



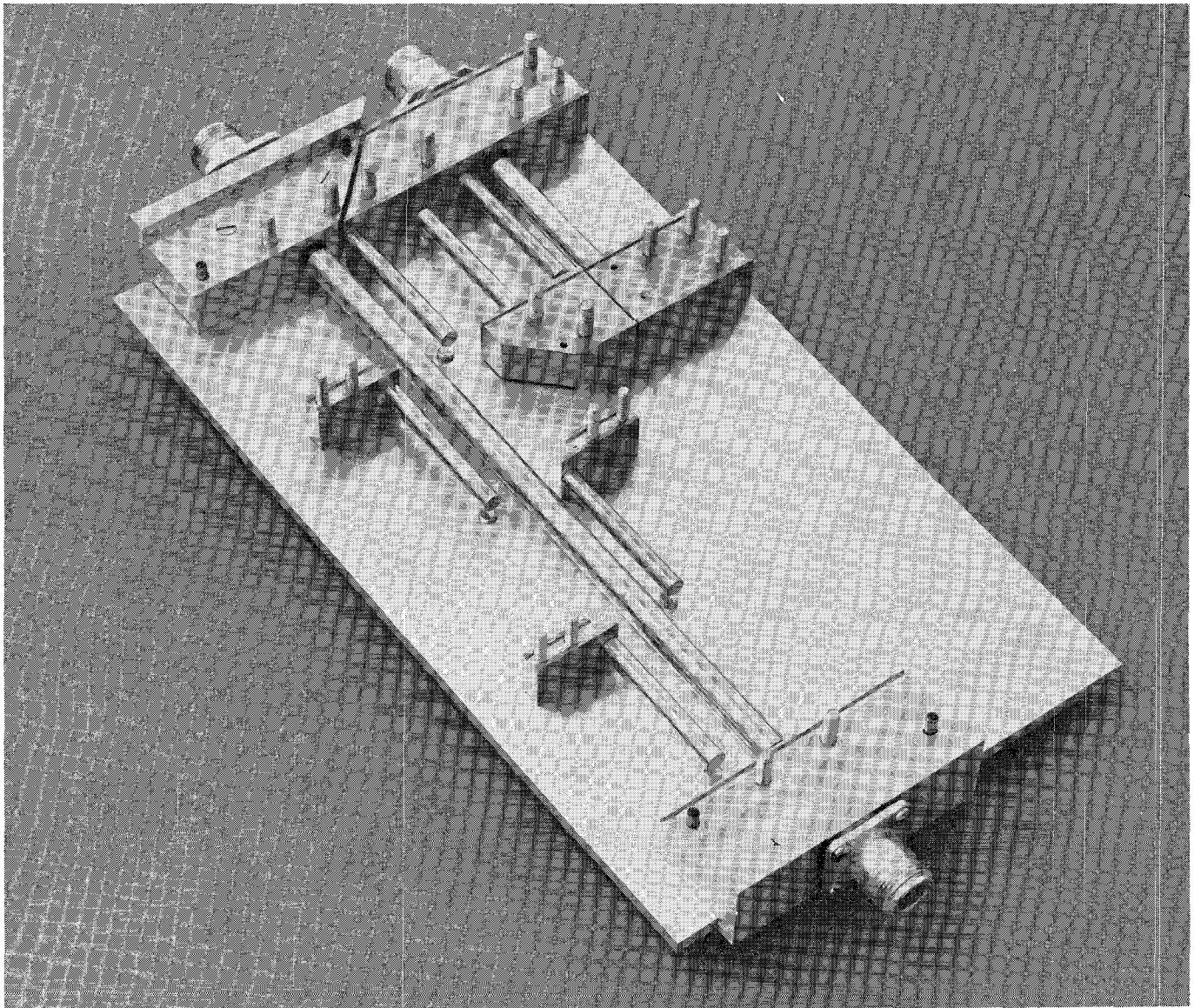
# IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

