

DPOACQSYNC Dual Oscilloscope Synchronization Kit Instructions



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Instructions

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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.

Connect and disconnect properly. Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement instrument.

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.

The inputs are not rated for connection to mains or Category II, III, or IV circuits.

Connect the probe reference lead to earth ground only.

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 that 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:



CAUTION
Refer to Manual



WARNING
High Voltage



Double
Insulated



Protective Ground
(Earth) Terminal



Earth Terminal



Standby



Do not connect to or
remove from an
uninsulated conductor that
is HAZARDOUS LIVE.

Preface

This manual describes connecting, deskewing, and synchronizing 2 instruments to get 4 channels sampling at 100 GS/s.

Documentation

| To read about | Use these documents * |
|---|---|
| Connecting, deskewing, and synchronizing 2 instruments to get 4 channels sampling at 100 GS/s | Read this Instruction Manual. |
| In-depth instrument operation, user interface help, GPIB commands | Access the online help from the Help menu on the host instrument. |

* To access the documentation that is installed on your instrument, click **Start** in the taskbar and select **All Programs > TekApplications**.

Introduction

Tektronix DPO/DSA/MSO7000C/D instruments above 12 GHz in bandwidth provide 50 GS/s sampling rate on each of 4 channels simultaneously, or 100 GS/s sampling rate on 2 channels in interleaved mode. With interleaved operation you can use two instruments, synchronized together, to get 4 channels sampling at 100 GS/s. The DPOACQSYNC kit provides the hardware needed to connect two DPO7000C/D Series Oscilloscopes for synchronous acquisition. In addition, using the Dual Oscilloscope Synchronization software provides automatic setup and removal of channel to channel skew on all 4 channels with one push of a button.

There are several ways to configure a two-instrument system for synchronized acquisition, with varying levels of alignment accuracy. This manual describes the most precise method to align acquisitions between two instruments.

Synchronization Methods

Channel sample synchronization (alignment of time related events across two instruments) consists of three elements: channel skew, acquisition sample alignment, and trigger alignment. Deskew adjustment of individual channels addresses the channel skew. Sample alignment is attained using a common reference clock for both oscilloscopes. Trigger alignment is achieved by carefully applying the same trigger signal to each oscilloscope by a matched-length path. Sample and Trigger alignment are both subject to random jitter that is difficult to remove from the acquisition. Using the techniques described in this manual, you can keep the effects of random jitter to a minimum.

Synchronization

To facilitate using 2 instruments to achieve 4 channels at 100 GS/s, Tektronix DPO/DSA7000D and DPO/DSA/MSO7000C models include enhancements to the system clock to provide tight timing synchronization between the two instruments. In interleave mode, using a 10 MHz external reference clock, the enhanced system clock provides acquisition sampling that is synchronized to ± 500 fs RMS for single acquisitions from minimum acquisition time to 10 μ s, across two instruments. The synchronization is maintained to ≤ 2 ps RMS from 100 μ s up to the maximum acquisition time of the instruments (increases somewhat linearly between 10 μ s and 10 ms, and then levels off at approximately 2 ps).

Deskew

The synchronized start of acquisition (triggering) of two instruments is affected by two aspects of operation.

First, it is necessary to deskew the channels. Coarse synchronization of the triggering events is attained by physically matching path lengths from the trigger source (the external trigger signal) using matched cable lengths and a power divider. Fine control of synchronization is achieved using the automated deskew function in the Tektronix Dual Scope Synchronization application or the deskew feature for each of the instrument channels. The channels on a single instrument are deskewed to each other. In addition, the two instruments are deskewed to remove minor differences in propagation through their trigger path and input channels. Deskew can be adjusted in 1 ps increments, with the ability to apply a maximum deskew of ± 75 ns to each channel.

Trigger synchronization is also affected by trigger jitter in each system. The trigger jitter is dependent on the minor differences in the trigger path between the two oscilloscopes. In addition, the slew rate of the trigger signal will affect the trigger jitter. The recommended trigger signal for both oscilloscopes in this manual is an output of the fast edge source board.

