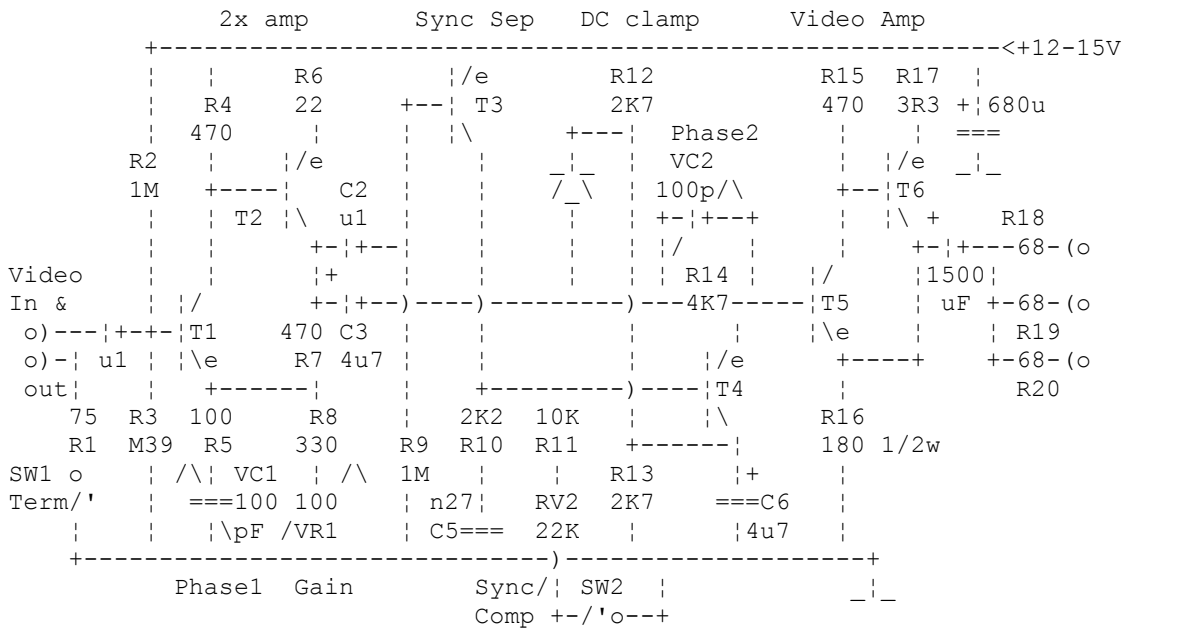
From : G8MNY

Black & Burst Sync Buffer

By G8MNY (first published in BATC's CQTV 193 Jan 01)

When genlocking video sources together sometimes there is cable or camera crosstalk from the genlock source feed when distributed with ordinary video as the genlock source. This circuit will solve that problem while still allowing the use of a non genlock camera as the genlock source master rather than the use of a PAL colour SPG.

This 6 transistor circuit is a precision vision buffer amp, or sync black and burst stripper amp, providing 3 outputs. It uses no hard to find or obsolete ICs that many video projects need, indeed many constructors will find all the bits are in their junk box. All transistors can be 100mA general purpose silicon small signal types as transistor performance has mainly been designed out of this circuit.
Construction can be UGLY, MATRIX or PCB, but be careful if using Strip board as the paralleled inductance lines can cause instability!

