

User's Guide

High Power Production Burn-In System Spartan LTS-7540



 **ILX Lightwave**[®]
A Newport Company

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Safety and Warranty Information

This section contains safety, classification, warranty, and customer service related information. It also contains ILX Lightwave contact information. The sections are categorized as follows:

- ✓ Details about cautionary symbols
- ✓ System classifications
- ✓ Information about the warranty
- ✓ Customer service contact information

Safety Information and the Manual

Throughout this manual the words Caution and Warning indicate potentially dangerous or hazardous situations which, if not avoided, could result in death, serious or minor injury, or damage to the product. Specifically:



Caution indicates a potentially hazardous situation which can result in minor or moderate injury or damage to the product or equipment.



Electrical Warning indicates a potentially dangerous situation which can result in serious injury or death.



Laser Warning indicates visible and/or invisible laser radiation. Avoid direct exposure to the beam.

General Safety Considerations

If any of the following conditions exist, or are even suspected, do not use the instrument until safe operation can be verified by trained service personnel:

- Visible damage
- Severe transport stress
- Prolonged storage under adverse conditions
- Failure to perform intended measurements or functions

If necessary, return the instrument to ILX Lightwave, or authorized local ILX Lightwave distributor, for service or repair to ensure that safety features are maintained.

All instruments returned to ILX Lightwave are required to have a Return Authorization Number assigned by an official representative of ILX Lightwave Corporation. See Returning an Instrument for more information.

General Classifications

Technical specifications including electrical ratings and weight are included within the manual. See the Table of Contents to locate the specifications and other product information. The following classifications are standard across all ILX Lightwave products:

- Indoor use only
- Ordinary Protection: This product is NOT protected against the harmful ingress of moisture.
- IEC Class I Equipment (grounded type)
- Mains supply voltage fluctuations are not to exceed $\pm 10\%$ of the nominal supply voltage.
- Pollution Degree II
- Installation (overvoltage) Category II for transient over-voltages
- Maximum Relative Humidity: $< 85\%$ RH, non-condensing
- Storage and transportation temperature of $-40\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$
- This equipment is suitable for continuous operation.

Warranty

ILX Lightwave Corporation warrants this instrument to be free from defects in material and workmanship for a period of one year from date of shipment. During the warranty period, ILX will repair or replace the unit, at our option, without charge.

Limitations

This warranty does not apply to fuses, lamps, defects caused by abuse, modifications, or to use of the product for which it was not intended.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for any particular purpose. ILX Lightwave Corporation shall not be liable for any incidental, special, or consequential damages.

If a problem occurs, please contact ILX Lightwave Corporation with the instrument's serial number, and thoroughly describe the nature of the problem.

Returning an Instrument

If an instrument is to be shipped to ILX Lightwave for repair or service, be sure to:

- Obtain a Return Authorization number (RA) from ILX Customer Service.
- Attach a tag to the instrument identifying the owner and indicating the required service or repair. Include the instrument serial number from the rear panel of the instrument.
- Attach the anti-static protective caps that were shipped with the instrument.
- Place the instrument in the original packing container with at least 3 inches (7.5 cm) of compressible packaging material. Shipping damage is not covered by this warranty.
- Secure the packing box with fiber reinforced strapping tape or metal bands.
- Send the instrument, transportation pre-paid, to ILX Lightwave. Clearly write the return authorization number on the outside of the box and on the shipping paperwork. ILX Lightwave recommends you insure the shipment.
- If the original shipping container is not available, place your instrument in a container with at least 3 inches (7.5 cm) of compressible packaging material on all sides.

Repairs are made and the instrument returned transportation pre-paid. Repairs are warranted for the remainder of the original warranty or for 90 days, whichever is greater.

Claims for Shipping Damage

Inspect the received instrument and its packaging immediately for any damage or shortages on the packing list. If the instrument is damaged, file a claim with the carrier. The factory will supply you with a quotation for estimated costs of repair. You must negotiate and settle with the carrier for the amount of damage.

Comments, Suggestions, and Problems

To ensure that you get the most out of your ILX Lightwave product, we ask that you direct any product operation or service related questions or comments to ILX Lightwave Customer Support. You may contact us in whatever way is most convenient:

Phone: (800) 459-9459 or (406) 586-1244
Fax: (406) 586-9405
Web: <http://www.newport.com/cms/support/service-and-returns>

Mail to:
ILX Lightwave
31950 East Frontage Road
Bozeman, Montana, U.S.A 59715-8642
www.newport.com/ilxlightwave

Include the following information when contacting ILX Lightwave:

- ✓ Model Number
- ✓ Serial Number
- ✓ End-user Name
- ✓ Company
- ✓ Phone
- ✓ Fax
- ✓ Description of the problem

If ILX Lightwave determines that a return to the factory is necessary, you will be issued a Return Authorization (RA) number. Please mark this number on the outside of the shipping box.

You or your shipping service are responsible for any shipping damage when returning the instrument to ILX Lightwave; ILX recommends you insure the shipment. If the original shipping container is not available, place your instrument in a container with at least 3 inches (7.5 cm) of compressible packaging material on all sides.

We look forward to serving you even better in the future!

Chapter 1: Introduction and Specifications

This chapter details the necessary steps to perform upon receipt of the system.

- ✓ Safety Considerations
- ✓ Initial Inspection
- ✓ Product Overview
- ✓ Setup
- ✓ Specifications

Safety Considerations



If any of the following symptoms exist, or are even suspected, remove the LTS-7540 from service. Do not use the LTS-7540 until trained service personnel can verify safe operation.

- Visible damage
- Severe transport stress
- Prolonged storage under adverse conditions
- Failure to perform intended measurements or functions

If necessary, return the LTS-7540 to ILX Lightwave for service and repair to ensure that safety features are maintained.

