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Q1 2014

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Volume 4 Number 1

IC MANUFACTURING FOR A SMART WORLD

www.towerjazz.com/newsletters.html



Message from CEO

Russell Ellwanger

Equatorial paradox is an economic principle that correlates the economic growth of a nation to its distance from the equator. The basic premise is that if a person can live among nature, sleep in a hammock under the stars and eat mangos as they fall from trees 365 days a year, there is little drive for development. In contrast, if a person lives in an area with a four month growing season and must create shelter, preserve food, and find fuel to survive the biting winter months, there is strong motivation to adapt, plan and innovate.

top photo: NASA Goddard Photo/Creative Commons



The paradox is that as one approaches either pole, there is an asymptotic drop in development. Hence, when life is too easy, there is little motivation to grow and when it is too hard, one loses "hope" to be able to grow.

The paradox in isolation is an oversimplification of all the factors contributing to economic growth of a nation, but thinking about the principle metaphorically and applying it to personal life is interesting. Good friends and caring mentors provide motivation and help create an environment to enable a person to take on challenges and progress. It is also good friends, and living true to one's belief system, that allow one to return to "latitudes of growth" when the occasional, and at times unavoidable, "arctic breezes" begin to be felt.

I was pondering this with respect to TowerJazz as a company. The analogy applies to a great degree, if not fully. As we develop in strong customer partnerships, our customer partners provide us the motivation and many times the mentoring to improve. This includes needed platform feature development, die yield/line yield improvements, planning, logistics, etc. It is not possible in our business to never make a mistake, and sometimes such mistakes become large. However, customer partnerships built out of sincere desire to perform, and based upon open and trustworthy communication and delivery, allow us to return from the "arctic" feelings of mistakes and not only fully recover, but also further improve.

We entered 2014 in a strong position, having realized substantial core business growth, which we expect will continue throughout the year. I believe we are at the most exciting point in our recent history and we will be a different, substantially larger company (with multiple new platform offerings) at the end of 2014 than we were at the onset. We thank our customers for their trust in us as a long-term partner. It is our responsibility and privilege to know our customers, understand their needs and how each of us in our specific functions can best serve these needs. As we continue to make this our sincere focus and grow in friendship with our customers, either through direct or indirect interaction, each of us will gain greater fulfillment from our individual roles, and the company performance will magnify.

We look forward to many more achievements and mutual success with our valued customers throughout 2014!

Upcoming Industry Events



SNUG Silicon Valley
March 24–26, 2014
Santa Clara, CA, USA



GOMAC Tech
March 31–April 3, 2014
Charleston, SC, USA
Booth #111



ChipEx
April 29–30, 2014
Tel Aviv, Israel



GOMAC Tech
April 2, 2014

If you're attending GOMACTech, don't miss the paper, "TowerJazz SiGe BiCMOS for mmWave: Process Technology and Circuit Demonstrations from W-band to 330GHz" presented by Arjun Karroy.

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Technology Offering Focus: Power Management

Need for smarter usage of available power in all electronic devices drives innovative technologies for use in power management ICs

Power Management Integrated Circuits (PMICs) are complex analog circuits with an ability to perform in high power environments while sustaining the high performance necessary in the application. In all aspects of our lives, power is needed and thus there exists the requirement for more efficient processing and delivery of the same. From portable applications like mobile handsets to high power motor drivers, all necessitate intelligent power management techniques and technologies to achieve high efficiencies, ruggedness and the desired footprint. Many of these applications need to utilize different technologies and different flavors of the technologies that are precisely tweaked to the specific application. TowerJazz is dedicated to enabling achievement of the high standards required in power management through its investment in the customized technologies that serve this highly demanding market.

The power management IC market in 2013 was around \$17B worldwide in packaged IC revenue. It is predicted to grow to \$21B worldwide by 2017 in packaged IC revenue. The market for power management ranges from mobile to consumer, industrial, as well

as lighting and automotive applications with a variety of technologies serving those markets. TowerJazz, with its breadth of power platforms, is serving various markets from low voltage (up to 60V) to high voltage (up to 700V) and continues to develop more flavors and deliver higher performance technologies. To some degree, there is a standardization of the platforms. Yet, serving various applications requires flexibility to deliver a variety of flavors of platforms: positive and negative biasing on the same silicon, various isolation techniques for various application needs, and NVM (yFlash) flavors (programming voltages, number or programming cycles), etc.

TowerJazz has developed a customer base on all continents with a range of requirements including automotive. Multiple manufacturing sites in Israel, the US and Japan allow for the flexibility of operational management for the highly demanding power management market.

Power Management Know How

TowerJazz offers comprehensive knowledge of the platform design coupled with application expertise important especially in the space of high currents-high power. Device construction is tilted, tested and qualified for many applications

like highly integrated PMICs, AMOLED drivers, high power switching regulators, high voltage motor drivers, LED drivers and alike.