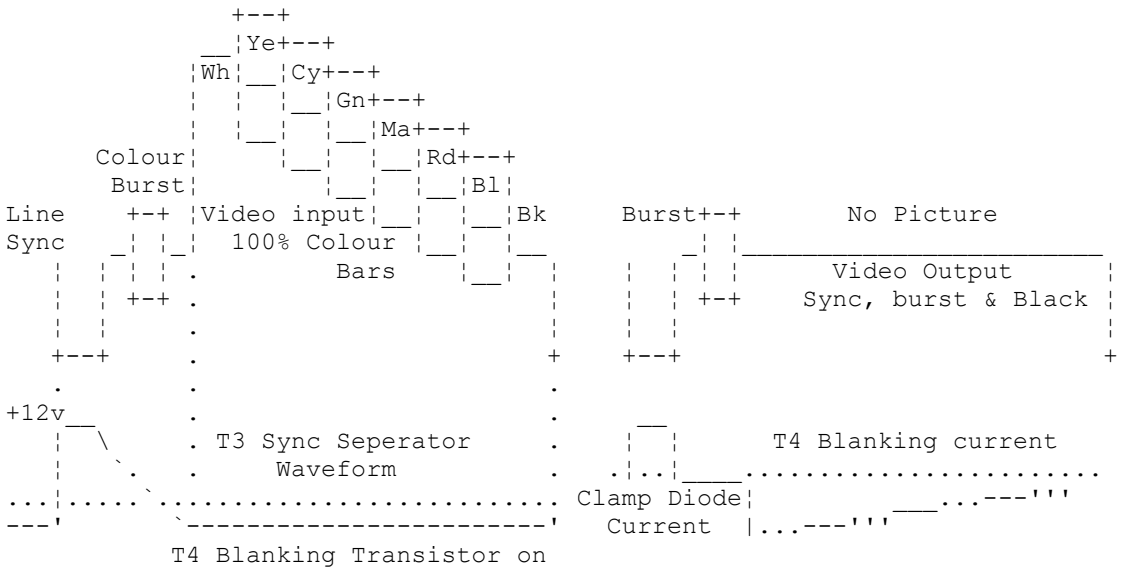


How it works.
The video input can be looped through or terminated with R1 (this can be made from 2x 150R in parallel if needed). Vision is fed to a high input impedance (>200k) transistor amp T1 and T2 with a gain of just over 2. The low value of pull up resistor R4 and the use of the PNP emitter resistor R6, ensure very good colour linearity. Presets VR1 and VC1 set the gain and colour phase (delay) of the amp.

The 2V P-P video feeds a lightly biased T3 PNP transistor to make a sync stripper stage. Its collector is high during syncs and VR2, R11 and C5 form a sync and colour burst timing window that will operate the blanking stage T4 PNP transistor during picture time. Resistor R10 in series with C5 lets fast sync rise time edges through. Mode switch SW2 will allows composite or black and burst modes by disabling the blanking stage. Capacitor C5 can be omitted if the colour burst is not wanted.

The amplified video also feeds through C3, then it is clamped at 0.6V below from the half supply rail with D1. Using a 2V P-P video level this point sets the black video level to approximately the bias rail with standard sync amplitude of the genlock source without the need for a proper black level clamp. When the collector of T3 is 0.5V more negative than the half rail (during picture time) T4 is turned on, shorting out the picture video that has gone through R14 and VC2 to the half rail.

Transistors T5 and T6 make up a unity gain video buffer amp, with a low value of pull down resistor R16 to provide good syncs while driving 3 loads. Again a low value of pull up resistor R15 and the use of the PNP emitter resistor R17, ensure very good video and colour linearity. VC2 trimmer sets the HF gain and colour phase. Good LF performance is ensured with a large value output C7 and each or the 3 output source impedances will be very close to the ideal 75 ohms with the use of 68 ohms as the feeding resistors.



Setting up.
The circuit should draw about 35mA from 12-14V DC anything wildly different should be investigated. Using an oscilloscope check the 2x amplifier is working OK. Then in black and burst mode, check the sync separator output, it should have inverted line syncs from 12V to 6V with a lazy back edge. Check at frame rate that there is no LF problems with the syncs.

Scoping the output buffer (T6 Collector) you should have just syncs and burst with no picture content at about 6V DC. Adjust the burst window preset VR2 so that blanking starts just after the burst. In composite mode there should be around 2V P-P. Terminate all the outputs into 75 ohms and check that the buffer amp output stays nearly constant (showing that the buffer amp has nearly zero ohms output impedance). Scope the output on one of the terminations, and adjust gain preset VR1 for unity overall gain of the circuit. Also check at frame rate that there are no LF droop problems.

Colour phase is best set up with a colour bar source and a vectorscope using identical leads. Adjust the 2 HF phase presets for best phase and amplitude match on the vector display. It will be seen that the two presets do have slightly different effects and by alternate tweeks the correct phase and amplitude can be obtained. Switching to black and burst mode the phase of the bursts should not alter.

But for those without a vectorscope and colour bars, adequate phase setup can be done by subtraction comparison using an evenly lit brightly coloured card in front of a colour camera and a dual beam scope with channel subtraction. Calibrate the scope by probing the video input with both probes and adjusting the timebase and gains to show a single colourful line. Put the scope into subtract mode and tweek channel gains and scope probes adjustments to produce the best nulled out blank line. Now move a probe to one of the terminated outputs and adjust the 2 HF phase presets for best burst and colour picture carrier null.

In use.
In composite mode the buffer amp works as well as can be expected. In the back and burst mode the video blanking is only approx at the black level and will depend on source sync levels. The exact amount of picture vision left after blanking may depend on the component layout. Both of these should not have any affect on the kit being genlocked.

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