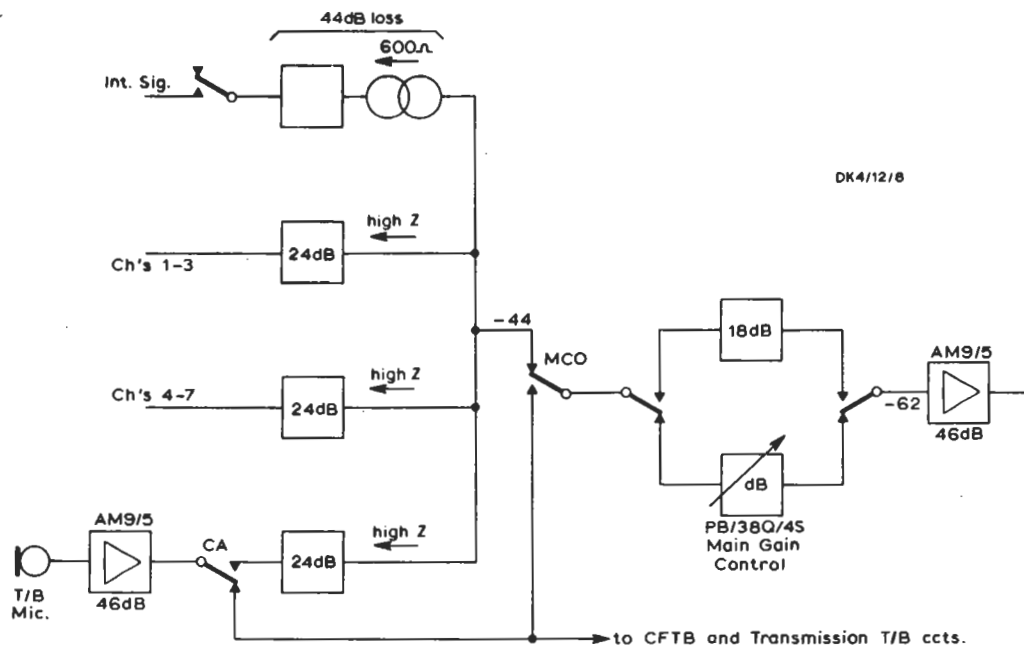


Fig. 8. Main Chain

### Output Circuits (Fig. 9)

The outputs of the main and independent channel amplifiers are combined in the clean feed hybrid coil LL/83ASC and fed to the main output amplifier AM7/3. The tone relay TN is connected after the output amplifier, allowing tone to be sent to line without interfering with studio rehearsal. The main amplifier is also connected, via the clean feed talkback relay TWT, to the clean feed output amplifier AM7/3. The independent channel amplifier is also connected to special Incoming Contributor headphone jacks in the studio after being amplified by a third AM7/3 amplifier to zero level. (See 'Monitoring' and 'Two-way Working'.)