Modular technology allows flexibility in the design with respect to the footprint and number of layers used: 5V CMOS, 1.8V CMOS, Y-Flash, high voltage module, thick Al or Cu top metals, and a variety of isolation schemes. Modularity exists in all low voltage (up to 60V) and very high voltage platforms (up to 700V).

What's next?

TowerJazz is continuously looking to expand its coverage in serving power management customers. In that effort, TowerJazz is developing a new SOI platform well-suited for applications requiring high isolation, high integration and robustness ideal for industrial, medical and automotive applications. Integration of extensive digital circuitry, precise analog, and high power output devices will be even more possible through this new technology.

For more information on our current and upcoming power management activities, please contact Marijana Vukicevic, Marketing Director at marijana.vukicevic@towerjazz.com.

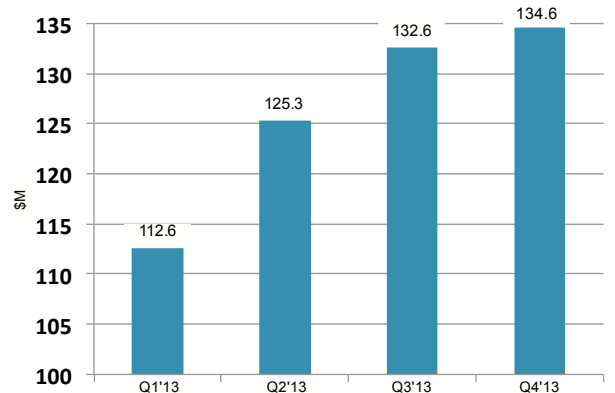
Financial Highlights: Q4 and Full Year 2013

Revenue

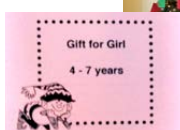
- Continuous Q/Q revenue growth throughout 2013 with \$134.6 million in Q4'13 vs. \$132.6 million in Q3'13 vs. \$125.3M in Q2'13 and vs. \$112.6M in Q1'13
 - Up 20% Q4'13 vs. Q1'13
- Recorded annual revenues of \$505 million, positioned between the three worldwide leading global specialty foundries

Balance Sheet

- Strong balance sheet financial ratios and indicators
- Current ratio improved from 1.8X as of Dec. 31, 2012 to 2.1X as of Dec. 31, 2013
- Cash balance as of Dec. 31, 2013 at \$123 million of cash and deposits, vs. \$133 million as of Dec. 31, 2012



Social Responsibility



OPERATION SANTA CLAUS

TowerJazz is actively involved in many charitable, educational and volunteer programs at its

facilities and in the surrounding areas. Over the holidays, the Newport Beach facility participated in the Angel Tags program and has done so for the past seven to eight years.

During the month of December, a form of giving back to the community was through the Operation Santa Claus program called Angel Tags. This program provides gifts to children who have been abandoned, neglected, or abused, and placed in foster care, as well as low-income seniors and adults with disabilities who are served by the County of Orange Social Services Agency, Health Care Agency, Probation Department, Child Support Services, and Orange County Community Resources.

Angel Tags provide holiday gift suggestions to aid in shopping. The tags are displayed on Christmas trees, or any visible location where employees may be encouraged to select a tag and purchase a gift for a child or senior in need. Gift checks and/or cash or check donations are also accepted to make it easy for those who do not have time to shop for gifts and also the cash is used to purchase special needs items for the toddlers, teens, seniors, and adults with disabilities. This is a way to give employees an opportunity to share or give back to the community. All the donated gifts collected are then turned-in to the County of Orange Social Services for distribution.



Ilan Rabinovich —VP/GM, Customer Support and Mixed-Signal CMOS Business Unit

In this issue, we feature a message from Ilan Rabinovich, who serves as both Vice President/GM, Customer Support and Vice President/GM of the Mixed-Signal CMOS Business Unit. He has served in this role since December of 2009 and previously held other positions within Tower Semiconductor, Israel in various engineering and management positions. Mr. Rabinovich holds a M.Sc. in Physics from Tel Aviv University and a B.Sc. in Physics and Mathematics from Hebrew University, Jerusalem.

Below, Mr. Rabinovich will discuss his role as head of TowerJazz's Customer Support Group; he will share his thoughts and vision for his group as well as highlight their achievements and commitment to their overall goal of providing the utmost in excellent service.

