

## SPLIT SCREEN SWITCH UNIT PA18M/522

### Introduction

The PA18M/522 is a split screen switching panel normally forming part of a video mixer chain. It provides facilities for colour overlay, split-screen working and black-edged captions, the required mode being selected by switches at the mixer position. It accepts three video inputs and switches between any two of them to give an output signal which, when displayed, gives a picture split between the two signals.

The PA18M/522 replaces the PA18/507 but uses the same video switch system augmented by a GE2/526A Caption Pulse Generator and a Relay Panel NE1/516A.

All the units comprising the PA18/522 are listed below. They are mounted on a PN3/23 panel with a PN3A/16H back panel.

Video Switch Unit	UN9/521
Switch Pulse Generator	GE2/520
Clamp Pulse Generator	GE2/505A
Caption Pulse Generator	GE2/526A
Distribution Amplifier	AM4/517
Relay Panel	NE1/516A
Power Supplier	PS2/13F
Power Supplier	PS2/505

### General Specification

Video Inputs A, B, C and Infill	1V p-p composite from 75 ohm sources
Video Input Impedance	75 ohms $\pm 2\%$
Split Screen Keying Input	0.7V p-p from 75 ohm source
Mixed Sync Input	2.0V p-p from 75 ohm source
Mixed Sync Input Impedance	high
Video Outputs	six at 1V p-p from 75- ohm source into 75 ohms
Video Propagation Time	70ns approx

Chrominance/Luminance ratio	unity
1T and 2T Pulse and Bar ratio	within 1% of unity
Bar Slope	not greater than 0.5%
Operating Temperature Range	10° C to 50° C ambient
Power Requirements	35W at 240V $\pm 10\%$ 50Hz
Relay Supply	80mA at 50V d.c.

### General Description

A block diagram is given in Fig. 1. The basic element of the PA18/522 is the fast-acting video switch in the UN9/521. This switch is fed with two clamped video signals having nominally identical black-level potentials and switches between them under control of signals developed in the GE2/520.

The two video inputs are normally from input A and input B but the C input can be routed to replace the A or B input by operation of the appropriate relay in the NE1/516A relay panel.

The split-screen keying waveforms can be any of the normal patterns generated externally. The overlay keying waveforms can be derived from the A or B video inputs, or from externally generated caption signals or B-Y colour difference signals. The overlaid or caption patterns may be infilled with other signals via the infill input.

The various modes of operation are selected by the NE1/516A relay panel, controlled by keys at the mixing position. In the caption mode the GE2/526A Caption Pulse Generator is driven by caption signals and produces keying pulses for the Switch Pulse Generator and also processed caption signals to fill the holes punched in the background picture by the switching action. If black edges are required, the caption signal output and the trailing edges of the holes are delayed and white letters appear centrally in black spaces. The caption signal input must consist of white letters on a black

background but the letters may be infilled with other signals.

### Maintenance

Routine maintenance is not required, but the following checks can be made occasionally or when operation appears to be below standard.

For these checks supplies of video test signals and syncs are required.

1. With a 240V mains supply, the output voltages from the power units should be:

PS2/505	+9V between tags 8 and 3
	—14V between tags 4 and 3
PS2/13F	+12V between tags 4 and 5
SKT A	+12V between tags 9 and 10

2. Check that the various waveforms are as shown on the circuit diagrams of the sub-units.

3. The A video should be switched to the output when a voltage of  $-4.5V$  appears at the output-1 test point of the GE2/520.

The B video should be switched to the output when a voltage of  $-1.5$  volts appears. With no keying waveform input the switch should fail to the B side.

4. With a 5mV/cm wideband oscilloscope and high impedance probe, inspect the clamping waveform at the junction of C6 and R14 in the UN9/521. The amplitude of the switching transients should be less than  $\pm 20mV$ . RV4 and RV6 in the GE2/505A provide adjustment.

Inspect the waveform at one of the main outputs, correctly loaded. Any disturbance during the field-blanking period should be less than 10mV p-p.

Operate RLA in the GE2/520 and repeat the above checks, this time monitoring at the junction of C16 and R53 in the UN9/521. RV1 and RV5 in the GE2/505A provide adjustment.

5. With a sawtooth signal connected to the S/S Keying input and with an oscilloscope connected to one of the outputs, properly terminated, check that the blanking levels of the A and B signals are equal. RV2 in the GE2/505A provides adjustment.

6. Check that the switching transients at the outputs, properly terminated, are less than 250mV p-p. R34 in the GE2/520 provides adjustment.

7. The d.c. level at the outputs should be less than 20mV as viewed on the unterminated d.c. oscilloscope and with no input signals or keying waveforms. R34 in the UN9/521 provides adjustment.

8. To adjust the gain of the UN9/521, proceed as follows. Feed a 1-volt p-p test signal to the B input terminated with 75 ohms. With the keying input disconnected, adjust R47 to give 2.5 volts p-p at the emitter of TR13 and adjust R31 to give 1 volt p-p at one of the outputs, properly terminated.

Feed the test signal into the A input, operate the interchange sources switch (to operate RLCP) and adjust R8 to give 1 volt p-p at the outputs.

9. To check for crosstalk, feed a 1 volt 625-line chrominance/luminance pulse and bar signal to the B input. Terminate the A and keying inputs in 75 ohms and connect an oscilloscope, terminated with 75 ohms to one of the outputs. Operate the interchange-sources switch; there should be no visible bar crosstalk, less than 1.5mV of 1T and 2T pulse crosstalk (which will be very distorted) and less than 2.5mV p-p of chrominance crosstalk.

Repeat with the input to the A input and with the interchange-sources switch released.

10. With the pulse and bar generator locked from an external source, check that the clamp trigger pulses from the GE2/520 occur after the trailing edge of mixed syncs as monitored at one of the outputs.

11. Check the operation of the video switch as the clip control potentiometer is adjusted. To do this, apply a sawtooth signal to the B input, operate the source B infill switch, the overlay key switch and the interchange-sources switch; the video switch should operate over more than 60% of the sawtooth waveform and there should be no noise or hum on the picture split.

### Reference

1. Designs Department Specification No. 8.379(70).

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