Initial Inspection

Upon receiving and unpacking, verify the following items are included with the shipment:

- Device Carriers (4 per LTU purchased)
- Laser Test Units (LTUs) preinstalled in rack
- Optional Bar Code Scanner (if purchased)
- Supplemental pamphlet

Product Overview

The LTS-7540 is a low cost burn-in system designed for production use. The rack houses up to nine Laser Test Units (LTUs) and contains a touch-screen display, Ethernet connectivity, and front-accessible breakers for each LTU. See left side image in Figure 1.

Each LTU is composed of a Shelf and a Current Source Tray. See right side top and right side middle images in Figure 1 for the Shelf and Current Source Tray respectively.

Each shelf can hold up to 4 Carriers. A single Carrier holds 7 DUTs which are driven in series by a single current source. See right side bottom image in Figure 1.



Figure 1: Rack, Shelf, Current Source Tray, & Carrier Images

The devices are held in the Carrier via a magnetic plate. The Carriers are temporarily held in the Shelf initially via magnets. During the course of a burn-in the Carriers are held in the Shelf via automatically actuated pneumatic clamps. See Figure 2 for details on Carrier assembly.



Figure 2: Fully Loaded Carrier Assembly, Disassembled & Assembled Views

Setup

The LTS-7540 Rack is shipped lying down on a pallet with all purchased LTUs preinstalled. Refer to Appendix A for unpacking instructions. Once unpacked, wheel the Rack to its final destination and connect water, air, and AC power. Install all Carriers and other purchased components, and power on the Rack. Note, AC, water, and air cables are NOT supplied with the system.

LTS-7540-109 Rack Specifications

PARAMETER	
System Capacity	252 Devices (9 Laser Test Units)
Dimensions	31.5" x 31.5" 74.8" (0.8 m x 0.8 m x 1.9 m)
Power requirements	200 – 240VAC, 3 phase, 100A / Phase, 50 / 60Hz
Power connection	Hard-wire 6/5AWG
Water flow requirement	> 6 GPM
Water inlet pressure range	25 psi – 50 psi
Water inlet - outlet pressure difference range	25 psi – 50 psi
Water connection	3/4" FNPT in and out
Inlet water temperature range	18°C to 22°C
Air requirements	55-60 psi
Air connection	1/4" male coupling
Maximum Relative Humidity	<85% RH, non-condensing
Ambient Operating Temperature Range	21C – 25C

LTS-7540-337 Laser Test Unit Specifications (Current Source Tray)

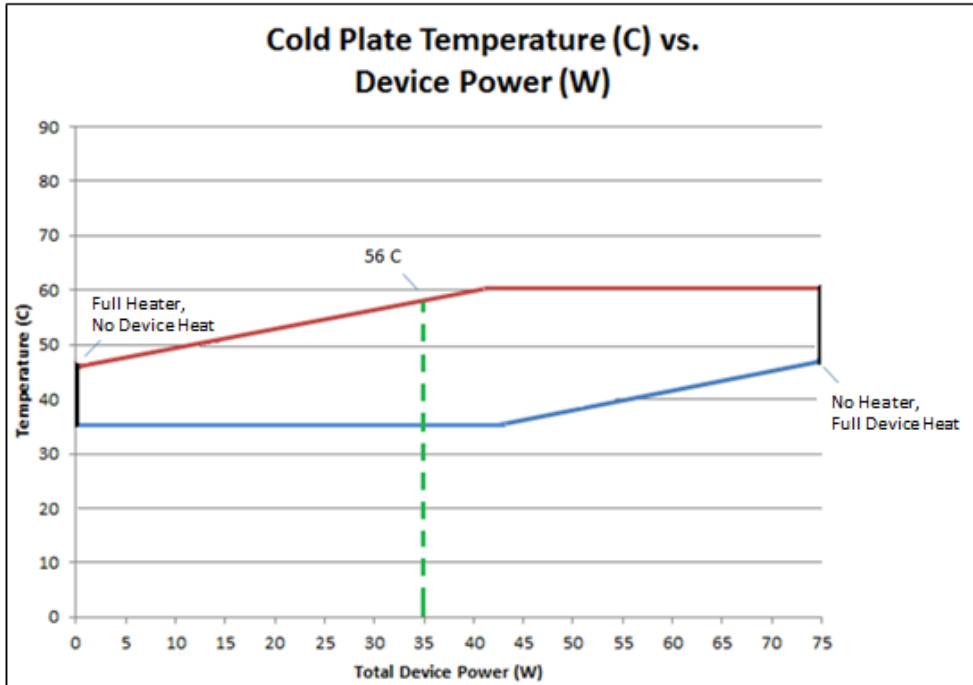
PARAMETER	
Current Range per Source	5 - 30A
Set-Point Accuracy	±200 mA
Set-Point Resolution	±20 mA
Stability (200 hr.)	±200mA
Noise and Ripple (mA rms)	±150 mA
Transients (Operational / Burst / Surge)	<1 A
Compliance Voltage	3 Volts per device
Adjustable Drive Current Ramp Rate	1 – 30 amps/minute

LTS-7540-337 Laser Test Unit Specifications (Shelf)

PARAMETER	
Temperature Set Point Range	Optimized for 55°C – see figure 1
Temperature Set Point Accuracy	±5.0°C
Temperature Stability	±0.5°C
Acceptable average power per DUT	35-75W (@55°C)
Acceptable average device conversion efficiency	0% - 60%
Cold plate material at DUT location ²	Anodized Aluminum
Cold plate surface finish at DUT location ³	<16 μ-in
Nominal clamping force per DUT	200N ±20%
Number of Devices Accommodated	28 per shelf
Device Types Accommodated	JDSU Proprietary LX carrier
Laser Diode Current	
Current Rating	30A
Device Current Drive Configuration	Series
Laser Diode Connections	Gold-Plated Copper

NOTES

1. All values after a one-hour warm-up period at room temperature.
2. Maximum and minimum device power ($I \cdot V$) at 55C. The maximum and minimum allowable power will change over the temperature range. See the chart below.



