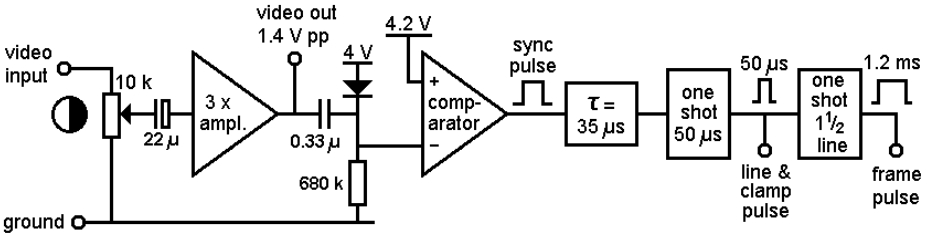
NBTV sync separator and video pre-amplifier

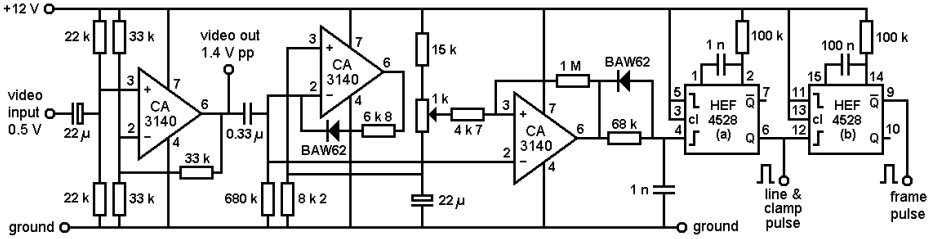
The NEON-LED driver in the previous chapter works best when it receives clamp pulses. This circuit generates these pulses.

Simplified Diagram

The circuit starts with the video input amplifier of a monitor. The 10k potentiometer (on the front) sets the contrast. The amplifier has a gain of 3x, so video signals of 0,5 volts peak/peak can be amplified to 1,4 volts, giving full contrast. The output signal of this first amplifier can be connected to the NEON/LED driver. The same output is fed into a diode DC restorer. The time constant has been chosen rather short, much shorter than is acceptable for video purposes. This ensures perfect sync separation, also on signals with fast changing brightness. The bottom of the sync pulses is stabilised onto 4 volts. The comparator clips the signal at 4.2 volt and thus it generates a sync pulse.

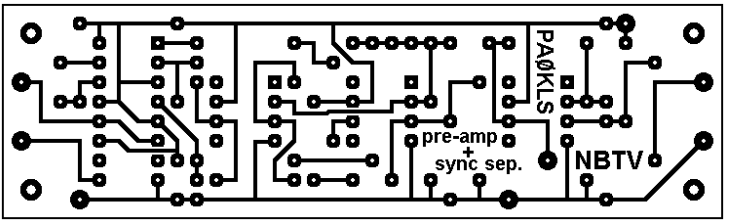


The NBTV sync pulse has a length of about 120 µsec. A clamping pulse should be positioned almost in the middle of it. After a delay of 35 µsec a retriggerable mono stable multivibrator generates the clamping pulse of 50 µsec. This pulse can also be used for line synchronisation of your Nipkow disc or oscilloscope monitor. The frame sync pulse is generated by a second retriggerable mono stable multivibrator. This one has a time constant of one and a half NBTV line. During the frame this circuit is retriggered each line, long before it could finish its pulse. Only if the sync pulse is missing it can finish its pulse. The inverse of this signal gives us the frame sync pulse. Notice however that it is active during the last half of line 1 of the NBTV frame. You need a flywheel circuit for driving an oscilloscope as NBTV monitor. This flywheel is anyway a good idea.

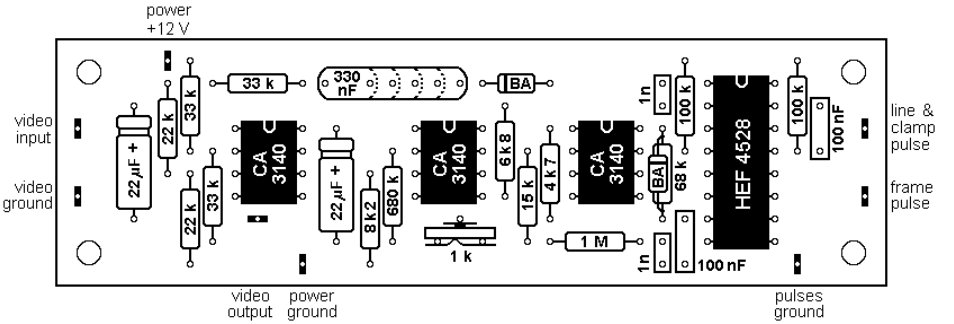


Circuit Diagram (previous page)
Three operational amplifiers CA3140 and one HEF4528 complete the circuit. The DC restoring diode is part of a "perfect diode" circuit. A trimmer potentiometer sets the clipping level for the sync. This setting is not at all critical. The diodes BAW62 can be replaced by any signal type silicon diode, e.g. 1N4148.

