SECTION 16

SOURCE/CHANNEL SELECTION AND ON-AIR CUE RELAY PANEL PA17/516

Introduction

This panel routes any one of 12 sources to each of the last four channels (channels 5, 6, 7 and 8) of a video mixer. The required selections are made on an associated PA8/512 Source/Channel Selection Control Panel which is mounted on the production control desk.

The PA17/516 consists of a bay-mounting chassis which carries 78 plug-in relays; when mounted, the relays and the panel connectors are accessible from the rear. Also located at the rear of the panel are 13 plug-in printed-circuit cards. These cards contain 135 diodes which are associated with the relay circuits.

Circuit Description

A simplified circuit of the selection system is shown in Fig. 16.1. Only part of the routing matrix control circuits (for channels 5 and 8 and for sources 1 and 12) is shown; the indication and on-air cue circuits are shown in Figs. 16.2 and 16.3. The circuits of the printed cards are shown in Fig. 16.4.

Relay Functions

1E to 12E	These relays have four functions: (i) To remember which source has been selected to channel 5 of the mixer. (ii) To control external circuits which switch video to channel 5 of the mixer. (iii) To route on-air cues from channel 5 of the mixer to the selected source. (iv) To provide lamp indications of the source selected.
1F to 12F	As above, but for channel 6 of the mixer.
1G to 12G	As above, but for channel 7 of the mixer.
1H to 12H	As above, but for channel 8 of the mixer.
13E to 13H	Controlled by relays 5E, 5F, 5G and 5H to provide information for delay-line switching when special effects is routed to a channel of the mixer.
A to H	On-air cues for channels 1 to 8.
J, K, L, M, N, P Q, R, S, T, U, V	On-air cues for sources 1 to 12.
Z	Button on-air interlock relay.
1W	Energised when any source button is pressed.
1Y	Energised when any channel button is pressed.
2W, 2Y	Delay relays for the button release system.
1X, 2X	Button release relays.

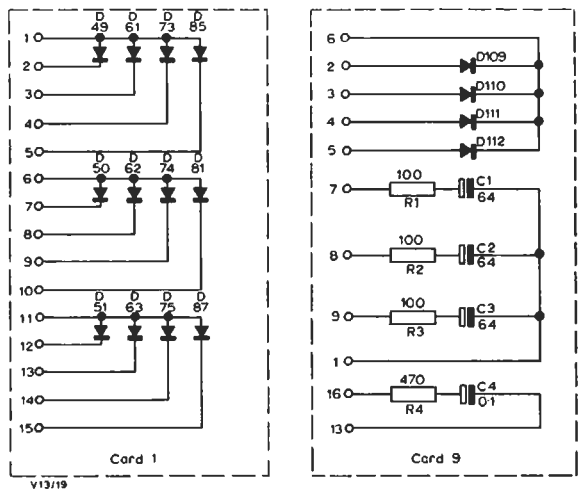

Fig. 16.4 Printed-circuit Cards

Cards 2—4 same as Card 1 except for component numbering.
Cards 5—8 contain 12 diodes with common cathode connection.
Card 10 contains 12 diodes with common anode connection.
Cards 11—13 shown on Fig. 16.3. All diodes type DA202.

Selection Circuit

Relays 2W and 2Y are energised when power is applied to the panel. The contacts of these relays energise relay 1X and this, in turn, energises relay 2X.

To make a selection, say source 1 to channel 8, the sequence of relay operation is as follows:

1. The channel-8 button is pressed and is held by its own solenoid which is energised via the *Clear* button and 1X-1. The −50 volt feed is removed from the channel-8 hold line, by the operation of the break contact on the channel button, but it still appears on the hold line via contact 1W-2 and diode D112. Relay 1Y is energised and, after a short delay, relay 2Y is de-energised by contact 1Y-1.
2. The source-1 button is pressed and is held in by its solenoid which is energised via the *Clear* button and 1X-1. The +50 volt feed is removed from the source-1 hold line by the operation of the break contact on the source-1 button. As contact 1Y-2 is already operated, any of the four source-1 relays (1E to 1H) that are already energised are released. Relay 1W is energised and any of the 12 channel-8 relays (J to V) that are already energised are released.
3. After a short delay 2W is de-energised by contact 1W-1; relay 2Y is already de-energised. This completes two circuits:
   (a) −50 volts via 2W-2, 2Y-2 and the channel-8 button to D37.
   (b) +50 volts via 2W-1, 2Y-1 and the source-1 button to D85.