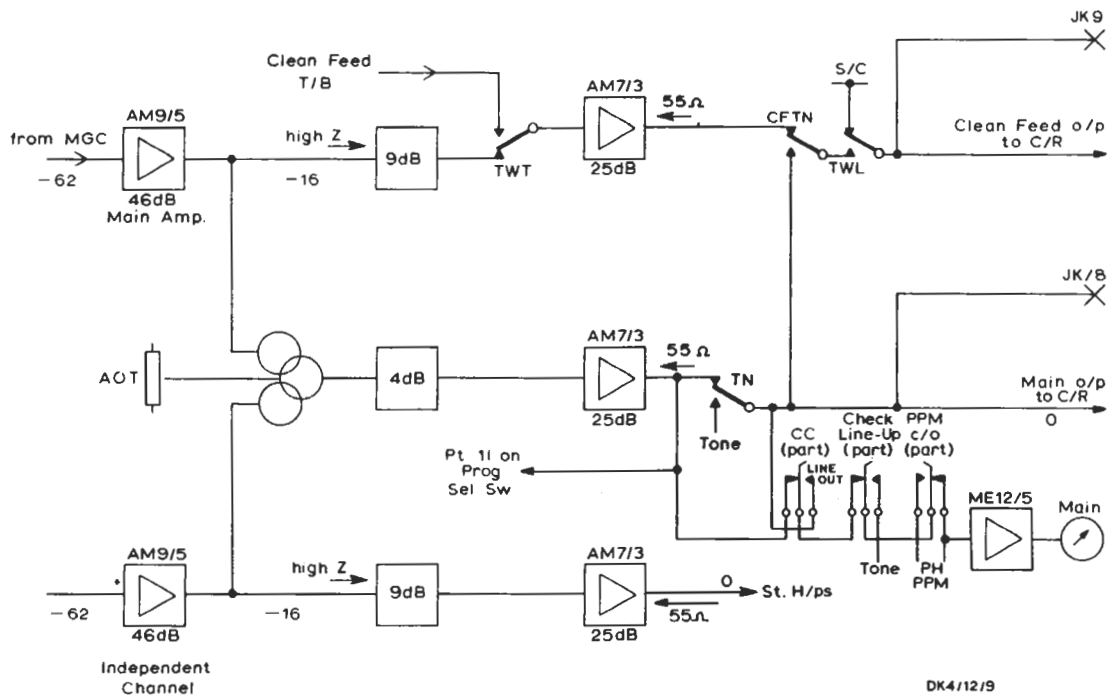


Fig. 9. Output Circuits

### Monitoring (Figs. 9, 10 and 13)

Visual monitoring is carried out on two peak programme meters driven by ME12/5 amplifiers. The amplifier panels have space for ME12/4 amplifiers if these are desired. The Main meter (Fig. 9) may be switched to the desk output (point 11 on the Programme Select switch) or to Line Out, a monitor point after the tone relay, by the white Comp. Check key. The other meter (Fig. 13) may be used on any of the channel prehear circuits when the Comp. Check key is operated to Prehear, or it may measure any local tape machine monitor output. The functions of the two programme meters may be interchanged by a locking pushbutton situated between them. A three-position Check Line-up key feeds line-up tone to either meter amplifier.

Aural monitoring is by quality loudspeaker and/or headphones. The cubicle loudspeaker (Fig. 10) may

be switched by the Comp. Check key to the cubicle Prog. Sel. switch, Line Out or Prehear Tape Mon. circuits. The loudspeaker volume is controlled in the usual manner. At Bush House, the loudspeaker is muted during a cubicle announcement by the Cub. Mic. key.

The output of the Studio Prog. Sel. switch (Fig. 10) is routed via the back contacts of the transmission talkback relay TTO in the following ways:

- To the studio loudspeaker: overridden by relay TTO (for transmission talkback), by relay SLSO (microphone fader back contacts or Studio LS Off key) and by relay SLSCO (rehearsal talkback).

- To the cue programme circuit on the outside source relay panel in the Control Room.
- To the normal headphone jacks in the studio.
- To the Incoming Contributor headphone jacks in the studio: overridden under two-way working conditions.
- To the desk headphone jacks (overridden by prehear) and tape/gram headphones.

Special headphone jacks are provided in the studio which carry the programme on point 9 of the Prog. Sel. switches (pluggable in the Control Room).

NOTE:- The Tape Mon. facility does not appear on the desk headphones. When a local recording is being made, the recorded programme appears on the cubicle loudspeaker (if the Comp. Check key is on Tape Mon.) but the programme being recorded remains on the desk headphones.



