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A Serious Case Of the Shorts

By Gina Roos

Electronic Buyers' News

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Cap makers report lengthening lead times, rising prices.

Strong OEM demand is stretching lead times for capacitors to 20 weeks or more, and manufacturers have placed some parts on allocation, market trackers report. As a result, prices of some ceramic and tantalum capacitors are moving upward, and most cap makers are adding production capacity. At the same time, OEMs are scrambling for replacements.

Capacitor suppliers say that last year, accelerated demand in the cell-phone market caught them by surprise. Combined with skyrocketing demand among other wireless-communication manufacturers and the Internet-backbone infrastructure sectors, capacitor vendors suddenly found themselves with insufficient product.

“There's a general shortage of all tan-talum and multilayer ceramic capacitors [MLCCs], which is more acute in the newer, smaller sizes,” said Glyndwr Smith, assistant to the chief executive and senior vice president at Vishay Intertechnology Inc., Malvern, Pa.

The parts shortage is expected to last until the third quarter of this year, when additional capacity will come on line, according to capacitor makers.

“Our best picture of the current situation shows that there won't be an easing of [the supply crunch] until October,” said John Denslinger, vice president at Murata Electronics North America Inc., Smyrna, Ga.

There are no real signs of immediate change, agreed Jim Wright, director of the technical product marketing group at [NIC Components Corp.](#), Melville, N.Y. “Demand is strong. Semiconductor-growth expectations are almost double-digit for the next year, so the demand for passives, which follows semiconductors, is going up also,” he said.

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Several factors, in addition to the cell-phone explosion, have contributed to the shortages, which began to surface last March. First, average selling prices had been driven so low that capacitor makers were reluctant to add capacity. Second, new, beefed-up microprocessors require many more passive devices than their forebears. (The passives count for the Pentium III is nearly 440, up from 124 passives for the Intel 486, according to Vishay.)

Sandy Beck, vice president of worldwide marketing at Kemet Electronics Corp., Greenville, S.C., believes that a renewed Asian economy, accompanied by accelerated demand for handheld products, has also helped fuel demand for ceramic and tantalum capacitors.

Murata's Denslinger notes that demand has exploded across a number of segments, including wireless, automotive, and computers and peripherals. "Everyone underestimated actual market demand by a substantial amount," he said.

Two markets have been fueling the global capacitor shortage-mobile and PC-according to Robert Galli, product marketing manager at Panasonic Industrial Co.'s Electronic Components Group, Secaucus, N.J.

Worldwide mobile production increased to 224 million units last year, from 172 million the previous year, and has expanded to more than 340 million this year. Worldwide PC production increased from 90 million units in 1998 to 110 million in 1999, and is expected to reach 120 million this year, Galli said.

Leery of adding capacity

By last year's third quarter, it was clear to capacitor makers that there was robust demand for their products. But although they began to report tightening supplies, they were still reluctant to add a significant amount of production capacity.

The reason? They've been burned before.

Four years ago, "a dramatic increase in demand for tantalum caps created a shortage of these products, causing OEMs to convert to high-capacitance MLCCs," said Willie King, director of product marketing at AVX Corp., Myrtle Beach, S.C. "And ceramic- and tantalum-cap manufacturers started to put significant amounts of production capacity into place.

"When capacity came on line about one to two years later, there was an overabundance of capacity," King said. "[But] what the suppliers soon found out was that some OEMs falsified their demand by about three to four times what they needed. The result: a huge rise in production capacity with low demand."

Some capacitor suppliers also suspected at the time that buyers were resorting to double ordering to secure a steady supply of parts. However, based on January 2000 bookings, most cap makers report little or no evidence of double ordering this time around.

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Discussions with a number of customers and distributors, according to Denslinger, indicate that there's some double ordering, but that "it's quite minimal."

Said Vishay's Smith: "There was some concern that after Y2K, we might see cancellations or corrections in January, but we haven't seen a thing. We're looking forward to 2000 with a high confidence level of continuing demand for passive components."

