



TEKTRONIX®

committed to
technical excellence

TELEVISION PRODUCTS application note 22

SHORTENING THE BLANKING INTERVALS of the TEKTRONIX 140-144-146 NTSC GENERATORS

Recently many broadcasters and production houses have shown new interest in accurate pulse parameters. The concern, primarily, centers around the horizontal (line) and vertical (field) blanking intervals and their tendency to be stretched during signal processing. Since it is not possible to recover program information obliterated when blanking intervals widen beyond tolerances, some originators are shortening these intervals, knowing that sync (blanking) of the correct width can be regenerated prior to airing. This will provide blanking intervals within FCC regulations without significant loss of program information.

The TEKTRONIX 140-144-146 NTSC Test Signal Generators were not provided with adjustable blanking widths, but relatively simple circuit modifications can be installed to shorten either or both blanking

widths. This application note contains detailed instruction on how to modify these generators to provide:

1. Horizontal blanking intervals variable from 10.2 to 10.8 μ s.
2. Vertical blanking intervals shortened to 19 lines.

The modifications described in this application note are easily removable, allowing restoration of the generator to its original parameters, whenever desired. The outside of generators, modified for shortened blanking intervals, should carry some form of prominent identification, to insure that they are not incorrectly determined to be defective.

Added Horizontal Blanking Circuitry

The addition of two one-shot multivibrators makes it possible to adjust the bar timing for the desired duration. These one-shots require a five-volt power supply, making it necessary to construct a small regulated supply also. Both the one-shots and the power supply can be built on one small circuit board. *Figures 1 and 2* show circuits built up on a small circuit board and their schematic diagram. Note from *Figure 1* that the circuits have been constructed on a 2-inch square piece of experimental circuit board, equivalent to Pattern "P" Vectorbord®. Similar material is available at most

electronic hobby stores.

The one-shots are contained in a SN74LS221 dual monostable multivibrator package. A SN74221 may be used instead, if desired.

All other components on the circuit board are readily available. The timing capacitors (330 and 220 pF) are mica. The 13.3 k Ω resistor is a 1%, 1/4 watt; all other resistors are 5%, 1/4 watt. The diodes on the one-shot outputs are silicon signal diodes and do not necessarily need to be IN4152s, as the diagram shows. The zener diode is an IN752 (5.6 volt).

A total of five connections need to be made between the Bar Timing board and the added circuit board. These are the three circuit paths (Bar Preset and the outputs of both one-shots) and source power supply (+10 V and ground). *Figure 3* shows the +10 V and ground leads as heavy wire so that they can be used to support the added circuit board.

Changing the Vertical Blanking

The simple addition of 2 transistors, 2 resistors, a wire, and the disabling of one IC output makes it possible to shorten the vertical (field) blanking interval to 19 lines.

1. Remove U322 from its socket and bend pin 7 so that it will not go back into the socket. Return U322 to its socket.
2. Solder a short piece of insulated wire between the circuit board run at U321 pin 7 and the run at U346 pin 1.
3. Add two 2N3692, or equivalent, transistors and two 1 k ohm 5%, 1/4 watt resistors to the bottom of the Field Timing Circuit Board as follows:
 - a. Connect both collectors to pin 7 of U346A.
 - b. Connect both emitters to board ground.
 - c. Connect the base of one transistor, through a 1 k ohm resistor, to pin 5 of U304.

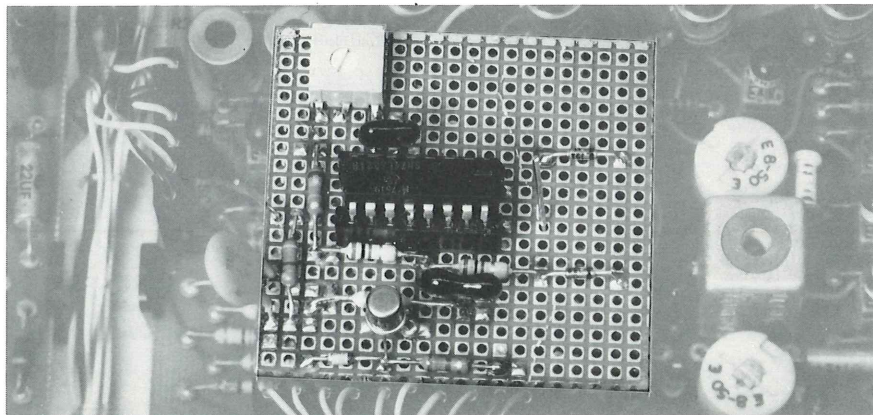


Figure 1. New horizontal blanking interval variable control circuits, shown installed on a circuit board that is mounted on the Bar Timing circuit board.

- d. Connect the base of the other transistor, through a 1 k ohm resistor, to pin 5 of U302.

Calibration

There is no adjustment of field blanking width required; however, blanking width should be checked. Connect the composite video from the generator to a waveform monitor equipped with selectable one-line display (TEKTRONIX 529 or 1480). Insert VITS from the generator on line 19 and display line 19 on the waveform monitor. One field (field 1) should display the entire VITS while the other field (field 2) should display a half line of VITS and a half line of the full field signal.

Line blanking is adjustable between at least 10.2 and 10.8 μ s. To make the

adjustment, an accurately calibrated test scope with a vertical sensitivity of 1 volt per division and delaying sweep is needed.