3. 0% defined as no optical output to 60% optical output as defined by " $I \cdot V - (1 - \text{Measured Optical Power})$ ".

Chapter 2: General Operation

This chapter provides an overview of the operation of the LTS-7540 along with step-by-step examples of common tasks.

- ✓ Installation requirements
- ✓ Configuration overview
- ✓ Operation overview

Grounding Requirements

The LTS-7540 must be properly grounded for safe operation. The personnel in charge of facility power must confirm the safe grounding connection to the LTS-7540 terminal box.

AC Line Power Requirements

The LTS-7540 requires three phases with 200 – 240 VAC 50/60 Hz between phases. The power cable used must be rated for 100A per phase. The personnel in charge of facility power must confirm the proper AC connection to the LTS-7540 terminal box.

Configuring the System

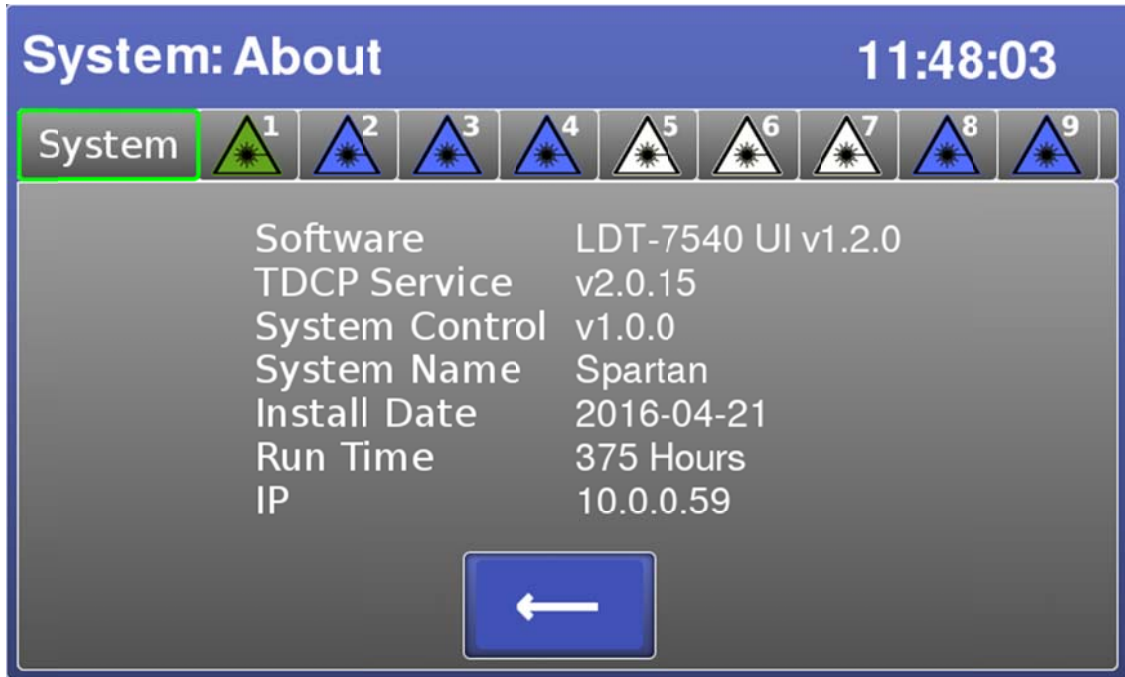
The following settings must be configured prior to using the system in a production environment:

- ✓ Rack Name
- ✓ Time and Date
- ✓ IP address

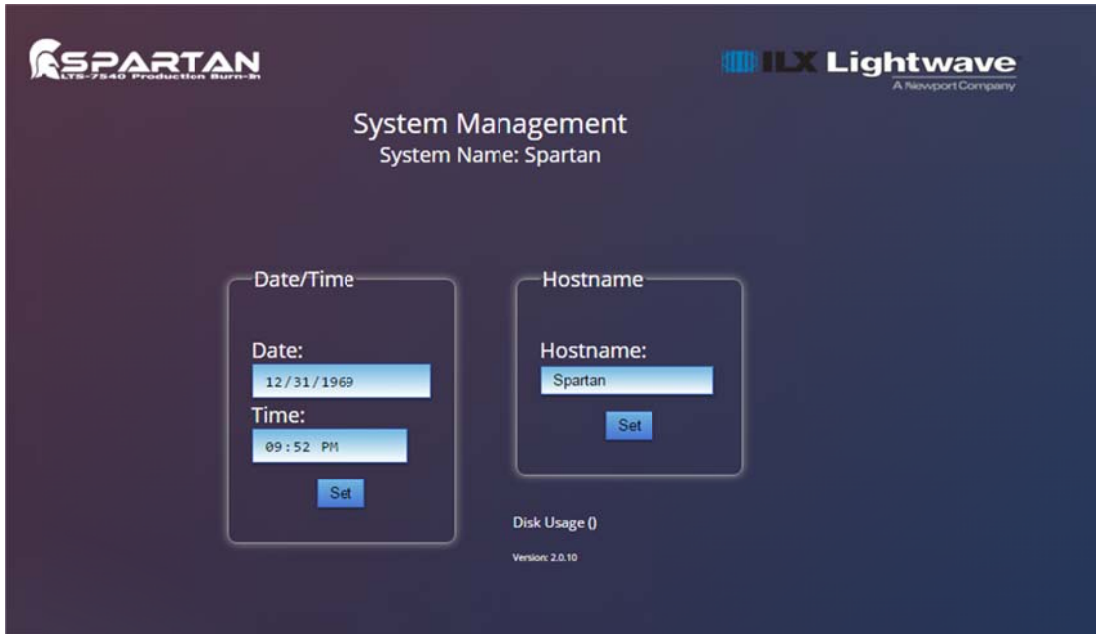
All of these settings are visible remotely via a Web Interface or directly via the System tab on the Rack display. These settings may only be modified via the Web Interface. The Web Interface may be accessed via HTTP using the Rack IP address and port 4000. Alternatively, if DNS is properly setup, the Web Interface may be accessed via HTTP using the Rack Hostname and port 4000.