Mike Tanahashi, strategic planning manager at Taiyo Yuden (USA) Inc., San Jose, heard rumors of double ordering in the range of 30%. "If that were the case, we would see some significant drop in January's orders, but we haven't seen anything," he said.

Other cap makers remain skeptical.

"I'm sure [double ordering] is going on," Kemet's Beck said. "We're destined to face this kind of volatility and cyclicity on an ongoing basis from here on out," he said. "And how smart we are as an industry in recognizing that pattern and developing a different [business] model to deal with it remains to be seen. Clearly, the model that the industry lived under throughout the 1980s to the mid-1990s will not work in this kind of environment."

Hard-to-find parts

Initially, the parts shortages were limited to the smaller A- and B-case tantalum caps, but this has now spilled over to the larger C, D, and E sizes. Ceramic caps in 0402 and 0603 packages are in severely short supply, as are high-capacitance MLCCs in larger 0805 and 1206 packages.

"The mobile sector primarily contributes to the shortage of A- and B-case sizes, and the PC market for C- and D-case sizes," Panasonic's Galli said.

For MLCCs, the mobile market contributes to the shortage of 0201 and 0402 sizes, and the PC market to that of higher-capacitance, 1-mF and higher X7R/Y5V dielectrics, he said.

In general, MLCCs and tantalum caps in greatest demand include 4.7-, 10-, and 22-mF devices.

The most difficult parts to obtain are tantalum caps in the smaller A- and B-case sizes in common 10-mF values, NIC's Wright said. On the ceramic side, customers are looking for values from 1 to 10 mF, and even as high as 22uF to replace tantalum capacitors, he added.

In many instances, lead times for high-capacitance ceramic parts are stretching, as some OEMs convert from tantalum caps to high-value, higher-priced 22-mF MLCCs. This conversion has also affected lead times of commodity parts, as capacitor makers shift more of their production to MLCCs.

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In today's environment, lead times are quoted on a case-by-case basis. Most capacitor makers are allocating supply to core strategic accounts, including distributors, and aren't accepting new customers. Instead, they are directing them to distributors.

In an effort to protect key customers, AVX has placed its tantalum caps on allocation.

“Everyone gets a certain amount of tantalum caps based on their projections [of] demand and what we're able to supply them,” King said.

NIC is quoting lead times of 20 weeks or more for tantalum devices and 0402 MLCCs. Six months ago, the company's lead times ranged between eight and 12 weeks for both.

Prices move upward

Strong demand has put a halt to price erosion. Some capacitor manufacturers have increased prices by between 6% and 10% for tantalum caps, and have slightly raised or maintained firm prices of MLCCs. The two primary reasons, suppliers say, are to recoup margins lost in the past several years through price cuts and to expand capacity.

“After three years of significant price erosion, cap suppliers are just trying to get back to a sense of reality,” King said. “Prices have stabilized for ceramic caps for now because suppliers can bring on production capacity faster than for tantalum caps, and there's a greater number of competitors,” he said.

Today's parts shortages can be traced in large part to capacitor manufacturers' lack of investment in capacity as a result of depressed demand and extreme margin erosion before 1999, according to the suppliers.

“Many cap suppliers lost money or weren't making money due to the severe price erosion that has taken place over the past three years, which certainly altered and minimized their investment in production capacity,” Murata's Denslinger said.

Only recently have capacitor makers decided to reinvest in capacity, and there's a significant stretch-out of lead times associated with that, Kemet's Beck said.

Like many capacitor vendors, Kemet didn't respond to the increased demand until late 1999, when the company invested in a new facility in Mexico and, more recently, ordered new equipment for it. Kemet has placed its ceramic and tantalum lines on allocation. Before March 1999, Kemet was quoting lead times of six weeks.

AVX plans to add capacity for both ceramic and tantalum caps. The company last year opened a tantalum-capacitor plant in the Czech Republic.

“[But] instead of adding capacity blindly like we did five years ago, we sat down with our key customers, including distributors, to evaluate their true demand and to plan accordingly,” King said.

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Shared risk is part of the arrangement. “The true spirit of partnership is collaborative thinking, mutual decisions, and shared risk by both sides,” he said. “By doing so, we give them a commitment to support them in the future.”

