



TRUE CIRCUITS INC.™ | *timing is everything*

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**Chip**Estimate™

# About True Circuits



- Leading provider of high-speed analog/mixed-signal timing IP products
- Founded in 1998, with new offices in Los Altos, CA
- Team of expert analog circuit designers who perform leading-edge R&D
- Powerful circuit characterization platform
- Automated layout generation technology
- Close technical relationships with leading foundries and IDMs in advanced process technologies
- Fully tested PLL and DLL hard macros in a variety of processes that meet customers' exact timing requirements



# PLL and DLL Product Line



- Clock Generator, Spread Spectrum, Low Bandwidth and Deskew PLLs
- High-speed DLLs
- TSMC, UMC, CHRT and Common Platform processes from 180nm to 55nm
- Support latest DDR, SerDes and video standards
- Low-jitter and very process tolerant
- Large multiplication factors (1-4096)
- Wide output frequency ranges
- Small sizes and flexible form factors
- Pin programmable
- Fully documented and supported through production ramp



# Advanced Process Experience



- 2003 – 90nm development with TI and TSMC
- 2004 – 90nm production ramp with TSMC
- 2005 – 65nm development with TI and TSMC
- 2005 – 90nm development with CHRT, NEC and UMC
- 2006 – 65nm development with CHRT
- 2007 – 55nm development with TSMC and NEC
- 2007 – 65nm/55nm production ramp with TSMC
- 2007 – Starting 45nm development



# Business Model



- TCI licenses its hard macros directly to customers or through its partners
  - Licensing terms are per use/multi use and do not require royalty payments
- TCI has partnerships with other semiconductor companies that provide indirect sales and distribution channels for its licensed products
  - IDM, ASIC, Foundry and Web portal IP libraries
  - Design services firms (True Partner Program)
  - IP Partners
  - Sales representatives/distributors
- All TCI products are designed and packaged so customers can easily choose and integrate a hard macro that meets their specific needs



# Why Customers Choose TCI



- Expertise developing advanced, robust and low-jitter analog/mixed-signal circuits
- Powerful circuit characterization platform for thorough pre-silicon verification
- Automated layout generation technology that accelerates analog IP development
- Large portfolio of PLL and DLL IP in advanced CMOS processes
- Close technical relationships with leading foundries and IDMs in advanced processes
- Staff of Ph.D.-level circuit designers who offer expert pre- and post-sale support
  - Track record of first-time silicon success over hundreds of IP implementations
  - Impressive list of marquee customers spanning the global semiconductor industry



# Thank you!



- Please stay and talk with Stephen
- Explore True Circuits IP at [ChipEstimate.com](http://ChipEstimate.com)
- Use True Circuits IP to Plan a Chip at DAC (get a DAC Trip Report!)

