

# Instructions

**Tektronix**

**013-0278-XX**  
**Video Display Clamp**  
**070-8762-01**

[www.tektronix.com](http://www.tektronix.com)



070876201

Copyright © Tektronix. All rights reserved. Licensed software products are owned by Tektronix or its subsidiaries or suppliers, and are protected by national copyright laws and international treaty provisions.

Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supercedes that in all previously published material. Specifications and price change privileges reserved.

TEKTRONIX and TEK are registered trademarks of Tektronix, Inc.

## **Contacting Tektronix**

Tektronix, Inc.  
14200 SW Karl Braun Drive  
P.O. Box 500  
Beaverton, OR 97077  
USA

For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit [www.tektronix.com](http://www.tektronix.com) to find contacts in your area.

## Warranty 5

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of three (3) months from the date of shipment. If any such product proves defective during the warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the respective warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.



# Table of Contents

<b>General Safety Summary</b> .....	<b>iii</b>
<b>Environmental Considerations</b> .....	<b>v</b>
<b>The Video Display Clamp</b> .....	<b>1</b>
Product Description .....	1
Features .....	2
Using the Video Display Clamp .....	2
Specifications .....	5
<b>Performance Verification</b> .....	<b>7</b>
General Instructions .....	7
Conventions .....	7
Equipment Required .....	7
Procedures .....	8
Back Porch Correction Check .....	8
Gain Error Check .....	11
Crosstalk and Timing Checks .....	13
Bandwidth Check .....	16
60 Hz Rejection Check .....	17
<b>Maintenance</b> .....	<b>21</b>
Service Information .....	21
Replacing the Contact Pins .....	21

## List of Figures

<b>Figure 1: The video display clamp</b> .....	<b>1</b>
<b>Figure 2: Video waveform disrupted by 60 Hz hum</b> .....	<b>2</b>
<b>Figure 3: Viewing a video signal directly with the video display clamp</b> .....	<b>3</b>
<b>Figure 4: Monitoring a video signal with the video display clamp</b> ..	<b>3</b>
<b>Figure 5: Probing circuits with the video display clamp</b> .....	<b>4</b>
<b>Figure 6: Back porch test setup</b> .....	<b>9</b>
<b>Figure 7: Back porch correction check (negative)</b> .....	<b>10</b>
<b>Figure 8: Back porch correction test (positive)</b> .....	<b>11</b>
<b>Figure 9: Gain error test setup</b> .....	<b>12</b>
<b>Figure 10: Gain check</b> .....	<b>13</b>
<b>Figure 11: Crosstalk test setup</b> .....	<b>14</b>
<b>Figure 12: Measuring interference</b> .....	<b>15</b>
<b>Figure 13: Measuring timing intervals</b> .....	<b>15</b>
<b>Figure 14: Bandwidth test setup</b> .....	<b>16</b>
<b>Figure 15: 60 Hz rejection test setup</b> .....	<b>18</b>
<b>Figure 16: 60 Hz rejection check (negative)</b> .....	<b>19</b>
<b>Figure 17: 60 Hz rejection check (positive)</b> .....	<b>19</b>
<b>Figure 18: Replacing the contact pins</b> .....	<b>21</b>

## List of Tables

<b>Table 1: Warranted Characteristics — Signal Pass Through (Insertion Characteristics)</b> .....	<b>5</b>
<b>Table 2: Warranted Characteristics — Signal Input Impedance (Return Characteristics)</b> .....	<b>5</b>
<b>Table 3: Warranted Characteristics — Video Display Clamp</b> .....	<b>5</b>
<b>Table 4: Warranted Characteristics — Environmental</b> .....	<b>6</b>
<b>Table 5: Typical Characteristics — Video Display Clamp</b> .....	<b>6</b>
<b>Table 6: Nominal Traits — Mechanical</b> .....	<b>6</b>
<b>Table 7: Test Equipment</b> .....	<b>7</b>

# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

*Only qualified personnel should perform service procedures.*

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

## To Avoid Fire or Personal Injury

**Connect and Disconnect Properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source.

**Ground the Product.** This product is indirectly grounded through the grounding conductor of the mainframe power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

**Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

**Do Not Operate Without Covers.** Do not operate this product with covers or panels removed.

**Do Not Operate With Suspected Failures.** If you suspect there is damage to this product, have it inspected by qualified service personnel.

**Avoid Exposed Circuitry.** Do not touch exposed connections and components when power is present.

**Do Not Operate in Wet/Damp Conditions.**

**Do Not Operate in an Explosive Atmosphere.**

**Keep Product Surfaces Clean and Dry.**

**Terms in this Manual**

These terms may appear in this manual:



---

**WARNING.** *Warning statements identify conditions or practices that could result in injury or loss of life.*

---



---

**CAUTION.** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

---

**Symbols and Terms on the Product**

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

The following symbol(s) may appear on the product:





# Environmental Considerations

This section provides information about the environmental impact of the product.

## Product End-of-Life Handling

Observe the following guidelines when recycling an instrument or component:

**Equipment Recycling.** Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



The symbol shown to the left indicates that this product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For information about recycling options, check the Support/Service section of the Tektronix Web site ([www.tektronix.com](http://www.tektronix.com)).

## Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive.



# The Video Display Clamp

## Product Description

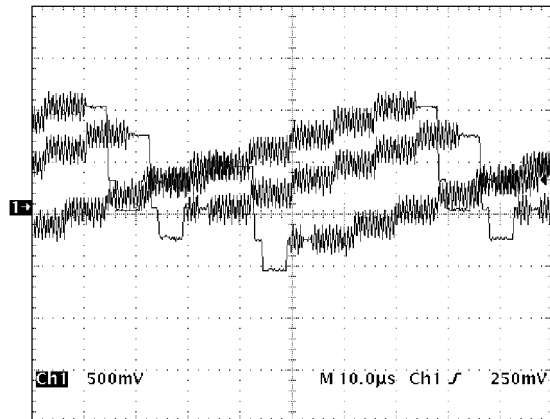
The Tektronix 013-0278-00 Video Display Clamp is an active signal processor designed to increase your ability to monitor video signals.