Configuring the System Step-by-Step:

1. Obtain the Rack IP address by selecting the **System** tab. For example 10.10.0.59. Alternatively, obtain the Rack Hostname from the same tab. For example Spartan.



2. Open a web browser on a PC that is connected to the same network and subnet as the Rack.
3. Type the Rack IP address followed by “:4000” into the web browser. For example <http://10.10.0.59:4000>. Alternatively, type the Rack Hostname followed by “.local:4000” into the web browser. For example <http://Spartan.local:4000>.
4. The **System Management** webpage will appear.



5. Under **Hostname**, input the new desired Hostname of the Rack then click **Set**.
6. Under **Date & Time**, input the new desired date & time then click **Set**.

Creating Tests

There are two methods of creating recipes for the LTS-7540. The methods are as follows:

- ✓ Via Web Interface
- ✓ Via USB Interface

The Web Interface is the preferred method as it provides immediate user feedback on any recipe configuration errors. The Web Interface is accessible via HTTP using the Rack IP address and port 3000. Alternatively, if DNS is properly setup, the Web Interface may be accessed via HTTP using the Rack Hostname and port 4000. See **Configuring the System** for more detail

The USB interface is for customer setups that disallow Rack network access. It requires a recipe file be placed on a USB drive which is then inserted into the Rack. The Rack scans the USB drive for new recipes, validates them, and then accepts or rejects them. Rejected recipes must be manually debugged and corrected on a PC.

Creating Tests via Web Interface Step-by-Step:

1. Obtain the Rack IP address by selecting the **System** tab and **About**. For example 10.10.0.59. Alternatively, obtain the Rack Hostname from the same tab. For example Spartan.
2. Open a web browser on a PC that is connected to the same network and subnet as the Rack.

- Type the Rack IP address followed by “:3000” into the web browser. For example http://10.10.0.59:3000. Alternatively, type the Rack Hostname followed by “.local:3000” into the web browser. For example http://Spartan.local:3000.
- The **Test Configuration** webpage will appear.



- Under **Test Settings**, input the desired recipe parameters and click **Save**.
- If any errors in the recipe are found, a dialog will appear with an error description. Correct the error and try to save again.
- Once the recipe has been successfully saved it will appear in the **Select File** list.

Creating Recipes via USB Interface Step-by-Step:

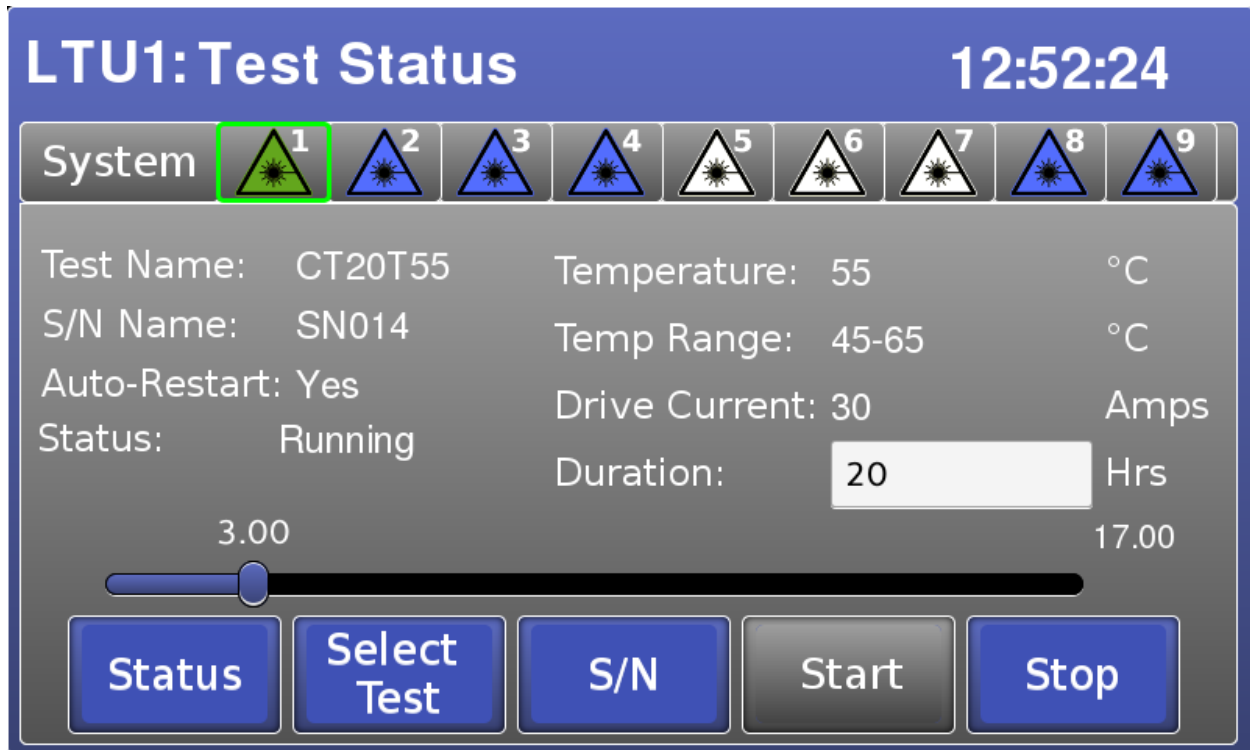
- Obtain a previously configured recipe file (ends in *.cfg). If one is not available, copy any recipe from the system via FTP. See “File Transfer” section for appropriate Step-by-Step.
- Using a text editor, edit the desired parameters of the recipe file.
- Save the modified recipe file to a USB drive. Place the file in a folder named **Test_Recipes** in the root directory of the USB drive.