   When these circuits are made relay 1H is energised.
4. After a further short delay contact 1X-1 opens, releasing both depressed buttons and supplying 50 volts to the two hold lines once more. Relay 1H is then held on by its own contacts.

Button Release Circuit

The steady state of relays 1X, 2X, 1Y, 2Y, 1W and 2W is as follows:

1W and 1Y de-energised.
2W and 2Y energised by 1W-1 and 1Y-1.
1X energised via 2X-1, 2Y-4 and 2W-4.
2X energised via 1X-2.

When the channel-8 button is pressed relay 1Y is energised and, after a short delay caused by the effect of C2 and R2, relay 2Y is released. Relay 1X remains energised via 2X-1 and 2W-4. When the source-1 button is pressed relay 1W is energised and, after a delay caused by C1 and R1, relay 2W is released. This causes relay 1X to be de-energised after which relay 2X de-energises also. When 2X is de-energised, contact 2X-1 changes over and relay 1X cannot now be re-energised until both 2W-3 and 2Y-3 are made; i.e. until both the source and the channel buttons are released. If either button is held down, relay 1X remains de-energised and so the button solenoid will not remain energised. As soon as both buttons are released, 1X energises and the selection cycle can be repeated.

Transmission Interlocks

If the channel selected (channel 8 say) is on transmission at the time of selection then relay H is energised. The operation of this relay does three things.

(a) It disconnects the channel-button make contact from the matrix relays and so prevents a new selection being made.
(b) It puts −50 volts on the appropriate hold line, thus preventing any relays already energised from de-energising.
(c) It operates relay Z. This prevents relay 1X from de-energising and so ensures that the channel-button does not release.

If the source selected is on transmission at the time of selection the appropriate on-air relay is energised. This applies similar interlocks to those listed above except that an intermediate relay is not required to prevent the release of relay 1X.

Lamp Circuits and Video Switching

The channel push-buttons on the desk panel are illuminated permanently by a 24-volt supply which is applied to the panel via pins 25, 26, 29 and 30 of sockets C and D. The source lamps are illuminated via pins 1-24 of sockets C and D and these pins are fed by relay contacts 1E-1 to 1E-12, 1F-1 to 1F-12, 1G-1 to 1G-12 and 1H-1 to 1H-12.

The video switching outputs are fed to an associated PA9/504 Relay Matrix Unit via PLA, PLB, PLC and PLD.

On Air Cues

The following on-air cues are provided:

1. From PLE; control for sound-effects switching. This is used when it is required to switch sound and video simultaneously.
2. From PLF; camera on-air cues.
3. From SKG, SKH and SKJ; feeds for the channel on-air lamps in the production control room, the vision and lighting control room and the sound control room.

4. From SKK; feeds of camera on-air cues for the camera monitors in the vision control room.
5. From PLJ; on-air cues for the captions room.
6. From SKM; on-air cues for the channel monitors in the production control room.

On-air cue inputs to the panel appear on SKF and SKE. The two sets of cues, from the A and B banks of the video mixer, are combined and are fed to the channel on-air relays A to H. The cues for channels 5—8 are also fed via the matrix of relay contacts (1E-5, 2E-5 and so on) to the source on-air relays. Thus, if Special Effects is on channel 5, relays E and N will energise together. When Special Effects is on transmission the sources associated with it will also be on transmission. For example, if a split-screen is set up between cameras 1 and 2 then, when Special Effects is on transmission, source on-air relays N, A and B will be energised.

Special Effects cues are fed into the panel on SKL.

Inlay Delay Switching

When Special Effects is selected as a source to one of the mixer channels, contacts 13E-2, 13F-2, 13G-2 and 13H-2 route information regarding the selection to the video mixer; there the information is used to remove delay from the appropriate mixer channel to compensate for the delay introduced by special-effects equipment. This action ensures that a camera signal fed direct to a mixer channel arrives there at the same time as a signal fed to another channel via Special Effects.

