

## SECTION 16

### SYNC PULSE SWITCH UNIT UN9/516

#### Introduction

The UN9/516 consists of three identical solid-state switch circuits; the unit accepts 3 feeds of mixed-sync pulses and selects one of these inputs as an output<sup>1,2</sup>. The switch circuits are operated by a positive-going picture-frequency control signal. This is routed externally<sup>3</sup> and is then applied to one of four trigger inputs; these are a *Trigger On* input for each switch circuit in the UN9/516 and a common *Trigger Off* input.

The unit is constructed on a CH1/12A chassis with index peg positions 3 and 11. Monitor sockets for the sync and trigger input signals are provided on the front panel of the unit. Power supplies at +12 volts and -6 volts are required<sup>4</sup>.

#### General Specification

<i>Signal Inputs</i>	2 volts $\pm 2$ dB.
<i>Signal Output</i>	2 mA (suitable for driving an AM1/509).
<i>Input Impedance</i>	1.6 kilohms.
<i>Trigger Inputs</i>	+12 volts $\pm 1.5$ volts or 12 volt ( $\pm 1.5$ volts) positive-going pulses.
<i>Isolation</i> (one unselected input to AM1/509 output)	100 kHz: more than 80 dB. 5 MHz: more than 54 dB.
<i>Noise</i>	less than 2 mV p-p.
<i>Power Consumption</i>	35 mA at +12 volts $\pm 4\%$ 3 mA at -6 volts $\pm 4\%$
<i>Weight</i>	1 lb.

#### Circuit Description

The UN9/516 consists of three identical solid-state switch circuits. A circuit diagram of one switch circuit is given in Fig. 16.1.

The sync input to the switch is applied to the base of TR1, which is biased to about +6 volts. When the switch control circuit is in the *On* condition

(TR3 conducting) the emitter potential of TR1 is about +6.25 volts and the transistor conducts. The collector current of TR1 divides between two paths; the majority flows to the output of the switch, via MR2, and the remainder flows through R7 and RV1 to the -6 volt line. RV1 provides a means of adjusting the output current of the switch.

When the switch control circuit is in the *Off* condition (TR4 conducting) the voltage at the collector of TR3, and hence at the base of TR2, will fall from 8 volts to about 2 volts. Thus the emitter of TR1 will be held at 2-3 volts and TR1 will be cut off. When TR1 is cut off MR1 conducts; MR2 will be reverse-biased by the potential at the input of the associated AM1/509 sync pulse amplifier, about 0.3 volts, and the potential drop across MR1, also about 0.3 volts. Thus the input of the switch will be effectively isolated from the output.

Transistors TR3 and TR4 form a bistable multivibrator (see Television Engineering, Vol. 3) which functions as the control circuit for the switch. When TR4 is conducting and TR3 is cut off, a positive-going 12-volt pulse applied to the *Trigger On* connection will cause the multivibrator to change states. This pulse is also fed, via MR5, to the *Trigger Off* connection and so turns off any other switches which are connected to that point. Conversely, when TR3 is conducting and TR4 is cut off, a pulse applied to the *Trigger Off* connection will cause the multivibrator to change states. In this instance MR5 is reverse-biased and so the pulse does not appear at the *Trigger On* point. Resistor R13 ensures that, during triggering, the base impedance of TR3 is always less than the base impedance of TR4, thus TR3 is always the *On* transistor.

The first pulse applied to the *Trigger On* connection turns TR3 on and TR4 off. Subsequent pulses will cause the base potentials of TR3 and TR4 to move in a positive direction. If no correction circuit were provided the positive-going change at the base of TR3 which, while not causing the multivibrator to change states, might upset the correct functioning of the switch. To guard against this MR7 and R17 are connected between the *Trigger On* point and the junction of the emitters of TR3 and TR4. When a pulse is applied to the *Trigger On* point the potential at the base of TR3