Preliminary setup considerations

Recommended equipment

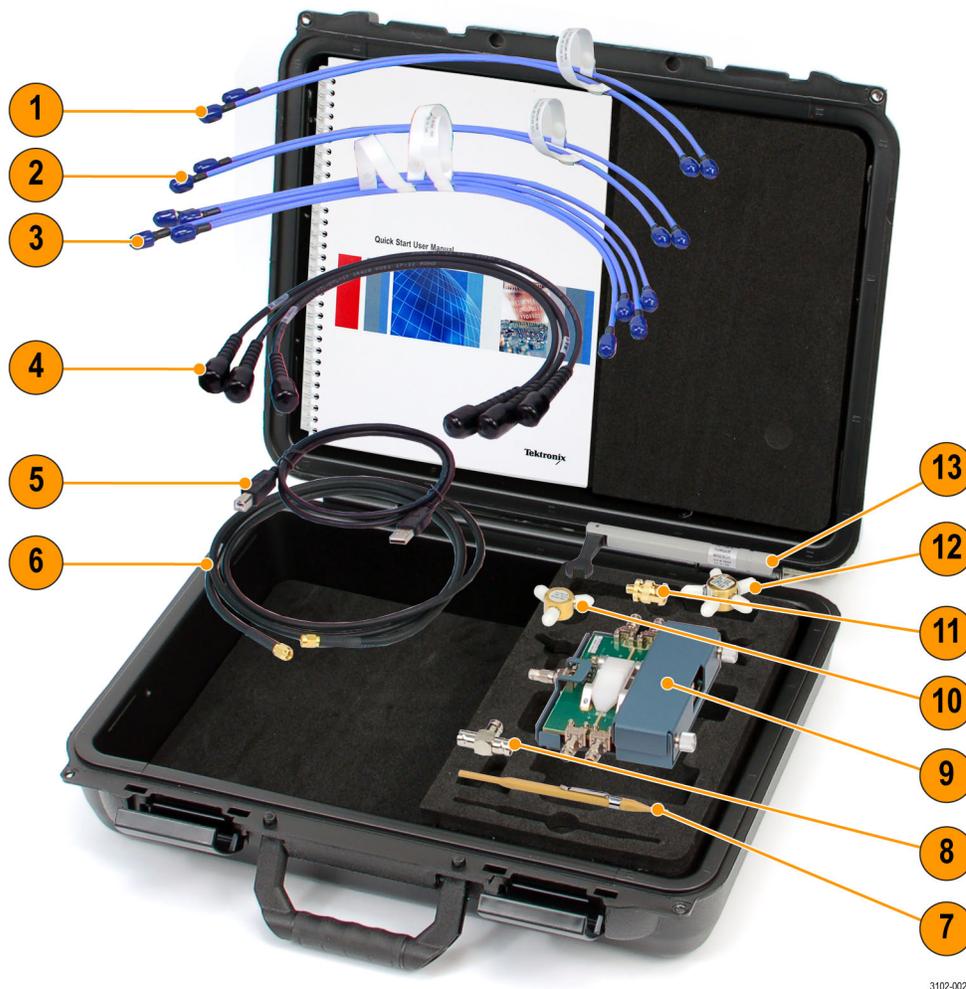
The DPOACQSYNC kit provides all the hardware needed to support using two DPO70000 series oscilloscopes with synchronized acquisitions. With this kit, you can acquire 4 channels at up to 33 GHz bandwidth and 100 GS/s to capture extremely fast signals. The kit accessories provide precise alignment between acquisitions on two DPO/DSA/MSO70000 oscilloscopes. Using the kit hardware and the kit procedure, you can achieve oscilloscope to oscilloscope skew of 2 ps RMS. As part of this kit multiple matched length cables are provided. In addition, a fast edge source for aligning the acquisitions is included.

The DPOACQSYNC board receives power from a USB slot and has 1 coax input and 4 coax outputs. The coax input requires a square wave between -2.0 V to +5.0 V. The board produces 2 differential outputs that are 1 V peak to peak. The input frequency can be up to 1 MHz. The output signals are used to synchronize two oscilloscopes.

The following list shows the equipment included in the DPOACQSYNC kit.

Table 1: DPOACQSYNC Kit contents

| Accessory | Quantity | Part number | Description |
|-----------|----------|-------------|--|
| 1 | 1 | 174-6213-00 | Pair of unmatched 2.92 mm coaxial cables (12 inch, 30 cm) |
| 2 | 2 | 174-6211-00 | Pair of delay matched (1 ps) 2.92 mm coaxial cables (12 inch, 30 cm) |
| 3 | 1 | 174-6212-00 | Delay matched (1 ps) 2.92 mm coaxial cables (12 inch, 30 cm) |
| 4 | 3 | 012-0076-00 | BNC cable (20 inch, 51 cm) |
| 5 | 1 | 174-4401-00 | USB A to B cable |
| 6 | 1 | 174-6025-00 | SMA cable (72 inch, 183 cm) |
| 7 | 1 | 003-1890-00 | Adjustment tool |
| 8 | 1 | 103-0469-00 | BNC T adapter |
| 9 | 1 | 650-5659-00 | Fast edge source |
| | 5 | 321-8010-00 | 2.92 mm terminators, 50 Ohm (shown with fast edge source) |
| 10 | 1 | 174-6215-00 | 2:1 SMA power divider |
| 11 | 1 | 015-0572-00 | SMA female to BNC male adapter |
| 12 | 1 | 174-6214-00 | 4:1 SMA power divider |
| 13 | 1 | 003-1929-00 | SMA torque wrench, 8 inch pound |
| | 1 | 016-2060-00 | Case, hard, DPOACQSYNC |



3102-002

Figure 1: Kit accessories

Calibrate the signal path (SPC)

Use the following procedure to compensate the internal signal acquisition path. Perform this procedure if the ambient temperature has changed more than 5 °C (9 °F) since you performed the last signal path compensation. Perform the signal path compensation once a week. Failure to do so may result in the instrument not meeting warranted performance levels.

1. Power on and wait for the instrument to complete its warm up period before continuing with this procedure.
2. Disconnect any signals (cables) you have attached to the input channels.
3. If the Tekscope user interface (UI) is in Buttons mode, set the instrument UI to Menu mode.
4. Select **Instrument Calibration** from the Utilities menu.

5. Note any instructions that appear under Calibration Instructions in the control window.
6. Click **Calibrate** to begin the procedure. The procedure will take several minutes to complete.

External trigger

Optimal trigger jitter performance is attained by using one of the analog channels as a trigger source. When using 100 GS/s sampling, you can use one of the disabled channels (for example CH2 and CH4 when using CH1 and CH3 as the data inputs) as a trigger source without disturbing the 100 GS/s operation. You can use any of the PinPoint trigger features in this configuration.

