

# 3DPanel: 3D Flash, The Next Dimension

Steve Leibson, Cadence Design Systems

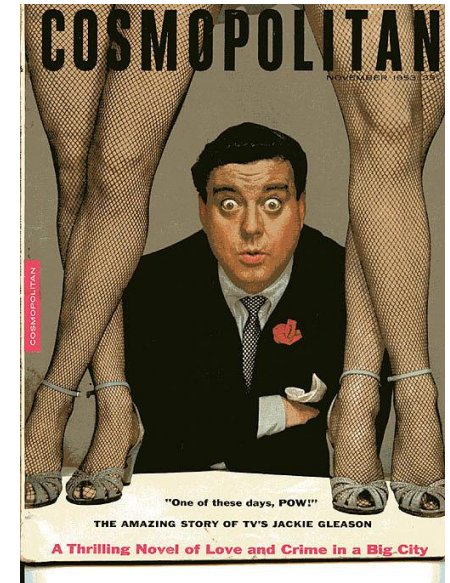
# Steve's Improbable History of 3D Electronics



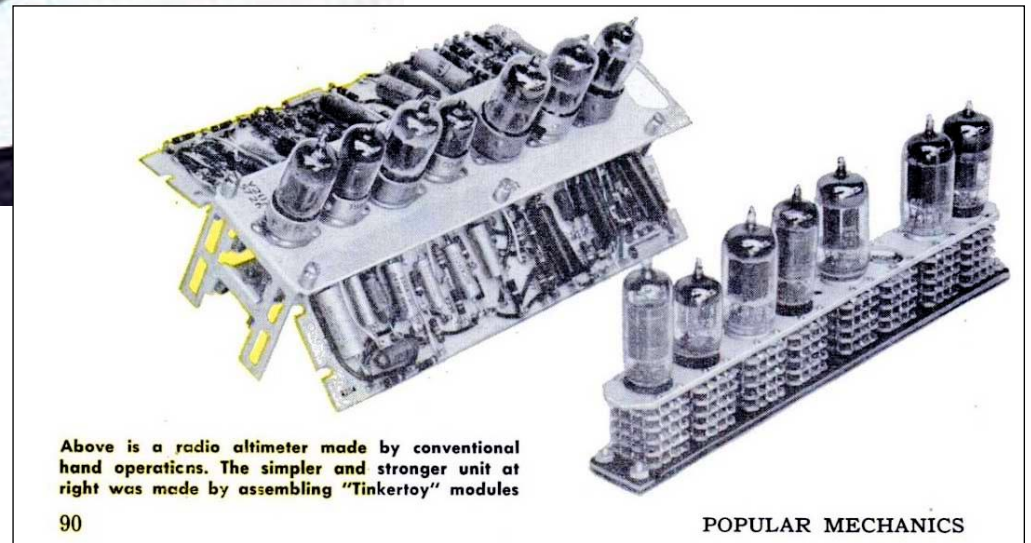
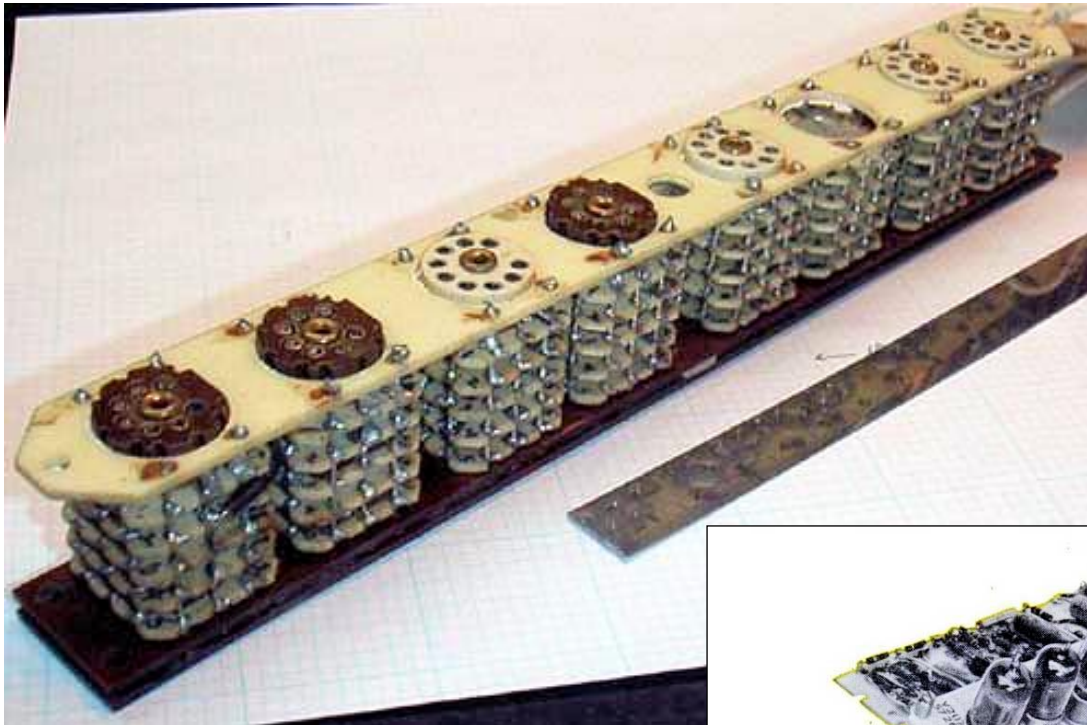
**Sherman, set the Wayback Machine  
for 1953,**

