

**TLAser203™**

**User's Guide**

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**REQUIRED CHANGES TO THE TLASERLINK CONFIGURATION FILES .....ERROR!**  
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## **Laser Micrometers – Theory of Operation**

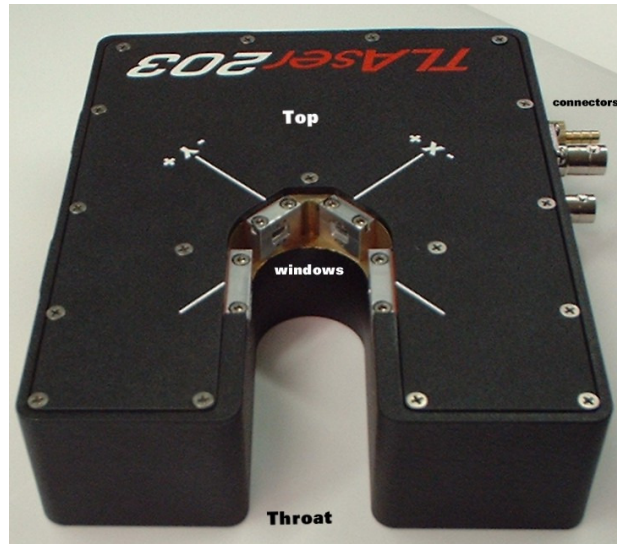
Laser scan micrometers use a laser light source to measure diameter, gap, position, width, and other dimensions. The light source is focused onto the facets of a rotating mirror that reflects the laser beam into a collimating lens. The lens refracts the beam so that all paths of light from the mirror through the lens emerge parallel to each other. A “focal” lens on the other side of the measurement field focuses the incoming light onto a photocell, generating an analog voltage. When an object is placed in the measurement field, it obstructs the laser beam. When the beam is obstructed, the photocell output voltage is at its lowest level; when unobstructed, the voltage is at its highest level. As the mirror rotates, the beam scans the measurement field from one side to the other. An object in the field obstructs the laser beam, casting a shadow that causes a low output voltage for a period of time that is proportional to the size of the object. Using the speed at which the beam is traversing the measurement field as a reference, the shadow time is converted to an accurate measurement of the object’s size.