Connector torque

To ensure the best signal fidelity, all connectors should be tightened to 8 inch lbs using the DPOACQSYNC torque wrench.

Fast edge source (deskew fixture)

This illustration identifies the controls, connectors, and indicators on the fast edge source included in the DPOACQSYNC kit. The fast edge source can also be used as a probe deskew fixture. See Appendix A for more details on the use of this fixture.

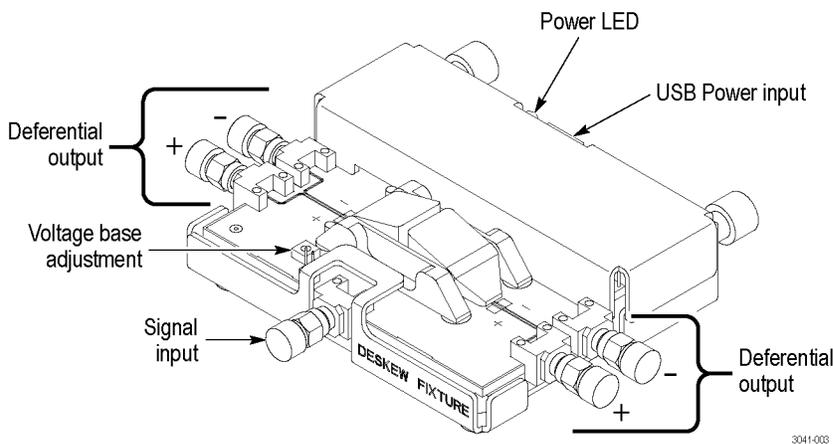


Figure 2: Deskew fixture controls, connectors, and indicators

Equipment setup

Parent and child instrument connections

In the setup and subsequent procedure that follows, the terms parent and child are used to differentiate between the instrument that is the reference for acquisition alignment (the parent), and the instrument that receives the alignment reference (the child). The instruments used in synchronization are linked through the use of an external trigger source, and a common reference source.

External trigger source

The analog channels are used as the source for the oscilloscope trigger; using the analog channels provides the least trigger jitter, ensuring that the signals are tightly aligned in time. The output of the fast edge source is used as the synchronized trigger source. The output of the fast edge source is split and connected to the Channel 2 input of both the parent and child instruments.

External reference clock source

To minimize any differences that may exist between the sampling clocks of the two instruments, the external reference clock of the parent is fed to the child instrument. The **REF OUT** is connected to the **REF IN** of the child instrument. Select the High (Tracking) option in the external reference menu of the child instrument.

NOTE. *You must perform signal path compensation whenever you change the reference clock setting.*

Deskew procedure

Deskewing the two instruments ensures that synchronization of ≤ 2 ps RMS is attained between channels on both instruments. Instruments are aligned to a common point in time (the trigger source of the parent instrument) by applying a small time offset (as needed, typically a few picoseconds) to each channel of the parent and child instruments, so that the acquisitions are more closely aligned in time than they would be if we just used the hardware setup alone. The deskew procedure is necessary as part of a full synchronization operation, and should be performed if your setup has changed in any way.

Connection procedure

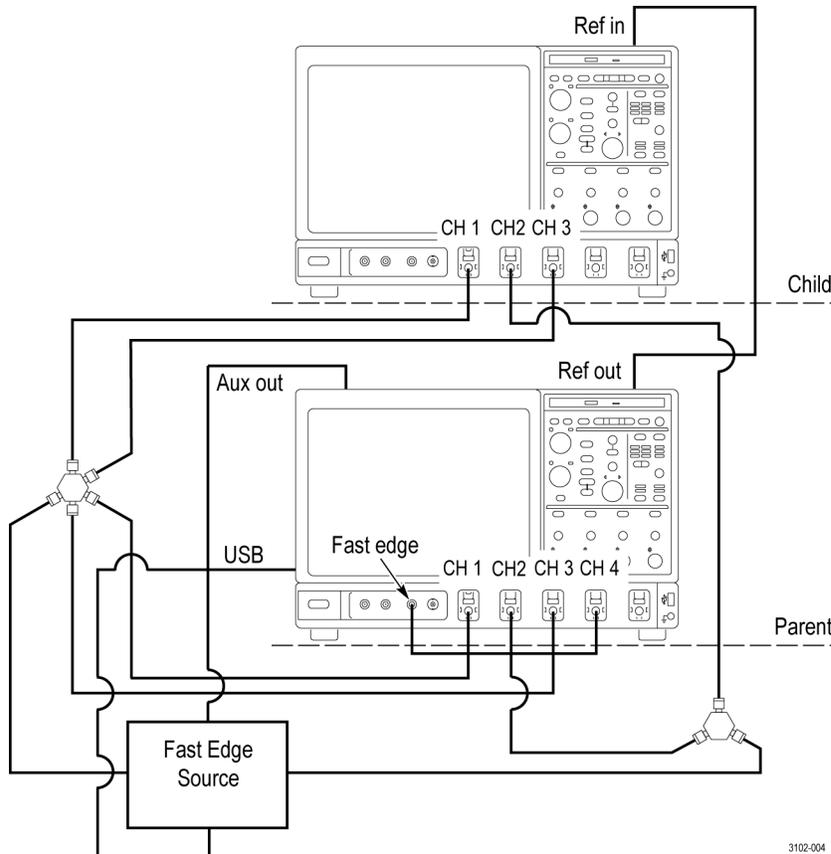


Figure 3: Connections for deskewing the instruments

1. Using the set of four 12 inch (30 cm) matched SMA cables, connect one cable to **CH1** of the parent, and connect the other end to an open port on your 4-way power divider. Use one of the other open cables in this set to connect from **CH3** on the parent, to an open port on the 4-way divider.
2. Connect one of the remaining unattached cables of the set of four 12 inch matched SMA cables to CH1 of the child, and the other end to an open port on your 4-way power divider. The remaining cable in this set of four will connect from CH3 on the child, to an open port on the 4-way divider