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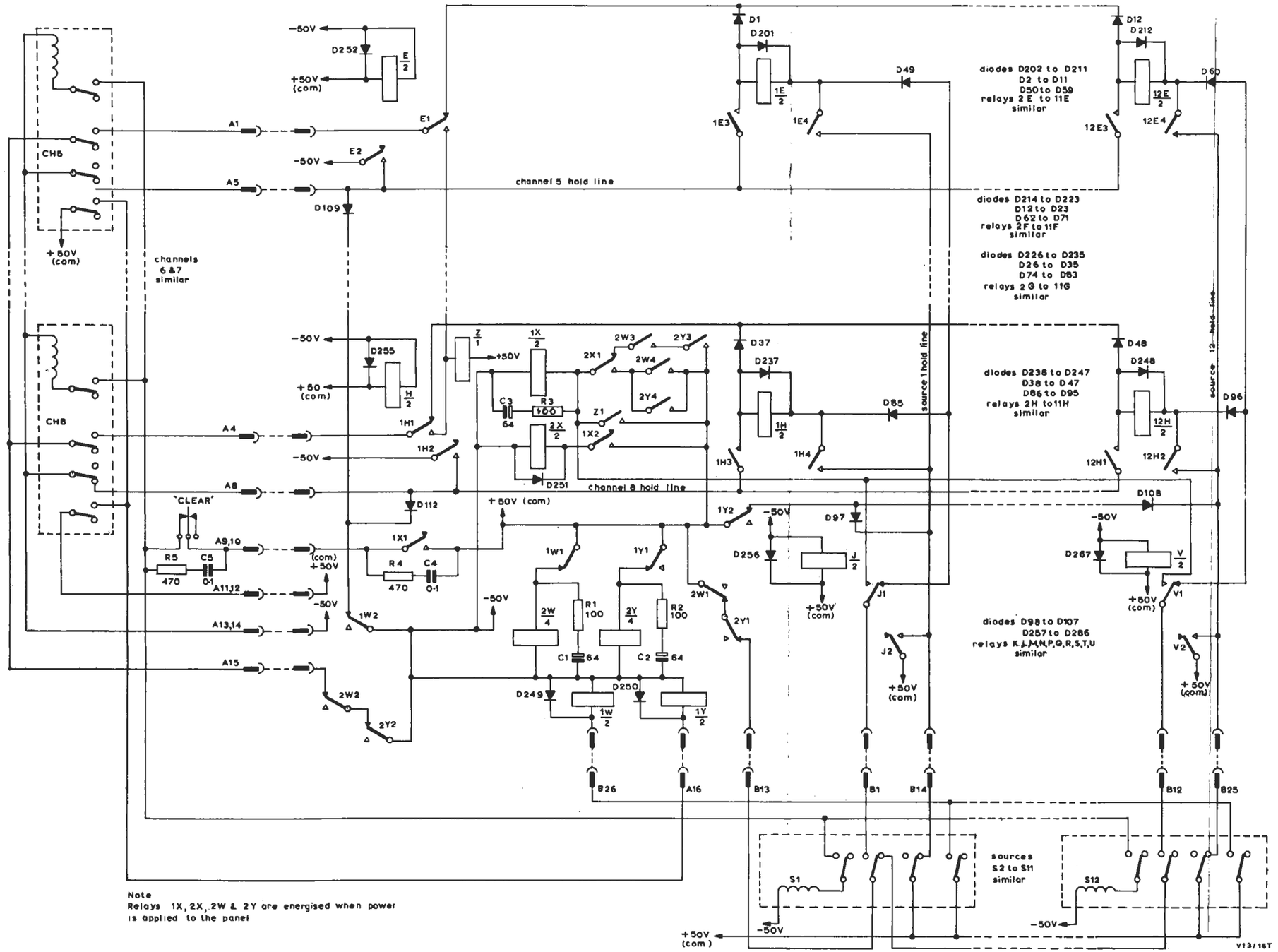