1. Set Line Blanking Width

Connect the generator's Comp Blanking output to the test scope's vertical input. Use a vertical deflection factor of 1 V/div and a time base of 2 μ sec/div. Adjust triggering for a stable display and position the waveform so that the blanking interval period at 50% amplitude is on the horizontal graticule scale. Adjust the 5 k Ω variable resistor, on the added circuit board, and check the range of adjustment. The range should provide a blanking interval adjustable from 10.2 to

10.8 μ s. If there is insufficient range, change the value of the resistor (shown as 13 k) in series with the variable resistor. A smaller value will widen the range. Set the variable resistor for the desired blanking interval.

2. Adjust Generator Luminance-to-Chrominance Delay

Connect the generator's Comp Video output, through a 75 Ω termination to the test scope's vertical input and follow the generator's Instruction Manual Calibration Procedure for adjusting luminance-to-chrominance delay.

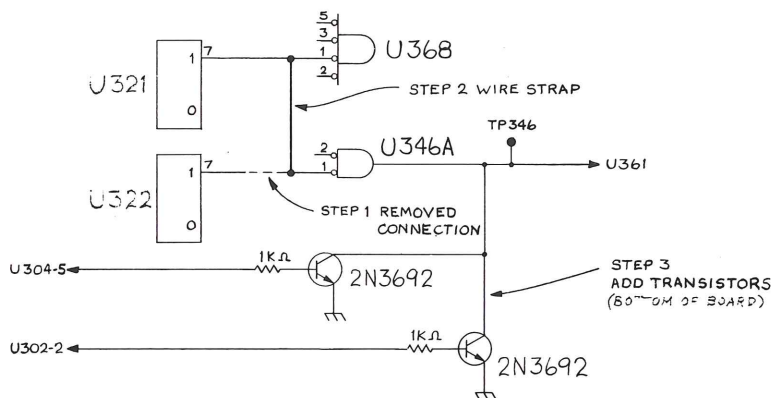
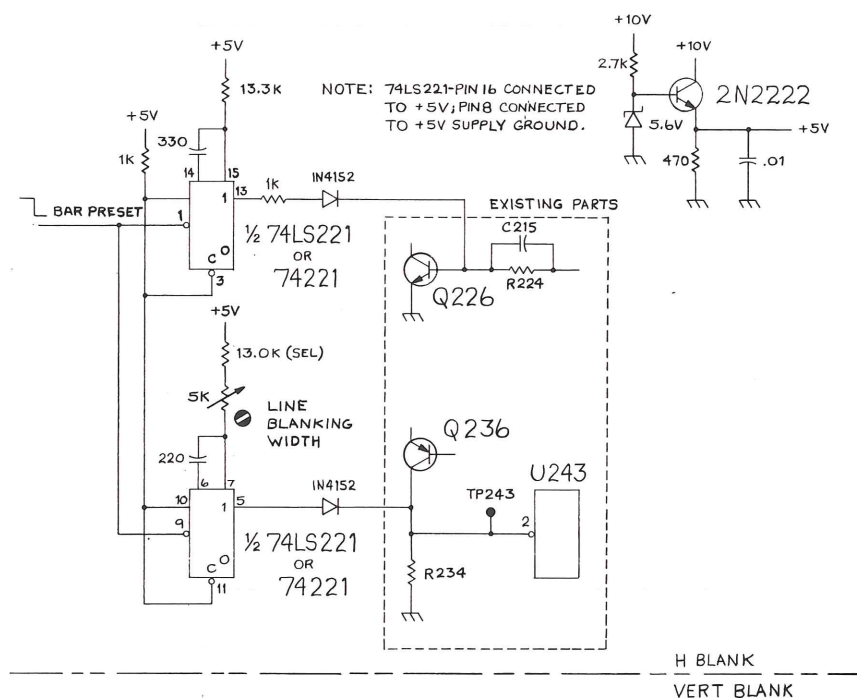


Figure 2. Schematic diagram for the horizontal interval variable control circuits and the changes for the shortened vertical blanking interval.

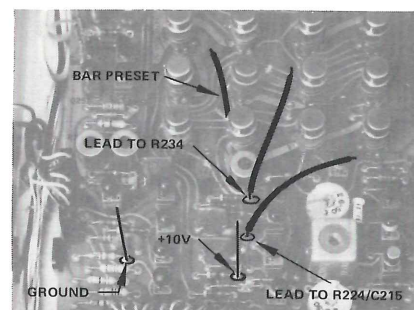


Figure 3. Bar Timing circuit board showing where to connect the wiring for the new horizontal blanking interval variable control circuits.

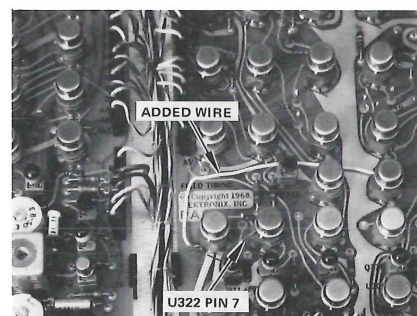


Figure 4. The changes to the top of the Field Timing circuit board.

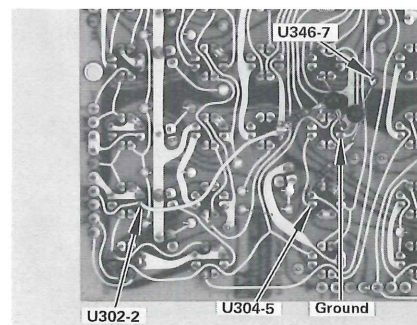


Figure 5. Bottom view of the Field Timing circuit board showing the added transistors and resistors.