

Pre-Installation Guide for Mai Tai® and Mai Tai DeepSee® (Legacy models)



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May 2020

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Introduction

Congratulations on your purchase of a Spectra-Physics system. This guide describes pre- installation information for your laser system.

Some preliminary planning is essential to avoid unnecessary delays during installation and to ensure easy operation and access to your system. You are requested to carefully consider your operating environment prior to installation. Proper water, power and room temperature are required for each system.

A checklist of pre-installation considerations is provided in this guide. You are responsible for meeting these requirements prior to installation, with due consideration given to all applicable building and safety codes.

We at Spectra-Physics intend to provide you with responsive support so that you can derive great satisfaction and value in using our systems for your applications. We are available to you at 1-800-456-2552.

When the System Arrives

Inspection

When the system arrives, any sign of damage to the shipping crates should be brought to the attention of the delivering freight company. A claim must be filed with that commercial carrier (usually within 30 days). Notify the originating Spectra-Physics office of any shipping damage. Shipping damage is not covered by Spectra-Physics.

Your packing list will show all items that you have ordered. Open all the packages and check each item for possible damage during shipping. Check the items against your packing list. Some items may have been installed at the factory.

Each system comes with a manual; verify that you have received this item.

Please report any missing or damaged items to Spectra-Physics, or you may contact your Spectra-Physics' Sales Engineer.

Review Instruction Manuals

Please read the manual to get vital information about your system. Familiarize yourself with the system. You are encouraged to spend as much time as possible reviewing the system components before your Spectra-Physics' Service Engineer arrives for the installation and training.

Laser Safety Considerations

In addition to reviewing the sections in the manual regarding laser safety; be sure to have the proper safety glasses available for ALL lab personnel present during the installation and testing of your system. For more information, please call Spectra-Physics at 1-800-456-2552.

Diagnostics

During the course of installation, power measurements will be demonstrated on all of the appropriate wavelengths. Your Service Engineer can identify which specifications will be demonstrated and the equipment necessary to conduct such tests. A non-standard system will require special consideration.

To have other published specifications demonstrated, consult with your Service Engineer to determine whether additional diagnostic equipment will be required.

Pre-Installation Considerations

Location and Environment

The location of the system and environment of your lab should have the following features:

- a) A safe location that meets all applicable building codes.
- b) Easy access with adequate clearance around the instrument.
- c) An optical table that will meet the space requirement of the instruments to be installed.
- d) Proper air conditioning could be critical for the performance of the laser.
- e) For certain applications ambient room temperature changes may be an important factor for the laser system's performance. Air ducts should not blow directly on laser or optical path.
- f) To ensure stable day-to-day operation, the recommended minimum and maximum operating room temperatures are 20 - 25°C. Room temperature should ideally be 22°C and should not fluctuate $\pm 1^\circ\text{C}$ during any two-hour period.
- g) See specifications in Table 3-5 in the User's Manual.
- h) In some applications vibration isolation may be required for your system. Structural integrity of the flooring could play an important role.
- i) Please note that the laser head is very heavy and requires a sturdy and stable optical table.

Consider room requirements for future maintenance and upgrades by your Spectra- Physics' Field Service Engineer.

Physical Description

Dimensions and Weights

<u>Feature</u>	<u>Specifications</u>	
	English Unit	Metric Unit
Size (L x W x H)		
Laser head, Scientific	23.4 × 13.8 × 5.8 in.	58.5 × 35.0 × 14.7 cm
Laser head, OEM	19.5 × 13.3 × 5.5 in.	49.5 × 33.7 × 13.9 cm
Laser head, DeepSee	35.4 x 13.8 x 5.8 in.	90.0 x 35.0 x 14.6 cm
Power supply (J80)	17.9 x 19.0 x 6.9 in.	45.5 x 48.3 x 17.5
Umbilical length	10 ft.	3 m
Chiller (ThermoRack 401)	21.0 x 19.0 x 7.0 in.	53.3 x 48.3 x 17.8 cm
Weight		
Laser head, Scientific	70 lb.	32 kg
Laser head with DeepSee	106 lb.	48 kg
Laser head, OEM	65 lb.	29.5 kg
Power supply (J80)	49.5 lb.	22.5 kg
Chiller (ThermoRack 401)	28.00 lb.	12.70 kg

Pre-Installation Considerations (Continued)

Utility Requirements

Water

The Mai Tai HP DS is closed loop water cooled system and requires no utility water services. The hoses are 12 ft. (3.6 m) long, mostly routed through the umbilical.