3. Using the pair of 12 inch (30 cm) matched SMA cables, connect one cable to CH2 of the parent, and the other end to an open port of your 2-way power divider. The other cable in this pair will connect from CH2 on the child, to an open port of the 2-way divider.
4. Using one cable of the pair of 12 inch (30 cm) unmatched SMA cables, connect the last open port on your 2-way divider to one of the negative outputs on the fast edge source/deskew fixture.
5. Connect the remaining cable of the pair of 12 inch unmatched SMA cables to the last open port on your 4-way power divider and attach the other end to the second negative output on the fast edge source/deskew fixture.
6. Connect an external trigger signal to CH4 of the parent. If no external trigger source is available, the FAST EDGE output from the front of the parent can be connected to CH4 for deskew operations.
7. Attach one end of your 20 inch (51 cm) BNC cable to the REF OUT on the parent, and the opposite end of the cable to the REF IN on the child.
8. Attach the SMA-BNC adapter to AUX OUT of the parent; connect one end of the 60 inch (152 cm) SMA cable to the adapter, and connect the opposite end of cable to the trigger input on the front of the fast edge source power input.
9. Connect the USB cable to any open USB type A port on the parent, and the type B connector to the fast edge source.

Refer to the figure (See Figure 3 on page 6.) to see how the equipment is connected.

After completion of the connection procedure, perform the deskew procedure. There are two possible deskew procedures, one automated, the other manual.

Deskew procedure (automated)

1. If your oscilloscopes are not already connected to a network, connect them to each other using an Ethernet cable.
2. Open the Dual Scope Synchronization application located at Start > All Programs > Tektronix.
3. In the Instrument Connections section (See Figure 4.) of the Configure tab, enter the IP addresses for both the parent and the child into the text boxes on the left side of the application window.

NOTE. *The oscilloscope that you are running the application on becomes the parent. The application will connect through the Virtual GPIB connection to the oscilloscope software on the parent.*

To easily get the IP addresses of the instruments, you can hover-over the LAN Server Control icon in the system tray (See Figure 5.) and see the current IP address of the oscilloscope as assigned by the network.

4. Press **Connect**. The oscilloscopes should report back with identity information in the console readout at the bottom of the application.

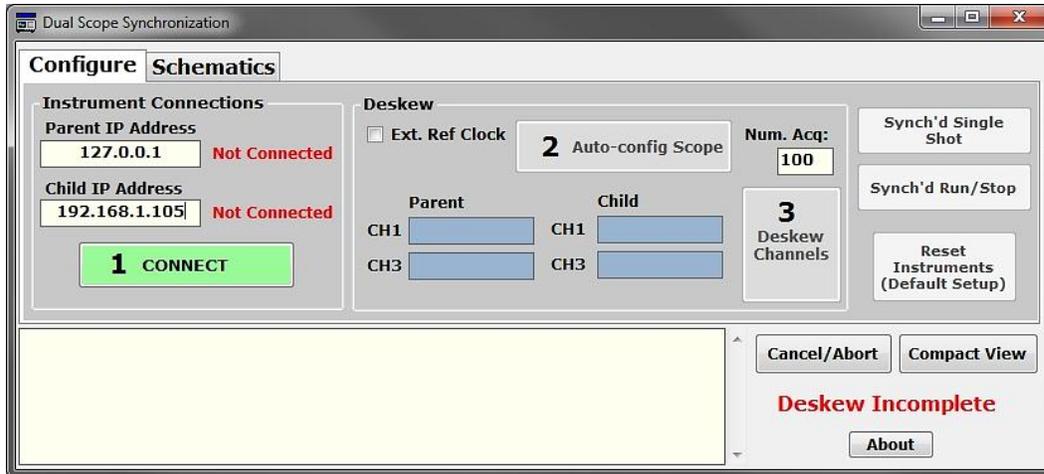


Figure 4: Configure tab view upon initial application startup

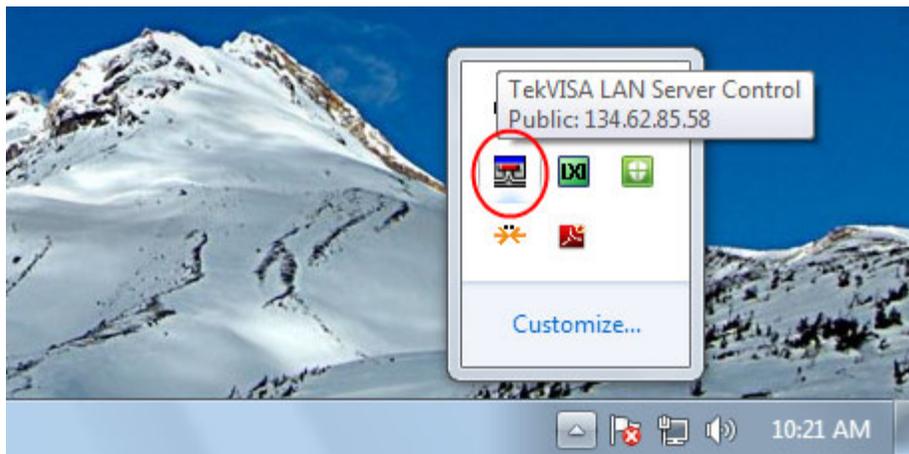


Figure 5: Easily find the IP address of the oscilloscope from the LAN Server Control icon in the system tray