4. Insert the USB drive into either of the Rack USB ports. A USB Transfer screen will appear.
5. Check **Transfer New Recipes** and press **OK**. Wait until the operation is complete
6. Remove the USB drive.
7. If there were no issues with the recipe, it will now be stored on the Rack. If there was an issue with the recipe then the Rack will not accept it. Manually debug the recipe file and try again. Refer to the specifications for valid parameter ranges.

Note, The **NAME:** parameter within the recipe file must not be the name of any recipe currently stored on the Rack.

Main Display Overview

The display contains a top row of tabs corresponding to each LTU. Selecting an LTU icon will bring up the LTU Test Status display from which a recipe may be started/stopped or current test status displayed. The top row also contains a System tab, which contains system level information such as IP address, system name, and rack status.



Touch Panel Control Screen

The touch-enabled display that is integrated into the rack allows for:


- ✓ Starting and Stopping Tests
- ✓ Viewing System Status
- ✓ Viewing Test Status

Starting and stopping tests is as simple as navigating to the desired LTU tab, selecting the desired recipe, entering or selecting the desired serial numbers, and pressing start.

Viewing the status or events of either the system or a specific LTU is as simple as navigating to the desired LTU tab and optionally pressing the Events button.

Starting a Test Step-by-Step:

1. Press the desired LTU tab at the top of the Rack display.
2. Press **Select Test** at the bottom of the display.

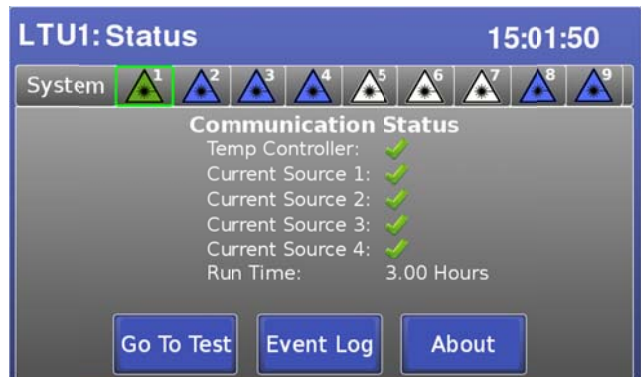
3. Scroll to and select the desired recipe.
4. Press **S/N** at the bottom of the display.
5. Scroll to and select the desired serial numbers list. Alternatively, enter a new list of serial numbers. See "Entering Serial Numbers" section for appropriate Step-By-Step.
6. Once you have selected a test and serial number file the START button will turn blue and become active.
7. Press START
8. The system will ask for the operator name. Enter the **Operator Name** via the on-screen keyboard.
9. The test will start as indicated by a change in the icon color to green  and the status line displaying the action currently underway.

Stopping a Test Step-by-Step:

1. Press the desired LTU tab at the top of the Rack display.
2. Press **Stop Test** at the bottom of the display.
3. Once the current source and temperature controller have been turned off the numatic clamp will disengage and you can remove your devices. A test report is completed indicating the test was incomplete and the number of hours completed.

Viewing Status Step-by-Step:

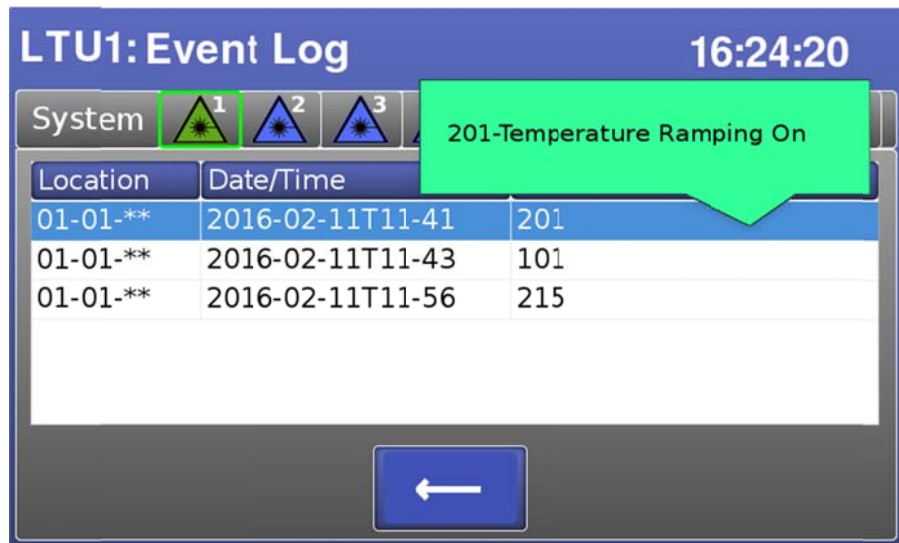
1. Press the desired LTU tab at the top of the Rack display. Alternatively, select System to view the Rack status.
2. Review the status displayed on-screen.