# 3D Assembly Has been a dream and an art for a long, long time

- We've been building 3D electronic circuits at least since I've been alive – 1953

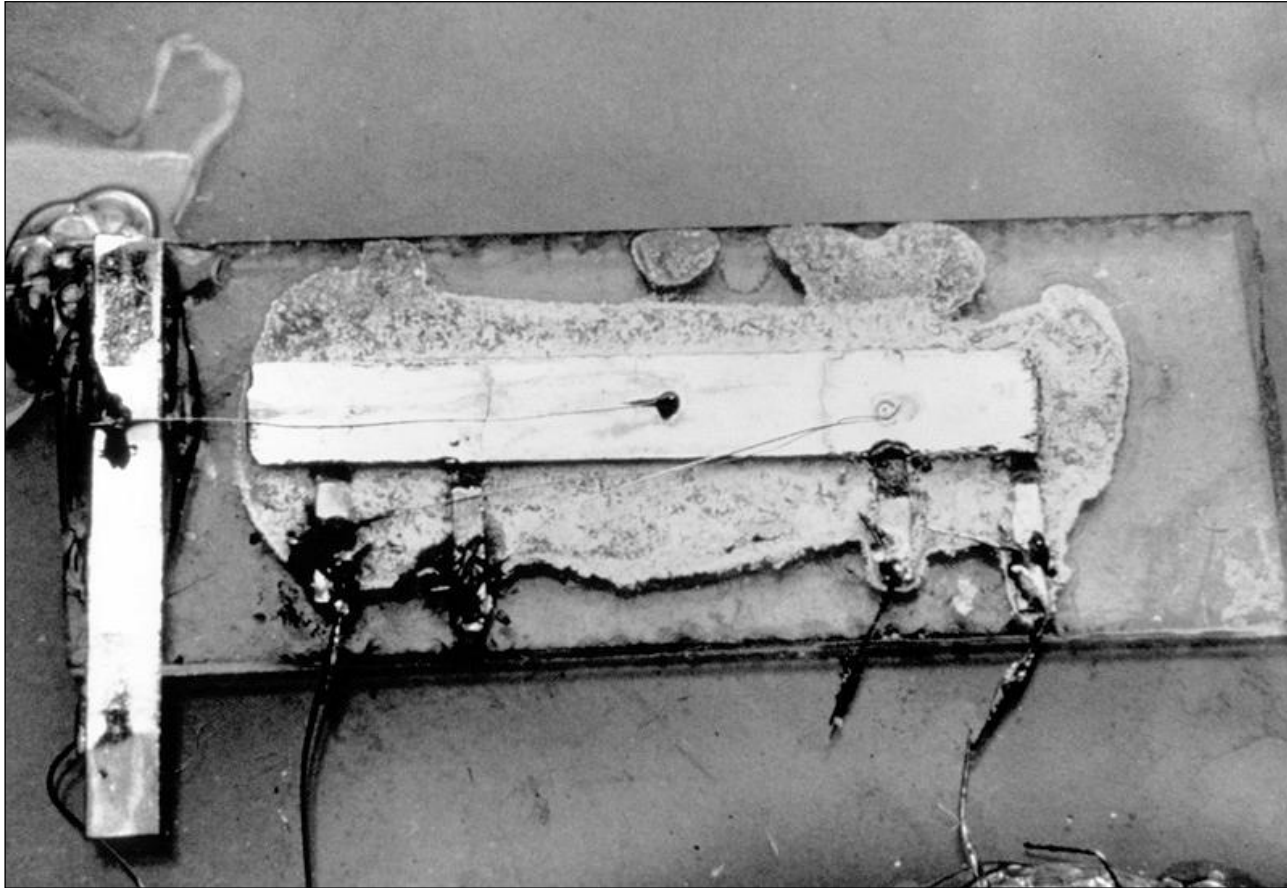