## TLaser203™ Laser Micrometer

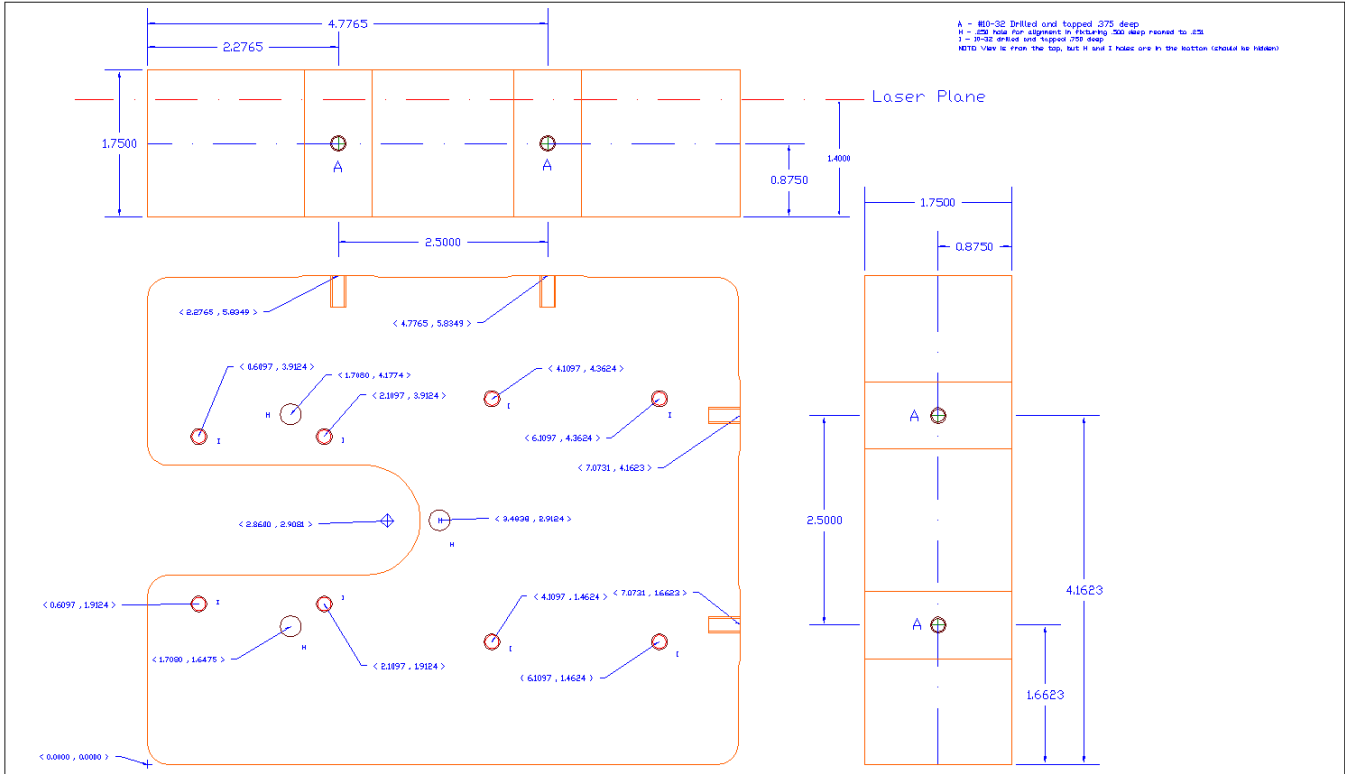
### Getting Started



- Be gentle with your scanner, it is a precision optical instrument. Rough treatment can reduce the precision, and the life expectancy of your scanner.

### Mounting

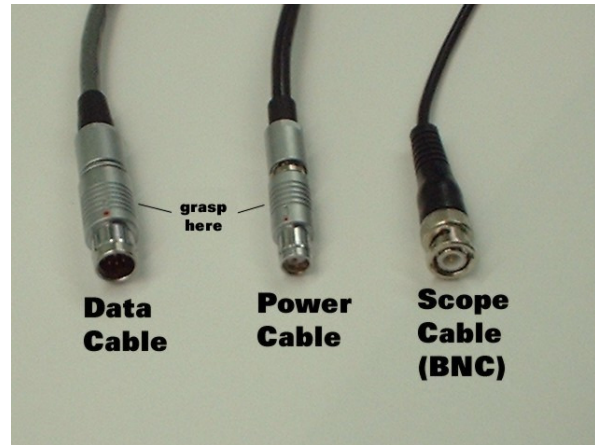
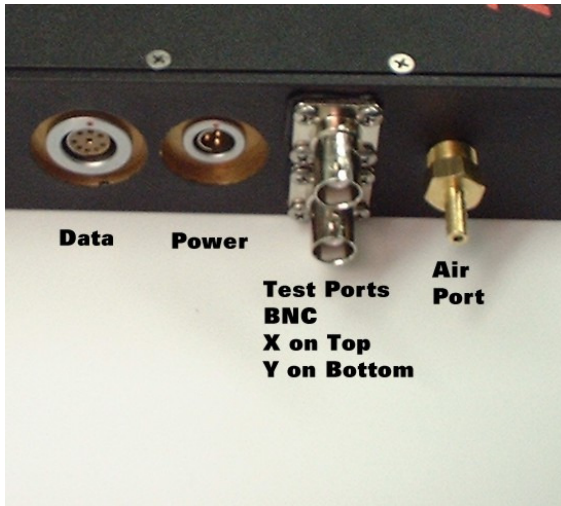
- Mounting Hole Drawings – See full size fold out drawing later in this manual



Title: TLaser203 Mounting Holes			TLA, Inc. 125 S. Walnut St. Yellow Springs, OH 45387 Phone: 937.767.4852 Fax: 937.767.2852		Drawn: 7/21/00	By: Dan Dixon
Drawing Number:					Rev: A 11/22/00	By: Dan Dixon
Scale: 1:1	Size: B	Sheet:			Rev:	By:

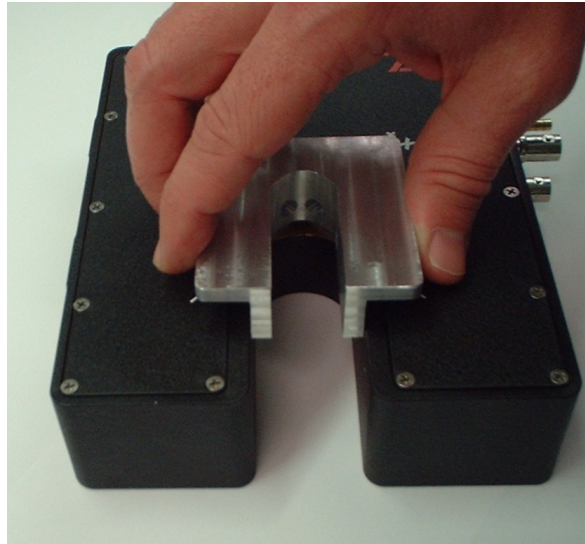
- Orientation - Any orientation is acceptable, as long as the mounting is secure and free from vibration.

