

Advance Programme  
of IFIP WG 10.5  
Workshop on Applications of the  
Reed-Muller Expansion  
in Circuit Design

Hamburg, Germany

September 16-17, 1993  
(between t-Workshop and Euro-DAC)

About the Workshop:

This workshop focuses on the application of AND-ExOR expressions like the Reed-Muller expansions, the Kroenecker expansions, the Exclusive-OR Sum-of-Products form (ESOPs) and others to various aspects of circuit design and implementation.

AND-ExOR expressions are representations of Boolean functions using ExOR polynomials which are known to be of lower complexity and can lead to easier testable implementations than the Sum-of-Products form. The goal of this workshop is to bring together researchers to discuss new approaches in efficient minimization algorithms for AND-ExOR expressions, and to compare OR-based with EXOR-based representations.

The Program Committee selected 26 papers. These will be presented in 5 sessions. A session will take 2 hours, 1 hour for 4 oral presentations taking 15 minutes each, and one hour for a poster session. During this poster session each speaker will present his ideas on an additional poster, to allow extended discussions. Also one poster-only presentation will take place during each poster session.

The workshop will be held at the University Hamburg, Library of the Dept. of Chemistry (Building No. 32), Martin-Luther-King-Pl. 6, near the Congress Center Hamburg.

Sponsors:

This workshop is sponsored by IFIP 10.5.

Information:

For Information about this workshop please contact:

Prof. W. Rosenstiel  
Wilhelm-Schickard-Institut fuer Informatik  
Sand 13  
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Germany  
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email reed-muller@peanuts.informatik.uni-tuebingen.de

Program and Organization Committee:

- U. Kebschull	University of Tuebingen, Germany
- M. A. Perkowski	Portland State University, USA
- R. Rudell	Synopsys Corp. , USA
- T. Sasao	Kyushu Inst. of Technology , Japan
- J. Saul	University of Bristol, UK
- E. Schubert	University of Tuebingen, Germany

Proceedings:

A handout will be distributed to the workshop participants.

Registration Information:

Workshop fees:

Advance registration (Until August 15) DM 200,-  
Late registration (After August 15) DM 250,-

The above fees include admission to all workshop events Thursday thru Friday, Lunch on Thursday and Friday and the Thursday Conference Dinner, and a handout.

Special rates available on site only:

Students DM 60,-

Students must register at-conference and must present a valid Student Identification. Student registration includes lunch and a handout, it does not include the Conference Dinner.

Important registration instructions:

1. Full payment in Deutsch Marks or a copy of the bank transfer MUST accompany registration.
2. To qualify for the lower rate, all Advance Registrations must be postmarked no later than August 15.
3. Register one person per form (copy adjacent form as needed).
4. Payment must be made in Deutsch Marks (free of any bank transfer charges) either by check made payable to "Wilhelm-Schickard-Institut" or by transfer to account Number 67340008 at Volksbank Ammerbuch, BLZ 64161397 and made payable to "Wilhelm-Schickard-Institut".
5. Please use the keyword "IFIP-Reed-Muller-Workshop" for payment!
6. Telephone registrations will not be accepted.

Hotel Reservations:

Following hotels will accept your reservations until August 15:

Hotel Am Holstenwall

Phone: ++49-40-314051, Fax: ++49-40-316264  
single room: DM 192,- double room: DM 268,-

Hotel Baseler Hof

Phone: ++49-40-359060, Fax: ++49-40-35906918  
single room: DM 145,-

Motel Hamburg

Phone: ++49-40-4204141, Fax: ++49-40-4229905  
single room: DM 130,-

All these hotels are within 2km distance from the workshop location. Please do your reservations on your own with keyword "Reed-Muller-Workshop". Reservations can be done for the workshop and the period of Euro-DAC. After August 15 room reservations will be very difficult!

Technical Program:

Thursday, 16 September, 1993

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|-------------|--|
| 9.00-11.00  | Session A: OR- vs. EXOR-based representations (W. Rosenstiel)  |
| A1          | - Towards a Mixed Exclusive-/Inclusive-OR Factored Form,<br>J. Saul  |
| A2          | - The Complexity of Mod-2 Sum PLA's for Symmetric Functions<br>U. Rollwage   |
| A3          | - How much ExOR Improves on OR?<br>C. Damm   |
| A4          | - Minimization of AND-ExOR expressions<br>B. Steinbach, and G. Kempe   |
| A5          | - XOR Canonical Forms of Switching Functions (Poster)<br>M.A. Perkowski, A. Sarabi, and F.R. Beyl                                      |
| A6          | - Reed-Muller Integrated Research/Teaching/Design Environment<br>(Demo Presentation)<br>M.J. Perkowski                                 |
| 11.00-11.15 | Coffee Break   |
| 11.15-13.15 | Session B: Logic Synthesis Methods (T. Sasao)  |
| B1          | - Multilevel Logic Synthesis for Cellular FPGAs Based on<br>Orthogonal Expansions<br>I. Schaefer, M.A. Perkowski, and H. Wu.           |
| B2          | - A Fundamental Theorem for EXOR Circuits<br>M.A. Perkowski  |
| B3          | - Synthesis of Multi-level Reed Muller Circuits using Matrix<br>Transformations<br>G. Lee, J.-Y. Chang, T.T. Hwang, Mary J. Irwin, and |

