Triple waveform generator

The second way to get NBTV signals to drive your monitor is to build an electronic signal generator. This chapter describes a simple circuit that makes three useful waveforms for testing NBTV equipment. This is an ideal project for a beginner to start with, using simple 4000 series CMOS devices that are readily available and inexpensive.

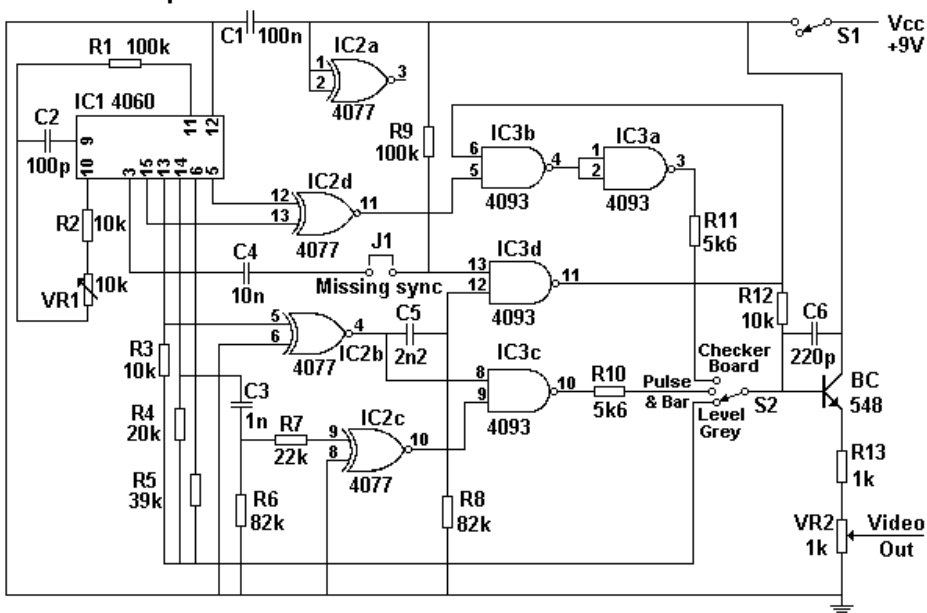
Functions

With just 3 IC's this stand-alone circuit generates 30-line or 32-line NBTV video signals for testing NBTV monitors. The following waveforms are available:

1. a pulse and bar to test for high and low frequency response,
2. an eight level grey scale to check for linearity of response,
3. a checkerboard pattern to act as a test picture and to check disc accuracy.

All waveforms have line sync pulses so that they lock solidly when applied to an oscilloscope. Waveforms and monitor pictures are shown on the next page.