Viewing Events Step-by-Step:

1. Press the desired LTU tab at the top of the Rack display.
2. Alternatively, select **System** to view the Rack events.
3. Press **View Events** at the bottom of the display.
4. Press any event number to view a textual description of the event code in a text bubble.

Note, the text bubble will disappear after a few seconds.



Entering Serial Numbers

There are three methods for entering serial numbers. The methods are as follows:

- ✓ Via Touch Panel Entry
- ✓ Via Bar Code Scanner Entry
- ✓ Via File Entry

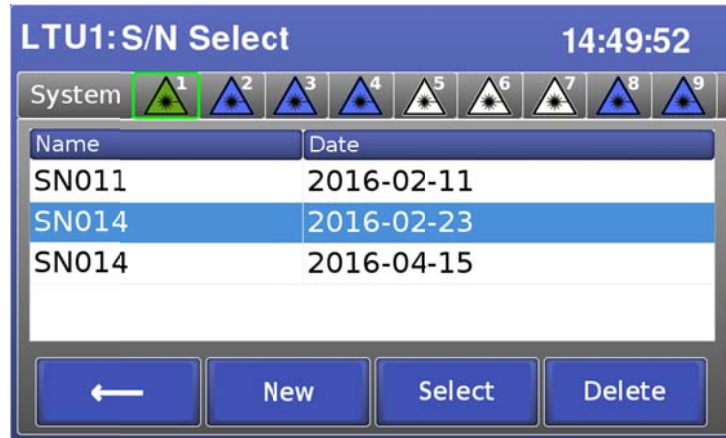
The Touch Panel interface is the slowest entry method however it requires no additional hardware. Navigate to the serial number screen from any LTU and click New. From there fill in the appropriate numbers, using auto-fill if desired, and save the list.

Bar Code Scanner entry is a faster method. You can purchase a scanner as an optional accessory. Navigate to the serial number screen from any LTU and click New. From there select the first row onscreen and fill in the appropriate numbers by scanning each barcode in sequence. Lastly save and/or immediately use the list.

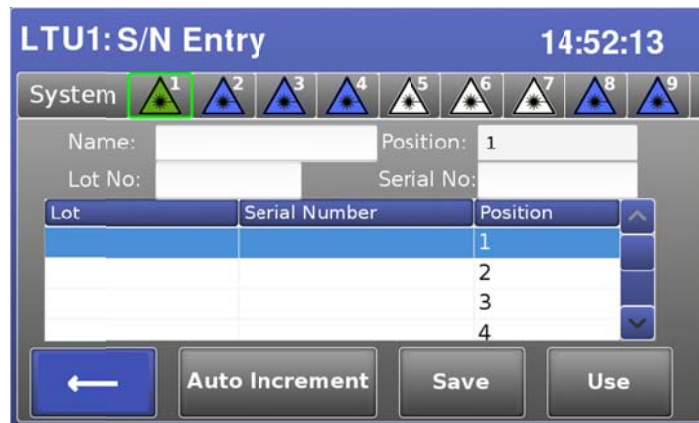
File entry allows offline generation of serial number files which are then moved to the system via USB. Simply place a properly formatted text file with the serial number information in a folder on the USB drive named **Serial_Numbers**, plug the USB drive into the Rack, and transfer the serials to the Rack.

Entering Serial Numbers via Touch Panel Step-by-Step:

1. Press the desired LTU tab at the top of the Rack display.
2. Press **S/N** at the bottom of the display.
3. Press **New** at the bottom of the display.



4. Enter the **Name** and **Lot** via the on-screen keyboard. The name entry will become the file name for the serial numbers.



5. Tap on the blue selection bar at the top of the empty serial numbers list. The bar will increase in size slightly, indicating the system is ready to receive the first serial number.
6. Press **Serial No.** and enter the desired serial number via the on-screen keyboard.
7. If the serial numbers increment in ascending order, press **Auto-Increment**. If the serial numbers do not increment, press the empty slot corresponding to the next serial number and enter it.
8. Repeat steps 5 – 7 for all 28 serial numbers.
9. To save the list for future use, press **Save**.
10. To use the list immediately on the LTU without saving, press **Use**.

11. To save the list for future use and also use it, press **Save** first then press **Use**.

12. If not immediately using the list, press **Back** twice.

Entering Serial Numbers via Bar Code Scanner Step-by-Step:

1. Press the desired LTU tab at the top of the Rack display.
2. Press **S/N** at the bottom of the display.
3. Press **New** at the bottom of the display.
4. Enter the **User Name** and **Lot** via the on-screen keyboard.
5. Tap on the blue selection bar at the top of the empty serial numbers list. The bar will increase in size slightly indicating the system is ready to receive consecutive barcode scans.
6. Scan all 28 serial bar codes from first to last.
7. To save the list for future use, press **Save**.
8. To use the list immediately on the LTU without saving, press **Use**.
9. To save the list for future use and also use it, press **Save** first then press **Use**.
10. If not immediately using the list, press **Back** twice.

Entering Serial Numbers via File Entry Step-by-Step:

1. Obtain a previously configured serial file (ends in *.txt). If one is not available, copy any serial file from the system via FTP.
2. Using a text editor, edit the desired parameters of the serial file.
3. Save the modified serial file to a USB drive. Place the file in a folder named **Serial_Numbers** in the root directory of the USB drive.
4. Insert the USB drive into the Rack. . A USB Transfer screen will appear.
5. Check **Transfer New Serials** and press **OK**. Wait until the operation is complete.
6. Remove the USB drive.
7. If there were no issues with the serial file, it will now be stored on the Rack.
8. If there was an issue with the serial file then the Rack will not accept it. Manually debug the file and try again.