Robert M. Owens

- B4 - Optimization of the Reed-Muller Exclusive-OR Expansions with Mixed Polarity for Completely and Incompletely Specified Functions  
M.K. Habib
- B5 - A Numerical Method for Reed-Muller Circuit Synthesis (Poster)  
M.A. Thornton and V.S.S. Nair

13.15-15.00 Lunch Break

- 15.00-17.00 Session C: Theoretical studies (M.A. Perkowski)
- C1 - Fast Walsh Transform Computation with Binary Decision Diagram  
E.M. Clarke, X. Zhao, M. Fujita, and Y. Matsunaga
- C2 - Spectral Transforms for Large Boolean Functions with Applications to Technology Mapping  
E.M. Clarke, K.L. McMillan, X. Zhao, and M. Fujita
- C3 - An Exact Minimization of AND-EXOR Expressions Using BDDs  
T. Sasao
- C4 - LP Characteristic Vector of Logic Functions  
N. Koda and T. Sasao
- C5 - Multilevel Logic Minimization Using K-map XOR Patterns (Poster)  
R.F. Tinder
- C6 - Estimations of Shannon's Function for Polarity Reed-Muller Expressions (Poster)  
V. Suprun

Friday, 17 september, 1993

- 9.00-11.00 Session D: Testability Aspects (J. Saul)
- D1 - Rapid Prototyping of Fully Testable Multi-Level AND/EXOR Networks  
R. Drechsler and B. Becker
- D2 - Testability of a Class of Multi-level Reed Muller Circuits  
G. Lee, M. Hwang, Mary Jane Irwin, and Robert M. Owens
- D3 - Minimization of Parity-Checked Fault-Secure AND/EXOR Networks  
M. Eggerstedt, N. Hendrich, and K. von der Heide
- D4 - Design for Testability Properties of AND/XOR Networks  
A. Sarabi and M.A. Perkowski.
- D5 - An Approach to PLA Test Pattern Generation Using Reed-Muller Networks (Poster)  
M. Riege and W. Anheier

11.00-11.15 Coffee Break

- 11.15-13.00 Session E: Graph-based Representations (M. Fujita)
- E1 - On the Implementation of a Package for Efficient Representation and Manipulation of Functional Decision Diagrams  
B. Becker, R. Drechsler, and M. Theobald
- E2 - Mod-2-OBDDs -- a Generalization of OBDDs and EXOR-Sum-of-Products  
J. Gergov and C. Meinel
- E3 - Some Optimizations for Functional Decision Diagrams  
E. Schubert, U. Keschull, and W. Rosenstiel
- E4 - Reed-Muller Binary Decision Diagrams (Poster)  
L. McKenzie, L. Xu, and A.E.A. Almaini

13.00 Closing Session & Lunch

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Registration Form

To register, mail this form or a copy of this form with payment to:

IFIP-Reed-Muller-Workshop  
Technische Informatik  
WSI  
Sand 13  
72076 Tuebingen  
Germany  
(Fax: ++49-7071-610399)

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(Please type or print clearly, this information will be used to print your identification badge!)

Name \_\_\_\_\_

Prenome \_\_\_\_\_

Company \_\_\_\_\_

Mail Stop \_\_\_\_\_

Street Address \_\_\_\_\_

Postal Code \_\_\_\_\_

Country \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number \_\_\_\_\_

Email \_\_\_\_\_

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IFIP-Reed-Muller-Workshop

Hotel Reservation

Name \_\_\_\_\_

Prenome \_\_\_\_\_

Company \_\_\_\_\_

Mail Stop \_\_\_\_\_

Street Address \_\_\_\_\_

Postal Code \_\_\_\_\_

Country \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number \_\_\_\_\_

Arrival (Date & Time) \_\_\_\_\_

Departure (Date & Time) \_\_\_\_\_

Signature

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Send this reservation directly to your hotel!  
Keep in mind the deadline for reservation:  
August 15.