

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)

<TABLE>
 <S> DELAWARE <C> 04-2564110

 (State of incorporation) (I.R.S. Employer Identification No.)
 </TABLE>

160 Rio Robles
 San Jose, CA 95134
 (Address, including zip code, of principal executive offices)

 RESTATED 1982 STOCK OPTION PLAN
 1997 EMPLOYEE STOCK PURCHASE PLAN
 (Full Titles of the Plans)

 STUART J. NICHOLS
 VICE PRESIDENT, GENERAL COUNSEL
 KLA-TENCOR CORPORATION
 160 Rio Robles
 San Jose, CA 95134
 (Name and address of agent for service)
 (408) 875-4200
 (Telephone number, including area code, of agent for service)

 Copy to:
 JUDITH M. O'BRIEN, ESQ.
 WILSON SONSINI GOODRICH & ROSATI
 Professional Corporation
 650 Page Mill Road
 Palo Alto, California 94304-1050

CALCULATION OF REGISTRATION FEE

<TABLE>
 <CAPTION>

Amount of Title of Securities to be Registered Registration	Amount to be Registered(1)	Proposed Maximum Offering Price Per Share	Proposed Maximum Aggregate Offering Price
Fee(4)			
-----	-----	-----	-----
<S> Common Stock, \$.001 par value, to be issued \$40,218.98 under the Restated 1982 Stock Option Plan	<C> 5,616,391	<C> \$27.125 (2)	<C> \$152,344,605.88
Common Stock, \$.001 par value, to be issued \$ 9,130.28 under the 1997 Employee Stock Purchase Plan	1,500,000	\$23.05625 (3)	\$ 34,584,375.00

- -----
- (1) Amount of securities to be registered computed in accordance with Rule 457(h) of the Securities Act of 1933, as amended, as the maximum number of the Registrant's Common Stock issuable under the plans covered by this registration statement.
 - (2) Estimated in accordance with Rule 457(c) of the Securities Act solely for the purpose of calculating the registration fee based on the average of the high and low prices per share of the Common Stock as reported on the Nasdaq National Market on November 10, 2000.
 - (3) Estimated in accordance with Rule 457(c) of the Securities Act solely for the purpose of calculating the registration fee based on 85% of the average of the high and low prices per share of the Common Stock as reported on the Nasdaq National Market on November 10, 2000.
 - (4) Amount of registration fee was calculated pursuant to Section 6(b) of the Securities Act which provides that the fee shall be \$264 per \$1,000,000 of the proposed maximum aggregate offering price of the securities proposed to be registered.

PART II

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

ITEM 3. INCORPORATION OF DOCUMENTS BY REFERENCE.

KLA-Tencor Corporation (the "REGISTRANT" or the "COMPANY") hereby incorporates by reference in this registration statement the following documents:

- (a) Registrant's Annual Report on Form 10-K for the fiscal year ended June 30, 2000 (File No. 000-09992) pursuant to Section 13(a) of the Securities Exchange Act of 1934, as amended (the "EXCHANGE ACT");
- (b) Registrant's definitive proxy statement dated October 10, 1997, filed in connection with the November 17, 1998 Annual Meeting of Stockholders of the Company;
- (c) Registration Statement on Form S-8 filed with the Securities and Exchange Commission on August 13, 1999 registering shares under the Restated 1982 Stock Option Plan (File No. 333-85123)
- (d) Registration Statement on Form S-8 filed with the Securities and Exchange Commission on August 7, 1998 registering shares under the Restated 1982 Stock Option Plan (File No. 333-60887).
- (e) Registration Statement on Form S-8 filed with the Securities and Exchange Commission on December 4, 1998 registering shares under the 1997 Employee Stock Purchase Plan (File No. 333-68415).
- (f) 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 Exchange Act and any amendments or reports thereto filed with the Securities and Exchange Commission 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.

All documents subsequently filed by the Registrant pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act, prior to the filing of a post-effective amendment to this registration statement which indicates that all securities offered hereby have been sold or which deregisters all securities remaining unsold, shall be deemed to be incorporated by reference in this registration statement and to be a part hereof from the date of filing of such documents.

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 may 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 he 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 him in connection with such action, suit or proceeding if he acted in good faith and in a manner he 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 his conduct was unlawful." With respect to derivative actions, Section 145(b) of the DGCL provides in relevant part that "[a] corporation may 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 his service in one of the capacities specified in the preceding sentence] against expenses (including attorneys' fees) actually and reasonably incurred by him in connection with the defense or settlement of such action or suit if he acted in good faith and in a manner he 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 Company's Amended and Restated Certificate of Incorporation provides that to the fullest extent permitted by the DGCL, no director of the Company shall be personally liable to the Company or its stockholders for monetary damages for breach of fiduciary duty as a director. The 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 Company's Bylaws provide that the Company shall indemnify to the full 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 Company.

The Company 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

Inapplicable.

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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 to include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, 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.

(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 Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the 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 Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the 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 Act and will be governed by the final adjudication of such issue.

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SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of San Jose, State of California, on November 13, 2000.