Note, the NAME: parameter within the serial file must not be the name of any recipe currently stored on the Rack.

File Transfer

There are two methods of transferring reports and logs from the LTS-7540 system. The methods are as follows:

- ✓ Via FTP
- ✓ Via USB

The FTP interface is the only remote method for downloading logs from the system. Simply FTP into the system, navigate to the appropriate log folder, and download the desired log file. Any FTP client may be used to access the system. Windows Explorer is probably the most ubiquitous.

The FTP interface can also be used to read all files from the system including recipes and serial files. FTP access is read-only. It is not possible to upload any files to the system via FTP.

The USB interface is the simplest file transfer method available, requiring only a USB drive and a few taps on the Rack touchscreen.

Downloading Files via FTP Step-by-Step:

1. Obtain the Rack IP address by selecting the **System** tab. For example 10.10.0.59. Alternatively, obtain the Rack Hostname from the same tab. For example Spartan.
2. Open a Windows Explorer window on a PC that is connected to the same network and subnet as the Rack.
3. Type the Rack IP address. For example ftp://10.10.0.59. Alternatively, type the Rack Hostname followed by “.local”. For example ftp://Spartan.local.
4. The read-only directory structure of the Rack will appear as follows:
 - a. Serial_Numbers
 - b. System_Logs
 - c. Test_Event_Logs
 - d. Test_Recipes
 - e. Test_Reports.
5. Open the **Test_Reports** folder. All reports contain a timestamp in the filename.
6. Find the desired test report and drag & drop it to the desktop.
7. If desired, open the file using any text viewer or editor.
8. Repeat steps 3 through 5 for any desired logs located in **System_Logs** or **Test_Event_Logs**.

Note, report files are human readable text files that end in *.trp.

Note, this same procedure may be used to obtain copies of recipe or serial files located in **Test_Recipes** and **Serial_Numbers** respectively.

Downloading Files via USB Step-by-Step:

1. Insert a USB drive into either of the Rack USB ports. A USB Transfer screen will appear.
2. Check which items to transfer between the Rack and the USB drive.
3. Press **OK** and wait until the transfers have completed.
4. Remove the USB drive from the Rack.

Chapter 3:

Event and Status Codes

This chapter is an overview of various codes generated by the system during normal operation and fault conditions.

Event Codes

Event Code – A three digit code not categorized as a fault. The codes indicate an event that resulted in a change of operating state for the system, an LTU, or a device.

The event codes are categorized as follows:

1XX – Start/Pause/Stop Events –

101 – Test Started

102 – Resuming Test

113 – Test Paused – System Fault

115 – Test Halted – System Fault

116 – Test Halted – LTU Fault

117 – Test Halted – By User

2XX – Status Events –

201 – Temperature ramping on

203 – Temperature Controller Off

211 – Current Source Ramping On

212 – Current Source at Set point

213 – Current Source Ramping Off

214 – Current Source Off

215 – Test Ran to Completion

216 – Test Finished

3XX – Internal Events –

301 – Start-test command ignored (already running)

303 – Start failed (No Test Recipe Loaded)

304 – Start failed (No Test SerialNo Loaded)

310 – TDCP Service started

311 – TDCP Service stopped

312 – MCP Service started

313 – MCP Service stopped

315 – TDCP Service Recovery started

316 – MCP Service Recovery started

317 – MCP Service Connected

318 – MCP Service Not Connected

320 – Remote User Changed System Name

321 – Remote User Changed Date/Time

Status Codes

Status Code – A three digit code indicating a fault condition for the test. The codes are categorized as follows:

4XX – Device Fault – Faults due to a device or string of devices
401 – Open Circuit

5XX – Reserved

6XX – Minor LTU Fault - Faults at the LTU level that may be remedied on-site by the customer

601 – Below operating temperature window

602 – Above operating temperature window

603 – Carrier missing

604 – Unable to reach temperature

7XX – Critical LTU Fault - Faults at the LTU level that may require service

702 – Heater malfunction

703 – Measurement failed

704 – Over current

705 – Power supply failed

707 – Calibration data lost

708 – Emergency shutdown

709 – Fast ramp-down

710 – Immediate ramp-down

721 – TCP Communications failed

724 – TCP Communications restored

730 – Shelf Communications failed

731 – Shelf Communications restored

8XX – System Fault – Faults at the system level that may be remedied on-site by the customer

801 – Loss of AC power

802 – Loss of water flow

803 – Loss of air pressure

804 – Water leak or condensation detected

805 – AC power restored

806 – Water flow restored





807 – Air pressure restored



808 – Water leak no longer detected

Chapter 4: Status Indicators

This section describes the on-screen status indicators.

The status indicator is a triangle next to the LTU number at the top of the Rack display. The fill and outline color combination indicates the LTU status in real-time.

Indicator	Description	Causes	Resolution
	No Test has been started or defined for the LTU		
	A test is running and no faults have been detected		
	A test has completed successfully and no faults were detected.		
	A test is running and one or more faults have been detected.	<p>System fault that has been resolved & auto-resume is enabled.</p> <p>LTU fault has been resolved & auto-resume is enabled.</p> <p>Device fault occurred stopping some carriers but other carriers are still running.</p>	<p>Review the LTU events to identify the cause. Once cause is identified either allow the test to run in its current state; or stop the test, correct the cause, and start a new test.</p>

	<p>The system has paused operation due to a system level fault.</p>	<p>System fault has occurred.</p>	<p>Review the systems events to identify the cause. Once cause is identified correct the fault.</p> <p>Test will automatically resume if auto-resume option is enabled, or manually start a new test if auto-resume is disabled.</p>
	<p>The test has completed and the test had one or more errors.</p>	<p>System fault has been corrected and auto-resume is disabled.</p> <p>LTU fault has been corrected and auto-resume is disabled.</p> <p>Test completed with errors.</p>	<p>Review the LTU events to identify the cause. Once cause is identified then correct the cause and start a new test if desired.</p>

Chapter 5: File Formats

This section describes the various file name and formats.

