The rapidly growing popularity of Video has resulted in an ever increasing string of requests to provide articles for the new band of Video enthusiasts. It is an even more interesting area now that the price of a good video camera is reaching more affordable levels. However, it is a relatively new field and good ideas and circuits take time to formulate.
The article here is pointed in the right direction and is aimed at readers who find an interest in making their own video recordings. The circuit enables certain video tricks or special effects to be used in a video recording and provide an extra dimension that can make a lot of difference.

from an idea by
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video effect generator

box of tricks for video enthusiasts

It is not easy to describe the effects which can be obtained with this generator. It gives the pictures a more 'graphic' character as it were. But that is not the only thing. Depending upon how the generator is adjusted, the effects achieved are reminiscent of trick photography.
What is the idea behind this box of tricks? Well, mainly the dividing of the normally continuously variable brightness of the screen into four fixed values of brightness. The result is, therefore, not just a black and white picture, but additionally two grades of grey, analogous to a digitalisation of the brightness and contrast.
A second feature, which is virtually forced as shall be seen later in the article, is the separate adjustment of brightness and colour saturation. The brightness and colour information are split in the early stages and combined again in the later stages of the circuit; the combining can be achieved in a proportion which is under the control of the operator. By choosing deliberate disproportions, grotesque effects are obtained.
An important remark before technical details are gone into; the input and output of the generator are tuned to standard video signals and it is therefore possible to insert it anywhere in the video chain.

Operation

As usual, the principle of the circuit is best explained with the aid of a block diagram as shown in figure 1.
The video input signal is split into two parts:

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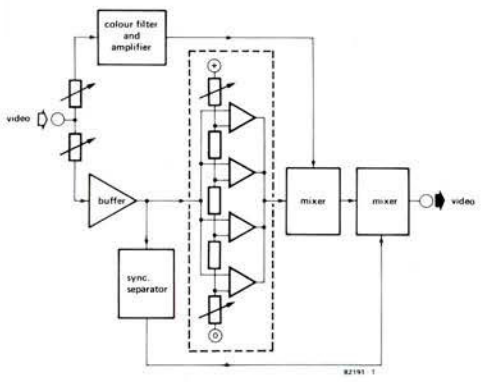

Figure 1. Block schematic diagram of the video effect generator. The information contained in a video signal is dissected into information regarding the brightness, information as to colour and information about the synchronisation. After the brightness information has been processed, the three bits of information are recombined in two mixer stages.

one part is passed to a colour filter and amplifier, which will be dealt with a little further on, and the other to a four-stage comparator via a buffer. The comparator arranges the (pre-settable) splitting of the brightness into four levels. The processed signal is then passed to a mixer which re-combines the colour and brightness information.
At first sight it may appear unnecessary to filter out the colour information, only to add it again at a later stage, but there is a good reason for this. If the colour were not filtered, the four-stage comparator would also affect the colour information. The sync signal is protected likewise for the same reason: a sync separator takes the sync signal from the buffer and applies it to a second mixer stage where it is re-combined with the rest of the signal.

Circuit description

The blocks shown in figure 1 can be recognised in the circuit diagram of figure 2: A1 is the buffer with input derived via LEVEL control P1 and its output applied to comparators K1 . . . K4. The comparators divide the originally continuously variable brightness into four fixed levels.
The sync separator is formed by comparator K5. Clamping diode D1 ensures that the output of A1 is always positive with respect to the reference voltage of comparator K5. The sync signal lies roughly in the bottom quarter of the video signal and is separated from it by K5. Diodes D2 . . . D5 and potentiometers P3 and P5 form the preset reference voltage supply for the four-stage comparator.
Transistor stage T3 is the colour filter and amplifier; its input level is set by potentiometer P2 and its output is taken to the inverting input of mixer A2. This stage filters and amplifies frequencies in the range 4.43 ± 1 MHz. The amplification is necessary to ensure retention of the information of the original signal.
The four-level output of comparators K1 . . . K4 is also applied to mixer A2 and there mixed with the colour signal from T3. The output of A2 is applied to a second mixer, T2, together with the sync signal from comparator K5.
The output of the generator is best connected

