S E R V I C E N O T E

SUPERSEDES: 4285A-09

HP 4285A Precision LCR Meter

Serial Numbers: 0000A00000/9999Z99999

Firmware Revision: Rev 1.10 and below

Duplicate Service Notes: None

Modification to prevent the HP 42841A Bias Current Source A4 board's fuses from blowing

To Be Performed By: HP-qualified personnel

Parts Required:

HP P/N	Qty.	Description
04285-86003	1	ROM Set Rev. 2.00

Situation:

When the HP 4285A(firmware revision 1.10 and below) is used with the HP 42841A Bias Current Source, the HP 42841A fuses (A4F2, A4F3, A4F4, and A4F5) may sometimes blow because of the HP 4285A firmware bug. When A4F2/A4F3 blow it causes there to be no bias current in the 1 A range, and when A4F4/A4F5 blow it causes there to be no bias current in the 5 A range.

Continued

DATE: December 1994

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

MODIFICATION RECOMMENDED

ACTION CATEGORY:	☐ IMMEDIATELY ■ ON SPECIFIED FAILURE ☐ AGREEABLE TIME	STANDARDS: LABOR 1.5 Hours			
LOCATION CATEGORY:	☐ CUSTOMER INSTALLABLE ☐ ON-SITE ■ HP LOCATION	SERVICE INVENTORY:	☐ RETURN ■ SCRAP ☐ SEE TEXT	USED PARTS:	☐ RETURN ■ SCRAP ☐ SEE TEXT
AVAILABILITY:	PRODUCT'S SUPPORT LIFE	HP RESPONSIBLE UNTIL: July 1995			
AUTHOR: YM	ENTITY: 3355	ADDITIONAL INFORMATION:			

HEWLETT PACKARD

Solution/Action:

(1) For 4285A

Replace the HP 4285A ROMs to revision 2.00 according to the following procedure. Performance tests and adjustments are not required.

(2) For 42841A

Replace the blown fuses and A2,A4 boards of the HP 42841A referring to Service Note 42841A-04B.

Copy the "Change Information" in this service note, which gives the information about the changes implemented by this modification, and attach it to the HP 4285A.

HP 4285A ROM Replacement Procedure:

1. Remove the two feet located on the top of the rear panel to remove the top cover.
2. Remove the shield plate which doesn't have the warning message.
3. Remove the A7 digital control board, which has the black and violet board extractor.
4. Replace the ROMs with the new ROMs, refer to Figure 1.
5. Reinstall the A7 board.
6. Turn the HP 4285A ON to confirm that the firmware version is 02.00. (The firmware version is displayed on the lower left side of the LCD at the start of the turn on process.)
7. Replace the shield plate, the top cover, and the two feet.

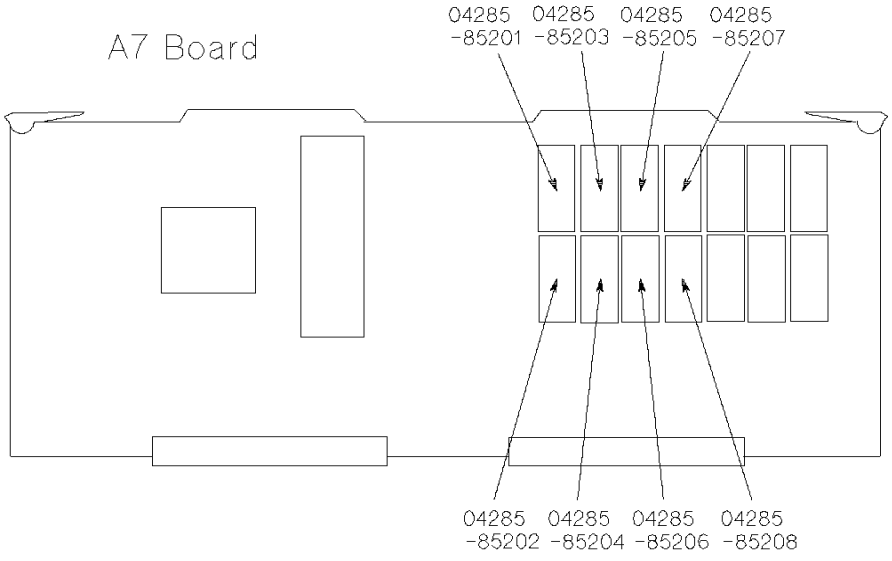

Figure 1. A7 Board ROM Location

Change Information:

For the HP 4285A units with ROM version 02.00 and above, the following changes have been implemented and are relevant to only when the HP 4285A is used with the HP 42851A for Q measurement.

Change 1:

The following system messages have been added

"Waiting, Cannot find resonance"
Meaning: It is impossible to measure because the tuninig capacitor cannot resonate with the device under test(DUT) under the current operating conditions. Change the measurement frequency higher or lower, or change the measurement connection(DIRECT, SERIES or PARALLEL) so that the measurement circuit satisfies the resonant equation. Also, check if the DUT is properly connected to the HIGH and LOW terminals.

