SECTION 1

SYNC PULSE MONITOR MN2/501

Introduction

The MN2/501 compares separated synchronising pulses with a reference signal and provides +12 volt and relay-switched outputs if the sync pulse input is either non-synchronous or non-existent (no-sync condition). The sync input is derived from a Sync Pulse Separator Unit UN1/523 (see Instruction V.14) and the reference signal is derived from station syncs in a Gating Pulse Generator GE2/510 (see Instruction V.10). See also Sync Pulse Separation and Monitor Panels PA1/513 and PA1/520 (Instruction V.13).

The MN2/501 is constructed on a CH1/12A chassis with index peg positions 3 and 9. Input and output monitor points are provided on the front panel of the unit. Power supplies at +12 volts and −6 volts are obtained from a PS2/20 Stabilised Power Supplier (see Instruction G.2).

Circuit Description

A block diagram, which shows the waveforms at various points in the signal chain, is given in Fig. 1.1 and a circuit diagram in Fig. 1.2

The separated sync pulse input is applied to a phase-splitter TR1. The negative-going output from this stage is applied to a gating circuit, TR2-TR3, which is driven by the gating pulse input; the positive-going output is applied to the signal-failure circuits. If the sync pulses applied to the gating circuit do not lie wholly within the gating waveform, error pulses appear at the collector of TR2 and these have a duration proportional to the timing error of the leading or trailing edges. These error pulses are partially integrated and are then applied, via the d.c. amplifier TR5-TR6, to a monostable multivibrator TR7-TR8.

When error pulses are present the multivibrator is held in its unstable state and produces an output which is applied, via d.c. amplifier TR9, to the relay driver and output stage TR10. Thus transistor TR10 bottoms and relay RLA is energised; additionally a +12 volt signal is produced at the *Non-sync Output* of the unit. When the gate inputs are coincident in time there is no error signal and the multivibrator releases after about 0.2 secs. TR10 then cuts off, the output signal is removed and relay RLA de-energises.

The positive-going output from the phase-splitter is differentiated and applied to amplifier-clipper TR11 which conducts on the positive-going leading-edges of the waveform. When TR11 conducts D4 is forward-biased and C13 is discharged to the forward-conduction voltage of diodes D5 and D6. Between pulses D4 is reverse-biased and C13 charges through R40. The positive-going sawtooth waveform generated at this point is applied, via emitter-follower TR12, to transistor TR13 but, normally, it does not go sufficiently positive to cause TR13 to conduct. However, if the input to TR11 fails, C13 continues to charge and, after three or four lines TR13 conducts.

When TR13 starts to conduct the relay driver and output stage, TR14, cuts off; this causes TR13 to conduct more heavily and gives a positive switching action. When TR14 cuts off, relay RLB is de-energised; additionally a +12 volt signal is produced at the *No-sync Output* of the unit.

The outputs of relays RLA and RLB appear on pins 6—10 of the unit connector. The circuits provided for different signal conditions are given in Table 1.

TABLE 1

Input	Pins 6 and 9	Pins 7 and 8	Pins 7 and 10	Pins 6 and 7 (with 9 and 10 strapped)
Sync Signal	s/c	o/c	s/c	s/c
Non-sync Signal	s/c	s/c	o/c	o/c
Signal Absent (non-sync)	o/c	s/c	s/c	o/c