SEPTEMBER 1965

VOLUME MTT-13

NUMBER 5

**Special Issue on Microwave Filters**





## IEEE MICROWAVE THEORY AND TECHNIQUES GROUP

The Microwave Theory and Techniques Group is an association of IEEE members with professional interest in the field of Microwave Theory and Techniques. All IEEE members are eligible for membership and will receive all Group publications upon payment of the prescribed annual fee of \$4.00. Members of the American Physical Society and the Institution of Electrical Engineers of Great Britain may become affiliated and receive all Group publications upon payment of the Affiliate fee of \$7.50 per year.

### Administrative Committee

Chairman	Vice Chairman	Secretary-Treasurer	
E. N. TORGOW	S. W. ROSENTHAL	P. A. RIZZI	
H. M. ALTSCHULER	S. B. COHN	T. MORENO	K. TOMIYASU
H. E. M. BARLOW	R. C. HANSEN	J. PIPPIN	F. G. R. WARREN
A. C. BECK	R. HENNING	R. A. RIVERS	J. C. WILTSE
J. H. BRYANT	I. KAUFMAN	T. S. SAAD	L. YOUNG
M. COHN	D. D. KING	G. SHAPIRO	

### Honorary Life Members

A. G. CLAVIER	W. W. MUMFORD	G. C. SOUTHWORTH
---------------	---------------	------------------

### Editor

ROBERT W. BEATTY

### Associate Editors

K. TOMIYASU	W. K. KAHN
<i>Microwave Abstracts</i>	<i>Quantum Phenomena and Optical Techniques</i>

### G-MTT Chapters

Albuquerque-Los Alamos	T. M. Tinkle	Nebraska	R. B. Olson
Baltimore	R. A. Moore	New York	M. Rabinowitz
Boston	E. Richter	North Carolina	W. T. Joines
Buffalo	R. Johnson	North Jersey	B. M. Mindes
Chicago	M. Zohn	Orange Co.	J. W. Duncan
Columbus	C. H. Walter	Orlando	J. W. Dees
Dallas	B. R. Hallford	Philadelphia	D. J. Miller
Denver-Boulder	R. E. Larson	San Diego	F. M. Millican
Florida-W. Coast	J. E. Andrews	San Francisco	R. J. Prickett
Foothill	A. DeFrenza	Schenectady	A. E. Blume
Huntsville	L. W. Root, Jr.	Seattle	A. W. Biggs
Kansas City	W. P. Waite	S.E. Michigan	G. Haddad
Long Island	A. Arfin	Syracuse	E. G. Schwartz
Los Angeles	N. P. Weinhouse	Tokyo, Japan	Hideo Iwakata
Milwaukee	T. K. Ishii	Toronto	N. Tomcio
Montreal	T. J. F. Pavlasek	Washington, D. C.	H. W. Cooper

### IEEE TRANSACTIONS® on Microwave Theory and Techniques

Published by the Institute of Electrical and Electronics Engineers for the Microwave Theory and Techniques Group, 345 East 47 Street, New York, N.Y. 10017. Responsibility for the contents rests upon the authors, and not upon the IEEE, the Group, or its members. Individual copies, except special issues, may be purchased at the following prices: IEEE members (one copy) \$2.25, public libraries and colleges, \$3.25, all others \$4.50. Annual subscription price: public libraries and colleges \$12.75; non-members, \$17.00.

Address all manuscripts to Robert W. Beatty, Editor, National Bureau of Standards, Boulder, Colo. Submission of three copies of manuscripts, including figures, will expedite the review.

COPYRIGHT © 1965—THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

Printed in U.S.A.

All rights, including translations, are reserved by The Institute of Electrical and Electronics Engineers, Inc. Requests should be addressed to the Institute of Electrical and Electronics Engineers, 345 East 47 Street, New York, N.Y. 10017