Fill the chiller reservoir with distilled water. Never use deionized water, and do not place the chiller above the laser-- should the unit not be installed properly, and a leak develops, dripping water may damage the laser. The chiller must always be on when the power supply is on, even if the diode lasers are not on.

Power Requirements

Electrical (single phase)

Power Supply (J80)

100 to 240 VAC, 50/60 Hz / Current: 10A max

ThermoRack 401 Chiller

100-240 VAC ($\pm 10\%$), 50/60 Hz / Current: 9A-4A amps max

Computer Requirements

Two modes of control are offered for the standard Mai Tai system:

Mai Tai graphical user interface (GUI) control software for use on a Microsoft Windows 7, 8, or 10 operating system. For more information on the control software, refer to the User's Manual.

Serial commands can be sent to the power supply from the user's host system. For systems that include the DeepSee accessory, simple commands can be used via serial OR Mai Tai DeepSee GUI software tab.

To control the system remotely with user-written software, refer to the Mai Tai command language described in "Commands and Queries" in User's Manual. For connector information, refer to "Using the RS-232 Serial Port".

In order to maintain CDRH safety requirements, run only the GUI software on the control computer during laser operation, i.e., do not run other software at the same time.

Pre-Installation Considerations (Continued)

Computer Requirements (Continued)

To use the Mai Tai and DeepSee GUI control programs, Microsoft Windows 7, 8, or 10, 32-bit or 64-bit based host computer must meet these minimum requirements:

- a) Pentium processor or newer, 1 GHz or higher 1 GB RAM
- b) 30 MB available disk space for installation

- c) a mouse or other Windows-compatible pointing device

- d) A video display with 800 x 600, 1024 x 768, 1280 x 768, 1280 x 800, 1280 x 1024, 1600 x 1200 or 1680 x 1050.

An available USB or RS-232 serial port (or converting adapter) for standard Mai Tai systems. A serial cable (P/N 90009851) is provided with the system. If USB port(s) are used, USB to serial adaptor(s) are also available (P/N 90033116)

Pre-Installation Checklist

Before the arrival of your Spectra-Physics' Service Engineer please review the following pre-installation requirements. When all the requirements have been met, initial the boxes and fax a signed copy to the Spectra-Physics Service department at (408) 980-6921.

Physical Locations:

- A location with adequate clearance around system to conduct service and accessible by Spectra-Physics' personnel.
- A temperature controlled room.
- Utility services have been installed.
- Local building and safety codes are in compliance and have been verified.

When Your System Arrives:

- Check crates for damage; if damaged, file a claim with the carrier and notify Spectra-Physics.
- Uncrate and place the system on your work surface; two or more people will be required to lift some equipment.
- Compare the packing list with your quotation. Call your Spectra-Physics office about any discrepancies.
- Check that all manuals were received.
- Save all packing and shipping material until the installation has been completed.
- Obtain the correct safety glasses and a power meter.

Customer Signature

Date

Phone Number

Fax Number

Email

Sales Order Number

Maintenance Agreement

To maintain a valid warranty on your Spectra-Physics system, it is necessary for the customer to assume the responsibility and perform the routine maintenance program. Failure to do so may result in the warranty being voided.

Nalco Mixture

The Nalco Cleaner (P/N 1607-0547) is used to flush your system clean of ferrous metals and copper alloys as a result of corrosion. It is recommended as a maintenance procedure that the chiller/critical cooling loop in each piece of equipment is cleaned and treated 1x per year. The laser does not have to be lasing. The cleaner should be circulated for a minimum of 8 hours (the longer the better if time permits in order to assure thorough cleaning).

