Last Word: Who the heck is Balda?

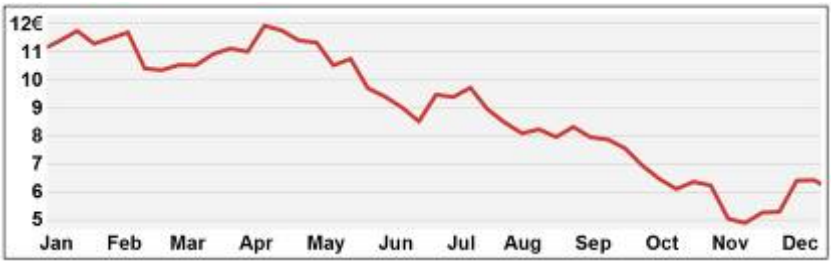
by Geoff Walker

Geoff Walker, associate editor for Veritas et Visus, is the principal consultant at Walker Mobile, LLC. Based in Silicon Valley, Geoff writes about and consults on the technical marketing of touch screens, displays and mobile computers. He can be reached at geoff@veritasetvisus.com.

With the shipment of the Apple iPhone on June 29, 2007, Balda leapt into prominence as the finally-revealed supplier of the iPhone's touch screen. But who the heck is Balda? They're unknown in the touch-screen business, so why would Apple select them as the supplier for one of the most critical components of the iPhone? This article attempts to answer those questions, based mostly on source material from the Balda website.

About Balda AG: Balda AG (http://www.balda.de) is a 100-year old German company that started out as a producer of high-quality cameras. In 1994, they refocused the entire company on supplying high-performance plastics to the mobile communications, automotive and medical technology markets. In 1998 Balda entered the mobile phone business; they currently supply "up to 25 precision components made of high-performance plastic" such as phone and headset housings to mobile phone suppliers such as Nokia, Sony Ericsson and Motorola.

2006 was a difficult year for Balda; on revenues of €371M ($506M) they had a net loss of €42M ($57M). As a result they sold five of their German factories and laid off around 1,500 (~60%) of their German workforce. Their poor performance was the result of several factors, including (1) the bankruptcy of the mobile phone business that BenQ had purchased from Siemens only 12 months before (Balda was supplying components to BenQ); (2) the accelerated movement of mobile phone production from Europe to Asia; (3) rapidly declining revenues from Balda's factory in Brazil due to Nokia moving their production from Brazil to Mexico as a result of a revaluation of Brazil's currency, and (4) intense price competition in Europe. With regard to the last point, in a press release issued 9/26/06, Balda said, *"The company cannot entirely absorb the pressure on prices from customers in the mobile phone market. This pressure is so intense that while the global market for mobile phones has grown in volume, it has in fact shrunk in [revenue] terms."* Sounds like business as usual for the hardware industry, doesn't it? As a result, Balda stock lost around 40% of its value during 2006:

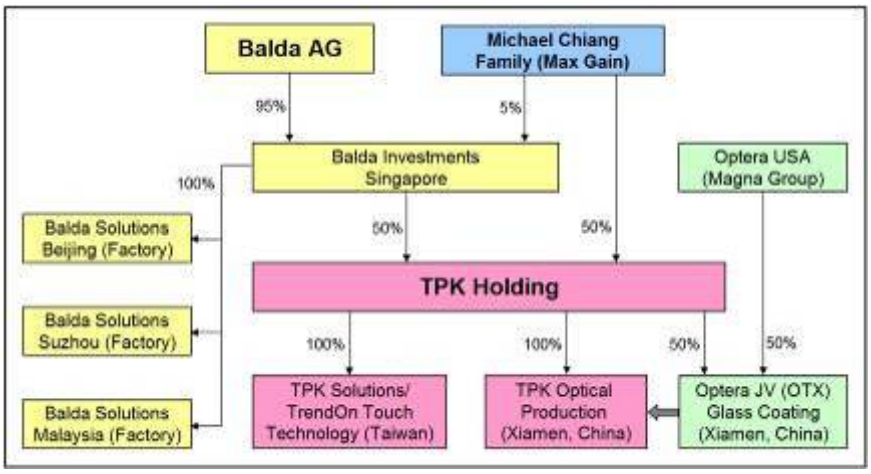


Source: Balda 2006 Annual Report

Simultaneously in 2006, Balda expanded their factories in Malaysia and China, opened a joint-venture factory in India, and bought 50% of a Taiwanese touch-screen company, TPK Holding. Buying half of TPK Holding was part of Balda's technology diversification strategy; it's how Balda entered the touch-screen business. In a press release announcing the move, Balda said, *"The company is thus taking the step from a previously regional, highly-specialized manufacturer of components made of high-performance plastics, to a global high-technology business making sophisticated electronics for touch sensors"*. Balda now claims to be the only company offering both plastics and touch screens from a single source.

