VIDEO GATING UNIT UN1/567

Introduction

The UN1/567 is designed to be used with the Safe-area Generator GE1/525. The unit requires a feed of pulses from the GE1/525 and accepts up to four separate 1-volt video signals. Four outputs from the UN1/567 contain both the video signal and the safe-area information. The outputs are intended for use only with monitoring circuits and should never be used in a transmission chain. The unit is designed for use with monochrome signals but colour signals are acceptable.

The UN1/567 has an integral power supplier for use with a 240-volt mains supply. It is built on a CH1/26A chassis with index-peg positions 17 and 18.

General Specification

Inputs

From GE1/525	±1 volt p-p
Composite Video	up to four at 1 volt p-p
Output	1 volt p-p
Input Impedance	approximately 3 kilohms
Output Impedance	75 ohms ±3 per cent
Differential Phase Distortion	4 degrees maximum
Power Requirements	210-250 volts, 50 Hz
Power Consumption	40 mA at 240 volts
Operating Temperature	5 to 45 degrees C
Weight	1·25 kg (2 lb 12 oz)

Construction

The unit is constructed on two printed-wiring boards. Board 1 carries the pulse amplifier, the power supplier and video gates 3 and 4. Board 2 carries video gates 1 and 2. Two mains fuses and a fuse in the negative output lead from the bridge rectifier are mounted at the rear of the chassis.

Circuit Description

The circuit of the UN1/567 is shown in Fig. 1. The unit comprises a pulse amplifier, four identical video gate circuits and a power supplier.

Pulse Amplifier

The pulse amplifier TR11, TR12 and TR13 comprises three common emitter stages. The potential of TR12 emitter is determined by zener diode D4. Outputs of opposite polarity pulses are taken from the collectors of TR12 and TR13 to the video gate units.

Video Gates

The input signal to each video gate is passed via two common emitter stages, TR1 and TR2, to an emitter follower stage TR3. The d.c. potential of TR2 emitter is set by zener diode D1. Variable resistor R10, capacitor C3 and diode D2 form a d.c. restoration circuit; R10 is used to set the d.c. potential at the base of TR3 and hence the sync level of the composite video input signal. The output from TR3 is fed via a second emitter follower TR4 to a gating circuit. The gain, up to the emitter of TR4, is approximately 6 dB.

Transistors TR5 to TR8 comprise the gating circuit which is used to clamp the video input signal so that the required safe-area information is present on the output signal. If Pulse 1 is positive going, either transistor TR5 or transistor TR6 conducts and clamps the video signal from TR4 to zero volts. If Pulse 1 is negative going either transistor TR7 or TR8 conducts to clamp the signal to 0·7 volts. Because the video input signal is amplified in the first stages of the gate unit the border on a displayed picture is of two shades of grey instead of black and white.

The gated video signal is applied to TR9 and TR10, a complementary feedback amplifier. The output is taken from the collector of TR10.

Power Supplier

The 240-volt mains input to the power supplier is applied to a 240/17-volt transformer. The transformer output voltage is rectified by a full-wave bridge circuit which is followed by a conventional series stabiliser comprising transistors TR14, TR15 and TR16. The stabilised output is applied across series connected zener diode D10 and resistor R57. A 0·7 volt output is determined by the base-emitter voltage drop in transistor TR17.

Test Procedure

Apparatus Required

High-grade oscilloscope
6-dB-gain video amplifier
75-ohm variable attenuator
75-ohm termination
Avometer Model 8
Safe-area Generator GE1/525
A source of composite 1-volt p-p video test signal (sawtooth or staircase waveform)

Procedure

1. Adjust R55 so that the voltage across C25 is 12 volts.
2. Check that the voltage between the negative terminal of C25 and earth is $-2{\cdot}9 \pm 0{\cdot}4$ volts. Check that the voltage between the base of TR17 and earth is $+0{\cdot}7 \pm 0{\cdot}2$ volts.

   Check that the voltage between each video output and earth is zero $\pm 0{\cdot}1$ volts.
3. Link the four video inputs together.
   Apply the 1-volt p-p video test signal to Video Input 1 and terminate Video Input 4 with 75 ohms.
   Set variable resistors 1R10, 2R10, 3R10 and 4R10 to their mid-position.
   Terminate each video output with 75 ohms.
4. Check that each output is 1 volt p-p $\pm 1{\cdot}5$ dB and that it is not visibly distorted.
5. Apply the output from the GE1/525 to the Pulse Input and terminate with 75 ohms.
6. The waveform obtained from each video output point on the UN1/567 should show the information from the GE1/525 gated into the test signal waveform. The amplitude of the gated-in signal should be approximately 0·35 volts p-p and the amount of lift should increase slightly as the video test signal is increased in amplitude.
7. Set 1R10, 2R10, 3R10 and 4R10, for video outputs 1, 2, 3 and 4 respectively, so that the gated-in waveform sits equally between blanking and white levels.
8. Increase the level of the applied video test signal until the waveform displayed from each video output begins to crush at white level. This should not occur until the input has been increased by at least 2·5 dB.

