10th IFAC Workshop on Programmable Devices and Embedded Systems 2010

(PDES 2010)

Gliwice, Poland
6-7 October 2010

Editors:

Adam Milik **Edward Hrynkiewicz**

ISBN: 978-1-61839-622-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2010) by Elsevier Limited
All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the publisher, Elsevier Limited
at the address below.

Elsevier Limited
The Boulevard, Langford Lane
Kidlington OX5 1GB, United Kingdom

Phone: +44 (0)1865 844640
Fax: +44 (0)1865 843912

Email: eurobkinfo@elsevier.com

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

Content

Banyan Switch Applied for LDPC Decoder FPGA Implementation 1
Wojciech Sułek

The Stream Ciphers and the Keystream Generator Based on Inverse Permutation 7
Vladimir Scholtz, J. Scholtzova

Wavelet Based Approach for Fusarium Corn Kernels Recognition Using Spectral Data Processing 11
Tsvetelina D. Draganova, Violeta P. Mancheva, Plamen I. Daskalov, Rusin S. Tsonev

Implementation of the Robot Ego-Motion Estimation Algorithm with FPGA Circuits 16
Marek Kraft, Andrzej Kasiński

On Efficient Implementation of Search Algorithm for Genome Patterns 22
Adam Milik, Andrzej Pułka

Multiplication in GF(2m): Area and Time Dependency/Efficiency/Complexity Analysis 28
Danuta Pamuła , Edward Hrynkiewicz, Arnaud Tisserand

Contention-free and Application-specific Network-on-Chip Generation for Embedded Systems 34
Robert Tomaszewski, Stanisław Deniziak

Active Noise Control System on Multicore DSP 40
Krzysztof Czyż, Tomasz Zając

Active Noise Control Systems with Time Varying Sound Sensor Position 44
Małgorzata I. Michalczyk

Hybrid QRS Detection Circuit Based on Dynamic Reconfigurable 48
Field Programmable Analog Array
Andrzej Malcher, Stanisław Pietraszek, Tomasz Przybyła

Image and video processing on FPGAs: An Exploration Framework for 54
Real-Time Applications
Paulo da Cunha Possa, Zied El Hadhri, Carlos Valderrama

Intra Prediction Hardware Module For High-Profile H.264/AVC Decoder. 60
Mikołaj Roszkowski, Grzegorz Pastuszak

Stream Header Decoder and Context-Adaptive Variable-Length Decoder Hardware Module 66
for H.264/AVC Codec
Grzegorz Pastuszak, Michał Wieczorek

Matched DDWT ROI Compression Engine for the Imaging Particle Detector 72
Wojciech Półchłopek, Roman Rumian

Fast Cycle-Accurate Compiled Simulation 76
Zdeněk Přikryl, Tomáš Hruška, Karel Masařík, Adam Husár

Reduced-size Signature-based Diagnostic Dictionary for Interconnection Testing 82
Tomasz Garbolino, Krzysztof Gucwa, Andrzej Hławiczka

Strategy for Modeling Variability in Configurable Software. 88
Anilloy A. Frank, Eugen Brenner

On Embeddable Passive Testing 92
Krzysztof M. Brzeziński

Development of Interconnecting SW for Intranets and Fieldbuses 98
Miroslav Sveda, Roman Trchalik

TNC Controller Influence on Transmission Delays in Packet Radio Network 104
Bartłomiej Zieliński

Trends in Automation – Investigation in Network Control Systems and Sensor Networks 109
Frantisek Zezulka, Zdenek Bradac, Petr Fiedler, Michal Šír

Model based Binary Decision Diagrams for Complex Networks Reliability Optimization 114
Mohamed-Larbi Rebaiaia, Daoud Ait-Kadi

An Outline of Advanced Regulation Techniques on PLC Background and Control Systems 120
with Self Tuning Methods Design
Jiri Kocian, Jiri Koziorek