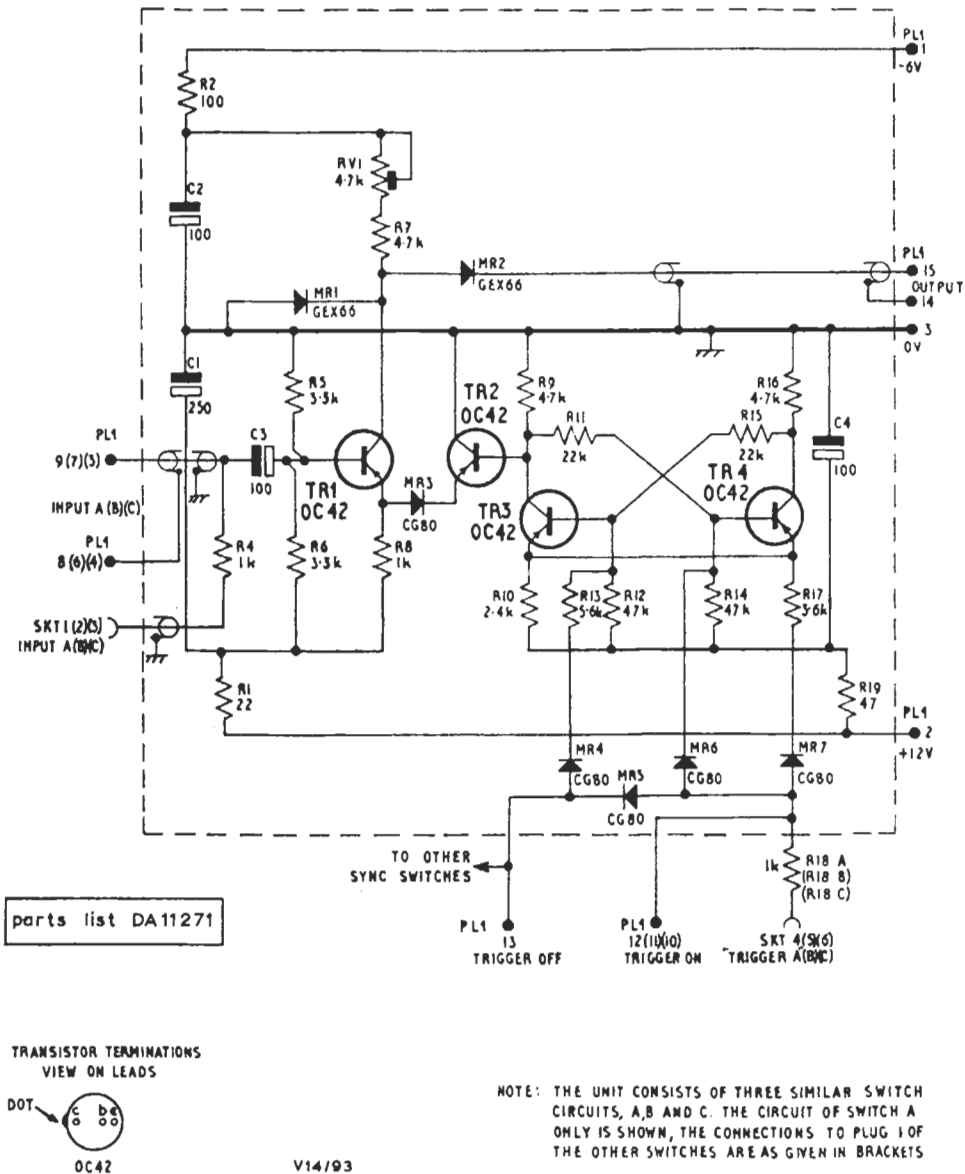


Fig. 16.1 Circuit of One Switch from a UN9/516

increases and the emitter current through R10 falls. However, this pulse is also applied to the emitter of TR3, via MR7 and R17. The current flow through R17 adds to the current flow through R10 and so maintains the emitter current of TR3 at the correct value; thus no significant pulse appears at TR3 collector.

**Maintenance**

The UN9/516 is tested and maintained as part of

the parent unit<sup>1</sup>.

**References to Typical Associated Equipment**

1. Sync Switch Panels PA18/508 and PA18/509, Instruction V.13.
2. Sync Pulse Amplifier AM1/509, Instruction V.7.
3. Studio Video Mixing Equipment EP5/502 and EP5/503, Instruction V.15.
4. Stabilised Power Supplier PS2/20, Instruction G.2.

TES 1/67