NIC plans to boost capacity for both ceramic and tantalum caps. The company has placed orders for new equipment and is moving to a 24/7 production schedule at its sites in Japan, Taiwan, and Thailand. **NIC** also intends to move some production from Japan to China by the end of the year.

Late last year, Taiyo Yuden invested roughly \$210 million to establish one factory each in Korea and China. The facility in China will produce 0402 MLCCs and chip inductors, and the Korean plant will make high-capacitance MLCCs.

Production at the two plants should start in July of this year, according to Taiyo Yuden, which has also expanded capacity at its Malaysia plant

Murata has an aggressive plan to add capacity the next couple of years, Denslinger said. The company is currently producing about 14 billion pieces per month on a 24/7 worldwide schedule, and has incremental capacity increases scheduled for March and September. Another increase is scheduled for March 2001.

Murata's goal is to increase capacity by 40% during the next year. The bulk of the investment is in the manufacture of 0402 and high-capacitance MLCCs.

The company has decided not to invest in larger package sizes. “We're not making any capital investment into more capacity for 1206 or 0805 packages,” Denslinger said.

Panasonic's new investments center on products such as 0805-size tantalum caps and polymer-tantalum and polymer-aluminum devices. Minimal investments are planned for A, B, C, and D sizes.

Tantalum-capacitor production will increase by 30 million pieces per month toward the end of the year, according to Panasonic. Investments are also earmarked for small-size and high-capacitance MLCCs.

Vishay is concentrating on maximizing current capacity and expects to increase production at its Israel plant by roughly 25%.

Almost all capacitor suppliers anticipate strong growth this year. Market leader Vishay forecasts a 25% increase in unit shipments of both MLCCs and tantalum capacitors. Revenue growth will be 18% for MLCCs and 15% for tantalum caps, the company said.

NIC anticipates gains of 10% to 15% in revenue and 25% in unit shipments.

Murata expects to increase unit sales in North America by 30% this year and 40% in 2001.

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Searching for replacements

OEMs are using alternatives to tantalum and ceramic capacitors for some applications in which an adequate supply is critical.

To help OEMs make the right choice, **NIC** has prepared guidelines spelling out viable substitutes for tantalum capacitors.

Well received by customers as an alternative to tantalum are surface-mount aluminum-electrolytic caps, which closely match tantalum in performance and construction, according to Wright.

“You can get a broad range of [capacitance] values, [SMT aluminum-electrolytic caps] are less expensive, and lead times are very stable,” he said.

NIC is quoting lead times of eight to 12 weeks for surface-mount aluminum-electrolytic capacitors.

“There already exist many cases where surface-mount aluminum caps have replaced tantalum-chip caps,” Panasonic’s Galli said. “Replacements have typically been for new designs or redesigns. Each must be done on a case-by-case basis since each footprint is different and certain electrical specs are not as good.”

Panasonic’s solid-polymer aluminum-electrolytic capacitor has been a very popular replacement for tantalum caps in DC/DC converter applications that require very low ESR and high ripple currents, Galli said.

For high-frequency applications, Panasonic’s ECPU series of submicron film capacitors has replaced tantalum devices, and ECPU surface-mount film has been used to replace low-end, X5R/Y5V dielectric MLCCs, he added.

High-capacitance MLCCs are being used as replacements for tantalum capacitors with long lead times.

“The ceramic cap with values from 1 to 22 mF is becoming maybe a product of choice to replace some of the tantalums,” Murata’s Denslinger said.

Lead times for high-capacitance MLCCs are much more promising than for tantalum caps, he said. Lead times are 52 weeks for tantalum capacitors and 16 to 18 weeks for MLCCs.

Other capacitor makers say they don’t see evidence of widespread substitution. It’s not happening, Kemet’s Beck said.

Vishay’s Smith voiced a similar sentiment. “Based on the specification, ceramic and tantalum capacitors offer the best technical contribution vs. cost, compared to other technologies. We see no major technological breakthroughs to change these reliable dielectrics.”

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