Application of H-infinity Robust Controller on PAC 126
Stepan Ozana, Martin Pies

A FPGA-Based Bit-Word PLC CPUs Development Platform 132
Mirosław Chmiel, Edward Hrynkiewicz, Jan Mocha

Virtual Automation Networks – One Way from Incompatibility 138
Petr Fiedler, Frantisek Zezulka, Zdenek Bradac, Václav Kaczmarczyk, O. Sajdl

Optimization of Robot Trajectory with Motion Constraints 144
Viktor Michna, Petr Wagner, Zdenek Machacek

Motion Control for Robots Based on Cubic Hermite Splines in Real-Time 150
Petr Wagner, Jan Kordas, Viktor Michna, Jiri Kotzian

Model-Based Development Concept for Hybrid Systems to Support Process Engineers 156
in Thermo-Mechanical Process Development
Gülden Bayrak, Brigit Vogel-Heuser

Greenhouse Energy Balance Modeling Review and Perspectives 162
Silviu Gavrila, Aurel Gontean

Chaotic Logistic Map Implementation in the PIC12F629 Microcontroller Unit 167
Leonardo Acho Zuppa

The Oscilloscope as a Digital Display 171
Roland Szabó, Aurel Gontean, Ioan Lie

A Noise Robust IFA Identification Method and Their Implementation at DSC 177
Veselý Ivo, Zámečník Dušan

Application of Wireless Sensor Networks for Road Monitoring 183
Ondrej Karpis, Jozef Juricek, Juraj Micek

Direct Digital Synthesis Based - Function Generator with Digital Signal Modulations 189
Zdenek Machacek, Martin Gabzdyl, Viktor Michna

Design and Simulation of the Embedded System 195
Jan Kordas, Petr Wagner, Vilém Srovnal

High Fidelity FPGA-Based Music Player 201
Jerzy Kasperek, Wojciech Półchłopek, Paweł J.Rajda, Jaromir Waszczyszyn

Hardware Implementation of the Transformation Module of the MPEG-4 AAC Codec 205
Grzegorz Brzuchalski, Grzegorz Pastuszak

Context-Adaptive Binary Arithmetic Decoder Architecture for H.264/AVC 211
Andrzej Abramowski, Grzegorz Pastuszak

A PC-Based Object Simulator for Supporting PLC Software Development 215
Józef Kulisz, Robert Czerwiński, Jan Mocha, Mirosław Chmiel

On Simulation Methods for Timed Automata 221
Václav Kaczmarczyk, Zdeněk Bradáč, Michal Šír

The Determination of Microbicidal Effects of Corona Discharge Using the Image Analysis 227
Hana Soušková, L. Kommová, V. Scholtz, A. Korbárová, J. Julák

The Virtual Drum Kit 232
Piotr Foltyn, Przemyslaw Flak, Robert Czerwinski, Tomasz Rudnicki

The Use of RFID Technology in Mines for Identification and Localization of Persons 236
Vladimir Hon, Zdenek Slanina, Martin Dostal

Implementation of Video Synchronisation Generator Based on Block RAM Memory 242
Peter Ševčík

Interoperability and Ontology for AS-Interface Bus 248
Šír Michal, Fiedler Petr, Václav Kaczmarczyk

Fieldbus and Functional Safety 254
Tomas Larys

An Input Shaping Filter 259
Juraj Miček, Ján Kapitulík

Usage of Web Applications for Monitoring of Geothermal Systems 264
Radovan Hajovsky, Petr Vojcinak, Jiri Koziorek

Usage of Software Applications for Temperature Analysis of SRP Boreholes 270
Petr Vojcinak, Radovan Hajovsky, Jiri Koziorek

STD Approach for Simulation, Control and Visualization of Color-sorting Machine 276
Stepan Ozana, Zdenek Slanina, Martin Pies

Simulative Evaluation of SNR in Asynchronous Sigma-Delta ADC 280
Marek Jabłeka