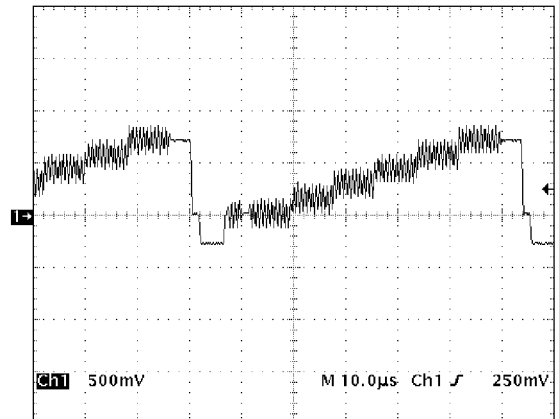
**Figure 1: The video display clamp**

Video signals containing a 60 Hz ripple or a DC offset make it difficult to view the video signal with an oscilloscope. The Video Display Clamp provides a stable signal to the oscilloscope by clamping the back porch of the video signal to ground reference. This does not affect the signal source.

Figure 2 gives an example of how a 60 Hz hum disrupts the capability to view the video signal. Figure 2 also shows the same signal stabilized by using the Video Display Clamp. You can see how this enhances your ability to take measurements of the video signal.



Video Signal Disrupted with 60 Hz Hum



Video Signal Stabilized using the Video Display Clamp

**Figure 2: Video waveform disrupted by 60 Hz hum**

The Video Display Clamp receives its power from the host instrument. The host instrument must have a TEKPROBE™ Level 2 interface (such as the Tektronix TDS400, TDS500, and TDS600 Series Oscilloscopes).

The video display clamp works with most popular signal formats including the following:

- NTSC
- PAL
- HDTV (component and composite)

## Features

Features of the video display clamp (other than setting the back porch to ground reference) include the following items.

**CLAMP FILTER.** When **ON**, the Video Display Clamp ignores the presence of a color burst signal. This helps ensure a ground level for the back porch. The filter does not remove the color burst signal from the video waveform.

**SYNC POLARITY.** Select **+** to match sync pulses having a positive leading edge. Select **-** to match sync pulses having a negative leading edge.

## Using the video display clamp

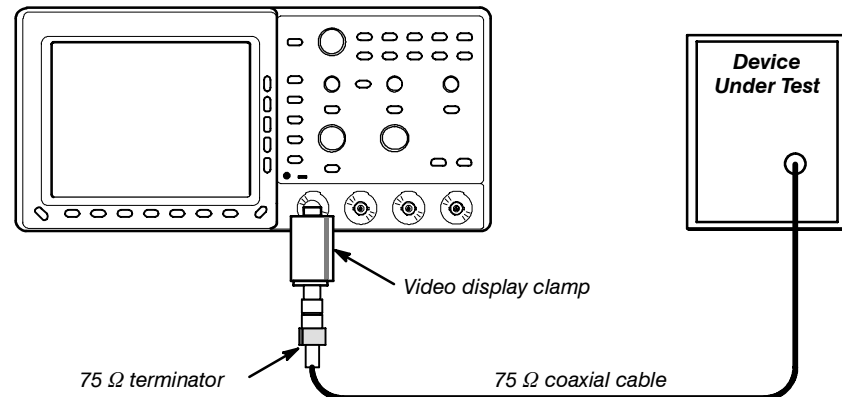
Signals passing through cables often pick up stray 60 Hz hum (from the line voltage) or a small DC offset might be generated by the video equipment. Although these signals may not affect the quality of the information contained in

the signal, it makes it nearly impossible to obtain a viewable display of the video information.

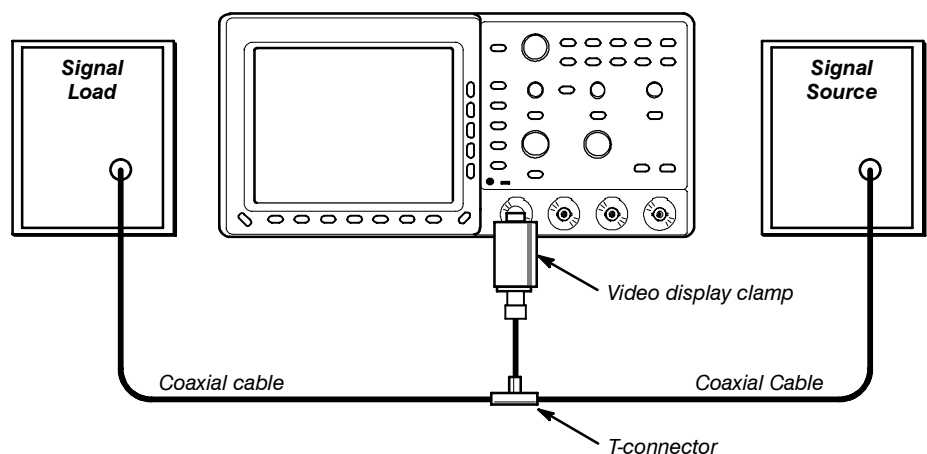
Use the Video Display Clamp to reduce or eliminate this type of interference to view the video signal.

Viewing the video signals can be accomplished with several methods.

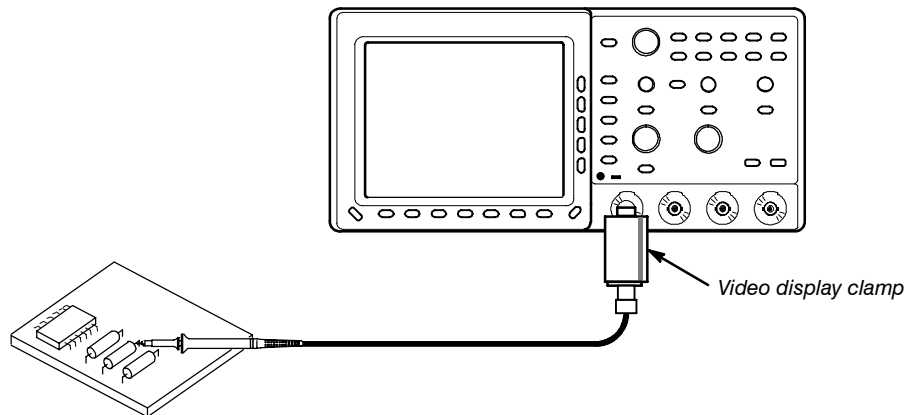
- Connect a video signal directly to the video display clamp (see Figure 3).
- Tap into a video signal line with a T-connector to monitor the signal without causing loading interference to the signal (see Figure 4).
- Connect a 1X probe directly to the video display clamp to probe video circuits (see Figure 5). The bandwidth of the video display clamp may be compromised due to the probes characteristics.