# 3D Circa 1953: Project Tinkertoy



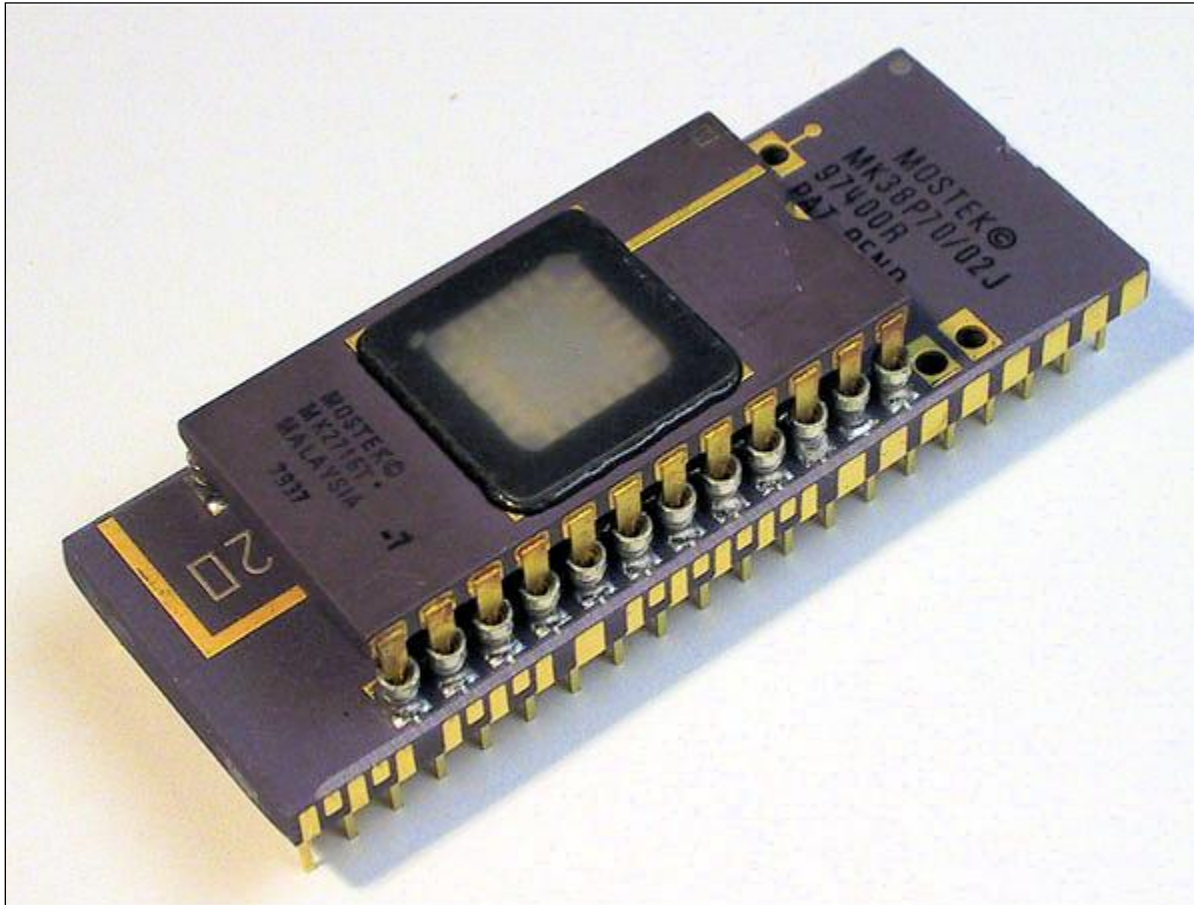
[http://www.radiomuseum.org/forum/usa\\_project\\_tinkertoy.html](http://www.radiomuseum.org/forum/usa_project_tinkertoy.html)

