

Reprinted with permission from *The Tuesday Report, Chip Scale Review*, March 6, 2007. Copyright © CSR 2007.

**A new interconnection technology blooms
at Rev. Jerry Falwell's university**

Los Angeles—What do the Rev. Jerry Falwell and Liberty University, the fundamentalist Baptist institution he founded, have in common with the semiconductor industry?

Until recently, the answer would have been nothing.

However, last year inventor Charles S. Clark, the father of two LU alumni and a 30-year veteran of the electronics industry, donated his invention for “mirrored pinouts” to the university.



Martin Hart
(Chip Scale Review)

On the other hand, Martin “Marty” Hart is a veteran of the semiconductor industry and the “King of Dummy Components,” which he has purveyed for several decades through his Garden Grove, Calif., company, TopLine [***topline.tv***]

Liberty, with no experience in semiconductors or electronics, decided it needed a way to bring Clark’s invention to market. The university took a booth at last year’s PCB West, hoping to interest someone with experience and connections.

Hart was drawn to the Liberty booth at the show and discussed the invention with Clark, he told ***Chip Scale Review*** recently during APEX in Los Angeles. When Clark explained it, says Hart, “I realized that my life would not be the same again.”



Sometimes technology
blooms where you least
expect it.

Letter of Intent

As a result of that meeting, LU has signed a letter of intent with Hart to take the mirrored pinout from concept to production. The University has also filed a patent for the invention and believes it may be worth “many, many millions of dollars.” Hart agrees.

The benefits of the mirrored pinouts are a smaller circuit board, a faster circuit speed, reduction of inner layers (for reduced EMI), and lower cost. With a standard pinout, the circuit routing is relatively long.

(Continued)

A new interconnection technology blooms (continued)

By combining standard pinout ICs together with mirrored pinout devices, however, the routing distance is very short, as shown in the illustration.

The project has been taken over by Hart's new startup **Mirror Semiconductor** [mirrorsemi.com].

He's in the very early stages of proof of concept, talking to prototype shops like Corwil.

Hart says as many as 20 percent of the boards currently built may ultimately have a small percentage of devices with mirrored pinouts on them.

Most of the same IC assembly equipment used traditionally will be employed for the mirrored pinouts (MPs), except MP packages are wirebonded in a clockwise direction, while standard pinouts are wirebonded in a counter-clockwise direction. Hart says he's also considering deploying Microbond's "Xwire" for bonding.

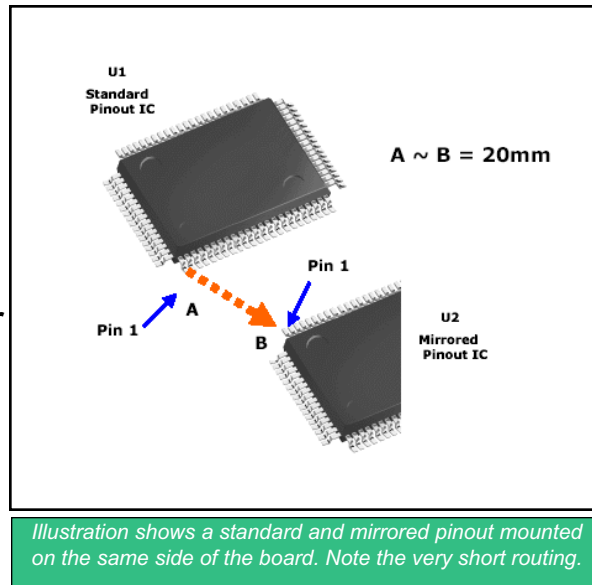
The greatest change in the IC device assembly process, he adds, will involve designing new wire-bonding software. Special fixtures will also be needed.

"If the market will embrace MPs," he adds, "we're looking at capturing six billion devices that are now being packaged per year, which is only 5 percent of the total number of packages."

Part of the anticipated business, says Hart, will be as a fabless IC maker, delivering IC devices using the MPs. The other part of Mirror Semi's revenue, he adds, will come from customers who want to license the technology, such as packaging foundries, OEMs, ODMs and other fabless IC makers.

Mix and Match

Essentially, any semiconductor can be made into a package with a mirrored pinout, and the MPs, known as **MirrorChips™**, can be mixed on the same board with standard pinouts.



(Continued)

A new interconnection technology blooms (continued)

The startup will be based in Irvine, Calif., near but separate from TopLine's Southern California home. Hart says he has already lined-up representative offices in France, Germany, Japan, Korea, Sweden and the U.S.

"We are now looking for both strategic partners and venture capitalists," Hart says. If the MP is the success he thinks it will be, Hart plans to "pick a successor" for TopLine.

While he believes the first key application may be for parallel data bus circuits, the invention may have extensive applications for many devices, including microcontrollers, memory and digital signal processors, he says.

—**Ron Iscoff, Editor**

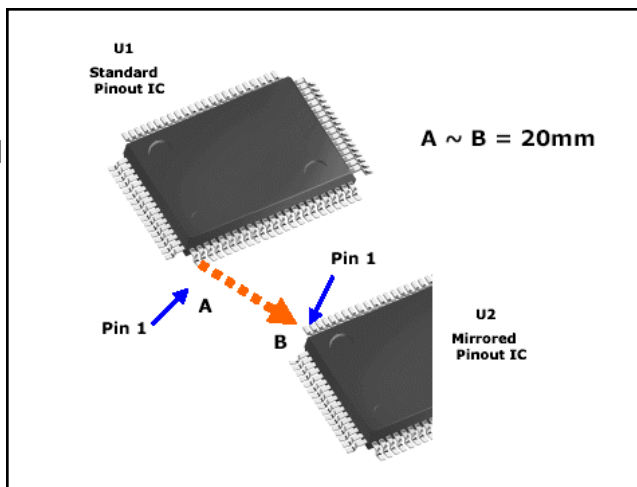


Illustration shows a standard and mirrored pinout mounted on the same side of the board. Note the very short routing.

Have you subscribed to *Chip Scale Review* yet?
Did you know it's free in the United States?
You can select digital or print or both!
Don't miss any future issues!

Click [here](#) to subscribe today!

THE TUESDAY REPORT™

is published every Tuesday, except on federal and California state holidays by *Chip Scale Review*. To subscribe, please click [here](#). Copyright (C) Gene Selven & Associates Inc., 2007. All rights reserved. To contact the office of publication, phone 408/996-7016.

Publisher
Editor
Senior Editor

Gene Selven
Ron Iscoff
Terrence E. Thompson

gselven@aol.com
chipscale@gmail.com
tethompson@aol.com