## Connections and Cabling



- Power and Data – both are keyed, and cannot be connected incorrectly. Connectors (plugs), if oriented correctly, will slide snugly into sockets. To remove, grasp metal plug housing and pull directly away from scanner. Plugs should slide out. The connection is snug, not tight. If the plug does not pull out fairly easily, you are not grasping the plug in the correct place; refer to illustration and try again.
- Nitrogen Port – the nitrogen port is a barb fitting for 1/8" I.D. flexible plastic or rubber tubing. Make sure the tubing is pushed firmly onto the barbs, or it may blow off when gas pressure is applied. If your scanner is equipped for the Nitrogen purge, it is important that you use it, or leave the protective cap over the barbed fitting. Otherwise, you risk the introduction of unwanted dirt and dust into your scanner.
- Test Ports – The test ports are designed for waveform output to an oscilloscope. The connection is via BNC connector. For a discussion of the waveforms, see FAQ and Troubleshooting below.

## Air Purge



- To insert the air purge, line it up over the scanner and allow it to slide gently into place. The purge is held in place by magnets. Make sure that the purge is not allowed to SNAP into place, but is gently lowered into place.
- To remove the air purge, grasp firmly and lift directly out of the scanner. Care should be taken not to tilt the purge as it is removed. A sharp tilt of the purge during removal could cause it to bind in the scanner.

## Cleaning and Routine Maintenance

- Cleaning – The windows of the TLAser203 must always be clean to ensure the highest measurement accuracy. To clean the windows:
  1. Remove the air purge.
  2. Inspect the windows for specks of dirt or (especially) metal. If the scanner is powered, any specks of dirt should “glow” under the illumination of the laser. Any loose dirt should be blown off of the windows. If loose dirt, especially metal, is wiped across the windows, scratching may result. If lung power is not adequate, try “canned air” or compressed air. Do not use excessive air pressure. You do not want to scour the window, just blow off any loose dirt.
  3. Clean each of the four windows with a cotton swab or Kim-wipe damp (not dripping) with Windex, ethanol (denatured is fine), acetone, or lacquer thinner. If acetone or lacquer thinner is used, use caution to see that it is applied only to the windows. Acetone and lacquer thinner are strong solvents, and will dissolve plastic and paint. The adhesives used to secure the windows into the scanner will lose strength if SOAKED in either of these solvents. The silk-screened logo on the scanner will also dissolve under either of these solvents. Remember, the wipe or swab should be DAMP not DRIPPING.
  4. Wipe each window once, from side to side. Do NOT scrub. Do not wipe from top to bottom.
  5. Use a new swab or wipe for each window.
  6. If Windex is used, a dry swab or wipe will be necessary to dry the window (again, from side to side, once....DO NOT SCRUB). All other cleaners (solvents) will dry quickly, on their own. Windex will leave spots if allowed to dry on its own.
  7. Replace the air purge.

## Operating Environment

- Ambient Temp. without nitrogen: 45-110F, relative humidity 10-90 non-condensing
- Ambient Temp. with clean, dry N<sub>2</sub> at 20-40PSIG and temp of N<sub>2</sub> between 45F and 90F at the gauge: 45-140F, relative humidity 0-100
- Power – 86-265 VAC 47-440 Hz 5W maximum. The standard power cord delivered with the TLAser203 is a 6' power cord with American style 3 prong plug (NEMA 5-15P plug). Other power cords can be supplied upon special request.