**Figure 3: Viewing a video signal directly with the video display clamp**



**Figure 4: Monitoring a video signal with the video display clamp**



**Figure 5: Probing circuits with the video display clamp**

**Procedure**

Use the following short procedure to install and use the Video Display Clamp. Attaching the video display clamp to an oscilloscope with a TEKPROBE™ Level 2 interface automatically turns on the video display clamp.

---

**STOP.** *The use of this clamp requires that the test oscilloscope has a TEK-PROBE™ Level 2 interface and the vertical input impedance is 1 MΩ.*

---

1. Attach the video display clamp to the input of the oscilloscope and apply the test signal to the input of the video display clamp. See the examples provided in Figures 3 through 5.
2. Set the input impedance of the oscilloscope to 1 MΩ.
3. Set the **SYNC POLARITY** of the video display clamp to match the polarity of the signal source.
  - Set to **-** for video signals with negative sync pulses.
  - Set to **+** for video signals with positive sync pulses.
4. Set the **CLAMP FILTER** of the video display clamp.
  - Set to **OFF** for video signals without a color burst signal.
  - Set to **ON** for video signals with a color burst signal.
5. Set the controls of the test oscilloscope as you normally would to view the signal.

## Specifications

The electrical characteristics found in these tables of warranted characteristics apply when operating at an ambient temperature between 0 °C and +50 °C.

**Table 1: Warranted Characteristics — Signal Pass Through (Insertion Characteristics)**

Name	Description
Bandwidth The bandwidth of the video clamp signal path with the oscilloscope input coupling set to 1 M $\Omega$ and the input of the clamp is terminated into 75 $\Omega$ .	-3 dB at 70 MHz (100 MHz typical), $\pm 1$ dB out to 30 MHz (60 MHz typical)
Gain Error Error does not include the vertical error of the oscilloscope or the error in the terminator.	$\pm 2.5\%$

**Table 2: Warranted Characteristics — Signal Input Impedance (Return Characteristics)**

Name	Description
Input Resistance Only applies when the video display clamp is operating.	$\geq 15$ k $\Omega$

**Table 3: Warranted Characteristics — Video Display Clamp**

Name	Description
60 Hz Rejection Measured with 1 V <sub>p-p</sub> NTSC video signal with 1 V <sub>p-p</sub> 60 Hz interference signal.	21 dB (NTSC or PAL, typical) worst case. Faster speed standards have better rejection.
60 Hz Modulation The maximum amount of 60 Hz interference that the clamp functions under.	1 V <sub>p-p</sub> (NTSC and PAL) 0.5 V <sub>p-p</sub> (HDTV)
Video Input Amplitude	240 mV to 570 mV sync tip height (measured from the top of the sync tip to the back porch).  If the video information does not extend below the back porch, these limits translate to approximately 0.85 V <sub>p-p</sub> to 2 V <sub>p-p</sub> of video signal amplitude.
Back Porch Correction The maximum voltage between the back porch and ground the video clamp can correct.	$\pm 1$ V

**Table 3: Warranted Characteristics — Video Display Clamp (Cont.)**

Name	Description										
Crosstalk The maximum crosstalk interference created on the back porch.	10 mV <sub>p-p</sub>										
Line Rates/Standards The video display clamp works with any bi-level sync pulse standard that has a back porch at least 3 μs long. The clamp works with any tri-level sync pulse standard as long as the sync tip is shorter than 1.8 μs and the back porch is at least 1 μs long.	<table border="0"> <tr> <td>525/59.94/2:1</td> <td>1050/59.94/2:1</td> </tr> <tr> <td>525/59.94/1:1</td> <td>1050/59.94/1:1</td> </tr> <tr> <td>625/50/2:1</td> <td>1250/50/2:1</td> </tr> <tr> <td>625/50/1:1</td> <td>1250/50/1:1</td> </tr> <tr> <td>787/59.94/1:1</td> <td></td> </tr> </table>	525/59.94/2:1	1050/59.94/2:1	525/59.94/1:1	1050/59.94/1:1	625/50/2:1	1250/50/2:1	625/50/1:1	1250/50/1:1	787/59.94/1:1	
525/59.94/2:1	1050/59.94/2:1										
525/59.94/1:1	1050/59.94/1:1										
625/50/2:1	1250/50/2:1										
625/50/1:1	1250/50/1:1										
787/59.94/1:1											
Offset Error The difference between the back porch and ground.	±16 mV Offset error may increase up to 40 mV for certain standards (such as 787/59.94/1:1) due to timing considerations of the vertical interval sync pulses. This increase is resolved by the fourth line.										

**Table 4: Warranted Characteristics — Environmental**

Name	Description
Operating Temperature	0 °C to +50 °C
Nonoperating Temperature	-55 °C to +75 °C
Humidity	90% +5% -0% humidity, 60 °C non-operating, 50 °C operating

**Table 5: Typical Characteristics — Video Display Clamp**

Name	Description
Maximum Input Voltage The maximum input voltage allowed for proper operation.	±3 V

**Table 6: Nominal Traits — Mechanical**

Name	Description
Weight	500 grams



# Performance Verification

This *Performance Verification* subsection confirms the performance of the 013-0278-00 Video Display Clamp to its warranted specifications.

## General Instructions

These *General Instructions* describe the conventions used in the test procedures and provides a list of the required test equipment.

### Conventions

The procedures in this section provide the following information:

- Title of test
- Equipment required (if applicable)
- Procedure

The procedures check all the characteristics designated as checked in the *Specifications* subsection. (The checked characteristics appear in **boldface** type.)

### Equipment Required

These procedures use external, traceable signal sources to directly check warranted characteristics. Table 7 lists the required test equipment.

