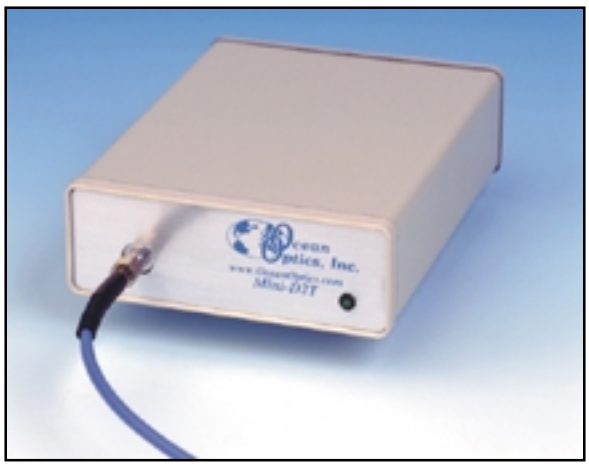
MINI-D2T Miniature Deuterium Tungsten Light Source

The MINI-D2T Miniature Deuterium Tungsten Light Source (MINI-D2T) combines the continuous spectrum of an RF-coupled deuterium UV light source and a tungsten halogen VIS/shortwave NIR light source in a single optical path. The combined-spectrum light source produces a peak-to-peak stability of 0.3% from ~200-100 nm.



Parts Included

The following parts are included with the MINI-D2T:

- MINI-D2T Miniature Deuterium Tungsten Light Source
- Power cable
- 15-pin Accessory Cable (for software control of the MINI-D2T)

Warning!

- The MINI-D2T light beam produces ultraviolet radiation. Direct eye contact can cause permanent eye damage. Always wear safety eyewear, and never look directly into the light source or stare at the diffuse reflected beam.
- Dangerous voltages are present in the MINI-D2T. When replacing the bulb in the MINI-D2T, disconnect the power cable from the unit, and do not touch or attempt to modify other components of the lamp.
- Do not use the MINI-D2T for any clinical or diagnostic purposes.
- Do not drop the instrument, as this may cause permanent damage to the unit. Handle with care.
- Only trained electrical technicians with experience in electrical circuitry should attempt to open the unit and/or change the bulb.

Using the MINI-D2T

The following sections detail the various steps in configuring and using the MINI-D2T lamp:

Connecting the MINI-D2T

Follow the steps below to configure the MINI-D2T:

1. Connect an optical fiber (the illumination fiber) to the SMA 905 connector on the front of the MINI-D2T, and then attach the other end of the optical fiber to the SMA 905 connector on the sampling chamber.
2. Connect a second optical fiber (the read fiber) from the other SMA 905 connector on the sampling chamber to the SMA 905 connector on the spectrometer.

   Note: If you have a direct-attach cuvette holder on the MINI-D2T, you only need to connect an optical fiber from the cuvette holder to the spectrometer.
3. Connect the power cable to a standard wall outlet, and then connect the 12 V power input to the power connector on the back of the MINI-D2T.

The green LED should now illuminate, indicating that the unit is receiving power. This does not mean that the bulbs in the lamp are illuminated.

Using the MINI-D2T

Follow the steps below to use the MINI-D2T:

2. Locate the switch on the rear panel of the MINI-D2T.
3. Move the switch into **On** position to operate the lamp manually (for software operation, see the *Configuring Software Control on the MINI-D2T* section below).
4. Allow a 30-minute warm-up period to allow the bulb temperature to stabilize.

Note: There is normally a delay of approximately 1.5 seconds between switching the lamp on and bulb illumination. However, if you have not used the lamp in an extended period, the deuterium bulb may require up to 60 seconds before illumination.

Configuring Software Control on the MINI-D2T

Follow the steps below to control the MINI-D2T via software:

1. Connect the 15-pin Accessory Cable to the spectrometer, and then connect the other end of the cable to the accessory connector input on the rear panel of the MINI-D2T.
2. Locate the switch on the rear panel of the MINI-D2T.
3. Move the switch into the **Remote** position. This allows you to control the lamp via software (OOIBase32 or OOIChem).
4. Turn the lamp on/off in one of the following ways:
    - **OOIBase32** – Select or deselect the **Strobe Enable** box in the Acquisition Parameter dialog box above the graph display.
    - **OOIChem** - Select **Spectrometer | Enable Strobe** from the Spectrometer menu.
5. Allow a 30-minute warm-up period to allow the bulb temperature to stabilize.

Note: There is normally a delay of approximately 1.5 seconds between switching the lamp on and bulb illumination. However, if you have not used the lamp in an extended period, the deuterium bulb may require up to 60 seconds before illumination.

Enabling and Disabling the Tungsten and Deuterium Bulbs on the MINI-D2T

You can disable either the tungsten or the deuterium bulbs in the MINI-D2T. Ocean Optics enables both bulbs at the time of manufacture. In order to disable one of the bulbs, you must remove the casing of the MINI-D2T.

