

PAL FILTER AND DELAY UNIT UN1/572

UN1/572

Introduction

The UN1/572 comprises two separate circuits. One of these accepts a standard level, colour or monochrome composite video signal and produces an output of similar form but reduced in level by 15 dB and with the chrominance information filtered out; this filtering action can be inhibited for a monochrome input signal. The other circuit accepts a chrominance signal at 1.5 volts p-p, and delays it by approximately one television line without attenuation.

The unit normally forms part of a 625-line-standard PAL decoding equipment^{1,2}. The filter circuit is used in the decoder luminance channel, and contains also a luminance-signal delay line. The separate delay circuit comprises an ultrasonic delay line which is associated with the decoder chrominance channel when delay-line interpolation of the chrominance signal is employed.

The unit is constructed on a CH1/12A chassis with index-peg positions 1 and 43. It requires d.c. supplies of +6 volts and -6 volts⁴.

General Specification

Rejection Filter and Luminance-delay Section

Input Impedance	940 ohms
Output Impedance	150 ohms
Insertion Loss	15 dB
<i>Amplitude/Frequency Response</i>	
Luminance signals (subcarrier filter inoperative)	± 0.5 dB 100Hz to 5 MHz
Chrominance signals (subcarrier filter operative)	-20dB at 4.4 MHz
Luminance signals (subcarrier filter operative)	-3dB at 3.4 MHz
	-3dB at 5.4 MHz
<i>Luminance Delay</i>	440 \pm 20 ns
<i>Chrominance Delay Section</i>	
Insertion Loss	0dB at 4.3 MHz
Delay (total)	64.056 μ s
<i>Amplitude/Frequency Response</i> (w.r.t. subcarrier level)	-3dB at ± 1 MHz
<i>Power Supply</i>	+6, -6 volts, 40 mA

Circuit Description

Fig. 1 is a complete circuit diagram showing both sections of the UN1/572.

Subcarrier Rejection Filter and Luminance-delay Section

Composite video signals (with or without chrominance information) are applied to emitter-follower TR1 through a variable resistor RV1 which enables the input level to be adjusted by ± 3 dB; RV1 is mounted on the unit front panel and designated Y GAIN. Delay line DL1 delays the output from TR1 by an amount which is chosen so that the luminance signal from the UN1/572 is coincident with the relevant colour-difference signal when combined in the decoder luminance-signal matrix⁵. L1, L2 and L3, together with C2 are response-correction components; L1 and L2 also serve to eliminate reflections in the delay line. C18, C19 and C20 are capacitors which are sometimes added to compensate for variations in frequency response caused by different samples of delay cable.