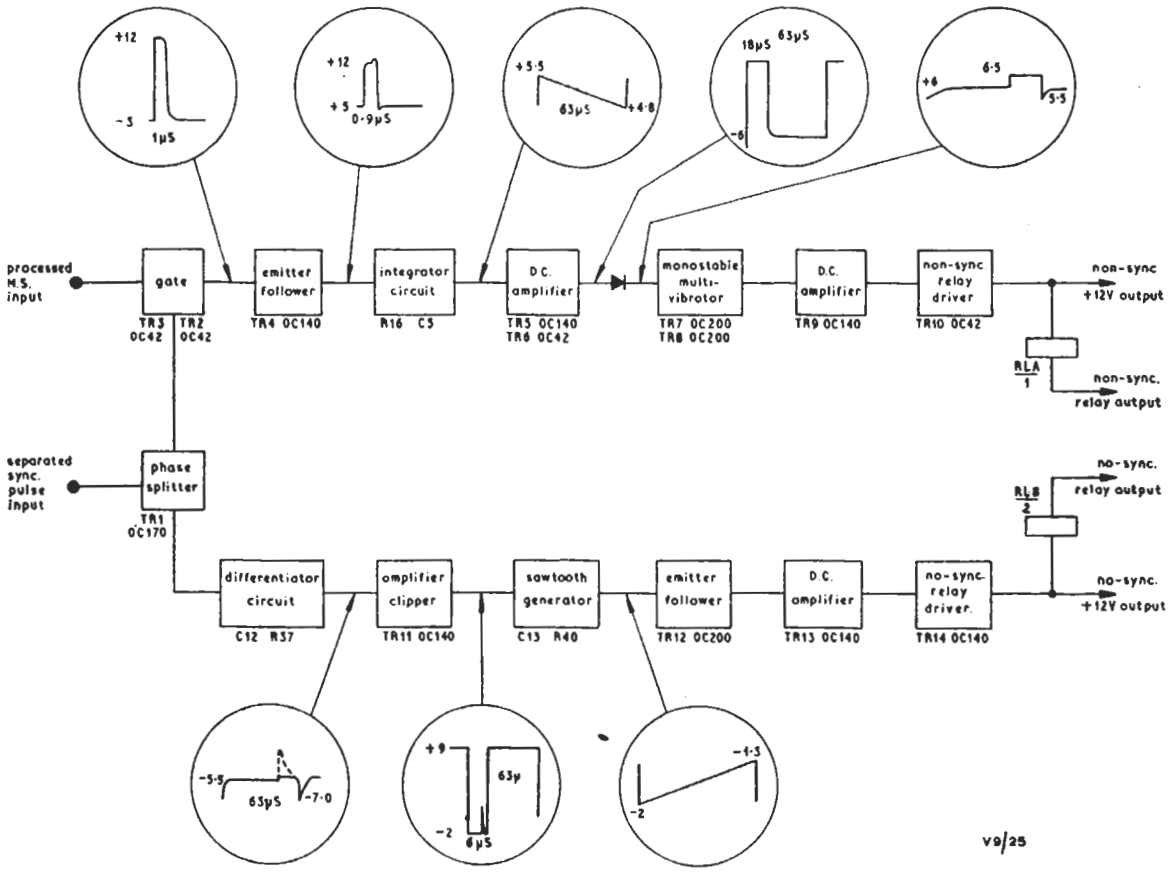

Fig. 4.1 Circuit of the MN2/501

General Specification

Inputs

Separated Syncs	2 volts p-p ±1 dB
Gated Syncs	2 volts p-p ±1 dB

Outputs

Non-sync	+12 volts
No-sync (no signal)	−12 volts
Relay Outputs	see Table 1

Input Impedances

Separated Syncs	6·5 kilohms
Gated Syncs	3 kilohms

Sensitivity

525/625 line	±300—350 ns
405 line	±475—550 ns, or one line

Response Times (d.c.)

No Input	300 μs
Sync to Non-sync	20 lines (line error) 1 field (field error)
Non-sync to Sync	0·2 seconds

Relay Response Times — Delayed up to 5 ms with respect to d.c. outputs

Power Inputs — +12 volts ±4% (85 mA); −6 volts ±4% (15 mA)

Weight — 1 lb.