**Table 7: Test Equipment**

Item Number and Description	Minimum Requirements	Example	Purpose
1. Oscilloscope	TEKPROBE™ Level 2 interface, 100 MHz bandwidth	Tektronix TDS460	Signal display
2. Cable, Precision Coaxial	50 $\Omega$ , 36 in, male to male BNC connectors	Tektronix part number 012-0482-00	Signal interconnection
3. Termination, 50 $\Omega$	Impedance 50 $\Omega$ ; connectors: female BNC input, male BNC output	Tektronix part number 011-0049-01	Signal interconnection
4. Attenuator, 2.5X	Ratio: 2.5X; impedance 50 $\Omega$ ; connectors: female BNC input, male BNC output	Tektronix part number 011-0076-02	Signal attenuation
5. Coupler, Dual-input (two required)	Female BNC to dual male BNC	Tektronix part number 067-0525-02	Signal interconnection
6. Generator, Leveled Sine Wave	30 MHz; Variable amplitude from 5 mV to 4 V <sub>p-p</sub> into 50 $\Omega$ .	TEKTRONIX SG503 Leveled Sine Wave Generator <sup>1</sup>	Bandwidth check

**Table 7: Test Equipment (Cont.)**

Item Number and Description	Minimum Requirements	Example	Purpose
7. Generator, Leveled Sine Wave	60 Hz; Variable amplitude from 5 mV to 4 V <sub>p-p</sub> into 50 Ω	TEKTRONIX SG502 Leveled Sine Wave Generator <sup>1</sup>	60 Hz rejection check
8. Generator, Pulse	0 to 3 V, 15 kHz pulses with independent controls of the top and bottom pulse levels; Variable pulse duration and pulse period; Normal output and its complement	TEKTRONIX PG502 Pulse Generator <sup>1</sup>	Back porch correction and gain accuracy checks

<sup>1</sup> Requires a TM500 or TM5000 Series Power Module Mainframe.

## Procedures

These procedures check the characteristics of the Video Display Clamp listed as checked under *Warranted Characteristics* in the *Specifications* section.

### Back Porch Correction Check

These procedures check those characteristics that relate to the back porch correction capability of the Video Display Clamp listed as checked under *Warranted Characteristics* in the *Specifications* section.

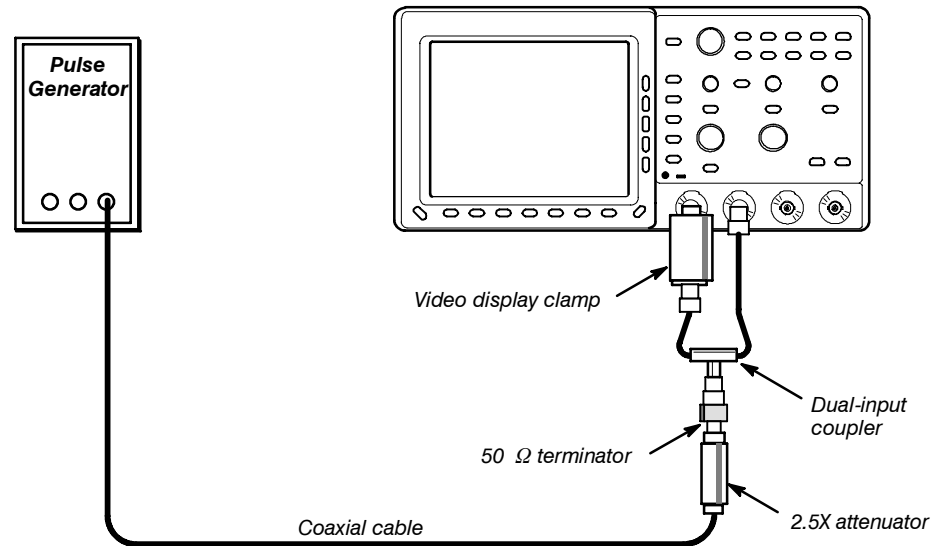
**Equipment Required:** One test oscilloscope (Item 1), one pulse generator (Item 8), one 2.5X attenuator (Item 4), one 50 Ω terminator (Item 3), one dual-input coupler (Item 5), and one precision coaxial cable (Item 2).

- Set the test oscilloscope as follows:
  - Set the sec/div scale to 10 μs
  - Set the channel 1 volts/div scale to 100 mV, DC coupled
  - Set the channel 2 volts/div scale to 500 mV, DC coupled
  - Position both channel 1 and 2 traces to center screen
  - Display channel 2 (channel 1 off)
- Connect the output of the pulse generator to the test oscilloscope as shown in Figure 6.

---

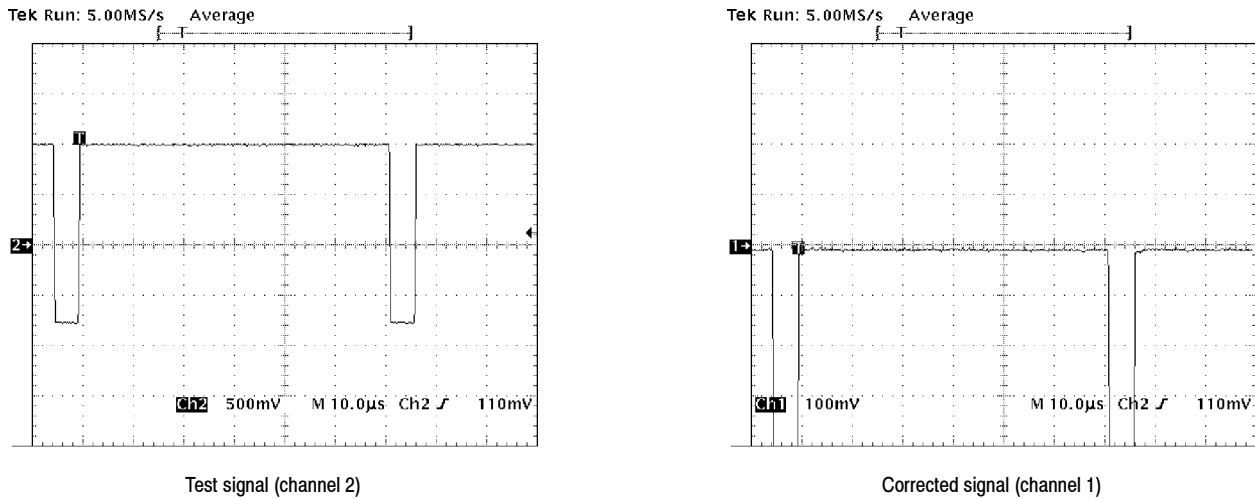
**NOTE.** This test setup provides a display of the test signal on channel 2 and a clamped test signal on channel 1.