# 3D Circa 1959: Jack Kilby's first IC at TI



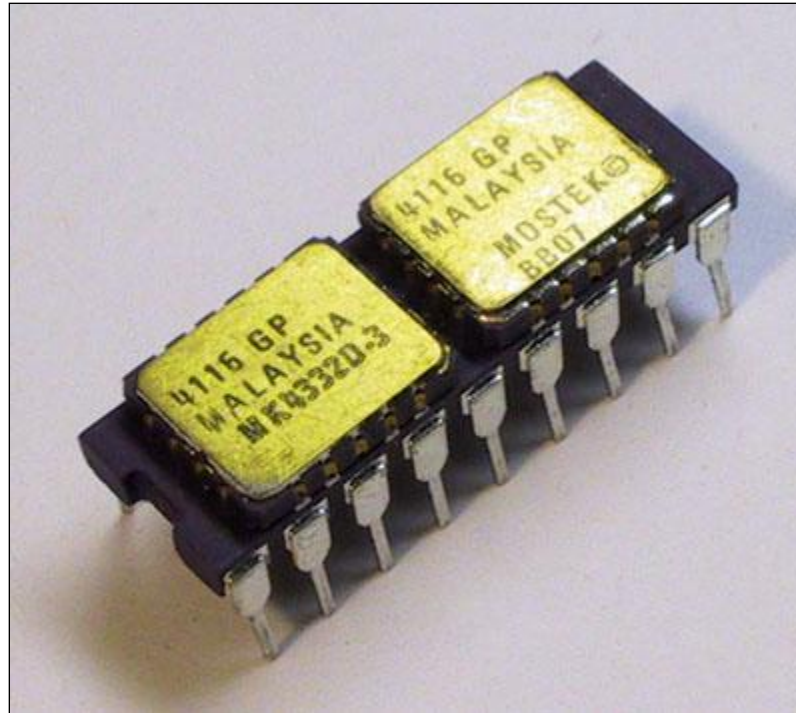
<http://www.computerhistory.org/timeline/?category=cmpnt>

# 3D Circa 1979: Mostek MK3870 microcontroller with piggyback EPROM (Package on Package)



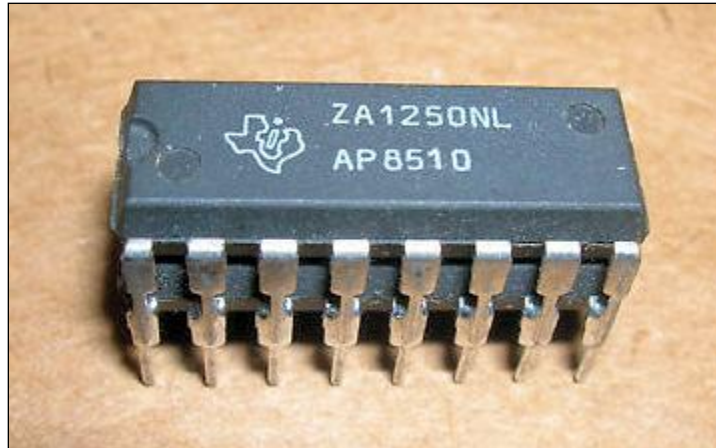
<http://decadecounter.com/vta/articleview.php?item=399>