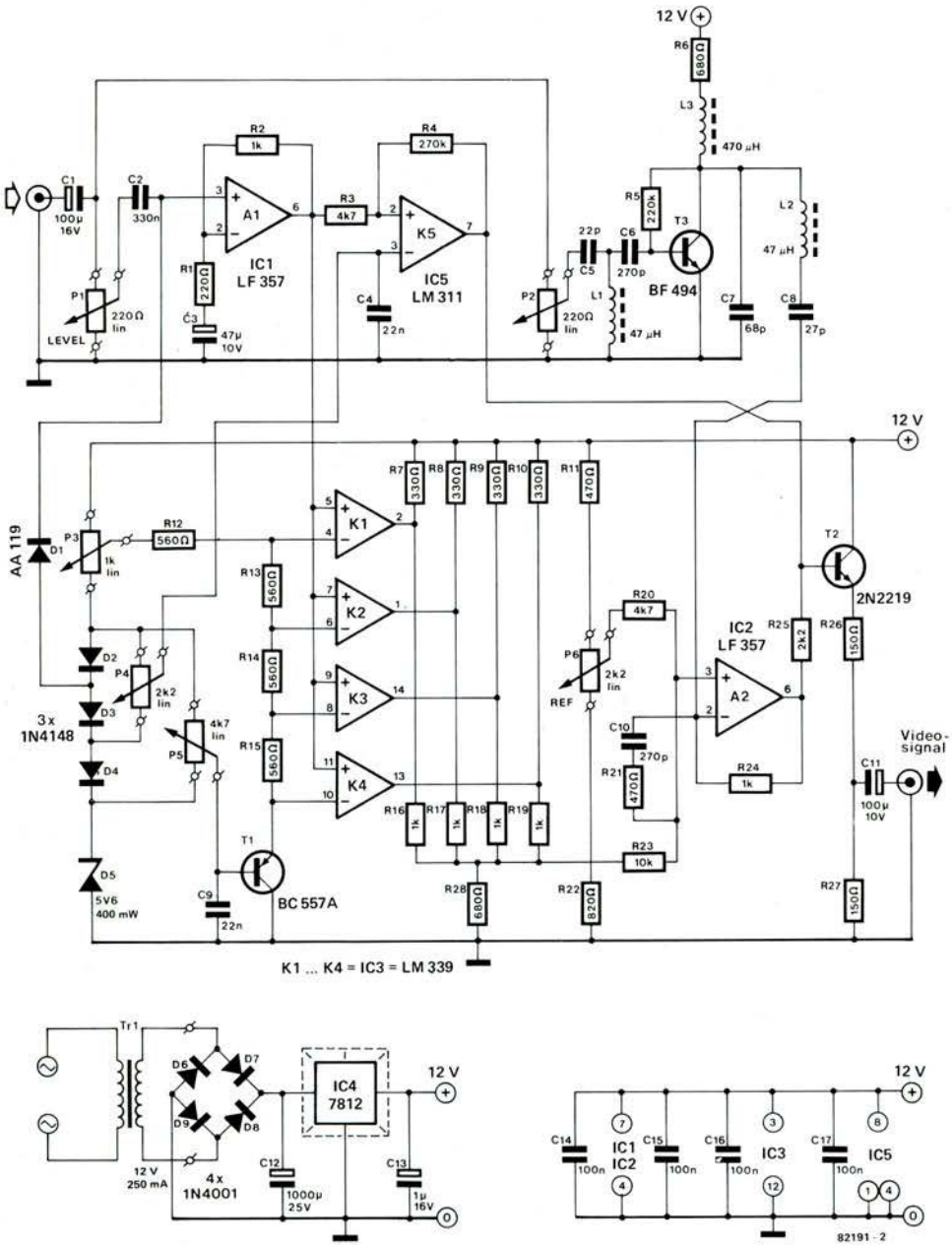

Figure 2. Circuit diagram of the video effect generator. The change of continuously variable to (four) fixed level brightness control takes place in comparators K1 . . . K4. Synchronisation signals are separated by K5, while T3 separates and amplifies the colour information. The complete video signal is reconstituted in mixers A2 and T2.

to the video input of a television receiver, but if such an input is not available, it can be fed to the aerial input via a VHF/UHF modulator.

Adjustment

The functions of the various potentiometers are;

P1 = setting of the input level (sensitivity);
P2 = setting of the colour saturation;
P3 and P5 = setting of the reference voltage for comparators K1 . . . K4;
P4 = setting of the reference voltage for comparator K5;
P6 = setting of operating point of mixer A2.

1. Set all potentiometers to their mid position.
2. Connect the generator to the television receiver and switch on the mains supply.

The input signal should preferably be a test card.

3. Adjust P4 until the picture on the television screen is still.
4. Set the reference voltage for K1 . . . K4.

If four levels are not attainable, the input signal is too weak and the input sensitivity should be increased by P1. If the picture quality is poor, this may be due to overloading: the input level should then be reduced by P1.

5. Increase the input signal by means of P1 and adjust P6 to that position where the largest possible input signal can be processed without undue distortion.
6. Finally, set the required colour saturation with P2.

NOTE: After every change of input sensitivity, it is recommended to readjust the sync level with P4.