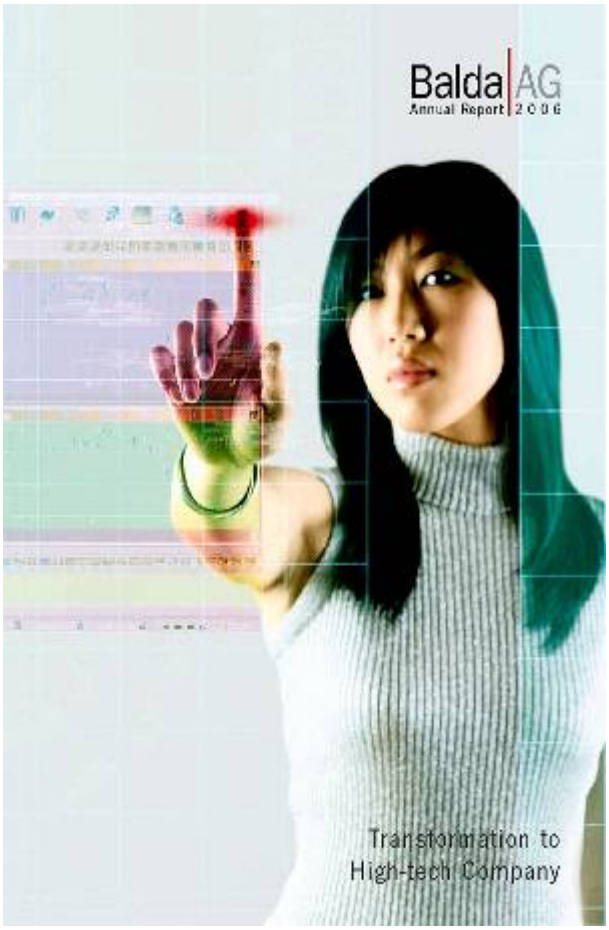
About TPK: TPK was founded in 2005 by Michael Chiang, originally a Taiwanese engineer and now an entrepreneur. As shown in the figure on the next page, TPK consists of two main groups. TPK Optical Production is a newly-constructed, 678,000-square-foot factory in Xiamen, China (see photo below), while TPK Solutions (http://www.tpksolutions.com.tw), also known as TrendOn Touch Technology (http://www.trendon.com.tw), is

TPK's headquarters and engineering organization in Taiwan. Both components are under TPK Holding, the entity in which Balda purchased a 50% share (the other 50% is owned by the Michael Chiang family, identified in some Balda documents as "Max Gain"). In addition, TPK Holding has a joint venture with US-based Optera (http://www.optera.com), one of the world's leading glass ITO-coating firms. Optera is a subsidiary of the $25B Magna Group (http://www.magna.com), one of the world's largest automotive suppliers. The joint venture, Optera Technology Xiamen, Ltd. (OTX), is co-located with TPK's Xiamen factory. In the context of the iPhone touch screen, the value of the joint venture as a supplier to TPK is immediately obvious.



Adapted from "Welcome to Balda" presentation on Balda's website

TPK's new factory in Xiamen, China



Source: Balda 2006 Annual Report

Did you catch the fact that TPK was founded in 2005? That's right; it's a very new touch-screen sensor company! However, Balda points out in their public material that *"a large number of TPK's management has over 15 years of experience in the finishing of large-format touch screens"*. In addition, Balda states that *"for 20 years, the business family of Michael Chiang has, through one of its firms, been the producer of high-quality electronics components [such as] monitors and LCD displays for the computer industry. For five years, the company has additionally produced large-sized touch screens [of] 12 to 21 inches… In 2006, the company is expected to attain [revenues] of approximately $180M USD."* Note that "the company" here is not TPK, but instead, one of Michael Chiang's family's other firms. Some bloggers and media reporters wrote that TPK's 2006 revenue was $180M; in light of the fact that it was founded in 2005, that seems extremely unlikely.