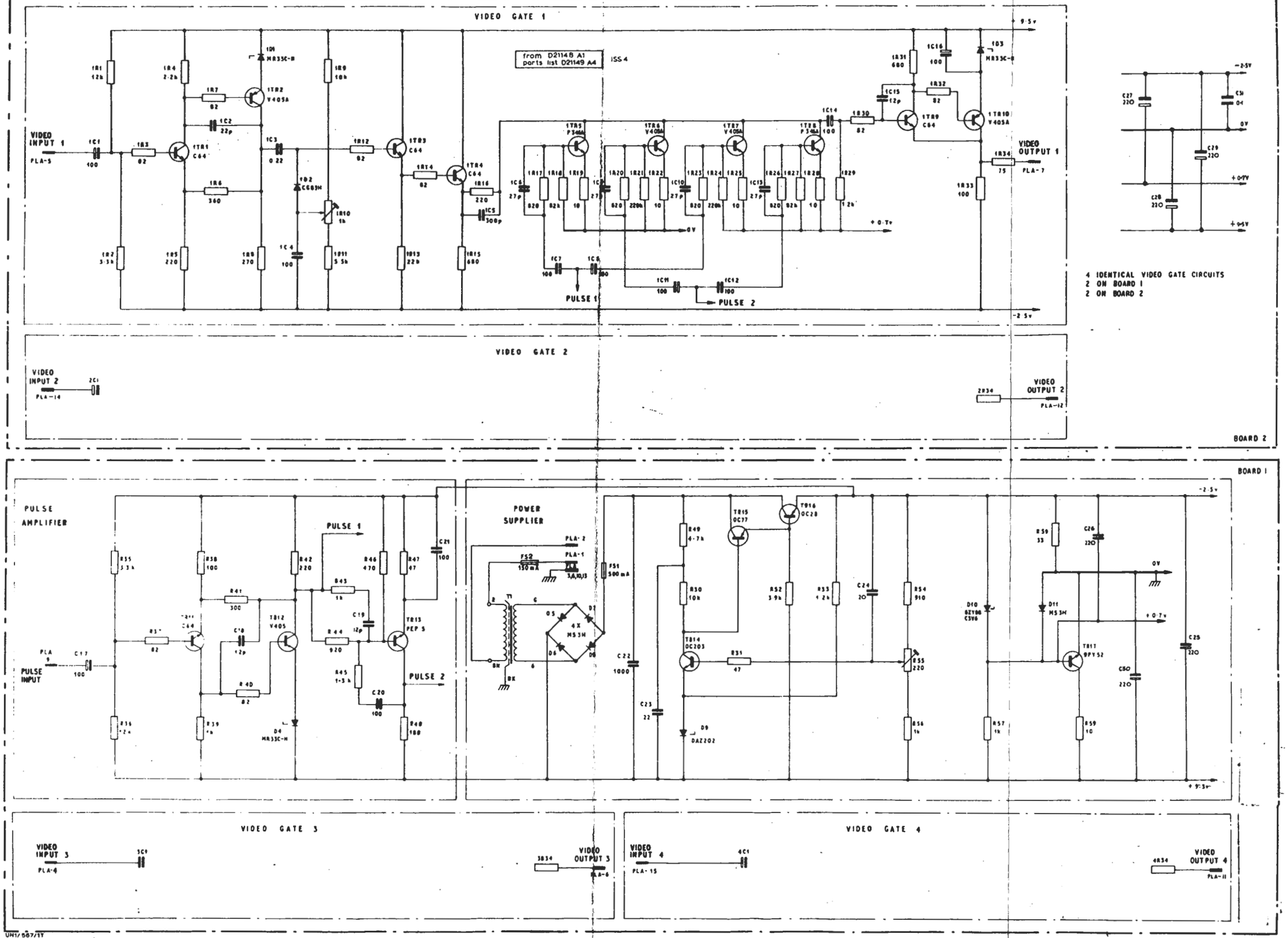

Fig I Circuit of the Video Gating Unit UNI/567