## Specifications:

- One-second measurement repeatability +/- .0125um
- 1/100<sup>th</sup> second measurement repeatability +/- .05um
- Measurement deviation within the 2mm x 2mm +/- .25 microns.
- Measurement Field (usable) 2mm x 2mm
- Scan Rate: 2400 scans / second (1200 scans / second / axis)
- Size: 7" x 6" x 1.75"

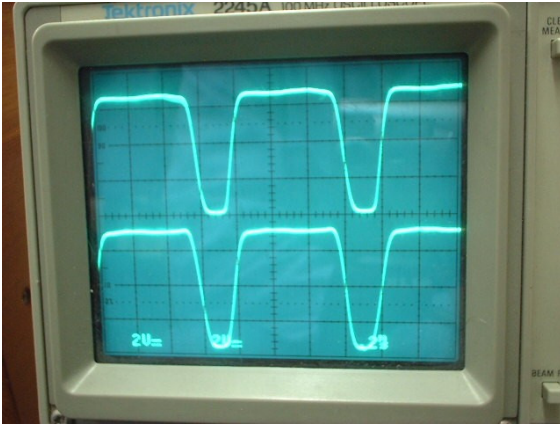
## Troubleshooting and FAQs

- Troubleshooting
  - **Problem:** TLAserLink measurement reports "Too Few: 4"
  - **Possible Causes:**
    1. There is no part in the field. Check that the part is in the field and illuminated by the laser. Check each axis, via the test port, for correct waveform.
    2. One axis is completely obstructed. Check that there is nothing obstructing either axis. Check each axis, via the test port, for correct waveform.
  - **Problem:** TLAserLink measurement reports "Too Few: 6"
  - **Possible Cause:**
    1. The part is in the field in one axis, but not the other. Check each axis, via the test port, for correct waveform.
  - **Problem:** TLAserLink measurement reports "Too Few: 0"
  - **Possible Causes:**
    1. The laser field is obstructed. Check that the air purge is completely inserted into the scanner. Check each axis, via the test port, for correct waveform.
  - **Problem:** TLAserLink measurement reports "Too Many: (any number > 8)"
  - **Possible Causes:**
    1. There is dirt on a window. Remove the air purge and inspect for spots, dots, or glowing flecks on any of the windows. Follow the window cleaning procedure described earlier in this document. Check each axis, via the test port, for correct waveform.
    2. There is more than one part in the field. Check for lint attached to the air purge. Check for any additional fibers in the scan field. Check each axis, via the test port, for correct waveform.
  - **Problem:** TLAserLink measurement reports "No Scan"
  - **Possible Causes:**
    1. The scanner is not powered. Check that the power cord is completely plugged in at both ends, and that it is not plugged into a dead circuit (e.g. a power strip that is turned off).
    2. The scanner data cable is not connected. Check that the scanner data cable is plugged into the scanner, and into the TLAser400 in the PC.
  - **Problem:** There are many problems that are not related to the scanner.
  - **Possible Causes:**
    1. Check the software section of this document for a broader range of problems.

