

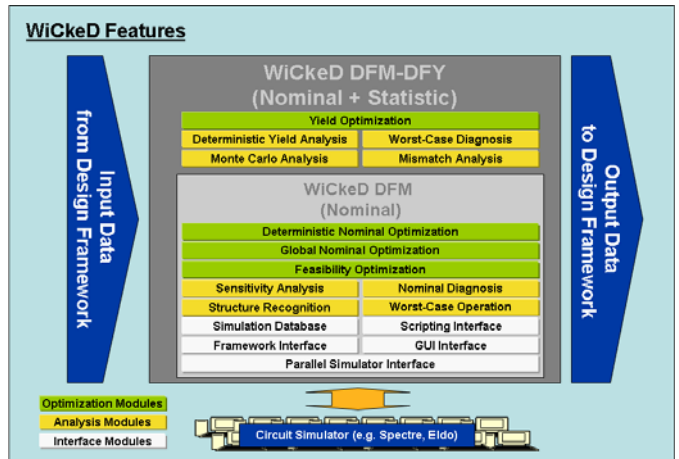
An IP Porting System for Analog Libraries

Porting analog IP libraries to new technologies is a time-consuming task that traditionally has been performed manually. To speed up the main steps of specification-driven resizing, we required an industry-proven, fast and incremental circuit optimizer. IP porting of libraries particularly benefits from MunEDA's analog design system WiCkeD, that allow the user to apply an "optimization strategy" and also let it run automatically, because many circuit topologies are sized a few times each to target different specifications and

technologies. For our Analog IP porting project, proven manual design strategies are translated into user-defined step-by-step optimization procedures, thereby perpetuating important design knowledge that is not otherwise formalized. This methodology accelerates the optimization flow, makes it reliable and facilitates the introduction of automated IP porting to an existing manual workflow.

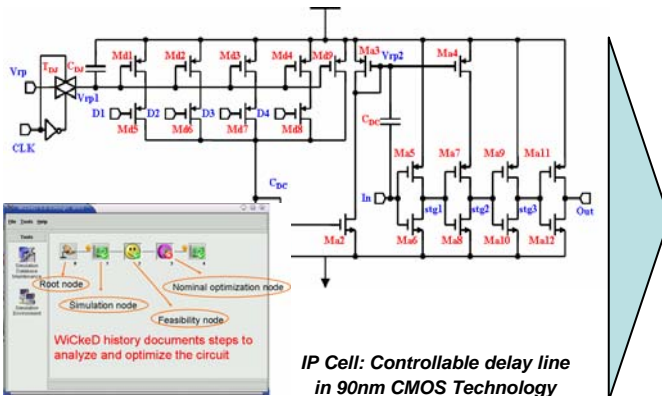
Faraday IP Porting Flow & Tools using WiCkeD

IP Porting Flow Elements	Applied Tools
Parameter / specification / objective set up	- Circuit modeling and characterization workbench, performance specifications and optimization goals - MunEDA-Module BAS: Constraint Editor
Simulation	- Synopsys-HSPICE®, Mentor Eldo® - MunEDA-Module BAS: Parallel Simulator Interface
Topology Analysis & Constraint Management	MunEDA-Module BAS + FEA: Constraint Editor with Automatic Structure Recognition and Constraint Setup, Feasibility Optimization
Sensitivity Analysis & Nominal Diagnosis	MunEDA-Module BAS + NOD: Sensitivity Analysis, Nominal Diagnosis
Nominal Optimization	MunEDA-Module NOP: Automatic Deterministic Nominal Optimization (Least Square, Parameter Distance Algorithms)
Layout Migration	Layout Migration Tool



Thomas Hsieh, R&D Associate Vice President, Faraday Technology Corp:

"MunEDA's WiCkeD showed the capability as an optimization tool in the key role of our IP porting project. The capacity is a general issue for the simulation-based optimization tool. We successfully could demonstrate the circuit optimization process through the comprehensive GUI and script based flow."



David Wu, R&D Technical Director, Faraday Technology Corp.:

"We successfully used the script language provided by WiCkeD in the optimization plan to drive the porting process in less than 1,5 hours from 0,18µm to 90nm (including layout). It's quite impressive. The same task requires days of efforts for a regular designer. The simple setup procedure and intuitive flow make it a useful tool kit for automatic circuit optimization."

Optimization Plan	Targets
Step 1: MOS Characteristics	Calculate shortest possible transistor length that achieves a small sensitivity of the channel length modulation parameter: $\Delta\lambda/\lambda$.
Step 2: Anti-Jitter Design	Minimize the area of transmission gates with constraints on max. allowed clock feedthrough.
Step 3: Reference Voltage	Adjust current mirror to achieve balanced voltage level.
Step 4: Monotonic Current Sources	Adjust current sources so that binary codes cause a monotonic increase of the currents.
Step 5: De-couple compensation	Minimize area of C_{DC} with constraints on max. coupling between stages through current supply.
Step 6 Loading and Driving Capability	Find minimal area of output stage for required driving capability.
Step 7 Enlarge Operation Range	Increase output voltage range to 99% of V_{DD} while keeping area small.

About Faraday Technology Corporation

Faraday Technology Corporation is a leading fabless ASIC vendor as well as a silicon intellectual property (SIP) provider. Faraday has been acknowledged its innovative power with over 3,000 successful designs, along with nearly 100 million ASIC chips shipped annually worldwide. The ability in attaining an economic scale in top quality ASIC products has allowed Faraday to establish an enormous IP data bank. Faraday's ASIC and IP business models complement each other, which contributes as the key to its success. Faraday was founded in 1993. Faraday posted 171 million US dollars revenues for 2006 and currently employs approximately 700 people worldwide. Faraday is a public traded company in the Taipei stock exchange with its headquarters in Taiwan, and affiliates in the United States, Japan, China, and Europe.

About MunEDA

MunEDA provides leading EDA technology for analysis and optimization of yield and performance of analog, mixed-signal and digital designs. MunEDA's products and consulting enable customers to reduce the design times of their circuits and to maximize robustness and yield. MunEDA's solutions are in industrial use by leading semiconductor companies in the areas of communication, computer, memories, automotive, and consumer electronics. WiCkeD is a comprehensive and powerful software tool for interactive, manual, semi- and full automatic analysis, sizing, design centering and yield optimization of analog and mixed signal circuits. MunEDA has distribution partners worldwide.