System Event Log

The purpose of the System Event log is to record events created by the System Control Module (SCM). These events are typically system faults such as power loss and leak detect. This file is a text file, with a single event per line.

The system event log has a file name that is established automatically as defined by:

System.log

An entry in the system event log has the following format:

Event Source	Time Stamp	Event Code
00-**-**	yyyy-mm-ddThh:mm	xxx

Here is an example entry in the System Event log:

00-**-**, 2015-12-20T19:42, 801

This entry indicates that the system detected a loss of AC power (801) at 19:42.

The System Event log file stores a maximum of 1000 lines. When a new event is added to a file that already contains the maximum number of lines, the oldest event is removed from the file.

Test Event Log

The purpose of the Test Event Log is to record all events generated by a single LTU, relative to the test currently being run. It also contains system-related events that occurred during the test run. The Test Event log is contained in a text file; each line represents one event.

The format for an entry in the test event log is as follows:

Event Source	Time Stamp	Event Code
ll-cc-dd	yyyy-mm-ddThh:mm	xxx

The Event Source (or "location") indicates the source of the event: LTU, carrier within the LTU, and device number. The format for the Event Source field is as follows.

LTU Number	Carrier Number	Device Number
ll	cc	dd

Many events will not have a Carrier Number or Device Number. For example, a Test Started event is LTU-specific and applies to all devices within the LTU. For those events, the Carrier Number and Device Number fields will be asterisks (**). However, certain events are device-specific. An example is an Open Circuit: in this case, the location field indicates the LTU, the carrier number, and the device with an open circuit.

A test event will be generated for all events or faults detected.

Here is an example event entry:

05-**-**, 2015-12-20T04:06, 211

This entry indicates that LTU 5 (05) entered the Current Ramping On (211) state at 04:06 on December 20, 2015. No carrier or device information is associated with this event, so those fields contain asterisks.

In the case of an Open Circuit or other device-specific event, the Event Source will contain information that will be useful in determining which device has the problem. Take the following entry for example:

05-02-08, 2015-12-20T04:13, 401

This shows that an open circuit (401) occurred on device 8 (08), carrier 2 (02), LTU 5 (05) at 4:13 on December 20, 2015.

System events such as a water leak or a loss of air pressure use a slightly different location specifier. In this case, the location specifier is 00-**-**. For example, the entry

00-**-**, 2015-12-20T06:35, 803

indicates that the system detected a loss of air pressure (803) at 06:35.

Serial Number File

The serial number file is text files that can be exported to and from excel to allow the user to easily develop a file with serial numbers relative to position in a rack. The line number of the entry corresponds to the position in the shelf.

Lot	Serial Number
12 characters	20 characters

Lot Number – 12 Alpha Numeric characters
 Serial Number - 20 Alpha Numeric characters

Fault Handling: Any field that is out of range will result in the file being rejected.

Test Report

File name – [Test Name].[Location].[Time Stamp].trp

Description:

The device test report will have the file name established automatically as defined by:

[Test Name] – This is the test configuration name selected by the operator at the time of starting a test.

[Location] - XXXXXX-XX

[Rack]-[Shelf #]

Rack # – 8 Alpha Numeric characters

Shelf # – 2 digit number ranging from 01-09

[Time Stamp] – YYYY-MM-DDThh-mm

Test Parameters

File Name: [[Test Name].[Location].[Time Stamp].trp

Operator ID: [Name]

Test Configuration File: [Name]

Test Duration: [Time] hrs

Set Point Current: [Current] A

Current Ramp Rate: [Ramp Rate] A/min

Set Point Temperature: [Temperature] °C

Operating Temperature Window: [Low Temperature] °C – [High Temperature] °C

Auto Restart on AC Fault: [Auto Restart]

Lot	Serial Number	Location	Result	Time
12 alpha numeric characters	20 alpha numeric characters	xxxxxx-xx-xx	Complete / Incomplete	xxxxx.x

Description:

The device test report will be default in length to the total number of devices the LTU is capable of running. At the time of this document it will be a 28 line file. Each entry will be comma delineated with a space following the comma. The list will be preceded with the header as defined above.

Lot – An alpha numeric string input by the user at the start of the test. The Lot number field is linked to the location. There may be more than 1 lot number in a test but typically only 1.

Serial Number – An alpha numeric string input by the user at the start of the test. The serial number field is linked to the location.

Location – [Rack]-[Shelf #]-[Position]

Rack # – 8 Alpha Numeric characters
Shelf # – 2 digit number ranging from 01-09
Position – 2 digit number ranging from 01-28

Result – There are only 2 result values –

Complete – Test ran on the device for the length of time and current requested
Incomplete – Test ran on the device less than the length of time requested

Time – Number of hours the test ran at the requested current set point and within the temperature window. Range is from 0.1 to 99999.9 hours

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Test Configuration File

Test configuration files are plain text files. On each line in the file, there is a “tag” that is the name of the setting, a colon (:), and a value for the setting. Whitespace is acceptable after the tag, after the colon, and before the end of line. String values (such as name and auto-restart) do not need to be quoted. The file will be saved as a .cfg file

Example configuration file contents

Name: Test Number 17A.cfg
Duration: 100
Current: 22
Ramp Rate: 0.25
Temperature: 45.7
High Temperature: 52.2
Low Temperature: 40.7
Auto Restart: yes
