

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

**FORM S-8
REGISTRATION STATEMENT***Under
The Securities Act of 1933***KLA-TENCOR CORPORATION**

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction
of incorporation or organization)04-2564110
(IRS Employer
Identification No.)One Technology Drive
Milpitas, California 95035
(Address, including zip code, of principal executive offices)Amended and Restated 1997 Employee Stock Purchase Plan
(Full title of the Plan)Brian M. Martin
Senior Vice President and General Counsel
KLA-Tencor Corporation
One Technology Drive
Milpitas, California 95035
(408) 875-3000
(Name, address including zip code, and telephone number,
including area code, of agent for service)

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer (Do not check if a smaller reporting company)Smaller reporting company **CALCULATION OF REGISTRATION FEE**

Title of Securities to be Registered	Amount to be Registered(1)	Proposed Maximum Offering Price Per Share	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, \$0.001 par value, to be issued under the Amended and Restated 1997 Employee Stock Purchase Plan	2,000,000	\$27.25 (2)	\$54,500,000	\$3,885.85

- (1) Amount of securities to be registered computed in accordance with Rule 457(h) of the Securities Act of 1933, as amended, (the "Securities Act") as the maximum number of the Registrant's Common Stock issuable under the plans covered by this Registration Statement. Pursuant to Rule 416(a) of the Securities Act, this Registration Statement shall also cover any additional shares of the Registrant's Common Stock that become issuable under the plans covered by this Registration Statement by reason of any stock split, stock dividend, recapitalization or other similar transaction effected without the Registrant's receipt of consideration that results in an increase in the number of the Registrant's outstanding shares of Common Stock. This Registration Statement shall also cover any additional shares of the Registrant's Common Stock that become issuable under the plans covered by this Registration Statement by reason of any stock dividend, stock split, recapitalization or other similar transaction effected without the Registrant's receipt of consideration that results in an increase in the number of the outstanding shares of the Registrant's Common Stock.
- (2) Calculated under Rule 457(h) of the Securities Act solely for the purpose of calculating the registration fee on the basis of 85% of the average of the high and low selling prices per share of the Registrant's Common Stock on August 3, 2010 as reported by the NASDAQ Global Select Market.

PART II
Information Required in the Registration Statement

Item 3. Incorporation of Documents by Reference

KLA-Tencor Corporation (the "Registrant") hereby incorporates by reference into this Registration Statement the following documents previously filed with the Securities and Exchange Commission (the "SEC"):

- (a) The Registrant's Annual Report on Form 10-K for the fiscal year ended June 30, 2010, filed with the SEC on August 6, 2010;
- (b) The Registrant's Current Reports on Form 8-K filed with the SEC on July 13, 2010 and August 5, 2010;
- (c) The description of the Registrant's Common Stock as set forth in the Registration Statement filed by the Registrant on Form 8-A on March 29, 1989 (File No. 000-09992) pursuant to Section 12(g) of the Securities Exchange Act of 1934, as amended (the "1934 Act"), and any amendments or reports thereto filed with the SEC for the purpose of updating such description, including Amendment No. 1 to Form 8-A filed September 25, 1995 and Amendment No. 2 to Form 8-A filed September 24, 1996; and
- (d) All other descriptions of the Registrant's Common Stock contained in a registration statement filed under the 1934 Act, including any amendment or report filed for the purpose of updating such description.

All reports and definitive proxy or information statements filed pursuant to Section 13(a), 13(c), 14 or 15(d) of the 1934 Act after the date of this Registration Statement and prior to the filing of a post-effective amendment which indicates that all securities offered hereby have been sold or which deregisters all securities then remaining unsold shall be deemed to be incorporated by reference into this Registration Statement and to be a part hereof from the date of filing of such documents. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained herein or in any subsequently filed document which also is deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

Item 4. Description of Securities

Not Applicable.

Item 5. Interests of Named Experts and Counsel

Not Applicable.

Item 6. Indemnification of Directors and Officers

Section 145(a) of the Delaware General Corporation Law (the "DGCL") provides in relevant part that "[a] corporation shall have power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint-venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with such action, suit or proceeding if the person acted in good faith

and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe the person's conduct was unlawful." With respect to derivative actions, Section 145(b) of the DGCL provides in relevant part that "[a] corporation shall have power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if the person acted in good faith and in a manner reasonably believed to be in or not opposed to the best interests of the corporation and except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper."

The Registrant's Amended and Restated Certificate of Incorporation provides that, to the fullest extent permitted by the DGCL, no director of the Registrant shall be personally liable to the Registrant or its stockholders for monetary damages for breach of fiduciary duty as a director. The Registrant's Amended and Restated Certificate of Incorporation also provides that no amendment or repeal of such provision shall apply to or have any effect on the right to indemnification permitted thereunder with respect to claims arising from acts or omissions occurring in whole or in part before the effective date of such amendment or repeal whether asserted before or after such amendment or repeal.

The Registrant's Bylaws provide that the Registrant shall indemnify to the fullest extent permitted by the DGCL each of its directors, officers, employees and other agents against expenses actually and reasonably incurred in connection with any proceeding arising by reason of the fact that such person is or was an agent of the Registrant.

The Registrant has entered into indemnification agreements with its directors and executive officers and intends to enter into indemnification agreements with any new directors and executive officers in the future.

Item 7. Exemption from Registration Claimed

Not Applicable.

Item 8. Exhibits

See Exhibit Index.

