

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

SCHEDULE 13G

Under the Securities Exchange Act of 1934

(Amendment No. 6) \*

KLA-Tencor Corporation  
(Name of Issuer)

Common Stock  
(Title of Class of Securities)

482480100  
(CUSIP Number)

December 31, 2012  
(Date of Event Which Requires Filing of this Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

- Rule 13d-1(b)  
 Rule 13d-1(c)  
 Rule 13d-1(d)

\*The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

CUSIP: 482480100  
<Page>

Page 1 of 4

1 NAMES OF REPORTING PERSONS  
I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS (ENTITIES ONLY)  
Capital Research Global Investors \*\*

2 CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (SEE INSTRUCTIONS) (a)

3 SEC USE ONLY (b)

4 CITIZENSHIP OR PLACE OF ORGANIZATION  
Delaware

5 SOLE VOTING POWER

15,003,050

6 SHARED VOTING POWER

NUMBER OF  
SHARES NONE

BENEFICIAL  
Y OWNED BY

7 SOLE DISPOSITIVE POWER

EACH  
REPORTING  
PERSON  
WITH: 15,003,050

8 SHARED DISPOSITIVE POWER

NONE

9 AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON

15,003,050 Beneficial ownership disclaimed pursuant to Rule  
13d-4

10 CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES  
(SEE INSTRUCTIONS)

11 PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9

9.0%

12 TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)

IA

\*\* A division of Capital Research and Management Company (CRMC)

CUSIP: 482480100  
<Page>

Page 2 of 4

SECURITIES AND EXCHANGE COMMISSION  
Washington, DC 20549

Schedule 13G  
Under the Securities Exchange Act of 1934

Amendment No. 6

Item 1(a) Name of Issuer:  
KLA-Tencor Corporation

Item 1(b) Address of Issuer's Principal Executive Offices:  
One Technology Drive  
Milpitas CA 95035

Item 2(a) Name of Person(s) Filing:  
Capital Research Global Investors

Item 2(b) Address of Principal Business Office or, if none,  
Residence:  
333 South Hope Street  
Los Angeles, CA 90071

Item 2(c) Citizenship: N/A

Item 2(d) Title of Class of Securities:  
Common Stock

Item 2(e) CUSIP Number:  
482480100

Item 3 If this statement is filed pursuant to sections 240.13d-1(b)  
or 240.13d-2(b) or (c), check whether the person filing is a:  
(e)  An investment adviser in accordance with  
section 240.13d-1(b)(1)(ii)(E).

Item 4 Ownership

Provide the following information regarding the aggregate  
number and percentage of the class of securities of the issuer  
identified in Item 1.

- (a) Amount beneficially owned:
- (b) Percent of class:
- (c) Number of shares as to which the person has:
  - (i) Sole power to vote or to direct the vote:
  - (ii) Shared power to vote or to direct the vote:
  - (iii) Sole power to dispose or to direct the disposition of:
  - (iv) Shared power to dispose or to direct the disposition of:

See page 2

Capital Research Global Investors is deemed to be the beneficial owner of 15,003,050 shares or 9% of the 166,515,564 shares believed to be outstanding as a result of CRMC acting as investment adviser to various investment companies registered under Section 8 of the Investment Company Act of 1940.

CUSIP: 482480100

Page 3 of 4

<Page>

- Item 5 Ownership of Five Percent or Less of a Class. If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following: [ ]
- Item 6 Ownership of More than Five Percent on Behalf of Another Person: N/A
- Item 7 Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company or Control Person: N/A
- Item 8 Identification and Classification of Members of the Group: N/A
- Item 9 Notice of Dissolution of Group: N/A
- Item 10 Certification

By signing below, I certify that, to the best of my knowledge and belief, the securities referred to above were acquired and are held in the ordinary course of business and were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

Signature

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

Date: February 11, 2013

Signature: Timothy D. Armour\*\*\*  
Name/Title: Timothy D. Armour - Senior Vice President  
Capital Research Global Investors

\*\*\*By /s/ James P. Ryan  
James P. Ryan  
Attorney-in-fact

Signed pursuant to a Power of Attorney dated December 29, 2010 included as an Exhibit to Schedule 13G filed with the Securities and Exchange Commission by Capital Research Global Investors on January 10, 2011 with respect to Portfolio Recovery Associates, Inc.

CUSIP: 482480100

Page 4 of 4