---



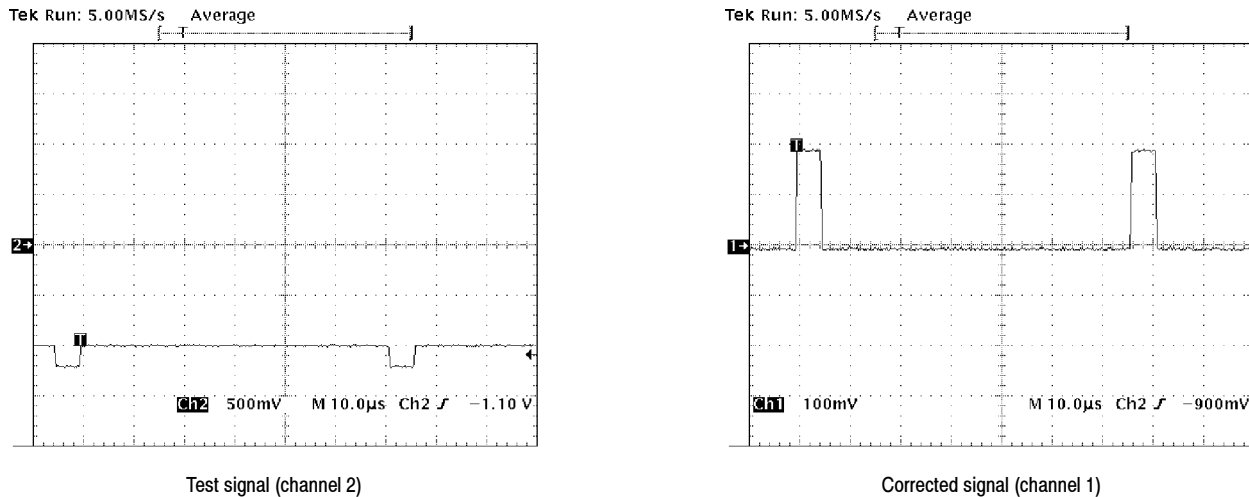
**Figure 6: Back porch test setup**

3. Set the pulse generator as follows (viewed with channel 2):
  - Set the compliment to -
  - Adjust the period to 15 kHz
  - Adjust the pulse duration to 5  $\mu$ s
  - Set the high level to 1.0 volts
  - Set the low level to 0.75 volts
4. Set the Video Display Clamp as follows:
  - **Polarity** to - (negative)
  - **Filter** to **Off**
5. Set the test oscilloscope to display channel 1 (channel 2 off).
6. Verify that the positive portion of the pulse is within  $\pm 14$  mV of the ground reference (see Figure 7).



**Figure 7: Back porch correction check (negative)**

7. Set the test oscilloscope to display channel 2 (channel 1 off).
8. Set the pulse generator as follows:
  - Set the high level to -0.8 volts
  - Set the low level to -1.0 volts
  - Set the compliment to +
9. Set the Video Display Clamp **Polarity** to + (positive).
10. Set the test oscilloscope to display channel 1 (channel 2 off).
11. Verify that the negative portion of the pulse is within  $\pm 14$  mV of the ground reference (see Figure 8).



**Figure 8: Back porch correction test (positive)**

### Gain Error Check

These procedures check those characteristics that relate to the gain error of the Video Display Clamp listed as checked under *Warranted Characteristics* in the *Specifications* section.

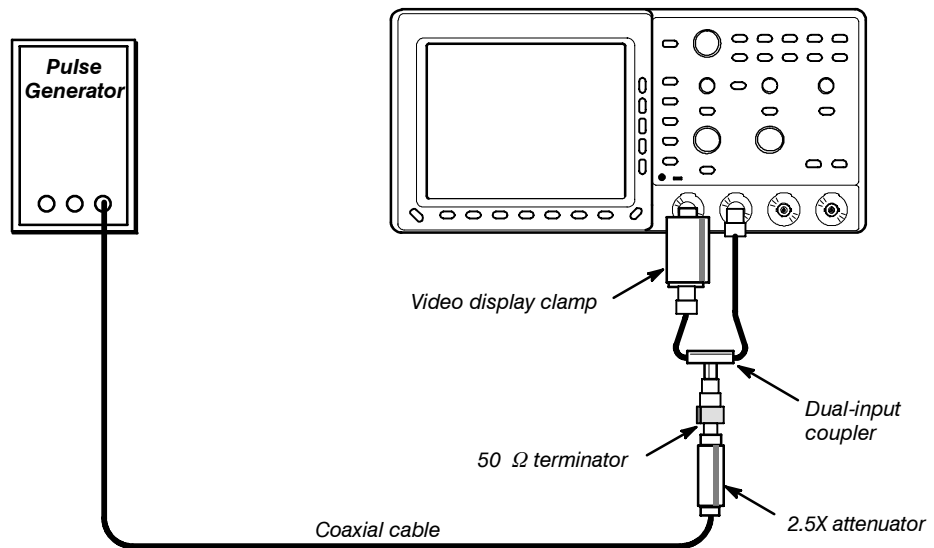
**Equipment Required:** One test oscilloscope (Item 1), one pulse generator (Item 8), one precision coaxial cable (Item 2), one 2.5X attenuator (Item 4), one 50  $\Omega$  terminator (Item 3), and one dual-input coupler (Item 5).

1. Set the test oscilloscope as follows:
  - Set the sec/div scale to 10  $\mu$ s
  - Set the channel 1 volts/div scale to 200 mV, DC coupled
  - Set the channel 2 volts/div scale to 500 mV, DC coupled
  - Position both channel 1 and 2 traces to center screen
  - Display channel 2 (channel 1 off)
2. Connect the output of the pulse generator to the test oscilloscope as shown in Figure 9.

---

**NOTE.** This test setup provides a display of the test signal on channel 2 and a clamped test signal on channel 1.

---



**Figure 9: Gain error test setup**

3. Set the pulse generator as follows:
  - Set the compliment to -
  - Adjust the period to 15 kHz
  - Adjust the pulse duration to 5  $\mu$ s
  - Set the high level to 500 mV
  - Set the low level to -500 mV
4. Set the Video Display Clamp as follows:
  - **Polarity** to - (negative)
  - **Filter** to **Off**
5. Set the test oscilloscope to display channel 1 (channel 2 off).
6. Vertically position the channel 1 display to view the entire signal.
7. Verify that the pulse amplitude is between 975 mV<sub>p-p</sub> and 1.025 V<sub>p-p</sub> (see Figure 10).

