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# Read This First: Preventing ESD/EOS in 8 Series

This document provides guidelines that will help you reduce the risk of electrostatic discharge (ESD) or electrical overvoltage stress (EOS) damage to your sampling modules.

## Terms

The following terms are used in this document:

- ESD** ESD (electrostatic discharge) is the momentary discharge of electricity between objects that are at different potentials. ESD can have amplitudes in hundreds or even thousands of volts. A single ESD event can cause the sampling head to fail.
- EOS** EOS (electrical overvoltage stress) occurs when an electronic device is subjected to a voltage level that is slightly higher than its designed limit. EOS damage can occur at low voltage levels. EOS damage has a cumulative effect, and over time causes the sampling head to fail. Standard methods for preventing ESD are not very effective against EOS damage.

## Installing TSO8C17 and TSO8C18 optical modules

Procedure for installing and removing modules.

The TSO820 sampling oscilloscope allows for installation of the following two modules. For detailed specifications information, see the *TSO820, TSO8C17, TSO8C18 Sampling Oscilloscope and Modules Specifications and Performance Verification* manual available for download on [www.tek.com](http://www.tek.com).

- TSO8C17, 1 channel 28 GBd / 53 GBd
- TSO8C18, 2 channel 28 GBd / 53 GBd



**CAUTION.** *Do not hot swap modules. Installing or removing modules into/from the mainframe with the power on will damage the module. To avoid damage, turn off the power before installing or removing a module.*

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**CAUTION.** *Only qualified personnel should perform the following procedures. Ensure power is off to the unit before installing or removing modules.*

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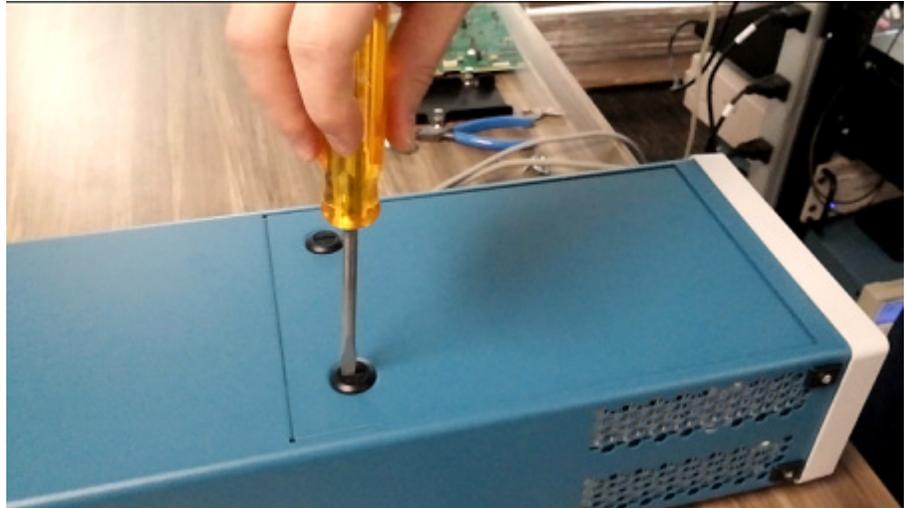


**CAUTION.** *To prevent damage to the modules, wear a grounded antistatic strap when removing and installing modules and cables connected to modules.*

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1. Power off the mainframe.
2. Use a flathead screw driver to loosen the two latch screws that secure the top cover to the mainframe and lift off the cover.



3. Notice that the mainframe ships with one filler module installed. This is a place holder that ensures proper air flow and temperature stability when only one module is installed.

Before installing a module, remove the filler module from the side into which you want to insert the regular module by loosening the securing screws (they are captive and stay attached to the filler module).

Never leave a module slot empty while the instrument is powered on and running. Always have a filler or regular modules installed to ensure proper air flow and temperature stability.

4. Insert the desired module into the mainframe at an angle, as shown.



5. Push down lightly on the rear of the module to seat it securely into the mainframe. You will hear a click when it seats fully.
6. Tighten the 4 attached screws to secure the module to the mainframe.

7. Replace the mainframe cover and use the driver again to turn the screw latches to secure it in place.



8. Before taking measurements, allow a minimum 30 minutes warm-up and run a compensation.

## Connecting optical signals



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**CAUTION.** To prevent loss of optical power or damage to the optical connectors, keep the connectors clean at all times. Check that all connectors, jumpers, and protective caps are clean before connecting them to the module.

*Do not drop an optical module, as doing so can cause damage and misalignment of the photodiode optical assembly.*

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Optical modules use a universal connector interface (UCI) that allows use of many standard fiber-optic female connector styles. Some of the standard UCI interfaces supported are FC, ST, SC, and DIN.

Attach the fiber optic cable with a suitable connector or a UCI Interface adapter to the optical input receptacle as follows:

1. Line up the key with the slot in the UCI adapter before inserting.
2. Firmly press the cable connector or adapter into the UIC interface ferrule until it reaches the stop.



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**CAUTION.** Do not insert the connector into the UCI adapter at an angle. Do not insert the connector and then rotate to line up the key with the slot. Either action may damage the UCI adapter.

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4. Firmly tighten the cable connector or the adapter shell. Tighten with finger pressure only.
5. To remove, loosen the cable connector or adapter shell.



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**CAUTION.** *To avoid damaging the module optical input, maintain signal levels within optimal performance range, and avoid clipping, attenuate the input optical signal to the Absolute Maximum Nondestructive Optical Input (peak) specifications.*

*Optical sampling modules may have dynamic ranges exceeded without obvious visual indication on the display because the overloaded photodetector signal output may still be within the dynamic range of the internal electrical sampler.*

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## Cleaning optical connectors

1. Obtain the following equipment:
  - One compressed air can (Tektronix part number 118-1068-01).
  - A cleaning tool such as a FIS cassette cleaner (FI-6270), a FIS tape dispenser cleaner (FI-7111), or an Optipop pipe cleaner (F1-6364). Cleaning kits for optical connectors (such as the Tektronix Optical Connector Cleaner part number 020-2494-xx) are available from several suppliers.
2. Loosen the UCI adapter and remove it. This exposes the male fiber end-face behind the UCI connector.
3. Pull the pipe cleaner through the hollow female-to-female ferrule alignment tube inside the UCI adapter. Then use the compressed air to clean the tube of the UCI adapter.



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**CAUTION.** *Do not blow compressed air into the female input of the UCI adapter when it is installed on the module.*

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4. Advance the fiber cleaning cassette or tape-dispenser cleaner to expose an unused clean section of the lint-free, dry, cleaning surface.
5. Lightly drag the clean, dry, surface of the cleaning tool cloth against the male end-face of the fiber input for a short distance (a centimeter or two).
6. Place the UCI adapter back on the cleaned fiber end-face on the module.
7. When the module does not have a fiber cable attached to its input(s), attach the black dust-cap to prevent airborne contaminants from lodging in the female optical input.
8. Clean any male fiber end-face input fiber cable or device that you attach to the UCI input.

## Preventing ESD

Electrostatic discharge (ESD) can damage a module's electrical inputs and outputs. Observe the following guidelines to prevent ESD.

- Always use a grounded wrist strap (provided with your instrument) when installing or removing modules from the mainframe and when connecting cables.
- Wear anti-static clothing and work in a static-free area when using sampling modules.
- Discharge cables to ground before connecting them to modules.
- Do not create an ESD antenna by leaving cables attached to the sampling-module input with the other end of the cable open.