KLA-TENCOR CORPORATION

By: /s/ Stuart J. Nichols

Stuart J. Nichols, Vice President,
General Counsel

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POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Kenneth Levy and Stuart J. Nichols, and each of them, their true and lawful attorneys and agents, with full power of substitution, each with power to act alone, to sign and execute on behalf of the undersigned any amendment or amendments to this Registration Statement on Form S-8 and to perform any acts necessary in order to file such amendments, and each of the undersigned does hereby ratify and confirm all that said attorneys and agents, or their or his or her substitutes, shall do or cause to be done by virtue hereof. Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<TABLE>
<CAPTION>

Signature -----	Title -----	Date ----
<S> /s/ Kenneth Levy ----- Kenneth Levy	<C> Chairman of the Board and Director	<C> November 13, 2000
/s/ Kenneth L. Schroeder ----- Kenneth L. Schroeder	President, Chief Executive Officer and Director (Principal Executive Officer)	November 13, 2000
/s/ John H. Kispert ----- John H. Kispert	Chief Financial Officer (Principal Financial and Accounting Officer)	November 13, 2000
/s/ Edward W. Barnholt ----- Edward W. Barnholt	Director	November 13, 2000

/s/ H. Raymond Bingham ----- H. Raymond Bingham	Director	November 13, 2000
/s/ Robert T. Bond ----- Robert T. Bond	Director	November 13, 2000
/s/ Richard J. Elkus, Jr. ----- Richard J. Elkus, Jr.	Director	November 13, 2000
/s/ Dean O. Morton ----- Dean O. Morton	Director	November 13, 2000
/s/ Jon D. Tompkins ----- Jon D. Tompkins	Director	November 13, 2000
/s/ Lida Urbanek ----- Lida Urbanek </TABLE>	Director	November 13, 2000

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KLA-TENCOR CORPORATION

REGISTRATION STATEMENT ON FORM S-8

INDEX TO EXHIBITS

<TABLE> <CAPTION> Exhibit Number -----	Description -----
<S> 4.1*	<C> Certificate of Incorporation, as amended.
4.2**	Bylaws of the Registrant, as amended.
4.3***	Amended and Restated Rights Agreement dated as of August 30, 1995 between the Registrant and The First National Bank of Boston, as Rights Agent.
5.1	Opinion re: legality
10.12+	1997 Employee Stock Purchase Plan
10.74++	Restated 1982 Stock Option Plan, as amended on November 18, 1996.
23.1	Consent of Independent Accountants
23.2	Consent of Counsel (included in Exhibit 5.1)
24.1	Power of Attorney (see Page II-5)

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- * Incorporated by reference to Exhibit 3.1 to the Registrant's Registration Statement on Form S-4, dated March 11, 1997 (Commission File No. 333-23075).
- ** Incorporated by reference to Exhibit 4.2 to the Registrant's Registration Statement on Form S-8, dated May 8, 1997 (Commission File No. 333-26681).
- *** Incorporated by reference to the Registrant's report on Form 8-A/A Amendment No. 1 to the Registration Statement on Form 8-A (filed September 24, 1996, Commission File No. 000-9992).
- + Incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-8, dated January 30, 1998 (Commission File No. 333-45271).

++ Incorporated by reference to Exhibit 10.74 to the Registrant's Registration Statement on Form S-8, dated March 7, 1997. (Commission File No. 333-22941)

[Letterhead]

November 13, 2000

KLA-Tencor Corporation
160 Rio Robles
San Jose, CA 95134

RE: REGISTRATION STATEMENT ON FORM S-8

Ladies and Gentlemen:

I have examined the Registration Statement on Form S-8 to be filed with the Securities and Exchange Commission on or about November 13, 2000 (the "Registration Statement"), in connection with the registration under the Securities Act of 1933, as amended, of an additional 5,616,391 shares of KLA-Tencor Common Stock reserved for issuance under the 1982 Stock Option Plan, as amended (the "1982 Plan") and 1,500,000 shares of KLA-Tencor Common Stock reserved for issuance under the 1997 Employee Stock Purchase Plan (the "1997 Plan"). Such shares of Common Stock are referred to herein as the "Shares." As legal counsel, I have examined the proceedings taken and proposed to be taken in connection with the issuance, sale and payment of consideration for the Shares to be issued under the 1982 Plan and 1997 Plan.

It is my opinion that, when issued and sold in compliance with applicable prospectus delivery requirements and in the manner referred to in the 1982 Plan and 1997 Plan and pursuant to the agreements which accompany the 1982 Plan and 1997 Plan, the Shares will be legally and validly issued, fully paid and non-assessable.

I consent to the use of this opinion as an exhibit to the Registration Statement and further consent to the use of my name wherever appearing in the Registration Statement and any amendments thereto.

Sincerely,

/s/ Stuart J. Nichols

Stuart J. Nichols
Vice President, General Counsel
KLA-Tencor Corporation

CONSENT OF INDEPENDENT ACCOUNTANTS

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated July 24, 2000, except as to Note 9 which is as of August 15, 2000, relating to the financial statements of KLA-Tencor Corporation, which appears in KLA-Tencor Corporation's Annual Report on Form 10-K for the year ended June 30, 2000. We also consent to the incorporation by reference of our report dated July 24, 2000 relating to the financial statement schedule, which appears in such Annual Report on Form 10-K.

/s/ PricewaterhouseCoopers LLP

San Jose, California
November 9, 2000