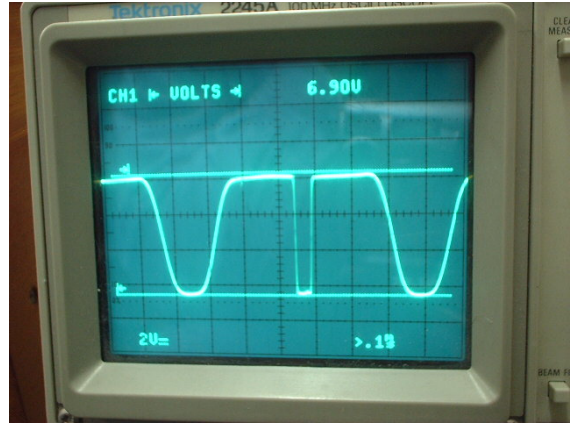




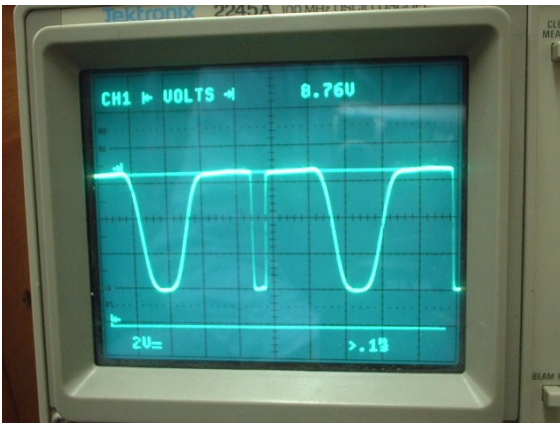
## Test Port Waveforms



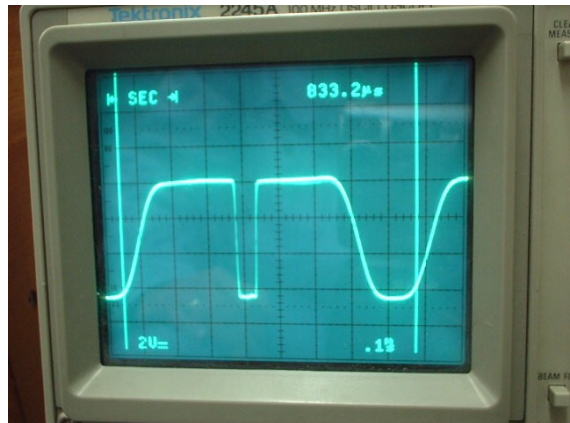
Normal waveforms – no part in field



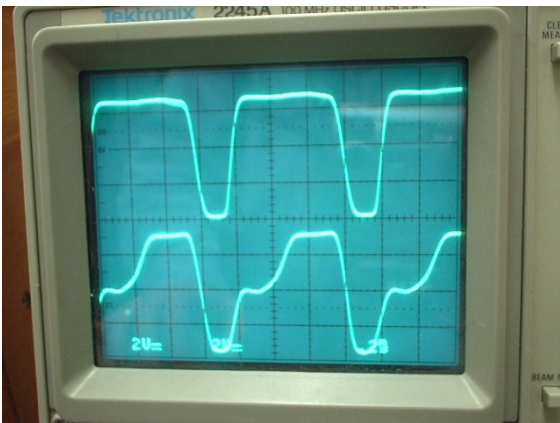
Normal amplitude – one part in field  
~6.9 volts bottom to top



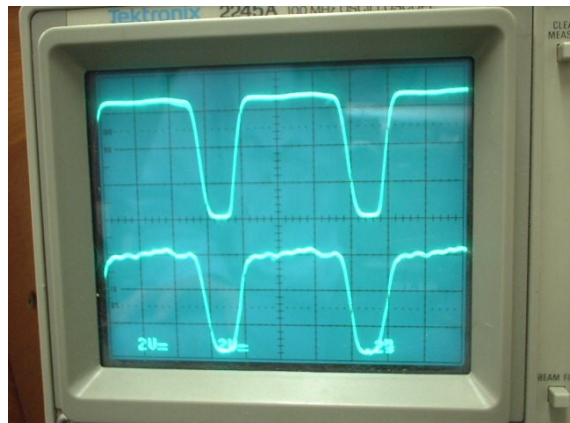
Typical amplitude from ground – one part in field  
~8.75 volts ground to top



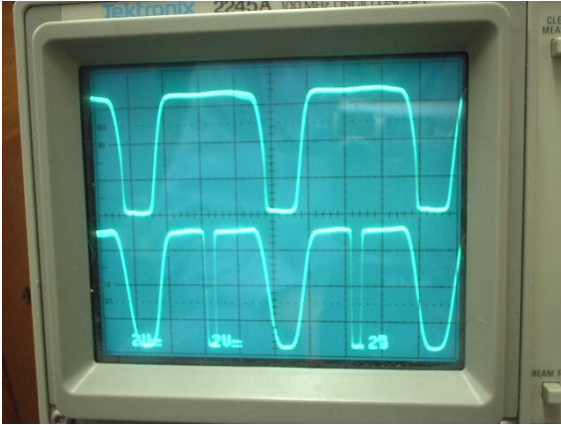
Typical period – one part in field  
1200 scans/sec - ~833uSec / scan



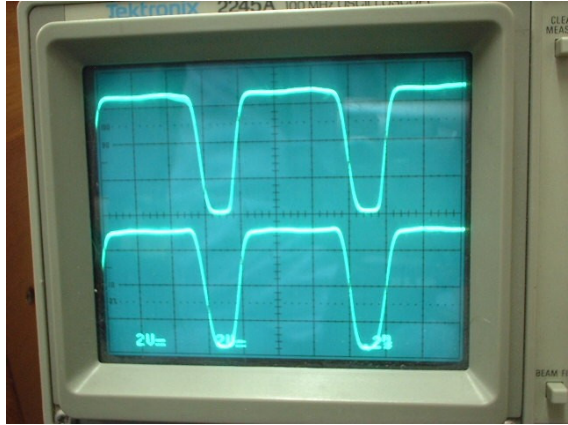
Big dirt on one window (bottom)



Fingerprint on one window (bottom)  
notice bumpy top on scan waveform



Part in one axis, but not the other - 'too few 6'