Enabling and Disabling the Tungsten Bulb

To enable or disable the tungsten bulb, follow the steps below:

1. Open the casing of the MINI-D2T.
2. Locate jumper block JB on the MINI-D2T circuit board.
3. Enable or disable the bulb as follows:
    - **Enable** the bulb – Short pins 2 and 3
    - **Disable** the bulb – Short pins 1 and 2

Enabling and Disabling the Deuterium Bulb

To enable or disable the deuterium bulb, follow the steps below:

1. Open the casing of the MINI-D2T.
2. Locate jumper block JA on the MINI-D2T circuit board.
3. Enable or disable the bulb as follows:
    - **Enable** the bulb – Short pins 2 and 3
    - **Disable** the bulb – Short pins 1 and 2

Maintaining the MINI-D2T

Solarization-Resistant Fiber Notes

Solarization is the loss of transparency in glass due to exposure to UV radiation. If you are using a UV light source, the UV radiation degrades the silica in a standard patch cord fiber over time, resulting in increased overall absorption values and invalid data.

Ocean Optics' 300-µm diameter solarization-resistant optical fiber consists of a silica core surrounded by a silica cladding material that we then coat in aluminum. You should use solarization-resistant fibers in regions below 250 nm or in applications where long-term exposure to UV light occurs.

Bulb Replacement

Bulb replacement (Part No. DT-MINI-B), requires the following parts:

- Standard Phillips-head screwdriver
- Allen wrench (included with replacement bulb)

To replace the bulb, follow the steps below:

Accessing the Lamp

1. Ensure that you have disconnected the power cable from the MINI-D2T.
2. Remove the two Phillips-head screws from the rear of the unit.
3. Slide the circuit card out by gently pulling the back panel outward (away from the unit).
4. Remove the locking screw and nut from the circuit board and copper shielding (located behind the indicator LED) and set it aside.
5. Remove the slotted screw on the opposite side of the copper shield and set it aside.
6. Pull up gently on the copper shield and set the shield aside (with the screw and locking nut you removed in Step 4)
7. Locate the four wire leads (three black and one red) running from the lamp to the circuit board, and disconnect them from the board by gently pulling up on the wire leads. If necessary, try short twists back and forth to loosen the leads while you gently pull up.
8. Use the Allen wrench to remove the lamp setscrew located on the side of the black block box, which contains the lamp. Do not remove the setscrew inserted in the silver barrel of the fiber connector.

(Continued)

Removing and Replacing the Bulb

1. Remove the old lamp from the circuit board and holder and set the lamp aside.
2. Verify that the aperture window of the **new** lamp (DT-MINI-B) is free of dirt or fingerprint smudges. Clean with alcohol on a cotton swab, if necessary.
3. Insert the new lamp into the holder.
4. Apply gentle pressure to the lamp so that it is flat against the holder and tighten the setscrew to immobilize the lamp.

Reassembling the Lamp Assembly

1. Reattach the wire leads on the circuit card terminal posts. There is no polarity for the two rear leads (terminal posts LP1 and LP2). The side leads have a required polarity. You must attach the red wire lead to the inner post (near the transformer T1), and then attach the black side wire to the terminal post near the front edge of the component card (near component R16).
2. Place the copper shield back on the circuit card and fasten the screw down with the screws and nut you removed in Steps 4 and 5 of the *Accessing the Lamp* section.
3. Reinsert the circuit card assembly into the housing of the MINI-D2T.
4. Slide the circuit card back into the MINI-D2T housing, ensuring that the fiber connecter and LED indicator protrude from the front panel correctly.
5. Replace the Phillips-head screws (removed in Step 2 of the *Accessing the Lamp* section) in the rear panel.

Testing the New Bulb Installation

1. Connect a fiber optic cable from the MINI-D2T to a light sensor or spectrometer.
2. Connect the 12 V power cable to the MINI-D2T and move the power switch to the **ON** position.
3. Allow up to two minutes for the new bulb to ignite.

> **Note**: Do not verify lamp illumination by looking directly into the light source. If you do not see the correct spectrum or intensity displayed in the software, verify that you have connected the spectrometer or sensor correctly and that it is actively collecting light signals. Contact Technical Support if you are unable to acquire spectra.

4. Verify that the software is displaying the expected spectrum.
5. Remove the fiber optic cable to avoid fiber solarization.
6. Allow the bulb to warm up for 1.5 – 2 hours to properly adjust and settle into the electronic circuitry, as well as stabilize in temperature.

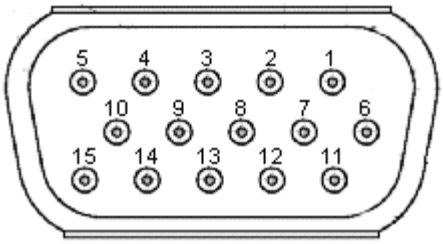
Specifications

Lamp Specifications

Wavelength Range	200-1100 nm
Deuterium Bulb Life	800 hours
Tungsten Bulb Life	2,000 hours
Ignition Delay	~1.5 seconds to 60 seconds
Peak-to-peak Stability	0.3% in 30 minutes 1.0% in 10 minutes
Connector	SMA 905
Power Input	12 V
Power Requirement	12 VDC/420 mA
Power Consumption	5 watts (deuterium 3.8 watts, tungsten 1.2 watts)

Pinout Information

The following graphic and table illustrate the pinout information for the MINI-D2T light source:



15-pin connector on MINI-D2T

Pin Number	Description
10	Ground
13	Strobe enable