

IEEE CAT. NO. 97CH36037  
Copyright Reg. ISSN 0149-645X



# 1997 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM DIGEST

Volume 1

June 8 - 13, 1997  
Colorado Convention Center  
Denver, Colorado

CD-ROM Editor  
Chris Jelks

Digest Editor  
Gerhard A. Koepf

Co-Editors  
Don Huebner  
Joseph J. Donovan



*Responsibility for the contents of the papers published in this Digest rests upon the author and not upon IEEE or any of its members.*

*Additional copies of this Digest are available from,*

The Institute of Electrical and Electronic Engineers, Inc.  
Publication Order Department  
445 Hoes Lane  
Piscataway,  
NJ 08855-1331

IEEE Catalog Number	97CH36037	ISBN 0-7803-3814-6 (softbound)
Library of Congress Number	77-645125	ISBN 0-7803-3815-4 (casebound)
ISSN:	0149-645x	ISBN 0-7803-3816-2 (microfiche)
		ISBN 0-7803-3817-0 (CD-ROM)

***IEEE MTT-S International Microwave Symposium***

IEEE MTT-S International Microwave Symposium Digest 1977  
New York, Institute of Electrical and Electronics Engineers  
v. III. 28 cm. annual

Continues:	IEEE MTT-S International Microwave Symposium Digest of Technical Papers	ISSN 01496298
Key title:	IEEE MTT-S International Microwave Symposium Digest	ISSN 0149-645X

1. Microwaves-Congresses	2. Microwave Devices-Congresses
I. Institute of Electrical and Electronics Engineers	II. IEEE MTT-S International Microwave Symposium Digest

TK7876.I184	621.381'3	77-645 125
Library of Congress	78	MARC-S

***Permission to Reprint or Copy***

*Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through the Copyright Clearance Center; 222 Rosewood Drive, Danvers, MA 01923. For other copying, reprint, or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscatawuy, NJ 08855-1331. All rights reserved.*

*Copyright © 1997 by The Institute of Electrical and Electronics Engineers, Inc.*

***Pictures for front covers contributed by:*** Colorado-Denver Metro Convention & Visitors Bureau, 1555 California Street #300, Denver, CO 80202 (Denver skyline, day and night); Denver International **Airport, Marketing/Governmental Affairs, 8500 Pena Boulevard, Denver, CO 80249 (DIA).**

***Pictures for back covers contributed by:*** Colorado-Denver Metro Convention & visitors Bureau, 1555 California Street #300, Denver, CO 80202 (US Mint, white water rafting, bull rider, Maroon Bells, Long's Peak, Monarch Pass, Rocky Mountain National Park); Air Force Academy, HQ USAFA/PAC, 2346 Academy Drive, Colorado Springs, CO 80840 (AF cathedral); University of Colorado, Campus Box 425, Boulder, CO 80309 (CU Boulder); Royal Gorge Bridge, PO Box 549, Canon City, CO 81215; Red Rocks Morrison, CO (Amphitheater); Durango & Silverton Narrow Gauge Railroad, 479 Main Avenue, Durango, CO 87301; The Adventure Agency 1630A, 30th Street#493, Boulder, CO 80301 (rock climber); Gerhard Koepf (Great Sand Dunes and Mesa Verde cliff dwellings) and Jeremy Koepf (Garden of the Gods City Park), 700 Kalmia Ave. Boulder, CO 80304; Linda D'Evelyn (ice climber) and Gary Wirkkala (mountain biker), SCT, 720 Corporate Circle, Golden, CO 80401.