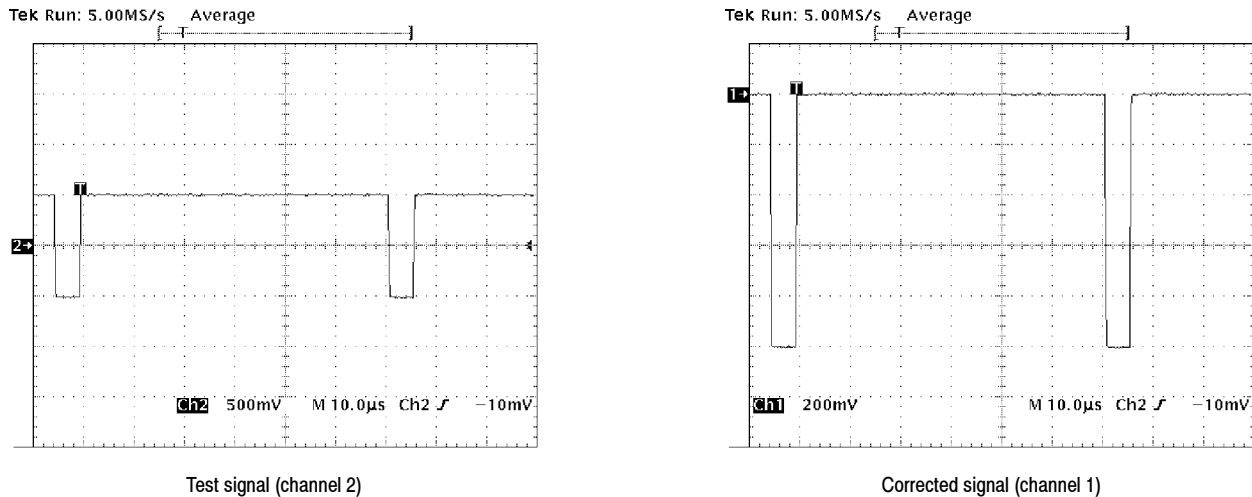


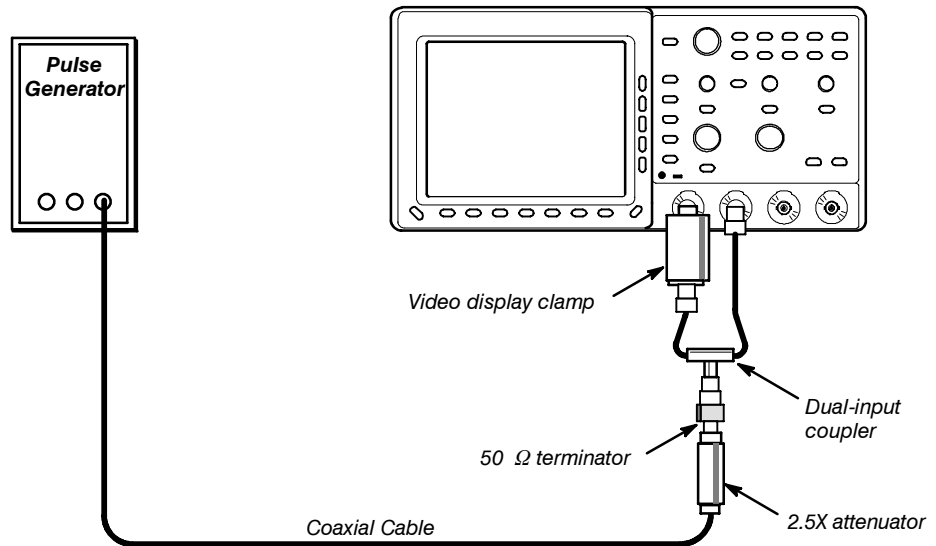
Figure 10: Gain check

### Crosstalk and Timing Checks

These procedures check those characteristics that relate to crosstalk interference and timing of the Video Display Clamp listed as checked under *Warranted Characteristics* in the *Specifications* section.

**Equipment Required:** One test oscilloscope (Item 1), one pulse generator (Item 8), one precision coaxial cable (Item 2), one 2.5X attenuator (Item 4), and one 50  $\Omega$  terminator (Item 3), and one dual-input coupler (Item 5).

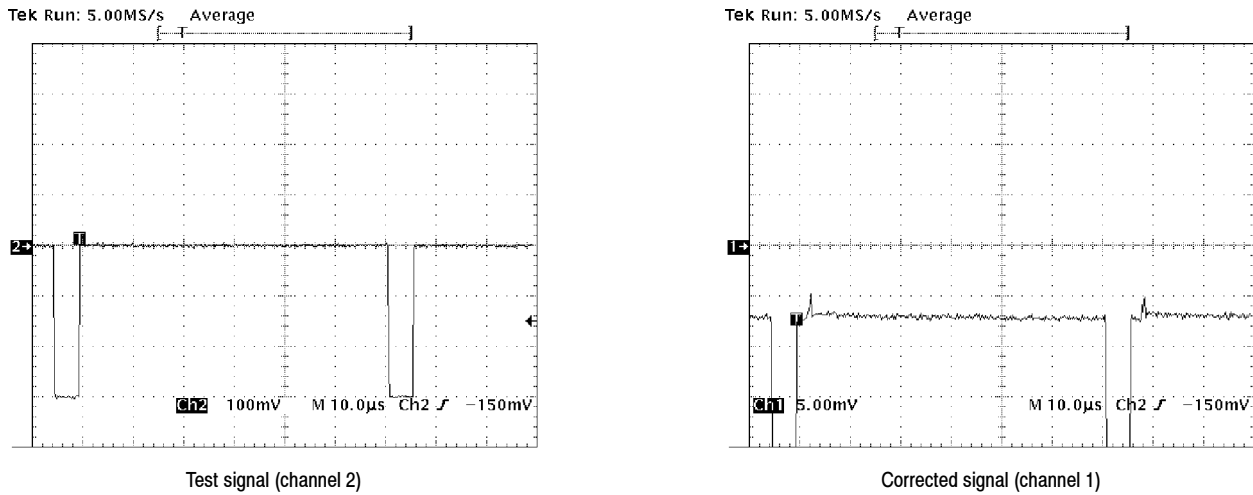
1. Set the test oscilloscope as follows:
  - Set the sec/div scale to 10  $\mu$ s
  - Set the channel 1 volts/div scale to 5 mV, DC coupled
  - Set the channel 2 volts/div scale to 100 mV, DC coupled
  - Position both channel 1 and channel 2 traces to center screen
  - Display channel 2 (channel 1 off)
2. Connect the output of the pulse generator to the test oscilloscope as shown in Figure 11.