5. The source of the oscilloscopes external reference clocks is configurable in this application using the **Ext. Ref Clock** check box. This check box lets you decide whether the oscilloscope is configured so that:
 - The parent external reference out is connected to the child external reference in (check box unchecked, default condition)
 - Both the parent and child oscilloscopes are receiving a reference clock from an external source that is split and connected to the reference in on both oscilloscopes (check box checked)
6. Once the oscilloscopes are connected, press the **Auto-Config Scope** button to set up the instruments for the automated deskew routine.
 - The auto-config routine will set up the oscilloscopes with instrument settings based on the Deskew configuration shown in the Schematics tab (See Figure 6.).
 - When this setup is complete, you will see an Autoscale Complete message in the console window at the bottom of the application.

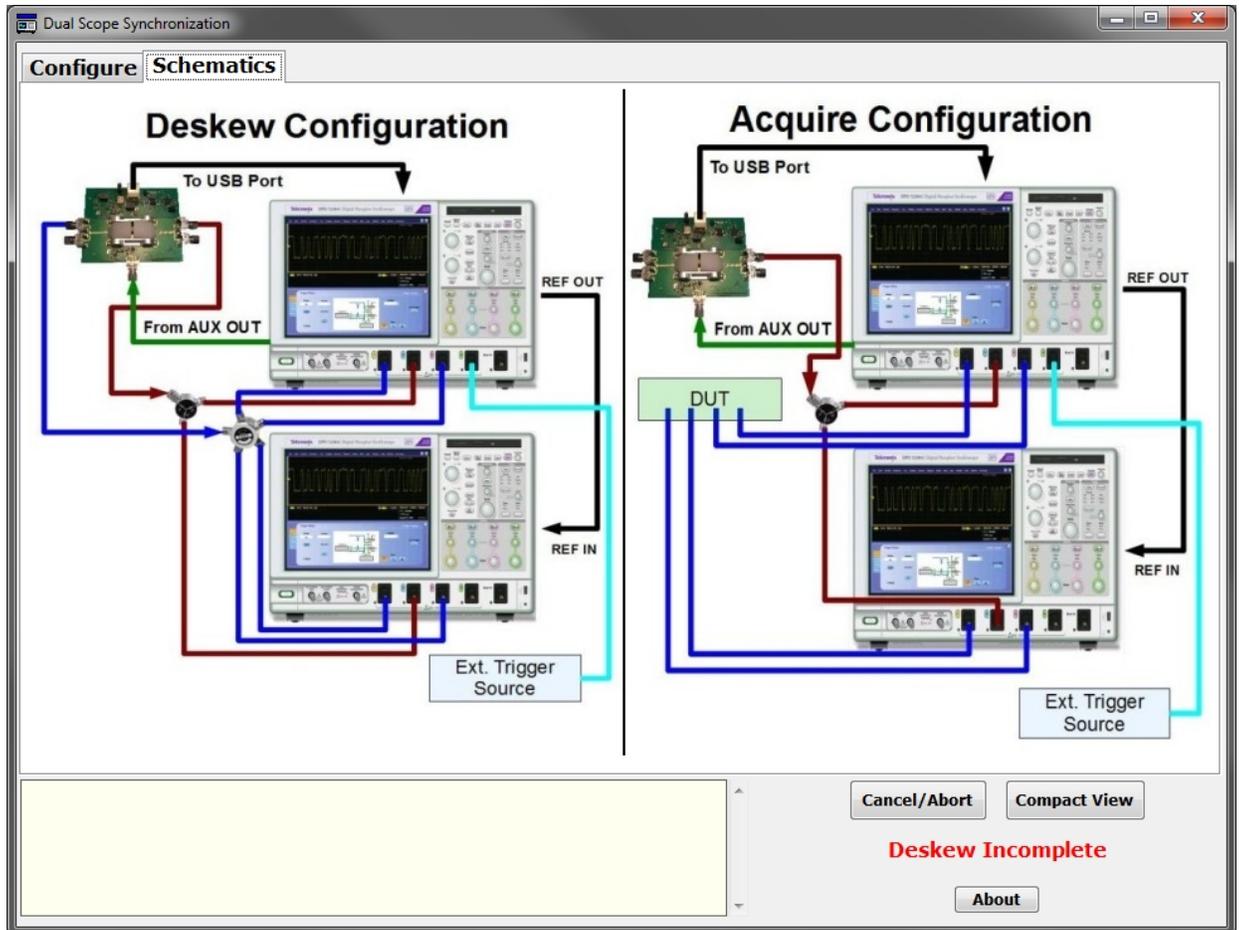


Figure 6: Schematics tab, showing instrument connections for Deskew and Acquire operations

7. When the automated configuration completes, run the deskew routine.
 - The Num. Acq text box allows you to control how many acquisitions are taken. These acquisitions are used as a statistical basis for the deskew values that are applied to the parent and child inputs.
 - The recommended minimum for Num. Acq is 100. Note: Tests have shown, negligible improvement with a setting beyond 200 acquisitions.
 - Pressing the **Deskew Channels** button starts the deskew operation.
8. During the deskew operation, you will see a message displayed on both instruments indicating the progress of the operation.
9. When deskew completes, you will see the Deskew Incomplete message, in the lower right-hand side of the application, change to Deskew Complete.