The Nalco Solution (P/N 1607-0546) is a premixed liquid corrosion inhibitor designed for use in closed loop cooling systems. It can be added directly to a closed cooling system (used in place of water); resulting in a proper treatment without dilution for up to 6 months (even if the pink tracer turns clear). This solution is a complete inhibitor that protects ferrous metals and copper alloys from corrosion. It is nitrite free and minimizes the challenge of bacteria control (depending on environment and usage).

Filters



Laser humidity purge filter



Chiller fluid filter

The laser head's humidity Purge Filter (P/N 90035539) should be replaced when the humidity reaches 15%. This filter has an average lifetime greater than a year, depending on the relative humidity and the temperature of the operating environment.

The Chiller's 10-micron fluid filter (P/N 2604-0490) should be inspected every 3 months and changed when dirty or no longer able to rinse clean. You should also monitor the laser tower temperature to make sure cooling is within specifications.

Maintenance Agreement (Continued)

Filters (Continued)

If the laser is not going to be used for an extended period of time, turn off the laser and drain the water or cooling solution.

***NOTE:** to restrict the growth of algae in the reservoir, it is recommended that the reservoir cover be kept in place and that all circulation lines be opaque. This will eliminate the entrance of light that is required for the growth of most common algae.

Also, it's important to regularly inspect the Power Supply's air filter, and the Chiller's air filter, for any buildup of dust. If either is dirty, remove the filter and wash it in clean water. The rate at which these filters becomes more restrictive is mainly dependent on the cleanliness of the environment.

Chiller Fluid

The chiller fluid level should be appropriate for the model laser and must meet Spectra-Physics specification requirements. Insufficient cooling could result in a decrease of performance or damage to the laser system.

CAUTION: NEVER USE DEIONIZED WATER

General Procedures

The chiller operation of the laser system should be checked once a week. The power output and the mode-locking of the system should also be checked once a week by verifying the output values.

If any of the output characteristics have changed, please call Spectra-Physics' Technical Support at **1-800-456-2552**.

Required Maintenance

Proper safeguards must be used when working with, or around the laser. The Mai Tai is a Class 4 laser that can cause serious skin and eye injury. We recommend you contact a Laser Safety Eyewear vendor that can offer proper personal protection equipment for the tunable wavelength outputs detailed in the specifications in your test summary.

Laser measurement equipment

The following equipment should be on hand when installing, or maintaining the system:

- Infrared (IR) viewer, such as FJW *model "Find-R-Scope"*, or Newport *model IRV2-1700*.
- A spectrometer with the appropriate software, such as Ocean Optics *Model USB2000+* spectrometer with grating #H4 (600 lines/mm, wavelength range 680- 1080 nm, 400 nm spectral range) with slit width of 25 μm and 400 μm NIR fiber with *Model CC-3 VIS/NIR* opaline glass cosine corrector.
- Power meter and sensor are required to measure the laser output, such as the Ophir Juno+ USB Interface and sensor. BeamTrack series 10A-PPS laser measurement sensor is adequate to measure the optical power. The StarLab application together with an Ophir meter turns your PC or laptop into a full-fledged laser power/energy meter.

Accessory Kit

Included with the laser system is a user's manual, a test summary, a packing slip listing all the components shipped with this order, and an accessory kit containing the following items:

- Hardware for mounting the *Mai Tai* laser head to an optics bench.
- Computer communication cables, AC power cords, and required coolant plumbing.
- Customer *GUI*, proper revision typically included on a thumb drive.
- System Test Summary Datasheet.

Preventative Maintenance

To keep your laser at optimal performance, the following steps should be taken approximately every 6 months, or if IR power is not making target value, and green correction factor is greater than 90%.

- Check that Millennia pump in Mai Tai is making rated power at 100% current.
- To ensure pump is optimal, periodically perform the SHG temperature adjustment, as instructed in the User's Manual Appendix F.
- Chiller water and filter should be changed, and air filters should be cleaned.
- Verify that the chiller is set to the appropriate temperature, and good coolant level.

Reference the Mai Tai and DeepSee User's manual that came with your system. It is recommended you read the entire manual before operating the laser system.