Printed Circuit Board
A small PCB has been designed for this project. It measures just 9½ by 3 cm, it is single sided, so it is cheap to produce.

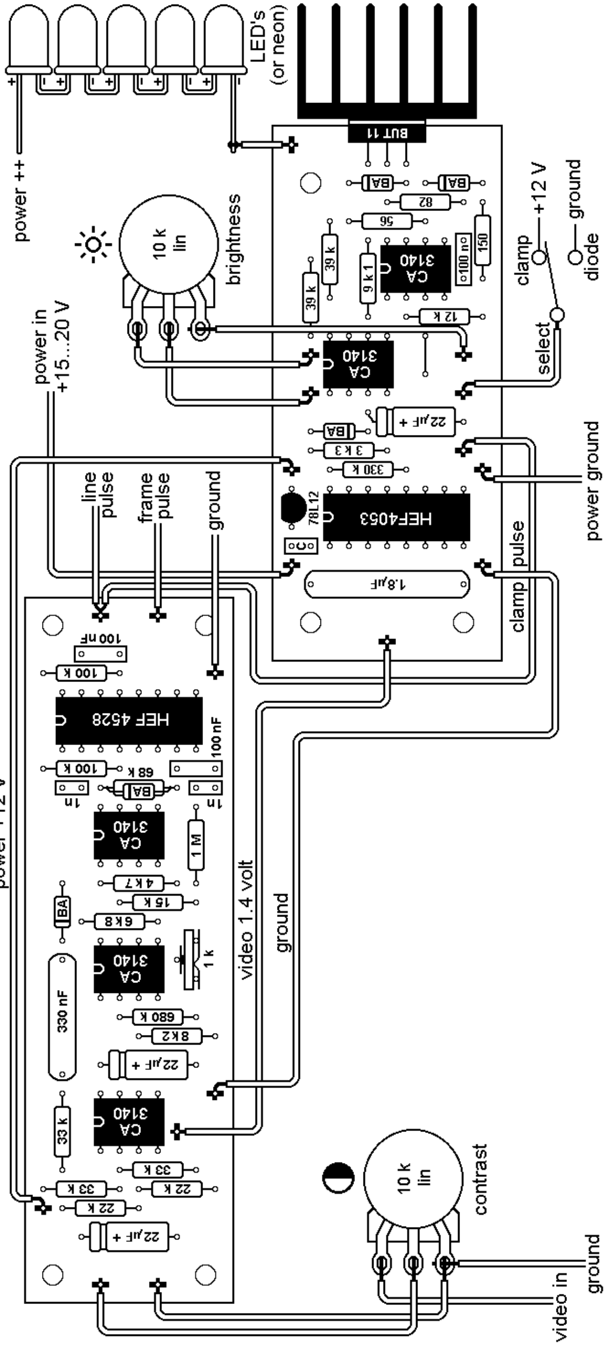


The larger copper pads are for soldering eyes and the square pads indicate pin 1 of the IC's. There are several holes to fit various sizes of the 330nF capacitor. Use a good quality polyester capacitor in this place. I used a rather large one with coloured bands over its body. The silicon diode (BA) across the resistor of 68k should be soldered directly to the wires of this resistor. This was a last minute change in the circuitry. Be sure to observe the polarity of the diode.



For the first test preset the 1k trimmer potmeter slightly below its centre position. The complete circuit needs just a few mA of power, so it can be fed from the stabilised 12 volts that is built in the NEON/LED driver. Adjust the contrast-input potmeter to get 1,4 volts peak/peak video measured on the video output pin. Then you should have stable line and frame pulses. If this is not the case then adjust the 1k trimmer potentiometer. Photograph on the next page.

Interconnections (next page)
The NEON/LED driver circuit is designed to work together with this sync separator. The two printed circuit boards should be interconnected as shown.



power ++
LED's
(or neon)
BUT 11
power in
+15...20 V
10 k
lin
brightness
clamp
+12 V
ground
diode
select
line
pulse
frame
pulse
ground
78L12
HEF4053
1.8µF
clamp pulse
power ground
power +12 V
HEF 4528
100 nF
100 k
68 k
1 M
CA
3140
4 k7
15 k
6 k8
1 k
330 nF
680 k
8 k2
22µF
33 k
22 k
video 1.4 volt
ground
10 k
lin
contrast
video in
ground

HEF4528BP
616670T
HSS8905P3
CA3140E
RCA 840