After deskew is applied to the system, you can disconnect the 4-way divider from the system, and apply your data signals to the oscilloscopes as shown in the Acquire Configuration under the Schematics tab.

Using the Dual Scope Synchronization software for instrument operation after deskew

Adjust the vertical and horizontal scaling on the instruments as needed, within the following guidelines:

- The sample rate of the instruments must not be changed after the deskew operation has been performed.
- To control the acquisition state of both instruments, you only need to use the parent front panel.
- The child unit is left in Run mode, and will respond to the parent Run/Stop and Single buttons.

The Dual Scope Synchronization application has a minimized interface that allows you to better see the oscilloscope graticule, and still perform most of the main functions available in the program. Pressing the **Compact View** button in the main window will minimize the application (See Figure 7.). Pressing the **Restore** button returns the application to the original (default) size.



Figure 7: Minimized application window

Deskew procedure (manual)

If the Dual Scope Synchronization application is not used, the channels on the two synchronized oscilloscopes can also be deskewed manually. The steps listed in this section guide you through the manual deskew process.

Configure the following oscilloscope settings:

1. Set Vertical Scale of CH1 and CH3 on both the parent and child to 20 mV/div.
 - Go into the Vertical menu, and select **Vertical Setup**.
 - Select the **CH1** tab and use the Scale control to change the scale of CH1 to **20 mV**.
 - Adjust the Position to **4 div** using the position selection just above the scale setting.
 - Repeat these steps for CH3 on the parent, and for CH1 and CH3 on the child.
2. Set scale of CH2 on parent and child to **40mV/div**.
 - Go into the Vertical menu, and select **Vertical Setup**.
 - Select the **CH2** tab and use the Scale control to change the scale of CH2 to **40 mV**.
 - Adjust the Position to **4 div** using the position selection just above the scale setting.
 - Repeat for CH2 on the child.
3. Set 100 GS/s sampling rate on the parent and the child.
 - Go into the Horiz/Acq menu, and select **Horizontal/Acquisition Setup**.
 - Set Horizontal Mode to manual.
 - Set Sample Rate to 100 GS/s.
 - Repeat for the child.

4. Setup the A Trigger on the parent.
 - Go into Trig>A Event (Main) Trigger Setup. and select the **A Event** tab
 - Select **Edge** from the Trigger Type pull-down.
 - Select **CH4** in the Source pull-down, and press the **Set to 50%** button.
5. In the A>B Seq tab, you select the **Trig on nth Event** button, and then set the B Event field value to **1**.
6. Setup the B Trigger on the parent.
 - Turn on **CH2**
 - Go to the tab labeled B Event and select Edge for the Trigger Type, and CH2 for the source. Adjust B Event trigger level to mid-point of the signal present on CH2, which should be approximately -60 mV. Turn off CH2.
7. Select the **Options** tab and ensure the **Normal** button is active under the Trigger Mode heading. Uncheck **Enhanced Triggering** from the section labeled Trigger Position. Now, select the Holdoff **Time** button, adjusting the Trig. Holdoff field to **50 ms**.
8. Set the child instrument to trigger on an single A Event trigger with **CH2** as the source.
9. Set up the A Trigger on the child to trigger on **CH2**, by going into Trig>A Event (Main) Trigger Setup, and in the A Event tab select Trigger Type **Edge**.
10. Now select **CH2** in the Source pull-down, and set the trigger level to **-160 mV**.
11. Select the **Options** tab and ensure **Normal** button is active under the Trigger Mode heading, then uncheck Trigger Position **Enhanced Triggering**.
12. Configure the child to accept an external reference.
 - Select **Utilities** from the top menu, then **External Signals**.
 - Choose **External** for the reference source.
 - Set PLL Loop Bandwidth setting to **High (Tracking)**.
13. Configure AUX OUT on the parent oscilloscope.
 - Select **Utilities** from the top menu, then **External Signals**.
 - Set the AUX OUT to **A Trig**.
 - Set polarity to **Neg**.
14. Turn on **Zoom** for both parent and child.
 - In the Horiz/Acq menu, select **Zoom Controls** and then select the **Display** button.
 - Adjust the horizontal position of the zoom window to **50%** (middle of acquisition).
 - Set the zoom factor to **100**.
15. Turn on **Infinite Persistence** for the parent and the child.
 - Go into the Display menu and select Display Setup.
 - In the Appearance tab, select Persistence **Variable**.
 - Under the Intensity section of the Appearance tab, adjust the Record View value to **35-40%**.
 - In the Colors tab, set the Record View Palette to **Temp**.

Apply deskew to channels

Adjust the deskew for both parent and child:

- In the Vertical menu, select **Deskew** from the menu listing.
- In the window that pops up, select **CH1** and adjust deskew until you reach the point where the center of the persisted waveform trace is lined up with the horizontal trigger position; this is indicated by the orange triangle at the top edge of the waveform display area.
- Apply deskew for CH3 on the parent, and CH1 and CH3 on the child in the same way as you did for CH1 of the parent.

Acquisition procedure

This procedure assumes you have just completed the deskew procedure.