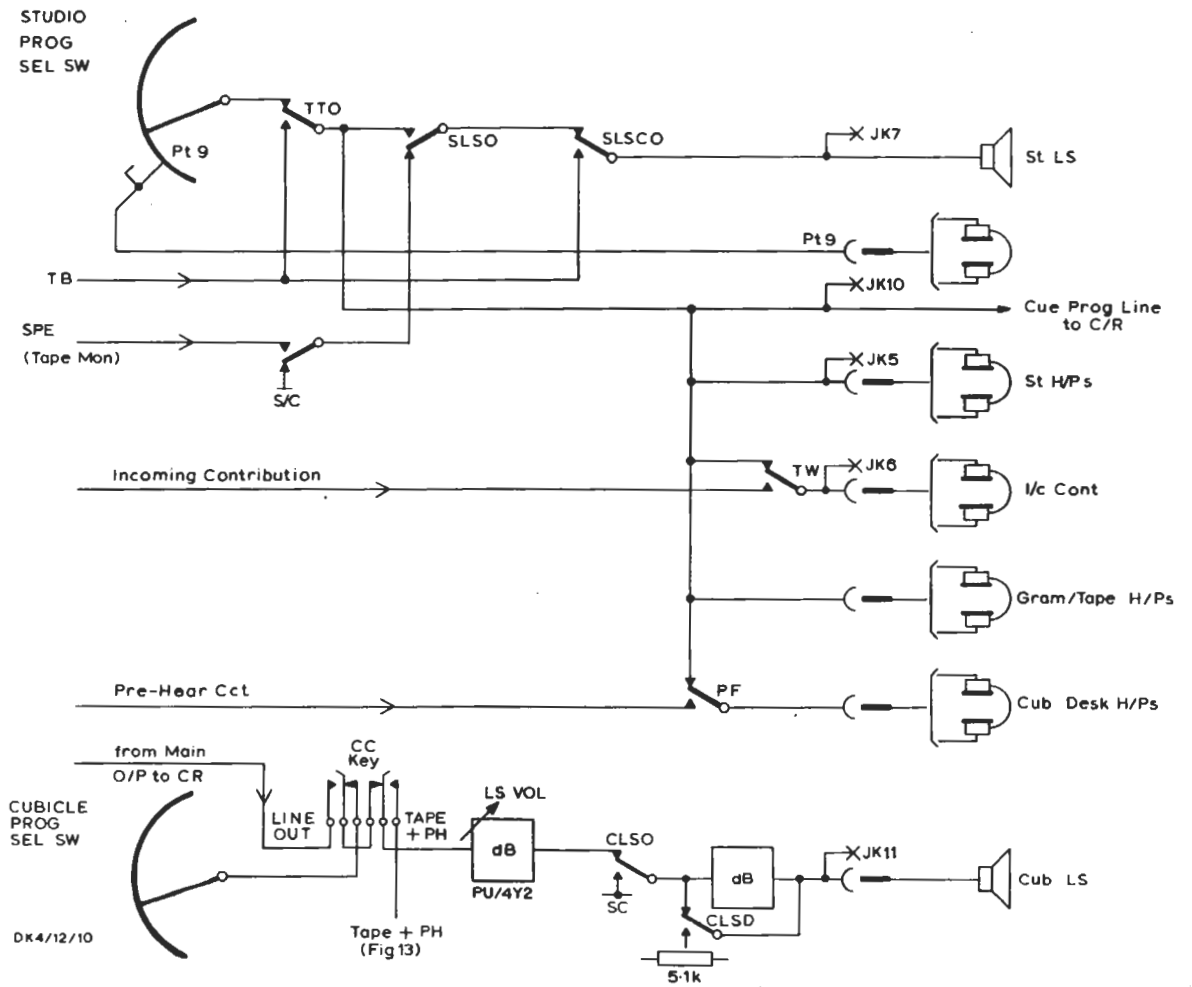


Fig. 10. Aural Monitoring System

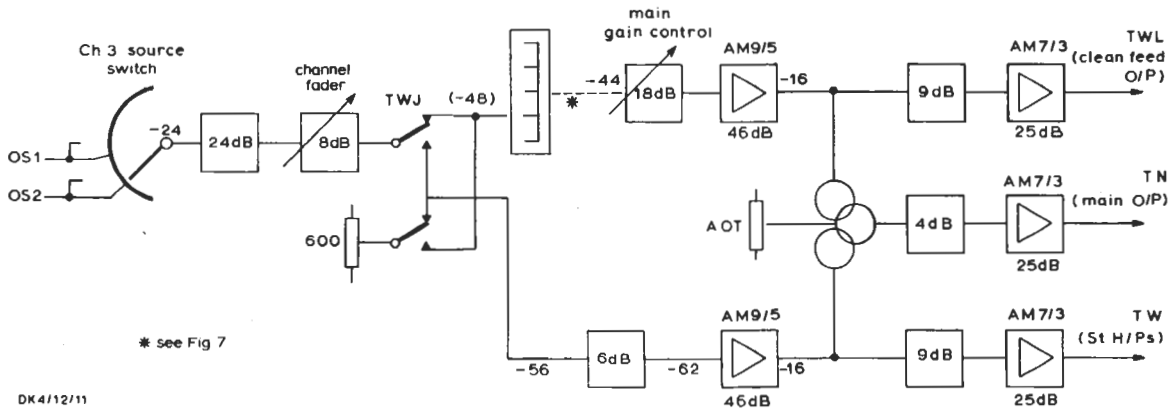


Fig. 11. Two-way Working Arrangements

**Two-way Working (Fig. 11)**

The incoming contribution on the appropriate outside source line must be selected on channel 3, whose fader is fitted with a yellow knob to act as a reminder; operation of the CF/CF+TB key in either direction diverts the output of channel-3 fader from the star-mixer, which is then dummy-loaded, and connects it to one input of the hybrid coil LL/83ASC via an AM9/5 amplifier. The forward gain of the independent channel requires 8 dB of attenuation to be inserted by the fader, thus giving a degree of control of the incoming contribution which does not pass through the main gain control. Other functions of the CF/CF+TTB key are:

- (a) It connects the incoming contribution to the special Inc. Cont. studio headphones via relay TW (Fig. 10).
- (b) It connects the output of the clean feed amplifier to the clean feed line via relay TWL (Fig. 9).
- (c) It prepares a circuit for clean feed talkback relay TWT (Fig. 9), either in the rehearsal con-

dition only if the key is operated to CF, or in both rehearsal and transmission conditions if the key is operated to CF+TTB. (See 'Talkback'.)