# 3D Circa 1979: Mostek dual-cavity MK4332 32Kbit DRAM MCM (Ceramic Interposer)



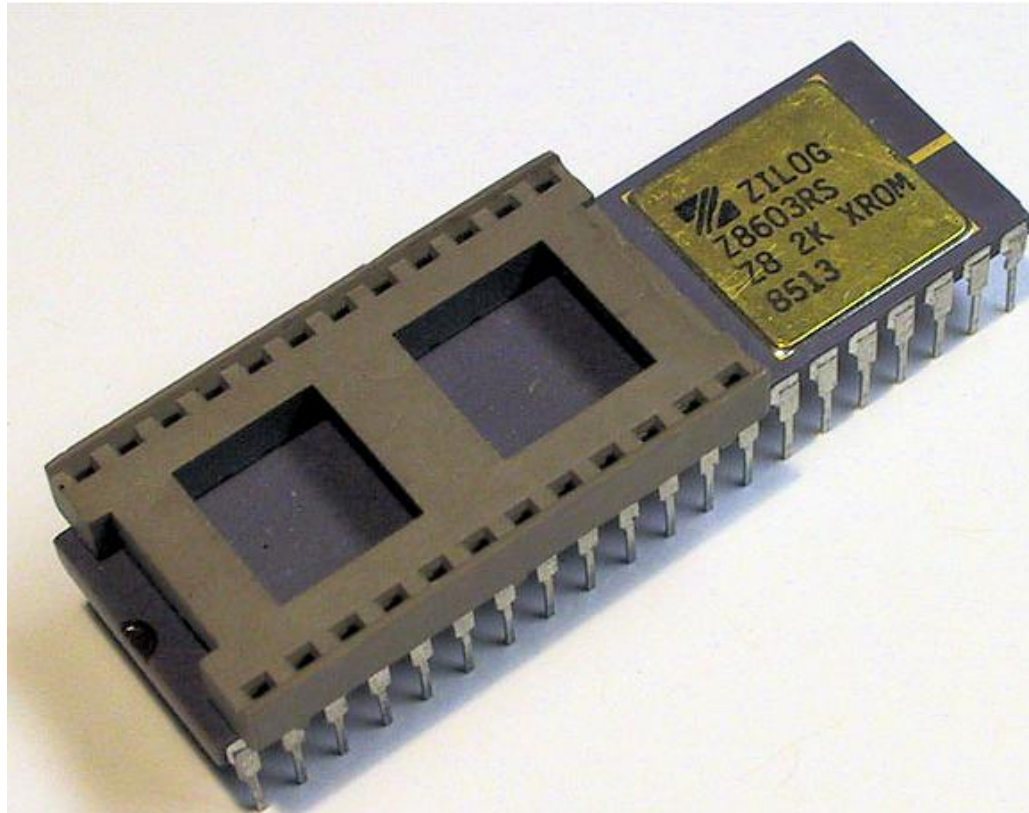
<http://www.decadecounter.com/vta/storearticleview.php?item=23>