**Figure 11: Crosstalk test setup**

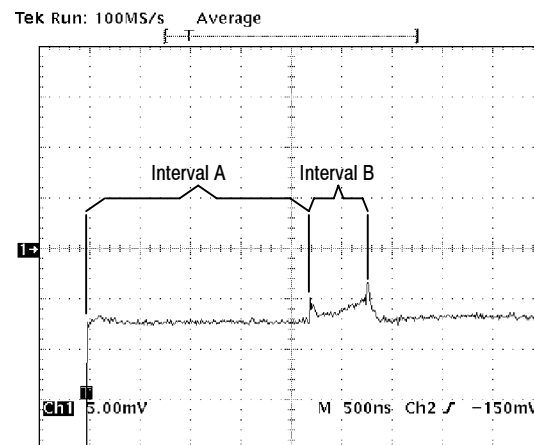
3. Set the pulse generator as follows:
  - Set the compliment to -
  - Adjust the period to 15 kHz
  - Adjust the pulse duration to 5  $\mu$ s
  - Set the high level to 0 V
  - Set the low level to -300 mV
4. Set the Video Display Clamp as follows:
  - **Polarity** to - (negative)
  - **Filter** to **Off**
5. Set the test oscilloscope to display channel 1 (channel 2 off).
6. Verify that any interference on the high level of the pulse is <math><10\text{ mV}\_{\text{p-p}}</math> (see Figure 12).





**Figure 12: Measuring interference**

7. Switch the Video Display Clamp **Polarity** to + (positive) then back to - (negative).
8. Verify that the pulse display returns to its original position within  $\pm 1$  mV.
9. Set the test oscilloscope sec/div scale to 500 ns.
10. Using Figure 13 as a reference, measure the time intervals marked A and B.
  - Verify that interval A is between 2.08 µs and 2.28 µs.
  - Verify that interval B is between 600 ns and 700 ns.



**Figure 13: Measuring timing intervals**

### Bandwidth Check

These procedures check those characteristics that relate to the bandwidth of the Video Display Clamp listed as checked under *Warranted Characteristics* in the *Specifications* section.

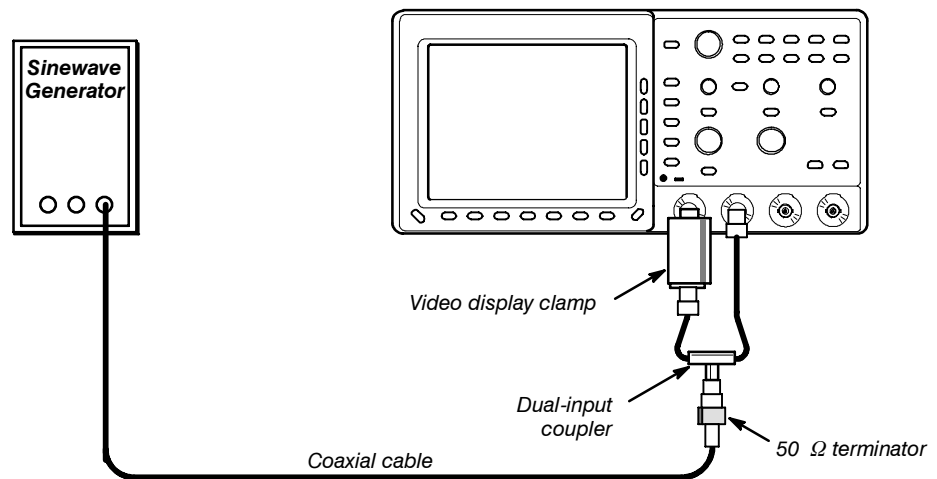
**Equipment Required:** One sinewave generator (Item 6), one precision coaxial cable (Item 2), one 50  $\Omega$  terminator (Item 3), and one dual-input coupler (Item 5).

1. Set the test oscilloscope as follows:
  - Set the sec/div scale to 10 ns
  - Set the channel 1 and channel 2 volts/div scales to 200 mV, AC coupled
  - Position both the channel 1 and channel 2 traces to center screen
  - Display channel 2 (channel 1 off)
2. Connect the output of the sinewave generator to the test oscilloscope as shown in Figure 14.

---

**NOTE.** This test setup provides a display of the test signal on channel 2 and a clamped test signal on channel 1.

---



**Figure 14: Bandwidth test setup**

3. Set the sinewave generator as follows:
  - Adjust the frequency to 30 MHz
  - Adjust the amplitude for a 1 V<sub>p-p</sub> display.

4. Set the Video Display Clamp as follows:
  - **Polarity** to - (negative)
  - **Filter** to **Off**
5. Set the test oscilloscope to display channel 1 (channel 2 off).
6. Verify that the signal display amplitude is greater than  $892 \text{ mV}_{\text{p-p}}$ .

### 60 Hz Rejection Check

These procedures check those characteristics that relate to the 60 Hz rejection capability of the Video Display Clamp listed as checked under *Warranted Characteristics* in the *Specifications* section.

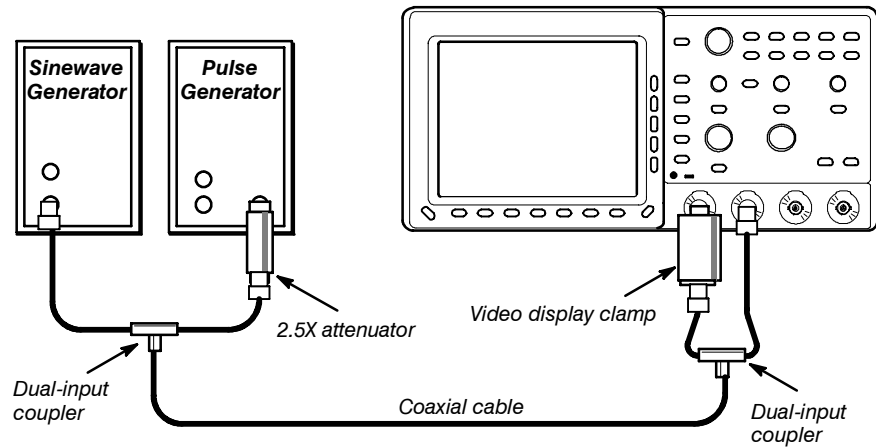
**Equipment Required:** One test oscilloscope (Item 1), one pulse generator (Item 8), one sinewave generator (Item 7), one 2.5X attenuator (Item 4), two dual-input couplers (Item 5), and one precision coaxial cable (Item 2).