- (d) It prepares a circuit for clean feed tone relay CFTN (Fig. 9).

The hybrid coil combines the independent channel with the main chain. The balancing resistor is adjusted on installation to obtain maximum separation between circuits.

Line-up tone to the clean feed line is obtained via relay CFTN (Fig. 9) by operation of the Tone button, which also causes tone to be sent on the main output via relay TN. (See 'Output Circuits'.)

**Talkback (Figs. 8, 12 and 14)**

Provision is made for rehearsal and transmission talkback both in normal and in two-way working. Rehearsal talkback is routed via relay MCO (Fig. 12) to the main chain before the main gain control, and via relay SLSCO (Fig. 14) to the studio LS. Transmission talkback is routed via an AM7/3 amplifier

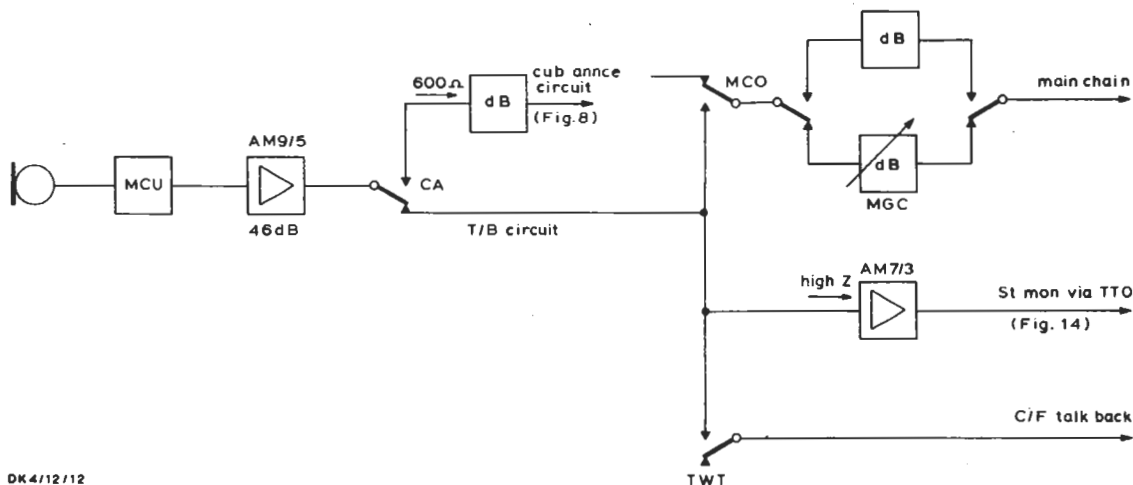


Fig. 12. Talkback Circuits

(Fig. 12) and relay TTO (Fig. 14) to the studio monitoring and cue programme circuits

Rehearsal and transmission talkback are both available on the clean feed line independently of the studio talkback. The two Talkback keys, Studio and Clean Feed, are close together and may be operated simultaneously.