TPK is focused on touch screens in the range of 2 to 8-inches, targeted primarily at "handheld devices, PDAs and mobile phones". However, Balda's press releases point out that *"TPK is nevertheless able to produce touch displays up to a size of 42 inches"* (the emphasis is mine). TPK made and delivered its first touch screen sensor in

the third quarter of 2006, after *"1-2 years of development work [in Taiwan] on touch sensors"*. TPK's 2006 revenue contribution to Balda's P&L was €4.3M ($5.9M). At the end of 2006, TPK had around 800 employees engaged in developing and producing *"all the conventional market technologies of touch sensors, including resistive and capacitive"*. TPK's production capacity is planned to be 35 million mobile phone touch screens by the end of 2007; this assumes that a planned expansion worth approximately €40-45M ($55-$61M) takes place during 2007.

Balda's expectations for TPK: According to their 2006 annual report, Balda's total 2007 revenue is expected to be €600-650M ($819-$887M). This is roughly a 170% increase over 2006, due almost entirely to the TPK purchase. 80% of the revenue is expected to be from Asian production, split 50-50 between plastics (what Balda calls their "Infocom Division") and touch screens. That works out to around $340M revenue from TPK's touch screens in 2007. Does that sound plausible? I don't think so!

Total worldwide touch sensor revenue (without controllers) in 2007 is forecasted to be somewhere between $1B and $1.5B (this is approximated from data in the recently published VDC and iSuppli touch market forecasts). Assuming that the $1.5B figure is closer to reality, $340M represents a 23% share of the total 2007 touch sensor market. Both the revenue and share figures seem impossibly large for the first full revenue year of a start-up company. ISuppli's forecasted worldwide 2007 revenue for projected-capacitive touch technology (sensor and controller combined) is $132M, which seems much more reasonable.

Looking at revenue from a product point of view, Apple's own target for the iPhone is 10 million units by the end of 2008. Analysts' estimates for Apple's 2007 sales range from 2 to 6 million units – for example, iSuppli predicts shipments of 4.5 million units in 2007. If Apple sells 2.5 million units in 2007 and experiences a 30% growth in each half of 2008, total sales will be their target 10 million. Using iSuppli's $27 cost estimate for the iPhone touch screen, 2.5 million units represents $68M revenue for TPK. Even if TPK has another big customer of equal size on the hook, that's still only $135M – a long way from $340M! It's hard for me to see why Balda isn't heading for another year of missed targets.

It's possible that TPK has some other significant sources of revenue, but as a start-up company that produced its very first product in Q3'06, it seems very unlikely. Balda's 2006 annual report makes it clear that Balda is *"[counting] on a rapid growth of integration of touch screens in mobile telephones"*. Balda quotes forecasts from Strategy Analytics (http://www.strategyanalytics.com, a US market research firm) which project that 115 million mobile phones will include capacitive touch screens by the end of 2008, and that 40% of all mobile phones will do so by the end of 2012. iSuppli's estimate for the number of mobile phones with touch screens in 2006 is 38 million – 100% of which are resistive, and relatively few of which are visible in the North American market.

There's at least one other possibility, namely that TPK's revenues could include the cost of the iPhone's LCD. While there's no indication of this in any of Balda's documents, if this is the case it would roughly double the numbers above. According to iSuppli's teardown estimate, the iPhone's LCD (supplied by Epson, Sharp and/or TMD) costs about $24. Revenue for 2.5M units would therefore be $128M; doubling that to account for other customers yields $255M – closer to $340M USD, but still no cigar.

Why Apple chose Balda: My opinion is that Apple chose Balda as their projected-capacitive touch screen manufacturer because nobody else was even close to having the necessary production capacity. With a committed production capacity of 30 million units by the end of 2007 (equivalent to $600M revenue at an ASP of $20), Balda/TPK is more than an order of magnitude larger than any current projected-capacitive manufacturer. The table below lists all current manufacturers of transparent projected-capacitive sensors (other than TPK), along with my estimates of their projected-capacitive 2006 revenue and my comments on each company.