# 3D Circa 1985: 128Kbit (2x 64Kbit) Stacked DRAM for IBM PC-AT (Package on Package)



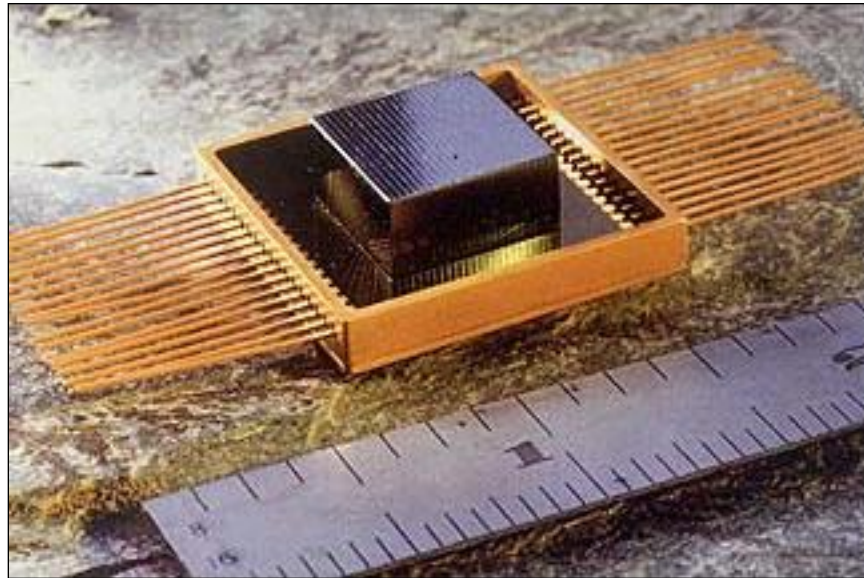


# 3D Circa 1985: Zilog Z8 with EPROM piggyback (Package on Package)



<http://www.decadecounter.com/vta/storearticleview.php?item=23>

# 3D Circa 1992: Irvine Sensors/NASA Memory Short Stack



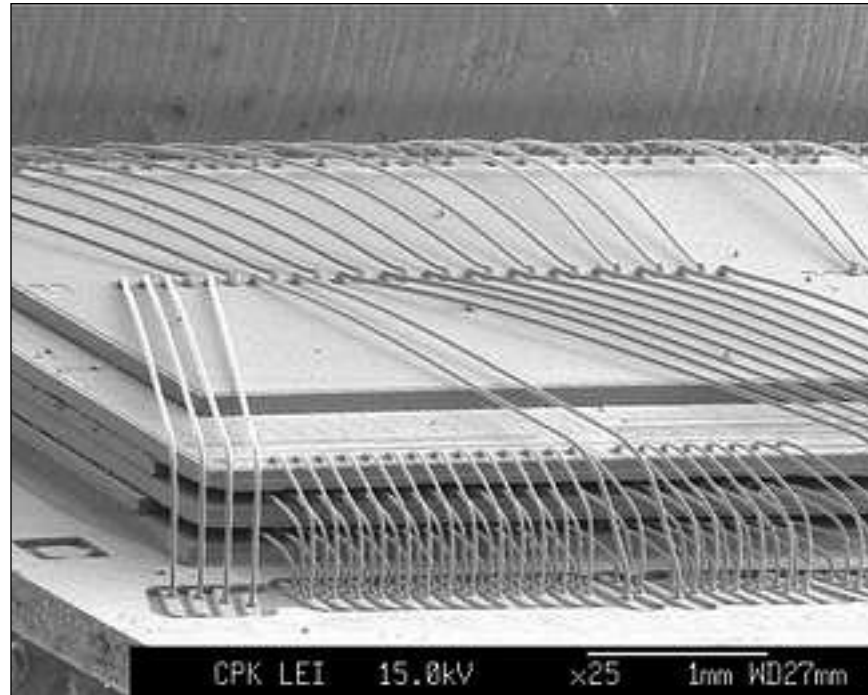
<http://www.sti.nasa.gov/tto/spinoff1996/57.html>

O.C. BRIEFLY

Irvine Sensors and IBM Reach  
Agreement on Stackable Chips

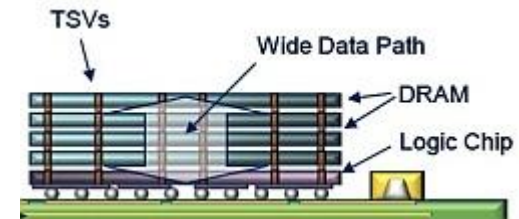
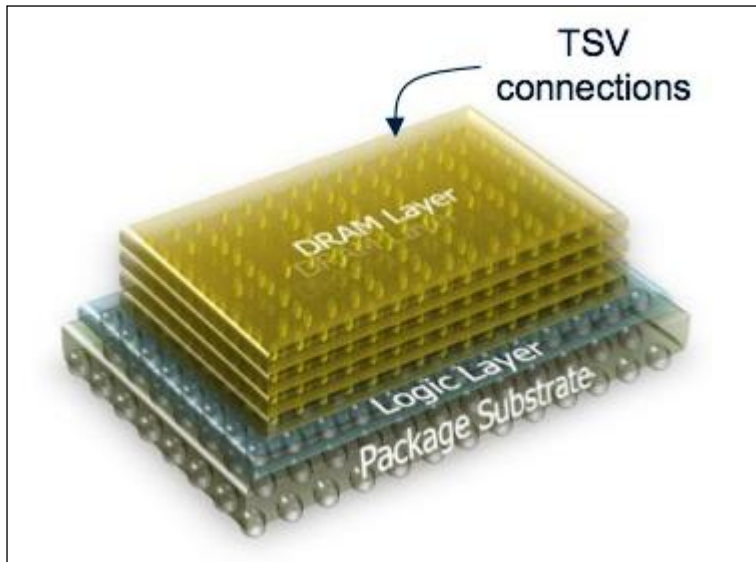
December 15, 1992