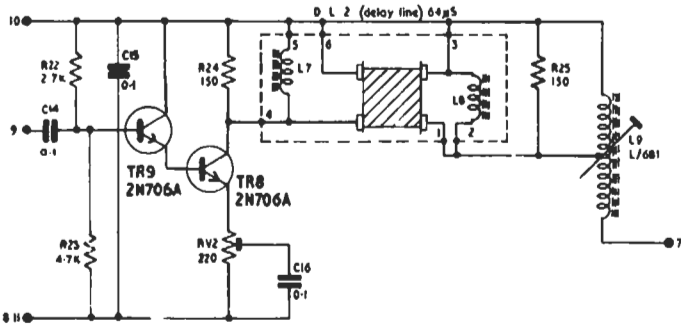
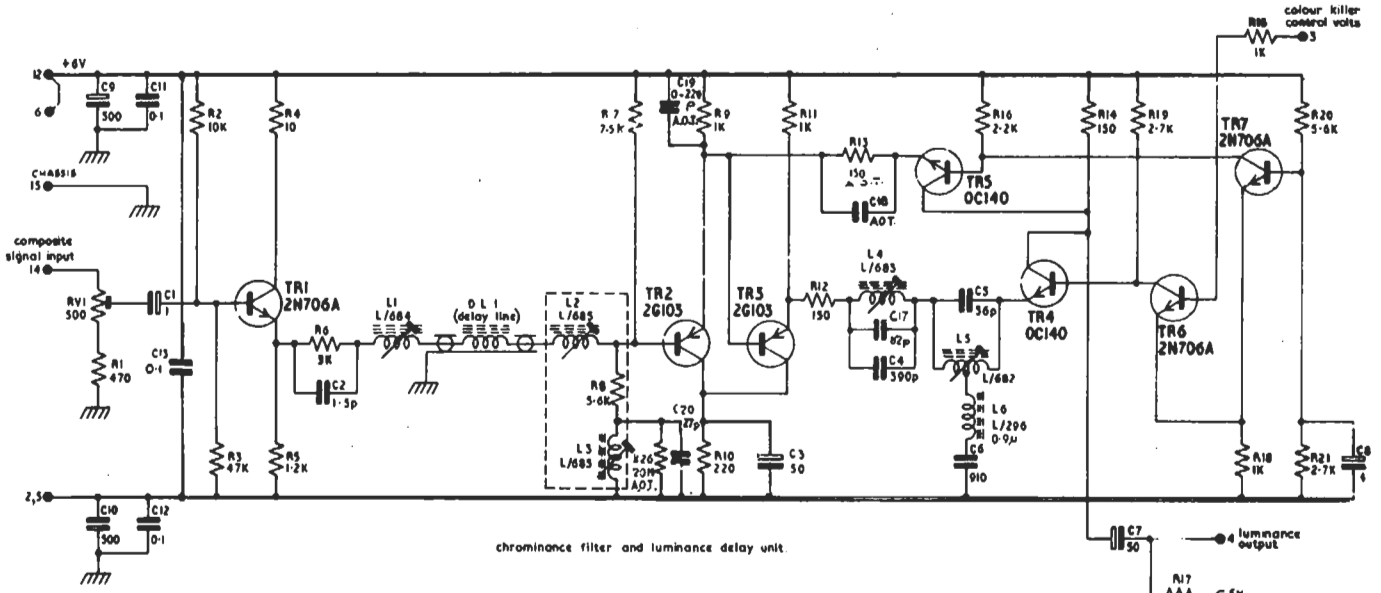
Transistors TR2 and TR3 both operate as emitter followers, with the (delayed) video signal from TR2 fed to TR3 and also to TR5 which acts as a d.c.-controlled switch. The output from TR3 is applied to a subcarrier rejection filter (L4, C17 and C4) and thence via a phase-corrector circuit to a second d.c.-controlled switching transistor TR4. TR6 and TR7 form a direct-coupled long-tailed pair, with the colour-killer control voltage (from the UN18/504 Chrominance Unit³) applied to TR6. When the decoder is fed with a monochrome signal, the colour-killer signal is at -1.5 volts; TR6 then conducts so that TR4 is cut off and inhibits signals from the filter. TR7 is also cut off, and the resulting conduction of TR5 provides an alternative path for luminance signals. Conversely, for a colour-coded input signal, the d.c. control signal is at -2.5 volts, and TR7 is the conducting half of the long-tailed pair. In this condition, TR5 is cut off whereas TR4 conducts to produce a luminance-signal output with the chrominance component reduced in level by the filter.

The output from either TR4 or TR5 is subsequently fed to the decoder luminance-unit matrix to be combined with the demodulated chrominance signals (if these are present), and to be used as the output of the decoder.

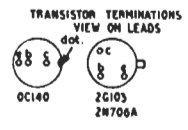
Chrominance Delay Section

The ultrasonic delay section of the UN1/572 forms part of the decoder chrominance channel when delay-line decoding is employed.

Chrominance signals, with the burst removed by a gating process in the decoder chrominance unit³, are



from D1B061
parts list D1B061



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Fig 1 Circuit of PAL Filter and Delay UN1/572
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fed to TR9 and TR8 operating as a compound common-emitter amplifier. A variable resistor, RV2, in the emitter circuit of TR8 can be adjusted so that only part of this resistance is affected by the action of C16; thus, the amount of negative feed-back applied to TR8, and hence the stage gain, can be controlled.

The amplified chrominance signal from TR8 is fed to delay line DL2, which produces a basic delay of 63.943 μ s (nominal). The delay is shorter than the duration of one television line (625-line standard) by one quarter-cycle of subcarrier; this represents a compromise between conflicting requirements for precise vertical colour registration and the whole number of half-cycles of subcarrier necessary for correct demodulation. In practice, because of added signal transit time in the wiring between decoder sub-units and in intervening circuits, the total chrominance delay is 64.056 μ s (as shown in the General Specification). This is one quarter-cycle of subcarrier longer than the line duration, and results in the same degree of vertical colour mis-registration as for the commonly-used effective delay value of 63.943 μ s.

Because of the extra delay, however, additional inversion of the chrominance signal is necessary so that it is in the correct phase for demodulation; this is arranged simply by reversing the connections to the delay line.

The delayed chrominance signal from DL2 is increased in level by the 2:1 voltage step-up occurring in transformer L9, and is then returned to the chrominance unit for subsequent demodulation.

Alignment and Maintenance

The UN1/572 is normally aligned and maintained as part of a complete decoder^{1,2}. In the Instruction for the parent equipment, some notes on typical faults in this unit are also given.

References to Typical Associated Equipment

1. PAL 625-line Colour-signal Decoder GE1/528.
2. PAL/NTSC 625/525-line Colour-signal Decoder GE1/529.
3. PAL Decoder Chrominance Unit UN18/504.
4. Sync Separator Unit UN1/540.
5. Colour-signal Decoder Luminance Unit UN19/503.

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