As a leading specialty foundry, excellent customer support is a dominant factor in maintaining global presence and becoming the foundry of choice in the industry. Our company's vision is to become the world leader in specialty foundry solutions as measured by our customers, employees and investors. In many aspects, we are already there, but we still have a lot to do as the company is growing in both revenues and customer base. Being responsible for this service, I enjoy the excellent talent of our Customer Support team which is a key factor in implementing best support practices. In the past few years, the company has significantly increased its global presence not only in Marketing and Sales, but also in R&D centers of excellence and manufacturing sites. This introduced new challenges for a customer support organization, requiring establishment of new work procedures, providing a 24/7 service, facing cultural differences and being able to communicate effectively throughout the organization. In the past year, we have

started to provide service from multiple manufacturing sites to common customers which enjoy our dual source capabilities and rich technology offerings. We have learned to provide an uninterrupted customer support in cases where both TowerJazz's manufacturing and our customer's activity are diversified over countries and continents.

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We have established good alignment and cooperation between our internal teams, along with excellent customer centric mentality

throughout the organization. In order to achieve this goal, we exercised cross-site training and created common practices not only to provide a uniform performance, but also to create the close-to-the-customer environment which enables a quick and effective response to our customers' needs. Our local support teams in Migdal Haemek (Israel), Newport Beach, CA (USA) and Nishiwaki (Japan) include Account Managers (AMs) dealing with engineering and quality issues as well as Customer Operations Managers (COMs) dealing with logistics and operations of our customers' orders. Our success stories are well presented in the appreciation notes and many awards we receive from our customers such as "Foundry of the Year" and "Excellent Supplier."

I am very proud and pleased with the level of expertise, commitment and professionalism of the Customer Support team; we are committed to continue serving our customers in the best way possible.

Getting to Know Us In each issue, we introduce one of our employees who works with our valued customers in some capacity. We delve into their professional roles and responsibilities as well as some details on their home life, hobbies and travels. At TowerJazz, we encourage work-life balance for our employees. We are a large, multi-cultural family and each employee is unique and brings different characteristics and experience. It is our goal to share a bit of our company and employee culture with you. In this issue, we feature Abhijit Joshi.



Abhijit Joshi
Director, Customer Solutions

Abhijit joined the company in 1996 as a Process Engineer in the Diffusion/Thin Film group in the Newport Beach fab, then moved into the Customer Solutions group.

Q: Please tell us about your position, focus areas, etc.

A: I am currently working as Director of Customer Solutions with additional responsibility for revenue management for the Newport Beach site. My group functions as the key interface with our customers. The main focus of our group is to satisfy requests from our customers by closely working with internal resources within TowerJazz. We are also an integral part of our 'order to cash' by managing customer demand and fulfilling this with supply from the fabs. Thus, a key focus of the team is to ensure that we meet our revenue targets by constantly working with our customers and the fabs.

Q: What do you enjoy about your position and what challenges you?

A: First and foremost, I enjoy working with an extremely talented and dedicated team who lives and breathes customer satisfaction. As we are the #1 specialty foundry overall, we have continuously increased our customer base with more than 100 active customers doing business with us. I personally enjoy the challenges that come with interactions with such a diverse group of organizations and individuals. Customers come to us with problems, requests or complaints and it is the ultimate satisfaction when we are able to help them and their confidence in us is redoubled. To me, challenges make life exciting and due to the nature of my position, they are never in short supply, be it an ongoing issue affecting a customer, or an aggressive request for support, or meeting upside revenue targets.

Q: What is your focus this year from a business standpoint?

A: As our customers ramp production in newer technologies such as SOI and SBC18H3, it is critical that we focus on making this an absolutely delightful experience for

them. This will involve working closely with customers as well as internal teams. It is also critical that we focus on making the global manufacturing a success as we require it for future production needs. Finally, from a systems perspective, we will also focus on the end-state definition and implementation of our customer portal 'eBizz' to make it truly a world class experience for our customers!

Q: What are some of your hobbies?

A: I enjoy reading books and I am currently reading a rather large text on the "History of the World" which I hope to finish in the next six months. I also enjoy spending time with my family, especially playing with my children and also watching informative programs with them.

Q: What is your favorite travel destination?

A: From the places I have visited, I enjoyed traveling to Singapore and Israel a lot. Domestically, I would like to visit Alaska and spend some time there, especially the Denali National Park and cross the Arctic Circle. I also enjoy traveling to Yosemite National Park. Finally, my native India is always my favorite destination.



03/20 — TowerJazz Signs Definitive Agreements with Its Existing Institutional Bondholders to Strengthen Its Balance Sheet
[link to PR](#) | [download](#)



03/18 — TowerJazz and Gpixel Announce World's Highest Resolution, 150 Megapixel Full-Frame CMOS Image Sensor
[link to PR](#) | [download](#)



03/13 — TowerJazz Announces First 700V 8" 0.18µm Power Platform at APEC 2014, [link to PR](#) | [download](#)



02/17 — UC Irvine and TowerJazz Present 9-element Fully Integrated W-band Direct-detection-based Receiver at Prestigious IC Design Conference (ISSCC), [link to PR](#) | [download](#)