# 3D Circa 2000: Wire-bonded chip stack



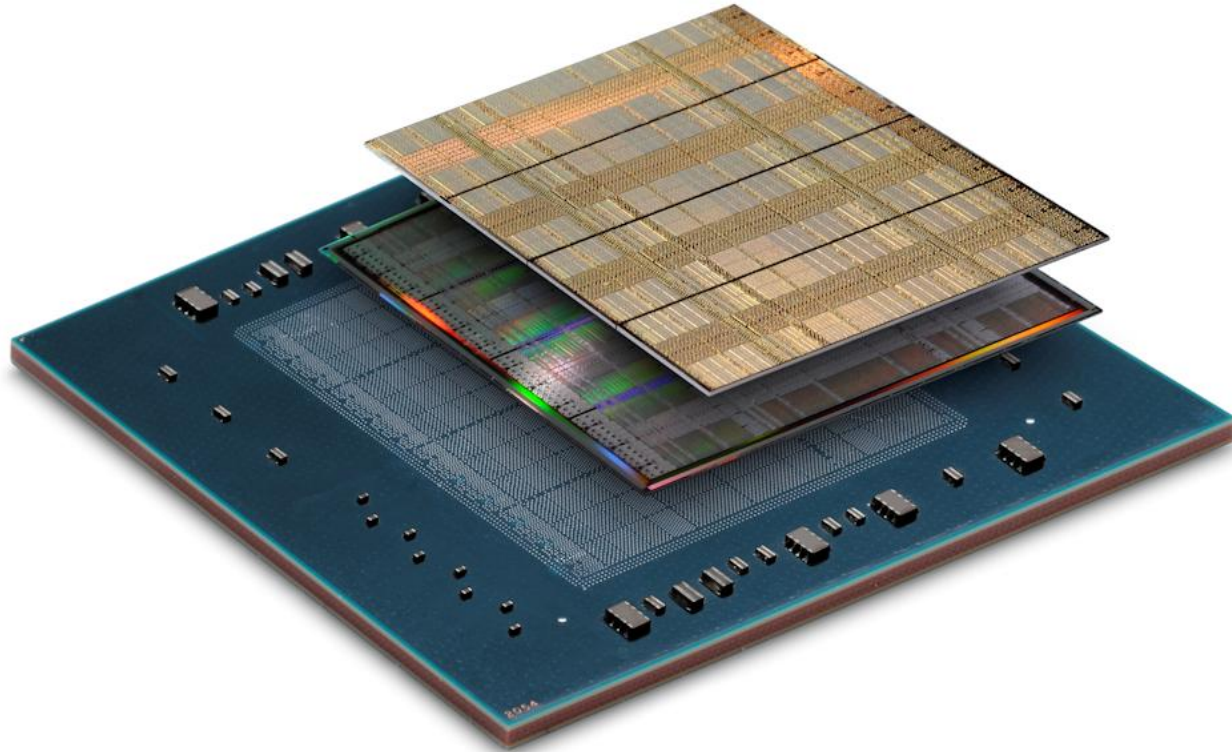
<http://www.flipchips.com/tutorial71.html>

# 3D Circa 2011: Micron Hybrid Memory Cube



<http://www.flipchips.com/tutorial71.html>

# 3D Circa 2011: Xilinx Virtex-7 2000T



<http://www.flipchips.com/tutorial71.html>

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