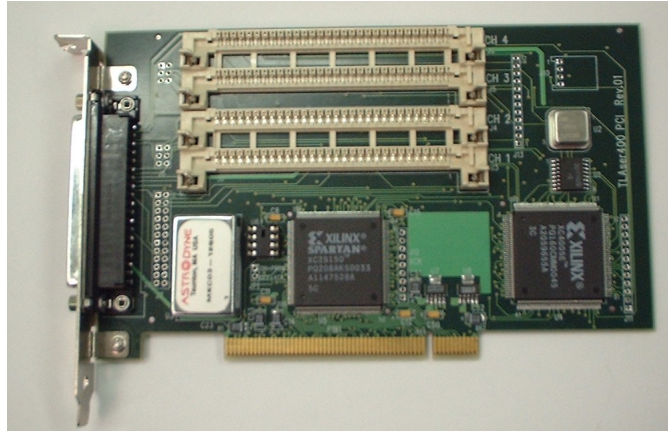


No part in either axis - 'too few 4'



## TLAser400™ PCI Micrometer Interface Card

### Getting Started



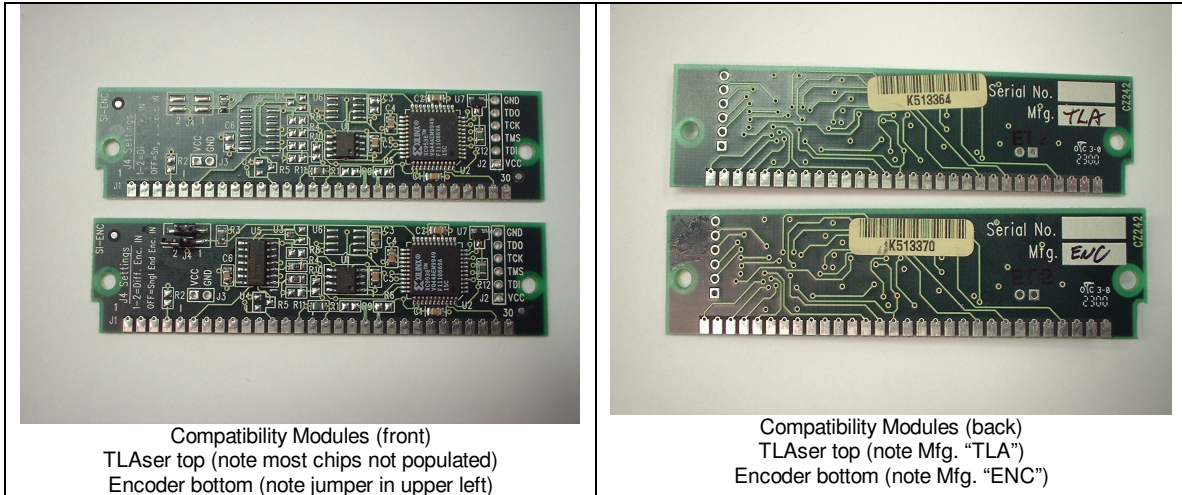
TLAser400 PCI (no modules installed)

- Your TLAser400 will arrive with compatibility modules installed. You should do a visual inspection to make sure that they are still firmly in their slots.

### Hardware Installation

- Turn off the target PC.
- Remove the cover to gain access to the backplane.
- Find an open PCI slot. PCI slots generally have white/cream colored connectors. ISA slots generally have dark brown or black connectors.
- Remove the back panel slot cover.
- Insert the card into the slot. Make sure that the card edge connector is aligned with the backplane connector.
- Press firmly. You should feel the card snap into place.
- Use the screw that was originally holding the back panel slot cover in place to secure the TLAser400 PCI in its slot.
- Replace the PC cover
- Power the PC.
- Refer to software installation section for further installation instructions.

## Compatibility Modules



## Connections and Connectors

- The only external port on the TLAsers400 interface card is a 37 pin D style, female (socket) connector. The Cable to any scanner(s) should be connected to this port. The PC should be turned off before this connection is made or broken.

## Cleaning and Routine Maintenance

- There is no routine cleaning or maintenance required for the TLAsers400 interface card. Any routine cleaning on the PC should be sufficient to keep the TLAsers400 interface card sufficiently clean.

## Operation Environment

- Operating temperature: 0°C – 40°C
- Storage Temp: -25°C - 85°C
- Humidity: 10% to 90% relative, non-condensing

## Specifications

- Number of channels: 4
  - Interface: PCI 2.1 or 2.2
  - Resolution: 0.1ns, based upon event average  
Single event resolution is 2ns  
Resultant measurement accuracy is dependent upon the individual micrometer
- Measurement rate: over 50,000 measurements/second