Company	Projected Capacitive Revenues (2006 est.)	Author's Comment
3M	$1 million	3M cancelled both of their projected capacitive products (Near Field Imaging & Intelligent Surface Technology) in 2006; Flex Capacitive (launched 5/07) is too little, too late for Apple
Elo TouchSystems	$1 million	Elo resells Zytronic's projected-capacitive product; Elo has no standard products smaller than 6-inch in any touch technology
N-trig	$0 million	Focused on supplying dual-mode pen-and-touch projected-capacitive sensors to Tablet PC OEMs; no revenue in 2006
Synaptics	$1 million	Supplies the projected-capacitive sensor used in LG's KE850 "Prada" smartphone (shipped 3/07), but production capacity is probably insufficient for Apple's needs
Touch International	$5 million	"ExtremeTouch" is very similar to TPK's sensor technology, but production capacity is probably insufficient for Apple's needs
TouchKO	$1 million	Focused on sensors for larger displays; very limited production capacity; purchased by Wacom 6/07
Visual Planet	$2 million	Focused on 30-inch and larger sensors in interactive digital signage applications
Zytronic	$12 million	Focused on making sensors with 10-micron wire rather than transparent ITO conductors; no Asian production capability

What about the controller? The media seems to have focused mostly on the iPhone's touch-screen sensor, which at iSuppli's $27 estimated cost is quite an expensive little piece of ITO-coated glass or film. Admittedly, this cost includes the expense of optically bonding (or "laminating", as Balda terms it) the sensor to the LCD and to the cover glass. But a sensor is useless without a controller, and particularly so in this case, since the controller implements multi-touch. The sensor is just a dumb X-Y grid of transparent ITO conductors. (If you turn your iPhone off and look at it under a 5x or 10x magnifier using light reflected from the surface of the screen, you can clearly see the conductor grid. The grid mostly disappears when the screen is on.)

Broadcom (http://www.broadcom.com), a $3.7B fabless semiconductor company, provides both the graphics controller and the touch screen controller for the iPhone combined in a single proprietary chip. The former is probably based on one of Broadcom's standard mobile phone products; the latter is undoubtedly unique to Apple. At this point in time it's unknown how the development of the touch-screen controller was split between Apple, Broadcom and TPK, but my bet is that most of the critical code (e.g., DSP code that processes multiple touches) was developed by and remains the property of Apple.

Conclusions: Balda isn't really the iPhone's touch screen manufacturer; it's actually TPK. And since TPK is a private company, it's very difficult to get any information about them other than through Balda. Balda is making a very large bet on what seems to be an extremely aggressive growth target for touch screens in mobile phones, so they'll get the kudos or criticisms when the results of the bet are known in the first quarter of 2008. But it's TPK who's doing all the heavy lifting – Balda's just supplying capital.

Regardless of the outcome of Balda's bet, the emergence of projected capacitive as a practical alternative to resistive technology in mobile devices is likely to have a substantial effect on the overall touch-screen market. With TPK, Synaptics, and 3M as the top three potential major players in projected capacitive, there's more than enough sensor production capacity to meet any possible market demand. Widespread adoption requires reducing the cost well below the current (estimated) $27, but that always comes with volume and experience.

However, who will supply the controllers for those sensors is much less clear. Synaptics clearly has the IP and experience to supply whatever is needed to projected-capacitive customers (including two-point multi-touch, which is supported in their latest version of ClearPad). Broadcom may not have sufficient IP of their own to supply projected-capacitive touch-screen controllers to customers other than TPK. Finally, according to 3M's "Flex Capacitive" sensor product announcement at SID 2007, 3M plans to leave the controller sourcing up to their (future) mobile phone OEM customers. 3M doesn't seem to be thinking clearly about multi-touch.

The bottom line is that while Balda has purchased half of what appears to be a powerful production operation for projected-capacitive touch sensors in mobile devices, they seem to have little ability to provide a controller, which could turn out to be the limiting factor on market growth.

For more information on how the iPhone's touch screen works, see the following articles by the author:
"The Impact of the Apple iPhone on the Touch-Panel Industry" (SID *Information Display*, 5/07)
"Touch and the Apple iPhone" (Veritas et Visus *Touch Panel*, 2/07)