Connection procedure

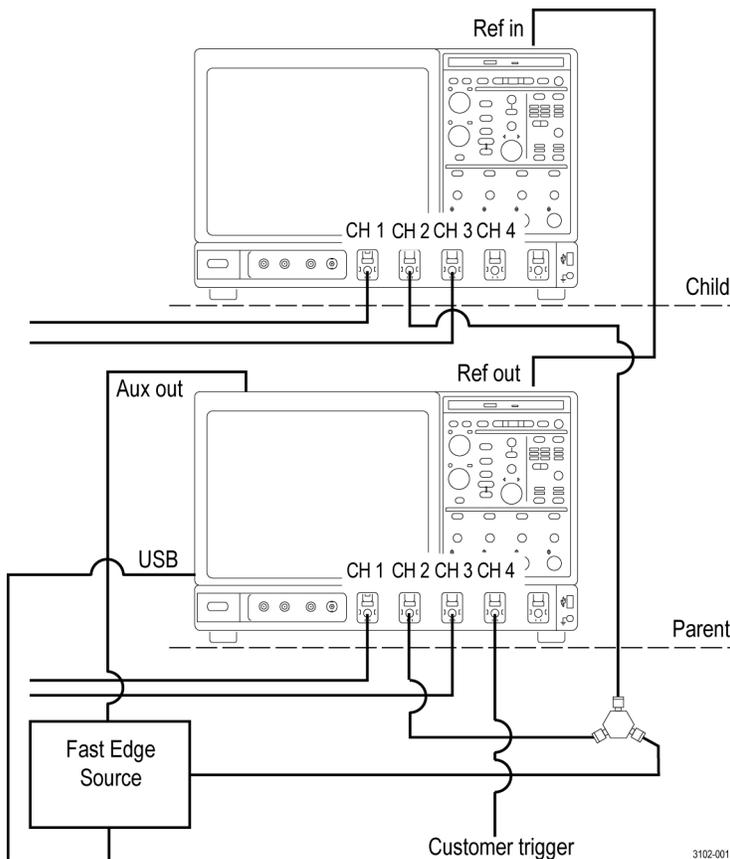


Figure 8: Connections to acquire waveforms

1. Remove the 12 inch (30 cm) SMA cable that goes from the negative output of the fast edge source to the four-way SMA power divider.
2. Disconnect the two pairs of 12 inch matched delay SMA cables from the four-way divider. Use these four cables to connect to the signals to be acquired.
3. Disconnect the cable on the FAST EDGE output of the parent instrument. Connect the open end of the cable to your trigger signal.

Refer to the figure (See Figure 8.) to see how the equipment is connected.

After completion of the connection procedure, you're ready to acquire your signals.

Conclusion

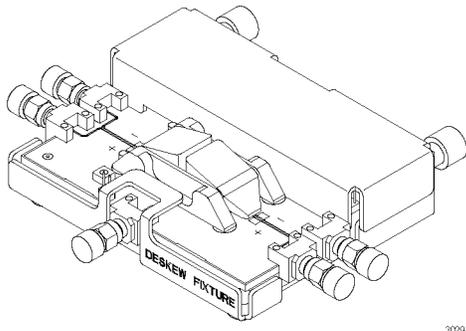
Once you complete the actions discussed in this document, you have two instruments that are synchronized in time, to within ≤ 2 ps RMS between instrument channels on the two instruments.

Appendix A

067-2431-xx Deskew Fixture

Product description

The fast edge source can also be used as a probe deskew fixture. When used as a probe deskew fixture, it provides an edge source to time-align (deskew) signals at the inputs of P7600 Series probes. It allows you to deskew the probes when you are using P76CA-xxx probe adapters with coax cables or the P76TA solder tip adapter with P7500 Series TriMode Probe solder tips.



The edge signal input voltage is adjustable to accommodate different logic levels, and is provided by the oscilloscope FAST EDGE output or by an external source. The edge signal input voltage must be between -2 and $+5$ volts, with a 1 ns or faster rise time.

Internal circuitry conditions the input signal to between -1.5 and $+4$ volts, with a rise time of 40 ps. The fixture is powered by one of the USB ports of the oscilloscope.

Connectors on the fixture accept the coax adapters and solder tips that are available for the P7600 series probes.

NOTE. You cannot deskew probes with coax connectors to probes with solder tips; only coax-to-coax or tip-to-tip probes can be deskewed together.



CAUTION. The deskew fixture is ESD sensitive. To avoid damaging the fixture, only use it at an antistatic workstation and observe proper ESD practices.

Overview

For best performance, you should do the DC Calibration procedure before performing the Deskew procedure. Refer to your probe manual for detailed instructions for performing the DC Probe Calibration Procedure.

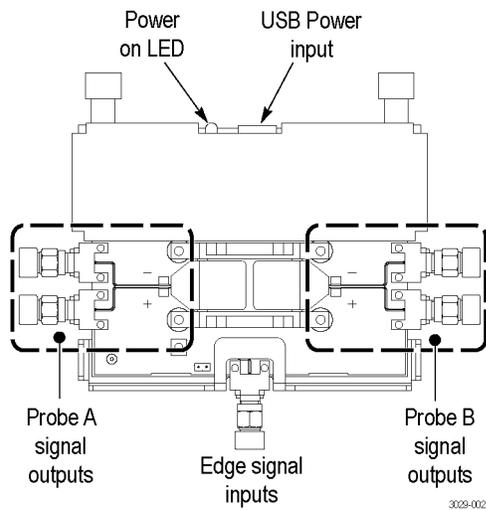
You should also check the calibration status of the probes that you intend to use prior to performing the deskew procedure. Use the procedure below.