At Bush House, the talkback microphone is also used for announcements which precede foreign-language transmissions. When the Cub. Mic. key is operated, the talkback amplifier output is routed via relay CA (Fig. 8) to the main chain.

**Prehear/Tape Mon. (Fig. 13)**

Provision is made for monitoring the outputs of the channel selection switches (on a PPM and the desk headphones) and the replay output of three tape

recorders (on the PPM and cubicle loudspeaker). The channel prehear keys have locking and fleeting positions. Operation of any channel prehear key puts the Prehear/Tape Mon. PPM and the desk headphones onto the selected circuit, via relays PF1 and PF2 respectively. The keys are wired in a priority pattern, channel 1 having preference, and the selected circuit passes through the back contacts of higher-priority circuits. Channel prehear overrides tape monitoring.

The tape machine outputs are selected by three interlocked locking pushbuttons mounted on the right-hand panel. When any of these is depressed, the selected output is connected to the tape monitor contacts of the Comp. Check key (Fig. 10) and to the Prehear/Tape Mon. PPM. The tape monitor circuits do not appear on the desk headphones, but are available on a maintenance jack (JK13).

Balancing transformers are fitted in the two circuits as required.

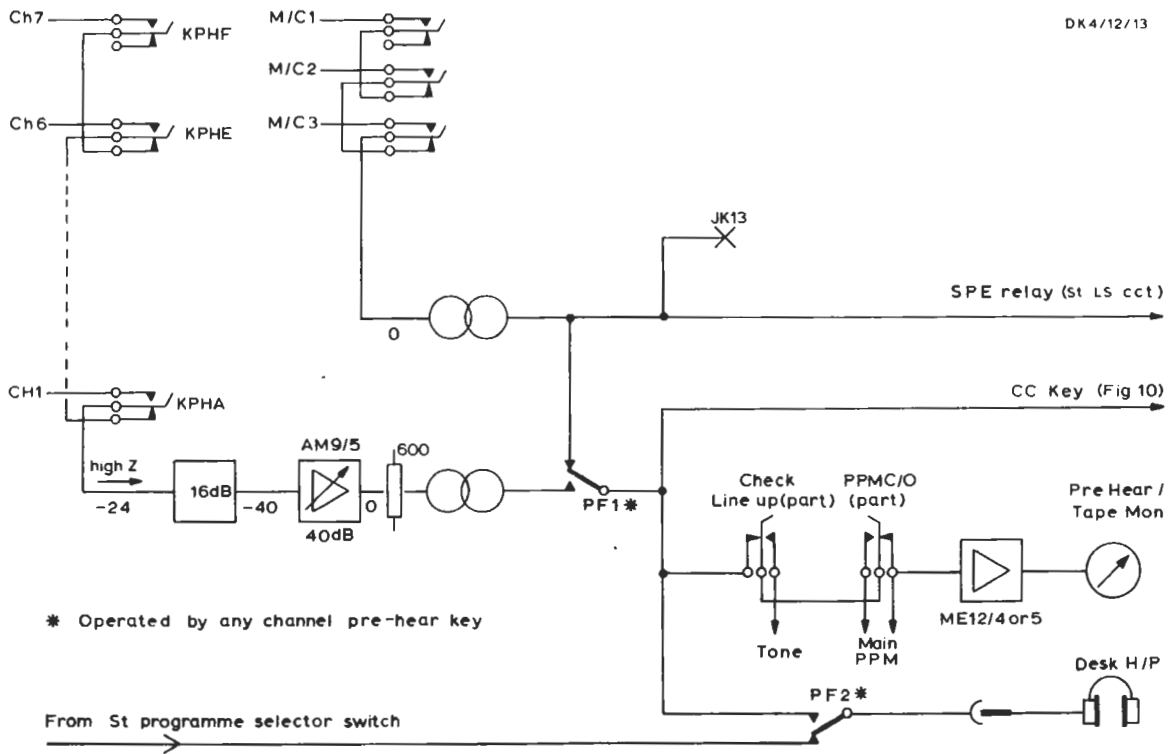


Fig. 13. Prehear and Tape Monitoring

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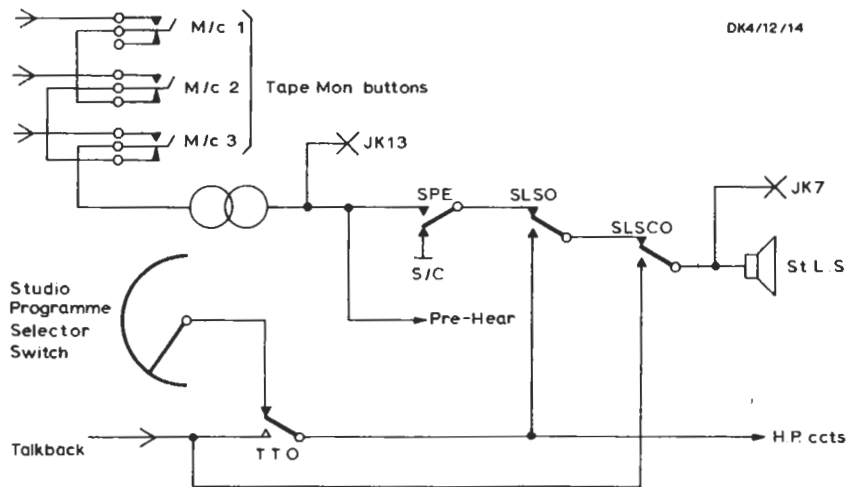


Fig. 14. S.P.E. Programme Circuit

#### Studio Playback Edit (Fig. 14)

This facility capitalises on the design feature of tape machines (e.g., Leavers-Rich) which permits a direct change from playback to recording without interrupting the tape transport mechanism. Recorded tapes which contain faulty speech passages may be played back over the studio loudspeaker while the microphone circuit is still live. The artist listens to the playback and