"Waiting for trigger"
Meaning: Measurement has not yet been initiated. Press the TRIGGER key on the HP 4285A front panel, or change the TRIG field on the Q MEAS SETUP page to INT. If the TRIG field is set to EXT, check if a proper triggering signal is applied.

Change 2:

On the Q CORRECTION page, SHORT correction function is always ON.

The SHORT correction is used to reduce the internal error in the HP 42851A and this function should be always set to ON regardless of the measurement conditions. To ensure measurement accuracy, the SHORT correction should be performed before using your HP 42851A. Refer to page 3-30 in the Getting Started Guide and page 5-27 in the HP 42851A Operation Manual for the correction procedure.

Due to the change described above, the following HP-IB commands have been deleted.

CORRection:SHORt:STAT{ON|OFF}
CORRection:SHORt:STAT?

Change 3:

On the Q CORRECTION page, Q-MODE field is added to select EFFECTIVE Q mode and CIRCUIT Q mode. When EFFECTIVE Q mode is selected, "EF" is displayed on the CORR field on the Q MEAS DISPLAY page. Nothing is displayed for CIRCUIT Q mode. For HP 4285A with ROM version 01.10 and below, only CIRCUIT Q mode is available. A detailed description for the Q-MODE follows.

EFFECTIVE Q mode:

This mode corrects the error due to loss in the tuning capacitor inside the HP 42851A and displays the corrected Q value. The obtained Q value is closer to the true Q value of the DUT. Generally, as shown in Figure 2, the resonant circuit contains a very small loss in the tuning capacitor. This loss, however, is not a simple resistance and is directly proportional to the measurement frequency. The effect of the loss becomes significant when the DUT's loss is small. For this reason, the measured value obtained by the resonant method is different from the DUT's true Q value. This difference becomes larger when the measurement frequency is high, or when the DUT's Q value is high, or when the tuning capacitance value is high. The EFFECTIVE Q mode calculates and corrects the error due to the loss in the tuninig capacitor, Thereby, the measured Q value becomes greater than the CIRCUIT Q mode. The correction is automatically done in the HP 4285A and also applies to PARALLEL connection

method(in SERIES connection, calculation is not required because of its measurement principle). The OFFSET L/C/R function which corrects fixture residuals can also be used in the same time. At the factory shipment, he HP 4285A is set to this mode.

CIRCUIT Q mode:

This mode does not correct the error caused by loss in the tuninig capacitor. However, the displayed Q value is closer to the value that would given by a Q meter. The Q value in this mode is also compatible with the HP 4285A serialized below 3009J00275 which cannot select the Q mode. Q measurement accuracy described in the HP 42851A Operaion Manual directly applies to the CIRCUIT Q mode. The accuracy, however, does not refer to the DUT's true Q value but to the circuit's Q value.

Q mode selection:

EFFECTIVE Q mode and CIRCUIT Q mode can be selected on the Q-MODE field.

Change in HP-IB command reference

Add the following commands to the HP-IB command reference

CORRection:QMODe{EFFective|CIRcuit}
CORRection:QMODe?

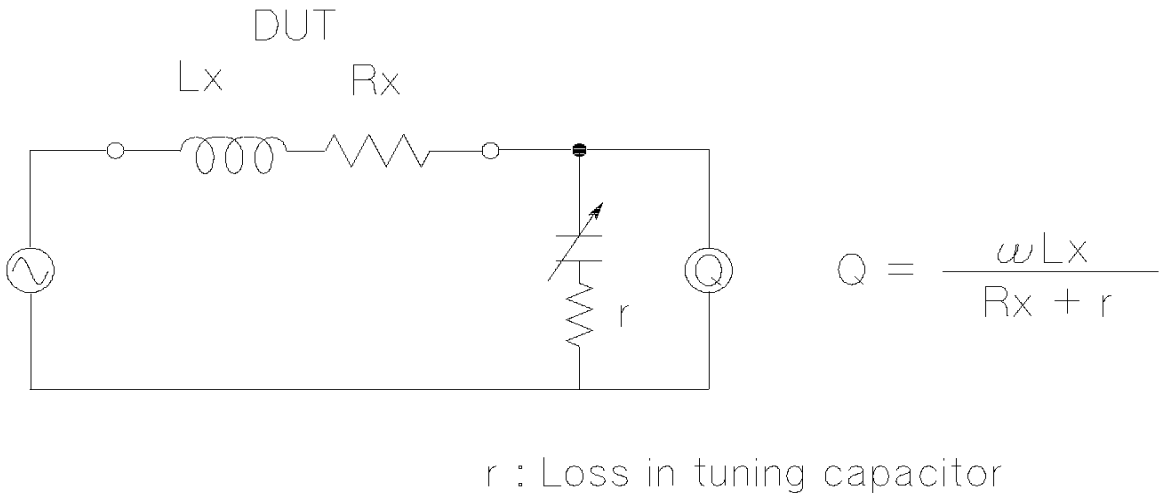

Figure 2 Tuning Capacitor Loss Effect on Q Measurement