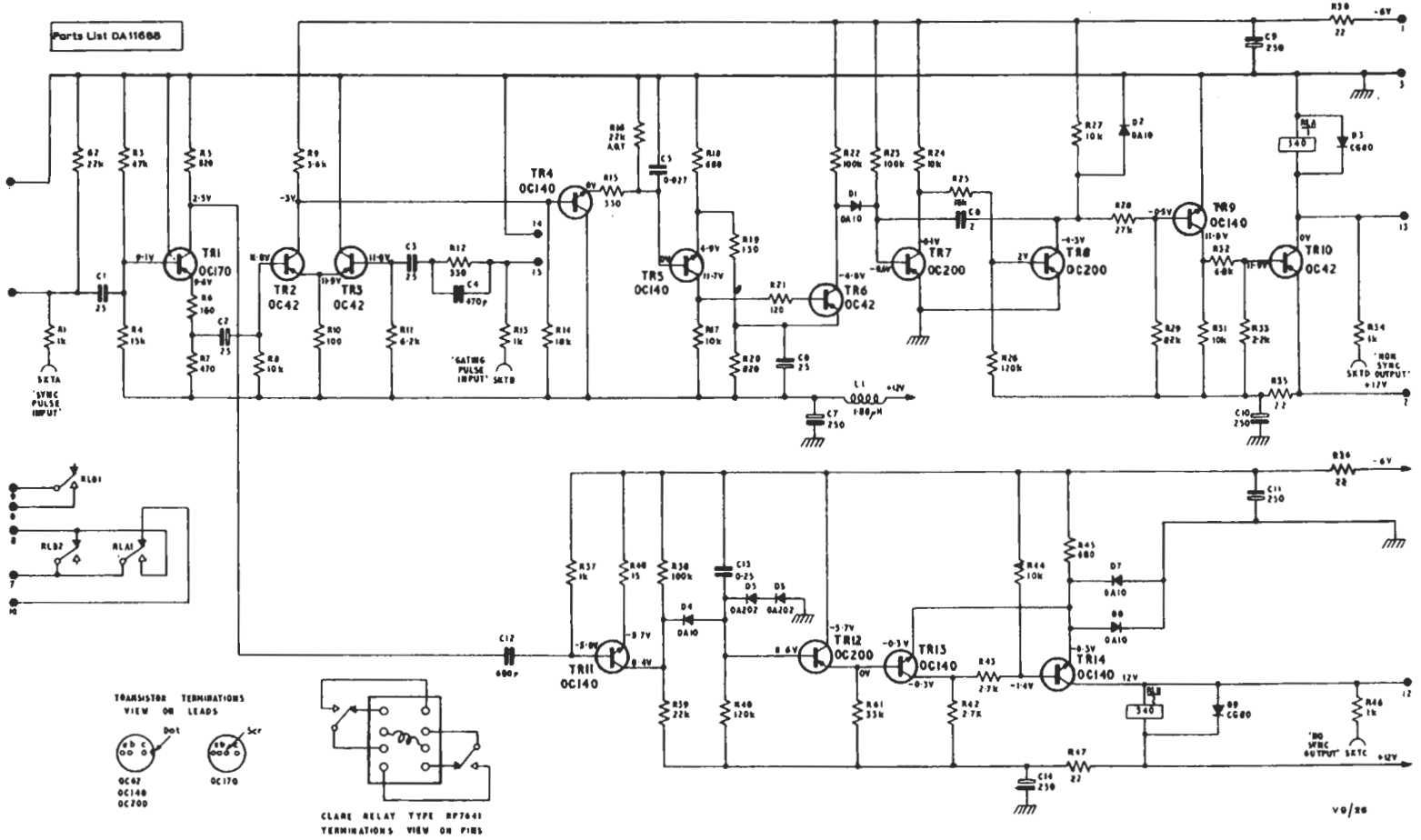

Fig 1.2 Block Diagram of the MN2/501

Maintenance

No installation or routine adjustments are necessary. Resistor R16 is selected for a 625-line timing error of 300 ns; if components, particularly transistors, in the circuits of TR2 or TR3 are replaced this timing error must be rechecked as described below.

1. Feed the sync-pulse and gating-pulse inputs with two similar 625-line mixed-sync signals. (These are obtained most conveniently from the two outputs of a GE2/510 unit).
2. Extend the inputs to the A and B inputs of a dual-trace oscilloscope and terminate them in 75 ohms.
3. Check that the MN2/501 declares the two inputs to be synchronous (socket D should be at 0 volts).
4. Delay the gating-pulse input until there is a measured time difference between the two inputs of 300 ns ($\pm$15 ns).
5. Substitute resistors from the standard 2% range for R16, increase the value from 15 kilohms until the input is declared non-synchronous (socket D at +12 volts).
6. Solder the selected resistor into circuit.

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