

Keysight Technologies Noise Sources: 346C and N4002A (All Serial Numbers)

Instructions for Setting Bias Current

Notices

Copyright Notice

© Keysight Technologies 2001 - 2019

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies as governed by United States and international copyright laws.

Manual Part Number

00346-90140

Edition

Edition 3, December 16, 2019

Printed in:

Printed in Malaysia

Published by:

Keysight Technologies
Bayan Lepas Free Industrial Zone,
11900 Penang, Malaysia

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Declaration of Conformity

Declarations of Conformity for this product and for other Keysight products may be downloaded from the Web. Go to <http://www.keysight.com/go/conformity>. You can then search by product number to find the latest Declaration of Conformity.

U.S. Government Rights

The Software is "commercial computer software," as defined by Federal Acquisition Regulation ("FAR") 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement ("DFARS") 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at <http://www.keysight.com/find/sweula>. The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no greater than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

Warranty

THE MATERIAL CONTAINED IN THIS DOCUMENT IS PROVIDED "AS IS," AND IS SUBJECT TO BEING CHANGED, WITHOUT NOTICE, IN FUTURE EDITIONS. FURTHER, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, KEYSIGHT DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH REGARD TO THIS MANUAL AND ANY INFORMATION CONTAINED HEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. KEYSIGHT SHALL NOT BE LIABLE FOR ERRORS OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, USE, OR PERFORMANCE OF THIS DOCUMENT OR OF ANY INFORMATION CONTAINED HEREIN. SHOULD KEYSIGHT AND THE USER HAVE A SEPARATE WRITTEN AGREEMENT WITH WARRANTY TERMS COVERING THE MATERIAL IN THIS DOCUMENT THAT CONFLICT WITH THESE TERMS, THE WARRANTY TERMS IN THE SEPARATE AGREEMENT SHALL CONTROL.

Safety Information

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Notice

The information contained in this document is subject to change without notice.

Keysight Technologies makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Keysight Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Waste Electrical and Electronic Equipment (WEEE) Directive

This instrument complies with the WEEE Directive marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a “Monitoring and Control Instrument” product.

The affixed product label is as shown below.



Do not dispose in domestic household waste.

To return this unwanted instrument, contact your nearest Keysight Service Center, or visit <http://about.keysight.com/en/companyinfo/environment/takeback.shtml> for more information.

Sales and Technical Support

To contact Keysight for sales and technical support, refer to the support links on the following Keysight websites:

- www.keysight.com/find/mta
(product-specific information and support, software and documentation updates)
- www.keysight.com/find/assist
(worldwide contact information for repair and service)

Table of Contents

Notice	3
Waste Electrical and Electronic Equipment (WEEE) Directive	4
Product category:	4
Sales and Technical Support	4
List of Figures	7
List of Tables	9
Introduction	11
Replacement Parts List	11
346C Replacement Noise Cartridge Installation Instructions	12
346C Replacement Bulkhead Assembly Installation Instructions	12
346C Replacement Printed Circuit Board Assembly Installation Instructions	13
N40002A Replacement Noise Cartridge Installation Instructions	13
N40002A Replacement Bulkhead Assembly Installation Instructions	14
N4002A Replacement Printed Circuit Board Assembly Installation Instructions	14
Printed Circuit Board Assembly Graphic and Resistor List	14

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

List of Figures

Figure 1	00346-60034		15
----------	-------------	-------	----

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

List of Tables

Table 1	Replacement parts list	11
Table 2	Parts list	14

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

Introduction

Due to a change of manufacturer of the noise diodes, adjustment of bias current is now necessary to ensure that the noise source performs within its specified ENR range. This document is supplied with all the following replacement parts.

CAUTION

Repair or parts replacement of noise sources should NOT be attempted without full calibration capability and official field calibration software.

Replacement Parts List

This Installation Note applies to the installation of the following replacement parts:

Table 1 Replacement parts list

Model	Replacement bulkhead	Replacement noise cartridge	Replacement PC board kit
346C	00346-60021	00346-60155	00346-60158
N4002A	N4002-60004	00346-60155	N4002-60005

The replacement bulkheads and cartridges listed in Table 1 are tested in the factory to determine the bias current level necessary to ensure that the product meets ENR specification.