Note
Relays 1X, 2X, 2W & 2Y are energised when power is applied to the panel

Fig. 16.1

Simplified Circuit of the Source/Channel Selection System

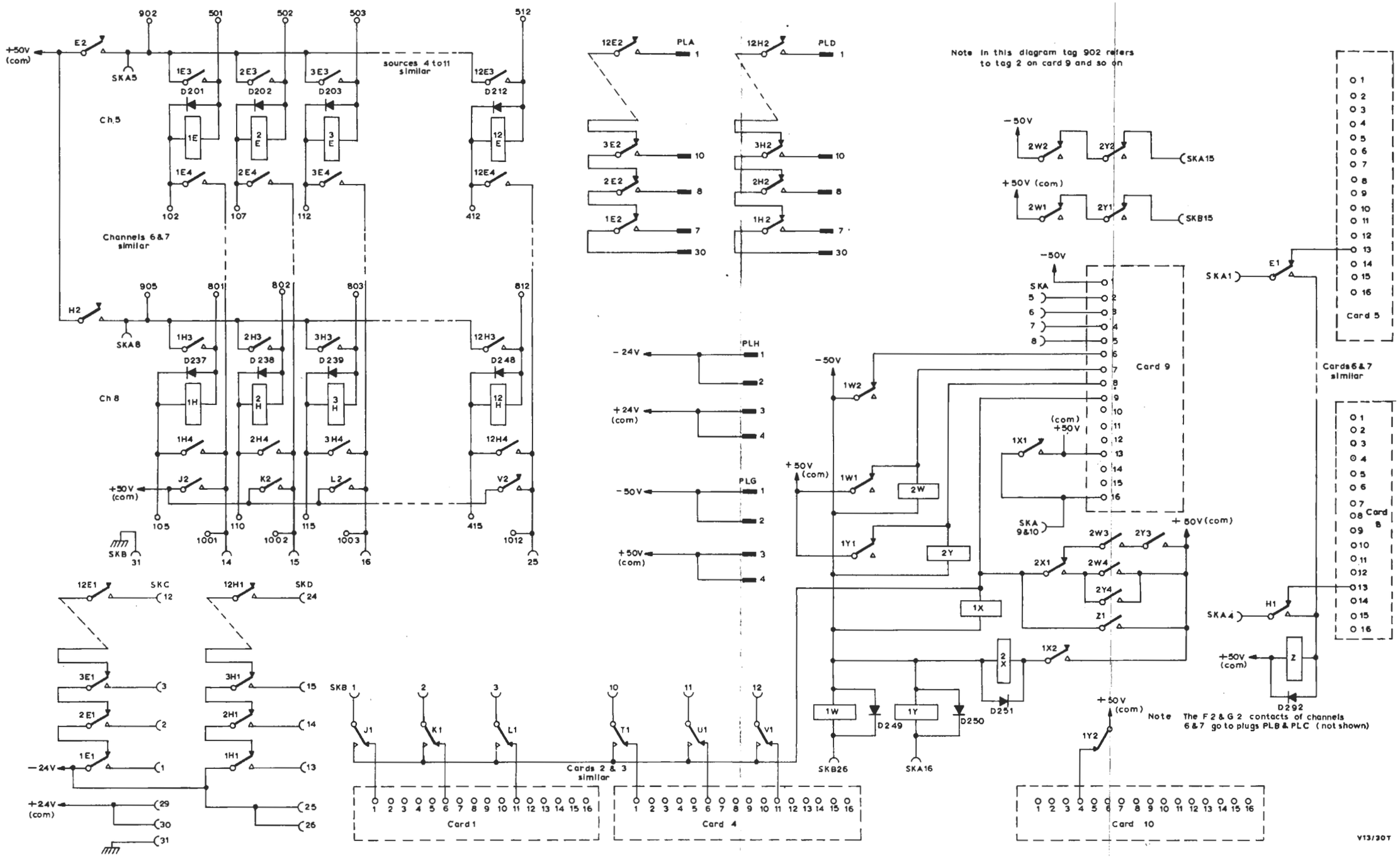