Item 9. Undertakings

A. The undersigned Registrant hereby undertakes:

(1) to file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement (i) to include any prospectus required by Section 10(a)(3) of the Securities Act of 1933 (the "1933 Act"), (ii) to reflect in the prospectus any facts or events arising after the effective date of this Registration Statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in this Registration Statement and (iii) to include any material information with respect to the plan of distribution not previously disclosed in this Registration Statement or any material change to such information in this Registration Statement; provided, however, that clauses (1)(i) and (1)(ii) shall not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed with or furnished to the SEC by the Registrant pursuant to Section 13 or Section 15(d) of the 1934 Act that are incorporated by reference into this Registration Statement;

(2) that for the purpose of determining any liability under the 1933 Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof; and

(3) to remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

B. The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the 1933 Act, each filing of the Registrant's annual report pursuant to Section 13(a) or Section 15(d) of the 1934 Act that is incorporated by reference into this Registration Statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

C. Insofar as indemnification for liabilities arising under the 1933 Act may be permitted to directors, officers, or controlling persons of the Registrant pursuant to the indemnification provisions summarized in Item 6 or otherwise, the Registrant has been advised that, in the opinion of the SEC, such indemnification is against public policy as expressed in the 1933 Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer, or controlling person of the Registrant in the successful defense of any action, suit, or proceeding) is asserted by such director, officer, or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the 1933 Act and will be governed by the final adjudication of such issue.

<u>/S/ VIRENDRA A. KIRLOSKAR</u> Virendra A. Kirloskar	Senior Vice President and Chief Accounting Officer (principal accounting officer)	August 6, 2010
<u>/S/ EDWARD W. BARNHOLT</u> Edward W. Barnholt	Chairman of the Board and Director	August 6, 2010
<u>/S/ ROBERT P. AKINS</u> Robert P. Akins	Director	August 6, 2010
<u>/S/ ROBERT T. BOND</u> Robert T. Bond	Director	August 6, 2010
<u>/S/ ROBERT M. CALDERONI</u> Robert M. Calderoni	Director	August 6, 2010
<u>/S/ JOHN T. DICKSON</u> John T. Dickson	Director	August 6, 2010
<u>/S/ STEPHEN P. KAUFMAN</u> Stephen P. Kaufman	Director	August 6, 2010
<u>/S/ KEVIN J. KENNEDY</u> Kevin J. Kennedy	Director	August 6, 2010
<u>/S/ KIRAN M. PATEL</u> Kiran M. Patel	Director	August 6, 2010
<u>/S/ DAVID C. WANG</u> David C. Wang	Director	August 6, 2010

EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Exhibit</u>
4.1(1)	Amended and Restated Certificate of Incorporation.
4.2(2)	Certificate of Amendment of Amended and Restated Certificate of Incorporation.
4.3(3)	Amended and Restated Bylaws.
4.4(4)	Amended and Restated Rights Agreement dated as of April 25, 1996, between the Registrant and The First National Bank of Boston, as Rights Agent. This agreement includes the Form of Right Certificate as Exhibit A thereto and the Summary of Terms of Rights as Exhibit B thereto.
5.1	Opinion of Brian M. Martin, Esq.
10.1(5)	Amended and Restated 1997 Employee Stock Purchase Plan.
23.1	Consent of Independent Registered Public Accounting Firm.
23.2	Consent of Brian M. Martin, Esq. (included in Exhibit 5.1).
24.1	Power of Attorney (included on signature page).
(1)	Incorporated by reference to Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 1997 (Commission File No. 000-09992).
(2)	Incorporated by reference to Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended December 31, 2000 (Commission File No. 000-09992).
(3)	Incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed with the SEC on February 19, 2009 (Commission File No. 000-09992).
(4)	Incorporated by reference to Exhibit 1 of the Registrant's report on Form 8-A/A Amendment No. 2 to the Registration Statement on Form 8-A filed with the SEC on September 24, 1996 (Commission File No. 000-09992).
(5)	Incorporated by reference to Exhibit 10.49 to the Registrant's Quarterly Report on Form 10-Q, filed with the SEC on January 29, 2010 (Commission File No. 000-09992).

OPINION OF BRIAN M. MARTIN, ESQ.

[KLA-Tencor Corporation letterhead]

August 6, 2010

KLA-Tencor Corporation
One Technology Drive
Milpitas, California 95035

Re: Registration Statement on Form S-8

Ladies and Gentlemen:

KLA-Tencor Corporation, a Delaware corporation (the "Company"), is filing with the Securities and Exchange Commission a Registration Statement on Form S-8 (the "Registration Statement") for the purpose of registering under the Securities Act of 1933, as amended (the "Securities Act"), an additional 2,000,000 shares of the Company's common stock, par value \$0.001 per share (the "Common Stock"), reserved for issuance under the Company's Amended and Restated 1997 Employee Stock Purchase Plan (the "1997 ESPP"), as described in the Registration Statement. Such shares of Common Stock are collectively referred to herein as the "Shares."

I have acted as General Counsel to the Company with respect to the issuance of this opinion and, as such counsel, I have examined such documents and such matters of fact and law that I have deemed necessary for the purpose of rendering the opinion expressed herein. In such examinations, I have assumed the genuineness of all signatures and the authenticity of all documents submitted to me as originals and the conformity to original documents of all documents submitted to me as conformed or photostatic copies.

Based on the foregoing, I am of the opinion that when the Shares have been duly issued and delivered in accordance with the terms and conditions of the 1997 ESPP, such Shares will be validly issued, fully paid and non-assessable.

I hereby consent to the filing of this opinion as an Exhibit to the Registration Statement.

Sincerely,

/s/ BRIAN M. MARTIN

Brian M. Martin
Senior Vice President and General Counsel
KLA-Tencor Corporation

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated August 5, 2010 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in KLA-Tencor Corporation's Annual Report on Form 10-K for the year ended June 30, 2010.

/s/ PricewaterhouseCoopers LLP

San Jose, California
August 5, 2010