For the 346C, bias levels are determined by installing the appropriate resistor value for R2 and R3 on the printed circuit board (Figure 1). The appropriate resistors are supplied with the replacement part.

Replacement Bulkheads for the 346C have the recommended bias level written on the part. The appropriate resistors are enclosed in a small envelope. The resistors' value and part number are written on the envelope. The N4002A bulkheads are not be supplied with an envelope and resistor. However, the value of the current is marked on the part.

00346-60155 Replacement Noise Cartridges are used in both models. These parts will be labeled with a tracking number. The appropriate resistors will be enclosed in an envelope which is marked with the tracking number of the cartridge, resistor value, part number and recommended bias current level. Also, the cartridges are shipped with Installation Note 00346-90024, Attenuator Replacement, in case attenuator tuning is necessary to bring the unit to within specification.

For the N4002A model, the bias is set electronically by using field calibration software to calibrate the Noise Source and re-burn the EEPROM. The bias value of current supplied with the Replacement Noise Cartridge is to be used to program the sensor. The enclosed resistors are to be discarded.

346C Replacement Noise Cartridge Installation Instructions

- 1 Ensure that the cartridge was shipped with two resistors of the same value contained in a small envelope.
- 2 Ensure that the tracking number on the cartridge matches the number on the envelope.
- 3 Ensure that the value of current marked on the envelope corresponds to the resistors value and part number provided (refer to [Table 2](#)).
- 4 Ensure that the resistor value on the envelope matches the resistors supplied.
- 5 Ensure that Installation Note 00346-90024 has been provided.
- 6 Disassemble the Noise Source using the procedure in the 346 Operating and Service manual, 00346-90139.
- 7 Remove the old cartridge and install the replacement cartridge.
- 8 Check the resistors installed in positions R2 and R3 on the 00346-60034 printed circuit board; refer to [Figure 1](#). Both resistors should be the same value. If the resistors installed match the resistors supplied, it is not necessary to replace them in the printed circuit board.
- 9 If necessary, install the supplied resistors in R2 and R3 position (refer to [Figure 1](#)).
- 10 Reassemble the unit and do a preliminary ENR measurement.
- 11 If the ENR is not within specification, refer to the supplied 00346-90024 Installation Note for instructions on how to tune the attenuator to meet the ENR specification at frequencies above 12 GHz (polyiron adjustment has no effect on ENR below 2 GHz).
- 12 Retest ENR after tuning the attenuator.
- 13 If the ENR is still out of specification, substitute another pair of resistors for R2 and R3 from [Table 2](#). Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
- 14 Retest ENR.

346C Replacement Bulkhead Assembly Installation Instructions

- 1 Ensure that the bulkhead was shipped with two resistors of the same value contained in a small envelope.
- 2 Ensure that the value of current marked on the bulkhead matches the value on the envelope.
- 3 Ensure that the value of current marked on the envelope corresponds to the resistors' value and part number provided (refer to [Table 2](#)).
- 4 Ensure that the resistor value on the envelope matches the resistors supplied.
- 5 Disassemble the Noise Source using the procedure in the 346 Operating and Service manual, 00346-90139.
- 6 Remove the old bulkhead and install the replacement bulkhead.
- 7 Check the resistors installed in positions R2 and R3 on the 00346-60034 printed circuit board; please refer to [Figure 1](#). Both resistors should be the same value. If the resistors installed match the resistors supplied, it is not necessary to replace them in the printed circuit board.
- 8 If necessary, install the supplied resistors in the R2 and R3 positions (refer to [Figure 1](#)).
- 9 Reassemble the unit and do a preliminary ENR measurement.

- 10** If the ENR is not in specification, substitute another resistor for R2 and R3 from [Table 2](#). Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
- 11** Retest ENR.

346C Replacement Printed Circuit Board Assembly Installation Instructions

- 1** Disassemble the Noise Source using the procedure in the 346 Operating and Service manual, 00346-90139.
- 2** The value of R2 and R3 on the replacement printed circuit board will probably be 287 ohms. Use the resistors supplied, install the same value of R2 and R3 as in the printed circuit board being replaced.
- 3** Install the replacement printed circuit board, reassemble the unit and do a preliminary ENR measurement.
- 4** If the ENR is not meeting specification, substitute another resistor for R2 and R3 from [Table 1](#). Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
- 5** Retest ENR.