Fig. 16.2

Transmission Interlocks, Lamp Circuits and Video Switching Circuits

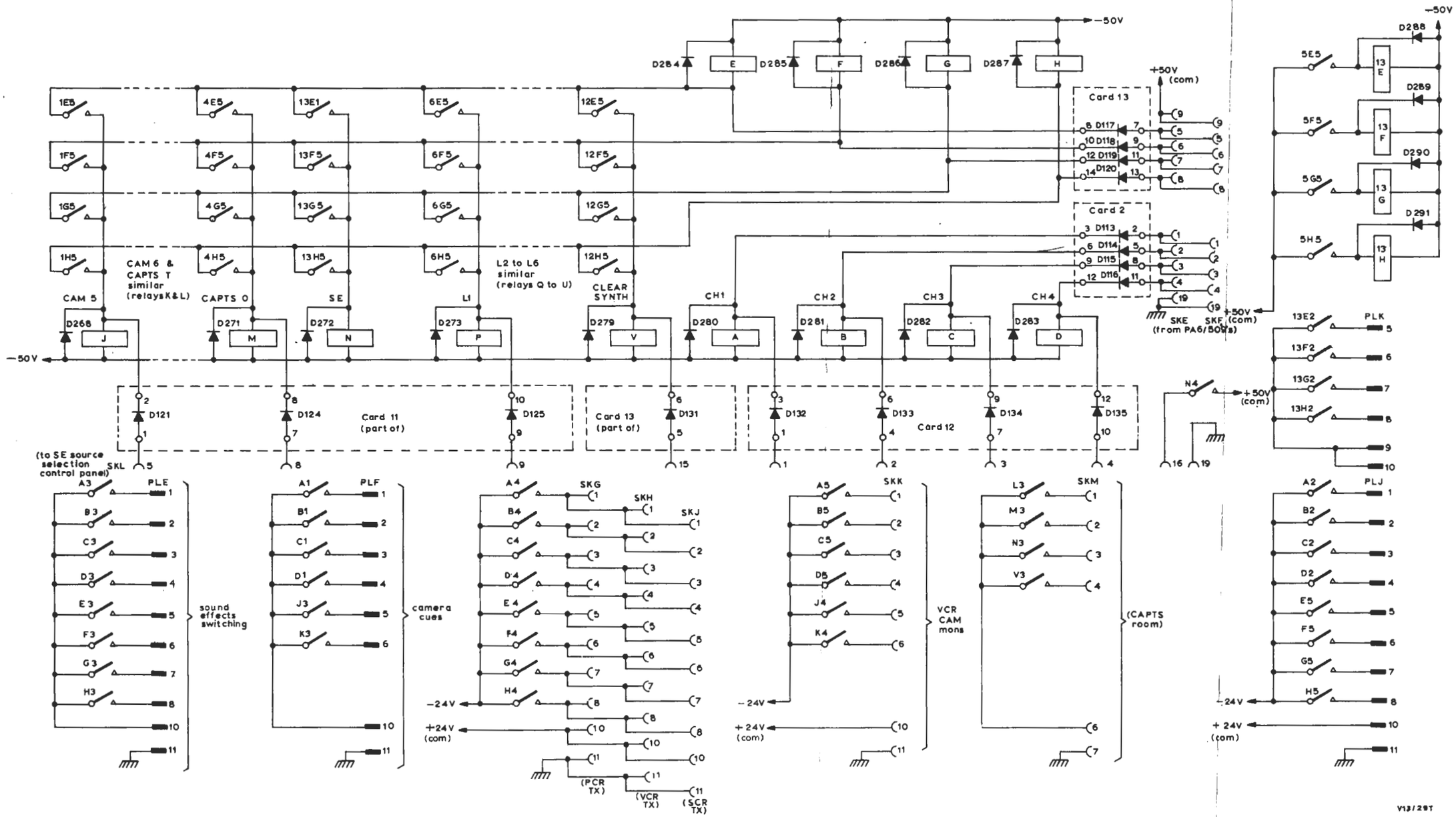

Fig. 16.3 On-air Cue Circuits