1. Set the test oscilloscope as follows:
  - Set the sec/div scale to  $10 \mu\text{s}$
  - Set both channel 1 and channel 2 volts/div scales to 200 mV, DC coupled.
  - Position both channel 1 and 2 traces to center screen
  - Display channel 2 (channel 1 off)
2. Connect the output of the pulse generator and the sinewave generator to the test oscilloscope as shown in Figure 15.

---

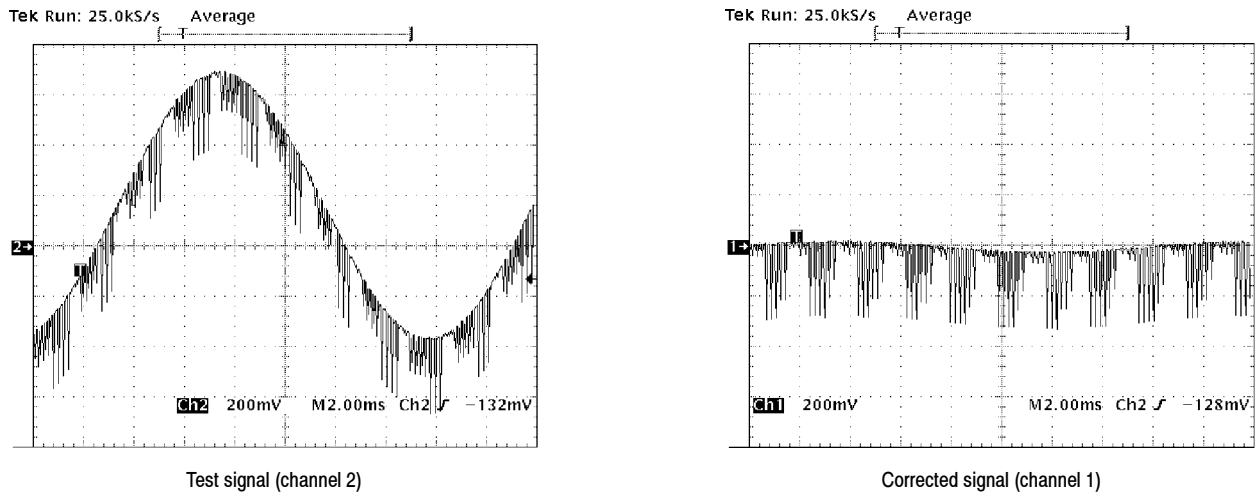
**NOTE.** *This test setup provides a display of the test signal on channel 2 and a clamped test signal on channel 1.*

---



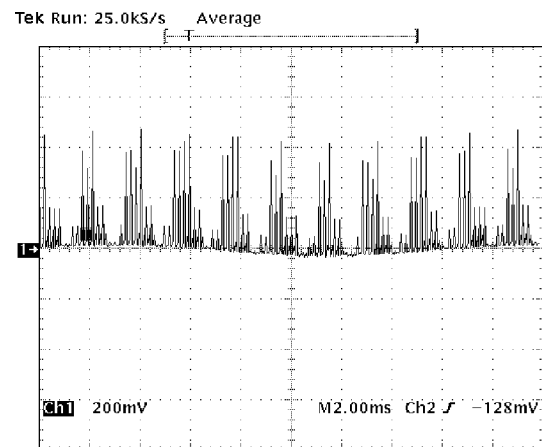
**Figure 15: 60 Hz rejection test setup**

3. Set the Video Display Clamp as follows:
  - **Polarity** to - (negative)
  - **Filter** to **Off**
4. Set the sinewave generator as follows:
  - Set the frequency to 60 Hz
  - Adjust the amplitude to 0 V
5. Set the pulse generator as follows:
  - Set the compliment to -
  - Adjust the period to 15 kHz
  - Adjust the pulse duration to 5  $\mu$ s
  - Set the high level to 150 mV
  - Set the low level to -420 mV
6. Set the test oscilloscope sec/div to 2 ms.
7. Set the sinewave generator amplitude to create a 1 V<sub>p-p</sub> display of the 60 Hz sinewave.
8. Set the test oscilloscope to display channel 1 (channel 2 off).
9. Verify that the amplitude of the 60 Hz sinewave component of the waveform is  $\leq 70$  mV<sub>p-p</sub> (see Figure 16).



**Figure 16: 60 Hz rejection check (negative)**

10. Set the compliment of the pulse generator to +.
11. Set the Video Display Clamp **Polarity** to + (positive).
12. Verify that the amplitude of the 60 Hz sinewave component of the waveform is  $\leq 70$  mV<sub>p-p</sub> (see Figure 17).



**Figure 17: 60 Hz rejection check (positive)**



# Maintenance

This subsection provides you with the service information for the Video Display Clamp.

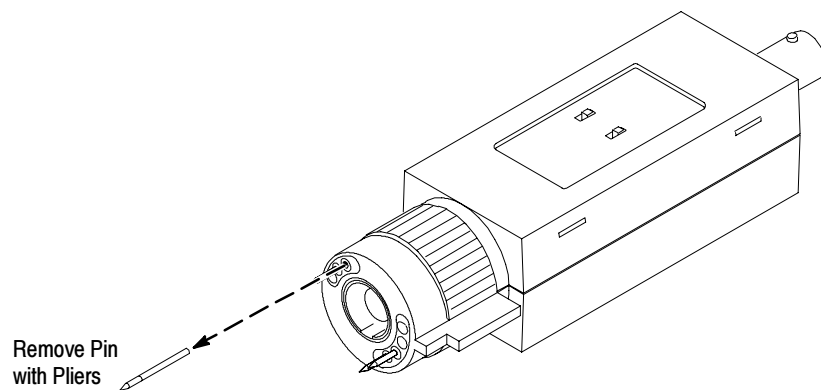
## Service Information

There are no user serviceable parts inside the case of the Video Display Clamp. The TEKPROBE™ interface contact pins are the only replaceable part of the Video Display Clamp.

### Replacing the Contact Pins

If the contact pins become damaged, obtain replacement pins through your nearest Tektronix Field Office or representative. Use the following procedure to replace a damaged contact pin.

1. Using a pair of needle-nosed pliers, grasp the damaged pin and pull the pin straight out of the assembly (see Figure 18). Note the location of the removed pin.
2. Using the needle-nosed pliers, grasp the replacement pin and carefully insert the pin into the assembly. Use care to avoid crushing or bending the new pin during installation.
3. Verify that the new pin is installed to the same depth as the other pins.



**Figure 18: Replacing the contact pins**