N40002A Replacement Noise Cartridge Installation Instructions

- 1** Ensure that the cartridge was shipped with a small envelope.
- 2** Ensure that a value of current is marked on the envelope (the resistors will not be used).
- 3** Ensure that Installation Note 00346-90024 has been provided.
- 4** Disassemble the Noise Source using the procedure in the SNS Series Operating and Service Guide, N4000-90001.
- 5** Remove the old cartridge and install the replacement cartridge.
- 6** Using the field calibration software, set the bias current to the value on the envelope (in mA). Discard the resistors enclosed.
- 7** Reassemble the unit and do a preliminary ENR measurement.
- 8** If the ENR is not within specification, refer to the supplied 00346-90024 Installation Note for instructions on how to tune the attenuator to meet the ENR specification at frequencies above 12 GHz.
- 9** Retest ENR after tuning the attenuator.
- 10** If the ENR is not meeting specification, use the field calibration software to reprogram the bias current using the values from [Table 2](#). Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz
- 11** Retest ENR.

N40002A Replacement Bulkhead Assembly Installation Instructions

- 1 Ensure that the value of the current is marked on the replacement bulkhead.
- 2 Disassemble the Noise Source using the procedure in the SNS Series Operating and Service Guide, N4000-90001.
- 3 Remove the old bulkhead and install the replacement bulkhead.
- 4 Using the field calibration software, set the bias current to the value on the bulkhead (in mA).
- 5 Reassemble the unit and do a preliminary ENR measurement.
- 6 If the ENR is not meeting specification, use the field calibration software to reprogram the bias current using the values from [Table 2](#). Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
- 7 Retest ENR.

N4002A Replacement Printed Circuit Board Assembly Installation Instructions

- 1 Using the field calibration software, determine the bias current applied to the noise diode or use the bias current value written on the bulkhead.
- 2 Disassemble the Noise Source using the procedure in the SNS Series Operating and Service Guide, N4000-90001.
- 3 Install the replacement printed circuit board.
- 4 Reassemble the unit.
- 5 Using the field calibration software, set the bias current to the original value
- 6 Perform a preliminary ENR measurement.
- 7 If the ENR is not meeting specification, use the field calibration software to change the bias setting. Refer to [Table 2](#) for bias current values. Decreasing the bias current increases the ENR response.
- 8 Retest ENR.

Printed Circuit Board Assembly Graphic and Resistor List

Table 2 Parts list

Current (mA)	R2 and R3 ohms	R2 and R3 part number
38.3	287	0698-3443
34.8	316	0698-3444

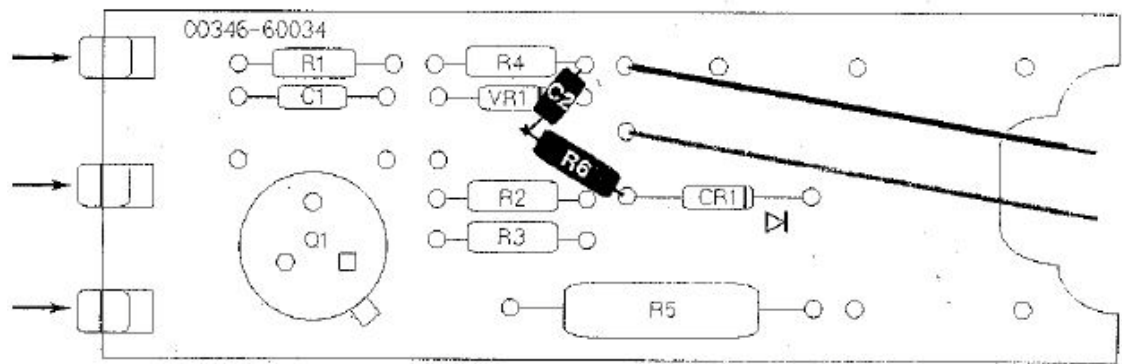


Figure 1 00346-60034

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.



This information is subject to change without notice. Always refer to the Keysight website for the latest revision.

© Keysight Technologies 2001 - 2019
Edition 3, December 16, 2019

Printed in Malaysia



00346-90140

www.keysight.com