Check the Calibration Status.

1. Select Probe Cal... from the Vertical menu.
2. Select the channel to which the probe is attached and then check the Probe Status readout. This readout can show one of the following values:
 - Initialized. The probe has not been calibrated on the selected channel; perform the DC probe calibration procedure.
 - Compensated. The probe has been calibrated on the selected channel.
 - Fail. The probe has not been calibrated; repeat the procedure.

If the test continues to fail, troubleshoot the problem; do not continue with the deskew procedure.

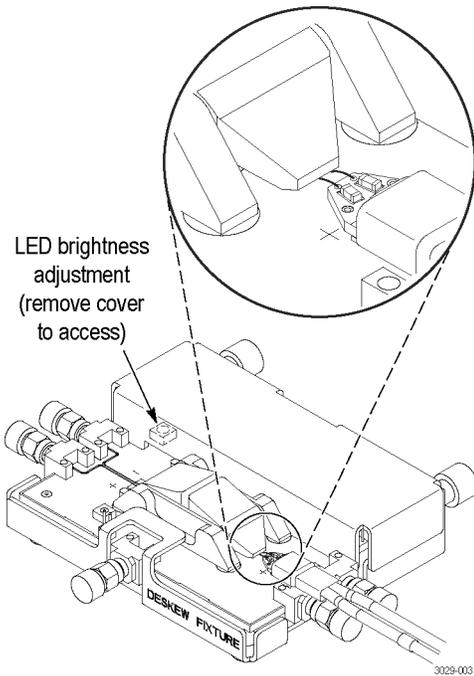
Deskew Procedure. The deskew function compensates for signal delays that occur between probes due to differences in tips or cable lengths. The oscilloscope deskew feature applies deskew values after it completes each acquisition. The deskew values do not affect logic triggering. Deskew has no affect on XY and XYZ display formats.



1. Connect the deskew fixture to a USB power source. The power LED lights and the solder tip retainer clips illuminate.
2. Connect the probes to the oscilloscope.
3. Connect the probes to the fixture, using the connectors that match your probe. Leave the 50 Ω terminations on any unused SMA connectors.
 - Connect the P76CA–292 or P76CA–292C coax adapters to the SMA connectors on the fixture.
 - Connect the P76CA–SMP coax adapters to SMP-to-SMA adapters, and then to the SMA connectors on the fixture.
 - Attach the P76TA probe solder tip adapter with P7500 Series TriMode Probe solder tips beneath the spring-loaded retainers on the fixture. LEDs with adjustable brightness help you align the probe tip leads to the fixture contacts. See figure below.

NOTE. If you are deskewing probes with solder tips, use the same solder tips with the deskew fixture that you will use to take measurements.

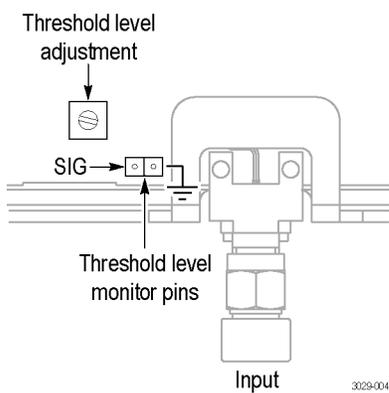
NOTE. You cannot deskew probes with coax connectors to probes with solder tips; only coax-to-coax or tip-to-tip probes can be deskewed together.



4. Connect the edge signal input to the fixture. Use either the FAST EDGE output on the oscilloscope, or connect an external source. The external signal source voltage must be between -2 and $+5$ volts, with a 1 ns or faster rise time.



CAUTION. Do not exceed the input voltage limits of the fixture. Damage to the fixture and probes may result.



5. Connect a DMM or oscilloscope to the threshold level monitor pins.

6. Using an insulated tool, adjust the threshold level on the fixture to the appropriate logic level (for example, 1.4 V for TTL circuits).
7. Select a reference channel with which all other channels will be deskewed. This is typically Channel 1, but can vary depending on your setup.
8. Select Deskew from the Vertical menu.
9. Select Channel 1 and set the Deskew to 0.0 s.
10. Display all channels to deskew, including the reference channel.
11. Set the Display Persistence to Infinite Persistence mode.
12. Set the Record View Palette to Temperature Grading.
13. Adjust the trigger level to get a stable trigger.
14. Adjust the vertical SCALE, POSITION, and OFFSET for each channel so that the signals overlap and are centered on screen. Make sure all channels being deskewed are at the same volts/div setting. Deskew the channels at the same level as your planned signal measurement.
15. Adjust the horizontal POSITION so that a triggered rising edge of the reference channel is at center screen.
16. Adjust the horizontal SCALE so the differences in the channel delays are clearly visible.
17. Adjust the horizontal POSITION again so that the first rising edge of the reference channel is at center screen.
18. Select Deskew from the Vertical menu.
19. Select one of the channels to match to the reference channel.

NOTE. Do the next step at a signal amplitude within the same attenuator range (vertical scale) as your planned signal measurements. Any change to the vertical scale after the deskew is complete can change the attenuator setting and give a slightly different signal path. This signal path difference can cause as high as 100 ps variation in timing skew between channels.

20. Adjust the deskew time for that channel so that its signal aligns with that of the reference channel.
21. Repeat steps 19 and 20 for each additional channel that you want to deskew.



Equipment Recycling. This product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For more information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

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Warranty Information

For warranty information, go to www.tektronix.com/warranty.

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