01/29 — TowerJazz Awarded Five-Year Multi-Million Dollar Foundry Improvement and Sustainability Program in Partnership with US Air Force, [link to PR](#) | [download](#)



01/13 — TowerJazz and MAPS Launch First Resonant Wireless Power Transfer (Rx Chip) for Mobile Devices; New Paradigm Enables Charging at Much Greater Distances, [link to PR](#) | [download](#)



12/20 — TowerJazz Signs Definitive Agreement Creating Joint Venture with Panasonic Corporation to Acquire its 3 Semiconductor Factories in Japan and to Manufacture Panasonic and Additional Products, [download](#)

Featured News



Israel's TowerJazz, Panasonic in joint venture for Japan chip plants

Israeli chipmaker TowerJazz (TSEM.O) will create a joint venture with Panasonic Corp (6752.T) to manufacture Panasonic's chips for cars and digital products, a move expected to boost TowerJazz's revenue by 65 percent. Panasonic will transfer its three semiconductor factories in Japan to the joint venture, which will be held 51 percent by TowerJazz (TSEM.TA), the companies said on Friday. Panasonic, which is wrapping up a multi-billion-dollar restructuring, has committed to acquiring its products from the joint venture for at least five years.

"From day one this joint venture, of which we are the majority shareholder, will provide us with \$400 million of annual profitable revenue," TowerJazz Chief Executive Russell Ellwanger told Reuters. "On top of that there is substantial added capacity available in those manufacturing facilities beyond the agreement with Panasonic."

<http://www.reuters.com/article/2013/12/20/us-towerjazz-panasonic-idUSBRE9BJ08E20131220>



Tower signs deal with Shanghai hub

TowerJazz has signed a memorandum of understanding to provide access to its foundry through the Shanghai IC Technology & Industry Promotion Center (Shanghai ICC), a non-profit group formed by the Chinese government to help grow China's emerging IC companies. Shanghai ICC, approved by China's ministry of science and technology, provides EDA and testing services to local companies and organizes multiproject wafer runs. Through the partnership Shanghai ICC's customers will be supported in the use of Tower's mixed-signal CMOS and power technologies, thereby increasing TowerJazz sales in China.

http://www.analog-eetimes.com/en/tower-signs-deal-with-shanghai-hub.html?cmp_id=7&news_id=222905995



UC Irvine and TowerJazz present 9-element fully integrated W-band direct-detection-based receiver

Specialty foundry TowerJazz says that, at the IEEE International Solid-State Circuits Conference (ISSCC 2014) in San Francisco (9–13 February), researchers from the University of California, Irvine's (UCI's) Nanoscale Communication Integrated Circuits (NCIC) Labs presented results from an integrated circuit operating in the W-band (75-110GHz) comprising a 9-element fully integrated direct-detection-based receiver (RX) array (fabricated in TowerJazz's 0.18µm SiGe BiCMOS process). The fully integrated receiver uses a new concept—spatial-overlapping super-pixels—for millimeter-wave (MMW) imaging applications (used for concealed-weapon detection, airplane navigation in low-visibility conditions, and satellite surveillance).

http://www.semiconductor-today.com/news_items/2014/FEB/UCI-TOWERJAZZ_170214.shtml



TowerJazz and MAPS Launch First Resonant Wireless Power Transfer (Rx Chip) for Mobile Devices; New Paradigm Enables Charging at Much Greater Distances

TowerJazz and MAPS Inc. announced collaboration on the launch of the first resonant wireless power transfer (WPT) receiver Chip(Rx) for mobile products which integrates high efficiency full active rectifier (FAR) technology and enables wireless charging at a distance which is cutting-edge in the market. Wireless charging is a breakthrough in the mobile communications and computing devices infrastructure arena. MAPS expects mass production to begin in Q2 2014, targeting the giant mobile, portable and computing market in Korea as well as worldwide. Korea's mobile market is one of the strongest in the world. MAPS, as a local fabless company, has a high potential to be dominant in the wireless charging market as the trend moves from inductive to resonant. Pike Research estimates that worldwide revenues from wireless power devices will exceed \$15B by 2020, and that systems based on highly resonant wireless power transfer will account for more than 80% of the total market.

<http://online.wsj.com/article/PR-CO-20140113-901382.html>



TowerJazz Snags Big Contract with U.S. Air Force Five-Year Deal to Boost Infrared Sensor Research

Inside Tower Semiconductor's North American subsidiary, Jazz Semiconductor Inc., its 120,000-square-foot factory annually churns out about 290,000 wafers—the foundation for chips designed by commercial, industrial and military customers. The defense industry accounts for about 10% of the company's annual sales of about \$500 million. Revenue from that segment is expected to increase in the coming years, thanks to a recent partnership with the U.S. Air Force. The company was awarded a \$5 million foundry improvement and sustainability program that aims to boost research and development efforts in a specialized area of military applications: infrared sensors.