follows the original script. At the point where the faulty passage begins, the machine is switched from replay to record and the studio loudspeaker is muted. The artist continues reading the script at the same speed as the preceding material and the repeated passage is recorded within the same length of tape as the original. The time displacement between recording and reproduction has to be allowed for. Also, if the rerecorded passage is shorter than that which contained the error or hesitation, editing may be necessary to close the gap.

A number of requirements must be met before the SPE facility can be used. When all the necessary conditions have been set up, the blue SPE indicator lamp on the right-hand panel lights. The conditions are:

- The studio must be in the Rehearsal mode.
- The tape machine must be set for Remote Record.
- The monitor output of the tape machine must be selected.
- The Comp. Check key (Fig. 10) must be set to Tape Mon./Prehear.
- The microphone fader must be open.

When the appropriate tape machine SPE start key

is operated, the SPE relay routes the tape monitor circuit (Fig. 14) to the studio loudspeaker via relay SLSO (unoperated) and relay SLSCO (unoperated). When the tape start key is moved from Replay (non-locking) to Record (locking) the SPE relay drops out and supplies the short-circuit which mutes the studio loudspeaker.

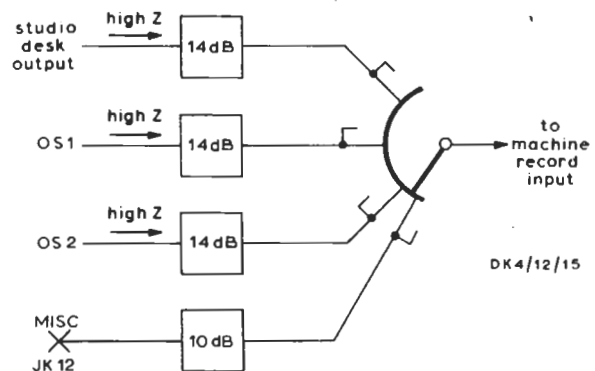


Fig. 15. Tape Machine Input Circuit

#### Local Tape Record Inputs (Fig. 15)

Provision is made for recording the desk output, or either of the outside sources. Bridging attenuators with a loss of 14 dB are connected between the sources and the selector switches, one per machine. The tape machines are started and stopped by controls on the right-hand panel. Maintenance jacks are provided at the machine inputs, and a 'Misc' jack (JK 12) is wired to a fourth position of the source switches.

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