# SECTION 9

## SYNC SWITCH PANEL PA18/509

**Introduction**

The PA18/509 accepts up to eight feeds of separated mixed-sync pulses and a feed of station mixed-sync pulses and from these selects the appropriate sync pulses for use in the stabilising amplifier[1] of a video mixer[2]. The panel also accepts trigger signals which are derived from the mixer control circuits[2]. Other outputs from the panel are gating pulses[3] and switching pulses[2,4].

The panel comprises three sync-switch units, arranged so that they form an eight-input switch system, together with units which accept station syncs and generate switching pulses. It operates on the 405, 525 or 625 line-standards without adjustment. Integral power supplies are provided.

The panel consists of the following plug-in sub-units (described in the Instructions indicated) mounted on a PN3/23 chassis:

| | |
|---|---|
| 3—Sync Pulse Switch Units UN9/516 | (V.14) |
| 1—Sync Pulse Amplifier AM1/509 | (V.7) |
| 1—Gating Pulse Generator GE2/510 | (V.10) |
| 1—Switching Pulse Generator GE2/511 | (V.10) |
| 1—Stabilised Power Supplier PS2/20 | (G.2) |

**General Specification**

| | |
|---|---|
| *Inputs* | |
| Separated Syncs | 2 volts p-p ± 1 dB |
| Mixed Syncs | 2 volts p-p ± 1 dB |
| Trigger | 12 volts p-p, positive-going |
| *Outputs* | |
| Sync | 2 volts p-p across 75 ohms |
| Gating Pulse | 2 volts p-p across 75 ohms |
| Switching Pulse | 12 volts positive-going 1 line-pulse in duration once per picture during field-blanking |
| *Input Impedances* | |
| Separated Syncs | 75 ohms |
| Mixed Syncs | 7·5 kilohms |
| *Output Impedances* | |
| Sync | 75 ohms |
| Gating Pulse | 75 ohms |
| *Isolation* | |
| (one unselected channel to output) | 100 kHz: more than 80 dB<br>5 MHz: more than 54 dB |
| *Noise* | less than 2 mV p-p |
| *Max. Ambient Temperature* | 45 degrees C |
| *Mains Input* | 210—250 volts |
| *Weight* | 17 lbs. |

**General Description**

A block diagram showing interconnections between the sub-units is given in Fig. 9.1 and a circuit of the panel wiring in Fig. 9.2.

The switching operations are carried out by three UN9/516 sync switch units, each of which contains three identical switching circuits. The first eight inputs of the switch so formed are fed with separated mixed-sync pulses, derived from the video signal inputs to the mixer, and the ninth input is fed with pulses derived from station syncs by the gating pulse generator. In this application, only six of the first eight inputs are used.

The switches are operated by the application of trigger pulses. Each sync switch unit has four trigger connections; three *On* and one *Off*. The *Off* circuits of all three units are joined together and this common *Off* connection is also applied to the AM1/509 sync pulse amplifier. The mixer control system is arranged so that a trigger pulse is applied to only one switch at a time and, when any switch input is turned *On*, an *Off* signal appears at the common *Off* connection, thus turning *Off* any switches that were on. A trigger guard circuit, in the sync pulse amplifier, provides additional protection against more than one switch being triggered *On* at a time.

The common output bus-bar of the sync switch units is connected to the input of the sync pulse amplifier. This unit feeds the selected sync pulses to the stabilising amplifier.

Station syncs are applied to the input of the GE2/510 gating pulse generator. This unit provides two outputs of clipped and delayed sync pulses:

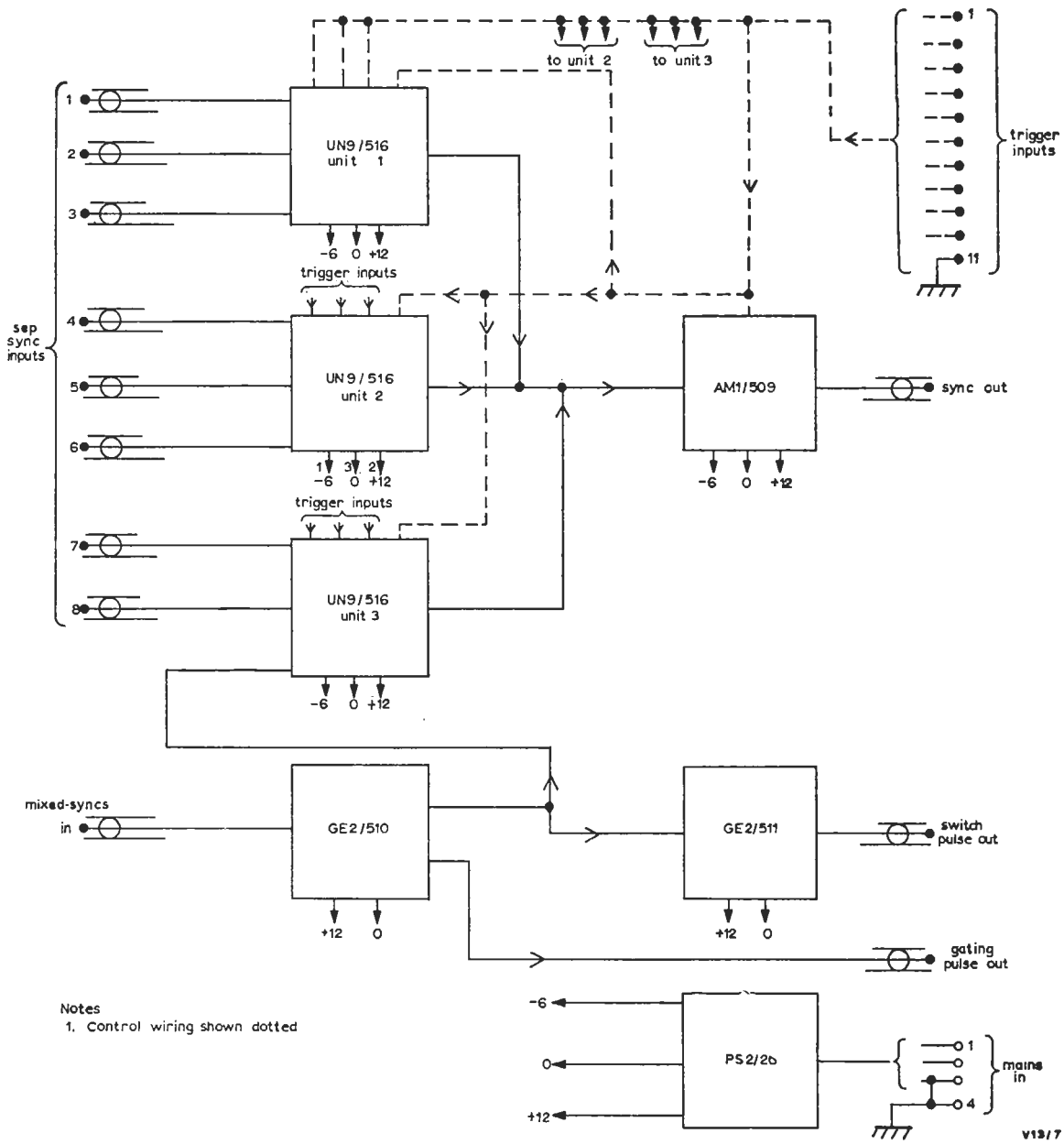


*Fig. 9.1 Block Diagram of the PA18/509*

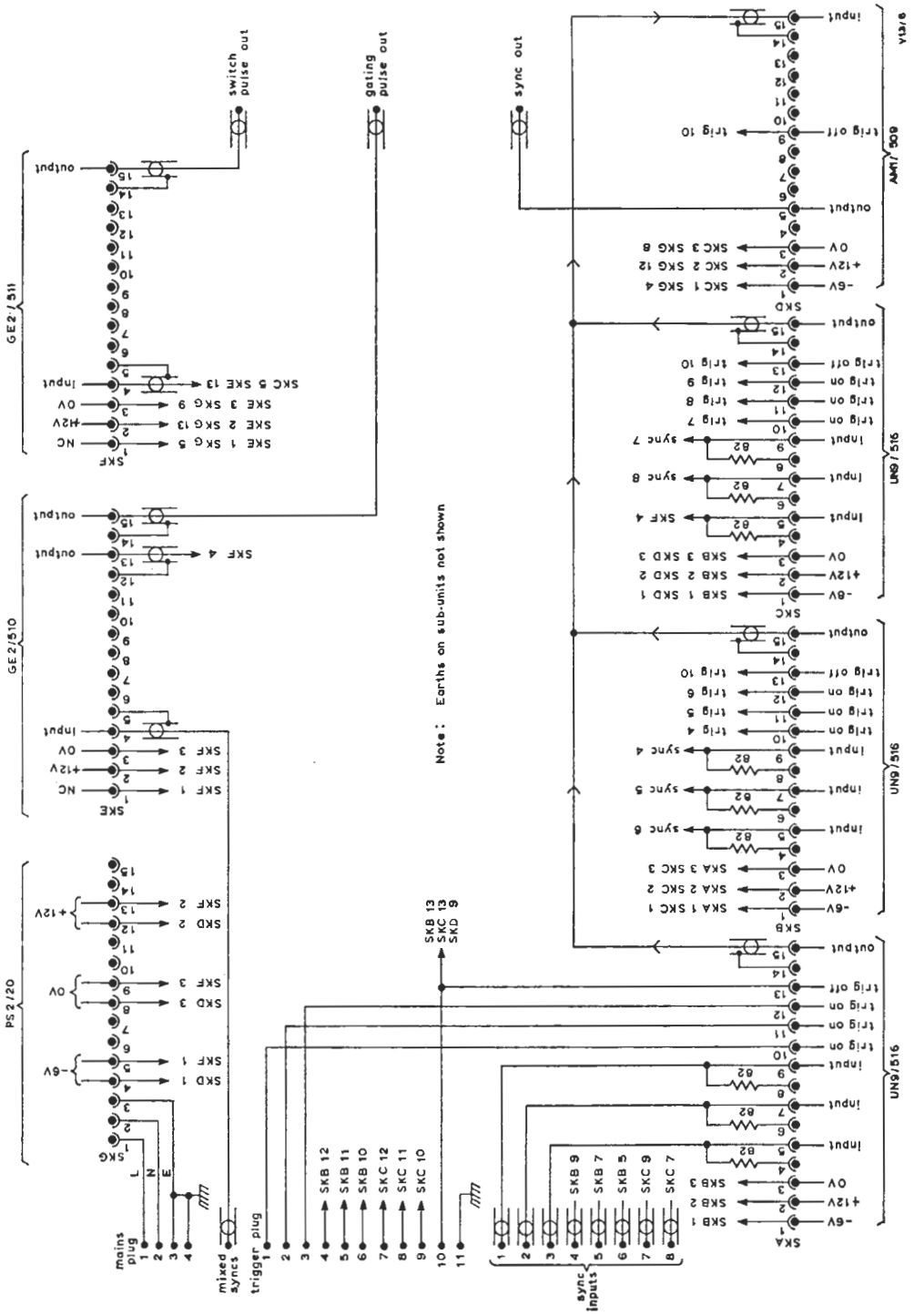


*Fig. 9.2 Panel Wiring of the PA18/509*

one feeds the ninth input of the sync switch and the input of the GE2/511 switching pulse generator; the other is applied, via the *Gating Pulse Out* connector, to a number of MN2/501 sync monitor units[3].

The switching pulse generator produces a 12-volt positive-going pulse once per picture during the field-blanking period. This is fed, via the *Switch Pulse Out* connector, to the mixer control circuits.

**Maintenance**

The following two tests can be used to detect incipient failure of the equipment.

1. Connect the switching pulse output to a d.c. oscilloscope and terminate the oscilloscope in 75 ohms. The waveform should consist of a positive-going pulse, occurring once per picture, about 12 volts in amplitude and at least one line-pulse in duration. If necessary, re-align the PS2/20 power supplier and/or the GE2/511 switching pulse generator as described later.
2. Set the oscilloscope timebase to a slow sweep speed and examine the waveform at the common output connection of the sync switch units while triggering between sync-switch inputs. Low-frequency exponential transients should be less than 0·2 volts in amplitude and of the same polarity, irrespective of the direction of switching. If necessary re-align the sync switch units.

Failure of one or more switches can usually be localised to a unit by checking the monitor points or by interchanging units. When the fault has been traced the units should be returned to their original positions; if this is not done the units must be realigned.

If the fault is a switching one the following points should be noted.

(a) The system is d.c. controlled and pulses of insufficient amplitude may not initiate switching. Switching is initiated by the positive peak of a pulse and this should be 11·5 volts $\pm$ 1·0 volt.
(b) Owing to the presence of series diodes in the pulse routing circuits the fall times of pulses may be very long.
(c) Between pulses the voltages on the switching lines may have any value between +3 volts and −14 volts.

**Alignment**

See Sync Switch Panel PA18/508.

**References to Typical Associated Equipment**

1. Sync Pulse Stabilising Amplifier AM18/513A, Instruction V.7.
2. Studio Video Mixing Equipment EP5/503, Instruction V.15.
3. Sync Pulse Separation and Monitoring Panel PA1/520.
4. Studio Video Mixer MX6/501, Instruction V.9.

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