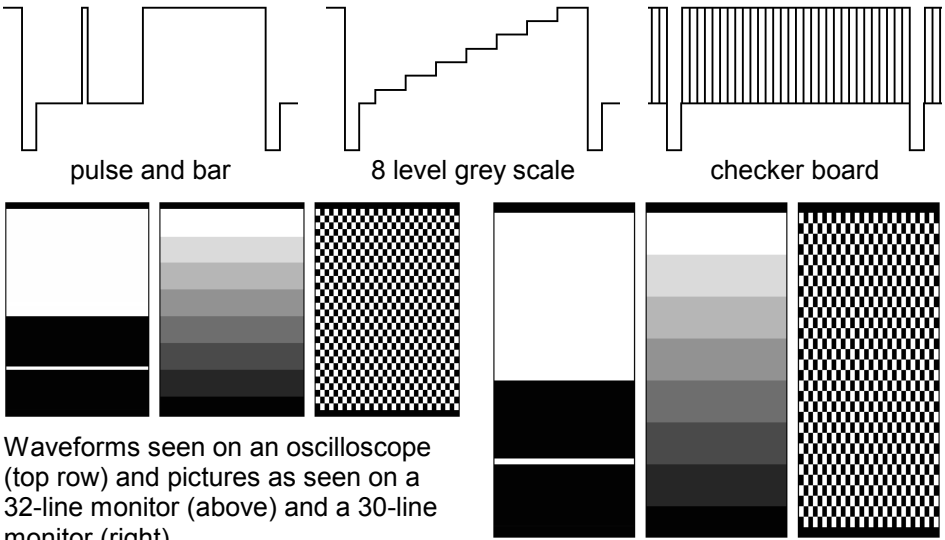
Circuit description



The 4060 is the master oscillator and generator of the raw waveforms. VR1 must be adjusted for the correct line frequency. IC3d together with C5 and R8 generates the 150 μsec wide sync pulses. C3 and R6 define the width of the pulse. The bar and the checkerboard are derived directly from the divider IC1 and R3, R4 and R5 form the A to D converter for the 8 level grey scale. With VR2 the output voltage can be adjusted to 1 volt black to white video.

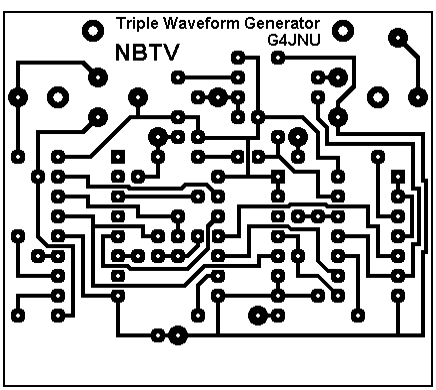
When the jumper J1 is removed uninterrupted line sync pulses are generated. This signal can be used for both 32-line monitors and 30-line Baird Televisors. When the jumper is applied, one in every 32 sync pulses is suppressed.

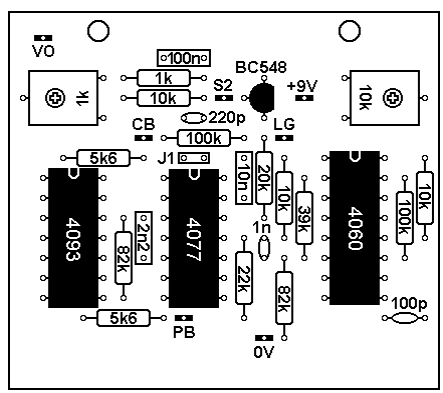
Waveforms and pictures



Waveforms seen on an oscilloscope (top row) and pictures as seen on a 32-line monitor (above) and a 30-line monitor (right).

Printed circuit board





All components can be placed on this small single sided printed circuit board. Use solder eyelets for the wires to the selection switch S2. CB = checker board, PB = pulse and bar, LG = 8 level grey scale. S2 = central contact.
VO = video output, +9V and 0V connected to the battery via on/off switch S1.
Size of the PCB: 55 x 48 mm or $2^{5}/_{32}$" x $1^{7}/_{8}$".

Building the generator

Club sales can provide you with the printed circuit board. This makes building this electronic circuit easier. Use a light soldering iron and thin solder wire and avoid making connecting bridges between the copper tracks.

To adjust the line frequency select the grey level waveform and adjust VR1 for the frequency of the output signal to be 400 Hz for the 32-line system or 375 Hz for the 30-line system.

You may decide to build a handy "one system" generator with a fixed output voltage. Then you may build it in a small enclosure after you have adjusted the controls on the PCB for the optimal setting. The only front panel controls that you need are the on-off switch S1 and the wave form selection switch S2, made of a miniature ON-ON-ON dual pole three position lever switch.

Or you may decide to make a universal generator. Then you want to have VR1, VR2 and J1 as well as front panel controls. This implies a larger panel and thus a larger box. Switch S2 (rotary wafer type) can be extended with a black field (5k6 to ground) and a white field (open input). Ask club sales as well for the cabinets.

The circuit diagram suggests running the generator from a 9 volts battery. The circuit however will run unchanged from voltages from 5 to 15 volts. The current drawn from a 9 volts battery is about 8 mA.

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